HEATER & AIR CONDITIONER

SECTION HA

CONTENTS

MANUAL AND AUTO

PRECAUTIONS AND PREPARATION 2
- Supplemental Restraint System (SRS) "AIR BAG" 2
- Precautions for Working with HFC-134a (R-134a) 2
- General Refrigerant Precautions 2
- Precautions for Refrigerant Connection 3
- Precautions for Servicing Compressor 6
- Special Service Tools 6
- HFC-134a (R-134a) Service Tools and Equipment 7
- Precautions for Service Equipment 9

DESCRIPTION 11
- Refrigeration Cycle 11
- V-6 Variable Displacement Compressor 12
- Component Layout 16
- Discharge Air Flow 17

MANUAL

DESCRIPTION 18
- Control Operation 18

TROUBLE DIAGNOSES 20
- Contents 20

MANUAL AND AUTO

TROUBLE DIAGNOSES 31
- Performance Test Diagnoses 31
- Performance Chart 33
- Trouble Diagnoses for Abnormal Pressure 34

MANUAL

TROUBLE DIAGNOSES 37
- Wiring Diagram — A/C, M — 40

AUTO

DESCRIPTION 59
- Introduction 59
- Features 59
- Control Operation 60

TROUBLE DIAGNOSES 62
- Contents 62
- Wiring Diagram — A/C, A — 91

SYSTEM DESCRIPTION 114
- Overview of Control System 114
- Control System Input Components 115
- Control System Automatic Amplifier (Auto amp.) 117
- Control System Output Components 117

MANUAL AND AUTO

SERVICE PROCEDURES 125
- HFC-134a (R-134a) Service Procedure 125
- Maintenance of Lubricant Quantity in Compressor 127
- Refrigerant Lines 129
- Checking Refrigerant Leaks 130
- Compressor Mounting 132
- Belt Tension 132
- Fast Idle Control Device (FICD) 132
- Compressor 133
- Compressor Clutch 133

AUTO

SERVICE PROCEDURES 137
- Replacing A/C Auto Amp. 137

MANUAL AND AUTO

SERVICE DATA AND SPECIFICATIONS (SDS) 139
- General Specifications 139
- Inspection and Adjustment 139

CONTENTS (Cont'd)

When you read wiring diagrams:
- Read GI section, "HOW TO READ WIRING DIAGRAMS".
- See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.

When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES" and "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT".

Supplemental Restraint System (SRS) "AIR BAG"

The Supplemental Restraint System "Air Bag", used along with a seat belt, 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 bag modules (located in the center of the steering wheel and on the instrument panel on the passenger side), a diagnosis sensor unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **RS section** of this Service Manual.

WARNING:

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

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

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed, compressor failure is likely to occur.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
  - **a: When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
  - **b: When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
  - **c: Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
  - **d: Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove R-134a from the A/C system, using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment), or J2209 (R-134a recovery equipment). If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
  - **e: Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.**

General Refrigerant Precautions

WARNING:

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

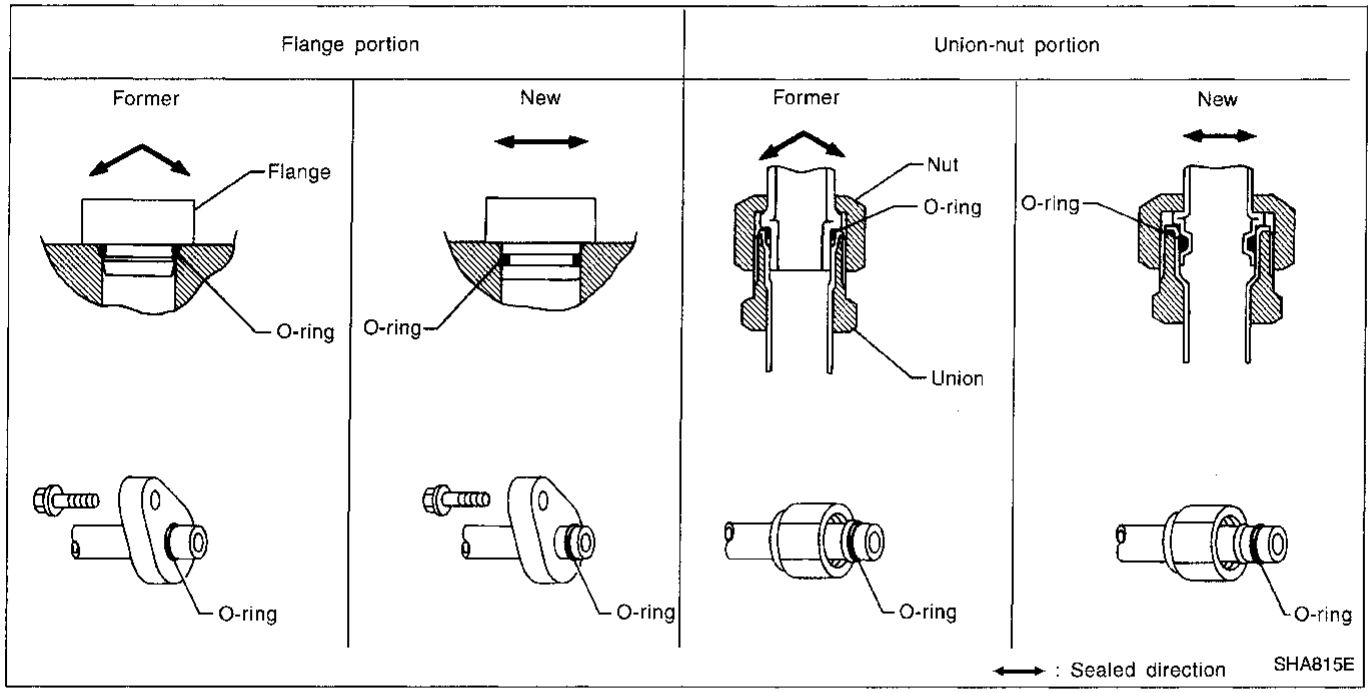
Precautions for Refrigerant Connection

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

- Expansion valve to cooling unit

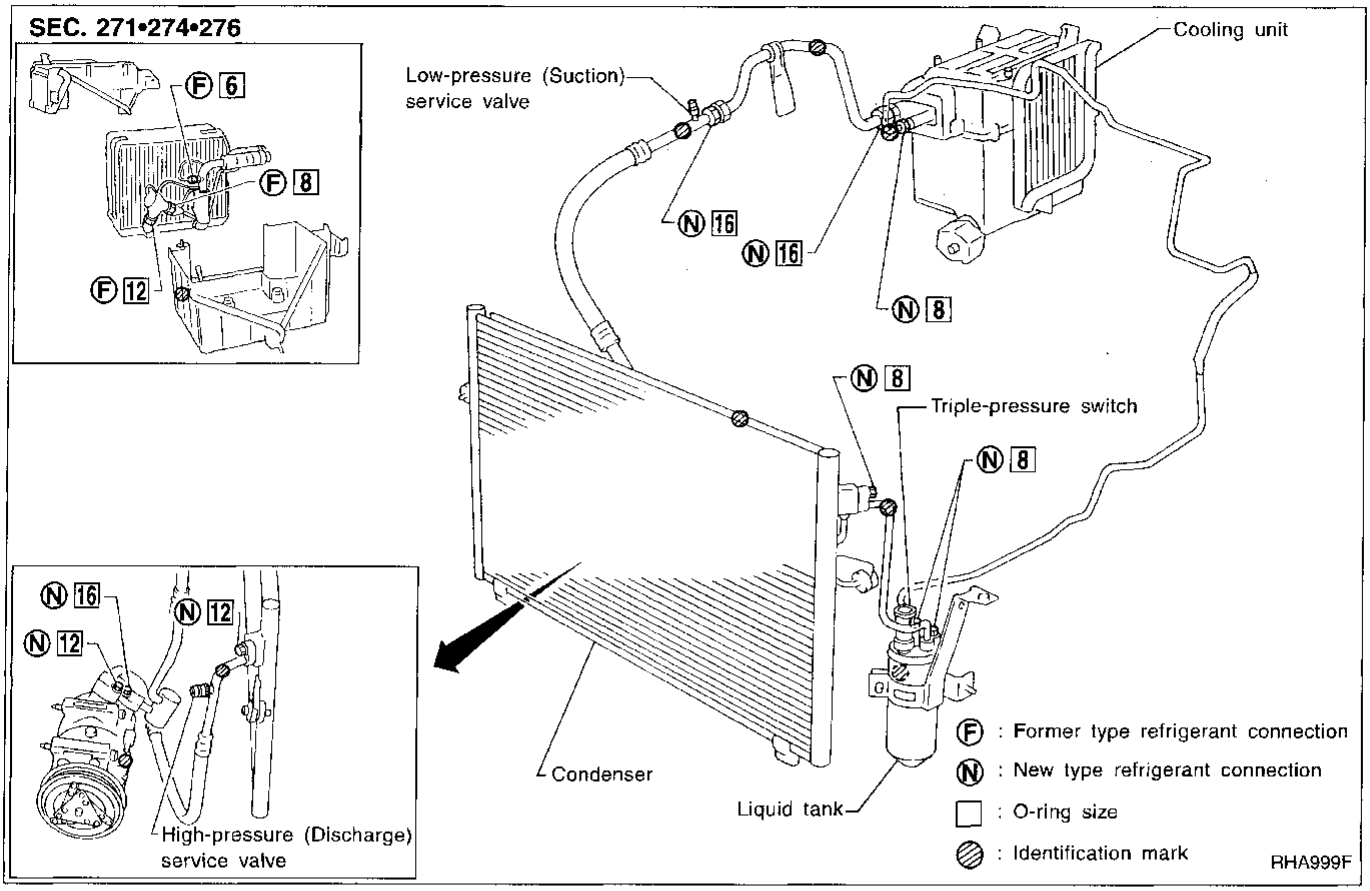
FEATURES OF NEW TYPE REFRIGERANT CONNECTION

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



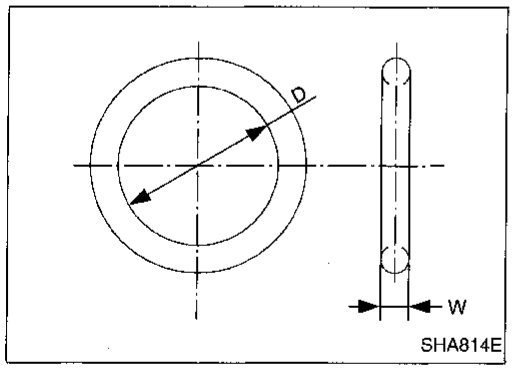
Precautions for Refrigerant Connection (Cont'd)

O-RING AND REFRIGERANT CONNECTION



CAUTION:

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



O-ring part numbers and specifications

Connection type	O-ring size	Part number	D mm (in)	W mm (in)
Former	6	92472 N8200	4.5 (0.177)	1.40 (0.0551)
New	8	92471 N8210	6.8 (0.268)	1.87 (0.0736)
Former		92470 N8200	6.07 (0.2390)	1.78 (0.0701)
New	12	92472 N8210	10.9 (0.429)	2.43 (0.0957)
Former		92471 N8200	10.8 (0.425)	1.78 (0.0701)
New	16	92473 N8210	13.6 (0.535)	2.43 (0.0957)
Former		92475 72L00	14.3 (0.563)	2.3 (0.091)

Precautions for Refrigerant Connection (Cont'd)

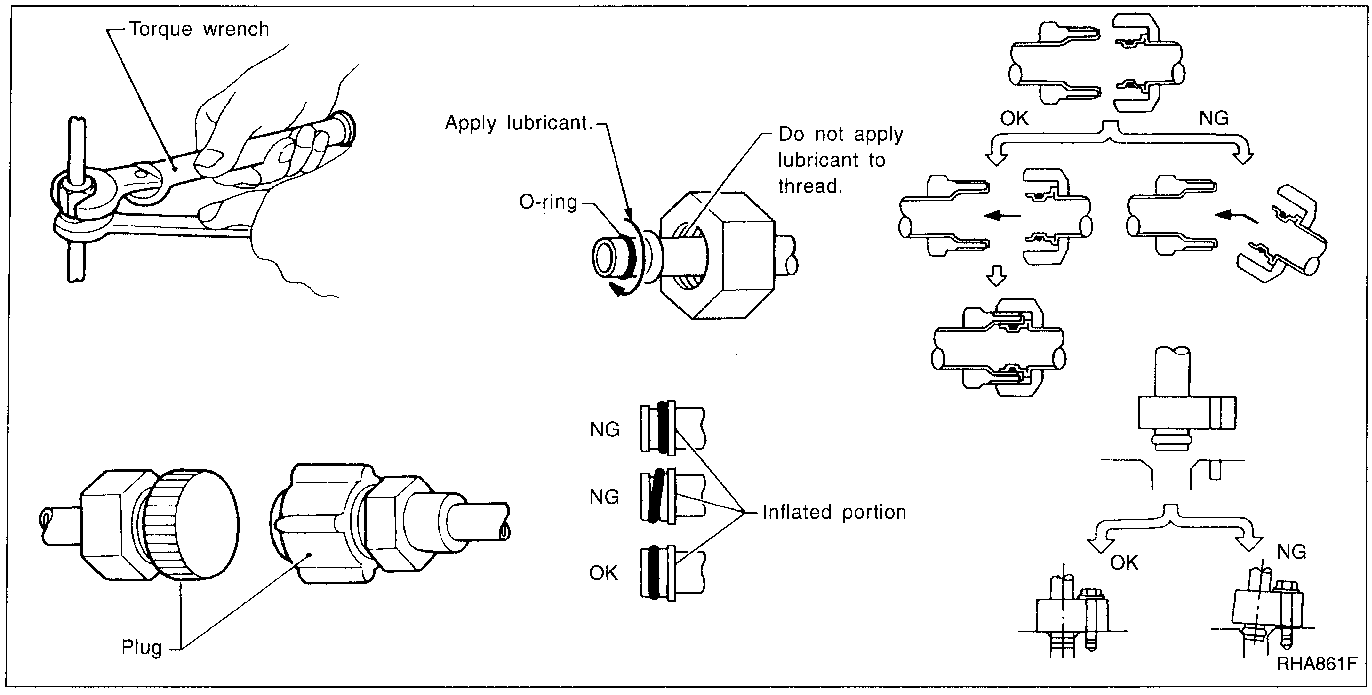
WARNING:

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

CAUTION:

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

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

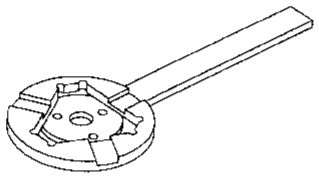
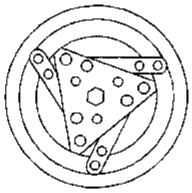
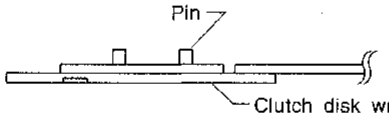
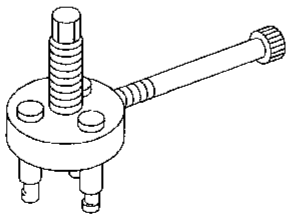
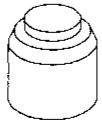


Precautions for Servicing Compressor

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same position as it is when mounted on the car.**
- **When replacing or repairing compressor, follow "Maintenance of Oil Quantity in Compressor" exactly. Refer to HA-127.**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.**

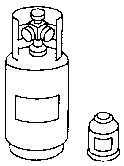
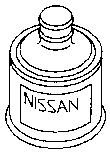
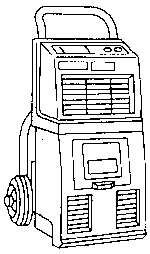
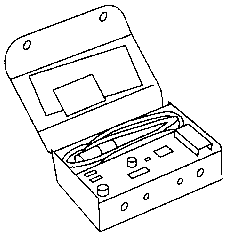
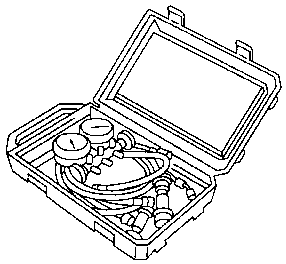
Special Service Tools

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

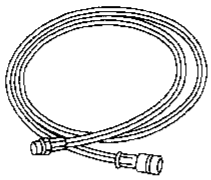
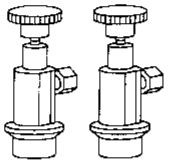
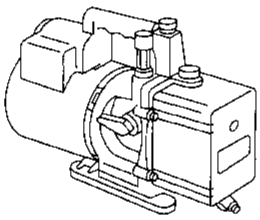
Tool number (Kent-Moore No.) Tool name	Description
KV99106100 (J-41260) Clutch disc wrench	Removing center bolt  NT232  When replacing the magnet clutch in the above compressor, use a clutch disc wrench with the pin side on the clutch disc to remove it.  NT378
KV99232340 (J-38874) or KV992T0001 (—) Clutch disc puller	Removing clutch disc  NT376
KV99106200 (J-41261) Pulley installer	Installing pulley  NT235

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

Never mix HFC-134a refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor failure will result.

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

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

Tool number (Kent-Moore No.) Tool name	Description	Note
Service hoses • High side hose (J-39501-72) • Low side hose (J-39502-72) • Utility hose (J-39476-72)	 NT201	Hose color: • Low hose: Blue with black stripe • High hose: Red with black stripe • Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: • 1/2"-16 ACME
Service couplers • High side coupler (J-39500-20) • Low side coupler (J-39500-24)	 NT202	Hose fitting to service hose: • M14 x 1.5 fitting is optional or permanently attached.
(J-39650) Refrigerant weight scale	 NT200	For measuring of refrigerant Fitting size: Thread size • 1/2"-16 ACME
(J-39649) Vacuum pump (Including the isolator valve)	 NT203	Capacity: • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz) Fitting size: Thread size • 1/2"-16 ACME

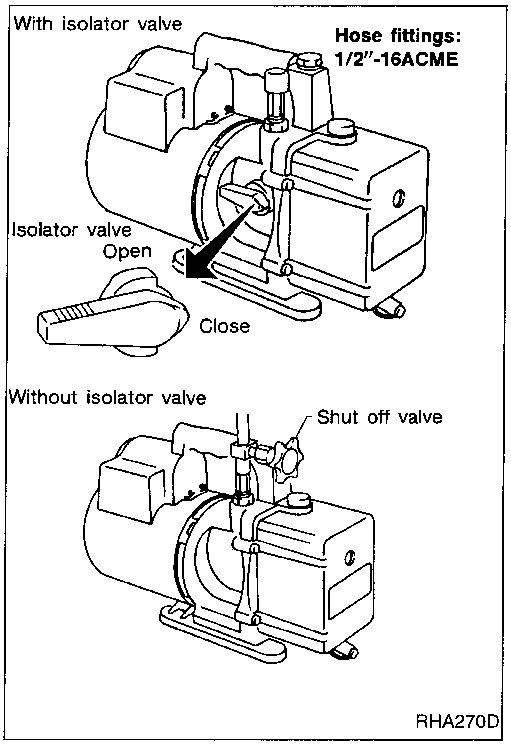
Precautions for Service Equipment

RECOVERY/RECYCLING EQUIPMENT

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

ELECTRONIC LEAK DETECTOR

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



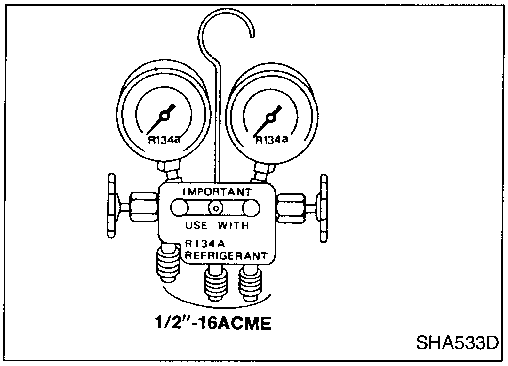
VACUUM PUMP

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

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

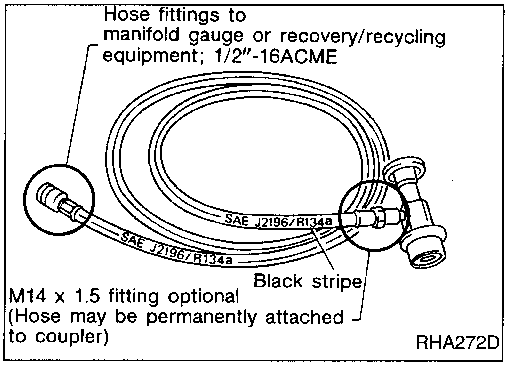
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has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

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



MANIFOLD GAUGE SET

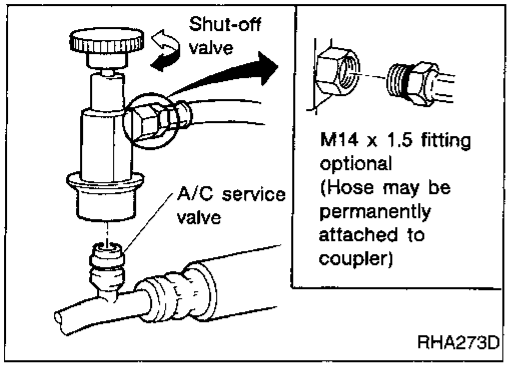
Be certain that the gauge face indicates R-134a or 134a. Make sure the gauge set has 1/2"-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) along with specified lubricant.



SERVICE HOSES

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

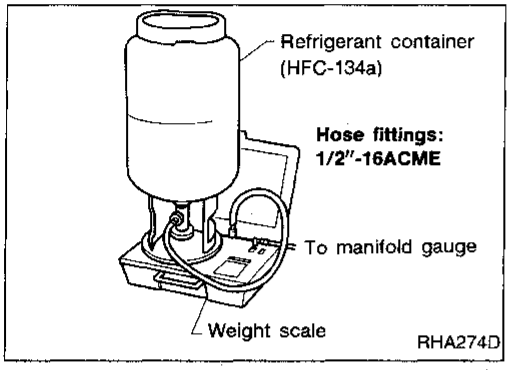
Precautions for Service Equipment (Cont'd)



SERVICE COUPLERS

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

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



REFRIGERANT WEIGHT SCALE

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

CHARGING CYLINDER

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

Refrigeration Cycle

REFRIGERANT FLOW

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

FREEZE PROTECTION

Under normal operating conditions, when the AUTO is switched on, the compressor runs continuously, and the evaporator pressure, and therefore temperature, is controlled by the V-6 variable displacement compressor to prevent freeze up.

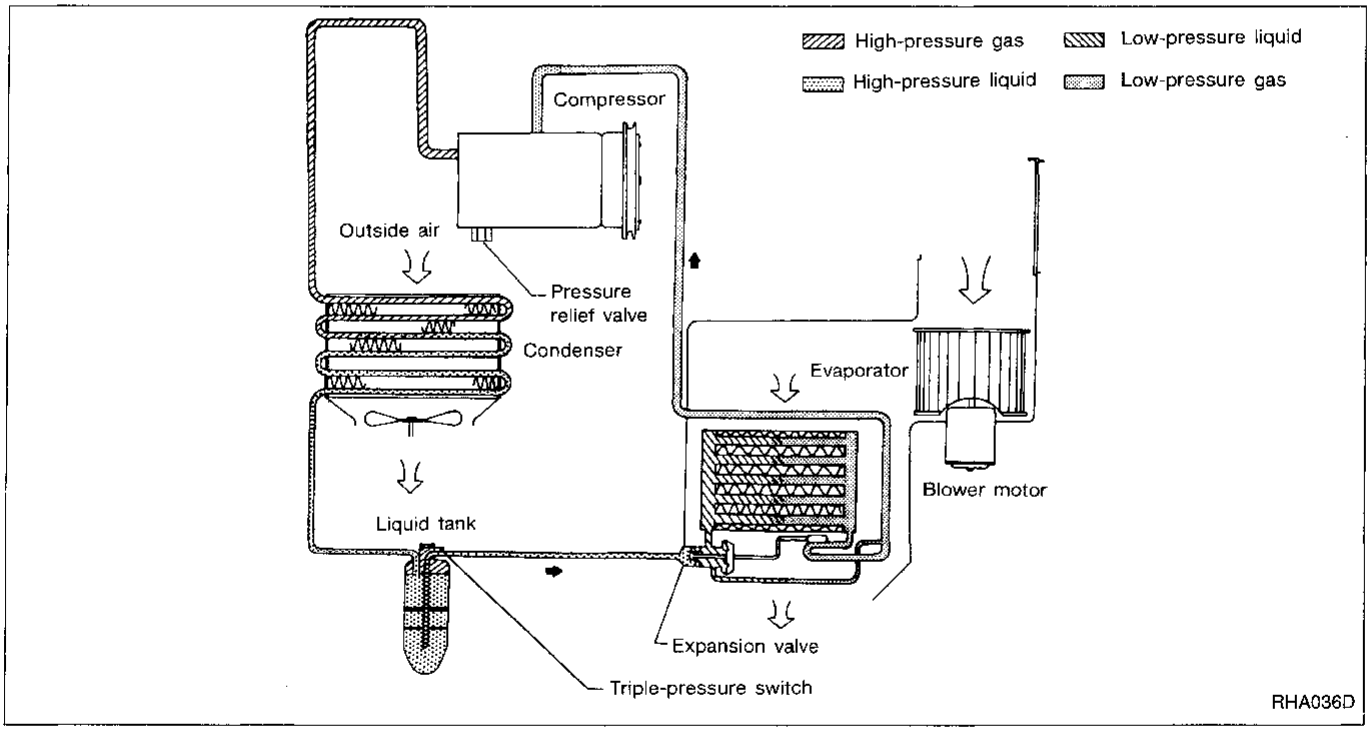
REFRIGERANT SYSTEM PROTECTION

Triple-pressure switch

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

Pressure relief valve

The refrigerant system is protected by a pressure relief valve. The valve is located on the bottom of the compressor. When refrigerant system pressure increases abnormally [over 3,727 kPa (38 kg/cm^2, 540 psi)], the relief valve's port opens. The valve then releases refrigerant into the atmosphere.



V-6 Variable Displacement Compressor

GENERAL INFORMATION

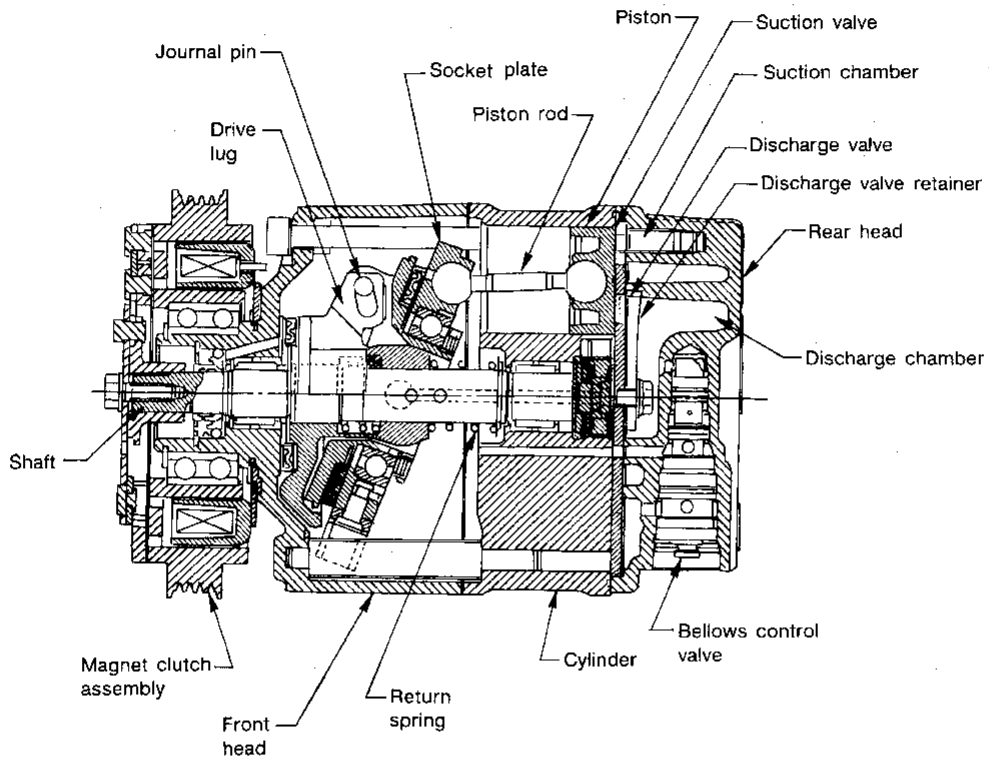
1. The V-6 variable compressor differs from previous units. The vent temperatures of the V-6 variable compress do not drop too far below 5°C (41°F) when:
   - evaporator intake air temperature is less than 20°C (68°F)
   - engine is running at speeds less than 1,500 rpm.

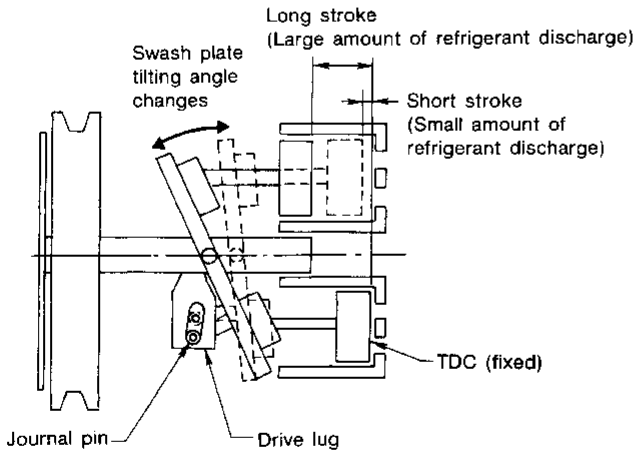
   This is because the V-6 compressor provides a means of "capacity" control.
2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.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

DESCRIPTION

General

The variable compressor is basically a swash plate type that changes piston stroke in response to the required cooling capacity.
The tilt of the swash plate allows the piston's stroke to change so that refrigerant discharge can be continuously changed from 10.5 to 184 cm^3 (0.641 to 11.228 cu in).





Discharge control	Discharge capacity cm^3 (cu in)/rev.	Piston stroke length mm (in)
Minimum	10.5 (0.641)	1.6 (0.063)
Maximum	184 (11.228)	28.6 (1.126)

RHA037DA

Operation

1. Operation control valve

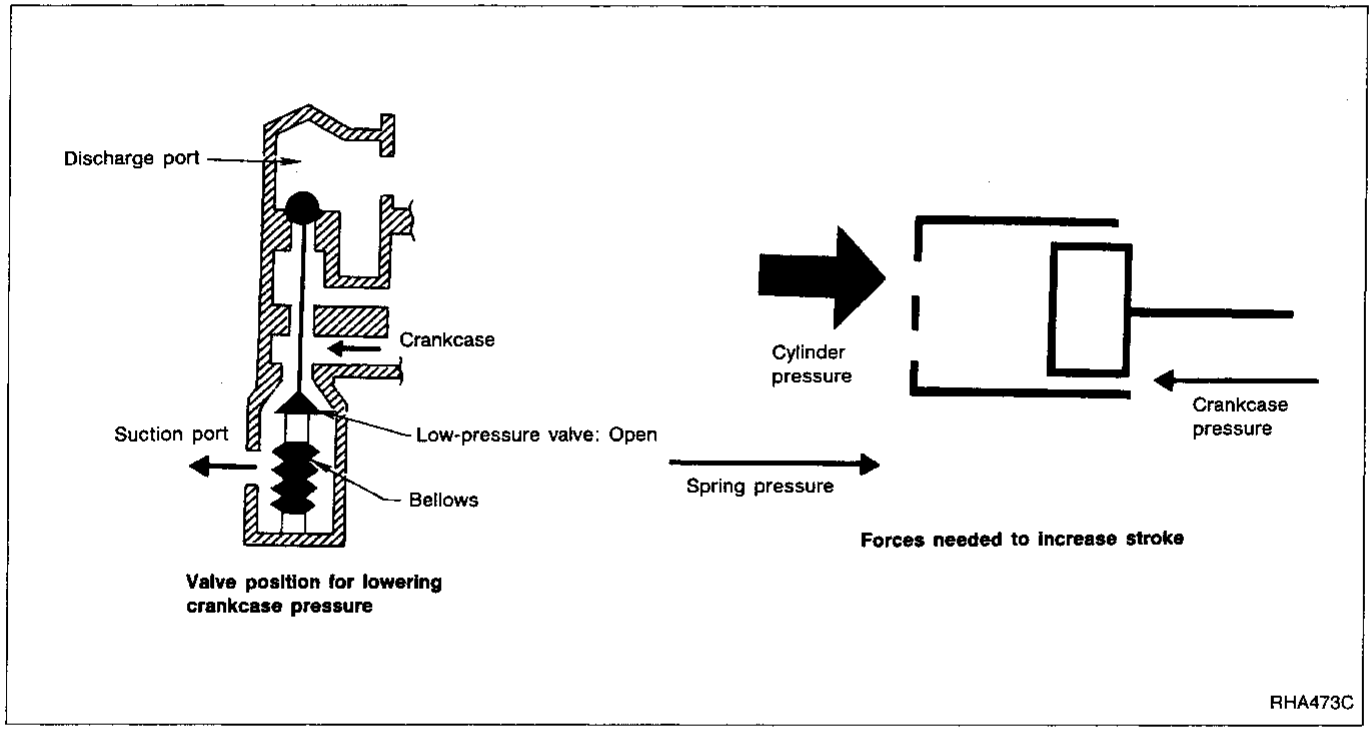
Operation control valve is located in the suction port (low-pressure) side, and opens or closes in response to changes in refrigerant suction pressure.
Operation of the valve controls the internal pressure of the crankcase.
The angle of the swash plate is controlled between the crankcase's internal pressure and the piston cylinder pressure.

2. Maximum cooling

Refrigerant pressure on the low-pressure side increases with an increase in heat loads.
When this occurs, the control valve's bellows compress to open the low-pressure side valve and close the high-pressure side valve.
This causes the following pressure changes:

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

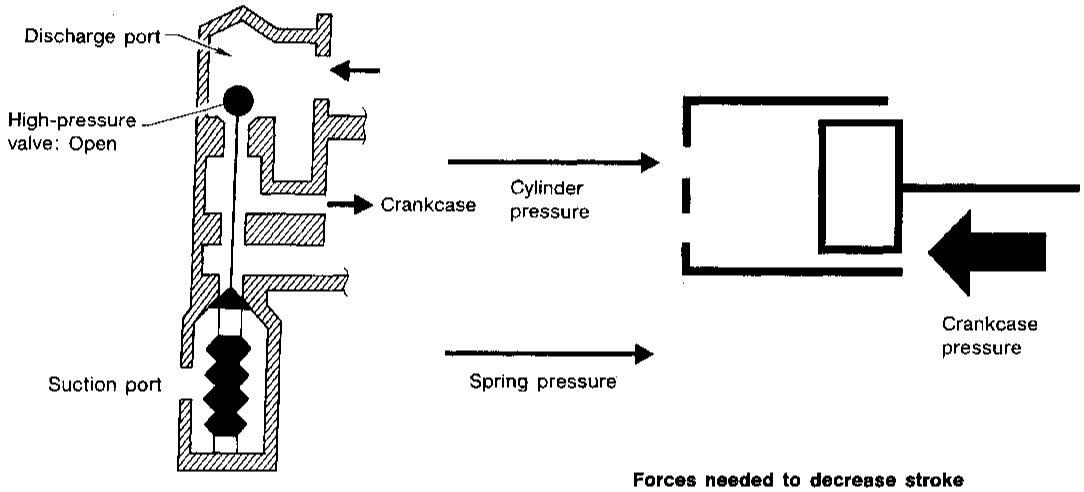
Under this condition, the swash plate is set to the maximum stroke position.



V-6 Variable Displacement Compressor (Cont'd)

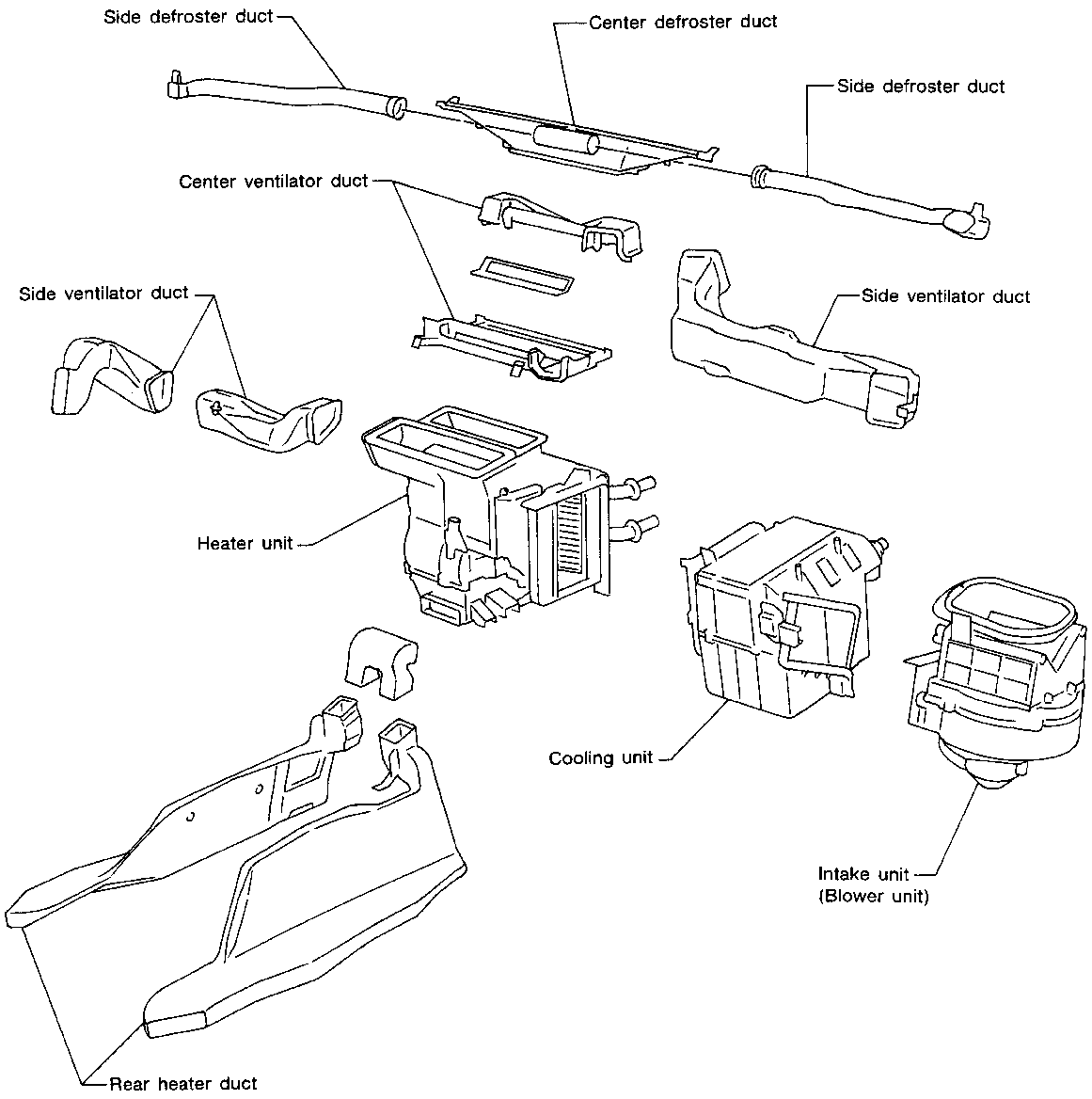
3. Capacity control

- Refrigerant pressure on suction side is low during high speed driving or when ambient or interior temperature is low.
- The bellows expands when refrigerant pressure on the suction pressure side drops below approximately 177 kPa (1.8 kg/cm^2, 26 psi).
  Since suction pressure is low, it makes the suction port close and the discharge port open. Thus, crankcase pressure becomes high as high pressure enters the crankcase.
- The force acts around the journal pin near the swash plate, and is generated by the pressure difference before and behind the piston.
  The drive lug and journal pin are located where the piston generates the highest pressure. Piston pressure is between suction pressure Ps and discharge pressure Pd, which is near suction pressure Ps. If crankcase pressure Pc rises due to capacity control, the force around the journal pin makes the swash plate angle decrease and also the piston stroke decrease. In other words, crankcase pressure increase triggers pressure difference between the piston and the crankcase. The pressure difference changes the angle of the swash plate.



Component Layout

SEC. 270•271•273



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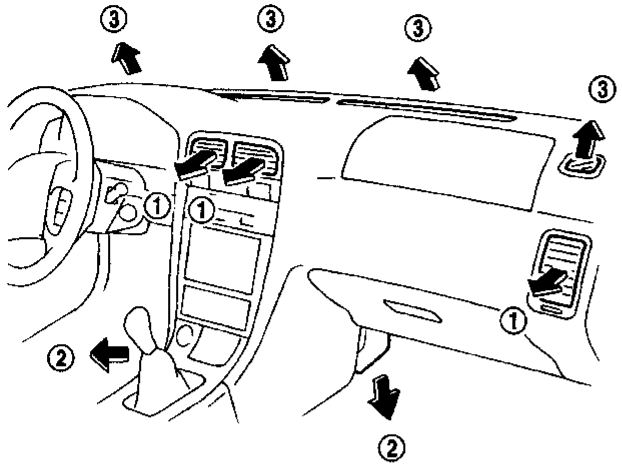
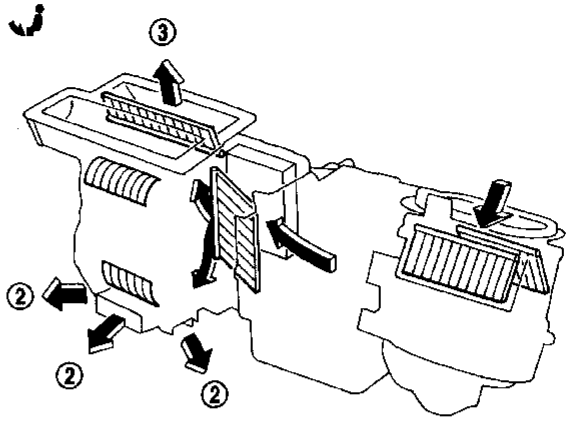
Discharge Air Flow

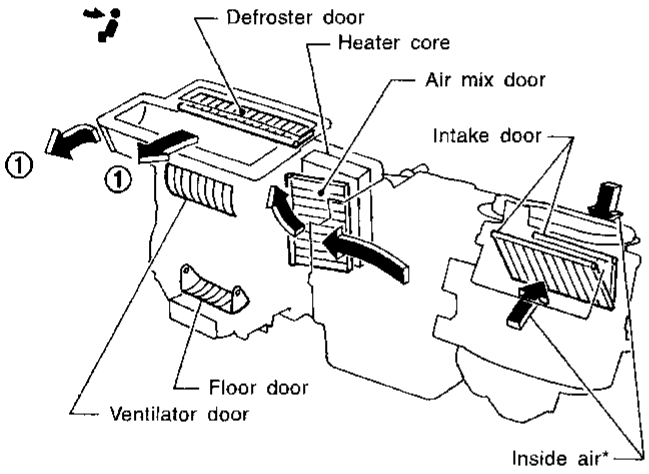
Air outlets



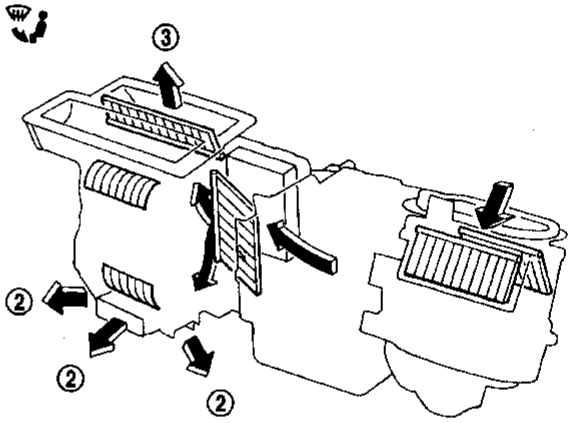
Foot



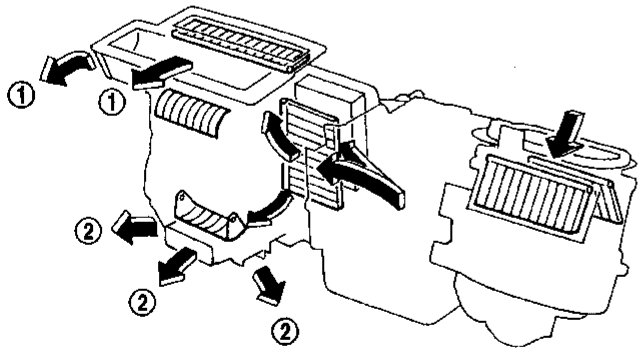
Face



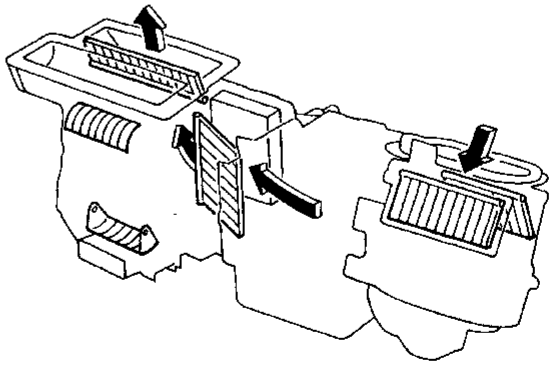
Foot and defroster



Bi-level



Defroster

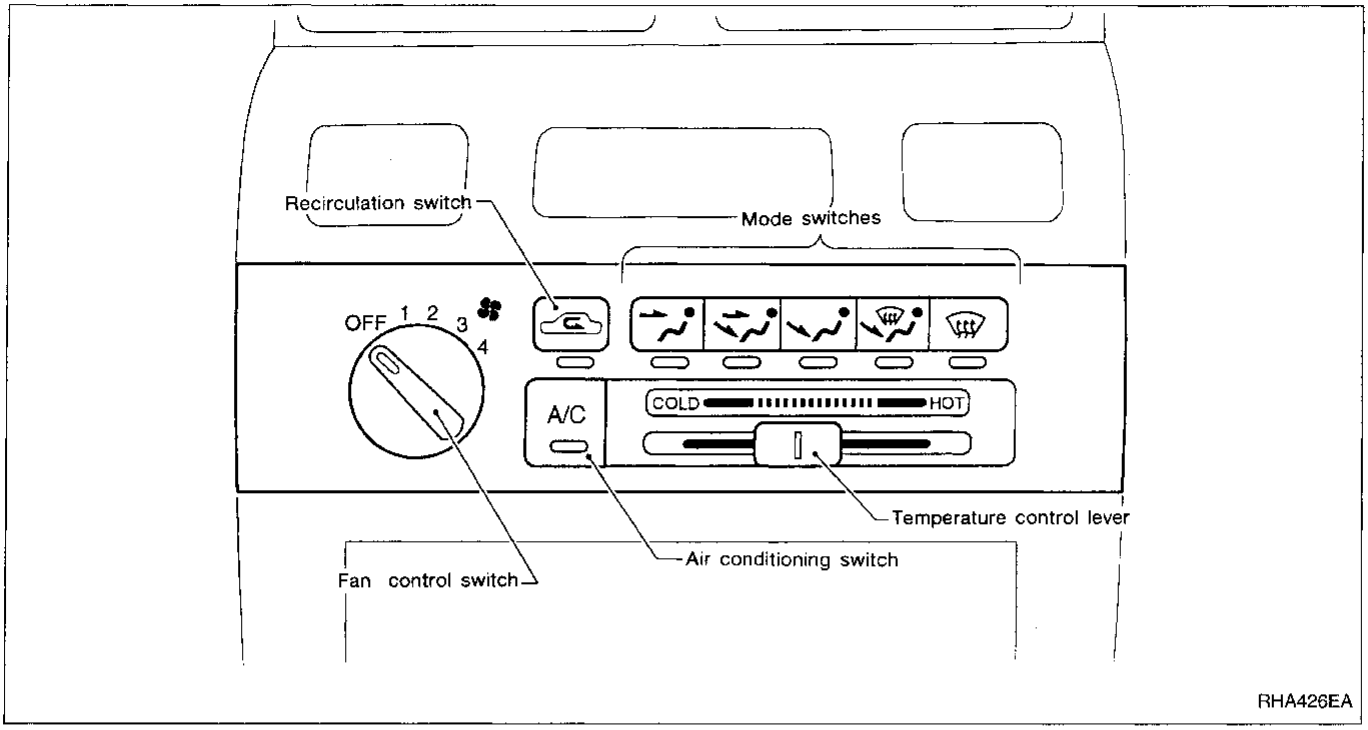


① : To face
② : To foot
③ : To defroster
* : When recirculation switch is ON

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

SHA847E

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.

RECIRCULATION (REC) SWITCH

OFF position: Outside air is drawn into the passenger compartment.
ON position: Interior air is recirculated inside the vehicle.
Recirculation is canceled when DEF or F/D is selected, and resumes when another mode is chosen.
Intake door is set at recirculation position automatically when the following conditions are met:

- VENT position
  - Fan speed: speed 4 position
  - Temperature control: Full cold position
  - Compressor: ON
- VENT, B/L, FOOT position
  - Engine coolant temperature: Over 105°C (221°F)
  - Compressor: ON

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.

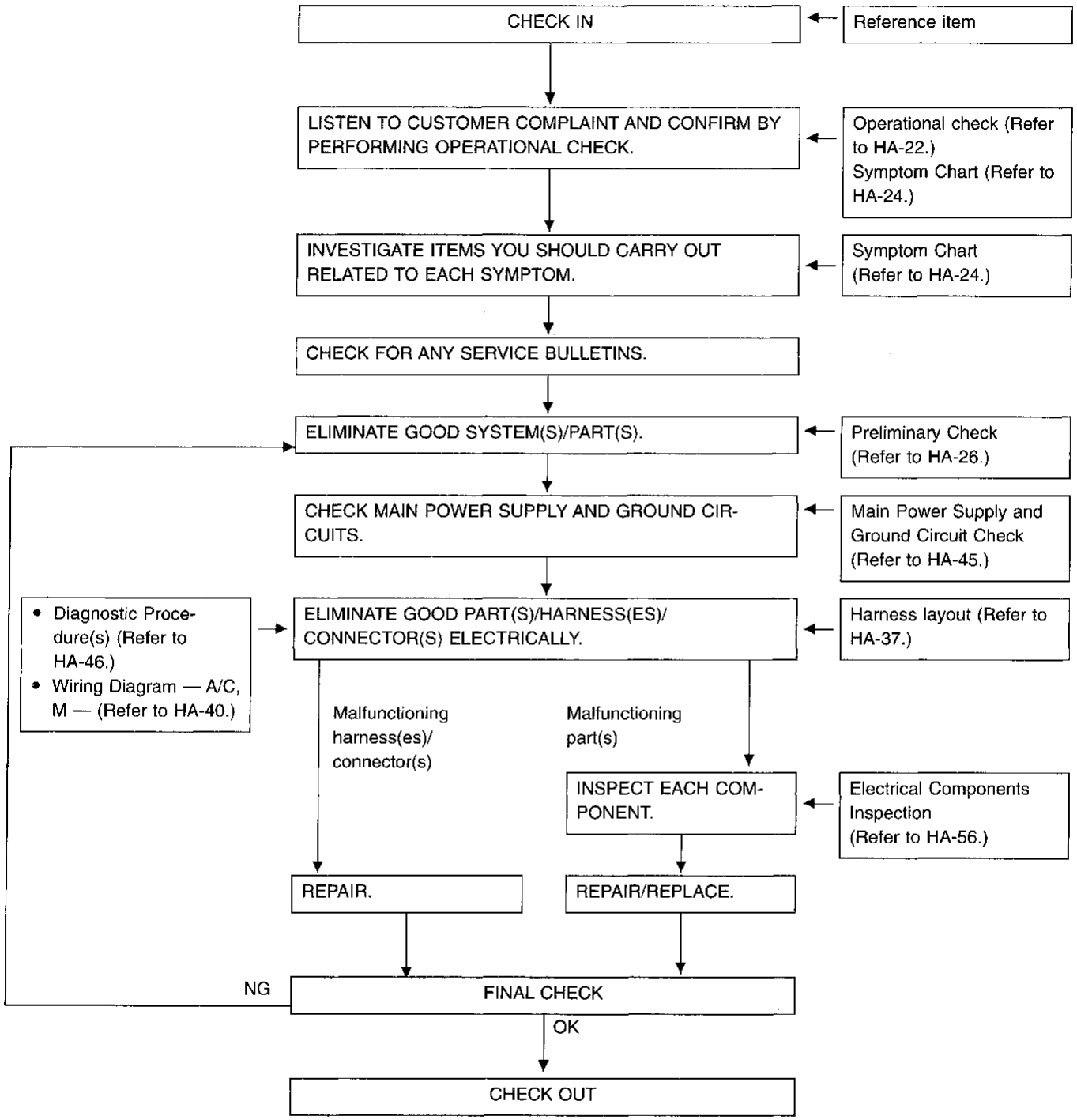
NOTE

Contents

How to Perform Trouble Diagnoses for Quick and Accurate Repair HA-21
Operational Check HA-22
Symptom Chart HA-24
Preliminary Check HA-26
PRELIMINARY CHECK 1
(Intake door is not set at "FRESH" in DEF or F/D mode.) HA-26
PRELIMINARY CHECK 2
(A/C does not blow cold air.) HA-27
PRELIMINARY CHECK 3
(Magnet clutch does not engage in DEF mode.) HA-28
PRELIMINARY CHECK 4
(Air outlet does not change.) HA-28
PRELIMINARY CHECK 5
(Noise) HA-29
PRELIMINARY CHECK 6
(Insufficient heating) HA-30
Performance Test Diagnoses HA-31
INSUFFICIENT COOLING HA-31
Performance Chart HA-33
TEST CONDITION HA-33
TEST READING HA-33
Trouble Diagnoses for Abnormal Pressure HA-34
Harness Layout HA-37
Circuit Diagram HA-39
Wiring Diagram — A/C, M — HA-40
Main Power Supply and Ground Circuit Check HA-45
Diagnostic Procedure 1
(SYMPTOM: Blower motor does not rotate.) HA-46
Diagnostic Procedure 2
(SYMPTOM: Air outlet does not change.) HA-48
Diagnostic Procedure 3
(SYMPTOM: Intake door does not change in VENT, B/L or FOOT mode.) HA-50
Diagnostic Procedure 4
(SYMPTOM: Air mix door does not change.) HA-51
Diagnostic Procedure 5
(SYMPTOM: Magnet clutch does not engage when A/C switch and fan switch are ON.) HA-53
Electrical Components Inspection HA-56
Control Linkage Adjustment HA-57

How to Perform Trouble Diagnoses for Quick and Accurate Repair

WORK FLOW

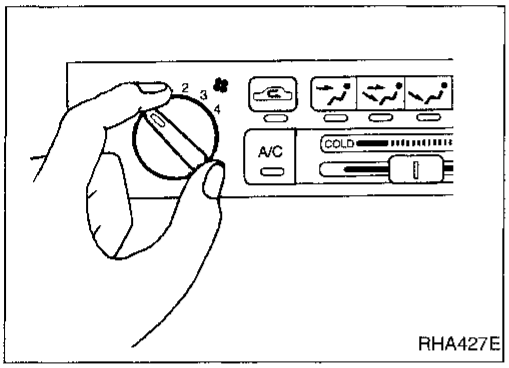


Operational Check

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:

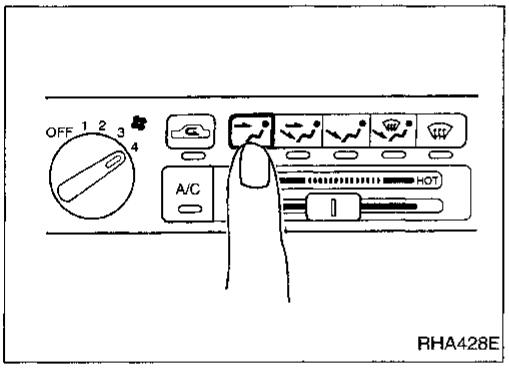
- **Engine running and at normal operating temperature.**



PROCEDURE:

1. Check blower

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



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%
	—	60%	40%
	—	—	100%

RHA429E

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

Refer to "Discharge Air Flow", "DESCRIPTION" (HA-17).

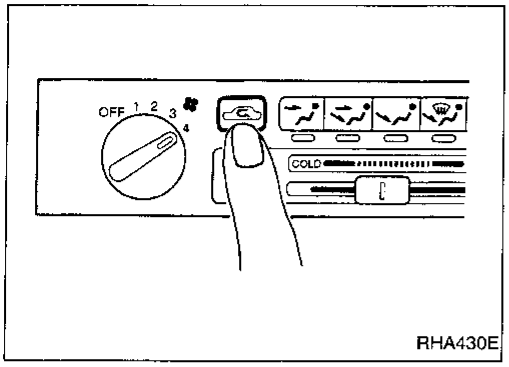
NOTE:

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)



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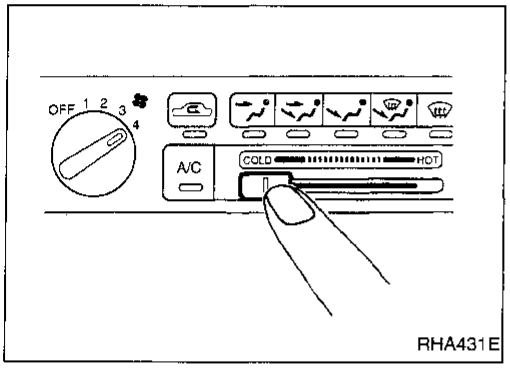
3. Check recirculation

1) Press REC switch.
   Recirculation indicator should illuminate.
2) Listen for intake door position change (air flow sound from intake unit).



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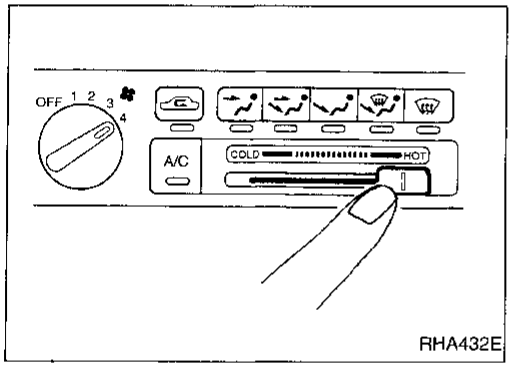
4. Check temperature decrease

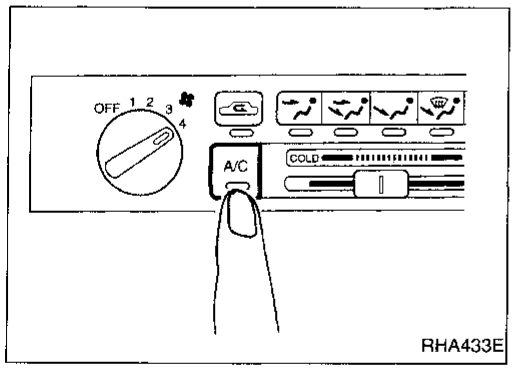
1) Slide temperature control lever to full cold.
2) Check for cold air at discharge air outlets.



RHA432E

5. Check temperature increase

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



RHA433E

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

Symptom Chart

DIAGNOSTIC TABLE

PROCEDURE	Preliminary Check						Diagnostic Procedure					Main Power Supply and Ground Circuit Check			
REFERENCE PAGE	HA-26	HA-27	HA-28	HA-28	HA-29	HA-30	HA-46	HA-48	HA-50	HA-51	HA-53	HA-45	HA-45	HA-45	HA-45
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	15A Fuses (#2, #3)	7.5A Fuse (#16)	7.5A Fuse (#61)	Push control unit
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			○		○
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)

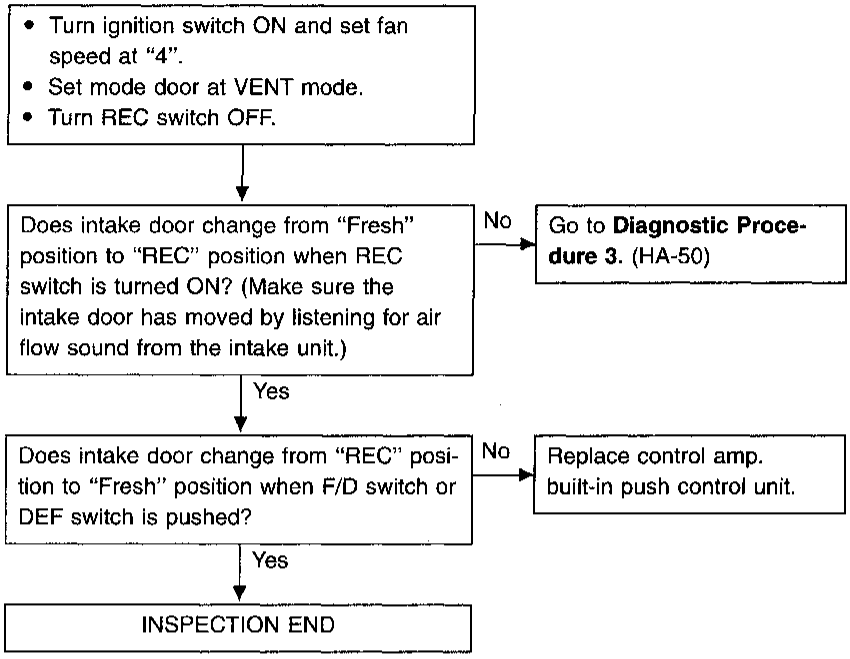
Electrical Components Inspection

Blower motor	Resistor	Push control unit: A/C switch	Push control unit: REC switch	Push control unit: VENT switch	Push control unit: B/L switch	Push control unit: FOOT switch	Push control unit: F/D switch	Push control unit: DEF switch	Push control unit: Fan switch	Mode door motor	Intake door motor	Air mix door motor	A/C relay	Triple-pressure switch	Compressor: Compressor (Magnet clutch)	ECM (ECCS control module)	Harness
HA-56	HA-56	HA-56	—	—	—	—	—	—	HA-56	HA-57	HA-58	HA-58	HA-57	HA-57	HA-133	Refer to EC section.	—
○	○	○							○			○	○	○	○	○	○
												○					○
○	○								○								○
				○	○	○	○	○		○							○
			○								○						○
			○								○						○
												○					○
		○							○				○	○	○	○	○
								○	○				○	○	○	○	○

Preliminary Check

PRELIMINARY CHECK 1

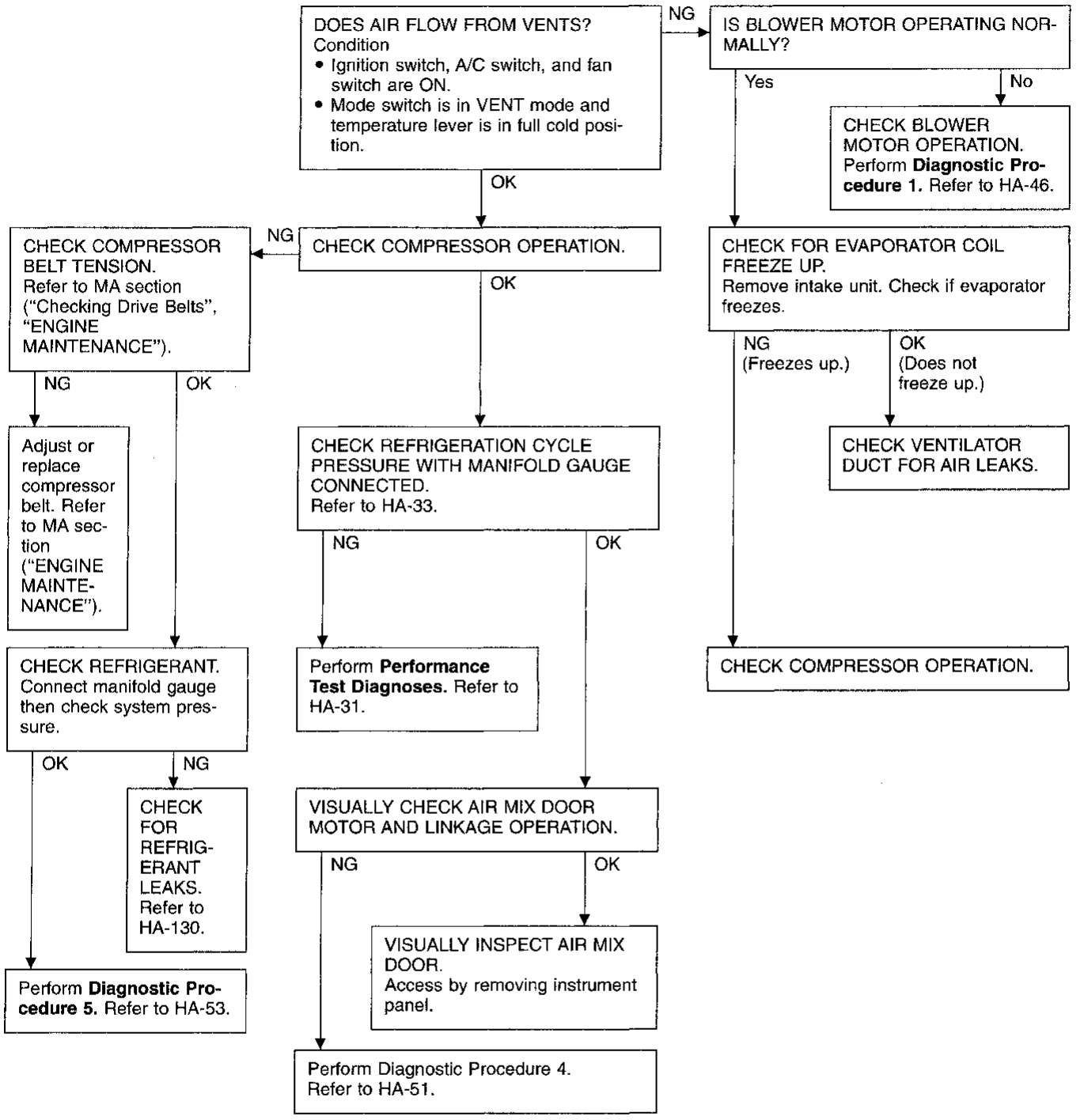
Intake door is not set at "FRESH" in DEF or F/D mode.



Preliminary Check (Cont'd)

PRELIMINARY CHECK 2

A/C does not blow cold air.

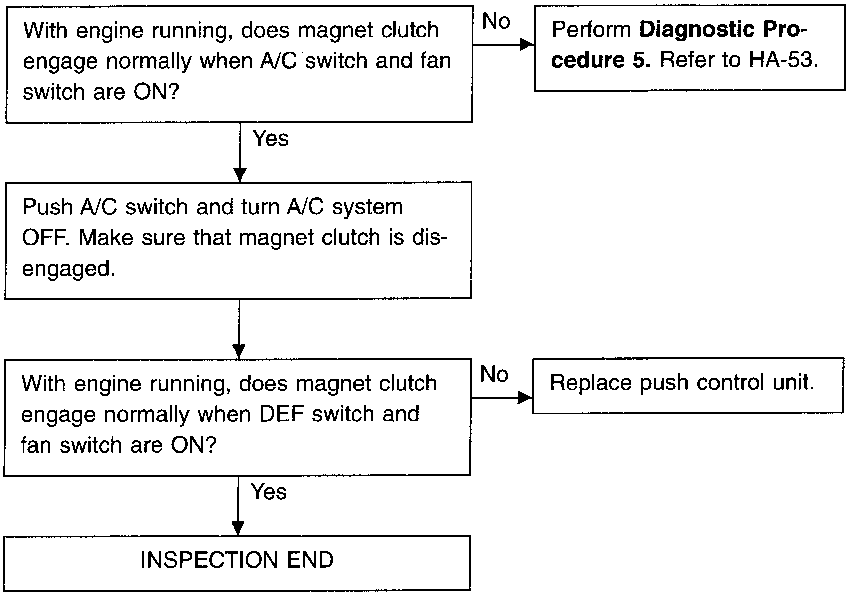


Preliminary Check (Cont'd)

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.

TURN IGNITION SWITCH ON. DOES AIR COME OUT NORMALLY FROM EACH DUCT WHEN EACH MODE SWITCH IS SELECTED?

No → Perform **Diagnostic Procedure 2.** Refer to HA-48.

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

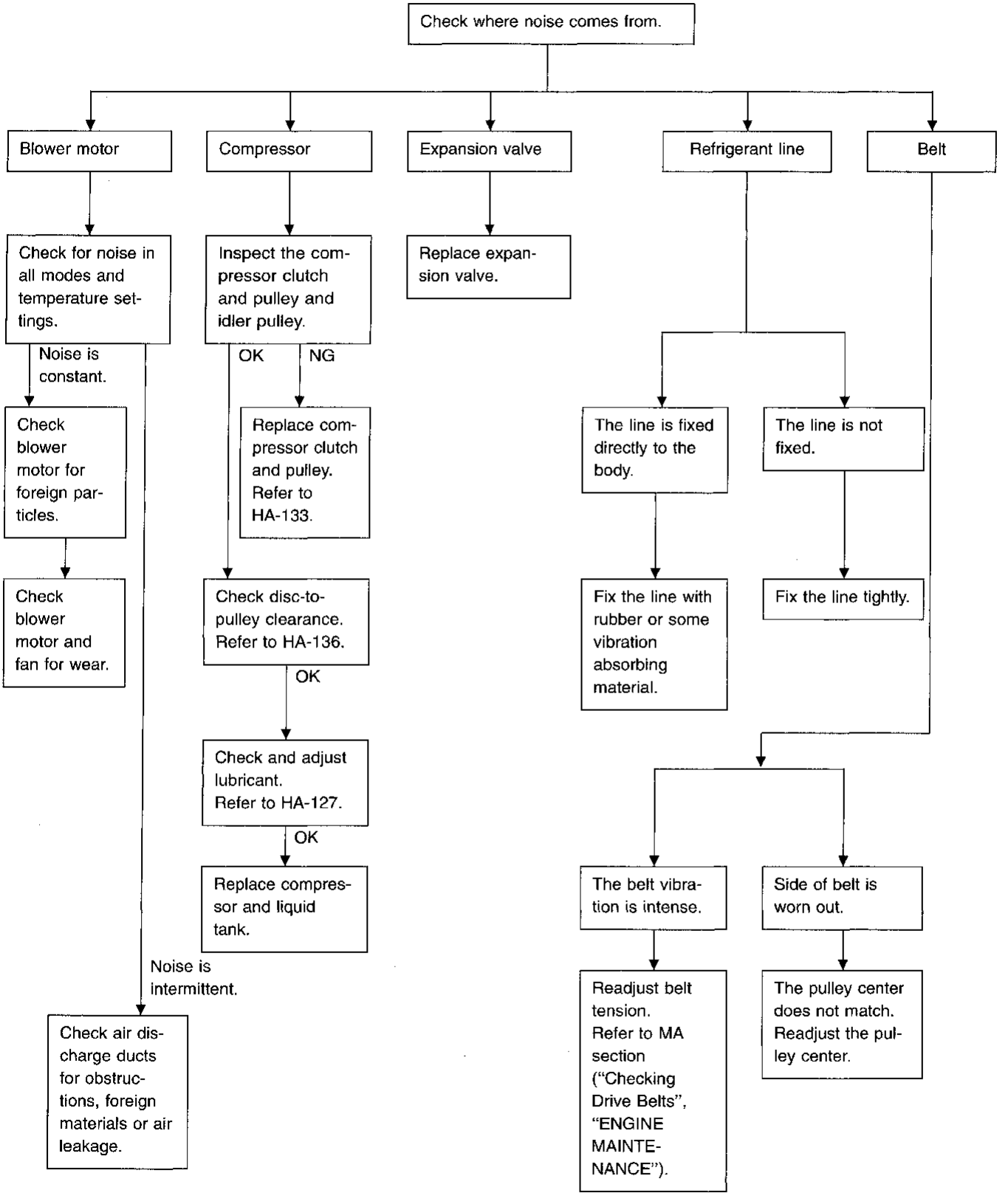
Yes

INSPECTION END

Preliminary Check (Cont'd)

PRELIMINARY CHECK 5

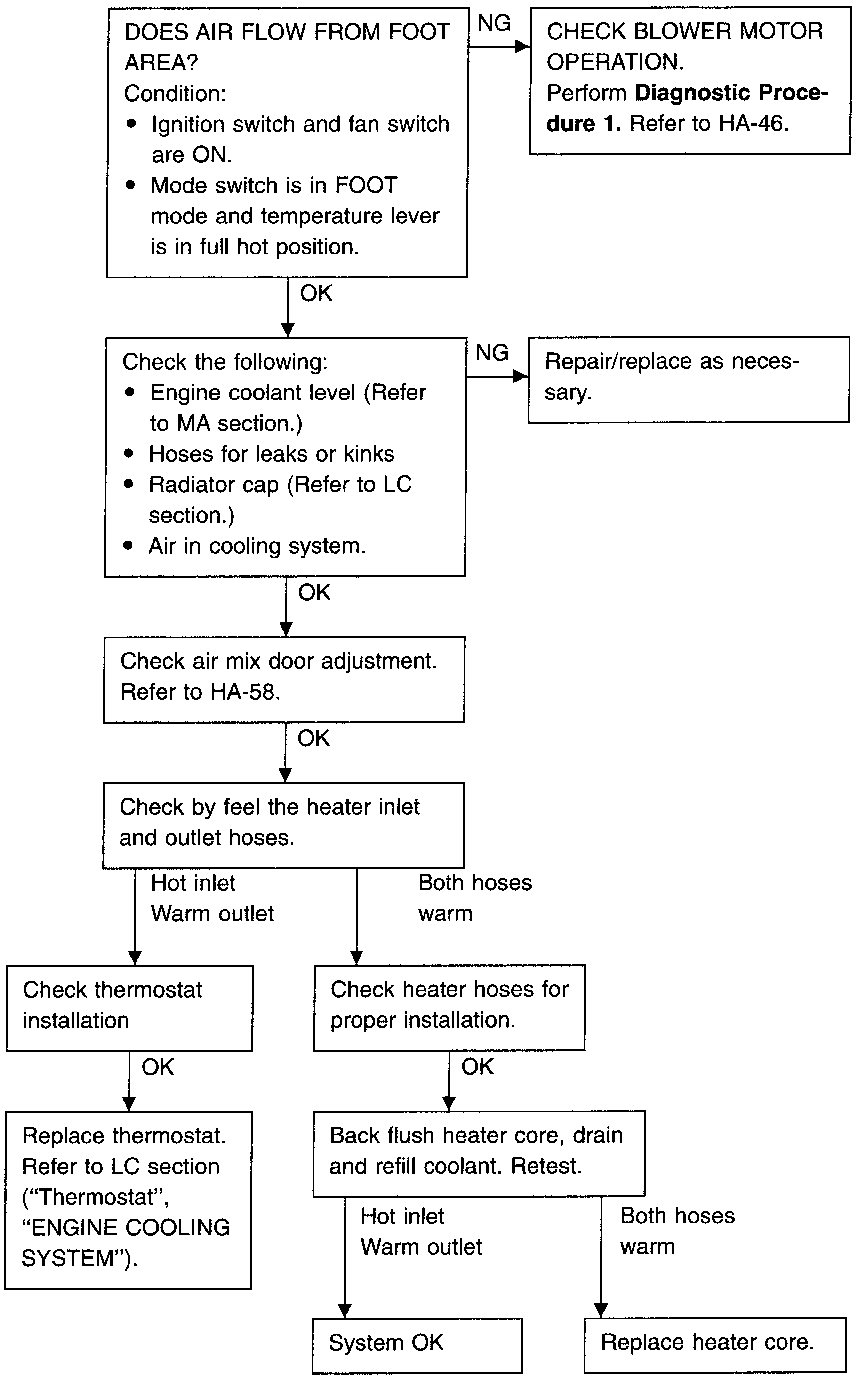
Noise



Preliminary Check (Cont'd)

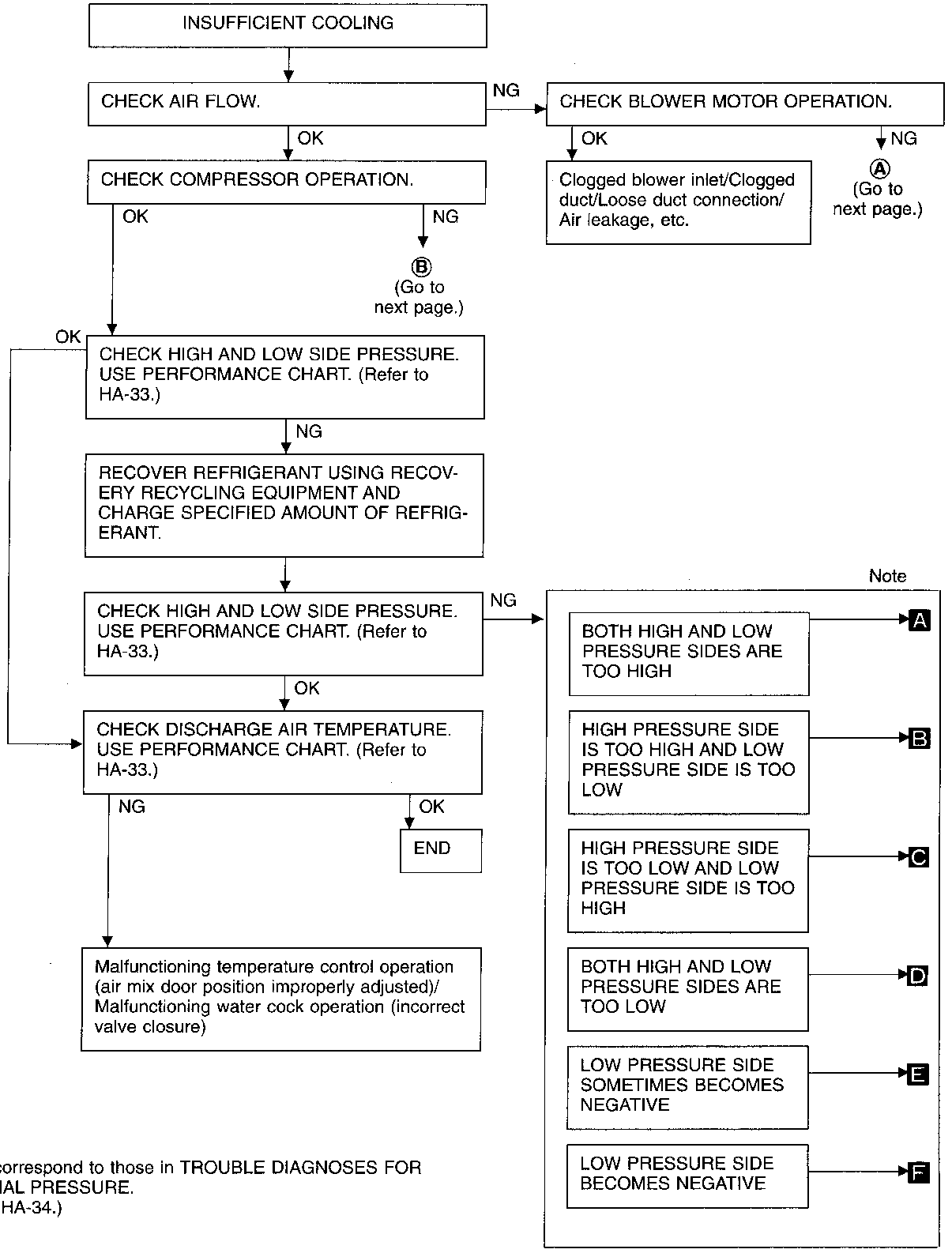
PRELIMINARY CHECK 6

Insufficient heating



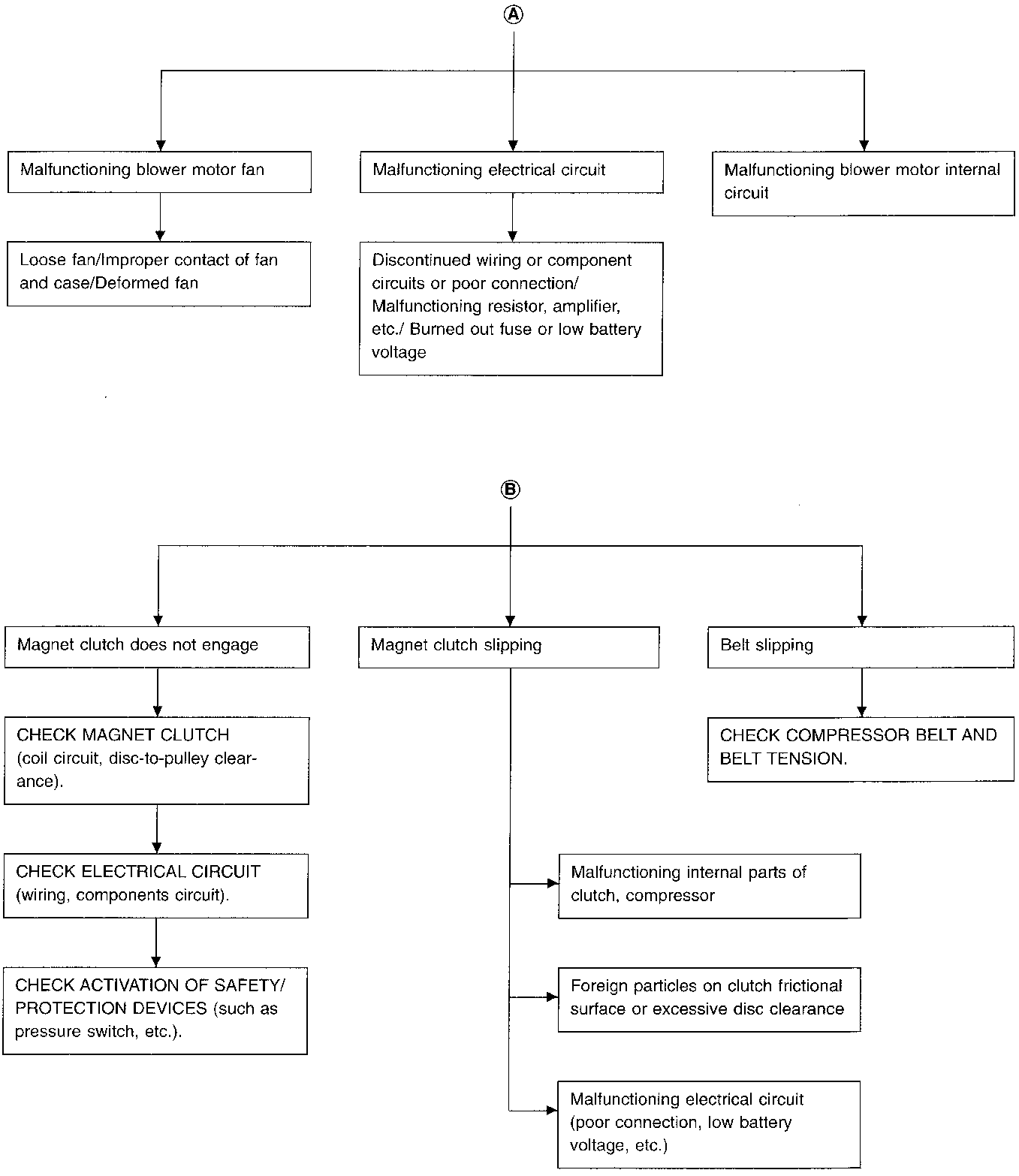
Performance Test Diagnoses

INSUFFICIENT COOLING



Note: A-F correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE. (Refer to HA-34.)

Performance Test Diagnoses (Cont'd)



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 (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	20 (68)	1.5 - 2.6 (35 - 37)
	25 (77)	3.7 - 5.7 (39 - 42)
	30 (86)	7.6 - 10.0 (46 - 50)
	35 (95)	12.4 - 15.2 (54 - 59)
60 - 70	20 (68)	2.6 - 3.6 (37 - 38)
	25 (77)	5.7 - 7.6 (42 - 46)
	30 (86)	10.0 - 12.4 (50 - 54)
	35 (95)	15.2 - 18.0 (59 - 64)

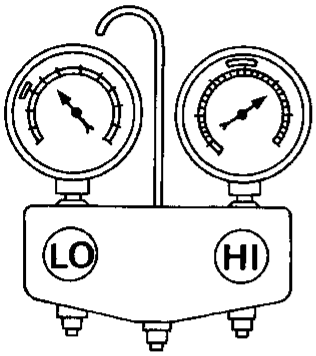
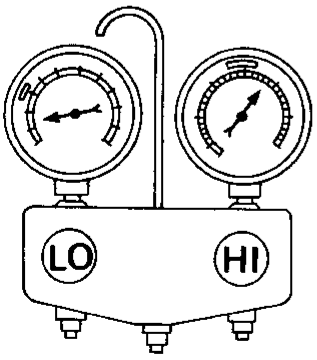
Ambient air temperature-to-operating pressure table

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)	785 - 1,040 (8.0 - 10.6, 114 - 151)	137 - 167 (1.4 - 1.7, 20 - 24)
	25 (77)	981 - 1,304 (10.0 - 13.3, 142 - 189)	137 - 167 (1.4 - 1.7, 20 - 24)
	30 (86)	1,167 - 1,550 (11.9 - 15.8, 169 - 225)	147 - 177 (1.5 - 1.8, 21 - 26)
	35 (95)	1,373 - 1,804 (14.0 - 18.4, 199 - 262)	157 - 186 (1.6 - 1.9, 23 - 27)
	40 (104)	1,550 - 2,059 (15.8 - 21.0, 225 - 299)	167 - 206 (1.7 - 2.1, 24 - 30)

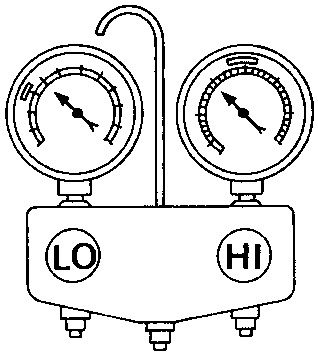
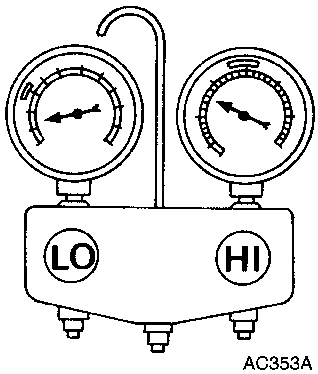
If pressure is not within range, refer to HA-34, "Trouble Diagnoses for Abnormal Pressure".

Trouble Diagnoses for Abnormal Pressure

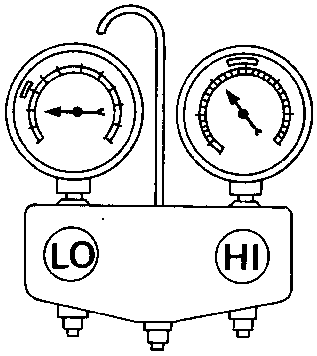
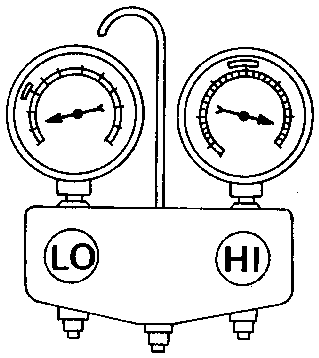
Whenever system's high or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (normal) pressure range. Since the standard (normal) pressure, however, differs from vehicle to vehicle, refer to HA-33 ("Ambient air temperature-to-operating pressure table").

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 cooling fan is insufficient.	Insufficient condenser cooling performance ↓ ① Condenser fins are clogged. ② Improper fan rotation of cooling fan	• Clean condenser. • Check and repair 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.
	• An area of the low-pressure pipe is colder than areas near the evaporator outlet. • 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.
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 lubricant for contamination.

Trouble Diagnoses for Abnormal Pressure (Cont'd)

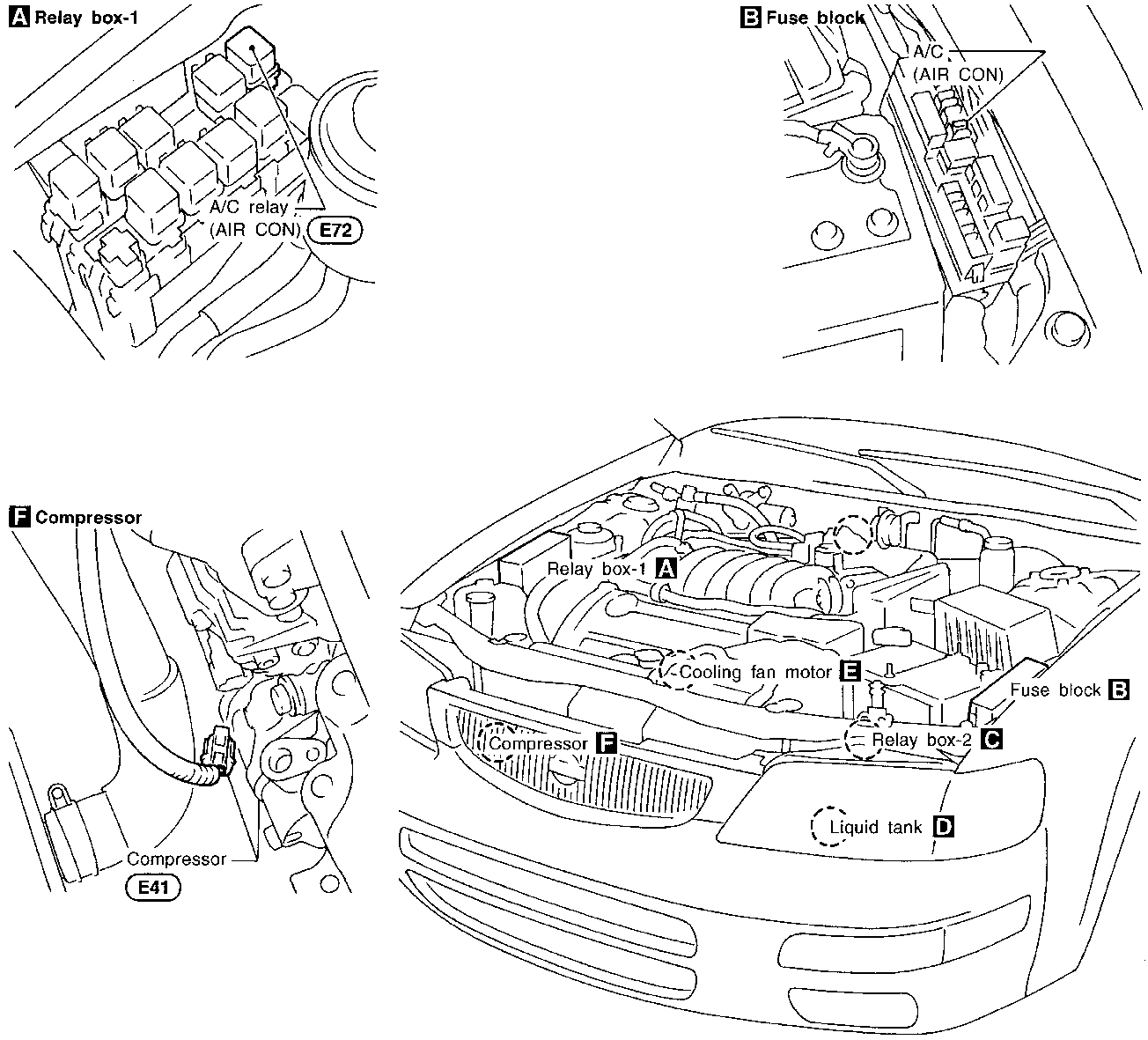
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high. C  AC356A	High and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings	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 lubricant 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 lubricant for contamination.
	• Expansion valve and liquid tank are warm or only cool to the touch.	Low refrigerant charge. ↓ Leaking fittings or components.	• Check for refrigerant leaks. Refer to "Checking Refrigerant Leaks", HA-130.
	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 lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	• Check and repair malfunctioning parts. • Check lubricant 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.

Trouble Diagnoses for Abnormal Pressure (Cont'd)

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
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.
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.	Leave the system at rest until no frost is present. Start it again to check whether or not the problem is caused by water or foreign particles. • If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. • If due to foreign particles, remove expansion valve and remove particles with dry and compressed air (not shop air). • If either of the above methods cannot correct the problem, replace expansion valve. • Replace liquid tank. • Check lubricant for contamination.

Harness Layout

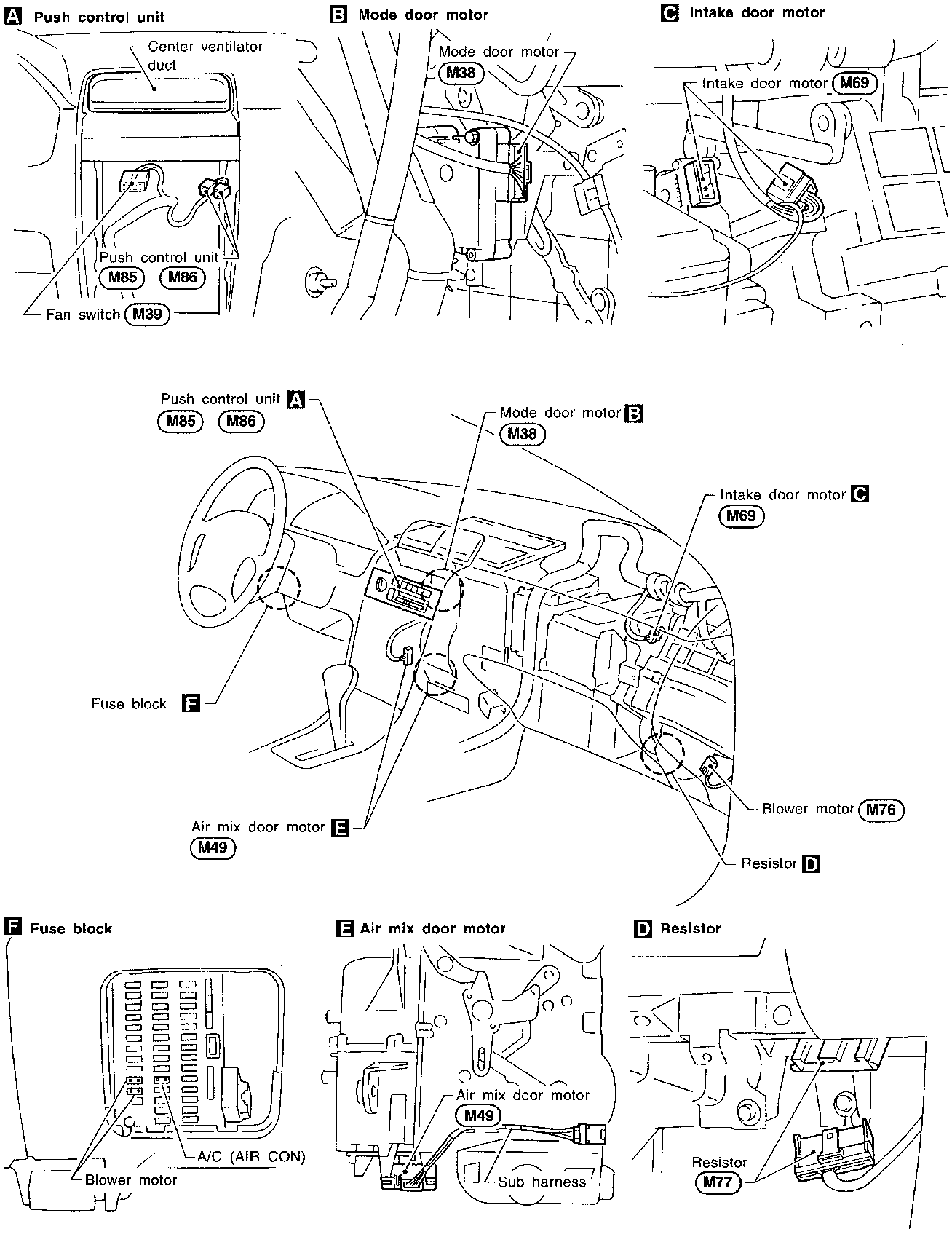
Engine compartment



RHA111F

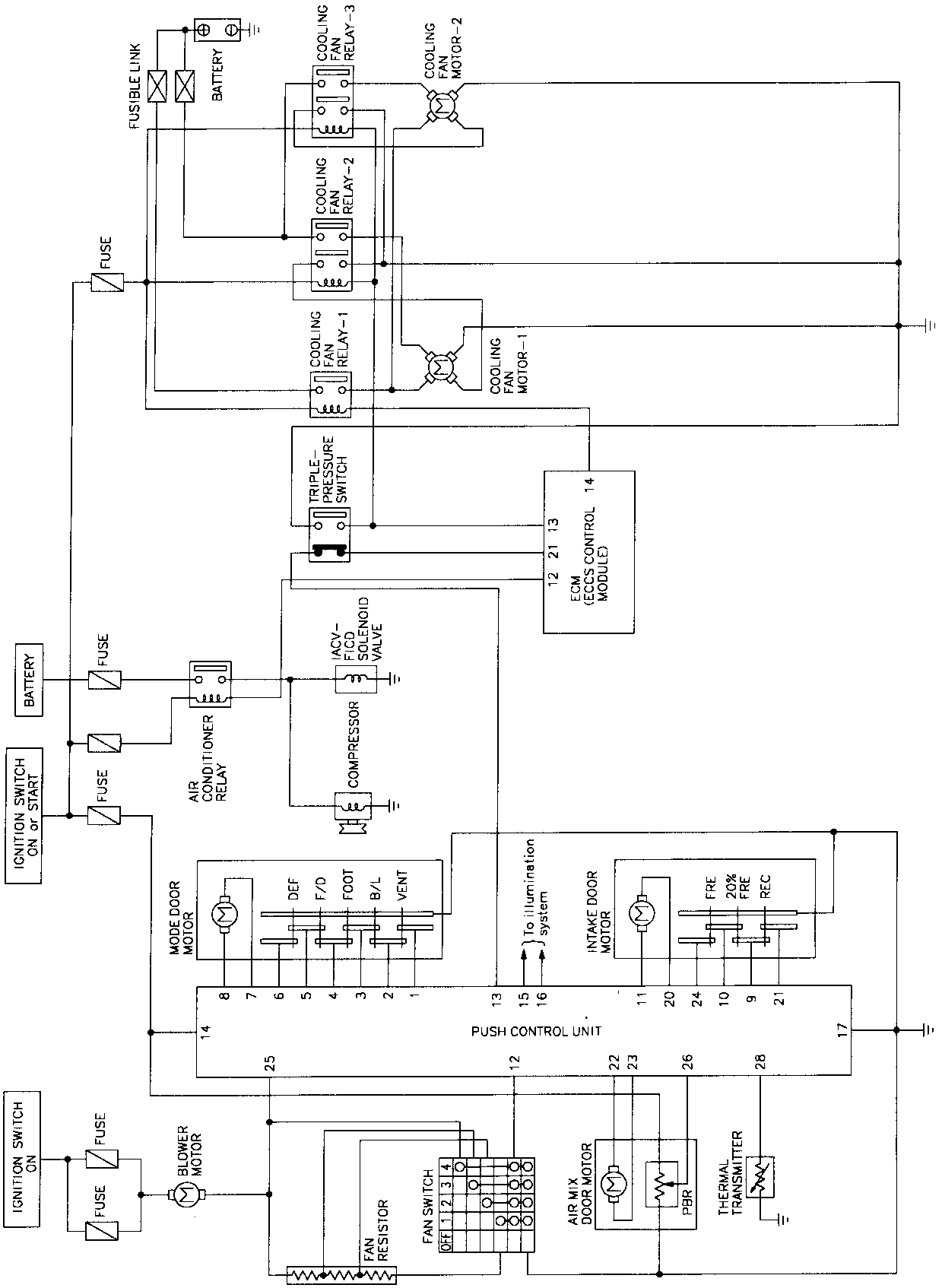
Harness Layout (Cont'd)

Passenger compartment



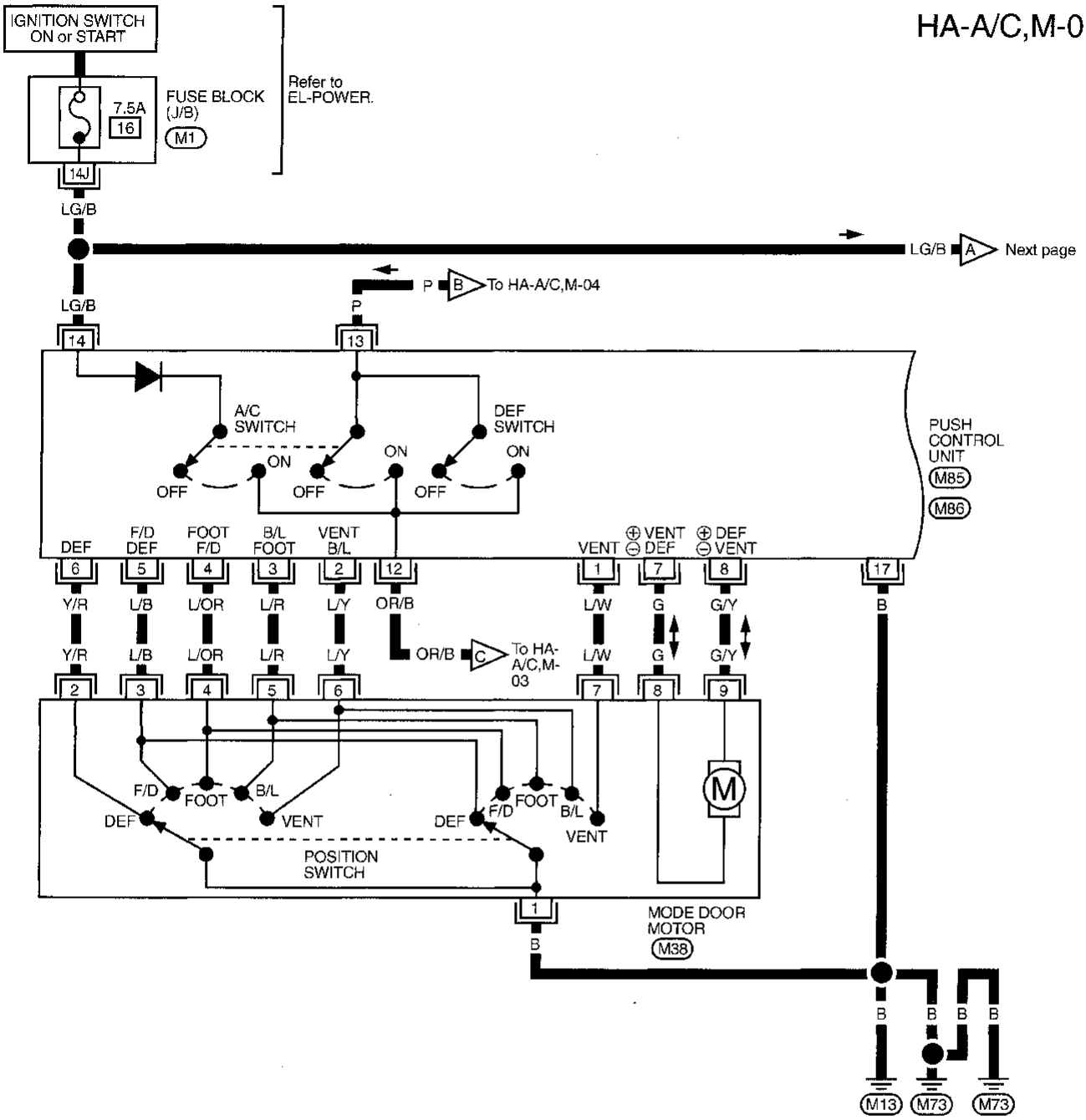
RHA132G

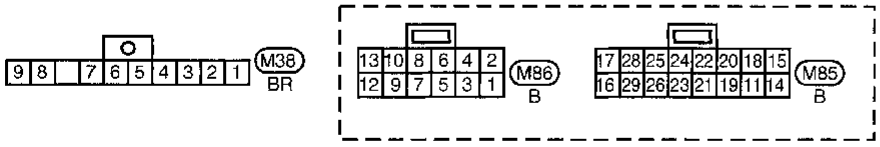
Circuit Diagram



MHA599A

Wiring Diagram — A/C, M —



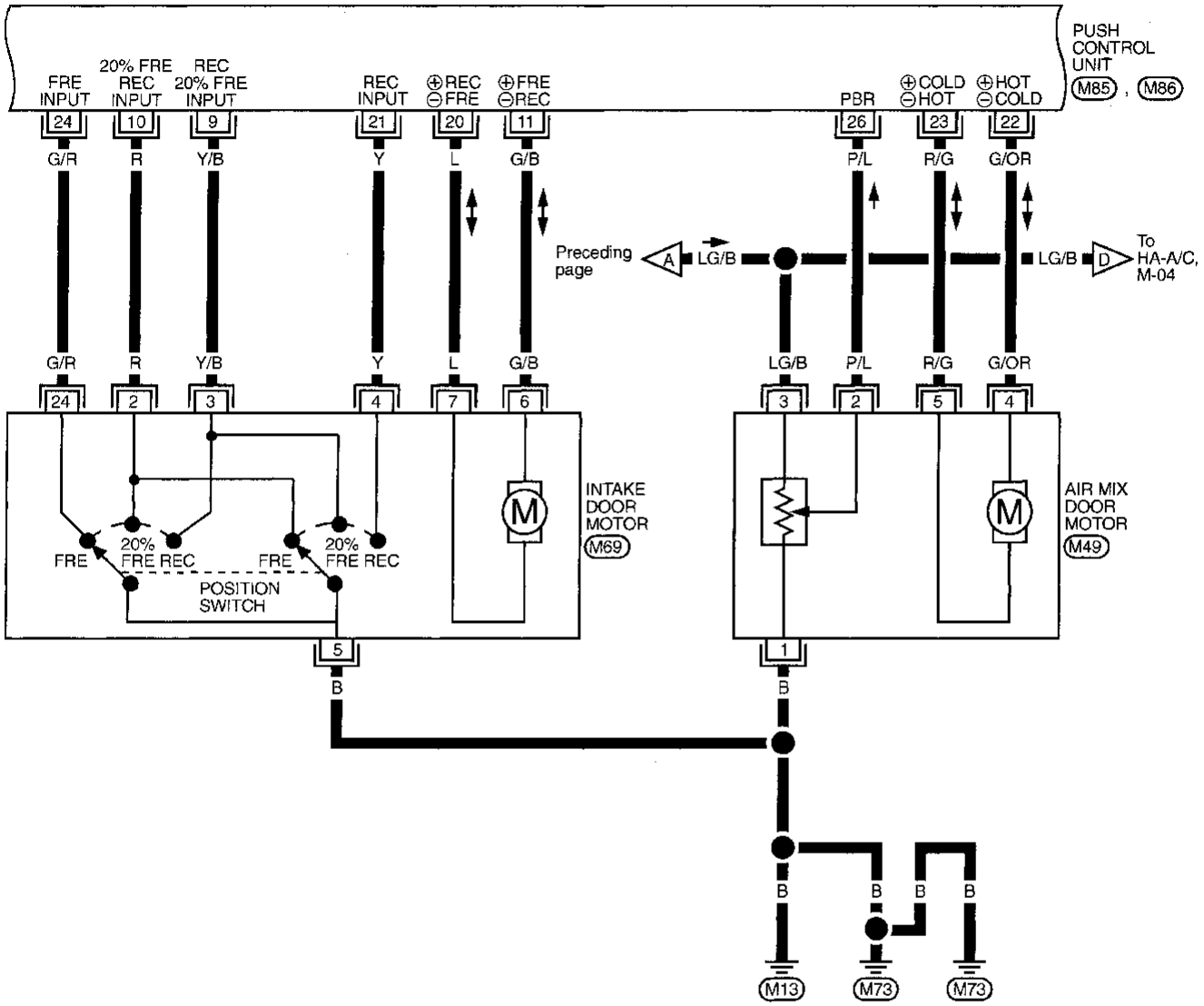


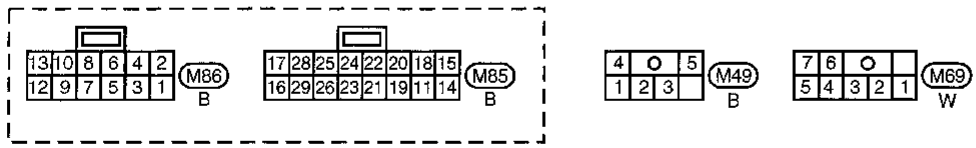
Refer to last page (Foldout page).
M1

MHA600A

Wiring Diagram — A/C, M — (Cont'd)

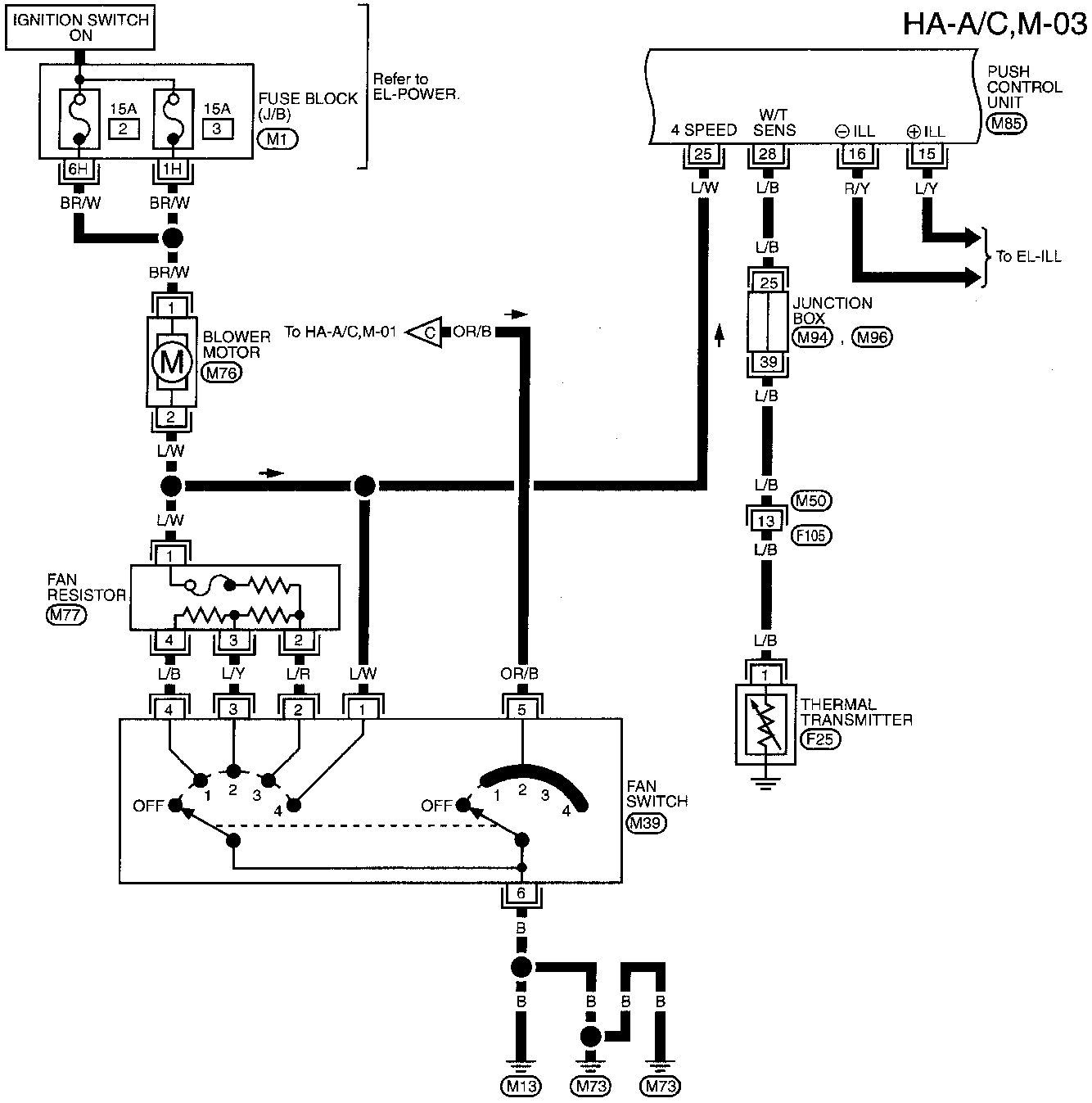
HA-A/C,M-02

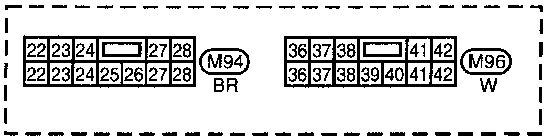


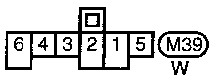


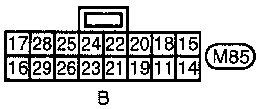
MHA601A

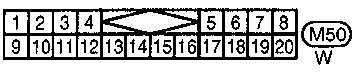
Wiring Diagram — A/C, M — (Cont'd)

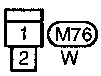


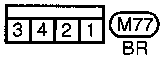












Refer to last page (Foldout page).

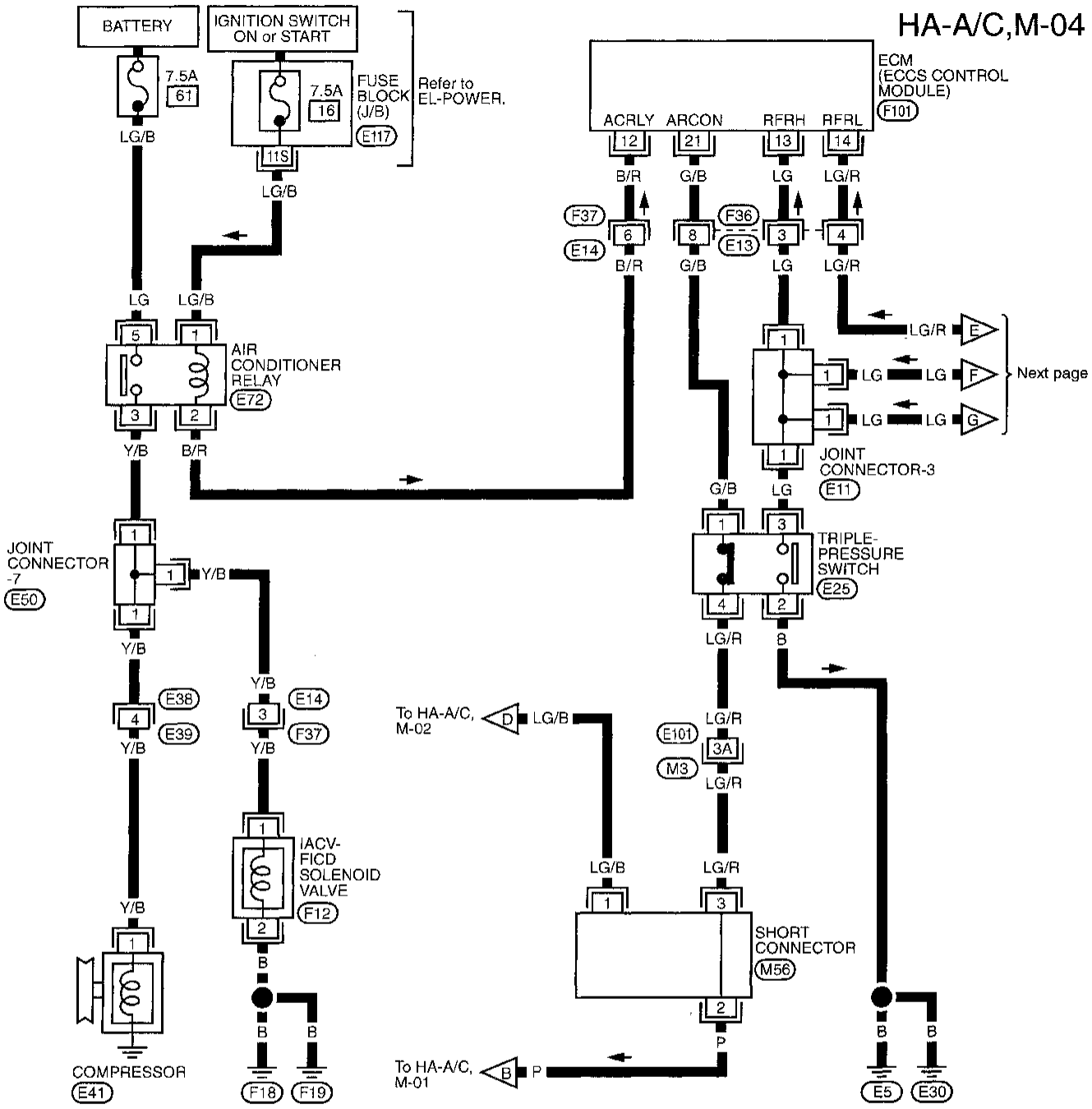
M1

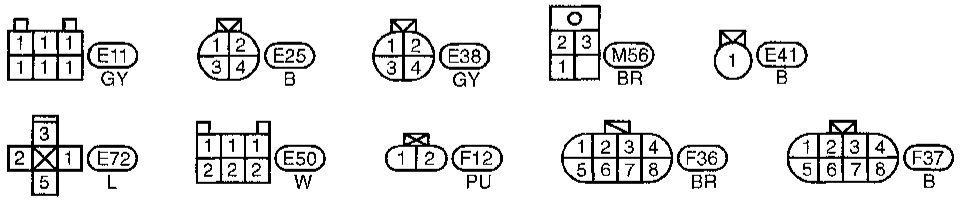
M94

M96

MHA602A

Wiring Diagram — A/C, M — (Cont'd)

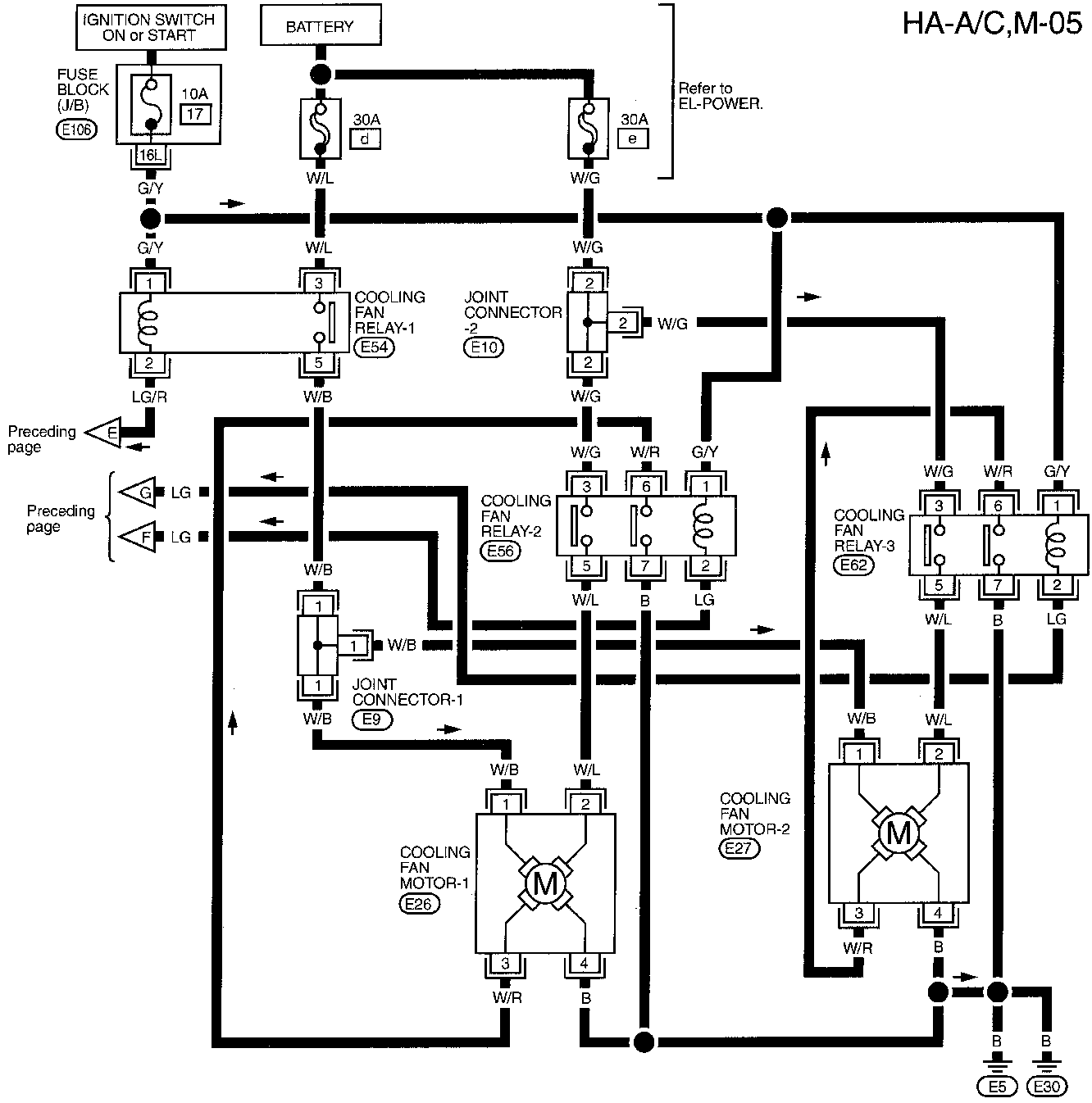




Refer to last page (Foldout page).
M3 , E101
E11
E50
E117
F101

MHA603A

Wiring Diagram — A/C, M — (Cont'd)



E9 W , E10 W

E54 L

E56 BR , E62 BR

E26 GY , E27 GY

Refer to last page (Foldout page).

E9

E10

E106

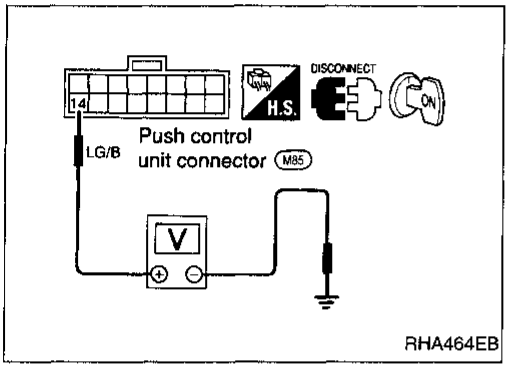
MHA604A

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").

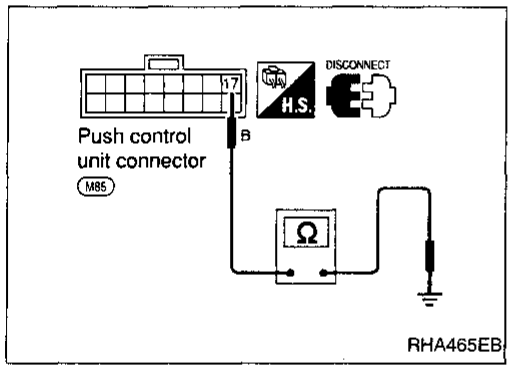


PUSH CONTROL UNIT CHECK

Check power supply circuit for push control unit with ignition switch at ON.

1. Disconnect push control unit harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal ⑭ and body ground.

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



Check body ground circuit for push control unit.

1. Disconnect push control unit harness connector.
2. Connect ohmmeter from harness side.
3. Check for continuity between terminal 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

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 ① and body ground?

No → Check power supply circuit and 15A fuses (No. 2 and 3 , located in the fuse block).
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

Yes

B

Check circuit continuity between blower motor harness terminal ② and body ground.

NG → Reconnect blower motor harness connector.

OK

CHECK BLOWER MOTOR.
(Refer to HA-56.)

NG

Replace blower motor.

C

CHECK BLOWER MOTOR CIRCUIT BETWEEN BLOWER MOTOR AND RESISTOR.
Do approx. 12 volts exist between resistor harness terminal ① and body ground?

No → Disconnect blower motor and resistor harness connectors.

Yes

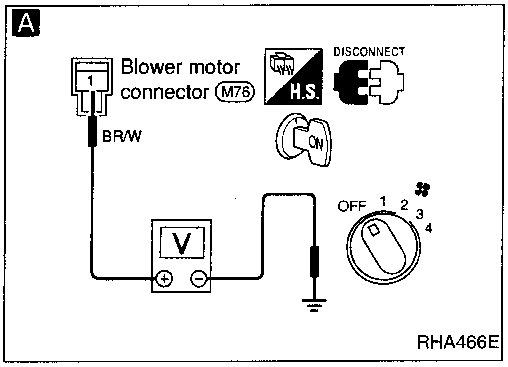
Ⓐ (Go to next page.)

D

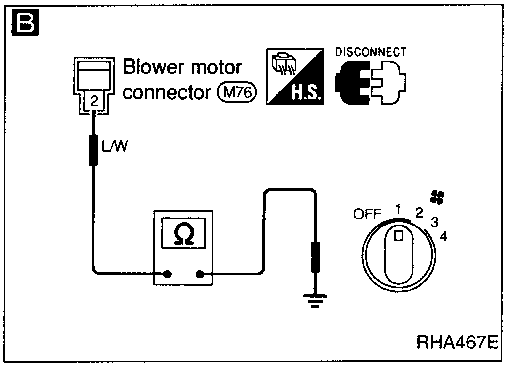
Note

Check circuit continuity between blower motor harness terminal ② and resistor harness terminal ①.
Continuity should exist.
If OK, check harness for short.

A



B



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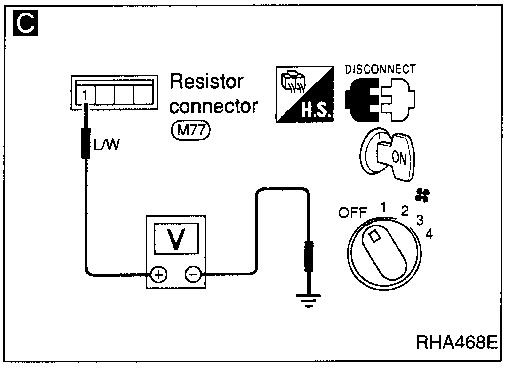
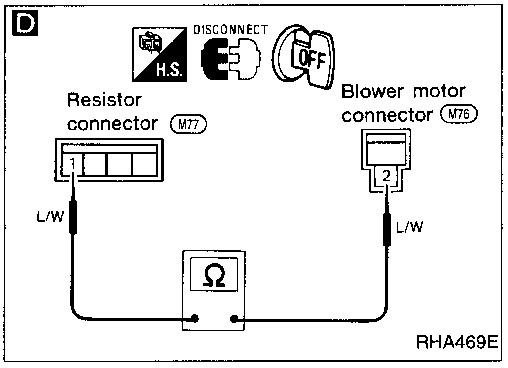


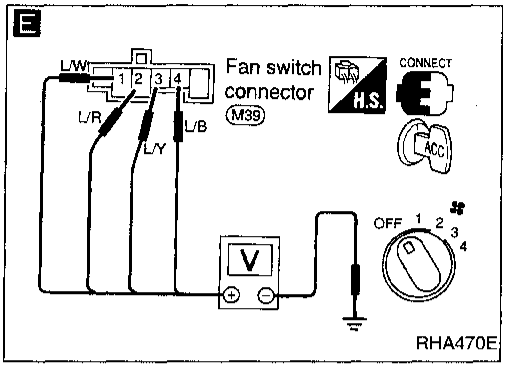
D



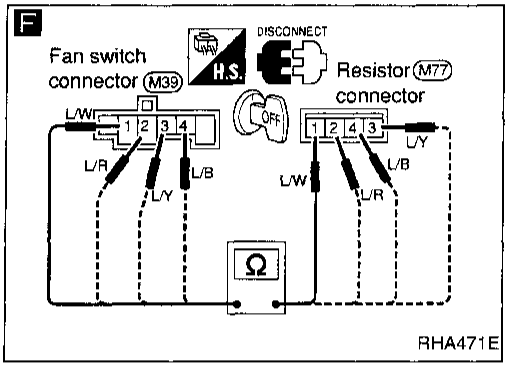
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 1 (Cont'd)

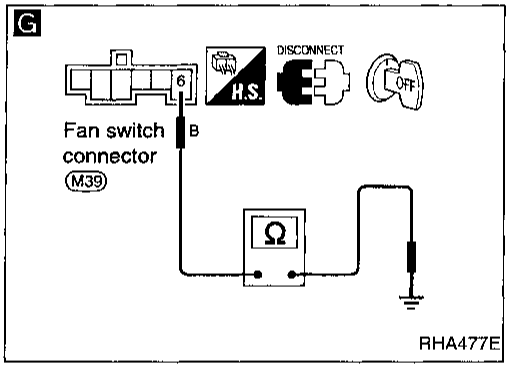
E



F



G



Ⓐ

1

CHECK RESISTOR AFTER DISCONNECTING IT.
(Refer to HA-56.)

OK

NG

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	④	Body ground	Approx. 12V
3	③		
4	②		
5	①		

Yes

2 3 4 5

No

F

Note

Check circuit continuity between fan switch and resistor.

Terminal No. Resistor	Terminal No. Fan control switch	Continuity
①	①	Yes
②	②	
③	③	
④	④	

If OK, check harness for short.

CHECK FAN SWITCH AFTER DISCONNECTING IT.
(Refer to HA-56.)

NG

Replace fan switch.

OK

G

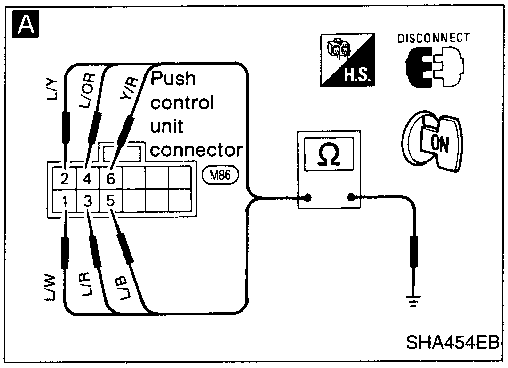
Note

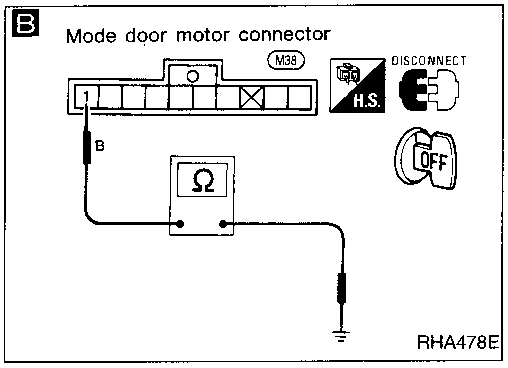
Check circuit continuity between fan switch harness terminal ⑥ and body ground.

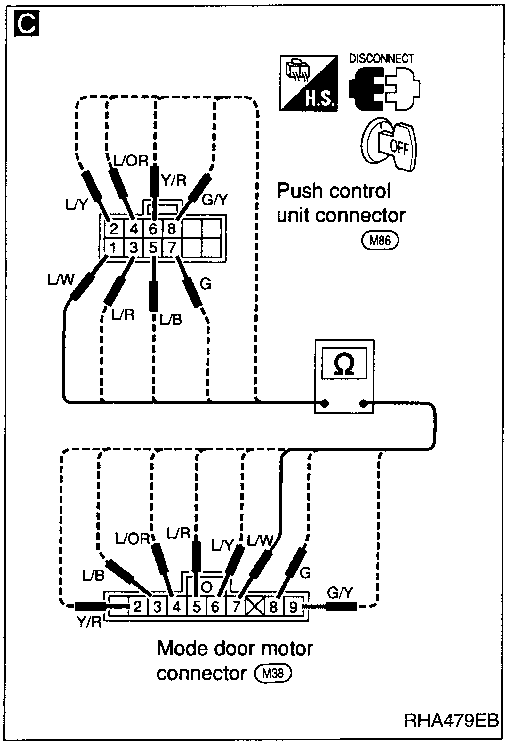
OK

Replace blower motor.

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







Diagnostic Procedure 2

SYMPTOM: Air outlet does not change.

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

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 unit connector.
3. Turn ignition switch ON. Check continuity between terminal ① or ② of push control unit 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		

NG → Disconnect mode door motor harness connector.

OK → CHECK SIDE LINK. Refer to HA-57.

B

Note

CHECK BODY GROUND CIRCUIT FOR MODE DOOR MOTOR. Does continuity exist between mode door motor harness terminal ① and body ground?

Yes

C

Note

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

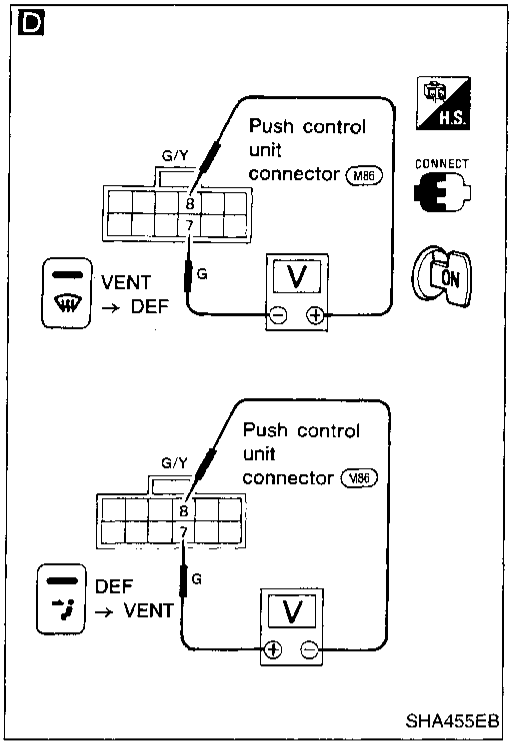
Terminal No. ⊕ Push control unit	Terminal No. ⊖ Mode door motor	Continuity
①	⑦	Yes
②	⑥	
③	⑤	
④	④	
⑤	③	
⑥	②	
⑦	⑧	
⑧	⑨	

If OK, check harness for short.

OK → Ⓐ (Go to next page.)

Note:
If the result is NG or No after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 2 (Cont'd)



Ⓐ

Reconnect push control unit and mode door motor harness connectors.

D

CHECK FOR OUTPUT OF PUSH CONTROL UNIT.
Change the mode from VENT to DEF, and from DEF to VENT. Do approx. 12 volts exist between push control unit harness terminals ⑦ and ⑧ in both cases?

No → Replace push control unit.

Terminal No.		Mode door operation	Voltage
⑦	⑧		
Each side		Stop	0V
⊖	⊕	VENT → DEF	12V
⊕	⊖	DEF → VENT	

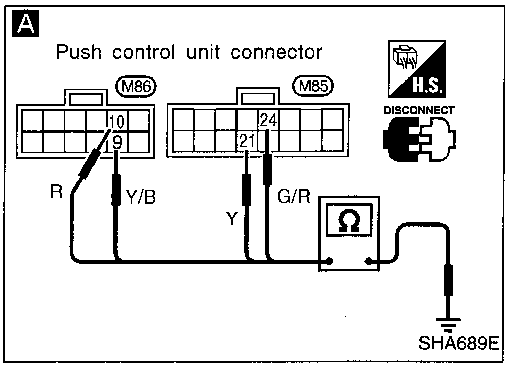
Yes

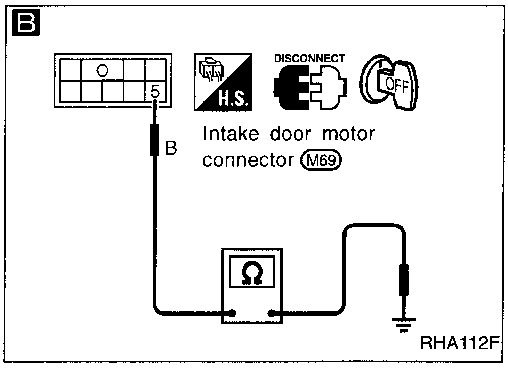
Replace mode door motor.

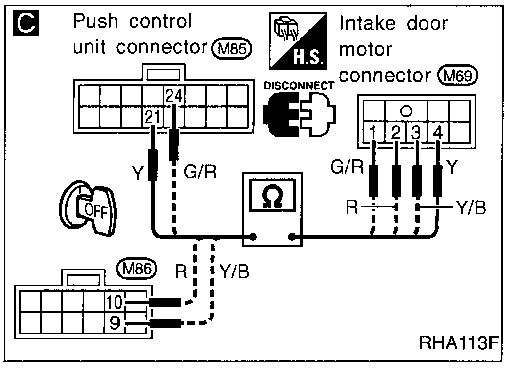
Diagnostic Procedure 3

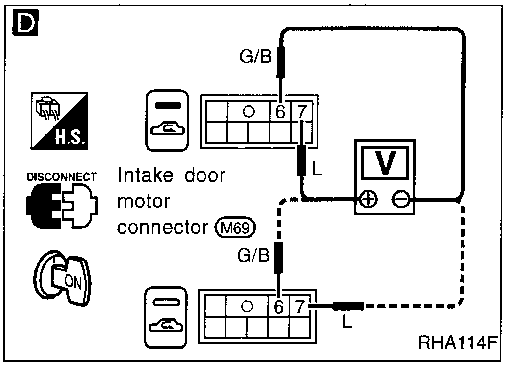
SYMPTOM: Intake door does not change in VENT, B/L or FOOT mode.

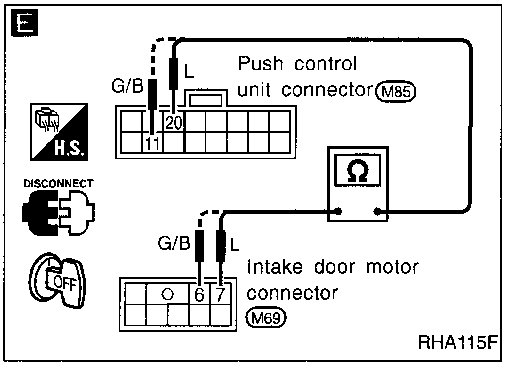
- **Perform PRELIMINARY CHECK 1, Main Power Supply and Ground Circuit Check before referring to the following flow chart below.**











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 unit connector.
3. Check if continuity exists between terminal (21) of push control unit 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) or (9)	Body ground	Yes
OFF	(24) or (10)		

NG → Disconnect intake door motor harness connector.

OK → CHECK INTAKE DOOR LINK. Refer to HA-58.

B

Note

CHECK BODY GROUND CIRCUIT FOR INTAKE DOOR MOTOR.
Does continuity exist between intake door motor harness terminal (5) and body ground?

Yes →

C

Note

Check circuit continuity between each terminal on push control unit and on intake door motor.

Terminal No. ⊕ Push control unit	Terminal No. ⊖ Intake door motor	Continuity
(9)	(3)	Yes
(10)	(2)	
(21)	(4)	
(24)	(1)	

If OK, check harness for short.

OK → Reconnect push control unit and intake door motor harness connector.

D

CHECK FOR OUTPUT OF PUSH CONTROL UNIT.
Check voltage between intake door motor harness terminals (6) and (7), for conditions below.

REC switch	Terminal No. ⊕	Terminal No. ⊖	Voltage
ON	(7)	(6)	12V
OFF	(6)	(7)	

If OK, check harness for short.

NG ← E

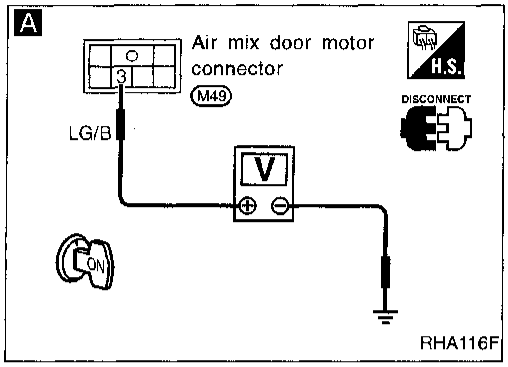
Note

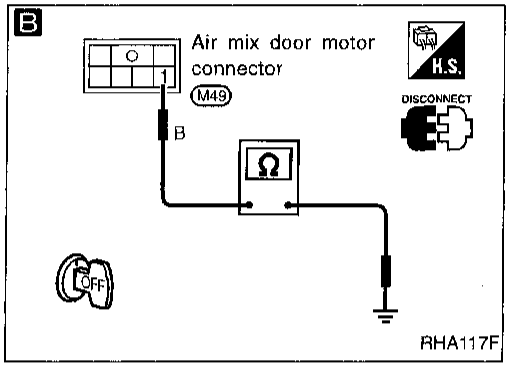
Check continuity between push control unit harness terminal (20) ((11)) and intake door motor harness terminal (7) ((6)).
Continuity should exist.
If OK, check harness for short.

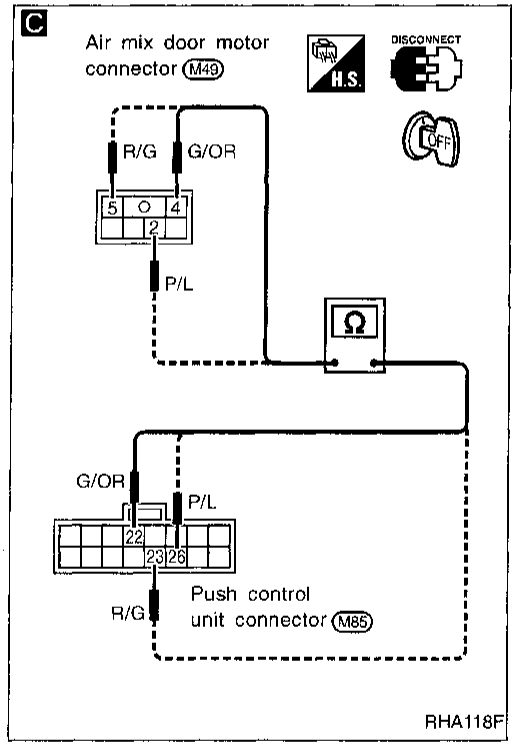
OK → Replace push control unit.

OK → Replace intake door motor.

Note:
If the result is NG or No after checking circuit continuity, repair harness or connector.







Diagnostic Procedure 4

SYMPTOM: Air mix door does not change.

Perform PRELIMINARY CHECK 2, 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 ③ and body ground?

No → Check power supply circuit and 7.5A fuse (No. 16, located in the fuse block). Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

Yes ↓

B

Note

Check circuit continuity between air mix door motor harness terminal No. ① and body ground.

OK ↓

Disconnect push control unit harness connector.

C

Note

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

Terminal No.		Continuity
Push control unit	Air mix door motor	
㉒	④	Yes
㉓	⑤	
㉖	②	

If OK, check harness for short.

OK ↓

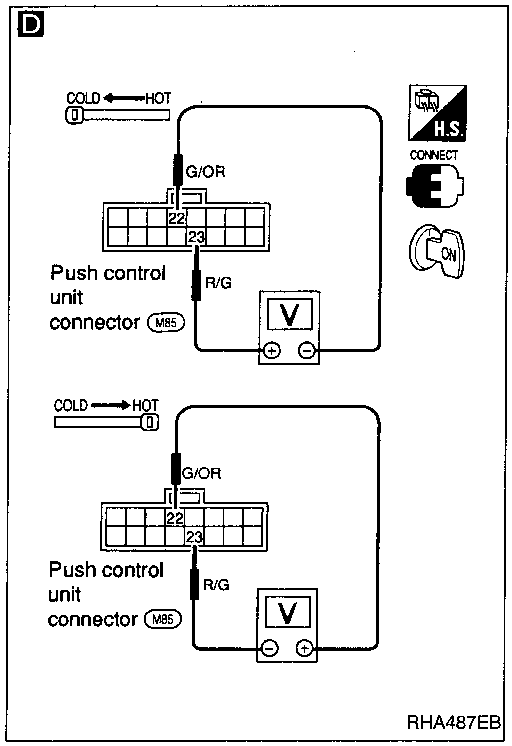
Reconnect push control unit and air mix door motor harness connector.

Ⓐ

(Go to next page.)

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

Diagnostic Procedure 4 (Cont'd)



Ⓐ

D

CHECK FOR PUSH CONTROL UNIT OUTPUT.
Slide the temperature control lever from Hot to Cold and Cold to Hot.
Do approx. 12 volts exist between push control unit harness terminals ㉒ and ㉓ in both cases?

Terminal No.		Temp. control lever operation	Voltage
㉒	㉓		
⊖	⊕	HOT → COLD	Approx. 12V
⊕	⊖	COLD → HOT	
Each side		STOP	Approx. 0V

No → Replace push control unit.

Yes

CHECK FOR PBR RESISTANCE IN AIR MIX DOOR MOTOR.
(Refer to HA-58.)

Yes → Replace air mix door motor.

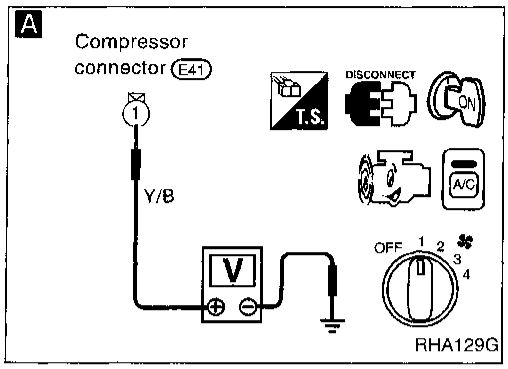
No

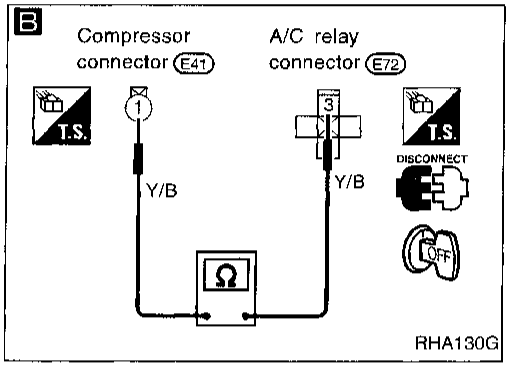
CHECK AIR MIX DOOR.
(Refer to HA-58.)

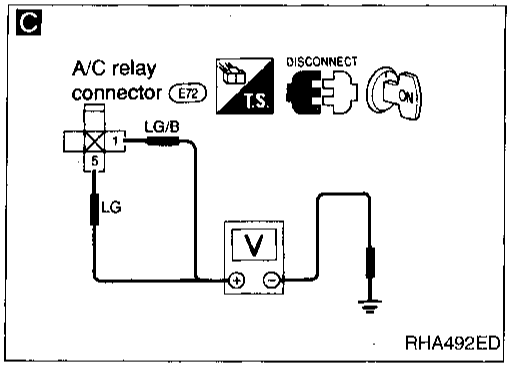
Diagnostic Procedure 5

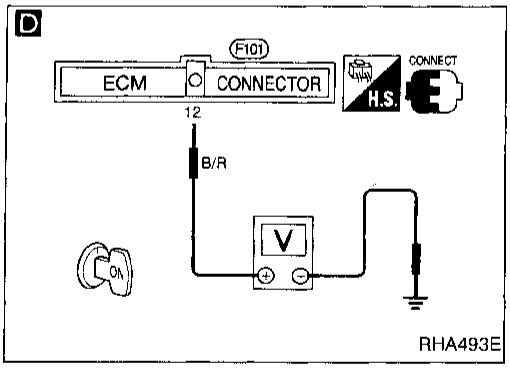
SYMPTOM: Magnet clutch does not engage when A/C switch and fan switch are ON.

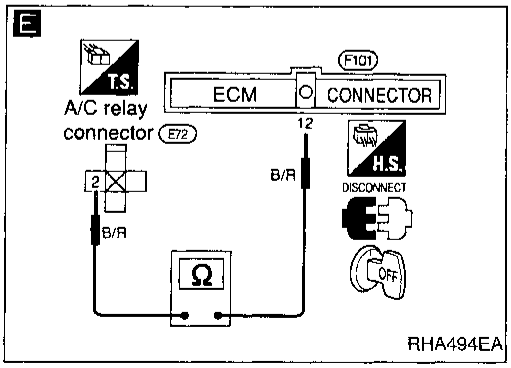
- **Perform PRELIMINARY CHECK 2 before referring to the following chart.**











A

CHECK POWER SUPPLY FOR COMPRESSOR.
Disconnect compressor harness connector.
Do approx. 12 volts exist between compressor harness terminal ① and body ground?

No → Disconnect A/C relay harness connector.

Yes → Check magnet clutch coil continuity.

NG → Replace magnet clutch assembly. Refer to HA-133.

B

Note

Check circuit continuity between A/C relay harness terminal ③ and compressor harness terminal ①.
Continuity should exist.
If OK, check harness for short.

OK → C

C

CHECK POWER SUPPLY FOR A/C RELAY.
Do approx. 12 volts exist between A/C relay harness terminals ①, ⑤ and body ground?

Yes → CHECK A/C RELAY. (Refer to HA-57.)

OK → Reconnect A/C relay.

NG → Replace A/C relay.

No → Check power supply circuit and 7.5A fuses (No. 16 and 61, located in the fuse block).
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

D

CHECK COIL SIDE CIRCUIT OF A/C RELAY.
Do approx. 12 volts exist between ECM (ECCS control module) harness terminal ⑫ and body ground?
[For terminal arrangement, refer to last page (Foldout page).]

No → E

E

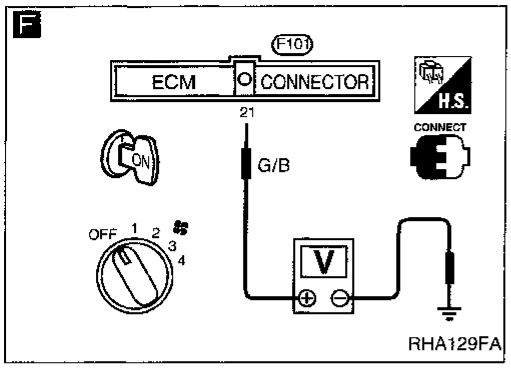
Note

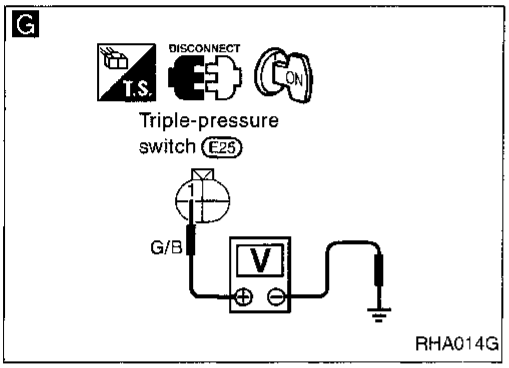
Check circuit continuity between A/C relay harness terminal ② and ECM (ECCS control module) harness terminal ⑫.
[For terminal arrangement, refer to last page (Foldout page).]
Continuity should exist.
If OK, check harness for short.

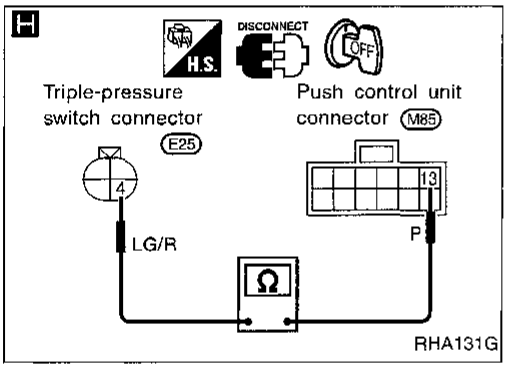
Yes → Ⓐ (Go to next page.)

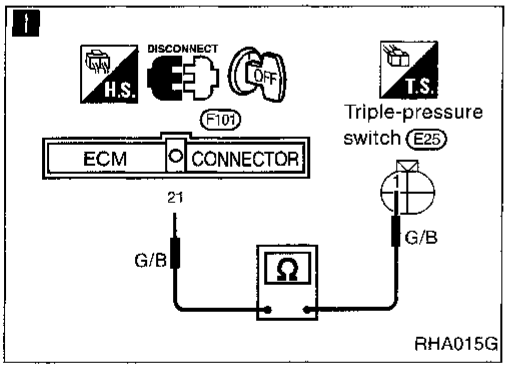
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 5 (Cont'd)









Ⓐ

F CHECK COIL SIDE CIRCUIT OF A/C RELAY CONTROLLED BY ECM (ECCS control module).
Do approx. 8 to 9 volts exist between ECM (ECCS control module) harness terminal No. ㉑ and body ground?
[For terminal arrangement, refer to last page (Foldout page).]

Yes → **G** CHECK TRIPLE-PRESSURE SWITCH CIRCUIT BETWEEN TRIPLE-PRESSURE SWITCH AND ECM (ECCS control module).
Disconnect triple-pressure switch harness connector.
Do approx. 8 to 9 volts exist between triple-pressure switch harness terminal ① and body ground?

Yes → Disconnect ECM (ECCS control module) harness connector.

No → CHECK ECM (ECCS control module).
Refer to EC section ("ECM Terminals and Reference Value", "TROUBLE DIAGNOSES — General Description").

No → CHECK TRIPLE-PRESSURE SWITCH.
(Refer to HA-57.)

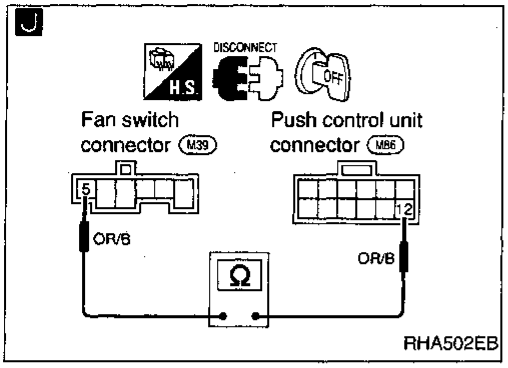
NG → **I** Note
Check circuit continuity between ECM (ECCS control module) harness terminal ㉑ and triple-pressure switch harness terminal ①. [For terminal arrangement, refer to last page (Foldout page).]
Continuity should exist.
If OK, check harness for short.

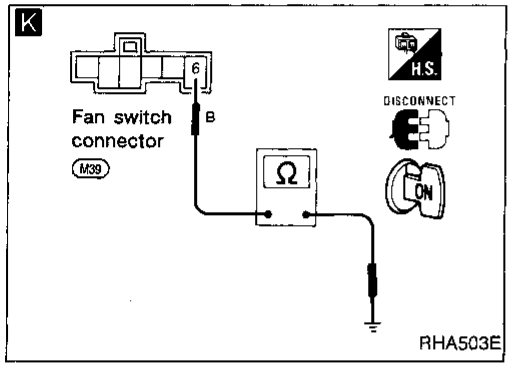
OK → **H** Note
Check circuit continuity between triple-pressure switch harness terminal ④ and push control unit harness terminal ⑬.
Continuity should exist.
If OK, check harness for short.

OK → Ⓑ
(Go to next page.)

Replace triple-pressure switch.

Diagnostic Procedure 5 (Cont'd)





Ⓑ

Disconnect push control unit harness connector.

OK

CHECK A/C SWITCH. (Refer to HA-56.) — NG → Replace push control unit.

OK

Disconnect fan switch harness connector.

OK

J Note

Check circuit continuity between push control unit harness terminal ⑫ and fan switch harness terminal ⑤.
Continuity should exist.
If OK, check harness for short.

OK

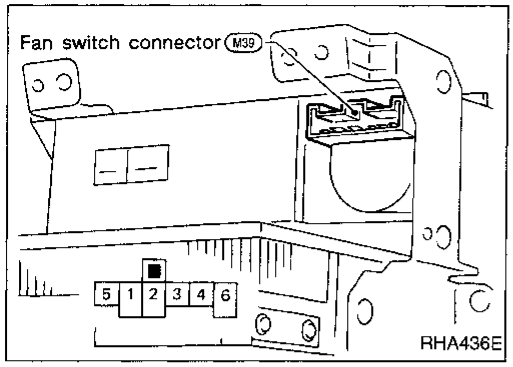
K Note

CHECK BODY GROUND CIRCUIT FOR FAN SWITCH.
Does continuity exist between fan switch harness terminal ⑥ and body ground?

Yes

CHECK FAN SWITCH. (Refer to HA-56.) — NG → Replace fan switch.

Note:
If the result is NG or No after checking circuit continuity, repair harness or connector.

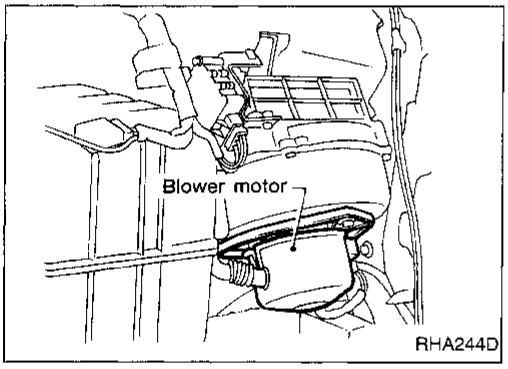


Electrical Components Inspection

FAN SWITCH

Check continuity between terminals at each position.

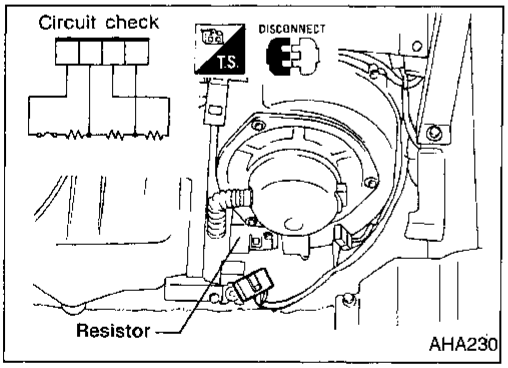
POSITION	TERMINAL					
	1	2	3	4	5	6
OFF						
1				○	○	○
2			○		○	○
3		○			○	○
4	○				○	○



BLOWER MOTOR

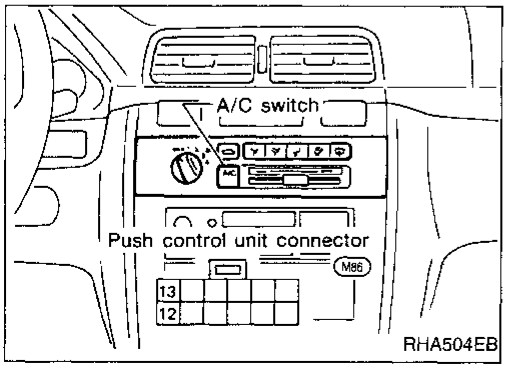
Check blower motor for smooth rotation.

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



BLOWER RESISTOR

Check continuity between terminals.



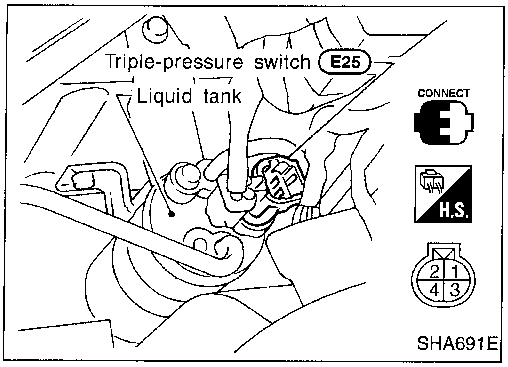
A/C SWITCH (Push control unit)

Check continuity between terminals.

A/C switch	Terminals	Continuity
ON	⑫ - ⑬	Exists.
OFF		Does not exist.

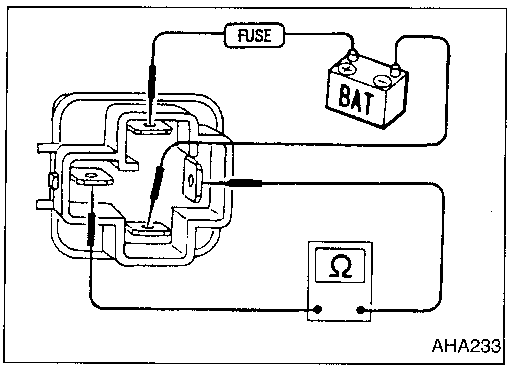
Electrical Components Inspection (Cont'd)

TRIPLE-PRESSURE SWITCH



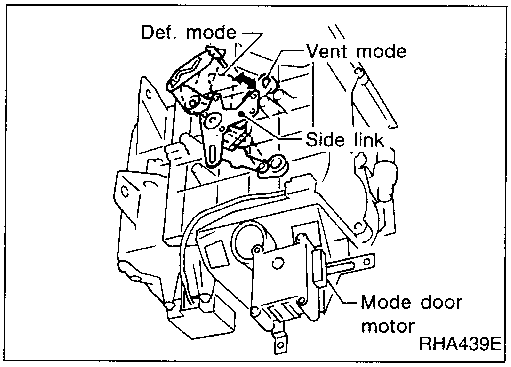
	Terminals	High-pressure side line pressure kPa (kg/cm^2, psi)	Operation	Continuity
Low-pressure side	① - ④	Increasing to 157 - 226 (1.6 - 2.3, 23 - 33)	ON	Exists.
		Decreasing to 152.0 - 201.0 (1.55 - 2.05, 22.0 - 29.2)	OFF	Does not exist.
Medium-pressure side*	② - ③	Increasing to 1,422 - 1,618 (14.5 - 16.5, 206 - 235)	ON	Exists.
		Decreasing to 1,128 - 1,422 (11.5 - 14.5, 164 - 206)	OFF	Does not exist.
High-pressure side	① - ④	Decreasing to 1,667 - 2,059 (17 - 21, 242 - 299)	ON	Exists.
		Increasing to 2,452 - 2,844 (25 - 29, 356 - 412)	OFF	Does not exist.

* For cooling fan motor operation.



A/C RELAY

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

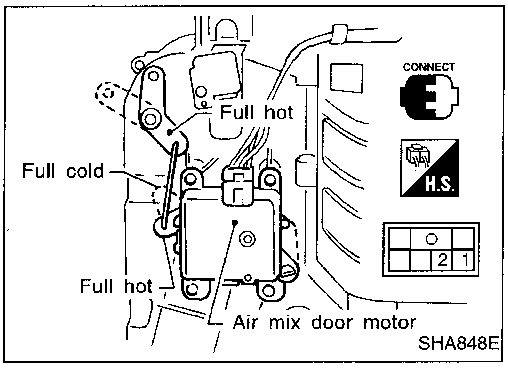


Control Linkage Adjustment

MODE DOOR

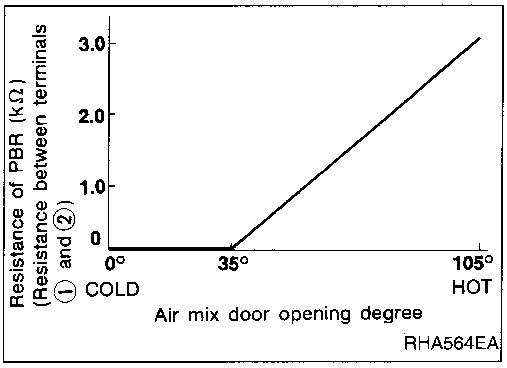
1. Install mode door motor on heater unit and connect it to main harness.
   Make sure lever of mode door motor is fitted into the slit of mode door link.
2. Turn ignition switch to ON.
3. Turn VENT switch ON.
4. Turn DEF switch ON. Check that side link operates at the fully-open position. Also turn DEF switch ON to check that side link operates at the fully-open position.

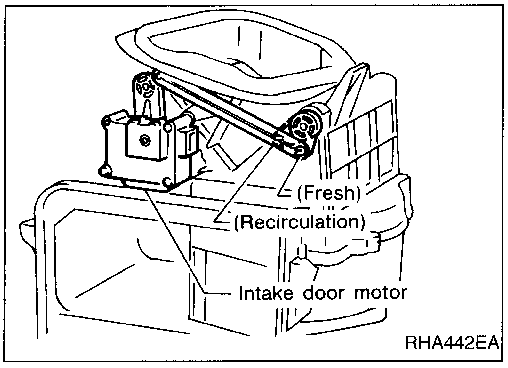
Control Linkage Adjustment (Cont'd)



AIR MIX DOOR

1. Install air mix door motor on heater unit and connect sub- harness.
   Make sure lever of air mix door is fitted into the slit of air mix door link.
2. Turn ignition switch to ON.
3. Slide temperature control lever to full cold.
4. Check that air mix door operates properly when temperature control lever is slid to full hot and full cold.
5. Check PBR characteristics, measure resistance between air mix door motor terminal between ① and ②.





INTAKE DOOR

1. Install intake door motor on intake unit and connect it to main harness.
   Make sure lever of intake door motor is fitted into the slit of intake door link.
2. Turn ignition switch to ON.
3. Turn REC switch ON.
4. Check that intake door operates properly when REC switch is turned ON and OFF.

Introduction

The Automatic Temperature Control (ATC) system provides automatic regulation of the vehicles interior temperature. The operator selects "set temperature", on which the regulation is based, 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 (BCM) 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 and 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 compressor.

Outlet door control

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

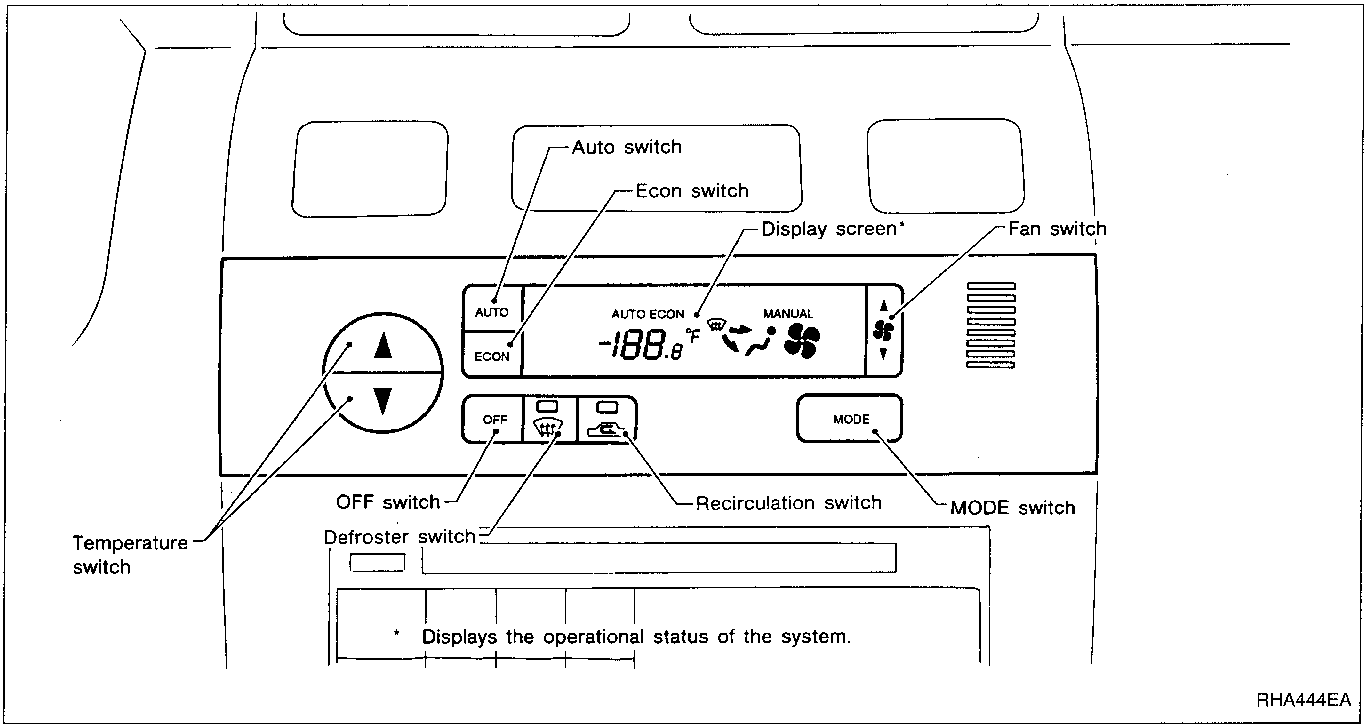
Magnet clutch control

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

Self-diagnostic system

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

Control Operation



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.

TEMPERATURE SWITCH (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. Then, 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. It tries to maintain the interior temperature based on the last set temperature of the system.

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

Control Operation (Cont'd)

RECIRCULATION (REC) SWITCH

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

DEFROSTER (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.

Contents

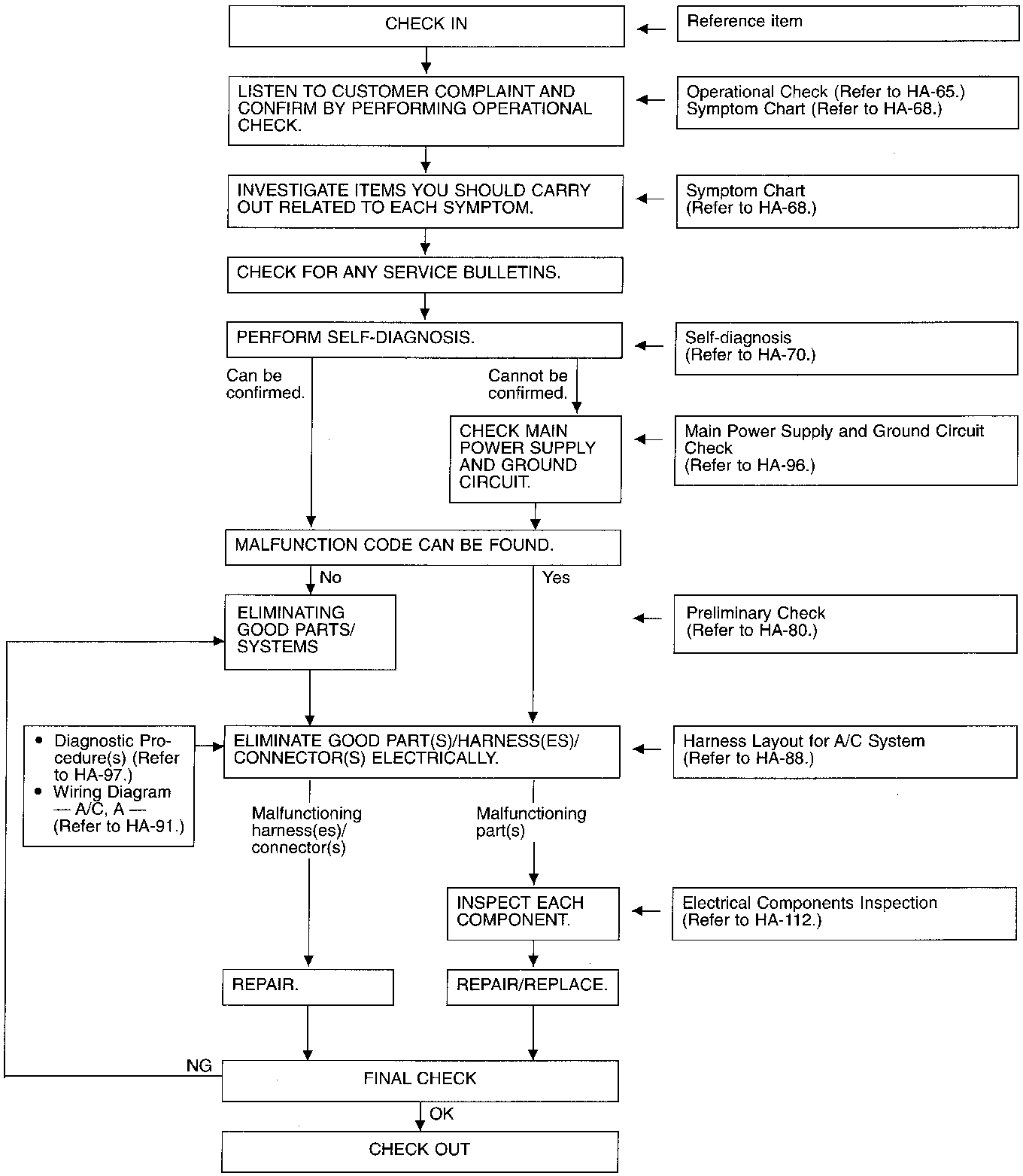
How to Perform Trouble Diagnoses for Quick and Accurate Repair ..... HA- 64
Operational Check ..... HA- 65
Symptom Chart ..... HA- 68
Self-diagnosis ..... HA- 70
CHECKING PROCEDURE ..... HA- 71
STEP 1: Checks LEDs and segments ..... HA- 74
STEP 2: Checks each sensor circuit for open or short circuit ..... HA- 74
STEP 3: Checks mode and intake door positions ..... HA- 75
STEP 4: Checks operation of each actuator ..... HA- 76
STEP 5: Checks temperature detected by sensors, and detects multiplex communication error ..... HA- 76
AUXILIARY MECHANISM: Temperature setting trimmer ..... HA- 79
Preliminary Check ..... HA- 80
PRELIMINARY CHECK 1 (Air outlet does not change.) ..... HA- 80
PRELIMINARY CHECK 2 (Intake door does not change.) ..... HA- 81
PRELIMINARY CHECK 3 (Insufficient cooling) ..... HA- 82
PRELIMINARY CHECK 4 (Insufficient heating) ..... HA- 83
PRELIMINARY CHECK 5 (Blower motor operation is malfunctioning.) ..... HA- 84
PRELIMINARY CHECK 6 (Magnet clutch does not engage.) ..... HA- 85
PRELIMINARY CHECK 7 (Discharged air temperature does not change.) ..... HA- 86
PRELIMINARY CHECK 8 (Noise) ..... HA- 87
Performance Test Diagnoses ..... HA- 31
INSUFFICIENT COOLING ..... HA- 31
Performance Chart ..... HA- 33
TEST CONDITION ..... HA- 33
TEST READING ..... HA- 33
Trouble Diagnoses for Abnormal Pressure ..... HA- 34
Harness Layout ..... HA- 88
Circuit Diagram ..... HA- 90
Wiring Diagram — A/C, A — ..... HA- 91
Main Power Supply and Ground Circuit Check ..... HA- 96
Diagnostic Procedure 1
SYMPTOM: Ambient sensor circuit is open or shorted.
(21 or −21 is indicated on display as a result of conducting Self-diagnosis STEP 2.) ..... HA- 97
Diagnostic Procedure 2
SYMPTOM: In-vehicle sensor circuit is open or shorted.
(22 or −22 is indicated on display as a result of conducting Self-diagnosis STEP 2.) ..... HA- 98
Diagnostic Procedure 3
SYMPTOM: Thermal transmitter circuit is open or shorted.
(23 or −23 is indicated on display as a result of conducting Self-diagnosis STEP 2.) ..... HA- 99
Diagnostic Procedure 4
SYMPTOM: Sunload sensor circuit is open or shorted.
(25 or −25 is indicated on display as a result of conducting Self-diagnosis STEP 2.) HA-100

Contents (Cont'd)

Diagnostic Procedure 5
SYMPTOM: PBR circuit is open or shorted.
(25 or –25 is indicated on display as a result of conducting Self-diagnosis STEP 2.) HA-101
Diagnostic Procedure 6
SYMPTOM: Mode door motor does not operate normally. HA-102
Diagnostic Procedure 7
SYMPTOM: Intake door motor does not operate normally. HA-104
Diagnostic Procedure 8
SYMPTOM: Air mix door motor does not operate normally. HA-106
Diagnostic Procedure 9
SYMPTOM: Blower motor operation is malfunctioning under out of Starting Fan Speed Control. HA-107
Diagnostic Procedure 10
SYMPTOM: Magnet clutch does not engage after performing Preliminary Check 6. ..... HA-109
Diagnostic Procedure 11
SYMPTOM: • Self-diagnosis cannot be performed.
• Multiplex communication error (52 with fan symbol detected as a result of conducting self-diagnosis STEP 5.) HA-111
Electrical Component Inspection HA-112
Control Linkage Adjustment HA-113

How to Perform Trouble Diagnoses for Quick and Accurate Repair

WORK FLOW

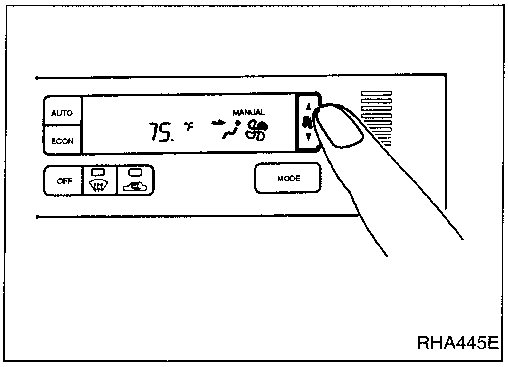


Operational Check

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.**

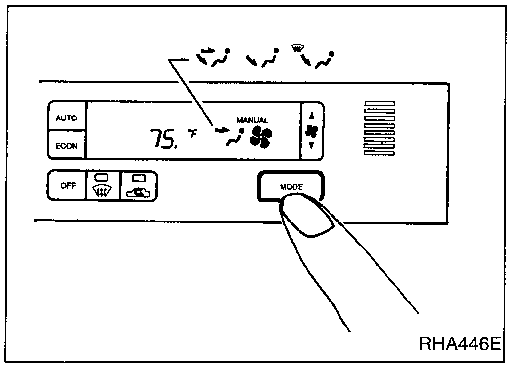


RHA445E

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 .



RHA446E

2. Check discharge air

1) Press mode switch four times and DEF button.

Discharge air flow

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

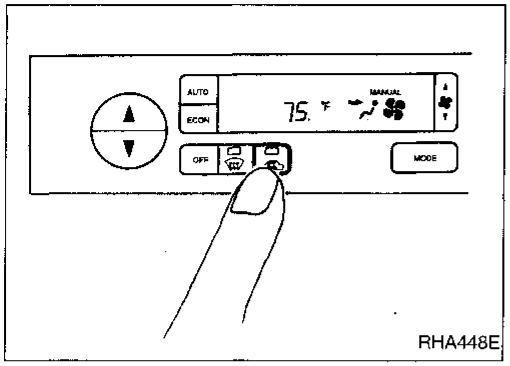
RHA429E

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

Refer to "Discharge Air Flow", "DESCRIPTION" (HA-17).

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.

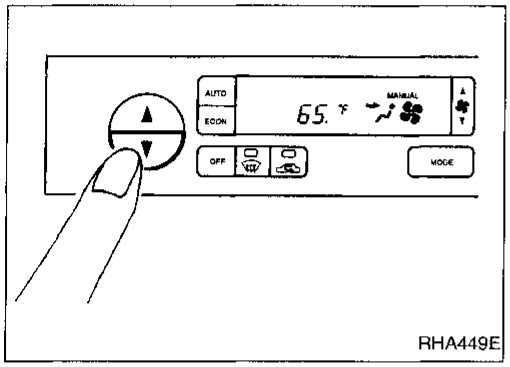
Operational Check (Cont'd)



RHA448E

3. Check recirculation

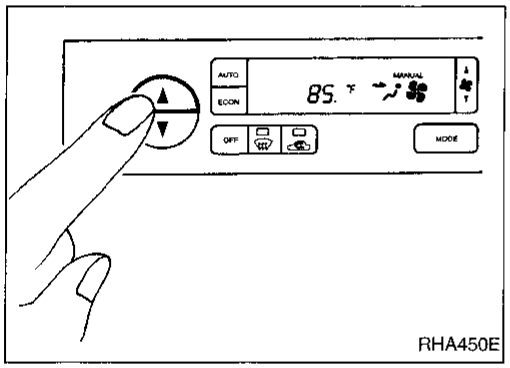
1) Press REC switch.
   Recirculation indicator should illuminate.
2) Listen for intake door position change (you should hear blower sound change slightly).



RHA449E

4. Check temperature decrease

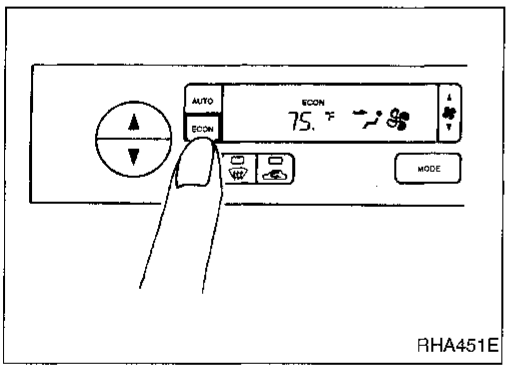
1) Press the temperature decrease button until 18°C (65°F) is displayed.
2) Check for cold air at discharge air outlets.



RHA450E

5. Check temperature increase

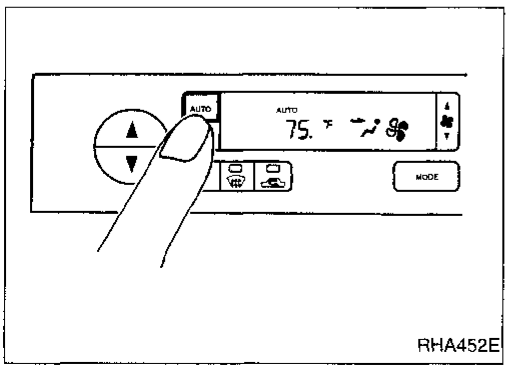
1) Press the temperature increase button until 32°C (85°F) is displayed.
2) Check for hot air at discharge air outlets.



RHA451E

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.)
3) Check for intake air at Fresh position.

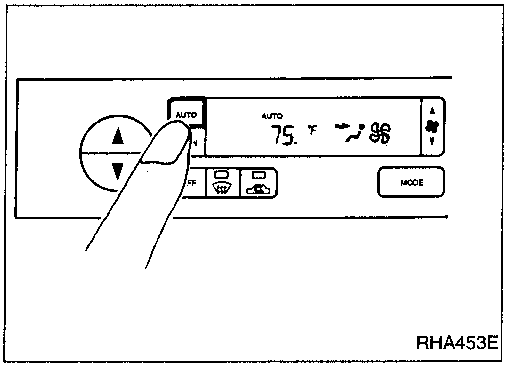


RHA452E

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 and suction air will depend on ambient, in-vehicle, and set temperatures.)

Operational Check (Cont'd)



RHA453E

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				
SYMPTOM / DIAGNOSTIC ITEM AND REFERENCE PAGE	STEP 1 (HA-71, 74)	STEP 2 (HA-71, 74)	STEP 3 (HA-72, 75)	STEP 4 (HA-72, 76)	STEP 5 (HA-73, 76)	AUXILIARY MECHANISM (HA-79)	Preliminary Check 1 (HA-80)	Preliminary Check 2 (HA-81)	Preliminary Check 3 (HA-82)	Preliminary Check 4 (HA-83)	Preliminary Check 5 (HA-84)	Preliminary Check 6 (HA-85)	Preliminary Check 7 (HA-86)	Preliminary Check 8 (HA-87)	Diagnostic Procedure 1 (HA-97)	Diagnostic Procedure 2 (HA-98)	Diagnostic Procedure 3 (HA-99)	Diagnostic Procedure 4 (HA-100)	Diagnostic Procedure 5 (HA-101)
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 of 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			
23 Thermal transmitter circuit is open.	❶	❷															❸		
25 Sunload sensor circuit is open.	❶	❷																❸	
26 PBR circuit is open.	❶	❷																	❸
−21 Ambient sensor circuit is shorted.	❶	❷			❸										❹				
−22 In-vehicle sensor circuit is shorted.	❶	❷			❸											❹			
−23 Thermal transmitter circuit is shorted.	❶	❷															❸		
−25 Sunload sensor circuit is shorted.	❶	❷																❸	
−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	○										○	○		○	○
Blower motor operation is malfunctioning under out of 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.
○: As for checking order, refer to each flow chart. (It depends on malfunctioning portion.)

Symptom Chart (Cont'd)

Diagnostic Procedure						Main Power Supply and Ground Circuit Check					Electrical Components Inspection																		
Diagnostic Procedure 6 (HA-102)	Diagnostic Procedure 7 (HA-104)	Diagnostic Procedure 8 (HA-106)	Diagnostic Procedure 9 (HA-107)	Diagnostic Procedure 10 (HA-109)	Diagnostic Procedure 11 (HA-111)	Auto amp. (BCM) (HA-96)	Push control unit (HA-96)	7.5A Fuse #16 (HA-96)	15A Fuses #2 and #3 (HA-96)	7.5A Fuse #61 (HA-96)	Ambient sensor (HA-116)	In-vehicle sensor (HA-115)	Thermal transmitter (EL)	Sunload sensor (HA-116)	PBR (HA-119)	Air mix door motor (HA-118)	Mode door motor (HA-120)	Intake door motor (HA-122)	Blower motor (HA-112)	Fan control amp. (HA-123)	A/C relay (HA-112)	Triple-pressure switch (HA-112)	Magnet clutch (Compressor) (HA-133)	Push control unit (HA-115)	Auto amp. (BCM) (HA-117)	ECM (ECCS control module) (EC)	Cooling fan motor (EC)	Cooling fan relay (EC)	Harness
○						○	○	○	○	○	○	○		○	○		○							○	○				○
	○					○	○	○	○		○	○		○	○			○						○	○				○
○	○	○	○	○		○	○	○	○	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
						○	○	○	○		○	○		○	○	○	○	○	○					○	○				○
			○			○	○	○	○		○	○	○	○	○				○	○				○	○	○			○
				○		○	○	○	○	○	○										○	○	○	○	○	○				○
		○				○	○	○	○	○	○	○		○	○	○										○				
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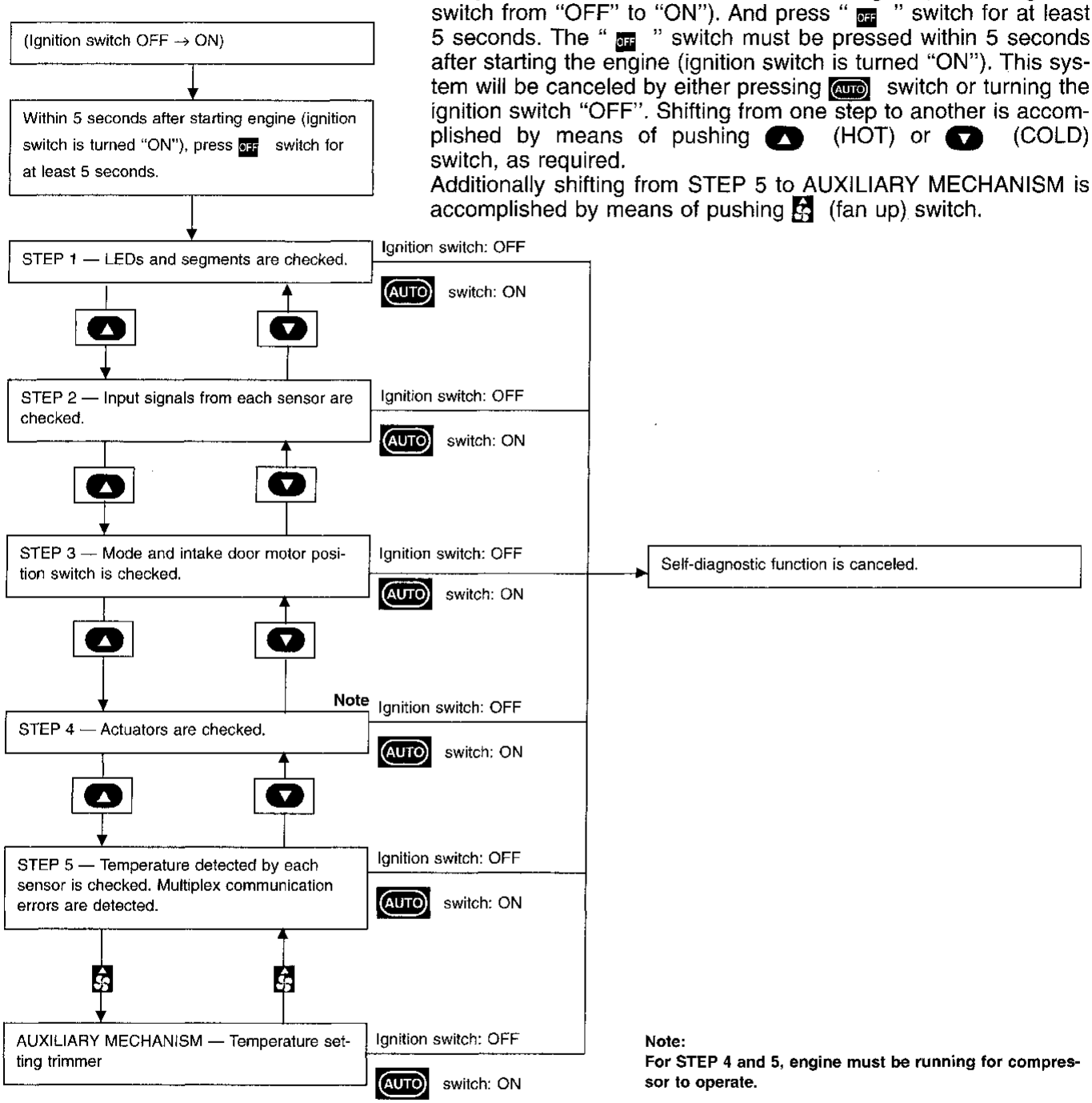
❺						○	○	○	○		○	○		○	○		○							○	○				○
	❹					○	○	○	○		○	○		○	○			○						○	○				○
		❹				○	○	○	○		○	○		○	○	○								○	○				○
			❹				○	○	○		○	○	○	○	○					○	○				○	○	○		○
				❹		○	○	○	○	○	○											○	○	○	○	○	○			○
					❶	❷	❸																			○	○			○

Self-diagnosis

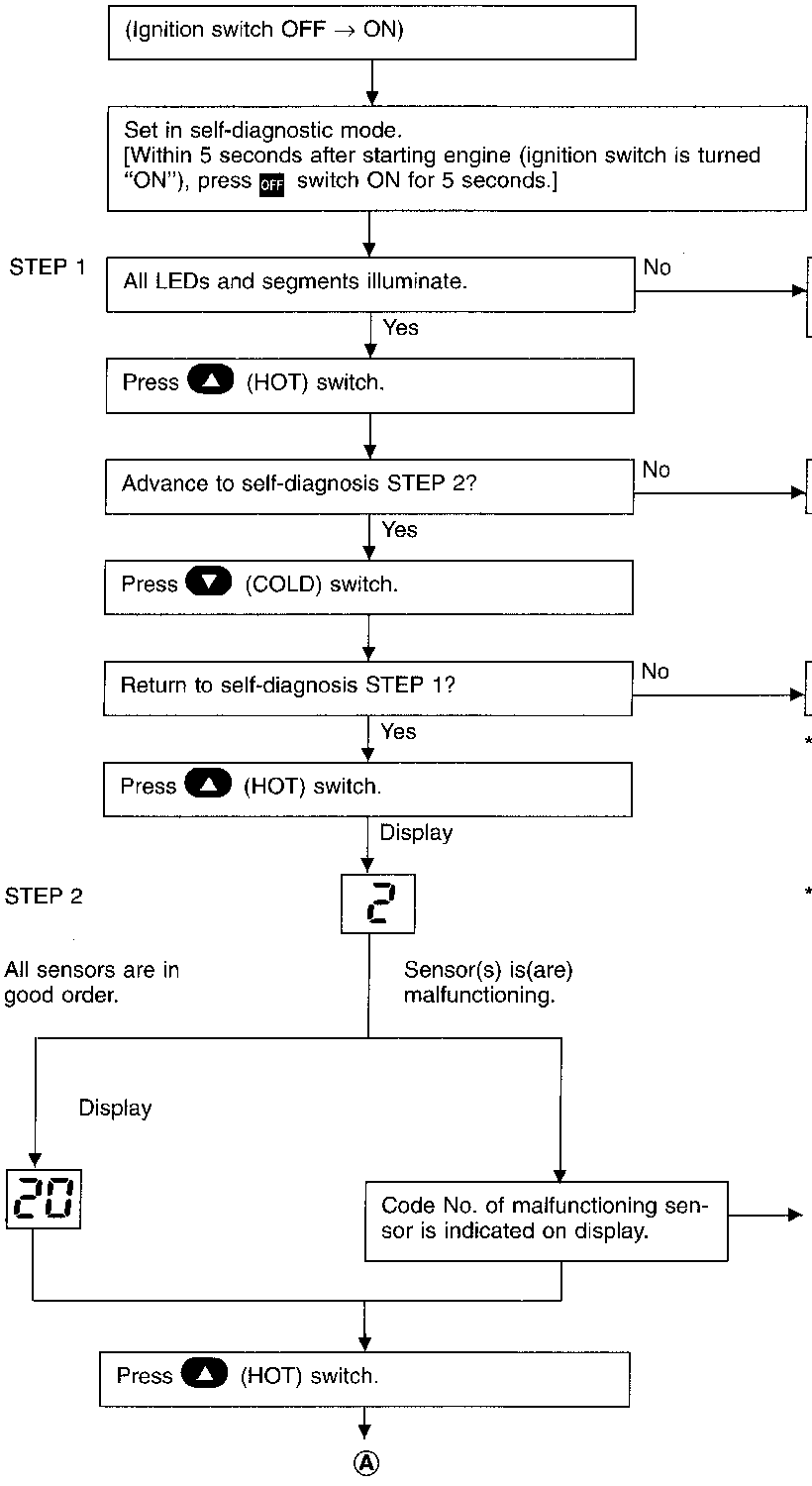
The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnostic system is done as follows. Start the engine (turn the ignition switch from "OFF" to "ON"). And press " OFF " 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.

Self-diagnosis (Cont'd)

CHECKING PROCEDURE



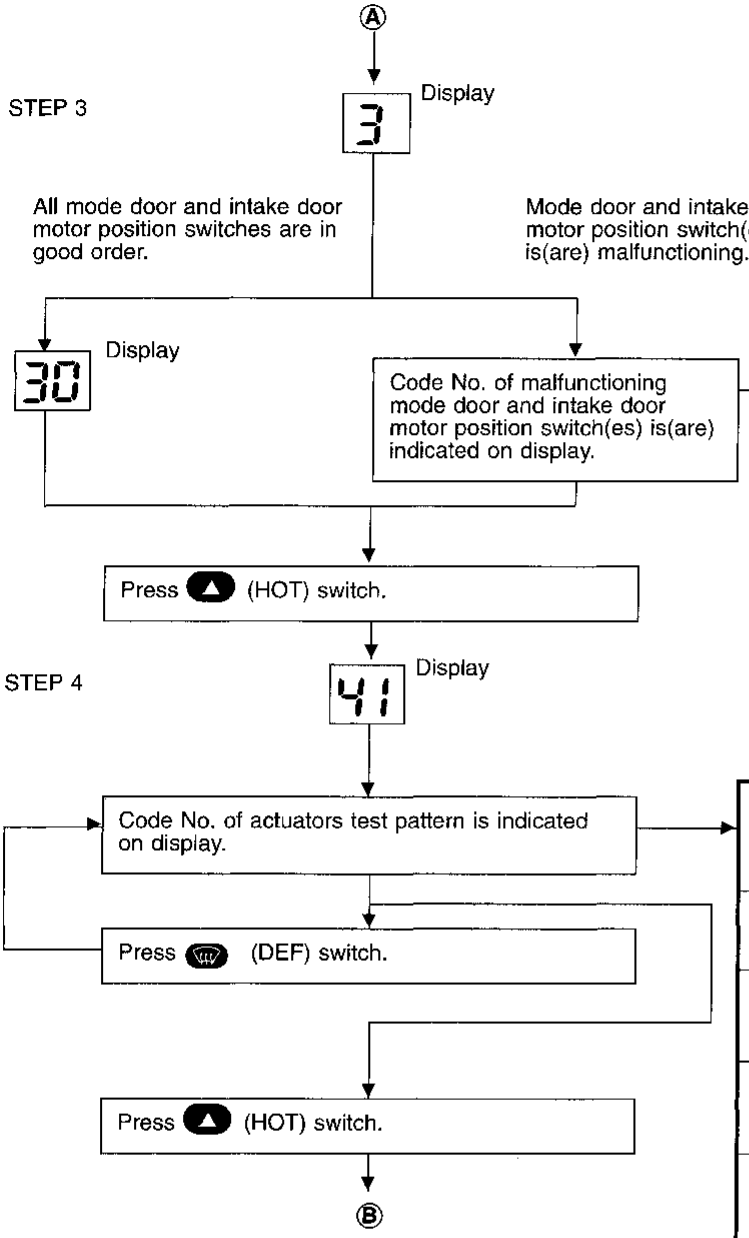
***1: Conduct self-diagnosis STEP 2 under sunshine.**
When conducting indoors, direct light (more than 60W) at sunload sensor or Code No. 25 will indicate despite the fact that sunload sensor is functioning properly.

***2: Conduct self-diagnosis STEP 2 after warming up engine.**
When engine coolant temperature is low, code 23 will sometimes appear even when thermal transmitter is functioning.

Code No.	Malfunctioning sensor (including circuits)
21	Ambient sensor
22	In-vehicle sensor
23	Thermal transmitter*2 (Thermistor)
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.

Self-diagnosis (Cont'd)

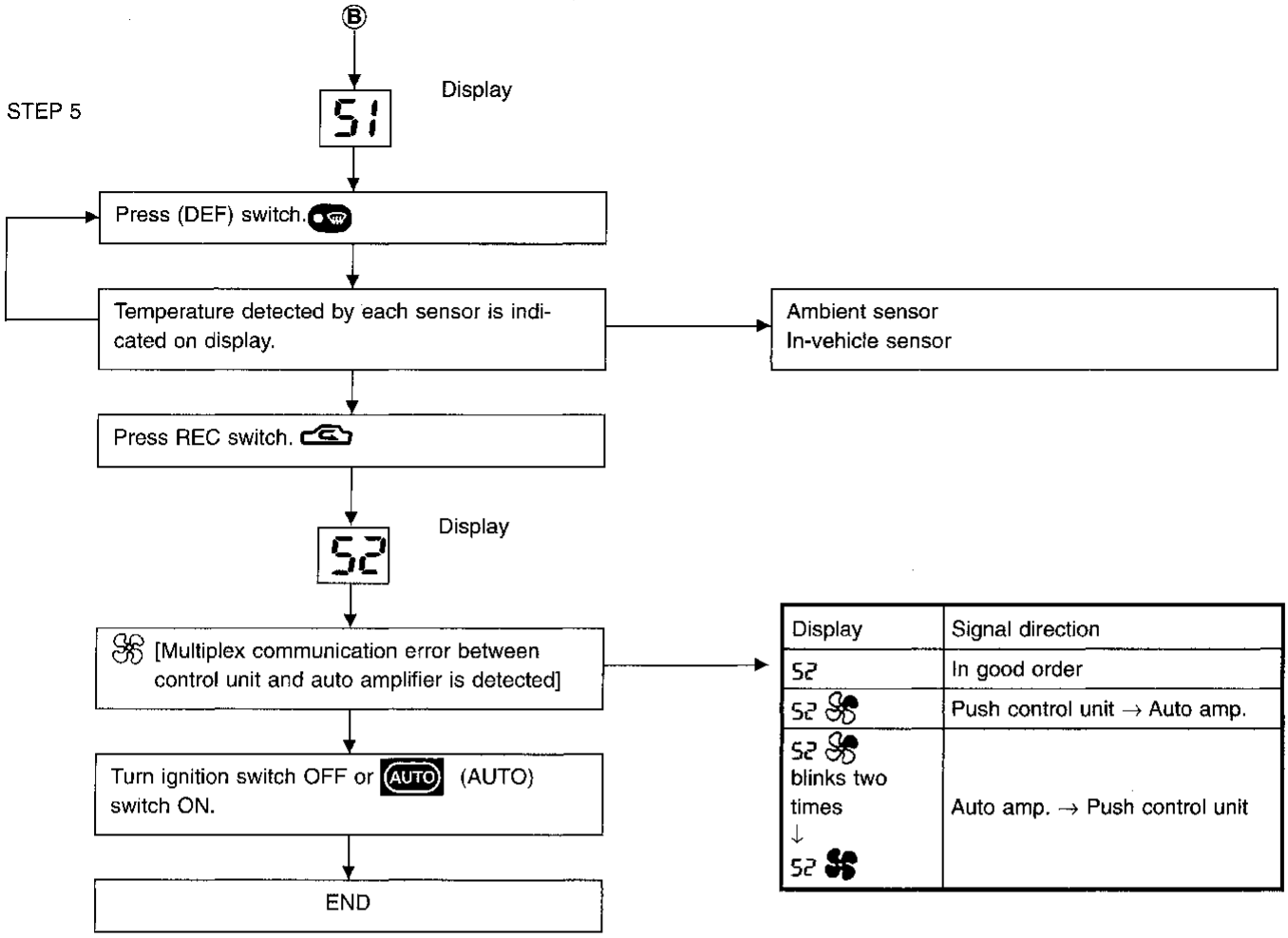


Code No.	Malfunctioning part or circuit	
	Position switch	
31	VENT	Mode door motor
32	B/L	
33	FOOT	
34	FOOT/DEF	
35	DEF	
36	FRE	Intake door motor
38	20% FRE	
39	REC	

Code No.	Actuators test pattern					
	Mode door	Intake door	Air mix door	Bi-level 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	OFF
44	FOOT	FRE	Full Hot	CLOSE	7 - 9V	OFF
45	F/D	FRE	Full Hot	CLOSE	7 - 9V	ON
46	DEF	FRE	Full Hot	CLOSE	10 - 12V	ON

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

Self-diagnosis (Cont'd)



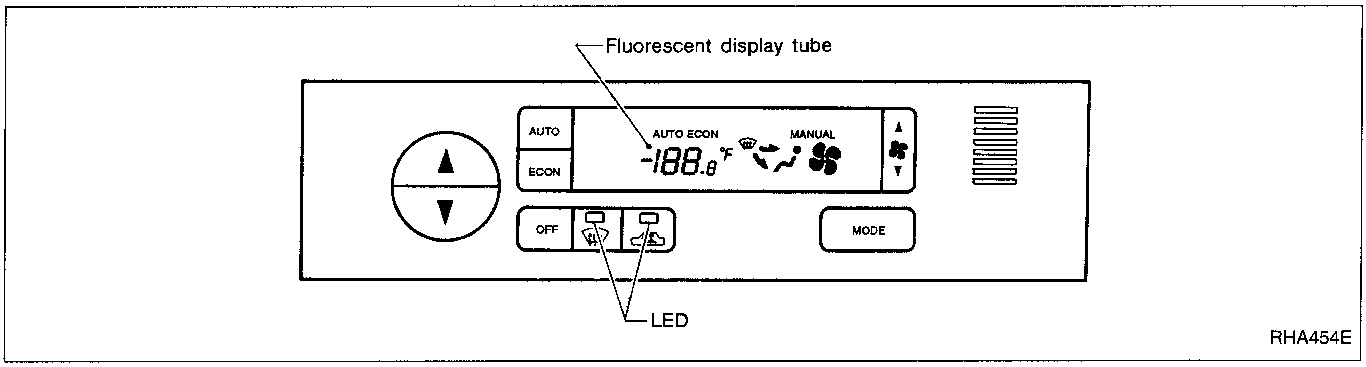
Display	Signal direction
52	In good order
52	Push control unit → Auto amp.
52 blinks two times ↓ 52	Auto amp. → Push control unit

Self-diagnosis (Cont'd)

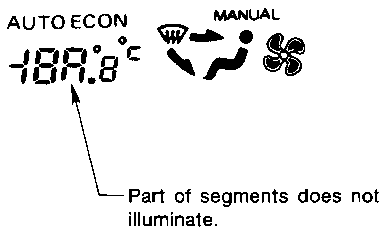
HOW TO INTERPRET THE RESULTS

STEP 1: Checks LEDs and segments

When switch's LED and segments are in functioning properly in STEP 1, LED and display will come on.

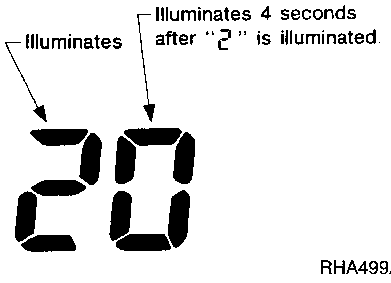


Display malfunction



If LEDs or segments malfunction, LED will not come on or display will show incomplete segment.

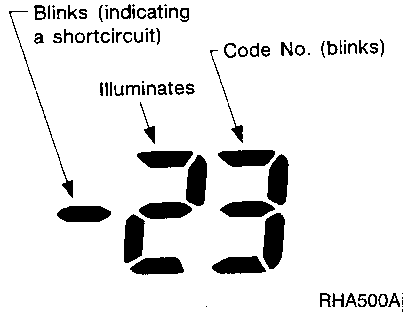
Display (when all sensors are in good order)



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

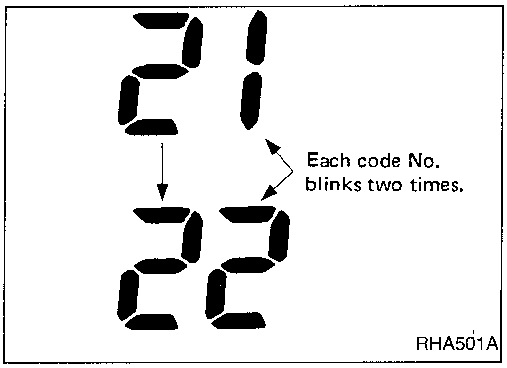
Display shows "2 " in STEP 2 mode.
When all sensors are in good order, display shows "20".
It takes approximately 4 seconds to check all sensors.

Display (when sensor malfunctions)



If a sensor is malfunctioning, the corresponding code No. blinks on display. A short circuit is identified by a blinking "– " mark preceding mode number.

Self-diagnosis (Cont'd)



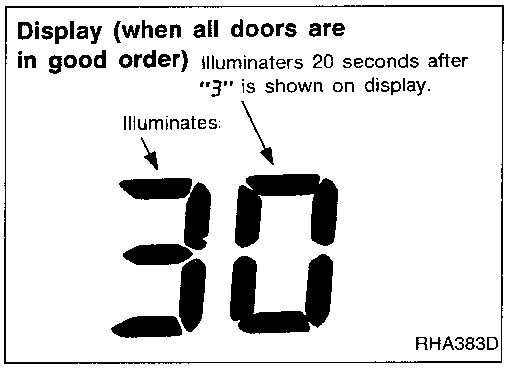
If two or more sensors malfunction, corresponding code Nos. respectively blink two times.

Sensors and abnormalities

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

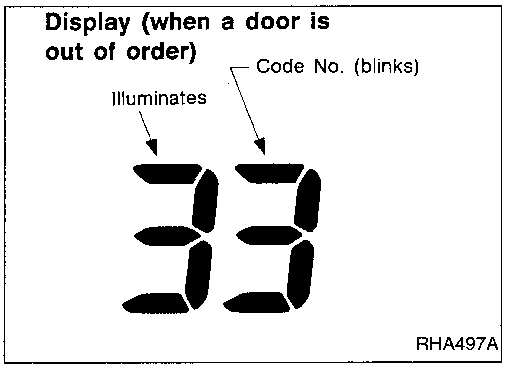
Code No.	Sensor	Open circuit	Short circuit
21	Ambient sensor	Less than −41.9°C (−43°F)	Greater than 100°C (212°F)
22	In-vehicle sensor	Less than −41.9°C (−43°F)	Greater than 100°C (212°F)
23	Thermal transmitter*3	Less than −25.6°C (−14°F)	Greater than 150°C (302°F)
25	Sunload sensor*2	Less than 0.01515 mA	Greater than 0.545 mA
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.
*3: **Conduct self-diagnosis STEP 2 after warming up engine.**



STEP 3: Checks mode and intake door positions

Display shows "3 " in STEP 3 mode.
When all doors are in good order, display will then show "30".
It takes approximately 20 seconds to check all mode and intake doors.

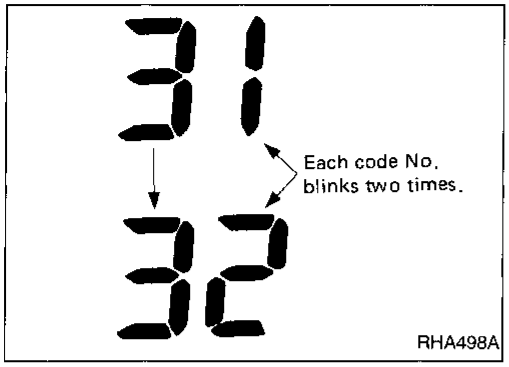


When abnormalities are detected, display shows a code No. corresponding with malfunctioning part.

Code No.	31	32	33	34	35	36	38	39
Malfunctioning part	VENT	B/L	FOOT	FOOT/ DEF	DEF	FRE	20% FRE	REC

GI MA EM LC EC FE CL MT AT FA RA BR ST RS BT HA EL IDX

Self-diagnosis (Cont'd)



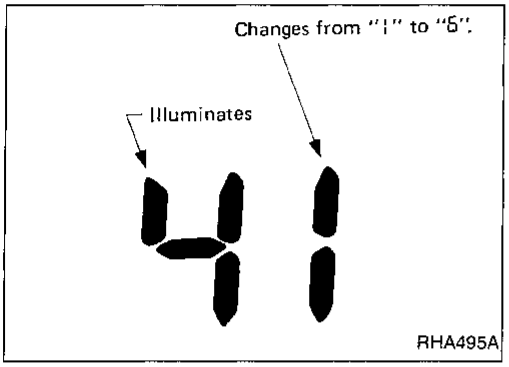
If two or more mode or intake doors are out of order, corresponding code numbers respectively blink two times.
If mode door motor harness connector is disconnected, the following display pattern will appear.

31 → 32 → 33 → 34 → 35

If intake mode door harness connector is disconnected, the following display pattern will appear.

36 → 38 → 39

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



STEP 4: Checks operation of each actuator

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".

Discharge air flow

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

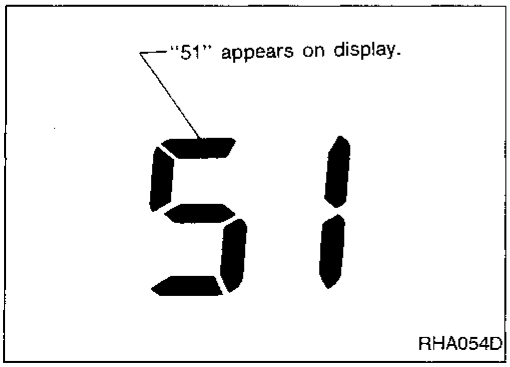
RHA429E

During inspection in STEP 4, the auto amp. will forcefully transmit an output to the affected actuators. The corresponding code Nos. are shown on display as indicated in the table below.

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

Code No. / Actuator	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
Blower motor	4 - 5 V	9 -11 V	7 - 9 V	7 - 9 V	7 - 9 V	10 - 12 V
Compressor	ON	ON	OFF	OFF	ON	ON

Operating condition of each actuator cannot be checked by indicators.



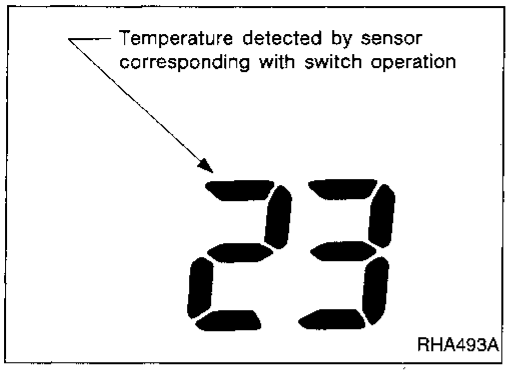
STEP 5: Checks temperature detected by sensors, and detects multiplex communication error

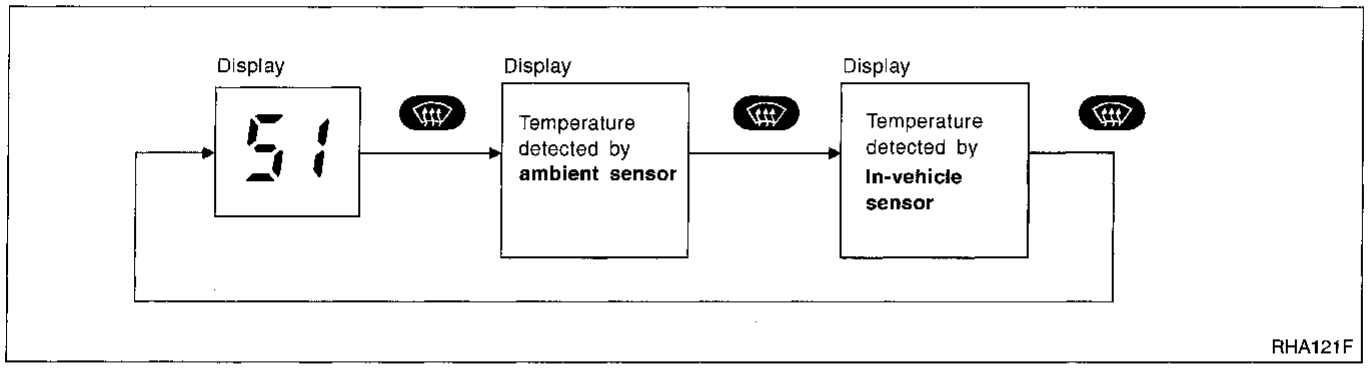
Checks temperature detected by sensors

Display shows "51" in STEP 5 mode.

- When FRONT DEF switch is pressed one time, display shows temperature detected by ambient sensor.
- When FRONT DEF switch is pressed second time, display shows temperature detected by in-vehicle sensor.
- When FRONT DEF switch is pressed third time, display returns to original presentation "51".

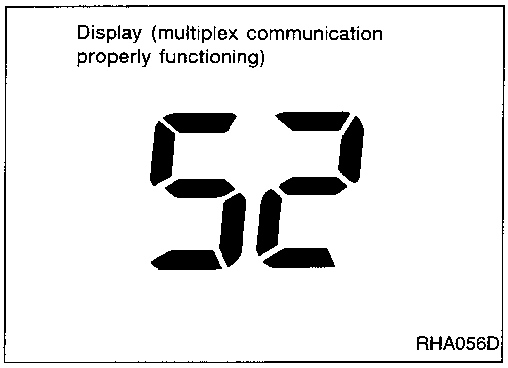
Self-diagnosis (Cont'd)





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 Component**. Refer to HA-115.

Self-diagnosis (Cont'd)



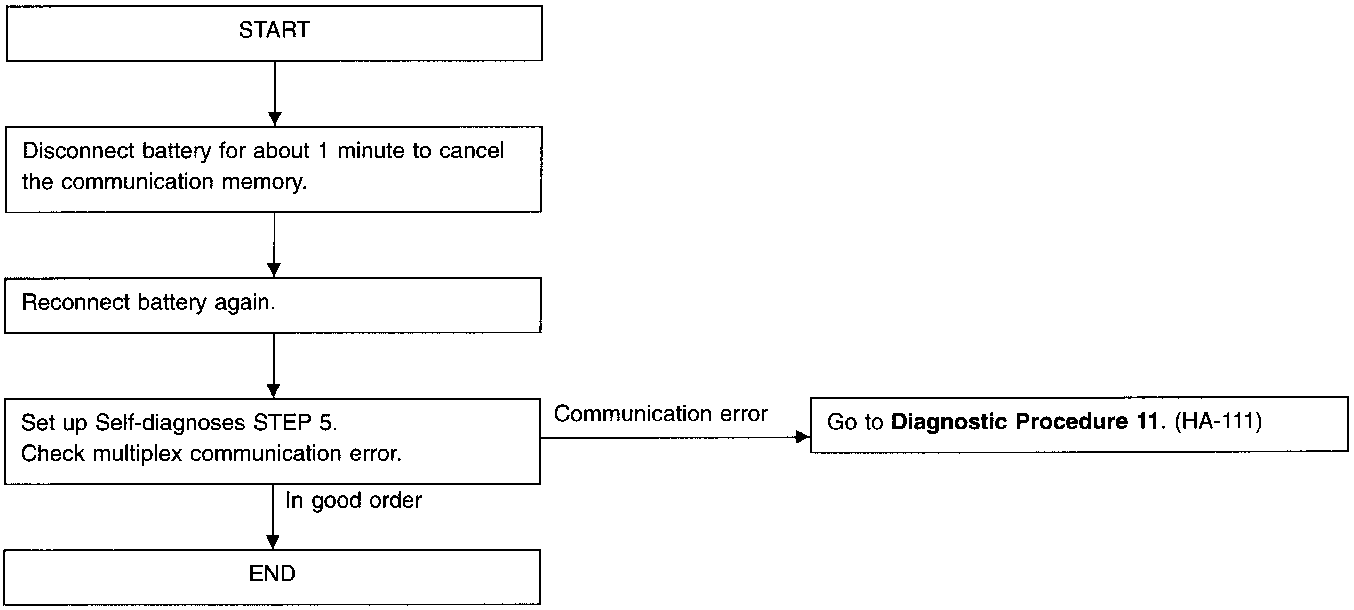
Detects multiplex communication error

Display shows "52" in STEP 5 mode.
[Multiplex communication error between push control unit and auto amplifier is detected]

Display	Signal direction
52	In good order
52	Push control unit → auto amp.
52 blinks two times. ↓ 52	Auto amp. → Push control unit

CAUTION:
The auto amp. memorizes any communication error in the system in a normal control with battery connected.
When there is an error, display will be as shown above.
When plural errors occur, the display of each error will blink two times for 0.5 second intervals.

If a communication error is displayed, follow the flow chart below. Determine if the error occurred in the past or is currently happening.



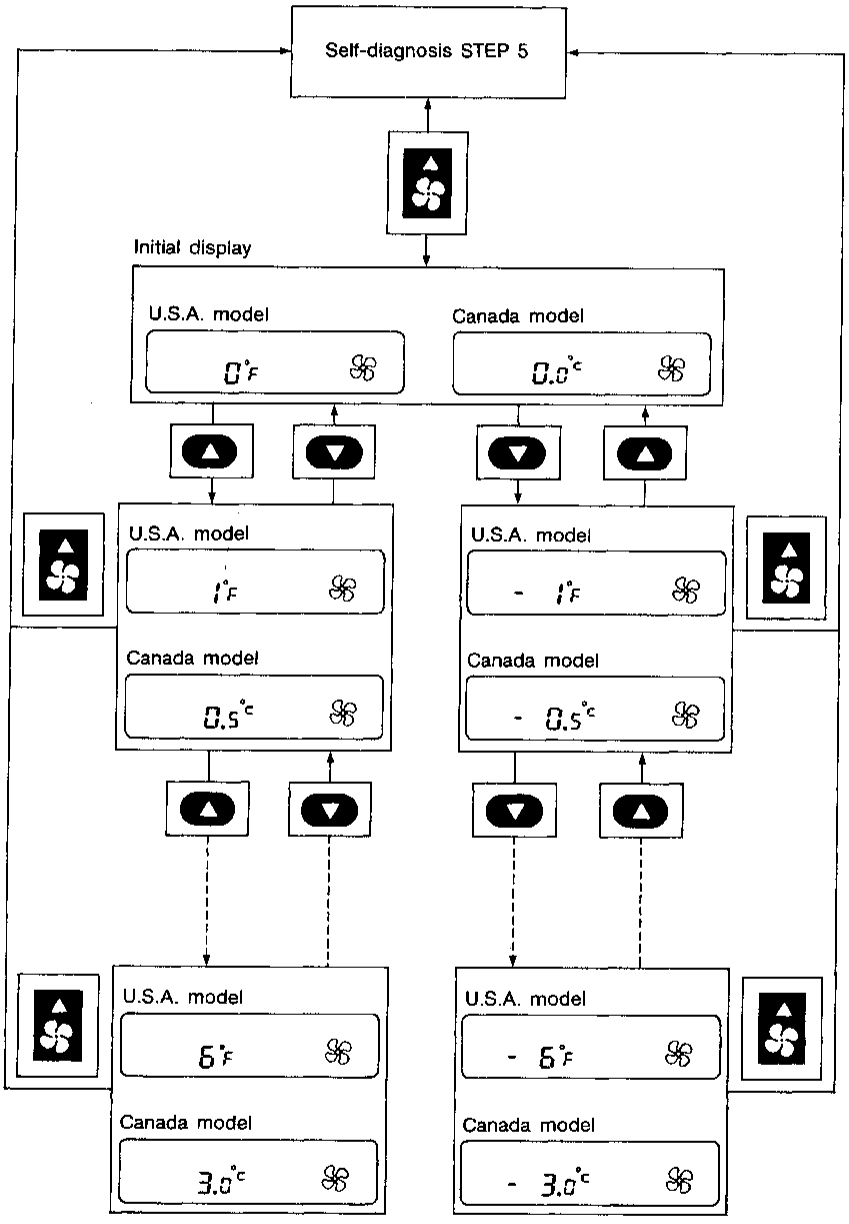
Self-diagnosis (Cont'd)

AUXILIARY MECHANISM: Temperature setting trimmer

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

Operating procedures for this trimmer are as follows:

Starting with STEP 5 under "Self-diagnostic mode", press (fan up) switch to set air conditioning system in auxiliary mode. Then, press either (HOT) or (COLD) switch as desired. Temperature will change at a rate of 0.5°C (1°F) each time a switch is pressed.



SHA197E

When battery cable is disconnected, trimmer operation is canceled 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. 3 seconds.

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

Code No.	How to repair	Reference page
21	Go to Diagnostic Procedure 1.	HA-97
22	Go to Diagnostic Procedure 2.	HA-98
23	Go to Diagnostic Procedure 3.	HA-99
25	Go to Diagnostic Procedure 4.	HA-100
26	Go to Diagnostic Procedure 5.	HA-101
-21	Go to Diagnostic Procedure 1.	HA-97
-22	Go to Diagnostic Procedure 2.	HA-98
-23	Go to Diagnostic Procedure 3.	HA-99
-25	Go to Diagnostic Procedure 4.	HA-100
-26	Go to Diagnostic Procedure 5.	HA-101

Are sensor circuits for ambient sensor and in-vehicle sensor operating normally? If malfunction is suspected, check temperature detected by each sensor using Self-diagnosis STEP 5. Confirm the temperature is within normal range before performing Diagnostic Procedures.

Yes ↓

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. 3 seconds.

No → Go to **Diagnostic Procedure 6.** (HA-102)

Yes ↓

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/D2	DEF

Refer to Air Flow. (HA-17)

No → CHECK SIDE LINK MECHANISM.
Refer to CONTROL LINKAGE ADJUSTMENT. (HA-113)

NG → Repair or adjust.

OK ↓

Go to **Diagnostic Procedure 6.** (HA-102)

Yes ↓

Air outlet control system is normal. Refer to **Mode door control specification.** (HA-120)

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. 3 seconds later.

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

Code No.	How to repair	Reference page
21	Go to Diagnostic Procedure 1.	HA-97
22	Go to Diagnostic Procedure 2.	HA-98
23	Go to Diagnostic Procedure 3.	HA-99
25	Go to Diagnostic Procedure 4.	HA-100
26	Go to Diagnostic Procedure 5.	HA-101
-21	Go to Diagnostic Procedure 1.	HA-97
-22	Go to Diagnostic Procedure 2.	HA-98
-23	Go to Diagnostic Procedure 3.	HA-99
-25	Go to Diagnostic Procedure 4.	HA-100
-26	Go to Diagnostic Procedure 5.	HA-101

Are sensor circuits for ambient sensor and in-vehicle sensor operating normally? If malfunction is suspected, check temperature detected by each sensor using Self-diagnosis STEP 5. Confirm the temperature is within normal range before performing Diagnostic Procedures.

Yes ↓

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% FRE	FRE	FRE	FRE

No → CHECK INTAKE DOOR ROD or LEVER MECHANISM.
Refer to CONTROL LINKAGE ADJUSTMENT. (HA-113)

NG → Repair or adjust.

OK ↓

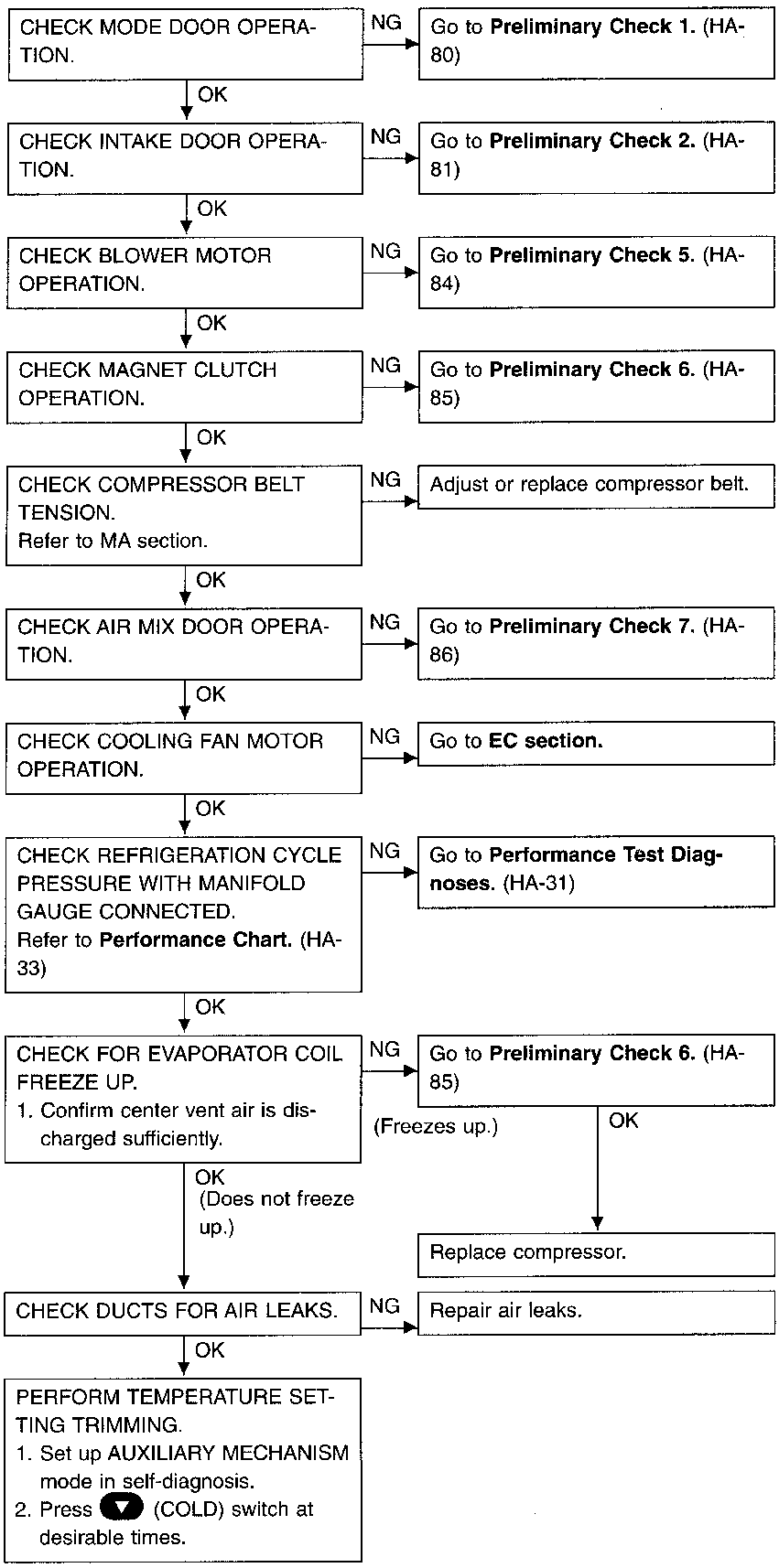
Go to **Diagnostic Procedure 7.** (HA-104)

Yes ↓

Intake door control system is normal.
Refer to **Intake door control specification.** (HA-121)

Preliminary Check (Cont'd)

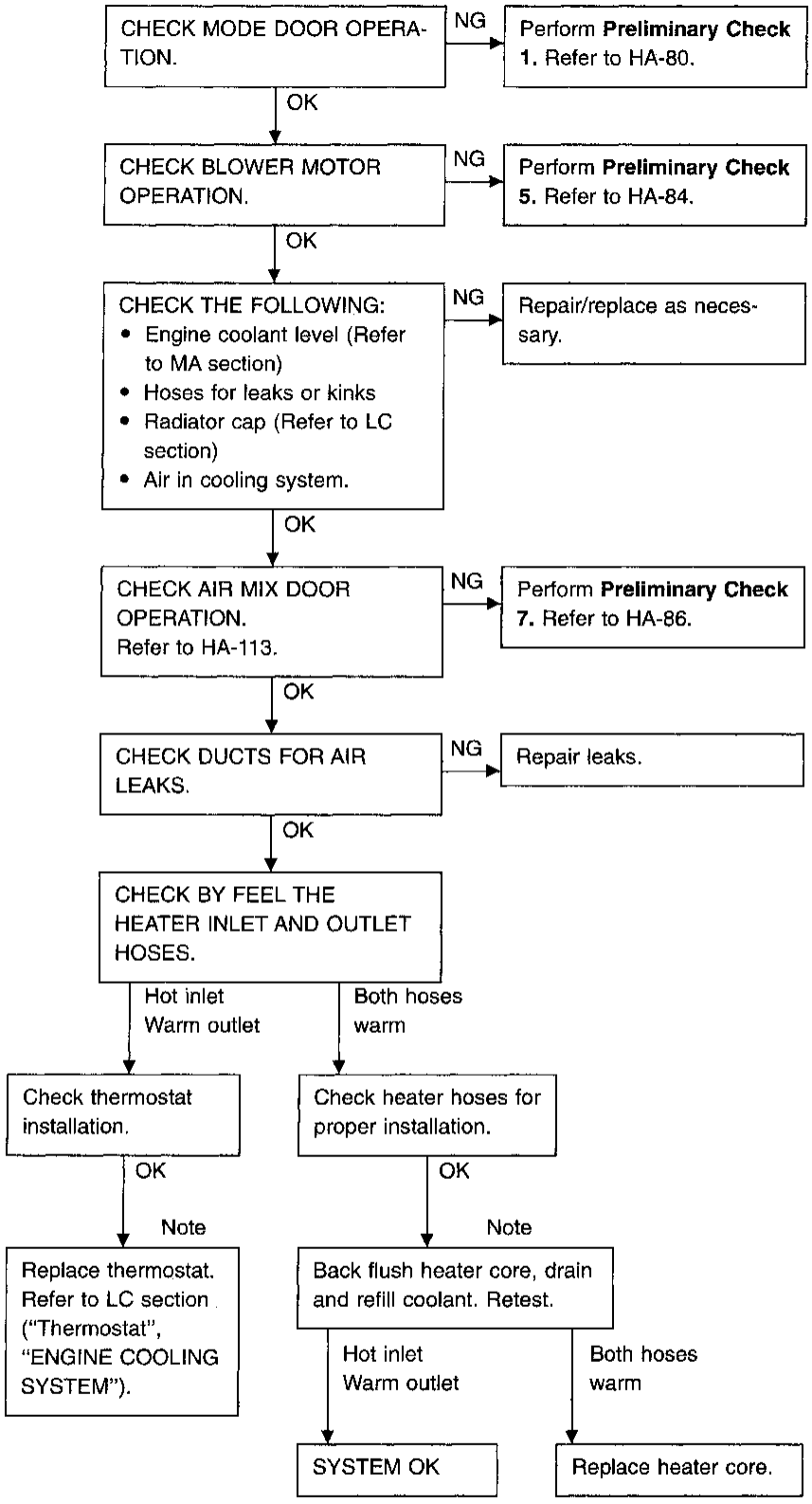
PRELIMINARY CHECK 3
Insufficient cooling



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". (HA-79)

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. 3 seconds.

No →

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

Code No.	How to repair	Reference page
21	Go to Diagnostic Procedure 1.	HA-97
22	Go to Diagnostic Procedure 2.	HA-98
23	Go to Diagnostic Procedure 3.	HA-99
25	Go to Diagnostic Procedure 4.	HA-100
26	Go to Diagnostic Procedure 5.	HA-101
-21	Go to Diagnostic Procedure 1.	HA-97
-22	Go to Diagnostic Procedure 2.	HA-98
-23	Go to Diagnostic Procedure 3.	HA-99
-25	Go to Diagnostic Procedure 4.	HA-100
-26	Go to Diagnostic Procedure 5.	HA-101

Are sensor circuits for ambient sensor and in-vehicle sensor operating normally? If malfunction is suspected, check temperature detected by each sensor using Self-diagnosis STEP 5. Confirm the temperature is within normal range before performing Diagnostic Procedures.

Yes ↓

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

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

No → Go to **Diagnostic Procedure 9.** (HA-107)

Yes ↓

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 **Fan speed control specification.** (HA-123)

Yes ↓

IS BLOWER MOTOR CONTROLLED UNDER STARTING FAN SPEED CONTROL?
Refer to **Starting fan speed control.** (HA-123)

No → Check thermal transmitter. Refer to EL section.

Yes ↓

Blower motor operation is normal.

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. 3 seconds.

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

Code No.	How to repair	Reference page
21	Go to Diagnostic Procedure 1.	HA-97
22	Go to Diagnostic Procedure 2.	HA-98
23	Go to Diagnostic Procedure 3.	HA-99
25	Go to Diagnostic Procedure 4.	HA-100
26	Go to Diagnostic Procedure 5.	HA-101
-21	Go to Diagnostic Procedure 1.	HA-97
-22	Go to Diagnostic Procedure 2.	HA-98
-23	Go to Diagnostic Procedure 3.	HA-99
-25	Go to Diagnostic Procedure 4.	HA-100
-26	Go to Diagnostic Procedure 5.	HA-101

Are sensor circuits for ambient sensor and in-vehicle sensor operating normally? If malfunction is suspected, check temperature detected by each sensor using Self-diagnosis STEP 5. Confirm the temperature is within normal range before performing Diagnostic Procedures.

Yes ↓

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

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

No → CHECK REFRIGERANT.
Connect manifold gauge, then check system pressure.

NG → Check refrigerant leaks.

OK ↓

Go to **Diagnostic Procedure 10.** (HA-109)

Yes ↓

Magnet clutch control system is normal.
Refer to MAGNET CLUTCH CONTROL. (HA-124)

Preliminary Check (Cont'd)

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. 3 seconds later.

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

Code No.	How to repair	Reference page
21	Go to Diagnostic Procedure 1.	HA-97
22	Go to Diagnostic Procedure 2.	HA-98
23	Go to Diagnostic Procedure 3.	HA-99
25	Go to Diagnostic Procedure 4.	HA-100
26	Go to Diagnostic Procedure 5.	HA-101
-21	Go to Diagnostic Procedure 1.	HA-97
-22	Go to Diagnostic Procedure 2.	HA-98
-23	Go to Diagnostic Procedure 3.	HA-99
-25	Go to Diagnostic Procedure 4.	HA-100
-26	Go to Diagnostic Procedure 5.	HA-101

Are sensor circuits for ambient sensor and in-vehicle sensor operating normally? If malfunction is suspected, check temperature detected by each sensor using Self-diagnosis STEP 5. Confirm the temperature is within normal range before performing Diagnostic Procedures.

Yes

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			

Yes → Air mix door control system is normal.
Refer to **Air mix door control specification.** (HA-118)

No → CHECK AIR MIX DOOR MECHANISM.
Refer to CONTROL LINKAGE ADJUSTMENT. (HA-113)

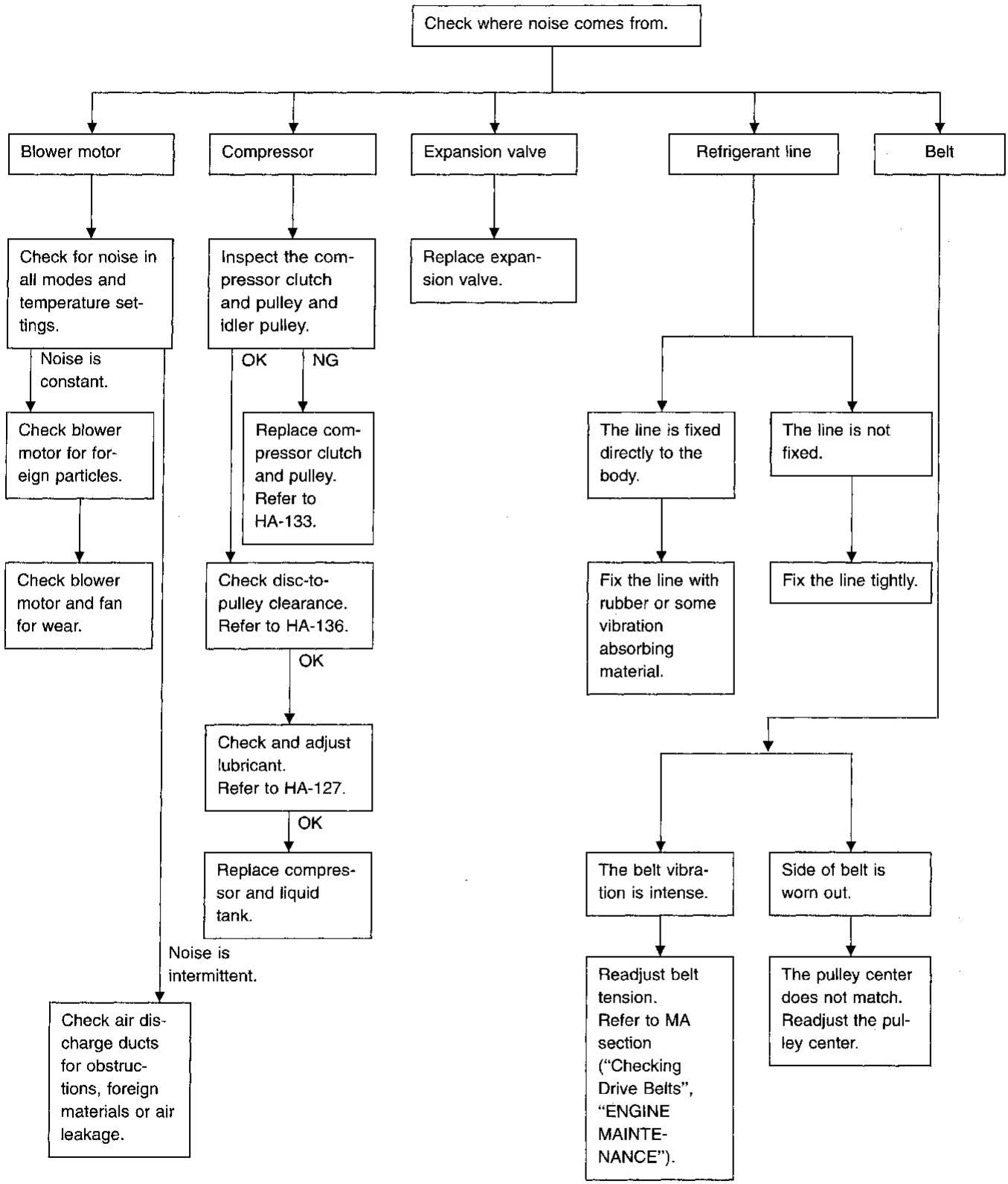
NG → Repair or adjust.

OK → Go to **Diagnostic Procedure 8.** (HA-106)

Preliminary Check (Cont'd)

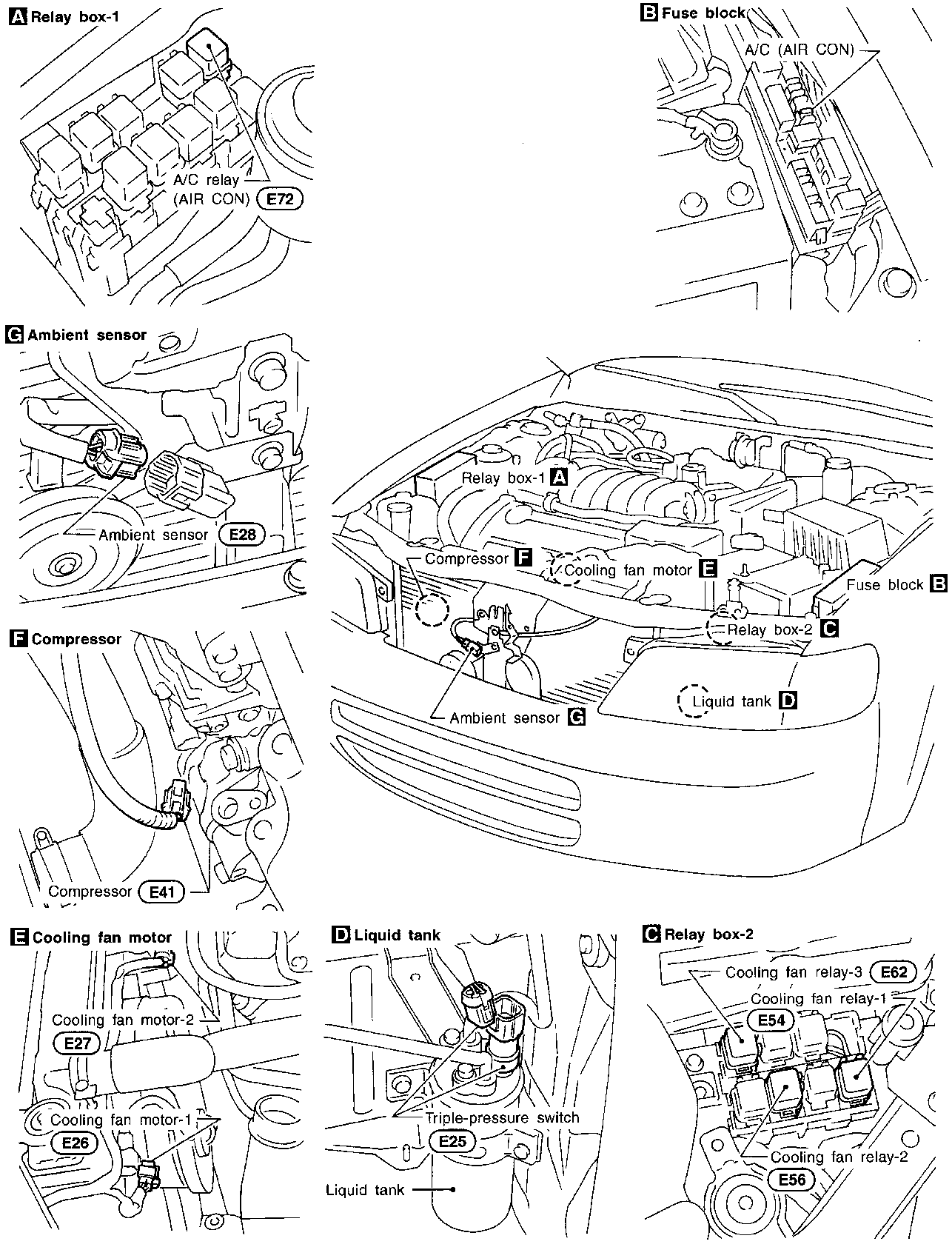
PRELIMINARY CHECK 8

Noise



Harness Layout

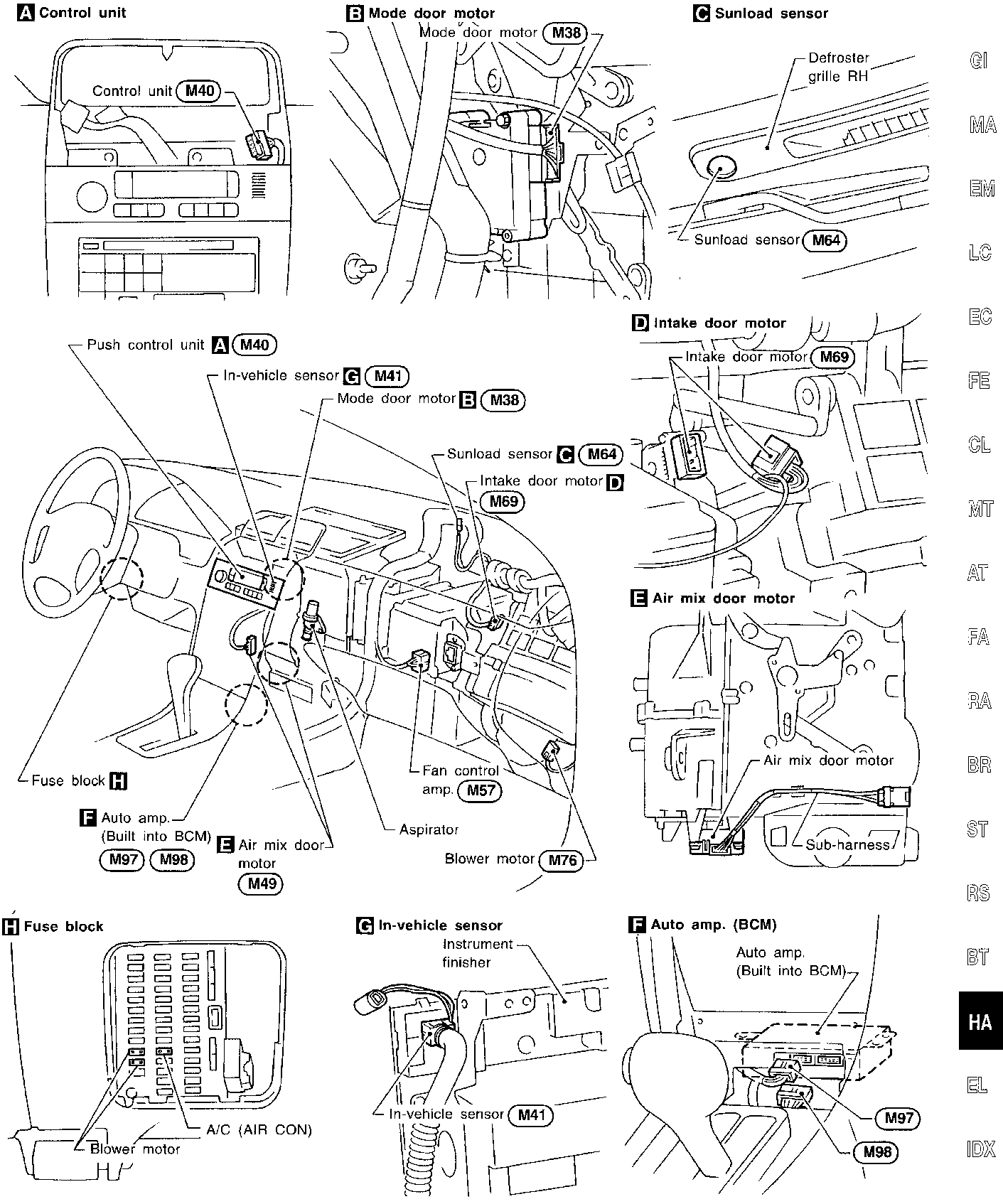
ENGINE COMPARTMENT



RHA098FA

Harness Layout (Cont'd)

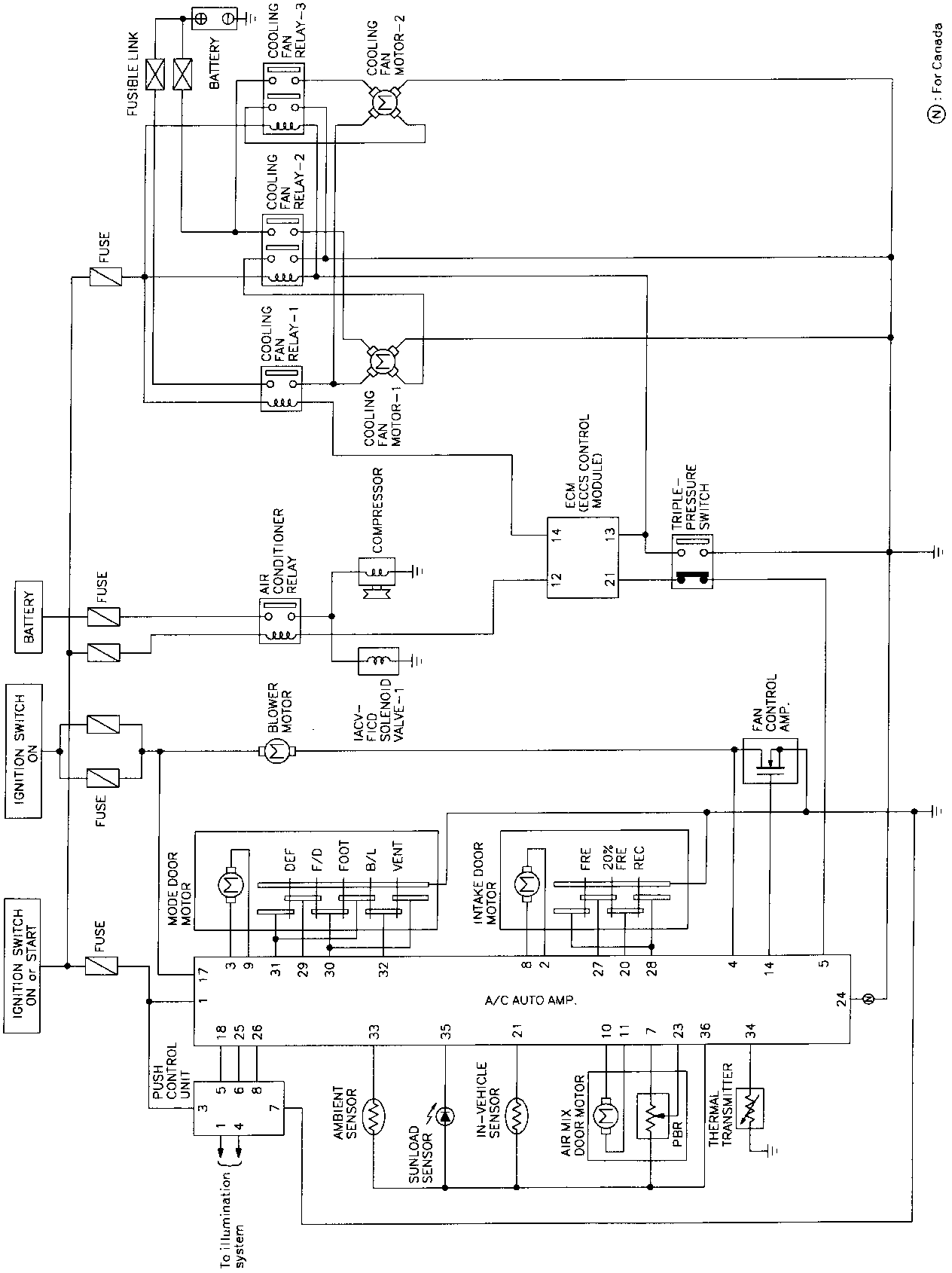
PASSENGER COMPARTMENT



RHA029G

1151

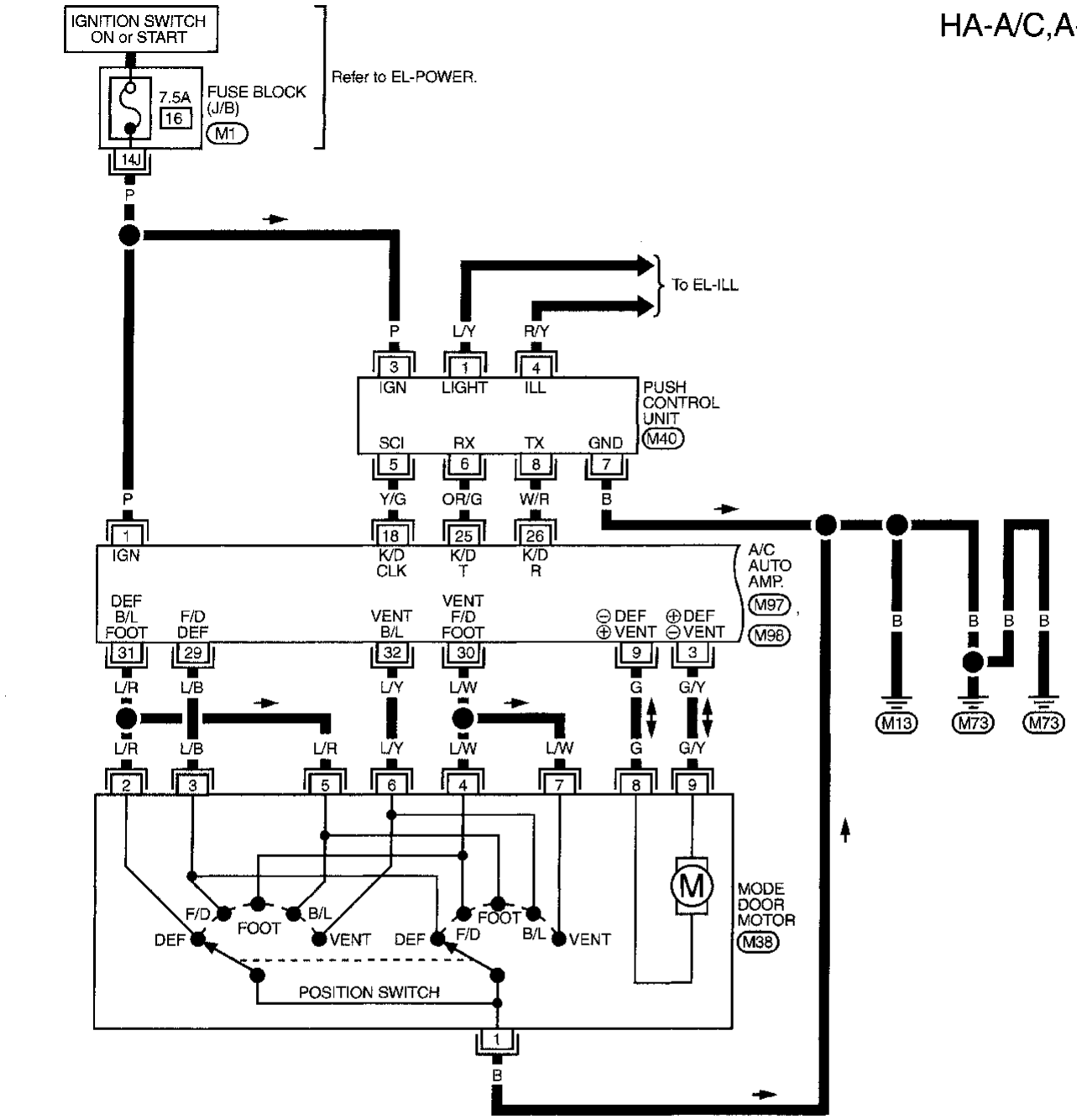
Circuit Diagram



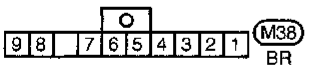
MHA605A

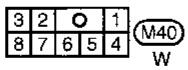
Wiring Diagram — A/C, A —

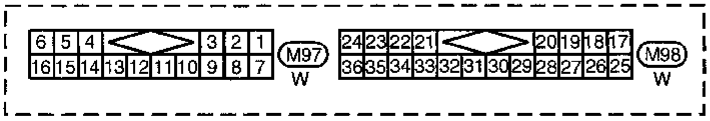
HA-A/C,A-01



Refer to last page (Foldout page).
M1



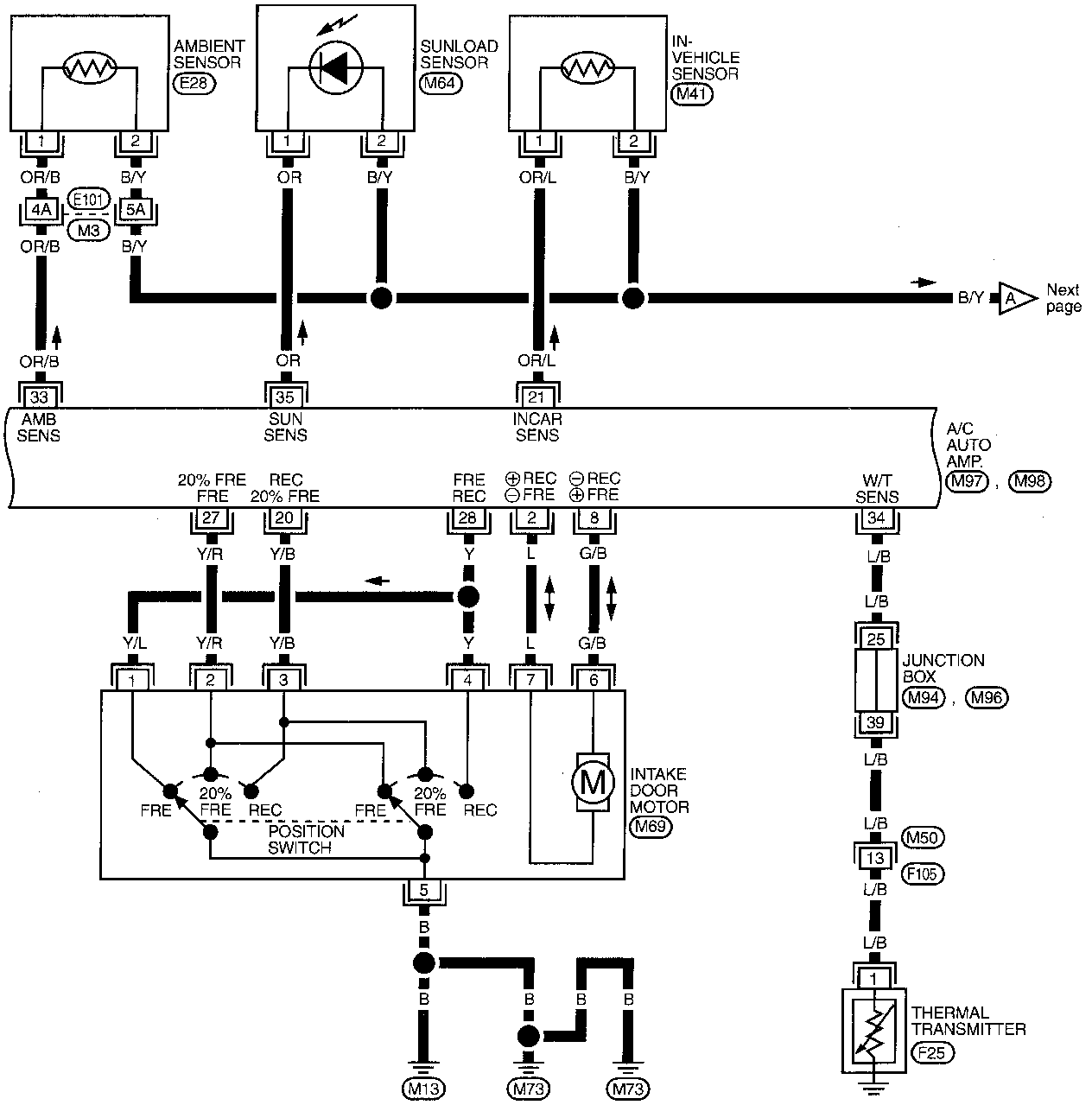




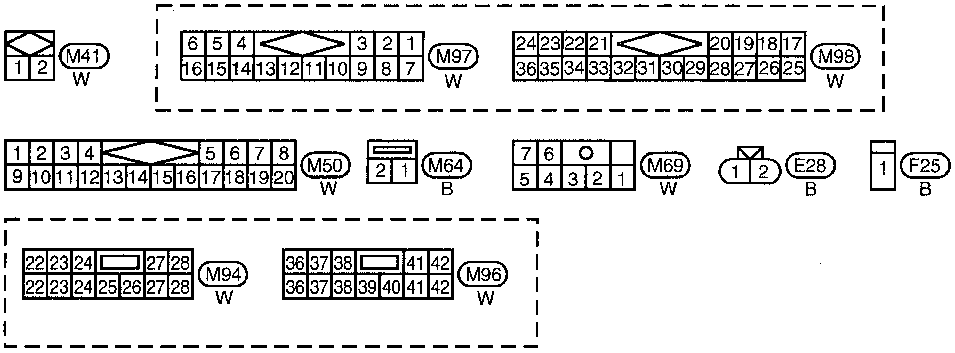
MHA606A

Wiring Diagram — A/C, A — (Cont'd)

HA-A/C,A-02



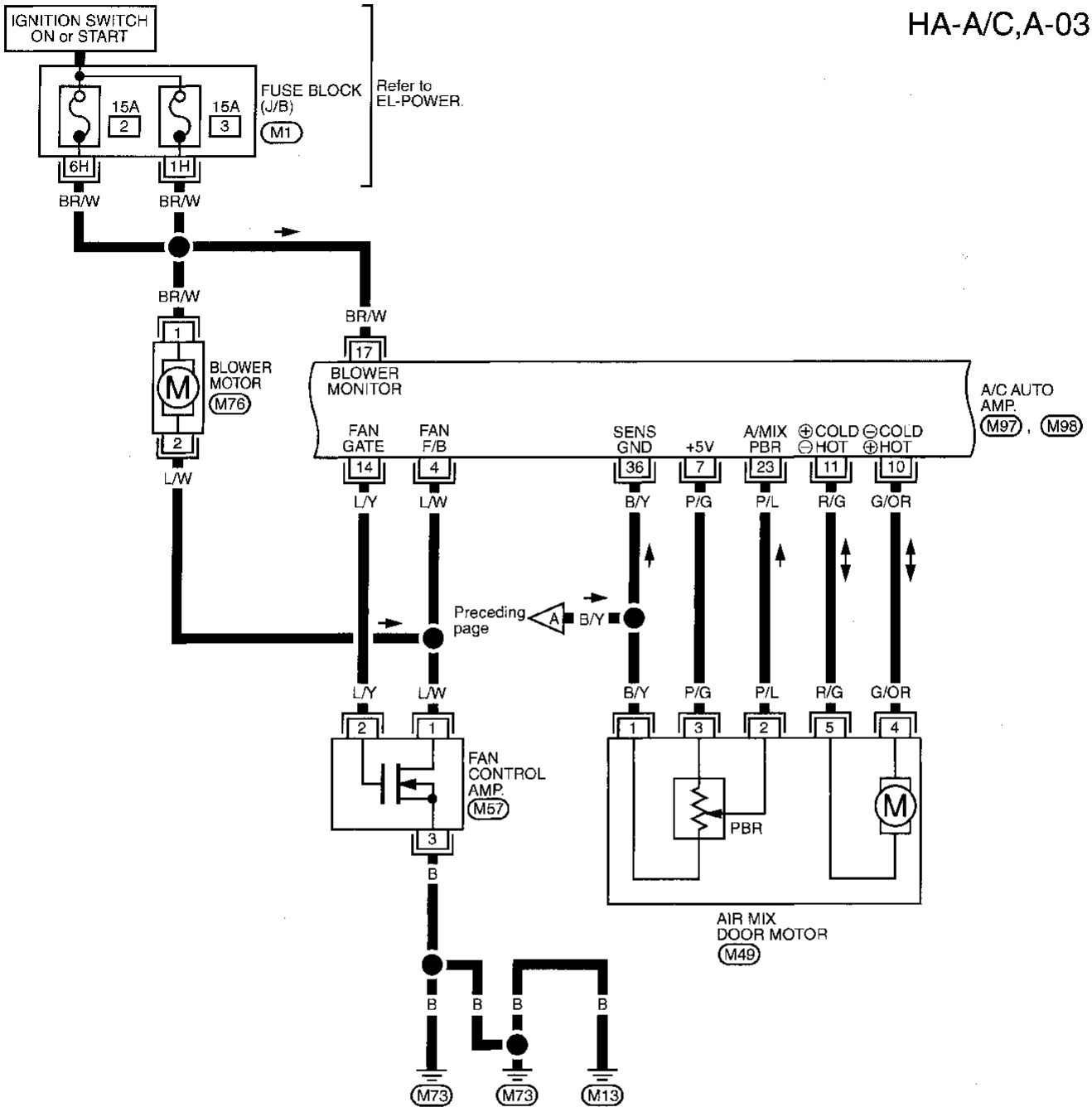
Refer to last page (Foldout page).
M3, E101
M94
M96

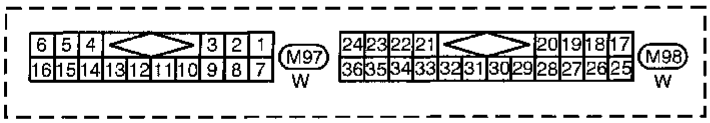


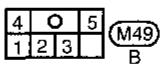
MHA607A

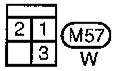
Wiring Diagram — A/C, A — (Cont'd)

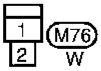
HA-A/C,A-03







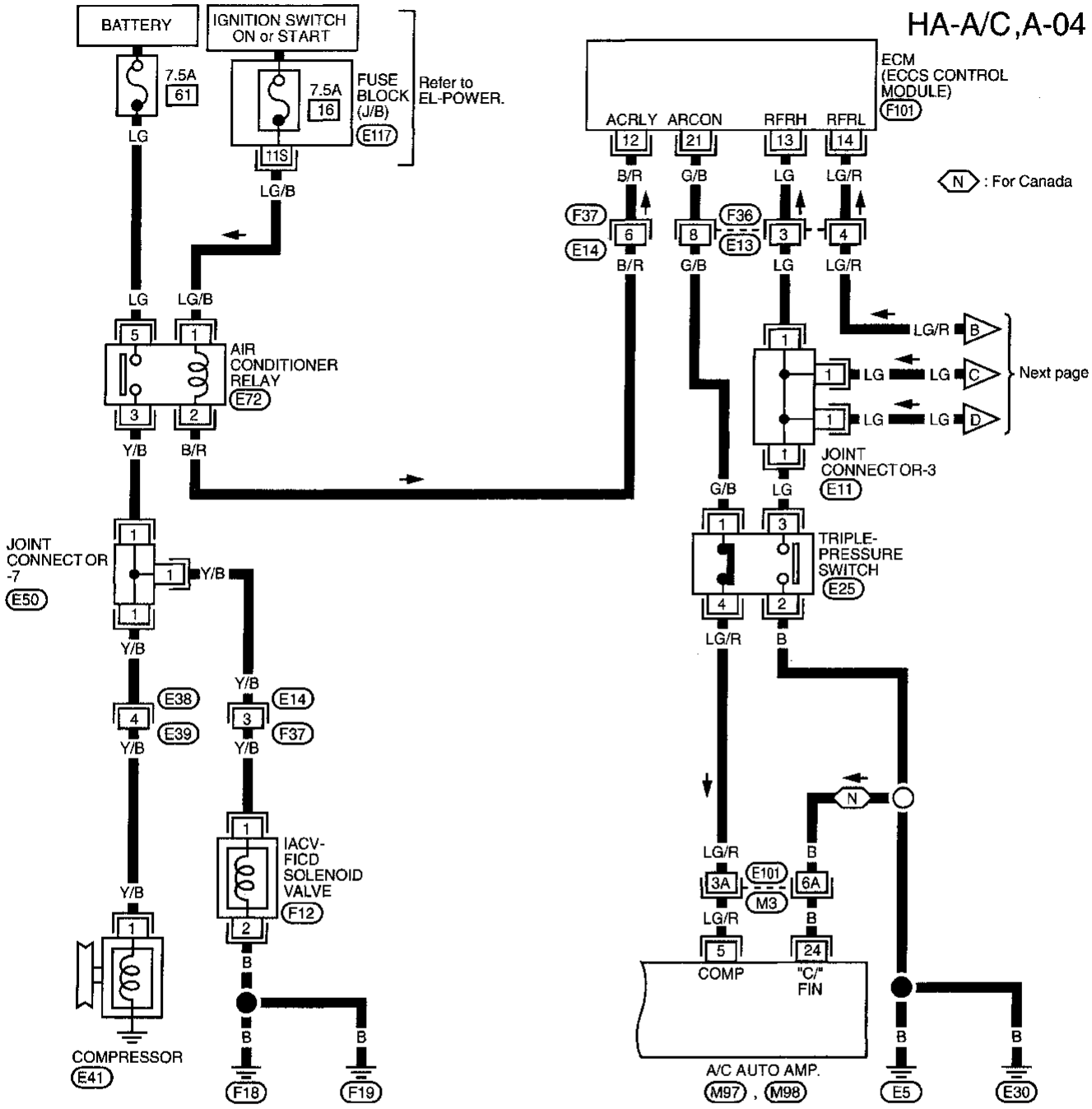


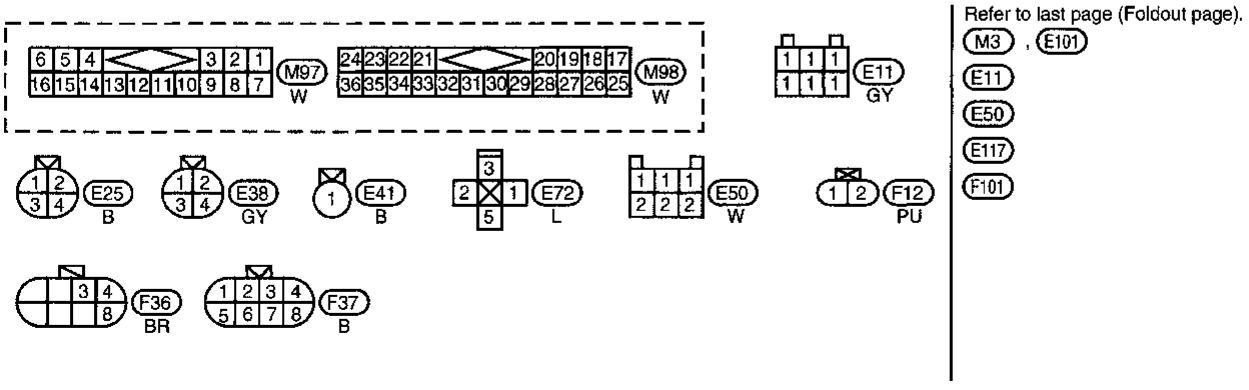


Refer to last page (Foldout page).
M1

MHA608A

Wiring Diagram — A/C, A — (Cont'd)

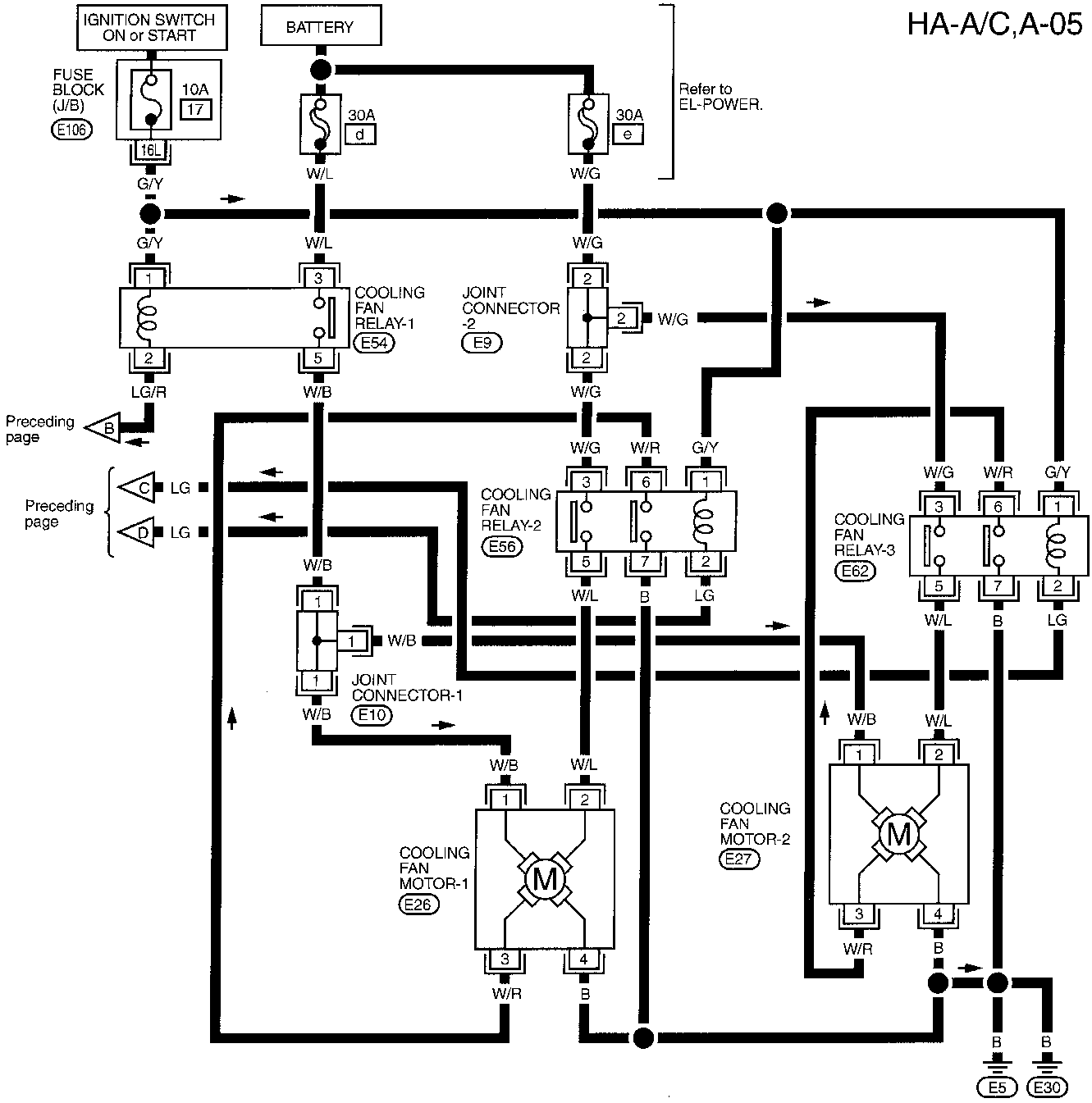




Refer to last page (Foldout page).
M3, E101
E11
E50
E117
F101

MHA609A

Wiring Diagram — A/C, A — (Cont'd)



E9 W, E10 W — E54 L — E56 BR, E62 BR — E26 GY, E27 GY

Refer to last page (Foldout page).
E9
E10
E106

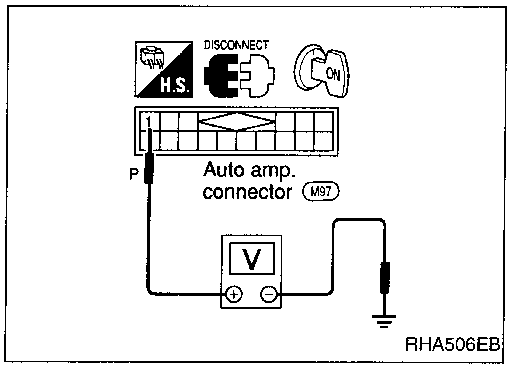
MHA610A

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

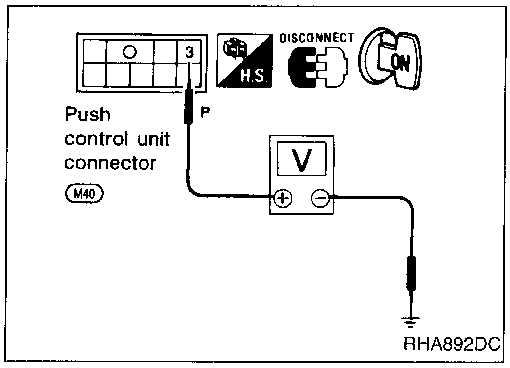


AUTO AMP. (BCM) CHECK

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

1. Disconnect auto amp. (BCM) harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal ① and body ground.

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

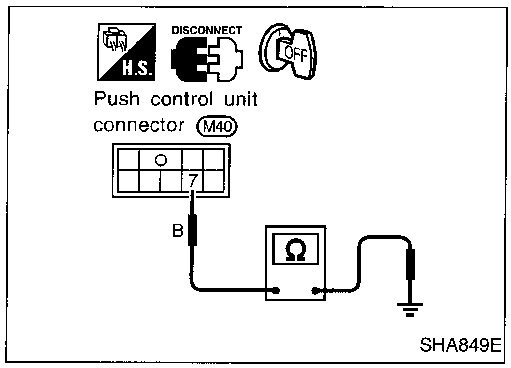


PUSH CONTROL UNIT CHECK

Check power supply circuit for push control unit with ignition switch ON.

1. Disconnect push control unit harness connector.
2. Connect voltmeter from harness side.
3. Measure voltage across terminal ③ and body ground.

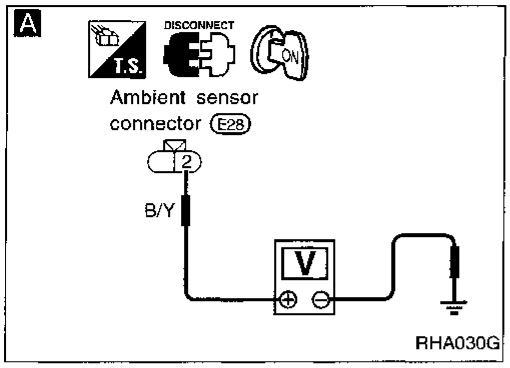
Voltmeter terminal		Voltage
⊕	⊖	
③	Body ground	Approx. 12V

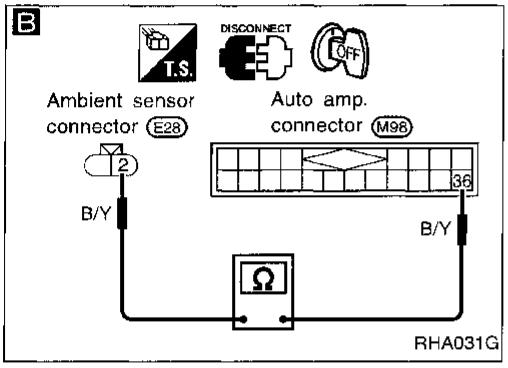


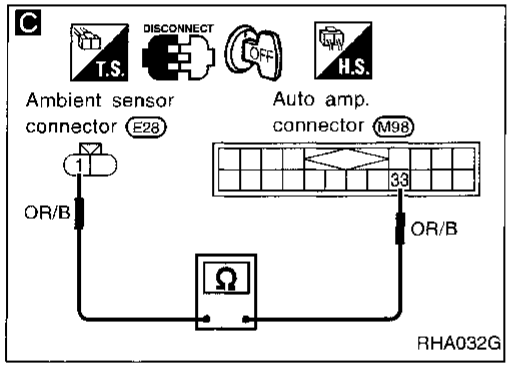
Check body ground circuit for push control unit.

1. Disconnect push control unit harness connector.
2. Connect ohmmeter from harness side.
3. Check for continuity between terminal ⑦ and body ground.

Ohmmeter terminal		Continuity
⊕	⊖	
⑦	Body ground	Yes







Diagnostic Procedure 1

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

A

CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (BCM).
Disconnect ambient sensor harness connector.
Do approx. 5 volts exist between ambient sensor harness terminal ② and body ground?

No → Disconnect auto amp. (BCM) harness connector.

C Note

Check circuit continuity between ambient sensor harness terminal ① and auto amp. (BCM) harness terminal ㉝.
Continuity should exist.
If OK, check harness for short.

OK → Replace auto amp. (BCM). Refer to HA-137.

Yes → Disconnect auto amp. (BCM) harness connector.

B Note

Check circuit continuity between ambient sensor harness terminal ② and auto amp. (BCM) harness terminal ㊱.
Continuity should exist.
If OK, check harness for short.

OK → CHECK AMBIENT SENSOR. (Refer to Control System Input Components.) (HA-116)

NG → Replace ambient sensor.

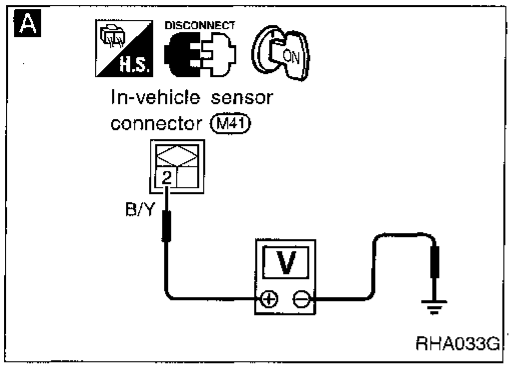
OK → Replace auto amp. (BCM). Refer to HA-137.

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

Diagnostic Procedure 2

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

A



CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND AUTO AMP. (BCM).
Disconnect in-vehicle sensor harness connector.
Do approx. 5 volts exist between in-vehicle sensor harness terminal ② and body ground?

No → Disconnect auto amp. (BCM) harness connector.

C

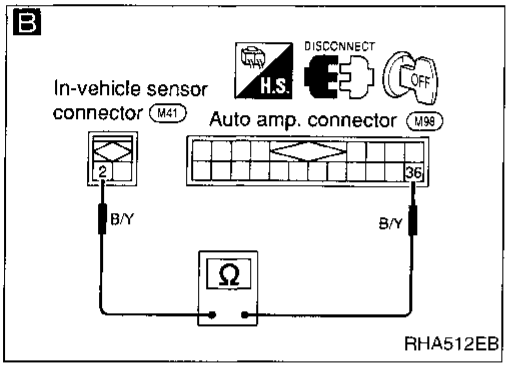
Note

Check circuit continuity between in-vehicle sensor harness terminal ① and auto amp. (BCM) harness terminal ㉑.
Continuity should exist.
If OK, check harness for short.

OK → Replace auto amp. (BCM). Refer to HA-137.

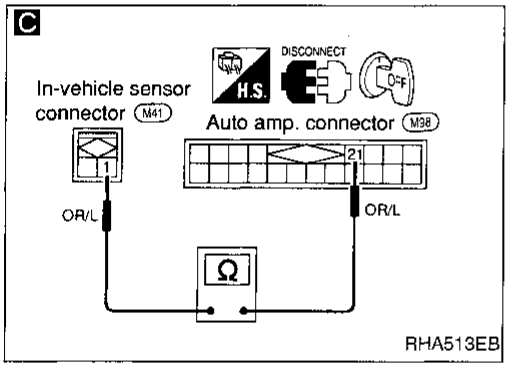
Yes

B



Disconnect auto amp. (BCM) harness connector.

C



B

Note

Check circuit continuity between in-vehicle sensor harness terminal ② and auto amp. (BCM) harness terminal ㊱.
Continuity should exist.
If OK, check harness for short.

OK

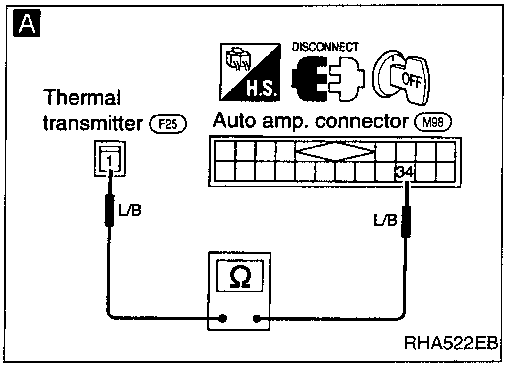
CHECK IN-VEHICLE SENSOR.
(Refer to Control System Input Components.) (HA-115)

NG → Replace in-vehicle sensor.

OK

Replace auto amp. (BCM).
Refer to HA-137.

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



Diagnostic Procedure 3

SYMPTOM: Thermal transmitter circuit is open or shorted. (23 or −23 is indicated on display as a result of conducting Self-diagnosis STEP 2.)

A

Note

CHECK THERMAL TRANSMITTER CIRCUIT BETWEEN THERMAL TRANSMITTER AND AUTO AMP. (BCM).
Disconnect thermal transmitter harness connector and auto amp. (BCM) harness connector.
Check circuit continuity between thermal transmitter harness terminal ① and auto amp. (BCM) harness terminal ㉞.
Continuity should exist.
If OK, check harness for short.

↓ OK

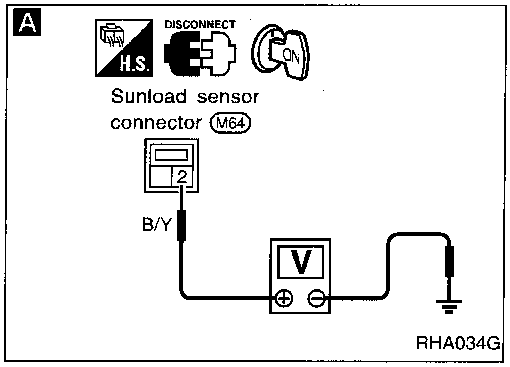
CHECK THERMAL TRANSMITTER.
Refer to EL section.

↓ OK

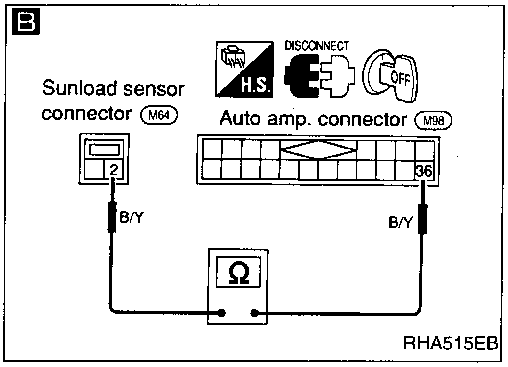
Replace auto amp. (BCM).
Refer to HA-137.

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

A



B



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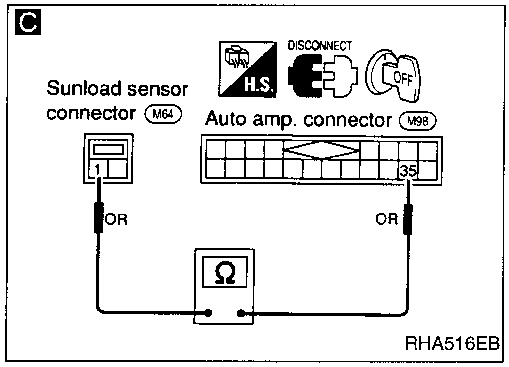


Diagnostic Procedure 4

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

A

CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND AUTO AMP. (BCM).
Disconnect sunload sensor harness connector.
Do approx. 5 volts exist between sunload sensor harness terminal ② and body ground?

No → Disconnect auto amp. (BCM) harness connector.

C

Note

Check circuit continuity between sunload sensor harness terminal ① and auto amp. (BCM) harness terminal ㉟.
Continuity should exist.
If OK, check harness for short.

OK → Replace auto amp. (BCM). Refer to HA-137.

Yes → Disconnect auto amp. (BCM) harness connector.

B

Note

Check circuit continuity between sunload sensor harness terminal ② and auto amp. (BCM) harness terminal ㊱.
Continuity should exist.
If OK, check harness for short.

OK → CHECK SUNLOAD SENSOR.
(Refer to Control System Input Components.) (HA-116)

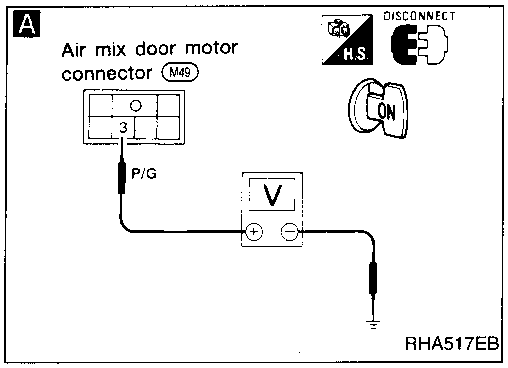
NG → Replace sunload sensor.

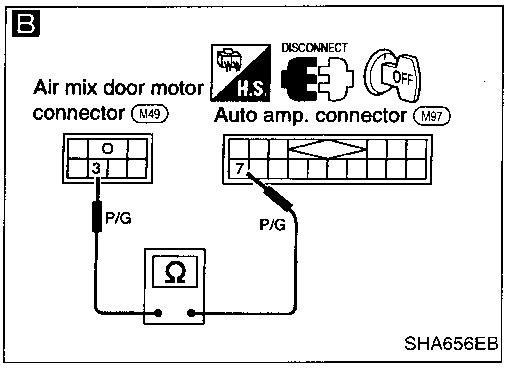
OK → Replace auto amp. (BCM). Refer to HA-137.

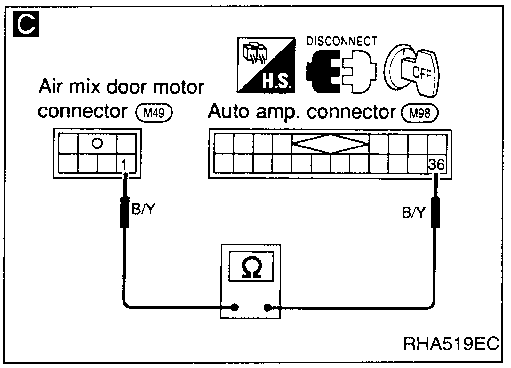
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

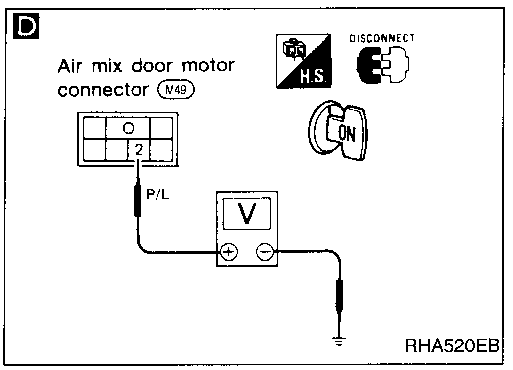
Diagnostic Procedure 5

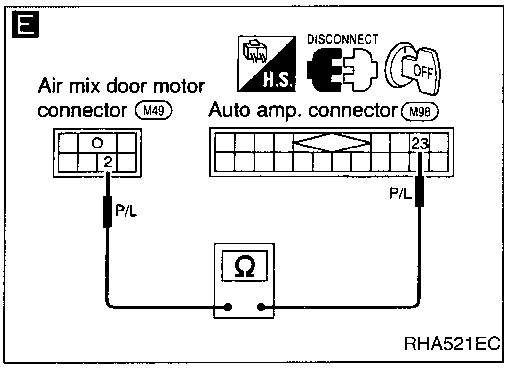
SYMPTOM: PBR circuit is open or shorted. (26 or −26 is indicated on display as a result of conducting Self-diagnosis STEP 2.)











A

CHECK PBR CIRCUIT BETWEEN PBR AND AUTO AMP. (BCM).
Disconnect air mix door motor harness connector.
Do approx. 5 volts exist between air mix door motor harness terminal ③ and body ground?

No → Disconnect auto amp. (BCM) harness connector.

B Note

Check circuit continuity between air mix door motor harness terminal ③ and auto amp. (BCM) harness terminal ⑦.
Continuity should exist.
If OK, check harness for short.

OK → Replace auto amp. (BCM). Refer to HA-137.

Yes → Disconnect auto amp. (BCM) harness connector.

C Note

Check circuit continuity between air mix door motor harness terminal ① and auto amp. harness terminal ㊱.
Continuity should exist.
If OK, check harness for short.

OK

D

CHECK PBR CIRCUIT BETWEEN PBR AND AUTO AMP. (BCM).
1. Set temperature switch to full hot 32°C (85°F) with ignition switch ON.
2. Turn ignition switch OFF.
3. Reconnect auto amp. (BCM) harness connector.
4. Do approx. 5 volts exist between air mix door motor harness terminal ② and body ground?

Yes → Disconnect auto amp. (BCM) harness connector.

E Note

Check circuit continuity between air mix door motor harness terminal ② and auto amp. (BCM) harness terminal ㉓.
Continuity should exist.
If OK, check harness for short.

OK → Replace auto amp. (BCM). Refer to HA-137.

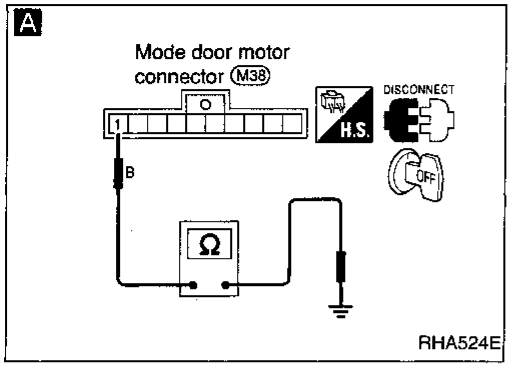
No

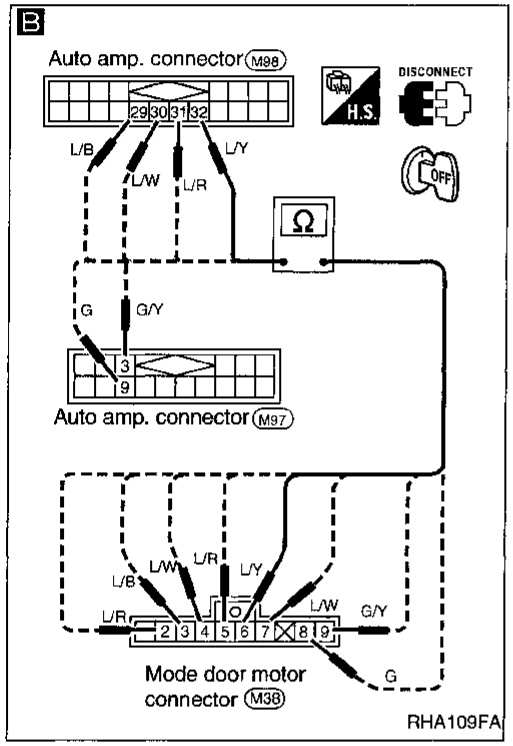
CHECK PBR.
(Refer to Control System Output Components.) (HA-119)

NG → Replace air mix door motor (PBR).

OK → Replace auto amp. (BCM). Refer to HA-137.

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





Diagnostic Procedure 6

SYMPTOM: Mode door motor does not operate normally.

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

Disconnect mode door motor harness connector.

A — Note

CHECK BODY GROUND CIRCUIT FOR MODE DOOR MOTOR.
Does continuity exist between mode door motor harness terminal ① and body ground?

Yes

Disconnect auto amp. (BCM) harness connector.

B — Note

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

Terminal No.		Continuity
⊕	⊖	
Auto amp. (BCM)	Mode door motor	
㉙	③	Yes
㉚	④ or ⑦	
㉛	② or ⑤	
㉜	⑥	
③	⑨	
⑨	⑧	

If OK, check harness for short.

OK

Reconnect auto amp. (BCM) harness connector.

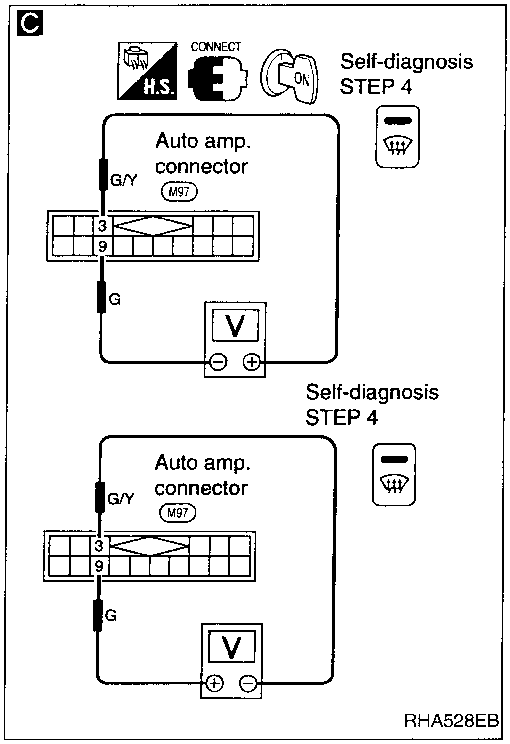
Ⓐ

(Go to next page.)

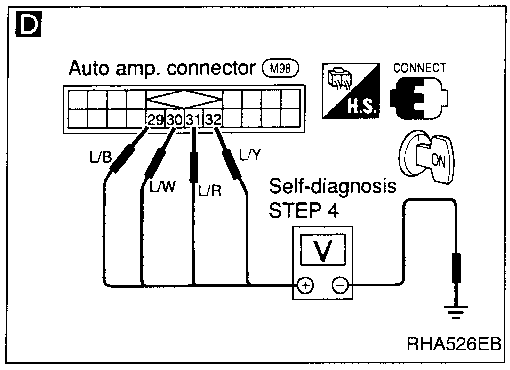
Note:
If the result is NG or No after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 6 (Cont'd)

C



D



Ⓐ

C

CHECK FOR OUTPUT OF AUTO AMP.
Do approx. 10.5 volts exist between auto amp. (BCM) harness terminals ③ and ⑨ when code No. is switched from "41" to "42" or when code No. is switched from "46" to "41"?

No → Replace auto amp. (BCM). Refer to HA-137.

Code No.	Mode door motor operation	Terminal No. ③	Terminal No. ⑨	Voltage V
41 → 42	VENT → B/L	⊕	⊖	Approx. 10.5
46 → 41	DEF → VENT	⊖	⊕	
–	Stop	–	–	0

Yes

D

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

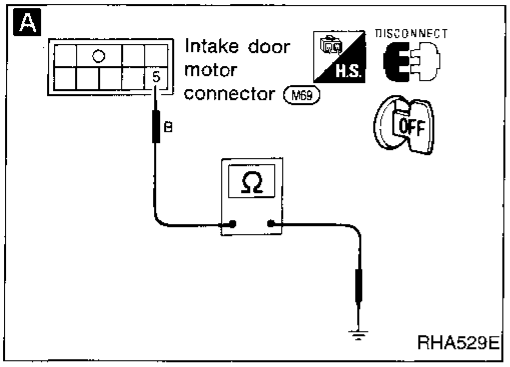
NG → Replace mode door motor.

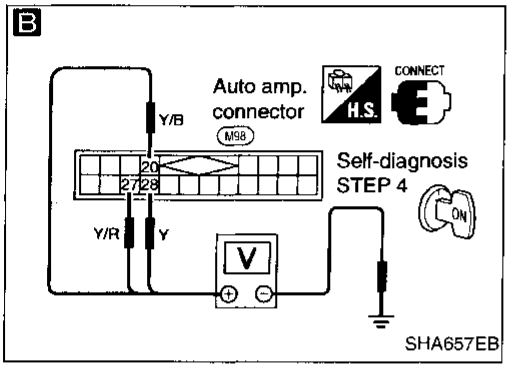
Code No.	Condition	Terminal No. ⊕ ㉙	⊕ ㉚	⊕ ㉛	⊕ ㉜	Terminal No. ⊖
41	VENT	5V	0V	5V	0V	Body ground
42 or 43	B/L 1	5V	5V	0V	0V	
44	D/F 1	5V	0V	0V	5V	
45	D/F 2	0V	0V	5V	5V	
46	DEF	0V	5V	0V	5V	

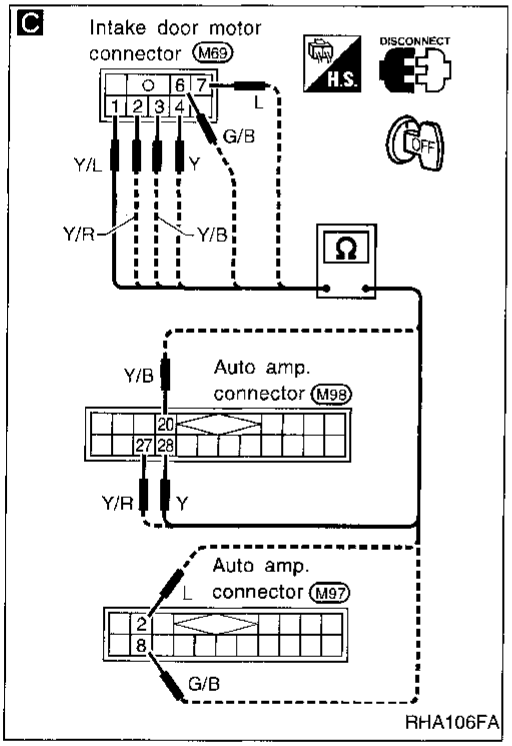
0V: Approx. 0V
5V: Approx. 5V

OK

INSPECTION END







Diagnostic Procedure 7

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 ⑤ and body ground?

Yes ↓

Reconnect intake door motor harness connector.

B

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

Code No.	Terminal No. ⊕	Terminal No. ⊖	Condition	Voltage V
41 42	㉗	Body ground	REC	12
	㉘, ⑳			0
43	㉘		20% REC	12
	㉗, ⑳			0
44 45 46	⑳		FRE	12
	㉗, ㉘			0

12V: Approx. 12V
If OK, check harness for short.

NG →

C

Note

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

Terminal No. Auto amp. (BCM)	Terminal No. Intake door motor	Continuity
㉘	①	Yes
㉗	②	
⑳	③	
㉘	④	
②	⑦	
⑧	⑥	

If OK, check harness for short.

OK ↓

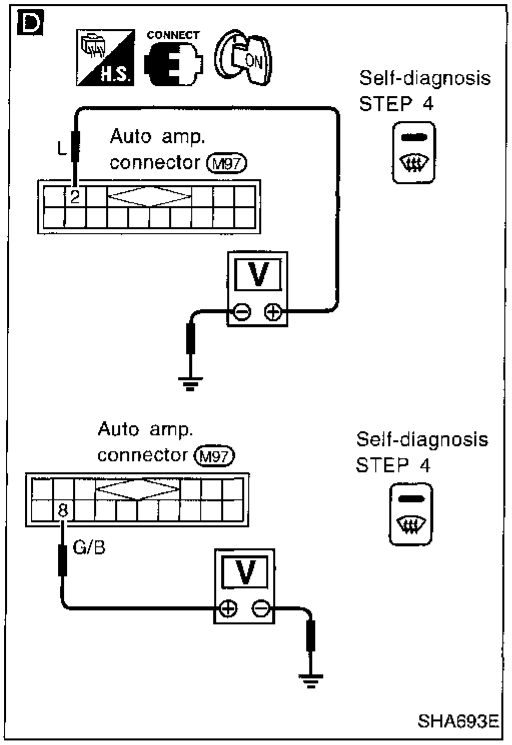
Ⓐ
(Go to next page.)

OK ↓

INSPECTION END

Note:
If the result is NG or No after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 7 (Cont'd)



Ⓐ

D

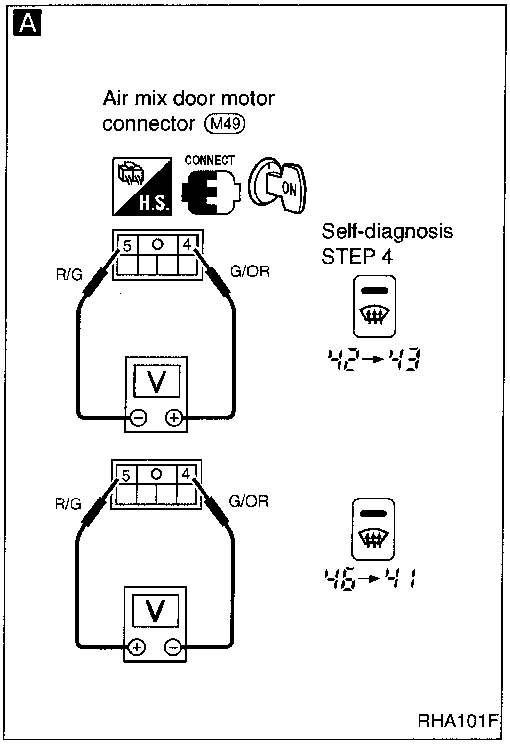
CHECK FOR AUTO AMP. (BCM) OUTPUT.
Set up Self-diagnosis STEP 4.
Measure voltage across auto amp. (BCM) harness terminals and body ground.

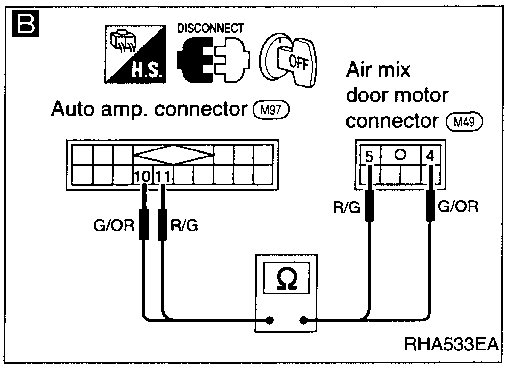
NG → Replace auto amp. (BCM). Refer to HA-137.

Code No.	Terminal No. ⊕	Terminal No. ⊖	Condition	Voltage V
41, 42	②	Body ground	REC	12
	⑧			0
44, 45, 46	②		FRE	0
	⑧			12

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

OK → Replace intake door motor





Diagnostic Procedure 8

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.

No → CHECK PBR CIRCUIT.
Go to Diagnostic Procedure 6.

Yes ↓

A

CHECK FOR OUTPUT OF AUTO AMP. (BCM).
Set up Self-diagnosis STEP 4.
Do approx. 10.5 volt exist between air mix door motor harness terminals ④ and ⑤ when code No. is switched from "42" to "43" or when code No. is switched from "46" to "41"?

No → Replace auto amp. (BCM).
Refer to HA-137.

Code No.	Air mix door operation	Terminal No. ④	Terminal No. ⑤	Voltage V
42 → 43	Cold → Hot	⊕	⊖	Approx. 10.5
46 → 41	Hot → Cold	⊖	⊕	Approx. 10.5
–	Stop	–	–	0

Yes ↓

Disconnect auto amp. (BCM) and air mix door motor harness connectors.

B

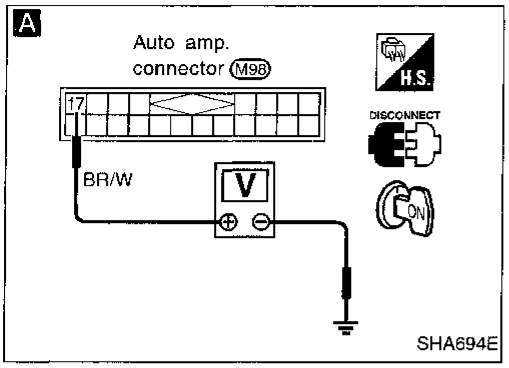
Note

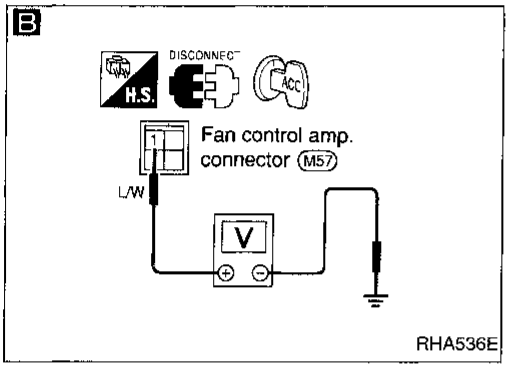
Check circuit continuity between auto amp. (BCM) harness terminal ⑩ (⑪) and air mix door motor harness terminal ④ (⑤).
Continuity should exist.
If OK, check harness for short.

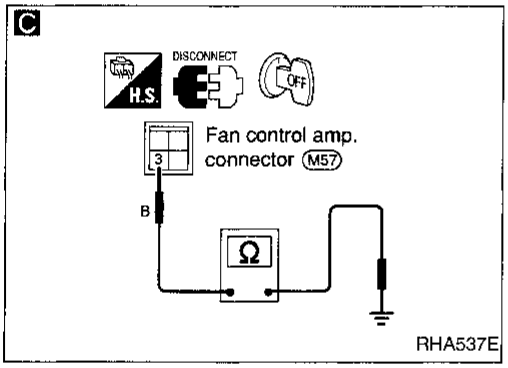
OK ↓

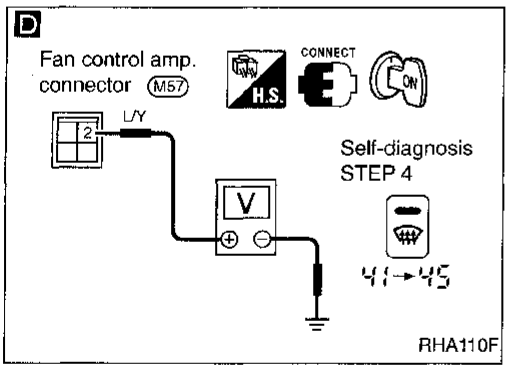
Replace air mix door motor.

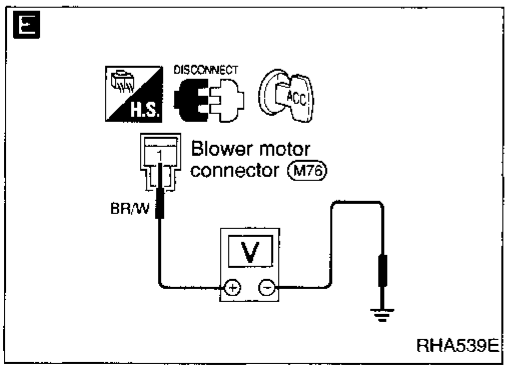
Note:
If the result is NG after checking circuit continuity, repair harness or connector.











Diagnostic Procedure 9

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

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

A

CHECK POWER SUPPLY FOR AUTO AMP.
Disconnect auto amp. harness connector.
Do approx. 12 volts exist between auto amp. harness terminal ⑰ and body ground?

No → Check power supply circuit and 15A fuses (No. 2 and 3, located in the fuse block).
Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING".)

Yes ↓

B

CHECK POWER SUPPLY FOR FAN CONTROL AMP.
Disconnect fan control amp. harness connector.
Do approx. 12 volts exist between fan control amp. harness terminal ① and body ground?

No → **E**

CHECK POWER SUPPLY FOR BLOWER MOTOR.
Disconnect blower motor harness connector.
Do approx. 12 volts exist between blower motor harness terminal ① and body ground?

Yes → **F**
No → Check power supply circuit and 15A fuses (No. 2 and 3, located in the fuse block). Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

Yes ↓

C

Note

CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP.
Check harness continuity between fan control amp. harness terminal ③ and body ground.
Continuity should exist.
If OK, check harness for short.

OK ↓

Reconnect fan control amp. harness connector and auto amp. harnesses connector.

F

Note

Check circuit continuity between blower motor harness terminal ② and fan control amp. harness terminal ①.
Continuity should exist.
If OK, check harness for short.

OK ↓

CHECK BLOWER MOTOR.
(Refer to Electrical Components Inspection.) (HA-112)

NG ↓

Replace blower motor.

D

CHECK FOR OUTPUT OF AUTO AMP.
Set up Self-diagnosis STEP 4.
Measure voltage across fan control amp. harness terminal ② and body ground.

Code No.	Terminal No. ⊕	Terminal No. ⊖	Voltage
41→45	②	Body ground	Approx. 2.5 - 9.0V

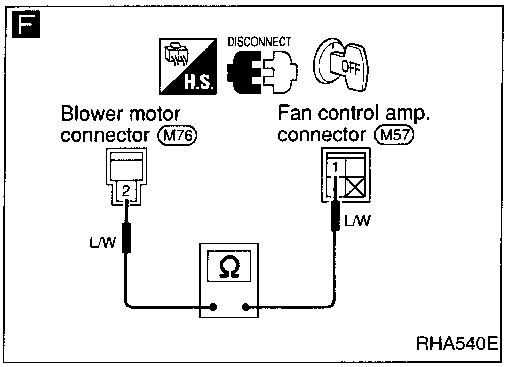
NG → Ⓐ (Go to next page.)

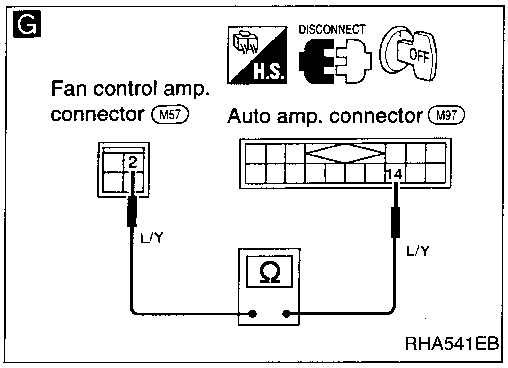
OK ↓

Replace fan control amp.

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

Diagnostic Procedure 9 (Cont'd)





Ⓐ

Disconnect auto amp. (BCM) and fan control amp. harness connector.

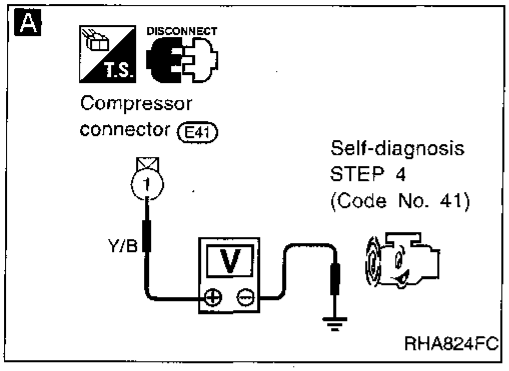
G — Note

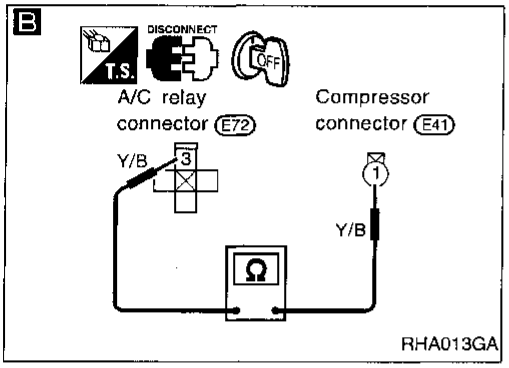
Check harness continuity between auto amp. (BCM) harness terminal ⑭ and fan control amp. harness terminal ②.
Continuity should exist.
If OK, check harness for short.

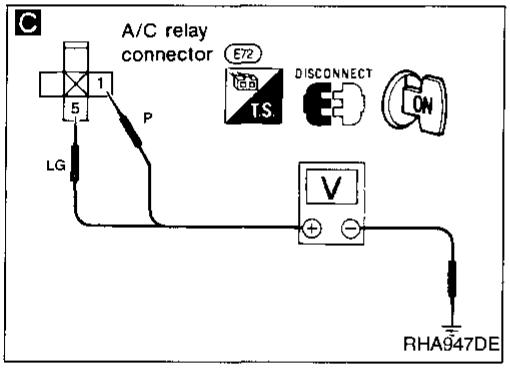
OK

Replace auto amp. (BCM).
Refer to HA-137.

Note:
If the result is NG 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 ① and body ground?

No → Disconnect A/C relay harness connector.

B

Note: Check circuit continuity between A/C relay harness terminal ③ and compressor harness terminal ①. **Continuity should exist.** If OK, check harness for short.

OK →

Yes →

Check magnet clutch, coil continuity.

NG →

Replace magnet clutch assembly. Refer to HA-133.

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

C

CHECK POWER SUPPLY FOR A/C RELAY.
Disconnect A/C relay.
Do approx. 12 volts exist between A/C relay harness terminal ①, ⑤ and body ground?

No → Check power supply circuit and 7.5A fuses (No. 16, located in the fuse block and No. 61, located in the fuse and fusible link box). Refer to EL section ("Wiring Diagram", "POWER SUPPLY ROUTING").

Yes →

CHECK A/C RELAY AFTER DISCONNECTING IT.
(Refer to Electrical Components Inspection.) (HA-112)

NG → Replace A/C relay.

OK →

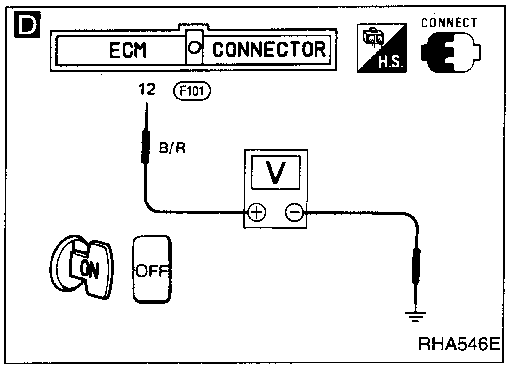
Reconnect A/C relay.

Ⓐ
(Go to next page.)

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

Diagnostic Procedure 10 (Cont'd)

D



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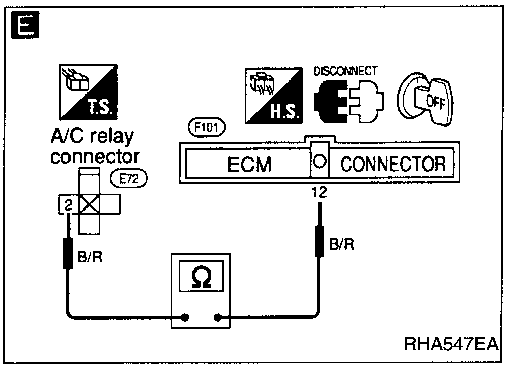
E



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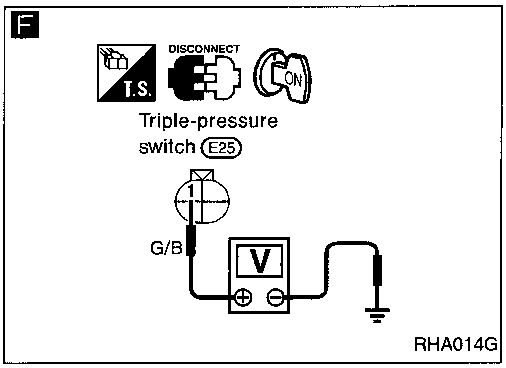
F



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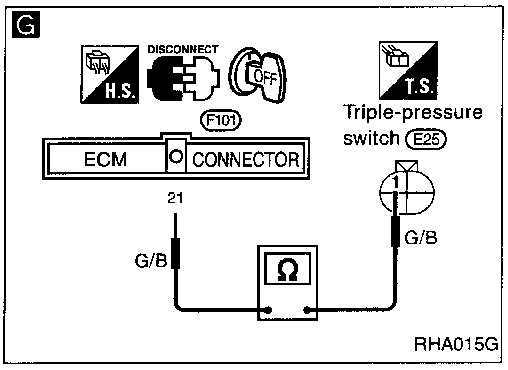
G



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Ⓐ

D CHECK COIL SIDE CIRCUIT OF A/C RELAY.
Do approx. 12 volts exist between ECM (ECCS control module) harness terminal ⑫ and body ground?

No → **E** Note: Check circuit continuity between A/C relay harness terminal ② and ECM (ECCS control module) harness terminal ⑫.
Continuity should exist.
If OK, check harness for short.

Yes ↓

CHECK TRIPLE-PRESSURE SWITCH. (Refer to Electrical Components Inspection.) (HA-112)

NG → Replace triple-pressure switch.

OK ↓

F CHECK TRIPLE-PRESSURE SWITCH CIRCUIT BETWEEN TRIPLE-PRESSURE SWITCH AND ECM (ECCS CONTROL MODULE).
Disconnect triple-pressure switch harness connector.
Do approx. 12 volts exist between triple-pressure switch harness terminal ① and body ground?

No → Disconnect ECM (ECCS control module) harness connector.

Disconnect ECM (ECCS control module) harness connector. → **G** Note: Check circuit continuity between ECM (ECCS control module) harness terminal ㉑ and triple-pressure switch harness terminal ①.
Continuity should exist.
If OK, check harness for short.

OK ↓

CHECK ECM (ECCS control module).

Yes ↓

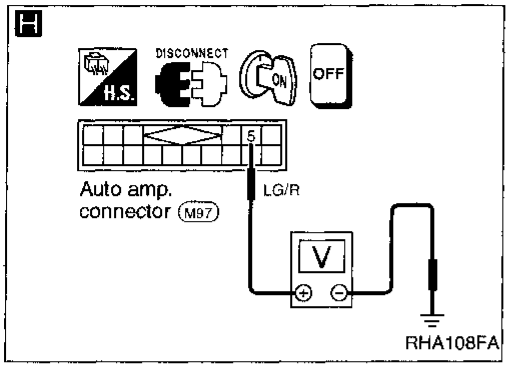
Reconnect triple-pressure switch harness connector.

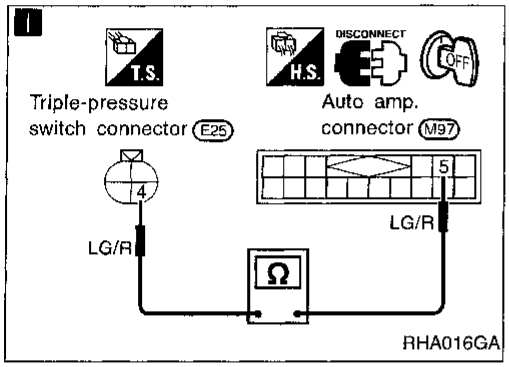
Ⓑ

(Go to next page.)

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

Diagnostic Procedure 10 (Cont'd)





Ⓑ

Disconnect auto amp. (BCM) harness connector.

H

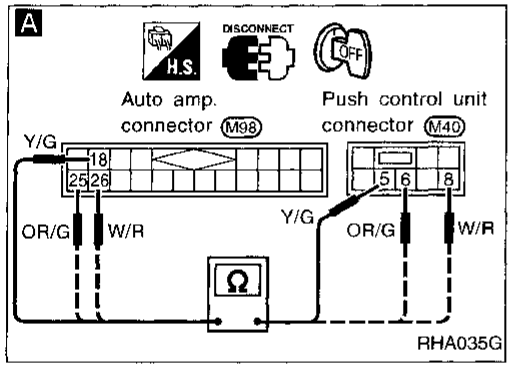
CHECK AUTO AMP. (BCM) CIRCUIT BETWEEN AUTO AMP. (BCM) AND TRIPLE-PRESSURE SWITCH.
Do approx. 12 volts exist between auto amp. (BCM) harness terminal ⑤ and body ground?

No → I Note: Check circuit continuity between auto amp. (BCM) harness terminal ⑤ and triple-pressure switch harness terminal ④.
Continuity should exist.
If OK, check harness for short.

Yes

Replace auto amp. (BCM).
Refer to HA-137.

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



Diagnostic Procedure 11

SYMPTOM:
- **Self-diagnosis cannot be performed.**
- **Multiplex communication error (52 with fan symbol detected as a result of conducting self-diagnosis STEP 5.)**

CHECK MAIN POWER SUPPLY AND GROUND CIRCUIT FOR AUTO AMP. (BCM) AND CONTROL UNIT.
(Refer to HA-96.)

NG → Repair Main Power Supply and Ground Circuit.

OK

A Note: Check circuit continuity between each terminal on auto amp. (BCM) and push control unit.

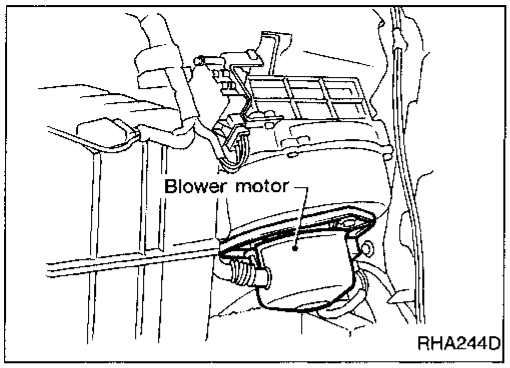
Terminal No.		Continuity
⊕	⊖	
Auto amp. (BCM)	Push control unit	
⑱	⑤	Yes
㉕	⑥	
㉖	⑧	

If OK, check harness for short.

OK

Replace auto amp. (BCM) or push control unit.
Refer to HA-137.

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

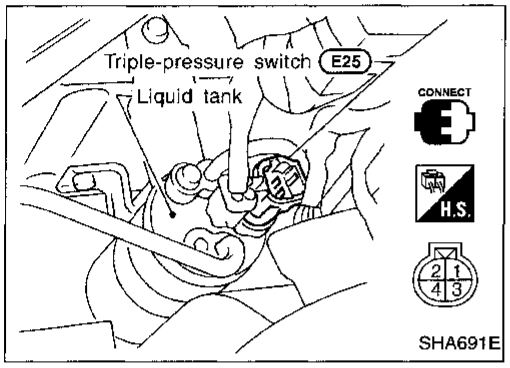


Electrical Components Inspection

BLOWER MOTOR

Check blower motor for smooth rotation.

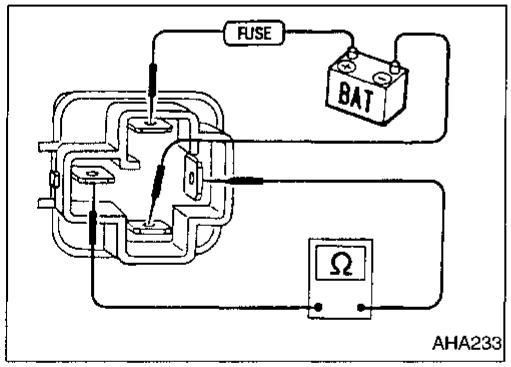
- Ensure that there are no foreign particles inside the intake unit.



TRIPLE-PRESSURE SWITCH

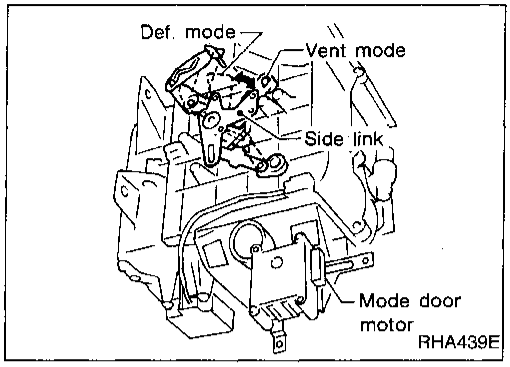
	Terminals	High-pressure side line pressure kPa (kg/cm^2, psi)	Operation	Continuity
Low-pressure side	① - ④	Increasing to 157 - 226 (1.6 - 2.3, 23 - 33)	ON	Exists.
		Decreasing to 152.0 - 201.0 (1.55 - 2.05, 22.0 - 29.2)	OFF	Does not exist.
Medium-pressure side*	② - ③	Increasing to 1,422 - 1,618 (14.5 - 16.5, 206 - 235)	ON	Exists.
		Decreasing to 1,128 - 1,422 (11.5 - 14.5, 164 - 206)	OFF	Does not exist.
High-pressure side	① - ④	Decreasing to 1,667 - 2,059 (17 - 21, 242 - 299)	ON	Exists.
		Increasing to 2,452 - 2,844 (25 - 29, 356 - 412)	OFF	Does not exist.

* For cooling fan motor operation.



A/C RELAY

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

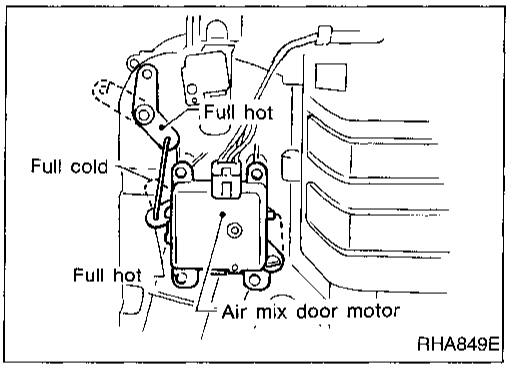


Control Linkage Adjustment

MODE DOOR

1. Install mode door motor on heater unit and connect it to main harness.
   Make sure lever of mode door motor is fitted into the slit of mode door link.
2. Set up code No. 46 in Self-diagnosis STEP 4.
3. Make sure mode door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

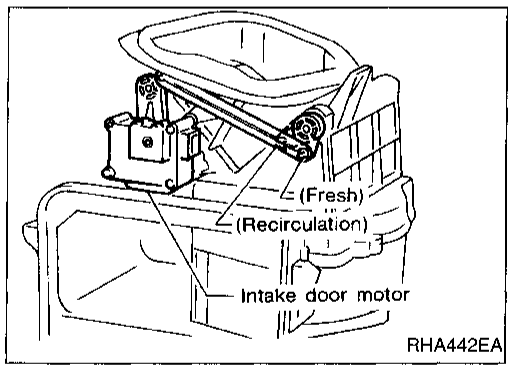
41	42	43	44	45	46
VENT	B/L	B/L	FOOT	F/D	DEF



AIR MIX DOOR

1. Install air mix door motor on heater unit and connect it to main harness.
   Make sure lever of Air mix door is fitted into the slit of air mix door link.
2. Set up code No. 41 in Self-diagnosis STEP 4.
3. 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			



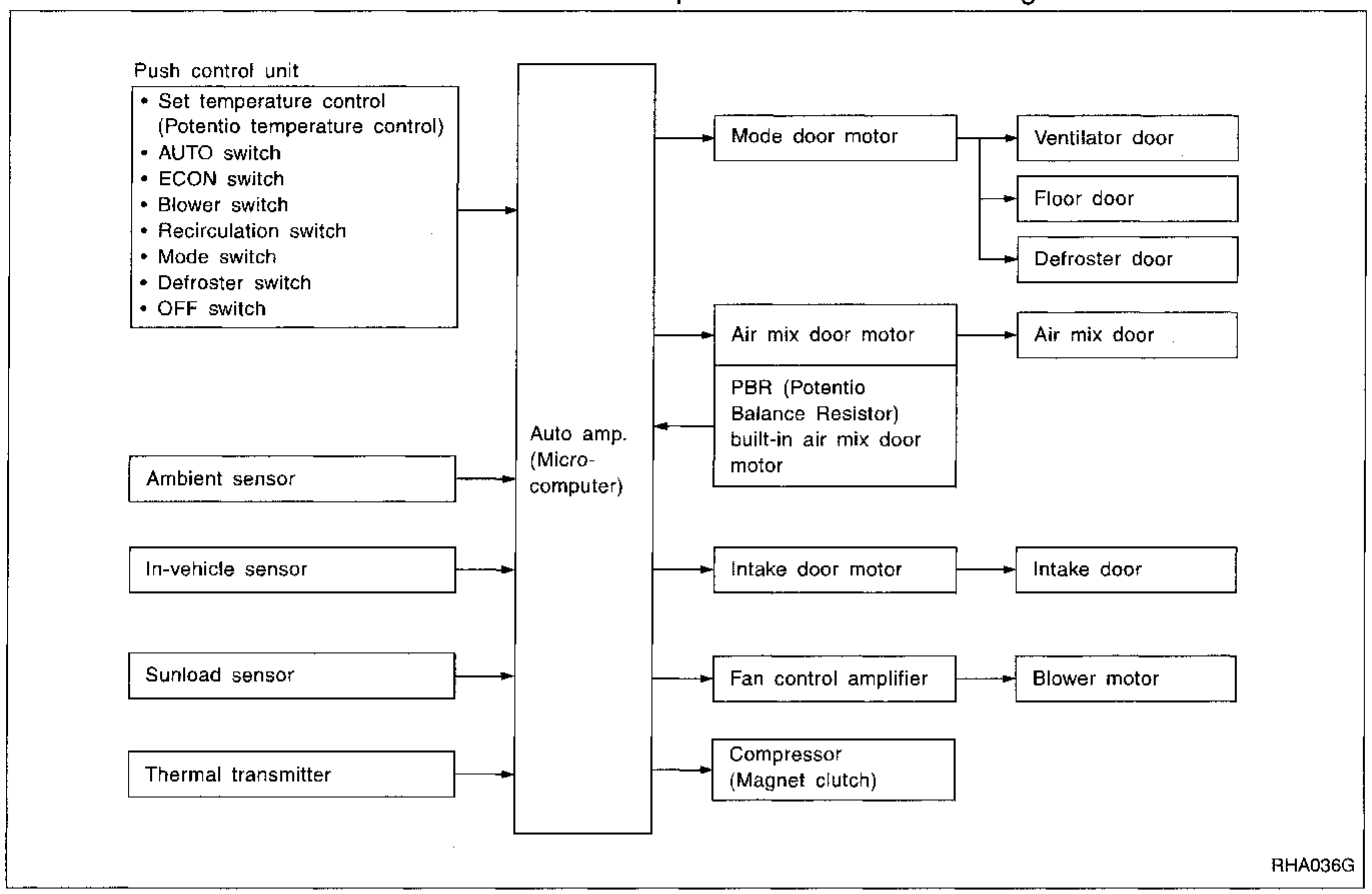
INTAKE DOOR

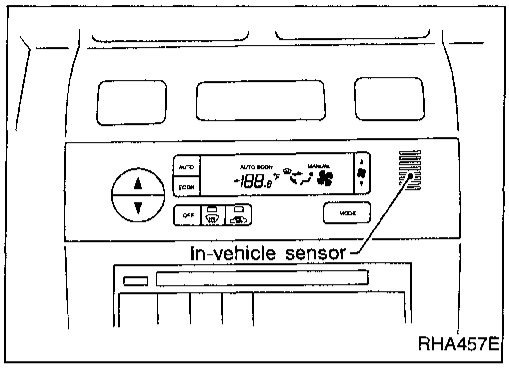
1. Install intake door motor on intake unit and connect it to main harness.
   Make sure lever of intake door motor is fitted in the slit of intake door link.
2. Set up code No. 41 in Self-diagnosis STEP 4.
3. Make sure intake door operates properly when changing from code No. 41 to 46 by pushing DEF switch.

41	42	43	44	45	46
REC		20% FRE	FRE		

Overview of Control System

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





Control System Input Components

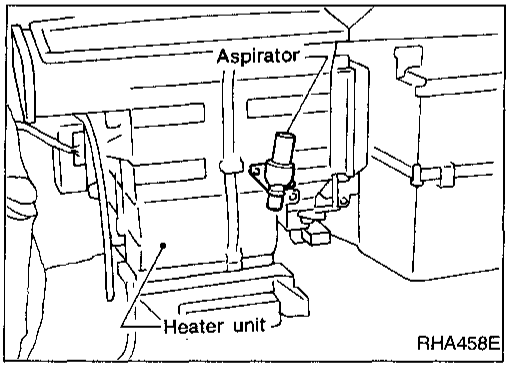
POTENTIO TEMPERATURE CONTROL (PTC)

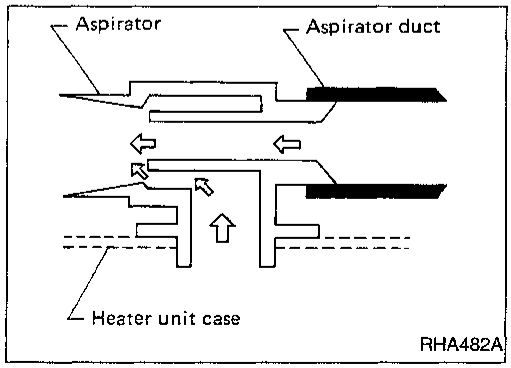
The PTC is built into the push control unit. It can be set at an interval of 1°C (2°F) through both ▲ (HOT) and ▼ (COLD) control switches. Setting temperature is digitally displayed.

IN-VEHICLE SENSOR

The in-vehicle sensor is attached to A/C control finisher. It converts variations in temperature of compartment air drawn from an aspirator into a resistance value. It is then input into the auto amp.
After disconnecting in-vehicle sensor harness connector, measure resistance between terminals ① and ② at sensor harness side, using the table below.

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

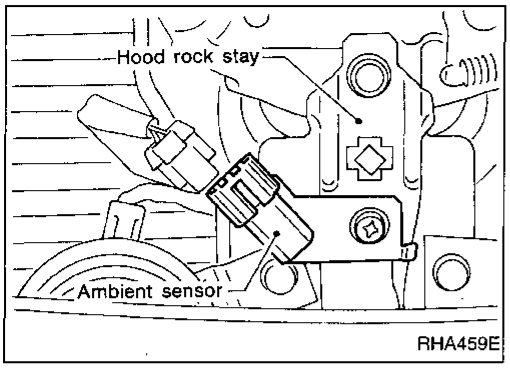




ASPIRATOR

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)

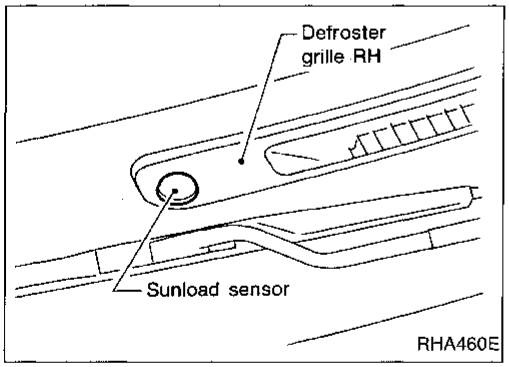


AMBIENT SENSOR

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 amp.

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

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



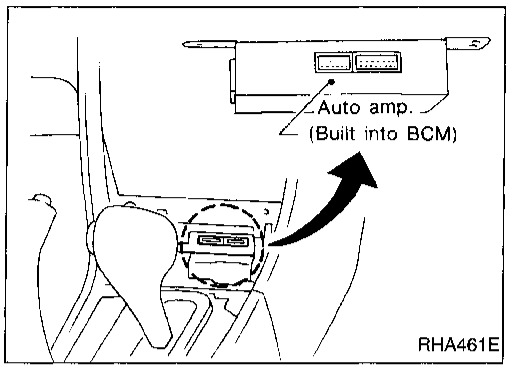
SUNLOAD SENSOR

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 amp.

Measure voltage between terminals ① and ② 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, bi-level door motor and compressor are then controlled.

The auto amp. 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 amp. to provide quick check of malfunctions in the auto air conditioning system.

AMBIENT TEMPERATURE INPUT PROCESS

The auto amp. includes a "processing circuit" for the ambient sensor input. When the ambient temperature increases quickly, the processing circuit controls the input from the ambient sensor. It allows the auto amp. to recognize the increase of temperature 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 ambient temperature has not changed, the ambient sensor will detect the increase of temperature. The heat radiated from the engine compartment can radiate to the front grille area. The ambient sensor is located there.

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. As a result, the effect the above mentioned 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:

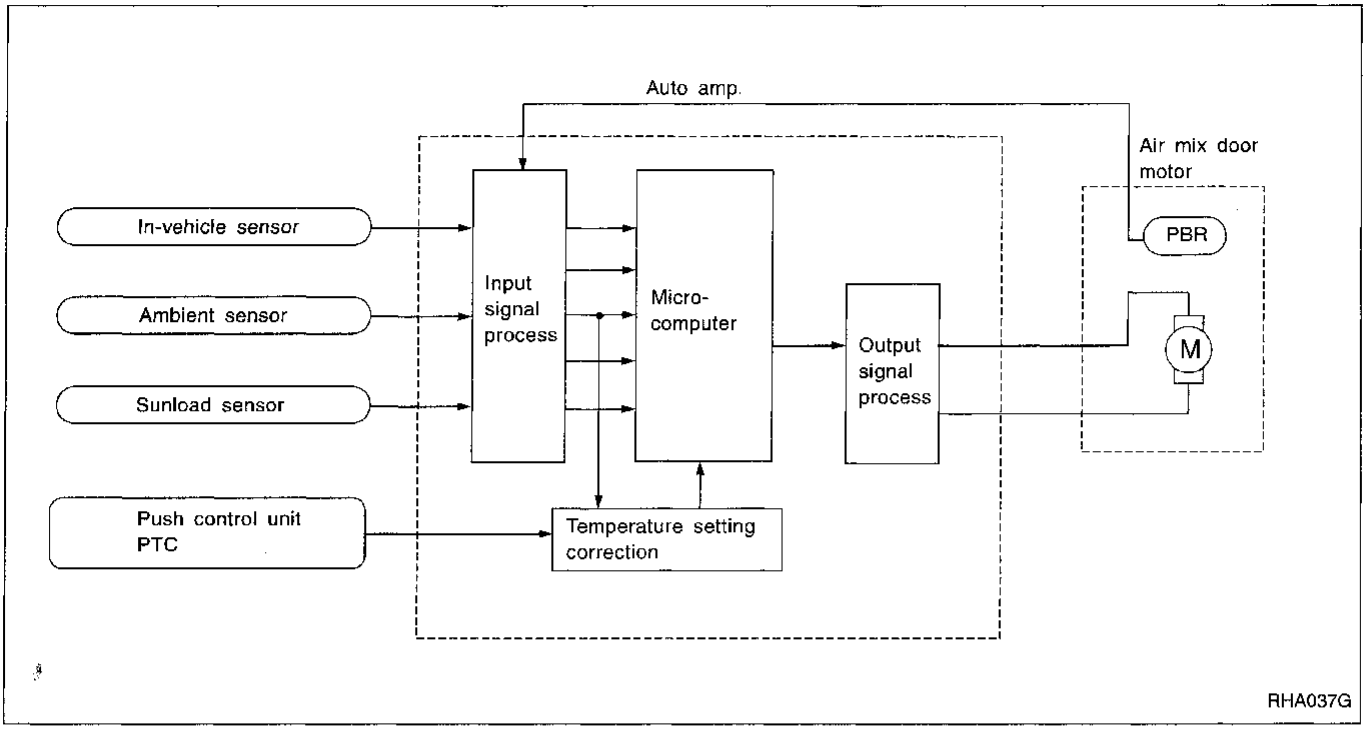
1) Auto amp.
2) Air mix door motor (PBR)
3) In-vehicle sensor
4) Ambient sensor
5) Sunload sensor

System operation

Temperature set by Potentio Temperature Control (PTC) is compensated through setting temperature correction circuit to determine target temperature.

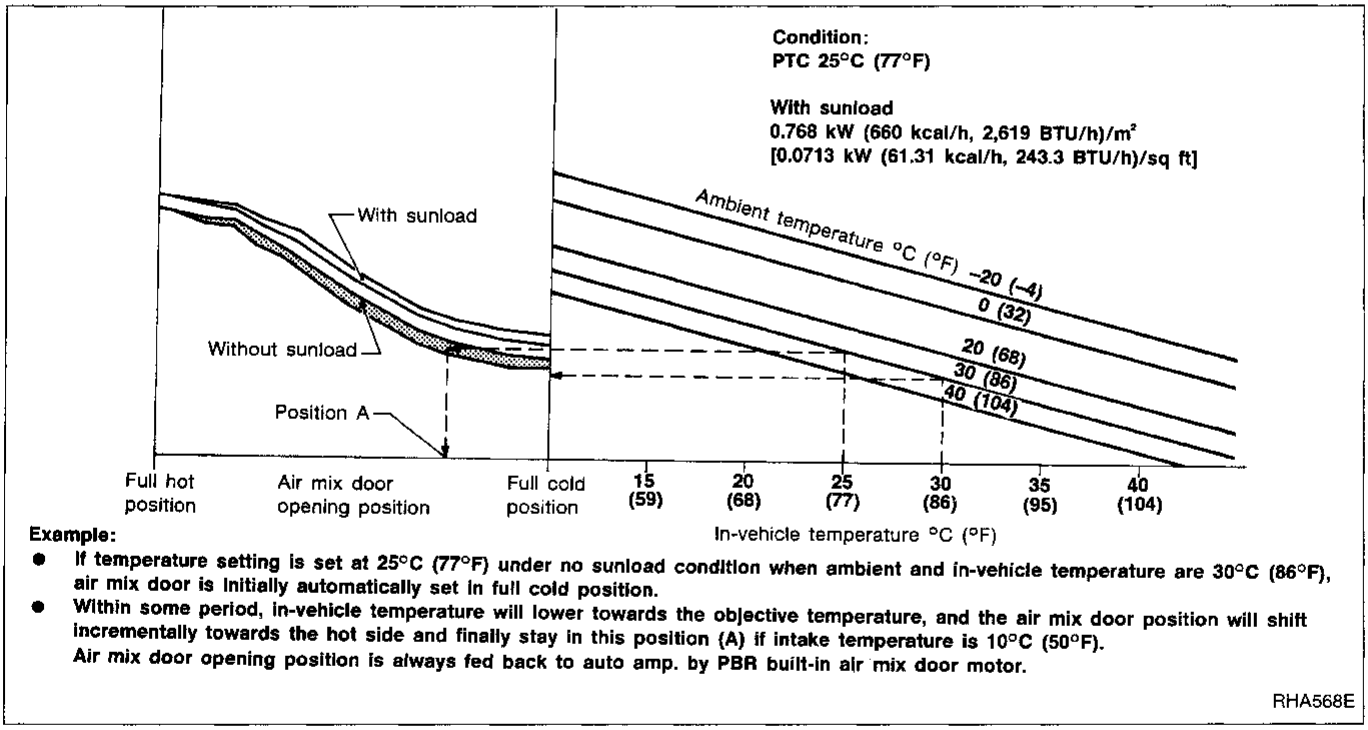
Auto amp. will operate air mix door motor to set air conditioning system in HOT or COLD position, depending upon relationship between conditions (target temperature, sunload, in-vehicle temperature and ambient temperature) and conditions (air mix door position and compressor operation).

Control System Output Components (Cont'd)



RHA037G

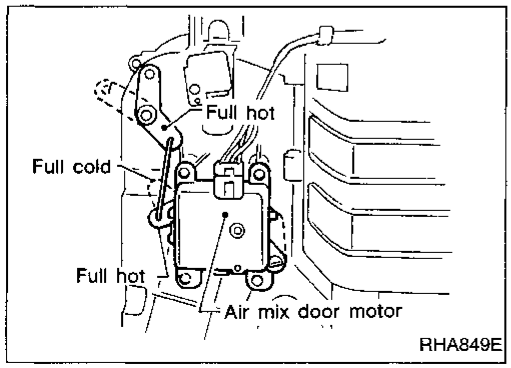
Air mix door control specification



Example:

- **If temperature setting is set at 25°C (77°F) under no sunload condition when ambient and in-vehicle temperature are 30°C (86°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 intake temperature is 10°C (50°F).**
  Air mix door opening position is always fed back to auto amp. by PBR built-in air mix door motor.

RHA568E



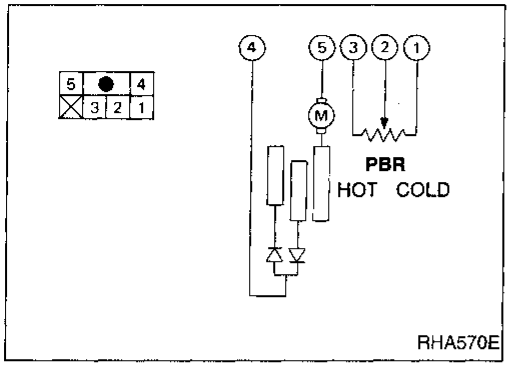
RHA849E

AIR MIX DOOR MOTOR

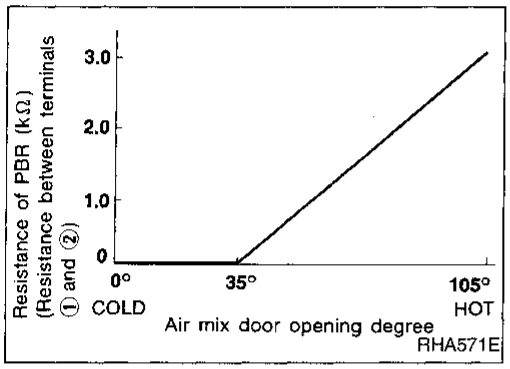
The air mix door motor is attached to the bottom of the heater unit. It rotates so that the air mix door is opened to a position set by the auto amp. Motor rotation is then conveyed through a shaft and air mix door position is then fed back to the auto amp. by PBR built-in air mix door motor.

Control System Output Components (Cont'd)

Air mix door operation



4	5	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 resistance between terminals ① and ② at vehicle harness side.

MODE DOOR CONTROL

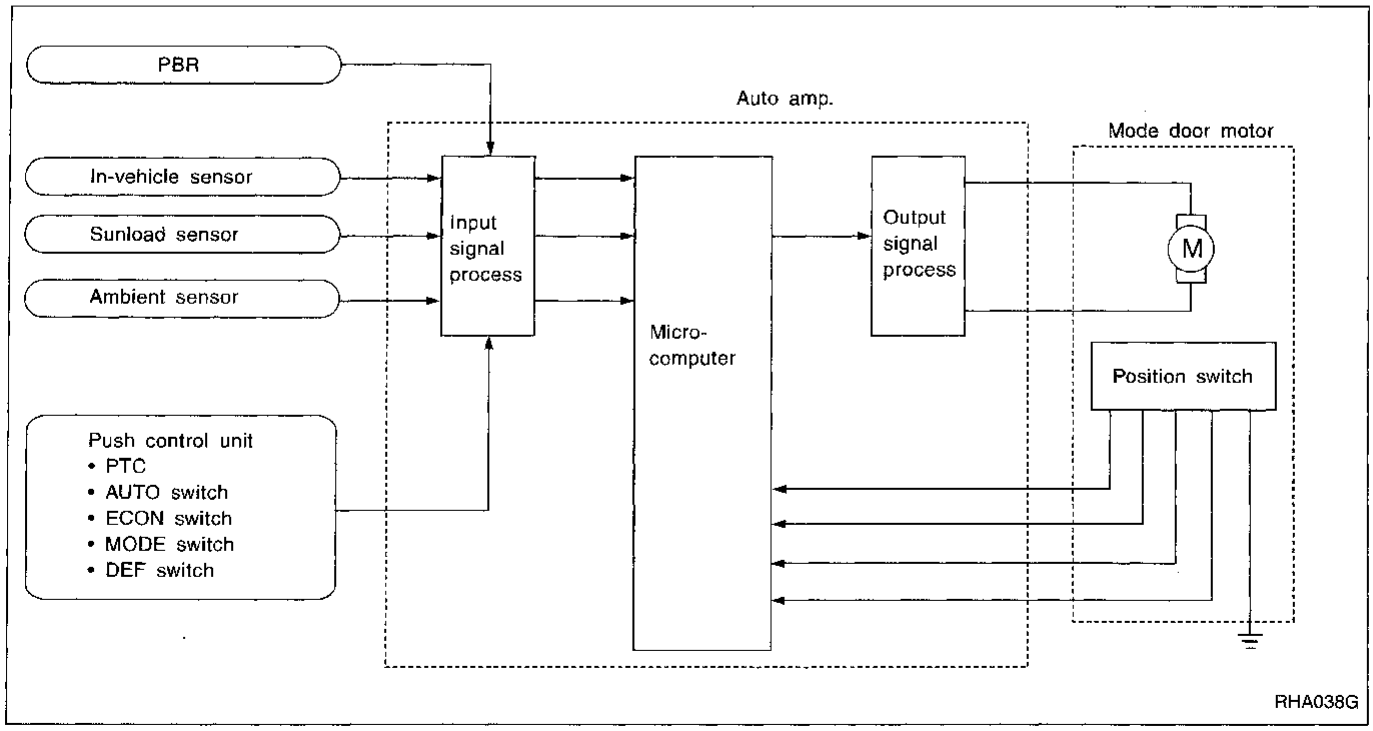
Component parts

Mode door control system components are:

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

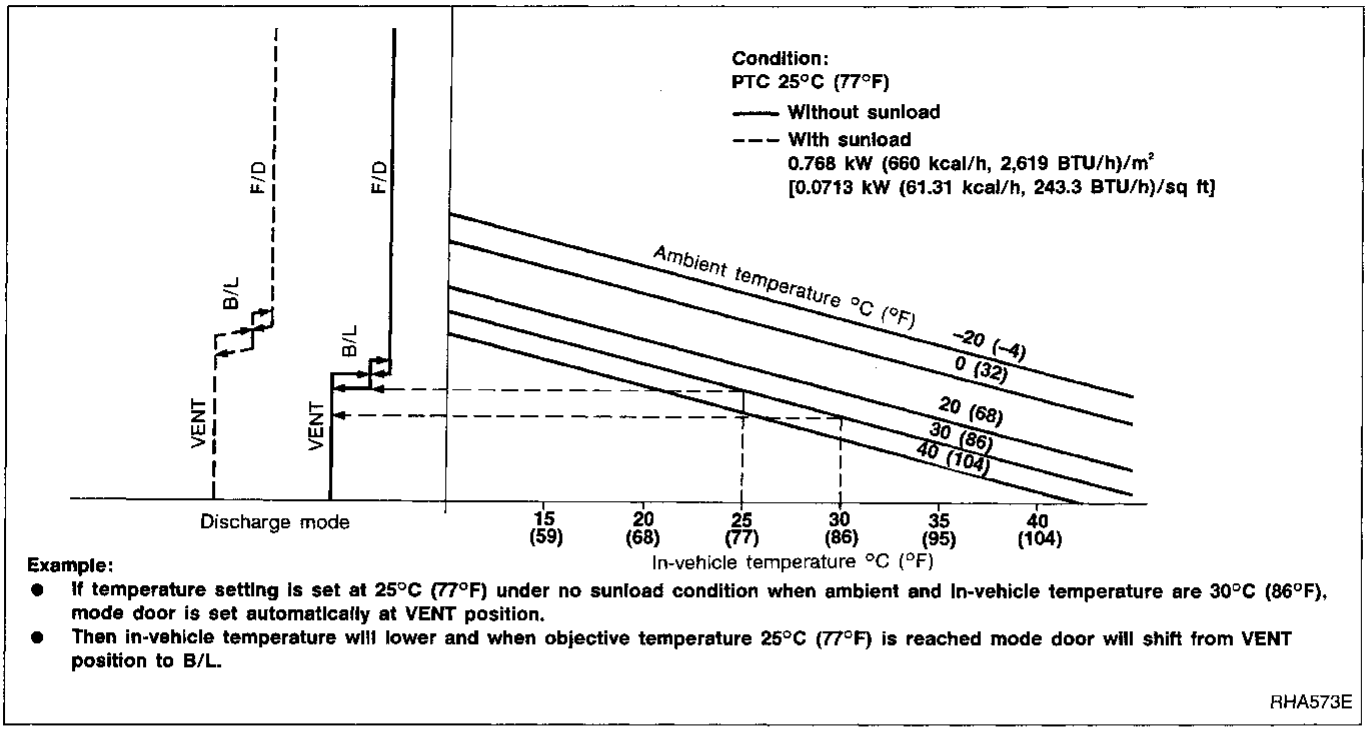
System operation

The auto amp. computes the air discharge conditions according to the ambient temperature and the in-vehicle temperature. The computed discharge conditions are then corrected for sunload. By this correction, it is determined through which outlets air will flow into the passenger compartment.



Control System Output Components (Cont'd)

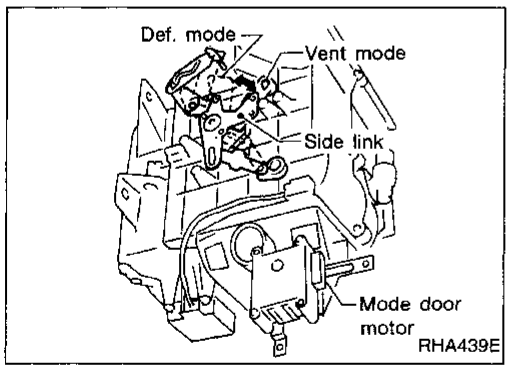
Mode door control specification



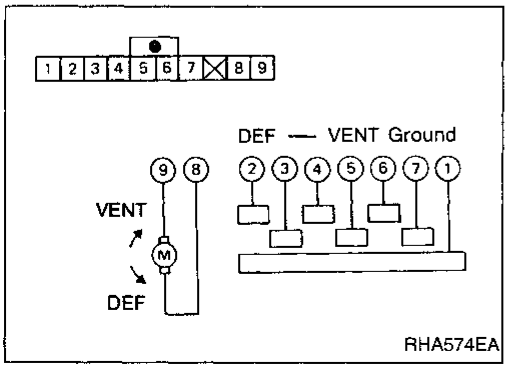
Example:

- **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.**
- **Then in-vehicle temperature will lower and when objective temperature 25°C (77°F) is reached mode door will shift from VENT position to B/L.**

RHA573E



RHA439E



RHA574EA

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 amp. Motor rotation is conveyed to a link which activates the mode door.

9	8	Mode door operation	Direction of side link rotation
⊕	⊖	VENT → DEF	Clockwise
—	—	STOP	STOP
⊖	⊕	DEF → VENT	Counterclockwise

Control System Output Components (Cont'd)

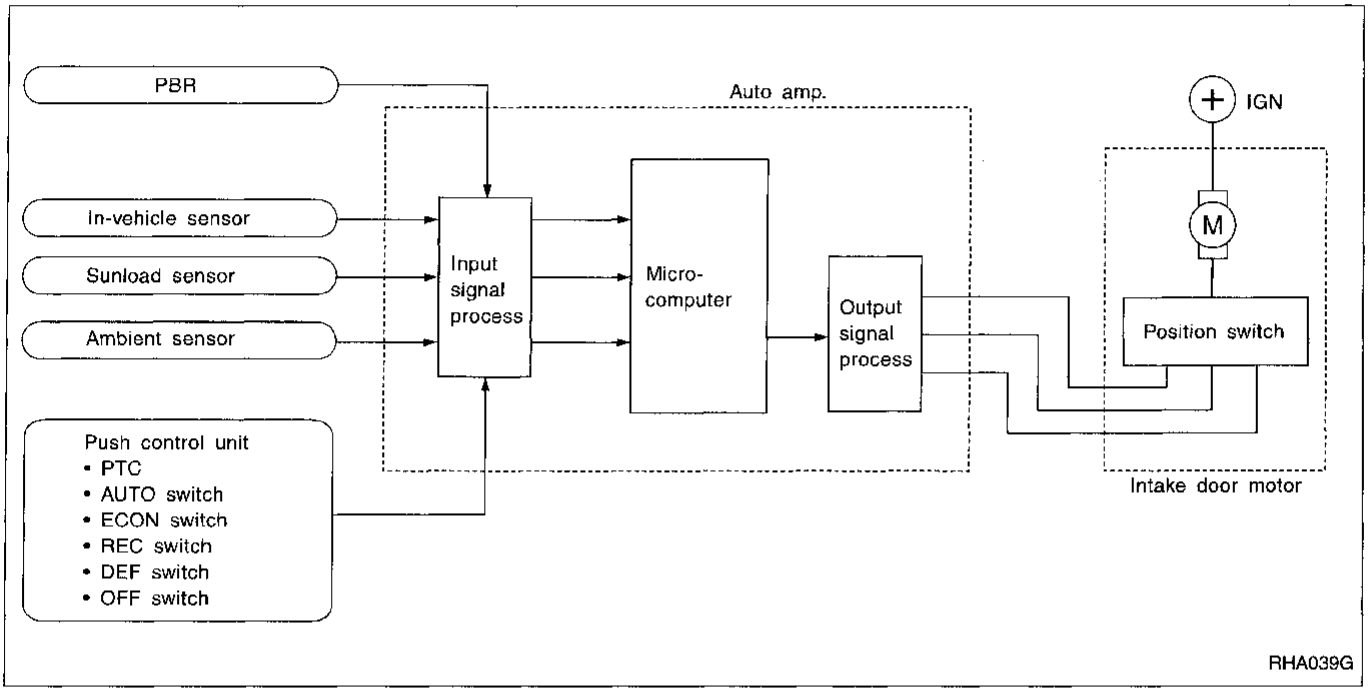
INTAKE DOOR CONTROL

Components parts

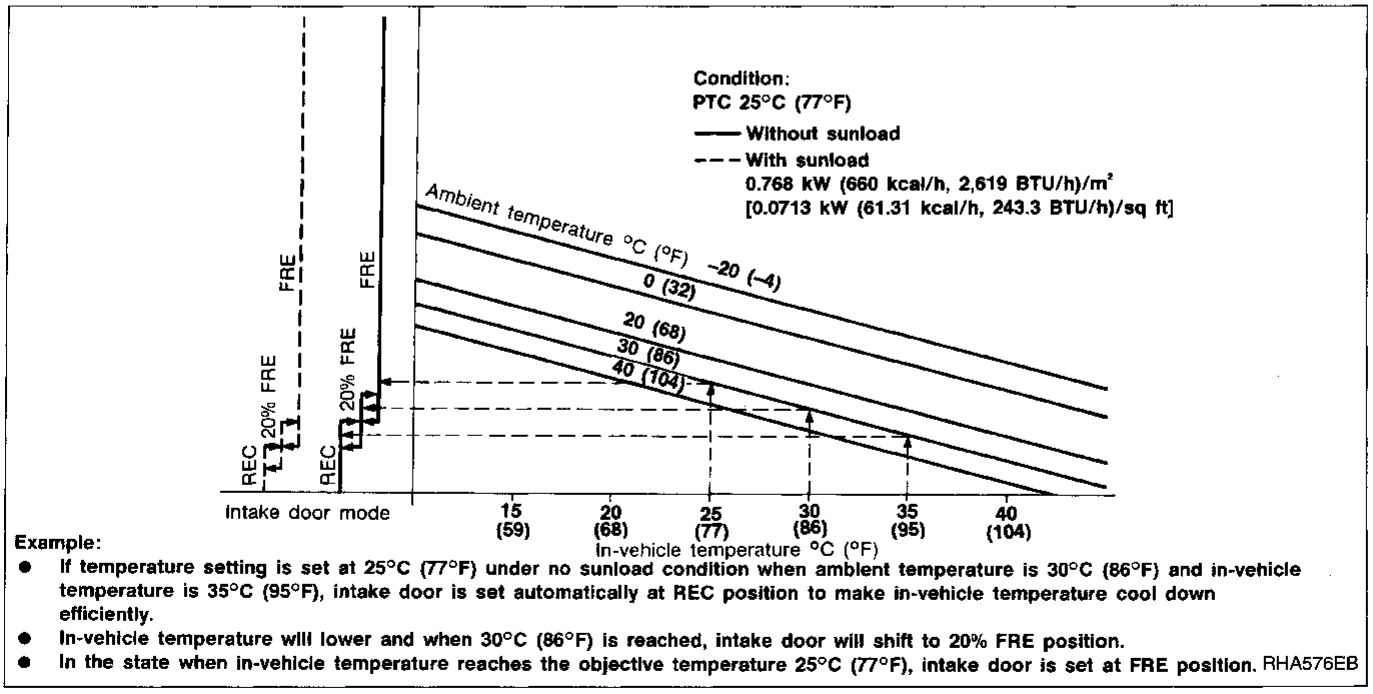
Intake door control system components are:
1) Auto amp.
2) Intake door motor
3) PBR
4) In-vehicle sensor
5) Ambient sensor
6) Sunload sensor

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 amp. sets the intake door at the "Fresh" position.

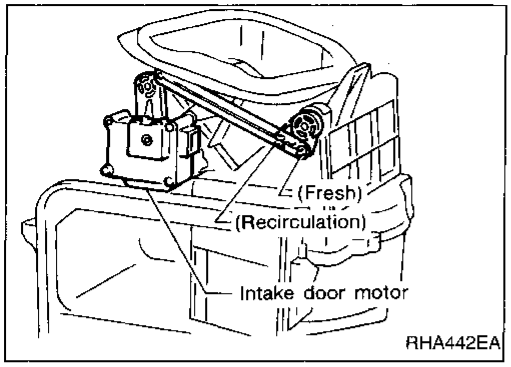


Intake door control specification



Example:
- If temperature setting is set at 25°C (77°F) under no sunload condition when ambient temperature is 30°C (86°F) and in-vehicle temperature is 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 30°C (86°F) is reached, intake door will shift to 20% FRE position.
- In the state when in-vehicle temperature reaches the objective temperature 25°C (77°F), intake door is set at FRE position. RHA576EB

Control System Output Components (Cont'd)

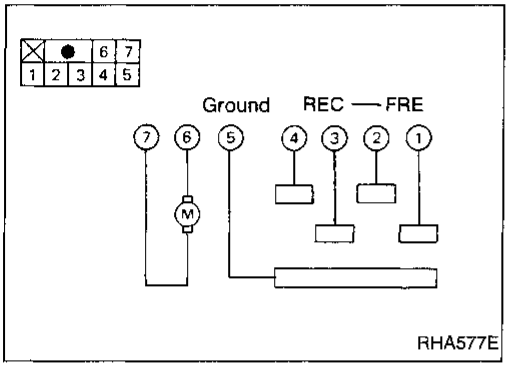


INTAKE DOOR MOTOR

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

Intake door motor operation

6	7	Intake door operation	Movement of link rotation
⊕	⊖	REC → FRE	Clockwise
—	—	STOP	STOP
⊖	⊕	FRE → REC	Counterclockwise



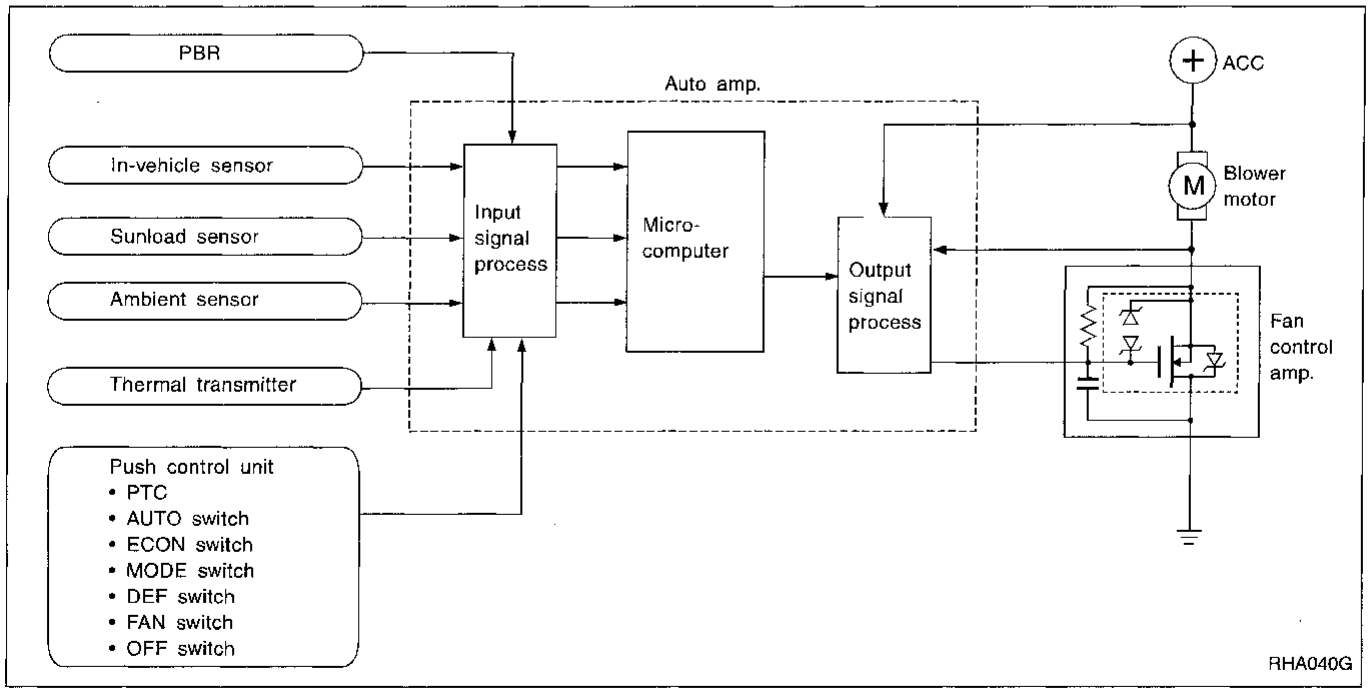
FAN SPEED CONTROL

Component parts

Fan speed control system components are:

1) Auto amp.
2) Fan control amplifier
3) PBR
4) In-vehicle sensor
5) Ambient sensor
6) Sunload sensor
7) Thermal transmitter

System operation



Control System Output Components (Cont'd)

AUTOMATIC MODE

In the automatic mode, the blower motor speed is calculated by the auto amp. 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, the auto amp. supplies a signal (in the range of 2.5V to 9V), to the fan control amplifier. Based on this signal, the fan control amplifier controls the current flow from the blower motor to ground.

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 150 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 150 seconds. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 50°C (122°F). Then the blower speed will increase to the objective speed.

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

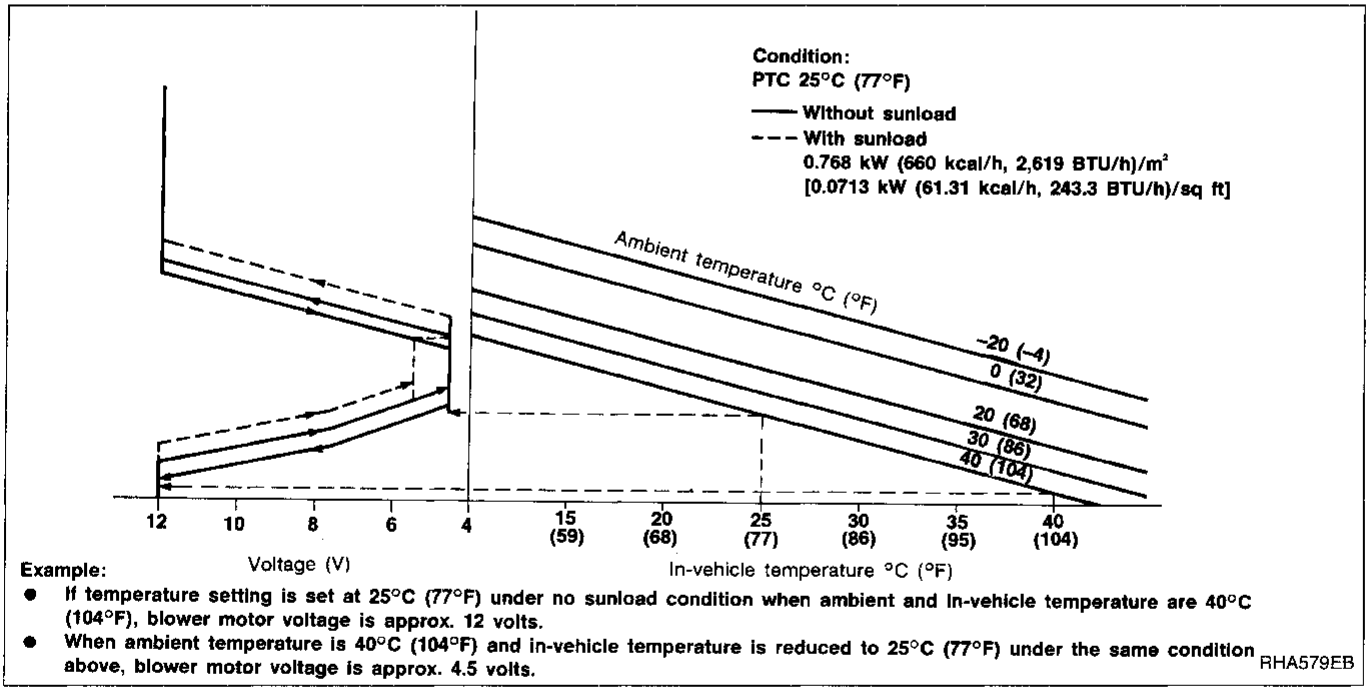
The blower will begin operation momentarily after the AUTO button is pushed. The blower speed will gradually rise to the objective speed over a time period of 5 seconds or less (actual time depends on the objective blower speed).

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).

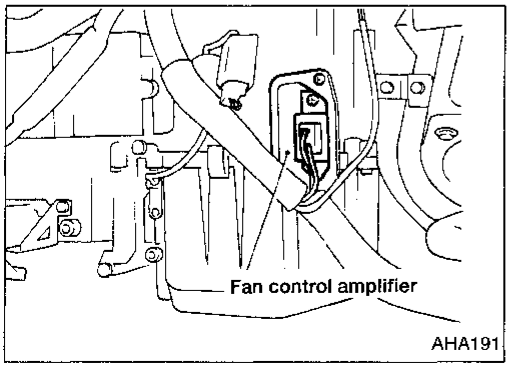
Fan speed control specification



Example:

- **If temperature setting is set at 25°C (77°F) under no sunload condition when ambient and in-vehicle temperature are 40°C (104°F), blower motor voltage is approx. 12 volts.**
- **When ambient temperature is 40°C (104°F) and in-vehicle temperature is reduced to 25°C (77°F) under the same condition above, blower motor voltage is approx. 4.5 volts.**

RHA579EB



AHA191

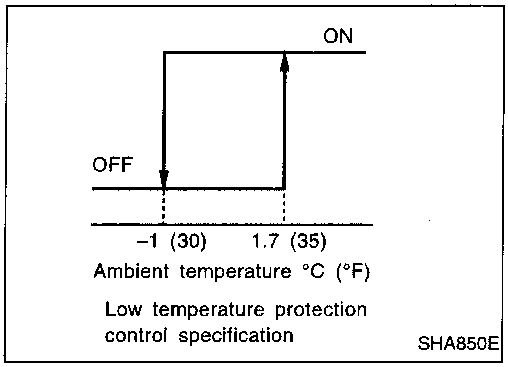
FAN CONTROL AMPLIFIER

The fan control amplifier is located on the cooling unit. It amplifies the base current flowing from the auto amp. to change the blower speed within the range of 4V to 12V.

Control System Output Components (Cont'd)

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

Auto amplifier will turn the compressor "ON" or "OFF" as determined by a signal detected by ambient temperature sensor.
The compressor turns "OFF" when ambient temperatures are less than –1°C (30°F).

Acceleration cut control

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

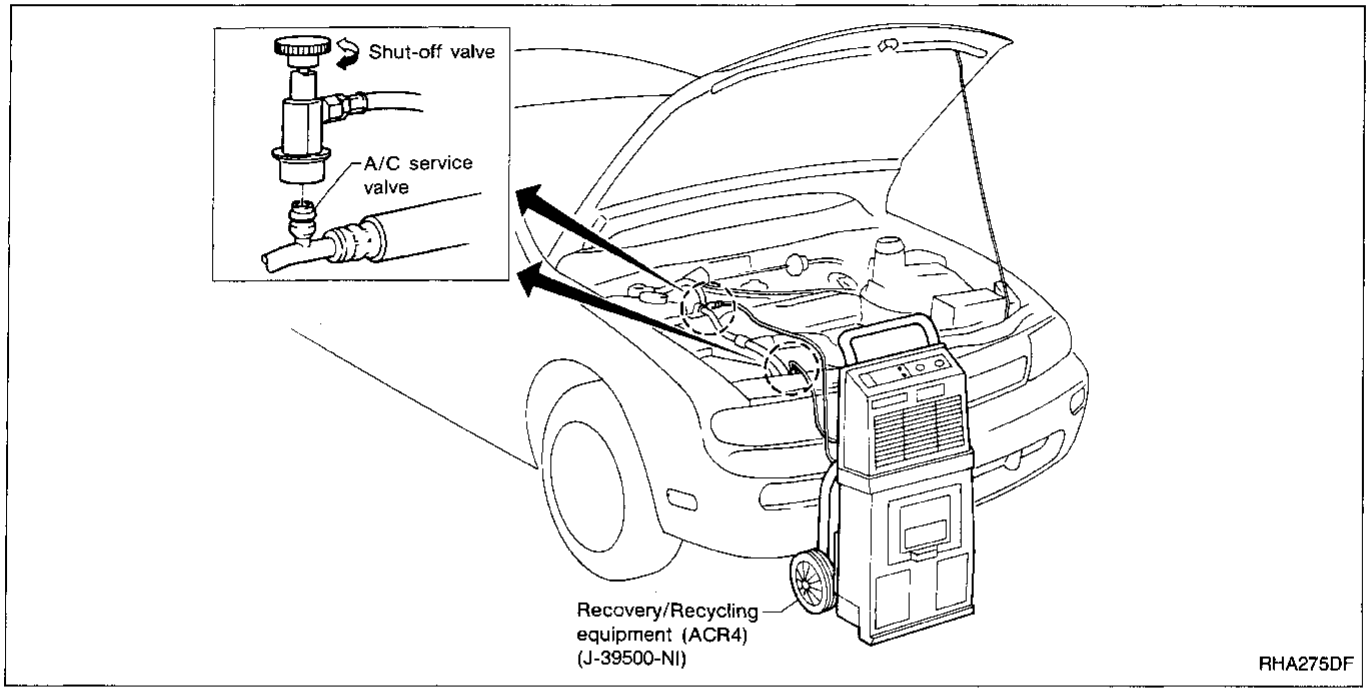
HFC-134a (R-134a) Service Procedure

SETTING OF SERVICE TOOLS AND EQUIPMENT

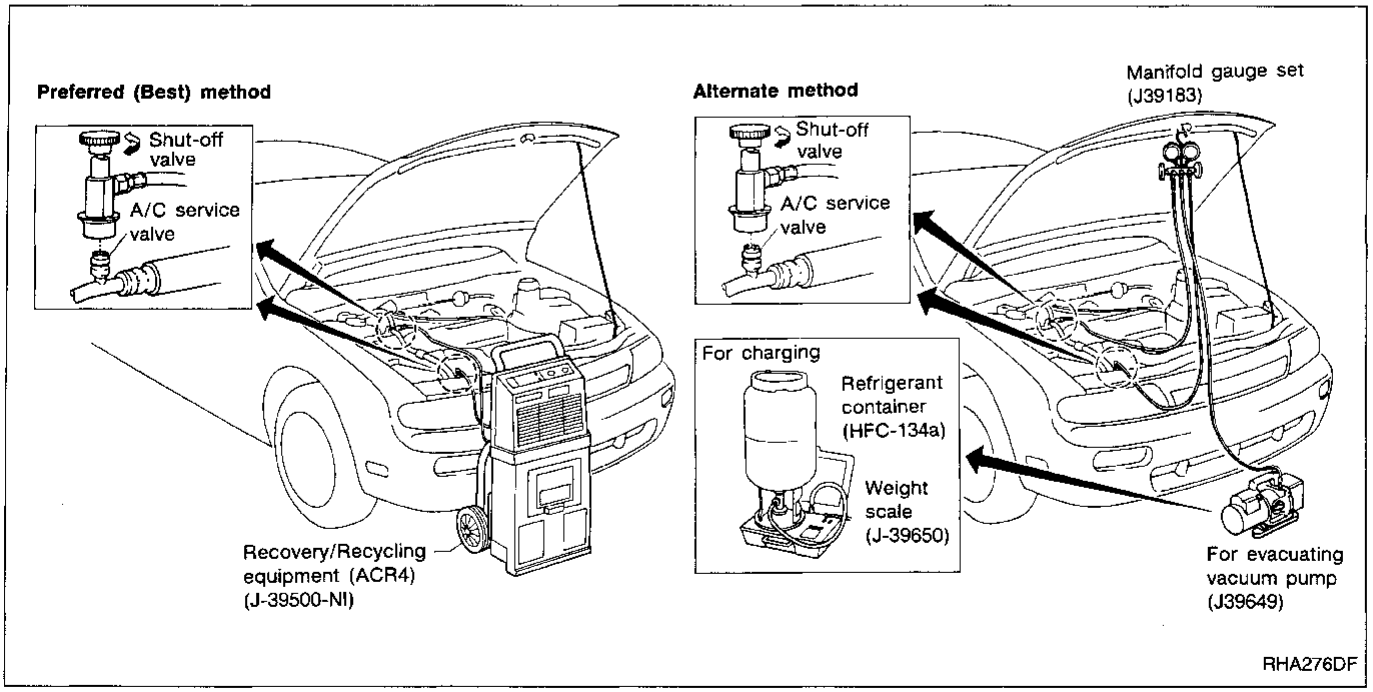
DISCHARGING REFRIGERANT

WARNING:

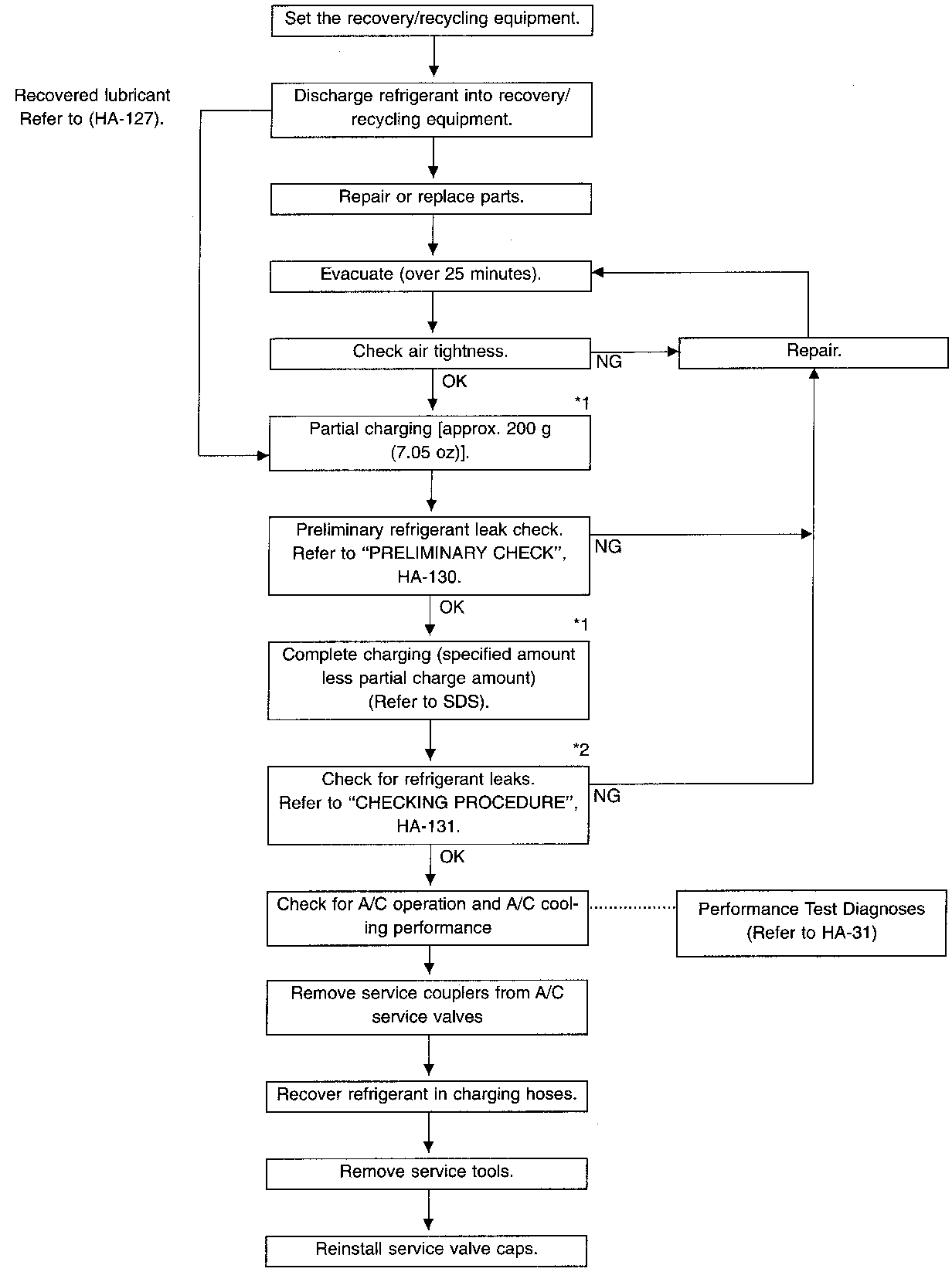
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove R-134a from A/C system, using certified service equipment meeting requirements of SAE J2210 (R-134a recycling equipment), or J2209 (R-134a recovery equipment). If accidental system discharge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



EVACUATING SYSTEM AND CHARGING REFRIGERANT



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



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

Maintenance of Lubricant Quantity in Compressor

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

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

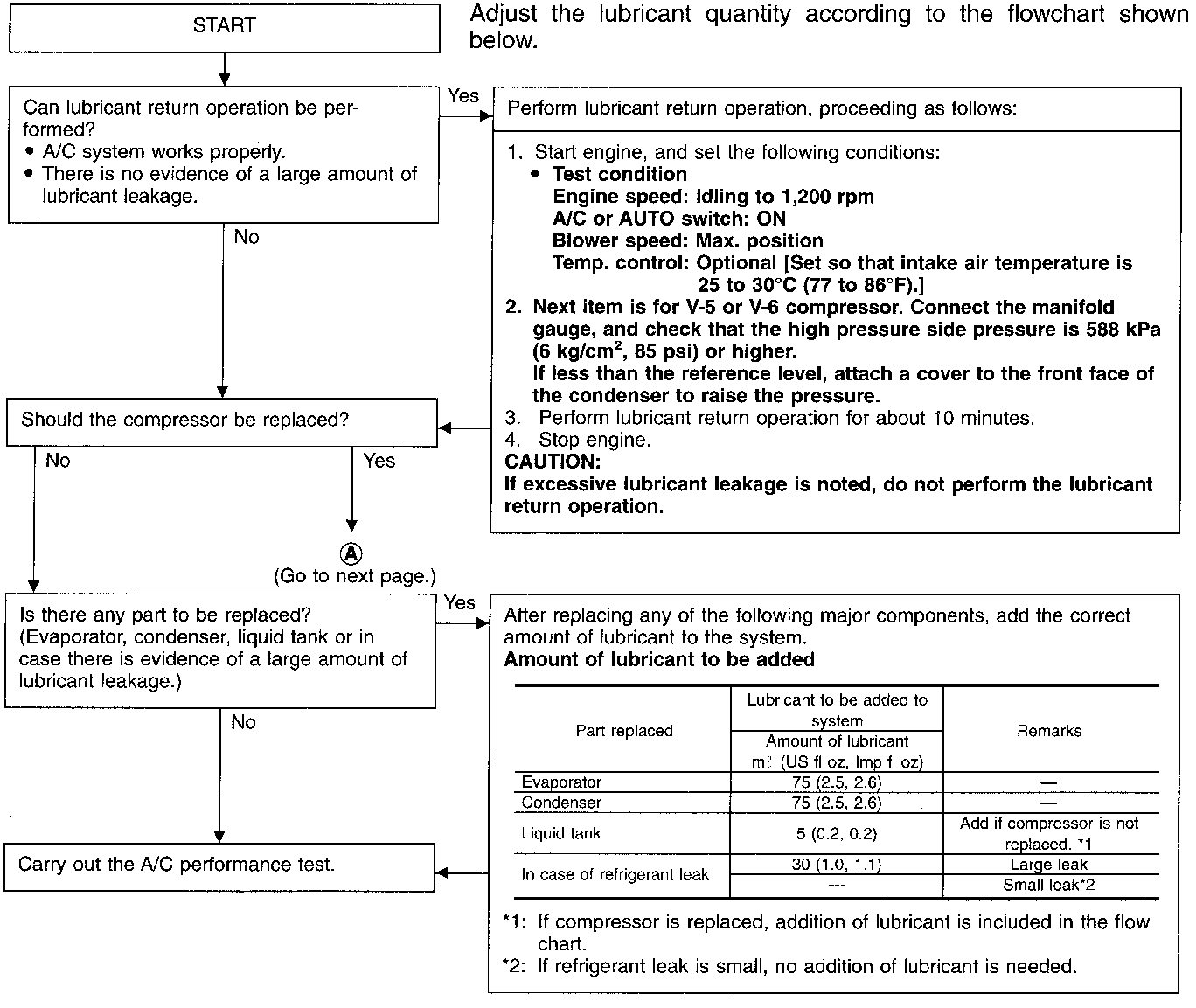
- Lack of lubricant: May lead to a seized compressor
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

LUBRICANT

Name: Nissan A/C System Oil Type S
Part number: KLH00-PAGS0

CHECKING AND ADJUSTING

Adjust the lubricant quantity according to the flowchart shown below.



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

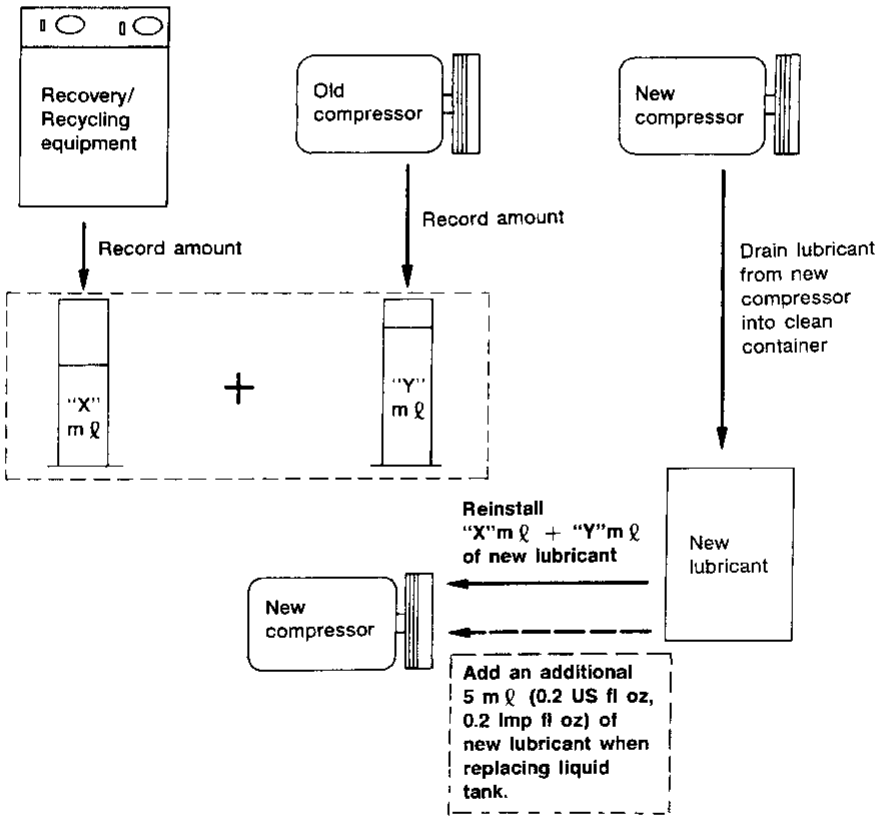
*1: If compressor is replaced, addition of lubricant is included in the flow chart.
*2: If refrigerant leak is small, no addition of lubricant is needed.

Maintenance of Lubricant Quantity in Compressor (Cont'd)

Ⓐ

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

Lubricant adjusting procedure for compressor replacement

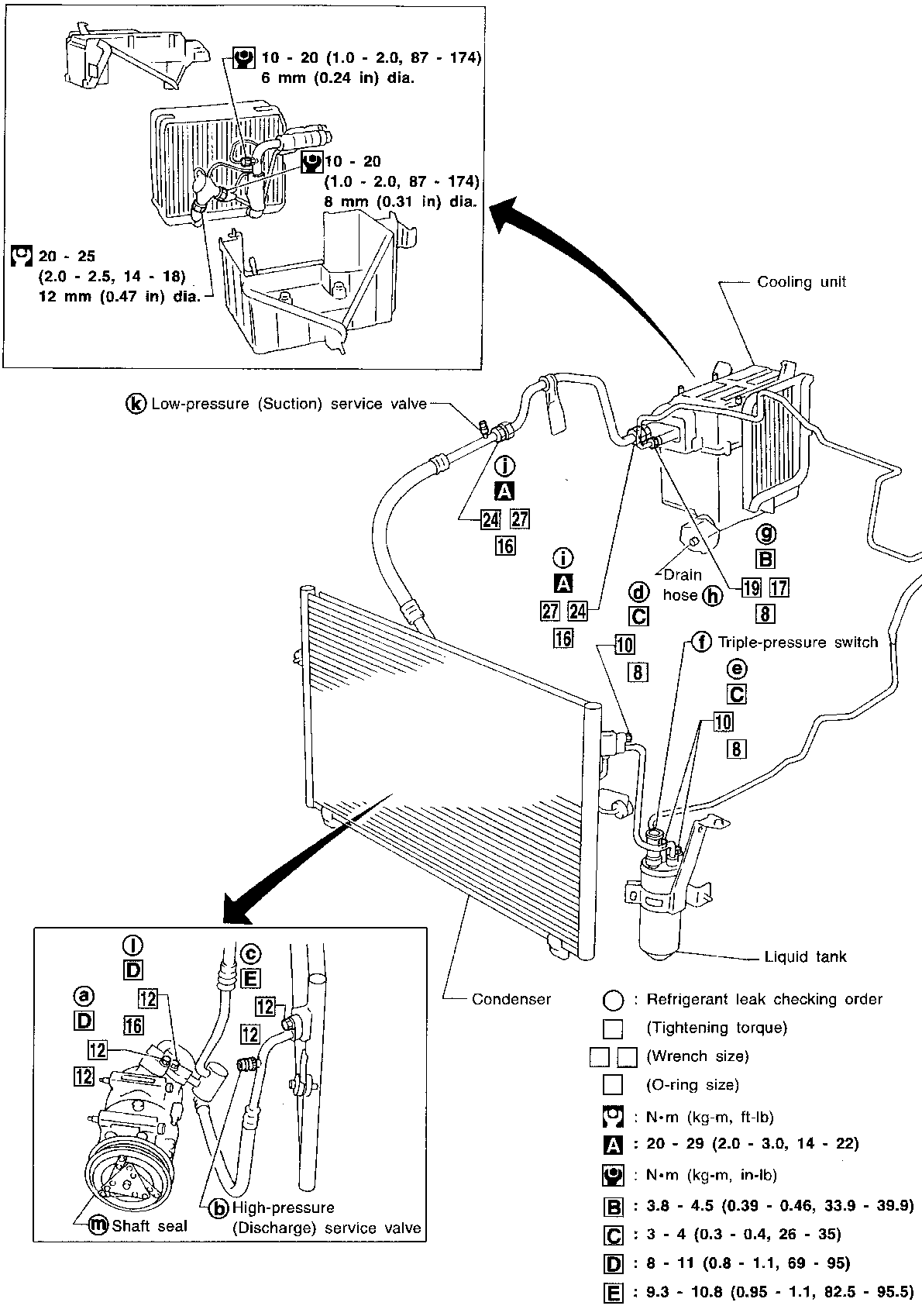


RHA065DD

Refrigerant Lines

- Refer to Precautions for Refrigerant Connection (HA-3).

SEC. 271•274•276

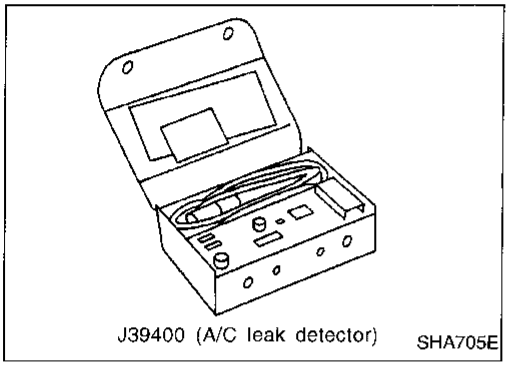


RHA133G

Checking Refrigerant Leaks

PRELIMINARY CHECK

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



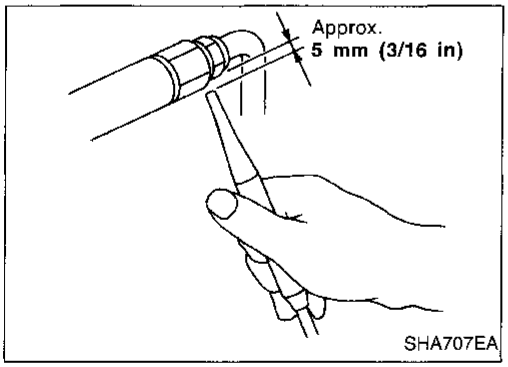
J39400 (A/C leak detector) SHA705E

PRECAUTIONS FOR HANDLING LEAK DETECTOR

When performing a refrigerant leak check, use a J39400 A/C leak detector or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.

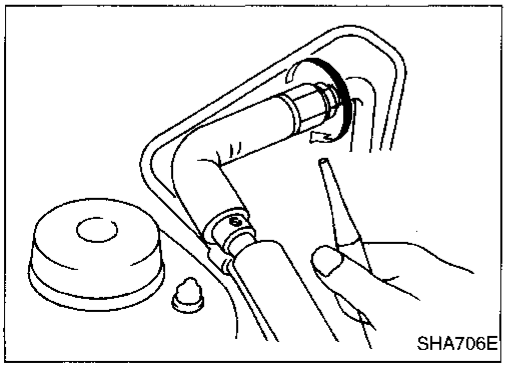
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.

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



SHA707EA

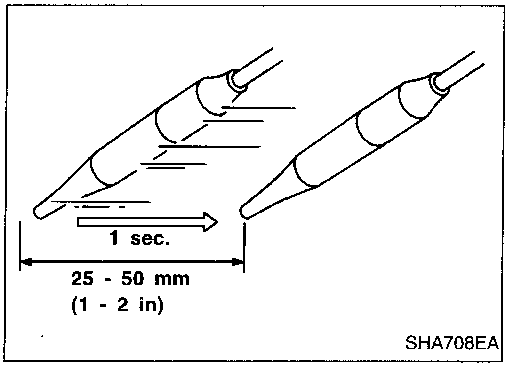
1. Position probe approximately 5 mm (3/16 in) away from point to be checked.



SHA706E

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

Checking Refrigerant Leaks (Cont'd)

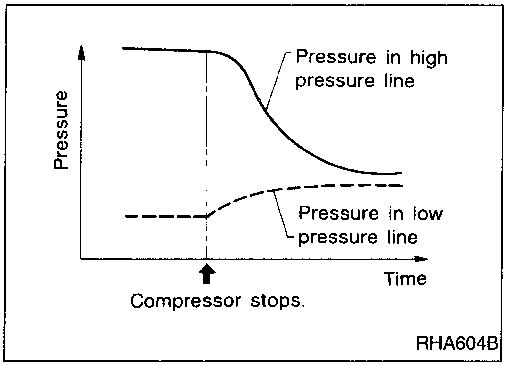


3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.

CHECKING PROCEDURE

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

1. Charge the system with the specified amount of refrigerant.
2. Run the engine with the A/C compressor ON for at least 2 minutes.
3. Stop engine.

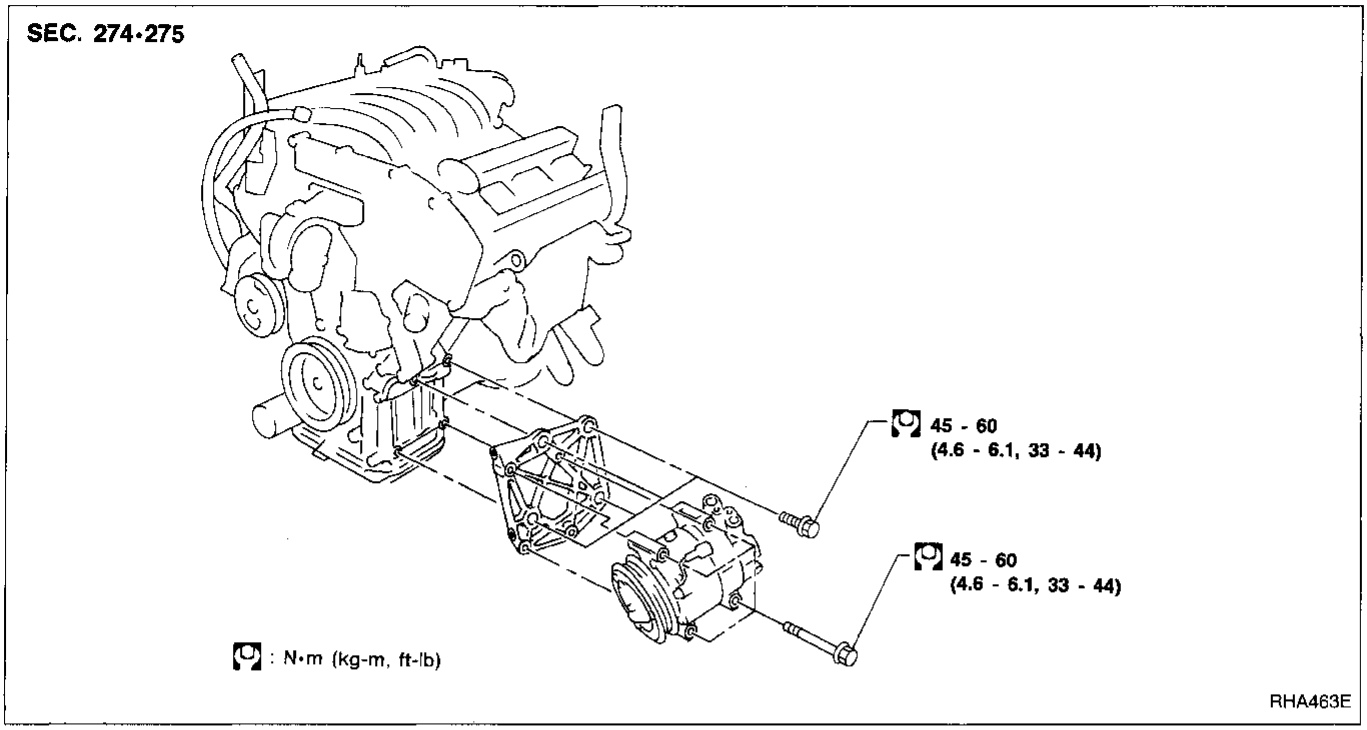


Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector on the high pressure line. The pressure in the high pressure line will gradually drop after refrigerant circulation stops and pressure in the low pressure line will gradually rise, as shown in the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

4. Conduct the leak test from the high side to the low side at points ⓐ through ⓜ. Refer to HA-129.
   Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detector probe completely around the connection/component.

- **Compressor**
  Check the fitting of high and low pressure hoses, relief valve and shaft seal.
- **Liquid tank**
  Check the pressure switch, tube fitting and the fusible plug mounts.
- **Service valves**
  Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).
- **Cooling unit**
  Turn blower fan on "High" for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Insert the leak detector probe into the drain hose immediately after stopping the engine. (Keep the probe inserted for at least ten seconds.)

Compressor Mounting



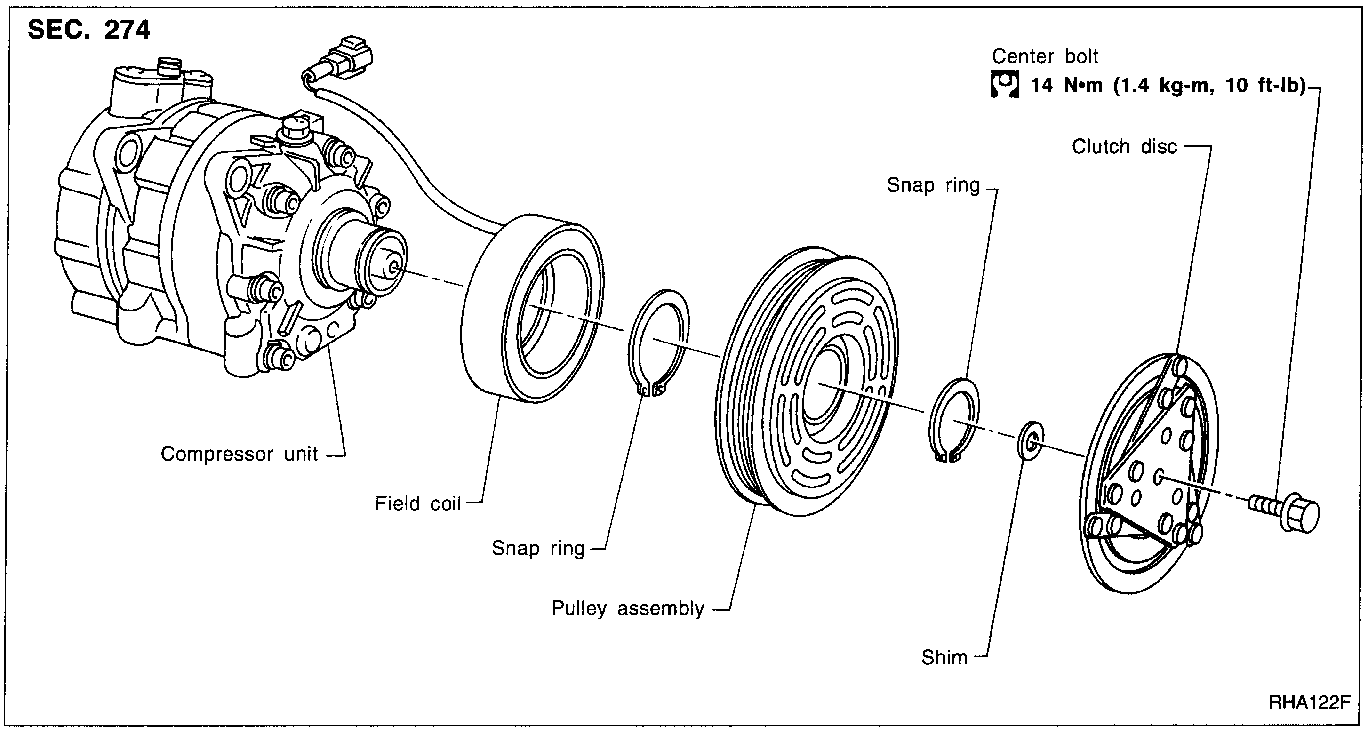
Belt Tension

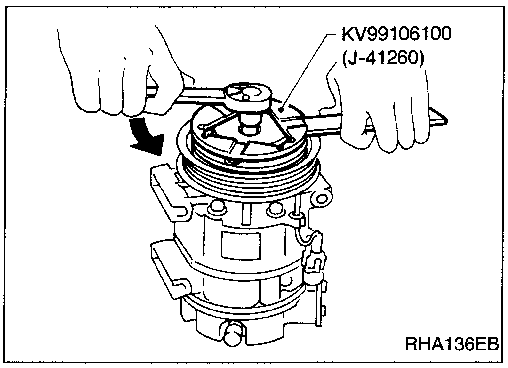
- Refer to MA section ("Checking Drive Belts", "ENGINE MAINTENANCE").

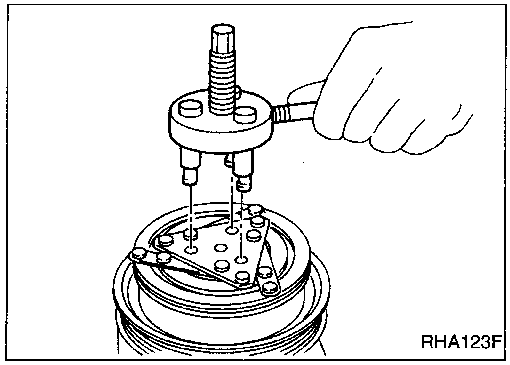
Fast Idle Control Device (FICD)

- Refer to EC section ("IACV-FICD SOLENOID VALVE", "TROUBLE DIAGNOSES FOR NON-DETECTIVE ITEMS").

Compressor





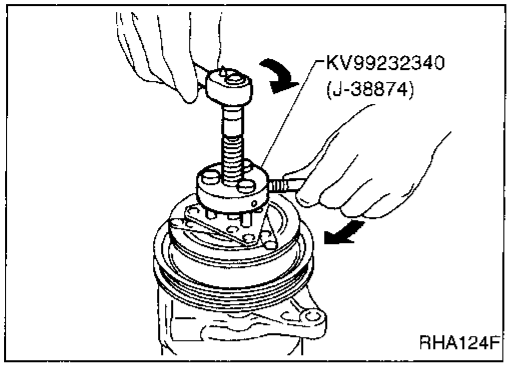


Compressor Clutch

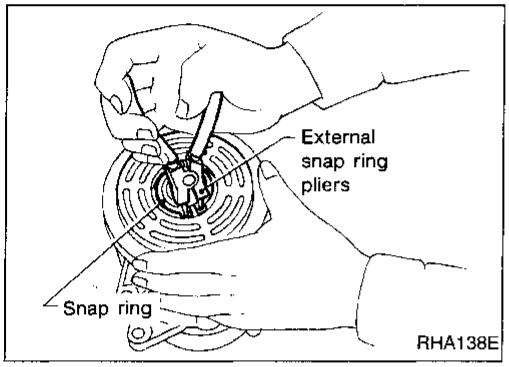
REMOVAL

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

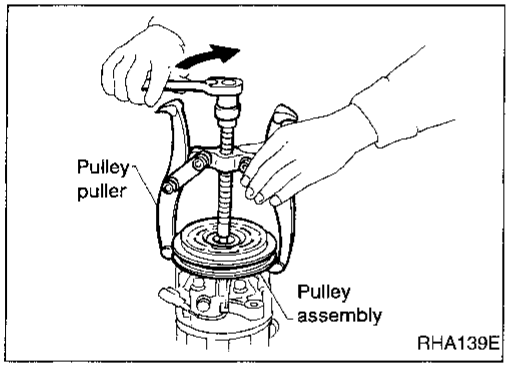
Compressor Clutch (Cont'd)



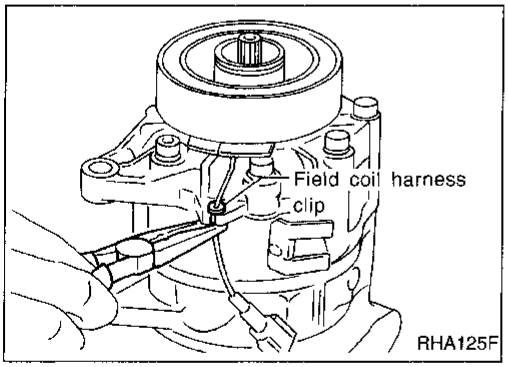
- Remove the clutch disc using the clutch disc puller.
  Insert the holder's three pins into the holes in the clutch disc. Rotate the holder clockwise to hook it onto the plate. Then, tighten the center bolt to remove the clutch disc.
  After removing the clutch disc, remove the shims from either the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



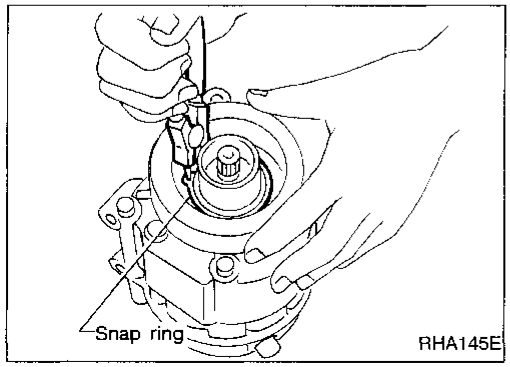
- Remove the snap ring using external snap ring pliers.



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

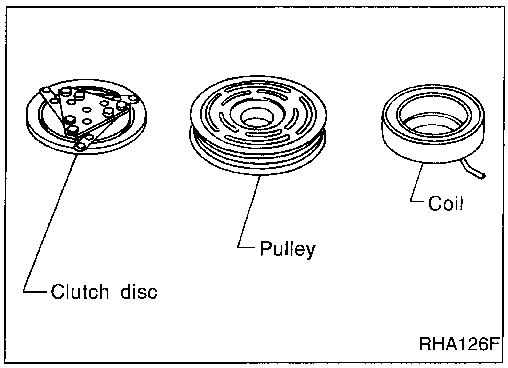


- Remove the field coil harness clip using a pair of pliers.



- Remove the snap ring using external snap ring pliers.

Compressor Clutch (Cont'd)



INSPECTION

Clutch disc

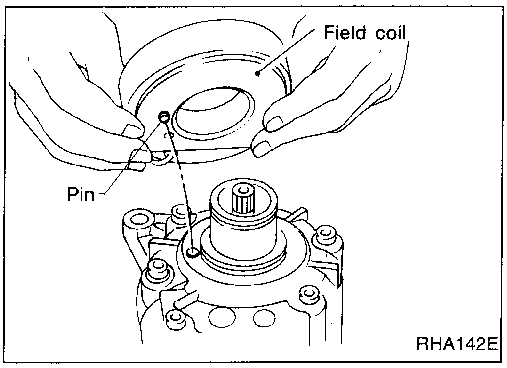
If the contact surface shows signs of damage due to excessive heat, replace clutch disc and pulley.

Pulley

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

Coil

Check clubricant for loose connection or cracked insulation.

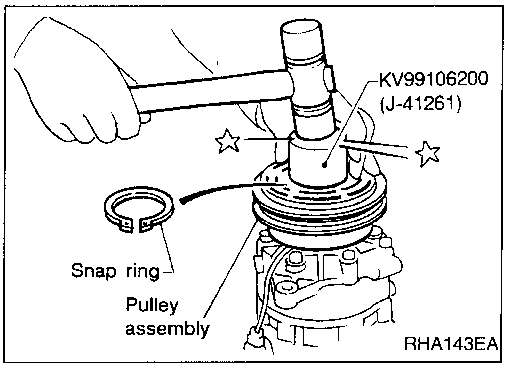


INSTALLATION

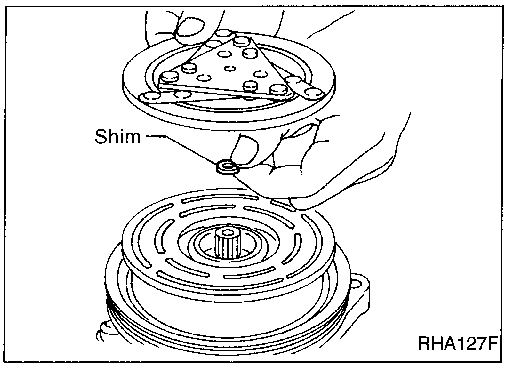
- Install the field coil.

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

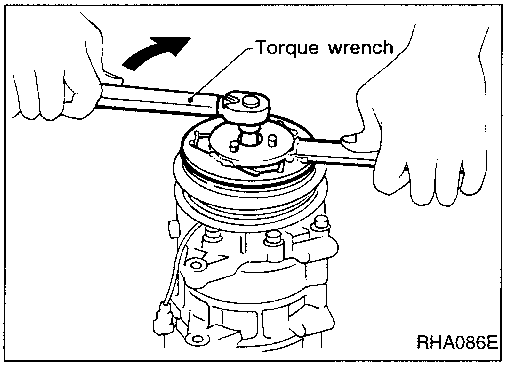
- Install the field coil harness clip using a screwdriver.



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



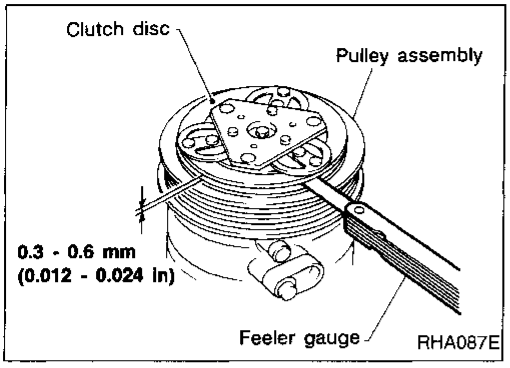
- Install the clutch disc on the drive shaft, together with the original shim(s). Press the clutch disc down by hand.



- Using the holder to prevent clutch disc rotation, tighten the bolt to 14 N·m (1.4 kg-m, 10 ft-lb) torque.

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

Compressor Clutch (Cont'd)



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

BREAK-IN OPERATION

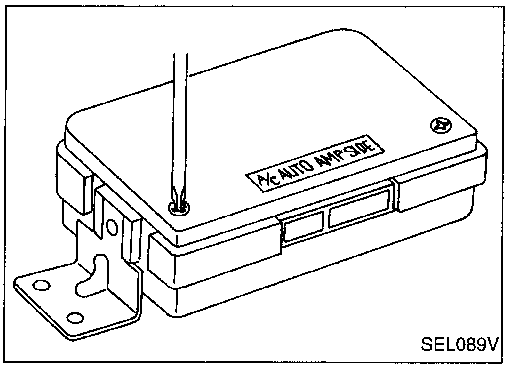
When replacing compressor clutch assembly, always carry out the break-in operation. This is done by engaging and disengaging the clutch about thirty times. Break-in operation raises the level of transmitted torque.

Replacing A/C Auto Amp.

The BCM unit for models equipped with auto A/C's (air conditioners) is provided with an auto A/C amplifier.
The BCM and auto A/C amplifier must be replaced independently with new ones as described below:

CAUTION:

- **Never handle the BCM unit with dirty hands (wet with oil, grease, etc.).**
- **When handling the BCM unit, hold the case as much as possible.**
- **Do not attempt to touch parts on the PC board unless absolutely necessary. Doing so may damage affected circuits or parts.**
- **The BCM unit consists of two cases—the BCM case and the A/C auto amplifier case. These cases are interconnected with a sub-harness. Be careful not to break the sub-harness while handling them.**
- **The "BCM SIDE" is stamped on the BCM case.**
  The "A/C AUTO AMP" is stamped on the A/C auto amplifier case.
  Be careful not to confuse one case with the other during replacement.



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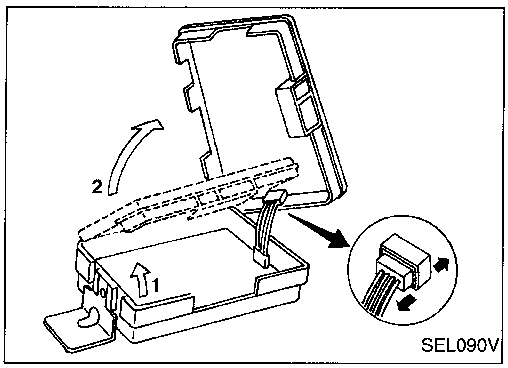
To replace either of the cases with a new one, proceed as follows:

1. Using a cross-head screwdriver, remove the two screws.



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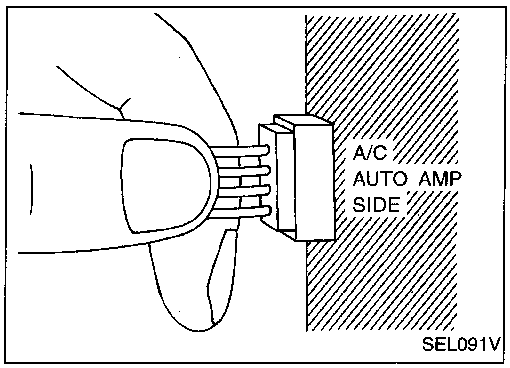
2. With the "A/C AUTO AMP SIDE" mark toward you and facing up, open the front of the case and then flip it open to the right.

CAUTION:
The BCM case and A/C auto amplifier case are interconnected with a sub-harness. Be careful not to break the sub-harness.

Replacing A/C Auto Amp. (Cont'd)

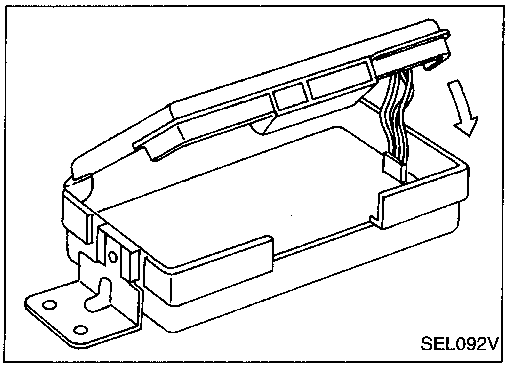


3. While holding the 4 wires of sub-harness, disconnect the sub-harness connector from the mating connector.

CAUTION:
Be sure to pull connector straight out.

4. Prepare a new auto amplifier. The "BCM SIDE" case can be re-used.
5. Connect the BCM-side connector to the A/C auto amplifier-side connector.

CAUTION:
Be sure to connect the BCM-side connector until a "click" is heard. If it does not connect properly, the auto A/C will not operate properly.



6. With the "A/C AUTO AMP SIDE" mark facing upward, engage the back side of the case first, then close the case.

CAUTION:
Do not allow the sub-harness to be caught in the cases.

7. Using a cross-head screwdriver, tighten the two screws to a torque of 0.4 to 0.6 N·m (4.1 to 6.1 kg-cm, 3.6 to 5.3 in-lb).

CAUTION:
- **Be sure the two cases are in close contact with each other and are secure while tightening the screws.**
- **Do not overtighten the screws since it may break the case.**

8. Following BCM case replacement, make sure that:

a. The BCM and A/C auto amplifier-side connectors are properly connected to the main harness connector.
b. Perform IVMS communication diagnosis. Refer to EL section.
c. Check that the auto A/C operates properly.

General Specifications

COMPRESSOR

Model	CALSONIC make V-6
Type	V-6 variable displacement
Displacement cm^3 (cu in)/rev.	
Max.	184 (11.228)
Min.	10.5 (0.641)
Cylinder bore x stroke mm (in)	37 (1.46) x [1.6 - 28.6 (0.063 - 1.126)]
Direction of rotation	Clockwise (viewed from drive end)
Drive belt	Poly V

LUBRICANT

Model	CALSONIC make V-6
Name	Nissan A/C System Oil Type S
Part number	KLH00-PAGS0
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	HFC-134a (R-134a)
Capacity kg (lb)	0.65±0.05 (1.43±0.11)

Inspection and Adjustment

ENGINE IDLING SPEED (When A/C is ON)

- Refer to EC section.

BELT TENSION

- Refer to Checking Drive Belts (MA section).