HEATER & AIR CONDITIONER

SECTION HA

CONTENTS

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

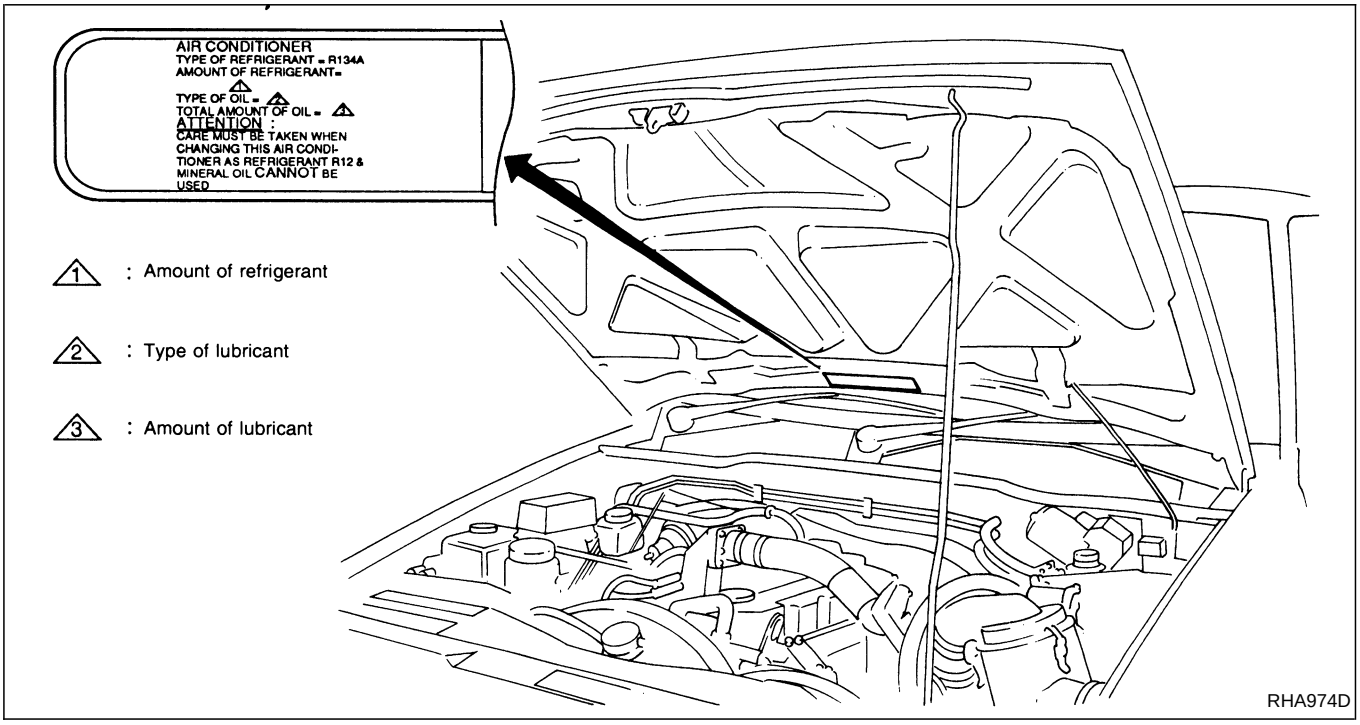
When you perform trouble diagnoses, read GI section, “HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES”.

Introduction

To prevent the ozone layer from being destroyed, the HFC-134a (R-134a) refrigerant has replaced the previously used CFC-12 (R-12).
The new and previous service tools, refrigerant, lubricant, etc. are not interchangeable due to differences in their physical properties and characteristics.
Always service the HFC-134a (R-134a) air conditioning system using the specified tools, lubricant and refrigerant, observing the following precautions:

Identification

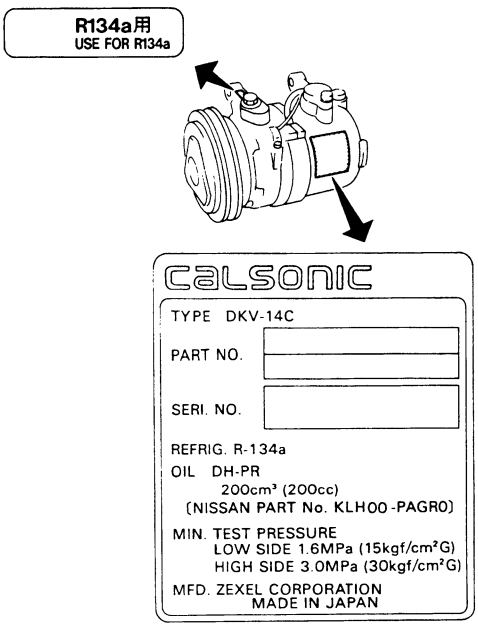
IDENTIFICATION LABEL FOR VEHICLE



PARTS IDENTIFICATION

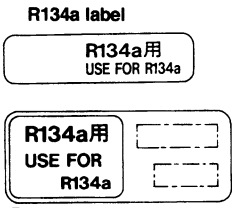
1. Compressor label

R134a label



2. Other component parts label

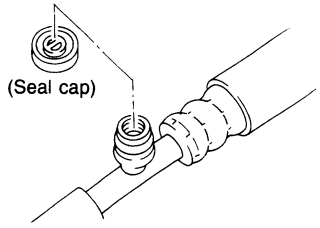
R134a label



Base color: Light blue

Part name	Identification
1. Compressor	R134a label or Compressor label
2. Cooling unit	R134a label
3. Expansion valve	Stamp
4. Condenser	R134a label
5. Liquid tank	R134a label
6. Hose or pipe	R134a label

3. Service valves (suction/discharge)



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

RHA254D

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

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant must never be mixed, even in the smallest amounts, as they are incompatible with each other. If the refrigerants are mixed, compressor failure is likely to occur.**
- **Use only specified lubrication oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubrication oil other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) lubrication oil absorbs moisture from the atmosphere at a rapid rate, therefore the following handling precautions must be observed:**
  - **a: When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
  - **b: When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Also, complete the connection of all refrigerant loop components as quickly as possible to minimize the entry of moisture into the system.**
  - **c: Use the specified lubrication oil from a sealed container only. Containers must be re-sealed immediately after dispensing the lubrication oil. Lubrication oil in containers which are not properly sealed will become moisture saturated, and such lubrication oil is no longer suitable for use and should be properly disposed of.**
  - **d: Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) system. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
  - **e: Do not allow lubrication oil (Nissan A/C System Oil Type S or Type R) 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 drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Do not introduce compressed air to any refrigerant container or refrigerant component.**

Precautions for Refrigerant Connection

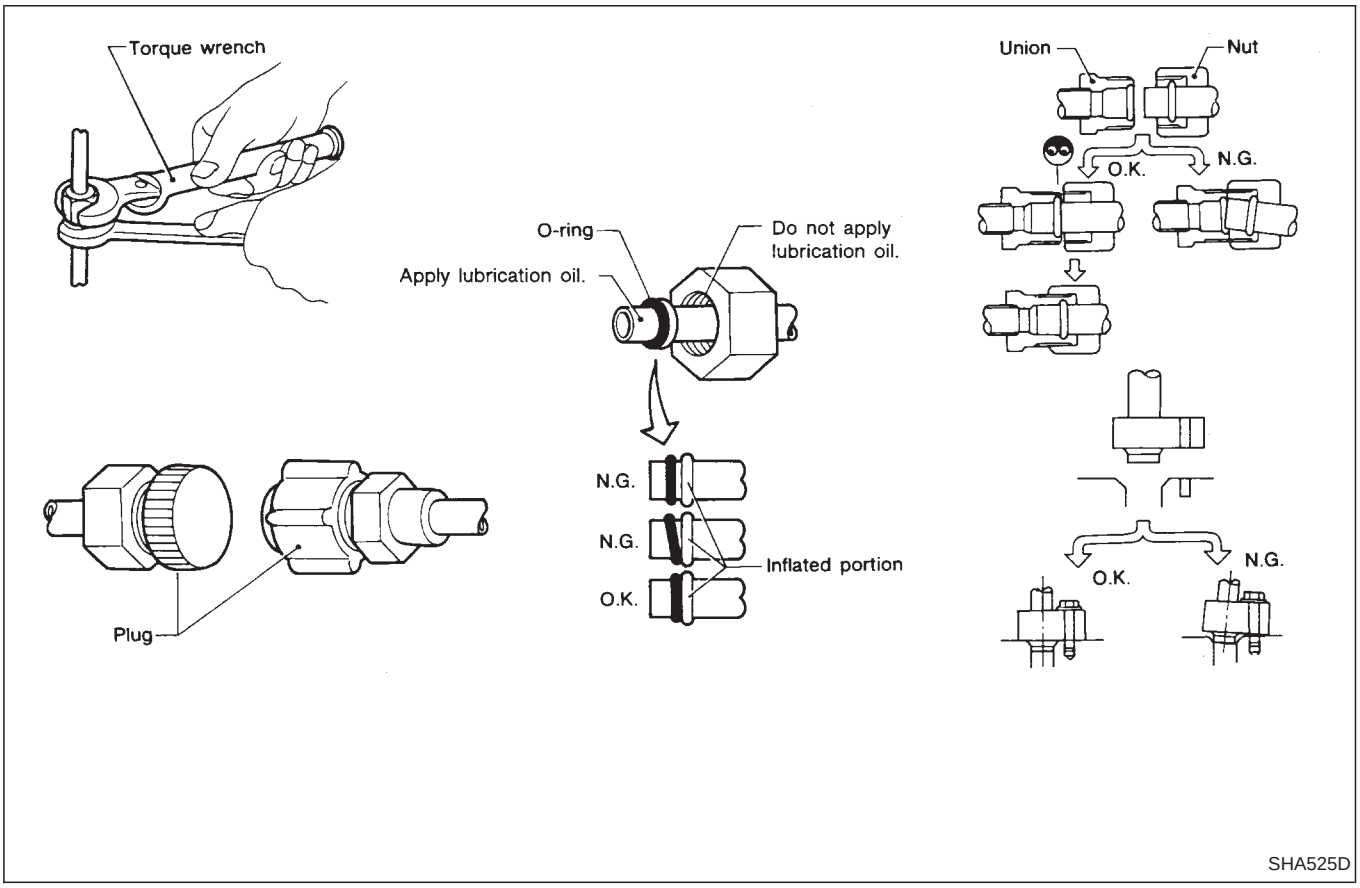
WARNING:

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

CAUTION:

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

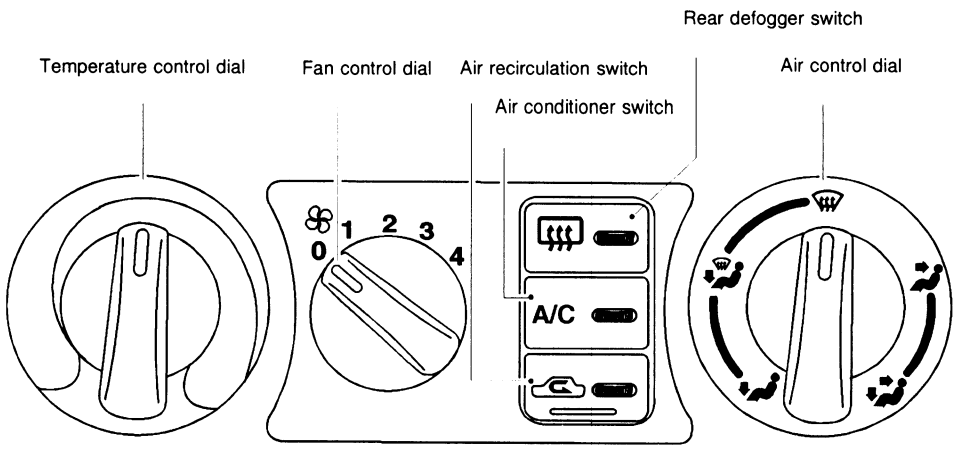
- **Do not leave compressor on its side or upside down for more than 10 minutes, as compressor oil will enter low pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, plug all openings immediately to prevent entrance of dirt and moisture.**
- **When installing an air conditioner in the vehicle, the pipes must be connected at the final stage of the operation. The seal caps of the pipes and other components must not be removed until their removal is required for connection.**
- **To prevent the condensation of moisture inside A/C components, components stored in cool areas should be allowed to warm to the working area temperature before removing the seal caps.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubrication oil to portions shown in illustration. Be careful not to apply oil to threaded portion.**
  Lubrication oil name: NISSAN A/C System Oil Type R
  Part number: KLH00-PAGR0
- **O-ring must be closely attached to inflated portion of tube.**
- **After inserting tube into union until O-ring is no longer visible, tighten nut to specified torque.**
- **After connecting line, conduct leak test and make sure that there is no leakage from connections. When the gas leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Precautions for Servicing Compressor

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

Control Operation



NHA331

FAN CONTROL DIAL

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

AIR CONTROL DIAL

This DIAL allows outlet air to flow.

TEMPERATURE CONTROL DIAL

This DIAL allows the temperature of the outlet air to be adjusted.

AIR RECIRCULATION SWITCH

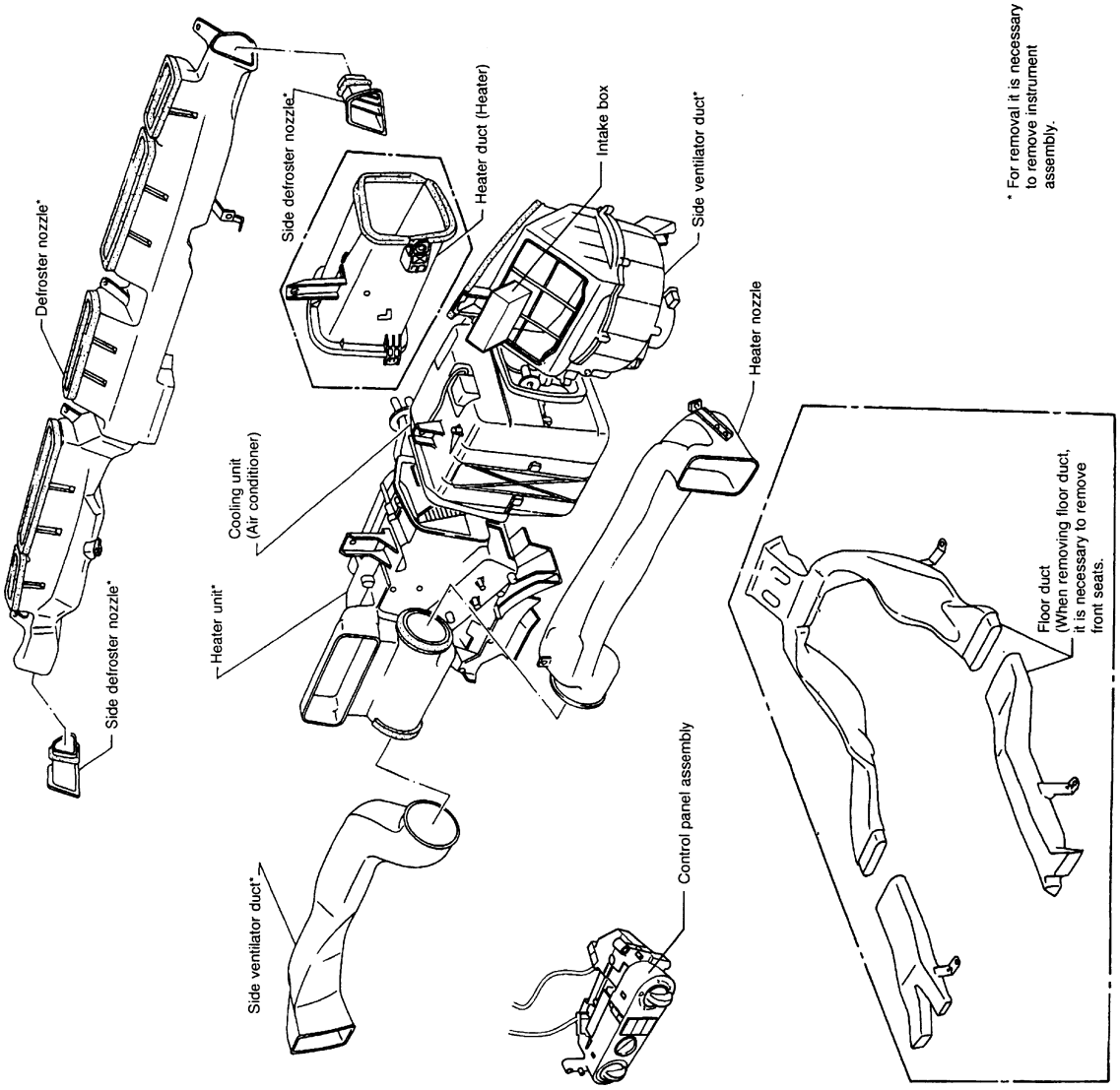
OFF position:
Outside air is drawn into the passenger compartment.
ON position (Indicator light ON):
Interior air is recirculated inside the vehicle.

AIR CONDITIONER SWITCH

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

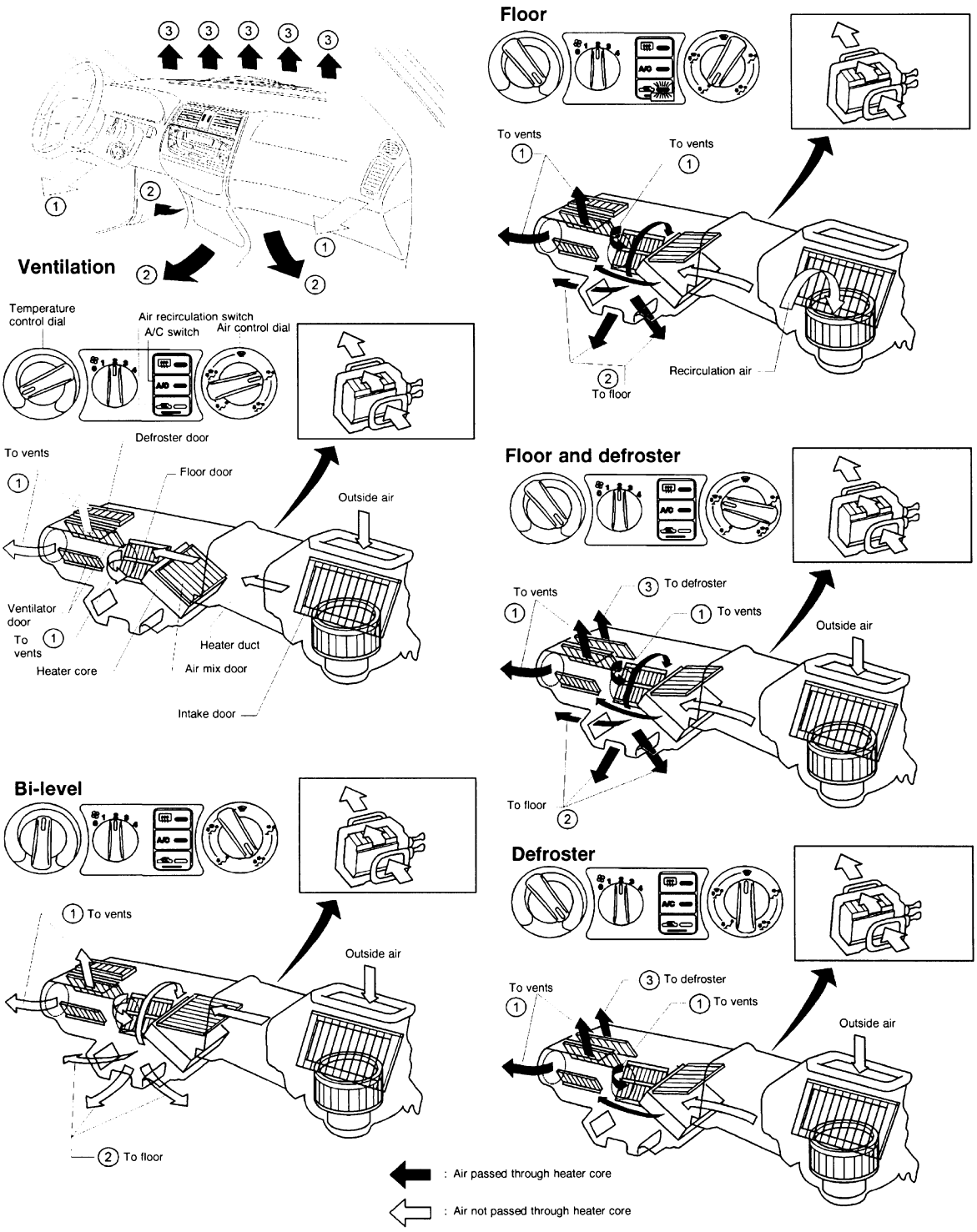
The air conditioner cooling function operates only when the engine is running.

Component Layout



NHA339

Air Flow



NHA332

Refrigeration Cycle

REFRIGERANT FLOW

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

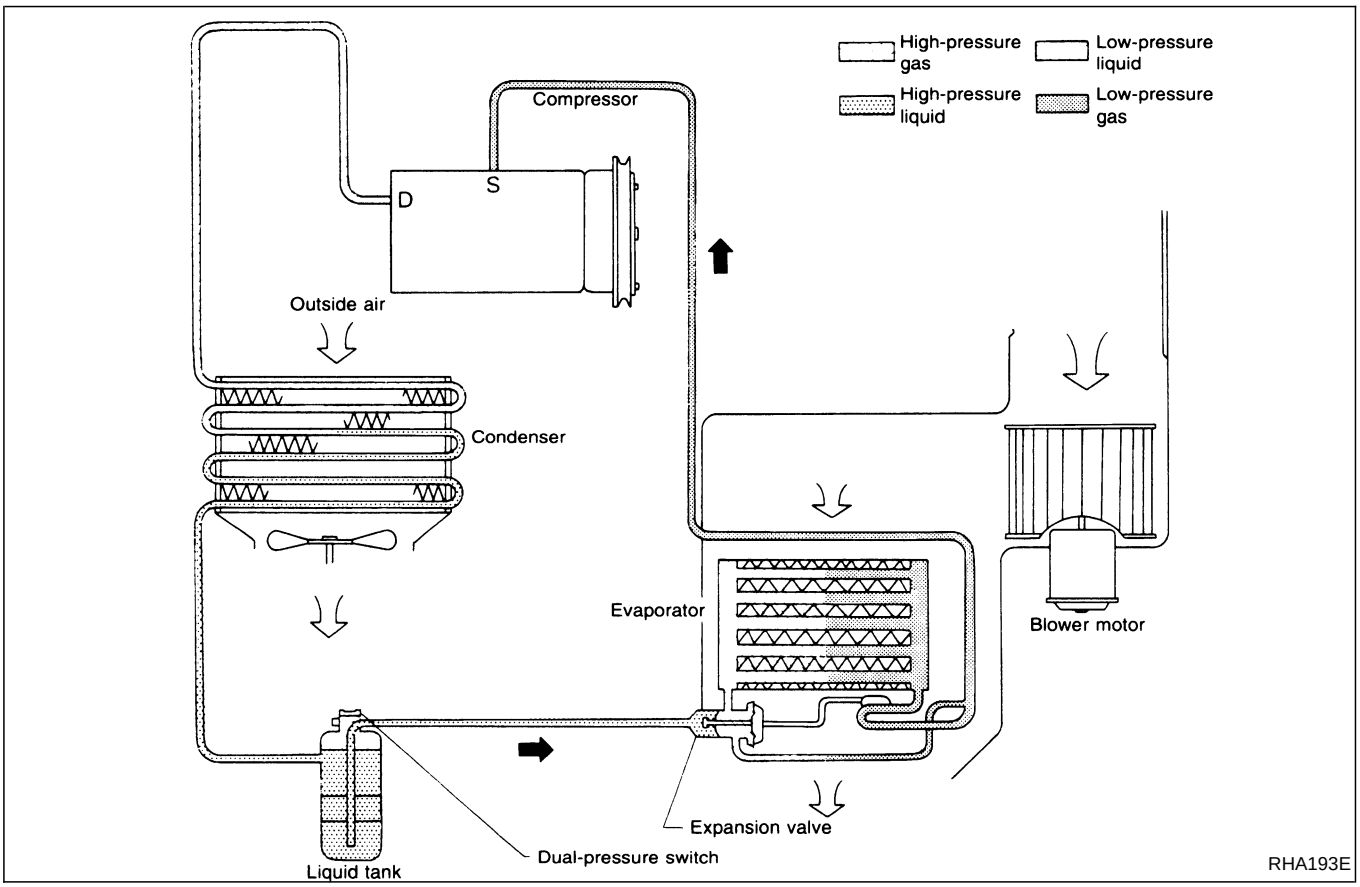
FREEZE PROTECTION

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

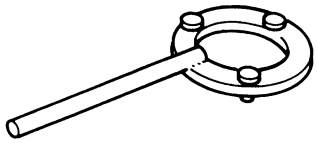
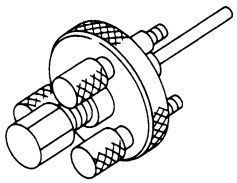
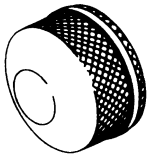
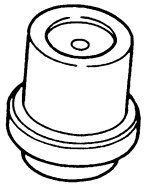
REFRIGERANT SYSTEM PROTECTION

Dual-pressure switch

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

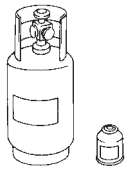
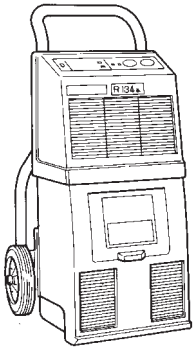
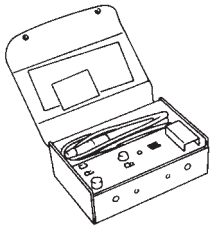


Special Service Tools

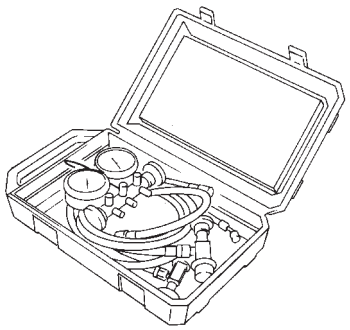
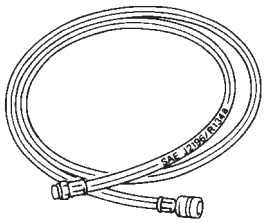
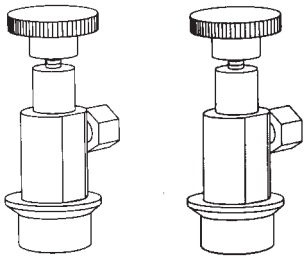
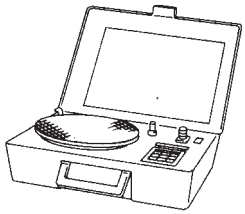
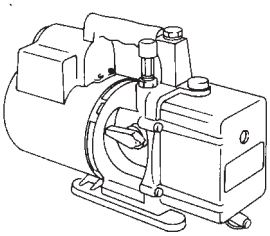
Tool number Tool name	Description	
KV99231260 Clutch disc wrench		Removing shaft nut and clutch disc
KV99232340 Clutch disc puller		Removing clutch disc
KV99234330 Pulley installer		Installing pulley
KV99233130 Pulley puller		Removing pulley

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

It is important to understand that HFC-134a (R-134a) refrigerant, and the specified lubricant which must be used with HFC-134a (R-134a), must never be mixed with CFC-12 (R-12) refrigerant and/or the CFC-12 (R-12) lubricant.
This means that separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
To prevent the mixing of refrigerants/lubricants, refrigerant container fittings, service hose fittings, and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a).
Adaptors to convert from one size of 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		Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size ● large container 1/2″-16 ACME
KLH00-PAGR0 (—) Nissan A/C System Oil Type R		Type: Poly alkyline glycol oil (PAG), type R Application: HFC-134a (R-134a) vane rotary compressors (Nissan only) Lubricity: 40 mℓ (1.4 Imp fl oz)
(J-39500-NI) (115V) (J-39635) (220V) Recovery/Recycling/ Recharging equipment (ACR4)		Function: Refrigerant Recovery and Recycling and Recharging
(J-39400) Electrical leak detector		Power supply: ● DC 12V (Cigarette lighter)

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

Tool number (Kent-Moore No.) Tool name	Description	Note
(J-39183) Manifold gauge set (with hoses and couplers)		Identification: ● The gauge face indicates R-134a. Fitting size: Thread size ● 1/2″-16 ACME
Service hoses ● High side hose (J-39501-72) ● Low side hose (J-39502-72) ● Utility hose (J-39476-72)		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)		Hose fitting to service hose: ● M14 x 1.5 fitting (optional) or permanently attached
(J-39650) (115V) (J-39656) (220V) Refrigerant weight scale		For measuring of refrigerant Fitting size: Thread size ● 1/2″-16 ACME
(J-39649) (115V) (J-39655) (220V) Vacuum pump (Including the isolator valve)		Capacity: ● Air displacement: 4 CFM ● Micron rating: 20 microns ● Oil capacity: 482 g (17 oz) Fitting size: Thread size ● 1/2″-16 ACME

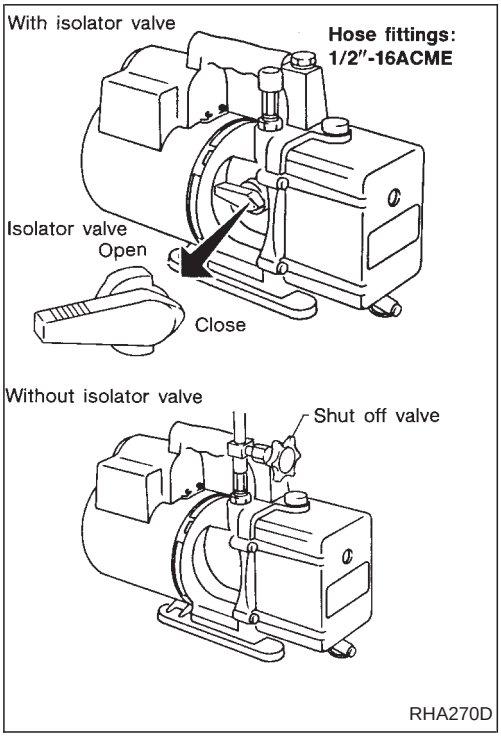
Precautions for Service Equipment

RECOVERY/RECYCLING/RECHARGING EQUIPMENT

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

ELECTRONIC LEAK DETECTOR

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



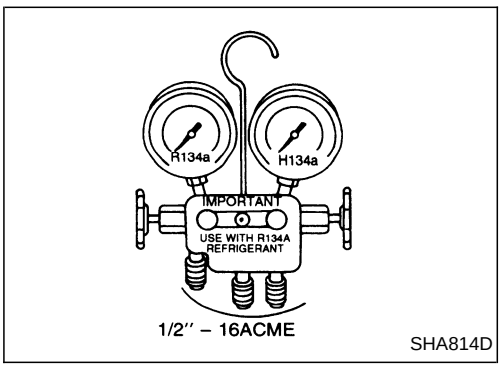
VACUUM PUMP

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

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

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

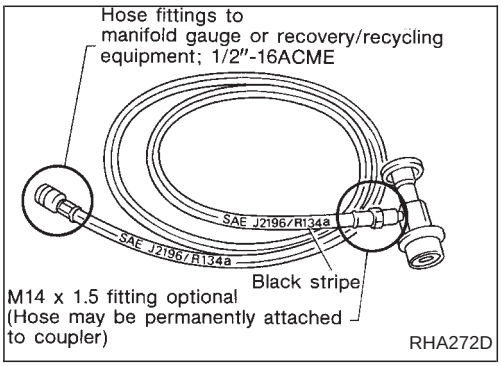
One-way valves which open when vacuum is applied and close under a no vacuum condition are not recommended, because this valve may restrict the pump's ability to pull a deep vacuum.



MANIFOLD GAUGE SET

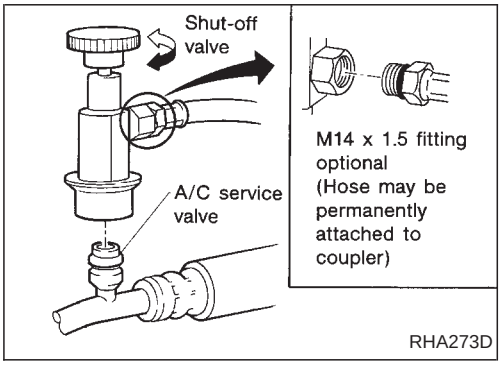
Be certain that the gauge face indicates R-134a or 134a. Be certain that the manifold gauge set has the 1/2″-16 ACME threaded connections for service hoses, and that no refrigerants other than HFC-134a (R-134a) (along with only specified lubricants) have been used with the manifold gauge set.

Precautions for Service Equipment (Cont'd)



SERVICE HOSES

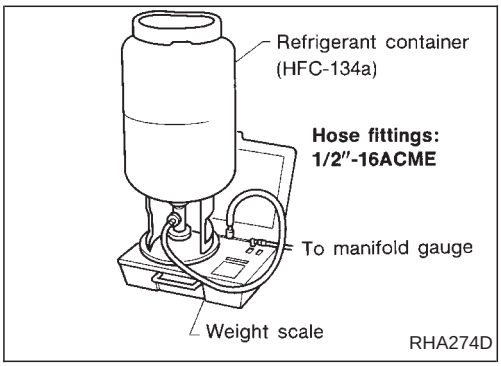
Be certain that the service hoses display the markings described (colored hose with black stripe). Be certain that all hoses include positive shut off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

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

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



REFRIGERANT WEIGHT SCALE

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

CHARGING CYLINDER

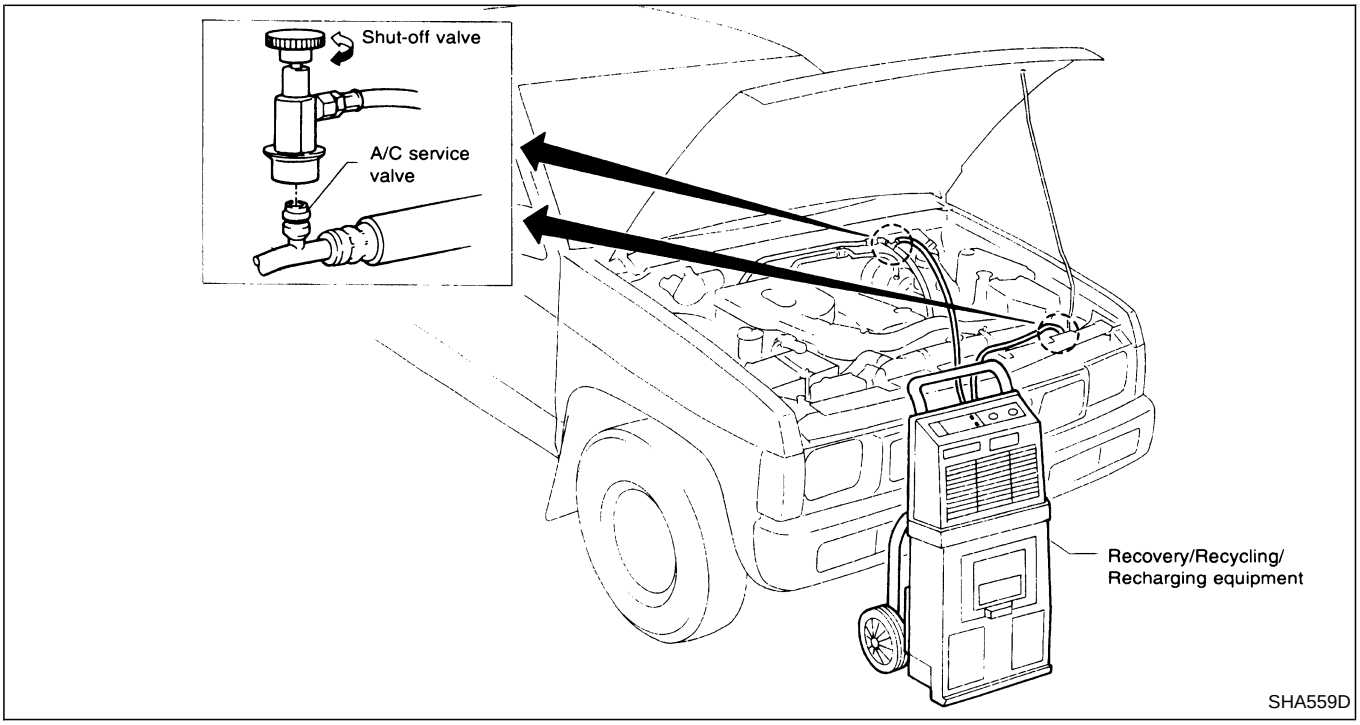
The charging cylinder is not recommended because refrigerant may be vented into the air from the top valve of the cylinder when filling the cylinder with refrigerant. Additionally, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

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

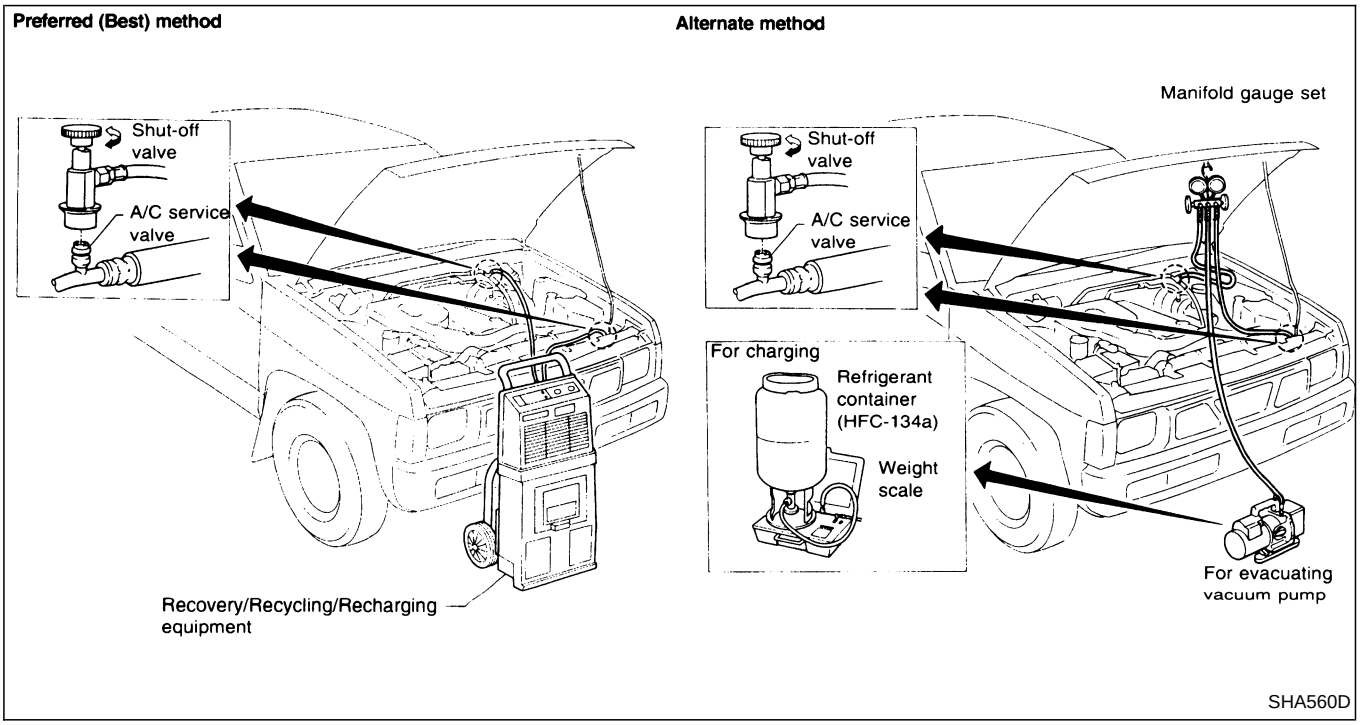
DISCHARGING REFRIGERANT

WARNING:

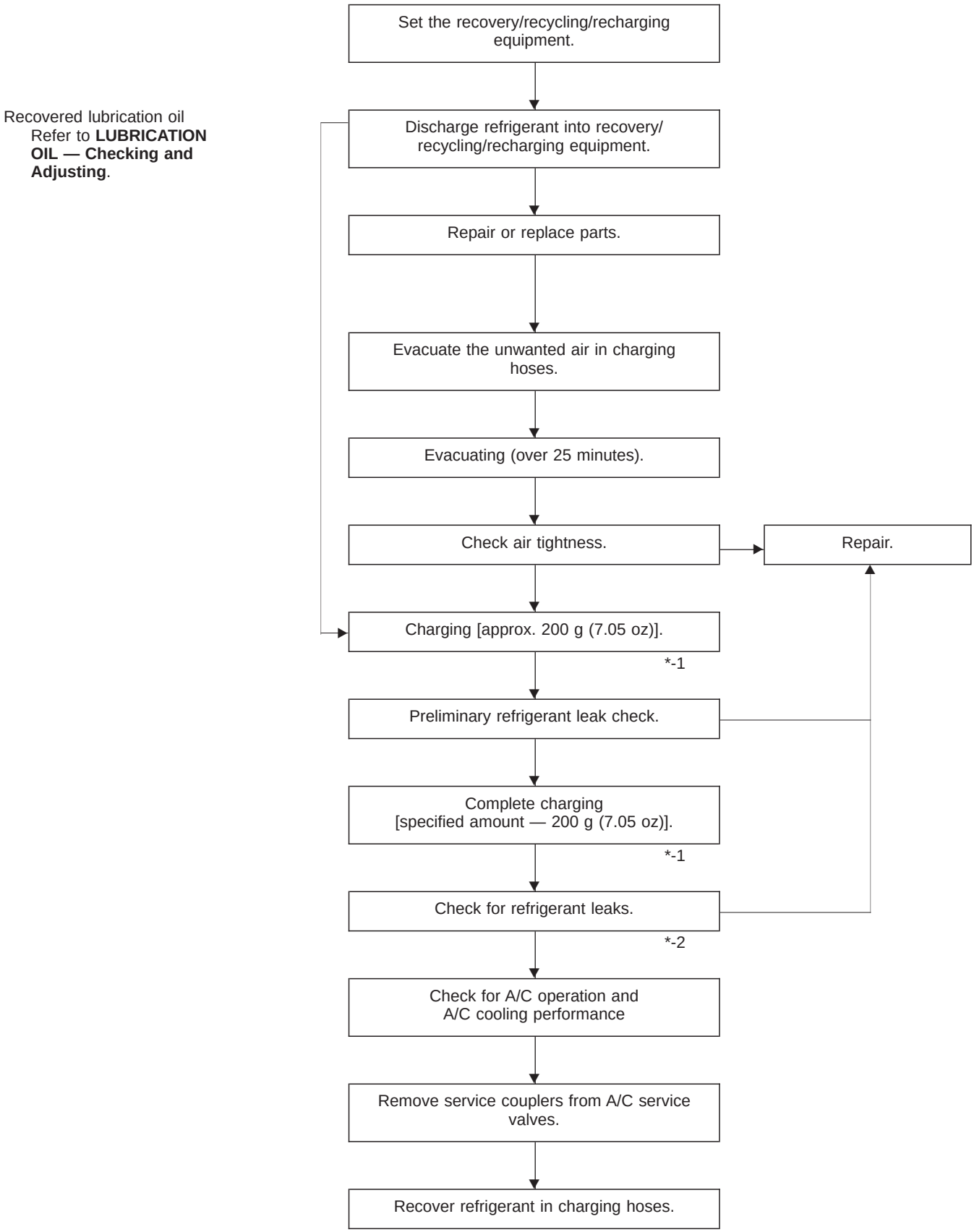
Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. To remove R-134a from the A/C system, use service equipment certified to meet the requirements of R-134a recycling equipment or R-134a recovery equipment. If accidental system discharge occurs, ventilate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



EVACUATING SYSTEM AND CHARGING REFRIGERANT



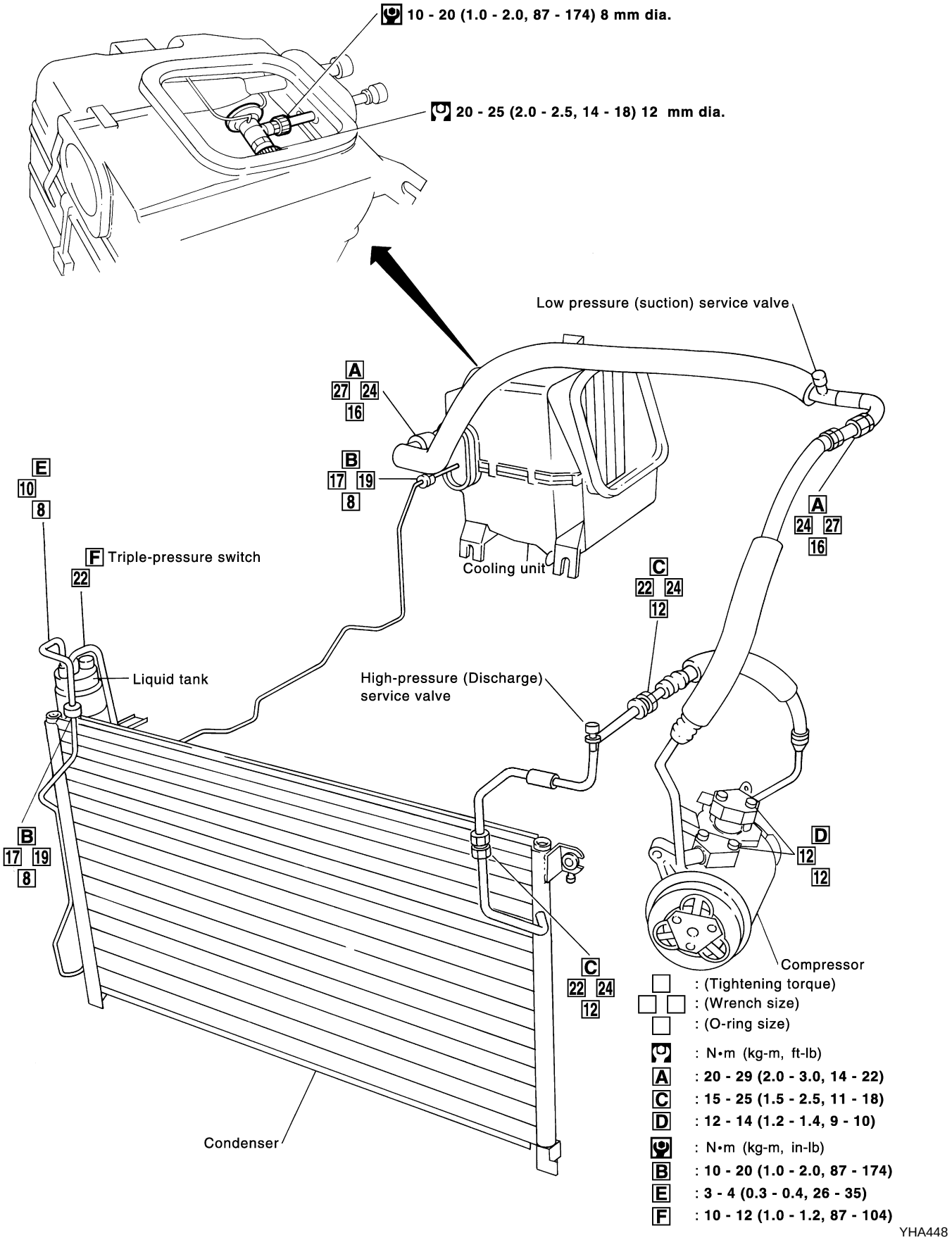
HFC-134a (R-134a) Service Procedure (Cont'd)



Note: *-1 Before charging refrigerant, ensure engine is off.
*-2 Before checking for leaks, start engine to activate air conditioning system then turn it off. Service valve caps must be attached to valves (to prevent leak).

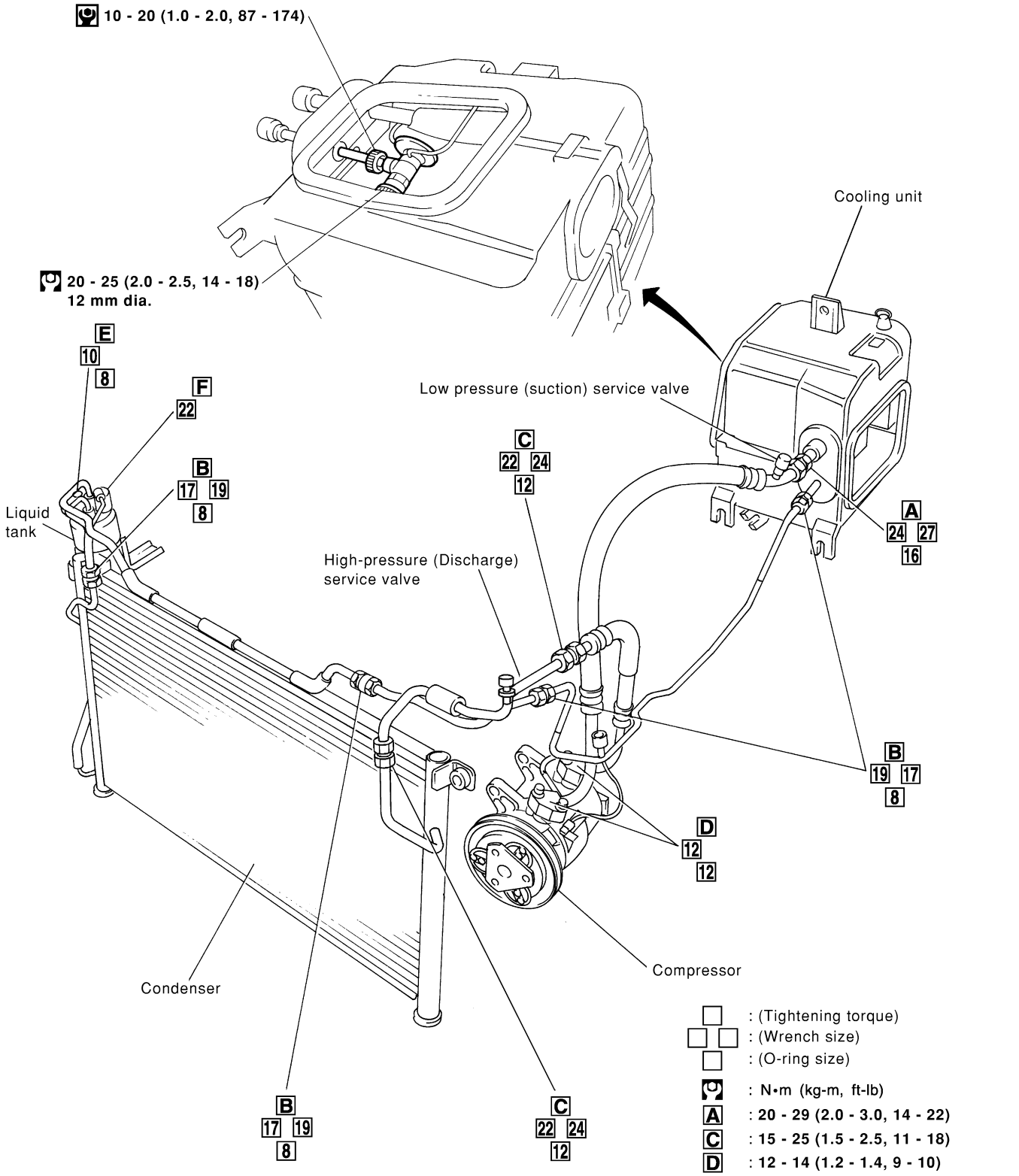
Refrigerant Lines

TD ENGINE LHD MODELS



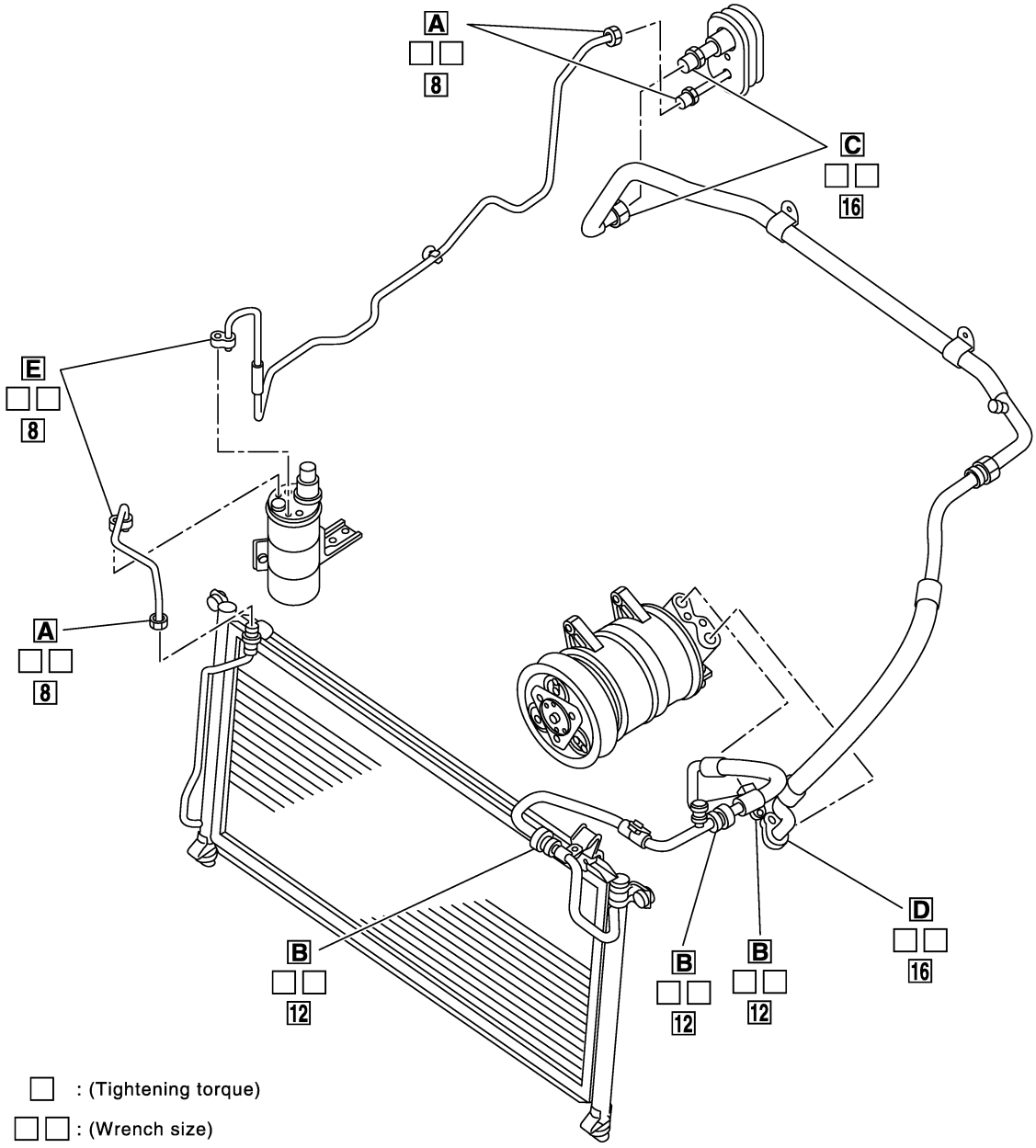
Refrigerant Lines (Cont'd)

TD ENGINE RHD MODELS



Refrigerant Lines (Cont'd)

ZD ENGINE LHD MODELS



□ : (Tightening torque)

□□ : (Wrench size)

□ : (O-ring size)

: N•m (kg-m, ft-lb)

A : 15 - 25 (1.6 - 2.5, 11 - 18)

B : 25 - 30 (2.6 - 3.0, 19 - 22)

C : 25 - 35 (2.6 - 3.5, 19 - 25)

: N•m (kg-m, in-lb)

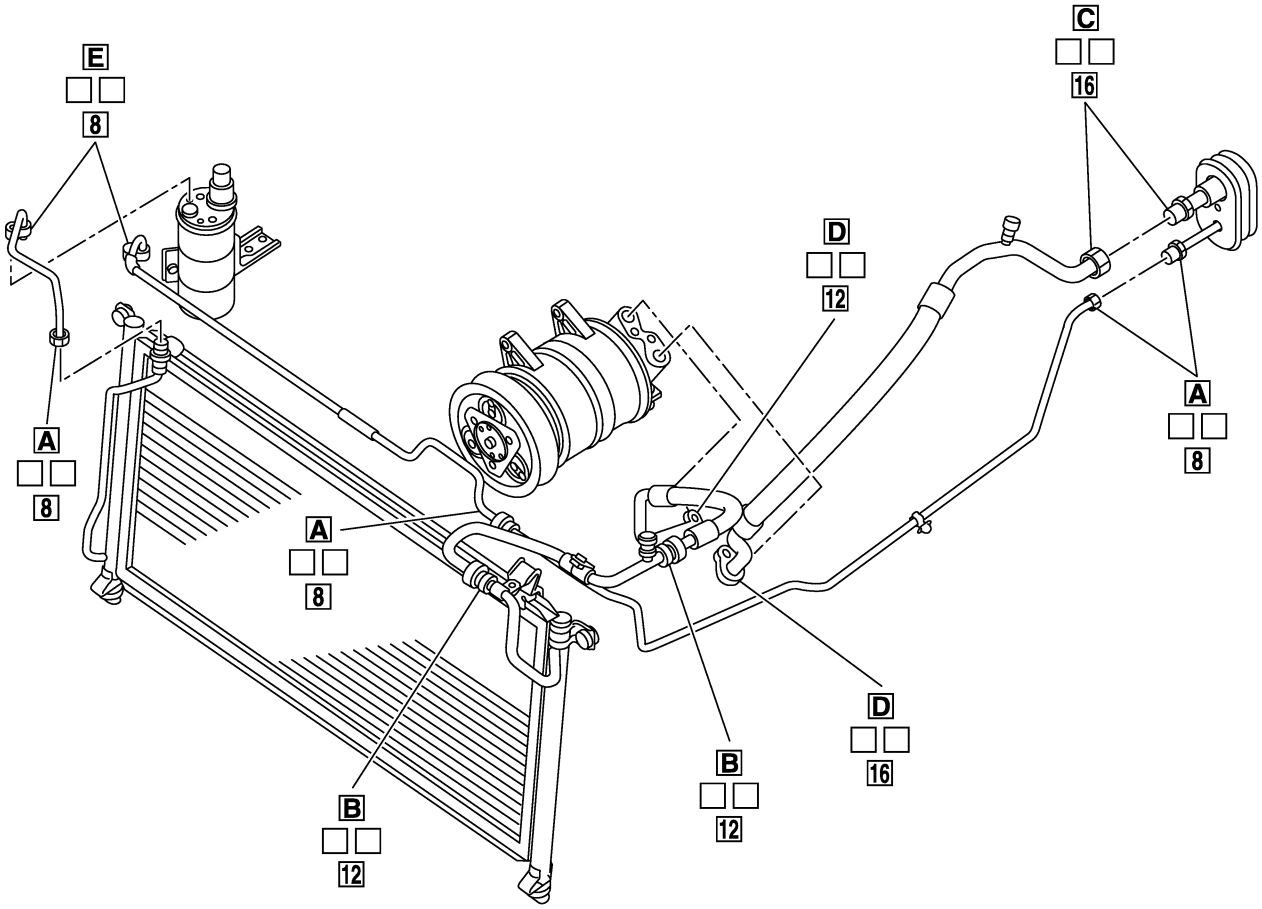
D : 8 - 11 (0.9 - 1.1, 71 - 97)

E : 3.2 - 3.6 (0.33 - 0.36, 29 - 31)

YHA457

Refrigerant Lines (Cont'd)

ZD ENGINE RHD MODELS



: (Tightening torque)

: (Wrench size)

: (O-ring size)

: N•m (kg-m, ft-lb)

A : 15 - 25 (1.6 - 2.5, 11 - 18)

B : 25 - 30 (2.6 - 3.0, 19 - 22)

C : 25 - 35 (2.6 - 3.5, 19 - 25)

: N•m (kg-m, in-lb)

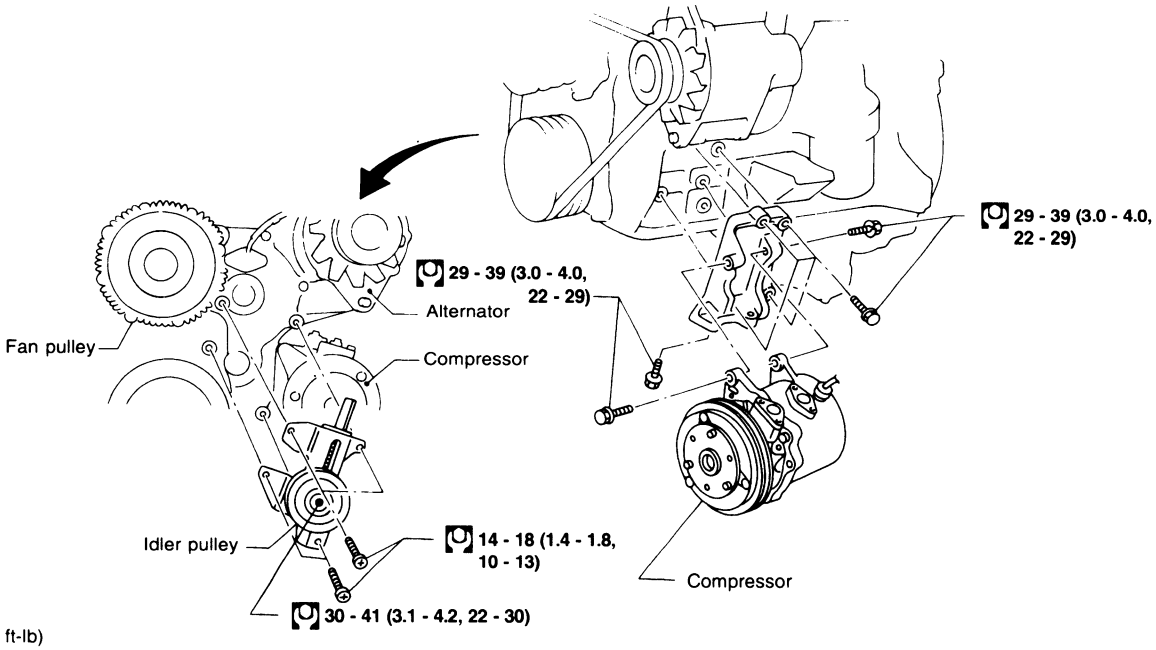
D : 8 - 11 (0.9 - 1.1, 71 - 97)

E : 3.2 - 3.6 (0.33 - 0.36, 29 - 31)

YHA458

Compressor Mounting

TD engine model



: N·m (kg-m, ft-lb)

RHA980D

Belt Tension

- Refer to MA section.

Lubrication Oil

Name: Nissan A/C System Oil Type R
Part number: KLH00-PAGR0

Maintenance of Oil Quantity in Compressor

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

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

Checking and Adjusting

Adjust the oil quantity according to the flowchart shown below.

START

Can oil return operation be performed?
- A/C system works properly.
- There is no evidence of a large amount of oil leakage.

Yes → Perform oil return operation, proceeding as follows:

1. Start engine, and set the following conditions:
- **Test condition**
  Engine speed: Idling to 1,200 rpm
  A/C or AUTO switch: ON
  Blower speed: Max. position
  Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).]
2. Perform oil return operating for about 10 minutes.
3. Stop engine.

CAUTION:
If excessive oil leakage is noted, do not perform the oil return operation.

No

Should the compressor be replaced?

No

Yes

Ⓐ (Go to next page.)

Is there any part to be replaced? (Evaporator, condenser, liquid tank or in case there is evidence of a large amount of oil leakage.)

Yes → After replacing any of the following major components of the system, be sure to add the correct amount of oil to the system.

Amount of oil to be added

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

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

No

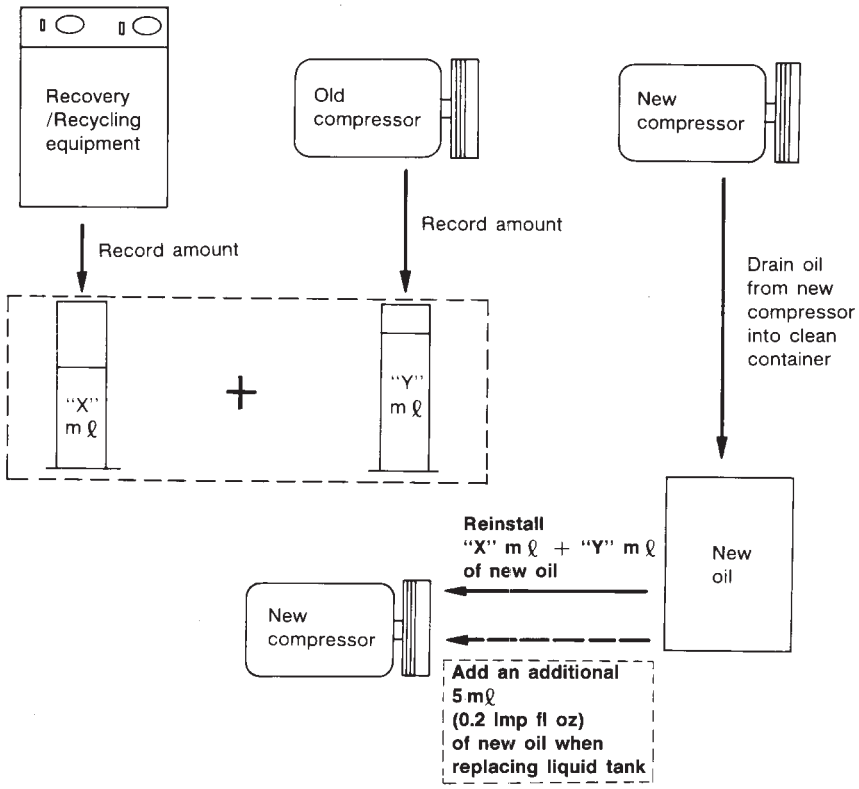
Carry out the A/C performance test.

Checking and Adjusting (Cont'd)

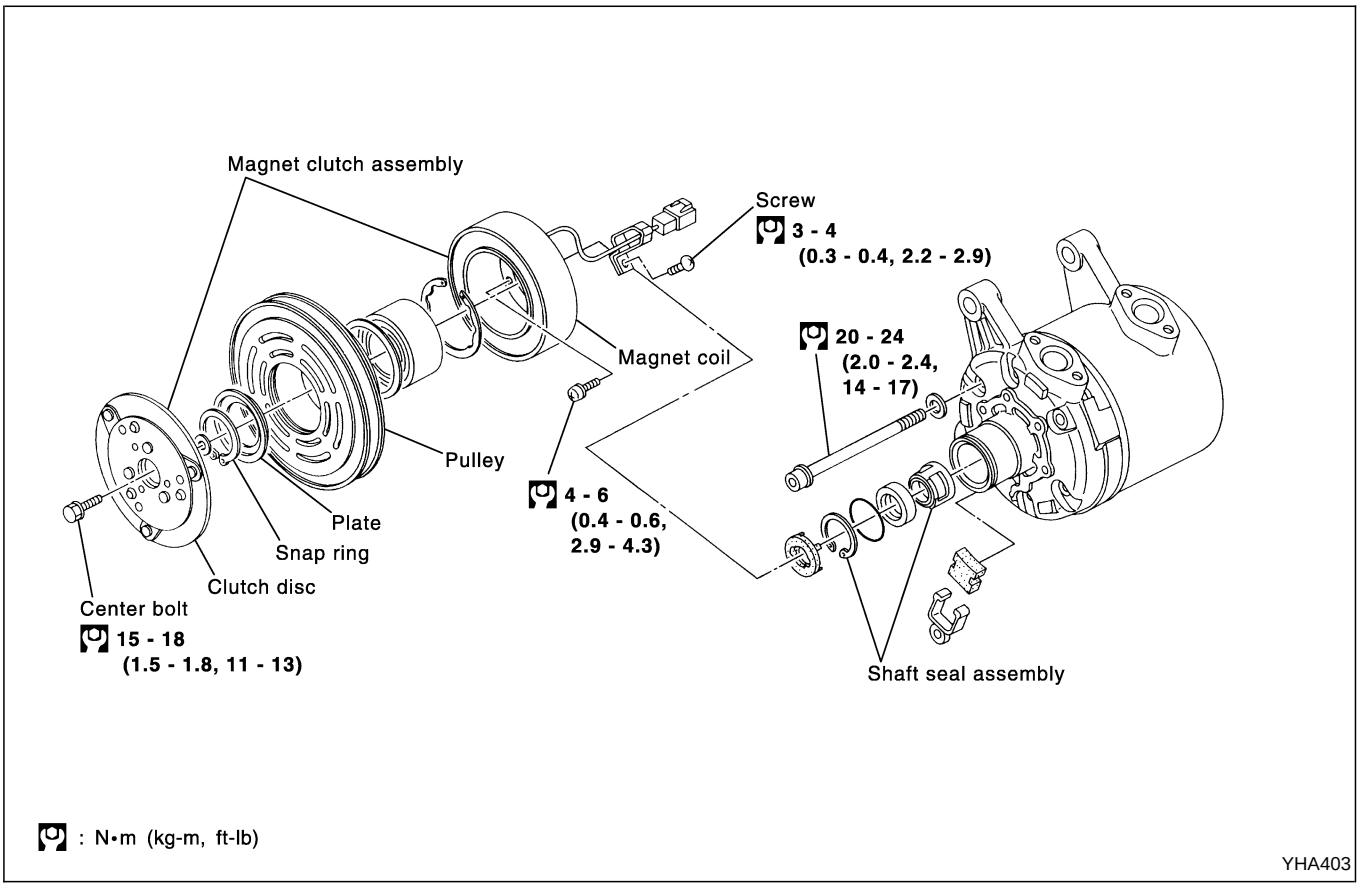
Ⓐ

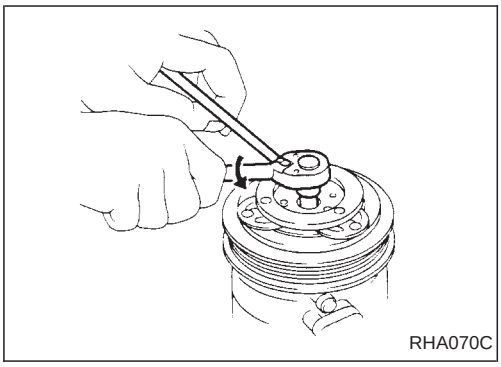
1. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure oil discharged into the recovery/recycling equipment.
2. Drain the oil from the "old" (removed) compressor into a graduated container, and record the amount of oil drained.
3. Drain the oil from the "new" compressor into a separate, clean container.
4. Measure an amount of the new oil equivalent to that drained from the "old" compressor, and add this oil to the "new" compressor through the drain plug or suction port opening.
5. Measure an amount of the "new" oil equivalent to that recovered during discharging, and add this oil to the "new" compressor through the drain plug or suction port opening.
6. If the liquid tank also needs to be replaced, add an additional 5 mℓ (0.2 Imp fl oz) of oil at this time.
   Do not add this 5 mℓ (0.2 Imp fl oz) of oil if only replacing the compressor.

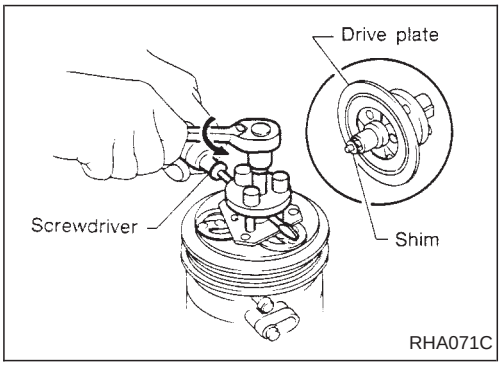
Oil adjusting procedure for compressor replacement



SHA563D







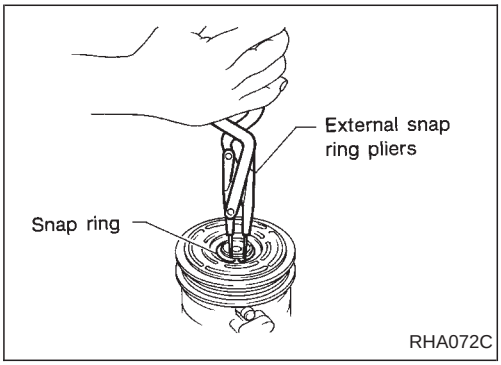
Compressor Clutch

REMOVAL

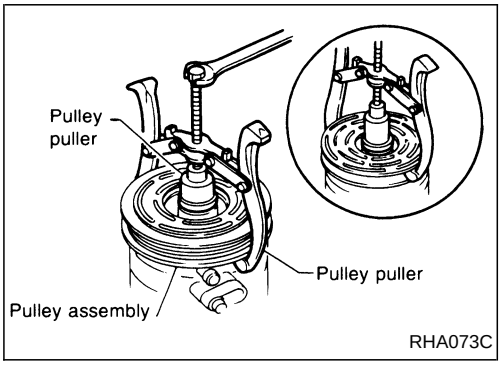
- When removing center bolt, hold clutch disc with clutch disc wrench.

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

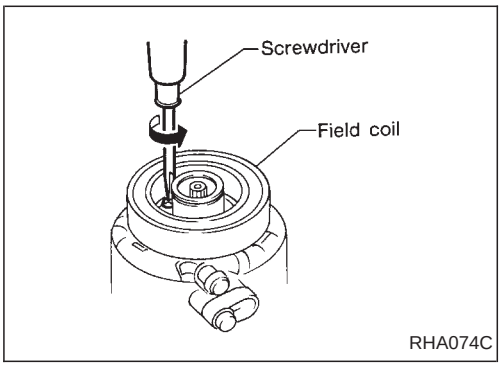
Compressor Clutch (Cont'd)



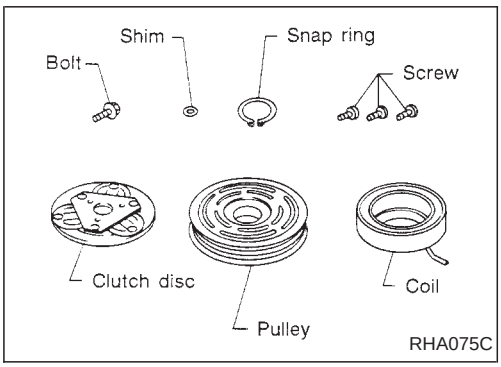
- Remove the snap ring using external snap ring pliers.



- Pulley removal
  Position the center pulley puller on the end of the drive shaft, and remove the pulley assembly using any commercially available pulley puller.
  For pressed pulleys:
  To prevent deformation of the pulley groove, the puller claws should be hooked into (not under) the pulley groove.
  For machine latched pulleys:
  Align the pulley puller groove with the pulley groove, and then remove the pulley assembly.

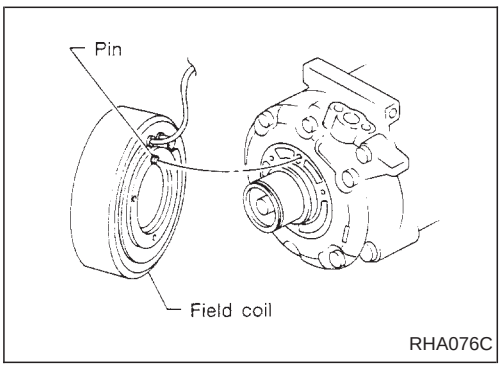


- Remove the field coil harness clip using a screwdriver.
- Remove the three field coil fixing screws and remove the field coil.



INSPECTION

Clutch disc: If the contact surface shows signs of damage due to excessive heat, the clutch disc and pulley should be replaced.
Pulley: Check the appearance of the pulley assembly. If the contact surface of the pulley shows signs of excessive grooving due to slippage, both the pulley and clutch disc should be replaced. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.
Coil: Check coil for loose connection or cracked insulation.



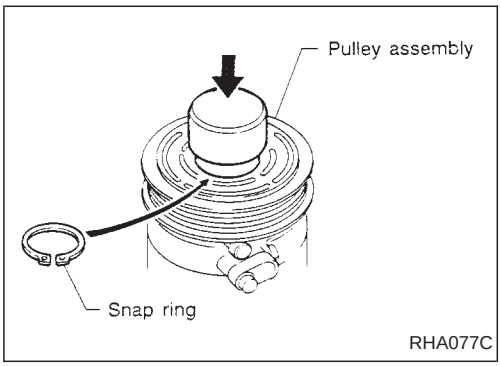
INSTALLATION

- Install the field coil.

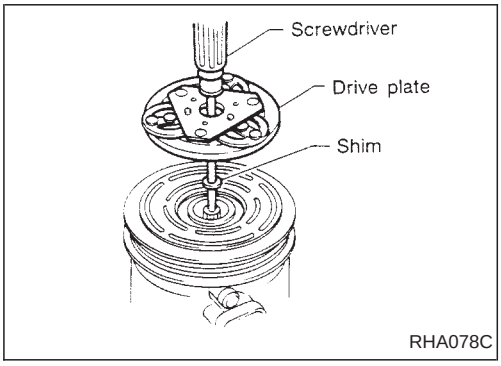
Be sure to align the coil's pin with the hole in the compressor's front head.

- Install the field coil harness clip using a screwdriver.

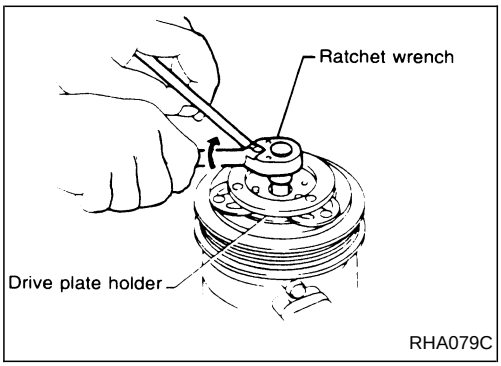
Compressor Clutch (Cont'd)



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

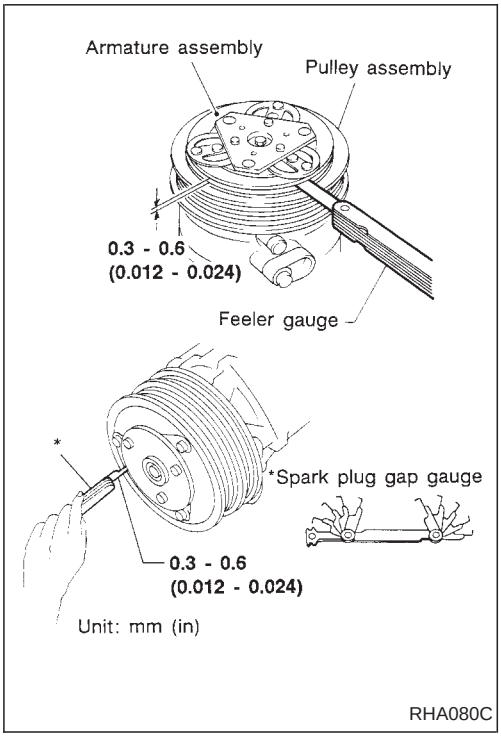


- Install the drive plate on the drive shaft, together with the original shim(s). Press the drive plate down by hand.



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

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



- Check clearance around the entire periphery of clutch disc.

  Disc-to-pulley clearance:

  0.3 - 0.6 mm (0.012 - 0.024 in)

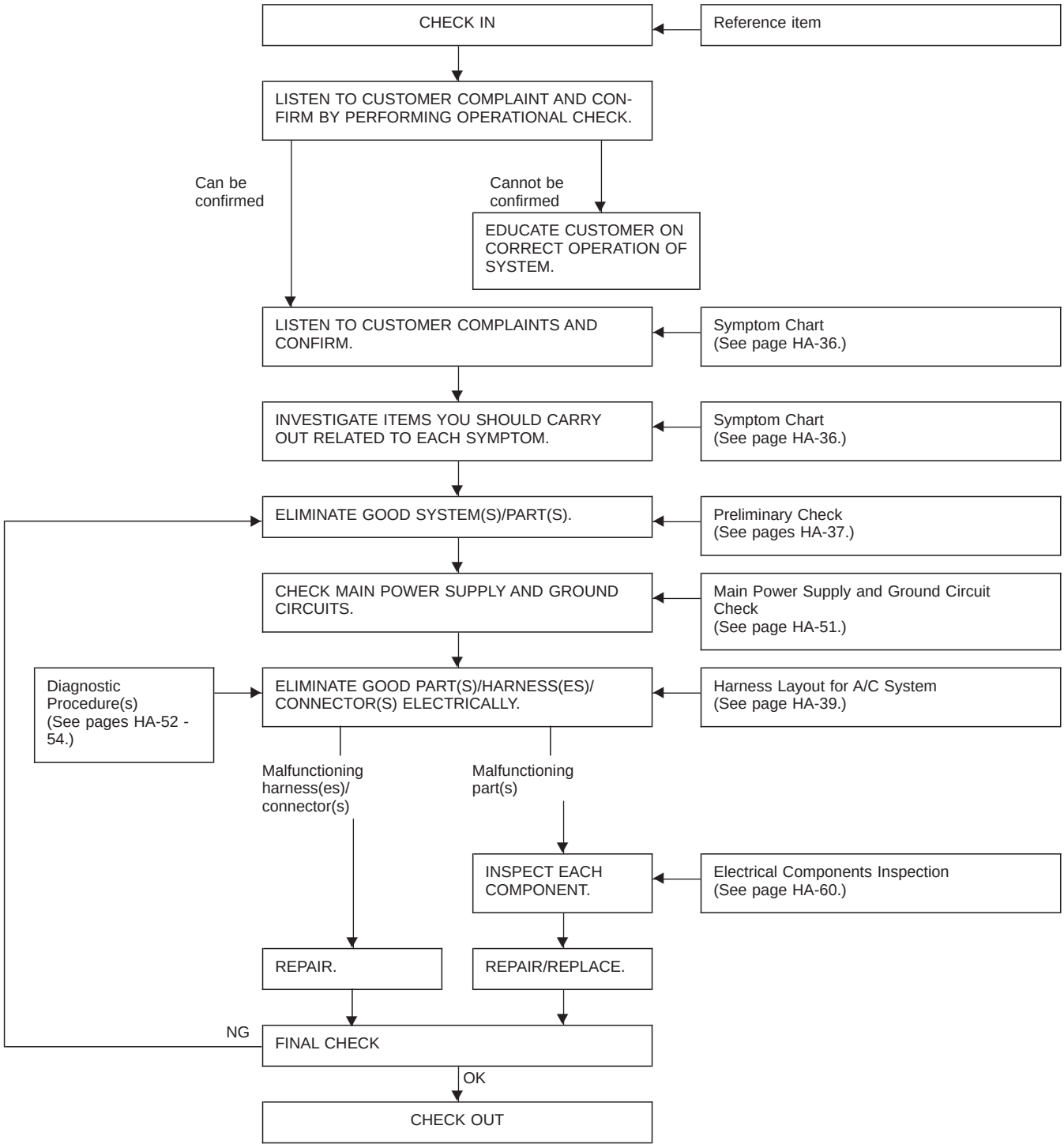
  If the specified clearance is not obtained, replace adjusting spacer and readjust.

BREAK-IN OPERATION

When replacing compressor clutch assembly, do not forget break-in operation, accomplished by engaging and disengaging the clutch about thirty times. Break-in operation raises the level of transmitted torque.

How to Perform Trouble Diagnoses for Quick and Accurate Repair

WORK FLOW

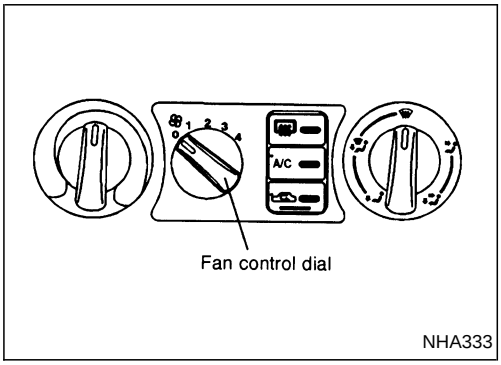


Operation Check

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 system.

CONDITIONS:

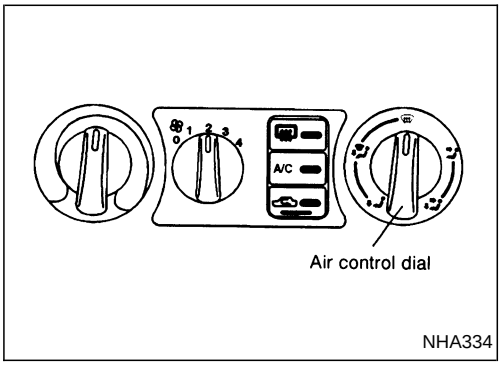
Engine running and at normal operating temperature.



PROCEDURE:

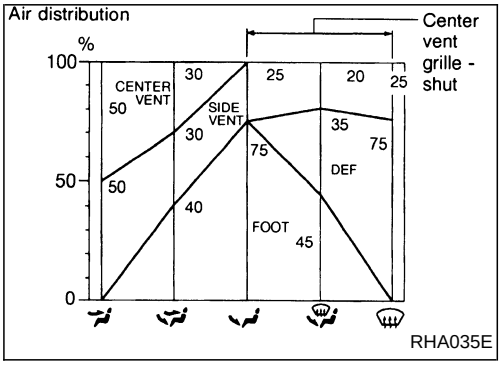
1. Check blower

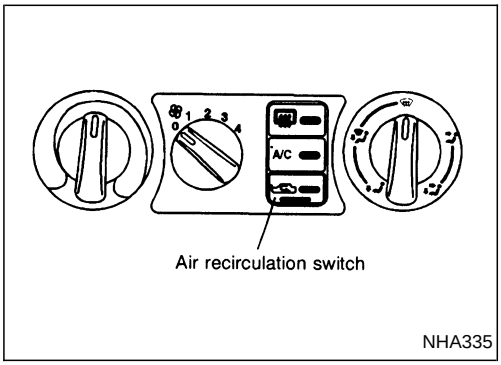
1) Turn FAN CONTROL DIAL to 1.
   Blower should operate at speed 1.
2) Then turn the DIAL to speed 2.
3) Continue checking blower speed until all speeds are checked.
4) Leave blower on speed 4.



2. Check discharge air

1) Turn AIR CONTROL DIAL to position.
2) Confirm that all discharge air comes out of face vents.
3) Turn AIR CONTROL DIAL to position.
4) Confirm that discharge air comes out of face vents and foot vents.
5) Turn AIR CONTROL DIAL to position.
6) Confirm that discharge air comes out of foot vents, with some air from face vents.
7) Turn AIR CONTROL DIAL to position.
8) Confirm that discharge air comes out of foot vents with some air from defroster vents.
9) Turn AIR CONTROL DIAL to position.
10) Confirm that all discharge air comes out of defroster vents, with some air from face vents.

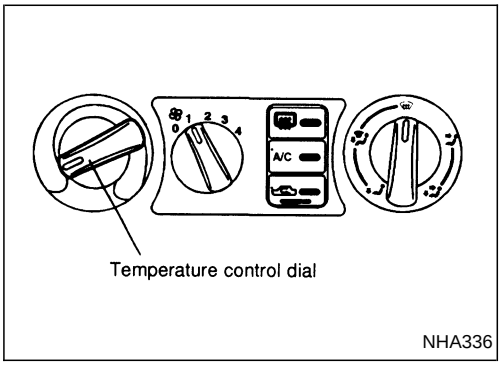




3. Check recirculation

1) Switch AIR RECIRCULATION SWITCH to ON position (Indicator light ON).
2) Listen for intake door position change (you should hear sound change slightly).

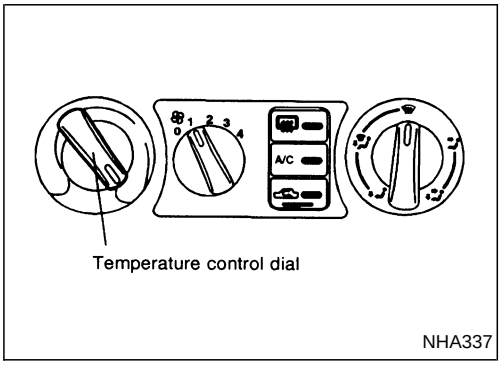
Operation Check (Cont'd)



NHA336

4. Check temperature decrease

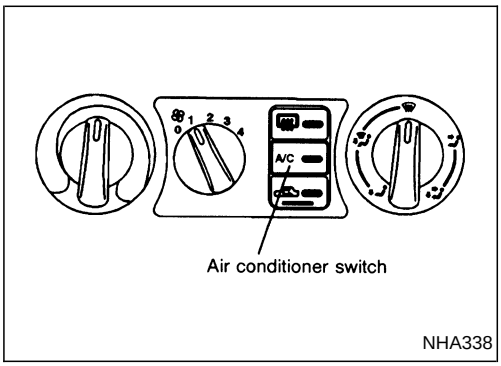
1) Turn TEMPERATURE CONTROL DIAL to full cold (counter-clockwise).
2) Check for cold air at discharge air outlets.



NHA337

5. Check temperature increase

1) Turn TEMPERATURE CONTROL DIAL to full hot (clockwise).
2) Check for hot air at discharge air outlets.



NHA338

6. Check A/C switch

Turn FAN CONTROL DIAL to the desired position (1 to 4) and switch AIR CONDITIONER SWITCH to turn ON air conditioner. Indicator light will come on when air conditioner is ON.

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 (Front driver side only)
Hood:	Open
TEMP. control lever position:	Max. COLD
AIR control lever position:	(Ventilation)
INTAKE lever position:	(Recirculation)
FAN lever:	4
Engine speed:	1,500 rpm
Time required before starting testing after air conditioner starts operating:	More than 10 minutes

TEST READING

Recirculating-to-discharge air temperature table

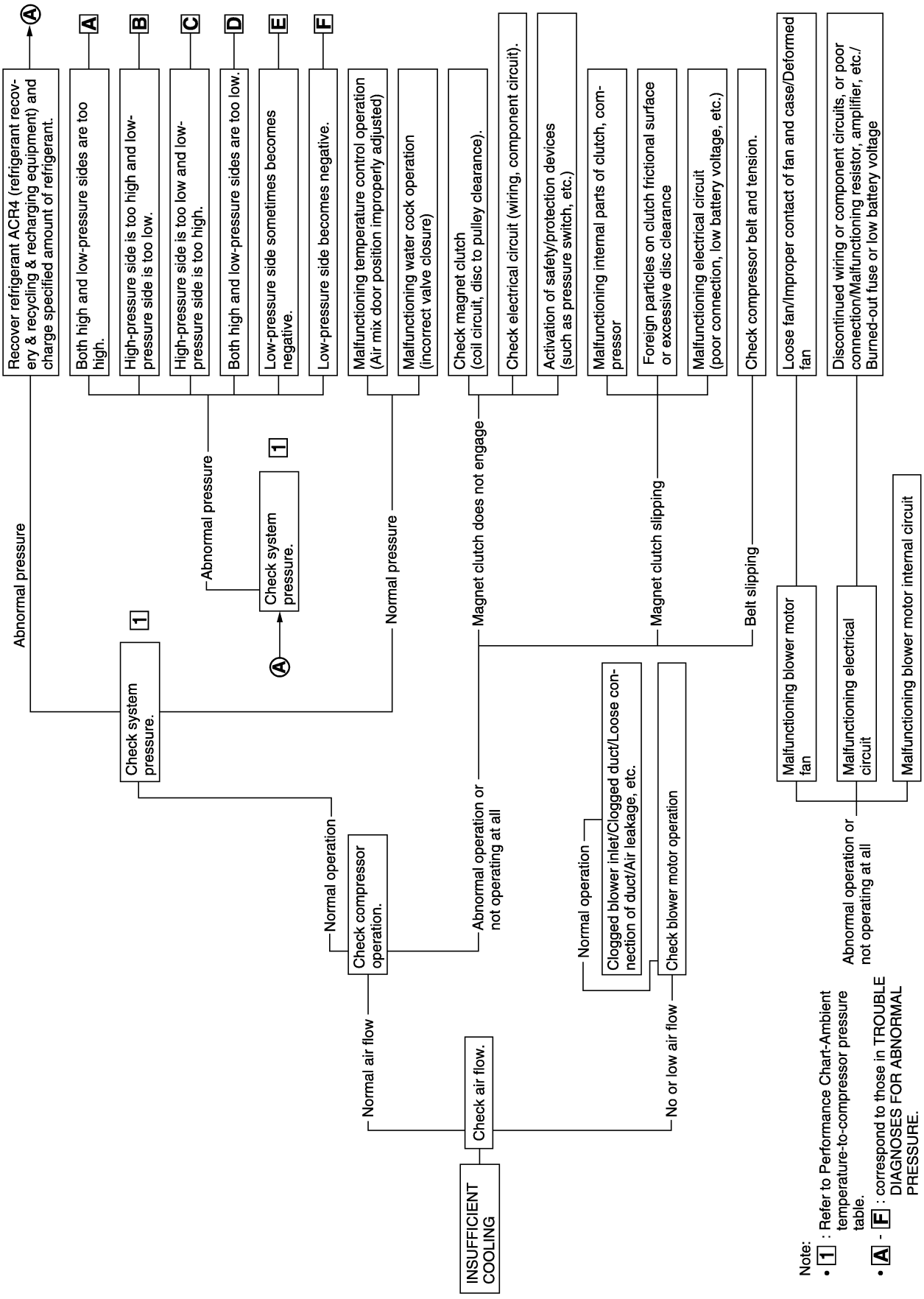
Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
40 - 60	25 (77)	9.8 - 11.5 (50 - 53)
	30 (86)	13.8 - 15.9 (57 - 61)
	35 (95)	17.9 - 20.3 (64 - 69)
60 - 80	25 (77)	11.5 - 13.3 (53 - 56)
	30 (86)	15.9 - 18.0 (61 - 64)
	35 (95)	20.3 - 22.7 (69 - 73)

Ambient air temperature-to-compressor pressure table

Ambient air		High-pressure (Discharge side) kPa (bar, kg/cm^2, psi)	Low-pressure (Suction side) kPa (bar, kg/cm^2, psi)
Relative humidity %	Air temperature °C (°F)		
40 - 80	25 (77)	1,451 - 1,608 (14.51 - 16.08, 14.8 - 16.4, 210 - 233)	157 - 186 (1.57 - 1.86, 1.6 - 1.9, 23 - 27)
	30 (86)	1,569 - 1,804 (15.69 - 18.04, 16.0 - 18.4, 228 - 262)	176 - 235 (1.76 - 2.35, 1.8 - 2.4, 26 - 34)
	35 (95)	1,834 - 2,138 (18.34 - 21.38, 18.7 - 21.8, 266 - 310)	226 - 304 (2.26 - 3.04, 2.3 - 3.1, 33 - 44)

Performance Test Diagnoses

INSUFFICIENT COOLING



Note:
- 1 : Refer to Performance Chart-Ambient temperature-to-compressor pressure table.
- A - F : correspond to those in TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE.

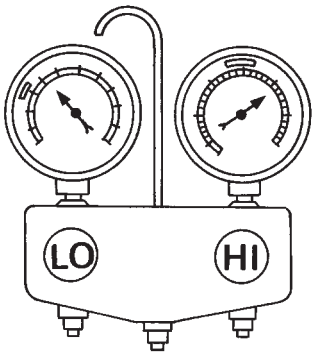
(Go to next page)

MHA176B

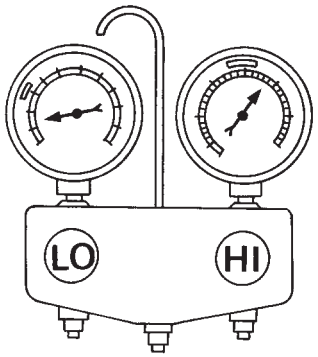
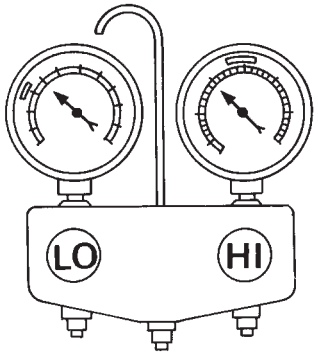
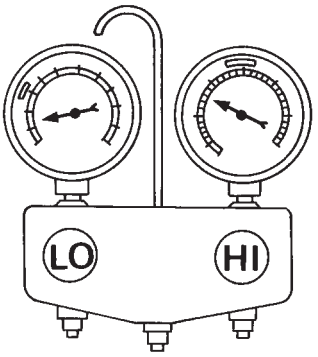
Performance Test Diagnoses (Cont'd)

TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE

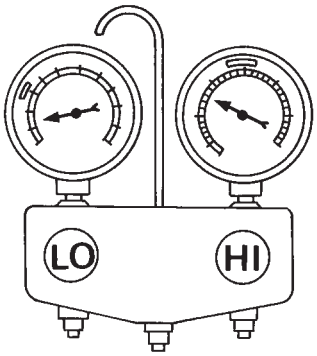
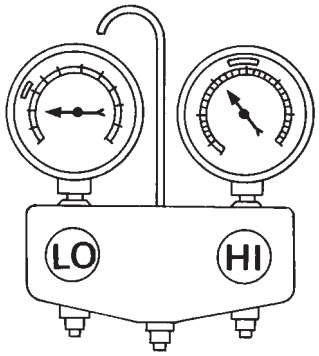
Whenever abnormal pressure of high and/or low sides of the system is noted, diagnosis must be conducted by using a manifold gauge. The large-line zone on the gauge scale (see illustrations.) shown in the following table refers to the standard (normal) pressure range for the corresponding pressure side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

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

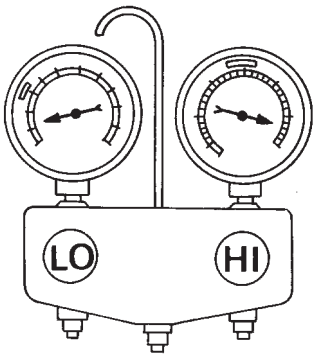
Performance Test Diagnoses (Cont'd)

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

Performance Test Diagnoses (Cont'd)

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

Performance Test Diagnoses (Cont'd)

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative. F  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	After the system is left at rest, start it again in order to confirm whether or not problem is caused by water or foreign particles. ● If the problem is due to water, drain water from refrigerant or replace refrigerant. ● If it is due to foreign particles, remove expansion valve and remove them with dry and compressed air. ● If either of the above methods cannot correct the problem, replace expansion valve. ● Replace liquid tank. ● Check compressor oil for contamination.

Symptom Chart

DIAGNOSTIC TABLE

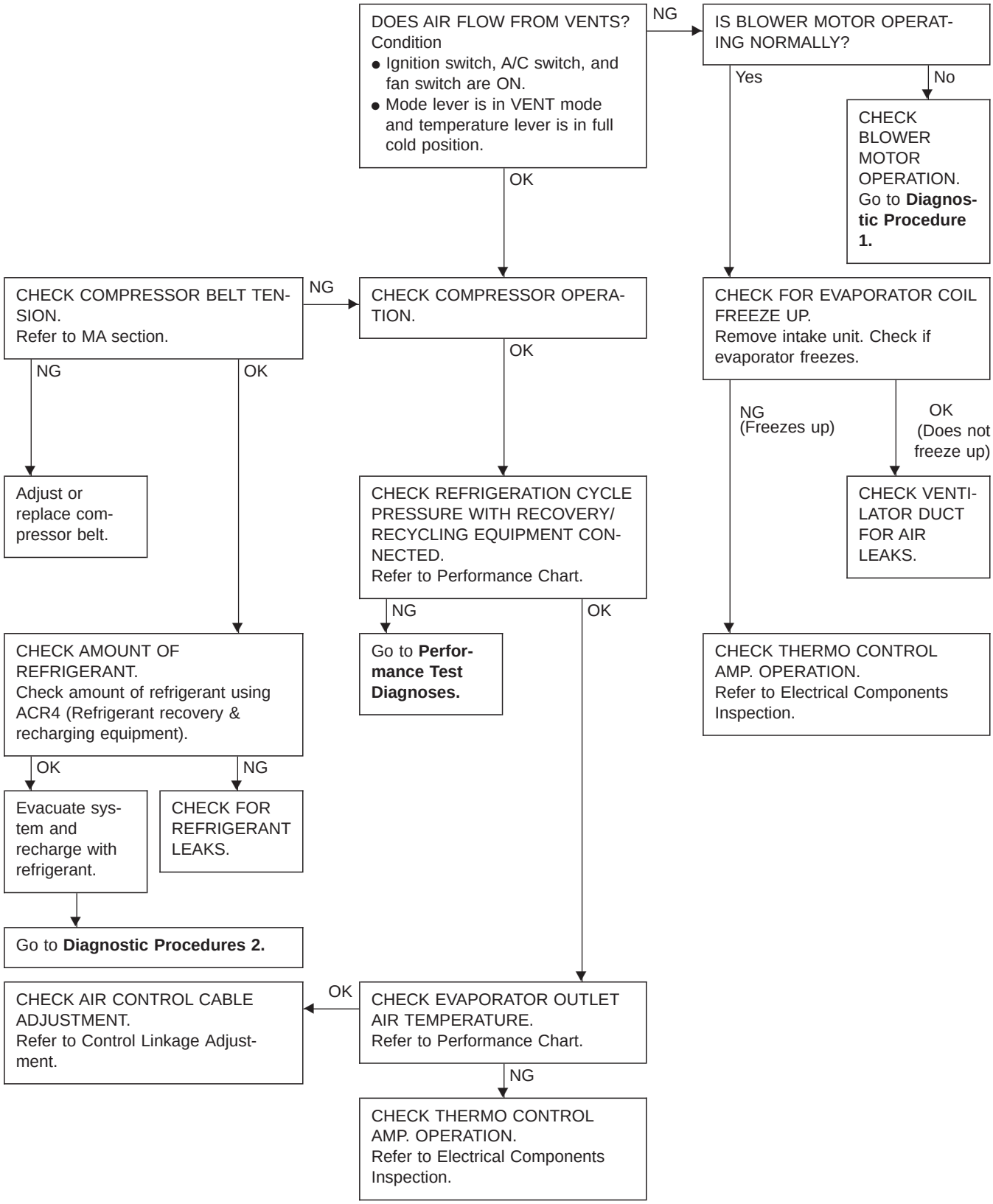
PROCEDURE	Preliminary Check		Diagnostic Procedure			Main Power Supply and Ground Circuit Check			Electrical Components Inspection								
SYMPTOM	Preliminary check 1	Preliminary check 2	Diagnostic procedure 1	Diagnostic procedure 2	Diagnostic procedure 3	15A Fuses	10A Fuse	15A Fuse	Blower motor	Intake door motor	Resistor	A/C switch	Fan switch	A/C relay	Dual-pressure switch	Compressor: Magnet clutch	Harness
A/C does not blow cold air.	❶		○			○	○	○	○		○	○	○	○	○	○	○
Blower motor does not rotate.	❶		❷			○		○	○		○		○				○
Magnet clutch does not engage when A/C switch and fan switch are ON.	❶			❷			○	○				○	○	○	○	○	○
Noise		❶															
Intake door does not change.					❶		○			○							○

❶, ❷: The number indicates checking order.
○: Refer to each flow chart for checking order. (It depends on malfunctioning portion.)

Preliminary Check

PRELIMINARY CHECK 1

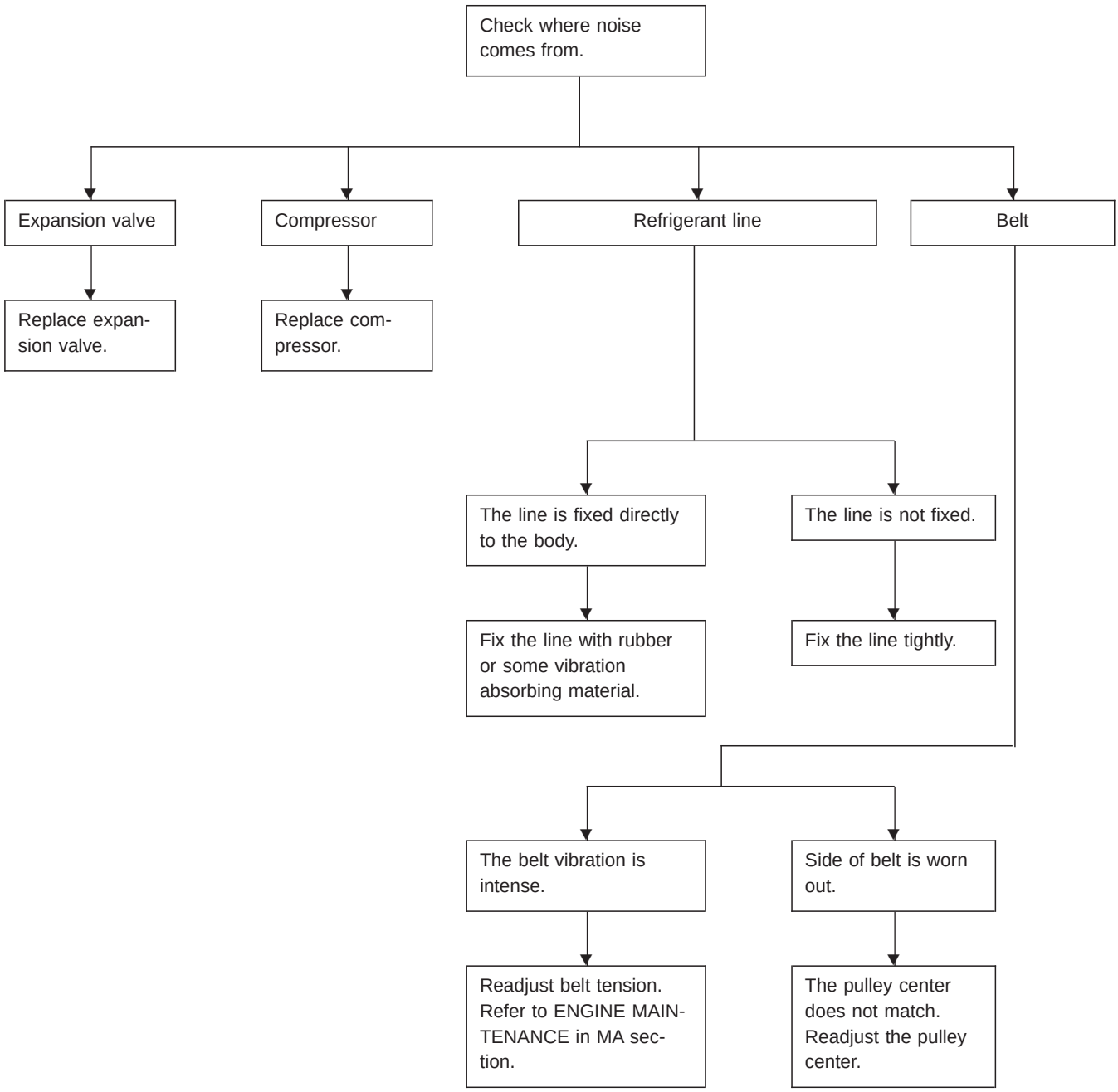
A/C does not blow cold air.



Preliminary Check (Cont'd)

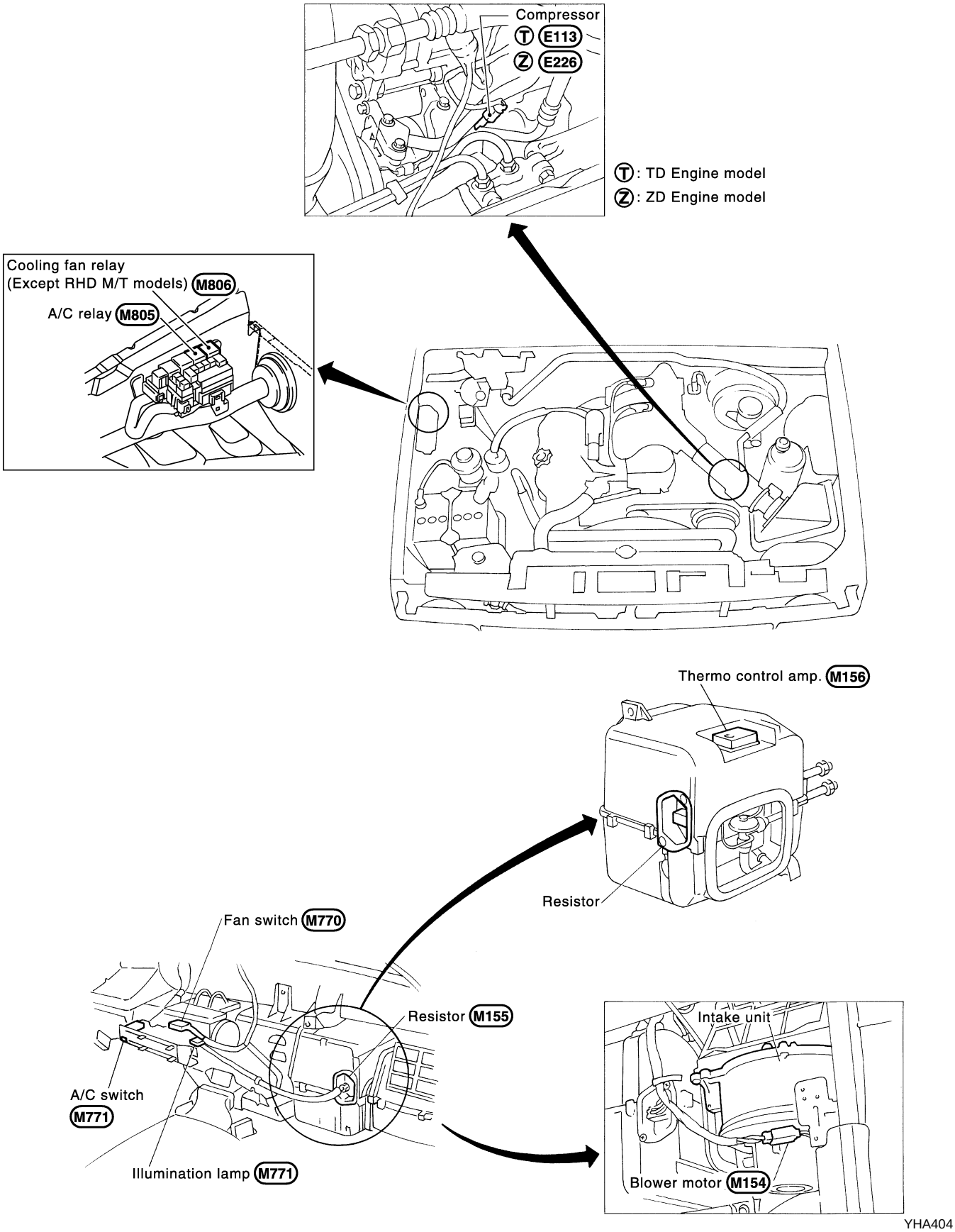
PRELIMINARY CHECK 2

Noise



Harness Layout for A/C System

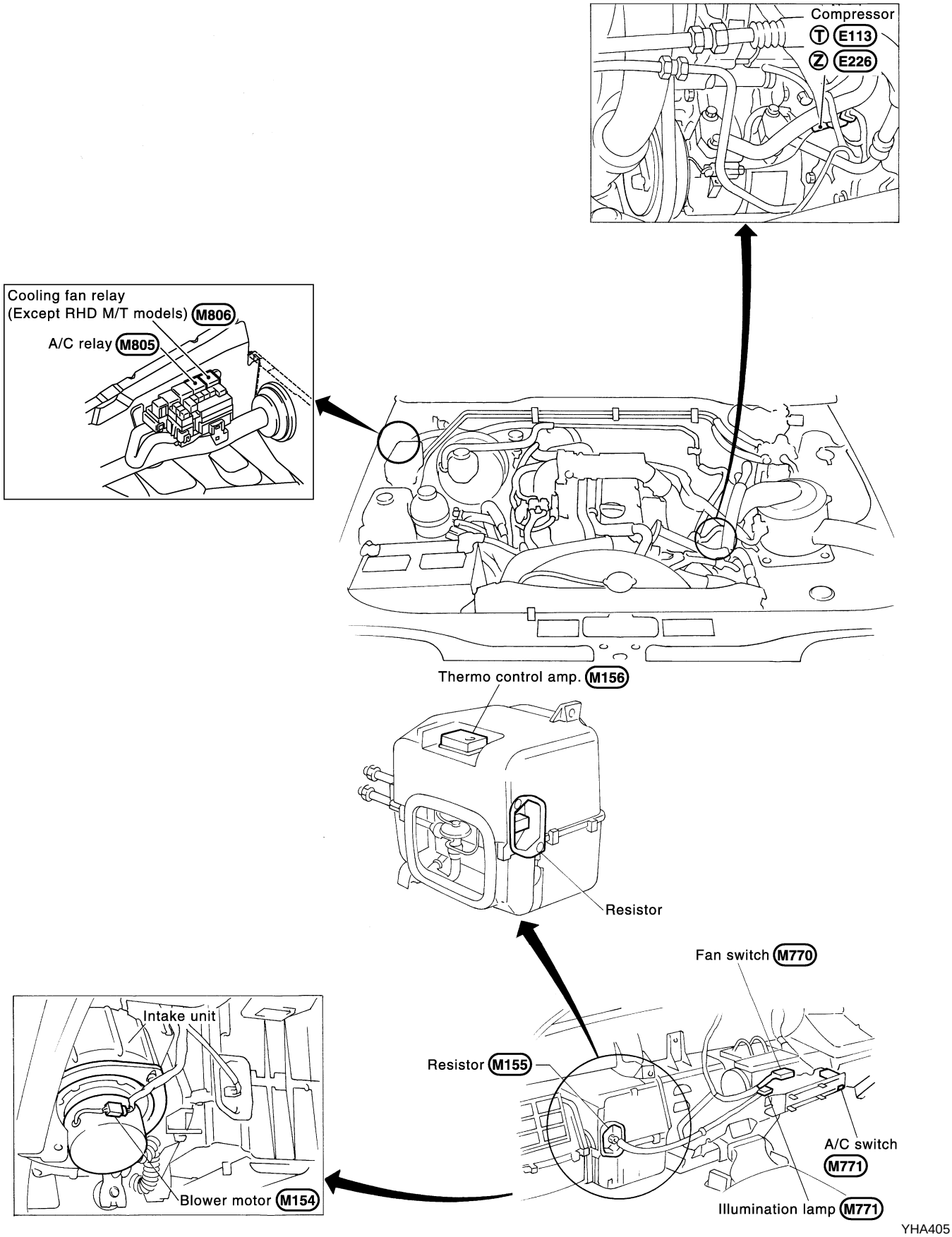
LH DRIVE MODELS



YHA404

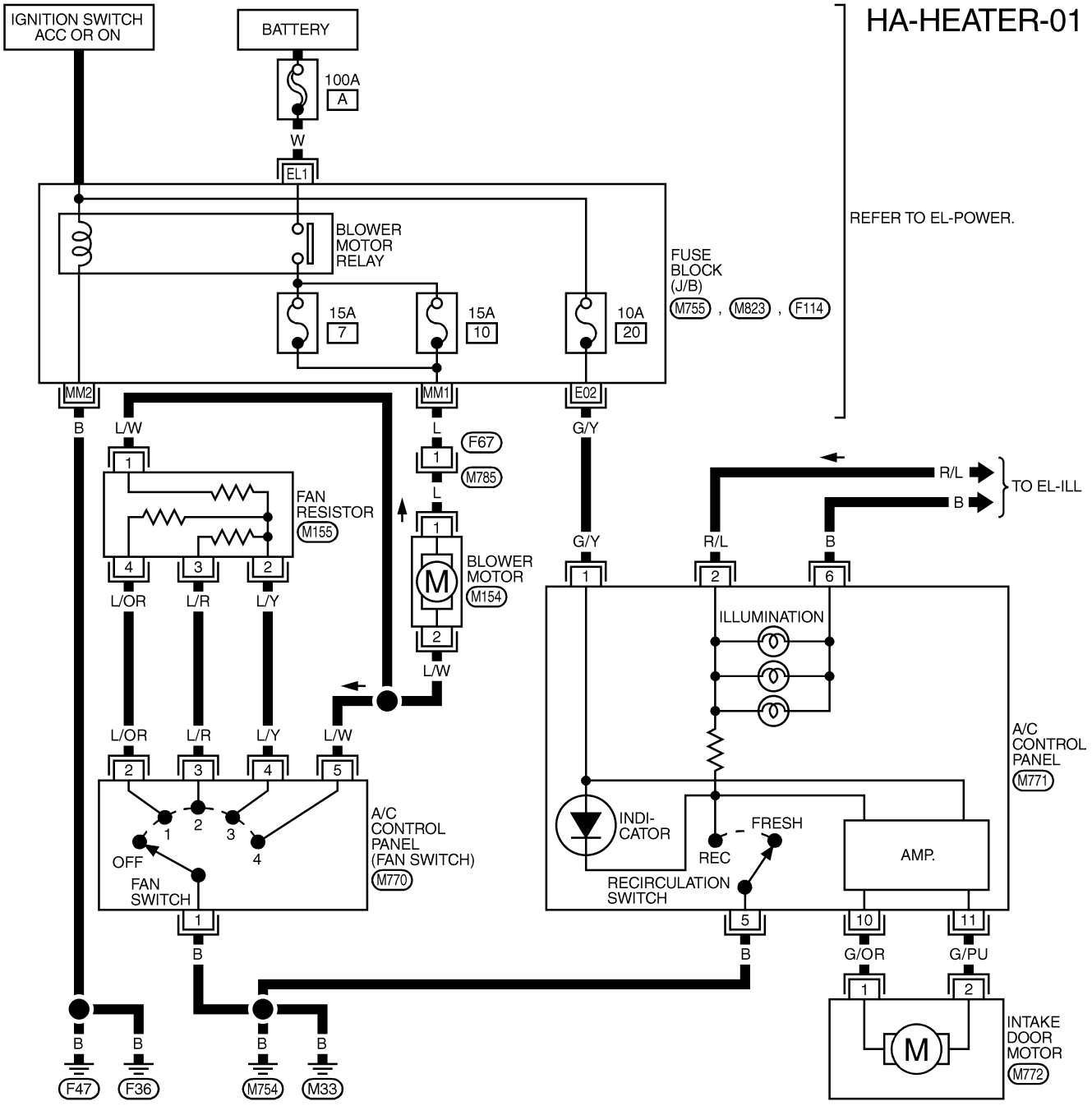
Harness Layout for A/C System (Cont'd)

RH DRIVE MODELS



Wiring Diagram — Heater

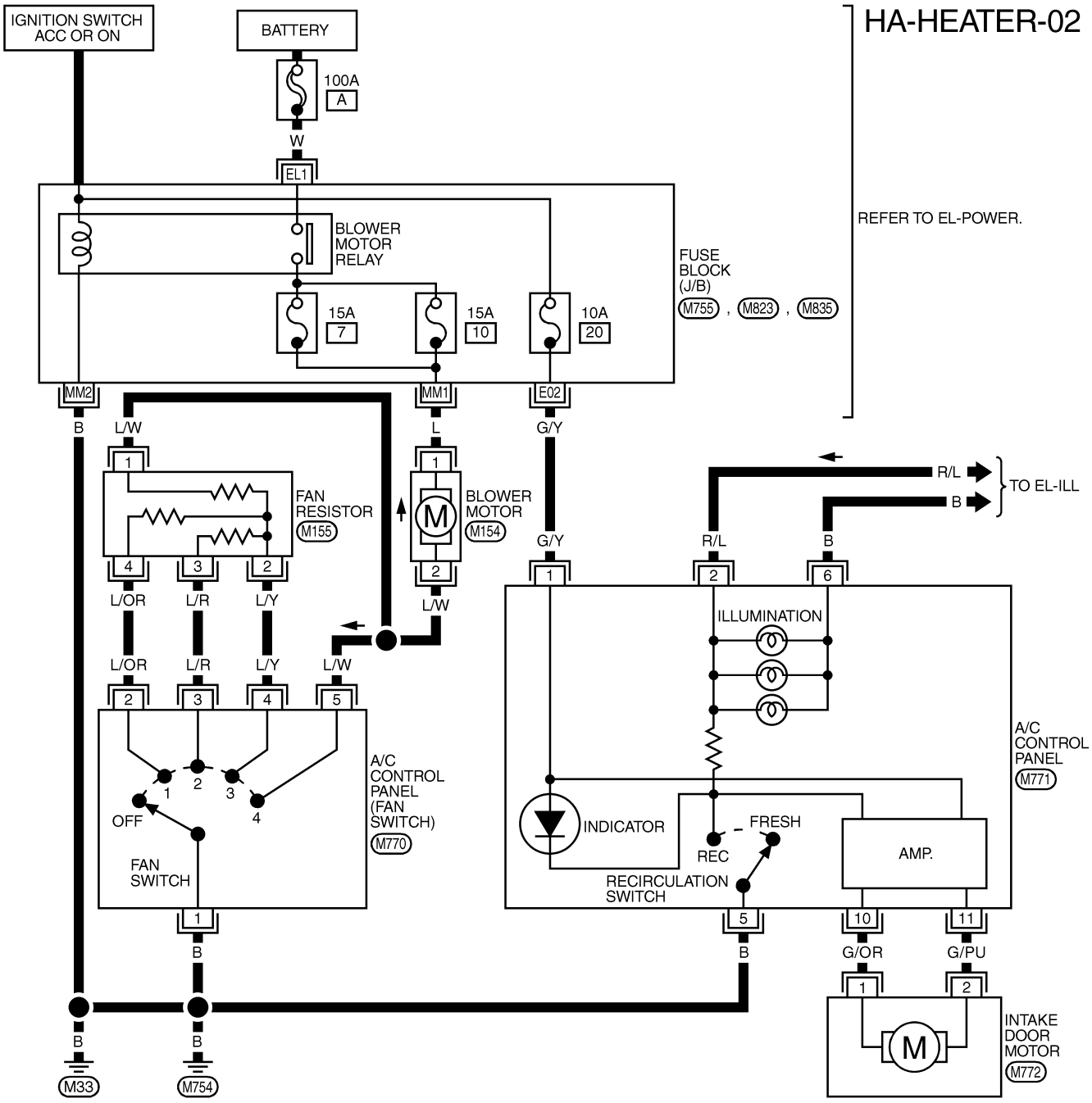
LHD MODELS

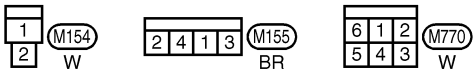


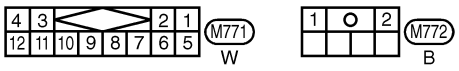
YHA400

Wiring Diagram — Heater (Cont'd)

RHD MODELS





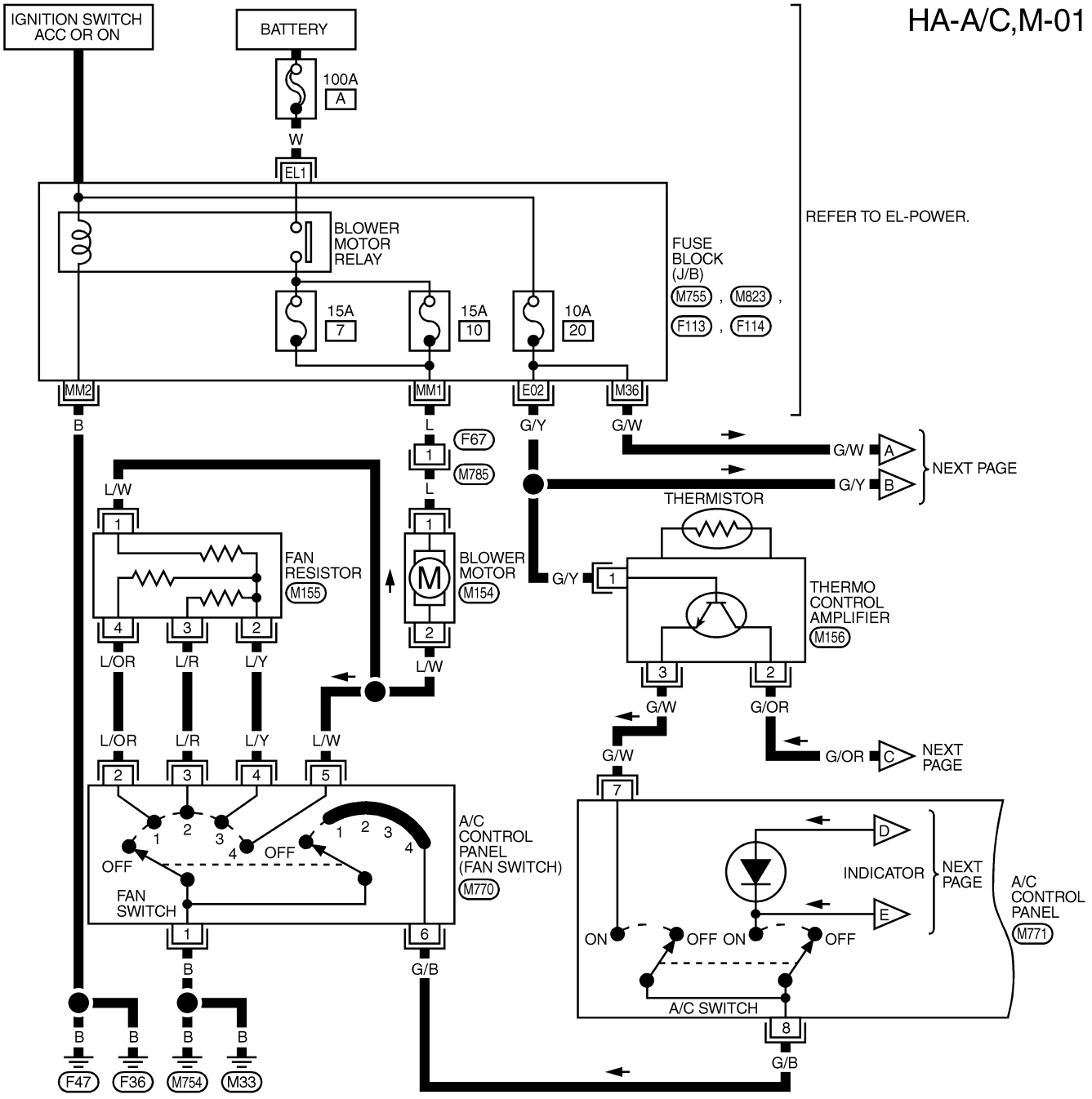


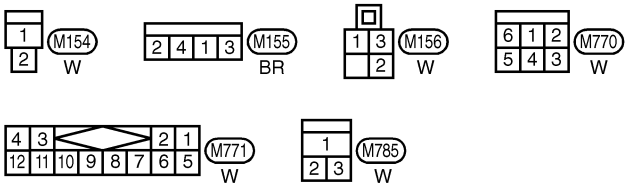
REFER TO THE FOLLOWING.
M755 , M823 , M835
-FUSE BLOCK-
JUNCTION BOX (J/B)

YHA401

Wiring Diagram

LHD TD27Ti ENGINE MODELS

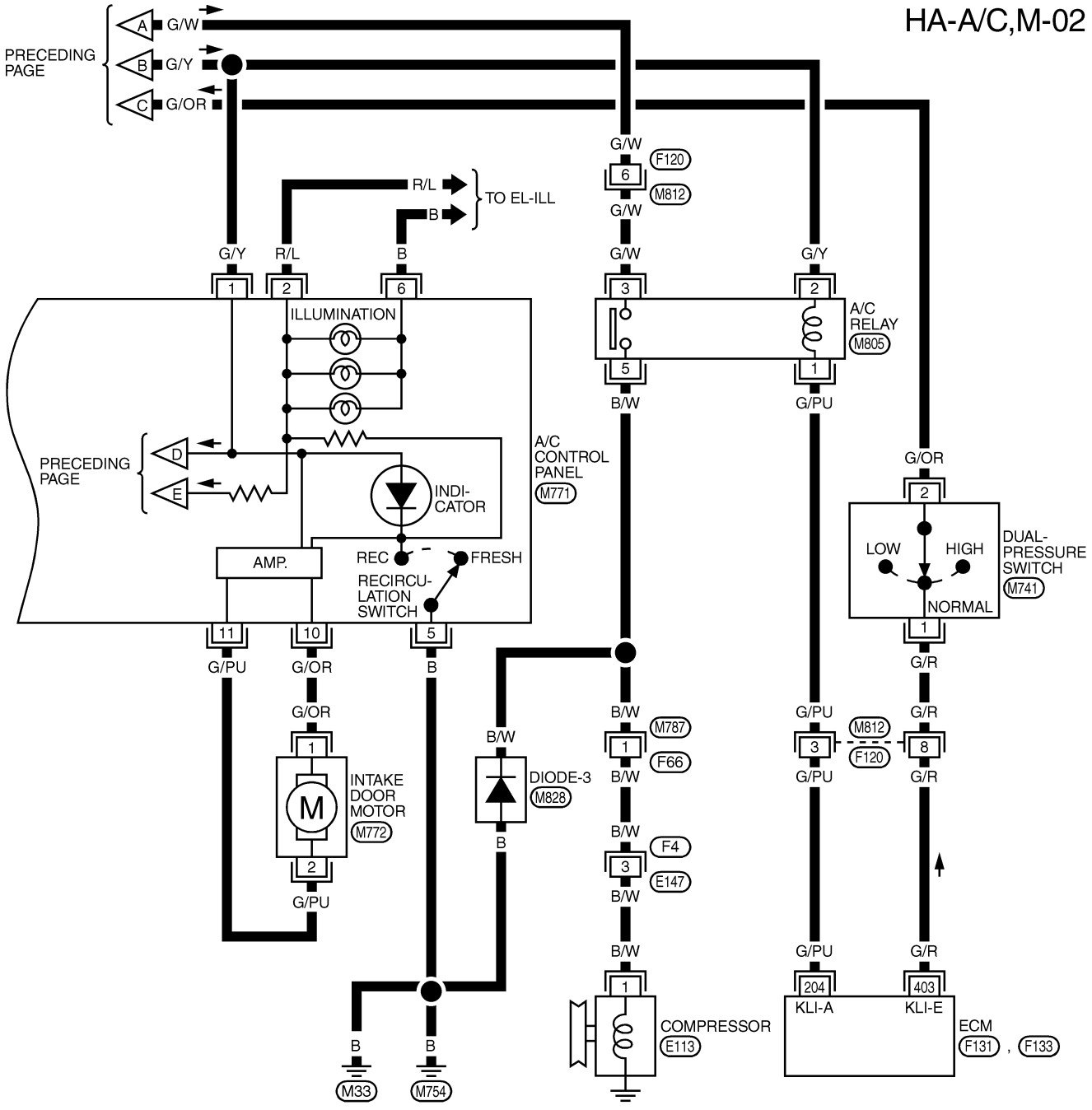


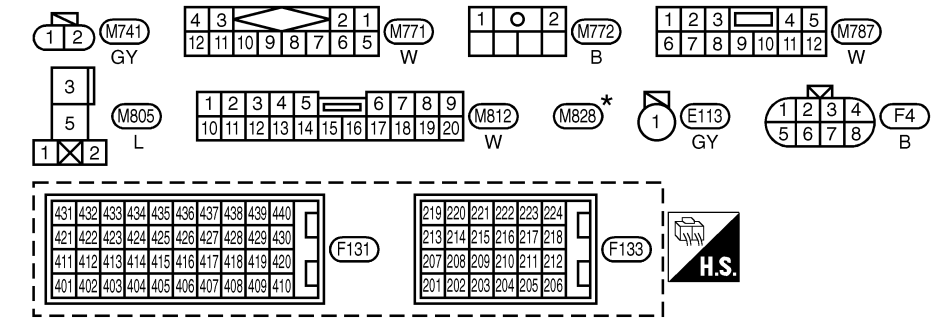


REFER TO THE FOLLOWING.
M755 , M823 , F113 , F114
-FUSE BLOCK-
JUNCTION BOX (J/B)

YHA392

Wiring Diagram (Cont'd)



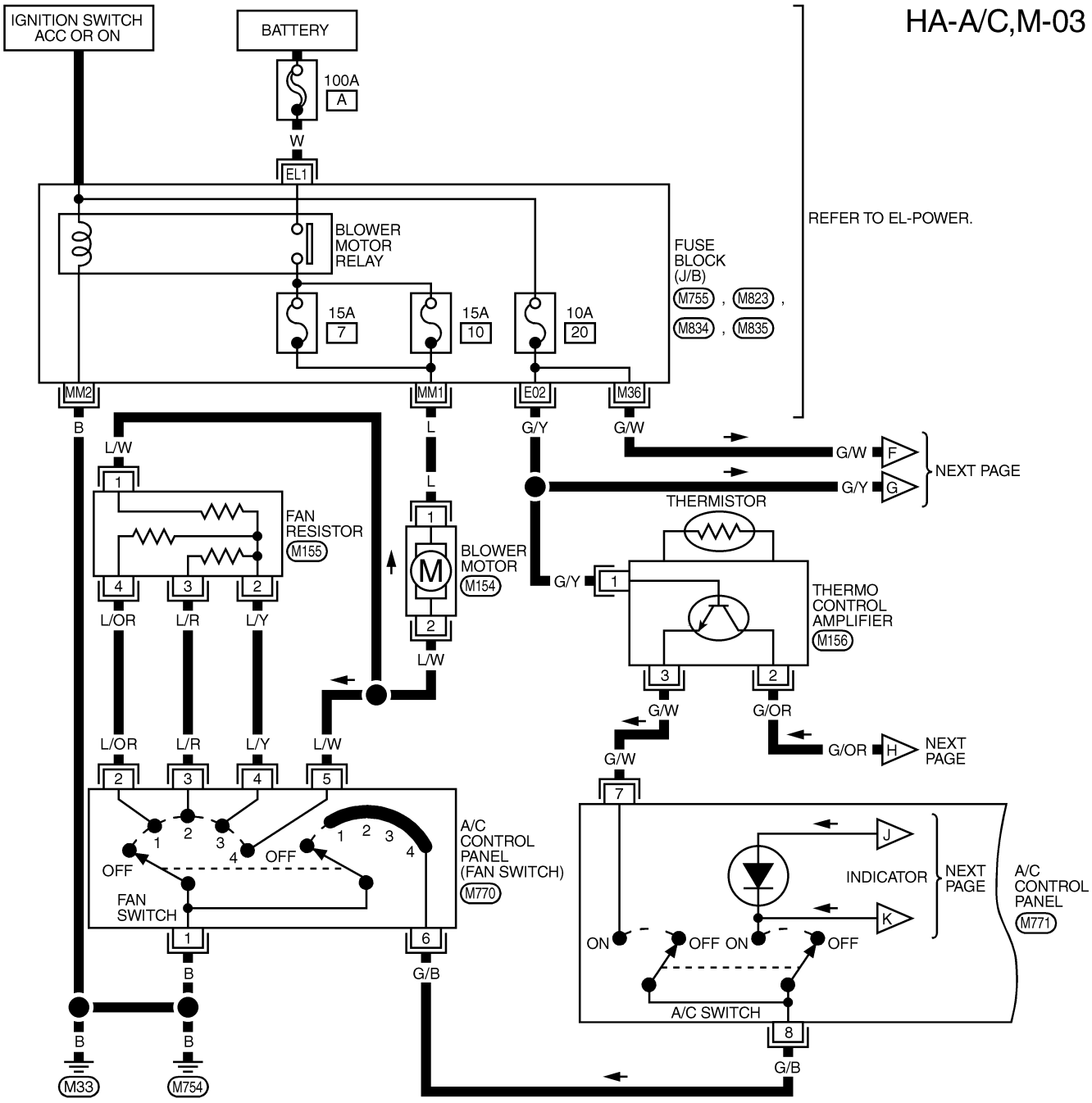


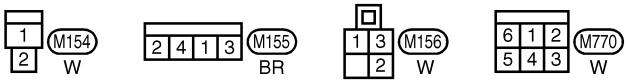
*: THIS DIODE IS BUILT IN HARNESS.

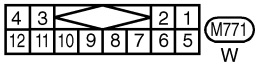
YHA393

Wiring Diagram (Cont'd)

RHD TD27Ti ENGINE MODELS



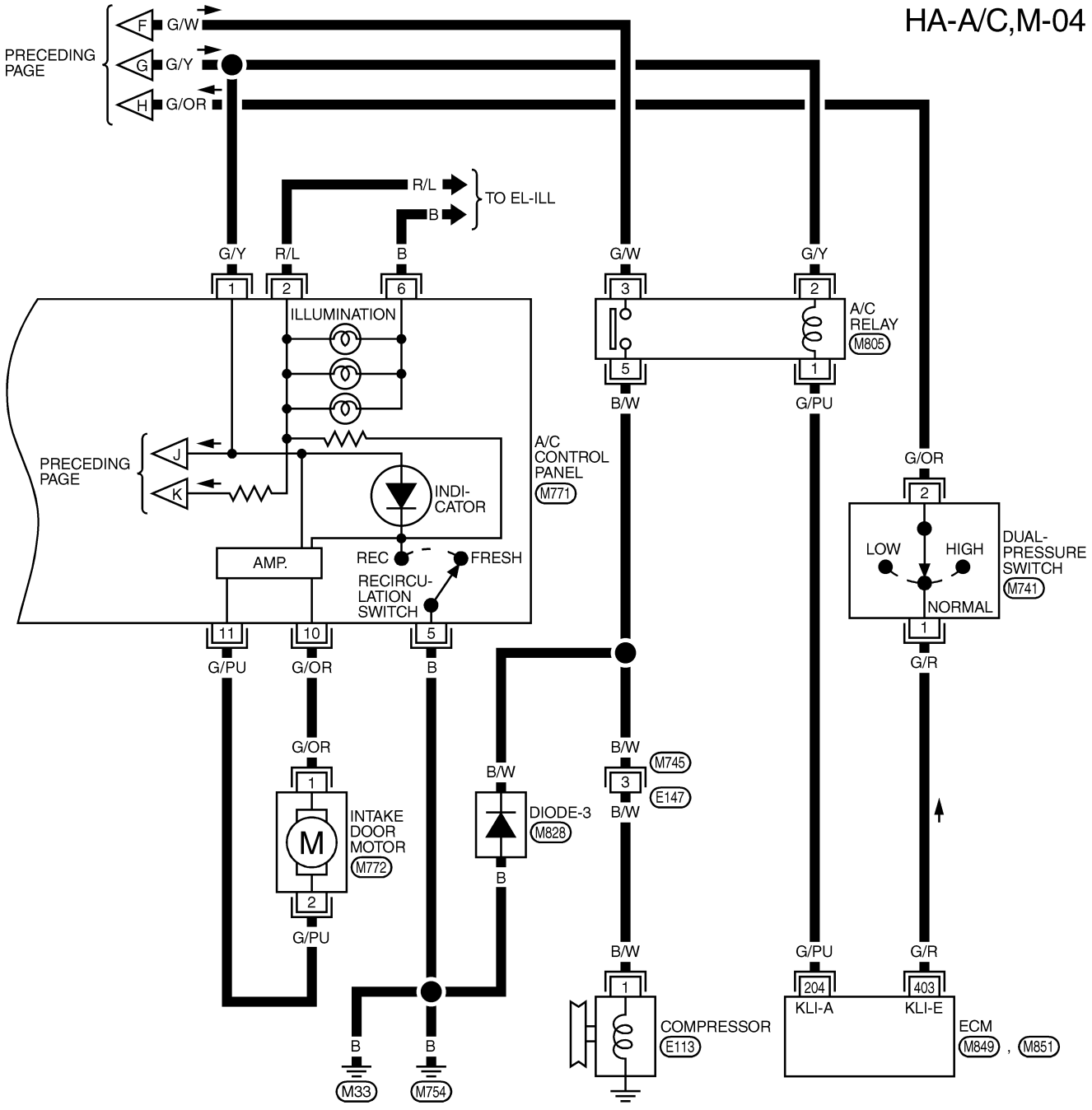




REFER TO THE FOLLOWING.
M755 , M823 , M834 , M835
-FUSE BLOCK-
JUNCTION BOX (J/B)

YHA394

Wiring Diagram (Cont'd)

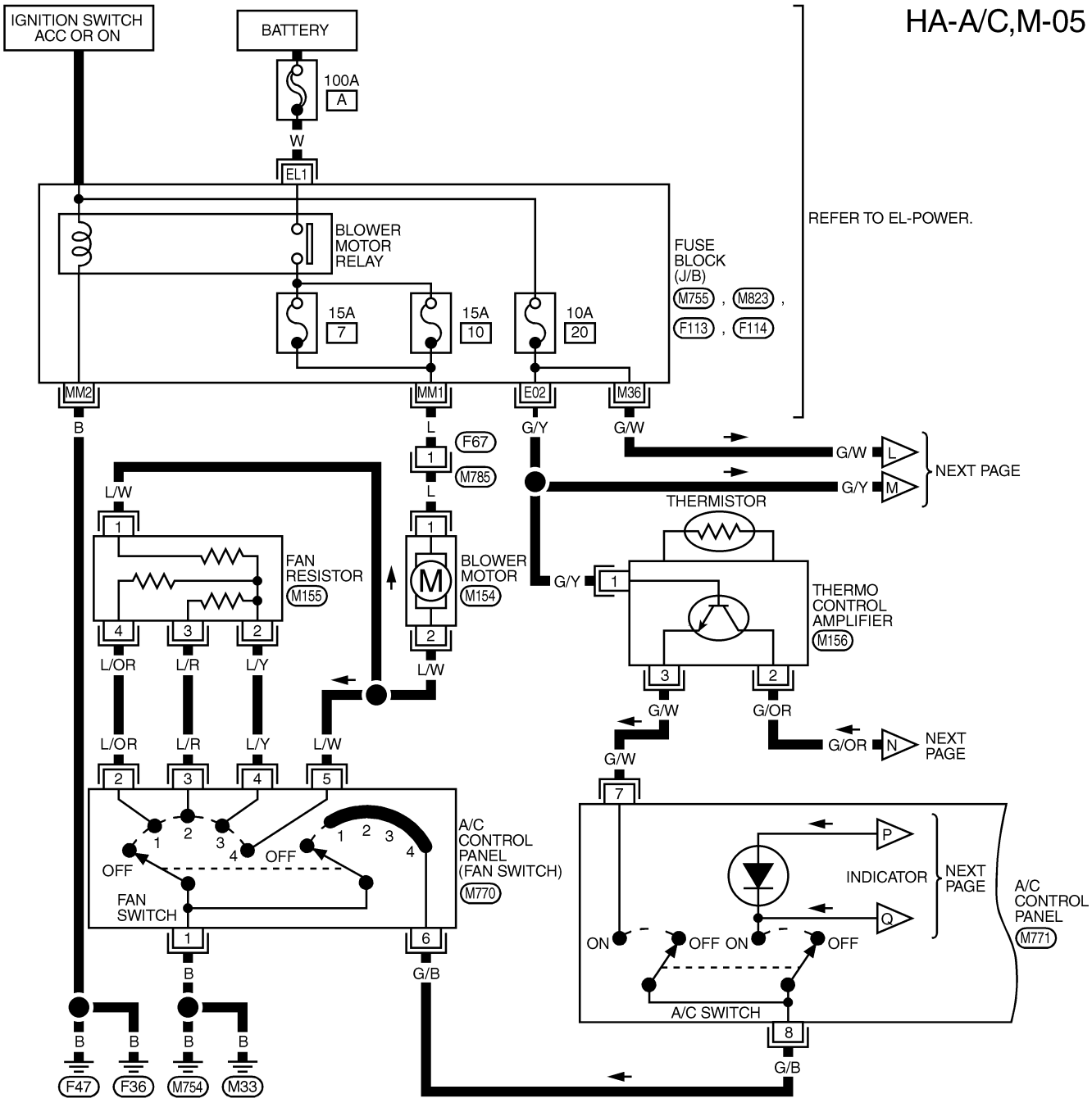


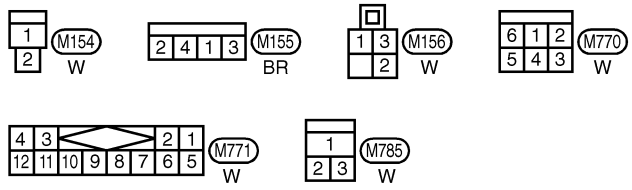
*: THIS DIODE IS BUILT IN HARNESS.

YHA395

Wiring Diagram (Cont'd)

LHD ZD30DDTi ENGINE MODELS

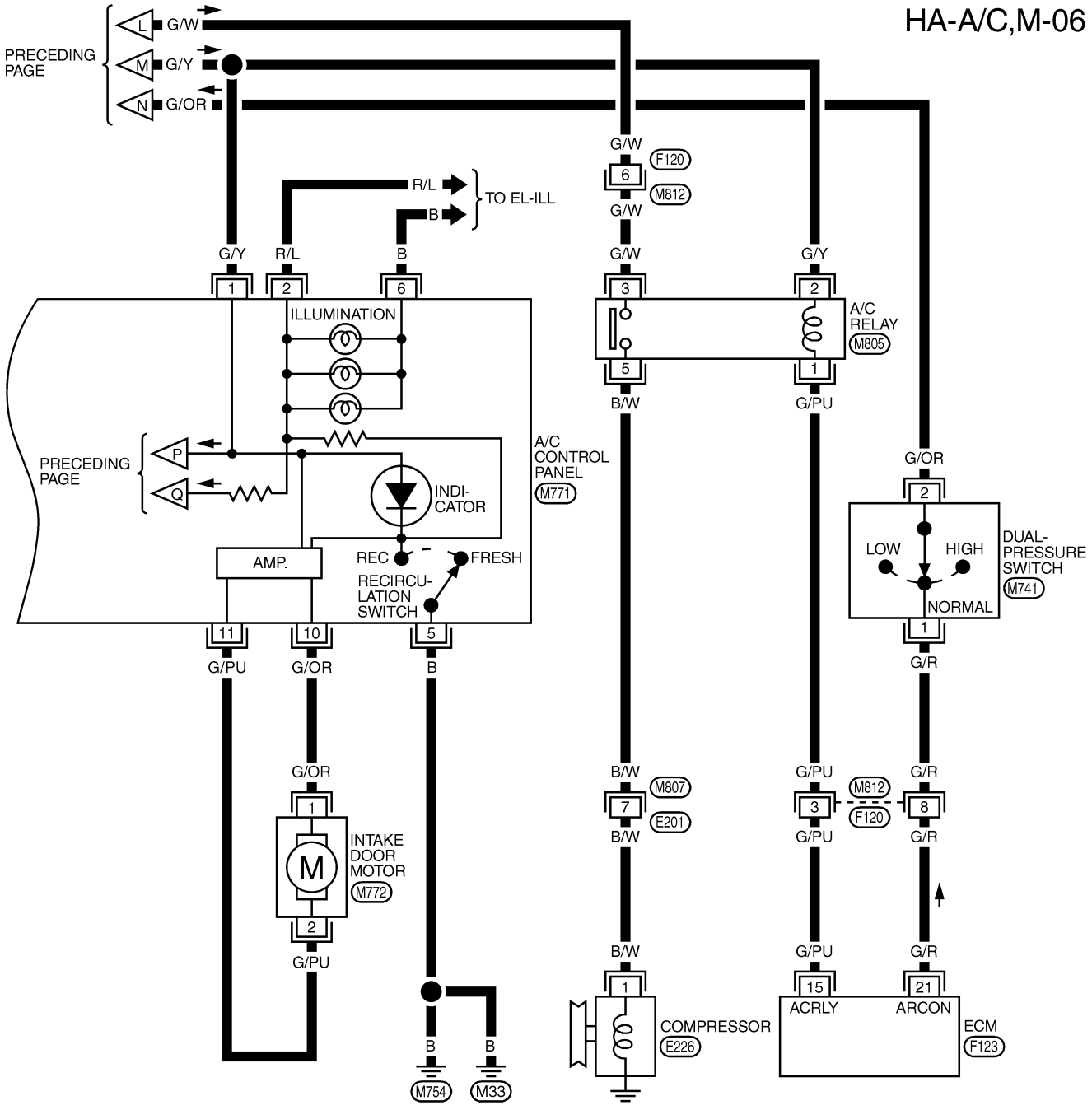


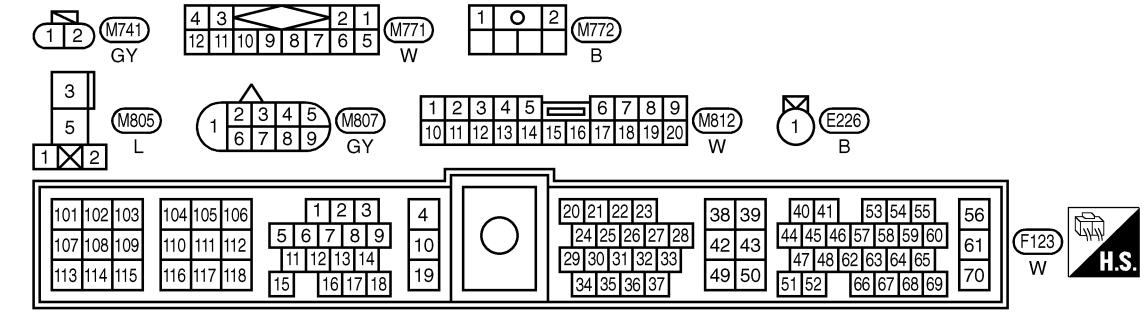


REFER TO THE FOLLOWING.
M755 , M823 , F113 , F114
-FUSE BLOCK-
JUNCTION BOX (J/B)

YHA396

Wiring Diagram (Cont'd)

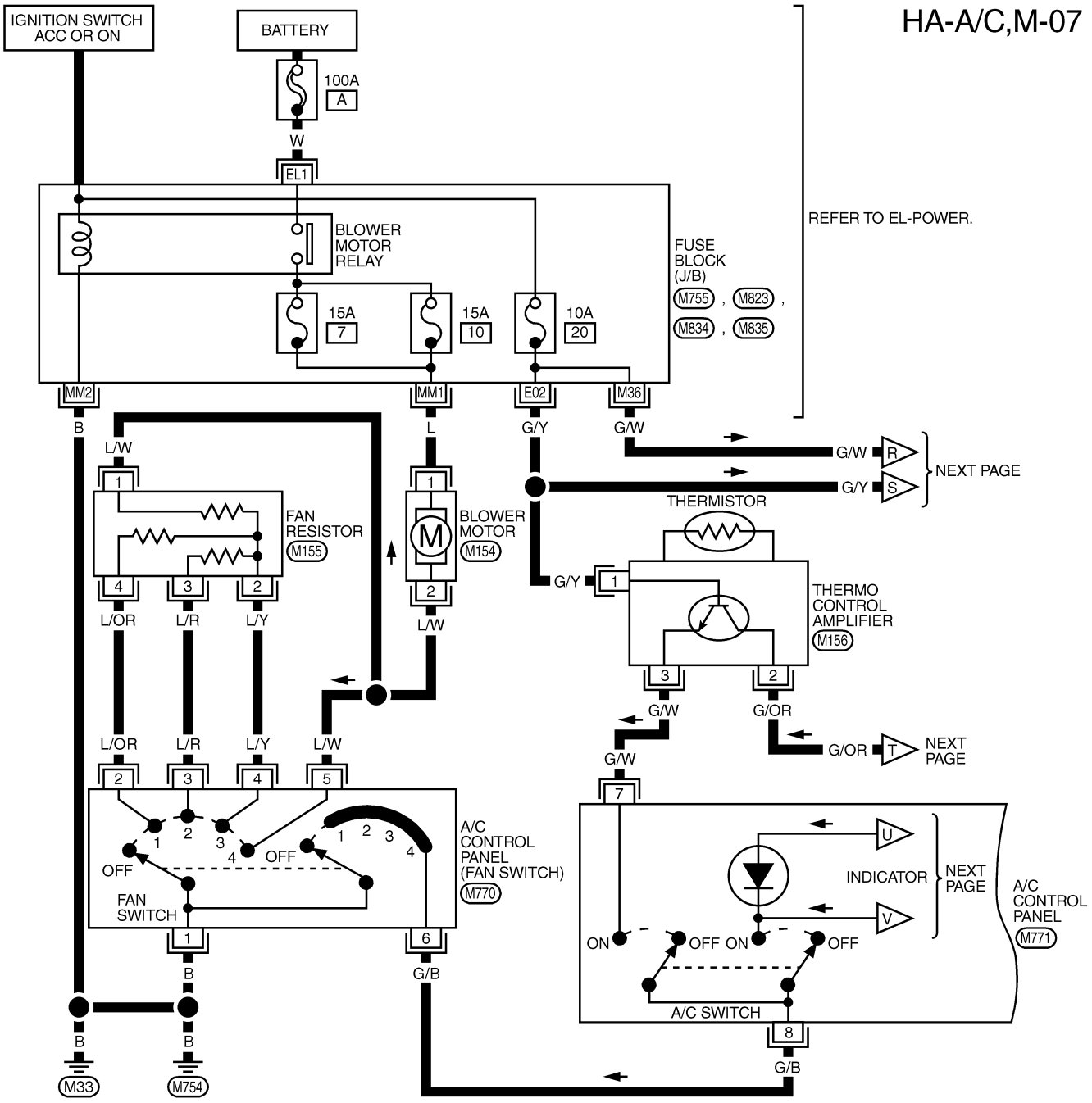


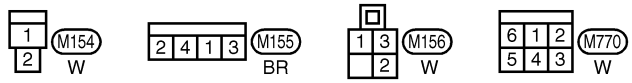


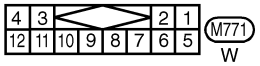
YHA397

Wiring Diagram (Cont'd)

RHD ZD30DDTi ENGINE MODELS



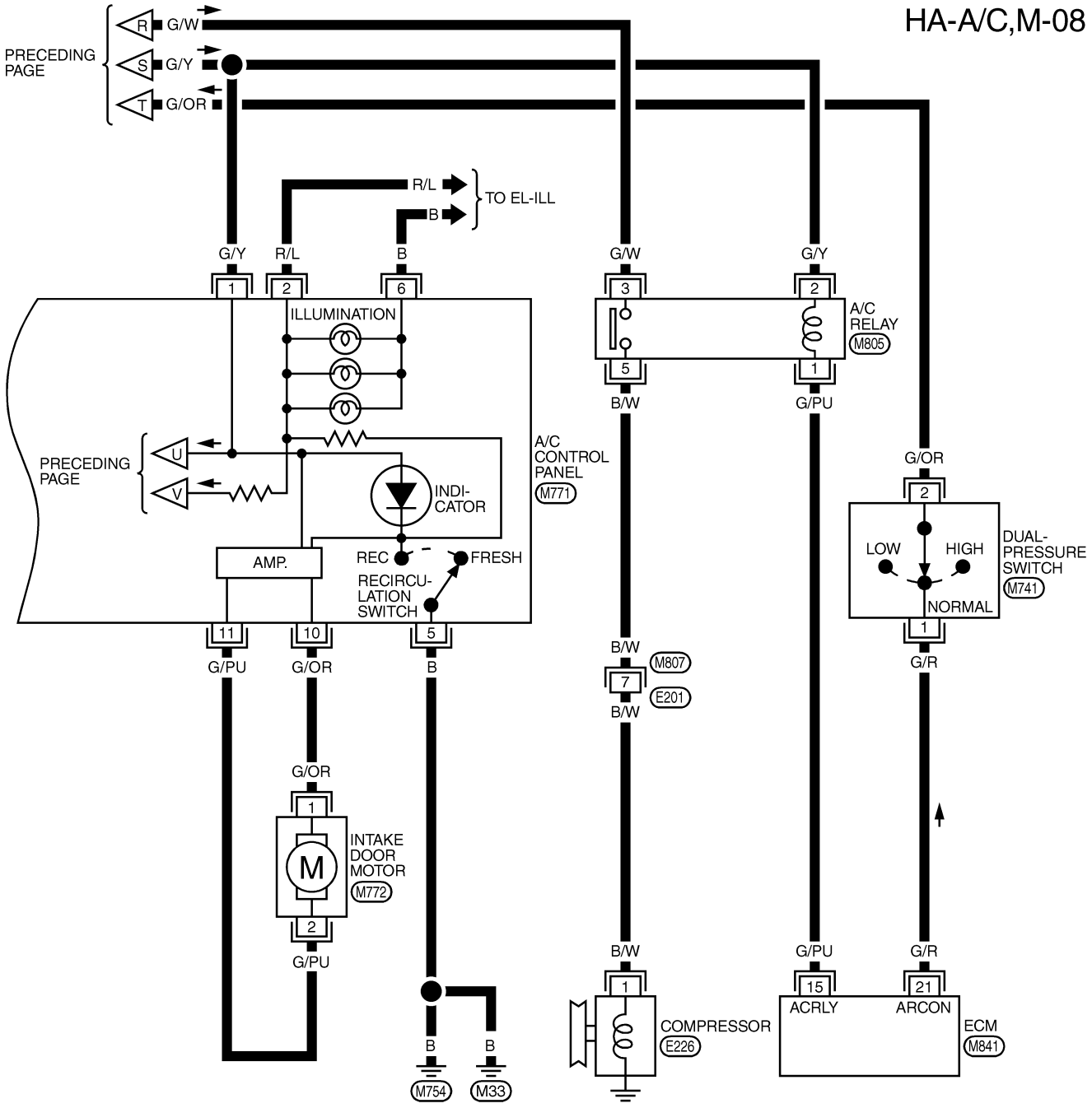




REFER TO THE FOLLOWING.
M755 , M823 , M834 , M835
-FUSE BLOCK-
JUNCTION BOX (J/B)

YHA398

Wiring Diagram (Cont'd)

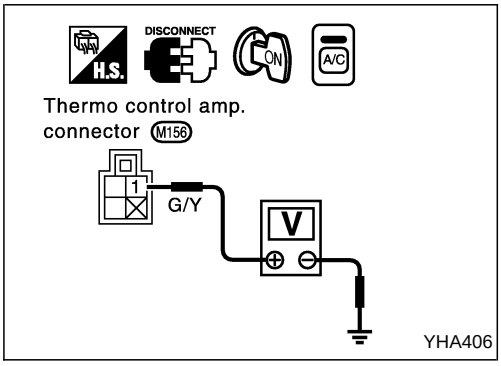


YHA399

Main Power Supply and Ground Circuit Check

POWER SUPPLY CIRCUIT CHECK FOR A/C SYSTEM

Check power supply circuit for air conditioning system.
Refer to "POWER SUPPLY ROUTING" in EL section and "Wiring Diagram".

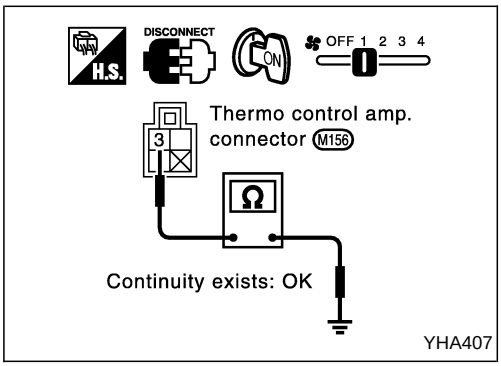


THERMO CONTROL AMP. CHECK

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

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

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



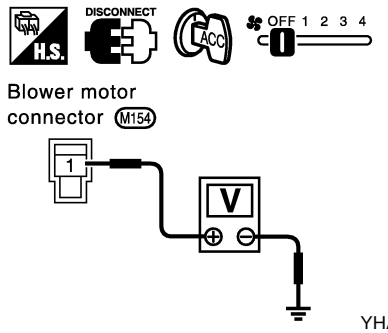
Check body ground circuit for thermo control amp. with A/C switch ON and fan switch ON.

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

Ohmmeter terminal		Continuity
⊕	⊖	
③	Body ground	Yes

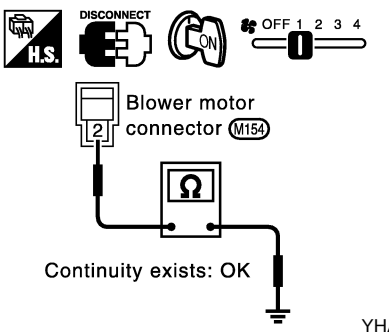
	INCIDENT	Flow chart No.
1	Fan fails to rotate.	1
2	Fan does not rotate at 1-speed.	2
3	Fan does not rotate at 2-speed.	3
4	Fan does not rotate at 3-speed.	4
5	Fan does not rotate at 4-speed.	5

A



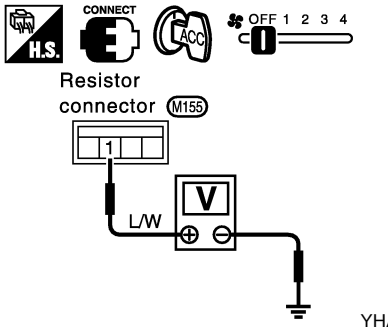
YHA408

B



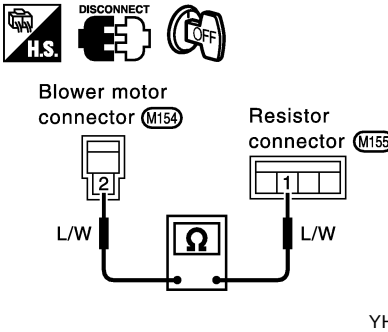
YHA409

C



YHA410

D



YHA411

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.
- Turn ignition switch to ACC or ON position.

Do approx. 12 volts exist between blower motor harness terminal No. ① and body ground?

NG → Check 15A fuses at fuse block. (Refer to "POWER SUPPLY ROUTING" in EL section and "Wiring Diagram".)

OK ↓

B

- Put fan switch to ON position.

Check circuit continuity between blower motor harness terminal No. ② and body ground.

NG → Reconnect blower motor harness connector.

OK ↓

CHECK BLOWER MOTOR.
(Refer to Electrical Components Inspection.)

NG ↓

Replace blower motor.

C

CHECK BLOWER MOTOR CIRCUIT BETWEEN BLOWER MOTOR AND RESISTOR.
- Put fan switch to OFF position.

Do approx. 12 volts exist between resistor harness terminal No. ① and body ground?

NG → Disconnect blower motor and resistor harness connectors.

D Note
- Turn ignition switch OFF.

Check circuit continuity between blower motor harness terminal No. ② and resistor harness terminal No. ① .

OK ↓

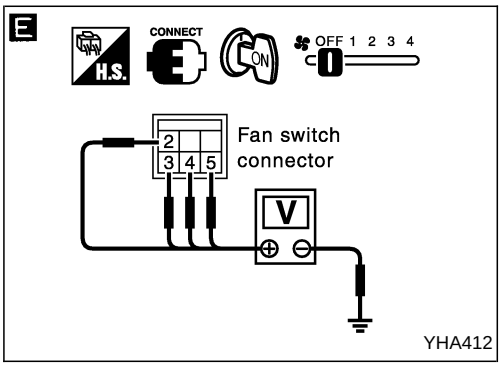
Ⓐ

(Go to next page.)

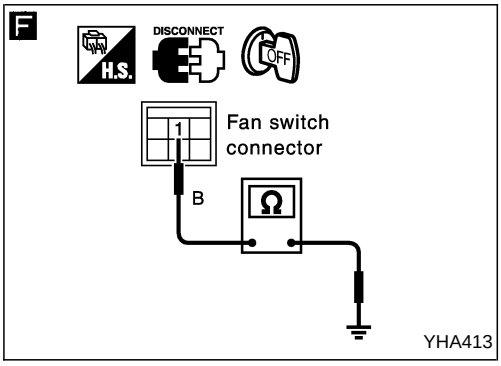
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 1 (Cont'd)

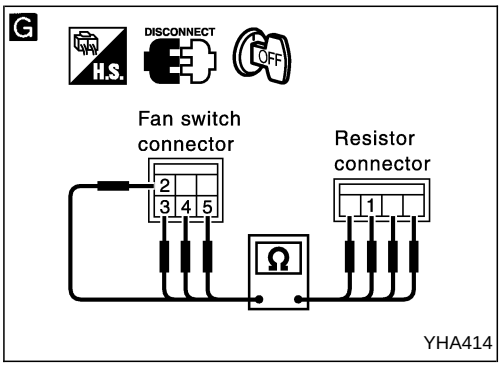
E



F



G



Ⓐ 1 — Ⓑ 2 3 4 — Ⓒ 5

CHECK RESISTOR AFTER DISCONNECTING IT.
(Refer to Electrical Components Inspection.)

OK → Reconnect resistor harness connector. (1 — 2 3 4)

NG → Replace resistor. → Reconnect resistor harness connector.

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

OK → 2 3 4 5

NG → G Note: Check circuit continuity between fan switch and resistor.

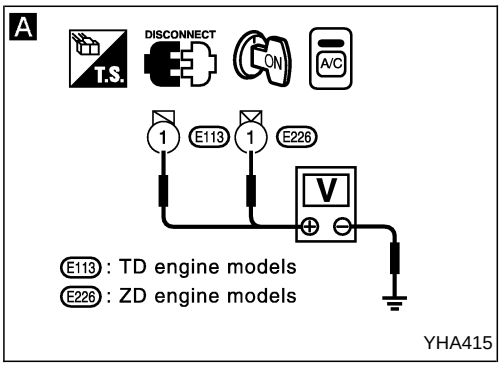
CHECK FAN SWITCH AFTER DISCONNECTING IT.
(Refer to Electrical Components Inspection.)

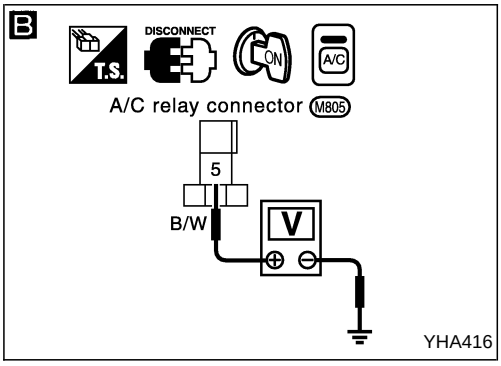
NG → Replace fan switch.

OK → F Note: Check circuit continuity between fan switch harness terminal No. ① 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: Magnet clutch does not engage when A/C switch and fan switch are ON.

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

A

CHECK POWER SUPPLY FOR COMPRESSOR.
Disconnect compressor harness connector.
- Turn ignition switch ON and A/C switch ON.

Do approx. 12 volts exist between compressor harness terminal No. ① and body ground?

NG → B

CHECK A/C RELAY OPERATION.
Do approx. 12 volts exist between A/C relay harness terminal No. ⑤ and body ground.

OK → Ⓐ
NG → Ⓑ

OK ↓

Check magnet clutch coil.

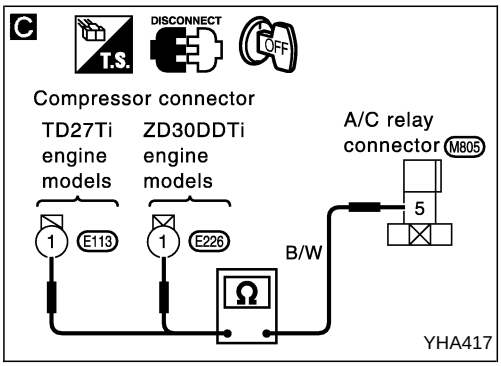
OK ↓

Replace magnet clutch.
Refer to COMPRESSOR — Model DKV-14C (ZEXEL make).

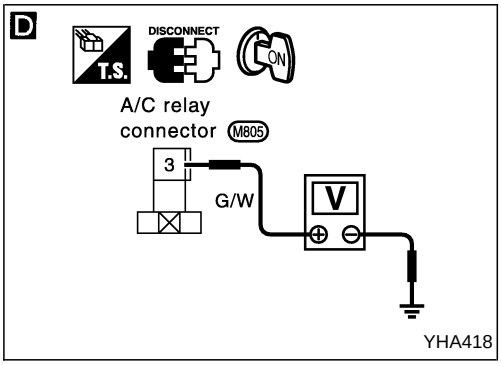
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 2 (Cont'd)

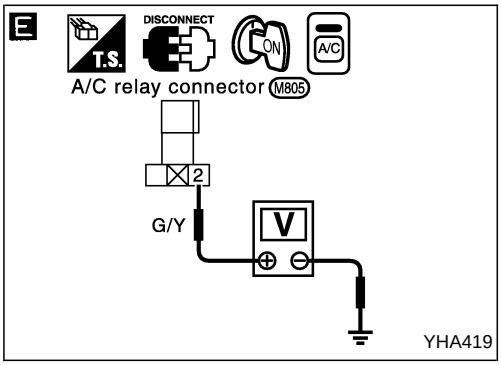
C



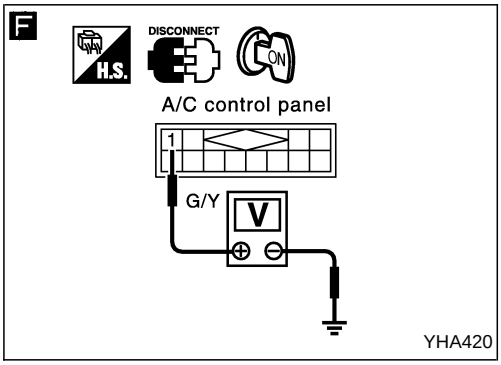
D



E



F



Ⓐ

● Turn ignition switch OFF.
Disconnect A/C relay harness connector.

C

Note

Check circuit continuity between A/C relay harness connector terminal No. ⑤ and compressor harness connector terminal No. ① .
If NG, check harness connectors.

Ⓑ

D

CHECK POWER SUPPLY FOR A/C RELAY.
Disconnect A/C relay.
Do approx. 12 volts exist between A/C relay harness connector terminal No. ③ and body ground?

OK

NG

CHECK POWER SUPPLY CIRCUIT AND 10A FUSE AT FUSE BLOCK.
(Refer to "POWER SUPPLY ROUTING" in EL section and Wiring Diagram.)

E

● Turn ignition switch ON.
CHECK POWER SUPPLY FOR A/C RELAY (Coil side).
Do approx. 12 volts exist between A/C relay harness connector terminal No. ② and body ground?

NG

F

CHECK POWER SUPPLY FOR A/C CONTROL PANEL.
Disconnect A/C control panel harness connector.
Do approx. 12 volts exist between A/C control panel harness connector terminal No. ① and body ground?

OK

NG

Ⓒ

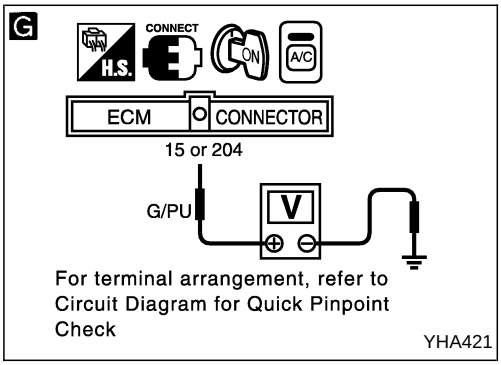
(Go to next page.)

CHECK POWER SUPPLY CIRCUIT AND 10A FUSE AT FUSE BLOCK.
(Refer to "POWER SUPPLY ROUTING" in EL section and Wiring Diagram.)

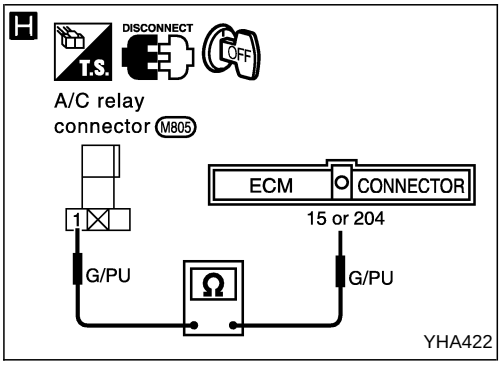
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 2 (Cont'd)

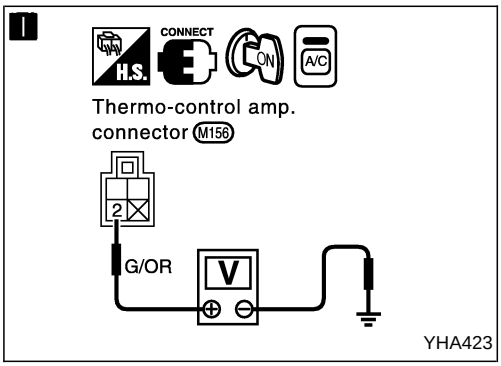
G



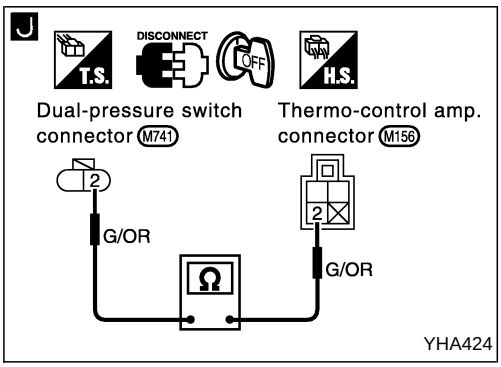
H



I



J



Ⓒ

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

NG → Replace A/C relay.

OK → Reconnect A/C relay.

G

CHECK COIL SIDE CIRCUIT OF A/C RELAY.
Do approx. 12 volts exist between ECM harness connector terminal No. 204 (TD27Ti models) or 15 (ZD30DDTi models) and body ground?

NG → H

H — Note

● Turn ignition switch OFF. Check circuit continuity between A/C relay harness terminal No. 1 and ECM harness connector terminal No. 204 (TD27Ti models) or 15 (ZD30DDTi models).

OK → I

I

CHECK VOLTAGE FOR THERMO CONTROL AMP.
Do more than 8 volts exist between thermo-control amp. harness connector terminal No. 2 and body ground?

NG → J

J

● Turn ignition switch OFF. Check circuit continuity between thermo-control amp. harness connector terminal No. 2 and dual-pressure switch connector terminal No. 2 .

OK → CHECK DUAL-PRESSURE SWITCH.
(Refer to Electrical Components Inspection.)

OK → Ⓔ (Go to page HA-58.)

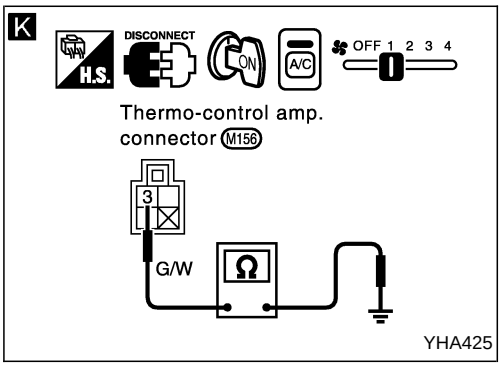
NG → Replace dual-pressure switch.

OK → Ⓓ (Go to next page.)

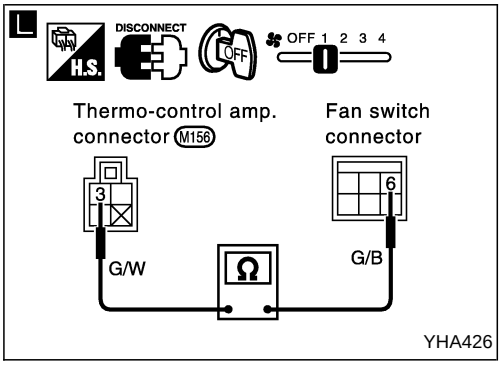
Note:
If the result is NG after checking circuit continuity, repair harness or connector.

Diagnostic Procedure 2 (Cont'd)

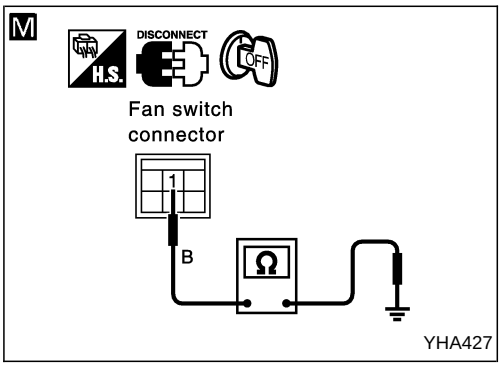
K



L



M



Ⓓ

CHECK POWER SUPPLY FOR THERMO-CONTROL AMP.
Go to Main Power Supply and Ground Circuit Check.

OK

K

● Turn ignition switch OFF.
CHECK BODY GROUND CIRCUIT FOR THERMO-CONTROL AMP.
Disconnect thermo-control amp. harness connector.
Ensure A/C switch is in ON position.
Ensure fan switch is in ON position (1 to 4).
Does continuity exist between thermo control amp. harness connector terminal No. ③ and body ground?

NG → Disconnect fan switch harness connector.
Ensure A/C switch is in ON position.

OK

Replace thermo-control amp.

L Note

Check circuit continuity between thermo-control amp. harness connector terminal No. ③ and fan switch harness connector terminal No. ⑥ .

NG

Check A/C switch (Refer to Electrical Components Inspection, HA-60)

OK

Repair harness or connectors.

M Note

CHECK BODY GROUND CIRCUIT FOR FAN SWITCH.
Does continuity exist between fan switch harness connector terminal No. ① and body ground?

OK

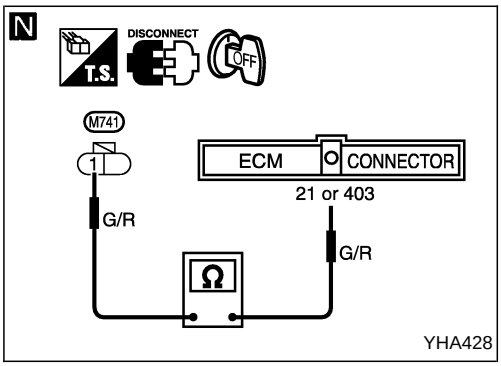
CHECK FAN SWITCH.
(Refer to Electrical Components Inspection.)

NG

Replace fan switch.

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

Diagnostic Procedure 2 (Cont'd)



Ⓔ

Note

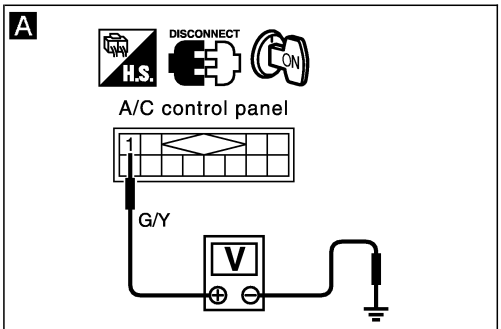
Check circuit continuity between ECM harness connector terminal No. ㉑ (ZD30DDTi) or 403 (TD27Ti) and dual-pressure switch harness connector terminal No. ① .

OK

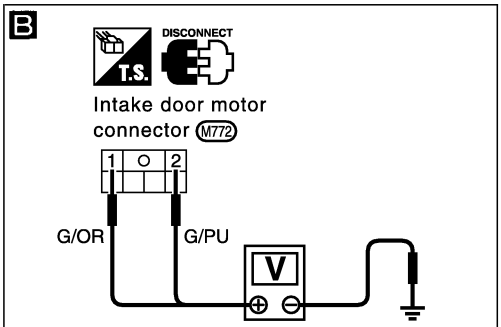
CHECK ECM.
(Refer to EF & EC section.)

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

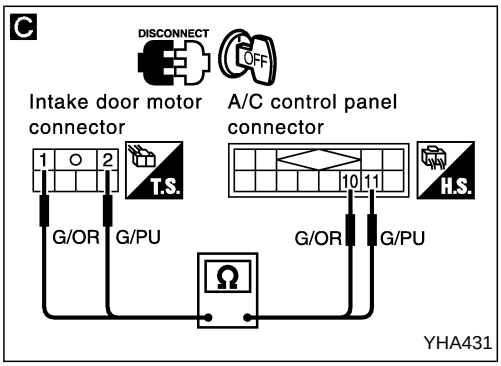
A



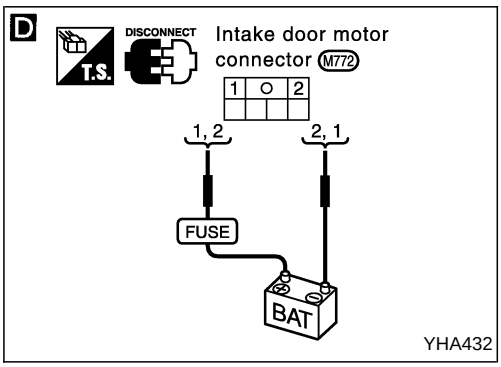
B



C



D



Diagnostic Procedure 3

SYMPTOM: Intake door does not change.

CHECK OPERATION
Does intake door motor (recirculation system) operate, correctly?

OK → Intake door motor (recirculation system) is OK.

NG ↓

A

CHECK POWER SUPPLY A/C CONTROL PANEL
Disconnect A/C control panel harness connector.
Do approx. 12 volts exist between A/C panel harness connector terminal ① and body ground?

NG → CHECK POWER SUPPLY CIRCUIT AND 10A FUSE.
(Refer to “POWER SUPPLY ROUTING” in EL section and Wiring Diagram).

OK ↓

B

CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR
- Turn ignition switch ON.

Check voltage between intake door motor terminal ① and ground, a few seconds after air recirculation switch is switched ON.
Do approx. 12 volts exist?
Check voltage between intake door motor terminal ② and ground, a few seconds after air recirculation switch is switched OFF.
Do approx. 12 volts exist?

NG → C

Check continuity between intake door motor terminal ① (②) and A/C control panel terminal ⑩ (⑪).
If NG, repair harness or connector.

OK → Replace A/C control panel.

OK ↓

D

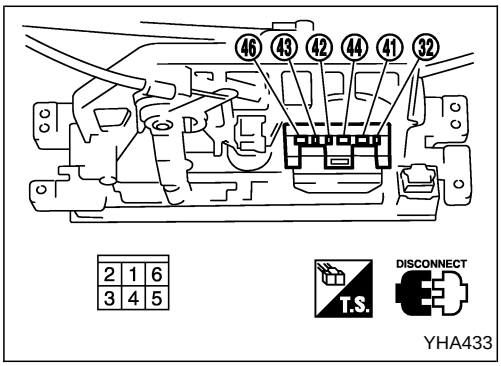
CHECK INTAKE DOOR MOTOR
Apply approx. 12 volts between intake door motor terminals ① (②) and ② (①).
Does intake door motor operate, correctly?

NG → Replace intake door motor.

OK ↓

CHECK INTAKE DOOR LINKAGE
(Refer to “Control Linkage Adjustment.)
If OK, intake door is OK.

NG → Repair intake door linkage.



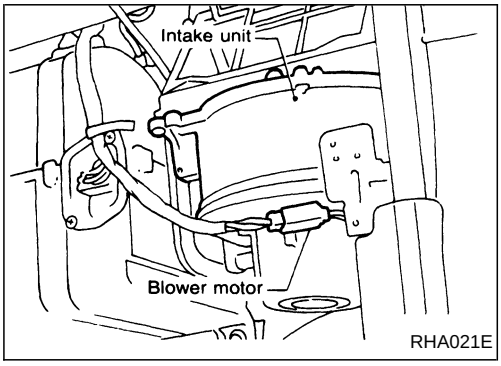
YHA433

Electrical Components Inspection

FAN SWITCH

Check continuity between terminals at each switch position.

TERMINAL	LEVER POSITION	OFF	1	2	3	4
5						o
2			o			
3				o		
4					o	
1			o	o	o	o
6			o	o	o	o

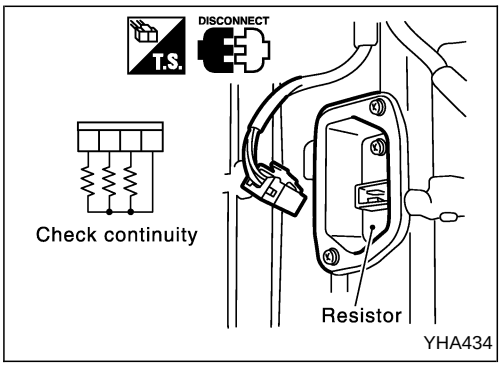


RHA021E

BLOWER MOTOR

Confirm smooth rotation of the blower motor.

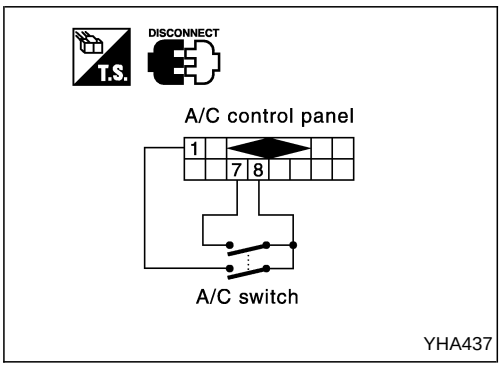
- Ensure that there are no foreign particles inside the intake unit.



YHA434

BLOWER RESISTOR

Check continuity between terminals.



YHA437

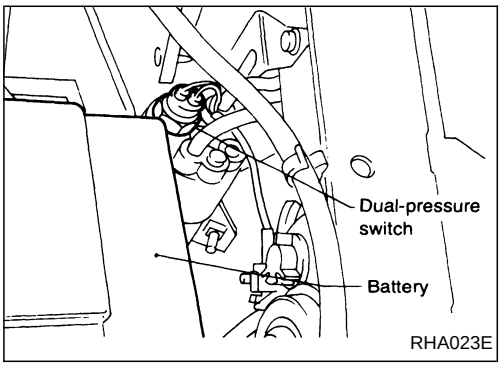
A/C SWITCH

Check continuity between component terminals.

A/C control panel connector terminal No.	A/C switch condition	Continuity
① — ⑦	ON	YES
	OFF	NO
① — ⑧	ON	YES
	OFF	NO
⑦ — ⑧	ON	YES
	OFF	NO

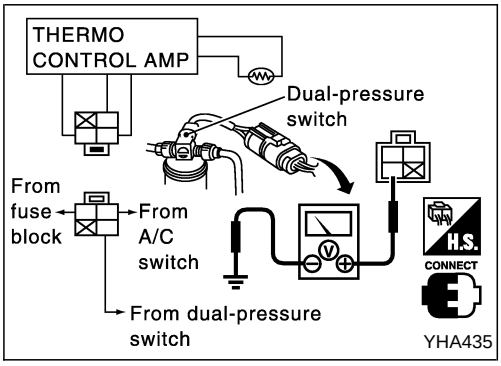
Electrical Components Inspection (Cont'd)

DUAL-PRESSURE SWITCH



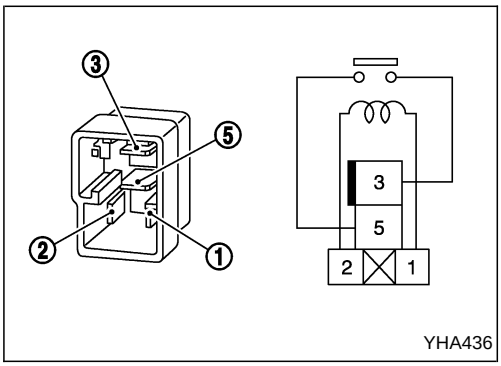
High-pressure side line pressure kPa (kg/cm^2, psi)	Operation	Continuity
Decreasing to 157 - 216 (1.6 - 2.2, 23 - 31) Increasing to 2,452 - 2,844 (25 - 29, 356 - 412)	Turn OFF	Does not exist
Increasing to 157 - 235 (1.6 - 2.4, 23 - 34) Decreasing to 1,863 - 2,256 (19 - 23, 270 - 327)	Turn ON	Exists

THERMO CONTROL AMP.



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

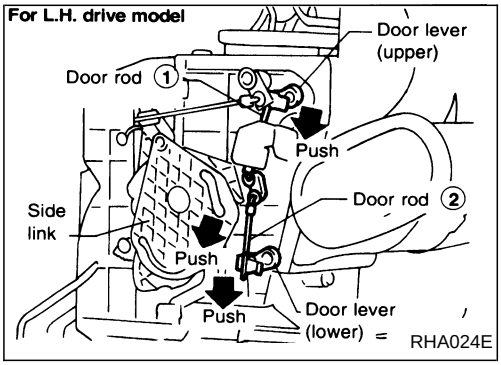
A/C RELAY, COOLING FAN RELAY



Check circuit continuity between terminals by supplying 12 volts to coil side terminals of relay.
Apply 12V to terminals ① and ② and check continuity between terminals ③ and ⑤.

Conditions	Continuity
12V direct current supply between terminals ① and ②	YES
No current supply	NO

If NG, replace relay.
Refer to EL section for Description.

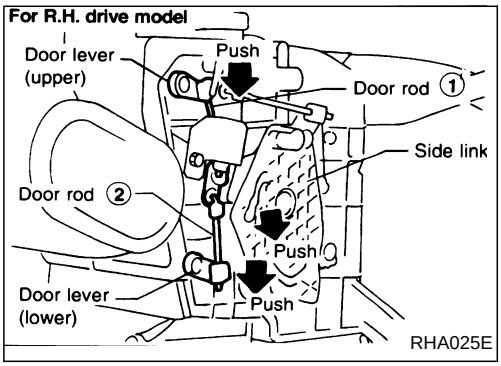


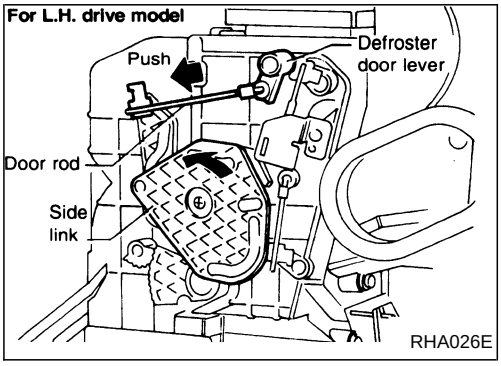
Control Linkage Adjustment

VENTILATOR DOOR CONTROL ROD

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

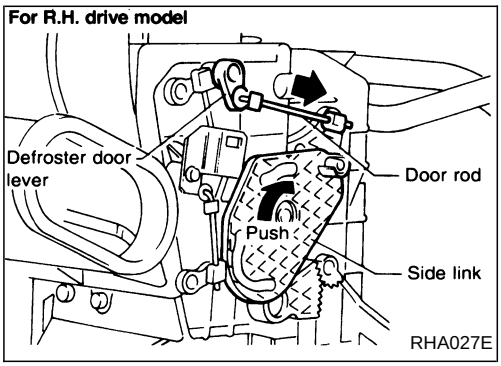
Control Linkage Adjustment (Cont'd)

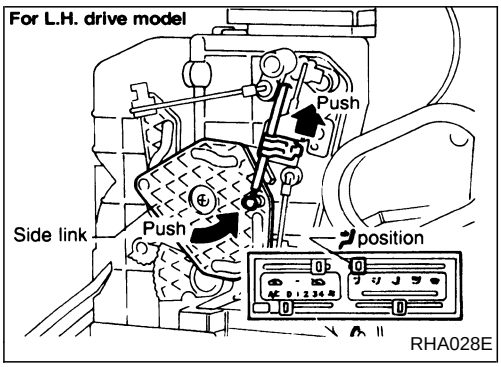




DEFROSTER DOOR CONTROL ROD

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

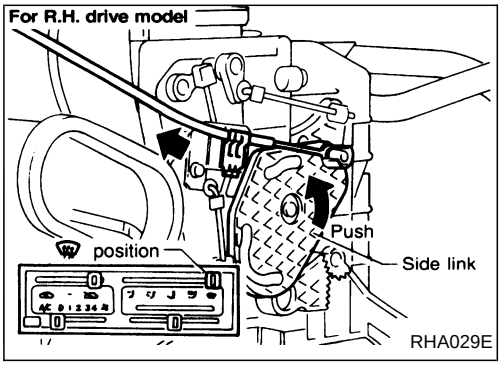




AIR CONTROL CABLE

For L.H. drive model

- Move air control lever to position.
  Set side link in VENT mode.
  Pull outer cable in direction of arrow and then clamp it.

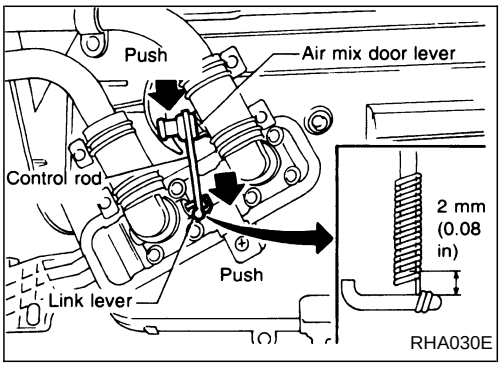


For R.H. drive model

- Move air control lever to position.
  Set side link in DEF mode.
  Pull outer cable in direction of arrow and then clamp it.

After positioning control cable, check that it operates properly.

Control Linkage Adjustment (Cont'd)

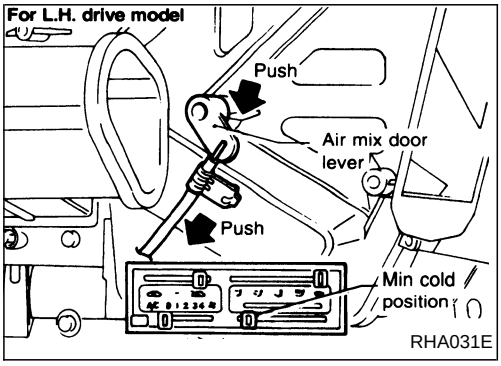


WATER COCK CONTROL ROD

- **When adjusting water cock control rod, first disconnect temperature control cable from air mix door lever and then adjust control rod. Reconnect temperature control cable and readjust it. (Refer to next item.)**

1. Push air mix door lever in direction of arrow.
2. Pull control rod of water cock in direction of arrow so as to make clearance of about 2 mm (0.08 in) between ends of rod and link lever and connect the rod to door lever.

After connecting control rod, check that it operates properly.

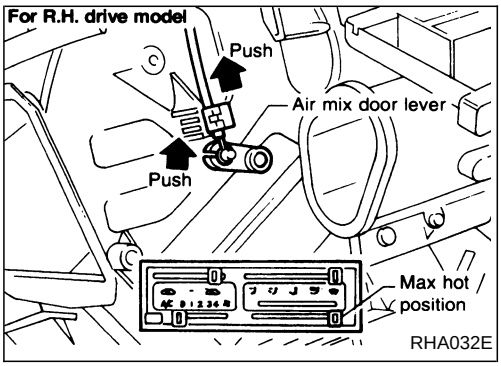


TEMPERATURE CONTROL CABLE

- **When adjusting ventilator door rod and defroster door rod, first disconnect air control cable from side link. Reconnect and readjust air control cable.**

For L.H. drive model

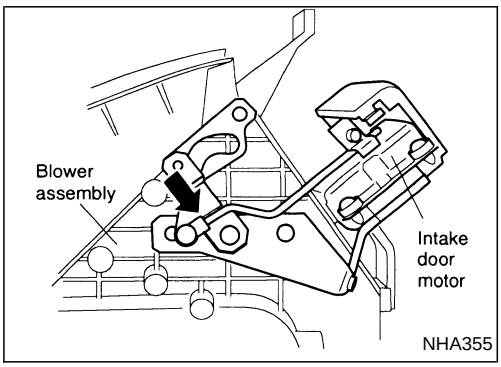
- Move temperature control lever to max. COLD position. Set air mix door lever in full cold mode. Pull outer cable in direction of arrow and then clamp it.



For R.H. drive model

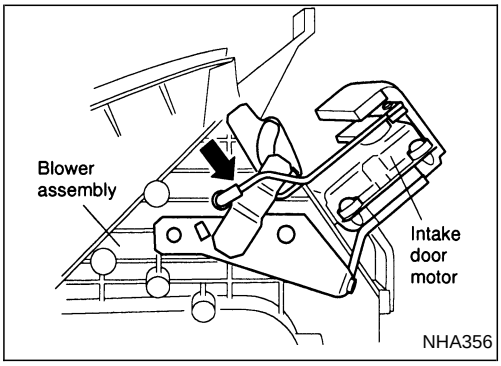
- Move temperature control lever to max. HOT position. Set air mix door lever in full hot mode. Pull outer cable in direction of arrow and then clamp it.

After positioning control cable, check it operates properly.



INTAKE DOOR CONTROL LINKAGE

- Adjust the portion of connecting rod where indicated with arrow as shown in figure.



General Specifications

COMPRESSOR

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

LUBRICATION OIL

Model	ZEXEL make DKV-14C
Name	Nissan A/C System Oil Type R
Part number	KLH00-PAGR0
Capacity mℓ (Imp fl oz)	
Total in system	200 (7.0)
Compressor (Service parts) charging amount	200 (7.0)

REFRIGERANT

Type	R134a
Capacity kg (lb)	0.70 - 0.80 (1.54 - 1.76)

Inspection and Adjustment

ENGINE IDLING SPEED

When A/C is ON
Refer to EF & EC section.

BELT TENSION

Refer to Checking Drive Belts (MA section).

COMPRESSOR

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