

AIR CONDITIONER

SECTION AC

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Precautions

SRS Airbag • Pretensioner Seatbelt

WARNING:

- To install/remove the SRS airbag, pretensioner seatbelt system related components and harness, turn the ignition switch “OFF”, disconnect the battery terminals and wait over 3 minutes. (This is to discharge all the remaining electricity in the airbag sensor unit’s auxiliary power circuit.)
- Do not use air impact or electrical tools when installing/removing the components.
- Do not use any hand-held tools for harness used in SRS airbag and pretensioner seatbelt systems. Be careful with the harness not to tangle with or interfere with other components.
- Do not use any electrical test equipments such as circuit tester when inspecting the SRS airbag and pretensioner seatbelt circuit while installed unless the Service Manual instructs to do so. (The weak current in the tester can cause the SRS airbag to operate.)
- Do not insert any foreign materials such as a screwdriver in the airbag module and pretensioner seatbelt connector in order to prevent unintended operation due to static electricity.
- The harnesses used in SRS airbag and pretensioner are covered with yellow insulation for easy identification.
- Refer to “RS Restraint System” in this Service Manual for safe airbag system service information.

A/C Refrigerant HFC134a Handling

- Always use HFC134a as A/C refrigerant. If CFC12 is used, it may damage the compressor due to bad lubrication.
- Handle the A/C refrigerant according to label on the service can. If not properly handled, it can be exploded causing frostbite and loss of eyesight.
- Do not inhale the A/C refrigerant. It can damage your eye, nose and throat.
- HFC134a generates poisonous gas when expose to high temperature. Do not get it near to fire or so. Properly ventilate while service.

Compressor Oil

- To meet the characteristics of the A/C refrigerant, synthetic oil is using for the compressor. There are 2 types of compressor oils to meet 2 different compressors. Always use the below designated compressor oil.

For QG engine: NISSAN A/C System Oil Type R or NISSAN A/C System Oil Type S (Rotary type compressor)

- If the rotary type compressor oil (NISSAN A/C System Oil Type R) and swash plate compressor oil (NISSAN A/C System Oil Type S) are not properly used, compressor durability will be deteriorated. And if you use compressor oil for CFC12 (mineral fluid), the compressor gets damaged due to lack of lubrication.
- Compressor oil for HFC134a is high moisture-absorbent. Please follow the precautions noted below.
 - When cooler cycle components were removed, seal the opened hole with a cap or vinyl tape to separate from air.
 - When installing the cooler cycle components, keep the sealing just before to installation.
 - When the compressor oil can was used, close the cap right away and separate from air.
- Do not inhale the compressor oil vapor. It may stir your eyes, nose and throat.
- Compressor oil for HFC134a damages styrofoam and painted surfaces (except for heat treated paint coat). So be careful not to stain the oil in the vehicle.

Tube Connection

The new tubing method (axial seal type) is used for all cooler cycle connections except for below location.

- Between the expansion valve and evaporator

O-Ring Part Number

Connection Method	Location		Bore
Axial Seal Type	Heater & cooling unit	Inlet	φ 8
		Outlet	φ 16
	Compressor	Inlet	φ 19
		Outlet	φ 12
	Condenser	Inlet	φ 8
		Outlet	φ 8
	Liquid tank	Inlet	φ 8
		Outlet	φ 8
Conventional Type	Expansion valve	Inlet	φ 16
		Outlet	φ 16

Precautions for Cooler Cycle Service

- Always obey the below items and label instructions during cooler cycle service.

Refrigerant (HFC134a) capacity	550 ± 50 g
Compressor oil capacity	180 cm ³

- After removing the tubes, seal the opening with a cap or vinyl tape right away to prevent any dust or vapor entrance.
- Always use torque wrench or backup wrench when installing the tubes.
- When installing the A/C to the vehicle, perform the tube installation as the last stage. Also, do not open the sealing caps until just before to the installation of tubes or other components.
- When the components are stored in a cold place, adjust the temperature of then to working place before removing the sealing caps. This is to prevent moistening of the components.
- Completely remove moisture from the cooler cycle before recharging the A/C refrigerant.
- O-ring on the cooler cycle should be replaced with new if removed.
- Apply compressor oil at the O-ring when installing the tubes. However, be careful not to apply onto the threads.

For QG Engine: NISSAN A/C System Oil Type R (for rotary type compressor)

- Completely seat the O-ring against tube bead.
- Be careful not to damage the O-ring or tubes when installing the O-ring.
- Connect the tube until it clicks. After then, tighten the nuts or bolts with hands firmly.
- Check if the O-ring is properly seated.
- After connecting the tubes, check for any A/C refrigerant leakage at the connections. Disconnect the tubes when leakage is found and replace the O-ring, then tighten the connection to the specified torque.

Precautions for Compressor Service

- Seal all openings to prevent any dust or vapor entrance.
- When the compressor is removed, the oil may enter into low-pressure space. So, place it in the same direction as it is installed on the vehicle.
- When the compressor is replaced, adjust the compressor oil level. Refer to "Compressor Oil" (AC-8).

- Keep the clutch and pulley surfaces clean. If the surface is stained with oil, wipe it out with a clean and wet cloth.
- When the compressor service is completed, rotate the compressor shaft with hand to both directions at least 5 times. This is to lubricate the compressor inside. After installing the compressor, operate the compressor with idling speed for about 1 hour.

Precautions for Service Equipment

REFRIGERANT-RECOVERY STATION

Follow the manufacturer's instructions for station handling and maintenance. Use only designated refrigerant.

ELECTRONIC LEAK DETECTOR

Follow the manufacturer's instructions for detector handling and maintenance.

FLUIDS AND REFRIGERANT

Item	Application	Use	Remark
Refrigerant can	All	Charging refrigerant	
NISSAN A/C System Oil Type R 40 cm ³	QG engine	Adding compressor oil	DHC

Refrigerant System

Refrigerant Cycle

REFRIGERANT CYCLE

The refrigerant returns to the compressor through compressor, condenser, liquid tank and evaporator. The refrigerant evaporation inside the evaporator is controlled by the expansion valve.

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FREEZING PROTECTION

The compressor operates so that it can maintain the evaporator temperature to the specified range. If the evaporator temperature goes under the specified value, then the auto amp stops the compressor. Also, if the evaporator temperature goes above the specified value, then the auto amp operates the compressor.

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Refrigerant System Protection

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REFRIGERANT PRESSURE SENSOR

- The A/C refrigerant system is protected from high or low pressure by the refrigerant pressure sensor on the condenser.
- When abnormal pressure in the cooler cycle (approx. more than 2.7 Mpa [28 kgf/cm²•G] or less than 0.14 Mpa [1.4 kgf/cm²•G]) is detected, the refrigerant pressure sensor stops the compressor.

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NOTE:

- The value in the parenthesis means gage pressure.

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Compressor Oil

Oil Level Adjustment

The compressor oil circulates in the system with refrigerant. When cooler cycle component is replaced or large amount of refrigerant is leaked, the compressor oil should be added. It is important to maintain proper oil level and if not properly maintained, the following troubles may occur.

- Lack of oil: Compressor sticks
 - Excessive oil: Lack of cooling capacity (Due to lack of heat exchange)
- Oil specification (QG engine): NISSAN A/C System Oil Type R (Rotary type compressor)

Oil Return Operation

Adjust oil level as follows.

1. A/C System Inspection

1. Inspect if A/C system is normally operating.
2. Inspect if large amount of refrigerant or oil is leaked.

Inspection results are OK?

- OK → Go to No. 2
- NG → Go to No. 3

2. Oil Return Operation

1. Start the engine and maintain the following conditions.
 - Engine RPM: Idle to 1,200 RPM
 - A/C or AUTO switch: ON
 - Fan speed: High
 - Set temperature: Full hot
2. Run the engine for about 10 minutes.
3. Stop the engine.

CAUTION:

- When refrigerant or oil is leaked a lot, do not perform the oil return operation.
→ Go to No. 3

3. Compressor Inspection

Replace the compressor?

- YES → Go to “Oil Level Adjustment When Compressor is Replaced” (AC-57).
- NO → Go to No. 4

4. Other Components Inspection

Replace other components? (evaporator, condenser, liquid tank or refrigerant or oil)

- YES → Go to “Oil Level Adjustment When Other Components are Replaced” (AC-57).
- NO → Perform performance check. Refer to “PERFORMANCE CHECK” (AC-31).

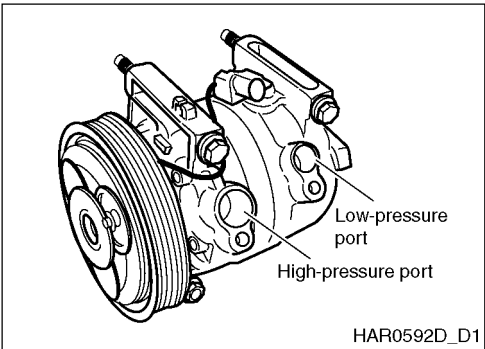
Oil Level Adjustment When Other Components Are Replaced

Add oil to the compressor using the high-pressure port as below. The “α” stands for oil volume that has released with refrigerant when removing refrigerant.

Replacing Component	Adding Capacity
Evaporator	75 + α cm ³
Condenser	35 + α cm ³
Liquid tank	10 + α cm ³

CAUTION:

- When several components are replaced, do not refill refrigerant and oil respectively.
Example: Evaporator and liquid tank refill (cm³) = 75 + 10 + α



Oil Level Adjustment When Compressor is Replaced

- Drain the compressor oil from the high-pressure port and low-pressure port and measure the volume. (The low-pressure port has a valve inside. Press it with a minus (-) screwdriver to drain the compressor oil.)
- Drain the compressor oil from the new compressor as below. The “α” stands for oil volume that has released with refrigerant when removing refrigerant.

Oil volume (cm³) drained from new compressor

= Oil capacity of new compressor (180) - Drained oil from removed compressor - Remaining oil inside the compressor (20) - α

= 160 - Drained oil from removed compressor - α

AUTO A/C System

General




- The auto A/C system detects interior temperature, ambient air temperature, intake air temperature and sunload using in-vehicle sensor, ambient sensor and sunload sensor. It compares and calculates the detected value and set temperature by temperature control lever. Then it controls outlet air temperature, fan speed, air outlets and air intake door to maintain the set temperature.

Setting the Difference Between the Set Temperature and Control Temperature

GENERAL

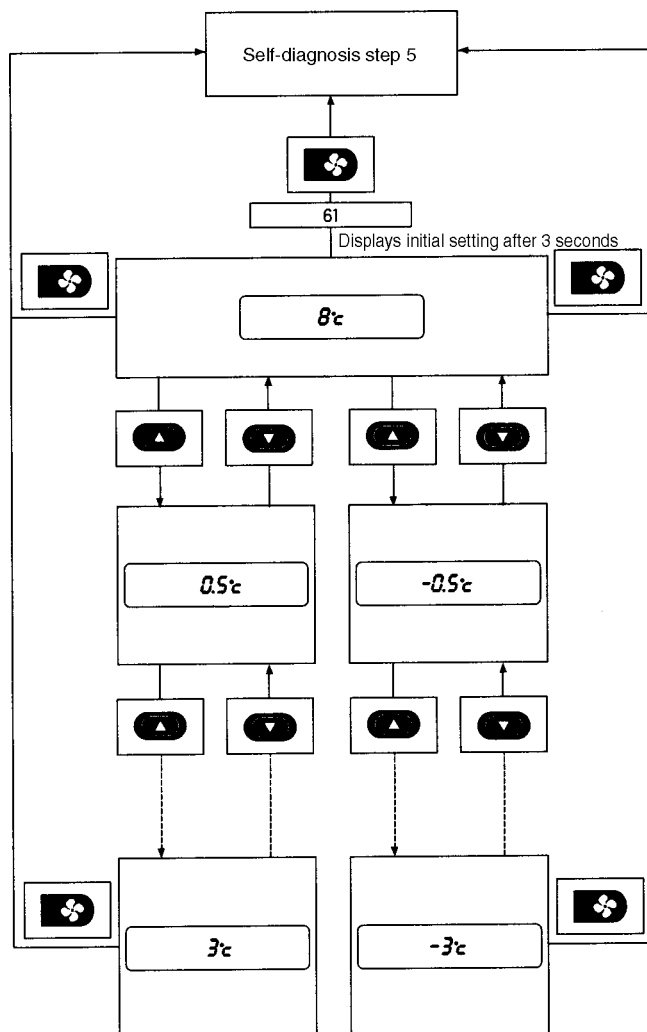
- If an occupant feels that the outlet air temperature is different from the set temperature, the control temperature of the auto amp can be changed to be as set temperature (displayed temperature).

SETTING PROCEDURE

- Press the fan switch  from the self-diagnosis step 5 and switch into temperature setting (setting the difference between the set temperature and control temperature).
- "61" comes on the display and start to set after about 3 seconds.
- The displayed temperature will increase/decrease by 0.5°C every time pushing the temperature control button  (HOT) or  (COLD). The temperature can be adjusted between +3°C ~ -3°C.

REFERENCE:

- When the temperature is lowered by -3°C while the displaying (set) temperature is 25°C, the auto amp will control the temperature to 22°C ($25 - 3 = 22$), the lower temperature than displayed temperature.



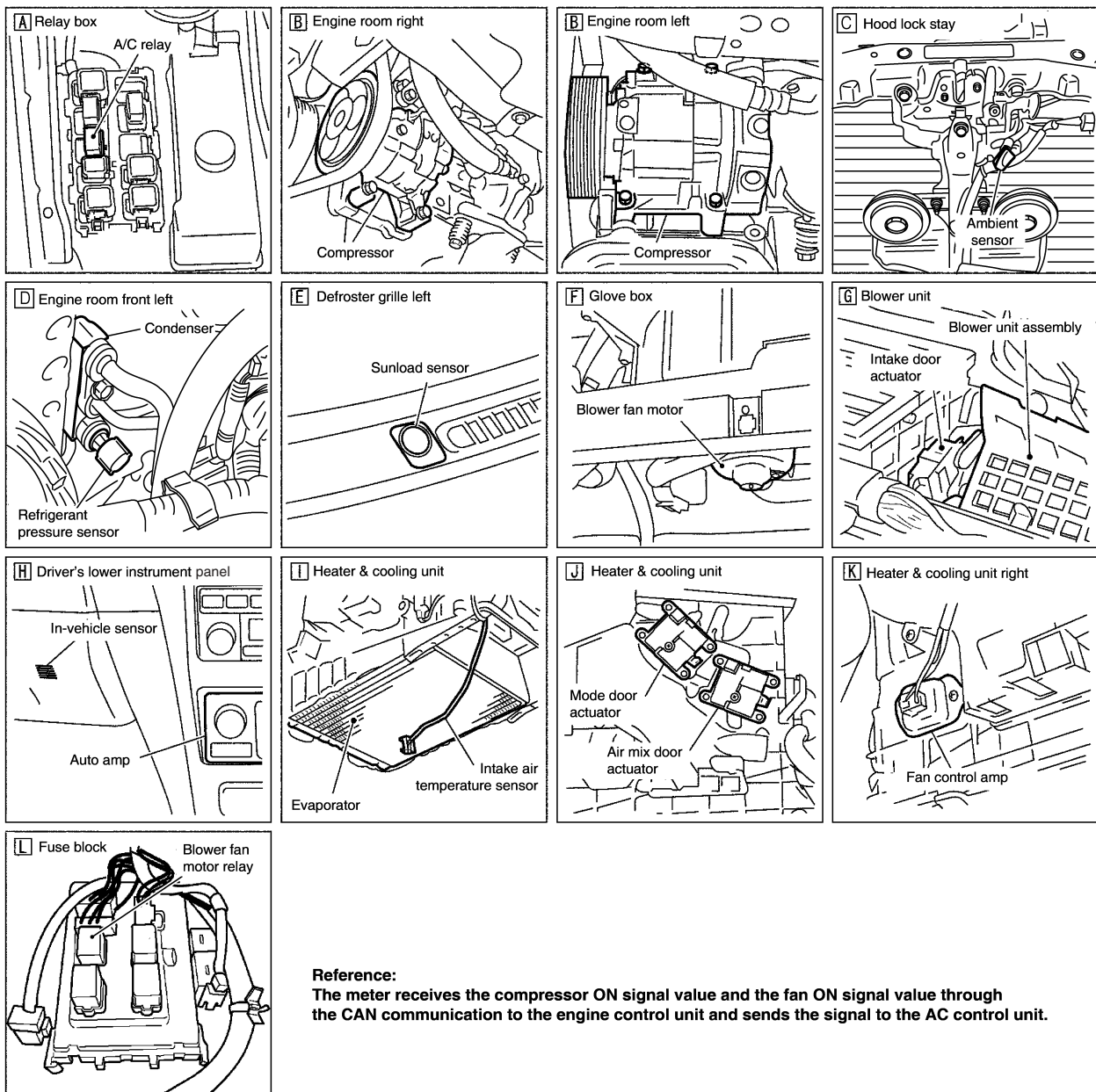
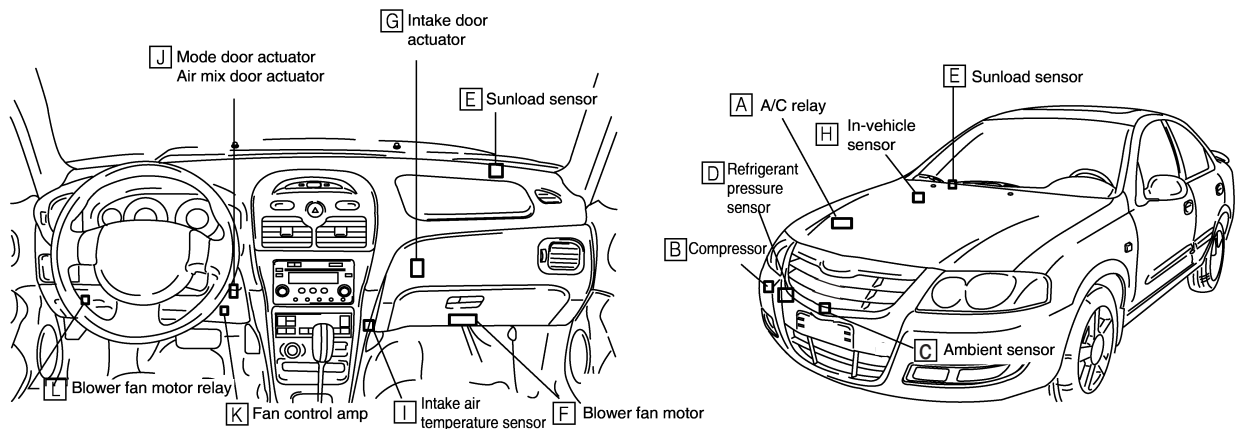
Trouble Diagnosis

Trouble Diagnosis by Symptoms

Symptom	Operation check	Trouble Route	Possible cause	
No air from the vent No change in air volume	Check blower fan motor operation Refer to "Blower Fan Motor System" (AC-27).	Blower fan motor route	<ul style="list-style-type: none"> Defective blower fan motor Defective fan control amp Defective blower fan motor relay 	GI EM
	Above conditions are normal	Auto amp route	Defective auto amp	LC
Common (Check this item for the following 3 symptoms)	Check air mix door actuator installation	Air mix door route	<ul style="list-style-type: none"> Bad installation of air mix door lever Defective air mix door system (broken or locked) 	EC
	Set the temperature control button to 18°C and 32°C, then check full stroke operation of air mix door	Air mix door actuator route	Refer to "Air Mix Door Actuator System" (AC-31)	FE
	Failure detected in self-diagnosis step 2	<ul style="list-style-type: none"> Sensor route Air mix door actuator route 	<ul style="list-style-type: none"> Defective sensor Bad sensor harness Defective air mix door actuator Bad air mix door actuator harness 	RS AC AV
	No failure detected in self-diagnosis step 2	Mode door actuator route	Refer to "Mode Door Actuator System" (AC-31).	EL
	Check operation of magnet clutch under AUTO switch ON	Magnet clutch route	Refer to "Magnet Clutch System" (AC-29).	WH
	<ul style="list-style-type: none"> Check refrigerant level Check performance 	Cooler cycle	Refer to "Performance Inspection" in "Bad Cooling" (AC-31).	CL
	Above conditions are normal	Auto fan route	Defective auto amp	MT
	Blower fan motor doesn't change	Coolant route	<ul style="list-style-type: none"> Defective cooling system Clogged heater hose or heater core 	AT
	Above condition is normal	Auto fan route	Defective auto amp	
	Blower fan motor doesn't change	Blower fan motor route	Refer to "Blower Fan Motor System" (AC-27).	FA
Interior temperature is much different with set temperature	Aspirator does not intake air even at fan speed 4	Aspirator route	<ul style="list-style-type: none"> Defective aspirator Peeled or broken aspirator duct 	RA
	Above conditions are normal	Auto amp route	Defective auto amp	BR
Air outlet does not change	Check mode door operation (Manual)	Mode door route	<ul style="list-style-type: none"> Defective mode door link and bad installation of mode door lever Defective mode door system (broken or locked) 	ST
	Failure detected in self-diagnosis step 3	Mode door actuator route	Refer to "Mode Door Actuator System" (AC-31).	BT
	Above conditions are normal	Auto amp route	Defective auto amp	

Symptom	Operation check	Trouble Route	Possible cause
Air outlet does not change	Check intake door operation (Manual)	Intake door route	<ul style="list-style-type: none"> ● Bad installation of intake door lever ● Defective intake door system (broken or locked)
	Failure detected in self-diagnosis step 3	Intake door actuator route	Refer to "Intake Door Actuator System" (AC-31).
	Above conditions are normal	Auto amp route	Defective auto amp
	Check AQS sensor operation	AQS sensor route	Defective AQS sensor

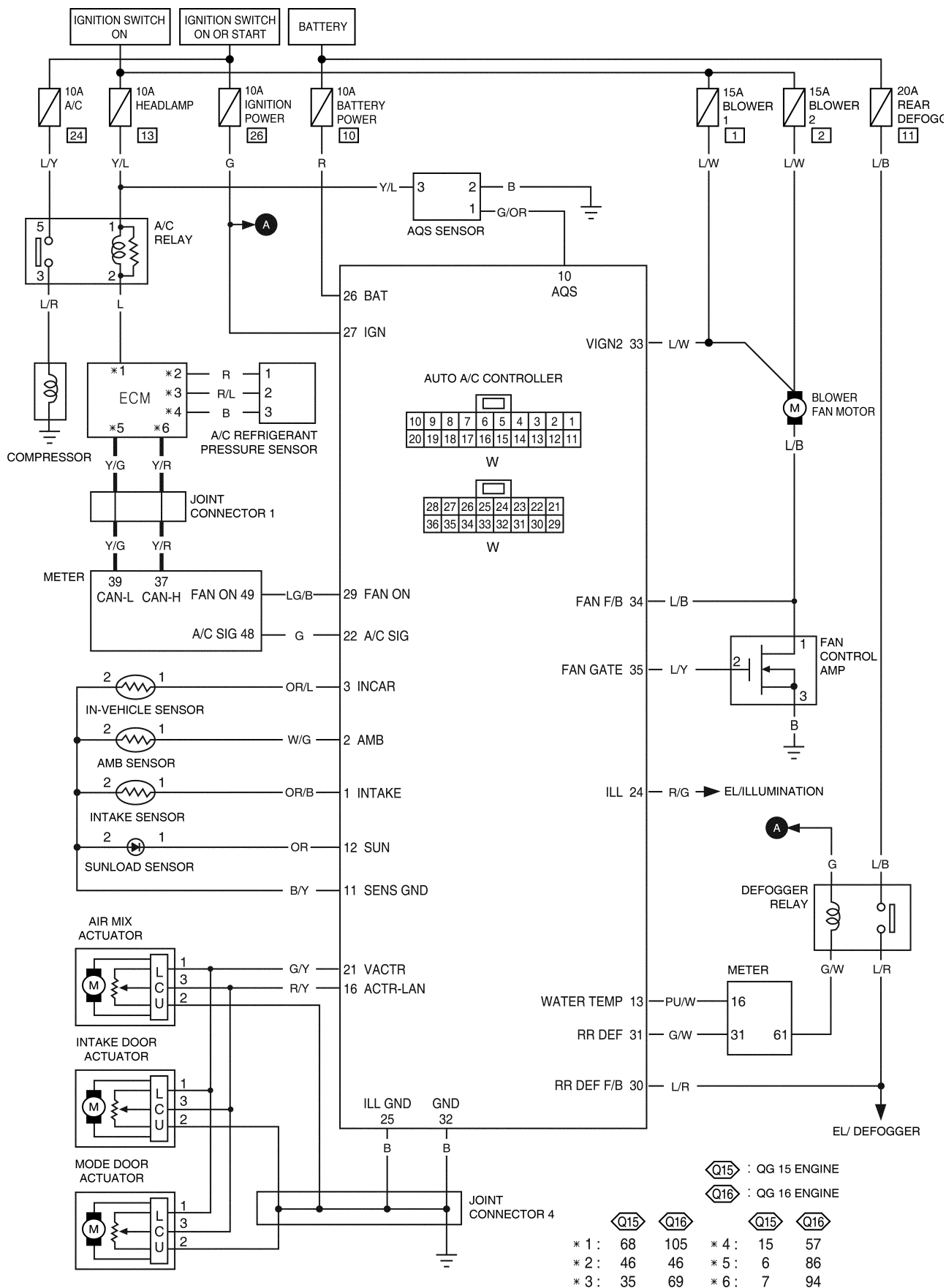
Components Location

**Reference:**

The meter receives the compressor ON signal value and the fan ON signal value through the CAN communication to the engine control unit and sends the signal to the AC control unit.

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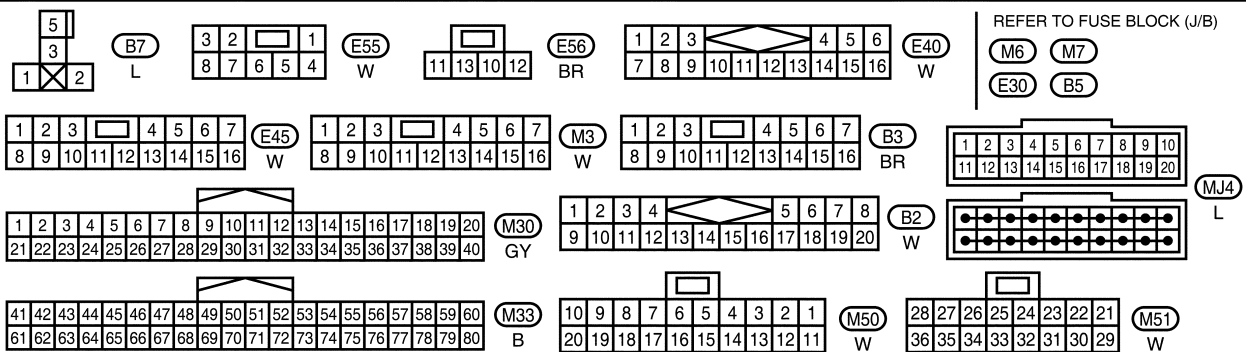
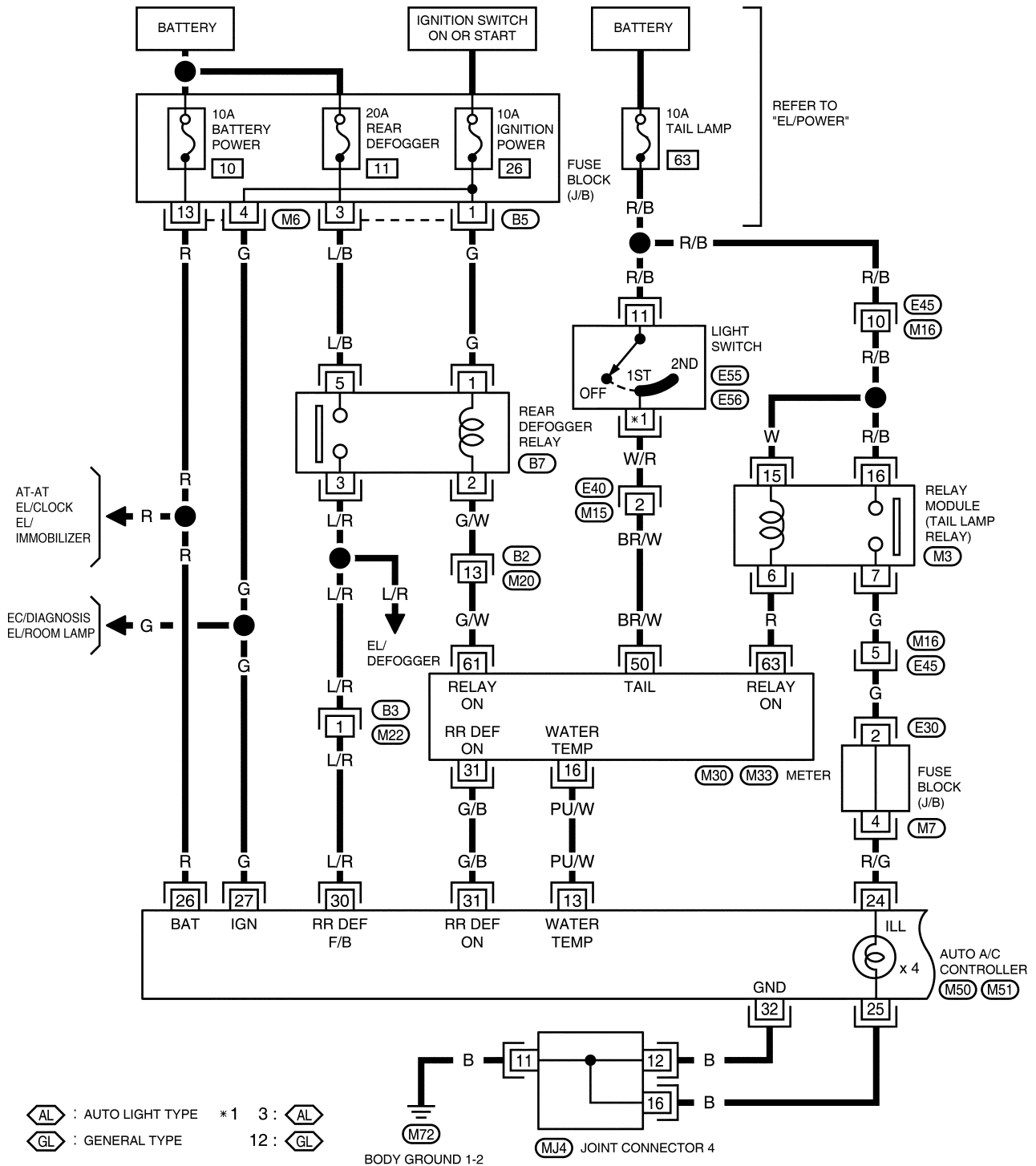
Circuit Diagram



Wiring Diagram

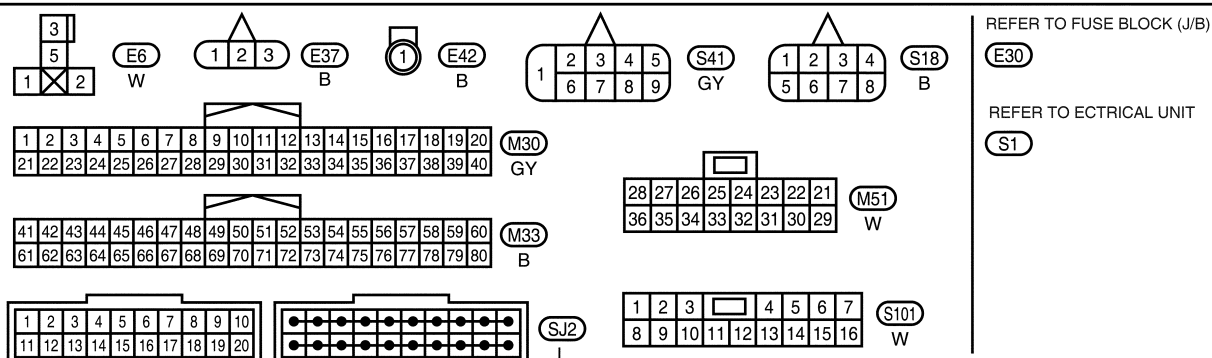
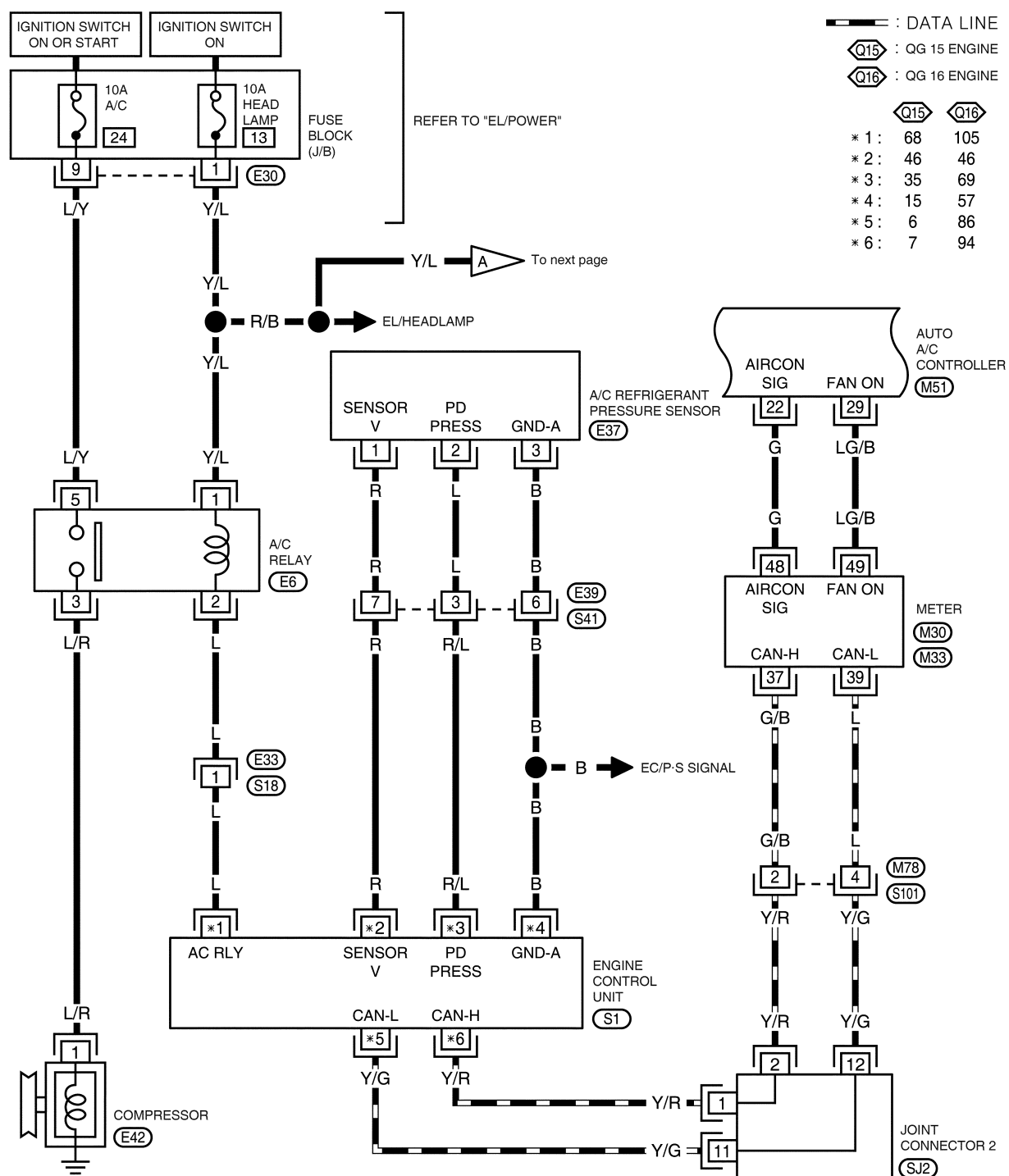
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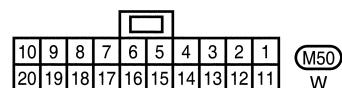
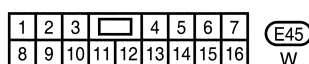
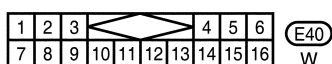
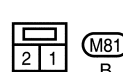
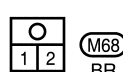
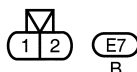
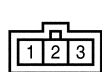
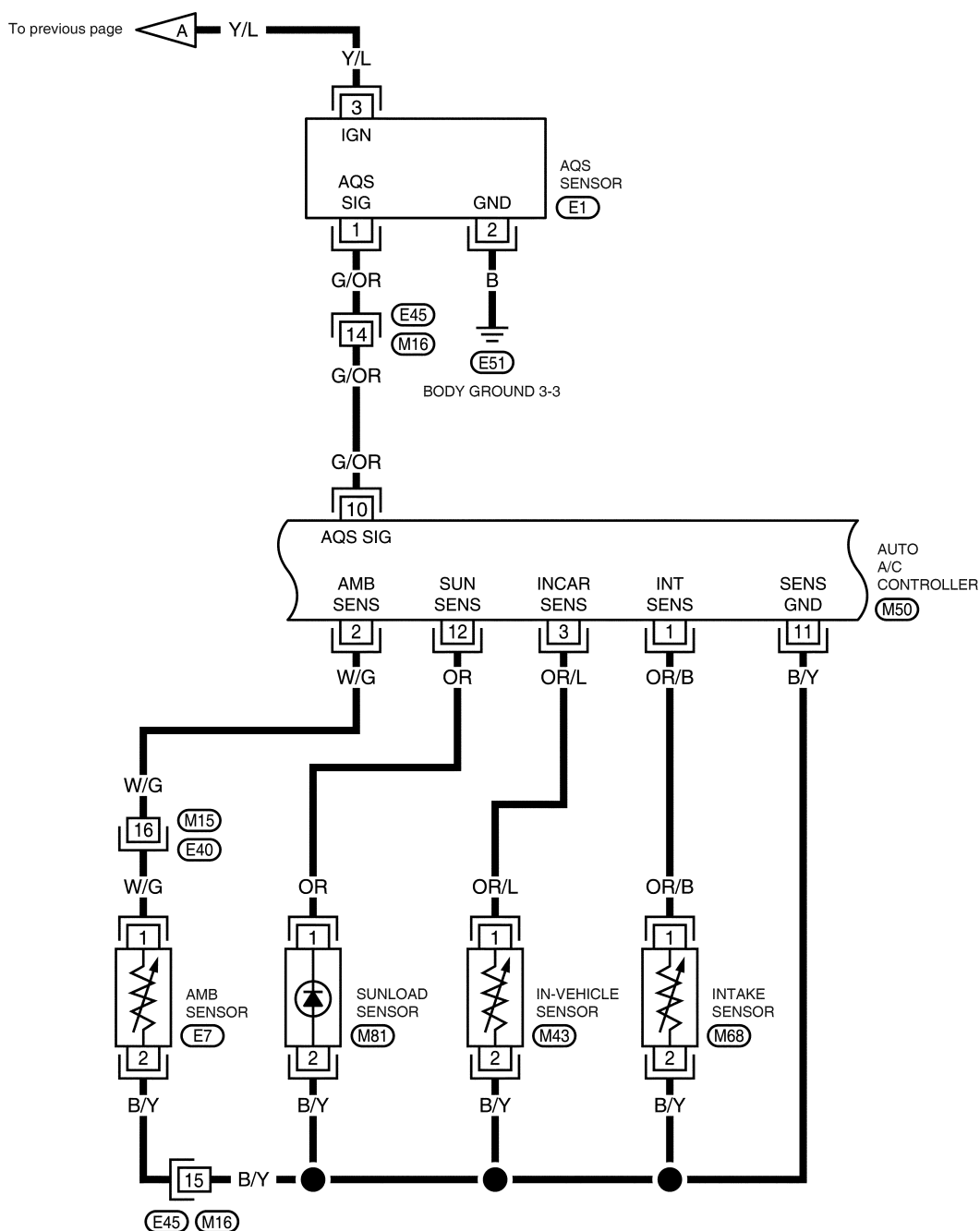
Wiring Diagram

AC/AUTO A/C- 02



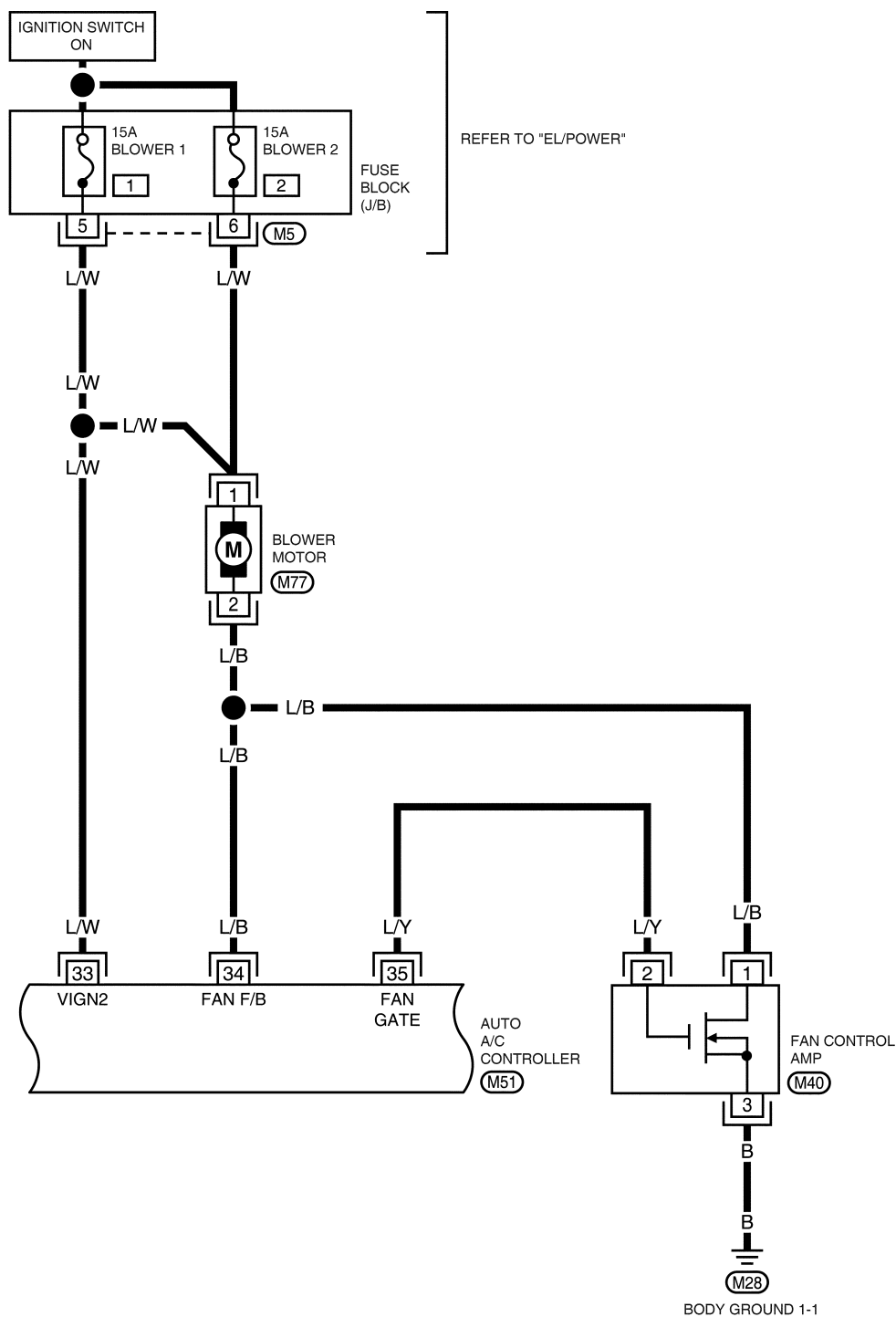
Wiring Diagram

AC/AUTO A/C- 03



Wiring Diagram

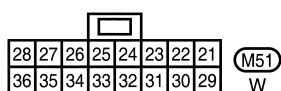
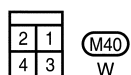
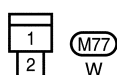
AC/AUTO A/C- 04



BODY GROUND 1-1

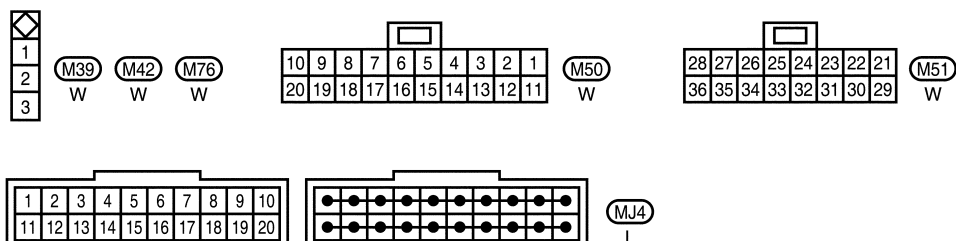
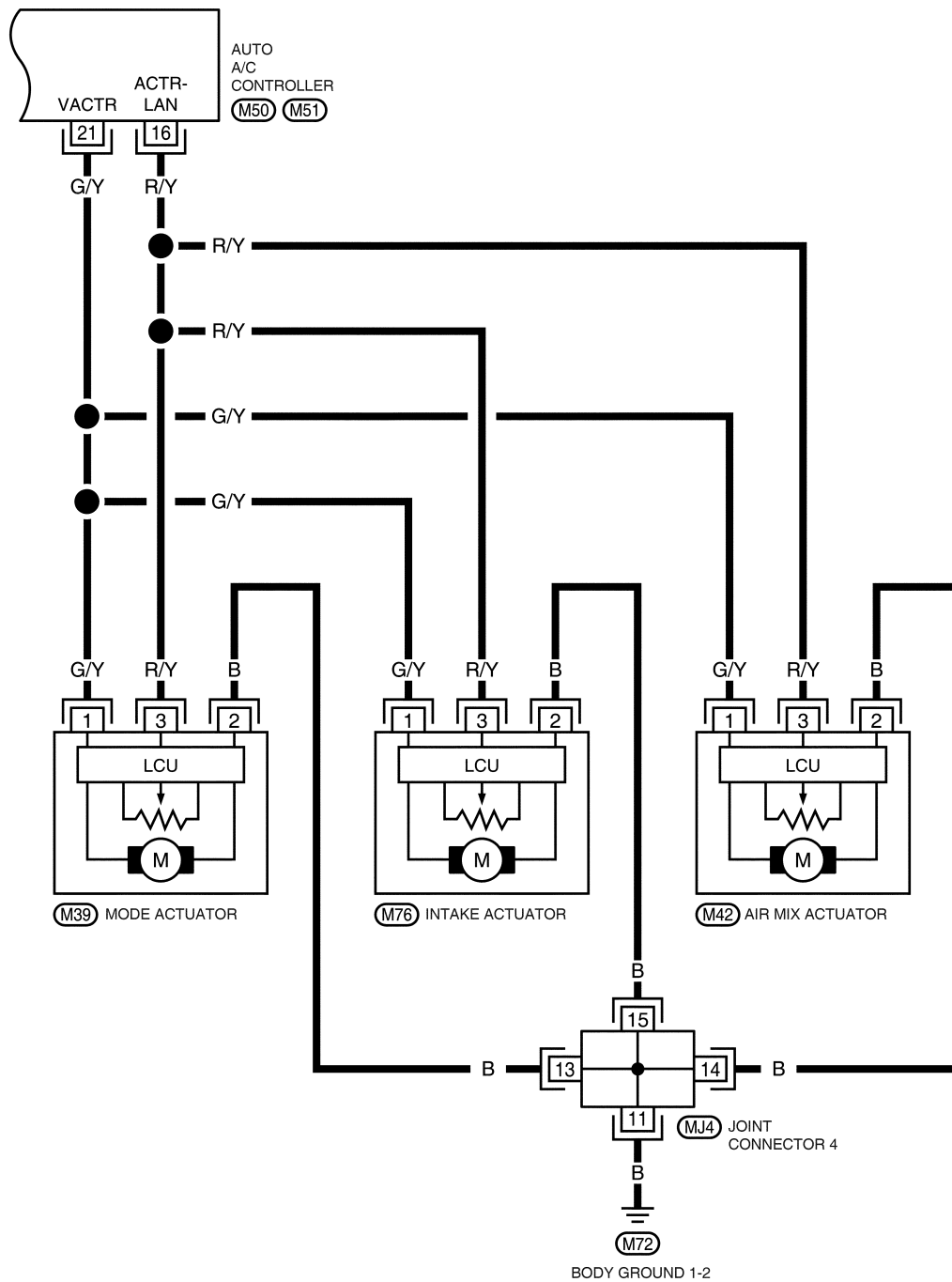
REFER TO FUSE BLOCK (J/B)

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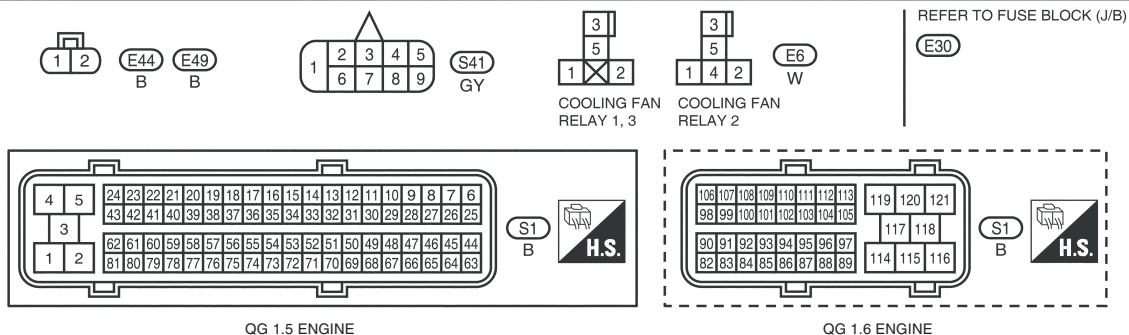
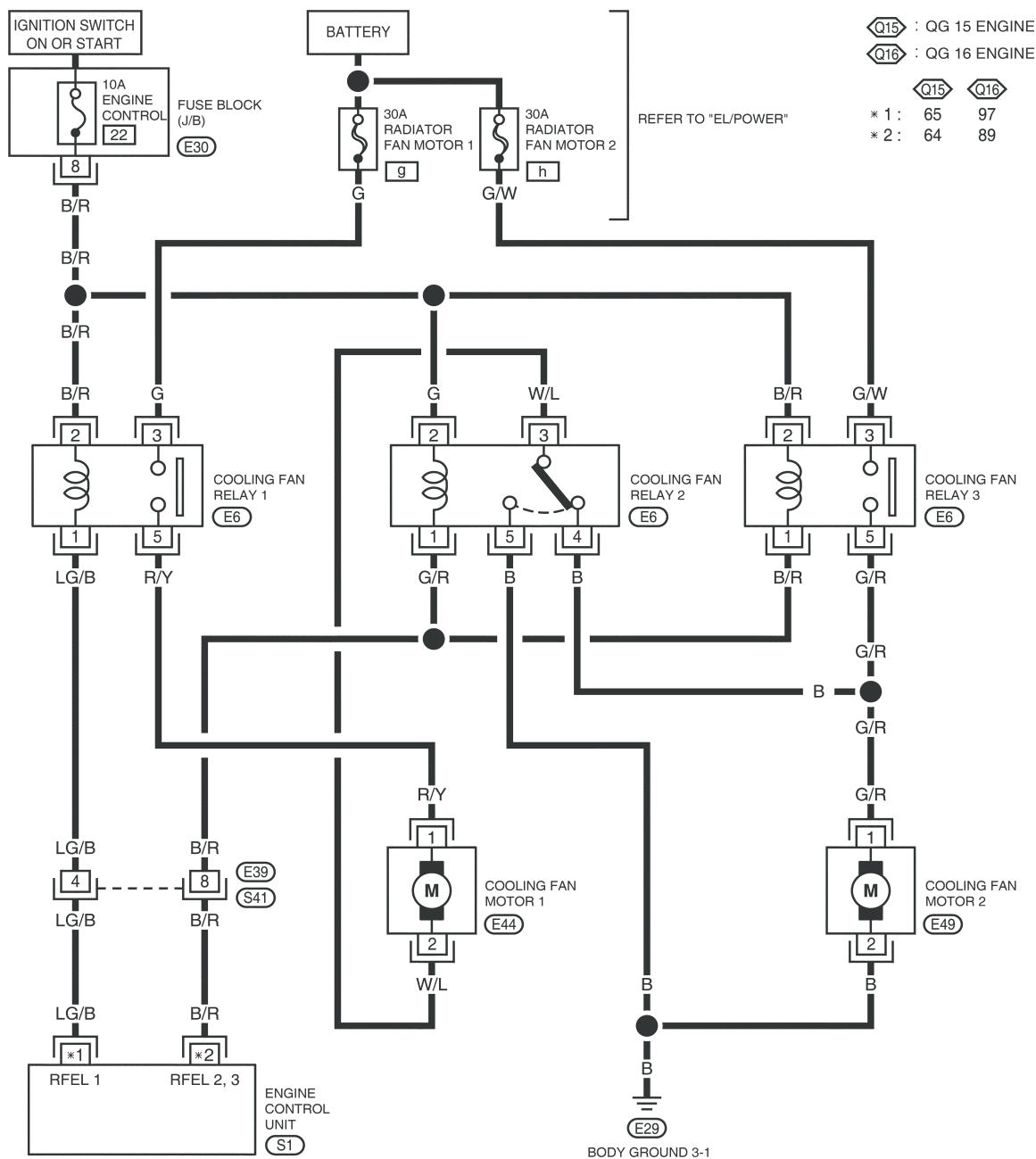
Wiring Diagram

AC/AUTO A/C- 05



Wiring Diagram

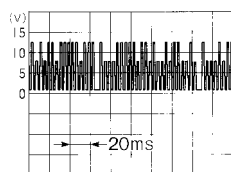
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Auto Amp Input/Output Signal Standards

STANDARDS

Terminal No.	Signal	Measurement		Standard (V)
		Key switch	Operation	
27	IGN power	ON	-	Approx. 12
26	Battery power (for memory)	OFF	-	Approx. 12
32	Ground	ON	-	Approx. 0
22	Compressor ON signal	ON	Compressor: ON	Approx. 0
			Compressor: OFF	Approx. 4.8
21	Actuator drive power	ON	-	Approx. 12
3	In-vehicle sensor signal	-	-	Note 1
12	Ambient sensor signal	-	-	Note 2
2	Sunload sensor signal	-	-	Note 3
25	Illumination ground	ON	Light switch: Stage 1	Approx. 0
24	Illumination	-	Light switch: Stage 1	Approx. 12
16	LAN signal	ON	-	Note 4: Approx. 5.7  HAK0652D_D1
35	Fan control amp control signal	ON	Fan speed: Manual speed 1, 2, 3	Approx. 2.5 - 3.0
			Fan speed: Manual speed 4	Approx. 9.0
34	Blower fan motor voltage feedback	ON	Fan speed: Manual speed 1	Approx. 8
29	Fan ON signal	ON	Blower fan: ON	Approx. 0
			Blower fan: OFF	Approx. 4.8
33	Blower motor power feedback	ON	-	Approx. 12
13	Thermal transmitter signal	-	-	Note 5
11	Sensor ground	ON	-	Approx. 0
1	Intake air temperature sensor signal	-	-	Note 6
10	AQS sensor	ON	Within 30 seconds after IGN ON (for heating)	Approx. 5

NOTE 1: Refer to "In-Vehicle Sensor" (AC-26).

NOTE 2: Refer to "Ambient Sensor" (AC-26).

NOTE 3: Refer to "Sunload Sensor" (AC-26).

NOTE 4: The value obtained by a tester.

NOTE 5: Refer to "COMBINATION METER - TROUBLE DIAGNOSIS" (EL-105).

NOTE 6: Refer to "Intake Air Temperature Sensor" (AC-27).

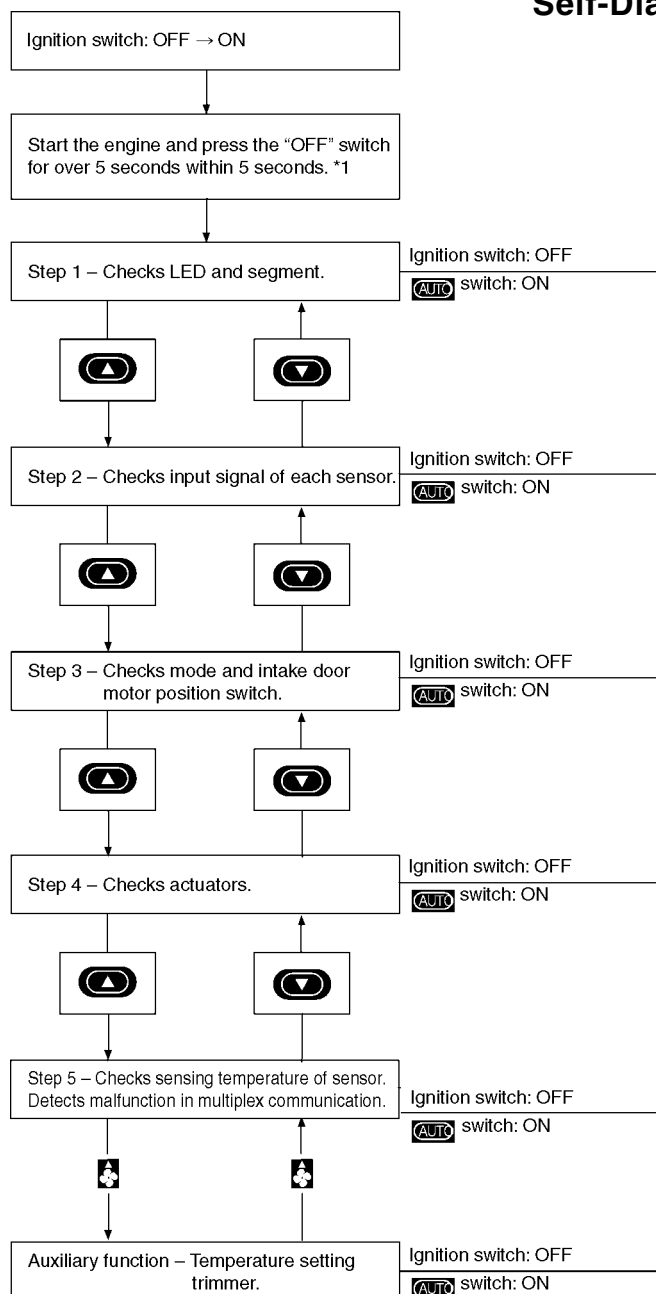
Self-Diagnosis Function

GENERAL

- There are 5 steps in self-diagnosis. Each sensor will be checked for normal operation and then determined control signal will be sent to each output device to check for its operation.

	Step 1	Step 2	Step 3	Step 4	Step 5
Diagnosing item	Checks indicator lights	Checks each sensor	Checks each door position	Checks each output device	Checks each sensor's recognizing temperature
Diagnosing component	Indicator lights	<ul style="list-style-type: none"> Ambient sensor In-vehicle sensor Sunload sensor Air mix PBR 	<ul style="list-style-type: none"> Mode door actuator Intake door actuator 	<ul style="list-style-type: none"> Mode door actuator Intake door actuator Air mix door actuator Blower fan motor Compressor 	<ul style="list-style-type: none"> Ambient sensor In-vehicle sensor Intake air temperature sensor

Self-Diagnosis



The self-diagnosis system diagnoses sensor, door motor and blower motor in the system. Refer to respective section for details. When shifting from normal control mode to self-diagnosis mode, do as follow.

After turning the ignition switch from OFF to ON or after running the engine, press **OFF** switch for over 5 seconds within 5 seconds.

The diagnosis system will be cancelled when the **AUTO** switch is pressed or the ignition switch is turn to OFF. To shift to the next step, press **HOT** switch or **COLD** switch.

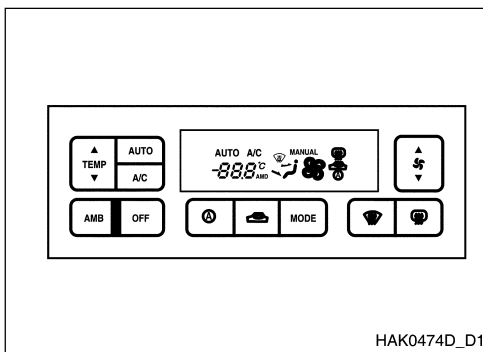
To shift to the auxiliary function from step 5, press **fan, up** switch.

- *1: It can work when the ignition switch is ON.
Note: In order to operate the compressor in step 4 and 5, start the engine.

PROCEDURE

1. Activating Temperature Control Mode

1. Place the temperature control button to full cold.
2. Turn the ignition switch from OFF to ON or start the engine. Press "OFF" switch for over 5 seconds within 5 seconds.
→ Go to No. 2



2. Step 1: Turning on of display and indicator lights

Checks all switches on the controller and LCDs.

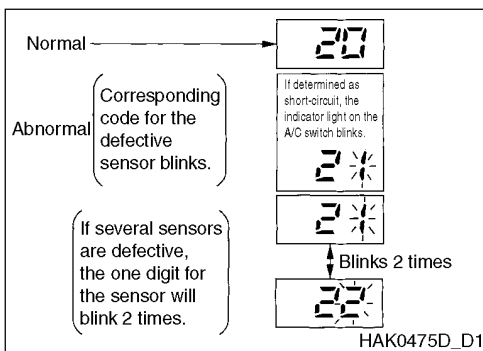
When normal: All indications are turned on.

When abnormal: The troubling section does not turn on.

Indicator lights are normal?

OK → Go to No. 3

NG → Defective switch LEP or LCDs
(Replace auto amp)



3. Step 2: Checking respective sensors

1. Increase the set temperature and then shift to step 2.
2. Diagnosis results comes on after displaying "2".

When normal: Displays "20".

When abnormal: Defective sensor position comes on.

Inspection results are normal?

OK → Go to No. 5

NG → Go to No. 4

4. Checking Defective Sensor

If defective, the corresponding code number of the sensor and actuator blinks. If determined that sensor and actuator circuit is shorted, the LED on the A/C switch blinks. If several sensors and actuators are defective, the corresponding code number of the sensor and actuator blinks 2 times respectively.

Code No.	Corresponding sensor	Malfunction conditions		Reference
21	Ambient sensor	Below 0.49 V	More than 4.84 V	"Ambient Sensor" (AC-26)
22	In-vehicle sensor	Below 0.49 V	More than 4.84 V	"In-Vehicle Sensor" (AC-26)
24	Intake air temperature sensor	Below 0.31 V	More than 3.65 V	"Intake Air Temperature Sensor" (AC-27)
25	Sunload sensor	More than 48.8 W/m ² (42 Kcal/m ²)	More than 1639.5 W/m ² (1410 Kcal/m ²)	"Sunload Sensor" (AC-26)
26	Air mix PBR	PBR opening: Less than 5 %	PBR opening: More than 95 %	"Air Mix Door Actuator System" (AC-31)

Example: In case of ambient sensor open circuit, the auto amp recognizes ambient air as extreme condition (below -43.8°C) and then controls towards heating.

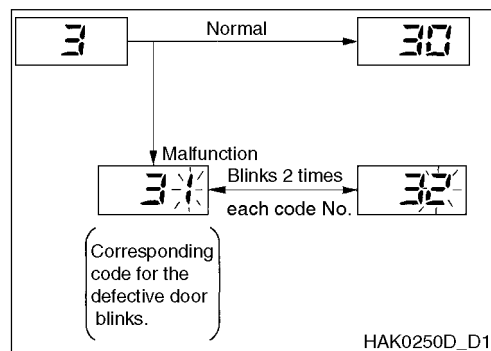
CAUTION:

- The sunload sensor may make faulty determination during evening or under indoor due to lack of light intensity.

Inspection results are OK?

OK → Go to No. 5

NG → Corresponding sensor is defective



5. Step 3: Checking mode door and intake door position

1. Press (HOT) switch 2 times to shift into step 3.
2. Diagnosis results comes on after displaying "3".

When normal: Displays "30".

When abnormal: The corresponding code number of the door which has different position will blink. If several doors have different positions, the corresponding code number of the door will blink 2 times respectively. When a door position is wrong, mode door actuator or intake door actuator is defective.

CAUTION:



- If the battery voltage goes under 12 V while diagnosing in step 3, the actuator speed slows down and it may be determined as defective even under normal operation. Perform the diagnosis while engine running.

Inspection results are OK?

OK → Go to No. 6

NG → Corresponding mode door actuator or intake door actuator is defective

6. Step 4: Checking each output device

1. Press  (HOT) switch 3 times to shift into step 4.
2. Each time the  (DEF) switch is pressed, the display changes among 42, 43, 44, 45, 46 and 41.
3. Following the chart below, check the discharging air temperature, blower motor voltage, compressor operation and air distribution. Visually check each operation, inspect by touching air outlet and for noise.

Code No.		41	42	43	44	45	46
Output device	Mode door	VENT	B/L	B/L	FOOT	D/F	DEF
	Intake door	Recirculation	Recirculation	20 % fresh air	Fresh air	Recirculation	Recirculation
	Air mix door	Full cold	Full cold	Full hot	Full hot	Full hot	Full hot
	Blower fan motor	Approx. 4.5 V	Approx. 10.5 V	Approx. 8.5 V	Approx. 8.5 V	Approx. 8.5 V	Approx. 12 V
	Compressor	ON	ON	OFF	OFF	ON	ON

Inspection results are OK?

OK → Go to No. 7

NG → ● Air outlet does not change: Refer to “Mode Door Actuator System” (AC-31).



● Intake door does not change: Refer to “Intake Door Actuator System” (AC-31).

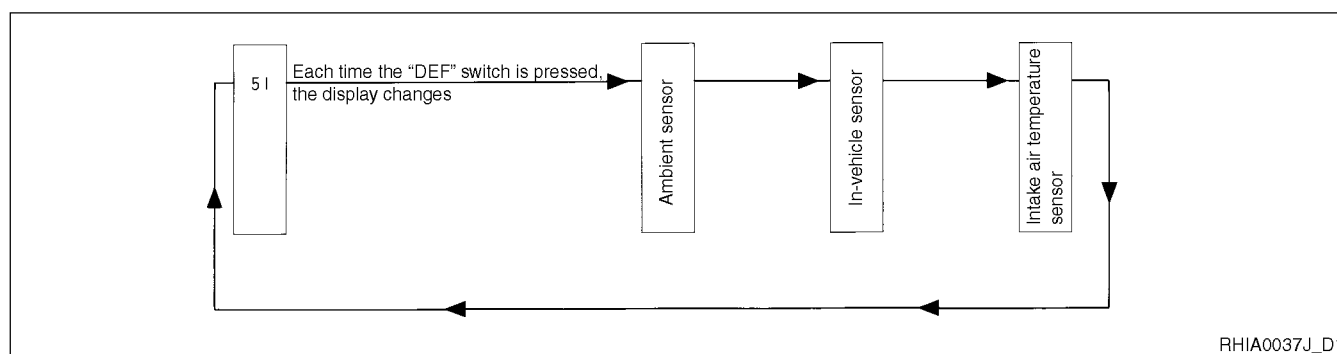
● Blower fan motor does not operate: Refer to “Blower Fan Motor System” (AC-27).

● Magnet clutch does not operate: Refer to “Magnet Clutch System” (AC-29).

● Discharging air temperature does not change: Refer to “Air Mix Door Actuator System” (AC-31).

7. Step 5: Displaying temperature detected by sensor

1. Press  (HOT) switch 4 times to shift into step 5.
2. Each time the  (DEF) switch is pressed, the display changes from temperature that detected by ambient sensor, temperature that detected by in-vehicle sensor, temperature that detected by intake air temperature sensor to “51”.

**CAUTION:**

- Temperature detecting range of the sensor is -30°C ~ 55°C.

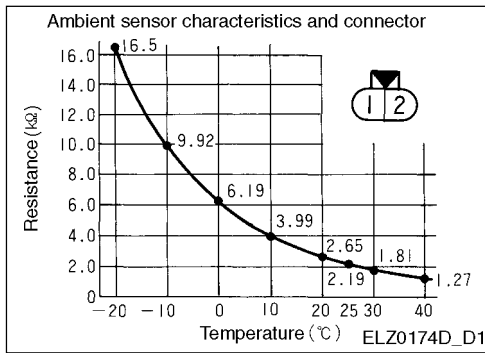
Inspection results are OK?

OK → End

NG → ● Defective ambient sensor: Refer to “Ambient Sensor” (AC-26).

● Defective in-vehicle sensor: Refer to “In-Vehicle Sensor” (AC-26).

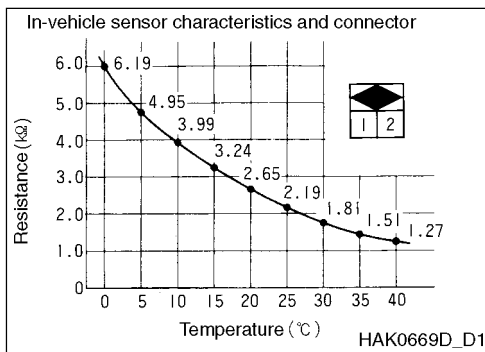
● Defective intake air temperature sensor: Refer to “Intake Air Temperature Sensor” (AC-27).



Ambient Sensor

AMBIENT SENSOR INSPECTION

Remove the connector and measure the resistance between the ambient sensor terminal No. 1 and No. 2.



In-Vehicle Sensor

IN-VEHICLE SENSOR INSPECTION

Remove the connector and measure the resistance between the in-vehicle sensor terminal No. 1 and No. 2.

Sunload Sensor

INSPECTION PROCEDURE

1. Power Inspection

After turning the key switch ON, remove the sunload sensor connector and measure the voltage between the terminal No. 1 and body ground.

Terminal No. 1 and body ground: Approx. 5 V

Inspection results are OK?

OK → Go to No. 2.

NG → Go to No. 4.

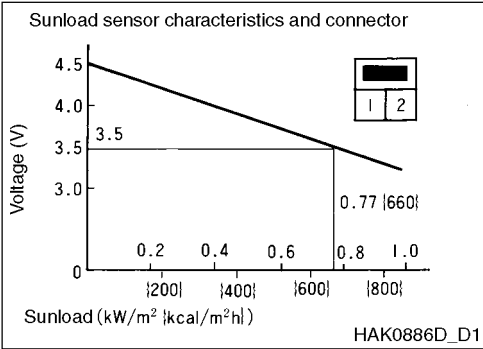
2. Circuit Inspection

1. Remove the auto amp connector.
2. Check the continuity between the sunload sensor terminal No. 2 and auto amp terminal No. 11.

Is there continuity?

OK → Go to No. 3.

NG → Repair the harness or connector.



3. Sunload Sensor Inspection

Measure the voltage between the auto amp terminal No. 12 and body ground.

REFERENCE:

- While indoors, measure the voltage by moving around a 60 W light.
- On a sunny day, the sun load will be around 767 W/m² (660 kcal/m²·h).

Inspection results are OK?

OK → 1. Replace the auto amp.
2. Perform the self-diagnosis step 2 and check if normal.
Refer to “Self-Diagnosis Function” (AC-22).

NG → 1. Replace the sunload sensor.
2. Perform the self-diagnosis step 2 and check if normal.
Refer to “Self-Diagnosis Function” (AC-22).

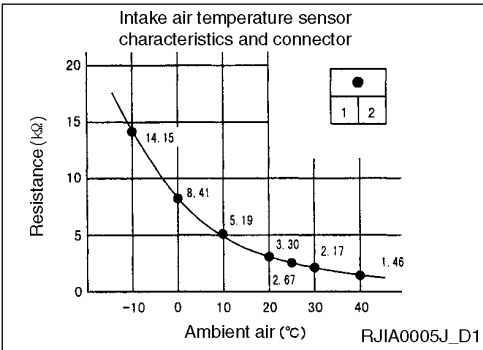
4. Circuit Continuity Inspection

1. Remove the auto amp connector.
2. Check the continuity between the sunload sensor terminal No. 1 and auto amp terminal No. 12.

Is there continuity?

OK → 1. Replace the auto amp.
2. Perform the self-diagnosis step 2 and check if normal.
Refer to “Self-Diagnosis Function” (AC-22).

NG → Repair the harness or connector.



Intake Air Temperature Sensor

INTAKE AIR TEMPERATURE SENSOR INSPECTION

Remove the connector and measure the resistance between the intake air temperature sensor terminal No. 1 and No. 2.

Blower Fan Motor System

INSPECTION PROCEDURE

Symptom: Blower fan motor operates abnormally

1. Blower Fan Motor Relay Inspection

Check the continuity between terminals No. 3 and No. 5 when applied 12 V on the blower fan motor relay terminal No. 1 and No. 2 after removing the blower fan motor relay.

Inspection results are OK?

OK → Go to No. 2.

NG → Replace the blower fan motor relay.

2. Auto Amp Output Inspection

Measure the voltage change between the fan control amp terminal No. 1 and No. 2 by changing fan speed from 1 to 4 after turning the key switch ON.

	1	2	3	4
Terminal No. 1	Approx. 8 V	Approx. 5.5 V	Approx. 3 V	Approx. 0 V
Terminal No. 2	Approx. 2.5 - 3.0 V			Approx. 9.0 V

Inspection results are OK?

OK → Go to No. 2.

NG → Go to No. 3.

3. Fan Control Amp Inspection

1. Remove the fan control amp connector.
2. Check the continuity between the fan control amp terminal No. 2 and No. 3.

Is there continuity?

OK → Go to No. 3.

NG → ● Replace the fan control amp.

- Check if the blower fan motor is locked or shorted.

4. Blower Fan Motor Inspection

Remove the blower fan motor connector. Short the blower fan motor terminal No. 2 and apply 12 V on the terminal No. 1 to check the motor operation.

Inspection results are OK?

NG → Replace the blower fan motor.

Magnet Clutch System

INSPECTION PROCEDURE

1. Magnet Clutch Inspection

Remove the compressor connector. Check the magnet clutch operation by applying 12 V on the compressor terminal No. 1.

1 ~ Body ground: Power voltage

Inspection results are OK?

OK → Go to No. 2.

NG → Replace the magnet clutch.

2. A/C Relay Inspection

Check the continuity between the terminal No. 3 and No. 5 when 12 V is applied on A/C relay terminal No. 1 and No. 2.

Is there continuity?

OK → Go to No. 3.

NG → Repair the harness or connector.

LAN System

Symptom:

One or all of the mode door actuator, intake door actuator, air mix door actuator is not operating normally.

INSPECTION PROCEDURE

1. Auto Amp Power Circuit Inspection

Measure the voltage between auto amp terminal No. 21 and body ground.

21 ~ Body ground: Power voltage

Inspection results are OK?

OK → Go to No. 2.

NG → Replace the auto amp.

2. Auto Amp Signal Circuit Inspection

Check the output wave of auto amp terminal No. 16. Refer to "Auto Amp Input/Output Signal Standards" (AC-21).

Inspection results are OK?

OK → Go to No. 3.

NG → Replace the auto amp.

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3. Actuator Power Circuit Inspection

Measure the voltage between corresponding actuator's terminal No. 1 and body ground.

1 ~ Body ground: Power voltage

Inspection results are OK?

OK → Go to No. 4.

NG → Repair the harness or connector.

4. Actuator Signal Circuit Inspection

Check the output wave of the corresponding actuator's terminal No. 2. Refer to "Auto Amp Input/Output Signal Standards" (AC-21).

Inspection results are OK?

OK → Go to No. 5.

NG → Repair the harness or connector.

5. Actuator Ground Circuit Inspection

Check the continuity between the corresponding actuator's terminal No. 2 and body ground.

Inspection results are OK?

OK → Go to No. 6.

NG → Repair the harness or connector.

6. Actuator Operation Inspection.

Remove the corresponding actuator connector and then check the actuator operation by reconnecting.

Inspection results are OK?

OK → Bad actuator connector connection.

NG → Go to No. 7.

7. Intake Door Actuator Abnormal Signal Inspection

1. Remove all intake, air mix, mode door actuator connectors.

2. Connect the air mix and mode door actuator connectors.

3. Check the mode door and air mix door actuator operation.

Inspection results are OK?

OK → Replace the intake door actuator.

NG → Go to No. 8.

8. Air Mix Door Actuator Abnormal Signal Inspection

1. Remove all intake, air mix, mode door actuator connectors.

2. Connect the intake and mode door actuator connectors.

3. Check the intake and mode door actuator operation.

Inspection results are OK?

OK → Replace the air mix door actuator.

NG → Go to No. 9.

9. Mode Door Actuator Abnormal Signal Inspection

1. Remove all intake, air mix, mode door actuator connectors.
2. Connect the intake and air mix door actuator connectors.
3. Check the air mix and intake door actuator operation.

Inspection results are OK?

OK → Replace the mode door actuator.

NG → Replace the auto amp.

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Intake Door Actuator System

Symptoms

- The intake door does not change.
- The intake door motor does not operate normally.

EC

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INSPECTION PROCEDURE

Symptoms

- The intake door actuator does not operate normally.
- Refer to “LAN System” (AC-29).

RS

Mode Door Actuator System

AC

INSPECTION TIPS

Symptoms

- The air outlet does not change.
- The mode door actuator does not operate normally.

AV

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Refer to “LAN System” (AC-29).

WH

Air Mix Door Actuator System**INSPECTION TIPS**

Symptoms

- Discharging air temperature does not change.
- The air mix door actuator does not operate.

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Refer to “LAN System” (AC-29).

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Air Mix Door Actuator PBR System**INSPECTION TIPS**

Symptoms

- Open or short in PBR circuit.
- Refer to “LAN System” (AC-29).

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Bad Cooling

BR

PERFORMANCE CHECK**INSPECTION PROCEDURE**

1. Connect the manifold gage to the vehicle's cooler cycle (service valve).
2. Install a wet and dry thermometer to the aspirator (below the glove box) in the blower unit and a thermometer at the right side of the center vent.
3. Start the engine to warm up the system.
4. After warming up the engine, check if the engine speed is in specified RPM.

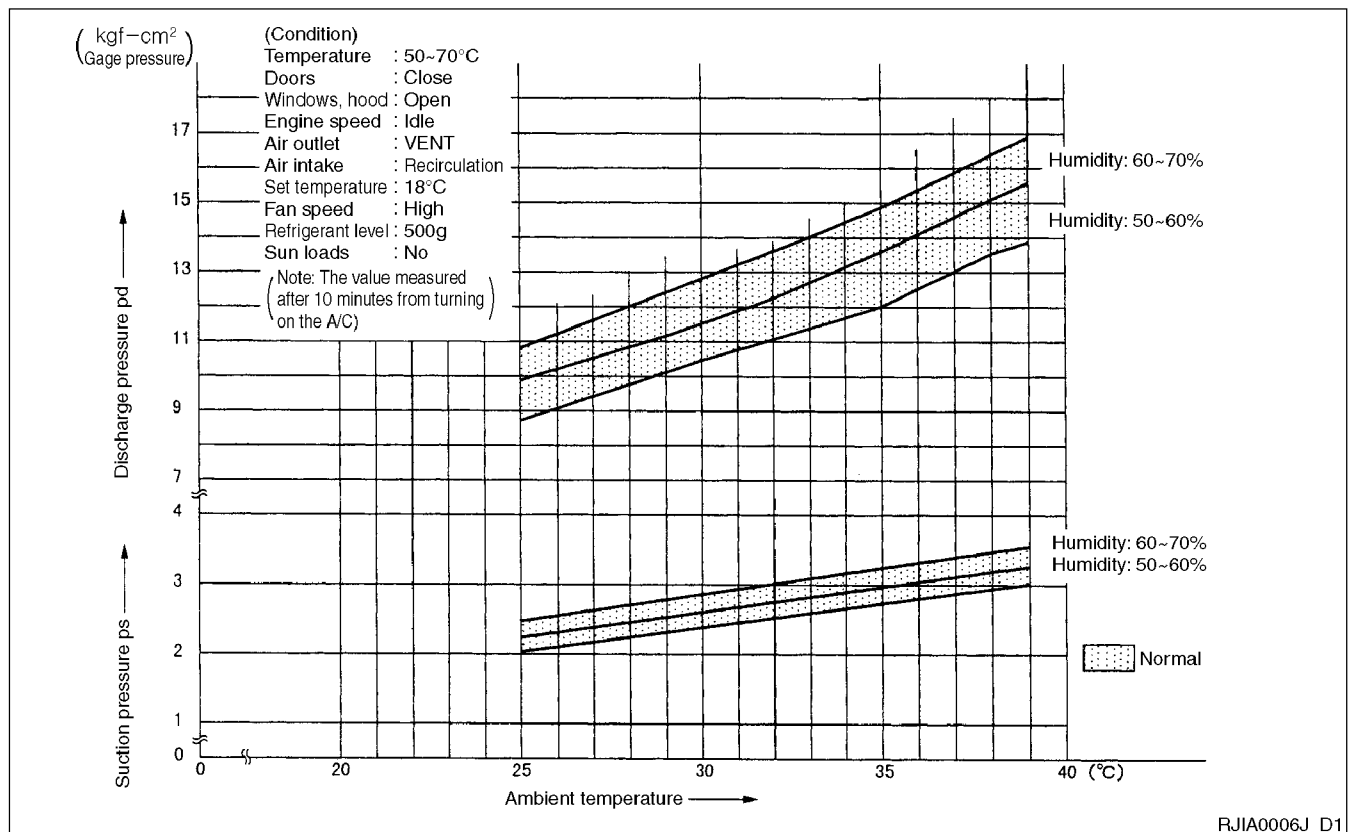
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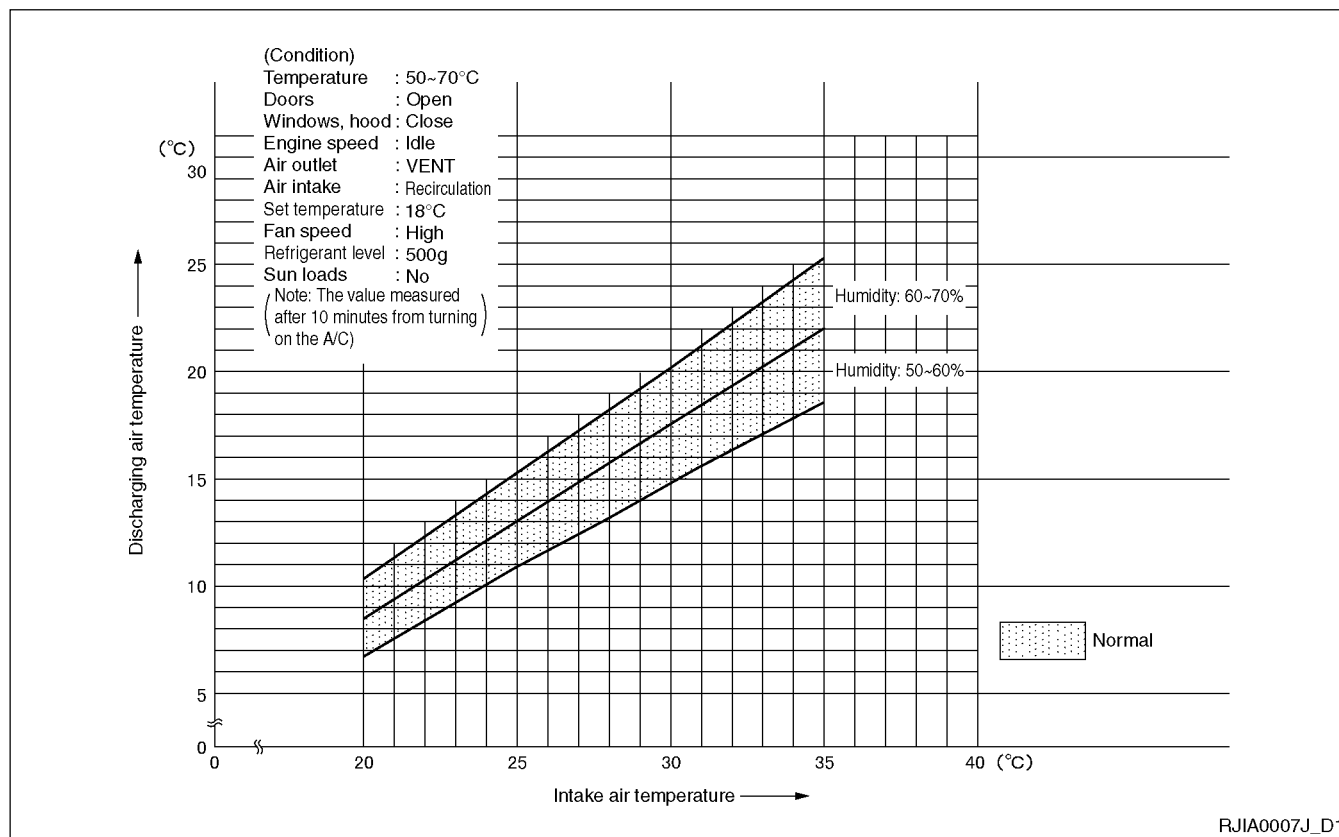
5. Operate the compressor and then set to the below conditions by using controller.
 Fan Speed: Hi
 Air intake mode: Recirculation
 Air outlet: VENT(Ventilator)
 Set temperature: Full cold
6. Open the hood and all door windows but close all doors.
7. Maintain this condition until cooler cycle stabilizes (about 10 minutes).
8. Idle the engine.
9. Measure the aspirator's temperature and humidity, air outlet temperature and high and low pressure of the cooler cycle. And then judge the system by combining them with "Ambient Air Temperature-Pressure Characteristics" and "Intake and Discharge Air Temperature Characteristics".

PERFORMANCE CURVE

Ambient air temperature - pressure characteristics



INTAKE AND DISCHARGE AIR TEMPERATURE CHARACTERISTICS



Trouble Diagnosis Using Gage Pressure

Connect the manifold gage to the cooler cycle (service valve) then isolate defective component and possible cause by reading cooler cycle pressure.

Symptoms	Cycle Status	Possible Cause	Remedy
Both low and high pressures are high	When poured water to condenser, it returns to normal	Bad cooling of condenser <ul style="list-style-type: none"> ● Bad operation of radiator and condenser fan ● Bad installation of air guide ● Dirty or clogged condenser fin 	<ul style="list-style-type: none"> ● Repair or replace the defective components ● Clean and repair the condenser fin
		Overcharged refrigerant	Evacuate refrigerant and then recharge to the specified value
	When compressor is stopped, the pressure drops to 2 kg/cm ² and then decreases gradually	Air in the cooler cycle	Evacuate refrigerant and then recharge to the specified value
	Frost is formed in the low-pressure pipe or low-pressure pipe is colder than the evaporator outlet	Excessive opening of the expansion valve (Excessive flow of refrigerant)	Replace the expansion valve
High pressure is extremely high	Temperature is different on where high-pressure pipe is damaged or clogged	High-pressure pipe between the compressor and condenser is damaged or clogged	Repair or replace the defective components

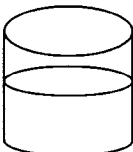
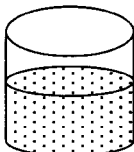
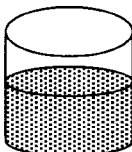
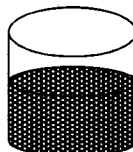
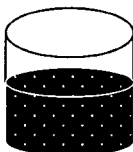
Symptoms	Cycle Status	Possible Cause	Remedy
Both low and high pressures are low (Sometimes, even negative value)	Evaporator outlet is not cold Frost is formed at the evaporator inlet	Clogged expansion valve <ul style="list-style-type: none"> Gas leak at temperature detecting section Clogged by foreign particles 	Remove foreign particles at expansion valve or replace the unit
	Temperature differences in the liquid tank outlet pipe. Frost is formed in the liquid tank	Bad liquid tank (Clogged strainer)	Replace the liquid tank
	Frost is formed in the evaporator	Clogged or damaged evaporator fins	Repair or replace
		Lack of air flow	Replace the blower unit
	Slight temperature differences in the compressor high-pressure and low-pressure pipes	Lack of refrigerant	<ul style="list-style-type: none"> Inspect for refrigerant leakage Evacuate refrigerant and then recharge to the specified value
Sometimes high-pressure is low and low-pressure becomes negative	Sometimes the evaporator outlet is not cold Sometimes frost is formed in the evaporator inlet	Water in the cooler cycle (Clogged due to moisture formed by the expansion valve)	Evacuate refrigerant and then recharge to the specified value after dehumidifying. Always replace the liquid tank
High-pressure is low and low-pressure is high	When compressor is stopped, both pressures become to the same value at once No temperature differences between the high-pressure and low-pressure pipes	Bad compressor (Bad compression) <ul style="list-style-type: none"> Damaged or broken valve Bad gasket 	Replace the compressor

Compressor Trouble Diagnosis

When compressor assembly is defective (noise, bad cooling), diagnose as below.

Symptoms	Object	Method	Result	Remedy
Noise occurs from compressor assembly while A/C ON	Pressure in the cooler cycle	Inspect using manifold gage	-	Recharge to the specified value
			-	Replace compressor only
Bad cooling (Note 1)	Inspect compressor oil status	Determine after draining compressor oil	Determine by referring "AC-35"	Determination 1: Replace compressor only Determination 2: Replace compressor and liquid tank
	Compressor assembly	Check compressor operation. If burnt or stuck, determine after draining compressor oil		
	Pressure in the cooler cycle	Inspect using manifold gage. If pressure difference between the high-pressure and low-pressure is small, determine after draining compressor oil		
Discharging temperature temporarily increases while driving (Note 2)	-	-	-	Replace compressor only

Note 1: Perform the inspection according to symptom diagnosis.

Compressor oil contamination				
 <p>Clear No foreign particles</p>	 <p>Gray but near clear No foreign particles</p>	 <p>Light gray No foreign particles</p>	 <p>Gray Foreign particles</p>	 <p>Black Foreign particles</p>
Determination 1			Determination 2	
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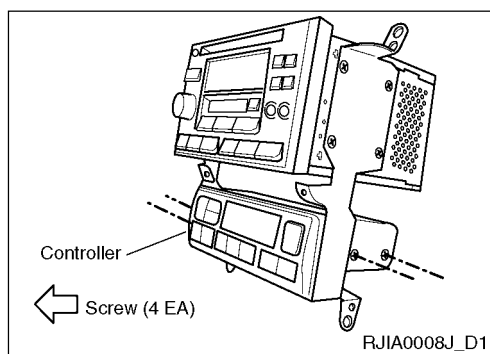
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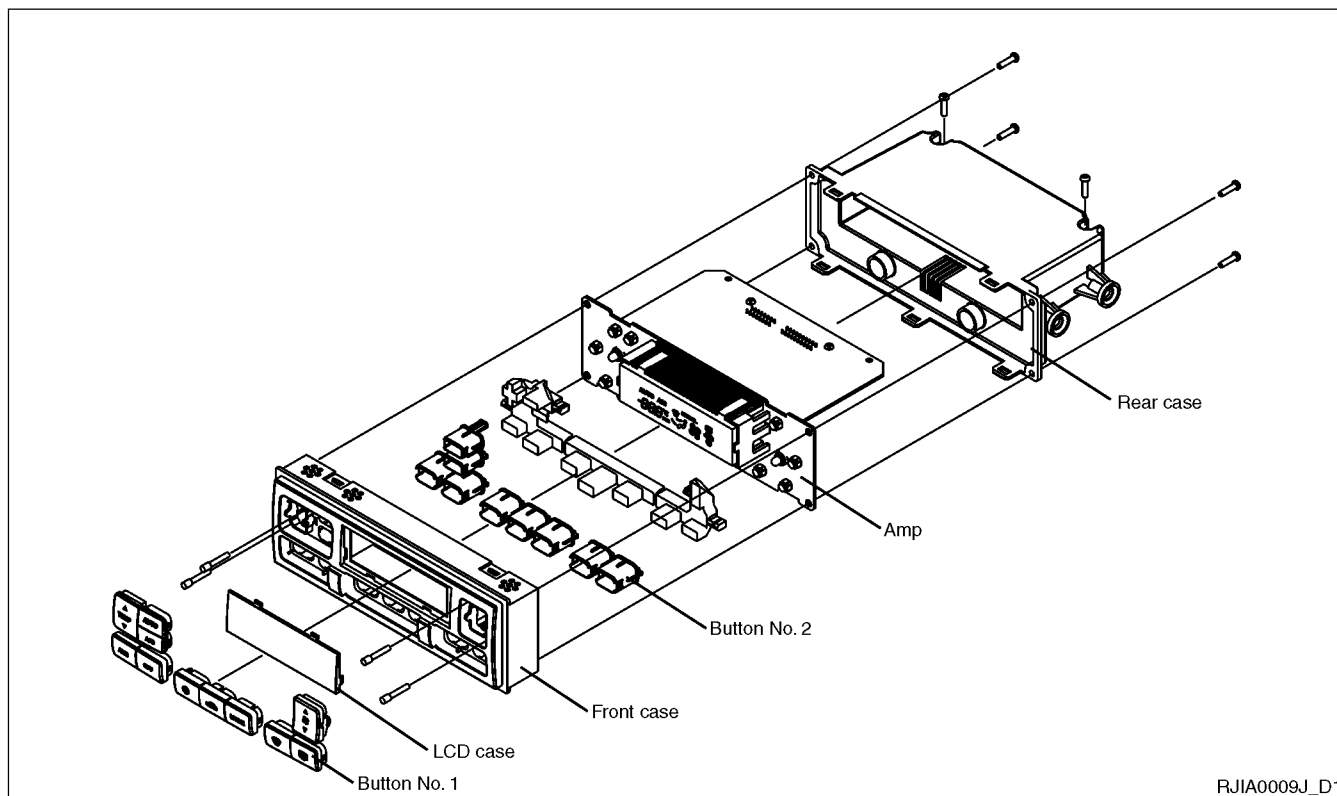
Controller

Removal • Installation

1. Remove the audio assembly.
2. Remove the controller.

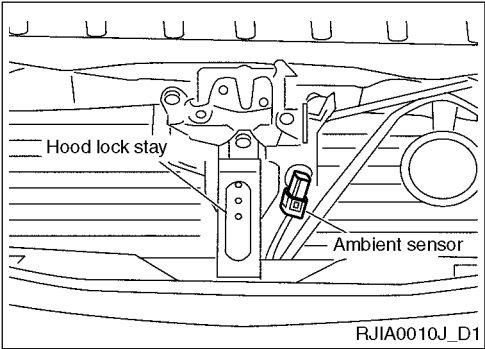


Disassembly • Assembly



Ambient Sensor

Removal • Installation



REMOVAL

FRONT

- 1. Remove the radiator grille. Refer to “FRONT GRILL” (BT-22).
- 2. Remove the ambient sensor.

INSTALLATION

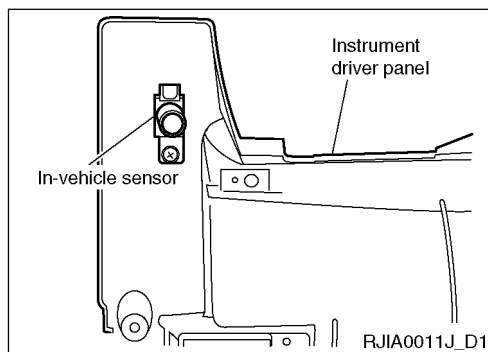
Install in the reverse order of removal.

- GI
- EM
- LC
- EC
- FE
- RS
- AC
- AV
- EL
- WH
- CL
- MT
- AT
- FA
- RA
- BR
- ST
- BT

In-Vehicle Sensor

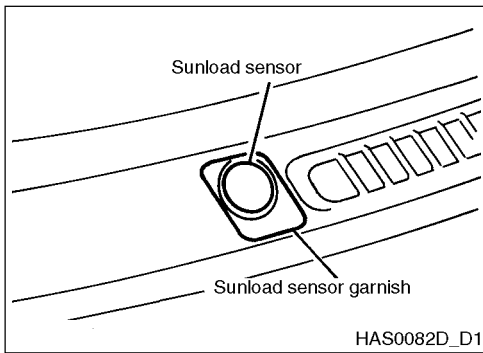
Removal • Installation

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



Sunload Sensor**Removal • Installation**

1. Remove the sunload sensor garnish.
2. Remove the sunload sensor.



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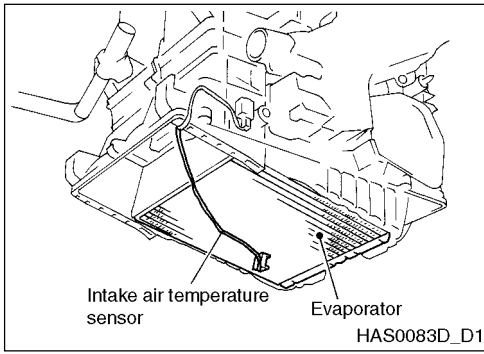
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Intake Air Temperature Sensor



Removal • Installation

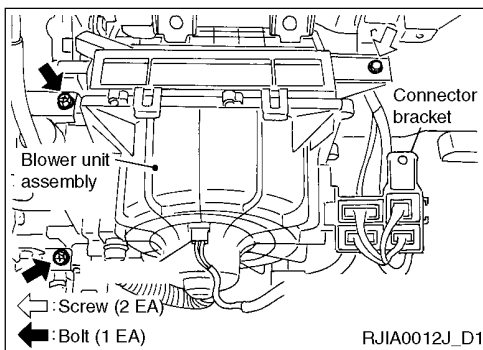
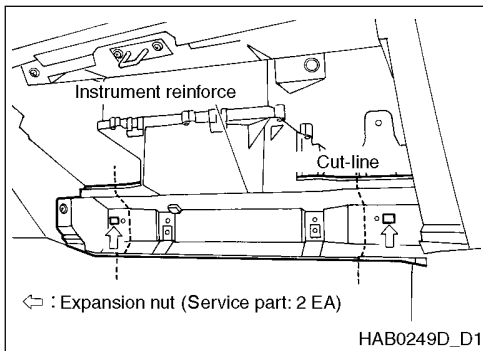
1. Remove the heater and cooling unit assembly lower case.
2. Remove the intake air temperature sensor.

Blower Unit Assembly

Removal • Installation

REMOVAL

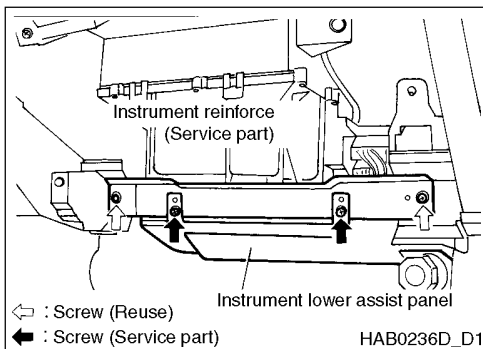
1. Remove the glove box assembly.
2. Pry off the glove box cover and instrument lower assist panel.
3. Cut the instrument reinforce following the cut-line and smoothen the edges.



4. Remove the intake door actuator connector.
5. Remove the connector and connector bracket from blower fan motor.
6. Remove the 2 screws and 1 bolt and then remove the blower unit.

CAUTION:

- Push the blower unit towards the left and pull out the 2 positioning pins, then remove downwards.



REMOVAL

CAUTION:

- Install the instrument reinforce (service part).
- Check if 2 positioning pins are securely located.

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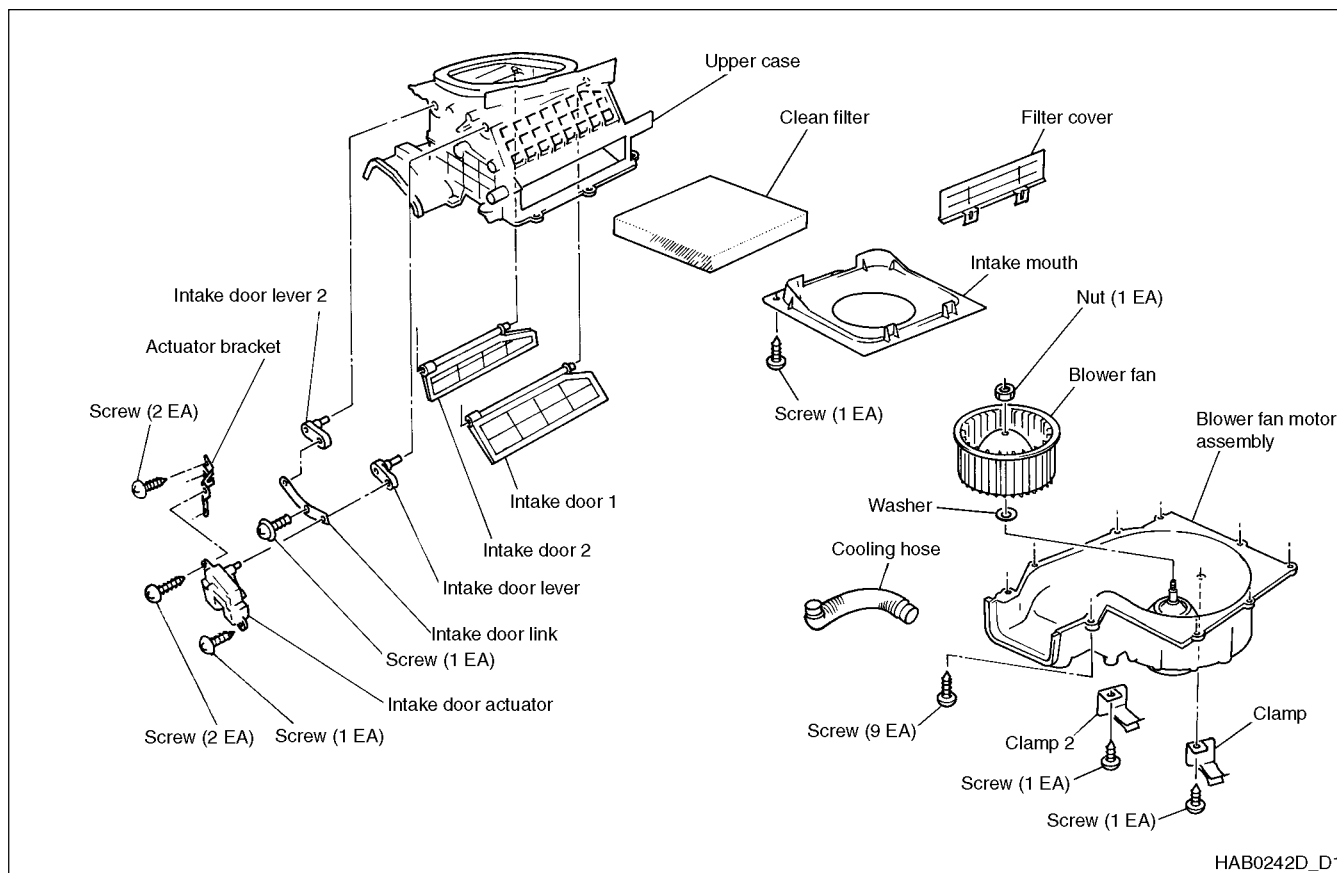
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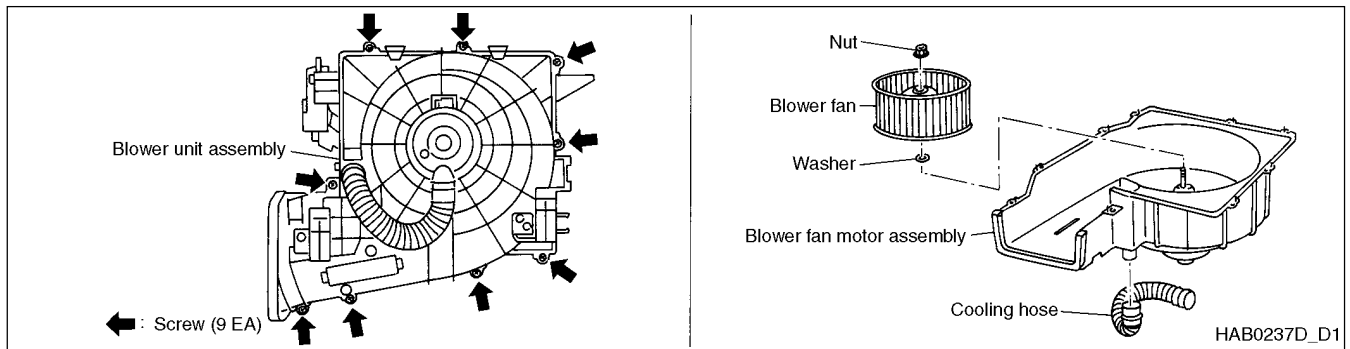
Disassembly • Assembly



Blower Fan Motor

Removal • Installation

1. Remove the blower unit assembly.



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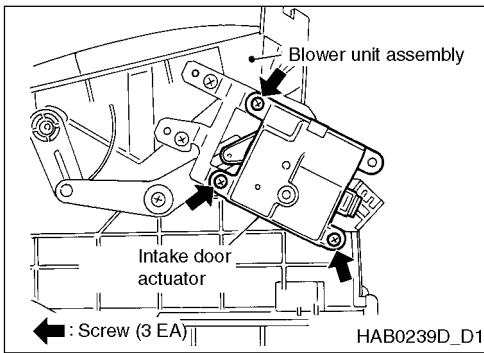
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Intake Door Actuator

Removal • Installation

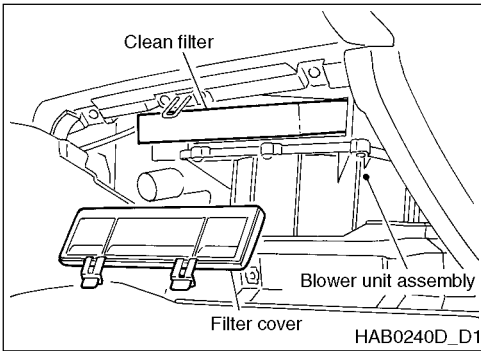
1. Remove the blower unit assembly.
2. Remove the intake door actuator.



Clean Filter

Removal • Installation

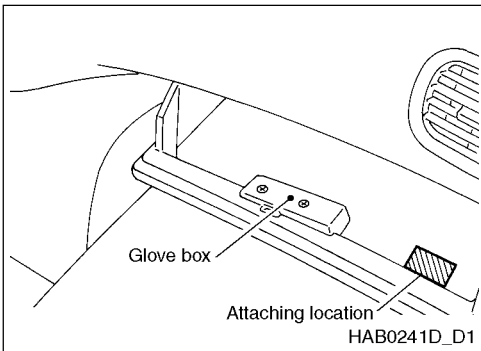
1. Remove the glove box.
2. Remove the clean filter.



Replacement

Clean filter replacement: Refer to MA section.

- Record on the label and attach to the illustrated location on the glove box.



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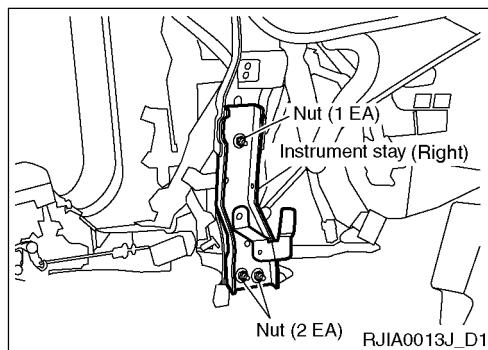
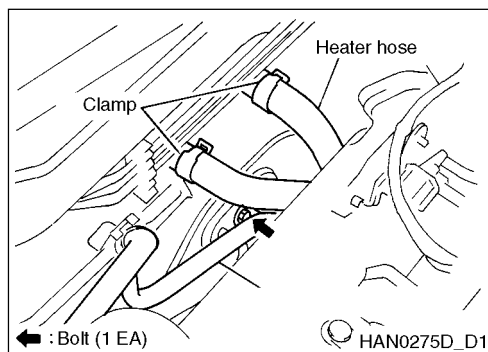
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Heater & Cooling Unit Assembly



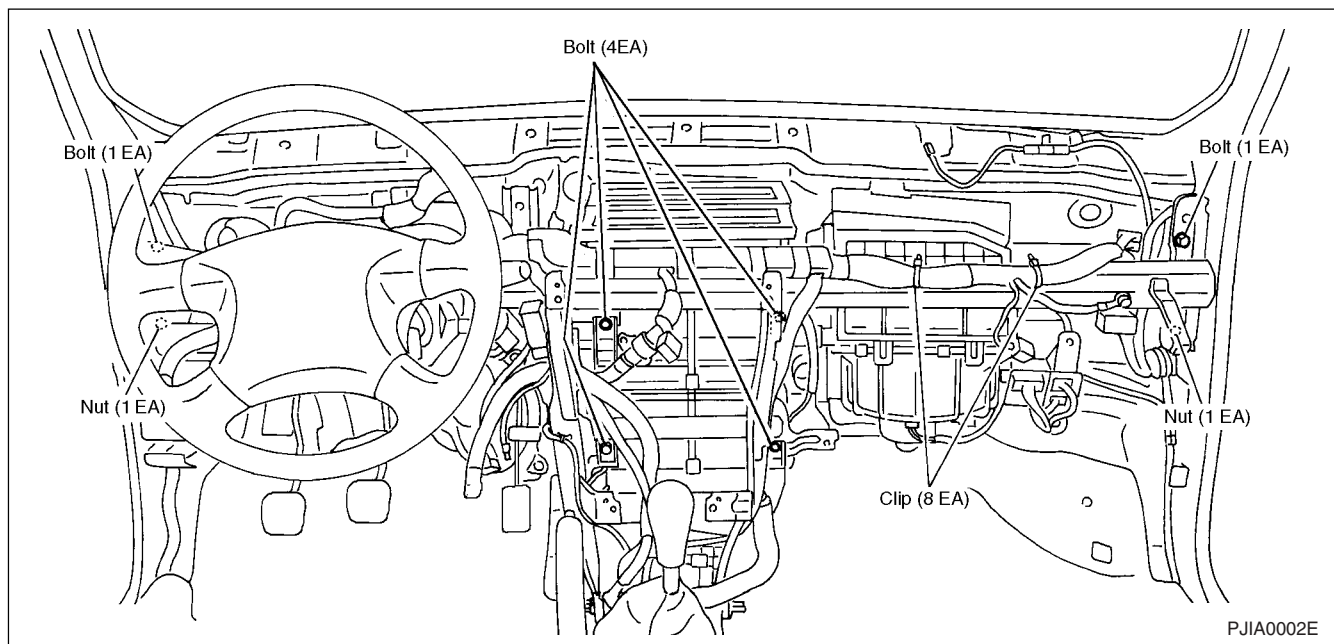
Removal • Installation

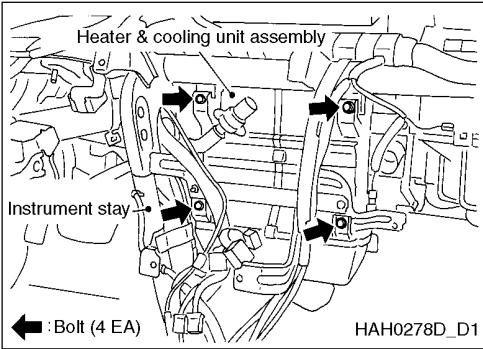
REMOVAL

1. Trap the refrigerant using a refrigerant-recovery station (for HFC134a).
2. Drain the engine coolant.
3. Disconnect the low-pressure flexible hose and high-pressure pipe from the evaporator.
4. Remove the heater hose from the heater core.

CAUTION:

- Some coolant will leak when removing the heater hose.
 - Block the coolant inlet/outlet on the heater core with a cloth.
5. Remove the instrument assembly.
 6. Remove the blower unit assembly.
 7. Remove the clip from vehicle harness and remove the instrument stay (right: 4 nuts, left: 3 nuts).





- 8. Remove the heater & cooling unit assembly mounting bolts.
- 9. Remove the steering member and the heater & cooling unit assembly.

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Installation

- 1. Install the heater & cooling unit assembly.
Heater & cooling unit assembly mounting bolt
Tightening torque: 5.98 - 7.64 N•m (0.61 - 0.78 kgf-m)
- 2. Reverse the removal steps 3~7 to install.
Steering member mounting nuts and bolts
Tightening torque: 10.87 - 13.72 N•m (1.1 - 1.4 kgf-m)
- 3. Refill the engine coolant.
- 4. Recharge the refrigerant using a refrigerant-recovery station (for HFC134a).

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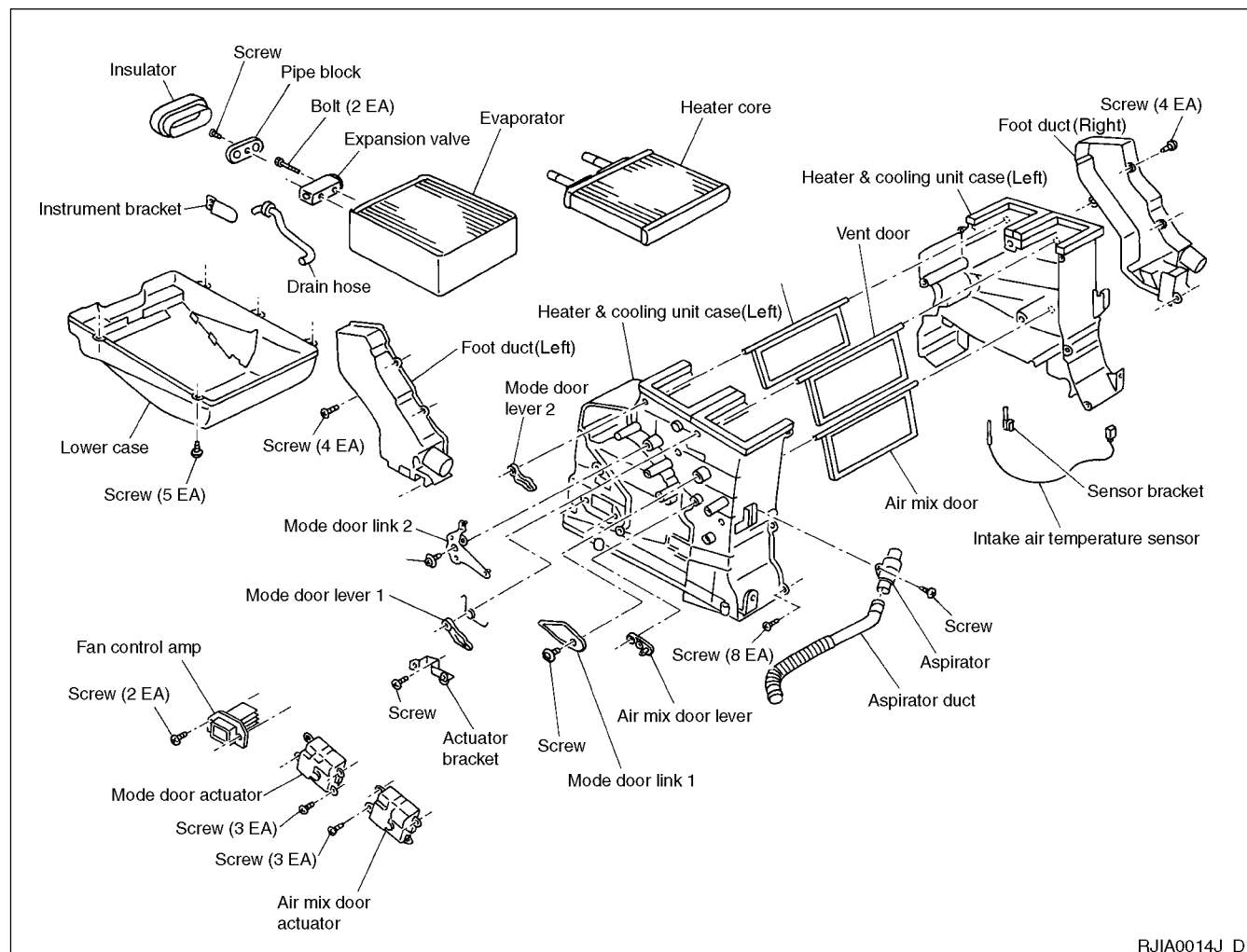
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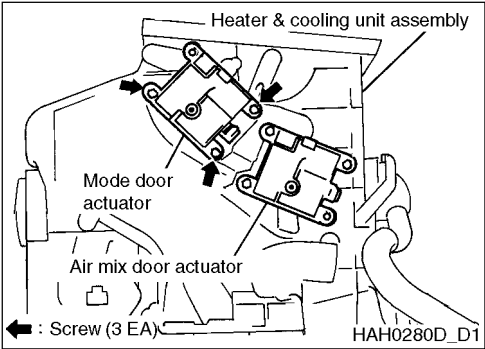
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Disassembly • Assembly



Mode Door Actuator



Removal • Installation

1. Remove the instrument lower driver panel.
2. Remove the mode door actuator.

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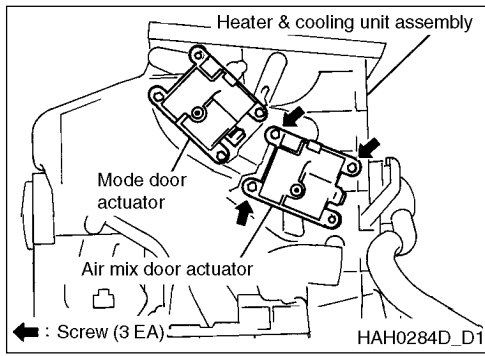
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Air Mix Door Actuator



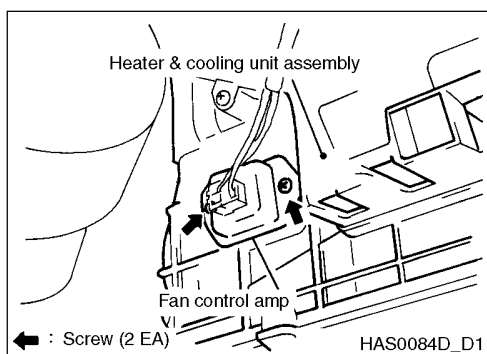
Removal • Installation

1. Remove the instrument lower driver panel.
2. Remove the air mix door actuator.

Fan Control Amp

Removal • Installation

1. Remove the glove box.
2. Remove two fixing screws.
3. Remove the fan control amp.



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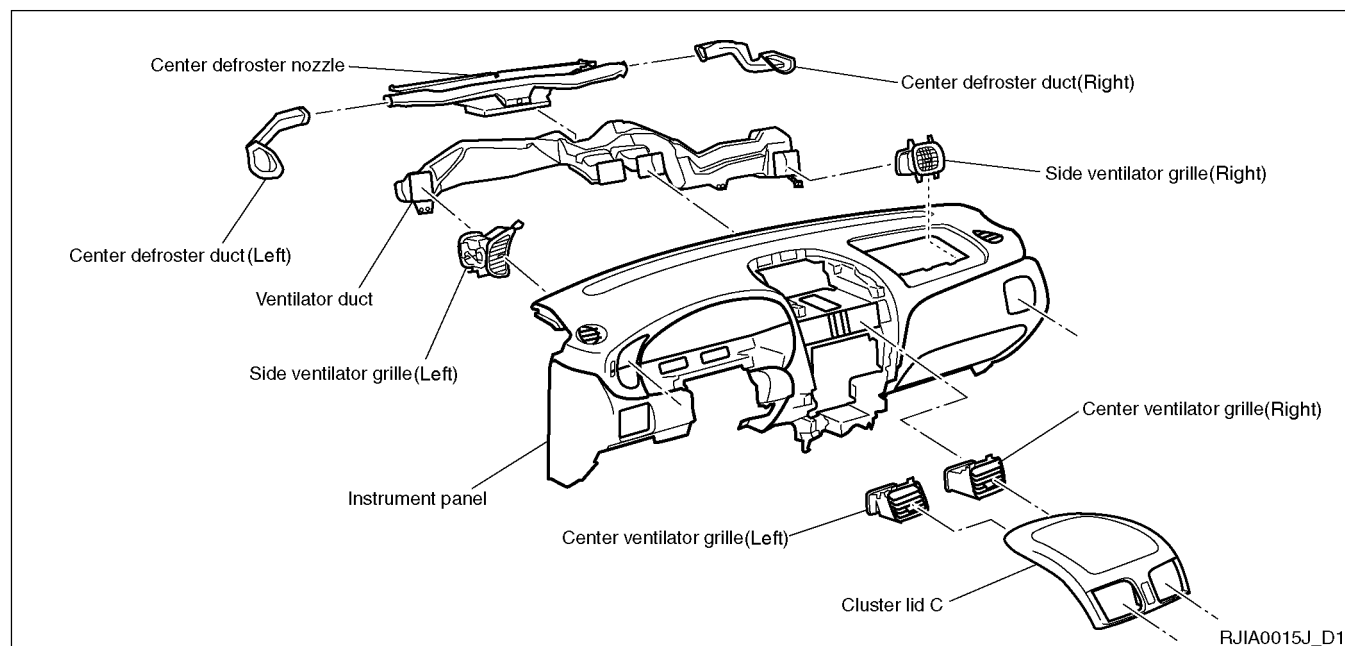
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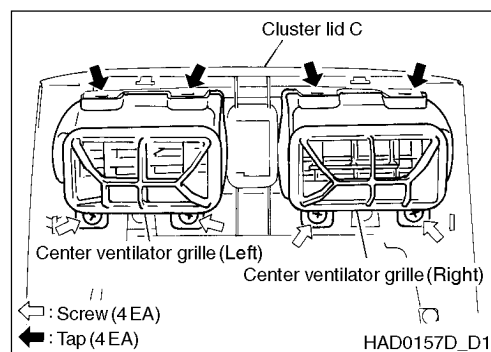
Duct and Grille

Removal • Installation

Ventilator duct, Defroster nozzle and duct

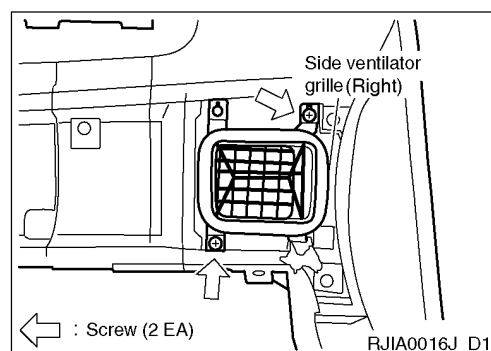


1. Remove the instrument panel.



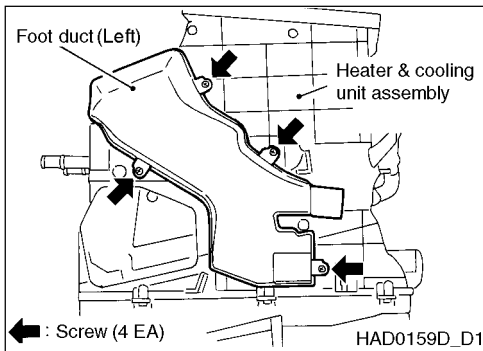
Center Ventilated Grille

1. Remove the cluster lid C.
2. Remove the center ventilator grille.



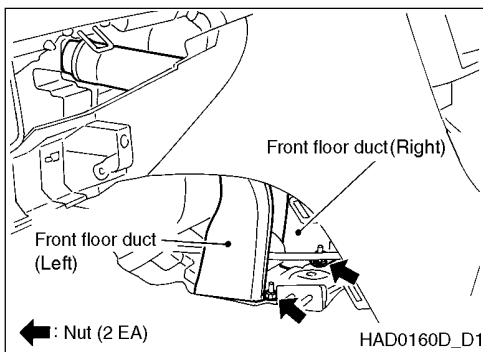
Side Ventilator Grille

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



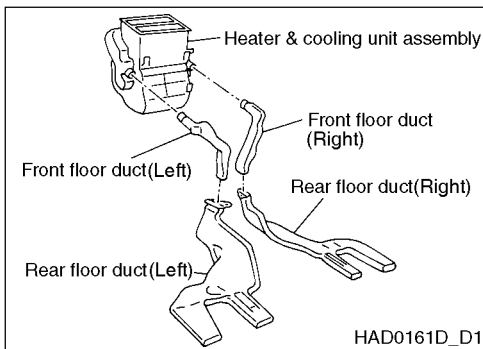
Foot Duct

1. Remove the heater & cooling unit assembly.
2. Remove the foot duct.



Blower Duct

1. Remove the instrument lower cover and glove box.
2. Remove the instrument lower driver panel.
3. Remove the console and instrument stay (left).
4. Remove the front blower duct (left and right).
5. Remove the rear blower duct mounting nuts.
6. Remove the front seat, front kicking plate and dash side finisher.



7. Strip the blower trim from both sides of the vehicle and remove the rear blower duct (left and right).

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Fluids and Refrigerant

Item	Application	Use	Remark
Refrigerant can	All	Charging refrigerant	
NISSAN A/C System Oil Type R 40 cm ³	QG engine	Adding compressor oil	DHC

Refrigerant System

Refrigerant Cycle

REFRIGERANT CYCLE

The refrigerant returns to the compressor through compressor, condenser, liquid tank and evaporator. The refrigerant evaporation inside the evaporator is controlled by the expansion valve.

GI

EM

FREEZING PROTECTION

The compressor operates so that it can maintain the evaporator temperature to the specified range. If the evaporator temperature goes under the specified value, then the auto amp stops the compressor. Also, if the evaporator temperature goes above the specified value, then the auto amp operates the compressor.

LC

EC

Refrigerant System Protection

REFRIGERANT PRESSURE SENSOR

FE

- The A/C refrigerant system is protected from high or low pressure by the refrigerant pressure sensor on the liquid tank.
- When abnormal pressure in the cooler cycle (approx. more than 2.7 Mpa [28 kgf/cm²•G] or less than 0.14 Mpa [1.4 kgf/cm²•G]) is detected, the refrigerant pressure sensor stops the compressor.

RS

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NOTE:

- The value in the parenthesis means gage pressure.

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Compressor Oil

Oil Level Adjustment

The compressor oil circulates in the system with refrigerant. When cooler cycle component is replaced or large amount of refrigerant is leaked, the compressor oil should be added. It is important to maintain proper oil level and if not properly maintained, the following troubles may occur.

- Lack of oil: Compressor sticks
- Excessive oil: Lack of cooling capacity (due to lack of heat exchange)

Oil specification: NISSAN A/C System Oil Type R (rotary type compressor)

Oil Return Operation

Adjust oil level as follows.

1. A/C System Inspection

1. Inspect if A/C system is normally operating.
2. Inspect if large amount of refrigerant or oil is leaked.

Inspection results are OK?

OK → Go to No. 1

NG → Go to No. 3

2. Oil Return Operation

1. Start the engine and maintain the following conditions.
 - Engine RPM: Idle to 1,200 RPM
 - A/C switch: ON
 - Fan speed: High
 - Set temperature: Full hot
2. Run the engine for about 10 minutes.
3. Stop the engine.

CAUTION:

- When refrigerant or oil is leaked a lot, do not perform the oil return operation.
→ Go to No. 3

3. Compressor Inspection

Replace the compressor?

YES → Go to "Oil Level Adjustment when Compressor is Replaced" (AC-57).

NO → Go to No. 4

4. Other Components Inspection

Replace other components? (evaporator, condenser, liquid tank or refrigerant or oil)

YES → Go to "Oil Level Adjustment when Other Components are Replaced" (AC-57).

NO → Perform performance check. Refer to "PERFORMANCE CHECK" (AC-31).

Oil Level Adjustment when Other Components are Replaced

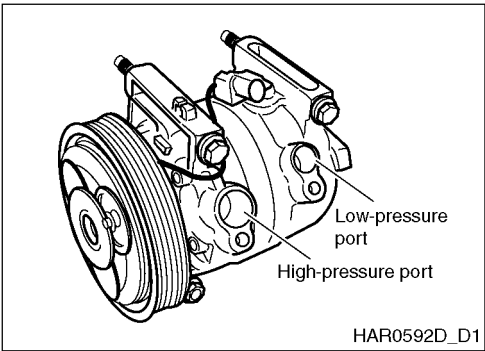
Add oil to the compressor using the high-pressure port as below.
The “α” stands for oil volume that has released with refrigerant when removing refrigerant.

Replacing Component	Adding capacity
Evaporator	75 + α cm ³
Condenser	35 + α cm ³
Liquid tank	10 + α cm ³

CAUTION:

- When several components are replaced, do not refill refrigerant and oil respectively.

Example: Evaporator and liquid tank refill (cm³) = 75 + 10 + α



Oil Level Adjustment When Compressor is Replaced

- Drain the compressor oil from the high-pressure port and low-pressure port and measure the volume. (The low-pressure port has a valve inside. Press it with a minus (-) screwdriver to drain the compressor oil.)
- Drain the compressor oil from the new compressor as below. The “α” stands for oil volume that has released with refrigerant when removing refrigerant.

Oil volume (cm³) drained from new compressor

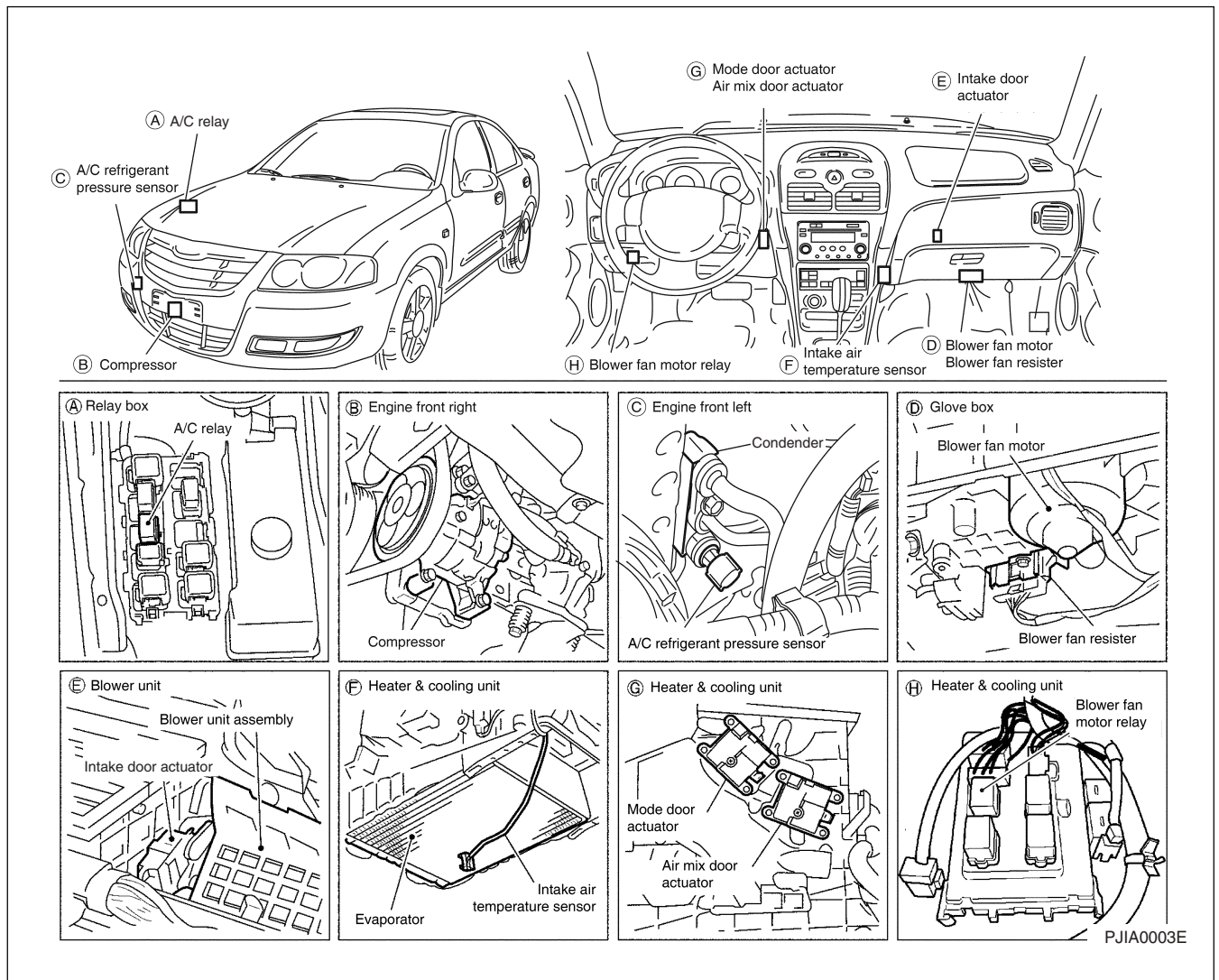
= Oil capacity of new compressor (180) - Drained oil from removed compressor - Remaining oil inside the compressor (20) - α

= 160 - Drained oil from removed compressor - α

Trouble Diagnosis
Troubleshooting Procedure
TROUBLE DIAGNOSIS BY SYMPTOMS

Symptom		Operation Check	Trouble Route	Possible Cause
No air from the vent No change in air volume		Check blower fan motor operation Refer to "Blower Fan Motor System" (AC-27)	Blower fan motor route	Defective blower fan motor
Bad temperature control	Common (Check this item for the following 2 symptoms)	Check if air mix door operates in full stroke by moving temperature control lever	Air mix door route	<ul style="list-style-type: none"> ● Bad installation of air mix door lever ● Defective air mix door system (broken or locked) Refer to "Air Mix Door Actuator System" (AC-31).
	No cold air (Fan speed is normal)	Check operation of magnet clutch under fan switch and A/C switch ON	Magnet clutch route	Refer to "Magnet Clutch System" (AC-29).
		<ul style="list-style-type: none"> ● Check refrigerant level ● Check performance 	Cooler cycle	<ul style="list-style-type: none"> ● Defective sensor ● Defective sensor harness ● Defective air mix door actuator ● Defective air mix door actuator harness
	No hot air (Fan speed is normal)	Heater core inlet/outlet hoses are not hot while heating	Coolant route	<ul style="list-style-type: none"> ● Defective cooling system ● Clogged heater hose or heater core
Air outlet does not change		Check if mode door moves in full stroke by operating mode switch	Mode door route	<ul style="list-style-type: none"> ● Bad installation of mode door lever ● Defective mode door system (broken or locked) Refer to "Mode Door Actuator System" (AC-31).
Air outlet does not change		Check if intake door moves in full stroke by operating REC switch	Intake door route	<ul style="list-style-type: none"> ● Bad installation of intake door lever ● Defective intake door system (broken or locked) Refer to "Intake Door Actuator System" (AC-31).

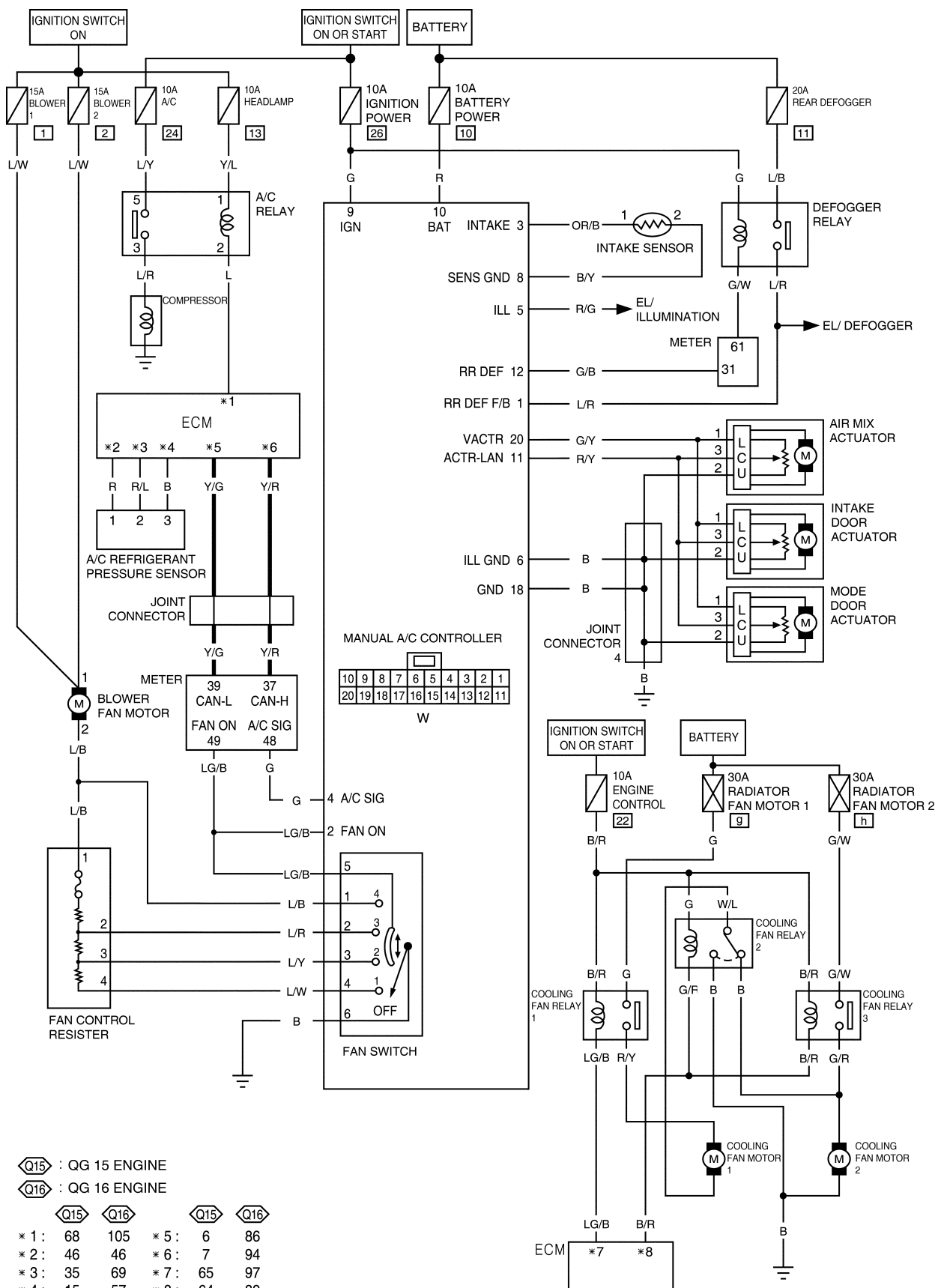
Components Location



Reference:

- The meter receives the compressor ON signal and the fan ON signal through the CAN communication from engine control unit and sends the signals to the AC control unit.

Circuit Diagram

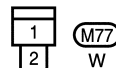
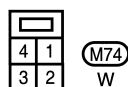
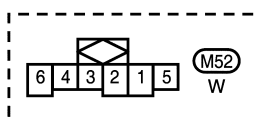
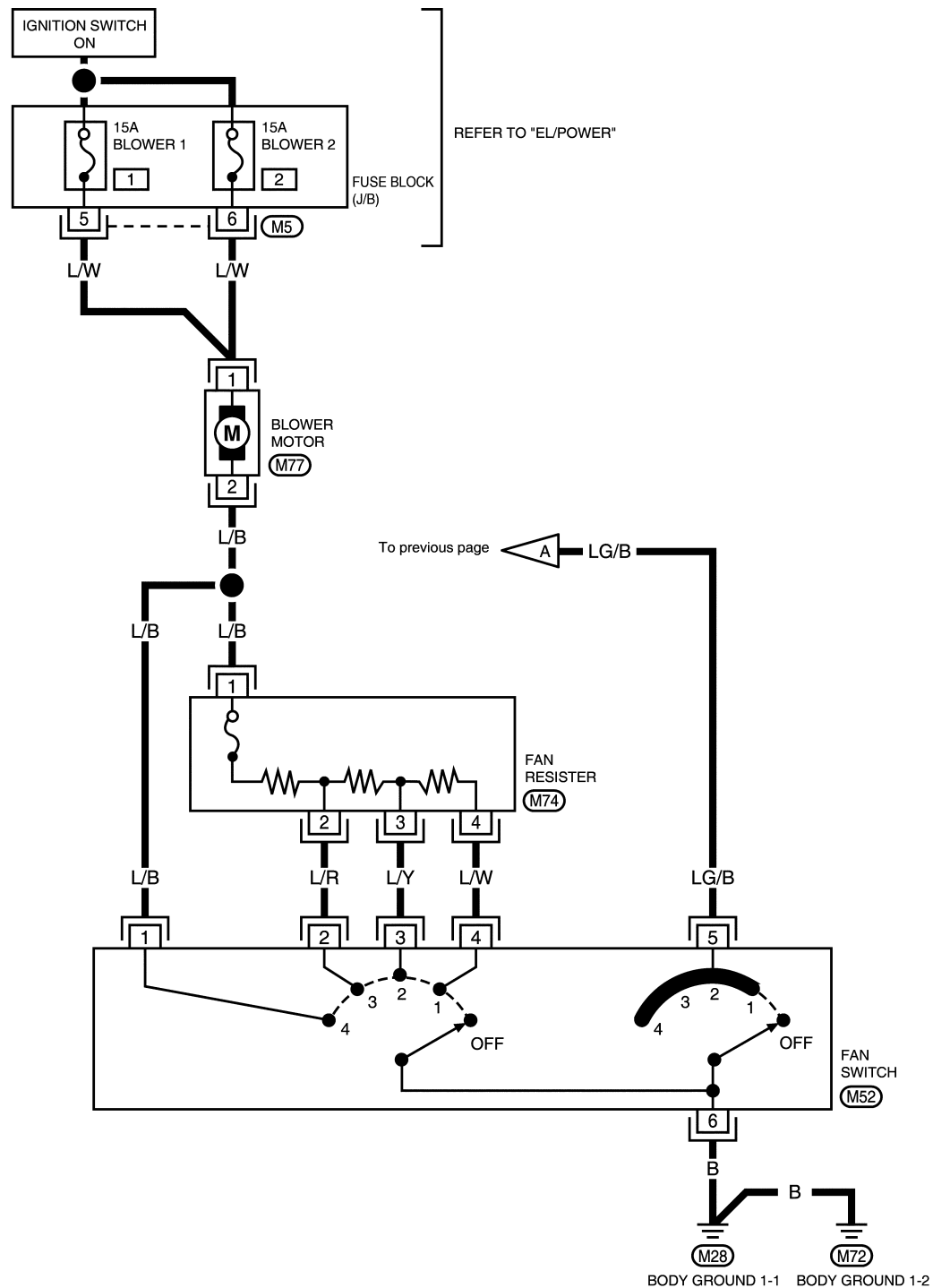


AC/MANUAL A/C-01



Wiring Diagram

AC/MANUAL A/C-03



REFER TO FUSE BLOCK (J/B)

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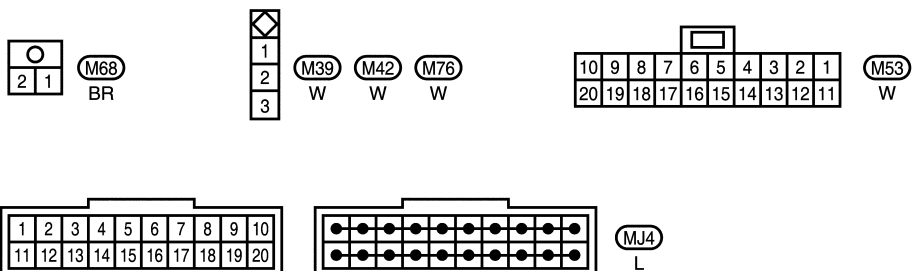
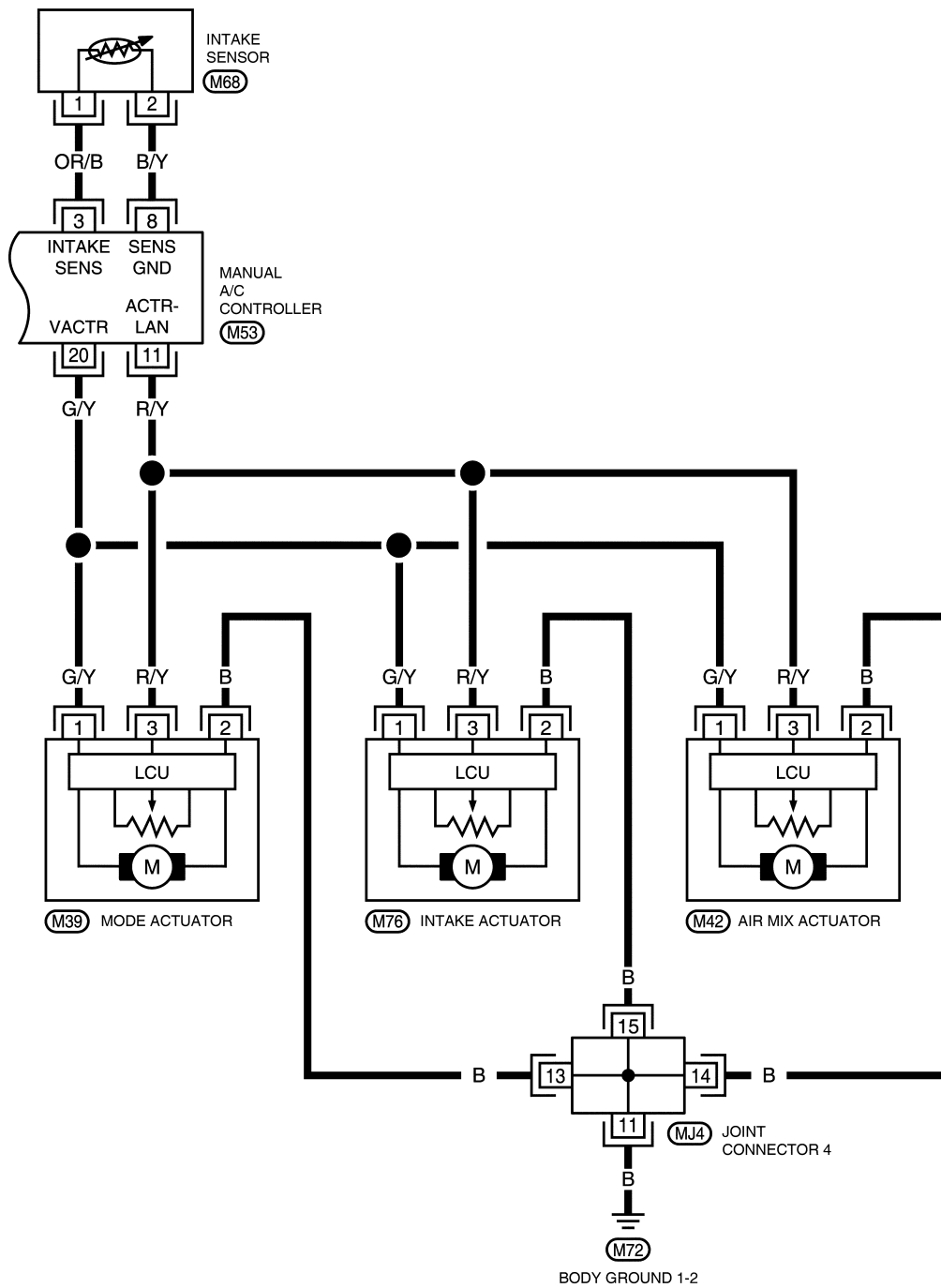
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AC/MANUAL A/C-05



Controller Input/Output Signal Standards

STANDARDS

Terminal No.	Signal	Measurement		Standard (V)
		Key switch	Operation	
9	IGN power	ON	-	Approx. 12
10	Battery power	OFF	-	Approx. 12
18	Body ground	ON	-	Approx. 0
4	Compressor ON signal	ON	Compressor: ON	Approx. 0
			Compressor: OFF	Approx. 4.8
20	Actuator drive power	ON	-	Approx. 12
8	Sensor ground	ON	-	Approx. 0
3	Intake air temperature sensor standard voltage	-	-	Note 1
6	Illumination ground	-	-	Approx. 0
5	Illumination power	ON	Light switch: Stage 1	Approx. 12
2	Fan ON signal	ON	Blower fan: ON	Approx. 0
			Blower fan: OFF	Approx. 4.8
11	LAN signal	ON	-	Approx. 5.7 (Note 2)

NOTE 1: Refer to “Intake Air Temperature Sensor” (AC-27).

NOTE 2: The value obtained by a tester.

Blower Fan Motor System

INSPECTION PROCEDURE

Symptom: Blower fan motor does not operate.

1. Blower Fan Motor Relay Inspection

- Check the relay operating sound after applying 12 V on the blower fan motor relay terminal No. 1 and No. 2.
- Check the continuity between terminals No. 3 and No. 5.

Inspection results are OK?

OK → Go to No. 2.

NG → Replace the blower fan motor relay.

2. Blower Fan Motor Inspection

Check the blower fan motor operation after applying 12 V on the blower fan motor terminal No. 1 and No. 2.

Inspection results are OK?

OK → Go to No. 3.

NG → Replace the blower fan motor.

3. Blower Fan Resister Inspection

Check the continuity between blower fan resister terminal No. 1 and No. 2, 3, 4.

Inspection results are OK?

OK → Go to No. 4.

NG → Replace the blower fan resister.

GI

EM

4. Blower Fan Switch Inspection

Remove the fan switch and check the continuity between fan switch terminal No. 5 and No. 1, 2, 3, 4, 6. **LC**

Inspection results are OK?

OK → End.

NG → Replace the fan switch.

EC

FE

Magnet Clutch System**INSPECTION PROCEDURE**

RS

1. Magnet Clutch Inspection

Remove the compressor connector. Check the magnet clutch operation by applying 12 V on the compressor terminal No. 1. **AC**

Inspection results are OK?

OK → Go to No. 2.

NG → Replace the magnet clutch.

AV

EL

2. A/C Relay Inspection

Check the continuity between the terminal No. 3 and No. 5 when 12 V is applied on A/C relay terminal No. 1 and No. 2. **WH**

Is there continuity?

OK → Go to No. 5.

NG → Replace the A/C relay.

CL

MT

LAN System

Symptom:

One or all of the mode door actuator, intake door actuator, air mix door actuator is not operating normally. **AT**

FA

INSPECTION PROCEDURE**1. Controller Power Circuit Inspection**

RA

Measure the voltage between controller terminal No. 20 and body ground.

20 ~ Body ground: Power voltage

BR

Inspection results are OK?

OK → Go to No. 2.

NG → Replace the controller.

ST

BT

2. Controller Signal Circuit Inspection

Check the output wave of the controller terminal No. 6. Refer to "Controller Input/Output Signal Standards" (AC-66).

Inspection results are OK?

OK → Go to No. 3.

NG → Replace the controller.

3. Actuator Power Circuit Inspection

Measure the voltage between corresponding actuator's terminal No. 1 and body ground.

1 ~ Body ground: Power voltage

Inspection results are OK?

OK → Go to No. 4.

NG → Repair the harness or connector.

4. Actuator Signal Circuit Inspection

Check the output wave of the corresponding actuator's terminal No. 3. Refer to "Controller Input/Output Signal Standards" (AC-66).

Inspection results are OK?

OK → Go to No. 5.

NG → Repair the harness or connector.

5. Actuator Ground Circuit Inspection

Check the continuity between the corresponding actuator's terminal No. 2 and body ground.

Inspection results are OK?

OK → Go to No. 6.

NG → Repair the harness or connector.

6. Actuator Operation Inspection.

Remove the corresponding actuator connector and then check the actuator operation by reconnecting.

Inspection results are OK?

OK → Bad actuator connector connection.

NG → Go to No. 7.

7. Intake Door Actuator Abnormal Aignal Inspection

1. Remove all intake, air mix, mode door actuator connectors.
2. Connect the air mix and mode door actuator connectors.
3. Check the mode door and air mix door actuator operation.

Inspection results are OK?

OK → Replace the intake door actuator.

NG → Go to No. 8.

8. Air Mix Door Actuator Abnormal Signal Inspection

1. Remove all intake, air mix, mode door actuator connectors.
2. Connect the intake and mode door actuator connectors.
3. Check the intake and mode door actuator operation.

Inspection results are OK?

- OK → Replace the air mix door actuator.
 NG → Go to No. 9.

GI

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9. Mode Door Actuator Abnormal Signal Inspection

1. Remove all intake, air mix, mode door actuator connectors.
2. Connect the intake and air mix door actuator connectors.
3. Check the air mix and intake door actuator operation.

Inspection results are OK?

- OK → Replace the mode door actuator.
 NG → Replace the controller.

EC

FE

RS

Intake Door Actuator System

Symptoms

- The intake door does not change.
- The intake door motor does not operate normally.

AC

AV

INSPECTION TIPS

Symptoms

- The intake door actuator does not operate normally.
- Refer to "LAN System" (AC-29) for inspection details.

EL

WH

Mode Door Actuator System**INSPECTION TIPS**

Symptoms

- The air outlet does not change.
 - The mode door actuator does not operate normally.
- Refer to "LAN System" (AC-29) for inspection details.

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Air Mix Door Actuator System**INSPECTION TIPS**

Symptoms

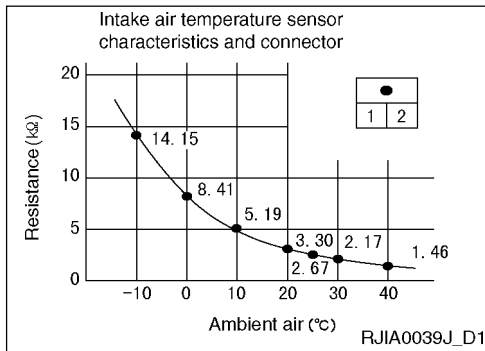
- Discharging air temperature does not change.
 - The air mix door actuator does not operate.
- Refer to "LAN System" (AC-29) for inspection details.

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Intake Air Temperature Sensor System

INTAKE AIR TEMPERATURE SENSOR INSPECTION

Measure the resistance between the intake air temperature sensor terminal No. 1 and No. 2.

Bad Cooling

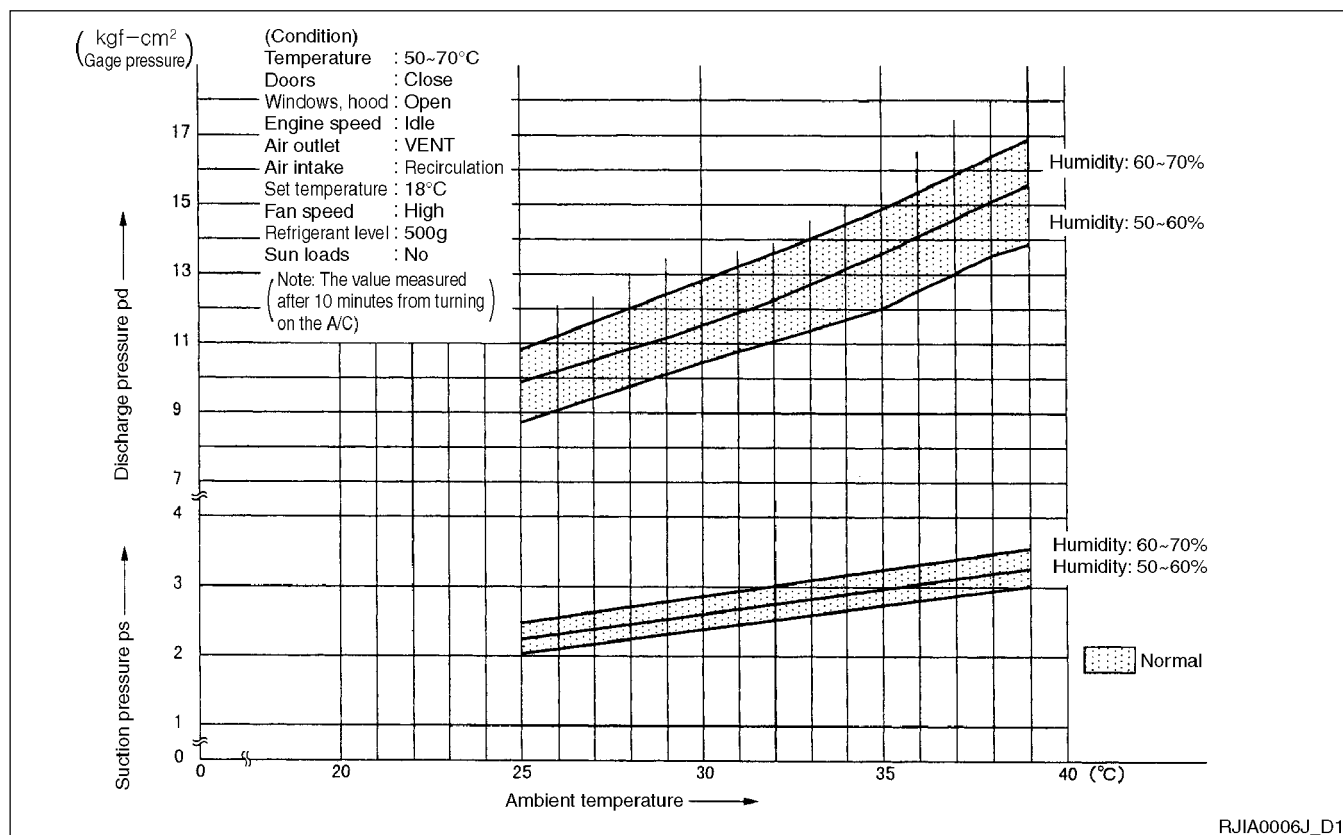
PERFORMANCE CHECK

INSPECTION PROCEDURE

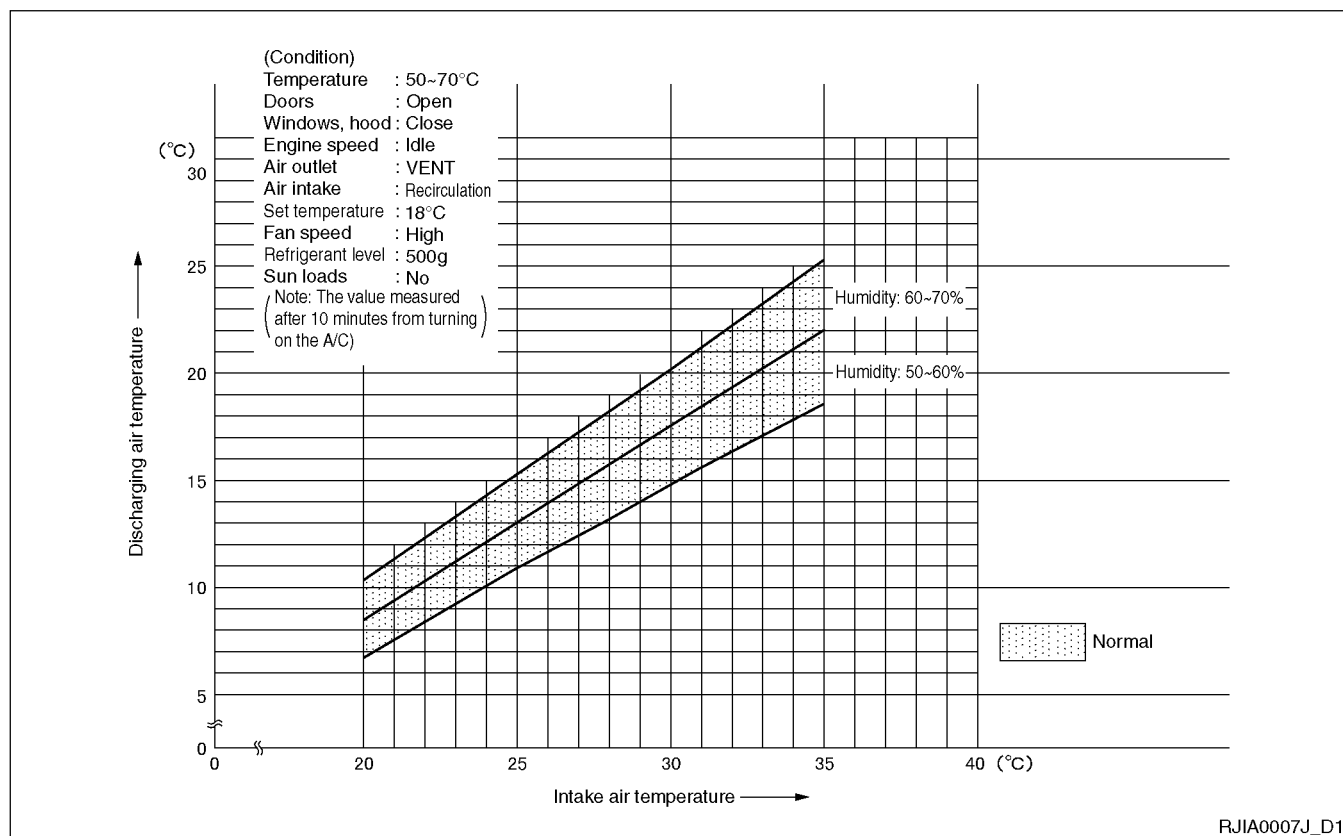
1. Connect the manifold gage to the vehicle's cooler cycle (service valve).
2. Install a wet and dry thermometer to the aspirator (below the glove box) in the blower unit and a thermometer at the right side of the center vent.
3. Start the engine to warm up the system.
4. After warming up the engine, check if the engine speed is in specified RPM.
5. Operate the compressor and then set to the below conditions by using controller.
 - Fan Speed: Hi
 - Air intake mode: Recirculation
 - Air outlet: VENT (Ventilator)
 - Set temperature: Full cold
6. Open the hood and all door windows but close all doors.
7. Maintain this condition until cooler cycle stabilizes (about 10 minutes).
8. Idle the engine.
9. Measure the aspirator's temperature and humidity, air outlet temperature and high and low pressure of the cooler cycle. And then judge the system by combining them with "Ambient air temperature-pressure characteristics" and "Intake and discharge air temperature characteristics".

Performance Curve

AMBIENT AIR TEMPERATURE-PRESSURE CHARACTERISTICS



INTAKE AND DISCHARGE AIR TEMPERATURE CHARACTERISTICS



Trouble Diagnosis Using Gage Pressure

Connect the manifold gage to the cooler cycle (service valve) then isolate defective component and possible cause by reading cooler cycle pressure.

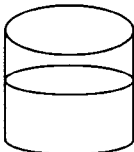
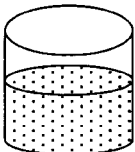
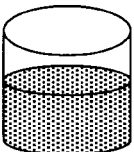
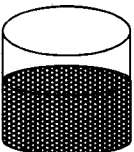
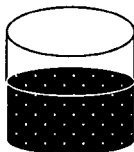
Symptoms	Cycle Status	Possible Cause	Remedy
Both low and high pressures are high	When poured water to condenser, it returns to normal	Bad cooling of condenser <ul style="list-style-type: none"> ● Bad operation of radiator and condenser fan ● Bad installation of air guide ● Dirty or clogged condenser fin 	<ul style="list-style-type: none"> ● Repair or replace the defective components ● Clean and repair the condenser fin
		Overcharged refrigerant	Evacuate refrigerant and then recharge to the specified value
	When compressor is stopped, the pressure drops to 2 kg/cm ² and then decreases gradually	Air in the cooler cycle	Evacuate refrigerant and then recharge to the specified value
	Frost is formed in the low-pressure pipe or low-pressure pipe is colder than the evaporator outlet	Excessive opening of the expansion valve (Excessive flow of refrigerant)	Replace the expansion valve
High pressure is extremely high	Temperature is different on where high-pressure pipe is damaged or clogged	High-pressure pipe between the compressor and condenser is damaged or clogged	Repair or replace the defective components
Both low and high pressures are low (Sometimes, even negative value)	Evaporator outlet is not cold Frost is formed at the evaporator inlet	Clogged expansion valve <ul style="list-style-type: none"> ● Gas leak at temperature detecting section ● Clogged by foreign particles 	Remove foreign particles at expansion valve or replace the unit
	Temperature differences in the liquid tank outlet pipe. Frost is formed in the liquid tank	Bad liquid tank (Clogged strainer)	Replace the liquid tank
	Frost is formed in the evaporator	Clogged or damaged evaporator fins	Repair or replace
		Lack of air flow	Replace the blower unit
	Slight temperature differences in the compressor high-pressure and low-pressure pipes	Lack of refrigerant	<ul style="list-style-type: none"> ● Inspect for refrigerant leakage ● Evacuate refrigerant and then recharge to the specified value
Sometimes high-pressure is low and low-pressure becomes negative	Sometimes the evaporator outlet is not cold Sometimes frost is formed in the evaporator inlet	Water in the cooler cycle (Clogged due to moisture formed by the expansion valve)	Evacuate refrigerant and then recharge to the specified value after dehumidifying. Always replace the liquid tank
High-pressure is low and low-pressure is high	When compressor is stopped, both pressures become to the same value at once No temperature differences between the high-pressure and low-pressure pipes	Bad compressor (Bad compression) <ul style="list-style-type: none"> ● Damaged or broken valve ● Bad gasket 	Replace the compressor

Compressor Trouble Diagnosis

When compressor assembly is defective (noise, bad cooling), diagnose as below.

Symptoms	Object	Method	Result	Remedy	
Noise occurs from compressor assembly while A/C ON	Pressure in the cooler cycle	Inspect using manifold gage	-	Refill refrigerant as required	GI
			-	Replace compressor only	EM
	Inspect compressor oil status	Determine after draining compressor oil	Determine as per below illustration	Determination 1: Replace compressor only Determination 2: Replace compressor and liquid tank	LC
Bad cooling (Note 1)	Compressor assembly	Check compressor operation. If burnt or stuck, determine after draining compressor oil			EC
	Pressure in the cooler cycle	Inspect using manifold gage. If pressure difference between the high-pressure and low-pressure is small, determine after draining compressor oil			FE
					RS

NOTE 1: Perform the inspection according to symptom diagnosis.

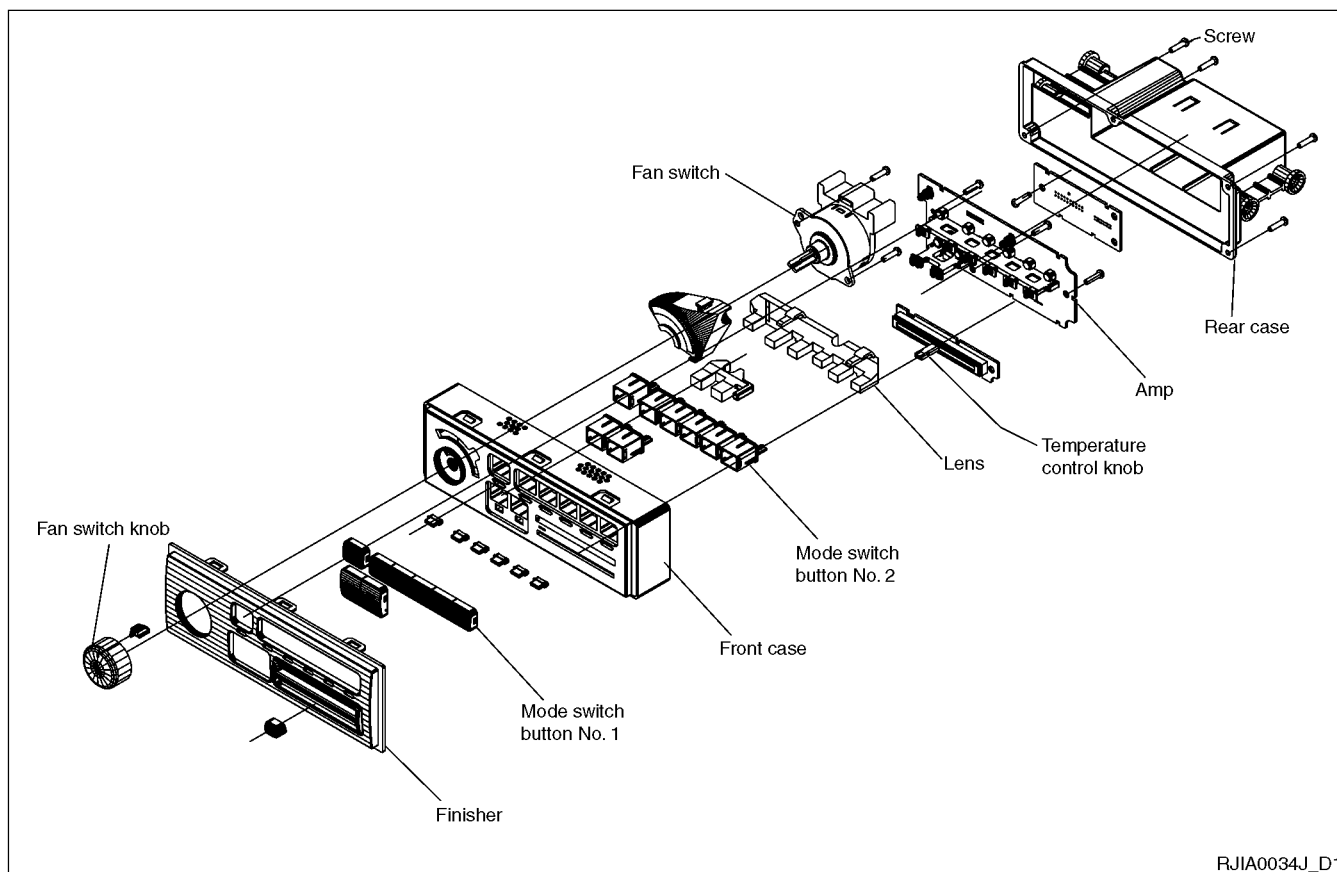
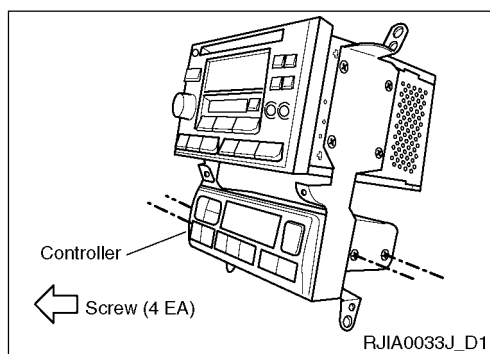
Compressor oil contamination				
				
Clear No foreign particles	Gray but near clear No foreign particles	Light gray No foreign particles	Gray Foreign particles	Black Foreign particles
Determination 1			Determination 2	
HAK0874D_D1				

CONTROLLER

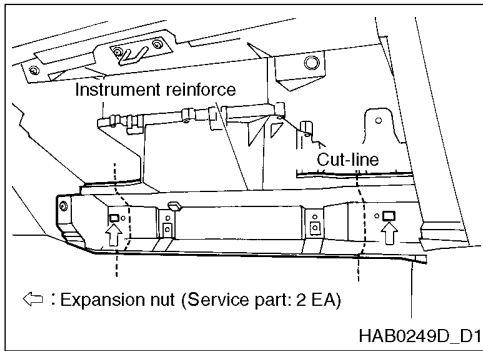
Controller

Removal • Installation

1. Remove the audio assembly.
2. Remove the controller.



Blower Unit Assembly



Removal • Installation

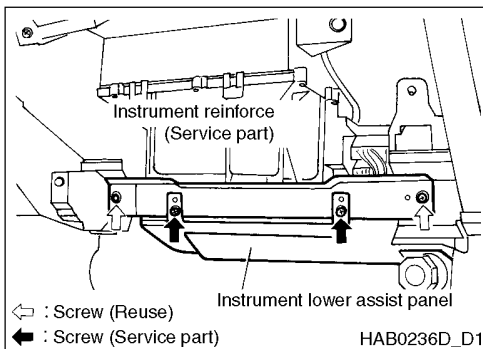
REMOVAL

1. Remove the glove box assembly.
2. Pry off the glove box cover and instrument lower assist panel.
3. Cut the instrument reinforce following the cut-line and smoothen the edges.

4. Remove the blower fan resister, intake door actuator and blower fan motor connectors.
5. Remove the connector bracket from blower unit.
6. Remove the 2 screws and 1 bolt and then remove the blower unit.

CAUTION:

- Push the blower unit towards the left and pull out the 2 positioning pins, then remove downwards.



REMOVAL

CAUTION:

- Install the instrument reinforce (service part).
- Check if 2 positioning pins are securely located.

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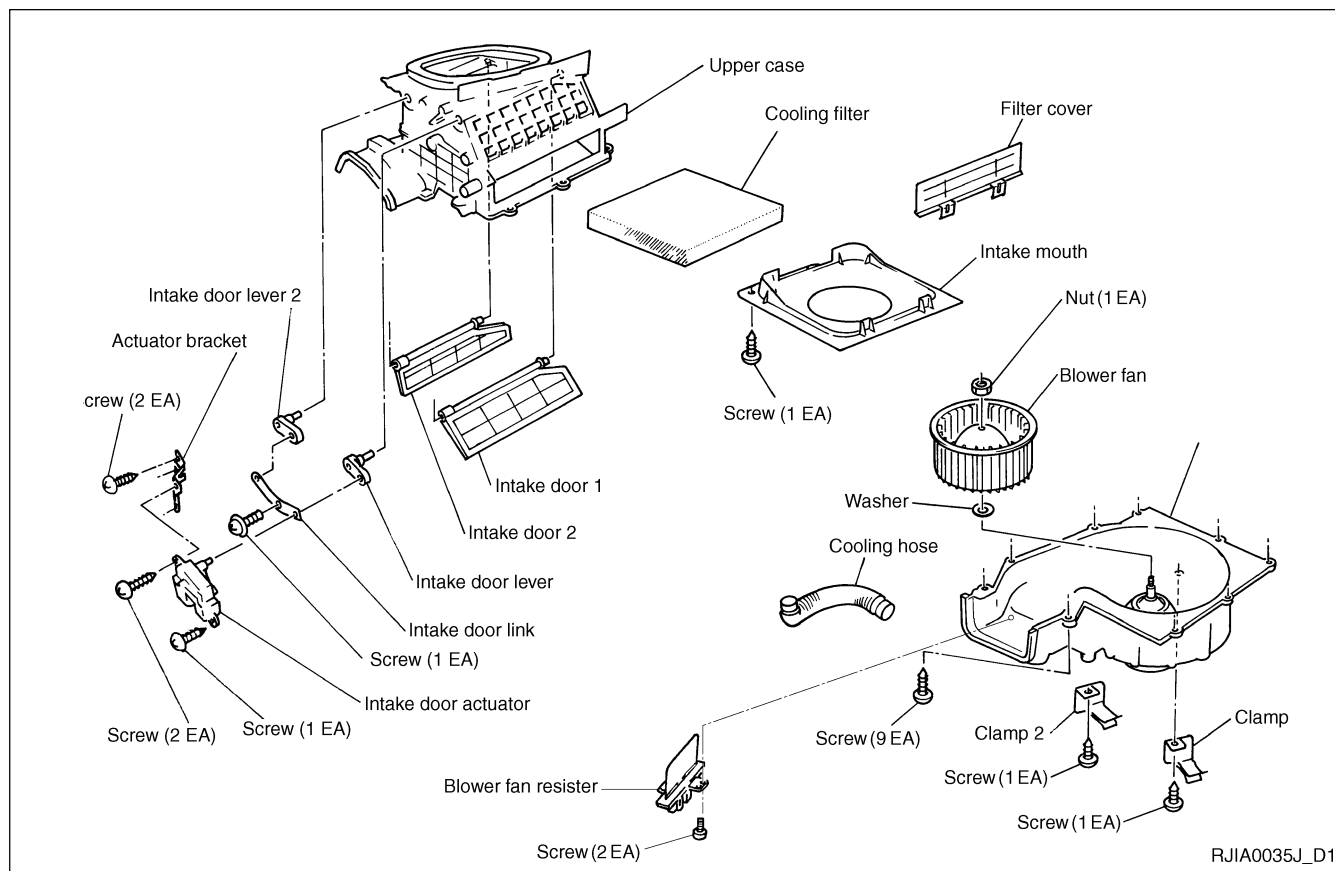
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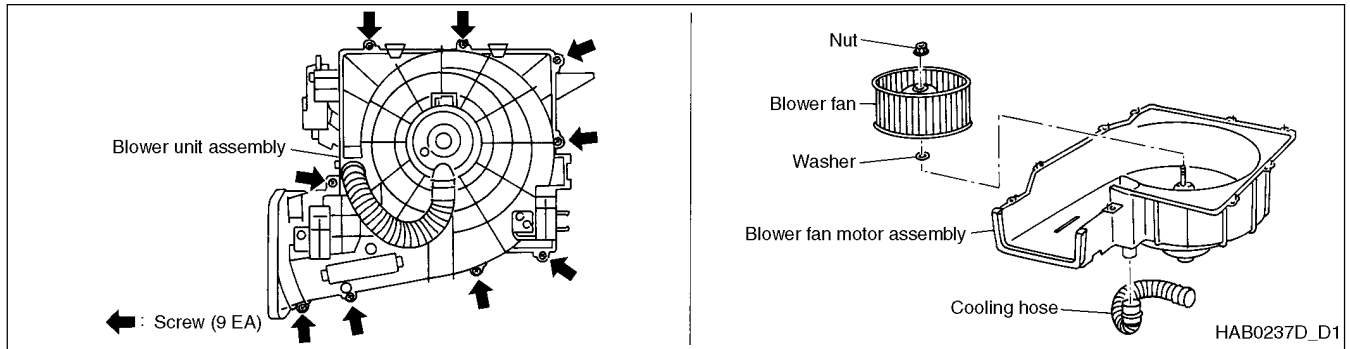
BT

Disassembly • Assembly



Blower Fan Motor

Removal • Installation



1. Remove the blower unit assembly.

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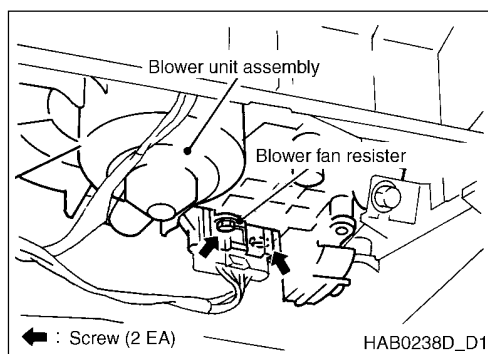
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Blower Fan Resister



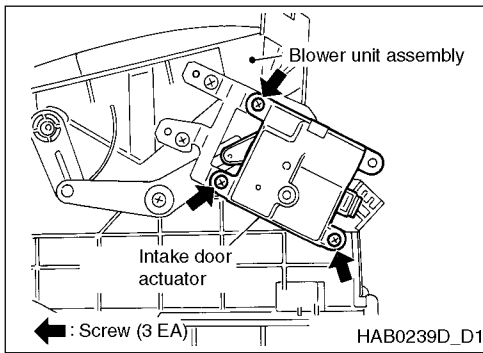
Removal • Installation

1. Remove the glove box assembly.
2. Remove the blower fan resistor.

CAUTION:

- If the blower fan resistor's temperature fuse is out, then inspect the blower fan motor and harness, then replace the blower fan resistor with new. Never try to repair the temperature fuse.

Intake Door Actuator



Removal • Installation

1. Remove the blower unit assembly.
2. Remove the intake door actuator.

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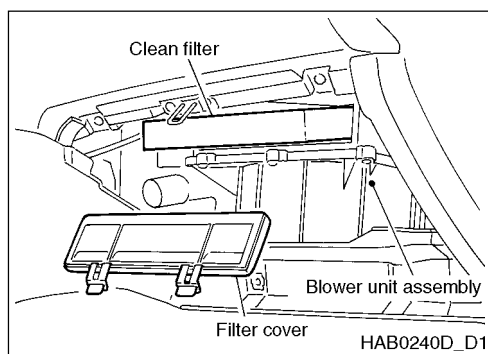
BT

CLEAN FILTER

Clean Filter

Removal • Installation

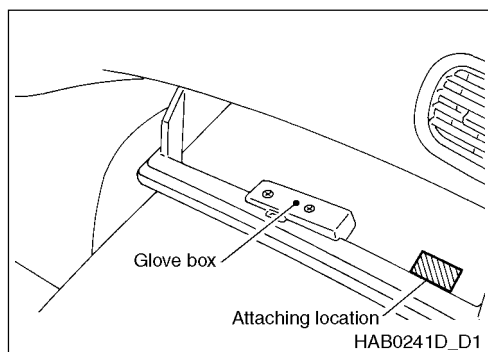
1. Remove the glove box.
2. Remove the clean filter.



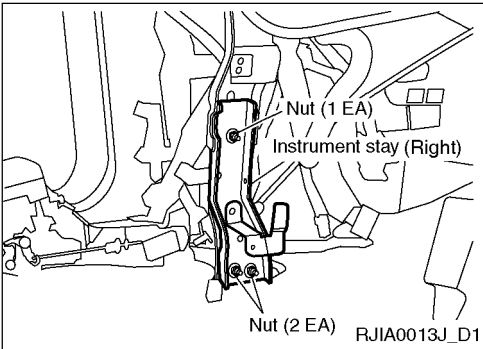
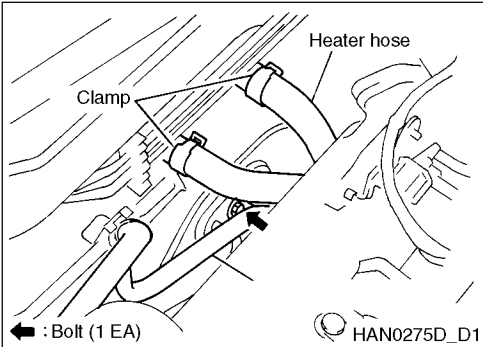
Replacement

Clean filter replacement: Refer to MA section.

- Record on the label and attach to the illustrated location on the glove box.



Heater & Cooling Unit Assembly



Removal • Installation

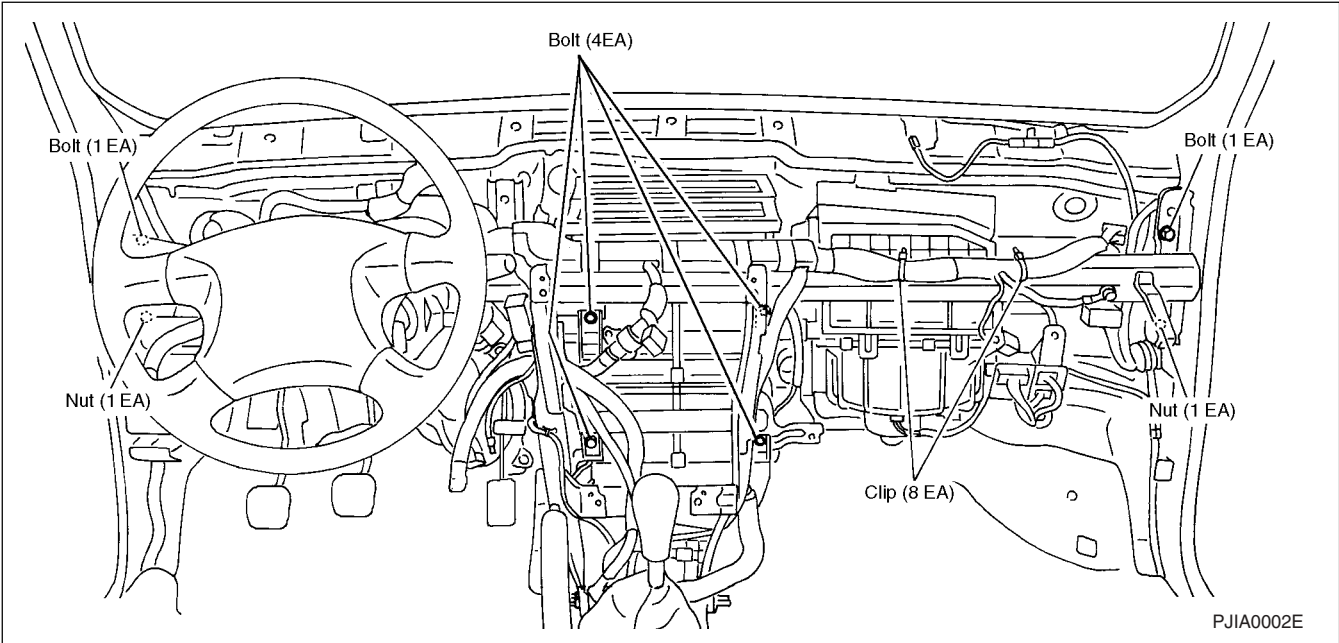
REMOVAL

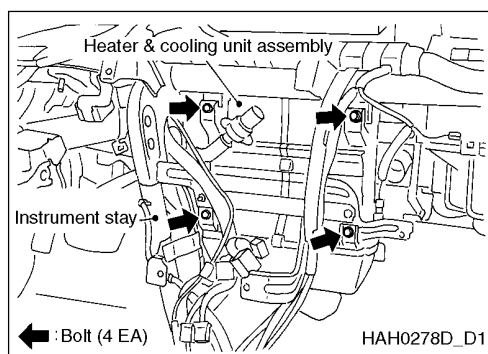
1. Trap the refrigerant using a refrigerant-recovery station (for HFC134a).
2. Drain the engine coolant.
3. Disconnect the low-pressure flexible hose and high-pressure pipe from the evaporator.
4. Remove the heater hose from the heater core.

CAUTION:

- Some coolant will leak when removing the heater hose.
- Block the coolant inlet/outlet on the heater core with a cloth.

5. Remove the instrument assembly.
6. Remove the blower unit assembly.
7. Remove the clip from vehicle harness and remove the instrument stay.



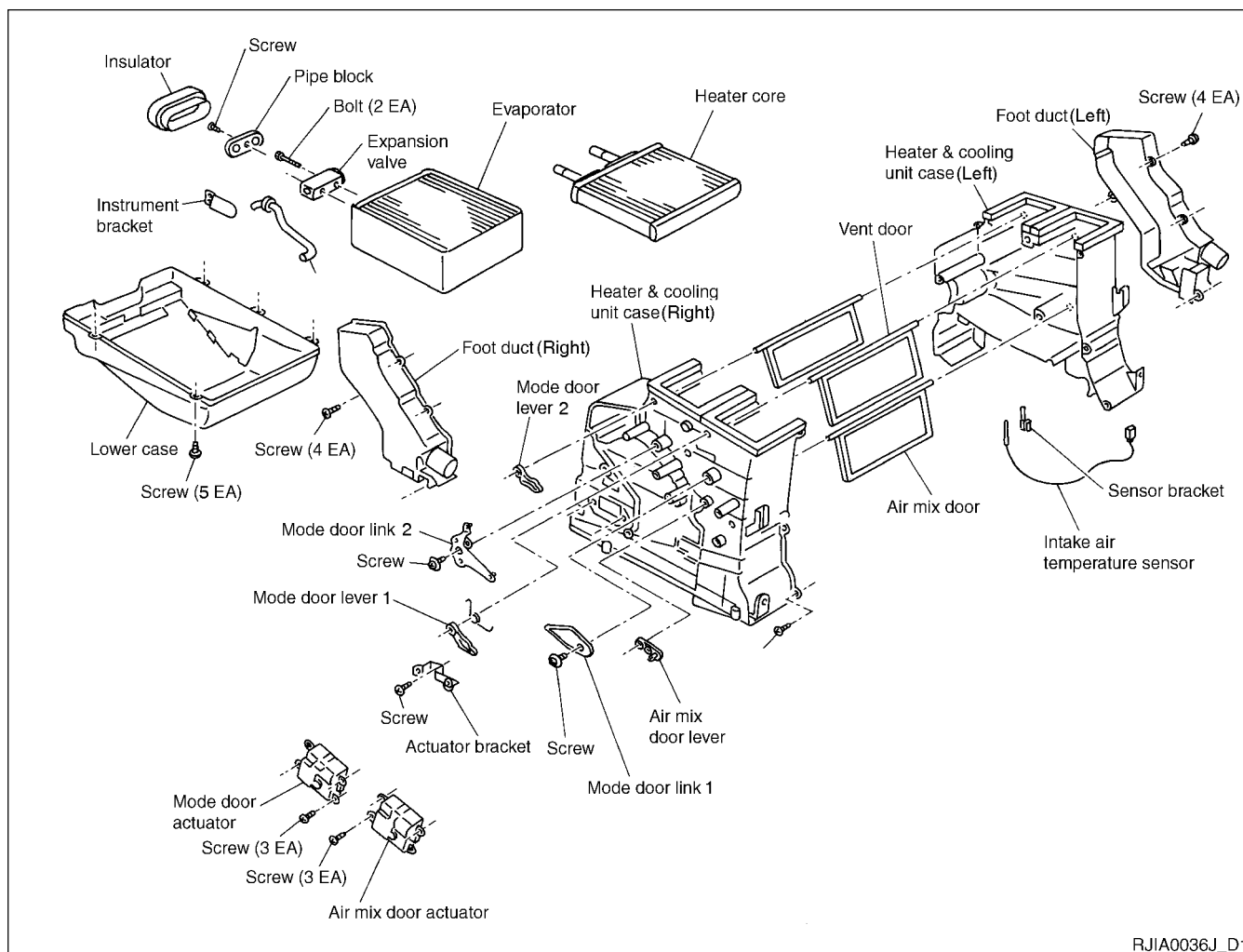


8. Remove the heater & cooling unit assembly mounting bolts.
9. Remove the steering member and the heater & cooling unit assembly.

Installation

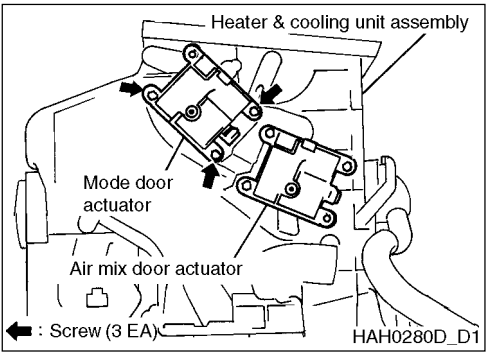
1. Install the heater & cooling unit assembly.
Heater & cooling unit assembly mounting bolt
Tightening torque: 5.98 - 7.64 N·m (0.61 - 0.78 kgf-m)
2. Reverse the removal steps 3~7 to install.
Steering member mounting nuts and bolts
Tightening torque: 10.87 - 13.72 N·m (1.1 - 1.4 kgf-m)
3. Refill the engine coolant.
4. Recharge the refrigerant using a refrigerant-recovery station (for HFC134a).

Disassembly • Assembly



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Mode Door Actuator



Removal • Installation

1. Remove the clutch pedal bracket (M/T vehicles).
2. Remove the mode door actuator.

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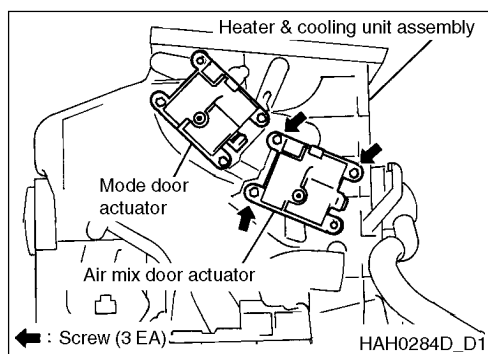
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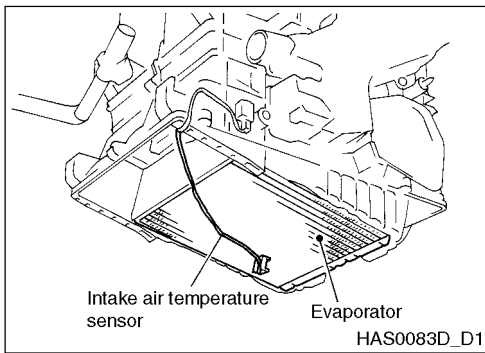
Air Mix Door Actuator



Removal • Installation

1. Remove the instrument lower driver panel.
2. Remove the air mix door actuator.

Intake Air Temperature Sensor



Removal • Installation

1. Remove the heater and cooling unit assembly lower case.
2. Remove the intake air temperature sensor.

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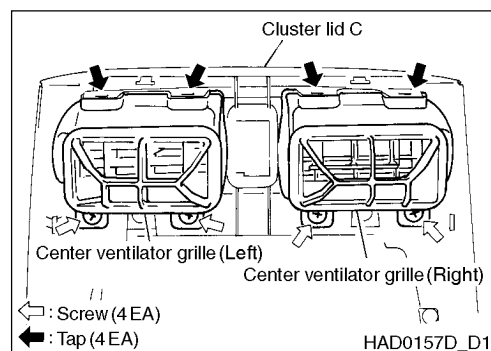
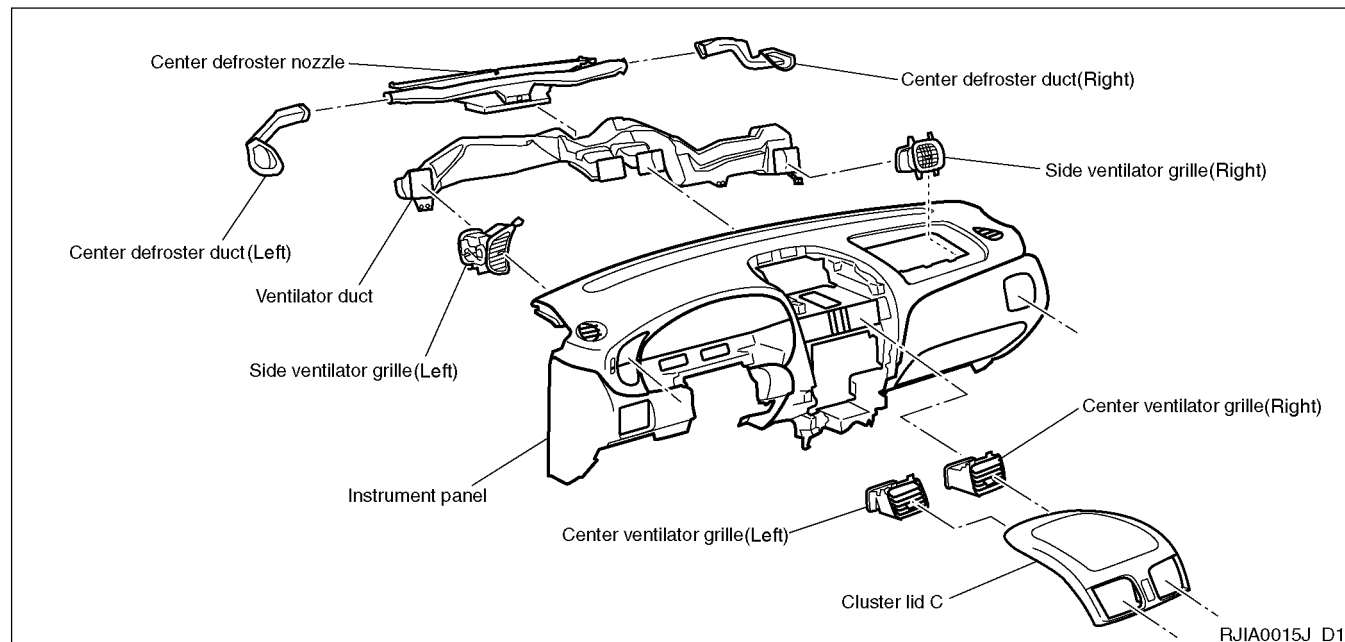
BT

Duct and Grille

Removal • Installation

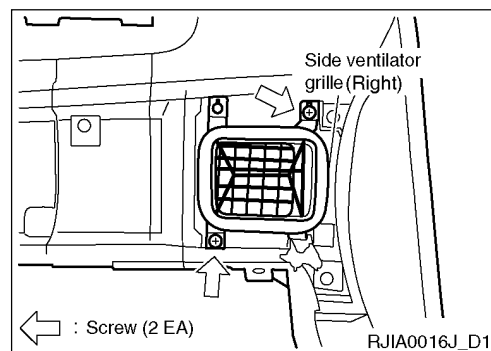
Ventilator duct, Defroster nozzle and duct

1. Remove the instrument panel.



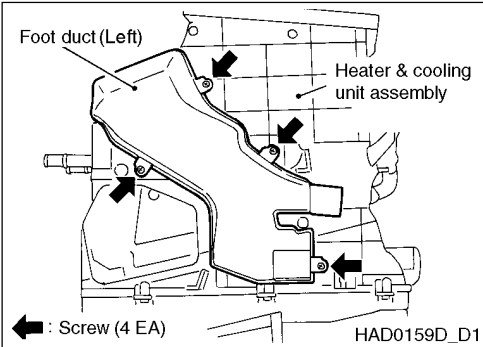
Center Ventilated Grille

1. Remove the cluster lid C.
2. Remove the center ventilator grille.



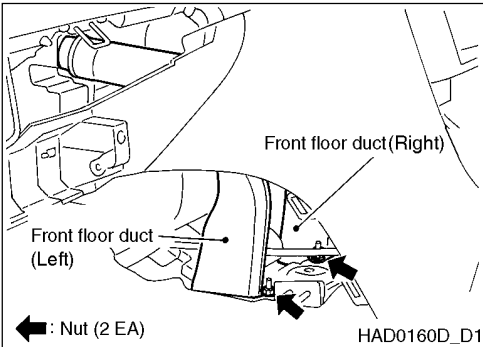
Side Ventilator Grille

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



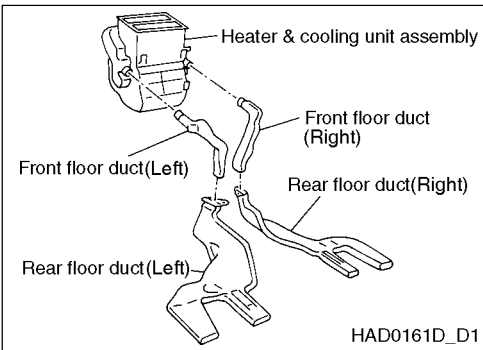
Foot Duct

1. Remove the heater & cooling unit assembly.
2. Remove the foot duct.



Blower Duct

1. Remove the instrument lower cover and glove box.
2. Remove the instrument lower driver panel.
3. Remove the console.
4. Remove the instrument stay (left).
5. Remove the front blower duct (left and right).
6. Remove the rear blower duct mounting nuts.
7. Remove the front seat, front kicking plate, footrest and dash side finisher.
8. Strip the blower trim from both sides of the vehicle and remove the rear blower duct (left and right).



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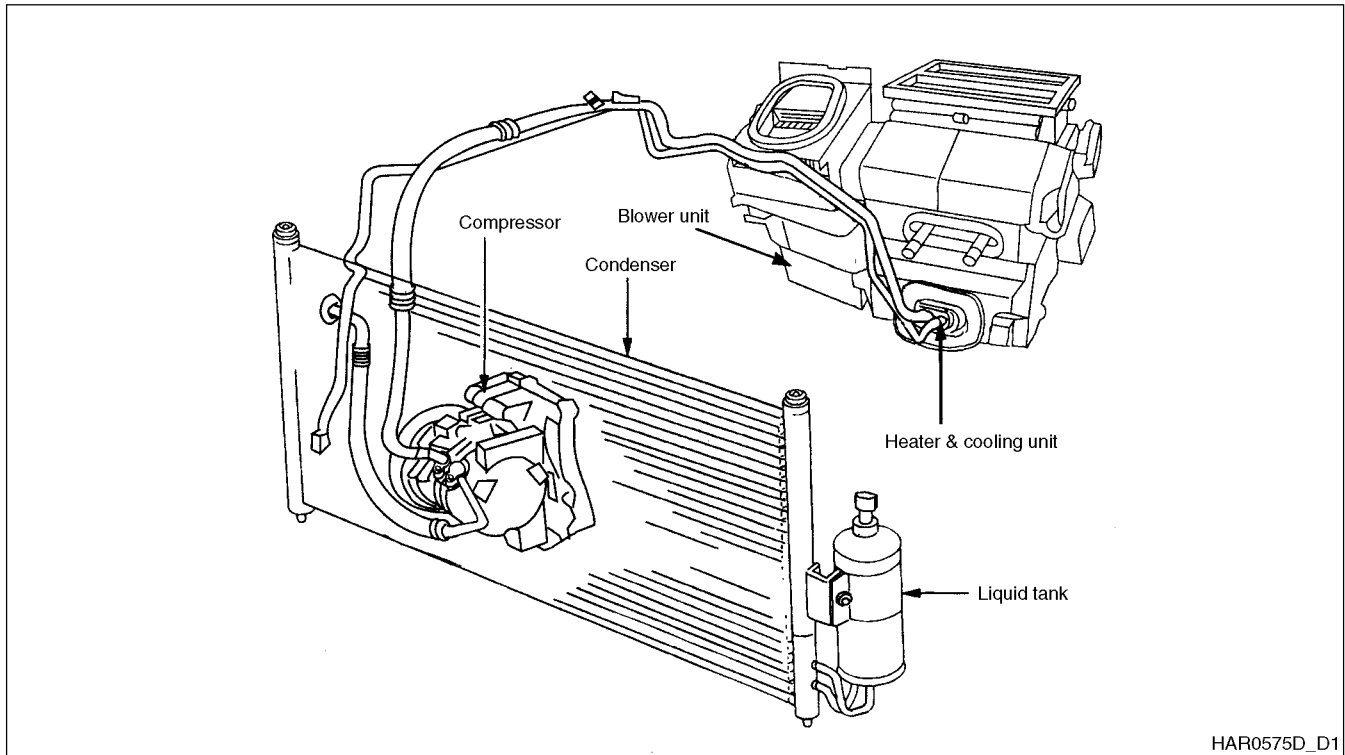
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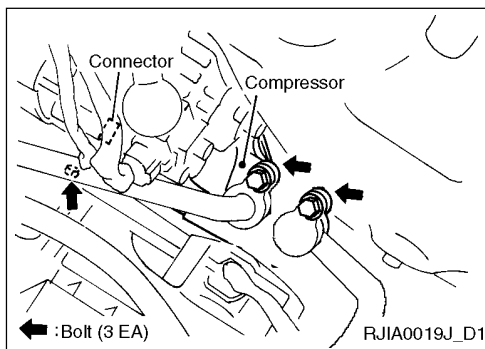
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Cooler Cycle

Components Diagram



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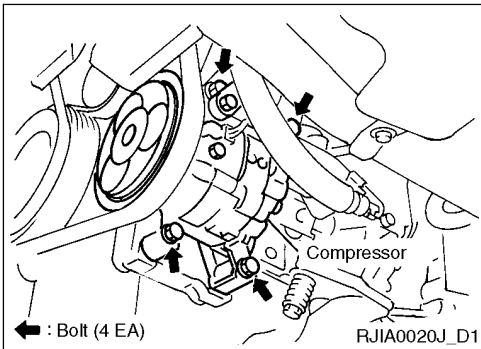
Removal • Installation of Compressor

REMOVAL

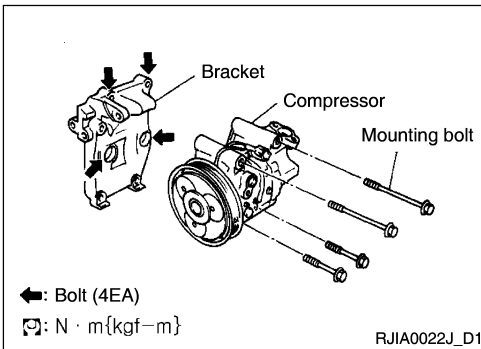
1. Trap the refrigerant using a refrigerant-recovery station (for HFC134a).
2. Remove the compressor connector.
3. Remove the engine under cover (right).
4. Remove the A/C compressor and alternator belt.
Refer to "BELTS" (QG-15: EM-10).
5. Disconnect the high-pressure and low-pressure flexible hoses from compressor.

CAUTION:

- Block the pipe's connection with a cap or vinyl tape to prevent air contacts.



6. Remove the compressor mounting bolts.
7. Remove the compressor from underneath the vehicle.



INSTALLATION

CAUTION:

- Replace the high-pressure and low-pressure flexible hose O-rings with new and apply compressor oil.
- Perform the compressor and alternator belt tension adjustment after installation.
- Check for refrigerant leakage while charging.

Compressor mounting bolts

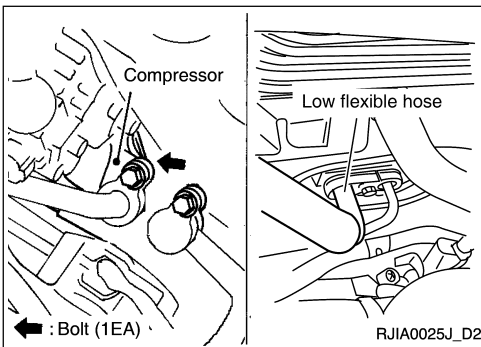
Tightening torque: 44.1 - 51.9 N•m (4.5 - 5.3 kgf-m)

High-pressure flexible hose mounting bolts and nuts

Tightening torque: 7.8 - 19.6 N•m (0.8 - 2.0 kgf-m)

Low-pressure flexible hose mounting bolts and nuts

Tightening torque: 7.8 - 19.6 N•m (0.8 - 2.0 kgf-m)



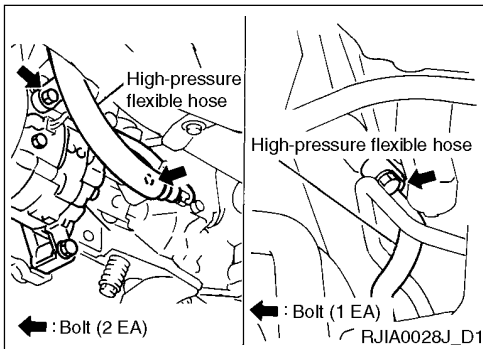
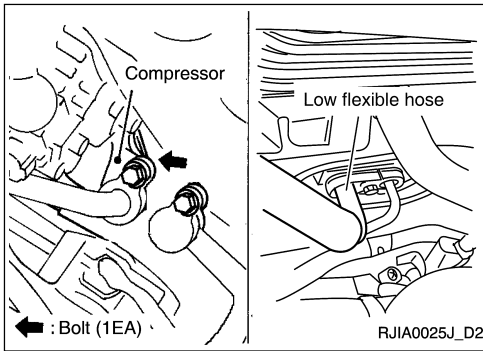
Removal • Installation of Low-Pressure Flexible Hose

REMOVAL

1. Trap the refrigerant using a refrigerant-recovery station (for HFC134a).
2. Remove the low-pressure flexible hose bracket mounting bolt.
3. Remove the low-pressure flexible hose clip.
4. Remove the low-pressure flexible hose mounting bolt's connection.

CAUTION:

- Block the pipe's connection with a cap or vinyl tape to prevent air contacts.



INSTALLATION

CAUTION:

- Replace the low-pressure flexible hose O-ring with new and apply compressor oil.

- Check for refrigerant leakage while charging.

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

Tightening torque: 2.9 - 5.9 N•m (0.29 - 0.6 kgf-m)

Low-pressure flexible hose mounting bolts and nuts (to compressor)

Tightening torque: 7.85 - 19.6 N•m (0.8 - 2.0 kgf-m)

Removal • Installation of High-Pressure Flexible Hose

REMOVAL

1. Trap the refrigerant using a refrigerant-recovery station (for HFC134a).
2. Remove the pipe clip.
3. Remove the high-pressure flexible hose bracket mounting bolt.
4. Remove the high-pressure flexible hose mounting bolt and remove the high-pressure flexible hose.

CAUTION:

- Block the pipe's connection with a cap or vinyl tape to prevent air contacts.

INSTALLATION

CAUTION:

- Replace the high-pressure flexible hose O-ring with new and apply compressor oil.

- Check for refrigerant leakage while charging.

High-pressure flexible hose mounting bolt

Tightening torque: 7.8 - 19.6 N•m (0.8 - 2.0 kgf-m)

Removal • Installation of High-Pressure Pipe

REMOVAL

1. Trap the refrigerant using a refrigerant-recovery station (for HFC134a).
2. Remove the high-pressure pipe clip.
3. Remove the low-pressure flexible hose.
4. Remove the high-pressure pipe mounting bolt and remove the high-pressure pipe.

CAUTION:

- Block the pipe's connection with a cap or vinyl tape to prevent air contacts.

INSTALLATION

CAUTION:

- Replace the high-pressure pipe O-ring with new and apply compressor oil.

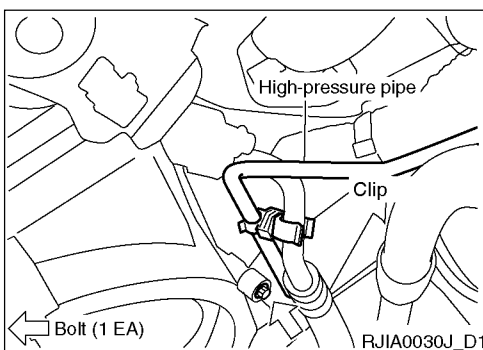
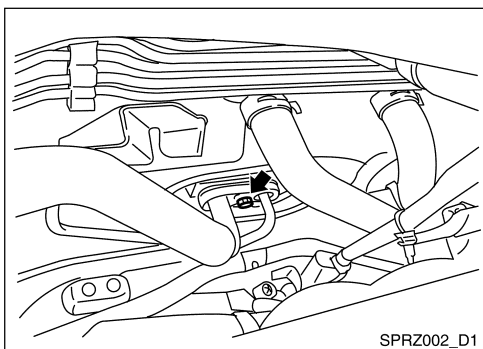
- Check for refrigerant leakage while charging.

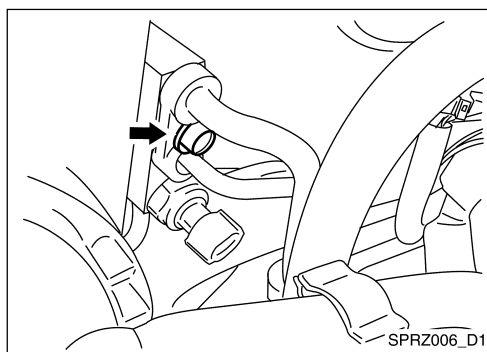
High-pressure pipe mounting bolt (to condenser and evaporator)

Tightening torque: 2.9 - 5.9 N•m (0.29 - 0.6 kgf-m)

Low-pressure flexible hose mounting nut

Tightening torque: 2.9 - 5.9 N•m (0.29 - 0.6 kgf-m)





Removal • Installation of Condenser

REMOVAL

1. Trap the refrigerant using a refrigerant-recovery station (for HFC134a).
2. Disconnect the high-pressure flexible hose and high-pressure pipe from the compressor.

CAUTION:

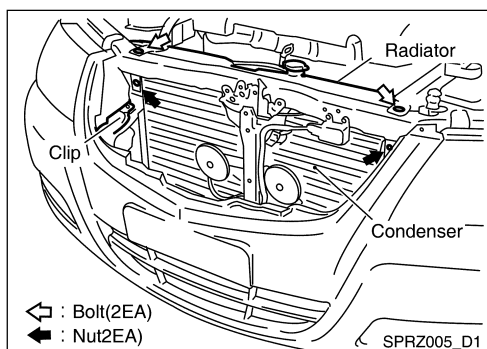
- Block the pipe's connection with a cap or vinyl tape to prevent air contacts.

3. Remove the radiator mounting bracket.
4. Remove the condenser bracket mounting nuts.
5. Remove the radiator from the lower mounts and then lean it against the engine. Remove the condenser with the liquid tank from between the radiator and the radiator core support.

CAUTION:

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

6. Remove the liquid tank.



INSTALLATION

CAUTION:

- Replace the high-pressure pipe and high-pressure flexible hose and condenser pipe (liquid tank outlet) O-rings with new and apply compressor oil.
- Check for refrigerant leakage while charging.

High-pressure flexible hose mounting bolts

Tightening torque: 7.8 - 19.6 N•m (0.8 - 2.0 kgf-m)

High-pressure pipe mounting bolts

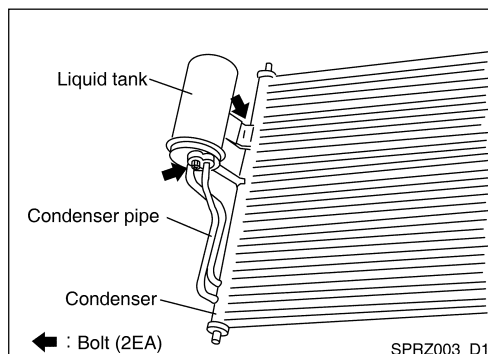
Tightening torque: 2.8 - 5.9 N•m (0.29 - 0.6 kgf-m)

Condenser pipe installation bolts (liquid tank outlet)

Tightening torque: 2.8 - 5.9 N•m (0.29 - 0.6 kgf-m)

Condenser mounting bolts

Tightening torque: 3.8 - 4.5 N•m (0.39 - 0.46 kgf-m)



Removal • Installation of Liquid Tank

REMOVAL

1. Trap the refrigerant using a refrigerant-recovery station (for HFC134a).
2. Remove the condenser.
3. Remove the liquid tank mounting bolt.
4. Remove the condenser pipe mounting bolt and remove the liquid tank.

CAUTION:

- Block the pipe's connection with a cap or vinyl tape to prevent air contacts.

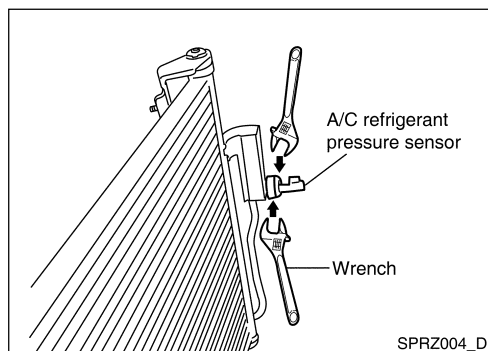
Installation

CAUTION:

- Replace the condenser pipe O-ring with new and apply compressor oil.
- Check for refrigerant leakage while charging.

Condenser pipe mounting bolt

Tightening torque: 2.9 - 5.9 N•m (0.29 - 0.6 kgf-m)



Removal • Installation of A/C Refrigerant Pressure Sensor

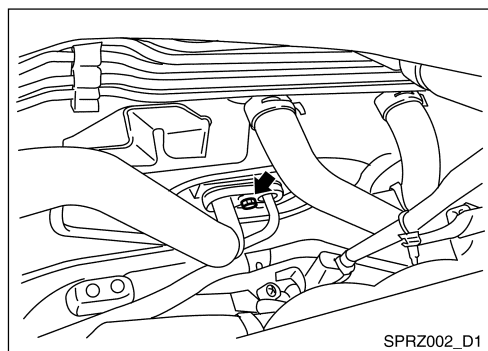
1. Remove the liquid tank.
2. Tighten the liquid tank on the vise and remove the A/C refrigerant pressure sensor.

CAUTION:

- Wrap the liquid tank with a cloth to prevent from damage.
- Apply compressor oil to refrigerant pressure sensor O-ring section.

A/C refrigerant pressure sensor

Tightening torque: 9.8 - 11.7 N•m (1.0 - 1.2 kgf-m)



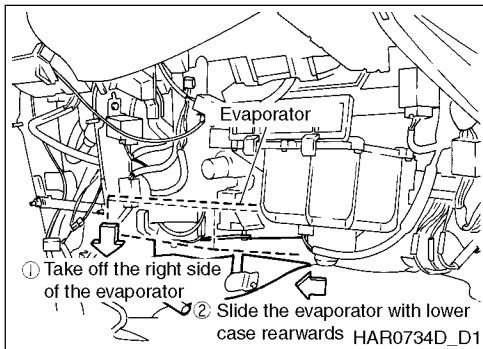
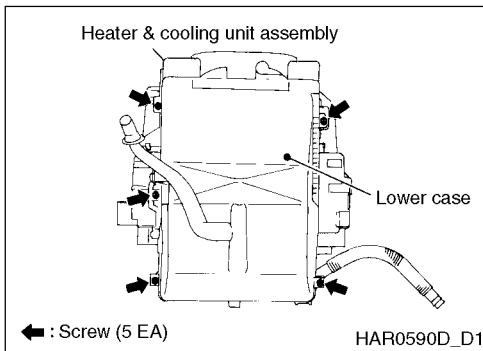
Removal • Installation of Evaporator

REMOVAL

1. Trap the refrigerant using a refrigerant-recovery station (for HFC134a).
2. Disconnect the low-pressure flexible hose and high-pressure pipe from the evaporator.
3. Remove the insulator cover and remove the insulator.

CAUTION:

- Block the low-pressure flexible hose and high-pressure pipe connections with a cap or vinyl tape to prevent air contacts.
4. Remove the instrument lower cover.
 5. Remove the front blower duct (left) (If equipped for freezing area).



6. Remove the drain hose and lower case mounting screws.

7. Lower the rear part of the evaporator and put it aside rearwards of the vehicle with the lower case.

8. Remove the lower case.

9. Disconnect the intake air temperature sensor's thermistor from the evaporator

10. Push the evaporator towards vehicle front and remove downwards.

INSTALLATION

CAUTION:

- Replace the low-pressure flexible hose and high-pressure pipe O-rings with new and apply compressor oil.
- Mark the mounting location of the intake air temperature sensor's thermistor.
- Do not rotate the termistor when removing/installing the intake air temperature sensor.
- Install the evaporator so that the pipe block comes out towards engine room.

Removal • Installation of Expansion Valve

1. Remove the insulator cover.
2. Remove the insulator.
3. Remove the pipe block and expansion valve.

Expansion valve mounting bolt

Tightening torque: 2.9 - 5.0 N•m (0.30 - 0.50 kgf-m)

