

SECTION **ATC**

AUTOMATIC AIR CONDITIONER

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PRECAUTIONS

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Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

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The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB 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/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harness connectors.

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

EJS001HH

WARNING:

- 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:
 - When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
 - 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.
 - 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.
 - 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.
 - Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

General Refrigerant Precautions

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WARNING:

- Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.
- Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.
- Do not store or heat refrigerant containers above 52°C (125°F).
- Do not heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.
- Do not intentionally drop, puncture, or incinerate refrigerant containers.
- Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.
- Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.
- Do not pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and R-134a have been

PRECAUTIONS

shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.

Lubricant Precautions

EJS001HJ

- 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:
 - When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
 - 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.
 - 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.
- 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.
- Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

Precautions for Refrigerant Connection

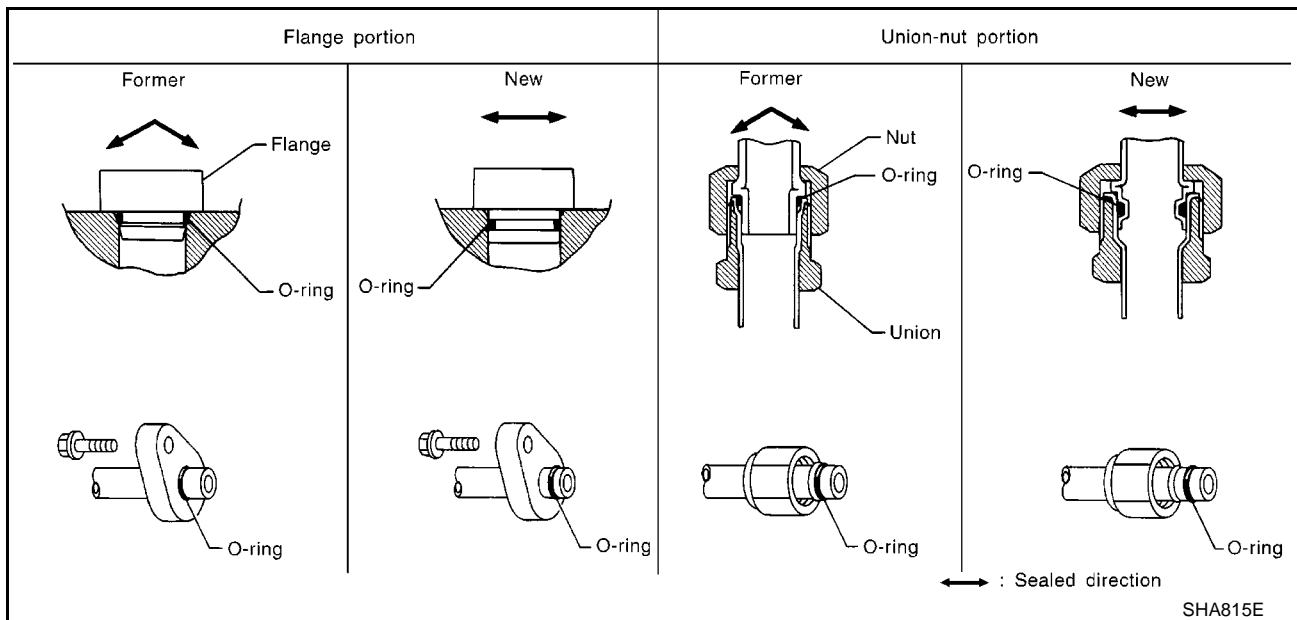
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A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to cooling unit
- Refrigerant pressure sensor to liquid tank

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.

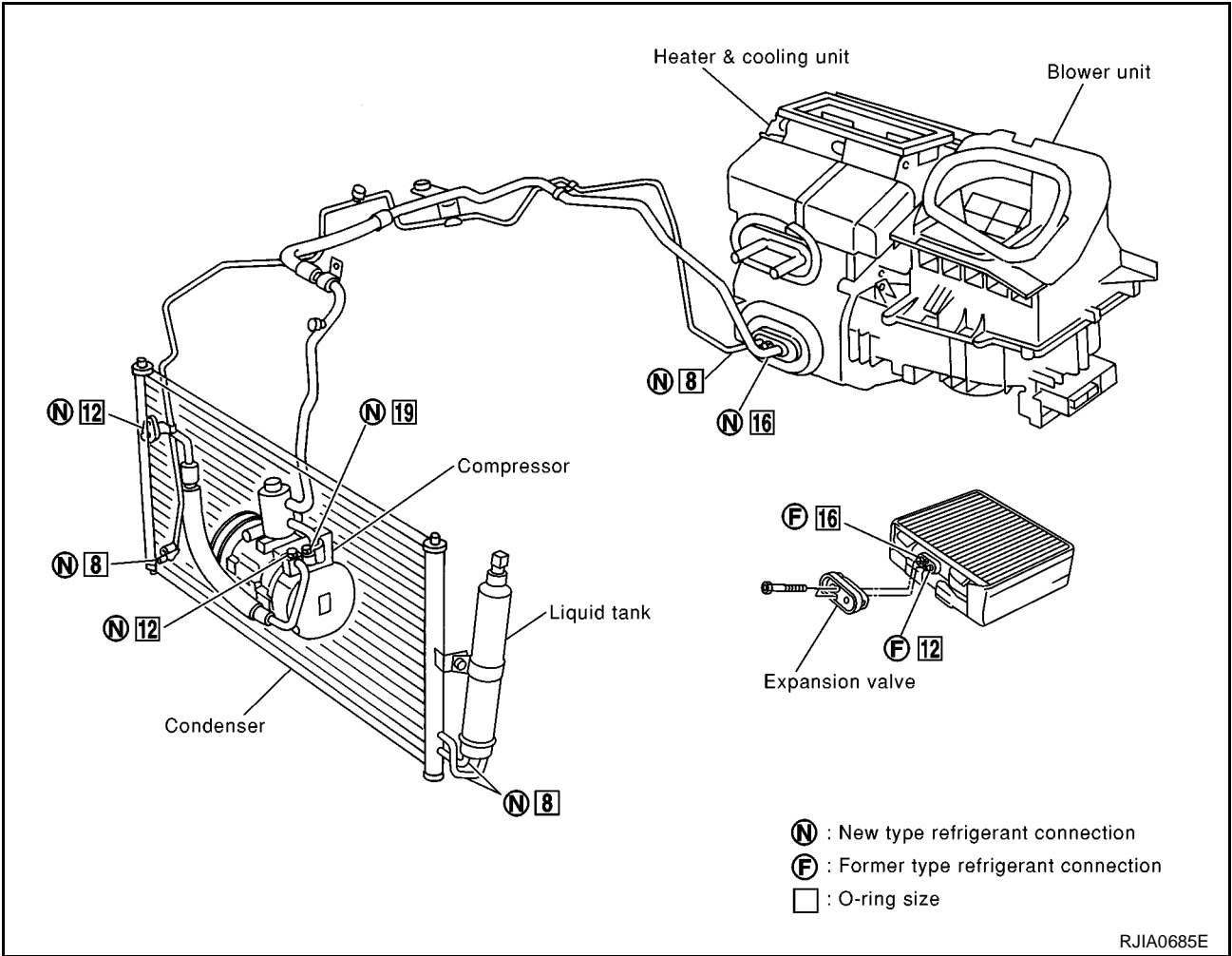


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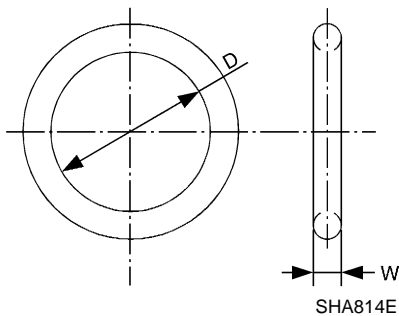
O-RING AND REFRIGERANT CONNECTION



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)
New	8	92471 N8210	6.8 (0.268)	1.85 (0.0728)
Former		92470 N8200	6.07 (0.2390)	1.78 (0.0701)
Former	10	J2476 89956	9.25 (0.3642)	1.78 (0.0701)
New	12	92472 N8210	10.9 (0.429)	2.43 (0.0957)
Former		92475 71L00	11.0 (0.433)	2.4 (0.094)
New	16	92473 N8210	13.6 (0.535)	2.43 (0.0957)
Former		92475 72L00	14.3 (0.563)	2.3 (0.091)
New	19	92474 N8210	16.5 (0.650)	2.43 (0.0957)
Former		92477 N8200	17.12 (0.6740)	1.78 (0.0701)

WARNING:

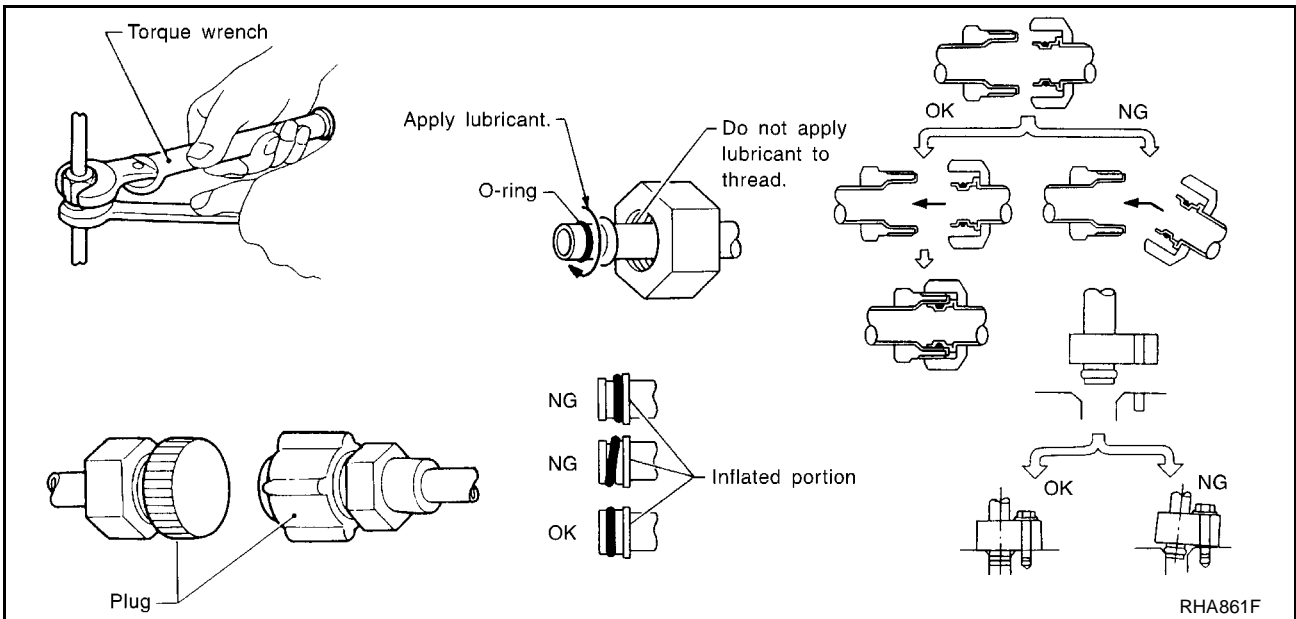
Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

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

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- 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

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- Plug all openings to prevent moisture and foreign matter from entering.
- When the compressor is removed, store it in the same position as it is when mounted on the car.
- When replacing or repairing compressor, follow "Maintenance of Lubricant Quantity in Compressor" exactly. Refer to [ATC-21, "Maintenance of Lubricant Quantity in Compressor"](#).
- 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.

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Precautions for Service Equipment RECOVERY/RECYCLING EQUIPMENT

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

ELECTRONIC LEAK DETECTOR

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

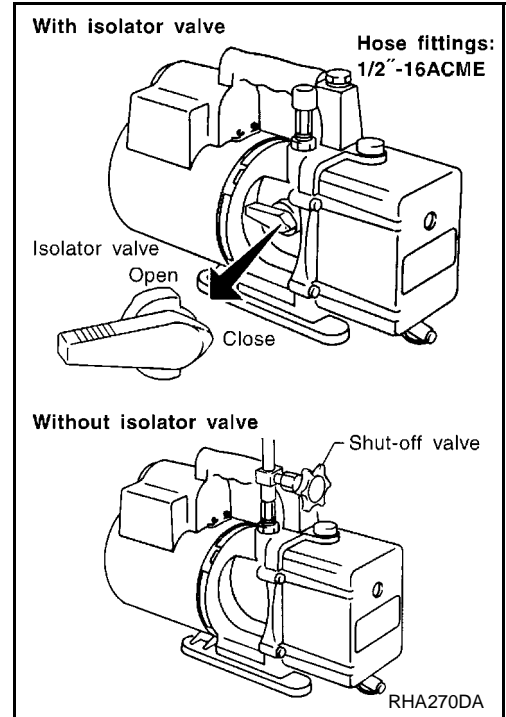
VACUUM PUMP

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 placed near the hose-to-pump connection, as follows.

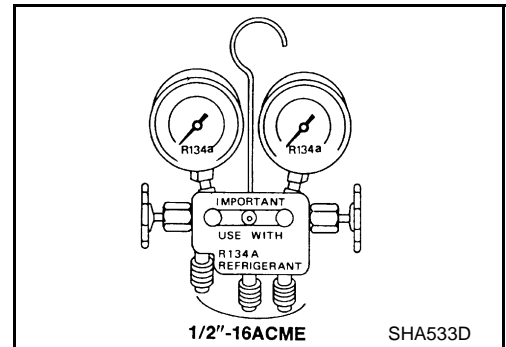
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has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

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



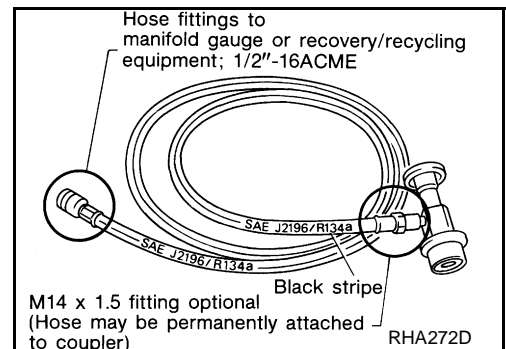
MANIFOLD GAUGE SET

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



SERVICE HOSES

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.

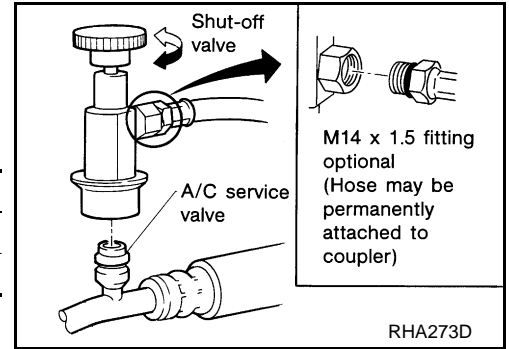


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SERVICE COUPLERS

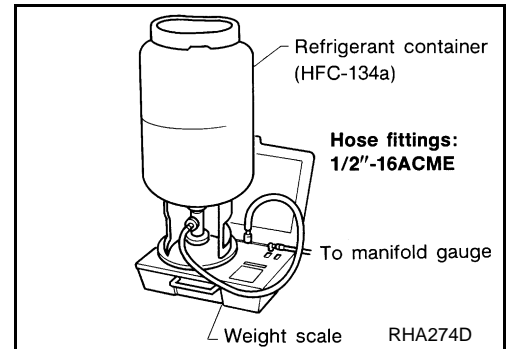
Never attempt to connect HFC-134a (R-134a) service couplers to an CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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.



CALIBRATING ACR4 WEIGHT SCALE

Calibrate the scale every three months.
To calibrate the weight scale on the ACR4:

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

CHARGING CYLINDER

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.

Precautions for Leak Detection Dye

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- The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.
- Always wear fluorescence enhancing UV safety glasses to protect your eyes and enhance the visibility of the fluorescent dye.
- The fluorescent dye leak detector is not a replacement for an electronic refrigerant leak detector. The fluorescent dye leak detector should be used in conjunction with an electronic refrigerant leak detector to (J-41995) pin-point refrigerant leaks.

PRECAUTIONS

- For your safety and your Customer's satisfaction, read and follow all manufacturer's operating instructions and precautions prior to performing the work.
- A compressor shaft seal should not be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electronic refrigerant leak detector (J-41995).
- Always remove any remaining dye from the leak area after repairs are complete to avoid a misdiagnosis during a future service.
- Do not allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Do not spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Do not use more than one refrigerant dye bottle (1/4 ounce / 7.4 cc) per A/C system.
- Leak detection dyes for R-134a and R12 A/C systems are different. Do not use R-134a leak detection dye in R-12 A/C system or R-12 leak detector dye in R-134a A/C systems or A/C system damage may result.
- The fluorescent properties of the dye will remain for over three (3) years unless a compressor failure occurs.

IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have this identification label on the front side of hood.

AIR CONDITIONER NISSAN		
	REFRIGERANT	COMPRESSOR LUBRICANT
TYPE (PART NO.)	HFC134a (R134a)	Nissan UV Luminous Oil Type S [KLHOO-PAGSO]
AMOUNT		

CAUTION PRECAUTION

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

Nissan Motor Co., Ltd., TOKYO, Japan

27090 6P102
SHA436FA

Wiring Diagrams and Trouble Diagnosis

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When you read wiring diagrams, refer to the followings:

- [GI-14, "How to Read Wiring Diagrams"](#) in GI section.
- [PG-4, "Wiring Diagram — POWER —"](#) in PG section.

When you perform trouble diagnosis, refer to the followings:

- [GI-10, "How to Follow Trouble Diagnoses"](#) in GI section.
- [GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident"](#) in GI section.

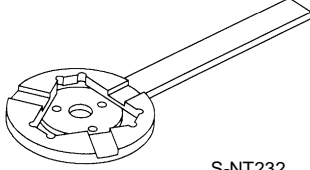
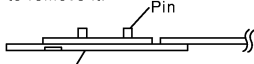
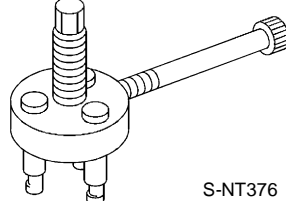
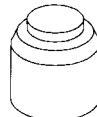
PREPARATION

PREPARATION

PFP:00002

Special Service Tools

EJS0010J

Tool number Tool name	Description
KV99106100 Clutch disc wrench	 <p style="text-align: center;">S-NT232</p> <p style="text-align: center;">Removing shaft nut and clutch disc</p> <p>When replacing the magnetic clutch in the above compressor, use a clutch disc wrench with the pin side on the clutch disc to remove it.</p>  <p style="text-align: center;">Clutch disc wrench RJIA0194E</p>
KV99232340 or KV992T0001 Clutch disc puller	 <p style="text-align: center;">S-NT376</p> <p style="text-align: center;">Removing clutch disc</p>
KV99106200 Pulley installer	 <p style="text-align: center;">S-NT235</p> <p style="text-align: center;">Installing pulley</p>

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

EJS001HQ

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

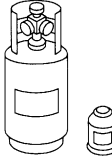

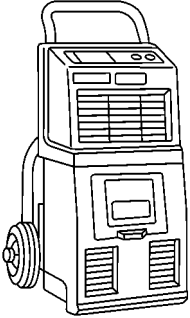
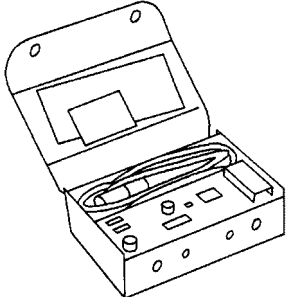
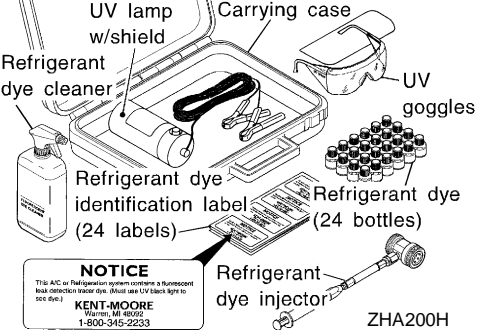
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.

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.

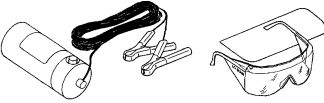

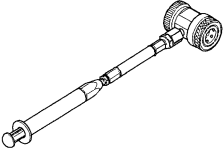

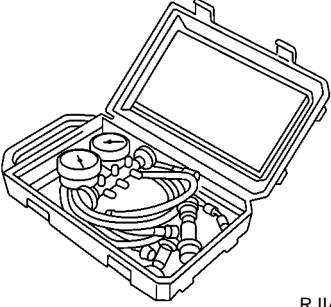
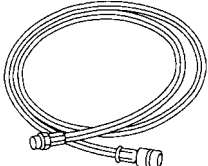
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor failure will result.

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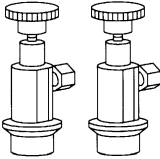
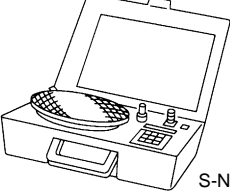
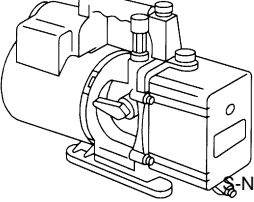
PREPARATION

Tool number Tool name	Description
HFC-134a (R-134a) refrigerant	<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size</p> <ul style="list-style-type: none"> ● large container 1/2² -16 ACME </div> </div> <p style="text-align: center;">S-NT196</p>
KLH00-PAGS0 Nissan A/C System Oil Type S	<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Type: Poly alkylene glycol oil (PAG), type S Application: HFC-134a (R-134a) swash plate compressors (Nissan only) Lubricity: 40 ml [Litre] (1.4 Imp fl oz)</p> </div> </div> <p style="text-align: center;">S-NT197</p>
Recovery/Recycling/ Recharging equipment (ACR4)	<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Function: Refrigerant Recovery and Recycling and Recharging</p> </div> </div> <p style="text-align: center;">RJIA0195E</p>
Electrical leak detector	<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Power supply: DC 12V (Cigarette lighter)</p> </div> </div> <p style="text-align: center;">A/C leak detector SHA705EB</p>
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety glasses (J-41459) Refrigerant dye injector (J-41447) qty. 24 HFC-134a (R-134a) refrigerant dye (J-43872) Refrigerant dye cleaner	<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Power supply: DC 12V (Battery terminal)</p> </div> </div> <p style="text-align: center;">ZHA200H</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>NOTICE This A/C or Refrigerant system contains a fluorescent leak detection tracer dye. (Must use UV flash light to see dye.) KENT-MOORE Warren, MI 48090 1-800-345-2233</p> </div>

PREPARATION

Tool number Tool name	Description	
(J-42220) Fluorescent dye leak detector	 <p style="text-align: center;">SHA438F</p> <p>Power supply: DC 12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system. Includes: UV lamp and UV safety glasses</p>	A B C
(J-41447) HFC-134a (R-134a) Fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 <p style="text-align: center;">Refrigerant dye (24 bottles) SHA439F</p> <p>Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4 cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)</p>	D E
(J-41459) HFC-134a (R-134a) Dye injector Use with J-41447, 1/4 ounce bottle	 <p style="text-align: center;">SHA440F</p> <p>For injecting 1/4 ounce of fluorescent leak detection dye into A/C system.</p>	F G
(J-43872) Dye cleaner	 <p style="text-align: center;">SHA441F</p> <p>For cleaning dye spills.</p>	H I ATC
Manifold gauge set (with hoses and couplers)	 <p style="text-align: center;">RJIA0196E</p> <p>Identification:</p> <ul style="list-style-type: none"> ● The gauge face indicates R-134a. ● Fitting size: Thread size ● 1/2² -16 ACME 	K L M
Service hoses <ul style="list-style-type: none"> ● High side hose ● Low side hose ● Utility hose 	 <p style="text-align: center;">S-NT201</p> <p>Hose color:</p> <ul style="list-style-type: none"> ● Low hose: Blue with black stripe ● High hose: Red with black stripe ● Utility hose: Yellow with black stripe or green with black stripe <p>Hose fitting to gauge:</p> <ul style="list-style-type: none"> ● 1/2² -16 ACME 	

PREPARATION

Tool number Tool name	Description
<p>Service couplers</p> <ul style="list-style-type: none"> ● High side coupler ● Low side coupler 	<div style="text-align: center;">  <p>S-NT202</p> </div> <p>Hose fitting to service hose:</p> <ul style="list-style-type: none"> ● M14 x 1.5 fitting is optional or permanently attached.
<p>Refrigerant weight scale</p>	<div style="text-align: center;">  <p>S-NT200</p> </div> <p>For measuring of refrigerant Fitting size: Thread size</p> <ul style="list-style-type: none"> ● 1/2² -16 ACME
<p>Vacuum pump (Including the isolator valve)</p>	<div style="text-align: center;">  <p>S-NT203</p> </div> <p>Capacity:</p> <ul style="list-style-type: none"> ● Air displacement:4 CFM ● Micron rating:20 microns ● Oil capacity:482 g (17 oz) Fitting size: Thread size ● 1/2² -16 ACME

REFRIGERATION SYSTEM

REFRIGERATION SYSTEM

PFP:KA990

Refrigerant Cycle REFRIGERANT FLOW

EJS001HR

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

FREEZE PROTECTION

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

Refrigerant System Protection REFRIGERANT PRESSURE SENSOR (WITH GASOLINE ENGINE)

EJS001HS

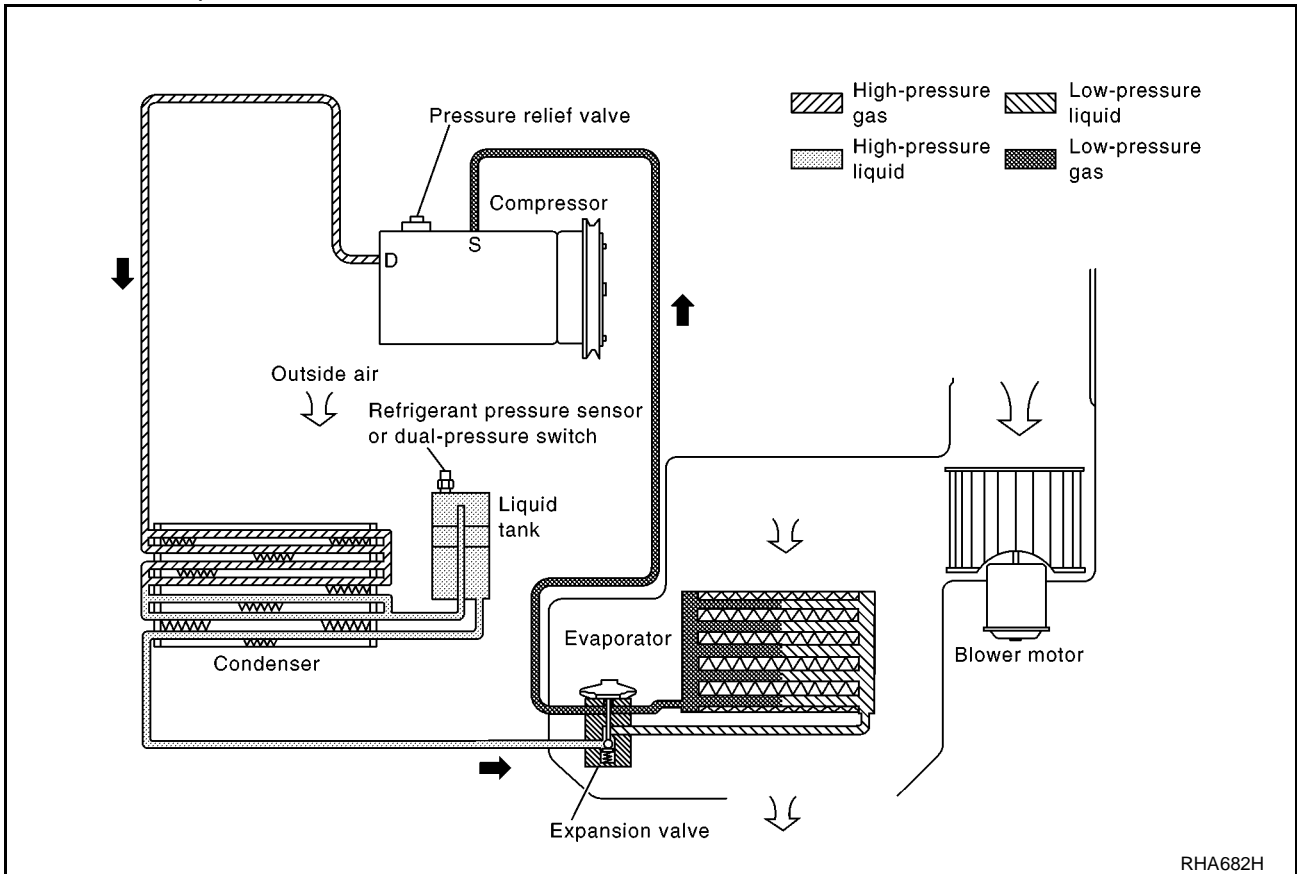
The refrigerant system is protected against excessively high or low pressures by the refrigerant pressure sensor, located on the liquid tank. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (27.5 bar, 28 kg/cm², 398 psi), or below about 134 kPa (1.37 bar, 1.4 kg/cm², 20 psi).

DUAL-PRESSURE SWITCH (WITH DIESEL ENGINE)

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

PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 3,727 kPa (37.3 bar, 38 kg/cm², 540 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



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REFRIGERATION SYSTEM

V-6 Variable Displacement Compressor

EJS001HT

GENERAL INFORMATION

1. The V-6 variable compressor differs from previous units. The vent temperatures of the V-6 variable compressor do not drop too far below 5°C (41°F) when:
Evaporator intake air temperature is less than 20°C (68°F).
Engine is running at speeds less than 1,500 rpm.
This is because the V-6 compressor provides a means of "capacity" control.
2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.
3. A "clanking" sound may occasionally be heard during refrigerant charge. The sound indicates that the tilt angle of the swash plate has changed and is not a problem.
4. For air conditioning systems with the V-6 compressor, the clutch remains engaged unless: the system main switch, fan switch or ignition switch is turned OFF. When ambient (outside) temperatures are low or when the amount of refrigerant is insufficient, the clutch is disengaged to protect the compressor.
5. A constant range of suction pressure is maintained when engine speed is greater than a certain value. It normally ranges from 147 to 177 kPa (1.47 to 1.77 bar, 1.5 to 1.8 kg/cm², 21 to 26 psi) under varying conditions.
In previous compressors, however, suction pressure was reduced with increases in engine speed.

DESCRIPTION

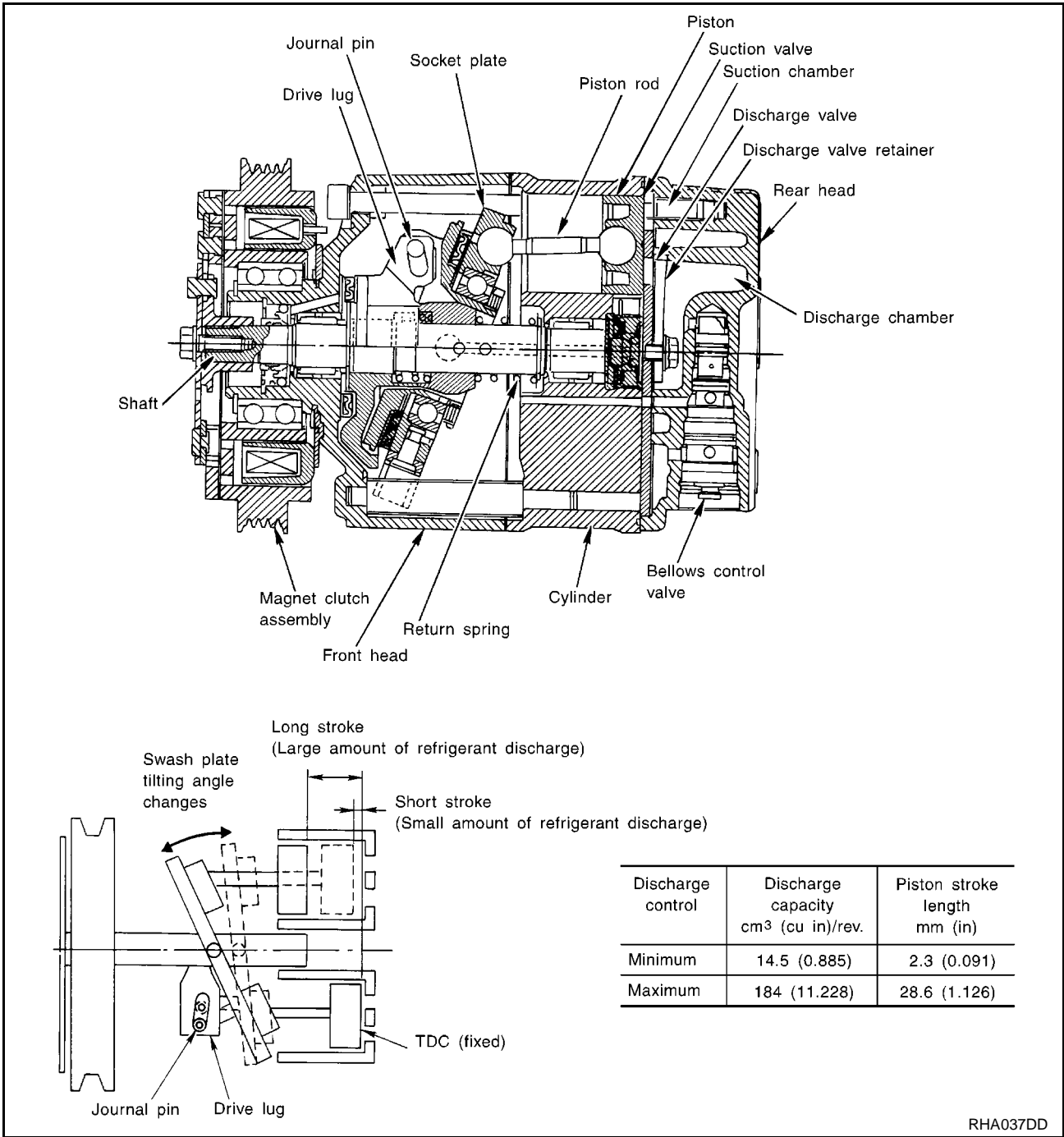
General

For QR Engine Models (CWV615 Compressor):

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

REFRIGERATION SYSTEM

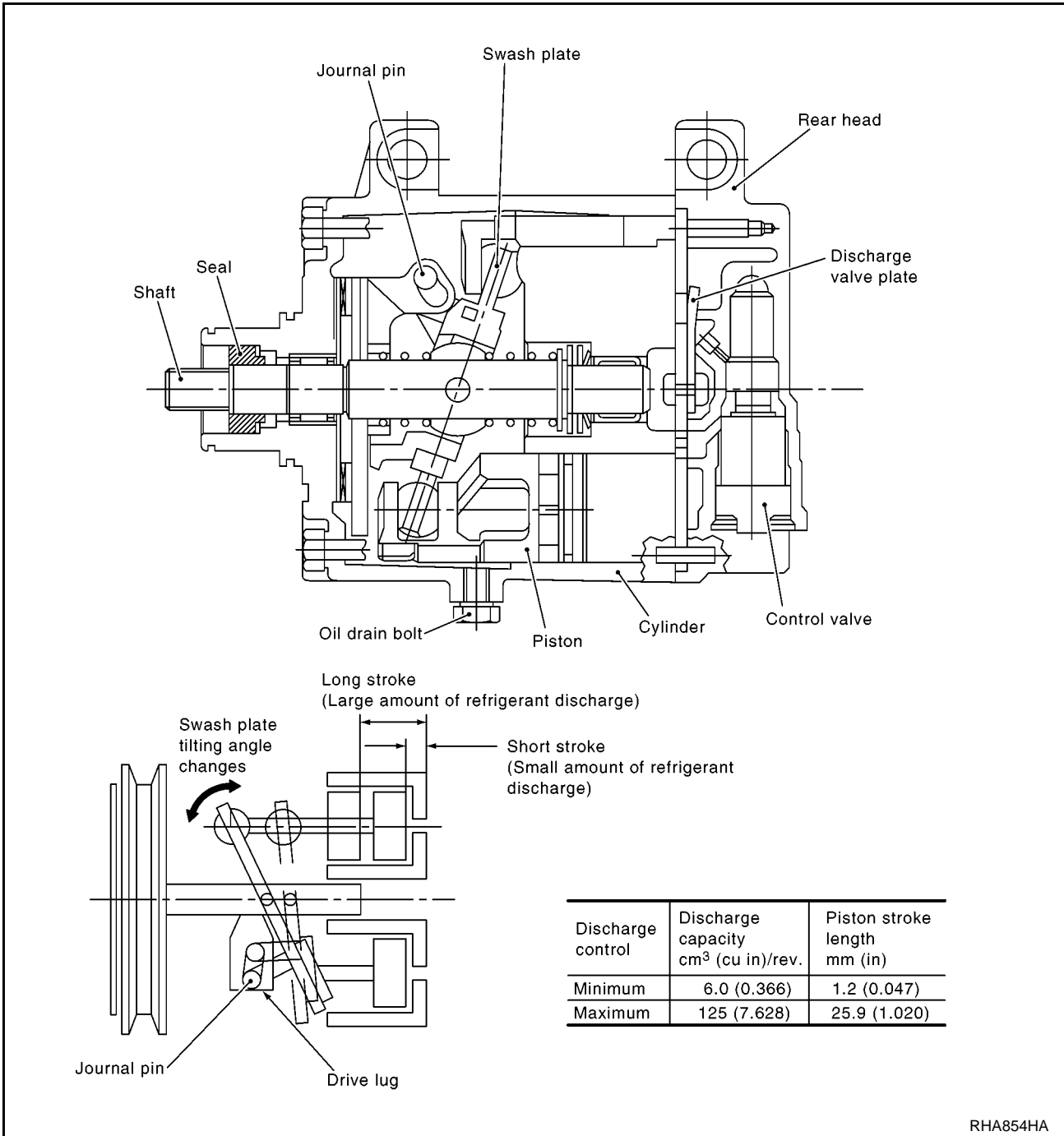
The tilt of the swash plate allows the piston's stroke to change so that refrigerant discharge can be continuously changed from 14.5 to 146 cm³ (0.885 to 8.91 cu in).



Except for QR Engine Models (CSV613 Compressor):
The variable compressor is basically a swash plate type that changes piston stroke in response to the required cooling capacity.

REFRIGERATION SYSTEM

The tilt of the swash plate allows the piston's stroke to change so that refrigerant discharge can be continuously changed from 6.0 to 125 cm³ (0.366 to 7.628 cu in).



RHA854HA

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

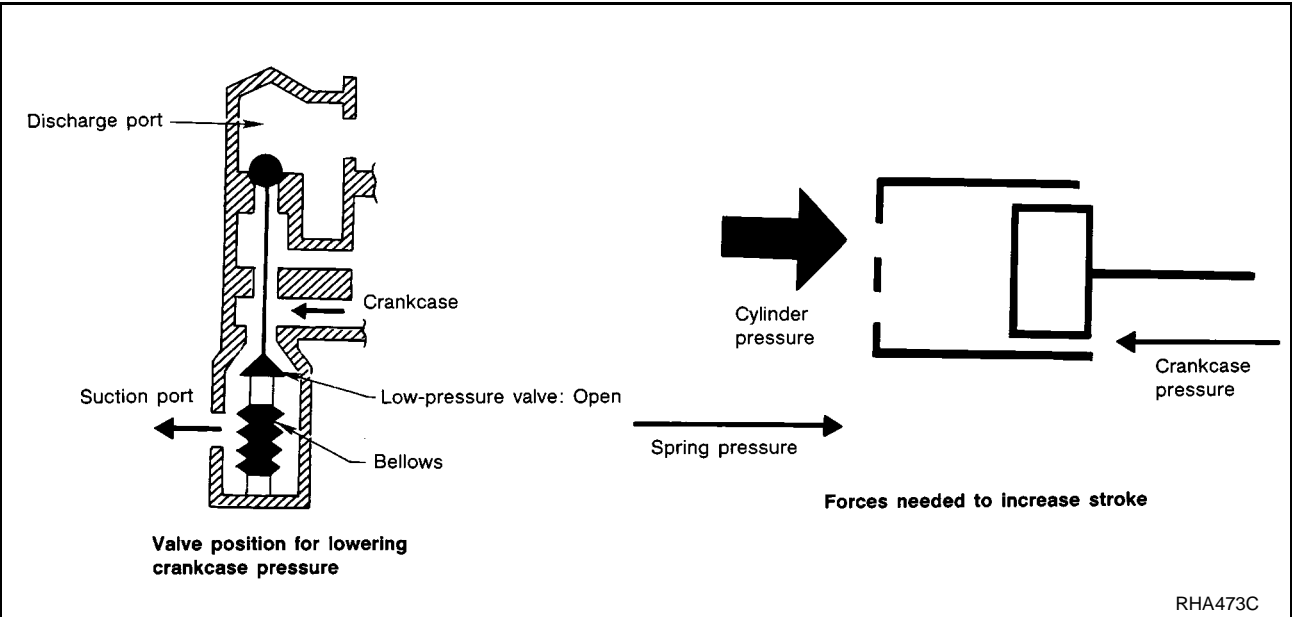
Refrigerant pressure on the low-pressure side increases with an increase in heat loads.

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:

REFRIGERATION SYSTEM

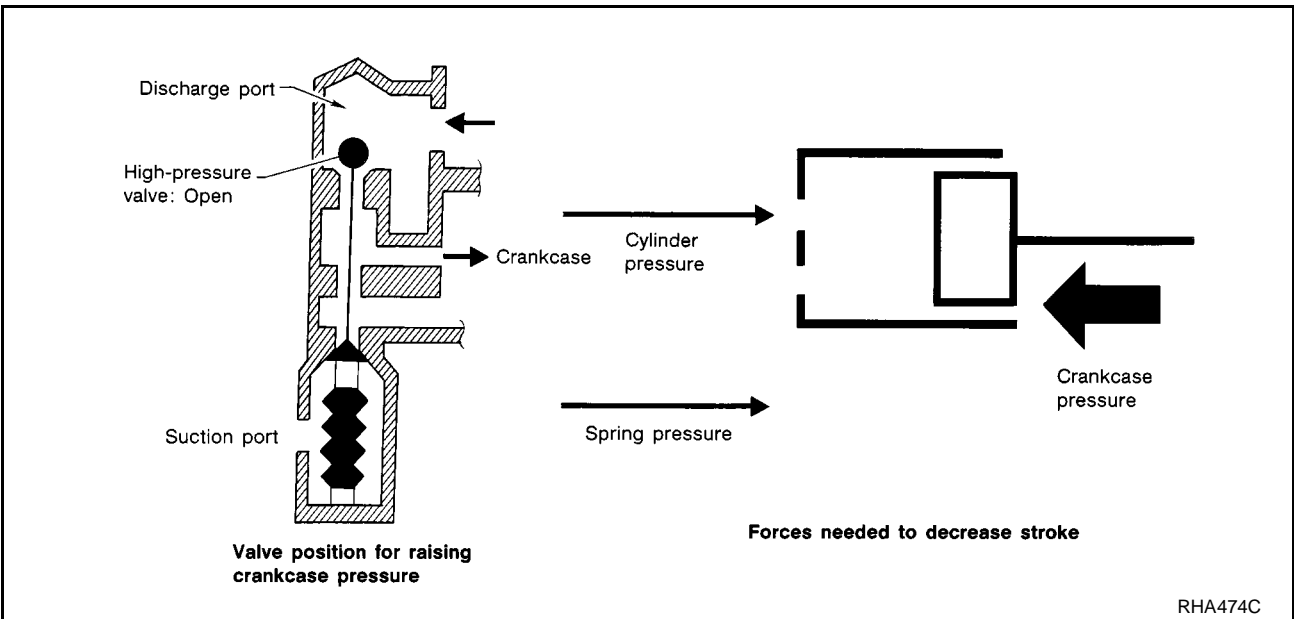
- The crankcase's internal pressure to equal the pressure on the low-pressure side;
 - The cylinder's internal pressure to be greater than the crankcase's internal pressure.
- Under this condition, the swash plate is set to the maximum stroke position.



3. Capacity Control

- 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 (1.77 bar, 1.8 kg/cm², 26 psi).
- Since suction pressure is low, it makes the suction port close and the discharge port open. Thus, crankcase pressure becomes high as high pressure enters the crankcase.
- The force acts around the journal pin near the swash plate, and is generated by the pressure difference before and behind the piston.

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

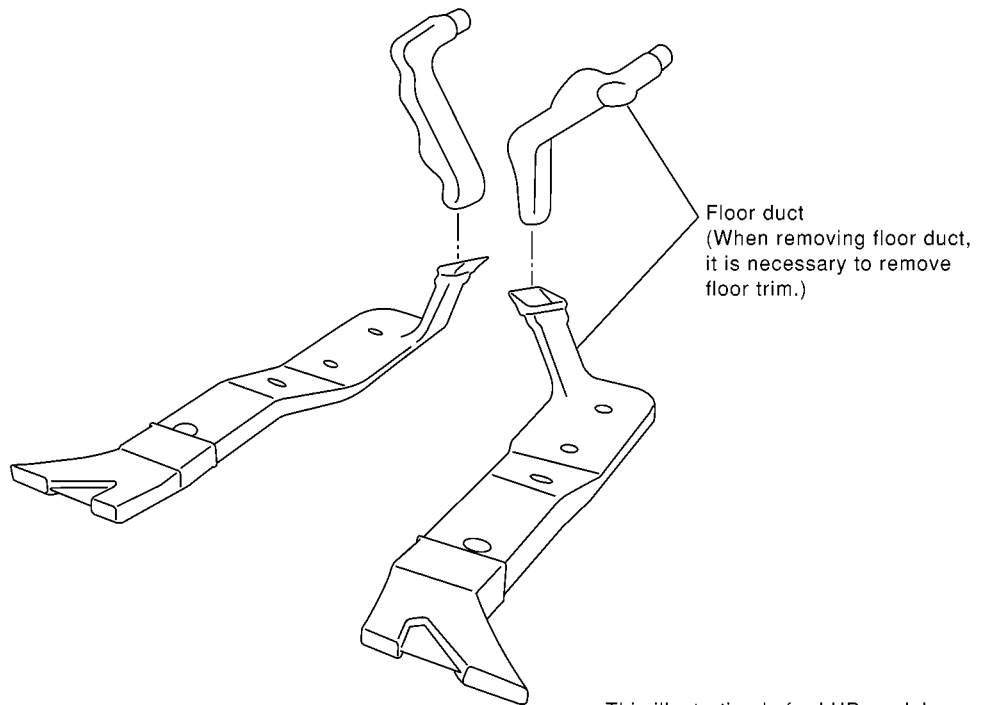
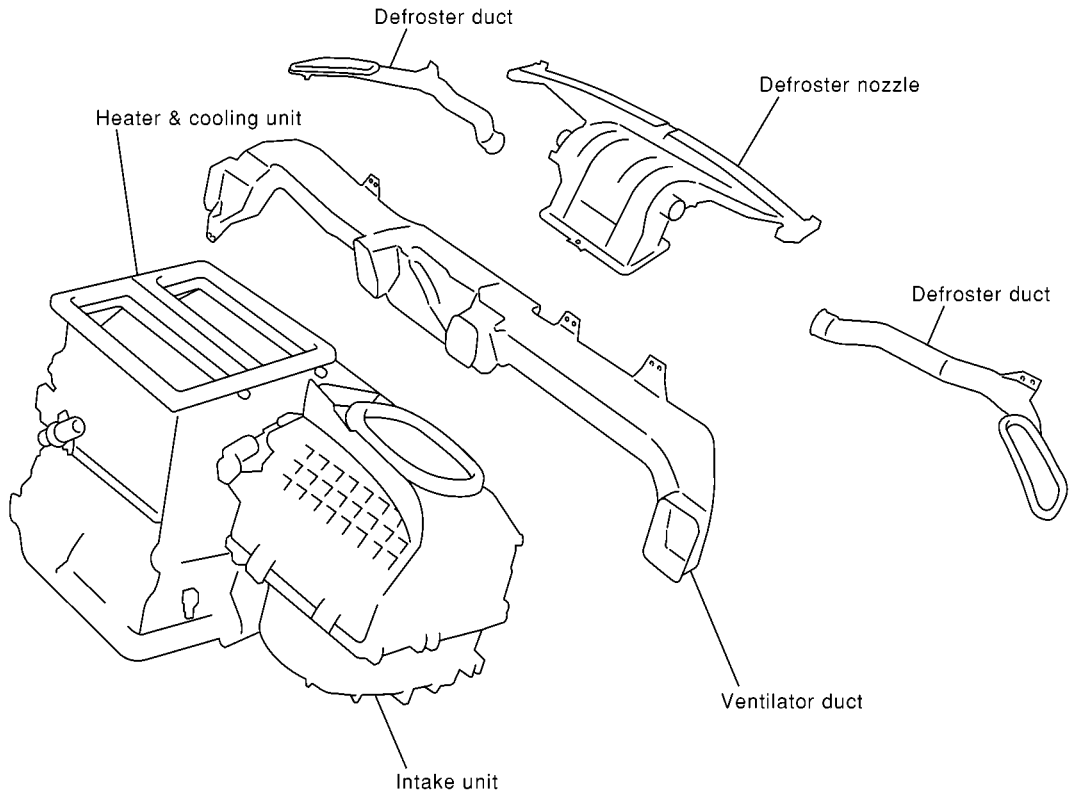


REFRIGERATION SYSTEM

Component Layout

EJS001HU

SEC. 270•271•272•273



This illustration is for LHD models.
The layout for RHD models is
symmetrically opposite.

RJIA0686E

LUBRICANT

LUBRICANT

PF:KLG00

Maintenance of Lubricant Quantity in Compressor

EJS001HV

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

LUBRICANT RETURN OPERATION

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

1. CHECK LUBRICANT RETURN OPERATION

Can lubricant return operation be performed?

- A/C system works properly.
- There is no evidence of a large amount of lubricant leakage.

Yes or No

- Yes >> GO TO 2.
No >> GO TO 3.

2. PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS:

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).]
 - Intake position: Recirculation (REC)
2. Perform lubricant return operation for about 10 minutes.
3. Stop engine.

CAUTION:

If excessive lubricant leakage is noted, do not perform the lubricant return operation.

>> GO TO 3.

3. CHECK COMPRESSOR

Should the compressor be replaced?

Yes or No

- Yes >> Go to [ATC-22, "LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT"](#).
- No >> GO TO 4.

LUBRICANT

4. CHECK ANY PART

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

Yes or No

Yes >> Go to [ATC-22, "LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR"](#).

No >> Carry out the A/C performance test.

LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR

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

Amount of lubricant to be added

Part replaced	Lubricant to be added to system	Remarks
	Amount of lubricant ml [Litre] (Imp fl oz)	
Evaporator	75 (2.6)	-
Condenser	35 (1.2)	-
Liquid tank	10 (0.4)	-
In case of refrigerant leak	30 (1.1)	Large leak
	-	Small leak *1

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

LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT

1. Before connecting ACR4 to vehicle, check ACR4 gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
3. Drain the lubricant from the old (removed) compressor into a graduated container and recover the amount of lubricant drained.
4. Drain the lubricant from the new compressor into a separate, clean container.
5. 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.
6. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to new compressor through the suction port opening.
7. If the liquid tank also needs to be replaced, add an additional 5 ml [Litre] (0.2 Imp fl oz) of lubricant at this time.
Do not add this 5 ml (0.2 Imp fl oz) of lubricant if only replacing the compressor.

AIR CONDITIONER CONTROL

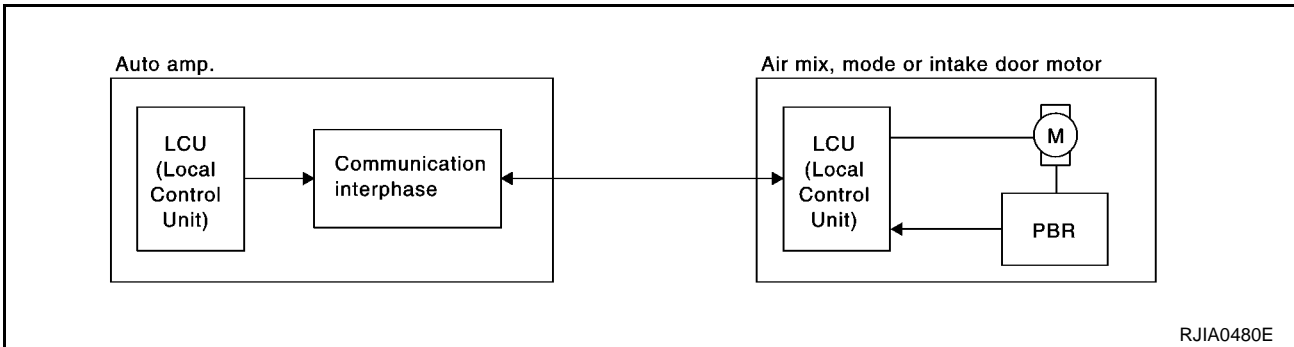
AIR CONDITIONER CONTROL

PPF:27500

Overview Air Conditioner LAN Control System

EJS001HW

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



System Construction

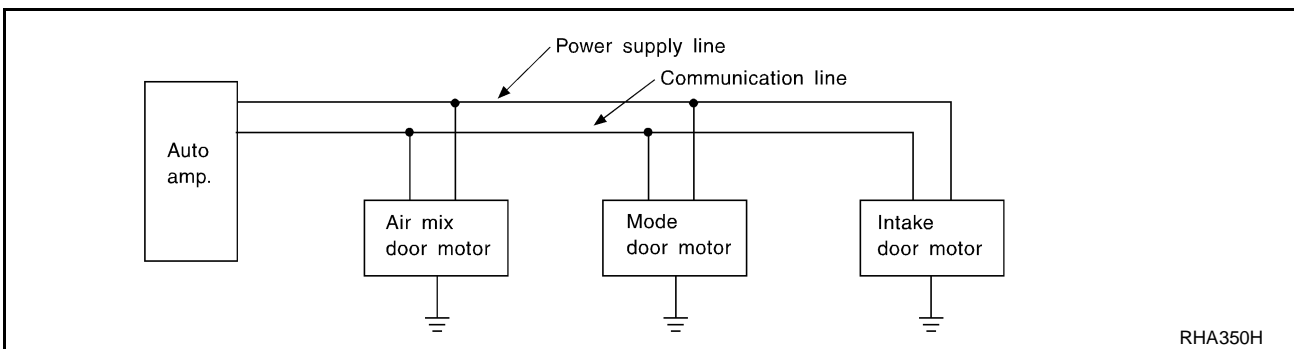
EJS001HX

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

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

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

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

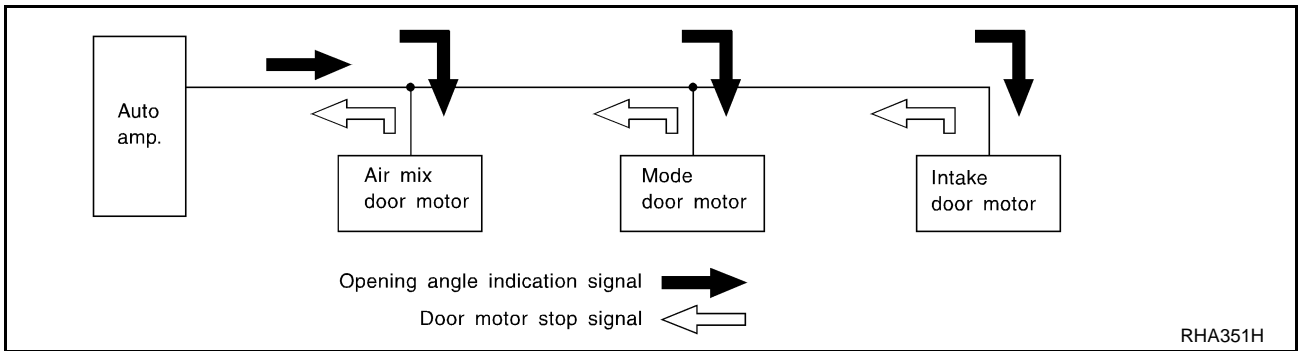


OPERATION

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

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

AIR CONDITIONER CONTROL



TRANSMISSION DATA AND TRANSMISSION ORDER

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

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

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

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

Opening angle:

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

Error check:

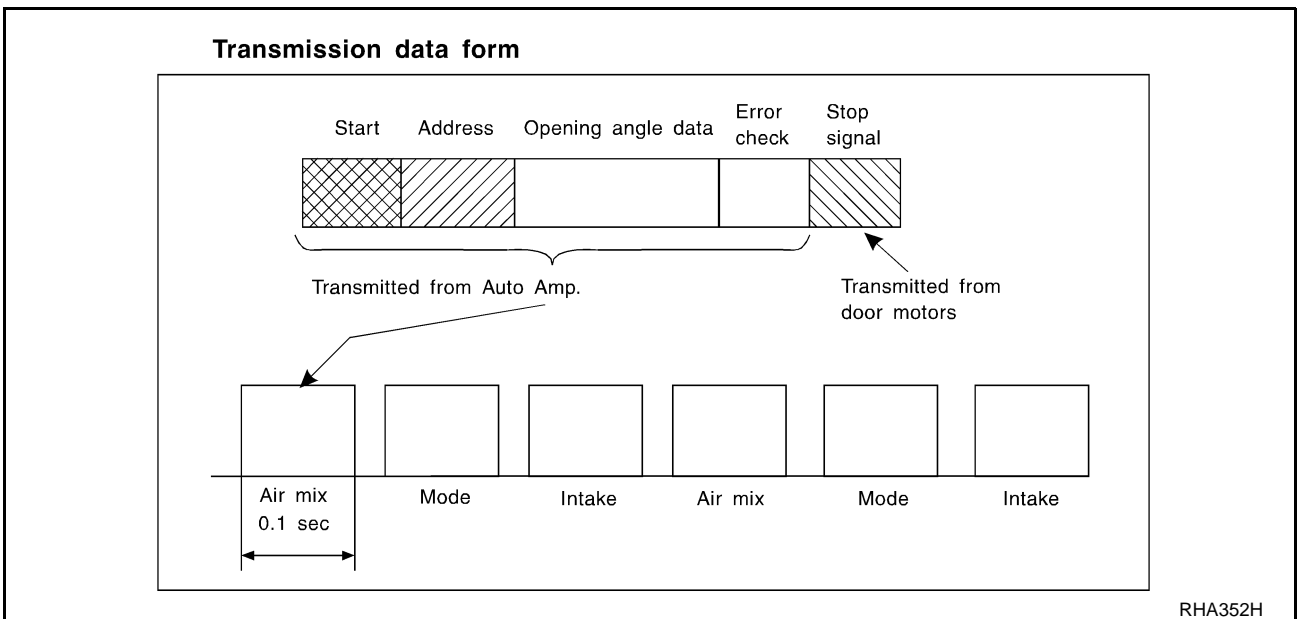
Procedure by which sent and received data is checked for errors. Error data is then compiled. The error check prevents corrupted data from being used by the air mix door motor, mode door motor and intake door motor.

Error data can be related to the following problems.

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

Stop signal:

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



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.

AIR CONDITIONER CONTROL

FAN SPEED CONTROL

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

INTAKE DOOR CONTROL

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

OUTLET DOOR CONTROL

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

MAGNET CLUTCH CONTROL

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

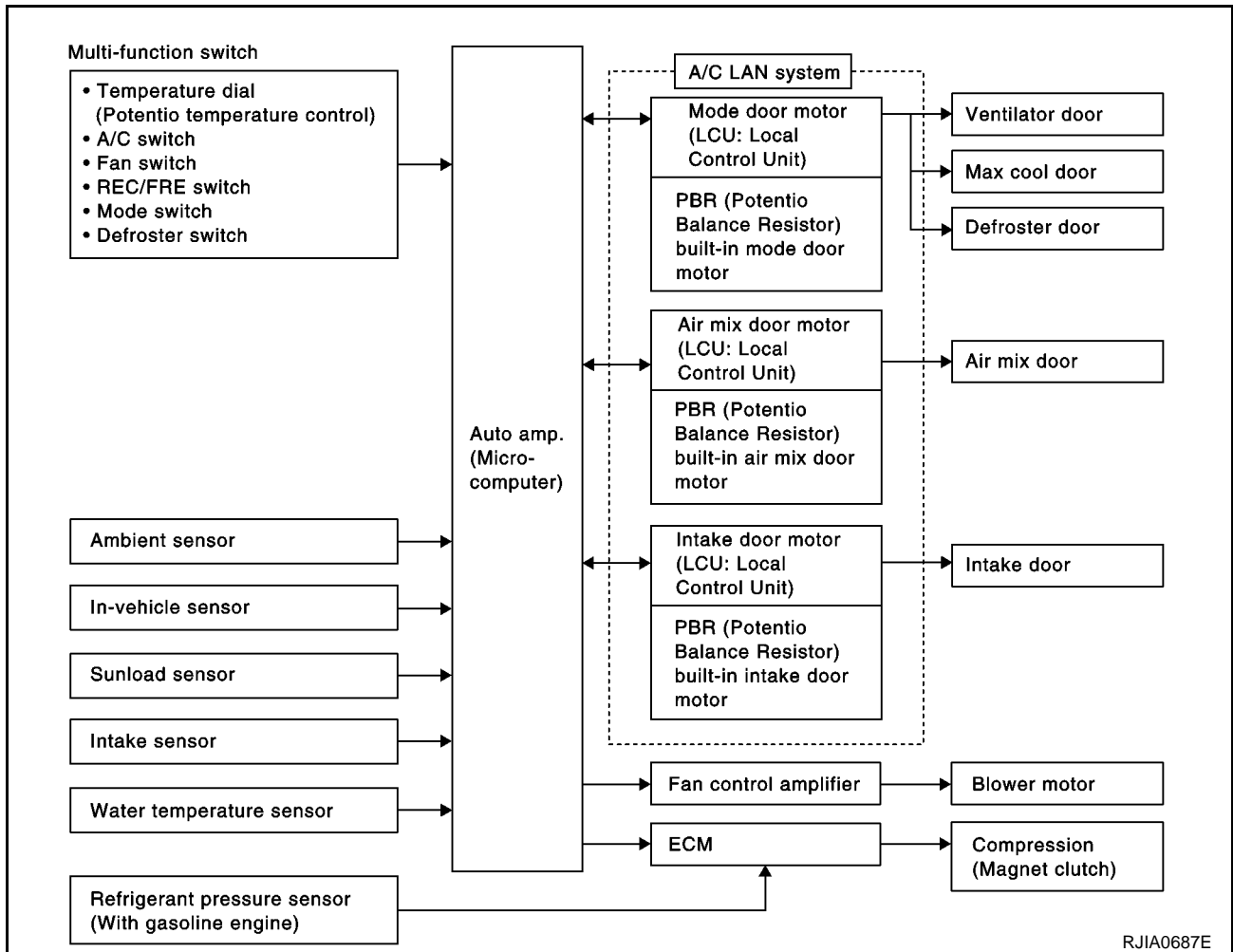
SELF-DIAGNOSTIC SYSTEM

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

Overview of Control system

EJS001HY

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

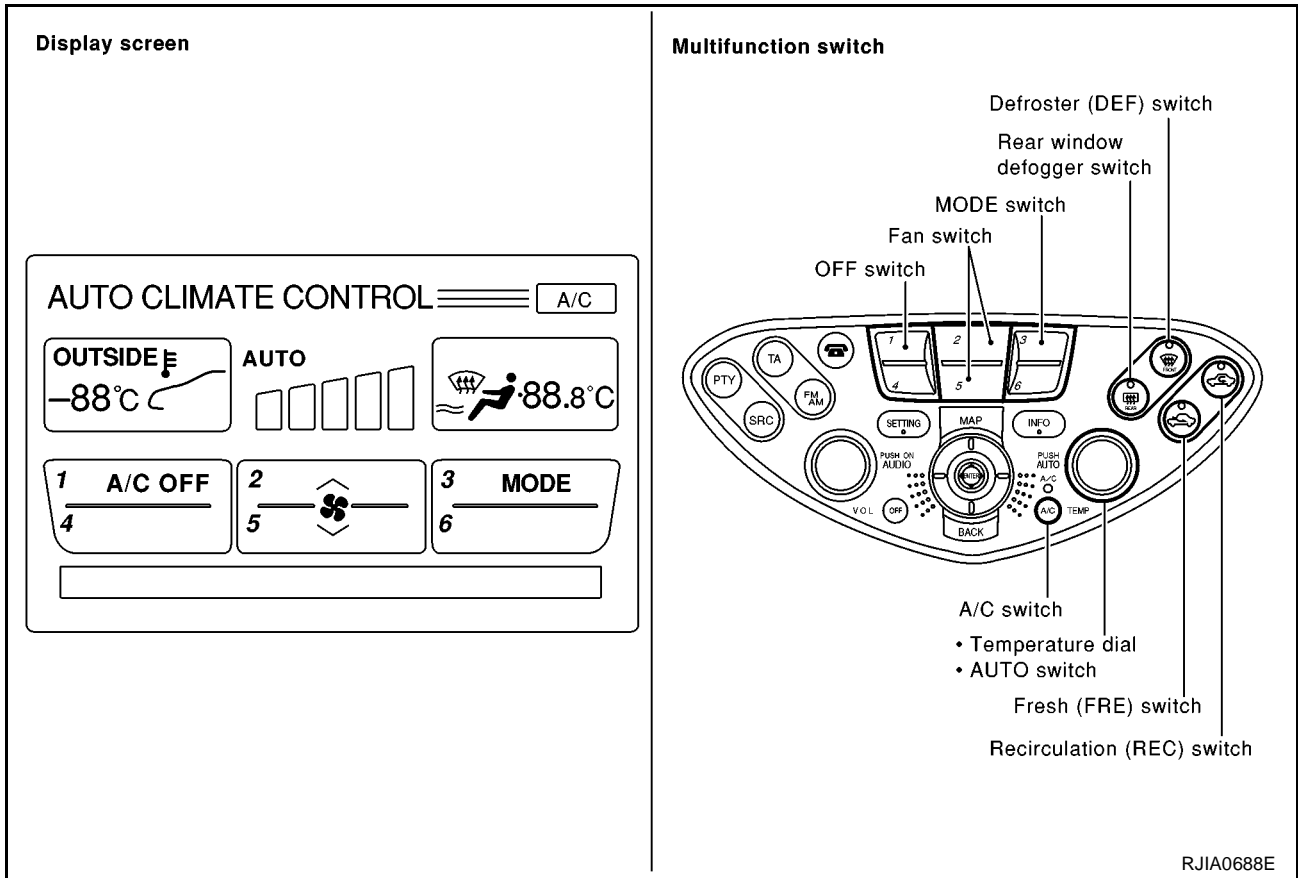


ATC

AIR CONDITIONER CONTROL

Control Operation

EJS001HZ



RJIA0688E

DISPLAY SCREEN

Displays the operational status of the system.

AUTO SWITCH

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

TEMPERATURE DIAL (POTENTIAL TEMPERATURE CONTROL)

Increase or decrease the set temperature.

A/C SWITCH

The compressor is ON or OFF.

(Pressing the A/C switch when the AUTO switch is ON will turn off the A/C switch and compressor.)

DEFROSTER (DEF) SWITCH

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

MODE SWITCH

Control the air discharge outlets.

FAN SWITCH

Manually controls the blower speed. Five speeds are available for manual control (as shown on the display screen).

OFF SWITCH

The compressor and blower are OFF, the intake doors are set to the outside air position, and the air outlet doors are set to the foot position.

FRESH (FRE) SWITCH

OFF position: Interior air is recirculated inside the vehicle.

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

AIR CONDITIONER CONTROL

(When RECIRCULATION switch is ON, the FRESH switch turns OFF automatically.)

RECIRCULATION (REC) SWITCH

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

ON position: Interior air is drawn into the passenger compartment.

(When the FRESH switch is ON or the compressor is turned from ON to OFF, the RECIRCULATION switch turns OFF automatically.)

REAR WINDOW DEFOGGER SWITCH

When illumination is ON, rear window is defogged.

Fail-safe Function

EJS0010K

If fail-safe request signal is sent from AV control unit, or if communication error exists between auto amplifier and AV control unit for at least 30 seconds, air conditioner is controlled under following conditions.

Compressor	: ON
Air inlet	: Fresh
Air outlet	: AUTO
Blower fan speed	: AUTO
Set temperature	: Setting before communication error occurs

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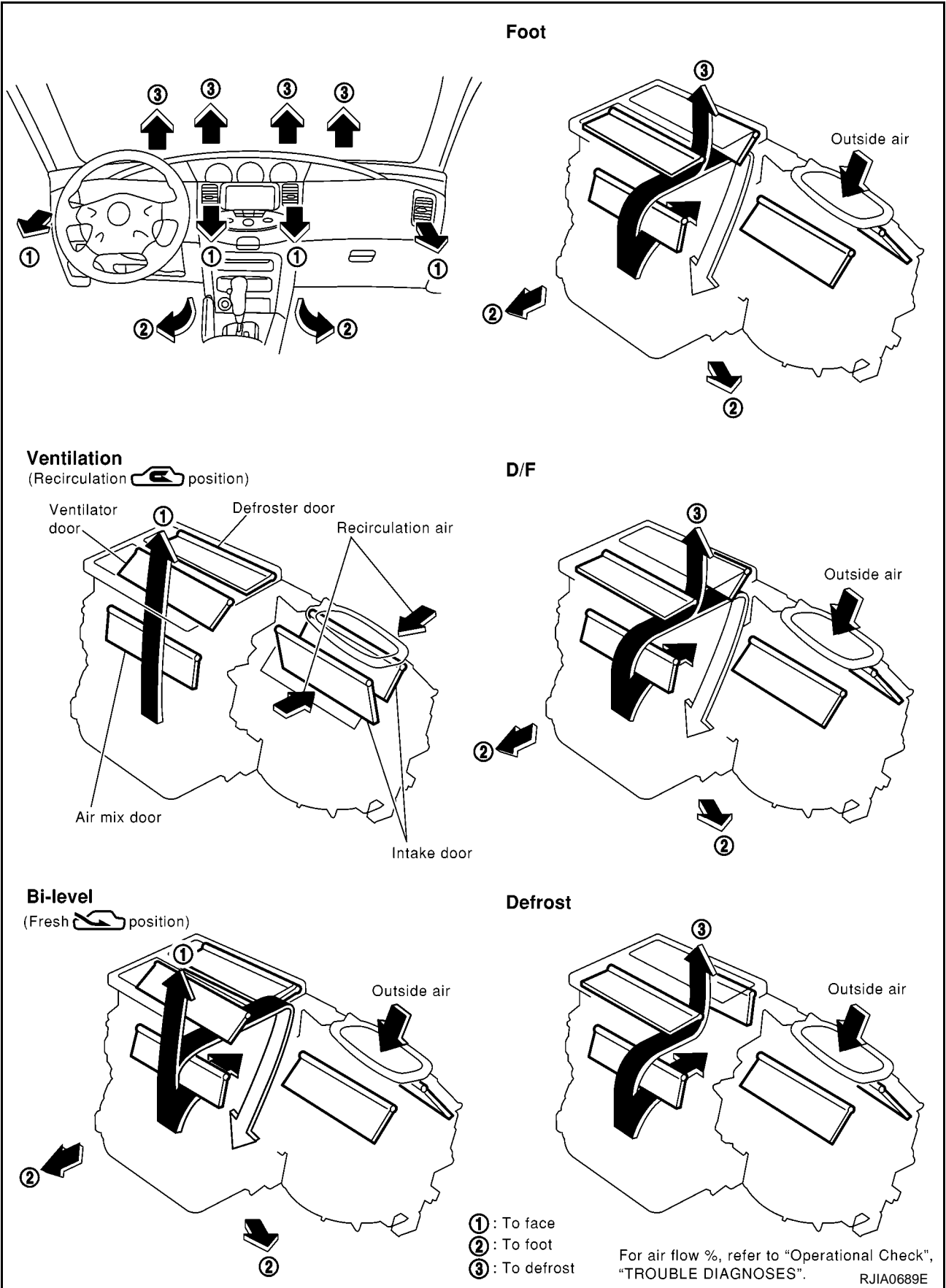
L

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AIR CONDITIONER CONTROL

Discharge Air Flow

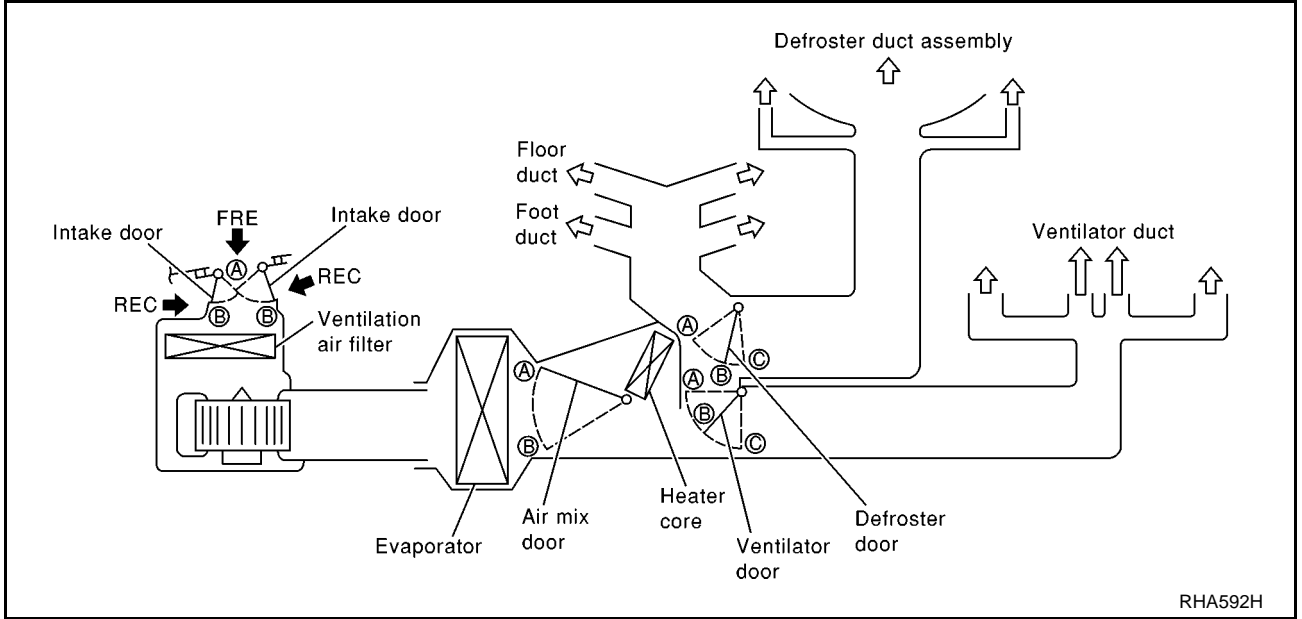
EJS00110



AIR CONDITIONER CONTROL

System Description SWITCHES AND THEIR CONTROL FUNCTION

EJS00111



RHA592H

Position or switch	MODE SW				DEF SW		REC/FRE SW			Temperature dial		
	AUTO	VENT	B/L	FOOT	ON	OFF	REC	FRE		18°C	—	32°C
Door	AUTO											
Ventilator door	AUTO	A	B	C	C	—	—			—		
Defroster door		C	C	B	A		—			—		
Intake door	—				A	—	A	AUTO	B	—		
Air mix door	—				—		—			A	AUTO	B

RJIA0846E

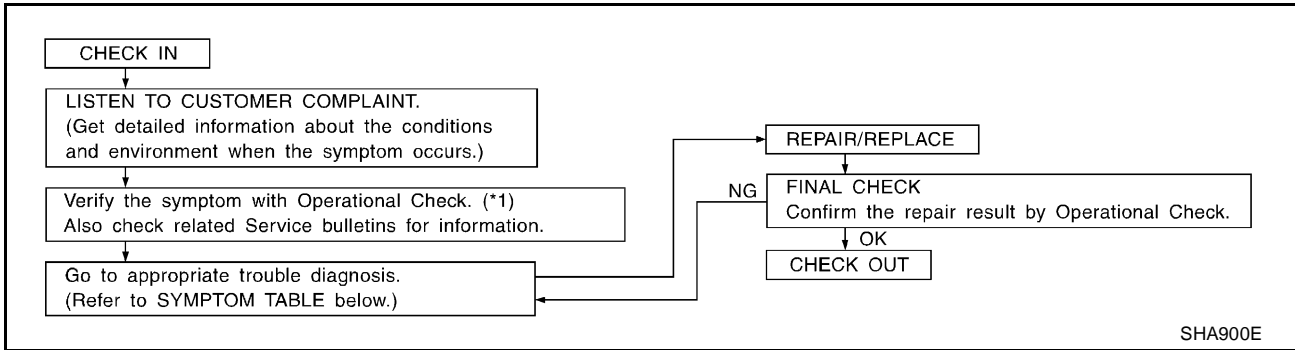
TROUBLE DIAGNOSIS

PFP:00004

TROUBLE DIAGNOSIS

How to Perform Trouble Diagnoses for Quick and Accurate Repair WORK FLOW

EJS0010L



*1 [ATC-48, "Operational Check"](#)

SYMPTOM TABLE

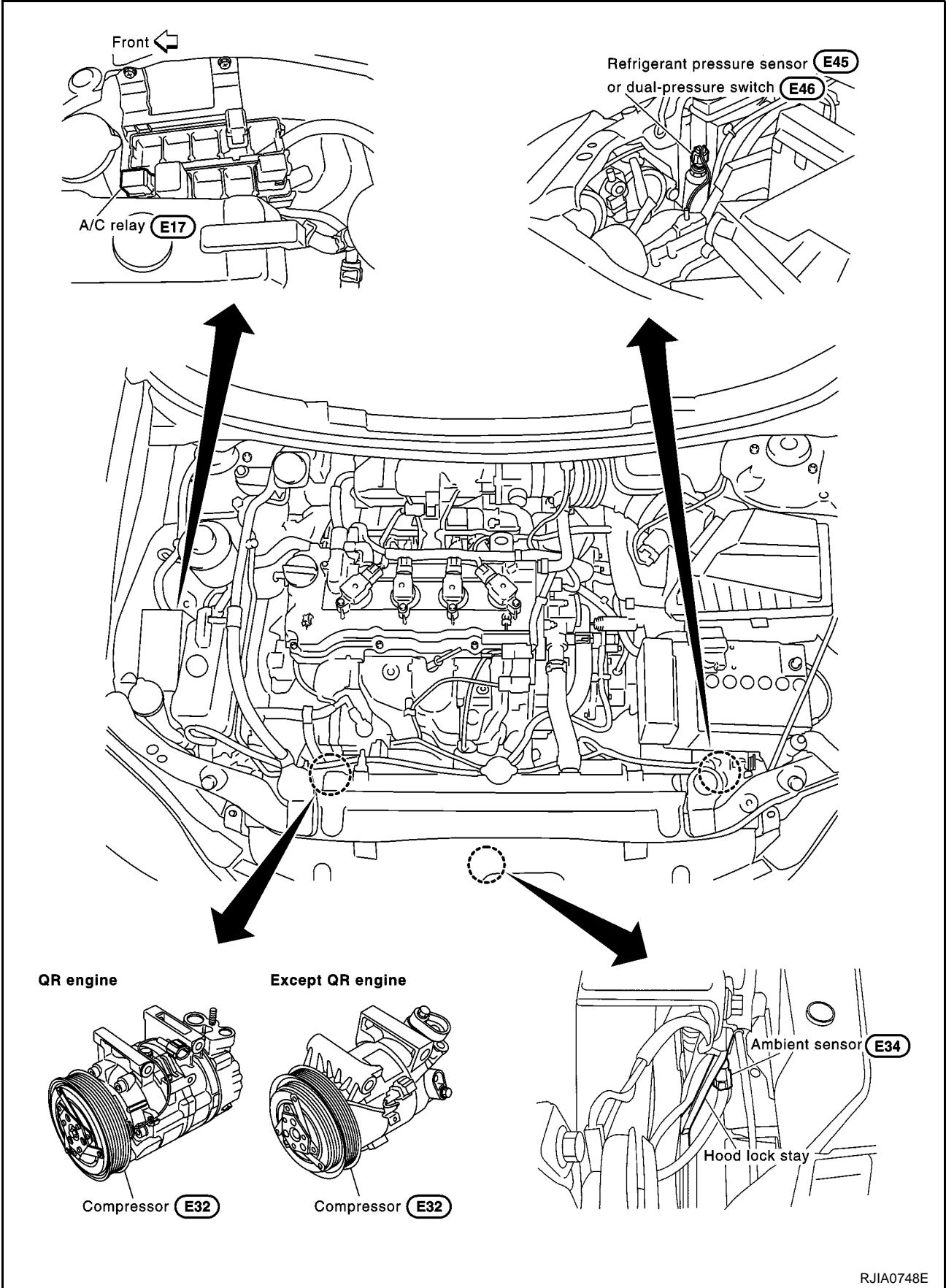
Symptom	Reference Page
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C system. ATC-51, "Power Supply and Ground Circuit for Auto Amp."
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor. (LAN) ATC-56, "Mode Door Motor Circuit"
Mode door motor does not operate normally.	
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor. (LAN) ATC-59, "Air Mix Door Motor Circuit"
Air mix door motor does not operate normally.	
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.(LAN) ATC-62, "Intake Door Motor Circuit"
Intake door motor does not operate normally.	
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor. ATC-65, "Blower Motor Circuit"
Blower motor operation is malfunctioning under out of starting fan speed control.	
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch. ATC-72, "Magnet Clutch Circuit"
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling. ATC-80, "Insufficient Cooling"
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating. ATC-88, "Insufficient Heating"
Noise	Go to Trouble Diagnosis Procedure for Noise. ATC-90, "Noise"
Self-diagnosis can not be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis. ATC-91, "Self-diagnosis"
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function. ATC-92, "Memory Function"
A/C system cannot be controlled.	Go to Trouble Diagnosis Procedure for Multiplex Communication Circuit. ATC-102, "Multiplex Communication Circuit"

TROUBLE DIAGNOSIS

Component Parts and Harness Connector Location ENGINE COMPARTMENT

EJS0010M

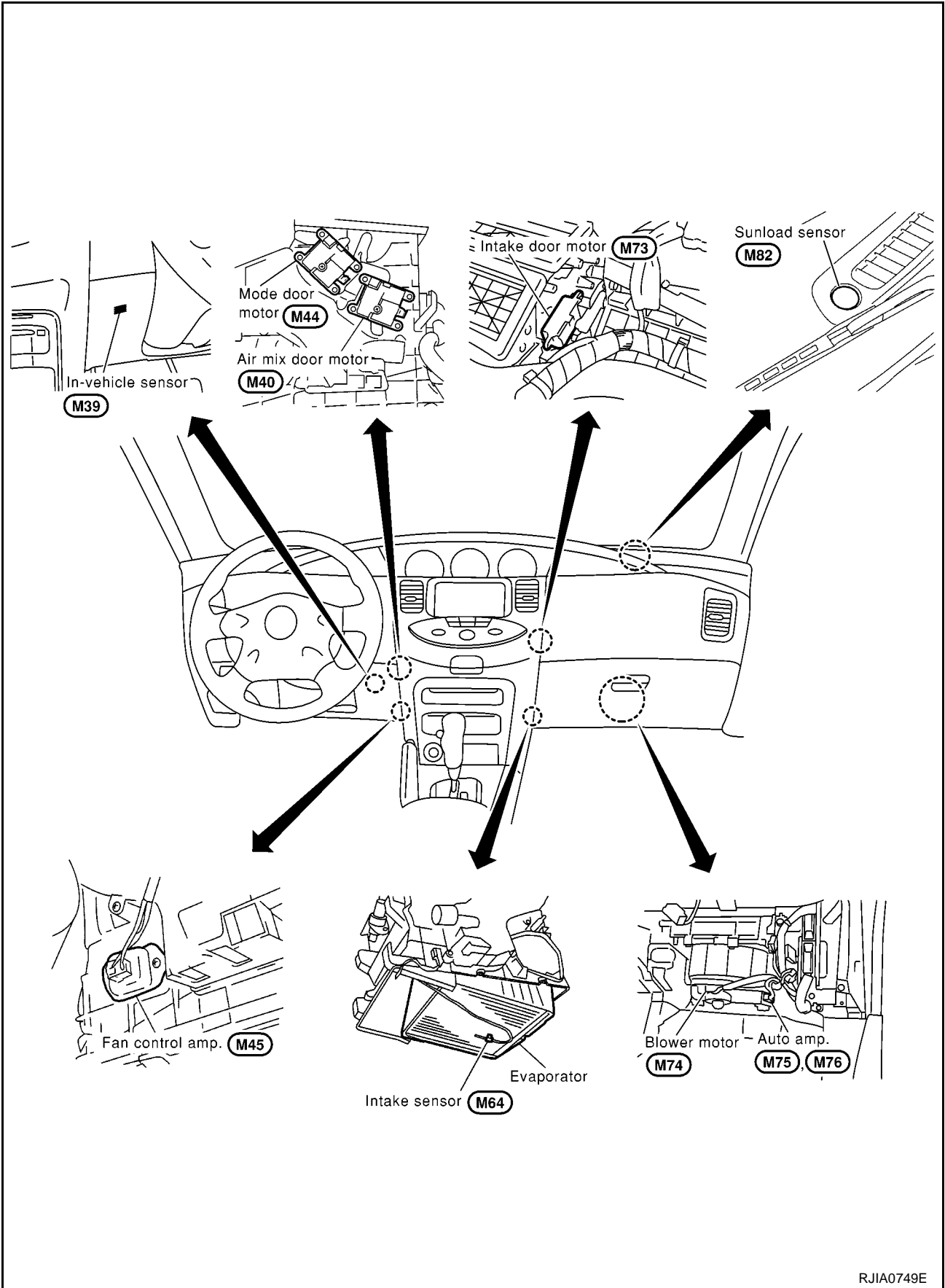
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RJIA0748E

TROUBLE DIAGNOSIS

PASSENGER COMPARTMENT



RJIA0749E

TROUBLE DIAGNOSIS

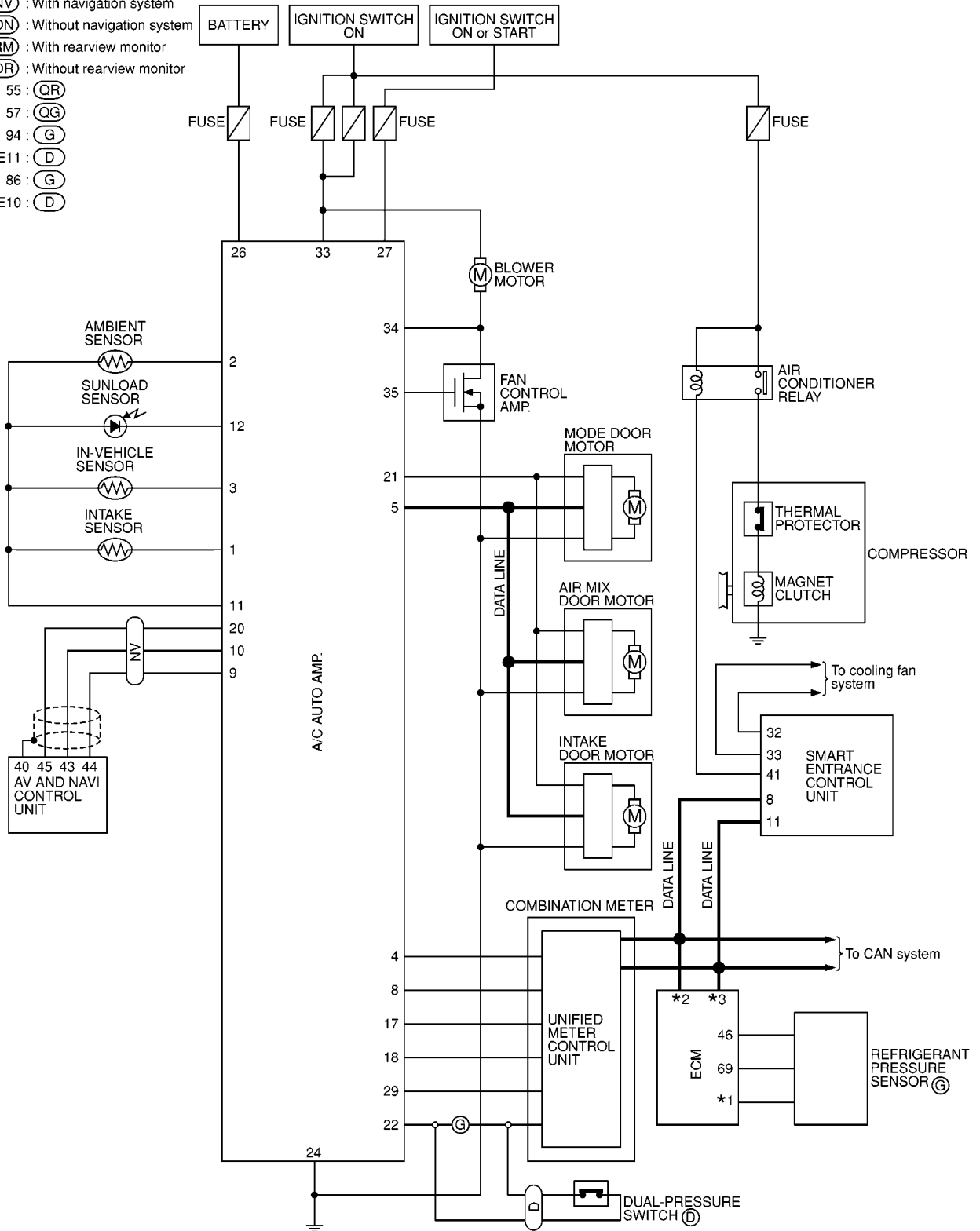
Circuit Diagram

EJS0010N

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ATC

- (G) : With gasoline engine
 - (D) : With diesel engine
 - (QR) : With QR engine
 - (QG) : With QG engine
 - (NV) : With navigation system
 - (ON) : Without navigation system
 - (RM) : With rearview monitor
 - (OR) : Without rearview monitor
- *1 55 : (QR)
57 : (QG)
- *2 94 : (G)
E11 : (D)
- *3 86 : (G)
E10 : (D)



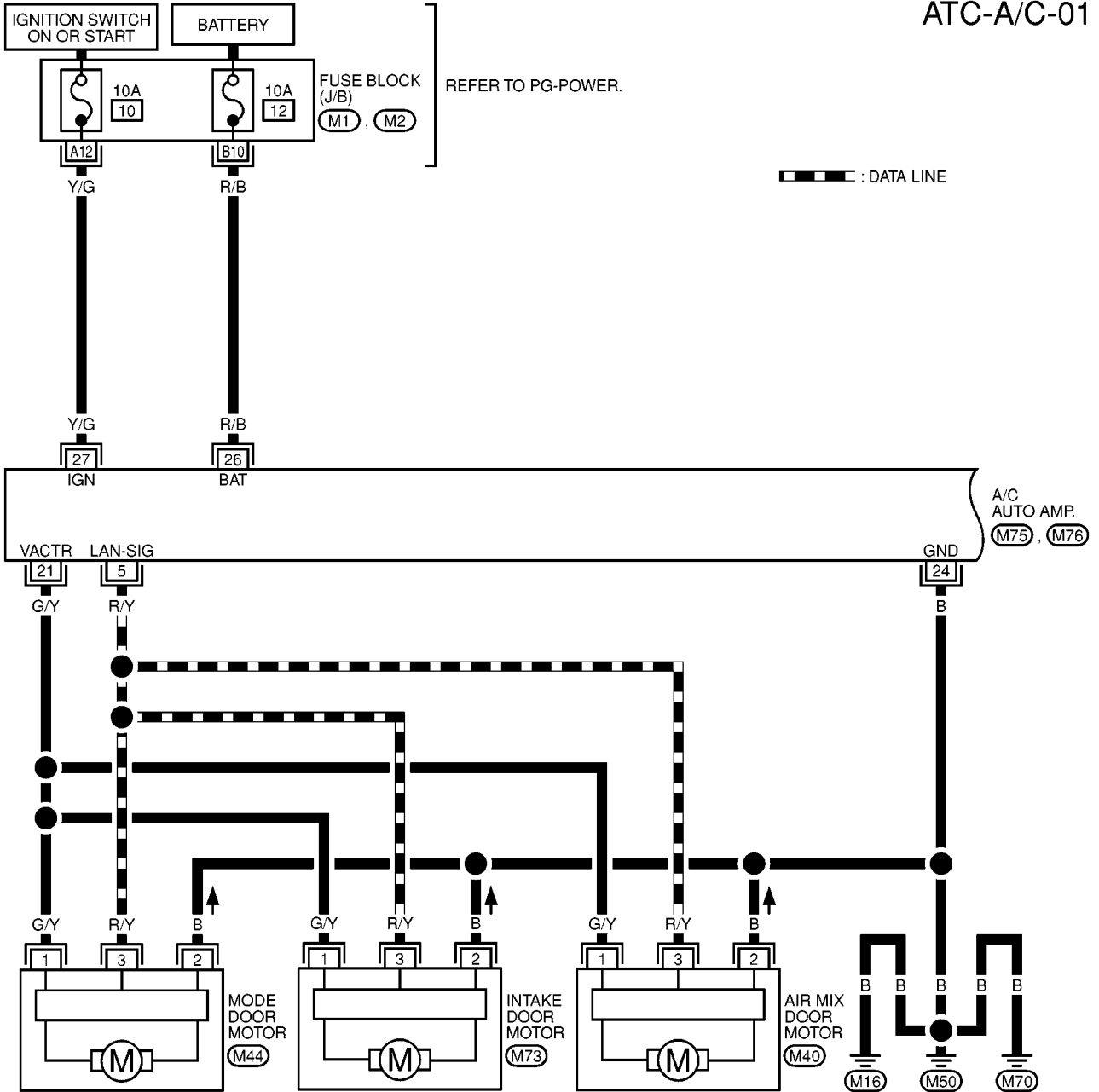
MJWA0001E

TROUBLE DIAGNOSIS

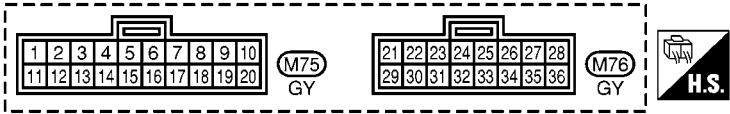
EJS00100

ATC-A/C-01

Wiring Diagram



1			
2	(M40)	(M44)	(M73)
3	W	W	W

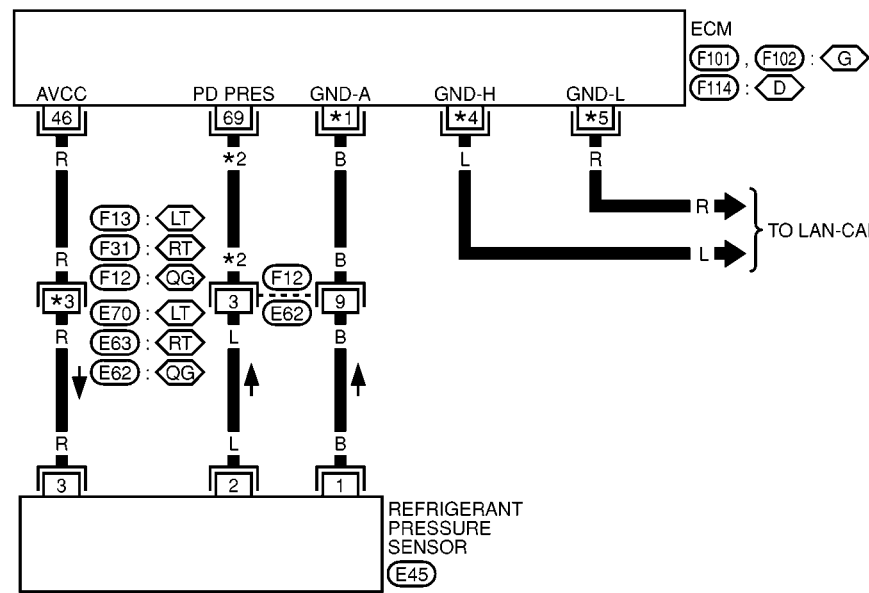
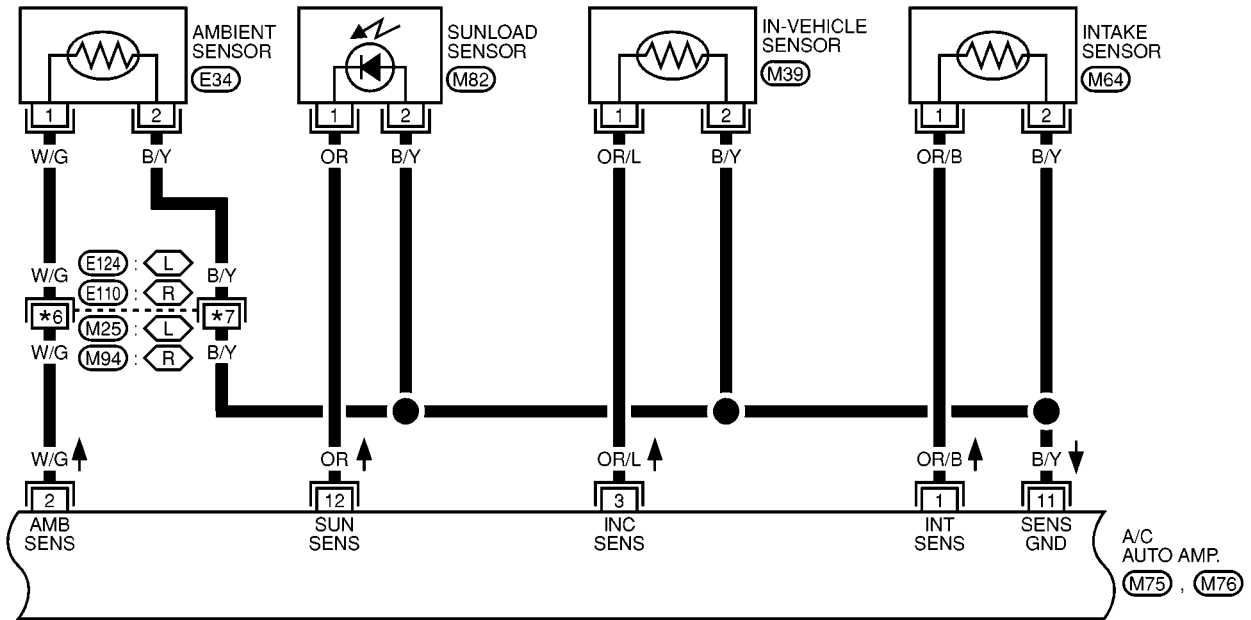


REFER TO THE FOLLOWING.
(M1), **(M2)** - FUSE BLOCK-
 JUNCTION BOX (J/B)

MJWA0002E

TROUBLE DIAGNOSIS

ATC-A/C-02

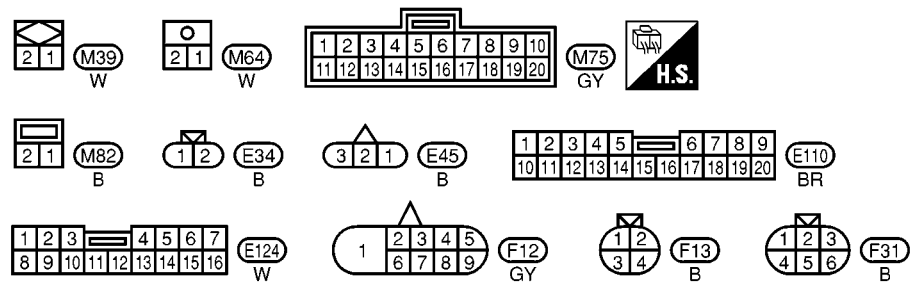


- (L) : LHD MODELS
 - (R) : RHD MODELS
 - (G) : WITH GASOLINE ENGINE
 - (D) : WITH DIESEL ENGINE
 - (QR) : WITH QR ENGINE
 - (LT) : LHD MODELS WITH QR ENGINE
 - (RT) : RHD MODELS WITH QR ENGINE
 - (QG) : WITH QG ENGINE
 - (LQ) : LHD MODELS WITH QG ENGINE
 - (RQ) : RHD MODELS WITH QG ENGINE
- | | | | |
|----|-----------|-------|----------|
| *1 | 55 : (QR) | *4 | 94 : (G) |
| | 57 : (QG) | E11 : | (D) |
| *2 | L : (QR) | *5 | 86 : (G) |
| | W : (LQ) | E10 : | (D) |
| | B : (RQ) | *6 | 3 : (L) |
| *3 | 2 : (LT) | 5 : | (R) |
| | 3 : (RT) | *7 | 2 : (L) |
| | 7 : (QG) | 4 : | (R) |

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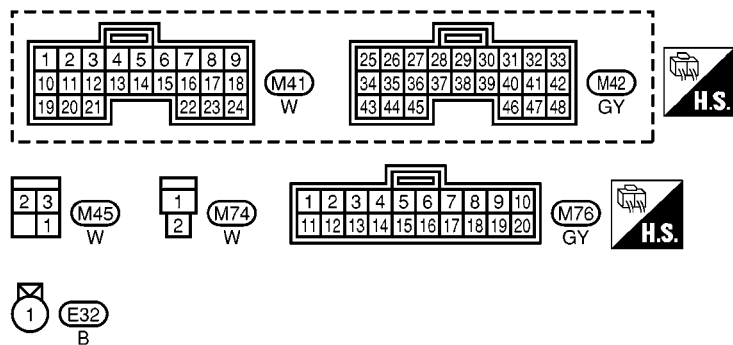
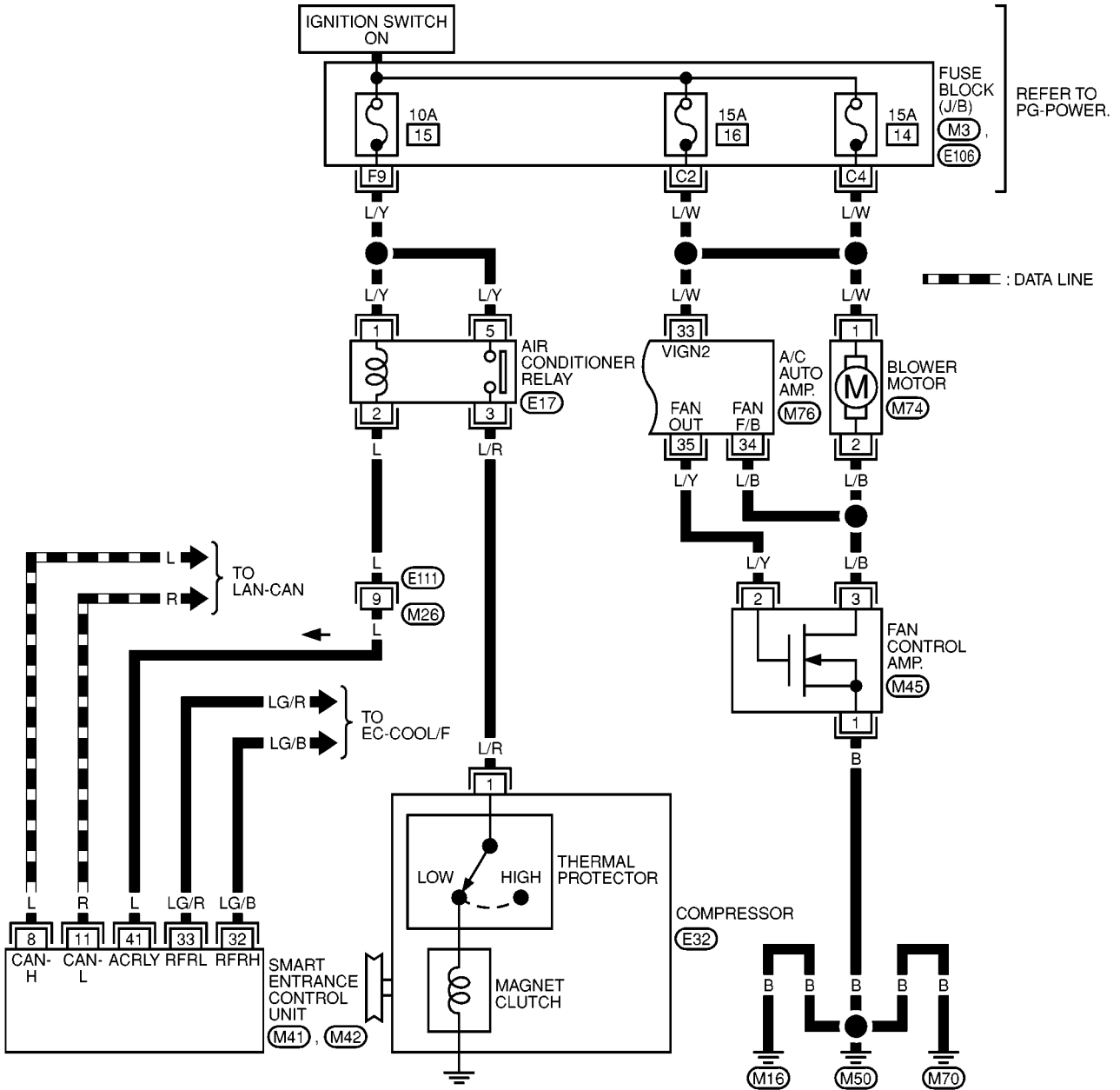
M



REFER TO THE FOLLOWING.
(F101, F102, F114)
-ELECTRICAL UNITS

TROUBLE DIAGNOSIS

ATC-A/C-03



REFER TO THE FOLLOWING.

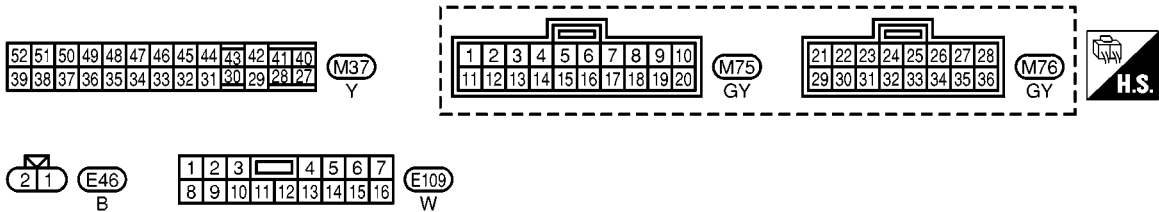
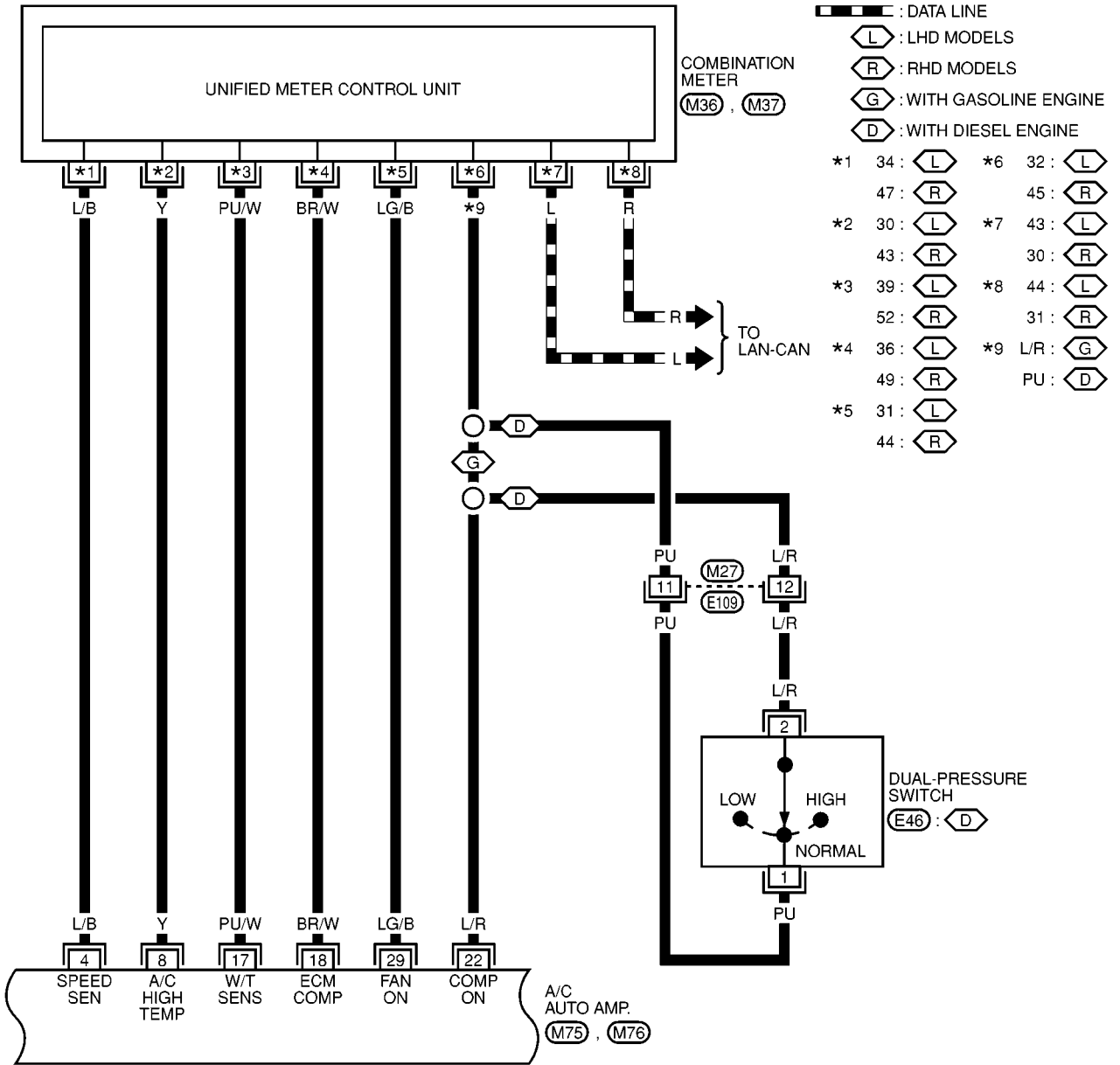
(M3), (E106)

- FUSE BLOCK-JUNCTION BOX (J/B)

MJWA0004E

TROUBLE DIAGNOSIS

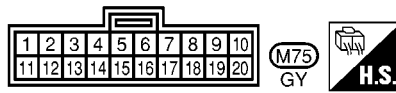
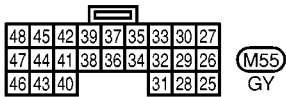
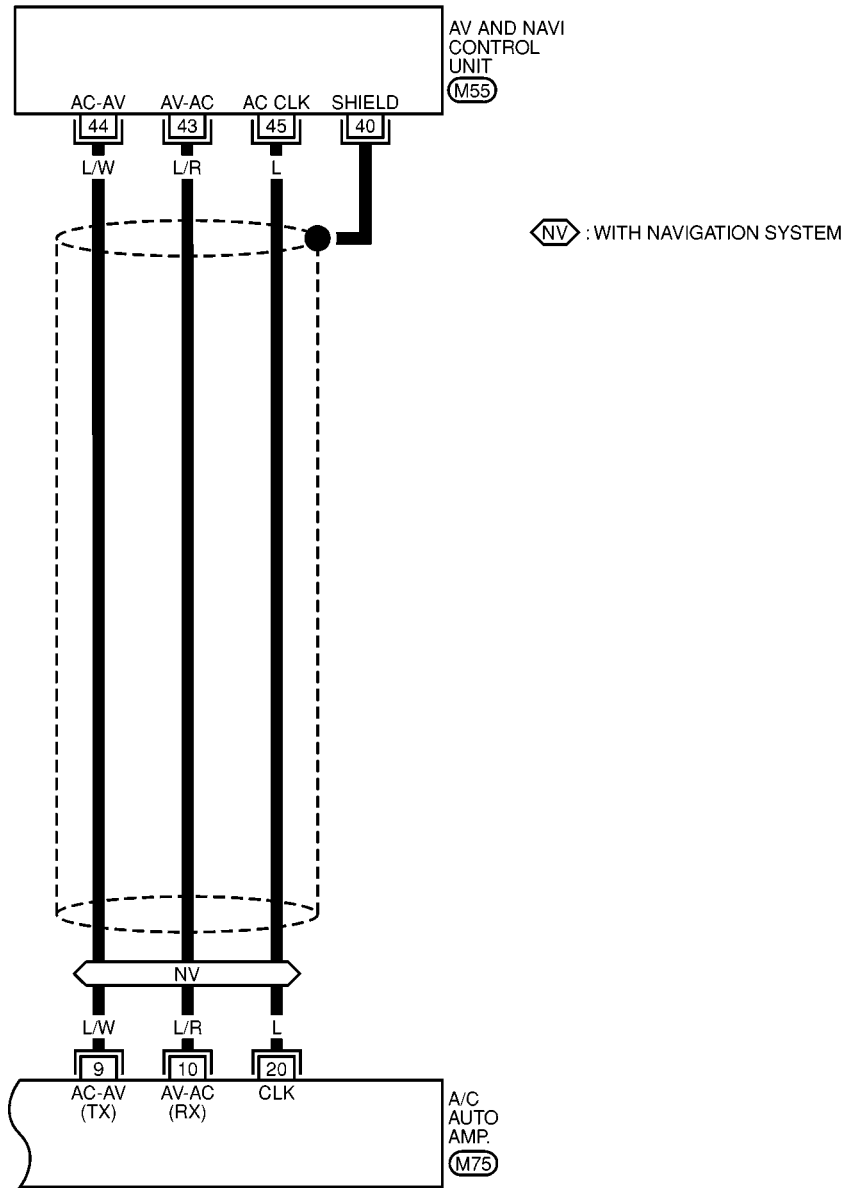
ATC-A/C-04



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TROUBLE DIAGNOSIS

ATC-A/C-05



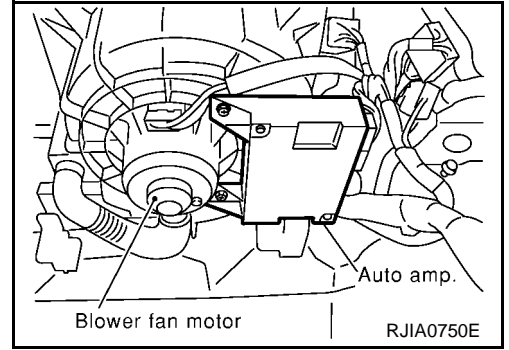
MJWA0006E

TROUBLE DIAGNOSIS

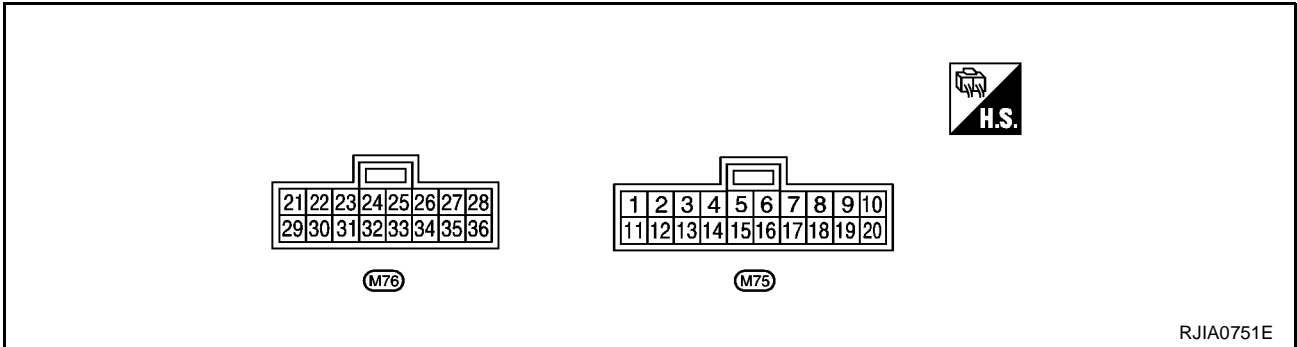
Auto Amp. Terminals and Reference Value

EJS0010P

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



PIN CONNECTOR TERMINAL LAYOUT



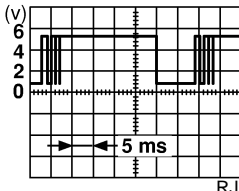
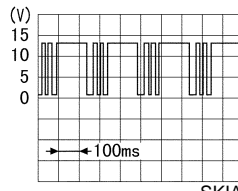
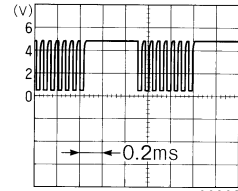
AUTO AMP. INSPECTION TABLE

TERMI- NAL NO.	ITEM	CONDITION		Voltage (V)
1	Intake sensor	-	-	-
2	Ambient sensor	-	-	-
3	In-vehicle sensor	-	-	-
4	Speed sensor signal	IGN ON	Speedometer: Approx. 40 km/h (25 MPH)	 ELF1080D
5	LAN signal	IGN ON	-	 HAK0652D
8	HTA (FICD) switch	IGN ON	When ambient temperature is more than 1°C	Approx. 0
			When ambient temperature is less than 0°C	Approx. 12
9	Multiplex communication (Tx) signal A/C amp. → AV	IGN ON	-	 RJIA0212E

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TROUBLE DIAGNOSIS

TERMI- NAL NO.	ITEM	CONDITION		Voltage (V)
10	Multiplex communication (Rx) signal AV → A/C amp.	IGN ON	-	
11	Sensor ground	IGN ON	-	Approx. 0
12	Sunload sensor	IGN ON	-	-
17	Water temperature sensor signal	IGN ON	Engine coolant temperature: Approx. 60°C	
18	Compressor feed back sig- nal (With gasoline engine)	IGN ON	A/C ON	Approx. 0
			- When refrigerant pres- sure sensor connector is disconnected.	Approx. 5
20	Multiplex communication (CLK) signal	IGN ON	-	
21	Power supply for mode door, air mix door and intake door motor	IGN ON	-	Approx. 12
22	Compressor ON signal	IGN ON	Compressor: ON	Approx. 0
			Compressor: OFF	Approx. 5
24	Ground	IGN ON	-	Approx. 0
26	Power supply for BATT	IGN OFF	-	Approx. 12
27	Power supply for IGN	IGN ON	-	Approx. 12
29	Fan ON signal	IGN ON	Blower fan: ON	Approx. 0
			Blower fan: OFF	Approx. 5
33	Power supply for ACC	IGN ON	-	Approx. 12
34	Blower fan motor feed back signal	IGN ON	Fan speed: Manual 1st	Approx. 8
35	Fan control amp. control signal	IGN ON	Fan speed:	Approx. 2.5 - 3.5
			Manual 1st - 4th speed	Approx. 9.0
			Manual 5th speed	

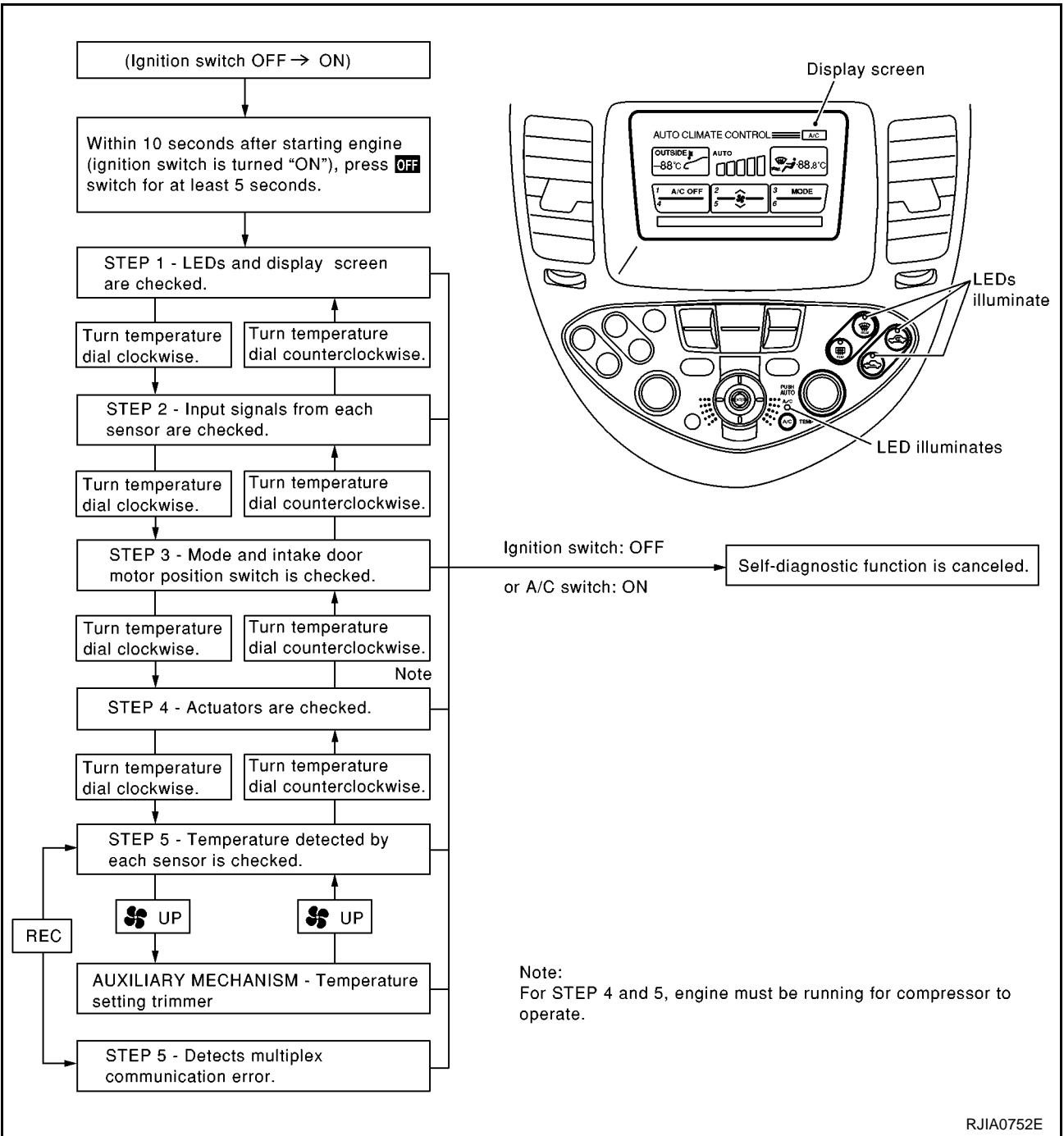
TROUBLE DIAGNOSIS

EJS00100

Self-diagnosis Function DESCRIPTION

The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch from OFF to ON) and pressing OFF switch for at least 5 seconds. The "OFF" switch must be pressed within 10 seconds after starting the engine (ignition switch is turned ON). This system will be canceled by either pressing A/C switch or turning the ignition switch OFF. Shifting from one step to another is accomplished by means of turning temperature dial, as required. Additionally shifting from STEP 6 to AUXILIARY MECHANISM is accomplished by means of pushing  (fan) UP switch.

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ATC

TROUBLE DIAGNOSIS

FUNCTION CONFIRMATION PROCEDURE

1. SET IN SELF-DIAGNOSTIC MODE

Method 1 (Without navigation system, or with navigation system)

1. Turn ignition switch to ON.
2. Within 10 seconds after starting engine (ignition switch is turned ON.), press and hold OFF switch for at least 5 seconds.
3. The self-diagnosis (step 1) should start.

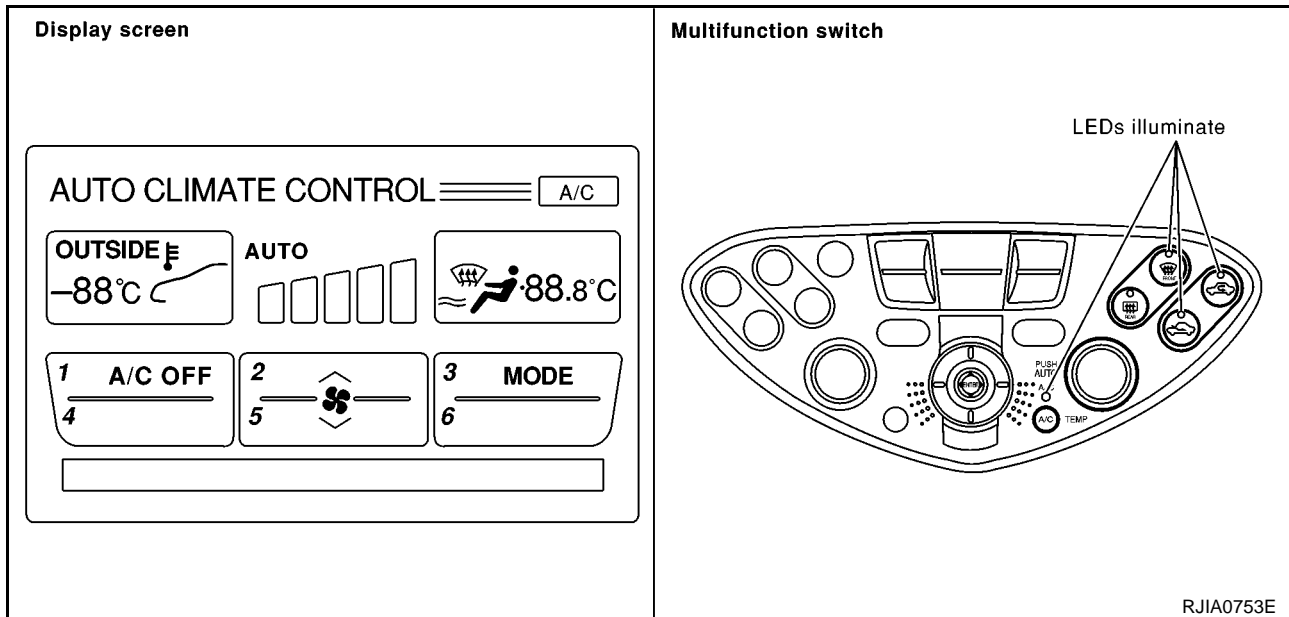
Method 2 (Only with navigation system)

1. Turn OFF the audio system.
2. While pressing "Vehicle Information" switch, turn audio switch (volume adjustment dial) by at least 30 notches.
3. Trouble diagnosis initial screen appears. Using joystick, select "Confirmation and Adjustment". And press "Confirm".
4. Confirmation and adjustment initial screen appears. Using joystick, select "Air-conditioner trouble diagnosis", and press "Confirm" to start self-diagnosis (step 1).

>> GO TO 2.

2. STEP 1 - LEDS AND DISPLAY ARE CHECKED

Check LEDs illuminate and display screen.



Yes or No

- Yes >> GO TO 3.
- No >> Malfunctioning OFF switch or LEDs.
>> Check multi-function switch.

3. CHECK TO ADVANCE SELF-DIAGNOSIS STEP 2

1. Turn the temperature dial clockwise.
2. Advance to self-diagnosis STEP 2?

Yes or No

- Yes >> GO TO 4.
- No >> Malfunctioning temperature dial.
>> Check multi-function switch.

TROUBLE DIAGNOSIS

4. CHECK TO RETURN SELF-DIAGNOSIS STEP 1

1. Turn the temperature dial counterclockwise.
2. Return to self-diagnosis STEP 1?

Yes or No

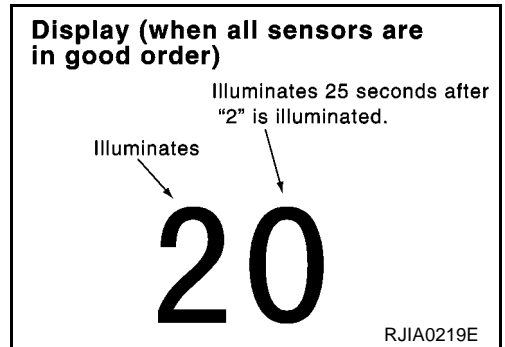
- Yes >> GO TO 5.
No >> Malfunctioning temperature dial.
>> Check multi-function switch.

5. STEP 2 - SENSOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT

1. Turn the temperature dial clockwise.
2. Does code No.20 appear on the display?

Yes or No

- Yes >> GO TO 6.
No >> GO TO 14.

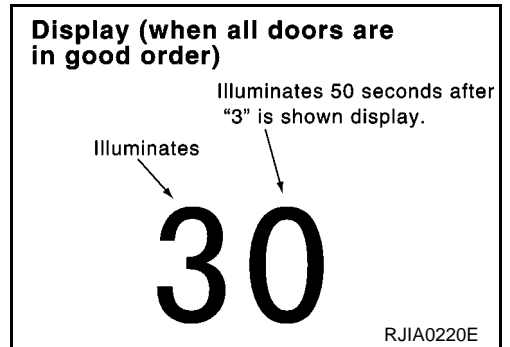


6. STEP 3 - MODE DOOR AND INTAKE DOOR POSITIONS ARE CHECKED

1. Turn the temperature dial clockwise.
2. Does code No.30 appear on the display?

Yes or No

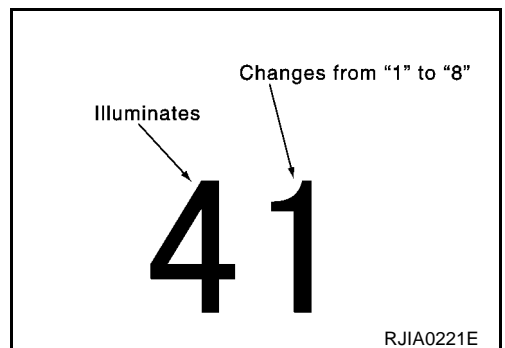
- Yes >> GO TO 7.
No >> GO TO 15.



7. STEP 4 - OPERATION OF EACH ACTUATOR IS CHECKED

1. Turn the temperature dial clockwise.
2. Engine running.
3. Press DEF switch, code No. of each actuator test is indicated on the display.






>> GO TO 8.



TROUBLE DIAGNOSIS

8. CHECK ACTUATORS

Refer to the following chart and confirm discharge air flow, air temperature, blower motor voltage and compressor operation.

Discharge air flow			
Mode door position	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	65%	35%
	–	–	100%

RHA654FI

	41	42	43	44	45	46
Mode door position	VENT	B/L	B/L	FOOT	D/F	DEF
Intake door position	REC	REC	20% FRE	FRE	FRE	FRE
Air mix door position	FULL COLD	FULL COLD	FULL HOT	FULL HOT	FULL HOT	FULL HOT
Blower fan	Approx. 4.5V	Approx. 10.5V	Approx. 8.5V	Approx. 8.5V	Approx. 8.5V	Approx. 12V
Compressor	ON	ON	OFF	OFF	ON	ON

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

OK or NG

OK >> GO TO 9.

- NG >>
- Air outlet does not change.
Go to [ATC-56, "Mode Door Motor Circuit"](#) .
 - Intake door does not change.
Go to [ATC-62, "Intake Door Motor Circuit"](#) .
 - Blower motor operation is malfunctioning.
Go to [ATC-65, "Blower Motor Circuit"](#) .
 - Magnet clutch does not engage.
Go to [ATC-72, "Magnet Clutch Circuit"](#) .
 - Discharge air temperature does not change.
Go to [ATC-59, "Air Mix Door Motor Circuit"](#) .


9. STEP 5 - TEMPERATURE OF EACH SENSOR IS CHECKED

1. Turn the temperature dial clockwise.
2. Code No.51 appears on the display.

>> GO TO 10.

TROUBLE DIAGNOSIS

10. CHECK AMBIENT SENSOR

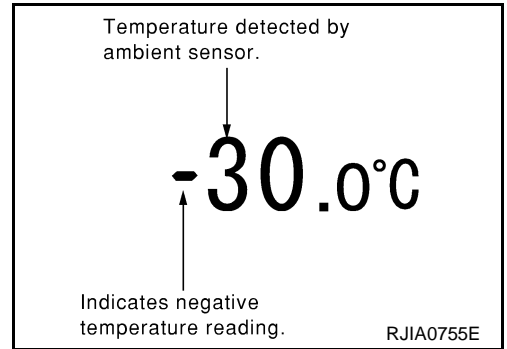
Press  (DEF) switch one time, temperature detected by ambient sensor is indicated on the display.

NOTE:


If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.

OK or NG

- OK >> GO TO 11.
- NG >> Go to [ATC-93, "Ambient Sensor Circuit"](#) .



11. CHECK IN-VEHICLE SENSOR

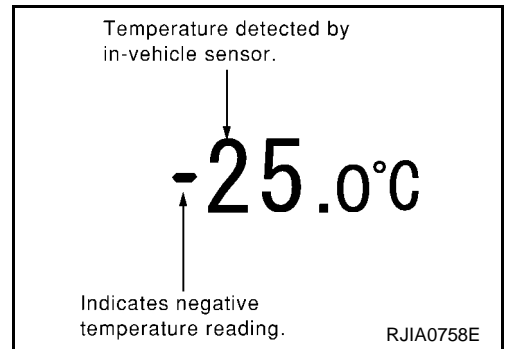
Press  (DEF) switch the second time, temperature detected by in-vehicle sensor is indicated on the display.

NOTE:


If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.

OK or NG

- OK >> GO TO 12.
- NG >> Go to [ATC-95, "In-vehicle Sensor Circuit"](#) .



12. CHECK INTAKE SENSOR

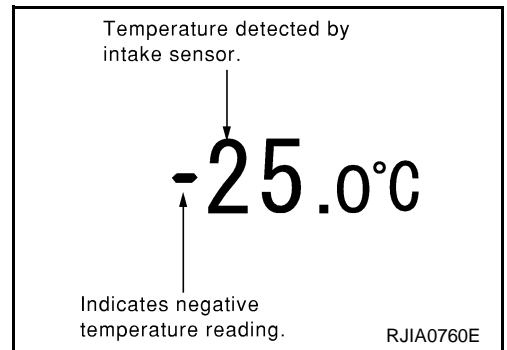
Press  (DEF) switch the third time, temperature detected by intake sensor is indicated on the display.

NOTE:

If temperature shown on display greatly differs from actual temperature, check sensor circuit first, then inspect sensor.

OK or NG

- OK >> GO TO 13.
- NG >> Go to [ATC-101, "Intake Sensor Circuit"](#) .





13. CHECK MULTIPLEX COMMUNICATION ERROR

1. Press REC (Recirculation) switch.
2. Multiplex communication error between AV AND NAVI CONTROL UNIT (or DISPLAY) and auto amp. is detected.

(If plural errors occur, the display of each error will blink two times for 0.5 second intervals.)

OK or NG

- OK >> 1. Turn ignition switch OFF or (AUTO) switch ON.
2. END
- NG >> Go to [ATC-102, "Multiplex Communication Circuit"](#) .

Display	Multiplex communication error
52	In good order
52 	AV AND NAVI CONTROL UNIT or DISPLAY ⇔ Auto amp.
52 	Auto amp. ⇔ AV AND NAVI CONTROL UNIT or DISPLAY

RJA0754E

TROUBLE DIAGNOSIS

14. CHECK MALFUNCTIONING SENSOR

Refer to the following chart for malfunctioning code No.

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

*1: Conduct self-diagnosis STEP 2 under sunshine.

When conducting indoors, aim a light (more than 60W) at sunload sensor, otherwise Code No.25 will indicate despite that sunload sensor is functioning properly.

Code No.	Malfunctioning sensor (Including circuits)	Reference page
21 / -21	Ambient sensor	*2
22 / -22	In-vehicle sensor	*3
24 / -24	Intake sensor	*4
25 / -25	Sunload sensor	*5
26 / -26	Air mix door motor (LCU) PBR	*6

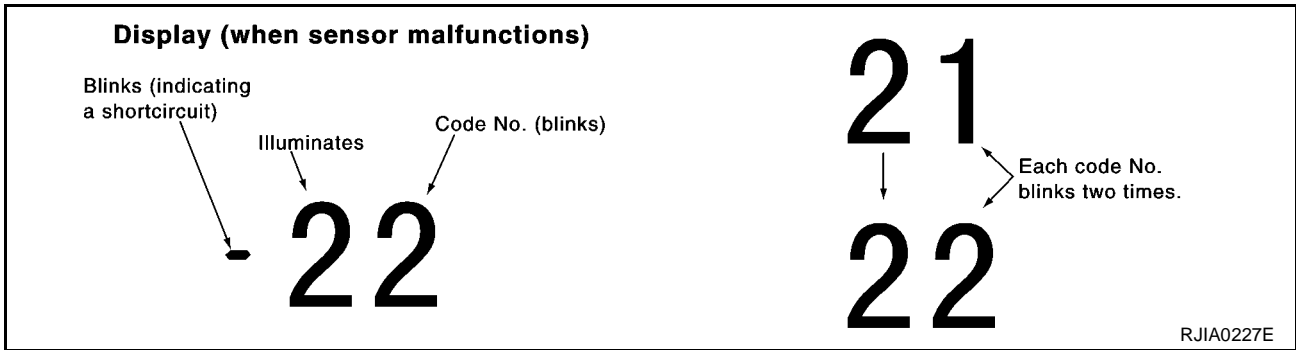
*2: [ATC-93, "Ambient Sensor Circuit"](#) .

*3: [ATC-95, "In-vehicle Sensor Circuit"](#) .

*4: [ATC-101, "Intake Sensor Circuit"](#) .

*5: [ATC-98, "Sunload Sensor Circuit"](#) .

*6: [ATC-59, "Air Mix Door Motor Circuit"](#) .



>> INSPECTION END

TROUBLE DIAGNOSIS

15. CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH

Mode or (and) intake door motor position switch(es) is (are) malfunctioning.

Code No. *1 *2	Mode or intake door position	Reference page
31	VENT	*3
32	B/L	
34	FOOT	
35	D/F	
36	DEF	
37	FRE	*4
38	20% FRE	
39	REC	

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

*1:If mode door motor harness connector is disconnected, the following display pattern will appear.

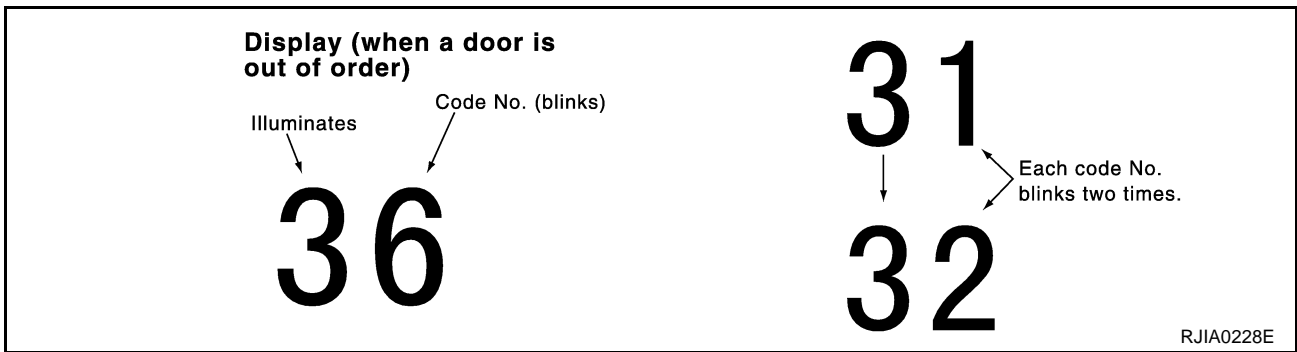
31→32→33→34→35→36→Return to 31

*2:If intake door motor harness connector is disconnected, the following display pattern will appear.

37→38→39→Return to 37

*3:[ATC-56, "Mode Door Motor Circuit"](#) .

*4:[ATC-62, "Intake Door Motor Circuit"](#) .



>> INSPECTION END

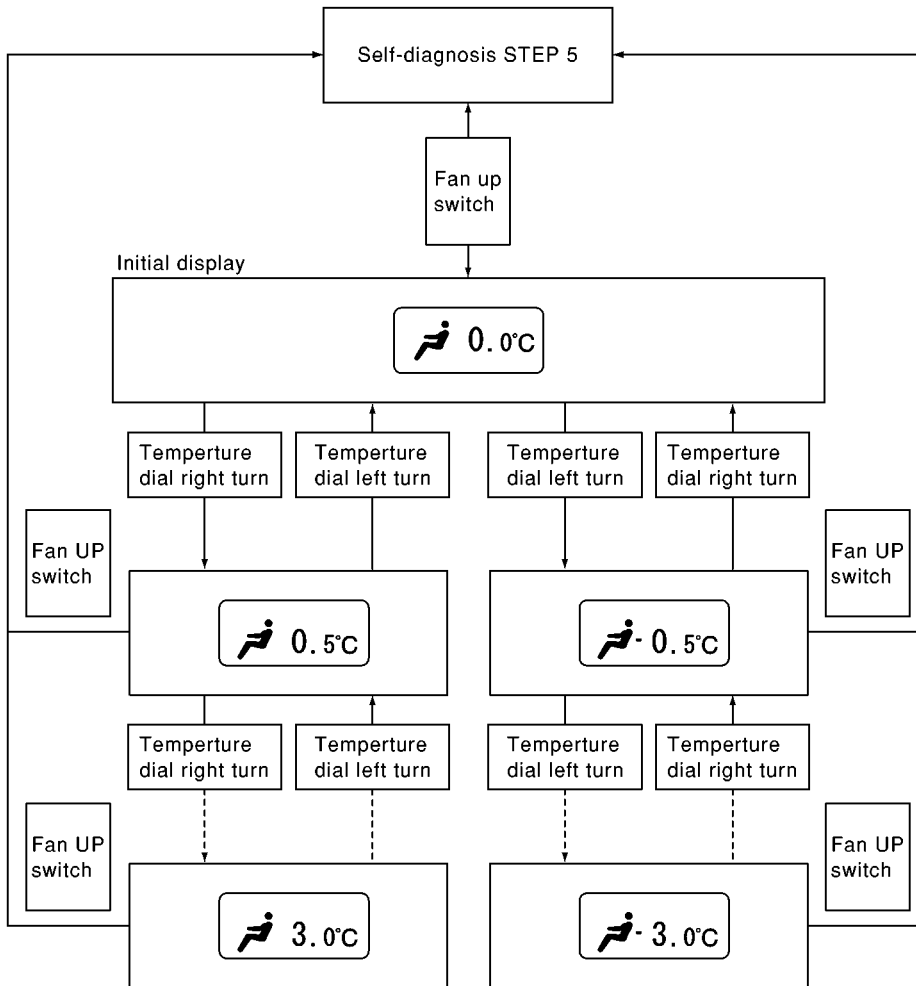
AUXILIARY MECHANISM: TEMPERATURE SETTING TRIMMER

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

Operating procedures for this trimmer are as follows:

- Begin Self-diagnosis STEP 5 mode.
- Press (fan) UP switch to set system in auxiliary mode.
- Display shows 61 in auxiliary mechanism. It takes approximately 3 seconds.
- Turn the temperature dial as desired. Temperature will change at a rate of 1°C (2°F) each time a dial is turned.

TROUBLE DIAGNOSIS



RJIA0778E

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

Operational Check

EJS0010R

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

Conditions : Engine running and at normal operating temperature

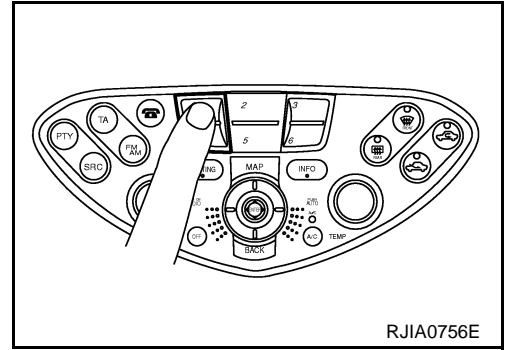
TROUBLE DIAGNOSIS

CHECKING MEMORY FUNCTION

1. Set the temperature 90°F or 32°C.
2. Press OFF switch.
3. Turn the ignition switch OFF.
4. Turn the ignition switch ON.
5. Press the AUTO switch.
6. Confirm that the set temperature remains at previous temperature.
7. Press OFF switch.

If NG, go to trouble diagnosis procedure for [ATC-92, "Memory Function"](#).

If OK, continue with next check.

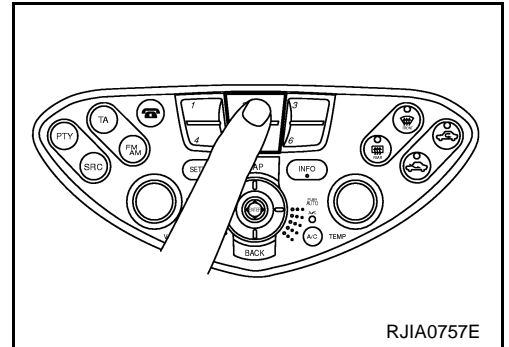


CHECKING BLOWER

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, and continue checking blower speed and fan symbol until all speeds are checked.
3. Leave blower on MAX speed.

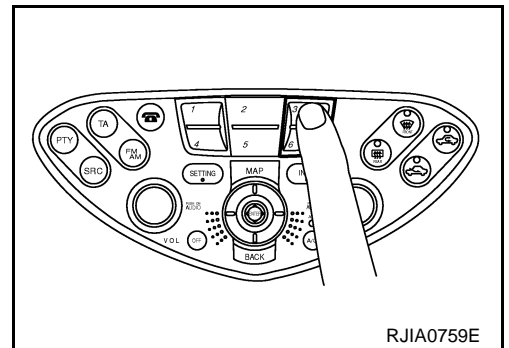
If NG, go to trouble diagnosis procedure for [ATC-65, "Blower Motor Circuit"](#).

If OK, continue with next check.



CHECKING DISCHARGE AIR

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



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ATC

TROUBLE DIAGNOSIS

3. Confirm that discharge air comes out according to the air distribution table. Refer to [ATC-28, "Discharge Air Flow"](#). Intake door position is checked in the next step.
 If NG, go to trouble diagnosis procedure for [ATC-62, "Intake Door Motor Circuit"](#).
 If OK, continue with next check.

NOTE:

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

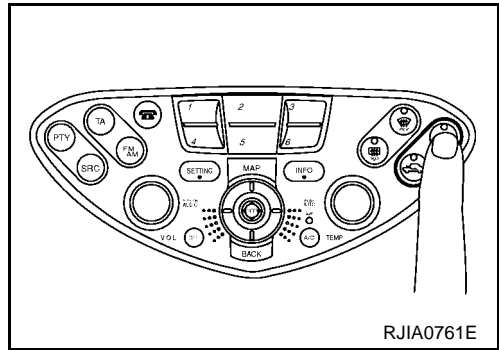
Discharge air flow			
Mode door position	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	65%	35%
	–	–	100%

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CHECKING RECIRCULATION

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

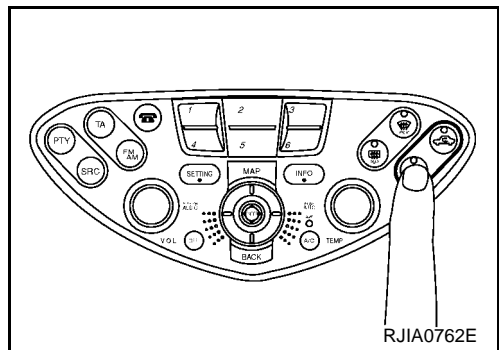
If NG, go to trouble diagnosis procedure for [ATC-62, "Intake Door Motor Circuit"](#).
 If OK, continue with next check.



CHECKING FRESH SWITCH

1. Press fresh (FRE) switch one time. Fresh switch indicator should illuminate.
2. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to trouble diagnosis procedure for [ATC-62, "Intake Door Motor Circuit"](#).
 If OK, continue with next check.



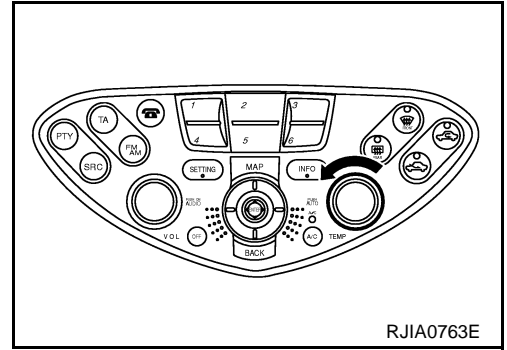
TROUBLE DIAGNOSIS

CHECKING TEMPERATURE DECREASE

1. Turn the temperature dial until 18°C (60°F) is displayed.
2. Check for cold air at discharge air outlets.

If NG, go to trouble diagnosis procedure for [ATC-80, "Insufficient Cooling"](#).

If OK, continue with next check.

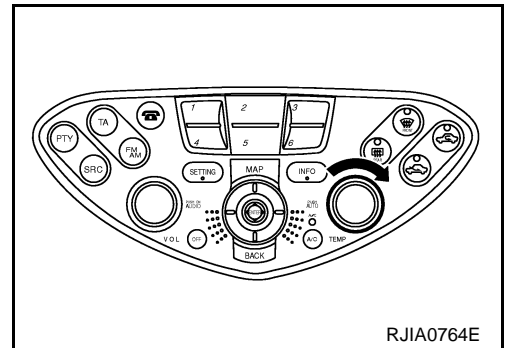


CHECKING TEMPERATURE INCREASE

1. Turn the temperature dial until 32°C (90°F) is displayed.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for [ATC-88, "Insufficient Heating"](#).

If OK, continue with next check.

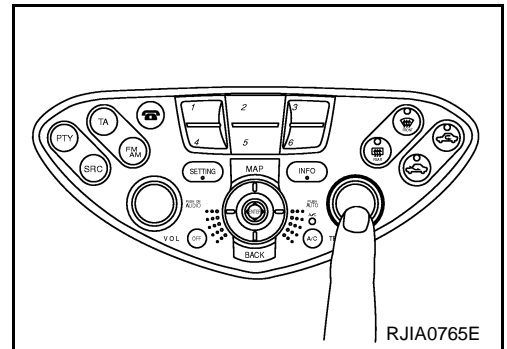


CHECKING AUTO MODE

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

If NG, go to trouble diagnosis procedure for [ATC-51, "Power Supply and Ground Circuit for Auto Amp."](#), then if necessary, trouble diagnosis procedure for [ATC-72, "Magnet Clutch Circuit"](#).

If all operational check are OK (symptom can not be duplicated), go to Incident Simulation Tests in [GI-24, "How to Perform Efficient Diagnosis for an Electrical Incident"](#) and perform tests as outlined to simulate driving conditions environment. If symptom appears, refer to [ATC-30, "SYMPTOM TABLE"](#) and perform applicable trouble diagnosis procedures.



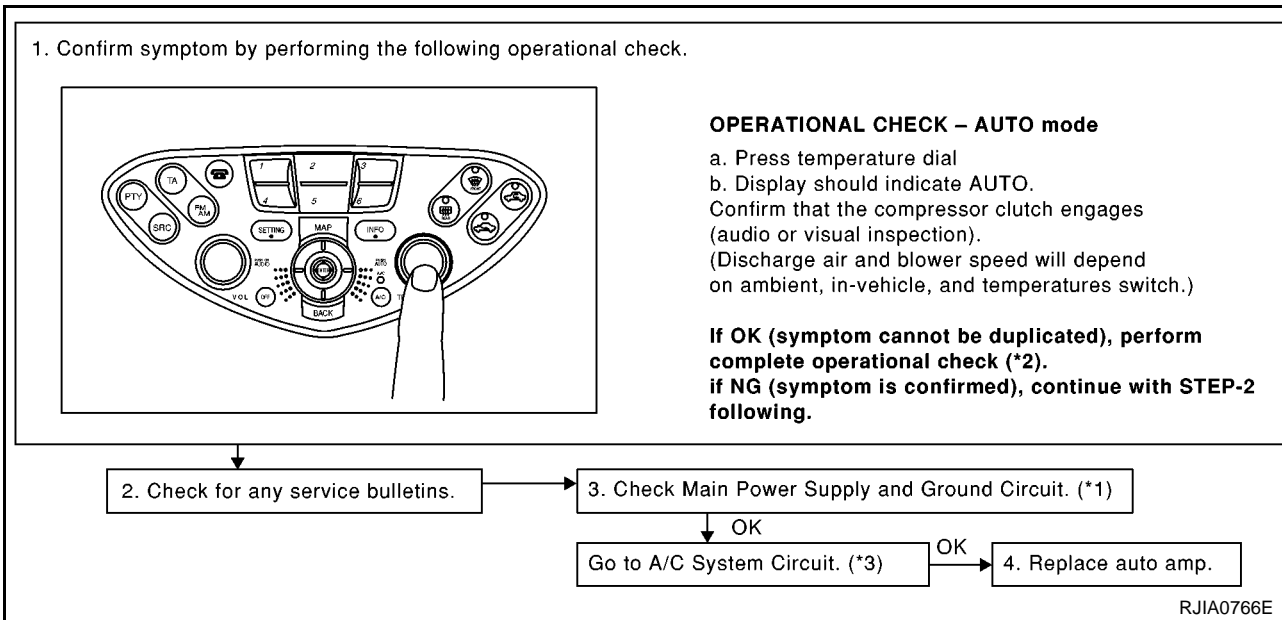
Power Supply and Ground Circuit for Auto Amp.

SYMPTOM: A/C system does not come on.

EJS0010S

TROUBLE DIAGNOSIS

INSPECTION FLOW



*1 [PG-4, "BATTERY POWER SUPPLY — IGNITION SW. IN ANY POSITION"](#) *2 [ATC-48, "Operational Check"](#)

*3 [ATC-53, "DIAGNOSTIC PROCEDURE FOR A/C SYSTEM"](#)

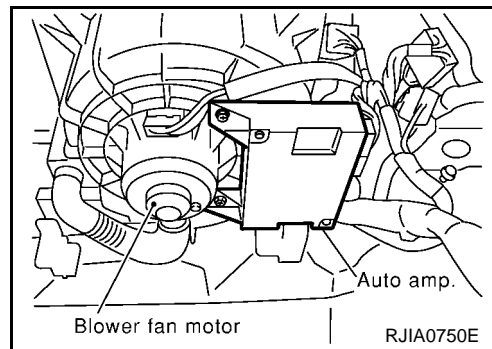
COMPONENT DESCRIPTION

Automatic Amplifier (Auto Amp.)

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

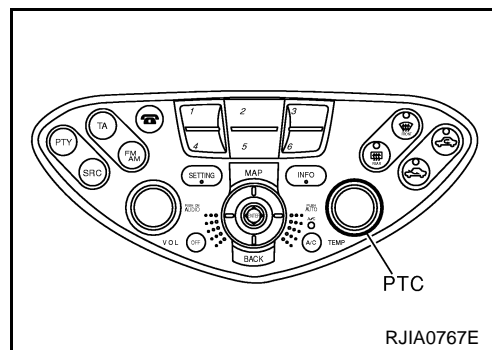
The auto amplifier is unitized with control mechanisms. When the various switches and temperature adjustment dial are operated, data is input to the auto amp. from the AV AND NAVI CONTROL UNIT (or DISPLAY) using multiplex communication.

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



Potential Temperature Control (PTC)

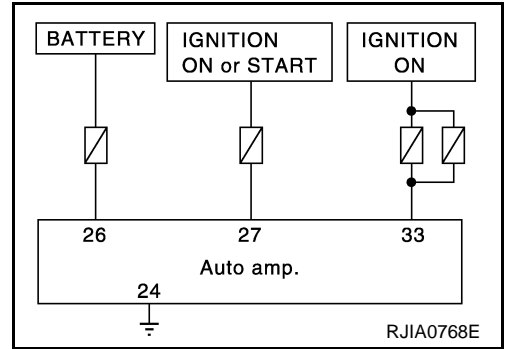
The PTC is built into the multi-function switch. It can be set at an interval of 0.5°C (1.0°F) in the 18°C (60°F) to 32°C (90°F) temperature range by turning the temperature dial. The set temperature is displayed.



TROUBLE DIAGNOSIS

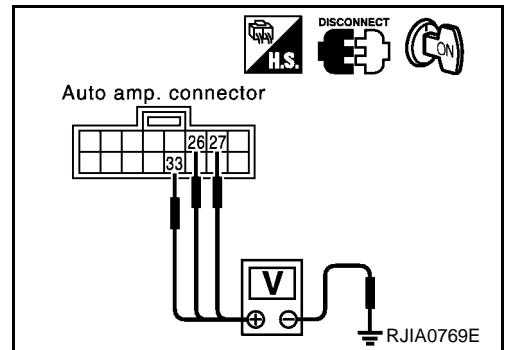
DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

SYMPTOM: A/C system does not come on.



1. CHECK POWER SUPPLY CIRCUIT FOR AUTO AMP.

Voltmeter terminal		(-)	Ignition switch position		
(+)			OFF	ACC	ON
Auto amp. connector	Terminal No. (Wire color)				
M76	26 (R/B)	Body ground	Approx. 12V	Approx. 12V	Approx. 12V
	27 (Y/G)		Approx. 0V	Approx. 0V	Approx. 12V
	33 (L/W)		Approx. 0V	Approx. 12V	Approx. 12V



OK or NG

OK >> GO TO 2.

NG >> Check 10A fuses (Nos. 10 and 12) and 15A fuses (Nos. 14 and 16) located in the fuse block.

- If fuses are OK, check for open circuit in wiring harness. Repair or replace as necessary.
- If fuses are NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary.

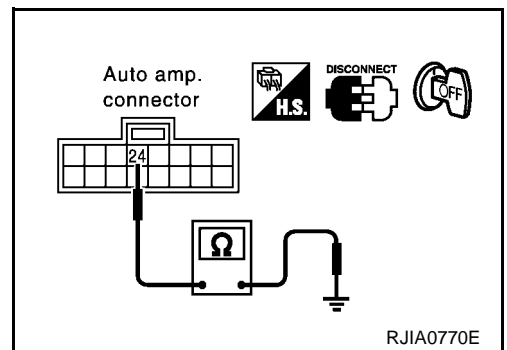
2. CHECK BODY GROUND CIRCUIT FOR AUTO AMP.

Ohmmeter terminal		(-)	Continuity
(+)			
Auto amp. connector	Terminal No. (Wire color)		
M76	24 (B)	Body ground	Yes

Yes or No

Yes >> Replace auto amp. INSPECTION END

No >> Repair or replace harness.

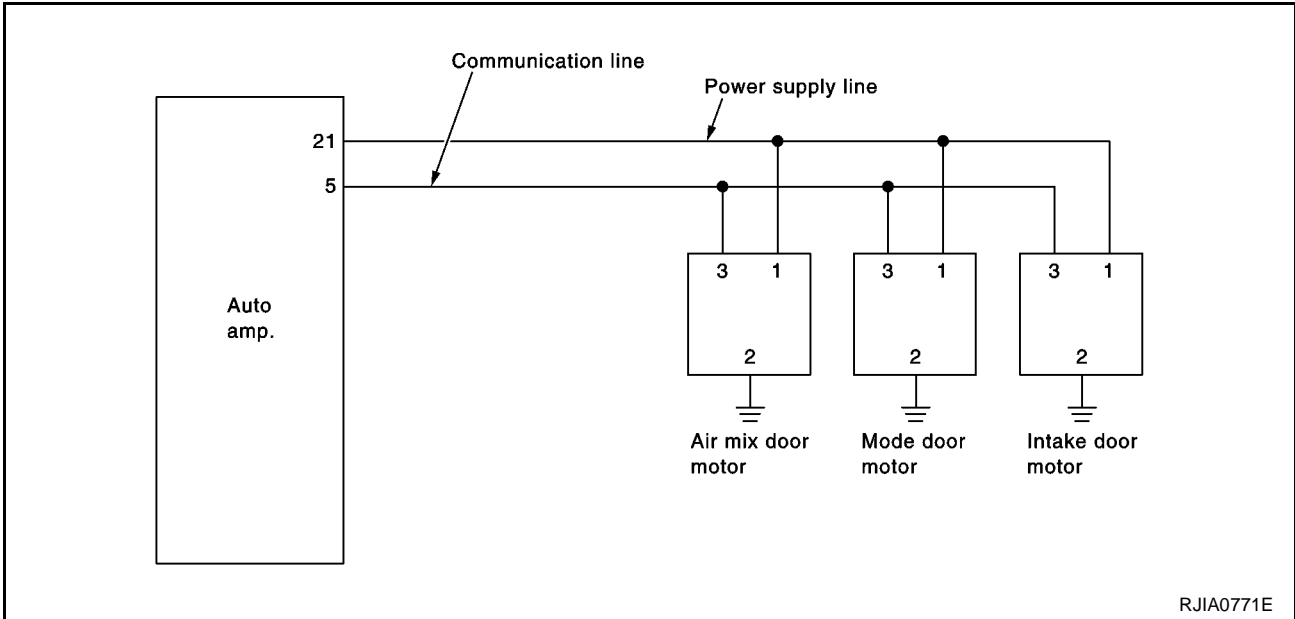


TROUBLE DIAGNOSIS

EJS0010T

LAN System Circuit

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



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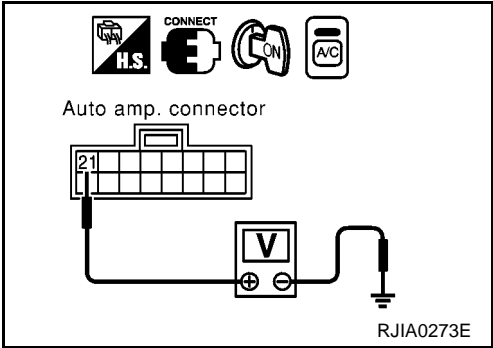
DIAGNOSTIC PROCEDURE FOR LAN SYSTEM CIRCUIT

1. CHECK POWER SUPPLY FOR AUTO AMP. (LCU) SIDE

Voltmeter terminal		(-)	Voltage
(+)			
Auto amp. connector	Terminal No. (Wire color)		
M76	21 (G/Y)	Body ground	Approx. 12V

OK or NG

- OK >> GO TO 2.
- NG >> Replace auto amp.(LCU).



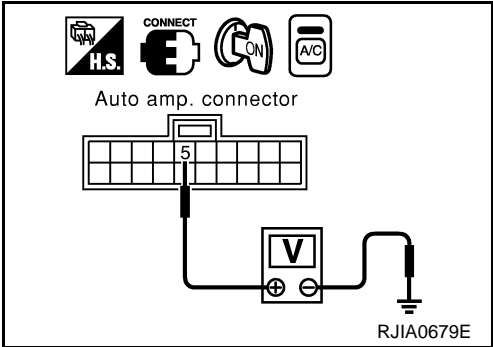
RJIA0273E

2. CHECK SIGNAL FOR AUTO AMP. (LCU) SIDE

Voltmeter terminal		(-)	Voltage
(+)			
Auto amp. connector	Terminal No. (Wire color)		
M75	5 (R/Y)	Body ground	Approx. 5.5V

OK or NG

- OK >> GO TO 3.
- NG >> Replace auto amp.(LCU)



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TROUBLE DIAGNOSIS

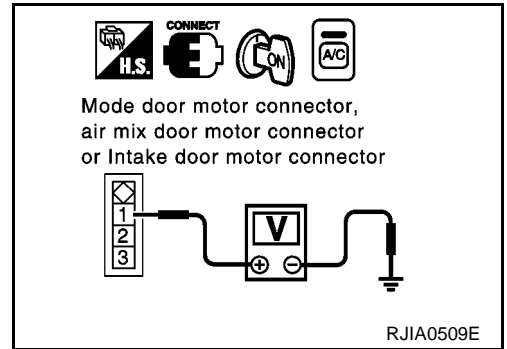
3. CHECK POWER SUPPLY FOR MOTOR SIDE

Door motor	Voltmeter terminal		(-)	Voltage
	(+)			
	Connector	Terminal No. (Wire color)		
Mode	M44	1 (G/Y)	Body ground	Approx. 12V
Air mix	M40	1 (G/Y)		
Intake	M73	1 (G/Y)		

OK or NG

OK >> GO TO 4.

NG >> Replace harness or connector.



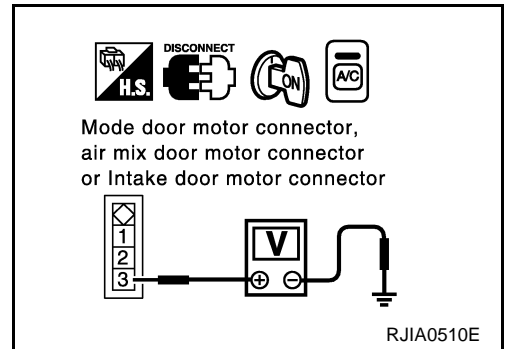
4. CHECK SIGNAL FOR MOTOR SIDE

Door motor	Voltmeter terminal		(-)	Voltage
	(+)			
	Connector	Terminal No. (Wire color)		
Mode	M44	3 (R/Y)	Body ground	Approx. 5.5V
Air mix	M40	3 (R/Y)		
Intake	M73	3 (R/Y)		

OK or NG

OK >> GO TO 5.

NG >> Replace harness or connector.



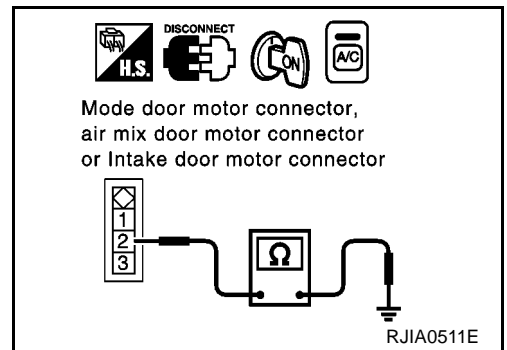
5. CHECK MOTOR GROUND CIRCUIT

Door motor	Ohmmeter terminal		(-)	Continuity
	(+)			
	Connector	Terminal No. (Wire color)		
Mode	M44	2 (B)	Body ground	Yes
Air mix	M40	2 (B)		
Intake	M73	2 (B)		

OK or NG

OK >> GO TO 6.

NG >> Replace harness or connector.



6. CHECK MOTOR OPERATION

Disconnect and reconnect the motor connector and confirm the motor operation.

OK or NG

OK >> (Return to operate normally.)

- Poor contacting the motor connector

NG >> (Does not operate normally.)

- GO TO 7

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ATC

TROUBLE DIAGNOSIS

7. CHECK MODE DOOR MOTOR OPERATION

1. Disconnect mode door motor and air mix door motor connector.
2. Reconnect mode door motor connector and confirm the mode door motor operation.

OK or NG

- OK >> (Mode door motor operates normally.)
- GO TO 8
- NG >> (Mode door motor does not operate normally.)
- Replace the mode door motor.

8. CHECK AIR MIX DOOR MOTOR OPERATION

1. Disconnect mode door motor connector.
2. Reconnect air mix door motor connector and confirm the air mix door motor operation.

OK or NG

- OK >> (Air mix door motor operates normally.)
- GO TO 9
- NG >> (Air mix door motor does not operate normally.)
- Replace the air mix door motor.

9. CHECK INTAKE DOOR MOTOR OPERATION

1. Disconnect air mix door motor connector.
2. Reconnect intake door motor connector and confirm the intake door motor operation.

OK or NG

- OK >> (Intake door motor operates normally.)
- Replace auto amp.
- NG >> (Intake door motor does not operate normally.)
- Replace intake door motor.

Mode Door Motor Circuit

EJS0010U

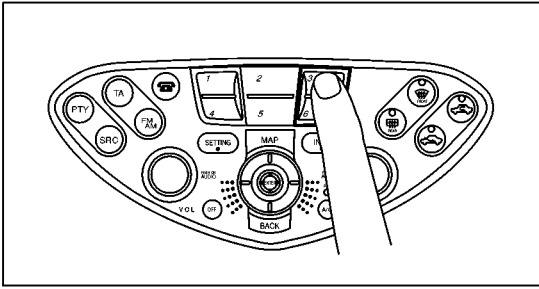
SYMPTOM:

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

TROUBLE DIAGNOSIS

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Discharge air

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

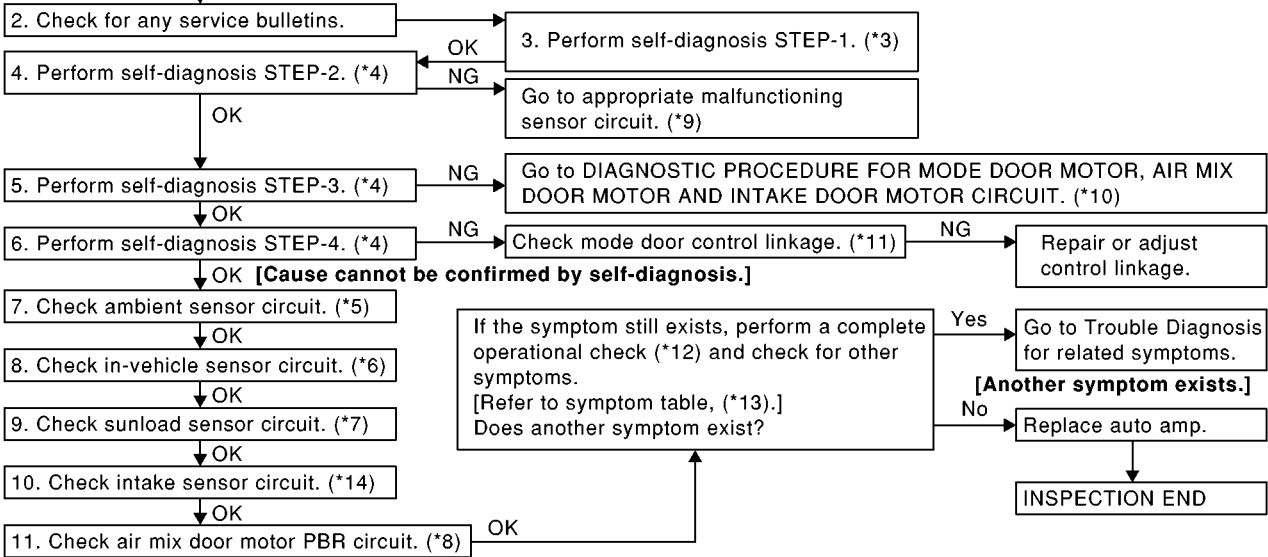
Discharge air flow

Mode door position	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	–	80%	20%
	–	65%	35%
	–	–	100%

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

NOTE:

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



RJIA0772E

*1 [ATC-28, "Discharge Air Flow"](#)

*2 [ATC-48, "Operational Check"](#)

*3 [ATC-41, "Self-diagnosis Function"](#), see No.1

*4 [ATC-41, "Self-diagnosis Function"](#), see No. 5

*5 [ATC-93, "Ambient Sensor Circuit"](#)

*6 [ATC-95, "In-vehicle Sensor Circuit"](#)

*7 [ATC-98, "Sunload Sensor Circuit"](#)

*8 [ATC-59, "Air Mix Door Motor Circuit"](#)

*9 [ATC-41, "Self-diagnosis Function"](#), see No.14

*10 [ATC-54, "LAN System Circuit"](#)

*11 [ATC-59, "COMPONENT DESCRIPTION"](#)

*12 [ATC-48, "Operational Check"](#)

*13 [ATC-30, "SYMPTOM TABLE"](#)

*14 [ATC-101, "Intake Sensor Circuit"](#)

TROUBLE DIAGNOSIS

SYSTEM DESCRIPTION

Component Parts

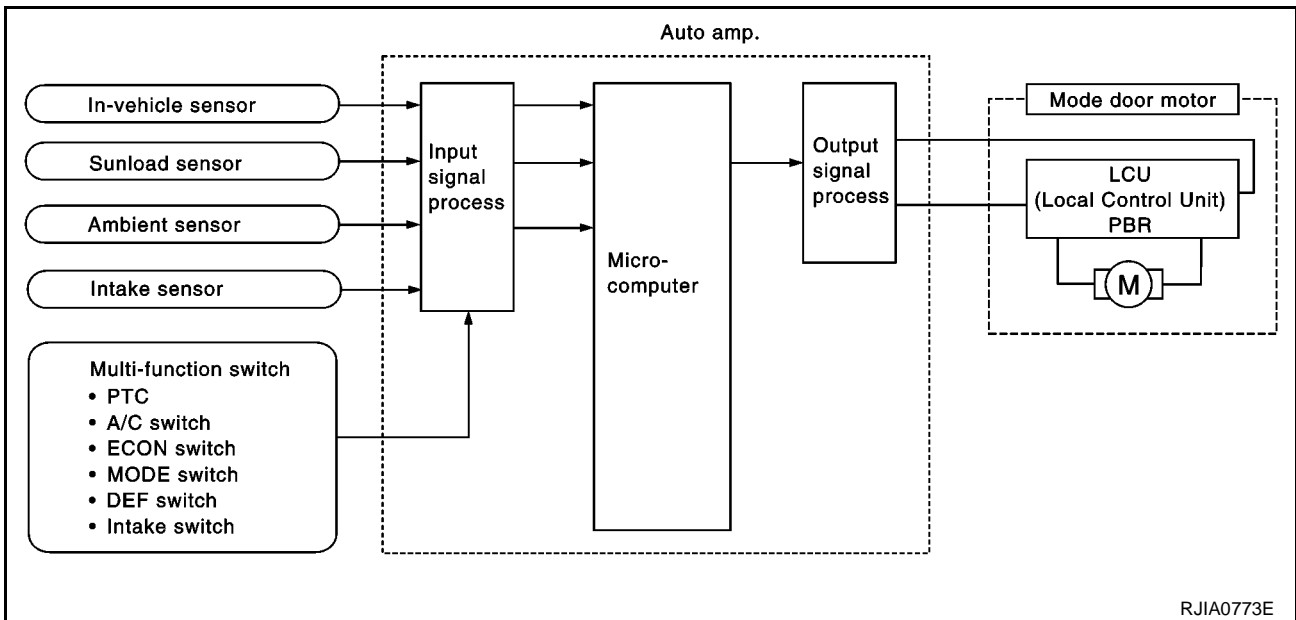
Mode door control system components are:

- Auto amp.
- Mode door motor (LCU)
- A/C LAN system (PBR built-in air mix door motor, mode door motor and intake door motor)
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

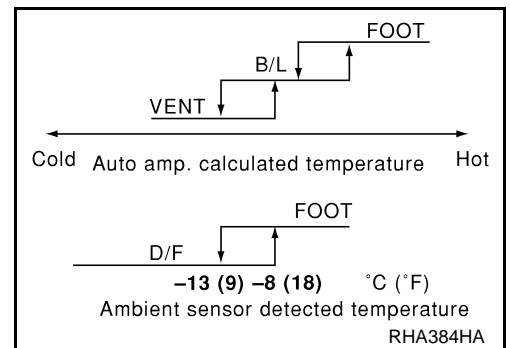
System Operation

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

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



Mode Door Control Specification

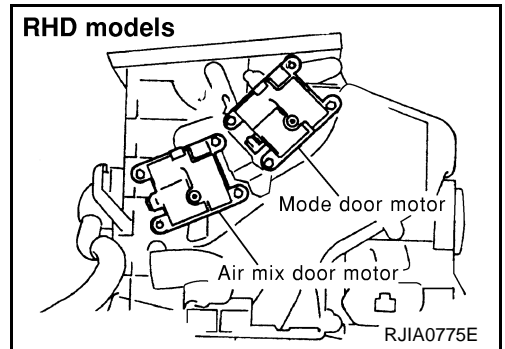
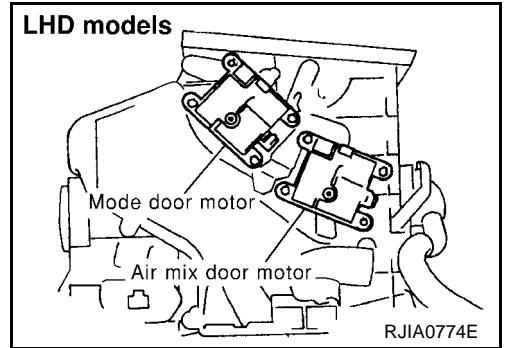


TROUBLE DIAGNOSIS

COMPONENT DESCRIPTION

Mode Door Motor

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



DIAGNOSTIC PROCEDURE FOR MODE DOOR

SYMPTOM: Mode door motor does not operate normally.

Perform diagnostic procedure for LAN system circuit. Refer to [ATC-54, "LAN System Circuit"](#).

Air Mix Door Motor Circuit

EJS0010V

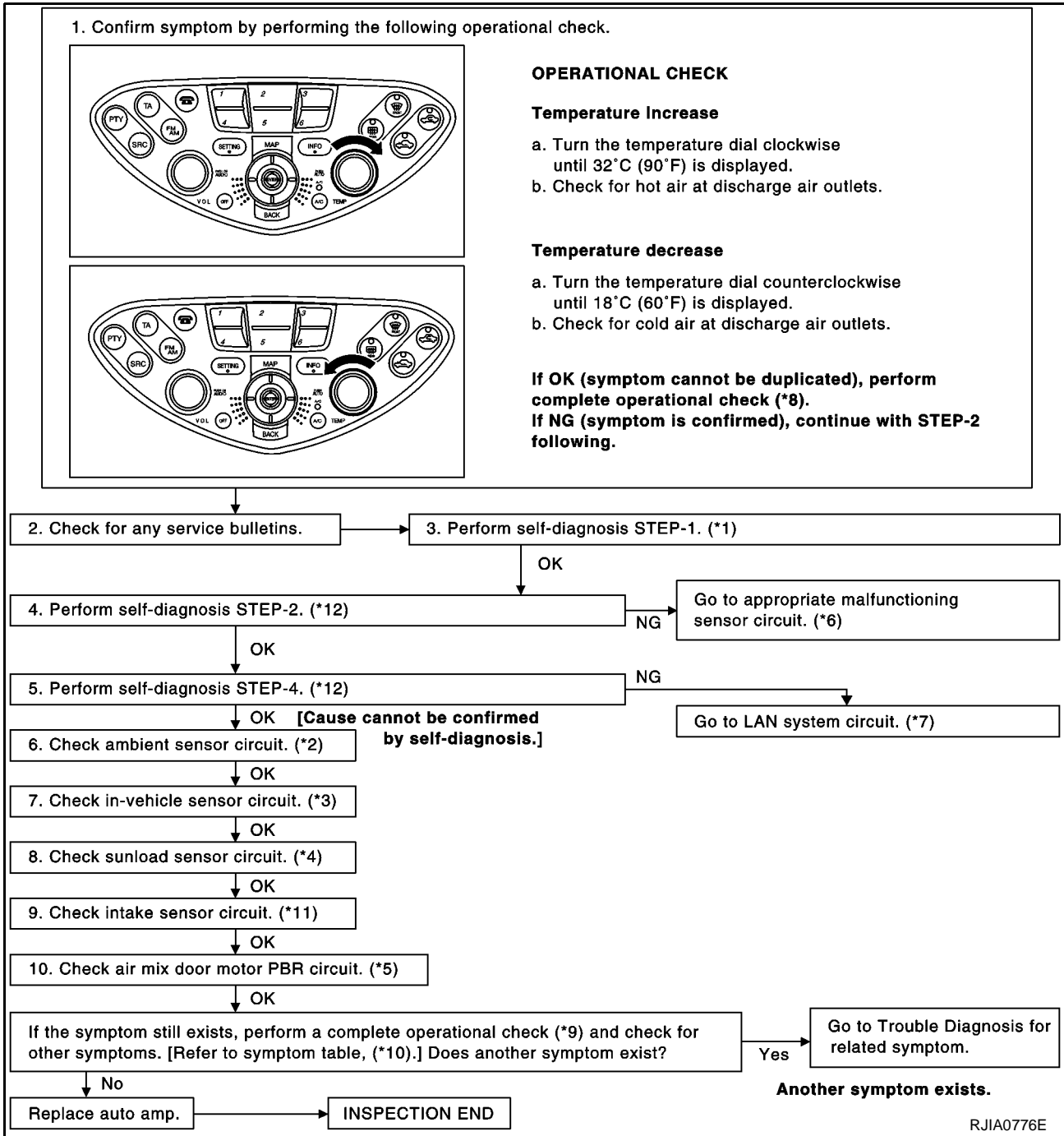
ATC

SYMPTOM:

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

TROUBLE DIAGNOSIS

INSPECTION FLOW



RJIA0776E

*1 [ATC-41, "Self-diagnosis Function"](#), see No.1

*2 [ATC-93, "Ambient Sensor Circuit"](#)

*3 [ATC-95, "In-vehicle Sensor Circuit"](#)

*4 [ATC-98, "Sunload Sensor Circuit"](#)

*5 [ATC-59, "Air Mix Door Motor Circuit"](#)

*6 [ATC-41, "Self-diagnosis Function"](#), see No. 14.

*7 [ATC-54, "LAN System Circuit"](#)

*8 [ATC-48, "Operational Check"](#)

*9 [ATC-48, "Operational Check"](#)

*10 [ATC-30, "SYMPTOM TABLE"](#)

*11 [ATC-101, "Intake Sensor Circuit"](#)

*12 [ATC-41, "Self-diagnosis Function"](#), see No. 7

SYSTEM DESCRIPTION

Component Parts

Air mix door control system components are:

- Auto amp.
- Air mix door motor (LCU)

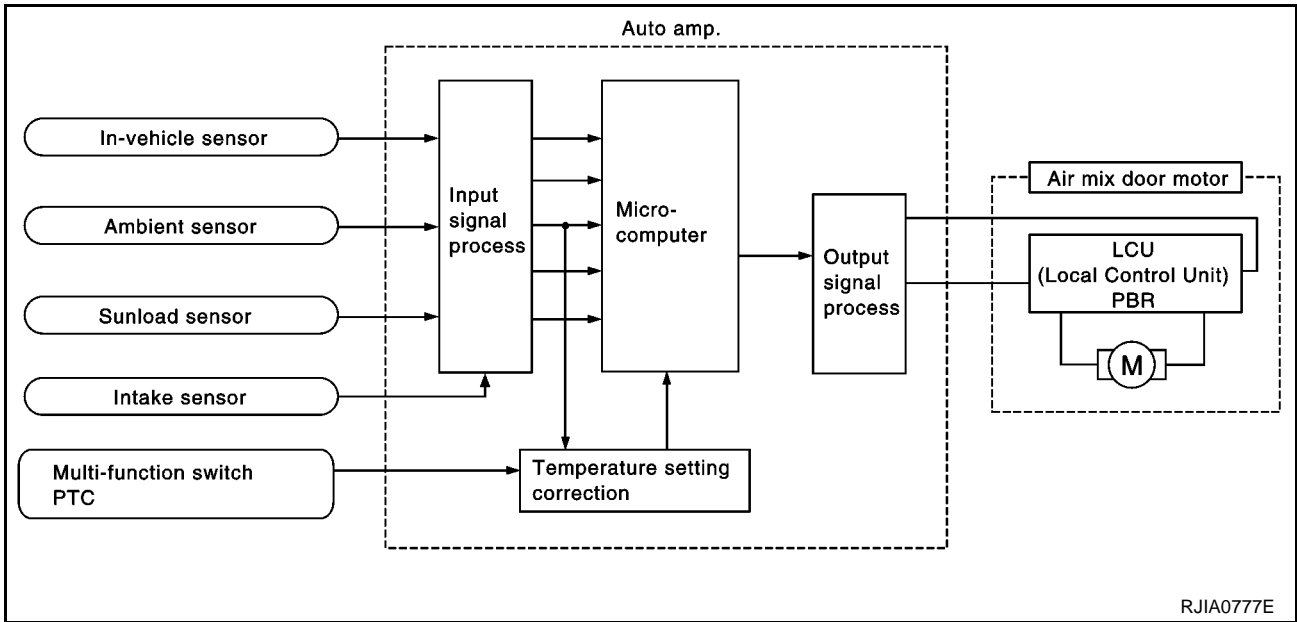
TROUBLE DIAGNOSIS

- A/C LAN system (PBR built-in air mix door motor, mode door motor and intake door motor)
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

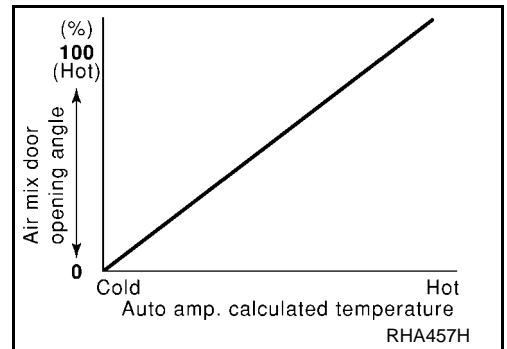
System Operation

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

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



Air Mix Door Control Specification

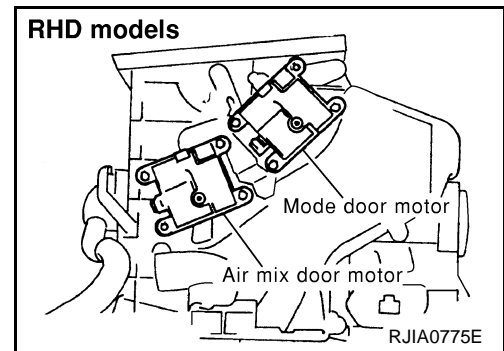
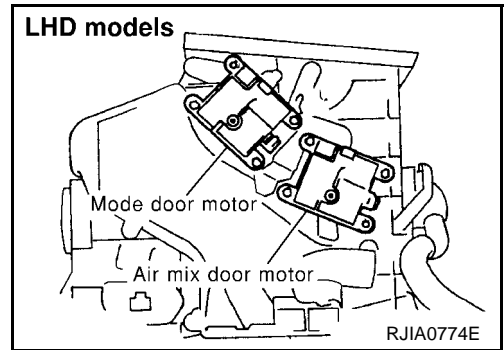


TROUBLE DIAGNOSIS

COMPONENT DESCRIPTION

Air Mix Door Motor

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



DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR

SYMPTOM: Discharge air temperature does not change.

Perform diagnostic procedure for LAN system circuit. Refer to [ATC-54, "LAN System Circuit"](#).

Intake Door Motor Circuit

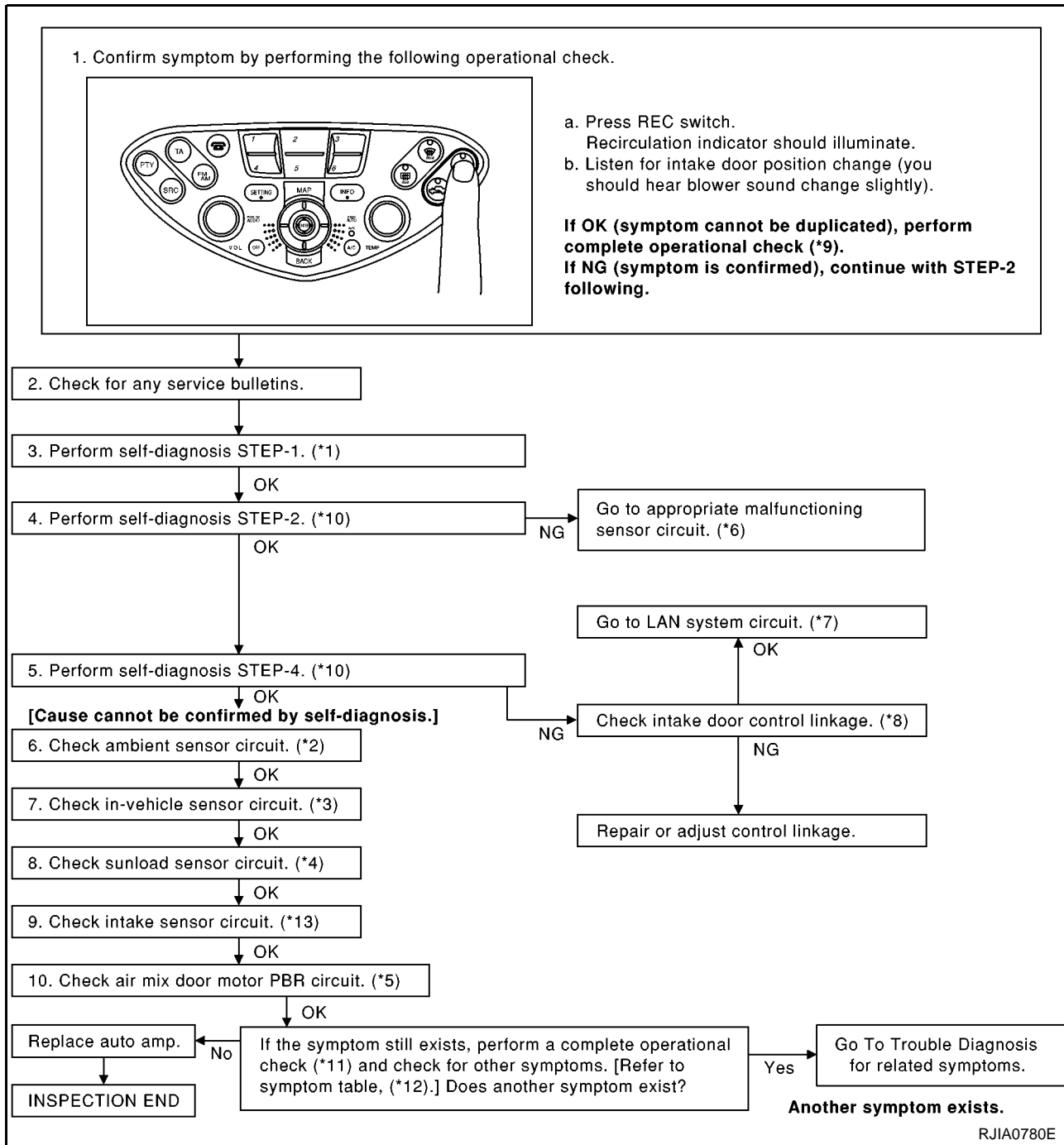
EJS0010W

SYMPTOM:

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

TROUBLE DIAGNOSIS

INSPECTION FLOW



- | | | |
|---|--|--|
| <p>*1 ATC-41, "Self-diagnosis Function", see No.1</p> | <p>*2 ATC-93, "Ambient Sensor Circuit"</p> | <p>*3 ATC-95, "In-vehicle Sensor Circuit"</p> |
| <p>*4 ATC-98, "Sunload Sensor Circuit"</p> | <p>*5 ATC-59, "Air Mix Door Motor Circuit"</p> | <p>*6 ATC-41, "Self-diagnosis Function", see No. 14.</p> |
| <p>*7 ATC-54, "LAN System Circuit"</p> | <p>*8 ATC-64, "COMPONENT DESCRIPTION"</p> | <p>*9 ATC-48, "Operational Check"</p> |
| <p>*10 ATC-41, "Self-diagnosis Function", see No.5 or 7</p> | <p>*11 ATC-48, "Operational Check"</p> | <p>*12 ATC-30, "SYMPTOM TABLE"</p> |
| <p>*13 ATC-101, "Intake Sensor Circuit"</p> | | |

TROUBLE DIAGNOSIS

SYSTEM DESCRIPTION

Component Parts

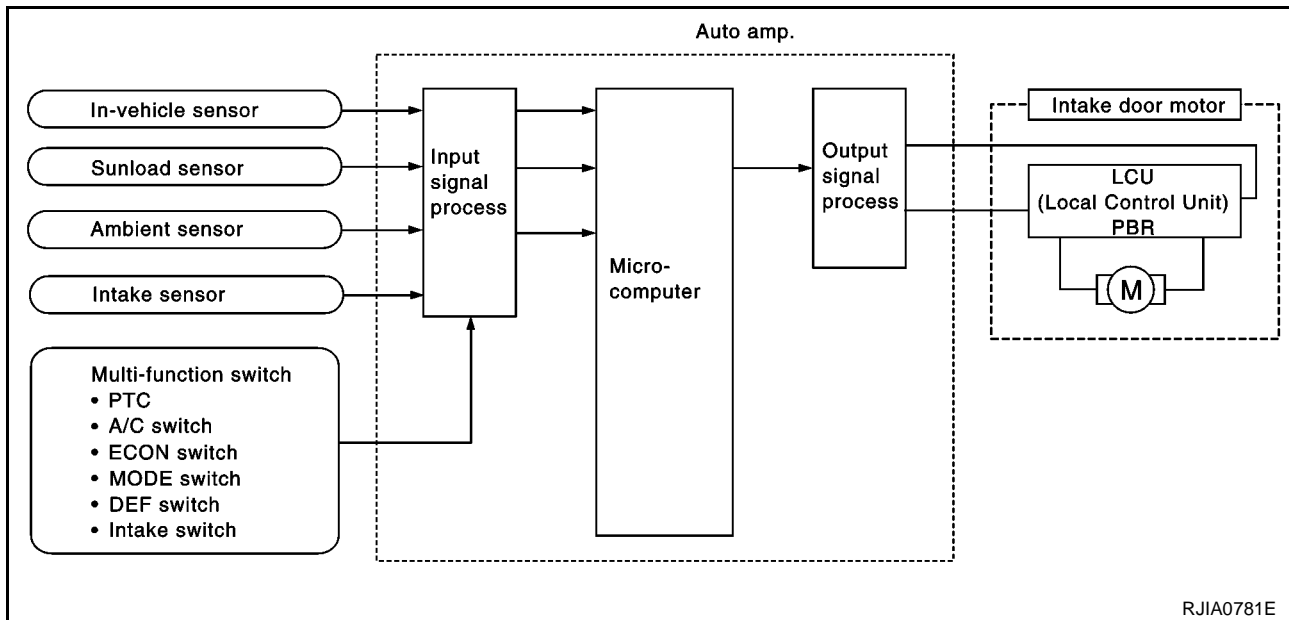
Intake door control system components are:

- Auto amp.
- Intake door motor (LCU)
- A/C LAN system (PBR built-in air mix door motor, mode door motor and intake door motor)
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

System Operation

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

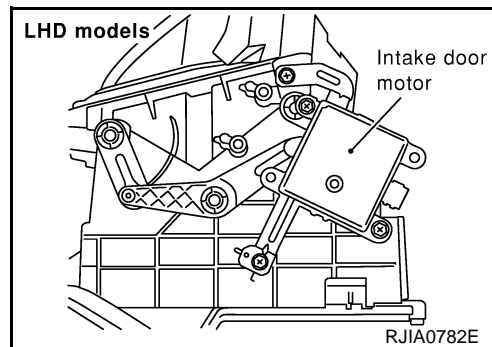
The air mix door motor, mode door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amplifier and each of the motor position sensors are compared by the LCUs in each motor with the existing decision and opening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



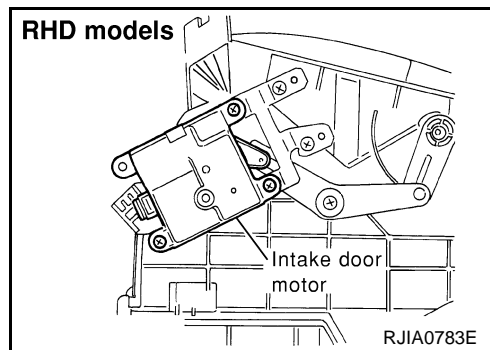
COMPONENT DESCRIPTION

Intake Door Motor

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



TROUBLE DIAGNOSIS



A
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D

DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

SYMPTOM: Intake door motor does not operate normally.

Perform diagnostic procedure for LAN system circuit. Refer to [ATC-54, "LAN System Circuit"](#) .

E

Blower Motor Circuit

EJS0010X

SYMPTOM:

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

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ATC

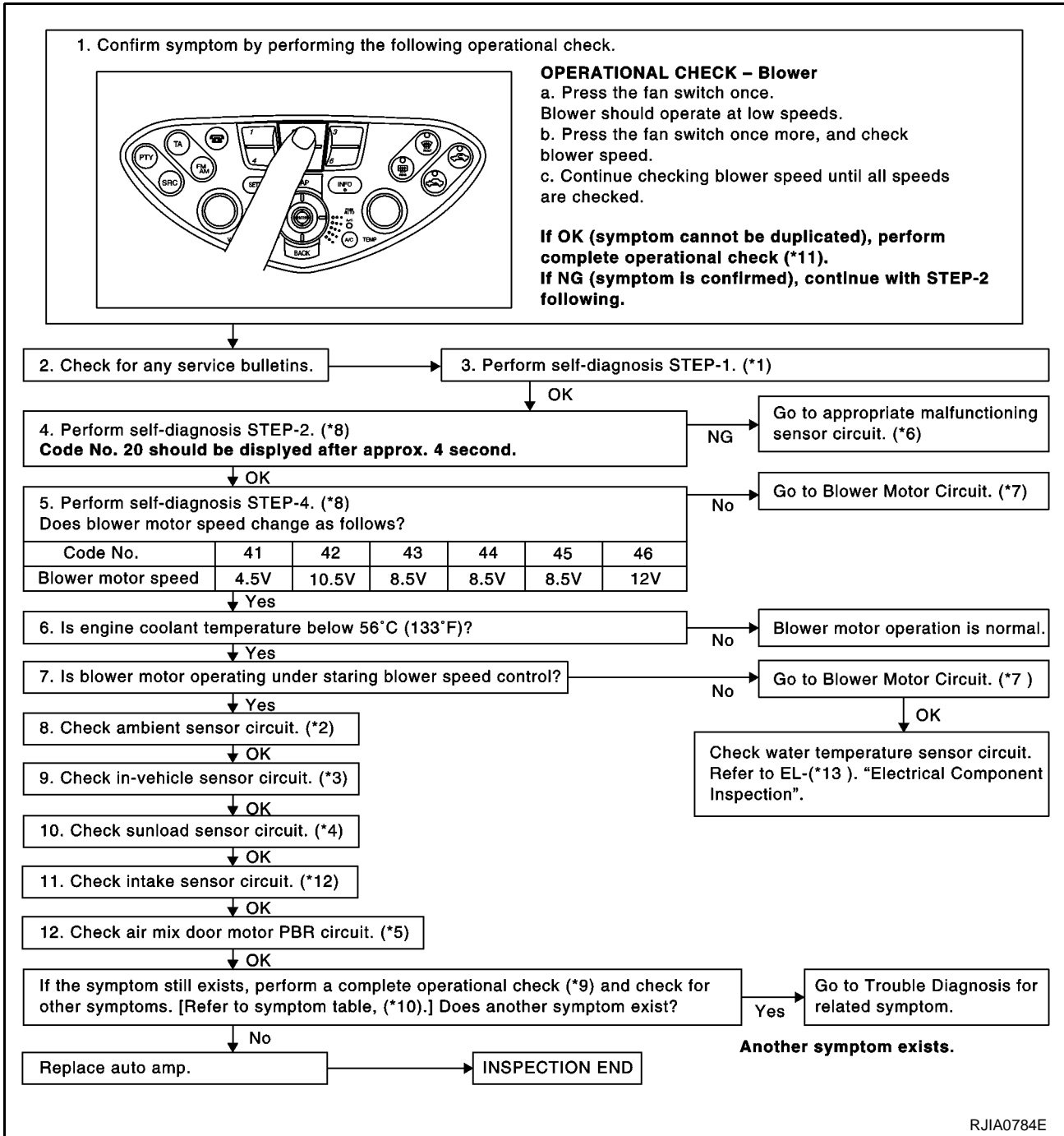
K

L

M

TROUBLE DIAGNOSIS

INSPECTION FLOW



RJIA0784E

- | | | |
|--|---|---|
| *1 ATC-41, "Self-diagnosis Function" | *2 ATC-93, "Ambient Sensor Circuit" | *3 ATC-95, "In-vehicle Sensor Circuit" |
| *4 ATC-98, "Sunload Sensor Circuit" | *5 ATC-59, "Air Mix Door Motor Circuit" | *6 ATC-41, "Self-diagnosis Function" , see No.13. |
| *7 ATC-65, "Blower Motor Circuit" | *8 ATC-41, "Self-diagnosis Function" | *9 ATC-48, "Operational Check" |

TROUBLE DIAGNOSIS

*10 [ATC-30, "SYMPTOM TABLE"](#)

*11 [ATC-48, "Operational Check"](#)

*12 [ATC-101, "Intake Sensor Circuit"](#)

*13 OR engine (With EURO-OBD): [EC-1111, "DTC P0117, P0118 ECT SENSOR"](#)

QR engine (Without EURO-OBD): [EC-1514, "DTC P0117, P0118 ECT SENSOR"](#)

QG engine (With EURO-OBD): [EC-194, "DTC P0117, P0118 ECT SENSOR"](#)

QG engine (Without EURO-OBD): [EC-672, "DTC P0117, P0118 ECT SENSOR"](#)

YD engine: [EC-1798, "DTC P0115 ENGINE COOLANT TEMPERATURE \(ECT\) SENSOR \(CIRCUIT\)"](#)

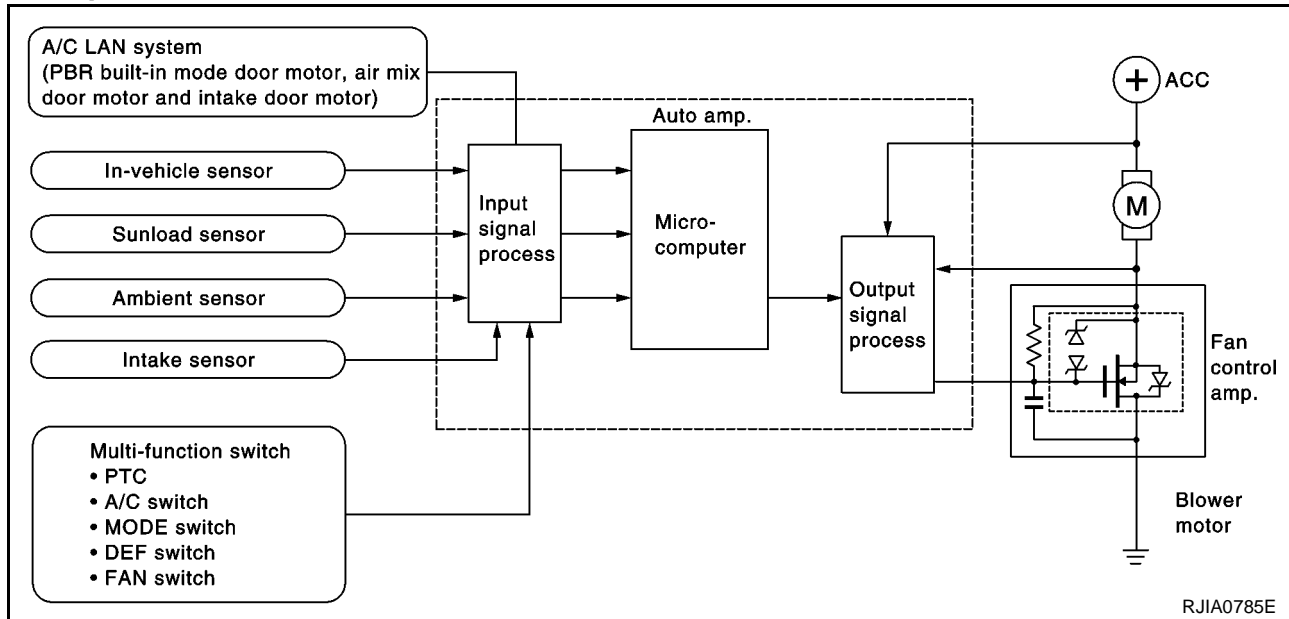
SYSTEM DESCRIPTION

Component Parts

Fan speed control system components are:

- Auto amp.
- A/C LAN system (PBR built-in air mix door motor, mode door motor and intake door motor)
- Fan control amp.
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

System Operation



Automatic Mode

In the automatic mode, the blower motor speed is calculated by the automatic amplifier based on input from the PBR, in-vehicle sensor, sunload sensor, intake sensor and ambient sensor.

The blower motor applied voltage ranges from approximately 4 volts (lowest speed) to 12 volts (highest speed).

The control blower speed (in the range of 4 to 12V), the automatic amplifier supplies a gate voltage to the fan control amplifier. Based on this voltage, the fan control amplifier controls the voltage supplied to the blower motor.

TROUBLE DIAGNOSIS

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 56°C (133°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 as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 56°C (133°F), at which time the blower speed will increase to the objective speed.

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

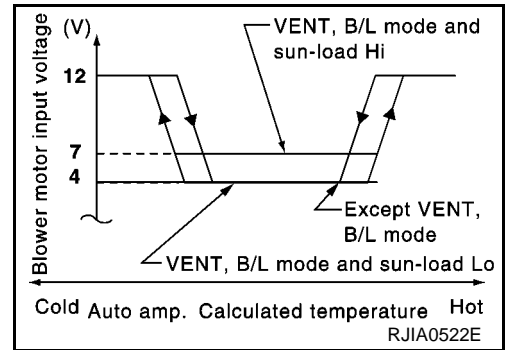
The blower will begin operation momentarily after the A/C button is pushed. The blower speed will gradually rise to the objective speed over a time period of 3 seconds or less (actual time depends on the objective blower speed).

Blower Speed Compensation

Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. The low speed will vary depending on the sunload. During conditions of low or no sunload, the blower low speed is normal low speed (approx. 4V). During high sunload conditions, the auto amp causes the blower fan speed to increase. (Approx. 7V)

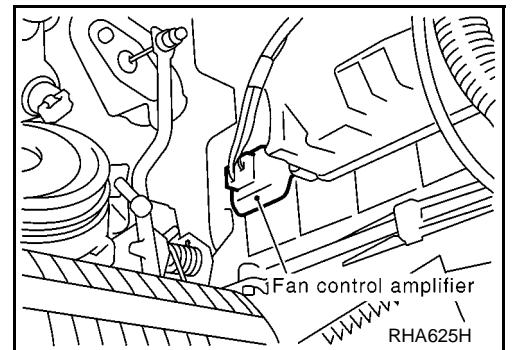
Fan Speed Control Specification



COMPONENT DESCRIPTION

Fan Control Amplifier

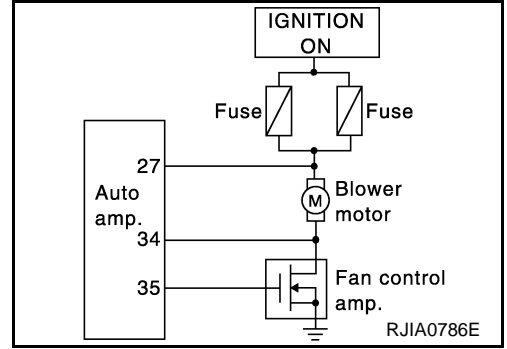
The fan control amplifier is located on the heater & cooling unit. The fan control amp. receives a gate voltage from the auto amp. to steplessly maintain the blower fan motor voltage in the 4 to 12 volt range.



TROUBLE DIAGNOSIS

DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR

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



1. CHECK POWER SUPPLY FOR BLOWER MOTOR

Disconnect blower motor harness connector.

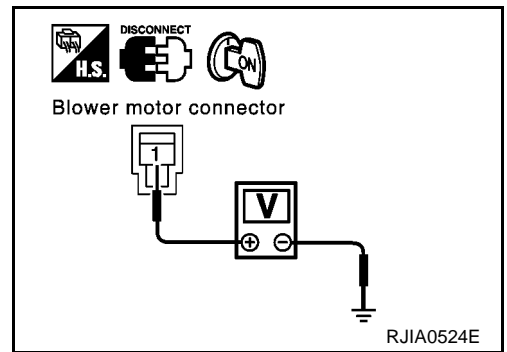
Voltmeter terminal		(-)	Voltage
(+)	Terminal No. (Wire color)		
Blower motor connector	Terminal No. (Wire color)		
M74	1 (L/W)	Body ground	Approx. 12V

OK or NG

OK >> GO TO 2.

NG >> Check power supply circuit and 15A fuses (Nos. 14 and 16, located in the fuse block). Refer to [PG-4, "BATTERY POWER SUPPLY — IGNITION SW. IN ANY POSITION"](#).

- If OK, check for open circuit in wiring harness. Repair or replace as necessary.
- If NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary.



2. CHECK FAN FEED BACK CIRCUIT

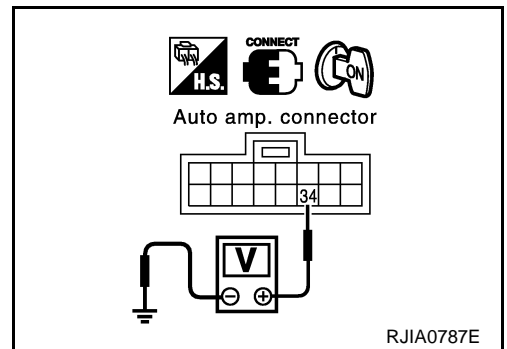
Disconnect auto amp. harness connector.

Voltmeter terminal		(-)	Condition	Voltage
(+)	Terminal No. (Wire color)			
Auto amp. connector	Terminal No. (Wire color)			
M76	34 (L/B)	Body ground	Fan speed: 1st	Approx. 8V

OK or NG

OK >> GO TO 3.

NG >> Repair harness or connector.



3. CHECK BLOWER MOTOR

Refer to COMPONENT INSPECTION.

OK or NG

OK >> GO TO 4.

NG >> Replace blower motor.

TROUBLE DIAGNOSIS

4. CHECK POWER SUPPLY FOR FAN CONTROL AMP.

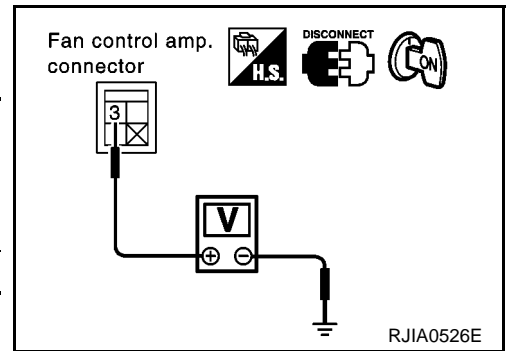
1. Reconnect blower motor connector and auto amp. connector.
2. Disconnect fan control amp. harness connector.

Voltmeter terminal		(-)	Voltage
(+)			
Fan control amp. connector	Terminal No. (Wire color)		
M45	3 (L/B)	Body ground	Approx. 12V

OK or NG

OK >> GO TO 5.

NG >> Repair harness or connector.



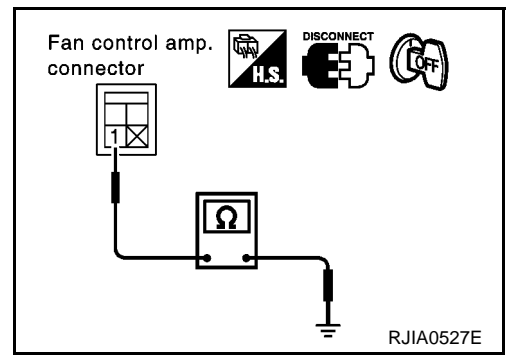
5. CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP.

Ohmmeter terminal		(-)	Continuity
(+)			
Fan control amp. connector	Terminal No. (Wire color)		
M45	1 (B)	Body ground	Yes

OK or NG

OK >> GO TO 6.

NG >> Repair harness or connector.



6. CHECK FOR AUTO AMP. OUTPUT

Reconnect the fan control amp. harness connector.

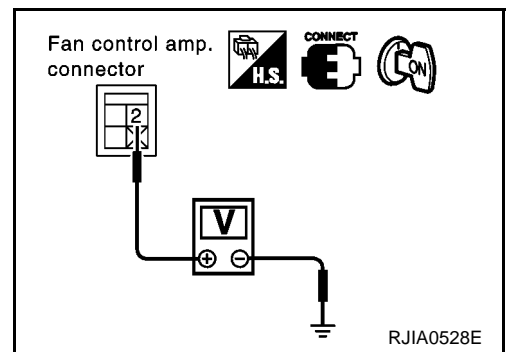
Voltmeter terminal		(-)	Condition	Voltage
(+)				
Fan control amp. connector	Terminal No. (Wire color)			
M45	2 (L/Y)	Body ground	Fan speed: 1 - 4	Approx. 2.5 - 3.5
			Fan speed: 5	Approx. 9.0

OK or NG

OK >> GO TO 9.

NG >> ● If the voltage is less than 2.5V: GO TO 8.

- If the voltage is more than 9.0V: GO TO 7.



TROUBLE DIAGNOSIS

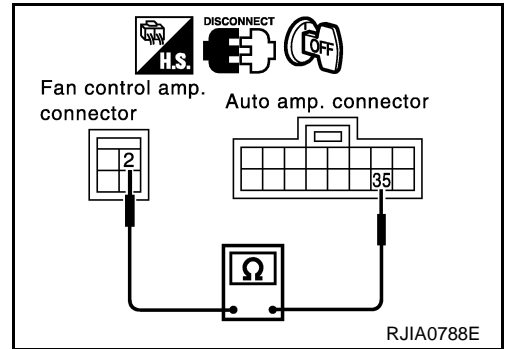
7. CHECK CIRCUIT CONTINUITY BETWEEN AUTO AMP. AND FAN CONTROL AMP.

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

Ohmmeter terminal				Continuity
Auto amp.		Fan control amp.		
Connector	Terminal (Wire color)	Connector	Terminal (Wire color)	
M76	35 (L/Y)	M45	2 (L/Y)	Yes

OK or NG

- OK >> Replace fan control amp.
- NG >> Repair harness or connector.



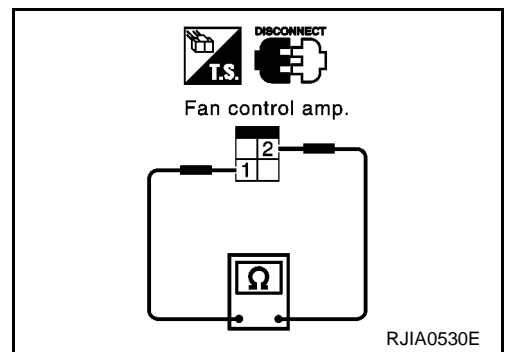
8. CHECK FAN CONTROL AMP.

Disconnect the fan control amp. harness connector.

Ohmmeter terminal				Continuity
(+) (+)		(-) (-)		
Fan control amp. connector	Terminal No.	Fan control amp. connector	Terminal No.	
M45	2	M45	1	Yes

OK or NG

- OK >> GO TO 9.
- NG >> Replace fan control amp.

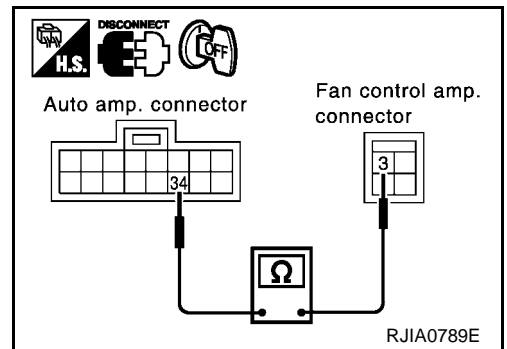


9. CHECK CIRCUIT CONTINUITY BETWEEN AUTO AMP. AND FAN CONTROL AMP.

Ohmmeter terminal				Continuity
(+) (+)		(-) (-)		
Auto amp. connector	Terminal No. (Wire color)	Fan control amp. Connector	Terminal No. (Wire color)	
M76	34 (L/B)	M45	3 (L/B)	Yes

OK or NG

- OK >> Replace auto amp.
- NG >> Repair harness or connector.

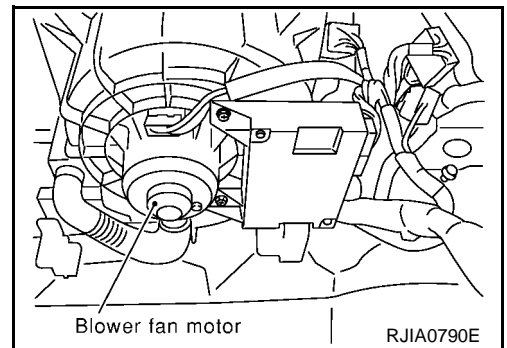


COMPONENT INSPECTION

Blower Motor

Confirm smooth rotation of the blower motor.

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



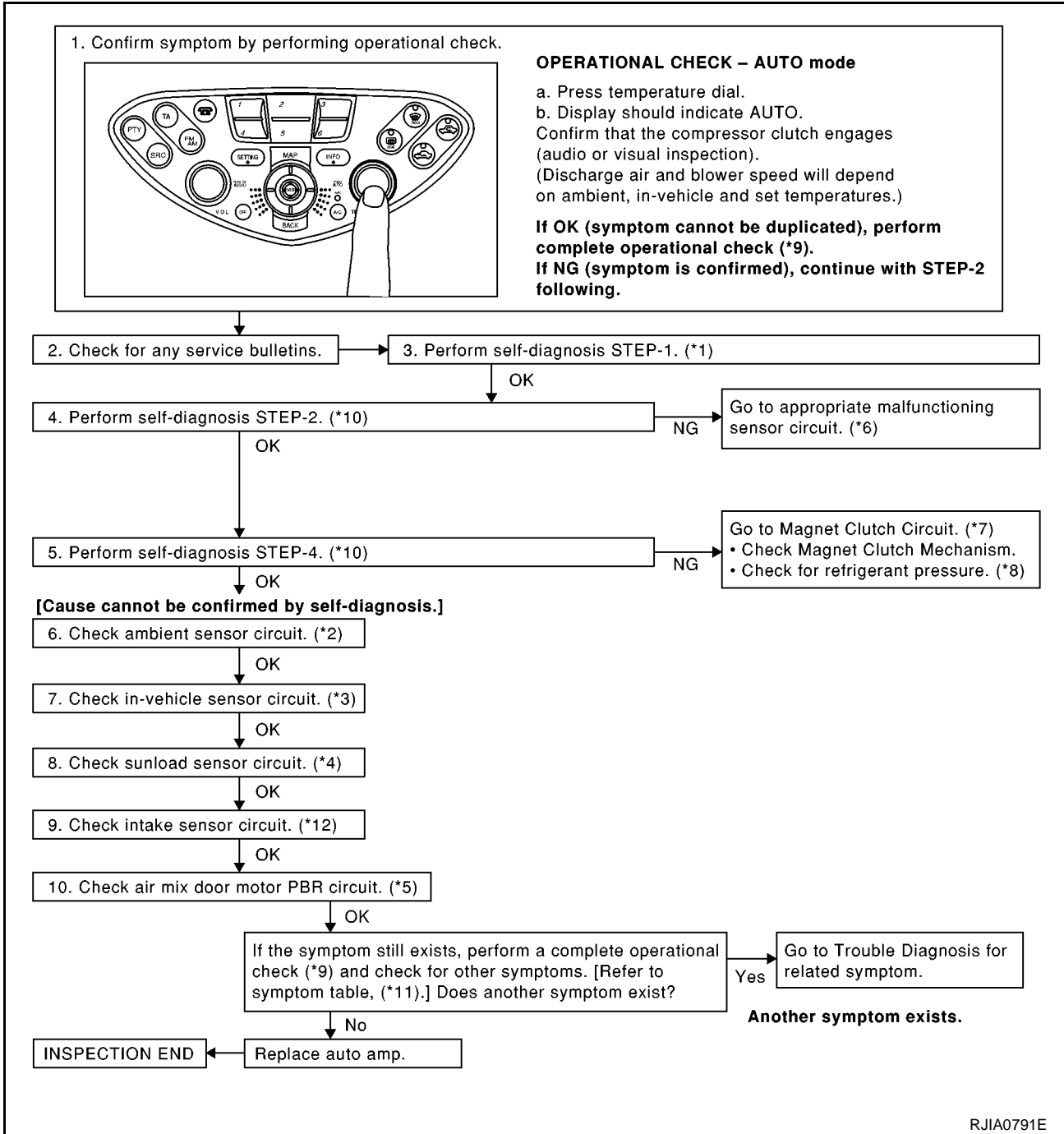
TROUBLE DIAGNOSIS

EJS0010Y

Magnet Clutch Circuit

SYMPTOM: Magnet clutch does not engage.

INSPECTION FLOW



RJIA0791E

*1 [ATC-41, "Self-diagnosis Function"](#), see No.1.

*2 [ATC-93, "Ambient Sensor Circuit"](#)

*3 [ATC-95, "In-vehicle Sensor Circuit"](#)

*4 [ATC-98, "Sunload Sensor Circuit"](#)

*5 [ATC-59, "Air Mix Door Motor Circuit"](#)

*6 [ATC-41, "Self-diagnosis Function"](#), see No. 14.

*7 [ATC-72, "Magnet Clutch Circuit"](#)

*8 [ATC-85, "TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE"](#)

*9 [ATC-48, "Operational Check"](#)

*10 [ATC-41, "Self-diagnosis Function"](#) see No.7.

*11 [ATC-30, "SYMPTOM TABLE"](#)

*12 [ATC-101, "Intake Sensor Circuit"](#)

SYSTEM DESCRIPTION

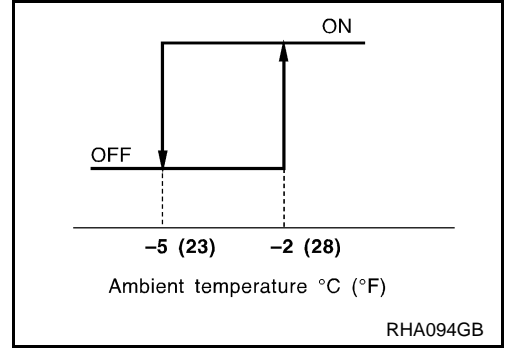
Auto amplifier controls compressor operation by ambient temperature and signal from ECM.

ATC-72

TROUBLE DIAGNOSIS

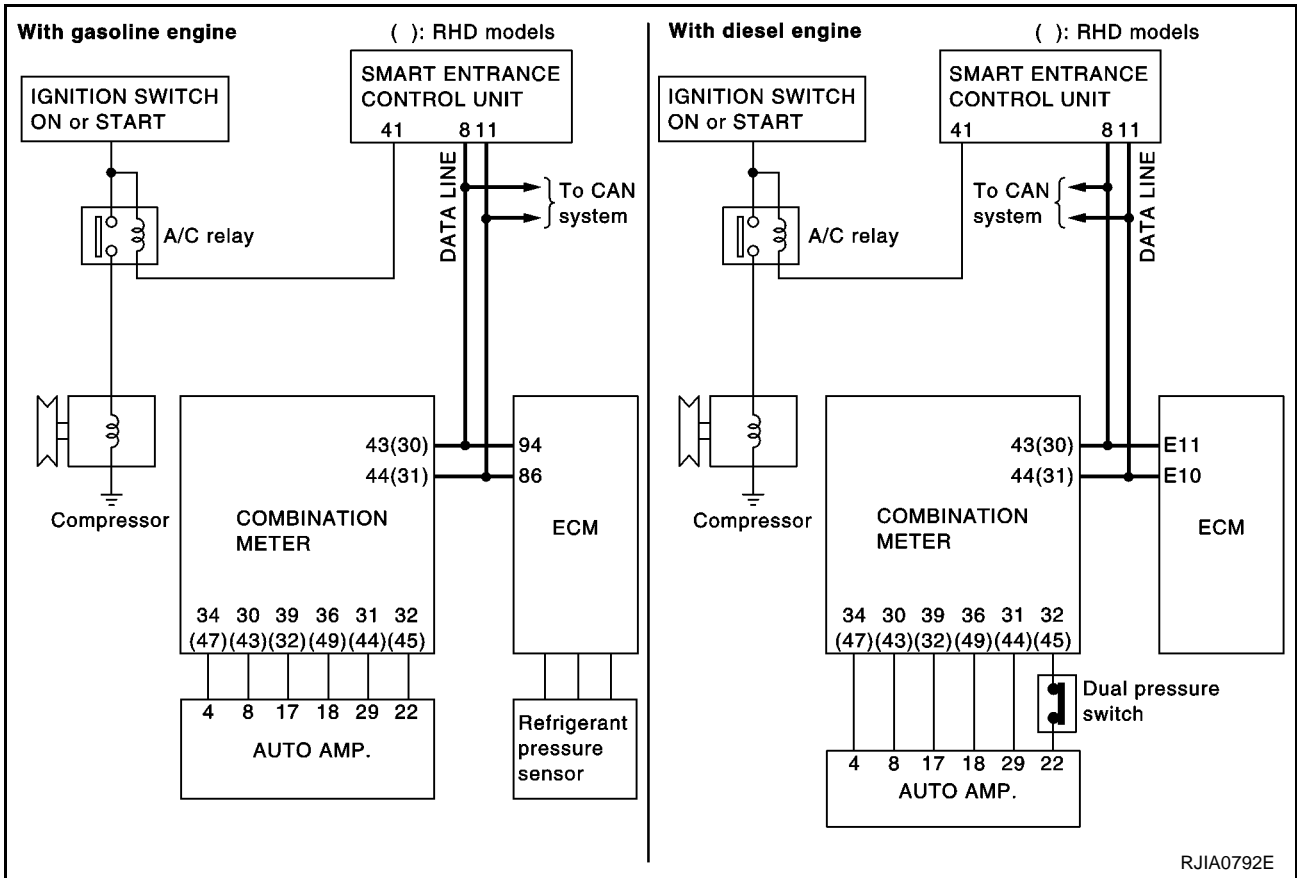
Low Temperature Protection Control

Auto amplifier will turn the compressor ON or OFF as determined by a signal detected by ambient sensor. When ambient temperatures are greater than -2°C (28°F), the compressor turns ON. The compressor turns OFF when ambient temperatures are less than -5°C (23°F).



DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



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ATC

TROUBLE DIAGNOSIS

1. CHECK POWER SUPPLY FOR COMPRESSOR

Disconnect compressor harness connector.

Voltmeter terminal		(-)	Voltage
(+) Terminal No. (Wire color)			
Compressor connector	1 (L/R)	Body ground	Battery voltage

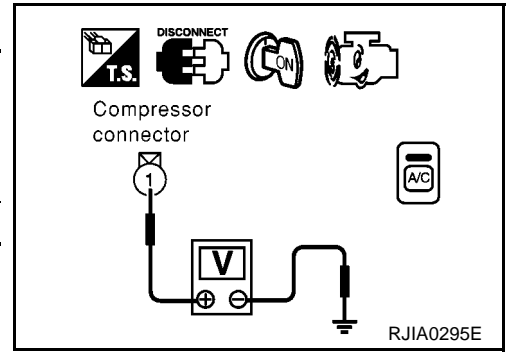
OK or NG

OK >> Check magnet clutch coil.

1. If NG, replace magnet clutch. Refer to [ATC-135](#), "[Compressor Clutch](#)".

2. Go to self-diagnosis function confirmation procedure [ATC-42](#), "[FUNCTION CONFIRMATION PROCEDURE](#)" and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is normal.

NG >> Disconnect A/C relay. And GO TO 2.



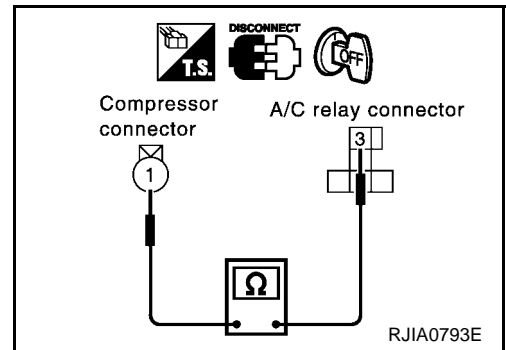
2. CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY AND COMPRESSOR

Ohmmeter terminal				Continuity
(+) Terminal No. (Wire color)		(-) Terminal No. (Wire color)		
A/C relay connector	3 (L/R)	Compressor connector	1 (L/R)	Yes

OK or NG

OK >> Check harness for short. And GO TO 3.

NG >> Repair harness or connector.



3. CHECK POWER SUPPLY FOR A/C RELAY

Disconnect A/C relay.

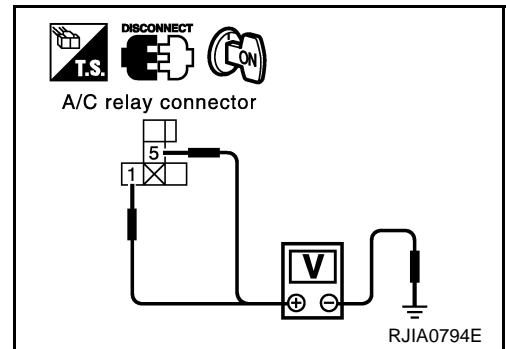
Voltmeter terminal		(-)	Voltage
(+) Terminal No. (Wire color)			
A/C relay connector	1 (L/Y)	Body ground	Battery voltage
E17	5 (L/Y)		

OK or NG

OK >> GO TO 4.

NG >> Check power supply circuit and 10A (No.15) fuse at fuse block. Refer to [PG-4](#), "[BATTERY POWER SUPPLY — IGNITION SW. IN ANY POSITION](#)".

- If OK, check for open circuit in wiring harness. Repair or replace as necessary.
- If NG, replace fuse and check wiring harness for short circuit. Repair or replace as necessary.



TROUBLE DIAGNOSIS

4. CHECK A/C RELAY AFTER DISCONNECTING IT

Refer to [ATC-79, "A/C Relay"](#) .

OK or NG

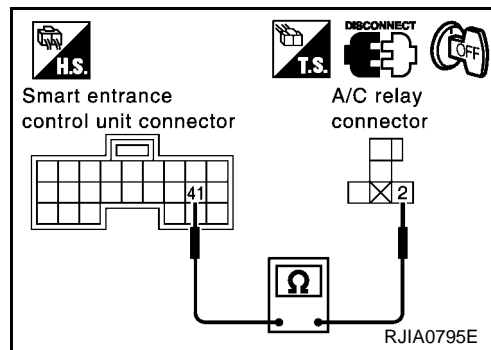
OK >> Reconnect A/C relay. And GO TO 5.

NG >> 1. Replace A/C relay.

2. Go to self-diagnosis function confirmation procedure: [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is normal.

5. CHECK COIL SIDE CIRCUIT OF A/C RELAY

Ohmmeter terminal				Continuity
(+)		(-)		
A/C relay connector	Terminal No. (Wire color)	Smart entrance control unit connector	Terminal No. (Wire color)	
E17	2 (L)	M42	41 (L)	Yes



OK or NG

OK >> GO TO 6.

NG >> Repair harness or connector.

6. CHECK AMBIENT SENSOR

Refer to [ATC-93, "Ambient Sensor Circuit"](#) .

OK or NG

OK >> ● With gasoline engine: GO TO 7.

● With diesel engine: GO TO 8.

NG >> Repair or replace the malfunctioning part(s).

7. CHECK REFRIGERANT PRESSURE SENSOR (WITH GASOLINE ENGINE)

Refer to [ATC-79, "Refrigerant Pressure Sensor \(With Gasoline Engine\)"](#) .

OK or NG

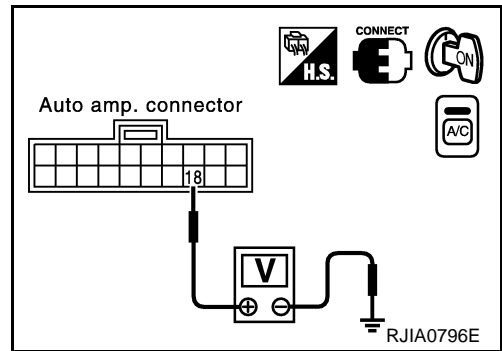
OK >> GO TO 8.

NG >> Repair or replace the malfunctioning part(s).

TROUBLE DIAGNOSIS

8. CHECK COMPRESSOR FEED BACK SIGNAL

Voltmeter terminal		(-)	Condition	Voltage
(+) Auto amp. connector				
Auto amp. connector	Terminal No. (Wire color)			
M75	18 (BR/W)	Body ground	A/C SW: ON	Approx. 0V
			A/C SW: ON (When refrigerant pressure sensor connector is disconnected)	Approx. 4.8V

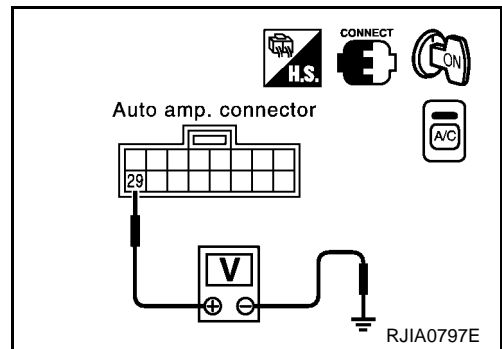


OK or NG

- OK >> GO TO 9.
- NG >> GO TO 16.

9. CHECK FAN ON SIGNAL

Voltmeter terminal		(-)	Condition	Voltage
(+) Auto amp. connector				
Auto amp. connector	Terminal No. (Wire color)			
M76	29 (LG/B)	Body ground	Blower fan: ON	Approx. 0V
			Blower fan: OFF	Approx. 4.8V

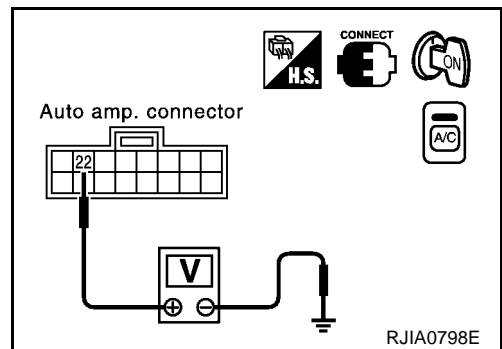


OK or NG

- OK >> GO TO 10.
- NG >>
 - If the voltage is approx. 4.8V when the blower fan is ON: Replace the auto amp.
 - If the voltage is approx. 0V when the blower fan is OFF: GO TO 17.

10. CHECK COMPRESSOR ON SIGNAL

Voltmeter terminal		(-)	Condition	Voltage
(+) Auto amp. connector				
Auto amp. connector	Terminal No. (Wire color)			
M76	22 (L/R)	Body ground	A/C SW: ON	Approx. 0V
			A/C SW: OFF	Approx. 4.8V



OK or NG

- OK >> GO TO 11.
- NG >>
 - If the voltage is approx. 4.8V when the A/C switch is ON: Replace the auto amp.
 - If the voltage is approx. 0V when the A/C switch is OFF.
 - With gasoline engine: GO TO 18.
 - With diesel engine: GO TO 13.

TROUBLE DIAGNOSIS

11. CHECK MULTIPLEX COMMUNICATION CIRCUIT

Refer to multiplex communication circuit. [ATC-102, "Multiplex Communication Circuit"](#)

OK or NG

- OK >> GO TO 12.
- NG >> Repair harness or connector.

12. CHECK CAN CIRCUIT

Refer to CAN communication. [DI-7, "CAN Communication"](#) (LHD models), [DI-35, "CAN Communication"](#) (RHD models).

OK or NG

- OK >> INSPECTION END.
- NG >> Repair or replace malfunctioning part(s).

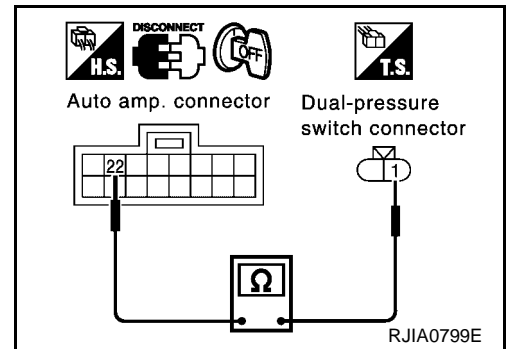
13. CHECK CIRCUIT CONTINUITY BETWEEN DUAL-PRESSURE SWITCH AND AUTO AMP. (WITH DIESEL ENGINE)

Disconnect dual-pressure switch connector and auto amp. connector.

Ohmmeter terminal				Continuity
(+)		(-)		
Dual-pressure switch connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
E46	1 (PU)	M76	22 (L/R)	Yes

OK or NG

- OK >> GO TO 14.
- NG >> Repair harness or connector.



14. CHECK DUAL-PRESSURE SWITCH CIRCUIT (WITH DIESEL ENGINE)

Refer to [ATC-80, "Dual-Pressure Switch \(With Diesel Engine\)"](#) .

OK or NG

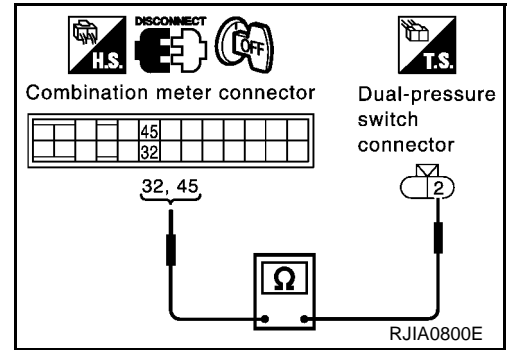
- OK >> GO TO 15.
- NG >> Repair or replace malfunctioning part(s).

TROUBLE DIAGNOSIS

15. CHECK CIRCUIT CONTINUITY BETWEEN DUAL-PRESSURE SWITCH AND COMBINATION METER (WITH DIESEL ENGINE)

Disconnect combination meter connector.

Ohmmeter terminal				Continuity
(+)		(-)		
Dual-pressure switch connector	Terminal No. (Wire color)	Combination meter connector	Terminal No. (Wire color)	
E46	2 (L/R)	M37	LHD models: 32 RHD models: 45 (Gasoline engine: L/R, Diesel engine: PU)	Yes



OK or NG

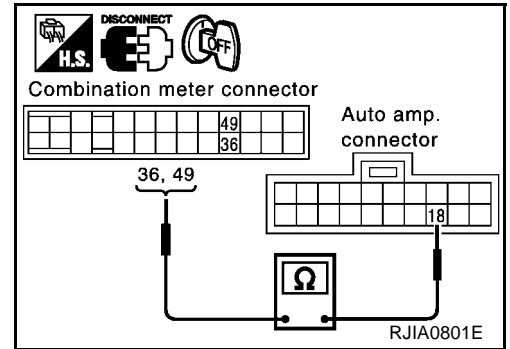
OK >> GO TO 14.

NG >> Repair harness or connector.

16. CHECK CIRCUIT CONTINUITY BETWEEN COMBINATION METER AND AUTO AMP.

Disconnect combination meter connector and auto amp. connector.

Ohmmeter terminal				Continuity
(+)		(-)		
Combination meter connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M37	LHD models: 36 (BR/W) RHD models: 49 (BR/W)	M75	18 (BR/W)	Yes



OK or NG

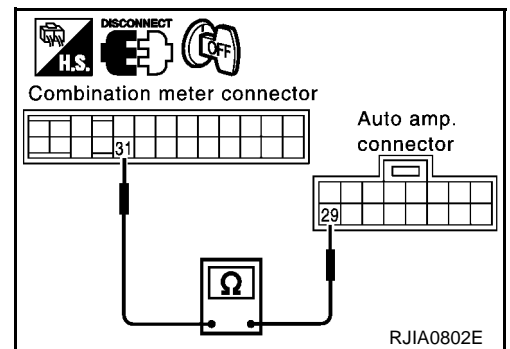
OK >> GO TO 11.

NG >> Repair harness or connector.

17. CHECK CIRCUIT CONTINUITY BETWEEN COMBINATION METER AND AUTO AMP.

Disconnect combination meter connector and auto amp. connector.

Ohmmeter terminal				Continuity
(+)		(-)		
Combination meter connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M37	31 (LG/B)	M76	29 (LG/B)	Yes



OK or NG

OK >> GO TO 11.

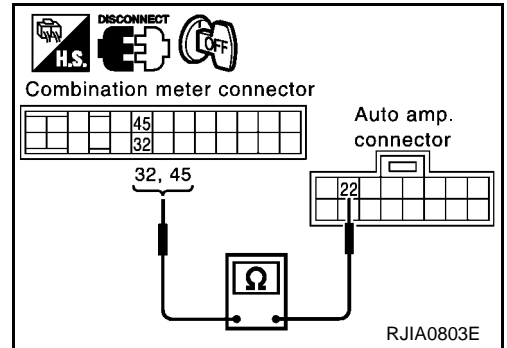
NG >> Repair harness or connector.

TROUBLE DIAGNOSIS

18. CHECK CIRCUIT CONTINUITY BETWEEN COMBINATION METER AND AUTO AMP. (WITH GASOLINE ENGINE)

Disconnect combination meter connector and auto amp. connector.

Voltmeter terminal				Continuity
(+)		(-)		
Combination meter connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M37	LHD models: 32 RHD models: 45 (With gasoline engine: L/R, With diesel: PU)	M76	22 (L/R)	Yes



OK or NG

OK >> GO TO 11.

NG >> Repair harness or connector.

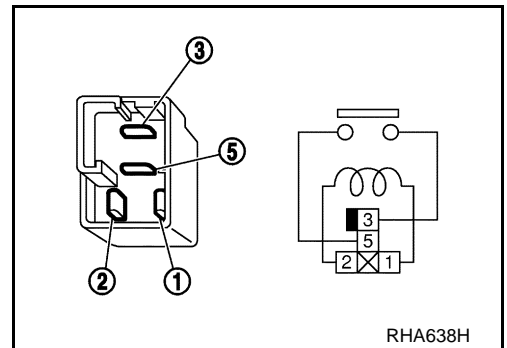
COMPONENT INSPECTION

A/C Relay

Check continuity between terminal Nos. 3 and 5.

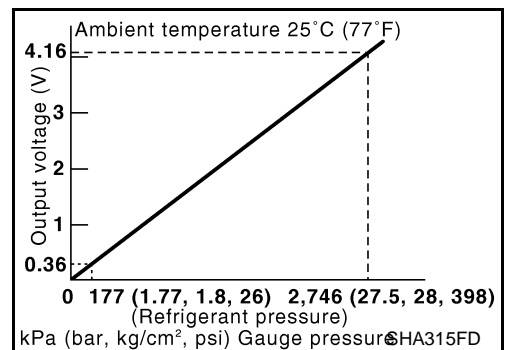
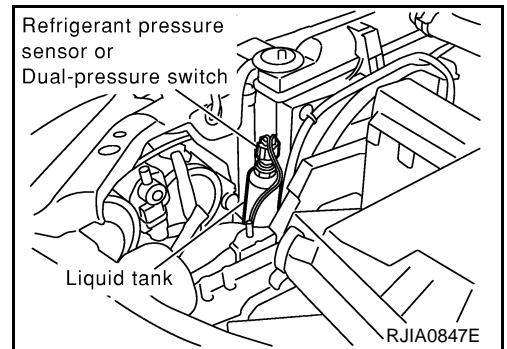
Conditions	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

If NG, replace relay.



Refrigerant Pressure Sensor (With Gasoline Engine)

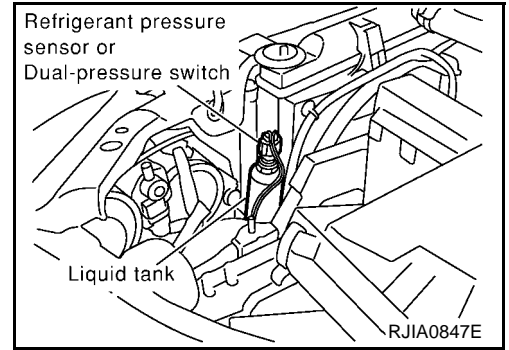
The refrigerant pressure sensor is attached to the liquid tank (condenser).



TROUBLE DIAGNOSIS

Dual-Pressure Switch (With Diesel Engine)

	Compressor: ON KPa (bar, kg/cm ² , psi)	Compressor: OFF KPa (bar, kg/cm ² , psi)
Low-pressure side	186 (1.86, 1.9, 27)	177 (1.77, 1.8, 26)
High-pressure side	1,569 (15.7, 16, 228)	2,746 (27.5, 28, 398)



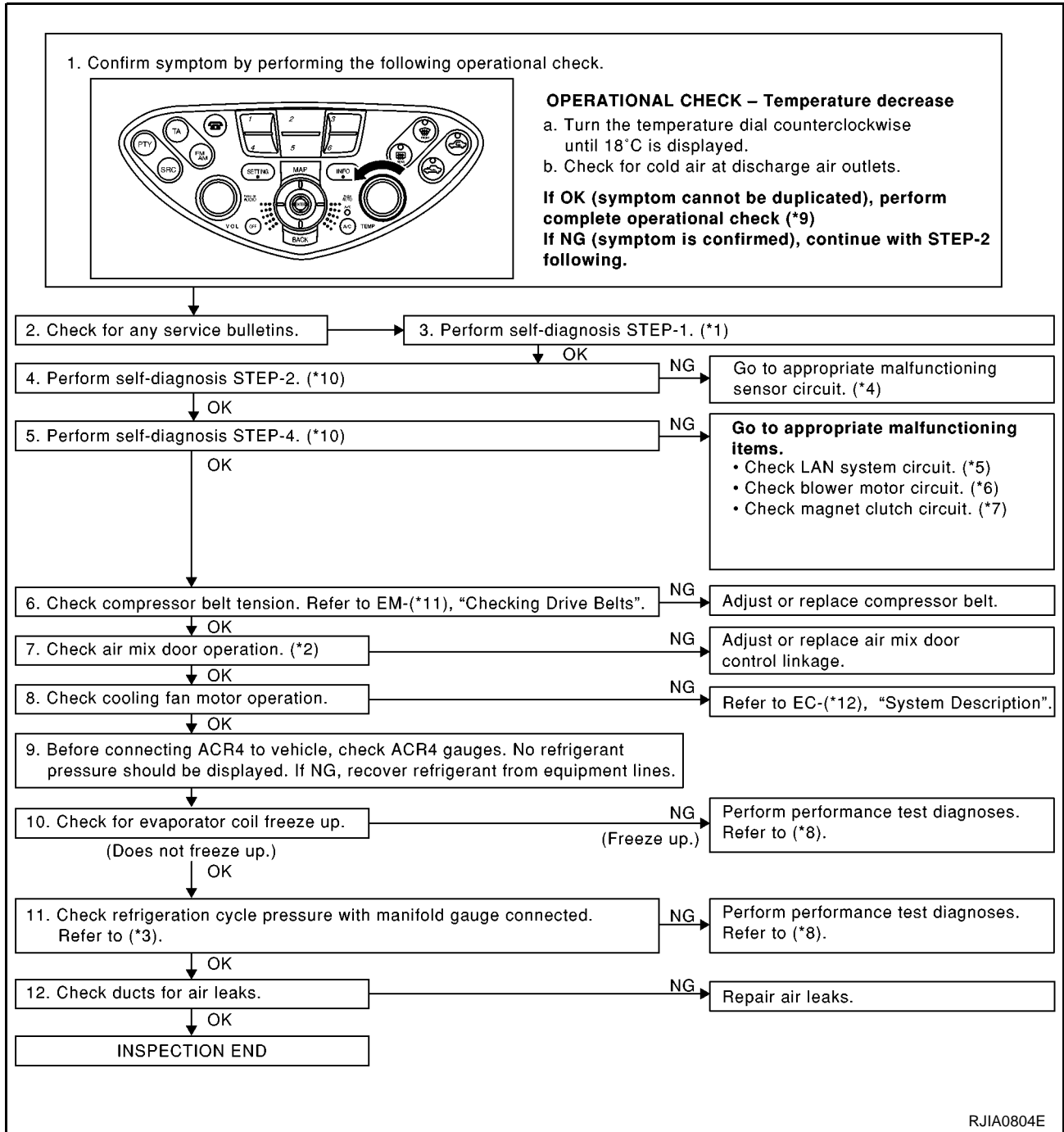
Insufficient Cooling

SYMPTOM: Insufficient cooling

EJS0010Z

TROUBLE DIAGNOSIS

INSPECTION FLOW



*1 [ATC-41, "Self-diagnosis Function"](#), see No.1.

*2 [ATC-59, "Air Mix Door Motor Circuit"](#)

*3 [ATC-84, "Test Reading \(Gasoline Engine\)"](#)
[ATC-84, "Test Reading \(Diesel Engine\)"](#)

*4 [ATC-47, "AUXILIARY MECHANISM: TEMPERATURE SETTING TRIMMER" STEP6.](#)

*5 [ATC-54, "LAN System Circuit"](#)

*6 [ATC-65, "Blower Motor Circuit"](#)

RJIA0804E

TROUBLE DIAGNOSIS

*7 [ATC-72, "Magnet Clutch Circuit"](#)

*8 [ATC-82, "PERFORMANCE TEST DIAGNOSES"](#)

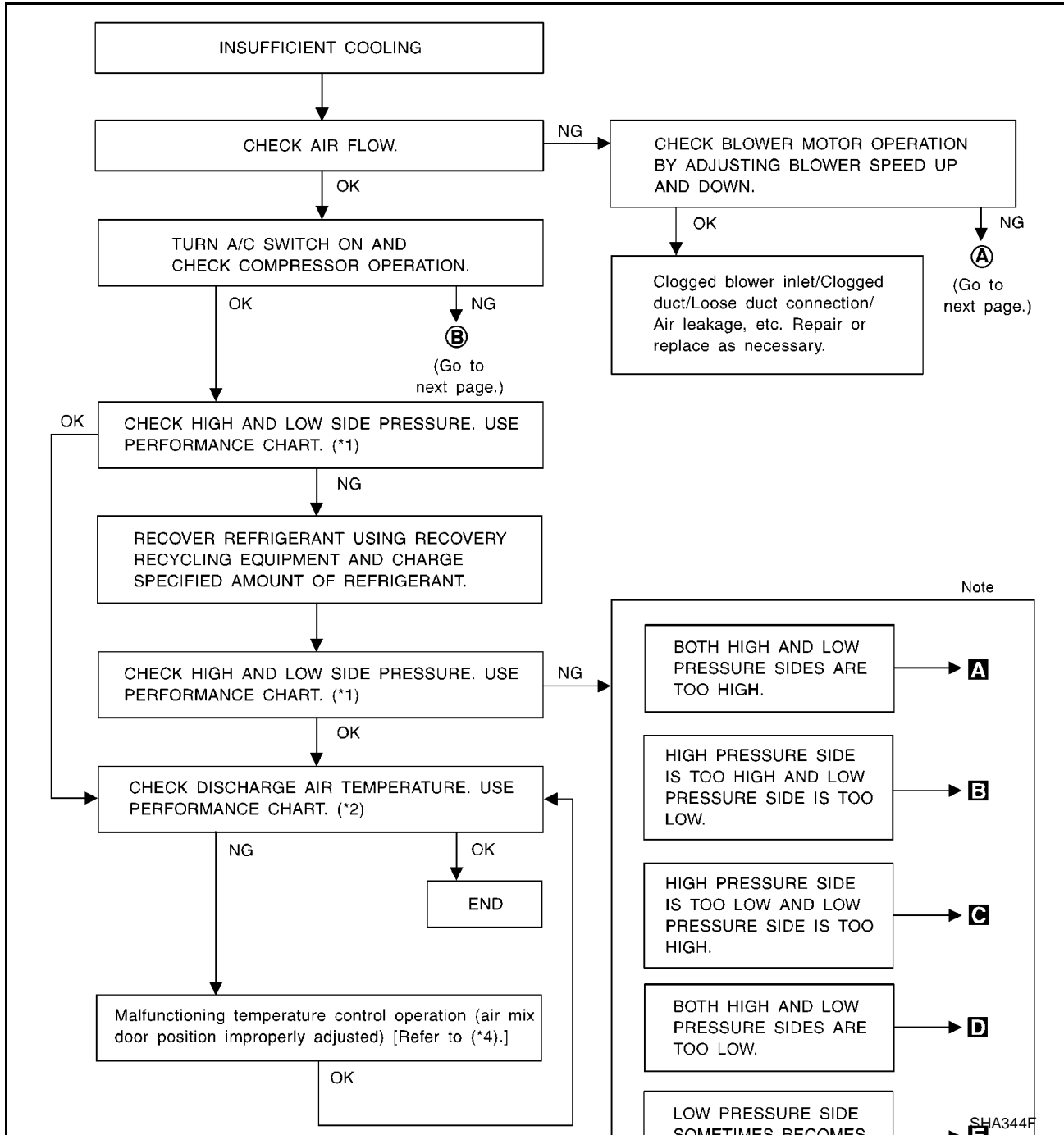
*9 [ATC-48, "Operational Check"](#)

*10 [ATC-41, "Self-diagnosis Function"](#), see No.5 or 7.

*11 QR engine: [EM-112, "Checking Drive Belts"](#)
 QG engine: [EM-14, "Checking Drive Belts"](#)
 YD engine: [EM-211, "Checking Drive Belts"](#)

*12 QR engine: [CO-27, "COOLING SYSTEM"](#)
 QG engine: [CO-7, "COOLING SYSTEM"](#)
 YD engine: [CO-47, "COOLING SYSTEM"](#)

PERFORMANCE TEST DIAGNOSES



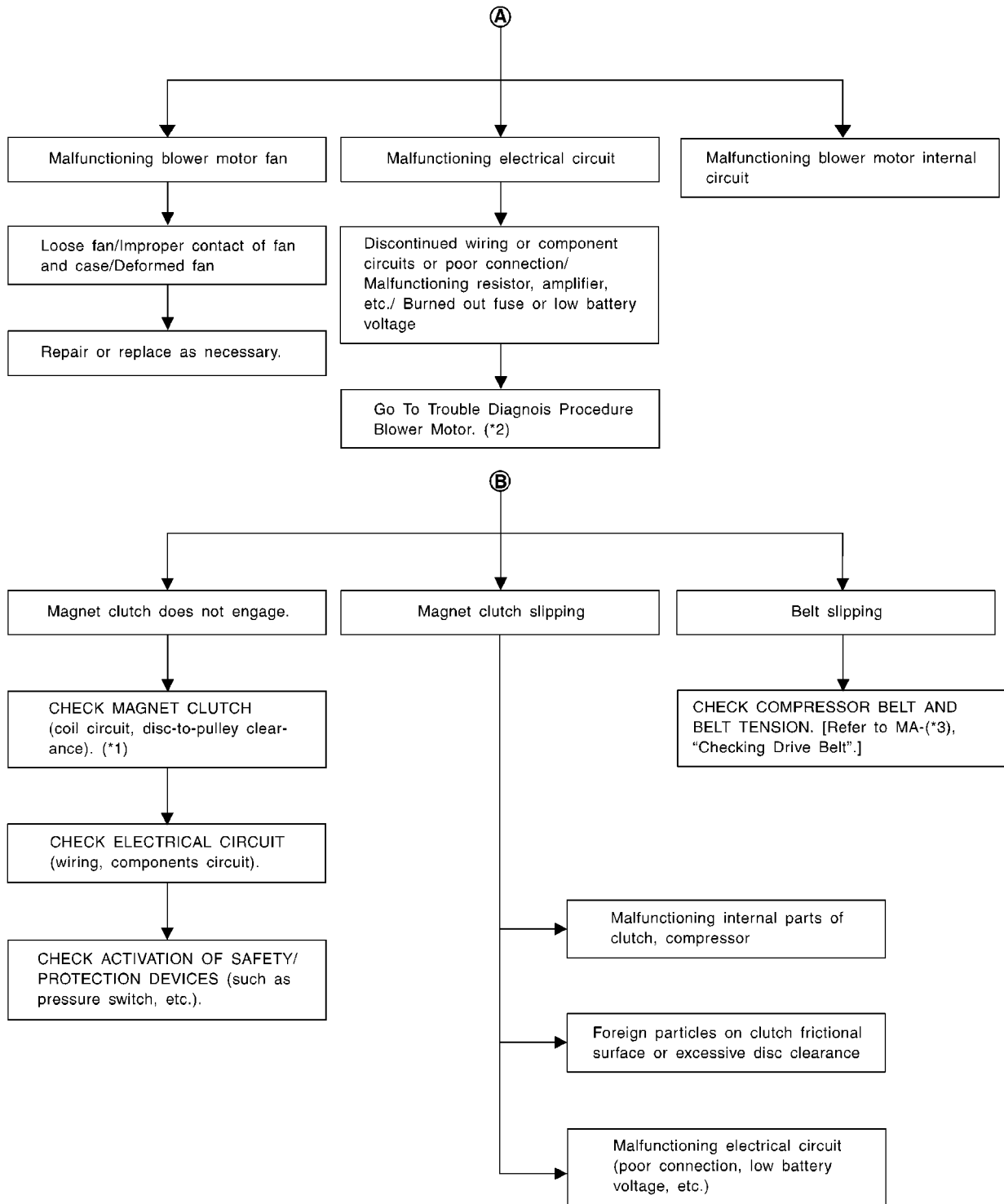
*1 [ATC-84, "PERFORMANCE CHART"](#)

*2 [ATC-84, "PERFORMANCE CHART"](#)

*3 [ATC-85, "TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE"](#)

*4 [ATC-59, "Air Mix Door Motor Circuit"](#)

TROUBLE DIAGNOSIS



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*1 [ATC-135, "Compressor Clutch"](#)

*2 [ATC-65, "Blower Motor Circuit"](#)


*3 QR engine: [EM-112, "Tension Adjustment"](#)
 QG engine: [EM-15, "Tension Adjustment"](#)
 YD engine: [EM-211, "Tension Adjustment"](#)

TROUBLE DIAGNOSIS

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 windows	Open
Hood	Open
TEMP.	Max. COLD
Mode switch	(Ventilation) set
Intake switch	(Recirculation) set
 (blower) speed	Max. speed set
Engine speed	Idle speed

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

Test Reading (Gasoline Engine)

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	25 (77)	10.0 - 11.6 (50 - 53)
	30 (86)	13.9 - 16.2 (57 - 61)
	35 (95)	17.8 - 21.4 (64 - 71)
60 - 70	25 (77)	11.6 - 13.9 (53 - 57)
	30 (86)	16.2 - 18.9 (61 - 66)
	35 (95)	21.4 - 24.5 (71 - 76)

Ambient Air Temperature-to-operating 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)		
50 - 70	30 (86)	980 - 1,180 (9.8 - 11.8, 9.99 - 12.04, 142 - 171)	230 - 270 (2.3 - 2.7, 2.35 - 2.75, 33 - 39)
	35 (95)	1,180 - 1,390 (11.8 - 13.9, 12.04 - 14.18, 171 - 202)	260 - 310 (2.6 - 3.1, 2.65 - 3.16, 38 - 45)
	40 (104)	1,400 - 1,580 (14.0 - 15.8, 14.28 - 16.12, 203 - 229)	300 - 350 (3.0 - 3.5, 3.06 - 3.57, 44 - 51)

Test Reading (Diesel Engine)

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)	6.5 - 9.0 (44 - 48)
	25(77)	12 - 14(54 - 57)
	30 (86)	15.5 - 18.8 (60 - 66)
	35 (95)	20.4 - 24.0 (69 - 75)

TROUBLE DIAGNOSIS

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
60 - 70	20 (68)	9.0 - 11.0 (48 - 52)
	25(77)	14.0 - 16.5 (57 - 62)
	30 (86)	18.8 - 21.5 (66 - 71)
	35 (95)	24 - 27 (75 - 81)

Ambient Air Temperature-to-operating 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)		
50 - 70	20 (68)	765 - 922 (7.65 - 9.22, 7.8 - 9.4, 111 - 134)	177 - 226 (1.77 - 2.26, 1.8 - 2.3, 26 - 33)
	25 (77)	922 - 1,020 (9.22 - 10.20, 9.4 - 10.4, 134 - 148)	196 - 245 (1.96 - 2.45, 2.0 - 2.5, 28 - 36)
	30 (86)	1,177 - 1,451 (11.77 - 14.51, 12.0 - 14.8, 171 - 210)	235 - 284 (2.35 - 2.84, 2.4 - 2.9, 34 - 41)
	35 (95)	1,373 - 1,667 (13.73 - 16.67, 14 - 17, 199 - 242)	275 - 333 (2.75 - 3.33, 2.8 - 3.4, 40 - 48)
	40 (104)	1,618 - 1,961 (16.18 - 19.61, 16.5 - 20.0, 235 - 284)	333 - 392 (3.33 - 3.92, 3.4 - 4.0, 48 - 57)

TROUBLE DIAGNOSES FOR ABNORMAL PRESSURE

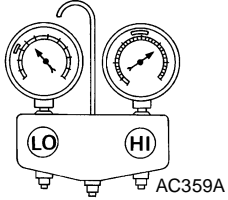
Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (normal) pressure range. Since the standard (normal) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient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

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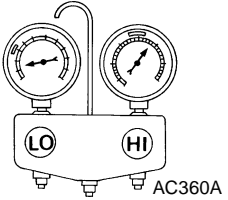
ATC

TROUBLE DIAGNOSIS

Both High and Low-pressure Sides are Too High.

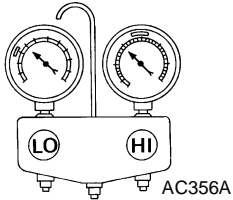
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Both high and low-pressure sides are too high.</p>  <p style="text-align: right; margin-right: 50px;">AC359A</p>	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan	<ul style="list-style-type: none"> ● Clean condenser. ● Check and repair cooling fan as necessary.
	<ul style="list-style-type: none"> ● Low-pressure pipe is not cold. ● When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (1.96 bar, 2 kg/cm², 28 psi). It then decreases gradually thereafter. 	Poor heat exchange in condenser (After compressor operation stops, high pressure decreases too slowly.) ↓ Air in refrigeration cycle	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	<ul style="list-style-type: none"> ● An area of the low-pressure pipe is colder than areas near the evaporator outlet. ● Plates are sometimes covered with frost. 	<ul style="list-style-type: none"> ● Excessive liquid refrigerant on low-pressure side ● Excessive refrigerant discharge flow ● Expansion valve is open a little compared with the specification. ↓ 1. Improper thermal valve installation 2. Improper expansion valve adjustment	Replace expansion valve.

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

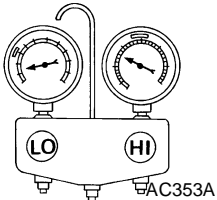
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>High-pressure side is too high and low-pressure side is too low.</p>  <p style="text-align: right; margin-right: 50px;">AC360A</p>	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	<ul style="list-style-type: none"> ● Check and repair or replace malfunctioning parts. ● Check lubricant for contamination.

TROUBLE DIAGNOSIS

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

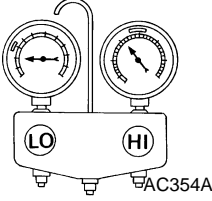
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high. 	High and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings	Replace compressor.
	No temperature difference between high and low-pressure sides	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

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

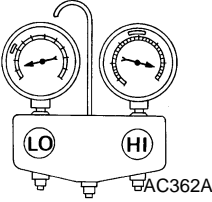
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low. 	<ul style="list-style-type: none"> There is a big temperature difference between receiver drier outlet and inlet. Outlet temperature is extremely low. Liquid tank inlet and expansion valve are frosted. 	Liquid tank inside is slightly clogged.	<ul style="list-style-type: none"> Replace liquid tank. Check lubricant for contamination.
	<ul style="list-style-type: none"> Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. Expansion valve inlet may be frosted. Temperature difference occurs somewhere in high-pressure side 	High-pressure pipe located between receiver drier and expansion valve is clogged.	<ul style="list-style-type: none"> Check and repair malfunctioning parts. Check lubricant for contamination.
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge ↓ Leaking fittings or components	Refer to ATC-142, "Checking for Refrigerant Leaks" .
	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.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Check and repair malfunctioning parts. Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	<ul style="list-style-type: none"> Check intake sensor circuit. Replace compressor.

TROUBLE DIAGNOSIS

Low-pressure Side Sometimes Becomes Negative.

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
<p>Low-pressure side sometimes becomes negative.</p> 	<ul style="list-style-type: none"> ● Air conditioning system does not function and does not cyclically cool the compartment air. ● The system constantly functions for a certain period of time after compressor is stopped and restarted. 	<p>Refrigerant does not discharge cyclically.</p> <p>↓</p> <p>Moisture is frozen at expansion valve outlet and inlet.</p> <p>↓</p> <p>Water is mixed with refrigerant.</p>	<ul style="list-style-type: none"> ● Drain water from refrigerant or replace refrigerant. ● Replace liquid tank.

Low-pressure Side Becomes Negative.

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

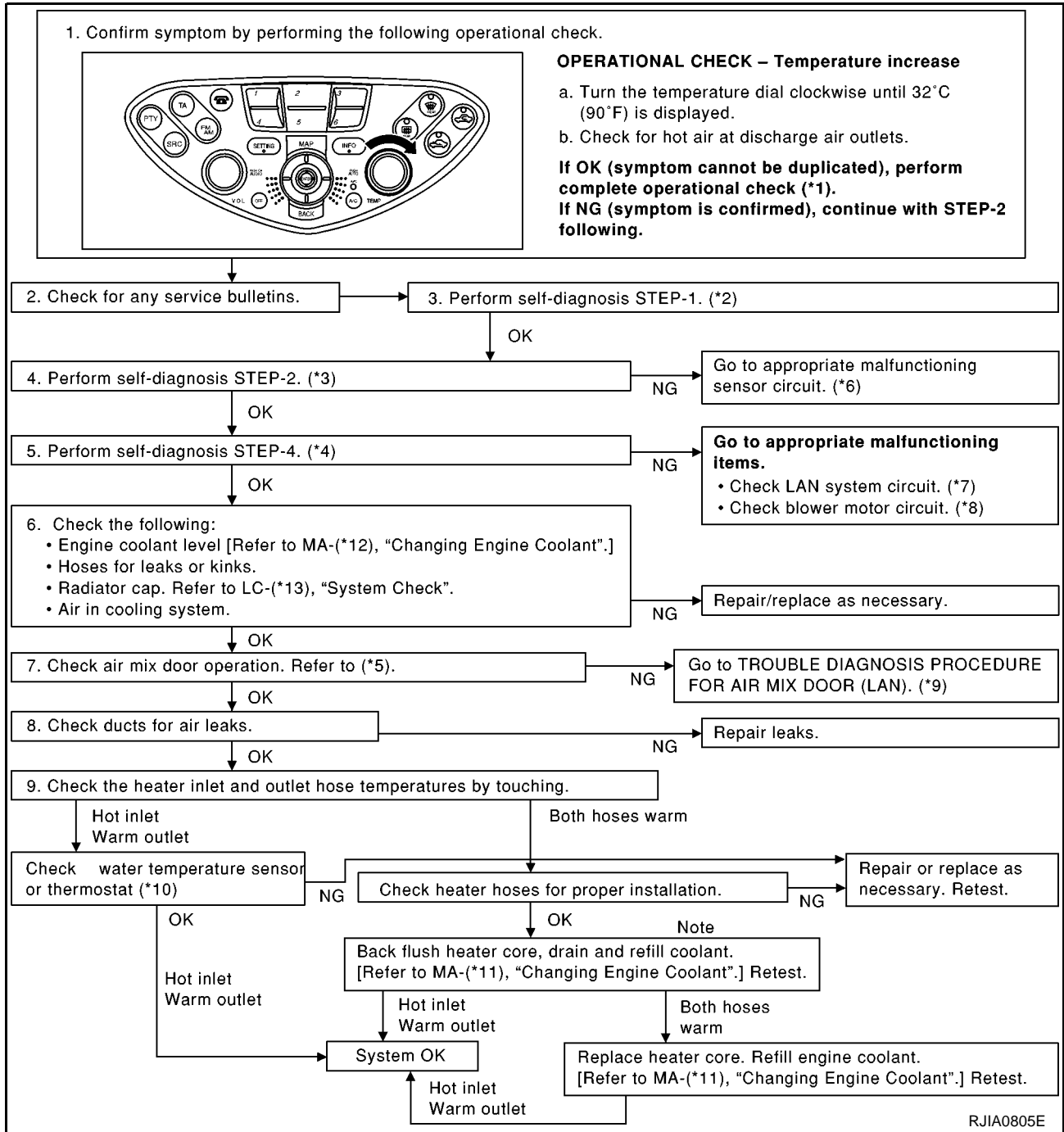
Insufficient Heating

SYMPTOM: Insufficient heating

EJS001P0

TROUBLE DIAGNOSIS

INSPECTION FLOW



*1 [ATC-48, "Operational Check"](#)

*2 [ATC-41, "Self-diagnosis Function"](#), see No.1.

*3 [ATC-41, "Self-diagnosis Function"](#), see No.5.

*4 [ATC-41, "Self-diagnosis Function"](#), see No.7.

*5 [ATC-59, "Air Mix Door Motor Circuit"](#)

*6 [ATC-41, "Self-diagnosis Function"](#), see No.14.

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TROUBLE DIAGNOSIS

- *7 [ATC-54, "LAN System Circuit"](#)
- *8 [ATC-65, "Blower Motor Circuit"](#)
- *9 [ATC-59, "Air Mix Door Motor Circuit"](#)
- *10 QR engine (With EURO-OBD): [EC-1111, "DTC P0117, P0118 ECT SENSOR"](#)
QR engine (Without EURO-OBD): [EC-1514, "DTC P0117, P0118 ECT SENSOR"](#)
QG engine (With EURO-OBD): [EC-194, "DTC P0117, P0118 ECT SENSOR"](#)
QG engine (Without EURO-OBD): [EC-672, "DTC P0117, P0118 ECT SENSOR"](#)
YD engine: [EC-1798, "DTC P0115 ENGINE COOLANT TEMPERATURE \(ECT\) SENSOR \(CIRCUIT\)"](#)
- *11 QR engine: [CO-29, "Changing Engine Coolant"](#)
QG engine: [CO-8, "Changing Engine Coolant"](#)
YD engine: [CO-49, "Changing Engine Coolant"](#)
- *12 QR engine: [CO-32, "CHECKING RADIATOR CAP"](#)
QG engine: [CO-12, "CHECKING RADIATOR CAP"](#)
YD engine: [CO-53, "Checking Radiator Cap"](#)

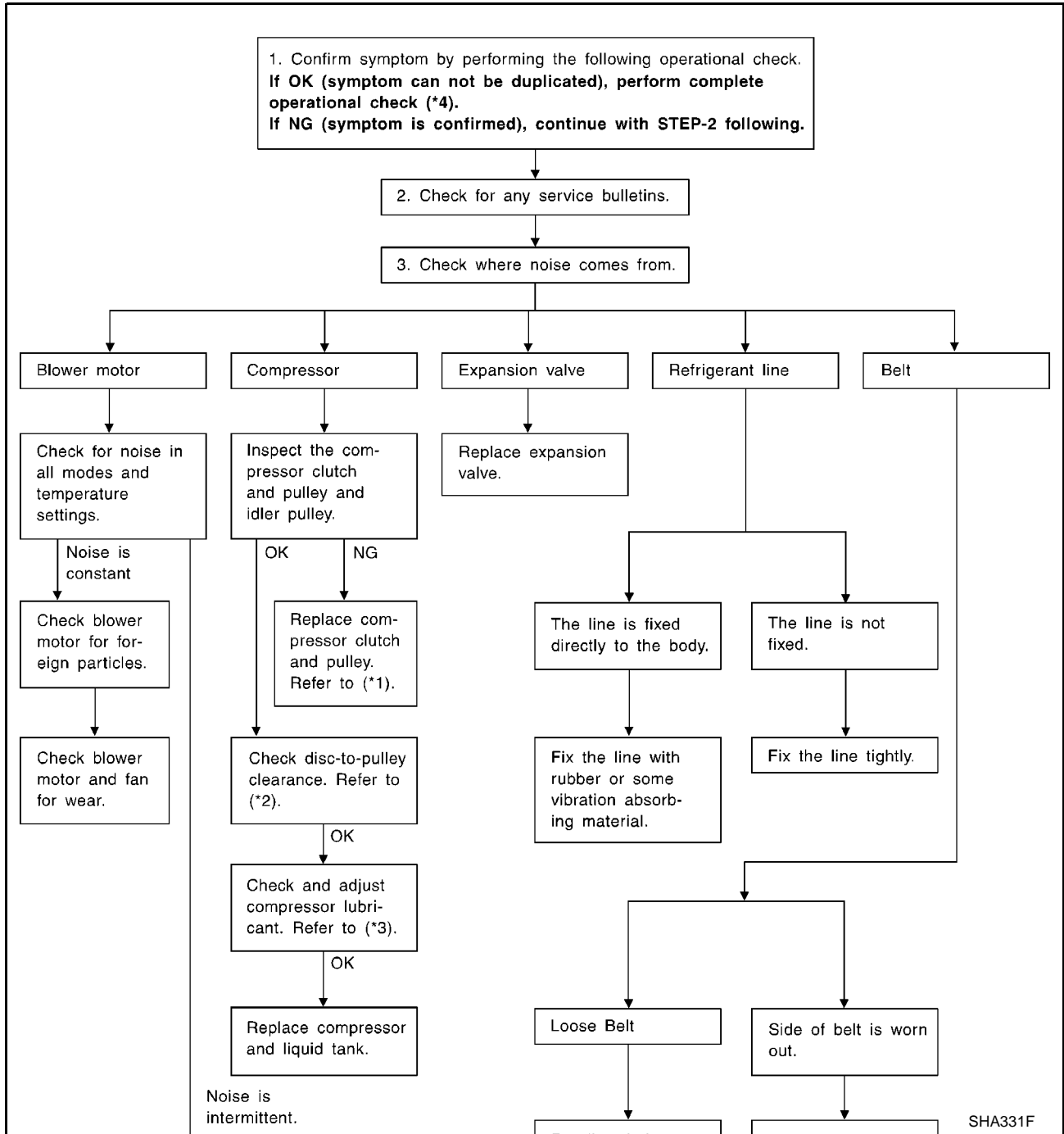
Noise

EJS001P1

SYMPTOM: Noise

TROUBLE DIAGNOSIS

INSPECTION FLOW



*1 [ATC-135, "Compressor Clutch"](#)

*2 [ATC-136, "Inspection"](#)

*3 [ATC-21, "Maintenance of Lubricant Quantity in Compressor"](#)

*4 [ATC-48, "Operational Check"](#)

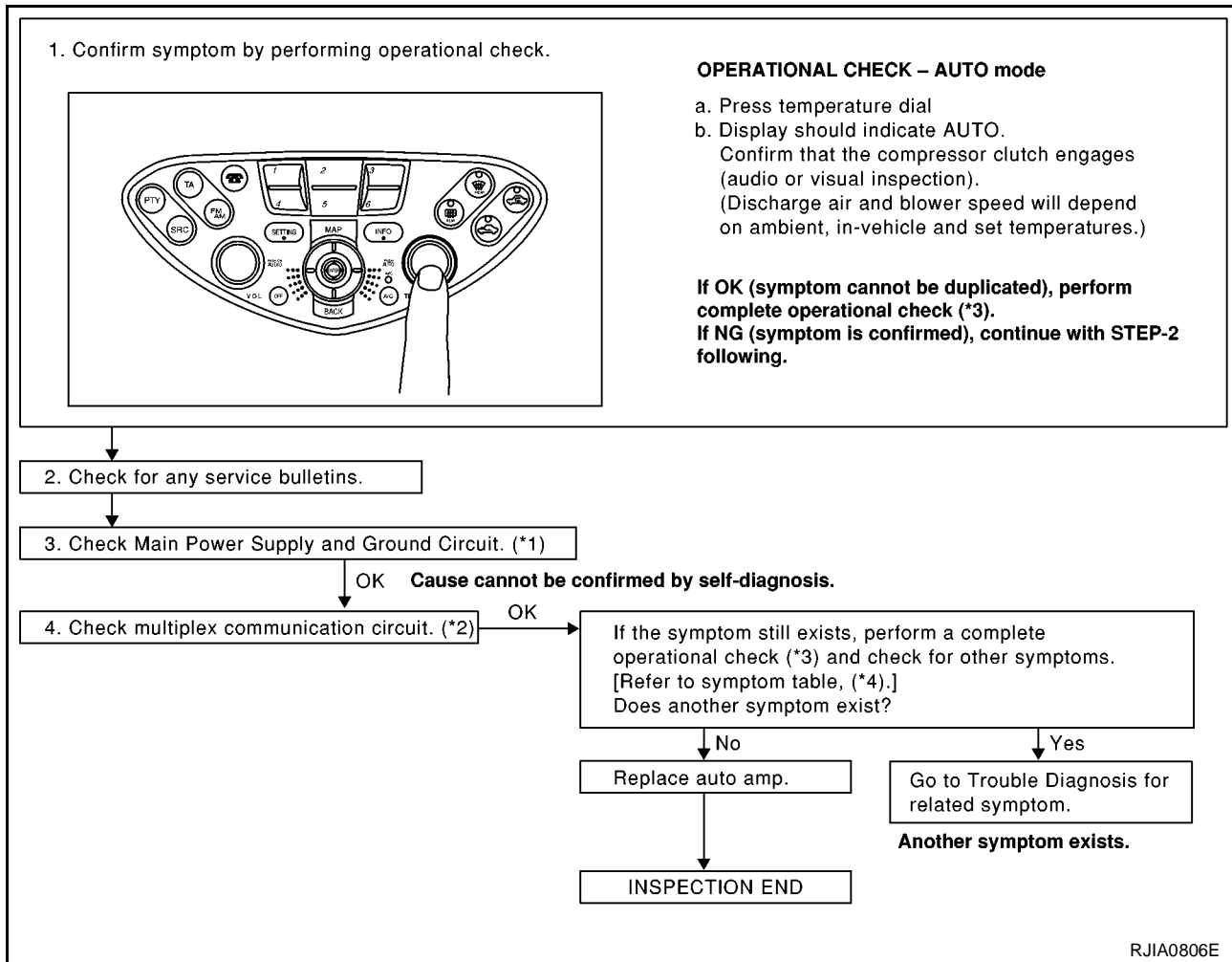
*5 QR engine: [EM-112, "Checking Drive Belts"](#)
 QG engine: [EM-14, "Checking Drive Belts"](#)
 YD engine: [EM-211, "Checking Drive Belts"](#)

Self-diagnosis

Symptom: Self-diagnosis cannot be performed.

TROUBLE DIAGNOSIS

INSPECTION FLOW



*1 [PG-4, "BATTERY POWER SUPPLY — IGNITION SW. IN ANY POSITION"](#) *2 [ATC-102, "Multiplex Communication Circuit"](#) *3 [ATC-48, "Operational Check"](#)

*4 [ATC-30, "SYMPTOM TABLE"](#)

Memory Function

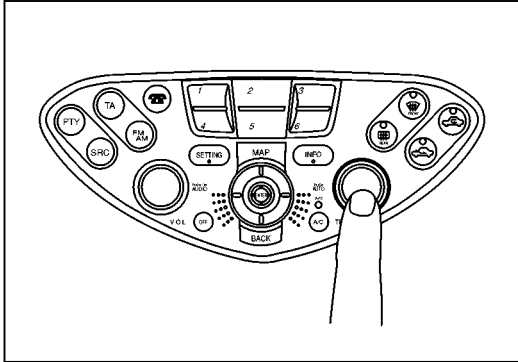
Symptom: Memory function does not operate.

EJS001P3

TROUBLE DIAGNOSIS

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Memory function

- Set the temperature 90°F or 32°C.
- Press OFF switch.
- Turn the ignition off.
- Turn the ignition on.
- Press the temperature dial.
- Confirm that the set temperature remains at previous temperature.
- Press OFF switch.

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

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

2. Check for any service bulletins.

3. Check Main Power Supply and Ground Circuit. (*1)

OK

Go to A/C system circuit. (*4)

OK

4. Replace auto amp.

5. FINAL CHECK

Go to self-diagnosis step-by-step procedure (*3) and perform self-diagnosis STEP-2.
Confirm that code No. 20 is displayed.

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*1 [PG-4, "BATTERY POWER SUPPLY — IGNITION SW. IN ANY POSITION"](#)

*2 [ATC-48, "Operational Check"](#)

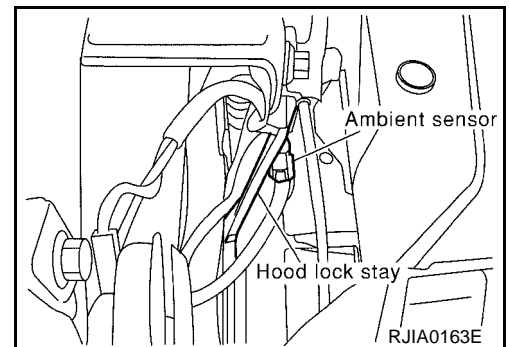
*3 [ATC-41, "Self-diagnosis Function"](#)

*4 [ATC-51, "Power Supply and Ground Circuit for Auto Amp."](#)

Ambient Sensor Circuit COMPONENT DESCRIPTION

Ambient Sensor

The ambient sensor is attached on the hood lock stay. It detects ambient temperature and converts it into a resistance value which is then input into the auto amplifier.



EJS001P4

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AMBIENT TEMPERATURE INPUT PROCESS

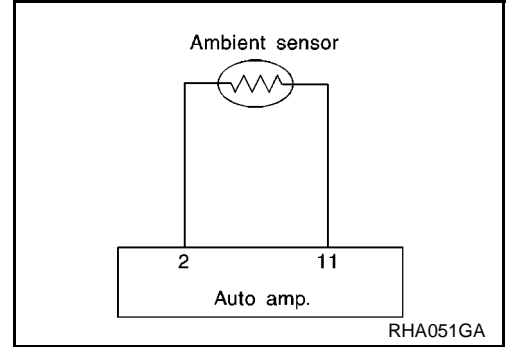
The automatic amplifier includes a processing circuit for the ambient sensor input. However, when the temperature detected by the ambient sensor increases quickly, the processing circuit retards the auto amp. function. It only allows the auto amp. to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds.

TROUBLE DIAGNOSIS

As an example, consider stopping for a cup of coffee after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front grille area, location of the ambient sensor.

DIAGNOSTIC PROCEDURE FOR AMBIENT SENSOR

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



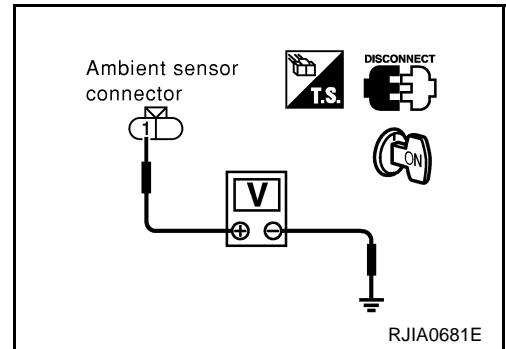
1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR HARNESS CONNECTOR AND GROUND

Disconnect ambient sensor harness connector.

Voltmeter terminal		(-)	Voltage
(+)			
Ambient sensor connector	Terminal No. (Wire color)		
E34	1 (W/G)	Body ground	Approx. 5V

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.



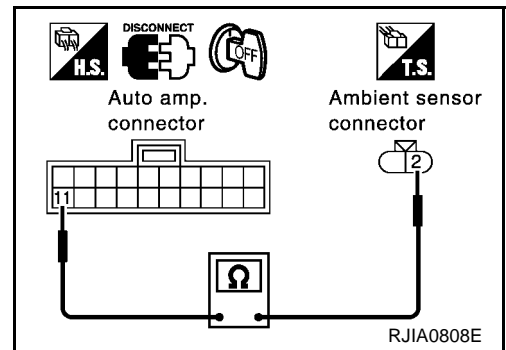
2. CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU)

Disconnect auto amp. (LCU) harness connector.

Ohmmeter terminal				Continuity
(+)		(-)		
Ambient sensor connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
E34	2 (B/Y)	M75	11 (B/Y)	Yes

OK or NG

- OK >> GO TO 3.
- NG >> Repair harness or connector.



3. CHECK AMBIENT SENSOR

Refer to [ATC-95, "Ambient Sensor"](#)

OK or NG

- OK >> 1. Replace auto amp. (LCU).
2. Go to [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"ATC-42](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
- NG >> Replace ambient sensor.

TROUBLE DIAGNOSIS

4. CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU)

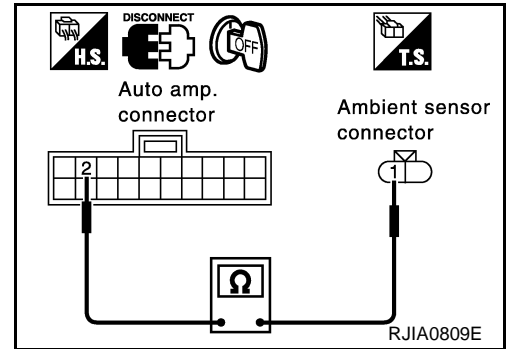
Disconnect auto amp. (LCU) harness connector.

Ohmmeter terminal				Continuity
(+)		(-)		
Ambient sensor connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
E34	1 (W/G)	M75	2 (W/G)	Yes

OK or NG

- OK >> 1. Replace auto amp. (LCU).
 2. Go to [ATC-42. "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

NG >> Repair harness or connector.



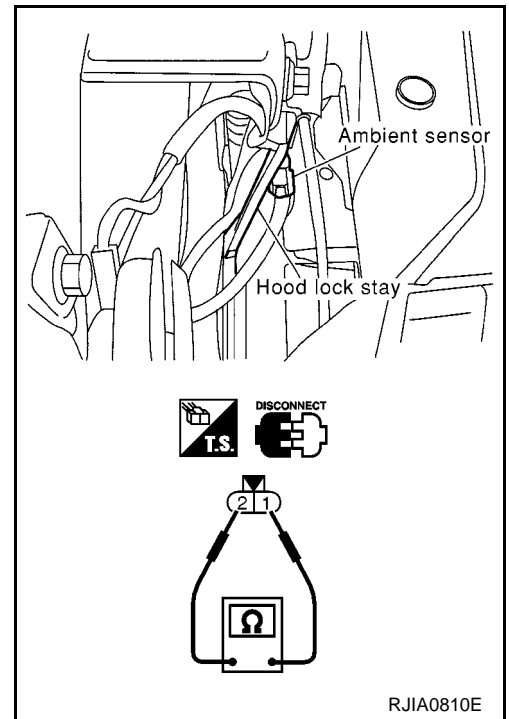
COMPONENT INSPECTION

Ambient Sensor

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

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

If NG, replace ambient sensor.

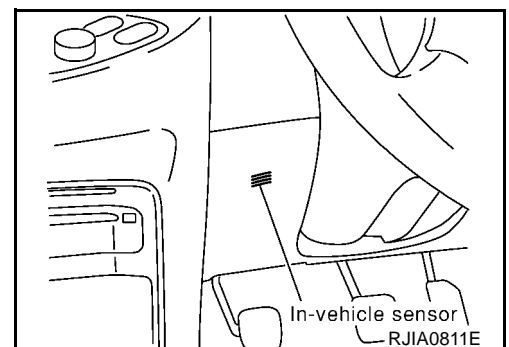


In-vehicle Sensor Circuit

COMPONENT DESCRIPTION

In-vehicle sensor

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



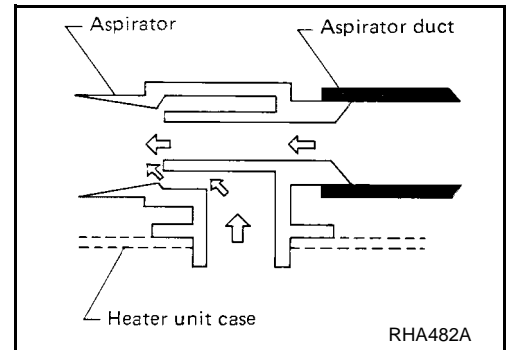
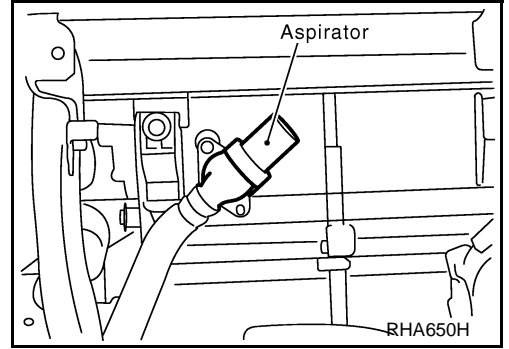
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TROUBLE DIAGNOSIS

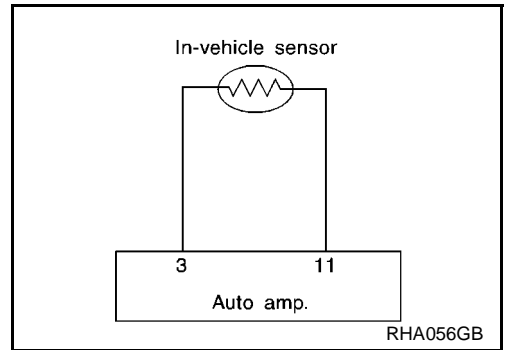
Aspirator

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



DIAGNOSTIC PROCEDURE FOR IN-VEHICLE SENSOR

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



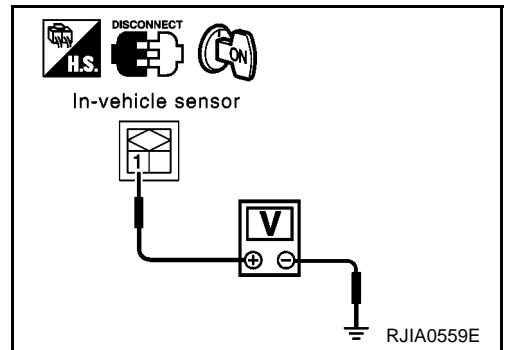
1. CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND BODY GROUND

Disconnect in-vehicle sensor harness connector.

Voltmeter terminal		(-)	Voltage
(+) In-vehicle sensor connector			
In-vehicle sensor connector	Terminal No. (Wire color)		
M39	1 (OR/L)	Body ground	Approx. 5V

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.



TROUBLE DIAGNOSIS

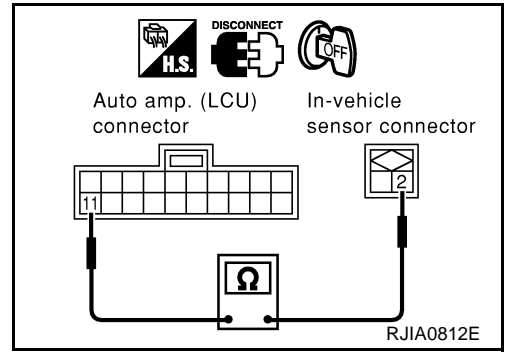
2. CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN IN-VEHICLE SENSOR AND AUTO AMP. (LCU)

Disconnect auto amp. (LCU) harness connector.

Ohmmeter terminal				Continuity
(+)		(-)		
In-vehicle sensor connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M39	2 (B/Y)	M75	11 (B/Y)	Yes

OK or NG

- OK >> GO TO 3.
- NG >> Repair harness or connector.



3. CHECK IN-VEHICLE SENSOR

Refer to [ATC-97, "In-vehicle Sensor"](#)

OK or NG

- OK >> 1. Replace auto amp.
- 2. Go to [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
- NG >> 1. Replace in-vehicle sensor.
- 2. Go to [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

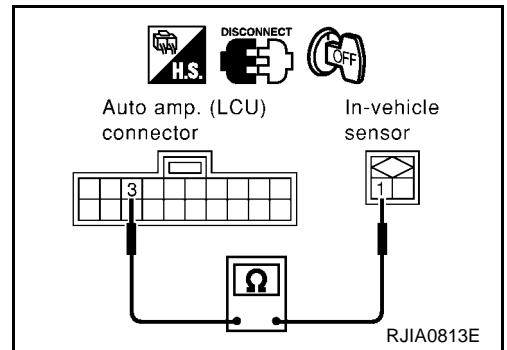
4. CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU)

Disconnect auto amp. (LCU) harness connector.

Ohmmeter terminal				Continuity
(+)		(-)		
In-vehicle sensor connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M39	1 (OR/L)	M75	3 (OR/L)	Yes

OK or NG

- OK >> 1. Replace auto amp. (LCU).
- 2. Go to [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
- NG >> Repair harness or connector.

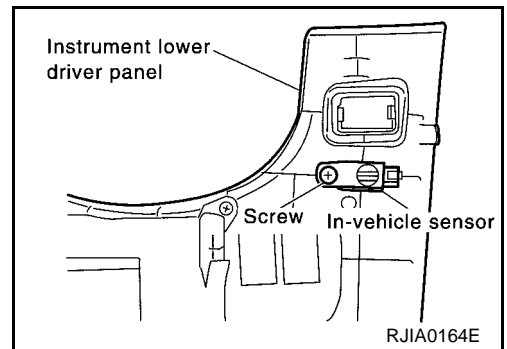


COMPONENT INSPECTION

In-vehicle Sensor

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

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



TROUBLE DIAGNOSIS

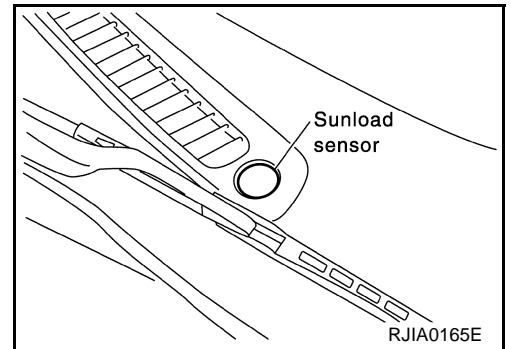
Temperature °C (°F)	Resistance kΩ
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace in-vehicle sensor.

Sunload Sensor Circuit COMPONENT DESCRIPTION

EJS001P6

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



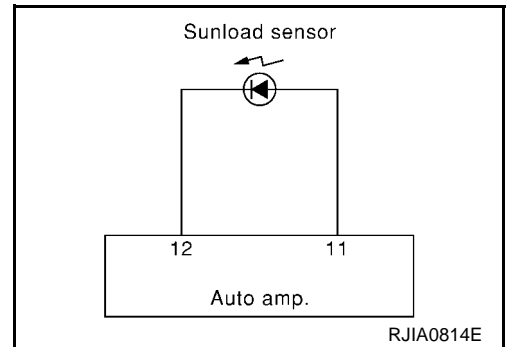
SUNLOAD INPUT PROCESS

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

For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the trees momentarily obstructing the sunlight does not cause any change in the A/C system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.

DIAGNOSTIC PROCEDURE FOR SUNLOAD SENSOR

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



TROUBLE DIAGNOSIS

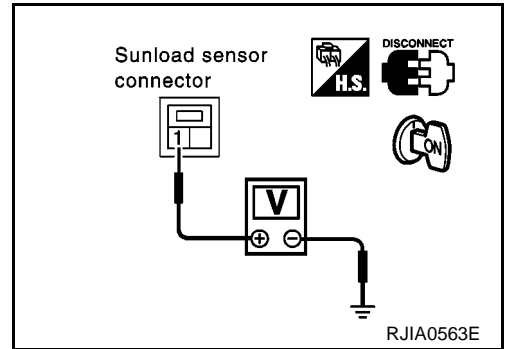
1. CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND GROUND

Disconnect sunload sensor harness connector.

Voltmeter terminal		(-)	Voltage
(+) Sunload sensor connector			
Sunload sensor connector	Terminal No. (Wire color)		
M82	1 (O/R)	Body ground	Approx. 5V

OK or NG

- OK >> GO TO 2.
- NG >> GO TO 4.



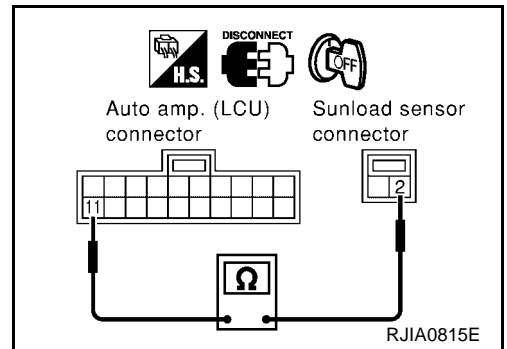
2. CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND AUTO AMP. (LCU)

Disconnect auto amp. (LCU) harness connector.

Ohmmeter terminal				Continuity
(+) Sunload sensor connector		(-) Auto amp. connector		
Sunload sensor connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M82	2 (B/Y)	M75	11 (B/Y)	Yes

OK or NG

- OK >> GO TO 3.
- NG >> Repair harness or connector.



3. CHECK SUNLOAD SENSOR.

Refer to [ATC-100, "Sunload Sensor"](#).

OK or NG

- OK >> 1. Replace auto amp. (LCU).
- 2. Go to [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
- NG >> 1. Replace sunload sensor.
- 2. Go to [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

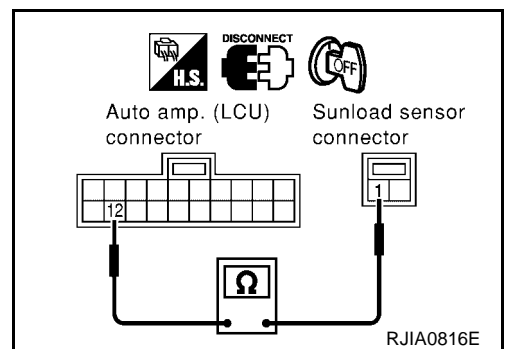
4. CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND AUTO AMP. (LCU)

Disconnect auto amp. (LCU) harness connector.

Ohmmeter terminal				Continuity
(+) Sunload sensor connector		(-) Auto amp. connector		
Sunload sensor connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M82	1 (OR)	M75	12(OR)	Yes

OK or NG

- OK >> 1. Replace auto amp.
- 2. Go to self-diagnosis function confirmation procedure [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
- NG >> Repair harness or connector.

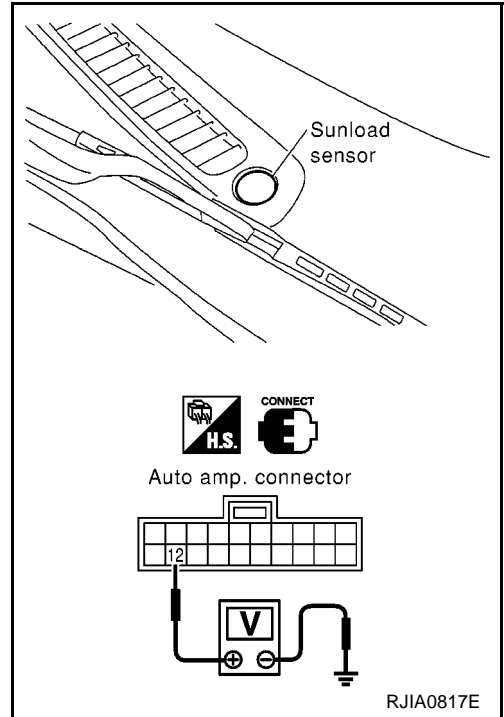


TROUBLE DIAGNOSIS

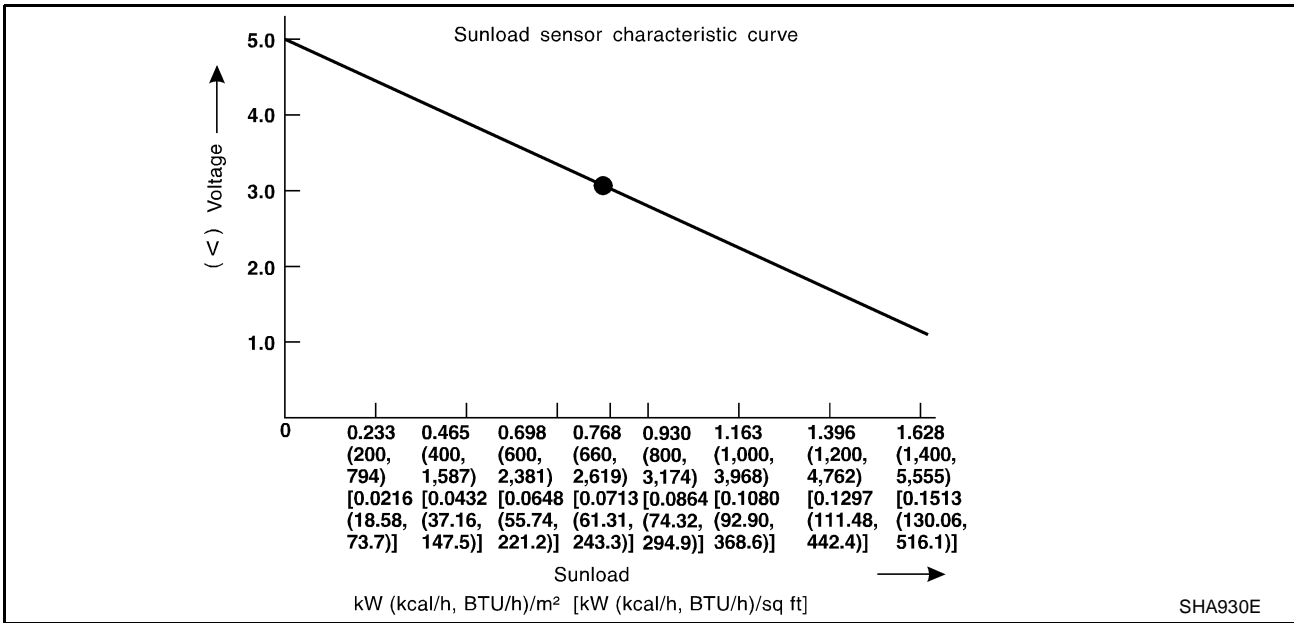
COMPONENT INSPECTION

Sunload Sensor

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



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



TROUBLE DIAGNOSIS

EJS001P7

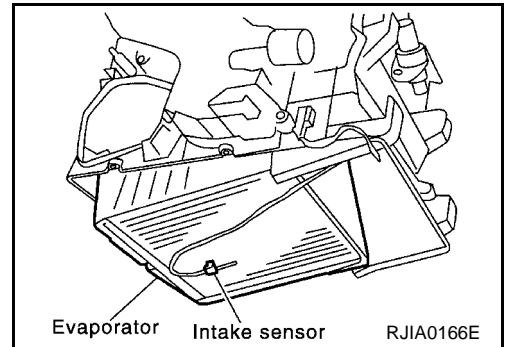
Intake Sensor Circuit COMPONENT DESCRIPTION

Intake Sensor

The intake sensor is located on the heater & cooling unit. It converts temperature of air after it passes through the evaporator into a resistance value which is then input to the auto amp.

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

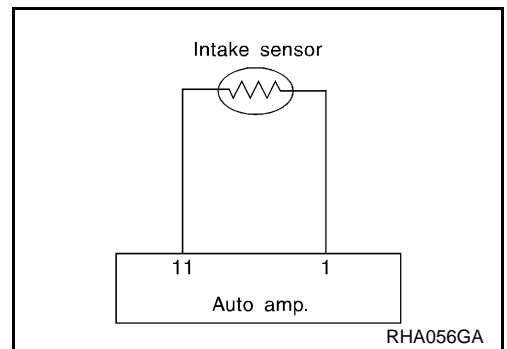
Temperature °C (°F)	Resistance kΩ	
	With gasoline engine	With diesel engine
-15 (5)	12.34	18.63
-10 (14)	9.62	14.15
-5 (23)	7.56	10.86
0 (32)	6.00	8.41
5 (41)	4.80	6.58
10 (50)	3.87	5.19
15 (59)	3.15	4.12
20 (68)	2.57	3.30
25 (77)	2.12	2.67
30 (86)	1.76	2.17
35 (95)	1.47	1.78
40 (104)	1.23	1.46
45 (113)	1.04	1.21



If NG, replace intake sensor.

DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

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



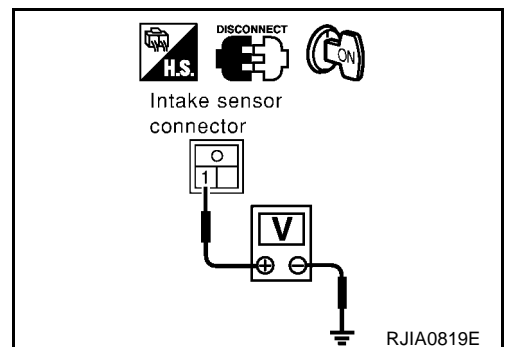
1. CHECK INTAKE SENSOR CIRCUIT BETWEEN INTAKE SENSOR AND BODY GROUND

Disconnect intake sensor harness connector.

Voltmeter terminal (+)		Terminal No. (Wire color)	(-)	Voltage
Intake sensor connector				
M64		1 (OR/B)	Body ground	Approx. 5V

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 4.



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TROUBLE DIAGNOSIS

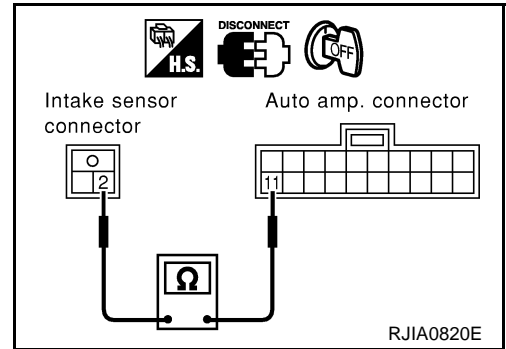
2. CHECK INTAKE SENSOR CIRCUIT BETWEEN INTAKE SENSOR AND AUTO AMP. (LCU)

Disconnect auto amp. (LCU) harness connector.

Ohmmeter terminal				Continuity
(+) Intake sensor connector		(-) Auto amp. connector		
Terminal No. (Wire color)	Terminal No. (Wire color)	Terminal No. (Wire color)	Terminal No. (Wire color)	
M64	2 (B/Y)	M75	11 (B/Y)	Yes

OK or NG

- OK >> GO TO 3.
- NG >> Repair harness or connector.



3. CHECK INTAKE SENSOR

Refer to [ATC-101, "Intake Sensor"](#).

OK or NG

- OK >> 1. Replace auto amp.
- 2. Go to self-diagnosis function confirmation procedure [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
- NG >> 1. Replace intake sensor.
- 2. Go to self-diagnosis function confirmation procedure [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.

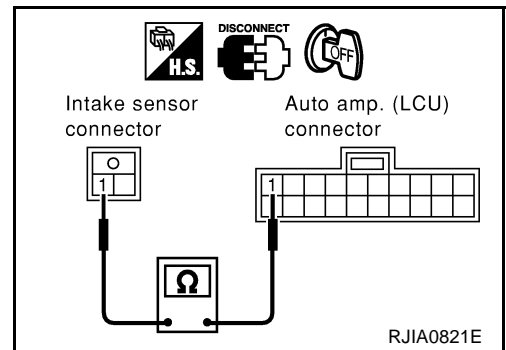
4. CHECK INTAKE SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND AUTO AMP. (LCU)

Disconnect auto amp. (LCU) harness connector.

Ohmmeter terminal				Continuity
(+) Intake sensor connector		(-) Auto amp. connector		
Terminal No. (Wire color)	Terminal No. (Wire color)	Terminal No. (Wire color)	Terminal No. (Wire color)	
M64	1 (OR/B)	M75	11 (OR/B)	Yes

OK or NG

- OK >> 1. Replace auto amp.
- 2. Go to self-diagnosis function confirmation procedure [ATC-42, "FUNCTION CONFIRMATION PROCEDURE"](#) and perform self-diagnosis STEP-2. Confirm that code No. 20 is displayed.
- NG >> Repair harness or connector.

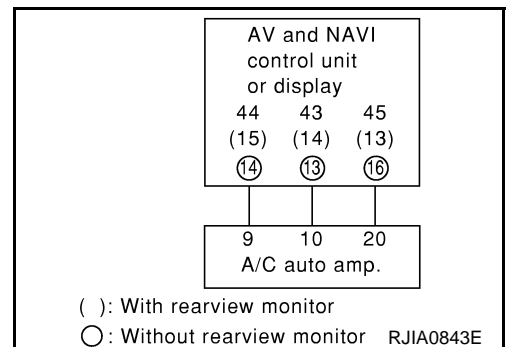


Multiplex Communication Circuit DIAGNOSTIC PROCEDURE FOR MULTIPLEX COMMUNICATION CIRCUIT

EJS001P8

SYMPTOM:

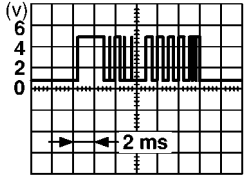
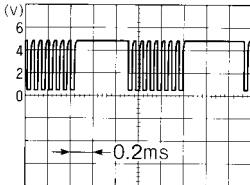
- A/C system cannot be controlled.



TROUBLE DIAGNOSIS

1. CHECK FOR AUTO AMP. OUTPUT

Confirm multiplex communication signal using an oscilloscope.

Terminal		Voltage
Auto amp. connector	Terminal No. (Wire color)	
M75	9 (L/W)	 <p style="text-align: right; margin-top: 5px;">RJIA0212E</p>
	20 (L)	 <p style="text-align: right; margin-top: 5px;">HAK0363D</p>

OK or NG

- OK >> GO TO 2.
- NG >> Replace auto amp.

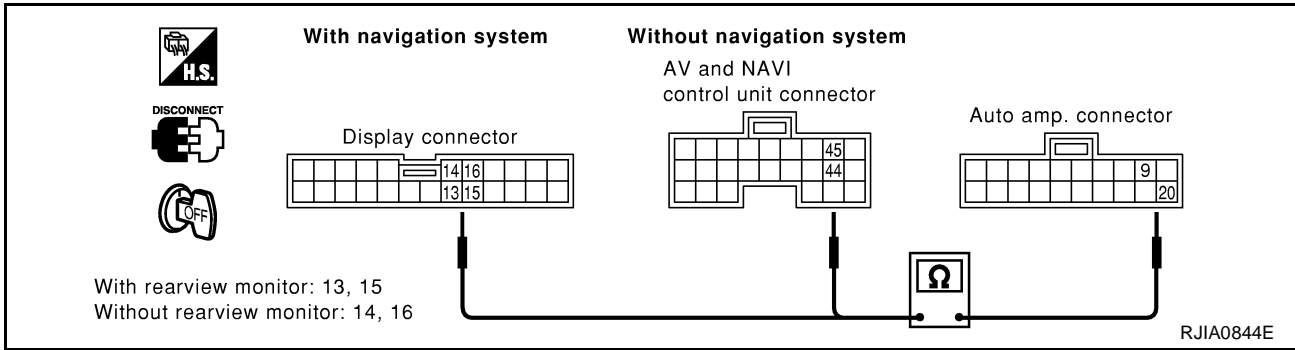
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TROUBLE DIAGNOSIS

2. CHECK CIRCUIT CONTINUITY BETWEEN AUTO AMP. AND DISPLAY (OR AV AND NAVI CONTROL UNIT)

Disconnect DISPLAY (or AV AND NAVI CONTROL UNIT) and auto amp. connector.



Without navigation system

Ohmmeter terminal				Continuity
(+)		(-)		
DISPLAY connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M61	With rearview monitor: 15 (L/W) Without rearview monitor: 14 (L/W)	M75	9 (L/W)	Yes
	With rearview monitor: 13 (L) Without rearview monitor: 16 (L)		20 (L)	

With navigation system

Ohmmeter terminal				Continuity
(+)		(-)		
AV AND NAVI CONTROL UNIT connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M55	44 (L/W)	M75	9 (L/W)	Yes
	45 (L)		20 (L)	

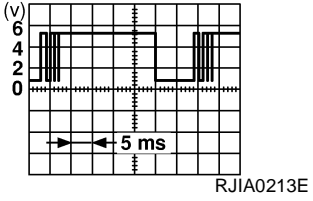
OK or NG

- OK >> Reconnect DISPLAY (OR AV AND NAVI CONTROL UNIT) and auto amp. connector. And GO TO 3.
- NG >> Repair harness or connector.

TROUBLE DIAGNOSIS

3. CHECK FOR AUTO AMP. INPUT

Confirm multiplex communication signal using an oscilloscope.

Terminal		Voltage
Auto amp. connector	Terminal No. (Wire color)	
M75	10 (L/R)	

OK or NG

- OK >> INSPECTION END
- NG >> GO TO 4.

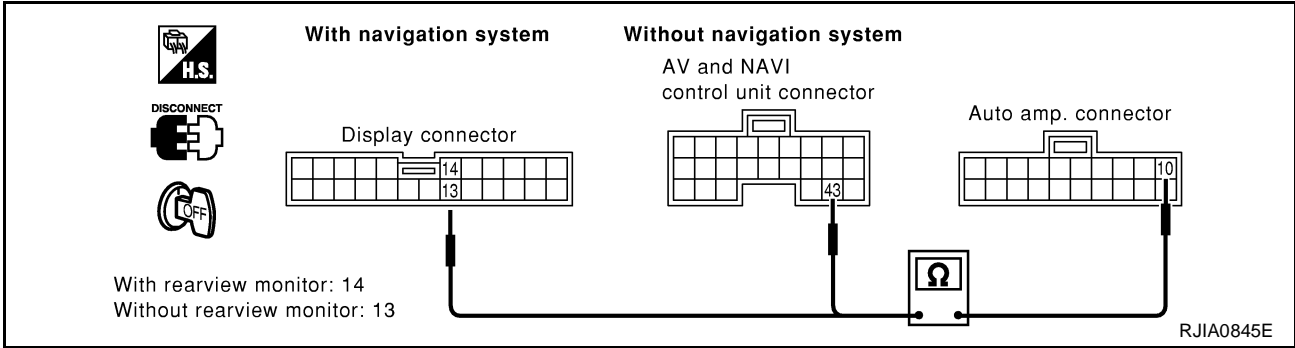
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TROUBLE DIAGNOSIS

4. CHECK CIRCUIT CONTINUITY BETWEEN DISPLAY (OR AV AND NAVI CONTROL UNIT) AND AUTO AMP.

Disconnect DISPLAY (or AV AND NAVI CONTROL UNIT) and auto amp. connector.



Without navigation system

Terminal				Continuity
(+)		(-)		
DISPLAY connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M61	With rearview monitor: 14 (L/R) Without rearview monitor: 13 (L/R)	M75	10 (L/R)	Yes

With navigation system

Terminal				Continuity
(+)		(-)		
AV AND NAVI CONTROL UNIT connector	Terminal No. (Wire color)	Auto amp. connector	Terminal No. (Wire color)	
M55	43 (L/R)	M75	10 (L/R)	Yes

OK or NG

- OK >> Replace auto amp.
- NG >> Repair harness or connector.

CONTROLLER

CONTROLLER

PFP:27500

Removal and Installation

EJS001IP

1. Remove multifunction switch. Refer to [AV-117, "Removal and Installation of Multifunction Switch"](#).

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AUTO AMP

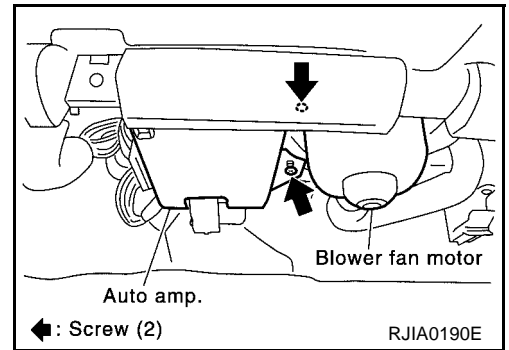
AUTO AMP

PFP:27760

REMOVAL AND INSTALLATION

EJS001PH

1. Remove the instrument lower assist panel.
2. Remove the auto amp. fixing screw.
3. Disconnect the auto amp. connector, then remove the auto amp.



AMBIENT SENSOR

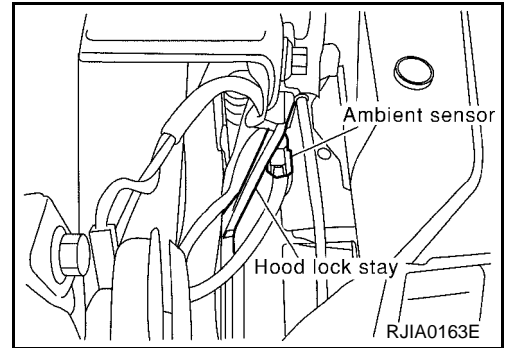
AMBIENT SENSOR

PFP:27722

Removal and Installation

1. Remove the front grille.
2. Remove the ambient sensor.

EJS0011R



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IN-VEHICLE SENSOR

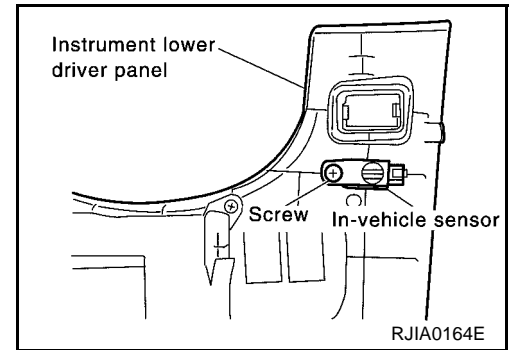
IN-VEHICLE SENSOR

PFP:27720

Removal and Installation

EJS001IS

1. Remove the instrument lower driver panel.
2. Remove the in-vehicle sensor.



SUNLOAD SENSOR

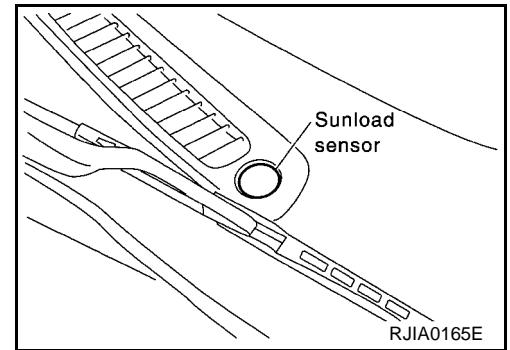
SUNLOAD SENSOR

PFP:27721

Removal and Installation

1. Remove the instrument panel.
2. Remove the sunload sensor.

EJS0011T



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INTAKE SENSOR CIRCUIT

PFP:27723

INTAKE SENSOR CIRCUIT

EJS001IU

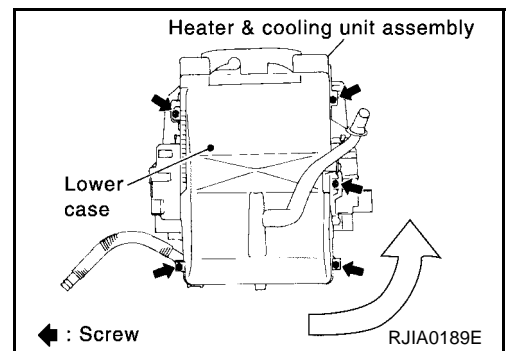
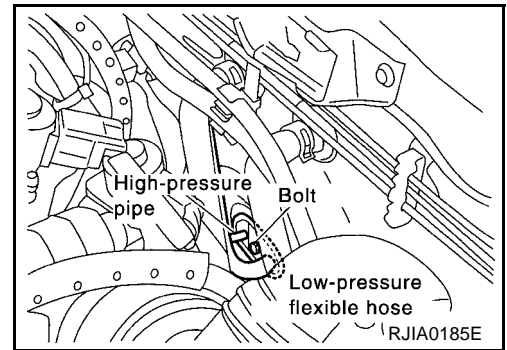
Removal and Installation

1. Use the refrigerant collecting equipment (for HFC-134a), to discharge the refrigerant from A/C system.
2. Remove the cowl top panel.
3. Remove the canister from canister bracket. (With QR engine)
4. Disconnect low-pressure flexible hose and high-pressure pipe from the evaporator.

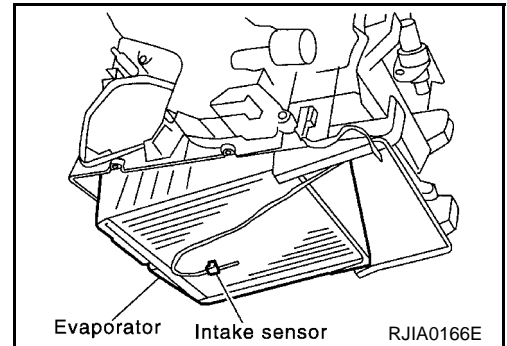
CAUTION:

Cap or wrap the joint of the low-pressure flexible hose and the high-pressure pipe with a suitable tool such as a vinyl tape to avoid the entry of air.

5. Hold expansion valve and move it slightly upward. Push evaporator toward rear of vehicle.
6. Remove the drain hose and lower case mounting screw.
7. Swivel rear of lower case toward passenger seat to remove lower case.



8. Remove the intake sensor from evaporator.



BLOWER UNIT

PPF:27200

BLOWER UNIT

Removal and Installation

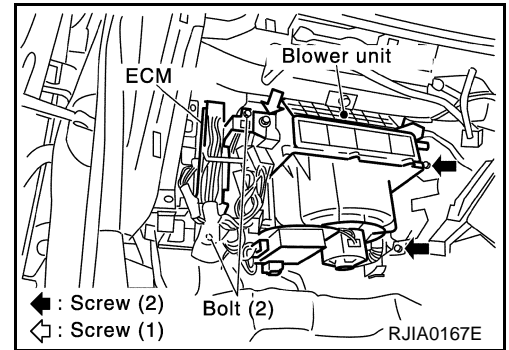
REMOVAL

1. Remove the glove box assembly.
2. Remove the glove box cover and instrument lower assist panel.
3. Remove the ECM with ECM bracket.
4. Remove the blower unit fixing bolt and screw.
5. Disconnect the blower motor connector and auto amp. connector.
6. Move the blower unit downwards, then disconnect the intake door motor connector.

CAUTION:

Slide the blower unit toward the passenger side, remove location pins (2 pieces), then move it downwards.

7. Remove the blower unit.



INSTALLATION

CAUTION:

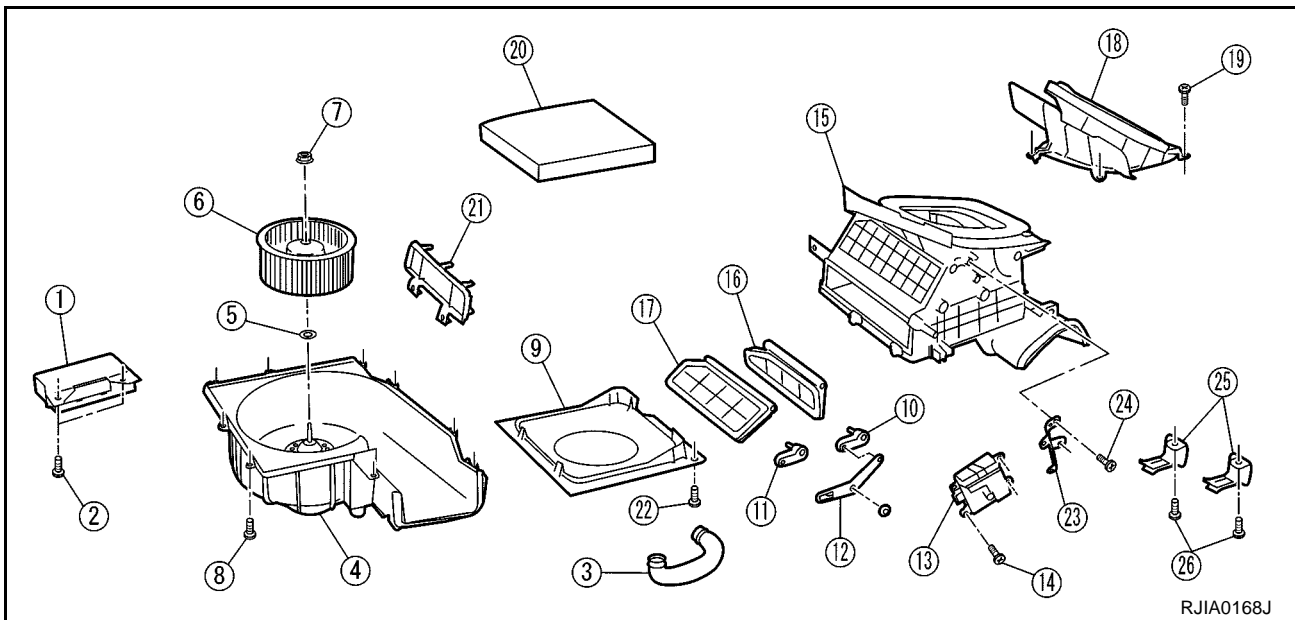
- Make sure the location pins (2 pieces) are securely installed.

Disassembly and Assembly

EJS001PA

NOTE:

This illustration is for RHD models. The layout for LHD models is symmetrically opposite.



- | | | |
|------------------------------|----------------------------|----------------------|
| 1. Auto amplifier | 2. Screw | 3. Cooling hose |
| 4. Blower fan motor assembly | 5. Washer | 6. Blower fan |
| 7. Nut | 8. Screw | 9. Intake bellmouth |
| 10. Intake door lever 2 | 11. Intake door lever 1 | 12. Intake door link |
| 13. Intake door motor | 14. Screw | 15. Upper case |
| 16. Intake door 2 | 17. Intake door 1 | 18. Adapter assembly |
| 19. Screw | 20. Ventilation air filter | 21. Filter cover |
| 22. Screw | 23. Bracket | 24. Screw |
| 25. Under cover clip | 26. Screw | |

BLOWER MOTOR

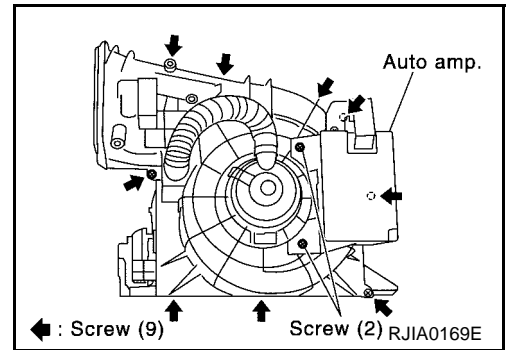
PFP:27226

BLOWER MOTOR

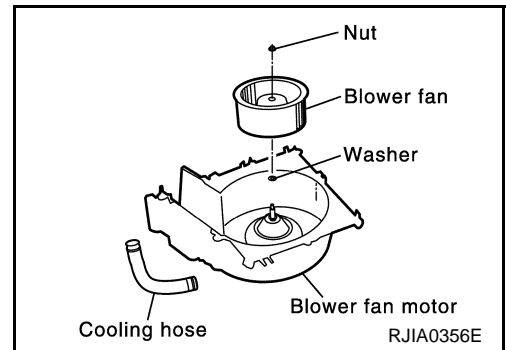
Removal and Installation

EJS001IX

1. Remove the blower unit. Refer to [ATC-113, "Removal and Installation"](#).
2. Remove the auto amp.
3. Remove the blower unit fixing screw, then separate the blower unit.



4. Remove the cooling hose and blower fan.



INTAKE DOOR MOTOR

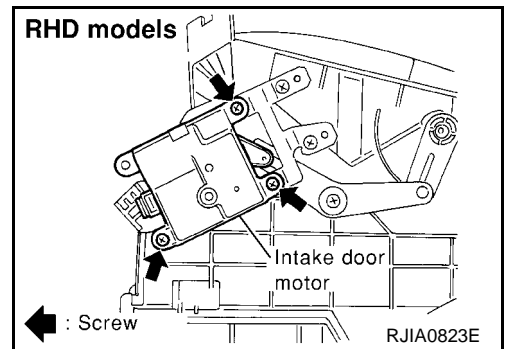
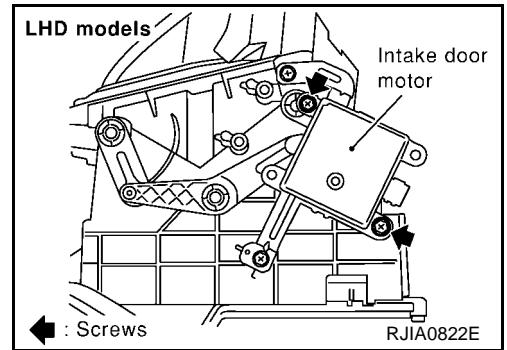
INTAKE DOOR MOTOR

PFP:27730

Removal and Installation

EJS0011Y

1. Remove the blower unit. Refer to [ATC-113, "Removal and Installation"](#)
2. Remove the intake door motor from the blower unit.



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HEATER & COOLING UNIT ASSEMBLY

PFP:27110

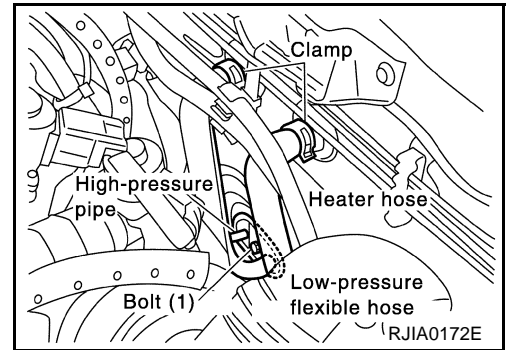
EJS001J1

HEATER & COOLING UNIT ASSEMBLY

Removal and Installation

REMOVAL

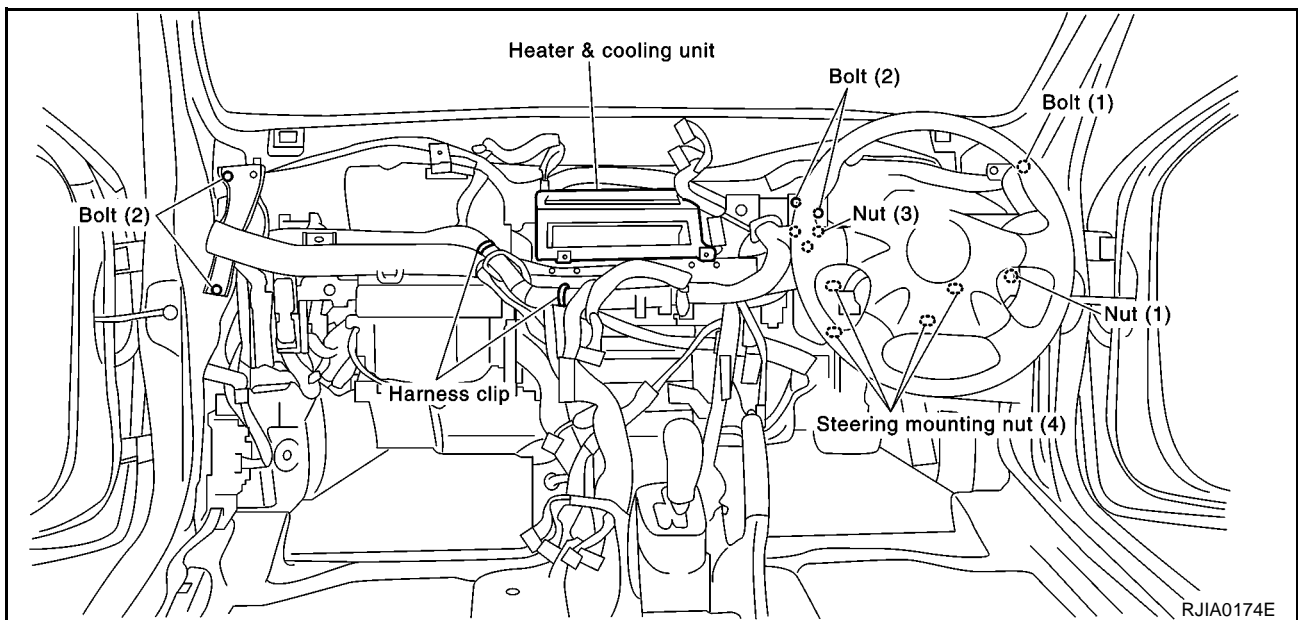
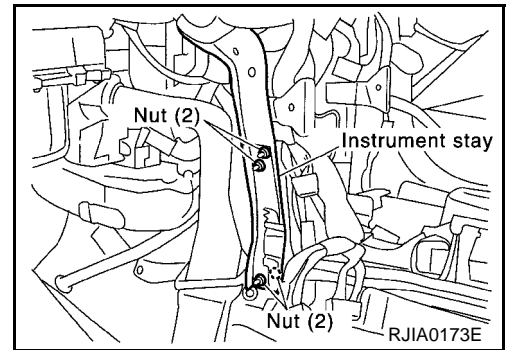
1. Use the refrigerant collecting equipment (For HFC-134a) to discharge the refrigerant from A/C system.
2. Drain coolant from cooling system. Refer to [CO-29, "Changing Engine Coolant"](#) for QR engine, [CO-8, "Changing Engine Coolant"](#) for QG engine, [CO-49, "Changing Engine Coolant"](#) for YD engine.
3. Remove the cowl top panel.
4. Disconnect two heater hoses from heater core pipe.
5. Disconnect the low-pressure flexible hose and high-pressure pipe from the evaporator.



CAUTION:

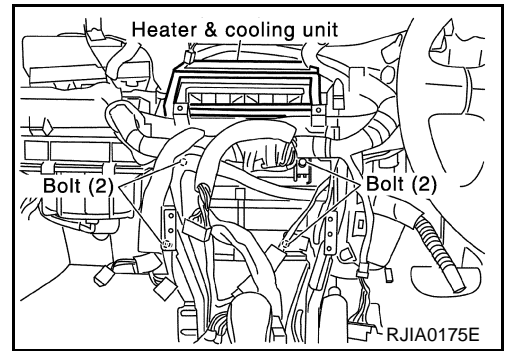
Cap or wrap the joint of the low-pressure flexible hose and the high-pressure pipe with a suitable tool such as a vinyl tape to avoid the entry of air.

6. Remove the instrument panel assembly.
7. Remove the blower unit.
8. Remove clips of vehicle harness from steering member.
9. Remove the instrument stay.



HEATER & COOLING UNIT ASSEMBLY

10. Remove the fixing bolts from heater & cooling unit.
11. Remove the steering member.
12. Remove the heater & cooling unit.



INSTALLATION

1. Installation is basically the reverse order of removal.

NOTE:

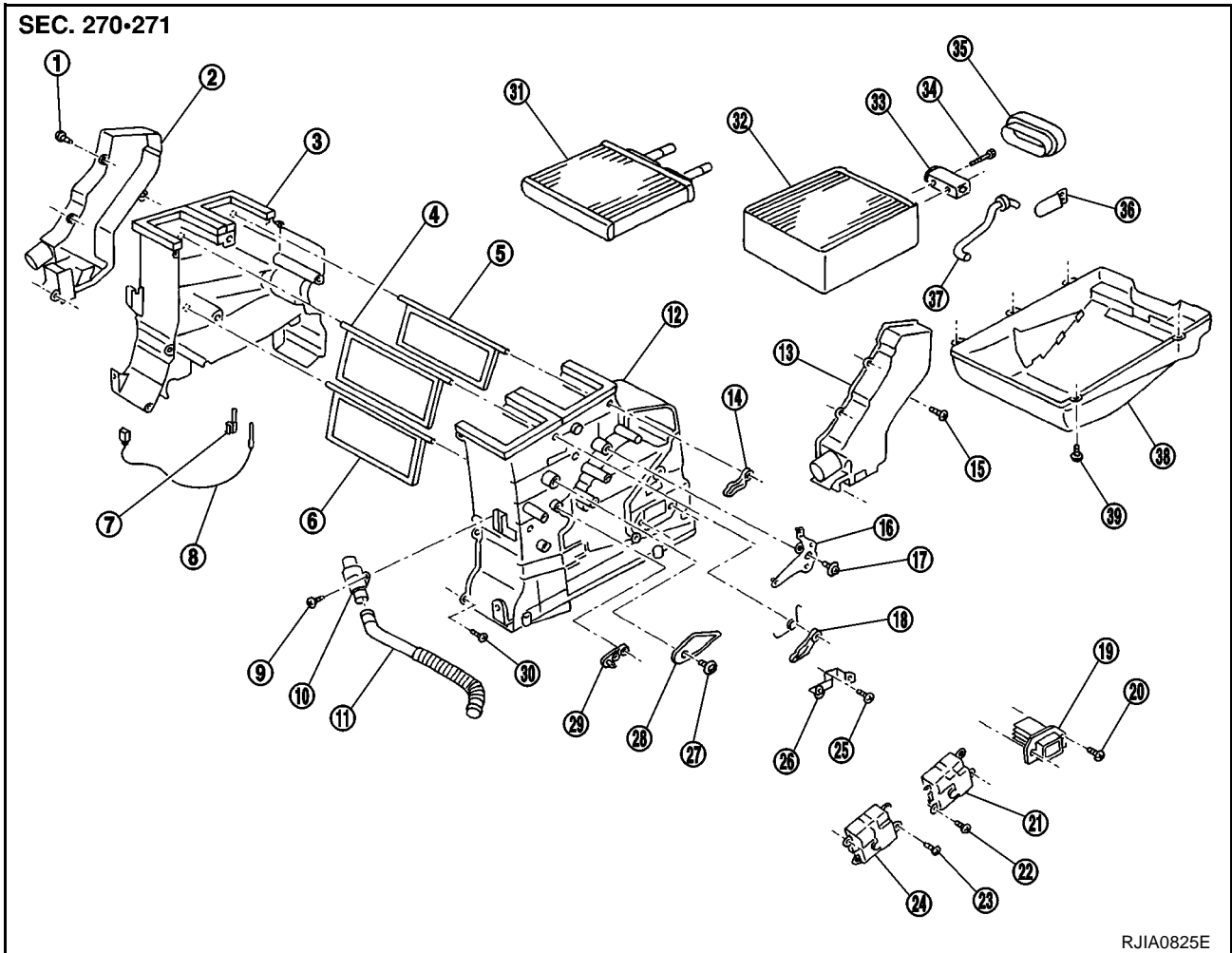
When filling radiator with coolant, refer to [CO-29, "Changing Engine Coolant"](#) for QR engine, [CO-8, "Changing Engine Coolant"](#) for QG engine, [CO-49, "Changing Engine Coolant"](#) for YD engine.

Disassembly and Assembly

EJS001J2

NOTE:

This illustration is for RHD models. The layout for LHD models is symmetrically opposite.



- | | | |
|-----------------------|-----------------------|--|
| 1. Screw | 2. Foot duct (left) | 3. Heater & cooling unit case (left) |
| 4. Ventilator door | 5. Defroster door | 6. Air mix door |
| 7. Sensor bracket | 8. Intake sensor | 9. Screw |
| 10. Aspirator | 11. Aspirator duct | 12. Heater & cooling unit case (right) |
| 13. Foot duct (right) | 14. Mode door lever 2 | 15. Screw |

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HEATER & COOLING UNIT ASSEMBLY

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|----------------------|------------------------|------------------------|
| 16. Mode door link 2 | 17. Screw | 18. Mode door lever 1 |
| 19. Fan control amp. | 20. Screw | 21. Mode door motor |
| 22. Screw | 23. Screw | 24. Air mix door motor |
| 25. Screw | 26. Actuator bracket | 27. Screw |
| 28. Mode door link | 29. Air mix door lever | 30. Screw |
| 31. Heater core | 32. Evaporator | 33. Expansion valve |
| 34. Bolt | 35. Cooler grommet | 36. Instrument bracket |
| 37. Drain hose | 38. Lower case | 39. Screw |

MODE DOOR MOTOR

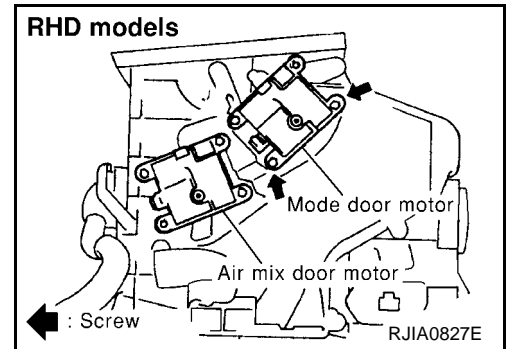
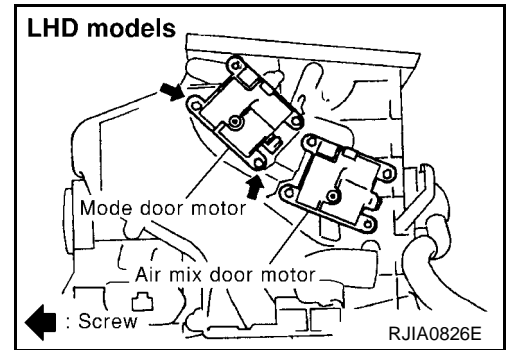
MODE DOOR MOTOR

PFP:27731

Removal and Installation

EJS001J3

1. Disconnect the mode door motor connector.
2. Remove the mode door motor.



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AIR MIX DOOR MOTOR

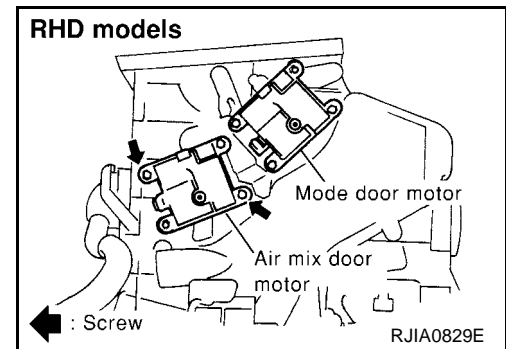
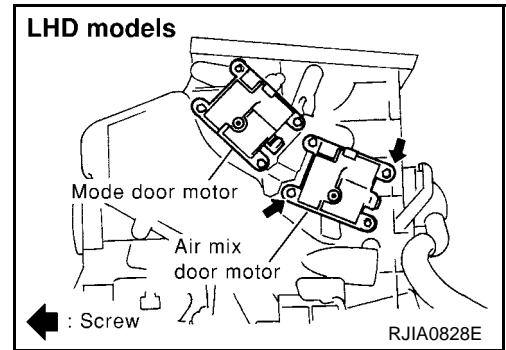
AIR MIX DOOR MOTOR

PFP:27732

Removal and Installation

EJS001J4

1. Disconnect the air mix door motor connector.
2. Remove the air mix door motor.



FAN CONTROL AMPLIFIER

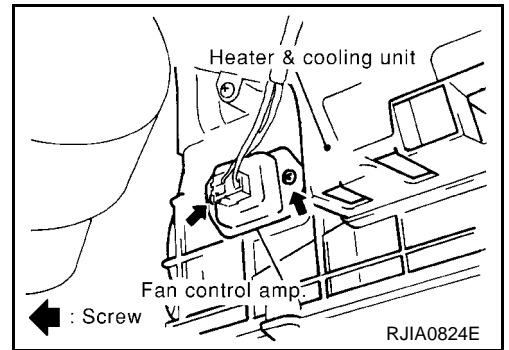
FAN CONTROL AMPLIFIER

PFP:27761

Removal and Installation

EJS001PG

1. Remove the fan control amp.



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VENTILATION AIR FILTER

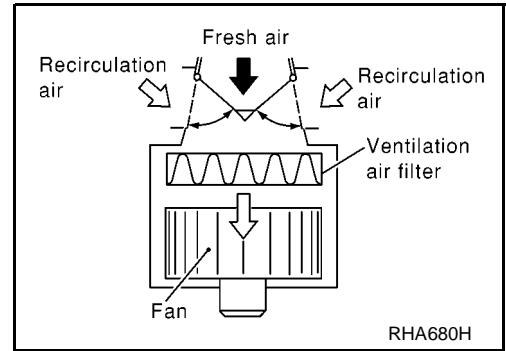
VENTILATION AIR FILTER

PFP:27277

Removal and Installation FUNCTION

EJS001PJ

Air inside passenger compartment is kept clean at either recirculation or fresh mode by installing ventilation air filter into blower unit.

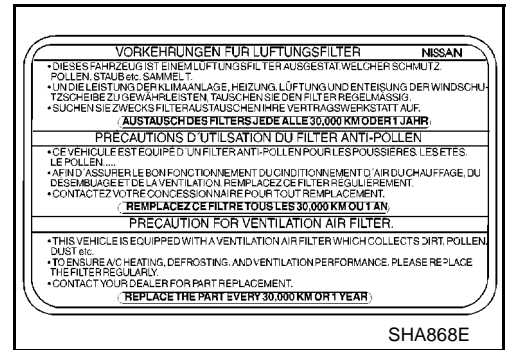


REPLACEMENT TIMING

Replace ventilation air filter.

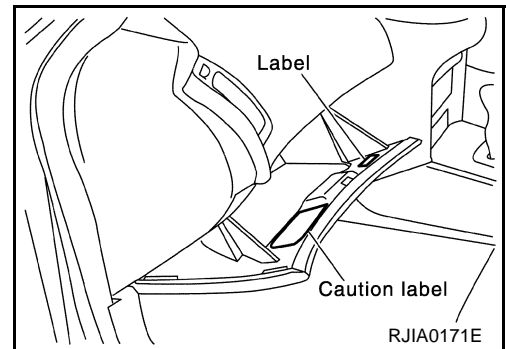
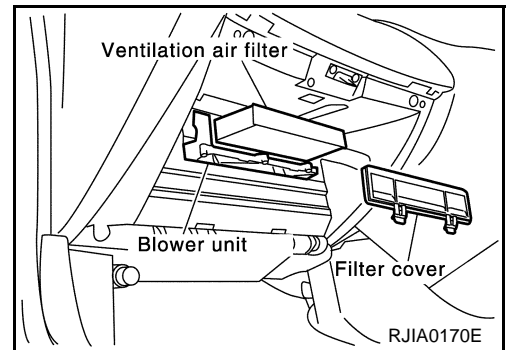
Refer to [MA-36, "CHASSIS AND BODY MAINTENANCE"](#) in SCHEDULE 1 and 2.

Caution label is fixed inside the glove box.



REPLACEMENT AND PROCEDURES

1. Remove the glove box.
 2. Remove the ventilation air filter cover.
 3. Take out the ventilation air filter from blower unit.
 4. Replace with new one and reinstall on blower unit.
 5. Reinstall the glove box.
6. Fill in the necessary details on the label and attach in to the glove box in the position shown at right.



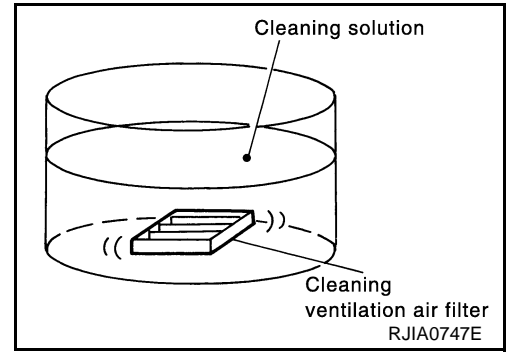
VENTILATION AIR FILTER

CLEANING

1. Soak the filter in a solution of a mild strength detergent cleaner & water.
2. Move the filter lightly through the solution to clean.
3. Rinse with tap water.
4. Drain the filter water into a can etc, and dry.

CAUTION:

- The filter could become mouldy or smell if it is left in a moist state.
- Once cleaned, the filter can only be used 1-2 more times.
- Replace the filter if, after cleaning, should the filter not function correctly.



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HEATER CORE

HEATER CORE

PFP:27140

Removal and Installation

EJS001J5

1. Remove the heater & cooling unit. Refer to [ATC-116, "Removal and Installation"](#) .
2. Separate the heater & cooling unit, then remove the heater core. Refer to [ATC-117, "Disassembly and Assembly"](#) .

DUCTS AND GRILLES

DUCTS AND GRILLES

PFP:27860

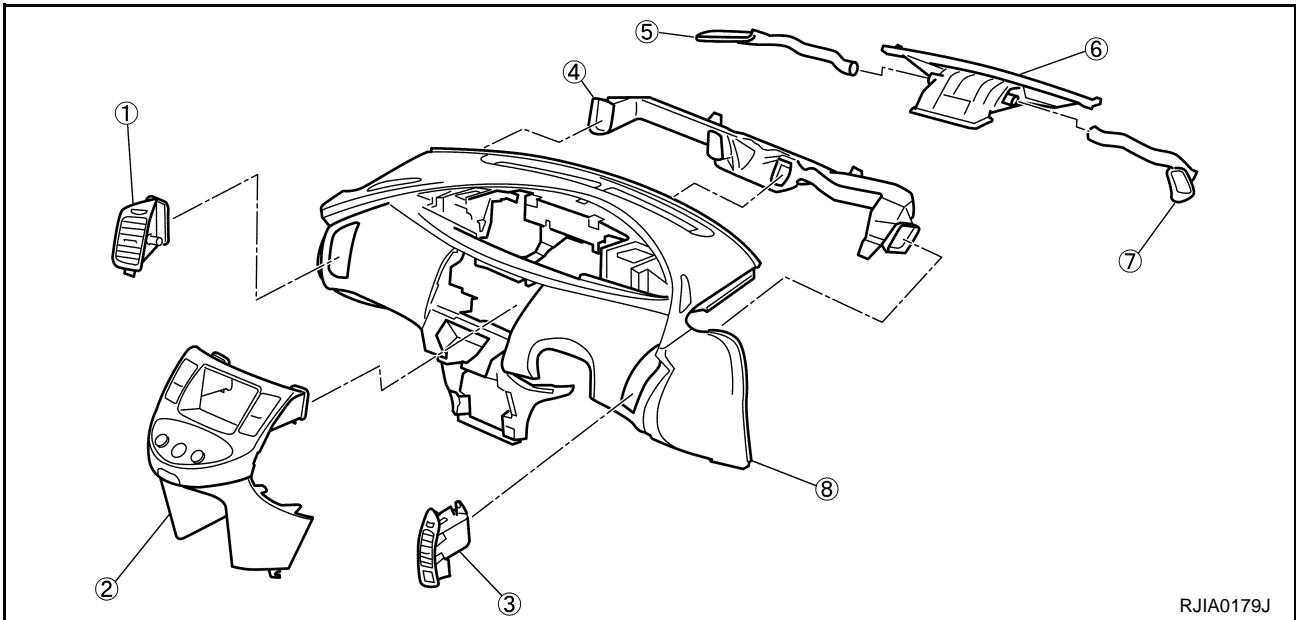
Removal and Installation

VENTILATOR DUCT, DEFROSTER NOZZLE AND DEFROSTER DUCTS

EJS001J6

NOTE:

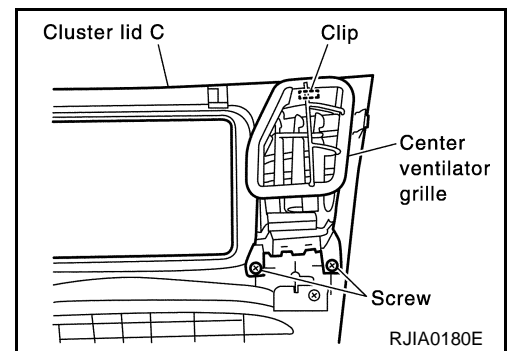
This illustration is for RHD models. The layout for LHD models is symmetrically opposite.



- | | | |
|----------------------------------|---|-----------------------------------|
| 1. Side ventilator grille (left) | 2. Cluster lid C (center ventilator grille) | 3. Side ventilator grille (right) |
| 4. Ventilator duct | 5. Side defroster duct | 6. Side defroster nozzle |
| 7. Side defroster duct (right) | 8. Instrument panel | |

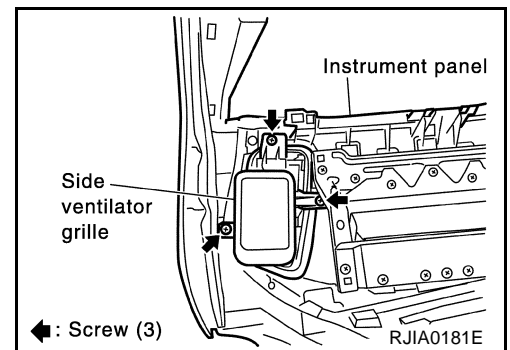
CENTER VENTILATOR GRILLE

1. Remove the cluster lid C. Refer to [IP-6, "CLUSTER LID C"](#).
2. Remove the center ventilator grille.



SIDE VENTILATOR GRILLE

1. Remove the instrument panel.
2. Remove the side ventilator grille.



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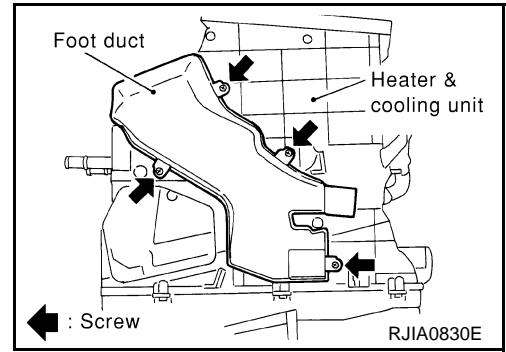
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DUCTS AND GRILLES

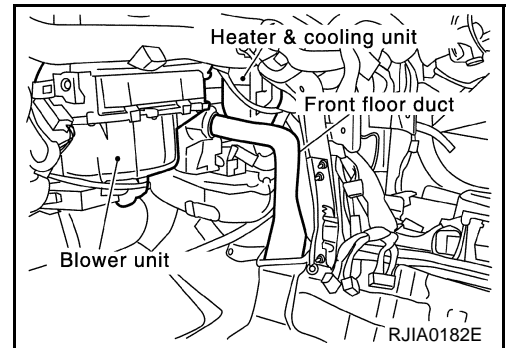
FOOT DUCT

1. Remove the heater & cooling unit. Refer to [ATC-116, "Removal and Installation"](#) .
2. Remove the foot duct.

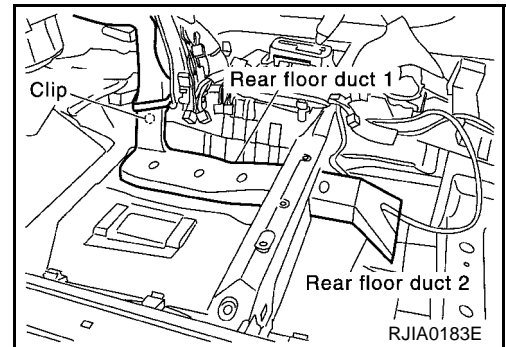


FLOOR DUCT

1. Remove the front seats.
2. Remove the instrument panel.
3. Remove the front floor duct.
4. Peel back the floor trim to a point where the floor duct is visible.



5. Remove the rear floor duct 2.
6. Remove the clip, then rear floor duct 1.



REFRIGERANT LINES

REFRIGERANT LINES

PFP:92600

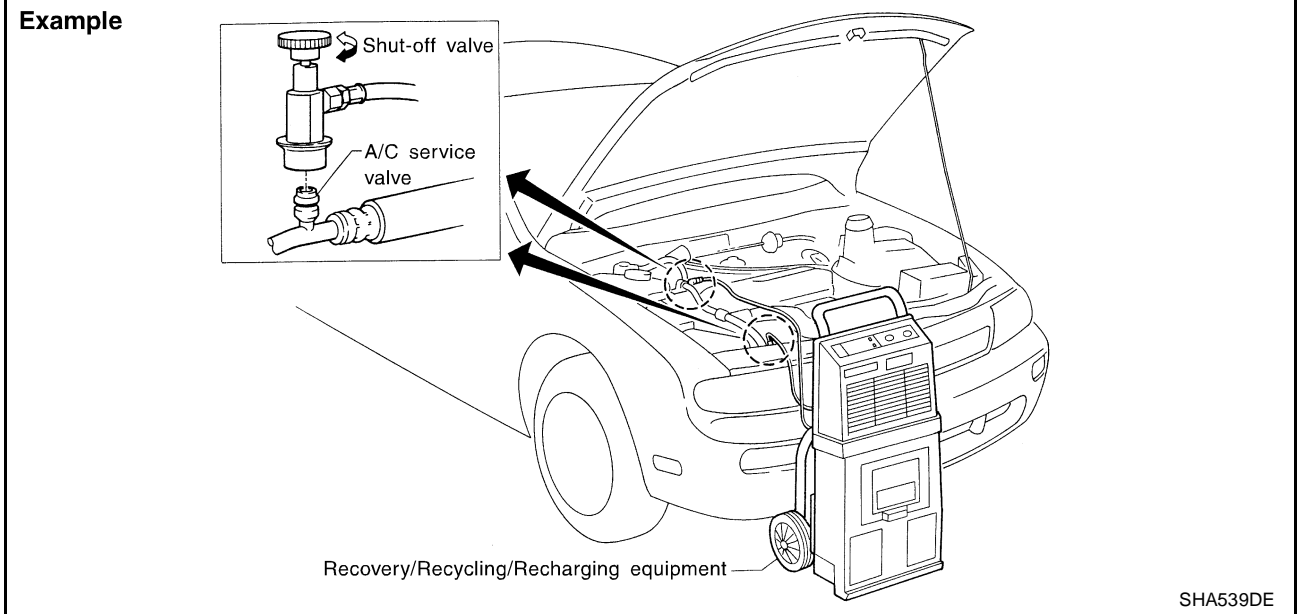
HFC-134a (R-134a) Service Procedure SETTING OF SERVICE TOOLS AND EQUIPMENT

EJS001J7

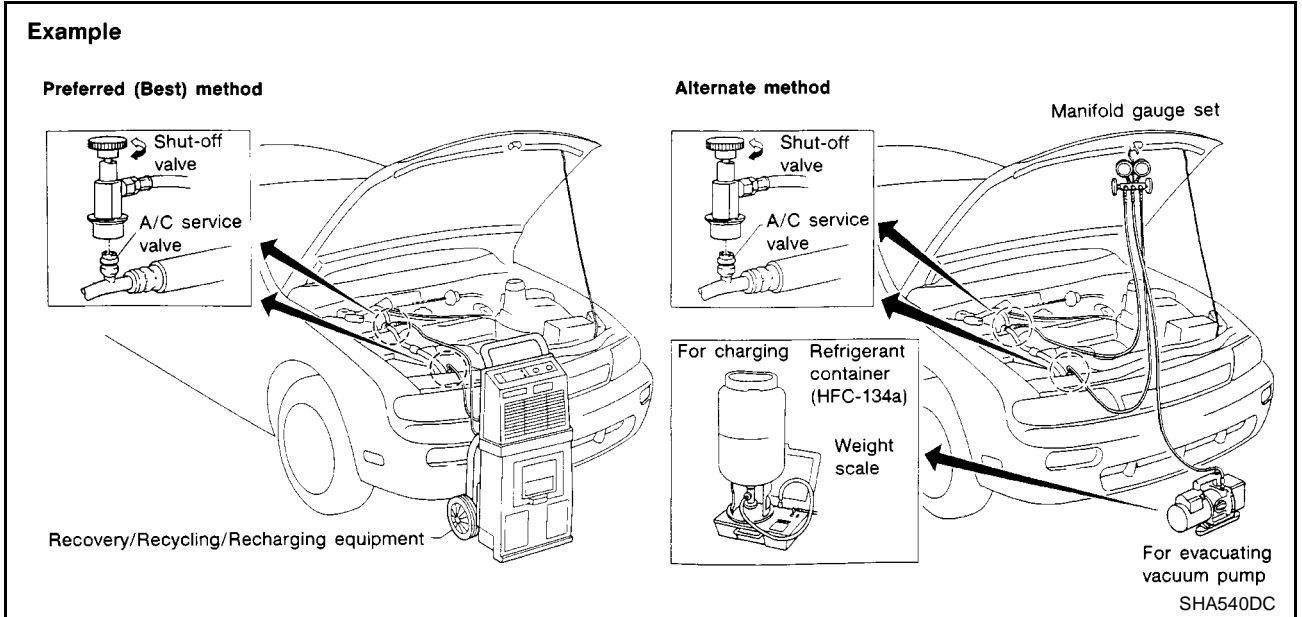
Discharging Refrigerant

WARNING:

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) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.

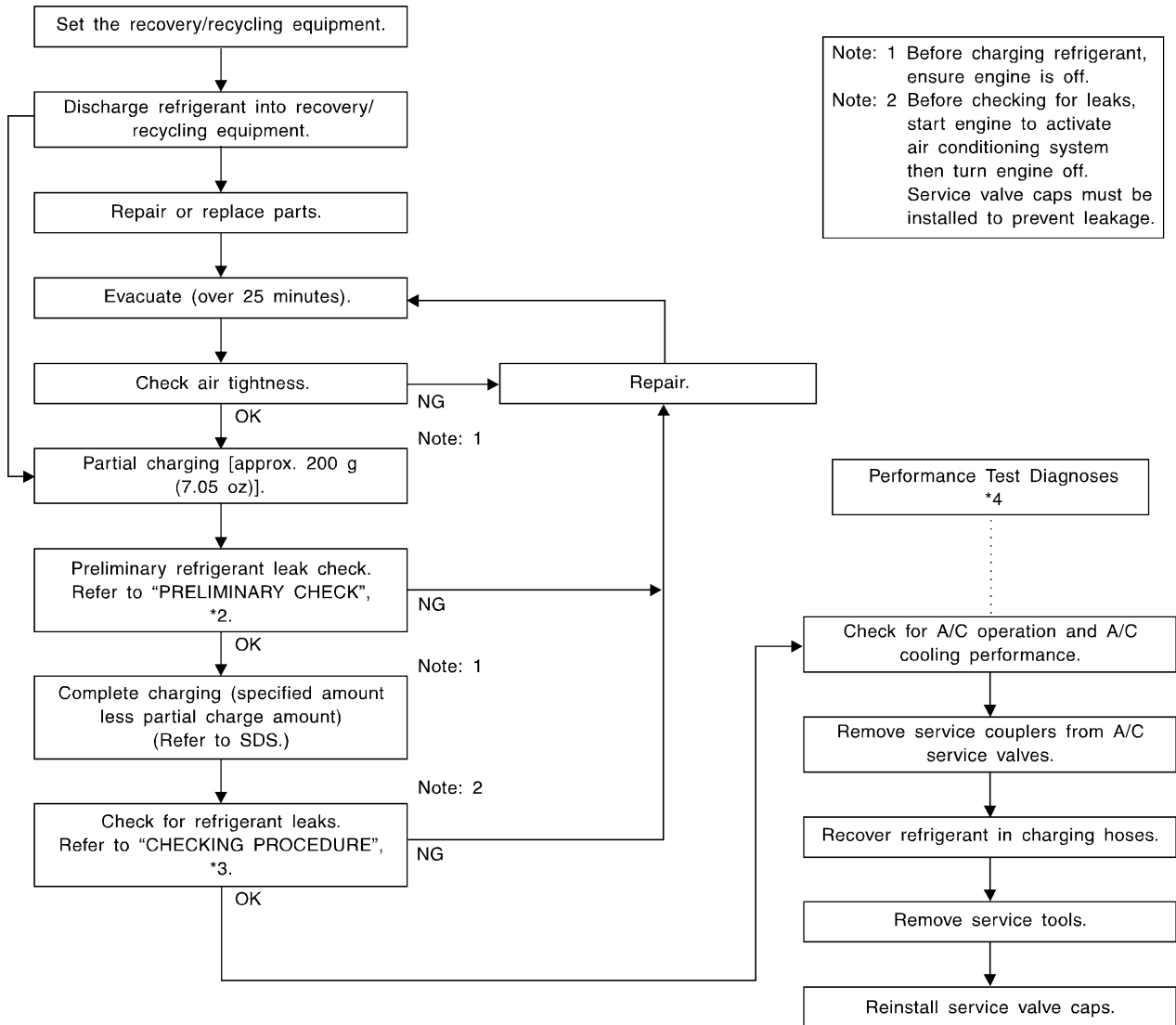


Evacuating System and Charging Refrigerant



REFRIGERANT LINES

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



SHA383F

*1 [ATC-21, "LUBRICANT RETURN OPERATION"](#)

*2 [ATC-142, "Checking for Refrigerant Leaks"](#)

*3 [ATC-142, "Checking for Refrigerant Leaks"](#)

*4 [ATC-82, "PERFORMANCE TEST DIAGNOSES"](#)

REFRIGERANT LINES

EJS001J8

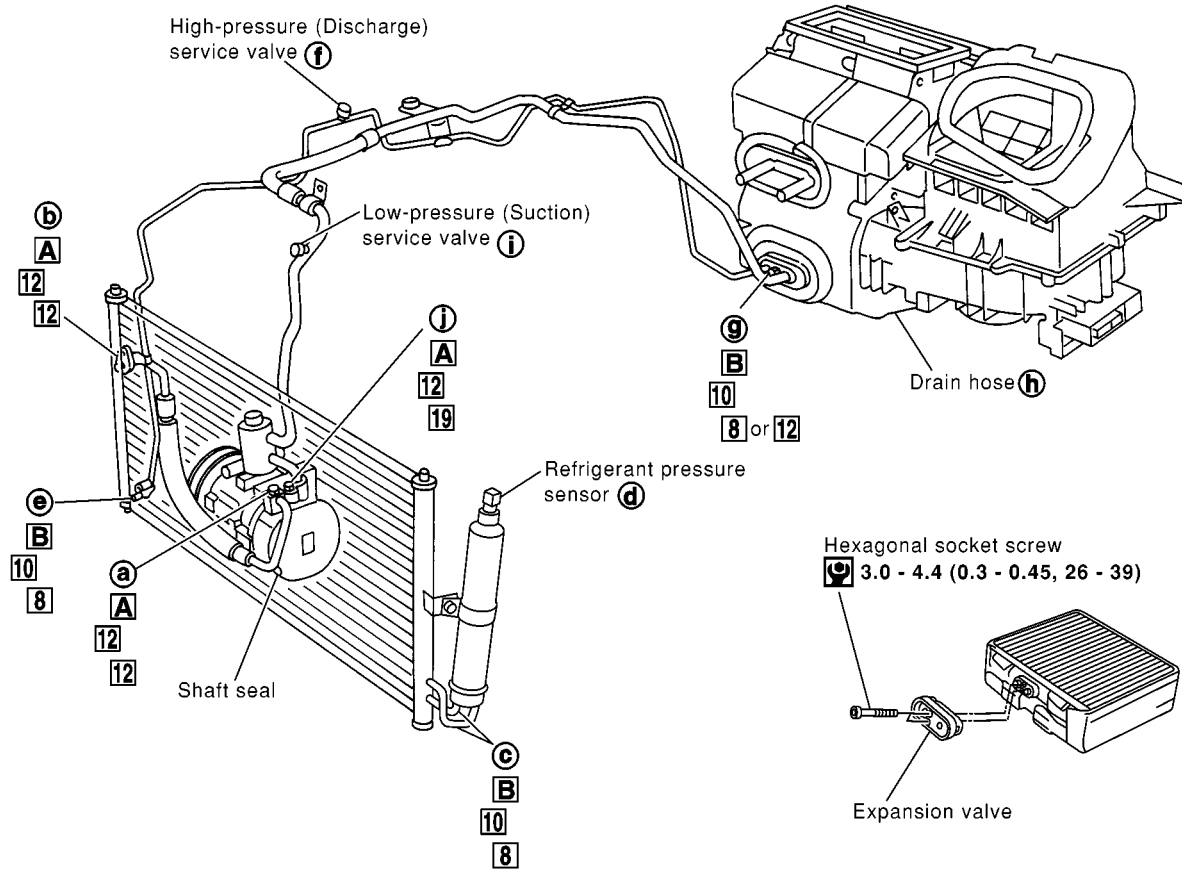
Components

Refer to page [ATC-5, "Precautions for Refrigerant Connection"](#) .

SEC. 271•274

RHD MODELS WITH QR ENGINE

The heater & cooling unit layout for LHD models is symmetrically opposite.



- : Refrigerant leak checking order
- (Tightening torque)
- (Wrench size)
- (O-ring size)
- ⊙ : N•m (kg-m, in-lb)
- A** : 7.8 - 19.6 (0.8 - 2.0, 69 - 173)
- B** : 3.4 - 5.9 (0.35 - 0.60, 30 - 52)

RJIA0831E

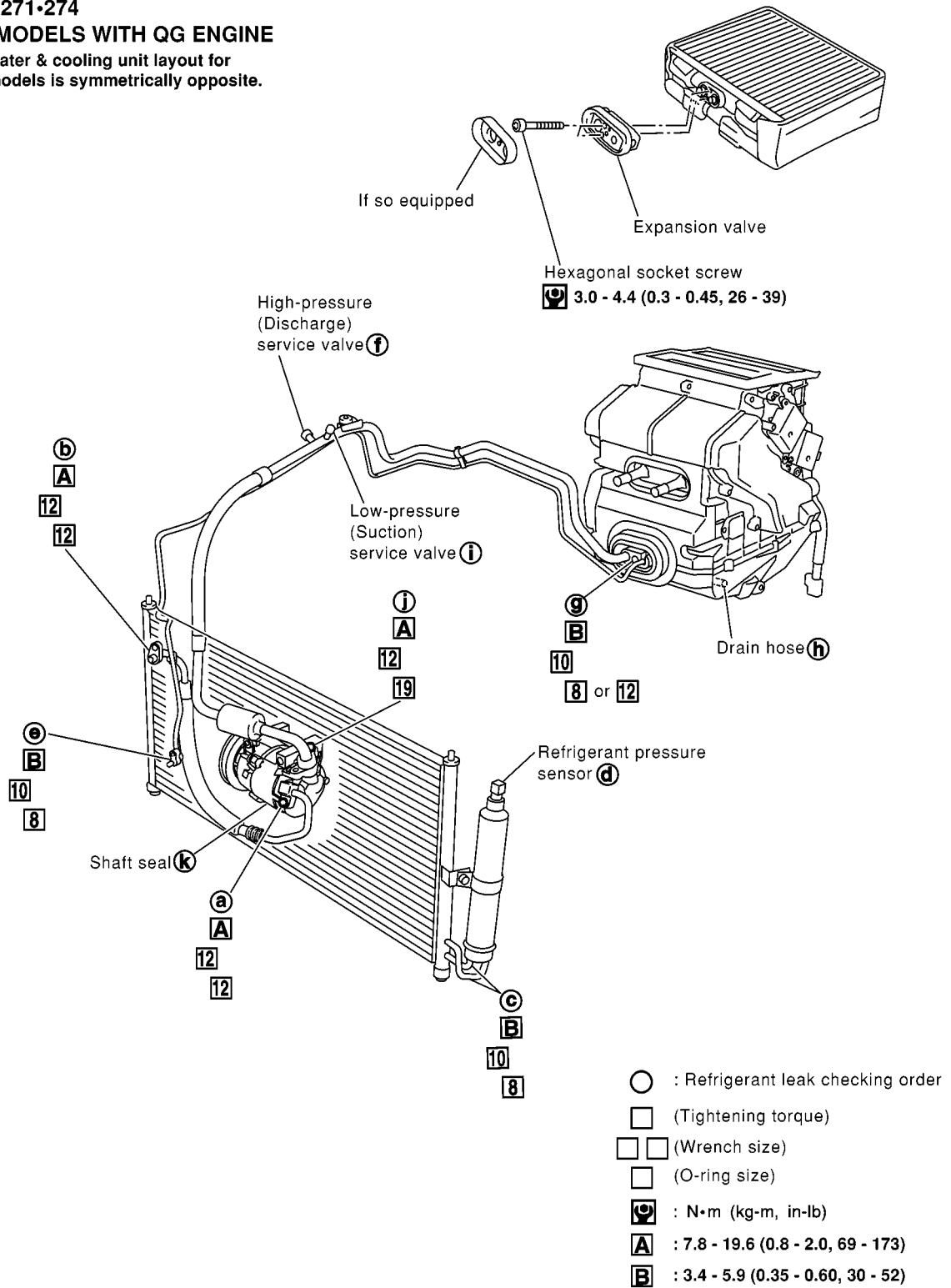
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REFRIGERANT LINES

SEC. 271-274

LHD MODELS WITH QG ENGINE

The heater & cooling unit layout for RHD models is symmetrically opposite.



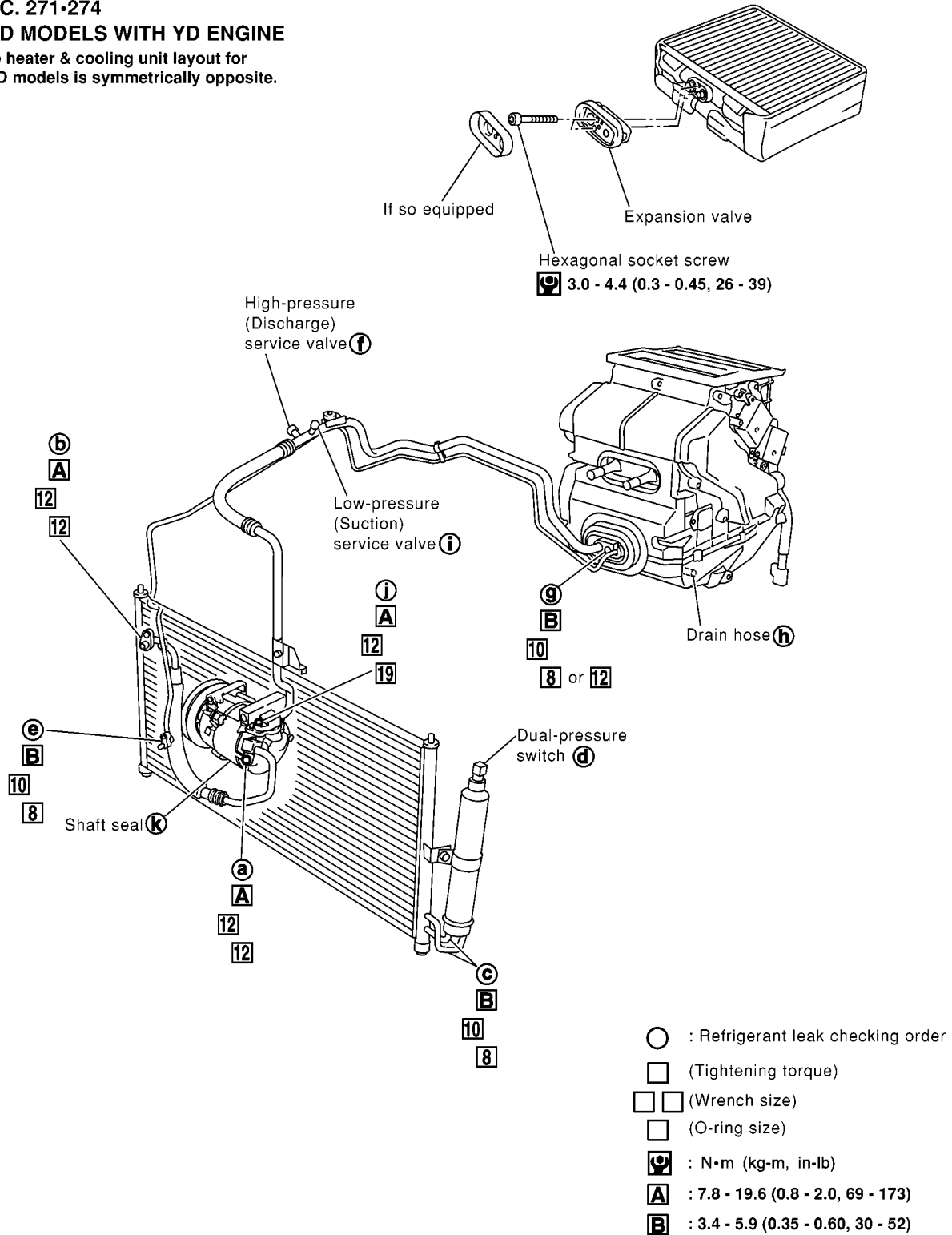
RJIA0832E

REFRIGERANT LINES

SEC. 271-274

LHD MODELS WITH YD ENGINE

The heater & cooling unit layout for RHD models is symmetrically opposite.



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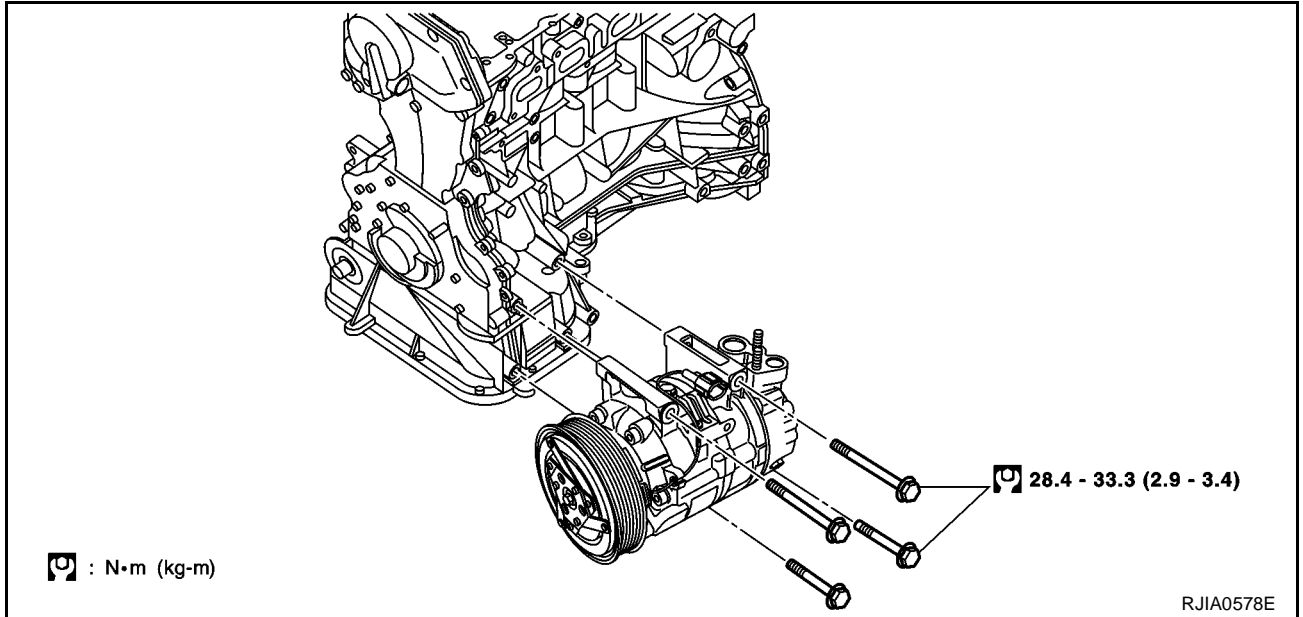
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RJIA0839E

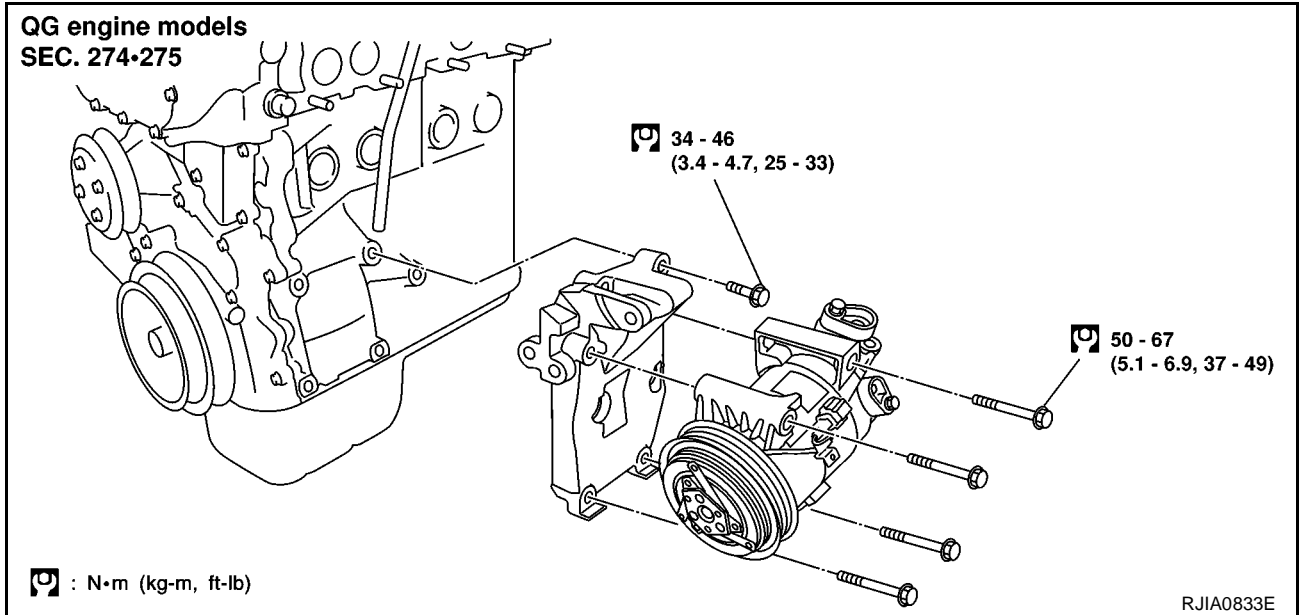
REFRIGERANT LINES

EJS001J9

Compressor REMOVAL With QR Engine

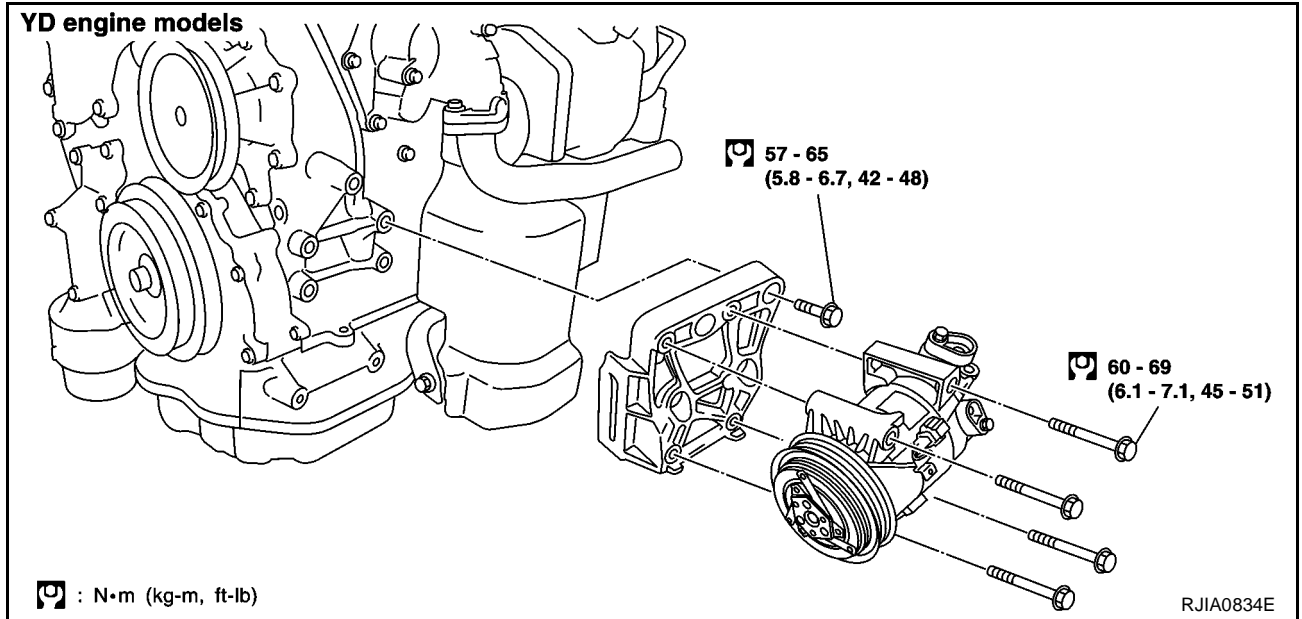


With QG Engine

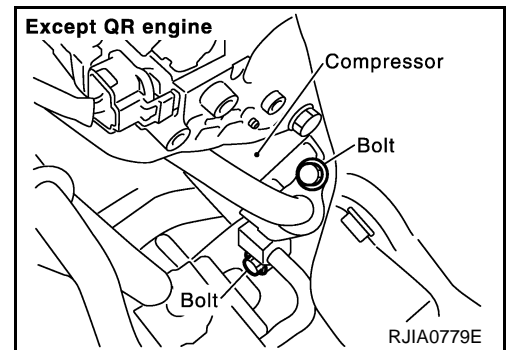
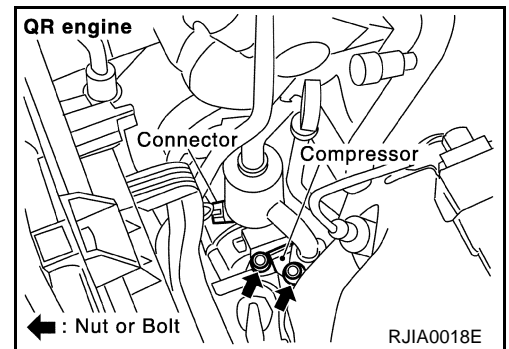


REFRIGERANT LINES

With YD Engine

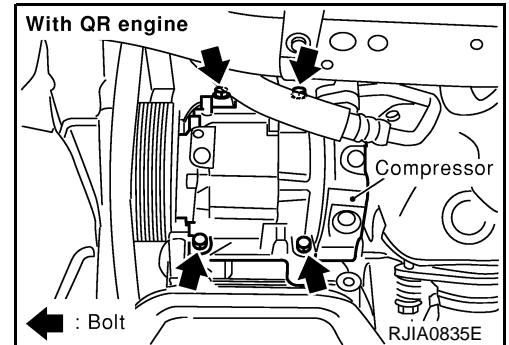


1. Use refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.
2. Disconnect the compressor connector.
3. Remove the engine under cover (right side).
4. Remove the compressor-alternator belt. Refer to [EM-112, "Removal and Installation"](#) (QR engine), [EM-16, "Removal and Installation"](#) (QG engine), [EM-212, "Removal and Installation"](#) (YD engine).

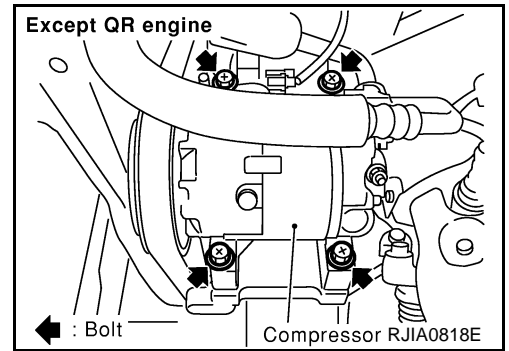


5. Remove the mounting nuts (bolts) from the high-pressure flexible hose and low-pressure flexible hose.

CAUTION:
Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
6. Remove the mounting bolts from compressor.
7. Remove the compressor from the lower side of the vehicle.



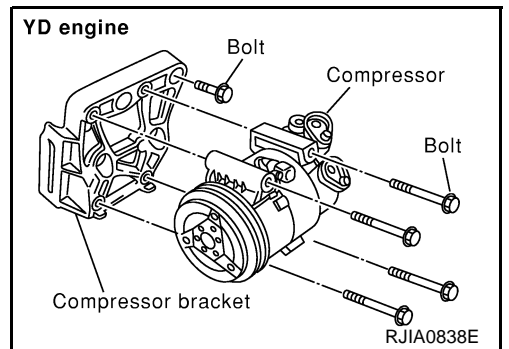
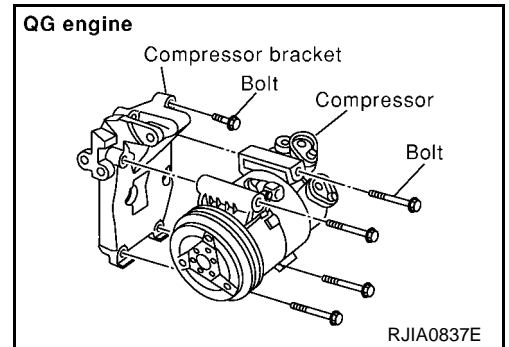
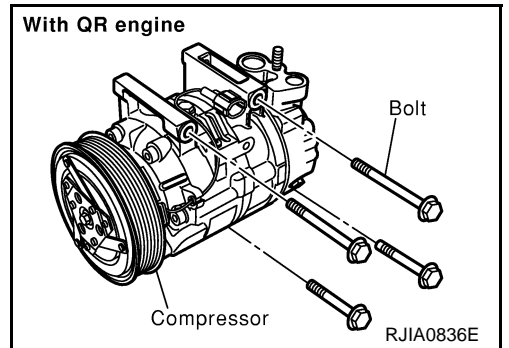
REFRIGERANT LINES



INSTALLATION

CAUTION:

- Replace the O-ring of the low-pressure flexible hose and high-pressure flexible hose with a new one, then apply compressor oil to it when installing it.
- When pouring refrigerant, check for leaks.



Compressor mounting bolt (QR engine)

Tightening torque : 28.4 - 33.3 N-m (2.9 - 3.4 kg-m, 21 - 24 ft-lb)

Compressor mounting bolt (QG engine)

Tightening torque : 50 - 60 N-m (5.1 - 6.9 kg-m, 37 - 49 ft-lb)

Compressor mounting bolt (YD engine)

Tightening torque : 60 - 69 N-m (6.1 - 7.1 kg-m, 45 - 51 ft-lb)

Compressor bracket mounting bolt (QG engine)

Tightening torque : 34 - 46 N-m (3.4 - 4.7 kg-m, 25 - 33 ft-lb)

Compressor bracket mounting bolt (YD engine)

Tightening torque : 57 - 65 N-m (5.8 - 6.7 kg-m, 42 - 48 ft-lb)

Nut (bolt) mounting the high-pressure flexible hose

REFRIGERANT LINES

Tightening torque : 7.8 - 19.6 N-m (0.8 - 2.0 kg-m, 69 - 173in-lb)

Nut (bolt) mounting the low-pressure flexible hose

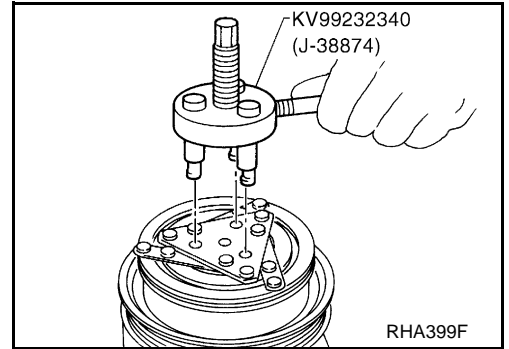
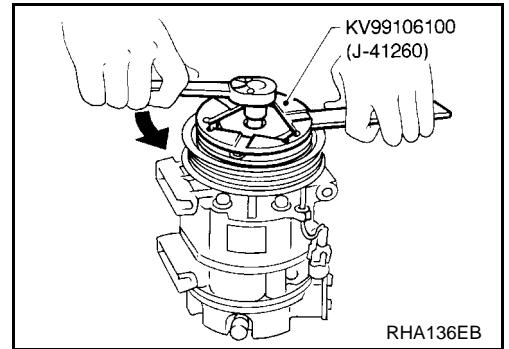
Tightening torque : 7.8 - 19.6 N-m (0.8 - 2.0 kg-m, 69 - 173in-lb)

Compressor Clutch REMOVAL

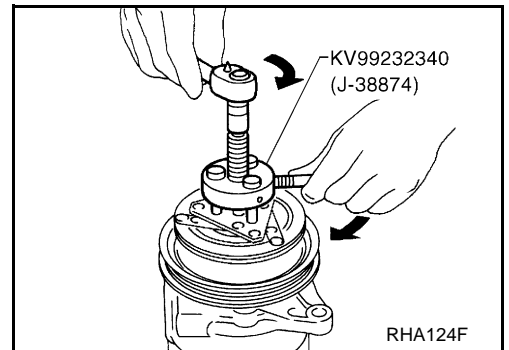
Overhaul

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

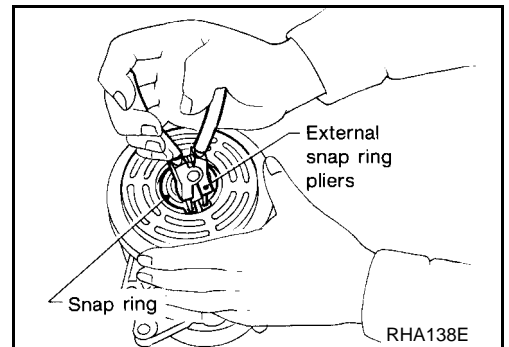
EJS001PB



2. Remove the clutch disc using the clutch disc puller.



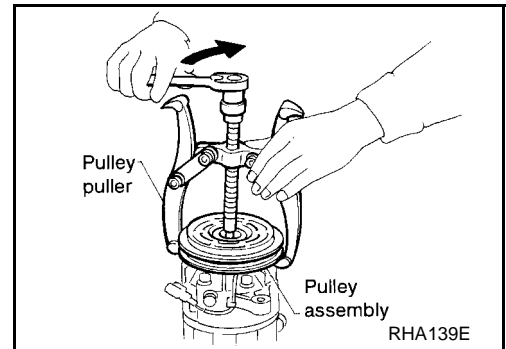
3. Remove the snap ring using external snap ring pliers.



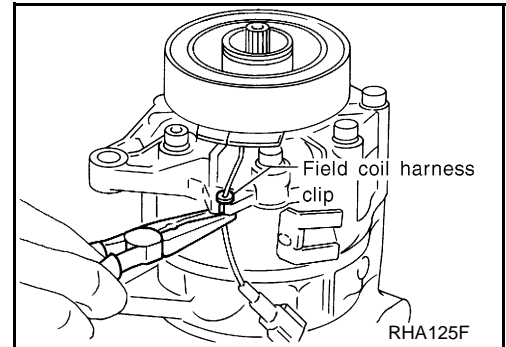
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REFRIGERANT LINES

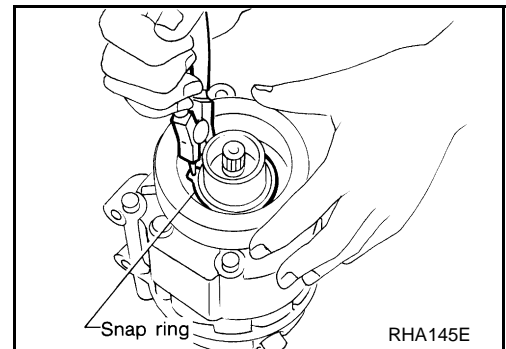
4. Position the center pulley puller on the end of the drive shaft, and remove the pulley assembly using any commercially available pulley puller.
To prevent the pulley groove from being deformed, the puller claws should be positioned into the edge of the pulley assembly.



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



6. Remove the snap ring using external snap ring pliers.



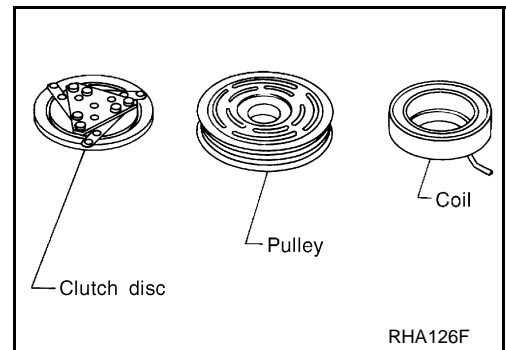
Inspection

Clutch disc

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

Pulley

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



Coil

Check coil for loose connection or cracked insulation.

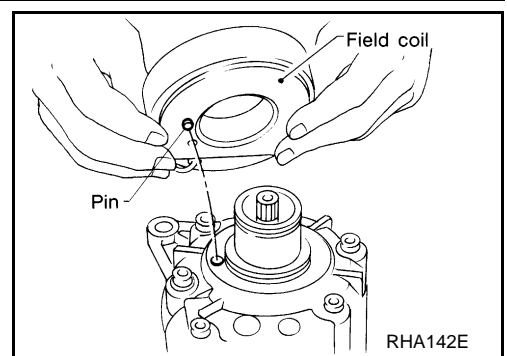
INSTALLATION

1. Install the field coil.

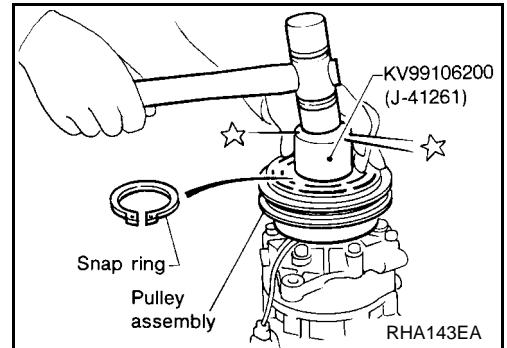
REFRIGERANT LINES

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

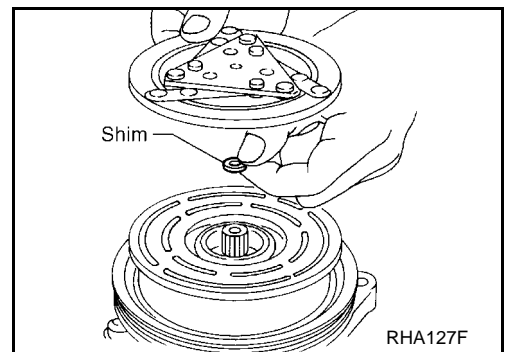
2. Install the field coil harness clip using a screwdriver.



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



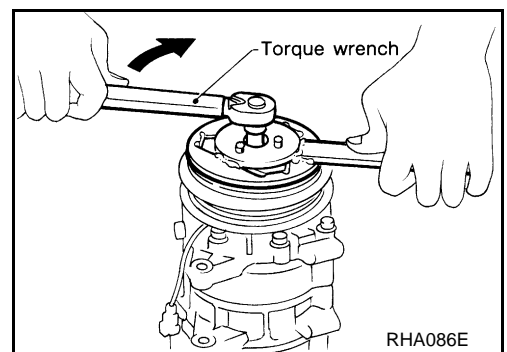
4. Install the clutch disc on the drive shaft, together with the original shim(s). Press the clutch disc down by hand.



5. Using the holder to prevent clutch disc rotation.

Tightening torque : 14 N-m (1.4 kg-m, 10 ft-lb)

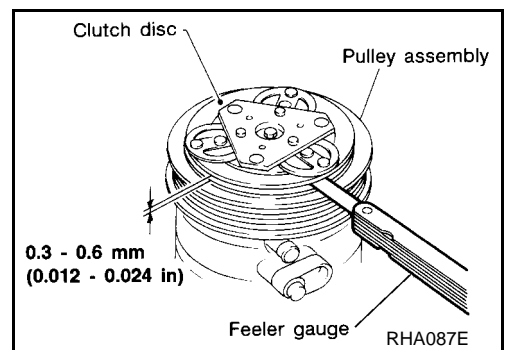
After tightening the bolt, check that the pulley rotates smoothly.



6. 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.



A
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REFRIGERANT LINES

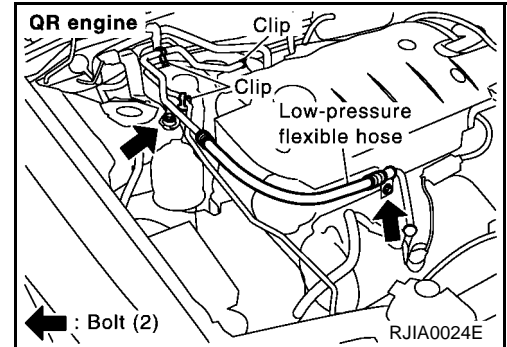
Break-In Operation

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.

Low-pressure Flexible Hose REMOVAL

EJS001JB

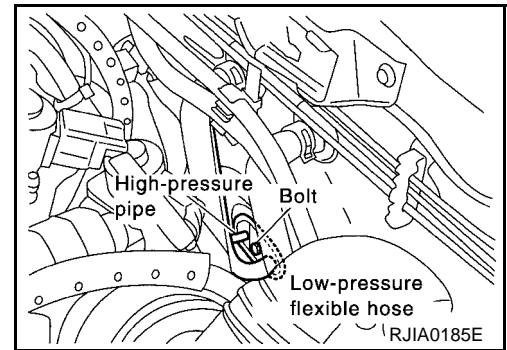
1. Use refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.
2. Remove the cowl top panel.
3. Remove the canister from bracket. (With QR engine)
4. Remove the clip from the low-pressure flexible hose.



5. Remove the mounting bolts from the low-pressure flexible hose.
6. Remove the low-pressure flexible hose.

CAUTION:

Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

CAUTION:

- Replace the O-ring of the low-pressure flexible hose with a new one, then apply compressor oil to it when installing it.
- When pouring refrigerant, check for leaks.

Low-pressure flexible hose and bolts mounting the high-pressure pipe (evaporator side)

Tightening torque :2.9 - 5.9 N-m (0.29 - 0.6 kg-m, 26 - 52 in-lb)

Nut (Bolt) mounting the low-pressure flexible hose (compressor side)

Tightening torque :7.8 - 19.6 N-m (0.8 - 2.0 kg-m, 70 - 173 in-lb)

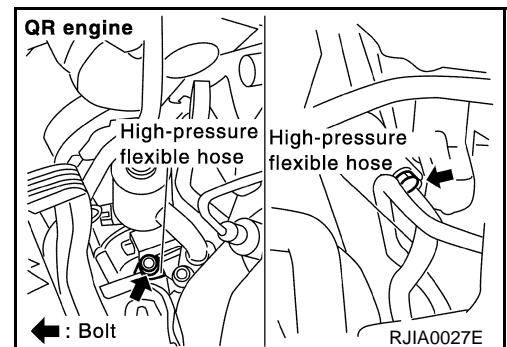
High-pressure Flexible Hose REMOVAL

EJS001JC

1. Use refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.
2. Remove the clip from high-pressure flexible hose.
3. Remove the mounting bolt and nut from the high-pressure flexible hose, then remove it.

CAUTION:

Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



REFRIGERANT LINES

INSTALLATION

CAUTION:

- Replace the O-ring of the high-pressure flexible hose with a new one, then apply compressor oil to it when installing it.
- When pouring refrigerant, check for leaks.

Bolt and nut mounting the high-pressure flexible hose

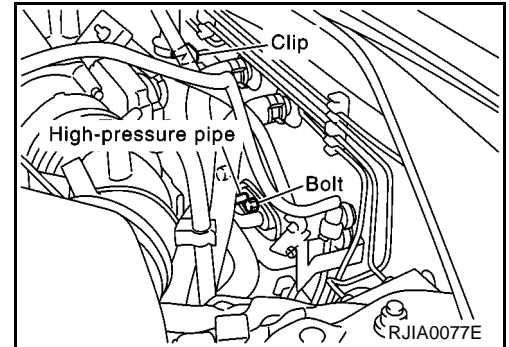
Tightening torque

:7.8 - 19.6 N-m (0.8 - 2.0 kg-m, 70 - 173 in-lb)

High-pressure Pipe

REMOVAL

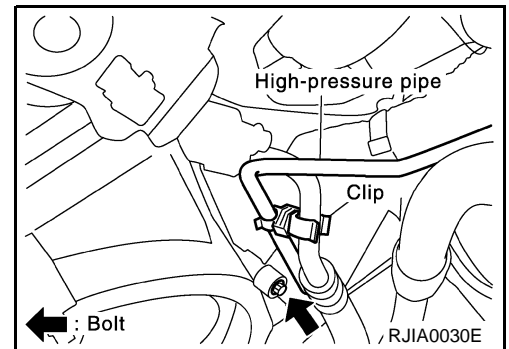
1. Use refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.
2. Remove the cowl top panel.
3. Remove the low-pressure flexible hose. Refer to [ATC-138](#), "[Low-pressure Flexible Hose](#)".
4. Remove the high-pressure pipe from the clip.



5. Remove the mounting bolt from the high-pressure pipe.
6. Remove the high-pressure pipe.

CAUTION:

Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

CAUTION:

- Replace the O-ring of the high-pressure pipe and low-pressure flexible hose with a new one, then apply compressor oil to it when installing it.
- When pouring refrigerant, check for leaks.

Bolts mounting the high-pressure pipe (condenser side, evaporator side)

Tightening torque

:2.9 - 5.9 N-m (0.29 - 0.6 kg-m, 26 - 52 in-lb)

Refrigerant Pressure Sensor

REMOVAL AND INSTALLATION

1. Use refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.

EJS001JD

R/JIA0077E

R/JIA0030E

EJS001PC

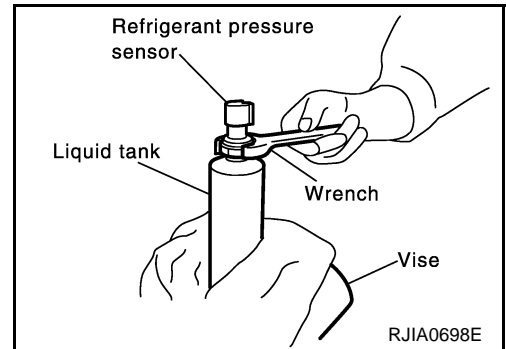
REFRIGERANT LINES

2. Remove the liquid tank.
3. Using a vise, secure liquid tank, and remove refrigerant pressure sensor.

CAUTION:

- When working, be careful not to damage the compressor fan.
- Apply compressor oil to the O-ring of the refrigerant pressure sensor when installing it.

Tightening torque :9.8 - 11.7 N-m (1.0 - 1.2kg-m, 87 - 104 in-lb)



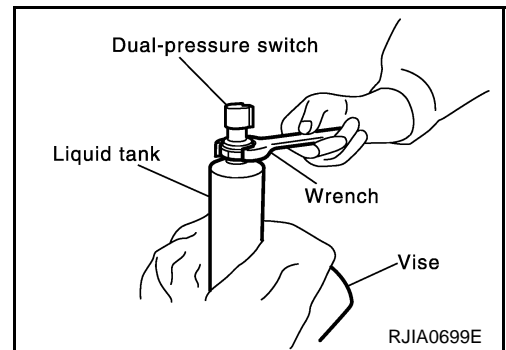
Dual-pressure Switch REMOVAL AND INSTALLATION

1. Use refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.
2. Remove the liquid tank.
3. Using a vise, secure liquid tank, and remove refrigerant pressure sensor.

CAUTION:

- When working, be careful not to damage the compressor fan.
- Apply compressor oil to the O-ring of the refrigerant pressure sensor when installing it.

Tightening torque :9.8 - 11.7 N-m (1.0 - 1.2kg-m, 87 - 104 in-lb)



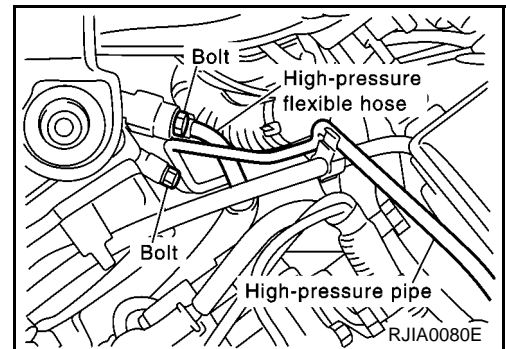
Condenser Assembly REMOVAL

1. Use refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.
2. Disconnect the high-pressure flexible hose and the high-pressure pipe from the condenser.

CAUTION:

Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

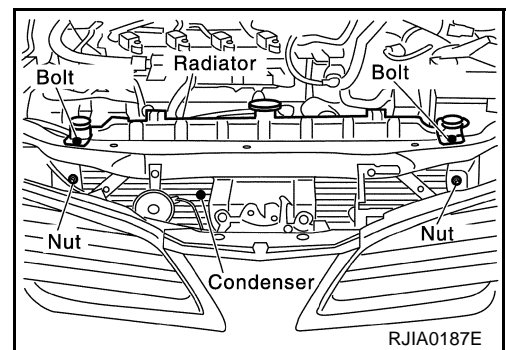
3. Remove the battery and battery tray.



4. Remove the front grille and radiator mounting bracket.
5. Remove the mounting nuts from the condenser upper bracket.
6. Remove the radiator from the lower mount, move it to the engine side, then remove the condenser between the radiator and the radiator core support.

CAUTION:

Be careful not to damage the core surface of the condenser and the radiator.



INSTALLATION

CAUTION:

- Replace the O-rings of the high-pressure pipe and the high-pressure flexible hose with new ones, then apply compressor oil to them after installing them.
- When pouring refrigerant, check for leaks.

REFRIGERANT LINES

High-pressure flexible hose mounting bolts

Tightening torque :7.8 - 19.6 N-m (0.8 - 2.0 kg-m, 70 - 173 in-lb)

High-pressure pipe mounting bolts

Tightening torque :2.9 - 5.9 N-m (0.29 - 0.6 kg-m, 26 - 52 in-lb)

Condenser mounting bolts

Tightening torque :3.82 - 4.51 N-m (0.39 - 0.46 kg-m, 34 - 39 in-lb)

Evaporator REMOVAL

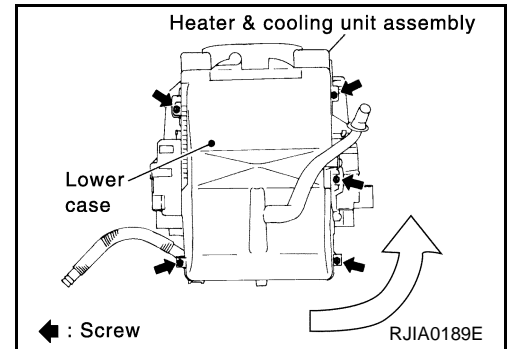
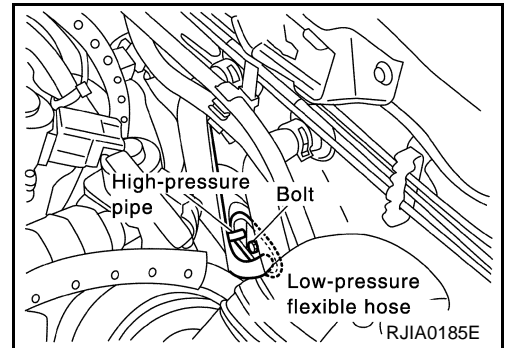
EJS001JH

1. Use refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.
2. Remove the cowl top panel.
3. Remove the canister from bracket. (With QR engine)
4. Disconnect the low-pressure flexible hose and the high-pressure pipe from the evaporator.

CAUTION:

Cap or wrap the joint of the low-pressure flexible hose and the high-pressure pipe with a suitable tool such as a vinyl tape to avoid the entry of air.

5. Hold expansion valve and move it slightly upward. Push evaporator toward rear of vehicle.
6. Remove the drain hose and lower cover mounting screw.
7. Swivel rear of lower case toward passenger seat to remove lower case.
8. Remove the intake sensor from evaporator.
9. Slide the evaporator to backward, then remove it from the heater & cooling unit.



INSTALLATION

CAUTION:

- Replace the O-rings of the low-pressure flexible hose and the high-pressure pipe with new ones, then apply compressor oil to them when installing them.
- Mark the mounting position of the intake sensor bracket.

Expansion Valve REMOVAL

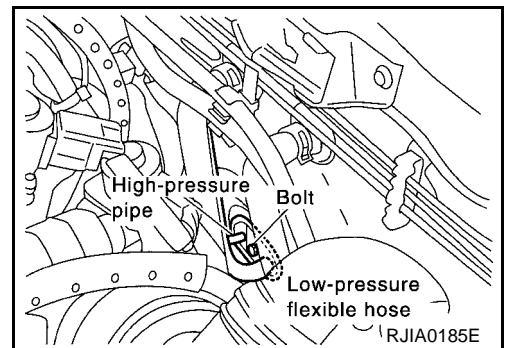
EJS001PE

1. Use refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.
2. Disconnect the low-pressure flexible hose and high-pressure pipe from the evaporator.

CAUTION:

Cap or wrap the joint of the low-pressure flexible hose and the high-pressure pipe with a suitable tool such as a vinyl tape to avoid the entry of air.

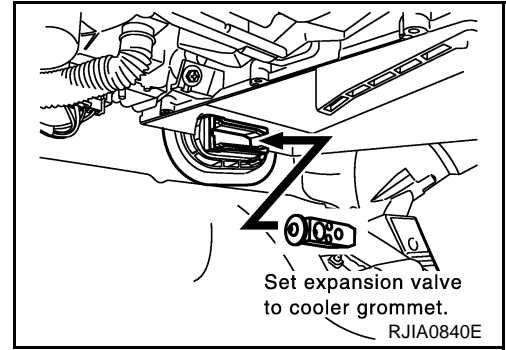
3. Remove the evaporator. Refer to [ATC-141, "REMOVAL"](#).
4. Remove the expansion valve from evaporator.



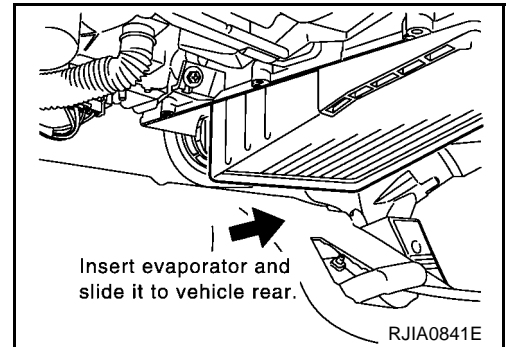
REFRIGERANT LINES

INSTALLATION

1. Set the expansion valve to cooler grommet.



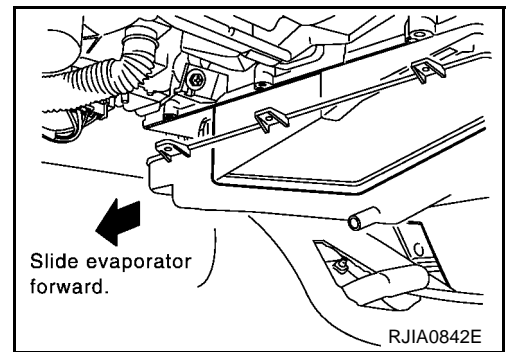
2. Install the evaporator to heater & cooling unit.



3. Install the lower cover, then slide evaporator to forward.
4. Install the expansion valve from engine compartment

Expansion valve mounting bolts

Tightening torque :2.9 - 5.0 N-m (0.30 - 0.50 kg-m, 26 - 44 in-lb)



Checking for Refrigerant Leaks

EJS001JK

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C lubricant leakage, damage and corrosion. A/C lubricant leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using either an electronic refrigerant leak detector or fluorescent dye leak detector.

If dye is observed, confirm the leak with an electronic refrigerant leak detector. It is possible a prior leak was repaired and not properly cleaned.

When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.

When searching for refrigerant leaks using an electronic leak detector, move the probe along the suspected leak area at 1 to 2 inches per second and no further than 1/4 inch from the component.

CAUTION:

Moving the electronic leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

Checking System for Leaks Using the Fluorescent Leak Detector

EJS001JL

1. Check A/C system for leaks using the UV lamp and safety glasses (J-42220) in a low sunlight area (area without windows preferable). Illuminate all components, fittings and lines. The dye will appear as a bright green/yellow area at the point of leakage. Fluorescent dye observed at the evaporator drain opening indicates an evaporator core assembly (tubes, core or TXV) leak.

REFRIGERANT LINES

2. If the suspected area is difficult to see, use an adjustable mirror or wipe the area with a clean shop rag or cloth, with the UV lamp for dye residue.
3. After the leak is repaired, remove any residual dye using dye cleaner (J-43872) to prevent future misdiagnosis.
4. Perform a system performance check and verify the leak repair with an approved electronic refrigerant leak detector.

NOTE:

Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and lubricants, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean.

Clean with a dry cloth or blow off with shop air.

Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

Dye Injection

EJS001JM

(This procedure is only necessary when recharging the system or when the compressor has seized and was replaced.)

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.45 bar, 3.52kg/cm², 50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool (J-41459).
3. Connect the injector tool to the A/C LOW PRESSURE side service fitting.
4. Start engine and switch A/C ON.
5. When the A/C operating (compressor running), inject one bottle (1/4 ounce / 7.4 cc) of fluorescent dye through the low-pressure service valve using dye injector tool J-41459 (refer to the manufacture's operating instructions).
6. With the engine still running, disconnect the injector tool from the service fitting.

CAUTION:

Be careful the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.

7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.

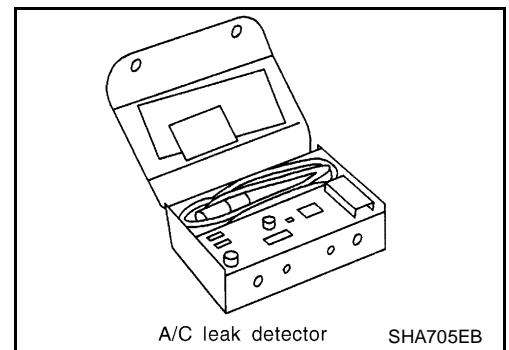
Electronic Refrigerant Leak Detector

EJS001JN

PRECAUTIONS FOR HANDLING LEAK DETECTOR

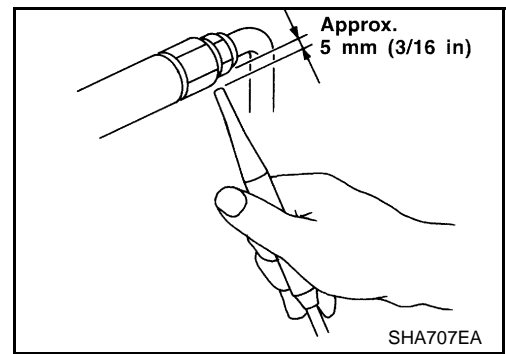
When performing a refrigerant leak check, use an A/C leak detector or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.

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

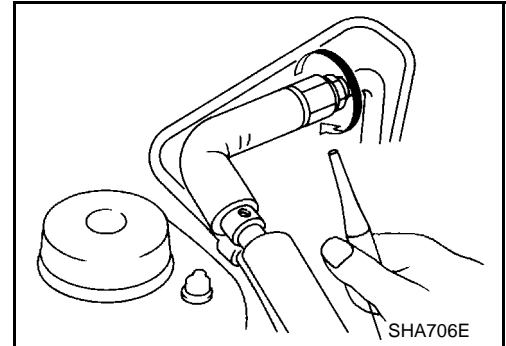


REFRIGERANT LINES

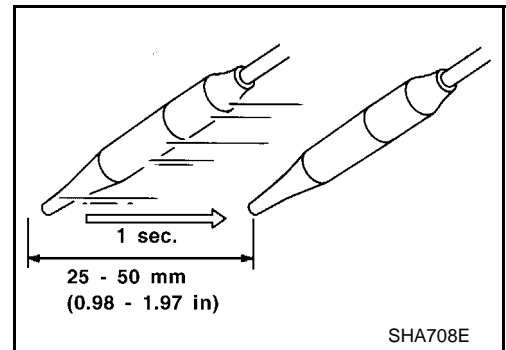
1. Position probe approximately 5 mm (3/16 in) away from point to be checked.



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



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



CHECKING PROCEDURE

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

1. Turn engine OFF.
2. Connect a suitable A/C manifold gauge set to the A/C service ports.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.45 bar, 3.52 kg/cm², 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.

NOTE:

At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.54 kg/cm², 50 psi).

4. Conduct the leak test from the high side (compressor discharge a to evaporator inlet f) to the low side (evaporator drain hose g to shaft seal i). Refer to [ATC-129, "Components"](#). Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detected probe completely around the connection/component. [ATC-129, "Components"](#).

Compressor

Check the fitting of high and low pressure hoses, relief valve and shaft seal.

Liquid tank

Check the refrigerant pressure sensor.

Service valves

REFRIGERANT LINES

Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).

NOTE:

After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.

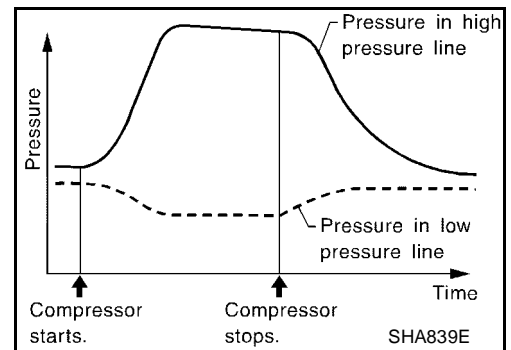
Cooling unit (Evaporator)

With engine OFF, turn blower fan on "High" for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer's recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.

Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

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

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



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

Service Data and Specifications (SDS) COMPRESSOR

EJS001JO

Model	With QR engine	Without QR engine
	CALSONIC KANSEI make CWV-615	CALSONIC KANSEI make CSV-613
Type	V-6 variable displacement	

REFRIGERANT LINES

Displacement cm ³ (cu. in)/rev	Max.	146 (8.91)	125 (7.628)
	Min.	14.5 (0.885)	6.0(0.366)
Cylinder bore × stroke mm (in)		37 (1.46) × [2.3 - 28.6 (0.091 - 1.126)]	32 (1.26) × [1.2 - 25.9 (0.047 - 1.020)]
Direction of rotation		Clockwise (viewed from drive end)	
Drive belt		With gasoline engine: Poly V With diesel engine: Type A	

LUBRICANT

Model		All models
Name		Nissan A/C System Oil Type S
Part number		KLH00-PAGS0
Capacity ml (Imp fl oz)	Total in system	180 (6.3)
	Compressor (Service part) charging amount	180 (6.3)

REFRIGERANT

Type	HFC-134a (R-134a)
Capacity kg (lb)	0.50 (1.10)

ENGINE IDLING SPEED

Refer to [EC-54, "IDLE SPEED"](#) for QG engine(WITH EURO-OBD),[EC-588, "IDLE SPEED"](#) for QG engine(WITHOUT EURO-OBD),[EC-997, "IDLE SPEED"](#) for QR engine (WITH EURO-OBD),[EC-1439, "IDLE SPEED"](#) for QG engine(WITHOUT EURO-OBD),[EC-1754, "Basic Inspection"](#) Check IDLE SPEED for YD engine.

BELT TENSION

Refer to [EM-112, "Tension Adjustment"](#) for QR engine, [EM-15, "Tension Adjustment"](#) for QG engine, [EM-211, "Tension Adjustment"](#) for YD engine.