

# SECTION **HAC**

## HEATER & AIR CONDITIONING CONTROL SYSTEM

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## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

How to Perform Trouble Diagnosis For Quick And Accurate Repair

INFOID:0000000011070943

#### WORK 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. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

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

Verify the symptom with operational check. Refer to [HAC-4, "Operational Check"](#).

Can a symptom be duplicated?

YES >> Go to trouble diagnosis. Refer to [HAC-52, "Symptom Matrix Chart"](#).

NO >> GO TO 4.

#### 4. PERFORM THE FRONT AIR CONTROL SELF-DIAGNOSIS

Perform front air control self-diagnosis. Refer to [HAC-16, "Front Air Control Self-Diagnosis"](#).

>> If any diagnostic trouble codes set. Refer to [HAC-16, "Front Air Control Self-Diagnosis Chart"](#).

>> Confirm the repair by performing operational check. Refer to [HAC-4, "Operational Check"](#).

## INSPECTION AND ADJUSTMENT

## Operational Check

INFOID:000000011070944

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

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

## CHECKING BLOWER

1. Turn blower control all the way counter-clockwise, and then turn the dial one detent clockwise. Blower should operate on low speed.
2. Turn the blower control dial clockwise again, and continue checking each blower speed until all speeds are checked.
3. Leave blower on HI speed.

If NG, go to trouble diagnosis procedure for [HAC-28, "Front Blower Motor Diagnosis Procedure"](#).

If OK, continue with next check.

## CHECK A/C SWITCH

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

If NG, go to trouble diagnosis procedure for [HAC-33, "Magnet Clutch Diagnosis Procedure"](#).

If OK, continue with next check.

## CHECKING DISCHARGE AIR

Press each mode switch and confirm that discharge air comes out according to the air distribution table. Refer to [HAC-11, "Discharge Air Flow"](#).

If NG, go to trouble diagnosis procedure for [HAC-18, "Mode Door Motor Diagnosis Procedure"](#).

If OK, continue with next check.

**NOTE:**

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

## CHECKING RECIRCULATION

1. Press recirculation (  ) switch one time. Recirculation indicator should illuminate.
2. Press recirculation (  ) switch one more time. Recirculation indicator should go off.
3. Listen for intake door position change (blower sound should change slightly).

If NG, go to trouble diagnosis procedure for [HAC-26, "Intake Door Motor Diagnosis Procedure"](#).

If OK, continue with next check.

**NOTE:**

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

## CHECKING TEMPERATURE DECREASE

1. Rotate temperature control dial counterclockwise.
2. Check for cold air at appropriate discharge air outlets.

If NG, listen for sound of air mix door motor operation. If OK, go to trouble diagnosis procedure for [HAC-53, "Component Function Check"](#). If air mix door motor appears to be malfunctioning, go to [HAC-22, "Air Mix Door Motor Component Function Check"](#).

If OK, continue with next check.

## CHECKING TEMPERATURE INCREASE

1. Rotate temperature control dial clockwise.
2. Check for hot air at appropriate discharge air outlets.

If NG, listen for sound of air mix door motor operation. If OK, go to trouble diagnosis procedure for [HAC-61, "Component Function Check"](#). If air mix door motor (front) appears to be malfunctioning, go to [HAC-22, "Air Mix Door Motor Component Function Check"](#).

If OK, continue with next check.

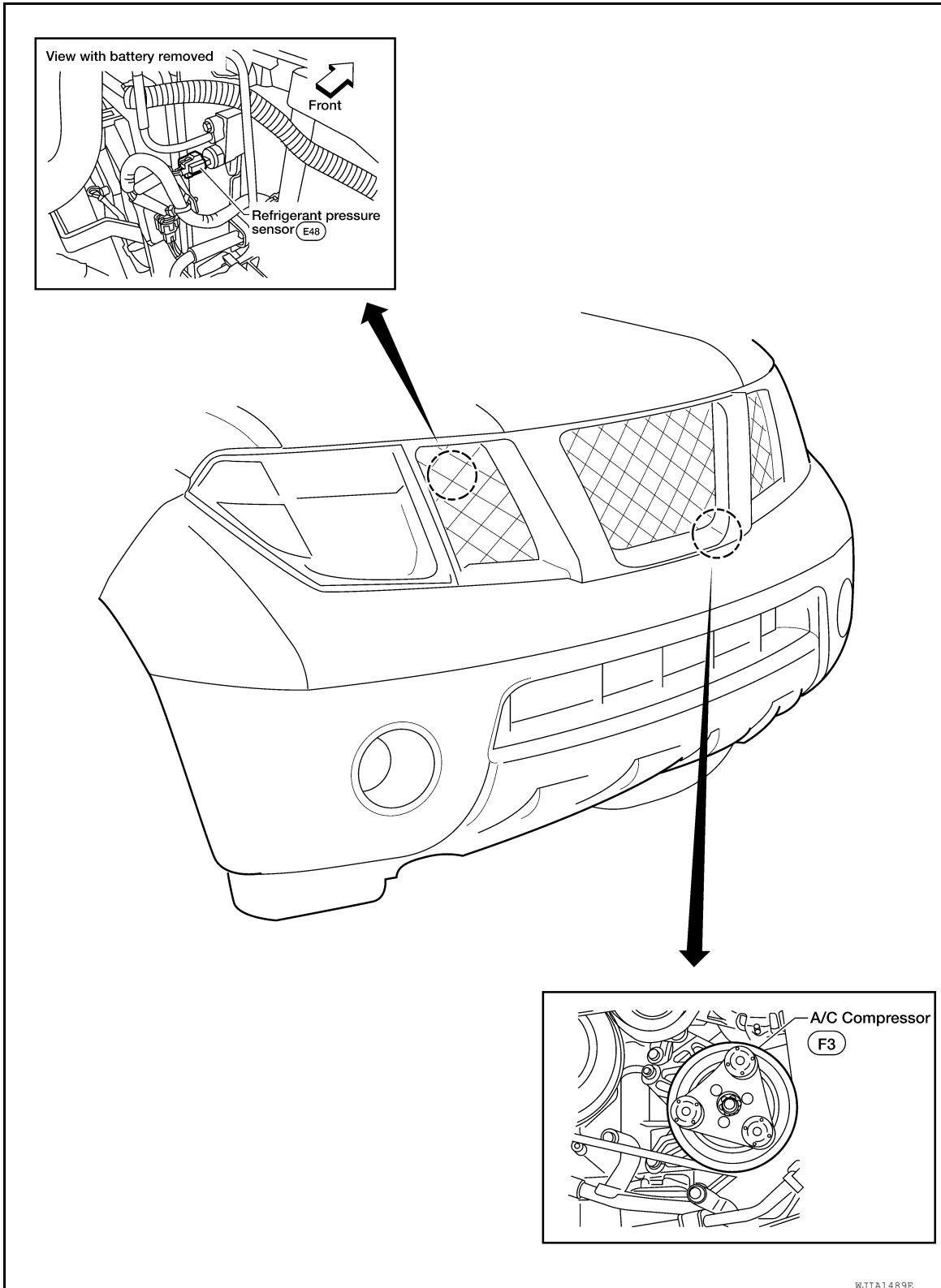
## SYSTEM DESCRIPTION

### FUNCTION INFORMATION

#### Component Part Location

#### ENGINE COMPARTMENT

INFOID:0000000011070945



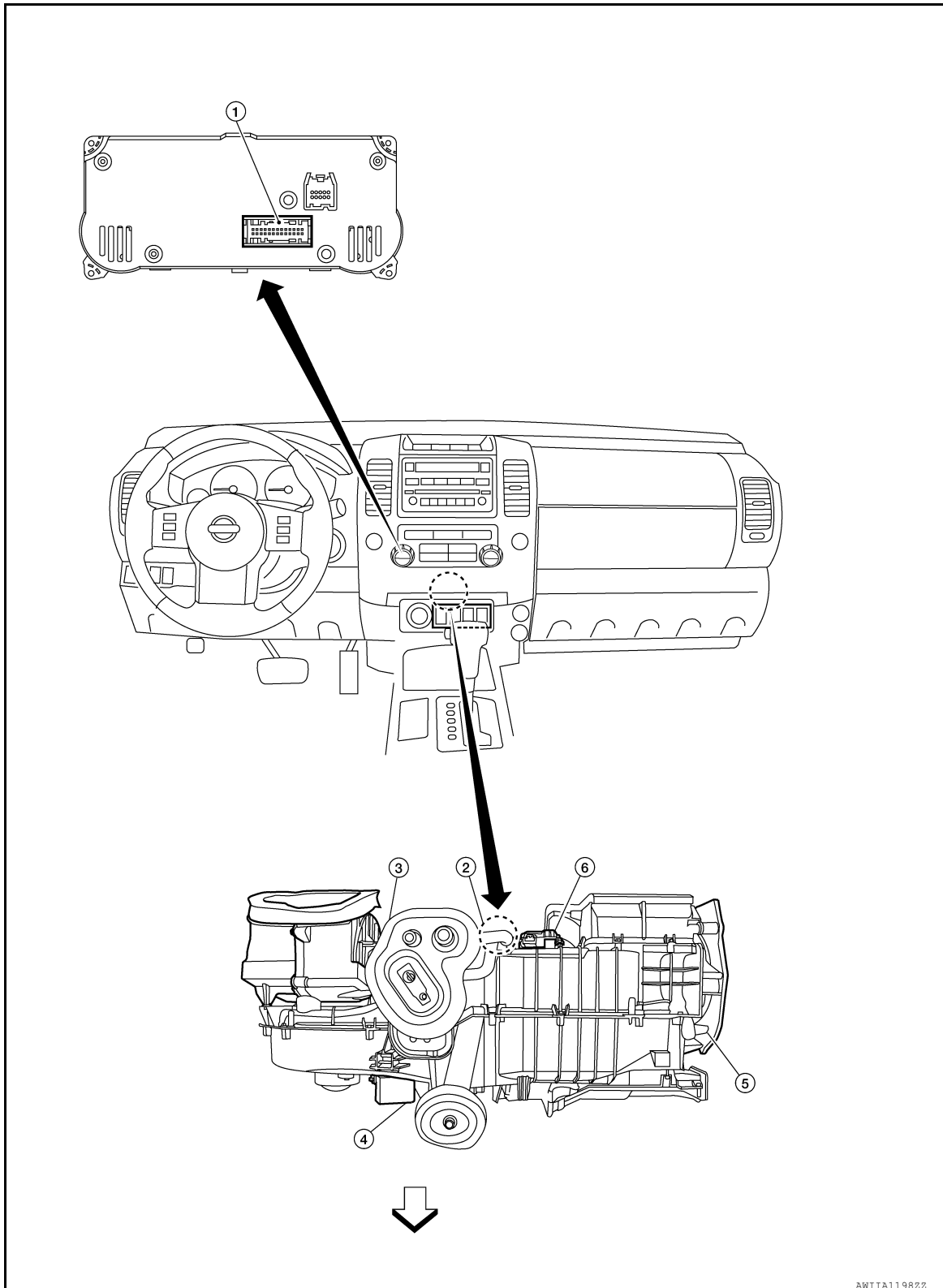
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# FUNCTION INFORMATION

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONER]

## PASSENGER COMPARTMENT



⇒ :Front

1. Front air control M50

2. Intake sensor M146

FUNCTION INFORMATION

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONER]

3.

Intake door motor M58
4.

Variable blower control M121
5.

Mode door motor M142
6.

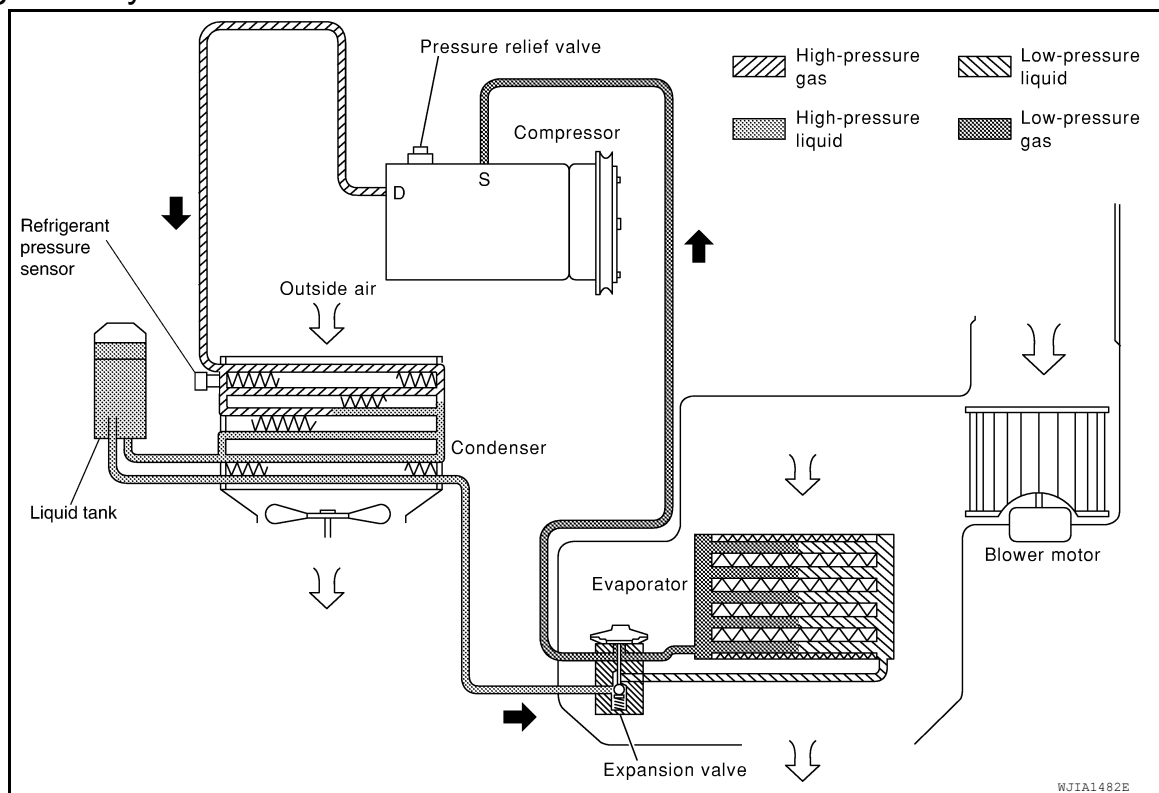
Air mix door motor M147

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

## REFRIGERATION SYSTEM

### Refrigerant Cycle

INFOID:0000000011070946



### REFRIGERANT FLOW

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

### FREEZE PROTECTION

The compressor cycles on and off to maintain the evaporator temperature within a specified range. When the evaporator coil temperature falls below a specified point, the intake sensor interrupts the compressor operation. When the evaporator coil temperature rises above the specification, the intake sensor allows compressor operation.

### Refrigerant System Protection

INFOID:0000000011070947

### REFRIGERANT PRESSURE SENSOR

The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends a voltage signal to the ECM. The ECM de-energizes the A/C relay to disengage the magnetic compressor clutch when pressure on the high pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (28 kg/cm<sup>2</sup>, 398 psi), or below about 120 kPa (1.22 kg/cm<sup>2</sup>, 17.4 psi).

### PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 2,990 kPa (30.5 kg/cm<sup>2</sup>, 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.

# MANUAL AIR CONDITIONER SYSTEM

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONER]

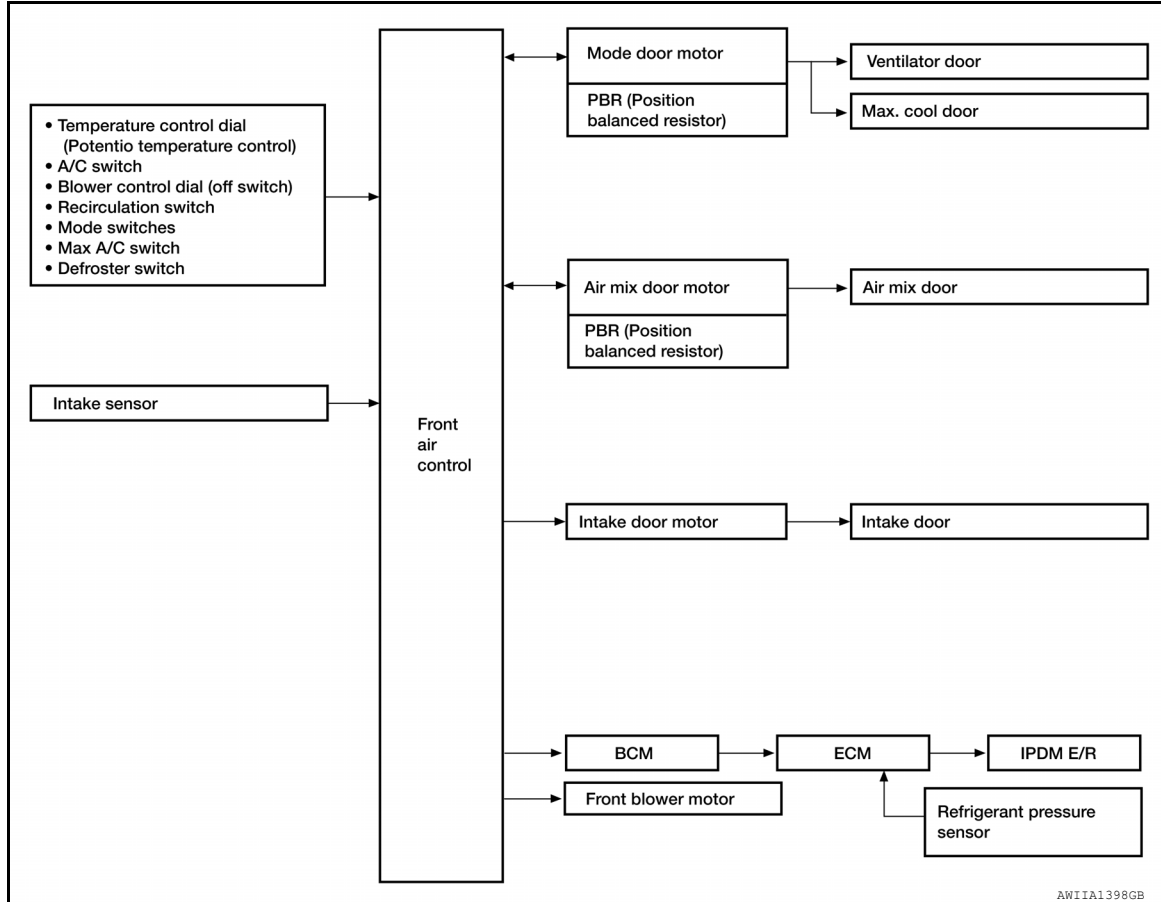
## MANUAL AIR CONDITIONER SYSTEM

### Control System Diagram

INFOID:0000000011070948

#### CONTROL SYSTEM

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

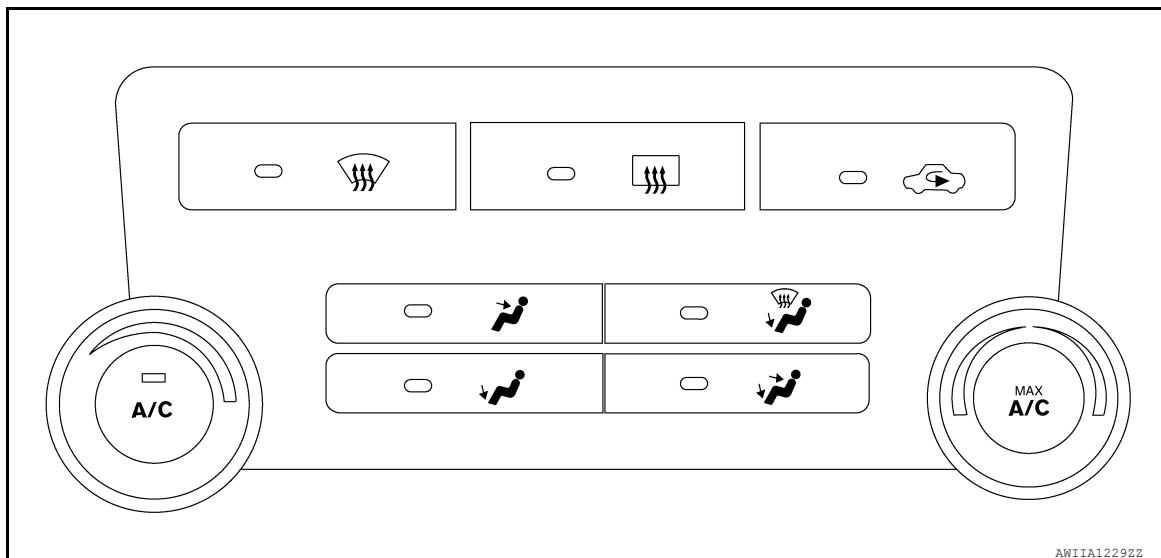


### Control System Description

INFOID:0000000011070949

#### CONTROL OPERATION

##### Front air control



# MANUAL AIR CONDITIONER SYSTEM

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONER]

## TEMPERATURE CONTROL DIAL (TEMPERATURE CONTROL)

Increases or decreases the set temperature.

## RECIRCULATION ( ) SWITCH

- When REC switch is ON, REC switch indicator turns ON, and air inlet is set to REC.
- When REC switch is turned OFF, or when compressor is turned from ON to OFF, REC switch is automatically turned OFF. REC mode can be re-entered by pressing REC switch again.
- REC switch is not operated when DEF switch is turned ON, or at the D/F or FOOT position.

## DEFROSTER ( ) SWITCH

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

## REAR WINDOW DEFOGGER SWITCH

When switch is ON, rear window defogger is activated.

## OFF SWITCH (BLOWER SPEED DIAL)

When the blower speed dial is turned all the way counter-clockwise, the compressor and blower are OFF.

## A/C SWITCH

Sends a signal to the BCM requesting the A/C compressor be turned ON or OFF.  
(Pressing the A/C switch will turn off the A/C switch and compressor.)

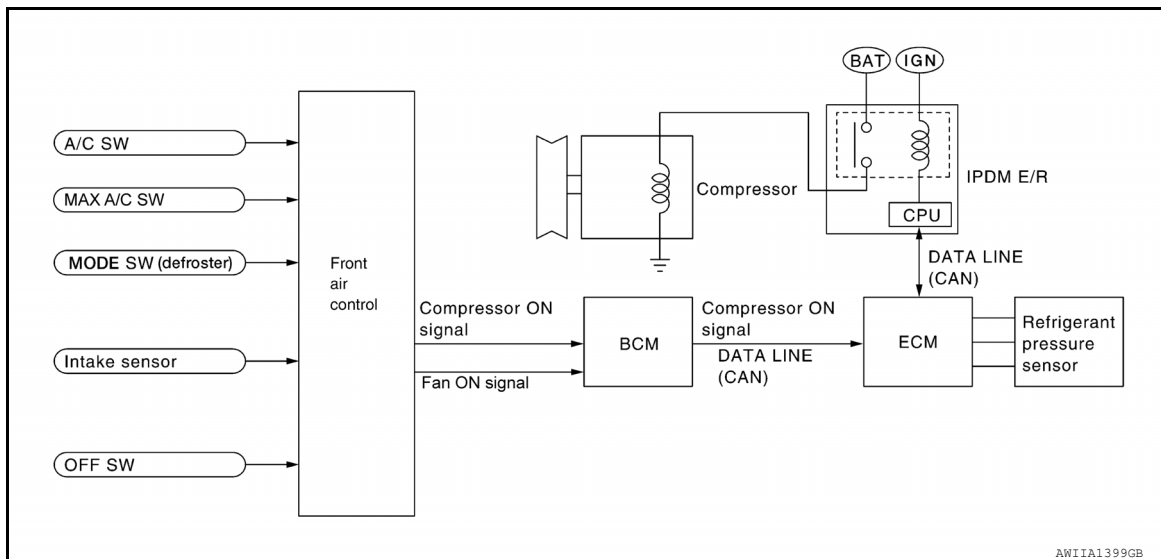
## MODE SWITCHES

Controls the air discharge outlets.

## FRONT BLOWER CONTROL DIAL

Sends a fan ON signal to the BCM and manually controls the blower speed.

## MAGNET CLUTCH CONTROL



In order for the IPDM E/R to complete a compressor ON request, the following conditions must be met:

- The blower speed dial is in one of the fan speed positions. This allows the front air control to send a fan ON signal to the BCM.
- The A/C switch is pressed. The A/C switch LED illuminates and the front air control outputs a compressor ON signal to the BCM. Any mode control button may be selected.
- If the A/C switch is OFF, and the MAX A/C button is pressed, the A/C switch LED will automatically illuminate and the front air control outputs a compressor ON signal to the BCM.
- If the A/C switch is OFF, and the mode buttons for either D/F or DEF are selected, the front air control will send a compressor ON signal to the BCM, but it does not illuminate the A/C switch LED
- The intake temperature value must be within the specified range.

Once the front air control conditions are met and the fan ON and compressor ON signals are detected by the BCM:

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

# MANUAL AIR CONDITIONER SYSTEM

## < SYSTEM DESCRIPTION >

## [MANUAL AIR CONDITIONER]

- The ECM judges whether the compressor can be turned ON, based on each sensor status (refrigerant pressure sensor signal, throttle angle sensor, etc.). If it judges compressor can be turned ON, it sends compressor ON signal to IPDM E/R, via CAN communication line.
- Upon receipt of compressor ON signal from ECM, IPDM E/R turns air conditioner relay ON to operate the compressor.

### Defrost latching logic

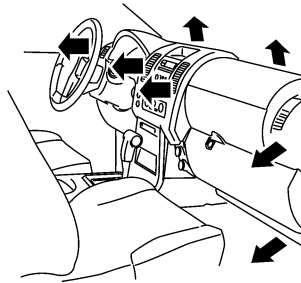
If the compressor was engaged by pressing the D/F or DEF mode buttons, and the time spent in either mode exceeds 1 minute, then the compressor stays requested, even when modes other than D/F or DEF are selected, until either:

1. The ignition switch is turned OFF.
2. The blower speed dial is turned completely counter-clockwise to the OFF position.
3. The A/C switch is manually turned OFF.

In other words, the compressor ON request cannot be turned off in D/F or DEF modes.

### Discharge Air Flow

INFOID:0000000011070950



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| Mode door position                                                                  | Air outlet/distribution |      |           |
|-------------------------------------------------------------------------------------|-------------------------|------|-----------|
|                                                                                     | Vent                    | Foot | Defroster |
|  | 95%                     | 5%   | —         |
|  | 60%                     | 40%  | —         |
|  | 20%                     | 55%  | 25%       |
|  | 15%                     | 50%  | 35%       |
|  | 7%                      | 15%  | 78%       |

Airflow always present at driver and passenger side demisters

# MANUAL AIR CONDITIONER SYSTEM

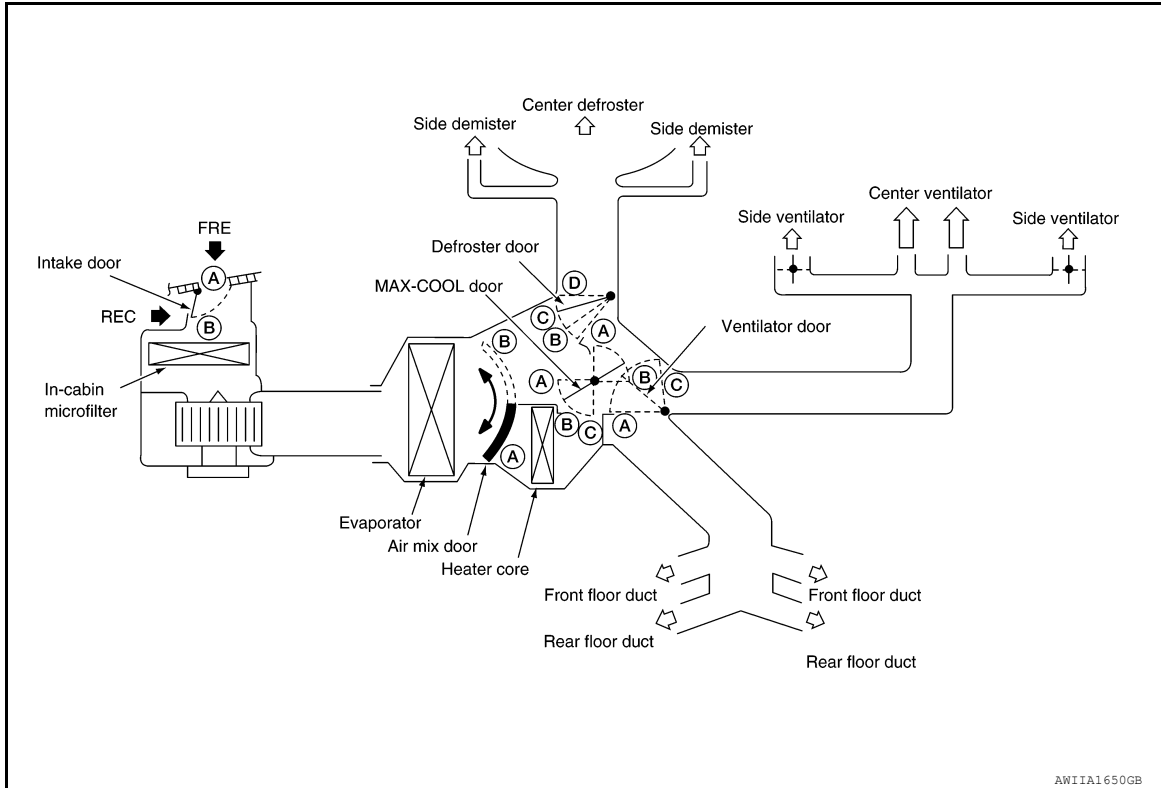
< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONER]

## Switches And Their Control Function

INFOID:0000000011070951

### SWITCHES AND THEIR CONTROL FUNCTION



AWI1A1650GB

| Door<br><div>Position<br/>or<br/>switch</div> | MODE SW |     |          |     | DEF SW |     | REC SW |     | Temperature dial |   |     | OFF SW |
|-----------------------------------------------|---------|-----|----------|-----|--------|-----|--------|-----|------------------|---|-----|--------|
|                                               | VENT    | B/L | FOOT     | D/F | ON     | OFF | ON     | OFF |                  |   |     |        |
|                                               |         |     |          |     |        |     |        |     | COLD             | ~ | HOT |        |
| Ventilator door                               | (A)     | (B) | (C)      | (C) | (C)    | —   | —      |     | —                |   |     | (C)    |
| MAX-COOL door                                 | (A)     | (B) | (B)      | (B) | (C)    |     | —      |     | —                |   |     | (B)    |
| Defroster door                                | (D)     | (D) | (D or C) | (B) | (A)    |     | —      |     | —                |   |     | (C)    |
| Intake door                                   | —       |     |          |     | (B)    |     | (A)    | (B) | —                |   |     | (B)    |
| Air mix door                                  | —       |     |          |     | —      |     | —      |     | (A)              |   | (B) | —      |

AWI1A1393GB

AWI1A1393GB

## DIAGNOSIS SYSTEM (HVAC)

## CONSULT Function (HVAC)

INFOID:0000000011070952

CONSULT can display each diagnostic item using the diagnostic test modes shown following.

| Diagnostic mode       | Description                                                                |
|-----------------------|----------------------------------------------------------------------------|
| Data Monitor          | Displays Front air control input/output data in real time.                 |
| CAN DIAG SUPPORT MNTR | The result of transmit/receive diagnosis of CAN communication can be read. |
| ECU Identification    | Front air control part number can be read.                                 |

## DATA MONITOR

## Display Item List

| Monitor item  | Value    | Contents                                              |
|---------------|----------|-------------------------------------------------------|
| BATT VIA CAN  | "V"      | Displays battery voltage signal.                      |
| IGN VIA CAN   | "ON/OFF" | Displays ignition switch signal.                      |
| EVAP TEMP SEN | "°C"     | Displays intake sensor signal.                        |
| MODE FDBCK    | "V"      | Displays mode door motor feedback signal.             |
| DVR MIX FDBCK | "V"      | Displays air mix door motor (driver) feedback signal. |
| RECIRC        | "ON/OFF" | Displays recirculation switch signal.                 |
| DEFROST       | "ON/OFF" | Displays defrost switch signal.                       |
| A/C           | "ON/OFF" | Displays A/C switch signal.                           |
| RR DEFOG      | "ON/OFF" | Displays rear window defogger switch signal.          |
| MODE SELECT   | "DTNT"   | Displays mode switch signal.                          |

# DIAGNOSIS SYSTEM (BCM)

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONER]

## DIAGNOSIS SYSTEM (BCM)

### COMMON ITEM

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

INFOID:0000000011372144

#### APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM.

| Direct Diagnostic Mode | Description                                                                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ECU Identification     | The BCM part number is displayed.                                                                                                                                     |
| Self Diagnostic Result | The BCM self diagnostic results are displayed.                                                                                                                        |
| Data Monitor           | The BCM input/output data is displayed in real time.                                                                                                                  |
| Active Test            | The BCM activates outputs to test components.                                                                                                                         |
| Work support           | The settings for BCM functions can be changed.                                                                                                                        |
| Configuration          | <ul style="list-style-type: none"><li>The vehicle specification can be read and saved.</li><li>The vehicle specification can be written when replacing BCM.</li></ul> |
| CAN Diag Support Mntr  | The result of transmit/receive diagnosis of CAN communication is displayed.                                                                                           |

#### SYSTEM APPLICATION

BCM can perform the following functions.

| System                               | Sub System           | Direct Diagnostic Mode |                        |              |             |              |               |                       |
|--------------------------------------|----------------------|------------------------|------------------------|--------------|-------------|--------------|---------------|-----------------------|
|                                      |                      | ECU Identification     | Self Diagnostic Result | Data Monitor | Active Test | Work support | Configuration | CAN Diag Support Mntr |
| Door lock                            | DOOR LOCK            |                        |                        | x            | x           | x            |               |                       |
| Rear window defogger                 | REAR DEFOGGER        |                        |                        | x            | x           |              |               |                       |
| Warning chime                        | BUZZER               |                        |                        | x            | x           |              |               |                       |
| Interior room lamp timer             | INT LAMP             |                        |                        | x            | x           | x            |               |                       |
| Remote keyless entry system          | MULTI REMOTE ENT     |                        |                        | x            | x           | x            |               |                       |
| Exterior lamp                        | HEAD LAMP            |                        |                        | x            | x           | x            |               |                       |
| Wiper and washer                     | WIPER                |                        |                        | x            | x           | x            |               |                       |
| Turn signal and hazard warning lamps | FLASHER              |                        |                        | x            | x           |              |               |                       |
| Air conditioner                      | AIR CONDITIONER      |                        |                        | x            |             |              |               |                       |
| Combination switch                   | COMB SW              |                        |                        | x            |             |              |               |                       |
| BCM                                  | BCM                  | x                      | x                      |              |             | x            | x             | x                     |
| Immobilizer                          | IMMU                 |                        | x                      | x            | x           |              |               |                       |
| Interior room lamp battery saver     | BATTERY SAVER        |                        |                        | x            | x           | x            |               |                       |
| Back door open                       | TRUNK                |                        |                        | x            | x           |              |               |                       |
| Vehicle security system              | THEFT ALM            |                        |                        | x            | x           | x            |               |                       |
| RAP system                           | RETAINED PWR         |                        |                        | x            | x           | x            |               |                       |
| Signal buffer system                 | SIGNAL BUFFER        |                        |                        | x            | x           |              |               |                       |
| TPMS                                 | AIR PRESSURE MONITOR |                        | x                      | x            | x           | x            |               |                       |
| Panic alarm system                   | PANIC ALARM          |                        |                        |              | x           |              |               |                       |

#### AIR CONDITIONER

## DIAGNOSIS SYSTEM (BCM)

< SYSTEM DESCRIPTION >

[MANUAL AIR CONDITIONER]

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

INFOID:0000000011372145

#### DATA MONITOR

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

A

B

C

D

E

F

G

H

HAC

J

K

L

M

N

O

P

## SELF-DIAGNOSIS FUNCTION

### Front Air Control Self-Diagnosis

INFOID:0000000011070955

#### A/C SYSTEM SELF-DIAGNOSIS FUNCTION

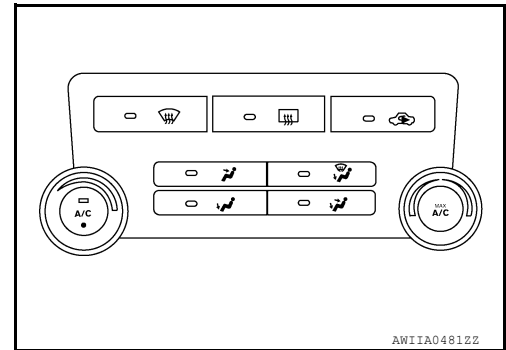
The self-diagnosis function is built into the front air control to quickly locate the cause of malfunctions.

#### DESCRIPTION

The self-diagnostic system diagnoses sensors, CAN system, and battery voltage on front air control. Refer to applicable sections (items) for details. Malfunctions (if any are present) will be displayed in the form of turning ON the A/C, MAX A/C, DEF and RECIRCULATION button LED's. Refer to [HAC-16, "Front Air Control Self-Diagnosis Chart"](#).

#### SELF-DIAGNOSTIC MODE

1. Turn ignition switch ON.
2. Press the DEF/FOOT (  ) and DEF (  ) mode switches at the same time and release on the front air control.
3. Press the FOOT (  ) and RECIRCULATION (  ) buttons within two seconds to enter self diagnostic mode.
4. The mode (VENT, DEF/FOOT, FOOT and VENT/FOOT) LED's start flashing in a clockwise sequence indicating that Self test is in progress. This takes about 17 seconds to complete.
5. All mode LED's stay ON once self test completes.
6. Malfunctions (if any) will be displayed in the form of turning ON the A/C, MAX A/C, DEF and RECIRCULATION button LED's. Refer to [HAC-16, "Front Air Control Self-Diagnosis Chart"](#).
7. To exit diagnostic mode, press any button on the front air control.



### Front Air Control Self-Diagnosis Chart

INFOID:0000000011070956

#### SELF-DIAGNOSTIC CHART

| Button LED    | Description                               |
|---------------|-------------------------------------------|
| A/C           | Evap sensor open                          |
| MAX A/C       | Evap sensor short                         |
| DEFROST       | Air mix door motor circuit malfunctioning |
| RECIRCULATION | Mode door motor circuit malfunctioning    |

## DTC/CIRCUIT DIAGNOSIS

### MODE DOOR MOTOR

#### System Description

INFOID:0000000011070957

#### SYSTEM DESCRIPTION

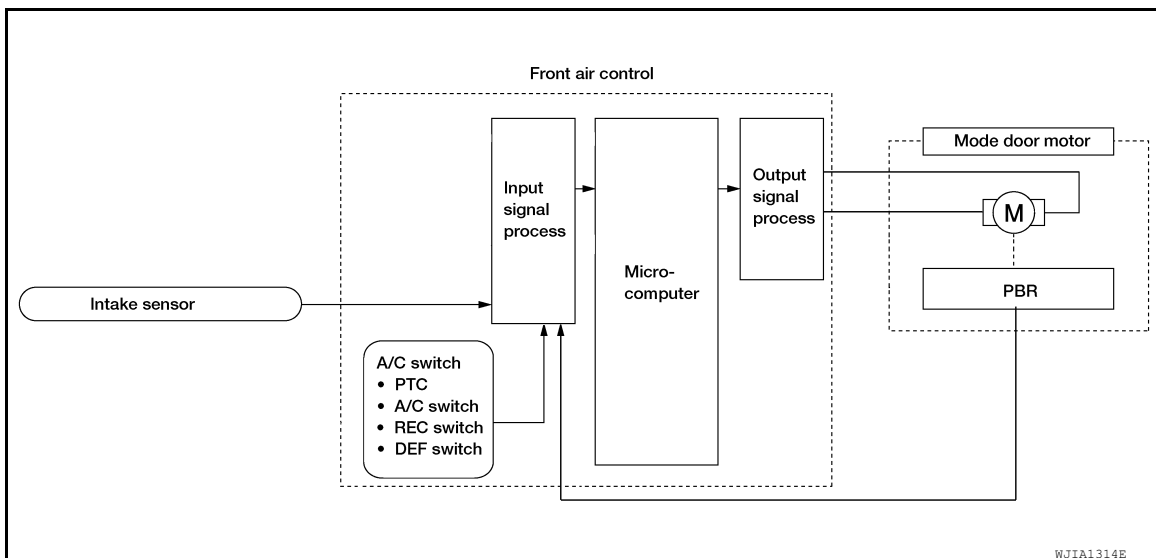
##### Component Parts

Mode door control system components are:

- Front air control
- Mode door motor
- Position Balanced Resistor (PBR) (built into mode door motor)
- Intake sensor

##### System Operation

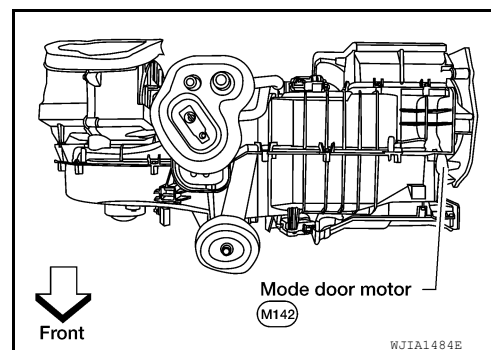
The mode door position (VENT, B/L, FOOT, D/F, and DEFROST) is set by the front air control by means of the mode door motor. When a mode door position is selected on the front air control, voltage is applied to one circuit of the mode door motor while ground is applied to the other circuit, causing the mode door motor to rotate. The direction of rotation is determined by which circuit has voltage applied to it, and which one has ground applied to it. The front air control monitors the mode door position by measuring the voltage signal on the PBR circuit.



#### COMPONENT DESCRIPTION

##### Mode Door Motor

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



#### Mode Door Motor Component Function Check

INFOID:0000000011070958

##### SYMPTOM:

- Air outlet does not change.

# MODE DOOR MOTOR

## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

- Mode door motor does not operate normally.

### INSPECTION FLOW

#### 1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - DISCHARGE AIR

1. Turn blower control dial to HI speed.
2. Press each mode switch and check all positions.
3. Confirm that discharge air comes out according to the air distribution table. Refer to [HAC-11, "Discharge Air Flow"](#).

##### NOTE:

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

##### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to [HAC-18, "Mode Door Motor Diagnosis Procedure"](#).

### Mode Door Motor Diagnosis Procedure

INFOID:0000000011070959

Regarding Wiring Diagram information, refer to [HAC-45, "Wiring Diagram"](#).

##### SYMPTOM:

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

#### 1. CHECK MODE DOOR MOTOR CIRCUITS FOR OPEN AND SHORT TO GROUND

1. Turn ignition switch OFF.
2. Disconnect the front air control harness connector M50 and the mode door motor harness connector M142.
3. Check continuity between front air control harness connector M50 terminals 23, 24 and the mode door motor harness connector M142 terminals 1, 6.

| Connector | Terminal | Connector | Terminal | Continuity |
|-----------|----------|-----------|----------|------------|
| M50       | 24       | M142      | 1        | Yes        |
|           | 23       |           | 6        |            |

4. Check continuity between front air control harness connector M50 terminals 23, 24 and ground.

| Connector | Terminal | —      | Continuity |
|-----------|----------|--------|------------|
| M50       | 23       | Ground | No         |
|           | 24       |        |            |

##### Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace harness as necessary.

#### 2. CHECK FRONT AIR CONTROL FOR MODE DOOR MOTOR POWER AND GROUND

1. Reconnect front air control harness connector.
2. Turn ignition switch ON.
3. Press the mode switch D/F (  ) mode.
4. Check voltage between front air control harness connector M50 terminal 23 and terminal 24 while pressing the VENT (  ) mode, and then the B/L (  ) mode.

# MODE DOOR MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

| Connector | Terminals |     | Condition                                                                                                                                                                                                                              | Voltage (Approx.) |
|-----------|-----------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|           | (+)       | (-) |                                                                                                                                                                                                                                        |                   |
| M50       | 24        | 23  | While pressing the mode control from D/F (  ) mode to VENT (  ) mode | Battery voltage   |
|           | 23        | 24  | While pressing the mode control from VENT (  ) mode to B/L (  ) mode | Battery voltage   |

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace front air control. Refer to [VTL-7. "Removal and Installation"](#).

## 3.CHECK MODE DOOR MOTOR PBR CIRCUITS FOR OPEN AND SHORT TO GROUND

- Turn ignition switch OFF.
- Disconnect the front air control harness connectors M50 and M2.
- Check continuity between front air control harness connectors M50 terminal 3 and M2 terminal 28, and the mode door motor harness connector M142 terminals 2, 3.

| Connector | Terminal | Connector | Terminal | Continuity |
|-----------|----------|-----------|----------|------------|
| M50       | 3        | M142      | 2        | Yes        |
| M2        | 28       |           | 3        |            |

- Check continuity between front air control harness connectors M50 terminal 3 and M2 terminal 28, and ground.

| Connector | Terminal | —      | Continuity |
|-----------|----------|--------|------------|
| M50       | 3        | Ground | No         |
| M2        | 28       |        |            |

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace harness as necessary.

## 4.CHECK PBR FEEDBACK SIGNAL CIRCUIT FOR OPEN AND SHORT TO GROUND

- Check continuity between front air control harness connector M50 terminal 10 and mode door motor harness connector M142 terminal 4.

| Connector | Terminal | Connector | Terminal | Continuity |
|-----------|----------|-----------|----------|------------|
| M50       | 10       | M142      | 4        | Yes        |

- Check continuity between front air control harness connector M50 terminal 10 and ground.

| Connector | Terminal | —      | Continuity |
|-----------|----------|--------|------------|
| M50       | 10       | Ground | No         |

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

## 5.CHECK FRONT AIR CONTROL FOR 5 VOLT REFERENCE (VREF), VREF RETURN, AND FEEDBACK SIGNAL

- Reconnect front air control harness connectors.
- Turn ignition switch ON.
- Check voltage between front air control harness connector M50 terminal 3 and M2 terminal 28.

## MODE DOOR MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

| Connector | Terminal | Connector | Terminal | Voltage (Approx.) |
|-----------|----------|-----------|----------|-------------------|
|           | (+)      |           | (-)      |                   |
| M2        | 28       | M50       | 3        | 5V                |

4. Check voltage between front air control harness connector M50 terminal 10 and ground.

| Connector | Terminal | —      | Voltage (Approx.) |
|-----------|----------|--------|-------------------|
| M50       | 10       | Ground | 0V                |

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace front air control. Refer to [VTL-7, "Removal and Installation"](#).

### 6. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

1. Reconnect the mode door motor harness connector M142.  
2. Check voltage between front air control harness connector M50 terminal 10 and ground.

| Connector | Terminal | —      | Voltage (Approx.) |
|-----------|----------|--------|-------------------|
| M50       | 10       | Ground | 0.2V to 4.8V      |

Is the inspection result normal?

YES >> Inspect mode door for binding or mechanical failure. If mode door moves freely, replace front air control. Refer to [VTL-7, "Removal and Installation"](#).

NO >> Replace the mode door motor. Refer to [VTL-19, "Removal and Installation"](#).

## AIR MIX DOOR MOTOR

### System Description

INFOID:0000000011070960

### SYSTEM DESCRIPTION

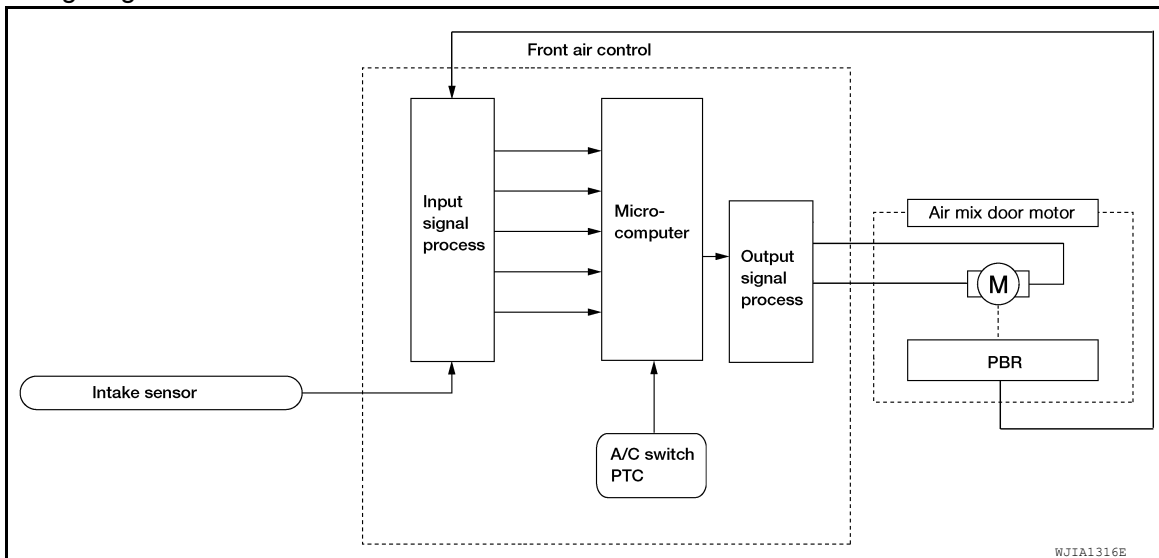
#### Component Parts

Air mix door control system components are:

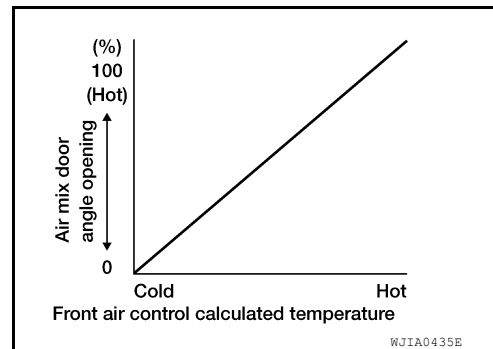
- Front air control
- Air mix door motor
- Position Balanced Resistor (PBR) (built into air mix door motor)
- Intake sensor

#### System Operation

The front air control receives data from the temperature selected by the driver. The front air control then applies a voltage to one circuit of the air mix door motor, while ground is applied to the other circuit, causing the air mix door motor to rotate. The direction of rotation is determined by which circuit has voltage applied to it, and which one has ground applied to it. The front air control monitors the air mix door positions by measuring the voltage signal on the PBR circuits of each door.



#### Air Mix Door Control Specification



### COMPONENT DESCRIPTION

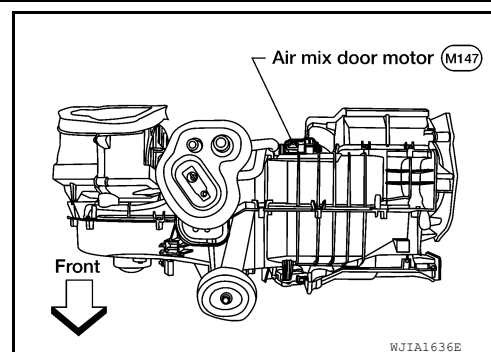
#### Air Mix Door Motor

## AIR MIX DOOR MOTOR

### < DTC/CIRCUIT DIAGNOSIS >

### [MANUAL AIR CONDITIONER]

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



### Air Mix Door Motor Component Function Check

INFOID:000000011070961

#### INSPECTION FLOW

#### 1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE

1. Blower must be ON.
2. Turn the temperature control dial clockwise to maximum heat.
3. Check for hot air at discharge air outlets.

>> GO TO 2.

#### 2. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

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

Is the inspection results normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to [HAC-22. "Air Mix Door Motor Diagnosis Procedure"](#).

### Air Mix Door Motor Diagnosis Procedure

INFOID:000000011070962

Regarding Wiring Diagram information, refer to [HAC-45. "Wiring Diagram"](#).

#### SYMPTOM:

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

#### DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR

#### 1. CHECK AIR MIX DOOR MOTOR CIRCUITS FOR OPEN AND SHORT TO GROUND

1. Turn ignition switch OFF.
2. Disconnect the front air control harness connector M50 and the air mix door motor harness connector M147.
3. Check continuity between front air control harness connector M50 terminals 17, 18 and the air mix door motor harness connector M147 terminals 5, 6.

| Connector | Terminal | Connector | Terminal | Continuity |
|-----------|----------|-----------|----------|------------|
| M50       | 18       | M147      | 6        | Yes        |
|           | 17       |           | 5        |            |

# AIR MIX DOOR MOTOR

[MANUAL AIR CONDITIONER]

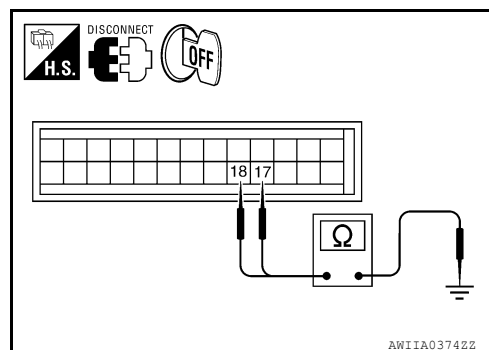
## < DTC/CIRCUIT DIAGNOSIS >

- Check continuity between front air control harness connector M50 terminals 17, 18 and ground.

| Connector | Terminal | —      | Continuity |
|-----------|----------|--------|------------|
| M50       | 17       | Ground | No         |
|           | 18       |        |            |

Is the inspection result normal?

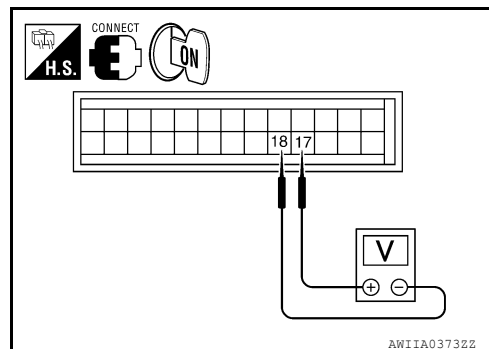
- YES >> GO TO 2.  
NO >> Repair or replace harness as necessary.



## 2.CHECK FRONT AIR CONTROL FOR AIR MIX DOOR MOTOR POWER AND GROUND

- Reconnect front air control harness connector.
- Turn ignition switch ON.
- Press the mode switch D/F (D/F) mode.
- Check voltage between front air control harness connector M50 terminal 17 and terminal 18 while pressing the mode switch to VENT (VENT), and then to B/L (B/L) mode.

| Connector | Terminals |     | Condition                                                        | Voltage (Approx.) |
|-----------|-----------|-----|------------------------------------------------------------------|-------------------|
|           | (+)       | (-) |                                                                  |                   |
| M50       | 18        | 17  | Pressing the mode switch from D/F (D/F) mode to VENT (VENT) mode | Battery voltage   |
|           | 17        | 18  | Pressing the mode switch from VENT (VENT) mode to B/L (B/L) mode | Battery voltage   |



Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Replace front air control. Refer to [VTL-19, "Removal and Installation"](#).

## 3.CHECK AIR MIX DOOR MOTOR PBR CIRCUITS FOR OPEN AND SHORT TO GROUND

- Turn ignition switch OFF.
- Disconnect the front air control harness connectors M50 and M2.
- Check continuity between front air control harness connectors M50 terminal 3 and M2 terminal 28, and the air mix door motor harness connector M147 terminals 1, 3.

| Connector | Terminal | Connector | Terminal | Continuity |
|-----------|----------|-----------|----------|------------|
| M50       | 3        | M147      | 3        | Yes        |
| M2        | 28       |           | 1        |            |

- Check continuity between front air control harness connectors M50 terminal 3 and M2 terminal 28, and ground.

| Connector | Terminal | —      | Continuity |
|-----------|----------|--------|------------|
| M50       | 3        | Ground | No         |
| M2        | 28       |        |            |

Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Repair or replace harness as necessary.

## 4.CHECK PBR FEEDBACK SIGNAL CIRCUIT FOR OPEN AND SHORT TO GROUND

- Check continuity between front air control harness connector M50 terminal 6 and air mix door motor harness connector M147 terminal 2.

# AIR MIX DOOR MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

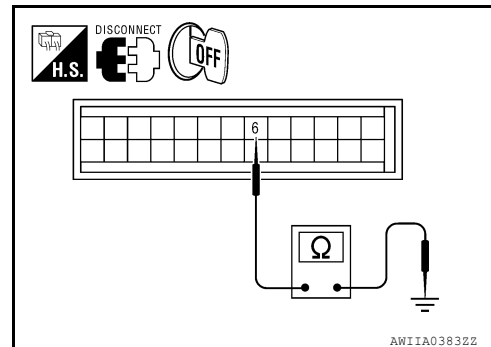
| Connector | Terminal | Connector | Terminal | Continuity |
|-----------|----------|-----------|----------|------------|
| M50       | 6        | M147      | 2        | Yes        |

- Check continuity between front air control harness connector M50 terminal 6 and ground.

| Connector | Terminal | —      | Continuity |
|-----------|----------|--------|------------|
| M50       | 6        | Ground | No         |

Is the inspection result normal?

- YES >> GO TO 5.  
NO >> Repair or replace harness as necessary.



## 5.CHECK FRONT AIR CONTROL FOR 5 VOLT REFERENCE (VREF), VREF RETURN, AND FEEDBACK SIGNAL

- Reconnect front air control harness connectors.
- Turn ignition switch ON.
- Check voltage between front air control harness connector M50 terminal 3 and M2 terminal 28.

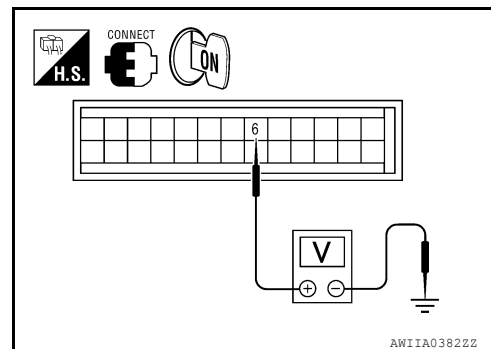
| Connector | Terminal (+) | Connector | Terminal (-) | Voltage (Approx.) |
|-----------|--------------|-----------|--------------|-------------------|
| M2        | 28           | M50       | 3            | 5V                |

- Check voltage between front air control harness connector M50 terminal 6 and ground.

| Connector | Terminal | —      | Voltage (Approx.) |
|-----------|----------|--------|-------------------|
| M50       | 6        | Ground | 0V                |

Is the inspection result normal?

- YES >> GO TO 6.  
NO >> Replace front air control. Refer to [VTL-19. "Removal and Installation"](#).



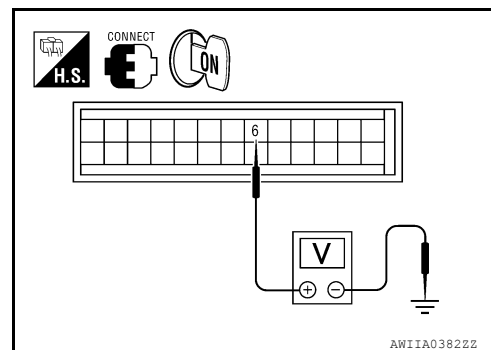
## 6.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- Reconnect the air mix door motor harness connector M147.
- Check voltage between front air control harness connector M50 terminal 6 and ground.

| Connector | Terminal | —      | Voltage (Approx.) |
|-----------|----------|--------|-------------------|
| M50       | 6        | Ground | 0.2V to 4.8V      |

Is the inspection result normal?

- YES >> Inspect air mix door for binding or mechanical failure. If air mix door moves freely, replace front air control. Refer to [VTL-19. "Removal and Installation"](#).  
NO >> Replace the air mix door motor. Refer to [VTL-20. "Removal and Installation"](#).



## INTAKE DOOR MOTOR

### System Description

INFOID:0000000011070963

### SYSTEM DESCRIPTION

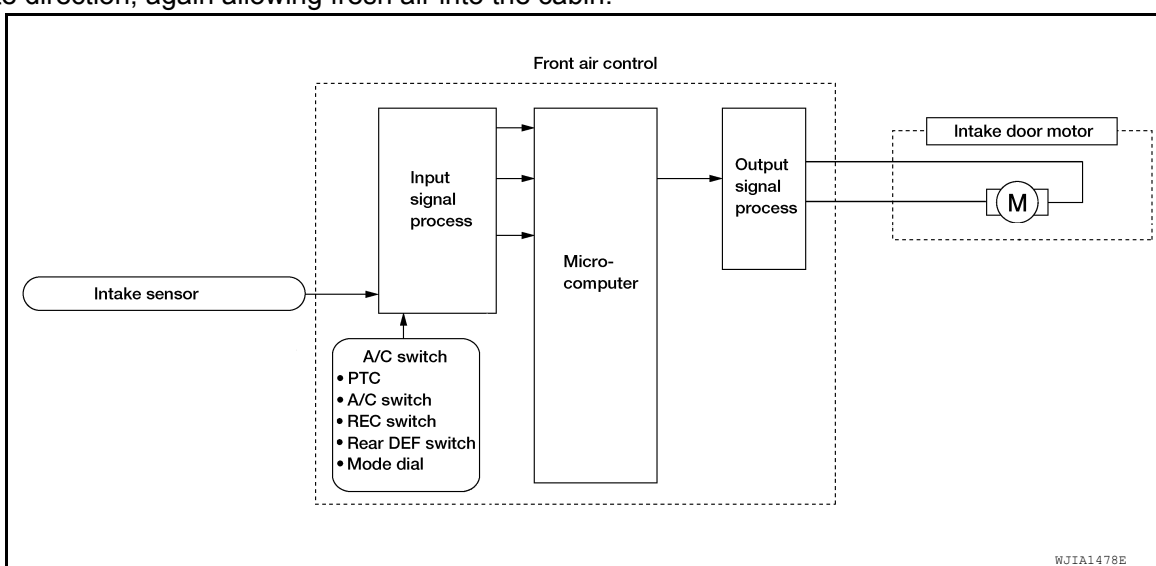
#### Component Parts

Intake door control system components are:

- Front air control
- Intake door motor
- Intake sensor

#### System Operation

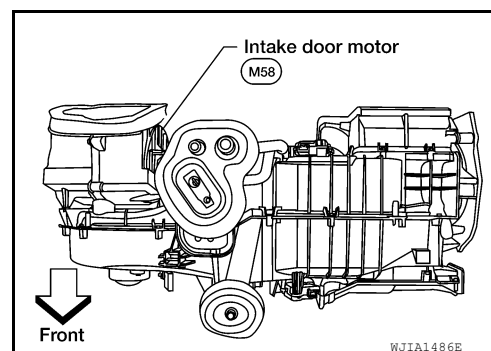
The intake door control determines the intake door position based on the position of the recirculation switch. When the recirculation switch is depressed the intake door motor rotates closing off the fresh air inlet and recirculating the cabin air. If the recirculation switch is depressed again, the intake door motor rotates in the opposite direction, again allowing fresh air into the cabin.



### COMPONENT DESCRIPTION

#### Intake door motor

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



### Intake Door Motor Component Function Check

INFOID:0000000011070964

#### SYMPTOM:

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

### INSPECTION FLOW

#### 1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - REC ( )

1. Turn blower control dial to any speed.

# INTAKE DOOR MOTOR

[MANUAL AIR CONDITIONER]

## < DTC/CIRCUIT DIAGNOSIS >

1. Press vent mode (  ) switch.
3. Press REC (  ) switch.
4. Press REC (  ) switch again.
5. Listen for intake door position change (you should hear blower sound change slightly).

### Is the inspection result normal?

- YES >> Inspection End.  
NO >> Go to diagnosis procedure. Refer to [HAC-26. "Intake Door Motor Diagnosis Procedure"](#).

## Intake Door Motor Diagnosis Procedure

INFOID:0000000011070965

Regarding Wiring Diagram information, refer to [HAC-45. "Wiring Diagram"](#).

### SYMPTOM:

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

## DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

### 1.CHECK INTAKE DOOR MOTOR CIRCUITS FOR OPEN AND SHORT TO GROUND

1. Turn ignition switch OFF.
2. Disconnect the front air control harness connector M50 and the intake door motor harness connector M58.
3. Check continuity between front air control harness connector M50 terminals 21, 22 and the intake door motor harness connector M58 terminals 1, 6.

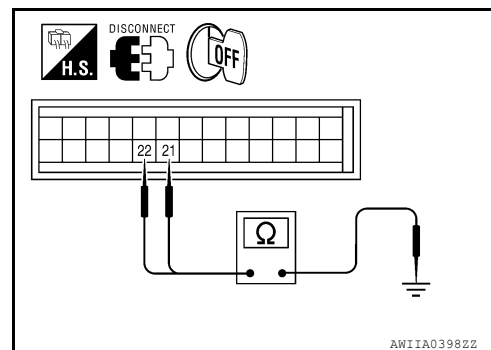
| Connector | Terminal | Connector | Terminal | Continuity |
|-----------|----------|-----------|----------|------------|
| M50       | 21       | M58       | 6        | Yes        |
|           | 22       |           | 1        |            |

4. Check continuity between front air control harness connector M50 terminals 21, 22 and ground.

| Connector | Terminal | —      | Continuity |
|-----------|----------|--------|------------|
| M50       | 21       | Ground | No         |
|           | 22       |        |            |

### Is the inspection result normal?

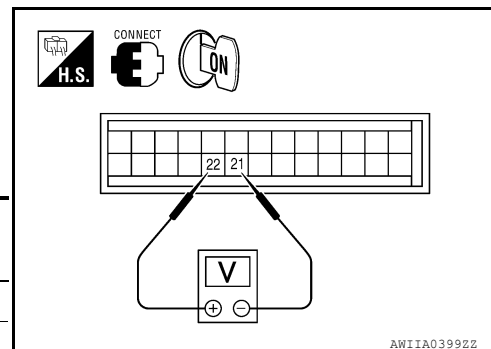
- YES >> GO TO 2.  
NO >> Repair or replace harness as necessary.



### 2.CHECK FRONT AIR CONTROL FOR INTAKE DOOR MOTOR POWER AND GROUND

1. Reconnect front air control harness connector.
2. Turn ignition switch ON.
3. Check voltage between front air control harness connector M50 terminal 21 and terminal 22 while placing the HVAC system into self-diagnostic mode.

| Connector | Terminals |     | Condition                      | Voltage (Approx.) |
|-----------|-----------|-----|--------------------------------|-------------------|
|           | (+)       | (-) |                                |                   |
| M50       | 22        | 21  | Self-diagnostic mode (opening) | Battery voltage   |
|           | 21        | 22  | Self-diagnostic mode (closing) | Battery voltage   |



### Is the inspection result normal?

- YES >> Inspect intake door for binding or mechanical failure. If intake door moves freely, replace the intake door motor. Refer to [VTL-18. "Removal and Installation"](#).  
NO >> Replace front air control. Refer to [VTL-7. "Removal and Installation"](#).

## BLOWER MOTOR

### System Description

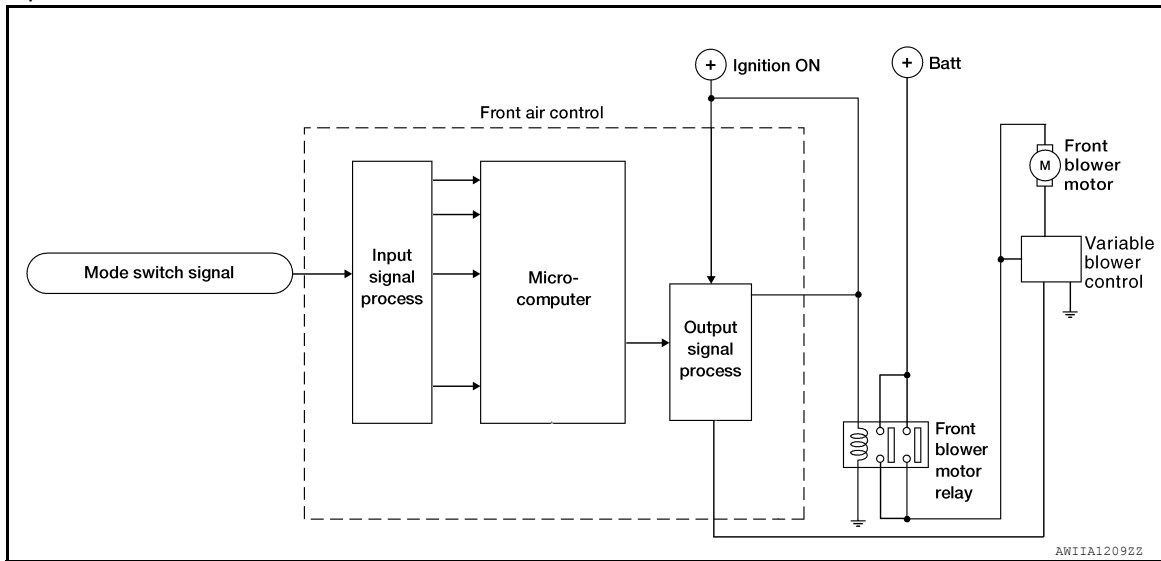
INFOID:0000000011070966

#### Component Parts

Blower speed control system components are:

- Front air control
- Variable blower control
- Front blower motor
- Front blower motor relay

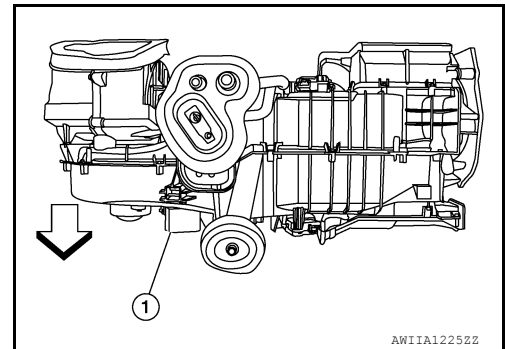
#### System Operation



### COMPONENT DESCRIPTION

#### Variable Blower Control

The variable blower control (1) is located on the heater and cooling unit assembly. The variable blower control receives a gate voltage from the front air control to maintain the blower motor voltage in the 0 to 5 volt range (approx.) ⇒ front



### Front Blower Motor Component Function Check

INFOID:0000000011070967

#### INSPECTION FLOW

##### 1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - FRONT BLOWER

1. Rotate the blower control dial clockwise. Blower should operate.
2. Rotate the blower control dial clockwise, and continue checking blower speed until all speeds are checked.

Is the inspection result normal?

YES >> Inspection End.

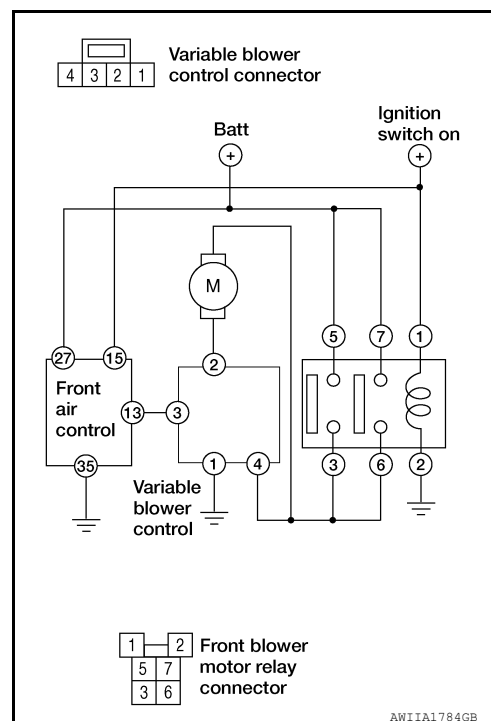
NO >> Go to diagnosis procedure. Refer to [HAC-28. "Front Blower Motor Diagnosis Procedure"](#).

## Front Blower Motor Diagnosis Procedure

INFOID:000000011070968

Regarding Wiring Diagram information, refer to [HAC-45. "Wiring Diagram"](#).

SYMPTOM: Blower motor operation is malfunctioning.



## DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR

### 1.CHECK FUSES

Check 15A fuses [No. 24 and 27 (Located in the fuse and fusible link box)]. For fuse layout refer to [PG-65. "Terminal Arrangement"](#).

**Fuses are good.**

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> GO TO 9.

### 2.CHECK FRONT BLOWER MOTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect front blower motor connector.
3. Turn ignition switch ON.
4. Rotate blower control dial to maximum speed.
5. Press the A/C switch.
6. Check voltage between front blower motor harness connector M62 terminal 2 and ground.

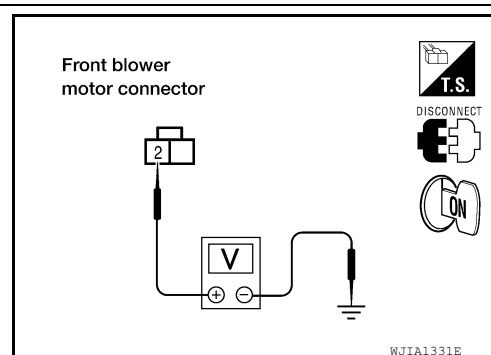
**2 - Ground**

**: Battery voltage**

Is the inspection result normal?

- YES >> GO TO 12.
- NO >> GO TO 3.

### 3.CHECK FRONT BLOWER MOTOR RELAY (SWITCH SIDE) POWER SUPPLY CIRCUIT



# BLOWER MOTOR

[MANUAL AIR CONDITIONER]

## < DTC/CIRCUIT DIAGNOSIS >

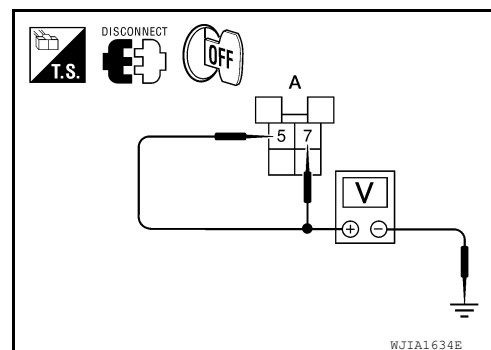
1. Turn ignition switch OFF.
2. Disconnect front blower motor relay.
3. Check voltage between front blower motor relay harness connector E54 terminals 5,7 and ground.

**5, 7 - Ground : Battery voltage**

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.



## 4.CHECK FRONT BLOWER MOTOR RELAY

Turn ignition switch OFF.

Check front blower motor relay. Refer to [HAC-31. "Front Blower Motor Component Inspection"](#).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace front blower motor relay.

## 5.CHECK FRONT BLOWER MOTOR RELAY (SWITCH SIDE) CIRCUIT FOR OPEN

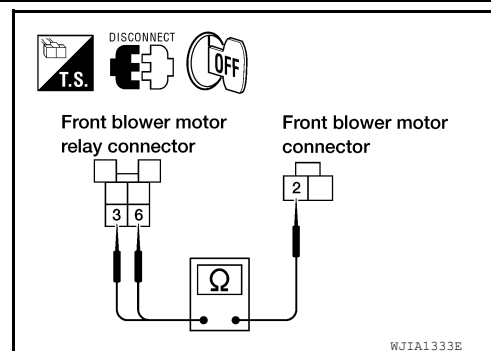
Check continuity between front blower motor relay harness connector E54 terminals 3, 6 and front blower motor harness connector M62 terminal 2.

**3, 6 - 2 : Continuity should exist.**

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector.



## 6.CHECK VARIABLE BLOWER CONTROL POWER SUPPLY CIRCUIT FOR OPEN

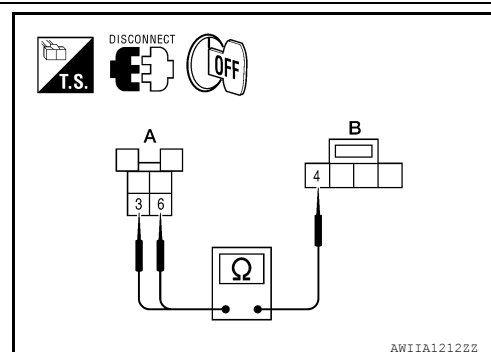
1. Disconnect variable blower control harness connector.
2. Check continuity between front blower motor relay harness connector E54 (A) terminals 3, 6 and variable blower control harness connector M121 (B) terminal 4.

**3, 6 - 4 : Continuity should exist.**

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair harness or connector.



## 7.CHECK FRONT BLOWER MOTOR RELAY (COIL SIDE) GROUND CIRCUIT

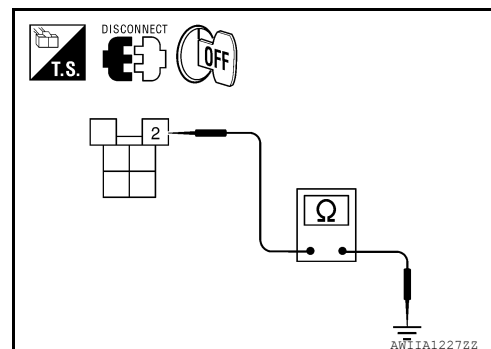
Check continuity between front blower motor relay harness connector E54 terminal 2 and ground.

**2 - Ground : Continuity should exist**

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.



## 8.CHECK FRONT BLOWER MOTOR RELAY (COIL SIDE) POWER SUPPLY

## BLOWER MOTOR

[MANUAL AIR CONDITIONER]

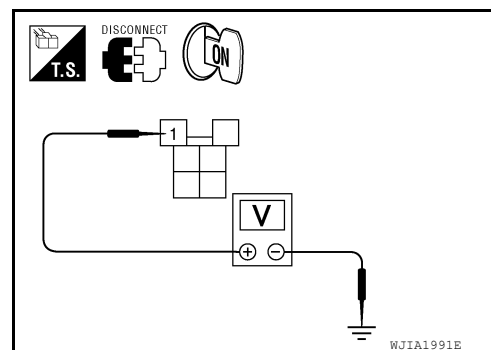
### < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch ON.
2. Check voltage between front blower motor relay harness connector E54 terminal 1 and ground.

**1 - Ground : Battery voltage**

Is the inspection result normal?

- YES >> Intermittent incident. Refer to [GI-41, "Intermittent Incident"](#).
- NO >> Repair harness or connector.



## 9. REPLACE FUSES

Replace fuses.

Does the fuse blow?

- YES >> • If fuse blows without activating the front blower motor, repair short between fuse and front blower motor relay.  
• If fuse blows activating the front blower motor, GO TO 10.
- NO >> Inspection End.

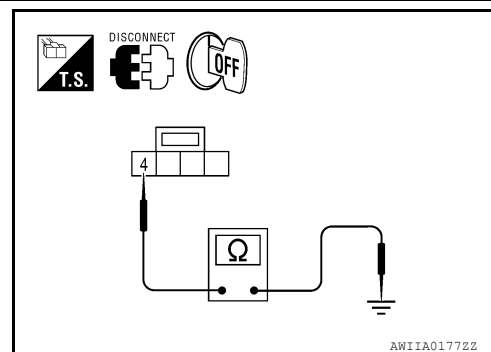
## 10. CHECK FRONT BLOWER MOTOR POWER SUPPLY CIRCUIT FOR SHORT

1. Turn ignition switch OFF.
2. Disconnect front blower motor connector and variable blower control connector.
3. Check continuity between variable blower control harness connector M121 terminal 4 and ground.

**4 - Ground : Continuity should not exist.**

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Repair harness or connector.



## 11. CHECK FRONT BLOWER MOTOR

Check front blower motor. Refer to [HAC-31, "Front Blower Motor Component Inspection"](#).

Is the inspection result normal?

- YES >> Replace variable blower control. Refer to [VTL-10, "Removal and Installation"](#).
- NO >> Replace front blower motor. Refer to [VTL-9, "Removal and Installation"](#).

## 12. CHECK FRONT BLOWER MOTOR

Check front blower motor. Refer to [HAC-31, "Front Blower Motor Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Replace front blower motor. Refer to [VTL-9, "Removal and Installation"](#).

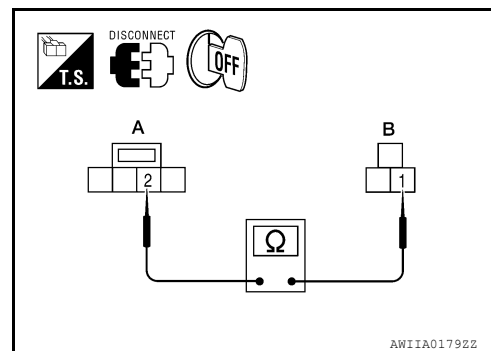
## 13. CHECK BLOWER MOTOR GROUND CIRCUIT

1. Disconnect variable blower control harness connector.
2. Check continuity between front blower motor harness connector M62 (B) terminal 1 and variable blower control harness connector M121 (A) terminal 2.

**1 - 2 : Continuity should exist.**

Is the inspection result normal?

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



## 14. CHECK VARIABLE BLOWER CONTROL POWER SUPPLY CIRCUIT FOR OPEN

# BLOWER MOTOR

## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

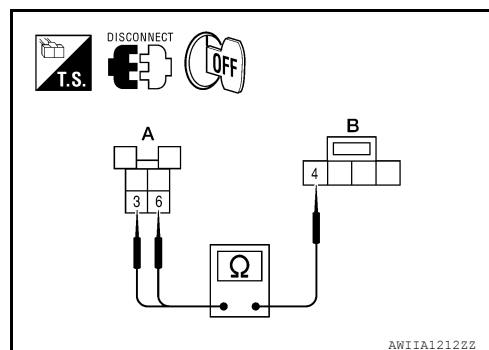
Check continuity between front blower motor relay harness connector E54 (A) terminals 3, 6 and variable blower control harness connector M121 (B) terminal 4.

**3, 6 - 4 : Continuity should exist.**

Is the inspection result normal?

YES >> GO TO 15.

NO >> Repair harness or connector.



## 15. CHECK VARIABLE BLOWER CONTROL GROUND CIRCUIT

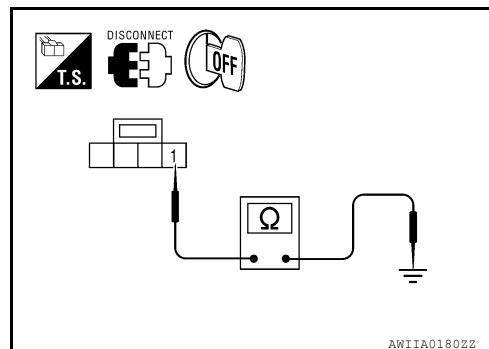
Check continuity between variable blower control harness connector M121 terminal 1 and ground.

**1 - Ground : Continuity should exist.**

Is the inspection result normal?

YES >> GO TO 16.

NO >> Repair harness or connector.



## 16. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

1. Reconnect all disconnected component connectors.
2. Turn ignition switch ON.
3. While turning blower control dial from minimum to maximum speed, check voltage between variable blower control connector M121 terminal 3 and ground.

**3 - Ground Varying between approx.: 0 to 4.5V**

Is the inspection result normal?

YES >> Replace variable blower control. Refer to [VTL-10, "Removal and Installation"](#).

NO >> GO TO 17.

## 17. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect variable blower control.
3. Check continuity between front air control harness connector M50 terminal 13 and variable blower control harness connector M121 terminal 3.

**13 - 3 : Continuity should exist.**

Is the inspection result normal?

YES >> Replace front air control. Refer to [VTL-7, "Removal and Installation"](#).

NO >> Repair harness or connector.

## Front Blower Motor Component Inspection

INFOID:0000000011070969

## COMPONENT INSPECTION

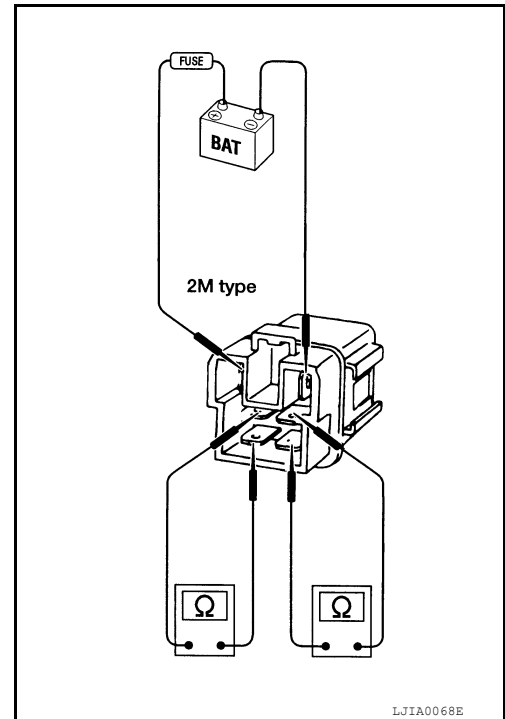
Front Blower Motor Relay

## BLOWER MOTOR

### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

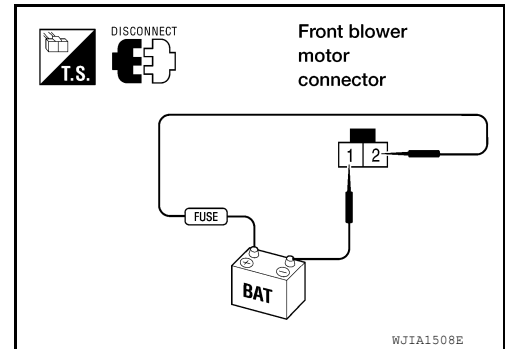
Check continuity between terminals 3 and 5 and terminals 7 and 6 by supplying 12 volts and ground to coil side terminals 1 and 2 of the relay.



#### Front Blower Motor

Confirm smooth rotation of the blower motor.

- Ensure that there are no foreign particles inside the blower unit.
- Apply 12 volts to terminal 2 and ground to terminal 1 and verify that the motor operates freely and quietly.



## MAGNET CLUTCH

## System Description

INFOID:0000000011070970

## SYSTEM DESCRIPTION

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

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

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

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

## Low Temperature Protection Control

The IPDM E/R will turn the compressor ON or OFF as determined by a signal detected from the intake sensor. The front air control monitors the intake sensor, and based on the threshold temperatures will stop sending the compressor ON signal to the BCM.

When intake air temperature is higher than 3.5°C (38.3°F), the compressor turns ON. When the intake air temperature is lower than 2.5°C (36.5°F) the compressor turns OFF.

## Magnet Clutch Component Function Check

INFOID:0000000011070971

HAC

SYMPTOM: Magnet clutch does not engage.

## INSPECTION FLOW

## 1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MAGNET CLUTCH

1. Rotate blower control dial clockwise.
2. Press the vent (  ) mode switch.
3. Press A/C switch. Confirm that the compressor clutch engages (sound or visual inspection).

Is the inspection result normal?

- YES    >> Inspection End.  
 NO     >> Go to diagnosis procedure. Refer to [HAC-33, "Magnet Clutch Diagnosis Procedure"](#).

## Magnet Clutch Diagnosis Procedure

INFOID:0000000011070972

Regarding Wiring Diagram information, refer to [HAC-45, "Wiring Diagram"](#).

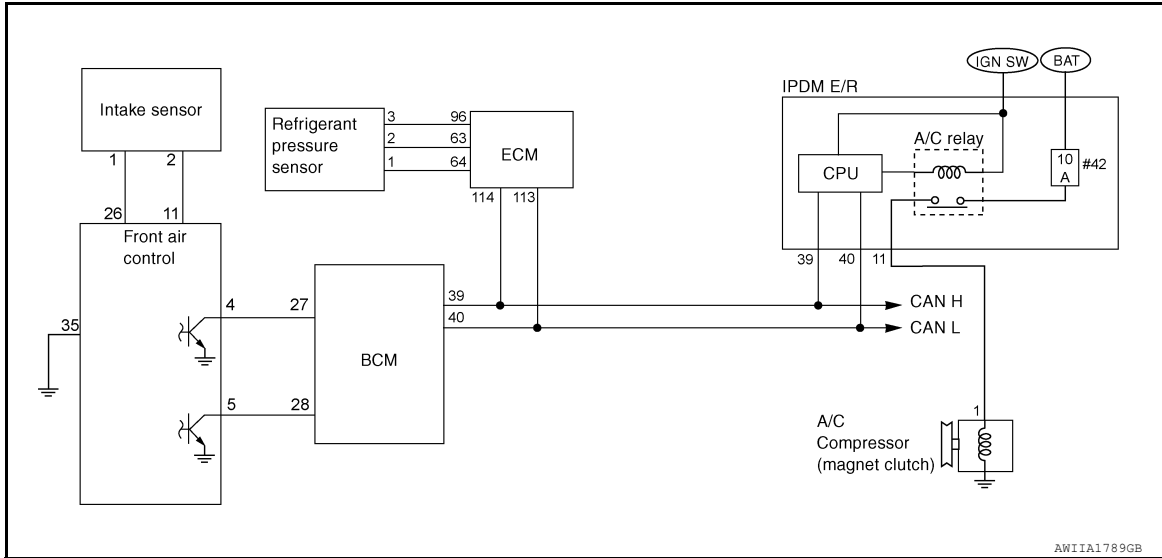
## DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

# MAGNET CLUTCH

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

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



## 1. PERFORM IPDM E/R AUTO ACTIVE TEST

Perform IPDM E/R auto active test. Refer to [PCS-11, "CONSULT Function \(IPDM E/R\)"](#).

Does magnet clutch operate?

YES or NO

- YES >> • ☒ WITH CONSULT  
GO TO 2.  
• ☐ WITHOUT CONSULT  
GO TO 4.

NO >> Check 10A fuse (No. 42, located in IPDM E/R), and GO TO 11.

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

Check FAN ON/OFF signal. Refer to [BCS-21, "AIR CONDITIONER : CONSULT Function \(BCM - AIR CONDITIONER\)"](#).

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

Is the inspection result normal?

- YES >> GO TO 3.  
NO >> GO TO 4.

## 3. CHECK BCM INPUT (A/C COMPRESSOR ON) SIGNAL

With blower control dial in any "ON" position, check A/C compressor ON/OFF signal. Refer to [BCS-21, "AIR CONDITIONER : CONSULT Function \(BCM - AIR CONDITIONER\)"](#).

**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.

## 4. CHECK VOLTAGE FOR FRONT AIR CONTROL (FAN ON SIGNAL)

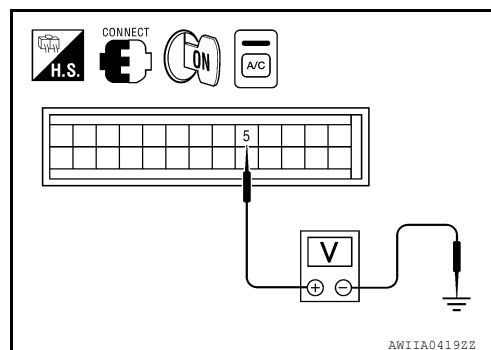
# MAGNET CLUTCH

## < DTC/CIRCUIT DIAGNOSIS >

## [MANUAL AIR CONDITIONER]

1. Turn ignition switch ON.
2. Turn A/C switch ON.
3. Check voltage between front air control harness connector M50 terminal 5 and ground.

| Terminals                   |              |        | Condition                | Voltage<br>(Approx.) |
|-----------------------------|--------------|--------|--------------------------|----------------------|
| (+)                         |              | (-)    |                          |                      |
| Front air control connector | Terminal No. |        |                          |                      |
| M50                         | 5            | Ground | Blower control dial: ON  | 0V                   |
|                             |              |        | Blower control dial: OFF | Battery voltage      |



Is the inspection result normal?

- YES >> GO TO 6.  
NO >> GO TO 5.

## 5.CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect BCM connector and front air control connector.
3. Check continuity between BCM harness connector M18 terminal 28 and front air control harness connector M50 terminal 5.

| Connector | Terminal | Connector              | Terminal | Continuity |
|-----------|----------|------------------------|----------|------------|
| BCM: M18  | 28       | Front air control: M50 | 5        | Yes        |

4. Check continuity between BCM harness connector M18 terminal 28 and ground.

| Connector | Terminal | Ground | Continuity |
|-----------|----------|--------|------------|
| BCM: M18  | 28       |        | No         |

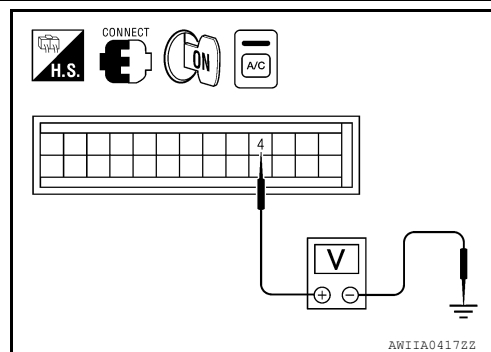
Is the inspection result normal?

- YES-1 >> If the voltage in the previous step was approx. battery voltage when the blower control dial was ON, replace front air control. Refer to [VTL-7, "Removal and Installation"](#).  
YES-2 >> If the voltage in the previous step was approx. 0V when the blower control dial was OFF, replace BCM. Refer to [BCS-51, "Removal and Installation"](#).  
NO >> Repair harness or connector.

## 6.CHECK VOLTAGE FOR FRONT AIR CONTROL (A/C COMPRESSOR ON SIGNAL)

1. Turn ignition switch ON.
2. Check voltage between front air control harness connector M50 terminal 4 and ground.

| Terminals                           |              |        | Condition          | Voltage<br>(Approx.) |
|-------------------------------------|--------------|--------|--------------------|----------------------|
| (+)                                 |              | (-)    |                    |                      |
| Front air<br>control con-<br>nector | Terminal No. |        |                    |                      |
| M50                                 | 4            | Ground | A/C switch: ON     | 0V                   |
|                                     |              |        | A/C switch:<br>OFF | 5V                   |



Is the inspection result normal?

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

## 7.CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

## MAGNET CLUTCH

[MANUAL AIR CONDITIONER]

### < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF
2. Disconnect BCM connector and front air control connector.
3. Check continuity between BCM harness connector M18 terminal 27 and front air control harness connector M50 terminal 4.

**27 - 4 : Continuity should exist.**

4. Check continuity between BCM harness connector M18 terminal 27 and ground.

**27 - ground : Continuity should not exist.**

#### Is the inspection result normal?

YES-1 >> If the voltage in the previous step was approx. 5V when A/C switch is ON, replace front air control. Refer to [VTL-7, "Removal and Installation"](#).

YES-2 >> If the voltage in the previous step was approx. 0V when A/C switch is OFF, replace BCM. Refer to [BCS-51, "Removal and Installation"](#).

NO >> Repair harness or connector.

### 8. CHECK REFRIGERANT PRESSURE SENSOR

Check refrigerant pressure sensor. Refer to [EC-490, "Diagnosis Procedure"](#).

#### Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace refrigerant pressure sensor. Refer to [HA-36, "Removal and Installation"](#).

### 9. CHECK INTAKE SENSOR

Check intake sensor. Refer to [HAC-39, "Intake Sensor Component Inspection"](#).

#### Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace intake sensor. Refer to [VTL-8, "Removal and Installation"](#).

### 10. CHECK CAN COMMUNICATION

Check CAN communication. Refer to [LAN-14, "Trouble Diagnosis Flow Chart"](#).

#### Is the inspection result normal?

YES >> Replace BCM. Refer to [BCS-51, "Removal and Installation"](#).

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

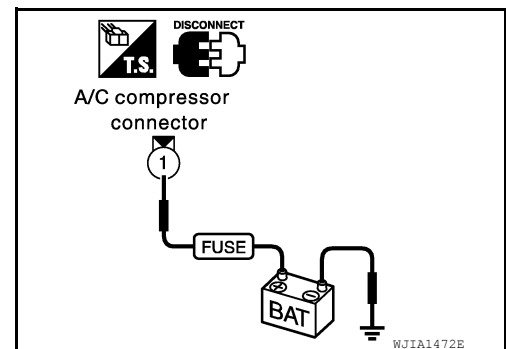
### 11. CHECK MAGNET CLUTCH CIRCUIT

1. Disconnect A/C compressor connector.
2. Check for operation sound when applying battery voltage to A/C compressor terminal 1.

#### Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace magnet clutch. Refer to [HA-28, "Removal and Installation of Compressor Clutch"](#).



### 12. CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND A/C COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect IPDM E/R connector.
3. Check continuity between IPDM E/R harness connector E119 terminal 11 and A/C compressor harness connector F3 terminal 1.

**11 - 1 : Continuity should exist.**

4. Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

**11 - ground : Continuity should not exist.**

MAGNET CLUTCH

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-27, "Removal and Installation"](#).
- NO >> Repair harness or connector.

A  
B  
C  
D  
E  
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HAC

## INTAKE SENSOR

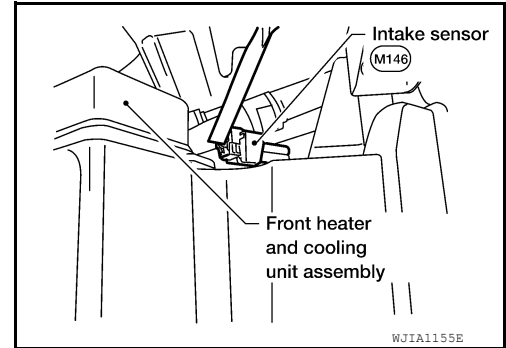
### System Description

INFOID:000000011070973

### COMPONENT DESCRIPTION

#### Intake Sensor

The intake sensor is located on top of the heater and cooling unit assembly next to the A/C evaporator cover. It converts temperature of air after it passes through the evaporator into a resistance value which is then input to the front air control.



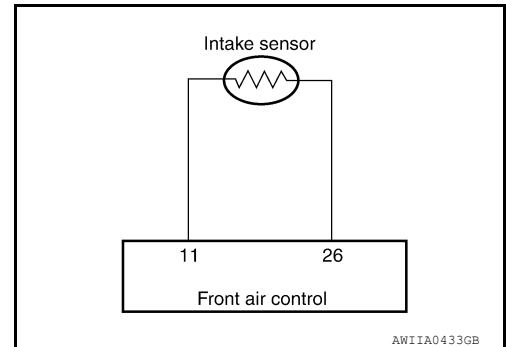
### Intake Sensor Diagnosis Procedure

INFOID:000000011070974

Regarding Wiring Diagram information, refer to [HAC-45. "Wiring Diagram"](#).

### DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted.



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

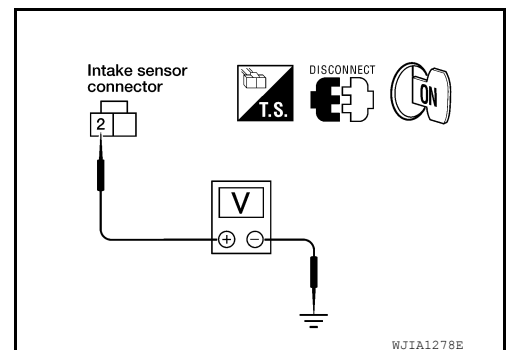
1. Disconnect intake sensor connector.
2. Turn ignition switch ON.
3. Check voltage between intake sensor harness connector M146 terminal 2 and ground.

**2 - Ground**

**: Approx. 5V**

Is the inspection result normal?

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



#### 2. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND FRONT AIR CONTROL

# INTAKE SENSOR

[MANUAL AIR CONDITIONER]

## < DTC/CIRCUIT DIAGNOSIS >

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between intake sensor harness connector M146 (B) terminal 1 and front air control harness connector M50 (A) terminal 26.

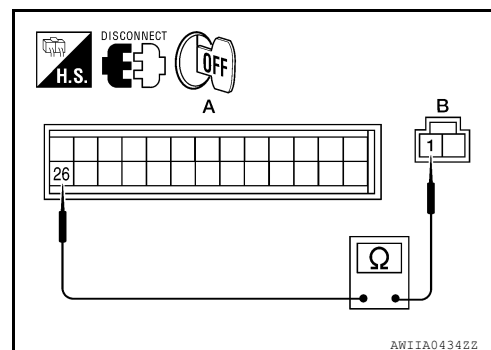
**1 - 26**

**: Continuity should exist.**

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.



## 3.CHECK INTAKE SENSOR

Refer to [HAC-39, "Intake Sensor Component Inspection"](#).

Is the inspection result normal?

YES >> Replace front air control. Refer to [VTL-7, "Removal and Installation"](#).

NO >> Replace intake sensor. Refer to [VTL-8, "Removal and Installation"](#).

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

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between intake sensor harness connector M146 (B) terminal 2 and front air control harness connector M50 (A) terminal 11.

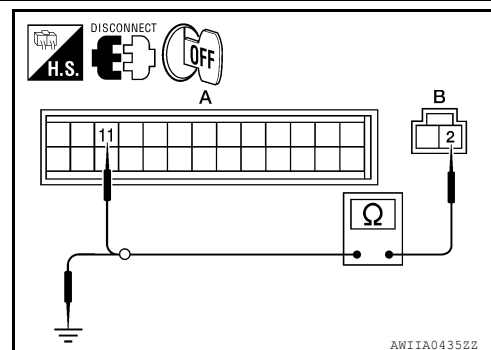
**2 - 11**

**: Continuity should exist.**

4. Check continuity between intake sensor harness connector M146 (B) terminal 2 and ground.

**2 - Ground**

**: Continuity should not exist.**



Is the inspection result normal?

YES >> Replace front air control. Refer to [VTL-7, "Removal and Installation"](#).

NO >> Repair harness or connector.

## Intake Sensor Component Inspection

INFOID:0000000011070975

## COMPONENT INSPECTION

Intake Sensor

# INTAKE SENSOR

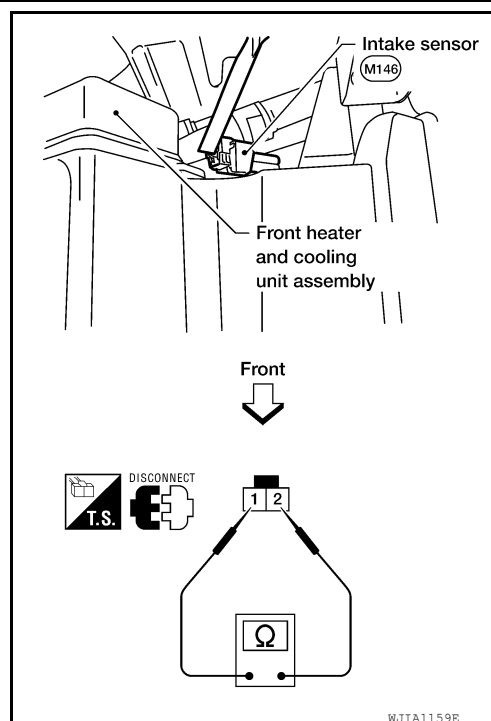
[MANUAL AIR CONDITIONER]

## < DTC/CIRCUIT DIAGNOSIS >

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

| Temperature °C (°F) | Resistance kΩ |
|---------------------|---------------|
| -15 (5)             | 209.0         |
| -10 (14)            | 160.0         |
| -5 (23)             | 123.0         |
| 0 (32)              | 95.8          |
| 5 (41)              | 74.9          |
| 10 (50)             | 58.9          |
| 15 (59)             | 46.7          |
| 20 (68)             | 37.3          |
| 25 (77)             | 30.0          |
| 30 (86)             | 24.2          |
| 35 (95)             | 19.7          |
| 40 (104)            | 16.1          |
| 45 (113)            | 13.2          |

If NG, replace intake sensor. Refer to [VTL-8. "Removal and Installation"](#).



WJIA1159E

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

## POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

### Component Description

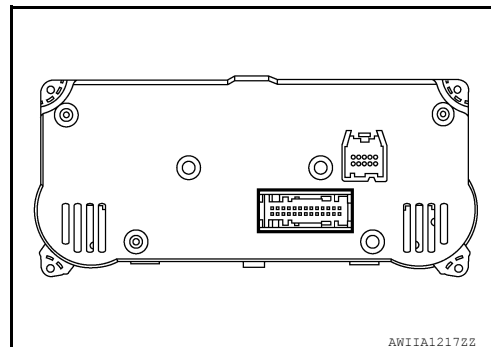
INFOID:0000000011070976

#### COMPONENT DESCRIPTION

##### Front Air Control

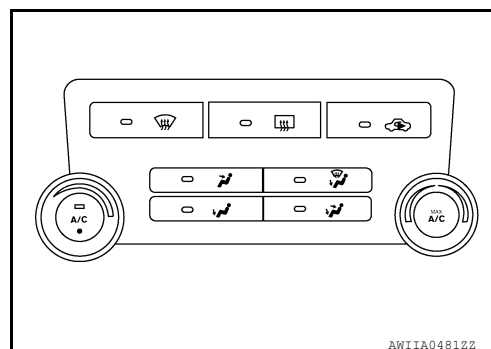
The front air control has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, blower motor and compressor are then controlled.

The front air control is unitized with control mechanisms. When the various switches and temperature dials are operated, data is input to the front air control.



##### Potential Temperature Control (PTC)

The PTC is built into the front air control. It can be set from cold to hot or any intermediate position by rotating the temperature dial.



### Front Air Control Component Function Check

INFOID:0000000011070977

SYMPTOM: A/C system does not come on.

#### INSPECTION FLOW

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

1. Turn blower motor ON, then press A/C switch.
2. Confirm that the compressor clutch engages (sound or visual inspection).

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to [HAC-41, "Front Air Control Power and Ground Diagnosis Procedure"](#).

### Front Air Control Power and Ground Diagnosis Procedure

INFOID:0000000011070978

Regarding Wiring Diagram information, refer to [HAC-45, "Wiring Diagram"](#).

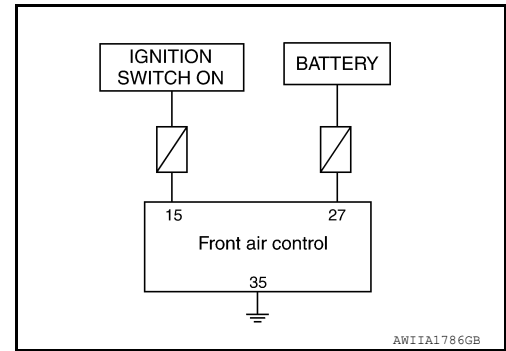
#### DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL AIR CONDITIONER]

SYMPTOM: A/C system does not come on.



## 1. CHECK POWER SUPPLY CIRCUITS FOR FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Turn ignition switch ON.
4. Check voltage between front air control harness connectors M50 terminal 15 and M2 terminal 27, and ground.

| Terminals                   |              | Ignition switch position |                          |                 |                 |
|-----------------------------|--------------|--------------------------|--------------------------|-----------------|-----------------|
| (+)                         |              | (-)                      | Ignition switch position |                 |                 |
| Front air control connector | Terminal No. |                          | OFF                      | ACC             | ON              |
| M50                         | 15           | Ground                   | Approx. 0V               | Approx. 0V      | Battery voltage |
| M2                          | 27           |                          | Battery voltage          | Battery voltage | Battery voltage |

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check 10A fuses [Nos. 8 and 19, located in the fuse block (J/B)]. Refer to [PG-64, "Terminal Arrangement"](#).

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

## 2. CHECK GROUND CIRCUIT FOR FRONT AIR CONTROL

1. Turn ignition switch OFF.
2. Check continuity between front air control harness connector M2 terminal 35 and ground.

**35 - Ground : Continuity should exist.**

Is the inspection result normal?

YES >> Replace front air control. Refer to [VTL-7, "Removal and Installation"](#).

NO >> Repair harness or connector.

# AIR CONDITIONER CONTROL

< ECU DIAGNOSIS INFORMATION >

[MANUAL AIR CONDITIONER]

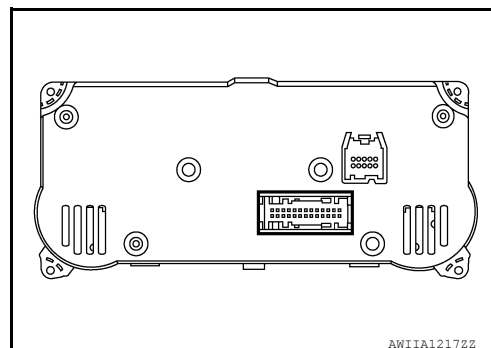
## ECU DIAGNOSIS INFORMATION

### AIR CONDITIONER CONTROL

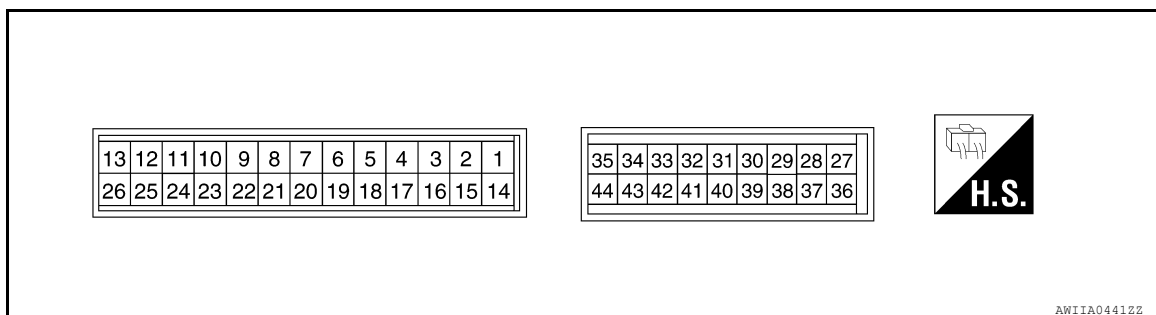
#### Front Air Control Terminals Reference Values

INFOID:0000000011070979

Measure voltage between each terminal and ground by following Terminals and Reference Values for front air control.



#### FRONT AIR CONTROL HARNESS CONNECTOR TERMINAL LAYOUT



#### TERMINALS AND REFERENCE VALUES FOR FRONT AIR CONTROL

| Terminal No. | Wire color | Item                                                  | Ignition switch | Condition              | Voltage (V) (Approx.) |
|--------------|------------|-------------------------------------------------------|-----------------|------------------------|-----------------------|
| 3            | P          | Ground for mode door motor and air mix door motor PBR | ON              | -                      | 0V                    |
| 4            | W          | Compressor ON signal                                  | ON              | A/C switch OFF         | 5V                    |
|              |            |                                                       | ON              | A/C switch ON          | 0V                    |
| 5            | R          | Front blower monitor                                  | ON              | Front blower motor OFF | Battery voltage       |
|              |            |                                                       |                 | Front blower motor ON  | 0V                    |
| 6            | SB         | Air mix door motor feedback                           | ON              | -                      | 0 - 5V                |
| 8            | G          | Illumination +                                        | ON              | Park lamps ON          | Battery voltage       |
| 9            | BR         | Illumination -                                        | -               | Park lamps ON          | <p>PTIA2344E</p>      |
| 10           | V          | Mode door motor feedback                              | ON              | -                      | 0 - 5V                |
| 11           | L          | Intake sensor                                         | ON              | -                      | 0 - 5V                |
| 13           | LG         | Variable blower control                               | ON              | Blower speed (low)     | 1.7V                  |
|              |            |                                                       |                 | Blower speed (hi)      | 4.5V                  |
| 15           | W/G        | Power supply for IGN                                  | ON              | -                      | Battery voltage       |
| 16           | Y          | Rear defroster request                                | ON              | -                      | Battery voltage       |

# AIR CONDITIONER CONTROL

< ECU DIAGNOSIS INFORMATION >

[MANUAL AIR CONDITIONER]

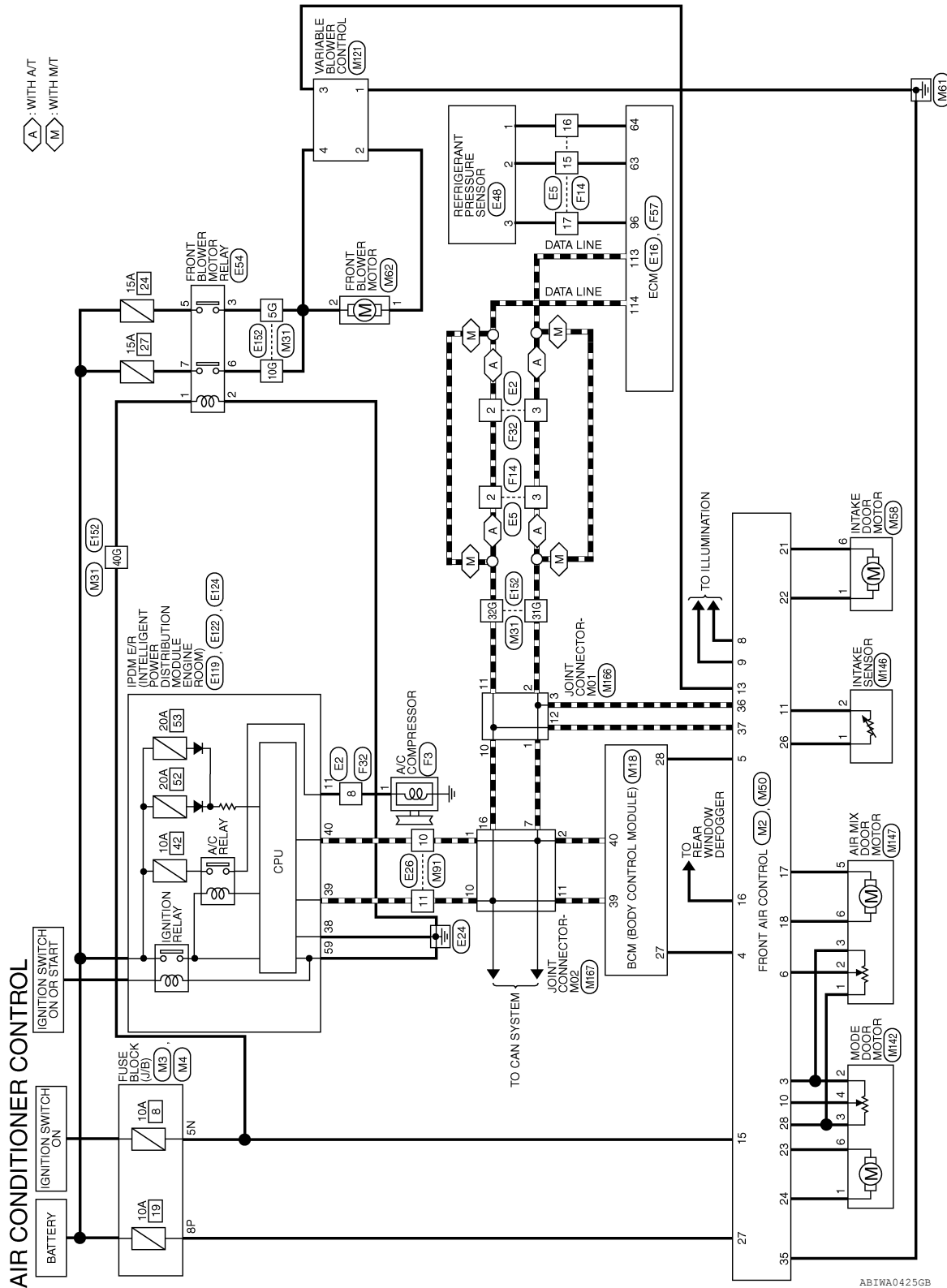
| Terminal No. | Wire color | Item                                                        | Ignition switch | Condition                 | Voltage (V) (Approx.) |
|--------------|------------|-------------------------------------------------------------|-----------------|---------------------------|-----------------------|
| 17           | GR         | Air mix door motor CCW                                      | ON              | Counterclockwise rotation | Battery voltage       |
| 18           | BG         | Air mix door motor CW                                       | ON              | Clockwise rotation        | Battery voltage       |
| 21           | BG         | Intake door motor CCW                                       | ON              | Counterclockwise rotation | Battery voltage       |
| 22           | Y          | Intake door motor CW                                        | ON              | Clockwise rotation        | Battery voltage       |
| 23           | R          | Mode door motor CCW                                         | ON              | Counterclockwise rotation | Battery voltage       |
| 24           | BR         | Mode door motor CW                                          | ON              | Clockwise rotation        | Battery voltage       |
| 26           | V          | Sensor ground                                               | ON              | -                         | 0V                    |
| 27           | R/Y        | Power supply for BAT                                        | -               | -                         | Battery voltage       |
| 28           | G          | Power supply for mode door motor and air mix door motor PBR | ON              | -                         | 5V                    |
| 35           | B          | Ground                                                      | -               | -                         | 0V                    |
| 36           | P          | CAN-L                                                       | ON              | -                         | 0 - 5V                |
| 37           | L          | CAN-H                                                       | ON              | -                         | 0 - 5V                |

**[MANUAL AIR CONDITIONER]**

## WIRING DIAGRAM

## Wiring Diagram

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



# AIR CONDITIONER CONTROL

< WIRING DIAGRAM >

[MANUAL AIR CONDITIONER]

## AIR CONDITIONER CONTROL CONNECTORS

|                 |                   |
|-----------------|-------------------|
| Connector No.   | M2                |
| Connector Name  | FRONT AIR CONTROL |
| Connector Color | WHITE             |

|    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|
| 35 | 34 | 33 | 32 | 31 | 30 | 29 | 28 | 27 |
| 44 | 43 | 42 | 41 | 40 | 39 | 38 | 37 | 36 |



| Terminal No. | Color of Wire | Signal Name    |
|--------------|---------------|----------------|
| 27           | R/Y           | VBAT           |
| 28           | G             | 5V REF VOLTAGE |
| 29           | -             | -              |
| 30           | -             | -              |
| 31           | -             | -              |
| 32           | -             | -              |
| 33           | -             | -              |
| 34           | -             | -              |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 35           | B             | GND         |
| 36           | P             | CAN-L       |
| 37           | L             | CAN-H       |
| 38           | -             | -           |
| 39           | -             | -           |
| 40           | -             | -           |
| 41           | -             | -           |
| 42           | -             | -           |
| 43           | -             | -           |
| 44           | -             | -           |

|                 |                  |
|-----------------|------------------|
| Connector No.   | M3               |
| Connector Name  | FUSE BLOCK (J/B) |
| Connector Color | WHITE            |

|    |    |    |
|----|----|----|
| 3N | 2N | 1N |
|    |    | 4N |
|    | 6N | 5N |
| 8N | 7N |    |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 5N           | W/G           | -           |

|                 |                  |
|-----------------|------------------|
| Connector No.   | M4               |
| Connector Name  | FUSE BLOCK (J/B) |
| Connector Color | WHITE            |

|     |     |     |     |     |     |     |    |    |
|-----|-----|-----|-----|-----|-----|-----|----|----|
| 7P  | 6P  | 5P  | 4P  | 3P  | 2P  | 1P  |    |    |
| 16P | 15P | 14P | 13P | 12P | 11P | 10P | 9P | 8P |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 8P           | R/Y           | -           |

|                 |                           |
|-----------------|---------------------------|
| Connector No.   | M18                       |
| Connector Name  | BCM (BODY CONTROL MODULE) |
| Connector Color | WHITE                     |



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

| Terminal No. | Color of Wire | Signal Name   |
|--------------|---------------|---------------|
| 27           | W             | AIRCON SW     |
| 28           | R             | BLOWER FAN SW |
| 39           | L             | CAN-H         |
| 40           | P             | CAN-L         |

# AIR CONDITIONER CONTROL

< WIRING DIAGRAM >

[MANUAL AIR CONDITIONER]

| Terminal No. | Color of Wire | Signal Name      |
|--------------|---------------|------------------|
| 10           | V             | MODE FEEDBACK    |
| 11           | L             | EVAP TEMP SENSOR |
| 12           | -             | -                |
| 13           | LG            | FRONT BLWR SPEED |
| 14           | -             | -                |
| 15           | W/G           | VIGN             |
| 16           | Y             | REAR DEF REQ     |
| 17           | GR            | SZ BLND DR A     |
| 18           | BG            | SZ BLND DR B     |
| 19           | -             | -                |
| 20           | -             | -                |
| 21           | BG            | INTAKE DR1 A     |
| 22           | Y             | INTAKE DR1 B     |
| 23           | R             | MODE DR A        |
| 24           | BR            | MODE DR B        |
| 25           | -             | -                |
| 26           | V             | SENSOR RETURN    |

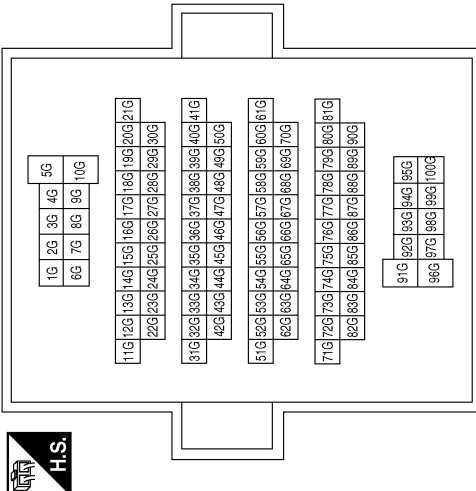
|                 |                   |
|-----------------|-------------------|
| Connector No.   | M50               |
| Connector Name  | FRONT AIR CONTROL |
| Connector Color | BLACK             |

|    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 13 | 12 | 11 | 10 | 9  | 8  | 7  | 6  | 5  | 4  | 3  | 2  | 1  |
| 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 |



| Terminal No. | Color of Wire | Signal Name   |
|--------------|---------------|---------------|
| 1            | -             | -             |
| 2            | -             | -             |
| 3            | P             | VREF RET      |
| 4            | W             | AC REQ        |
| 5            | R             | FAN ON        |
| 6            | SB            | SZ BLND DR FB |
| 7            | -             | -             |
| 8            | G             | ILLUM+        |
| 9            | BR            | ILLUM-        |

|                 |              |
|-----------------|--------------|
| Connector No.   | M31          |
| Connector Name  | WIRE TO WIRE |
| Connector Color | WHITE        |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 5G           | W/G           | -           |
| 10G          | W/G           | -           |
| 31G          | P             | -           |
| 32G          | L             | -           |
| 40G          | W/G           | -           |

|                 |                   |
|-----------------|-------------------|
| Connector No.   | M58               |
| Connector Name  | INTAKE DOOR MOTOR |
| Connector Color | BLACK             |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | Y             | -           |
| 6            | BG            | -           |

|                 |                    |
|-----------------|--------------------|
| Connector No.   | M62                |
| Connector Name  | FRONT BLOWER MOTOR |
| Connector Color | BLACK              |

|   |   |
|---|---|
| 1 | 2 |
|---|---|



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | L             | -           |
| 2            | W/G           | -           |

|                 |              |
|-----------------|--------------|
| Connector No.   | M91          |
| Connector Name  | WIRE TO WIRE |
| Connector Color | WHITE        |



|    |    |    |    |    |    |    |   |   |
|----|----|----|----|----|----|----|---|---|
| 7  | 6  | 5  | 4  | 3  | 2  | 1  |   |   |
| 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |

| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 10           | P             | -           |
| 11           | L             | -           |

# AIR CONDITIONER CONTROL

< WIRING DIAGRAM >

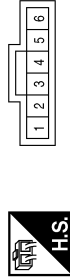
[MANUAL AIR CONDITIONER]

|                 |                            |
|-----------------|----------------------------|
| Connector No.   | M121                       |
| Connector Name  | VARIABLE BLOWER<br>CONTROL |
| Connector Color | WHITE                      |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | B             | -           |
| 2            | L             | -           |
| 3            | LG            | -           |
| 4            | W/G           | -           |

|                 |                 |
|-----------------|-----------------|
| Connector No.   | M142            |
| Connector Name  | MODE DOOR MOTOR |
| Connector Color | BLACK           |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | BR            | -           |
| 2            | P             | -           |
| 3            | G             | -           |
| 4            | V             | -           |
| 6            | R             | -           |

|                 |               |
|-----------------|---------------|
| Connector No.   | M146          |
| Connector Name  | INTAKE SENSOR |
| Connector Color | GRAY          |



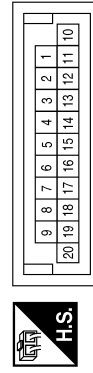
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | V             | -           |
| 2            | L             | -           |

|                 |                    |
|-----------------|--------------------|
| Connector No.   | M147               |
| Connector Name  | AIR MIX DOOR MOTOR |
| Connector Color | BLACK              |



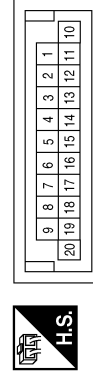
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | Y             | -           |
| 2            | SB            | -           |
| 3            | P             | -           |
| 5            | GR            | -           |
| 6            | BG            | -           |

|                 |                     |
|-----------------|---------------------|
| Connector No.   | M166                |
| Connector Name  | JOINT CONNECTOR-M01 |
| Connector Color | BLUE                |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | P             | -           |
| 2            | P             | -           |
| 3            | P             | -           |
| 10           | L             | -           |
| 11           | L             | -           |
| 12           | L             | -           |

|                 |                     |
|-----------------|---------------------|
| Connector No.   | M167                |
| Connector Name  | JOINT CONNECTOR-M02 |
| Connector Color | BLUE                |



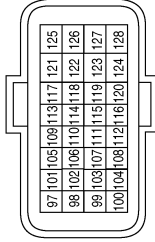
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | P             | -           |
| 2            | P             | -           |
| 7            | P             | -           |
| 10           | L             | -           |
| 11           | L             | -           |
| 16           | L             | -           |

# AIR CONDITIONER CONTROL

< WIRING DIAGRAM >

[MANUAL AIR CONDITIONER]

|                 |      |
|-----------------|------|
| Connector No.   | E16  |
| Connector Name  | ECM  |
| Connector Color | GRAY |



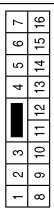
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 113          | P             | CAN-L       |
| 114          | L             | CAN-H       |

|                 |              |
|-----------------|--------------|
| Connector No.   | E5           |
| Connector Name  | WIRE TO WIRE |
| Connector Color | WHITE        |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 2            | L             | -           |
| 3            | P             | -           |
| 15           | BR            | -           |
| 16           | LG            | -           |
| 17           | P             | -           |

|                 |              |
|-----------------|--------------|
| Connector No.   | E2           |
| Connector Name  | WIRE TO WIRE |
| Connector Color | WHITE        |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 2            | L             | -           |
| 3            | P             | -           |
| 8            | Y             | -           |

|                 |                          |
|-----------------|--------------------------|
| Connector No.   | E54                      |
| Connector Name  | FRONT BLOWER MOTOR RELAY |
| Connector Color | BROWN                    |



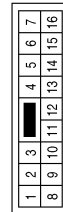
| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | W/G           | -           |
| 2            | B             | -           |
| 3            | W/G           | -           |
| 5            | L             | -           |
| 6            | W/G           | -           |
| 7            | GR            | -           |

|                 |                             |
|-----------------|-----------------------------|
| Connector No.   | E48                         |
| Connector Name  | REFRIGERANT PRESSURE SENSOR |
| Connector Color | BLACK                       |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 1            | LG            | -           |
| 2            | BR            | -           |
| 3            | P             | -           |

|                 |              |
|-----------------|--------------|
| Connector No.   | E26          |
| Connector Name  | WIRE TO WIRE |
| Connector Color | WHITE        |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 10           | P             | -           |
| 11           | L             | -           |

ABIIA1295GB

# AIR CONDITIONER CONTROL

< WIRING DIAGRAM >

[MANUAL AIR CONDITIONER]

|                 |                                                              |
|-----------------|--------------------------------------------------------------|
| Connector No.   | E124                                                         |
| Connector Name  | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | BLACK                                                        |



|    |    |    |
|----|----|----|
| 59 | 58 | 57 |
| 62 | 61 | 60 |

|              |               |             |
|--------------|---------------|-------------|
| Terminal No. | Color of Wire | Signal Name |
| 59           | B             | GND (POWER) |

|                 |                                                              |
|-----------------|--------------------------------------------------------------|
| Connector No.   | E122                                                         |
| Connector Name  | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE                                                        |



|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 42 | 41 | 40 | 39 | 38 | 37 |
| 48 | 47 | 46 | 45 | 44 | 43 |

|              |               |              |
|--------------|---------------|--------------|
| Terminal No. | Color of Wire | Signal Name  |
| 38           | B             | GND (SIGNAL) |
| 39           | L             | CAN-H        |
| 40           | P             | CAN-L        |

|                 |                                                              |
|-----------------|--------------------------------------------------------------|
| Connector No.   | E119                                                         |
| Connector Name  | IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) |
| Connector Color | WHITE                                                        |



|    |    |    |    |             |    |    |    |    |
|----|----|----|----|-------------|----|----|----|----|
| 9  | 8  | 7  | 6  | <div></div> | 5  | 4  | 3  |    |
| 18 | 17 | 16 | 15 | 14          | 13 | 12 | 11 | 10 |

|              |               |                |
|--------------|---------------|----------------|
| Terminal No. | Color of Wire | Signal Name    |
| 11           | Y             | A/C COMPRESSOR |

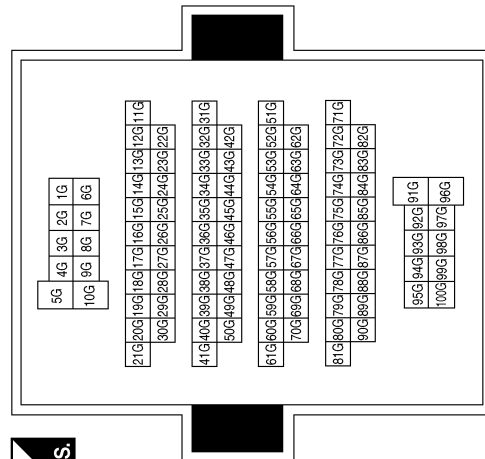
|                 |                |
|-----------------|----------------|
| Connector No.   | F3             |
| Connector Name  | A/C COMPRESSOR |
| Connector Color | BLACK          |



|              |               |             |
|--------------|---------------|-------------|
| Terminal No. | Color of Wire | Signal Name |
| 1            | Y             | —           |

|              |               |             |
|--------------|---------------|-------------|
| Terminal No. | Color of Wire | Signal Name |
| 5G           | W/G           | —           |
| 10G          | W/G           | —           |
| 31G          | P             | —           |
| 32G          | L             | —           |
| 40G          | W/G           | —           |

|                 |              |
|-----------------|--------------|
| Connector No.   | E152         |
| Connector Name  | WIRE TO WIRE |
| Connector Color | WHITE        |



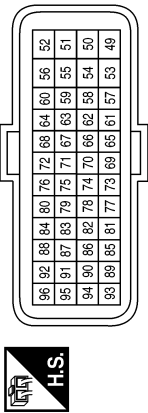
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AIR CONDITIONER CONTROL

< WIRING DIAGRAM >

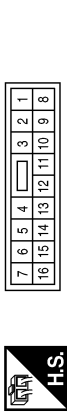
[MANUAL AIR CONDITIONER]

|                 |       |
|-----------------|-------|
| Connector No.   | F57   |
| Connector Name  | ECM   |
| Connector Color | BROWN |



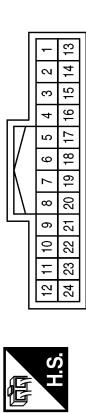
| Terminal No. | Color of Wire | Signal Name   |
|--------------|---------------|---------------|
| 63           | BR            | PDPRESS       |
| 64           | LG            | GNDA-PDPRES   |
| 96           | P             | AVCC (PDPRES) |

|                 |              |
|-----------------|--------------|
| Connector No.   | F32          |
| Connector Name  | WIRE TO WIRE |
| Connector Color | WHITE        |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 2            | L             | -           |
| 3            | P             | -           |
| 8            | Y             | -           |

|                 |              |
|-----------------|--------------|
| Connector No.   | F14          |
| Connector Name  | WIRE TO WIRE |
| Connector Color | WHITE        |



| Terminal No. | Color of Wire | Signal Name |
|--------------|---------------|-------------|
| 2            | L             | -           |
| 3            | P             | -           |
| 15           | BR            | -           |
| 16           | LG            | -           |
| 17           | P             | -           |

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

## SYMPTOM DIAGNOSIS

### AIR CONDITIONER CONTROL

#### Symptom Matrix Chart

INFOID:0000000011070981

#### SYMPTOM TABLE

| Symptom                                         | Reference Page                                              |                        |
|-------------------------------------------------|-------------------------------------------------------------|------------------------|
| A/C system does not come on.                    | Go to Trouble Diagnosis Procedure for A/C System.           | <a href="#">HAC-41</a> |
| Air outlet does not change.                     | Go to Trouble Diagnosis Procedure for Mode Door Motor.      | <a href="#">HAC-17</a> |
| Mode door motor is malfunctioning.              |                                                             |                        |
| Discharge air temperature does not change.      | Go to Trouble Diagnosis Procedure for Air Mix Door Motor.   | <a href="#">HAC-22</a> |
| Air mix door motor is malfunctioning.           |                                                             |                        |
| Intake door does not change.                    | Go to Trouble Diagnosis Procedure for Intake Door Motor.    | <a href="#">HAC-25</a> |
| Intake door motor is malfunctioning.            |                                                             |                        |
| Front blower motor operation is malfunctioning. | Go to Trouble Diagnosis Procedure for Front Blower Motor.   | <a href="#">HAC-27</a> |
| Magnet clutch does not engage.                  | Go to Trouble Diagnosis Procedure for Magnet Clutch.        | <a href="#">HAC-33</a> |
| Insufficient cooling                            | Go to Trouble Diagnosis Procedure for Insufficient Cooling. | <a href="#">HAC-53</a> |
| Insufficient heating                            | Go to Trouble Diagnosis Procedure for Insufficient Heating. | <a href="#">HAC-61</a> |
| Noise                                           | Go to Trouble Diagnosis Procedure for Noise.                | <a href="#">HAC-63</a> |
| Self-Diagnosis cannot be performed              | Go to Trouble Diagnosis Procedure for Self-Diagnosis.       | <a href="#">HAC-16</a> |

## INSUFFICIENT COOLING

## Component Function Check

INFOID:0000000011070982

SYMPTOM: Insufficient cooling

## INSPECTION FLOW

**1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE**

1. Turn temperature control dial counterclockwise to maximum cold.
2. Check for cold air at discharge air outlets.

Can the symptom be duplicated?

- YES >> GO TO 3.  
 NO >> GO TO 2.

**2.CHECK FOR ANY SYMPTOMS**Perform a complete operational check for any symptoms. Refer to [HAC-4, "Operational Check"](#).Does another symptom exist?

- YES >> Refer to [HAC-52, "Symptom Matrix Chart"](#).  
 NO >> System OK.

**3.CHECK FOR SERVICE BULLETINS**

Check for any service bulletins.

&gt;&gt; GO TO 4.

**4.PERFORM SELF-DIAGNOSIS**Perform self-diagnosis. Refer to [HAC-16, "Front Air Control Self-Diagnosis"](#).Is the inspection result normal?

- YES >> GO TO 5.  
 NO >> Check symptom chart. Refer to [HAC-52, "Symptom Matrix Chart"](#).

**5.CHECK DRIVE BELTS**Check compressor belt tension. Refer to [EM-13, "Checking Drive Belts"](#).Is the inspection result normal?

- YES >> GO TO 6.  
 NO >> Adjust or replace compressor belt. Refer to [EM-13, "Adjustment"](#).

**6.CHECK AIR MIX DOOR OPERATION**

Check and verify air mix door mechanism for smooth operation.

Does air mix door operate correctly?

- YES >> GO TO 7.  
 NO >> Repair or replace air mix door control linkage.

**7.CHECK COOLING FAN MOTOR OPERATION**Check and verify cooling fan motor for smooth operation. Refer to [EC-468, "Component Inspection"](#).Does cooling fan motor operate correctly?

- YES >> GO TO 8.  
 NO >> Check cooling fan motor. Refer to [EC-468, "Component Inspection"](#).

**8.CHECK RECOVERY/RECYCLING EQUIPMENT BEFORE USAGE**

Check recovery/recycling equipment before connecting to vehicle. Verify there is no pressure in the recovery/recycling equipment by checking the gauges. If pressure exists, recover refrigerant from equipment lines.

&gt;&gt; GO TO 9.

**9.CHECK REFRIGERANT PURITY**

# INSUFFICIENT COOLING

[MANUAL AIR CONDITIONER]

## < SYMPTOM DIAGNOSIS >

1. Connect recovery/recycling equipment to vehicle.
2. Confirm refrigerant purity in supply tank using recovery/recycling and refrigerant identifier.

### Is the inspection result normal?

YES >> GO TO 10.

NO >> Check contaminated refrigerant. Refer to [HA-3, "Contaminated Refrigerant"](#).

## 10.CHECK FOR EVAPORATOR FREEZE UP

Start engine and run A/C. Check for evaporator freeze up.

### Does evaporator freeze up?

YES >> Perform diagnostic work flow. Refer to [HAC-54, "Diagnostic Work Flow"](#).

NO >> GO TO 11.

## 11.CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to [HAC-56, "Performance Chart"](#).

### Is the inspection result normal?

YES >> Perform diagnostic work flow. Refer to [HAC-54, "Diagnostic Work Flow"](#).

NO >> GO TO 12.

## 12.CHECK AIR DUCTS

Check ducts for air leaks.

### Is the inspection result normal?

YES >> System OK.

NO >> Repair air leaks.

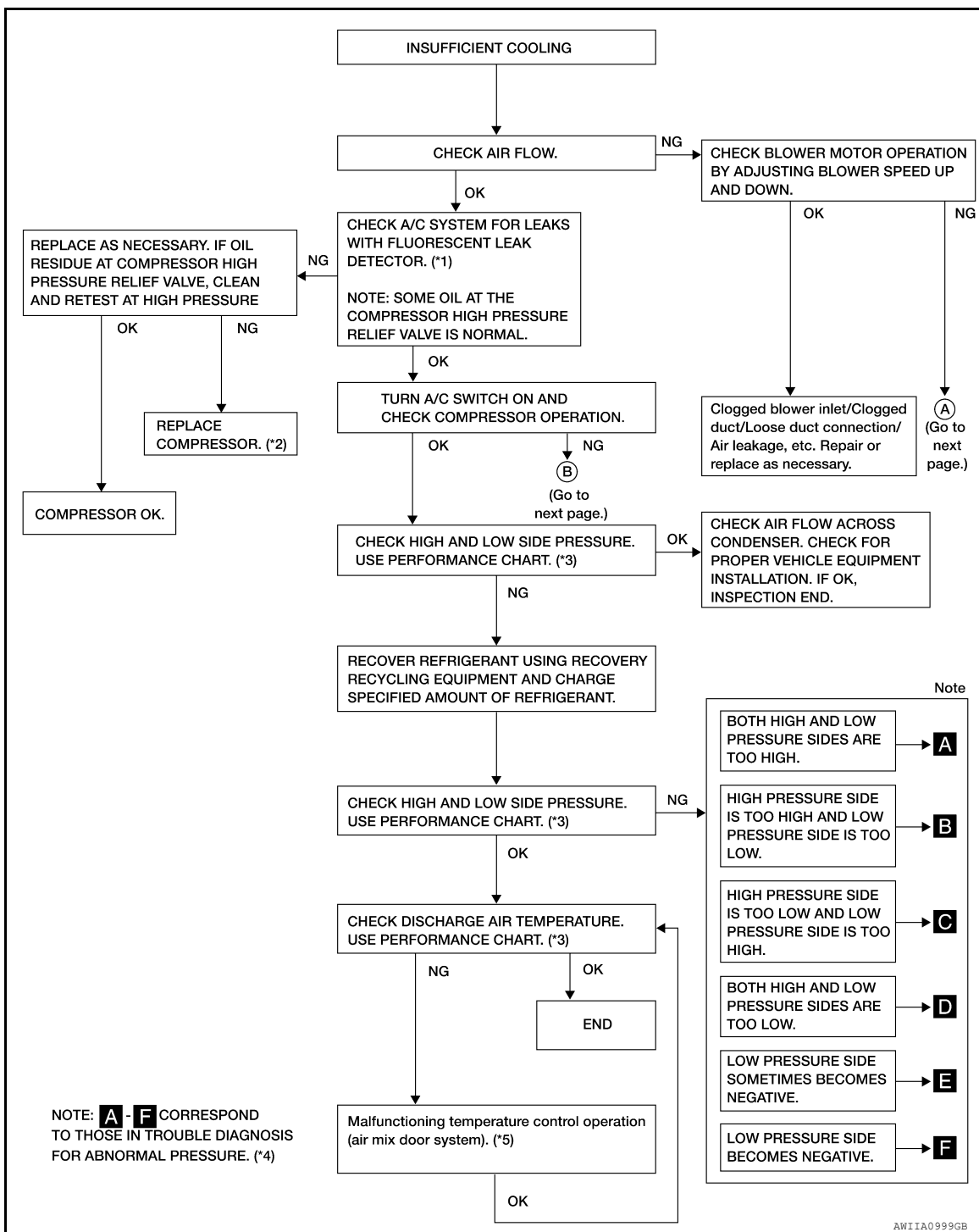
## Diagnostic Work Flow

INFOID:0000000011070983

# INSUFFICIENT COOLING

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\*1 [HA-20. "Checking System for Leaks Using the Fluorescent Dye Leak Detector"](#)

\*2 [HA-27. "Removal and Installation of Compressor"](#)

\*3 [HAC-56. "Performance Chart"](#)

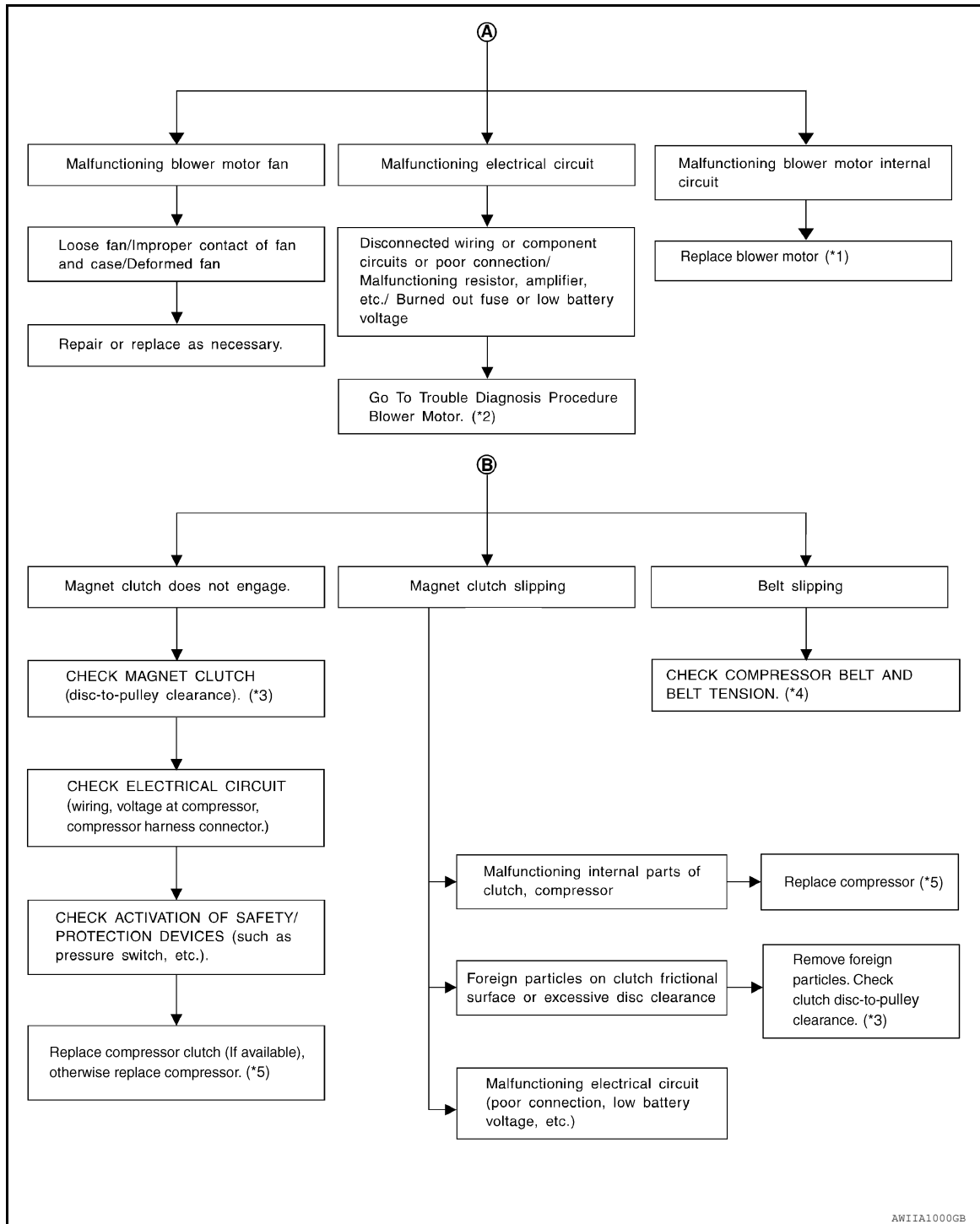
\*4 [HAC-57. "Trouble Diagnoses for Abnormal Pressure"](#)

\*5 [HAC-22. "Air Mix Door Motor Diagnosis Procedure"](#)

# INSUFFICIENT COOLING

< SYMPTOM DIAGNOSIS >

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\*1 [VTL-9. "Removal and Installation"](#)

\*2 [HAC-28. "Front Blower Motor Diagnosis Procedure"](#)

\*3 [HA-28. "Removal and Installation of Compressor Clutch"](#)

\*4 [EM-13. "Checking Drive Belts"](#)

\*5 [HA-27. "Removal and Installation of Compressor"](#)

## Performance Chart

INFOID:0000000011070984

## TEST CONDITION

Testing must be performed as follows:

# INSUFFICIENT COOLING

< SYMPTOM DIAGNOSIS >

[MANUAL AIR CONDITIONER]

|                                                                                                |                                                                                                       |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Vehicle location                                                                               | Indoors or in the shade (in a well-ventilated place)                                                  |
| Doors                                                                                          | Closed                                                                                                |
| Door window                                                                                    | Open                                                                                                  |
| Hood                                                                                           | Open                                                                                                  |
| TEMP.                                                                                          | Max. COLD                                                                                             |
| Mode switch                                                                                    |  (Ventilation) set   |
| Recirculation (REC) switch                                                                     |  (Recirculation) set |
|  Blower speed | Max. speed set                                                                                        |
| Engine speed                                                                                   | Idle speed                                                                                            |

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

## TEST READING

Recirculating-to-discharge Air Temperature Table

| Inside air (Recirculating air) at blower assembly inlet |                            | Discharge air temperature at center ventilator<br>°C (°F) |
|---------------------------------------------------------|----------------------------|-----------------------------------------------------------|
| Relative humidity<br>%                                  | Air temperature<br>°C (°F) |                                                           |
| 50 - 60                                                 | 20 (68)                    | 5.3 - 6.5 (42 - 44)                                       |
|                                                         | 25 (77)                    | 9.7 - 11.5 (49 - 53)                                      |
|                                                         | 30 (86)                    | 13.8 - 16.3 (57 - 61)                                     |
|                                                         | 35 (95)                    | 18.0 - 21.2 (64 - 70)                                     |
|                                                         | 40 (104)                   | 22.2 - 25.7 (72 - 78)                                     |
| 60 - 70                                                 | 20 (68)                    | 6.5 - 7.7 (44 - 46)                                       |
|                                                         | 25 (77)                    | 11.5 - 13.3 (53 - 56)                                     |
|                                                         | 30 (86)                    | 16.3 - 18.8 (61 - 66)                                     |
|                                                         | 35 (95)                    | 21.2 - 24.0 (70 - 75)                                     |
|                                                         | 40 (104)                   | 25.7 - 29.2 (78 - 85)                                     |

Ambient Air Temperature-to-operating Pressure Table

| Ambient air            |                            | High-pressure (Discharge side)<br>kPa (kg/cm <sup>2</sup> , psi) | Low-pressure (Suction side)<br>kPa (kg/cm <sup>2</sup> , psi) |
|------------------------|----------------------------|------------------------------------------------------------------|---------------------------------------------------------------|
| Relative humidity<br>% | Air temperature<br>°C (°F) |                                                                  |                                                               |
| 50 - 70                | 20 (68)                    | 680 - 840<br>(6.94 - 8.57, 98.6 - 121.8)                         | 160 - 198<br>(1.63 - 2.02, 23.2 - 28.7)                       |
|                        | 25 (77)                    | 800 - 985<br>(8.16 - 10.05, 116.0 - 142.8)                       | 198 - 245<br>(2.02 - 2.50, 28.7 - 35.5)                       |
|                        | 30 (86)                    | 940 - 1,150<br>(9.59 - 11.73, 136.3 - 166.8)                     | 225 - 278<br>(2.30 - 2.84, 32.6 - 40.3)                       |
|                        | 35 (95)                    | 1,160 - 1,410<br>(11.83 - 14.38, 168.2 - 204.5)                  | 273 - 335<br>(2.78 - 3.42, 39.6 - 48.6)                       |
|                        | 40 (104)                   | 1,325 - 1,620<br>(13.52 - 16.52, 192.1 - 234.9)                  | 325 - 398<br>(3.32 - 4.06, 47.1 - 57.7)                       |

## Trouble Diagnoses for Abnormal Pressure

INFOID:0000000011070985

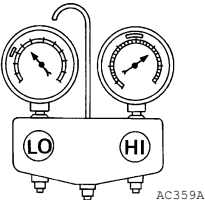
Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient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

# INSUFFICIENT COOLING

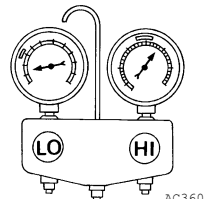
[MANUAL AIR CONDITIONER]

## < SYMPTOM DIAGNOSIS >

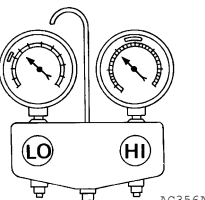
Both High- and Low-pressure Sides are Too High

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

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

| Gauge indication                                                                                                                                                    | Refrigerant cycle                                                                           | Probable cause                                                                               | Corrective action                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>B</b><br>High-pressure side is too high and low-pressure side is too low.<br> | Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot. | High-pressure tube or parts located between compressor and condenser are clogged or crushed. | <ul style="list-style-type: none"> <li>Check and repair or replace malfunctioning parts.</li> <li>Check oil for contamination.</li> </ul> |

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

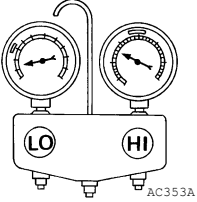
| Gauge indication                                                                                                                                                    | Refrigerant cycle                                                                | Probable cause                                   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

# INSUFFICIENT COOLING

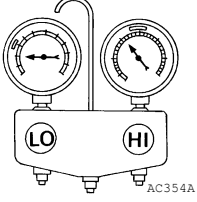
< SYMPTOM DIAGNOSIS >

[MANUAL AIR CONDITIONER]

Both High- and Low-pressure Sides are Too Low

| Gauge indication                                                                                                                                                    | Refrigerant cycle                                                                                                                                                                                                                                                       | Probable cause                                                                                                                                                                                | Corrective action                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>D</b><br/>Both high- and low-pressure sides are too low.</p>  <p>AC353A</p> | <ul style="list-style-type: none"> <li>There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low.</li> <li>Liquid tank inlet and expansion valve are frosted.</li> </ul>                                          | Liquid tank inside is slightly clogged.                                                                                                                                                       | <ul style="list-style-type: none"> <li>Replace liquid tank.</li> <li>Check oil for contamination.</li> </ul>                                                                                                                                                                                                                             |
|                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank.</li> <li>Expansion valve inlet may be frosted.</li> <li>Temperature difference occurs somewhere in high-pressure side.</li> </ul> | High-pressure pipe located between liquid tank and expansion valve is clogged.                                                                                                                | <ul style="list-style-type: none"> <li>Check and repair malfunctioning parts.</li> <li>Check oil for contamination.</li> </ul>                                                                                                                                                                                                           |
|                                                                                                                                                                     | Expansion valve and liquid tank are warm or only cool when touched.                                                                                                                                                                                                     | Low refrigerant charge.<br>↓<br>Leaking fittings or components.                                                                                                                               | Check refrigerant system for leaks. Refer to <a href="#">HA-22, "Checking of Refrigerant Leaks"</a> .                                                                                                                                                                                                                                    |
|                                                                                                                                                                     | There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.                                                                                                                                                       | Expansion valve closes a little compared with the specification.<br>↓<br>1. Improper expansion valve adjustment.<br>2. Malfunctioning expansion valve.<br>3. Outlet and inlet may be clogged. | <ul style="list-style-type: none"> <li>Remove foreign particles by using compressed air.</li> <li>Check oil for contamination.</li> </ul>                                                                                                                                                                                                |
|                                                                                                                                                                     | An area of the low-pressure pipe is colder than areas near the evaporator outlet.                                                                                                                                                                                       | Low-pressure pipe is clogged or crushed.                                                                                                                                                      | <ul style="list-style-type: none"> <li>Check and repair malfunctioning parts.</li> <li>Check oil for contamination.</li> </ul>                                                                                                                                                                                                           |
|                                                                                                                                                                     | Air flow volume is too low.                                                                                                                                                                                                                                             | Evaporator is frozen.                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Check intake sensor circuit. Refer to <a href="#">HAC-38, "Intake Sensor Diagnosis Procedure"</a>.</li> <li>Replace compressor.</li> <li>Repair evaporator fins.</li> <li>Replace evaporator.</li> <li>Refer to <a href="#">HAC-27, "Front Blower Motor Component Function Check"</a>.</li> </ul> |

Low-pressure Side Sometimes Becomes Negative

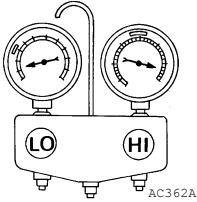
| Gauge indication                                                                                                                                                    | Refrigerant cycle                                                                                                                                                                                                                                              | Probable cause                                                                                                                                      | Corrective action                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>E</b><br/>Low-pressure side sometimes becomes negative.</p>  <p>AC354A</p> | <ul style="list-style-type: none"> <li>Air conditioning system does not function and does not cyclically cool the compartment air.</li> <li>The system constantly functions for a certain period of time after compressor is stopped and restarted.</li> </ul> | Refrigerant does not discharge cyclically.<br>↓<br>Moisture is frozen at expansion valve outlet and inlet.<br>↓<br>Water is mixed with refrigerant. | <ul style="list-style-type: none"> <li>Drain water from refrigerant or replace refrigerant.</li> <li>Replace liquid tank.</li> </ul> |

Low-pressure Side Becomes Negative

# INSUFFICIENT COOLING

< SYMPTOM DIAGNOSIS >

[MANUAL AIR CONDITIONER]

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

## INSUFFICIENT HEATING

## Component Function Check

INFOID:0000000011070986

SYMPTOM: Insufficient heating

## INSPECTION FLOW

**1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE**

1. Rotate blower control dial clockwise.
2. Turn the temperature control dial clockwise to maximum heat.
3. Check for hot air at discharge air outlets.

Can the symptom be duplicated?

YES &gt;&gt; GO TO 2.

NO >> Perform complete operational check. Refer to [HAC-4, "Operational Check"](#).**2.CHECK FOR SERVICE BULLETINS**

Check for any service bulletins.

&gt;&gt; GO TO 3.

**3.PERFORM SELF-DIAGNOSIS**Perform self-diagnosis. Refer to [HAC-16, "Front Air Control Self-Diagnosis"](#).Is the inspection results normal?

YES &gt;&gt; GO TO 4.

NO >> Refer to [HAC-52, "Symptom Matrix Chart"](#).**4.CHECK ENGINE COOLING SYSTEM**

1. Check for proper engine coolant level. Refer to [CO-10, "System Inspection"](#).
2. Check hoses for leaks or kinks.
3. Check radiator cap.
4. Check for air in cooling system.

&gt;&gt; GO TO 5.

**5.CHECK AIR MIX DOOR OPERATION**

Check the operation of the air mix door.

Is the inspection result normal?

YES &gt;&gt; GO TO 6.

NO >> Check the air mix door motor circuit. Refer to [HAC-22, "Air Mix Door Motor Component Function Check"](#).**6.CHECK AIR DUCTS**

Check for disconnected or leaking air ducts.

Is the inspection result normal?

YES &gt;&gt; GO TO 7.

NO &gt;&gt; Repair all disconnected or leaking air ducts.

**7.CHECK HEATER HOSE TEMPERATURES**

1. Start engine and warm it up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be warm.

Is the inspection result normal?

YES &gt;&gt; Hot inlet hose and a warm outlet hose: GO TO 8.

NO &gt;&gt; Both hoses warm: GO TO 9.

**8.CHECK ENGINE COOLANT SYSTEM**Check engine coolant temperature sensor. Refer to [EC-189, "Component Inspection"](#).

## INSUFFICIENT HEATING

< SYMPTOM DIAGNOSIS >

[MANUAL AIR CONDITIONER]

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Is the inspection result normal?

YES >> System OK.

NO >> Repair or replace as necessary. Retest.

### 9. CHECK HEATER HOSES

---

Check heater hoses for proper installation.

Is the inspection result normal?

YES >> System OK.

- NO >> 1. Back flush heater core.  
2. Drain the water from the system.  
3. Refill system with new engine coolant. Refer to [CO-11, "Changing Engine Coolant"](#).  
4. GO TO 10 to retest.

### 10. CHECK HEATER HOSE TEMPERATURES

---

1. Start engine and warm it up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be warm.

Is the inspection result normal?

YES >> System OK.

NO >> Replace heater core. Refer to [VTL-17, "Removal and Installation"](#).

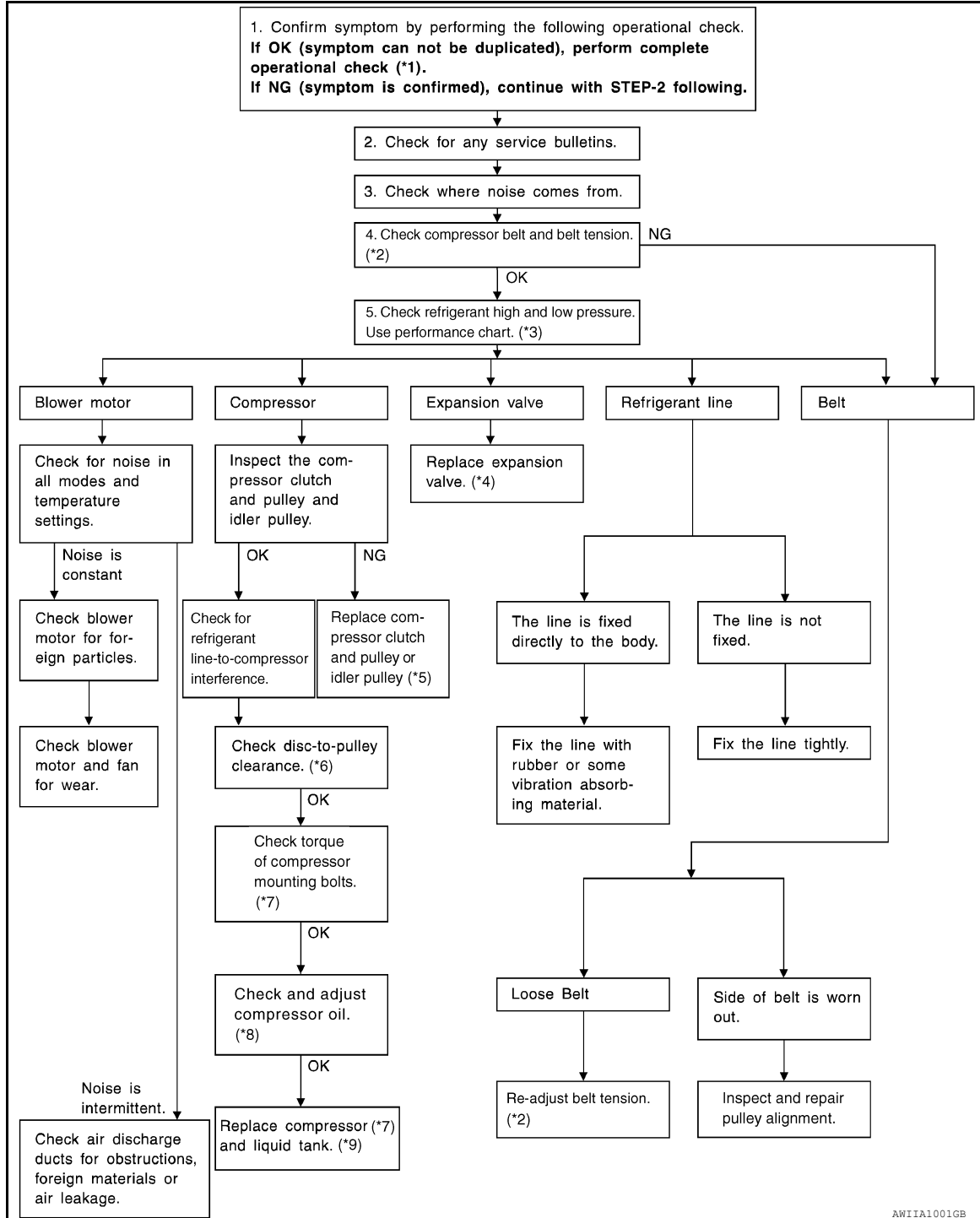
## NOISE

### Component Function Check

INFOID:0000000011070987

SYMPTOM: Noise

### INSPECTION FLOW



\*1 [HAC-4, "Operational Check"](#)

\*2 [EM-13, "Checking Drive Belts"](#)

\*3 [HAC-56, "Performance Chart"](#)

## NOISE

< SYMPTOM DIAGNOSIS >

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\*4 [HA-37. "Removal and Installation"](#)

\*5 [HA-28. "Removal and Installation of Compressor Clutch"](#)

\*6 [HA-28. "Removal and Installation of Compressor Clutch"](#)

\*7 [HA-27. "Removal and Installation of Compressor"](#)

\*8 [HA-18. "Maintenance of Oil Quantity in Compressor"](#)

\*9 [HA-35. "Removal and Installation of Condenser"](#)

## PRECAUTION

### PRECAUTIONS

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

INFOID:0000000011070988

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 SR and SB section of this Service Manual.

#### **WARNING:**

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

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

#### **WARNING:**

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

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

INFOID:0000000011070989

#### **WARNING:**

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed compressor failure is likely to occur. Refer to [HA-3, "Contaminated Refrigerant"](#). To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/ Recycling Recharging equipment and Refrigerant Identifier.
- Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
  - When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
  - When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
  - Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.
  - Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.
  - Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

#### CONTAMINATED REFRIGERANT

A

B

C

D

E

F

G

H

HAC

J

K

L

M

N

O

P

# PRECAUTIONS

[MANUAL AIR CONDITIONER]

## < PRECAUTION >

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

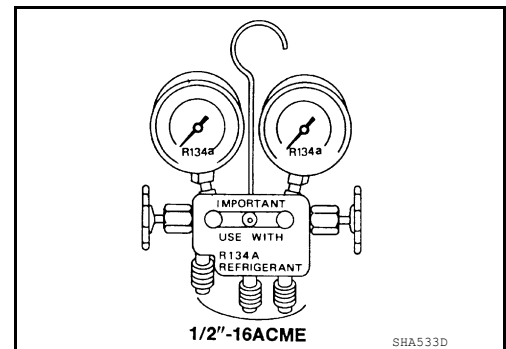
- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact NISSAN Customer Affairs for further assistance.

## Precaution for Service Equipment

INFOID:0000000011070990

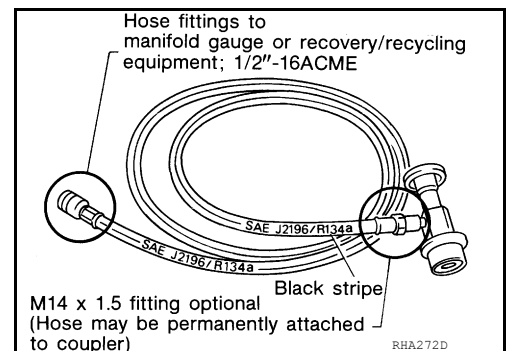
### MANIFOLD GAUGE SET

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



### SERVICE HOSES

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



### SERVICE COUPLERS

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

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

