

SECTION **HAC**

HEATER & AIR CONDITIONING CONTROL SYSTEM

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PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000009515769

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

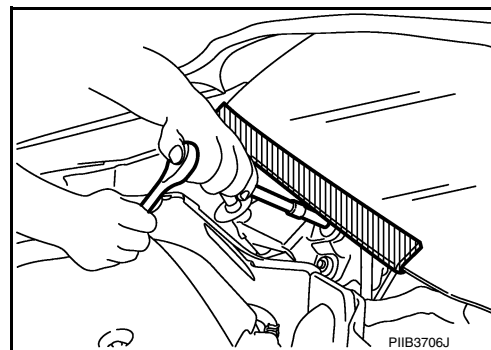
WARNING:

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery and wait at least three minutes before performing any service.

Precaution for Procedure without Cowl Top Cover

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When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precaution for Work

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- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.
- If a part is specified as a non-reusable part, always replace it with a new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components:
 - Water soluble dirt:
 - Dip a soft cloth into lukewarm water, wring the water out of the cloth and wipe the dirty area.
 - Then rub with a soft, dry cloth.
 - Oily dirt:

PRECAUTIONS

< PRECAUTION >

[MANUAL AIR CONDITIONING]

- Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%) and wipe the dirty area.
- Then dip a cloth into fresh water, wring the water out of the cloth and wipe the detergent off.
- Then rub with a soft, dry cloth.
- Do not use organic solvent such as thinner, benzene, alcohol or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

Precautions For Refrigerant System Service

INFOID:000000009515771

GENERAL REFRIGERANT PRECAUTION

WARNING:

- Do not breathe A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. Ventilate work area before resuming service if accidental system discharge occurs. Additional health and safety information may be obtained from refrigerant and oil manufacturers.
- Do not release refrigerant into the air. Use approved recovery/recycling recharging equipment to capture the refrigerant each time an air conditioning system is discharged.
- Wear always eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.
- Do not store or heat refrigerant containers above 52°C (126°F).
- Do not heat a refrigerant container with an open flame. Place the bottom of the container in a pail of warm water if container warming is required.
- Do not intentionally drop, puncture, or incinerate refrigerant containers.
- Keep refrigerant away from open flames. Poisonous gas is produced if refrigerant burns.
- Refrigerant displaces oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.
- Do not pressure test or leakage test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.

WORKING WITH HFC-134a (R-134a)

CAUTION:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. Compressor malfunction is likely occur if the refrigerants are mixed.
- Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. Compressor malfunction is likely to occur if oil other than that specified is used.
- The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
 - Cap (seal) immediately the component to minimize the entry of moisture from the atmosphere when removing refrigerant components from a vehicle.
 - Do not remove the caps (unseal) until just before connecting the components when installing refrigerant components to a vehicle. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
 - Use only the specified oil from a sealed container. Reseal immediately containers of oil. Oil becomes moisture saturated and should not be used without proper sealing.
 - Do not allow oil (A/C System Oil Type: DH-PR) to come in contact with styrene foam parts. Damage may result.

REFRIGERANT CONNECTION

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

- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

WARNING:

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

CAUTION:

Observe the following when replacing or cleaning refrigerant cycle components.

PRECAUTIONS

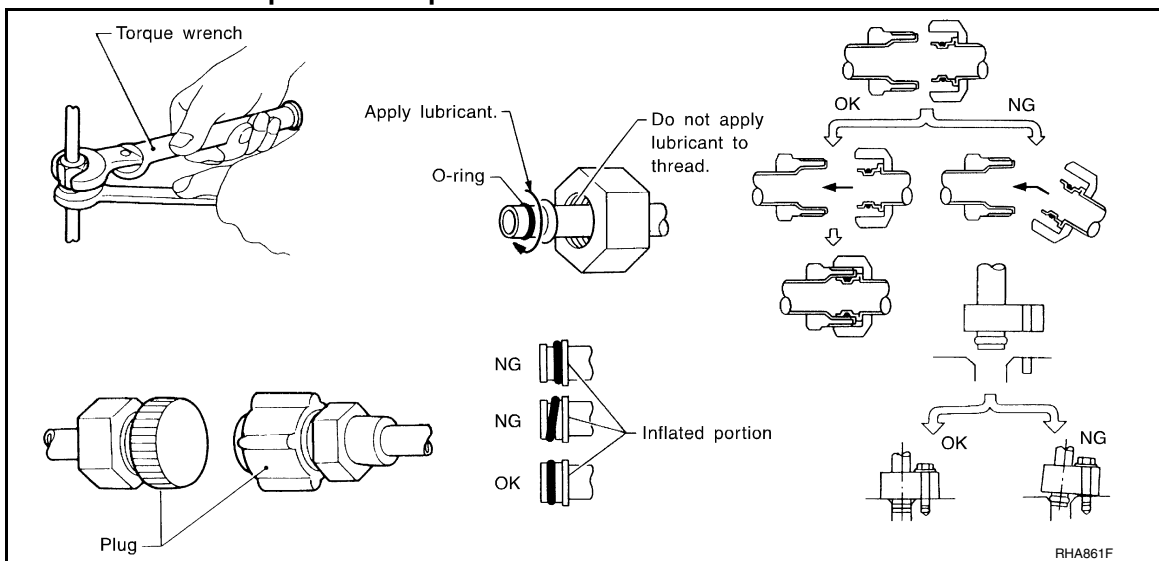
< PRECAUTION >

[MANUAL AIR CONDITIONING]

- When the compressor is removed, store it in the same way as it is when mounted on the vehicle. Failure to do so will cause oil to enter the low-pressure chamber.
- Use always a torque wrench and a back-up wrench when connecting tubes.
- Plug immediately all openings to prevent entry of dust and moisture after disconnecting tubes.
- Connect the pipes at the final stage of the operation when installing an air conditioner in the vehicle. Do not remove the seal caps of pipes and other components until just before required for connection.
- Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.
- Remove thoroughly moisture from the refrigeration system before charging the refrigerant.
- Replace always used O-rings.
- Apply oil to the O-rings shown in illustrations when connecting tubes. Be careful not to apply oil to threaded portion.

Name : A/C System Oil Type: DH-PR

- O-ring must be closely attached to the groove portion of tube.
- Be careful not to damage O-ring and tube when replacing the O-ring.
- Connect tube until a click can be heard. Then tighten the nut or bolt by hand. Check that the O-ring is installed to tube correctly.
- Perform leak test and make sure there are no leaks from connections after connecting lines. Disconnect that line and replace the O-ring when the refrigerant leak point is found. Then tighten connections of seal seat to the specified torque.



COMPRESSOR

CAUTION:

- Plug all openings to prevent moisture and foreign matter from entering.
- When the compressor is removed, store it in the same way as it is when mounted on the vehicle.
- Follow "MAINTENANCE OF OIL LEVEL" exactly when replacing or repairing compressor. Refer to [HA-21, "Description"](#).
- Keep friction surfaces between clutch and pulley clean. Wipe them off by using a clean waste cloth moistened with solvent if the surfaces are contaminated with oil.
- Turn the compressor shaft by hand more than five turns in both directions after compressor service operation. This equally distributes oil inside the compressor. Let the engine idle and operate the compressor for one hour after the compressor is installed.
- After replacing the compressor magnet clutch, apply voltage to the new clutch to check for normal operation.

LEAK DETECTION DYE

CAUTION:

- The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.
- Always wear fluorescence enhancing UV safety goggles to protect eyes and enhance the visibility of the fluorescent dye.

PRECAUTIONS

[MANUAL AIR CONDITIONING]

< PRECAUTION >

- The fluorescent leak detection dye is not a replacement for an electronic leak detector. The fluorescent leak detection dye should be used in conjunction with an electronic leak detector to pin-point refrigerant leaks.
- Read and follow all manufacture's operating instructions and precautions prior to performing the work for the purpose of safety and customer's satisfaction.
- A compressor shaft seal should not necessarily be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electronic leak detector.
- Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.
- Do not allow dye to come into contact with painted body panels or interior components. Clean immediately with the approved dye cleaner if dye is spilled. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Do not spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Do not use more than one refrigerant dye bottle [1/4 ounce (7.4 cc)] per A/C system.
- Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Do not use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system, or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system, or A/C system damage may result.
- The fluorescent properties of the dye remains for three or more years unless a compressor malfunction occurs.

NOTE:

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

Service Equipment

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RECOVERY/RECYCLING RECHARGING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Do not introduce any refrigerant other than that specified into the machine.

ELECTRICAL LEAK DETECTOR

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

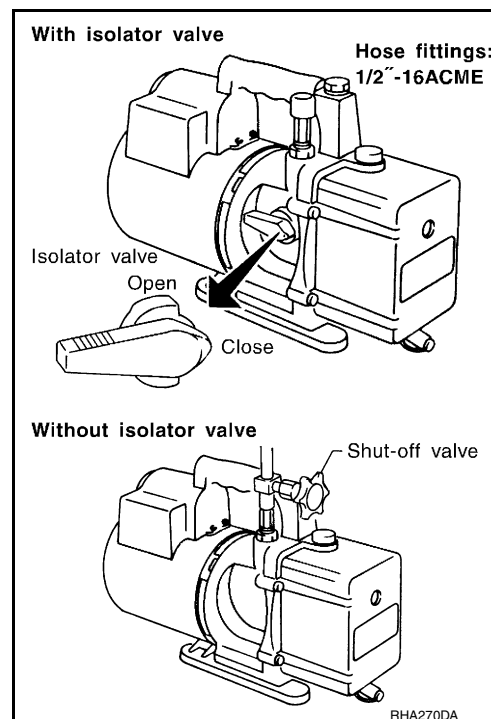
VACUUM PUMP

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

To prevent this migration, use a manual valve placed near the hose-to-pump connection, as per the following.

- Vacuum pumps usually have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- Use a hose equipped with a manual shut-off valve near the pump end for pumps without an isolator. Close the valve to isolate the hose from the pump.
- Disconnect the hose from the pump if the hose has an automatic shut-off valve. As long as the hose is connected, the valve is open and lubricating oil may migrate.

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



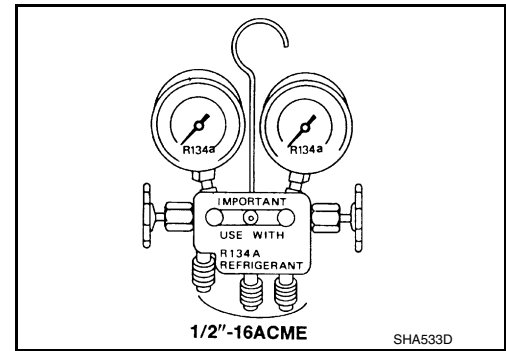
MANIFOLD GAUGE SET

PRECAUTIONS

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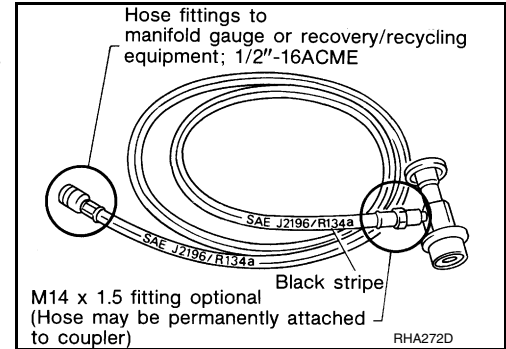
Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2"-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified oils.

[MANUAL AIR CONDITIONING]



SERVICE HOSES

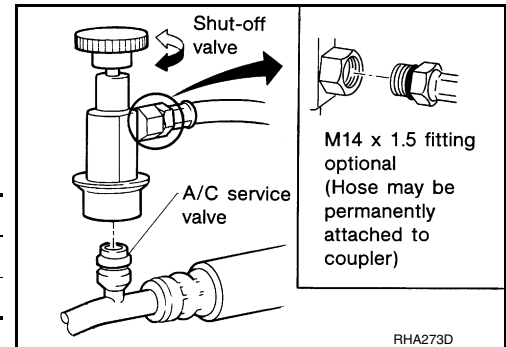
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must be equipped with positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



SERVICE COUPLERS

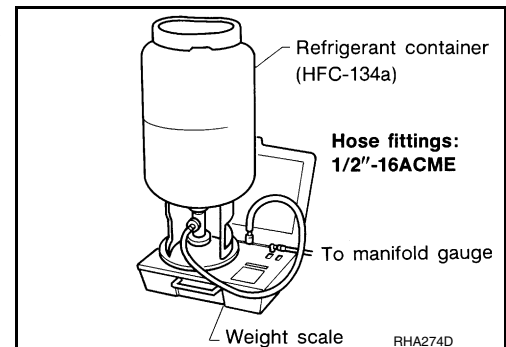
Do not attempt to connect HFC-134a (R-134a) service couplers to the CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers do not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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



REFRIGERANT WEIGHT SCALE

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



CHARGING CYLINDER

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

PREPARATION

< PREPARATION >

[MANUAL AIR CONDITIONING]

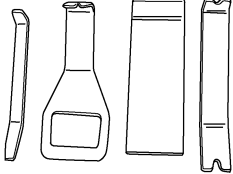
PREPARATION

PREPARATION

Special Service Tool

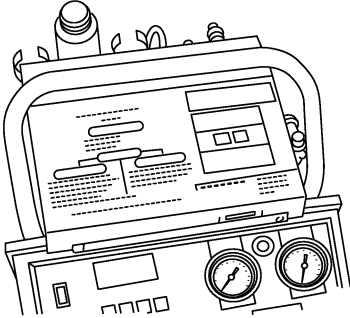
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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-46534) Trim Tool Set	Removing trim components
 AWJIA0483ZZ	

Commercial Service Tool

INFOID:000000009667202

(Kent-Moore No.) Tool name	Description
(J-41810-NI) Refrigerant identifier equipment (R-134a)	For checking refrigerant purity and system contamination
 RJIA0197E	
(—) Power tool	Loosening nuts, screws and bolts
 PIIB1407E	
(J-48710) NISSAN ACR2009 RRR Unit	Refrigerant recovery, recycling and re-charging
 WJIA0293E	

PREPARATION

< PREPARATION >

[MANUAL AIR CONDITIONING]

(Kent-Moore No.) Tool name	Description	A
(J-41995) Electronic refrigerant leak detector AHA281A	Power supply: • DC 12V (battery terminal)	B C D
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) Refrigerant dye injector (J-41447) Fluorescent leak detection dye (box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner NOTICE This A/C or Refrigeration system contains a fluorescent leak detection tracer dye. (Must use UV light to see dye.) KENT-MOORE Tools and Equipment 1-800-345-2233 ZHA200H	Power supply: • DC 12V (battery terminal)	E F G H
(J-39183-C) Manifold gauge set (with hoses and couplers) RJIA0196E	Identification: • The gauge face indicates R-134a. Fitting size-Thread size • 1/2"-16 ACME	HAC J K
Service hoses: • High side hose (J-39500-72B) • Low side hose (J-39500-72R) • Utility hose (J-39500-72Y) S-NT201	Hose color: • Low side hose: Blue with black stripe • High side hose: Red with black stripe • Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: • 1/2"-16 ACME	L M
Service couplers • High side coupler (J-39500-20A) • Low side coupler (J-39500-24A) S-NT202	Hose fitting to service hose: • M14 x 1.5 fitting is optional or permanently attached.	N O P

PREPARATION

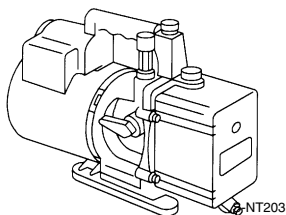
< PREPARATION >

[MANUAL AIR CONDITIONING]

(Kent-Moore No.) Tool name	Description
(J-39699) Refrigerant weight scale	For measuring of refrigerant Fitting size-Thread size • 1/2"-16 ACME
(J-39649) Vacuum pump (Including the isolator valve)	Capacity: • Air displacement: 4 CFM • Micron rating: 20 microns • Oil capacity: 482 g (17 oz) Fitting size-Thread size • 1/2"-16 ACME



S-NT200

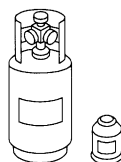


S-NT203

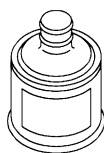
Sealant and/or Oil

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(Kent-Moore No.) Tool name	Description
(—) HFC-134a (R-134a) Refrigerant	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size • large container 1/2"-16 ACME
(—) NISSAN A/C System Oil Type DH-PR	Type: Poly alkylene glycol oil (PAG), type DH-PR Application: HFC-134a (R-134a) Vane-rotary compressors Capacity: 110 - 130 mℓ (3.7 - 4.4 US fl oz, 3.9 - 4.6 Imp fl oz)



S-NT196



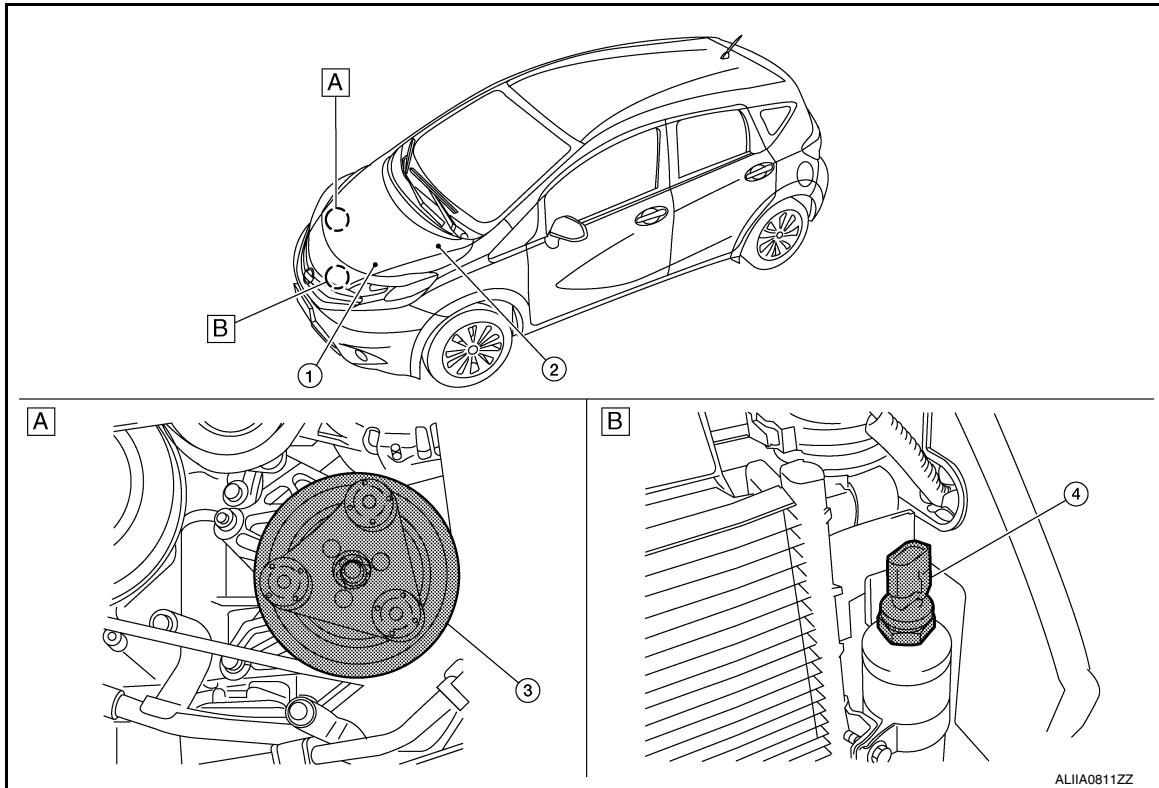
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SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

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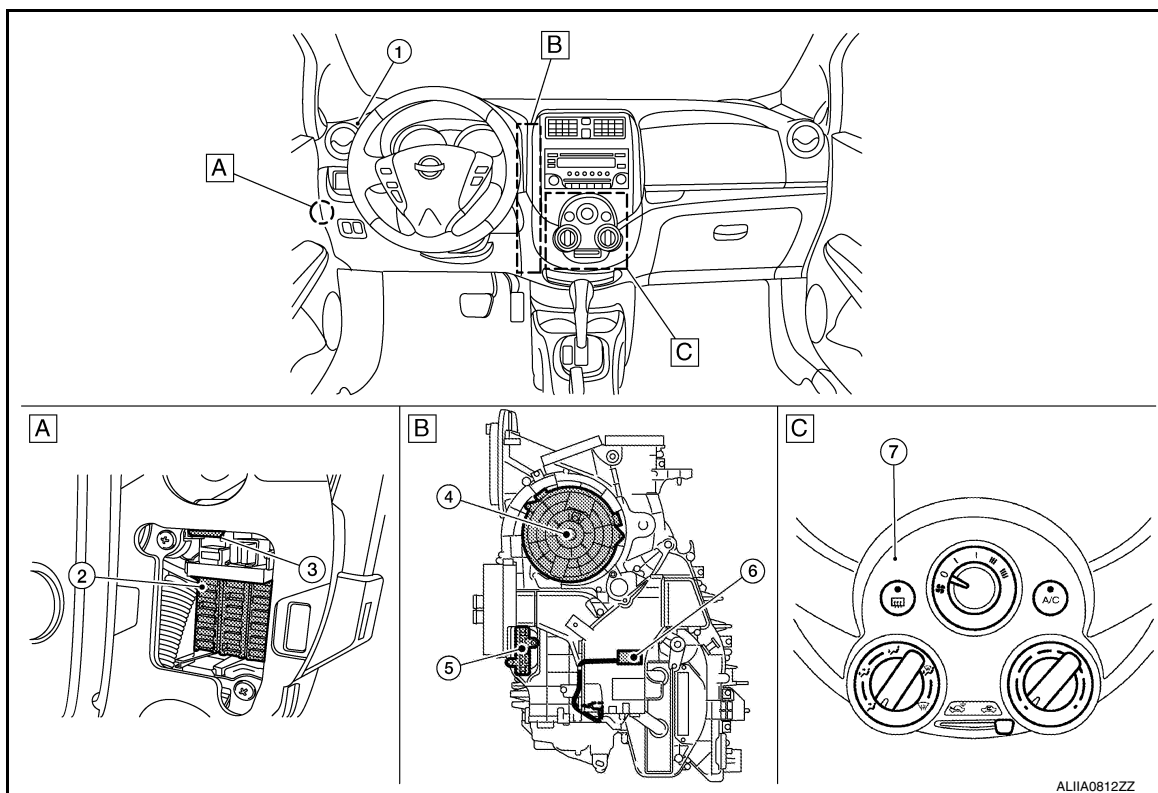
A. RH front of engine compartment B. Behind LH side of front fascia

No.	Component	Description
1.	ECM	The ECM sends a compressor ON request to the IPDM E/R based on the status of engine operation and load as well as refrigerant pressure information. If all the conditions are met for A/C operation, the ECM transmits the compressor ON request to the IPDM E/R.
2.	IPDM E/R	A/C relay is integrated in IPDM E/R. IPDM E/R operates A/C relay when receiving A/C compressor request signal from ECM via CAN communication line.
3.	A/C compressor	Vaporized refrigerant is drawn into the A/C compressor from the evaporator, where it is compressed to a high pressure, high temperature vapor. The hot, compressed vapor is then discharged to the condenser.
4.	Refrigerant pressure sensor	Refer to EC-22, "Refrigerant Pressure Sensor" .

COMPONENT PARTS

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONING]



A. LH side of instrument panel

B. Behind center of instrument panel

C. Center of instrument panel

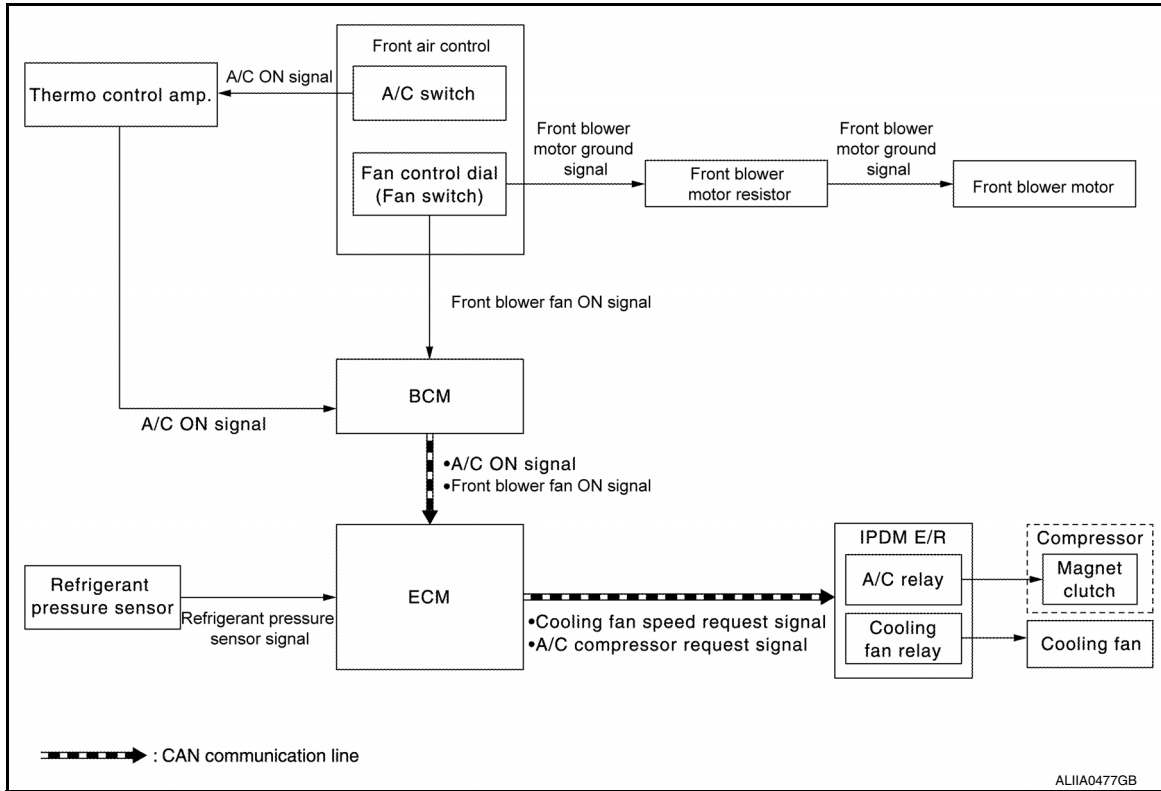
No.	Component	Description
1.	BCM	The BCM receives the fan ON and A/C ON signals from the front air control and sends a compressor ON request to the ECM.
2.	Fuse Block (J/B)	Located in the passenger compartment, behind the left lower IP, the Fuse Block (J/B) contains the front blower motor relay and several fuses required for the air conditioner control system.
3.	Front blower motor relay	The front blower motor relay controls the flow of current to fuse 20, 21 and 22 in the Fuse Block (J/B). The relay is connected directly to ground, and is energized when the ignition switch is in the ON or START position.
4.	Front blower motor	The front blower motor varies the speed at which the air flows through the ventilation system.
5.	Front blower motor resistor	Ground for the blower is supplied through blower resistor and the blower speed switch. As the switch is moved from position 1 through 4, more current is allowed to flow through the motor, for a higher speed. This is because less resistors are in the path as the switch is moved to a higher position. When the switch is on the highest position, all resistors are bypassed.
6.	Thermo control amp.	Thermo control amp. is composed of thermistor and amplifier. When the A/C switch signal is received from the front air control, the thermo control amp. transmits the A/C ON signal to the BCM according to evaporator fin temperature. When the thermistor detecting temperature of the air that passes through evaporator is extremely low, the thermo control amp. sends the A/C OFF signal to BCM, and stops the compressor.
7.	Front air control	The front air control controls the operation of the A/C and heating system.

SYSTEM

System Description

INFOID:000000009477929

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

- The manual air conditioning system is controlled by a sequence of functions from the front air control, BCM, ECM, and IPDM E/R.
- The fan speed of the front blower motor is changed by the combination of the fan control dial (fan switch) operation and blower resistor control.

Module/Function	Door control	A/C request signal	Compressor control	Cooling fan control
Front air control	HAC-14	—	HAC-13	—
BCM	—	BCS-5	—	—
ECM	—	—	HAC-13	EC-35
IPDM E/R	—	—	HAC-13	EC-35

Compressor Control

INFOID:000000009477930

DESCRIPTION

- When A/C switch signal is received from front air control, the thermo control amp. transmits A/C ON signal to the BCM according to evaporator fin temperature.
- When the front blower motor is operated, the front air control transmits blower fan ON signal to the BCM.
- BCM transmits the A/C ON signal and blower fan ON signal to ECM via CAN communication line. Refer to [LAN-24, "CAN COMMUNICATION SYSTEM : System Description"](#)
- ECM judges the conditions of each sensor (Refrigerant pressure sensor signal, accelerator position signal, etc.), and transmits the A/C compressor request signal to IPDM E/R via CAN communication line.
- By receiving the A/C compressor request signal from ECM, IPDM E/R turns the A/C relay to ON, and activates the compressor. Refer to [PCS-5, "RELAY CONTROL SYSTEM : System Description"](#)

CONTROL BY THERMO CONTROL AMP.

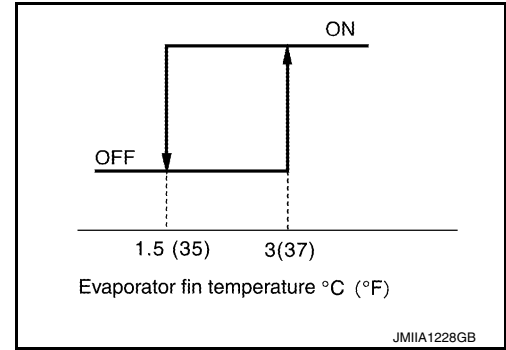
SYSTEM

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONING]

Low Temperature Protection Control

- When thermo control amp. detects that evaporator fin temperature is 1.5°C (35°F) or less, thermo control amp. switches A/C ON signal to OFF and stops the compressor. When the evaporator fin temperature returns to 3°C (37°F) or more, the compressor is activated.



CONTROL BY ECM

Refrigerant Pressure Protection

The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the liquid tank on the condenser. The refrigerant pressure sensor detects the pressure inside the refrigerant line and sends a voltage signal to the ECM. If the system pressure rises above or falls below the following values, the ECM requests the IPDM E/R to de-energize the A/C relay and disengage the compressor.

- 3.12 MPa (31.82 kg/cm², 452.4 psi) or more (When the engine speed is less than 1,500 rpm)
- 2.74 MPa (27.95 kg/cm², 397.3 psi) or more (When the engine speed is 1,500 rpm or more)
- 0.14 MPa (1.43 kg/cm², 20.3 psi) or less

Compressor Oil Circulation Control

When the engine starts while the engine coolant temperature is 56°C (133°F) or less, ECM activates the compressor for approximately 6 seconds and circulates the compressor oil once.

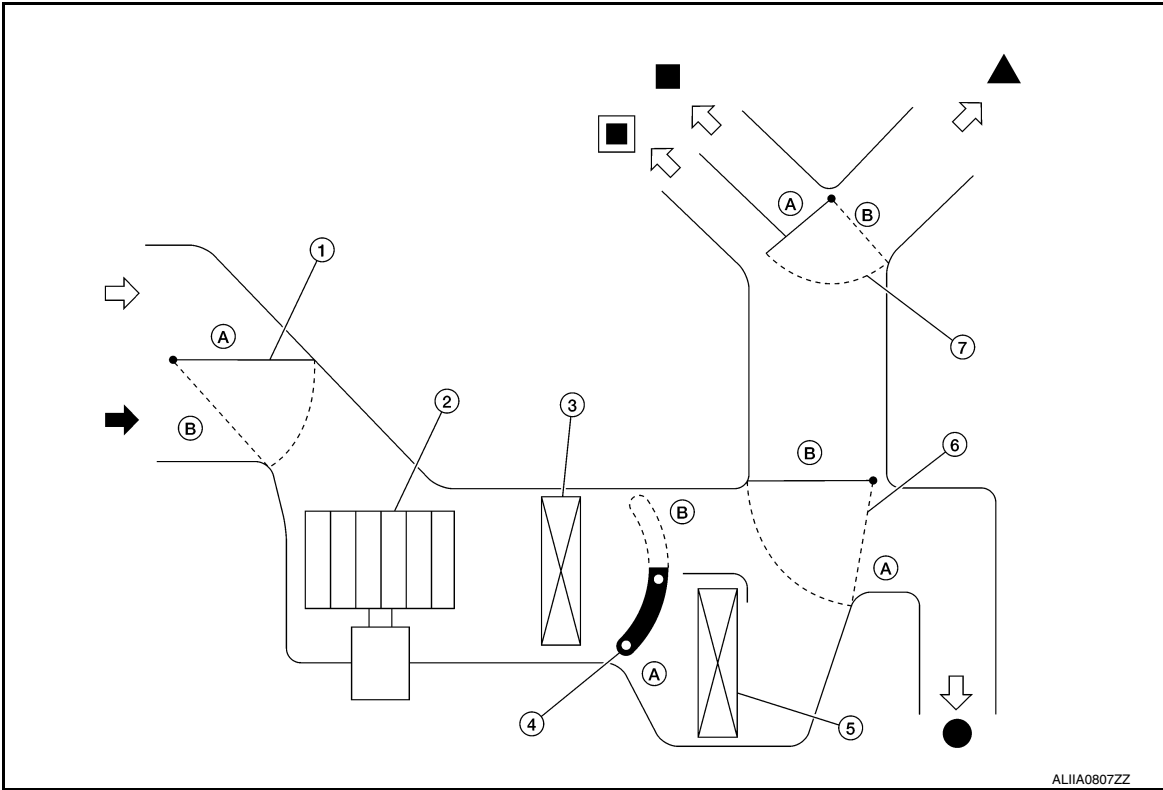
Air Conditioning Cut Control

When the engine is under a high load condition, the ECM transmits an A/C relay OFF request to IPDM E/R, and stops the compressor. Refer to [EC-33, "AIR CONDITIONING CUT CONTROL : System Description"](#).

Door Control

INFOID:000000009477931

SWITCHES AND THEIR CONTROL FUNCTIONS



1. Intake door

4. Air mix door

7. Ventilator and defroster door

Fresh air intake

Center ventilator
2. Blower motor

5. Heater core

Recirculation air

Side ventilator
3. Evaporator

6. Foot door

Defroster

Foot

Switch/Dial position		Door position			
		Ventilator and defroster door	Foot door	Intake door	Air mix door
MODE dial		B	A	—	—
			A – B		
		A	A – B		
			A – B		
			A		
Air intake lever		—	—	A	—
				B	
Temperature control dial	Full cold	—	—	—	A
	Full hot				B

AIR DISTRIBUTION

A
B
C
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G
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HAC
J
K
L
M
N
O
P

SYSTEM

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONING]

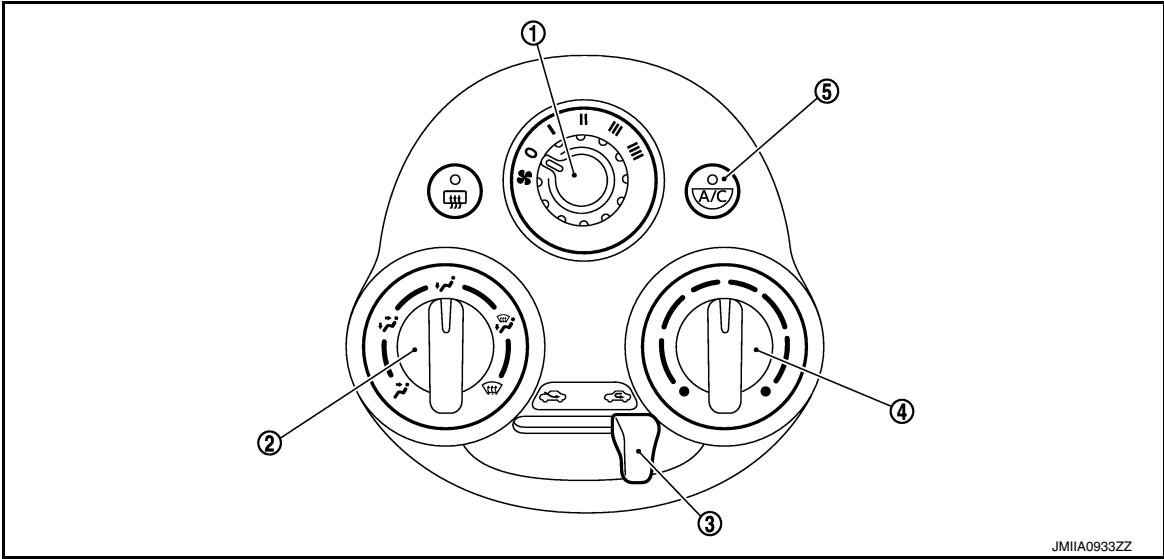
Discharge air flow				
Mode position indication	Air outlet/distribution			
	Ventilator		Foot	Defroster
	Center	Side		
	50%	50%	—	—
	30%	30%	40%	—
	—	14%	66%	20%
	—	14%	51%	35%
	—	22%	—	78%

OPERATION

Switch Name and Function

INFOID:000000009477932

CONTROLLER



1. Fan control dial (fan switch)
2. MODE dial
3. Intake lever
4. Temperature control dial
5. A/C switch

SWITCH OPERATION

Fan control dial (fan switch)	Fan speed can be adjusted within a range from 1st to 4th.
MODE dial	Mode position is selected to an optimal position by operating this dial.
Intake lever	The air inlet changes REC ⇔ FRE each time by operation this lever.
Temperature control dial	The setting temperature can be selected to an optimum temperature by operating this dial.
A/C switch	The compressor control (switch indicator) is turned ON ⇔ OFF each time by pressing this switch while the blower motor is activated.

A
B
C
D
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HAC
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N
O
P

HAC

DIAGNOSIS SYSTEM (BCM)

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONING]

DIAGNOSIS SYSTEM (BCM)

COMMON ITEM

COMMON ITEM : CONSULT Function (BCM - COMMON ITEM)

INFOID:000000009567625

APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM.

Direct Diagnostic Mode	Description
ECU identification	The BCM part number is displayed.
Self Diagnostic Result	The BCM self diagnostic results are displayed.
Data Monitor	The BCM input/output data is displayed in real time.
Active Test	The BCM activates outputs to test components.
Work support	The settings for BCM functions can be changed.
Configuration	- The vehicle specification can be read and saved. - The vehicle specification can be written when replacing BCM.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication is displayed.

SYSTEM APPLICATION

BCM can perform the following functions.

System	Sub System	Direct Diagnostic Mode						
		ECU identification	Self Diagnostic Result	Data Monitor	Active Test	Work support	Configuration	CAN DIAG SUPPORT MNTR
Door lock	DOOR LOCK		×	×	×	×		
Rear window defogger	REAR DEFOGGER			×	×			
Warning chime	BUZZER			×	×			
Interior room lamp timer	INT LAMP			×	×	×		
Exterior lamp	HEAD LAMP			×	×	×		
Wiper and washer	WIPER			×	×	×		
Turn signal and hazard warning lamps	FLASHER			×	×			
Air conditioner	AIR CONDITIONER			×				
Intelligent Key system	INTELLIGENT KEY		×	×	×	×		
Combination switch	COMB SW			×				
BCM	BCM	×	×			×	×	×
Immobilizer	IMMU		×		×	×		
Interior room lamp battery saver	BATTERY SAVER			×	×	×		
Vehicle security system	THEFT ALM			×	×	×		
RAP system	RETAINED PWR			×		×		
Signal buffer system	SIGNAL BUFFER			×				

AIR CONDITIONER

DIAGNOSIS SYSTEM (BCM)

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONING]

AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)

INFOID:0000000009567627

DATA MONITOR

Monitor Item [Unit]	Description
FAN ON SIG [On/Off]	Indicates condition of fan switch.
AIR COND SW [On/Off]	Indicates condition of A/C switch.

A

B

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D

E

F

G

H

HAC

J

K

L

M

N

O

P

ECU DIAGNOSIS INFORMATION

BCM, ECM, IPDM E/R

List of ECU Reference

INFOID:000000009477937

ECU	Reference
BCM	BCS-28. "Reference Value"
	BCS-44. "Fail-safe"
	BCS-46. "DTC Inspection Priority Chart"
	BCS-46. "DTC Index"
ECM	EC-62. "Reference Value"
	EC-73. "Fail Safe"
	EC-74. "DTC Inspection Priority Chart"
	EC-76. "DTC Index"
IPDM E/R	PCS-13. "Reference Value"
	PCS-18. "Fail-safe"
	PCS-20. "DTC Index"

MANUAL AIR CONDITIONING SYSTEM

< WIRING DIAGRAM >

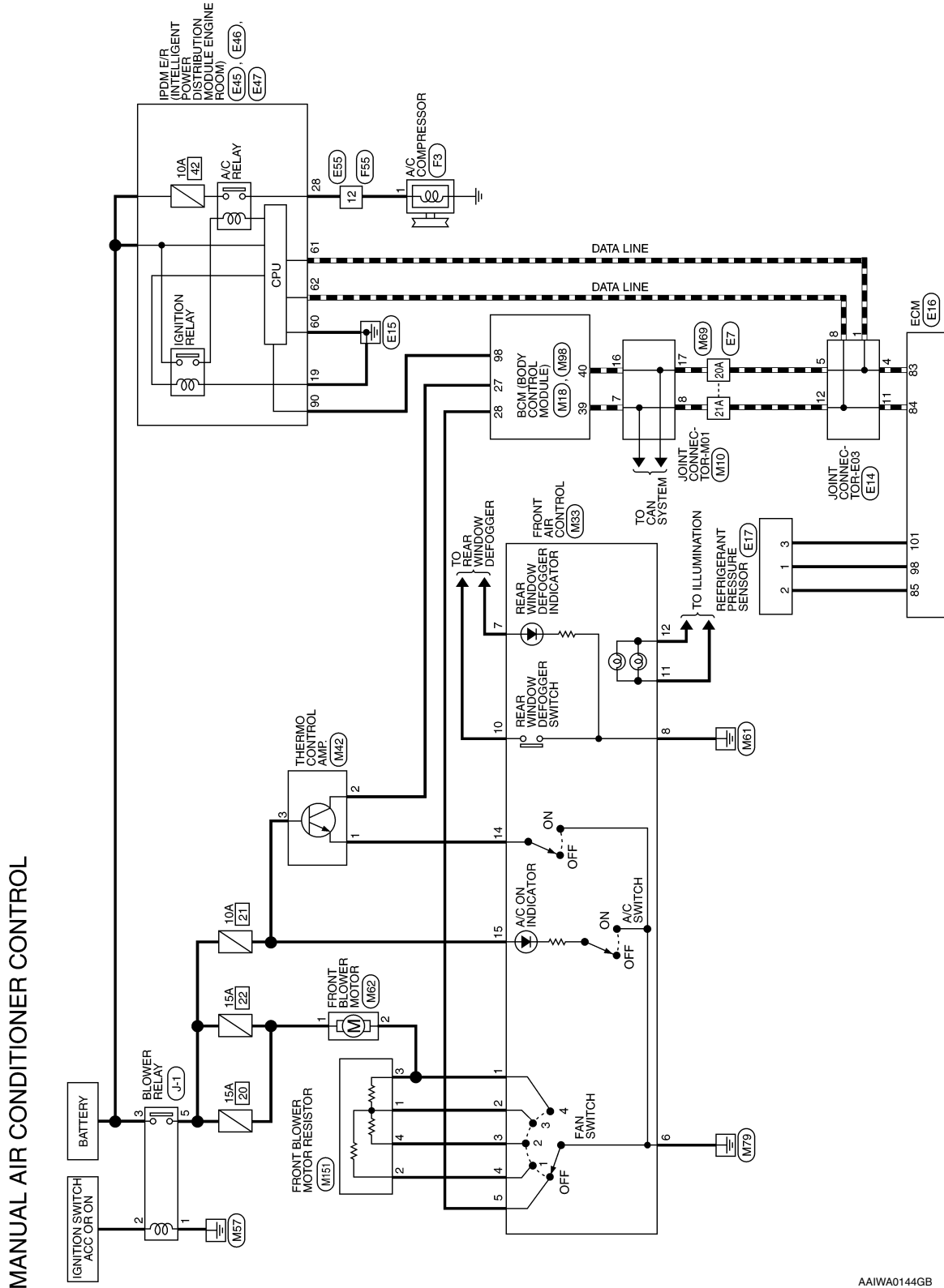
[MANUAL AIR CONDITIONING]

WIRING DIAGRAM

MANUAL AIR CONDITIONING SYSTEM

Wiring Diagram

INFOID:000000009477938



AAIWA0144GB

MANUAL AIR CONDITIONING SYSTEM

< WIRING DIAGRAM >

[MANUAL AIR CONDITIONING]

MANUAL AIR CONDITIONER CONTROL CONNECTORS

Connector No.	M10
Connector Name	JOINT CONNECTOR-M01
Connector Color	BLUE

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Terminal No.	Color of Wire	Signal Name
7	L	-
8	L	-
16	P	-
17	P	-

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE) (WITHOUT INTELLIGENT KEY SYSTEM)
Connector Color	BLACK



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
27	W	AIR CON SW
28	SB	BLOWER FAN SW
39	L	CAN-H
40	P	CAN-L

Connector No.	M33
Connector Name	FRONT AIR CONTROL
Connector Color	BLACK

6	5	4	3	2	1			
15	14	13	12	11	10	9	8	7



Terminal No.	Color of Wire	Signal Name
1	L	-
2	Y	-
3	P	-
4	W	-
5	SB	-
6	B	-
7	R	-

Terminal No.	Color of Wire	Signal Name
8	B	GND
9	-	-
10	G	R/DEF SWITCH
11	W	ILL+
12	B	ILL-
13	-	-
14	V	A/C AND FAN ON
15	Y	IGN

Connector No.	M42
Connector Name	THERMO CONTROL AMP.
Connector Color	BROWN

3	2	1
---	---	---



Terminal No.	Color of Wire	Signal Name
1	V	-
2	W	-
3	Y	-
4	-	-

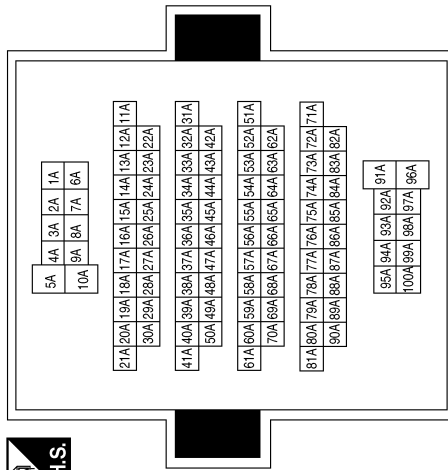
MANUAL AIR CONDITIONING SYSTEM

< WIRING DIAGRAM >

[MANUAL AIR CONDITIONING]

Terminal No.	Color of Wire	Signal Name
20A	P	-
21A	L	-

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Color	WHITE

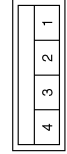


Connector No.	M62
Connector Name	FRONT BLOWER MOTOR
Connector Color	WHITE



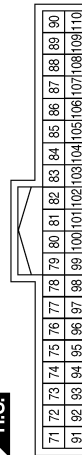
Terminal No.	Color of Wire	Signal Name
1	Y	-
2	L	-

Connector No.	M151
Connector Name	FRONT BLOWER MOTOR RESISTOR
Connector Color	BROWN



Terminal No.	Color of Wire	Signal Name
98	O	IGN RELAY OUTPUT (USM)

Connector No.	M98
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE



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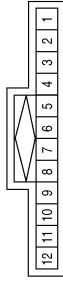
A B C D E F G H HAC J K L M N O P

MANUAL AIR CONDITIONING SYSTEM

< WIRING DIAGRAM >

[MANUAL AIR CONDITIONING]

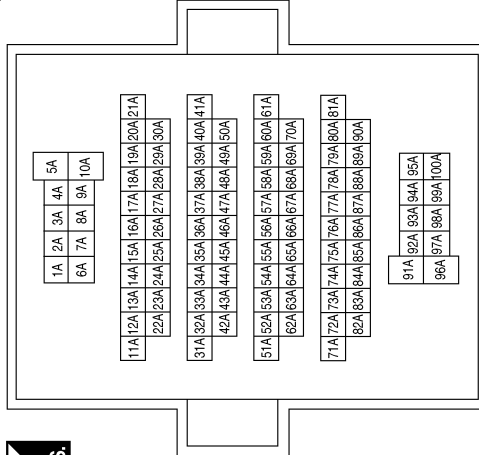
Connector No.	E14
Connector Name	JOINT CONNECTOR-E03
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
1	P	-
4	P	-
5	P	-
8	L	-
11	L	-
12	L	-

Terminal No.	Color of Wire	Signal Name
20A	P	-
21A	L	-

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Color	WHITE



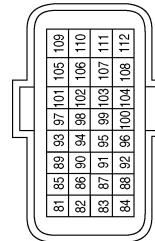
Connector No.	E17
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	LG	-
2	V	-
3	W	-

Terminal No.	Color of Wire	Signal Name
83	P	CAN-L
84	L	CAN-H
85	V	REFRIGERANT PRESSURE SENSOR
98	LG	SENSOR GROUND (REFRIGERANT PRESSURE SENSOR)
101	W	SENSOR POWER SUPPLY (REFRIGERANT PRESSURE SENSOR)

Connector No.	E16
Connector Name	ECM
Connector Color	BLACK



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MANUAL AIR CONDITIONING SYSTEM

< WIRING DIAGRAM >

[MANUAL AIR CONDITIONING]

Connector No.	E47
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



84	83	82	81	80	79	78	77
92	91	90	89	88	87	86	85

Terminal No.	Color of Wire	Signal Name
90	L	IGN SIGNAL

Connector No.	E46
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE



64	63	62	61	60	59	58	57	56	55	54	53
76	75	74	73	72	71	70	69	68	67	66	65

Terminal No.	Color of Wire	Signal Name
60	B	GND (SIGNAL)
61	P	CAN-L
62	L	CAN-H

Connector No.	E45
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BROWN



21	20	19	18	17
28	27	26	25	24
23	22			

Terminal No.	Color of Wire	Signal Name
19	B	GND (POWER)
28	V	A/C CLUTCH

Connector No.	F55
Connector Name	WIRE TO WIRE
Connector Color	GRAY



5	4	3	2	1
12	11	10	9	8
7	6			

Terminal No.	Color of Wire	Signal Name
12	V	—

Connector No.	F3
Connector Name	A/C COMPRESSOR
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	V	—

Connector No.	E55
Connector Name	WIRE TO WIRE
Connector Color	GRAY



1	2	3	4	5
6	7	8	9	10
11	12			

Terminal No.	Color of Wire	Signal Name
12	V	—

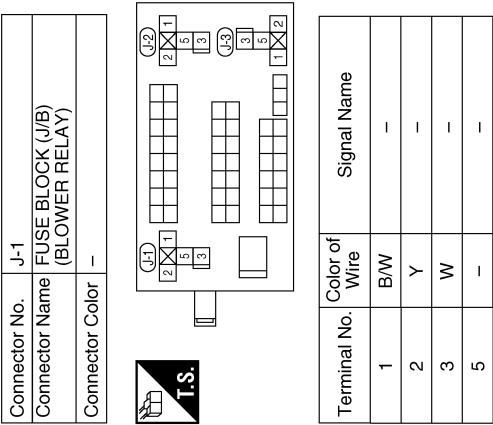
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MANUAL AIR CONDITIONING SYSTEM

< WIRING DIAGRAM >

[MANUAL AIR CONDITIONING]



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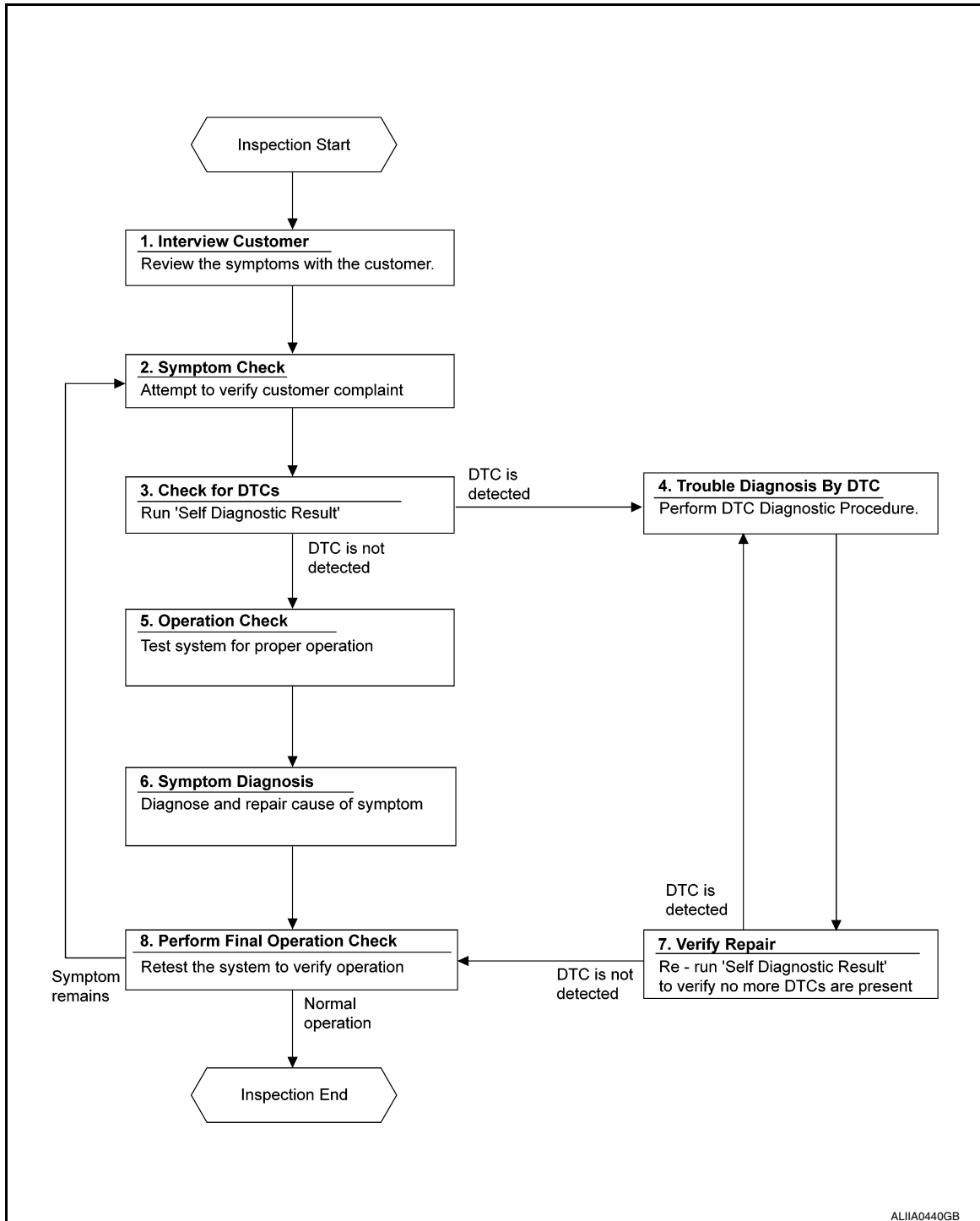
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Workflow

INFOID:000000009477940

OVERALL SEQUENCE



DETAILED FLOW

1. INTERVIEW CUSTOMER

Interview the customer to obtain as much information as possible about the conditions and environment under which the malfunction occurred.

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[MANUAL AIR CONDITIONING]

>> GO TO 2.

2. SYMPTOM CHECK

Verify symptoms.

>> GO TO 3.

3. CHECK FOR DTCS

 With CONSULT

1. Turn ignition switch ON.
2. Select "Self Diagnostic Result" mode of "BCM" using CONSULT.
3. Check DTC.

Is any DTC detected?

- YES >> GO TO 4.
NO >> GO TO 5.

4. PERFORM DTC DIAGNOSTIC PROCEDURE

Perform the diagnostic procedure for the detected DTC. Refer to [BCS-46, "DTC Inspection Priority Chart"](#).

>> GO TO 7.

5. OPERATION CHECK

Perform the operation check. Refer to [HAC-29, "Work Procedure"](#).

>> GO TO 6.

6. SYMPTOM DIAGNOSIS

Check the symptom diagnosis table. Refer to [HAC-43, "Symptom Table"](#).

>> GO TO 8.

7. VERIFY REPAIR.

 With CONSULT

1. Turn ignition switch ON.
2. Select "Self Diagnostic Result" mode of "BCM" using CONSULT.
3. Check DTC.

Is any DTC detected?

- YES >> GO TO 4.
NO >> GO TO 8.

8. PERFORM FINAL OPERATION CHECK

Perform the operation check. Refer to [HAC-29, "Work Procedure"](#).

Does it operate normally?

- YES >> Inspection End.
NO >> GO TO 2.

OPERATION INSPECTION

Work Procedure

INFOID:000000009477941

The purpose of the operation inspection is to check that the individual system operates normally.

Check condition : Engine running at normal operating temperature.

1.CHECK FRONT BLOWER MOTOR

1. Operate fan control dial.
2. Check that fan speed changes. Check operation for all fan speeds.

Is the inspection result normal?

- YES >> GO TO 2.
NO >> GO TO 8.

2.CHECK DISCHARGE AIR

1. Operate fan control dial to set the fan speed to maximum speed.
2. Operate MODE dial to each position.
3. Check that air outlets change according to each indicated air outlet by placing a hand in front of the air outlets. Refer to [VTL-4, "System Description"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> GO TO 8.

3.CHECK INTAKE AIR

1. Operate intake lever to each position.
2. Listen to intake sound and confirm air inlets change.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 8.

4.CHECK COMPRESSOR

1. Turn fan control dial ON.
2. Press A/C switch. The A/C switch indicator is turns ON.
3. Check visually and by sound that the compressor operates.
4. Press A/C switch again. The A/C switch indicator is turns OFF.
5. Check that compressor stops.

Is the inspection result normal?

- YES >> GO TO 5.
NO >> GO TO 8.

5.CHECK DISCHARGE AIR TEMPERATURE

1. Operate temperature control dial.
2. Check that discharge air temperature changes.

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 8.

6.CHECK TEMPERATURE DECREASE

1. Operate compressor.
2. Turn temperature control dial to full cold position.
3. Check that cool air blows from the air outlets.

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 8.

7.CHECK TEMPERATURE INCREASE

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OPERATION INSPECTION

< BASIC INSPECTION >

[MANUAL AIR CONDITIONING]

1. Turn temperature control dial to full hot position.
2. Check that warm air blows from air outlets.

Is the inspection result normal?

- YES >> Inspection End.
NO >> GO TO 8.

8.CHECK SELF-DIAGNOSIS WITH CONSULT

1. Perform self-diagnosis with CONSULT.
2. Check that any DTC is detected.

Is any DTC detected?

- YES >> Perform trouble diagnosis for the detected DTC.
NO >> Refer to [HAC-43. "Symptom Table"](#) and perform the appropriate diagnosis.

DTC/CIRCUIT DIAGNOSIS**A/C ON SIGNAL****Component Function Check**

INFOID:000000009477942

1.CHECK A/C ON SIGNAL

④ With CONSULT

1. Turn ignition switch ON.
2. Operate front blower motor.
3. Select "AIR CONDITIONER" of "BCM" using CONSULT.
4. Select "AIR COND SW" in "DATA MONITOR" mode, and check status under the following condition.

Monitor item	Condition		Status
AIR COND SW	A/C switch	ON	On
		OFF	Off

Is the inspection result normal?

- YES >> Inspection End.
 NO >> Refer to [HAC-31, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000009477943

Regarding Wiring Diagram information, refer to [HAC-21, "Wiring Diagram"](#).**1.CHECK FUSE**

1. Turn ignition switch OFF.
2. Check 10A fuse (No. 21, located in fuse block (J/B)).

NOTE:Refer to [PG-37, "Terminal Arrangement"](#).Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Replace the blown fuse after repairing the affected circuit.

2.CHECK THERMO CONTROL AMP. POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect thermo control amp. connector.
3. Turn ignition switch ON.
4. Check voltage between thermo control amp. harness connector and ground.

+		-	Voltage (V) (Approx.)
Thermo control amp.			
Connector	Terminal		
M42	3	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair harness or connector between thermo control amp. and fuse.

3.CHECK THERMO CONTROL AMP. GROUND CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between thermo control amp. harness connector and front air control harness connector.

A/C ON SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONING]

Thermo control amp.		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M42	1	M33	14	Yes

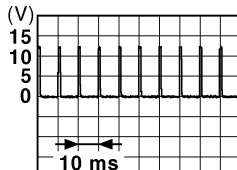
Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.

4.CHECK A/C ON SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between thermo control amp. harness connector and ground with using oscilloscope.

+		-	Output waveform
Thermo control amp.			
Connector	Terminal		
M42	2	Ground	

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 6.

5.CHECK FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Check front air control. Refer to [HAC-32, "Component Inspection"](#).

Is the inspection result normal?

YES >> Replace thermo control amp. Refer to [HAC-48, "Removal and Installation"](#).

NO >> Replace front air control. Refer to [HAC-47, "Removal and Installation"](#).

6.CHECK A/C ON SIGNAL CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity between thermo control amp. harness connector and BCM harness connector.

Thermo control amp.		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M42	2	M18	27	Yes

Is the inspection result normal?

YES >> Replace BCM. Refer to [BCS-67, "Removal and Installation"](#).

NO >> Repair harness or connector.

Component Inspection

INFOID:000000009477944

1.CHECK A/C CONTROL

Check continuity front air control terminals.

A/C ON SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONING]

Terminal		Condition	Continuity
14	6	A/C switch: ON Fan control dial: Except OFF position	Yes

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace front air control. Refer to [HAC-47, "Removal and Installation"](#).

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BLOWER FAN ON SIGNAL

Component Function Check

INFOID:000000009477945

1.CHECK BLOWER FAN ON SIGNAL

④With CONSULT

1. Turn ignition switch ON.
2. Select "AIR CONDITIONER" of "BCM" using CONSULT.
3. Select "FAN ON SIG" in "DATA MONITOR" mode, and check status under the following condition.

Monitor item	Condition		Status
FAN ON SIG	Fan control dial	Except OFF position	On
		OFF position	Off

Is the inspection result normal?

- YES >> Inspection End.
 NO >> Refer to [HAC-34, "Diagnosis Procedure"](#).

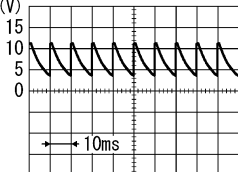
Diagnosis Procedure

INFOID:000000009477946

Regarding Wiring Diagram information, refer to [HAC-21, "Wiring Diagram"](#).

1.CHECK BLOWER FAN ON SIGNAL

1. Turn ignition switch OFF.
2. Disconnect front air control harness connector.
3. Turn ignition switch ON.
4. Check output waveform between front air control and ground with using oscilloscope.

+		-	Output waveform
Front air control			
Connector	Terminal		
M33	5	Ground	 PKIB4960J

Is the inspection result normal?

- YES >> Replace front air control. Refer to [HAC-47, "Removal and Installation"](#).
 NO >> GO TO 2.

2.CHECK BLOWER FAN ON SIGNAL CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect BCM connector.
3. Check continuity front air control harness connector and BCM harness connector.

Front air control		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M33	5	M18	28	Yes

Is the inspection result normal?

- YES >> GO TO 3.

BLOWER FAN ON SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONING]

NO >> Repair harness or connector.

3.CHECK BLOWER FAN ON SIGNAL CIRCUIT FOR SHORT

Check continuity between front air control harness connector and ground.

Front air control		—	Continuity
Connector	Terminal		
M33	5	Ground	No

Is the inspection result normal?

YES >> Replace BCM. Refer to [BCS-67. "Removal and Installation"](#).

NO >> Repair harness or connector.

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HAC

A/C INDICATOR

Diagnosis Procedure

INFOID:000000009477947

Regarding Wiring Diagram information, refer to [HAC-21, "Wiring Diagram"](#).

1.CHECK A/C INDICATOR POWER SUPPLY

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

+		-	Voltage (V) (Approx.)
Front air control			
Connector	Terminal		
M33	15	Ground	Battery voltage

Is the inspection result normal?

- YES >> Replace front air control. Refer to [HAC-47, "Removal and Installation"](#).
- NO >> Repair harness or connector between front air control and fuse.

FRONT BLOWER MOTOR

Description

INFOID:000000009477948

The front blower motor utilizes a brush-less motor with a rotating magnet. Quietness is improved over previous motors where the brush was the point of contact and the coil rotated.

Diagnosis Procedure

INFOID:000000009477949

Regarding Wiring Diagram information, refer to [HAC-21, "Wiring Diagram"](#).

1.CHECK SYMPTOM

Check symptom (A or B).

Symptom	
A	Front blower motor does not operate at any dial position
B	Front blower motor does not operate at any dial position other than 4th, or operation speed is not normal.

Which symptom is detected?

- A >> GO TO 2.
B >> GO TO 7.

2.CHECK FUSE

- Turn ignition switch OFF.
- Check 15A fuses (Nos. 20 and 22, located in fuse block (J/B)).

NOTE:

Refer to [PG-37, "Terminal Arrangement"](#).

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Replace the blown fuse after repairing the affected circuit.

3.CHECK FRONT BLOWER MOTOR POWER SUPPLY

- Disconnect front blower motor connector.
- Turn ignition switch ON.
- Check voltage between front blower motor harness connector and ground.

+		-	Voltage (V) (Approx.)
Front blower motor			
Connector	Terminal		
M62	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 5.
NO >> GO TO 4.

4.CHECK BLOWER RELAY

- Turn ignition switch OFF.
- Check blower relay. Refer to [HAC-39, "Component Inspection \(Blower Relay\)"](#).

Is the inspection result normal?

- YES >> Repair harness or connector between front blower motor and fuse.
NO >> Replace blower relay.

5.CHECK FAN SWITCH GROUND CIRCUIT FOR OPEN

- Turn ignition switch OFF.

FRONT BLOWER MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONING]

2. Disconnect front air control connector.
3. Check continuity between front air control harness connector and ground.

Front air control		—	Continuity
Connector	Terminal		
M33	6	Ground	Yes

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector.

6.CHECK FAN SWITCH 4TH POSITION CIRCUIT FOR OPEN

Check continuity between front air control harness connector and front blower motor harness connector.

Front air control		Front blower motor		Continuity
Connector	Terminal	Connector	Terminal	
M33	1	M62	2	Yes

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair the harness or connector.

7.CHECK FRONT BLOWER MOTOR RESISTOR POWER SUPPLY

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

+		-	Voltage (V) (Approx.)
Front blower motor resistor			
Connector	Terminal		
M151	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector between front blower motor resistor and front blower motor.

8.CHECK FAN SWITCH 1ST, 2ND, AND 3RD POSITION CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect front air control.
3. Check continuity between front air control harness connector and front blower motor resistor.

Front air control		Front blower motor resistor		Continuity
Connector	Terminal	Connector	Terminal	
M33	2	M151	1	Yes
	3		4	
	4		2	

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair harness or connector.

9.CHECK FRONT BLOWER MOTOR RESISTOR

Check front blower motor resistor. Refer to [HAC-39, "Component Inspection \(Front Blower Motor Resistor\)"](#).

Is the inspection result normal?

YES >> GO TO 10.

FRONT BLOWER MOTOR

[MANUAL AIR CONDITIONING]

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace front blower motor resistor. Refer to [HAC-50. "Removal and Installation"](#).

10.CHECK FAN SWITCH

Check fan switch. Refer to [HAC-39. "Component Inspection \(Fan Switch\)"](#).

Is the inspection result normal?

YES >> Replace front blower motor. Refer to [VTL-8. "Removal and Installation"](#).

NO >> Replace front air control. Refer to [HAC-47. "Removal and Installation"](#).

Component Inspection (Front Blower Motor)

INFOID:0000000009477950

1.CHECK FRONT BLOWER MOTOR

1. Connect battery voltage to terminal 1 of front blower motor.
2. Connect ground to terminal 2 of front blower motor.

Does the front blower motor operate?

YES >> Intermittent incident. Refer to [GI-41. "Intermittent Incident"](#).

NO >> Replace front blower motor. Refer to [VTL-8. "Removal and Installation"](#).

Component Inspection (Blower Relay)

INFOID:0000000009477951

1.CHECK BLOWER RELAY

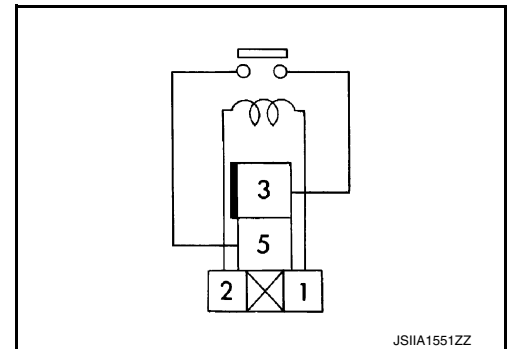
1. Remove blower relay. Refer to [PG-37. "Terminal Arrangement"](#).
2. Check continuity between blower relay terminal 3 and 5 when the voltage is supplied between terminal 1 and 2.

Terminal		Voltage	Continuity
3	5	ON	Yes
		OFF	No

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace blower relay.



Component Inspection (Front Blower Motor Resistor)

INFOID:0000000009477952

1.CHECK FRONT BLOWER MOTOR RESISTOR

1. Disconnect front blower motor resistor connector.
2. Check resistance between front blower motor resistor terminals. Refer to applicable table for the normal value.

Terminal		Resistance: Ω (Approx.)
3	1	0.54
	4	1.56
	2	3.07

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace front blower motor resistor. Refer to [HAC-50. "Removal and Installation"](#).

Component Inspection (Fan Switch)

INFOID:0000000009477953

1.CHECK FAN SWITCH

1. Remove front air control. Refer to [HAC-47. "Removal and Installation"](#).
2. Check continuity between front air control terminals.

FRONT BLOWER MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONING]

Terminal		Condition	Continuity
		Fan control dial (fan switch) position	
6	4	1st	Yes
	3	2nd	
	2	3rd	
	1	4th	

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace front air control. Refer to [HAC-47, "Removal and Installation"](#).

MAGNET CLUTCH

Description

INFOID:000000009477954

SYSTEM DESCRIPTION

When the blower speed dial is in one of the fan speed positions, the front air control outputs a fan ON signal to the BCM. When the A/C switch is pressed, the A/C switch LED illuminates and the front air control outputs a compressor ON signal to the BCM. Any mode control button can be selected. As long as the BCM receives a compressor ON signal and a fan ON signal from the front air control, the conditions required for the BCM to transmit a compressor ON request to the ECM have been met.

The BCM sends a compressor ON signal to ECM, via CAN communication line.

The ECM judges whether the compressor can be turned ON, based on each sensor status (refrigerant pressure sensor signal, throttle angle sensor, etc.). If it judges the compressor can be turned ON, it sends a compressor ON signal to IPDM E/R, via CAN communication line.

Upon receipt of a compressor ON signal from ECM, IPDM E/R turns the A/C relay ON to operate the compressor.

Component Function Check

INFOID:000000009477955

1. CHECK MAGNET CLUTCH OPERATION

Perform auto active test of IPDM E/R. Refer to [PCS-10, "CONSULT Function \(IPDM E/R\)"](#).

Is the inspection result normal?

YES >> Inspection End.

NO >> Refer to [HAC-41, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000009477956

Regarding Wiring Diagram information, refer to [HAC-21, "Wiring Diagram"](#).

1. CHECK FUSE

Check 10A fuse (No. 42, located in IPDM E/R).

NOTE:

Refer to [PG-39, "IPDM E/R Terminal Arrangement"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the blown fuse after repairing the affected circuit.

2. CHECK MAGNET CLUTCH

1. Turn ignition switch OFF.
2. Disconnect compressor connector.
3. Directly apply battery voltage to the magnet clutch. Check for operation visually and by sound.

Does it operate normally?

YES >> GO TO 3.

NO >> Replace magnet clutch. Refer to [HA-25, "Removal and Installation"](#).

3. CHECK MAGNET CLUTCH POWER SUPPLY CIRCUIT FOR OPEN

1. Disconnect IPDM E/R connector.
2. Check continuity between IPDM E/R harness connector and compressor harness connector.

IPDM E/R		Compressor		Continuity
Connector	Terminal	Connector	Terminal	
E45	28	F3	1	Yes

MAGNET CLUTCH

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONING]

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-30, "Removal and Installation"](#).
- NO >> Repair harness or connector.

SYMPTOM DIAGNOSIS

MANUAL AIR CONDITIONING SYSTEM

Symptom Table

INFOID:000000009477957

SYMPTOM TABLE

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-29
A/C system cannot be controlled.	Go to Self-diagnosis Function.	HAC-27
Air outlet does not change.	Go to Adjustment Procedure for Mode Door.	HAC-52
Discharge air temperature does not change.	Go to Adjustment Procedure for Air Mix Door.	HAC-52
Intake door does not change.	Go to Adjustment Procedure for Intake Door.	HAC-51
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-37
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-41
Insufficient cooling.	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-44
Insufficient heating.	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-45
Noise.	Go to Trouble Diagnosis Procedure for Noise.	HA-16
A/C switch LED does not illuminate.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-36
Both high- and low-pressure sides are too high.	Go to Trouble Diagnosis Procedure for Abnormal Pressure.	HA-14
High-pressure side is too high and low pressure side is too low.	Go to Trouble Diagnosis Procedure for Abnormal Pressure.	HA-14
High-pressure side is too low and low-pressure side is too high.	Go to Trouble Diagnosis Procedure for Abnormal Pressure.	HA-14
Both high- and low-pressure side sometimes become negative.	Go to Trouble Diagnosis Procedure for Abnormal Pressure.	HA-14
Low-pressure side sometimes becomes negative.	Go to Trouble Diagnosis Procedure for Abnormal Pressure.	HA-14
Low-pressure side becomes negative.	Go to Trouble Diagnosis Procedure for Abnormal Pressure.	HA-14

INSUFFICIENT COOLING

Description

INFOID:000000009477958

Symptom

- Insufficient cooling
- No cool air comes out. (Air flow volume is normal.)

Diagnosis Procedure

INFOID:000000009477959

NOTE:

Perform self-diagnosis with CONSULT before performing symptom diagnosis. If any malfunction result or DTC is detected, perform the corresponding diagnosis.

1.CHECK MAGNET CLUTCH OPERATION

1. Turn ignition switch ON.
2. Turn fan control dial ON.
3. Press A/C switch.
4. Check that A/C indicator turns ON. Check visually and by sound that compressor operates.
5. Press A/C switch again.
6. Check that A/C indicator turns OFF. Check that compressor stops.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check compressor operation. Refer to [HAC-46, "Diagnosis Procedure"](#).

2.CHECK DRIVE BELT

Check tension of drive belt. Refer to [EM-17, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Adjust or replace drive belt depending on the inspection results.

3.CHECK REFRIGERANT CYCLE PRESSURE

Connect the recovery/recycling recharging equipment to the vehicle and perform the pressure inspection using gauge. Refer to [HA-14, "Symptom Table"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace parts depending on the inspection results.

4.CHECK AIR LEAKAGE FROM EACH DUCT

Check duct and nozzle, etc. of the air conditioner system for leakage.

Is the inspection result normal?

YES >> Check air mix door cable installation and air mix door operation.

NO >> Repair or replace parts depending on the inspection results.

INSUFFICIENT HEATING

Description

INFOID:000000009477960

Symptom

- Insufficient heating
- No warm air comes out. (Air flow volume is normal.)

Diagnosis Procedure

INFOID:000000009477961

NOTE:

Perform self-diagnosis with CONSULT before performing symptom diagnosis. If any malfunction result or DTC is detected, perform the corresponding diagnosis.

1.CHECK COOLING SYSTEM

1. Check engine coolant level and check for leakage. Refer to [CO-8, "Inspection"](#).
2. Check radiator cap. Refer to [CO-8, "Inspection"](#).
3. Check water flow sounds of the engine coolant. Refer to [CO-9, "Refilling"](#).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Refill engine coolant and repair or replace the parts depending on the inspection results.

2.CHECK HEATER HOSE

Check installation of heater hose by visually or touching.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace parts depending on the inspection results.

3.CHECK HEATER CORE

1. Check temperature of inlet hose and outlet hose of heater core.
2. Check that inlet side of heater core is hot and the outlet side is slightly lower than/almost equal to the inlet side.

CAUTION:

Always perform the temperature inspection in a short period of time because the engine coolant temperature is very hot.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace heater core. Refer to [HA-33, "HEATER CORE : Removal and Installation"](#).**4.CHECK AIR LEAKAGE FROM EACH DUCT**

Check duct and nozzle, etc. of air conditioning system for air leakage.

Is the inspection result normal?

YES >> Check air mix door cable installation and air mix door operation.

NO >> Repair or replace parts depending on the inspection results.

COMPRESSOR DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

[MANUAL AIR CONDITIONING]

COMPRESSOR DOES NOT OPERATE

Description

INFOID:000000009477962

SYMPTOM

Compressor does not operate.

Diagnosis Procedure

INFOID:000000009477963

NOTE:

- Perform self-diagnosis with CONSULT before performing symptom diagnosis. If any malfunction result or DTC is detected, perform the corresponding diagnosis.
- Check that refrigerant system is fully charged. If the refrigerant charge is low, perform the inspection for refrigerant leakage

1.CHECK MAGNET CLUTCH OPERATION

Check magnet clutch. Refer to [HAC-41, "Component Function Check"](#).

Does it operate normally?

YES >> GO TO 2.

NO >> Repair or replace malfunctioning parts.

2.CHECK REFRIGERANT PRESSURE SENSOR

Check refrigerant pressure sensor. Refer to [EC-325, "Component Function Check"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning parts.

3.CHECK A/C ON SIGNAL

Check A/C ON signal. Refer to [HAC-31, "Component Function Check"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning parts.

4.CHECK BLOWER FAN ON SIGNAL

Check blower fan ON signal. Refer to [HAC-34, "Component Function Check"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace malfunctioning parts

5.CHECK BCM OUTPUT SIGNAL

Ⓔ With CONSULT

1. Select "DATA MONITOR" mode of "ECM" using CONSULT.
2. Select "AIR COND SIG" and "HEATER FAN SW", and check status under the following conditions.

Monitor item	Condition		Status
AIR COND SIG	A/C switch	OFF (A/C indicator: OFF)	Off
		ON (A/C indicator: ON)	On
HEATER FAN SW	Blower motor	OFF	Off
		ON	On

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to [PCS-30, "Removal and Installation"](#).

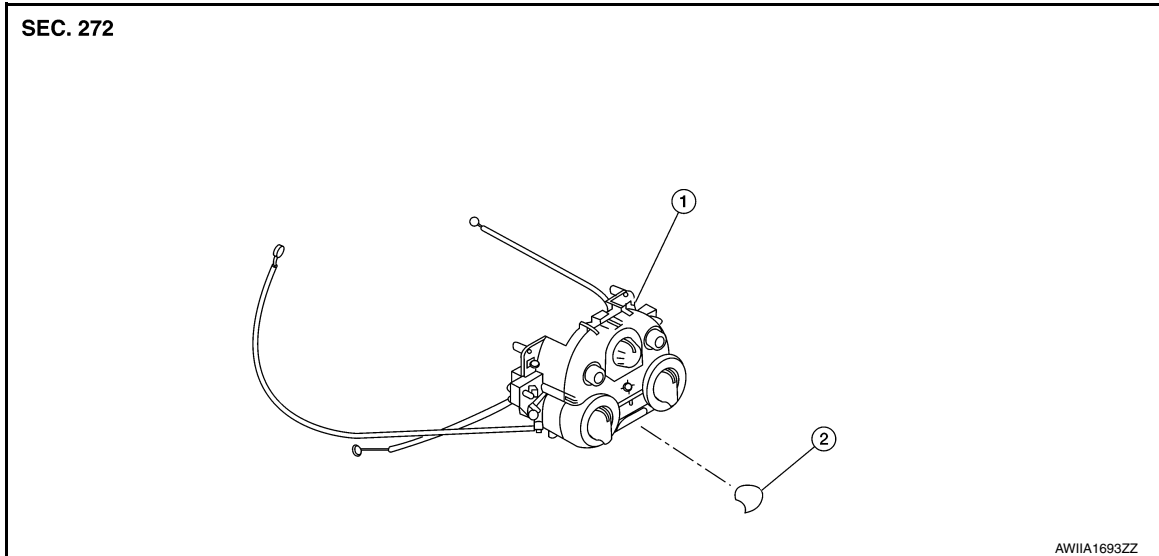
NO >> Replace BCM. Refer to [BCS-67, "Removal and Installation"](#).

REMOVAL AND INSTALLATION

FRONT AIR CONTROL

Exploded View

INFOID:000000009405613



1. Front air control

2. Intake door lever knob

Removal and Installation

INFOID:000000009405614

HAC

REMOVAL

1. Remove cluster lid C. Refer to [IP-22, "Removal and Installation"](#).
2. Remove front air control finisher. Refer to [IP-23, "Removal and Installation"](#).
3. Remove audio unit or AV control unit. Refer to [AV-33, "Removal and Installation"](#) (AUDIO UNIT), or [AV-93, "Removal and Installation"](#) (DISPLAY AUDIO), or [AV-178, "Removal and Installation"](#) (NAVIGATION).
4. Remove air mix door cable, mode door cable, and intake door cable from the heating and cooling unit assembly.
5. Remove screws and front air control.

INSTALLATION

Installation is in the reverse order of removal.

THERMO CONTROL AMPLIFIER

Removal and Installation

INFOID:000000009645133

REMOVAL

1. Remove evaporator. Refer to [HA-33, "EVAPORATOR : Removal and Installation"](#).
2. Remove thermo control amplifier from evaporator.

INSTALLATION

Installation is in the reverse order of removal.

REFRIGERANT PRESSURE SENSOR

< REMOVAL AND INSTALLATION >

[MANUAL AIR CONDITIONING]

REFRIGERANT PRESSURE SENSOR

Removal and Installation

INFOID:000000009515775

CAUTION:

Perform lubricant return operation before each A/C system disassembly. However, if a large amount of refrigerant or lubricant leaks from the system, do not perform lubricant return operation. Refer to [HA-21, "Perform Oil Return Operation"](#).

REMOVAL

1. Discharge the refrigerant. Refer to [HA-19, "Recycle Refrigerant"](#).
2. Remove front grille. Refer to [EXT-21, "Removal and Installation"](#).
3. Remove upper air guide and air guide (LH). Refer to [CO-14, "Exploded View"](#).
4. Clean refrigerant pressure sensor and surrounding area.

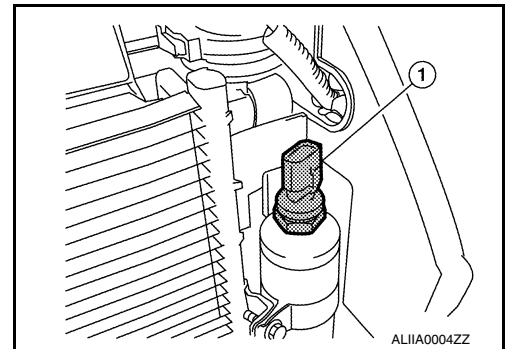
CAUTION:

Make sure to clean carefully.

5. Disconnect refrigerant pressure sensor harness connector.
6. Support liquid tank, then remove refrigerant pressure sensor (1).

CAUTION:

- Be careful not to damage liquid tank.
- Be careful not to damage core surface of condenser.
- Cap or wrap the joint of the condenser and liquid tank with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- Do not reuse O-rings.
- Apply compressor oil to new O-ring of the refrigerant pressure sensor for installation.
- After charging refrigerant, check for leaks. Refer to [HA-17, "Leak Test"](#).

FRONT BLOWER MOTOR RESISTOR

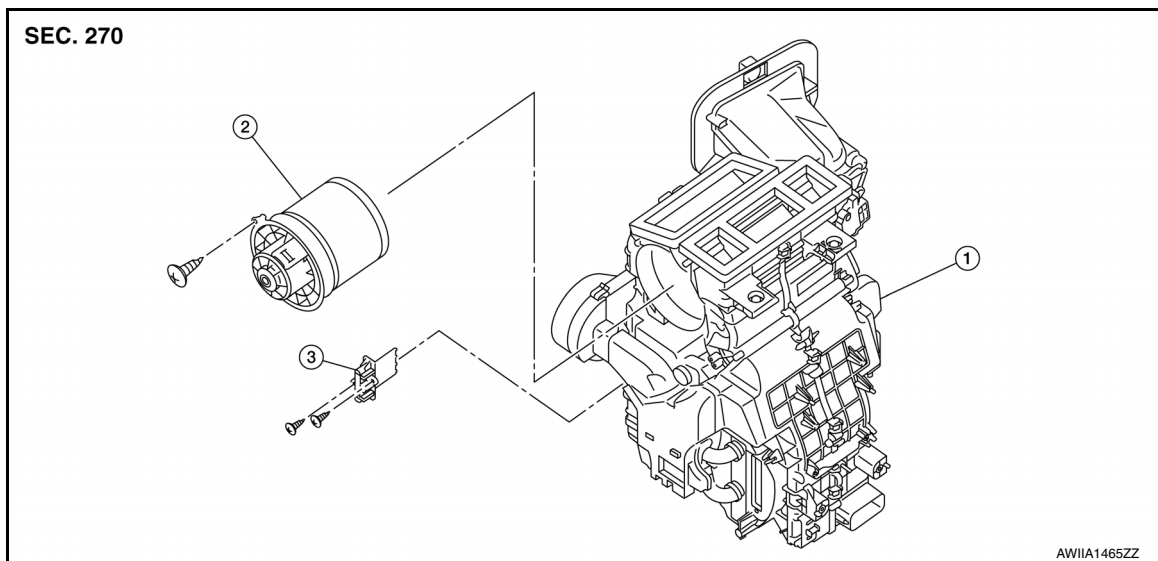
< REMOVAL AND INSTALLATION >

[MANUAL AIR CONDITIONING]

FRONT BLOWER MOTOR RESISTOR

Exploded View

INFOID:000000009405616



1. Heating and cooling unit assembly

2. Front blower motor

3. Front blower motor resistor

Removal and Installation

INFOID:000000009405617

REMOVAL

1. Disconnect harness connector from front blower motor resistor.
2. Remove screws and front blower motor resistor.

INSTALLATION

Installation is in the reverse order of removal.

DOOR CABLE

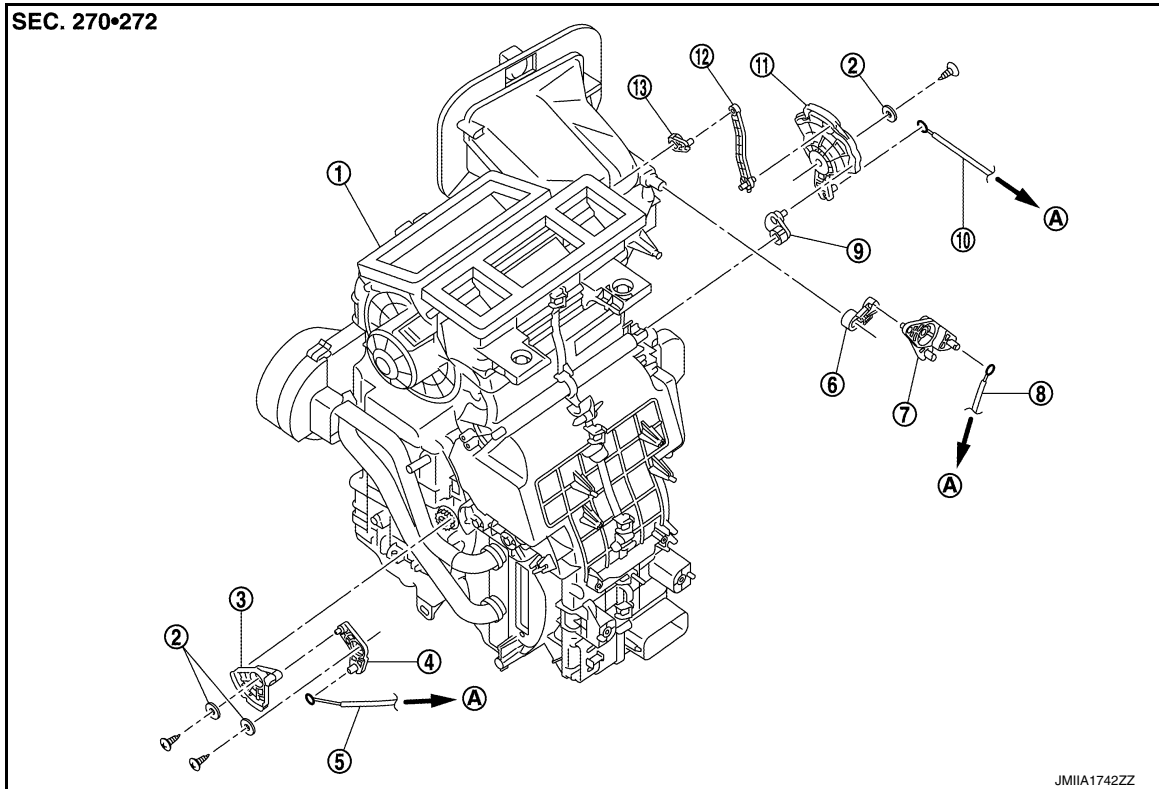
< REMOVAL AND INSTALLATION >

[MANUAL AIR CONDITIONING]

DOOR CABLE

Exploded View

INFOID:000000009405618



- | | | |
|--------------------------------------|-----------------------|---------------------------|
| 1. Heating and cooling unit assembly | 2. Plate | 3. Air mix door linkage 2 |
| 4. Air mix door linkage 1 | 5. Air mix door cable | 6. Intake door lever |
| 7. Intake door linkage | 8. Intake door cable | 9. Foot door lever |
| 10. Mode door cable | 11. Main linkage | 12. Ventilator door rod |
| 13. Ventilator door lever | | |
| A. To front air control | | |

INTAKE DOOR CABLE

INTAKE DOOR CABLE : Removal and Installation

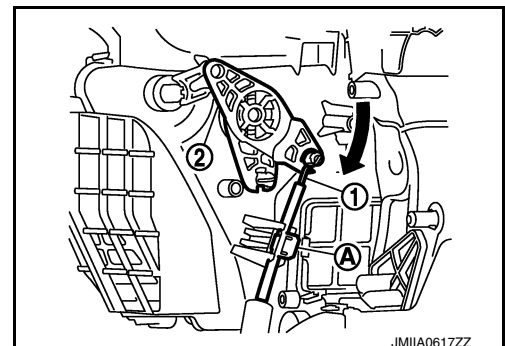
INFOID:000000009405619

The intake door cable is not serviced separately. Refer to [HAC-47, "Removal and Installation"](#).

INTAKE DOOR CABLE : Adjustment

INFOID:000000009405620

1. Remove glove box assembly. Refer to [IP-25, "Removal and Installation"](#).
2. Disconnect intake door cable (1) from clip (A).
3. Set intake door lever to REC position.
4. Push intake door link (2) in the direction shown, then carefully pull outer cable to front air control side and connect clip.



DOOR CABLE

< REMOVAL AND INSTALLATION >

[MANUAL AIR CONDITIONING]

5. Operate intake door lever to make sure that inner cable moves smoothly.

CAUTION:

When clipping outer cable, do not move inner cable.

MODE DOOR CABLE

MODE DOOR CABLE : Removal and Installation

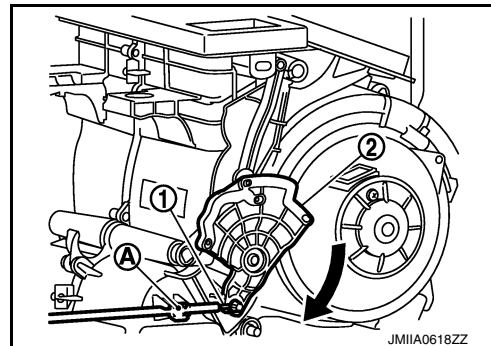
INFOID:000000009405621

The mode door cable is not serviced separately. Refer to [HAC-47, "Removal and Installation"](#).

MODE DOOR CABLE : Adjustment

INFOID:000000009405622

1. Remove glove box assembly. Refer to [IP-25, "Removal and Installation"](#).
2. Disconnect mode door cable (1) from clip (A).
3. Set mode dial to VENT position.
4. Push main link (2) in the direction shown, then carefully pull outer cable to front air control side and connect clip.



5. Operate mode dial to make sure that inner cable moves smoothly.

CAUTION:

When clipping outer cable, do not move inner cable.

AIR MIX DOOR CABLE

AIR MIX DOOR CABLE : Removal and Installation

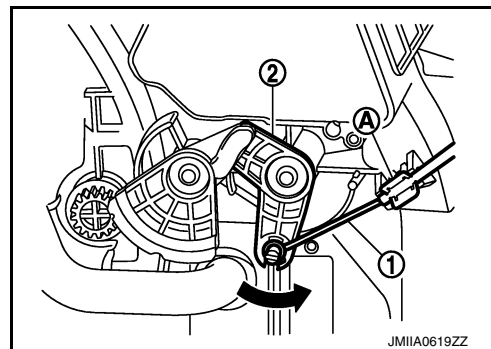
INFOID:000000009405623

The air mix door cable is not serviced separately. Refer to [HAC-47, "Removal and Installation"](#).

AIR MIX DOOR CABLE : Adjustment

INFOID:000000009405624

1. Remove instrument lower panel LH. Refer to [IP-24, "Removal and Installation"](#).
2. Remove foot duct (LH). Refer to [VTL-7, "FOOT DUCT : Removal and Installation"](#).
3. Disconnect air mix door cable (1) from clip (A).
4. Set temperature dial to full cold position.
5. Push air mix door link (2) in the direction shown, then carefully pull outer cable to front air control side and connect clip.



6. Operate temperature dial to make sure that inner cable moves smoothly.

CAUTION:

When clipping outer cable, do not move inner cable.