HEATER AND AIR CONDITIONING

SECTION HA

CONTENTS

CONTENTS (Cont'd.)

AUTO

CONTENTS (Cont'd.)

MANUAL AND AUTO

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 for 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 control module, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **BF section** of this Service Manual.

WARNING:

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

Precautions for Working with R-134a

WARNING:

- **CFC-12 (R-12) refrigerant and 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 R-134a A/C system and R-134a components. If lubrication oil other than that specified is used, compressor failure is likely to occur.**
- **The specified 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 lubricant vapor or mist. Exposure may irritate eyes, nose and throat. To remove R-134a from the A/C system, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment) or J2209 (R-134a recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
  - **e: Do not allow lubrication oil to come in contact with styrofoam parts. Damage may result.**

General Refrigerant Precautions

WARNING:

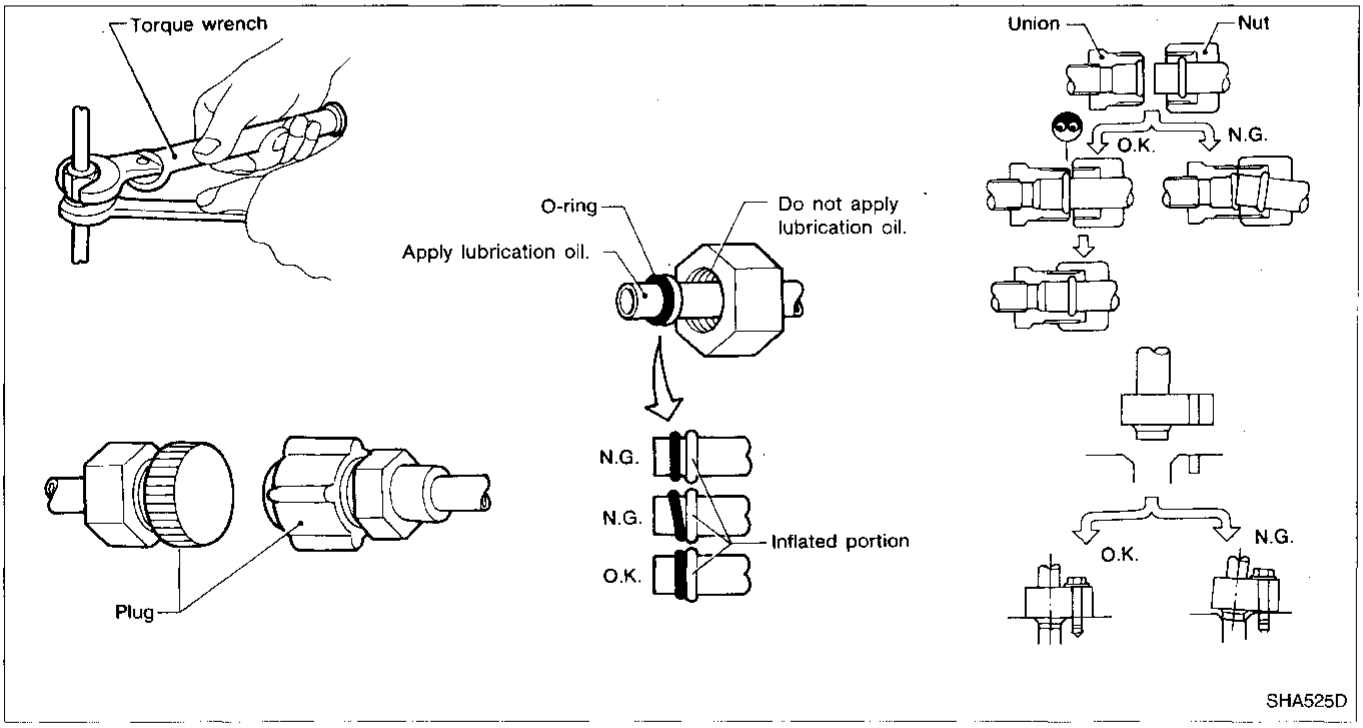
- Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.
- Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.
- Do not store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

Precautions for Refrigerant Connection

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.

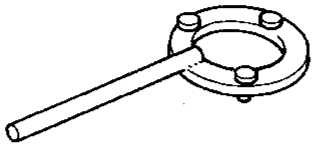
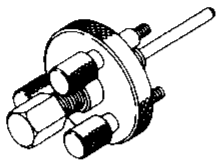
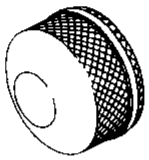
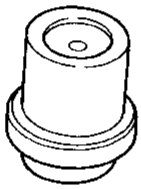
- **Do not leave compressor on its side or upside down for more than 10 minutes, as compressor oil will enter low pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, plug all openings immediately to prevent entrance of dirt and moisture.**
- **When installing an air conditioning 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.**
  Name: Nissan A/C System Oil Type R
  Part No.: KLH00-PAGR0
- **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 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.
- Do not keep the compressor in the upside down position or laid on its side for more than 10 minutes.
- When replacing or repairing 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. Refer to the "Maintenance of Oil Quantity in Compressor", "SERVICE PROCEDURES".
- 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.
- When the compressor magnet clutch has been replaced, be sure to check the magnet clutch for normal operation by applying voltage to the clutch.

Special Service Tools

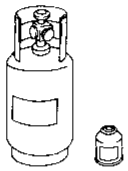
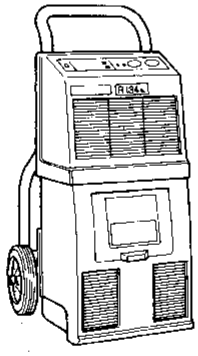
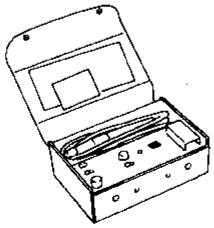
Tool number (Kent-Moore No.) Tool name	Description	Note
KV99231260 (J-38874) Clutch disc wrench		Removing shaft nut and clutch disc
KV99232340 (J-38874) Clutch disc puller		Removing clutch disc
KV99234330 (J-39024) Pulley installer		Installing pulley
KV99233130 (J-39023) Pulley puller		Removing pulley

R-134a Service Tools and Equipment

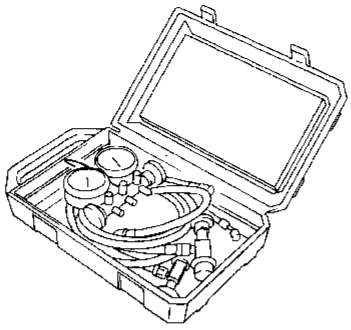
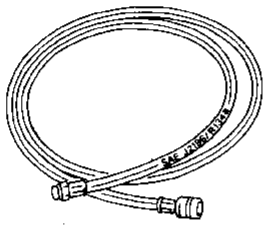
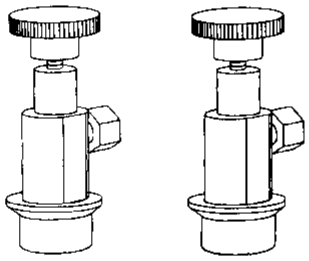
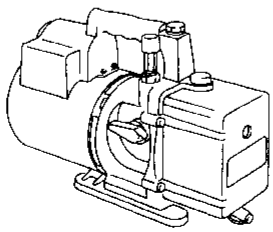
It is important to understand that R-134a refrigerant, and the specified lubrication oil which must be used with R-134a, must never be mixed with CFC-12 (R-12) refrigerant and/or the CFC-12 (R-12) lubrication oil. This means that separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubrication oil.

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

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

Tool number (Kent-Moore No.) Tool name	Description	Note
R-134a refrigerant	 RHA259D	Container color: Light blue Container marking: R-134a Fitting size: Thread size • large container 1/2″-16 ACME
KLH00-PAGR0 (—) Nissan A/C System Oil Type R	 RHA260D	Type: Poly alkyline glycol oil (PAG), type R Application: R-134a vane rotary compressors (Nissan only) Lubricity: 40 mℓ (1.4 US fl oz, 1.4 Imp fl oz)
(J-39500-NI) Recovery/Recycling equipment (ACR4)	 RHA261D	Function: Refrigerant Recovery and Recycling and Recharging
(J-39400) Electronic leak detector	 RHA267D	Power supply: • DC 12 V (Cigarette lighter)

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

Tool number (Kent-Moore No.) Tool name	Description	Note
(J-39183) Manifold gauge set (with hoses and couplers)	 RHA262D	Identification: • The gauge face indicates R-134a. Fitting size: Thread size • 1/2″-16 ACME
Service hoses • High side hose (J-39501-72) • Low side hose (J-39502-72) • Utility hose (J-39476-72)	 RHA263D	Hose color: • Low hose: Blue with black stripe • High hose: Red with black stripe • Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: • 1/2″-16 ACME
Service couplers • High side coupler (J-39500-20) • Low side coupler (J-39500-24)	 RHA264D	Hose fitting to service hose: • M14 x 1.5 fitting (optional) or permanently attached
(J-39650) Refrigerant weight scale	 RHA265D	For measuring of refrigerant Fitting size: Thread size • 1/2″-16 ACME
(J-39649) Vacuum pump (Including the isolator valve)	 RHA266D	Capacity: • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz) Fitting size: Thread size • 1/2″-16 ACME

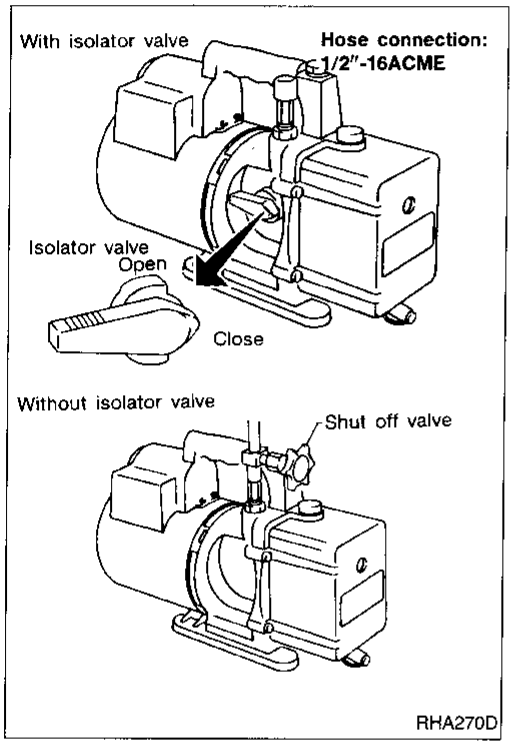
Precautions for Service Equipment

RECOVERY/RECYCLING EQUIPMENT

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

ELECTRONIC LEAK DETECTOR

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



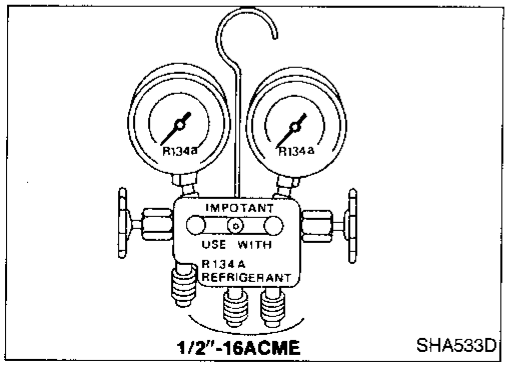
VACUUM PUMP

The lubrication oil contained inside the vacuum pump is not compatible with the specified lubrication oil for 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 lubrication oil 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 lubrication oil 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 lubrication oil: as long as the hose is connected, the valve is open and lubrication oil may migrate.

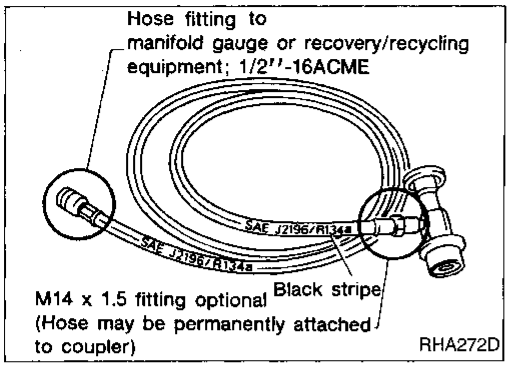
One-way valves which open when vacuum is applied and close under a no vacuum condition are not recommended, because this valve may restrict the pump's ability to pull a deep vacuum.



MANIFOLD GAUGE SET

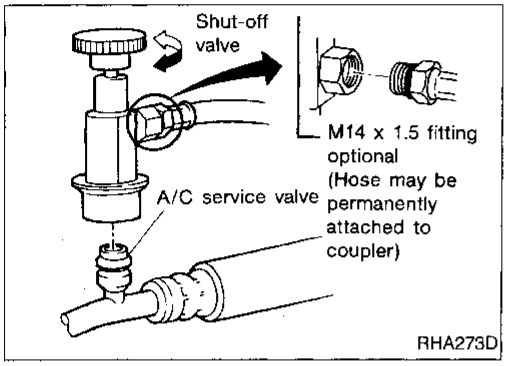
Be certain that the gauge face indicates R-134a or 134a. Be certain that the manifold gauge set has the 1/2"-16 ACME threaded connections for service hoses, and that no refrigerants other than R-134a (along with only specified lubrication oils) have been used with the manifold gauge set.

Precautions for Service Equipment (Cont'd)



SERVICE HOSES

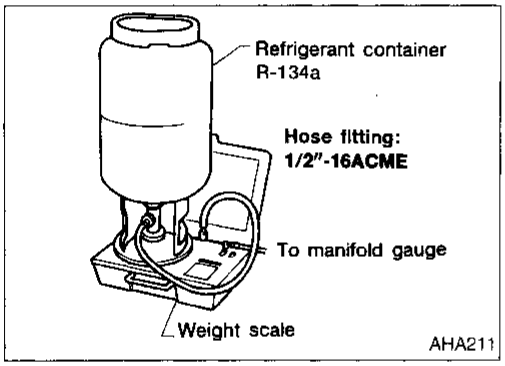
Be certain that the service hoses display the markings described (colored hose with black stripe). Be certain that all hoses include positive shut off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

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

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



REFRIGERANT WEIGHT SCALE

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

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.

Refrigeration Cycle

REFRIGERANT FLOW

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

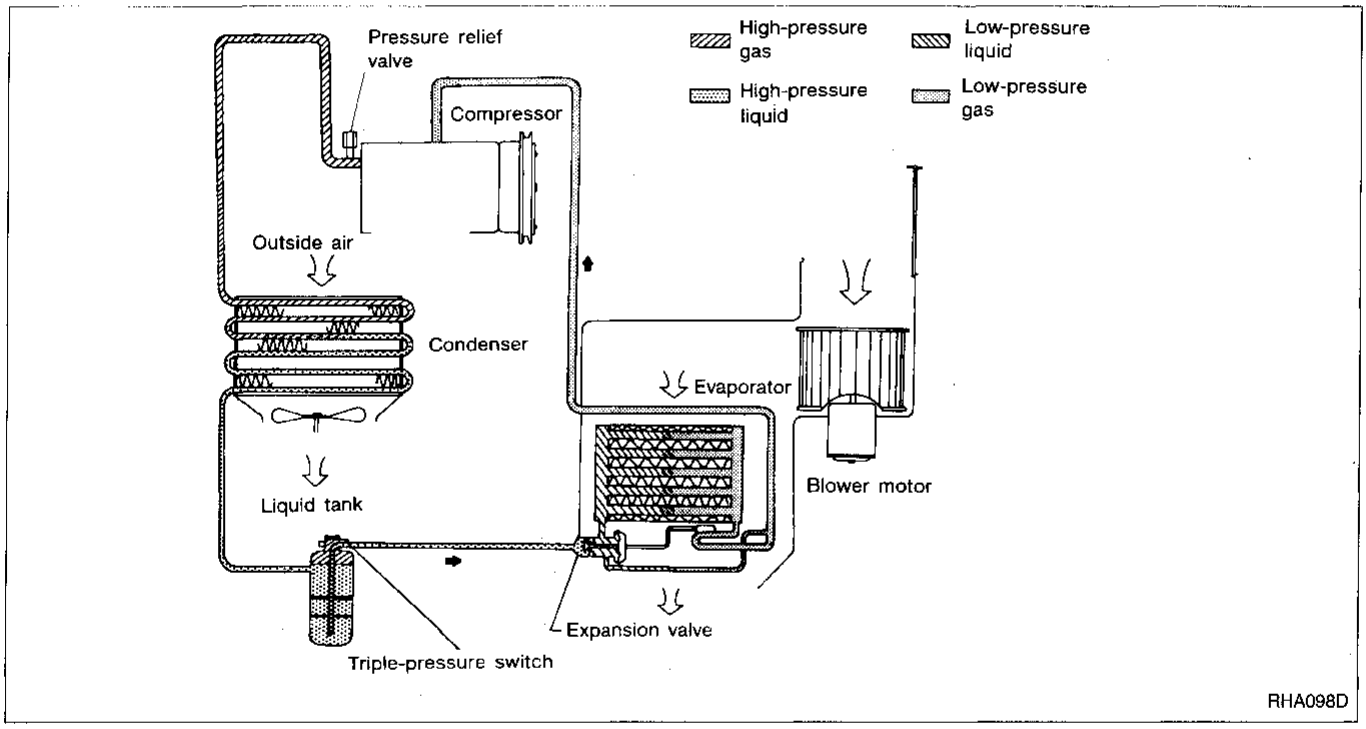
REFRIGERANT SYSTEM PROTECTION

Triple-pressure switch

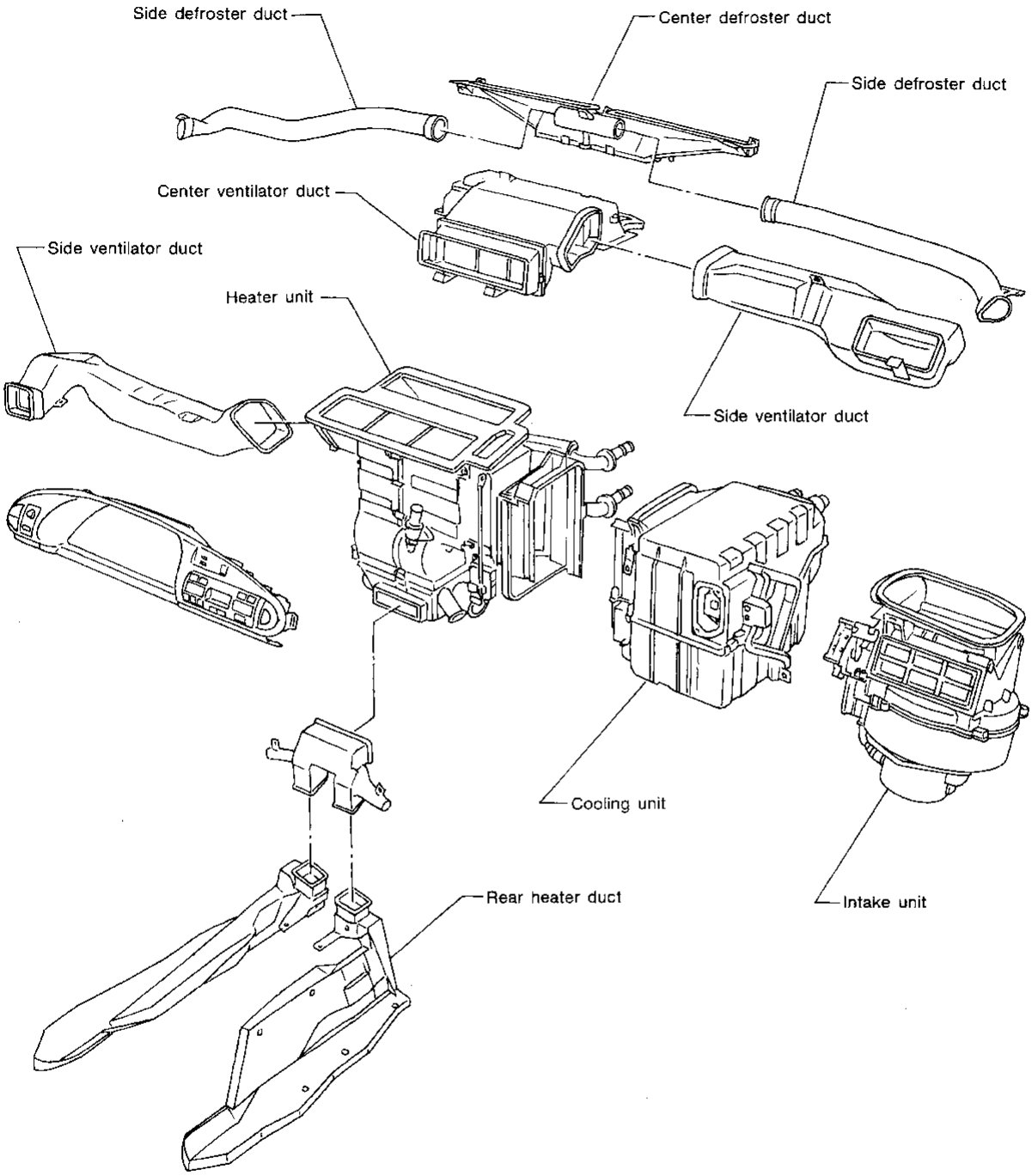
The refrigerant system is protected against excessively high or low pressures by the triple-pressure switch, located on the liquid tank. If the system pressure rises above, or falls below the specifications, the triple-pressure switch opens to interrupt the compressor operation and to operate the cooling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

Pressure relief valve

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



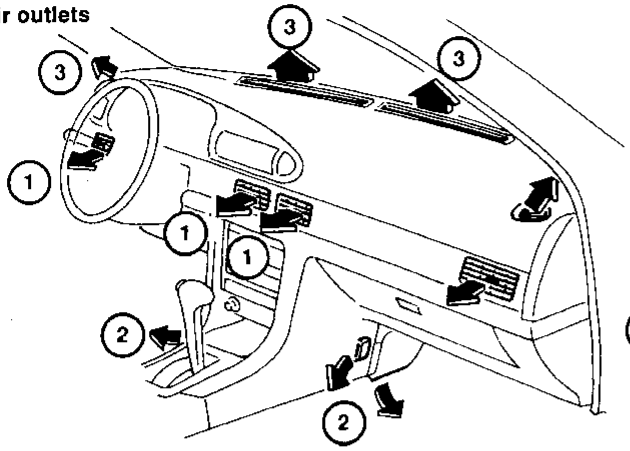
Component Layout



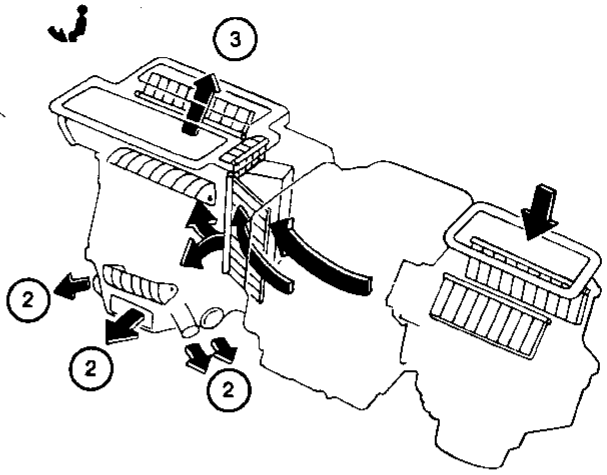
RHA096D

Discharge Air Flow

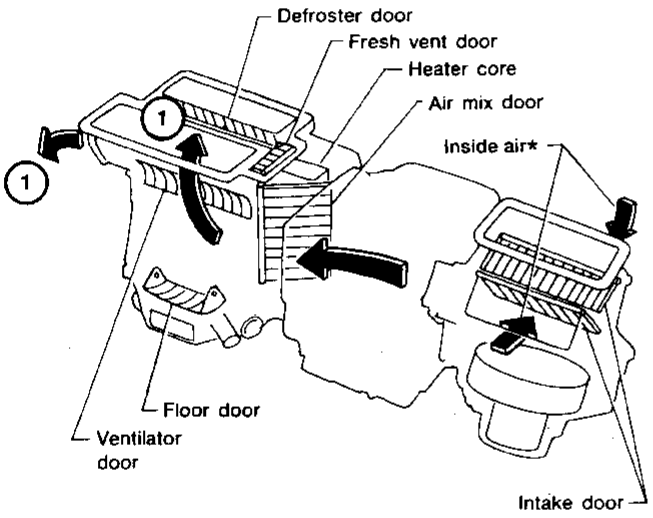
Air outlets



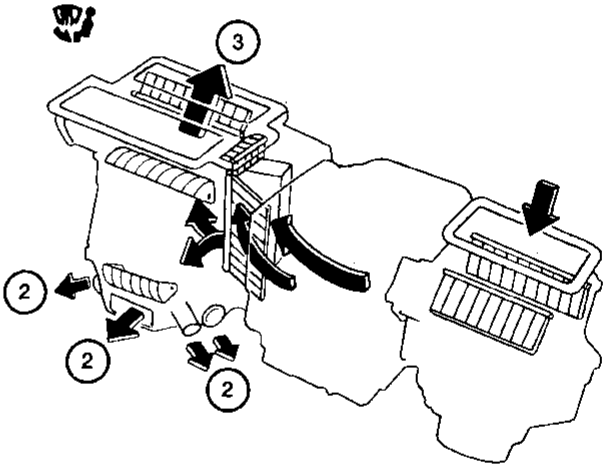
Foot



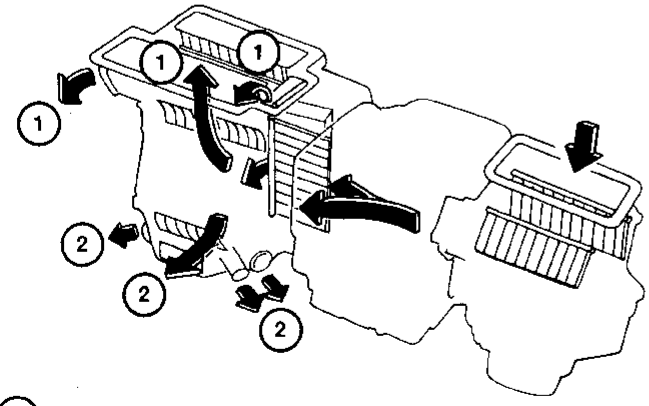
Face



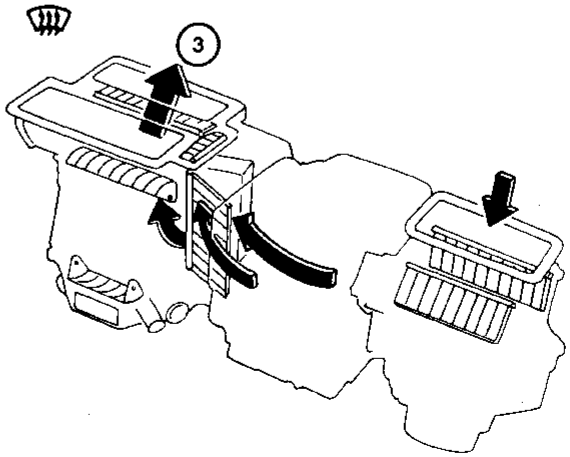
Foot and defroster



Bi-level



Defroster

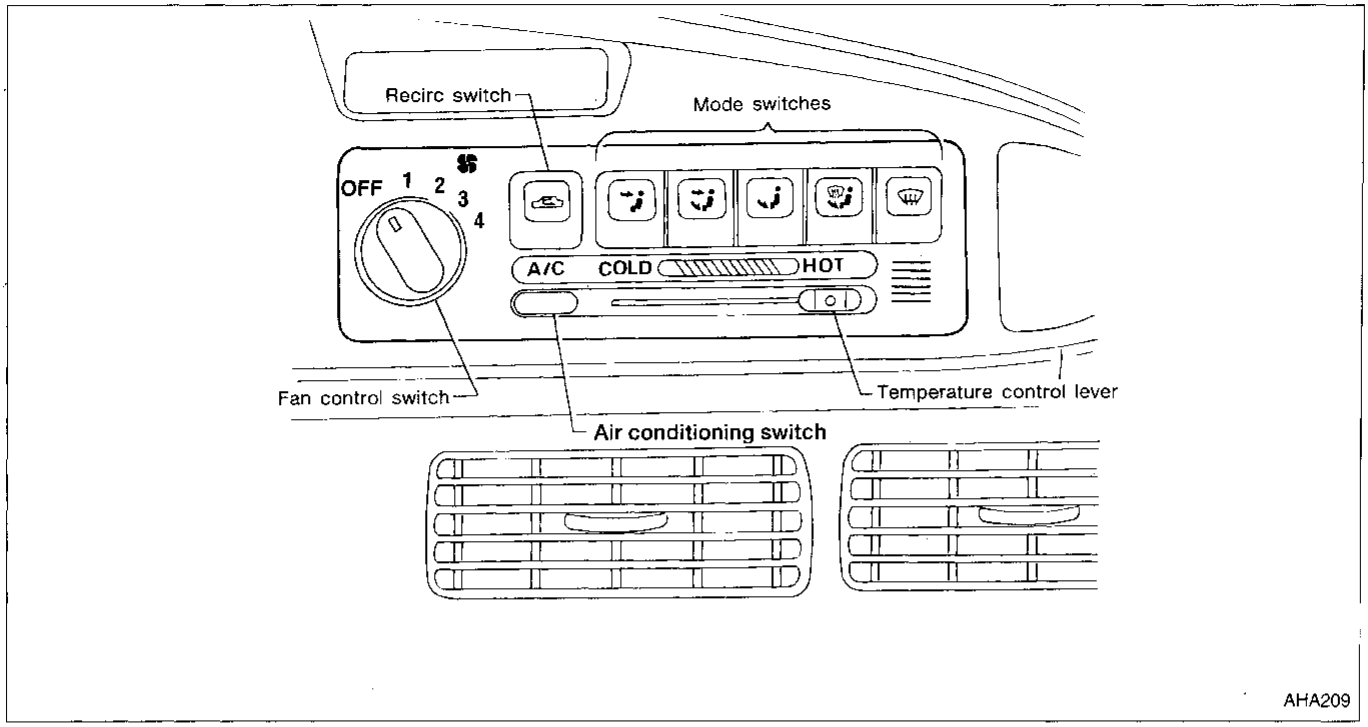


(1) : To face
(2) : To foot
(3) : To defroster
* : When RECIRC switch is ON

For air flow %, refer to "Operational Check," "TROUBLE DIAGNOSES."

AHA255

Control Operation



FAN CONTROL SWITCH

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

MODE SWITCHES

These switches allow control of the air discharge outlets.
When the MODE switch is moved to "DEF" or "F/D", the push control amplifier sets the intake door to "FRESH". The compressor turns on when the MODE switch is moved to "DEF".

TEMPERATURE CONTROL LEVER

This lever allows you to adjust the temperature of the discharge 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 or F/D is selected. RECIRC resumes when another mode is chosen.

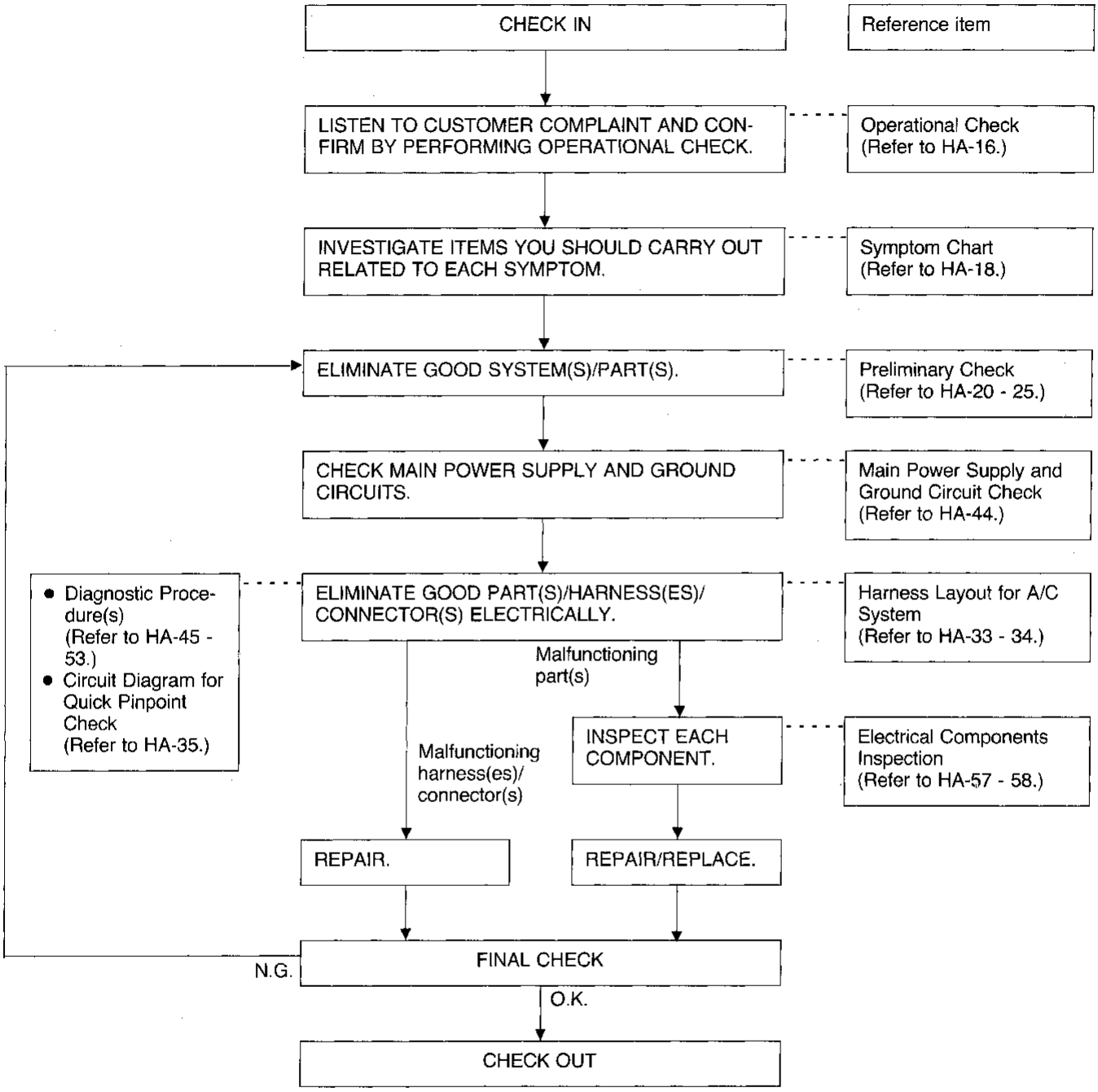
AIR CONDITIONING SWITCH

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

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

How to Perform Trouble Diagnoses for Quick and Accurate Repair

WORK FLOW

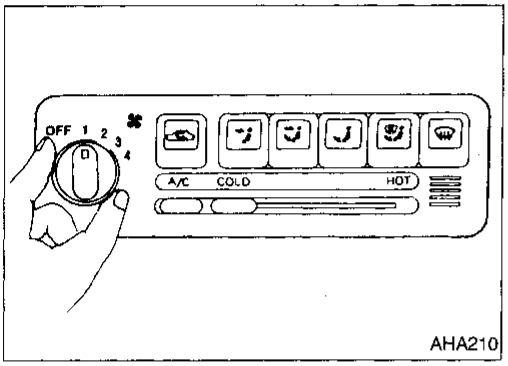


Operational Check

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

CONDITIONS:

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

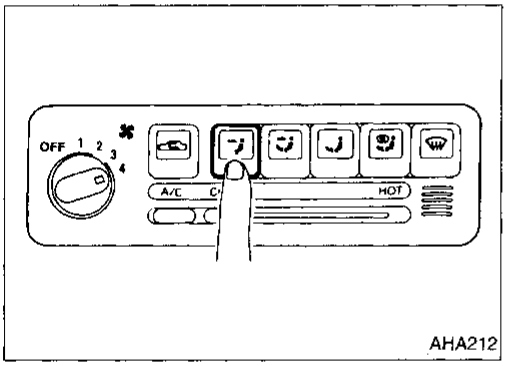


AHA210

PROCEDURE:

1. Check blower

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



AHA212

2. Check discharge air.

1) Press each mode switch.

Discharge air flow

Switch mode/ indicator	Air outlet/distribution		
	Face	Foot	Defroster
	100%	—	—
	60%	40%	—
	—	78%	22%
	—	55%	45%
	—	—	100%

AHA213

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

Refer to "Discharge Air Flow", "DESCRIPTION" (HA-13).

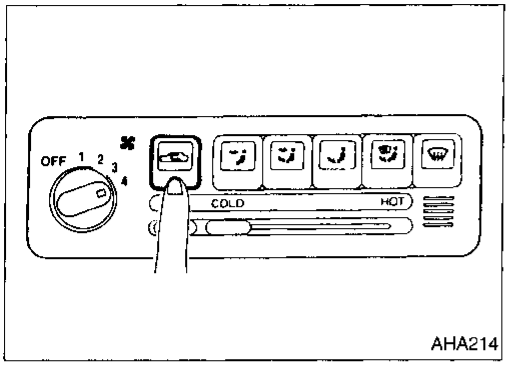
NOTE:

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

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

Intake door position is checked in the next step.

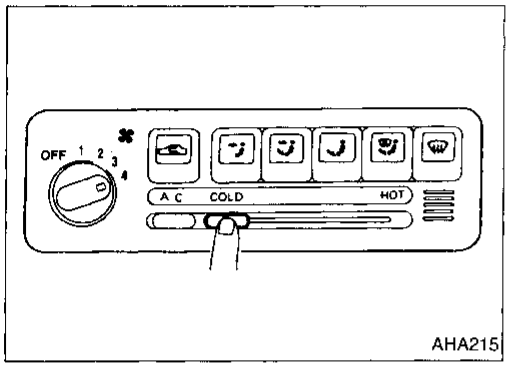
Operational Check (Cont'd)



AHA214

3. Check recirc

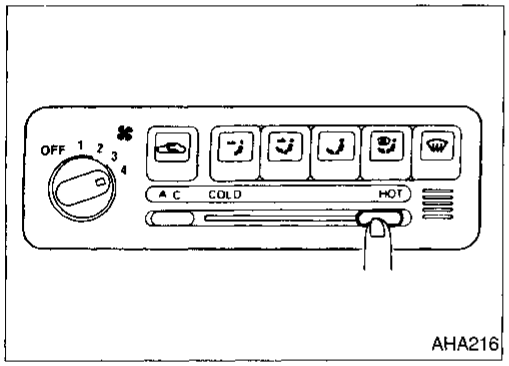
1) Press REC switch
   Recirc indicator should illuminate.
2) Listen for intake door position change (you should hear blower sound change slightly).



AHA215

4. Check temperature decrease

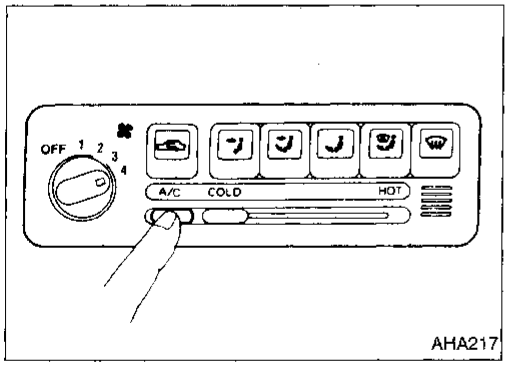
1) Slide temperature control lever to full cold.
2) Check for cold air at discharge air outlets.



AHA216

5. Check temperature increase

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



AHA217

6. Check air conditioning switch

Move the fan control switch to the desired (1 to 4 speed) position and push the A/C switch to turn ON the air conditioning.
The indicator lamp should come on when air conditioning is ON.

Symptom Chart

DIAGNOSTIC TABLE

PROCEDURE	Preliminary Check						Diagnostic Procedure						Main Power Supply and Ground Circuit Check			
REFERENCE PAGE	HA-20	HA-21	HA-22	HA-23	HA-24	HA-25	HA-45	HA-47	HA-49	HA-50	HA-52	HA-53	HA-44	HA-44	HA-44	HA-44
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	20A Fuses (#4, #5)	10A Fuse (#10)	10A Fuse (#20)	Push control module
A/C does not blow cold air.		❶					○			○			○	○		
Insufficient heating.						❶	○					○				
Blower motor does not rotate.		❶					❷						○			
Air outlet does not change.				❶				❷						○		○
Intake door does not change in VENT, B/L or FOOT mode.									❶					○		○
Intake door is not set at "FRESH" in DEF or F/D mode.	❶								○					○		○
Air mix door does not change.		❶								❷						
Fresh vent door does not change.											❶					
Magnet clutch does not engage when A/C switch and fan switch are ON.		❶										❷		○	○	
Magnet clutch does not engage in DEF mode.		❶	❷									○		○	○	
Noise					❶											

❶, ❷ : The number means checking order.
○ : Checking order depends on malfunction in each flow chart.

Symptom Chart (Cont'd)

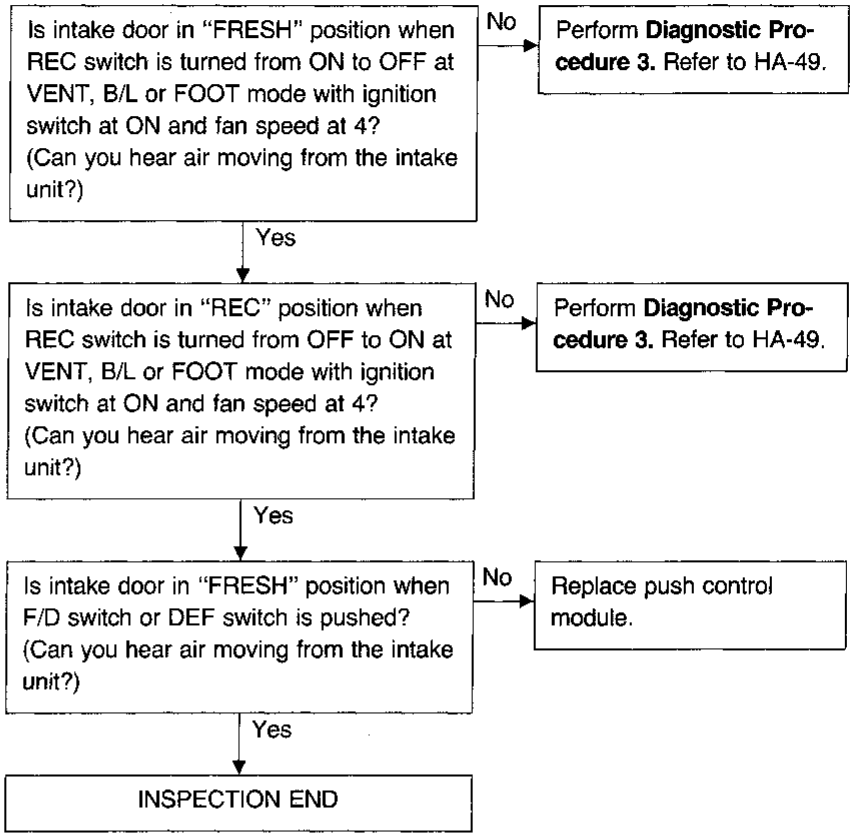
Electrical Components Inspection

Blower motor	Resistor	A/C switch	REC switch	VENT switch	B/L switch	FOOT switch	F/D switch	DEF switch	Fan switch	Mode door motor	Intake door motor	Air mix door motor	Fresh vent door motor	A/C relay	Triple pressure switch	Compressor (Magnet clutch)	Ambient switch	ECM (ECCS control module)	Harness		
		Push control module														Compressor					
HA-57	HA-57	HA-57	—	—	—	—	—	—	HA-57	—	—	—	—	HA-58	HA-58	—	—	Refer to EF & EC section.	—		
○	○	○							○			○		○	○	○	○	○	○	FA	
												○							○		
○	○								○										○	RA	
				○	○	○	○	○		○			○						○		
			○								○								○	BR	
			○								○								○	ST	
												○							○	BF	
													○						○	HA	
		○							○					○	○	○	○	○	○	EL	
								○	○					○	○	○	○	○	○	IDX	

Preliminary Check

PRELIMINARY CHECK 1

Intake door is not set at "FRESH" in DEF or F/D mode.



PRELIMINARY CHECK 2

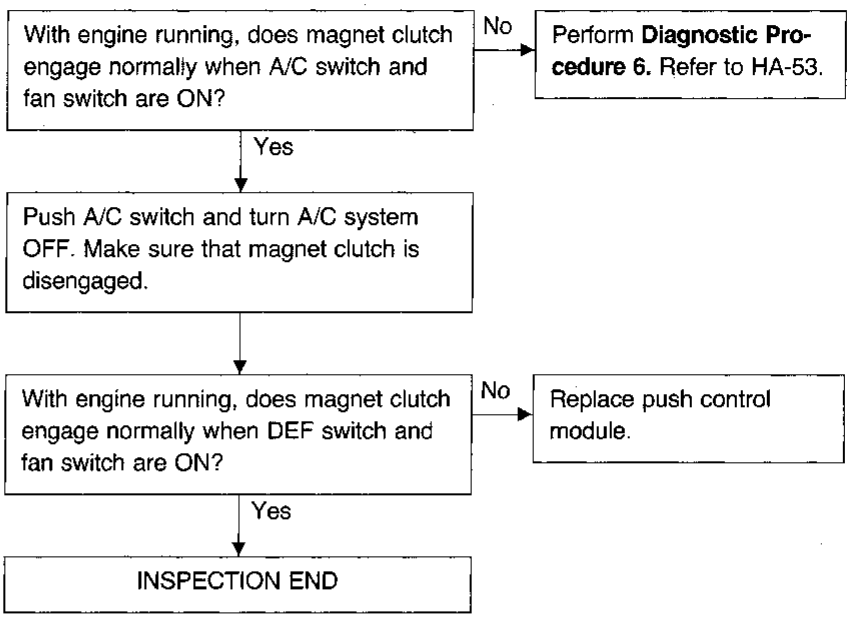
A/C does not blow cold air.

Preliminary Check (Cont'd)

PRELIMINARY CHECK 3

Magnet clutch does not engage in DEF mode.

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



PRELIMINARY CHECK 4

Air outlet does not change.

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

No → Perform **Diagnostic Procedure 2.** Refer to HA-47.

Switch mode/ Indicator	Air outlet/distribution		
	Face	Foot	Defroster
	100%	—	—
	60%	40%	—
	—	78%	22%
	—	55%	45%
	—	—	100%

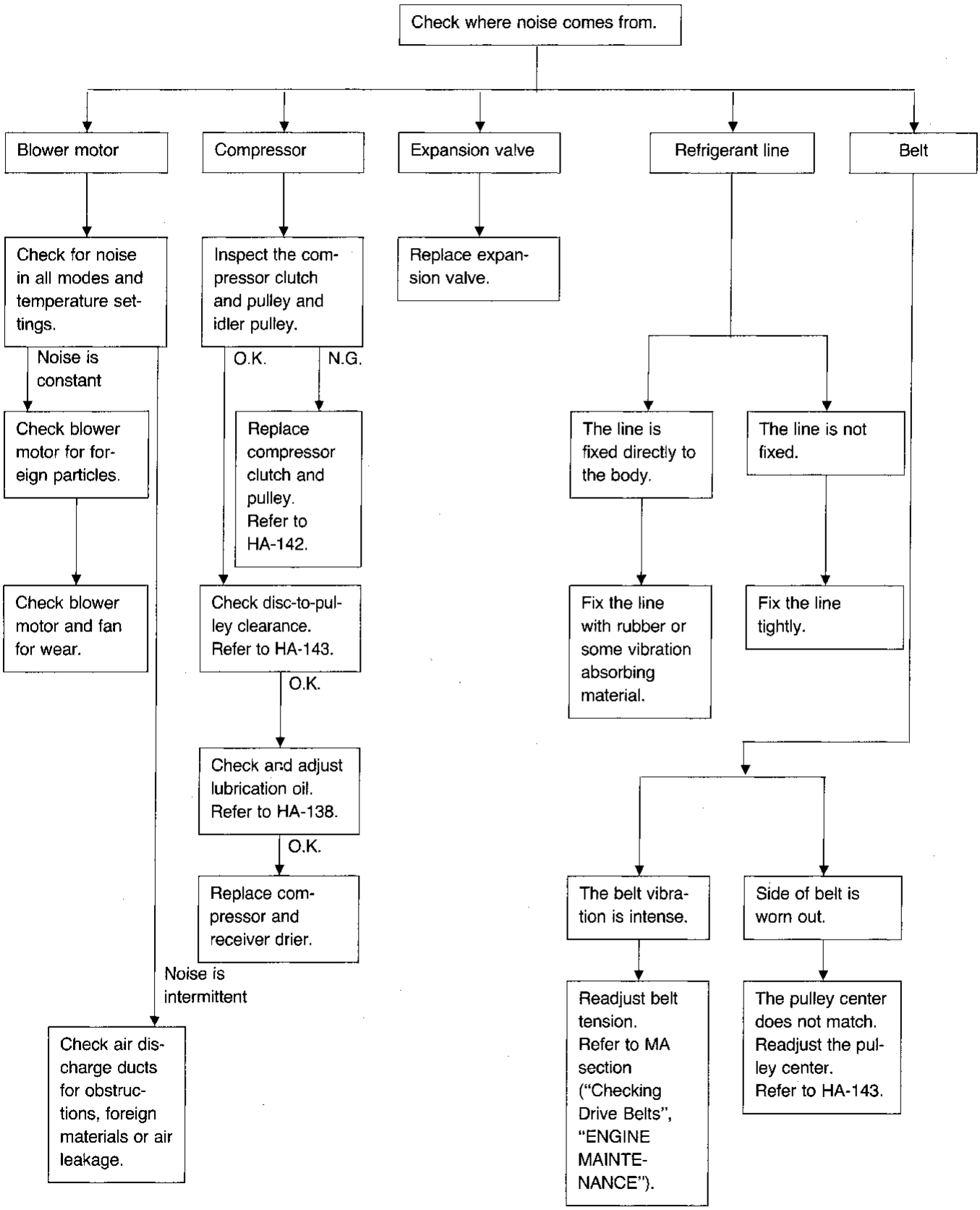
Yes

INSPECTION END

Preliminary Check (Cont'd)

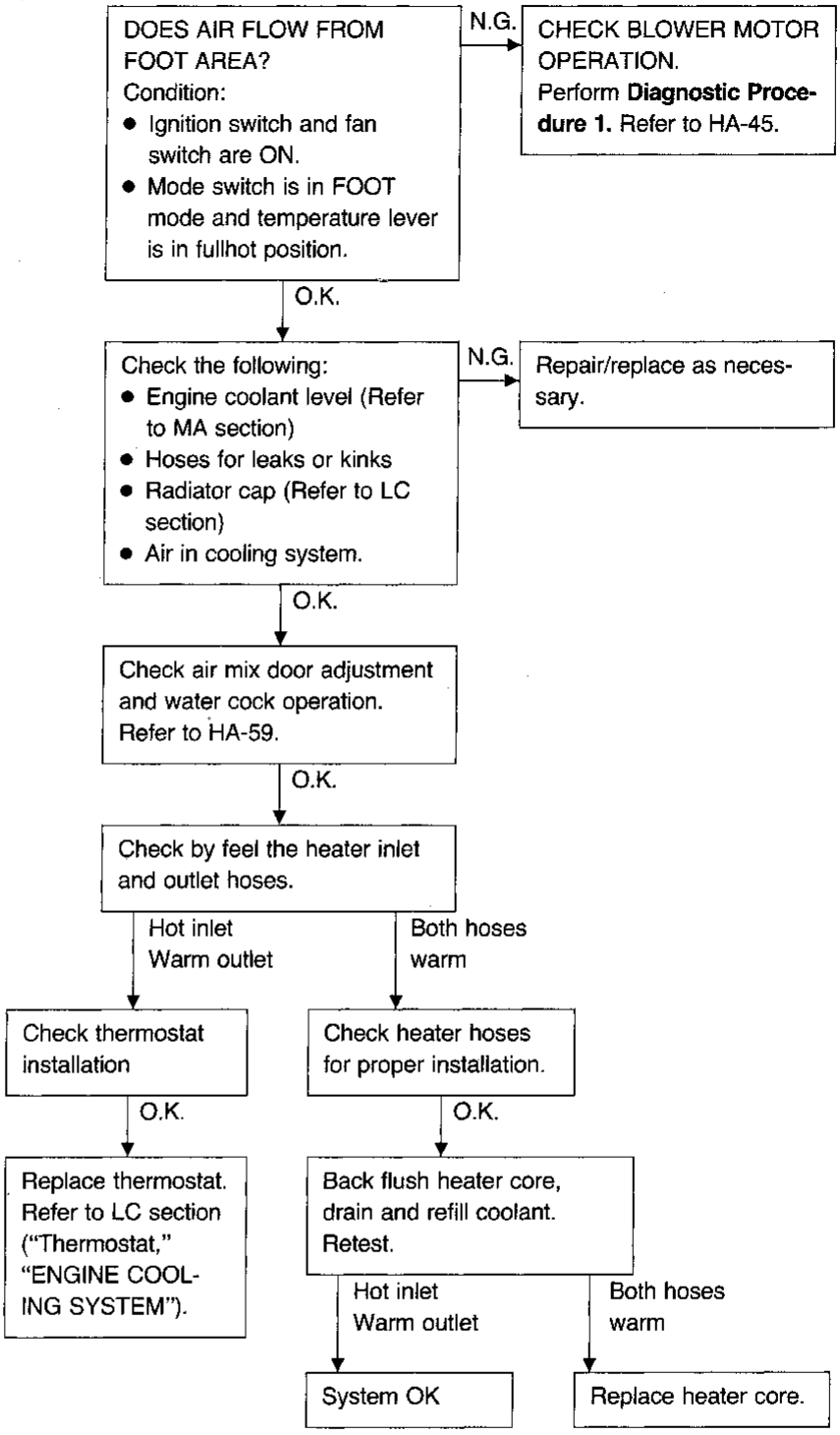
PRELIMINARY CHECK 5

Noise



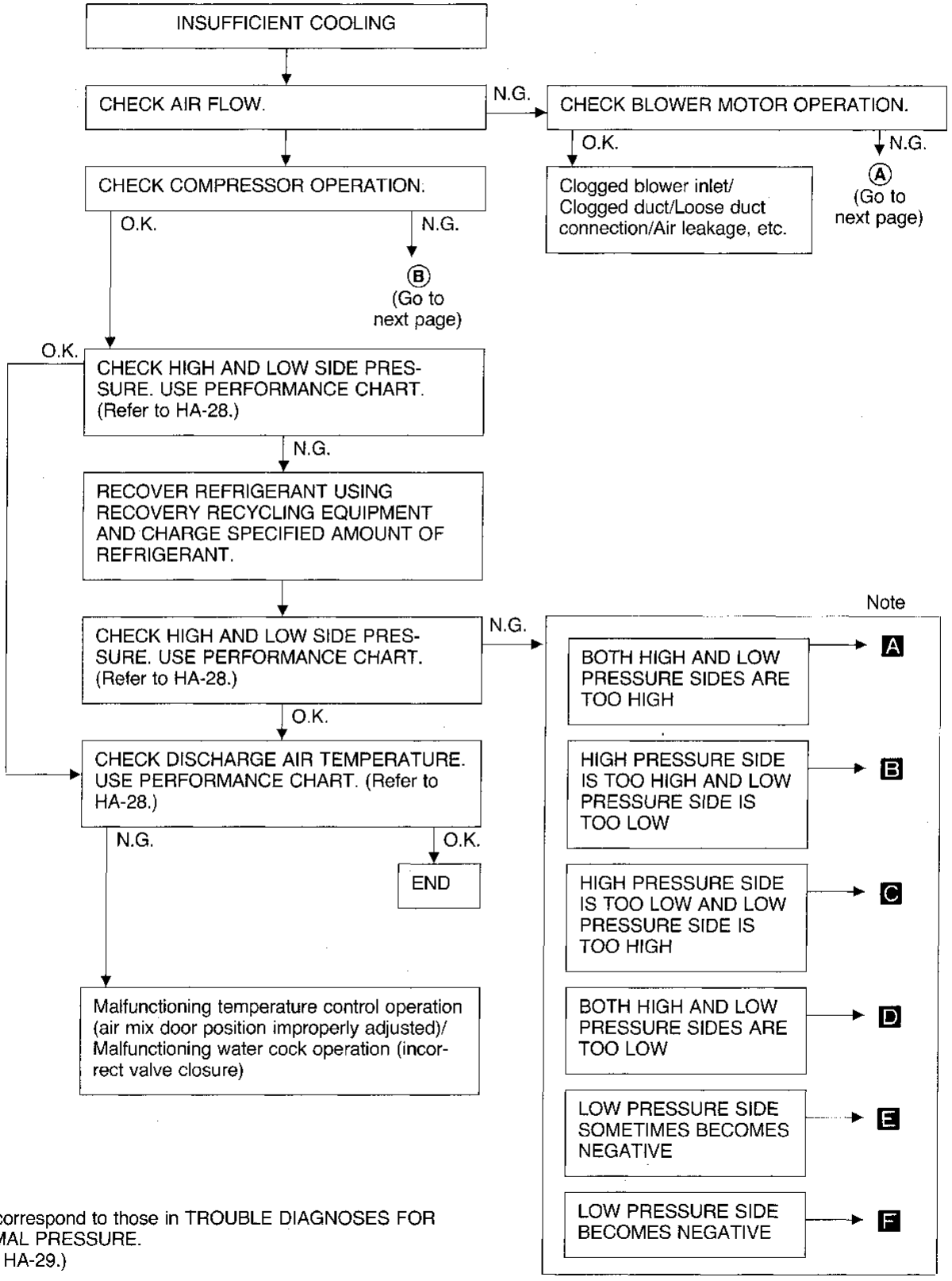
Preliminary Check (Cont'd)

PRELIMINARY CHECK 6
Insufficient heating

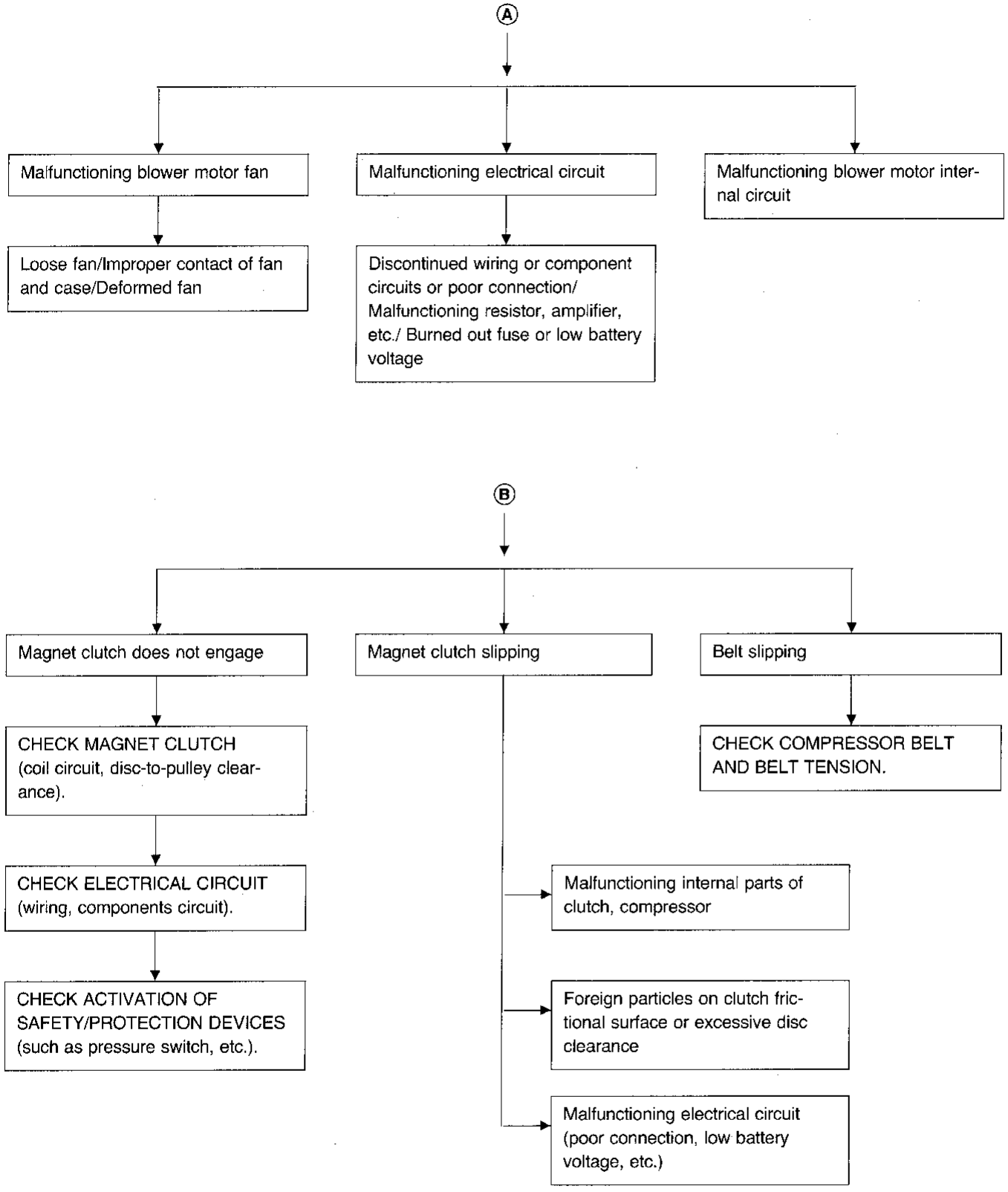


Performance Test Diagnoses

INSUFFICIENT COOLING



Note: A-F correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE.
(Refer to HA-29.)


Ⓐ
Malfunctioning blower motor fan
Loose fan/Improper contact of fan and case/Deformed fan
Malfunctioning electrical circuit
Discontinued wiring or component circuits or poor connection/ Malfunctioning resistor, amplifier, etc./ Burned out fuse or low battery voltage
Malfunctioning blower motor internal circuit
Ⓑ
Magnet clutch does not engage
CHECK MAGNET CLUTCH (coil circuit, disc-to-pulley clearance).
CHECK ELECTRICAL CIRCUIT (wiring, components circuit).
CHECK ACTIVATION OF SAFETY/PROTECTION DEVICES (such as pressure switch, etc.).
Magnet clutch slipping
Malfunctioning internal parts of clutch, compressor
Foreign particles on clutch frictional surface or excessive disc clearance
Malfunctioning electrical circuit (poor connection, low battery voltage, etc.)
Belt slipping
CHECK COMPRESSOR BELT AND BELT TENSION.

Performance Chart

TEST CONDITION

Testing must be performed as follows:

Vehicle location: Indoors or in the shade (in a well ventilated place)
Doors: Closed
Door window: Open
Hood: Open
TEMP. setting: Max. COLD
Discharge Air: Face Vent
RECIRC switch: (Recirculation) ON
FAN speed: 4-speed
A/C switch: ON
Engine speed: 1,500 rpm
Operate the air conditioning system for 10 minutes before taking measurements.

TEST READING

Recirculating-to-discharge air temperature table

Inside air at blower assembly inlet for RECIRC*		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	4.0 - 5.4 (39 - 42)
	25 (77)	4.2 - 5.6 (40 - 42)
	30 (86)	8.5 - 11.1 (47 - 52)
	35 (95)	13.5 - 16.7 (56 - 62)
	40 (104)	18.5 - 22.3 (65 - 72)
60 - 70	20 (68)	5.4 - 6.8 (42 - 44)
	25 (77)	5.6 - 8.0 (42 - 46)
	30 (86)	11.1 - 14.1 (52 - 57)
	35 (95)	16.7 - 20.3 (62 - 69)
	40 (104)	22.3 - 26.5 (72 - 80)

* Thermometer should be placed at intake unit under RH side of instrument panel.

Ambient air temperature-to-operating pressure table

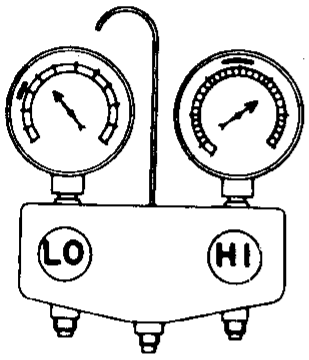
Ambient air		High-pressure (Discharge side) kPa (kg/cm^2, psi)	Low-pressure (Suction side) kPa (kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	834 - 1,098 (8.5 - 11.2, 121 - 159)	122.6 - 161.8 (1.25 - 1.65, 17.8 - 23.5)
	25 (77)	1,049 - 1,363 (10.7 - 13.9, 152 - 198)	137.3 - 181.4 (1.4 - 1.85, 19.9 - 26.3)
	30 (86)	1,226 - 1,618 (12.5 - 16.5, 178 - 235)	152.0 - 201.0 (1.55 - 2.05, 22.0 - 29.2)
	35 (95)	1,255 - 1,716 (12.8 - 17.5, 182 - 249)	166.7 - 230.5 (1.7 - 2.35, 24.2 - 33.4)
	40 (104)	1,540 - 2,030 (15.7 - 20.7, 223 - 294)	201.0 - 289.3 (2.05 - 2.95, 29.2 - 41.9)

If pressure is not within range, refer to HA-29, "Trouble Diagnoses for Abnormal Pressure".

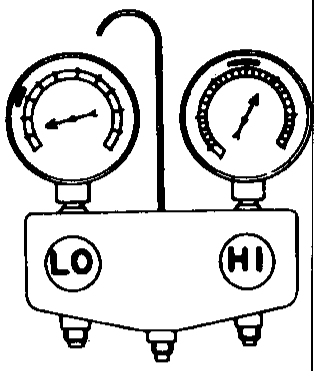
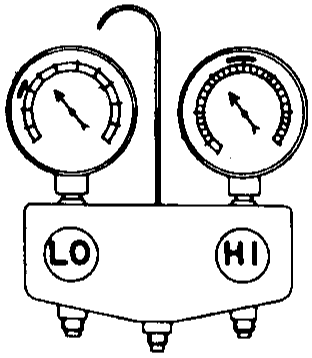
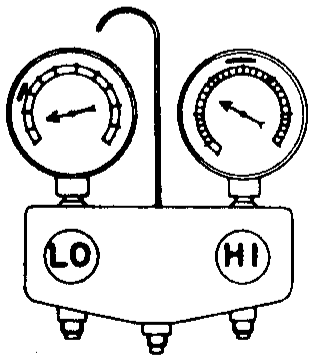
Trouble Diagnoses for Abnormal Pressure

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 HA-28 ("Ambient air temperature-to-operating pressure table").

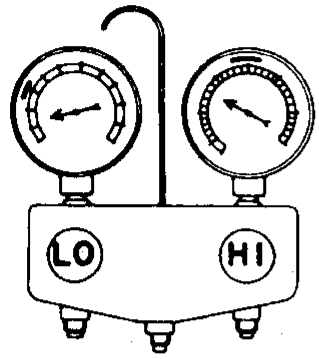
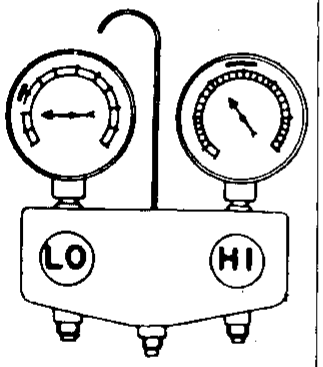
Pressure measurements are effective only when ambient temperature is in the range indicated under the Performance Chart.

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

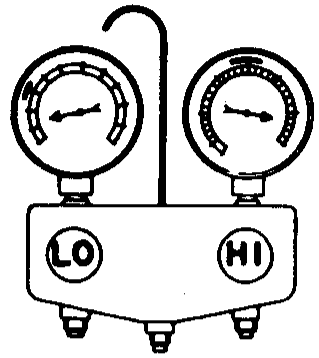
Trouble Diagnoses for Abnormal Pressure (Cont'd)

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low. B  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check compressor oil for contamination.
High-pressure side is too low and low-pressure side is too high. C  AC356A	High and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings	Replace compressor.
	No temperature difference between high and low-pressure sides	Compressor discharge capacity does not change. (Compressor stroke is set at maximum.)	Replace compressor.
Both high- and low-pressure sides are too low. D  AC353A	• 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.	Liquid tank inside is clogged a little.	• Replace liquid tank. • Check compressor oil for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check compressor oil for contamination.

Trouble Diagnoses for Abnormal Pressure (Cont'd)

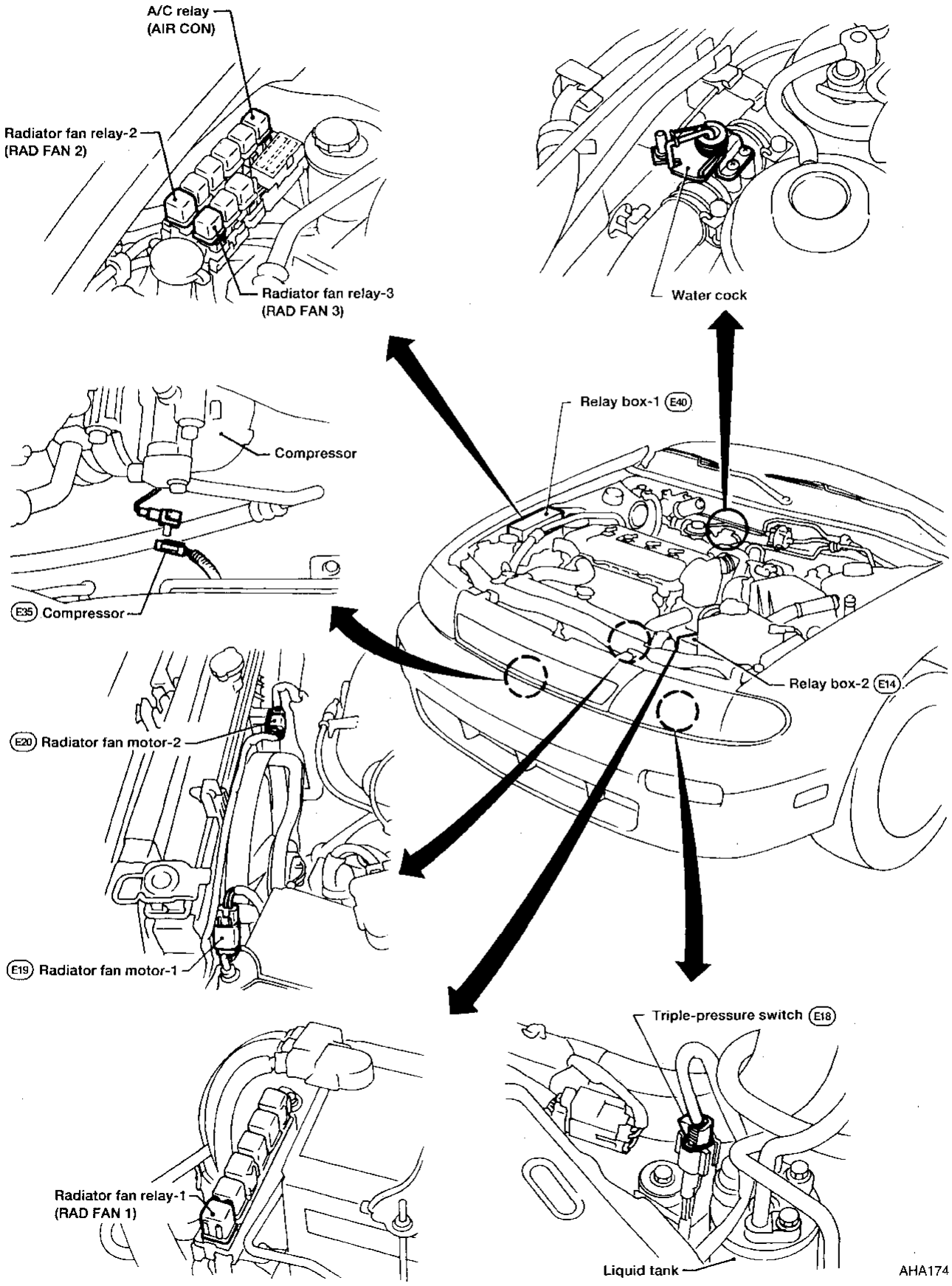
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low. D  AC353A	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ ① Improper expansion valve adjustment ② Malfunctioning thermal valve ③ Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Check compressor oil for contamination.
	Areas near low-pressure pipe connection and service valve are extremely cold as compared with areas near expansion valve outlet and evaporator.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check compressor oil for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen. ↓ Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)	Replace compressor.
Low-pressure side sometimes becomes negative. E  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

Trouble Diagnoses for Abnormal Pressure (Cont'd)

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative. F  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	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. • 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.

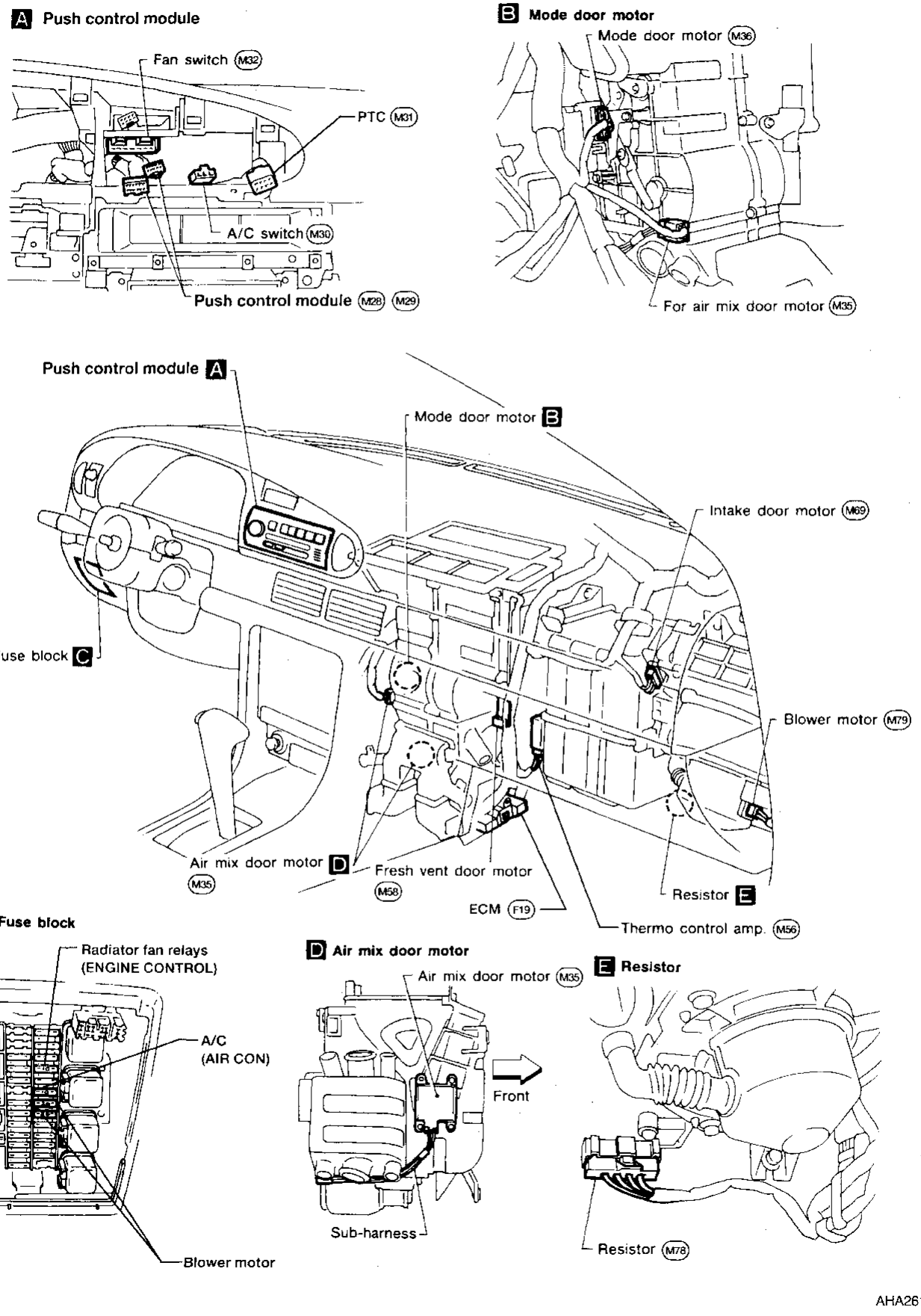
Harness Layout

Engine compartment



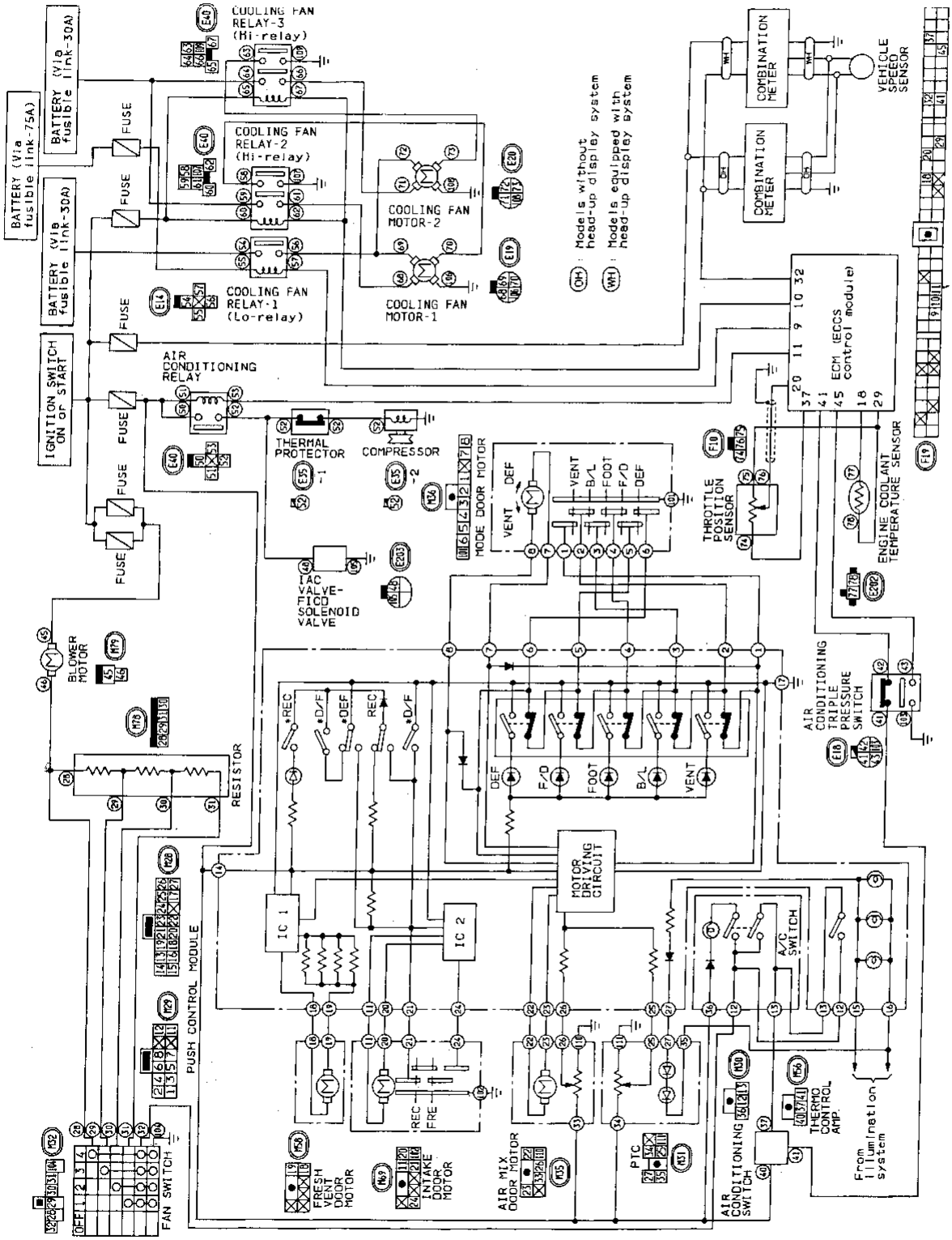
Harness Layout (Cont'd)

Passenger compartment



AHA261

Circuit Diagram for Quick Pinpoint Check

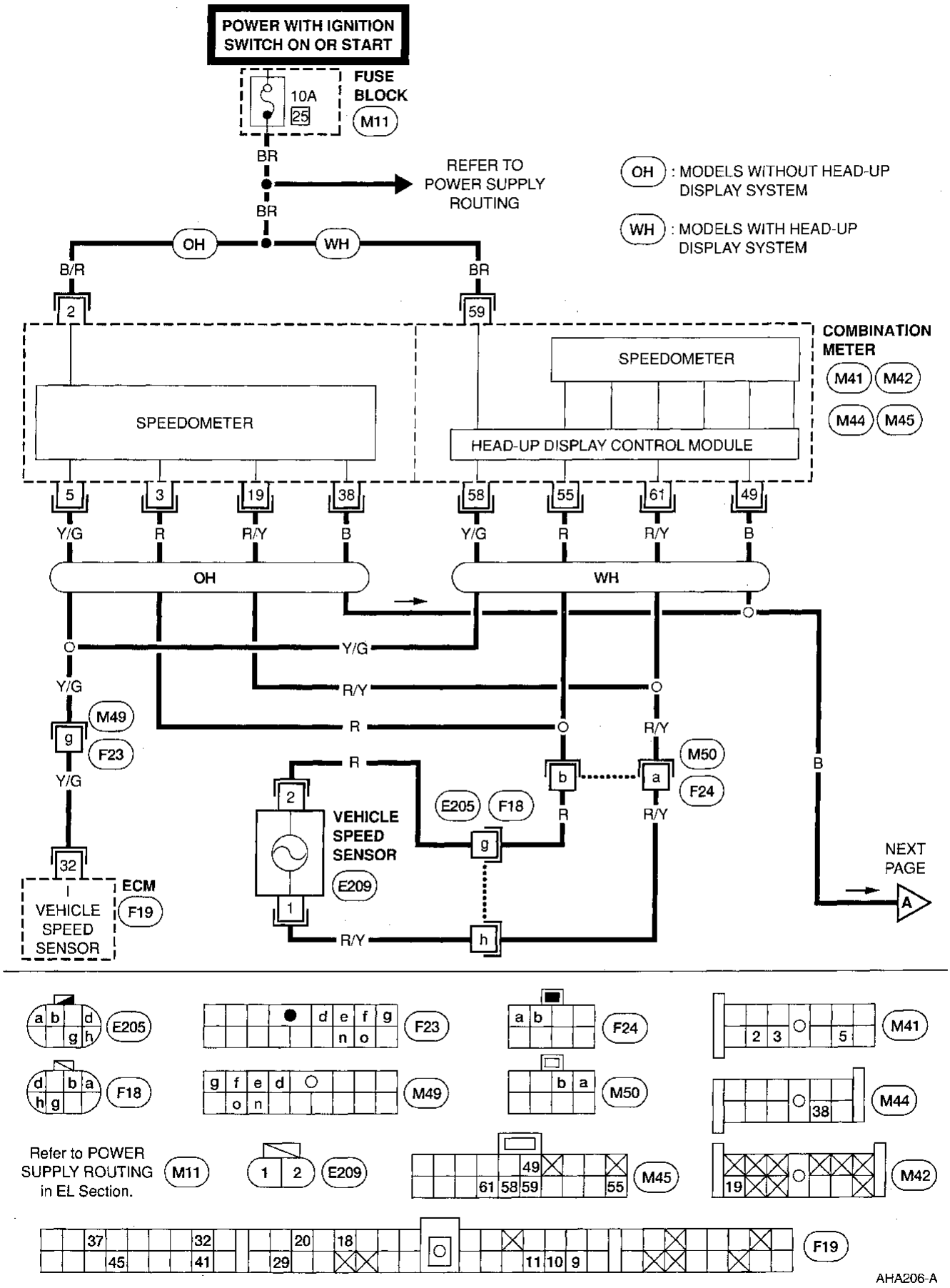


- All connectors shown in this illustration are unit side connectors.
- The unit side connectors with a double circle "◎" are connected to the harness side connectors shown in the "Harness Layout."
- The terminal numbers in the connector coincide with the circuit numbers surrounded by a single circle "○."
- *: These switches are built into push control module and mechanically linked to corresponding switches.

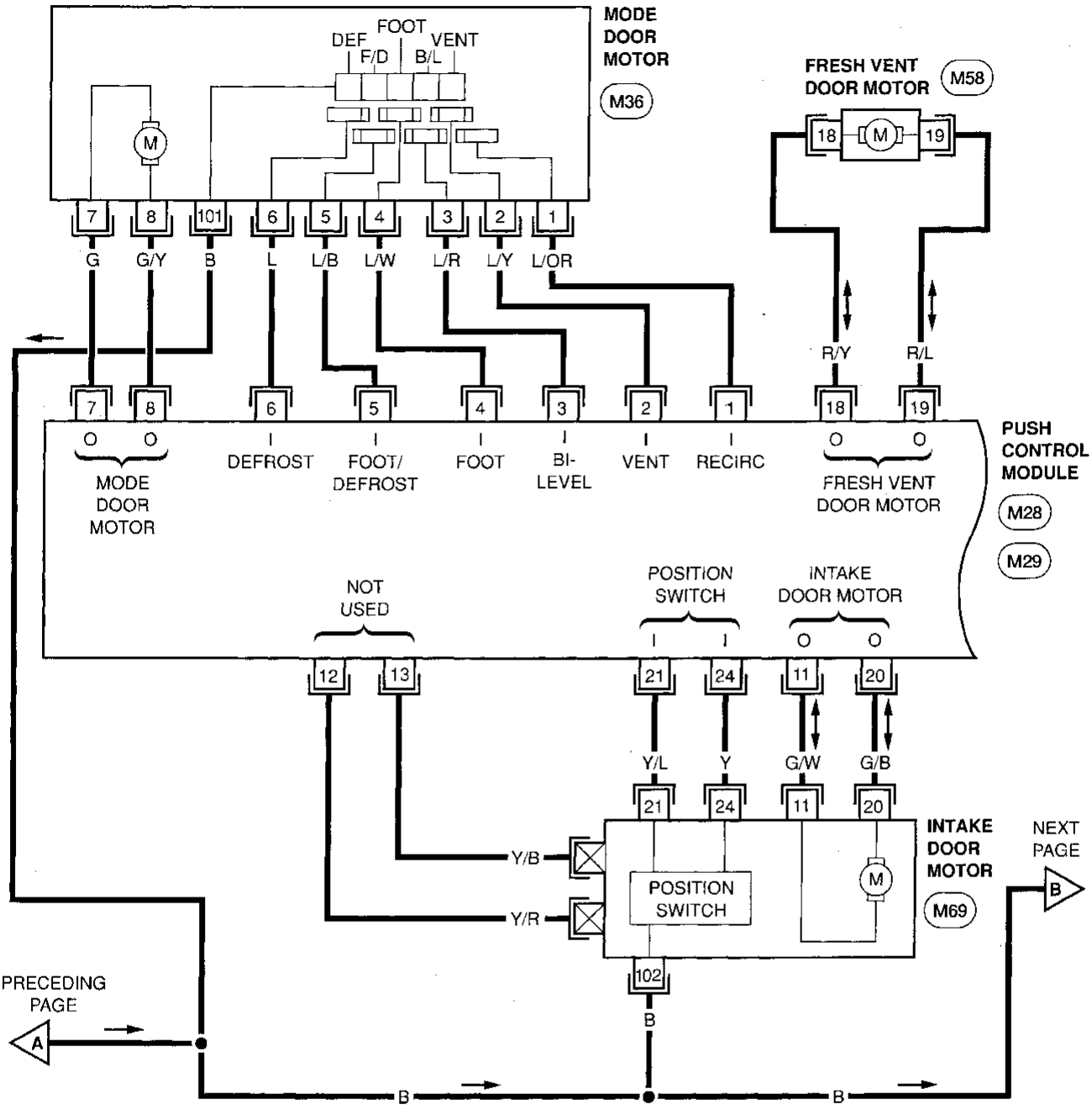
AHA219

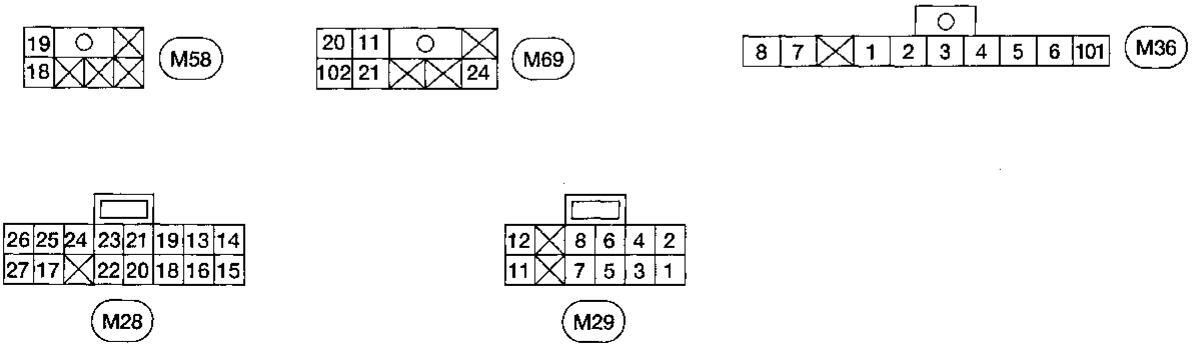
NOTE

Wiring Diagram



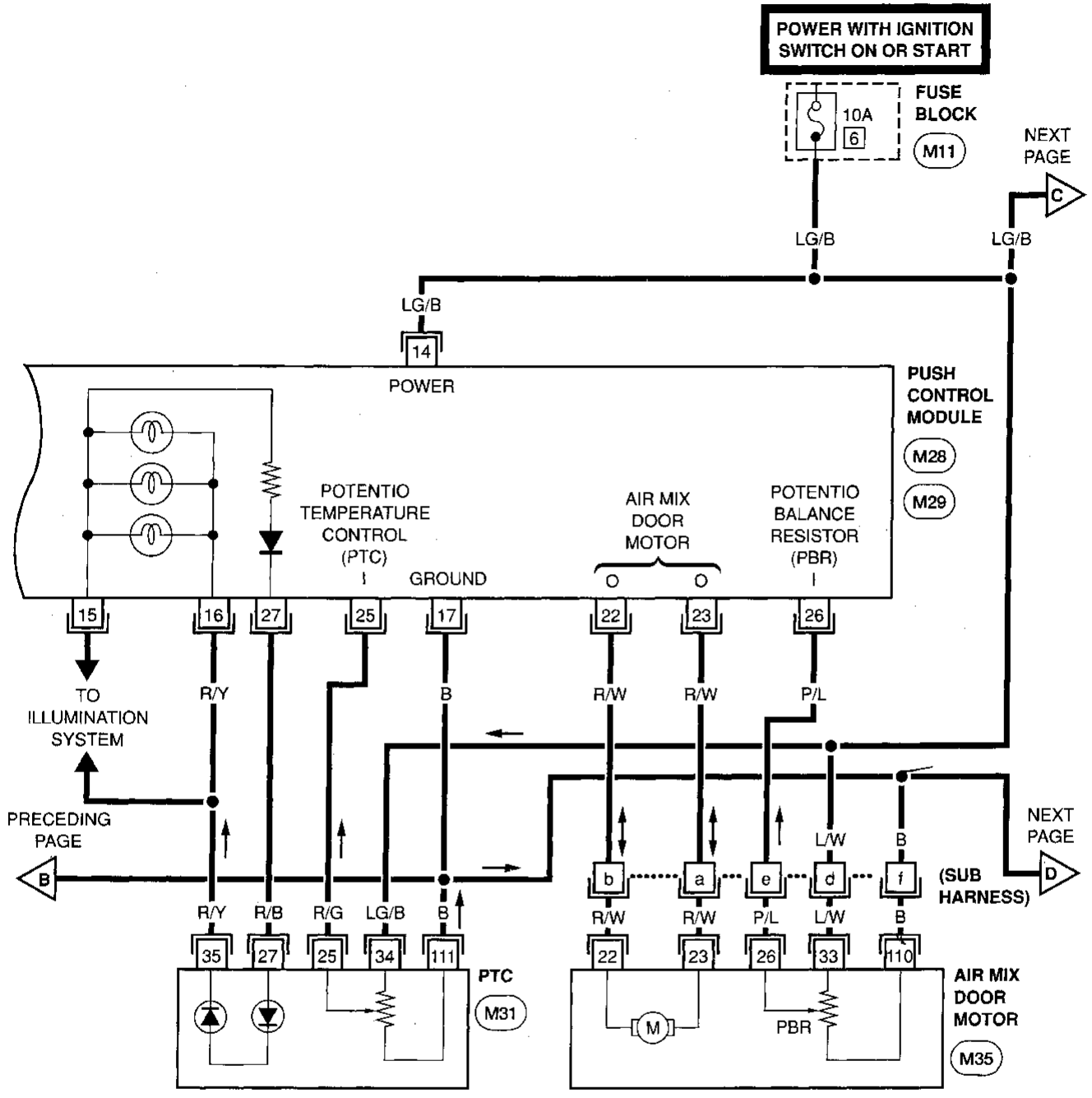
Wiring Diagram (Cont'd)





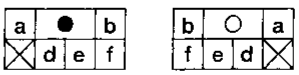
AHA206-B

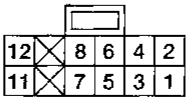
Wiring Diagram (Cont'd)

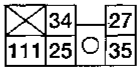


Refer to POWER SUPPLY ROUTING in EL Section. M11

(SUB-HARNESS)

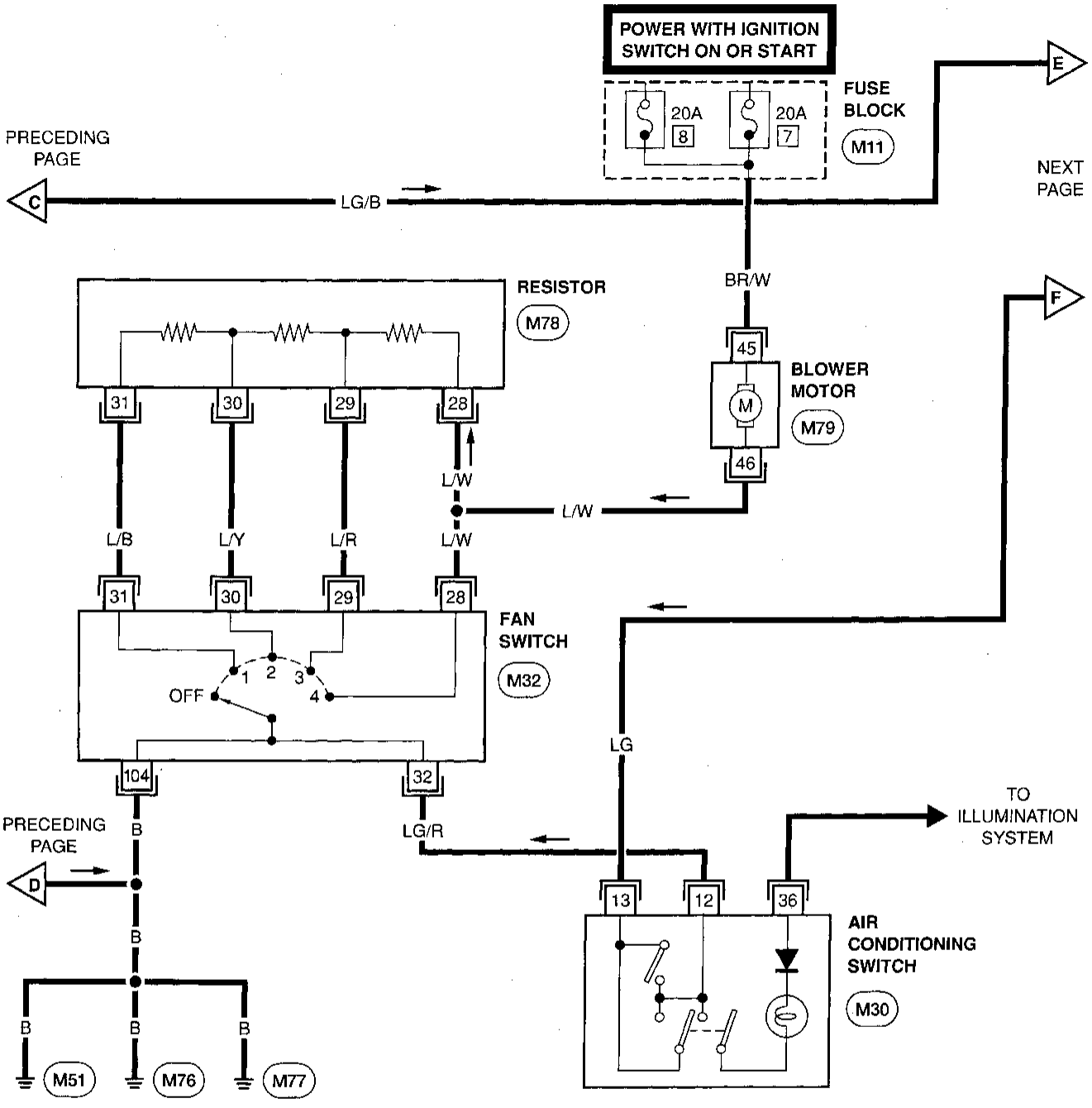




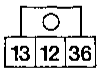


AHA206-C

Wiring Diagram (Cont'd)

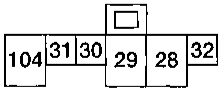


Refer to POWER SUPPLY ROUTING in EL Section. M11

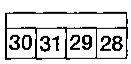


M30

M79



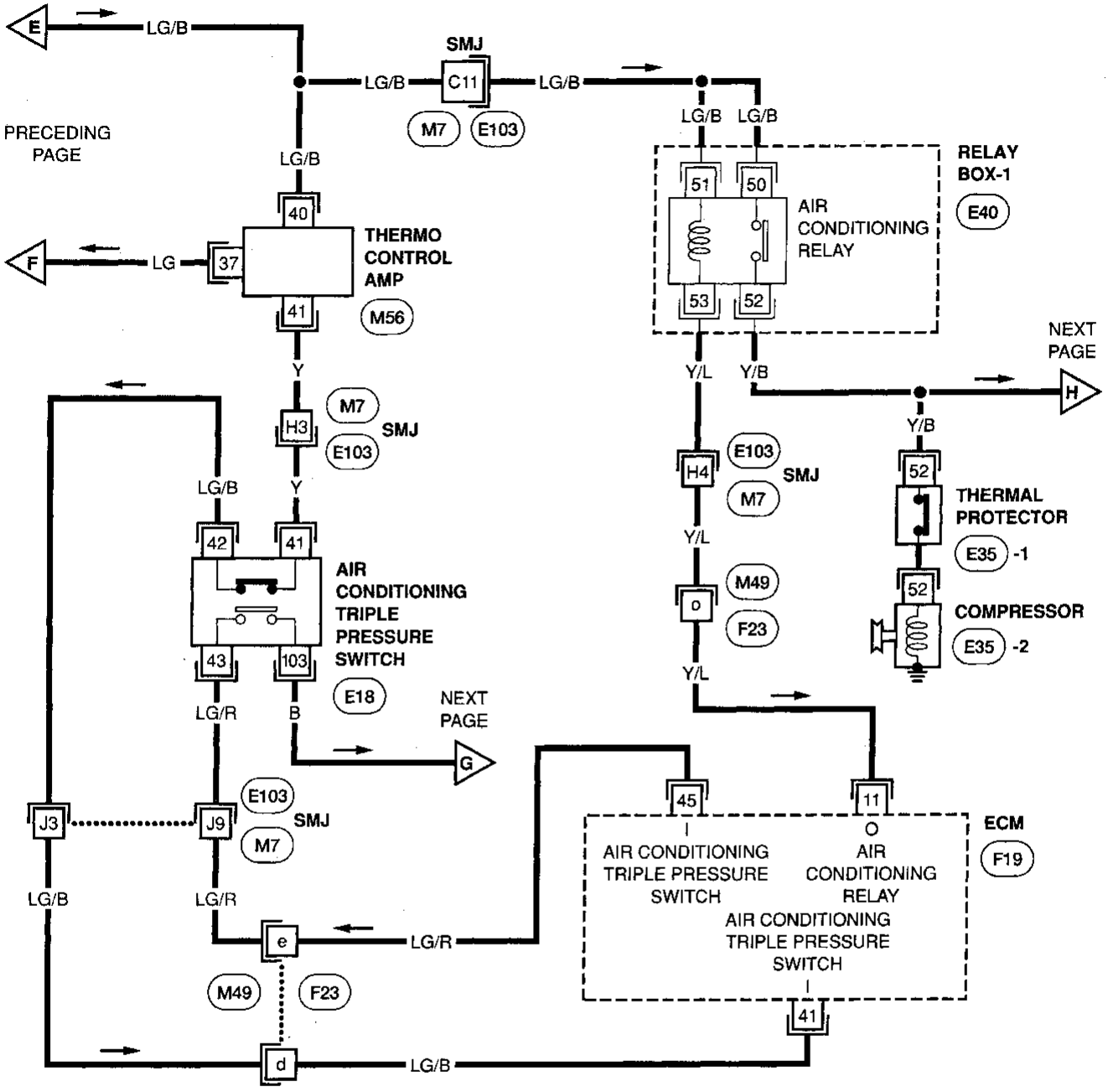
M32



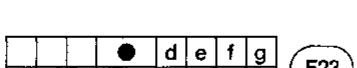
M78

AHA206-D

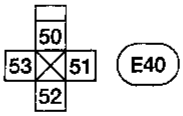
Wiring Diagram (Cont'd)



Refer to Foldout Page in EL Section for details.

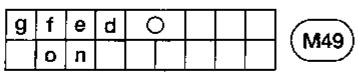


F23

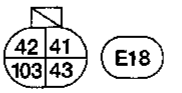


E40

E35 -1 -2



M49



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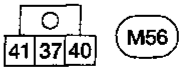

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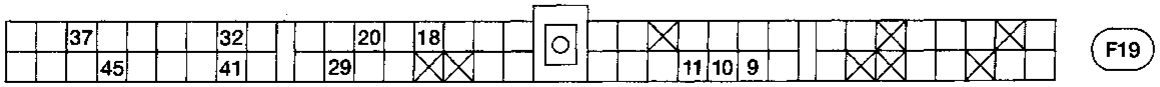
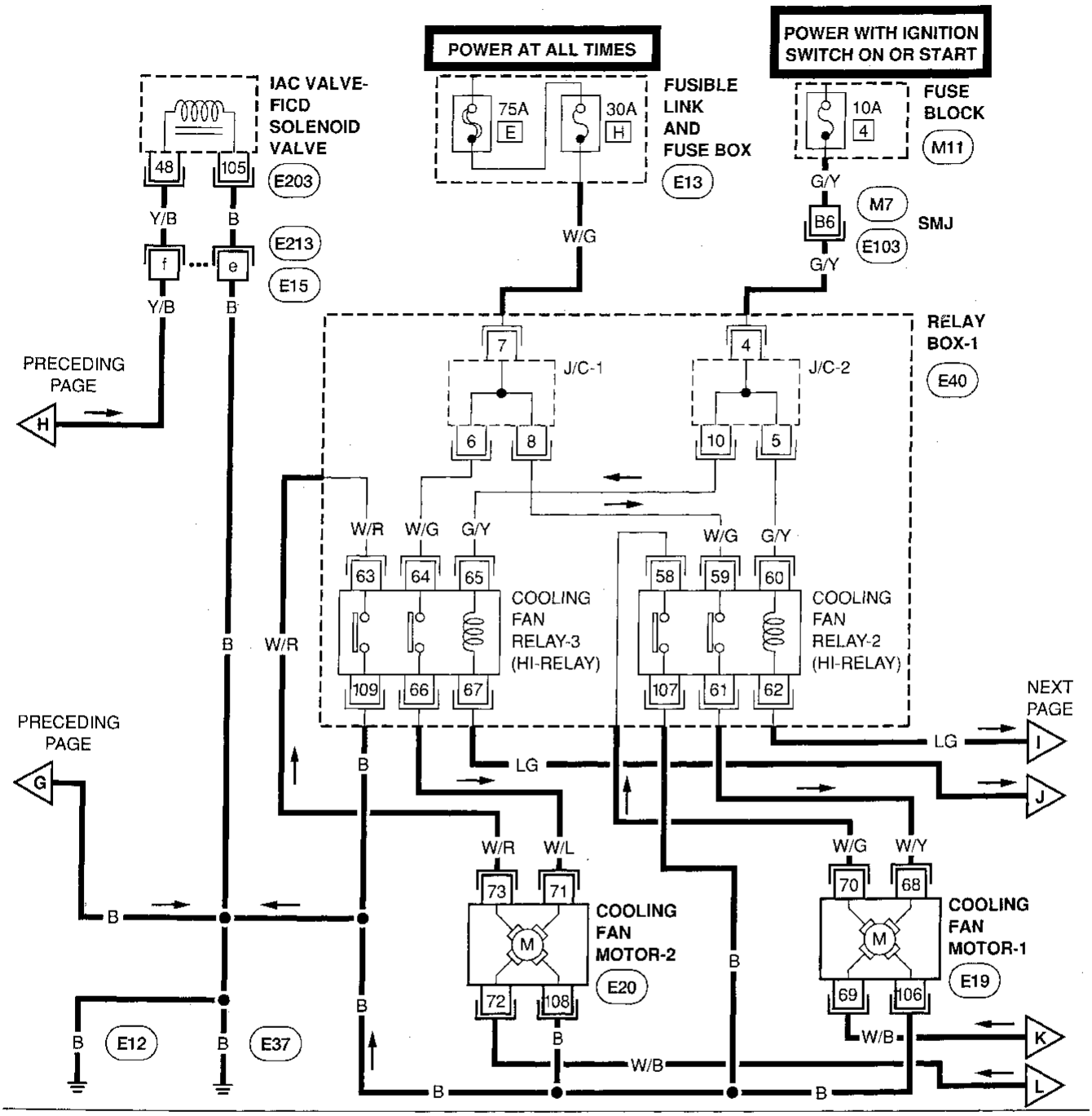


F19

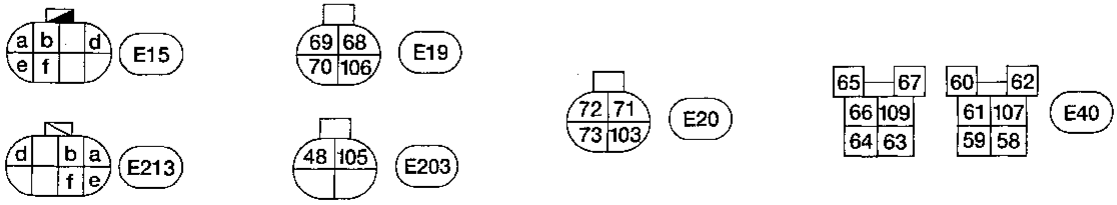
AHA206-E

Wiring Diagram (Cont'd)



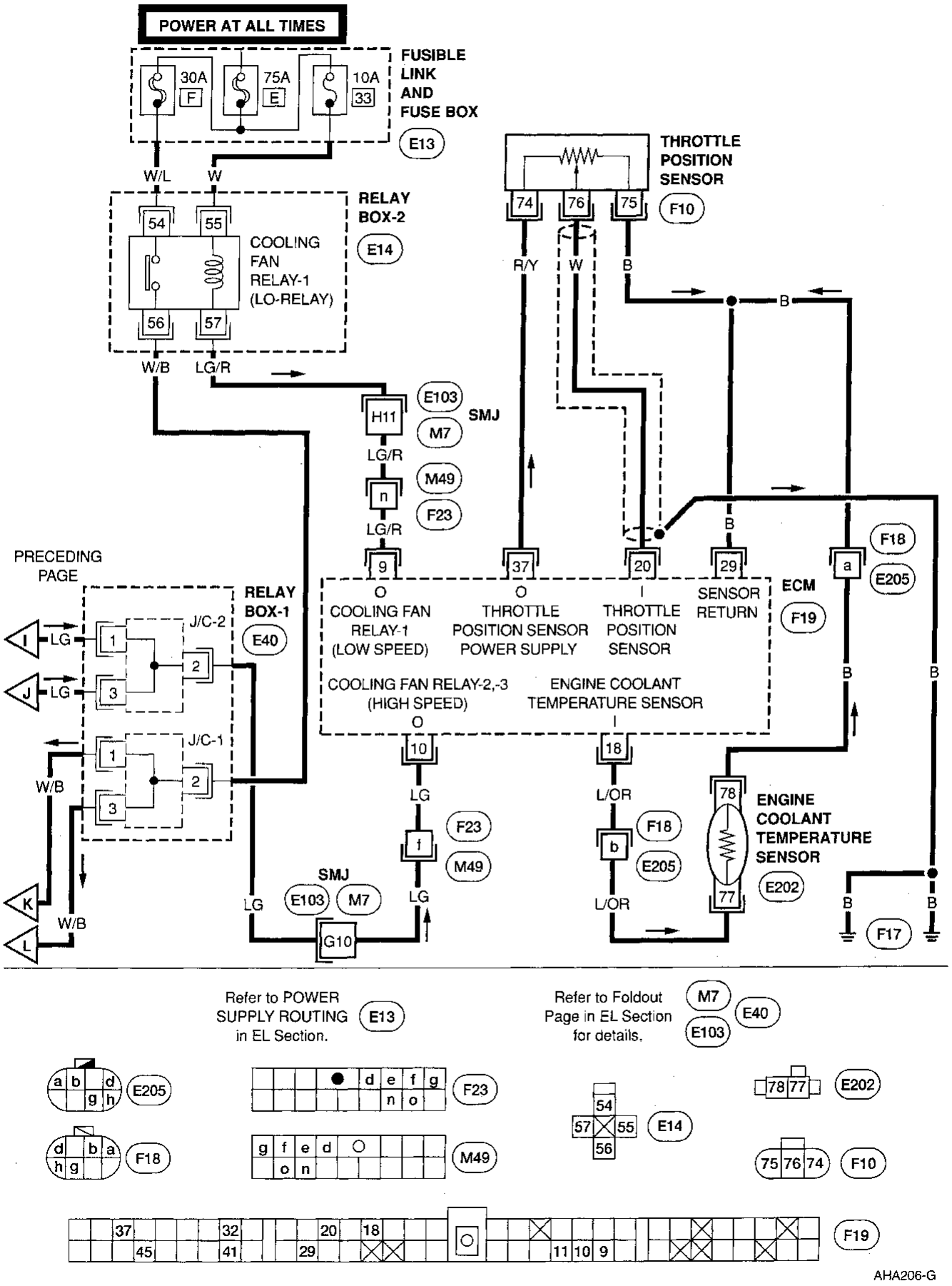
Refer to POWER SUPPLY ROUTING in EL Section. E13 M11

Refer to Foldout Page in EL Section for details. M7 E40 E103



AHA206-F

Wiring Diagram (Cont'd)

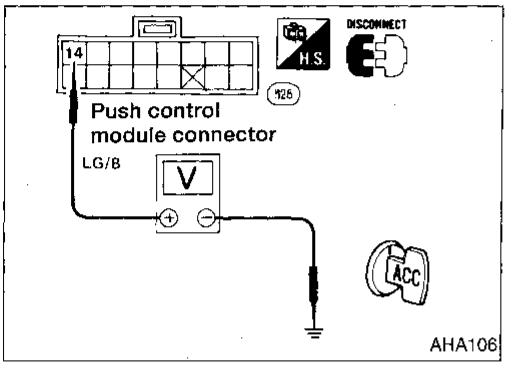


Main Power Supply and Ground Circuit Check

POWER SUPPLY CIRCUIT CHECK

Check power supply circuit for air conditioning system.

Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

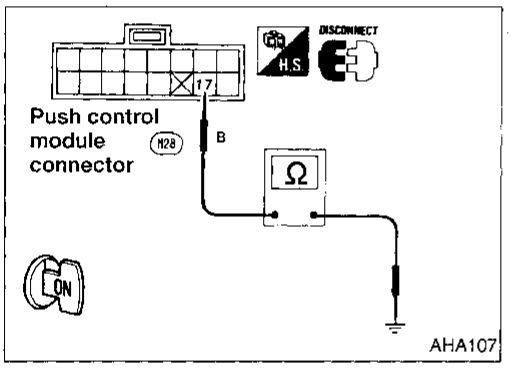


PUSH CONTROL MODULE CHECK

Check power supply circuit for push control module with ignition switch at ACC.

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

Voltmeter terminal		Voltage
⊕	⊖	
⑭	Body ground	Approx. 12V



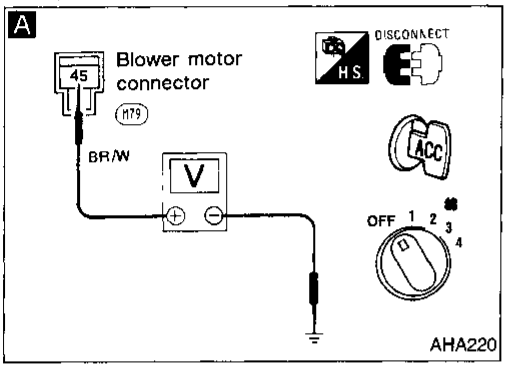
Check body ground circuit for push control module with ignition switch ON.

1. Disconnect push control module harness connector.
2. Connect ohmmeter from harness side.
3. Check for continuity between terminal No. ⑰ and body ground.

Ohmmeter terminal		Continuity
⊕	⊖	
⑰	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

A



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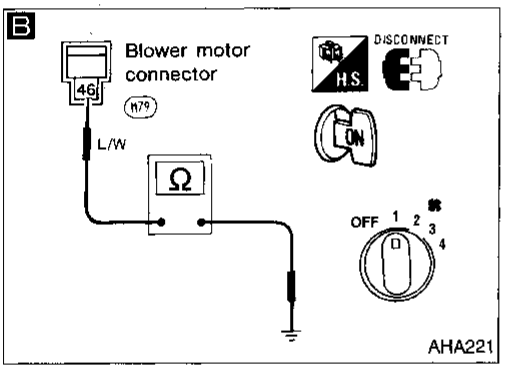

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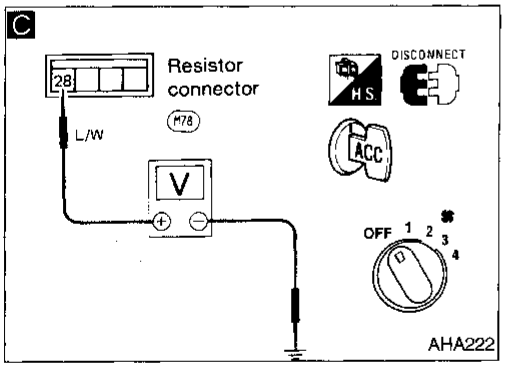
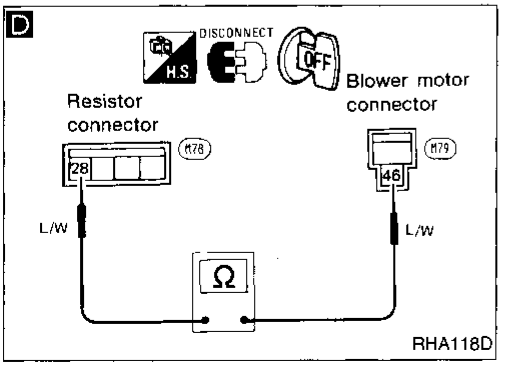


D



Diagnostic Procedure 1

SYMPTOM: Blower motor does not rotate.

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

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

2 3 4 5 (Go to next page.) → Ⓑ

1

A

CHECK POWER SUPPLY FOR BLOWER MOTOR.
Disconnect blower motor harness connector.
Do approx. 12 volts exist between blower motor harness terminal No. (45) and body ground?

N.G. → Check 20A fuses at fuse block.
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

O.K.

B

Check circuit continuity between blower motor harness terminal No. (46) and body ground.

N.G. → Reconnect blower motor harness connector.

O.K.

CHECK BLOWER MOTOR.
(Refer to HA-57.)

N.G.

Replace blower motor.

C

CHECK BLOWER MOTOR CIRCUIT BETWEEN BLOWER MOTOR AND RESISTOR.
Do approx. 12 volts exist between resistor harness terminal No. (28) and body ground?

N.G. → Disconnect blower motor and resistor harness connectors.

D

Note: Check circuit continuity between blower motor harness terminal No. (46) and resistor harness terminal No. (28).

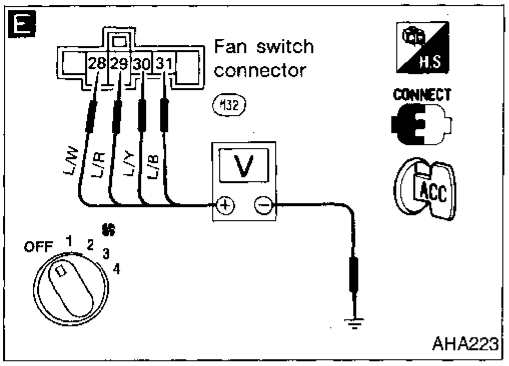
O.K.

Ⓐ (Go to next page.)

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

Diagnostic Procedure 1 (Cont'd)

E



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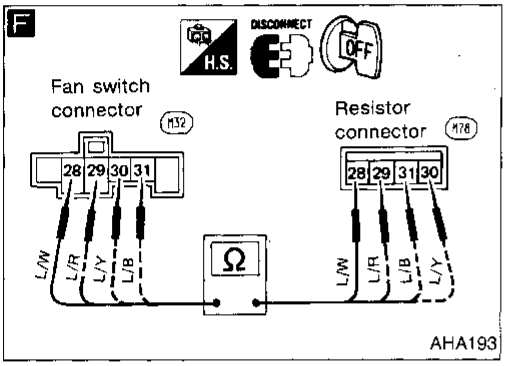
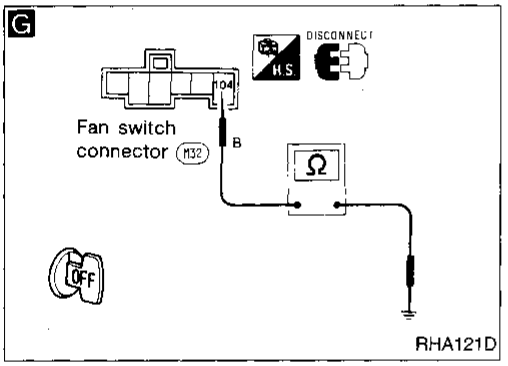


G



Ⓐ

1

CHECK RESISTOR AFTER DISCONNECTING IT.
(Refer to HA-57.)

2 3 4

O.K. / N.G.

N.G. → Replace resistor.

Reconnect resistor harness connector.

1 2 3 4 5

E

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

Flow chart No.	Terminal No. ⊕	Terminal No. ⊖	Voltage
2	31	Body ground	Approx. 12V
3	30		
4	29		
5	28		

O.K.
2
3
4
5

N.G.

F Note

Check circuit continuity between fan switch and resistor.

CHECK FAN SWITCH AFTER DISCONNECTING IT.
(Refer to HA-57.)

N.G. → Replace fan switch.

O.K.

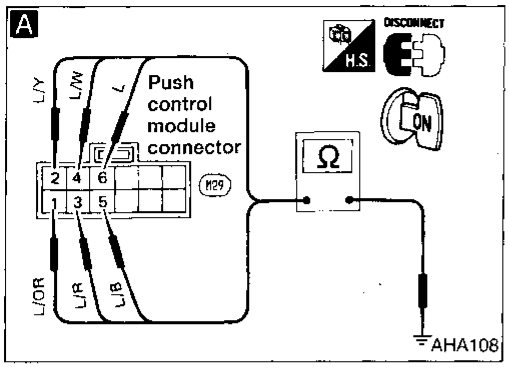
G Note

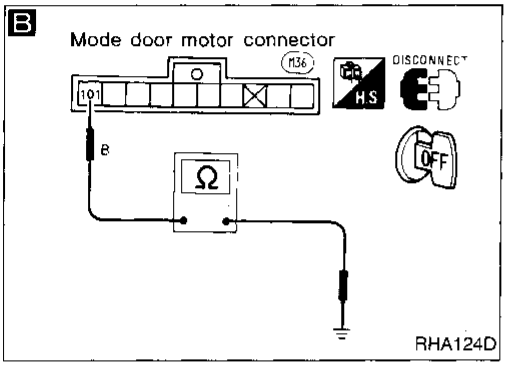
Check circuit continuity between fan switch harness terminal No. (104) and body ground.

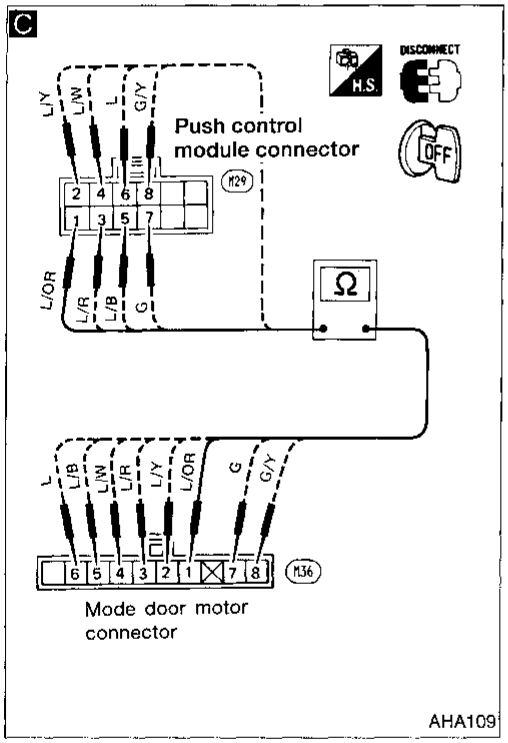
O.K.

Replace blower motor.

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







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.**

A

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

Mode switch	Terminal No. ⊕	Terminal No. ⊖	Continuity
VENT	① or ②	Body ground	Yes
B/L	② or ③		
FOOT	③ or ④		
F/D	④ or ⑤		
DEF	⑤ or ⑥		

N.G. → Disconnect mode door motor harness connector.

O.K. ↓

CHECK SIDE LINK.
Refer to HA-59.

B

Note

CHECK BODY GROUND CIRCUIT FOR MODE DOOR MOTOR.
Does continuity exist between mode door motor harness terminal No. (101) and body ground?

O.K. ↓

C

Note

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

Terminal No. ⊕ Push control module	Terminal No. ⊖ Mode door motor	Continuity
①	①	Yes
②	②	
③	③	
④	④	
⑤	⑤	
⑥	⑥	
⑦	⑦	
⑧	⑧	

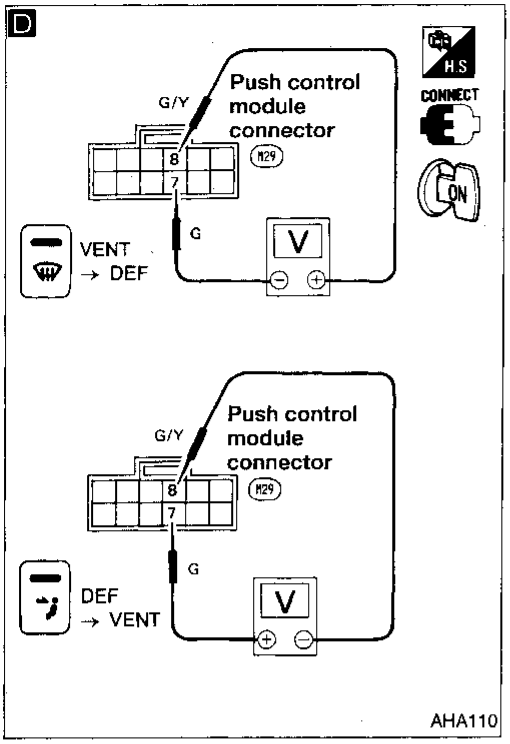
O.K. ↓

Ⓐ

(Go to next page.)

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

Diagnostic Procedure 2 (Cont'd)



Ⓐ

Reconnect push control module and mode door motor harness connectors.

D

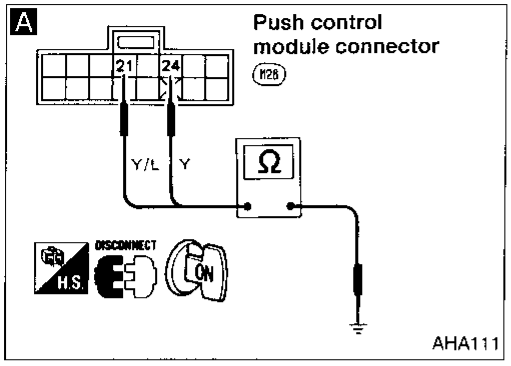
CHECK FOR OUTPUT OF PUSH CONTROL MODULE.
Do approx. 12 volts exist between push control module harness terminal No. ⑦ and ⑧ when mode is switched from "VENT" to "DEF" or when mode is switched from "DEF" to "VENT"?

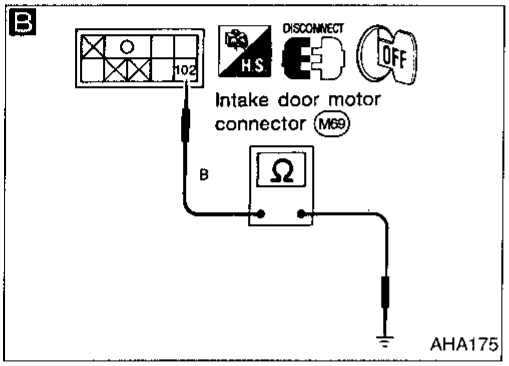
N.G. → Replace push control module.

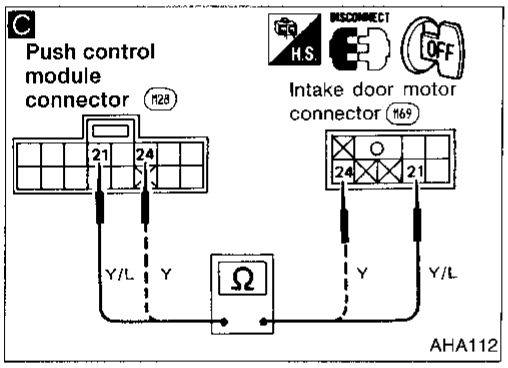
Terminal No.		Mode door motor	
⑦	⑧	Mode door operation	Direction of linkage rotation
⊖	⊖	Stop	Stop
⊖	⊕	VENT → DEF	Clockwise
⊕	⊖	DEF → VENT	Counterclockwise

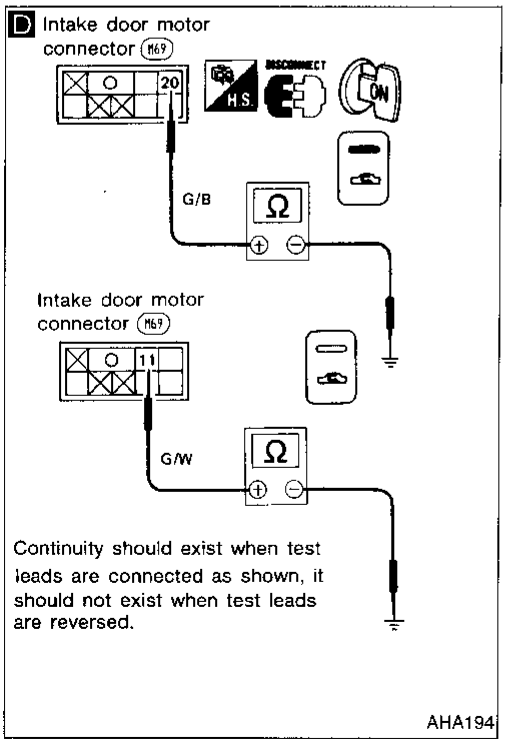
O.K.

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 INTAKE DOOR MOTOR POSITION SWITCH.
1. Turn REC switch ON with ignition switch at ON position.
2. Turn ignition switch OFF. Disconnect push control module connector.
3. Turn ignition switch ON. Check if continuity exists between terminal No. (21) of push control module harness connector and body ground.
4. Using above procedures, check for REC switch OFF position as indicated in chart.

REC switch	Terminal No. ⊕	Terminal No. ⊖	Continuity
ON	(21)	Body ground	Yes
OFF	(24)		

N.G. → Disconnect intake door motor harness connector.

O.K. → CHECK INTAKE DOOR LINK. Refer to HA-59.

B Note

CHECK BODY GROUND CIRCUIT FOR INTAKE DOOR MOTOR. Does continuity exist between intake door motor harness terminal No. (102) and body ground?

O.K. →

C Note

Check circuit continuity between push control module harness terminal No. (21) ((24)) and intake door motor harness terminal No. (21) ((24)).

O.K. → Reconnect push control module and intake door motor harness connector.

D

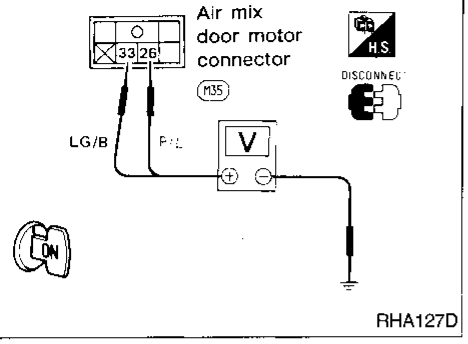
CHECK BODY GROUND CIRCUIT FOR INTAKE DOOR MOTOR. Does continuity exist between intake door motor harness terminal No. (20) and body ground when REC switch is ON? Does continuity exist between intake door motor harness terminal No. (11) and body ground when REC switch is OFF?

N.G. → Replace push control module.

O.K. → Replace intake door motor.

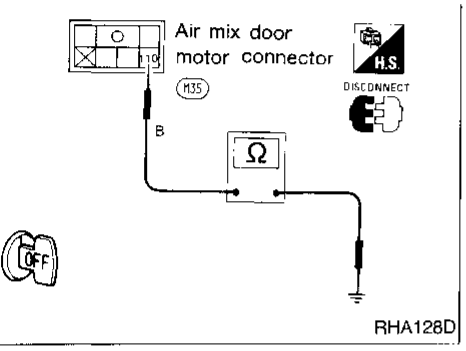
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

A



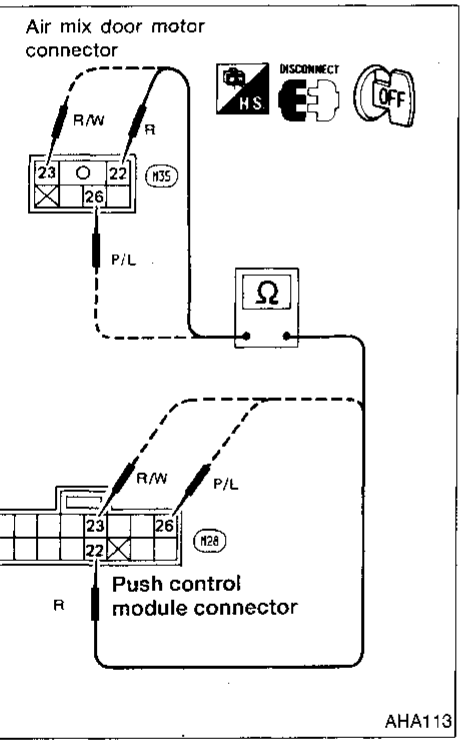
RHA127D

B



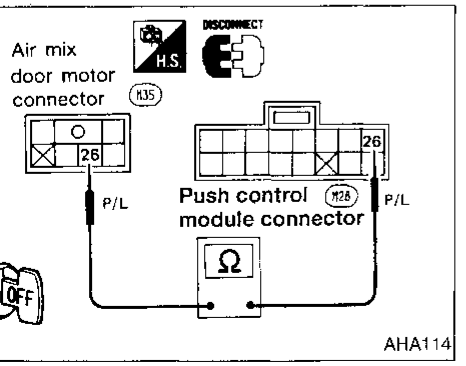
RHA128D

C



AHA113

D



AHA114

Diagnostic Procedure 4

SYMPTOM: Air mix door does not change.

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

A

CHECK POWER SUPPLY FOR AIR MIX DOOR MOTOR.
Disconnect air mix door motor harness connector.
Do approx. 12V exist between air mix door motor harness terminal No. (26) ((33)) and body ground?

N.G. → Disconnect push control module harness connector.

D Note

Check circuit continuity between push control module harness terminal No. (26) and air mix door motor harness terminal No. (26).

O.K. → Replace push control module.

O.K.

B Note

Check circuit continuity between air mix door motor harness terminal No. (110) and body ground.

O.K.

Disconnect push control module harness connector.

C Note

Check circuit continuity between each terminal on push control module and air mix door motor.

O.K.

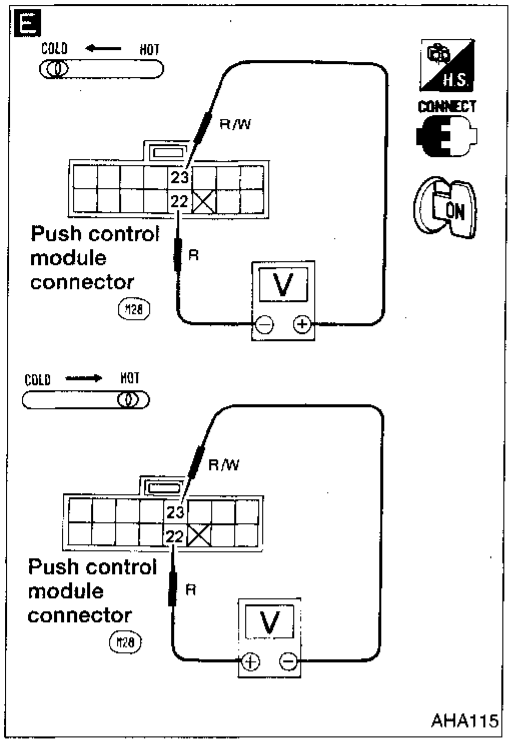
Reconnect push control module and air mix door motor harness connector.

(A)

(Go to next page.)

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

Diagnostic Procedure 4 (Cont'd)



Ⓐ

E

CHECK FOR PUSH CONTROL MODULE OUTPUT.
Do approx. 12 volts exist between push control module harness terminal No. ㉒ and ㉓ when temperature lever is slid from "HOT" to "COLD" or when temperature lever is slid from "COLD" to "HOT"?

Terminal No.		Air mix door motor	
㉒	㉓	Air mix door operation	Direction of linkage rotation
⊖	⊕	HOT → COLD	Clockwise
⊕	⊖	COLD → HOT	Counterclockwise
⊖	⊖	STOP	STOP

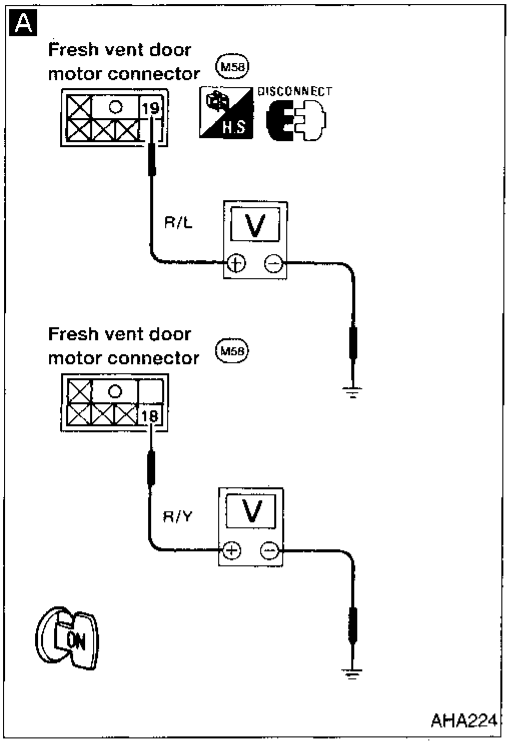
N.G. → Replace push control module.

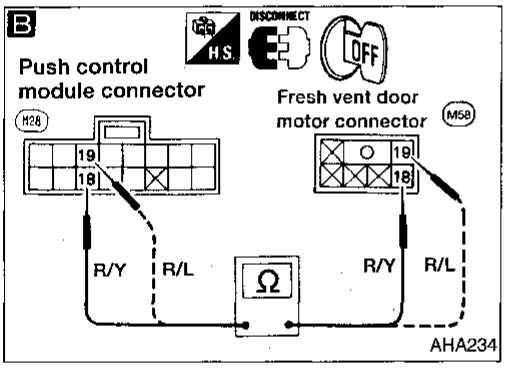
O.K. ↓

CHECK AIR MIX DOOR.
(Refer to HA-59.)

O.K. ↓

Replace air mix door motor.





Diagnostic Procedure 5

SYMPTOM: Fresh vent door does not operate.

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

A

CHECK POWER SUPPLY FOR FRESH VENT DOOR MOTOR.
Disconnect fresh vent door motor harness connector.
Do approx. 12 volts exist between fresh vent motor harness terminal No. ⑲ and body ground when B/L SWITCH is pressed ON?
Do approx. 12 volts exist between fresh vent door motor harness terminal No. ⑱ and body ground when B/L SWITCH is pressed OFF?

N.G. → Disconnect push control module connector.

B

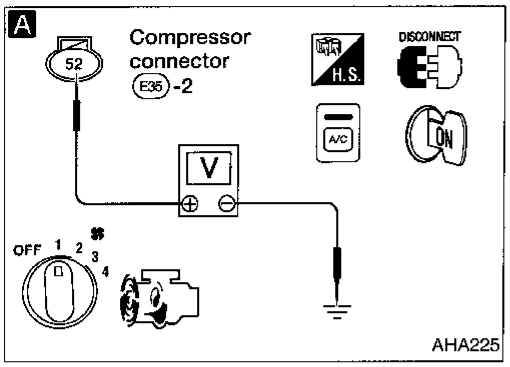
Check circuit continuity between fresh vent door motor harness terminal No. ⑱ (⑲) and push control module harness terminal No. ⑱ (⑲).

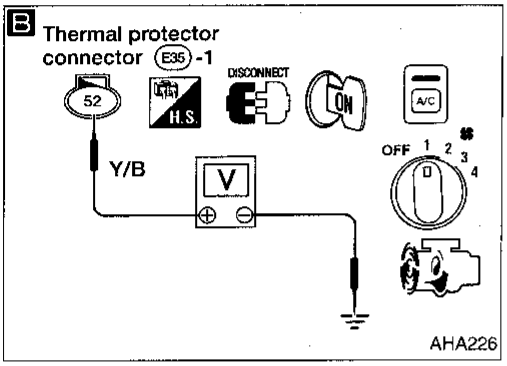
Note

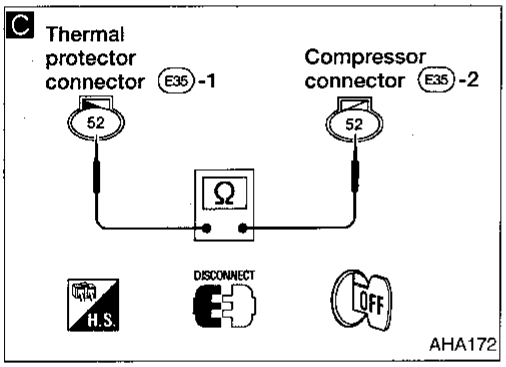
O.K. → Replace push control module.

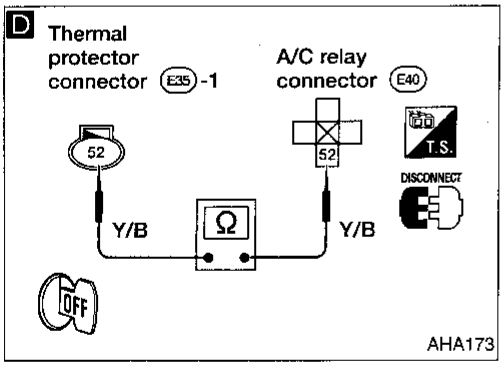
O.K. → Replace fresh vent door motor.

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









Diagnostic Procedure 6

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

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

A

CHECK POWER SUPPLY FOR COMPRESSOR.
Disconnect compressor harness connector.
Do approx. 12 volts exist between compressor harness terminal No. (52) and body ground?

N.G. → B

O.K. ↓

Check magnet clutch coil.

O.K. ↓

Replace magnet clutch.
Refer to HA-142.

B

CHECK POWER SUPPLY FOR THERMAL PROTECTOR.
Disconnect thermal protector harness connector.
Do approx. 12V exist between thermal protector harness terminal No. (52) and body ground?

O.K. ↓ C

N.G. → (A)

C

CHECK THERMAL PROTECTOR.
Check circuit continuity between thermal protector harness terminal No. (52) and compressor harness terminal No. (52).

N.G. ↓

Replace thermal protector.

(A) ↓

Disconnect A/C relay harness connector.

D

Note

Check circuit continuity between A/C relay harness terminal No. (52) and thermal protector harness terminal No. (52).

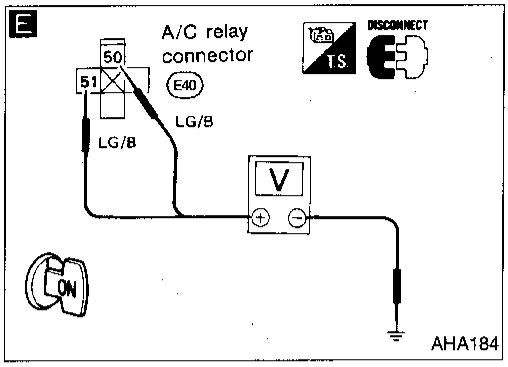
O.K. ↓

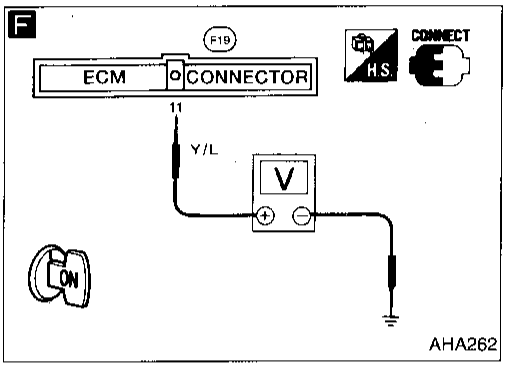
(B)

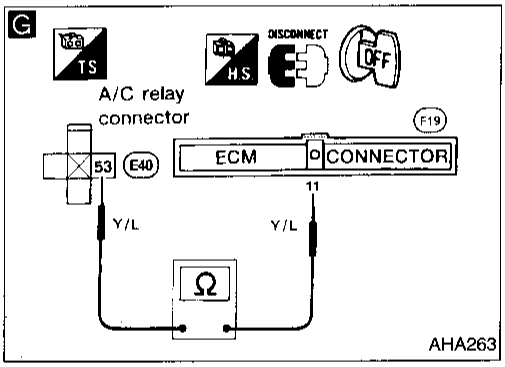
(Go to next page.)

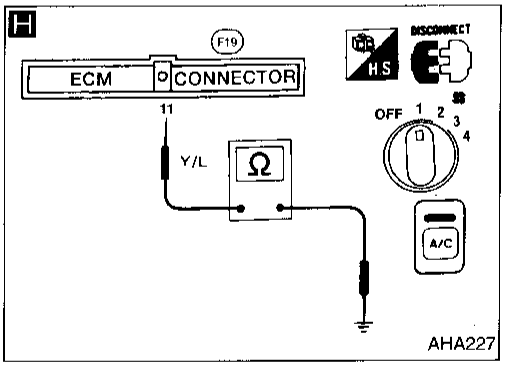
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

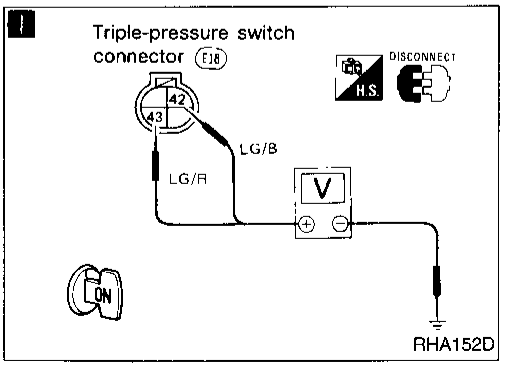
Diagnostic Procedure 6 (Cont'd)











Ⓑ

E

CHECK POWER SUPPLY FOR A/C RELAY.
Do approx. 12 volts exist between A/C relay harness terminals (50), (51) and body ground?

O.K. → CHECK A/C RELAY. (Refer to HA-58.)

O.K. → **F**

CHECK COIL SIDE CIRCUIT OF A/C RELAY.
Do approx. 12 volts exist between ECM (ECCS control module) harness terminal No. (11) and body ground?
(For terminal arrangement, refer to HA-35.)

O.K. → **H**

Disconnect ECM (ECCS control module) harness connector.
Does continuity exist between ECM (ECCS control module) harness terminal No. (11) and body ground?
(For terminal arrangement, refer to HA-35.)

O.K. → CHECK ECM (ECCS control module). Refer to EF & EC section ("Diagnostic Procedure 28", "TROUBLE DIAGNOSES").

H N.G. → Reconnect ECM (ECCS control module) harness connector.

F N.G. → **G**

Check circuit continuity between A/C relay harness terminal No. (53) and ECM (ECCS control module) harness terminal No. (11).
(For terminal arrangement, refer to HA-35.)

CHECK A/C RELAY. (Refer to HA-58.) N.G. → Replace A/C relay.

E N.G. → CHECK POWER SUPPLY CIRCUIT AND 10A FUSE AT FUSE BLOCK. Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

Reconnect ECM (ECCS control module) harness connector. → **I**

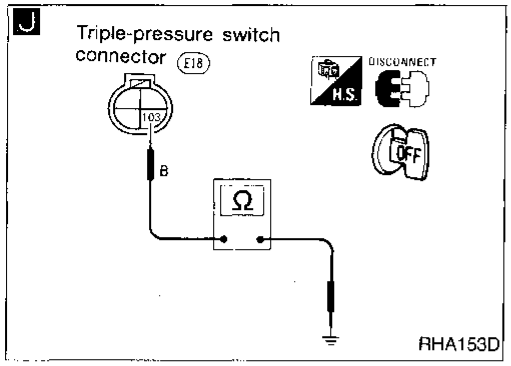
CHECK TRIPLE-PRESSURE SWITCH CIRCUIT BETWEEN TRIPLE-PRESSURE SWITCH AND ECM (ECCS control module.)
Disconnect triple-pressure switch harness connector.
Do approx. 0 volts exist between triple-pressure switch harness terminals No. (42), (43) and body ground?

O.K. → Ⓒ (Go to next page.)

N.G. → Ⓓ (Go to next page.)

Diagnostic Procedure 6 (Cont'd)

J



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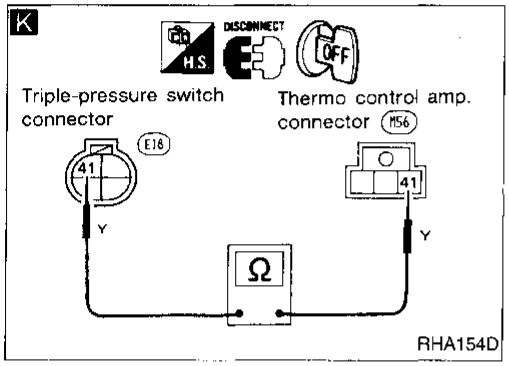
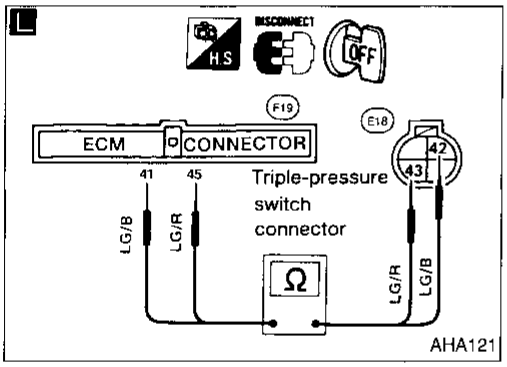


L



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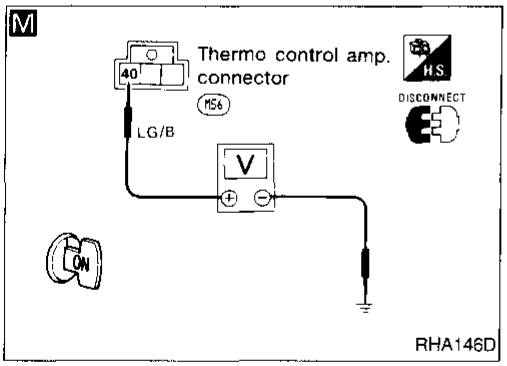
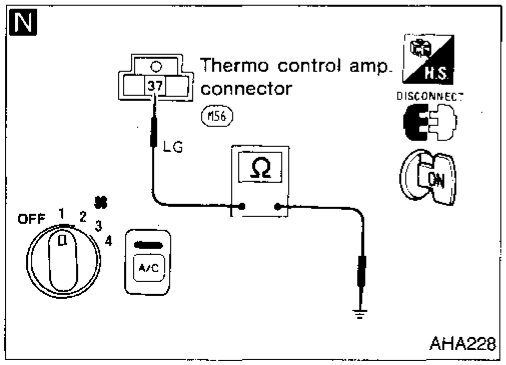


N



Ⓒ

J Note

Check circuit continuity between triple-pressure switch harness terminal No. (103) and body ground?

O.K.

CHECK TRIPLE-PRESSURE SWITCH. (Refer to HA-58.)

N.G. → **L** Note

Check circuit continuity between ECM (ECCS control module) harness terminal No. (41) ((45)) and triple-pressure switch harness terminal No. (42) ((43)). (For terminal arrangement, refer to HA-35.)

O.K.

Check ECM (ECCS control module). Refer to EF & EC section "ECM (ECCS Control Module) (Diagnostic trouble code No. 31)", "TROUBLE DIAGNOSES").

Replace triple-pressure switch.

O.K.

Disconnect thermo control amp. harness connector.

K Note

Check circuit continuity between triple-pressure switch harness terminal No. (41) and thermo control amp. harness terminal No. (41).

O.K.

M

CHECK POWER SUPPLY FOR THERMO CONTROL AMP.
Disconnect thermo control amp. harness connector.
Do approx. 12 volts exist between thermo control amp. harness terminal No. (40) and body ground?

N.G. → Check 10A fuses at fuse block
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

O.K.

N

CHECK BODY GROUND CIRCUIT FOR THERMO CONTROL AMP.
Does continuity exist between thermo control amp. harness terminal No. (37) and body ground?

N.G. → Disconnect A/C switch harness connector.

O.K.

Replace thermo control amp.

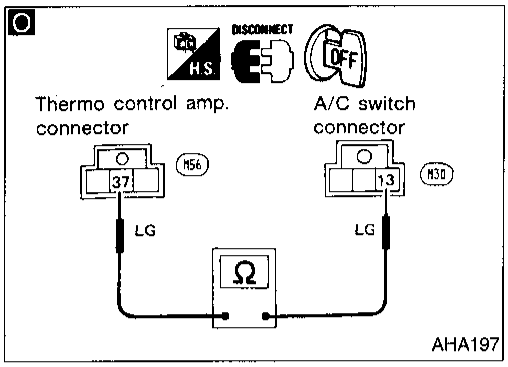
Ⓓ

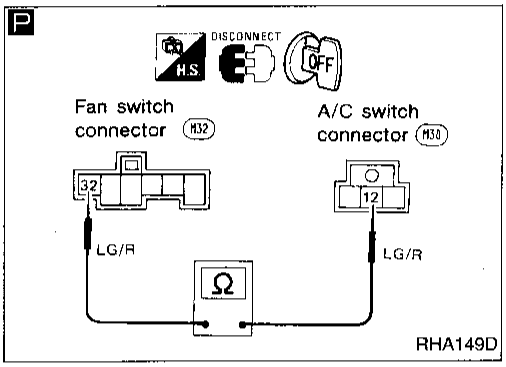
Disconnect ECM (ECCS control module) harness connector.

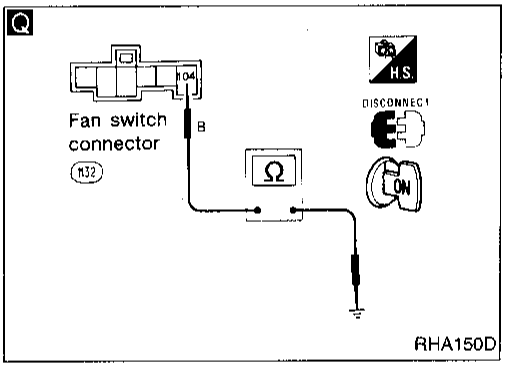
Ⓔ
(Go to next page.)

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

Diagnostic Procedure 6 (Cont'd)







Ⓔ

O Note

Check circuit continuity between thermo control amp. harness terminal No. (37) and A/C switch harness terminal No. (13).

O.K.

CHECK A/C SWITCH. (Refer to HA-57.)

N.G. → Replace A/C switch.

O.K.

Disconnect fan switch harness connector.

O.K.

P Note

Check circuit continuity between A/C switch harness terminal No. (12) and fan switch harness terminal No. (32).

O.K.

Q Note

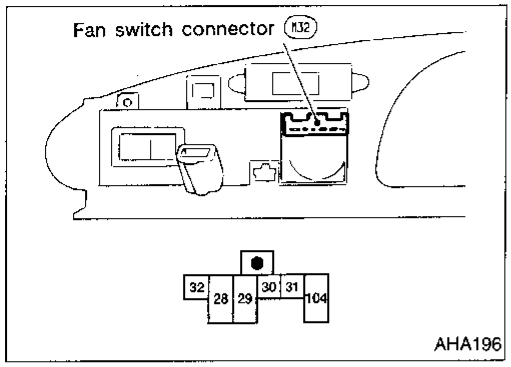
CHECK BODY GROUND CIRCUIT FOR FAN SWITCH.
Does continuity exist between fan switch harness terminal No. (104) and body ground?

O.K.

CHECK FAN SWITCH. (Refer to HA-57.)

N.G. → Replace fan switch.

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

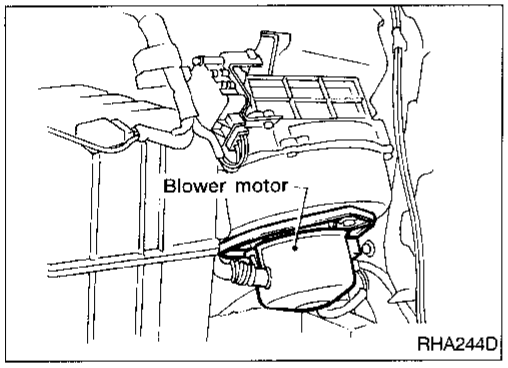


Electrical Components Inspection

FAN SWITCH

Check continuity between terminals at each position.

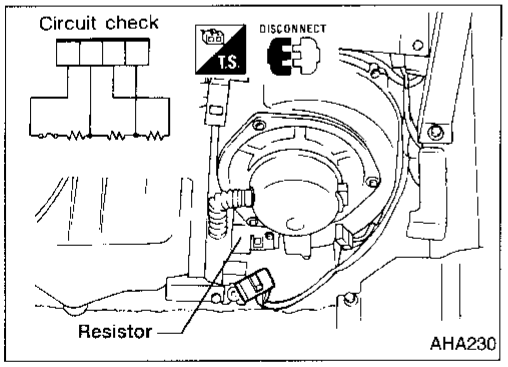
TERMINAL	POSITION				
	OFF	1	2	3	4
28					○
29				○	
30			○		
31		○			
32		○	○	○	○
104		○	○	○	○



BLOWER MOTOR

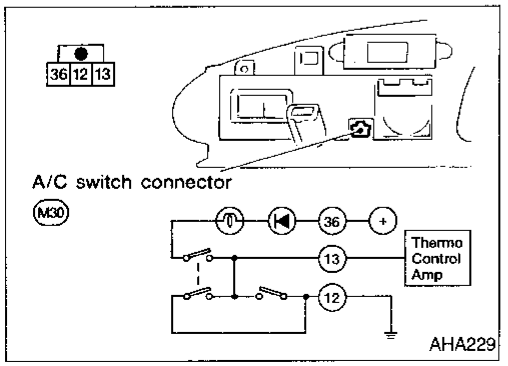
Check blower motor for smooth rotation.

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



BLOWER RESISTOR

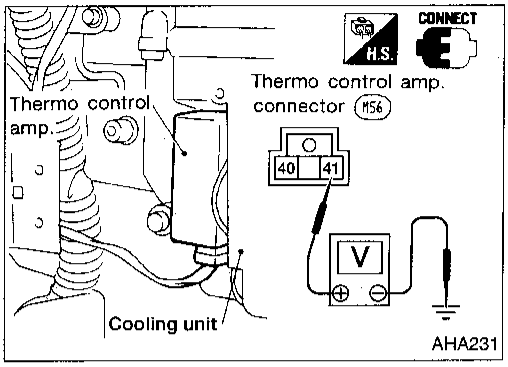
Check continuity between terminals.



A/C SWITCH

Check continuity between terminals.

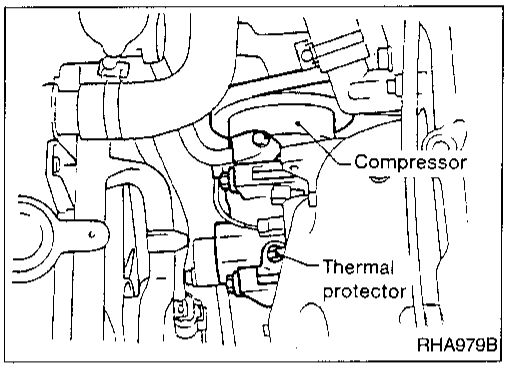
Electrical Components Inspection (Cont'd)



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.

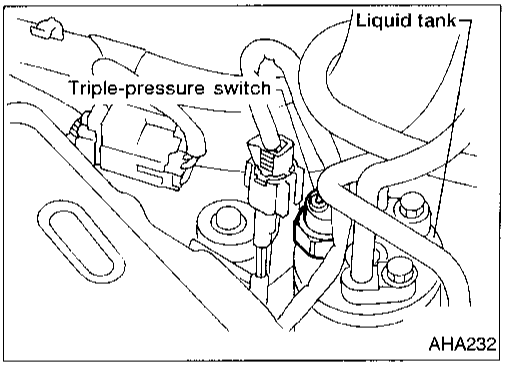
Evaporator outlet air temperature °C (°F)	Thermo amp. operation	Tester
Decreasing to 2.5 - 3.5 (37 - 38)	Turn OFF	Approx. 12V
Increasing to 4.0 - 5.0 (39 - 41)	Turn ON	Approx. 0V



THERMAL PROTECTOR

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

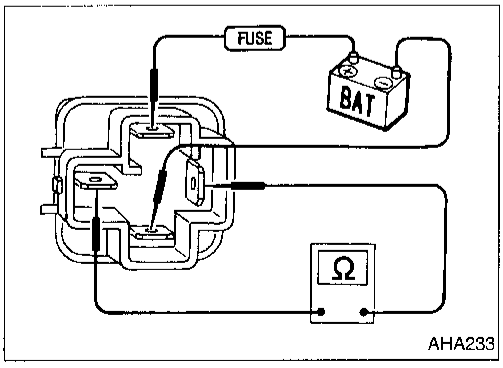
If N.G., replace thermal protector.



TRIPLE-PRESSURE SWITCH

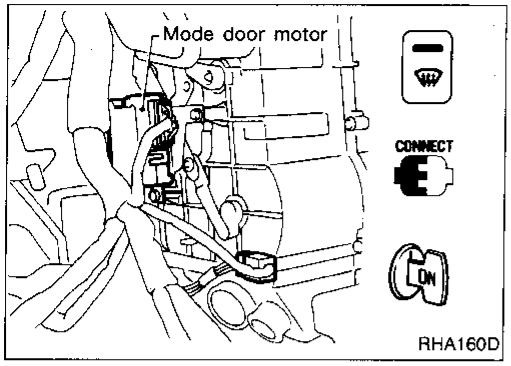
	ON kPa (kg/cm^2, psi)	OFF kPa (kg/cm^2, psi)
Low-pressure side	157 - 226 (1.6 - 2.3, 23 - 33)	152.0 - 201.0 (1.55 - 2.05, 22.0 - 29.2)
Medium-pressure side*	1,422 - 1,618 (14.5 - 16.5, 206 - 235)	1,128 - 1,422 (11.5 - 14.5, 164 - 206)
High-pressure side	1,667 - 2,059 (17 - 21, 242 - 299)	2,452 - 2,844 (25 - 29, 356 - 412)

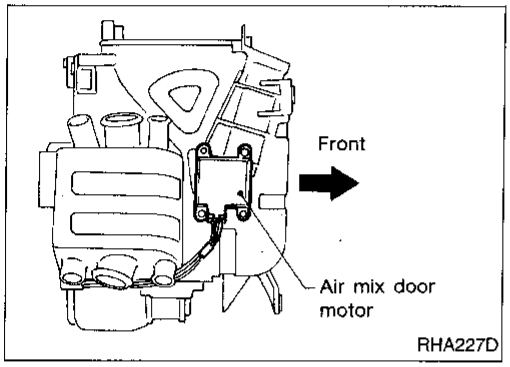
* For cooling fan motor operation.

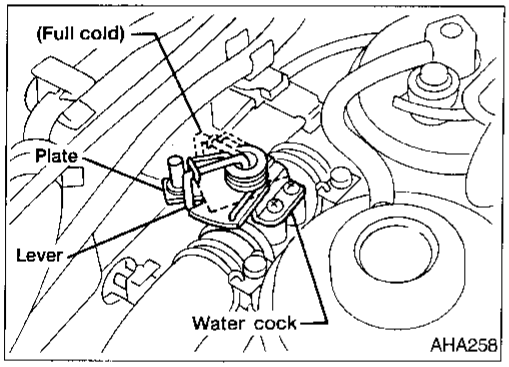


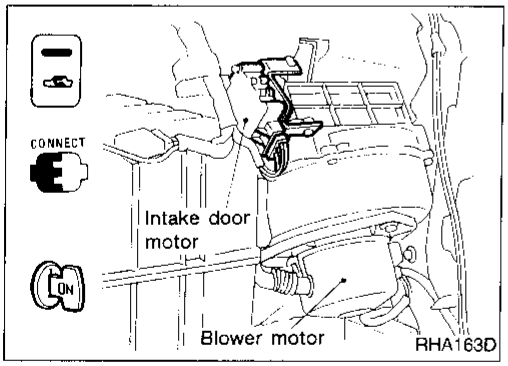
A/C RELAY

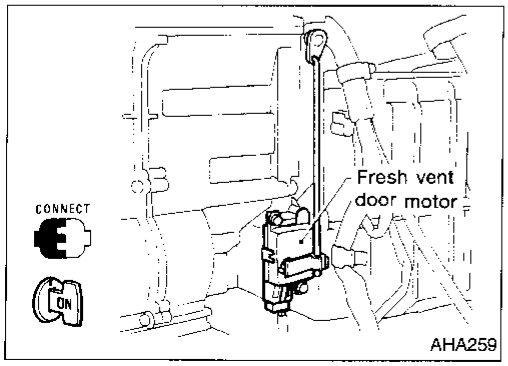
Check circuit continuity between terminals by supplying 12 volts to coil side terminals of the relay.











Control Linkage Adjustment

MODE DOOR

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

AIR MIX DOOR (Water cock)

1. Move air mix link by hand and hold air mix door in full cold position.
2. Install air mix door motor on heater unit and connect sub-harness.
3. Turn ignition switch to ON.
4. Slide temperature control lever to full cold.
5. Attach air mix door motor rod to air mix door link rod holder.
6. Check that air mix door operates properly when temperature control lever is slid to full hot and full cold.
7. Slide temperature control lever to full cold.
8. Attach water cock cable to air mix door linkage and secure with clip.
9. Rotate and hold water cock lever AND plate in the full cold position (CLOCKWISE completely).
10. Attach water cock cable to plate and secure with clip (white mark on cable housing should be centered under the retaining clip).
11. Check that water cock operates properly when temperature lever is slid to full hot and full cold. (After several cycles, water cock lever should be midpoint of plate opening when temperature slider is full cold).

INTAKE DOOR

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

FRESH VENT DOOR

1. Connect fresh vent door motor harness connector before installing fresh vent door motor.
2. Turn ignition switch to ON.
3. Install fresh vent door motor on heater unit.
4. Attach fresh vent door rod to fresh vent door link rod holder.
5. Check that fresh vent door operates properly when bi-level switch is turned ON and OFF with the temperature control lever in the middle position.

Introduction

The Automatic Temperature Control (ATC) system provides automatic regulation of the vehicles interior temperature based on the operator selected "set temperature", regardless of the outside temperature changes. This is done by utilizing a microcomputer, also referred to as the automatic amplifier, which receives input signals from several sensors. The automatic amplifier uses these input signals (including the set temperature) to automatically control the ATC system's outlet air volume, air temperature, and air distribution.

Features

Air mix door control (Automatic temperature control)

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

Fan speed control

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

Intake door control

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

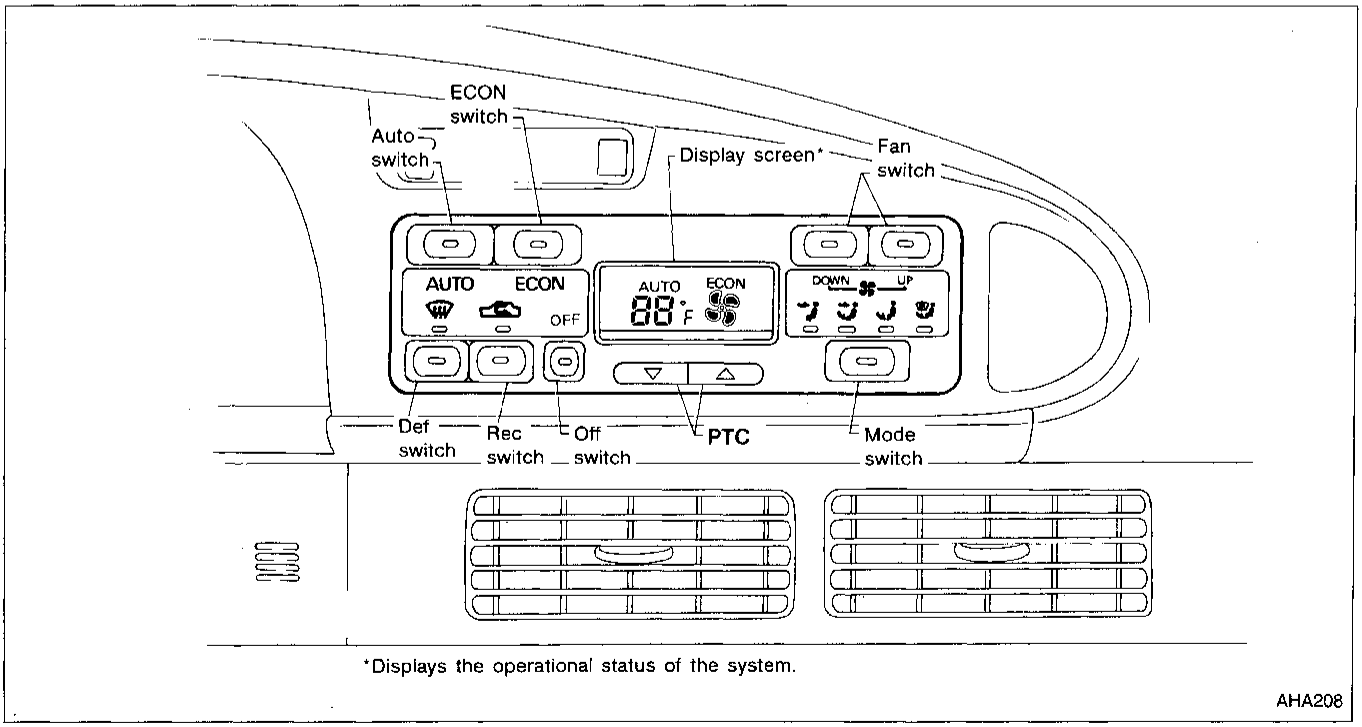
Outlet door control

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

Self-diagnostic system

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

Control Operation



*Displays the operational status of the system.

AHA208

Control Operation (Cont'd)

AUTO SWITCH

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

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

ECON SWITCH

Fully automatic control with the compressor off. With the compressor off, the system will not remove heat (cool) or de-humidify. The system will maintain the in-vehicle temperature at the set temperature when the set temperature is above the ambient (outside) temperature.

PTC (Potentio Temperature Control)

Increases or decreases the set temperature.

OFF SWITCH

The compressor and blower are off, the air intake doors are set to the outside air position, and the mode doors are set to the foot (78% foot and 22% defrost) position. In the off position the ATC system uses the vehicle's "flow through" ventilation to try to maintain the interior temperature based on the temperature set when the system was last operating.

FAN SWITCH

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

MODE SWITCH

Manual control of the air discharge outlets. Four selections are available (as shown on the display screen):
face , bi-level , foot , defrost/foot

REC SWITCH

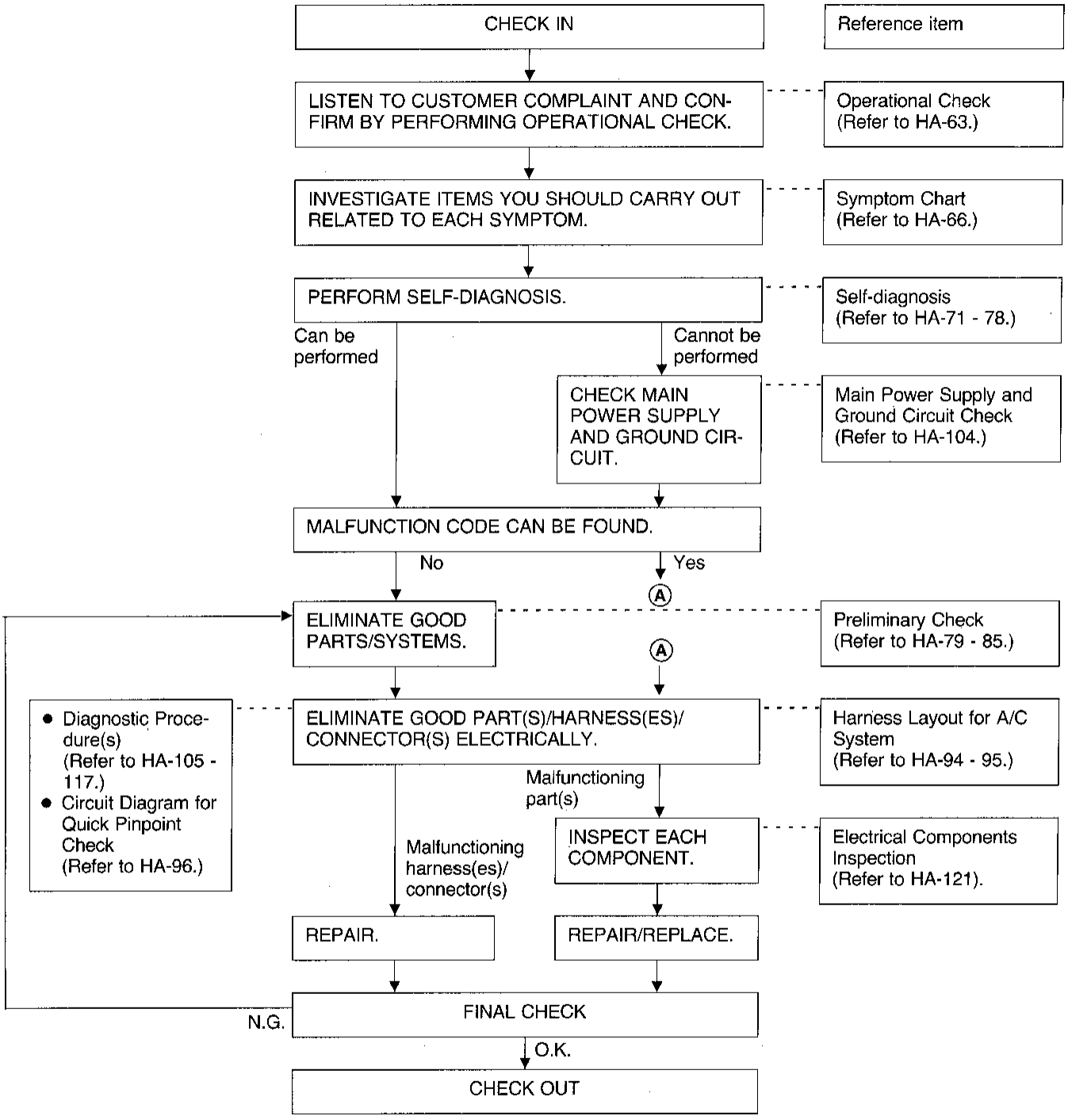
ON position: Interior air is recirculated inside the vehicle.
OFF position: Automatic control resumes.
RECIRC is canceled when AUTO, DEF or F/D is selected. RECIRC resumes when another mode is chosen.

DEF SWITCH

Positions the mode doors to the defrost position. Also positions the air intake doors to the outside air position. The compressor operates at ambient temperature approx. 2°C (35°F) or above.

How to Perform Trouble Diagnoses for Quick and Accurate Repair

WORK FLOW

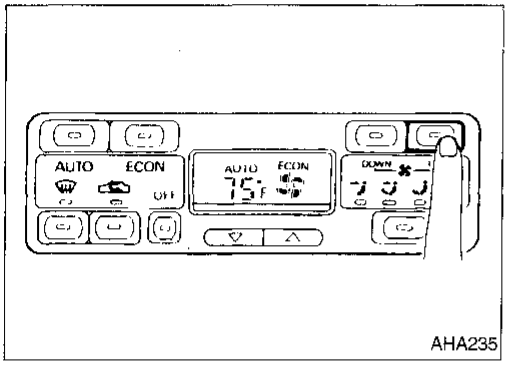


Operational Check

The purpose of the operational check is to confirm that the system is as it should be. The systems which will be checked are the blower, mode (discharge air), intake air, temperature decrease, temperature increase, A/C switch and the memory function.

CONDITIONS:

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

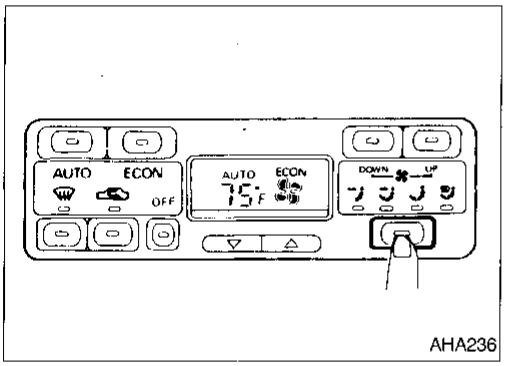


AHA235

PROCEDURE:

1. Check blower

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



AHA236

2. Check discharge air.

1) Press mode switch four times and DEF button.
2) Confirm that discharge air comes out according to the air distribution table at left.

Refer to "Discharge Air Flow", "DESCRIPTION" (HA-13).

NOTE:

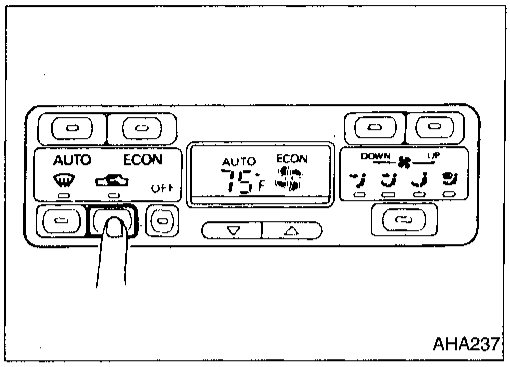
Confirm that the compressor clutch is engaged (visual inspection) and intake door position is at FRESH when the DEF button is pressed.
Intake door position is checked in the next step.

Discharge air flow

Switch mode/ indicator	Air outlet/distribution		
	Face	Foot	Defroster
	100%	—	—
	60%	40%	—
	—	78%	22%
	—	55%	45%
	—	—	100%

AHA213

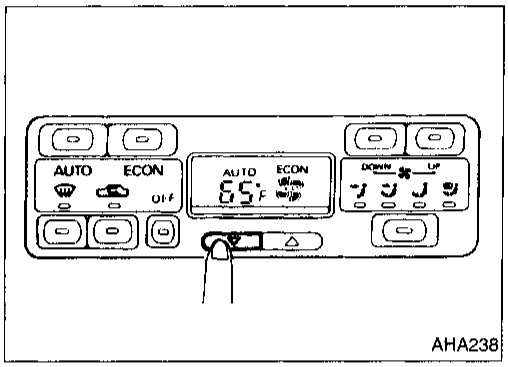
Operational Check (Cont'd)



AHA237

3. Check recirc

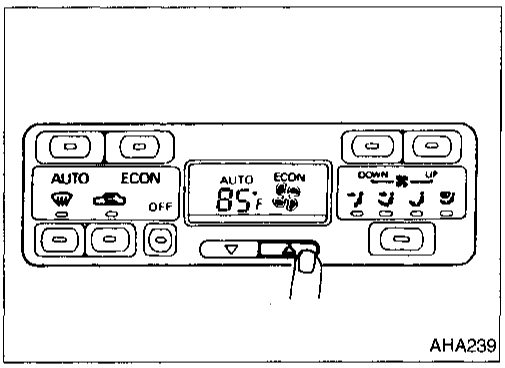
1) Press REC switch
   Recirc indicator should illuminate.
2) Listen for intake door position change (you should hear blower sound change slightly).



AHA238

4. Check temperature decrease

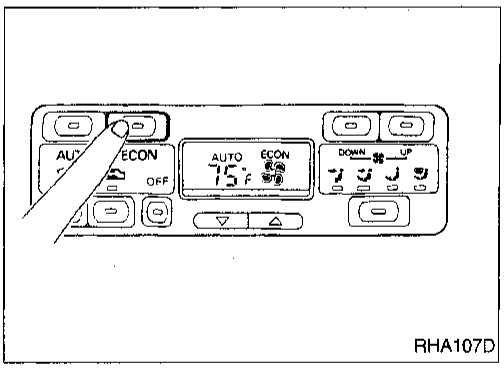
1) Press the temperature decrease button until 18°C (65°F) is displayed.
2) Check for cold air at discharge air outlets.



AHA239

5. Check temperature increase

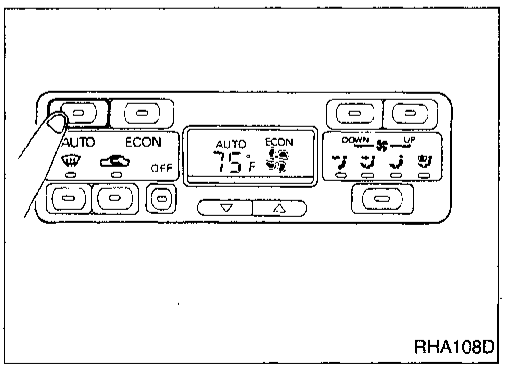
1) Press the temperature increase button until 32°C (85°F) is displayed.
2) Check for hot air at discharge air outlets.



RHA107D

6. Check ECON mode

1) Press ECON switch.
2) Display should indicate ECON (no AUTO, no MANUAL).
   Confirm that the compressor clutch is not engaged (visual inspection).
   (Discharge air will depend on ambient, in-vehicle, and set temperatures).

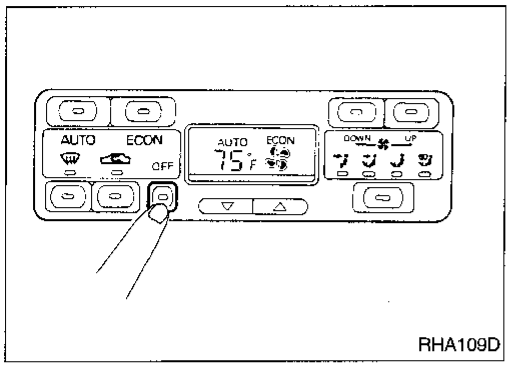


RHA108D

7. Check AUTO mode

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

Operational Check (Cont'd)



RHA109D

8. Check memory function

1) Press OFF switch.
2) Turn the ignition off.
3) Turn the ignition on.
4) Press the AUTO switch.
5) Confirm that the set temperature remains at previous temperature.

Symptom Chart

DIAGNOSTIC TABLE

PROCEDURE			Self-diagnosis						Preliminary Check								Diagnostic Procedure			
REFERENCE PAGE			HA-72, 74	HA-72, 74	HA-73, 75	HA-73, 76	HA-73, 76	HA-78	HA-79	HA-80	HA-81	HA-82	HA-83	HA-84	HA-85	HA-86	HA-105	HA-106	HA-107	HA-108
SYMPTOM			STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	AUXILIARY MECHANISM	Preliminary Check 1	Preliminary Check 2	Preliminary Check 3	Preliminary Check 4	Preliminary Check 5	Preliminary Check 6	Preliminary Check 7	Preliminary Check 8	Diagnostic Procedure 1	Diagnostic Procedure 2	Diagnostic Procedure 3	Diagnostic Procedure 4
Air outlet does not change.			❶	❷	○	○	○		❸								○	○	○	○
Intake door does not change.			❶	❷		○	○			❸							○	○	○	○
Insufficient cooling			○	○	○	○	○	○	○	○	❶		○	○	○		○	○	○	○
Insufficient heating			○	○	○	○	○	○	○	○		❶	○		○		○	○	○	○
Blower motor operation is malfunctioning.			❶	❷		○	○						❸				○	○	○	○
Magnet clutch does not engage.			❶	❷		○	○							❸			○	○	○	○
Discharged air temperature does not change.			❶	❷		○	○								❸		○	○	○	○
Noise																❶				
Result Self-diagnosis STEP 2	21	Ambient sensor circuit is open.	❶	❷			❸										❹			
	22	In-vehicle sensor circuit is open.	❶	❷			❸											❹		
	25	Sunload sensor circuit is open.	❶	❷															❸	
	26	PBR circuit is open.	❶	❷																❸

❶, ❷, ...: The number means checking order.
○: Checking order depends on malfunction in each flow chart.

Symptom Chart (Cont'd)

Diagnostic Procedure						Main Power Supply and Ground Circuit Check					Electrical Components Inspection																					
HA-109	HA-111	HA-112	HA-113	HA-114	HA-117	HA-104	HA-104	HA-104	HA-104	HA-104	HA-126	HA-125	HA-126	HA-129	HA-129	HA-131	HA-132	HA-123	HA-121	HA-121	HA-121	HA-121	HA-121	HA-135	Refer to EF & EC section.							—
Diagnostic Procedure 5	Diagnostic Procedure 6	Diagnostic Procedure 7	Diagnostic Procedure 8	Diagnostic Procedure 9	Diagnostic Procedure 10	Auto amp.	10A Fuse #23	20A Fuses #4 and #5	10A Fuse #10	10A Fuse #20	Ambient sensor	In-vehicle sensor	Sunload sensor	PBR	Air mix door motor	Mode door motor	Intake door motor	Fresh vent door motor	Blower motor	Thermo control amp.	Blower high relay	A/C relay	Triple-pressure switch	Magnet clutch (Compressor)	ECM (ECCS control module)	Cooling fan motor-1	Cooling fan motor-2	Cooling fan relay-1	Cooling fan relay-2	Cooling fan relay-3	Vehicle speed sensor	Harness
○						○	○	○		○	○	○	○	○		○																○
	○					○	○	○		○	○	○	○	○			○															○
○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○
			○			○	○	○		○	○	○	○	○	○	○	○	○	○	○	○											○
				○		○	○	○		○	○	○	○	○					○	○	○				○							○
					○	○	○	○	○	○	○											○	○	○	○							○
		○	○			○	○	○	○	○	○	○	○	○	○			○														○
											○																					○
												○																				○
													○																			○
														○																		○

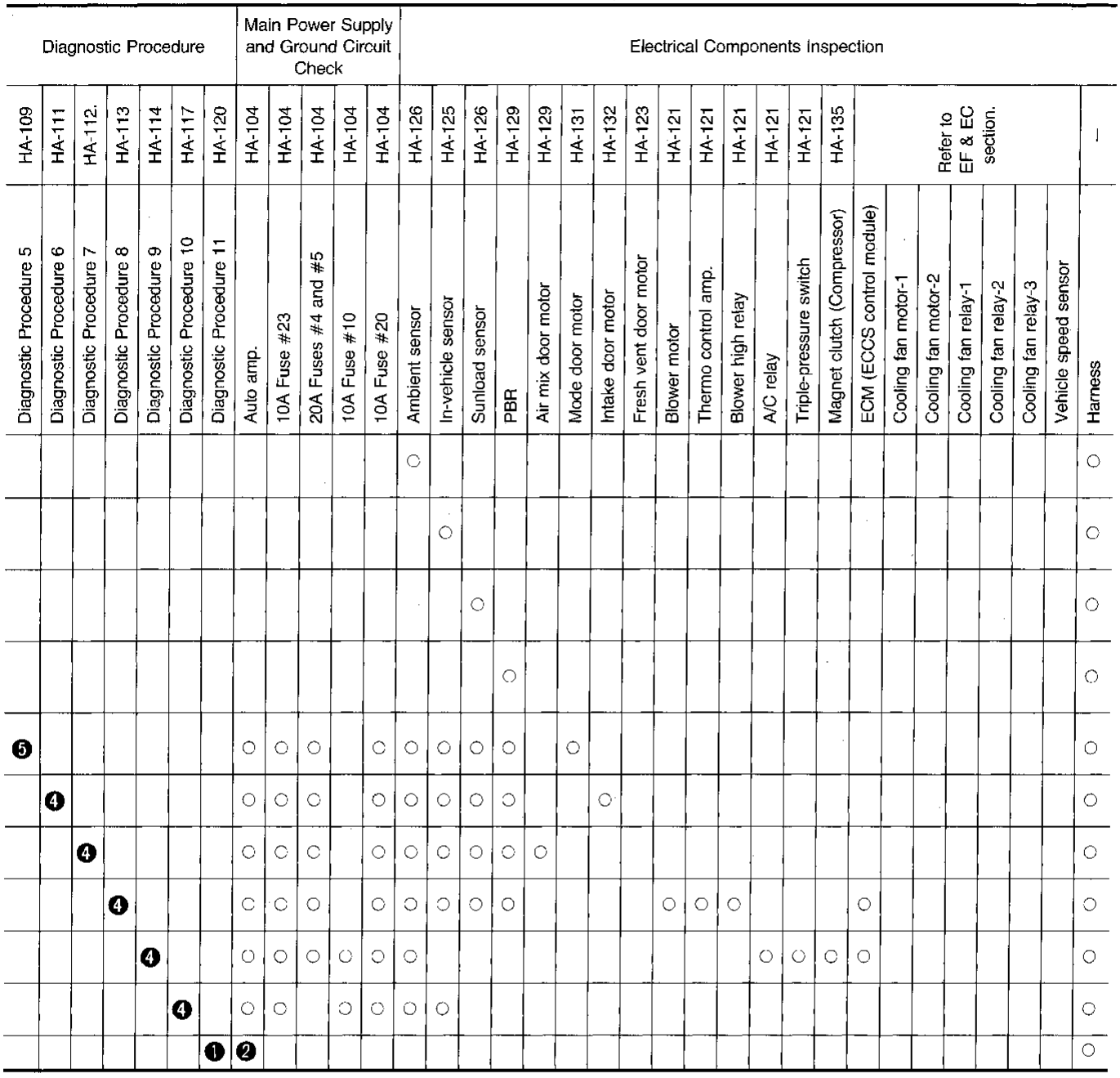
GI MA EM LC EF & EC FE CL MT AT FA RA BR ST BF HA EL IDX

Symptom Chart (Cont'd)

PROCEDURE			Self-diagnosis						Preliminary Check								Diagnostic Procedure			
REFERENCE PAGE			HA-72, 74	HA-72, 74	HA-73, 75	HA-73, 76	HA-73, 76	HA-78	HA-79	HA-80	HA-81	HA-82	HA-83	HA-84	HA-85	HA-86	HA-105	HA-106	HA-107	HA-108
SYMPTOM			STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	AUXILIARY MECHANISM	Preliminary Check 1	Preliminary Check 2	Preliminary Check 3	Preliminary Check 4	Preliminary Check 5	Preliminary Check 6	Preliminary Check 7	Preliminary Check 8	Diagnostic Procedure 1	Diagnostic Procedure 2	Diagnostic Procedure 3	Diagnostic Procedure 4
Result of Self-diagnosis STEP 2	ECON 21	Ambient sensor circuit is shorted.	❶	❷			❸										❹			
	ECON 22	In-vehicle sensor circuit is shorted.	❶	❷			❸											❹		
	ECON 25	Sunload sensor circuit is shorted.	❶	❷															❸	
	ECON 26	PBR circuit is shorted.	❶	❷																❸
Mode door motor does not operate normally.			❶	❷	❸	❹	○										○	○	○	○
Intake door motor does not operate normally.			❶	❷		❸	○										○	○	○	○
Air mix door motor does not operate normally.			❶	❷		❸	○										○	○	○	○
Fresh vent door does not operate normally.			❶	❷		❸														
Blower motor operation is malfunctioning under Starting Fan Speed Control.			❶	❷		○	○						❸				○	○	○	○
Magnet clutch does not operate after performing Preliminary Check 6.			❶	❷		○	○							❸			○	○	○	○
Self-diagnosis cannot be performed.																				

❶, ❷, ...: The number means checking order.
○: Checking order depends on malfunction in each flow chart.

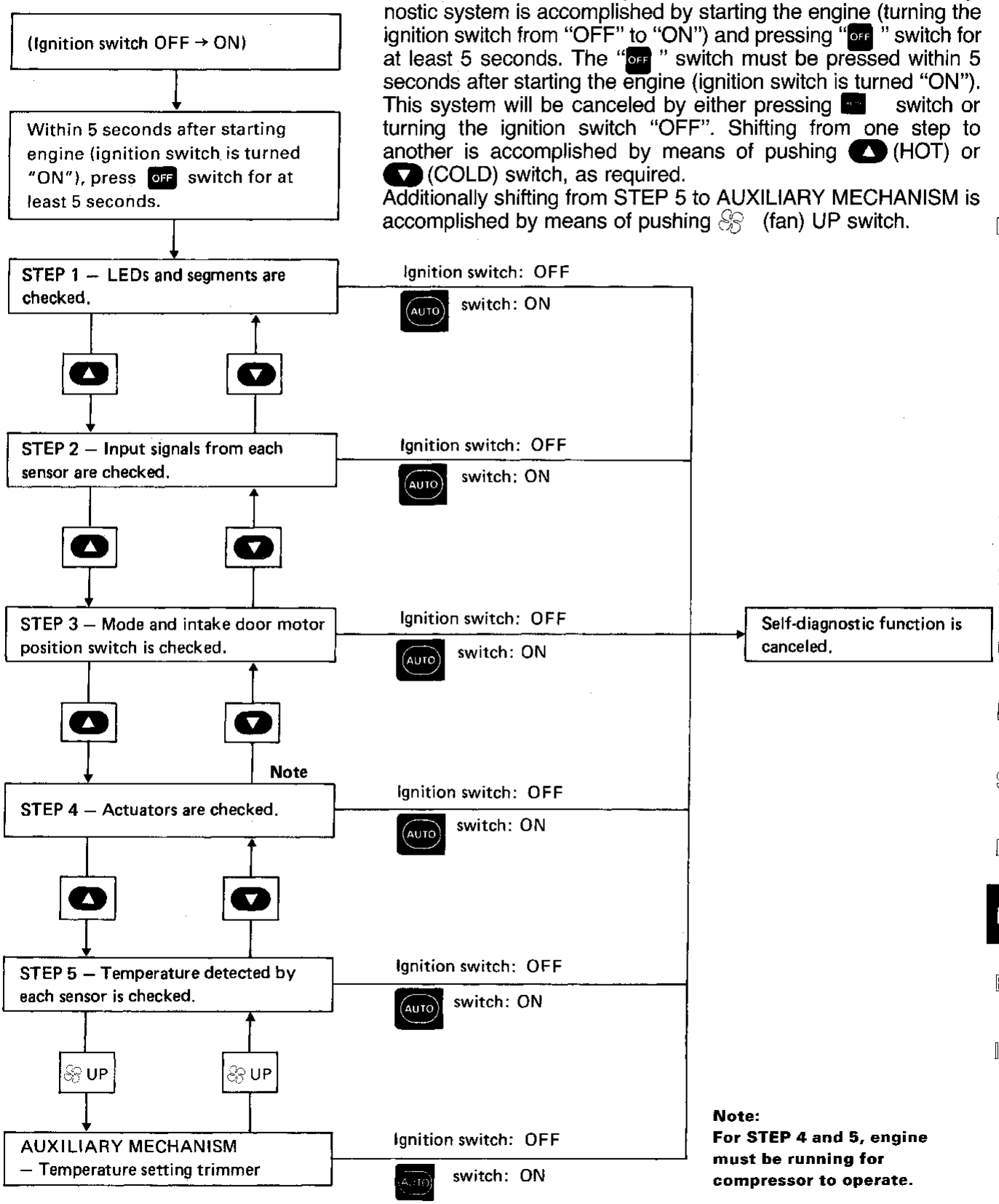
Symptom Chart (Cont'd)



NOTE

Self-diagnosis

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

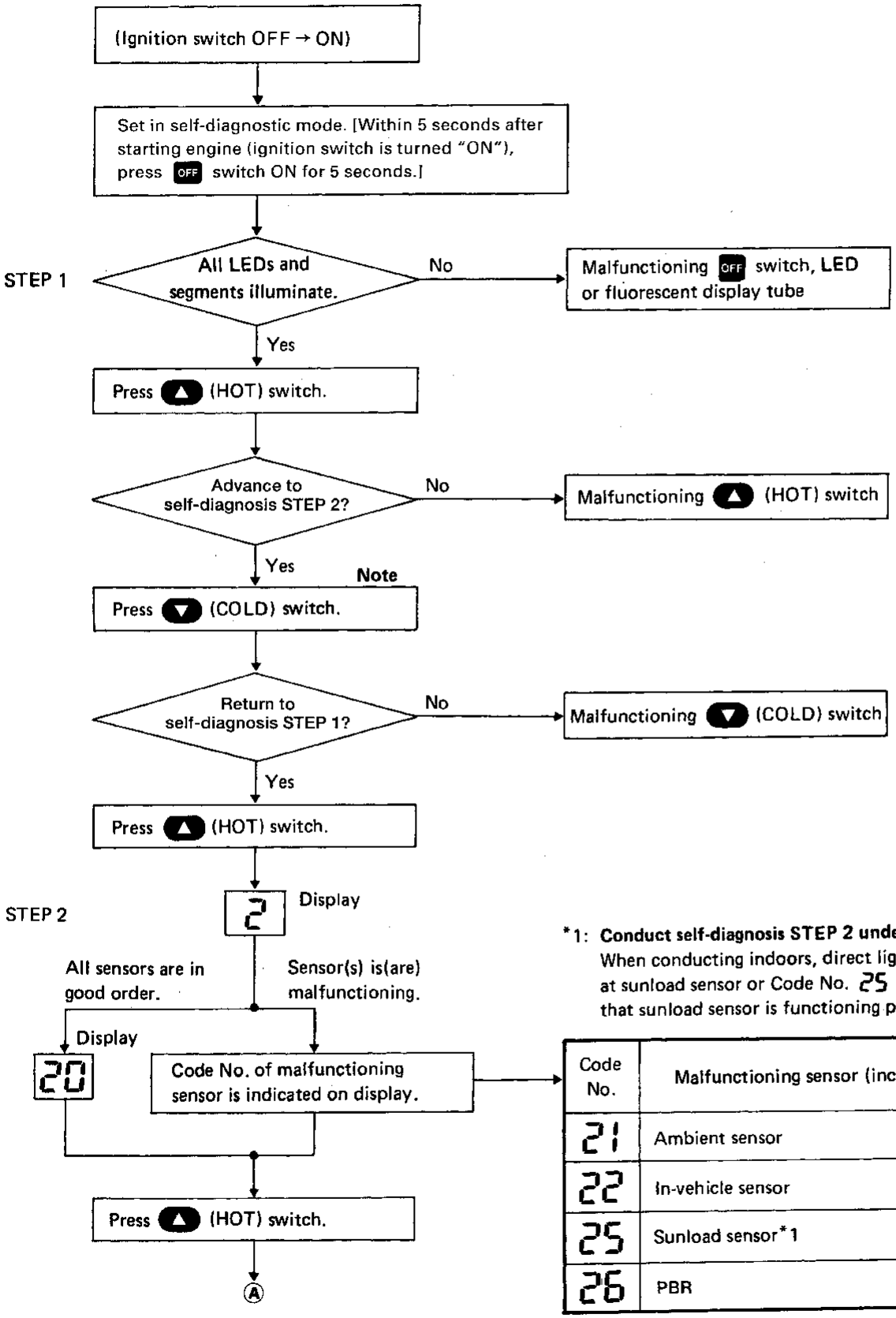


Note:
For STEP 4 and 5, engine must be running for compressor to operate.

AHA240

Self-diagnosis (Cont'd)

CHECKING PROCEDURE



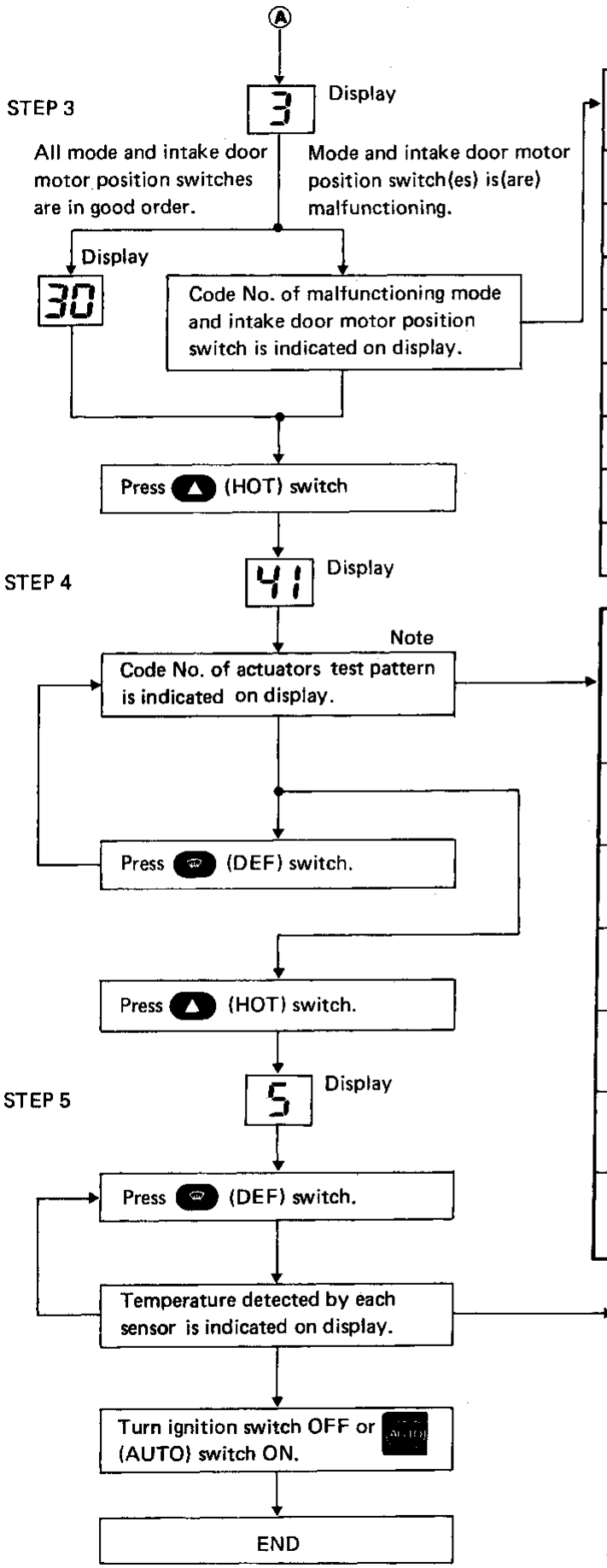
*1: **Conduct self-diagnosis STEP 2 under sunshine.**
When conducting indoors, direct light (more than 60W) at sunload sensor or Code No. 25 will indicate despite that sunload sensor is functioning properly.

Code No.	Malfunctioning sensor (including circuits)
21	Ambient sensor
22	In-vehicle sensor
25	Sunload sensor*1
26	PBR

Note:
At any time, you can return to a previous step in the self-diagnosis by pressing the ▼ (COLD) switch.

AHA241

Self-diagnosis (Cont'd)



Code No.	Malfunctioning part or circuit	
	Position switch	
31	VENT	Mode door motor
32	B/L	
34	FOOT	
35	FOOT/DEF	
36	DEF	
37	REC	Intake door motor
38	20% FRE	
39	FRE	

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

Ambient sensor
In-vehicle sensor

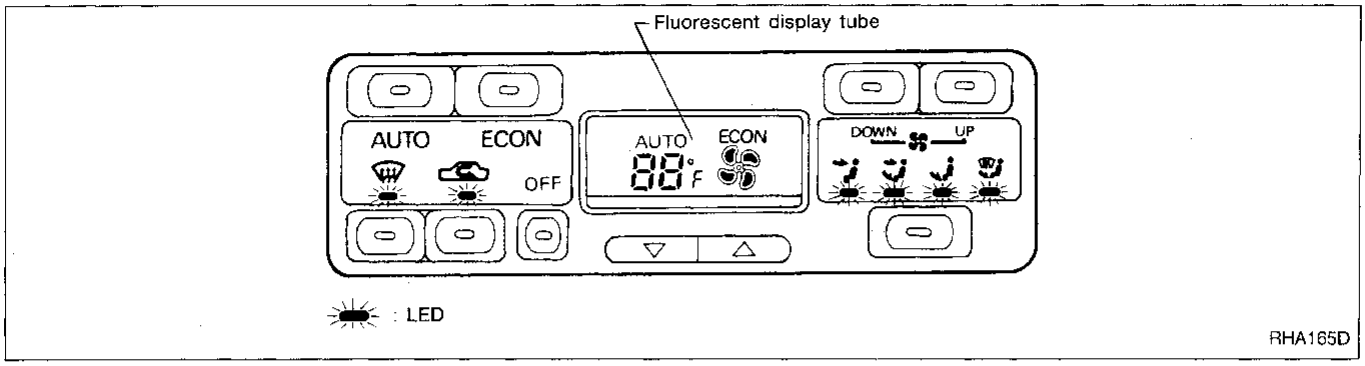
Note:
For STEP 4 and 5, engine must be running for compressor to operate.

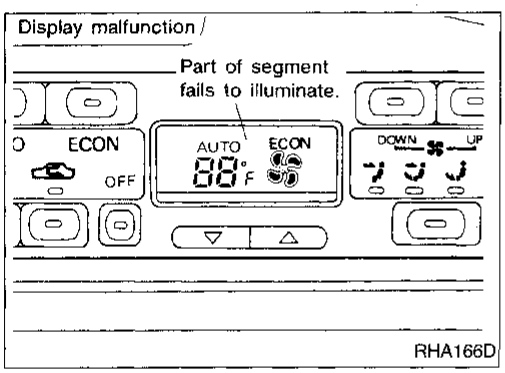
AHA242

Self-diagnosis (Cont'd)

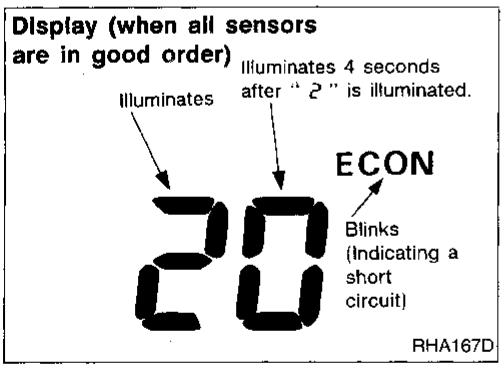
STEP 1: Checks LEDs and segments

When switch's LED and segments are in good order in STEP 1 mode, the corresponding LED and fluorescent display tube will illuminate.



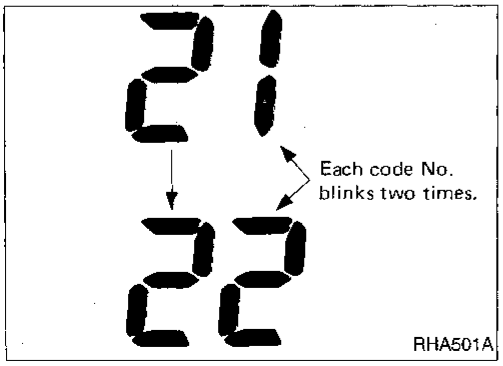


If LEDs or segments malfunction, LED does not come on or display shows incomplete segment.



STEP 2: Checks each sensor circuit for open or short circuit

Display shows " 2 " in STEP 2 mode.
When all sensors are in good order, display shows "20".
It takes approximately 4 seconds to check all sensors.
If a circuit is shorted, display shows ECON mark blinks on display.



If two or more sensors malfunction, corresponding code Nos. respectively blink two times.

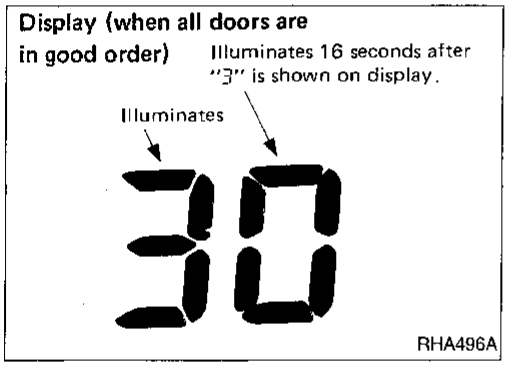
Self-diagnosis (Cont'd)

Sensors and abnormalities

If a circuit is opened or shorted, display shows its code No. when input corresponds with any of following conditions.

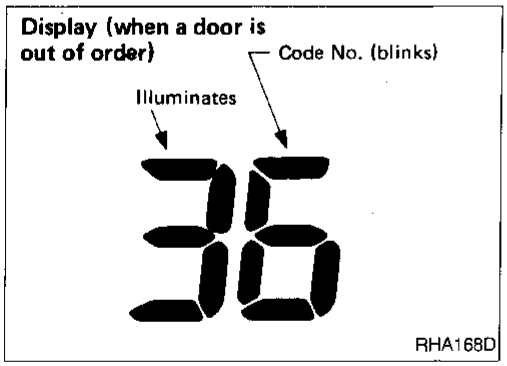
Code No.	Sensor	Open circuit	Short circuit
21	Ambient sensor	Less than −50°C (−58°F)	Greater than 75°C (167°F)
22	In-vehicle sensor	Less than −50°C (−58°F)	Greater than 75°C (167°F)
25	Sunload sensor*2	Less than 48.84 W/m² (42 kcal)	Greater than 1,640 W/m² (1,410 kcal)
26	PBR*1	Greater than 50%	Less than 30%

*1: "50%" and "30%" refer to percentage with respect to full stroke of air mix door. (Full cold: 0%, Full hot: 100%)
*2: **Conduct self-diagnosis STEP 2 under sunshine.**
When conducting indoors, direct light (more than 60W) at sunload sensor.



STEP 3: Checks mode door operation

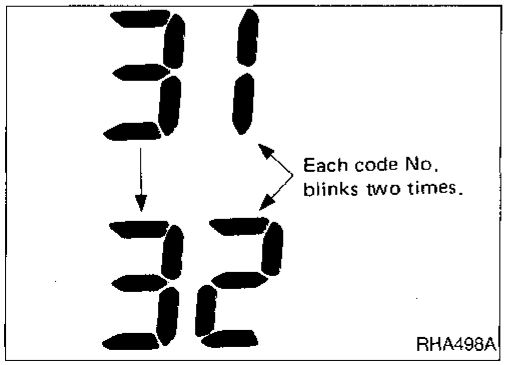
Display shows " 3 " in STEP 3 mode.
When all doors are in good order, display will then show "30".
It takes approximately 16 seconds to check all mode and intake doors.



When abnormalities are detected, display shows a code No. corresponding with malfunctioning circuit, door position switch or motor.

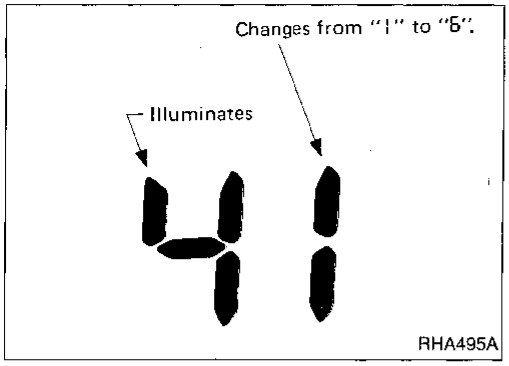
Code No.	31	32	34	35	36	37	38	39
Malfunction	VENT	B/L	FOOT	F/D	DEF	REC	20% FRE	FRE

If any mode and intake door motor position switch is malfunctioning, mode and intake door motor will also malfunction.



If two or more mode and intake doors are out of order, corresponding code numbers respectively blink two times.

Self-diagnosis (Cont'd)



RHA495A

STEP 4: Checks operation of each actuator

Start engine and run at operating temperature.
Display shows "41" in STEP 4 mode.
When (DEF) switch is pressed one time, display shows "42". Thereafter, each time the switch is pressed, display advances one number at a time, up to "46", then returns to "41".

The auto amplifier will forcefully transmit an output to the affected actuators in response to code No. shown on display, as indicated in table below.

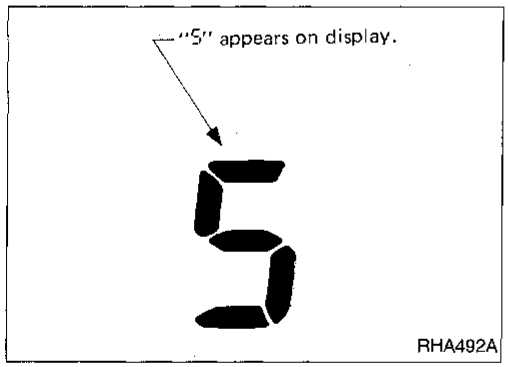
Checks must be made visually, by listening to any noise, or by touching air outlets with your hand, etc. for improper operation.
Operating condition of each actuator cannot be checked by indicators.

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

Discharge air flow

Switch mode/ indicator	Air outlet/distribution		
	Face	Foot	Defroster
	100%	—	—
	60%	40%	—
	—	78%	22%
	—	55%	45%
	—	—	100%

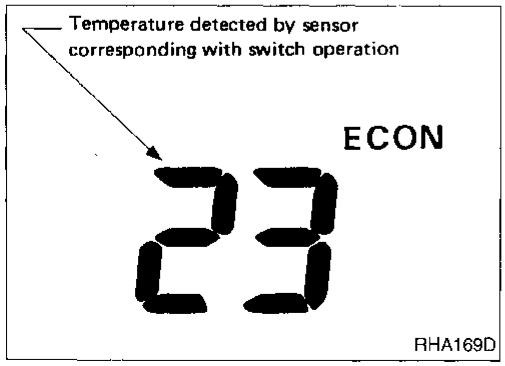
AHA213



RHA492A

STEP 5: Checks temperature detected by sensors

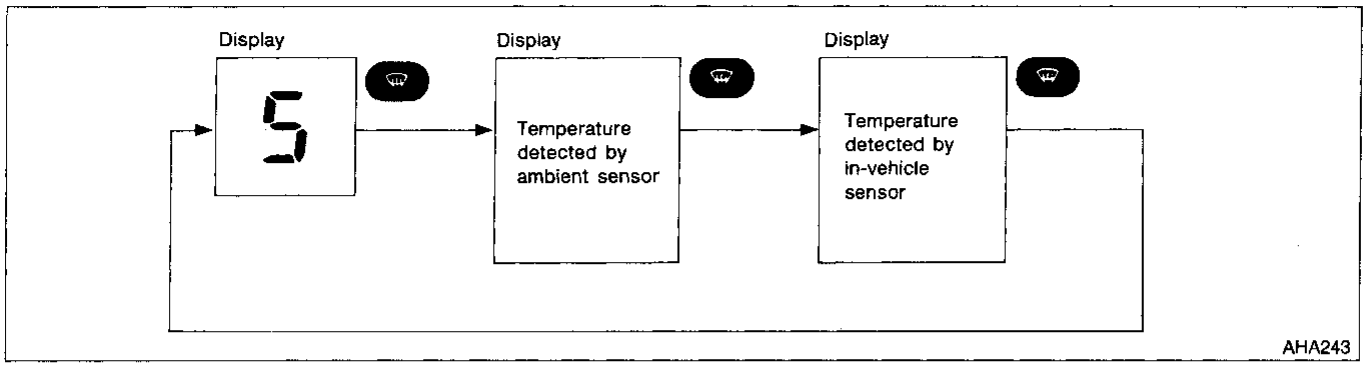
Display shows "5" in STEP 5 mode.



RHA169D

- When (DEF) switch is pressed one time, display shows temperature detected by ambient sensor.
- When (DEF) switch is pressed second time, display shows temperature detected by in-vehicle sensor.
- ECON indicates display shows negative temperature reading.
- When (DEF) switch is pressed third time, display returns to original presentation "5".

Self-diagnosis (Cont'd)



If temperature shown on display greatly differs from actual temperature, check sensor circuit at first then inspect sensor itself according to the procedures described in **Control System Input Components.** Refer to HA-125.

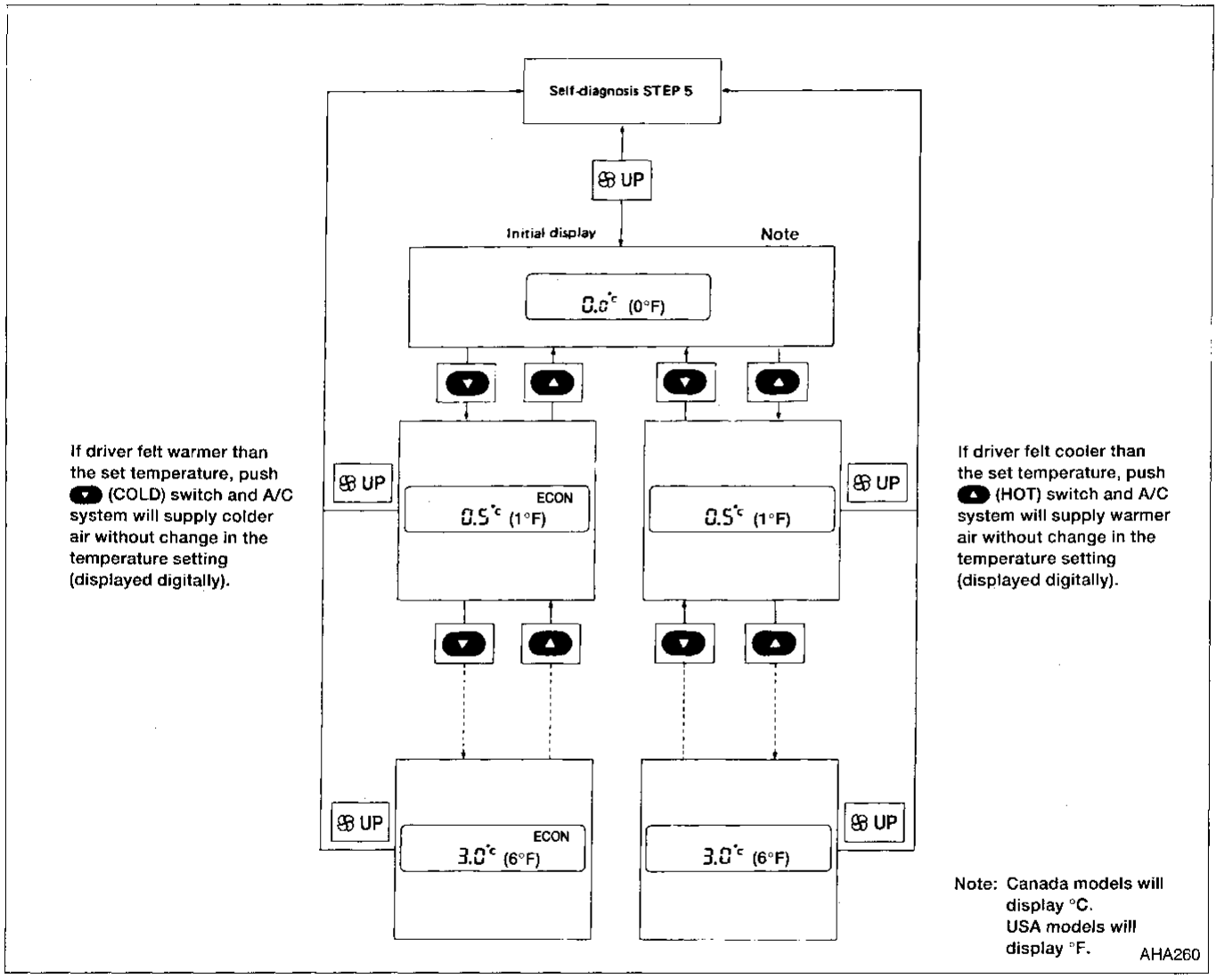
Self-diagnosis (Cont'd)

AUXILIARY MECHANISM: Temperature setting trimmer

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

Operating procedures for this trimmer are as follows:

- Begin Self-diagnosis STEP 5 mode.
- Press (fan) UP switch to set system in auxiliary mode.
- Press either ▲ (HOT) or ▼ (COLD) switch as desired. Temperature will change at a rate of 0.5°C (1°F) each time a switch is pressed.



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

Preliminary Check

PRELIMINARY CHECK 1

Air outlet does not change.

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

CHECK SENSOR CIRCUIT.
Set up Self-diagnosis STEP 2.
Is each sensor circuit normal?
Code No. 20 should be indicated on the display after approx. 4 seconds.

N.G. →

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

Code No.	How to repair
21	Perform Diagnostic Procedure 1. Refer to HA-105.
22	Perform Diagnostic Procedure 2. Refer to HA-106.
25	Perform Diagnostic Procedure 3. Refer to HA-107.
26	Perform Diagnostic Procedure 4. Refer to HA-108.
ECON 21	Perform Diagnostic Procedure 1. Refer to HA-105.
ECON 22	Perform Diagnostic Procedure 2. Refer to HA-106.
ECON 25	Perform Diagnostic Procedure 3. Refer to HA-107.
ECON 26	Perform Diagnostic Procedure 4. Refer to HA-108.

When malfunctioning sensor circuits for ambient sensor and in-vehicle sensor are suspected, it is useful to check temperature detected by each sensor with Self-diagnosis STEP 5 to confirm the temperature is within normal range before performing Diagnostic Procedures.

O.K. ↓

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

N.G. → Perform **Diagnostic Procedure 5.** Refer to HA-109.

O.K. ↓

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

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

Refer to HA-76.

N.G. → CHECK SIDE LINK MECHANISM. Refer to HA-122.

N.G. → Repair or adjust.

O.K. ↓

Perform **Diagnostic Procedure 5.** Refer to HA-109.

O.K. ↓

Air outlet control system is normal. Refer to HA-130.

Preliminary Check (Cont'd)

PRELIMINARY CHECK 2

Intake door does not change.

- **Perform Self-diagnosis STEP 1 before referring to the following flow chart.**

CHECK SENSOR CIRCUIT.
Set up Self-diagnosis STEP 2.
Is each sensor circuit normal?
Code No. 20 should be indicated on the display after approx. 4 seconds later.

N.G. →

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

Code No.	How to repair
21	Perform Diagnostic Procedure 1. Refer to HA-105.
22	Perform Diagnostic Procedure 2. Refer to HA-106.
25	Perform Diagnostic Procedure 3. Refer to HA-107.
26	Perform Diagnostic Procedure 4. Refer to HA-108.
ECON 21	Perform Diagnostic Procedure 1. Refer to HA-105.
ECON 22	Perform Diagnostic Procedure 2. Refer to HA-106.
ECON 25	Perform Diagnostic Procedure 3. Refer to HA-107.
ECON 26	Perform Diagnostic Procedure 4. Refer to HA-108.

When malfunctioning sensor circuits for ambient sensor and in-vehicle sensor are suspected, it is useful to check temperature detected by each sensor with Self-diagnosis STEP 5 to confirm the temperature is within normal range before performing Diagnostic Procedures.

O.K. ↓

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

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

Refer to HA-76.

N.G. → CHECK INTAKE DOOR ROD or LEVER MECHANISM. Refer to HA-123.

N.G. → Repair or adjust.

O.K. ↓

Perform **Diagnostic Procedure 6.**
Refer to HA-111.

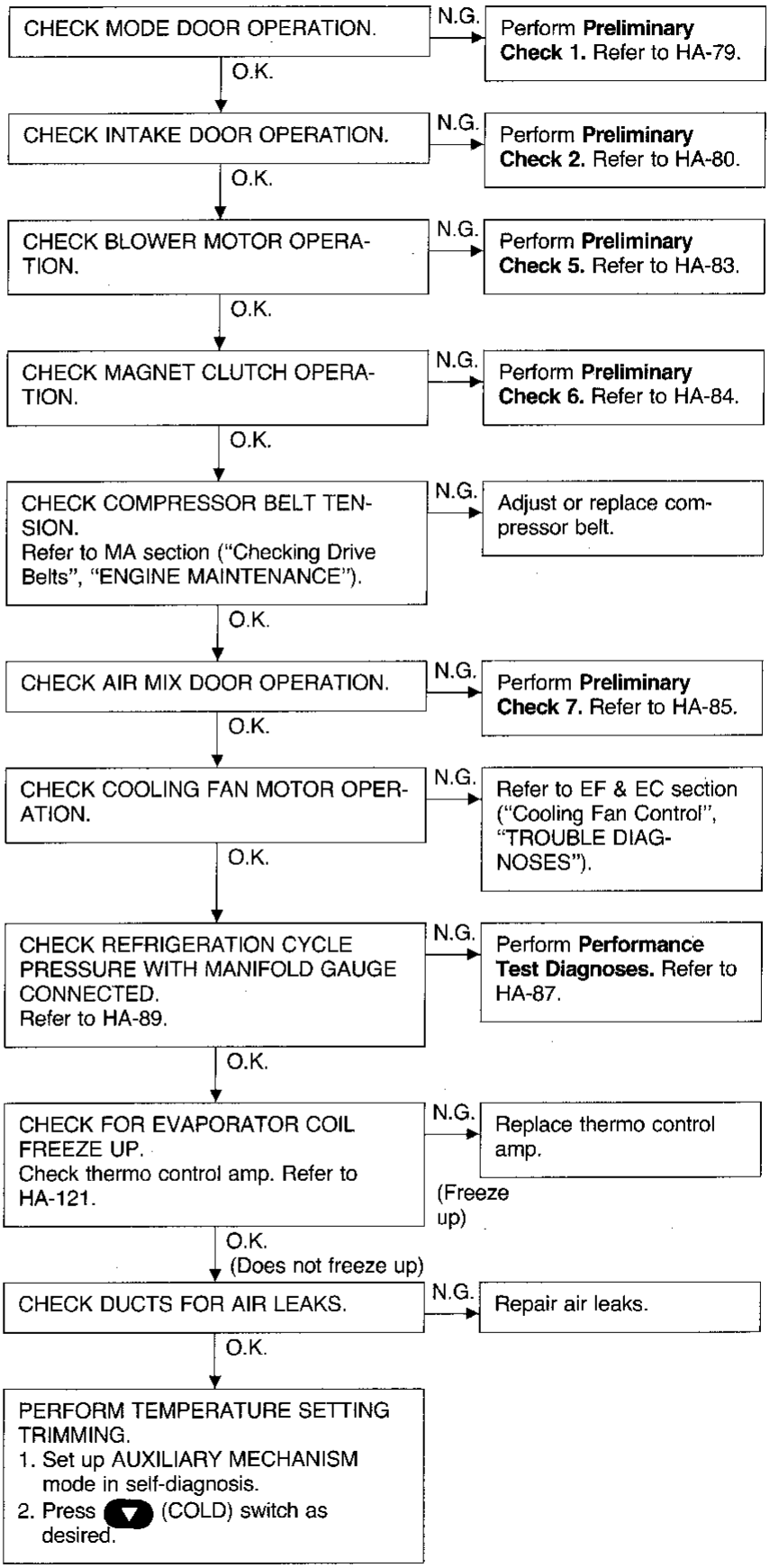
O.K. ↓

Intake door control system is normal. Refer to HA-131.

Preliminary Check (Cont'd)

PRELIMINARY CHECK 3

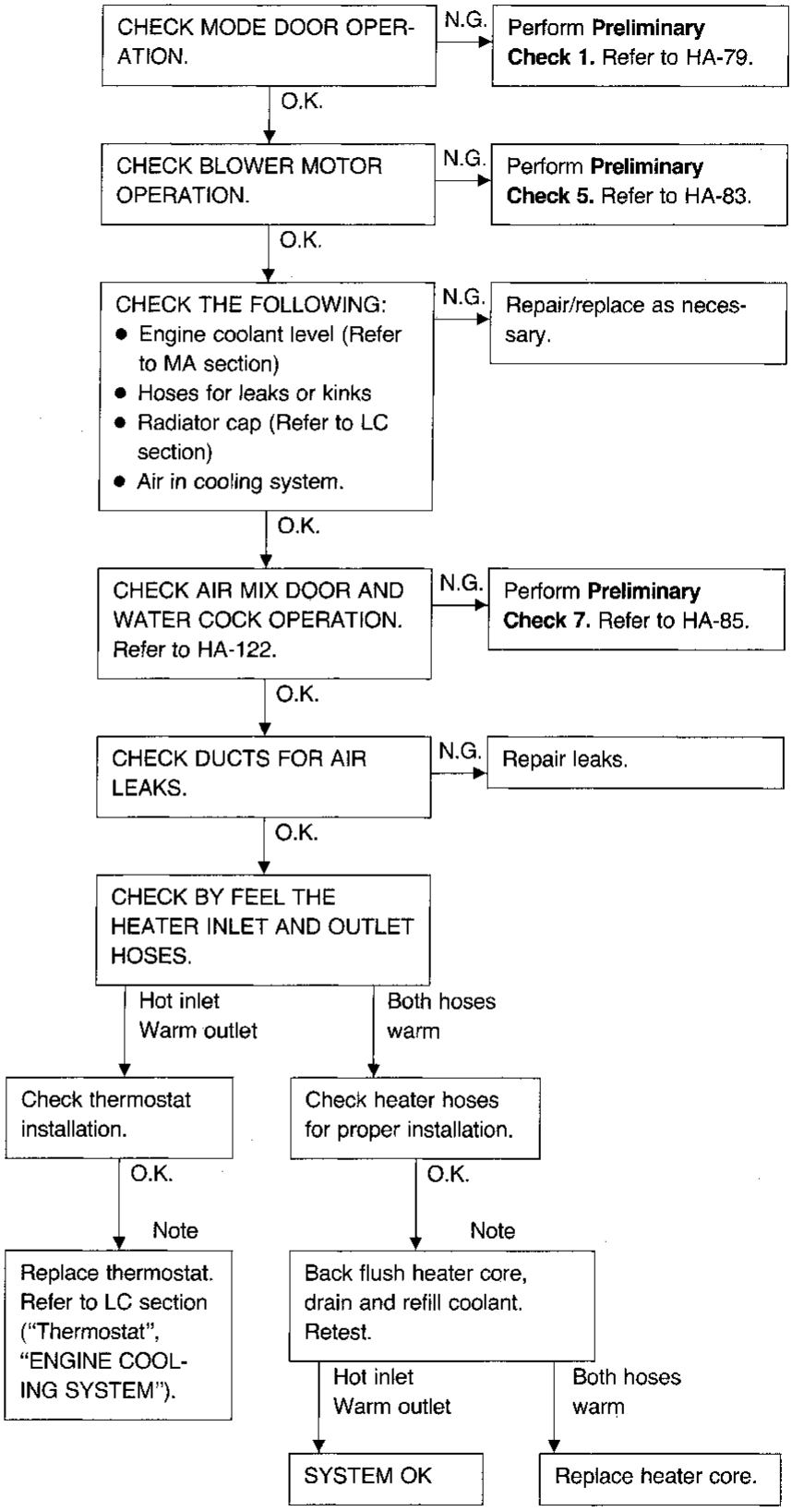
Insufficient cooling



Preliminary Check (Cont'd)

PRELIMINARY CHECK 4

Insufficient heating



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

Preliminary Check (Cont'd)

PRELIMINARY CHECK 5

Blower motor operation is malfunctioning.

- **Perform Self-diagnosis STEP 1 before referring to the following flow chart.**

CHECK SENSOR CIRCUIT.
Set up Self-diagnosis STEP 2.
Is each sensor circuit normal?
Code No. 20 should be indicated on the display after approx. 4 seconds.

N.G. →

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

Code No.	How to repair
21	Perform Diagnostic Procedure 1. Refer to HA-105.
22	Perform Diagnostic Procedure 2. Refer to HA-106.
25	Perform Diagnostic Procedure 3. Refer to HA-107.
26	Perform Diagnostic Procedure 4. Refer to HA-108.
ECON 21	Perform Diagnostic Procedure 1. Refer to HA-105.
ECON 22	Perform Diagnostic Procedure 2. Refer to HA-106.
ECON 25	Perform Diagnostic Procedure 3. Refer to HA-107.
ECON 26	Perform Diagnostic Procedure 4. Refer to HA-108.

When malfunctioning sensor circuits for ambient sensor and in-vehicle sensor are suspected, it is useful to check temperature detected by each sensor with Self-diagnosis STEP 5 to confirm the temperature is within normal range before performing Diagnostic Procedures.

O.K. ↓

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

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

N.G. → Perform **Diagnostic Procedure 9.** Refer to HA-114.

O.K. ↓

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

No → Blower motor operation is normal. Refer to HA-133.

Yes ↓

IS BLOWER MOTOR OPERATING UNDER FAN STARTING SPEED CONTROL?
Refer to HA-133.

No → Check thermal transmitter control circuit.
Refer to EL section ("Electrical Components Inspection", "TROUBLE DIAGNOSES").

Yes ↓

Blower motor operation is normal.

Preliminary Check (Cont'd)

PRELIMINARY CHECK 6

Magnet clutch does not engage.

- **Perform Self-diagnosis STEP 1 before referring to the following flow chart.**

CHECK SENSOR CIRCUIT.
Set up Self-diagnosis STEP 2.
Is each sensor circuit normal?
Code No. 20 should be indicated on the display after approx. 4 seconds.

N.G. →

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

Code No.	How to repair
21	Perform Diagnostic Procedure 1. Refer to HA-105.
22	Perform Diagnostic Procedure 2. Refer to HA-106.
25	Perform Diagnostic Procedure 3. Refer to HA-107.
26	Perform Diagnostic Procedure 4. Refer to HA-108.
ECON 21	Perform Diagnostic Procedure 1. Refer to HA-105.
ECON 22	Perform Diagnostic Procedure 2. Refer to HA-106.
ECON 25	Perform Diagnostic Procedure 3. Refer to HA-107.
ECON 26	Perform Diagnostic Procedure 4. Refer to HA-108.

When malfunctioning sensor circuits for ambient sensor and in-vehicle sensor are suspected, it is useful to check temperature detected by each sensor with Self-diagnosis STEP 5 to confirm the temperature is within normal range before performing Diagnostic Procedures.

O.K. ↓

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

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

N.G. →

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

N.G. →

Check refrigerant leaks.

O.K. ↓

Perform **Diagnostic Procedure 10.**
Refer to HA-117.

O.K. ↓

Magnet clutch control system is normal.
Refer to HA-135.

PRELIMINARY CHECK 7

Discharged air temperature does not change.

- **Perform Self-diagnosis STEP 1 before referring to the following flow chart.**

CHECK SENSOR CIRCUIT.
Set up Self-diagnosis STEP 2.
Is each sensor circuit normal?
Code No. 20 should be indicated on the display after approx. 4 seconds later.

N.G. →

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

Code No.	How to repair
21	Perform Diagnostic Procedure 1. Refer to HA-105.
22	Perform Diagnostic Procedure 2. Refer to HA-106.
25	Perform Diagnostic Procedure 3. Refer to HA-107.
26	Perform Diagnostic Procedure 4. Refer to HA-108.
ECON 21	Perform Diagnostic Procedure 1. Refer to HA-105.
ECON 22	Perform Diagnostic Procedure 2. Refer to HA-106.
ECON 25	Perform Diagnostic Procedure 3. Refer to HA-107.
ECON 26	Perform Diagnostic Procedure 4. Refer to HA-108.

When malfunctioning sensor circuits for ambient sensor and in-vehicle sensor are suspected, it is useful to check temperature detected by each sensor with Self-diagnosis STEP 5 to confirm the temperature is within normal range before performing Diagnostic Procedures.

O.K. ↓

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

41	42	43	44	45	46
Full cold		Full hot			

O.K. ↓

Air mix door control system is normal.
Refer to HA-127.

N.G. ↓

CHECK AIR MIX DOOR MECHANISM.
Refer to HA-122.

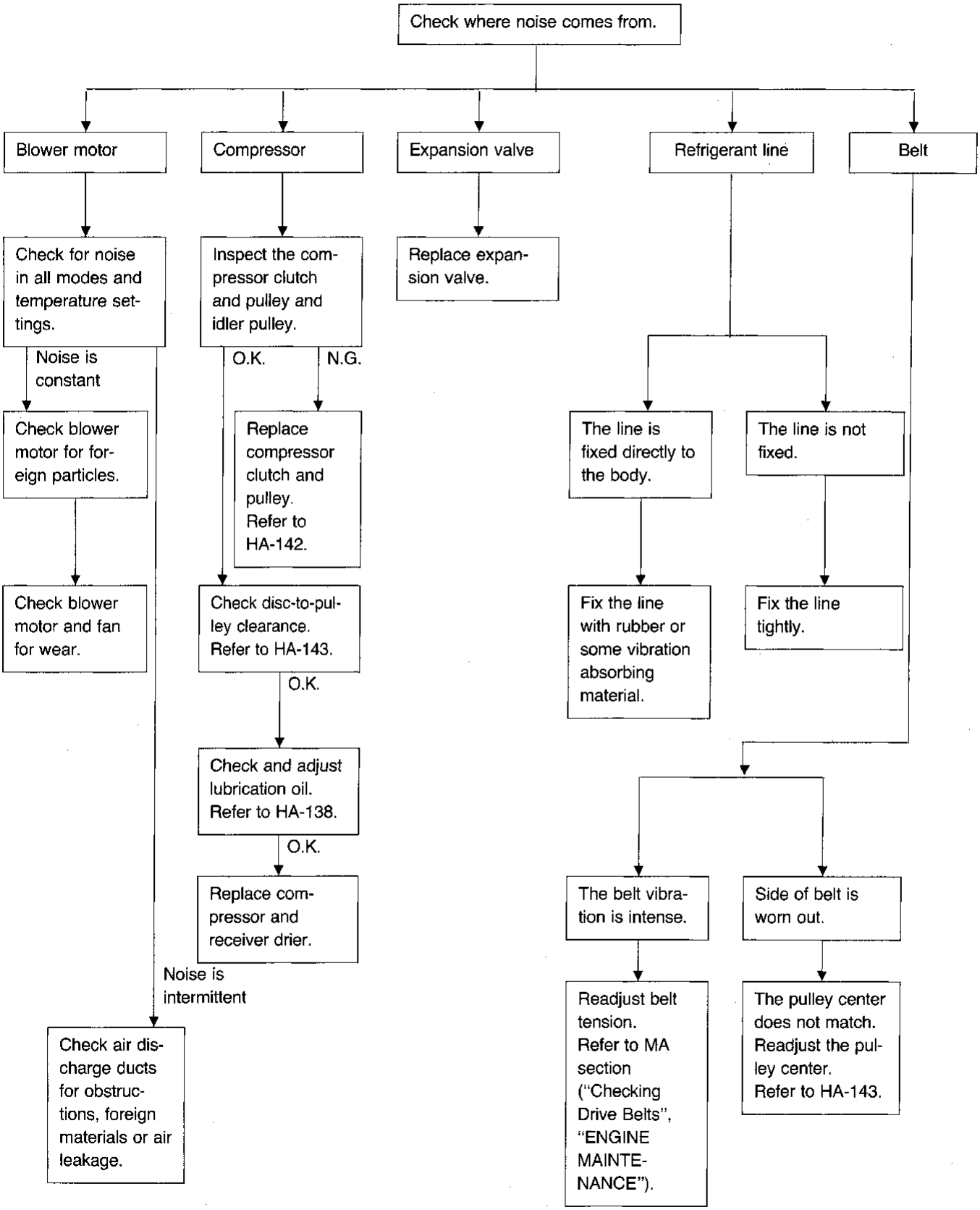
N.G. → Repair or adjust.

O.K. ↓

Perform **Diagnostic Procedure 7.** Refer to HA-112.

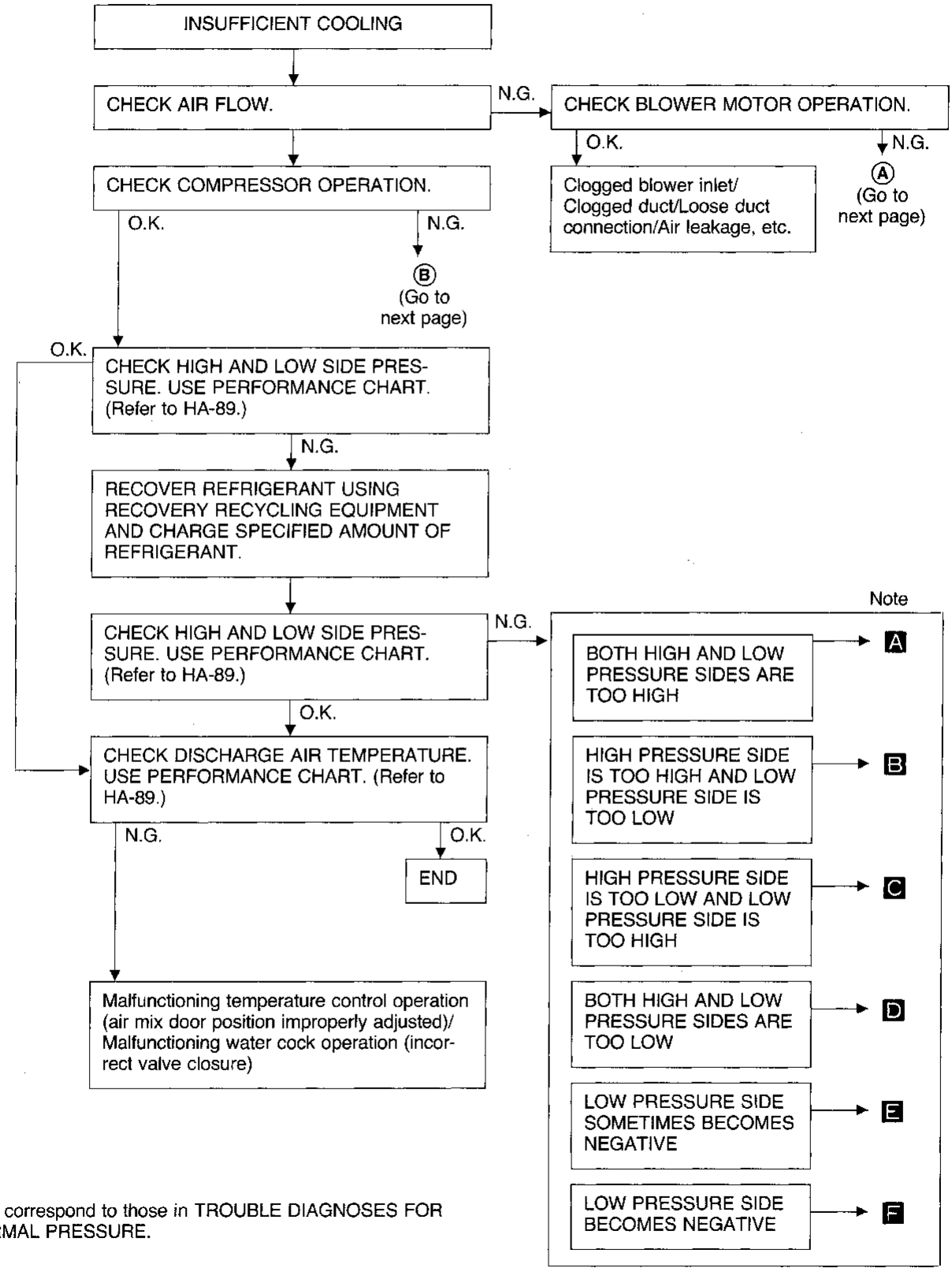
PRELIMINARY CHECK 8

Noise

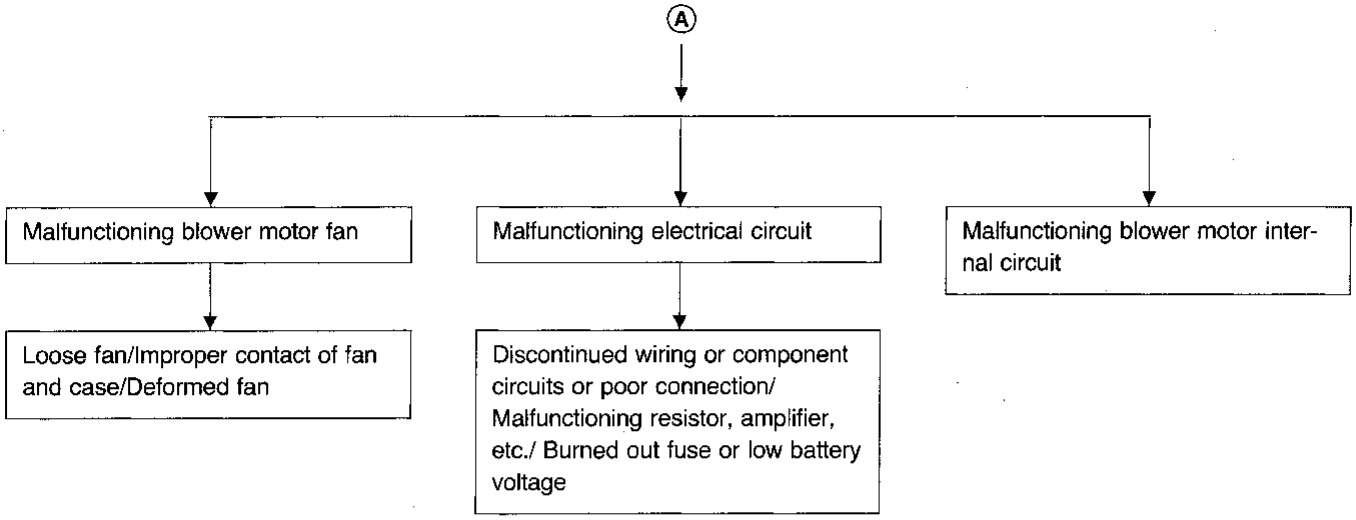


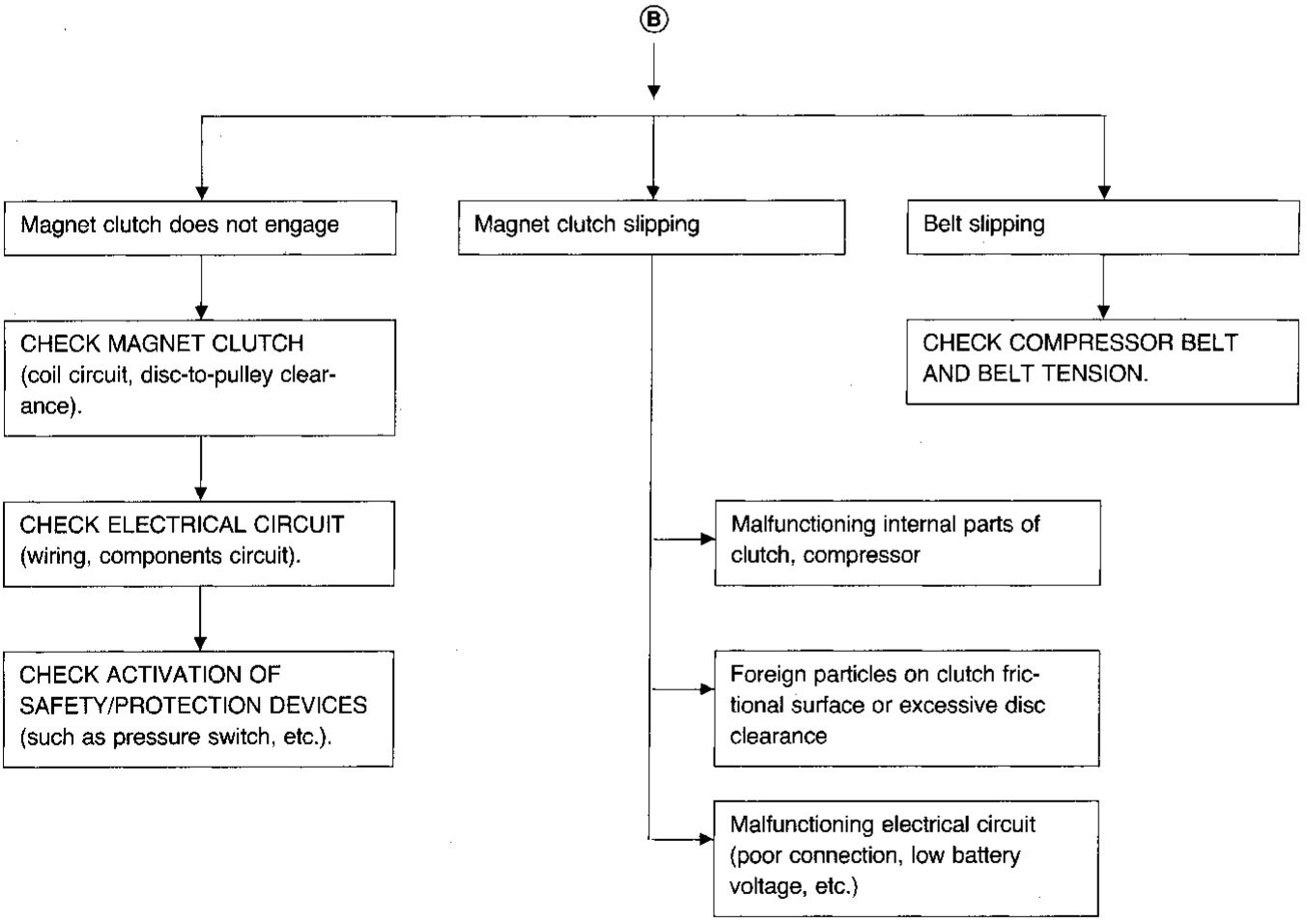
Performance Test Diagnoses

INSUFFICIENT COOLING



Note: A - F correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE.


Ⓐ
Malfunctioning blower motor fan
Malfunctioning electrical circuit
Malfunctioning blower motor internal circuit
Loose fan/Improper contact of fan and case/Deformed fan
Discontinued wiring or component circuits or poor connection/ Malfunctioning resistor, amplifier, etc./ Burned out fuse or low battery voltage


Ⓑ
Magnet clutch does not engage
Magnet clutch slipping
Belt slipping
CHECK MAGNET CLUTCH (coil circuit, disc-to-pulley clearance).
CHECK COMPRESSOR BELT AND BELT TENSION.
CHECK ELECTRICAL CIRCUIT (wiring, components circuit).
CHECK ACTIVATION OF SAFETY/PROTECTION DEVICES (such as pressure switch, etc.).
Malfunctioning internal parts of clutch, compressor
Foreign particles on clutch frictional surface or excessive disc clearance
Malfunctioning electrical circuit (poor connection, low battery voltage, etc.)

Performance Chart

TEST CONDITION

Before conducting performance test, disconnect ambient sensor harness connector and make short circuit using jumper cable.

Testing must be performed as follows:

Vehicle location: Indoors or in the shade (in a well ventilated place)
Doors: Closed
Door window: Open
Hood: Open
TEMP. setting: 18°C (65°F)
AUTO switch: ON
RECIRC switch: (Recirculation) ON
FAN speed: MAX.
Engine speed: 1,500 rpm
Operate the air conditioning system for 10 minutes before taking measurements.

TEST READING

Recirculating-to-discharge air temperature table

Inside air at blower assembly inlet for RECIRC*		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	4.0 - 5.4 (39 - 42)
	25 (77)	4.2 - 5.6 (40 - 42)
	30 (86)	8.5 - 11.1 (47 - 52)
	35 (95)	13.5 - 16.7 (56 - 62)
	40 (104)	18.5 - 22.3 (65 - 72)
60 - 70	20 (68)	5.4 - 6.8 (42 - 44)
	25 (77)	5.6 - 8.0 (42 - 46)
	30 (86)	11.1 - 14.1 (52 - 57)
	35 (95)	16.7 - 20.3 (62 - 69)
	40 (104)	22.3 - 26.5 (72 - 80)

* Thermometer should be placed at intake unit RH side of instrument panel.

Ambient air temperature-to-operating pressure table

Ambient air		High-pressure (Discharge side) kPa (kg/cm^2, psi)	Low-pressure (Suction side) kPa (kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	20 (68)	834 - 1,098 (8.5 - 11.2, 121 - 159)	122.6 - 161.8 (1.25 - 1.65, 17.8 - 23.5)
	25 (77)	1,049 - 1,363 (10.7 - 13.9, 152 - 198)	137.3 - 181.4 (1.4 - 1.85, 19.9 - 26.3)
	30 (86)	1,226 - 1,618 (12.5 - 16.5, 178 - 235)	152.0 - 201.0 (1.55 - 2.05, 22.0 - 29.2)
	35 (95)	1,255 - 1,716 (12.8 - 17.5, 182 - 249)	166.7 - 230.5 (1.7 - 2.35, 24.2 - 33.4)
	40 (104)	1,540 - 2,030 (15.7 - 20.7, 223 - 294)	201.0 - 289.3 (2.05 - 2.95, 29.2 - 41.9)

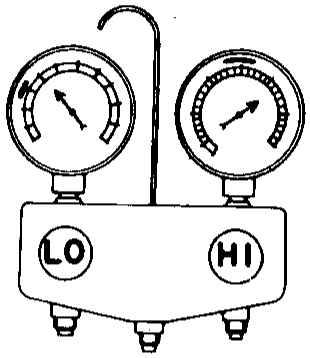
If pressure is not within range, refer to HA-90 "Trouble Diagnoses for Abnormal Pressure".

Performance Chart (Cont'd)

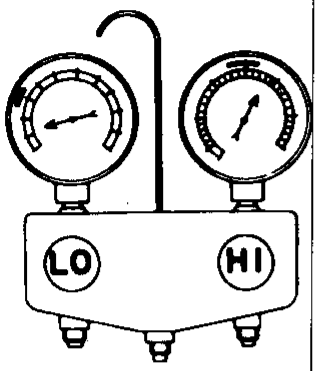
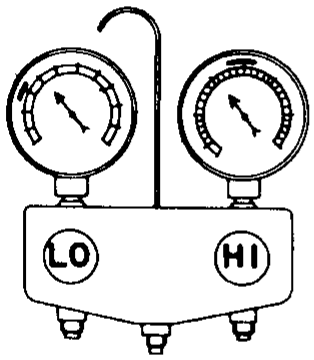
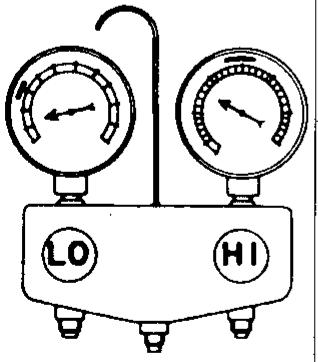
TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE

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 HA-89 ("Ambient air temperature-to-operating pressure table").

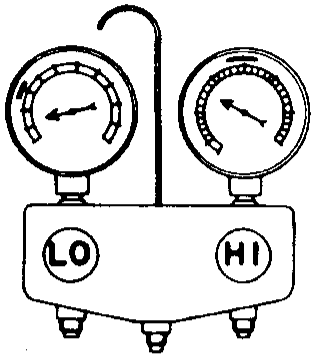
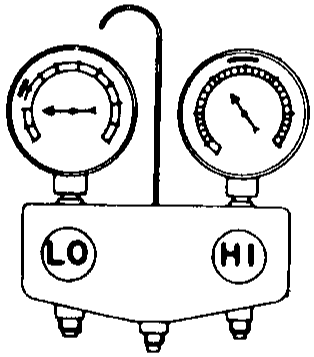
Pressure measurements are effective only when ambient temperature is in the range indicated under the Performance Chart.

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

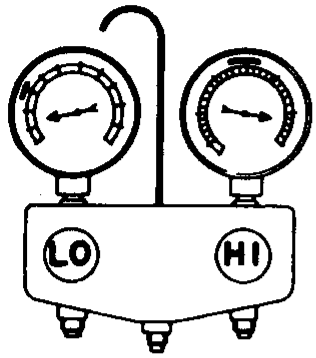
Performance Chart (Cont'd)

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low. B  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	• Check and repair or replace malfunctioning parts. • Check compressor oil for contamination.
High-pressure side is too low and low-pressure side is too high. C  AC356A	High and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings	Replace compressor.
	No temperature difference between high and low-pressure sides	Compressor discharge capacity does not change. (Compressor stroke is set at maximum.)	Replace compressor.
Both high- and low-pressure sides are too low. D  AC353A	• 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.	Liquid tank inside is clogged a little.	• Replace liquid tank. • Check compressor oil for contamination.
	• Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. • Expansion valve inlet may be frosted. • Temperature difference occurs somewhere in high-pressure side	High-pressure pipe located between liquid tank and expansion valve is clogged.	• Check and repair malfunctioning parts. • Check compressor oil for contamination.

Performance Chart (Cont'd)

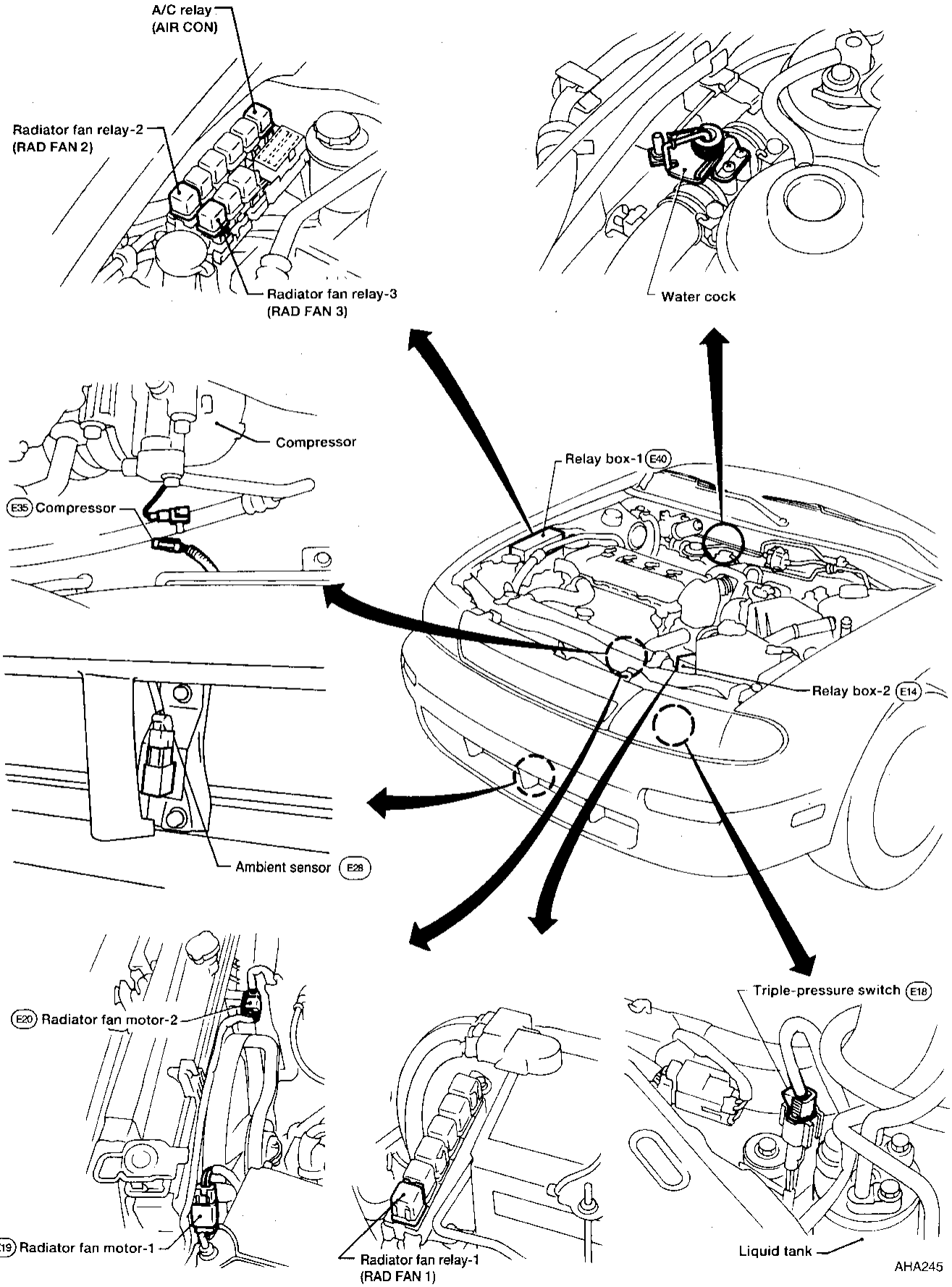
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low. D  AC353A	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ ① Improper expansion valve adjustment ② Malfunctioning thermal valve ③ Outlet and inlet may be clogged.	• Remove foreign particles by using compressed air. • Check compressor oil for contamination.
	Areas near low-pressure pipe connection and service valve are extremely cold as compared with areas near expansion valve outlet and evaporator.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check compressor oil for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen. ↓ Compressor discharge capacity does not change. (Compressor stroke is set at maximum length.)	Replace compressor.
Low-pressure side sometimes becomes negative. E  AC354A	• Air conditioning system does not function and does not cyclically cool the compartment air. • The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	• Drain water from refrigerant or replace refrigerant. • Replace liquid tank.

Performance Chart (Cont'd)

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative. F  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	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. ● 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.

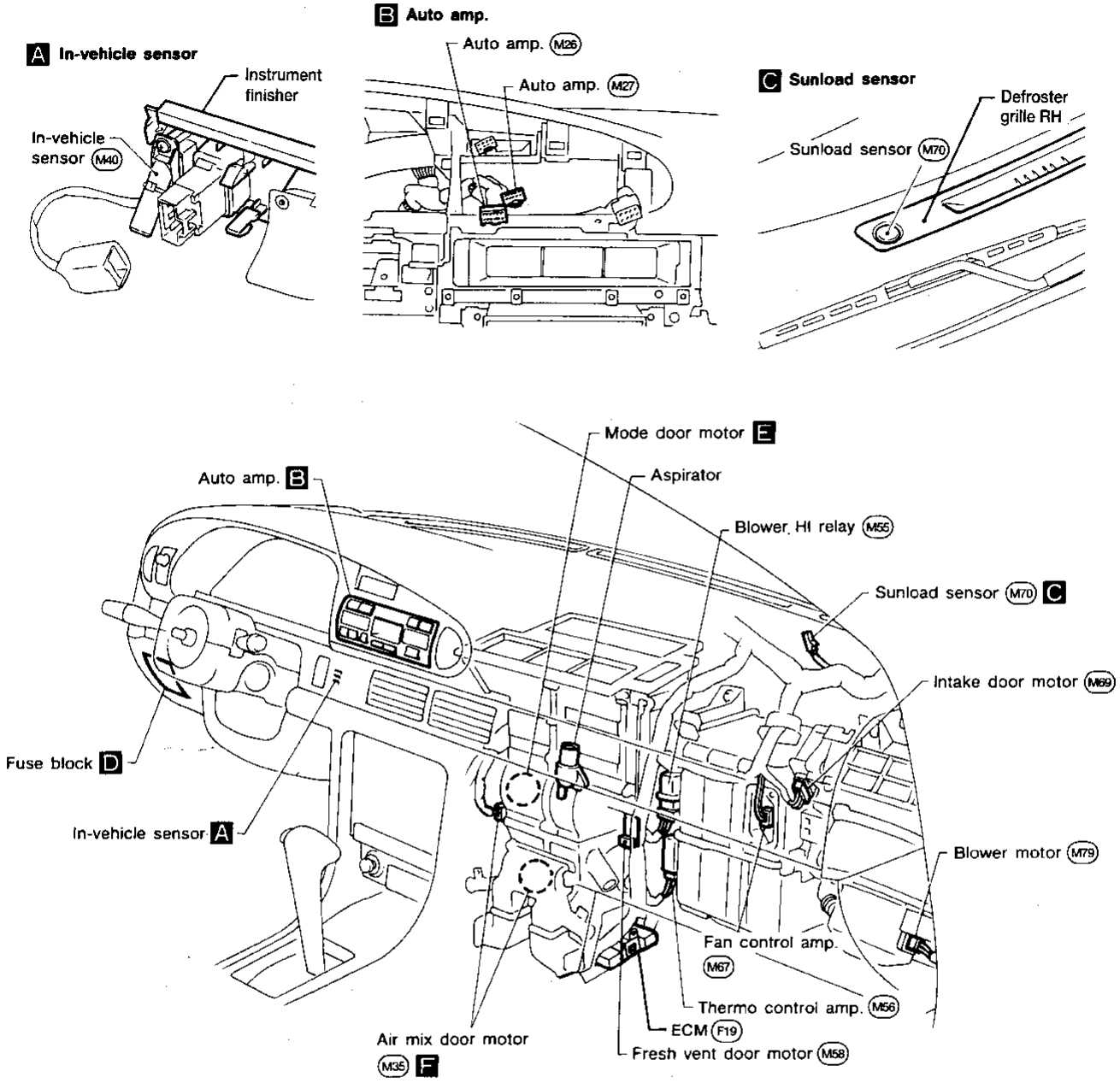
Harness Layout

Engine compartment



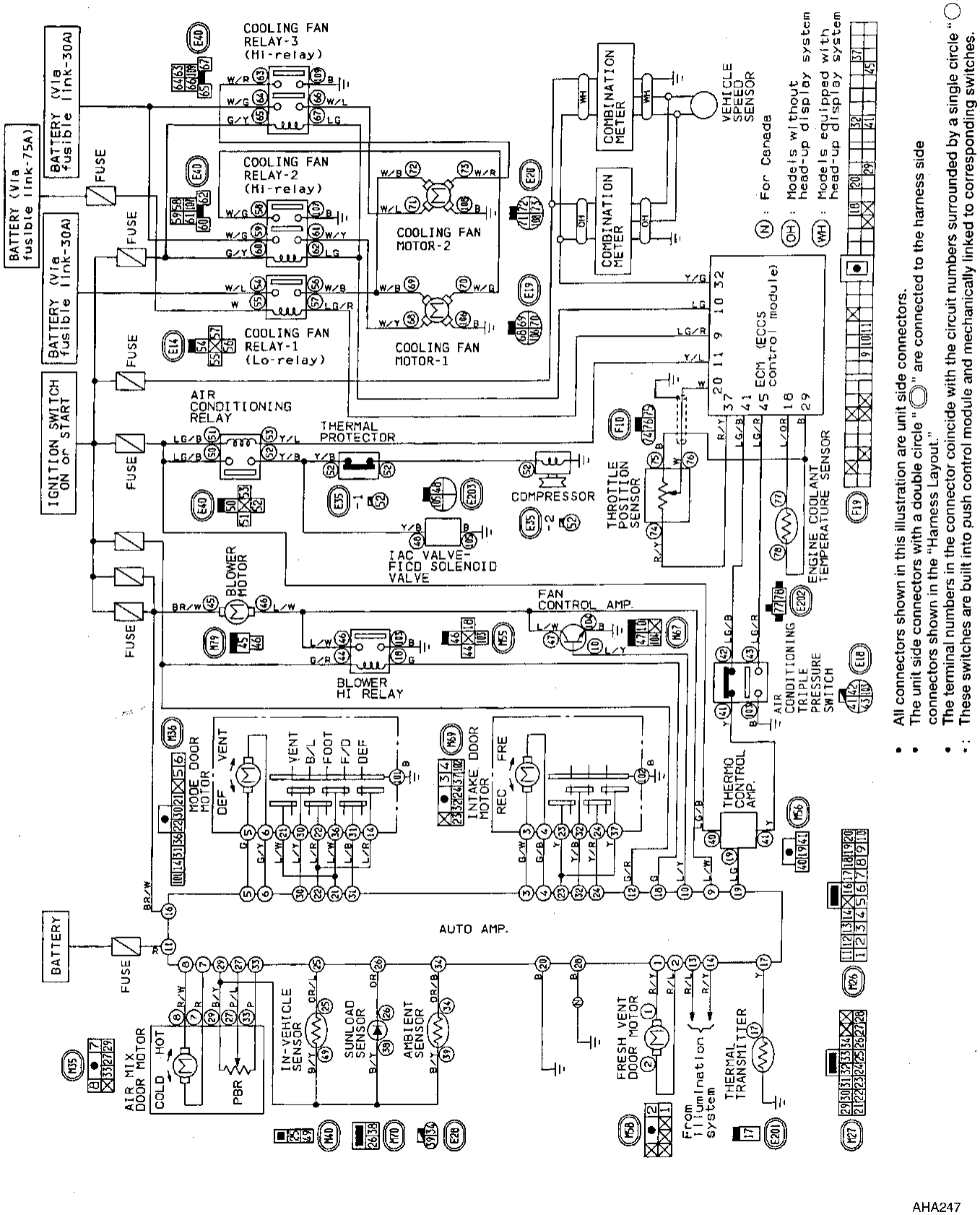
Harness Layout (Cont'd)

Passenger compartment



AHA246

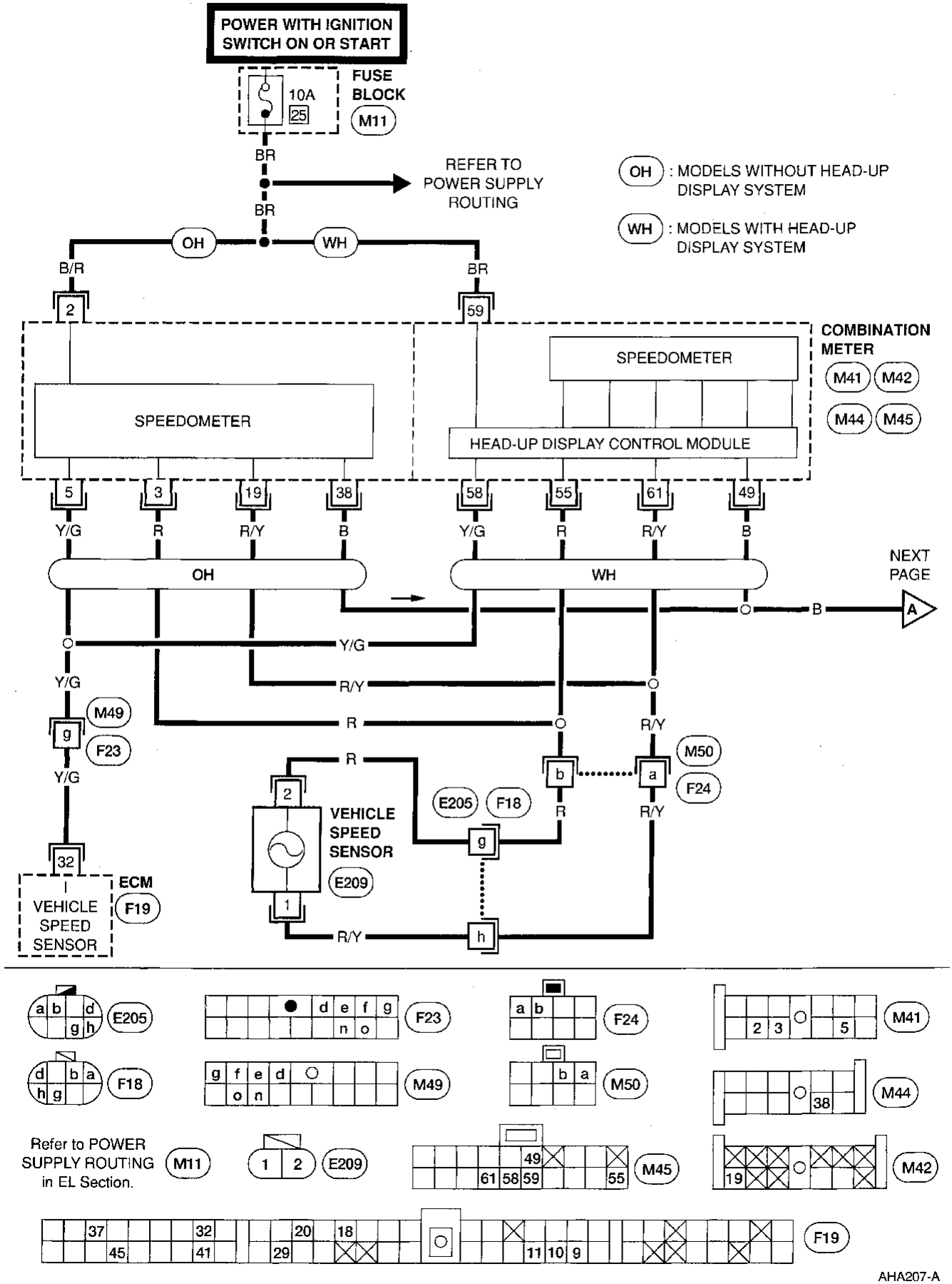
Circuit Diagram for Quick Pinpoint Check



- 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."
- The terminal numbers in the connector coincide with the circuit numbers surrounded by a single circle "○."
- ⁕: These switches are built into push control module and mechanically linked to corresponding switches.

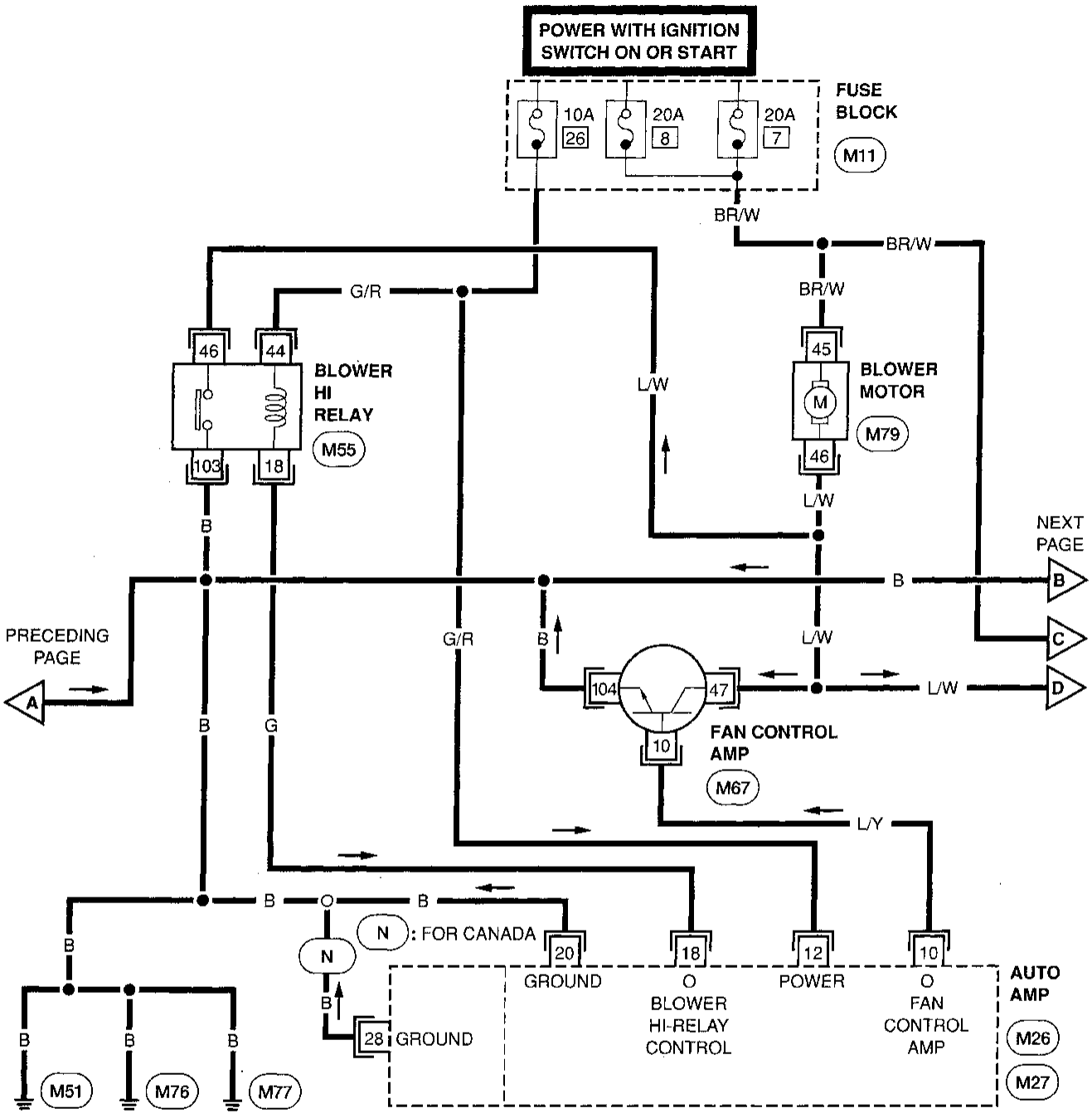
AHA247

Wiring Diagram

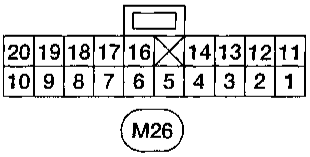


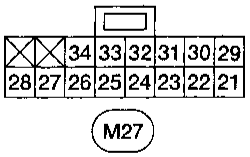
AHA207-A

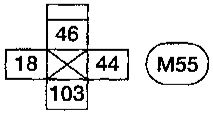
Wiring Diagram (Cont'd)

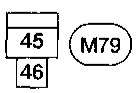


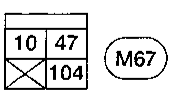
Refer to POWER SUPPLY ROUTING in EL Section. M11





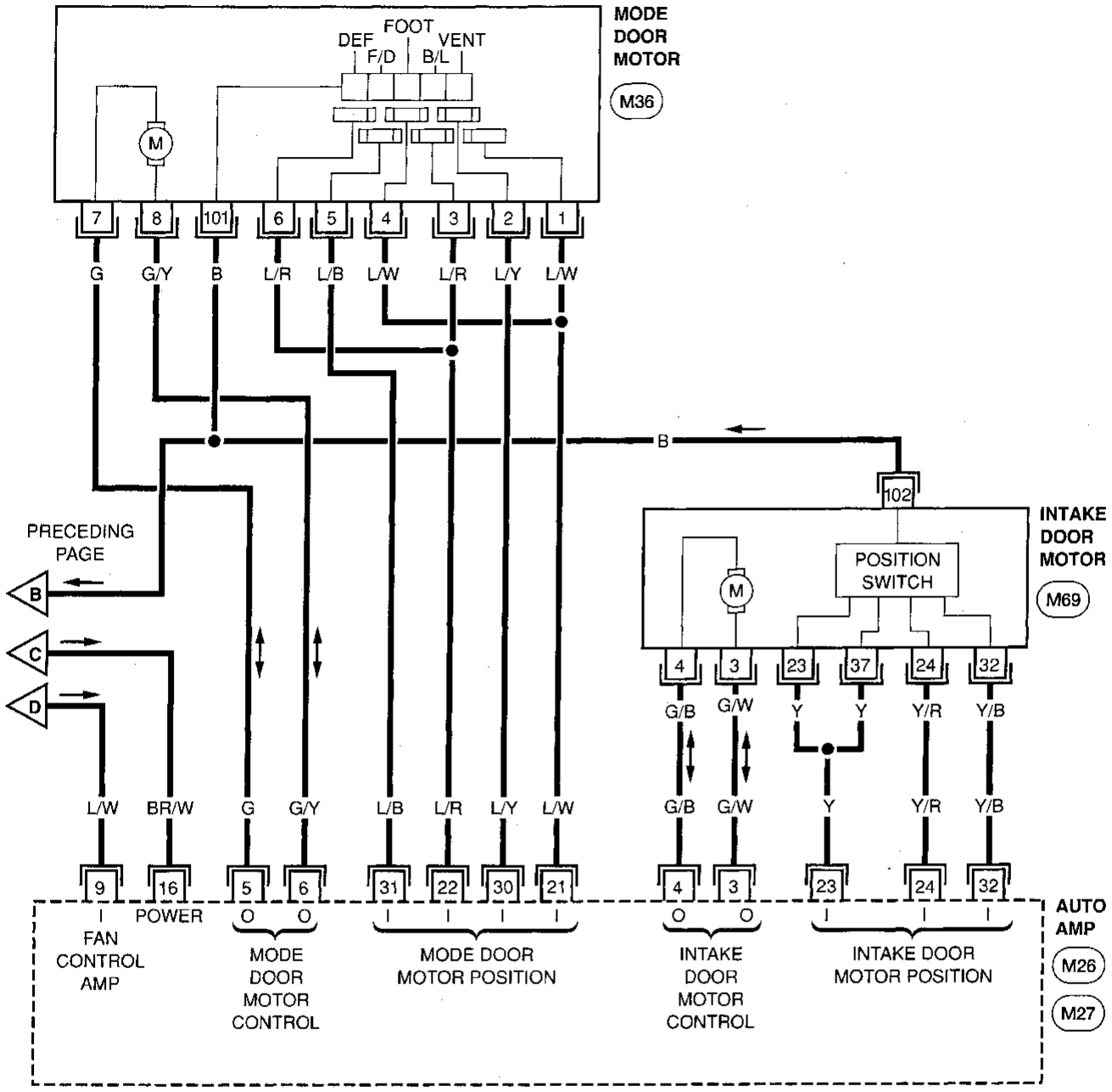


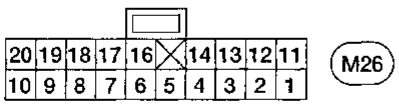


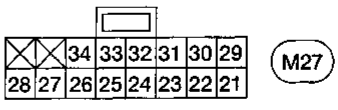


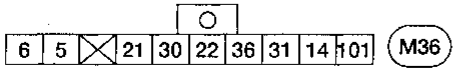
AHA207-B

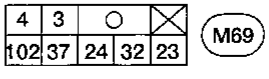
Wiring Diagram (Cont'd)





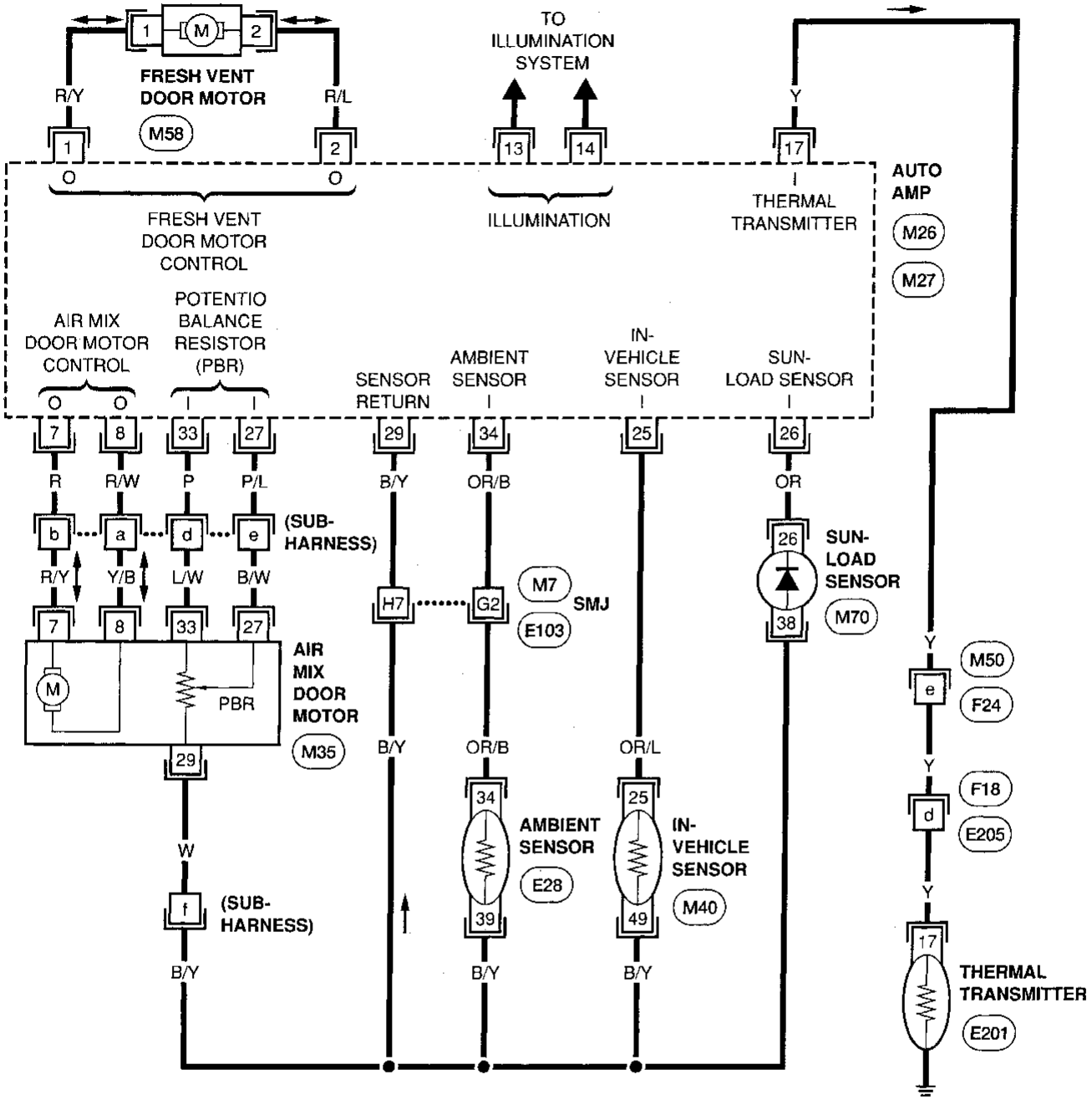


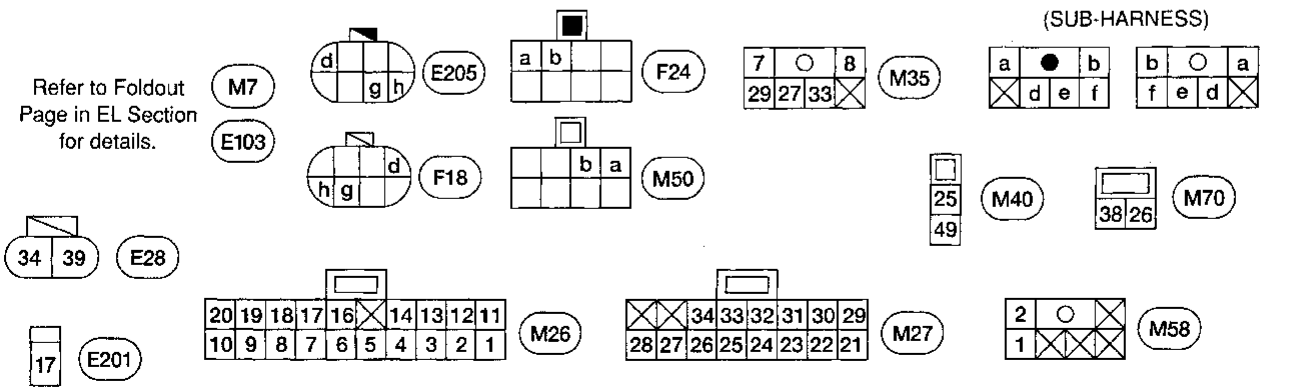




AHA207-C

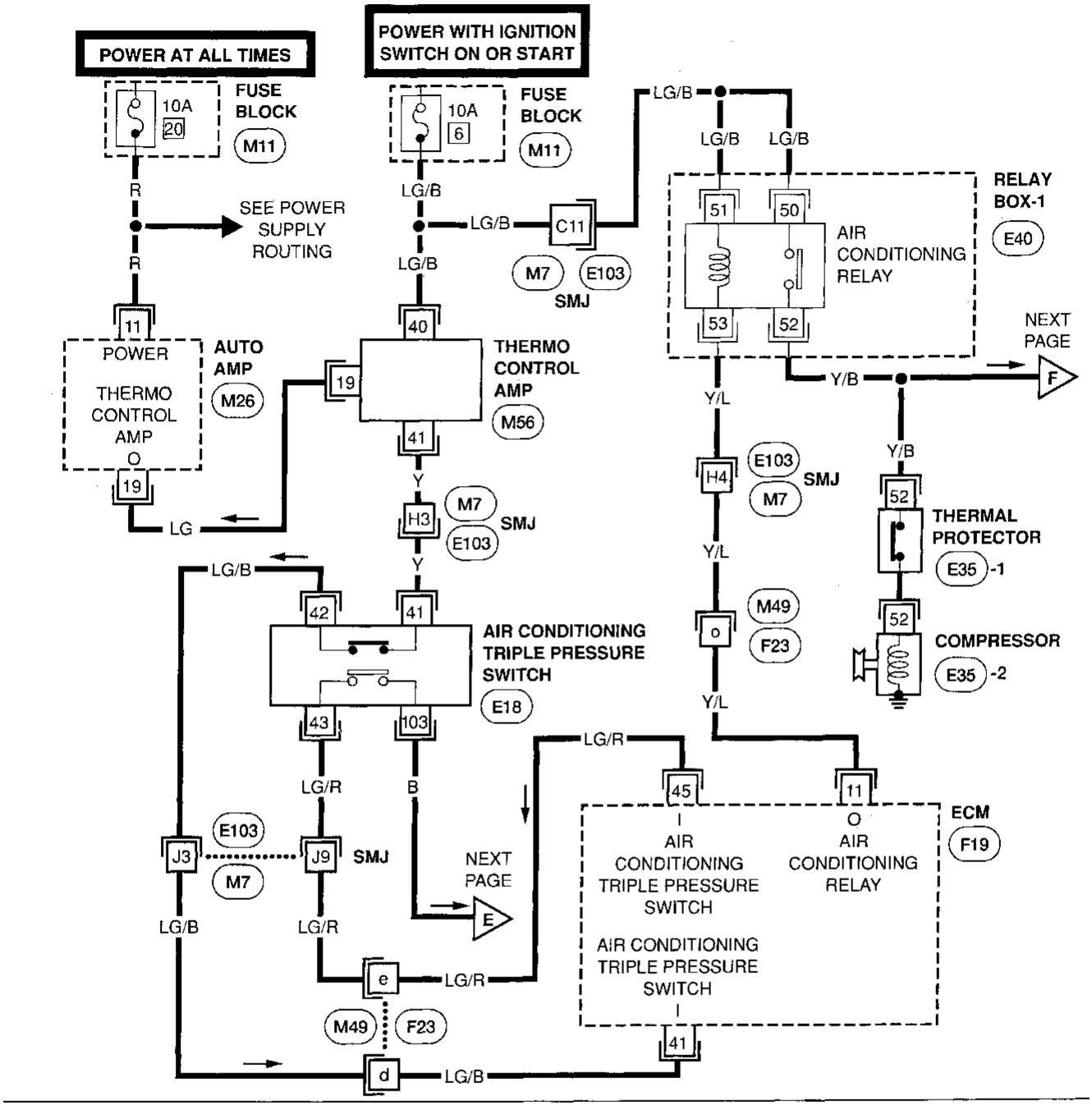
Wiring Diagram (Cont'd)

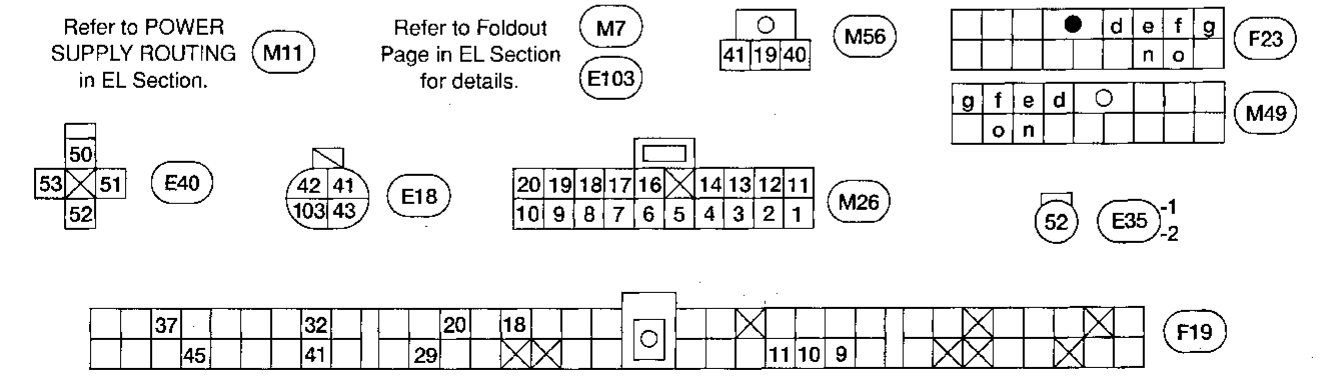




AHA207-D

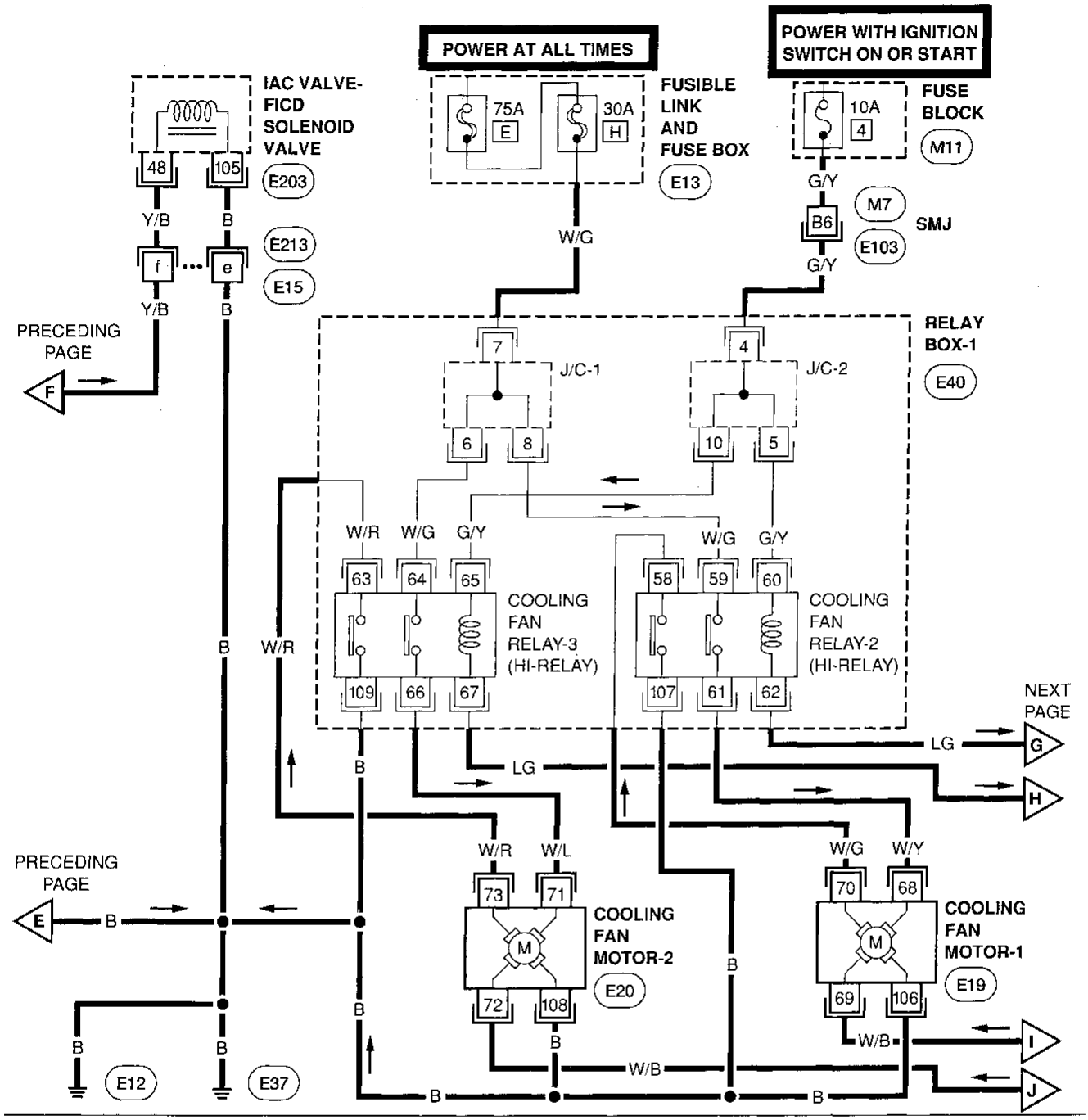
Wiring Diagram (Cont'd)





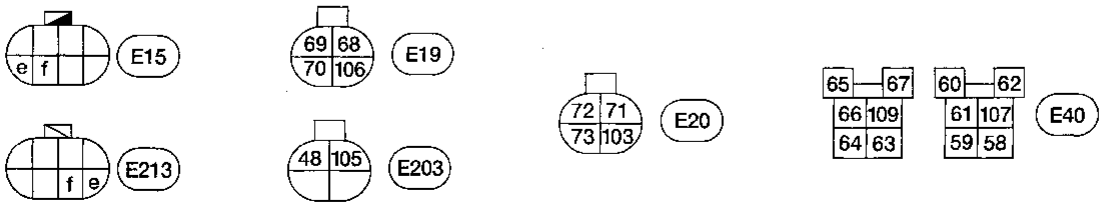
AHA207-E

Wiring Diagram (Cont'd)



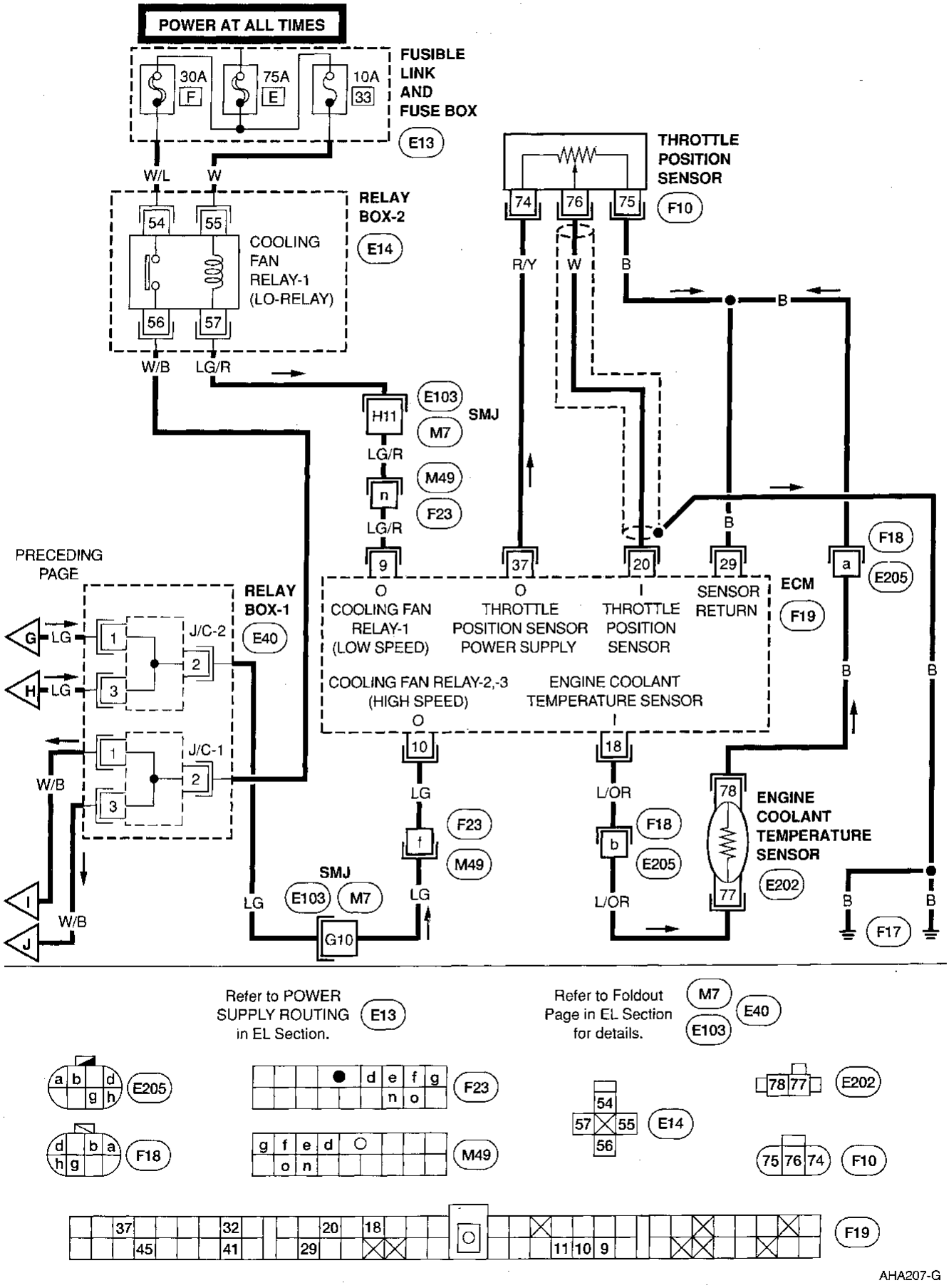
Refer to POWER SUPPLY ROUTING in EL Section. E13 M11

Refer to Foldout Page in EL Section for details. M7 E103 E40



AHA207-F

Wiring Diagram (Cont'd)



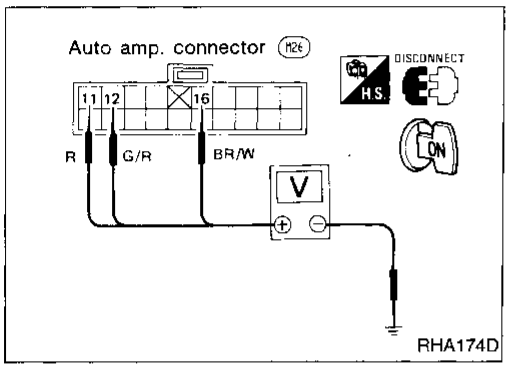
AHA207-G

Main Power Supply and Ground Circuit Check

POWER SUPPLY CIRCUIT CHECK FOR AUTO A/C SYSTEM

Check power supply circuit for auto air conditioning system.

Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING") and HA-97.

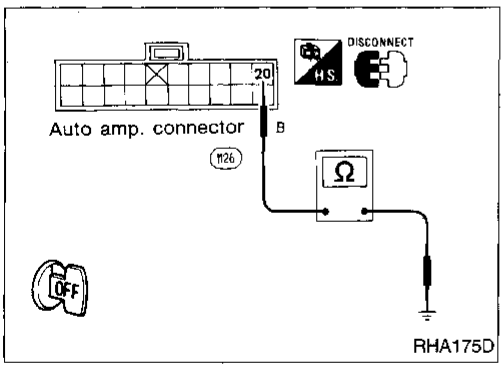


AUTO AMP. CHECK

Check power supply circuit for auto amp. with ignition switch ON.

1. Disconnect auto amp. harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal No. ⑪, ⑫, ⑯ and body ground.

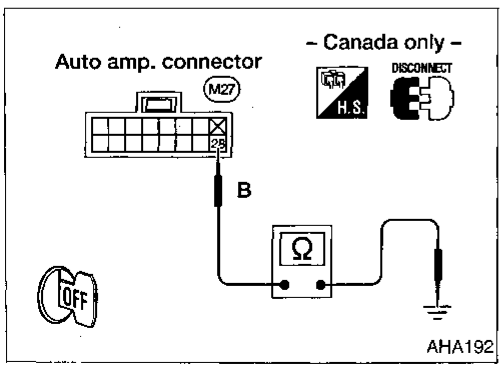
Voltmeter terminal		Voltage
⊕	⊖	
⑪	Body ground	Approx. 12V
⑫		
⑯		



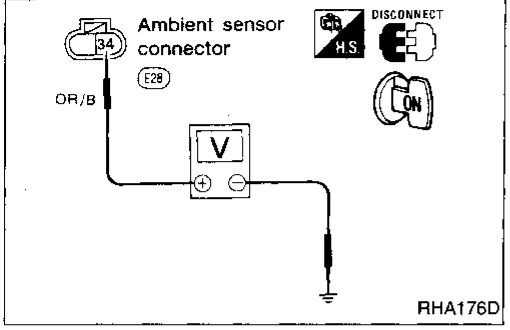
Check body ground circuit for auto amp. with ignition switch OFF.

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

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



A



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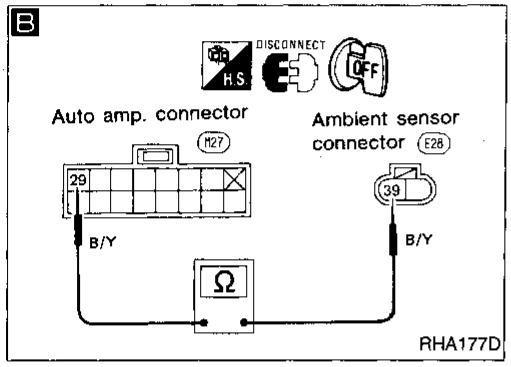

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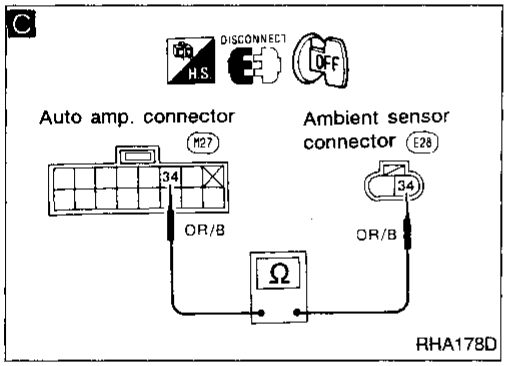


Diagnostic Procedure 1

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

A

CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP.
Disconnect ambient sensor harness connector.
Do approx. 5 volts exist between ambient sensor harness terminal No. (34) and body ground?

N.G. → Disconnect auto amp. harness connector.

C

Note

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

O.K. → Replace auto amp.

O.K. → Disconnect auto amp. harness connector.

B

Note

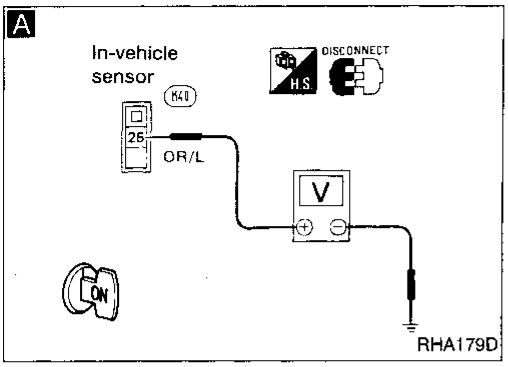
Check circuit continuity between ambient sensor harness terminal No. (39) and auto amp. harness terminal No. (29).

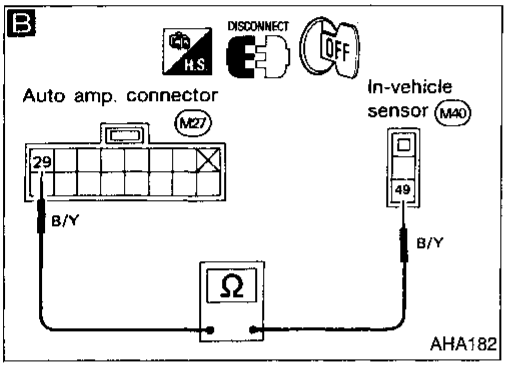
O.K. → CHECK AMBIENT SENSOR. (Refer to HA-126.)

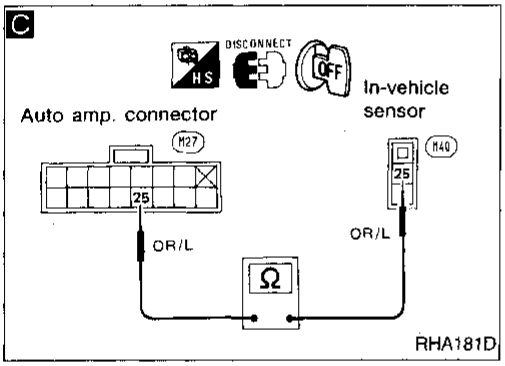
N.G. → Replace ambient sensor.

O.K. → Replace auto amp.

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







Diagnostic Procedure 2

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

A

CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND AUTO AMP.
Disconnect in-vehicle sensor harness connector.
Do approx. 5 volts exist between in-vehicle sensor harness terminal No. (25) and body ground?

N.G. → Disconnect auto amp. harness connector.

C

Note

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

O.K. → Replace auto amp.

O.K. → Disconnect auto amp. harness connector.

B

Note

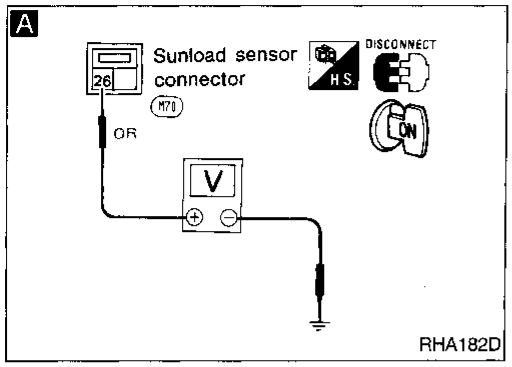
Check circuit continuity between in-vehicle sensor harness terminal No. (49) and auto amp. harness terminal No. (29).

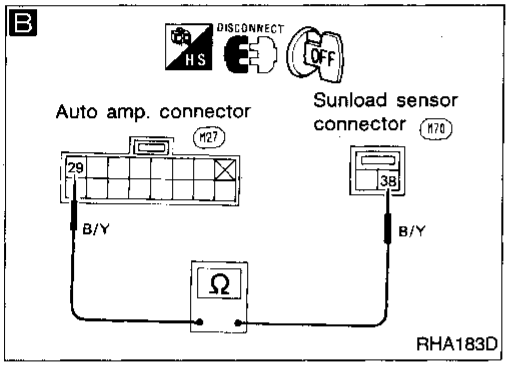
O.K. → CHECK IN-VEHICLE SENSOR. (Refer to HA-125.)

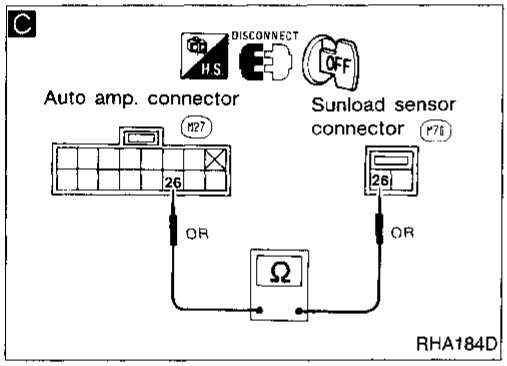
N.G. → Replace in-vehicle sensor.

O.K. → Replace auto amp.

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







Diagnostic Procedure 3

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

A

CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND AUTO AMP.
Disconnect sunload sensor harness connector.
Do approx. 5 volts exist between sunload sensor harness terminal No. (26) and body ground?

N.G. → Disconnect auto amp. harness connector.

C

Note

Check circuit continuity between sunload sensor harness terminal No. (26) and auto amp. harness terminal No. (26).

O.K. → Replace auto amp.

O.K. → Disconnect auto amp. harness connector.

B

Note

Check circuit continuity between sunload sensor harness terminal No. (38) and auto amp. harness terminal No. (29).

O.K. → CHECK SUNLOAD SENSOR. (Refer to HA-126.)

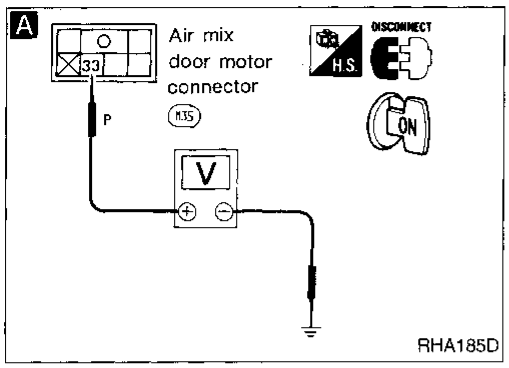
N.G. → Replace sunload sensor.

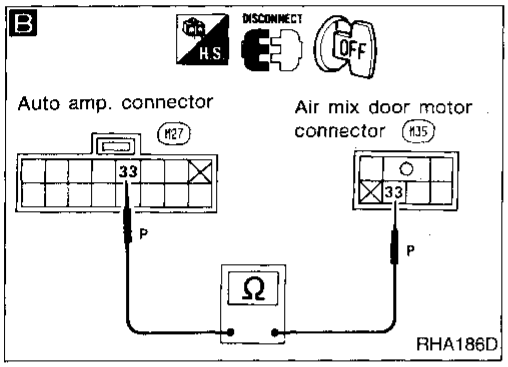
O.K. → Replace auto amp.

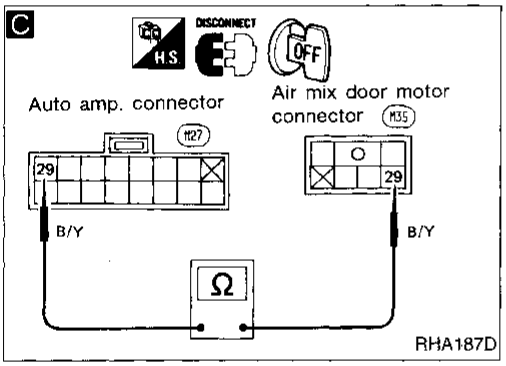
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

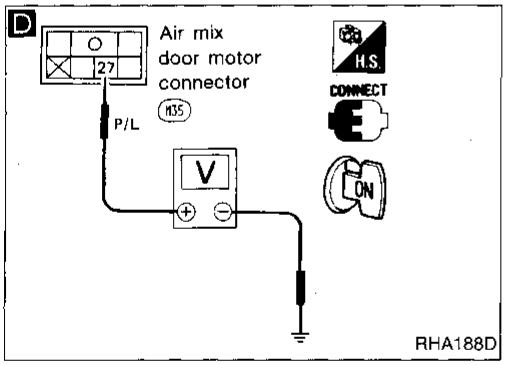
Diagnostic Procedure 4

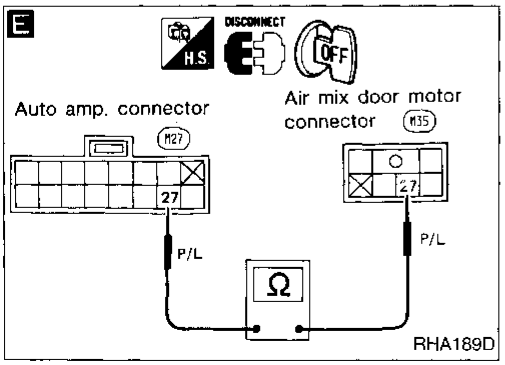
SYMPTOM: PBR circuit is open or shorted. (26 or ECON 26 is indicated on auto amp. as a result of conducting Self-diagnosis STEP 2.)











A

CHECK PBR CIRCUIT BETWEEN PBR AND AUTO AMP.
Disconnect air mix door motor harness connector.
Do approx. 5 volts exist between air mix door motor harness terminal No. (33) and body ground?

N.G. → Disconnect auto amp. harness connector.

B Note: Check circuit continuity between air mix door motor harness terminal No. (33) and auto amp. harness terminal No. (33).

O.K. → Replace auto amp.

O.K. → Disconnect auto amp. harness connector.

C Note: Check circuit continuity between air mix door motor harness terminal No. (29) and auto amp. harness terminal No. (29).

O.K.

D

CHECK PBR CIRCUIT BETWEEN PBR AND AUTO AMP.
Reconnect auto amp. harness connector.
Do approx. 5 volts exist between air mix door motor harness terminal No. (27) and body ground?

N.G. → Disconnect auto amp. harness connector.

E Note: Check circuit continuity between air mix door motor harness terminal No. (27) and auto amp. harness terminal No. (27).

O.K. → Replace auto amp.

O.K.

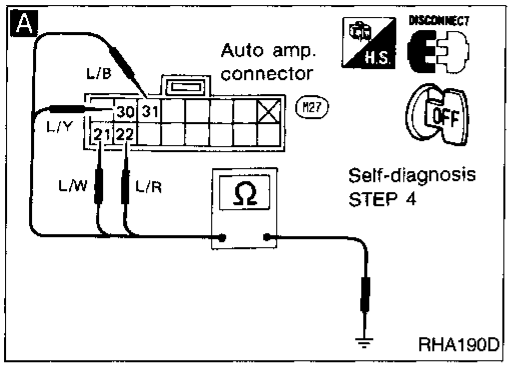
CHECK PBR SENSOR.
(Refer to HA-129.)

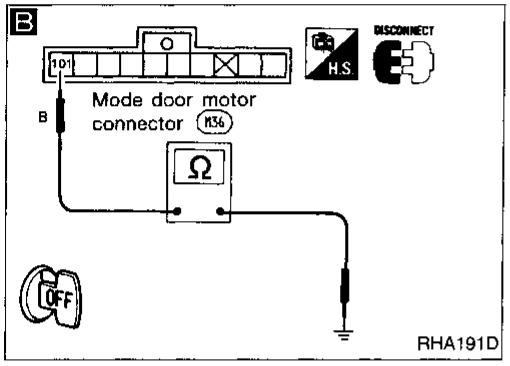
N.G. → Replace air mix door motor (PBR).

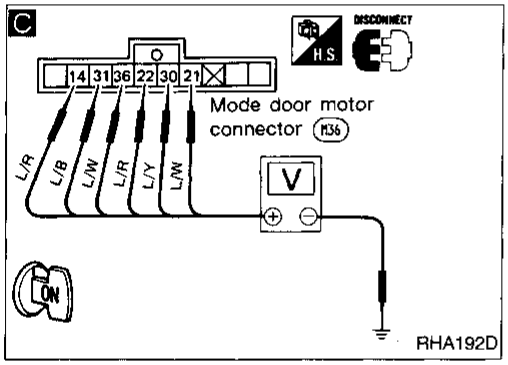
O.K.

Replace auto amp.

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







Diagnostic Procedure 5

SYMPTOM: Mode door motor does not operate normally.

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

A

CHECK MODE DOOR MOTOR POSITION SWITCH.

1. Set up code No. 41 in Self-diagnosis STEP 4.
2. Disconnect auto amp. harness connector after turning ignition switch OFF.
3. Check if continuity exists between terminal No. (22) or (31) of auto amp. harness connector and body ground.
4. Using above procedure, check for continuity in any other mode, as indicated in chart.

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

N.G. → Disconnect mode door motor harness connector.

O.K. ↓

INSPECTION END

B

Note

CHECK BODY GROUND CIRCUIT FOR MODE DOOR MOTOR.
Does continuity exist between mode door motor harness terminal No. (101) and body ground?

O.K. ↓

Reconnect auto amp. harness connector.

C

CHECK POWER SUPPLY FOR MODE DOOR MOTOR CONTROL CIRCUIT.
Do approx. 5 volts exist between mode door motor harness terminals and body ground?

Terminal No. ⊕	Terminal No. ⊖	Voltage
(21)	Body ground	Approx. 5V
(30)		
(22)		
(36)		
(31)		
(14)		

O.K. ↓

Reconnect mode door motor harness connector.

Ⓐ

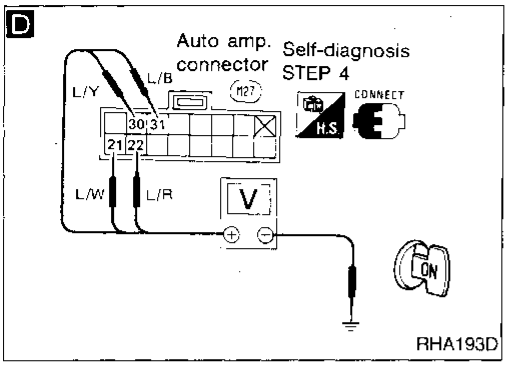
N.G. → Ⓑ

(Go to next page.)

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

Diagnostic Procedure 5 (Cont'd)

D



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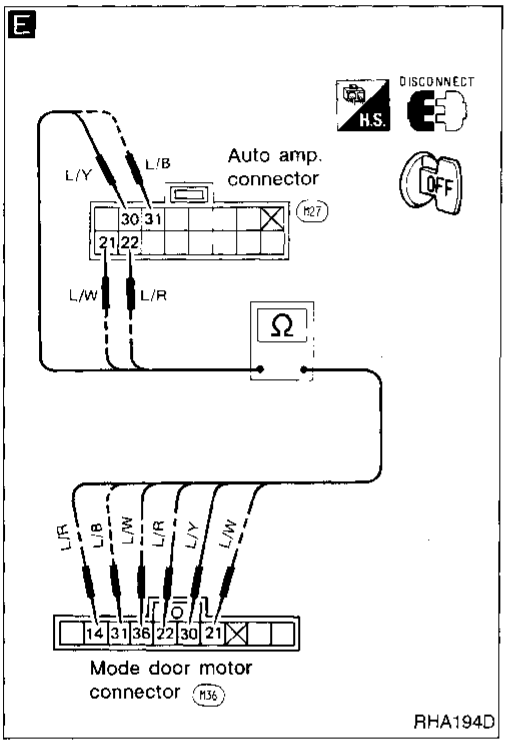
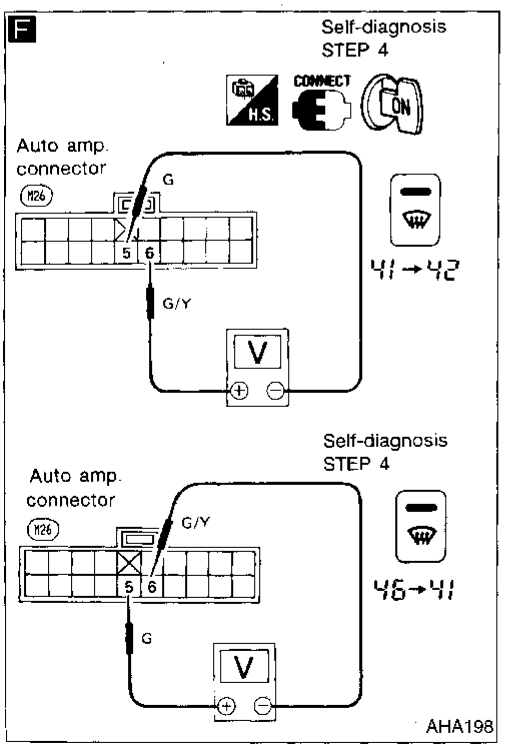
E



RHA194D

F



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Ⓐ

D

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

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

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

O.K. → F

N.G. → Replace mode door motor.

Ⓑ

E

Note

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

Terminal No. ⊕	Terminal No. ⊖	Continuity
Auto amp.	Mode door motor	Yes
30	30	
22	14 or 22	
21	21 or 36	
31	31	

O.K. → Replace auto amp.

F

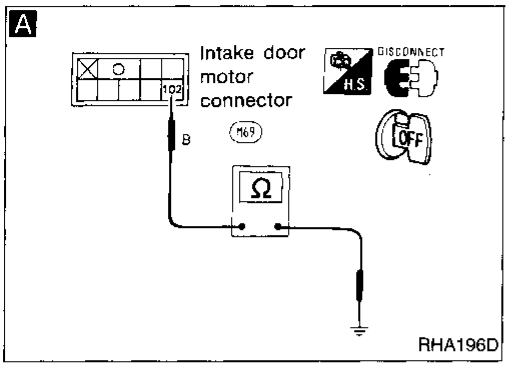
CHECK FOR AUTO AMP. OUTPUT.
Do approx. 10.5 volts exist between auto amp. harness terminals No. ⑤ and ⑥ when code No. is switched from "41" to "42" or when code No. is switched from "46" to "41"?

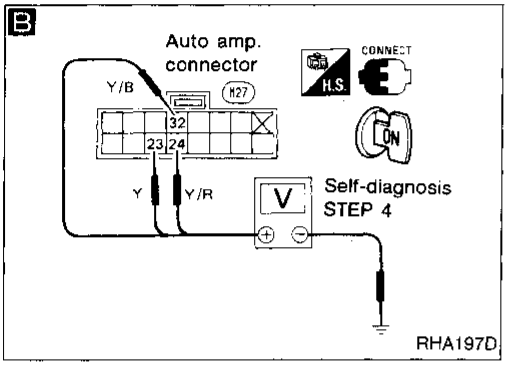
N.G. → Replace auto amp.

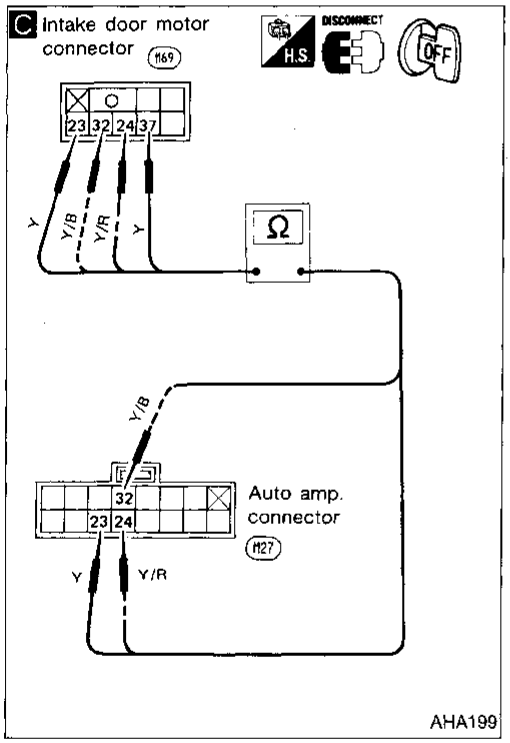
Code No.	Mode door motor operation	Terminal No. ⑥	Terminal No. ⑤	Voltage V
41 → 42	VENT → B/L	⊕	⊖	Approx. 10.5
46 → 41	DEF → VENT	⊖	⊕	
–	Stop	⊖	⊖	0

O.K. → Replace mode door motor.

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







Diagnostic Procedure 6

SYMPTOM: Intake door motor does not operate normally.

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

A

Note

CHECK BODY GROUND CIRCUIT FOR INTAKE DOOR MOTOR.
Disconnect intake door motor harness connector.
Does continuity exist between intake door motor harness terminal No. (102) and body ground?

O.K.

B

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

Code No.	Terminal No. ⊕	Terminal No. ⊖	Condition	Voltage V
41 42	23	Body ground	REC	0
	24			12
	32			12
43	23		20% REC	12
	24			0
	32			0
44 45 46	23		FRE	0
	24			12
	32			12

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

N.G.

C

Note

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

Terminal No. ⊕	Terminal No. ⊖	
Auto amp.	Intake door motor	Continuity
23	23 or 37	Yes
24	24	
32	32	

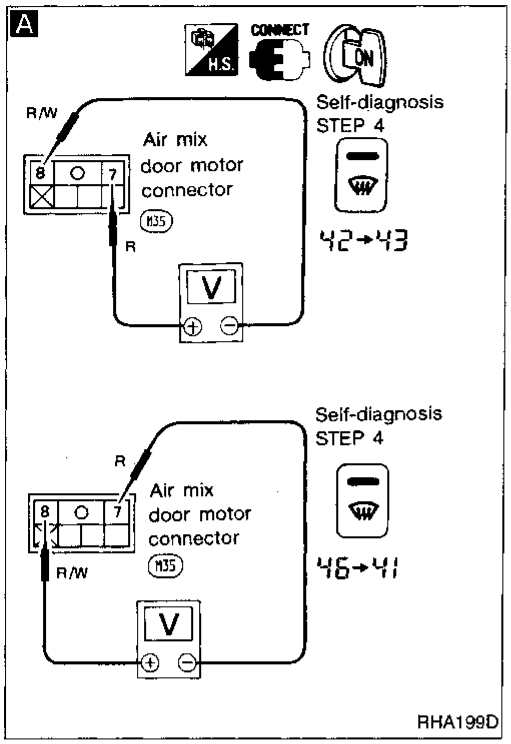
O.K.

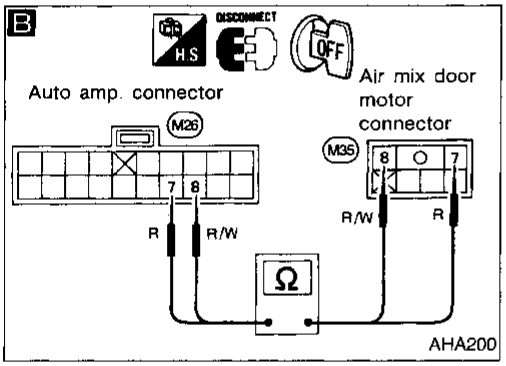
Replace auto amp.

O.K.

Replace intake door motor.

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





Diagnostic Procedure 7

SYMPTOM: Air mix door motor does not operate normally.

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

IS PBR OPERATING NORMALLY?
Refer to Self-diagnoses STEP 2.

N.G. → CHECK PBR CIRCUIT. Perform Diagnostic Procedure 4. Refer to HA-108.

O.K. ↓

A

CHECK FOR AUTO AMP. OUTPUT.
Set up Self-diagnosis STEP 4.
Do approx. 10.5 volt exist between air mix door motor harness terminals No. ⑦ and ⑧ when code No. is switched from "42" to "43" or when code No. is switched from "46" to "41"?

N.G. → Disconnect auto amp. and air mix door motor harness connectors.

Code No.	Air mix door operation	Terminal No. ⑦	Terminal No. ⑧	Voltage V
42 →43	Cold → Hot	⊕	⊖	Approx. 10.5
46 →41	Hot → Cold	⊖	⊕	Approx. 10.5
—	Stop	⊖	⊖	0

B

Note: Check circuit continuity between auto amp. harness terminal No. ⑦ (⑧) and air mix door harness terminal No. ⑦ (⑧).

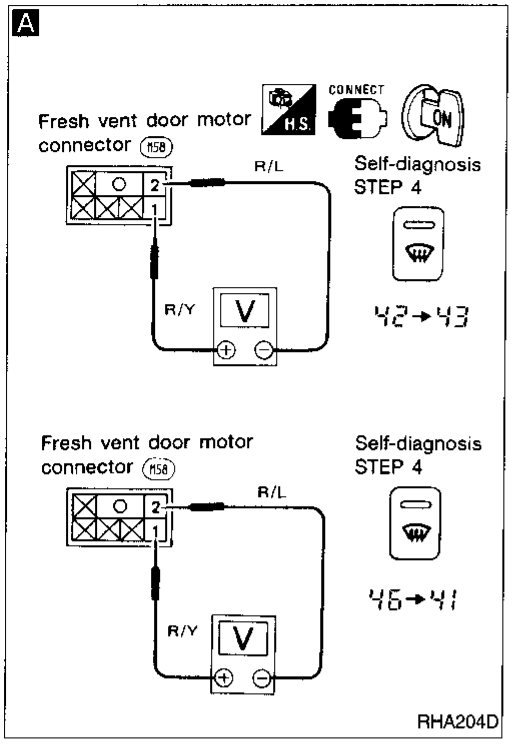
O.K. ↓

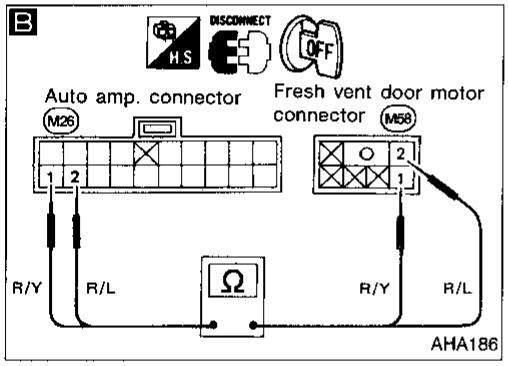
Replace auto amp.

O.K. ↓

Replace air mix door motor.

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





Diagnostic Procedure 8

SYMPTOM: Fresh vent door motor does not operate normally.

- **Perform Self-diagnosis STEP 4 before referring to the following flow chart.**

A

CHECK FOR AUTO AMP. OUTPUT.
Set up Self-diagnosis STEP 4.
Do approx. 12 volts exist between fresh vent door motor harness terminals ① and ② when code No. is switched from "42" to "43" or when code No. is switched from "46" to "41"?

Code No.	Fresh vent door condition	Terminal No. ①	Terminal No. ②	Voltage V
42 →43	OPEN → CLOSE	⊕	⊖	Approx. 12V
46 →41	CLOSE → OPEN	⊖	⊕	

O.K. → Replace fresh vent door motor.

N.G. →

Disconnect auto amp. harness connector.

B

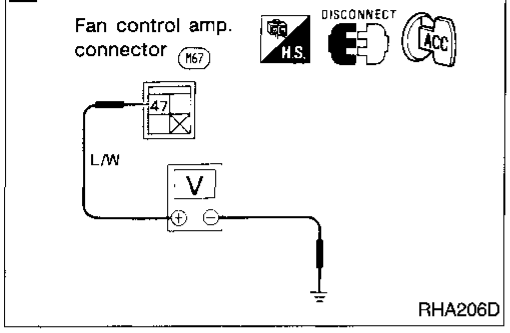
Note

Check circuit continuity between auto amp. harness terminal ① (②) and fresh vent door motor harness terminal No. ① (②).

Replace auto amp.

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

A



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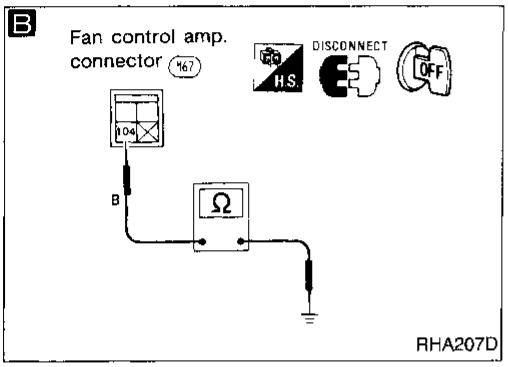

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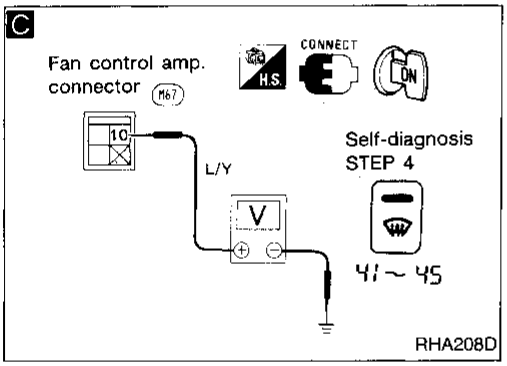

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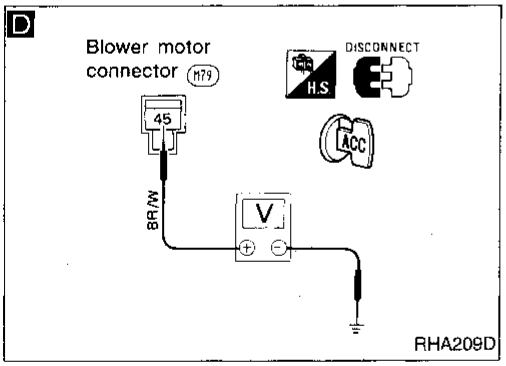

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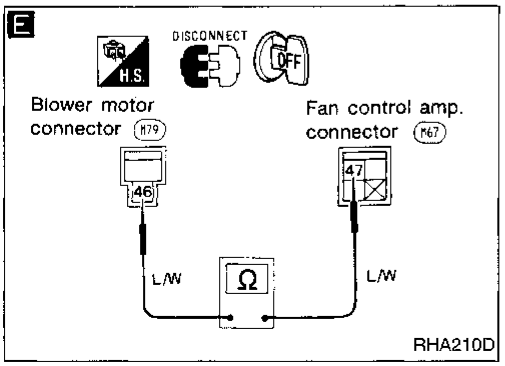


Diagnostic Procedure 9

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

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

A

CHECK POWER SUPPLY FOR FAN CONTROL AMP.
Disconnect fan control amp. harness connector.
Do approx. 12 volts exist between fan control amp. harness terminal No. (47) and body ground?

N.G. → **D**

CHECK POWER SUPPLY FOR BLOWER MOTOR.
Disconnect blower motor harness connector.
Do approx. 12 volts exist between blower motor harness terminal No. (45) and body ground?

O.K. → **B**

N.G. → Check 20A fuses at fuse block. Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING") and HA-97.

B Note

CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP.
Does continuity exist between fan control amp. harness terminal No. (104) and body ground?

O.K.

Reconnect fan control amp. harness connector.

C

CHECK FOR AUTO AMP. OUTPUT.
Set up Self-diagnosis STEP 4.
Measure voltage across fan control amp. harness terminal No. (10) and body ground.

Code No.	Terminal No. ⊕	Terminal No. ⊖	Voltage
41 -45	(10)	Body ground	Approx. 1 - 3V

O.K. → Replace fan control amp.

N.G. → **E** Note

Check circuit continuity between blower motor harness terminal No. (46) and fan control amp. harness terminal No. (47).

O.K. → CHECK BLOWER MOTOR. (Refer to HA-121.)

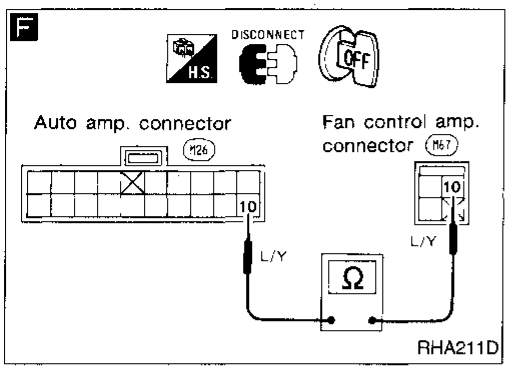
N.G. → Replace blower motor.

(A) (Go to next page.)

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

Diagnostic Procedure 9 (Cont'd)

F



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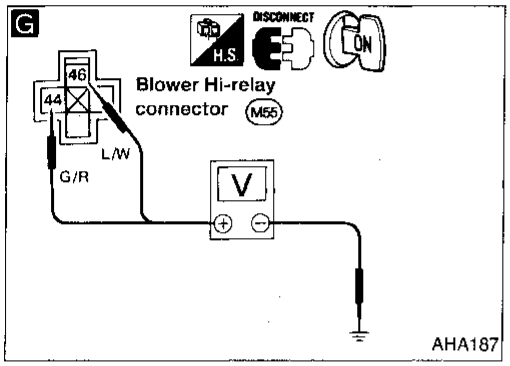

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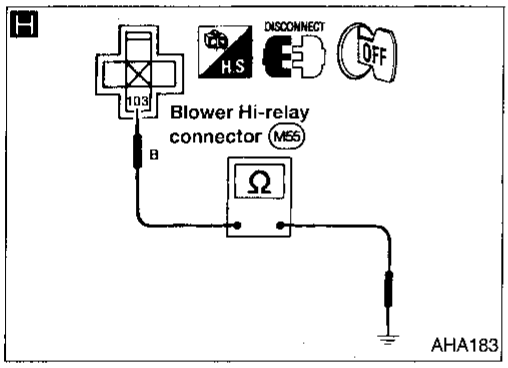


Ⓐ

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

F Note

Does continuity exist between auto amp. harness terminal No. ⑩ and fan control amp. harness terminal No. ⑩?

O.K.

G

CHECK POWER SUPPLY FOR BLOWER HI-RELAY.
Do approx. 12 volts exist between blower Hi-relay harness terminals No. ㊹, ㊻ and body ground?

N.G. → Check 10A or 20A fuses at fuse block.
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING") and HA-97.

O.K.

H Note

CHECK BODY GROUND CIRCUIT FOR BLOWER HI-RELAY.
Does continuity exist between blower Hi-relay harness terminal No. ⑩③ and body ground?

O.K.

CHECK BLOWER HI-RELAY AFTER DISCONNECTING IT.
(Refer to HA-121.)

N.G. → Replace blower Hi-relay.

O.K.

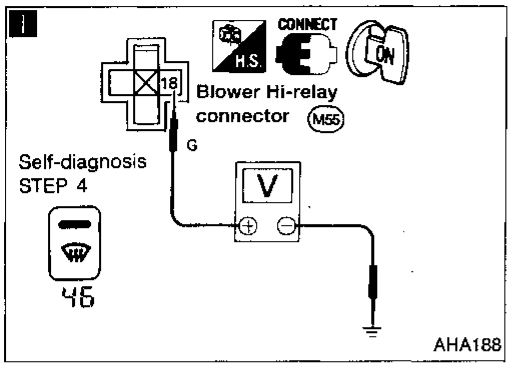
Reconnect blower Hi-relay.

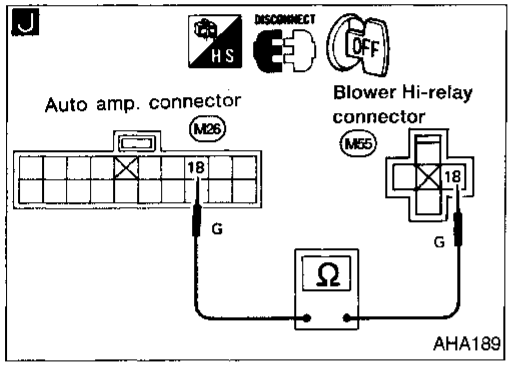
Ⓑ

(Go to next page.)

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

Diagnostic Procedure 9 (Cont'd)





B

CHECK FOR AUTO AMP. OUTPUT.
Set up Self-diagnosis STEP 4.
Measure voltage across blower Hi-relay harness terminal No. (18) and body ground.

Code No.	Terminal No. ⊕	Terminal No. ⊖	Voltage
46	(18)	Body ground	Less than approx. 1.5V

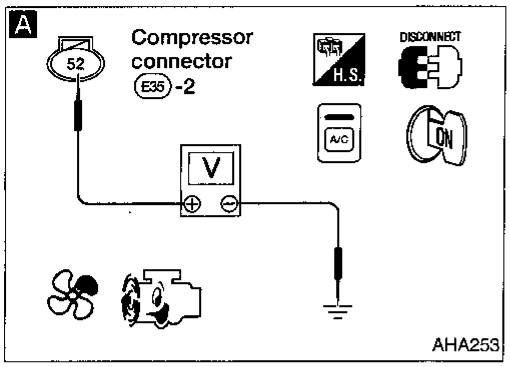
N.G. → Disconnect blower Hi-relay and auto amp. harness connectors.

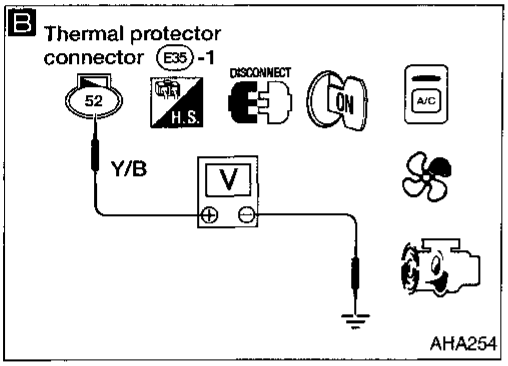
Note: Does continuity exist between blower Hi-relay harness terminal No. (18) and auto amp. harness terminal No. (18)?

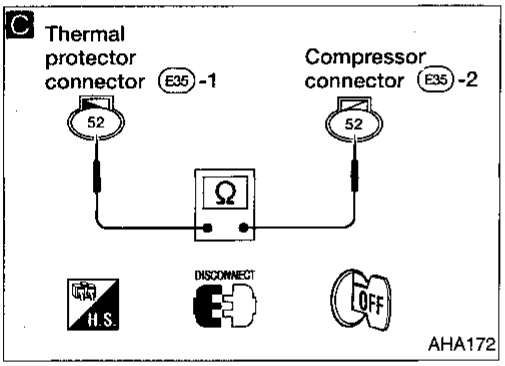
O.K. → Replace auto amp.

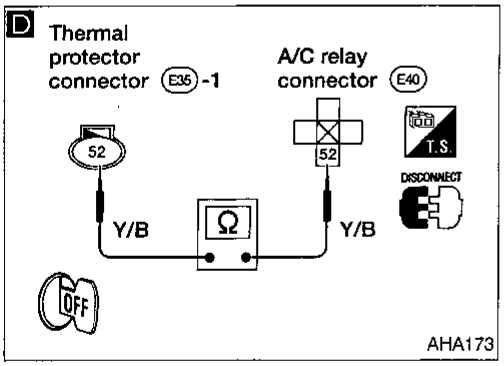
O.K. → Replace blower motor.

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









Diagnostic Procedure 10

SYMPTOM: Magnet clutch does not engage after performing Preliminary Check 6.

- **Perform Preliminary Check 6 before referring to the flow chart.**

A

CHECK POWER SUPPLY FOR COMPRESSOR.
1. Disconnect compressor harness connector.
2. Set up code No. 41 in Self-diagnosis STEP 4.
3. Do approx. 12 volts exist between compressor harness terminal No. (52) and body ground?

N.G. → B

CHECK POWER SUPPLY FOR THERMAL PROTECTOR.
Disconnect thermal protector harness connector.
Do approx. 12V exist between thermal protector harness terminal No. (52) and body ground?

O.K. → C
N.G. → (A)

O.K. ↓

Check magnet clutch.

N.G. ↓

Replace magnet clutch.
Refer to HA-138.

C

CHECK THERMAL PROTECTOR.
Check circuit continuity between thermal protector harness terminal No. (52) and compressor harness terminal No. (52).

N.G. ↓

Replace thermal protector.

(A) ↓

Disconnect A/C relay harness connector.

D Note

Check circuit continuity between A/C relay harness terminal No. (52) and thermal protector harness terminal No. (52).

O.K. ↓

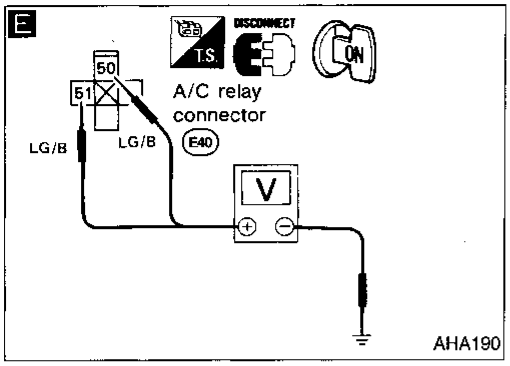
Turn ignition switch OFF to cancel Self-diagnosis STEP 4.

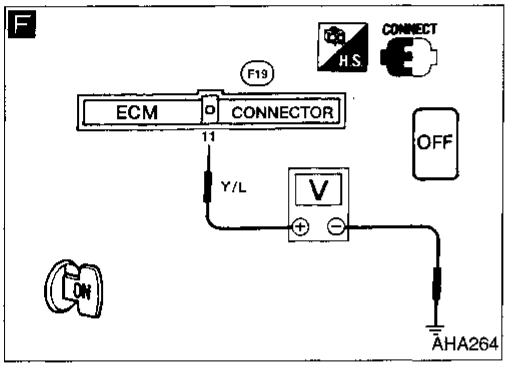
(B)

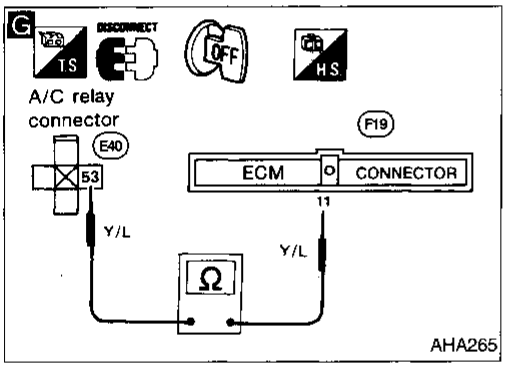
(Go to next page.)

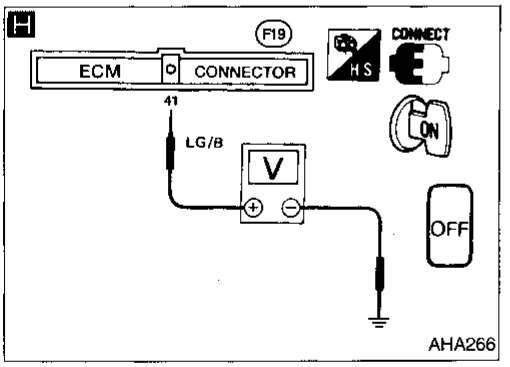
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 10 (Cont'd)









Ⓑ

E

CHECK POWER SUPPLY FOR A/C RELAY.
Disconnect A/C relay.
Do approx. 12 volts exist between A/C relay harness terminals No. (50), (51) and body ground?

N.G. → CHECK POWER SUPPLY CIRCUIT AND 10A FUSE AT FUSE BLOCK. Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

O.K. ↓

CHECK A/C RELAY AFTER DISCONNECTING IT.
(Refer to HA-58.)

N.G. → Replace A/C relay.

O.K. ↓

Reconnect A/C relay.

Turn ignition switch ON and press OFF switch.

F

CHECK COIL SIDE CIRCUIT OF A/C RELAY.
Do approx. 12 volts exist between ECM (ECCS control module) harness terminal No. (11) and body ground?
(For terminal arrangement, refer to HA-96.)

O.K. ↓

N.G. → Note

G

Check circuit continuity between A/C relay harness terminal No. (53) and ECM (ECCS control module) harness terminal No. (11).
(For terminal arrangement, refer to HA-96.)

H

CHECK COIL SIDE CIRCUIT OF A/C RELAY CONTROLLED BY ECM (ECCS control module).
Do more than 8 volts exist between ECM (ECCS control module) harness terminal No. (41) and body ground?
(For terminal arrangement, refer to HA-96.)

N.G. → CHECK ECM (ECCS control module).
(Refer to EF & EC section.)

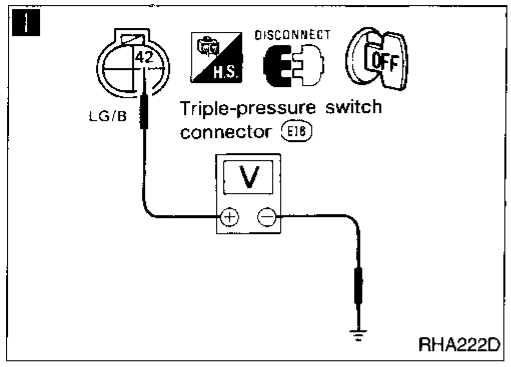
O.K. ↓

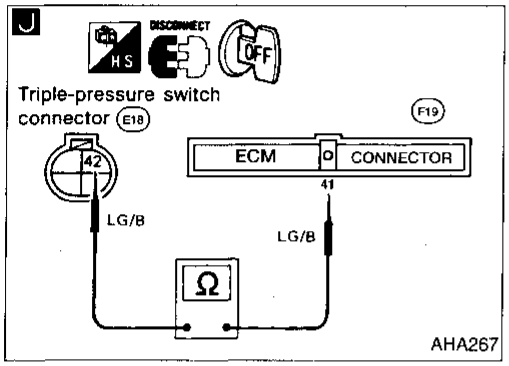
Ⓒ

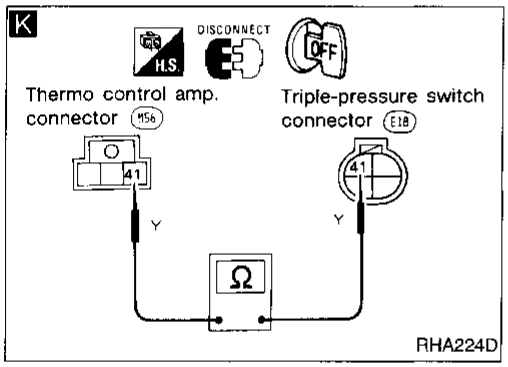
(Go to next page.)

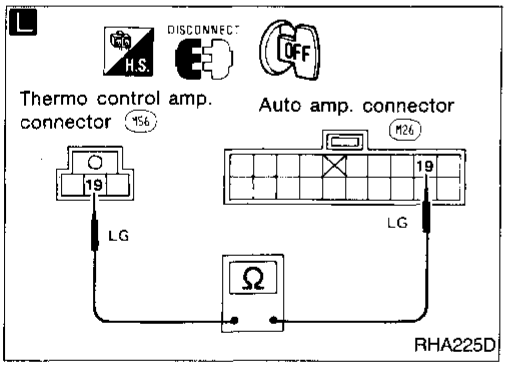
Note:
If the result is N.G. after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 10 (Cont'd)









Ⓒ

I

CHECK TRIPLE-PRESSURE SWITCH CIRCUIT BETWEEN TRIPLE-PRESSURE SWITCH AND ECM (ECCS control module).
Disconnect triple-pressure switch harness connector.
Do more than 8 volts exist between triple-pressure switch harness terminal No. ㊷ and body ground?

N.G. → Disconnect ECM (ECCS control module) harness connector.

J Note

Check circuit continuity between ECM (ECCS control module) harness terminal No. ㊶ and triple-pressure switch harness terminal No. ㊷. (For terminal arrangement, refer to HA-96.)

O.K. ↓

CHECK TRIPLE-PRESSURE SWITCH. (Refer to HA-121.)

N.G. → Replace triple-pressure switch.

O.K. ↓

Disconnect thermo control amp. harness connector.

K Note

Check circuit continuity between thermo control amp. harness terminal No. ㊶ and triple-pressure switch harness terminal No. ㊶.

N.G. → CHECK THERMO CONTROL AMP. (Refer to HA-121.)

N.G. → Replace thermo control amp.

O.K. ↓

Disconnect auto amp. harness connector.

L Note

Check circuit continuity between auto amp. harness terminal No. ⑲ and thermo control amp. harness terminal No. ⑲.

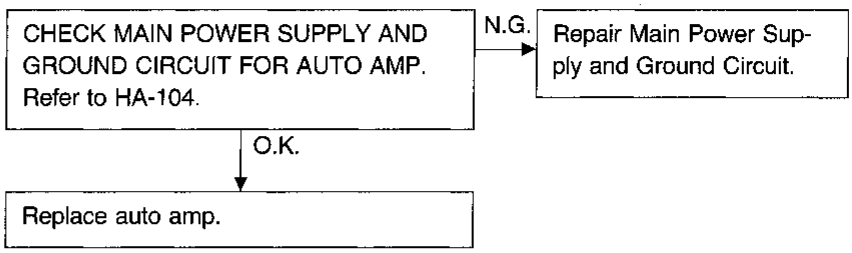
O.K. ↓

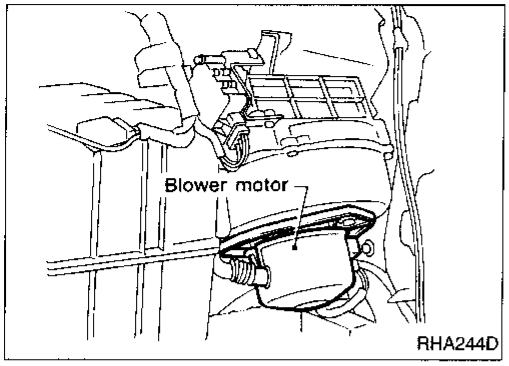
Replace auto amp.

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

Diagnostic Procedure 11

SYMPTOM: Self-diagnosis cannot be performed.



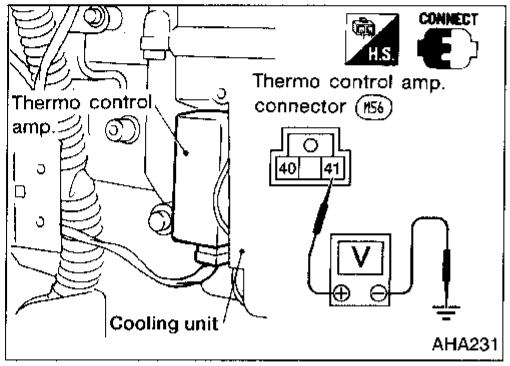


Electrical Components Inspection

BLOWER MOTOR

Check blower motor for smooth rotation.

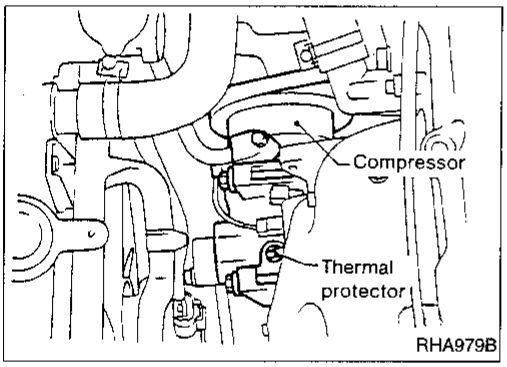
- Ensure that there are no foreign particles inside the intake unit.



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.

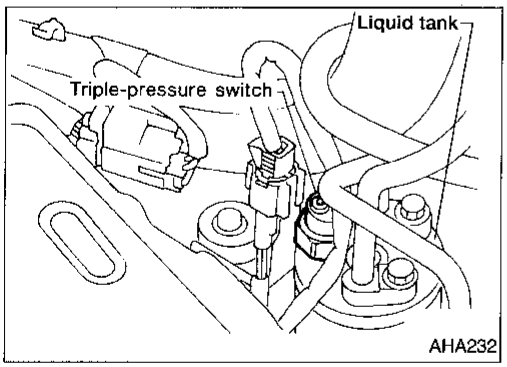
Evaporator outlet air temperature °C (°F)	Thermo amp. operation	Tester
Decreasing to 2.5 - 3.5 (37 - 38)	Turn OFF	Approx. 12V
Increasing to 4.0 - 5.0 (39 - 41)	Turn ON	Approx. 0V



THERMAL PROTECTOR

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

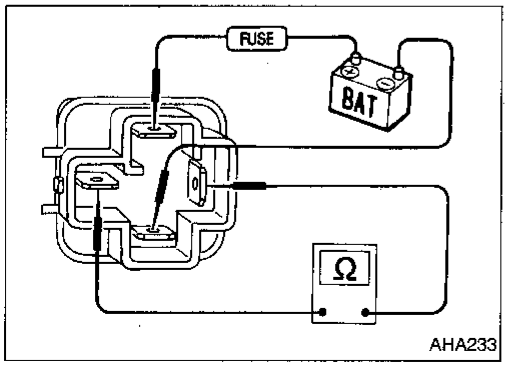
If N.G., replace thermal protector.



TRIPLE-PRESSURE SWITCH

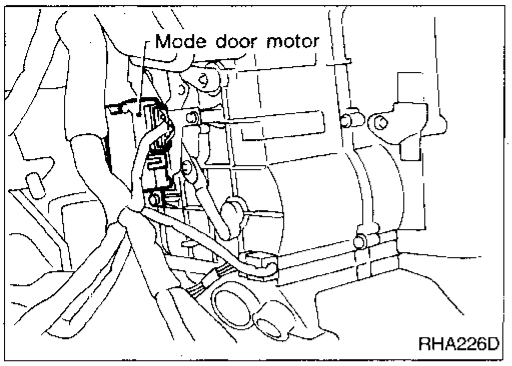
	ON kPa (kg/cm^2, psi)	OFF kPa (kg/cm^2, psi)
Low-pressure side	157 - 226 (1.6 - 2.3, 23 - 33)	152.0 - 201.0 (1.55 - 2.05, 22.0 - 29.2)
Medium-pressure side*	1,422 - 1,618 (14.5 - 16.5, 206 - 235)	1,128 - 1,422 (11.5 - 14.5, 164 - 206)
High-pressure side	1,667 - 2,059 (17 - 21, 242 - 299)	2,452 - 2,844 (25 - 29, 356 - 412)

* For cooling fan motor operation.



A/C RELAY AND BLOWER HI RELAY

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

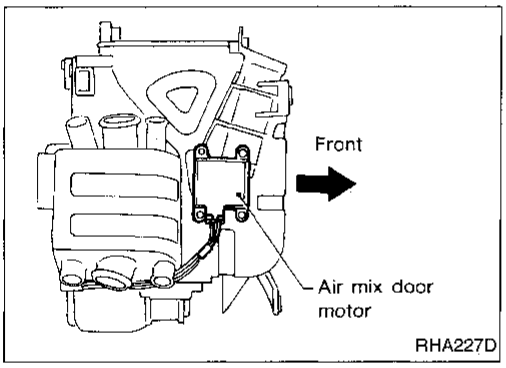


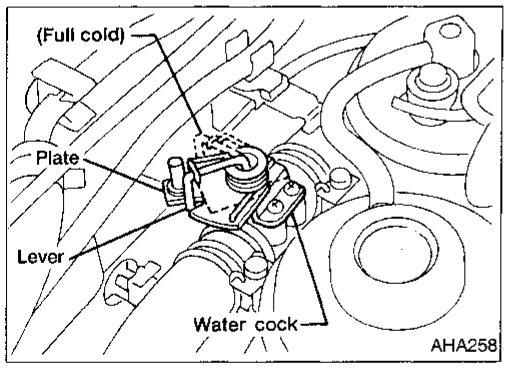
Control Linkage Adjustment

MODE DOOR

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

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





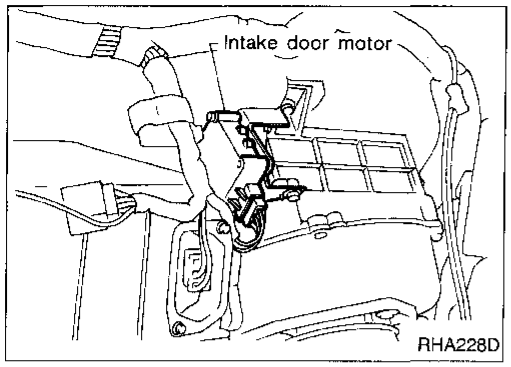
AIR MIX DOOR (Water cock)

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

41	42	43	44	45	46
Full cold		Full hot			

6. Set up code No. 41 in Self-diagnosis STEP 4.
7. Attach water cock cable to air mix door linkage and secure with clip.
8. Rotate and hold water cock lever AND plate in the full cold position (CLOCKWISE completely).
9. Attach water cock cable to plate and secure with clip (white mark on cable housing should be centered under the retaining clip).
10. Check that water cock operates properly when changing from code No. 41 to 46 by pushing DEF switch. (After several cycles, water cock lever should be midpoint of plate opening when code No. 41 is set.)

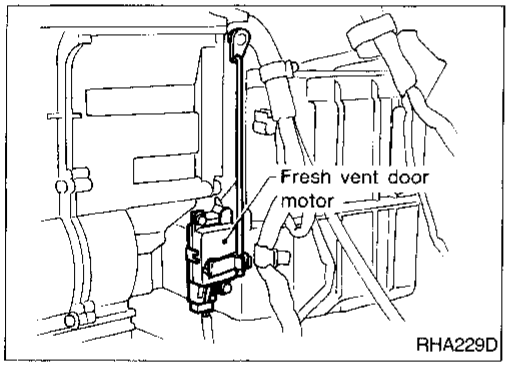
Control Linkage Adjustment (Cont'd)



INTAKE DOOR

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

41	42	43	44	45	46
REC		20% FRE	FRE		



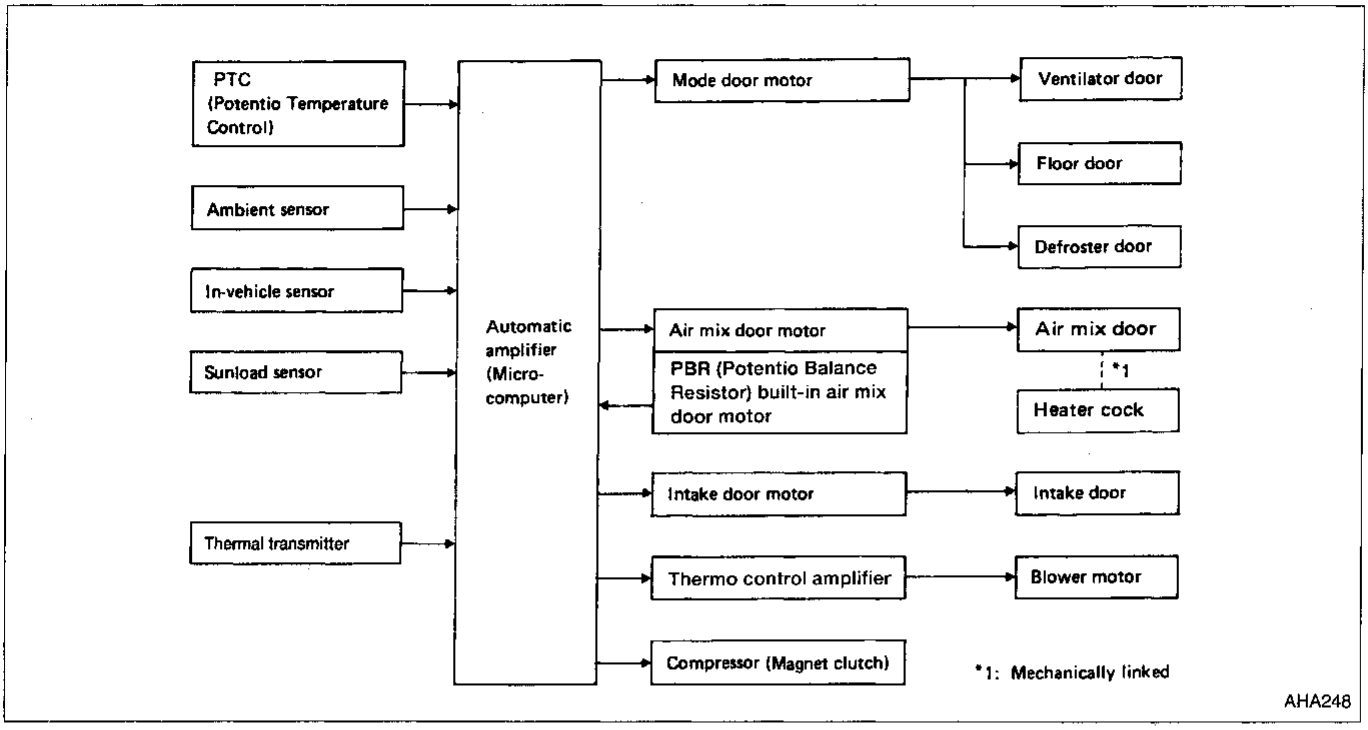
FRESH VENT DOOR

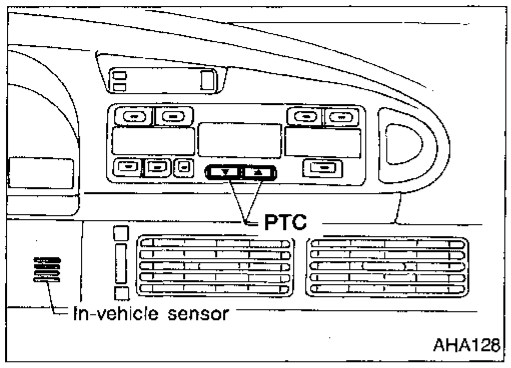
1. Install fresh vent door motor on cooling unit and connect it to main harness.
2. Set up code No. 46 in self-diagnosis STEP 4.
3. Move fresh vent door link by hand and hold it in CLOSE position.
4. Attach fresh vent door lever to rod holder.
5. Make sure fresh vent door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

41	42	43	44	45	46
OPEN		CLOSE			

Overview of Control System

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





Control System Input Components

POTENTIO TEMPERATURE CONTROL (PTC)

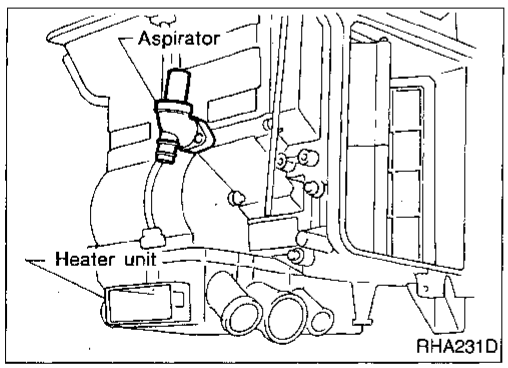
The PTC is built into the auto amplifier. It can be set at an interval of 1°C (2°F) through both ▲ (HOT) and ▼ (COLD) control switches. Setting temperature is digitally displayed.

IN-VEHICLE SENSOR

The in-vehicle sensor is attached to cluster lid-C. It converts variations in temperature of compartment air drawn from an aspirator into a resistance value which is then input into the auto amplifier.

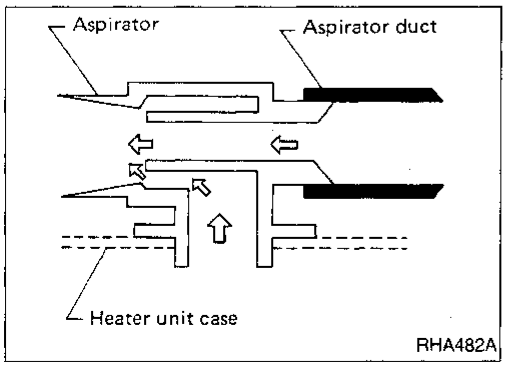
After disconnecting in-vehicle sensor harness connector, measure resistance between terminals ㉕ and ㊾ at sensor harness side, using the table below.

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

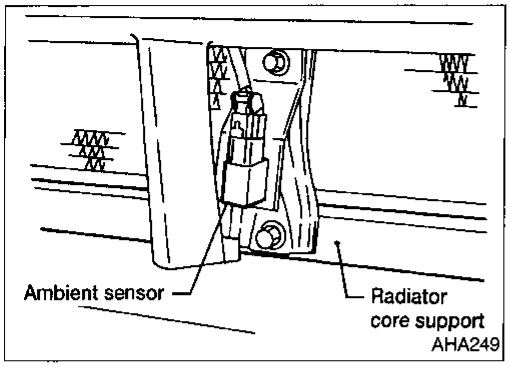


ASPIRATOR

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



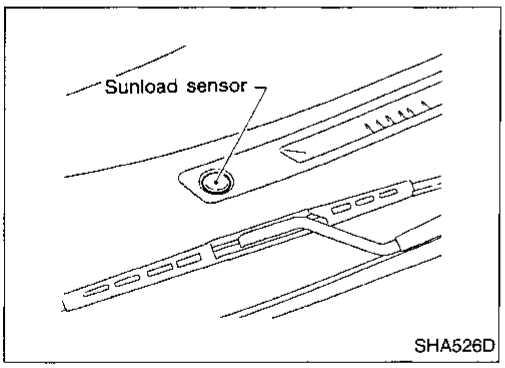
Control System Input Components (Cont'd)



AMBIENT SENSOR

The ambient sensor is attached to the radiator core support. It detects ambient temperature and converts it into a resistance value which is then input to the auto amplifier.
After disconnecting ambient sensor harness connector, measure resistance between terminals ㉞ and ㊴ at sensor harness side, using the table below.

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

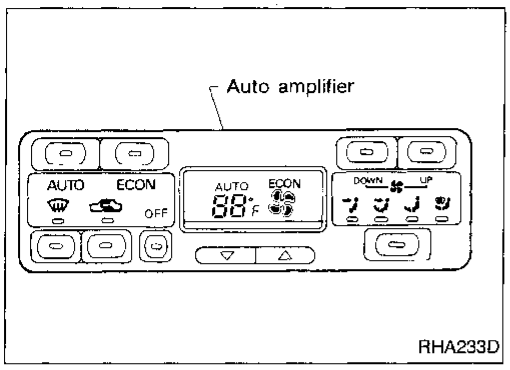


SUNLOAD SENSOR

The sunload sensor is located on the right defroster grille. It detects sunload entering through windshield by means of a photo diode and converts it into a current value which is then input to the auto amplifier.
Measure voltage between terminals ㉖ and ㊳ at vehicle harness side, using the table below.

Input current mA	Output voltage V
0	5.0
0.1	4.1
0.2	3.1
0.3	2.2
0.4	1.3
0.5	0.4

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



Control System Automatic Amplifier (Auto amp.)

The auto amplifier has a built-in microcomputer which processes information sent from various sensors needed for air conditioning operation. The air mix door motor, mode door motor, intake door motor, blower motor and compressor are then controlled.
The auto amplifier is unitized with control mechanisms. Signals from various switches and Potentio Temperature Control (PTC) are directly entered into auto amplifier.
Self-diagnostic functions are also built into auto amplifier to provide quick check of malfunctions in the auto air conditioning system.

AMBIENT TEMPERATURE INPUT PROCESS

The automatic amplifier includes a "processing circuit" for the ambient sensor input. When the temperature detected by the ambient sensor increases quickly, the processing circuit allows the auto amp. to recognize an ambient temperature increase of only 0.2°C (0.4°F) per 100 seconds.
As an example, consider stopping for a cup of coffee after high speed driving. Even though the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase because heat radiated from the engine compartment can radiate to the front grille area (where the ambient sensor is located).

SUNLOAD INPUT PROCESS

The auto amp. also includes a processing circuit which "average" the variations in detected sunload over a period of time. This prevents drastic swings in the ATC system operation due to small or quick variations in detected sunload.
For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the trees momentarily obstructing the sunlight does not cause any change in the ATC system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.

Control System Output Components

AIR MIX DOOR CONTROL (Automatic temperature control)

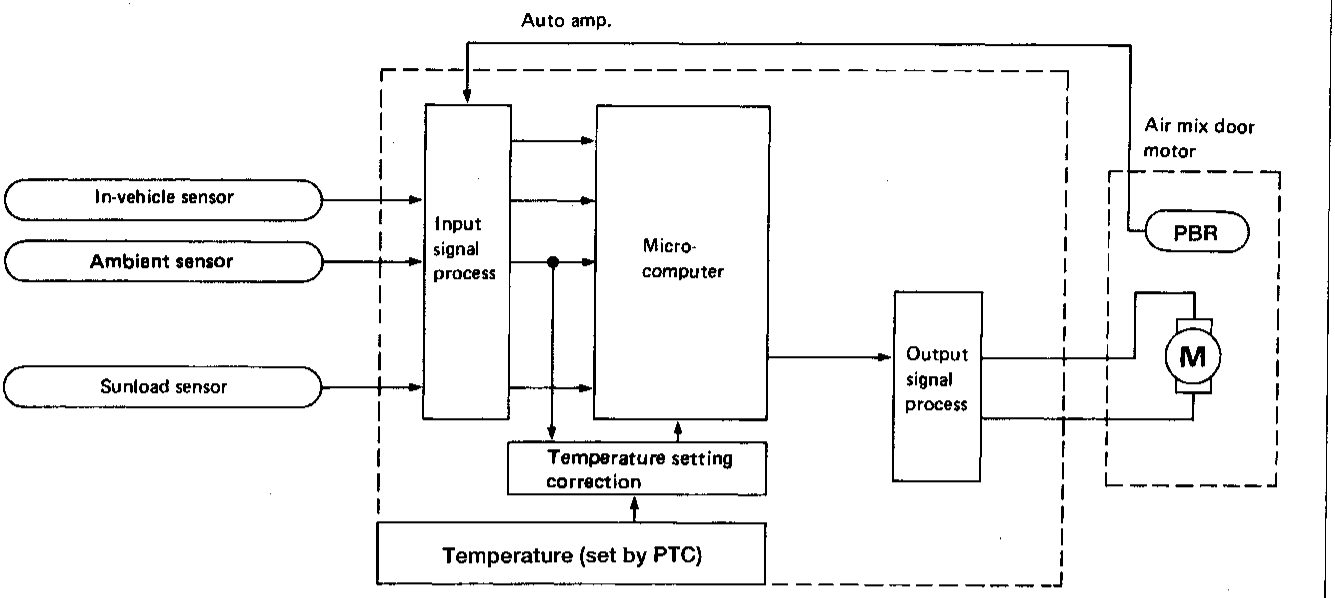
Component parts

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

System operation

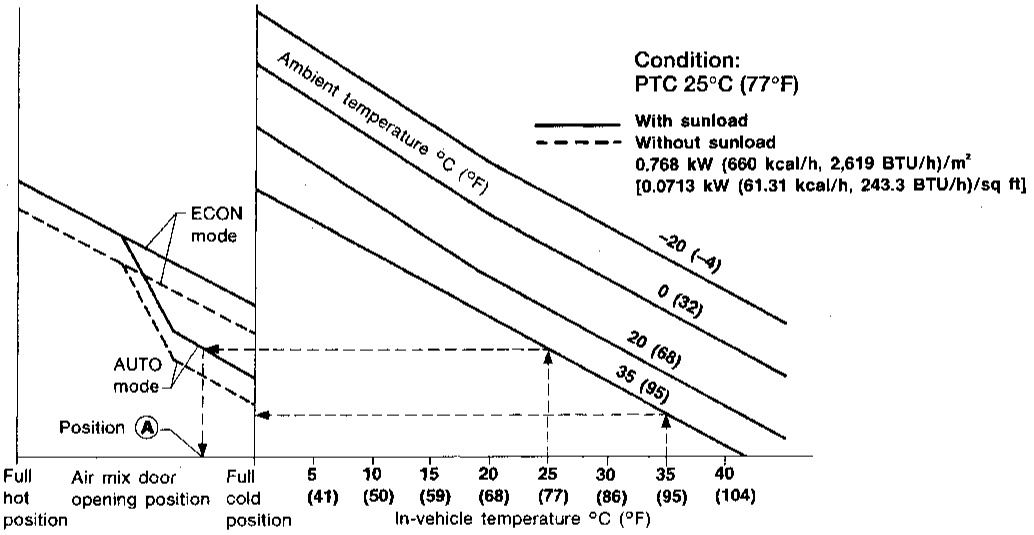
Temperature set by Potentio Temperature Control (PTC) is compensated through setting temperature correction circuit to determine target temperature.
Auto amplifier will operate air mix door motor to set air conditioning system in HOT or COLD position, depending upon relationship between conditions (target temperature, sunload, in-vehicle temperature and ambient temperature) and conditions (air mix door position and compressor operation).

Control System Output Components (Cont'd)



AHA129

Air mix door control specification



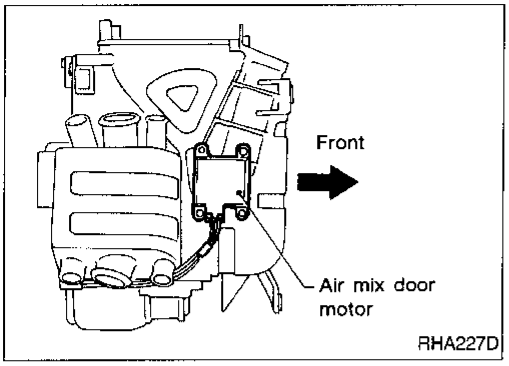
Example:

- If temperature setting is set at 25°C (77°F) under no sunload condition when ambient and in-vehicle temperature is 35°C (95°F), air mix door is initially automatically set in full cold position.
- Within some period, in-vehicle temperature will lower towards the objective temperature, and the air mix door position will shift incrementally towards the hot side and finally stay in this position (A) if mode is at AUTO position (No. ECON mode).
  Air mix door opening position is always fed back to auto amplifier by PBR built-in air mix door motor.

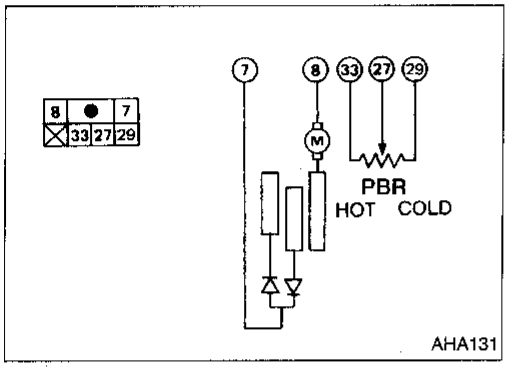
AHA130

Control System Output Components (Cont'd)

AIR MIX DOOR MOTOR

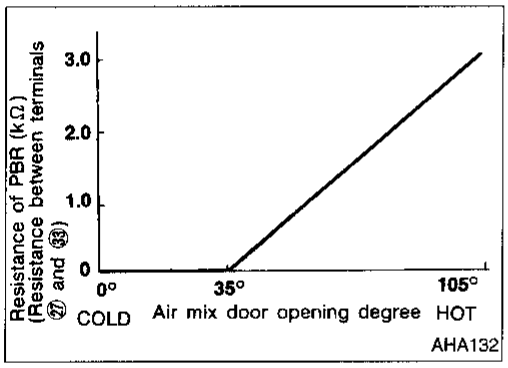


The air mix door motor is attached to the bottom of the heater unit. It rotates so that the air mix door is opened to a position set by the auto amplifier. Motor rotation is then conveyed through a shaft and air mix door position is then fed back to the auto amplifier by PBR built-in air mix door motor.



Air mix door operation

7	8	Air mix door operation	Direction of lever movement
⊕	⊖	COLD → HOT	Clockwise (Toward passenger compartment)
⊖	⊖	STOP	STOP
⊖	⊕	HOT → COLD	Counterclockwise (Toward engine compartment)



PBR characteristics

Measure voltage between terminals ㉗ and ㉝ at vehicle harness side.

Control System Output Components (Cont'd)

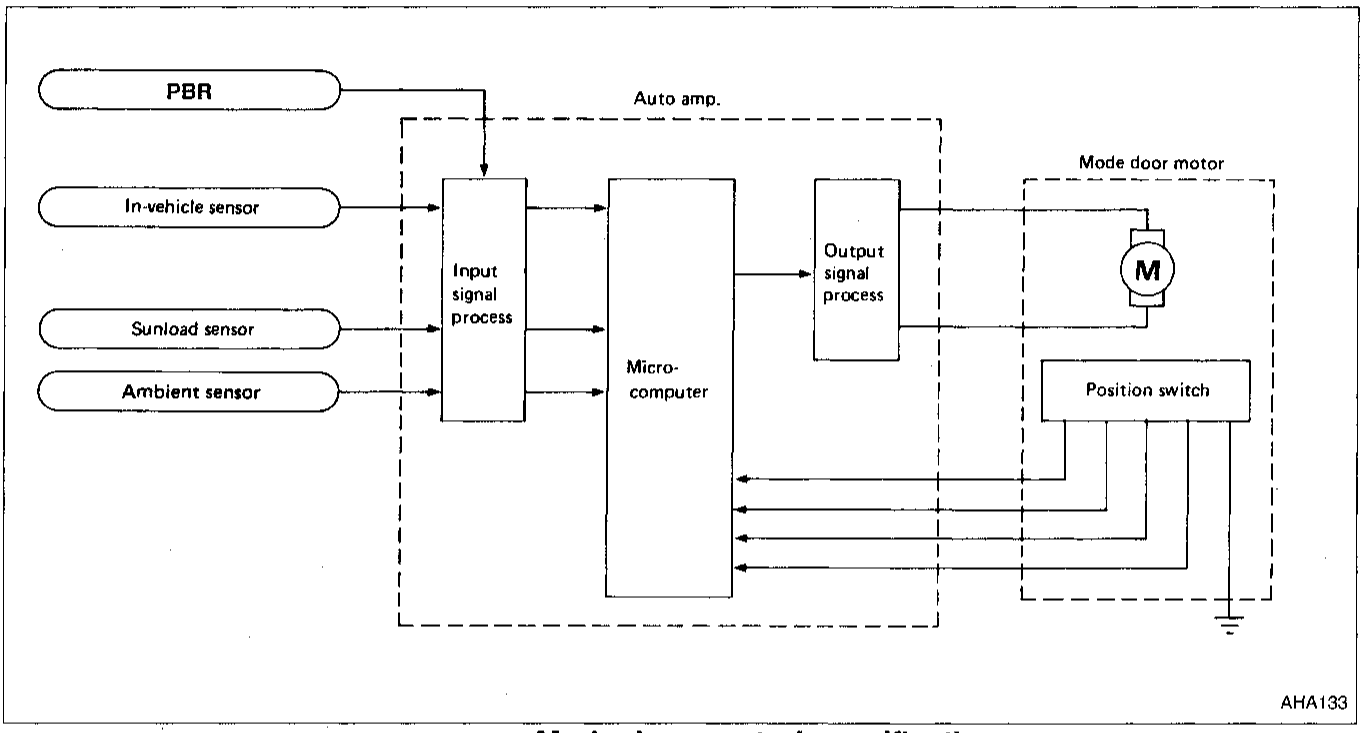
MODE DOOR CONTROL

Component parts

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

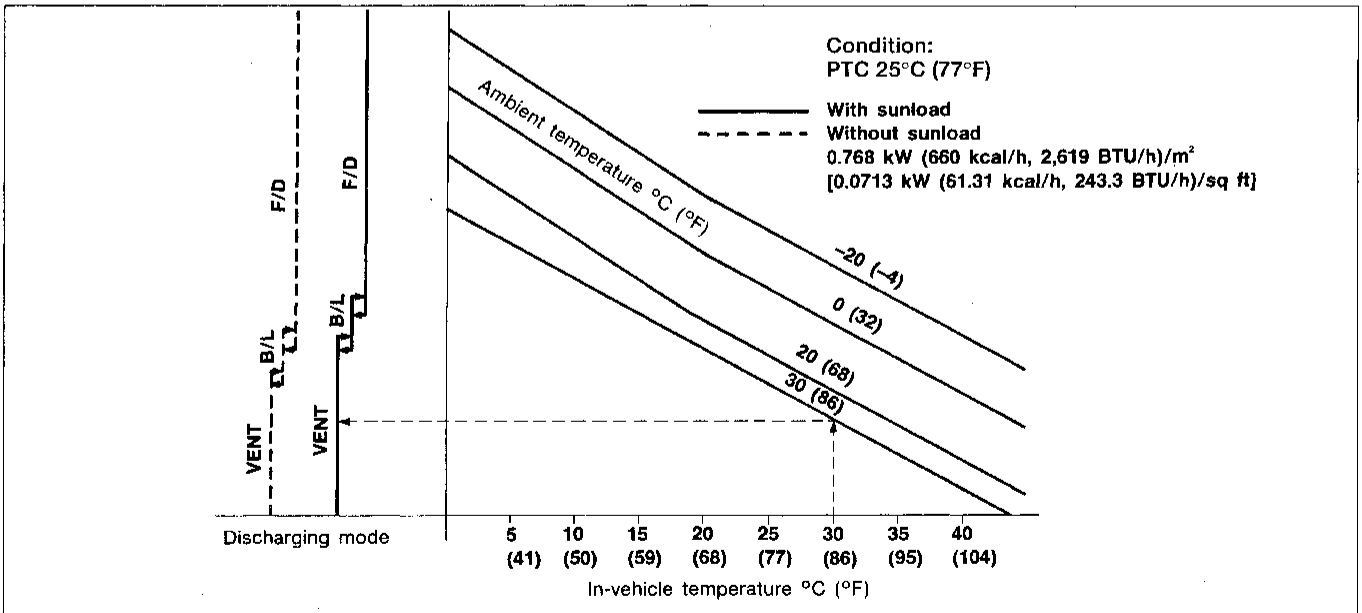
System operation

The auto amplifier computes the air discharge conditions according to the ambient temperature and the in-vehicle temperature. The computed discharge conditions are then corrected for sunload to determine through which outlets air will flow into the passenger compartment.



AHA133

Mode door control specification

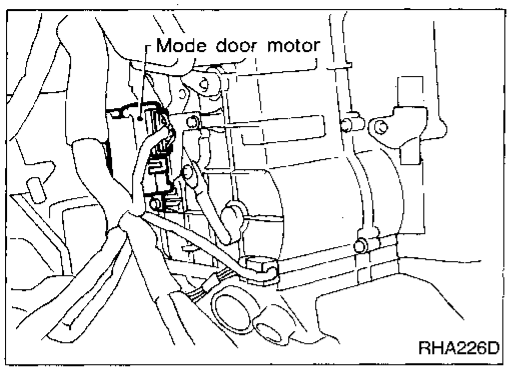


Example:

- **If temperature setting is set at 25°C (77°F) under no sunload condition when ambient and in-vehicle temperature are 30°C (86°F), mode door is set automatically at VENT position.**

AHA134

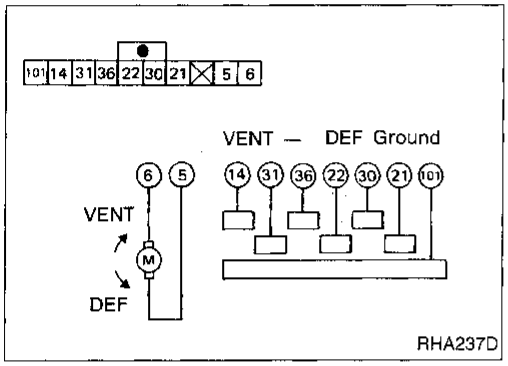
Control System Output Components (Cont'd)



MODE DOOR MOTOR

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

6	5	Mode door operation	Direction of side link rotation
⊕	⊖	VENT → DEF	Clockwise
⊖	⊖	STOP	STOP
⊖	⊕	DEF → VENT	Counterclockwise



INTAKE DOOR CONTROL

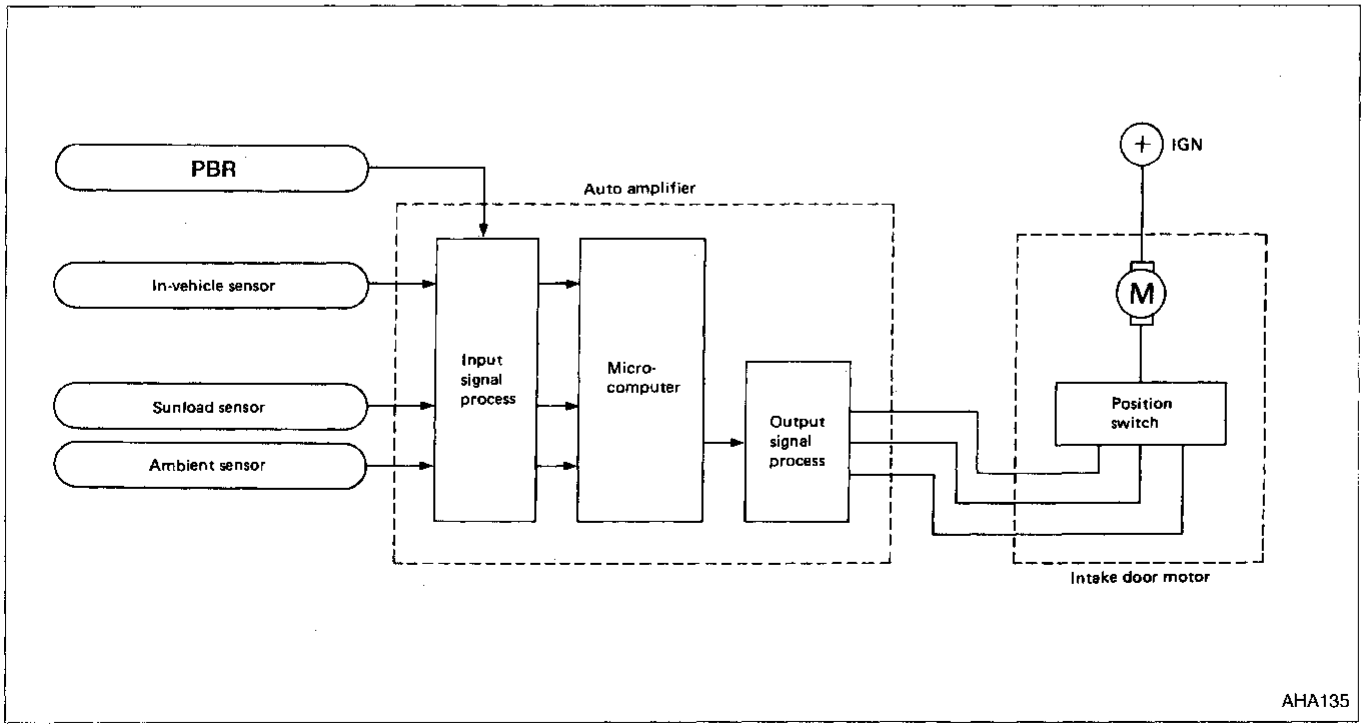
Components parts

Intake door control system components are:

1) Auto amplifier
2) Intake door motor
3) PBR
4) In-vehicle sensor
5) Ambient sensor
6) Sunload sensor

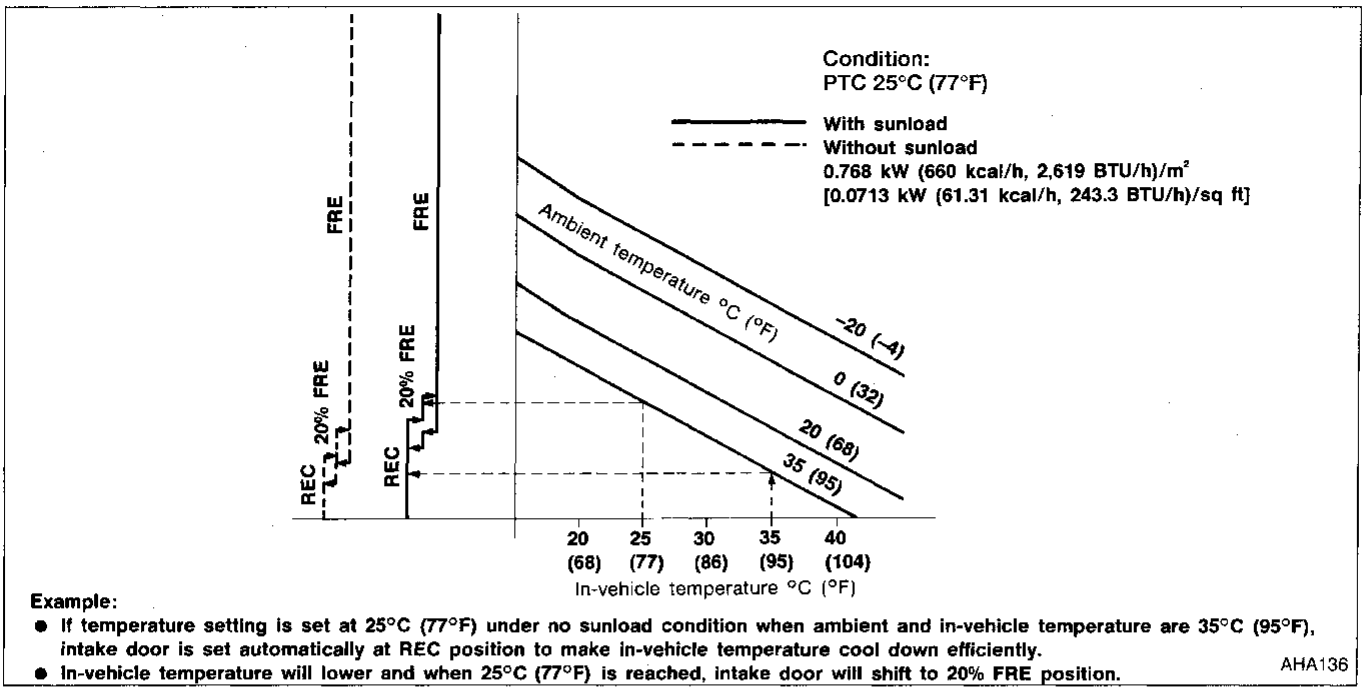
System operation

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



Control System Output Components (Cont'd)

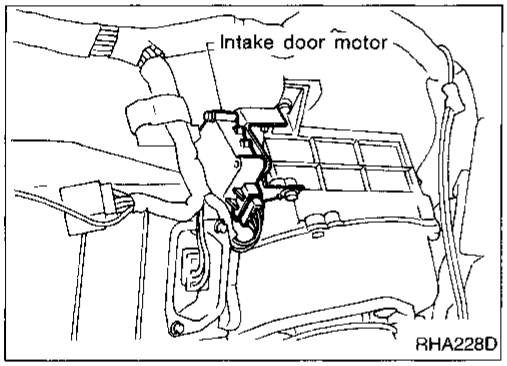
Intake door control specification

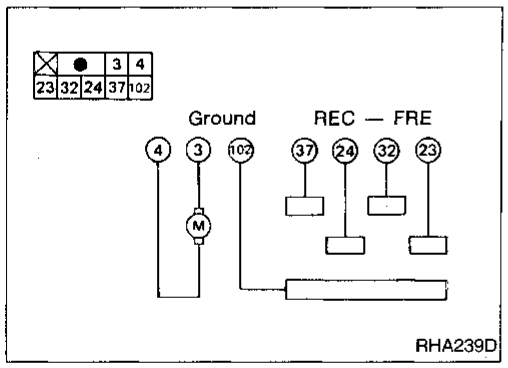


Example:

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

AHA136





INTAKE DOOR MOTOR

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

Intake door motor operation

3	4	Intake door operation	Movement of link rotation
⊕	⊖	REC → FRE	Clockwise
⊖	⊖	STOP	STOP
⊖	⊕	FRE → REC	Counterclockwise

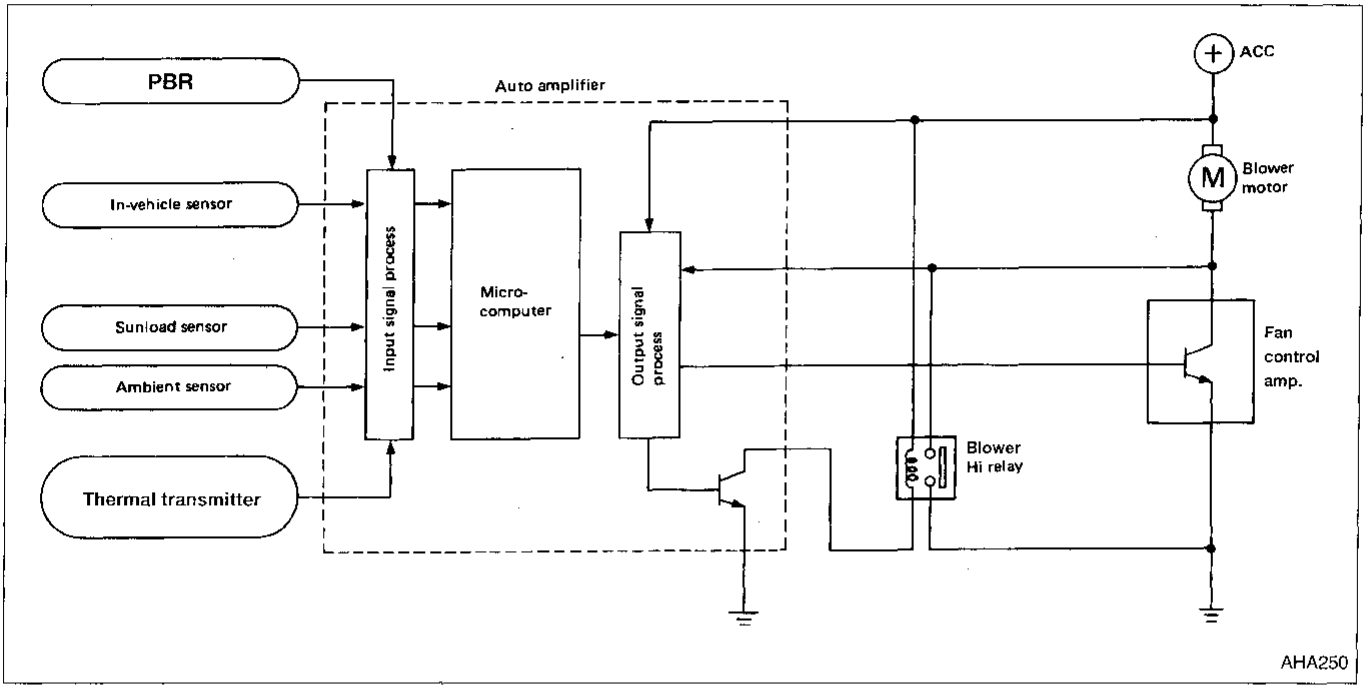
Control System Output Components (Cont'd)

FAN SPEED CONTROL

Component parts

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

System operation



AUTOMATIC MODE

In the automatic mode, the blower motor speed is calculated by the automatic amplifier based on inputs from the PBR, in-vehicle sensor, sunload sensor, and ambient sensor. The blower motor applied voltage ranges from approximately 4.5 volts (lowest speed) to 12 volts (highest speed).
To control blower speed (in the range of 4.5V to 10.5V), the automatic amplifier supplies a signal to the thermo control amplifier. Based on this signal, the thermo control amplifier controls the current flow from the blower motor to ground. If the computed blower voltage (from the automatic amplifier) is above 10.5 volts, the high blower relay is activated. The high blower relay provides a direct path to ground (bypassing the blower amplifier), and the blower motor operates at high speed.

STARTING FAN SPEED CONTROL

Start up from "COLD SOAK" condition (Automatic mode)

In a cold start up condition where the engine coolant temperature is below 50°C (122°F), the blower will not operate for a short period of time (up to 180 seconds). The exact start delay time varies depending on the ambient and engine coolant temperature.
In the most extreme case (very low ambient) the blower starting delay will be 180 seconds. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 50°C (122°F), at which time the blower speed will increase to the objective speed.

Start up from normal or "HOT SOAK" condition (Automatic mode)

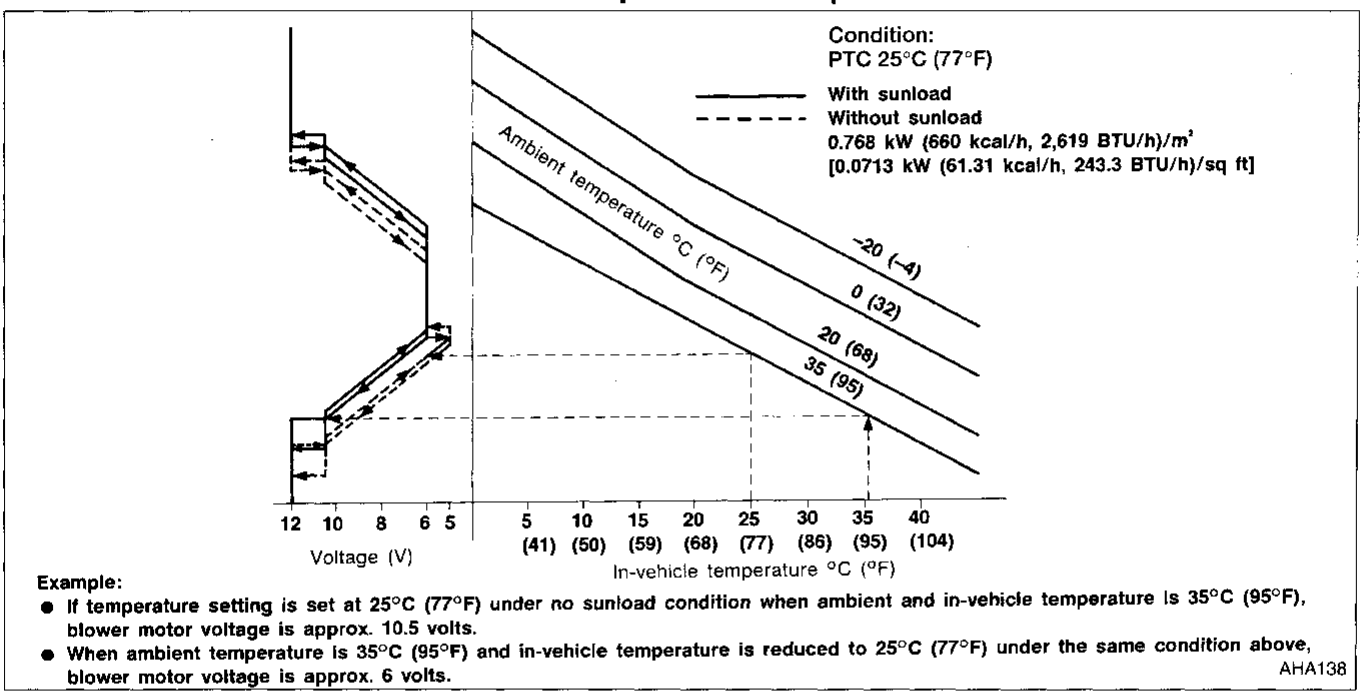
The blower will begin operation momentarily after the AUTO button is pushed. The blower speed will gradually rise to the objective speed over a time period of 5 seconds or less (actual time depends on the objective blower speed).

BLOWER SPEED COMPENSATION

Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will operate at low speed. The low speed varies depending on the sunload. During conditions of high sunload, the blower low speed is "normal" low speed (approx. 5.5V). During lesser sunload conditions, the low speed will drop to "low" low speed (approx. 4.5V).

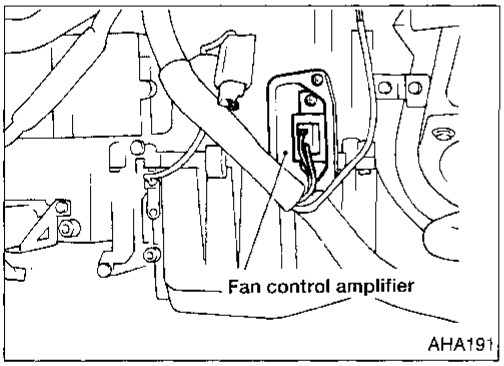
Fan speed control specification



Example:

- **If temperature setting is set at 25°C (77°F) under no sunload condition when ambient and in-vehicle temperature is 35°C (95°F), blower motor voltage is approx. 10.5 volts.**
- **When ambient temperature is 35°C (95°F) and in-vehicle temperature is reduced to 25°C (77°F) under the same condition above, blower motor voltage is approx. 6 volts.**

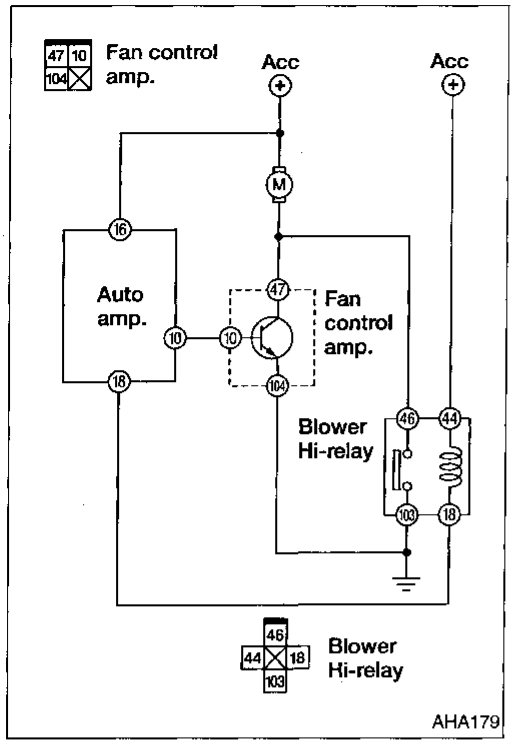
AHA138

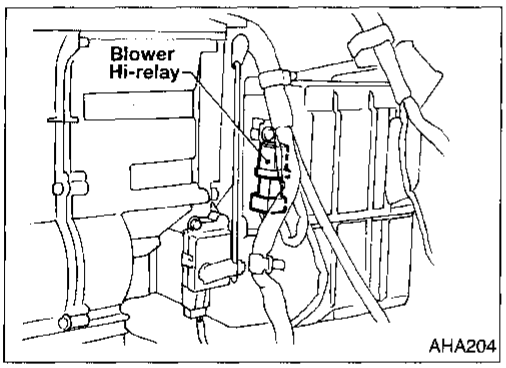


FAN CONTROL AMPLIFIER

The fan control amplifier is located on the cooling unit. It amplifies a 12-step base current flowing from the auto amplifier to change the blower speed within the range of 5V to 10.5V. Above 10.5 volts, the high relay applies a direct ground to the blower motor.

Control System Output Components (Cont'd)



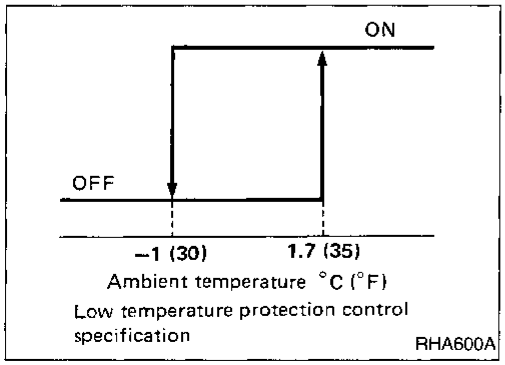


BLOWER HI-RELAY

The blower Hi-relay is located on the cooling unit. It receives a signal from the auto amplifier to operate the blower motor at high speed.

MAGNET CLUTCH CONTROL

The ECM (ECCS control module) controls compressor operation using inputs from the throttle position sensor and auto amplifier.



Low temperature protection control

The auto amplifier will signal the ECM (ECCS control module) to turn the compressor "ON" or "OFF" based on the signal supplied to the auto amplifier by the ambient temperature sensor.

Acceleration cut control

The ECM (ECCS control module) will turn the compressor "ON" or "OFF" based on the signal from the throttle position sensor.

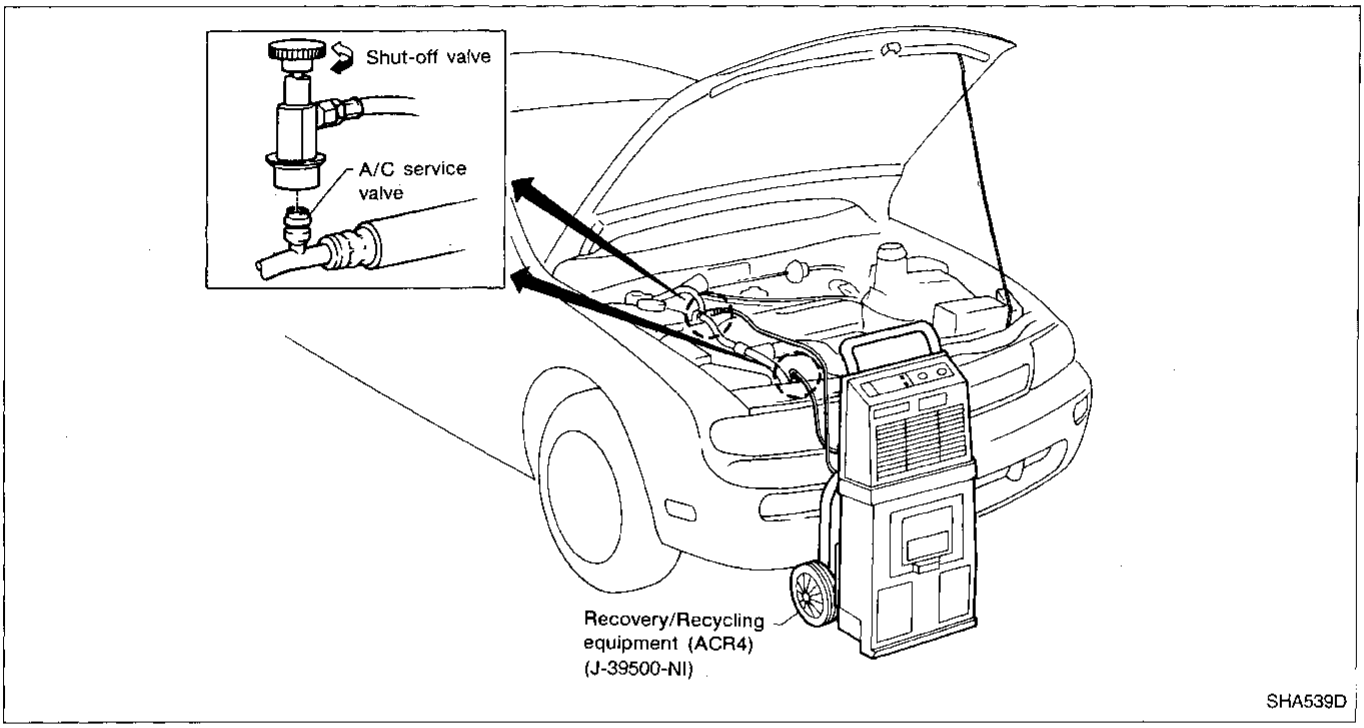
R-134a Service Procedure

SETTING OF SERVICE TOOLS AND EQUIPMENT

DISCHARGING REFRIGERANT

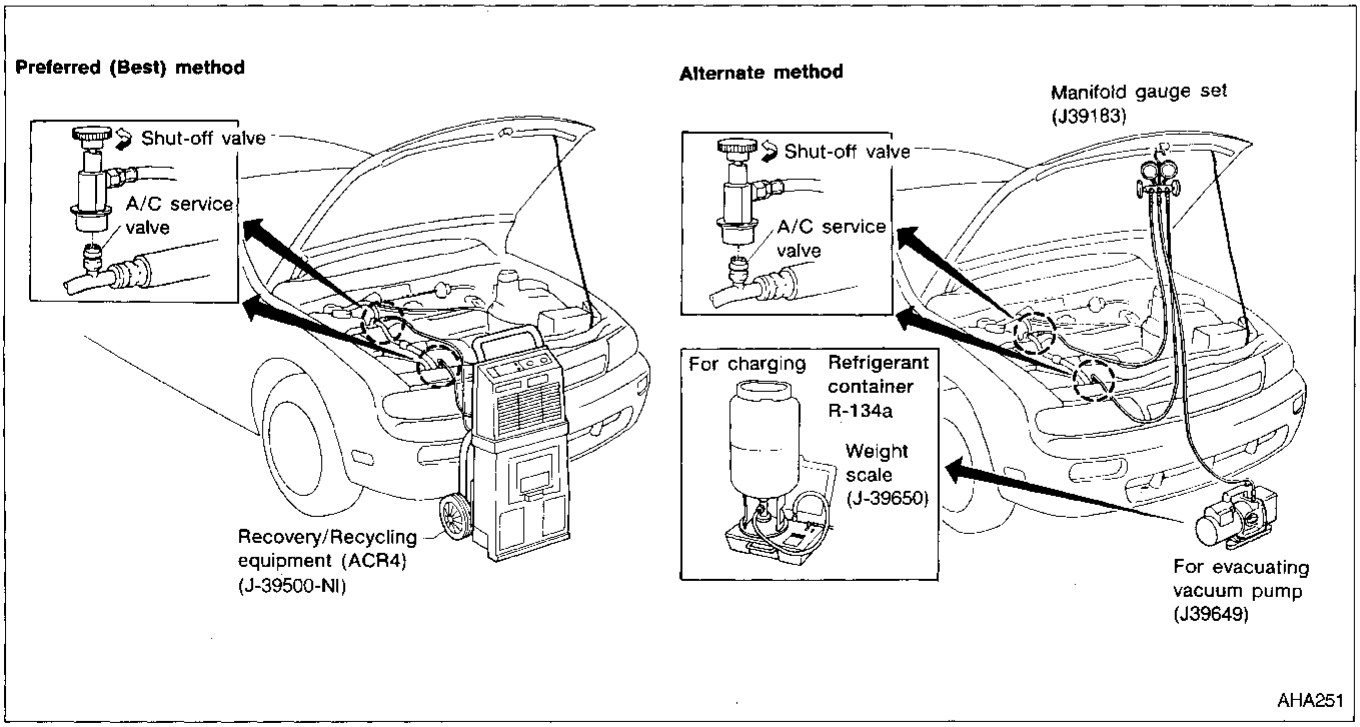
WARNING:

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



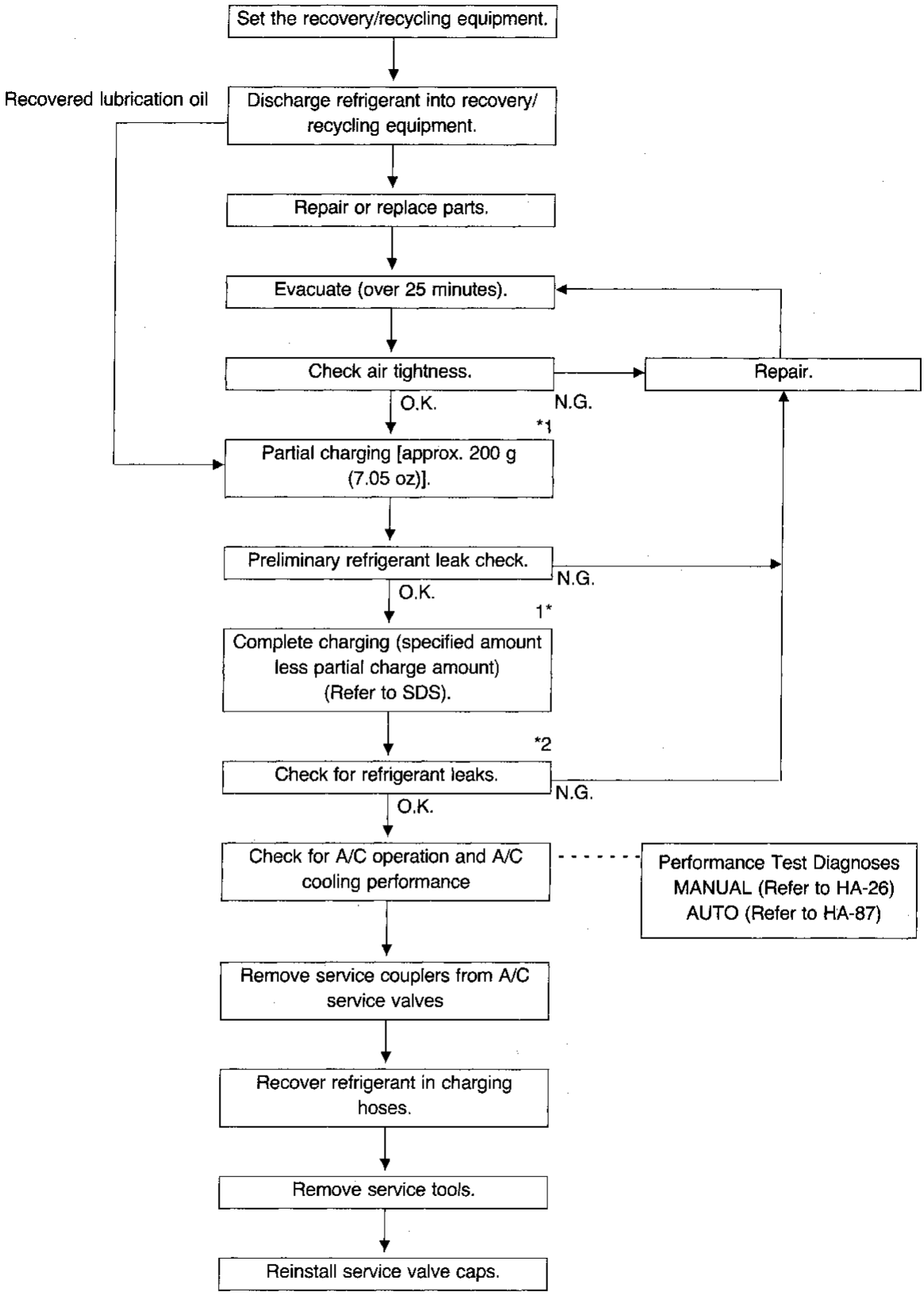
SHA539D

EVACUATING SYSTEM AND CHARGING REFRIGERANT



AHA251

R-134a Service Procedure (Cont'd)



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

Maintenance of 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:

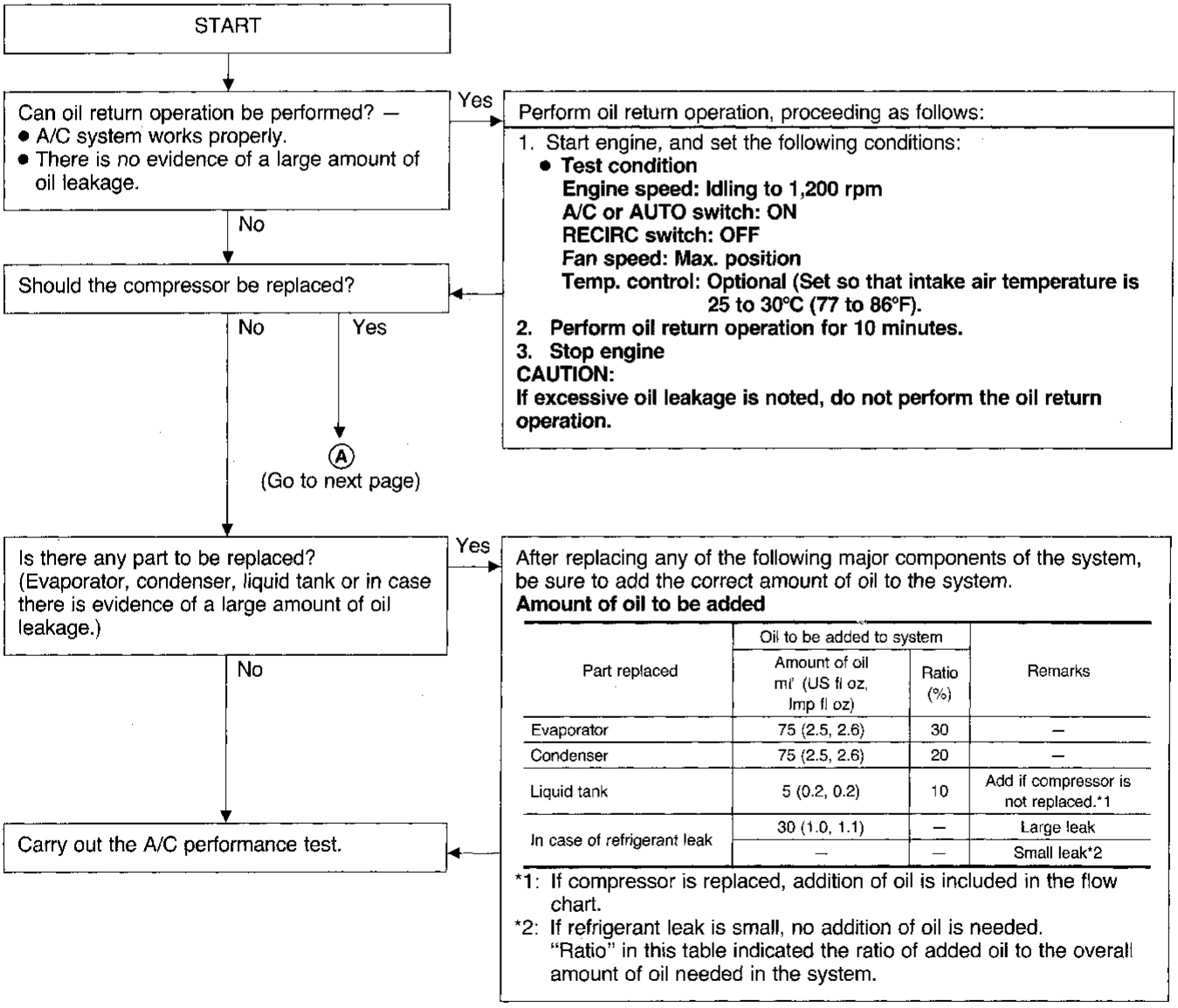
- Lack of oil: May lead to a seized compressor
- Excessive oil: Inadequate cooling (thermal exchange interference)

LUBRICATION OIL

Name: Nissan A/C System Oil Type R
Part No.: KLH00-PAGR0

CHECKING AND ADJUSTING

Adjust the oil quantity according to the flowchart shown below.



Part replaced	Oil to be added to system		Remarks
	Amount of oil ml (US fl oz, Imp fl oz)	Ratio (%)	
Evaporator	75 (2.5, 2.6)	30	—
Condenser	75 (2.5, 2.6)	20	—
Liquid tank	5 (0.2, 0.2)	10	Add if compressor is not replaced.*1
In case of refrigerant leak	30 (1.0, 1.1)	—	Large leak
	—	—	Small leak*2

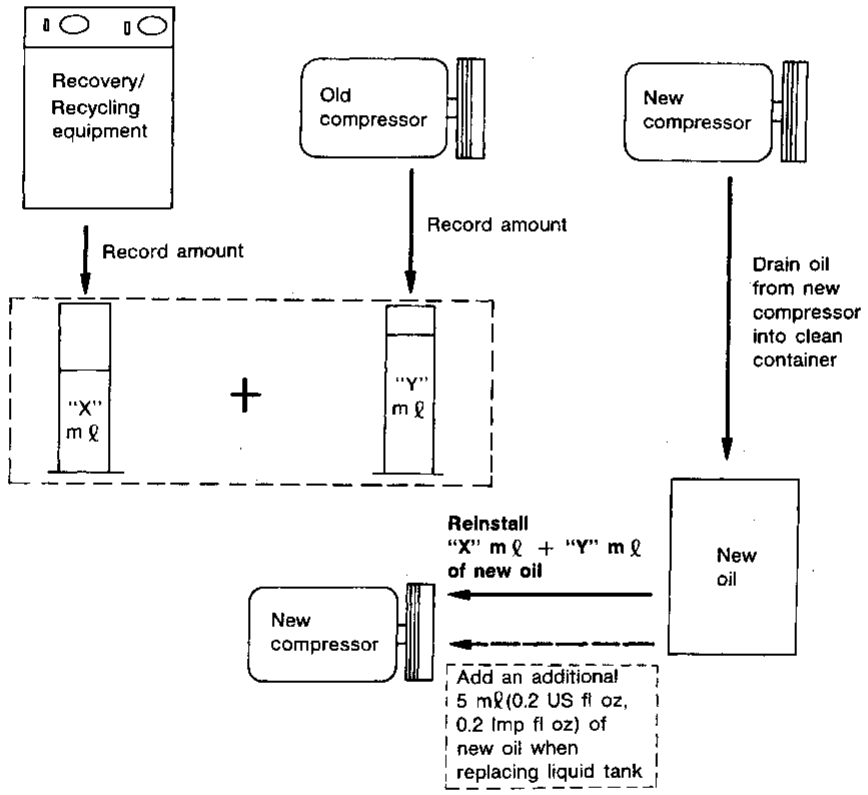
*1: If compressor is replaced, addition of oil is included in the flow chart.
*2: If refrigerant leak is small, no addition of oil is needed.
"Ratio" in this table indicated the ratio of added oil to the overall amount of oil needed in the system.

Maintenance of Oil Quantity in Compressor (Cont'd)

Ⓐ

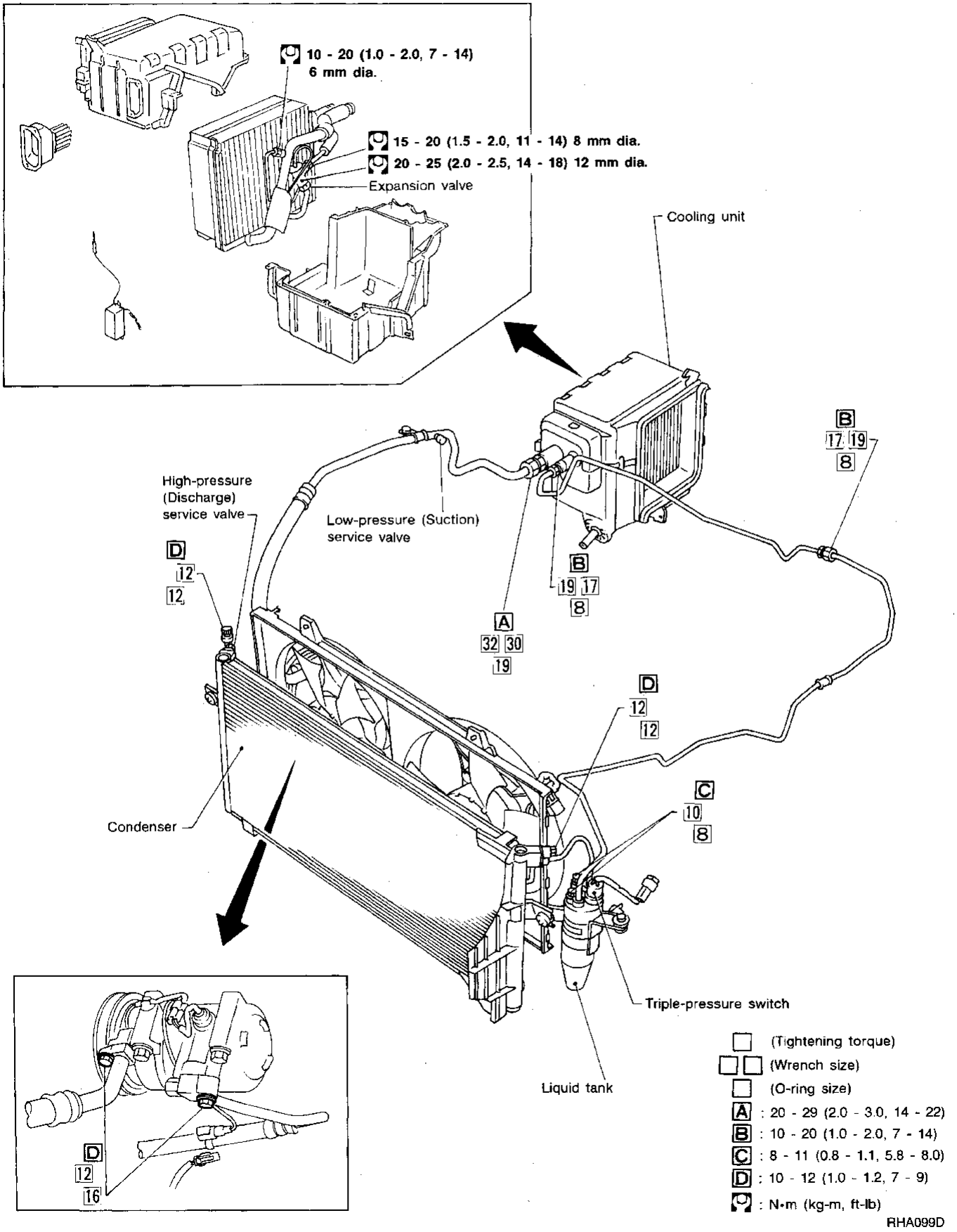
1. Discharge refrigerant into refrigerant recovery/recycling equipment. Measure oil discharged into the recovery/recycling equipment.
2. Drain the oil from the "old" (removed) compressor into a graduated container and record the amount of oil drained.
3. Drain the oil from the "new" compressor into a 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 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 suction port opening.
6. 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



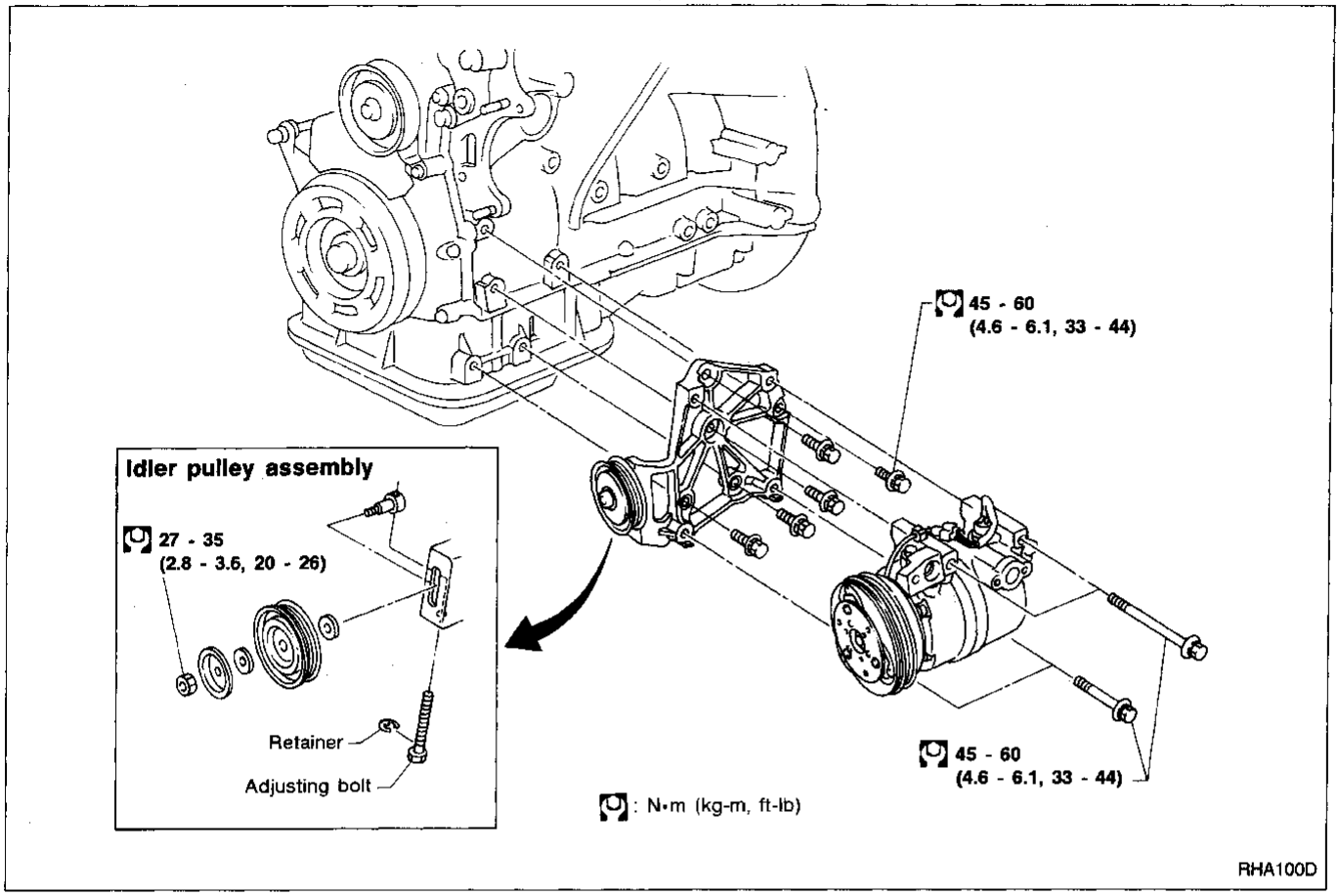
Refrigerant Lines

- Refer to HA-4.



RHA099D

Compressor Mounting



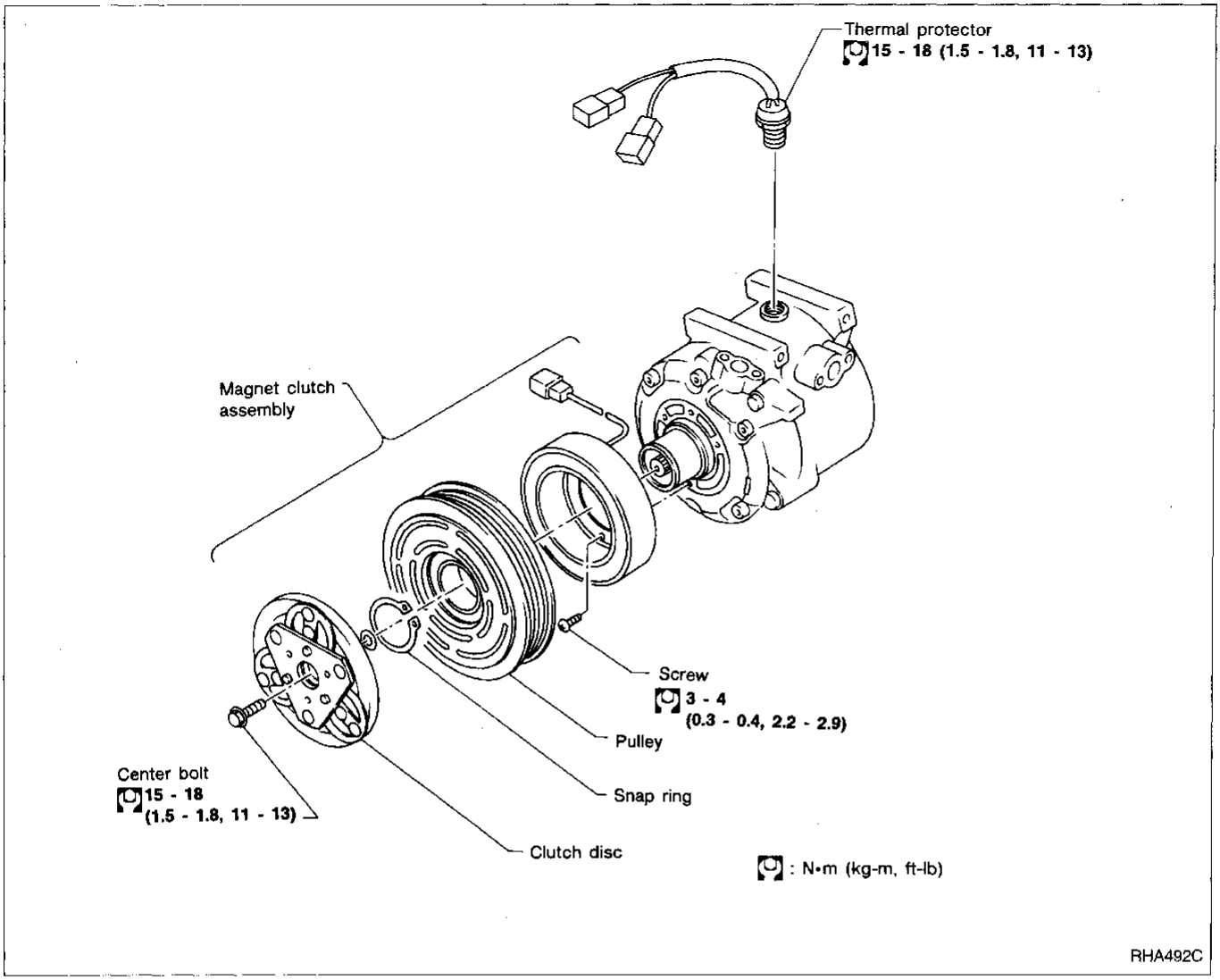
Belt Tension

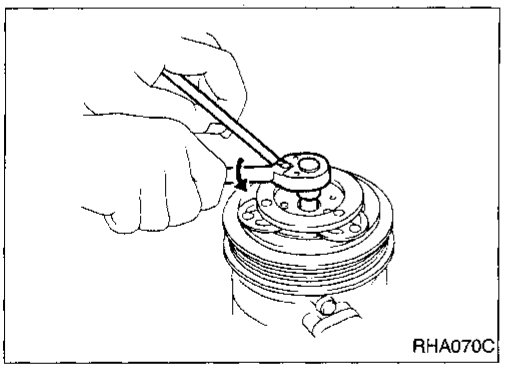
- Refer to MA section ("Checking Drive Belts", "ENGINE MAINTENANCE").

Fast Idle Control Device (FICD)

- Refer to EF & EC section ("IAC VALVE-FICD SOLENOID VALVE", "Electrical Components Inspection", "TROUBLE DIAGNOSES").

Compressor

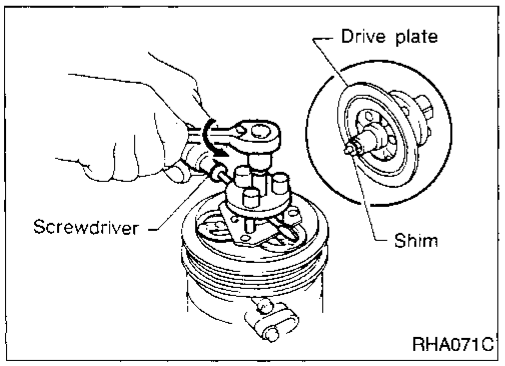




Compressor Clutch

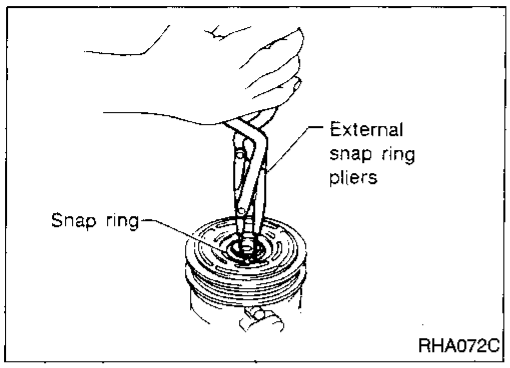
REMOVAL

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

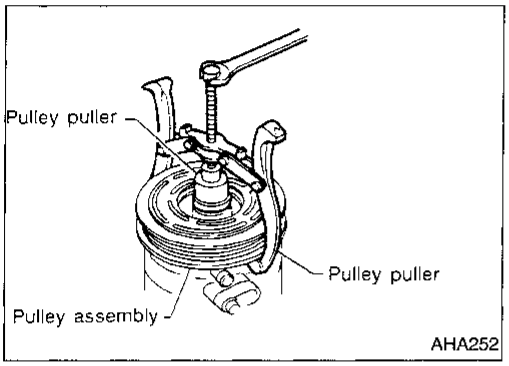


- Remove the drive plate using the clutch disc puller.
  Insert the holder's three pins into the holes in the drive plate, and rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the drive plate.
  When tightening the center bolt, insert a round bar (screwdriver,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

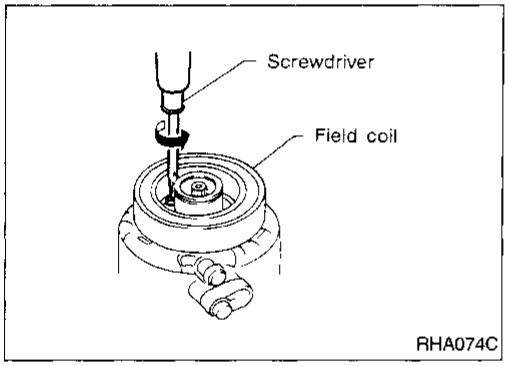
Compressor Clutch (Cont'd)



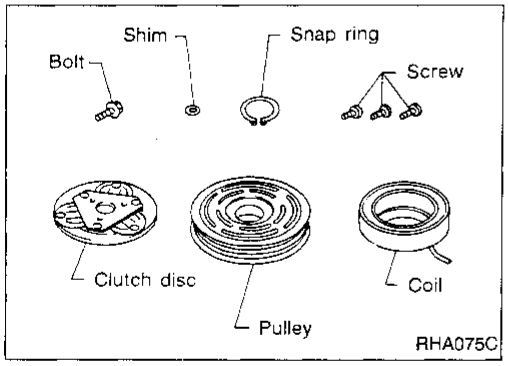
- Remove the snap ring using external snap ring pliers.



- Pulley removal
  Position the center pulley puller on the end of the drive shaft, and remove the pulley assembly using any commercially available pulley puller.
  To prevent deformation of the pulley groove, the puller claws should be hooked under (not into) the pulley groove.
- Remove the field coil harness clip using a screwdriver.



- Remove the three field coil fixing screws and remove the field coil.



INSPECTION

Clutch disc

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

Pulley

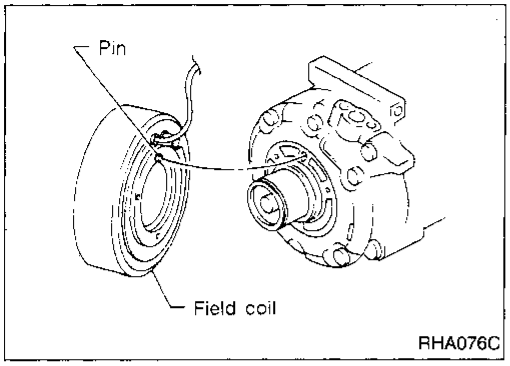
Check the appearance of the pulley assembly. If the contact surface of the pulley shows signs of excessive grooving due to slippage, both the pulley and clutch disc should be replaced. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

Coil

Check coil for loose connection or cracked insulation.

Compressor Clutch (Cont'd)

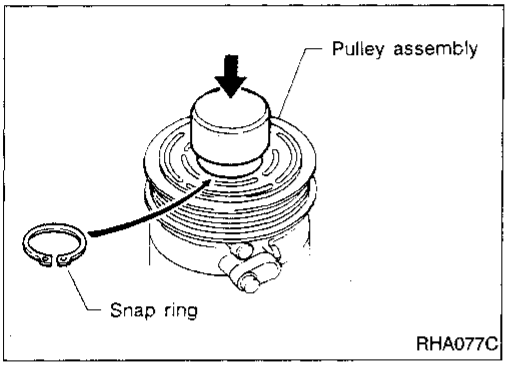
INSTALLATION



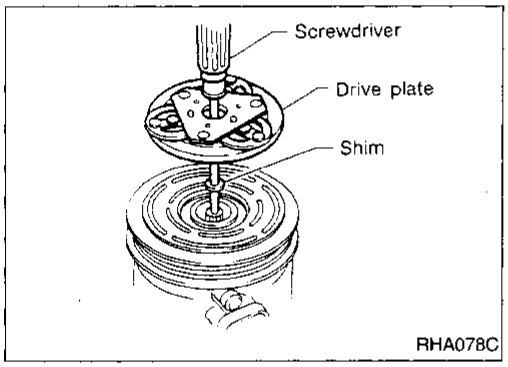
- Install the field coil.

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

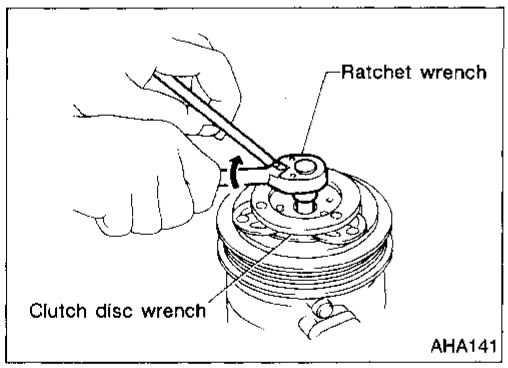
- Install the field coil harness clip using a screwdriver.



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



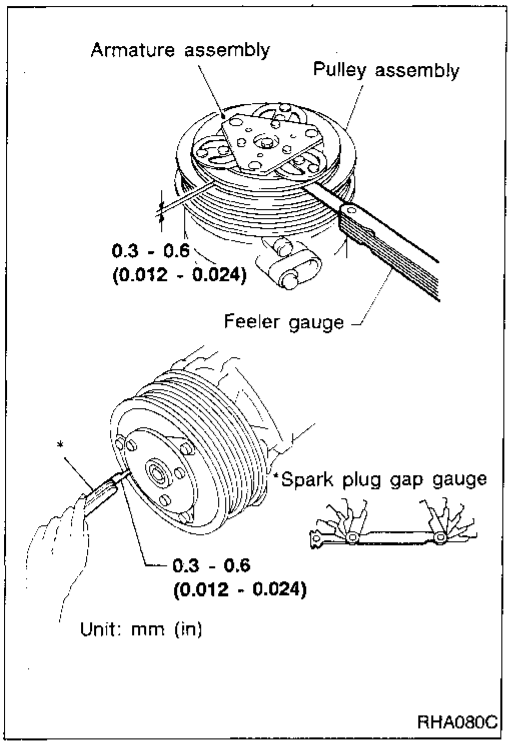
- Install the drive plate on the drive shaft, together with the original shim(s). Press the drive plate down by hand.



- Using the clutch disc wrench to prevent drive plate rotation, tighten the bolt to 12 to 15 N•m (1.2 to 1.5 kg-m, 9 to 11 ft-lb) torque.

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

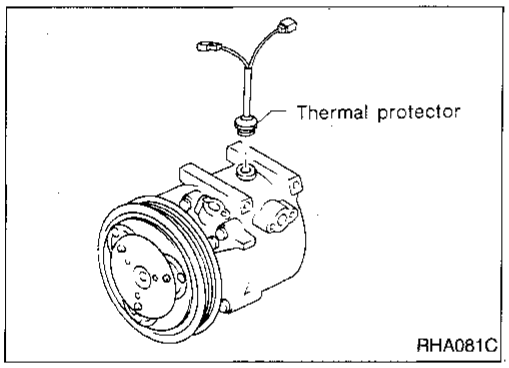
Compressor Clutch (Cont'd)



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

BREAK-IN OPERATION

When replacing compressor clutch assembly, 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.



Thermal Protector

INSPECTION

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

General Specifications

COMPRESSOR

Model	DKV-14C
Type	Vane rotary
Displacement cm^3 (cu in)/Rev	140 (8.54)
Direction of rotation	Clockwise (Viewed from drive end)
Drive belt	Poly V type

LUBRICATION OIL

Model	ZEXEL make DKV-14C
Name	Nissan A/C System Oil Type R
Part No.	KLH00-RAGR0
Capacity mℓ (US fl oz, Imp fl oz)	
Total in system	200 (6.8, 7.0)
Compressor (Service part) charging amount	200 (6.8, 7.0)

REFRIGERANT

Type		R-134a
Capacity	kg (lb)	0.70 - 0.80 (1.54 - 1.76)
	g (oz)	700 - 800 (24.64 - 28.16)

Inspection and Adjustment

ENGINE IDLING SPEED
When A/C is ON

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

BELT TENSION

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

COMPRESSOR CLUTCH

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