

# SECTION HAC

## HEATER & AIR CONDITIONING CONTROL SYSTEM

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# BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORKFLOW

### Work Flow

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#### DETAILED FLOW

#### 1. LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. (Get detailed information about the conditions and environment when the symptom occurs.)

>> GO TO 2.

#### 2. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to [HAC-6, "Description & Inspection"](#).

>> GO TO 3.

#### 3. GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis (Refer to [HAC-108, "Diagnosis Chart By Symptom"](#) below).

>> GO TO 4.

#### 4. REPAIR OR REPLACE

Repair or replace the specific parts.

>> GO TO 5.

#### 5. FINAL CHECK

Final check.

Is the inspection result normal?

YES >> CHECK OUT

NO >> GO TO 3.

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# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[AUTOMATIC AIR CONDITIONER]

## INSPECTION AND ADJUSTMENT

### Description & Inspection

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#### DESCRIPTION

The purpose of the operational check is to check if the individual system operates properly.

**Conditions** : Engine running at normal operating temperature

#### INSPECTION PROCEDURE

##### Memory Function

1. Turn temperature control dial (driver side) clockwise until 30.0°C is displayed.
2. Press ON/OFF switch.
3. Turn ignition switch OFF.
4. Turn ignition switch ON.
5. Press AUTO switch.
6. Confirm that the set temperature remains at previous temperature.
7. Press ON/OFF switch.

If NG, go to trouble diagnosis procedure for [HAC-116, "Inspection procedure"](#).

If OK, continue the check.

##### Blower

1. Turn fan control dial clockwise. Blower should operate on low speed.
2. Turn fan control dial clockwise again, and continue checking blower speed until all speeds are checked.
3. Leave blower on max. speed.

If NG, go to trouble diagnosis procedure for [HAC-62, "Diagnosis Procedure"](#).

If OK, continue the check.

##### Discharge Air (MODE switch and DEF switch)

1. Press MODE switches and DEF switch.
2. Each position indicator should illuminate.
3. Confirm that discharge air comes out according to the air distribution table. Refer to [HAC-15, "System Description"](#).

Discharge air flow					
Mode door position	Condition	Air outlet/distribution			
		VENT	FOOT		DEF
			Front	Rear	
	DUAL SW: OFF High-level ventilator door : SHUT	100%	—	—	—
		60%	24%	16%	—
		15%	39%	26%	20%
		10%	27%	18%	45%
		10%	—	—	90%

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If NG, go to trouble diagnosis procedure for [HAC-47, "Diagnosis Procedure"](#).

If OK, continue the check.

#### NOTE:

Confirm that the magnet clutch is engaged (sound or visual inspection) and intake door position is at FRE when the D/F or DEF is selected.

##### Discharge Air (High-level ventilator switch)

1. Press high-level ventilator switch. High-level ventilator switch indicator should illuminate.

# INSPECTION AND ADJUSTMENT

## [AUTOMATIC AIR CONDITIONER]

### < BASIC INSPECTION >

2. Confirm that discharge air comes out.
  3. Press high-level ventilator switch again. High-level ventilator indicator should not illuminate.
- If NG, go to trouble diagnosis procedure for [HAC-50, "Diagnosis Procedure"](#).  
If OK, continue the check.

#### Intake Air

1. Press recirculation (REC) switch. Recirculation indicator should illuminate.
  2. Press fresh (FRE) switch. Fresh indicator should illuminate.
  3. Listen for intake door position change. (Slight change of blower sound can be heard.)
- If NG, go to trouble diagnosis procedure for [HAC-59, "Diagnosis Procedure"](#).  
If OK, continue the check.

#### NOTE:

Confirm that the magnet clutch is engaged (sound or visual inspection) and intake door position is at FRE when the D/F or DEF is selected.

#### Temperature Decrease

1. Turn temperature control dial (driver side) counterclockwise until 16.0°C is displayed.
  2. Check for cold air at discharge air outlets.
- If NG, go to trouble diagnosis procedure for [HAC-109, "Inspection procedure"](#).  
If OK, continue the check.

#### Temperature Increase

1. Turn temperature control dial (driver side) clockwise until 30.0°C is displayed.
  2. Check for hot air at discharge air outlets.
- If NG, go to trouble diagnosis procedure for [HAC-111, "Inspection procedure"](#).  
If OK, continue the check.

#### A/C Switch

1. Press AUTO switch and A/C switch.
2. A/C switch indicator will turn ON.
  - Confirm that the magnet clutch engages (sound or visual inspection).

#### Auto Mode

1. Press AUTO switch and A/C switch.
  2. AUTO switch indicator will turn ON.
    - Confirm that discharge air and blower speed will depend on ambient, in-vehicle, and set temperatures.
- If NG, go to trouble diagnosis procedure for [HAC-89, "Diagnosis Procedure"](#), then if necessary, trouble diagnosis procedure for [HAC-66, "Diagnosis Procedure"](#).  
If all operational checks are OK (symptom cannot be duplicated), go to Incident Simulation Tests in [GI-38, "Work Flow"](#) and perform tests as outlined to simulate driving conditions environment. If symptom appears, refer to [HAC-108, "Diagnosis Chart By Symptom"](#) and perform applicable trouble diagnosis procedures.

### AUXILIARY MECHANISM

#### Temperature Setting Trimmer

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

Operating procedures for this trimmer are as follows:

1. Begin self-diagnosis STEP-5 mode. Refer to [HAC-27, "Diagnosis Description"](#).
2. Turn fan control dial clockwise to set system in auxiliary mode.
3. Display shows "61" in auxiliary mechanism. It takes approximately 3 seconds to enable setting operation.
4. Turn temperature control dial (driver side) as desired. Temperature will change at a rate of 0.5°C each time a dial is turned.

#### CAUTION:

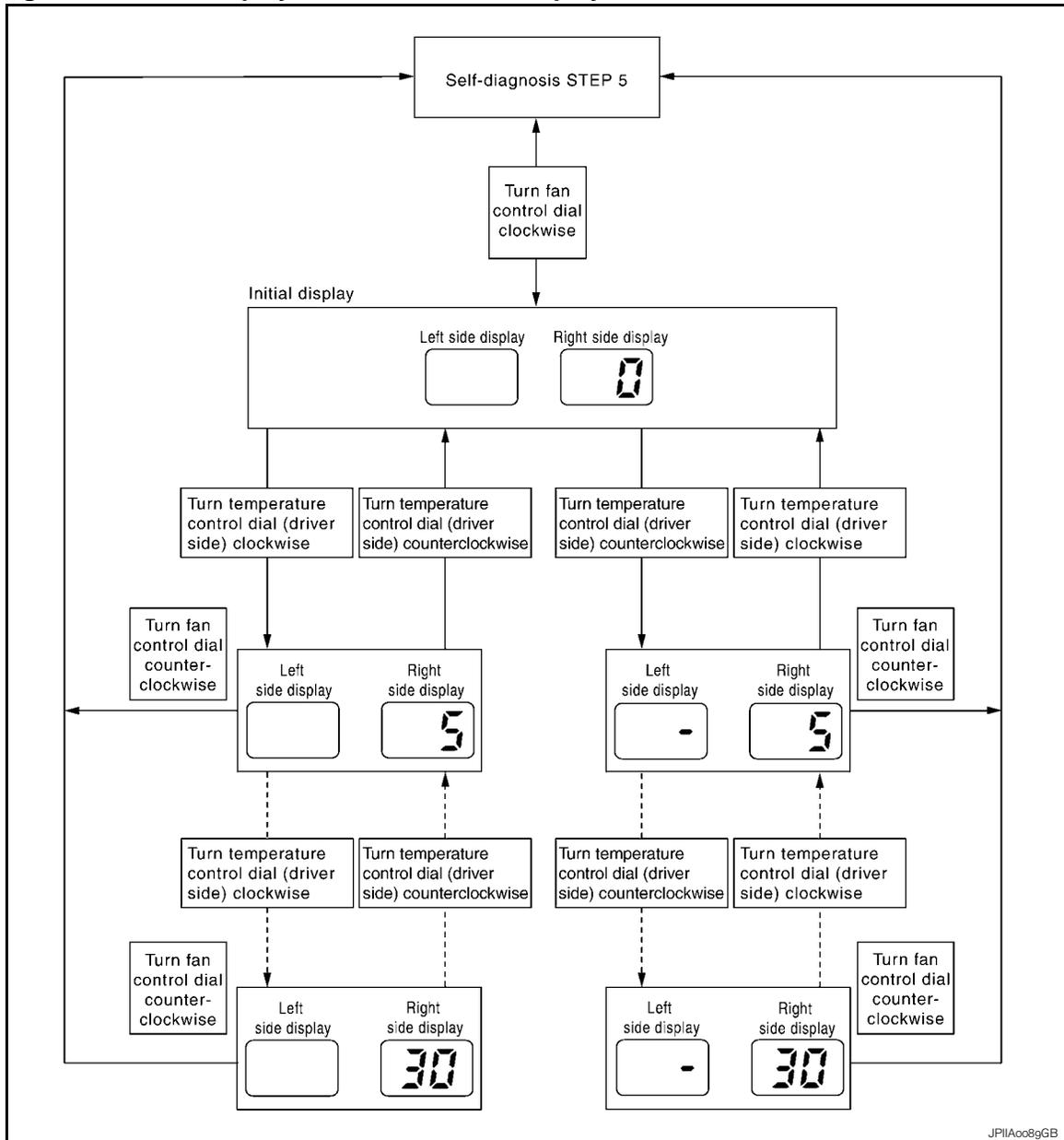
- A decimal point is not indicated on the display.

# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[AUTOMATIC AIR CONDITIONER]

- Negative value is displayed on the left side display.



When battery cable is disconnected or battery voltage is below 10 V, trimmer operation is canceled. Temperature set becomes that of initial condition, i.e. 0°C.

## Foot Position Setting Trimmer

Wind distribution ratio in FOOT mode can be set.

Operating procedures for this trimmer are as follows:

1. Begin self-diagnosis STEP-5 mode. Refer to [HAC-27, "Diagnosis Description"](#).
2. Turn fan control dial clockwise to set system in auxiliary mode.
3. Press ON/OFF switch as desired.

# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[AUTOMATIC AIR CONDITIONER]

Fan speed display	Discharge air flow							
	Automatically controls the mode door				Manually controls the mode door			
	VENT	FOOT		DEF	VENT	FOOT		DEF
Front		Rear	Front			Rear		
1st speed (Initial setting)	15%	39%	26%	20%	19%	49%	32%	—
2nd speed	15%	39%	26%	20%	15%	39%	26%	20%
3rd speed	19%	49%	32%	—	15%	39%	26%	20%
4th speed	19%	49%	32%	—	19%	49%	32%	—

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When battery cable is disconnected or battery voltage is below 10 V, trimmer operation is canceled. Wind distribution ratio set becomes that of initial condition.

### Inlet Port Memory Function

When ignition switch is turned from OFF to ON, inlet port can be set to AUTO or manual.

Operating procedures for this trimmer are as follows:

1. Begin self-diagnosis STEP-5 mode. Refer to [HAC-27. "Diagnosis Description"](#).
2. Turn fan control dial clockwise to set system in auxiliary mode.
3. Press recirculation (REC) and fresh (FRE) switch as desired.

Switch	LED status of REC/FRE switch	Setting status	Setting changeover method
REC	ON	Manual REC status is memorized. (Initial setting)	REC SW: ON
	OFF	AUTO control	
FRE	ON	Manual FRE status is memorized.	FRE SW: ON
	OFF	AUTO control (Initial setting)	

When battery cable is disconnected or battery voltage is below 10 V, memory function is canceled. Memory function set becomes that of initial condition.

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# COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## FUNCTION DIAGNOSIS

### COMPRESSOR CONTROL FUNCTION

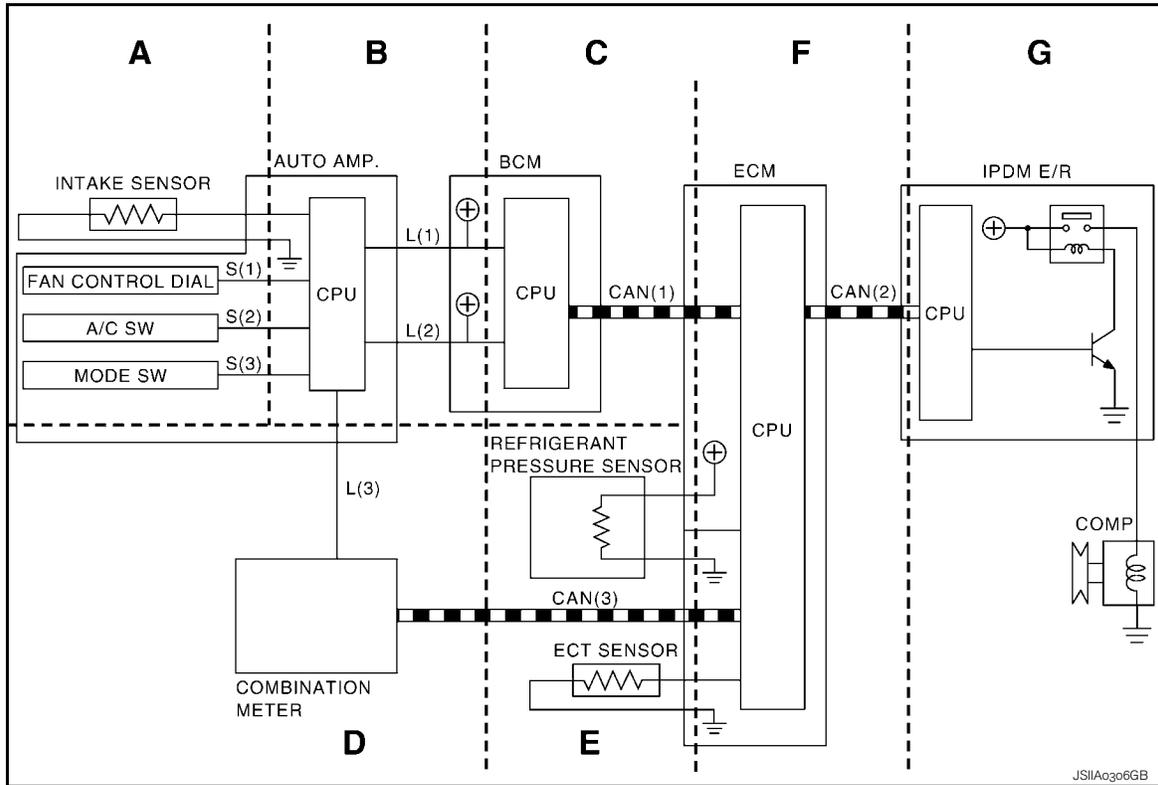
#### Description

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#### PRINCIPLE OF OPERATION

Compressor is not activated.

Functional circuit diagram



- |   |   |
|---|---|
| L (1) : Fan SW signal                     | S (3) : Defogger signal                     |
| L (2) : A/C SW signal                     | CAN (1) : A/C signal                        |
| L (3) : Engine coolant temperature signal | CAN (2) : Compressor request signal         |
| S (1) : Fan ON signal                     | CAN (3) : Engine coolant temperature signal |
| S (2) : A/C SW signal                     |   |

#### Functional initial inspection chart

Location	A	B	C	D	E	F	G
CONSULT-III	ECM DATA MONITOR		Yes		Yes	Yes	
	BCM DATA MONITOR		Yes				
	IPDM E/R DATA MONITOR					Yes	
	COMBINATION METER DATA MONITOR				Yes		
AUTO ACTIVE TEST							Yes
Self-diagnosis function (except CAN diagnosis)	Yes	Yes					

#### Component Part Location

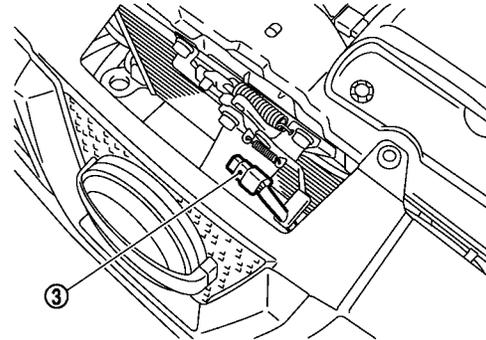
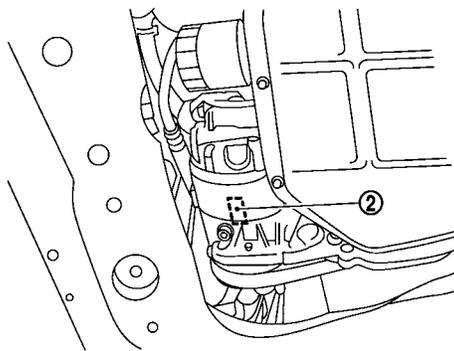
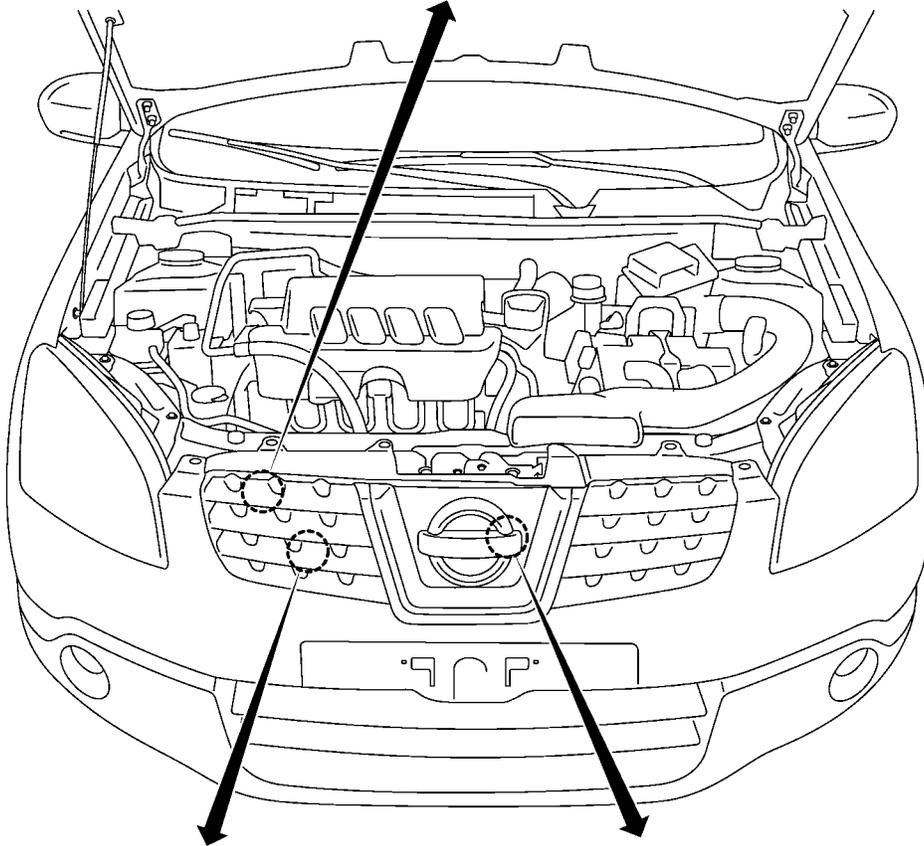
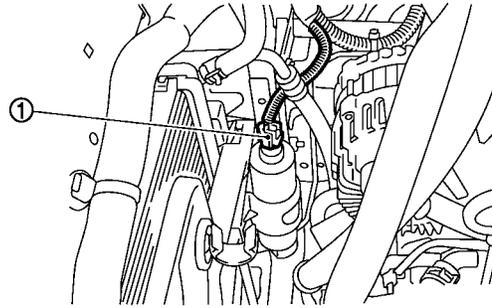
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#### ENGINE COMPARTMENT

# COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]



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1. Refrigerant pressure sensor

2. Compressor

3. OAT sensor

PASSENGER COMPARTMENT

LHD Models

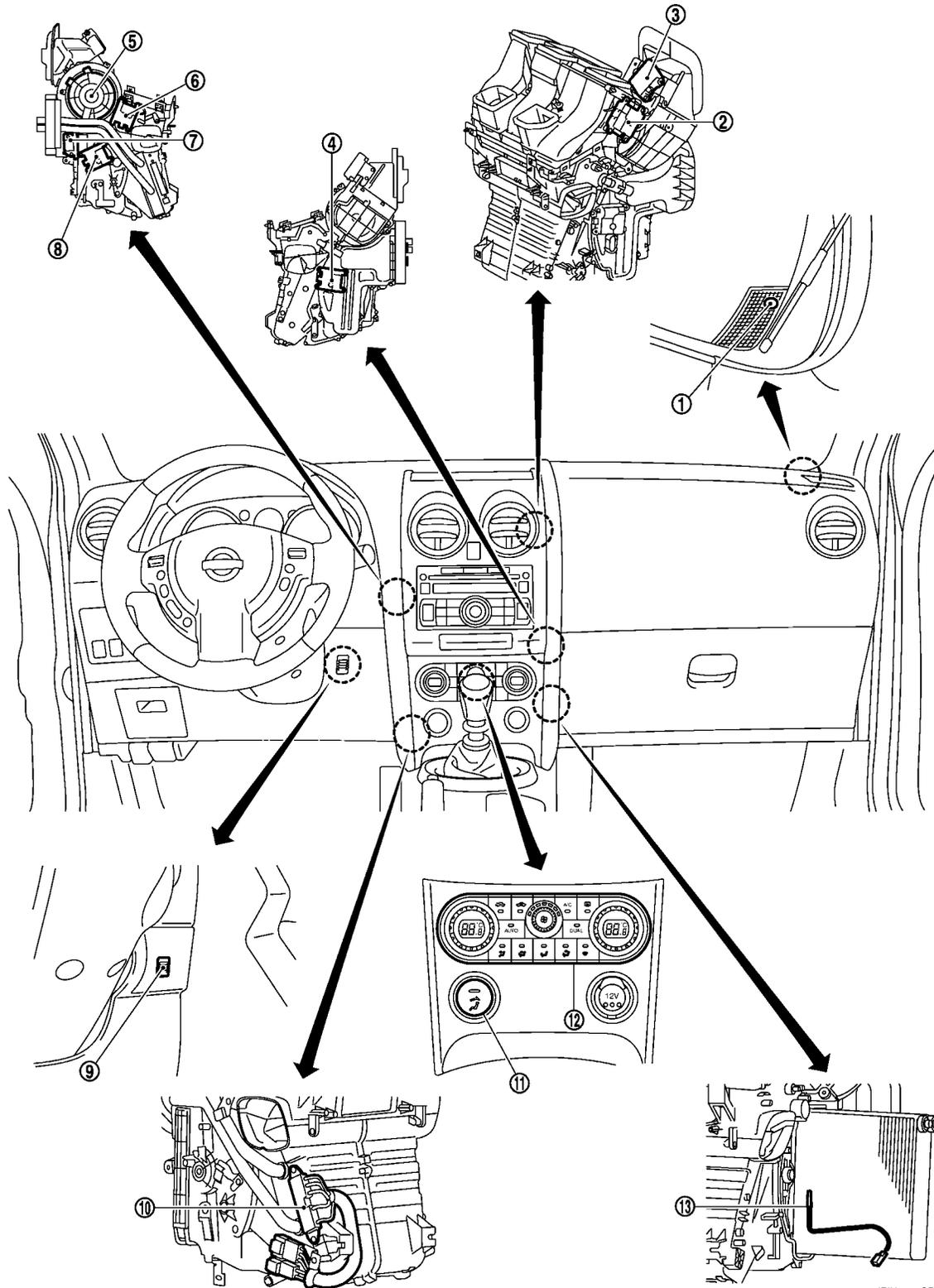
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# COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]



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| 1. Sunload sensor                      | 2. High-level ventilator door motor | 3. Intake door motor |
| 4. Air mix door motor (passenger side) | 5. Blower motor                     | 6. Mode door motor   |
| 7. Fan control amp.                    | 8. Air mix door motor (driver side) | 9. In-vehicle sensor |
| 10. PTC heater                         | 11. High-level ventilator switch    | 12. Auto amp.        |
| 13. Intake sensor                      |                                     |                      |

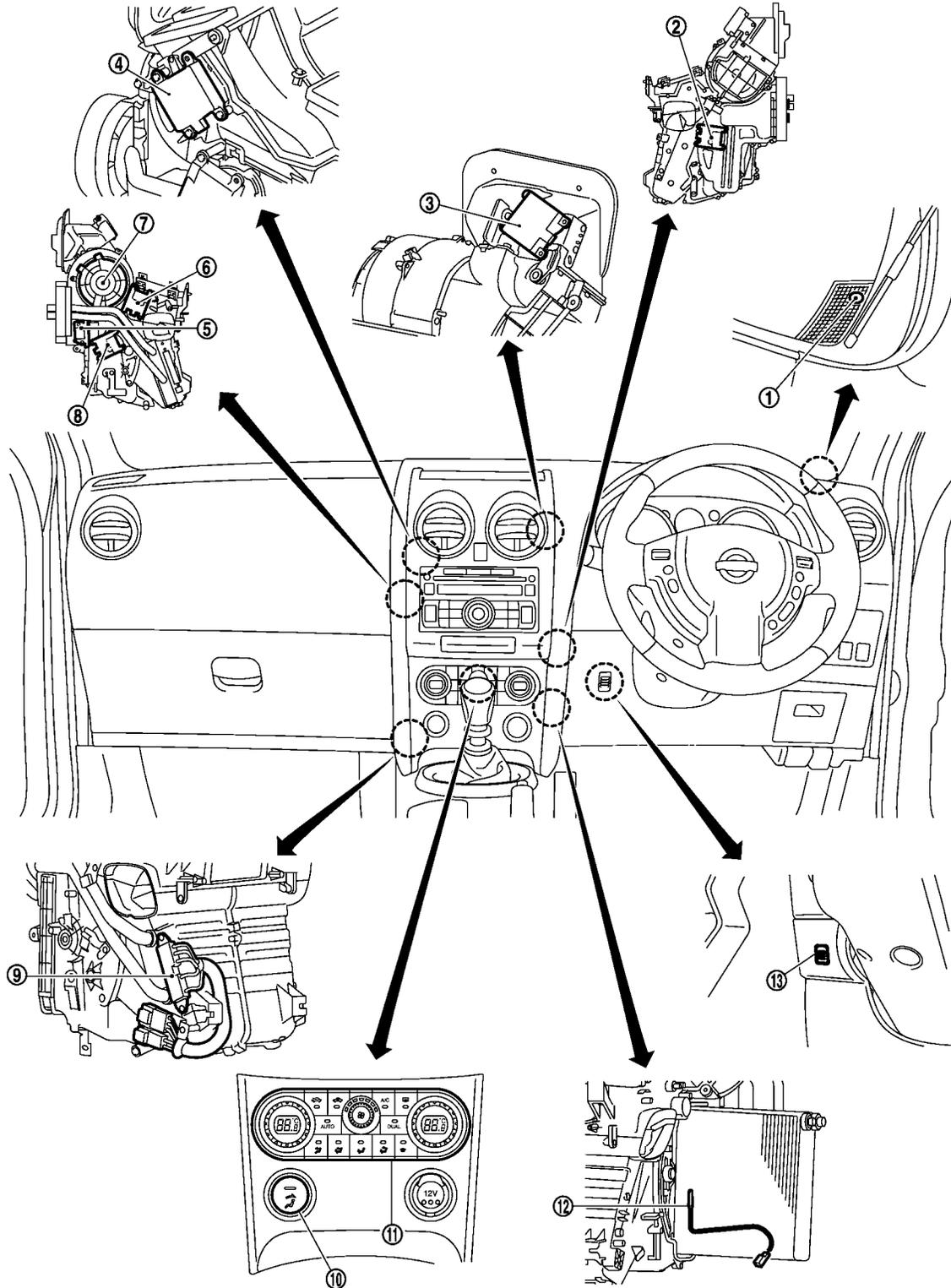
RHD Models

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# COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]



- |                                     |  |                      |
|-------------------------------------|--|----------------------|
| 1. Sunload sensor                   | 2. Air mix door motor (driver side)    | 3. Intake door motor |
| 4. High-level ventilator door motor | 5. Fan control amp.                    | 6. Mode door motor   |
| 7. Blower motor                     | 8. Air mix door motor (passenger side) | 9. PTC heater        |
| 10. High-level ventilator switch    | 11. Auto amp.                          | 12. Intake sensor    |
| 13. In-vehicle sensor               |  |                      |

Component's role

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## COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

Component	Reference
Air mix door motor	<a href="#">HAC-54. "Description"</a>
Auto amp.	<a href="#">HAC-89. "Description"</a>
Blower motor	<a href="#">HAC-62. "Description"</a>
Compressor	<a href="#">HAC-66. "Description"</a>
Fan control amp.	<a href="#">HAC-65. "Component Inspection"</a>
High-level ventilator door motor	<a href="#">HAC-50. "Description"</a>
High-level ventilator switch	<a href="#">HAC-52. "Component Inspection"</a>
Intake door motor	<a href="#">HAC-59. "Description"</a>
Intake sensor	<a href="#">HAC-86. "Description"</a>
In-vehicle sensor	<a href="#">HAC-80. "Description"</a>
Mode door motor	<a href="#">HAC-47. "Description"</a>
OAT sensor	<a href="#">HAC-77. "Description"</a>
PTC heater	<a href="#">HAC-76. "Component Inspection"</a>
Refrigerant pressure sensor	<a href="#">HAC-70. "Component Inspection"</a>
Sunload sensor	<a href="#">HAC-83. "Description"</a>

# AUTOMATIC AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

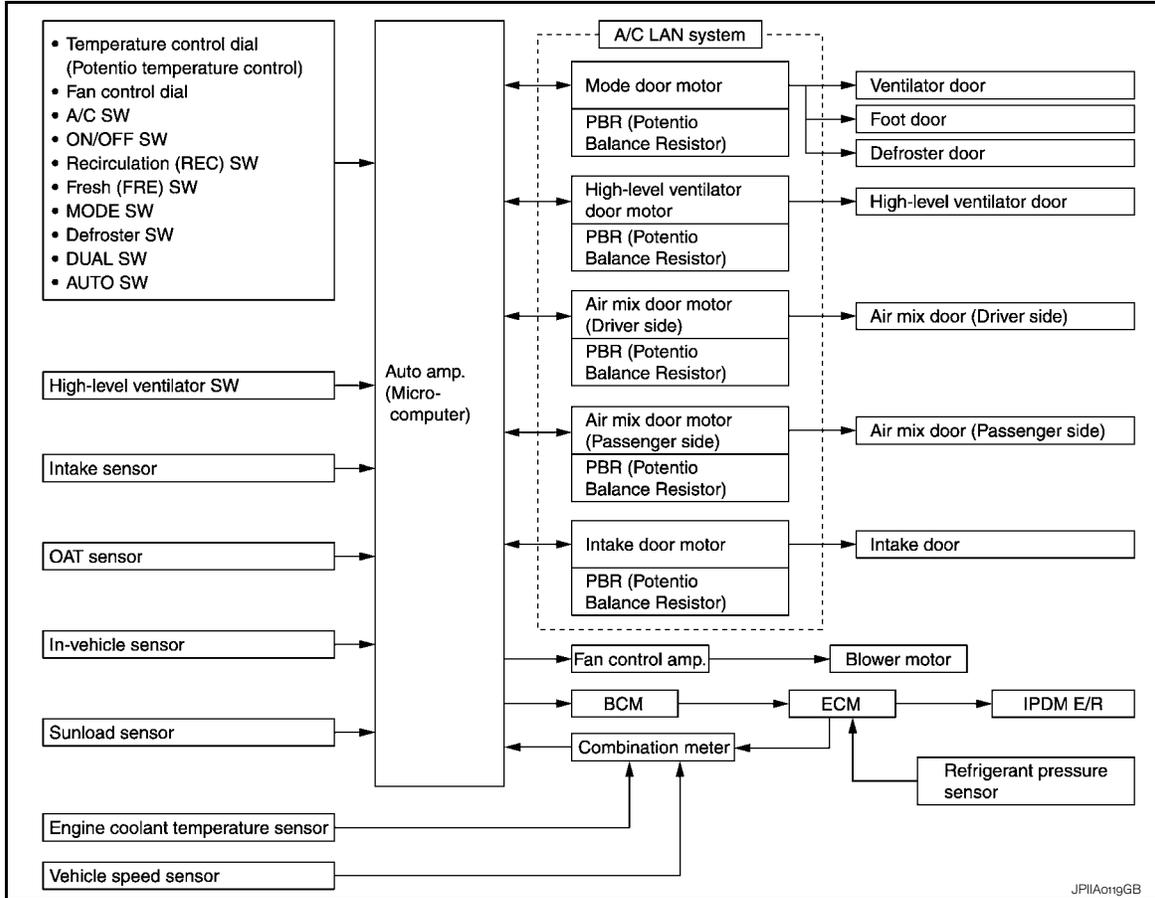
## AUTOMATIC AIR CONDITIONER SYSTEM

### System Diagram

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### CONTROL SYSTEM

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

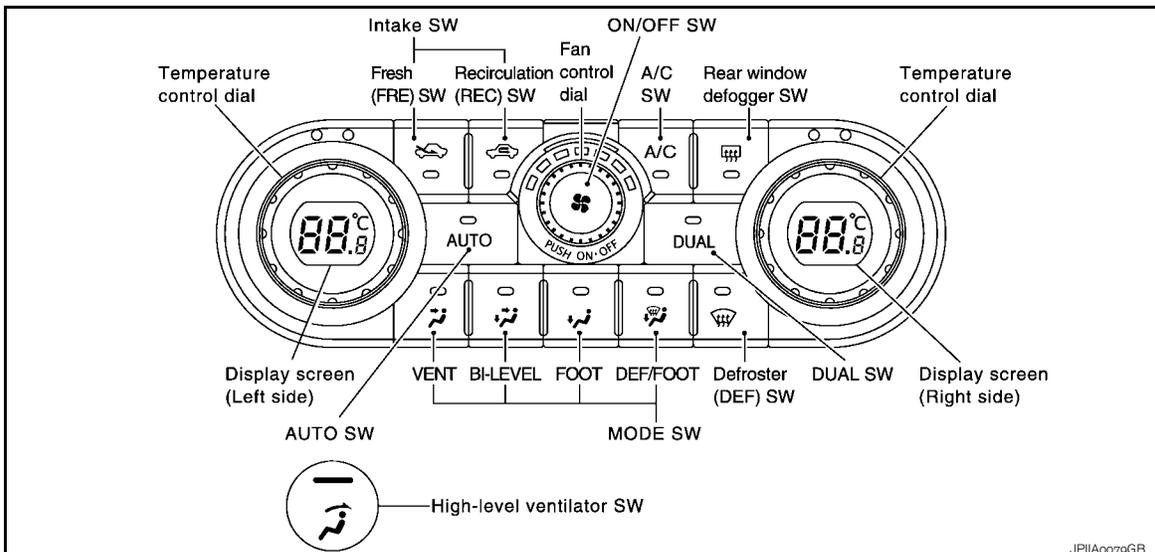


### System Description

INFOID:000000000954632

### CONTROL OPERATION

#### Controller



# AUTOMATIC AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## MODE Switch

The air discharge outlets is controlled with there switches.

## Temperature Control Dial [Potentio Temperature Control (Driver Side)]

The set temperature is increased or decreased with this dial.

## Temperature Control Dial [Potentio Temperature Control (Passenger Side)]

- The set temperature is increased or decreased with this dial.
- When the temperature control dial is turned, the DUAL switch indicator will automatically illuminate.

## AUTO Switch

- The compressor, intake door, air mix doors, mode doors and blower speed are automatically controlled so that the in-vehicle temperature will reach, and be maintained at the set temperature selected by the operator.
- When pressing AUTO switch, air inlet, air outlet, fan speed, and discharge air temperature are automatically controlled.

## Defroster (DEF) Switch

Mode doors are set to the defrost position with this switch. Also, intake door is set to the outside air position, and compressor turns ON.

## A/C Switch

Compressor is ON or OFF with this switch.

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

## Fan Control Dial

The blower speed is manually controlled with this dial. Seven speeds are available for manual control (as shown on the LEDs).

## ON/OFF Switch

Compressor and blower are OFF, mode door is set to the foot position, and intake door is automatically controlled.

## Rear Window Defogger Switch

When illumination is ON, rear window is defogged.

## Recirculation (REC) Switch

- When recirculation (REC) switch is ON, REC LED turns ON, and air inlet is fixed to REC.
- When press recirculation (REC) switch again, REC LED turns OFF, and then, automatic control mode is entered.
- When REC LED is turned OFF, shifting mode position to D/F or DEF, or when compressor is turned from ON to OFF, intake switch is automatically turned OFF (fixed to automatic control mode). REC mode can be re-entered by pressing intake switch again, and then compressor is turned ON. (Except D/F or DEF position)

## Fresh (FRE) Switch

- When fresh (FRE) switch is ON, FRE LED turns ON, and air inlet is fixed to FRE.
- When press fresh (FRE) switch again, FRE LED turns OFF, and then, automatic control mode is entered.

## DUAL Switch

- When the DUAL switch LED is turned ON, the driver side and passenger side, temperature can each be set independently.
- When the DUAL switch LED is not turned OFF, the driver side outlet and setting temperature is applied to both sides.

## High-level Ventilator Switch

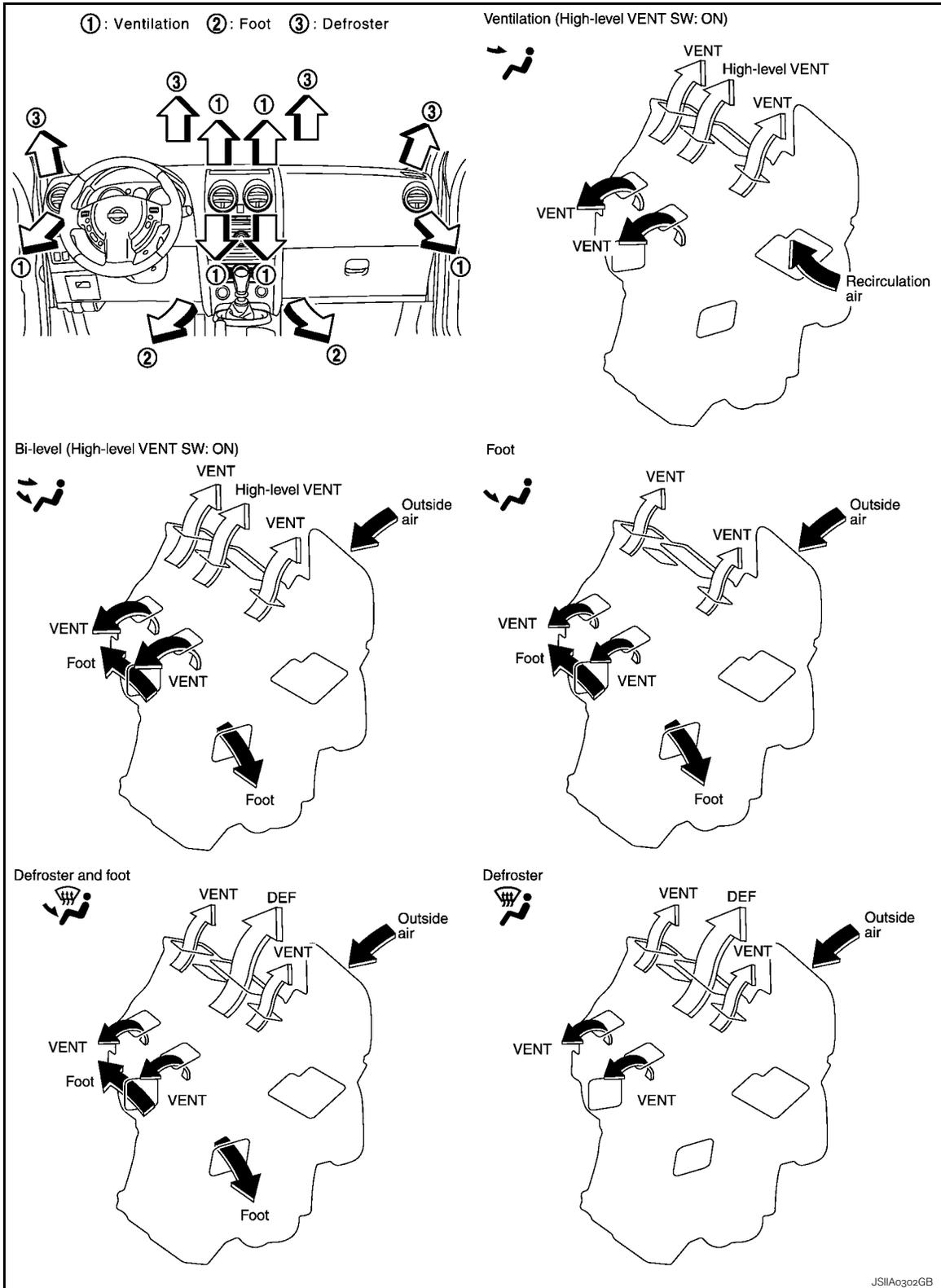
When high-level ventilator switch is ON, high-level ventilator switch indicator turn ON, and high-level ventilator door is opened.

# AUTOMATIC AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## DISCHARGE AIR FLOW



A  
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M  
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O  
P

HAC

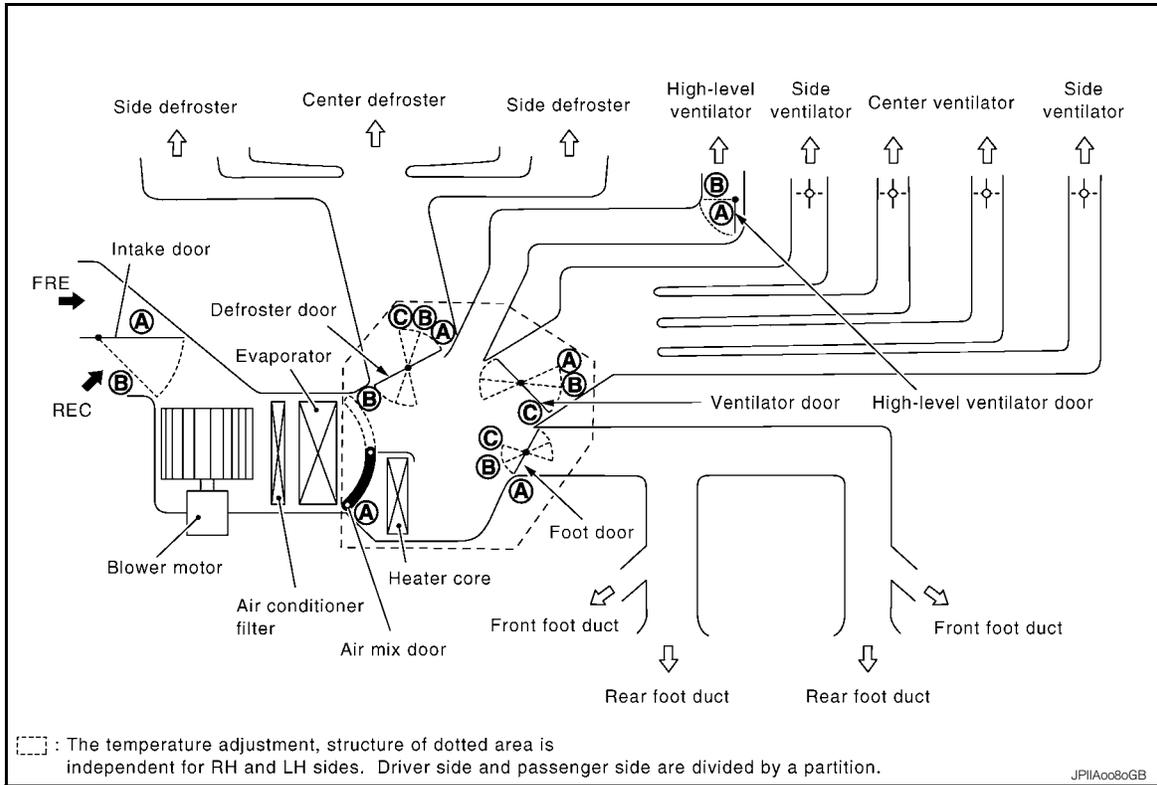
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# AUTOMATIC AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## SWITCHES AND THEIR CONTROL FUNCTION



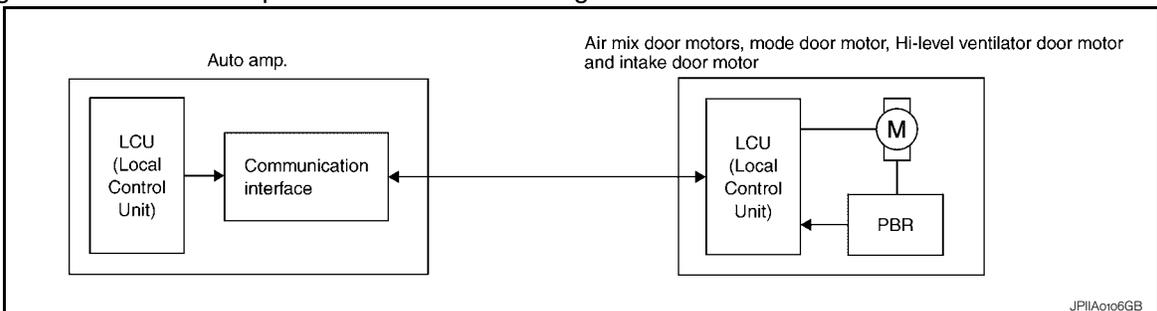
Position or Switch	DUAL SW		MODE SW				DEF SW		High-level ventilator SW		AUTO SW	Intake SW		Temperature control dial (Driver side)		Temperature control dial (Passenger side)		ON/OFF SW
	ON	OFF	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF		FRE SW	REC SW	16°C ↔ 30°C		16°C ↔ 30°C		
Ventilator door	—	—	A	B	C	C	—	—	—	—	—	—	—	—	—	—	—	C
Defroster door	—	—	A	A	A <sup>1</sup> B	C	A	—	—	AUTO	—	—	—	—	—	—	—	A <sup>1</sup> B <sup>1</sup>
Foot door	—	—	A	B	C	B	C	—	—	—	—	—	—	—	—	—	—	C
High-level ventilator door	—	—	—	—	—	—	—	—	A	B	—	—	—	—	—	—	—	—
Intake door	—	—	—	—	—	B	B	—	—	—	—	B <sup>2</sup>	A <sup>2</sup>	—	—	—	—	AUTO
Air mix door (Driver side)	—	—	—	—	—	—	—	—	—	—	—	—	—	A	AUTO	B	—	—
Air mix door (Passenger side)	ON	—	—	—	—	—	—	—	—	—	AUTO	—	—	—	A	AUTO	B	—
	OFF	—	—	—	—	—	—	—	—	—	—	—	—	A	AUTO	B	—	—

\* 1 This position is selected only when the mode door is automatic controlled.  
\* 2 Inlet status is displayed under the automatic control.

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## AIR CONDITIONER LAN CONTROL SYSTEM

The LAN (Local Area Network) system consists of auto amp., mode door motor, high-level ventilator door motor, air mix door motors and intake door motor. A configuration of these components is shown in the figure below.



# AUTOMATIC AIR CONDITIONER SYSTEM

[AUTOMATIC AIR CONDITIONER]

< FUNCTION DIAGNOSIS >

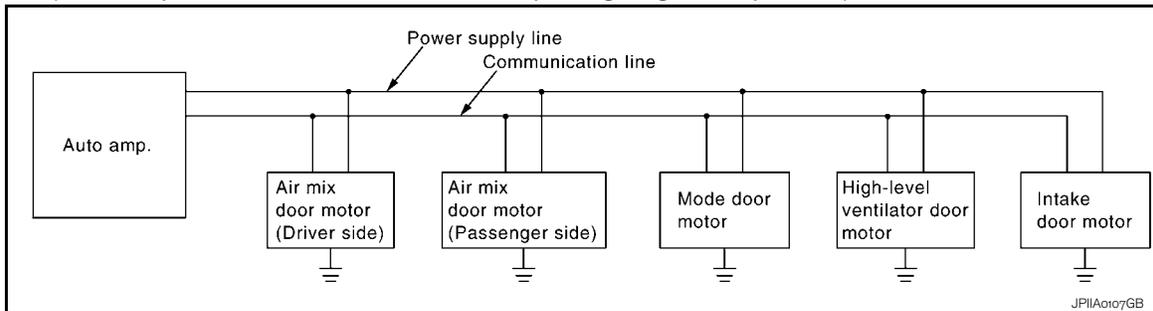
## SYSTEM CONSTRUCTION

A small network is constructed between the auto amp., mode door motor, high-level ventilator door motor, air mix door motors and intake door motor. The auto amp. and motors are connected by data transmission lines and motor power supply lines. The LAN network is built through the ground circuits of each door motor.

Addresses, motor opening angle signals, motor stop signals and error checking messages are all transmitted through the data transmission lines connecting the auto amp. and each door motor.

The following functions are contained in LCUs built into the mode door motor, the high-level ventilator door motor, the air mix door motors and the intake door motor.

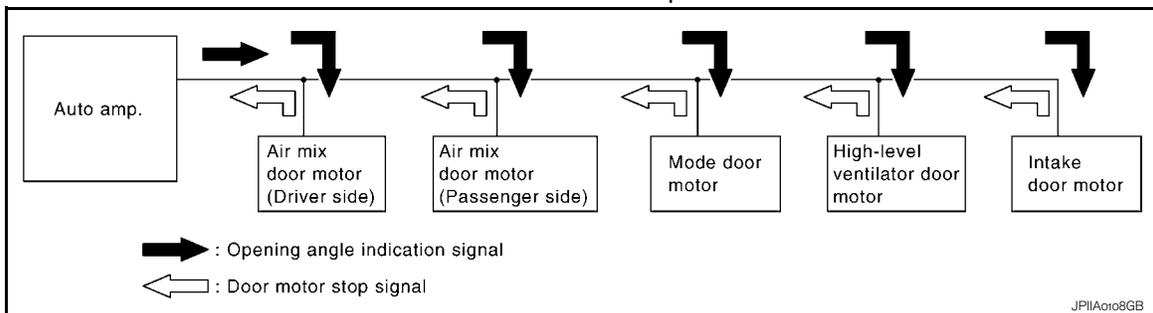
- Address
- Motor opening angle signals
- Data transmission
- Motor stop and drive decision
- Opening angle sensor (PBR function)
- Comparison
- Decision (Auto amp. indicated value and motor opening angle comparison)



## Operation

The auto amp. receives data from each of the sensors. The auto amp. sends mode door, high-level ventilator door, air mix door and intake door opening angle data to the mode door motor LCU, high-level ventilator door motor LCU, air mix door motor LCUs and intake door motor LCU.

The mode door motor, high-level ventilator door motor, air mix door motors and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors is compared by the LCUs in each door motor with the existing decision and opening angles. Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data is returned to the auto amp.



## Transmission Data and Transmission Order

Auto amp. data is transmitted consecutively to each of the doors motor following the form shown in the figure below.

### START:

- Initial compulsory signal is sent to each of the door motors.

### ADDRESS:

- Data sent from the auto amp. are selected according to data-based decisions made by the mode door motor, high-level ventilator door motor, air mix door motors and intake door motor.
- If the addresses are identical, the opening angle data and error check signals are received by the door motor LCUs. The LCUs then make the appropriate error decision. If the opening angle data have no error, door control begins.
- If an error exists, the received data are rejected and corrected data received. Finally, door control is based upon the corrected opening angle data.

# AUTOMATIC AIR CONDITIONER SYSTEM

[AUTOMATIC AIR CONDITIONER]

## < FUNCTION DIAGNOSIS >

### OPENING ANGLE:

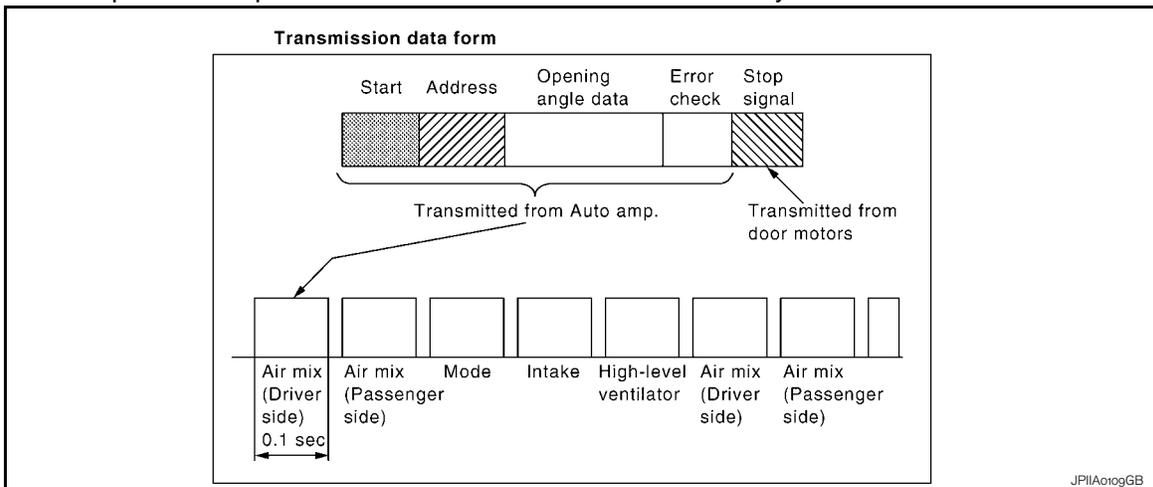
- Data that shows the indicated door opening angle of each door motor.

### ERROR CHECK:

- In this procedure, transmitted and received data is checked for errors. Error data are then compiled. The error check prevents corrupted data from being used by the mode door motor, the high-level ventilator door motor, the air mix door motors and the intake door motor. Error data can be related to the following symptoms.
  - Malfunction of electrical frequency
  - Poor electrical connections
  - Signal leakage from transmission lines
  - Signal level fluctuation

### STOP SIGNAL:

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



## AIR MIX DOOR CONTROL (AUTOMATIC TEMPERATURE CONTROL)

The air mix doors are automatically controlled so that in-vehicle temperature is maintained at a predetermined value by the temperature setting, ambient temperature, in-vehicle temperature and amount of sunload.

## FAN SPEED CONTROL

Blower speed is automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and air mix door position.

With pressing AUTO switch, the blower motor starts to gradually increase air flow volume.

When engine coolant temperature is low, the blower motor operation is delayed to prevent cool air from flowing.

## INTAKE DOOR CONTROL

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

## MODE DOOR CONTROL

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

## HIGH-LEVEL VENTILATOR DOOR CONTROL

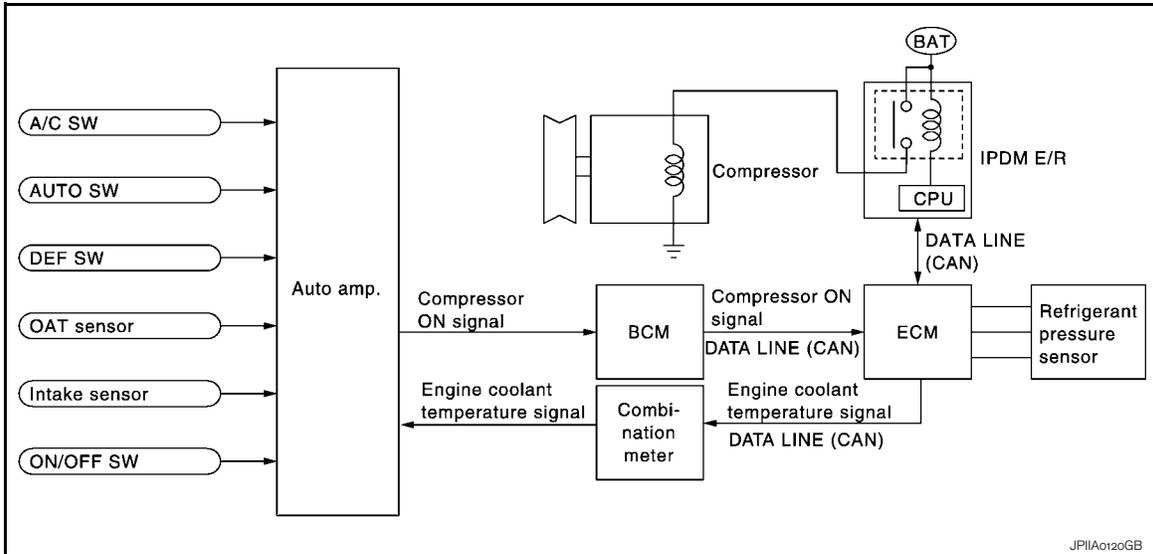
The high-level ventilator door is controlled by high-level ventilator door switch.

# AUTOMATIC AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## MAGNET CLUTCH CONTROL



When A/C switch, AUTO switch, DEF/FOOT switch, DEF switch is pressed, auto amp. transmits compressor ON signal to BCM.

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

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

Upon receipt of compressor ON signal from ECM, IPDM E/R turns air conditioner relay ON to operate compressor.

When sending compressor ON signal to IPDM E/R via CAN communication, ECM simultaneously sends compressor feedback signal to combination meter via CAN communication.

Combination meter sends compressor feedback signal to auto amp., then, uses input compressor feedback signal to control air inlet.

## Component Part Location

INFOID:000000001070366

## ENGINE COMPARTMENT

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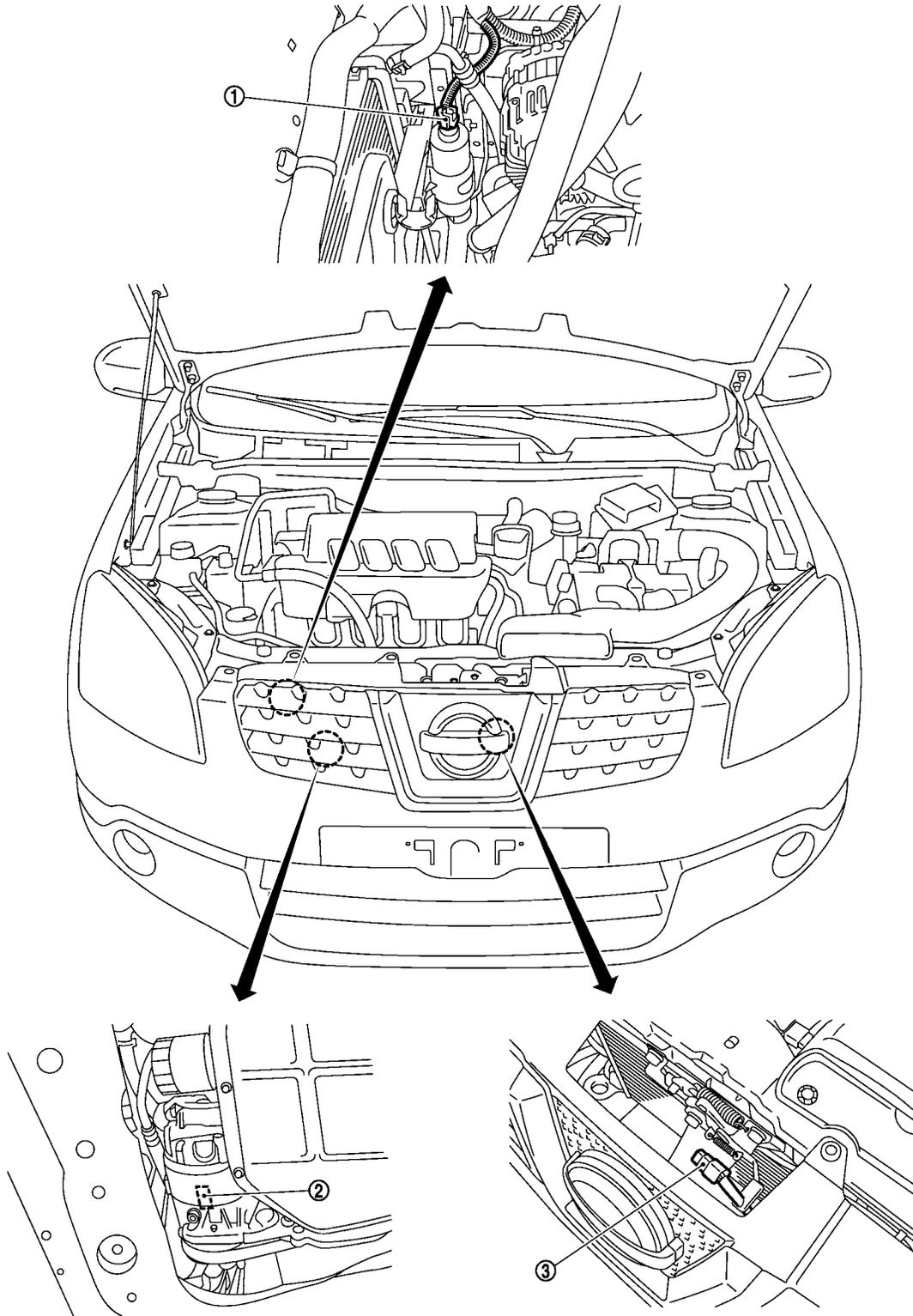
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HAC

# AUTOMATIC AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]



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1. Refrigerant pressure sensor

2. Compressor

3. OAT sensor

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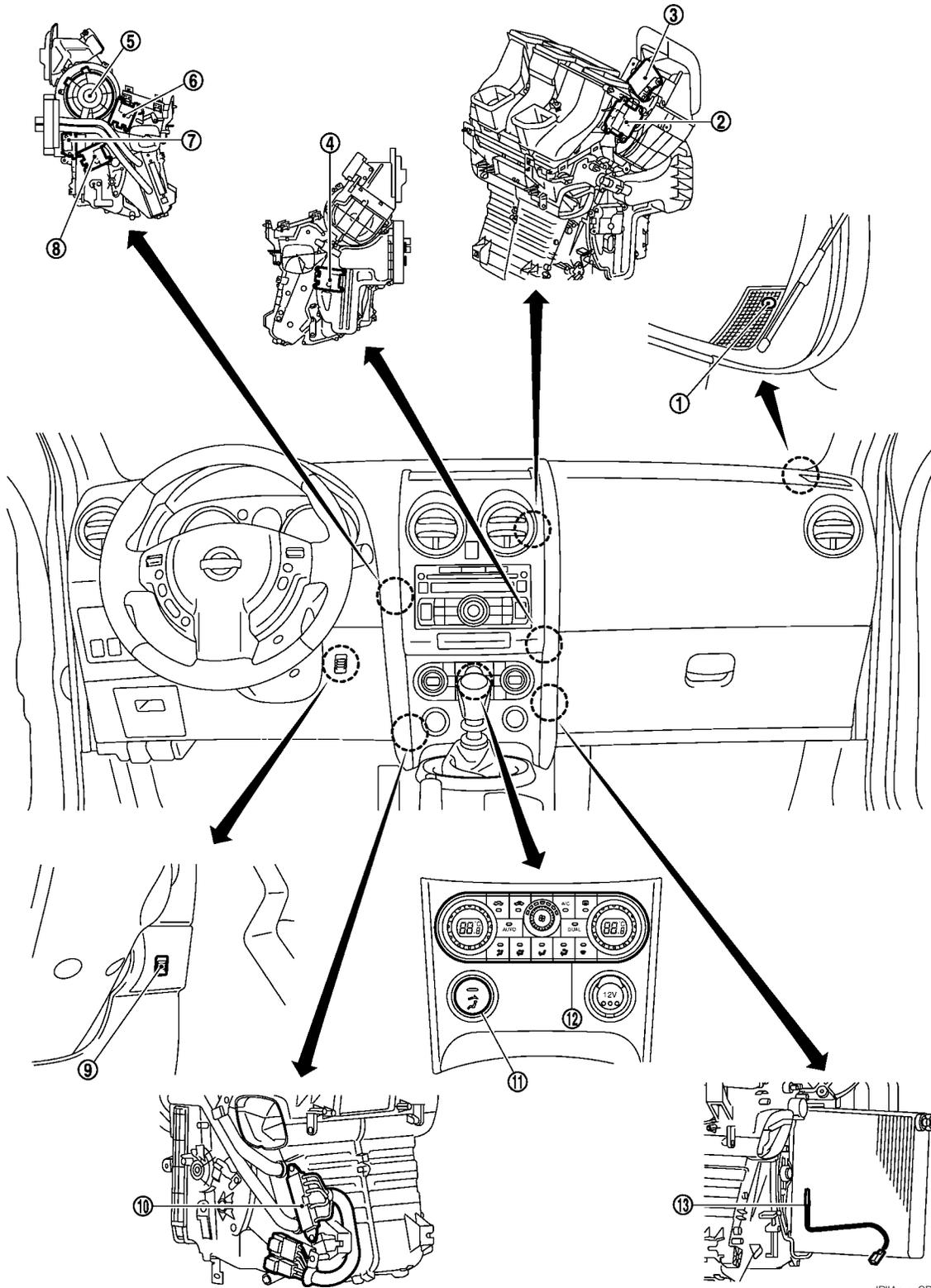
PASSENGER COMPARTMENT

LHD Models

# AUTOMATIC AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]



- |  |                                     |                      |
|--|-------------------------------------|----------------------|
| 1. Sunload sensor                      | 2. High-level ventilator door motor | 3. Intake door motor |
| 4. Air mix door motor (passenger side) | 5. Blower motor                     | 6. Mode door motor   |
| 7. Fan control amp.                    | 8. Air mix door motor (driver side) | 9. In-vehicle sensor |
| 10. PTC heater                         | 11. High-level ventilator switch    | 12. Auto amp.        |
| 13. Intake sensor                      |                                     |                      |

RHD Models

HAC-23

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HAC

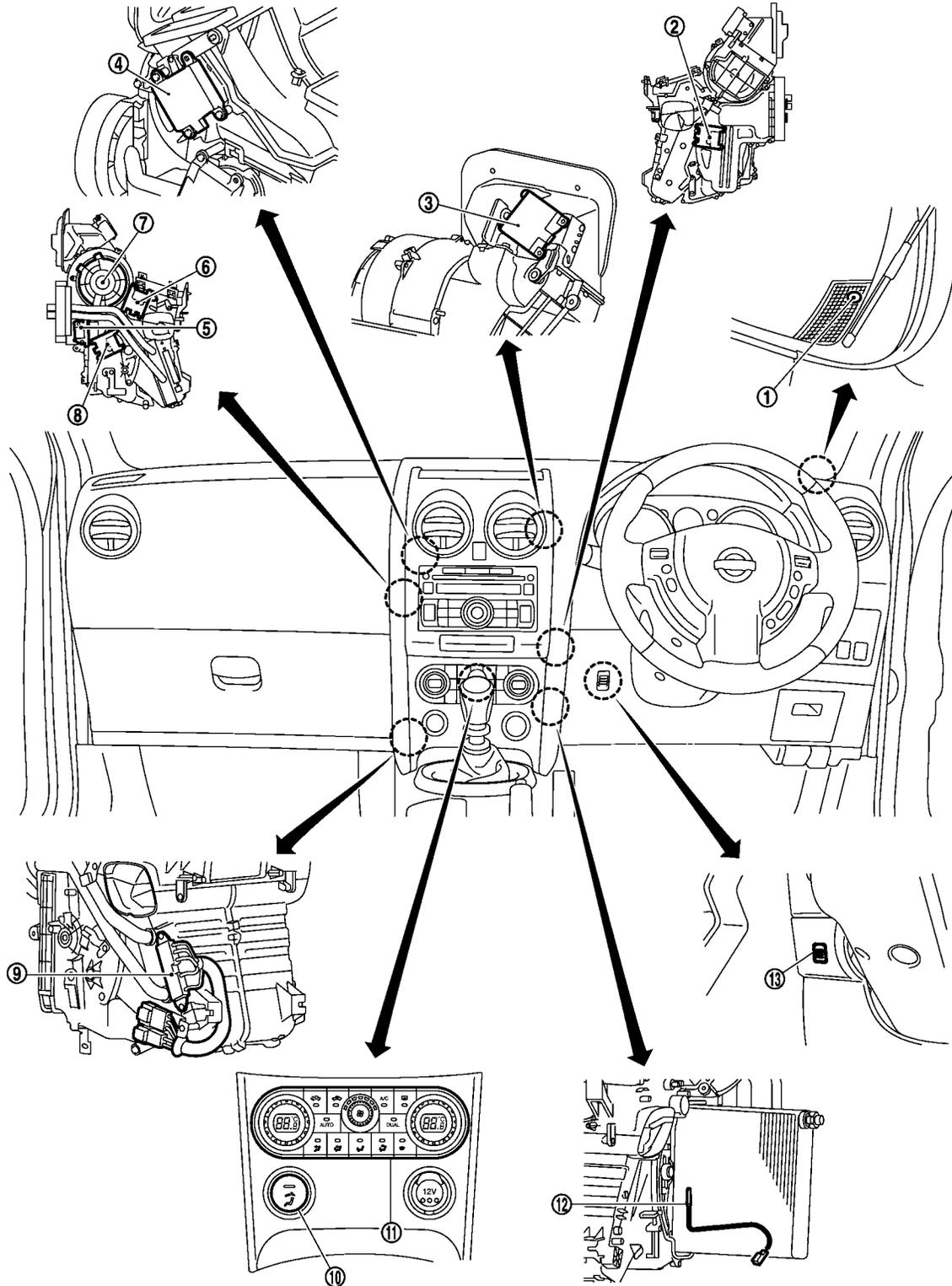
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# AUTOMATIC AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]



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- |                                     |  |                      |
|-------------------------------------|--|----------------------|
| 1. Sunload sensor                   | 2. Air mix door motor (driver side)    | 3. Intake door motor |
| 4. High-level ventilator door motor | 5. Fan control amp.                    | 6. Mode door motor   |
| 7. Blower motor                     | 8. Air mix door motor (passenger side) | 9. PTC heater        |
| 10. High-level ventilator switch    | 11. Auto amp.                          | 12. Intake sensor    |
| 13. In-vehicle sensor               |  |                      |

## Component Description

# AUTOMATIC AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

Component	Reference
Air mix door motor	<a href="#">HAC-54. "Description"</a>
Auto amp.	<a href="#">HAC-89. "Description"</a>
Blower motor	<a href="#">HAC-62. "Description"</a>
Compressor	<a href="#">HAC-66. "Description"</a>
Fan control amp.	<a href="#">HAC-65. "Component Inspection"</a>
High-level ventilator door motor	<a href="#">HAC-50. "Description"</a>
High-level ventilator switch	<a href="#">HAC-52. "Component Inspection"</a>
Intake door motor	<a href="#">HAC-59. "Description"</a>
Intake sensor	<a href="#">HAC-86. "Description"</a>
In-vehicle sensor	<a href="#">HAC-80. "Description"</a>
Mode door motor	<a href="#">HAC-47. "Description"</a>
OAT sensor	<a href="#">HAC-77. "Description"</a>
PTC heater	<a href="#">HAC-76. "Component Inspection"</a>
Refrigerant pressure sensor	<a href="#">HAC-70. "Component Inspection"</a>
Sunload sensor	<a href="#">HAC-83. "Description"</a>

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## CAN COMMUNICATION SYSTEM

### System Description

INFOID:000000000954635

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. For details, refer to [LAN-55, "CAN System Specification Chart"](#).

# DIAGNOSIS SYSTEM (AUTO AMP.)

[AUTOMATIC AIR CONDITIONER]

< FUNCTION DIAGNOSIS >

## DIAGNOSIS SYSTEM (AUTO AMP.)

### Diagnosis Description

INFOID:000000000954636

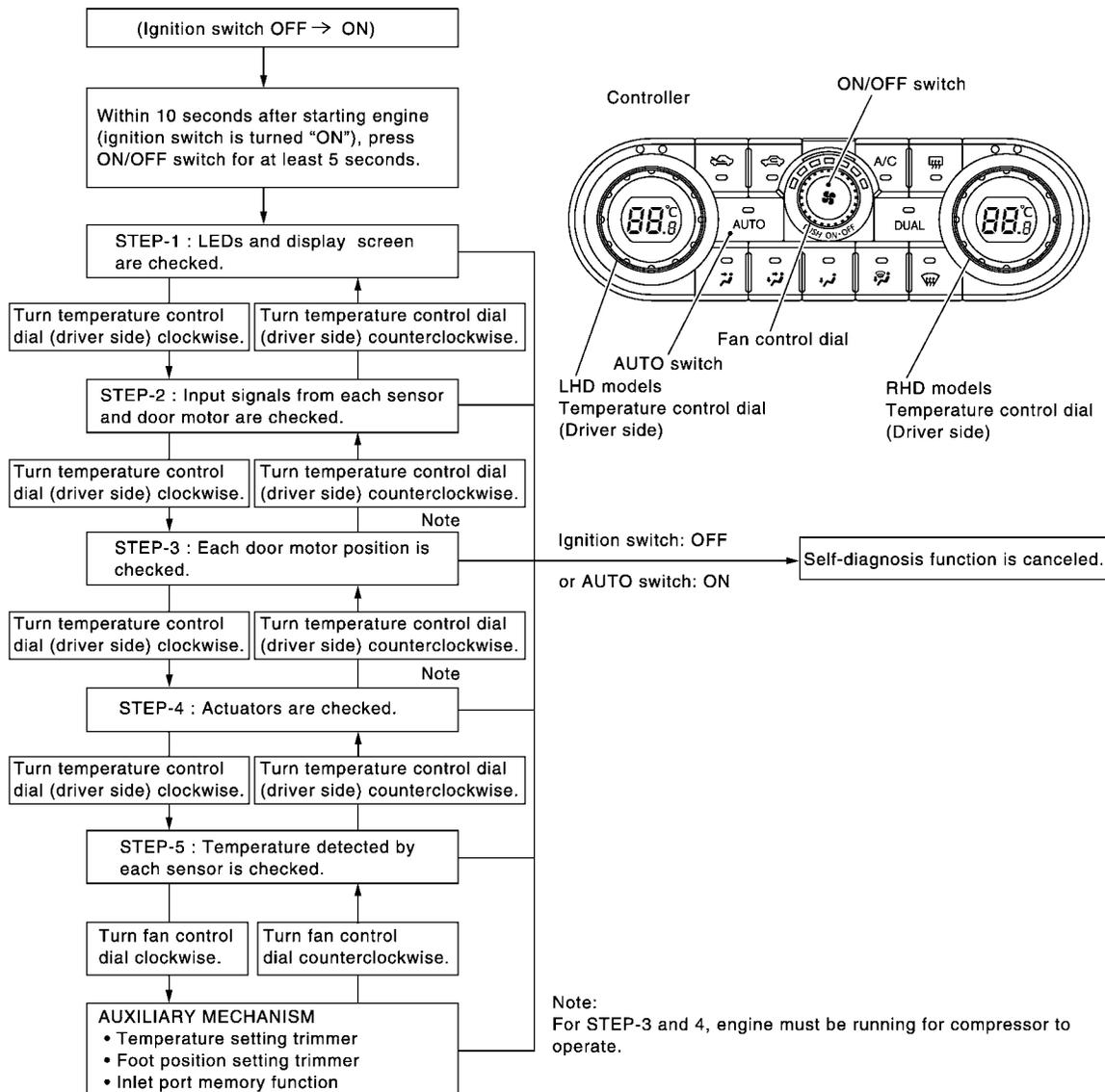
### SELF-DIAGNOSIS SYSTEM

The self-diagnosis system is built into the auto amp. to quickly locate the cause of malfunctions.

### SELF-DIAGNOSIS FUNCTION

The self-diagnosis system diagnoses sensors, door motors, blower motor, etc. by system line. Refer to applicable sections (items) for details. Shifting from normal control to the self-diagnosis system is accomplished by starting the engine (turning the ignition switch ON) and pressing ON/OFF switch for at least 5 seconds. The ON/OFF switch must be pressed within 10 seconds after starting the engine (ignition switch is turned ON). This system will be canceled by either pressing AUTO switch or turning the ignition switch OFF. Shifting from one step is accomplished by means of turning temperature control dial (driver side), as required.

Shifting from STEP-5 to AUXILIARY MECHANISM is accomplished by means of pressing fan control dial clockwise.



### CONFORMATION METHOD

#### 1.SET IN SELF-DIAGNOSIS MODE

A  
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HAC

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# DIAGNOSIS SYSTEM (AUTO AMP.)

[AUTOMATIC AIR CONDITIONER]

< FUNCTION DIAGNOSIS >

1. Turn ignition switch ON.
2. Set in self-diagnosis mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press ON/OFF switch for at least 5 seconds.

**NOTE:**

If battery voltage drops below 12 V during diagnosis STEP-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is normal. To avoid this, start engine before performing this diagnosis.

>> GO TO 2.

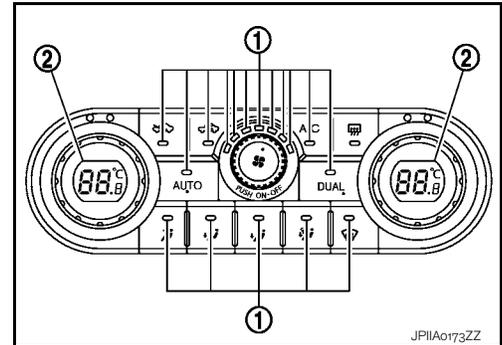
## 2.STEP-1: LEDES AND DISPLAY ARE CHECKED

Check LEDs (1) illumination and display screen (2).

Is this inspection result normal?

YES >> GO TO 3.

NO >> Malfunctioning ON/OFF switch or auto amp. Refer to [HAC-115, "Inspection procedure"](#).



## 3.STEP-2: SENSOR AND DOOR MOTOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT

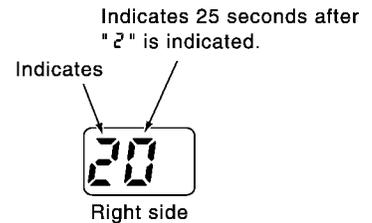
Turn temperature control dial (driver side) clockwise.

Does code No. 20 appear on the display?

YES >> GO TO 4.

NO >> GO TO 11.

**Display (when all sensors are in good order)**



## 4.STEP-3: MODE DOOR, HIGH-LEVEL VENTILATOR DOOR AND INTAKE DOOR POSITIONS ARE CHECKED

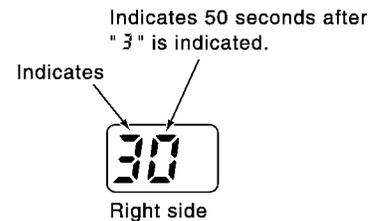
Turn temperature control dial (driver side) clockwise.

Does code No. 30 appear on the display?

YES >> GO TO 5.

NO >> GO TO 12.

**Display (when all doors are in good order)**



## 5.STEP-4: OPERATION OF EACH DOOR MOTOR IS CHECKED

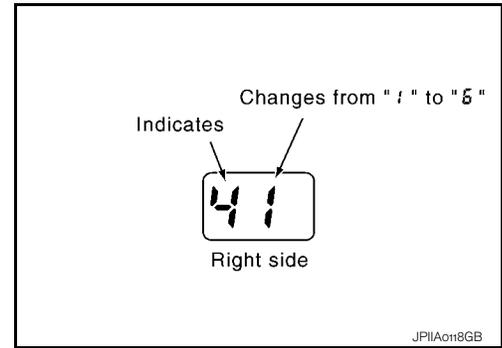
# DIAGNOSIS SYSTEM (AUTO AMP.)

## [AUTOMATIC AIR CONDITIONER]

### < FUNCTION DIAGNOSIS >

1. Turn temperature control dial (driver side) clockwise.
2. Press  (DEF) switch. Code No. of each door motor test is indicated on the display.

>> GO TO 6.



## 6. CHECK ACTUATORS

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

Discharge air flow					
Mode door position	Condition	Air outlet/distribution			
		VENT	FOOT		DEF
			Front	Rear	
	DUAL SW: OFF High-level ventilator door : SHUT	100%	—	—	—
		60%	24%	16%	—
		15%	39%	26%	20%
		10%	27%	18%	45%
		10%	—	—	90%

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Code No.	41	42	43	44	45	46
Mode door position	VENT	B/L 1	B/L 2	FOOT*1	D/F	DEF
Intake door position	REC	REC	20% FRE	FRE	FRE	FRE
Air mix door position	FULL COOL	FULL COOL	FULL HOT	FULL HOT	FULL HOT	FULL HOT
Blower motor voltage	5 V	11.75 V	8.5 V	8.5 V	8.5 V	11.75 V
Compressor	ON	ON	OFF	OFF	ON	ON
High-level ventilator door position	OPEN	OPEN	OPEN	OPEN	SHUT	SHUT

Checks must be made visually, by listening the sound, or by touching air outlets with hand, etc. for improper operation.

\*1: FOOT position during automatic control. Refer to [HAC-6, "Description & Inspection"](#).

Is this inspection result normal?

YES >> GO TO 7.

NO-1 >> Air outlet does not change. Go to Mode Door Motor Circuit. Refer to [HAC-47, "Diagnosis Procedure"](#).

NO-2 >> Intake door does not change. Go to Intake Door Motor Circuit. Refer to [HAC-59, "Diagnosis Procedure"](#).

NO-3 >> Discharge air temperature does not change. Go to Air Mix Door Motor Circuit. Refer to [HAC-54, "Diagnosis Procedure"](#).

NO-4 >> Blower motor operation is malfunctioning. Go to Blower Motor Circuit. Refer to [HAC-62, "Diagnosis Procedure"](#).

NO-5 >> Magnet clutch does not engage. Go to Magnet Clutch Circuit. Refer to [HAC-66, "Diagnosis Procedure"](#).

NO-6 >> High-level ventilator door does not change. Go to High-level Ventilator Door Motor Circuit. Refer to [HAC-50, "Diagnosis Procedure"](#).

# DIAGNOSIS SYSTEM (AUTO AMP.)

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## 7. STEP-5: TEMPERATURE OF EACH SENSOR IS CHECKED

1. Turn temperature control dial (driver side) clockwise.
2. Code No. 51 appears on the display.

>> GO TO 8.

## 8. CHECK OAT SENSOR

Press  (DEF) switch one time. Temperature detected by OAT sensor is indicated on the display.

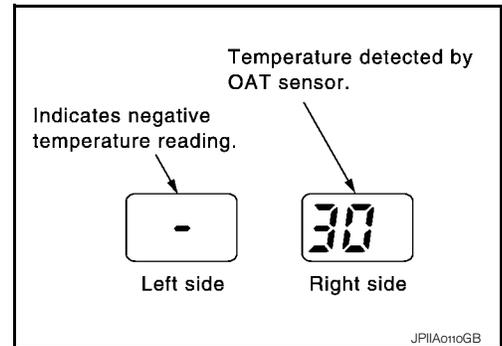
**NOTE:**

If the temperature indicated on the display greatly differs from the actual temperature, check sensor circuit first, and then check sensor.

Is this inspection result normal?

YES >> GO TO 9.

NO >> Go to OAT Sensor Circuit. Refer to [HAC-77. "Diagnosis Procedure"](#).



## 9. CHECK IN-VEHICLE SENSOR

Press  (DEF) switch for the one time. Temperature detected by in-vehicle sensor is indicated on the display.

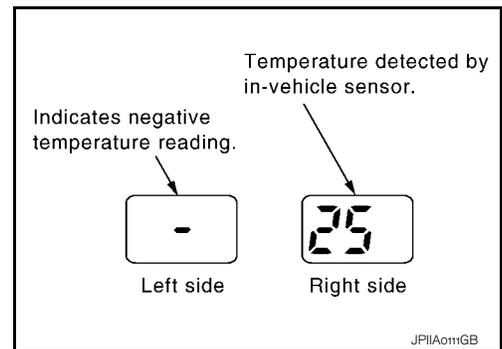
**NOTE:**

If the temperature indicated on the display greatly differs from the actual temperature, check sensor circuit first, and then check sensor.

Is this inspection result normal?

YES >> GO TO 10.

NO >> Go to In-vehicle Sensor Circuit. Refer to [HAC-81. "Diagnosis Procedure"](#).



## 10. CHECK INTAKE SENSOR

Press  (DEF) switch for the one time. Temperature detected by intake sensor is indicated on the display.

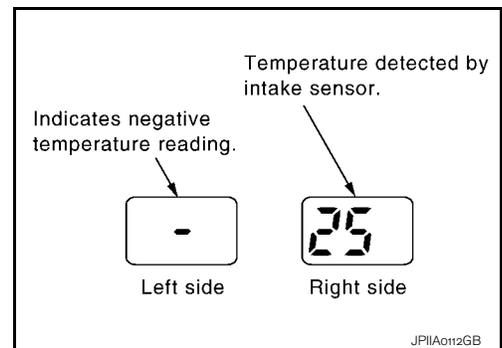
**NOTE:**

If the temperature indicated on the display greatly differs from the actual temperature, check sensor circuit first, and then check sensor.

Is this inspection result normal?

YES >> GO TO 11.

NO >> Go to Intake Sensor Circuit. Refer to [HAC-86. "Diagnosis Procedure"](#).



## 11. CHECK MALFUNCTIONING SENSOR AND DOOR MOTOR

Refer to the following chart for malfunctioning code No.

(If two or more sensors and door motors malfunction, corresponding code Nos. indicates 1 second each.)

Code No.	Malfunctioning sensor and door motor (Including circuits)	Reference
21 / -21	OAT sensor	<a href="#">HAC-77. "Diagnosis Procedure"</a>
22 / -22	In-vehicle sensor	<a href="#">HAC-81. "Diagnosis Procedure"</a>
24 / -24	Intake sensor	<a href="#">HAC-86. "Diagnosis Procedure"</a>
25 / -25	Sunload sensor *	<a href="#">HAC-83. "Diagnosis Procedure"</a>
26 / -26	Air mix door motor PBR (Driver side)	<a href="#">HAC-54. "Diagnosis Procedure"</a>
27 / -27	Air mix door motor PBR (Passenger side)	

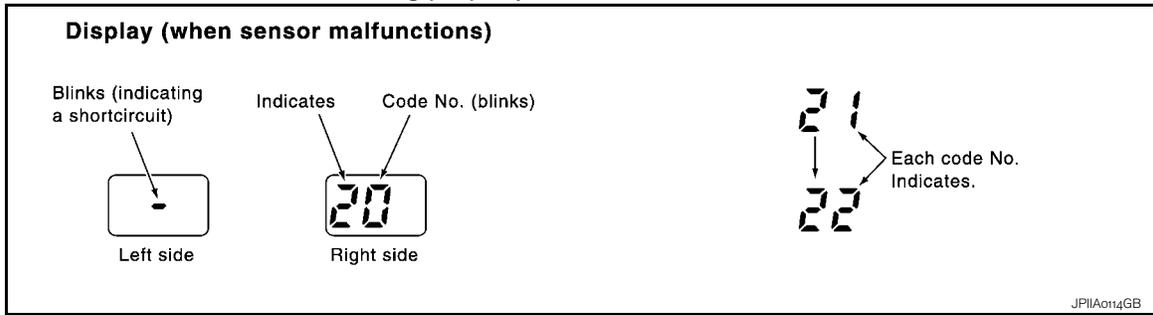
# DIAGNOSIS SYSTEM (AUTO AMP.)

[AUTOMATIC AIR CONDITIONER]

## < FUNCTION DIAGNOSIS >

\*: Perform self-diagnosis STEP-2 under sunshine.

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



>> INSPECTION END

## 12.CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH

Mode, high-level ventilator and/or intake door motor PBR(s) is/are malfunctioning.

Code No. *1 *2 *3	Mode, high-level ventilator or intake door position	Reference
31	High-level ventilator door open	High-level ventilator door motor <a href="#">HAC-50. "Diagnosis Procedure"</a>
32	High-level ventilator door shut	
33	VENT	Mode door motor <a href="#">HAC-47. "Diagnosis Procedure"</a>
34	D/F 1*4	
35	D/F 2	
36	DEF	
37	FRE	Intake door motor <a href="#">HAC-59. "Diagnosis Procedure"</a>
38	20% FRE	
39	REC	

(If two or more door motors are malfunctioning, corresponding code Nos. indicates 1 second each.)

\*1: If high-level ventilator door motor harness connector is disconnected, the following display pattern will appear.

31→32→ to 31

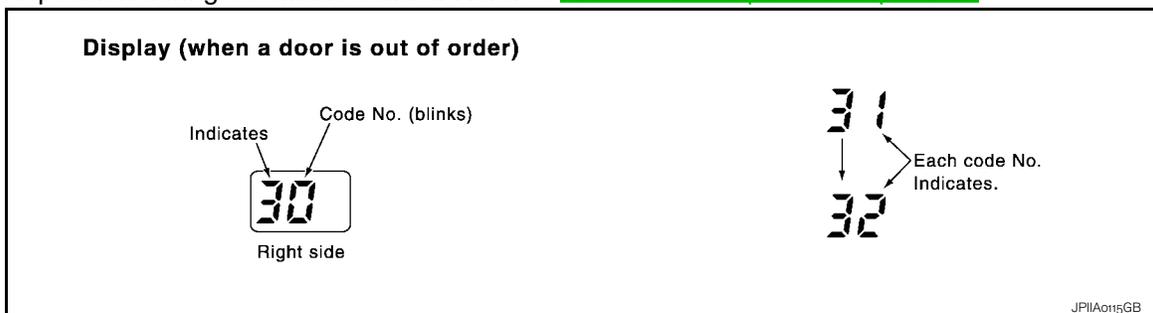
\*2: If mode door motor harness connector is disconnected, the following display pattern will appear.

33→34→35→36→Return to 33

\*3: If intake door motor harness connector is disconnected, the following display pattern will appear.

37→38→39→Return to 37

\*4: FOOT position during automatic control. Refer to [HAC-6. "Description & Inspection"](#).



>> INSPECTION END

## CONSULT-III Function

INFOID:000000000954637

## CONSULT-III APPLICATION ITEMS

CONSULT-III can display each diagnosis item using the diagnosis test modes shown following.

# DIAGNOSIS SYSTEM (AUTO AMP.)

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

System part	Check item, diagnosis mode	Description
ECM	Data monitor	Displays ECM input data in real time.
BCM	Data monitor	Displays BCM input data in real time.

## DATA MONITOR

Display Item List (ECM)

With Gasoline Engine

Monitor Item	Condition	Value/Status
AC PRESS SEN	<ul style="list-style-type: none"> <li>• Engine is running</li> <li>• Warm-up condition</li> <li>• Both A/C switch and blower fan motor switch: ON (Compressor operates.)</li> </ul>	1.0 - 4.0 V

With Diesel Engine

Monitor Item	Condition	Value/Status
RFRGERNT PRSS	<ul style="list-style-type: none"> <li>• Engine is running</li> <li>• Warm-up condition</li> <li>• Air conditioner switch: OFF</li> <li>• Shift lever: Neutral position</li> <li>• No load</li> </ul>	Approximately 5.7 bar

Display Item List (BCM)

Monitor Item	Condition	Value/Status
IGN ON SW	Ignition switch OFF → ON	Off → On
FAN ON SIG	Ignition switch ON	Blower fan motor switch ON On
		Blower fan motor switch OFF Off
AIR COND SW	Ignition switch ON	Compressor ON On
		Compressor OFF Off

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# DIAGNOSIS SYSTEM (BCM)

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## DIAGNOSIS SYSTEM (BCM)

### COMMON ITEM

#### COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:000000001096692

#### APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to <a href="#">BCS-61, "DTC Index"</a> .
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	<ul style="list-style-type: none"><li>Enables to read and save the vehicle specification.</li><li>Enables to write the vehicle specification when replacing BCM.</li></ul>

#### SYSTEM APPLICATION

BCM can perform the following functions for each system.

#### NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

#### AIR CONDITIONER

#### AIR CONDITIONER : CONSULT-III Function (BCM - AUTO AIR CONDITIONER)

INFOID:000000001096693

#### DATA MONITOR

Display Item List

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HAC

# DIAGNOSIS SYSTEM (BCM)

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

Monitor Item [Unit]	Contents
IGN SW [On/Off]	Display [ignition switch position (On)/(Off), ACC position (Off)] status as judged from ignition switch signal.
FAN ON SIG [On/Off]	Display [FAN (On)/FAN (Off)] status as judged from blower fan motor switch signal.
AIR COND SW [On/Off]	Display [COMP (On)/COMP (Off)] status as judged from air conditioner switch signal.

## PTC HEATER

### PTC HEATER : CONSULT-III Function (BCM - PTC HEATER)

INFOID:000000001096694

#### DATA MONITOR

Display Item List

Monitor Item [Unit]	Description
ELEC PWR CUT [OFF/FREEZ/INHBT]	Indicate [OFF/FREEZ/INHBT] condition of the PTC heater states.
FAN ON SIG [On/Off]	Displays [FAN (ON)/FAN (OFF)] status as judged from blower fan motor signal.
ENGINE STATUS [STOP/STAL/RUN/CRA]	Indicate [STOP/STALL/RUN/CRA] condition of the engine states.
ENG COOLNT T [°C]	The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.
BATTERY VOLT [V]	The power supply voltage of BCM is displayed.
ENGINE RPM [rpm]	Indicates the engine speed computed from the signal of the crankshaft position sensor.
OUTSIDE TEMP [°C]	The outside air temperature (determined by the signal voltage of the OAT sensor) is displayed.

#### ACTIVE TEST

Test item

Test Item	Operation	Description
PTC HEATER	OFF PTC 1 PTC 2 PTC 3	This test is able to check PTC heater operation.

# MODE DOOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## MODE DOOR CONTROL SYSTEM

### Description

INFOID:000000000954638

### SYSTEM DESCRIPTION

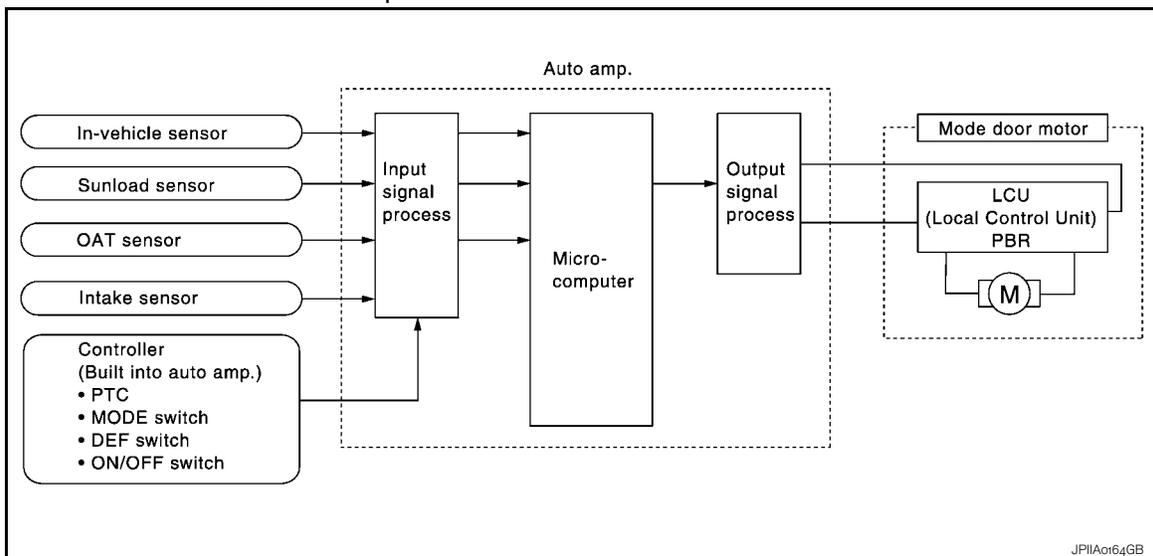
#### Component Parts

Mode door control system components are:

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

#### System Operation

- The auto amp. receives data from each of the sensors.
- The auto amp. sends air mix door, mode door, high-level ventilator door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU, high-level ventilator door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor, high-level ventilator door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles.
- Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data are returned to the auto amp.

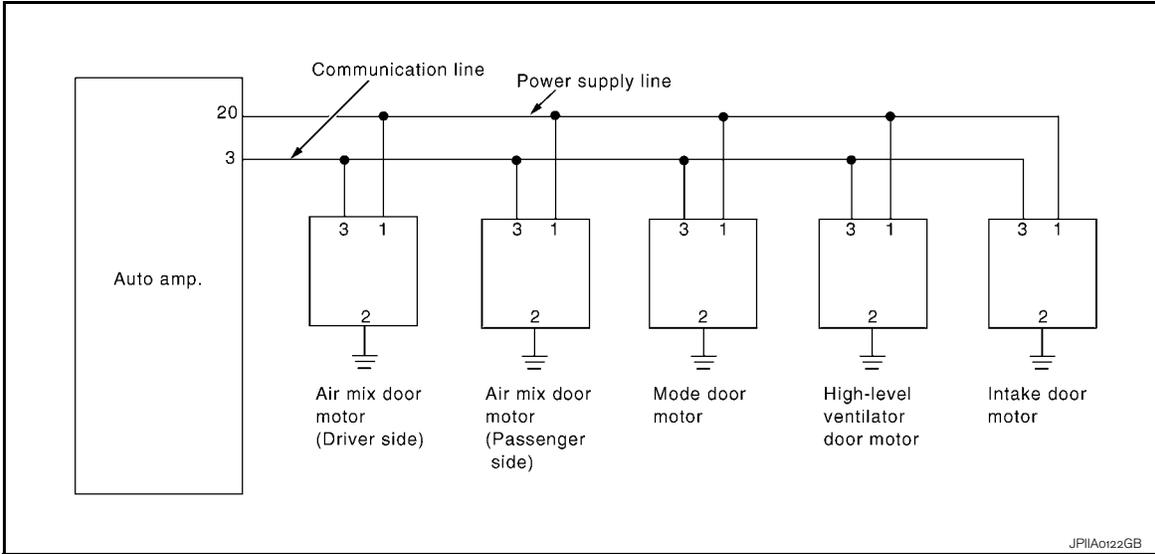


# MODE DOOR CONTROL SYSTEM

[AUTOMATIC AIR CONDITIONER]

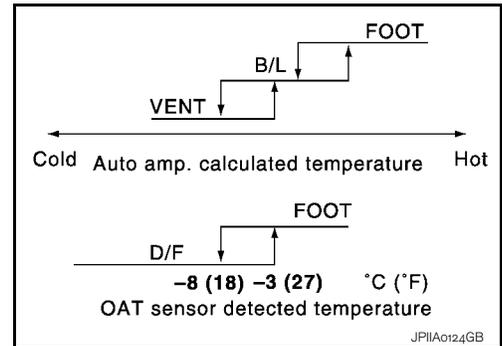
< FUNCTION DIAGNOSIS >

LAN System Circuit



## Mode Door Control Specification

Mode position can be selected manually by pressing MODE switch or DEF switch of the controller. This enables to fix a mode position. Automatic control by auto amp. Pressing AUTO switch allows automatic control by auto amp. During the automatic control of mode position, a mode door position (VENT, B/L, FOOT, or D/F) is selected based on a target air mix door opening angle and sunload depending on a temperature calculated by auto amp. In addition, D/F is selected to prevent windshield fogging only when ambient temperature is extremely low with mode position FOOT.



# HIGH-LEVEL VENTILATOR DOOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## HIGH-LEVEL VENTILATOR DOOR CONTROL SYSTEM

### Description

INFOID:000000000955084

### SYSTEM DESCRIPTION

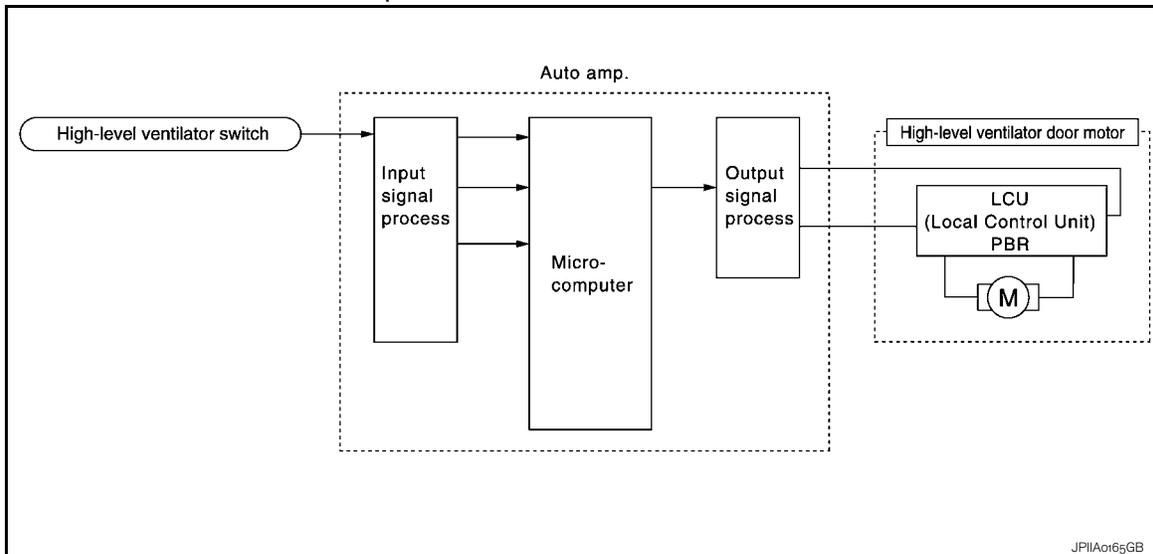
#### Component Parts

Hi-level ventilator door control system components are:

- Auto amp.
- High-level ventilator door motor (LCU)
- A/C LAN system (PBR built-in mode door motor, high-level ventilator door motor, air mix door motor and intake door motor)
- High-level ventilator switch

#### System Operation

- The auto amp. sends air mix door, mode door, high-level ventilator door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU, high-level ventilator door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor, high-level ventilator door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles.
- Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data are returned to the auto amp.



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HAC

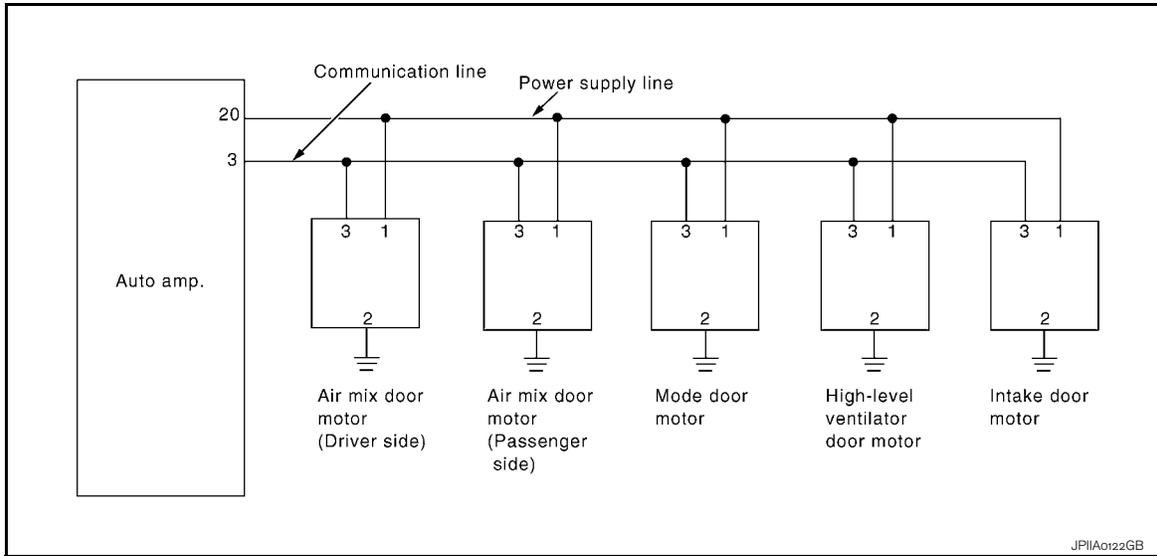
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# HIGH-LEVEL VENTILATOR DOOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

LAN System Circuit



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# AIR MIX DOOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## AIR MIX DOOR CONTROL SYSTEM

### Description

INFOID:000000000954639

### SYSTEM DESCRIPTION

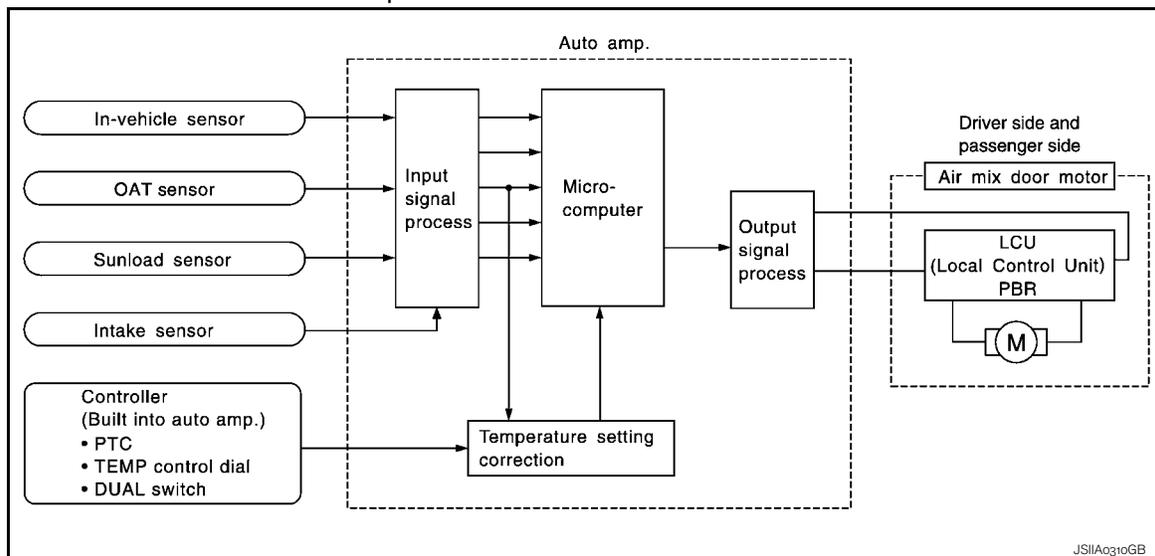
#### Component Parts

Air mix door control system components are:

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

#### System Operation

- The auto amp. receives data from each of the sensors.
- The auto amp. sends air mix doors, mode door, high-level ventilator door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU, high-level ventilator door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor, high-level ventilator door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles.
- Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data are returned to the auto amp.

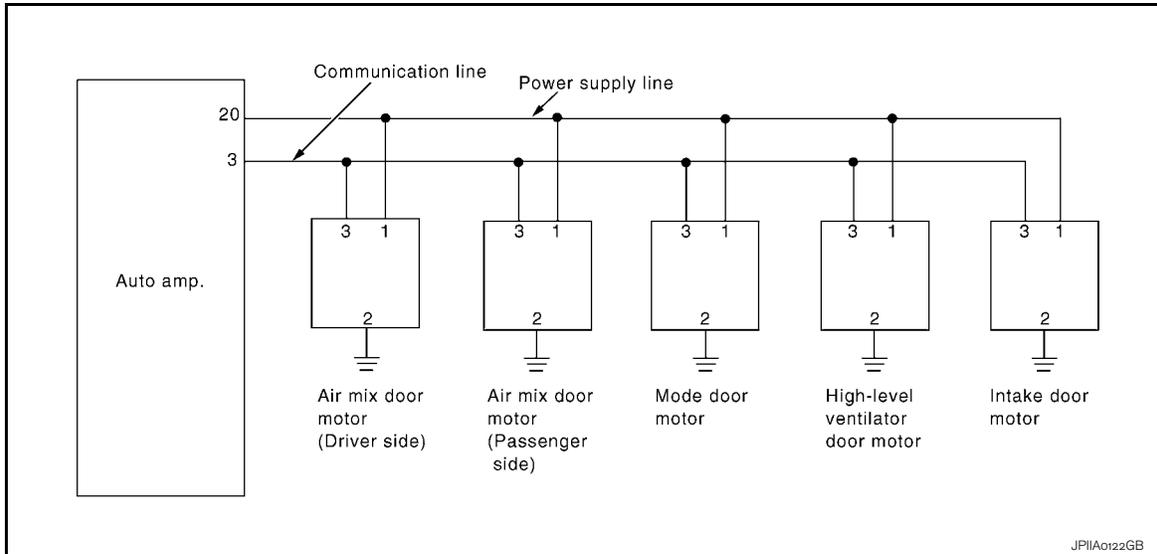


# AIR MIX DOOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

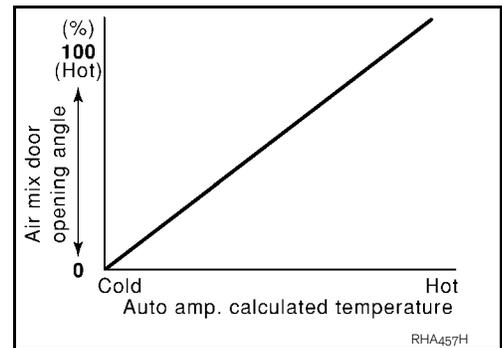
[AUTOMATIC AIR CONDITIONER]

LAN System Circuit



## Air Mix Door Control Specification

When ignition switch is ON, auto amp. continuously and automatically controls temperatures regardless of air conditioner operational condition. When setting a target temperature with temperature control dial, auto amp. corrects the set temperature and decides a target air mix door opening angle. Auto amp. controls air mix door according to the target air mix door opening angle and current air mix door opening angle in order to keep an optimum air mix door opening angle. When a temperature is set at 16.0°C, air mix door is fixed at full cold, and when a temperature is set at 30.0°C, it is set at full hot.



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# INTAKE DOOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## INTAKE DOOR CONTROL SYSTEM

### Description

INFOID:000000000954640

### SYSTEM DESCRIPTION

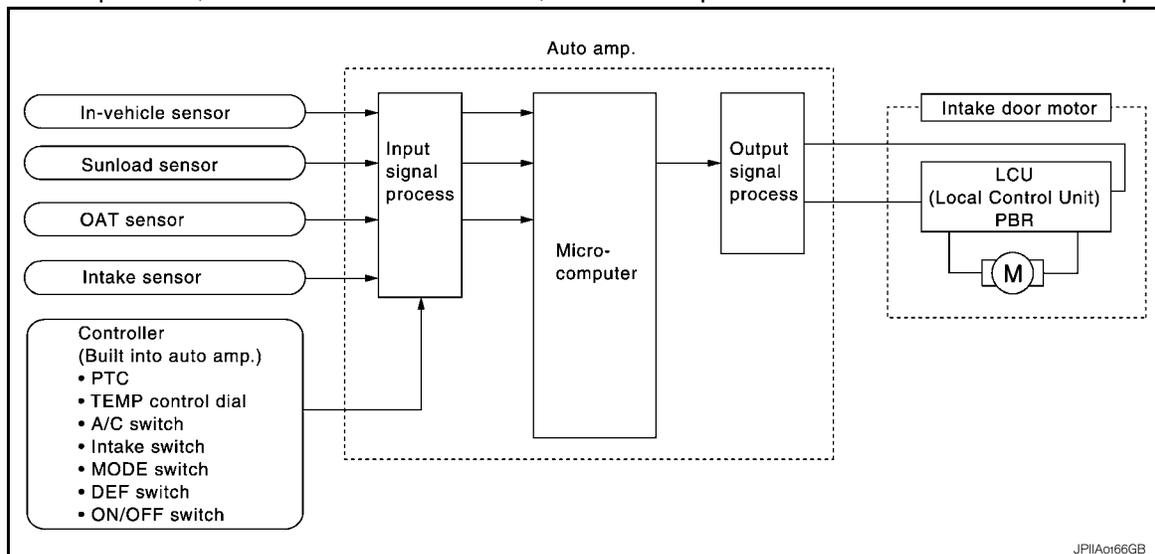
#### Component Parts

Intake door control system components are:

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

#### System Operation

- The auto amp. receives data from each of the sensors.
- The auto amp. sends air mix doors, mode door, high-level ventilator door and intake door opening angle data to the air mix door motor LCUs, mode door motor LCU, high-level ventilator door motor LCU and intake door motor LCU.
- The air mix door motors, mode door motor, high-level ventilator door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles.
- Subsequently, HOT/COLD, DEF/VENT, OPEN/SHUT and FRE/REC operation is selected. The new selection data are returned to the auto amp.
- The intake door control determines intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When shifting mode position D/F, when the DEF or OFF switches are pressed, or when A/C switch is OFF, the auto amp. sets the intake door at the FRE position.

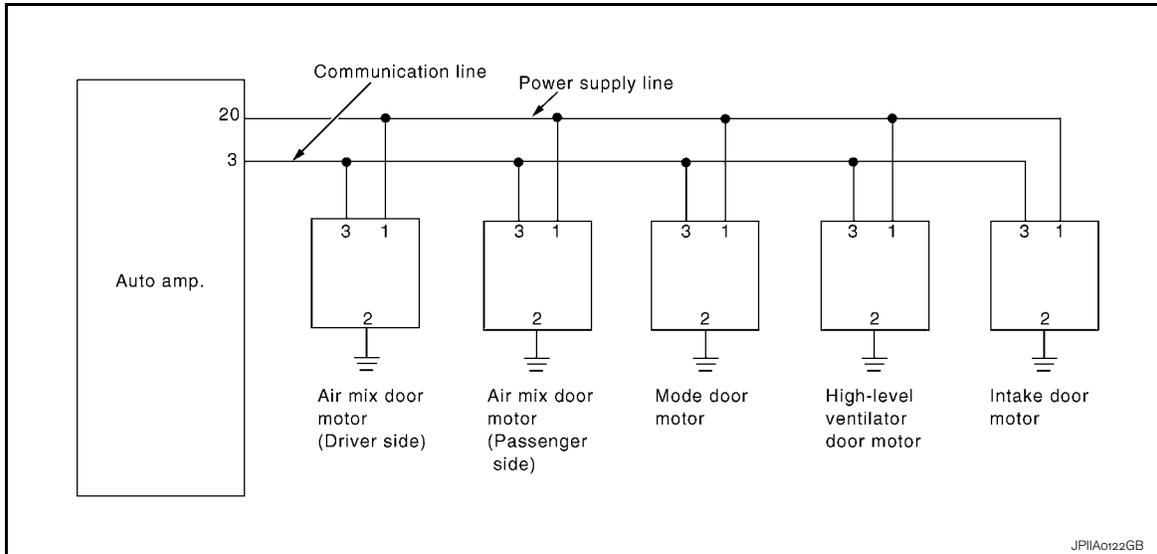


# INTAKE DOOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

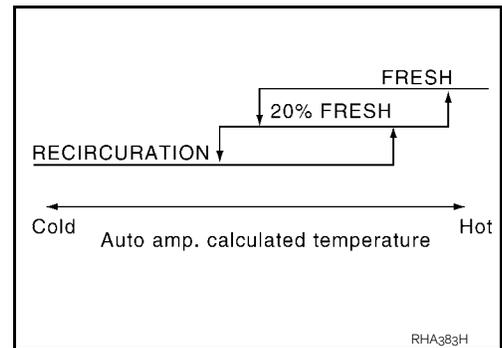
LAN System Circuit



## Intake Door Control Specification

Intake door position is basically fixed at FRE when FRE indicator lamps of DEF switch and intake switch turn ON, and fixed at REC when REC indicator lamp of intake switch turns ON.

Intake door automatic control selects FRE, 20%FRE, or REC depending on a target air mix door opening angle, based on in-vehicle temperature, ambient temperature, and sunload.



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# BLOWER MOTOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## BLOWER MOTOR CONTROL SYSTEM

### Description

INFOID:000000000954641

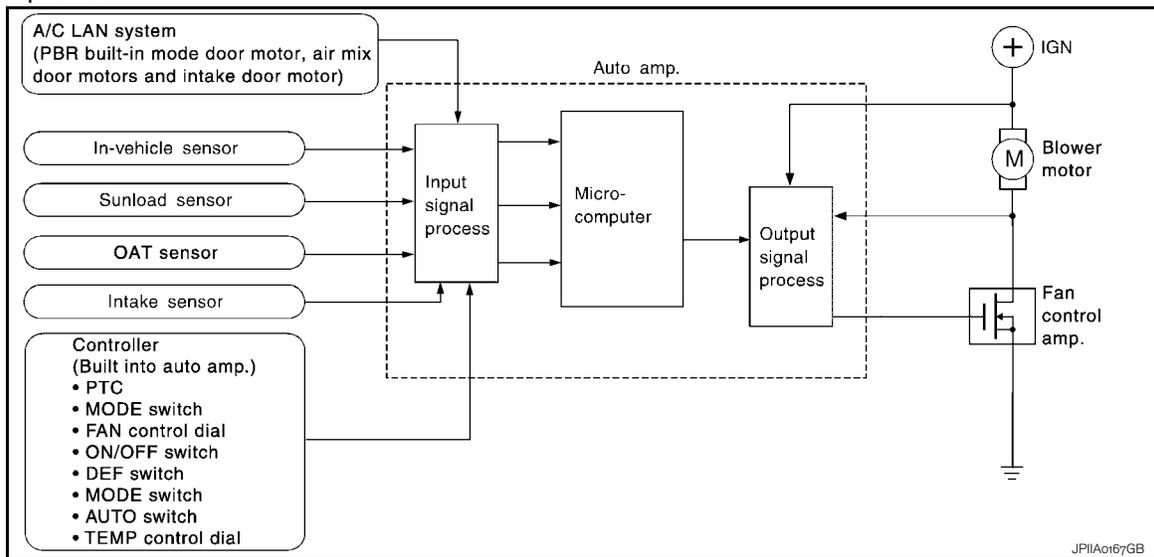
### SYSTEM DESCRIPTION

#### Component Parts

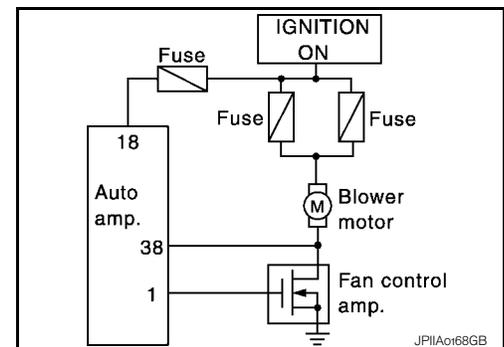
Fan speed control system components are:

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

#### System Operation



#### Blower motor circuit



#### Automatic Mode

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

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

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

#### Starting Fan Speed Control

Start up from COLD SOAK Condition (Automatic mode)

In a cold start up condition where the engine coolant temperature is below 56°C (133°F), the blower will not operate for a short period of time (up to 150 seconds). The exact start delay time varies depending on the ambient and engine coolant temperature.

# BLOWER MOTOR CONTROL SYSTEM

[AUTOMATIC AIR CONDITIONER]

## < FUNCTION DIAGNOSIS >

In the most extreme case (very low ambient temperature) the blower starting delay will be 150 seconds as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 56°C (133°F), and then the blower speed will increase to the objective speed.

Start up from usual or HOT SOAK Condition (Automatic mode)

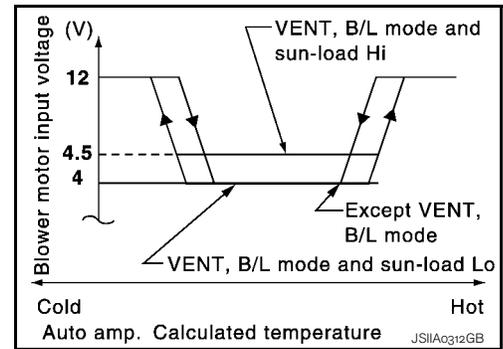
The blower will begin operation momentarily after the AUTO switch is pressed. The blower speed will gradually rise to the objective speed over a time period of 3 seconds or less (actual time depends on the objective blower speed).

### Blower Speed Compensation

#### Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. The low speed will vary depending on the sunload. During conditions of low or no sunload, the blower speed is low (approx. 4 V). During high sunload conditions, the auto amp. raise the blower speed (approx. 4.5 V).

### Fan Speed Control Specification



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# MAGNET CLUTCH CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## MAGNET CLUTCH CONTROL SYSTEM

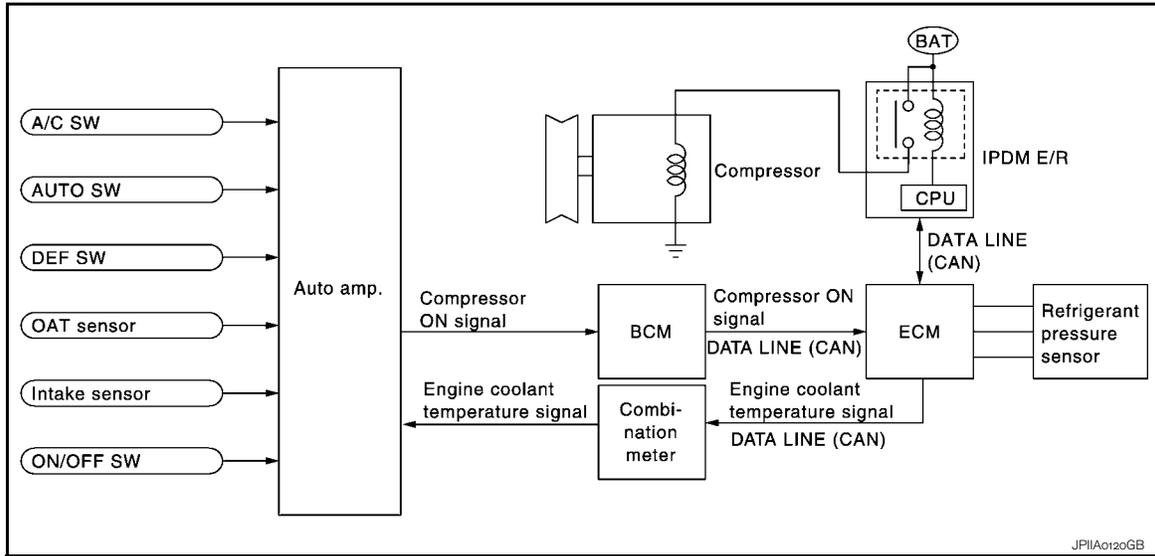
### Description

INFOID:000000000954642

### SYSTEM DESCRIPTION

Auto amp. controls compressor operation by ambient temperature, intake air temperature and signal from ECM.

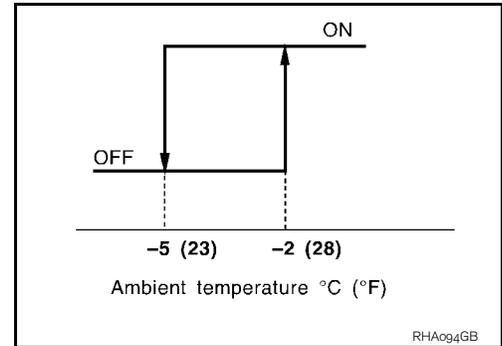
### System Operation



### Low Temperature Protection Control

Auto amp. will turn compressor ON or OFF as determined by a signal detected by OAT sensor and intake sensor.

When ambient temperature is higher than  $-2^{\circ}\text{C}$  ( $28^{\circ}\text{F}$ ), the compressor turns ON. The compressor turns OFF when ambient temperature is lower than  $-5^{\circ}\text{C}$  ( $28^{\circ}\text{F}$ ).



# PTC HEATER CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## PTC HEATER CONTROL SYSTEM

### Description

INFOID:000000001026642

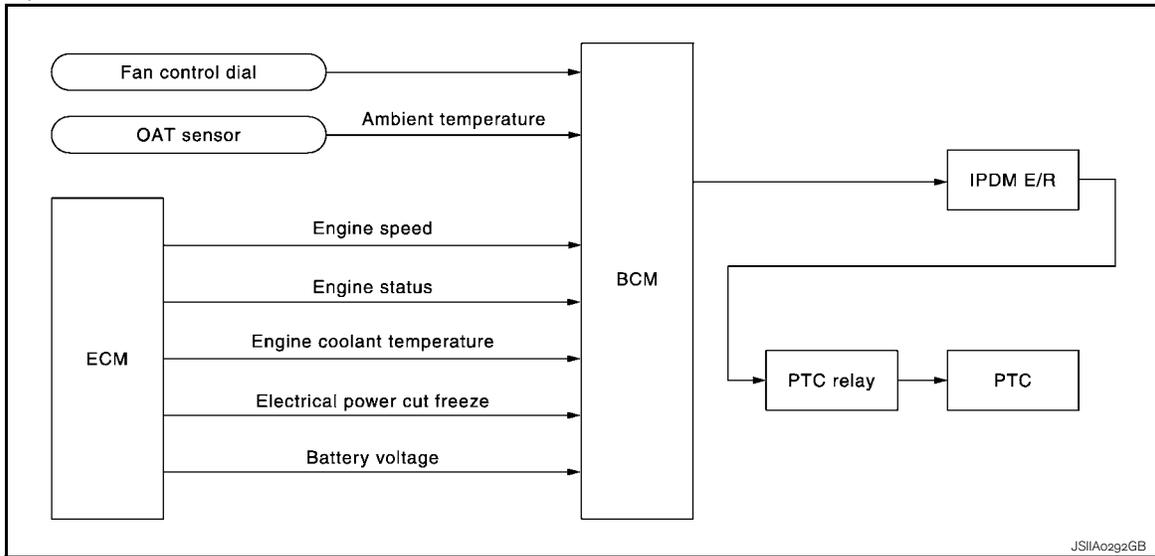
### SYSTEM DESCRIPTION

BCM controls PTC (Positive Temperature Coefficient) heater correspond to fan ON signal, ambient temperature, engine coolant temperature, engine speed, engine status, electrical power cut freeze signal and battery voltage.

BCM sends PTC ON signal to IPDM E/R, via CAN communication.

BCM judges whether PTC can be turned ON, based on each sensor status (ambient temperature, engine speed, engine coolant temperature, etc.). If it judges PTC can be turned ON, it send PTC heater relay ON signal to IPDM E/R via CAN communication.

### System Operation



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# COMPONENT DIAGNOSIS

## MODE DOOR MOTOR

### Description

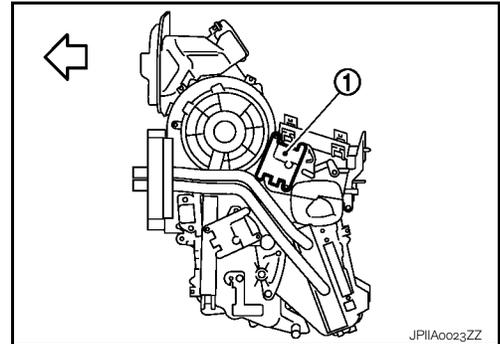
INFOID:000000000954643

### COMPONENT DESCRIPTION

#### Mode Door Motor

The mode door motor (1) are attached to the A/C unit assembly. It rotates so that air is discharged from the outlet set by the auto amp. Motor rotation is conveyed to a link which activates the mode door.

← Vehicle front



### Component Function Check

INFOID:000000000954644

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press MODE switches and DEF switch.
2. Each position indicator should illuminate.
3. Confirm that discharge air comes out according to the air distribution table at below. Refer to [HAC-15. "System Description"](#).

#### NOTE:

Confirm that the magnet clutch is engaged (Sound or visual inspection) and intake door position is at FRE when DEF or D/F is selected.

Is the inspection result normal?

YES >> END.

NO >> Go to diagnosis procedure. Refer to [HAC-47. "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000000954645

#### 1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27. "Diagnosis Description"](#), see No. 1 to 3.

Does code No. 20 appear on the display?

YES >> GO TO 2.

NO >> Go to appropriate malfunctioning sensor circuit. Refer to [HAC-27. "Diagnosis Description"](#), see No. 11.

#### 2. PERFORM SELF-DIAGNOSIS STEP-3

Perform self-diagnosis STEP-3. Refer to [HAC-27. "Diagnosis Description"](#), see No. 1 to 4.

Does code No. 30 appear on the display?

YES >> GO TO 8.

NO-1 >> Code No. 33, 34, 35 or 36 appear on the display: GO TO 3.

NO-2 >> Code No. 37, 38 or 39 appear on the display: Go to Intake Door Motor Circuit. Refer to [HAC-59. "Diagnosis Procedure"](#).

NO-3 >> Code No. 31 or 32 appear on the display: Go to High-level Ventilator Door Motor Circuit. Refer to [HAC-50. "Diagnosis Procedure"](#).

#### 3. CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

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## MODE DOOR MOTOR

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

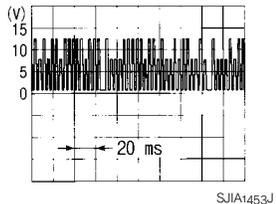
Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace auto amp.

### 4. CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace auto amp.

### 5. CHECK POWER SUPPLY FOR MODE DOOR MOTOR

Check voltage between mode door motor harness connector M310 terminal 1 and ground.

(+)		(-)	Voltage
Mode door motor		—	
Connector	Terminal		
M310	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector.

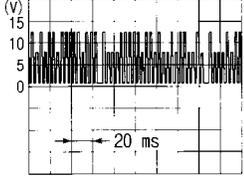
### 6. CHECK SIGNAL FOR MODE DOOR MOTOR

Confirm A/C LAN signal between mode door motor harness connector M310 terminal 3 and ground using an oscilloscope.

# MODE DOOR MOTOR

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

(+)		(-)	Voltage
Mode door motor		—	
Connector	Terminal		
M310	3	Ground	 <p style="text-align: right; font-size: small;">SJI/A1453/J</p>

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair harness or connector.

## 7. CHECK MODE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector.
3. Check continuity between mode door motor harness connector M310 terminal 2 and ground.

Mode door motor		—	Continuity
Connector	Terminal		
M310	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace mode door motor.

NO >> Repair harness or connector.

## 8. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 6.

Is it operated normally?

YES >> END.

NO >> GO TO 9.

## 9. CHECK MODE DOOR CONTROL LINKAGE

Check mode door control linkage.

Is it installed normally?

YES >> Refer to [VTL-35, "Exploded View"](#).

NO >> Repair or adjust control linkage.

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# HIGH-LEVEL VENTILATOR DOOR MOTOR

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## HIGH-LEVEL VENTILATOR DOOR MOTOR

### Description

INFOID:000000000955128

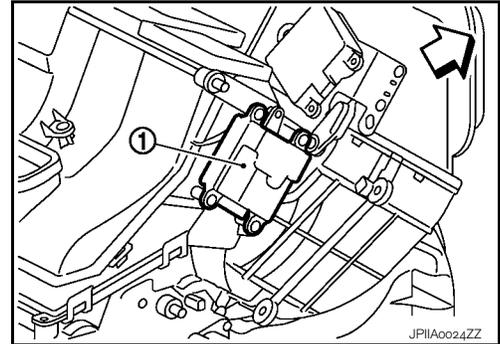
### COMPONENT DESCRIPTION

#### High-level Ventilator Door Motor

The high-level ventilator door motor (1) are attached to the A/C unit assembly. It rotates so that air is discharged from the outlet set by the auto amp. Motor rotation is conveyed to a link which activates the high-level ventilator door.

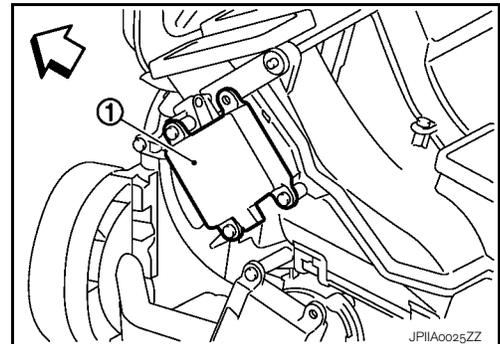
#### LHD models

← Vehicle front



#### RHD models

← Vehicle front



### Component Function Check

INFOID:000000000955129

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press high-level ventilator switch.
2. High-level ventilator switch indicator turn ON.
3. Confirm that discharge air comes out high-level ventilator.

Is the inspection result normal?

YES >> END.

NO >> Go to diagnosis procedure. Refer to [HAC-50, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000000955130

#### 1. PERFORM SELF-DIAGNOSIS STEP-3

Perform self-diagnosis STEP-3. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 4.

Does code No. 30 appear on the display?

YES >> GO TO 7.

NO-1 >> Code No. 33, 34, 35 or 36 appear on the display: Go to mode door motor circuit. Refer to [HAC-47, "Diagnosis Procedure"](#).

NO-2 >> Code No. 37, 38 or 39 appear on the display: Go to Intake Door Motor Circuit. Refer to [HAC-59, "Diagnosis Procedure"](#).

NO-3 >> Code No. 31 or 32 appear on the display: GO TO 2.

#### 2. CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.

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2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

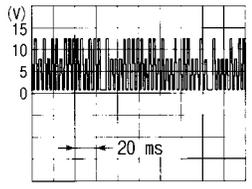
Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace auto amp.

## 3. CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace auto amp.

## 4. CHECK POWER SUPPLY FOR HIGH-LEVEL VENTILATOR DOOR MOTOR

Check voltage between high-level ventilator door motor harness connector M44 terminal 1 and ground.

(+)		(-)	Voltage
High-level VENT door motor		—	
Connector	Terminal		
M44	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair harness or connector.

## 5. CHECK SIGNAL FOR HIGH-LEVEL VENTILATOR DOOR MOTOR

Confirm A/C LAN signal between high-level ventilator door motor harness connector M44 terminal 3 and ground using an oscilloscope.

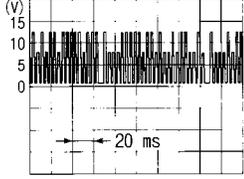
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(+)		(-)	Voltage
Connector	Terminal	—	
M44	3	Ground	 <p style="text-align: right; font-size: small;">SJIA1453J</p>

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair harness or connector.

## 6. CHECK HIGH-LEVEL VENTILATOR DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect high-level ventilator door motor connector.
3. Check continuity between high-level ventilator door motor harness connector M44 terminal 2 and ground.

High-level VENT door motor		—	Continuity
Connector	Terminal		
M44	2	Ground	Continuity should exist

Is the inspection result normal?

- YES >> Replace high-level ventilator door motor.
- NO >> Repair harness or connector.

## 7. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to [HAC-27. "Diagnosis Description"](#), see No. 1 to 6.

Is it operated normally?

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

## 8. CHECK HIGH-LEVEL VENTILATOR DOOR CONTROL LINKAGE

Check high-level ventilator door control linkage.

Is it installed normally?

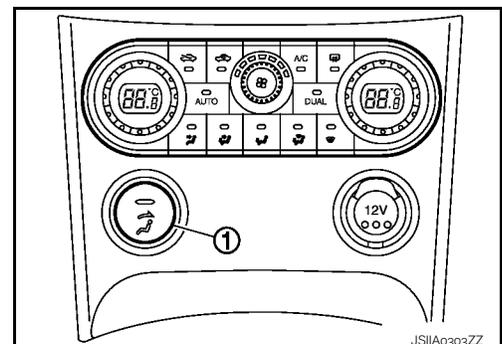
- YES >> Refer to [VTL-37. "Exploded View"](#).
- NO >> Repair or adjust control linkage.

## Component Inspection

INFOID:000000001117101

### HIGH-LEVEL VENTILATOR SWITCH

Check continuity between high-level ventilator switch (1) M52 terminal 2 and 3.



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High-level ventilator switch				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M52	2	M52	3	High-level VENT SW: OFF	Continuity should not exist
				High-level VENT SW: ON	Continuity should exist

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# AIR MIX DOOR MOTOR

< COMPONENT DIAGNOSIS >

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## AIR MIX DOOR MOTOR

### Description

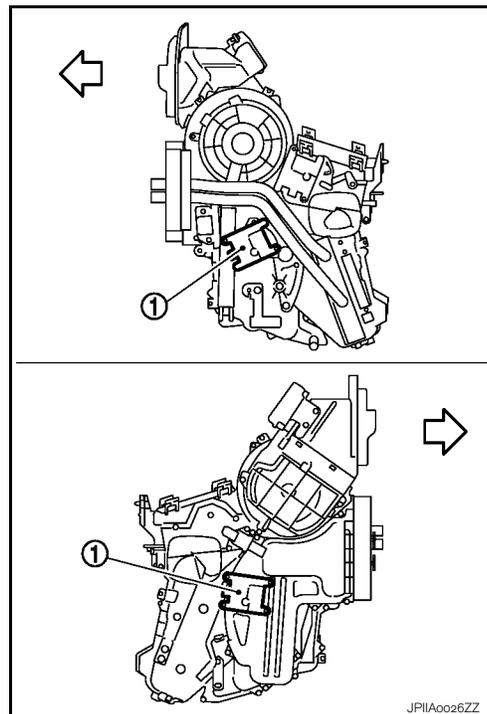
INFOID:000000000954646

### COMPONENT DESCRIPTION

#### Air Mix Door Motor

The air mix door motors (1) are attached to the A/C unit assembly. It rotates so that the air mix door is opened or closed to a position set by the auto amp. Motor rotation is then conveyed through a shaft and the air mix door position feedback is then sent to the auto amp. by PBR built-in air mix door motor.

← Vehicle front



### Component Function Check

INFOID:000000000954647

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn temperature control dial (driver side) clockwise until 30.0°C is displayed.
2. Check for hot air at discharge air outlets.
3. Turn temperature control dial (driver side) counterclockwise until 16.0°C is displayed.
4. Check for cold air at discharge air outlets.

Is the inspection result normal?

YES >> END.

NO >> Go to diagnosis procedure. Refer to [HAC-54, "Diagnosis Procedure"](#)

### Diagnosis Procedure

INFOID:000000000954648

#### 1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 3.

Does code No. 20 appear on the display?

YES >> GO TO 2.

NO >> Go to appropriate malfunctioning sensor circuit. Refer to [HAC-27, "Diagnosis Description"](#), see No. 11.

#### 2. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to [HAC-27, "Diagnosis Description"](#), see No.1 to 6.

Is it operated normally?

YES >> END.

# AIR MIX DOOR MOTOR

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## < COMPONENT DIAGNOSIS >

- NO-1 >> Malfunction is detected on left side. GO TO 3.  
 NO-2 >> Malfunction is detected on right side. GO TO 9.

### 3. CHECK AIR MIX DOOR MOTOR (LEFT SIDE)

Check air mix door motor (left side). Refer to [VTL-39. "Exploded View"](#).

Is it installed normally?

- YES >> GO TO 4.  
 NO >> Replace air mix door motor (left side).

### 4. CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

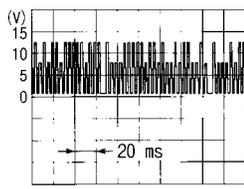
(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 5.  
 NO >> Replace auto amp.

### 5. CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	

Is the inspection result normal?

- YES >> GO TO 6.  
 NO >> Replace auto amp.

### 6. CHECK POWER SUPPLY FOR AIR MIX DOOR MOTOR (LEFT SIDE)

Check voltage between air mix door motor (left side) harness connector M306 terminal 1 and ground.

(+)		(-)	Voltage
Air mix door motor (left side)		—	
Connector	Terminal		
M306	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 7.  
 NO >> Repair harness or connector.

### 7. CHECK SIGNAL FOR AIR MIX DOOR MOTOR (LEFT SIDE)

Confirm A/C LAN signal between air mix door motor (left side) harness connector M306 terminal 3 and ground using an oscilloscope.

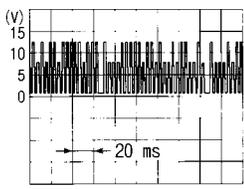
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(+)		(-)	Voltage
Air mix door motor (left side)		—	
Connector	Terminal		
M306	3	Ground	

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.

## 8. CHECK AIR MIX DOOR MOTOR (LEFT SIDE) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor (left side) connector.
3. Check continuity between air mix door motor (left side) harness connector M306 terminal 2 and ground.

Air mix door motor (left side)		—	Continuity
Connector	Terminal		
M306	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace air mix door motor (left side).

NO >> Repair harness or connector.

## 9. CHECK AIR MIX DOOR MOTOR (RIGHT SIDE)

Check air mix door motor (right side). Refer to [VTL-39, "Exploded View"](#).

Is it installed normally?

YES >> GO TO 10.

NO >> Replace air mix door motor (right side).

## 10. CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace auto amp.

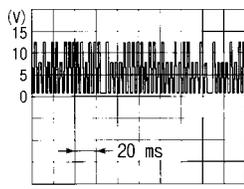
## 11. CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

# AIR MIX DOOR MOTOR

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(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace auto amp.

## 12. CHECK POWER SUPPLY FOR AIR MIX DOOR MOTOR (RIGHT SIDE)

Check voltage between air mix door motor (right side) harness connector M307 terminal 1 and ground.

(+)		(-)	Voltage
Air mix door motor (right side)		—	
Connector	Terminal		
M307	1	Ground	Battery voltage

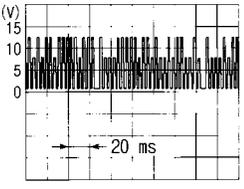
Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair harness or connector.

## 13. CHECK SIGNAL FOR AIR MIX DOOR MOTOR (RIGHT SIDE)

Confirm A/C LAN signal between air mix door motor (right side) harness connector M307 terminal 3 and ground using an oscilloscope.

(+)		(-)	Voltage
Air mix door motor (right side)		—	
Connector	Terminal		
M307	3	Ground	

Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair harness or connector.

## 14. CHECK AIR MIX DOOR MOTOR (RIGHT SIDE) GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor (right side) connector.
3. Check continuity between air mix door motor (right side) harness connector M307 terminal 2 and ground.

Air mix door motor (right side)		—	Continuity
Connector	Terminal		
M307	2	Ground	

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## AIR MIX DOOR MOTOR

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Is the inspection result normal?

YES >> Replace air mix door motor (right side).

NO >> Repair harness or connector.

# INTAKE DOOR MOTOR

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## INTAKE DOOR MOTOR

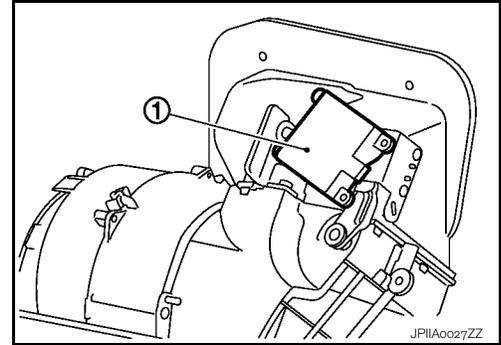
### Description

INFOID:000000000954649

### COMPONENT DESCRIPTION

#### Intake Door Motor

The intake door motor (1) is attached to the A/C unit. It rotates so that air is drawn from inlets set by the auto amp. Motor rotation is conveyed to a lever which activates the intake door.



←: Vehicle front

### Component Function Check

INFOID:000000000954650

#### 1.CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press recirculation (REC) switch.
2. REC indicator should illuminate.
3. Listen for intake door position change. (Slight change of blower sound can be heard.)
4. Press fresh (FRE) switch.
5. FRE indicator should illuminate.

Is the inspection result normal?

YES >> END.

NO >> Go to diagnosis procedure. Refer to [HAC-59, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000000954651

#### 1.PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 3.

Does code No. 20 appear on the display?

YES >> GO TO 2.

NO >> Go to appropriate malfunctioning sensor circuit. Refer to [HAC-27, "Diagnosis Description"](#), see No. 11.

#### 2.PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 6.

Is it operated normally?

YES >> END.

NO >> GO TO 3.

#### 3.CHECK INTAKE DOOR CONTROL LINKAGE

Check intake door control linkage.

Is it installed normally?

YES >> GO TO 4.

NO >> Repair or adjust control linkage.

#### 4.CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 20 and ground.

# INTAKE DOOR MOTOR

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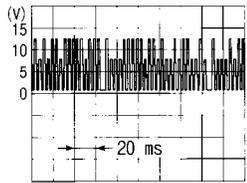
(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	20	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace auto amp.

## 5. CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M53 terminal 3 and ground using an oscilloscope.

(+)		(-)	Voltage
Auto amp.		—	
Connector	Terminal		
M53	3	Ground	

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Replace auto amp.

## 6. CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR

Check voltage between intake door motor harness connector M304 terminal 1 and ground.

(+)		(-)	Voltage
Intake door motor		—	
Connector	Terminal		
M304	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Repair harness or connector.

## 7. CHECK SIGNAL FOR INTAKE DOOR MOTOR

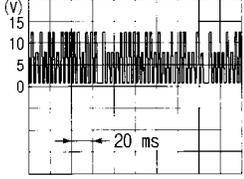
Confirm A/C LAN signal between intake door motor harness connector M304 terminal 3 and ground using an oscilloscope.

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# INTAKE DOOR MOTOR

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(+)		(-)	Voltage
Intake door motor		—	
Connector	Terminal		
M304	3	Ground	 <p style="text-align: right; font-size: small;">SJI/A1453/J</p>

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.

## 8. CHECK INTAKE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector.
3. Check continuity between intake door motor harness connector M304 terminal 2 and ground.

Intake door motor		—	Continuity
Connector	Terminal		
M304	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace intake door motor.

NO >> Repair harness or connector.

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# BLOWER MOTOR

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## BLOWER MOTOR

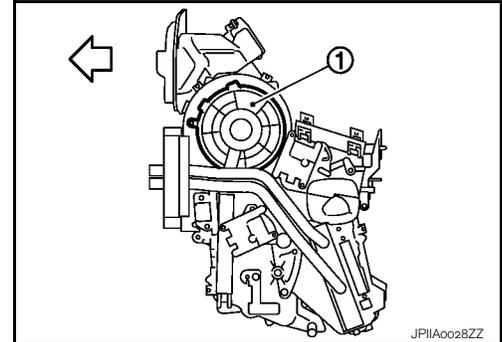
### Description

INFOID:000000000954652

#### COMPONENT DESCRIPTION

The blower motor (1) utilizes a brush motor with a sirocco fan type.

← Vehicle front



### Component Function Check

INFOID:000000000954653

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn fan control dial clockwise. Blower should operate on low speed.
2. Turn fan control dial clockwise, and continue checking blower speed and fan LEDs until all speeds checked.

Is the inspection result normal?

YES >> END.

NO >> Go to diagnosis procedure. Refer to [HAC-62, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000000954654

#### 1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 3.

Is there any malfunction displayed?

YES >> Go to appropriate malfunctioning sensor circuit. Refer to [HAC-27, "Diagnosis Description"](#), see to No. 11.

NO >> GO TO 2.

#### 2. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 6.

Code No.	41	42	43	44	45	46
Blower motor voltage	5 V	11.75 V		8.5 V		11.75 V

Does blower motor speed change according to each code No.?

YES >> GO TO 3.

NO >> GO TO 5.

#### 3. CHECK ENGINE COOLANT TEMPERATURE

Check engine coolant temperature.

Is engine coolant temperature below 56°C (133°F)?

YES >> GO TO 4.

NO >> Blower motor operation is normal.

#### 4. CHECK BLOWER MOTOR OPERATING

Check blower motor operating.

Is blower motor operation under starting blower speed control?

YES >> END.

NO >> GO TO 5.

# BLOWER MOTOR

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## 5. CHECK POWER SUPPLY FOR BLOWER MOTOR

1. Disconnect blower motor connector.
2. Turn ignition switch ON.
3. Check voltage between blower motor harness connector M312 terminal 1 and ground.

(+)		(-)	Voltage
Blower motor		—	
Connector	Terminal		
M312	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> GO TO 10.

## 6. CHECK POWER SUPPLY FOR FAN CONTROL AMP.

1. Disconnect fan control amp. connector.
2. Check voltage between fan control amp. harness connector M311 terminal 1 and ground.

(+)		(-)	Voltage
Fan control amp.		—	
Connector	Terminal		
M311	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 7.  
NO >> GO TO 14.

## 7. CHECK BLOWER MOTOR CONTROL SIGNAL

1. Reconnect blower motor connector and fan control amp. connector.
2. Turn ignition switch ON.
3. Press VENT switch.
4. Turn fan control dial to 1st speed.
5. Check voltage between fan control amp. harness connector M311 terminal 2 and ground.

(+)		(-)	Voltage
Fan control amp.		—	
Connector	Terminal		
M311	2	Ground	Approx. 2.5

Is the inspection result normal?

- YES >> GO TO 8.  
NO-1 >> In the case of less than approx. 2.5 V: GO TO 15.  
NO-2 >> In the case of more than approx. 9 V: Replace auto amp.

## 8. CHECK FAN CONTROL AMP. GROUND CIRCUIT

1. Disconnect fan control amp. connector.
2. Check continuity between fan control amp. harness connector M311 terminal 3 and ground.

Fan control amp.		—	Continuity
Connector	Terminal		
M311	3	Ground	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 9.  
NO >> Repair harness or connector.

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# BLOWER MOTOR

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## 9. CHECK BLOWER MOTOR FEEDBACK SIGNAL

1. Reconnect fan control amp. connector.
2. Turn ignition switch ON.
3. Turn fan control dial to 1st speed.
4. Check voltage between auto amp. harness connector M53 terminal 18 and ground.

(+) Auto amp.		(-)	Voltage
Connector	Terminal	—	
M53	18	Ground	Battery voltage

Is the inspection result normal?

YES >> Replace auto amp.

NO >> Repair harness or connector.

## 10. CHECK POWER VOLTAGE OF BLOWER RELAY

1. Turn ignition switch OFF.
2. Remove blower relay. Refer to [PG-110, "Fuse, Connector and Terminal Arrangement"](#).
3. Turn ignition switch ON.
4. Check voltage between blower relay fuse block terminals 1, 3 and body ground. Refer to [PG-108, "Description"](#) for relay terminal assignment.

(+) Blower relay		(-)	Voltage
1	3	Ground	
			Battery voltage

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 11.

## 11. CHECK IGNITION SWITCH CIRCUIT

Check ignition switch circuit. Refer to [DLK-91, "Diagnosis Procedure"](#) (WITH I-KEY, WITHOUT SUPER LOCK), [DLK-355, "Diagnosis Procedure"](#) (WITH I-KEY & SUPER LOCK), [DLK-597, "Diagnosis Procedure"](#) (WITHOUT I-KEY, WITHOUT SUPER LOCK) or [DLK-757, "Diagnosis Procedure"](#) (WITHOUT I-KEY & SUPER LOCK).

Is the inspection result normal?

YES >> Repair harness or connector.

NG >> Replace malfunctioning parts.

## 12. CHECK BLOWER RELAY

1. Turn ignition switch OFF.
2. Install blower relay. Refer to [PG-110, "Fuse, Connector and Terminal Arrangement"](#).
3. Check operation sound of the blower relay after switching ignition switch ON.

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace blower relay.

## 13. CHECK FUSE

Check 15A fuse [Nos 15 and 16, located in the fuse block (J/B)]. Refer to [PG-110, "Fuse, Connector and Terminal Arrangement"](#).

Is the inspection result normal?

YES >> Repair harness or connector.

NG >> Replace fuse.

## 14. CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND FAN CONTROL AMP.

# BLOWER MOTOR

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1. Turn ignition switch OFF.
2. Disconnect fan control amp. connector.
3. Check continuity between blower motor harness connector M312 terminal 2 and fan control amp. harness connector M311 terminal 1.

Blower motor		Fan control amp.		Continuity
Connector	Terminal	Connector	Terminal	
M312	2	M311	1	Continuity should exist

Is the inspection result normal?

YES >> Replace blower motor.

NO >> Repair harness or connector.

## 15.CHECK CIRCUIT FAN CONTROL AMP.

Check continuity between fan control amp. harness connector M311 terminal 3 and 2.

Fan control amp.				Continuity
Connector	Terminal	Connector	Terminal	
M311	3	M311	2	Continuity should exist

Is the inspection result normal?

YES >> Replace auto amp.

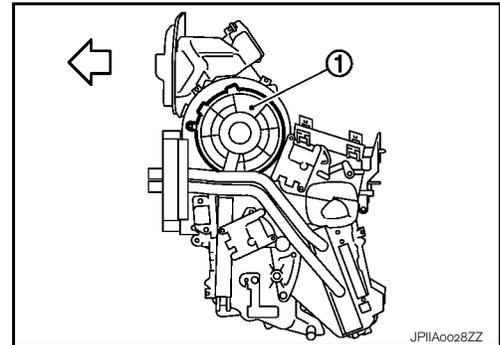
NO >> Replace fan control amp.

## Component Inspection

INFOID:000000000954655

Confirm smooth rotation of the blower motor (1).

← Vehicle front



# MAGNET CLUTCH

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## MAGNET CLUTCH

### Description

INFOID:000000000954656

Magnet clutch drives a compressor, by a signal of IPDM E/R.

### Component Function Check

INFOID:000000000954657

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press AUTO switch and A/C switch.
2. AUTO switch indicator will turn ON. Confirm that the magnet clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

Does the magnet clutch operate?

- YES >> END.  
NO >> Go to Diagnosis Procedure. Refer to [HAC-66. "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000000954658

#### 1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27. "Diagnosis Description"](#), see No. 1 to 3.

Is there any malfunction displayed?

- YES >> Go to appropriate malfunctioning sensor circuit. Refer to [HAC-27. "Diagnosis Description"](#), see to No. 11.  
NO >> GO TO 2.

#### 2. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to [HAC-27. "Diagnosis Description"](#), see No. 1 to 6.

Is it operated normally?

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

#### 3. PERFORM AUTO ACTIVE TEST

Perform "AUTO ACTIVE TEST". Refer to [PCS-9. "Diagnosis Description"](#).

Does the magnet clutch operate?

- YES >> •  WITH CONSULT-III: GO TO 7.  
•  WITHOUT CONSULT-III: GO TO 8.  
NO >> Check 10A fuse (No. 53, located in IPDM E/R), and GO TO 4.

#### 4. CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and compressor connector.
3. Check continuity between IPDM E/R harness connector E12 terminal 23 and compressor harness connector F17 (With Gasoline Engine) or F18 (With Diesel Engine) terminal 1.

With Gasoline Engine

IPDM E/R		Compressor		Continuity
Connector	Terminal	Connector	Terminal	
E12	23	F17	1	Continuity should exist

With Diesel Engine

IPDM E/R		Compressor		Continuity
Connector	Terminal	Connector	Terminal	
E12	23	F18	1	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 5.  
NO >> Repair harness or connector.

# MAGNET CLUTCH

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## 5. CHECK CIRCUIT CONTINUITY BETWEEN COMPRESSOR GROUND

Check continuity between compressor harness connector F17 (With Gasoline Engine) or F18 (With Diesel Engine) terminal 2 and ground.

With Gasoline Engine

Compressor		—	Continuity
Connector	Terminal		
F17	2	Ground	Continuity should exist

With Diesel Engine

Compressor		—	Continuity
Connector	Terminal		
F18	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector.

## 6. CHECK MAGNET CLUTCH CIRCUIT

Check for operation sound when applying battery voltage direct current to terminal.

Is the inspection result normal?

YES >> 1. Replace IPDM E/R.

2. Refer to self-diagnosis procedure [HAC-27, "Diagnosis Description"](#) and perform self-diagnosis STEP-4. Confirm that magnet clutch operation normal.

NO >> 1. Replace compressor.

2. Refer to self-diagnosis procedure [HAC-27, "Diagnosis Description"](#) and perform self-diagnosis STEP-4. Confirm that magnet clutch operation normal.

## 7. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal in "DATA MONITOR". Refer to [HAC-31, "CONSULT-III Function"](#).

**A/C SW ON : AIR COND SW ON**

**A/C SW OFF : AIR COND SW OFF**

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 8.

## 8. CHECK CIRCUIT CONTINUITY BETWEEN BCM AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect BCM harness connector and auto amp. harness connector.
3. Check continuity between BCM harness connector M65 terminal 14 and auto amp. harness connector M53 terminal 5.

BCM		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M65	14	M53	5	Continuity should exist

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair harness or connector.

## 9. CHECK BCM

1. Connect BCM harness connector.
2. Turn ignition switch ON.
3. Check voltage between BCM harness connector M65 terminal 14 and ground.

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# MAGNET CLUTCH

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

BCM		—	Voltage
Connector	Terminal		
M65	14	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace BCM. Refer to [BCS-64, "Exploded View"](#).

## 10. CHECK COMPRESSOR ON SIGNAL

1. Turn ignition switch OFF.
2. Connect auto amp. harness connector.
3. Turn ignition switch ON.
4. Check voltage between auto amp. harness connector M53 terminal 5 and ground.

Auto amp.		—	Condition	Voltage
Connector	Terminal			
M53	5	Ground	A/C switch: ON (Blower motor operates.)	Approx. 0

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace auto amp.

## 11. CHECK REFRIGERANT PRESSURE SENSOR

WITH CONSULT-III

1. Start the engine.
2. Check voltage of refrigerant pressure sensor in "DATA MONITOR". Refer to [HAC-91, "HR16DE : Reference Value"](#) (HR16DE), [HAC-92, "MR20DE : Reference Value"](#) (MR20DE), [HAC-92, "K9K : Reference Value"](#) (K9K).

WITHOUT CONSULT-III

1. Start the engine.
2. Check voltage between ECM harness connector F8 terminal 41 (With Gasoline Engine) or F68 terminal 78 (With Diesel Engine) and ground.

With Gasoline Engine

ECM		—	Condition	Voltage
Connector	Terminal			
F8	41	Ground	A/C switch: ON (Blower motor operates.)	Approx. 1.0 - 4.0

With Diesel Engine

ECM		—	Condition	Voltage
Connector	Terminal			
F68	78	Ground	A/C switch: ON (Blower motor operates.)	Approx. 2.3

Is the inspection result normal?

YES >> •  WITH CONSULT-III: GO TO 12.

•  WITHOUT CONSULT-III: GO TO 13.

NO >> Refer to [EC-316, "Diagnosis Procedure"](#) [HR16DE (WITH EURO-OBD)], [EC-595, "Diagnosis Procedure"](#) [HR16DE (WITHOUT EURO-OBD)], [EC-936, "Diagnosis Procedure"](#) [MR20DE (WITH EURO-OBD)], [EC-1215, "Diagnosis Procedure"](#) [MR20DE (WITHOUT EURO-OBD)], or [EC-1380, "Diagnosis Procedure"](#) (K9K).

# MAGNET CLUTCH

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## 12.CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal in "DATA MONITOR". Refer to [HAC-31, "CONSULT-III Function"](#).

**FAN CONTROL DIAL ON : FAN ON SIG ON**  
**FAN CONTROL DIAL OFF : FAN ON SIG OFF**

Is the inspection result normal?

YES >> GO TO 16.  
NO >> GO TO 13.

## 13.CHECK CIRCUIT CONTINUITY BETWEEN BCM AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect BCM connector and auto amp. connector.
3. Check continuity between BCM harness connector M65 terminal 15 and auto amp. harness connector M53 terminal 24.

BCM		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M65	15	M53	24	Continuity should exist

Is the inspection result normal?

YES >> GO TO 14.  
NO >> Repair harness or connector.

## 14.CHECK BCM

1. Connect BCM harness connector.
2. Turn ignition switch ON.
3. Check voltage between BCM harness connector M65 terminal 15 and ground.

BCM		—	Voltage
Connector	Terminal		
M65	15	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 15.  
NO >> Replace BCM. Refer to [BCS-64, "Exploded View"](#).

## 15.CHECK FAN ON SIGNAL

1. Turn ignition switch OFF.
2. Connect auto amp. connector.
3. Turn ignition switch ON.
4. Check voltage between auto amp. harness connector M53 terminal 24 and ground.

(+)		(-)		Condition	Voltage
Auto amp.		—			
Connector	Terminal				
M53	24	Ground		Fan control dial: ON	Approx. 0

Is the inspection result normal?

YES >> GO TO 16.  
NO >> Replace auto amp.

## 16.CHECK CAN COMMUNICATION

Check CAN communication. Refer to [LAN-59, "CAN Communication Signal Chart"](#).

- ECM – IPDM E/R
- ECM – BCM

Is the inspection result normal?

A  
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# MAGNET CLUTCH

[AUTOMATIC AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

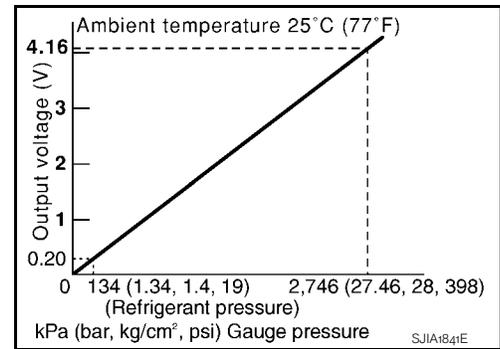
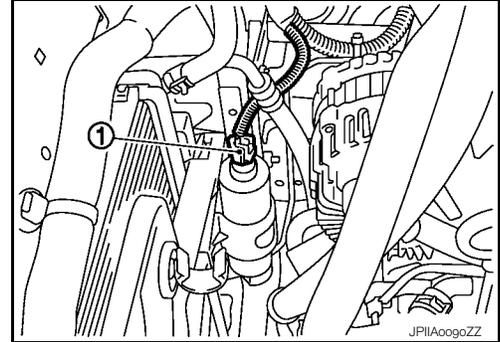
- YES >> Replace ECM.
- NO >> Repair or replace malfunctioning part(s).

## Component Inspection

INFOID:000000000954659

### Refrigerant Pressure Sensor

The refrigerant pressure sensor (1) is attached to the liquid tank. Make sure that the A/C refrigerant pressure and the sensor output voltage are within the specified range as shown in the A/C operating condition figure. Refer to [EC-316. "Description"](#) [HR16DE (WITH EURO-OBD)], [EC-595. "Description"](#) [HR16DE (WITHOUT EURO-OBD)], [EC-936. "Description"](#) [MR20DE (WITH EURO-OBD)], [EC-1215. "Description"](#) [MR20DE (WITHOUT EURO-OBD)], or [EC-1380. "Description"](#) (K9K).



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# PTC HEATER

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## PTC HEATER

### Description

INFOID:000000001026736

IPDM E/R operate a PTC heater, by a signal of BCM.

### Component Function Check

INFOID:000000001026738

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

##### CONSULT-III ACTIVE TEST

1. Start engine.
2. Select "PTC HEATER" of BCM active test item.  
**CAUTION:**
  - Engine must be cold.
  - Battery must be charged.
3. Turn fan control dial clockwise.
4. Turn temperature control dial to full hot position.
5. With operating the test item, check that PTC heater operation.
6. Check for warm air at discharge air outlet.

PTC 3	: PTC heater HI operation
PTC 2	: PTC heater MID operation
PTC 1	: PTC heater LO operation
OFF	: Stop the PTC heater operation

##### Does the PTC heater operate?

YES >> END.

NO >> Go to Diagnosis Procedure. Refer to [HAC-71, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000001026739

#### 1. CHECK PTC HEATER-1 OPERATION

##### CONSULT -III ACTIVE TEST

1. Disconnect PTC heater connector.
2. Start engine.
3. Select "PTC HEATER" of BCM active test item.
4. With operating the item, check voltage between PTC heater harness connector E117 terminal 3 and ground.

(+)		(-)	Test item	Voltage
Connector	Terminal	—	PTC HEATER	
E117	3	Ground	OFF	Approx. 0
			PTC 1	Battery voltage
			PTC 2	Approx. 0
			PTC 3	Battery voltage

##### In the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 5.

#### 2. CHECK GROUND CIRCUIT FOR PTC HEATER-1

1. Turn ignition switch OFF.
2. Check continuity between PTC heater harness connector E116 terminal 1 and ground.

A  
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# PTC HEATER

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

PTC heater		—	Continuity
Connector	Terminal		
E116	1	Ground	Continuity should exist.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

## 3.CHECK PTC HEATER-2 OPERATION

1. Start engine.
2. Select "PTC HEATER" of BCM active test item.
3. With operating the item, check voltage between PTC heater harness connector E117 terminal 4 and ground.

(+) PTC heater		(-)	Test item	Voltage
Connector	Terminal	—	PTC HEATER	
E117	4	Ground	OFF	Approx. 0
			PTC 1	Approx. 0
			PTC 2	Battery voltage
			PTC 3	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 12.

## 4.CHECK GROUND CIRCUIT FOR PTC HEATER-2

1. Turn ignition switch OFF.
2. Check continuity between PTC heater harness connector E116 terminal 2 and ground.

PTC heater		—	Continuity
Connector	Terminal		
E116	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace PTC heater.

NO >> Repair harness or connector.

## 5.CHECK VOLTAGE FOR PTC RELAY-1

1. Turn ignition switch OFF.
2. Disconnect PTC relay-1.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-1 harness connector E53 terminal 3 and ground.

(+) PTC relay-1		(-)	Voltage
Connector	Terminal	—	
E53	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

## 6.CHECK FUSE

# PTC HEATER

[AUTOMATIC AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

Check 30A fuse (Nos 37, located in the fuse, fusible link and relay box). Refer to [PG-111, "Fuse and Fusible Link Arrangement"](#).

Is the inspection result normal?

YES >> Repair harness or connector.

NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

### 7.CHECK PTC RELAY-1

Check PTC relay-1. Refer to [HAC-76, "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace PTC relay-1.

### 8.CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC HEATER

Check continuity between PTC relay-1 harness connector E53 terminal 5 and PTC heater harness connector E117 terminal 3.

PTC relay-1		PTC heater		Continuity
Connector	Terminal	Connector	Terminal	
E53	5	E117	3	Continuity should exist

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair harness or connector.

### 9.CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch ON.
2. Check voltage between PTC relay-1 harness connector E53 terminal 1 and ground.

(+)		(-)		Voltage
PTC relay-1		—		
Connector	Terminal			
E53	1	Ground		Battery voltage

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

### 10.CHECK FUSE

Check 10A fuse [Nos 17, located in the fuse block (J/B)]. Refer to [PG-110, "Fuse, Connector and Terminal Arrangement"](#).

Is the inspection result normal?

YES >> Repair harness or connector.

NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

### 11.CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-1 AND IPDM E/R

Check continuity between PTC relay-1 harness connector E53 terminal 2 and IPDM E/R harness connector E11 terminal 11.

PTC relay-1		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E53	2	E11	11	Continuity should exist

Is the inspection result normal?

YES >> GO TO 18.

NO >> Repair harness or connector.

### 12.CHECK VOLTAGE FOR PTC RELAY-2

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# PTC HEATER

[AUTOMATIC AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect PTC relay-2.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-2 harness connector E54 terminal 3 and ground.

(+)		(-)	Voltage
PTC relay-2		—	
Connector	Terminal		
E54	3	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 14.  
NO >> GO TO 13.

### 13.CHECK FUSE

Check 30A fuse (Nos 35, located in the fuse, fusible link and relay box). Refer to [PG-111, "Fuse and Fusible Link Arrangement"](#).

Is the inspection result normal?

- YES >> Repair harness or connector.  
NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

### 14.CHECK PTC RELAY-2

Check PTC relay-2. Refer to [HAC-76, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.  
NO >> Replace PTC relay-2.

### 15.CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-2 AND PTC HEATER

Check continuity between PTC relay-2 harness connector E54 terminal 5 and PTC heater harness connector E117 terminal 4.

PTC relay-2		PTC heater		Continuity
Connector	Terminal	Connector	Terminal	
E54	5	E117	4	Continuity should exist.

Is the inspection result normal?

- YES >> GO TO 16.  
NO >> Repair harness or connector.

### 16.CHECK POWER SUPPLY FOR PTC RELAY-2

1. Turn ignition switch ON.
2. Check voltage between PTC relay-2 harness connector E54 terminal 1 and ground.

(+)		(-)	Voltage
PTC relay-2		—	
Connector	Terminal		
E54	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 17.  
NO >> GO TO 10.

### 17.CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-2 AND IPDM E/R

Check continuity between PTC relay-2 harness connector E54 terminal 2 and IPDM E/R harness connector E11 terminal 12.

# PTC HEATER

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

PTC relay-1		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E54	2	E11	12	Continuity should exist.

Is the inspection result normal?

- YES >> GO TO 18.
- NO >> Repair harness or connector.

## 18.CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal in "DATA MONITOR". Refer to [HAC-31, "CONSULT-III Function"](#).

**FAN CONTROL DIAL ON : FAN ON SIG ON**  
**FAN CONTROL DIAL OFF : FAN ON SIG OFF**

Is the inspection result normal?

- YES >> GO TO 21.
- NO >> GO TO 19.

## 19.CHECK FAN ON SIGNAL

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M53 terminal 24 and ground.

(+)		(-)	Condition	Voltage
Auto amp.		—		
Connector	Terminal			
M53	24	Ground	Fan control dial: OFF	Approx. 12

3. Turn fan control dial clockwise.
4. Check voltage between auto amp. harness connector M53 terminal 24 and ground.

(+)		(-)	Condition	Voltage
Auto amp.		—		
Connector	Terminal			
M53	24	Ground	Fan control dial: ON (Blower motor operates.)	Approx. 0

Is the inspection result normal?

- YES >> GO TO 20.
- NO >> Replace auto amp.

## 20.CHECK CIRCUIT CONTINUITY BETWEEN BCM AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect BCM harness connector.
3. Check continuity between BCM harness connector M65 terminal 15 and auto amp. harness connector M53 terminal 24.

BCM		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M65	15	M53	24	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 21.
- NO >> Repair harness or connector.

## 21.CHECK CAN COMMUNICATION

Check CAN communication. Refer to [LAN-59, "CAN Communication Signal Chart"](#).

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# PTC HEATER

[AUTOMATIC AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

- BCM – IPDM E/R
- BCM – ECM

Is the inspection result normal?

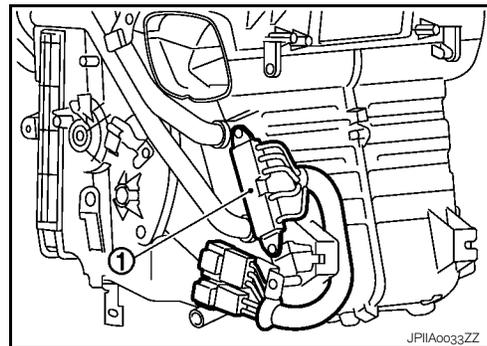
- YES >> Replace IPDM E/R.  
NO >> Repair or replace malfunctioning part(s).

## Component Inspection

INFOID:000000001026740

### PTC HEATER

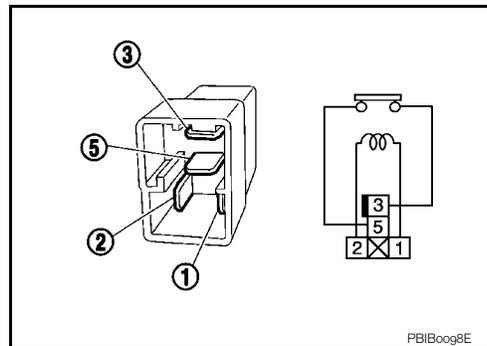
The PTC heater (1) is attached to the A/C unit assembly. It generates heat electrically.



### PTC RELAY

Check continuity between terminal 3 and 5.

Terminal	Condition	Continuity
3 and 5	12V direct current supply between terminal 1 and 2	Exist
	No current supply	Not exist



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## OAT SENSOR

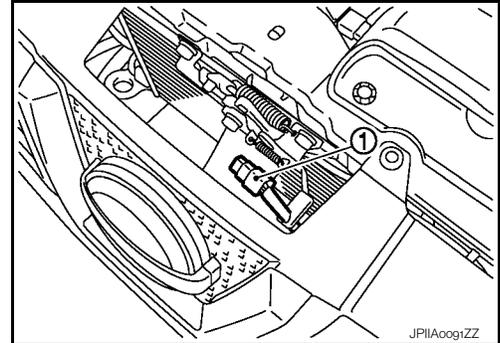
## Description

INFOID:000000000954660

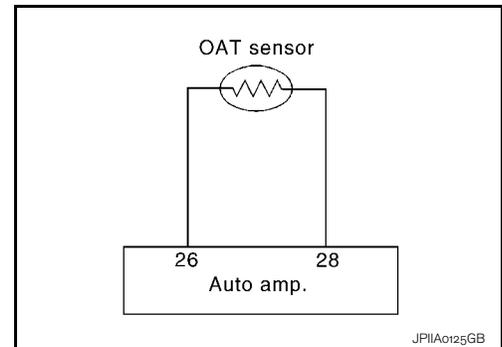
## COMPONENT DESCRIPTION

OAT (Outside Air Temperature) Sensor

The OAT sensor (1) is attached on the radiator core support. It detects ambient temperature and converts it into a resistance value which is then input into the auto amp.



## OAT Sensor Circuit



## AMBIENT TEMPERATURE INPUT PROCESS

The auto amp. includes a processing circuit for the OAT sensor input. However, when the temperature detected by the OAT sensor increases quickly, the processing circuit retards the auto amp. function. It only allows the auto amp. to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds. As an example, consider stopping for a few minutes after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the OAT sensor will increase. This is because the heat from the engine compartment can radiate to the front bumper area, location of the OAT sensor.

## Component Function Check

INFOID:000000000954661

## 1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 3.

21 or -21 is displayed.

- YES >> Go to Diagnosis Procedure. Refer to [HAC-77, "Diagnosis Procedure"](#).  
 NO >> END.

## Diagnosis Procedure

INFOID:000000000954662

## 1. CHECK VOLTAGE BETWEEN OAT SENSOR AND GROUND

1. Disconnect OAT sensor connector.
2. Turn ignition switch ON.
3. Check voltage between OAT sensor harness connector E52 terminal 4 and ground.

# OAT SENSOR

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

(+)		(-)	Voltage
OAT sensor		—	
Connector	Terminal		
E52	4	Ground	Approx. 5

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> GO TO 4.

## 2. CHECK CIRCUIT CONTINUITY BETWEEN OAT SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between OAT sensor harness connector E52 terminal 3 and auto amp. harness connector M53 terminal 26.

OAT sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
E52	3	M53	26	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair harness or connector.

## 3. CHECK OAT SENSOR

Refer to [HAC-78. "Component Inspection"](#).

Is the inspection result normal?

- YES >> Replace auto amp.
- NO >> Replace OAT sensor.

## 4. CHECK CIRCUIT CONTINUITY BETWEEN OAT SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between OAT sensor harness connector E52 terminal 4 and auto amp. harness connector M53 terminal 28.

OAT sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
E52	4	M53	28	Continuity should exist

4. Check continuity between OAT sensor harness connector E52 terminal 4 and ground.

OAT sensor		(-)	Continuity
Connector	Terminal		
E52	4	Ground	Continuity should not exist

Is the inspection result normal?

- YES >> Replace auto amp.
- NO >> Repair harness or connector.

## Component Inspection

INFOID:000000000954663

# OAT SENSOR

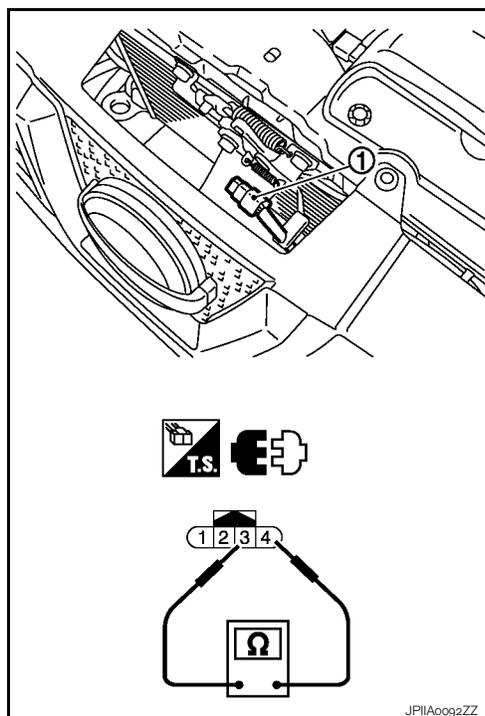
## < COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

After disconnecting OAT sensor (1) connector E52, measure resistance between terminals 3 and 4 at sensor side. Refer to table below.

Temperature °C (°F)	Resistance kΩ
-30 (-22)	13.33
-20 (-4)	7.89
-10 (14)	4.80
0 (32)	6.19
5 (41)	1.81
10 (50)	1.16
20 (68)	0.77
30 (86)	0.52
40 (104)	0.36

If NG, replace OAT sensor.



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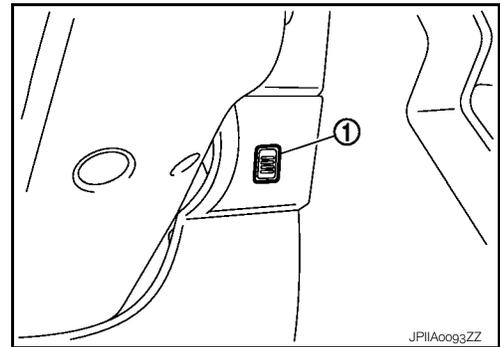
## IN-VEHICLE SENSOR

### Description

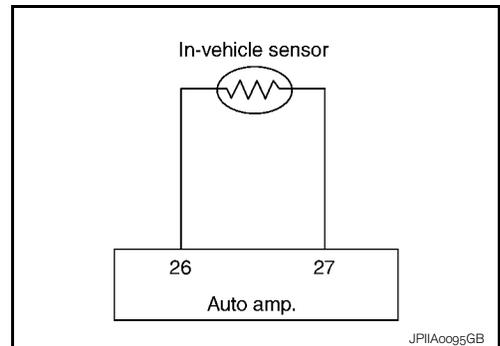
INFOID:000000000954664

#### In-vehicle Sensor

The in-vehicle sensor (1) is located on lower instrument panel, driver side. It converts variations in temperature of compartment air drawn from the aspirator into a resistance value. It is then input into the auto amp.



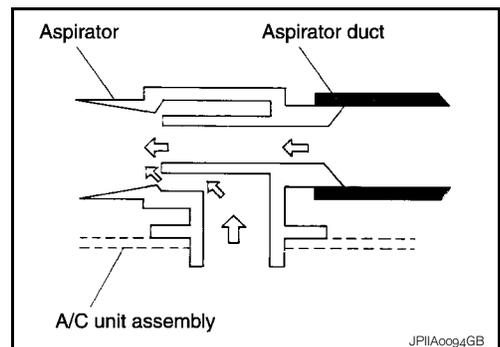
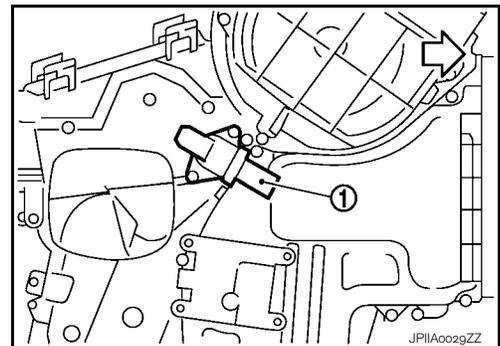
#### In-vehicle Sensor Circuit



#### Aspirator

The aspirator (1) is located on driver's side of A/C unit assembly. It produces vacuum pressure due to air discharged from the A/C unit assembly, continuously taking compartment air in the aspirator.

← Vehicle front



### Component Function Check

INFOID:000000000954665

#### 1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27. "Diagnosis Description"](#), see No. 1 to 3.

# IN-VEHICLE SENSOR

[AUTOMATIC AIR CONDITIONER]

< COMPONENT DIAGNOSIS >

22 or -22 is displayed.

- YES >> Go to Diagnosis Procedure. Refer to [HAC-81, "Diagnosis Procedure"](#).  
NO >> END.

## Diagnosis Procedure

INFOID:000000000954666

### 1. CHECK VOLTAGE BETWEEN IN-VEHICLE SENSOR AND GROUND

1. Disconnect in-vehicle sensor connector.
2. Turn ignition switch ON.
3. Check voltage between in-vehicle sensor harness connector M41 terminal 1 and ground.

(+)		(-)	Voltage
In-vehicle sensor		—	
Connector	Terminal		
M41	1	Ground	Approx. 5

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> GO TO 4.

### 2. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between in-vehicle sensor harness connector M41 terminal 2 and auto amp. harness connector M53 terminal 26.

In-vehicle sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M41	2	M53	26	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair harness or connector.

### 3. CHECK IN-VEHICLE SENSOR

Refer to [HAC-82, "Component Inspection"](#).

Is the inspection result normal?

- YES >> Replace auto amp.  
NO >> Replace in-vehicle sensor.

### 4. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between in-vehicle sensor harness connector M41 terminal 1 and auto amp. harness connector M53 terminal 27.

In-vehicle sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M41	1	M53	27	Continuity should exist

4. Check continuity between in-vehicle sensor harness connector M41 terminal 1 and ground.

In-vehicle sensor		(-)	Continuity
Connector	Terminal	—	
M41	1	Ground	Continuity should not exist

Is the inspection result normal?

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# IN-VEHICLE SENSOR

[AUTOMATIC AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

- YES >> Replace auto amp.
- NO >> Repair harness or connector.

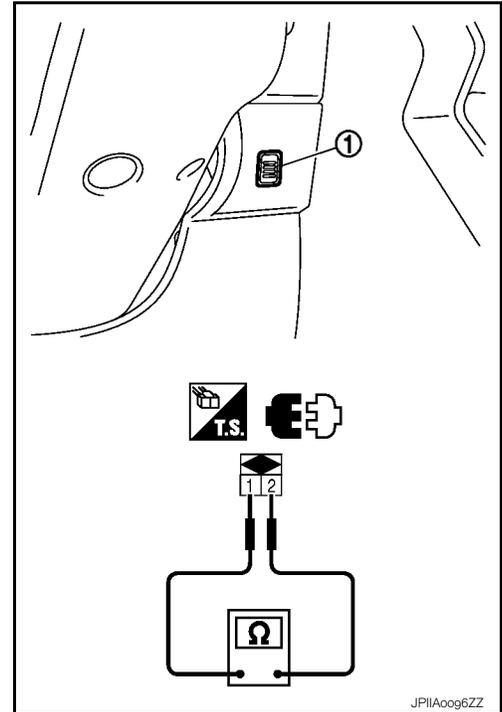
## Component Inspection

INFOID:000000000954667

After disconnecting in-vehicle sensor (1) connector M41, measure resistance between terminals 1 and 2 at sensor side. Refer to table below.

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

If NG, replace in-vehicle sensor.



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## SUNLOAD SENSOR

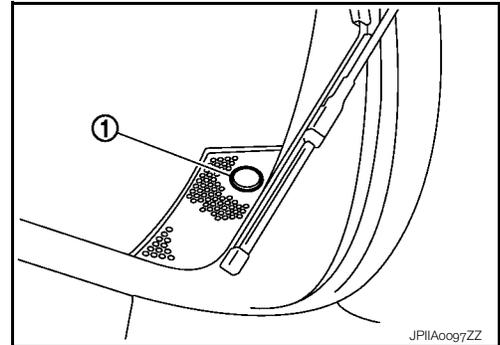
### Description

INFOID:000000000954668

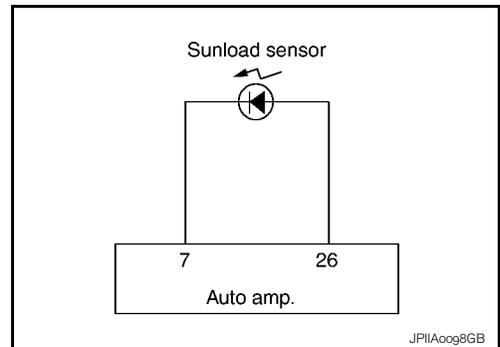
### COMPONENT DESCRIPTION

#### Sunload Sensor

The sunload sensor (1) is located on the tweeter grille (RH). It detects sunload entering through windshield by means of a photo diode. The sensor converts the sunload into a current value which is then input into the auto amp.



#### Sunload Sensor Circuit



### SUNLOAD INPUT PROCESS

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

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

### Component Function Check

INFOID:000000000954669

#### 1. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 3.  
25 or -25 is displayed.

- YES >> Go to Diagnosis Procedure. Refer to [HAC-83, "Diagnosis Procedure"](#).
- NO >> END.

### Diagnosis Procedure

INFOID:000000000954670

#### 1. CHECK VOLTAGE BETWEEN SUNLOAD SENSOR AND GROUND

1. Disconnect sunload sensor connector.
2. Turn ignition switch ON.
3. Check voltage between sunload sensor harness connector M74 terminal 1 and ground.

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# SUNLOAD SENSOR

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

(+)		(-)	Voltage
Sunload sensor		—	
Connector	Terminal		
M74	1	Ground	

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 4.

## 2. CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between sunload sensor harness connector M74 terminal 2 and auto amp. harness connector M53 terminal 26.

Sunload sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M74	2	M53	26	Continuity should exist

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

## 3. CHECK SUNLOAD SENSOR

1. Reconnect sunload sensor connector and auto amp. connector.
2. Refer to [HAC-84, "Component Inspection"](#).

Is the inspection result normal?

YES >> Replace auto amp.

NO >> Replace sunload sensor.

## 4. CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between sunload sensor harness connector M74 terminal 1 and auto amp. harness connector M53 terminal 7.

Sunload sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M74	1	M53	7	Continuity should exist

4. Check continuity between sunload sensor harness connector M74 terminal 1 and ground.

Sunload sensor		(-)	Continuity
Connector	Terminal		
M74	1	Ground	Continuity should not exist

Is the inspection result normal?

YES >> Replace auto amp.

NO >> Repair harness or connector.

## Component Inspection

INFOID:000000000954671

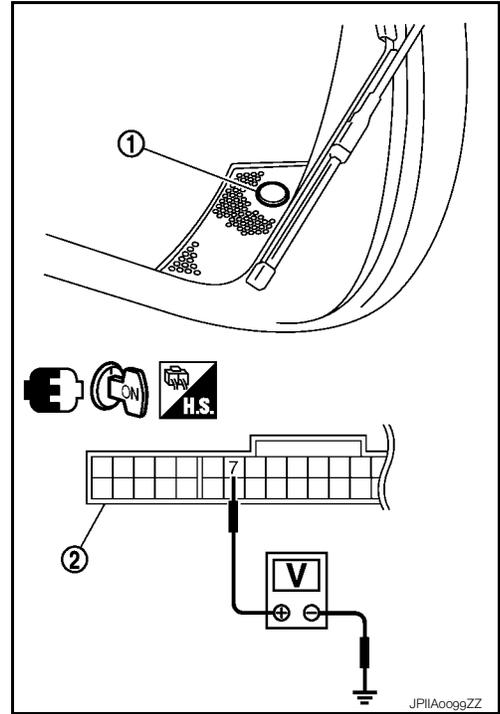
# SUNLOAD SENSOR

[AUTOMATIC AIR CONDITIONER]

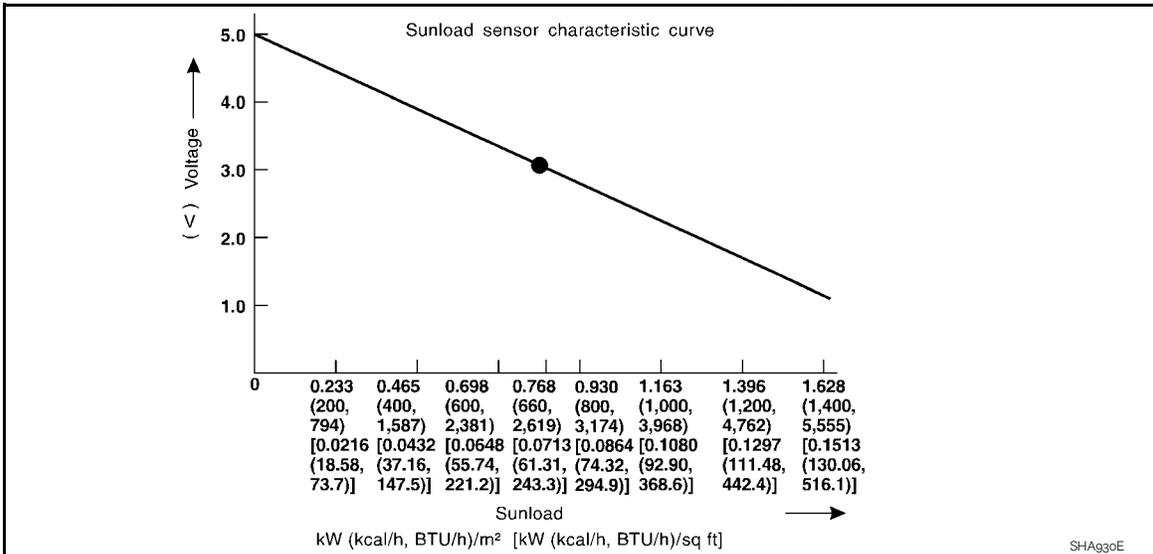
## < COMPONENT DIAGNOSIS >

Measure voltage between auto amp. harness connector (2) M53 terminal 7 and ground.

1. Sunload sensor



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



If NG, replace sunload sensor.

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# INTAKE SENSOR

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

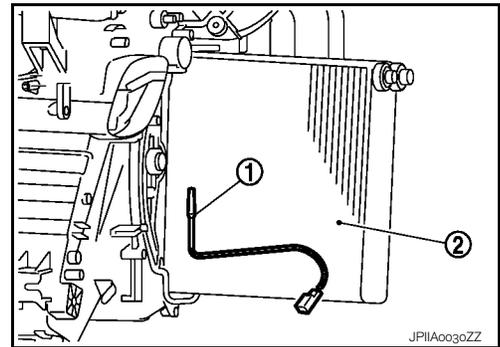
## INTAKE SENSOR

### Description

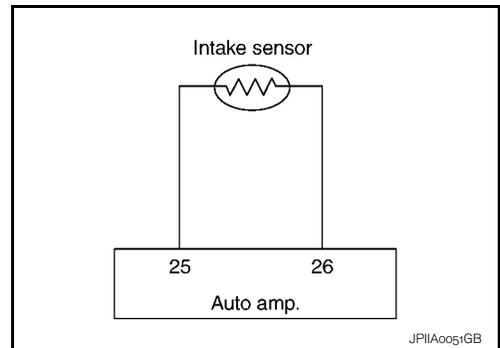
INFOID:000000000954672

#### Intake Sensor

The intake sensor (1) is located on the A/C unit assembly. It converts temperature of air after it passes through the evaporator (2) into a resistance value which is then input to the auto amp.



#### Intake Sensor Circuit



### Component Function Check

INFOID:000000000954673

#### 1.PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 3. 24 or -24 is displayed.

- YES >> Go to Diagnosis Procedure. Refer to [HAC-86, "Diagnosis Procedure"](#).  
NO >> END.

#### Diagnosis Procedure

INFOID:000000000954674

#### 1.CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

1. Disconnect intake sensor connector.
2. Turn ignition switch ON.
3. Check voltage between intake sensor harness connector M42 terminal 1 and ground.

(+)		(-)	Voltage
Intake sensor		—	
Connector	Terminal		
M42	1	Ground	

Is the inspection result normal?

- YES >> GO TO 2.  
NO >> GO TO 4.

#### 2.CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.

# INTAKE SENSOR

[AUTOMATIC AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

3. Check continuity between intake sensor harness connector M42 terminal 2 and auto amp. harness connector M53 terminal 26.

Intake sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M42	2	M53	26	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Repair harness or connector.

### 3.CHECK INTAKE SENSOR

Refer to [HAC-87. "Component Inspection"](#).

Is the inspection result normal?

- YES >> Replace auto amp.  
NO >> Replace intake sensor.

### 4.CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between intake sensor harness connector M42 terminal 1 and auto amp. harness connector M53 terminal 25.

Intake sensor		Auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M42	1	M53	25	Continuity should exist

4. Check continuity between intake sensor harness connector M42 terminal 1 and ground.

Intake sensor		—	Continuity
Connector	Terminal		
M42	1	Ground	Continuity should not exist

Is the inspection result normal?

- YES >> Replace auto amp.  
NO >> Repair harness or connector.

### Component Inspection

INFOID:000000000954675

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# INTAKE SENSOR

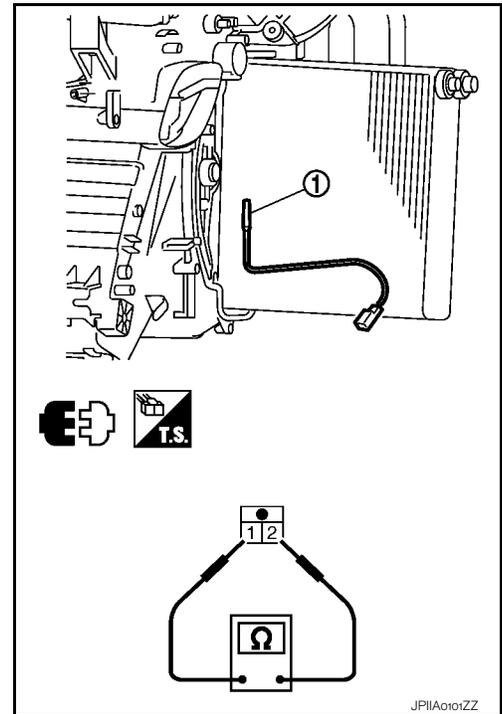
## < COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

After disconnecting intake sensor (1) connector M42, measure resistance between terminals 1 and 2 at sensor side. Refer to table below.

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

If NG, replace intake sensor.



# POWER SUPPLY AND GROUND CIRCUIT FOR AUTO AMP.

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## POWER SUPPLY AND GROUND CIRCUIT FOR AUTO AMP.

### Description

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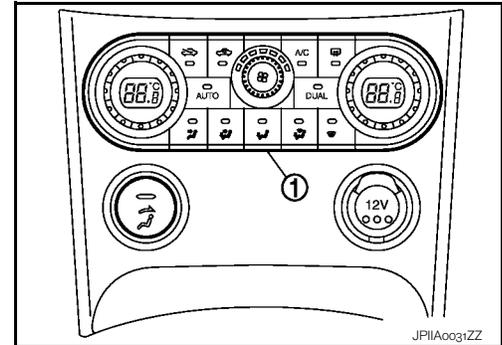
### COMPONENT DESCRIPTION

Auto Amp. (Automatic Amplifier)

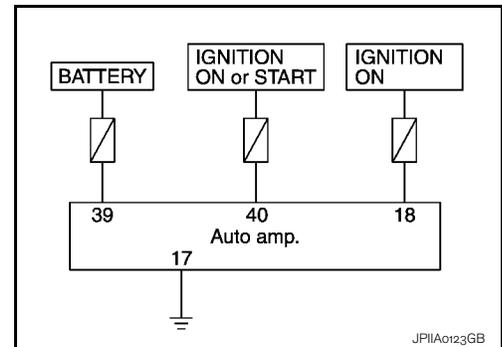
The auto amp. (1) has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motors, mode door motor, intake door motor, blower motor and compressor are then controlled.

The auto amp. is unitized with control mechanisms. Signal from various switches and potentiometer temperature control (PTC) are directly entered into auto amp.

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

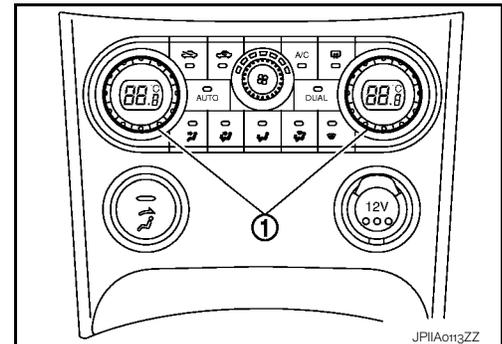


Power Supply and Ground Circuit for Auto Amp.



Potentiometer Temperature Control (PTC)

The PTC (1) is built into the auto amp. It can be set at an interval of 0.5°C in the 16.0°C to 30.0°C temperature range by turning temperature control dial. The set temperature is displayed.



### Component Function Check

INFOID:000000000954677

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press AUTO switch and A/C switch.
2. AUTO switch indicator will turn ON. Confirm that the magnet clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

Does magnet clutch engaged?

YES >> END.

NO >> Go to Diagnosis Procedure. Refer to [HAC-89, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000000954678

#### 1. CHECK POWER SUPPLY CIRCUIT FOR AUTO AMP.

1. Disconnect auto amp. connector.

# POWER SUPPLY AND GROUND CIRCUIT FOR AUTO AMP.

< COMPONENT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

2. Check voltage between auto amp. harness connector M53 terminals 18, 39 and 40 and ground.

(+)		(-)	Ignition switch position		
Auto amp.		—  Ground	OFF	ACC	ON
Connector	Terminal				
M53	18		Approx. 0 V	Approx. 0 V	Battery voltage
	39		Battery voltage	Battery voltage	Battery voltage
	40	Approx. 0 V	Approx. 0 V	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

## 2.CHECK FUSE

Check 10A fuses [Nos. 4, 8 and 17, located in the fuse block (J/B)]. Refer to [PG-110. "Fuse, Connector and Terminal Arrangement"](#).

Is the inspection result normal?

YES >> Check harness for open circuit. Repair or replace if necessary.

NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

## 3.CHECK GROUND CIRCUIT FOR AUTO AMP.

1. Turn ignition switch OFF.
2. Check continuity between auto amp. harness connector M53 terminal 17 and ground.

Auto amp.		(-)	Continuity
Connector	Terminal		
M53	17	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace auto amp.

NO >> Repair harness or connector.

# ECU DIAGNOSIS

## ECM

### HR16DE

#### HR16DE : Reference Value

INFOID:000000001116978

#### VALUES ON THE DIAGNOSIS TOOL

##### Remarks:

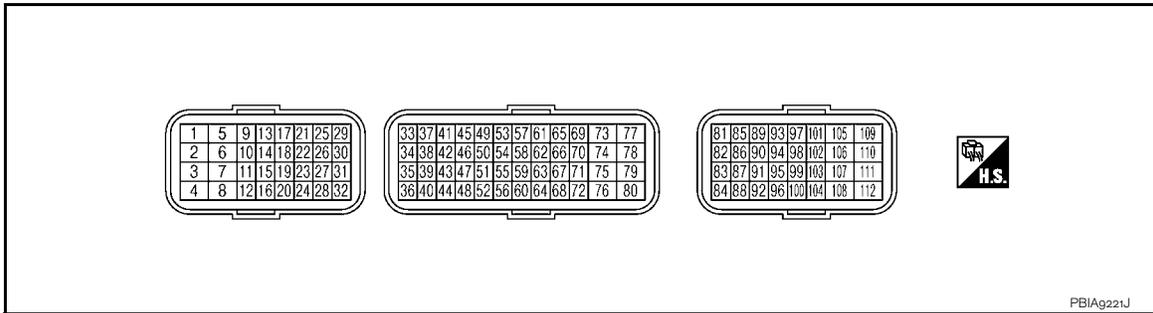
- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

\*Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Values/Status
AC PRESS SEN	<ul style="list-style-type: none"> <li>• Engine: Idle</li> <li>• Both A/C switch and blower fan switch: ON (Compressor operates)</li> </ul>	1.0 - 4.0 V

#### TERMINAL LAYOUT



#### PHYSICAL VALUES

##### NOTE:

- ECM is located in the engine room left side near battery.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

##### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.**

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	---		Signal name	Input/Output		
41	Ground	G/P	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0 V
48	Ground	R/L	Sensor ground (Refrigerant pressure sensor)	---	[Engine is running] • Warm-up condition • Idle speed	0 V
74	Ground	Y/W	Sensor power supply (Refrigerant pressure sensor)	---	[Ignition switch: ON]	5 V

#### MR20DE

MR20DE : Reference Value

INFOID:000000001116979

VALUES ON THE DIAGNOSIS TOOL

Remarks:

! Specification data are reference values.

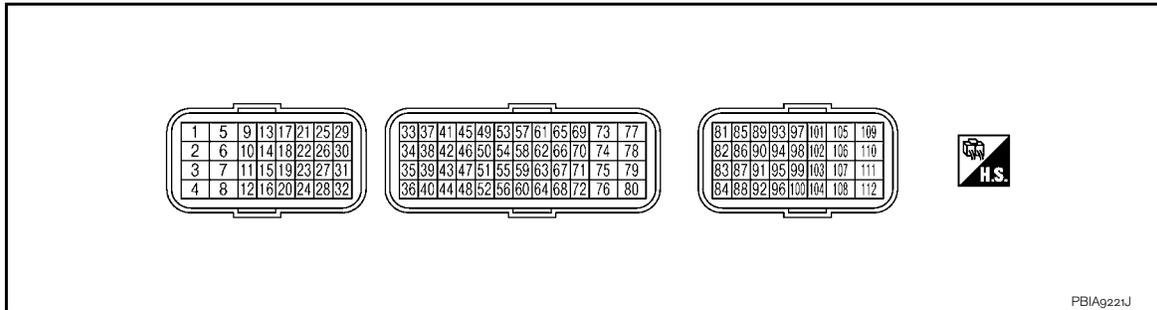
! Specification data are output/input values which are detected or supplied by the ECM at the connector.

\* Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Values/Status
AC PRESS SEN	<ul style="list-style-type: none"> <li>Engine: Idle</li> <li>Both A/C switch and blower fan switch: ON (Compressor operates)</li> </ul>	1.0 - 4.0 V

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.**

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	--		Signal name	Input/Output		
41	Ground	G	Refrigerant pressure sensor	Input	[Engine is running] <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Both A/C switch and blower fan motor switch: ON (Compressor operates)</li> </ul>	1.0 - 4.0 V
48	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] <ul style="list-style-type: none"> <li>• Warm-up condition</li> <li>• Idle speed</li> </ul>	0 V
74	Ground	L	Sensor power supply (Refrigerant pressure sensor)	Input	[Ignition switch: ON]	5 V

K9K

K9K : Reference Value

INFOID:000000001116980

VALUE ON THE DIAGNOSIS TOOL

Remarks:

! Specification data are reference values.

! Specification data are output/input values which are detected or supplied by the ECM at the connector.

# ECM

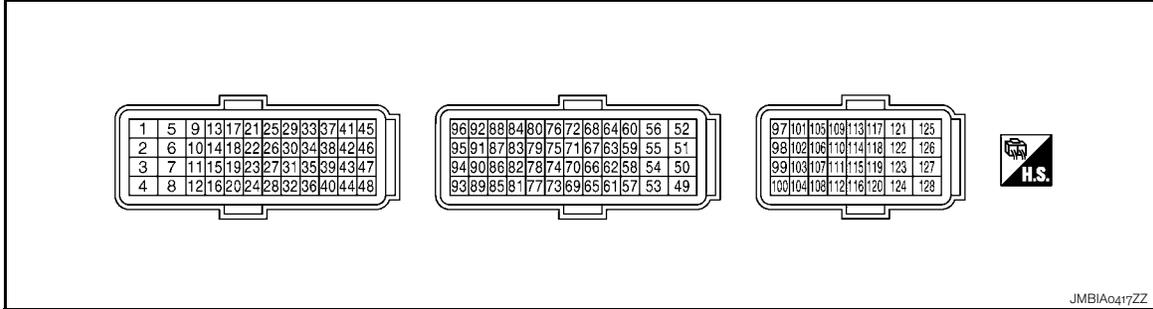
## < ECU DIAGNOSIS >

## [AUTOMATIC AIR CONDITIONER]

\* Specification data may not be directly related to their components signals/values/operations.

MONITOR ITEM	CONDITION		SPECIFICATION
RFRGERNT PRSS	<ul style="list-style-type: none"> <li>• Engine: After warming up</li> <li>• Air conditioner switch: OFF</li> <li>• Shift lever: Neutral position</li> <li>• No load</li> </ul>	Idle	Approximately 5.7 bar

### TERMINAL LAYOUT



### PHYSICAL VALUES

#### NOTE:

- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

#### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.**

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	---		Signal name	Input/Output		
74	Ground	R/L	Sensor power supply (Refrigerant pressure sensor)	—	[Ignition switch: ON]	Approximately 5.0 V
78	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	G/P	[Engine is running] • Warm-up condition • Idle speed	Approximately 0.3 V
89	Ground	Y/W	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan switch: ON (Compressor operates)	Approximately 2.3 V

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# BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## BCM (BODY CONTROL MODULE)

Reference Value

INFOID:000000001116981

VALUES ON THE DIAGNOSIS TOOL

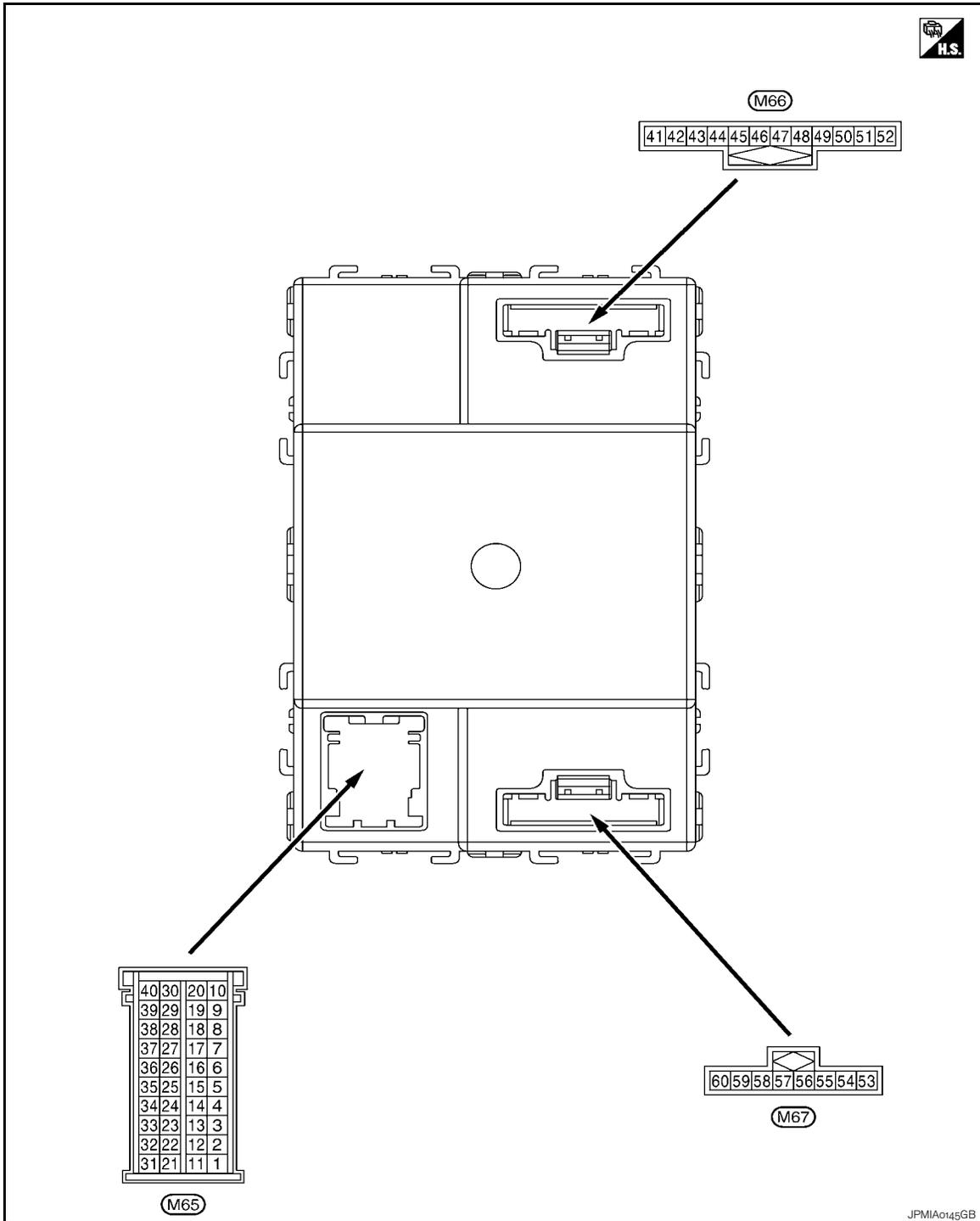
Monitor Item	Condition	Value/Status
AIR COND SW	A/C switch OFF	Off
	A/C switch ON	On
FAN ON SIG	Fan switch OFF	Off
	Fan switch ON	On
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

# BCM (BODY CONTROL MODULE)

[AUTOMATIC AIR CONDITIONER]

< ECU DIAGNOSIS >

## TERMINAL LAYOUT



### PHYSICAL VALUES

#### CAUTION:

- Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.
- Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to [BCS-26, "COMB SW : CONSULT-III Function \(BCM - COMB SW\)"](#).
- BCM reads the status of the combination switch at 10ms internal normally. Refer to [BCS-7, "System Description"](#).

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# BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	Not pressed	Battery voltage
					Pressed	0 V

# AUTO AMP.

< ECU DIAGNOSIS >

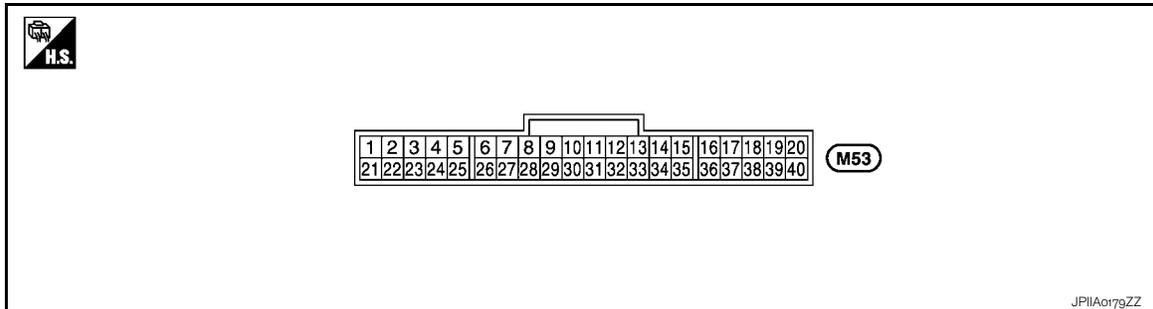
[AUTOMATIC AIR CONDITIONER]

## AUTO AMP.

Reference Value

INFOID:000000000954679

### TERMINAL LAYOUT



### PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition	Value (Approx.)	
+	-	Signal name	Input/ Output			
1 (L)	Ground	Blower motor control signal	Output	<ul style="list-style-type: none"> <li>Ignition switch ON</li> <li>Blower speed: 1st- 6th speed (manual)</li> </ul>	2.5 V	
				<ul style="list-style-type: none"> <li>Ignition switch ON</li> <li>Blower speed: 7th speed (manual)</li> </ul>	9.0 V	
3 (V)	Ground	A/C LAN signal	Input/ Output	Ignition switch ON	<p style="text-align: right;">SJIJA1453J</p>	
5 (L)	Ground	A/C switch signal	Output	A/C switch	Not pressed	12 V
				Pressed	0 V	
7 (O)	Ground	Sunload sensor	Input	—	—	
9 (O)	Ground	Engine coolant temperature signal	Input	At idle [after warming up, approx. 80°C (176°F)] NOTE: The wave forms vary depending on coolant temperature.	<p style="text-align: right;">SJIJA1438J</p>	

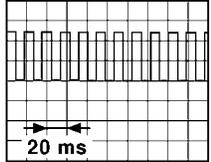
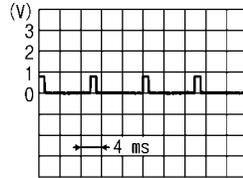
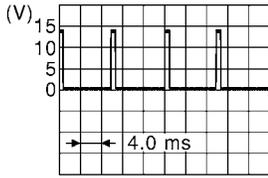
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# AUTO AMP.

< ECU DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
14 (Y)	Ground	Speed sensor (8-pulse)	Input	Speed meter operated (When vehicle speed is approx. 40 km/h)	NOTE: Maximum voltage may be 5 V due to specifications (connected units)  JSNIA0012GB
16 (R)	Ground	Illumination signal	Input	Ignition switch ON	12 V
				Ignition switch OFF	0 V
17 (B)	Ground	Ground	—	Ignition switch ON	0 V
18 (Y)	Ground	Power supply from IGN 2	—	Ignition switch ON	Battery voltage
20 (W)	Ground	Power supply for each door motor	Input	Ignition switch ON	Battery voltage
21 (R)	Ground	A/C PD cut	Input	Ignition switch ON	0 V
22 (R)	Ground	Rear window defogger feedback signal	Input	Rear window defogger: OFF	0 V
				Rear window defogger: ON	12 V
23 (SB)	Ground	Rear window defogger ON signal	Input	When rear window defogger switch is depressed.	 ZJIA1036J
				When rear window defogger switch is released.	 JPPIA0013GB
24 (LG)	Ground	Blower motor ON signal	Input	AUTO SW: ON (Blower motor operate.)	0 V
				AUTO SW: OFF	12 V
25 (P)	Ground	Intake sensor	Input	—	—
26 (GR)	Ground	Sensor Ground	—	Ignition switch ON	0 V
27 (BR)	Ground	In-vehicle sensor	Input	—	—
28 (G)	Ground	OAT sensor	Input	—	—
34 (O)	Ground	High-level VENT SW signal	Input	High-level VENT SW: OFF	12 V
				High-level VENT SW: ON	0 V

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# AUTO AMP.

< ECU DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
36 (B)	Ground	Illumination ground	—	Ignition switch ON	0 V
38 (R)	Ground	Blower motor feedback signal	Input	Blower speed: 1st	10 V
39 (Y)	Ground	Power supply from BATT	—	Ignition switch OFF	Battery voltage
40 (GR)	Ground	Power supply from IGN	—	Ignition switch ON	Battery voltage

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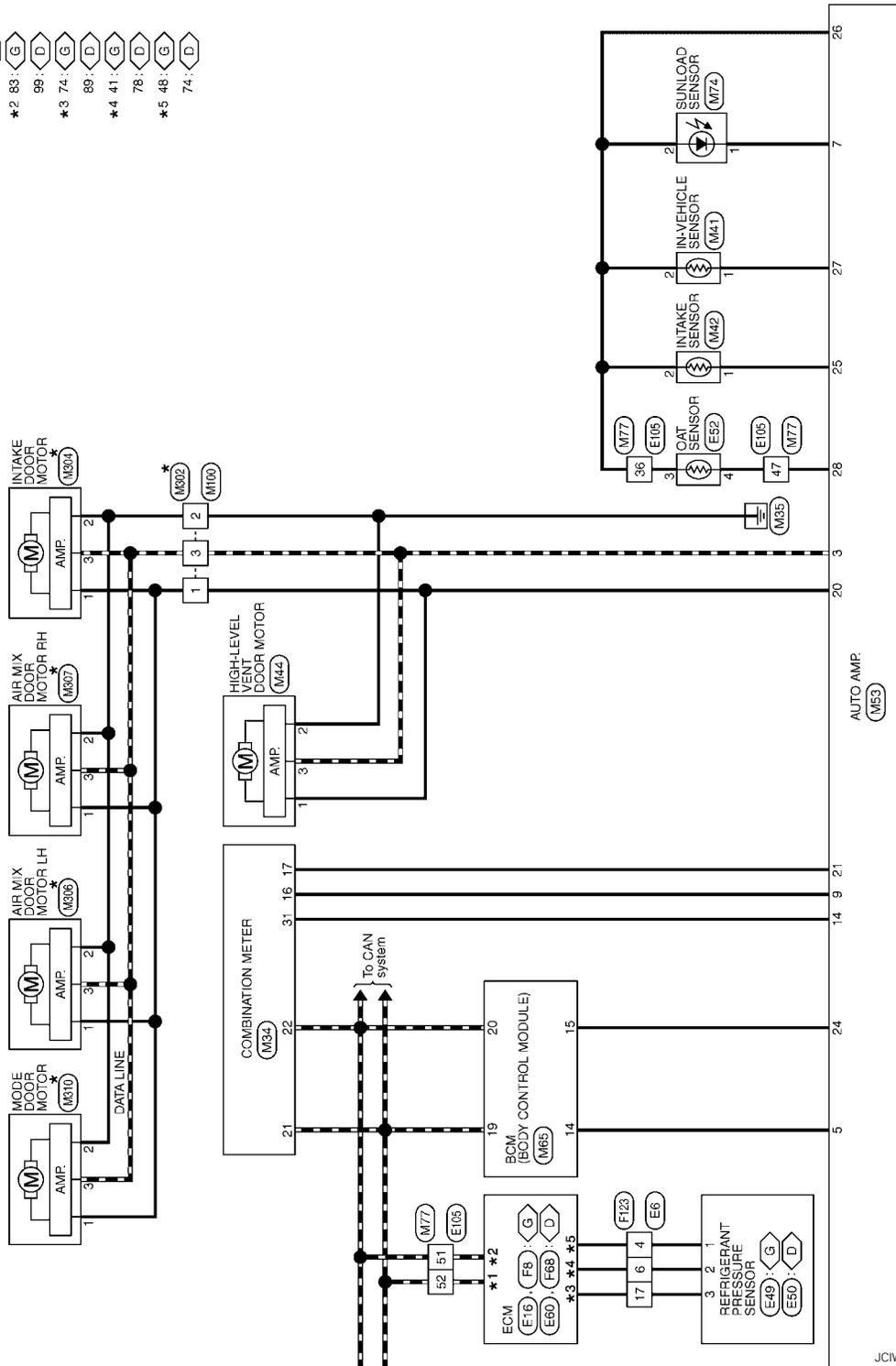


# AUTO AMP.

< ECU DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

- : With gasoline engine
- : With diesel engine
- \*1 84 :
- 100 :
- \*2 83 :
- 99 :
- \*3 74 :
- 89 :
- \*4 41 :
- 78 :
- \*5 48 :
- 74 :



\*: This connector is not shown in "Harness Layout".

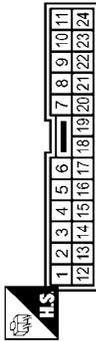
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### AIR CONDITIONER CONTROL (AUTO)

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V



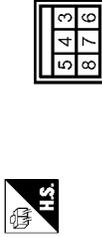
Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	
6	G/P	
15	B	
17	Y/W	

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
15	Y/B	

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	MA02FB-LC



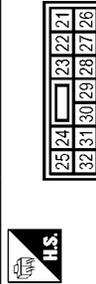
Terminal No.	Color of Wire	Signal Name [Specification]
5	B	
6	B	

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FBR-CS



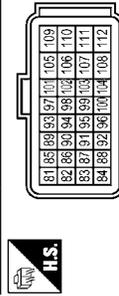
Terminal No.	Color of Wire	Signal Name [Specification]
11	O	
12	G/Y	

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
23	Y/B	
28	L	
28	P	

Connector No.	E16
Connector Name	ECM
Connector Type	MA24FB-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L
84	L	CAN-H

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	FR03FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	
2	G/P	
3	Y/W	

Connector No.	E50
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	DH0097F



Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	
2	G/P	
3	Y/W	

AIR CONDITIONER CONTROL (AUTO)

Connector No.	E52
Connector Name	OAT SENSOR
Connector Type	RHOAFB



Terminal No.	Color of Wire	Signal Name [Specification]
3	B/Y	-
4	W/G	-

Connector No.	E53
Connector Name	PTC RELAY-1
Connector Type	24347 9F900



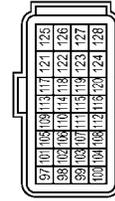
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	O	-
3	G	-
5	Y	-

Connector No.	E54
Connector Name	PTC RELAY-2
Connector Type	24347 9F900



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	G/Y	-
3	R	-
5	L	-

Connector No.	E60
Connector Name	ECM
Connector Type	MAA24FB-MEA&LH



Terminal No.	Color of Wire	Signal Name [Specification]
99	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH00MW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
36	B/Y	-
46	Y	-
47	W/G	-
48	P	-
50	L	-
51	P	-
52	L	-

Connector No.	E116
Connector Name	PTC HEATER
Connector Type	YAZ-7282-3020



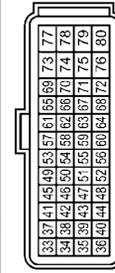
Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	B	-

Connector No.	E117
Connector Name	PTC HEATER
Connector Type	YAZ-7282-3030



Terminal No.	Color of Wire	Signal Name [Specification]
3	Y	-
4	L	-

Connector No.	F8
Connector Name	ECM
Connector Type	HMAA40FBF-MEA&LH



AIR CONDITIONER CONTROL (AUTO)

Connector No.	F17
Connector Name	COMPRESSOR
Connector Type	RH02FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	-
2	B	-

Connector No.	F18
Connector Name	COMPRESSOR
Connector Type	DELPHI I2162017



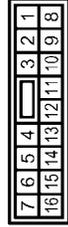
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	-
2	B	-

Connector No.	F88
Connector Name	ECM
Connector Type	MAA4QFBR-MEAB-LH



Terminal No.	Color of Wire	Signal Name [Specification]
74	R/L	FREON PRESS GND
78	G/P	FREON PRESS SENS
83	Y/W	FREON PRESSURE -V

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS18FW-GS



Terminal No.	Color of Wire	Signal Name [Specification]
15	Y/B	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-TV



Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-
6	G/P	-
15	B	-
17	Y/W	-

Connector No.	M84
Connector Name	COMBINATION METER
Connector Type	SAB4QFW



Terminal No.	Color of Wire	Signal Name [Specification]
16	O	WATER TEMP
17	R/L	AC PD CUT
21	L	CAN-H
22	P	CAN-L
31	Y	VEHICLE SPEED (8-PULSE)

Connector No.	M41
Connector Name	IN-VEHICLE SENSOR
Connector Type	A02FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	GR	-

Connector No.	M42
Connector Name	INTAKE SENSOR
Connector Type	C02FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	P	-
2	GR	-

### AIR CONDITIONER CONTROL (AUTO)

Connector No.	M44
Connector Name	HIGH-LEVEL VENT DOOR MOTOR
Connector Type	ACGFW



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M52
Connector Name	HIGH-LEVEL VENT SWITCH
Connector Type	CINCH 4B308EV4M5



Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-
3	O	-
4	GR	-

Connector No.	M53
Connector Name	AUTO AMP.
Connector Type	SAB40FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	FAN OUT
3	V	ACTR SIGNAL
5	L	A/C SIG
7	O	SUN SEN
9	O	W/T SEN
14	Y	VSP
17	B	GND
18	Y	IGN-2
20	W	ACTR POWER
21	R	ACPDCLUT
24	LG	FAN ON

25	P	INT SENS
26	GR	SENS GND
27	BR	INCARF SENS
28	G	OAT SENS
34	O	SW OUT/BLT
38	R	ILL-
39	Y	BAT
40	GR	IGN

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	AA840FB



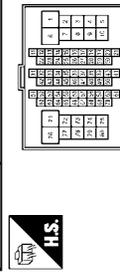
Terminal No.	Color of Wire	Signal Name [Specification]
14	L/R	A/C SW
15	LG/B	BLOWER FAN SW
18	L	CAN-H
20	P	CAN-L

Connector No.	M74
Connector Name	SUNLOAD SENSOR
Connector Type	K02FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	GR	-

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	T1-60FW-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
38	GR	-
46	Y	-
47	G	-
49	P	-
50	L	-
51	P	-
52	L	-

Connector No.	M89
Connector Name	WIRE TO WIRE
Connector Type	HM6FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	- [With auto A/C]
2	R	- [With auto A/C]
3	L	- [With auto A/C]
5	Y	-
6	Y	-

AIR CONDITIONER CONTROL (AUTO)

Connector No.	M100
Connector Name	WIRE TO WIRE
Connector Type	A03FW



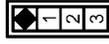
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M301
Connector Name	WIRE TO WIRE
Connector Type	M03MW-LC



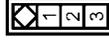
Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-[With auto A.C.]
2	R	-[With auto A.C.]
3	L	-[With auto A.C.]
5	Y	-
6	Y	-

Connector No.	M302
Connector Name	WIRE TO WIRE
Connector Type	A03MW



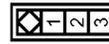
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M304
Connector Name	INTAKE DOOR MOTOR
Connector Type	A03FW



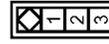
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M306
Connector Name	AIR MIX DOOR MOTOR LH
Connector Type	A03FW



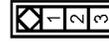
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M307
Connector Name	AIR MIX DOOR MOTOR RH
Connector Type	A03FW



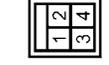
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M310
Connector Name	MODE DOOR MOTOR
Connector Type	A03FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	B	-
3	V	-

Connector No.	M311
Connector Name	FAN CONTROL AMP.
Connector Type	M04FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	B	-

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AIR CONDITIONER CONTROL (AUTO)

Connector No.	M312
Connector Name	BLOWER MOTOR
Connector Type	M02PW-LC



Terminal No.	Color of Wire	Signal Name (Specification)
1	Y	-
2	R	-

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# AIR CONDITIONER CONTROL

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## SYMPTOM DIAGNOSIS

### AIR CONDITIONER CONTROL

#### Diagnosis Chart By Symptom

INFOID:000000000954681

Symptom	Reference	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	<a href="#">HAC-89, "Diagnosis Procedure"</a>
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor. (LAN)	<a href="#">HAC-47, "Diagnosis Procedure"</a>
Mode door motor does not operate normally.		
High-level ventilator door motor does not operate normally.	Go to Trouble Diagnosis Procedure for High-level Ventilator Door Motor. (LAN)	<a href="#">HAC-50, "Diagnosis Procedure"</a>
High-level ventilator door does not change.		
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor. (LAN)	<a href="#">HAC-54, "Diagnosis Procedure"</a>
Air mix door motor does not operate normally.		
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor. (LAN)	<a href="#">HAC-59, "Diagnosis Procedure"</a>
Intake door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	<a href="#">HAC-62, "Diagnosis Procedure"</a>
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	<a href="#">HAC-66, "Diagnosis Procedure"</a>
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	<a href="#">HAC-109, "Inspection procedure"</a>
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	<a href="#">HAC-111, "Inspection procedure"</a>
Noise	Go to Trouble Diagnosis Procedure for Noise.	<a href="#">HAC-113, "Inspection procedure"</a>
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	<a href="#">HAC-115, "Inspection procedure"</a>
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	<a href="#">HAC-116, "Inspection procedure"</a>

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# INSUFFICIENT COOLING

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## INSUFFICIENT COOLING

### Description

INFOID:000000000954682

#### Symptom

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

### Inspection procedure

INFOID:000000000954683

#### 1. CHECK WITH A GAUGE OF ACR4

Connect the ACR4 to the vehicle and perform the pressure inspection with the gauge.

##### Is there refrigerant?

YES >> GO TO 2.

NO-1 >> Check for refrigerant leakages with the refrigerant leakage detecting fluorescent leak detector. Refer to [HA-32, "Inspection"](#)(HR16DE/MR20DE) or [HA-83, "Inspection"](#) (K9K).

NO-2 >> GO TO 2 after repairing or replacing the parts according to the inspection results.

#### 2. CHECK CHARGED REFRIGERANT AMOUNT

1. Connect ACR4 to the vehicle and discharge the refrigerant.
2. Recharge with the proper amount of refrigerant and perform the inspection with the refrigerant leakage detecting fluorescent leak detector. Refer to [HA-32, "Inspection"](#) (HR16DE/MR20DE) or [HA-83, "Inspection"](#) (K9K).

##### Is the inspection result normal?

YES >> GO TO 3.

NO >> Refill the refrigerant and repair or replace the parts according to the inspection results.

#### 3. CHECK REFRIGERANT CYCLE PRESSURE

Connect ACR4 to the vehicle and perform the performance test. Refer to [HA-12, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (HR16DE/MR20DE) or [HA-63, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (K9K).

##### Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform the diagnosis with the gauge pressure. Refer to [HA-12, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (HR16DE/MR20DE) or [HA-63, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (K9K).

#### 4. CHECK SETTING OF TEMPERATURE SETTING TRIMMER

Check the setting of temperature setting trimmer. Refer to [HAC-6, "Description & Inspection"](#).

1. Check that the temperature setting trimmer is set to "+ direction".

##### **NOTE:**

The control temperature can be set with the setting of temperature setting trimmer.

2. Set temperature control dial to "0".

##### Are the symptoms solved?

YES >> Perform the setting separately if necessary. END.

NO >> GO TO 5.

#### 5. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 2.

##### Does code No. 20 appear on the display?

YES >> GO TO 6.

NO >> Go to appropriate malfunctioning sensor circuit. Refer to [HAC-27, "Diagnosis Description"](#), see No. 11.

#### 6. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to [HAC-27, "Diagnosis Description"](#), see No.1 to 5.

##### Is it operated normally?

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## INSUFFICIENT COOLING

[AUTOMATIC AIR CONDITIONER]

< SYMPTOM DIAGNOSIS >

YES >> GO TO 7.

NO >> Perform the diagnosis applicable to each output device.

### 7.PERFORM SELF-DIAGNOSIS STEP-5

Perform self-diagnosis STEP-5. Refer to [HAC-27. "Diagnosis Description"](#), see No.1 to 10.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Go to appropriate malfunctioning sensor circuit. Refer to [HAC-27. "Diagnosis Description"](#).

### 8.CHECK A/C COMPRESSOR BELT

Check the A/C compressor belt. Refer to [EM-15. "Checking"](#) (HR16DE), [EM-134. "Checking"](#) (MR20DE) or [EM-259. "Inspection and Adjustment"](#) (K9K).

Is the inspection result normal?

YES >> GO TO 9.

NO >> Adjust or replace the A/C compressor belt.

### 9.CHECK AIR LEAKAGE FROM DUCT

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

YES >> Perform the setting separately if necessary. GO TO 4.

NO >> Repair or replace parts according to the inspection results.

# INSUFFICIENT HEATING

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## INSUFFICIENT HEATING

### Description

INFOID:000000000954684

#### Symptom

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

### Inspection procedure

INFOID:000000000954685

#### 1. CHECK COOLING SYSTEM

1. Check engine coolant level and check for leakage. Refer to [CO-9, "Inspection"](#) (HR16DE), [CO-30, "Inspection"](#) (MR20DE) or [CO-52, "Inspection"](#) (K9K).
2. Check radiator cap. Refer to [CO-12, "RESERVOIR TANK CAP : Inspection"](#) (HR16DE), [CO-33, "RESERVOIR TANK CAP : Inspection"](#) (MR20DE) or [CO-55, "RADIATOR CAP : Inspection"](#) (K9K).
3. Check water flow sounds of engine coolant. Refer to [CO-9, "Refilling"](#) (HR16DE), [CO-30, "Refilling"](#) (MR20DE) or [CO-52, "Refilling"](#) (K9K).

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> Refill the engine coolant and repair or replace the parts according to the inspection results.

#### 2. CHECK SETTING OF TEMPERATURE SETTING TRIMMER

1. Check the setting of temperature setting trimmer. Refer to [HAC-6, "Description & Inspection"](#).
2. Check that the temperature setting trimmer is set to "– direction".

#### NOTE:

The control temperature can be set with the setting of temperature setting trimmer.

3. Set temperature control dial to "0".

#### Are the symptoms solved?

YES >> Perform the setting separately if necessary. END.

NO >> • WITH DIESEL ENGINE: GO TO 3.

• WITH GASOLINE ENGINE: GO TO 4.

#### 3. CHECK PTC HEATER OPERATION

Check PTC heater. Refer to [HAC-71, "Component Function Check"](#).

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace malfunctioning part(s).

#### 4. CHECK OPERATION

1. Turn temperature control dial (driver side) and raise temperature setting to 30.0°C after warming up the engine.
2. Check that warm air blows from outlets.

#### Is the inspection result normal?

YES >> END.

NO >> GO TO 5.

#### 5. PERFORM SELF-DIAGNOSIS STEP-2

Perform self-diagnosis STEP-2. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 2.

#### Does code No. 20 appear on the display?

YES >> GO TO 6.

NO >> Go to appropriate malfunctioning sensor circuit. Refer to [HAC-27, "Diagnosis Description"](#), see No. 11.

#### 6. PERFORM SELF-DIAGNOSIS STEP-4

Perform self-diagnosis STEP-4. Refer to [HAC-27, "Diagnosis Description"](#), see No. 1 to 5.

#### Is it installed normally?

YES >> GO TO 7.

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## INSUFFICIENT HEATING

[AUTOMATIC AIR CONDITIONER]

< SYMPTOM DIAGNOSIS >

NO >> Perform the diagnosis applicable to each output device.

### 7. PERFORM SELF-DIAGNOSIS STEP-5

Perform self-diagnosis STEP-5. Refer to [HAC-27, "Diagnosis Description"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Go to appropriate malfunctioning sensor circuit. Refer to [HAC-27, "Diagnosis Description"](#).

### 8. CHECK AIR LEAKAGE FROM DUCT

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace parts according to the inspection results.

### 9. CHECK HEATER HOSE INSTALLATION CONDITION

Check the heater hose installation condition visually (for twist, crush, etc.).

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace parts according to the inspection results.

### 10. CHECK TEMPERATURE OF HEATER HOSE

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

**CAUTION:**

**The temperature inspection should be performed in a short time because the engine coolant temperature is too hot.**

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace the heater core after performing the procedures after the cooling system inspection again. GO TO 1.

### 11. REPLACE HEATER CORE

Replace the heater core. Refer to [VTL-41, "Exploded View"](#).

Are the symptoms solved?

YES >> END.

NO >> Perform the procedures after the cooling system inspection again. GO TO 1.

NOISE

Description

INFOID:000000000954686

Symptom

- Noise
- Noise is heard when the A/C system operates.

Inspection procedure

INFOID:000000000954687

1.CHECK OPERATION

1. Operate the A/C system and check the operation. Refer to [HAC-6. "Description & Inspection"](#).
2. Check the parts where noise is occurring.

Can the parts where noise is occurring be checked?

- YES-1 >> Noise from blower fan motor: GO TO 2.
- YES-2 >> Noise from compressor: GO TO 3.
- YES-3 >> Noise from expansion valve: GO TO 4.
- YES-4 >> Noise from A/C piping (pipe, flexible hose): GO TO 6.
- YES-5 >> Noise from A/C compressor belt: GO TO 7.
- NO >> END

2.CHECK BLOWER FAN MOTOR

1. Remove blower fan motor.
2. Remove foreign materials that are in the blower unit.
3. Check the noise from blower fan motor again.

Is the inspection result normal?

- YES >> END.
- NO >> Replace blower fan motor.

3.REPLACE COMPRESSOR

1. Correct the refrigerant with ACR4.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from compressor again.

Is the inspection result normal?

- YES >> END.
- NO >> Replace compressor.

4.CHECK WITH GAUGE PRESSURE

Perform the diagnosis with the gauge pressure. Refer to [HA-12. "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (HR16DE/MR20DE) or [HA-63. "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (K9K).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair or replace malfunctioning part(s).

5.REPLACE EXPANSION VALVE

1. Correct the refrigerant with ACR4.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from expansion valve again.

Are the symptoms solved?

- YES >> END.
- NO >> Replace expansion valve.

6.CHECK A/C PIPING (PIPE, FLEXIBLE HOSE)

1. Check A/C piping [pipe, flexible hose (for deformation and damage, etc.)].
2. Check the installation condition of clips and brackets, etc. of A/C piping (pipe, flexible hose).

Is the inspection result normal?

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## NOISE

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

YES >> Fix the line with rubber or come vibration absorbing material.

NO >> Repair or replace parts according to the inspection results.

### **7**.CHECK A/C COMPRESSOR BELT

Check tension of the A/C compressor belt. Refer to [EM-15. "Checking"](#) (HR16DE), [EM-134. "Checking"](#) (MR20DE) or [EM-259. "Inspection and Adjustment"](#) (K9K).

Is the inspection result normal?

YES >> Check the noise from compressor: GO TO 3.

NO >> Adjust or replace the A/C compressor belt according to the inspection results.

# SELF-DIAGNOSIS CANNOT BE PERFORMED

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## SELF-DIAGNOSIS CANNOT BE PERFORMED

### Description

INFOID:000000000954688

Symptom: Self-diagnosis function does not operate normally.

### Inspection procedure

INFOID:000000000954689

#### 1.CHECK SELF-DIAGNOSIS FUNCTION

1. Turn ignition switch ON.
2. Set in self-diagnosis mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press ON/OFF switch for at least 5 seconds.

#### NOTE:

If battery voltage drops below 12 V during diagnosis STEP-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is normal. To avoid this, start engine before performing this diagnosis.

Does self-diagnosis function operate?

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

#### 2.CHECK POWER SUPPLY AND GROUND CIRCUIT OF AUTO AMP

Check power supply and ground circuit of auto amp. Refer to [HAC-89. "Component Function Check"](#).

Is the inspection result normal?

- YES >> Replace auto amp.  
NO >> Repair or replace malfunctioning part(s).

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# MEMORY FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

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## MEMORY FUNCTION DOES NOT OPERATE

### Description

INFOID:000000000954690

#### Symptom

- Memory function does not operate normally.
- The setting is not maintained. (It returns to the initial condition.)

### Inspection procedure

INFOID:000000000954691

#### 1.CHECK OPERATION

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1. Set temperature control dial to 30.0°C.
2. Press ON/OFF switch.
3. Turn ignition switch OFF.
4. Turn ignition switch ON.
5. Press AUTO switch or ON/OFF switch.
6. Check that the set temperature is maintained.

#### Is the inspection result normal?

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

#### 2.CHECK POWER SUPPLY AND GROUND CIRCUIT OF AUTO AMP

---

Check power supply and ground circuit of auto amp. Refer to [HAC-89, "Component Function Check"](#).

#### Is the inspection result normal?

- YES >> Replace auto amp.  
NO >> Repair or replace malfunctioning part(s).

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000001109280

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC 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 SRC 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.

#### Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000001109281

**NOTE:**

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

#### OPERATION PROCEDURE

1. Connect both battery cables.

**NOTE:**

Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

#### Precaution for Procedure without Cowl Top Cover

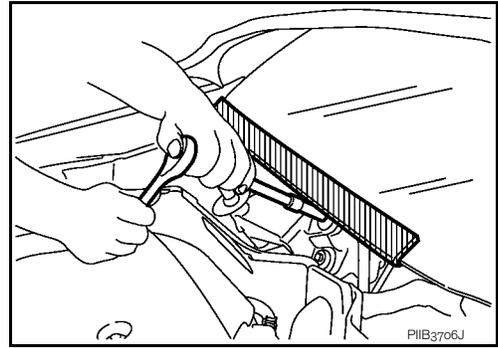
INFOID:000000001109282

# PRECAUTIONS

## < PRECAUTION >

## [AUTOMATIC AIR CONDITIONER]

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



## Working with HFC-134a (R-134a)

INFOID:000000001116718

### 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. If the refrigerants are mixed and compressor malfunction is likely occur.
- Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
  - When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
  - When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
  - Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
  - Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.

## General Refrigerant Precaution

INFOID:000000001116719

### WARNING:

- Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
- Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.
- Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.
- Never store or heat refrigerant containers above 52°C (126°F).
- Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.
- Never intentionally drop, puncture, or incinerate refrigerant containers.
- Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.
- Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.
- Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.

## Refrigerant Connection

INFOID:000000001116720

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

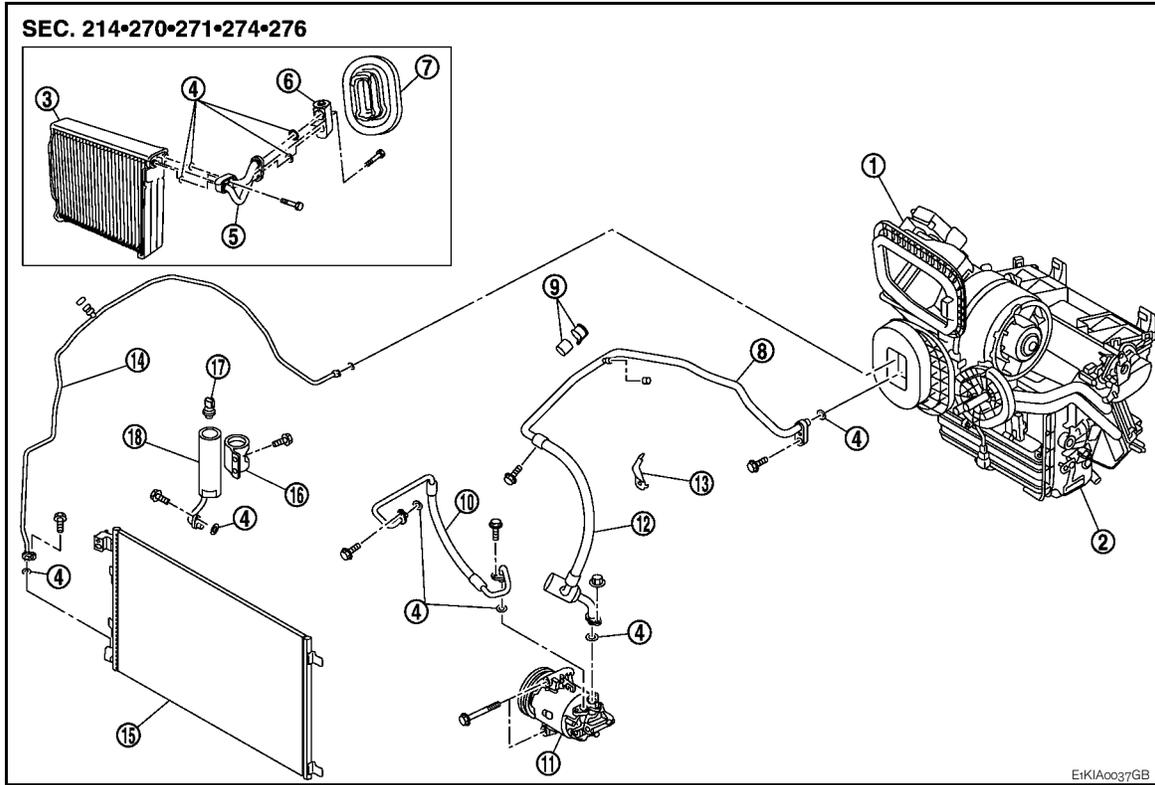
- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

# PRECAUTIONS

< PRECAUTION >

[AUTOMATIC AIR CONDITIONER]

## O-RING AND REFRIGERANT CONNECTION



- |                                 |  |   |
|---------------------------------|--|---|
| 1. Heater sealing               | 2. Expansion valve                                       | 3. O-ring                                 |
| 4. Evaporator                   | 5. Low pressure pipe 1 and high pressure pipe 2 assembly | 6. Connector pipe fixing bolt             |
| 7. High pressure pipe 1         | 8. Condenser assembly                                    | 9. Fixing bolt                            |
| 10. Compressor                  | 11. Heater & cooling unit assembly                       | 12. Heater & blower unit assembly         |
| 13. Refrigerant pressure sensor | 14. Liquid tank  | 15. Pipe fixing bolt                      |
| 16. Low pressure flexible hose  | 17. Low & high pipe bracket support                      | 18. Low pressure flexible hose and pipe 2 |
| 19. Pipes fixing clip           | 20. Low pressure pipe 2 fixing clamp assembly            | 21. Liquid tank fixing screw              |
| 22. Liquid tank fixing bracket  | 23. High pressure flexible hose                          |   |

### CAUTION:

The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

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# PRECAUTIONS

< PRECAUTION >

[AUTOMATIC AIR CONDITIONER]

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure	Inlet	92475 71L00	1	12
	pipe 2 assembly to expansion valve	Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure	Inlet	92475 71L00	1	12
	pipe 2 assembly to evaporator	Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		92474 N8210	2	19
	Compressor to high pressure flexible hose		92474 N8210	2	12
	Liquid tank to condenser		92473 N8210	1	16

**WARNING:**

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

**CAUTION:**

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

- When the compressor is removed, store it in the same way as it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.
- When connecting tubes, always use a torque wrench and a back-up wrench.
- After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.
- When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.
- Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.
- Thoroughly remove moisture from the refrigeration system before charging the refrigerant.
- Always replace used O-rings.
- When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.

**Name** : Nissan A/C System Oil Type S

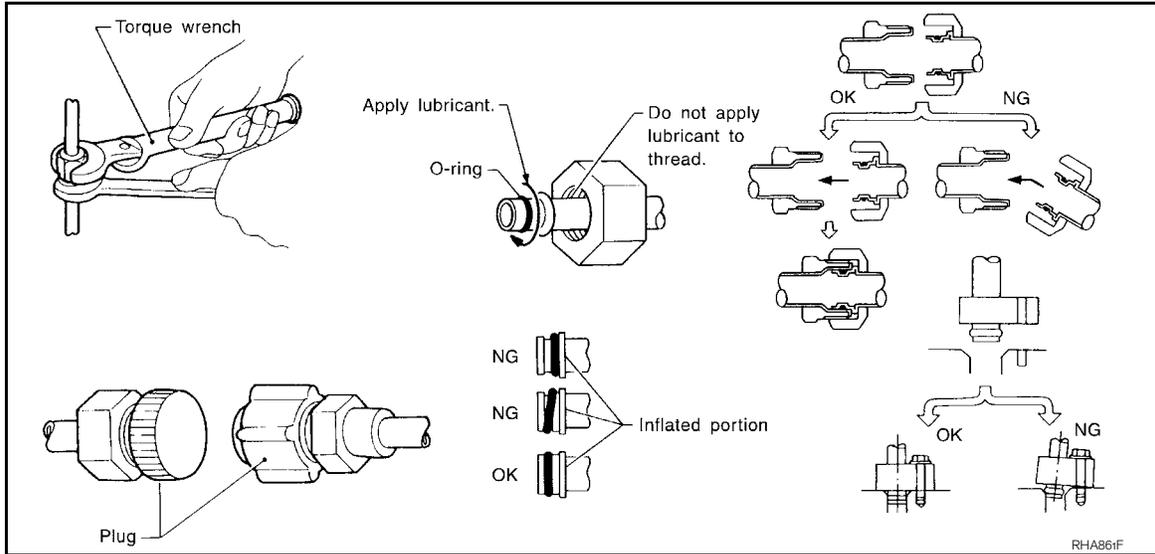
- O-ring must be closely attached to the groove portion of tube.
- When replacing the O-ring, be careful not to damage O-ring and tube.
- Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.

# PRECAUTIONS

[AUTOMATIC AIR CONDITIONER]

## < PRECAUTION >

- After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.



## Service Equipment

INFOID:000000001116721

## RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never 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.

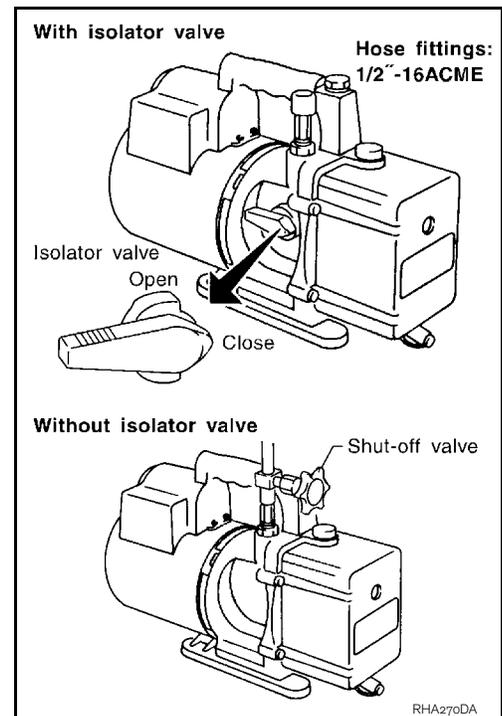
## VACUUM PUMP

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

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

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

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



## MANIFOLD GAUGE SET

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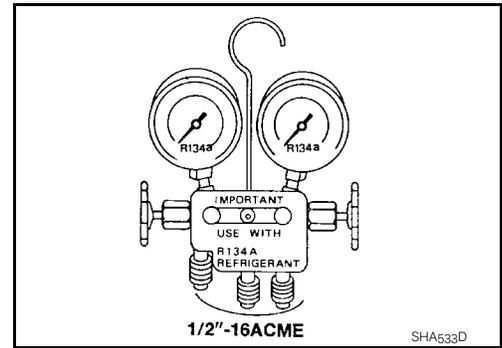
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# PRECAUTIONS

## < PRECAUTION >

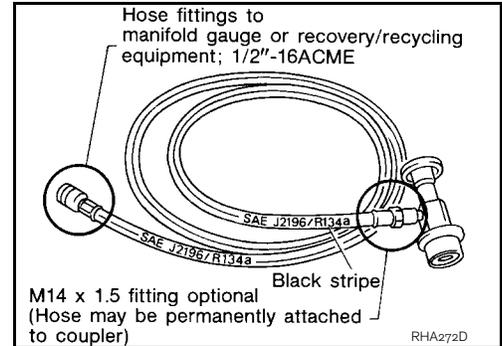
Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2"-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.

## [AUTOMATIC AIR CONDITIONER]



## SERVICE HOSES

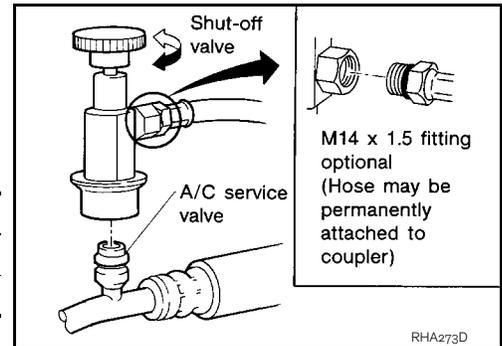
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



## SERVICE COUPLERS

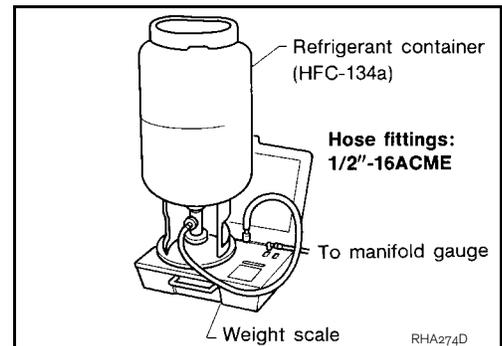
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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



## REFRIGERANT WEIGHT SCALE

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



## 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.

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## COMPRESSOR

### General Precautions

INFOID:000000001116722

**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 car.
- When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to [HA-27, "Adjustment"](#) (HR16DE/MR20DE) or [HA-78, "Adjustment"](#) (K9K).
- Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.
- After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.
- After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.

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# FLUORESCENT LEAK DETECTOR

< PRECAUTION >

[AUTOMATIC AIR CONDITIONER]

## FLUORESCENT LEAK DETECTOR

### General Precautions

INFOID:000000001116723

#### 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 your eyes and enhance the visibility of the fluorescent dye.
- The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST: J-41995). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST: J-41995) to pin-point refrigerant leaks.
- For the purpose of safety and customer's satisfaction, read and follow all manufacturer's operating instructions and precautions prior to performing the work.
- 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 electrical leak detector (SST: J-41995).
- Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.
- Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Never 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. Never 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 will remain for three years or a little over unless a compressor malfunction occurs.

#### IDENTIFICATION

##### NOTE:

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

#### IDENTIFICATION LABEL FOR VEHICLE

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

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# BASIC INSPECTION

## DIAGNOSIS AND REPAIR WORKFLOW

### Work Flow

INFOID:000000001069925

#### DETAILED FLOW

#### 1. LISTEN TO CUSTOMER COMPLAINT

Listen to customer complaint. (Get detailed information about the conditions and environment when the symptom occurs.)

>> GO TO 2.

#### 2. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to [HAC-126, "Description & Inspection"](#).

>> GO TO 3.

#### 3. GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis (Refer to [HAC-187, "Diagnosis Chart By Symptom"](#) below).

>> GO TO 4.

#### 4. REPAIR OR REPLACE

Repair or replace the specific parts

>> GO TO 5.

#### 5. FINAL CHECK

Final check.

Is the inspection result normal?

YES >> CHECK OUT

NO >> GO TO 3.

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# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MANUAL AIR CONDITIONER]

## INSPECTION AND ADJUSTMENT

### Description & Inspection

INFOID:000000001069926

#### DESCRIPTION

The purpose of the operational check is to check if the individual system operates properly.

**Conditions : Engine running at normal operating temperature**

#### INSPECTION PROCEDURE

##### Blower

1. Turn fan control dial to 1-speed. Blower should operate on low speed.
2. Then fan control dial to 2-speed, and continue checking blower speed until all speeds are checked.
3. Leave blower on max. speed.

If NG, go to trouble diagnosis procedure for [HAC-153, "Diagnosis Procedure"](#).

If OK, continue the check.

##### Discharge Air (Mode control dial)

1. Turn mode control dial to each position.
2. Confirm that discharge air comes out according to the air distribution table. Refer to [HAC-133, "System Description"](#).

Discharge air flow					
Mode door position	Condition	Air outlet/distribution			
		VENT	FOOT		DEF
			Front	Rear	
	High-level ventilator door : SHUT	100%	—	—	—
		60%	24%	16%	—
		15%	39%	26%	20%
		10%	27%	18%	45%
		10%	—	—	90%

JSIIA0311GB

If NG, go to mode door cable adjustment. Refer to [VTL-65, "Adjustment"](#).

If OK, continue the check.

##### Discharge Air (High-level ventilator switch)

1. Press high-level ventilator switch. High-level ventilator switch indicator should illuminate.
2. Press high-level ventilator switch again. High-level ventilator indicator should not illuminate.
3. Confirm that discharge air comes out.

If NG, go to trouble diagnosis procedure for [HAC-147, "Diagnosis Procedure"](#).

If OK, continue the check.

##### Intake Air

1. Press REC switch. Recirculation indicator should illuminate.
2. Press REC switch again. Recirculation indicator should not illuminate.
3. Listen for intake door position change. (Slight change of blower sound can be heard.)

If NG, go to trouble diagnosis procedure for [HAC-150, "Diagnosis Procedure"](#).

If OK, continue the check.

##### Temperature Decrease

1. Turn temperature control dial counterclockwise until full cold position.
2. Check for cold air at discharge air outlets.

# INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MANUAL AIR CONDITIONER]

If NG, go to trouble diagnosis procedure for [HAC-188, "Inspection procedure"](#).

If OK, continue the check.

## Temperature Increase

1. Turn temperature control dial clockwise until full hot position.
2. Check for hot air at discharge air outlets.

If NG, go to trouble diagnosis procedure for [HAC-189, "Inspection procedure"](#).

If OK, continue the check.

## A/C Switch

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Press A/C switch.
3. A/C switch indicator will turn ON.
  - Confirm that the compressor clutch engages (sound or visual inspection).

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# COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## FUNCTION DIAGNOSIS

### COMPRESSOR CONTROL FUNCTION

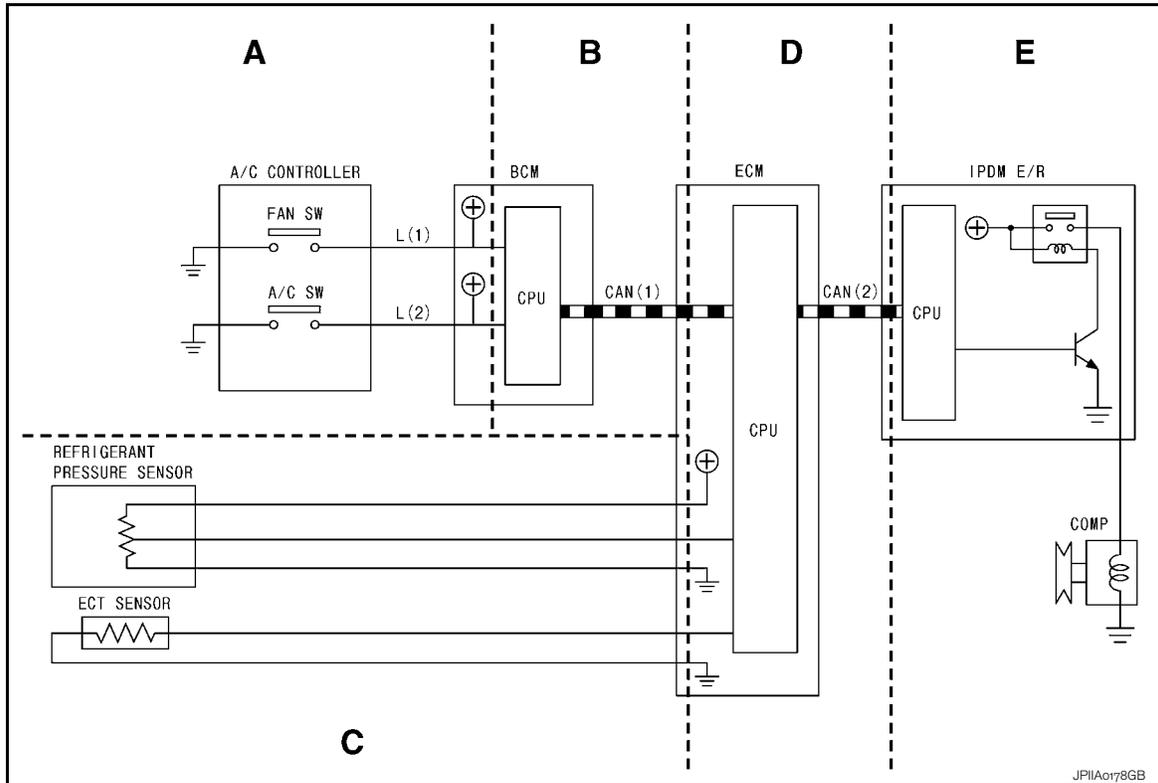
#### Description

INFOID:000000001069928

#### PRINCIPLE OF OPERATION

Compressor is not activated.

#### Functional circuit diagram



L (1) : FAN ON SIG  
L (2) : AIR COND SW

CAN (1) : AIR COND SIG  
CAN (2) : AC COMP REQ

#### Functional initial inspection chart

Location		A	B	C	D	E
CONSULT-III	BCM DATA MONITOR		Yes			
	ECM DATA MONITOR			Yes	Yes	
	IPDM E/R DATA MONITOR				Yes	
AUTO ACTIVE TEST						Yes

#### Component Part Location

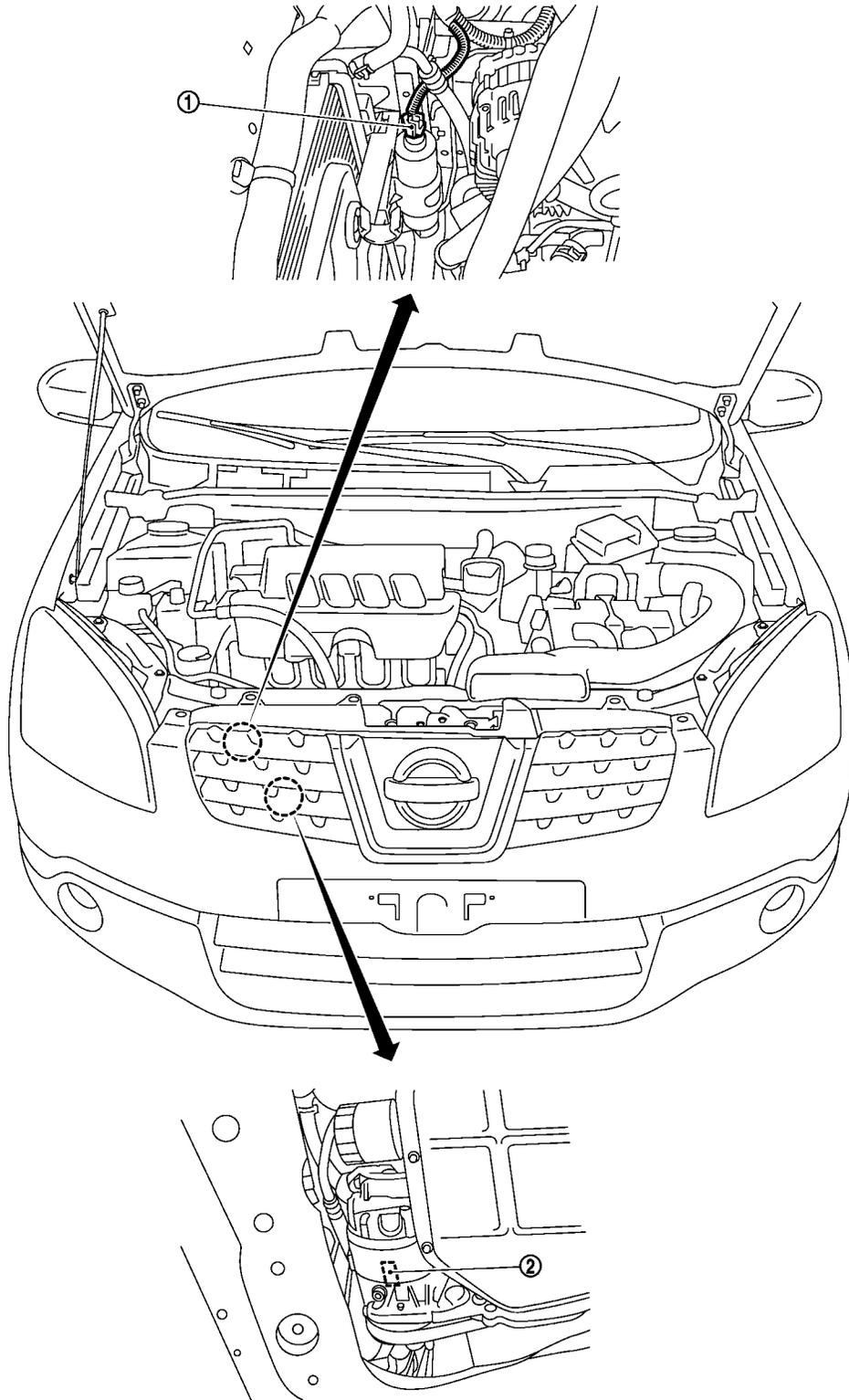
INFOID:000000001069930

#### ENGINE COMPARTMENT

# COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]



1. Refrigerant pressure sensor

2. Compressor

PASSENGER COMPARTMENT  
LHD Models

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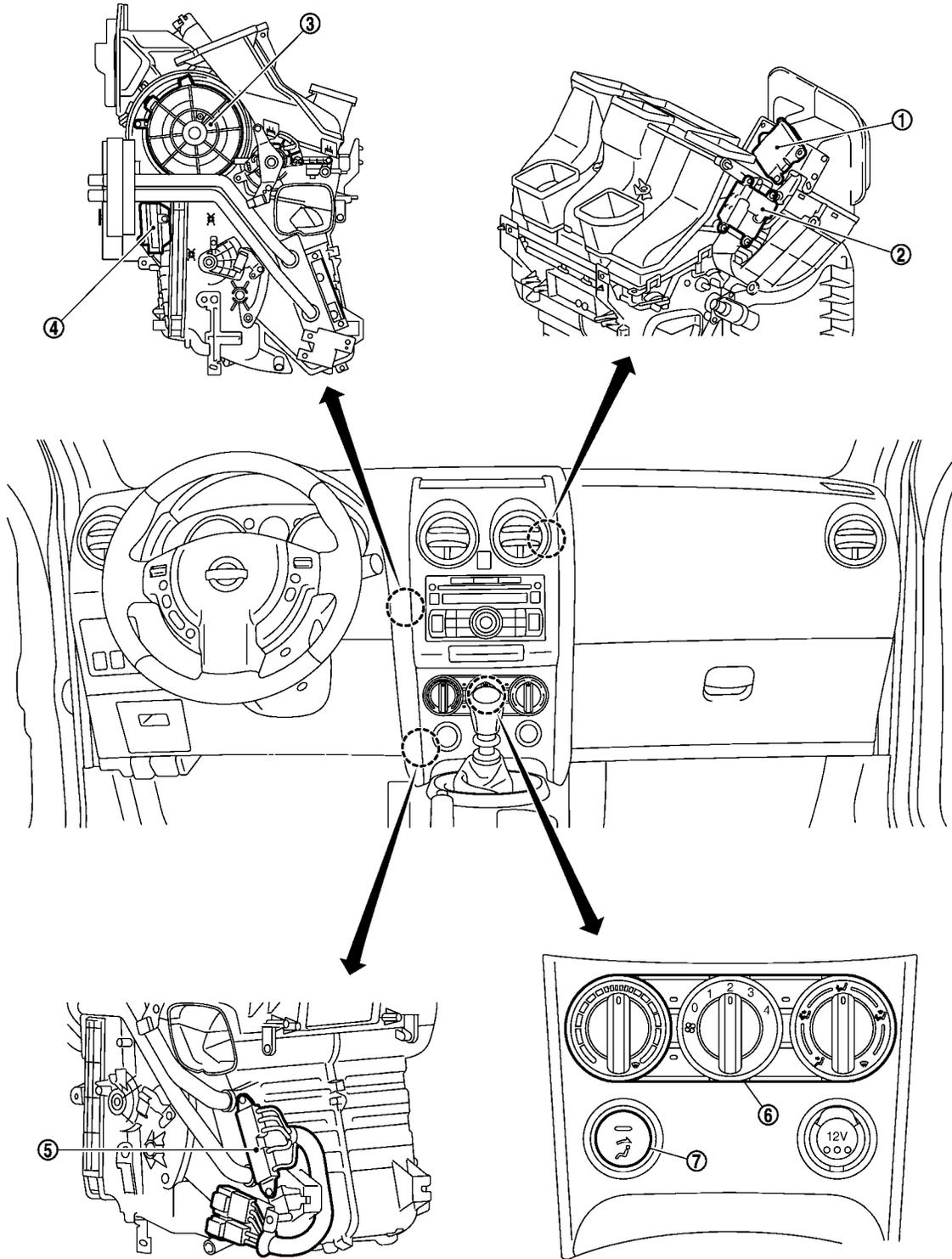
HAC

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# COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]



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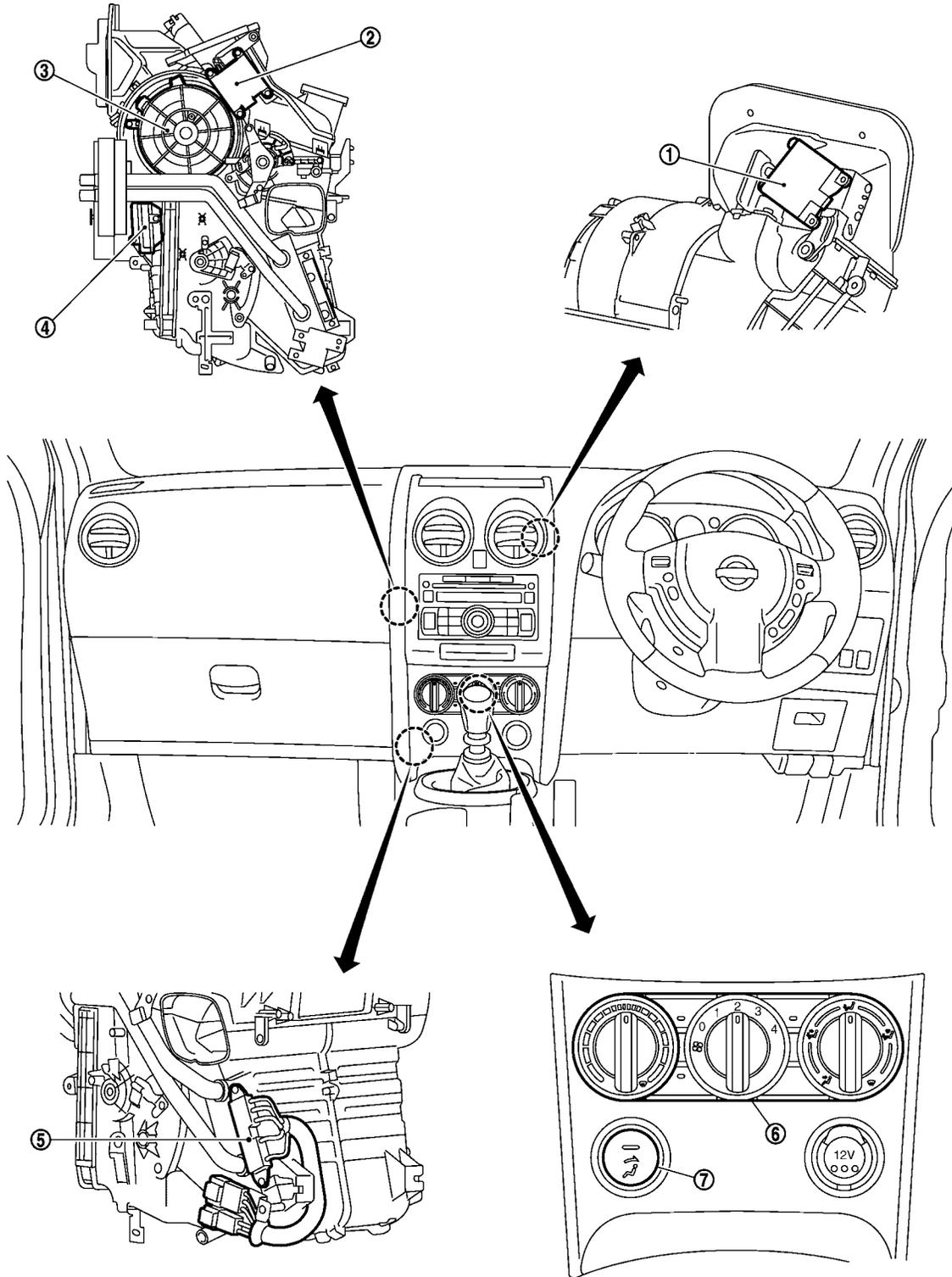
- 1. Intake door motor
- 2. High-level ventilator door motor
- 3. Blower motor
- 4. Blower fan resistor
- 5. PTC heater
- 6. Heater control panel
- 7. High-level ventilator switch

RHD Models

# COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]



- 1. Intake door motor
- 4. Blower fan resistor
- 7. High-level ventilator switch

- 2. High-level ventilator door motor
- 5. PTC heater

- 3. Blower motor
- 6. Heater control panel

Component's role

JPIIA0172ZZ

INFOID:000000001069931

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# COMPRESSOR CONTROL FUNCTION

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

Component	Reference
Blower fan resistor	<a href="#">HAC-155, "Component Inspection"</a>
Blower motor	<a href="#">HAC-153, "Description"</a>
Compressor	<a href="#">HAC-157, "Description"</a>
Heater control panel	<a href="#">HAC-169, "Description"</a>
High-level ventilator door motor	<a href="#">HAC-147, "Description"</a>
High-level ventilator switch	<a href="#">HAC-52, "Component Inspection"</a>
intake door motor	<a href="#">HAC-150, "Description"</a>
PTC heater	<a href="#">HAC-167, "Component Inspection"</a>
Refrigerant pressure sensor	<a href="#">HAC-161, "Component Inspection"</a>

# MANUAL AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

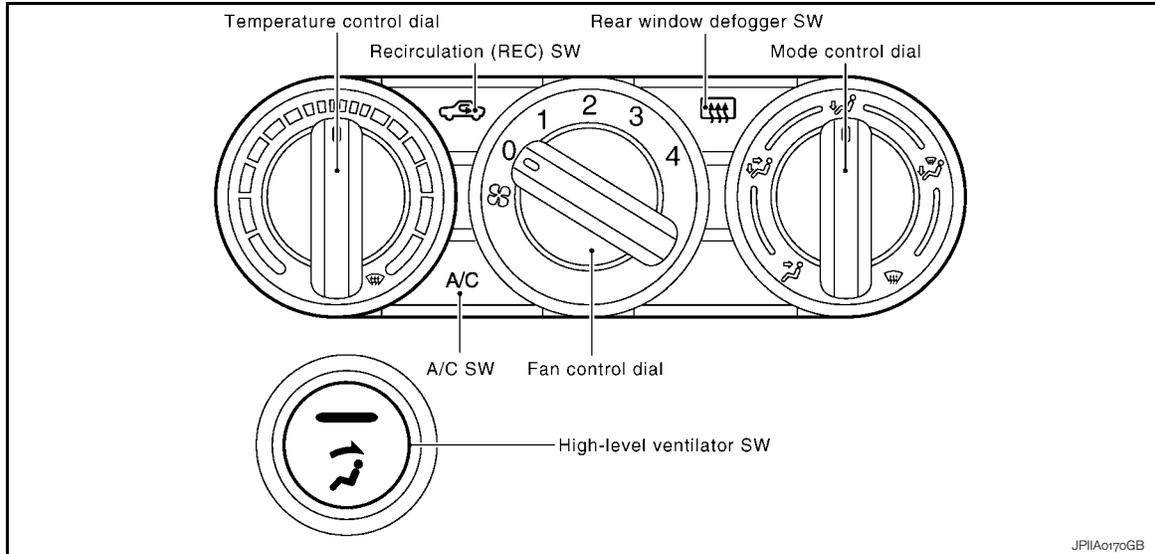
## MANUAL AIR CONDITIONER SYSTEM

### System Description

INFOID:000000001069937

### CONTROL OPERATION

#### Controller



#### Fan control dial

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

#### Temperature control dial

This dial is to adjust the temperature of the discharge air.

#### Mode control dial

This dial controls the outlet air flow.

#### A/C switch

Compressor is ON or OFF with this switch.

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

#### Rear window defogger switch

When illumination is ON, rear window is defogged.

#### Recirculation (REC) switch

- Recirculation (REC) position: Interior air is recirculated inside the vehicle. (The indicator lamp will light.)
- Fresh (FRE) position: Outlet air is drawn into the passenger compartment. (The indicator lamp will not light.)

#### High-level ventilator switch

When high-level ventilator switch is ON, high-level ventilator switch indicator turn ON, and high-level ventilator door is opened.

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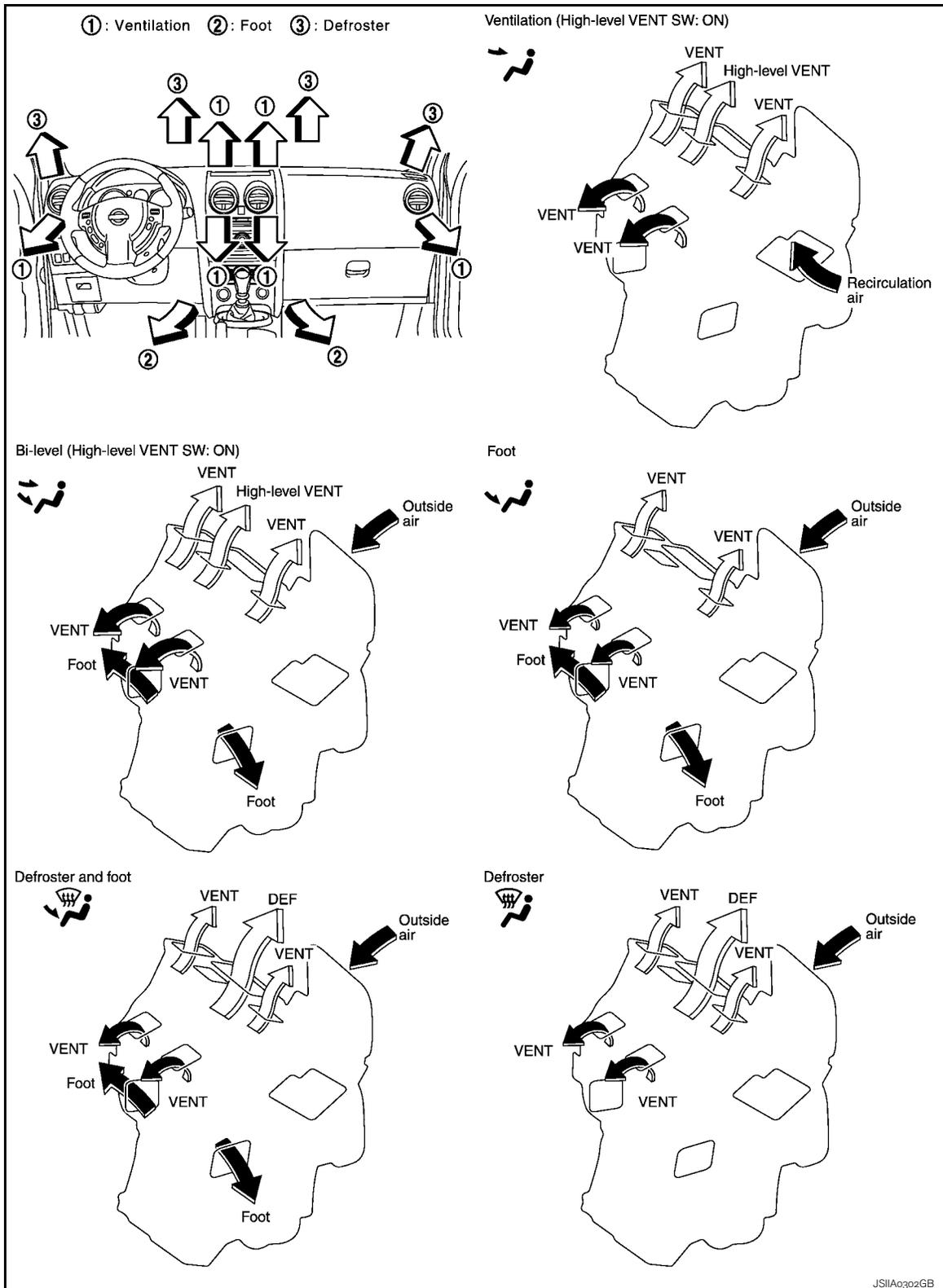
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# MANUAL AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## DISCHARGE AIR FLOW



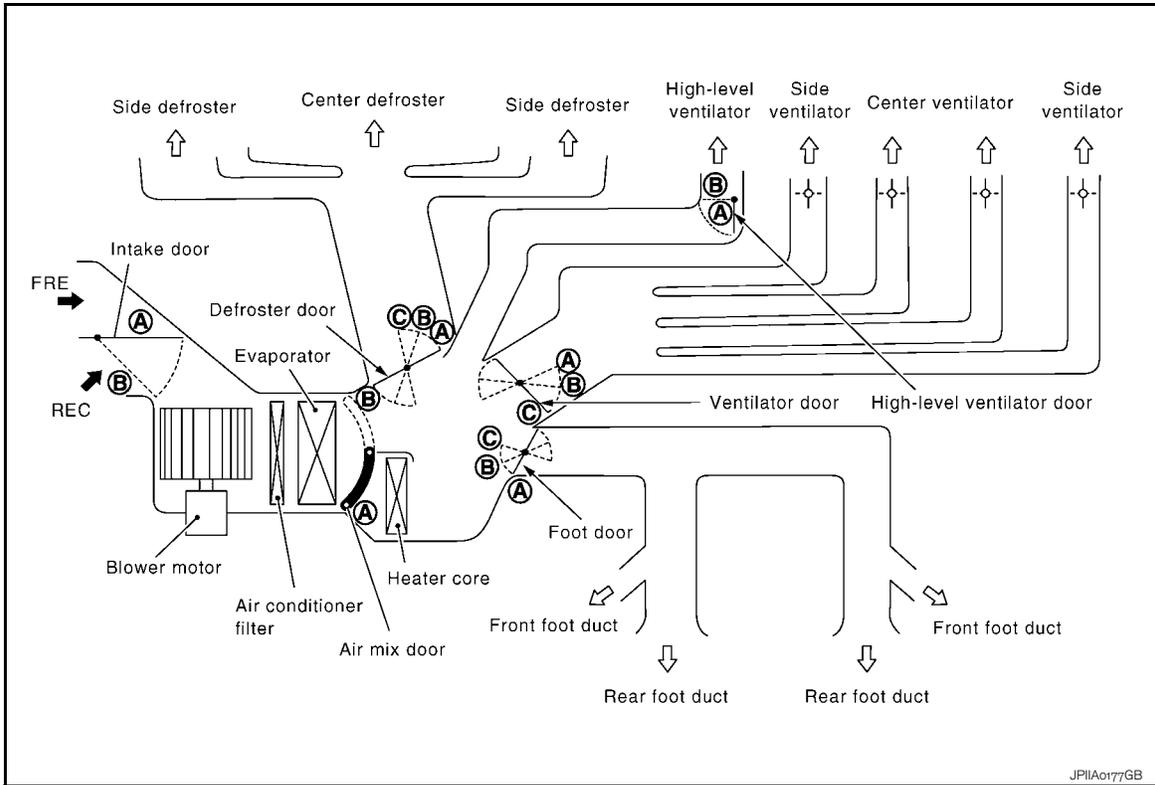
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# MANUAL AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## SWITCHES AND THEIR CONTROL FUNCTION



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	Mode control dial	MODE position					High-level ventilator SW		REC SW		Temperature control dial		
		VENT	B/L	FOOT	D/F	DEF	ON	OFF	FRE	REC	Full cold ↔ Full hot		
DOOR													
Ventilator door		(A)	(B)	(C)	(C)	(C)	-	-	-	-	-		
Defroster door		(A)	(A)	(A)	(B)	(C)	-	-	-	-	-		
Foot door		(A)	(B)	(C)	(B)	(A)	-	-	-	-	-		
High-level ventilator door		-	-	-	-	-	(A)	(B)	-	-	-		
Intake door		-	-	-	-	-	-	-	(B)	(A)	-		
Air mix door		-	-	-	-	-	-	-	-	-	(A)	↔	(B)

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## Component Part Location

INFOID:000000001070210

## ENGINE COMPARTMENT

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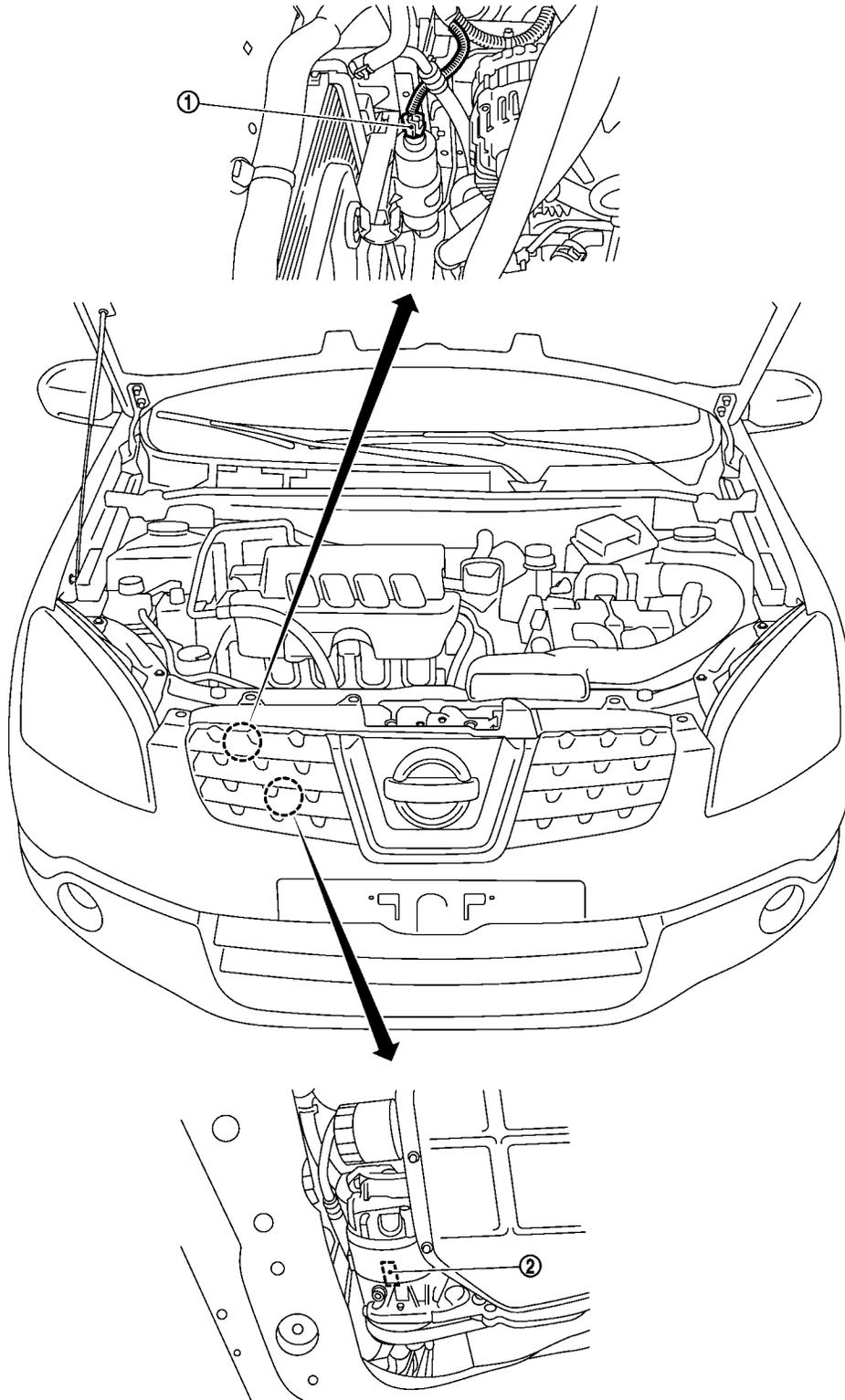
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# MANUAL AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]



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1. Refrigerant pressure sensor

2. Compressor

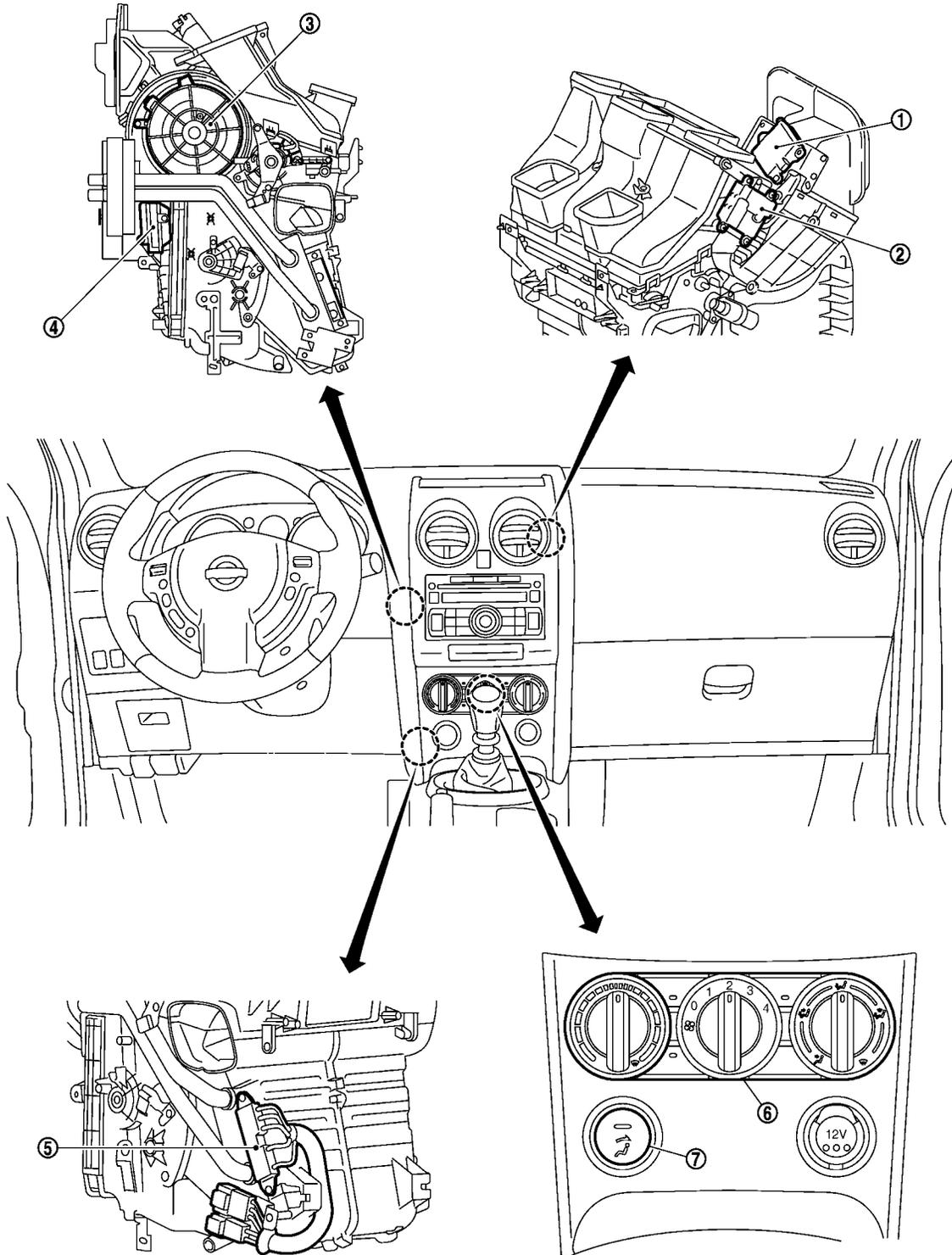
PASSENGER COMPARTMENT  
LHD Models

JPIIA016gZZ

# MANUAL AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]



- |                                 |                                     |                         |
|---------------------------------|-------------------------------------|-------------------------|
| 1. Intake door motor            | 2. High-level ventilator door motor | 3. Blower motor         |
| 4. Blower fan resistor          | 5. PTC heater                       | 6. Heater control panel |
| 7. High-level ventilator switch |                                     |                         |

RHD Models

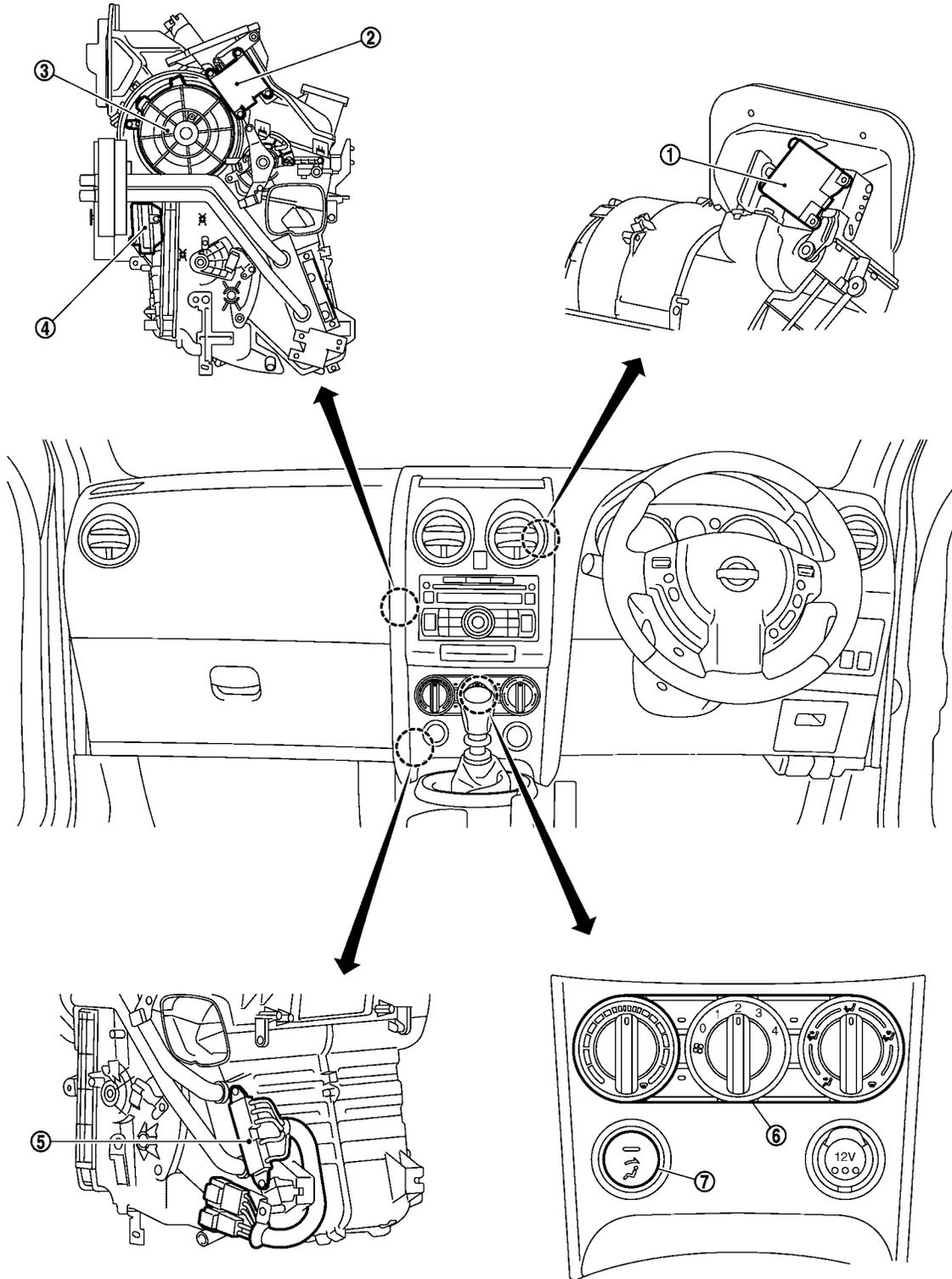
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# MANUAL AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]



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- |                                 |                                     |                         |
|---------------------------------|-------------------------------------|-------------------------|
| 1. Intake door motor            | 2. High-level ventilator door motor | 3. Blower motor         |
| 4. Blower fan resistor          | 5. PTC heater                       | 6. Heater control panel |
| 7. High-level ventilator switch |                                     |                         |

## Component Description

INFOID:000000001069939

# MANUAL AIR CONDITIONER SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

Component	Reference
Blower fan resistor	<a href="#">HAC-155, "Component Inspection"</a>
Blower motor	<a href="#">HAC-153, "Description"</a>
Compressor	<a href="#">HAC-157, "Description"</a>
Heater control panel	<a href="#">HAC-169, "Description"</a>
High-level ventilator door motor	<a href="#">HAC-147, "Description"</a>
High-level ventilator switch	<a href="#">HAC-149, "Component Inspection"</a>
intake door motor	<a href="#">HAC-150, "Description"</a>
PTC heater	<a href="#">HAC-167, "Component Inspection"</a>
Refrigerant pressure sensor	<a href="#">HAC-161, "Component Inspection"</a>

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# DIAGNOSIS SYSTEM (BCM)

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## DIAGNOSIS SYSTEM (BCM)

### COMMON ITEM

#### COMMON ITEM : CONSULT-III Function (BCM - COMMON ITEM)

INFOID:000000001096703

#### APPLICATION ITEM

CONSULT-III performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
WORK SUPPORT	Changes the setting for each system function.
SELF-DIAG RESULTS	Displays the diagnosis results judged by BCM. Refer to <a href="#">BCS-61, "DTC Index"</a> .
CAN DIAG SUPPORT MNTR	Monitors the reception status of CAN communication viewed from BCM.
DATA MONITOR	The BCM input/output signals are displayed.
ACTIVE TEST	The signals used to activate each device are forcibly supplied from BCM.
ECU IDENTIFICATION	The BCM part number is displayed.
CONFIGURATION	<ul style="list-style-type: none"> <li>Enables to read and save the vehicle specification.</li> <li>Enables to write the vehicle specification when replacing BCM.</li> </ul>

#### SYSTEM APPLICATION

BCM can perform the following functions for each system.

#### NOTE:

It can perform the diagnosis modes except the following for all sub system selection items.

System	Sub system selection item	Diagnosis mode		
		WORK SUPPORT	DATA MONITOR	ACTIVE TEST
—	BCM	×		
Door lock	DOOR LOCK	×	×	×
Rear window defogger	REAR DEFOGGER		×	×
Warning chime	BUZZER		×	×
Interior room lamp timer	INT LAMP	×	×	×
Remote keyless entry system	MULTI REMOTE ENT	×	×	×
Exterior lamp	HEAD LAMP	×	×	×
Wiper and washer	WIPER	×	×	×
Turn signal and hazard warning lamps	FLASHER		×	×
Air conditioner	AIR CONDITONER		×	
Intelligent Key system	INTELLIGENT KEY		×	
Combination switch	COMB SW		×	
Immobilizer	IMMU		×	×
Interior room lamp battery saver	BATTERY SAVER	×	×	×
Trunk open	TRUNK		×	
Vehicle security system	THEFT ALM	×	×	×
Signal buffer system	SIGNAL BUFFER		×	×
PTC heater system	PTC HEATER		×	×

#### AIR CONDITIONER

#### AIR CONDITIONER : CONSULT-III Function (BCM - MANUAL AIR CONDITIONER)

INFOID:000000001096704

#### DATA MONITOR

# DIAGNOSIS SYSTEM (BCM)

[MANUAL AIR CONDITIONER]

< FUNCTION DIAGNOSIS >

Display item list

Monitor item [unit]	Contents
IGN ON SW "On/Off"	Displays "IGN position (On)/OFF, ACC position (Off)" status as judged from ignition switch signal.
FAN ON SIG "On/Off"	Displays "FAN (On)/FAN (Off)" status as judged from blower fan motor switch signal.
AIR COND SW "On/Off"	Displays "COMP (On)/COMP (Off)" status as judged from A/C switch signal.

## PTC HEATER

### PTC HEATER : CONSULT-III Function (BCM - PTC HEATER)

INFOID:000000001114917

#### DATA MONITOR

Display Item List

Monitor Item [Unit]	Description
ELEC PWR CUT [OFF/FREEZ/INHBT]	Indicate [OFF/FREEZ/INHBT] condition of the PTC heater states.
FAN ON SIG [On/Off]	Displays [FAN (ON)/FAN (OFF)] status as judged from blower fan motor signal.
ENGINE STATUS [STOP/STAL/RUN/CRA]	Indicate [STOP/STAL/RUN/CRA] condition of the engine states.
ENG COOLNT T [°C]	The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.
BATTERY VOLT [V]	The power supply voltage of BCM is displayed.
ENGINE RPM [rpm]	Indicates the engine speed computed from the signal of the crankshaft position sensor.
OUTSIDE TEMP [°C]	The outside air temperature (determined by the signal voltage of the OAT sensor) is displayed.

#### ACTIVE TEST

Test item

Test Item	Operation	Description
PTC HEATER	OFF PTC 1 PTC 2 PTC 3	This test is able to check PTC heater operation.

# HIGH-LEVEL VENTILATOR DOOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## HIGH-LEVEL VENTILATOR DOOR CONTROL SYSTEM

### Description

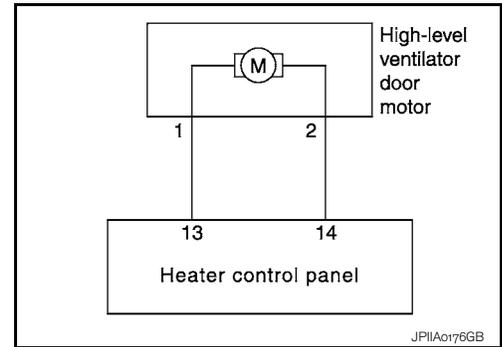
INFOID:000000001069949

### SYSTEM DESCRIPTION

#### Component Parts

- High-level ventilator door control system components are:
- Heater control panel (High-level ventilator switch)
  - High-level ventilator door motor

High-level ventilator door motor circuit



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# INTAKE DOOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## INTAKE DOOR CONTROL SYSTEM

### Description

INFOID:000000001069952

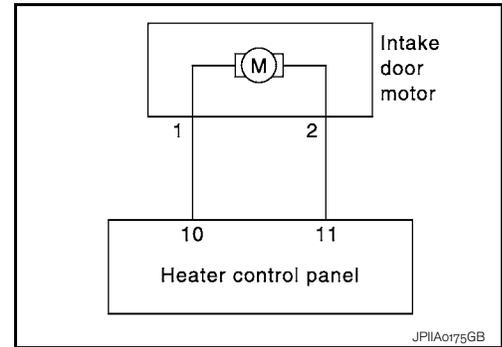
### SYSTEM DESCRIPTION

#### Component Parts

Intake door control system components are:

- Heater control panel (REC switch)
- Intake door motor

Intake door motor circuit



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# BLOWER MOTOR CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## BLOWER MOTOR CONTROL SYSTEM

### Description

INFOID:000000001069953

### SYSTEM DESCRIPTION

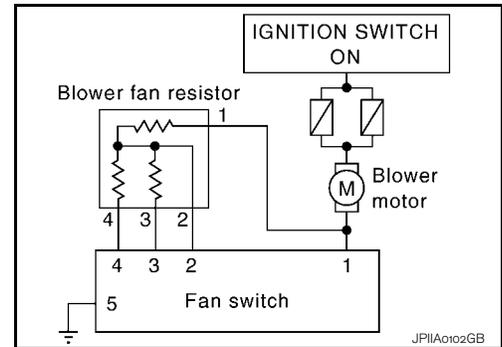
#### Component Parts

Blower motor control system components are:

- Blower motor
- Blower fan resistor
- Heater control panel (Fan switch)

#### Blower motor circuit

The blower speed is selected manually (1st – 4th) by the fan switch.



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# MAGNET CLUTCH CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## MAGNET CLUTCH CONTROL SYSTEM

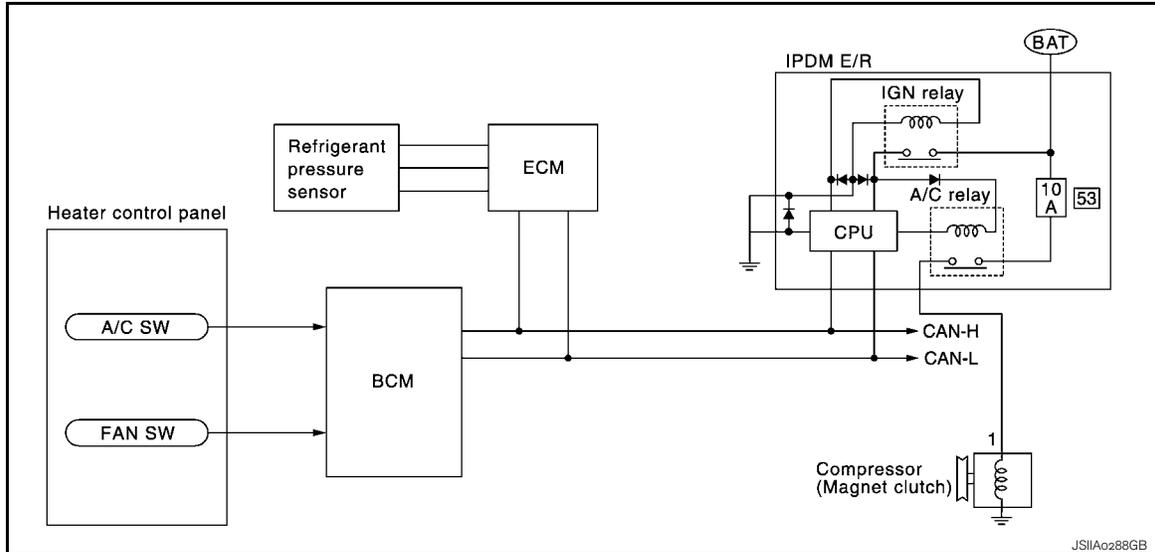
### Description

INFOID:000000001069955

### SYSTEM DISCRIPTION

- When A/C switch of the heater control panel is turned ON, the compressor ON signal is input to BCM.
- BCM transmits the compressor ON signal to ECM via CAN communication.
- ECM judges the condition of each sensor (Refrigerant pressure sensor signal, accelerator position signal, etc.), and transmits the compressor ON signal to IPDM E/R via CAN communication.
- IPDM E/R receives the compressor ON signal from ECM, turns the A/C relay ON, and activates the compressor.

### Magnet Clutch Circuit



### COMPRESSOR PROTECTION CONTROL

When the high-pressure side detected by the refrigerant pressure sensor is either approx. 2.7 MPa (approx. 27.5 kg/cm<sup>2</sup>·G) or more, or approx. 0.14 MPa (approx. 1.4 kg/cm<sup>2</sup>·G) or less, ECM turns the A/C relay OFF and stops the compressor.

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# PTC HEATER CONTROL SYSTEM

< FUNCTION DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## PTC HEATER CONTROL SYSTEM

### Description

INFOID:000000001117103

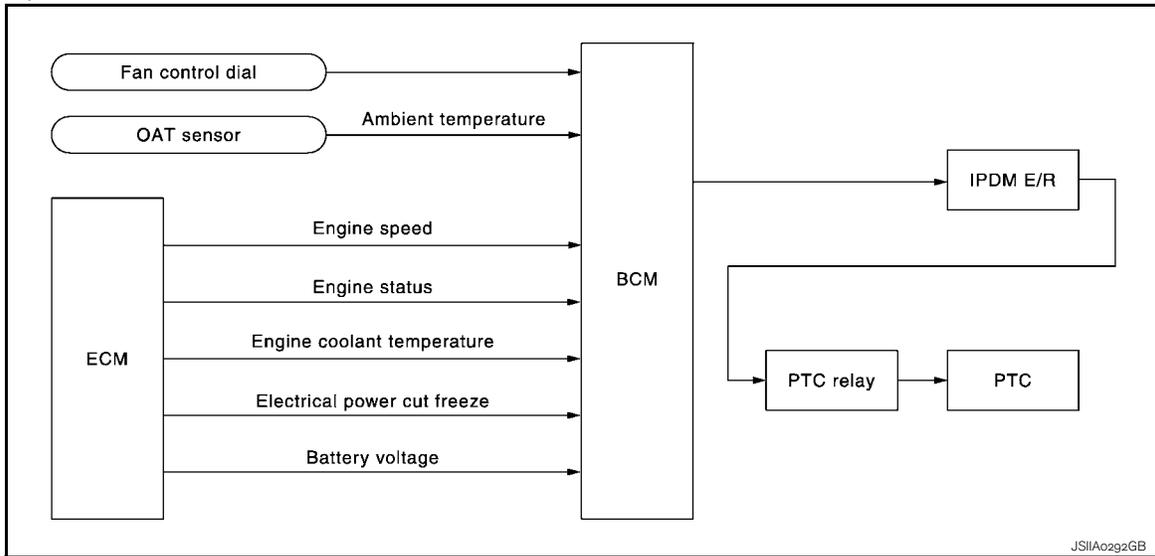
#### SYSTEM DESCRIPTION

BCM controls PTC (Positive Temperature Coefficient) heater correspond to fan ON signal, ambient temperature, engine coolant temperature, engine speed, engine status, electrical power cut freeze signal and battery voltage.

BCM sends PTC ON signal to IPDM E/R, via CAN communication.

BCM judges whether PTC can be turned ON, based on each sensor status (ambient temperature, engine speed, engine coolant temperature, etc.). If it judges PTC can be turned ON, it send PTC heater relay ON signal to IPDM E/R via CAN communication.

#### System Operation



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# HIGH-LEVEL VENTILATOR DOOR MOTOR

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## COMPONENT DIAGNOSIS

### HIGH-LEVEL VENTILATOR DOOR MOTOR

#### Description

INFOID:000000001070082

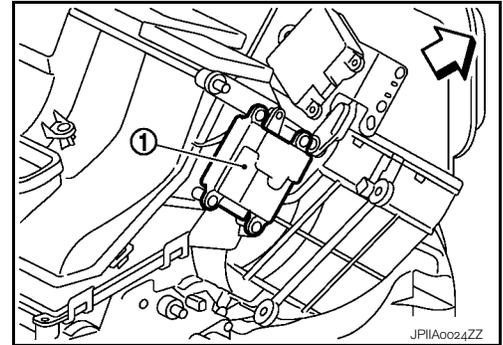
#### COMPONENT DESCRIPTION

##### High-level Ventilator Door Motor

The high-level ventilator door motor (1) are attached to the A/C unit assembly. It rotates so that air is discharged from the outlet set by the high-level ventilator switch. Motor rotation is conveyed to a link which activates the high-level ventilator door.

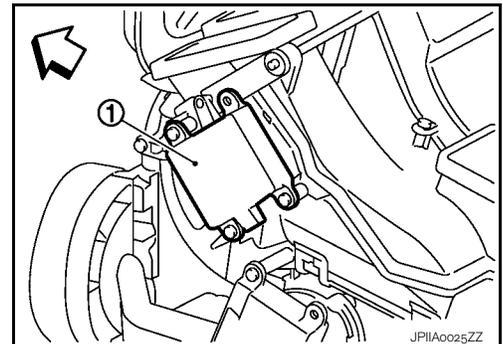
LHD models

← Vehicle front



RHD models

← Vehicle front



#### Component Function Check

INFOID:000000001070083

##### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press high-level ventilator switch. High-level ventilator switch indicator should illuminate.
2. Press high-level ventilator switch again. High-level ventilator indicator should not illuminate.
3. Confirm that discharge air comes out.

Is the inspection result normal?

YES >> END.

NO >> Go to diagnosis procedure. Refer to [HAC-147, "Diagnosis Procedure"](#).

#### Diagnosis Procedure

INFOID:000000001070084

##### 1. CHECK HIGH-LEVEL VENTILATOR DOOR CONTROL LINKAGE

Check high-level ventilator door control linkage.

Is it installed normally?

YES >> GO TO 2.

NO >> Repair or adjust control linkage.

##### 2. CHECK POWER SUPPLY FOR HEATER CONTROL PANEL

1. Disconnect heater control panel connector.

# HIGH-LEVEL VENTILATOR DOOR MOTOR

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

- Turn ignition switch ON.
- Check voltage between heater control panel harness connector M54 terminal 1 and ground.

(+)		(-)		Voltage
Connector	Terminal	Connector	Terminal	
M54	1		Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> GO TO 6.

## 3. CHECK GROUND CIRCUIT FOR HEATER CONTROL PANEL

- Turn ignition switch OFF.
- Check continuity between heater control panel harness connector M54 terminal 20 and ground.

Heater control panel		—	Continuity
Connector	Terminal		
M54	20	Ground	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair harness or connector.

## 4. CHECK POWER SUPPLY FOR HIGH-LEVEL VENTILATOR DOOR MOTOR

- Reconnect heater control panel connector.
- Turn ignition switch ON.
- Check voltage between high-level ventilator door motor harness connector M43 terminal 1 and 2.

(+)		(-)		Condition	Voltage
Connector	Terminal	Connector	Terminal		
M43	1	M43	2	High-level ventilator SW: ON	Approx. 12
	2		1	High-level ventilator SW: OFF	

Is the inspection result normal?

- YES >> Replace high-level ventilator door motor.  
NO >> GO TO 5.

## 5. CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND HIGH-LEVEL VENTILATOR DOOR MOTOR

- Turn ignition switch OFF.
- Disconnect heater control panel connector and high-level ventilator door motor connector.
- Check continuity between heater control panel harness connector M54 terminal 13 and high-level ventilator door motor harness connector M43 terminal 1.
- Check continuity between heater control panel harness connector M54 terminal 14 and high-level ventilator door motor harness connector M43 terminal 2.

Heater control panel		High-level ventilator door motor		Continuity
Connector	Terminal	Connector	Terminal	
M54	13	M43	1	Continuity should exist
	14		2	

Is the inspection result normal?

- YES >> Replace heater control panel.

# HIGH-LEVEL VENTILATOR DOOR MOTOR

[MANUAL AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

NO >> Repair harness or connector.

### 6. CHECK FUSE

Check 10A fuse [No.4 located in the fuse block (J/B)]. Refer to [PG-110, "Fuse, Connector and Terminal Arrangement"](#).

Is the inspection result normal?

YES >> Repair harness or connector.

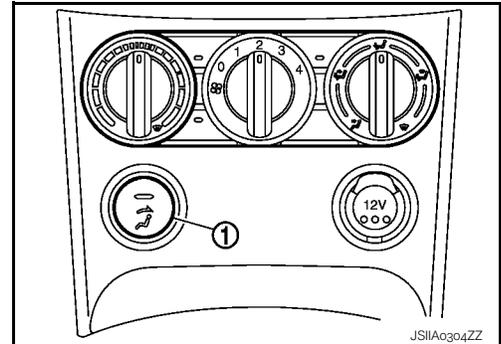
NO >> Replace fuse.

### Component Inspection

INFOID:000000001117102

### HIGH-LEVEL VENTILATOR SWITCH

Check continuity between high-level ventilator switch (1) M52 terminal 2 and 3.



High-level ventilator switch				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M52	2	M52	3	High-level VENT SW: OFF	Continuity should not exist
				High-level VENT SW: ON	Continuity should exist

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# INTAKE DOOR MOTOR

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## INTAKE DOOR MOTOR

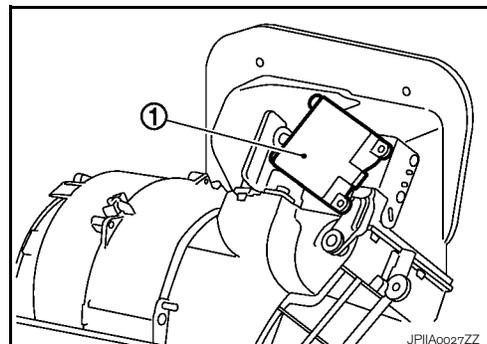
### Description

INFOID:000000001069965

### COMPONENT DESCRIPTION

#### Intake Door Motor

The intake door motor (1) is attached to the A/C unit assembly. It rotates so that air is drawn from inlets set by the heater control panel. Motor rotation is conveyed to a lever which activates the intake door.



### Component Function Check

INFOID:000000001069966

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Press REC switch.
2. REC indicator should illuminate.
3. Listen for intake door position change. (Slight change of blower sound can be heard.)
4. Press REC switch again.
5. REC indicator should not illuminate.

Is the inspection result normal?

YES >> END.

NO >> Go to diagnosis procedure. Refer to [HAC-150, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000001069967

#### 1. CHECK INTAKE DOOR CONTROL LINKAGE

Check intake door control linkage.

Is it installed normally?

YES >> GO TO 2.

NO >> Repair or adjust control linkage.

#### 2. CHECK POWER SUPPLY FOR HEATER CONTROL PANEL

1. Disconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between heater control panel harness connector M54 terminal 1 and ground.

(+)		(-)	Voltage
Heater control panel		—	
Connector	Terminal		
M54	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 6.

#### 3. CHECK GROUND CIRCUIT FOR HEATER CONTROL PANEL

1. Turn ignition switch OFF.
2. Check continuity between heater control panel harness connector M54 terminal 20 and ground.

# INTAKE DOOR MOTOR

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

Heater control panel		—	Continuity
Connector	Terminal		
M54	20	Ground	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 4.  
 NO >> Repair harness or connector.

## 4. CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR

1. Reconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between intake door motor harness connector M68 (LHD models) or M303 (RHD models) terminal 1 and 2.

LHD models

(+)		(-)		Condition	Voltage
Intake door motor					
Connector	Terminal	Connector	Terminal		
M68	2	M68	1	REC SW: ON	Approx. 12
	1		2	REC SW: OFF	

RHD models

(+)		(-)		Condition	Voltage
Intake door motor					
Connector	Terminal	Connector	Terminal		
M303	2	M303	1	REC SW: ON	Approx. 12
	1		2	REC SW: OFF	

Is the inspection result normal?

- YES >> Replace intake door motor.  
 NO >> GO TO 5.

## 5. CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND INTAKE DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector and intake door motor connector.
3. Check continuity between heater control panel harness connector M54 terminal 10 and intake door motor harness connector M68 terminal 1 (LHD models) or M303 terminal 1 (RHD models).
4. Check continuity between heater control panel harness connector M54 terminal 11 and intake door motor harness connector M68 terminal 2 (LHD models) or M303 terminal 2 (RHD models).

LHD models

Heater control panel		Intake door motor		Continuity
Connector	Terminal	Connector	Terminal	
M54	10	M68	1	Continuity should exist
	11		2	

RHD models

Heater control panel		Intake door motor		Continuity
Connector	Terminal	Connector	Terminal	
M54	10	M303	1	Continuity should exist
	11		2	

Is the inspection result normal?

- YES >> Replace heater control panel.  
 NO >> Repair harness or connector.

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## INTAKE DOOR MOTOR

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

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### 6.CHECK FUSE

Check 10A fuse [No.4, located in the fuse block (J/B)]. Refer to [PG-110. "Fuse, Connector and Terminal Arrangement"](#).

Is the inspection result normal?

- YES >> Repair harness or connector.
- NO >> Replace fuse.

## BLOWER MOTOR

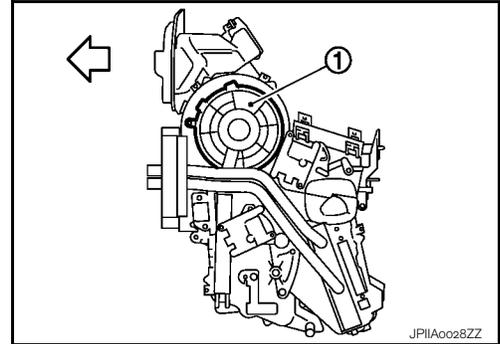
### Description

INFOID:000000001069968

#### COMPONENT DESCRIPTION

The blower motor (1) utilizes a brush motor with a sirocco fan type.

←: Vehicle front



JPIIA0028ZZ

### Component Function Check

INFOID:000000001069969

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn fan control dial clockwise. Blower should operate on low speed.
2. Turn fan control dial clockwise, and continue checking blower speed until all speeds checked.

Is the inspection result normal?

YES >> END.

NO >> Go to diagnosis procedure. Refer to [HAC-153, "Diagnosis Procedure"](#)

### Diagnosis Procedure

INFOID:000000001069970

#### 1. CHECK BLOWER MOTOR OPERATING

Check blower motor operating.

Is blower motor operation under starting blower speed control?

YES >> END.

NO >> Blower motor dose not operate: GO TO 2.

#### 2. CHECK POWER SUPPLY FOR BLOWER MOTOR

1. Turn ignition switch OFF.
2. Disconnect blower motor connector.
3. Turn ignition switch ON.
4. Check voltage between blower motor harness connector M312 terminal 1 and ground.

Blower motor		(+)	(-)	Voltage
Connector	Terminal	—		
M312	1	Ground		Battery voltage

Is the inspection result normal?

OK >> GO TO 3.

NG >> GO TO 4.

#### 3. CHECK BLOWER MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Turn fan control dial clockwise to 4th.
3. Check continuity between blower motor harness connector M312 terminal 2 and ground.

# BLOWER MOTOR

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[MANUAL AIR CONDITIONER]

Blower motor		—	Condition	Continuity
Connector	Terminal			
M312	2	Ground	Fan control dial: 4th	Continuity should exist

Is the inspection result normal?

YES >> Replace blower motor.

NO >> GO TO 10.

## 4. CHECK POWER VOLTAGE OF BLOWER RELAY

1. Turn ignition switch OFF.
2. Remove blower relay. Refer to [PG-110. "Fuse, Connector and Terminal Arrangement"](#).
3. Turn ignition switch ON.
4. Check the voltage between blower relay fuse block terminals 1, 3 and body ground. Refer to [PG-108. "Description"](#) for relay terminal assignment.

(+)	(-)	Voltage
Blower relay	—	
1	Ground	Battery voltage
3		

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 7.

## 5. CHECK BLOWER RELAY

1. Turn ignition switch OFF.
2. Install blower relay. Refer to [PG-110. "Fuse, Connector and Terminal Arrangement"](#).
3. Turn ignition switch ON.
4. Check operation sound of the blower relay after switching ignition switch ON.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace blower relay.

## 6. CHECK FUSE

Check 15A fuses [No. 15 and 16, located in the fuse block (J/B)]. Refer to [PG-110. "Fuse, Connector and Terminal Arrangement"](#).

Is the inspection result normal?

YES >> Repair harness or connector.

NG >> Replace fuse.

## 7. CHECK IGNITION SWITCH CIRCUIT

Check ignition switch circuit. Refer to [DLK-91. "Diagnosis Procedure"](#) (WITH I-KEY, WITHOUT SUPER LOCK), [DLK-355. "Diagnosis Procedure"](#) (WITH I-KEY & SUPER LOCK), [DLK-597. "Diagnosis Procedure"](#) (WITHOUT I-KEY, WITHOUT SUPER LOCK) or [DLK-757. "Diagnosis Procedure"](#) (WITHOUT I-KEY & SUPER LOCK).

Is the inspection result normal?

YES >> Repair harness or connector.

NG >> Replace malfunctioning parts.

## 8. CHECK CIRCUIT CONTINUITY BETWEEN BLOWER FAN RESISTOR.

1. Turn ignition switch OFF.
2. Disconnect blower fan resistor connector.
3. Check continuity between blower fan resistor harness connector M305 terminal 1 and 2, 3, 4. Refer to [HAC-155. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 9.

# BLOWER MOTOR

[MANUAL AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

NO >> Replace blower fan resistor.

### 9. CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND BLOWER FAN RESISTOR

1. Disconnect blower motor connector.
2. Check continuity between blower motor harness connector M312 terminal 2 and blower fan resistor M305 terminal 1.

Blower motor		Blower fan resistor		Continuity
Connector	Terminal	Connector	Terminal	
M312	2	M305	1	Continuity should exist

Is the inspection result normal?

OK >> GO TO 10.

NG >> Repair harness or connector.

### 10. CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR RESISTOR AND FAN SWITCH

1. Disconnect fan switch connector.
2. Check continuity between blower motor resistor harness connector M305 terminal 2, 3, 4 and fan switch M88 terminal 2, 3, 4.

Blower fan resistor		Fan SW		Continuity
Connector	Terminal	Connector	Terminal	
M305	2	M88	2	Continuity should exist
	3		3	
	4		4	

Is the inspection result normal?

OK >> GO TO 11.

NG >> Repair harness or connector.

### 11. CHECK FAN SWITCH

Check continuity between fan switch harness connector M88 terminal 5 and 1, 2, 3, 4, 6.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	5	M88	6	Fan control dial: except OFF	Continuity should exist
			4	Fan control dial: 1st	
			3	Fan control dial: 2nd	
			2	Fan control dial: 3rd	
			1	Fan control dial: 4th	

Is the inspection result normal?

YES >> Repair fan switch ground harness or connector.

NO >> Replace fan switch.

## Component Inspection

INFOID:000000001069971

## BLOWER MOTOR

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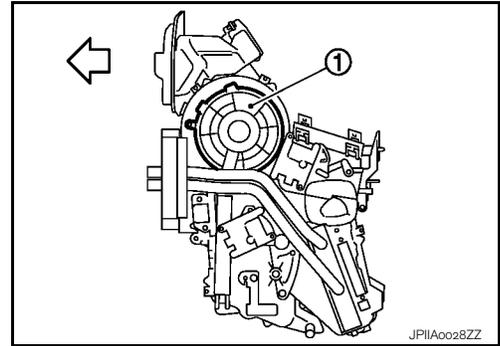
# BLOWER MOTOR

## < COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

Confirm smooth rotation of the blower motor (1).

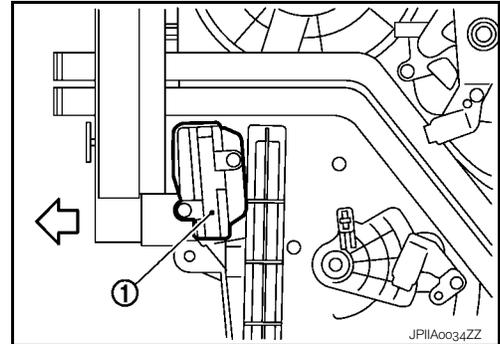
← Vehicle front



## BLOWER FAN RESISTOR

Check continuity between blower fan resistor connector (1) M305 terminal 1 and 2, 3, 4.

← Vehicle front



Blower fan resistor				Resistance (Ω)
Connector	Terminal	Connector	Terminal	
M305	1	M305	2	Approx. 0.3
			3	Approx. 0.9
			4	Approx. 2.0

## MAGNET CLUTCH

### Description

INFOID:000000001069976

Magnet clutch drives a compressor, by a signal of IPDM E/R.

### Component Function Check

INFOID:000000001069977

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Press A/C switch.
3. A/C switch indicator will turn ON. Confirm that the magnet clutch engages (sound or visual inspection).

#### Does the magnet clutch operate?

YES >> END.

NO >> Go to Diagnosis Procedure. Refer to [HAC-157. "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000001069978

#### 1. PERFORM AUTO ACTIVE TEST

Perform "AUTO ACTIVE TEST". Refer to [PCS-9. "Diagnosis Description"](#).

#### Does the magnet clutch operate?

YES >> •  WITH CONSULT-III: GO TO 5.

•  WITHOUT CONSULT-III: GO TO 6.

NO >> Check 10A fuse (No. 53, located in IPDM E/R), and GO TO 2.

#### 2. CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector and compressor connector.
3. Check continuity between IPDM E/R harness connector E12 terminal 23 and compressor harness connector F17 (With Gasoline Engine) or F18 (With Diesel Engine) terminal 1.

With Gasoline Engine

IPDM E/R		Compressor		Continuity
Connector	Terminal	Connector	Terminal	
E12	23	F17	1	Continuity should exist

With Diesel Engine

IPDM E/R		Compressor		Continuity
Connector	Terminal	Connector	Terminal	
E12	23	F18	1	Continuity should exist

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

#### 3. CHECK CIRCUIT CONTINUITY BETWEEN COMPRESSOR GROUND

1. Turn ignition switch OFF.
2. Check continuity between compressor harness connector F17 (With Gasoline Engine) or F18 (With Diesel Engine) terminal 2 and ground.

With Gasoline Engine

Compressor		—	Continuity
Connector	Terminal		
F17	2	Ground	Continuity should exist

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# MAGNET CLUTCH

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

With Diesel Engine

Compressor		—	Continuity
Connector	Terminal		
F18	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.

## 4.CHECK MAGNET CLUTCH CIRCUIT

Check for operation sound when applying battery voltage direct current to terminal.

Is the inspection result normal?

YES >> Replace IPDM E/R.

NO >> Replace compressor.

## 5.CHECK BCM INPUT (AIR COND SW) SIGNAL

Check compressor ON/OFF signal in "DATA MONITOR". Refer to [HAC-140. "AIR CONDITIONER : CONSULT-III Function \(BCM - MANUAL AIR CONDITIONER\)"](#).

**A/C SW ON : AIR COND SW ON**  
**A/C SW OFF : AIR COND SW OFF**

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 6.

## 6.CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND BCM

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector and BCM harness connector.
3. Check continuity between heater control panel harness connector M54 terminal 7 and BCM harness connector M65 terminal 14.

Heater control panel		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M54	7	M65	14	Continuity should exist

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair harness or connector.

## 7.CHECK A/C SWITCH SIGNAL

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector.
3. Turn ignition switch ON.
4. Check voltage between heater control panel harness connector M54 terminal 7 and ground.

(+)		(-)		Voltage
Heater control panel		—		
Connector	Terminal			
M54	7	Ground		Battery voltage

5. Reconnect heater control panel connector.
6. Press A/C switch and turn fan control dial except OFF position.
7. Check voltage between heater control panel harness connector M54 terminal 7 and ground.

# MAGNET CLUTCH

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

(+)		(-)	Condition	Voltage
Heater control panel		—		
Connector	Terminal			
M54	7	Ground	A/C SW: ON FAN SW: ON	Approx. 0

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace heater control panel.

## 8. CHECK REFRIGERANT PRESSURE SENSOR

 WITH CONSULT-III

1. Start the engine.
2. Check voltage of refrigerant pressure sensor in "DATA MONITOR". Refer to [HAC-181. "HR16DE : Reference Value"](#) (HR16DE), [HAC-182. "MR20DE : Reference Value"](#) (MR20DE), [HAC-182. "K9K : Reference Value"](#) (K9K).

 WITHOUT CONSULT-III

1. Start the engine.
2. Check voltage between ECM harness connector F8 terminal 41 (With Gasoline Engine) F68 terminal 78 (With Diesel Engine) and ground.

With Gasoline Engine

(+)		(-)	Condition	Voltage
ECM		—		
Connector	Terminal			
F8	41	Ground	A/C SW: ON (Blower motor operates.)	Approx. 1.0 - 4.0

With Diesel Engine

(+)		(-)	Condition	Voltage
ECM		—		
Connector	Terminal			
F68	78	Ground	A/C SW: ON (Blower motor operates.)	Approx. 2.3

Is the inspection result normal?

YES >>  WITH CONSULT-III: GO TO 9.

 WITHOUT CONSULT-III: GO TO 10.

NO >> Refer to [EC-316. "Diagnosis Procedure"](#) [HR16DE (WITH EURO-OBD)], [EC-595. "Diagnosis Procedure"](#) [HR16DE (WITHOUT EURO-OBD)], [EC-936. "Diagnosis Procedure"](#) [MR20DE (WITH EURO-OBD)], [EC-1215. "Diagnosis Procedure"](#) [MR20DE (WITHOUT EURO-OBD)], or [EC-1380. "Diagnosis Procedure"](#) (K9K).

## 9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal in "DATA MONITOR". Refer to [HAC-140. "AIR CONDITIONER : CONSULT-III Function \(BCM - MANUAL AIR CONDITIONER\)"](#).

**FAN SW ON : FAN ON SIG ON**

**FAN SW OFF : FAN ON SIG OFF**

Is the inspection result normal?

YES >> GO TO 14.

NO >> GO TO 10.

## 10. CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND BCM

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector and BCM harness connector.

# MAGNET CLUTCH

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

3. Check continuity between heater control panel harness connector M54 terminal 8 and BCM harness connector M65 terminal 15.

Heater control panel		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M54	8	M65	15	Continuity should exist

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

## 11.CHECK FAN ON SIGNAL

1. Reconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between heater control panel harness connector M54 terminal 8 and ground.

Heater control panel		(-)	Voltage
Connector	Terminal		
M54	8	Ground	Battery voltage

4. Turn fan control dial clockwise
5. Check voltage between heater control panel harness connector M54 terminal 8 and ground.

Heater control panel		(-)	Condition	Voltage
Connector	Terminal			
M54	8	Ground	Fan control dial: except OFF	Approx. 0

Is the inspection result normal?

YES >> GO TO 14.

NO >> GO TO 12.

## 12.CHECK CIRCUIT CONTINUITY BETWEEN FAN SWITCH

1. Turn ignition switch OFF.
2. Disconnect fan switch connector.
3. Check continuity between fan switch harness connector M88 terminal 6 and 5.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	6	M88	5	Fan control dial: OFF	Continuity should not exist

4. Turn fan control dial clockwise.
5. Check continuity between fan switch harness connector M88 terminal 6 and 5.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	6	M88	5	Fan control dial: except OFF	Continuity should exist

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace heater control panel.

## 13.CHECK GROUND CIRCUIT FOR FAN SWITCH

Check continuity between fan switch harness connector M88 terminal 5 and ground.

# MAGNET CLUTCH

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

FAN SW		—	Continuity
Connector	Terminal		
M88	5	Ground	Continuity should exist

Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair harness or connector.

## 14.CHECK CAN COMMUNICATION

Check CAN communication. Refer to [LAN-59, "CAN Communication Signal Chart"](#).

- ECM – BCM
- ECM – IPDM E/R

Is the inspection result normal?

YES >> Replace ECM.

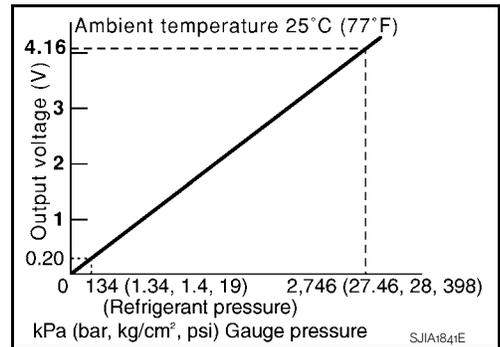
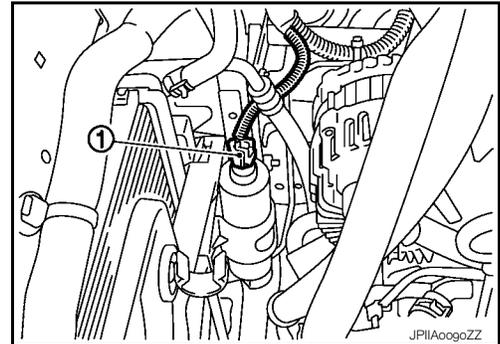
NO >> Repair or replace malfunctioning part(s).

## Component Inspection

INFOID:000000001069979

### REFRIGERANT PRESSURE SENSOR

The refrigerant pressure sensor (1) is attached to the liquid tank. Make sure that the A/C refrigerant pressure and the sensor output voltage are within the specified range as shown in the A/C operating condition figure. Refer to [EC-316, "Description"](#) [HR16DE (WITH EURO-OBD)], [EC-595, "Description"](#) [HR16DE (WITHOUT EURO-OBD)], [EC-936, "Description"](#) [MR20DE (WITH EURO-OBD)], [EC-1215, "Description"](#) [MR20DE (WITHOUT EURO-OBD)], or [EC-1380, "Description"](#) (K9K).



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# PTC HEATER

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## PTC HEATER

### Description

INFOID:000000001096707

IPDM E/R operate a PTC heater, by a signal of BCM.

### Component Function Check

INFOID:000000001096708

## 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

### CONSULT-III ACTIVE TEST

1. Start engine.
2. Select "PTC HEATER" of BCM active test item.  
**CAUTION:**
  - Engine must be cold.
  - Battery must be charged.
3. Turn fan control dial clockwise.
4. Turn temperature control dial to full hot position.
5. With operating the test item, check that PTC heater operation.
6. Check for warm air at discharge air outlet.

PTC 3	: PTC heater HI operation
PTC 2	: PTC heater MID operation
PTC 1	: PTC heater LO operation
OFF	: Stop the PTC heater operation

### Does the PTC heater operate?

YES >> END.

NO >> Go to Diagnosis Procedure. Refer to [HAC-162, "Diagnosis Procedure"](#).

## Diagnosis Procedure

INFOID:000000001096709

## 1. CHECK PTC HEATER-1 OPERATION

### CONSULT -III ACTIVE TEST

1. Disconnect PTC heater connector.
2. Start engine.
3. Select "PTC HEATER" of BCM active test item.
4. With operating the item, check voltage between PTC heater harness connector E117 terminal 3 and ground.

(+)		(-)	Test item	Voltage
Connector	Terminal	—	PTC HEATER	
E117	3	Ground	OFF	Approx. 0
			PTC 1	Battery voltage
			PTC 2	Approx. 0
			PTC 3	Battery voltage

### In the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 5.

## 2. CHECK GROUND CIRCUIT FOR PTC HEATER-1

1. Turn ignition switch OFF.
2. Check continuity between PTC heater harness connector E116 terminal 1 and ground.

# PTC HEATER

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

PTC heater		—	Continuity
Connector	Terminal		
E116	1	Ground	Continuity should exist.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

## 3.CHECK PTC HEATER-2 OPERATION

1. Start engine.
2. Select "PTC HEATER" of BCM active test item.
3. With operating the item, check voltage between PTC heater harness connector E117 terminal 4 and ground.

(+) PTC heater		(-)	Test item	Voltage
Connector	Terminal	—	PTC HEATER	
E117	4	Ground	OFF	Approx. 0
			PTC 1	Approx. 0
			PTC 2	Battery voltage
			PTC 3	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 12.

## 4.CHECK GROUND CIRCUIT FOR PTC HEATER-2

1. Turn ignition switch OFF.
2. Check continuity between PTC heater harness connector E116 terminal 2 and ground.

PTC heater		—	Continuity
Connector	Terminal		
E116	2	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace PTC heater.

NO >> Repair harness or connector.

## 5.CHECK VOLTAGE FOR PTC RELAY-1

1. Turn ignition switch OFF.
2. Disconnect PTC relay-1.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-1 harness connector E53 terminal 3 and ground.

(+) PTC relay-1		(-)	Voltage
Connector	Terminal	—	
E53	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

## 6.CHECK FUSE

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# PTC HEATER

[MANUAL AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

Check 30A fuse (Nos 37, located in the fuse, fusible link and relay box). Refer to [PG-111. "Fuse and Fusible Link Arrangement"](#).

Is the inspection result normal?

YES >> Repair harness or connector.

NO >> Replace fuse.

### 7.CHECK PTC RELAY-1

Check PTC relay-1. Refer to [HAC-76. "Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace PTC relay-1.

### 8.CHECK CIRCUIT CONTINUITY BETWEEN PTC RELAY-1 AND PTC HEATER

Check continuity between PTC relay-1 harness connector E53 terminal 5 and PTC heater harness connector E117 terminal 3.

PTC relay-1		PTC heater		Continuity
Connector	Terminal	Connector	Terminal	
E53	5	E117	3	Continuity should exist

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair harness or connector.

### 9.CHECK POWER SUPPLY FOR PTC RELAY-1

1. Turn ignition switch ON.
2. Check voltage between PTC relay-1 harness connector E53 terminal 1 and ground.

(+)		(-)		Voltage
PTC relay-1		—		
Connector	Terminal			
E53	1	Ground		Battery voltage

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

### 10.CHECK FUSE

Check 10A fuse [Nos 17, located in the fuse block (J/B)]. Refer to [PG-110. "Fuse, Connector and Terminal Arrangement"](#).

Is the inspection result normal?

YES >> Repair harness or connector.

NO >> Replace fuse.

### 11.CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-1 AND IPDM E/R

Check continuity between PTC relay-1 harness connector E53 terminal 2 and IPDM E/R harness connector E11 terminal 11.

PTC relay-1		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E53	2	E11	11	Continuity should exist

Is the inspection result normal?

YES >> GO TO 18.

NO >> Repair harness or connector.

### 12.CHECK VOLTAGE FOR PTC RELAY-2

# PTC HEATER

[MANUAL AIR CONDITIONER]

## < COMPONENT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect PTC relay-2.
3. Turn ignition switch ON.
4. Check voltage between PTC relay-2 harness connector E54 terminal 3 and ground.

(+)		(-)	Voltage
PTC relay-2		—	
Connector	Terminal		
E54	3	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 14.  
NO >> GO TO 13.

### 13.CHECK FUSE

Check 30A fuse (Nos 35, located in the fuse, fusible link and relay box). Refer to [PG-111, "Fuse and Fusible Link Arrangement"](#).

Is the inspection result normal?

- YES >> Repair harness or connector.  
NO >> Replace fuse.

### 14.CHECK PTC RELAY-2

Check PTC relay-2. Refer to [HAC-76, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 15.  
NO >> Replace PTC relay-2.

### 15.CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-2 AND PTC HEATER

Check continuity between PTC relay-2 harness connector E54 terminal 5 and PTC heater harness connector E117 terminal 4.

PTC relay-2		PTC heater		Continuity
Connector	Terminal	Connector	Terminal	
E54	5	E117	4	Continuity should exist.

Is the inspection result normal?

- YES >> GO TO 16.  
NO >> Repair harness or connector.

### 16.CHECK POWER SUPPLY FOR PTC RELAY-2

1. Turn ignition switch ON.
2. Check voltage between PTC relay-2 harness connector E54 terminal 1 and ground.

(+)		(-)	Voltage
PTC relay-2		—	
Connector	Terminal		
E54	1	Ground	Battery voltage

Is the inspection result normal?

- YES >> GO TO 17.  
NO >> GO TO 10.

### 17.CHECK CIRCUIT CONTINUIT BETWEEN PTC RELAY-2 AND IPDM E/R

Check continuity between PTC relay-2 harness connector E54 terminal 2 and IPDM E/R harness connector E11 terminal 12.

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# PTC HEATER

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

PTC relay-1		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E54	2	E11	12	Continuity should exist.

Is the inspection result normal?

- YES >> GO TO 18.  
 NO >> Repair harness or connector.

## 18.CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal in "DATA MONITOR". Refer to [HAC-140, "AIR CONDITIONER : CONSULT-III Function \(BCM - MANUAL AIR CONDITIONER\)"](#).

**FAN SW ON : FAN ON SIG ON**  
**FAN SW OFF : FAN ON SIG OFF**

Is the inspection result normal?

- YES >> GO TO 21.  
 NO >> GO TO 19.

## 19.CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND BCM

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector and BCM harness connector.
3. Check continuity between heater control panel harness connector M54 terminal 8 and BCM harness connector M65 terminal 15.

Heater control panel		BCM		Continuity
Connector	Terminal	Connector	Terminal	
M54	8	M65	15	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 20.  
 NO >> Repair harness or connector.

## 20.CHECK FAN ON SIGNAL

1. Reconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between heater control panel harness connector M54 terminal 8 and ground.

(+)		(-)		Voltage
Heater control panel				
Connector	Terminal			
M54	8	Ground		Battery voltage

4. Turn fan control dial clockwise
5. Check voltage between heater control panel harness connector M54 terminal 8 and ground.

(+)		(-)		Condition	Voltage
Heater control panel					
Connector	Terminal				
M54	8	Ground		Fan control dial: except OFF	Approx. 0

Is the inspection result normal?

- YES >> GO TO 21.  
 NO >> Replace heater control panel.

# PTC HEATER

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## 21. CHECK CIRCUIT CONTINUITY BETWEEN FAN SWITCH

1. Turn ignition switch OFF.
2. Disconnect fan switch connector.
3. Check continuity between fan switch harness connector M88 terminal 6 and 5.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	6	M88	5	Fan control dial: OFF	Continuity should not exist

4. Turn fan control dial clockwise.
5. Check continuity between fan switch harness connector M88 terminal 6 and 5.

FAN SW				Condition	Continuity
Connector	Terminal	Connector	Terminal		
M88	6	M88	5	Fan control dial: except OFF	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 22.  
 NO >> Replace heater control panel.

## 22. CHECK GROUND CIRCUIT FOR FAN SWITCH

Check continuity between fan switch harness connector M88 terminal 5 and ground.

FAN SW		—	Continuity
Connector	Terminal		
M88	5	Ground	Continuity should exist

Is the inspection result normal?

- YES >> GO TO 23.  
 NO >> Repair harness or connector.

## 23. CHECK CAN COMMUNICATION

Check CAN communication. Refer to [LAN-59. "CAN Communication Signal Chart"](#).

- BCM – IPDM E/R
- BCM – ECM

Is the inspection result normal?

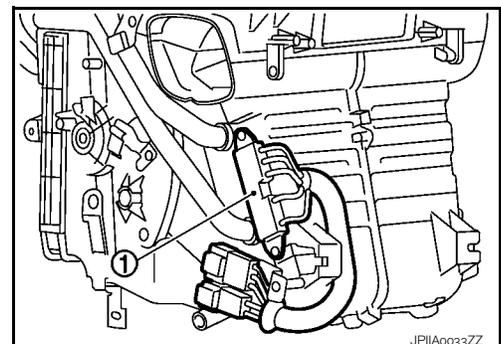
- YES >> Replace IPDM E/R.  
 NO >> Repair or replace malfunctioning part(s).

## Component Inspection

INFOID:000000001096710

### PTC HEATER

The PTC heater (1) is attached to the A/C unit assembly. It generates heat electrically.



JPIIA0033ZZ

### PTC RELAY

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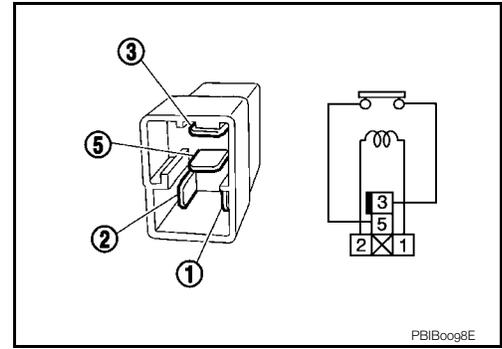
# PTC HEATER

## < COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

Check continuity between terminal 3 and 5.

Terminal	Condition	Continuity
3 and 5	12V direct current supply between terminal 1 and 2	Exist
	No current supply	Not exist



# POWER SUPPLY AND GROUND CIRCUIT FOR HEATER CONTROL PANEL

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## POWER SUPPLY AND GROUND CIRCUIT FOR HEATER CONTROL PANEL

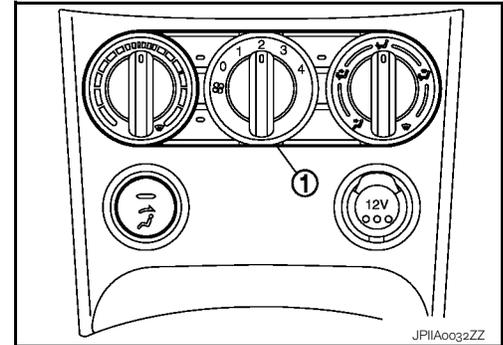
### Description

INFOID:000000001115374

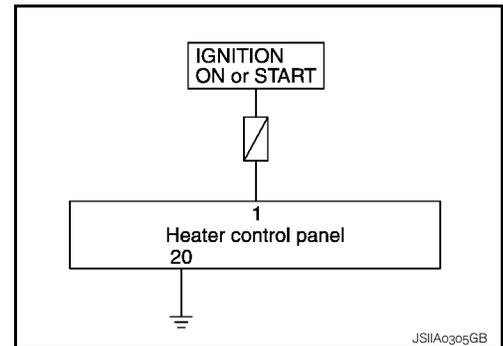
### COMPONENT DESCRIPTION

Heater Control Panel

1. Heater control panel



Power Supply and Ground Circuit for Heater Control Panel



### Component Function Check

INFOID:000000001115375

#### 1. CONFIRM SYMPTOM BY PERFORMING THE FOLLOWING OPERATIONAL CHECK

1. Turn fan control dial to the desired (1 to 4 speed) position.
2. Press A/C switch.
3. A/C switch indicator will turn ON. Confirm that the magnet clutch engages (sound or visual inspection).

Does magnet clutch engaged?

YES >> END.

NO >> Go to Diagnosis Procedure. Refer to [HAC-169, "Diagnosis Procedure"](#).

### Diagnosis Procedure

INFOID:000000001115376

#### 1. CHECK POWER SUPPLY CIRCUIT FOR HEATER CONTROL PANEL

1. Disconnect heater control panel connector.
2. Check voltage between heater control panel harness connector M54 terminals 1 and ground.

(+)		(-)	Ignition switch position		
Heater control panel		—	OFF	ACC	ON
Connector	Terminal				
M54	1	Ground	Approx. 0 V	Approx. 0 V	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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# POWER SUPPLY AND GROUND CIRCUIT FOR HEATER CONTROL PANEL

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## 2. CHECK FUSE

Check 10A fuses [Nos. 4, located in the fuse block (J/B)]. Refer to [PG-110. "Fuse, Connector and Terminal Arrangement"](#).

Is the inspection result normal?

YES >> Check harness for open circuit. Repair or replace if necessary.

NO >> Replace the blown fuse after repairing the affected circuit if a fuse is blown.

## 3. CHECK GROUND CIRCUIT FOR HEATER CONTROL PANEL

1. Turn ignition switch OFF.
2. Check continuity between heater control panel harness connector M54 terminal 20 and ground.

Heater control panel		—	Continuity
Connector	Terminal		
M54	20	Ground	Continuity should exist

Is the inspection result normal?

YES >> Replace heater control panel.

NO >> Repair harness or connector.

# MANUAL AIR CONDITIONER SYSTEM

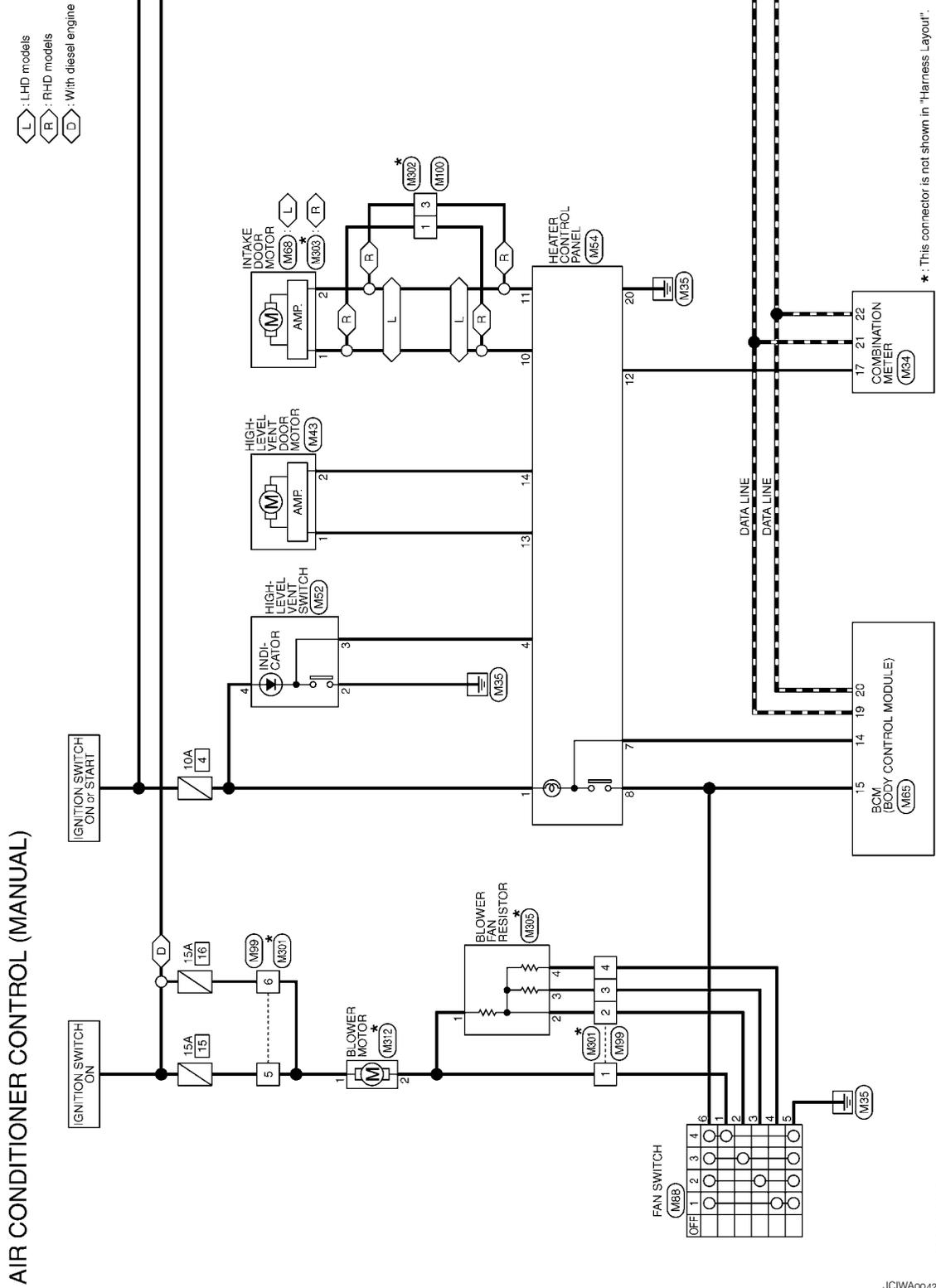
< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## MANUAL AIR CONDITIONER SYSTEM

### Wiring Diagram — AIR CONDITIONER CONTROL SYSTEM —

INFOID:000000001109245



\*: This connector is not shown in "Harness Layout".

AIR CONDITIONER CONTROL (MANUAL)

2006/12/08

JCIWA0042GB

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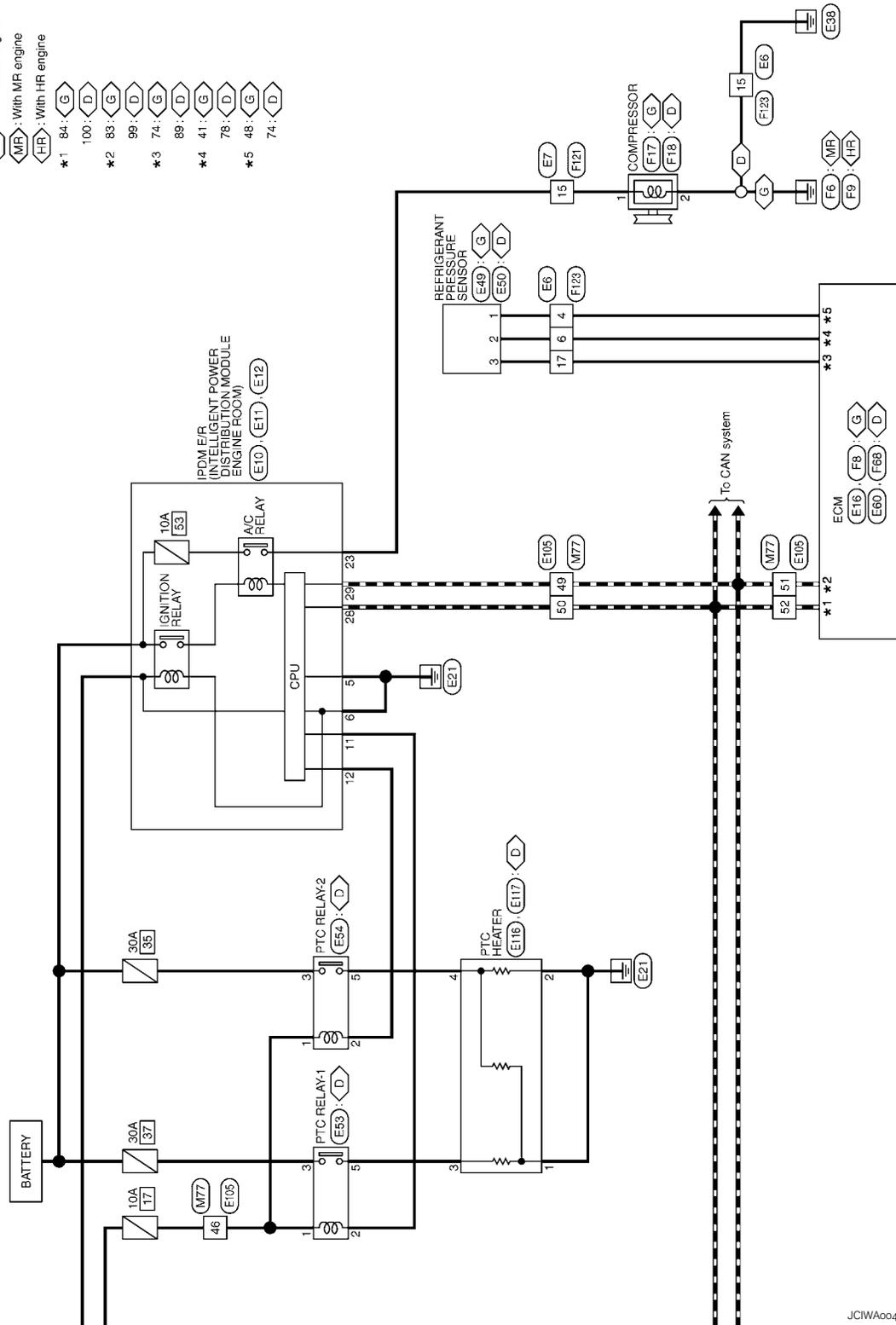
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# MANUAL AIR CONDITIONER SYSTEM

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

- ◇ G : With gasoline engine
- ◇ D : With diesel engine
- ◇ MR : With MR engine
- ◇ HR : With HR engine
- \*1 84 : ◇ G
- 100 : ◇ D
- \*2 83 : ◇ G
- 99 : ◇ D
- \*3 74 : ◇ G
- 89 : ◇ D
- \*4 41 : ◇ G
- 78 : ◇ D
- \*5 48 : ◇ G
- 74 : ◇ D



JCIWA0043GB

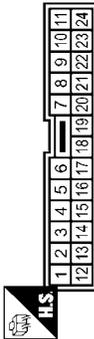
# MANUAL AIR CONDITIONER SYSTEM

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

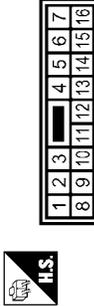
## AIR CONDITIONER CONTROL (MANUAL)

Connector No.	E6
Connector Name	WIRE TO WIRE
Connector Type	TK24MW-1V



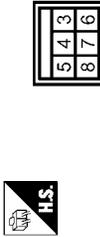
Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-
6	G/P	-
15	B	-
17	Y/W	-

Connector No.	E7
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
15	Y/B	-

Connector No.	E10
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	MA9FB-LC



Terminal No.	Color of Wire	Signal Name [Specification]
5	B	-
6	B	-

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FER-CS



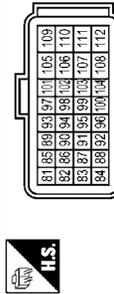
Terminal No.	Color of Wire	Signal Name [Specification]
11	O	-
12	G/Y	-

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS12FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
23	Y/B	-
28	L	-
28	P	-

Connector No.	E16
Connector Name	ECM
Connector Type	MA24FB-MEAB-LH



Terminal No.	Color of Wire	Signal Name [Specification]
83	P	CAN-L
84	L	CAN-H

Connector No.	E19
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	FR03FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	G/P	-
3	Y/W	-

Connector No.	E59
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	DA0397F



Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	-
2	G/P	-
3	Y/W	-

# MANUAL AIR CONDITIONER SYSTEM

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## AIR CONDITIONER CONTROL (MANUAL)

Connector No.	E53
Connector Name	PTC RELAY-1
Connector Type	24347 9F800



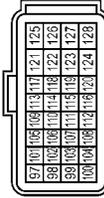
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	G	-
3	G	-
5	Y	-

Connector No.	E54
Connector Name	PTC RELAY-2
Connector Type	24347 9F900



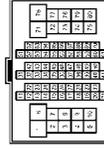
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	G/Y	-
3	R	-
5	L	-

Connector No.	E60
Connector Name	ECM
Connector Type	MAA424FB-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
39	P	MAIN CAN-L (BODY)
100	L	MAIN CAN-H (BODY)

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	THECOMV-NS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
46	Y	-
49	P	-
50	L	-
51	P	-
52	L	-

Connector No.	E116
Connector Name	PTC HEATER
Connector Type	YAZ-7282-3020



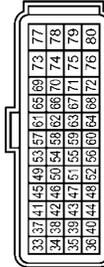
Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	B	-

Connector No.	E117
Connector Name	PTC HEATER
Connector Type	YAZ-7282-3030



Terminal No.	Color of Wire	Signal Name [Specification]
3	Y	-
4	L	-

Connector No.	F8
Connector Name	ECM
Connector Type	MAA40FBR-MEA8-LH



Terminal No.	Color of Wire	Signal Name [Specification]
41	G/P	POPPRES
48	R/L	GND-(A/DPPRES)
74	Y/W	AVCC2(POPPRES)

Connector No.	F17
Connector Name	COMPRESSOR
Connector Type	RF02FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	-
2	B	-

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# MANUAL AIR CONDITIONER SYSTEM

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

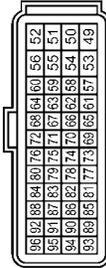
## AIR CONDITIONER CONTROL (MANUAL)

Connector No.	F18
Connector Name	COMPRESSOR
Connector Type	DELPHI12162017



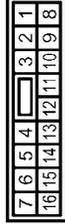
Terminal No.	Color of Wire	Signal Name [Specification]
1	Y/B	-
2	B	-

Connector No.	F68
Connector Name	ECM
Connector Type	MAA40FBR-MEAS-LH



Terminal No.	Color of Wire	Signal Name [Specification]
74	R/L	FREON PRESS GND
76	G/P	FREON PRESS SENS
89	Y/W	FREON PRESSURE +V

Connector No.	F121
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
15	Y/B	-

Connector No.	F123
Connector Name	WIRE TO WIRE
Connector Type	TK24FW-TV



Terminal No.	Color of Wire	Signal Name [Specification]
4	R/L	-
6	G/P	-
15	B	-
17	Y/W	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAG4FW



Terminal No.	Color of Wire	Signal Name [Specification]
17	R/L	AC PD CUT
21	L	CAN-H
22	P	CAN-L

Connector No.	M32
Connector Name	HIGH-LEVEL VENT SWITCH
Connector Type	CINCH-4830SEV4M5



Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-
3	O	-
4	GR	-

Connector No.	M34
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
4	O	SW OUTPUT
7	L	-
8	LG	-
10	W	INTAKE ACTR
11	V	INTAKE ACTR
12	R	ACPD CUT
13	W	COOL HEAD ACTR
14	V	COOL HEAD ACTR
20	B	GND

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# MANUAL AIR CONDITIONER SYSTEM

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

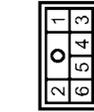
## AIR CONDITIONER CONTROL (MANUAL)

Connector No.	M85
Connector Name	SCM BODY CONTROL MODULE
Connector Type	AA840FE



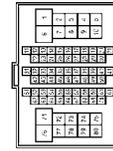
Terminal No.	Color of Wire	Signal Name [Specification]
14	L/R	A/C SW
15	LG/B	BLOWER FAN SW
19	L	CAN-H
20	P	CAN-L

Connector No.	M88
Connector Name	INTAKE DOOR MOTOR
Connector Type	CO8FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	- [With manual A/C]
2	V	- [With manual A/C]

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	T-60FW-NS1E-TM4



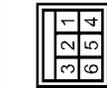
Terminal No.	Color of Wire	Signal Name [Specification]
46	Y	-
49	P	-
50	L	-
51	P	-
52	L	-

Connector No.	M88
Connector Name	FAN SWITCH
Connector Type	SUMITOMO 609F-0214



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	Y	-
4	W	-
5	B	-
6	LG	-

Connector No.	M89
Connector Name	WIRE TO WIRE
Connector Type	M09FW-LC



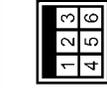
Terminal No.	Color of Wire	Signal Name [Specification]
1	R	- [Without auto A/C]
2	L	- [Without auto A/C]
3	Y	- [Without auto A/C]
4	W	-
5	Y	-
6	Y	-

Connector No.	M80
Connector Name	WIRE TO WIRE
Connector Type	A08FW



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
3	V	-

Connector No.	M801
Connector Name	WIRE TO WIRE
Connector Type	M08MW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	- [Without auto A/C]
2	L	- [Without auto A/C]
3	Y	- [Without auto A/C]
4	W	-
5	Y	-
6	Y	-

Connector No.	M802
Connector Name	WIRE TO WIRE
Connector Type	J03MW



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
3	V	-

JCIWA0047GB

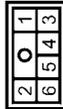
# MANUAL AIR CONDITIONER SYSTEM

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## AIR CONDITIONER CONTROL (MANUAL)

Connector No.	M303
Connector Name	INTAKE DOOR MOTOR
Connector Type	C06FE



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	- [With manual A/C]
2	V	- [With manual A/C]

Connector No.	M305
Connector Name	BLOWER FAN RESISTOR
Connector Type	M04FR-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	Y	-
4	W	-

Connector No.	M312
Connector Name	BLOWER MOTOR
Connector Type	M02FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	R	-

JCIWA0048GB

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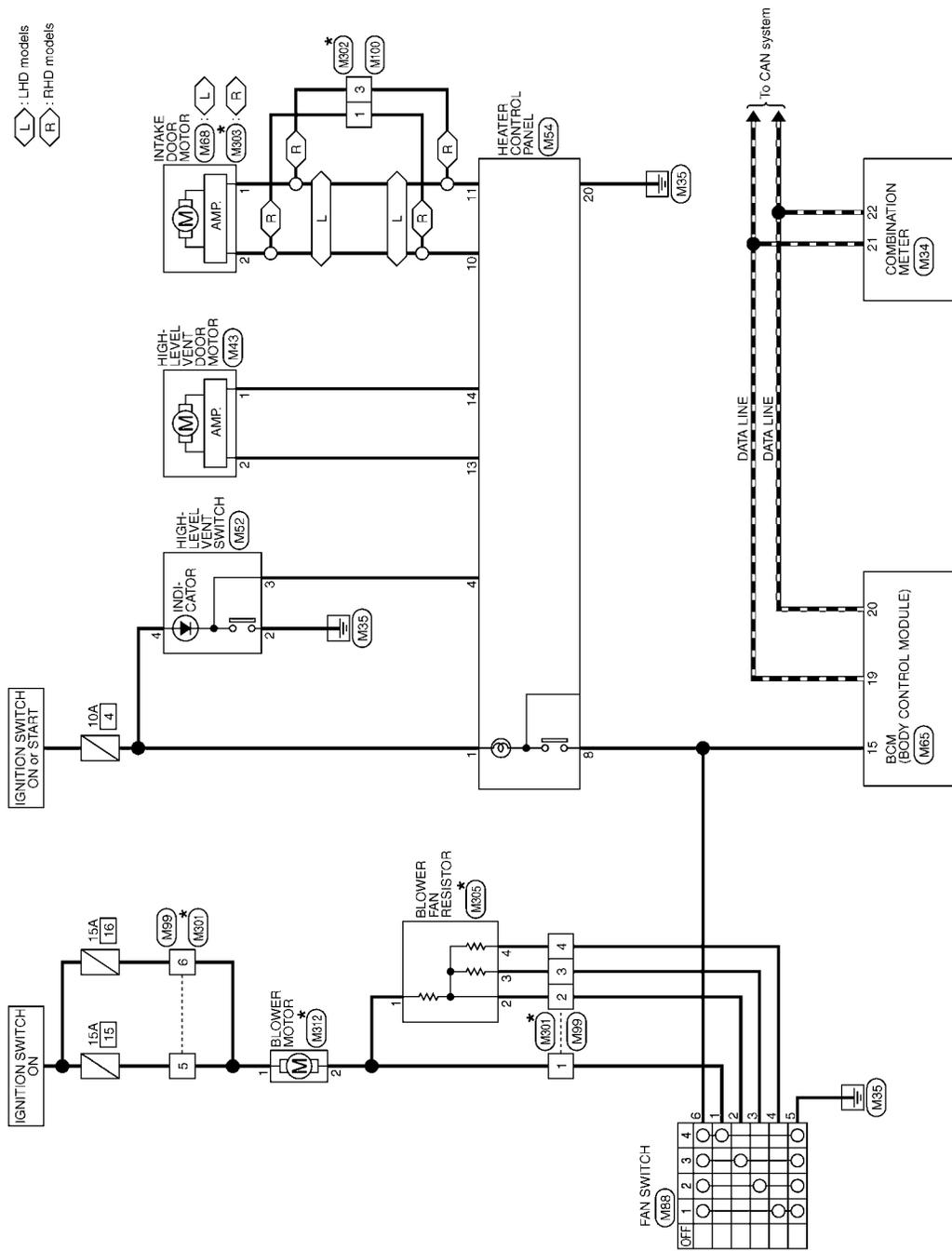
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# MANUAL AIR CONDITIONER SYSTEM

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## HEATER CONTROL



◁ L : LHD models  
 ▷ R : RHD models

\* : This connector is not shown in "Harness Layout".

2006/12/06

JCIWA0049GB

# MANUAL AIR CONDITIONER SYSTEM

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

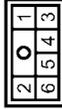
## HEATER CONTROL

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	SAB4QFW



Terminal No.	Color of Wire	Signal Name [Specification]
21	L	CAN-H
22	P	CAN-L

Connector No.	M43
Connector Name	HIGH-LEVEL VENT DOOR MOTOR
Connector Type	CO8FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	- [With manual A/C]
2	V	- [With manual A/C]

Connector No.	M52
Connector Name	HIGH-LEVEL VENT SWITCH
Connector Type	CINCH-48305EV4M5



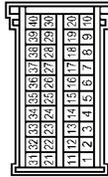
Terminal No.	Color of Wire	Signal Name [Specification]
2	B	-
3	O	-
4	GR	-

Connector No.	M54
Connector Name	HEATER CONTROL PANEL
Connector Type	TK20FCY



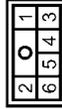
Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
4	O	SW OUTPUT
8	LG	-
10	W	INTAKE ACTR
11	V	INTAKE ACTR
13	W	COOL HEAD ACTR
14	V	COOL HEAD ACTR
20	B	GND

Connector No.	M65
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	MA64QFB



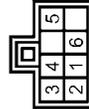
Terminal No.	Color of Wire	Signal Name [Specification]
19	L/G/B	BLOWER FAN SW
20	P	CAN-L

Connector No.	M68
Connector Name	INTAKE DOOR MOTOR
Connector Type	CO8FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	- [With manual A/C]
2	V	- [With manual A/C]

Connector No.	M68
Connector Name	FAN SWITCH
Connector Type	SUMITOMO 6098-0714



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	Y	-
4	W	-
5	B	-
6	LG	-

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Type	HM6FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	- [Without auto A/C]
2	L	- [Without auto A/C]
3	Y	- [Without auto A/C]
4	W	-
5	Y	-
6	Y	-

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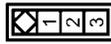
# MANUAL AIR CONDITIONER SYSTEM

< COMPONENT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## HEATER CONTROL

Connector No.	M100
Connector Name	WIRE TO WIRE
Connector Type	A03FW



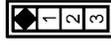
Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
3	V	-

Connector No.	M301
Connector Name	WIRE TO WIRE
Connector Type	M03MW-LC



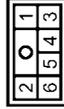
Terminal No.	Color of Wire	Signal Name [Specification]
1	R	- [Without auto A/C]
2	L	- [Without auto A/C]
3	Y	- [Without auto A/C]
4	W	-
5	Y	-
6	Y	-

Connector No.	M302
Connector Name	WIRE TO WIRE
Connector Type	A03MW



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
3	V	-

Connector No.	M303
Connector Name	INTAKE DOOR MOTOR
Connector Type	C03FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	- [With manual A/C]
2	V	- [With manual A/C]

Connector No.	M335
Connector Name	BLOWER FAN RESISTOR
Connector Type	M04FR-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	Y	-
4	W	-

Connector No.	M312
Connector Name	BLOWER MOTOR
Connector Type	M02FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	R	-

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# ECU DIAGNOSIS

## ECM

### HR16DE

#### HR16DE : Reference Value

INFOID:000000001117186

#### VALUES ON THE DIAGNOSIS TOOL

##### Remarks:

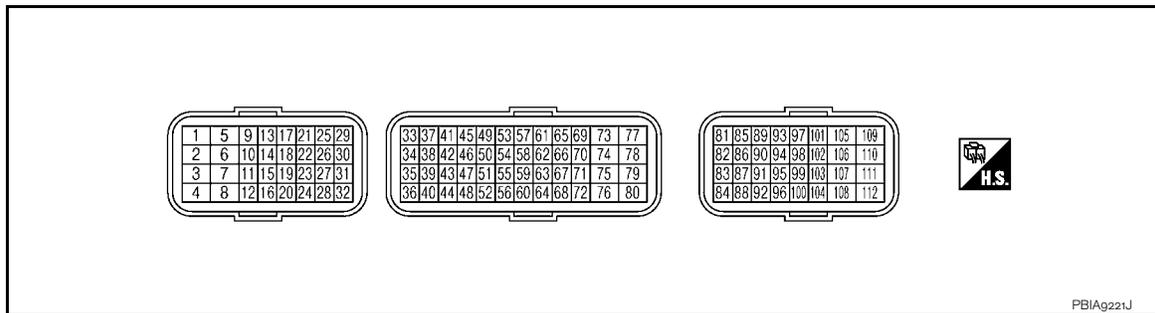
- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

\*Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Values/Status
AC PRESS SEN	<ul style="list-style-type: none"> <li>• Engine: Idle</li> <li>• Both A/C switch and blower fan switch: ON (Compressor operates)</li> </ul>	1.0 - 4.0 V

#### TERMINAL LAYOUT



#### PHYSICAL VALUES

##### NOTE:

- ECM is located in the engine room left side near battery.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

##### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.**

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	---		Signal name	Input/Output		
41	Ground	G/P	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0 V
48	Ground	R/L	Sensor ground (Refrigerant pressure sensor)	---	[Engine is running] • Warm-up condition • Idle speed	0 V
74	Ground	Y/W	Sensor power supply (Refrigerant pressure sensor)	---	[Ignition switch: ON]	5 V

#### MR20DE

MR20DE : Reference Value

INFOID:000000001117187

VALUES ON THE DIAGNOSIS TOOL

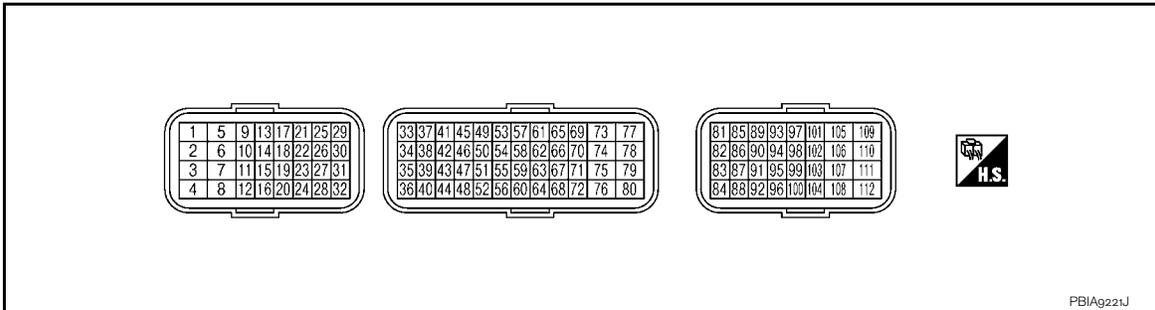
Remarks:

- ! Specification data are reference values.
- ! Specification data are output/input values which are detected or supplied by the ECM at the connector.
- \* Specification data may not be directly related to their components signals/values/operations.

I.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. this IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

Monitor Item	Condition	Values/Status
AC PRESS SEN	<ul style="list-style-type: none"> <li>• Engine: Idle</li> <li>• Both A/C switch and blower fan switch: ON (Compressor operates)</li> </ul>	1.0 - 4.0 V

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE:

- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

**CAUTION:**

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.**

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	--		Signal name	Input/Output		
41	Ground	G	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan motor switch: ON (Compressor operates)	1.0 - 4.0 V
48	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	—	[Engine is running] • Warm-up condition • Idle speed	0 V
74	Ground	L	Sensor power supply (Refrigerant pressure sensor)	Input	[Ignition switch: ON]	5 V

K9K

K9K : Reference Value

INFOID:000000001117188

VALUE ON THE DIAGNOSIS TOOL

Remarks:

- ! Specification data are reference values.
- ! Specification data are output/input values which are detected or supplied by the ECM at the connector.

# ECM

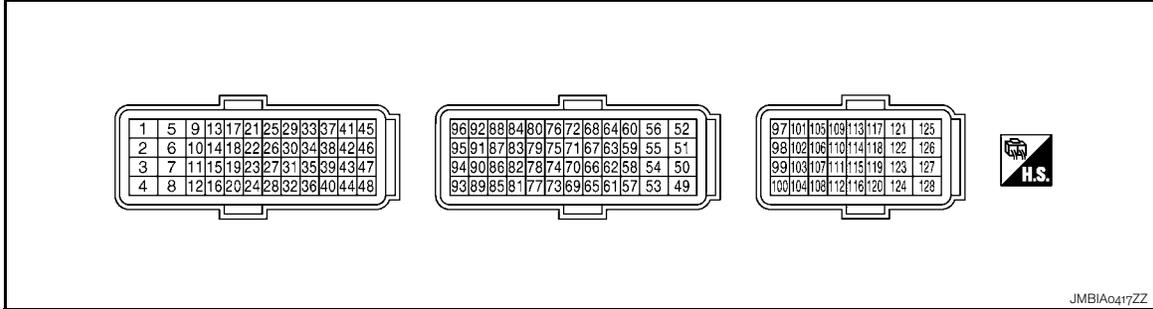
## < ECU DIAGNOSIS >

## [MANUAL AIR CONDITIONER]

\* Specification data may not be directly related to their components signals/values/operations.

MONITOR ITEM	CONDITION		SPECIFICATION
RFRGERNT PRSS	<ul style="list-style-type: none"> <li>• Engine: After warming up</li> <li>• Air conditioner switch: OFF</li> <li>• Shift lever: Neutral position</li> <li>• No load</li> </ul>	Idle	Approximately 5.7 bar

### TERMINAL LAYOUT



### PHYSICAL VALUES

#### NOTE:

- ECM is located behind the passenger side instrument lower panel. For this inspection, remove passenger side instrument lower panel.
- Specification data are reference values and are measured between each terminal and ground.
- Pulse signal is measured by CONSULT-III.

#### CAUTION:

**Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECMs transistor. Use a ground other than ECM terminals, such as the ground.**

Terminal No.		Wire color	Description		Condition	Value (Approx.)
+	---		Signal name	Input/Output		
74	Ground	R/L	Sensor power supply (Refrigerant pressure sensor)	—	[Ignition switch: ON]	Approximately 5.0 V
78	Ground	R/B	Sensor ground (Refrigerant pressure sensor)	G/P	[Engine is running] • Warm-up condition • Idle speed	Approximately 0.3 V
89	Ground	Y/W	Refrigerant pressure sensor	Input	[Engine is running] • Warm-up condition • Both A/C switch and blower fan switch: ON (Compressor operates)	Approximately 2.3 V

# BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## BCM (BODY CONTROL MODULE)

Reference Value

INFOID:000000001117189

VALUES ON THE DIAGNOSIS TOOL

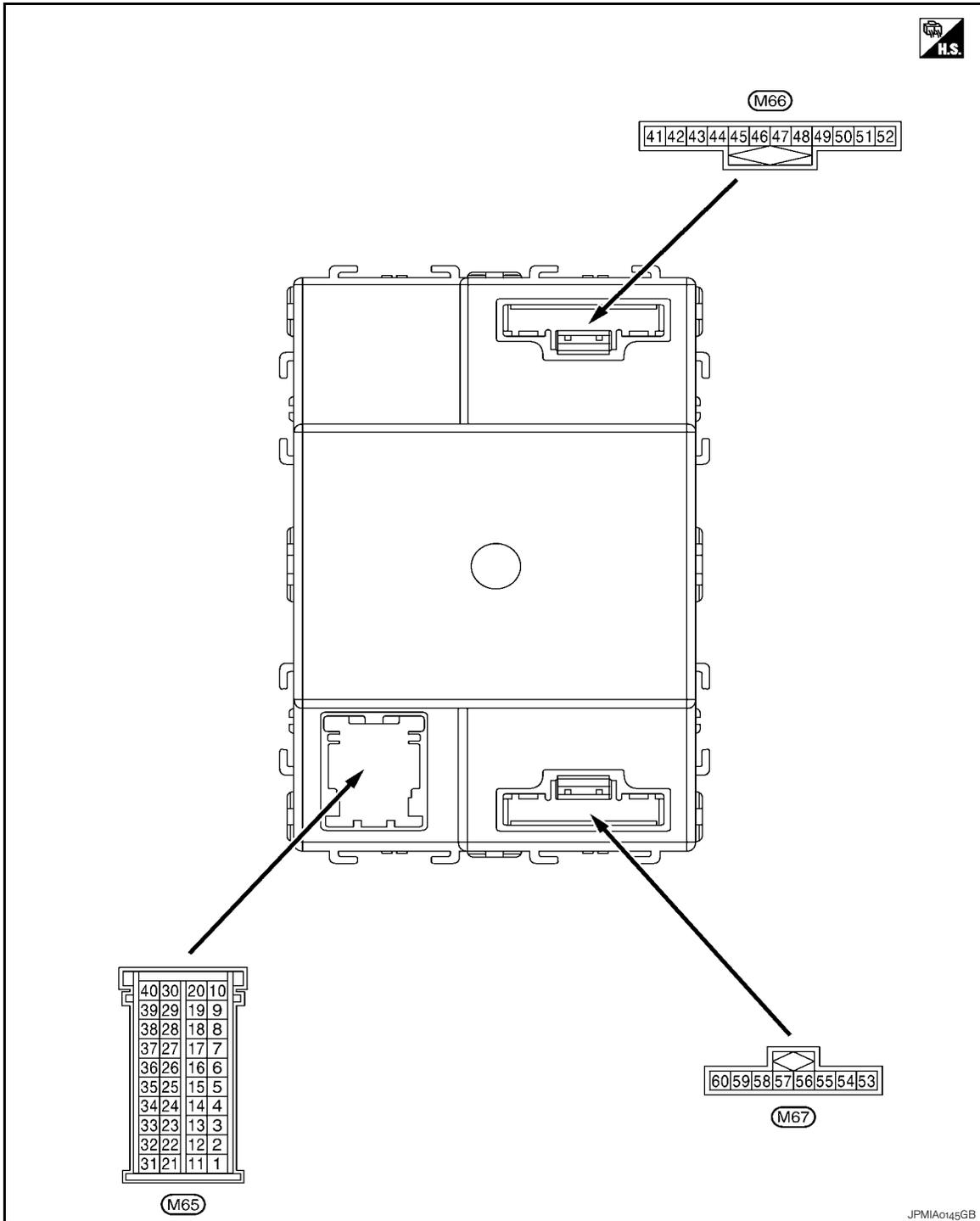
Monitor Item	Condition	Value/Status
AIR COND SW	A/C switch OFF	Off
	A/C switch ON	On
FAN ON SIG	Fan switch OFF	Off
	Fan switch ON	On
IGN ON SW	Ignition switch OFF or ACC	Off
	Ignition switch ON	On

# BCM (BODY CONTROL MODULE)

[MANUAL AIR CONDITIONER]

< ECU DIAGNOSIS >

## TERMINAL LAYOUT



### PHYSICAL VALUES

#### CAUTION:

- Check combination switch system terminal waveform under the loaded condition with lighting switch, turn signal switch and wiper switch OFF is not to be fluctuated by being overloaded.
- Turn wiper intermittent dial position to 4 except when checking waveform or voltage of wiper intermittent dial position. Wiper intermittent dial position can be confirmed on CONSULT -III. Refer to [BCS-26, "COMB SW : CONSULT-III Function \(BCM - COMB SW\)"](#).
- BCM reads the status of the combination switch at 10ms internal normally. Refer to [BCS-7, "System Description"](#).

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# BCM (BODY CONTROL MODULE)

< ECU DIAGNOSIS >

[MANUAL AIR CONDITIONER]

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	-	Signal name	Input/ Output			
14 (L/R)	Ground	A/C switch	Output	A/C switch	Not pressed	Battery voltage
					Pressed	0 V
15 (LG/B)	Ground	Fan switch	Output	Fan switch	OFF	Battery voltage
					EXCEPT OFF	0 V

# AIR CONDITIONER CONTROL

< SYMPTOM DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## SYMPTOM DIAGNOSIS

### AIR CONDITIONER CONTROL

#### Diagnosis Chart By Symptom

INFOID:000000001070002

Symptom	Reference	
Air outlet does not change.	Go to Adjustment for Mode Door.	<a href="#">VTL-65, "Exploded View"</a>
Discharge air temperature does not change.	Go to Adjustment for Air Mix Door.	<a href="#">VTL-67, "Exploded View"</a>
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<a href="#">HAC-150, "Diagnosis Procedure"</a>
Intake door motor does not operate normally.		
High-level ventilator door does not change.	Go to Trouble Diagnosis Procedure for High-level Ventilator Door Motor.	<a href="#">HAC-147, "Diagnosis Procedure"</a>
High-level ventilator door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	<a href="#">HAC-153, "Diagnosis Procedure"</a>
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	<a href="#">HAC-157, "Diagnosis Procedure"</a>
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	<a href="#">HAC-188, "Inspection procedure"</a>
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	<a href="#">HAC-189, "Inspection procedure"</a>
Noise	Go to Trouble Diagnosis Procedure for Noise.	<a href="#">HAC-191, "Inspection procedure"</a>

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**INSUFFICIENT COOLING****Description**

INFOID:000000001070003

## Symptom

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

**Inspection procedure**

INFOID:000000001070004

**1. CHECK WITH A GAUGE OF ACR4**

Connect ACR4 to the vehicle and perform the pressure inspection with the gauge.

Is there refrigerant?

- YES >> GO TO 2.
- NO-1 >> Check for refrigerant leakages with the refrigerant leakage detecting fluorescent leak detector. Refer to [HA-134, "Inspection"](#) (HR16DE/MR20DE) or [HA-185, "Inspection"](#) (K9K).
- NO-2 >> GO TO 2 after repairing or replacing the parts according to the inspection results.

**2. CHECK CHARGED REFRIGERANT AMOUNT**

1. Connect ACR4 to the vehicle and discharge the refrigerant.
2. Recharge with the proper amount of refrigerant and perform the inspection with the refrigerant leakage detecting fluorescent leak detector. Refer to [HA-134, "Inspection"](#) (HR16DE/MR20DE) or [HA-185, "Inspection"](#) (K9K).

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Refill the refrigerant and repair or replace the parts according to the inspection results.

**3. CHECK REFRIGERANT CYCLE PRESSURE**

Connect ACR4 to the vehicle and perform the performance test. Refer to [HA-114, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (HR16DE/MR18DE) or [HA-165, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (K9K).

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Perform the diagnosis with the gauge pressure. Refer to [HA-114, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (HR16DE/MR20DE) or [HA-165, "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (K9K).

**4. CHECK A/C COMPRESSOR BELT**

Check the A/C compressor belt. Refer to [EM-15, "Checking"](#) (HR16DE), [EM-134, "Checking"](#) (MR20DE) or [EM-259, "Inspection and Adjustment"](#) (K9K).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Adjust or replace the A/C compressor belt.

**5. CHECK AIR MIX DOOR CABLE**

Check the air mix door cable. Refer to [HAC-126, "Description & Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Adjust or replace the air mix door cable.

**6. CHECK AIR LEAKAGE FROM DUCT**

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

- YES >> END.
- NO >> Repair or replace parts according to the inspection results.

**INSUFFICIENT HEATING****Description**

INFOID:000000001070005

## Symptom

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

**Inspection procedure**

INFOID:000000001070006

**1.CHECK COOLING SYSTEM**

1. Check engine coolant level and check for leakage. Refer to [CO-9, "Inspection"](#) (HR16DE), [CO-30, "Inspection"](#) (MR20DE) or [CO-52, "Inspection"](#) (K9K).
2. Check radiator cap. Refer to [CO-12, "RESERVOIR TANK CAP : Inspection"](#) (HR16DE), [CO-33, "RESERVOIR TANK CAP : Inspection"](#) (MR20DE) or [CO-55, "RADIATOR CAP : Inspection"](#) (K9K).
3. Check water flow sounds of engine coolant. Refer to [CO-9, "Refilling"](#) (HR16DE), [CO-30, "Refilling"](#) (MR20DE) or [CO-52, "Refilling"](#) (K9K).

Is the inspection result normal?

- YES >> • WITH DIESEL ENGINE: GO TO 2.  
 • WITH GASOLINE ENGINE: GO TO 3.

NO >> Refill the engine coolant and repair or replace the parts according to the inspection results.

**2.CHECK PTC HEATER OPERATION**

Check PTC heater. Refer to [HAC-162, "Component Function Check"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace malfunctioning part(s).

**3.CHECK OPERATION**

1. Turn temperature control dial to full hot after warming up the engine.
2. Check that warm air blows from outlets.

Is the inspection result normal?

YES >> END.

NO >> GO TO 4.

**4.CHECK AIR MIX DOOR CABLE**

Check the air mix door cable. Refer to [HAC-126, "Description & Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Adjust or replace the air mix door cable.

**5.CHECK AIR LEAKAGE FROM DUCT**

Check duct and nozzle, etc. of A/C system for air leakage.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace parts according to the inspection results.

**6.CHECK HEATER HOSE INSTALLATION CONDITION**

Check the heater hose installation condition visually (for twist, crush, etc.).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace parts according to the inspection results.

**7.CHECK TEMPERATURE OF HEATER HOSE**

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

## INSUFFICIENT HEATING

< SYMPTOM DIAGNOSIS >

[MANUAL AIR CONDITIONER]

---

**CAUTION:**

The temperature inspection should be performed in a short time because the engine coolant temperature is too hot.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace the heater core after performing the procedures after the cooling system inspection again. GO TO 1.

### 8.REPLACE HEATER CORE

---

Replace the heater core. Refer to [VTL-87, "Exploded View"](#).

Are the symptoms solved?

YES >> END.

NO >> Perform the procedures after the cooling system inspection again. GO TO 1.

&lt; SYMPTOM DIAGNOSIS &gt;

**NOISE****Description**

INFOID:000000001070007

## Symptom

- Noise
- Noise is heard when the A/C system operates.

**Inspection procedure**

INFOID:000000001070008

**1.CHECK OPERATION**

1. Operate the A/C system and check the operation. Refer to [HAC-126. "Description & Inspection"](#).
2. Check the parts where noise is occurring.

Can the parts where noise is occurring be checked?

- YES-1 >> Noise from blower fan motor: GO TO 2.  
 YES-2 >> Noise from compressor: GO TO 3.  
 YES-3 >> Noise from expansion valve: GO TO 4.  
 YES-4 >> Noise from A/C piping (pipe, flexible hose): GO TO 6.  
 YES-5 >> Noise from A/C compressor belt: GO TO 7.  
 NO >> END

**2.CHECK BLOWER FAN MOTOR**

1. Remove blower fan motor.
2. Remove air conditioner filter.
3. Remove foreign materials that are in the blower unit.
4. Check the noise from blower fan motor again.

Is the inspection result normal?

- YES >> END.  
 NO >> Replace blower fan motor.

**3.REPLACE COMPRESSOR**

1. Correct the refrigerant with ACR4.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from compressor again.

Is the inspection result normal?

- YES >> END.  
 NO >> Replace compressor.

**4.CHECK WITH GAUGE PRESSURE**

Perform the diagnosis with the gauge pressure. Refer to [HA-114. "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (HR16DE/MR20DE) or [HA-165. "SYMPTOM DIAGNOSIS PROCEDURE : Trouble Diagnosis For Unusual Pressure"](#) (K9K).

Is the inspection result normal?

- YES >> GO TO 5.  
 NO >> Repair or replace malfunctioning part(s).

**5.REPLACE EXPANSION VALVE**

1. Correct the refrigerant with ACR4.
2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
3. Check for the noise from expansion valve again.

Are the symptoms solved?

- YES >> END.  
 NO >> Replace expansion valve.

**6.CHECK A/C PIPING (PIPE, FLEXIBLE HOSE)**

1. Check A/C piping [pipe, flexible hose (for deformation and damage, etc.)].
2. Check the installation condition of clips and brackets, etc. of A/C piping (pipe, flexible hose).

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## NOISE

[MANUAL AIR CONDITIONER]

< SYMPTOM DIAGNOSIS >

Is the inspection result normal?

YES >> Fix the line with rubber or come vibration absorbing material.

NO >> Repair or replace parts according to the inspection results.

### **7.**CHECK A/C COMPRESSOR BELT

Check tension of the A/C compressor belt. Refer to [EM-15. "Checking"](#) (HR16DE), [EM-134. "Checking"](#) (MR20DE) or [EM-259. "Inspection and Adjustment"](#) (K9K).

Is the inspection result normal?

YES >> Check the noise from compressor: GO TO 3.

NO >> Adjust or replace the A/C compressor belt according to the inspection results.

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000001109270

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRC 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 SRC 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.

#### Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000001109269

**NOTE:**

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

#### OPERATION PROCEDURE

1. Connect both battery cables.

**NOTE:**

Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-III.

#### Precaution for Procedure without Cowl Top Cover

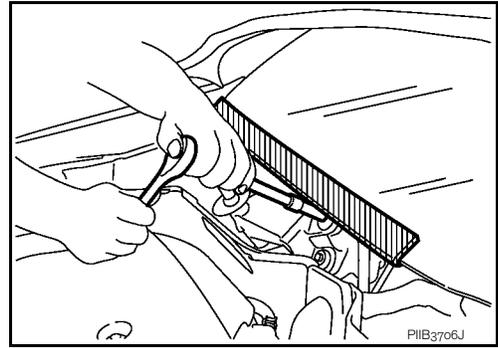
INFOID:000000001109275

# PRECAUTIONS

## < PRECAUTION >

## [MANUAL AIR CONDITIONER]

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



## Working with HFC-134a (R-134a)

INFOID:000000001117172

### 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. If the refrigerants are mixed and compressor malfunction is likely occur.
- Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
  - When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
  - When installing refrigerant components to a vehicle, never remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
  - Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
  - Never allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrene foam parts. Damage may result.

## General Refrigerant Precaution

INFOID:000000001117174

### WARNING:

- Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge HFC-134a (R-134a) refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
- Never release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.
- Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.
- Never store or heat refrigerant containers above 52°C (126°F).
- Never heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.
- Never intentionally drop, puncture, or incinerate refrigerant containers.
- Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.
- Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.
- Never pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (R-134a) have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.

## Refrigerant Connection

INFOID:000000001117175

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

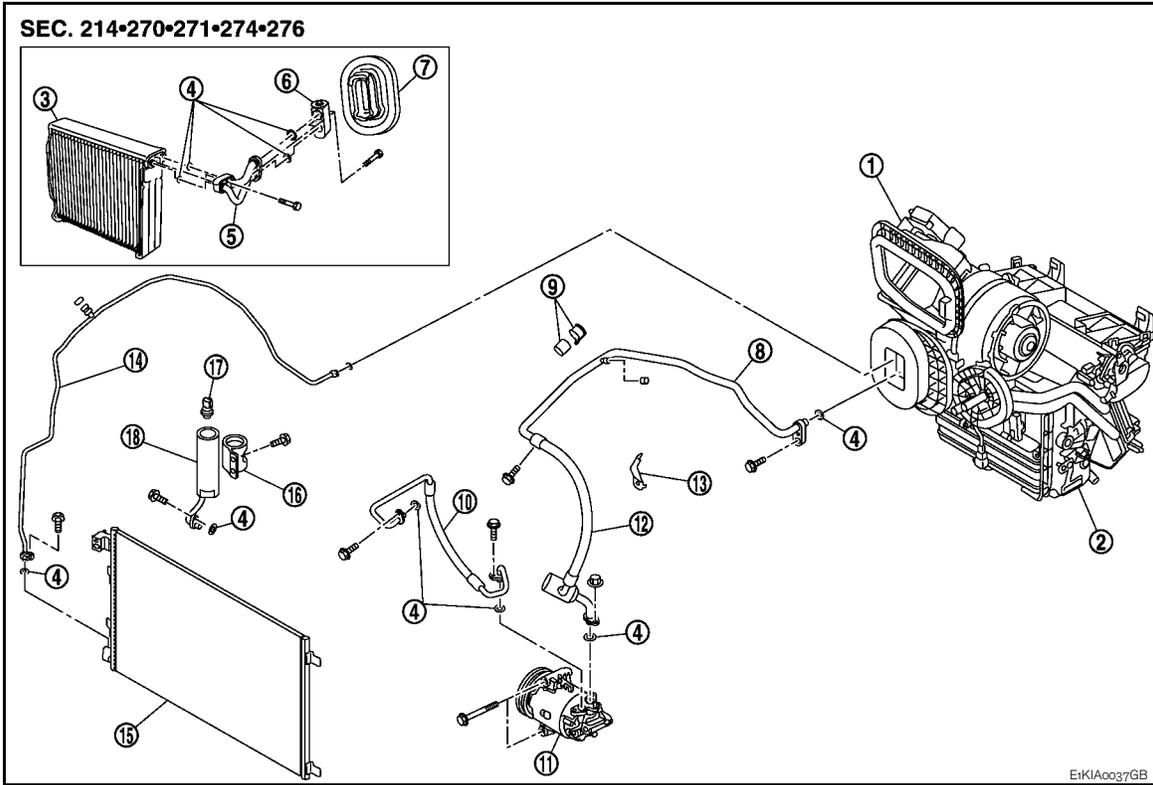
- Expansion valve to evaporator
- Refrigerant pressure sensor to liquid tank

# PRECAUTIONS

< PRECAUTION >

[MANUAL AIR CONDITIONER]

## O-RING AND REFRIGERANT CONNECTION



- |                                 |  |   |
|---------------------------------|--|---|
| 1. Heater sealing               | 2. Expansion valve                                       | 3. O-ring                                 |
| 4. Evaporator                   | 5. Low pressure pipe 1 and high pressure pipe 2 assembly | 6. Connector pipe fixing bolt             |
| 7. High pressure pipe 1         | 8. Condenser assembly                                    | 9. Fixing bolt                            |
| 10. Compressor                  | 11. Heater & cooling unit assembly                       | 12. Heater & blower unit assembly         |
| 13. Refrigerant pressure sensor | 14. Liquid tank  | 15. Pipe fixing bolt                      |
| 16. Low pressure flexible hose  | 17. Low & high pipe bracket support                      | 18. Low pressure flexible hose and pipe 2 |
| 19. Pipes fixing clip           | 20. Low pressure pipe 2 fixing clamp assembly            | 21. Liquid tank fixing screw              |
| 22. Liquid tank fixing bracket  | 23. High pressure flexible hose                          |   |

### CAUTION:

The new and former refrigerant connections use different O-ring configurations. Never confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant may leak at the connection.

O-Ring Part Numbers and Specifications

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# PRECAUTIONS

< PRECAUTION >

[MANUAL AIR CONDITIONER]

Connection type	Piping connection point		Part number	QTY	O-ring size
New	Low pressure pipe 2 to expansion valve		92473 N8210	1	16
	High pressure flexible pipe 1 to condenser		92472 N8210	1	12
	High pressure pipe 1 to expansion valve		92471 N8210	1	8
	Low pressure pipe 1 and high pressure	Inlet	92475 71L00	1	12
	pipe 2 assembly to expansion valve	Outlet	92475 72L00	1	16
	Low pressure pipe 1 and high pressure	Inlet	92475 71L00	1	12
	pipe 2 assembly to evaporator	Outlet	92475 72L00	1	16
	High pressure pipe 1 to liquid tank		92471 N8210	1	8
	Compressor to low pressure flexible hose		92474 N8210	2	19
	Compressor to high pressure flexible hose		92474 N8210	2	12
	Liquid tank to condenser		92473 N8210	1	16

**WARNING:**

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

**CAUTION:**

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

- When the compressor is removed, store it in the same way as it is when mounted on the car. Failure to do so will cause lubricant to enter the low-pressure chamber.
- When connecting tubes, always use a torque wrench and a back-up wrench.
- After disconnecting tubes, immediately plug all openings to prevent entry of dust and moisture.
- When installing an air conditioner in the vehicle, connect the pipes at the final stage of the operation. Never remove the seal caps of pipes and other components until just before required for connection.
- Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.
- Thoroughly remove moisture from the refrigeration system before charging the refrigerant.
- Always replace used O-rings.
- When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.

**Name** : Nissan A/C System Oil Type S

- O-ring must be closely attached to the groove portion of tube.
- When replacing the O-ring, be careful not to damage O-ring and tube.
- Connect tube until a click can be heard, then tighten the nut or bolt by hand. Make sure that the O-ring is installed to tube correctly.

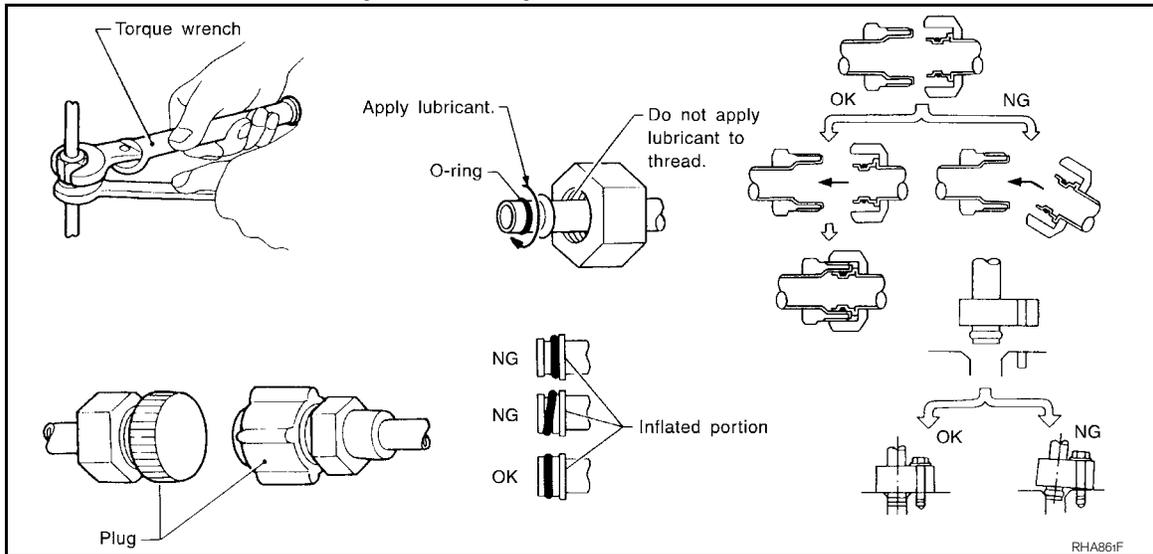
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# PRECAUTIONS

[MANUAL AIR CONDITIONER]

< PRECAUTION >

- After connecting line, perform leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.



## Service Equipment

INFOID:000000001117176

### RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never 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.

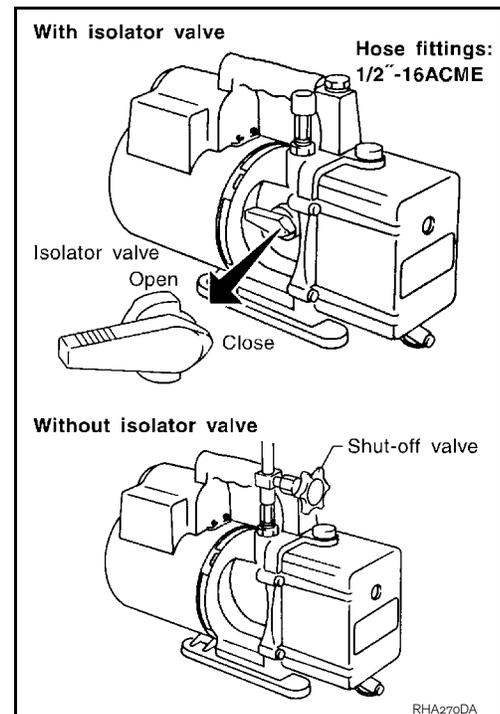
### VACUUM PUMP

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

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

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

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



### MANIFOLD GAUGE SET

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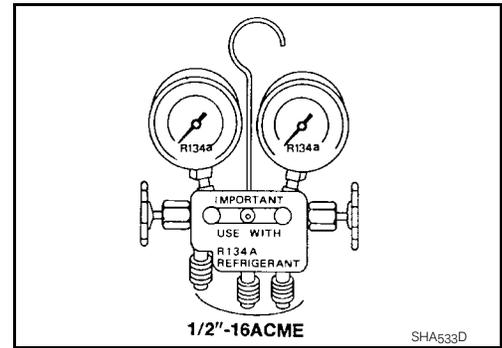
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# PRECAUTIONS

## < PRECAUTION >

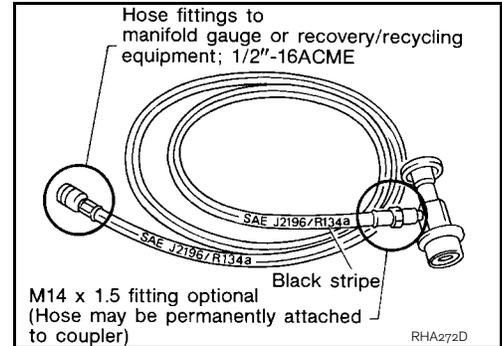
Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2"-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.

## [MANUAL AIR CONDITIONER]



## SERVICE HOSES

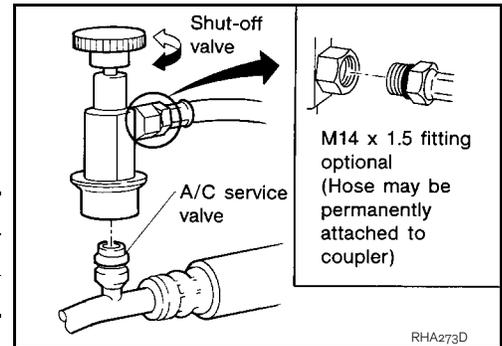
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite to the manifold gauge.



## SERVICE COUPLERS

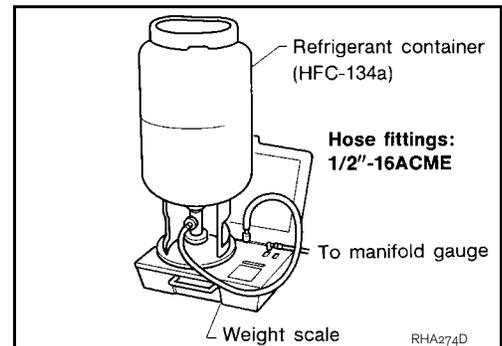
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

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



## REFRIGERANT WEIGHT SCALE

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



## 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.

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## COMPRESSOR

### General Precautions

INFOID:000000001070021

**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 car.
- When replacing or repairing compressor, follow "Maintenance of Lubricant Quantity in Compressor" exactly. Refer to [HA-129, "Adjustment"](#) (HR16DE/MR20DE) or [HA-180, "Adjustment"](#) (K9K).
- Keep friction surfaces between clutch and pulley clean. If the surface is contaminated with lubricant, wipe it off by using a clean waste cloth moistened with thinner.
- After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.
- After replacing the compressor magnet clutch, apply voltage to the new one and check for normal operation.

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# FLUORESCENT LEAK DETECTOR

< PRECAUTION >

[MANUAL AIR CONDITIONER]

## FLUORESCENT LEAK DETECTOR

### General Precautions

INFOID:000000001070022

#### 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 your eyes and enhance the visibility of the fluorescent dye.
- The fluorescent dye leak detector is not a replacement for an electrical leak detector (SST). The fluorescent dye leak detector should be used in conjunction with an electrical leak detector (SST) to pinpoint refrigerant leaks.
- For the purpose of safety and customer's satisfaction, read and follow all manufacturer's operating instructions and precautions prior to performing the work.
- 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 electrical leak detector (SST).
- Always remove any remaining dye from the leak area after repairs are completed to avoid a misdiagnosis during a future service.
- Never allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Never spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Never 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. Never 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 will remain for three years or a little over unless a compressor malfunction occurs.

### IDENTIFICATION

#### NOTE:

Vehicles with factory installed fluorescent dye have a green label.

Vehicles without factory installed fluorescent dye have a blue label.

### IDENTIFICATION LABEL FOR VEHICLE

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

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