SECTION ATC
AUTOMATIC AIR CONDITIONER

CONTENTS

PRECAUTIONS

PFP:00001

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

EJS002PJ

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. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. 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 harnesses or harness connectors.**

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

EJS002PK

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed compressor failure is likely to occur. Refer ATC-4, "Contaminated Refrigerant" . To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.**
- **Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) oil 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 oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.**
  - **Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.**
  - **Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.**

Contaminated Refrigerant

EJS002PL

If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility

does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.

- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact NISSAN Customer Affairs for further assistance.

General Refrigerant Precautions

EJS002PM

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 HFC-134a (R-134a) have been 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.**

Precautions for Leak Detection Dye

EJS002PN

- 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 goggles to protect your eyes and enhance the visibility of the fluorescent dye.
- 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 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 HFC-134a (R-134a) and HC-12 (R-12) A/C systems are different. Do not use HFC-134a (R-134a) leak detection dye in R-12 A/C systems or HC-12 (R-12) leak detection dye in HFC-134a (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.

A/C Identification Label

EJS002PO

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

Precautions for Refrigerant Connection

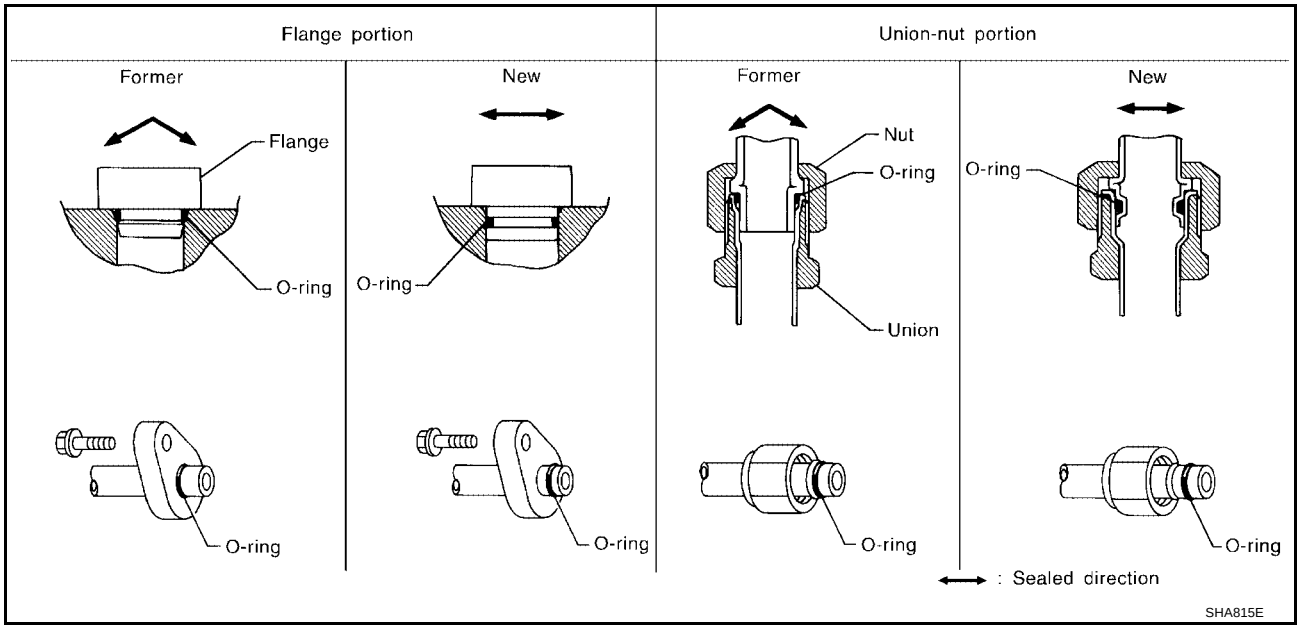
EJS002PP

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

- Expansion valve to cooling unit
- Evaporator pipes to evaporator (inside cooling unit)
- Refrigerant pressure sensor

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.



O-RING AND REFRIGERANT CONNECTION

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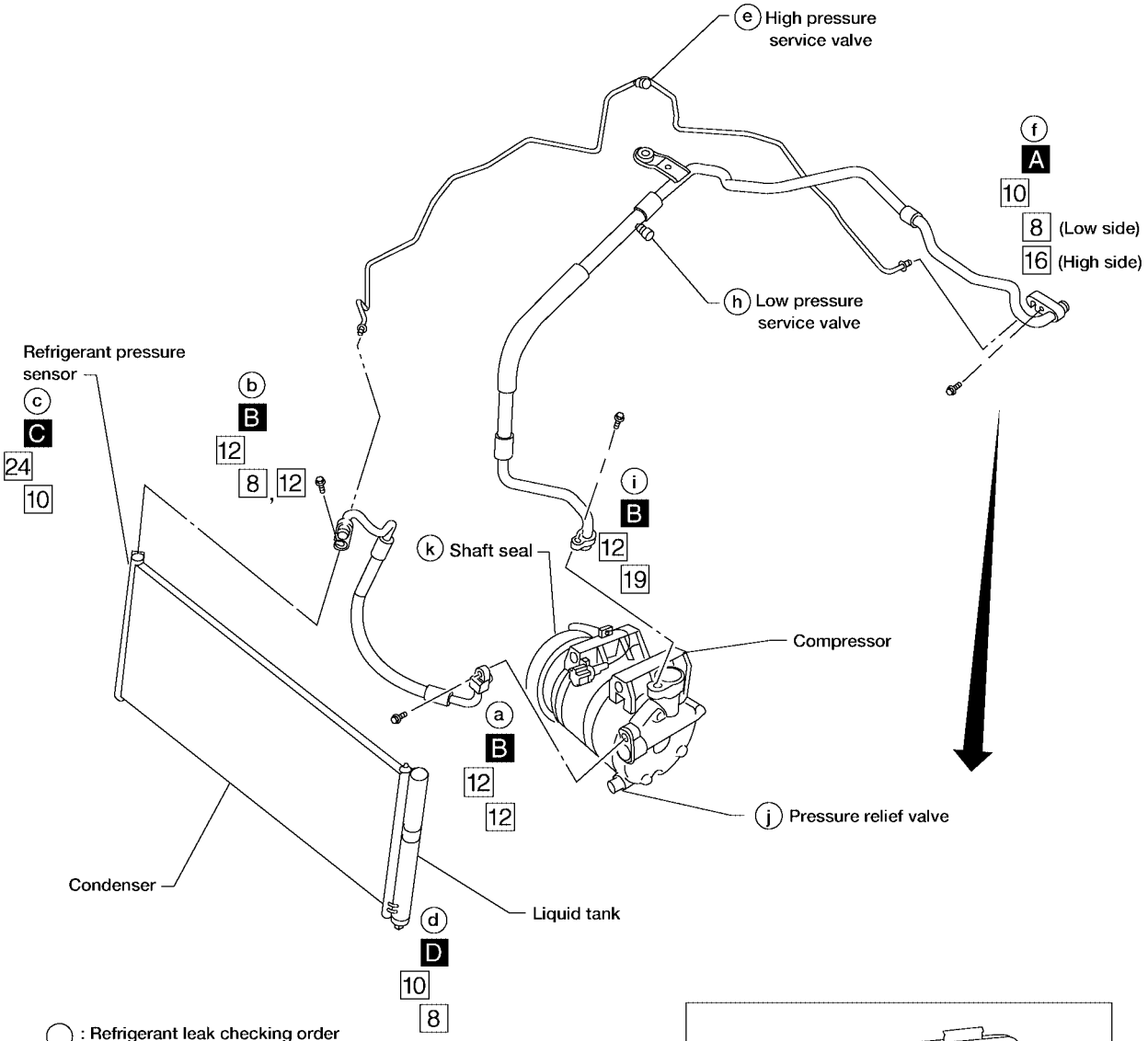
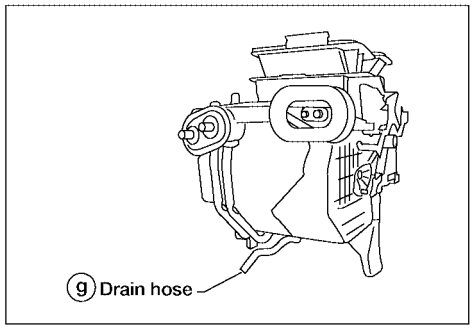
SEC. 214 • 271 • 274 • 276





○ : Refrigerant leak checking order

□ : (Tightening torque)

□ □ : (Wrench size)

□ : (O-ring size)

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

A : 2.9 – 5.9 (0.29 – 0.60, 26 – 52)

B : 7.8 – 19.6 (0.8 – 1.9, 69 – 173)

C : 9.8 – 11.7 (1.0 – 1.1, 7.3 – 8.6)

D : 5.0 – 6.47 (0.51 – 0.65, 45 – 57)

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VQ35DE

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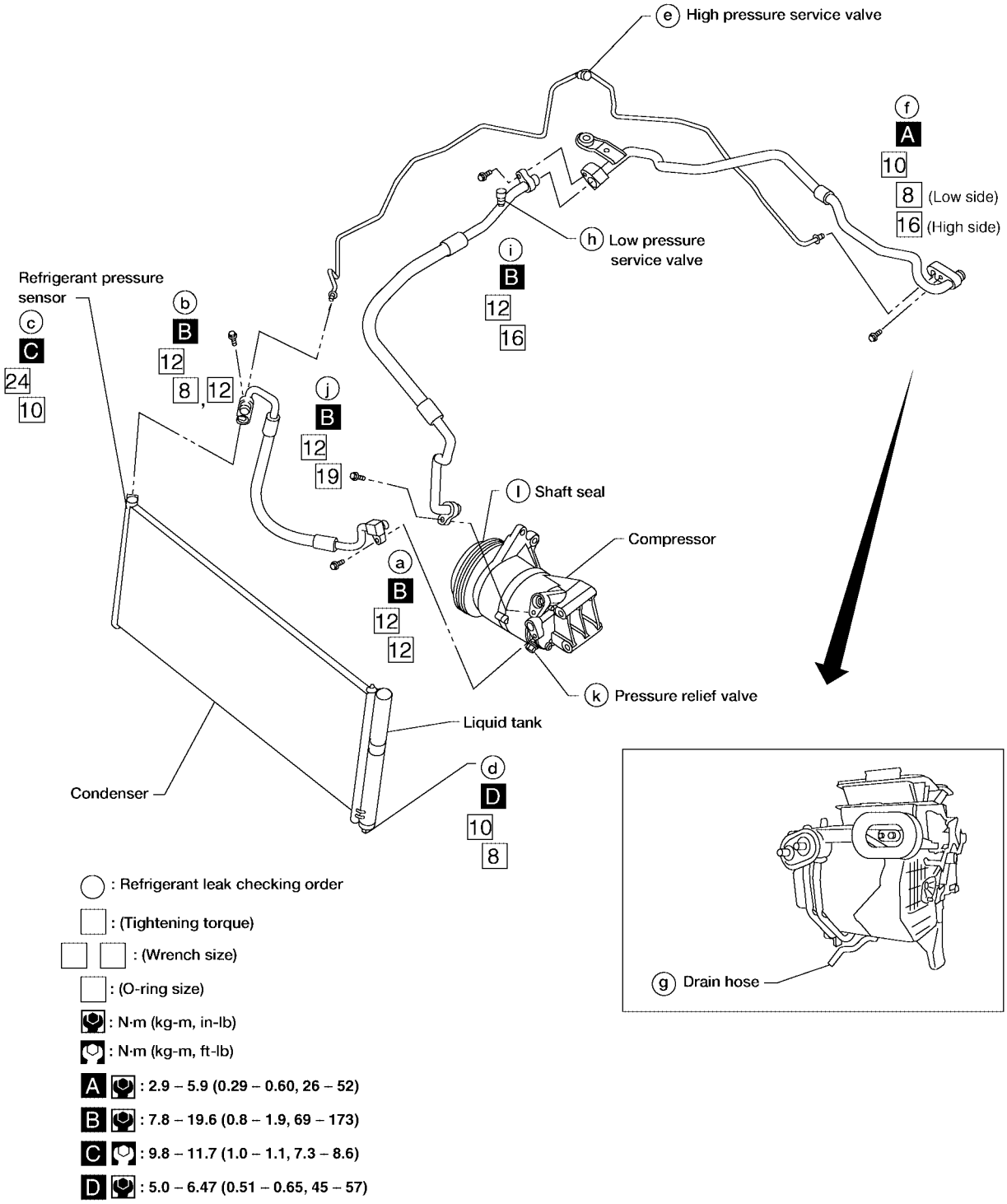

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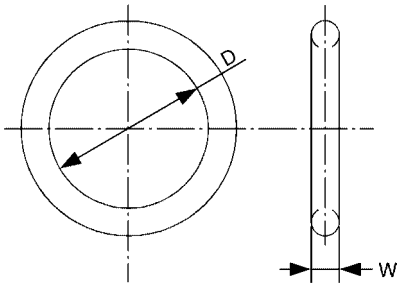
CAUTION:

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



SHA814E

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	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)
New	24	92195 AH300	21.8 (0.858)	2.4 (0.094)

*: Always check with the Parts Department for the latest parts information.

WARNING:

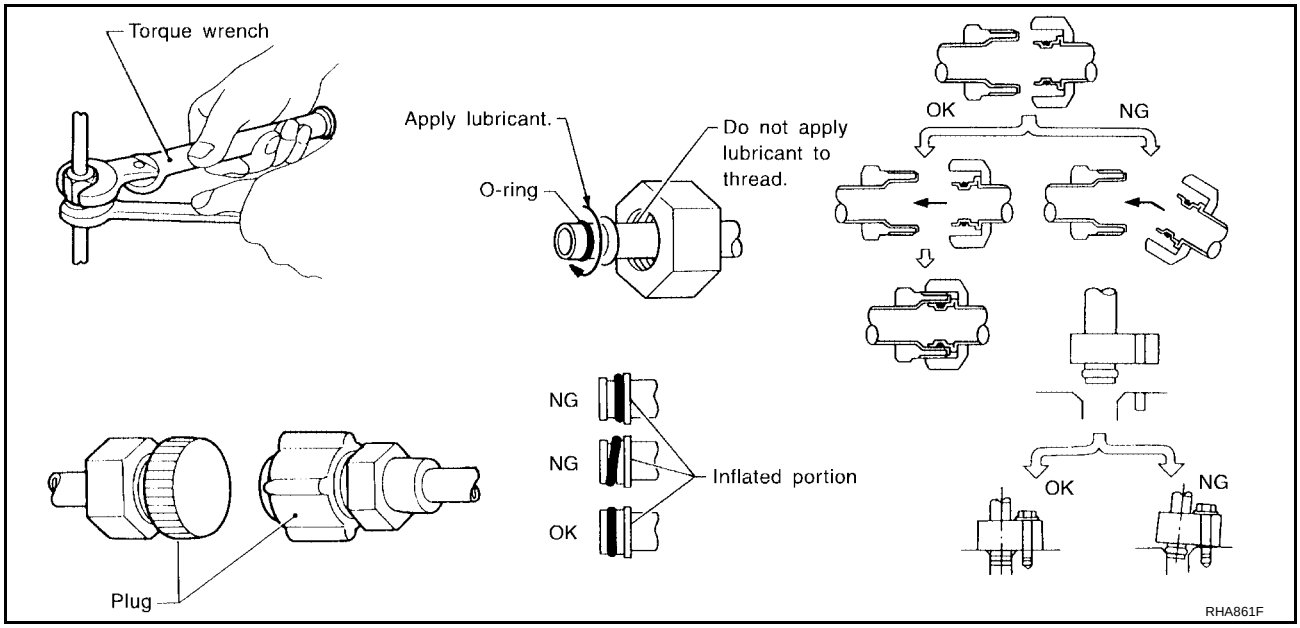
Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

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

- **When the compressor is removed, store it in the same position as it is when mounted on the car. Failure to do so will cause oil 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 oil to circle of the O-rings shown in illustration. Be careful not to apply oil to threaded portion.**
  Oil name: NISSAN A/C System Oil Type S (DH-PS) or equivalent
  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

EJS002PQ

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same position as it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Oil Quantity in Compressor” exactly. Refer to ATC-19, "Maintenance of Oil Quantity in Compressor" .**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with oil, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than 5 turns in both directions. This will equally distribute oil inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for 1 hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation. [Gap between clutch disc and pulley is 0.3 - 0.6 mm (0.012 - 0.024 in)]**

Precautions for Service Equipment

EJS002PR

RECOVERY/RECYCLING EQUIPMENT

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

ELECTRONIC LEAK DETECTOR

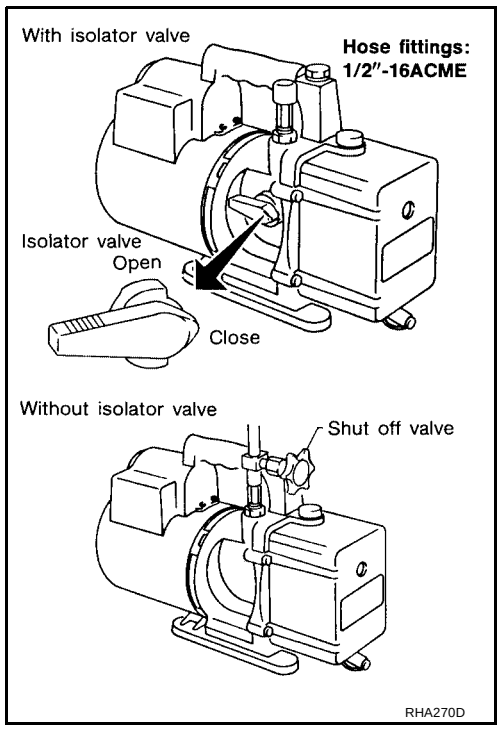
Follow the manufacturer's instructions for tester operation and tester maintenance.

VACUUM PUMP

The oil contained inside the vacuum pump is not compatible with the specified oil for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure so the vacuum pump oil may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.
To prevent this migration, use a manual valve situated near the hose-to-pump connection, as follows.

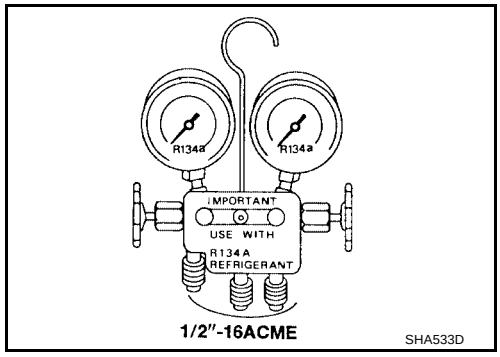
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has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

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



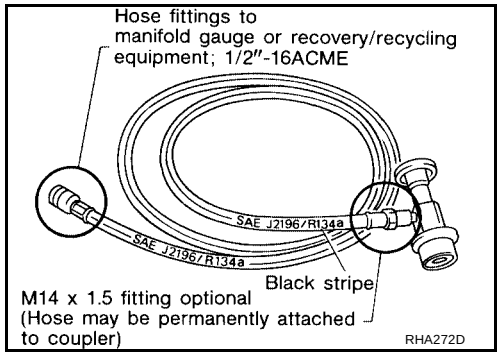
MANIFOLD GAUGE SET

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



SERVICE HOSES

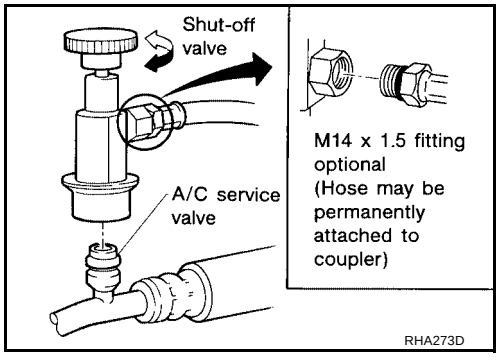
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

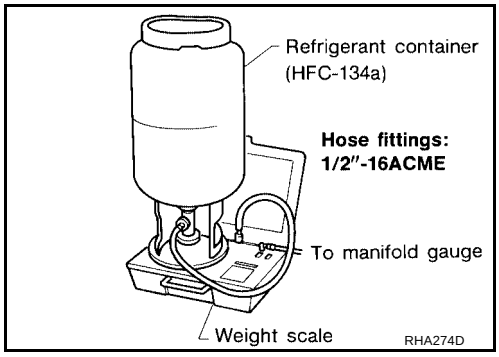
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC134a (R-134a) and specified oils have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2”-16 ACME.



CHARGING CYLINDER

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

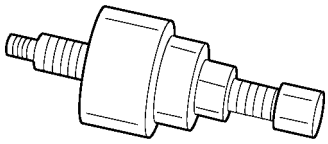
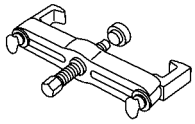
PREPARATION

PFP:00002

Special Service Tools

EJS002PT

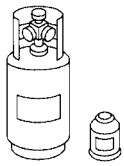
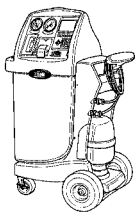
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

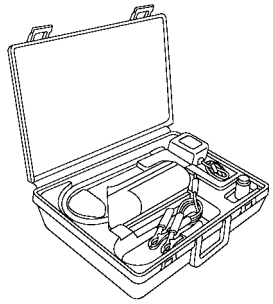
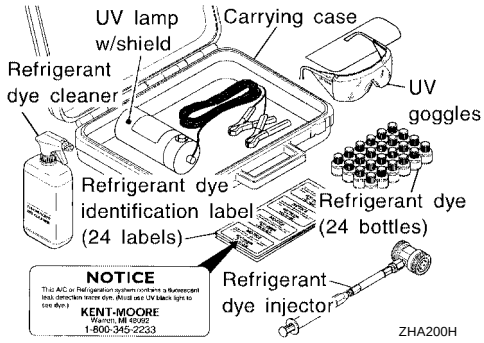
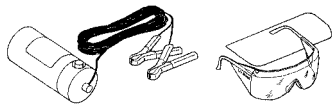
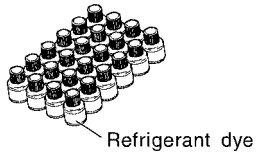
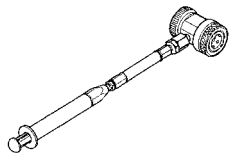
Tool number (Kent-Moore No.) Tool name		Description
— (J-38873-A) Drive plate installer	 WJIA0367E	Installing pulley and drive plate
KV99233130 (J-29884) Pulley puller	 LHA172	Removing pulley

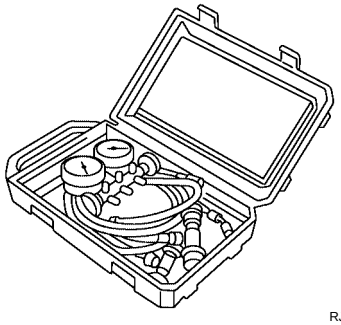
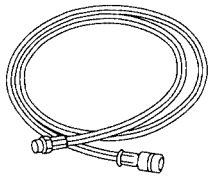
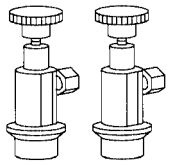
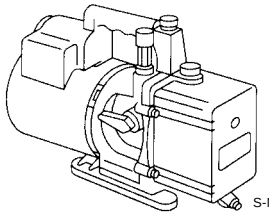
HFC-134a (R-134a) Service Tools and Equipment

EJS002PU

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

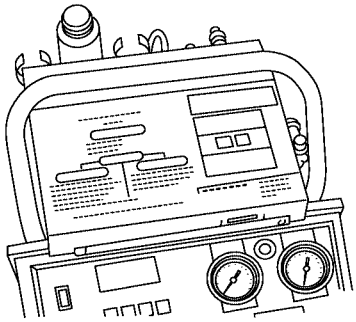
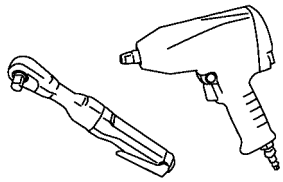
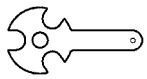
Tool number (Kent-Moore No.) Tool name		Description
— (—) Refrigerant HFC-134a (R-134a)	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size ● large container 1/2” -16 ACME
KLH00-PAGS0 (—) Genuine NISSAN A/C System Oil Type S (DH-PS)	 S-NT197	Type: Poly alkaline glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) vane rotary compressors (NISSAN only) Lubricity: 40 m ℓ (1.4 US fl oz, 1.4 Imp fl oz)
K991J0130 (ACR2005-NI) ACR A/C Service Center	 WJIA0293E	Refrigerant recovery, recycling and re-charging

Tool number (Kent-Moore No.) Tool name		Description
— (J-41995) Electronic refrigerant leak detector	 AHA281A	Power supply: DC 12V (Battery terminal)
— (J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) Refrigerant dye injector (J-41447) qty. 24 HFC-134a (R-134a) refrigerant dye (J-43872) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12V (Battery terminal)
— (J-42220) Fluorescent dye leak detector	 SHA438F	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 goggles
— (J-41447) HFC-134a (R-134a) Fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 SHA439F	Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
— (J-41459) HFC-134a (R-134a) Dye injector Use with J-41447, 1/4 ounce bottle	 SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system.
— (J-43872) Refrigerant dye cleaner	 SHA441F	For cleaning dye spills.

Tool number (Kent-Moore No.) Tool name		Description
— (J-39183-C) Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: ● The gauge face indicates R-134a. Fitting size: Thread size ● 1/2” -16 ACME
Service hoses ● (J-39500-72B) High side hose ● (J-39500-72R) Low side hose ● (J-39500-72Y) Utility hose	 S-NT201	Hose color: ● Low side hose: Blue with black stripe ● High side hose: Red with black stripe ● Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: ● 1/2” -16 ACME
Service couplers ● (J-39500-20A) High side coupler ● (J-39500-24A) Low side coupler	 S-NT202	Hose fitting to service hose: ● M14 x 1.5 fitting is optional or permanently attached.
— (J-39649) Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: ● Air displacement: 4 CFM ● Micron rating: 20 microns ● Oil capacity: 482 g (17 oz) Fitting size: Thread size ● 1/2” -16 ACME

Commercial Service Tools

EJS002PV

Tool number Tool name		Description
J-41810-NI Refrigerant identifier equipment HFC 134a (R-134a)	 RJIA0197E	Checking refrigerant purity and system contamination
Power tool	 PBIC0190E	Removing bolts and nuts
J-44614 Clutch disc holding tool	 WHA230	Holding clutch disc for removal and installation

REFRIGERATION SYSTEM

PFP:KA990

Refrigerant Cycle

EJS002PW

REFRIGERANT FLOW

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.

Refrigerant System Protection

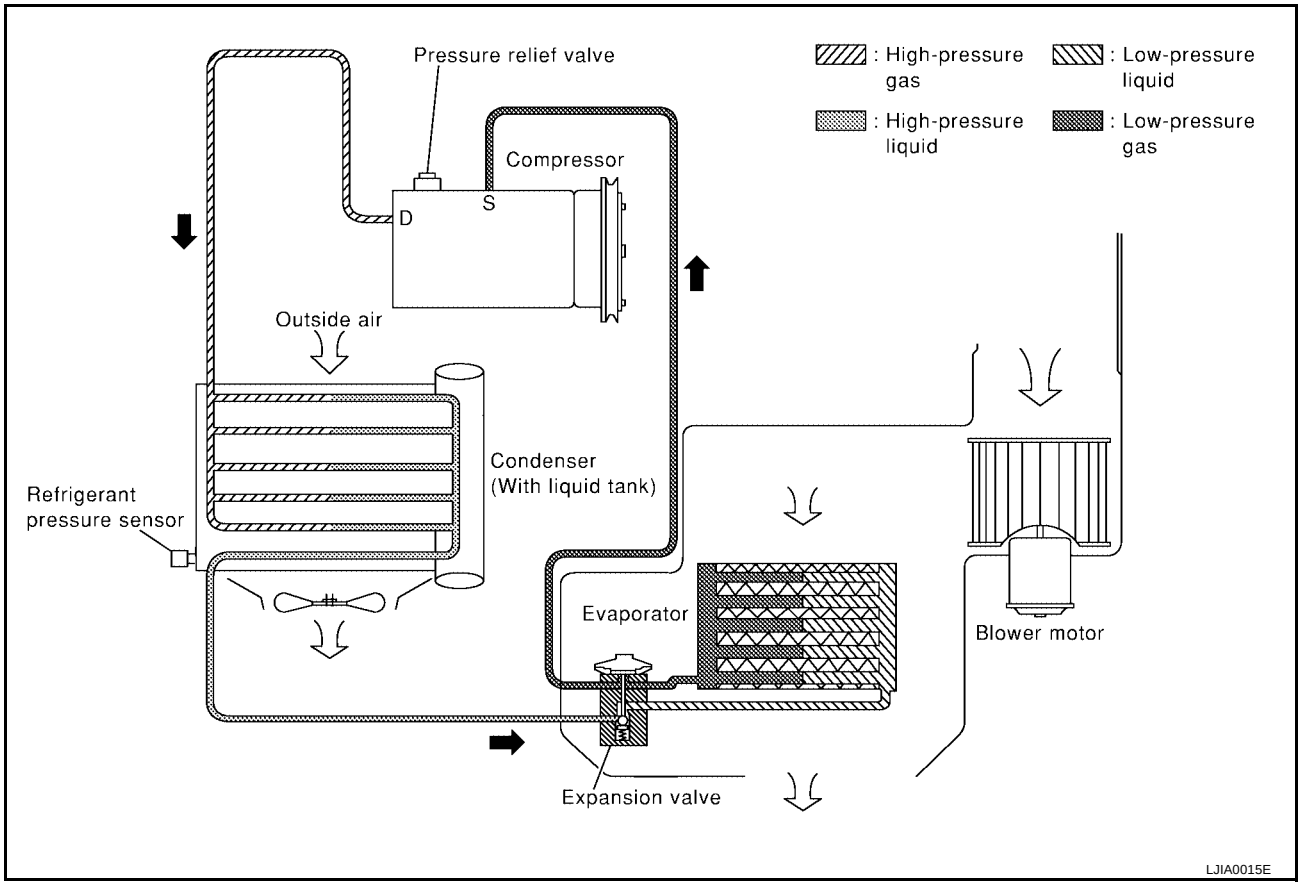
EJS002PX

REFRIGERANT PRESSURE SENSOR

The refrigerant system is protected against excessively high or low pressures by the refrigerant pressure sensor, located on the condenser. 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. The ECM then ceases to supply power to the A/C relay which disengages and stops the compressor when pressure on the high pressure side (as detected by refrigerant pressure sensor) is over approximately 2,746 kPa (28 kg/cm^2 , 398 psi), or below approximately 120 kPa (1.22 kg/cm^2 , 17.4 psi).

PRESSURE RELIEF VALVE

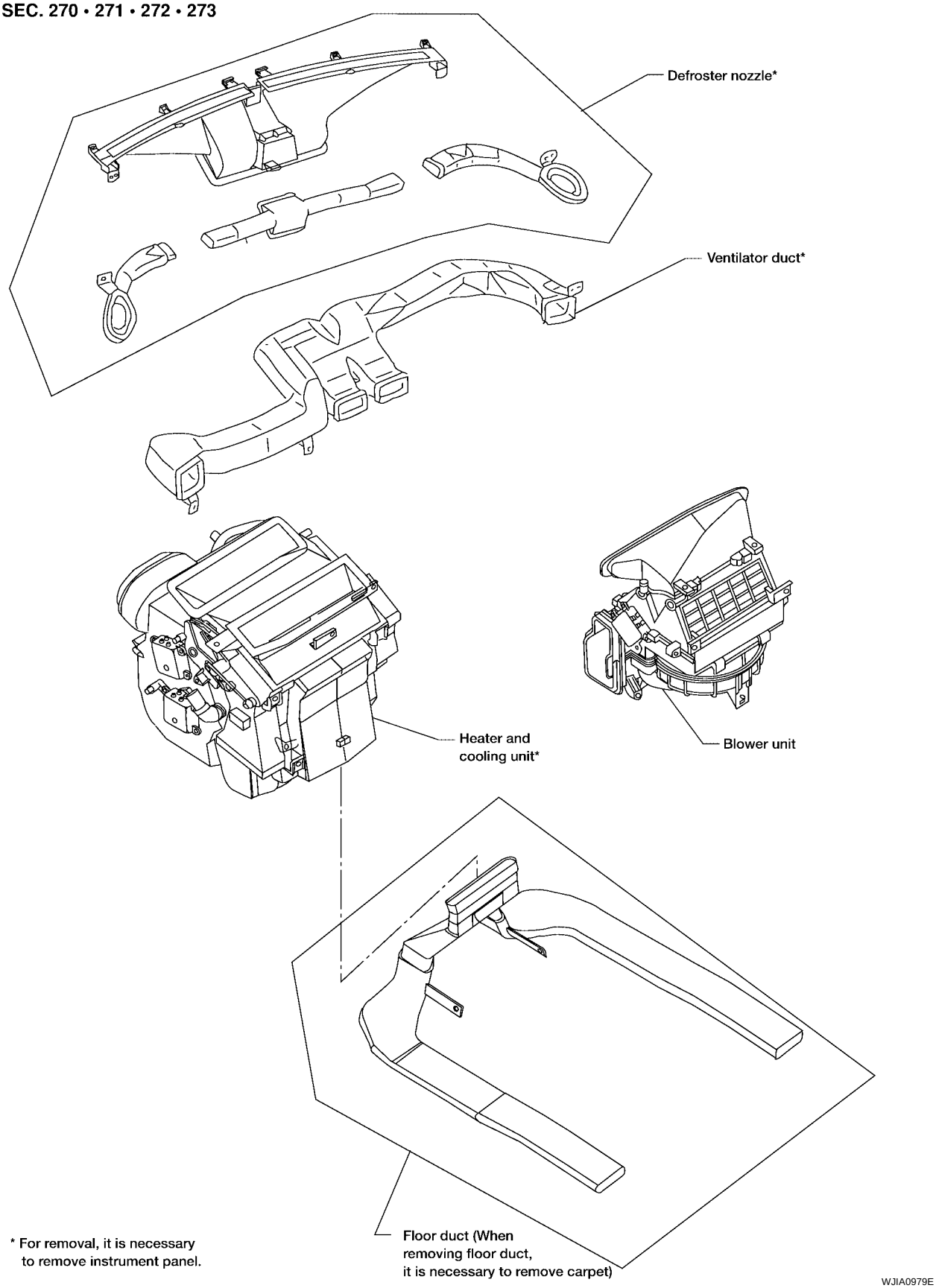
The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 3,727 kPa (38 kg/cm^2 , 540 psi)], the release port on the pressure relief valve automatically opens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



Component Layout

EJS002PY

SEC. 270 • 271 • 272 • 273



OIL

PFP:KLG00

Maintenance of Oil Quantity in Compressor

EJS002PZ

The oil in the compressor circulates through the system with the refrigerant. Add oil to compressor when replacing any component or after a large refrigerant leakage has occurred. It is important to maintain the specified amount.
If oil quantity is not maintained properly, the following malfunctions may result:

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

OIL

- Oil type: NISSAN A/C System Oil Type S (DH-PS) or equivalent
- Part number: KLH00-PAGS0

CHECKING AND ADJUSTING

CAUTION:
If excessive oil leakage is noted, do not perform the oil return operation.
Start the engine and set the following conditions:

Test Condition

- **Engine speed: Idling to 1,200 rpm**
- **A/C switch: On**
- **Blower fan speed: Max. position**
- **Temp. control: Optional [Set so that intake air temperature is 25° to 30° C (77° to 86°F).]**
- **Intake position: Recirculation ( )**
- **Perform oil return operation for about ten minutes**

Adjust the oil quantity according to the following table.

Oil Adjusting Procedure for Components Replacement Except Compressor

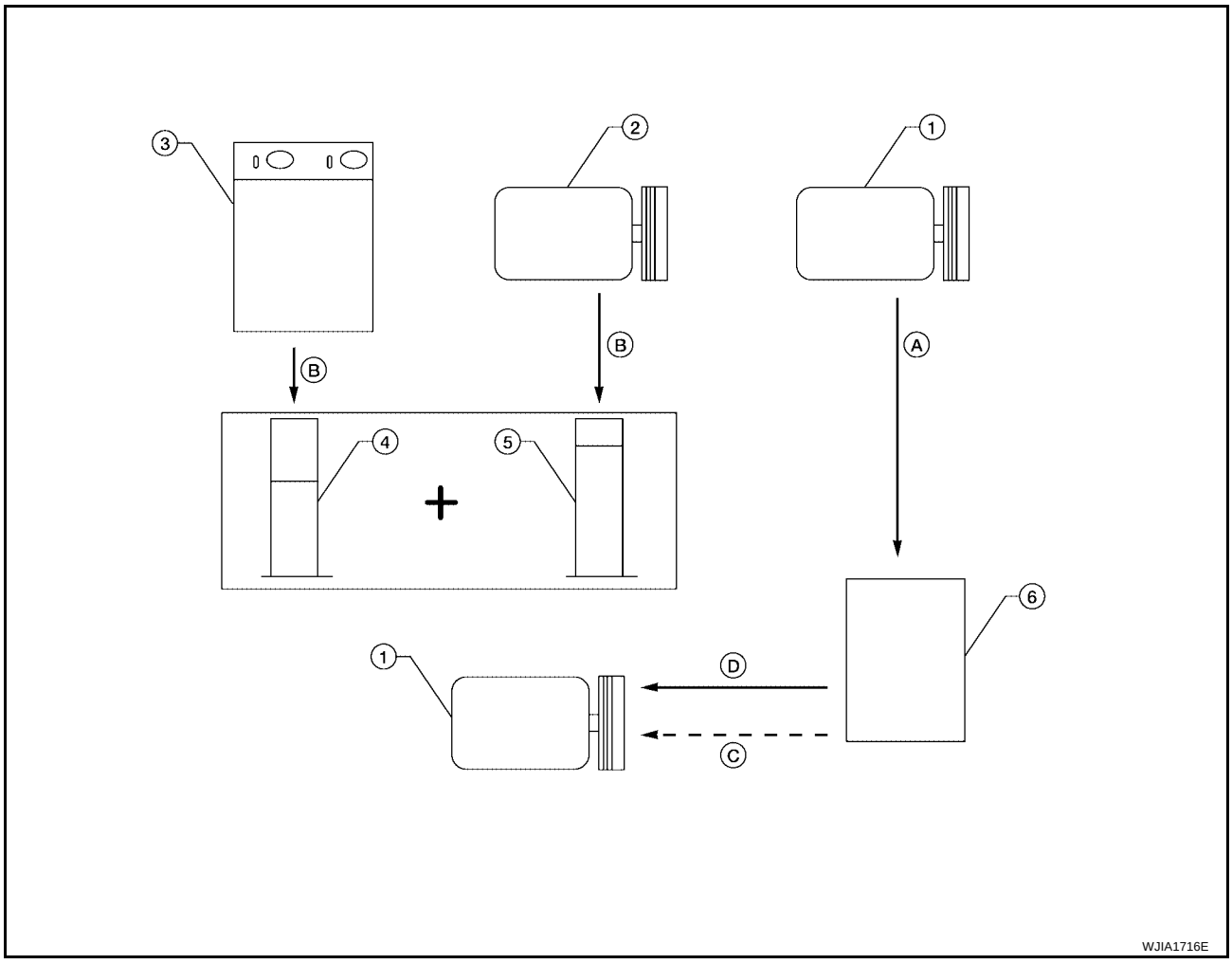
After replacing any of the following major components, add the correct amount of oil to the system.

Amount of Oil to be Added

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

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

Oil Adjustment Procedure for Compressor Replacement



1. New compressor
2. Old compressor
3. Recovery/recycling equipment
4. Measuring cup X
5. Measuring cup Y
6. New oil
- A. Drain oil from the new compressor into clean container
- B. Record amount of oil recovered
- C. Add an additional 5 m ℓ (0.2 US fl oz, 0.2 Imp fl oz) of new oil when replacing liquid tank
- D. Install new oil equal to recorded amounts in measuring cups X plus Y

1. Before connecting recovery/recycling equipment to vehicle, check recovery/recycling equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect recovery/recycling equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling equipment and refrigerant identifier. If NG, refer to ATC-4, "Contaminated Refrigerant" .
3. Confirm refrigerant purity in vehicle A/C system using recovery/recycling equipment and refrigerant identifier. If NG, refer to ATC-4, "Contaminated Refrigerant" .
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure oil discharged into the recovery/recycling equipment.
5. Drain the oil from the “old” (removed) compressor into a graduated container and recover the amount of oil drained.
6. Drain the oil from the “new” compressor into a separate, clean container.
7. Measure an amount of new oil installed equal to amount drained from “old” compressor. Add this oil to “new” compressor through the suction port opening.
8. Measure an amount of new oil equal to the amount recovered during discharging. Add this oil to “new” compressor through the suction port opening.
9. If the liquid tank also needs to be replaced, add an additional 5 m ℓ (0.2 US fl oz, 0.2 Imp fl oz) of oil at this time.

CAUTION:
Do not add the 5 m ℓ (0.2 US fl oz, 0.2 Imp fl oz) of oil if only replacing the compressor and not the liquid tank.

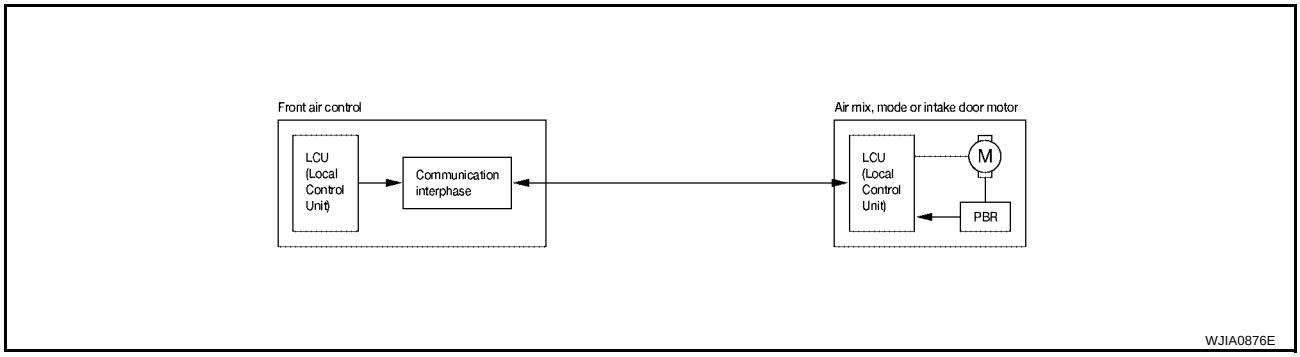
AIR CONDITIONER CONTROL

PFP:27500

Overview Air Conditioner LAN Control System

EJS002Q0

The LAN (local area network) system consists of front air control, air mix door motor, intake door motor, and mode door motor.
A configuration of these components is shown in the diagram below.

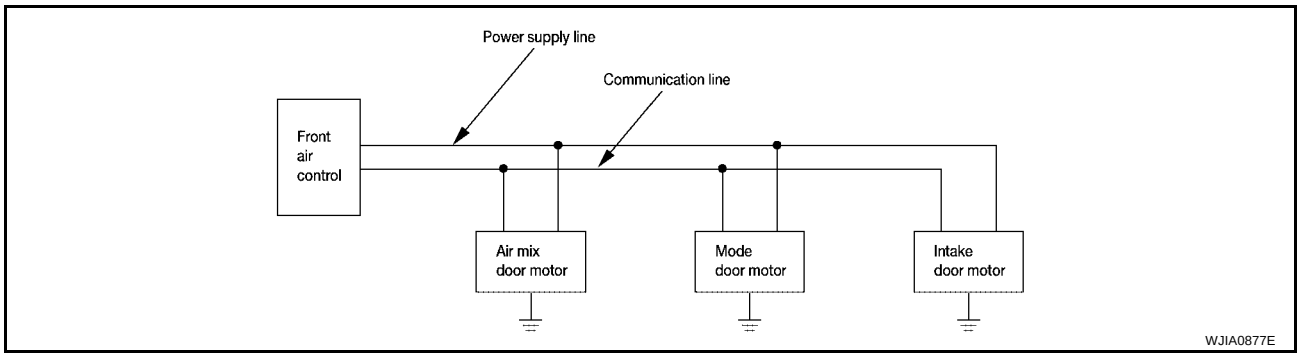


System Construction

EJS002Q1

A small network is constructed between the front air control, air mix door motor, intake door motor, and mode door motor. The front air control 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 front air control and each motor.
The following functions are contained in LCUs built into the air mix door motor, intake door motor, and the mode door motor.

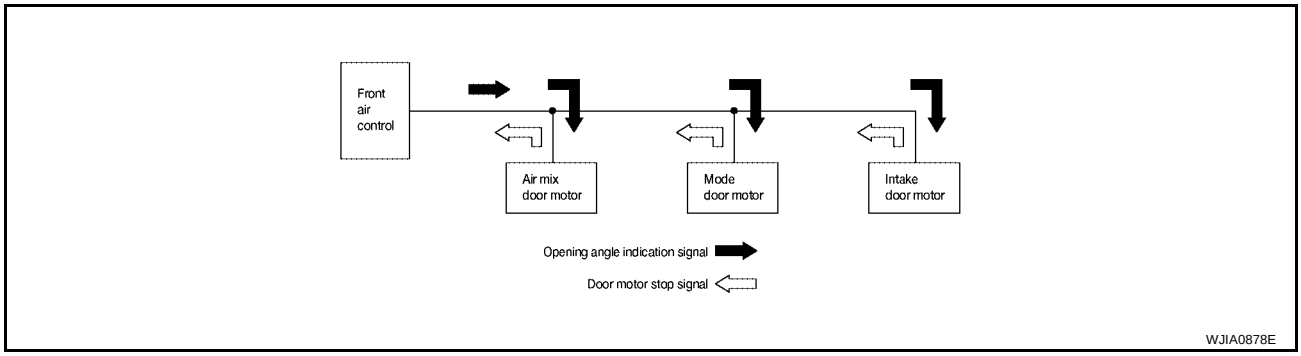
- Address
- Motor opening angle signals
- Data transmission
- Motor stop and drive decision
- Opening angle sensor (PBR function)
- Comparison
- Decision (front air control indicated value and motor opening angle comparison)



OPERATION

The front air control receives data from each of the sensors. It then 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 front air control and each of the motor position sensors are compared by the LCUs in each motor with the existing decision and opening angles. Subse-

quently, HOT/COLD, DEFROST/VENT or FRESH/RECIRCULATION operation is selected. The new selection data is returned to the front air control.

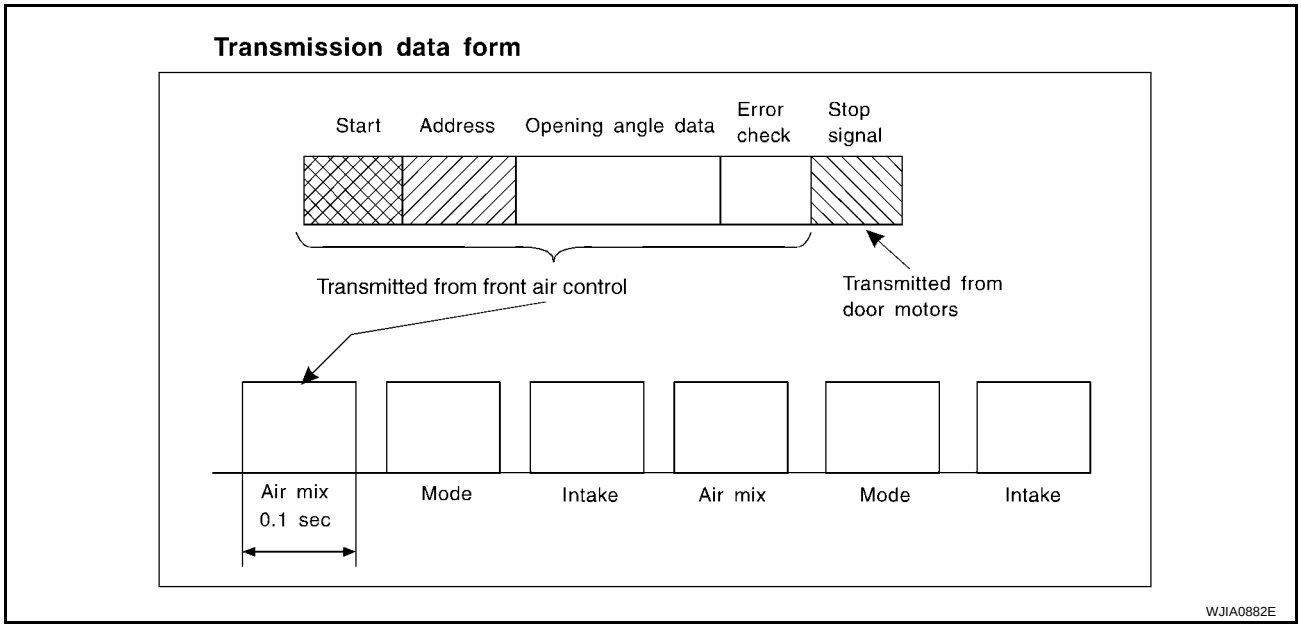


TRANSMISSION DATA AND TRANSMISSION ORDER

Front air control 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 front air control 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 front air control. 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.

FAN SPEED CONTROL

Fan 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.

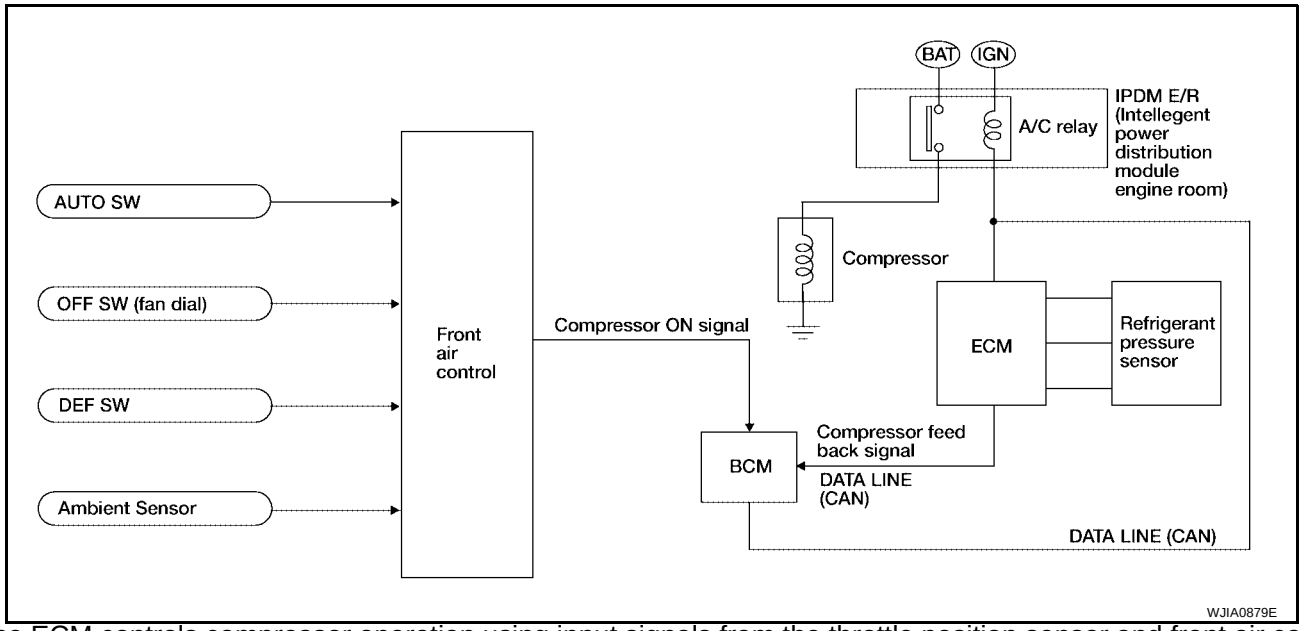
INTAKE DOOR CONTROL

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

MODE DOOR CONTROL

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

MAGNET CLUTCH CONTROL



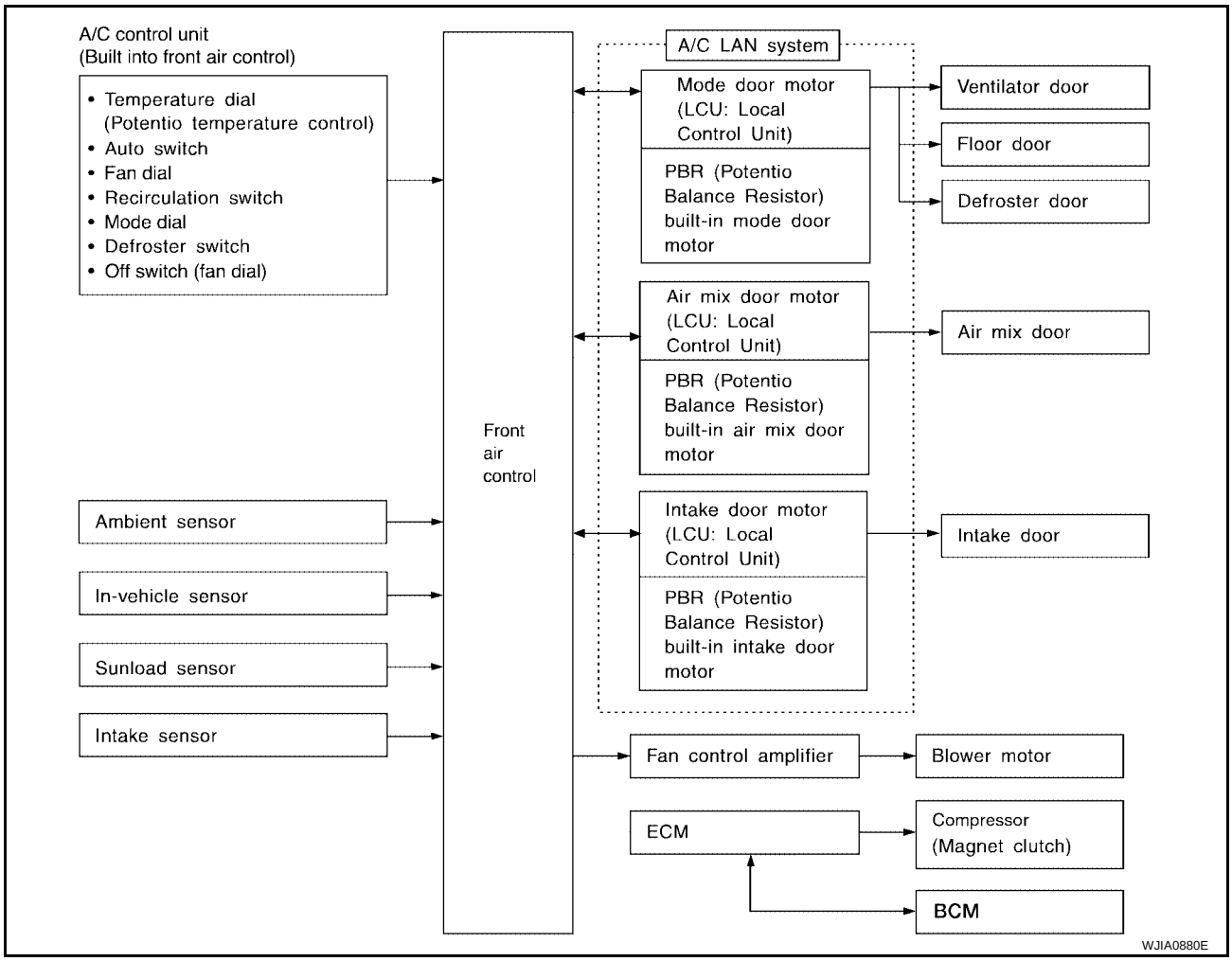
The ECM controls compressor operation using input signals from the throttle position sensor and front air control.

Overview of Control system

EJS002Q2

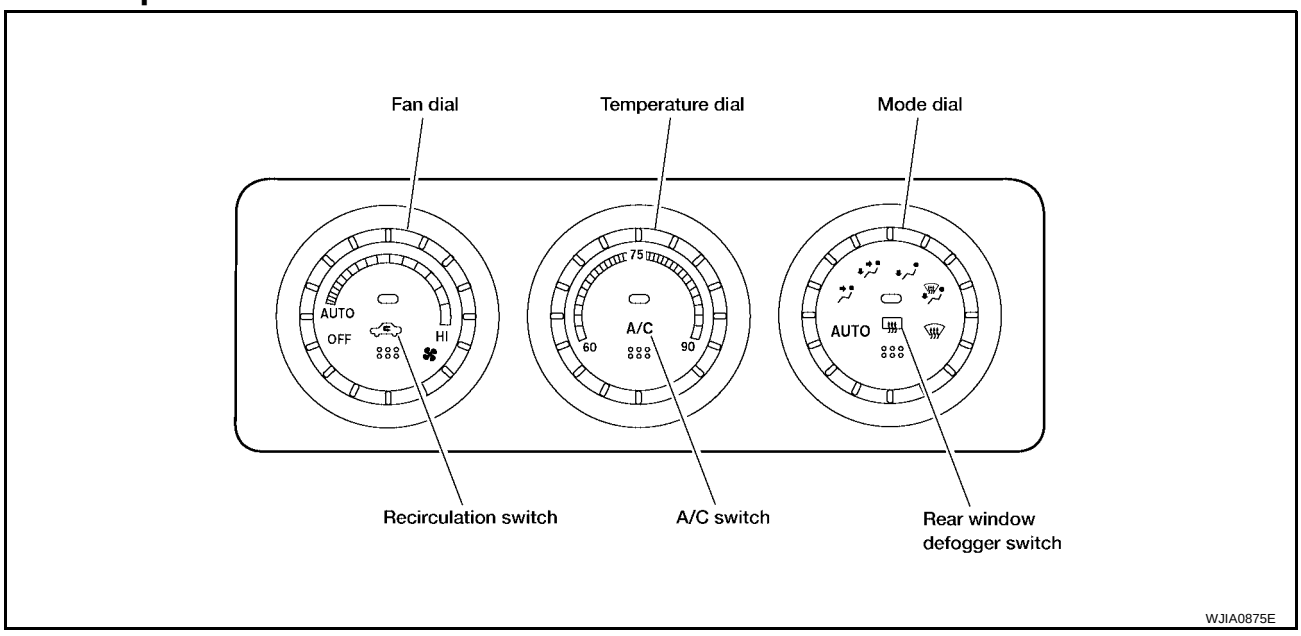
The control system consists of input sensors, switches, the front air control and outputs.

The relationship of these components is shown in the diagram below:



Control Operation

EJS002Q3



AUTO SWITCH

The compressor, intake door, air mix door, mode door 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 (POTENTIO TEMPERATURE CONTROL)

Increases or decreases the set temperature.

FAN AUTO SWITCH

Automatically controls the blower speed.

FAN DIAL/OFF SWITCH

Manually controls the blower speed.
In the off position, the compressor and blower are OFF, the intake door is set to the outside air position, and the air mode doors are set to the foot (80% foot and 20% defrost) position.

RECIRCULATION () SWITCH

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

DEFROSTER SWITCH

Positions the air mode doors to the defrost position. Also positions the intake doors to the outside air position. The compressor remains ON until the ignition is turned OFF.

MODE DIAL

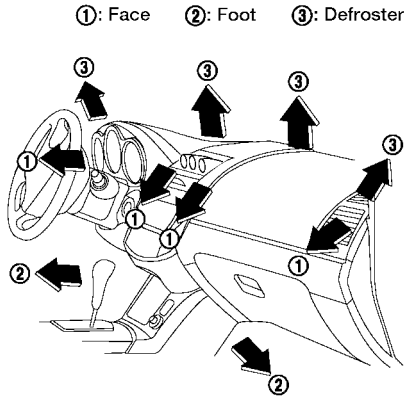
Controls the air discharge through control of mode door.

REAR WINDOW DEFOGGER SWITCH

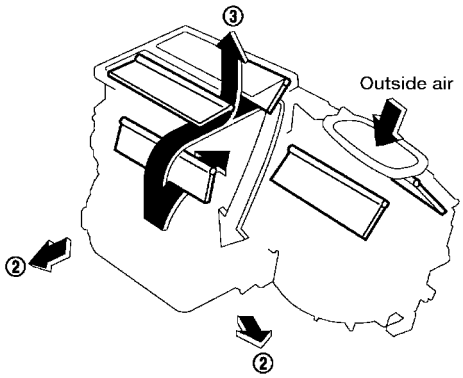
This switch turns the rear window defogger ON and OFF.

Discharge Air Flow

EJS002Q4

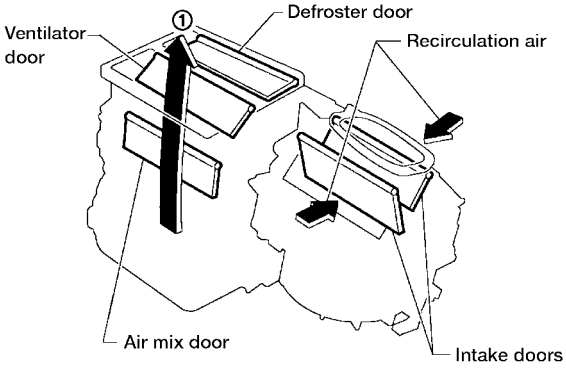


Foot

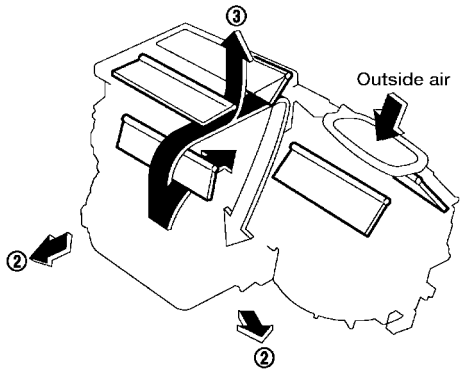


Face

(switch "ON")

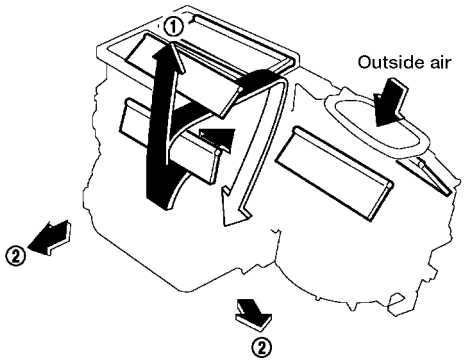


F/D

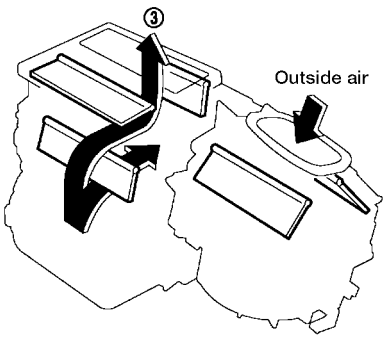


Bi-level

(switch "OFF")



Defroster



①: To face
②: To foot
③: To defroster

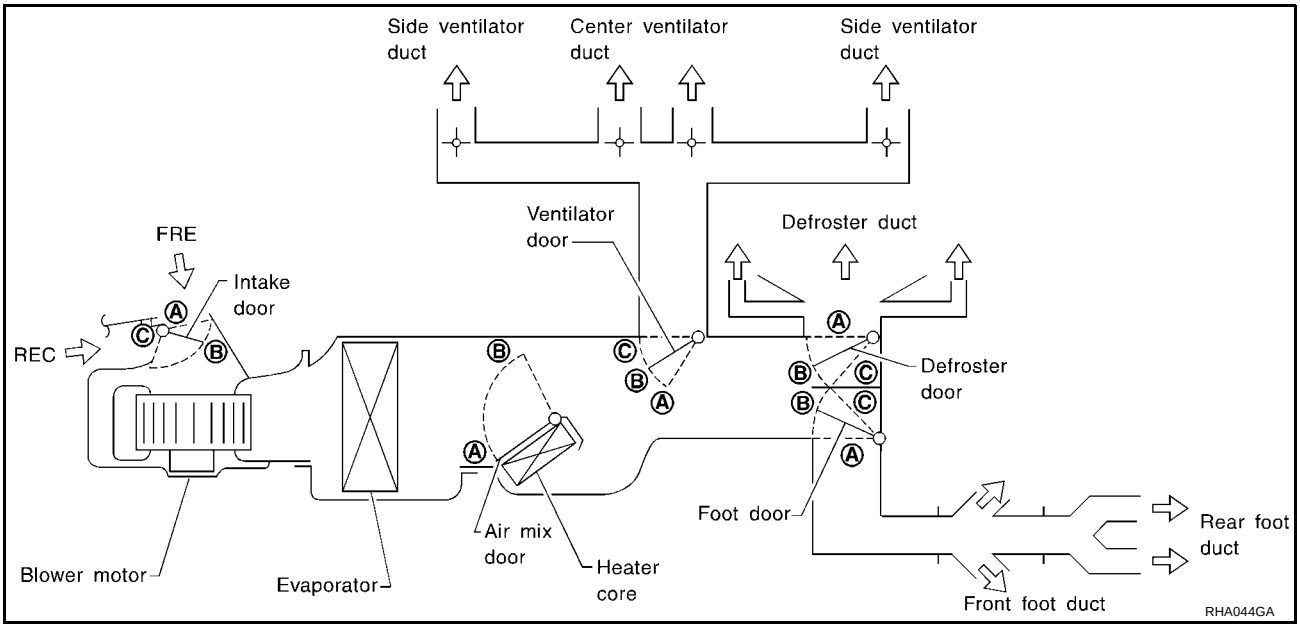
For air flow %, refer to "Operational Check", "TROUBLE DIAGNOSES".

WJIA1185E

System Description

EJS002Q5

SWITCHES AND THEIR CONTROL FUNCTION



Position or switch	MODE DIAL					AUTO SW	REC SW		Temperature DIAL		
	VENT	B/L	FOOT	D/F	DEF		ON	OFF			
Door						AUTO			"60"	—	"90"
Ventilator door	A	B	C	C	C	AUTO	—		—		
Foot door	A	B	C	C	A		—		—		
Defroster door	A	A	B	C	C		—		—		
Air mix door	—				—		—		A	AUTO	B
Intake door	—				C		A	AUTO*1	—		

*1: Automatically controlled when REC switch is OFF.

WJIA0760E

CAN Communication System Description

EJS002Q6

Refer to LAN-20, "CAN COMMUNICATION" .

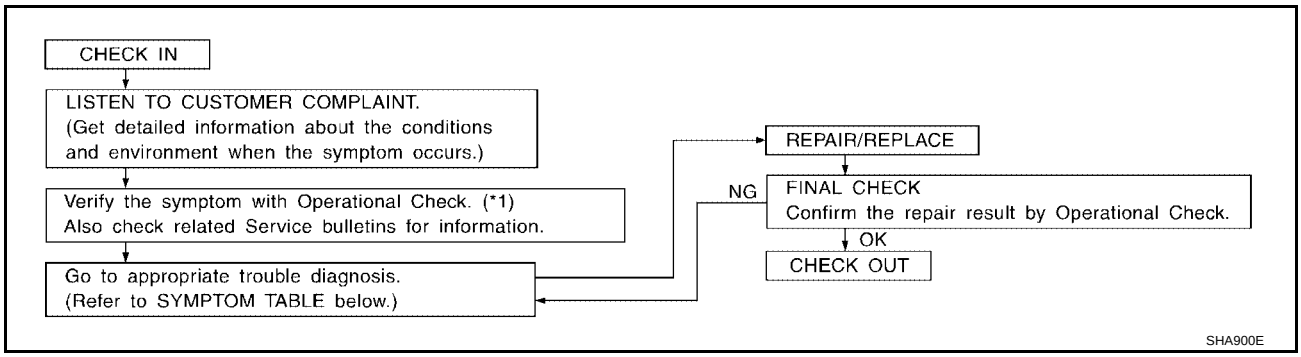
TROUBLE DIAGNOSIS

PFP:00004

How to Perform Trouble Diagnoses for Quick and Accurate Repair

EJS002Q7

WORK FLOW



*1: ATC-40

SYMPTOM TABLE

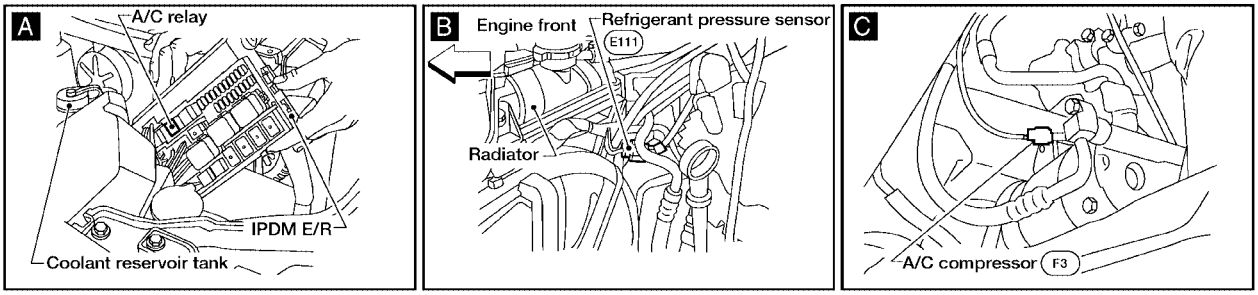
Symptom		Reference Page
● A/C system does not come on.	● Go to Trouble Diagnosis Procedure for A/C system.	ATC-42
● Air outlet does not change. ● Mode door motor does not operate normally.	● Go to Trouble Diagnosis Procedure for Mode Door Motor. (LAN)	ATC-47
● Discharge air temperature does not change. ● Air mix door motor does not operate normally.	● Go to Trouble Diagnosis Procedure for Air Mix Door Motor. (LAN)	ATC-50
● Intake door does not change. ● Intake door motor does not operate normally.	● Go to Trouble Diagnosis Procedure for Intake Door Motor. (LAN)	ATC-53
● Blower motor operation is malfunctioning.	● Go to Trouble Diagnosis Procedure for Blower Motor.	ATC-56
● Magnet clutch does not engage.	● Go to Trouble Diagnosis Procedure for Magnet Clutch.	ATC-62
● Insufficient cooling.	● Go to Trouble Diagnosis Procedure for Insufficient Cooling.	ATC-66
● Insufficient heating.	● Go to Trouble Diagnosis Procedure for Insufficient Heating.	ATC-73
● Noise.	● Go to Trouble Diagnosis Procedure for Noise.	ATC-74

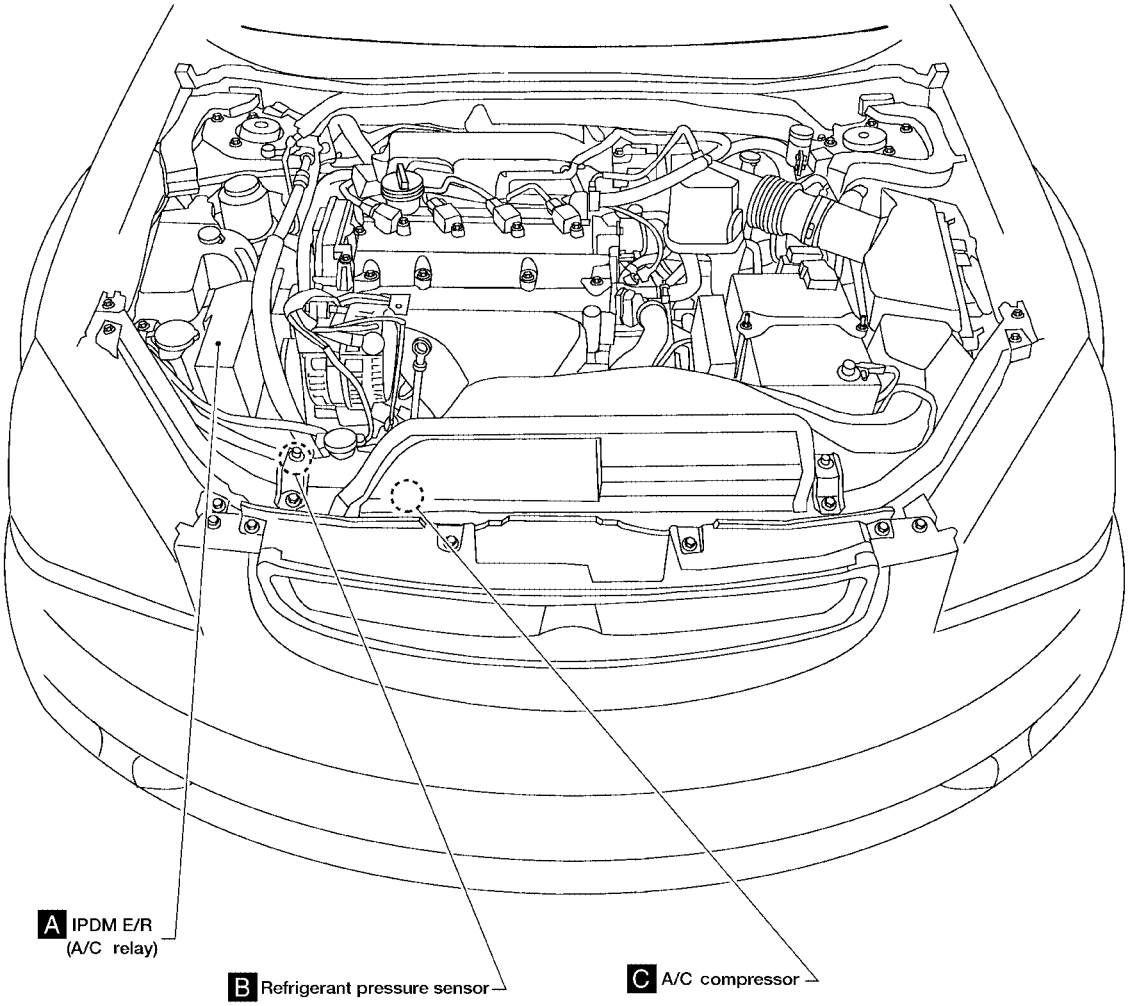
Component Parts and Harness Connector Location

EJS002Q8

ENGINE COMPARTMENT

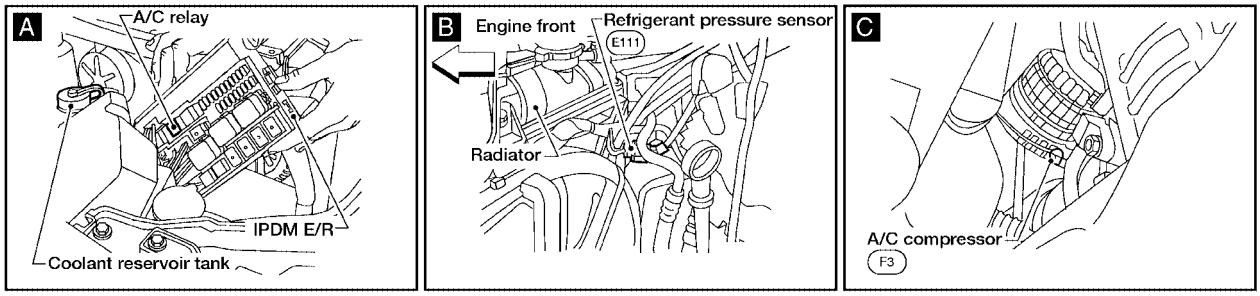
QR25DE Models

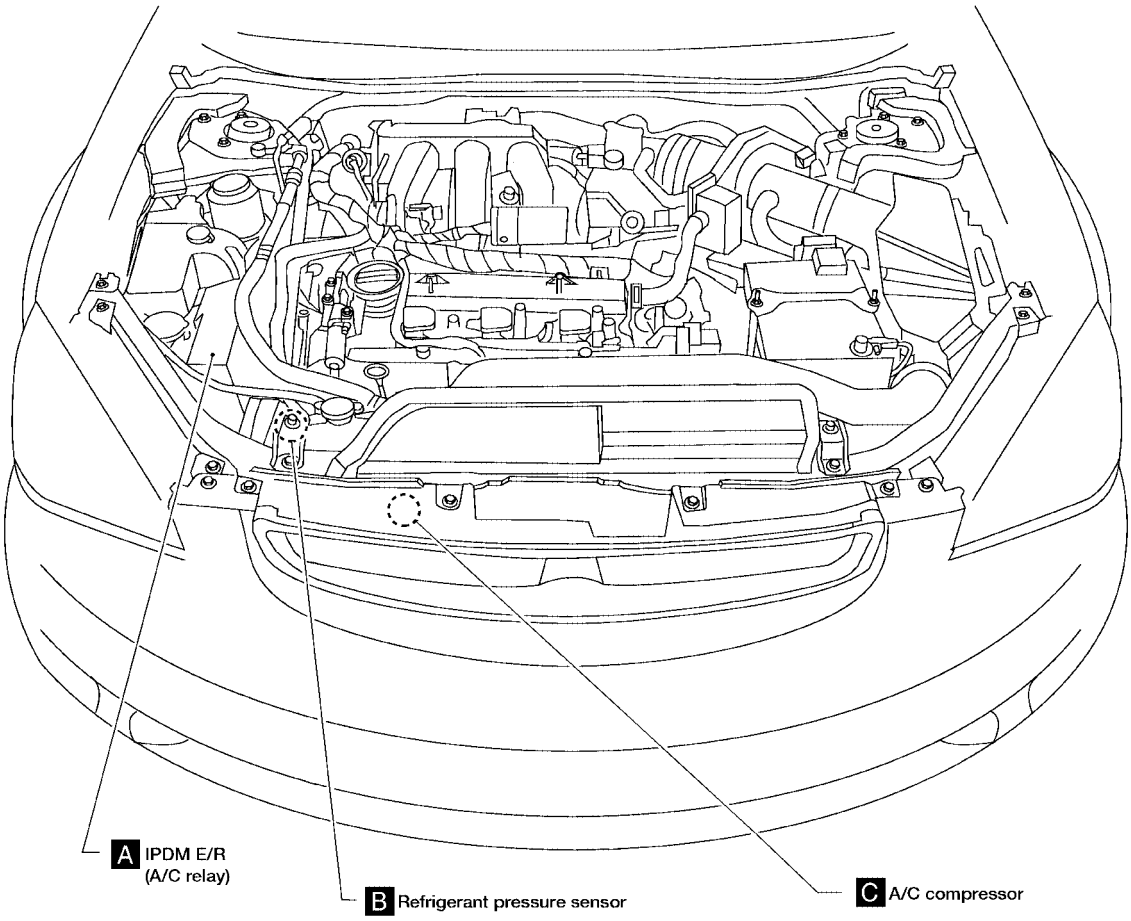




WJIA0136E

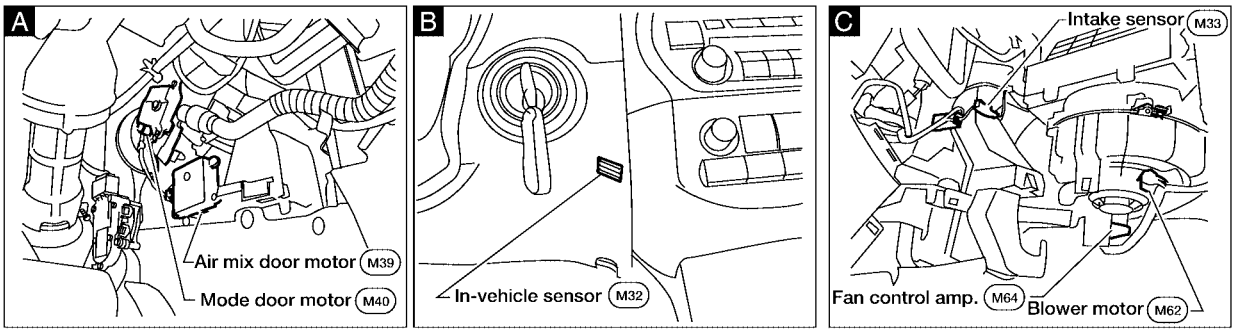
VQ35DE Model

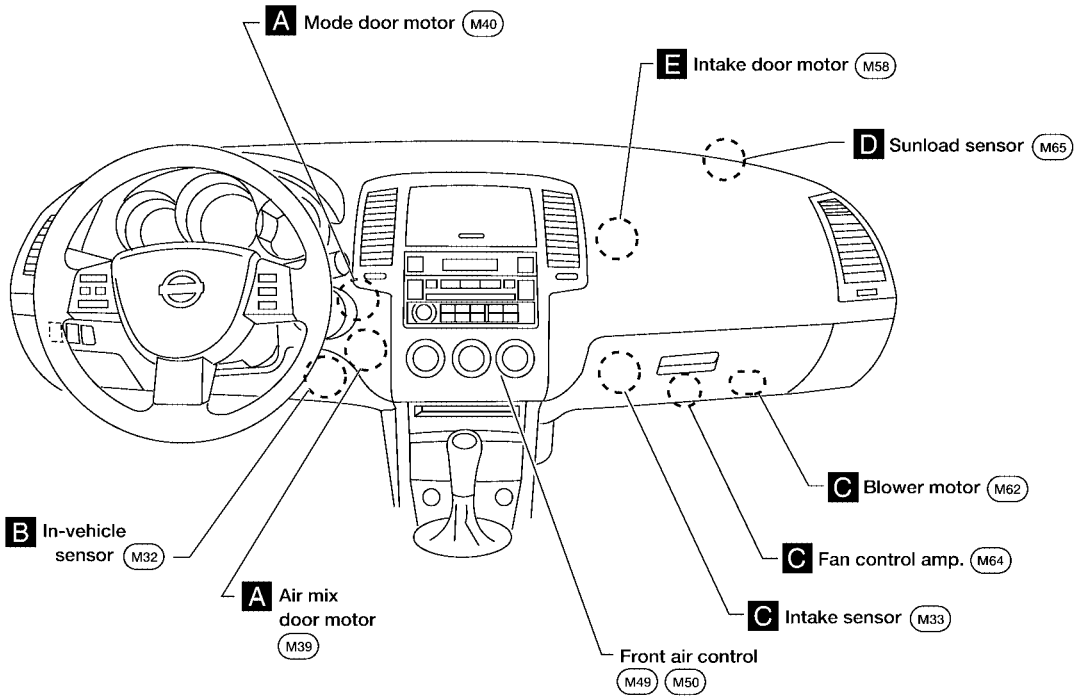


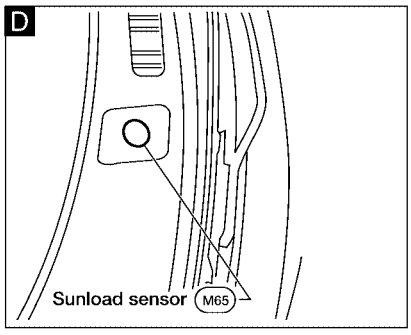


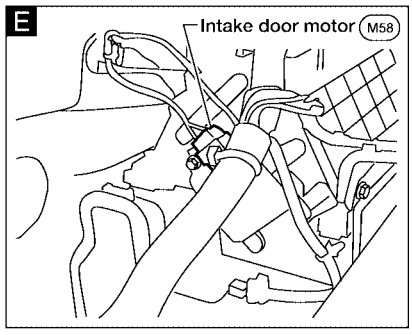
WJIA0137E

PASSENGER COMPARTMENT





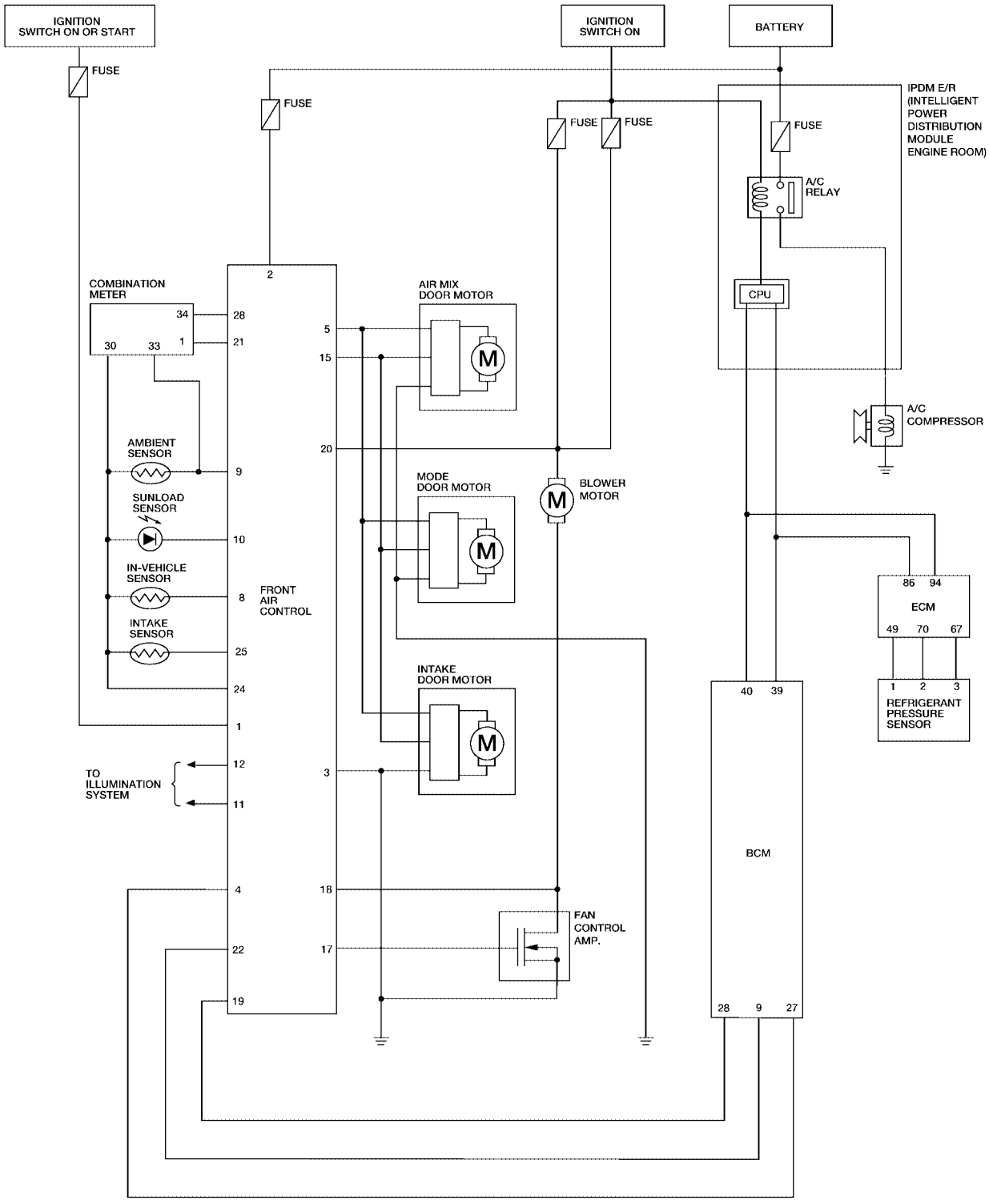




WJIA1556E

Circuit Diagram

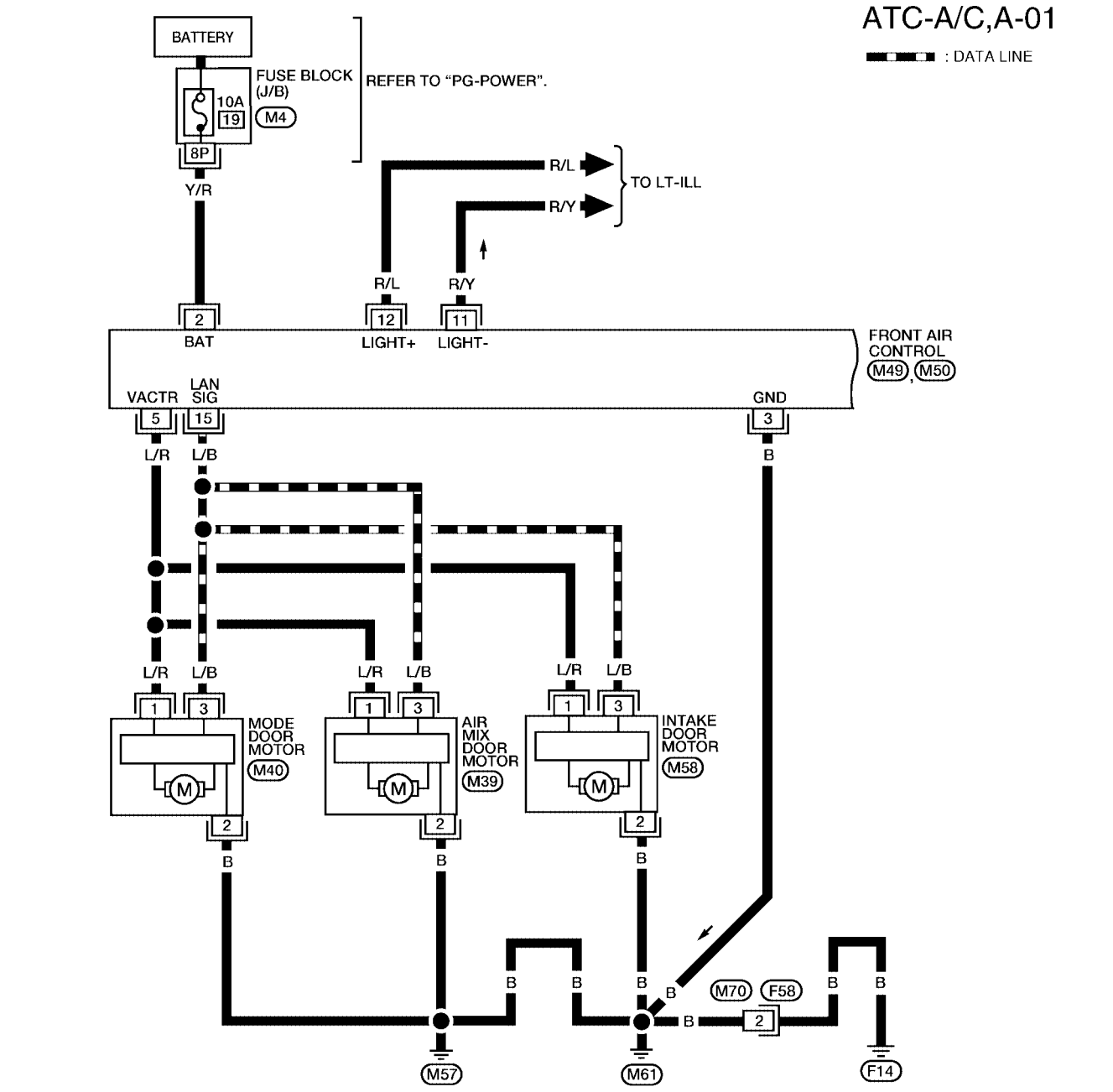
EJS002Q9

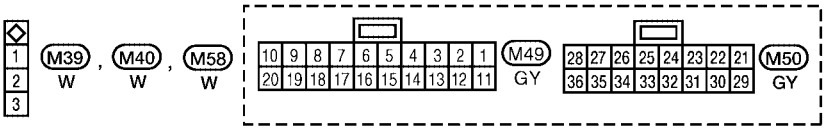


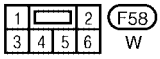
WJWA0312E

Wiring Diagram — A/C,A —

EJS002QA



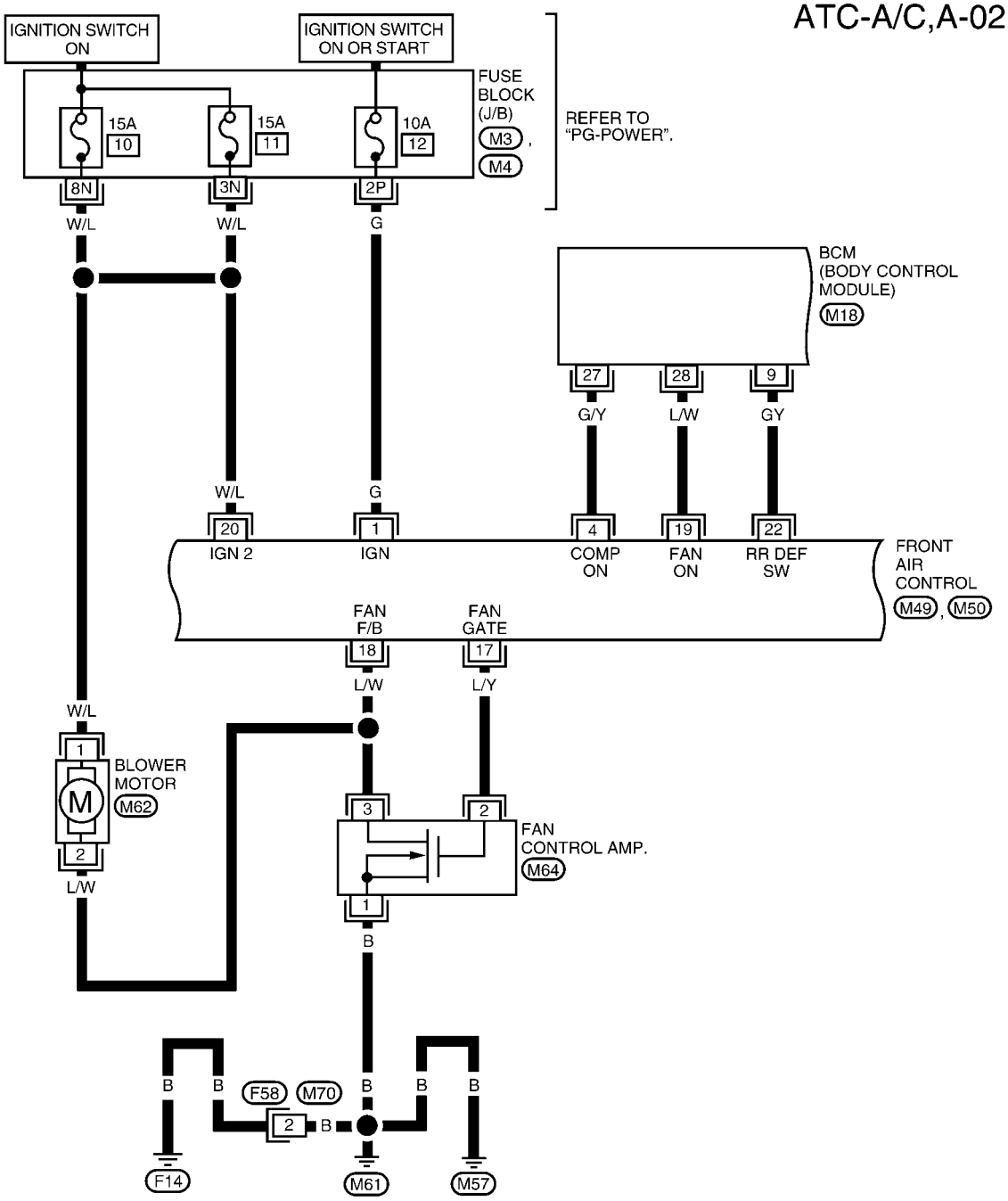


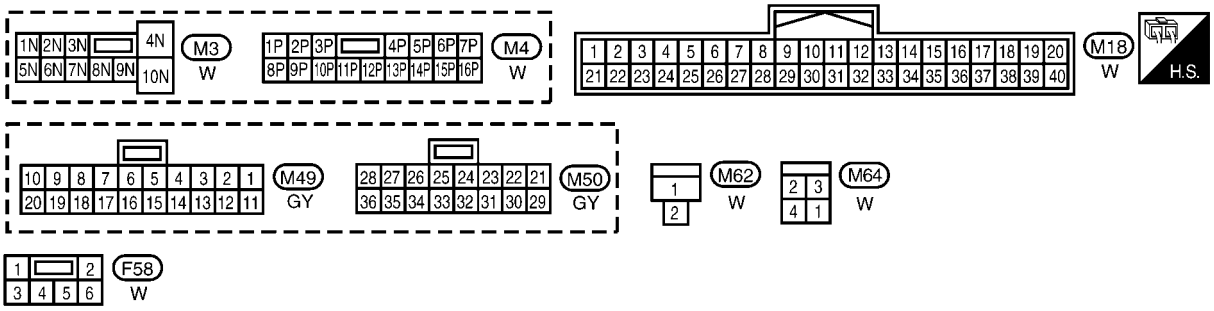


REFER TO THE FOLLOWING.
M4 - FUSE BLOCK
- JUNCTION BOX (J/B)

WJWA0130E

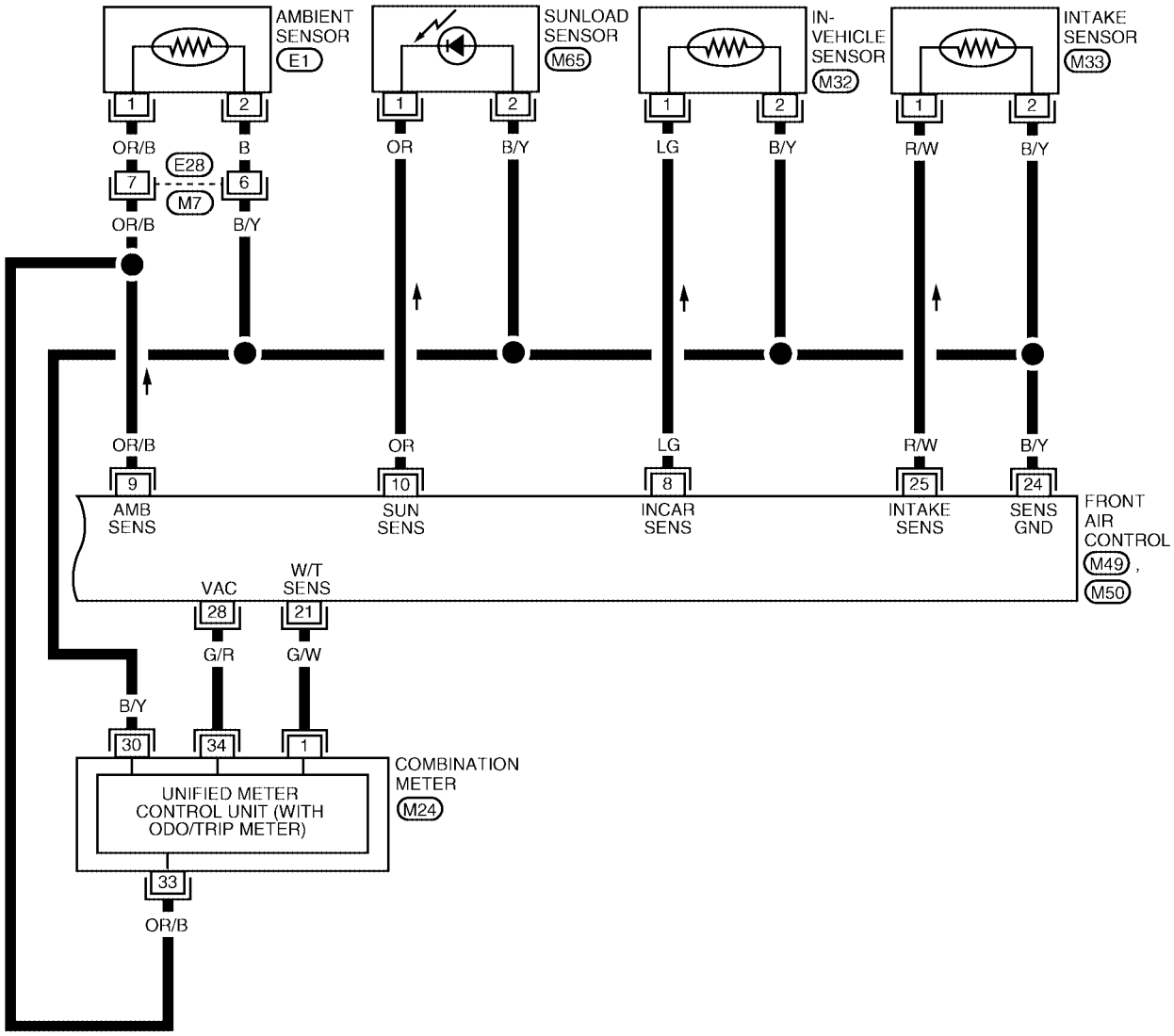
ATC-A/C,A-02

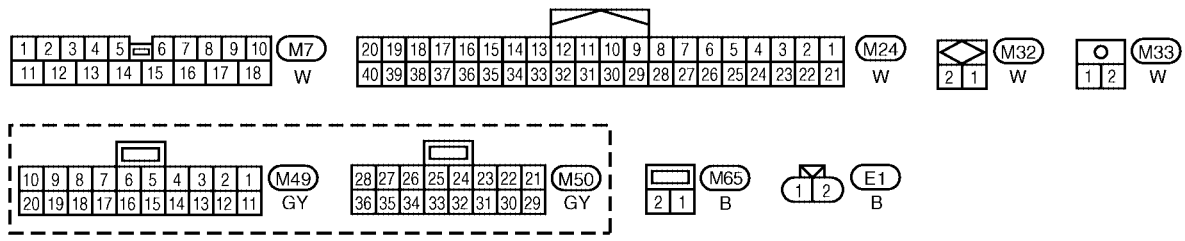




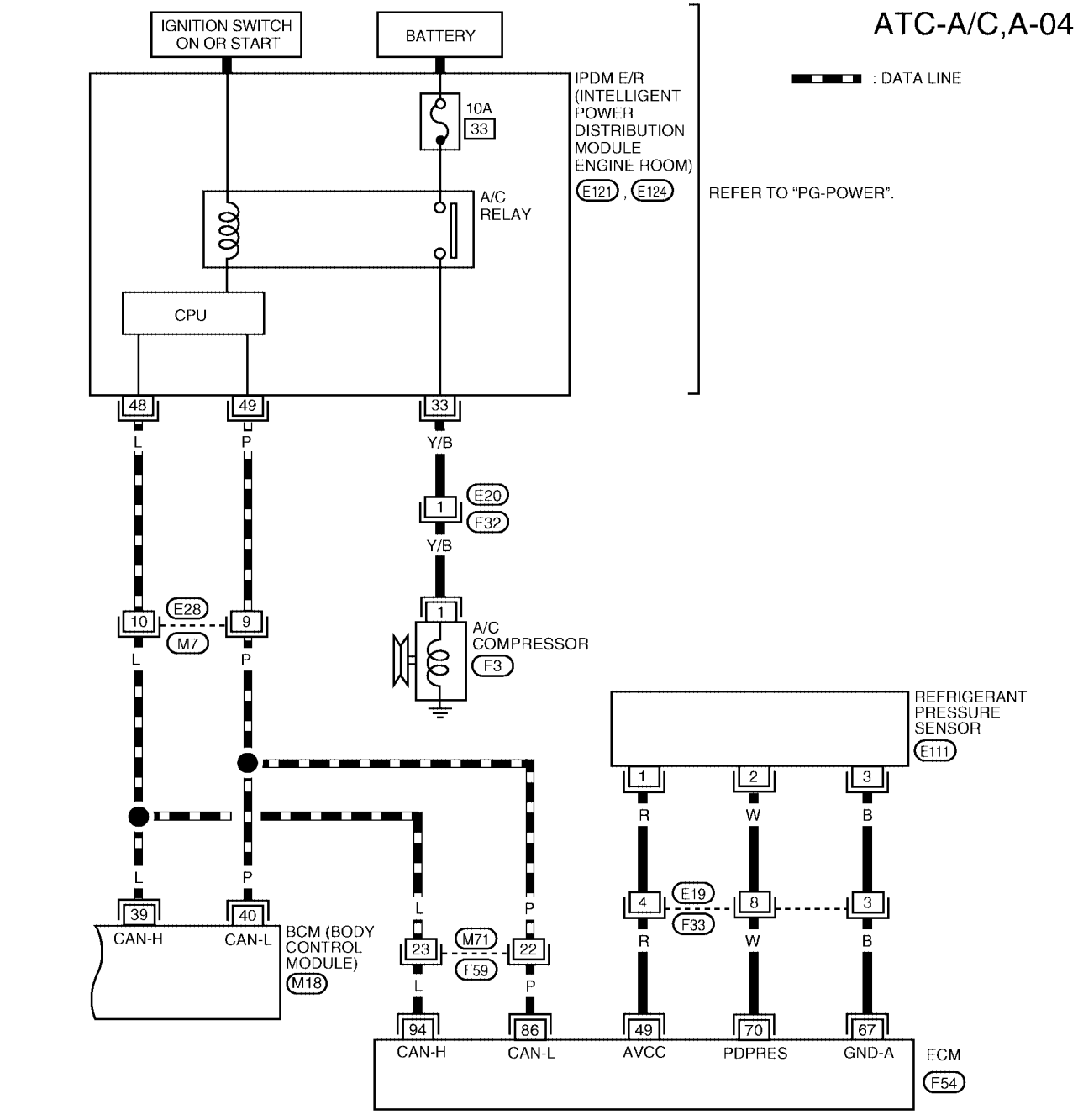
WJWA0313E

ATC-A/C,A-03





WJWA0132E


ATC-A/C,A-04
: DATA LINE
IGNITION SWITCH ON OR START
BATTERY
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E121 , E124
REFER TO "PG-POWER".
10A
33
A/C RELAY
CPU
48
49
33
L
P
Y/B
E20
F32
1
Y/B
E28
10
9
M7
L
P
1
A/C COMPRESSOR
F3
REFRIGERANT PRESSURE SENSOR
E111
1
2
3
R
W
B
L
P
39
40
CAN-H
CAN-L
BCM (BODY CONTROL MODULE)
M18
L
P
23
M71
F59
22
L
P
4
E19
F33
8
3
R
W
B
94
86
49
70
67
CAN-H
CAN-L
AVCC
PDPRES
GND-A
ECM
F54
M7
W
M18
W
H.S.
REFER TO THE FOLLOWING.
F54 - ELECTRICAL UNITS
E111
B
E121
W
E124
W
F3
B
F32
B
F33
GY
F59
W

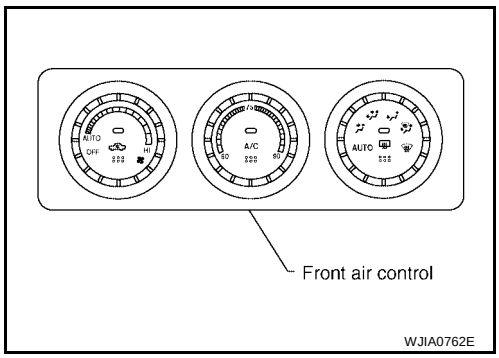
WJWA0133E

Front Air Control Terminals and Reference Value

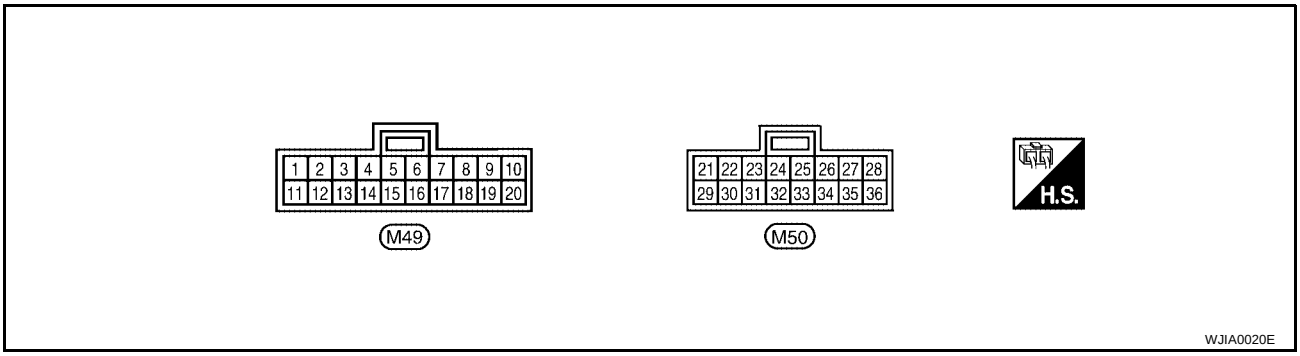
EJS002QB

INSPECTION OF FRONT AIR CONTROL

- Measure voltage between each terminal and body ground by following “FRONT AIR CONTROL INSPECTION TABLE”. Refer to ATC-38, "FRONT AIR CONTROL INSPECTION TABLE" .



FRONT AIR CONTROL HARNESS CONNECTOR TERMINAL LAYOUT



FRONT AIR CONTROL INSPECTION TABLE

Terminal No.	Wire color	Item	Ignition switch	Condition		Voltage (V) (Approx.)
1	G	Power supply for IGN	ON	—		12
2	Y/R	Power supply for BAT	OFF	—		12
3	B	Ground	—	—		0
4	G/Y	Compressor ON signal		Compressor	ON	0
					OFF	5

Terminal No.	Wire color	Item	Ignition switch	Condition		Voltage (V) (Approx.)
5	L/R	Power supply for mode door motor, intake door motor, and air mix door motor		—		12
8	LG	In-vehicle sensor		—		0 - 5
9	OR/B	Ambient sensor		—		0 - 5
10	OR	Sunload sensor		—		0 - 5
11	R/Y	Light (-)		—		0
12	R/L	Light (+)		Lighting switch	OFF	0
					1st position	12
15	L/B	A/C LAN signal		—		5.5
17	L/Y	Fan control AMP. control signal		Fan speed	Any speed except high	2.5 - 3
					High	9.- 10
18	L/W	Blower motor feed back			Low	7.0 - 10.0
19	L/W	Fan ON signal		Fan	ON	0
					OFF	5
20	W/L	Power supply for IGN		—		12
21	G/W	Water temperature sensor	—			—
22	GY	Rear defrost ON signal		Defroster switch	ON	0
					OFF	5
24	B/Y	Sensor ground		—		0
25	R/W	Intake sensor		—		0 - 5
28	G/R	Power supply for A/C ON signal			ON	4.6
					OFF	0

Operational Check

EJS002QC

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

CONDITIONS:

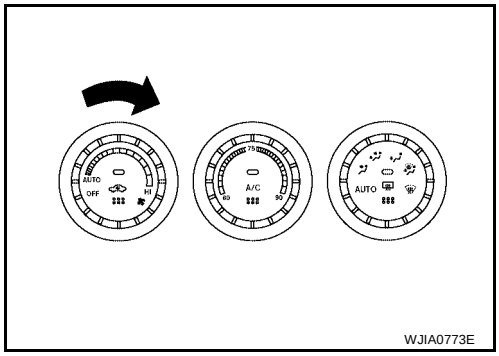
- **Engine running and at normal operating temperature.**

PROCEDURE:

1. Check Blower

1. Turn fan dial clockwise, blower should operate on low speed.
2. Continue turning fan dial clockwise, and continue checking blower speeds until all speeds are checked.
3. Leave fan on HI speed.

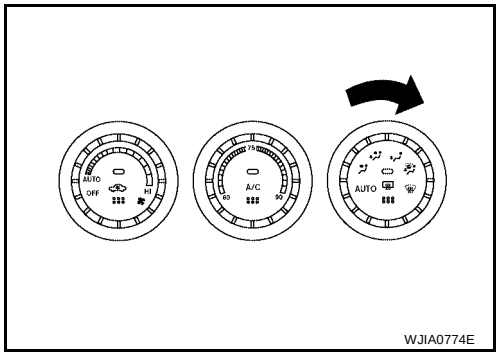
If NG, go to ATC-56, "Blower Motor Circuit" .
If OK, continue with next check.



WJIA0773E

2. Check Discharge Air

1. Turn mode dial clockwise five positions.



WJIA0774E

2. Confirm that discharge air comes out according to the air distribution table below.
   Refer to ATC-27, "Discharge Air Flow" .

Mode door position	Air outlet/distribution		
	Vent	Foot	Defroster
	100%	—	—
	70%	30%	—
	—	75%	25%
	—	60%	40%
	—	—	100%

NOTE:
Confirm that the compressor clutch is engaged (audio or visual inspection) and intake door is in the fresh position when the DEF is selected.

Intake door position is checked in the next step.
If NG, go to ATC-47, "Mode Door Motor Circuit" .
If OK, continue with next check.

3. Check Recirculation

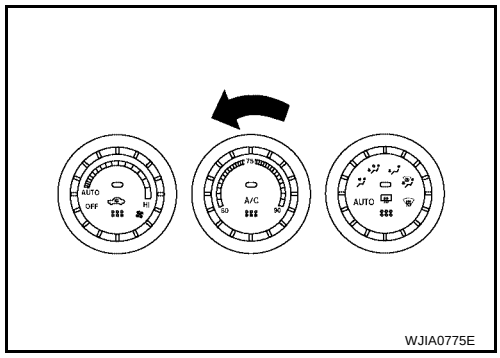
1. Press REC switch.
   Recirculation indicator should illuminate.
2. Press REC switch a second time.
3. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to ATC-53, "Intake Door Motor Circuit" .
If OK, continue with next check.

4. Check Temperature Decrease

1. Turn the temperature dial counterclockwise to "60".
2. Check for cold air at discharge air outlets.

If NG, go to ATC-66, "Insufficient Cooling" .
If OK, continue with next check.

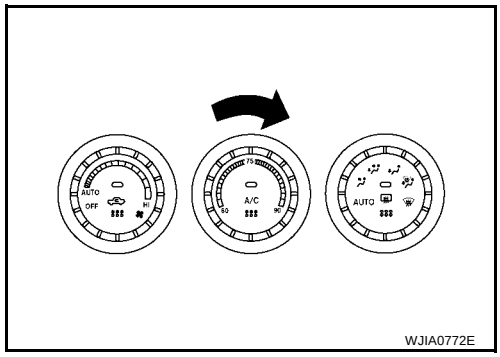


WJIA0775E

5. Check Temperature Increase

1. Turn the temperature dial clockwise to "90".
2. Check for hot air at discharge air outlets.

If NG, go to ATC-73, "Insufficient Heating" .
If OK, continue with next check.

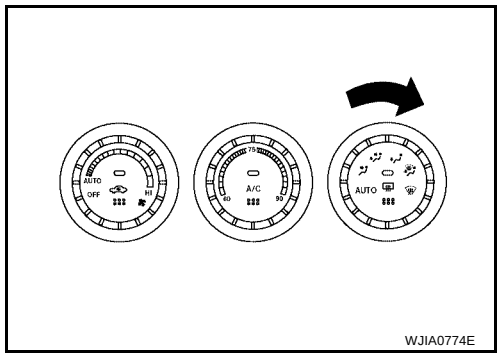


WJIA0772E

6. Check AUTO Mode

1. Turn mode dial to AUTO position.
2. 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 ATC-42, "DIAGNOSTIC PROCEDURE" , then if necessary, ATC-62, "Magnet Clutch Circuit" .
If all operational checks are OK (symptom can not be duplicated), go to GI-27, "How to Perform Efficient Diagnosis for an Electrical Incident" and perform tests as outlined to simulate driving condition environment. If symptom appears, refer to ATC-29, "SYMPTOM TABLE" and perform applicable trouble diagnosis procedures.



WJIA0774E

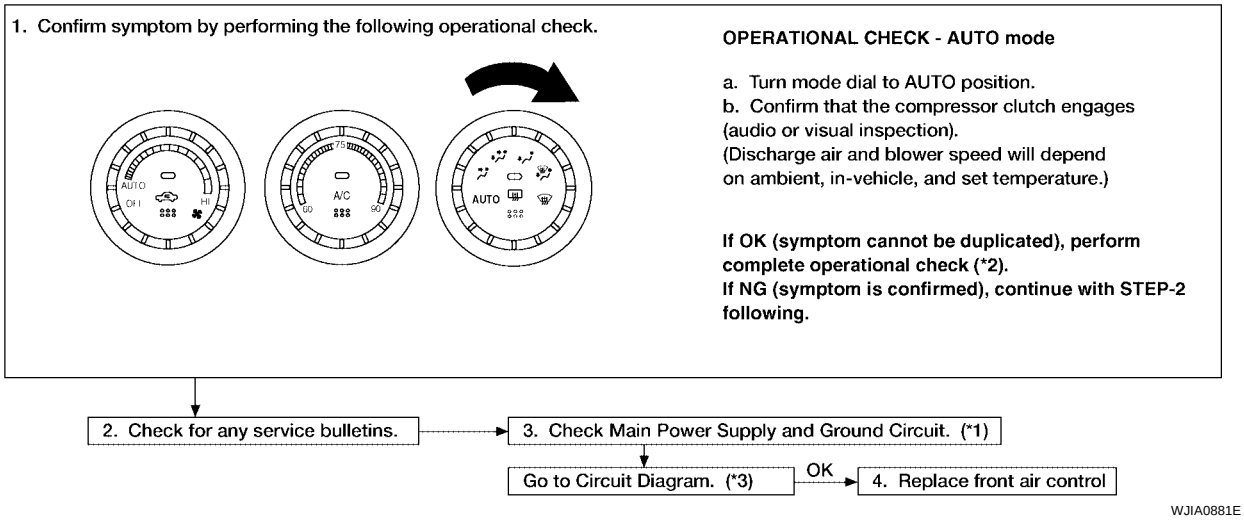
Power Supply and Ground Circuit for Front Air Control

EJS002QD

SYMPTOM:

- **A/C system does not come on.**

INSPECTION FLOW

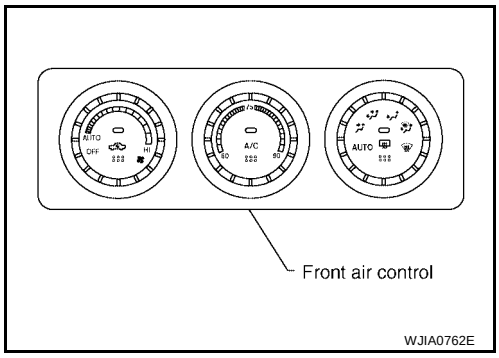


*1: ATC-42 *2: ATC-40 *3: ATC-42

COMPONENT DESCRIPTION

FRONT AIR CONTROL

The front air control 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.
Signals from various switches and Potentio Temperature Control (PTC) are directly entered into front air control.



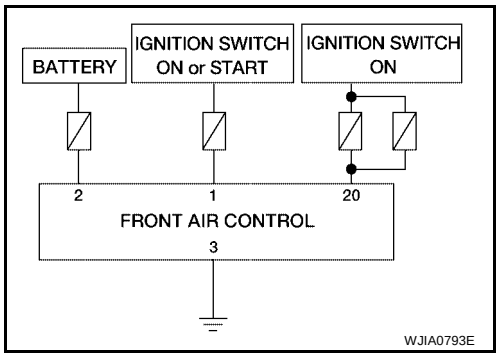
POTENTIO TEMPERATURE CONTROL (PTC)

The PTC is built into the front air control.

DIAGNOSTIC PROCEDURE

SYMPTOM:

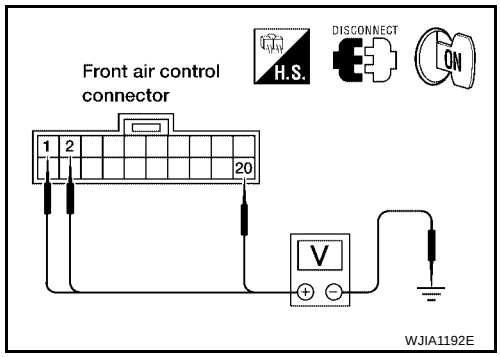
- **A/C system does not come on.**



1. CHECK POWER SUPPLY CIRCUIT FOR FRONT AIR CONTROL

1. Disconnect front air control connector M49.
2. Turn ignition switch ON.
3. Check voltage between front air control connector M49 terminals 1, 2, and 20, and ground.

Terminals		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	12V
M49-1		
M49-2		
M49-20		



OK or NG

OK >> GO TO 2.

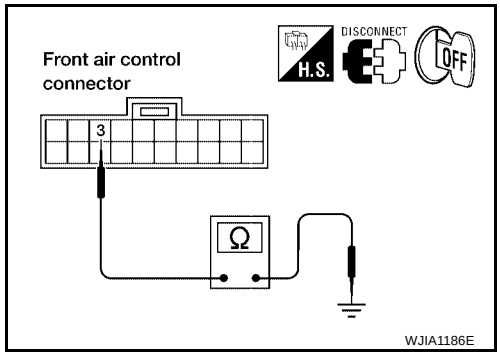
NG >> Check the following.

- 10A fuse [Nos. 12 and 19, located in the fuse block (J/B)] and 15A fuses [Nos. 10 and 11, located in the fuse block (J/B)].
- 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 FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Check continuity between front air control connector M49 terminal 3 and ground.

Terminal		Continuity
(+)	(-)	
Connector - Terminal	Body ground	Yes
M49-3		



OK or NG

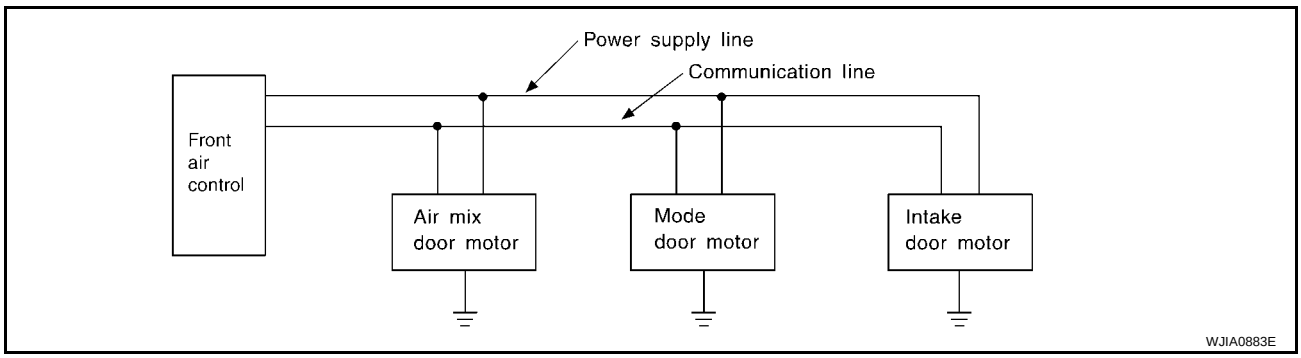
OK >>
- Replace front air control. Refer to ATC-86, "FRONT AIR CONTROL" .
- Inspection End.

NG >> Repair or replace harness.

LAN System Circuit

EJS002QE

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

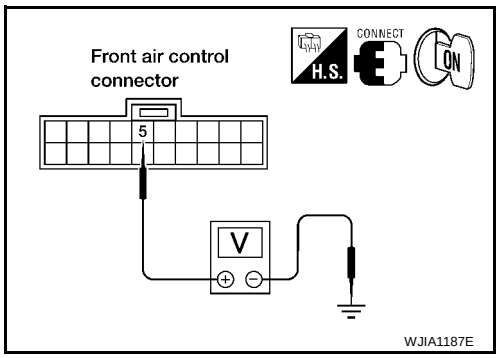


DIAGNOSTIC PROCEDURE

1. CHECK POWER SUPPLY FOR DOOR MOTORS

1. Turn ignition switch ON.
2. Check voltage between front air control connector M49 terminal 5 and ground.

Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal		
M49-5	Body ground	12V



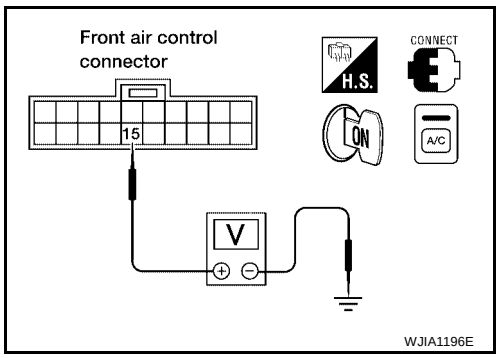
OK or NG

OK >> GO TO 2.
NG >> Replace front air control. Refer to ATC-86, "FRONT AIR CONTROL" .

2. CHECK SIGNAL FOR DOOR MOTORS

Check voltage between front air control connector M49 terminal 15 (L/B) and ground.

Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal		
M49-15	Ground	5.5V



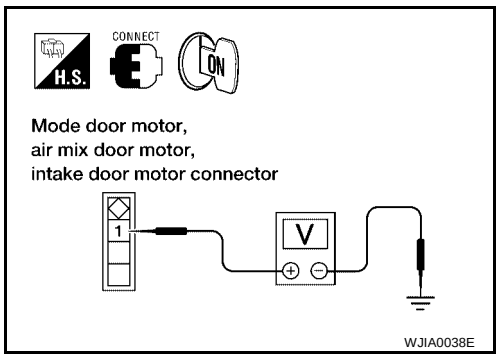
OK or NG

OK >> GO TO 3.
NG >> Replace front air control. Refer to ATC-86, "FRONT AIR CONTROL" .

3. CHECK POWER SUPPLY FOR MOTOR

Check voltage between mode door motor connector M40 terminal 1 and ground, between air mix door motor connector M39 terminal 1 and ground, and between intake door motor connector M58 terminal 1 and ground.

Door motors	Terminals		Voltage (V) (Approx.)
	(+)	(-)	
	Connector - Terminal		
Mode	M40-1	Body ground	12V
Air mix	M39-1		
Intake	M58-1		

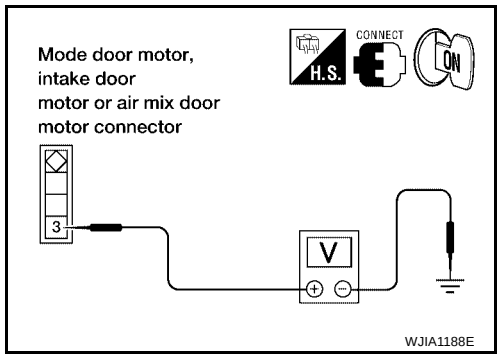


OK or NG

OK >> GO TO 4.
NG >> Replace harness or connector.

4. CHECK SIGNAL FOR MOTOR

Check voltage between mode door motor connector M40 terminal 3 and ground, between air mix door motor connector M39 terminal 3 and ground, and between intake door motor connector M58 terminal 3 and ground.



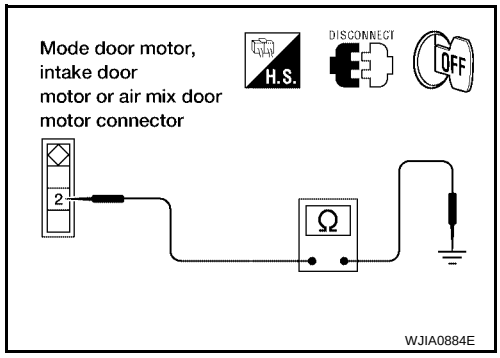
Door motors	Terminals		Voltage (V) (Approx.)
	(+)	(-)	
	Connector - Terminal		
Mode	M40-3	Body ground	5.5V
Air mix	M39-3		
Intake	M58-3		

OK or NG

OK >> GO TO 5.
NG >> Replace harness or connector.

5. CHECK MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect door motor connectors.
3. Check continuity between mode door motor connector M40 terminal 2 and ground, between air mix door motor connector M39 terminal 2 and ground, and between intake door motor connector M58 terminal 2 and ground.



Door motors	Terminals		Continuity
	(+)	(-)	
	Connector - Terminal		
Mode	M40-2	Body ground	Yes
Air mix	M39-2		
Intake	M58-2		

OK or NG

OK >> GO TO 6.
NG >> Replace harness or connector.

6. CHECK MOTOR OPERATION

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

OK or NG

OK >> (Returns to normal operation.)
- Motor connector contacts dirty or damaged

NG >> (Does not operate normally.)
- GO TO 7.

7. CHECK MODE DOOR MOTOR AND AIR MIX DOOR MOTOR OPERATION

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

OK or NG

OK >> (Mode door motor and air mix door motor operate normally.)
- Replace the intake door motor. refer to ATC-96, "Removal and Installation"

NG >> (Mode door motor and air mix door motor do not operate normally.)
- GO TO 8.

8. CHECK AIR MIX DOOR MOTOR AND INTAKE DOOR MOTOR OPERATION

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

OK or NG

OK >> (Air mix door motor and intake door motor operate normally.)
- Replace mode door motor. Refer toATC-97, "Removal and Installation"

NG >> (Air mix door motor and intake door motor do not operate normally.)
- GO TO 9.

9. CHECK INTAKE DOOR MOTOR AND MODE DOOR MOTOR OPERATION

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

OK or NG

OK >> (Intake door motor and mode door motor operate normally.)
- Replace air mix door motor. refer to ATC-98, "Removal and Installation"

NG >> (Intake door motor and mode door motor do not operate normally.)
- Replace front air control. Refer to ATC-86, "FRONT AIR CONTROL" .

Mode Door Motor Circuit

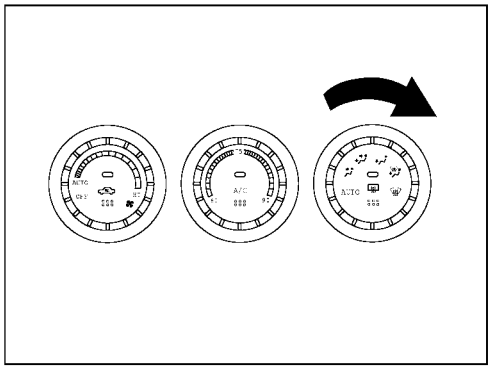
EJS002QF

SYMPTOM:

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

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Discharge air

a. Turn mode dial five positions.
b. Confirm that discharge air comes out according to the air distribution table.
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.

2. Check for any service bulletins.
OK
Go to LAN system circuit. (*10)
OK
Check mode door control linkage. NG → Repair control linkage.
OK **[Cause cannot be confirmed by self-diagnosis.]**
3. Check ambient sensor circuit. (*3)
OK
4. Check in-vehicle sensor circuit. (*4)
OK
5. Check sunload sensor circuit. (*5)
OK
6. Check intake sensor circuit. (*6)
OK
7. Check air mix door motor PBR circuit. (*7)
OK → If the symptom still exists, perform a complete operational check (*9) and check for other symptoms.
[Refer to symptom table, (*10).]
Does another symptom exist?
Yes → Go to Trouble Diagnosis for related symptoms.
[Another symptom exists.]
No → Replace front air control (*8).
INSPECTION END

WJIA1648E

*1 ATC-27, "Discharge Air Flow"
*2 ATC-40, "Operational Check"
*3 ATC-75, "Ambient Sensor Circuit"
*4 ATC-77, "In-vehicle Sensor Circuit"
*5 ATC-80, "Sunload Sensor Circuit"
*6 ATC-83, "Intake Sensor Circuit"
*7 ATC-50, "Air Mix Door Motor Circuit"
*8 ATC-86, "FRONT AIR CONTROL"
*9 ATC-40, "Operational Check"
*10 ATC-29, "SYMPTOM TABLE"

SYSTEM DESCRIPTION

Component Parts

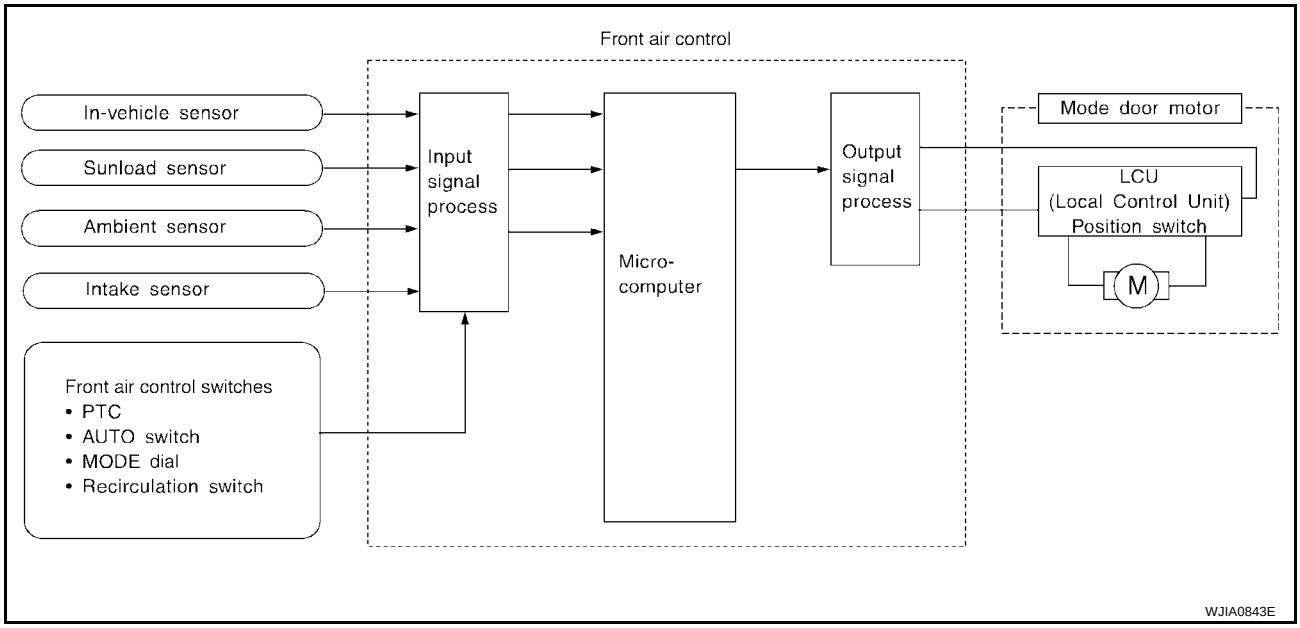
Mode door control system components are:

- Front air control
- Mode door motor (LCU)
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

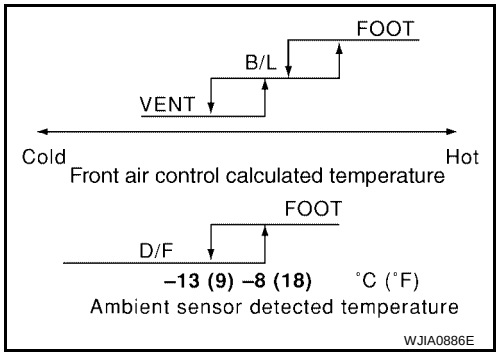
System Operation

The front air control receives data from each of the sensors. The front air control 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 front air control and each of the motor position sensors are compared by the LCU's 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 front air control.



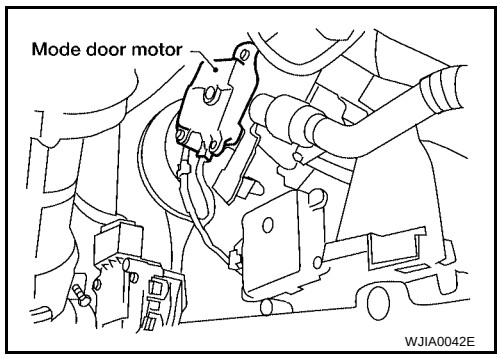
Mode Door Control Specification



COMPONENT DESCRIPTION

Mode Door Motor

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



DIAGNOSTIC PROCEDURE

SYMPTOM: Mode door motor and/or air mix door motor does not operate normally.
Perform diagnostic procedure for LAN system circuit. Refer to ATC-43, "LAN System Circuit" .

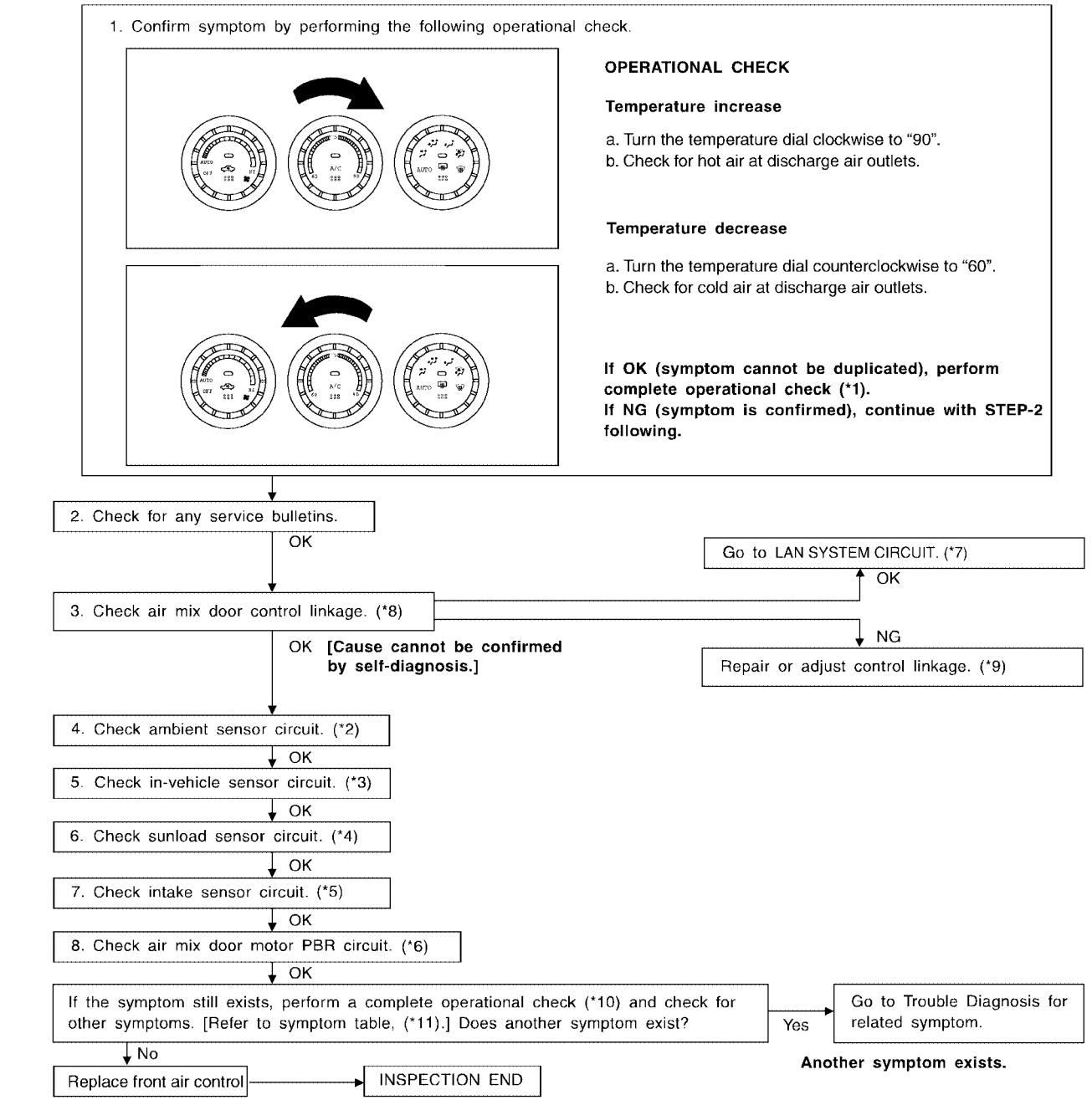
Air Mix Door Motor Circuit

EJS002QG

SYMPTOM:

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

INSPECTION FLOW



WJIA0840E

*1 ATC-40, "Operational Check"
*2 ATC-75, "Ambient Sensor Circuit"
*3 ATC-77, "In-vehicle Sensor Circuit"
*4 ATC-80, "Sunload Sensor Circuit"
*5 ATC-53, "Intake Door Motor Circuit"
*6 ATC-50, "Air Mix Door Motor Circuit"
*7 ATC-43, "LAN System Circuit"
*8 ATC-50, "Air Mix Door Motor Circuit"
*9 ATC-98, "AIR MIX DOOR MOTOR"
*10 ATC-40, "Operational Check"
*11 ATC-29, "SYMPTOM TABLE"

SYSTEM DESCRIPTION

Component Parts

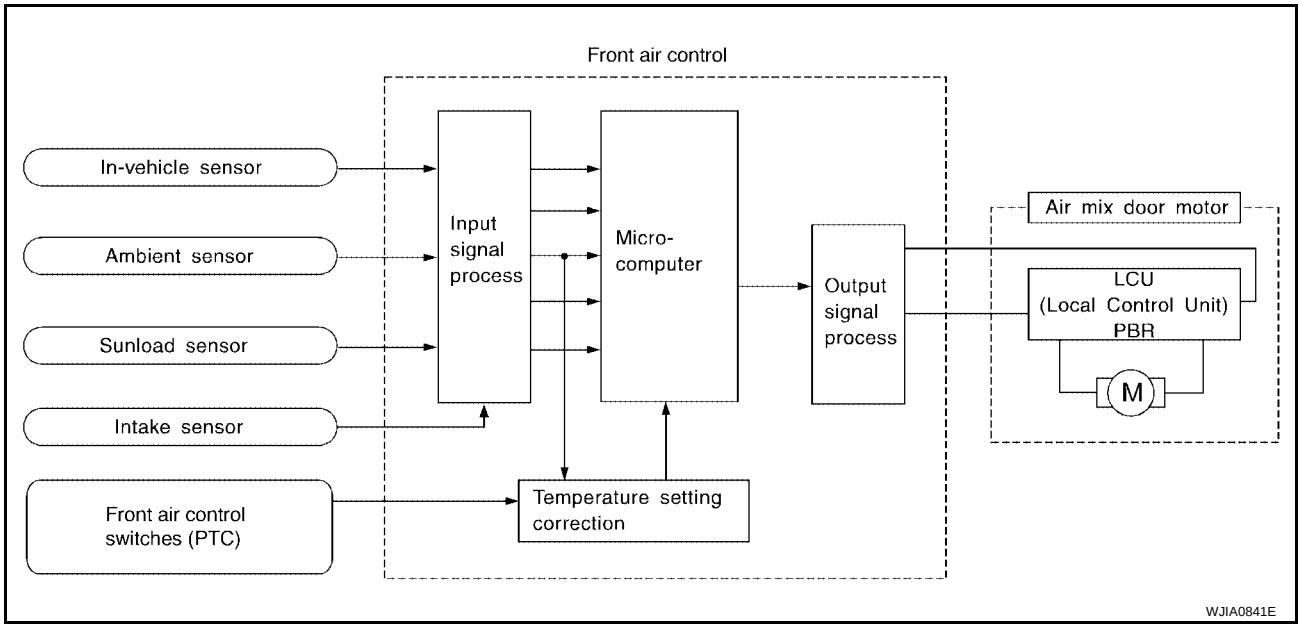
Air mix door control system components are:

- Front air control
- Air mix door motor (LCU)
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

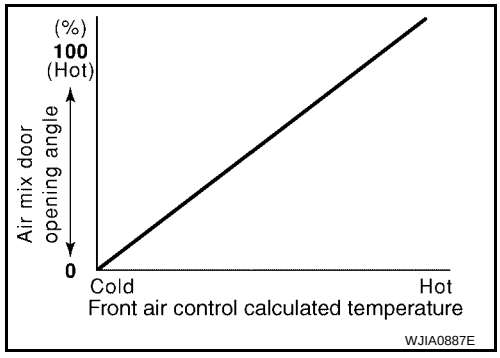
System Operation

The front air control 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 front air control 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 front air control.



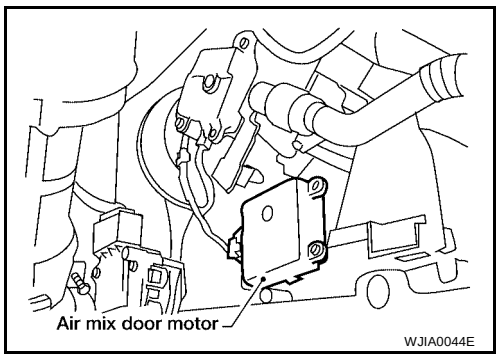
Air Mix Door Control Specification



COMPONENT DESCRIPTION

Air Mix Door Motor

The air mix door motor is attached to the heater and cooling unit assembly. It rotates so that the air mix door is opened or closed to a position set by the front air control. Motor rotation is then conveyed through a shaft and the air mix door position is then fed back to the front air control by PBR built-in air mix door motor.



DIAGNOSTIC PROCEDURE

SYMPTOM: Discharge air temperature does not change.
Perform diagnostic procedure for LAN system circuit. Refer to ATC-43, "LAN System Circuit" .

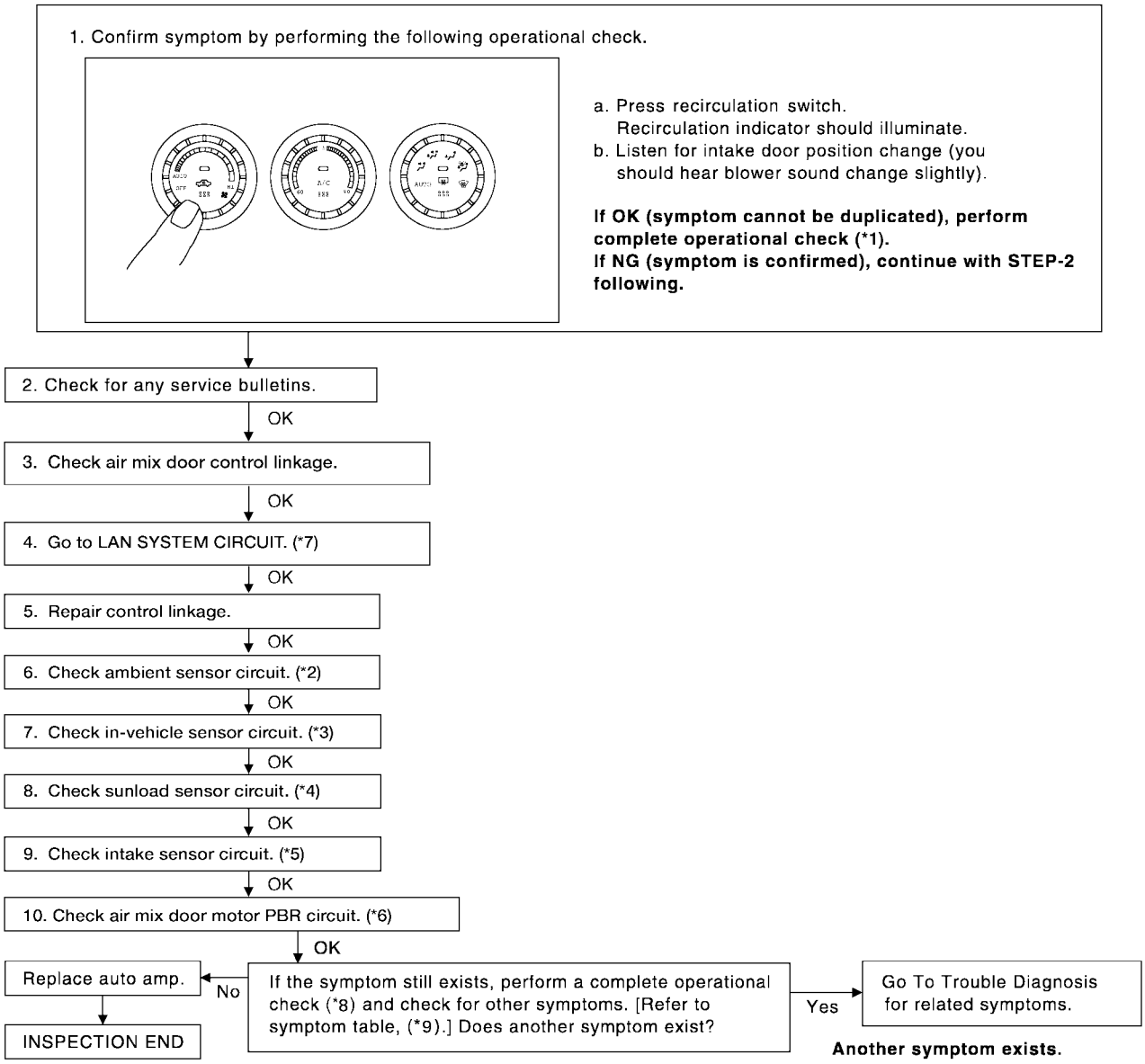
Intake Door Motor Circuit

EJS002QH

SYMPTOM:

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

INSPECTION FLOW



WJIA1643E

*1	ATC-40, "Operational Check"	*5	ATC-83, "Intake Sensor Circuit"	*9	ATC-29, "SYMPTOM TABLE"
*2	ATC-75, "Ambient Sensor Circuit"	*6	ATC-50, "Air Mix Door Motor Circuit"		
*3	ATC-77, "In-vehicle Sensor Circuit"	*7	ATC-43, "LAN System Circuit"		
*4	ATC-80, "Sunload Sensor Circuit"	*8	ATC-40, "Operational Check"		

SYSTEM DESCRIPTION

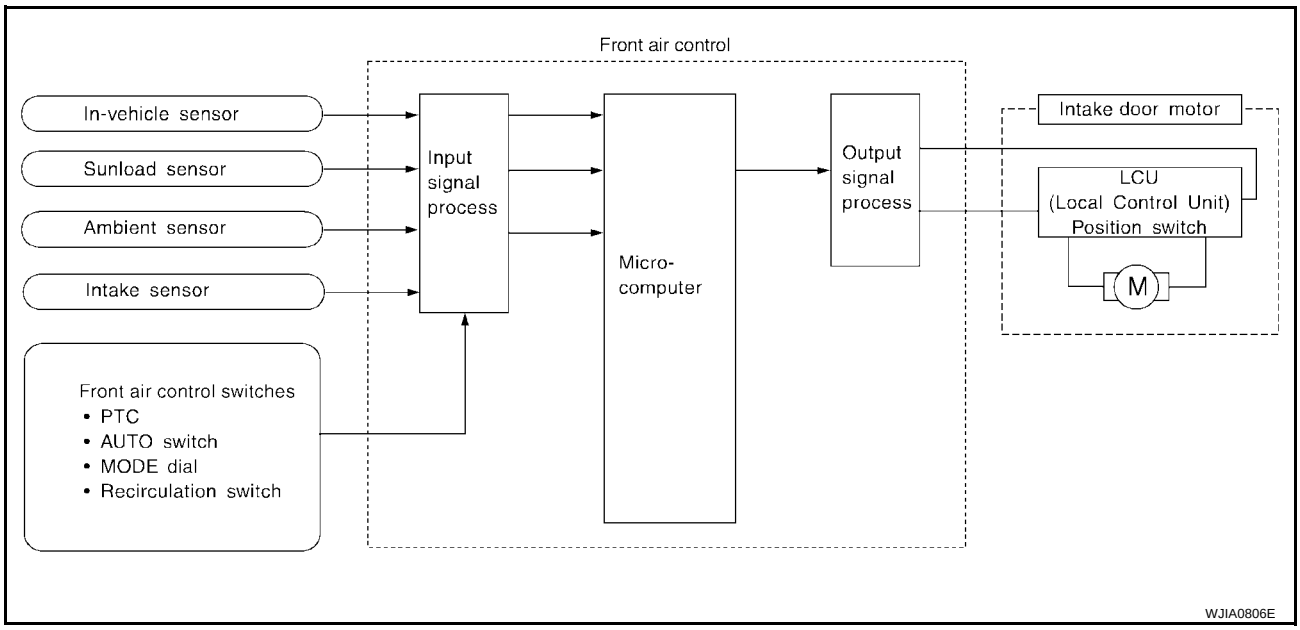
Component Parts

Intake door control system components are:

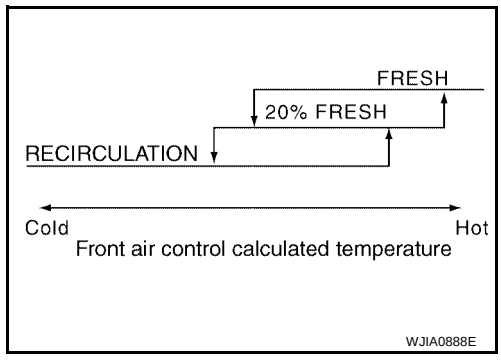
- Front air control
- Intake door motor
- A/C LAN system (PBR built-in mode motor and air mix door motor)
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

System Operation

The intake door control determines intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When the front air control is set to DEFROST, or OFF, the front air control sets the intake door at the fresh position.



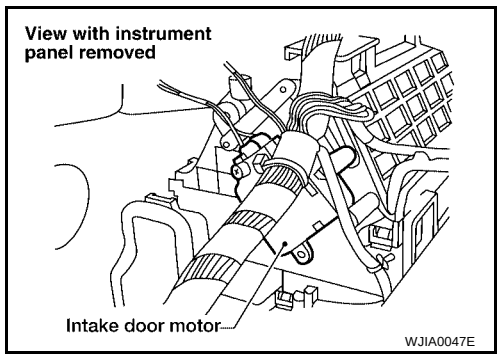
Intake Door Control Specification



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 front air control. Motor rotation is conveyed to a lever which activates the intake door. Door position is then fed back to the front air control by PBR built-in air mix door motor.



DIAGNOSTIC PROCEDURE

SYMPTOM: Intake door motor does not operate normally.
Perform diagnostic procedure for LAN system circuit. Refer to ATC-43, "LAN System Circuit" .

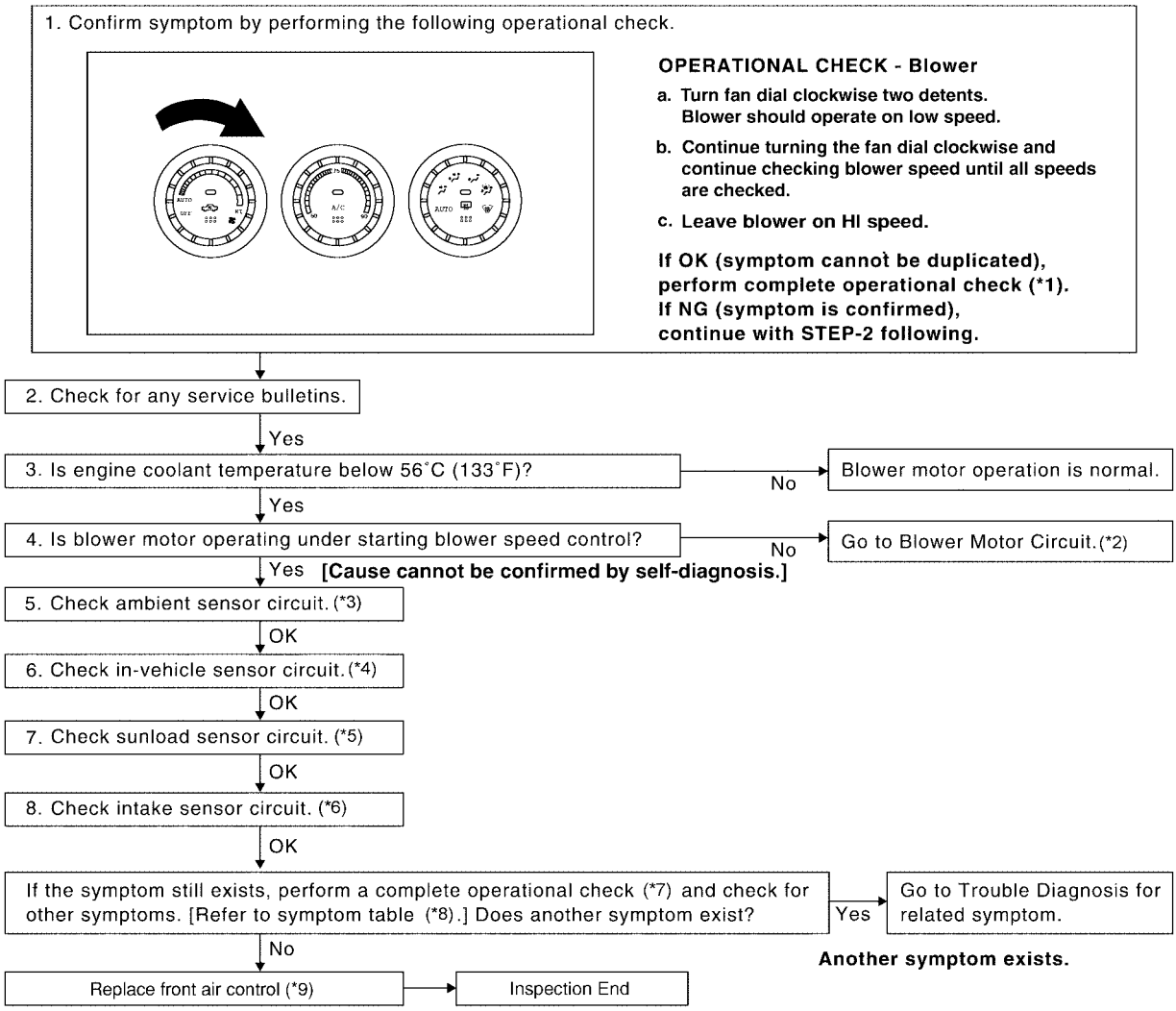
Blower Motor Circuit

EJS002QI

SYMPTOM:

- Blower motor operation is malfunctioning.

INSPECTION FLOW



WJIA1642E

*1	ATC-40, "Operational Check"	*4	ATC-88, "IN-VEHICLE SENSOR"	*7	ATC-40, "Operational Check"
*2	ATC-56, "Blower Motor Circuit"	*5	ATC-89, "SUNLOAD SENSOR"	*8	ATC-40, "Operational Check"
*3	ATC-75, "Ambient Sensor Circuit"	*6	ATC-90, "INTAKE SENSOR"	*9	ATC-86, "FRONT AIR CONTROL"

SYSTEM DESCRIPTION

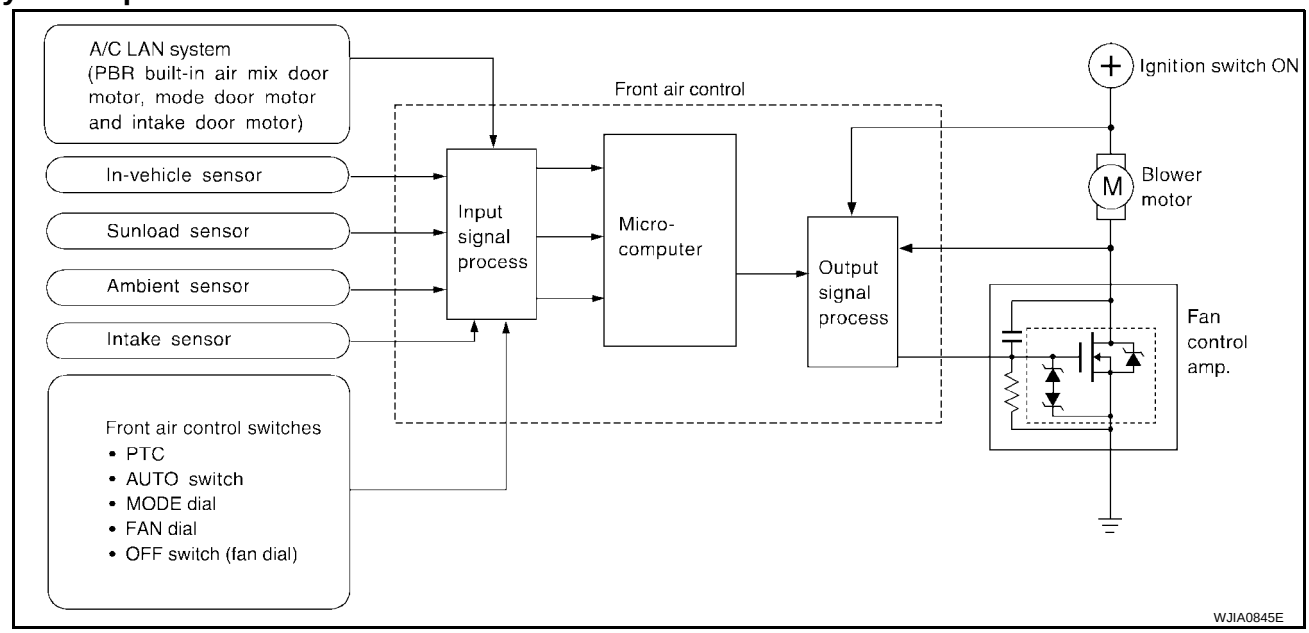
Component Parts

Fan speed control system components are:

- Front air control
- A/C LAN system (PBR built-in mode door motor, air mix door motor and intake door motor)

- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor
- Fan control amp.

System Operation



Automatic Mode

In the automatic mode, the blower motor speed is calculated by the front air control based on inputs from the PBR, in-vehicle sensor, sunload sensor, intake sensor and ambient sensor.
When the air flow is increased, the duty ratio of the blower fan motor's drive signal is changed at 8% sec. to prevent a sudden increase in air flow.
In addition to manual air flow control and the normal automatic air flow control, starting air flow control, low water temperature starting control and high passenger compartment temperature starting control are available.

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)

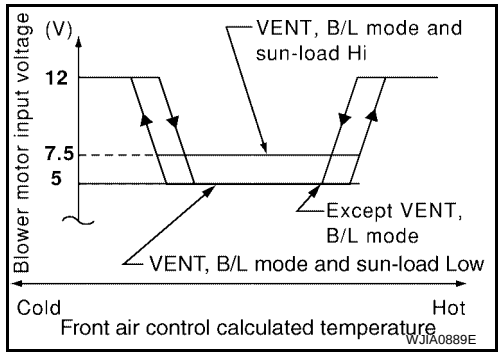
The blower will begin operation momentarily after the A/C button is pushed. The blower speed will gradually rise to the objective speed over a time period of 3 seconds or less (actual time depends on the objective blower speed).

Fan Speed Compensation

Sunload

When the in-vehicle temperature and the set temperature are very close, the fan will be operating at low speed. The low speed will vary depending on the sunload. During conditions of high sunload, the fan low speed is "normal" low speed (approx. 6V). During low or no sunload conditions, the low speed will drop to "low" low speed (approx. 5V).

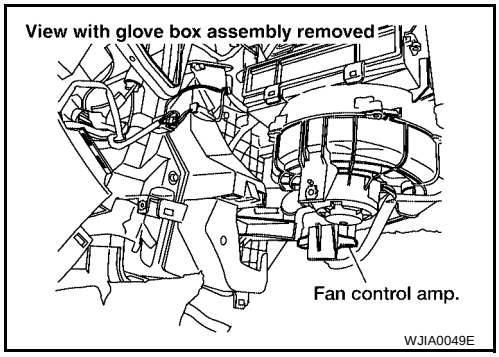
Fan Speed Control Specification



COMPONENT DESCRIPTION

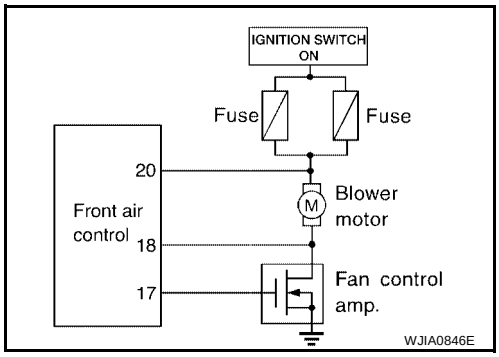
Fan Control Amplifier

The fan control amplifier is located on the cooling unit. The fan control amp. receives a gate voltage from the front air control to smoothly maintain the blower fan motor voltage in the 5 to the 12V range (approx.).



DIAGNOSTIC PROCEDURE

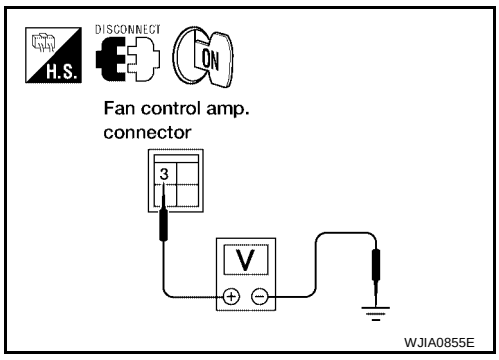
SYMPTOM: Blower motor operation is malfunctioning under Starting Fan Speed Control.



1. CHECK POWER SUPPLY FOR FAN CONTROL AMP.

1. Disconnect fan control amp. connector.
2. Turn ignition switch ON.
3. Check voltage between fan control amp. harness connector M64 terminal 3 and ground.

Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal		
M64-3	Body ground	12V

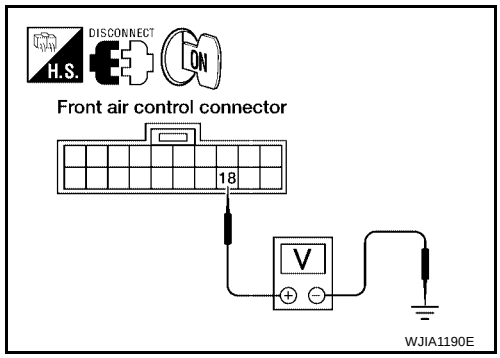


OK or NG

OK >> GO TO 2.
NG >> GO TO 7.

2. CHECK FAN FEEDBACK CIRCUIT

1. Disconnect front air control connector.
2. Check voltage between front air control harness connector M49 terminal 18 and ground.



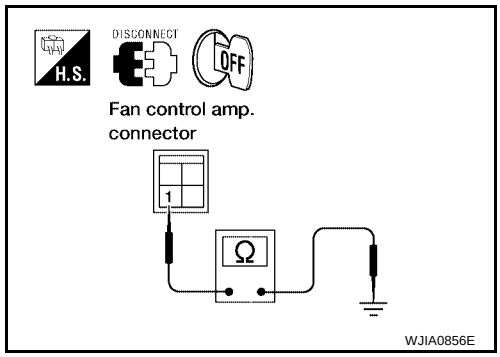
Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	12V
M49-18		

OK or NG

OK >> GO TO 3.
NG >> Check for open circuit in wiring harness. Repair or replace as necessary.

3. CHECK BODY GROUND CIRCUIT FOR FAN CONTROL AMP.

1. Turn ignition switch OFF.
2. Check continuity between fan control amp. harness connector M64 terminal 1 and ground.



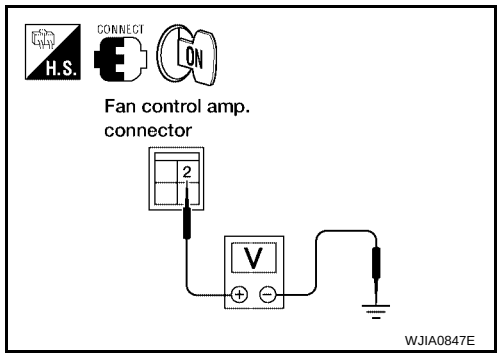
Terminal		Continuity
Connector - Terminal	Body ground	Yes
M64-1		

OK or NG

OK >> Reconnect fan control amp. harness connector and GO TO 4.
NG >> Repair harness or connector.

4. CHECK VOLTAGE FOR FAN CONTROL AMP.

1. Turn ignition switch ON.
2. Turn fan dial to any position except OFF or AUTO.
3. Check voltage between fan control amp. harness connector M64 terminal 2 and ground.



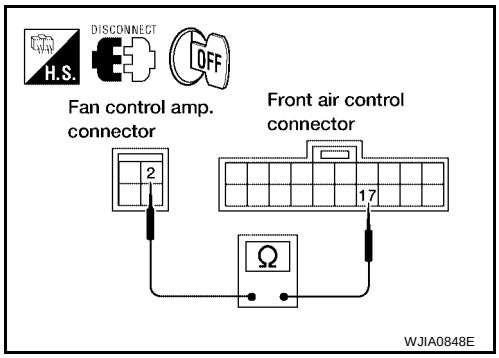
Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal		
M64-2	Body ground	12V

OK or NG

OK >> 1. Replace fan control amp. Refer to ATC-99, "FAN CONTROL AMPLIFIER"
2. Confirm that blower motor operation is normal.
NG >> GO TO 5.

5. CHECK FAN CONTROL AMP. CIRCUIT BETWEEN FAN CONTROL AMP. AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control and fan control amp. harness connectors.
3. Check continuity between fan control amp. harness connector M64 terminal 2 and front air control harness connector M49 terminal 17.



Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
M64-2	M49-17	

Continuity should exist.

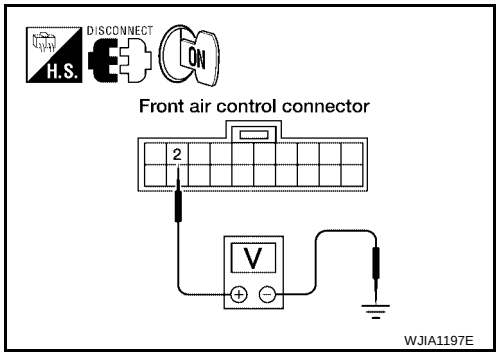
If OK, check harness for short.

OK or NG

OK >> GO TO 6.
NG >> Repair harness or connector.

6. CHECK POWER SUPPLY FOR FRONT AIR CONTROL

1. Turn ignition switch ON.
2. Check voltage between front air control harness connector M49 terminal 2 and ground.



Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	12V
M49-2		

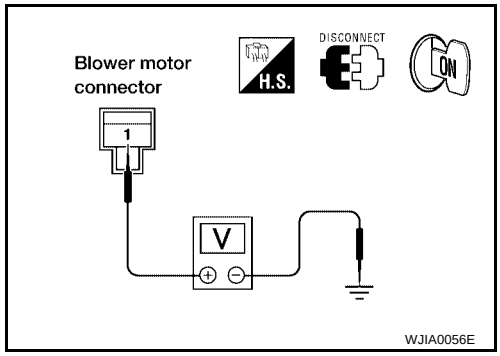
OK or NG

OK >> 1. Replace front air control. Refer to ATC-86, "Removal and Installation" .
2. Confirm that blower motor operation is normal.

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

7. CHECK POWER SUPPLY FOR BLOWER MOTOR

1. Turn ignition OFF.
2. Disconnect blower motor harness connector.
3. Turn ignition switch ON.
4. Check voltage between blower motor harness connector M62 terminal 1 and ground.



Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	12V
M62-1		

OK or NG

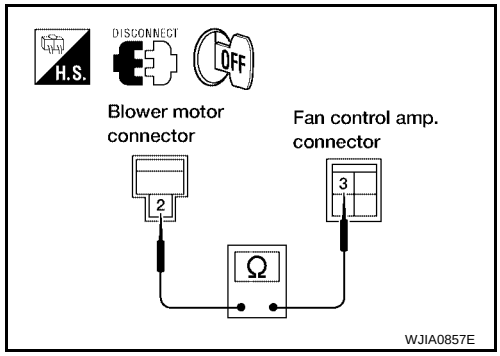
OK >> GO TO 8.

NG >> Check power supply circuit and 15A fuses [Nos. 10 and 11, located in the fuse block (J/B)].

- Check blower motor relay. Refer to PG-11, "IGNITION POWER SUPPLY — IGNITION SW. IN ON" .
- If OK, check for open circuit in wiring harness. Repair or replace as necessary.
- If OK, replace fuse and check wiring harness for short circuit. Repair or replace as necessary.

8. CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND FAN CONTROL AMP.

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between blower motor harness connector M62 terminal 2 and fan control amp. harness connector M64 terminal 3.



Terminals		Continuity
Connector - Terminal	Connector - Terminal	
M62-2	M64-3	Yes

OK or NG

OK >> Check blower motor. Refer to ATC-61, "Blower Motor" .

1. If NG, replace blower motor. Refer to ATC-92, "BLOWER MOTOR"
2. Confirm that blower motor operation is normal.

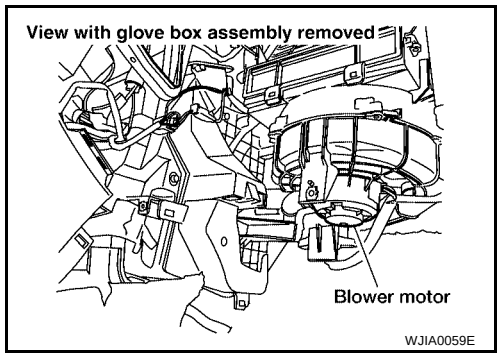
NG >> Repair harness or connector.

COMPONENT INSPECTION

Blower Motor

Confirm smooth rotation of the blower motor.

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

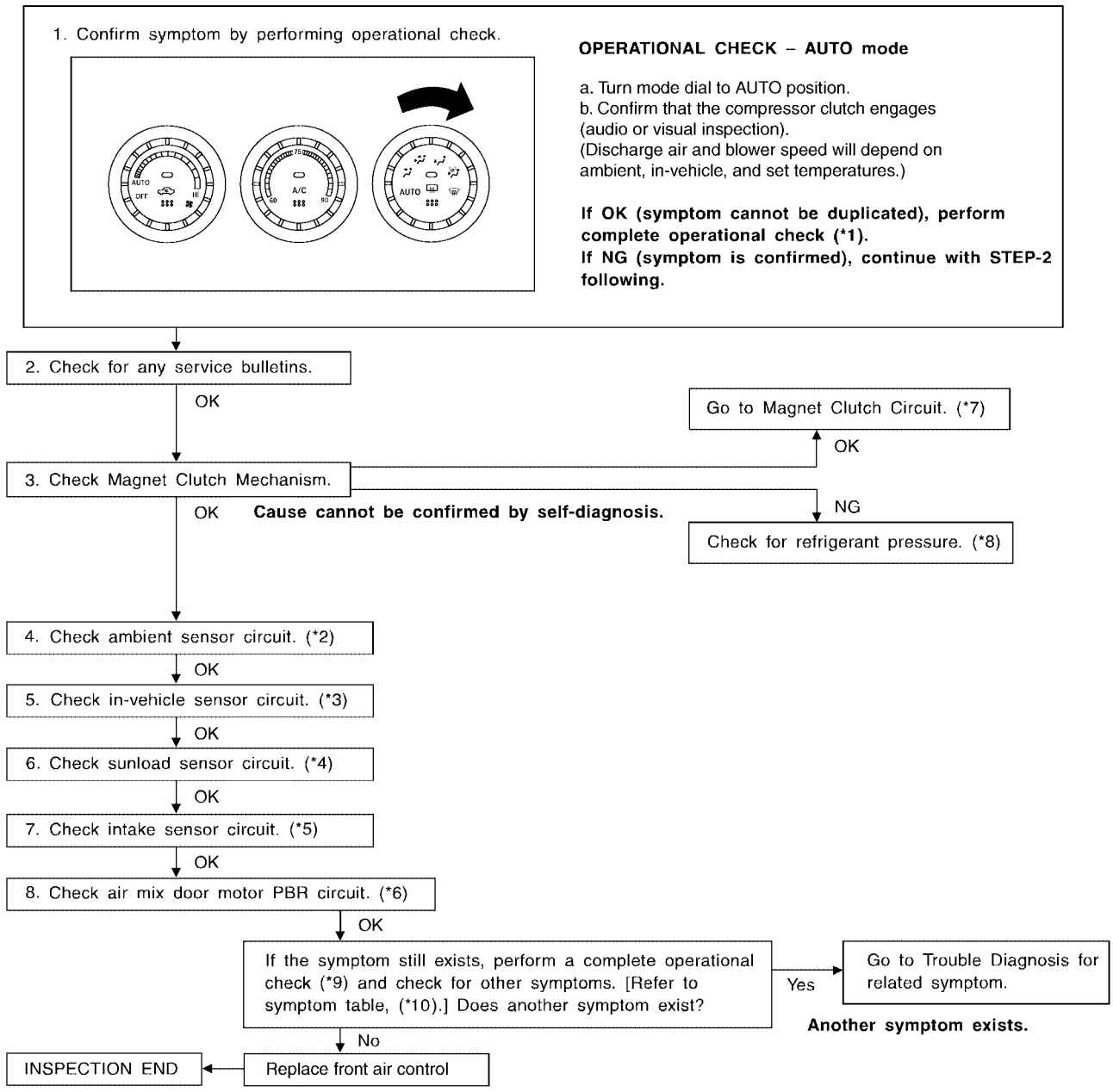


Magnet Clutch Circuit

EJS002QJ

SYMPTOM: Magnet clutch does not engage.

INSPECTION FLOW



WJIA0852E

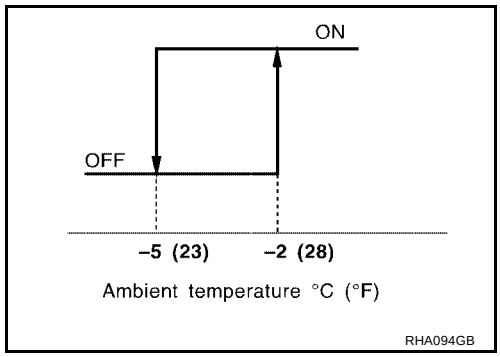
*1	ATC-40, "Operational Check"	*5	ATC-83, "Intake Sensor Circuit"	*9	ATC-40, "Operational Check"
*2	ATC-75, "Ambient Sensor Circuit"	*6	ATC-50, "Air Mix Door Motor Circuit"	*10	ATC-29, "SYMPTOM TABLE"
*3	ATC-77, "In-vehicle Sensor Circuit"	*7	ATC-62, "Magnet Clutch Circuit"		
*4	ATC-80, "Sunload Sensor Circuit"	*8	ATC-69, "TROUBLE DIAGNOSIS FOR ABNORMAL PRESSURE"		

SYSTEM DESCRIPTION

Front air control controls compressor operation by ambient temperature and signal from ECM.

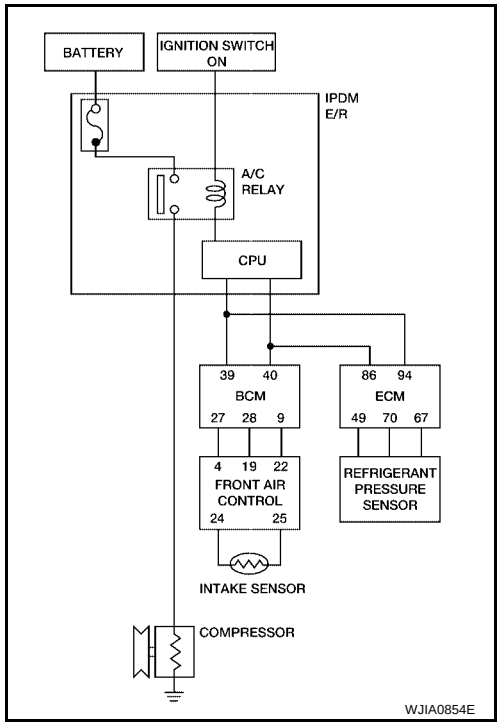
Low Temperature Protection Control

Front air control will turn the compressor ON or OFF as determined by a signal detected by ambient sensor.
When ambient temperature is greater than -2°C (28°F), the compressor turns ON. The compressor turns OFF when ambient temperature is less than -5°C (23°F).



DIAGNOSTIC PROCEDURE

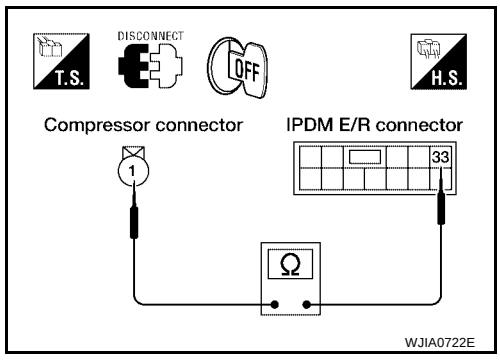
SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



1. CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY IN IPDM E/R AND COMPRESSOR

1. Disconnect IPDM E/R connector E124 and compressor connector.
2. Check continuity between compressor harness connector F3 terminal 1 and IPDM E/R harness connector E124 terminal 33.

Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
F3-1	E124-33	



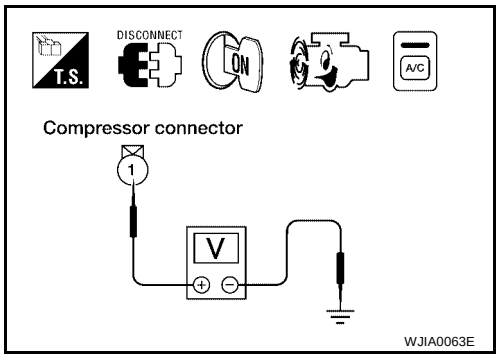
If OK, check harness for short to ground.

OK or NG

OK >> GO TO 2.
NG >> Repair harness or connector.

2. CHECK POWER SUPPLY FOR COMPRESSOR

1. Reconnect IPDM E/R harness connector.
2. Start engine and press A/C switch.
3. Check voltage between compressor harness connector F3 terminal 1 and ground.



Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	12V
F3-1		

OK or NG

OK >> Check magnet clutch coil.

1. If NG, replace magnet clutch. Refer to ATC-107, "Removal and Installation for Compressor Clutch" .
2. If OK, check compressor mounting points for looseness or corrosion and repair as necessary.

NG >> GO TO 3.

3. CHECK FUSE IN IPDM E/R

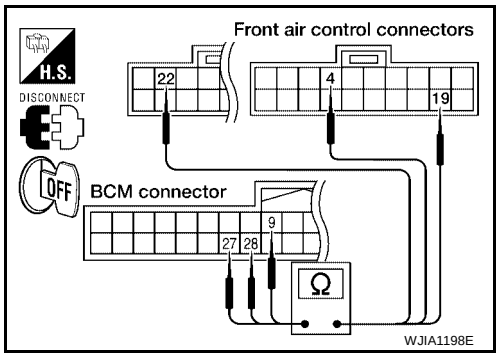
Check 10A fuse [No. 33 located at the IPDM E/R].

OK or NG

OK >> GO TO 4.
NG >> Replace fuse and check IPDM E/R for short circuit. Replace if necessary.

4. CHECK CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

1. Disconnect BCM connector M18 and front air control connectors M49 and M50.
2. Check continuity between BCM harness connector M18 terminals 9, 27, 28 and front air control connector M50 terminal 22, and M49 terminals 4, 19.



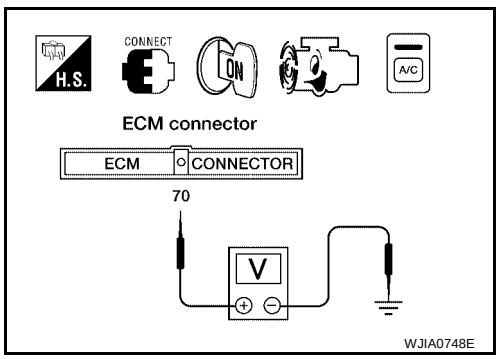
Terminals		Continuity
Connector - Terminal	Connector - Terminal	
M18-9	M50-22	Yes
M18-27	M49-4	
M18-28	M49-19	

OK or NG

OK >> GO TO 5.
NG >> Repair harness or connector.

5. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL

Check voltage between ECM harness connector F54 terminal 70 and ground.



Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector- Terminal	Body ground	12V
F54-70		

OK or NG

OK >> GO TO 6.
NG >> 1. Repair harness or connector.
2. Confirm that magnet clutch operation is normal.

6. CHECK REFRIGERANT PRESSURE SENSOR

Refer to ATC-65, "Refrigerant Pressure Sensor" .

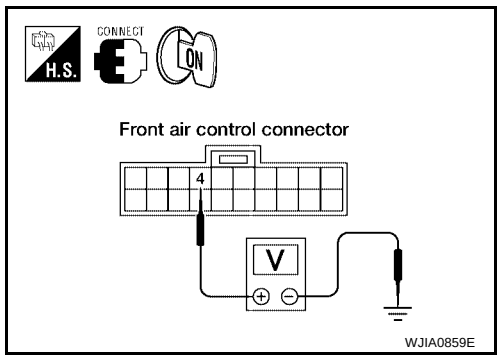
OK or NG

OK >> GO TO 7.
NG >> Replace refrigerant pressure sensor. Refer to ATC-112, "Removal and Installation for Refrigerant Pressure Sensor"

7. CHECK COMPRESSOR ON SIGNAL

Check voltage between front air control connector M49 terminal 4 and ground, with A/C compressor ON and with A/C compressor OFF.

Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	Compressor ON: 0V Compressor OFF: 5V
M49-4		



OK or NG

OK >> GO TO 8.
NG >>
- When compressor is ON and voltage is not approx. 0V, Replace front air control. Refer to ATC-86, "Removal and Installation" .
- When compressor is OFF and voltage is not approx. 5V, BCM is malfunctioning.

8. CHECK CAN COMMUNICATION CIRCUITS

Check CAN communication circuits between BCM to ECM and between ECM to IPDM E/R. Refer to LAN-20, "CAN COMMUNICATION" .

OK or NG

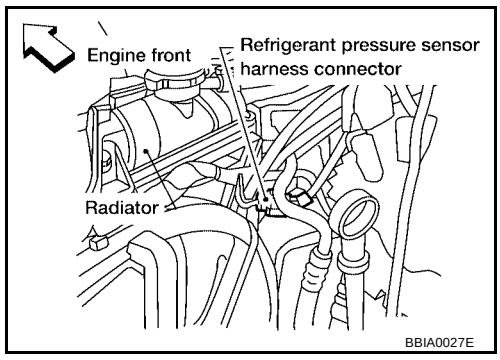
OK >> ECM malfunctioning.
NG >> Repair or replace component based on the result of diagnosis.

COMPONENT INSPECTION

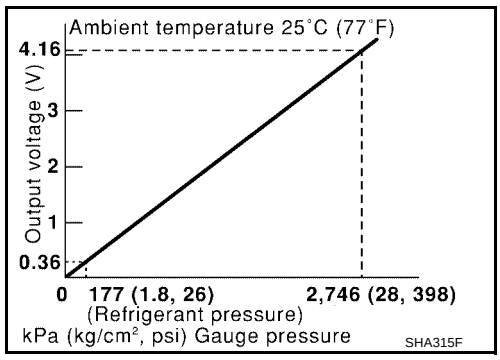
Refrigerant Pressure Sensor

The refrigerant pressure sensor is attached to the condenser.

- Refer to ATC-17, "Refrigerant pressure sensor" .



- Make sure that the A/C refrigerant pressure and the sensor output voltage are within the specified range as shown in the A/C operating condition figure.

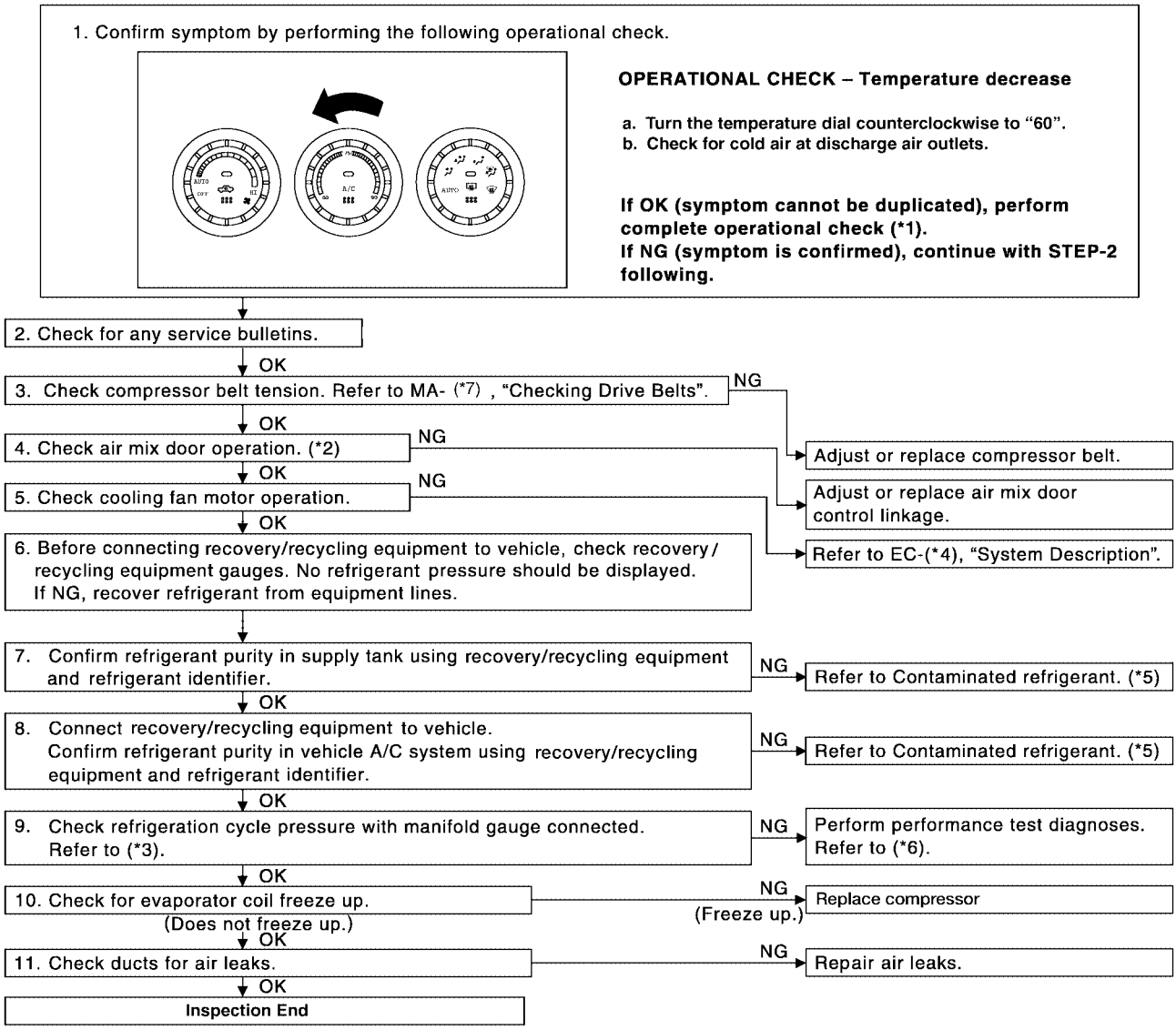


Insufficient Cooling

EJS002QK

SYMPTOM: Insufficient cooling

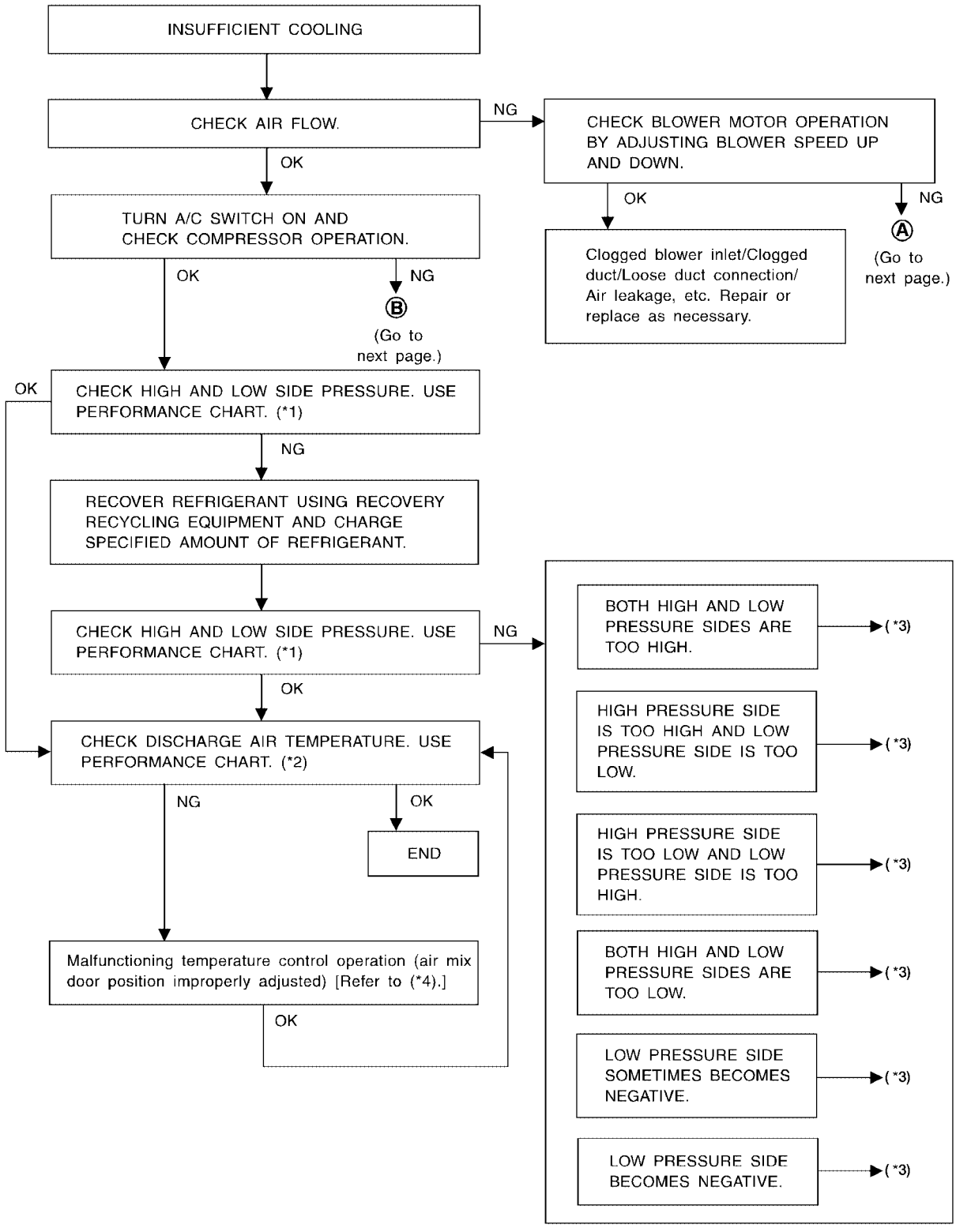
INSPECTION FLOW



WJIA1195E

*1 ATC-40, "Operational Check"
*2 ATC-50, "Air Mix Door Motor Circuit"
*3 ATC-69, "Test Reading"
*4 EC-1289, "Component Description"
*5 ATC-4, "Contaminated Refrigerant"
*6 ATC-67, "PERFORMANCE TEST ANALYSIS"
*7 EM-15, "Checking Drive Belts" (QR)
EM-117, "Checking Drive Belts" (VQ)

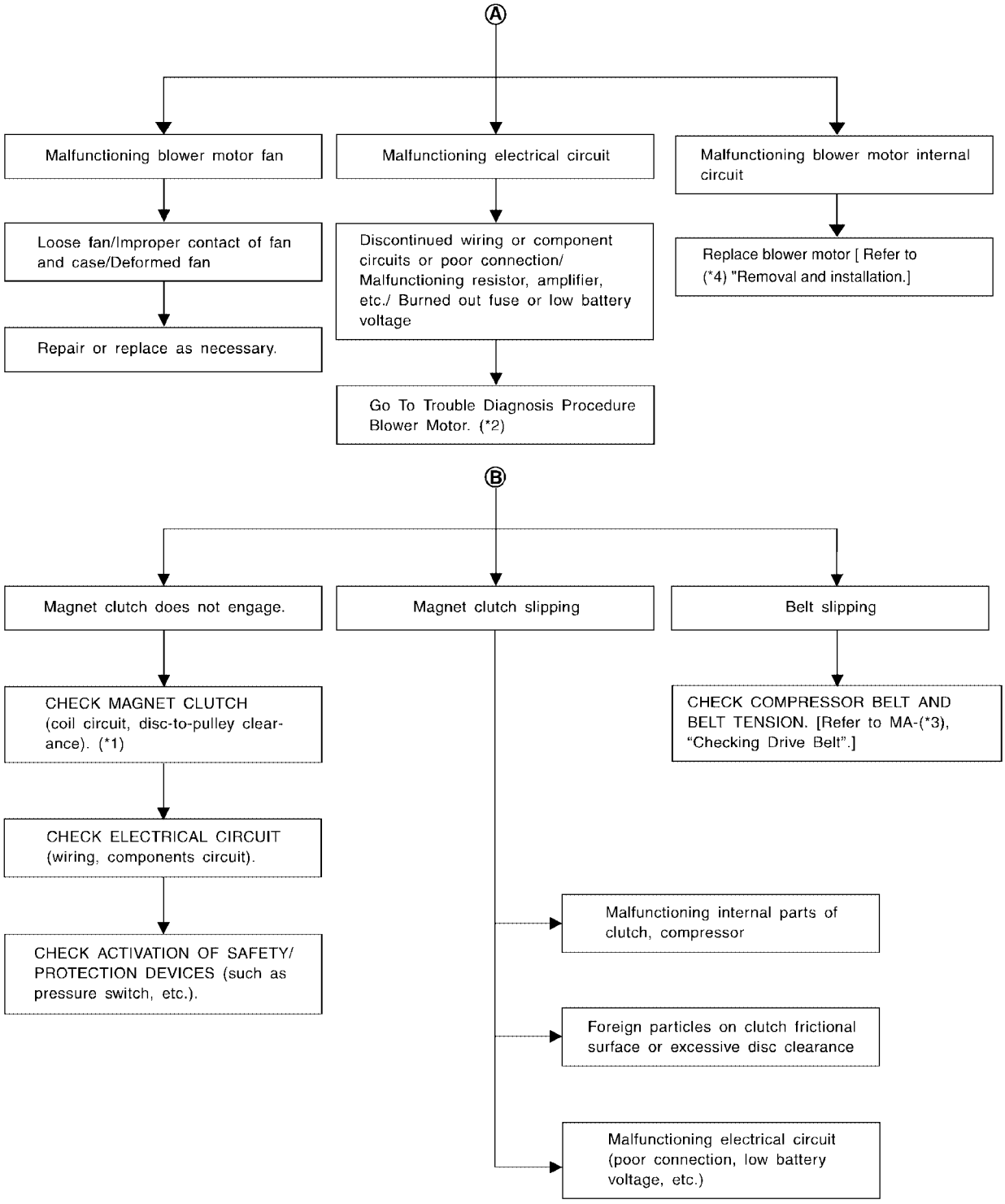
PERFORMANCE TEST ANALYSIS



WJIA0198E

*1 ATC-69, "PERFORMANCE CHART" *3 ATC-69, "TROUBLE DIAGNOSIS FOR ABNORMAL PRESSURE" *4 ATC-50, "Air Mix Door Motor Circuit"

*2 ATC-69, "Test Reading"



WJIA0749E

*1 ATC-109, "INSTALLATION"

*2 ATC-56, "Blower Motor Circuit"

*3 EM-15, "Checking Drive Belts" (QR)
EM-117, "Checking Drive Belts" (VQ)

*4 ATC-92, "Removal and Installation"

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
(fan) speed	Max. speed set
Engine speed	Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.	

Test Reading

Recirculating-to-discharge Air Temperature Table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	25 (77)	10.0 - 12.3 (50 - 54)
	30 (86)	13.2 - 15.3 (56 - 60)
	35 (95)	17.2 - 21.0 (63 - 70)
60 - 70	25 (77)	12.3 - 14.9 (54 - 59)
	30 (86)	15.3 - 19.3 (60 - 67)
	35 (95)	21.0 - 24.4 (70 - 76)

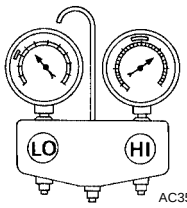
Ambient Air Temperature-to-operating Pressure Table

Ambient air		High-pressure (Discharge side) kPa (kg/cm2, psi)	Low-pressure (Suction side) kPa (kg/cm2, psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	30 (86)	1,220 - 1,500 (12.44 - 15.30, 176.9 - 217.5)	240 - 295 (2.45 - 3.01, 34.8 - 42.8)
	35 (95)	1,360 - 1,690 (13.87 - 17.24, 197.2 - 245.1)	275 - 335 (2.81 - 3.42, 39.9 - 48.6)
	40 (104)	1,500 - 1,830 (12.44 - 18.67, 176.9 - 265.4)	310 - 375 (3.16 - 3.83, 45.0 - 54.4)

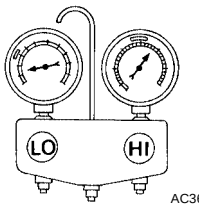
TROUBLE DIAGNOSIS FOR ABNORMAL PRESSURE

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 differs from vehicle to vehicle, refer to Ambient Air Temperature-to-operating Pressure Table above.

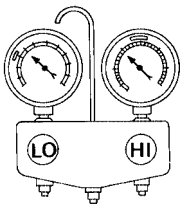
Both High- and Low-pressure Sides are Too High

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

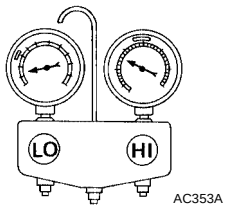
High-pressure Side is Too High and Low-pressure Side is Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	● Check and repair or replace malfunctioning parts. ● Check lubricant for contamination.

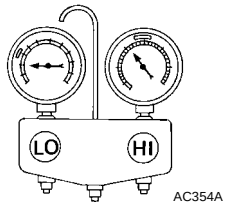
High-pressure Side is Too Low and Low-pressure Side is Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings	Replace compressor.
	No temperature difference between high and low-pressure sides	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

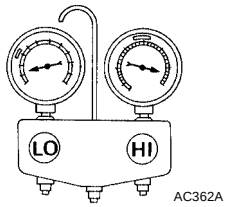
Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	● There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. ● Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	● Replace desiccant assembly. ● Check lubricant for contamination.
	● Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. ● Expansion valve inlet may be frosted. ● Temperature difference occurs somewhere in high-pressure side	High-pressure pipe located between receiver drier and expansion valve is clogged.	● 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	Check refrigerant for leaks. Refer to Checking Refrigerant Leaks, ATC-115, "Checking for Refrigerant Leaks" and ATC-116, "Electronic Refrigerant Leak Detector" .
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment 2. Malfunctioning thermal valve 3. Outlet and inlet may be clogged.	● Remove foreign particles by using compressed air. ● Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	● Check and repair malfunctioning parts. ● Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	● Check thermo control amp. and intake sensor operation. ● Replace compressor.

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	● Air conditioning system does not function and does not cyclically cool the compartment air. ● The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	● Drain water from refrigerant or replace refrigerant. ● Replace desiccant assembly.

Low-pressure Side Becomes Negative

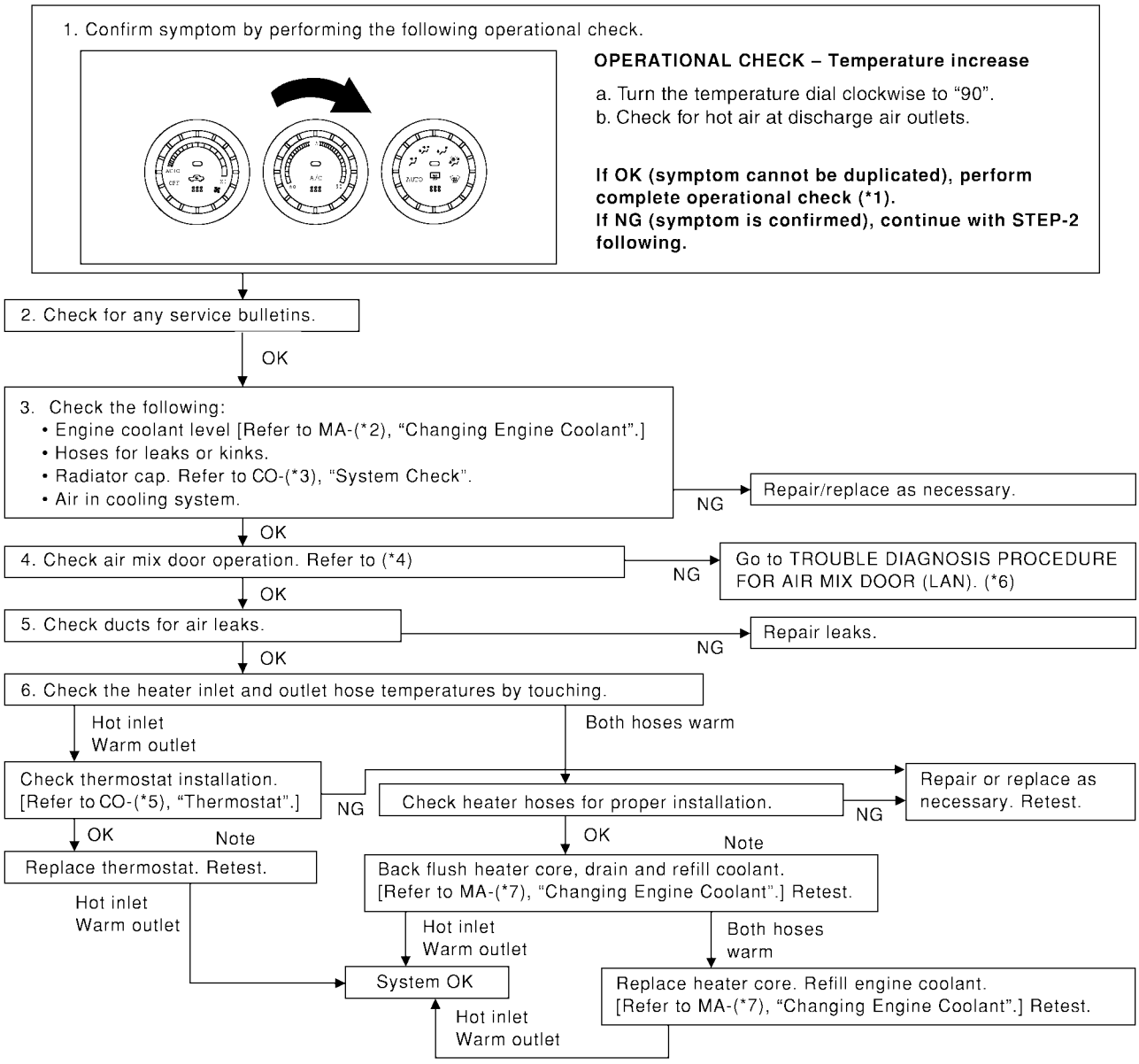
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the problem is caused by water or foreign particles. ● If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. ● If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). ● If either of the above methods cannot correct the problem, replace expansion valve. ● Replace desiccant assembly. ● Check lubricant for contamination.

Insufficient Heating

EJS002QL

SYMPTOM: Insufficient heating

INSPECTION FLOW



WJIA1649E

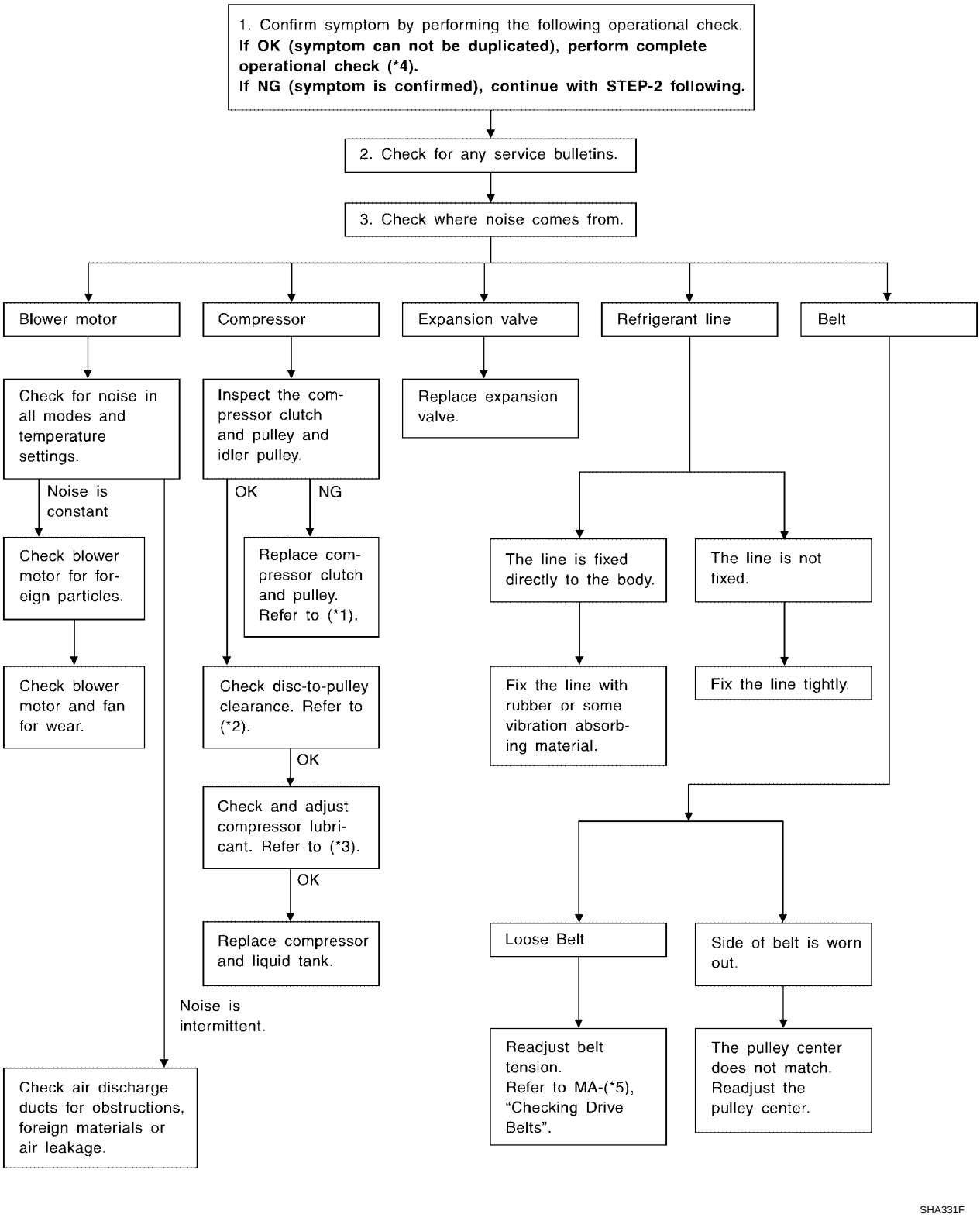
*1 ATC-40, "Operational Check"
*2 MA-23, "Changing Engine Coolant"
*3 CO-9, "CHECKING RADIATOR CAP"
*4 ATC-50, "Air Mix Door Motor Circuit"
*5 CO-47, "THERMOSTAT AND THERMOSTAT HOUSING"
*6 ATC-43, "LAN System Circuit"
*7 MA-23, "Changing Engine Coolant"

Noise

EJS002QM

SYMPTOM: Noise

INSPECTION FLOW



SHA331F

*1 ATC-107, "Removal and Installation for Compressor Clutch"
*2 ATC-107, "Removal and Installation for Compressor Clutch"
*3 ATC-19, "OIL"
*4 ATC-40, "Operational Check"
*5 EM-15, "Checking Drive Belts" (QR) EM-117, "Checking Drive Belts" (VQ)

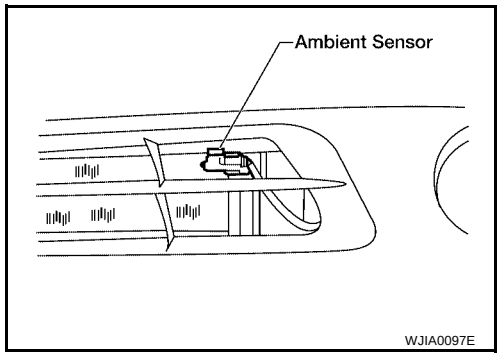
Ambient Sensor Circuit

EJS002QN

COMPONENT DESCRIPTION

Ambient Sensor

The ambient sensor is attached to the front bumper reinforcement. It detects ambient temperature and converts it into a resistance value which is then input into the front air control.



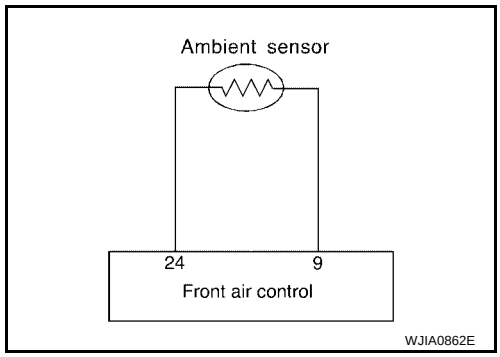
AMBIENT TEMPERATURE INPUT PROCESS

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 front air control function. It only allows the front air control to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds.

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

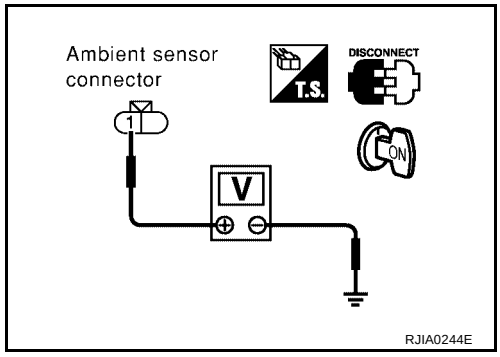
SYMPTOM: Ambient sensor circuit is open or shorted.



1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR HARNESS CONNECTOR AND BODY GROUND

1. Disconnect ambient sensor connector.
2. Turn ignition switch ON.
3. Check voltage between ambient sensor harness connector E1 terminal 1 and ground.

Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	12V
E1-1		

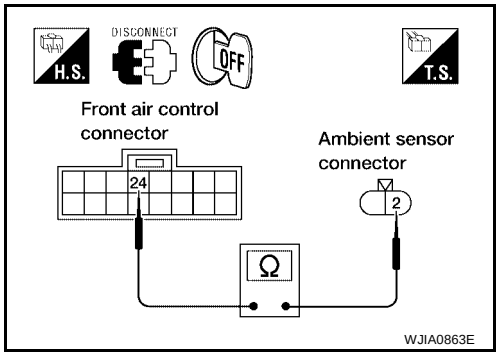


OK or NG

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

2. CHECK AMBIENT SENSOR GROUND CIRCUIT BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M50.
3. Check continuity between front air control harness connector M50 terminal 24 and ambient sensor harness connector E1 terminal 2.



Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
M50-24	E1-2	

If OK, check harness for short.

OK or NG

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

3. CHECK AMBIENT SENSOR

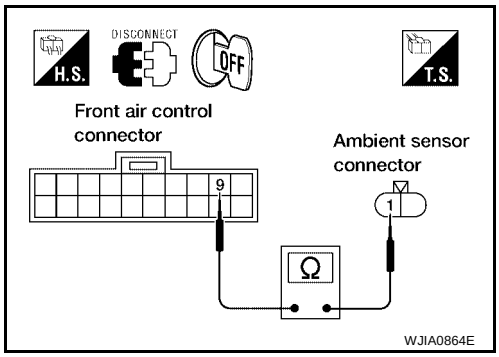
Refer to ATC-75, "Ambient Sensor Circuit" .

OK or NG

OK >> 1. Replace front air control. Refer to ATC-86, "Removal and Installation" .
2. Confirm system operation.
NG >> Replace ambient sensor. Refer to ATC-87, "AMBIENT SENSOR" .

4. CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M49.
3. Check continuity between front air control harness connector M49 terminal 9 and ambient sensor harness connector E1 terminal 1.



Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
M49-9	E1-1	

If OK, check harness for short.

OK or NG

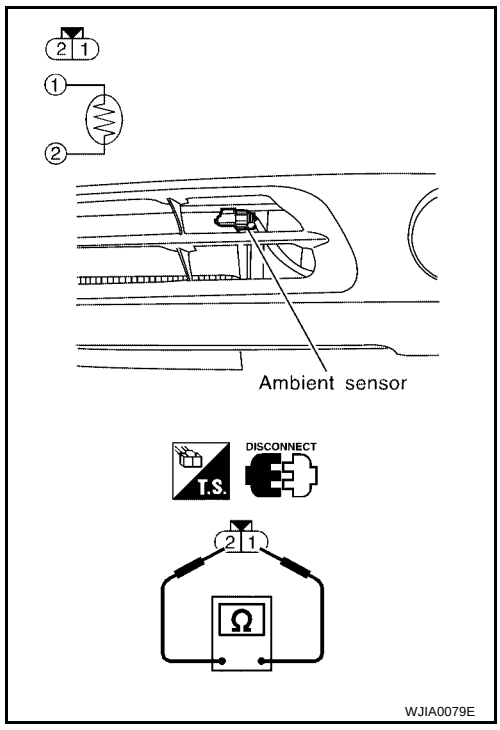
OK >> 1. Replace front air control. Refer to ATC-86, "Removal and Installation" .
2. Confirm system operation.
NG >> Repair harness or connector.

COMPONENT INSPECTION

Ambient Sensor

After disconnecting ambient sensor harness connector E1, measure resistance between terminals 2 and 1 at sensor 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. Refer to ATC-87, "AMBIENT SENSOR" .

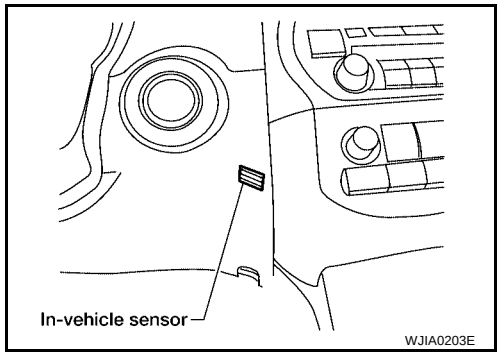
In-vehicle Sensor Circuit

EJS002QO

COMPONENT DESCRIPTION

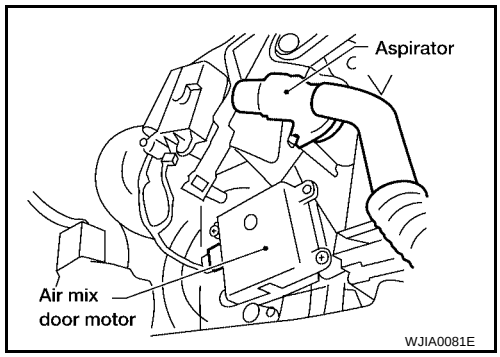
In-vehicle sensor

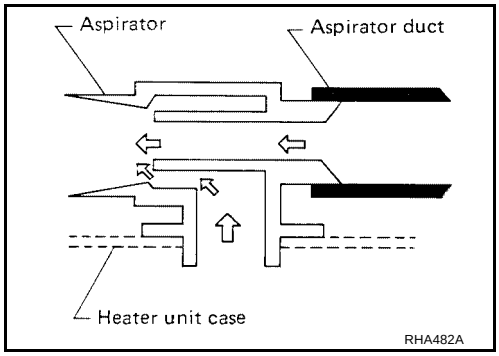
The in-vehicle sensor is located on instrument lower panel. It converts variations in temperature of compartment air drawn from the aspirator into a resistance value. It is then input into the front air control.



Aspirator

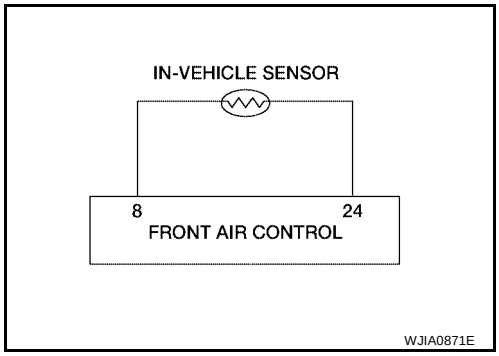
The aspirator is located on driver's side of heater and cooling unit. It produces vacuum pressure due to air discharged from the heater and cooling unit, continuously taking compartment air in the aspirator.





DIAGNOSTIC PROCEDURE

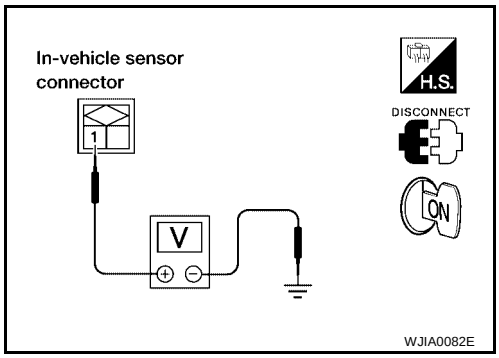
SYMPTOM: In-vehicle sensor circuit is open or shorted.



1. CHECK VOLTAGE BETWEEN IN-VEHICLE SENSOR HARNESS CONNECTOR AND BODY GROUND

1. Disconnect in-vehicle sensor connector.
2. Turn ignition switch ON.
3. Check voltage between in-vehicle sensor harness connector M32 terminal 1 and ground.

Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	5V
M32-1		



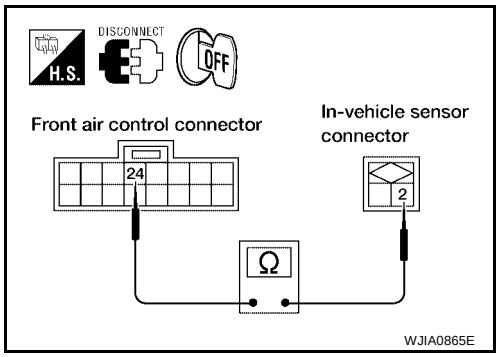
OK or NG

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

2. CHECK IN-VEHICLE SENSOR GROUND CIRCUIT BETWEEN IN-VEHICLE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M50.
3. Check continuity between front air control harness connector M50 terminal 24 and in-vehicle sensor harness connector M32 terminal 2.

Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
M50-24	M32-2	



If OK, check harness for short.

OK or NG

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

3. CHECK IN-VEHICLE SENSOR

Refer to ATC-88, "IN-VEHICLE SENSOR" .

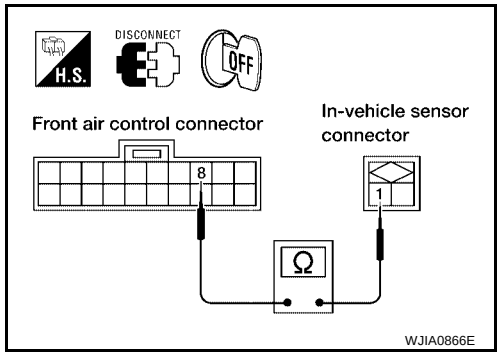
OK or NG

OK >> 1. Replace front air control. Refer to ATC-86, "Removal and Installation" .
2. Confirm system operation.

NG >> 1. Replace in-vehicle sensor. Refer to ATC-88, "IN-VEHICLE SENSOR" .
2. Confirm system operation.

4. CHECK IN-VEHICLE SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M49.
3. Check continuity between front air control harness connector M49 terminal 8 and in-vehicle sensor harness connector M32 terminal 1.



Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
M49-8	M32-1	

If OK, check harness for short.

OK or NG

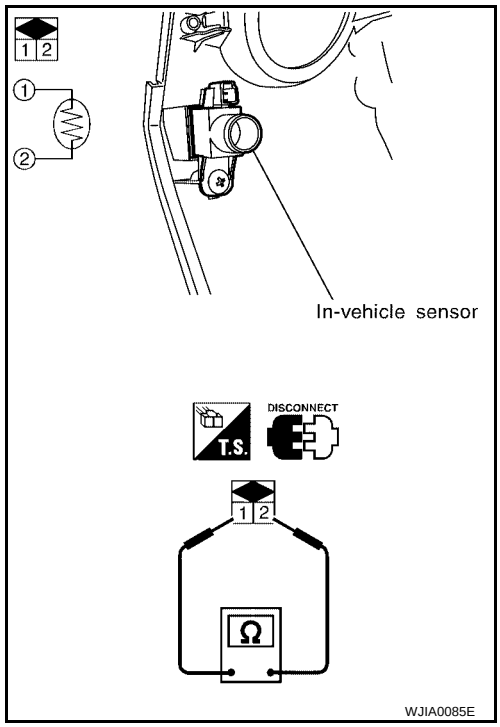
OK >> 1. Replace front air control. Refer to ATC-86, "Removal and Installation" .
2. Confirm system operation.

NG >> Repair harness or connector.

COMPONENT INSPECTION

In-vehicle Sensor

After disconnecting in-vehicle sensor harness connector M32, measure resistance between terminals 1 and 2 at sensor, 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

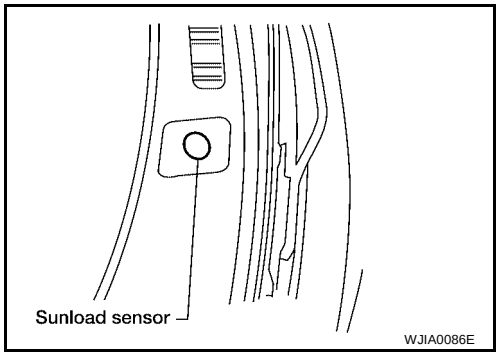
If NG, replace in-vehicle sensor. Refer to ATC-88, "IN-VEHICLE SENSOR" .

Sunload Sensor Circuit

EJS002QP

COMPONENT DESCRIPTION

The sunload sensor is located on the right 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 front air control.



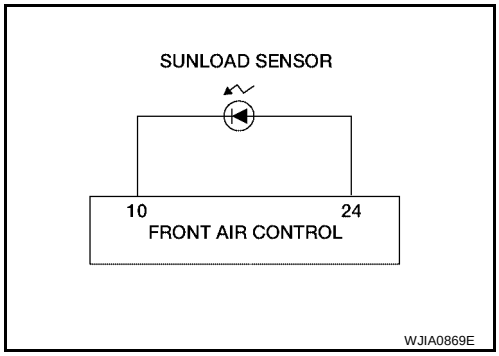
SUNLOAD INPUT PROCESS

The front air control also includes a processing circuit which averages the variations in detected sunload over a period of time. This prevents drastic swings in the ATC system operation due to small or quick variations in detected sunload.

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

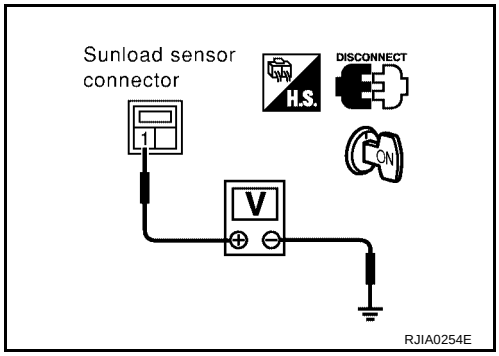
DIAGNOSTIC PROCEDURE

SYMPTOM: Sunload sensor circuit is open or shorted.



1. CHECK VOLTAGE BETWEEN SUNLOAD SENSOR HARNESS CONNECTOR AND BODY GROUND

1. Disconnect sunload sensor connector.
2. Turn ignition switch ON.
3. Check voltage between sunload sensor harness connector M65 terminal 1 and ground.



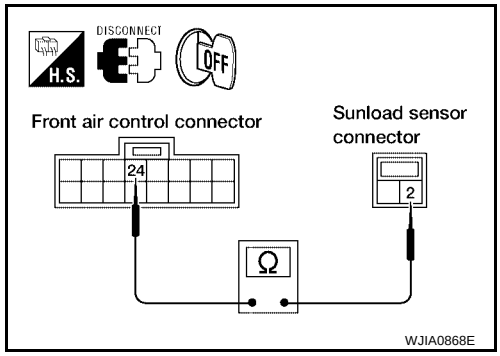
Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	5V
M65-1		

OK or NG

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

2. CHECK SUNLOAD SENSOR GROUND CIRCUIT BETWEEN SUNLOAD SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M50.
3. Check continuity between front air control connector M50 terminal 24 and sunload sensor harness connector M65 terminal 2.



Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
M50-24	M65-2	

If OK, check harness for short.

OK or NG

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

3. CHECK SUNLOAD SENSOR

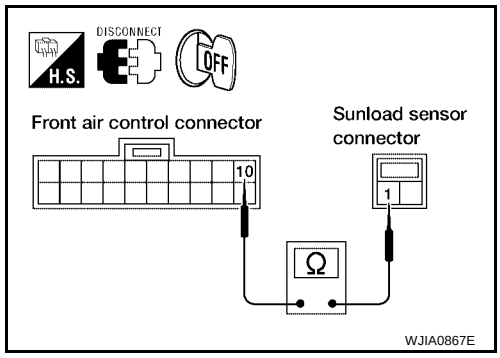
Refer to ATC-82, "Sunload Sensor" .

OK or NG

OK >> 1. Replace front air control. Refer to ATC-86, "Removal and Installation" .
2. Confirm system operation.
NG >> 1. Replace sunload sensor. Refer to ATC-89, "SUNLOAD SENSOR" .
2. Confirm system operation.

4. CHECK SUNLOAD SENSOR CIRCUIT BETWEEN SUNLOAD SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M49.
3. Check continuity between front air control connector M49 terminal 10 and sunload sensor harness connector M65 terminal 1.



Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
M49-10	M65-1	

If OK, check harness for short.

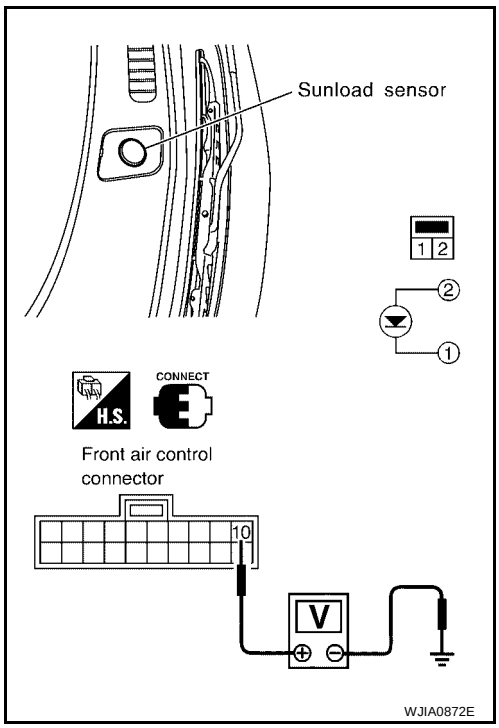
OK or NG

OK >> 1. Replace front air control. Refer to ATC-86, "Removal and Installation" .
2. Confirm system operation.
NG >> Repair harness or connector.

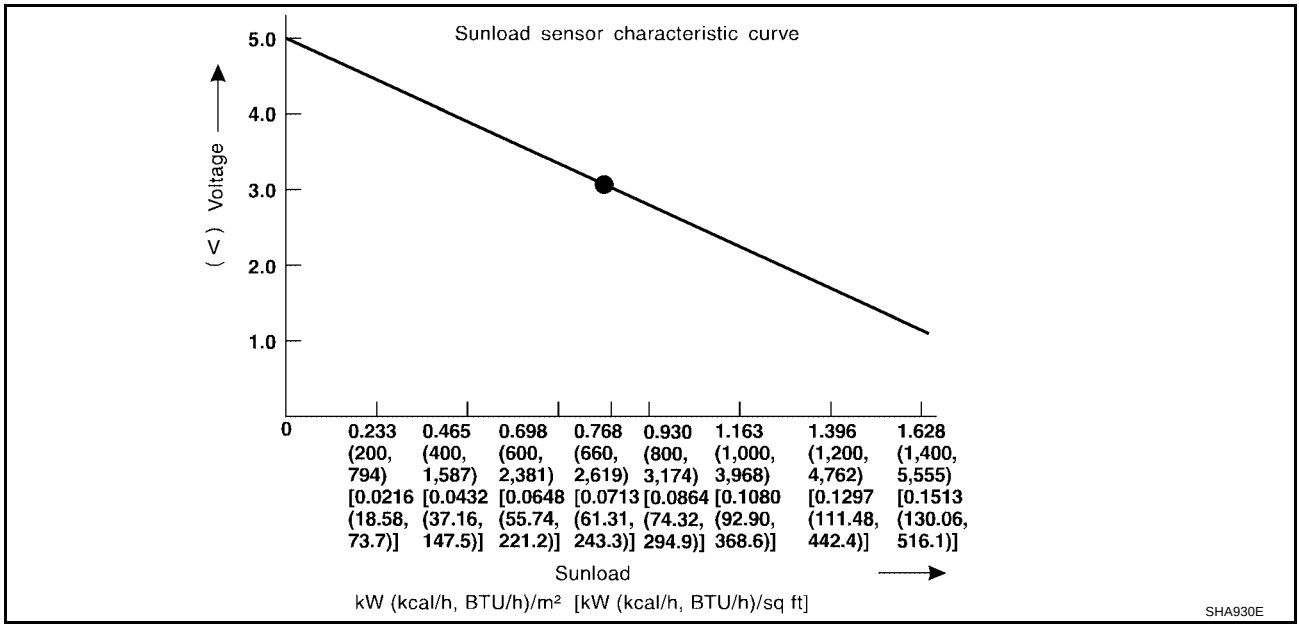
COMPONENT INSPECTION

Sunload Sensor

Measure voltage between front air control harness connector M49 terminal 10 and ground.
If NG, replace front air control. Refer to ATC-86, "Removal and Installation" .



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



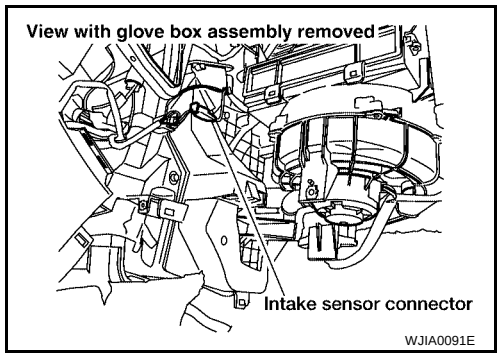
Intake Sensor Circuit

EJS002QQ

COMPONENT DESCRIPTION

Intake Sensor

The intake sensor is located on the heater and cooling unit. It converts temperature of air after it passes through the evaporator into a resistance value which is then input to the front air control.
After disconnecting intake sensor harness connector, measure resistance between terminals 1 and 2 at sensor harness side, using the table below.

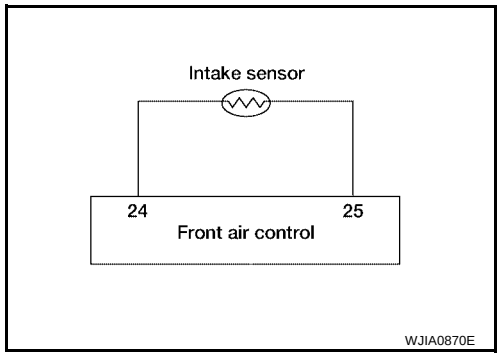


Temperature °C (°F)	Resistance kΩ
-15 (5)	12.34
-10 (14)	9.62
-5 (23)	7.56
0 (32)	6.00
5 (41)	4.80
10 (50)	3.87
15 (59)	3.15
20 (68)	2.57
25 (77)	2.12
30 (86)	1.76
35 (95)	1.47
40 (104)	1.23
45 (113)	1.04

If NG, replace intake sensor. Refer to ATC-90, "INTAKE SENSOR" .

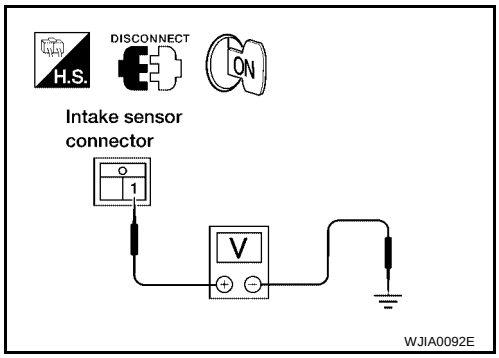
DIAGNOSTIC PROCEDURE

SYMPTOM: Intake sensor circuit is open or shorted.



1. CHECK VOLTAGE BETWEEN INTAKE SENSOR HARNESS CONNECTOR AND BODY GROUND

1. Disconnect intake sensor connector.
2. Turn ignition switch ON.
3. Check voltage between intake sensor connector M33 terminal 1 and ground.



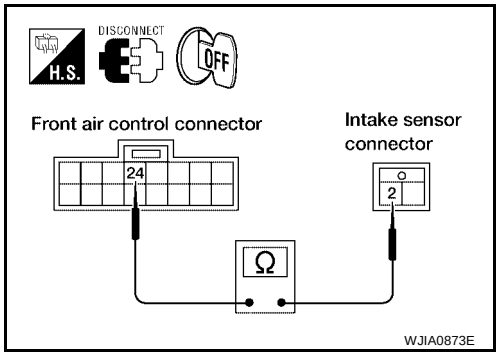
Terminal		Voltage (V) (Approx.)
(+)	(-)	
Connector - Terminal	Body ground	5V
M33-1		

OK or NG

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

2. CHECK INTAKE SENSOR GROUND CIRCUIT BETWEEN INTAKE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M50.
3. Check continuity between front air control connector M50 terminal 24 and intake sensor harness connector M33 terminal 2.



Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
M50-24	M33-2	

If OK, check harness for short.

OK or NG

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

3. CHECK INTAKE SENSOR

Refer to ATC-83, "Intake Sensor" .

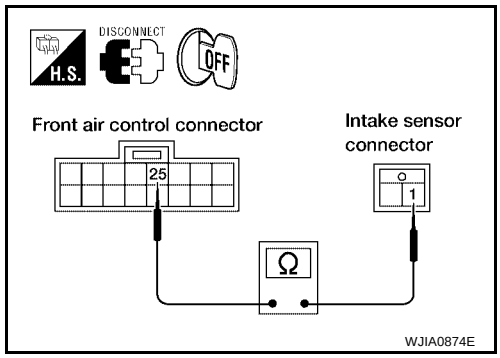
OK or NG

OK >> 1. Replace front air control. Refer to ATC-86, "Removal and Installation" .
2. Confirm system operation.

NG >> 1. Replace intake sensor. Refer to ATC-90, "INTAKE SENSOR" .
2. Confirm system operation.

4. CHECK INTAKE SENSOR CIRCUIT BETWEEN INTAKE SENSOR AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector M50.
3. Check continuity between front air control connector M50 terminal 25 and intake sensor harness connector M33 terminal 1.



Terminals		Continuity
Connector - Terminal	Connector - Terminal	Yes
M33-1	M50-25	

If OK, check harness for short.

OK or NG

OK >> 1. Replace front air control, Refer to ATC-86, "Removal and Installation" .
2. Confirm system operation.

NG >> Repair harness or connector.

CONTROL UNIT

PFP:27500

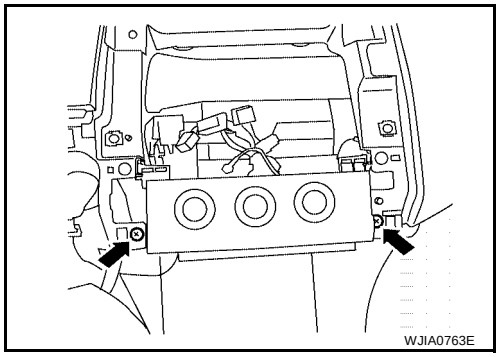
Removal and Installation

EJS002QR

FRONT AIR CONTROL

Removal

1. Remove cluster lid D. Refer to IP-12, "CLUSTER LID D" .
2. Remove the two screws and remove the front air control.



Installation

Installation is in the reverse order of removal.

AMBIENT SENSOR

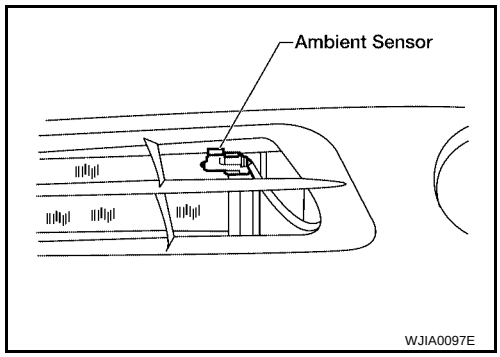
PFP:27722

Removal and Installation

EJS002QS

REMOVAL

1. Disconnect the ambient sensor connector.
2. Release the ambient sensor clip and remove the ambient sensor.



INSTALLATION

Installation is in the reverse order of removal.

IN-VEHICLE SENSOR

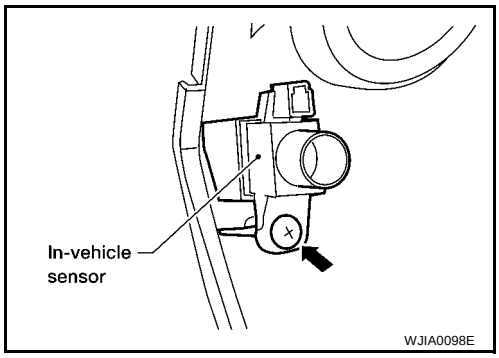
PFP:27720

Removal and Installation

EJS002QT

REMOVAL

1. Remove the instrument lower cover LH. Refer to IP-13, "INSTRUMENT LOWER COVER LH" .
2. Remove the in-vehicle sensor screw and remove the in-vehicle sensor.



INSTALLATION

Installation is in the reverse order of removal.

SUNLOAD SENSOR

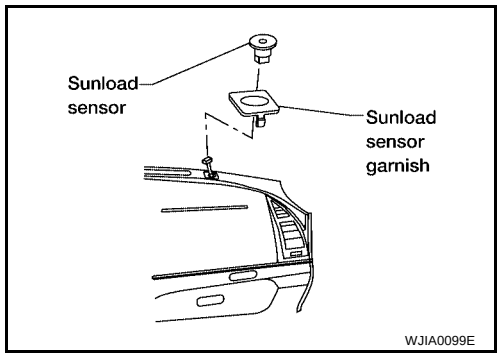
PFP:27721

Removal and Installation

EJS002QU

REMOVAL

1. Remove the sunload sensor and garnish.
2. Disconnect the connector.
3. Release the sunload sensor tabs to remove it from the garnish.



INSTALLATION

Installation is in the reverse order of removal.

INTAKE SENSOR

PFP:27723

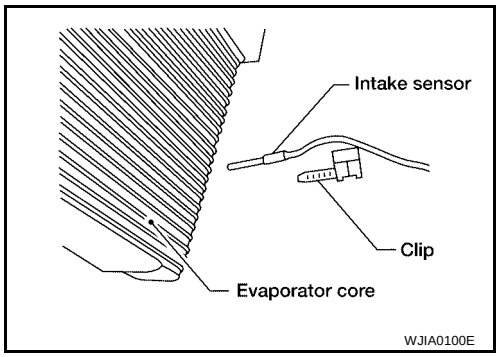
Removal and Installation

EJS002QV

REMOVAL

1. Remove the evaporator. Refer to ATC-113, "Removal and Installation for Evaporator" .
2. Release the intake sensor clip and then remove the intake sensor.

   CAUTION:
   Do not damage the evaporator core surface.



INSTALLATION

Installation is in the reverse order of removal.

BLOWER UNIT

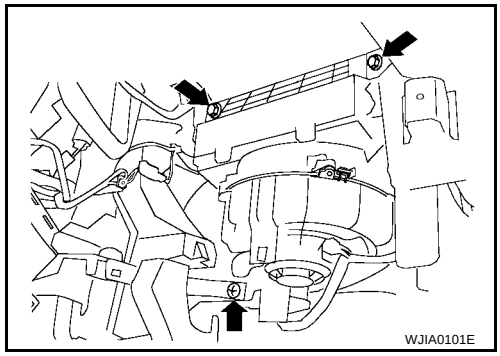
PFP:27200

Removal and Installation

EJS002QX

REMOVAL

1. Remove the glove box assembly. Refer to IP-15, "INSTRUMENT LOWER COVER RH AND GLOVE BOX"
2. Disconnect the battery negative terminal.
3. Remove the ECM.
4. Disconnect the blower motor, intake door motor and fan control amplifier connector.
5. Remove the two bolts and one screw from the blower unit, then remove the blower unit.



INSTALLATION

Installation is in the reverse order of removal.

BLOWER MOTOR

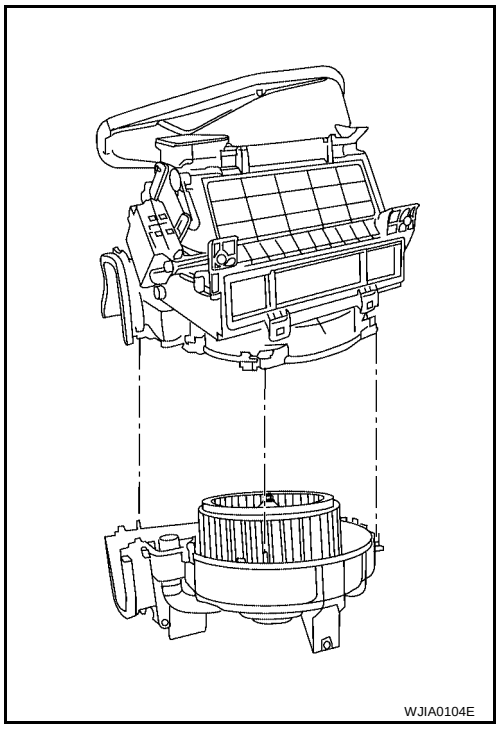
PFP:27226

Removal and Installation

EJS002QY

REMOVAL

1. Remove the blower unit. Refer to ATC-91, "Removal and Installation" .
2. Release the eight tabs attaching the blower motor to the blower unit case and then remove the blower motor.



INSTALLATION

Installation is in the reverse order of removal.

IN-CABIN MICROFILTER

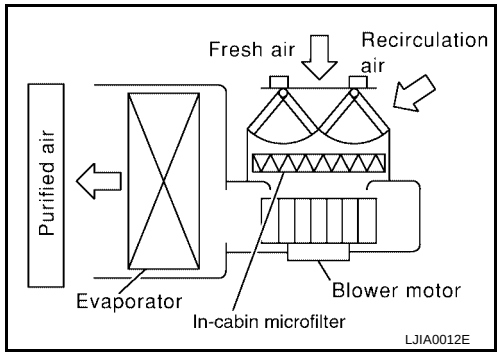
PFP:27277

Removal and Installation

EJS002QZ

FUNCTION

Air inside passenger compartment is kept clean in either the recirculation mode or fresh mode by the in-cabin microfilter located in the blower unit.

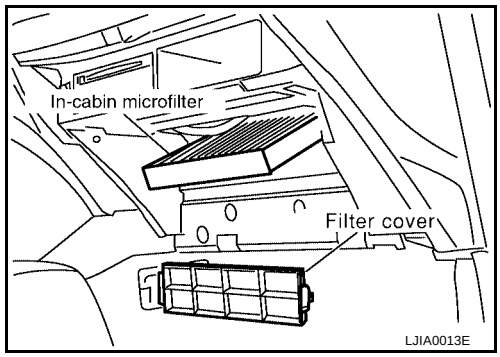


REPLACEMENT TIMING

Replace the in-cabin microfilter as described in the applicable maintenance schedule.
Refer to MA-7, "SCHEDULE 1" and MA-10, "SCHEDULE 2" .
The in-cabin microfilter caution label is attached inside the glove box.

REPLACEMENT PROCEDURES

1. Remove the glove box pins. Refer to IP-15, "INSTRUMENT LOWER COVER RH AND GLOVE BOX" .
2. Press in the sides of the glove box door to release the glove box door from the glove box housing.
3. Disconnect the glove box damper cord to remove the glove box door.
4. Disengage the two filter cover tabs to remove the filter cover.
5. Remove the in-cabin microfilter from the blower unit.
6. Install the new in-cabin microfilter into the blower unit.



CAUTION:

- **Insert the new filter with the “UP” arrow in the correct orientation.**
- **Insert the new filter with the “UP” arrow side of the filter facing the rear of the vehicle.**

7. Install the filter cover on the blower unit.
8. Connect the glove box damper cord to the glove box door.
9. Press in the sides of the glove box door to install the glove box door into the glove box housing.
10. Install the glove box pins.

HEATER & COOLING UNIT ASSEMBLY

PFP:27110

Removal and Installation

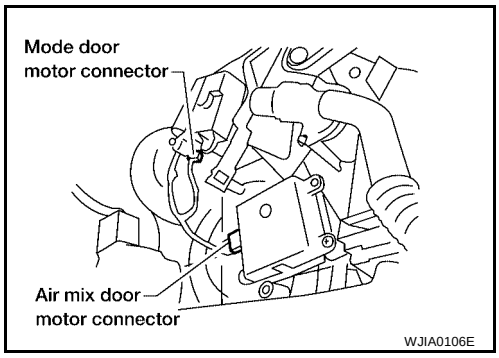
EJS002R0

REMOVAL

1. Discharge the refrigerant from the A/C system. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Drain the engine coolant from the cooling system. Refer to MA-15, "DRAINING ENGINE COOLANT" (QR25DE), MA-23, "DRAINING ENGINE COOLANT" (VQ35DE).
3. Remove the wiper motor and linkage. Refer to WW-27, "Removal" .
4. Remove the fasteners and cowl top. Refer to EI-19, "Removal and Installation" .
5. Disconnect the heater hoses from the heater core pipes.

   CAUTION:
   Cap or wrap the pipe joint with a suitable material such as vinyl tape to avoid the entry of contaminants into the system.
6. Disconnect the refrigerant lines from the evaporator. Refer to ATC-102, "REFRIGERANT LINES" .

   CAUTION:
   Cap or wrap the line joint with a suitable material such as vinyl tape to avoid the entry of contaminants into the system.
7. Remove the steering member. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
8. Remove the blower unit. Refer to ATC-91, "BLOWER UNIT" .
9. Disconnect the mode door motor and air mix door motor connectors.
10. Remove the heater and cooling unit.



INSTALLATION

Installation is in the reverse order of removal.

- Fill the radiator with the specified water and coolant mixture. Refer to MA-16, "REFILLING ENGINE COOLANT" (QR25DE), MA-24, "REFILLING ENGINE COOLANT" (VQ35DE).
- Recharge the A/C system. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .

HEATER CORE

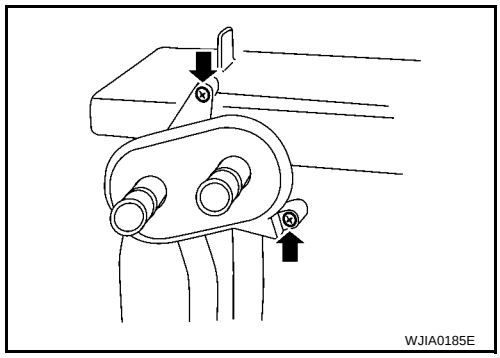
PFP:27140

Removal and Installation

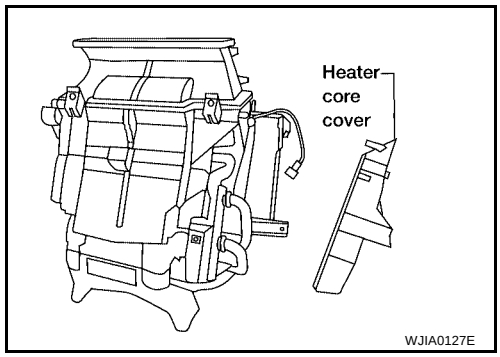
EJS002R1

REMOVAL

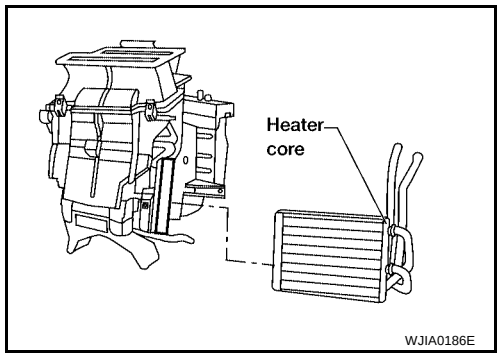
1. Remove the heater and cooling unit. Refer to ATC-94, "HEATER & COOLING UNIT ASSEMBLY" .
2. Remove the heater core pipe support screws and then remove the heater core pipe support.



3. Remove the heater core cover screws and then remove the heater core cover.



4. Remove the heater core.



INSTALLATION

Installation is in the reverse order of removal.

INTAKE DOOR MOTOR

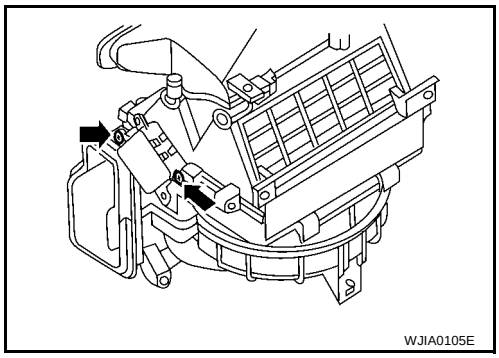
PFP:27730

Removal and Installation

EJS002R2

REMOVAL

1. Remove the blower unit. Refer to ATC-91, "Removal and Installation" .
2. Remove the screws and then remove the intake door motor from the blower unit.



INSTALLATION

Installation is in the reverse order of removal.

MODE DOOR MOTOR

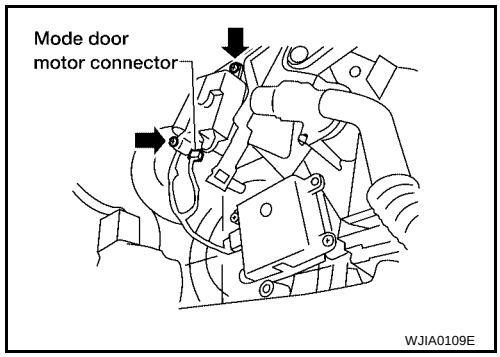
PFP:27731

Removal and Installation

EJS002R3

REMOVAL

1. Disconnect the mode door motor connector.
2. Remove the mode door motor screws and then remove the mode door motor.



INSTALLATION

Installation is in the reverse order of removal.

AIR MIX DOOR MOTOR

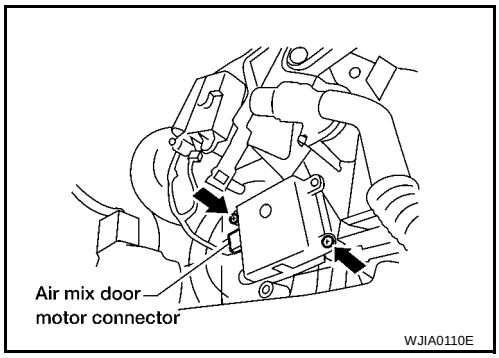
PFP:27732

Removal and Installation

EJS002R4

REMOVAL

1. Remove the instrument lower cover LH. Refer to IP-13, "INSTRUMENT LOWER COVER LH" .
2. Disconnect the air mix door motor connector.
3. Remove the air mix door motor screws and then remove the air mix door motor.



INSTALLATION

Installation is in the reverse order of removal.

FAN CONTROL AMPLIFIER

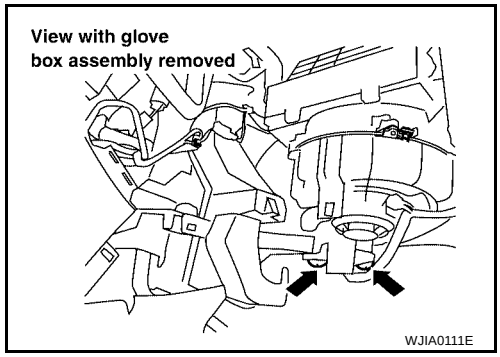
PFP:27761

Removal and Installation

EJS002R5

REMOVAL

1. Remove the glove box assembly. Refer to IP-15, "INSTRUMENT LOWER COVER RH AND GLOVE BOX" .
2. Disconnect the fan control amplifier connector.
3. Remove the screws from the fan control amplifier and then remove the fan control amplifier.



INSTALLATION

Installation is in the reverse order of removal.

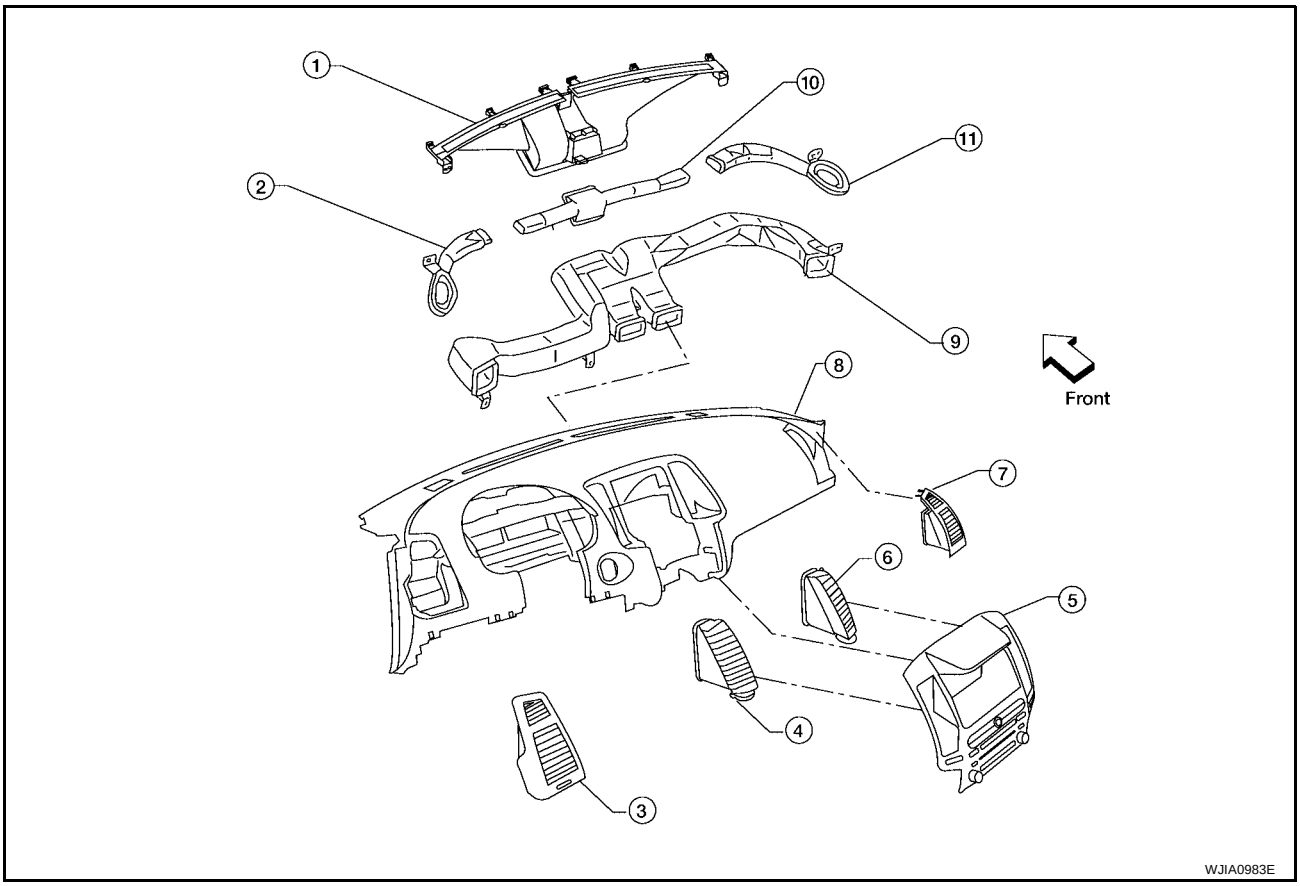
DUCTS AND GRILLES

PFP:27860

Removal and Installation

EJS002R6

Ventilator Duct, Defroster Nozzle, Defroster Ducts, and Grilles

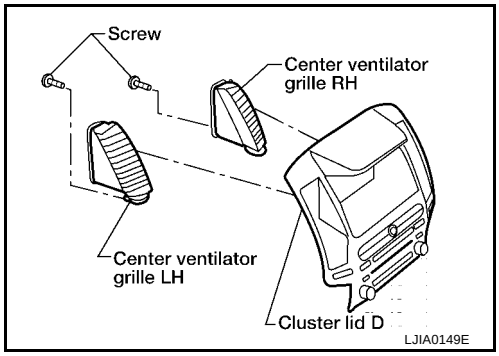


1. Center defroster nozzle
2. Side defroster duct LH
3. Side ventilator grille LH
4. Center ventilator grille LH
5. Cluster lid D
6. Center ventilator grille RH
7. Side ventilator grille RH
8. Instrument panel
9. Ventilator duct
10. Side defroster duct CENTER
11. Side defroster duct RH

REMOVAL

Center Ventilator Grille RH, LH

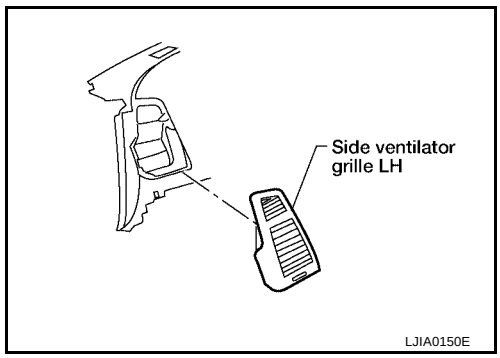
1. Remove cluster lid D. Refer to IP-12, "CLUSTER LID D" .
2. Remove the two center ventilator grille screws.
3. Release the two tabs and then remove the center ventilator grille.



Side Ventilator Grille LH

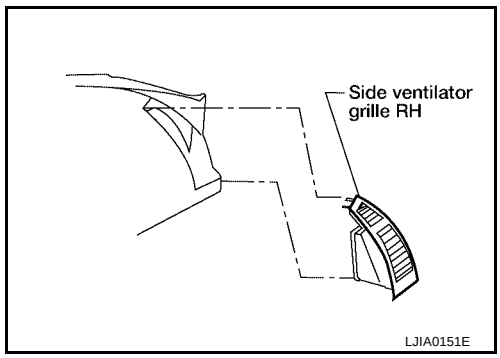
1. Remove the instrument lower cover LH. Refer to IP-13, "INSTRUMENT LOWER COVER LH" .

2. Remove the side ventilator grille LH.



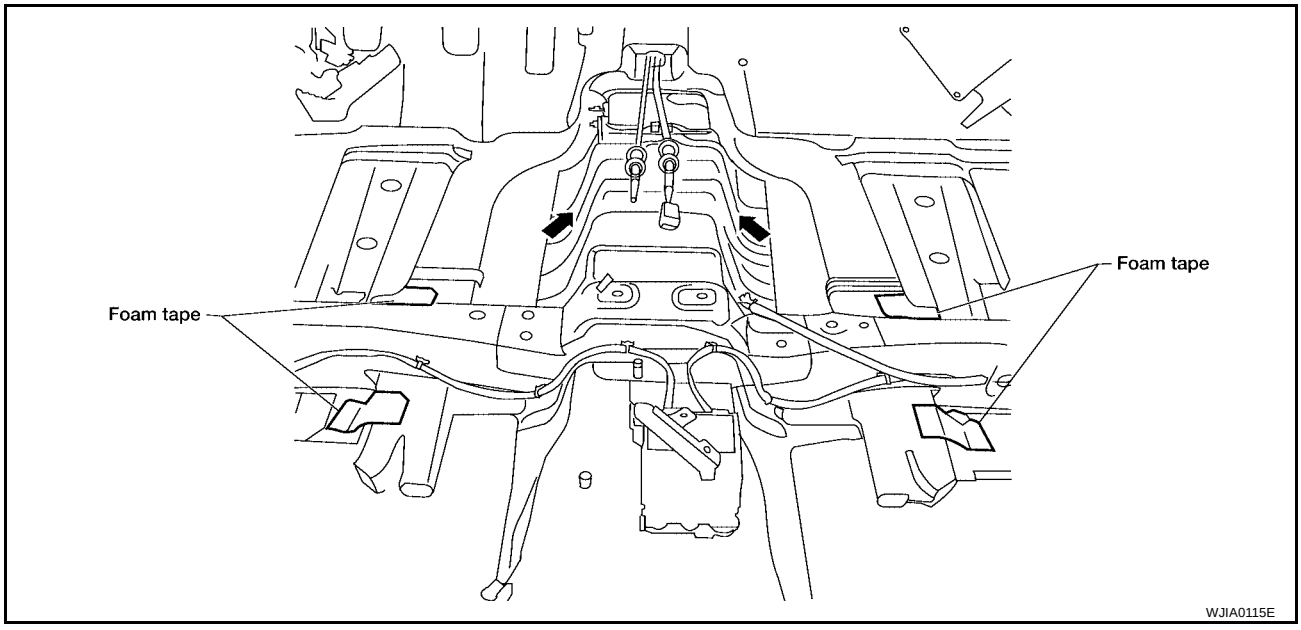
Side Ventilator Grille RH

1. Remove the instrument lower cover RH and glove box. Refer to IP-15, "INSTRUMENT LOWER COVER RH AND GLOVE BOX" .
2. Remove side ventilator grille RH.



Floor Duct

1. Remove the floor carpet. Refer to EI-35, "FLOOR TRIM" .
2. Release the foam tape and slide the floor duct rearward to release it from the clips.



INSTALLATION

Installation is in the reverse order of removal.

REFRIGERANT LINES

PFP:92600

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

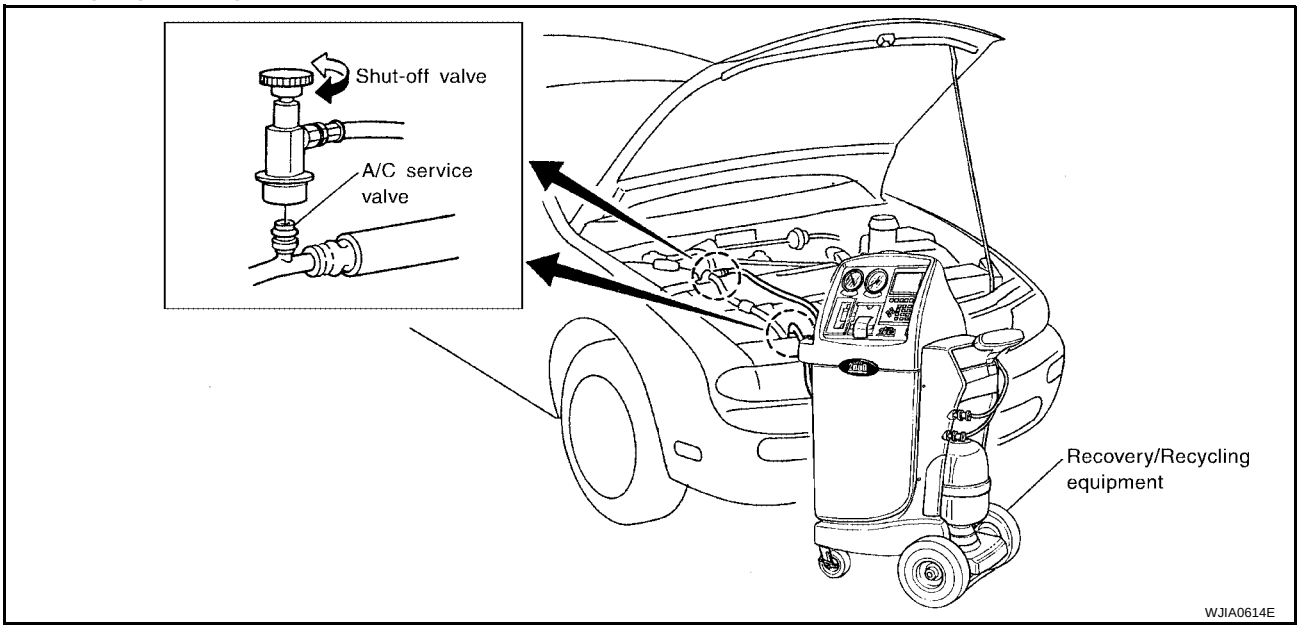
EJS002R7

SETTING OF SERVICE TOOLS AND EQUIPMENT

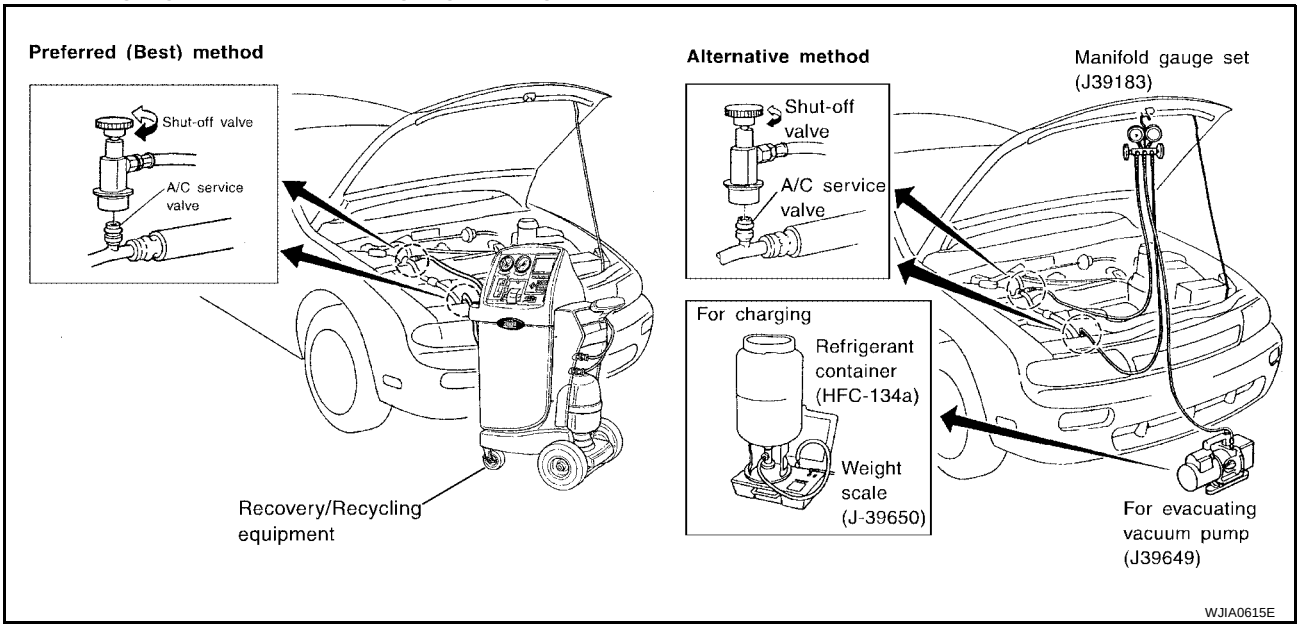
WARNING:

Avoid breathing the A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose, and throat. Remove the HFC-134a (R-134a) from the A/C system using certified service equipment meeting the requirements of SAE J2210 (R-134a recycling equipment) or SAE J2201 (R-134a recovery equipment). If an accidental system discharge occurs, ventilate the work area before resuming service. Additional health and safety information may be obtained from the refrigerant and oil manufacturers.

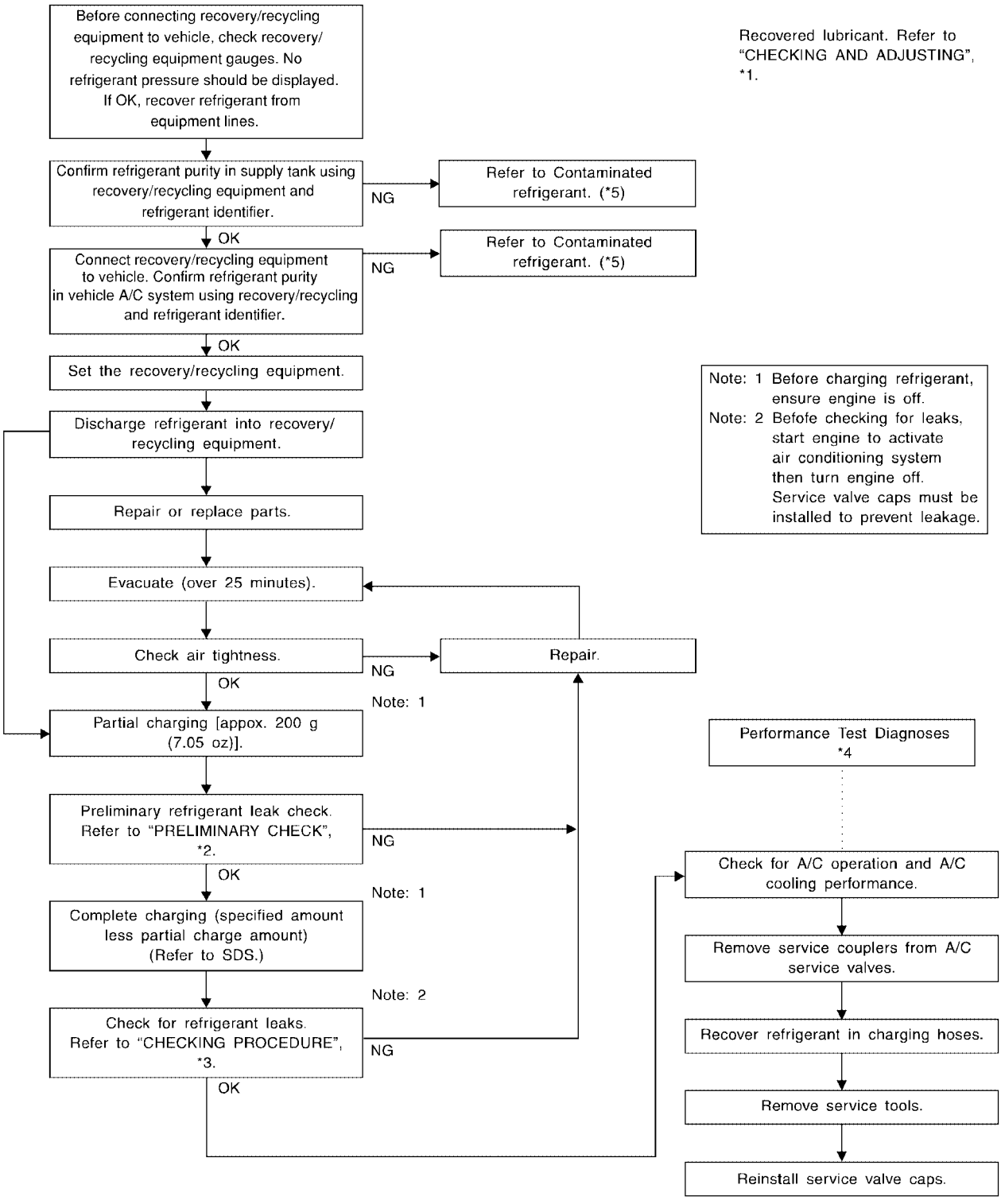
Discharging Refrigerant



Evacuating System and Charging Refrigerant



Discharging, Evacuating, and Recharging the A/C System



WJIA0530E

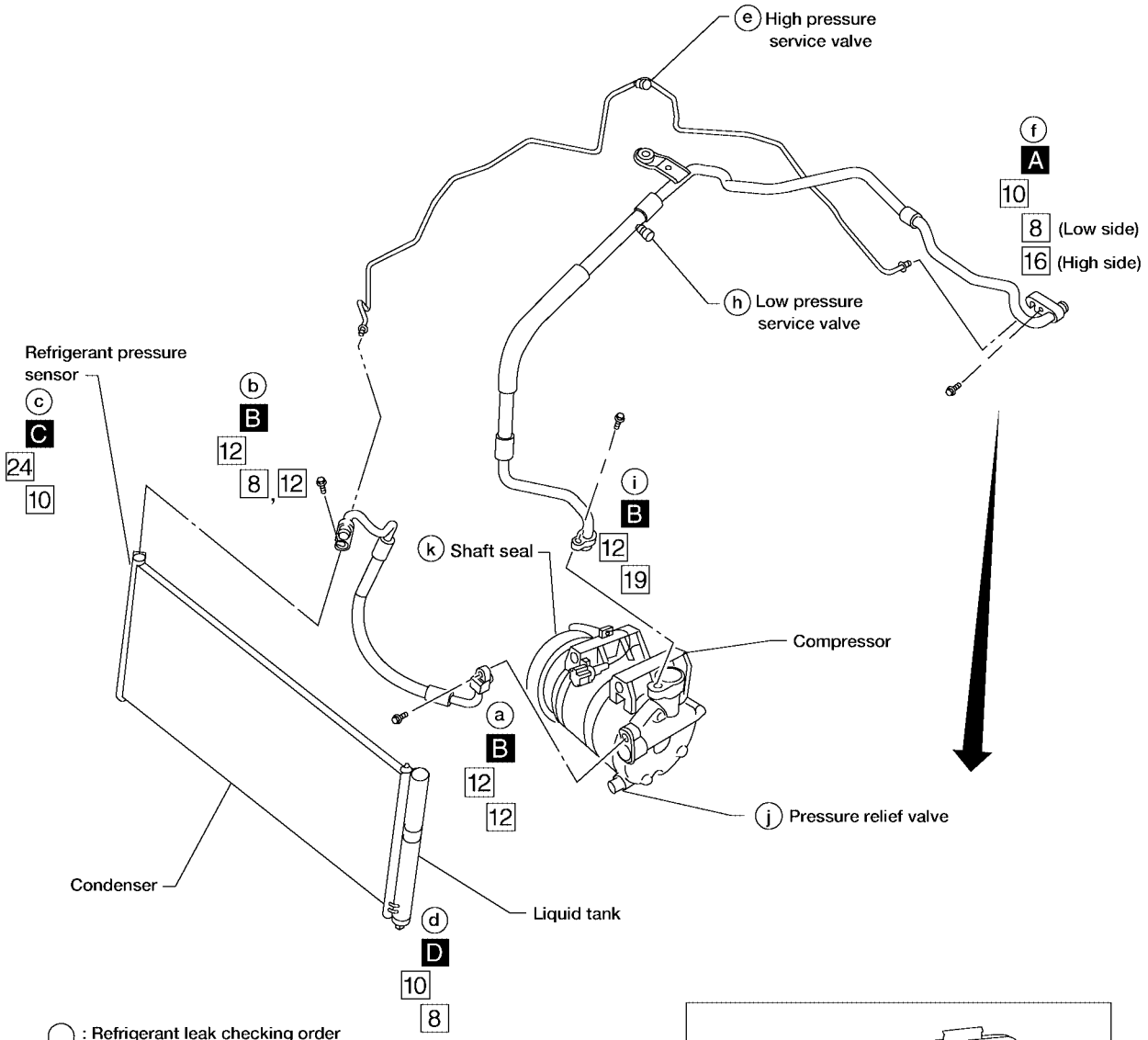
*1 ATC-19, "CHECKING AND ADJUSTING"
*2 ATC-115, "Checking for Refrigerant Leaks"
*3 ATC-115, "Checking for Refrigerant Leaks"
*4 ATC-67, "PERFORMANCE TEST ANALYSIS"
*5 ATC-4, "Contaminated Refrigerant"

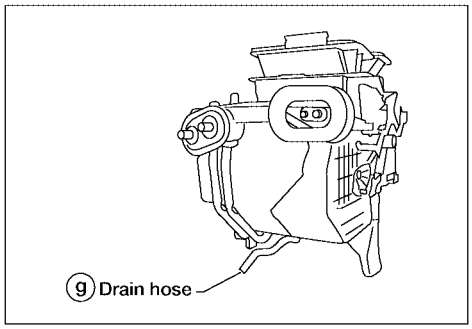
Components

EJS002R8

QR25DE Models

SEC. 214 • 271 • 274 • 276

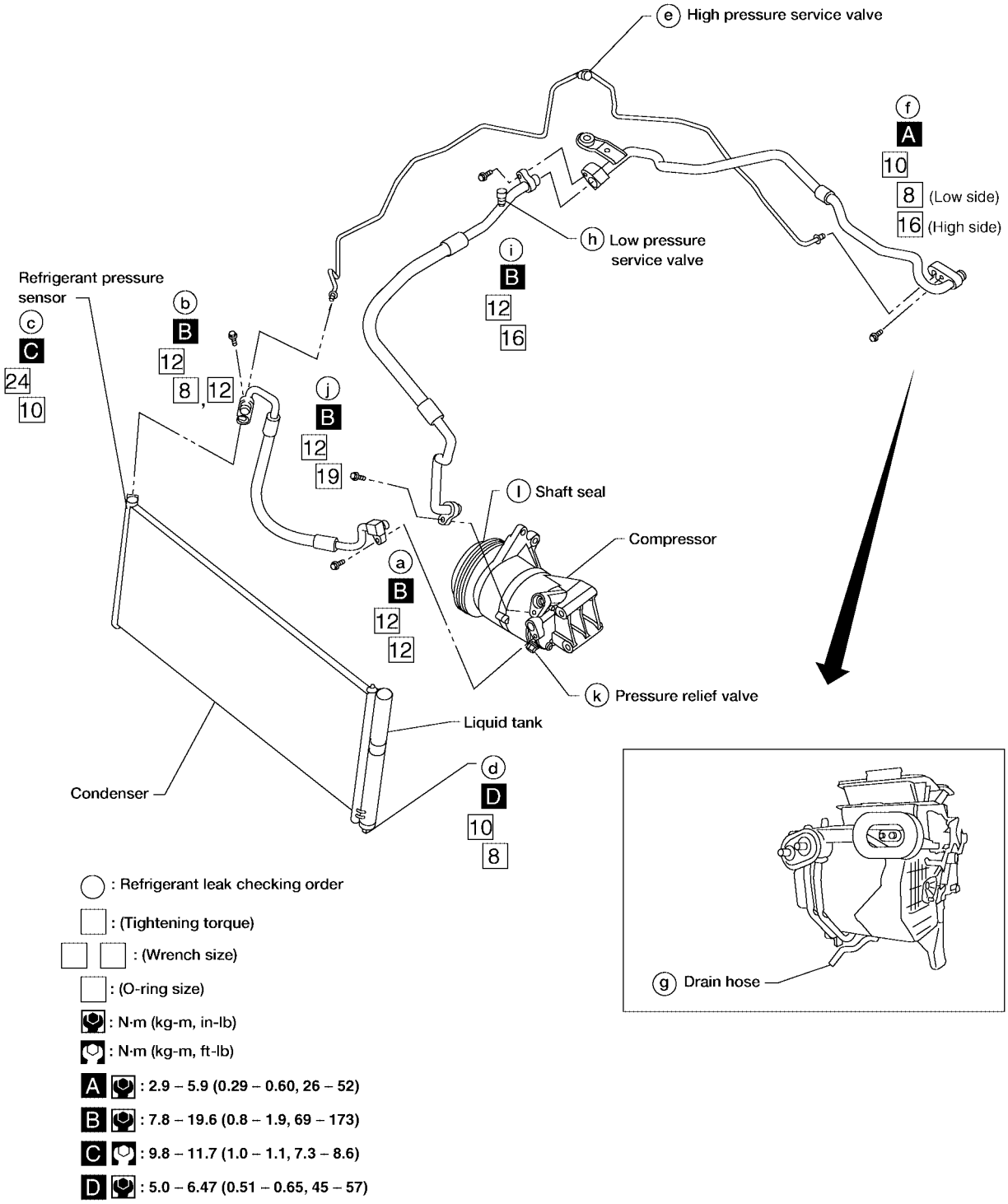




WJIA0981E

VQ35DE Models

SEC. 214 • 271 • 274 • 276

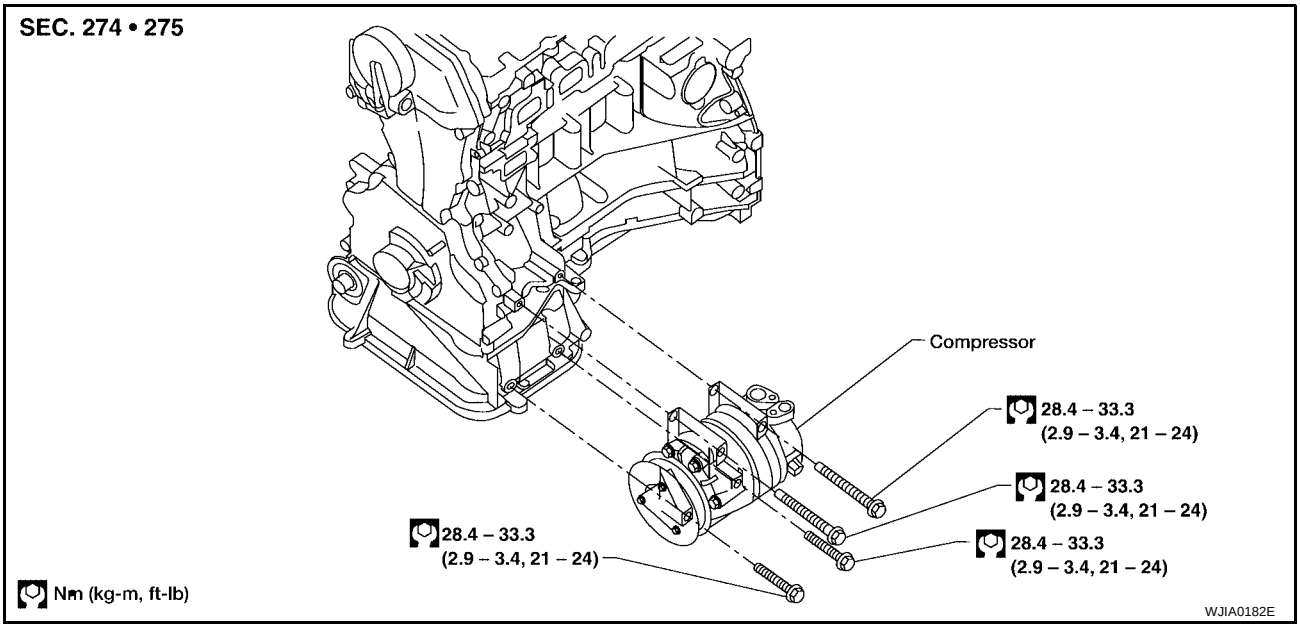


WJIA0982E

NOTE:
Refer to ATC-5, "Precautions for Refrigerant Connection" .

Removal and Installation for Compressor — QR25DE Models

EJS002R9



REMOVAL

1. Discharge the refrigerant. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Remove the drive belt. Refer to EM-15, "Removal and Installation" .
3. Disconnect the compressor connector.
4. Remove the high-pressure flexible hose and low-pressure flexible hose.

   CAUTION:
   Cap or wrap the joint of the hose with a suitable material such as vinyl tape to avoid the entry of any contaminants.
5. Remove the compressor bolts, then remove the compressor using power tools.

INSTALLATION

Installation is in the reverse order of removal.

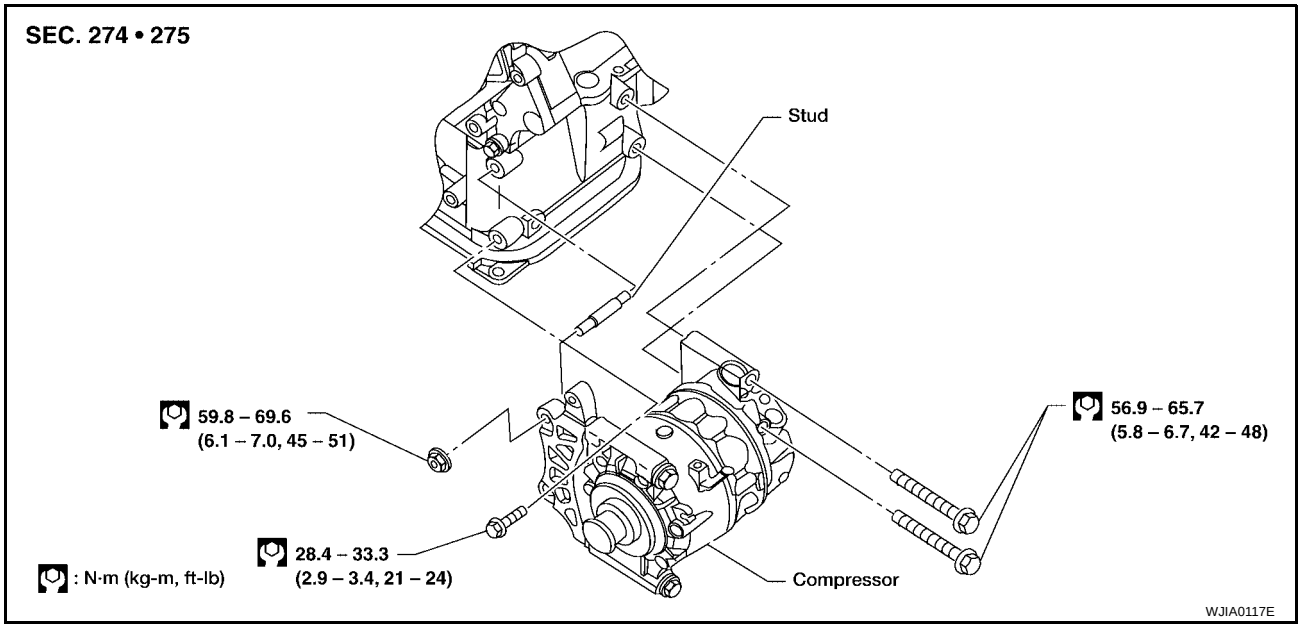
CAUTION:

- **Replace the O-ring of the low-pressure flexible hose and high-pressure flexible hose with new ones, then apply A/C oil to them for installation.**
- **After charging the A/C refrigerant, check for leaks. Refer to ATC-115, "Checking for Refrigerant Leaks" .**

High and low-pressure flexible hose bolts : Refer to ATC-104, "Components" .

Removal and Installation for Compressor — VQ35DE Models

EJS002RA



REMOVAL

1. Discharge the refrigerant. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Remove the drive belt. Refer to MA-23, "Checking Drive Belts" .
3. Remove the coolant pipe bracket bolt using power tools.
4. Remove the compressor mounting stud.
5. Disconnect the compressor connector.
6. Remove the high-pressure flexible hose and low-pressure flexible hose.

   CAUTION:
   Cap or wrap the joint of the hose with suitable material such as vinyl tape to avoid the entry of any contaminants.
7. Remove the compressor bolts and nut using power tools, and then remove the compressor.

INSTALLATION

Installation is in the reverse order of removal.

High and low-pressure flexible hose bolts : Refer to ATC-104, "Components" .

CAUTION:

- **Replace the O-rings on the low-pressure flexible hose and high-pressure flexible hose with new ones, then apply A/C oil to them for installation.**
- **After charging the A/C refrigerant, check for leaks. Refer to ATC-115, "Checking for Refrigerant Leaks" .**

Removal and Installation for Compressor Clutch

EJS002RB

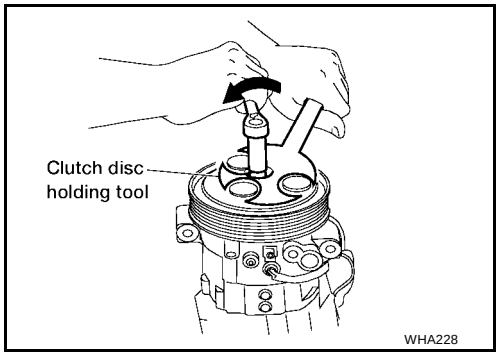
REMOVAL

1. Remove the compressor. Refer to (QR25DE), ATC-107, "Removal and Installation for Compressor — VQ35DE Models" (VQ35DE).

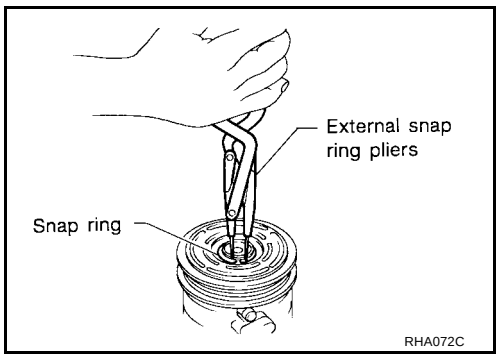
2. Remove the center bolt by holding the clutch disc steady using Tool.

Tool number : (J-44614)

3. Remove the clutch disc.



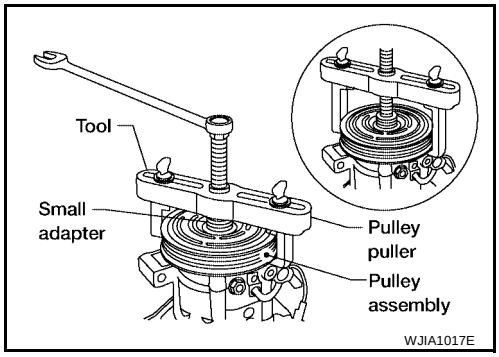
4. Remove the snap ring using external snap ring pliers.



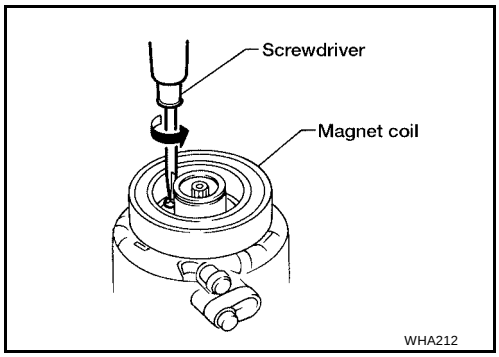
5. Remove the pulley assembly using Tool.
   - Use a pulley puller with a small adapter. Position the small adapter on the end of the compressor shaft and the center of the puller on the small adapter as shown.

Tool number : KV99233130 (J-29884)

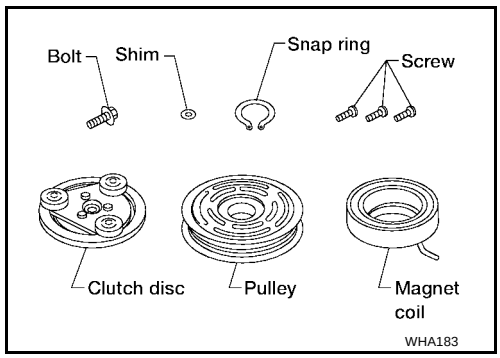
CAUTION:
To prevent deformation of the pulley groove, the puller claws should be hooked under (not into) the pulley groove.



6. Remove the snap ring using external snap ring pliers.
7. Remove the magnet coil harness clip using a screwdriver.



8. Remove the three magnet coil screws and remove the magnet coil.



INSPECTION AFTER REMOVAL

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

Coil

Check the magnet coil for a loose connection or cracked insulation.

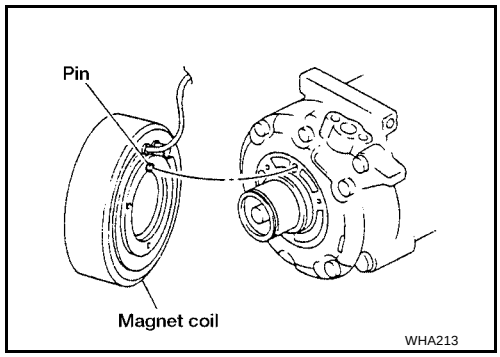
INSTALLATION

1. Install the magnet coil.

   CAUTION:

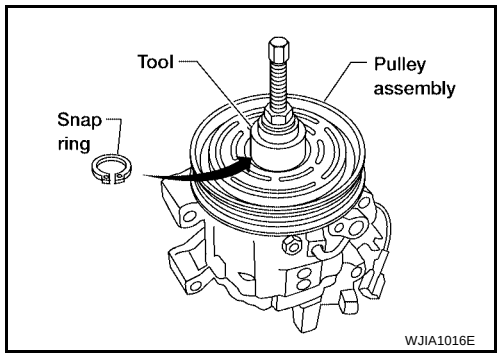
   Be sure to align the magnet coil pin with the hole in the compressor front head.

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

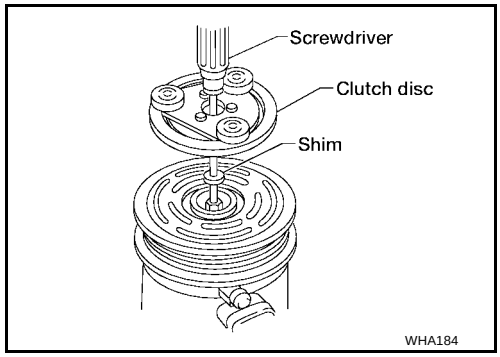


3. Install the pulley assembly using Tool and a wrench, and then install the snap ring using snap ring pliers.

   Tool number : — (J-38873-A)



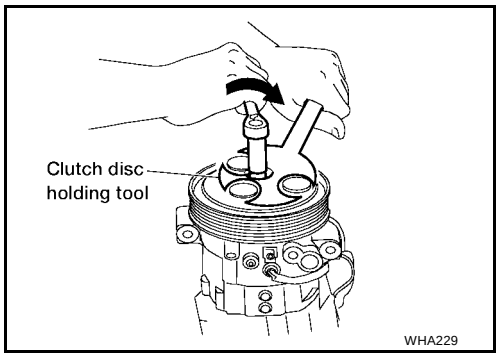
4. Install the clutch disc on the drive shaft, together with the original shim(s). Press the clutch disc down using the drive plate installer.



5. Install the center bolt using Tool.

Tool number : (J-44614)
Center bolt : 12 N·m (1.2 kg-m, 9 ft-lb)

- After tightening the center bolt to specification, check that the pulley rotates smoothly.

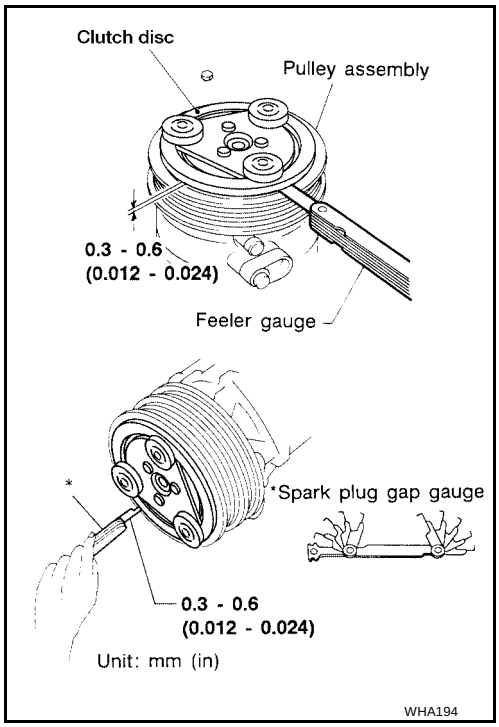


INSPECTION AFTER INSTALLATION

Check the clearance all the way around the clutch disc as shown.

Clutch disc-to-pulley clearance : 0.3 - 0.6 mm (0.012 - 0.024 in)

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



BREAK-IN OPERATION

When replacing compressor clutch assembly, always conduct the break-in operation. This is done by engaging and disengaging the clutch about 30 times. Break-in operation raises the level of transmitted torque.

Removal and Installation for Low-pressure Flexible Hose

EJS002RC

REMOVAL

1. Discharge the refrigerant. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Remove the refrigerant pressure sensor.
3. Remove the low-pressure flexible hose. Refer to ATC-104, "Components" .

CAUTION:
Cap or wrap the joint of the hose with a suitable material such as vinyl tape to avoid the entry of contaminants.

INSTALLATION

Installation is in the reverse order of removal.

Low-pressure flexible hose (evaporator side) bolt : Refer to ATC-104, "Components" .
Low-pressure flexible hose (compressor side) bolt : Refer to ATC-104, "Components" .
Low-pressure flexible hose (in-line connection) bolt : Refer to ATC-104, "Components" .

CAUTION:
- **Replace the O-ring on the low-pressure flexible hose with a new one, then apply A/C oil to it for installation.**
- **After recharging the refrigerant, check for leaks. Refer to ATC-115, "Checking for Refrigerant Leaks" .**

Removal and Installation for High-pressure Flexible Hose

EJS002RD

REMOVAL

1. Discharge the refrigerant. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Reposition the power steering reservoir out of the way without disconnecting the hose.
3. Reposition the engine coolant reservoir out of the way without disconnecting the hose.
4. Remove the high-pressure flexible hose. Refer to ATC-104, "Components" .

CAUTION:
Cap or wrap the joint of the hose with a suitable material such as vinyl tape to avoid the entry of contaminants.

INSTALLATION

Installation is in the reverse order of removal.

High-pressure flexible hose bolt : Refer to ATC-104, "Components" .

CAUTION:
- **Replace the O-ring of the high-pressure flexible hose with a new one, then apply A/C oil to it for installation.**
- **After charging the refrigerant, check for leaks. Refer to ATC-115, "Checking for Refrigerant Leaks" .**

Removal and Installation for High-pressure Pipe

EJS002RE

REMOVAL

1. Discharge the refrigerant. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Reposition the power steering reservoir out of the way without disconnecting the hose.
3. Reposition the engine coolant reservoir out of the way without disconnecting the hose.
4. Remove the high-pressure pipe. Refer to ATC-104, "Components" .

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

INSTALLATION

Installation is in the reverse order of removal.

High-pressure pipe (evaporator side) bolt : Refer to ATC-104, "Components" .
High-pressure pipe (condenser side) bolt : Refer to ATC-104, "Components" .

CAUTION:

- **Replace the O-ring of the high-pressure pipe with a new one, then apply compressor oil to it when installing it.**
- **After charging the refrigerant, check for leaks. Refer to ATC-115, "Checking for Refrigerant Leaks" .**

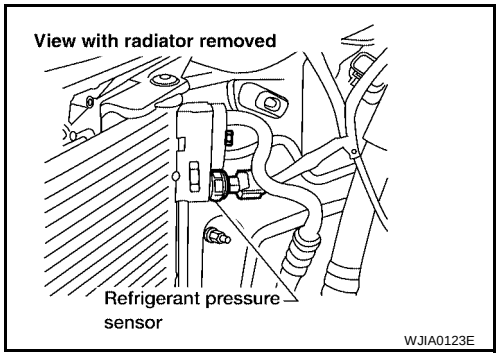
Removal and Installation for Refrigerant Pressure Sensor

EJS002RF

REMOVAL

1. Discharge the refrigerant. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Disconnect the refrigerant pressure sensor connector and remove the refrigerant pressure sensor from the condenser.

   CAUTION:
   Do not damage the condenser fins.



INSTALLATION

Installation is in the reverse order of removal.

Refrigerant pressure sensor : Refer to ATC-104, "Components" .

CAUTION:
Replace the O-ring of the refrigerant pressure sensor with a new one, then apply compressor oil to it when installing it.

Removal and Installation for Condenser

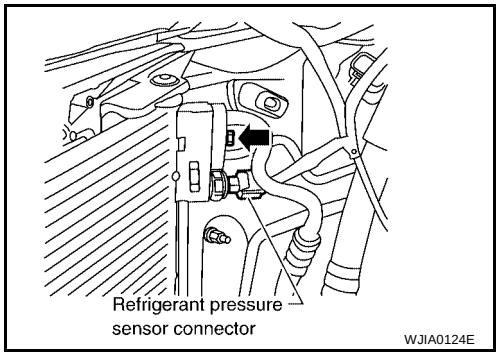
EJS002RG

REMOVAL

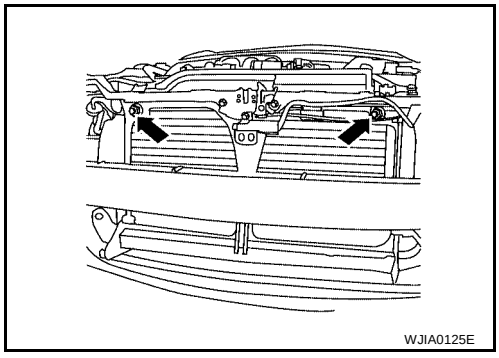
1. Discharge the refrigerant. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Remove the radiator. Refer to CO-13, "RADIATOR" (QR25DE), CO-34, "RADIATOR" (VQ35DE).

   CAUTION:
   Be careful not to damage the core surface of the condenser and the radiator.
3. Disconnect the high-pressure flexible hose and the high-pressure pipe from the condenser.

   CAUTION:
   Cap or wrap the joint of the pipe and hose with suitable material such as vinyl tape to avoid the entry of contaminants.
4. Disconnect the refrigerant pressure sensor connector.
5. Remove the front fascia. Refer to EI-14, "FRONT BUMPER" .



6. Remove the mounting nuts from condenser mounting brackets.
7. Remove the condenser.



INSTALLATION

Installation is in the reverse order of removal.

High-pressure flexible hose and pipe bolt : Refer to ATC-104, "Components" .

Condenser nuts : 5.0 - 6.79 N·m (0.51 - 0.69 kg-m, 45 - 60 in-lb)

CAUTION:

- **Replace the O-rings of the high-pressure pipe, refrigerant pressure sensor, and high-pressure flexible hose with new ones, then apply A/C oil to them after installing them.**
- **When charging refrigerant, check for leaks. Refer to ATC-115, "Checking for Refrigerant Leaks" .**

Removal and Installation for Evaporator

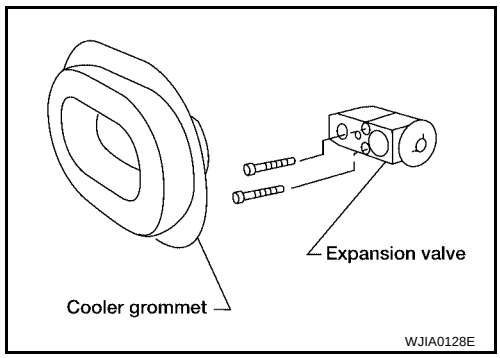
EJS003GE

REMOVAL

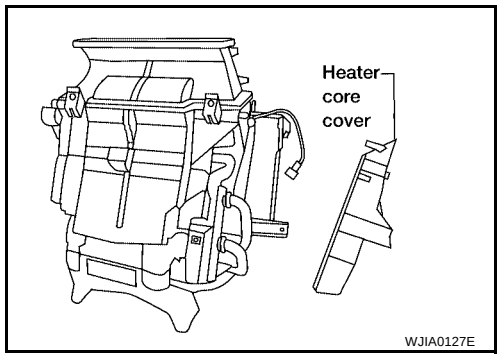
1. Evacuate and recover the A/C system refrigerant. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Disconnect the battery negative terminal.
3. Disconnect the air cleaner to electronic throttle control actuator tube. Refer to EM-17, "AIR CLEANER AND AIR DUCT" (QR25DE), EM-118, "AIR CLEANER AND AIR DUCT" (VQ35DE).

   NOTE:
   The tube is located between the air cleaner assembly and the intake manifold and is removed to access the expansion valve.
4. Disconnect the A/C pipe from the expansion valve.

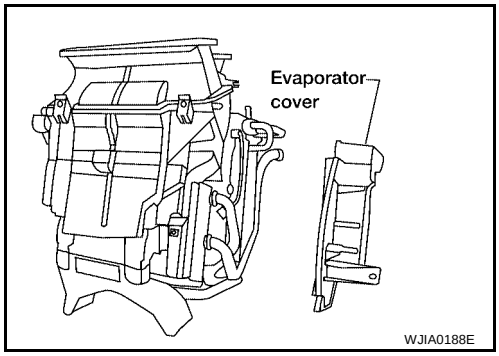
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
5. Remove the expansion valve.
6. Remove the center console side finisher RH. Refer to IP-16, "DISASSEMBLY AND ASSEMBLY" .
7. Remove the glove box assembly. Refer to IP-15, "INSTRUMENT LOWER COVER RH AND GLOVE BOX" .
8. Remove the ECM.
   - Disconnect the ECM connector.
   - Remove the wire harness from the ECM mounting bracket.
   - Remove the two ECM mounting bracket nuts and disconnect the ground wire.
9. Remove the blower unit. Refer to ATC-91, "BLOWER UNIT" .



10. Remove the heater core cover.

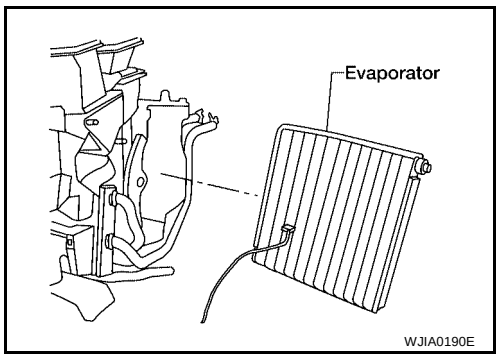


11. Remove the evaporator cover.



12. Remove the evaporator.
    - Remove the intake sensor.

    CAUTION:
    - **Mark the mounting position of the intake sensor.**



INSTALLATION

Installation is in the reverse order of removal.

Expansion valve mounting bolts : 2.9 - 5.0 N·m (0.29 - 0.51 kg-m, 26 - 44 in-lb)

CAUTION:
- **Replace the O-rings with new ones, then apply compressor oil to them when installing them.**

Removal and Installation for Expansion Valve

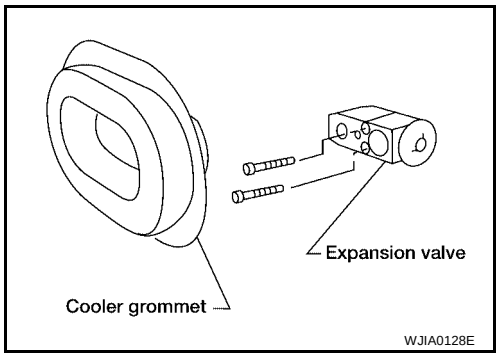
EJS003GF

REMOVAL

1. Evacuate and recover the A/C system refrigerant. Refer to ATC-102, "HFC-134a (R-134a) Service Procedure" .
2. Disconnect the air cleaner to electronic throttle control actuator tube. Refer to EM-17, "AIR CLEANER AND AIR DUCT" (QR25DE), EM-118, "AIR CLEANER AND AIR DUCT" (VQ35DE).

   NOTE:
   The tube is located between the air cleaner assembly and the intake manifold and is removed to access the expansion valve.
3. Disconnect the A/C pipe from the expansion valve.

   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
4. Remove the expansion valve.



INSTALLATION

Installation is in the reverse order of removal.

Expansion valve mounting bolts : 2.9 - 5.0 N·m (0.29 - 0.51 kg-m, 26 - 44 in-lb)

CAUTION:

- **Replace the O-rings with new ones, then apply compressor oil to them when installing them.**

Checking for Refrigerant Leaks

EJS002RJ

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C oil leakage, damage and corrosion. A/C oil 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 25 - 50 mm (1 - 2 in) per second and no further than 6 mm (1/4 in) 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

EJS002RK

1. Check A/C system for leaks using the UV lamp and safety goggles (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.
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 refrigerant 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 oils, 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

EJS002RL

NOTE:

This procedure is only necessary when recharging the A/C system or when the compressor has seized and has been replaced.

1. Check the A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.52 kg/cm^2 , 50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool (J-41459).

   CAUTION:

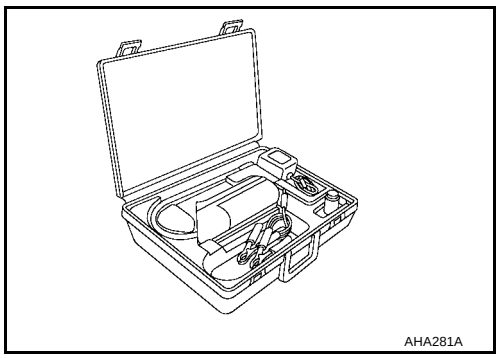
   If repairing the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.
3. Connect the injector tool to the A/C LOW PRESSURE side service valve.
4. Start the engine and switch the A/C ON and fan ON.
5. While the A/C is operating (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 manufacturer's operating instructions.
6. With the engine still running, disconnect the injector tool from the low-pressure service valve.
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 a few minutes to a few days for the dye to penetrate the leak and become visible.

Electronic Refrigerant Leak Detector

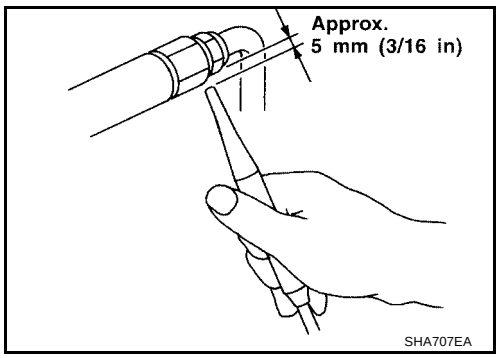
EJS002RM

PRECAUTIONS FOR HANDLING THE LEAK DETECTOR

When performing a refrigerant leak check, use a electronic refrigerant leak detector (J-41995) or equivalent. Ensure that the instrument is calibrated and set properly per the manufacturer's operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the manufacturer's operating instructions and perform any specified maintenance.

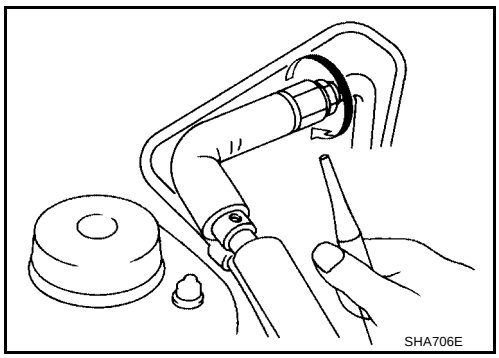

AHA281A

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

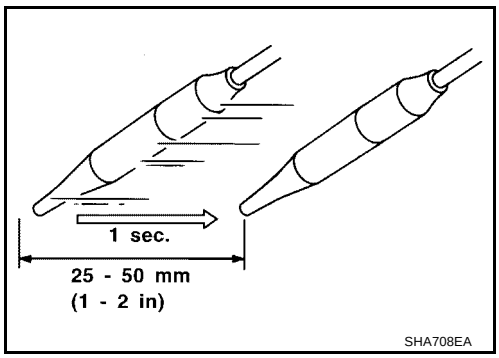


SHA707EA

2. When testing, circle each fitting completely with the leak detector probe.


SHA706E

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



SHA708EA

CHECKING PROCEDURE

NOTE:
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 a 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 (3.52 kg/cm^2 , 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.

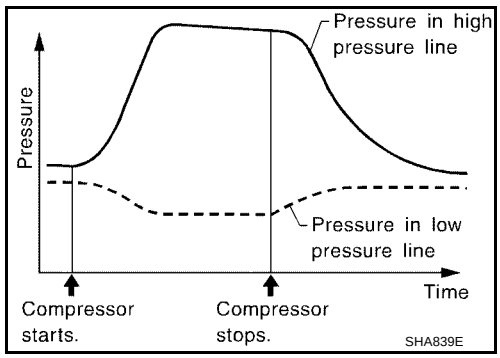
   NOTE:
   At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm^2 , 50 psi) pressure.

4. Conduct the leak test from the high side (compressor discharge to evaporator inlet) to the low side (evaporator drain hose to the compressor shaft seal). Refer to ATC-104, "Components" . Clean the component to be checked and move the leak detector probe completely around the connection/component.
   Perform a leak check for the following areas:
   - Compressor
   - High and low-pressure hose fittings, relief valve and shaft seal.
   - Liquid tank
   - Refrigerant pressure sensor
   - Service valves
   - Check that all the service valve caps are secure on the service valves (to prevent leaks).
   - After removing A/C manifold gauge set from service valves, wipe any residue from the valves to prevent any false readings by the leak detector.
   - Evaporator
   - With engine OFF, turn blower fan on high speed for at least 15 seconds to dissipate any refrigerant trace around the evaporator. 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 front air control as follows;

a. A/C switch: ON
b. Mode: Vent
c. Intake position: Recirculation
d. Temperature: MAX cold
e. Blower 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 the recovery/recycling equipment to the A/C system, check the recovery/recycling equipment gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover the refrigerant from the equipment lines and then check the refrigerant purity.
12. Confirm the refrigerant purity in the supply tank using the recovery/recycling equipment and the refrigerant identifier equipment.

13. Confirm the refrigerant purity in the A/C system using the recovery/recycling equipment and the refrigerant identifier equipment.
14. Discharge the A/C system using approved refrigerant recovery/recycling equipment. Repair the leaking fitting or component as necessary.
15. Evacuate and recharge the A/C system and perform the leak test to confirm there are no refrigerant leaks.
16. Conduct the A/C performance test to ensure that the system works properly. Refer to ATC-69, "PERFORMANCE CHART" .

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Service Data and Specifications (SDS)

EJS002RN

COMPRESSOR

Model	CALSONIC KANSEI
Type	DKS-17D
Displacement	175.5 cm^3 (10.7 in^3) / revolution
Cylinder bore × stroke	30.5 mm (1.201 in) x 21.4 mm (0.84 in)
Direction of rotation	Clockwise (viewed from drive end)
Drive belt	Poly V

LUBRICANT

Name		NISSAN A/C System Lubricant Type S (DH-PS) or equivalent
Part number		KLH00-PAGS0
Capacity	Total in system	150 mℓ (5.03 US fl oz, 5.3 Imp fl oz)
	Compressor (service part) charging amount	Refer to ATC-20, "Oil Adjustment Procedure for Compressor Replacement" .

REFRIGERANT

Type	HFC-134a (R-134a)
Capacity	0.50 ± 0.025 kg (1.10 ± 0.055 lb)

ENGINE IDLING SPEED

Refer to EC-80, "Idle Speed and Ignition Timing Check" (QR25DE), EC-682, "Idle Speed and Ignition Timing Check" (VQ35DE).

BELT TENSION

Refer to MA-15, "Checking Drive Belts" (QR25DE), or MA-23, "Checking Drive Belts" (VQ35DE).