# HEATER & AIR CONDITIONING CONTROL SYSTEM

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WORK FLOW	
1.LISTEN TO CUSTOMER COMPLAINT	С
Listen to customer complaint. Get detailed information about the conditions and environment when the symptom occurs.	D
>> GO TO 2	
2. CHECK FOR SERVICE BULLETINS	E
Check for any service bulletins.	
>> GO TO 3.	F
<b>3.</b> VERIFY THE SYMPTOM WITH OPERATIONAL CHECK	
Verify the symptom with operational check. Refer to <u>HAC-6</u> , " <u>Operational Check</u> ".	G
Can a symptom be duplicated?	
YES >> GO TO 4 NO >> GO TO 5	F
<b>4.</b> GO TO APPROPRIATE TROUBLE DIAGNOSIS	
Go to appropriate trouble diagnosis. Refer to HAC-72. "Symptom Matrix Chart".	HA
Can a symptom be duplicated? >> GO TO 5.	
5. PERFORM THE FRONT AIR CONTROL SELF-DIAGNOSIS	.
Perform front air control self-diagnosis. Refer to <u>HAC-20</u> , "Front Air Control Self-Diagnosis".	0
	K
>> If any diagnostic trouble codes set. Refer to <u>HAC-20, "Front Air Control Self-Diagnosis Code</u> <u>Chart"</u> .	L.
>> Confirm the repair by performing operational check. Refer to <u>HAC-6, "Operational Check"</u> .	1
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## INSPECTION AND ADJUSTMENT

## **Operational Check**

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

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

## CHECKING MEMORY FUNCTION

- 1. Set the temperature to 32° (90°F).
- 2. Press the OFF switch.
- 3. Turn ignition switch OFF.
- 4. Turn ignition switch ON.
- 5. Press the AUTO switch.
- 6. Confirm that the set temperature remains at previous temperature.
- 7. Press the OFF switch.

If NG, go to trouble diagnosis procedure for <u>HAC-85, "Memory Function Check"</u>. If OK, continue with next check.

#### CHECKING BLOWER

- 1. Rotate the blower control dial clockwise once, blower should operate on low speed.
- 2. Rotate the blower control dial again, and continue checking blower speed until all speeds are checked.
- 3. Leave blower on maximum speed.

If NG, go to trouble diagnosis procedure for <u>HAC-37</u>, "Front Blower Motor Diagnosis Procedure".

If OK, continue with next check.

#### CHECKING DISCHARGE AIR

- 1. Press each MODE switch and the DEF  $\mathbf{G}$  switch.
- 2. Each MODE position indicator should illuminate.
- Confirm that discharge air comes out according to the air distribution table. Refer to <u>HAC-15</u>, "<u>Discharge</u> <u>Air Flow</u>".

Mode door position is checked in the next step.

If NG, go to trouble diagnosis procedure for HAC-22. "Mode Door Motor Diagnosis Procedure".

If OK, continue the check.

#### NOTE:

Confirm that the 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 (7, 7 ONLY)

- 1. Press recirculation (
- 2. Press recirculation (
- 3. Listen for intake door position change (blower sound should change slightly).

If NG, go to trouble diagnosis procedure for HAC-34, "Intake Door Motor Diagnosis Procedure".

## If OK, continue the check.

#### NOTE:

Confirm that the compressor clutch is engaged (sound or visual inspection) and intake door position is at fresh when the DEF or D/F is selected. REC ( 2) is not allowed in DEF ( 3) D/F ( 3) or FOOT ( 4).

## CHECKING TEMPERATURE DECREASE

- 1. Rotate temperature control dial (drive or passenger) counterclockwise until 18°C (60°F) is displayed.
- 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 <u>HAC-73</u>, <u>"Component Function Check"</u>. If air mix door motor appears to be malfunctioning, go to <u>HAC-26</u>, "Air Mix Door <u>Motor (Driver) Component Function Check"</u>.

## If OK, continue the check.

## CHECKING TEMPERATURE INCREASE

- 1. Rotate temperature control dial clockwise (drive or passenger) until 32°C (90°F) is displayed.
- 2. Check for hot air at appropriate discharge air outlets.

В If NG, listen for sound of air mix door motor operation. If OK, go to trouble diagnosis procedure for HAC-81, "Component Function Check". If air mix door motor appears to be malfunctioning, go to HAC-26, "Air Mix Door Motor (Driver) Component Function Check".

If OK, continue with next check.

#### CHECK A/C SWITCH

- 1. Press A/C switch when AUTO switch is ON, or in manual mode.
- A/C switch indicator will turn ON.
  - Confirm that the compressor clutch engages (sound or visual inspection).

#### NOTE:

If current mode setting is DEF or D/F, compressor clutch will already be engaged and cannot be turned off. If NG, go to trouble diagnosis procedure for HAC-43, "Magnet Clutch Diagnosis Procedure". If OK. continue with next check.

#### CHECKING AUTO MODE

- 1. Press AUTO switch.
- 2. AUTO indicator should illuminate.

 If ambient temperature is warm, and selected temperature is cool, confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle, and set temperatures.)

If NG, go to trouble diagnosis procedure for HAC-59, "Front Air Control Power and Ground Diagnosis Procedure", then if necessary, trouble diagnosis procedure for HAC-43, "Magnet Clutch Diagnosis Procedure".

If all operational checks are OK (symptom cannot be duplicated), go to malfunction Simulation Tests in HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair" and perform tests as outlined to simulate driving conditions environment. If symptom appears. Refer to HAC-72. "Symptom Matrix Chart", and perform applicable trouble diagnosis procedures.

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# SYSTEM DESCRIPTION FUNCTION INFORMATION

**Component Part Location** 

ENGINE COMPARTMENT

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0 Front ₹2 9-2-01 (3) ALIIA0752ZZ

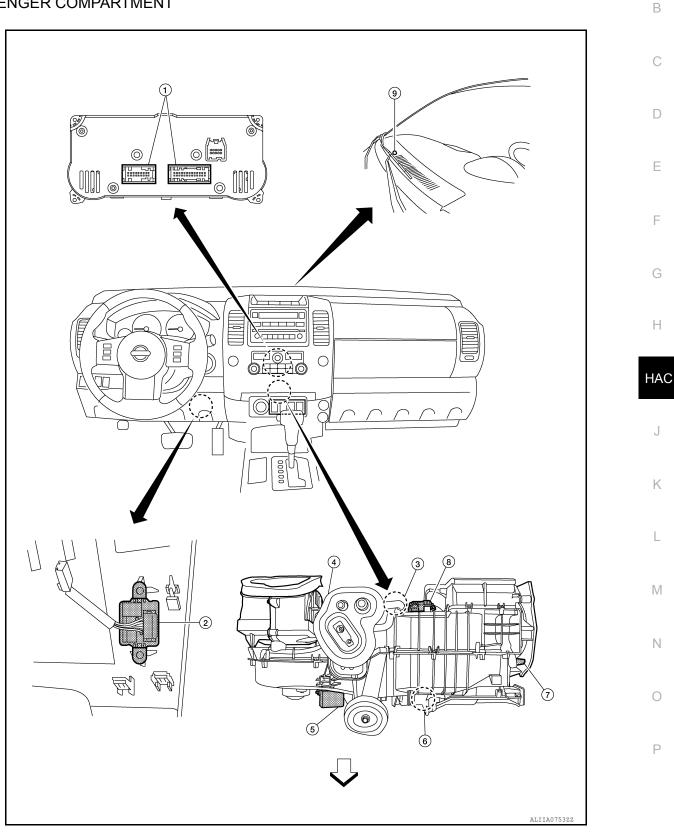
## < SYSTEM DESCRIPTION >

## [AUTOMATIC AIR CONDITIONER]

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- 1. Refrigerant pressure sensor E48 (view with battery removed)
- 2. Ambient sensor E28 (view with grille 3. A/C compressor F3 removed)

## PASSENGER COMPARTMENT



## < SYSTEM DESCRIPTION >

## FUNCTION INFORMATION

## [AUTOMATIC AIR CONDITIONER]

- 1. Front air control M52, M56
- 4. Intake door motor M58
- 7. Mode door motor M142
- ⇐ :Front

## Symptom Table

- 2. In-vehicle sensor M34
- 5. Variable blower control (front) M121
- 8. Air mix door motor (driver) M148 9.
- 3. Intake sensor M146
- 6. Air mix door motor (Passenger) M131
  - Optical sensor M14

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Symptom	Reference Page		
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	<u>HAC-59</u>	
A/C system cannot be controlled.	Go to Self-diagnosis Function.	<u>HAC-20</u>	
Air outlet does not change.	Co to Trouble Diagnosis Broadure for Mode Dear Mater		
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-22</u>	
Discharge air temperature does not change.	Co to Trouble Diagnosis Broadure for Air Mix Door Mater		
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u>HAC-26</u>	
Intake door does not change.	Co to Trouble Diagnosis Presedure for Intele Deer Mater		
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>HAC-34</u>	
Front blower motor operation is malfunction- ing.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	<u>HAC-37</u>	
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	<u>HAC-43</u>	
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	<u>HAC-73</u>	
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	<u>HAC-81</u>	
Noise	Go to Trouble Diagnosis Procedure for Noise.	<u>HAC-83</u>	
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	<u>HAC-20</u>	
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	HAC-85	

## **REFRIGERATION SYSTEM**

## **Refrigerant Cycle**

## REFRIGERANT FLOW

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

## Refrigerant System Protection

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## 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/

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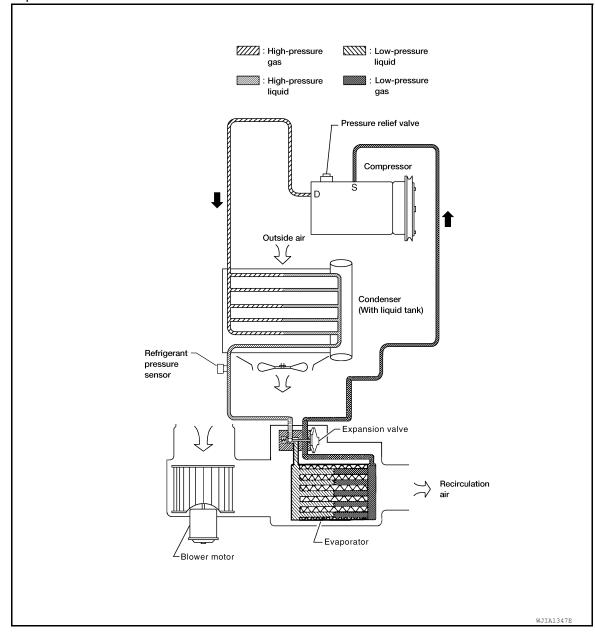
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[AUTOMATIC AIR CONDITIONER]

#### < SYSTEM DESCRIPTION >

## **REFRIGERATION SYSTEM**

cm<sup>2</sup>, 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



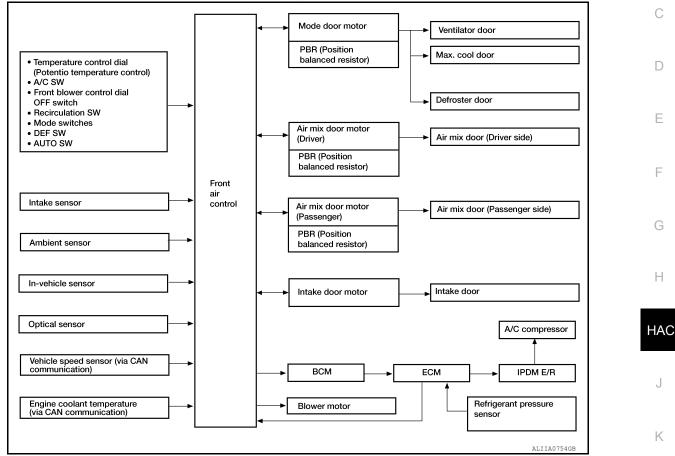
## < SYSTEM DESCRIPTION >

# AUTOMATIC AIR CONDITIONER SYSTEM

## Control System Diagram

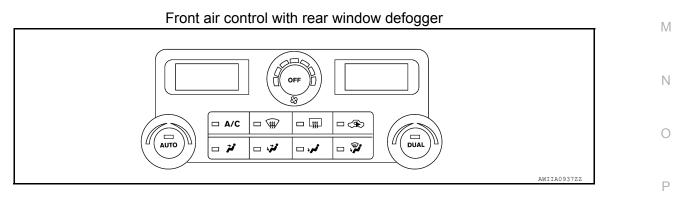
## CONTROL SYSTEM

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**

## CONTROL OPERATION



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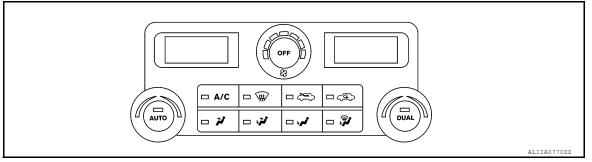
[AUTOMATIC AIR CONDITIONER]

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< SYSTEM DESCRIPTION >

Front air control without rear window defogger



#### AUTO SWITCH

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

## TEMPERATURE CONTROL DIAL (DRIVER)

Increases or decreases the set temperature.

#### TEMPERATURE CONTROL DIAL (PASSENGER)

Increases or decreases the set temperature.

#### RECIRCULATION (

- 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, at the D/F position, or in floor position.

#### DEFROSTER (@) SWITCH

Positions the air outlet doors to the defrost position. Also positions the intake doors to the outside air position, and turns A/C compressor ON.

#### REAR WINDOW DEFOGGER SWITCH (IF EQUIPPED)

When switch is ON, rear window and door mirrors are defogged.

#### FRE ( SWITCH (IF EQUIPPED)

When FRE switch is ON, FRE switch indicator turns ON, and air inlet is set to FRE.

#### OFF SWITCH

The compressor and blower are OFF, the intake doors are set to the outside air position, and the air outlet doors are set to the foot (75% foot and 25% defrost) position.

#### BLOWER CONTROL DIAL

The blower speed is manually controlled with this dial.

#### A/C SWITCH

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

#### MODE SWITCHES

Controls the air discharge outlets.

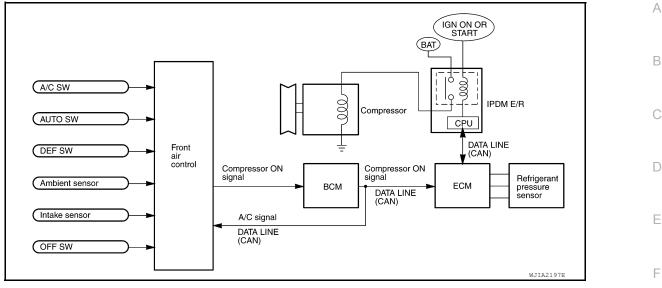
#### DUAL SWITCH

- When the DUAL switch indicator is illuminated, the driver and passenger temperature can each be set independently.
- When the DUAL switch indicator is not illuminated, the driver temperature setting is applied to both sides.

## < SYSTEM DESCRIPTION >

[AUTOMATIC AIR CONDITIONER]

MAGNET CLUTCH CONTROL



When A/C switch or DEF switch is pressed, front air control inputs compressor ON signal to BCM. BCM sends compressor ON signal to ECM and front air control, via CAN communication line. ECM judges whether 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 compressor.

## Discharge Air Flow

INFOID:000000009164273 HAC

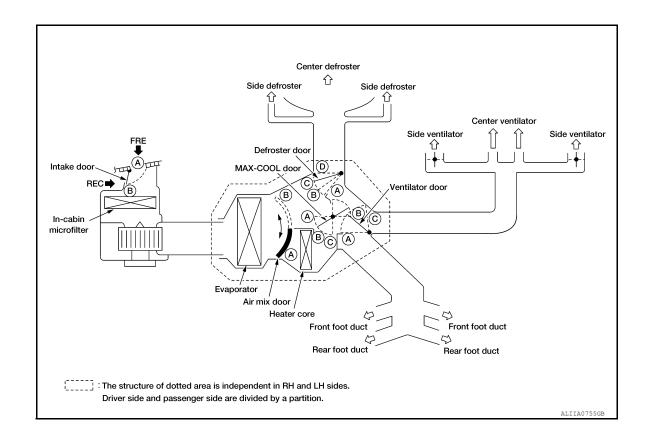
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	RR			I
		WJIA0540E		
Mode door position		Air outlet/distribution		
	Vent	Foot	Defroster	-
7	95%	5%	_	-
<del>ت</del>	60%	40%	_	- (
<b>.</b>	_	70%	30%	-
	_	60%	40%	-
¥	_	10%	90%	-

#### < SYSTEM DESCRIPTION >

## Switches And Their Control Function

INFOID:000000009164274



			Door position					
Switch/Dial position		Ventilator door	MAX-COOL door	Defroster door	Intake door	Air mix door		
	VENT	7		А	A	D	-	
MODE	B/L	U U		В	В	D	-	_
switch	FOOT D/F	ن		С	В	D or C		
		19	2	С	В	В		
DEF swi	itch	¢		С	С	А	В	_
REC swit	ch <sup>*1</sup>	Ē					А	_
FRE swit	ch <sup>*2</sup>	8			_		В	_
	Full Cold		Cold	_			А	
Temperature c	ontrol dial	$\begin{tabular}{lllllllllllllllllllllllllllllllllll$		_		AUTO		
Full Hot		-		В				

<sup>\*1</sup>: Inlet status is displayed by indicator when activating D/F mode.

\*2: If equipped (without rear defogger).

# DIAGNOSIS SYSTEM (HVAC)

## **CONSULT Function (HVAC)**

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

Diagnostic mode	Description	
SELF DIAGNOSTIC RESULT	Displays Front air control self-diagnosis results.	С
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.	D

## SELF-DIAGNOSIS

#### **Display Item List**

DTC	Description	Reference page	
B2573	Battery voltage out of range	CHG-2, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-5, "Work Flow (Without EXP-800 NI or GR8-1200 NI)"	
B2578	In-vehicle sensor circuit out of range (low)	HAC 51 "In Vehicle Senser Diagnosis Presedure"	
B2579	In-vehicle sensor circuit out of range (high)	HAC-51. "In-Vehicle Sensor Diagnosis Procedure"	
B257B	Ambient sensor circuit short	HAC 40 "Ambient Sensor Component Inspection"	
B257C	Ambient sensor circuit open	HAC-49, "Ambient Sensor Component Inspection"	
B257F	Optical sensor (Driver) circuit open or short		
B2580	Optical sensor (Passenger) circuit open or short	<ul> <li><u>HAC-54. "Optical Sensor Diagnosis Procedure"</u>.</li> </ul>	
B2581	Intake sensor circuit short		
B2582	Intake sensor circuit open	<u>HAC-57, "Intake Sensor Component Inspection"</u>	
B2587	Stuck button	VTL-7, "Removal and Installation"	
U1000	CAN bus fault	LAN-14, "Trouble Diagnosis Flow Chart"	

## DATA MONITOR

**Display Item List** 

Monitor item	Value	Contents		
BATT VIA CAN	"V"	Displays battery voltage signal.	M	
IGN VIA CAN	"ON/OFF"	Displays ignition switch signal.		
DVR SUNLD SEN	"w/m2"	Displays optical sensor (driver) signal.		
PAS SUNLD SEN	"w/m2"	Displays optical sensor (passenger) signal.	N	
AMB TEMP SEN	"°C"	Displays ambient sensor signal.		
EVAP TEMP SEN	"°C"	Displays intake sensor signal.	0	
INCAR TMP SEN	"°C"	Displays in-vehicle sensor signal.	0	
RR TEMPSET FR	"V"	Displays air mix door (front) set point signal.		
RR TEMPSET RR	"V"	Displays air mix door (rear) set point signal.	P	
MODE FDBCK	"V"	Displays mode door motor feedback signal.		
DVR MIX FDBCK	"V"	Displays air mix door motor (driver) feedback signal.		
PAS MIX FDBCK	"V"	isplays air mix door motor (passenger) feedback signal.		
RR FDBCK	"V"	Displays air mix door motor (rear) feedback signal.		

[AUTOMATIC AIR CONDITIONER]

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# DIAGNOSIS SYSTEM (BCM) COMMON ITEM

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

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## 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><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.

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

## AIR CONDITIONER

## **DIAGNOSIS SYSTEM (BCM)**

## < SYSTEM DESCRIPTION >

## [AUTOMATIC AIR CONDITIONER]

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

#### INFOID:000000009225453

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## 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.	0
AIR COND SW [On/Off]	Indicates condition of A/C switch.	

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## SELF-DIAGNOSIS FUNCTION

## Front Air Control Self-Diagnosis

INFOID:000000009164278

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

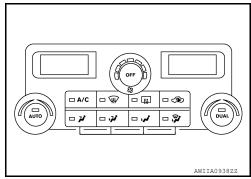
The self-diagnosis function is built into the front air control to quickly locate the cause of malfunctions.

#### DESCRIPTION

The self-diagnostic system diagnoses sensors, CAN system, and battery voltage on front air control Refer to applicable sections (items) for details. Fault codes (if any are present) will be displayed in the ambient temperature display area. Refer to HAC-20, "Front Air Control Self-Diagnosis Code Chart".

#### SELF-DIAGNOSTIC MODE

- 1. Press the OFF switch.
- 2. Press the FLOOR/DEF (**\***) and DEF (**\***) mode switches together and release on the front air control.
- 3. Press the REC (
- 4. Turn ignition switch OFF to exit out of self-diagnostic mode.



[AUTOMATIC AIR CONDITIONER]

## Front Air Control Self-Diagnosis Code Chart

INFOID:000000009164279

## SELF-DIAGNOSTIC CODE CHART

Code No.	F	Reference page	
03	Battery voltage out of range	CHG-2, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-5, "Work Flow (Without EXP-800 NI or GR8-1200 NI)"	
30	In-vehicle sensor circuit out of range (low)	HAC-51, "In-Vehicle Sensor Diagnosis Procedure"	
31	In-vehicle sensor circuit out of range (high)		
40	Ambient sensor circuit short	HAC-48, "Ambient Sensor Diagnosis Procedure"	
41	Ambient sensor circuit open		
50	Optical sensor (Driver) circuit open or short	HAC-54, "Optical Sensor Diagnosis Procedure"	
52	Optical sensor (Passenger) circuit open or short	The straight of the sense blaghesis ricedure	
56	Intake sensor circuit short	HAC-56, "Intake Sensor Diagnosis Procedure"	
57	Intake sensor circuit open	The so, make senser blagnosis riscedure	
80	CAN bus fault	LAN-14, "Trouble Diagnosis Flow Chart"	
90	Stuck button	VTL-7, "Removal and Installation"	

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INFOID:000000009164280

# < DTC/CIRCUIT DIAGNOSIS >

# DTC/CIRCUIT DIAGNOSIS MODE DOOR MOTOR

## System Description

## SYSTEM DESCRIPTION

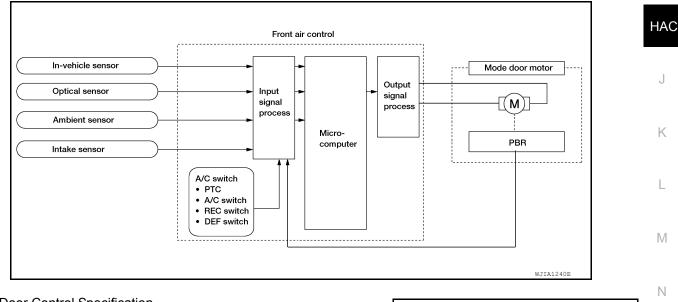
**Component Parts** 

Mode door control system components are:

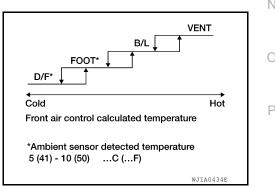
- Front air control
- Mode door motor
- PBR (built into mode door motor)
- In-vehicle sensor
- Ambient sensor
- · Optical sensor
- Intake sensor

#### 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. In AUTO mode the mode door position is set by the front air control which determines the proper position based on inputs from the in-vehicle sensor, ambient sensor, optical sensor, intake sensor, and the temperature selected by the driver or passenger.



## Mode Door Control Specification COMPONENT DESCRIPTION Mode Door Motor

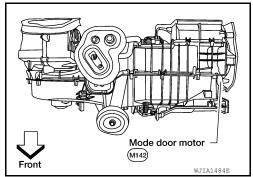


## MODE DOOR MOTOR

#### < DTC/CIRCUIT DIAGNOSIS >

The mode door motor is attached to the heater & 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.

## [AUTOMATIC AIR CONDITIONER]



INFOID:000000009164281

## Mode Door Motor Component Function Check

## INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - DISCHARGE AIR

- 1. Press each mode switch and press the 🙀 (DEF) switch. Each position indicator should illuminate.
- 2. Confirm that discharge air comes out according to the air distribution table. Refer to <u>HAC-15, "Discharge</u> <u>Air Flow"</u>.
  - NOTE:

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

## Is the inspection result normal?

- YES >> Inspection End.
- NO >> Go to diagnosis procedure. Refer to HAC-22. "Mode Door Motor Diagnosis Procedure".

## Mode Door Motor Diagnosis Procedure

INFOID:000000009164282

Regarding Wiring Diagram information, refer to HAC-63, "Wiring Diagram - Automatic Air Conditioner".

#### SYMPTOM:

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

## 1. CHECK MODE DOOR MOTOR POSITION BALANCED RESISTOR (PBR) FEEDBACK VOLTAGE

- 1. Turn ignition switch ON.
- 2. Using CONSULT, check "MODE FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to <u>HAC-17, "CON-</u> <u>SULT Function (HVAC)"</u>.
- 3. Observe "MODE FDBCK" voltage while cycling front air control mode switch through all modes.

Monitor Item	Condition	Results
MODE FDBCK	Cycle mode switch through all modes, D/F ( 蹤 ), VENT ( 🏹 ), B/L ( 🗘 ), and FOOT( 🤳 )	Voltage varies between D/F ( 🏶 ) and VENT ( 🍞 ), and between VENT ( 🍞 ) and B/L ( 🗘 ).

## Is the inspection result normal?

- YES >> Mode door motor is OK.
  - Inspect mode door for mechanical failure. Refer to VTL-21, "Removal and Installation".

NO >> GO TO 2.

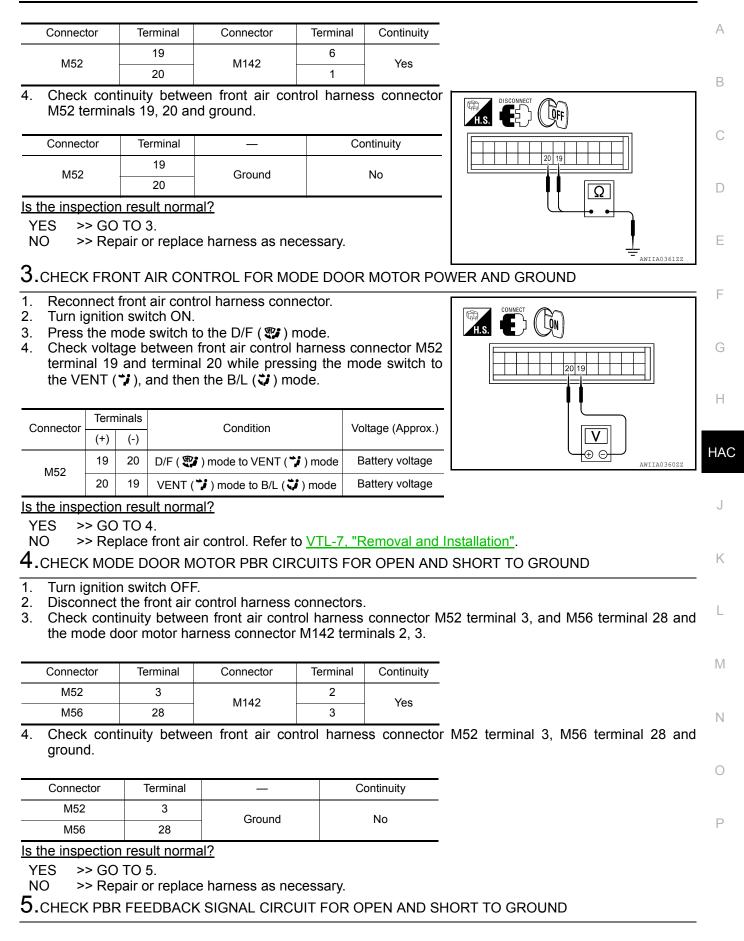
2.CHECK MODE DOOR MOTOR CIRCUITS FOR OPEN AND SHORT TO GROUND

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M52 and the mode door motor harness connector M142.
- 3. Check continuity between front air control harness connector M52 terminals 19, 20 and the mode door motor harness connector M142 terminals 6, 1.

## MODE DOOR MOTOR

## < DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]



## MODE DOOR MOTOR

#### < DTC/CIRCUIT DIAGNOSIS >

1. Check continuity between front air control harness connector M52 terminal 7 and mode door motor harness connector M142 terminal 4.

Connector	Terminal	Connector	Terminal	Continuity
M52	7	M142	4	Yes

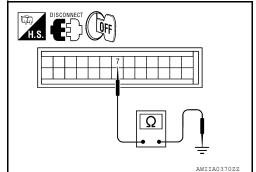
2. Check continuity between front air control harness connector M52 terminal 7 and ground.

Connector	Terminal	—	Continuity
M52	7	Ground	No

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness as necessary.



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

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- Check voltage between front air control harness connector M52 (B) terminal 3, and M56 (A) terminal 28.

	A		В	
Connector	Terminals	Connector	Terminals	Voltage (Approx.)
Connector	(+)	Connector	(-)	voltage (Approx.)
M56	28	M52	3	5 Volts

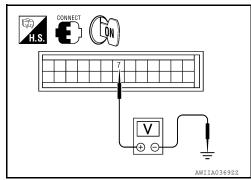
 Check voltage between front air control harness connector M52 L terminal 7 and ground.

Connector	Terminal	—	Voltage (Approx.)
M52	7	Ground	0 Volts

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-7</u>, "Removal and <u>Installation"</u>.



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## 7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

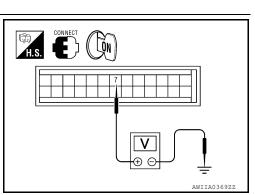
1. Reconnect the mode door motor harness connector M142.

2. Check voltage between front air control harness connector M52 terminal 7 and ground.

Connector	Terminal	—	Voltage (Approx.)
M52	7	Ground	0.2 to 4.8 Volts

#### 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 <u>VTL-7</u>, "Removal and Installation".
- NO >> Replace the mode door motor. Refer to <u>VTL-21</u>, "Removal and Installation".



#### SYMPTOM:

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

#### SYSTEM DESCRIPTION

#### **Component Parts**

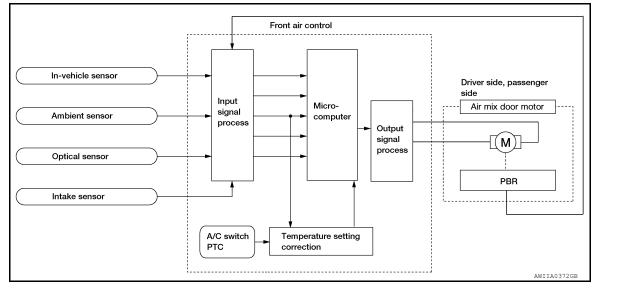
Air mix door control system components are:

- Front air control
- Air mix door motors (driver, passenger)
- PBR (built-into air mix door motors)
- In-vehicle sensor
- Ambient sensor
- · Optical sensor
- Intake sensor

#### System Operation

The front air control receives data from the temperature selected by the driver side, passenger side, and rear. The front air control then applies a voltage to one circuit of the appropriate air mix door motor, while ground is applied to the other circuit, causing the appropriate 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. In AUTO mode the air mix, intake, mode door, and defrost door positions are set by the front air control which determines the proper position based on inputs from the in-vehicle sensor, ambient sensor, optical sensor, intake sensor, and the temperature selected by the driver and front and rear passengers.

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



[AUTOMATIC AIR CONDITIONER]

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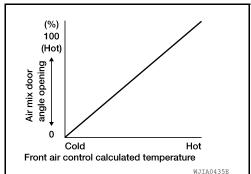
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## < DTC/CIRCUIT DIAGNOSIS >

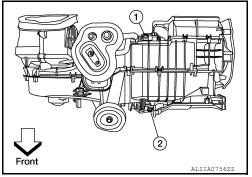
#### Air Mix Door Control Specification



## COMPONENT DESCRIPTION

#### Air Mix Door Motors

The driver (1) and passenger (2) air mix door motors are attached to the front heater & cooling unit assembly. These motors rotate 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 motors.



## Air Mix Door Motor (Driver) Component Function Check

INFOID:000000009164284

## INSPECTION FLOW

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

- 1. Turn the temperature control dial (driver) clockwise until 32°C (90°F) is displayed.
- 2. 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 (driver) counterclockwise until 18°C (60°F) is displayed.
- 2. Check for cold air at discharge air outlets.

## Can a symptom be duplicated?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>HAC-26</u>, "Air Mix Door Motor (Driver) Diagnosis Procedure".

Air Mix Door Motor (Driver) Diagnosis Procedure

INFOID:000000009164285

Regarding Wiring Diagram information, refer to HAC-63, "Wiring Diagram - Automatic Air Conditioner".

SYMPTOM:

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

## **1.**CHECK AIR MIX DOOR MOTOR (DRIVER) POSITION BALANCED RESISTOR (PBR) FEEDBACK VOLT-AGE

1. Turn ignition switch ON.

Revision: December 2012

## HAC-26

#### < DTC/CIRCUIT DIAGNOSIS >

- Using CONSULT, check "DVR MIX FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to <u>HAC-17</u>, <u>"CONSULT Function (HVAC)"</u>.
- Observe "DVR MIX FDBACK" voltage while rotating temperature control dial (driver) between 32°C (90°F) and 18°C (60°F).

Monitor Item	Condition	Results	В
DVR MIX FDBCK	Rotate temperature control dial (driver) be- tween 32°C (90°F) and 18°C (60°F)	Voltage varies with dial rotation between 0.2 and 4.8 volts.	

Is the inspection result normal?

- YES >> Air mix door motor (driver) is OK.
  - Inspect air mix door (driver) for mechanical failure and repair if necessary. If air mix door (driver) is OK, refer to <u>HAC-73, "Component Function Check"</u> for insufficient cooling or <u>HAC-81, "Component Function Check"</u> for insufficient heating.

NO >> GO TO 2.

## 2. CHECK AIR MIX DOOR MOTOR (DRIVER) CIRCUITS FOR OPEN AND SHORT TO GROUND

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M52 and the air mix door motor (driver) harness connector M148.
- 3. Check continuity between front air control harness connector M52 terminals 17, 18 and the air mix door motor (driver) harness connector M148 terminals 6, 5.

Connector	Terminal	Connector	Terminal	Continuity
M52	17	M148	6	Yes
WI32	18	101140	5	163

4. Check continuity between front air control harness connector M52 terminals 17, 18 and ground.

Connector	Terminal	—	Continuity
M52	17	Ground	No
M52	18	Crodina	NO

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

# $\mathbf{3}.$ Check front air control for air mix door motor (driver) power and ground

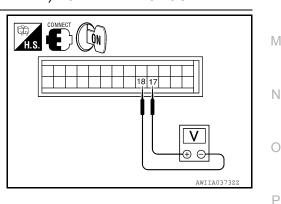
- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Rotate temperature control dial (driver) to 32°C (90°F).
- Check voltage between front air control harness connector M52 terminal 17 and terminal 18 while rotating temperature control dial (driver) to 18°C (60°F) and back to 32°C (90°F).

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	vollage (Applox.)	
M52	17	18	While rotating temperature control dial (driver) from 32°C (90°F) to 18°C (60°F)	Battery voltage	
10132	18	17	While rotating temperature control dial (driver) from 18°C (60°F) to 32°C (90°F)	Battery voltage	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace front air control. Refer to <u>VTL-7, "Removal and Installation"</u>.



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#### < DTC/CIRCUIT DIAGNOSIS >

## 4. CHECK AIR MIX DOOR MOTOR (DRIVER) PBR CIRCUITS FOR OPEN AND SHORT TO GROUND

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connectors.
- 3. Check continuity between front air control harness connector M52 terminal 3, connector M56 terminal 28 and air mix door motor (driver) harness connector M148 terminals 3, 1.

Connector	Terminal	Connector	Terminal	Continuity
M52	3	M148	3	Yes
M56	28	M148	1	165

4. Check continuity between front air control harness connector M52 terminal 3, M56 terminal 28 and ground.

Connector	Terminal	_	Continuity
M52	3	Ground	No
M56	28	Ground	NO

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

1. Check continuity between front air control harness connector M52 terminal 6 and air mix door motor (driver) harness connector M148 terminal 2.

Connector	Terminal	Connector	Terminal	Continuity
M52	6	M148	2	Yes

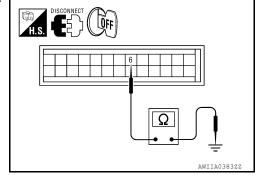
2. Check continuity between front air control harness connector M52 terminal 6 and ground.

Connector	Terminal	—	Continuity
M52	6	Ground	No

Is the inspection result normal?

YES >> GO TO 6.

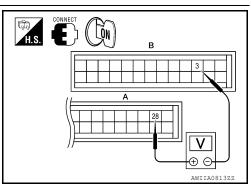
NO >> Repair or replace harness as necessary.



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

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- Check voltage between front air control harness connector M52 (B) terminal 3, and M56 (A) terminal 28.

A		В		
Connector	Terminals	Connector	Terminals	Voltage (Approx.)
Connector	(+)	Connector	(-)	voltage (Approx.)
M56	28	M52	3	5 Volts



## < DTC/CIRCUIT DIAGNOSIS >

4. Check voltage between front air control harness connector M52 terminal 6 and ground.

Connector	Terminal	_	Voltage (Approx.)
M52	6	Ground	0 Volts

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace front air control. Refer to <u>VTL-7</u>, "Removal and <u>Installation"</u>.

## 7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- Reconnect the air mix door motor (driver) harness connector M148.
- 2. Check voltage between front air control harness connector M52 terminal 6 and ground.

Connector	Terminal	_	Voltage (Approx.)
M52	6	Ground	0.2 to 4.8 Volts

#### Is the inspection result normal?

- YES >> Inspect air mix door (driver) for binding or mechanical failure. If air mix door (driver) moves freely, replace front air control. Refer to <u>VTL-7</u>, "Removal and Installation".
- NO >> Replace air mix door motor (driver). Refer to <u>VTL-23</u>, "Removal and Installation".

#### Air Mix Door Motor (Passenger) Component Function Check INFOID:000000009164286 HAC INSPECTION FLOW 1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE Turn the temperature control dial (passenger) clockwise until 32°C (90°F) is displayed. 1. 2. Check for hot air at discharge air outlets. Κ >> GO TO 2. 2.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE Turn the temperature control dial (passenger) counterclockwise until 18°C (60°F) is displayed. 1. Check for cold air at discharge air outlets. 2. Can a symptom be duplicated? Μ YES >> Inspection End. NO >> Go to diagnosis procedure. Refer to HAC-29, "Air Mix Door Motor (Passenger) Diagnosis Procedure". Ν Air Mix Door Motor (Passenger) Diagnosis Procedure INFOID:000000009164287 Regarding Wiring Diagram information, refer to <u>HAC-63, "Wiring Diagram - Automatic Air Conditioner"</u>. SYMPTOM: Discharge air temperature does not change. Ρ Air mix door motor does not operate. DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR (PASSENGER)

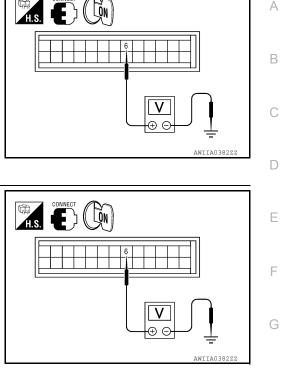
**1.**CHECK AIR MIX DOOR MOTOR (PASSENGER) POSITION BALANCED RESISTOR (PBR) FEEDBACK VOLTAGE

1. Turn ignition switch ON.

# HAC-29

#### 2013 Frontier

## [AUTOMATIC AIR CONDITIONER]



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## < DTC/CIRCUIT DIAGNOSIS >

- Using CONSULT, check "PAS MIX FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to <u>HAC-17.</u> <u>"CONSULT Function (HVAC)"</u>.
- Observe "PAS MIX FDBCK" voltage while rotating temperature control dial (passenger) between 32°C (90°F) and 18°C (60°F).

Monitor Item	Condition	Results
PAS MIX FDBCK	Rotate temperature control dial (passenger) be- tween 32°C (90°F) and 18°C (60°F)	Voltage varies between 0.2 and 4.8 volts.

Is the inspection result normal?

YES >> • Air mix door motor (passenger) is OK.

 Inspect air mix door (passenger) for mechanical failure and repair if necessary. If air mix door (passenger) is OK, refer to <u>HAC-73</u>, "<u>Component Function Check</u>" for insufficient cooling or <u>HAC-81</u>, "<u>Component Function Check</u>" for insufficient heating.

NO >> GO TO 2.

```
2.CHECK AIR MIX DOOR MOTOR (PASSENGER) CIRCUITS FOR OPEN AND SHORT TO GROUND
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- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M52 and the air mix door motor (passenger) harness connector M131.
- 3. Check continuity between front air control harness connector M52 terminals 2, 14 and the air mix door motor (passenger) harness connector M131 terminals 5, 6.

Connector	Terminal	Connector	Terminal	Continuity
M52	14	M131	6	Yes
IWI52	2	INTO I	5	165

4. Check continuity between front air control harness connector M52 terminals 2, 14 and ground.

Connector	Terminal	—	Continuity
M52	14	Ground	No
10102	2		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.



- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Rotate temperature control dial (passenger) to 32°C (90°F).
- Check voltage between front air control harness connector M52 terminal 2 and terminal 14 while rotating temperature control dial (passenger) to 18°C (60°F) and back to 32°C (90°F).

Connector (+) (-)		ninals	Condition	Voltage (Approx.)
		(-)	Condition	vollage (Applox.)
M52	2	14	While rotating temperature control dial (passenger) from 32°C (90°F) to 18°C (60°F)	Battery voltage
M52 14		2	While rotating temperature control dial (passenger) from 18°C (60°F) to 32°C (90°F)	Battery voltage

Is the inspection result normal?

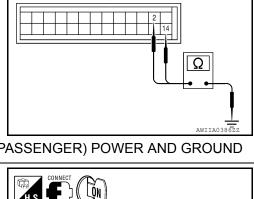
YES >> GO TO 4.

NO >> Replace front air control Refer to <u>VTL-7</u>, "Removal and Installation".





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## < DTC/CIRCUIT DIAGNOSIS >

## [AUTOMATIC AIR CONDITIONER]

## 4. CHECK AIR MIX DOOR MOTOR (PASSENGER) PBR CIRCUITS FOR OPEN AND SHORT TO GROUND

- 1. Turn ignition switch OFF.
- Disconnect the front air control harness connectors. 2.
- Check continuity between front air control harness connector M52 terminal 3 and M56 terminal 28 and air 3. В mix door motor (passenger) harness connector M131 terminals 3, 1.

Connector	Terminal	Connector	Terminal	Continuity
M52	3	M131	3	Yes
M56	28	WI ST	1	163

Check continuity between front air control harness connector M52 terminal 3, M56 terminal 28 and D 4. ground.

Connector	Terminal	_	Continuity	
 M52	3	Ground	No	
 M56	28	Cround	NO	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

## ${f 5.}$ CHECK PBR FEEDBACK SIGNAL CIRCUIT FOR OPEN AND SHORT TO GROUND

1. Check continuity between front air control harness connector M56 terminal 29 and air mix door motor (passenger) harness connector M131 terminal 2.

Connector	Terminal	Connector	Terminal	Continuity
M56	29	M131	2	Yes

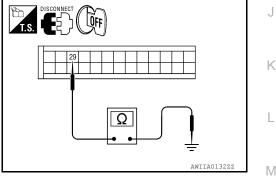
#### 2. Check continuity between front air control harness connector M56 terminal 29 and ground.

Connector	Terminal	—	Continuity
M56	29	Ground	No

#### Is the inspection result normal?

YES >> GO TO 6.

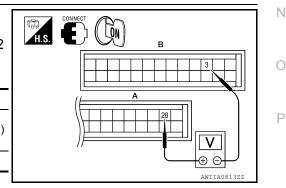
NO >> Repair or replace harness as necessary.



## $\mathbf{6.}$ CHECK FRONT AIR CONTROL FOR 5 VOLT REFERENCE (VREF), VREF RETURN, AND FEEDBACK SIGNAL

- Reconnect front air control harness connectors. 1.
- Turn ignition switch ON. 2.
- Check voltage between front air control harness connector M52 3. (B) terminal 3, and M56 (A) terminal 28.

A		В		
Connector	Terminals	erminals Connector		Voltage (Approx.)
Connector	(+)	Connector	(-)	voltage (Approx.)
M56	28	M52	3	5 Volts



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## < DTC/CIRCUIT DIAGNOSIS >

4. Check voltage between front air control harness connector M56 terminal 29 and ground.

Connector	Terminal	—	Voltage (Approx.)
M56	29	Ground	0 Volts

Is the inspection result normal?

- YES >> GO TO 7.
- NO >> Replace front air control. Refer to VTL-7, "Removal and Installation".

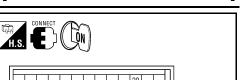
# 7. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- 1. Reconnect the air mix door motor (passenger) harness connector M131.
- 2. Check voltage between front air control harness connector M56 terminal 29 and ground.

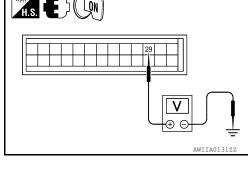
Connector	Terminal	—	Voltage (Approx.)
M56	29	Ground	0.2 to 4.8 Volts

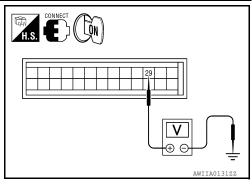
Is the inspection result normal?

>> Inspect air mix door (passenger) for binding or mechani-YES cal failure. If air mix door (passenger) moves freely, replace front air control. Refer to VTL-7, "Removal and Installation".



[AUTOMATIC AIR CONDITIONER]





>> Replace the air mix door motor (passenger). Refer to VTL-23, "Removal and Installation". NO

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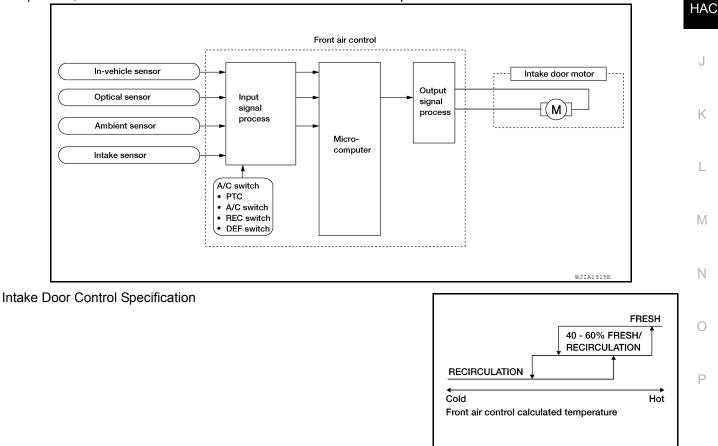
## INTAKE DOOR MOTOR

System Description	INFOID:00000009164288
SYSTEM DESCRIPTION	В
SYMPTOM: <ul> <li>Intake door motor does not operate normally.</li> <li>Intake door does not change.</li> </ul>	С
SYSTEM DESCRIPTION	
Component Parts	D
Intake door control system components are: • Front air control • Intake door motor (PRB built into the intake door motor) • In-vehicle sensor • Ambient sensor	E
<ul><li>Optical sensor</li><li>Intake sensor</li></ul>	F

#### System Operation

The intake door control determines the intake door position based on the position of the recirculation switch. G 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.

In the AUTO mode, the front air control determines the intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When the DEF, D/F, FOOT or OFF switches are pushed, the front air control sets the intake door at the fresh position.



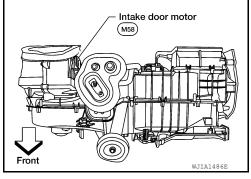
## COMPONENT DESCRIPTION

WJTA0436E

## < DTC/CIRCUIT DIAGNOSIS >

#### 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

INSPECTION FLOW

**1**.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - REC (  $\bigcirc$  )

- 1. Press the mode switch to vent mode().
- 2. Press REC ( ) switch. The REC ( ) indicator should illuminate.
- 3. Press REC (
- 4. 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 <u>HAC-34</u>, "Intake Door Motor Diagnosis Procedure".

Intake Door Motor Diagnosis Procedure

INFOID:000000009164290

INFOID:000000009164289

Regarding Wiring Diagram information, refer to HAC-63, "Wiring Diagram - Automatic Air Conditioner".

SYMPTOM:

Intake door does not change.

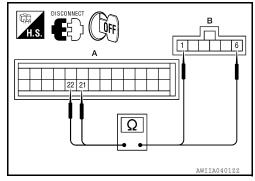
Intake door motor does not operate normally.

DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

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

- 1. Turn ignition switch OFF.
- Disconnect the front air control harness connector M52 (A) and the intake door motor harness connector M58 (B).
- 3. Check continuity between front air control harness connector M52 (A) terminals 21, 22 and the intake door motor harness connector M58 (B) terminals 1, 6.

А		В		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M52	21	M58	6	Yes	
	22	MSB	1	163	



## INTAKE DOOR MOTOR

#### < DTC/CIRCUIT DIAGNOSIS >

4. Check continuity between front air control harness connector M52 terminals 21, 22 and ground.

Connector	Terminal	—	Continuity	
M52	21	Ground	No	
	22	Ground		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

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

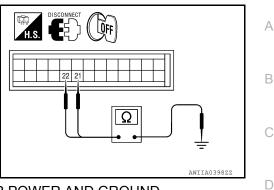
- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- Check voltage between front air control harness connector M52 terminal 21 and terminal 22 while placing the HVAC system into self-diagnostic mode.

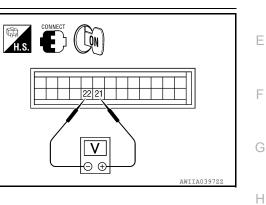
Connector	Tern	ninals	Condition	Voltage (Approx.)
Connector	(+)	(-)	Condition	
M52	21	22	Self-diagnostic mode (opening)	Battery voltage
	22	21	Self-diagnostic mode (closing)	Battery voltage

#### Is the inspection result normal?

- YES >> Inspect intake air door for binding or mechanical failure. If intake air door moves freely, replace the intake air door motor. Refer to <u>VTL-20, "Removal and Installation"</u>.
- NO >> Replace front air control. Refer to <u>VTL-7, "Removal and Installation"</u>.







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## < DTC/CIRCUIT DIAGNOSIS >

# **BLOWER MOTOR CONTROL SYSTEM**

## System Description

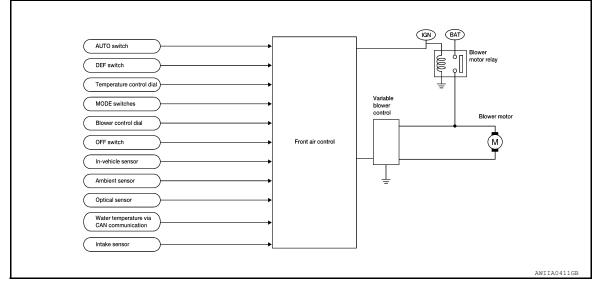
## SYSTEM DESCRIPTION

Component Parts

Blower speed control system components are:

- Front air control
- Variable blower control
- Front blower motor relay
- Front blower motor
- In-vehicle sensor
- Ambient sensor
- Optical sensor
- Intake sensor

System Operation



Automatic Mode

In the automatic mode, the blower motor speed is calculated by the front air control and variable blower control based on input from the in-vehicle sensor, optical sensor, intake sensor and ambient sensor, and potentio temperature control (PTC).

When the air flow is increased, the blower motor speed is adjusted gradually to prevent a sudden increase in air flow.

In addition to manual air flow control and the usual automatic air flow control, starting air flow control, low water temperature starting control and high passenger compartment temperature starting control are available.

#### Starting Blower Speed Control

Start up from cold soak condition (Automatic mode).

In a cold start up condition where the engine coolant temperature is below 50°C (122°F), the blower will not operate at blower speed 1 for a short period of time (up to 210 seconds). The exact start delay time varies depending on the ambient and engine coolant temperatures.

In the most extreme case (very low ambient temperature) the blower starting delay will be 210 seconds as described above. After the coolant temperature reaches 50°C (122°F), or the 210 seconds has elapsed, the blower speed will increase to the objective blower speed.

Start up from usual operating or hot soak condition (Automatic mode).

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

Blower Speed Compensation - Sunload

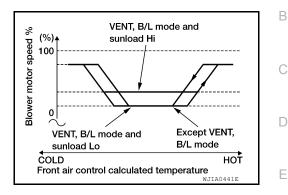
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[AUTOMATIC AIR CONDITIONER]

#### < DTC/CIRCUIT DIAGNOSIS >

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. The speed will vary depending on the sunload. During conditions of low or no sunload, the blower operates at low speed. During high sunload conditions, the front air control causes the blower speed to increase.

#### **Blower Speed Control Specification**



[AUTOMATIC AIR CONDITIONER]

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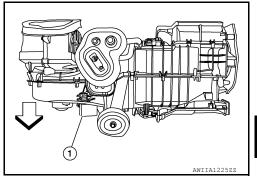
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#### COMPONENT DESCRIPTION

Variable Blower Control

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



## Front Blower Motor Component Function Check

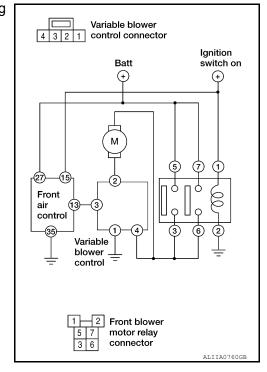
#### INSPECTION FLOW

<b>1.</b> CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - FRONT BLOWER	K
<ol> <li>Rotate the blower control dial clockwise once. Blower motor should operate in low speed.</li> <li>Rotate the blower control dial clockwise, and continue checking blower speed until all speeds are checked.</li> </ol>	L
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; Inspection End.</li> <li>NO &gt;&gt; Go to diagnosis procedure. Refer to <u>HAC-37</u>, "Front Blower Motor Diagnosis Procedure".</li> </ul>	M
Front Blower Motor Diagnosis Procedure	
	Ν
Regarding Wiring Diagram information, refer to <u>HAC-63, "Wiring Diagram - Automatic Air Conditioner"</u> .	
	0
SYMPTOM: Blower motor operation is malfunctioning.	
DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR	Р

#### < DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

SYMPTOM: Blower motor operation is malfunctioning under starting blower speed control.



## 1.CHECK FUSES

Check 15A fuses [No. 24 and 27 (Located in the fuse and fusible link box)]. For fuse layout. Refer to <u>PG-79.</u> "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. Press the A/C switch.
- 5. Rotate blower control dial to maximum speed.
- 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

- 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.

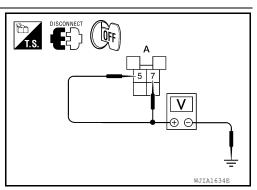


#### : Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.



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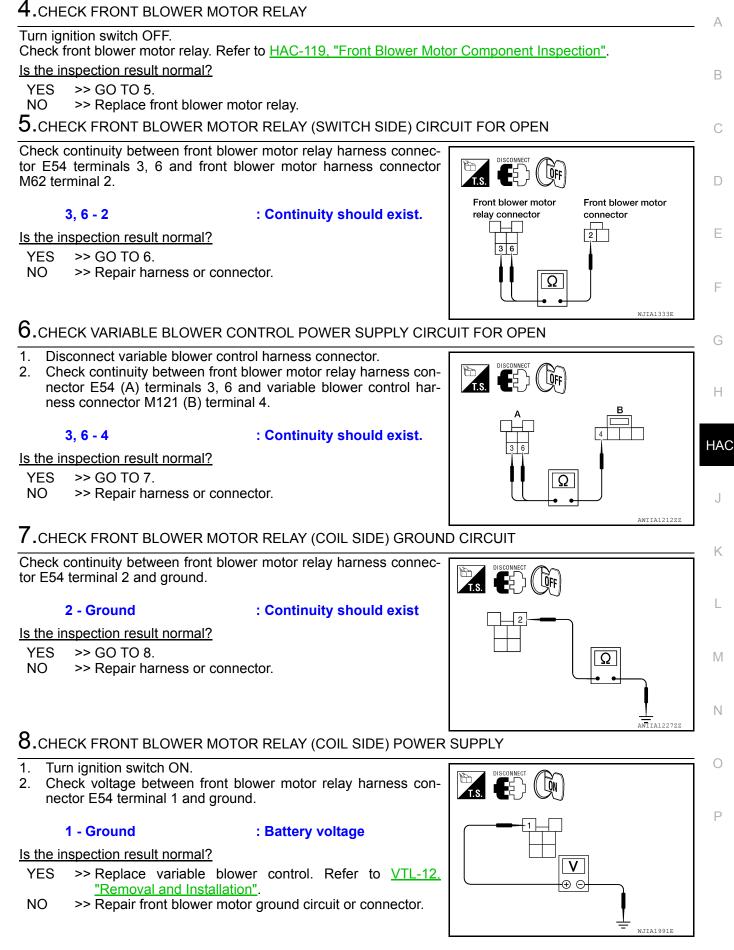
Front blower

motor connector

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#### < DTC/CIRCUIT DIAGNOSIS >

## [AUTOMATIC AIR CONDITIONER]





< DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

## 9.REPLACE FUSES

#### Replace fuses.

Does the fuse blow?

- >> If fuse blows without activating the front blower motor, repair short between fuse and front YES 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.
- Disconnect front blower motor connector and variable blower 2. 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-115, "Front Blower Motor Component Function Check".

Is the inspection result normal?

- >> Replace variable blower control. Refer to VTL-12, "Removal and Installation". YES
- >> Replace front blower motor. Refer to VTL-11, "Removal and Installation". NO

12. CHECK FRONT BLOWER MOTOR

Check front blower motor. Refer to HAC-115. "Front Blower Motor Component Function Check".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace front blower motor. Refer to VTL-11, "Removal and Installation".

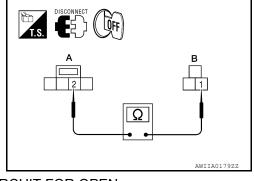
13. CHECK BLOWER MOTOR GROUND CIRCUIT

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

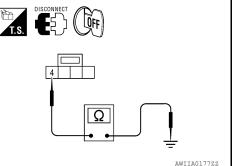
: Continuity should exist.

Is the inspection result normal?

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



14. CHECK VARIABLE BLOWER CONTROL POWER SUPPLY CIRCUIT FOR OPEN



#### < DTC/CIRCUIT DIAGNOSIS >

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.



- 1. Reconnect all disconnected component connectors.
- 2. Disconnect front air control connector.
- 3. Turn ignition switch ON.
- 4. Turn blower control dial to maximum speed.
- 5. check voltage between front air control harness connector M50 terminal 13 and ground.

#### 13 - Ground

#### Approx.: 4.5V

Is the inspection result normal?

- YES >> Replace front air control. Refer to <u>VTL-7, "Removal and Installation"</u>.
- NO >> GO TO 17.
- 17. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT
- 1. Turn ignition switch OFF.
- 2. Disconnect variable blower control.
- Check continuity between front air control harness connector M50 (B) terminal 13 and variable blower control harness connector M121 (A) terminal 3.

#### 13 - 3

#### : Continuity should exist.

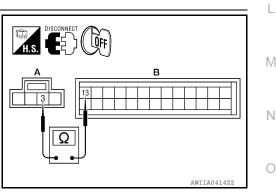
#### Is the inspection result normal?

- YES >> Replace variable blower control. Refer to <u>VTL-12</u>, <u>"Removal and Installation"</u>.
- NO >> Repair harness or connector.

Front Blower Motor Component Inspection

#### COMPONENT INSPECTION

Front Blower Motor Relay



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[AUTOMATIC AIR CONDITIONER]

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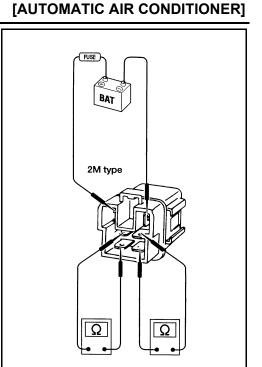
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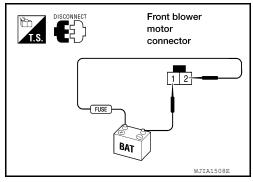
Check continuity between terminals 3 and 5 and terminals 7 and 6 by supplying 12 volts and ground to coil side terminals 1 and 2 of the relay.



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.



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#### < DTC/CIRCUIT DIAGNOSIS >

## MAGNET CLUTCH

#### System Description

#### SYSTEM DESCRIPTION

The front air control controls compressor operation based on ambient and intake temperature and a signal from ECM.

Low Temperature Protection Control

The front air control will turn the compressor ON or OFF as determined by a signal detected by the intake sensor and the ambient sensor.

When intake air temperature is higher than the preset value, the compressor turns ON. The compressor turns OFF when intake air temperature is lower than the preset value. That preset value is dependent on the ambient temperature, refer to the following table.

	Compressor OFF intake temperature °C (°F)	Compressor ON intake temperature °C (°F)	Ambient temperature °C (°F)
F	5.0 (41)	5.5 (42)	0 (32)
	5.0 (41)	5.5 (42)	10 (50)
	5.0 (41)	5.5 (42)	20 (68)
G	3.5 (38)	4.0 (39)	30 (86)
	3.0 (37)	3.5 (38)	40 (104)
Н	3.0 (37)	3.5 (38)	50 (122)

## Magnet Clutch Component Function Check

#### INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MAGNET CLUTCH

- 1. Turn ignition switch ON.
- 2. Press the A/C switch.
- 3. Press vent mode switch (\*).
- 4. Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

#### Is the inspection result normal?

YES NO	<ul> <li>&gt;&gt; Inspection End.</li> <li>&gt;&gt; Go to diagnosis procedure. Refer to <u>HAC-43</u>, "<u>Magnet Clutch Diagnosis Procedure</u></li> </ul>	<u>)"</u> .	L
Magno	et Clutch Diagnosis Procedure	INFOID:000000009164300	M
Regard	ing Wiring Diagram information, refer to HAC-63, "Wiring Diagram - Automatic Air Cond	itioner".	

DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

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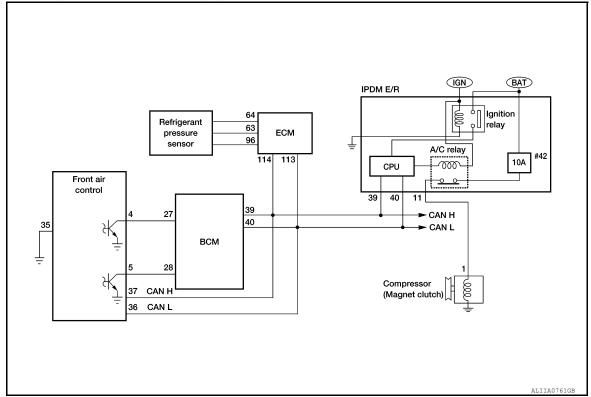
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## **MAGNET CLUTCH**

#### < DTC/CIRCUIT DIAGNOSIS >

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



## 1. CHECK INTAKE AND AMBIENT SENSOR CIRCUITS

Check intake and ambient sensors. Refer to HAC-20, "Front Air Control Self-Diagnosis".

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Malfunctioning intake sensor. Refer to <u>HAC-56</u>, "Intake Sensor Diagnosis Procedure".
  - Malfunctioning ambient sensor. Refer to <u>HAC-48</u>, "Ambient Sensor Diagnosis Procedure".

#### 2.PERFORM AUTO ACTIVE TEST

Refer to PCS-9, "Diagnosis Description".

#### Does magnet clutch operate?

- YES >> (I) WITH CONSULT
  - ĞO TO 5.
    - RWITHOUT CONSULT
      - ĞO TO 6.
- NO >> Check 10A fuse (No. 42, located in IPDM E/R), and GO TO 3.

3. CHECK CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

- 1. Turn ignition switch OFF.
- 2. Disconnect IPDM E/R connector and compressor (magnet clutch) connector.
- 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.

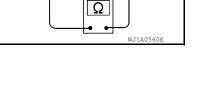
#### 11 – ground : Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 4.

Revision: December 2012





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IPDM E/R

connector

Compressor connector

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#### < DTC/CIRCUIT DIAGNOSIS >

#### NO >> Repair harness or connector. CHECK MAGNET CLUTCH CIRCUIT Check for operation sound when applying battery voltage direct current to terminal. Is the inspection result normal? Compressor YES >> Replace IPDM E/R. Refer to PCS-28, "Removal and connector Installation of IPDM E/R". NO >> Replace magnet clutch. Refer to HA-30, "Removal and Installation for Compressor Clutch". FUSE 5. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL Check compressor ON/OFF signal. Refer to HAC-19, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)". **A/C SWITCH ON** :AIR COND SW ON **A/C SWITCH OFF** :AIR COND SW OFF Is the inspection result normal? YES >> GO TO 8. NO >> GO TO 6. 6.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 (A) terminal 27 and front air control harness connector M52 (B) terminal 4. 27 - 4 Continuity should exist. Check continuity between BCM harness connector M18 (A) terminal 27 and ground. Ω 27 - ground Continuity should not exist. Is the inspection result normal? >> GO TO 7. YES NO >> Repair harness or connector. 7.CHECK VOLTAGE FOR FRONT AIR CONTROL (A/C COMPRESSOR ON SIGNAL) 1. Reconnect BCM connector and front air control connector.

- Turn ignition switch ON. 2.
- Check voltage between front air control harness connector M52 3. terminal 4 and ground.

	Terminals			
(+)			o	N/ 11
Front air con- trol connec- tor	Terminal No.	(-)	Condition	Voltage
M52	4	Ground	A/C switch: ON	Approx. 0V
WJ52	+	Gibunu	A/C switch: OFF	Approx. 5V

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Is the inspection result normal?

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## **MAGNET CLUTCH**

#### < DTC/CIRCUIT DIAGNOSIS >

- NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control Refer to <u>VTL-7</u>. <u>"Removal and Installation"</u>.
- NO-2 >> If the voltage is approx. 0V when A/C switch is OFF, replace BCM. Refer to <u>BCS-49, "Removal</u> and Installation".

8.CHECK REFRIGERANT PRESSURE SENSOR

- 1. Start engine.
- 2. Check voltage between ECM harness connector F57 terminal 63 and ground.

	Terminals			
(	(+)		Condition	Voltage
ECM con- nector	Terminal No.	(-)	Condition	
F57	63	Ground	A/C switch: ON	Approx. 0.36 - 3.88V

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Refer to <u>EC-458</u>, "Diagnosis Procedure" (QR25DE), <u>EC-944</u>, "Diagnosis Procedure" (VQ40DE USA and Canada) or <u>EC-1357</u>, "Diagnosis Procedure" (VQ40DE Mexico).

**9.**CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to <u>HAC-19, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDI-TIONER)"</u>.

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

Is the inspection result normal?

YES >> GO TO 12.

NO >> GO TO 10.

10. CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

- 1. Turn ignition switch OFF.
- 2. Disconnect BCM connector and front air control connector.
- Check continuity between BCM harness connector M18 (A) terminal 28 and front air control harness connector M52 (B) terminal 5.

#### 28 - 5 Continuity should exist.

 Check continuity between BCM harness connector M18 (A) terminal 28 and ground.

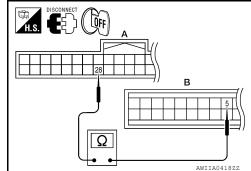
#### 28 - ground Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

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

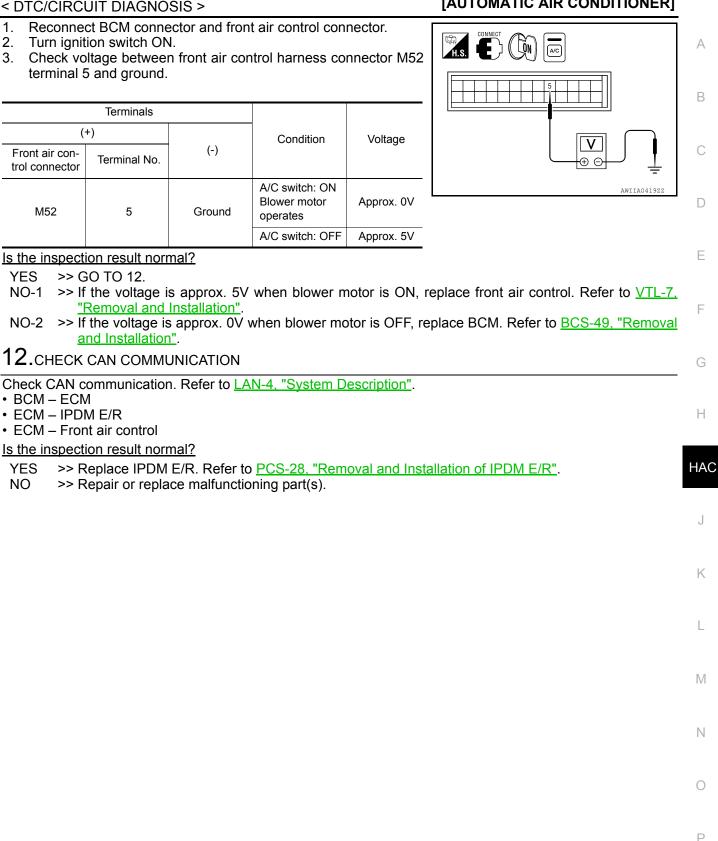


## **MAGNET CLUTCH**

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Reconnect BCM connector and front air control connector.
- 2. Turn ignition switch ON.
- 3. terminal 5 and ground.

#### [AUTOMATIC AIR CONDITIONER]



#### [AUTOMATIC AIR CONDITIONER]

## AMBIENT SENSOR

Component Description

#### COMPONENT DESCRIPTION

#### Ambient Sensor

The ambient sensor (1) is attached on the radiator core support (left side). It detects ambient temperature and converts it into a value which is then input into the front air control.

#### AMBIENT TEMPERATURE INPUT PROCESS

The front air control includes a processing circuit for the ambient sensor input. However, when the temperature detected by the ambient sensor increases quickly, the processing circuit retards the front air control function. It only allows the front air control to recognize an ambient temperature increase of  $0.33^{\circ}$ C ( $0.6^{\circ}$ F) per 100 seconds.

This prevents constant adjustments due to momentary conditions, such as stopping after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front grille area, location of the ambient sensor.

#### Ambient Sensor Diagnosis Procedure

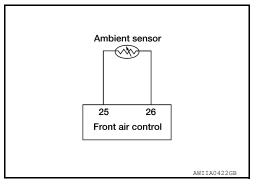
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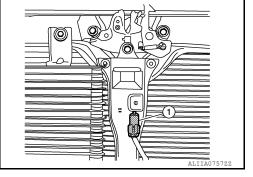
Regarding Wiring Diagram information, refer to HAC-63, "Wiring Diagram - Automatic Air Conditioner".

#### DIAGNOSTIC PROCEDURE FOR AMBIENT SENSOR

SYMPTOM: Ambient sensor circuit is open or shorted. Using the CONSULT, DTC B257B or B257C is displayed. Without CONSULT, code 40 or 41 is indicated on front air control as a result of conducting the front air control self-diagnosis.



## **1.**CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND



## AMBIENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Disconnect ambient sensor connector.
- 2. Turn ignition switch ON.
- 3. Check voltage between ambient sensor harness connector E28 terminal 1 and ground.

#### 1 - Ground

: Approx. 5V

Is the inspection result normal?

>> GO TO 2. YES

NO >> GO TO 4.

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

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- 3. Check continuity between ambient sensor harness connector E28 (B) terminal 2 and front air control harness connector M52 (A) terminal 26.

#### 2 - 26

#### : Continuity should exist.

Is the inspection result normal?

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

## 3. CHECK AMBIENT SENSOR

Check the ambient sensor circuit. Refer to HAC-49, "Ambient Sensor Component Inspection".

#### Is the inspection result normal?

- YES >> 1. Replace front air control. Refer to <u>VTL-7</u>, "Removal and Installation". GO TO HAC-20, "Front Air Control Self-Diagnosis" and perform self-diagnosis. 2.
- NO Replace ambient sensor. Refer to HA-38, "Removal and Installation". >> 1.
  - GO TO HAC-20, "Front Air Control Self-Diagnosis" and perform self-diagnosis. 2.

#### ${f 4}$ . CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND FRONT AIR CONTROL

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- 3. Check continuity between ambient sensor harness connector E28 (B) terminal 1 and front air control harness connector M52 (A) terminal 25.

#### 1 - 25

#### : Continuity should exist.

4. Check continuity between ambient sensor harness connector E28 (B) terminal 2 and ground.

#### 1 - Ground : Continuity should not exist.

#### Is the inspection result normal?

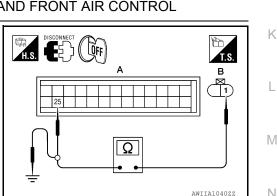
- YES >> 1. Replace front air control. Refer to VTL-7, "Removal and Installation".
  - GO TO HAC-20, "Front Air Control Self-Diagnosis" and perform self-diagnosis. 2.
- NO >> Repair harness or connector.

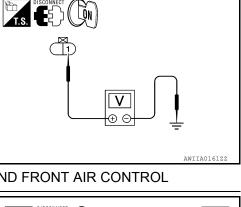
#### Ambient Sensor Component Inspection

#### COMPONENT INSPECTION

#### Ambient Sensor

After disconnecting ambient sensor connector E1, measure resistance between terminals 1 and 2 at sensor component side, using the table below.







#### **HAC-49**

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[AUTOMATIC AIR CONDITIONER]

## **AMBIENT SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

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

If NG, replace ambient sensor. Refer to HA-38, "Removal and Installation".

## < DTC/CIRCUIT DIAGNOSIS >

# IN-VEHICLE SENSOR

**Component Description** 

#### COMPONENT DESCRIPTION

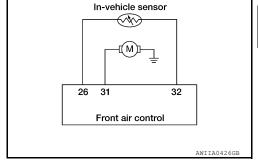
#### In-vehicle Sensor

The in-vehicle sensor (1) is located on the lower instrument panel LH. It converts variations in temperature of passenger compartment air (drawn in through the integrated fan) into a resistance value. It is then input into the front air control.

#### In-Vehicle Sensor Diagnosis Procedure

Regarding Wiring Diagram information, refer to HAC-63, "Wiring Diagram - Automatic Air Conditioner".

DIAGNOSTIC PROCEDURE FOR IN-VEHICLE SENSOR SYMPTOM: In-vehicle sensor circuit is open or shorted. Using the CONSULT, DTC B2578 or B2579 is displayed. Without a CONSULT, code 30, 31 is indicated on front air control as a result of conducting self-diagnosis.



In-vehicle sensor connector

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## 1. CHECK IN-VEHICLE SENSOR CIRCUIT

Is self-diagnosis DTC B2578 or B2579 (with CONSULT) or code 30, 31 (without CONSULT) present? YES or NO?

YES >> GO TO 6. NO >> GO TO 2.

2.check voltage between in-vehicle sensor and ground

- 1. Disconnect in-vehicle sensor connector.
- 2. Turn ignition switch ON.
- Check voltage between in-vehicle sensor harness connector M34 terminal 4 and ground.

#### 4 - Ground

: Approx. 5V.

Is the inspection result normal?

YES >> GO TO 3. NO >> GO TO 5.

3.CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND FRONT AIR CONTROL

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## **IN-VEHICLE SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector M52.
- Check continuity between in-vehicle sensor harness connector M34 (B) terminal 1 and front air control harness connector M52 (A) terminal 26.
  - terminal 26. 1 - 26 : Continuity should exist.

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair harness or connector.

#### **4.**CHECK IN-VEHICLE SENSOR

Check in-vehicle sensor. Refer to HAC-53, "In-Vehicle Sensor Component Inspection".

#### Is the inspection result normal?

- YES >> 1. Replace front air control. Refer to <u>VTL-7, "Removal and Installation"</u>.
  - 2. Go to <u>HAC-20</u>, "Front Air Control <u>Self-Diagnosis</u>" and perform self-diagnosis.
- NO >> 1. Replace in-vehicle sensor. Refer to <u>VTL-8</u>, "Removal and Installation".
   2. Go to <u>HAC-20</u>, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
- 5. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND FRONT AIR CONTROL
- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between in-vehicle sensor harness connector M34 (B) terminal 4 and front air control harness connector M56 (A) terminal 32.

#### 4 - 32

#### : Continuity should exist.

4. Check continuity between in-vehicle sensor harness connector M34 (B) terminal 4 and ground.

#### 4 - Ground

#### Continuity should not exist.

- Is the inspection result normal?
- YES >> 1. Replace front air control. Refer to VTL-7, "Removal and Installation".
  - 2. Go to HAC-20, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
- NO >> Repair harness or connector.

**O**.CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR MOTOR AND FRONT AIR CONTROL (SELF-DIAGNOSIS CODES 30, 31, 44, 46 OR DTC B2578, B2579)

#### 1. Turn ignition switch OFF.

- 2. Disconnect front air control connector and in-vehicle sensor connector.
- Check continuity between in-vehicle sensor harness connector M34 (B) terminal 3 and front air control harness connector M56 (A) terminal 31.

#### 3 - 31

#### : Continuity should exist.

- Check continuity between in-vehicle sensor harness connector M32 (B) terminal 3 and ground.
  - 2 Ground : Continuity should exist.

#### 3 - Ground

#### : Continuity should not exist.

#### Is the inspection result normal?

- YES >> 1. Replace front air control. Refer to VTL-7, "Removal and Installation".
  - 2. Go to HAC-20, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
- NO >> Repair harness or connector.

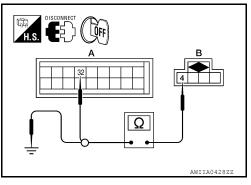
#### **HAC-52**

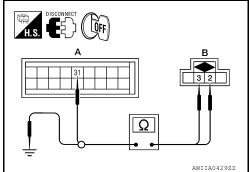


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#### < DTC/CIRCUIT DIAGNOSIS >

#### In-Vehicle Sensor Component Inspection

#### COMPONENT INSPECTION

In-vehicle Sensor

After disconnecting in-vehicle sensor connector M34, measure resistance between terminals 1 and 4 at sensor component side, using the table below.

Temperature °C (°F)	Resistance kΩ
-15 (5)	21.40
-10 (14)	16.15
-5 (23)	12.29
0 (32)	9.41
5 (41)	7.27
10 (50)	5.66
15 (59)	4.45
20 (68)	3.51
25 (77)	2.79
30 (86)	2.24
35 (95)	1.80
40 (104)	1.45
45 (113)	1.18

If NG, replace in-vehicle sensor. Refer to VTL-8, "Removal and Installation".

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#### < DTC/CIRCUIT DIAGNOSIS >

## **OPTICAL SENSOR**

Component Description

#### COMPONENT DESCRIPTION

The optical sensor (1) is located in the center of the defroster grille. It detects sunload entering through windshield by means of a photo diode. The sensor converts the sunload into a current value which is then input into the front air control.

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#### OPTICAL INPUT PROCESS

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

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

#### **Optical Sensor Diagnosis Procedure**

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Regarding Wiring Diagram information, refer to HAC-63, "Wiring Diagram - Automatic Air Conditioner".

#### DIAGNOSTIC PROCEDURE FOR OPTICAL SENSOR

SYMPTOM: Optical sensor circuit is open or shorted. Using the CONSULT, DTC B257F or B2580 is displayed. Without a CONSULT, code 50 or 52 is indicated on front air control as a result of conducting self-diagnosis.

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	1 Front air	38 control	18 (Bo	B	CM itrol module)

#### **1.**CHECK CIRCUIT CONTINUITY BETWEEN OPTICAL SENSOR AND FRONT AIR CONTROL

## **OPTICAL SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- Disconnect front air control connector and optical sensor connector.
- Check continuity between optical sensor harness connector M14 (B) terminals 1 and 2 and front air control harness connector M56 (C) terminal 38 and M52 (A) terminal 1.
  - 1 1 2 - 38
- : Continuity should exist.

: Continuity should exist.

4. Check continuity between optical sensor harness connector M14 (B) terminal 1 and 2 and ground.

#### 1, 2 - Ground

#### : Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 2.

- NO >> Repair harness or connector.
- 2.check circuit continuity between optical sensor and BCM
- 1. Disconnect BCM connector.
- Check continuity between optical sensor harness connector M14 (B) terminal 3 and BCM harness connector M18 (A) terminal 18.

#### 3 - 18

#### : Continuity should exist.

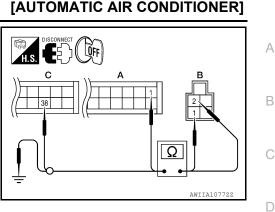
3. Check continuity between optical sensor harness connector M14 (B) terminal 4 and ground.

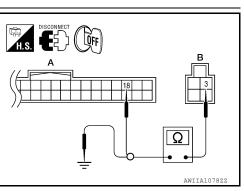
#### 3 - Ground

#### : Continuity should not exist.

Is the inspection result normal?

- YES >> Replace optical sensor. Refer to VTL-9, "Removal and Installation".
- NO >> Repair harness or connector.





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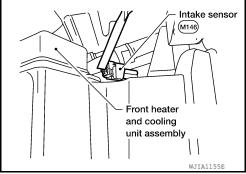
# INTAKE SENSOR

System Description

#### COMPONENT DESCRIPTION

#### Intake Sensor

The intake sensor is located on the heater & cooling unit assembly. It converts temperature of air after if passes through the evaporator into a resistance value which is then input to the front air control.



## Intake Sensor Diagnosis Procedure

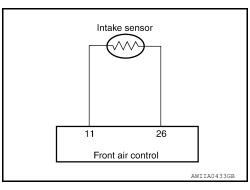
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Regarding Wiring Diagram information, refer to HAC-63, "Wiring Diagram - Automatic Air Conditioner".

#### DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted. Using the CON-SULT, DTC B2581 or B2582 is displayed. Without a CONSULT, code 56 or 57 is indicated on front air control as a result of conducting selfdiagnosis.



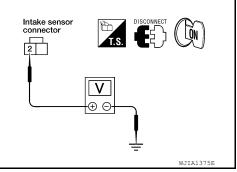
## $1. \mathsf{CHECK} \text{ voltage between intake sensor and ground}$

- 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

[AUTOMATIC AIR CONDITIONER]

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#### < 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 M52 (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

Check intake sensor. Refer to HAC-57, "Intake Sensor Component Inspection".

#### Is the inspection result normal?

- YES >> 1. Replace front air control. Refer to VTL-7, "Removal and Installation".
  - 2. Go to HAC-20, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
- NO Replace intake sensor. Refer to VTL-10, "Removal and Installation". >> 1.
- Go to HAC-20, "Front Air Control Self-Diagnosis" and perform self-diagnosis. 2.
- ${f 4}$  . CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND FRONT AIR CONTROL

#### 1. Turn ignition switch OFF.

- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector 3. M146 (B) terminal 2 and front air control harness connector M52 (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.

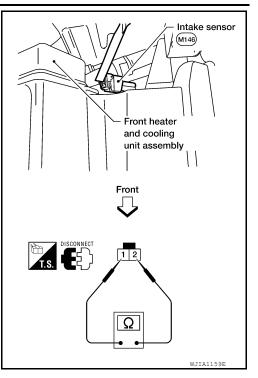
Is the inspection result normal? Replace front air control. Refer to VTL-7, "Removal and Installation". YES >> 1. Κ Go to HAC-20, "Front Air Control Self-Diagnosis" and perform self-diagnosis. 2. NO >> Repair harness or connector. Intake Sensor Component Inspection L INFOID:000000009164313 COMPONENT INSPECTION Μ Intake Sensor Ν

## **INTAKE SENSOR**

#### < 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 $k\Omega$
-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 <u>VTL-10</u>, "Removal and Installation".

#### [AUTOMATIC AIR CONDITIONER]

#### POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER [AUTOMATIC AIR CONDITIONER]

#### < DTC/CIRCUIT DIAGNOSIS >

## POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

## **Component Description**

#### 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 motors, 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.

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



There are two PTCs (driver and passenger) built into the front air control. They can be set at an interval of 0.5°C (1.0°F) in the 18°C (60°F) to 32°C (90°F) temperature range by rotating the temperature dial. The set temperature is displayed.

## Front Air Control Component Function Check

SYMPTOM: A/C system does not come on.

#### **INSPECTION FLOW**

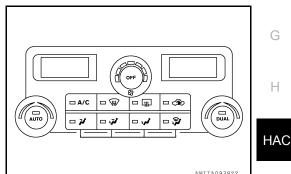
1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - AUTO MODE

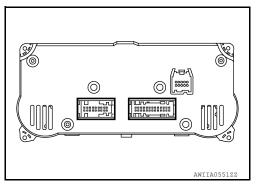
1. Press AUTO switch. 2. Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.) Is the inspection result normal? YES >> Inspection End. NO >> Go to diagnosis procedure. Refer to HAC-59, "Front Air Control Power and Ground Diagnosis Procedure". Front Air Control Power and Ground Diagnosis Procedure INFOID:000000009164316

Regarding Wiring Diagram information, refer to HAC-63, "Wiring Diagram - Automatic Air Conditioner".

DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

**Revision: December 2012** 





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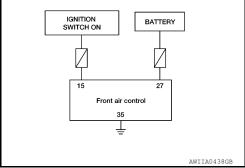
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## POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

#### < DTC/CIRCUIT DIAGNOSIS >

SYMPTOM: A/C system does not come on.

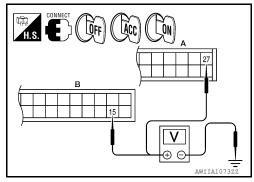




## 1. CHECK POWER SUPPLY CIRCUITS FOR FRONT AIR CONTROL

- 1. Turn ignition switch ON.
- Check voltage between front air control harness connector M52 (B) terminal 15 and M56 (A) terminal 27, and ground.

Terminals			Ignition switch position		
	(+)				
front air control connector	Terminal No.	(-)	OFF	ACC	ON
M52	15	Ground	Approx. 0V	Approx. 0V	Battery voltage
M56	27	Ground	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-78, "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.

## $\mathbf{2}$ . CHECK GROUND CIRCUIT FOR FRONT AIR CONTROL

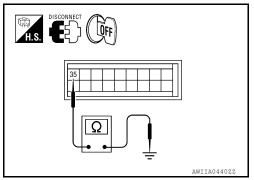
- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connectors.
- Check continuity between front air control harness connector M56 terminal 35 and ground.

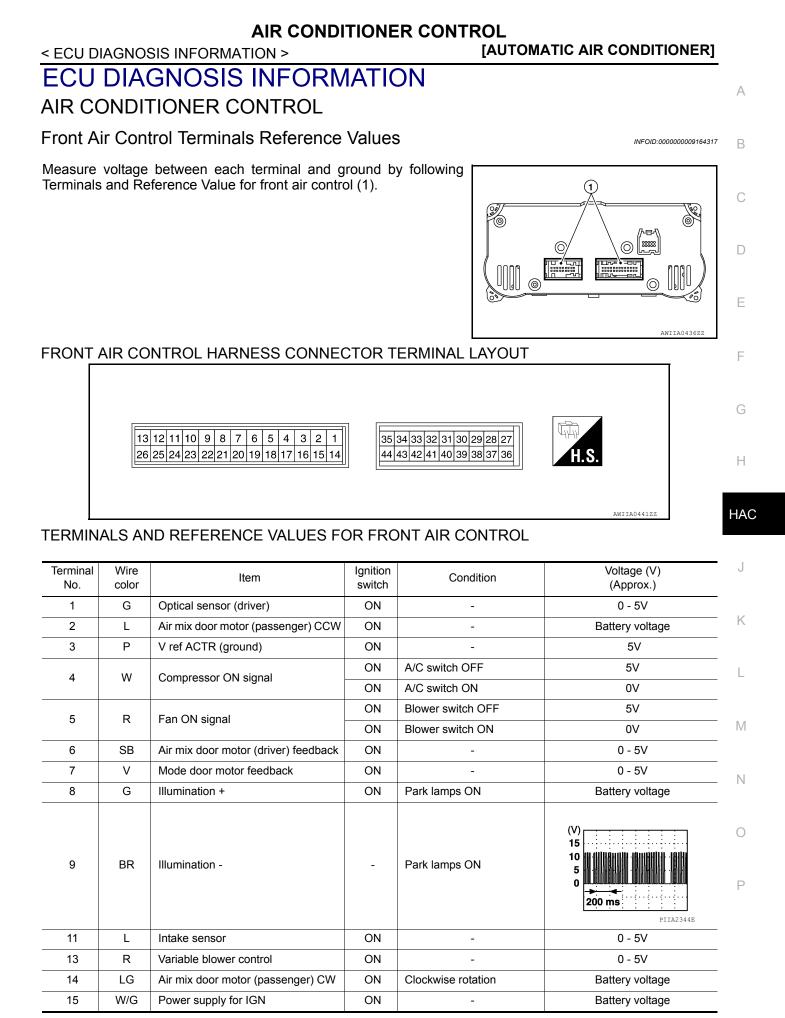
#### 35 - Ground

: Continuity should exist.

Is the inspection result normal?

- OK >> Replace front air control. Refer to <u>VTL-7</u>, "Removal and <u>Installation"</u>.
- NG >> Repair harness or connector.





## **AIR CONDITIONER CONTROL**

#### < ECU DIAGNOSIS INFORMATION >

#### [AUTOMATIC AIR CONDITIONER]

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
16	Y	Rear Defogger request *1	ON		Battery voltage
17	GR	Air mix door motor (driver) CW	ON	Clockwise rotation	Battery voltage
18	BR	Air mix door motor (driver) CCW	ON	Counterclockwise rotation	Battery voltage
19	L	Mode door motor CW	ON	Clockwise rotation	Battery voltage
20	BR	Mode door motor CCW	ON	Counterclockwise rotation	Battery voltage
21	0	Intake door motor CCW	ON	Counterclockwise rotation	Battery voltage
22	Y	Intake door motor CW	ON	Clockwise rotation	Battery voltage
25	W	Ambient sensor	ON	-	0 - 5V
26	V	Sensor ground	ON	-	0V
27	R/Y	Power supply for BAT	-	-	Battery voltage
28	Y	V ref ACTR (5V)	ON	-	0 - 5V
29	SB	Air mix door motor (passenger) feed- back	ON	-	0 - 5V
31	BR	In-vehicle sensor motor (+)	ON	-	Battery voltage
32	LG	In-vehicle sensor signal	ON	-	0 - 5V
35	В	Ground	-	-	0V
36	Р	CAN-L	ON	-	0 - 5V
37	L	CAN-H	ON	-	0 - 5V
38	GR	Optical sensor (passenger)	ON	-	0 - 5V

\*1: If equipped

< WIRING DIAGRAM >

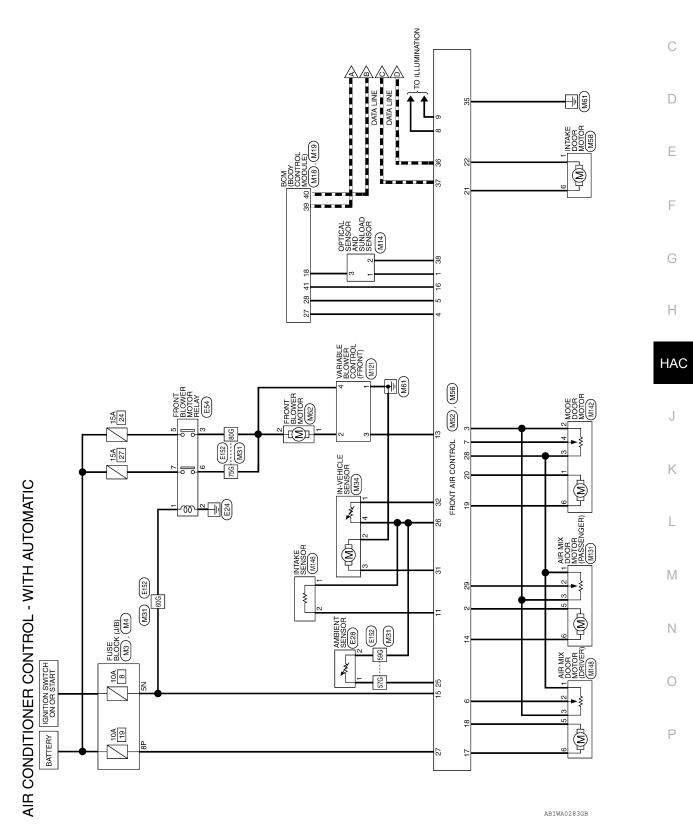
# WIRING DIAGRAM

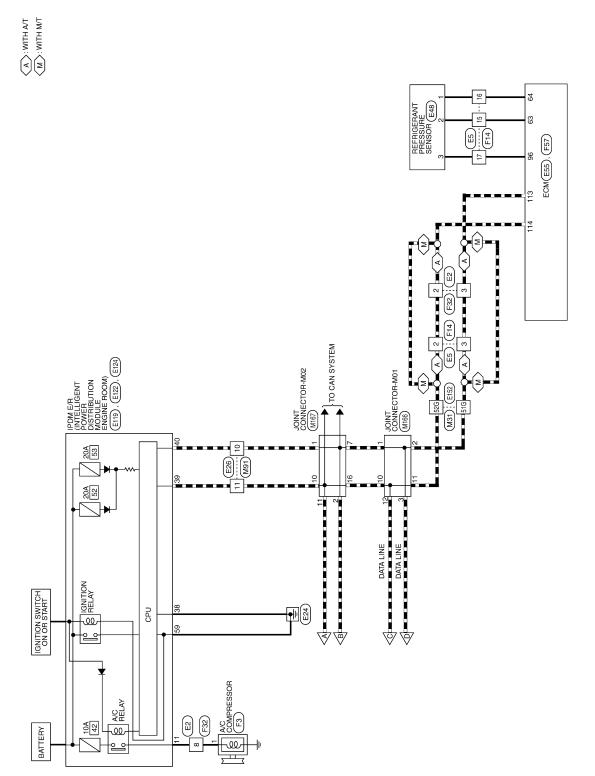
AIR CONDITIONER CONTROL

Wiring Diagram - Automatic Air Conditioner

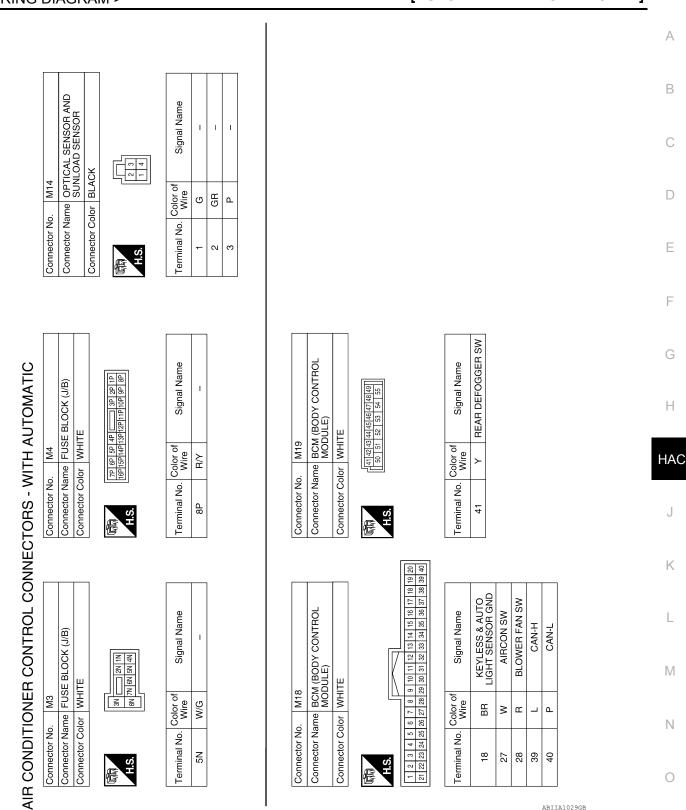
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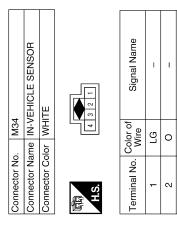
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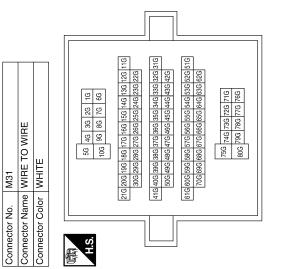
## **AIR CONDITIONER CONTROL**

#### < WIRING DIAGRAM >

#### [AUTOMATIC AIR CONDITIONER]

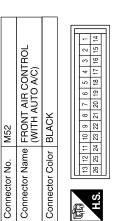


Signal Name	I	I	I	I	I	I	I	
Color of Wire	٩	_	N	>	W/G	W/G	W/G	
Terminal No. Color of Wire	51G	52G	57G	59G	60G	75G	80G	



Signal Name	IGN	REAR DEFROST REQUEST	DR BLEND DOOR A	DR BLEND DOOR B	MODE A	MODE B	INTAKE A	INTAKE B	I	Ι	AMB TEMP SENS	SENSON RETURN
Color of Wire	W/G	≻	GR	BR	_	BR	0	≻	I	-	×	>
Terminal No.	15	16	17	18	19	20	21	22	23	24	25	26

Signal Name	A/C REQUEST	FAN ON	DR BLEND DOOR FEED BACK	MODE FEED BACK	I	I	I	DISCHAGE AIR TEMP SENS	I	FRONT BLOWER VBC	PASS BLEND DR A
Color of Wire	N	щ	SB	>	σ	BR	I	L	I	щ	ГG
Terminal No.	4	5	9	7	8	6	10	11	12	13	14



Signal Name	SUNLOAD SEN LEFT (DR)	PASS BLEND DR B	V REF RETURN (GND)	
Color of Wire	U	_	٩	
Terminal No.	-	2	З	

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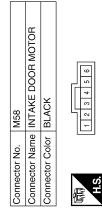
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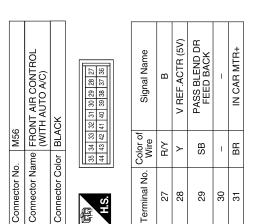
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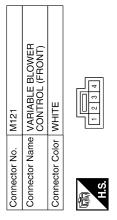
## [AUTOMATIC AIR CONDITIONER]



Signal Name	I	I	I	I	I	I
Color of Wire	٢	I	I	I	I	0
Terminal No. Color of Wire	1	2	ო	4	5	9

Signal Name	IN CAR TEMP SEN	1	I	GND	CAN-L	CAN-H	SUNLOAD SEN RIGHT (PASS)	1	I	I	1	I	1
Color of Wire	ГG	I	I	ш	٩	_	GR	I	I	I	ı	I	1
Terminal No.	32	33	34	35	36	37	38	39	40	41	42	43	44





				_
Signal Name	I	I	– (WITH AUTO A/C)	I
Color of Wire	В	L	н	W/G
Terminal No. Color of Wire	-	2	3	4

			_	
	-	8		
	~	6		
	e	10		
	П	11		
	ĮΠ	12		
IĽ	4	16 15 14 13 12		
F	ŝ	14		
5	9	15		
5	~	16		
Connector Color WHITE	f		ŗ Ľ	

Connector Name WIRE TO WIRE

M91

Connector No.

Signal Name	I	I	
Color of Wire	٩	Γ	
Terminal No. Color of Wire	10	11	

Connector No.	M62
Connector Name	Connector Name FRONT BLOWER MOTOR
Connector Color BLACK	BLACK
品 H.S.	

Signal Name	I	I	
Color of Wire	_	W/G	
Terminal No. C	-	2	

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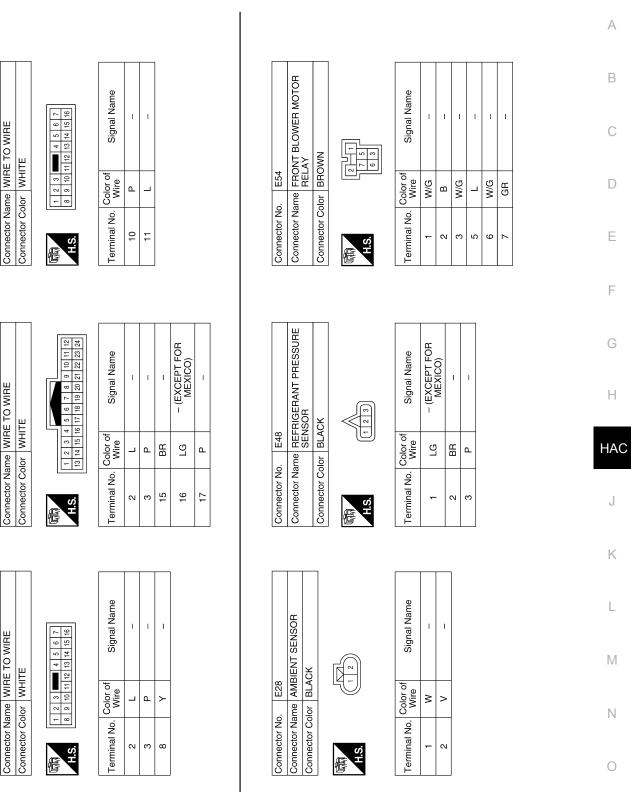
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	M131	Connector No.	. M142		Connector No.	M146	
Connector Name AIR MI) (PASSE Connector Color BLACK	Connector Name AIR MIX DOOR MOTOR (PASSENGER) Connector Color BLACK	Connector Name Connector Color	lor BLACK	Connector Name MUDE DUOH MUTOH Connector Color BLACK	Connector Name IN LAKE SENSOR Connector Color GRAY	ne INIAK or GRAY	ESENSOH
	3 4 5 6	品 H.S.		1 2 3 4 5 6	S.H	너크	
Terminal No. Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name
>	1	-	BR	1	-	>	1
SB	1	2	٩	1	5		1
œ	1	m	σ	1			
1	1	4	>	1			
_	1	ъ	1	1			
ГС	I	9	_	– (WITH AUTO A/C)			
Connector No. M148		Connector No.	. M166		Connector No.	M167	
Connector Name AIH MI) (DRIVE Connector Color BLACK	AIH MIX DOOH MUTOH (DRIVER) BLACK	Connector Color	lor BLUE		Connector Color		
1 2 3 4	3456	H.S.	9 8 7 1 20 19 18 17	6 5 4 3 2 1 16 15 14 13 12 11 10	H.S.	9 8 7 6 19 18 17 16	5         4         3         2         1           15         14         13         12         11         10
Terminal No. Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name
~	1	-	٩	I	-	٩.	1
SB	1	N	٩	1	N	٩	1
Ч	I	3	Ч	I	7	Ь	1
I	1	10	_	I	10	_	I
BR	1	11	L	1	11	L	1
GR	1	12		1	16		I

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E26

Connector No.

Connector No. E5

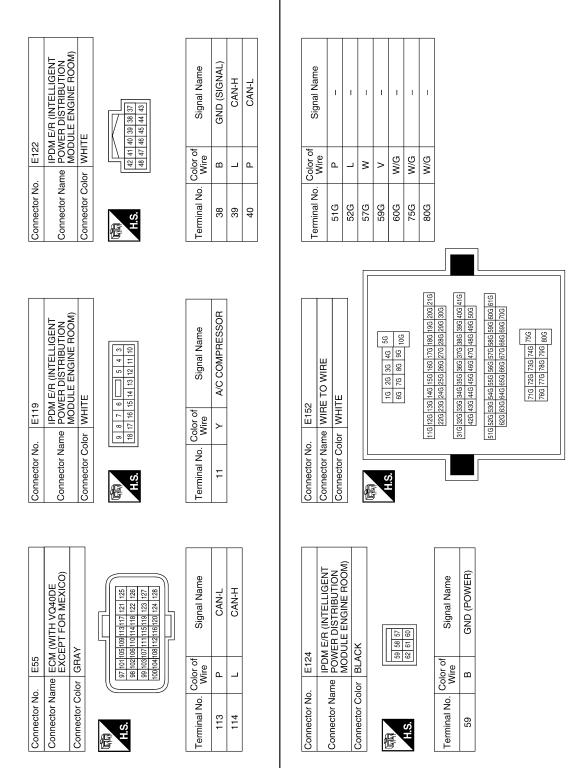
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Connector No.

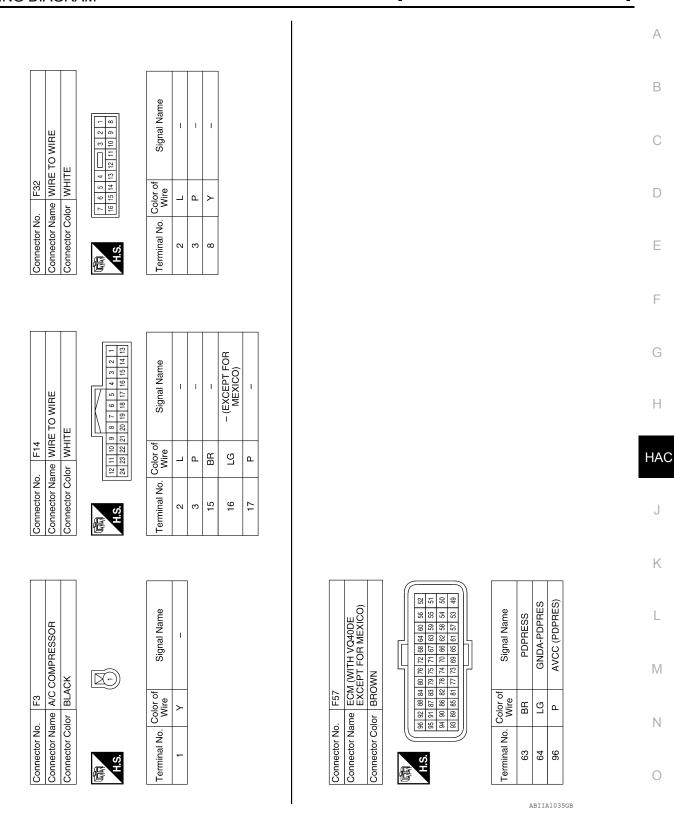
#### < WIRING DIAGRAM >

## AIR CONDITIONER CONTROL

#### [AUTOMATIC AIR CONDITIONER]



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**Revision: December 2012** 

2013 Frontier

# SYMPTOM DIAGNOSIS AIR CONDITIONER CONTROL

## Symptom Matrix Chart

INFOID:000000009164319

#### SYMPTOM TABLE

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	<u>HAC-59</u>
A/C system cannot be controlled.	Go to Self-diagnosis Function.	<u>HAC-20</u>
Air outlet does not change.	- Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-22</u>
Mode door motor is malfunctioning.		
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u>HAC-26</u>
Air mix door motor is malfunctioning.		
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>HAC-34</u>
Intake door motor is malfunctioning.		
Front blower motor operation is malfunction- ing.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-37
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	<u>HAC-43</u>
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	<u>HAC-73</u>
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	<u>HAC-81</u>
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-83
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	<u>HAC-59</u>
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	<u>HAC-85</u>

INSUFFICIENT COOLING	٨
Component Function Check	A
SYMPTOM: Insufficient cooling	В
INSPECTION FLOW	D
1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE	0
1. Press the AUTO switch.	C
<ol> <li>Turn temperature control dial (driver) counterclockwise until 18°C (60°F) is displayed.</li> <li>Check for cold air at discharge air outlets.</li> </ol>	
Can the symptom be duplicated?	D
YES >> GO TO 3.	
NO >> GO TO 2. 2.CHECK FOR ANY SYMPTOMS	Ε
Perform a complete operational check for any symptoms. Refer to <u>HAC-6</u> , "Operational Check".	
Does another symptom exist?	F
YES >> Refer to HAC-72, "Symptom Matrix Chart".	
NO >> System OK.	G
3. CHECK FOR SERVICE BULLETINS	
Check for any service bulletins.	Н
>> GO TO 4.	
4.PERFORM SELF-DIAGNOSIS	
Perform self-diagnosis Refer to HAC-20. "Front Air Control Self-Diagnosis".	HA
Is the inspection result normal?	
YES >> GO TO 5. NO >> Refer to <u>HAC-20, "Front Air Control Self-Diagnosis Code Chart"</u> .	J
5. CHECK DRIVE BELTS	
Check compressor belt tension. Refer to EM-129, "Checking Drive Belts".	Κ
Is the inspection result normal?	
YES >> GO TO 6. NO >> Adjust or replace compressor belt. Refer to <u>EM-129, "Removal and Installation"</u> .	L
6. CHECK AIR MIX DOOR OPERATION	
Check and verify air mix door mechanism for smooth operation. Refer to HAC-26. "Air Mix Door Motor (Driver)	M
Component Function Check".	
<u>Does air mix door operate correctly?</u> YES >> GO TO 7.	Ν
<ul> <li>NO &gt;&gt; Check air mix door motor circuit. Refer to <u>HAC-26</u>, "Air <u>Mix Door Motor (Driver) Diagnosis Proce</u>dure" or HAC-29, "Air Mix Door Motor (Passenger) Diagnosis Procedure".</li> </ul>	IN
7. CHECK COOLING FAN MOTOR OPERATION	0
Check and verify cooling fan motor for smooth operation. Refer to <u>EC-365</u> , "Overall Function Check" (OP25DE), EC 836, "Overall Function Check" (VO40DE USA and Canada) or EC 1355, "Overall Function	
(QR25DE), <u>EC-836, "Overall Function Check"</u> (VQ40DE USA and Canada) or <u>EC-1255, "Overall Function</u> <u>Check"</u> (VQ40DE Mexico).	Ρ
Does cooling fan motor operate correctly?	
<ul> <li>YES &gt;&gt; GO TO 8.</li> <li>NO &gt;&gt; Check cooling fan motor. Refer to <u>EC-366, "Diagnosis Procedure"</u> (QR25DE), <u>EC-837, "Diagnosis Procedure"</u> (VQ40DE USA and Canada) or <u>EC-1256, "Diagnosis Procedure"</u> (VQ40DE Mexico).</li> </ul>	
<b>8.</b> CHECK RECOVERY/RECYCLING EQUIPMENT BEFORE USAGE	

#### < SYMPTOM DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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.

>> GO TO 9.

9. CHECK REFRIGERANT PURITY

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 <u>HAC-86, "Working with HFC-134a (R-134a)"</u>.

**10.**CHECK FOR EVAPORATOR FREEZE UP

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

Does evaporator freeze up?

YES >> Perform performance test diagnoses. Refer to HAC-74, "Diagnostic Work Flow".

NO >> GO TO 11.

11.CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to <u>HAC-76, "Performance Chart"</u>. <u>Is the inspection result normal?</u>

YES >> Perform performance test diagnoses. Refer to <u>HAC-74, "Diagnostic Work Flow"</u>.

NO >> GO TO 12.

12. CHECK AIR DUCTS

Check ducts for air leaks.

Is the inspection result normal?

YES >> System OK.

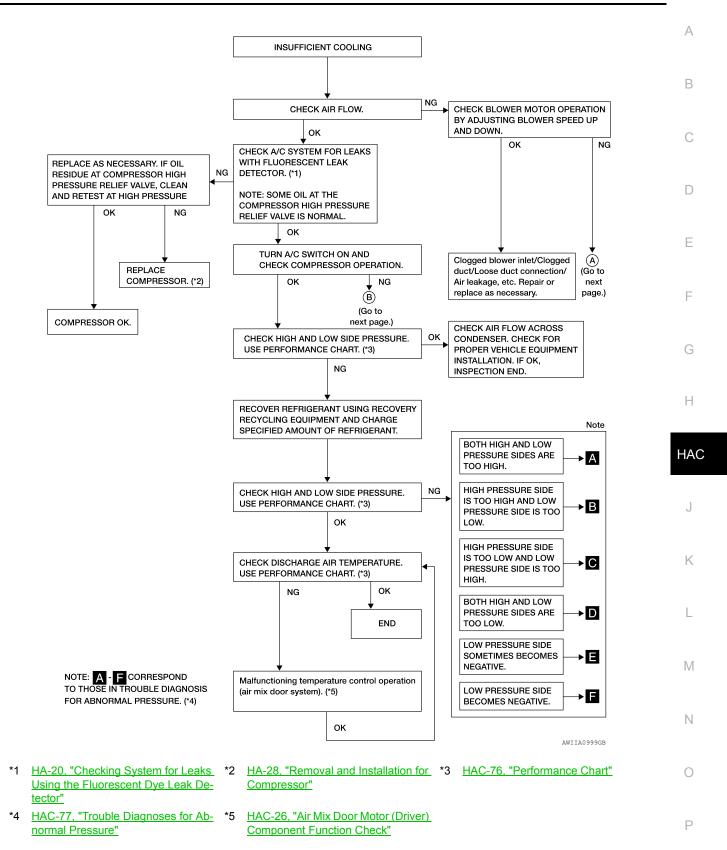
NO >> Repair air leaks.

Diagnostic Work Flow

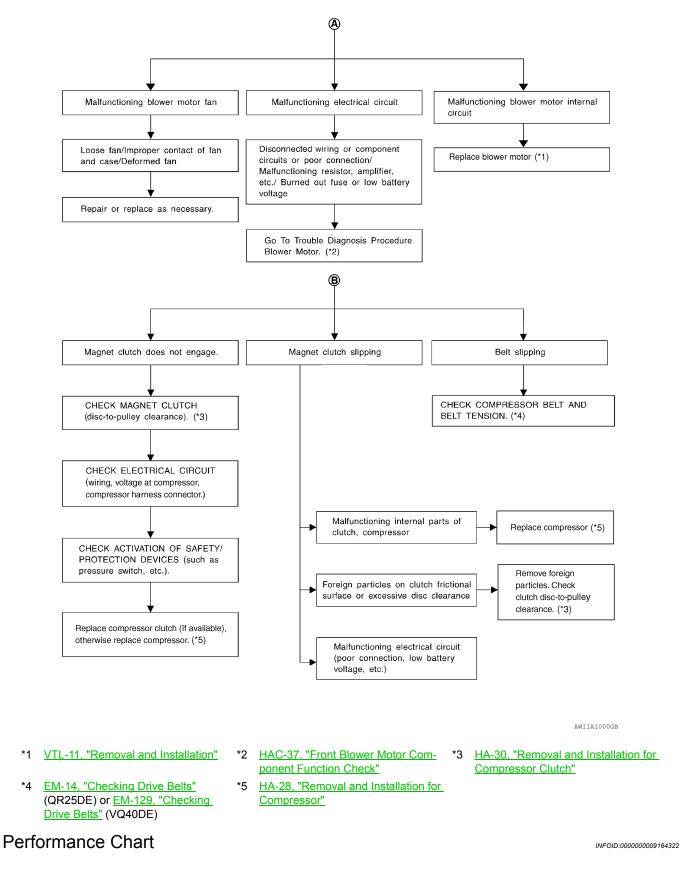
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#### < SYMPTOM DIAGNOSIS >

#### [AUTOMATIC AIR CONDITIONER]



#### < SYMPTOM DIAGNOSIS >



# **TEST CONDITION**

Testing must be performed as follows:

#### < SYMPTOM DIAGNOSIS >

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	
Solution Speed	Max. speed set	
Engine speed	Idle speed	
Operate the air conditioning system	n for 10 minutes before taking measurements.	

#### Recirculating-to-discharge Air Temperature Table

		Discharge air temperature at center ventilator	
Relative humidity %	Air temperature °C (°F)	°C (°F)	
	20 (68)	9.9 - 13.9 (50 - 57)	
-	25 (77)	14.6 - 18.6 (58 - 65)	
50 - 60	30 (86)	16.8 - 21.8 (62 - 71)	
-	35 (95)	21.1 - 27.1 (70 - 81)	
-	40 (104)	25.3 - 31.5 (78 - 89)	
	20 (68)	11.4 - 15.2 (53 - 59)	
	25 (77)	15.5 - 20.0 (60 - 68)	
60 - 70	30 (86)	19.9 - 25.0 (68 - 77)	
-	35 (95)	24.5 - 29.6 (76 - 85)	
	40 (104)	28.7 - 34.9 (84 - 95)	

Ambient Air Temperature-to-operating Pressure Table

Ambie	ent air	High-pressure (Discharge side)	Low-pressure (Suction side)
Relative humidity %	Air temperature °C (°F)	kPa (kg/cm <sup>2</sup> , psi)	kPa (kg/cm <sup>2</sup> , psi)
	20 (68)	1020 - 1250 (10.4 - 12.7, 147.9 - 181.3)	160 - 190 (1.63 - 1.94, 23.2 - 27.6)
-	25 (77)	1236 - 1510 (12.6 - 15.4, 179.2 - 219)	206 - 245 (2.1 - 2.5, 29.9 - 35.6)
50 - 70	30 (86)	1569 - 1,922 (16.0 - 19.6, 227.6 - 278.8)	265 - 324 (2.7 - 3.3, 38.4 - 46.9)
-	35 (95)	1,697 - 2079 (17.3 - 21.2, 246.1 - 301.5)	304 - 363 (3.1 - 3.7, 44.1 - 52.6)
-	40 (104)	1971 - 2403 (20.1 - 24.5, 285.9 - 348.5)	373 - 451 (3.8 - 4.6, 54.0 - 65.4)

# **Trouble Diagnoses for Abnormal Pressure**

Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (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).

# HAC-77

INFOID:000000009164323

# < SYMPTOM DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

# Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	Pressure is reduced soon af- ter water is splashed on con- denser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until speci- fied pressure is obtained.
Both high- and low-pressure sides are too high.	Air suction by cooling fan is in- sufficient.	<ul> <li>Insufficient condenser cooling performance</li> <li>↓</li> <li>1. Condenser fins are clogged.</li> <li>2. Improper fan rotation of cooling fan</li> </ul>	<ul> <li>Clean condenser.</li> <li>Check and repair cooling fan if necessary.</li> </ul>
	<ul> <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 con- denser (After compressor operation stops, high-pressure decreas- es too slowly.) ↓ Air in refrigeration cycle	Evacuate and recharge system
<b>В В В</b> асз59А	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cool- ing system.
	<ul> <li>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>Plates are sometimes cov- ered with frost.</li> </ul>	<ul> <li>Excessive liquid refrigerant on low-pressure side</li> <li>Excessive refrigerant dis- charge flow</li> <li>Expansion valve is open a lit- tle compared with the speci- fication.</li> <li>Improper expansion valve ad- justment</li> </ul>	Replace expansion valve.

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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts lo- cated between compressor and condenser are clogged or crushed.	<ul> <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
High-pressure side is too low and low-pressure side is too high.	High- and low-pressure sides become equal soon after com- pressor operation stops.	Compressor pressure opera- tion is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference be- tween high- and low-pressure sides.	Compressor pressure opera- tion is improper. ↓ Damaged inside compressor packings.	Replace compressor.

Revision: December 2012

# < SYMPTOM DIAGNOSIS >

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# Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	<ul> <li>There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low.</li> <li>Liquid tank inlet and expan- sion valve are frosted.</li> </ul>	Liquid tank inside is slightly clogged.	<ul> <li>Replace liquid tank.</li> <li>Check oil for contamination</li> </ul>
	<ul> <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 oc- curs somewhere in high- pressure side.</li> </ul>	High-pressure pipe located be- tween liquid tank and expan- sion valve is clogged.	<ul> <li>Check and repair malfunc- tioning parts.</li> <li>Check oil for contamination</li> </ul>
high- and low-pressure side	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or compo- nents.	Check refrigerant system for leaks. Refer to <u>HA-20, "Check</u> ing of <u>Refrigerant Leaks</u> " or <u>HA-22, "Checking of Refriger-</u> ant Leaks".
	There is a big temperature dif- ference between expansion valve inlet and outlet while the valve itself is frosted.	<ul> <li>Expansion valve closes a little compared with the specification.</li> <li>↓</li> <li>1. Improper expansion valve adjustment.</li> <li>2. Malfunctioning expansion valve.</li> <li>3. Outlet and inlet may be clogged.</li> </ul>	<ul> <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> <li>Check and repair malfunc- tioning parts.</li> <li>Check oil for contamination.</li> </ul>
	Air flow volume is too low.	Evaporator is frozen.	<ul> <li>Check intake sensor circuit. Refer to <u>HAC-56</u>, <u>"Intake</u> <u>Sensor Diagnosis Proce- dure"</u>.</li> <li>Repair evaporator fins.</li> <li>Replace evaporator.</li> <li>Refer to <u>HAC-37</u>, <u>"Front</u> <u>Blower Motor Component</u> <u>Function Check"</u>.</li> </ul>

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action	
E Low-pressure side sometimes be- comes negative.	<ul> <li>Air conditioning system does not function and does not cy- clically cool the compart- ment air.</li> <li>The system constantly func- tions for a certain period of time after compressor is stopped and restarted.</li> </ul>		<ul> <li>Drain water from refrigerant or replace refrigerant.</li> <li>Replace liquid tank.</li> </ul>	O

Low-pressure Side Becomes Negative

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#### < SYMPTOM DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
E Low-pressure side becomes nega- tive.	Liquid tank or front/rear side of expansion valve's pipe is frost- ed or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	<ul> <li>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.</li> <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** А Component Function Check INFOID:000000009164324 SYMPTOM: Insufficient heating INSPECTION FLOW **1.** CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE 1 Press the AUTO switch. Turn the temperature control dial (driver) clockwise until 32°C (90°F) is displayed. 2. Check for hot air at discharge air outlets. 3. D Can this symptom be duplicated? YES >> GO TO 2. NO >> Perform complete system operational check. Refer to <u>HAC-6, "Operational Check"</u>. Е 2.CHECK FOR SERVICE BULLETINS Check for any service bulletins. >> GO TO 3. 3.PERFORM SELF-DIAGNOSIS Perform self-diagnosis. Refer to HAC-20, "Front Air Control Self-Diagnosis". Is the inspection results normal? Н YES >> GO TO 4. NO >> Refer to HAC-20, "Front Air Control Self-Diagnosis Code Chart". 4. CHECK ENGINE COOLING SYSTEM HAC 1. Check for proper engine coolant level. Refer to CO-11, "System Inspection" (QR25DE) or CO-39, "System Inspection" (VQ40DE). 2. Check hoses for leaks or kinks. Check radiator cap. Refer to CO-11, "System Inspection" (QR25DE) or CO-39, "System Inspection" 3. (VQ40DE). Check for air in cooling system. Κ >> GO TO 5. 5.CHECK AIR MIX DOOR OPERATION Check the operation of the air mix door. Is the inspection result normal? YES >> GO TO 6. M NO >> Check the air mix door motor circuit. Refer to HAC-26, "Air Mix Door Motor (Driver) Component Function Check". **6.**CHECK AIR DUCTS Ν Check for disconnected or leaking air ducts. Is the inspection result normal? YES >> GO TO 7. NO >> Repair all disconnected or leaking air ducts. 7. CHECK HEATER HOSE TEMPERATURES P 1. Start engine and warm it up to normal operating temperature. Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be 2. warm. Is the inspection result normal? YES >> Hot inlet hose and a warm outlet hose: GO TO 8. NO >> • Inlet hose cold: GO TO 9.

Both hoses warm: GO TO 9.

# **INSUFFICIENT HEATING**

#### < SYMPTOM DIAGNOSIS >

# 8. CHECK ENGINE COOLANT SYSTEM

Check engine coolant temperature sensor. Refer to EC-189, "Component Inspection" (QR25DE), EC-656, "Component Inspection" (VQ40DE USA and Canada) or EC-1114, "Component Inspection" (VQ40DE Mexico).

#### 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-12, "Changing Engine Coolant" (QR25DE) or CO-40, "Changing Engine Coolant" (VQ40DE).
  - 4. GO TO 10 to retest.

**10.**CHECK HEATER HOSE TEMPERATURES

1. Start engine and warm it up to normal operating temperature.

Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be 2. warm.

Is the inspection result normal?

- YES >> System OK.
- NO >> Replace heater core. Refer to VTL-19, "Removal and Installation".

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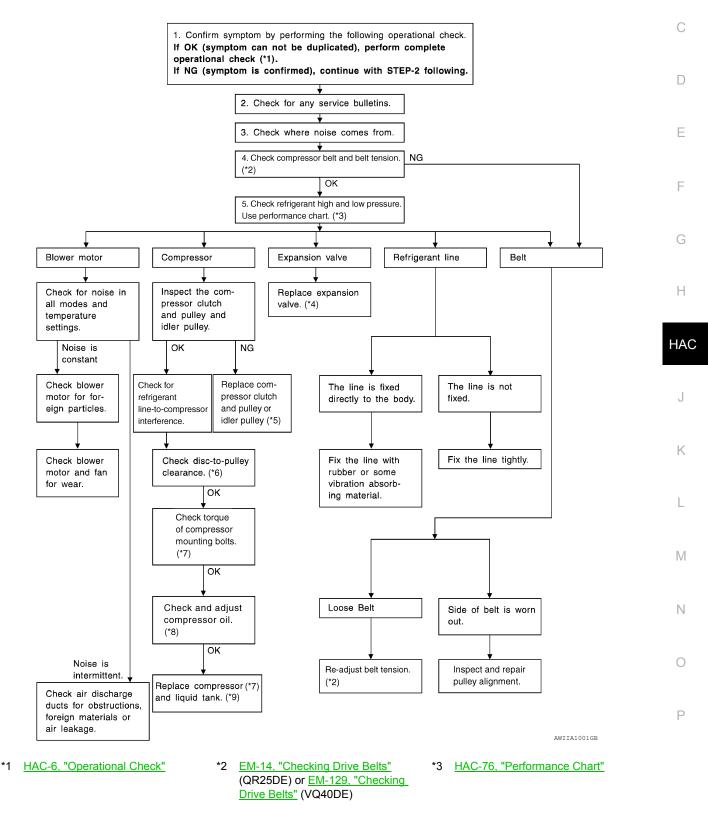
# NOISE

# **Component Function Check**

< SYMPTOM DIAGNOSIS >

SYMPTOM: Noise

**INSPECTION FLOW** 



# NOISE

# < SYMPTOM DIAGNOSIS >

- \*4 HA-40, "Removal and Installation" \*5 HA-30, "Removal and Installation for \*6 HA-30, "Removal and Installation for Compressor Clutch" Compressor Clutch"
- Compressor"
- \*7 HA-28, "Removal and Installation for \*8 HA-28, "Removal and Installation for \*9 HA-37, "Removal and Installation" Compressor"

MEMORY FUNCTION DOES NOT OPERATE         Memory Function Check         SYMPTOM: Memory function does not operate.         INSPECTION FLOW         1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MEMORY FUNCTION         1. Set the temperature to 32°C (90°F).         2. Rotate the front blower control dial (driver) to turn system OFF.         3. Turn ignition switch OFF.         4. Turn ignition switch ON.         5. Press the AUTO switch.         6. Confirm that the set temperature remains at previous temperature.         7. Press the OFF switch.         Can a symptom be duplicated?         YES >> 60 TO 3.         NO >> 60 TO 2.         2.PERFORM COMPLETE OPERATIONAL CHECK         Perform a complete operational check and check for any symptoms. Refer to <u>HAC-6. "Operational Check".</u> Can a symptom be duplicated?         YES >> 60 TO 3.         3. OH <> 60 TO 4.         4.PERFORM SELF-DIAGNOSIS         Perform self-diagnosis to check for any codes. Refer to <u>HAC-20. "Front Air Control Self-Diagnosis".</u> Are any self-diagnosis to check for any codes. Refer to <u>HAC-20. "Front Air Control Self-Diagnosis".</u> YES >> Refer to <u>HAC-20. "Front Air Control Self-Diagnosis".</u> YES >> GO TO 4.         4.PERFORM SELF-DIAGNOSIS         Perform self-diagnosis to check for any codes. Refer to <u>HAC-20. "F</u>	MEMORY FUNCTION DOES NOT OPERATE           < SYMPTOM DIAGNOSIS >         [AUTOMATIC AIR CONDITIONER]]
SYMPTOM: Memory function does not operate. INSPECTION FLOW  1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MEMORY FUNCTION  1. Set the temperature to 32°C (90°F). 2. Rotate the front blower control dial (driver) to turn system OFF. 3. Turn ignition switch OFF. 4. Turn ignition switch OFF. 5. Transition switch OFF. 6. Confirm that the set temperature remains at previous temperature. 7. Press the AUTO switch. 6. Confirm that the set temperature remains at previous temperature. 7. Press the OFF switch. 7. Press the UNIT SWITCH SWIT	MEMORY FUNCTION DOES NOT OPERATE
INSPECTION FLOW  1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MEMORY FUNCTION  1. Set the temperature to 32°C (90°F). 2. Rotate the front blower control dial (driver) to turn system OFF. 3. Turn ignition switch OFF. 4. Turn ignition switch OFF. 5. Press the AUTO switch. 6. Confirm that the set temperature remains at previous temperature. 7. Press the OFF switch. Can the symptom be duplicated? YES >> GO TO 3. NO >> GO TO 2. 2. PERFORM COMPLETE OPERATIONAL CHECK Perform a complete operational check and check for any symptoms. Refer to HAC-6. "Operational Check". Can a symptom be duplicated? YES >> Refer to HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair". NO >> System OK. 3. CHECK FOR SERVICE BULLETINS Check for any service bulletins. >> GO TO 4. 4. PERFORM SELF-DIAGNOSIS Perform self-diagnosis to check for any codes. Refer to HAC-20. "Front Air Control Self-Diagnosis". Ace any self-diagnosis codes present? YES >> Refer to HAC-20. "Front Air Control Self-Diagnosis". Ace any self-diagnosis codes present? YES >> Refer to HAC-20. "Front Air Control Self-Diagnosis". Ace any self-diagnosis codes present? YES >> Refer to HAC-20. "Front Air Control Self-Diagnosis". Ace any self-diagnosis codes present? YES >> Refer to HAC-20. "Front Air Control Self-Diagnosis". Ace any self-diagnosis codes present? YES >> Refer to HAC-20. "Front Air Control Component Function Check". Deteck FOR SYMPTOMS Perform a complete operational check for any symptoms. Refer to HAC-59. "Front Air Control Component Function Check". Settem inspection result normal? YES >> GO TO 6. NO >> Repair or replace as necessary. 6. RECHECK FOR SYMPTOMS Perform a complete operational check for any symptoms. Refer to HAC-6. "Operational Check". Does another symptom exist? YES >> Refer to HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair".	Memory Function Check
<ul> <li>1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MEMORY FUNCTION </li> <li>1. Set the temperature to 32°C (90°F).</li> <li>2. Rotate the front blower control dial (driver) to turn system OFF.</li> <li>3. Turn ignition switch OFF.</li> <li>4. Turn ignition switch OFF.</li> <li>5. Press the AUTO switch.</li> <li>6. Confirm that the set temperature remains at previous temperature.</li> <li>7. Press the OFF switch.</li> <li>Can the symptom be duplicated?</li> <li>YES &gt;&gt; GO TO 3.</li> <li>NO &gt;&gt; GO TO 2.</li> <li>2. PERFORM COMPLETE OPERATIONAL CHECK</li> <li>Perform a complete operational check and check for any symptoms. Refer to <u>HAC-6. "Operational Check".</u></li> <li>Can a symptom be duplicated?</li> <li>YES &gt;&gt; Refer to <u>HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair".</u></li> <li>NO &gt;&gt; System OK.</li> <li>3. CHECK FOR SERVICE BULLETINS</li> <li>Check for any service bulletins.</li> <li>&gt;&gt; GO TO 4.</li> <li>4. PERFORM SELF-DIAGNOSIS</li> <li>Perform self-diagnosis to check for any codes. Refer to <u>HAC-20. "Front Air Control Self-Diagnosis".</u></li> <li>Are any self-diagnosis codes present?</li> <li>YES &gt;&gt; Refer to <u>HAC-2. "Front Air Control Self-Diagnosis".</u></li> <li>5. CHECK POWER AND GROUND CIRCUIT</li> <li>Check main power supply and ground circuit. Refer to <u>HAC-59. "Front Air Control Component Function Check".</u></li> <li>Se GO TO 6.</li> <li>NO &gt;&gt; Repair or replace as necessary.</li> <li>6. RECHECK FOR SYMPTOMS</li> <li>Perform a complete operational check for any symptoms. Refer to <u>HAC-6. "Operational Check".</u></li> <li>Does another symptom self?</li> <li>YES &gt;&gt; Refer to <u>HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair".</u></li> </ul>	SYMPTOM: Memory function does not operate.
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<ul> <li>2. Rotate the front blower control dial (driver) to turn system OFF.</li> <li>3. Turn ignition switch OFF.</li> <li>4. Turn ignition switch ON.</li> <li>5. Press the AUTO switch.</li> <li>6. Confirm that the set temperature remains at previous temperature.</li> <li>7. Press the OFF switch.</li> <li>Can the symptom be duplicated?</li> <li>YES &gt;&gt; GO TO 3. NO &gt;&gt; GO TO 2.</li> <li>2. PERFORM COMPLETE OPERATIONAL CHECK</li> <li>Perform a complete operational check and check for any symptoms. Refer to <u>HAC-6</u>, "Operational Check".</li> <li>Can a symptom be duplicated?</li> <li>YES &gt;&gt; Refer to <u>HAC-5</u>. "How to Perform Trouble Diagnosis For Quick And Accurate Repair". NO &gt;&gt; System OK.</li> <li>3. CHECK FOR SERVICE BULLETINS</li> <li>Check for any service bulletins. &gt;&gt; GO TO 4.</li> <li>4. PERFORM SELF-DIAGNOSIS</li> <li>Perform self-diagnosis to check for any codes. Refer to <u>HAC-20</u>. "Front Air Control Self-Diagnosis". Are any self-diagnosis to check for any codes. Refer to <u>HAC-20</u>. "Front Air Control Self-Diagnosis".</li> <li>Are any self-diagnosis codes present?</li> <li>YES &gt;&gt; Refer to <u>HAC-20</u>. "Front Air Control Self-Diagnosis Code Chart". NO &gt;&gt; GO TO 5.</li> <li>5. CHECK POWER AND GROUND CIRCUIT</li> <li>Check main power supply and ground circuit. Refer to <u>HAC-59</u>. "Front Air Control Component Function Check".</li> <li>6. RECHECK FOR SYMPTOMS</li> <li>Perform a complete operational check for any symptoms. Refer to <u>HAC-6</u>. "Operational Check".</li> <li>6. RECHECK FOR SYMPTOMS</li> <li>Perform a complete operational check for any symptoms. Refer to <u>HAC-6</u>. "Operational Check".</li> <li>7. Obes another symptom selfs?</li> <li>7. YES &gt;&gt; Refer to <u>HAC-5</u>. "How to Perform Trouble Diagnosis For Quick And Accurate Repair".</li> </ul>	1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MEMORY FUNCTION
<ul> <li>6. Confirm that the set temperature remains at previous temperature.</li> <li>7. Press the OFF switch.</li> <li>Can the symptom be duplicated?</li> <li>YES ⇒ GO TO 3. NO ⇒ GO TO 2.</li> <li>2.PERFORM COMPLETE OPERATIONAL CHECK</li> <li>Perform a complete operational check and check for any symptoms. Refer to <u>HAC-6. "Operational Check".</u> Can a symptom be duplicated?</li> <li>YES ⇒ Refer to <u>HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair".</u> NO ⇒ System OK.</li> <li>3. CHECK FOR SERVICE BULLETINS</li> <li>Check for any service bulletins.</li> <li>⇒ GO TO 4.</li> <li>4. PERFORM SELF-DIAGNOSIS</li> <li>Perform self-diagnosis codes present?</li> <li>YES ⇒ Refer to <u>HAC-20. "Front Air Control Self-Diagnosis".</u> Are any self-diagnosis codes present?</li> <li>YES ⇒ Refer to <u>HAC-20. "Front Air Control Self-Diagnosis".</u> 5. CHECK POWER AND GROUND CIRCUIT</li> <li>Check main power supply and ground circuit. Refer to <u>HAC-59. "Front Air Control Component Function Check".</u></li> <li>Is the inspection result normal? YES ⇒ GO TO 6. NO ⇒ Repair or replace as necessary.</li> <li>6. RECHECK FOR SYMPTOMS</li> <li>Perform a complete operational check for any symptoms. Refer to <u>HAC-6. "Operational Check".</u> Does another symptom exist?</li> <li>YES ⇒ Refer to <u>HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair".</u></li> </ul>	<ol> <li>Rotate the front blower control dial (driver) to turn system OFF.</li> <li>Turn ignition switch OFF.</li> <li>Turn ignition switch ON.</li> </ol>
Can the symptom be duplicated?         YES       >> GO TO 3.         NO       >> GO TO 2.         2. PERFORM COMPLETE OPERATIONAL CHECK         Perform a complete operational check and check for any symptoms. Refer to HAC-6. "Operational Check".         Can a symptom be duplicated?         YES       >> Refer to HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair".         NO       >> System OK.         3. CHECK FOR SERVICE BULLETINS         Check for any service bulletins.         >> GO TO 4.         4. PERFORM SELF-DIAGNOSIS         Perform self-diagnosis codes present?         YES       >> Refer to HAC-20. "Front Air Control Self-Diagnosis".         Are any self-diagnosis codes present?         YES       >> Refer to HAC-20. "Front Air Control Self-Diagnosis Code Chart".         NO       >> GO TO 5.         5. CHECK POWER AND GROUND CIRCUIT         Check main power supply and ground circuit. Refer to HAC-59. "Front Air Control Component Function Check".         Is the inspection result normal?         YES       >> GO TO 6.         NO       >> Repair or replace as necessary.         6. RECHECK FOR SYMPTOMS         Perform a complete operational check for any symptoms. Refer to HAC-6. "Operational Check".         Does another symptom exist?         <	6. Confirm that the set temperature remains at previous temperature.
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Can a symptom be duplicated?         YES       >> Refer to HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair".         NO       >> System OK.         3. CHECK FOR SERVICE BULLETINS         Check for any service bulletins.         >> GO TO 4.         4. PERFORM SELF-DIAGNOSIS         Perform self-diagnosis to check for any codes. Refer to HAC-20. "Front Air Control Self-Diagnosis".         Are any self-diagnosis codes present?         YES       >> Refer to HAC-20. "Front Air Control Self-Diagnosis Code Chart".         NO       >> GO TO 5.         5. CHECK POWER AND GROUND CIRCUIT         Check main power supply and ground circuit. Refer to HAC-59, "Front Air Control Component Function Check".         Is the inspection result normal?         YES       >> GO TO 6.         NO       >> GO TO 6.         NO       >> Repair or replace as necessary.         6. RECHECK FOR SYMPTOMS         Perform a complete operational check for any symptoms. Refer to HAC-6, "Operational Check".         Does another symptom exist?         YES       >> Refer to HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair".	2.PERFORM COMPLETE OPERATIONAL CHECK
YES       >> Refer to <u>HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair"</u> .         NO       >> System OK.         3.CHECK FOR SERVICE BULLETINS         Check for any service bulletins.         >> GO TO 4.         4.PERFORM SELF-DIAGNOSIS         Perform self-diagnosis to check for any codes. Refer to <u>HAC-20, "Front Air Control Self-Diagnosis"</u> .         Are any self-diagnosis codes present?         YES       >> Refer to <u>HAC-20, "Front Air Control Self-Diagnosis Code Chart"</u> .         NO       >> GO TO 5.         5.CHECK POWER AND GROUND CIRCUIT         Check main power supply and ground circuit. Refer to <u>HAC-59, "Front Air Control Component Function Check"</u> .         Is the inspection result normal?         YES       >> GO TO 6.         NO       >> Repair or replace as necessary.         6.RECHECK FOR SYMPTOMS         Perform a complete operational check for any symptoms. Refer to <u>HAC-6, "Operational Check"</u> .         Dees another symptom exist?         YES       >> Refer to <u>HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair"</u> .	
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<ul> <li>&gt;&gt; GO TO 4.</li> <li>4. PERFORM SELF-DIAGNOSIS</li> <li>Perform self-diagnosis to check for any codes. Refer to <u>HAC-20. "Front Air Control Self-Diagnosis"</u>.</li> <li><u>Are any self-diagnosis codes present?</u></li> <li>YES &gt;&gt; Refer to <u>HAC-20. "Front Air Control Self-Diagnosis Code Chart"</u>.</li> <li>NO &gt;&gt; GO TO 5.</li> <li>5. CHECK POWER AND GROUND CIRCUIT</li> <li>Check main power supply and ground circuit. Refer to <u>HAC-59. "Front Air Control Component Function Check"</u>.</li> <li>Is the inspection result normal?</li> <li>YES &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; Repair or replace as necessary.</li> <li>6. RECHECK FOR SYMPTOMS</li> <li>Perform a complete operational check for any symptoms. Refer to <u>HAC-6. "Operational Check"</u>.</li> <li><u>Does another symptom exist?</u></li> <li>YES &gt;&gt; Refer to <u>HAC-5. "How to Perform Trouble Diagnosis For Quick And Accurate Repair"</u>.</li> </ul>	Check for any service bulletins.
<ul> <li>4. PERFORM SELF-DIAGNOSIS</li> <li>Perform self-diagnosis to check for any codes. Refer to <u>HAC-20</u>, "Front Air Control Self-Diagnosis".</li> <li><u>Are any self-diagnosis codes present?</u></li> <li>YES &gt;&gt; Refer to <u>HAC-20</u>, "Front Air Control Self-Diagnosis Code Chart".</li> <li>NO &gt;&gt; GO TO 5.</li> <li>5. CHECK POWER AND GROUND CIRCUIT</li> <li>Check main power supply and ground circuit. Refer to <u>HAC-59</u>, "Front Air Control Component Function Check".</li> <li>Is the inspection result normal?</li> <li>YES &gt;&gt; GO TO 6.</li> <li>NO &gt;&gt; Repair or replace as necessary.</li> <li>6. RECHECK FOR SYMPTOMS</li> <li>Perform a complete operational check for any symptoms. Refer to <u>HAC-6</u>, "Operational Check".</li> <li>Does another symptom exist?</li> <li>YES &gt;&gt; Refer to <u>HAC-5</u>, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".</li> </ul>	
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YES       >> Refer to HAC-20. "Front Air Control Self-Diagnosis Code Chart".         NO       >> GO TO 5. <b>5.</b> CHECK POWER AND GROUND CIRCUIT         Check main power supply and ground circuit. Refer to HAC-59, "Front Air Control Component Function Check".         Is the inspection result normal?         YES       >> GO TO 6.         NO       >> Repair or replace as necessary. <b>6.</b> RECHECK FOR SYMPTOMS         Perform a complete operational check for any symptoms. Refer to HAC-6, "Operational Check".         Does another symptom exist?         YES       >> Refer to HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".	
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Check".         Is the inspection result normal?         YES       >> GO TO 6.         NO       >> Repair or replace as necessary. <b>6</b> .RECHECK FOR SYMPTOMS         Perform a complete operational check for any symptoms. Refer to <u>HAC-6, "Operational Check".         Does another symptom exist?         YES       &gt;&gt; Refer to <u>HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair"</u>.   </u>	5. CHECK POWER AND GROUND CIRCUIT
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6.RECHECK FOR SYMPTOMS Perform a complete operational check for any symptoms. Refer to <u>HAC-6</u> , "Operational Check". Does another symptom exist? YES >> Refer to <u>HAC-5</u> , "How to Perform Trouble Diagnosis For Quick And Accurate Repair".	
Perform a complete operational check for any symptoms. Refer to <u>HAC-6, "Operational Check"</u> . <u>Does another symptom exist?</u> YES >> Refer to <u>HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair"</u> .	
<u>Does another symptom exist?</u> YES >> Refer to <u>HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair"</u> .	<b>D</b> .RECHECK FOR SYMPTOMS
YES >> Refer to <u>HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair"</u> .	
	YES >> Refer to <u>HAC-5</u> , "How to Perform Trouble Diagnosis For Quick And Accurate Repair".

# < PRECAUTION >

# PRECAUTION PRECAUTIONS

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

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 Man-

#### ual. 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:000000009164328

# 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 <u>HA-4</u>, <u>"Contaminated Refrigerant"</u>. 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

# PRECAUTIONS

#### < PRECAUTION >

# [AUTOMATIC AIR CONDITIONER]

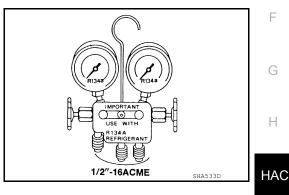
#### If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into А 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. D
- 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

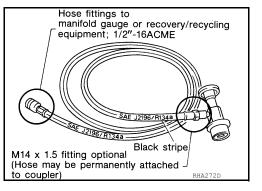
#### MANIFOLD GAUGE SET

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

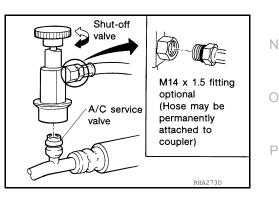
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shutoff devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



#### 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



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# BASIC INSPECTION MANUAL A/C IDENTIFICATION TABLE

# **Application Table**

INFOID:000000008789435

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]	
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]	AMILA12282Z

DIAGNOSIS AND REPAIR WORKFLOW < BASIC INSPECTION > [MANUAL A/C (TYPE 1)]	1
DIAGNOSIS AND REPAIR WORKFLOW	_
How to Perform Trouble Diagnosis For Quick And Accurate Repair	36
WORK FLOW 1.LISTEN TO CUSTOMER COMPLAINT	
Listen to customer complaint. Get detailed information about the conditions and environment when the symp tom 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-90, "Operational Check".	-
Can a symptom be duplicated? YES >> Go to trouble diagnosis. Refer to <u>HAC-142, "Symptom Matrix Chart"</u> . NO >> GO TO 4.	
4.PERFORM THE FRONT AIR CONTROL SELF-DIAGNOSIS	
Perform front air control self-diagnosis. Refer to HAC-101, "Front Air Control Self-Diagnosis".	-
>> If any diagnostic trouble codes set. Refer to <u>HAC-101, "Front Air Control Self-Diagnosis Chart"</u> . > Confirm the repair by performing operational check. Refer to <u>HAC-90, "Operational Check"</u> .	ŀ

# **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

# **INSPECTION AND ADJUSTMENT**

# Operational Check

INFOID:000000008789437

[MANUAL A/C (TYPE 1)]

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 dial clockwise. Blower should operate on low speed.
- 2. Turn the blower control dial 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 <u>HAC-116</u>, "Front Blower Motor 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 tot <u>HAC-96</u>, "Discharge Air Flow".

Mode door position is checked in the next step.

If NG, go to trouble diagnosis procedure for <u>HAC-104</u>, "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 ( $\mathbf{W}$ ) or D/F ( $\mathbf{W}$ ) is selected.

#### CHECKING RECIRCULATION

- 1. Press recirculation (
- 2. Press recirculation (
- 3. Listen for intake door position change (blower sound should change slightly).

If NG, go to trouble diagnosis procedure for <u>HAC-113</u>, "Intake Door Motor Diagnosis Procedure". If OK, continue with next check.

#### NOTÉ:

Confirm that the 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 <u>HAC-143</u>, <u>"Component Function Check"</u>. If air mix door motor appears to be malfunctioning, go to <u>HAC-108</u>, "<u>Air Mix</u> <u>Door Motor Component Function Check</u>".

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 <u>HAC-151</u>, <u>"Component Function Check"</u>. If air mix door motor (front) appears to be malfunctioning, go to <u>HAC-108</u>, "Air <u>Mix Door Motor Component Function Check"</u>.

If OK, continue with next check.

#### CHECK A/C SWITCH

- 1. Press A/C switch with the 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 <u>HAC-121. "Magnet Clutch Diagnosis Procedure"</u>. If OK, continue with next check.

# SYSTEM DESCRIPTION MANUAL A/C IDENTIFICATION TABLE

# Application Table

INFOID:000000008789438 В

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Manual A/C Type	Description	Visual Identification	С
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]		D
		AWIIA0481ZZ	F
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]		Н
		AWIIA12282Z	HA

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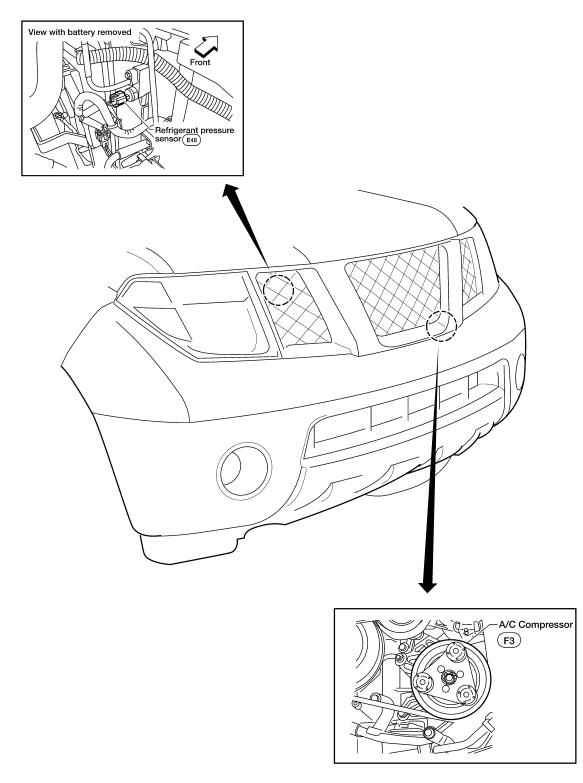
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# **FUNCTION INFORMATION**

**Component Part Location** 

ENGINE COMPARTMENT



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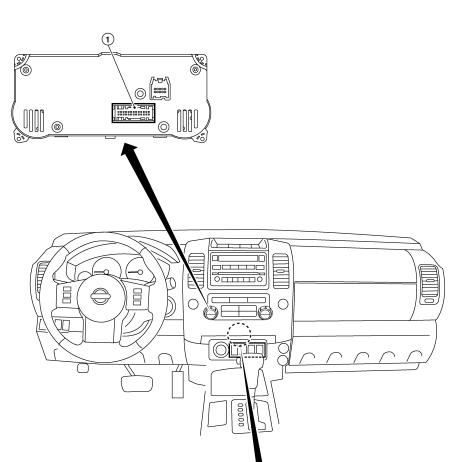
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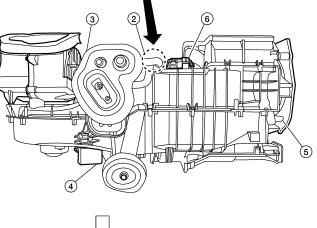
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# PASSENGER COMPARTMENT





 $\checkmark$ 

AWIIA1198ZZ

- $\Rightarrow$  :Front
- 3. Intake door motor M58
- 6. Air mix door motor M147
- 1. Front air control M50
- 4. Variable blower control M121
- 2. Intake sensor M146
- 5. Mode door motor M142

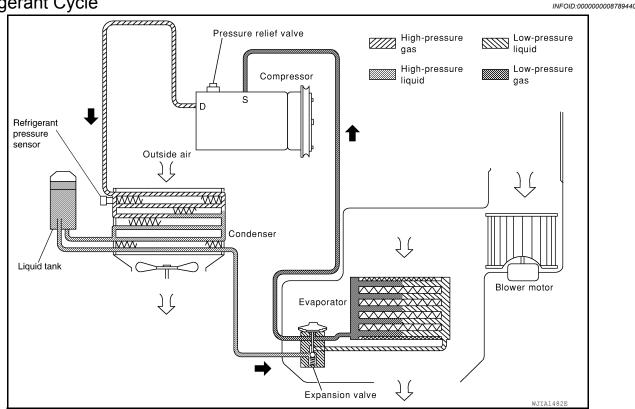
# **REFRIGERATION SYSTEM**

# < SYSTEM DESCRIPTION >

# **REFRIGERATION SYSTEM**







# **REFRIGERANT FLOW**

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

# 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:000000008789441

# 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.

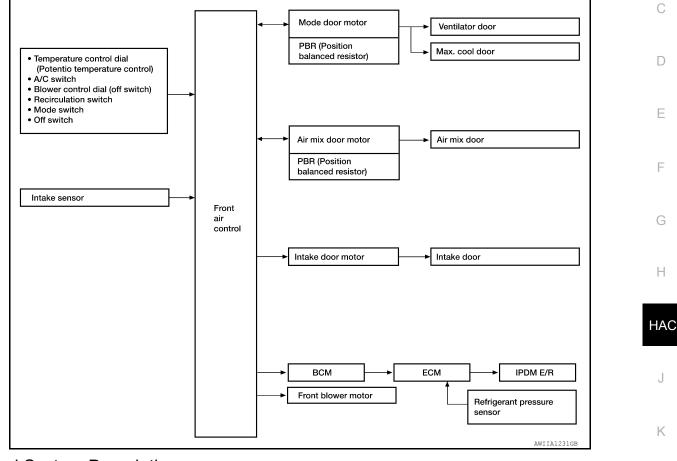
Control System Diagram

< SYSTEM DESCRIPTION >

# CONTROL SYSTEM

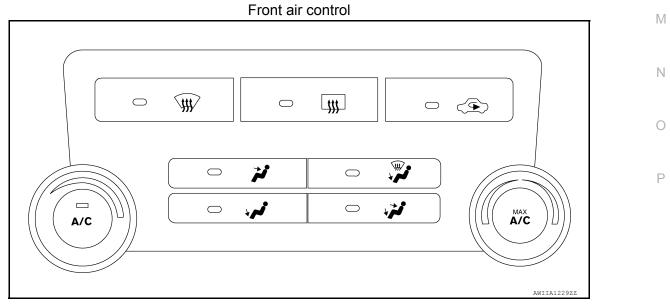
The control system consists of input sensors, switches, the front air control (microcomputer) and outputs. The relationship of these components is shown in the figure below:

MANUAL AIR CONDITIONER SYSTEM



# Control System Description

CONTROL OPERATION



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# MANUAL AIR CONDITIONER SYSTEM

# < SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 1)]

TEMPERATURE CONTROL DIAL (TEMPERATURE CONTROL) Increases or decreases the set temperature.

# RECIRCULATION (

- 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 is defogged.

OFF SWITCH (BLOWER SPEED DIAL)

The compressor and blower are OFF.

#### A/C SWITCH

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

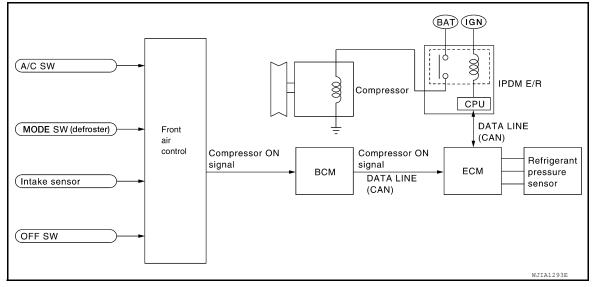
MODE SWITCHES

Controls the air discharge outlets.

FRONT BLOWER CONTROL DIAL

Manually controls the blower speed.

#### MAGNET CLUTCH CONTROL



When the A/C switch is pressed, or the mode switch is pressed to the DEF or D/F position, the front air control outputs a compressor ON signal to BCM.

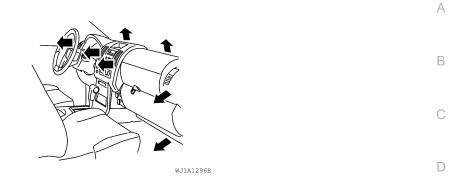
The BCM then sends a compressor ON signal to ECM, via CAN communication line.

ECM judges whether 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 compressor.

Discharge Air Flow

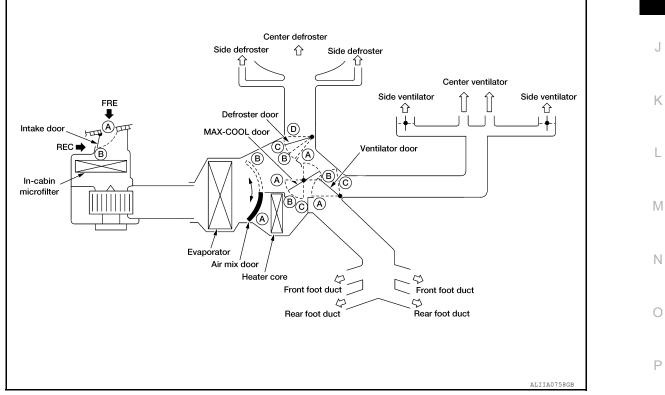
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Mode door position		Air outlet/distribution		
	Vent	Foot	Defroster	
7	95%	5%	_	
Ÿ	60%	40%	_	
J	20%	55%	25%	
	15%	50%	35%	
ŧ	7%	15%	78%	

# Switches And Their Control Function

# SWITCHES AND THEIR CONTROL FUNCTION



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# MANUAL AIR CONDITIONER SYSTEM

#### < SYSTEM DESCRIPTION >

Position		MOD	E SW		DEF	SW		sw	Temp	erature	ə dial	OFF
or switch	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF				SW
Door	+•	نير.		¥#			C	Ð		Ă/C		
			+/*	+		0		0	COLD	2	нот	
Ventilator door	۸	₿	©	©	C		_	_		—		C
MAX-COOL door	۲	B	B	B	©			_				B
Defroster door	0	D	<b>℗</b> ₀r <b>℗</b>	B	A		_					©
Intake door		_			B		A	B				₿
Air mix door		_							۸		B	

# < SYSTEM DESCRIPTION > DIAGNOSIS SYSTEM (BCM) COMMON ITEM

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

INFOID:000000009225448

# 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.	E
Work support	The settings for BCM functions can be changed.	
Configuration	<ul><li>The vehicle specification can be read and saved.</li><li>The vehicle specification can be written when replacing BCM.</li></ul>	F
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.	

#### SYSTEM APPLICATION

BCM can perform the following functions.

				Direct [	Diagnosti	c Mode			- H
System	Sub System	Ecu Identification	Self Diagnostic Result	Data Monitor	Active Test	Work support	Configuration	CAN Diag Support Mntr	HAC
Door lock	DOOR LOCK	ш	0)	×	×	> ×	0	0	_
Rear window defogger	REAR DEFOGGER			×	×				K
Warning chime	BUZZER			×	×				_
Interior room lamp timer	INT LAMP			×	×	×			-
Remote keyless entry system	MULTI REMOTE ENT			×	×	×			_ L
Exterior lamp	HEAD LAMP			×	×	×			_
Wiper and washer	WIPER			×	×	×			M
Turn signal and hazard warning lamps	FLASHER			×	×				_
Air conditioner	AIR CONDITIONER			×					_
Combination switch	COMB SW			×					- N
BCM	BCM	×	×			×	×	×	
Immobilizer	IMMU		×	×	×				0
Interior room lamp battery saver	BATTERY SAVER			×	×	×			
Vehicle security system	THEFT ALM			×	×	×			
RAP system	RETAINED PWR			×	×	×			P
Signal buffer system	SIGNAL BUFFER			×	×				-
TPMS	AIR PRESSURE MONITOR		×	×	×	×			
Panic alarm system	PANIC ALARM				×				

# AIR CONDITIONER

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# **DIAGNOSIS SYSTEM (BCM)**

#### < SYSTEM DESCRIPTION >

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

#### 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.

# SELF-DIAGNOSIS FUNCTION

# Front Air Control Self-Diagnosis

# 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 Intake button LED's. Refer to <u>HAC-101, "Front Air Control Self-Diagnosis</u> <u>Chart"</u>.

# SELF-DIAGNOSTIC MODE

- 1. Turn ignition switch ON.
- Press the FLOOR/DEF (♥) and DEF (♥) mode switches at the same time and release on the front air control.
- 3. Press the FLOOR ( ) and intake ( ) buttons within two seconds to enter self diagnostic mode.
- The mode (VENT, FLOOR/DEF, FLOOR and VENT/FLOOR) 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.
- Malfunctions (if any) will be displayed in the form of turning ON the A/C, MAX A/C, DEF and Intake button LED's. Refer to <u>HAC-</u> <u>101, "Front Air Control Self-Diagnosis Chart"</u>.
- 7. To exit diagnostic mode, press any button on the front air control.

# Front Air Control Self-Diagnosis Chart

# SELF-DIAGNOSTIC CHART

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

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# DTC/CIRCUIT DIAGNOSIS MANUAL A/C IDENTIFICATION TABLE

# **Application Table**

INFOID:000000008789450

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]	
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]	AWIIA12282Z

**Revision: December 2012** 

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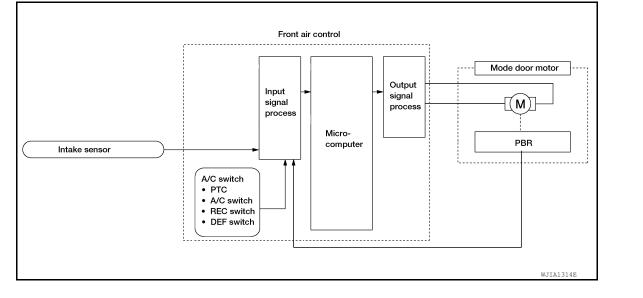
Mode door control system components are:

< DTC/CIRCUIT DIAGNOSIS >

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

#### System Operation

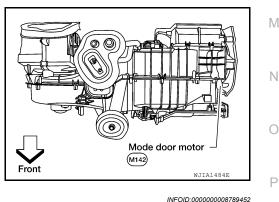
The mode door position (vent, B/L, foot, D/F, and defrost) is set by the front air control by means of the mode door motor. When a mode door position is selected on the front air control, voltage is applied to one circuit of the mode door motor while ground is applied to the other circuit, causing the 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

SYMPTOM:

• Air outlet does not change.

Mode door motor does not operate normally.

INSPECTION FLOW

# MODE DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# 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.
- Confirm that discharge air comes out according to the air distribution table. Refer to <u>HAC-96. "Discharge</u> <u>Air Flow"</u>.

# NOTE:

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

#### Is the inspection result normal?

- YES >> Inspection End.
- NO >> Go to diagnosis procedure. Refer to HAC-104, "Mode Door Motor Diagnosis Procedure".

# Mode Door Motor Diagnosis Procedure

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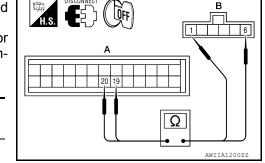
Regarding Wiring Diagram information, refer to HAC-133. "Wiring Diagram - With Type 1".

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 (A) and the mode door motor harness connector M142 (B).
- Check continuity between front air control harness connector M50 (A) terminals 19, 20 and the mode door motor harness connector M142 (B) terminals 1, 6.



Α		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M50	20	M142	1	Yes
WISO	19	111142	6	165

4. Check continuity between front air control harness connector M50 terminals 19, 20 and ground.

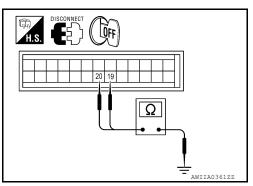
Connector	Terminal	—	Continuity	
M50	19	Ground	No	
	20	Ground		

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

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



# MODE DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Press the mode switch D/F ( 🐲 ) mode.
- Check voltage between front air control harness connector M50 terminal 19 and terminal 20 while pressing the VENT (♥) mode, and then the B/L (♥) mode.

Connector	Terminals		Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voluge (rippiox.)	
M50	20	19	While pressing the mode control from D/F ( $\textcircled{1}$ ) mode to VENT ( $\textcircled{1}$ ) mode	Battery voltage	
WOO	19	20	While pressing the mode control from VENT ( ) mode to B/L ( ) mode	Battery voltage	

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace front air control. Refer to <u>VTL-7, "Removal and Installation"</u>.

# ${f 3.}$ CHECK MODE DOOR MOTOR PBR CIRCUITS FOR OPEN AND SHORT TO GROUND

# 1. Turn ignition switch OFF.

- 2. Disconnect the front air control harness connector M50.
- Check continuity between front air control harness connector M50 (A) terminals 3, 23 and the mode door motor harness connector M142 (B) terminals 2, 3.

A		В	Continuity	
Connector	Terminal	Connector Terminal		
M50	3	M142 2	Yes	
10150	23	101142	3	165

4. Check continuity between front air control harness connector M50 terminals 3, 23 and ground.

Connector	Terminal	—	Continuity
M50 (A)	3	Ground	No
1000 (A)	23	Ground	NO

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

 ${f 4}$  . CHECK PBR FEEDBACK SIGNAL CIRCUIT FOR OPEN AND SHORT TO GROUND

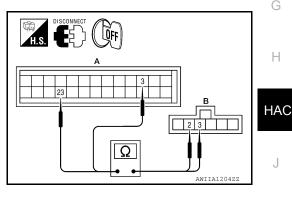
 Check continuity between front air control harness connector M50 (A) terminal 7 and mode door motor harness connector M142 (B) terminal 4.

А		В	Continuity	
Connector	Connector Terminal		Terminal	Continuity
M50	7	M142	4	Yes

2. Check continuity between front air control harness connector M50 (A) terminal 7 and ground.

Connector	Terminal	_	Continuity		
M50 (A)	7	Ground	No		

#### Is the inspection result normal?



# [MANUAL A/C (TYPE 1)]

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< DTC/CIRCUIT DIAGNOSIS >

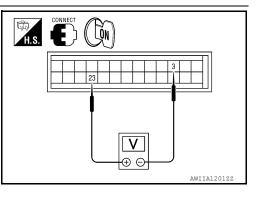
YES >> GO TO 6.

NO >> Repair or replace harness as necessary.

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

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M50 terminal 3 and terminal 23.

Connector	Terminals	Connector	Terminals	Voltage (Approx.)
	(+)	Connector	(-)	voltage (Approx.)
M50	3	M50	23	5 Volts



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4. Check voltage between front air control harness connector M50 terminal 7 and ground.

Connector	Terminal	—	Voltage (Approx.)		
M50	7	Ground	0 Volts		

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-7</u>, "Removal and <u>Installation"</u>.

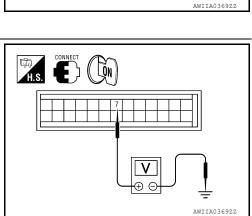
# 6. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- 1. Reconnect the mode door motor harness connector M142.
- 2. Check voltage between front air control harness connector M50 terminal 7 and ground.

Connector	Terminal	—	Voltage (Approx.)
M50	7	Ground	0.2 to 4.8 Volts

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 <u>VTL-7</u>, "Removal and Installation".
- NO >> Replace the mode door motor. Refer to <u>VTL-21</u>. <u>"Removal and Installation"</u>.



# AIR MIX DOOR MOTOR

# SYSTEM DESCRIPTION

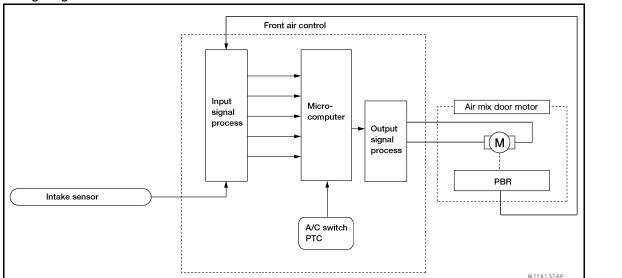
#### **Component Parts**

Air\_mix door control system components are:

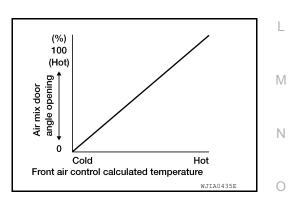
- Front air control
- Air mix door motor
- · Position Balanced Resistor (PBR) (built into air mix door motor)
- · Intake sensor

#### 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

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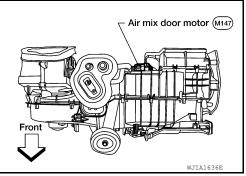
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# AIR MIX DOOR MOTOR

#### < DTC/CIRCUIT DIAGNOSIS >

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.

# [MANUAL A/C (TYPE 1)]



Air Mix Door Motor Component Function Check

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# 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 result normal?

- YES >> Inspection End.
- NO >> Go to diagnosis procedure. Refer to HAC-108. "Air Mix Door Motor Diagnosis Procedure".

Air Mix Door Motor Diagnosis Procedure

INFOID:00000008789456

Regarding Wiring Diagram information, refer to <u>HAC-133</u>, "Wiring Diagram - With Type 1".

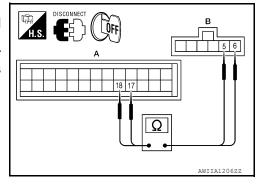
SYMPTOM:

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

# **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 (A) and the air mix door motor harness connector M147 (B).
- 3. Check continuity between front air control harness connector M50 (A) terminals 17, 18 and the air mix door motor harness connector M147 (B) terminals 5, 6.

А		В	Continuity	
Connector	Terminal	Connector Terminal		Continuity
M50	18	M147	6	Yes
MISO	17	101147	5	165



### AIR MIX DOOR MOTOR

### < DTC/CIRCUIT DIAGNOSIS >

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

Connector	Terminal	_	Continuity	
M50	17	Ground	No	
MOO	18	Ground	NO	
he inspectior	n result norm	al?		

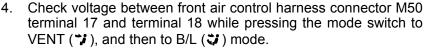
Is the inspe

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

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

- 1. Reconnect front air control harness connector.
- Turn ignition switch ON.
- Press the mode switch D/F ( ) mode.



Connector	Term	ninals	Condition Voltage (Approx.)		
Connector	(+)	(-)	Condition	vollage (Applox.)	
M50	18	17	Pressing the mode switch from D/F ( 💱 ) mode to VENT ( 🍞 ) mode	Battery voltage	
10100	17	18	Pressing the mode switch from VENT ( 🏹 ) mode to B/L ( 🟹 ) mode	Battery voltage	

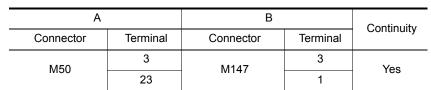
Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace front air control. Refer to VTL-7, "Removal and Installation".

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

- 1. Turn ignition switch OFF.
- Disconnect the front air control harness connector M50. 2.
- 3. Check continuity between front air control harness connector M50 (A) terminals 3, 23 and the air mix door motor harness connector M147 (B) terminals 1, 3.



4 Check continuity between front air control harness connector M50 (A) terminals 3, 23 and ground.

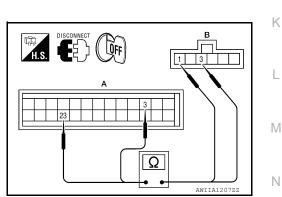
Connector	Terminal	_	Continuity
M50 (A)	3	Ground	No
10150 (A)	23	Ground	110

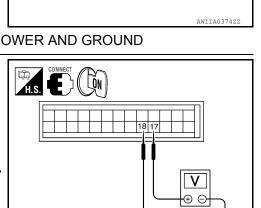
#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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





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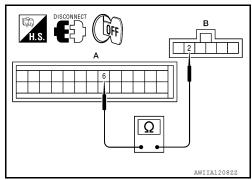
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### AIR MIX DOOR MOTOR

### < DTC/CIRCUIT DIAGNOSIS >

1. Check continuity between front air control harness connector M50 (A) terminal 6 and air mix door motor harness connector M147 (B) terminal 2.

А		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M50	6	M147	2	Yes



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2. 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?

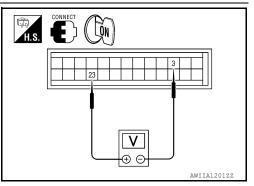
YES >> GO TO 6.

NO >> Repair or replace harness as necessary.

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

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- Check voltage between front air control harness connector M50 3. terminal 3 and terminal 23.

Connector	Terminals	Connector	Terminals	Voltage (Approx.)
	(+)	Connector	(-)	voltage (Approx.)
M50	3	M50	23	5 Volts



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Check voltage between front air control harness connector M50 4. terminal 6 and ground.

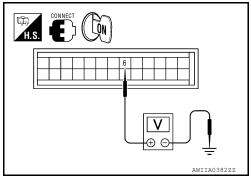
Connector	Terminal	—	Voltage (Approx.)
M50	6	Ground	0 Volts

### Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to VTL-7, "Removal and Installation".

6.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL



### AIR MIX DOOR MOTOR

### < DTC/CIRCUIT DIAGNOSIS >

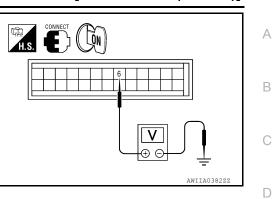
- 1. Reconnect the air mix door motor harness connector M147.
- 2. Check voltage between front air control harness connector M50 terminal 6 and ground.

Connector	Terminal	_	Voltage (Approx.)
M50	6	Ground	0.2 to 4.8 Volts

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-7, "Removal and Installation".

NO >> Replace the air mix door motor. Refer to <u>VTL-23.</u> "Removal and Installation".



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### INTAKE DOOR MOTOR

System Description

### SYSTEM DESCRIPTION

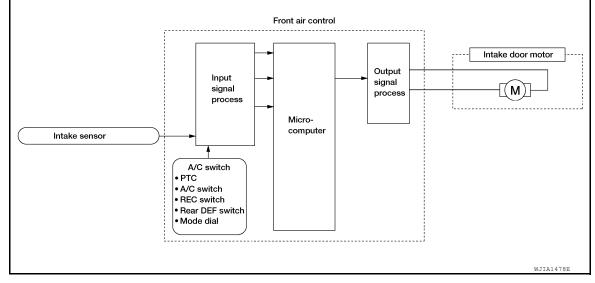
#### Component Parts

Intake door control system components are:

- Front air control
- Intake door motor
- Intake sensor

#### System Operation

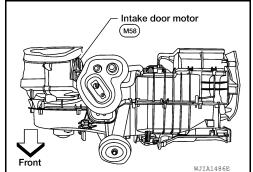
The intake door control determines the intake door position based on the position of the recirculation switch. When the recirculation switch is depressed the intake door motor rotates closing off the fresh air inlet and recirculating the cabin air. If the recirculation switch is depressed again, the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

SYMPTOM:

Intake door does not change.

Intake door motor does not operate normally.

### INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - REC (  $\bigcirc$  )

1. Turn blower control dial to any speed.

Revision: December 2012

### HAC-112

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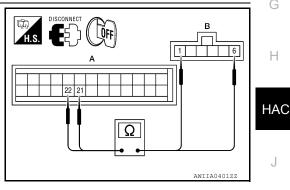
INFOID:00000008789458

### **INTAKE DOOR MOTOR**

< DTC/CIRCUIT DIAGNOSIS > [MANUAL A/C (TYPE 1				
<ol> <li>Press vent mode (*) switch.</li> <li>Press REC (*) switch.</li> <li>Press REC (*) switch again.</li> <li>Listen for intake door position change (you should hear blower sound change slight)</li> </ol>	ahtly).			
Is the inspection result normal?         YES       >> Inspection End.         NO       >> Go to diagnosis procedure. Refer to <u>HAC-113, "Intake Door Motor Diagn</u>				
Intake Door Motor Diagnosis Procedure	INFOID:00000008789459			
Regarding Wiring Diagram information, refer to HAC-133, "Wiring Diagram - With Typ	<u>be 1"</u> .			
DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR				
SYMPTOM: <ul> <li>Intake door does not change.</li> <li>Intake door motor does not operate normally.</li> </ul>				

### 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 (A) and the intake door motor harness connector M58 (B).
- 3. Check continuity between front air control harness connector M50 (A) terminals 21, 22 and the intake door motor harness connector M58 (B) terminals 1, 6.



А		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M50	21	M58	6	Yes
MOO	22	10136	1	165

4. Check continuity between front air control harness connector M50 terminals 8, 7 and ground.

Connector	Terminal	—	Continuity
M50	21	Ground	No
	22	Ground	110

Is the inspection result normal?

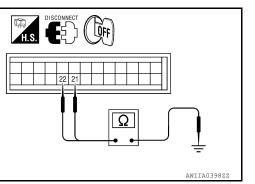
>> GO TO 3. YES

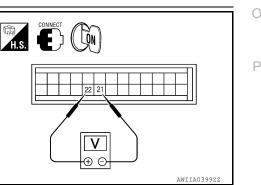
NO >> Repair or replace harness as necessary.

2.check front air control for intake air 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		ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voltage (Approx.)	
M50	22	21	Self-diagnostic mode (opening)	Battery voltage	
10100	21	22	Self-diagnostic mode (closing)	Battery voltage	





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### < DTC/CIRCUIT DIAGNOSIS >

### Is the inspection result normal?

- YES >> Inspect intake air door for binding or mechanical failure. If intake air door moves freely, replace the intake air door motor. Refer to <u>VTL-20</u>, "Removal and Installation".
- NO >> Replace front air control. Refer to <u>VTL-7, "Removal and Installation"</u>.

### < DTC/CIRCUIT DIAGNOSIS >

# **BLOWER MOTOR**

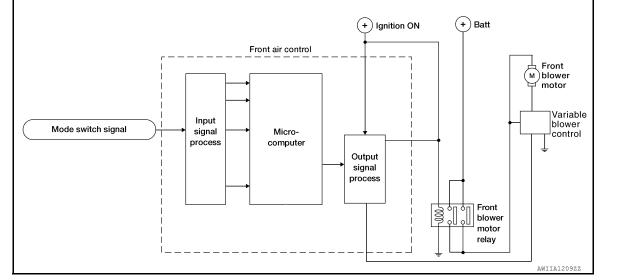
### System Description

Component Parts

Blower speed control system components are:

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

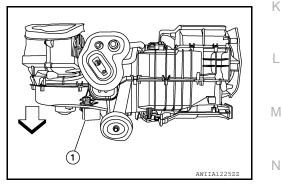
System Operation



### 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 steplessly maintain the blower motor voltage in the 0 to 5 volt range (approx.)  $\Rightarrow \downarrow$ :front.



### Front Blower Motor Component Function Check

### 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 <u>HAC-116</u>, "Front Blower Motor Diagnosis Procedure".

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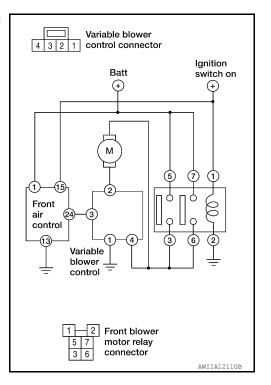
### Front Blower Motor Diagnosis Procedure

**Revision: December 2012** 

Regarding Wiring Diagram information, refer to <u>HAC-133, "Wiring Diagram - With Type 1"</u>.

SYMPTOM: Blower motor operation is malfunctioning.

DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR SYMPTOM: Blower motor operation is malfunctioning under starting blower speed control.



# 1.CHECK FUSES

Check 15A fuses [No. 24 and 27 (Located in the fuse and fusible link box)]. For fuse layout. Refer to PG-79, "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.
- Turn ignition switch ON. 3.
- Press the A/C switch. 4.
- 5. Rotate blower control dial to maximum speed.
- 6. Check voltage between front blower motor harness connector M62 terminal 2 and ground.

### 2 - Ground

: Battery voltage

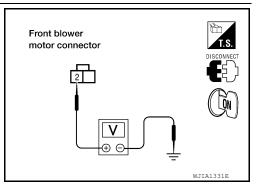
Is the inspection result normal?

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

 ${f 3.}$  CHECK FRONT BLOWER MOTOR RELAY (SWITCH SIDE) POWER SUPPLY CIRCUIT



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### **HAC-116**

### < DTC/CIRCUIT DIAGNOSIS >

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

### 5, 7 - Ground

: Battery voltage

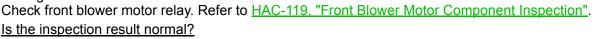
Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.

### 4.CHECK FRONT BLOWER MOTOR RELAY





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.

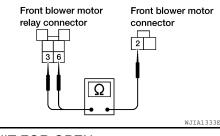
### 3, 6 - 2

: Continuity should exist.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector.



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

- 1. Disconnect variable blower control harness connector.
- 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

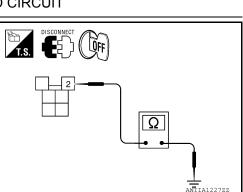
Check continuity between front blower motor relay harness connector E54 terminal 2 and ground.

### 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



### HAC-117

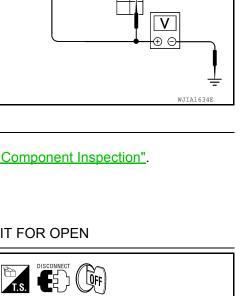
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### < DTC/CIRCUIT DIAGNOSIS >

- 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 >> Replace variable blower control. Refer to <u>VTL-12.</u> "Removal and Installation".
- NO >> Repair front blower motor ground circuit 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-115, "Front Blower Motor Component Function Check".

Is the inspection result normal?

- YES >> Replace variable blower control. Refer to <u>VTL-12</u>, "Removal and Installation".
- NO >> Replace front blower motor. Refer to <u>VTL-11, "Removal and Installation"</u>.

12. CHECK FRONT BLOWER MOTOR

Check front blower motor. Refer to <u>HAC-115</u>. "Front Blower Motor Component Function Check".

Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace front blower motor. Refer to <u>VTL-11, "Removal and Installation"</u>.

13. CHECK BLOWER MOTOR GROUND CIRCUIT

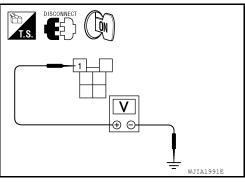
- 1. Disconnect variable blower control harness connector.
- Check continuity between front blower motor harness connector M62 (B) terminal 1 and variable blower control harness connector M121 (A) terminal 2.
  - 1 2

: Continuity should exist.

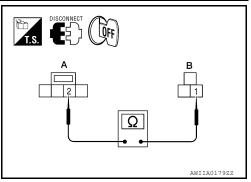
Is the inspection result normal?

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

14. CHECK VARIABLE BLOWER CONTROL POWER SUPPLY CIRCUIT FOR OPEN



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### < DTC/CIRCUIT DIAGNOSIS >

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.

# $16. {\sf check variable blower control signal circuit}$

- 1. Reconnect all disconnected component connectors.
- 2. Disconnect front air control connector.
- 3. Turn ignition switch ON.
- 4. Turn blower control dial to maximum speed.
- 5. check voltage between front air control harness connector M50 terminal 24 and ground.
  - 24 Ground

#### Approx.: 4.5V

Is the inspection result normal?

YES >> Replace front air control. Refer to <u>VTL-7, "Removal and</u> <u>Installation"</u>.

NO >> GO TO 17.

17. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect variable blower control.
- Check continuity between front air control harness connector M50 (B) terminal 24 and variable blower control harness connector M121 (A) terminal 3.

### 24 - 3

#### : Continuity should exist.

#### Is the inspection result normal?

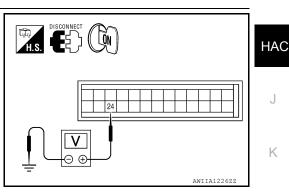
- YES >> Replace variable blower control. Refer to <u>VTL-12</u>. <u>"Removal and Installation"</u>.
- NO >> Repair harness or connector.

Front Blower Motor Component Inspection

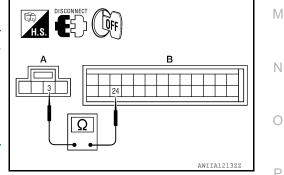
### COMPONENT INSPECTION

Front Blower Motor Relay

**Revision: December 2012** 



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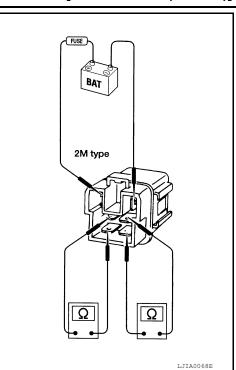
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#### < DTC/CIRCUIT DIAGNOSIS >

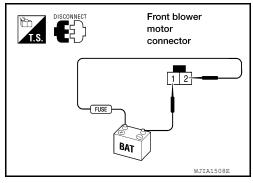
Check continuity between terminals 3 and 5 and terminals 7 and 6 by supplying 12 volts and ground to coil side terminals 1 and 2 of the relay.



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.



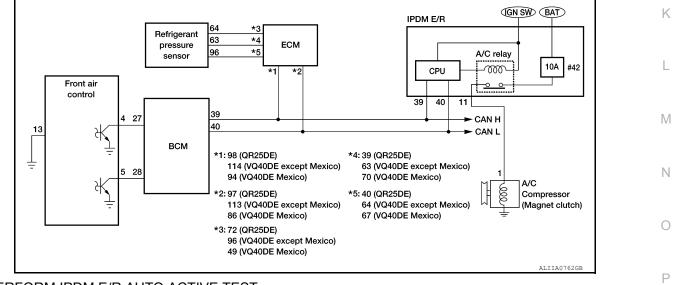
MAGNET CLUTCH	Λ
System Description	А
SYSTEM DESCRIPTION The front air control controls compressor operation based on intake temperature and a signal from ECM.	В
Low Temperature Protection Control The front air control will turn the compressor ON or OFF as determined by a signal detected by the intake sen- sor.	С
When intake air temperature is higher than 3.5°C (38.3°F), the compressor turns ON. The compressor turns OFF when intake air temperature is lower than 2.5°C (36.5°F).	D
Magnet Clutch Component Function Check	
SYMPTOM: Magnet clutch does not engage.	Ε
INSPECTION FLOW	
<b>1</b> .CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MAGNET CLUTCH	F
<ol> <li>Rotate blower control dial clockwise.</li> <li>Press the vent (*) mode switch.</li> <li>Press A/C switch. Confirm that the compressor clutch engages (sound or visual inspection).</li> <li>Is the inspection result normal?</li> </ol>	G
<ul> <li>YES &gt;&gt; Inspection End.</li> <li>NO &gt;&gt; Go to diagnosis procedure. Refer to <u>HAC-121, "Magnet Clutch Diagnosis Procedure"</u>.</li> </ul>	Н
Magnet Clutch Diagnosis Procedure	
	HA

Regarding Wiring Diagram information, refer to HAC-133, "Wiring Diagram - With Type 1".

### DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

< DTC/CIRCUIT DIAGNOSIS >

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 <u>PCS-11, "CONSULT Function (IPDM E/R)"</u>. <u>Does magnet clutch operate?</u>

- YES >>• (P)WITH CONSULT
  - GO TO 2.
  - 🕱 WITHOUT CONSULT

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< DTC/CIRCUIT DIAGNOSIS >

GO TO 8.

NO >> Check 10A fuse (No. 42, located in IPDM E/R), and GO TO 12.

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

Check A/C compressor ON/OFF signal. Refer to <u>BCS-20, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)"</u>.

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

Is the inspection result normal?

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

3.CHECK REFRIGERANT PRESSURE SENSOR

Check refrigerant pressure sensor. Refer to <u>EC-458, "Diagnosis Procedure"</u> (QR25DE) or <u>EC-944, "Diagnosis Procedure"</u> (VQ40DE).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace refrigerant pressure sensor. Refer to <u>HA-39. "Removal and Installation"</u>.

**4.**CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to <u>BCS-20, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDI-</u> TIONER)".

BLOWER CONTROL DIAL<br/>ON: FAN ON SIG ONBLOWER CONTROL DIAL<br/>OFF: FAN ON SIG OFF

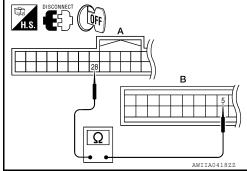
Is the inspection result normal?

YES >> GO TO 7. 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.
- Check continuity between BCM harness connector M18 (A) terminal 28 and front air control harness connector M50 (B) terminal 5.

А		В			
Connector	Terminal	Connector	Terminal	Continuity	
BCM: M18	28	Front air control: M50	5	Yes	



 Check continuity between BCM harness connector M18 (A) terminal 28 and ground.

Connector	Terminal	Ground	Continuity
BCM: M18	28	Ground	No

Is the inspection result normal?

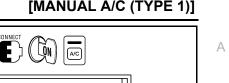
YES >> GO TO 6.

NO >> Repair harness or connector.

 ${f 6}.$ CHECK VOLTAGE FOR FRONT AIR CONTROL (FAN ON SIGNAL)

### < DTC/CIRCUIT DIAGNOSIS >

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



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	, and groun				В
	Terminals				l
(+)		(-)	Condition	Voltage	С
Front air con- trol connector	Terminal No.			(Approx.)	
M50	5	Ground	A/C switch: ON Blower motor operates	0V	D
			A/C switch: OFF	Battery voltage	F

#### Is the inspection result normal?

- YES >> Replace BCM. Refer to BCS-49, "Removal and Installation".
- NO-1 >> If the voltage is approx. 5V when blower motor is ON, replace front air control. Refer to <u>VTL-7</u>. F <u>"Removal and Installation"</u>.
- NO-2 >> If the voltage is approx. 0V when blower motor is OFF, replace BCM. Refer to <u>BCS-49, "Removal</u> and Installation".

### **/**.CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-14, "Trouble Diagnosis Flow Chart".

#### Is the inspection result normal?

YES >> Inspection End.

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

 $\mathbf{8}$ . 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					K
(	+)	(-)		Voltage		
Front air control con- nector	Terminal No.		Condition	(Approx.)		L
			A/C switch: ON	0V	AWIIA041722	
M50	4	Ground	A/C switch: OFF	Battery voltage		M

Is the inspection result normal?

YES >> GO TO 9.

- NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control. Refer to <u>VTL-7</u>, <u>"Removal and Installation"</u>.
- NO-2 >> If the voltage is approx. 0V when A/C switch is OFF, replace BCM. Refer to <u>BCS-49</u>, "<u>Removal</u> <u>C</u> <u>and Installation</u>".

9.CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect BCM connector and front air control connector.
- 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 >> GO TO 10.
- NO >> Repair harness or connector.

**10.**CHECK INTAKE SENSOR CIRCUITS

Check intake sensor. Refer to HAC-126, "Intake Sensor Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace intake sensor. Refer to <u>VTL-10</u>, "Removal and Installation".

11. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-14, "Trouble Diagnosis Flow Chart".

### Is the inspection result normal?

YES >> Replace BCM. Refer to <u>BCS-49, "Removal and Installation"</u>.

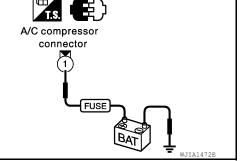
NO >> Repair or replace malfunctioning part(s).

12. CHECK MAGNET CLUTCH CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect A/C compressor connector.
- 3. Check for operation sound when applying battery voltage to A/C compressor terminal 1.

### Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Replace magnet clutch. Refer to <u>HA-30, "Removal and</u> <u>Installation for Compressor Clutch"</u>.



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

#### 1. Disconnect IPDM E/R connector.

 Check continuity between IPDM E/R harness connector E119 terminal 11 and A/C compressor harness connector F3 terminal 1.

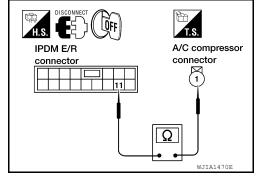
### 11 – 1 : Continuity should exist.

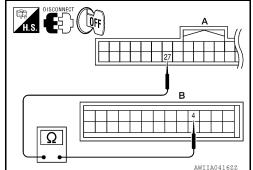
3. Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

#### 11 – ground : Continuity should not exist.

#### Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to PCS-28, "Removal and Installation of IPDM E/R".
- NO >> Repair harness or connector.





### < DTC/CIRCUIT DIAGNOSIS >

# **INTAKE SENSOR**

System Description

### 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 (M146) D Front heater Е and cooling unit assembly WJIA1155E F

### Intake Sensor Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>HAC-133, "Wiring Diagram - With Type 1"</u>.

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?

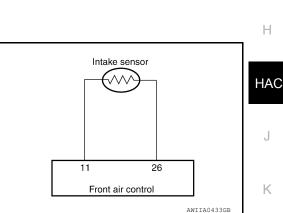
YES >> GO TO 2. NO

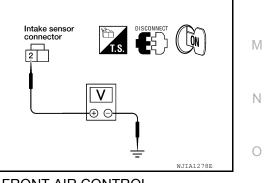
>> GO TO 4.

2.check circuit continuity between intake sensor and front air control

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### INTAKE SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector 3. 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-126, "Intake Sensor Component Inspection".

Is the inspection result normal?

- YES >> Replace front air control. Refer to VTL-7, "Removal and Installation".
- >> Replace intake sensor. Refer to VTL-10, "Removal and Installation". NO

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



- 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.

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

#### 2 - Ground

### : Continuity should not exist.

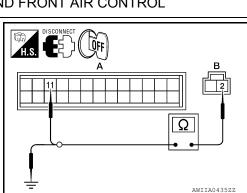
Is the inspection result normal?

- YES >> Replace front air control. Refer to VTL-7, "Removal and Installation".
- NO >> Repair harness or connector.

### Intake Sensor Component Inspection

### COMPONENT INSPECTION

Intake Sensor



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### [MANUAL A/C (TYPE 1)]

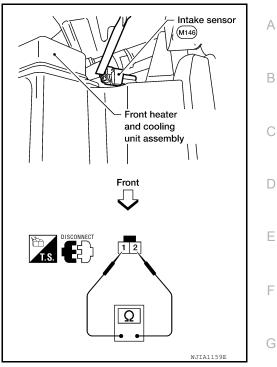
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### **INTAKE SENSOR**

### < 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 $k\Omega$		
-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 <u>VTL-10, "Removal and Installa-</u> tion".

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### POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

### < DTC/CIRCUIT DIAGNOSIS >

### POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

### **Component Description**

### COMPONENT DESCRIPTION

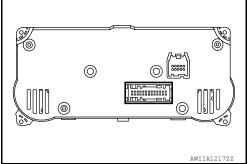
Potentio Temperature Control (PTC)

#### 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.

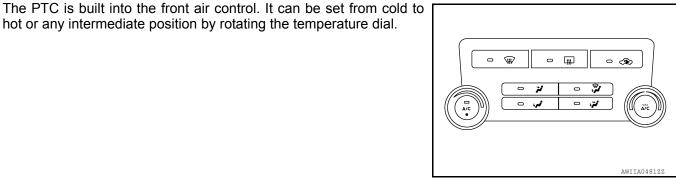
The front air control is unitized with control mechanisms. When the various switches and temperature dials are operated, data is input to the front air control.

hot or any intermediate position by rotating the temperature dial.



[MANUAL A/C (TYPE 1)]

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### Front Air Control Component Function Check

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.

Confirm that the compressor clutch engages (sound or visual inspection). 2.

#### Is the inspection result normal?

YES >> Inspection End.

- NO >> Go to diagnosis procedure. Refer to HAC-128, "Front Air Control Power and Ground Diagnosis Procedure".
- Front Air Control Power and Ground Diagnosis Procedure

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Regarding Wiring Diagram information, refer to HAC-133, "Wiring Diagram - With Type 1".

### DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

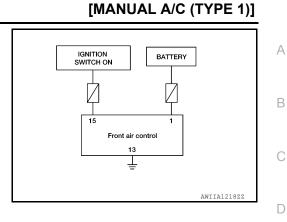
### **Revision: December 2012**

INFOID:00000008789471

### POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

#### < DTC/CIRCUIT DIAGNOSIS >

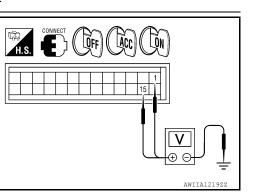
SYMPTOM: A/C system does not come on.



# 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 connector M50 terminals 1 and 15, and ground.

	Terminals		Ignition switch position			
	(+)					
Front air control connector	Terminal No.	(-)	OFF	ACC	ON	
M50	15	Ground	Approx. 0V	Approx. 0V	Battery voltage	
M50	1	Cround	Battery voltage	Battery voltage	Battery voltage	



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### 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 <u>PG-78, "Terminal</u> <u>Arrangement"</u>.
  - 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

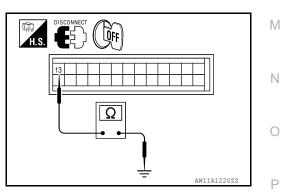
- 1. Turn ignition switch OFF.
- 2. Check continuity between front air control harness connector M50 terminal 13 and ground.

#### 13 - Ground

#### : Continuity should exist.

#### Is the inspection result normal?

- YES >> Replace front air control. Refer to <u>VTL-7. "Removal and</u> <u>Installation"</u>.
- NO >> Repair harness or connector.



# ECU DIAGNOSIS INFORMATION MANUAL A/C IDENTIFICATION TABLE

### **Application Table**

INFOID:000000008789473

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]	
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]	AWIIA12282Z

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### < ECU DIAGNOSIS INFORMATION >

### AIR CONDITIONER CONTROL

### Front Air Control Terminals Reference Values

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

### FRONT AIR CONTROL HARNESS CONNECTOR TERMINAL LAYOUT

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													
26 25 24 23 22 21 20 19 18 17 16 15 14	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

### TERMINALS AND REFERENCE VALUES FOR FRONT AIR CONTROL

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
1	R/Y	Power supply for BAT	-	-	Battery voltage
3	Ρ	Ground for mode door motor and air mix door motor PBR	ON	-	0V
4	W	Compressor ON signal	ON	A/C switch OFF	5V
4	vv	Compressor ON signal	ON	A/C switch ON	0V
F	R	Front blower monitor	ON	Front blower motor OFF	Battery voltage
5	ĸ	Front blower monitor	UN	Front blower motor ON	0V
6	SB	Air mix door motor feedback	ON	-	0 - 5V
7	V	Mode door motor feedback	ON	-	0 - 5V
8	G	Illumination +	ON	Park lamps ON	Battery voltage
9	BR	Illumination -	-	Park lamps ON	(V) 15 10 5 0 200 ms PIIA2344E
10	R	Rear defrost request	ON	-	Battery voltage
11	L	Intake sensor	ON	-	0 - 5V
13	В	Ground	-	-	0V
15	W/G	Power supply for IGN	ON	-	Battery voltage
16	Y	Rear defroster request	ON	-	Battery voltage

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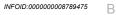
### **AIR CONDITIONER CONTROL**

### < ECU DIAGNOSIS INFORMATION >

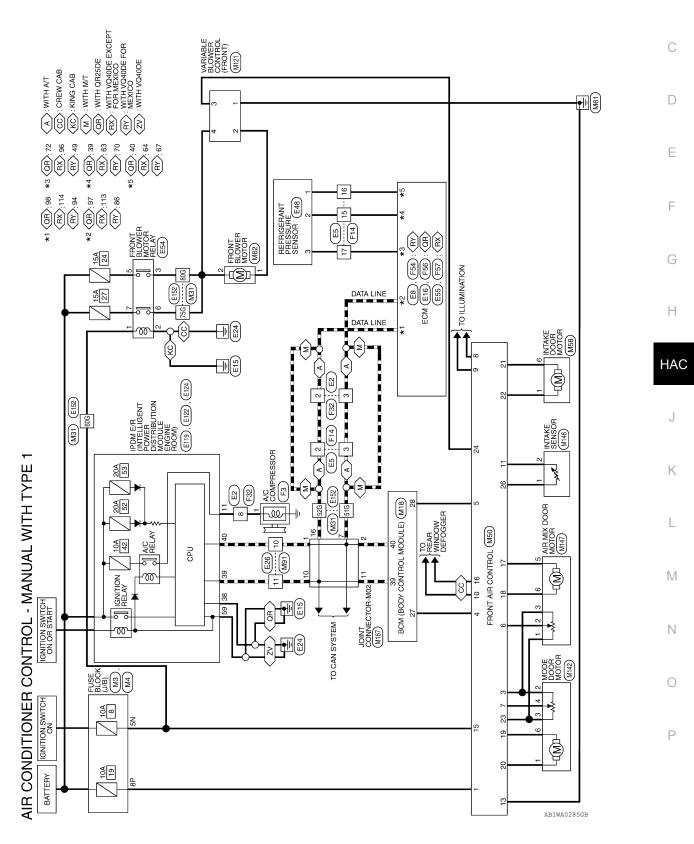
Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
17	GR	Air mix door motor CCW	ON	Counterclockwise rotation	Battery voltage
18	0	Air mix door motor CW	ON	Clockwise rotation	Battery voltage
19	R	Mode door motor CCW	ON	Counterclockwise rotation	Battery voltage
20	BR	Mode door motor CW	ON	Clockwise rotation	Battery voltage
21	0	Intake door motor CCW	ON	Counterclockwise rotation	Battery voltage
22	Y	Intake door motor CW	ON	Clockwise rotation	Battery voltage
23	G	Power supply for mode door motor and air mix door motor PBR	ON	-	5V
24	LG	Variable blower control	ON	Blower speed (low)	1.7V
24 L	LG			Blower speed (hi)	4.5V
26	V	Sensor ground	ON	-	0 - 5V

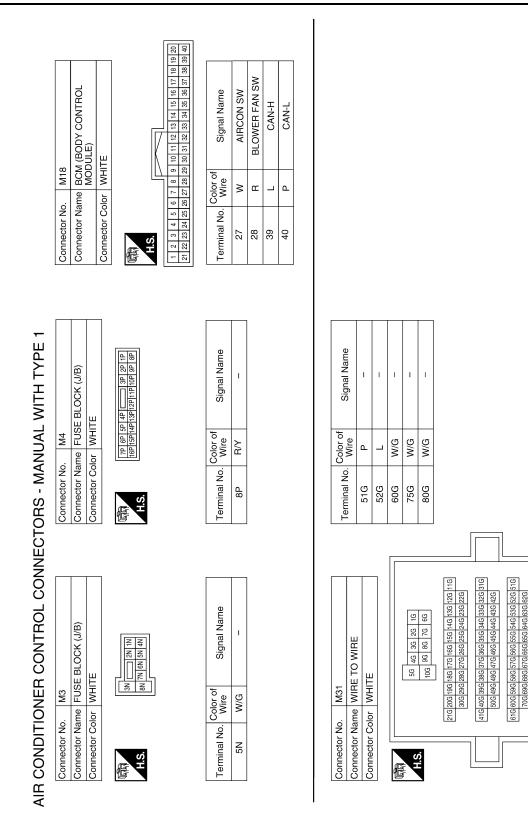
# WIRING DIAGRAM AIR CONDITIONER CONTROL

Wiring Diagram - With Type 1



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# < WIRING DIAGRAM >

[MANUAL A/C (TYPE 1)]

Revision: December 2012

75G 74G 73G 72G 71G 80G 79G 78G 77G 76G

ABIIA1036GB

Terminal No.     Color of Wire     Signal Name       10     P     -       11     L     -
Aame
lame lame
Signal Name
Terminal No. Color of Wire 2 W/G
Terr
Signal Name
Color of Wire Vire 0 − − − − − −
Terminal No.

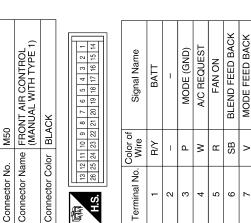
Signal Name	RECIRC DOOR CW	V REF ACTR (5V)	FR BLOWER MONITOR	I	SENS RETURN	
Color of Wire	Y	G	ГG	I	>	
Terminal No. Wire	22	23	24	25	26	

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Signal Name	1	I	RR DEF STATUS	INTAKE SENSOR	I	GND	I	IGN	REAR DEFOGGER REQUEST	BLEND DR CCW	BLEND DR CW	MODE CCW	MODE CW	RECIRC DOOR CCW
Color of Wire	σ	ВВ	щ	_	I	в	I	W/G	٢	GR	0	н	BR	0
Terminal No.	8	6	10	11	12	13	14	15	16	17	18	19	20	21

 MODE FEED BACK

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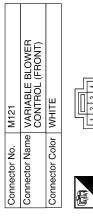


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# **AIR CONDITIONER CONTROL**

### < WIRING DIAGRAM >

g DIAGRAM >		ONER CONTROL	[MANUAL
Connector No. M146 Connector Name INTAKE SENSOR Connector Color GRAY	Terminal No.     Color of Wire     Signal Name       1     V     -       2     L     -	Connector No.     E2       Connector Name     WIRE TO WIRE       Connector Color     WHITE       Connector Color     WHITE       Minimal No     Color       Color of     Sinnal Name	
Connector No. M142 Connector Name MODE DOOR MOTOR Connector Color BLACK	Signal Name (WITHOUT AUTO A/C)	Connector No. M167 Connector Name JOINT CONNECTOR-M02 Connector Color BLUE Connector Color BLUE	
No. M142 Name MODE Color BLACK	No. Color of Wire BR	No. M167 Name JOINT Color BLUE 2019 18 17	
Connector No. Connector Name Connector Color	Terminal No. 1 2 3 4 6 6	Connector No. Connector Name Connector Color Connector Color Terminal No. Co	11 1 2 2 11



2 3 4	Signal Name	I	I
-	Color of Wire	В	L
H.S.	Terminal No.	1	2

Signal Name	I	Ι	- (WITHOUT AUTO A/C)	I	
Wire	В	Γ	ГG	W/G	
Terminal No. Wire	1	2	ю	4	

Connector No.	M147
Connector Name	Connector Name AIR MIX DOOR MOTOR
Connector Color BLACK	BLACK
E H.S.	1 2 3 4 5 6

Signal Name	I	I	I	I	I	– (MANUAL WITH TYPE 1)
Color of Wire	≻	SB	٩.	I	GR	0
Terminal No. Color of Wire	F	2	ю	4	5	9

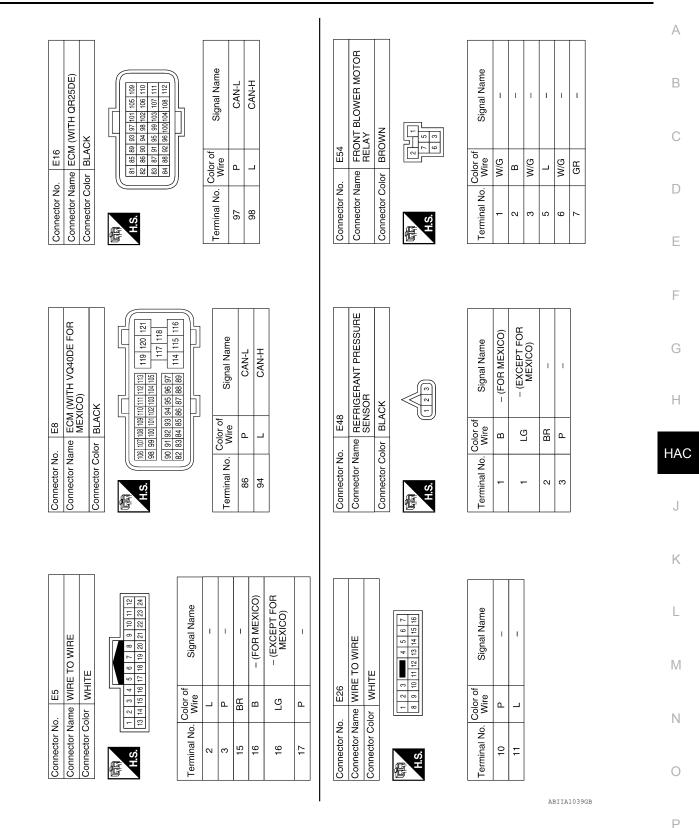
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### AIR CONDITIONER CONTROL

#### < WIRING DIAGRAM >

### [MANUAL A/C (TYPE 1)]



Revision: December 2012

### **AIR CONDITIONER CONTROL**

#### < WIRING DIAGRAM >

E122

Connector No.

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector Name Connector Color

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector Name Connector Color

ECM (WITH VQ40DE EXCEPT FOR MEXICO)

Connector Name Connector Color

E55

Connector No.

GRAY

E119

Connector No.

WHITE

WHITE

42

H.S. 佢

H.S.

H.S.

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#### **GND** (SIGNAL) Signal Name Signal Name CAN-L CAN-H L L I. I. Т Color of Wire Color of W/G M/G W/G Wire ш ۲ ۵. \_ \_ Terminal No. Terminal No. 51G 52G 60G 75G 80G 38 39 40 116 126 136 146 156 166 176 186 196 206 216 226 236 246 256 256 276 286 296 306 31G 32G 33G 34G 35G 35G 37G 38G 39G 40G 41G 42G 43G 44G 45G 46G 47G 48G 49G 50G 51G 52G 53G 54G 55G 56G 57G 58G 59G 60G 61G 62G 63G 64G 65G 66G 67G 68G 69G 70G A/C COMPRESSOR Signal Name 75G 80G 10G 56 71G 72G 73G 74G 71 76G 77G 78G 79G 8 1G 2G 3G 4G 6G 7G 8G 9G 1 Connector Name WIRE TO WIRE WHITE E152 Color of Wire ≻ Connector Color Connector No. Terminal No. ÷ H.S. F IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) GND (POWER) Signal Name Signal Name CAN-L CAN-H 59 58 57 62 61 60 BLACK E124 Color of Wire Color of Wire ۵. ш \_ Connector Name Connector Color Connector No. Terminal No. Terminal No. 113 114 59 H.S.

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< WIRING DIAGRAM >	[MANUAL A/C (TYPE 1)]
Connector No.     F32       Connector Name     WIRE TO WIRE       Connector Name     WIRE TO WIRE       Connector Color     WHITE       Connector Color     WHITE       Time     Signal Name       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L       Z     L	Image: Connector No.       F56         Connector Name       CM (WITH QR2SDE)         Connector Name       CM (WITH QR2SDE)         Connector Color       BROWN         Image: Connector Color       Connector Color         Image: Connector Color       Signal Name
Connector No.         F14           Connector Name         WIRE TO WIRE           Connector Name         WIRE TO WIRE           Connector Name         WIRE TO WIRE           Connector Color         WHITE           Connector Color         WIRE TO WIRE           Terminal No.         Color of Signal Name         Signal Name           2         L         -         -           15         BR         -         -           16         LG         -         -           17         P         -         -           17         P         -         -	P P P PPRESS P P PPRESS PPPR
Connector No.     F3       Connector Name     A/C COMPRESSOR       Connector Color     BLACK       Mine     Mine       1     Y	M       M         M       M

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Connector No. F57 Connector Name ECM (WITH VQ40DE EXCEPT FOR MEXICO)

Connector Color BROWN

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< WIRING DIAGRAM >

# SYMPTOM DIAGNOSIS MANUAL A/C IDENTIFICATION TABLE

### **Application Table**

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[MANUAL A/C (TYPE 1)]

Manual A/C Type	Description	Visual Identification	С
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]		D
		AWIIA048122	F
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]		Н
		AWIIA1228ZZ	HA

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### < SYMPTOM DIAGNOSIS >

# AIR CONDITIONER CONTROL

# Symptom Matrix Chart

### SYMPTOM TABLE

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-128
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	HAC-103
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-105</u>
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	HAC-108
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for All Mix Door Motor.	<u>HAC-100</u>
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	HAC-112
Intake door motor is malfunctioning.		HAC-112
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-115
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-121
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-143
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-151
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-153
Self-Diagnosis cannot be performed	Go to Trouble Diagnosis Procedure for Self-Diagnosis.	HAC-101

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INSUFFICIENT COOLING
Component Function Check
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-90, "Operational Check".
Does another symptom exist?
YES >> Refer to <u>HAC-142, "Symptom Matrix Chart"</u> . NO >> System OK.
3. CHECK FOR SERVICE BULLETINS
Check for any service bulletins.
>> GO TO 4.
4.PERFORM SELF-DIAGNOSIS
Perform self-diagnosis. Refer to HAC-101, "Front Air Control Self-Diagnosis".
Is the inspection result normal?
YES >> GO TO 5. NO >> Check symptom chart. Refer to <u>HAC-142, "Symptom Matrix Chart"</u> .
5. CHECK DRIVE BELTS
Check compressor belt tension. Refer to <u>EM-14</u> , "Checking Drive Belts" (QR25DE) or <u>EM-129</u> , "Checking
Drive Belts" (VQ40DE).
Is the inspection result normal?
YES >> GO TO 6. NO >> Adjust or replace compressor belt. Refer to EM-14, "Adjustment" (QR25DE) or EM-129, "Adjust-
NO >> Adjust or replace compressor belt. Refer to <u>EM-14, "Adjustment"</u> (QR25DE) or <u>EM-129, "Adjust-ment"</u> (VQ40DE).
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 <u>EC-922, "Component Inspection"</u> .
<u>Does cooling fan motor operate correctly?</u> YES >> GO TO 8.
NO >> Check cooling fan motor. Refer to EC-366, "Diagnosis Procedure" (QR25DE) or EC-837, "Diagno-
sis Procedure" (VQ40DE).
8.CHECK RECOVERY/RECYCLING EQUIPMENT BEFORE USAGE
Check recovery/recycling equipment before connecting to vehicle. Verify there is no pressure in the recovery/

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.

< SYMPTOM DIAGNOSIS >

### **INSUFFICIENT COOLING**

< SYMPTOM DIAGNOSIS >

>> GO TO 9.

9. CHECK REFRIGERANT PURITY

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 <u>HA-4. "Contaminated Refrigerant"</u>.

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 <u>HAC-144</u>, "Diagnostic Work Flow".

NO >> GO TO 11.

11.CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to HAC-146, "Performance Chart".

Is the inspection result normal?

YES >> Perform diagnostic work flow. Refer to <u>HAC-144, "Diagnostic Work Flow"</u>.

NO >> GO TO 12.

12.CHECK AIR DUCTS

Check ducts for air leaks.

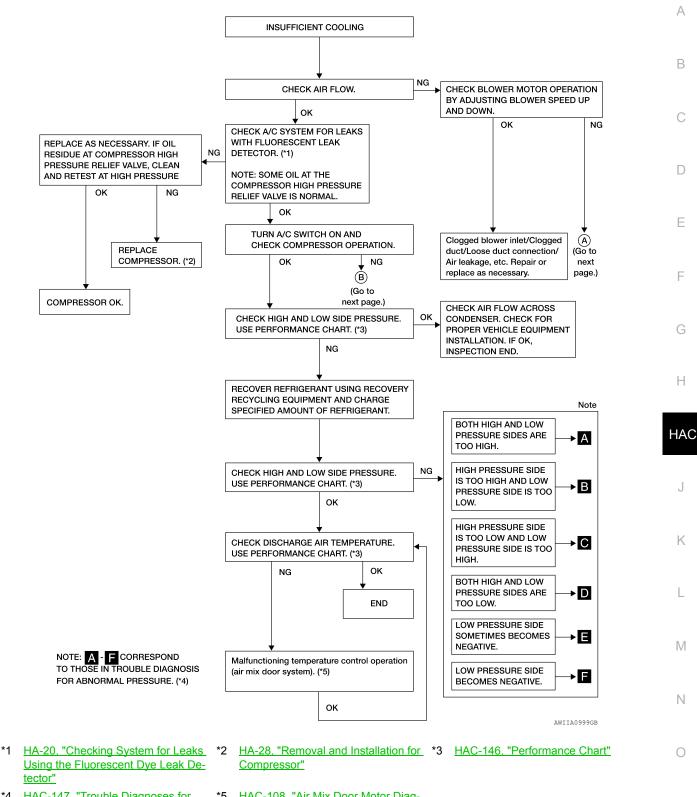
Is the inspection result normal?

YES >> System OK. NO >> Repair air leaks.

**Diagnostic Work Flow** 

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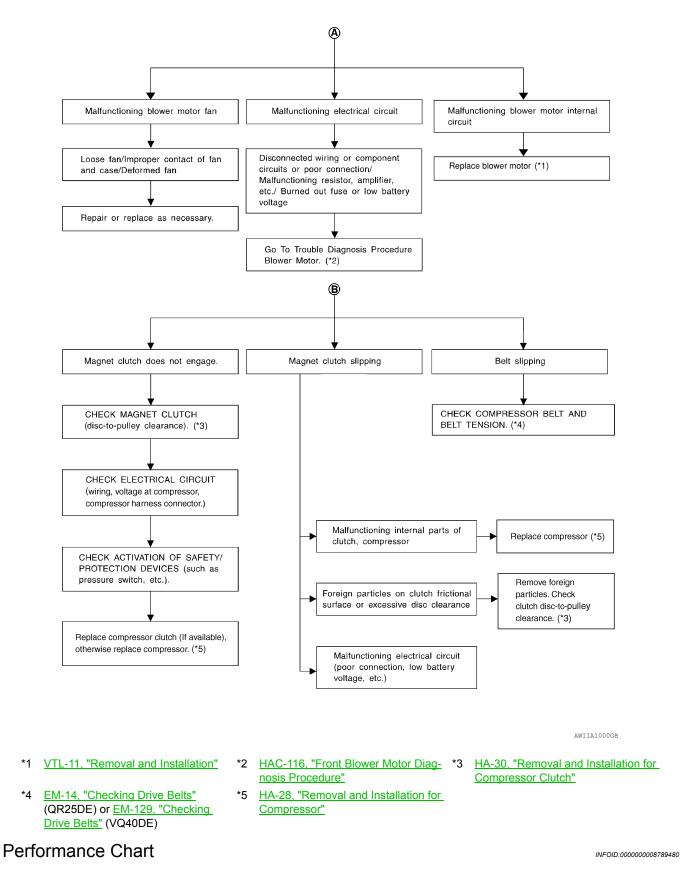
#### < SYMPTOM DIAGNOSIS >



\*4 <u>HAC-147, "Trouble Diagnoses for</u> <u>Abnormal Pressure"</u> \*5 <u>HAC-108, "Air Mix Door Motor Diag-</u> nosis Procedure"

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#### < SYMPTOM DIAGNOSIS >



#### TEST CONDITION

Testing must be performed as follows:

# HAC-146

#### < SYMPTOM DIAGNOSIS >

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	
Solution Speed	Max. speed set	
Engine speed	Idle speed	
Operate the air conditioning system	n for 10 minutes before taking measurements.	

#### **TEST READING**

#### Recirculating-to-discharge Air Temperature Table

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

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

# **Trouble Diagnoses for Abnormal Pressure**

Whenever system's high and/or low side pressure is abnormal, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (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).

# **HAC-147**

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# < SYMPTOM DIAGNOSIS >

#### Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	Pressure is reduced soon af- ter water is splashed on con- denser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until speci- fied pressure is obtained.
А	Air suction by cooling fan is in- sufficient.	<ul> <li>Insufficient condenser cooling performance</li> <li>↓</li> <li>1. Condenser fins are clogged.</li> <li>2. Improper fan rotation of cooling fan</li> </ul>	<ul> <li>Clean condenser.</li> <li>Check and repair cooling fan if necessary.</li> </ul>
Both high- and low-pressure sides are too high.	<ul> <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 con- denser (After compressor operation stops, high-pressure decreas- es too slowly.) ↓ Air in refrigeration cycle	Evacuate and recharge system.
AC359A	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cool- ing system.
	<ul> <li>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>Plates are sometimes cov- ered with frost.</li> </ul>	<ul> <li>Excessive liquid refrigerant on low-pressure side</li> <li>Excessive refrigerant dis- charge flow</li> <li>Expansion valve is open a lit- tle compared with the speci- fication.</li> <li>↓</li> <li>Improper expansion valve ad- justment</li> </ul>	Replace expansion valve.

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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts lo- cated between compressor and condenser are clogged or crushed.	<ul> <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
High-pressure side is too low and low-pressure side is too high.	High- and low-pressure sides become equal soon after com- pressor operation stops.	Compressor pressure opera- tion is improper. ↓ Damaged inside compressor packings.	Replace compressor.
	No temperature difference be- tween high- and low-pressure sides.	Compressor pressure opera- tion is improper. ↓ Damaged inside compressor packings.	Replace compressor.

Revision: December 2012

# < SYMPTOM DIAGNOSIS >

# Both High- and Low-pressure Sides are Too Low

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Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	<ul> <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> <li>Replace liquid tank.</li> <li>Check oil for contamination.</li> </ul>
	<ul> <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 oc- curs somewhere in high- pressure side.</li> </ul>	High-pressure pipe located be- tween liquid tank and expan- sion valve is clogged.	<ul> <li>Check and repair malfunc- tioning parts.</li> <li>Check oil for contamination.</li> </ul>
<b>)</b> oth high- and low-pressure sides re too low.	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or compo- nents.	Check refrigerant system for leaks. Refer to <u>HA-22, "Check-</u> ing of Refrigerant Leaks".
	There is a big temperature dif- ference between expansion valve inlet and outlet while the valve itself is frosted.	<ul> <li>Expansion valve closes a little compared with the specification.</li> <li>↓</li> <li>1. Improper expansion valve adjustment.</li> <li>2. Malfunctioning expansion valve.</li> <li>3. Outlet and inlet may be clogged.</li> </ul>	<ul> <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> <li>Check and repair malfunc- tioning parts.</li> <li>Check oil for contamination.</li> </ul>
	Air flow volume is too low.	Evaporator is frozen.	<ul> <li>Check intake sensor circuit. Refer to <u>HAC-125</u>, "Intake <u>Sensor Diagnosis Proce-</u> <u>dure"</u>.</li> <li>Replace compressor.</li> <li>Repair evaporator fins.</li> <li>Replace evaporator.</li> <li>Refer to <u>HAC-115</u>, "Front <u>Blower Motor Component</u> <u>Function Check"</u>.</li> </ul>

Gauge indication	Refrigerant cycle	Probable cause	Corrective action	
Low-pressure side sometimes be- comes negative.	<ul> <li>Air conditioning system does not function and does not cy- clically cool the compart- ment air.</li> <li>The system constantly func- tions for a certain period of time after compressor is stopped and restarted.</li> </ul>	cyclically. ↓ Moisture is frozen at expan-	<ul> <li>Drain water from refrigerant or replace refrigerant.</li> <li>Replace liquid tank.</li> </ul>	O

Low-pressure Side Becomes Negative

#### < SYMPTOM DIAGNOSIS >

# [MANUAL A/C (TYPE 1)]

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
E Low-pressure side becomes nega- tive.	Liquid tank or front/rear side of expansion valve's pipe is frost- ed or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	<ul> <li>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.</li> <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	!
SYMPTOM: Insufficient heating	
INSPECTION FLOW	
1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE	
1. Rotate blower control dial clockwise.	
<ol> <li>Turn the temperature control dial clockwise to maximum heat.</li> <li>Check for hot air at discharge air outlets.</li> </ol>	
Can the symptom be duplicated?	
YES >> GO TO 2.	
NO >> Perform complete operational check. Refer to <u>HAC-90, "Operational Check"</u> .	
2. CHECK FOR SERVICE BULLETINS	
Check for any service bulletins.	
>> GO TO 3.	
<b>3.</b> PERFORM SELF-DIAGNOSIS	
Perform self-diagnosis. Refer to HAC-101, "Front Air Control Self-Diagnosis".	
Is the inspection results normal?	
YES >> GO TO 4.	
NO >> Refer to <u>HAC-142, "Symptom Matrix Chart"</u> .	
4. CHECK ENGINE COOLING SYSTEM	.
<ol> <li>Check for proper engine coolant level. Refer to <u>CO-11, "System Inspection"</u> (QR25DE) or <u>CO-39, "System Inspection"</u> (VQ40DE).</li> </ol>	
2. Check hoses for leaks or kinks.	
<ol> <li>Check radiator cap. Refer to <u>CO-11, "System Inspection"</u> (QR25DE) or <u>CO-39, "System Inspection"</u> (VQ40DE).</li> </ol>	
4. Check for air in cooling system.	
>> GO TO 5.	
5. CHECK AIR MIX DOOR OPERATION	
Check the operation of the air mix door.	
Is the inspection result normal?	
YES >> GO TO 6.	
NO >> Check the air mix door motor circuit. Refer to <u>HAC-108</u> , "Air Mix Door Motor Component Function Check".	
6. CHECK AIR DUCTS	
Check for disconnected or leaking air ducts.	
Is the inspection result normal?	
YES >> GO TO 7.	
NO >> Repair all disconnected or leaking air ducts.	
CHECK HEATER HOSE TEMPERATURES	
1. Start engine and warm it up to normal operating temperature.	
<ol><li>Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be warm.</li></ol>	
Is the inspection result normal?	
YES >> Hot inlet hose and a warm outlet hose: GO TO 8.	

>> Both hoses warm: GO TO 9.

NO

< SYMPTOM DIAGNOSIS >

< SYMPTOM DIAGNOSIS >

# 8.CHECK ENGINE COOLANT SYSTEM

Check engine coolant temperature sensor. Refer to <u>EC-183</u>, "Component Inspection" (QR25DE) or <u>EC-650</u>, "Component Inspection" (VQ40DE).

#### 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 flus

- >> 1. Back flush heater core.
  - 2. Drain the water from the system.
  - 3. Refill system with new engine coolant. Refer to <u>CO-12</u>, "Changing Engine Coolant" (QR25DE) or <u>CO-40</u>, "Changing Engine Coolant" (VQ40DE).
  - 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 <u>VTL-19</u>, "Removal and Installation".

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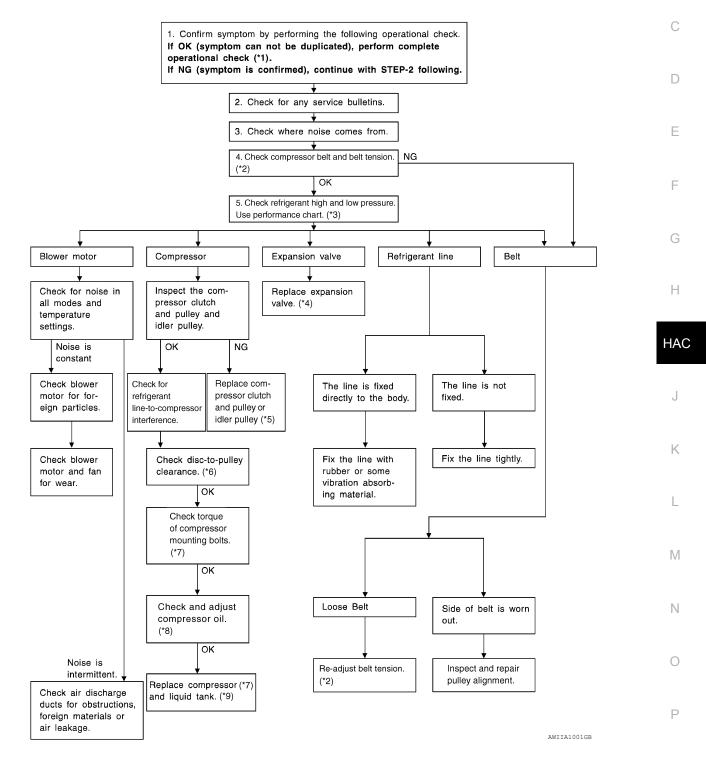
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# NOISE

# **Component Function Check**

SYMPTOM: Noise

**INSPECTION FLOW** 



# NOISE

# < SYMPTOM DIAGNOSIS >

*1	HAC-90, "Operational Check"	*2	EM-14, "Checking Drive Belts" (QR25DE) or EM-129, "Checking Drive Belts" (VQ40DE)	*3	HAC-146, "Performance Chart"
*4	HA-40, "Removal and Installation"	*5	HA-30, "Removal and Installation for Compressor Clutch"	*6	HA-30, "Removal and Installation for Compressor Clutch"
*7	HA-28, "Removal and Installation for Compressor"	*8	HA-18, "Maintenance of Oil Quantity in Compressor"	*9	HA-37, "Removal and Installation"

# < PRECAUTION > PRECAUTION PRECAUTIONS

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

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)

#### 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 <u>HA-4</u>, <u>"Contaminated Refrigerant"</u>. 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

# PRECAUTIONS

#### < PRECAUTION >

INFOID:00000008789486

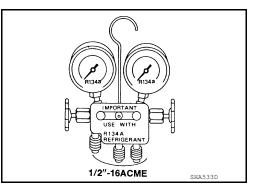
#### If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- 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

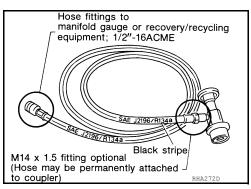
#### MANIFOLD GAUGE SET

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

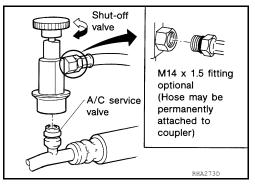
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shutoff devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



#### 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



# **BASIC INSPECTION** MANUAL A/C IDENTIFICATION TABLE

# Application Table

INFOID:000000008789487 В

Manual A/C Type	Description	Visual Identification	C
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]		D
		AWIIA048122	-
			G
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]		Н
			HAC
		AWIIA1228ZZ	• .I

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# DIAGNOSIS AND REPAIR WORKFLOW

How to Perform Trouble Diagnosis For Quick And Accurate Repair

INFOID:00000008789488

# 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.

 $\mathbf{3}$ . VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-159, "Operational Check".

Can a symptom be duplicated?

YES >> Go to trouble diagnosis. Refer to <u>HAC-213</u>, "Symptom Matrix Chart".

NO >> System OK.

# **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >	
INSPECTION AND ADJUSTMENT	A
Operational Check	INFOID:00000008789489
The purpose of the operational check is to confirm that the system operates pro-	operly. B
Conditions : Engine running and at normal operating tempe	rature
CHECKING BLOWER	C
1. Turn blower control dial clockwise. Blower should operate on low speed.	
<ol> <li>Turn the blower control dial again, and continue checking each blower speed</li> <li>Leave blower on speed 4.</li> </ol>	ed until all speeds are checked.
If NG, go to trouble diagnosis procedure for <u>HAC-183, "Front Blower Motor Dia</u> If OK, continue with next check.	<mark>gnosis Procedure"</mark> . E
CHECKING DISCHARGE AIR	L
1. Turn the mode switch to each position.	
<ol> <li>Confirm that discharge air comes out according to the air distribution table. Air Flow".</li> </ol>	F Refer to <u>HAC-166, "Discharge</u>
Mode door position is checked in the next step. If NG, go to trouble diagnosis procedure for <u>HAC-173, "Mode Door Motor Diagn</u> If OK, continue with next check.	G nosis Procedure".
<b>NOTE:</b> Confirm that the A/C compressor clutch is engaged (sound or visual inspection fresh when the DEF ( $\mathfrak{P}$ ) or D/F ( $\mathfrak{P}$ ) is selected.	) and intake door position is at
CHECKING RECIRCULATION	HA
1. Press recirculation (	illuminate.
2. Press recirculation ( C ) switch one more time. Recirculation indicator sl	-
<ol> <li>Listen for intake door position change (blower sound should change slight)</li> <li>If NG, go to trouble diagnosis procedure for <u>HAC-181</u>, "Intake Door Motor Diag</li> </ol>	y).
If OK, continue with next check.	Nosis Flocedule_
NOTE: Confirm that the compressor clutch is engaged (sound or visual inspection) and when the DEF or D/F is selected.	
CHECKING TEMPERATURE DECREASE	L
1. Rotate temperature control dial counterclockwise.	
2. Check for cold air at appropriate discharge air outlets.	Ν
If NG, listen for sound of air mix door motor operation if OK, go to trouble diag <u>"Component Function Check"</u> . If air mix door motor appears to be malfunction	nosis procedure for <u>HAC-214.</u>
Door Motor Component Function Check". If OK, continue with next check.	Л
CHECKING TEMPERATURE INCREASE	
1. Rotate temperature control dial clockwise.	C
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 diag <u>"Component Function Check"</u> . If air mix door motor (front) appears to be malfu <u>Mix Door Motor Component Function Check"</u> . If OK, continue with next check.	nosis procedure for <u>HAC-222.</u> Inctioning, go to <u>HAC-177, "Air</u> F
CHECK A/C SWITCH (IF EQUIPPED)	
1 Press $\Delta/C$ switch with the blower switch ON	

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

< BASIC INSPECTION >

# **INSPECTION AND ADJUSTMENT**

#### < BASIC INSPECTION >

If NG, go to trouble diagnosis procedure for <u>HAC-189</u>, "<u>Magnet Clutch Diagnosis Procedure</u>". If OK, continue with next check.

# SYSTEM DESCRIPTION MANUAL A/C IDENTIFICATION TABLE

# Application Table

INFOID:000000008789490

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Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]	AWIIA04812Z
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]	AMILAL2282Z

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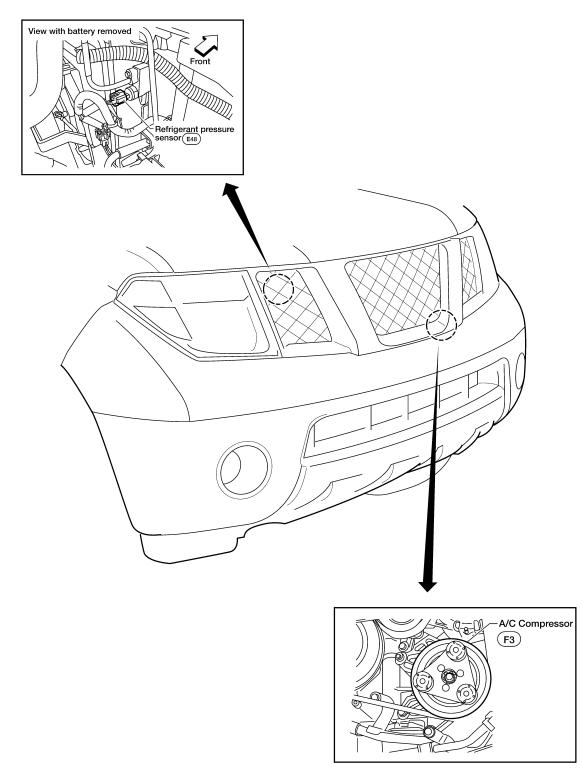
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# **FUNCTION INFORMATION**

**Component Part Location** 

ENGINE COMPARTMENT



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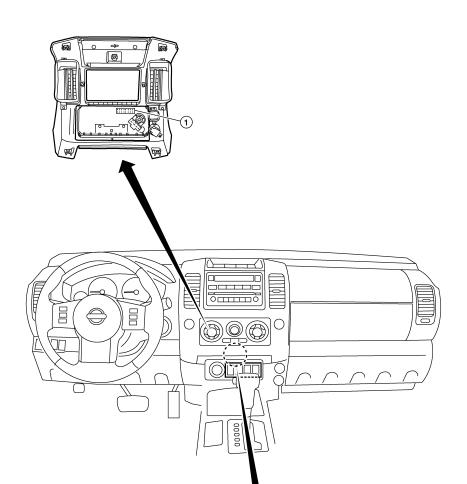
J

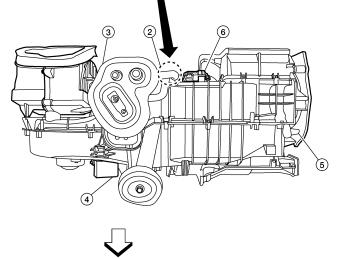
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#### PASSENGER COMPARTMENT





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AWIIA0724ZZ

- $\Rightarrow$  :Front
- 3. Intake door motor M58
- 6. Air mix door motor M147
- 1. Front air control M49
- 4. Front blower motor resistor M122
- 2. Intake sensor M146
- 5. Mode door motor M142

# HAC-163

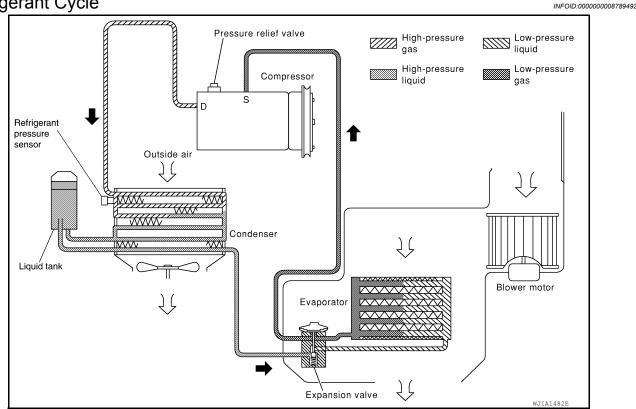
# **REFRIGERATION SYSTEM**

# < SYSTEM DESCRIPTION >

# **REFRIGERATION SYSTEM**







#### REFRIGERANT FLOW

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

#### 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:000000008789493

#### 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

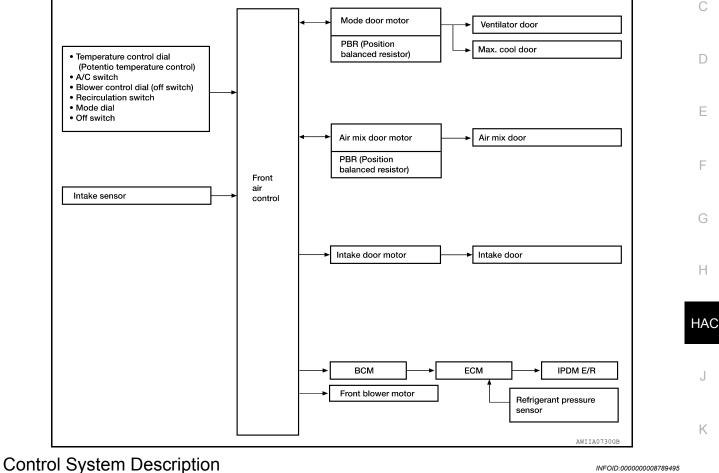
The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 2,990 kPa ( $30.5 \text{ kg/} \text{ cm}^2$ , 433.6 psi)], the release port on the pressure relief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

#### CONTROL SYSTEM The control system consists of input sensors, switches, the front air control (microcomputer) and outputs.

MANUAL AIR CONDITIONER SYSTEM

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

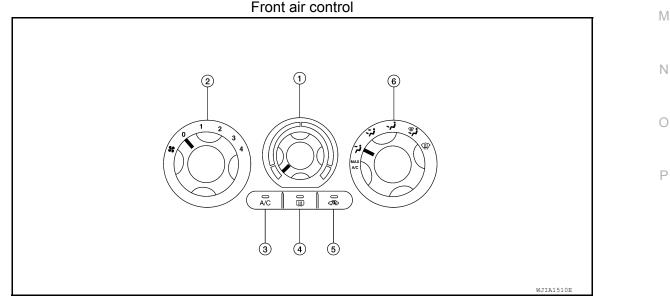
MANUAL AIR CONDITIONER SYSTEM



< SYSTEM DESCRIPTION >

**Control System Diagram** 

# CONTROL OPERATION



[MANUAL A/C (TYPE 2)]

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INFOID:000000008789494

# MANUAL AIR CONDITIONER SYSTEM

# < SYSTEM DESCRIPTION >

- 1. Temperature control dial
- 2. Blower control dial
- 3. A/C switch (if equipped)

- 4. Rear window defogger switch (if 5 equipped)
  - 5. Recirculation switch
- 6. Mode dial

TEMPERATURE CONTROL DIAL (TEMPERATURE CONTROL)

Increases or decreases the set temperature.

# RECIRCULATION (

• 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.

# REAR WINDOW DEFOGGER SWITCH (IF EQUIPPED)

When switch is ON, rear window is defogged.

OFF SWITCH (BLOWER SPEED SET TO 0)

The compressor and blower are OFF.

A/C SWITCH (IF EQUIPPED)

The compressor is ON or OFF.

(Pressing the A/C switch will turn off the A/C switch and compressor.)

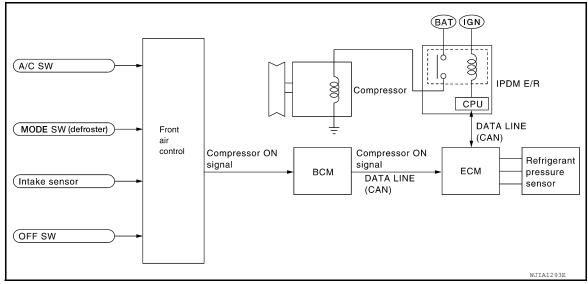
# MODE DIAL

Controls the air discharge outlets.

FRONT BLOWER CONTROL DIAL

Manually controls the four blower speeds.

# MAGNET CLUTCH CONTROL



When the A/C switch is pressed, or the mode dial is turned to the DEF or D/F position, the front air control outputs a compressor ON signal to BCM.

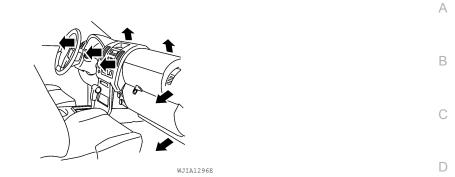
The BCM then sends a compressor ON signal to ECM, via CAN communication line.

ECM judges whether 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 compressor.

**Discharge Air Flow** 

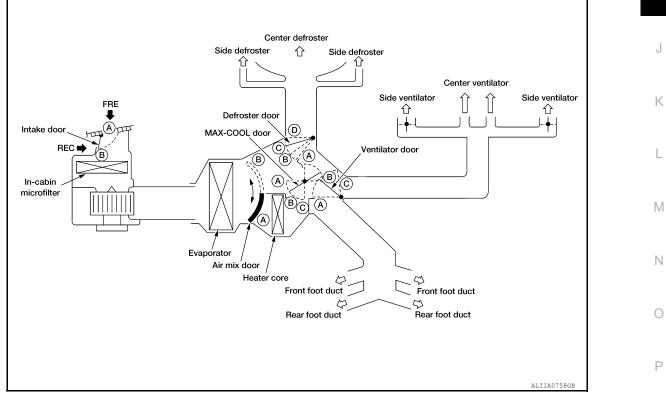
INFOID:000000008789496



Mode door position	Air outlet/distribution				
	Vent	Foot	Defroster		
7	95%	5%			
IJ	60%	40%	_		
ن.	20%	55%	25%		
<b>*</b>	15%	50%	35%		
¥	7%	15%	78%		

# Switches And Their Control Function

SWITCHES AND THEIR CONTROL FUNCTION



INFOID:000000008789497

Н

# MANUAL AIR CONDITIONER SYSTEM

#### < SYSTEM DESCRIPTION >

Position			E SW	D/5	DEF		REC ON	SW OFF	Temp	erature	edial	OFF SW		
or switch	VENT	B/L	FOOT	D/F						$\overline{\bigcirc}$		<b>S</b>		
Door	*	÷,	ن <b>ہ</b> ب			# <b>7</b>		<del>ک</del>			Ø	$(\mathfrak{G})$		
	_		-	-	<b>≥♦</b> <i>⊂</i>	0	<b>€</b> <b>€</b>	0	COLD	~	нот	OFF		
Ventilator door	۸	₿	©	©	©						©			
MAX-COOL door	۸	₿	B	₿	Ô									B
Defroster door	D	D	<b>℗</b> ₀r <b>℗</b>	₿	۸							Ô		
Intake door			_		B		A	₿				₿		
Air mix door			_						<b>A</b>		₿			

# < SYSTEM DESCRIPTION > DIAGNOSIS SYSTEM (BCM) COMMON ITEM

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

INFOID:000000009225450

# 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.	E
Work support	The settings for BCM functions can be changed.	
Configuration	<ul><li>The vehicle specification can be read and saved.</li><li>The vehicle specification can be written when replacing BCM.</li></ul>	F
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.	

#### SYSTEM APPLICATION

BCM can perform the following functions.

				Direct [	Diagnosti	c Mode			– н
System	Sub System	Ecu Identification	Self Diagnostic Result	Data Monitor	Active Test	Work support	Configuration	CAN Diag Support Mntr	HAC
		Ecu	Self	Data	Activ	Work	Conf	CAN	J
Door lock	DOOR LOCK			×	×	×			_
Rear window defogger	REAR DEFOGGER			×	×				K
Warning chime	BUZZER			×	×				
Interior room lamp timer	INT LAMP			×	×	×			-
Remote keyless entry system	MULTI REMOTE ENT			×	×	×			- L
Exterior lamp	HEAD LAMP			×	×	×			_
Wiper and washer	WIPER			×	×	×			M
Turn signal and hazard warning lamps	FLASHER			×	×				_
Air conditioner	AIR CONDITIONER			×					
Combination switch	COMB SW			×					- N
BCM	BCM	×	×			×	×	×	_
Immobilizer	IMMU		×	×	×				0
Interior room lamp battery saver	BATTERY SAVER			×	×	×			_
Vehicle security system	THEFT ALM			×	×	×			_
RAP system	RETAINED PWR			×	×	×			P
Signal buffer system	SIGNAL BUFFER			×	×				_
TPMS	AIR PRESSURE MONITOR		×	×	×	×			_
Panic alarm system	PANIC ALARM				×				

# AIR CONDITIONER

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# **DIAGNOSIS SYSTEM (BCM)**

#### < SYSTEM DESCRIPTION >

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

#### 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.

# **DTC/CIRCUIT DIAGNOSIS** MANUAL A/C IDENTIFICATION TABLE

# **Application Table**

INFOID:000000008789500 В

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Manual A/C Type	Description	Visual Identification	
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]		
		AWIIA0481ZZ	
			(
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]		
		AWIIA1228ZZ	H

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System Description

# SYSTEM DESCRIPTION

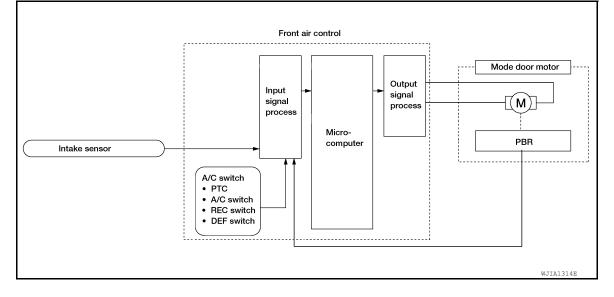
#### **Component Parts**

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

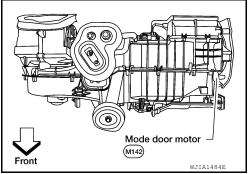
The mode door position (vent, B/L, foot, D/F, and defrost) is set by the front air control by means of the mode door motor. When a mode door position is selected on the front air control, voltage is applied to one circuit of the mode door motor while ground is applied to the other circuit, causing the 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

SYMPTOM:

Air outlet does not change.

Mode door motor does not operate normally.

INSPECTION FLOW

INFOID:00000008789502

[MANUAL A/C (TYPE 2)]

INFOID:00000008789501

# [MANUAL A/C (TYPE 2)]

AC-166. "Discharge psition is at FRESH
is Procedure".
INFCID:000000008789503
r <u>HAC-208, "Wiring</u>
<u>11/10/200, Wining</u>
In the second se
WJIA1241E
al 14 while rotating

# < DTC/CIRCUIT DIAGNOSIS >

Connector	onnector Terminals (+) (-)		Terminals		
Connector			Condition	Voltage (Approx.)	
M49	M49		Rotating the mode control dial from D/F ( 🏶 ) mode to VENT ( 🍞 ) mode	Battery voltage	
WHO			Rotating the mode control dial from VENT ( 💙 ) mode to B/L ( 💙 ) mode	Battery voltage	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace front air control. Refer to <u>VTL-7, "Removal and Installation"</u>.

 $\mathbf{3}$ . Check mode door motor PBR circuits for open and short to ground

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M49 (A).
- 3. Check continuity between front air control harness connector M49 (A) terminals 23, 26 and the mode door motor harness connector M142 (B) terminals 1, 3.

А		В		Continuity
Connector	Terminal	Connector	Terminal	
M49	23	M142	3	Yes
1014-5	26	101142	2	163

4. Check continuity between front air control harness connector M49 (A) terminals 23, 26 and ground.

Connector	Terminal	—	Continuity
M49 (A)	23	Ground	No
	26	Ground	NO

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

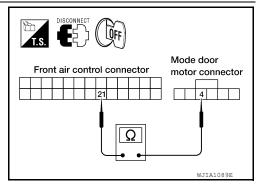
4.CHECK PBR FEEDBACK SIGNAL CIRCUIT FOR OPEN AND SHORT TO GROUND

1. Check continuity between front air control harness connector M49 terminal 21 and mode door motor harness connector M142 terminal 4.

Connector	Terminal	Connector	Terminal	Continuity
M49	21	M142	4	Yes

 Check continuity between front air control harness connector M49 terminal 16 and ground.

Connector	Terminal	_	Continuity
M49	21	Ground	No



Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness as necessary.

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

1. Reconnect front air control harness connectors.

2. Turn ignition switch ON.

3. Check voltage between front air control harness connector M49 terminal 23 and terminal 26.

# < DTC/CIRCUIT DIAGNOSIS >

Connector	Terminals	Connector -	Terminals	Voltage (Approx.)
Connector	(+)		(-)	voltage (Approx.)
M49	23	M49	26	5 Volts

4. Check voltage between front air control harness connector M49 terminal 21 and ground.

Connector	Terminal	—	Voltage (Approx.)
M49	21	Ground	0 Volts

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-7</u>, "Removal and <u>Installation"</u>.

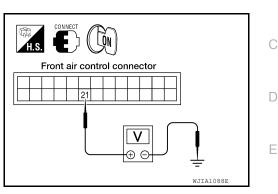
6.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

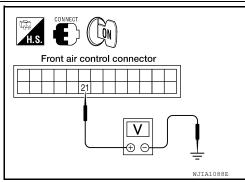
- 1. Reconnect the mode door motor harness connector M142.
- 2. Check voltage between front air control harness connector M49 terminal 21 and ground.

Connector	Terminal	—	Voltage (Approx.)
M49	21	Ground	0.2 to 4.8 Volts

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 <u>VTL-7</u>, "<u>Removal and Installation</u>".
- NO >> Replace the mode door motor. Refer to <u>VTL-21.</u> <u>"Removal and Installation"</u>.





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System Description

# SYSTEM DESCRIPTION

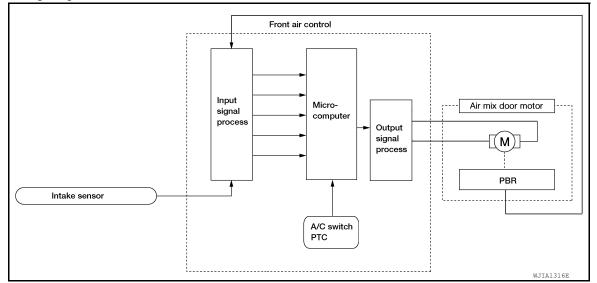
#### Component Parts

Air\_mix door control system components are:

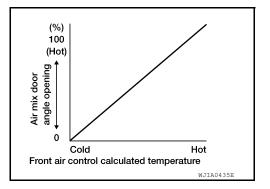
- Front air control
- Air mix door motor
- Position Balanced Resistor (PBR) (built into air mix door motor)
- Intake sensor

#### 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

INFOID:000000008789504

#### < DTC/CIRCUIT DIAGNOSIS >

1.

2.

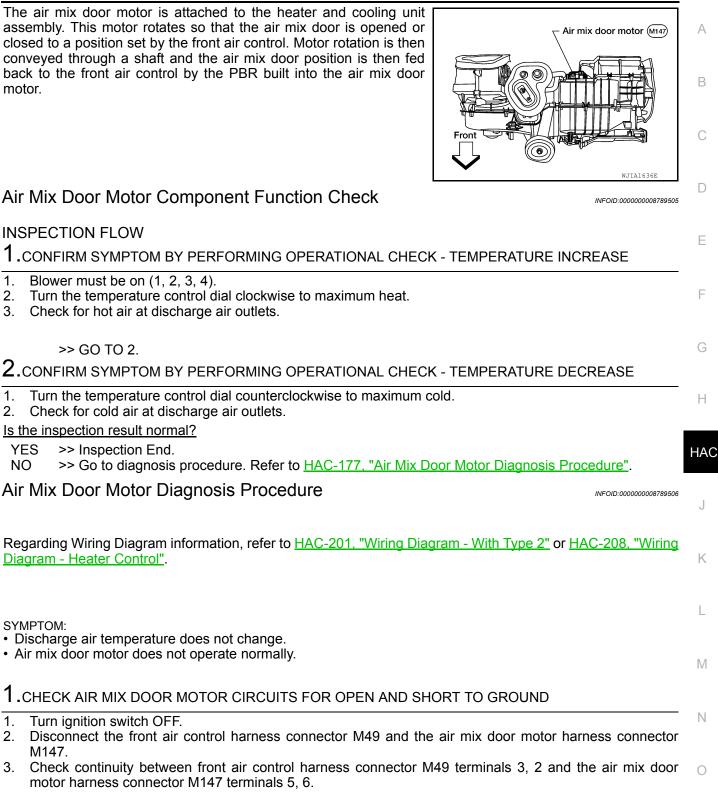
1.

2.

1.

2.

[MANUAL A/C (TYPE 2)]



Connector	Terminal	Connector	Terminal	Continuity
M49	2	M147	6	Yes
	3		5	163

Check continuity between front air control harness connector M49 terminals 3, 2 and ground. 4

Ρ

# < DTC/CIRCUIT DIAGNOSIS >

Connector	Terminal	—	Continuity
M49	3	Ground	No
	2	Ground	NO

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

 $2. \mathsf{CHECK} \ \mathsf{FRONT} \ \mathsf{AIR} \ \mathsf{CONTROL} \ \mathsf{FOR} \ \mathsf{AIR} \ \mathsf{MIX} \ \mathsf{DOOR} \ \mathsf{MOTOR} \ \mathsf{POWER} \ \mathsf{AND} \ \mathsf{GROUND}$ 

#### 1. Reconnect front air control harness connector.

2. Turn ignition switch ON.

- 3. Rotate the mode switch to the D/F ( 🐲 ) mode.
- 4. Check voltage between front air control harness connector M49 terminal 3 and terminal 2 while rotating the mode control dial to the VENT (♥), and then the B/L (♥) mode.

Connector	Term	ninals	Condition	Voltage (Approx.)
Connector	(+)	(-)	Condition	voltage (Approx.)
M49	2	3	Rotating the mode control dial from D/F ( 🎬 ) mode to VENT ( 🎲 ) mode	Battery voltage
10149	3	2	Rotating the mode control dial from VENT ( 🕻 ) mode to B/L ( 🕻 ) mode	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace front air control. Refer to <u>VTL-7, "Removal and Installation"</u>.

 ${f 3.}$  CHECK AIR MIX DOOR MOTOR PBR CIRCUITS FOR OPEN AND SHORT TO GROUND

1. Turn ignition switch OFF.

- 2. Disconnect the front air control harness connector M49.
- 3. Check continuity between front air control harness connector M49 terminals 23, 26 and the air mix door motor harness connector M147 terminals 1, 3.

Connector	Terminal	Connector	Terminal	Continuity
M49	26	M147	3	Yes
10143	23	M147	1	163

4. Check continuity between front air control harness connector M49 terminals 23, 26 and ground.

Connector	Terminal	—	Continuity	
M49	23	Ground	No	
101-13	26	Ground	INU	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

1. Check continuity between front air control harness connector M49 terminal 22 and air mix door motor harness connector M147 terminal 2.

Connector	Terminal	Connector	Terminal	Continuity
M49	22	M147	2	Yes

2. Check continuity between front air control harness connector M49 terminal 22 and ground.

#### < DTC/CIRCUIT DIAGNOSIS >

Connector	Termina	_		Continuity	
M49	22	Grour	nd	No	
ES >> G O >> R CHECK FF	• •	ace harness		•	EF RETURN, AND FEEDBACK
Turn igniti	on switch C			rs. ess connector M49 terminal 2	23 and terminal 26.
Connector	Terminals	Connector	Termina	ls Voltage (Approx.)	
	(+)		(-)		
M49	23	M49	26	5 Volts	
Check vo	tage betwe	en front air co	ontrol harn	ess connector M49 terminal 2	22 and ground.
Connector	Termina	_		/oltage (Approx.)	
1440		Grour	nd	0.1/ //	
M49	22	Gioui		0 Volts	
-	22 on result no			0 Volts	
ne inspecti ES >> G	on result no O TO 7.	rmal?			
ne inspecti ES >> G D >> R	on result no O TO 7. eplace front	rmal? air control. R	efer to <u>VT</u>	L-7, "Removal and Installatio	<u>n"</u> .
ne inspecti ES >> G D >> R	on result no O TO 7. eplace front	rmal? air control. R	efer to <u>VT</u>		<u>n"</u> .
ne inspecti S >> G D >> R CHECK FF Reconnec	on result no O TO 7. eplace front CONT AIR C	air control. R ONTROL FC	Refer to <u>VT</u> OR FEEDB	L-7, "Removal and Installatio	
ne inspecti S >> G D >> R CHECK FF Reconnec	on result no O TO 7. eplace front CONT AIR C	rmal? air control. R CONTROL FC door motor h on front air co	Refer to <u>VT</u> OR FEEDB narness co ontrol harn	L-7, "Removal and Installation ACK SIGNAL	
ne inspecti S >> G D >> R CHECK FF Reconnec Check vol	on result no O TO 7. eplace front CONT AIR C the air mix tage betwe	rmal? air control. R CONTROL FC door motor h on front air co	Refer to <u>VT</u> DR FEEDB marness co ontrol harn	L-7, "Removal and Installation ACK SIGNAL Innector M147. The ss connector M49 terminal 2	
ne inspecti S >> G D >> R CHECK FF Reconnec Check vol Connector M49 ne inspecti	O TO 7. O TO 7. Eplace front RONT AIR C tage between Terminal 22 On result no	air control. R ONTROL FC door motor h on front air co Grour rmal?	Refer to <u>VT</u> DR FEEDB narness co ontrol harn	L-7, "Removal and Installation ACK SIGNAL Innector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts	22 and ground.
ne inspecti S >> G D >> R CHECK FF Reconnec Check vol Connector M49 ne inspecti S >> In	O TO 7. eplace front CONT AIR C tage between Terminal 22 on result no spect air mi	air control. R ONTROL FC door motor h font air co Grour <u>rmal?</u> x door for bin	Refer to <u>VT</u> OR FEEDB narness co ontrol harn nd	L-7, "Removal and Installation ACK SIGNAL onnector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts	
te inspecti S >> G D >> R CHECK FF Reconnec Check vol Connector M49 te inspecti S >> In co	O TO 7. eplace front CONT AIR C et the air mix tage betweet Terminal 22 on result no spect air mi ontrol. Refer	air control. R CONTROL FC door motor h on front air co <u>Grour</u> rmal? x door for bin	Refer to <u>VT</u> DR FEEDB marness co ontrol harn nd ding or me emoval ar	L-7, "Removal and Installation ACK SIGNAL onnector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts echanical failure. If air mix door <u>d Installation</u> ".	22 and ground. or moves freely, replace front air
te inspecti S >> G D >> R CHECK FF Reconnec Check vol Connector M49 te inspecti S >> In co	O TO 7. eplace front CONT AIR C et the air mix tage betweet Terminal 22 on result no spect air mi ontrol. Refer	air control. R CONTROL FC door motor h on front air co <u>Grour</u> rmal? x door for bin	Refer to <u>VT</u> DR FEEDB marness co ontrol harn nd ding or me emoval ar	L-7, "Removal and Installation ACK SIGNAL onnector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts	22 and ground. or moves freely, replace front air
ne inspecti S >> G D >> R CHECK FF Reconnec Check vol Connector M49 ne inspecti S >> In co	O TO 7. eplace front CONT AIR C et the air mix tage betweet Terminal 22 on result no spect air mi ontrol. Refer	air control. R CONTROL FC door motor h on front air co <u>Grour</u> rmal? x door for bin	Refer to <u>VT</u> DR FEEDB marness co ontrol harn nd ding or me emoval ar	L-7, "Removal and Installation ACK SIGNAL onnector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts echanical failure. If air mix door <u>d Installation</u> ".	22 and ground. or moves freely, replace front air
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ne inspecti S >> G D >> R CHECK FF Reconnec Check vol Connector M49 ne inspecti S >> In co	O TO 7. eplace front CONT AIR C et the air mix tage betweet Terminal 22 on result no spect air mi ontrol. Refer	air control. R CONTROL FC door motor h on front air co <u>Grour</u> rmal? x door for bin	Refer to <u>VT</u> DR FEEDB marness co ontrol harn nd ding or me emoval ar	L-7, "Removal and Installation ACK SIGNAL onnector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts echanical failure. If air mix door <u>d Installation</u> ".	22 and ground. or moves freely, replace front air
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ne inspecti S >> G D >> R CHECK FF Reconnec Check vol Connector M49 ne inspecti S >> In co	O TO 7. eplace front CONT AIR C et the air mix tage betweet Terminal 22 on result no spect air mi ontrol. Refer	air control. R CONTROL FC door motor h on front air co <u>Grour</u> rmal? x door for bin	Refer to <u>VT</u> DR FEEDB marness co ontrol harn nd ding or me emoval ar	L-7, "Removal and Installation ACK SIGNAL onnector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts echanical failure. If air mix door <u>d Installation</u> ".	22 and ground. or moves freely, replace front air
ne inspecti S >> G D >> R CHECK FF Reconnec Check vol Connector M49 ne inspecti S >> In co	O TO 7. eplace front CONT AIR C et the air mix tage betweet Terminal 22 on result no spect air mi ontrol. Refer	air control. R CONTROL FC door motor h on front air co <u>Grour</u> rmal? x door for bin	Refer to <u>VT</u> DR FEEDB marness co ontrol harn nd ding or me emoval ar	L-7, "Removal and Installation ACK SIGNAL onnector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts echanical failure. If air mix door <u>d Installation</u> ".	22 and ground. or moves freely, replace front air
ne inspecti ES >> G D >> R CHECK FF Reconnec Check vol Connector M49 ne inspecti ES >> In co	O TO 7. eplace front CONT AIR C et the air mix tage betweet Terminal 22 on result no spect air mi ontrol. Refer	air control. R CONTROL FC door motor h on front air co <u>Grour</u> rmal? x door for bin	Refer to <u>VT</u> DR FEEDB marness co ontrol harn nd ding or me emoval ar	L-7, "Removal and Installation ACK SIGNAL onnector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts echanical failure. If air mix door <u>d Installation</u> ".	22 and ground. or moves freely, replace front air
he inspecti ES >> G O >> R CHECK FF Reconnec Check vol Connector M49 he inspecti ES >> In	O TO 7. eplace front CONT AIR C et the air mix tage betweet Terminal 22 on result no spect air mi ontrol. Refer	air control. R CONTROL FC door motor h on front air co <u>Grour</u> rmal? x door for bin	Refer to <u>VT</u> DR FEEDB marness co ontrol harn nd ding or me emoval ar	L-7, "Removal and Installation ACK SIGNAL onnector M147. ess connector M49 terminal 2 /oltage (Approx.) 0.2 to 4.8 Volts echanical failure. If air mix door d Installation".	22 and ground. or moves freely, replace front air

# INTAKE DOOR MOTOR

System Description

# SYSTEM DESCRIPTION

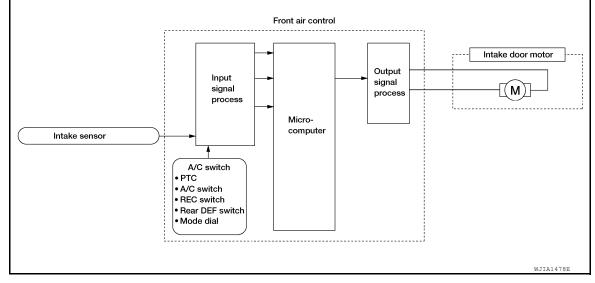
#### Component Parts

Intake door control system components are:

- Front air control
- Intake door motor
- Intake sensor

#### System Operation

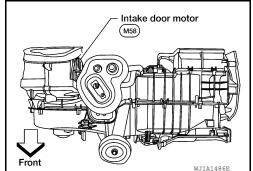
The intake door control determines the intake door position based on the position of the recirculation switch. When the recirculation switch is depressed the intake door motor rotates closing off the fresh air inlet and recirculating the cabin air. If the recirculation switch is depressed again, the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

SYMPTOM:

Intake door does not change.

Intake door motor does not operate normally.

#### INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - REC (  $\bigcirc$  )

1. Turn blower control dial to 4.

Revision: December 2012

# HAC-180

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# **INTAKE DOOR MOTOR**

< DTC/CIF	RCUI	T DIA	GNOS	S >			[MANUAL A/C (TYPE 2)]	
3. Press	REC	( 🖒	) switc	iode (🍞 ). h. h again.				
					ou should	hear blower	sound change slightly).	
s the insp				<u>al?</u>				
		pection to diac		procedure. Refe	er to HAC-	181. "Intake [	Door Motor Diagnosis Procedure".	
		-		gnosis Proce			-	
	001	MOLO			Julie		INFOID:00000008789509	
Regarding	Wiriı	ng Diag	gram in	formation, refer	to <u>HAC-2</u>	<u>:01, "Wiring D</u>	iagram - With Type 2".	
	STIC	PROC	CEDU	RE FOR INTA		R MOTOR		
SYMPTOM:								
Intake do	oor do				I			
Intake do	oor m	lotor ac	es not	operate normal	iy.			
							HORT TO GROUND	
		n switc			131000	JELIN AND S		
					s connect	or M49 and t	the intake door motor harness connector	
M58.		tipuitu	hotwor	n front oir oon	tral harna	an annaatar	M40 terminals 4. 5 and the inteke door	
				M58 terminals		ess connector	M49 terminals 4, 5 and the intake door	
					.,			
Connec	tor	Term	ninal	Connector	Terminal	Continuity		ł
M49		4		M58	1	Yes		
		5			6			
. Check	cont	inuity b	etwee	n front air contro	ol harness	s connector M	49 terminals 4, 5 and ground.	
Connec	tor	Term	ninal	_	0	Continuity	-	
		4	1				-	
M49		5	5	Ground		No		
s the insp	ectio	n result	norma	<u>al?</u>			-	
		т <u>о</u> 3.						
				e harness as ne				
						DOOR MOTO	DR POWER AND GROUND	
		front a n switc		ol harness conr	nector.			
				front air control	harness	connector M4	9 terminal 4 and terminal 5 while placing	
the H\	/AC s	system	into se	If-diagnostic mo	ode.			
	Tarm	inclo					_	
Connector		ninals		Condition		Voltage (Approx	)	
	(+) 5	(-)	Self-d	iagnostic mode (on	enina)	Battery voltage	_	
M49				f-diagnostic mode (opening)		Battery voltage	—	
s the insp	•	-			9/	_alloi y tollago	_	
-					a or mech	anical failure	If intake air door moves freely, replace the	
0 /				otor. Refer to V				

>> Replace front air control. Refer to VTL-7, "Removal and Installation". NO

# < DTC/CIRCUIT DIAGNOSIS >

# **BLOWER MOTOR**

# System Description

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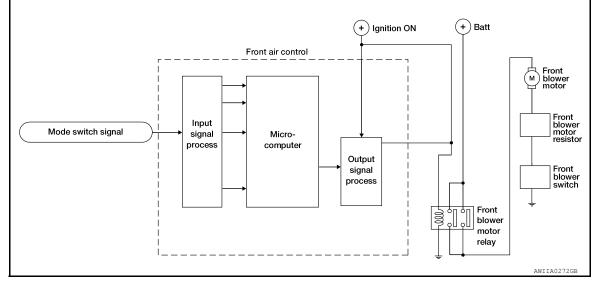
[MANUAL A/C (TYPE 2)]

Component Parts

Blower speed control system components are:

- Front air control
- Front blower motor resistor
- Front blower motor
- · Front blower relay
- Front blower switch

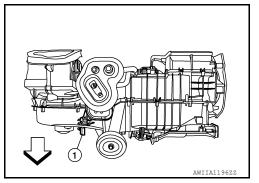
#### System Operation



#### COMPONENT DESCRIPTION

Blower Motor Resistor

The front blower motor resistor (1) is located on the heater and cooling unit assembly. The front blower motor resistor grounds the front blower motor through a series of 1, 2, or 3 resistors, depending upon speed selected. For high speed operation the front blower motor resistor is circumvented and the front blower motor grounds directly.



# Front Blower Motor Component Function Check

#### 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 <u>HAC-183</u>, "Front Blower Motor Diagnosis Procedure".

HAC-182

INFOID:000000008789511

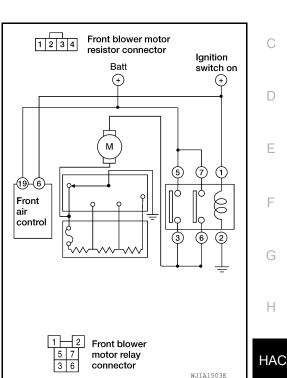
# Front Blower Motor Diagnosis Procedure

< DTC/CIRCUIT DIAGNOSIS >

Regarding Wiring Diagram information, refer to <u>HAC-201, "Wiring Diagram - With Type 2"</u> or <u>HAC-208, "Wiring Diagram - Heater Control"</u>.

SYMPTOM: Blower motor operation is malfunctioning under starting blower speed control.

#### **1.**DIAGNOSTIC PROCEDURE J 1. Turn ignition switch ON. 2. Turn the front blower switch to each of its four speeds. Does blower motor rotate normally at each speed? YES or NO Κ YES >> Inspection End. NO >> 1. Does not rotate at any speed, GO TO 2. 2. Does not rotate at 1 - 3 speed, GO TO 13. L Does not rotate at 4 speed, GO TO 16. 2.CHECK FUSES Μ Check 15A fuses (Nos. 24 and 27, located in the fuse and fusible link box). Refer to PG-79, "Terminal 1. Arrangement". 2. Check 10A fuse [No. 8, located in the fuse block (J/B)]. Refer to PG-78, "Terminal Arrangement". Ν Is inspection result normal? YES >> GO TO 3. NO >> GO TO 8. Ο 3.CHECK FRONT BLOWER MOTOR POWER SUPPLY Ρ



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# **BLOWER MOTOR**

## < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor harness connector.
- 3. Turn ignition switch ON.
- 4. Select any front blower speed except OFF.
- 5. Check voltage between front blower motor harness connector M62 terminal 2 and ground.

#### 2 - Ground

: Battery voltage

Is inspection result normal?

YES >> GO TO 12.

NO >> GO TO 4.

**4.**CHECK FRONT BLOWER MOTOR RELAY

1. Turn Ignition switch OFF.

2. Check front blower motor relay. Refer to HAC-186. "Front Blower Motor Component Inspection".

Is inspection result normal?

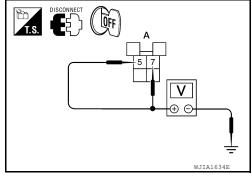
YES >> GO TO 5.

NO >> Replace front blower motor relay.

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

Check voltage between front blower motor relay harness connector E54 terminals 7 and 5 and ground.

	А		Voltage (Ap-	
(+)			Condition	prox.)
Front air control connector	Terminal	(-)		
E54	5	Ground	Blower motor relay power supply	Battery voltage
E54	7	Ground	Blower motor relay power supply	Battery voltage



Is inspection result normal?

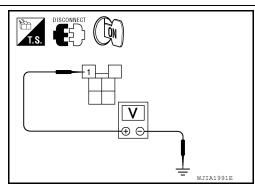
YES >> GO TO 6.

NO >> Repair harness or connector.

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

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

	А		Voltage (Ap-	
(+)			Condition	prox.)
Front air control connector	Terminal	(-)		
E54	1	Ground	Blower motor relay power supply (coil side)	Battery voltage

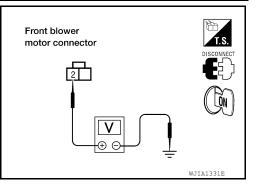


Is inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace harness as necessary.

**I**.CHECK FRONT BLOWER MOTOR POWER FROM RELAY TO FRONT BLOWER MOTOR



# **BLOWER MOTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

- Turn ignition switch OFF. 1.
- Check continuity between front blower motor relay harness con-2. nector E54 terminals 6 and 3 and front blower motor harness connector M62 terminal 2.

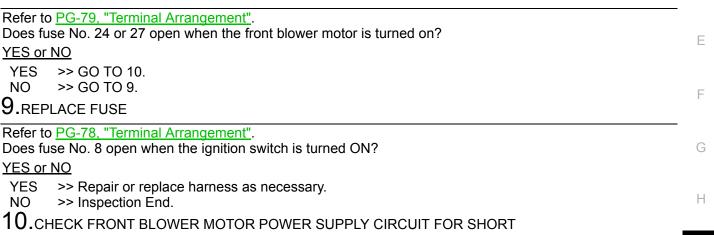
#### 3, 6 - 2

#### : Continuity should exist.

Is inspection result normal?

- YES >> Repair the blower motor ground circuit as necessary.
- NO >> Repair harness or connector between the front blower motor relay and the front blower motor.

# 8.REPLACE FUSE



- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor connector.
- 3. Check continuity between front blower motor harness connector M62 terminal 2 and ground.
  - 2 Ground

# : Continuity should not exist.

Is inspection result normal?

- YES >> GO TO 11.
- NO >> Repair or replace harness as necessary.

# 11. CHECK FRONT BLOWER MOTOR RELAY (SWITCH SIDE) POWER SUPPLY CIRCUIT FOR SHORT

- 1. Disconnect front blower motor relay connector.
- 2. Check continuity between the front blower motor relay harness connector E54 terminal 7 and terminal 5 and ground.
  - 7, 5 Ground

#### : Continuity should not exist.

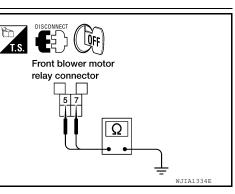
Is inspection result normal?

- YES >> Check front blower motor. Refer to HAC-183, "Front Blower Motor Diagnosis Procedure".
- NO >> Repair harness or connector.

# 12. CHECK FRONT BLOWER MOTOR

Turn ignition switch OFF. 1.

2. Check front blower motor. Refer to HAC-186, "Front Blower Motor Component Inspection". Is inspection result normal?



**Revision: December 2012** 

# **HAC-185**

# [MANUAL A/C (TYPE 2)]

WJIA1333E

LŐFF Front blower motor Front blower motor relay connector connector 2

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DISCONNECT

motor connector

2

TS Front blower LÖFF

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- < DTC/CIRCUIT DIAGNOSIS > YES >> GO TO 13.
- NO >> Replace front blower motor. Refer to <u>VTL-11, "Removal and Installation"</u>.

**13.**CHECK FRONT BLOWER MOTOR RESISTOR

Check front blower motor resistor. Refer to HAC-186. "Front Blower Motor Component Inspection".

#### Is inspection result normal?

YES >> GO TO 14.

NO >> Replace front blower motor resistor. Refer to <u>VTL-13. "Removal and Installation"</u>.

14.CHECK FRONT BLOWER SWITCH

Check front blower switch. Refer to <u>HAC-186, "Front Blower Motor Component Inspection"</u>.

Is inspection result normal?

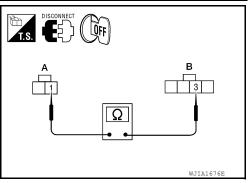
YES >> GO TO 15.

NO >> Replace front blower switch. Refer to <u>VTL-7. "Removal and Installation"</u>.

15. CHECK FRONT BLOWER MOTOR GROUND CIRCUIT TO FRONT BLOWER MOTOR RESISTOR

- 1. Disconnect front blower motor resistor harness connector.
- Check continuity between front blower motor connector M62 (A) terminal 1 and front blower motor resistor harness connector M122 (B) terminal 3.

A		В			
Connector	Terminal	Connector	Terminal	Continuity	
Front blower motor: M62	1	Front blower mo- tor resistor: M122	3	Yes	



Is inspection result normal?

YES >> Repair harness or connector between front blower switch connector M51 terminal 8 and ground.

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

**16.**CHECK FRONT BLOWER SWITCH

Check front blower switch. Refer to HAC-186, "Front Blower Motor Component Inspection".

Is inspection result normal?

YES >> Repair harness or connector between front blower motor switch connector M51 terminal 8 and front blower motor resistor connector M122 terminal 3.

NO >> Replace front blower switch. Refer to <u>VTL-7, "Removal and Installation"</u>. SYMPTOM: Blower motor operation is malfunctioning.

# Front Blower Motor Component Inspection

COMPONENT INSPECTION

Front Blower Motor Relay

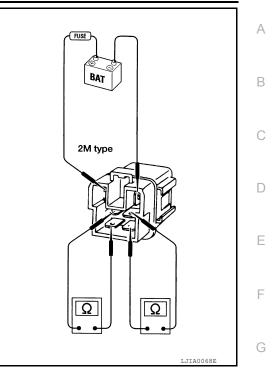
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# **BLOWER MOTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

Check continuity between terminals by supplying 12 volts and ground to coil side terminals of relay.





Front blower

1 2

WJIA1508E

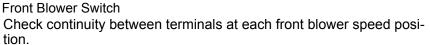
connector

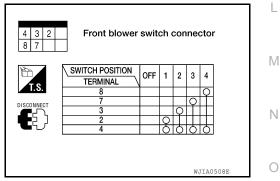
motor

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.





T.S. DISCONNECT

FUSE

BAT

Front Blower Motor Resistor

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# **BLOWER MOTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

Check continuity between terminals. There will be resistance, but there should not be an open or short between any two terminals.

# front blower motor resistor connector

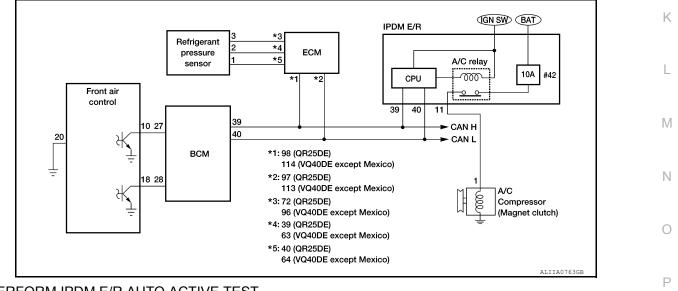
[MANUAL A/C (TYPE 2)]

WJIA0971E

MAGNET CLUTCH	А
System Description	~
SYSTEM DESCRIPTION The front air control controls compressor operation based on intake temperature and a signal from ECM.	В
Low Temperature Protection Control The front air control will turn the compressor ON or OFF as determined by a signal detected by the intake sen- sor.	С
When intake air temperature is higher than 3.5°C (38.3°F), the compressor turns ON. The compressor turns OFF when intake air temperature is lower than 2.5°C (36.5°F).	D
Magnet Clutch Component Function Check	
SYMPTOM: Magnet clutch does not engage.	Е
INSPECTION FLOW	
<b>1</b> .CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MAGNET CLUTCH	F
<ol> <li>Rotate blower control dial clockwise.</li> <li>Rotate mode dial to vent (*) position.</li> <li>Press A/C switch. Confirm that the compressor clutch engages (sound or visual inspection).</li> <li>Is the inspection result normal?</li> </ol>	G
<ul> <li>YES &gt;&gt; Inspection End.</li> <li>NO &gt;&gt; Go to diagnosis procedure. Refer to <u>HAC-189. "Magnet Clutch Diagnosis Procedure"</u>.</li> </ul>	Н
Magnet Clutch Diagnosis Procedure	
	HAC
Regarding Wiring Diagram information, refer to <u>HAC-201, "Wiring Diagram - With Type 2"</u> .	

# DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

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



# 1.PERFORM IPDM E/R AUTO ACTIVE TEST

Refer to PCS-11, "CONSULT Function (IPDM E/R)".

Does magnet clutch operate?

< DTC/CIRCUIT DIAGNOSIS >

- YES >> (E) WITH CONSULT
  - ĞO TO 2.
  - 🔊 WITHOUT CONSULT

< DTC/CIRCUIT DIAGNOSIS >

GO TO 8.

NO >> Check 10A fuse (No. 42, located in IPDM E/R), and GO TO 12.

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

Check A/C compressor ON/OFF signal. Refer to <u>BCS-20, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)"</u>.

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

Is the inspection result normal?

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

3.CHECK REFRIGERANT PRESSURE SENSOR

Check refrigerant pressure sensor. Refer to <u>EC-458, "Diagnosis Procedure"</u> (QR25DE) or <u>EC-944, "Diagnosis Procedure"</u> (VQ40DE).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace refrigerant pressure sensor. Refer to <u>HA-39</u>, "Removal and Installation".

**4.**CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to <u>BCS-20, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDI-</u> TIONER)".

BLOWER CONTROL DIAL<br/>ON: FAN ON SIG ONBLOWER CONTROL DIAL<br/>OFF: FAN ON SIG OFF

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 5.

NO >> GO 10 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.
- Check continuity between BCM harness connector M18 (A) terminal 28 and front air control harness connector M49 (B) terminal 18.

A		В		
Connector	Terminal	Connector	Terminal	Continuity
BCM: M18	28	Front air control: M49	18	Yes

 Check continuity between BCM harness connector M18 (A) terminal 28 and ground.

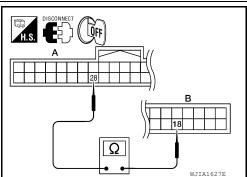
Connector	Terminal	Ground	Continuity				
BCM: M18	28	Ground	No				

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector.

 $\mathbf{6}.$ CHECK VOLTAGE FOR FRONT AIR CONTROL (FAN ON SIGNAL)



#### < DTC/CIRCUIT DIAGNOSIS >

Terminals

Terminal

No

18

1. Reconnect BCM connector and front air control connector.

(-)

Ground

- 2. Turn ignition switch ON.
- Turn A/C switch ON. 3.

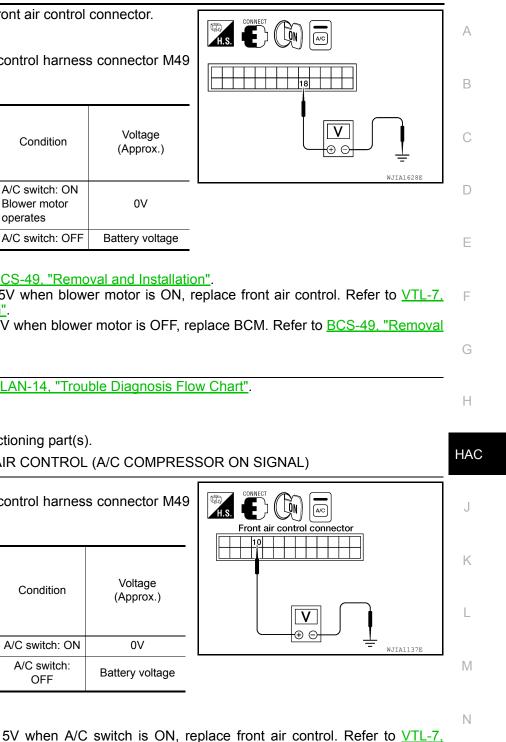
(+)

Front air con-

trol connector

M49

Check voltage between front air control harness connector M49 4. terminal 18 and ground.



[MANUAL A/C (TYPE 2)]

- Is the inspection result normal? YES
- >> Replace BCM. Refer to BCS-49, "Removal and Installation".

Condition

A/C switch: ON

Blower motor

operates

- NO-1 >> If the voltage is approx. 5V when blower motor is ON, replace front air control. Refer to VTL-7, "Removal and Installation".
- NO-2 >> If the voltage is approx. 0V when blower motor is OFF, replace BCM. Refer to BCS-49, "Removal and Installation".

# **I**.CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-14, "Trouble Diagnosis Flow Chart".

# Is the inspection result normal?

YES >> Inspection End.

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

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

#### 1. Turn ignition switch ON.

Check voltage between front air control harness connector M49 2. terminal 10 and ground.

	Terminals					K
(	+)	(-)		Voltage		
Front air control con- nector	control con- Terminal No.		Condition	(Approx.)		L
			A/C switch: ON	0V	WJIA1137E	
M49	10	Ground	A/C switch: OFF	Battery voltage		M

Is the inspection result normal?

YES >> GO TO 9.

- NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control. Refer to VTL-7, "Removal and Installation".
- NO-2 >> If the voltage is approx. 0V when A/C switch is OFF, replace BCM. Refer to BCS-49, "Removal and Installation".

9.CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

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#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- Disconnect BCM connector and front air control connector.
- 3. Check continuity between BCM harness connector M18 terminal 27 and front air control harness connector M49 terminal 10.

### 27 - 10 : 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 >> GO TO 10.
- NO >> Repair harness or connector.

**10.**CHECK INTAKE SENSOR CIRCUITS

Check intake sensor. Refer to HAC-194, "Intake Sensor Component Inspection".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace intake sensor. Refer to VTL-10, "Removal and Installation".

11. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-14, "Trouble Diagnosis Flow Chart".

#### Is the inspection result normal?

YES >> Replace BCM. Refer to <u>BCS-49, "Removal and Installation"</u>.

- NO >> Repair or replace malfunctioning part(s).
- 12. CHECK MAGNET CLUTCH CIRCUIT
- 1. Turn ignition switch OFF.
- 2. Disconnect A/C compressor connector.
- 3. Check for operation sound when applying battery voltage to A/C compressor terminal 1.

Is the inspection result normal?

- YES >> GO TO 13.
- NO >> Replace magnet clutch. Refer to <u>HA-30</u>, "Removal and <u>Installation for Compressor Clutch"</u>.

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

- 1. Disconnect IPDM E/R connector.
- 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.

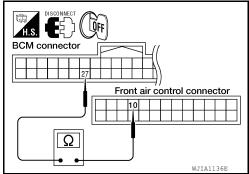
 Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

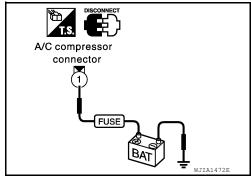
#### 11 – ground

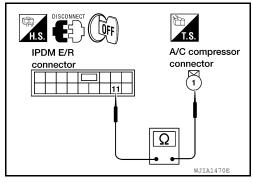
#### : Continuity should not exist.

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to PCS-28, "Removal and Installation of IPDM E/R".
- NO >> Repair harness or connector.







# < DTC/CIRCUIT DIAGNOSIS >

# INTAKE SENSOR

System Description

#### 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.

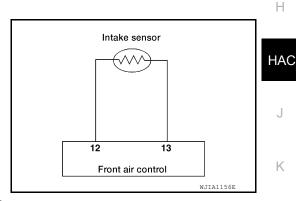
# Front heater and cooling unit assembly

# Intake Sensor Diagnosis Procedure

Regarding Wiring Diagram information, refer to HAC-201. "Wiring Diagram - With Type 2".

DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR SYMPTOM: Intake sensor circuit is open or shorted.





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Intake sensor

connector

2

# 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.

**Revision: December 2012** 



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[MANUAL A/C (TYPE 2)]

WJIA1278E

# **INTAKE SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 terminal 1 and front air control harness connector M49 terminal 13.

# : Continuity should exist.

Is the inspection result normal?

YES >> GO TO 3.

1 - 13

NO >> Repair harness or connector.

# 3. CHECK INTAKE SENSOR

Refer to HAC-194, "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-10, "Removal and Installation".

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



- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 terminal 2 and front air control harness connector M49 terminal 12.

#### 2 - 12

#### : Continuity should exist.

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

#### 2 - Ground

#### : Continuity should not exist.

Is the inspection result normal?

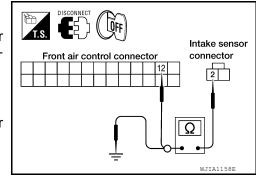
- YES >> Replace front air control. Refer to <u>VTL-7, "Removal and Installation"</u>.
- NO >> Repair harness or connector.

# Intake Sensor Component Inspection

#### COMPONENT INSPECTION

Intake Sensor

T.S. DISCONNECT	Intake sensor
Front air control connector	
	WJIA1157E

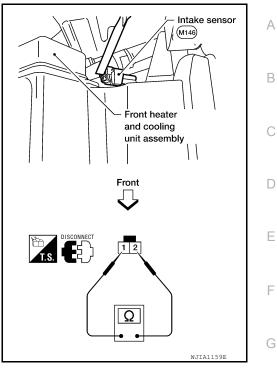


# **INTAKE SENSOR**

#### < 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 $k\Omega$
-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 <u>VTL-10, "Removal and Installa-</u> tion".

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# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

#### < DTC/CIRCUIT DIAGNOSIS >

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

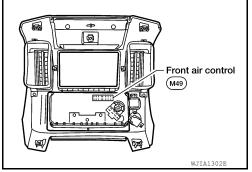
# Component Description

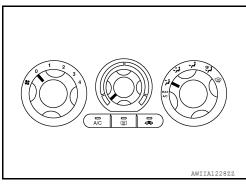
#### COMPONENT DESCRIPTION

#### 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.





Front Air Control Component Function Check

SYMPTOM: A/C system does not come on. (if equipped)

# INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK

1. Turn blower control dial to position 1-4, 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 <u>HAC-196</u>, "Front Air Control Power and Ground Diagnosis <u>Procedure"</u>.
- Front Air Control Power and Ground Diagnosis Procedure

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Regarding Wiring Diagram information, refer to <u>HAC-201, "Wiring Diagram - With Type 2"</u> or <u>HAC-208, "Wiring Diagram - Heater Control"</u>.

DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

Potentio 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.

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INFOID:000000008789520

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

#### < DTC/CIRCUIT DIAGNOSIS >

Turn ignition switch OFF.

Turn ignition switch ON.

Terminals

Terminal No.

(+)

Front air

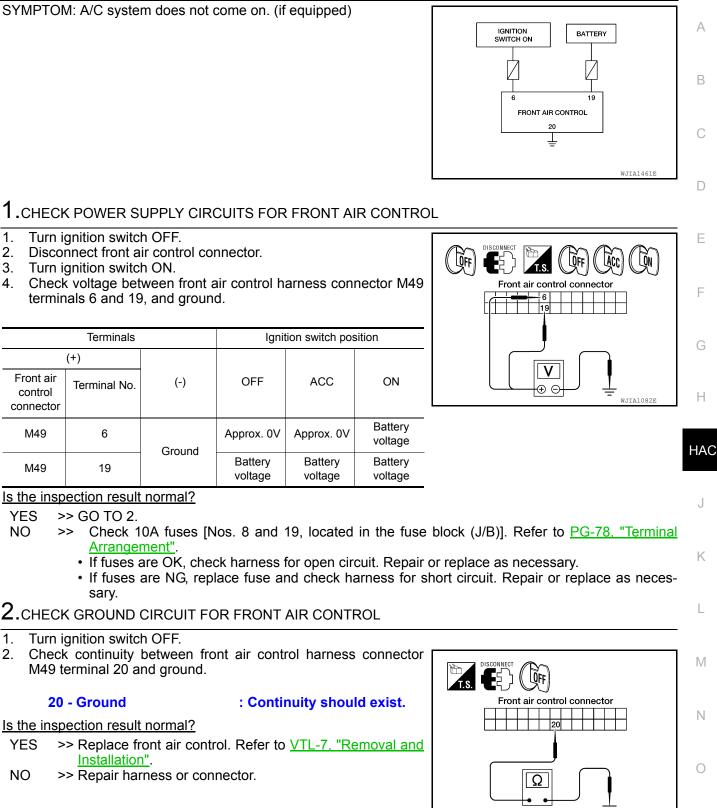
1.

2.

3.

4.

SYMPTOM: A/C system does not come on. (if equipped)



[MANUAL A/C (TYPE 2)]

control connector M49 6 Ground M49 19 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-78, "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

- Turn ignition switch OFF. 1.
- 2. Check continuity between front air control harness connector M49 terminal 20 and ground.

# 20 - Ground

Is the inspection result normal?

- YES >> Replace front air control. Refer to VTL-7, "Removal and Installation".
- NO >> Repair harness or connector.

P

# ECU DIAGNOSIS INFORMATION MANUAL A/C IDENTIFICATION TABLE

# **Application Table**

INFOID:000000008789523

Manual A/C Type	Description	Visual Identification				
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]					
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]	AMIIA1228ZZ				

# < ECU DIAGNOSIS INFORMATION >

# AIR CONDITIONER CONTROL

# Front Air Control Terminals Reference Values

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

# FRONT AIR CONTROL HARNESS CONNECTOR TERMINAL LAYOUT

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

TERMINALS AND REFERENCE VALUES FOR FRONT AIR CONTROL

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
1	BR	Mode door motor CW	ON	Clockwise rotation	Battery voltage
2	W	Air mix door motor CW	ON	Clockwise rotation	Battery voltage
3	GR	Air mix door motor CCW	ON	Counterclockwise rotation	Battery voltage
4	Y	Intake door motor CW	ON	Clockwise rotation	Battery voltage
5	0	Intake door motor CCW	ON	Counterclockwise rotation	Battery voltage
6	W/G	Power supply for IGN	ON	-	Battery voltage
8	G	Illumination +	ON	Park lamps ON	Battery voltage
9	BR	Illumination -	-	Park lamps ON	(V) 15 10 5 0 200 ms FIIA2344E
10	W	Compressor ON signal	ON	A/C switch OFF	5V
10	vv		ON	A/C switch ON	0V
11	Y	Rear defrost request	ON	-	Battery voltage
12	L	Intake sensor	ON	-	0 - 5V
13	V	Sensor ground	ON	-	0 - 5V
14	R	Mode door motor CCW	ON	Counterclockwise rotation	Battery voltage
10	DD	Front blower monitor		Front blower motor OFF	Battery voltage
18	BR	Front blower monitor	ON	Front blower motor ON	0V

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Front air control M49 MJIA1302E

WJIA2011E



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#### < ECU DIAGNOSIS INFORMATION >

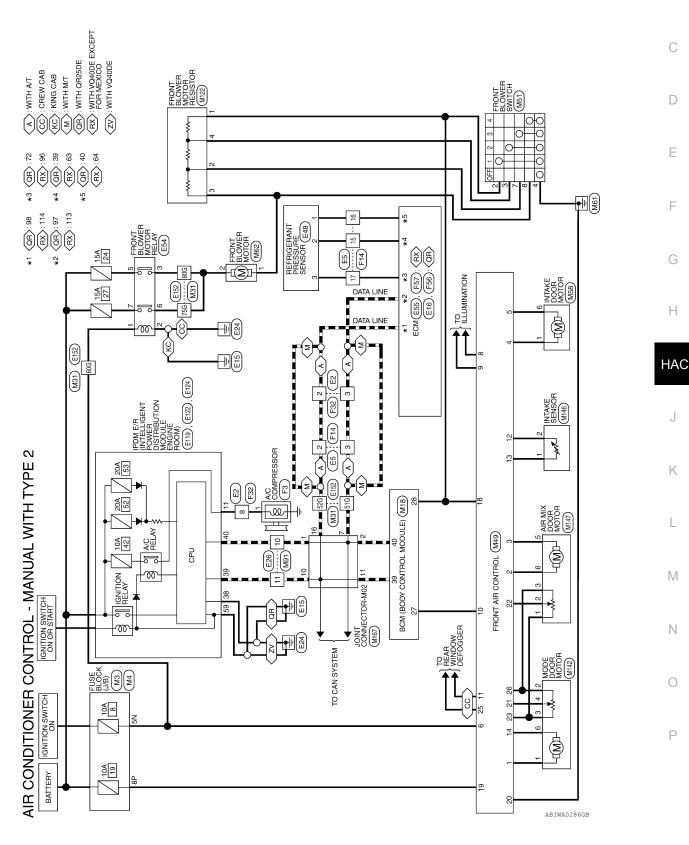
Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
19	R/Y	Power supply for BAT	-	-	Battery voltage
20	В	Ground	-	-	0V
21	V	Mode door motor feedback	ON	-	0 - 5V
22	SB	Air mix door motor feedback	ON	-	0 - 5V
23	G	Power supply for mode door motor and air mix door motor PBR	ON	-	5V
25	R	Rear defrost request	ON	-	Battery voltage
26	Ρ	Ground for mode door motor and air mix door motor PBR	ON	-	0V

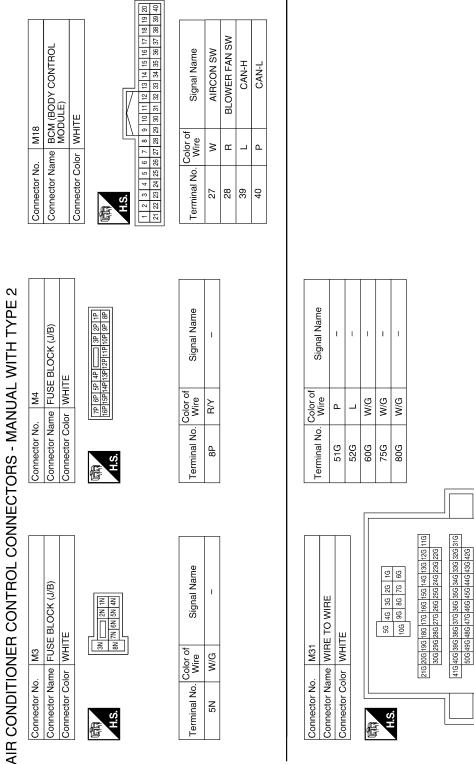
# WIRING DIAGRAM AIR CONDITIONER CONTROL

Wiring Diagram - With Type 2

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< WIRING DIAGRAM >

**Revision: December 2012** 

#### 2013 Frontier

[MANUAL A/C (TYPE 2)]

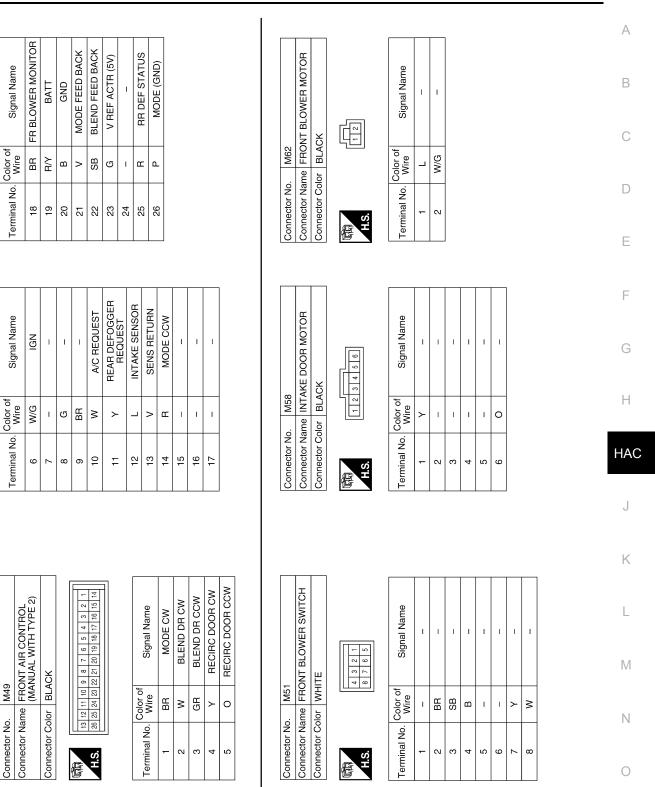
ABIIA1043GB

81G 60G 59G 58G 57G 56G 55G 54G 53G 52G 70G 69G 68G 67G 66G 65G 64G 63G 62G

75G 74G 73G 72G 71G 80G 79G 78G 77G 76G

#### < WIRING DIAGRAM >

[MANUAL A/C (TYPE 2)]

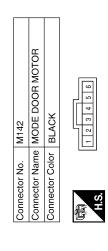


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#### < WIRING DIAGRAM >

# [MANUAL A/C (TYPE 2)]



							,
Signal Name	-	-	—	-	-	- (WITHOUT AUTO A/C)	
Color of Wire	BR	Р	G	^	I	В	
Terminal No. Wire	-	2	£	4	5	9	

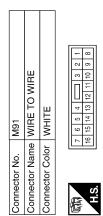
Connector No.	M122
Connector Name	Connector Name FRONT BLOWER MOTOR RESISTOR
Connector Color WHITE	WHITE
S H	4 3 2 1

H.S.

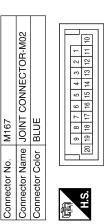
Signal Name	I	I	-	I	
Color of Wire	щ	Y	Γ	SB	
Terminal No. Wire	۲	2	3	4	

Т

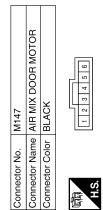
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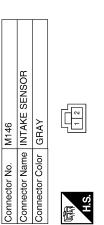


Signal Name	I	I	I	I	I	I
Color of Wire	٩	Ь	Ь	_	L	L
Terminal No. Wire	-	2	7	10	11	16

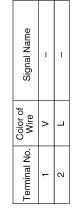


Signal Name	Ι	Ι	Ι	Ι	Ι	– (MANUAL WITH TYPE 2)
Color of Wire	≻	SB	Ч	I	GR	×
Terminal No. Color of Wire	-	2	3	4	5	6

Γ



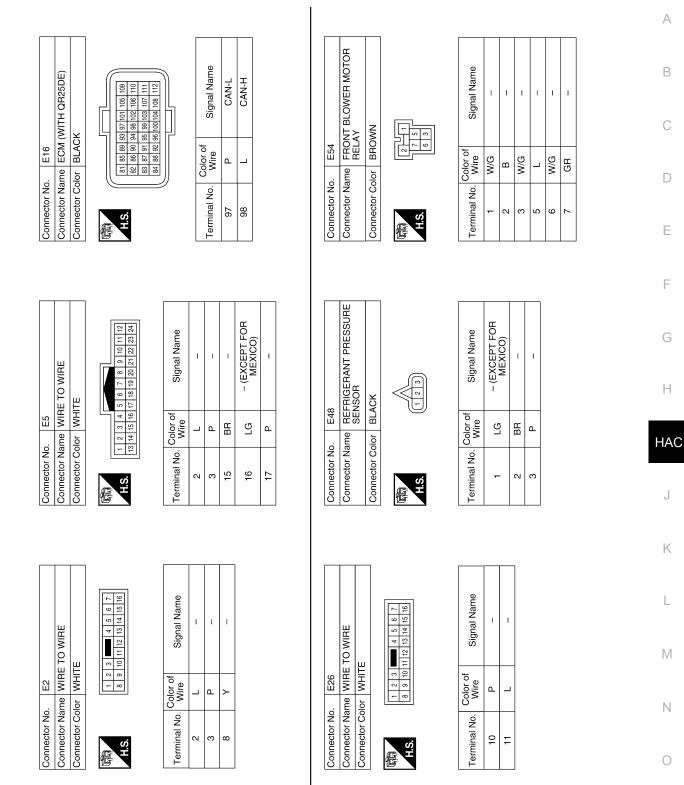
E



ABIIA1045GB

#### < WIRING DIAGRAM >

# [MANUAL A/C (TYPE 2)]



ABIIA1046GB

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#### < WIRING DIAGRAM >

E122

Connector No.

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector Name Connector Color

IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

Connector Name Connector Color

Connector Name ECM (WITH VQ40DE EXCEPT FOR MEXICO)

E55

Connector No.

GRAY

Connector Color

E119

Connector No.

WHITE

WHITE

# **AIR CONDITIONER CONTROL**

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H.S.H

H.S.

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GND (SIGNAL) Signal Name

> ш \_ ۲

38 39 40

A/C COMPRESSOR

Signal Name

Color of Wire ≻

> Terminal No. ÷

Signal Name

Color of Wire

Terminal No. 113 114

CAN-L CAN-H

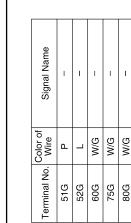
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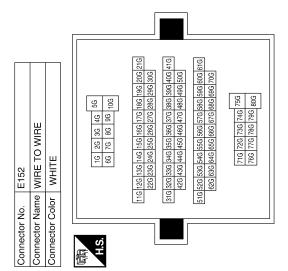
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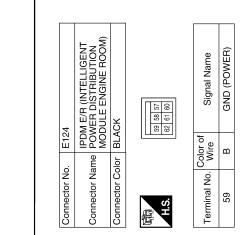
Color of Wire

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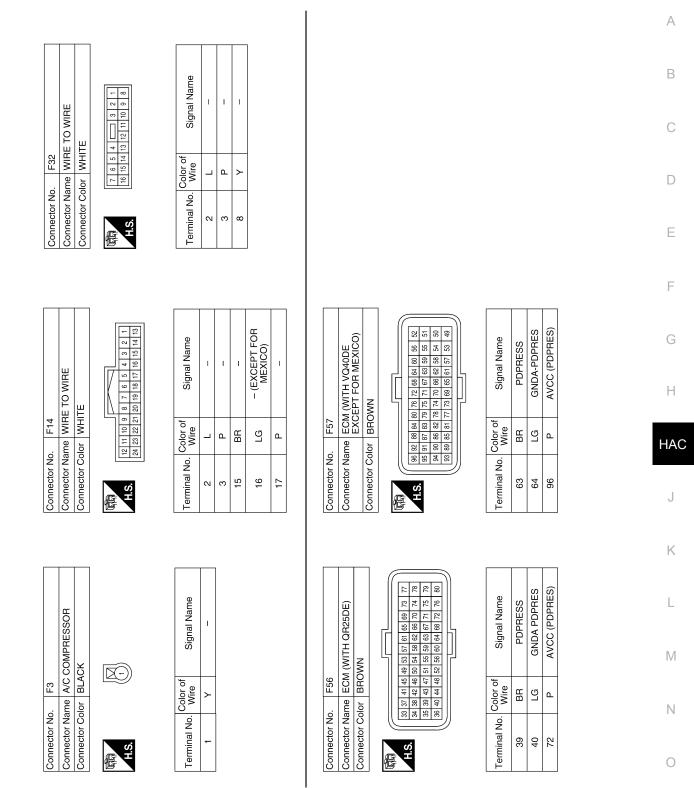
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# **Revision: December 2012**

#### < WIRING DIAGRAM >

# AIR CONDITIONER CONTROL

# [MANUAL A/C (TYPE 2)]



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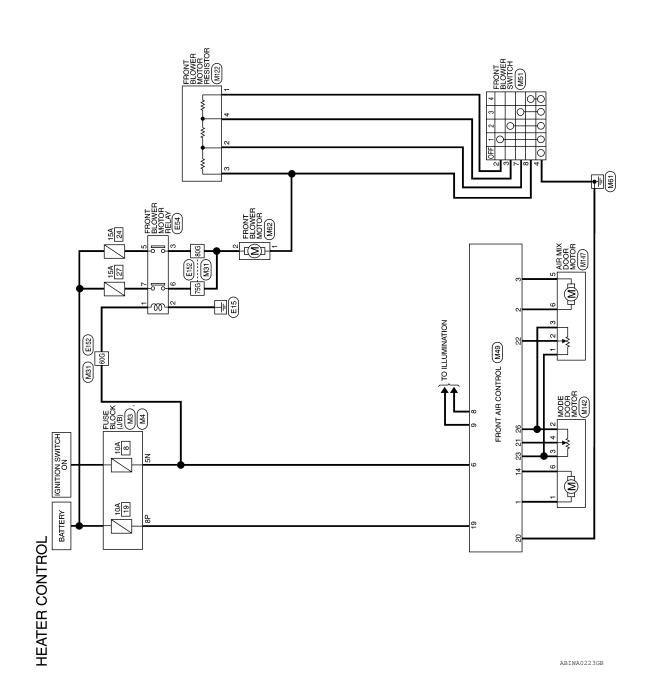
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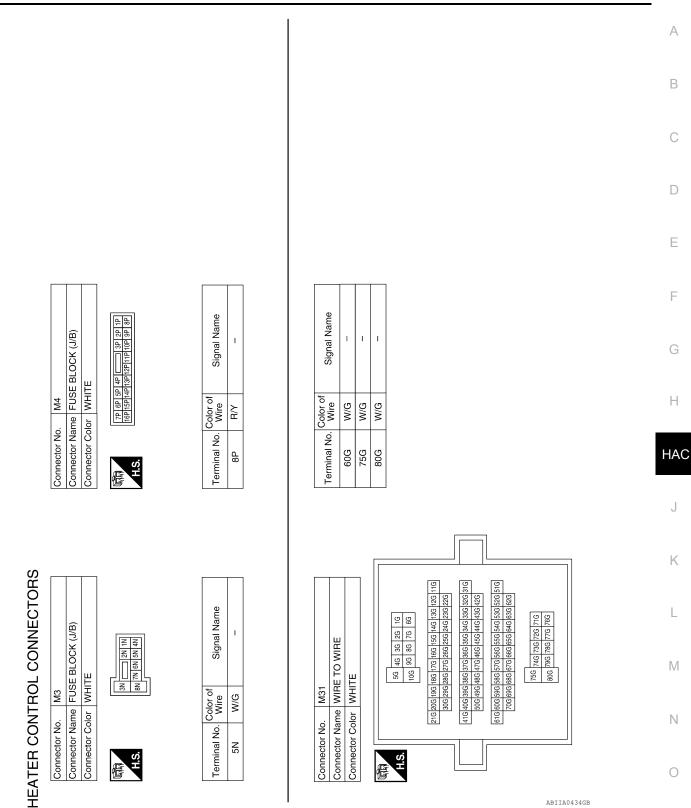
< WIRING DIAGRAM >

[MANUAL A/C (TYPE 2)]

Wiring Diagram - Heater Control

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< WIRING DIAGRAM >

# [MANUAL A/C (TYPE 2)]

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#### < WIRING DIAGRAM >

[MANUAL A/C (TYPE 2)]

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Signal Name	I	BATT	GND	MODE FEED BACK	BLEND FEED BACK	V REF ACTR (5V)	-	I	MODE (GND)	
Color of Wire	I	R/Y	в	>	SB	ŋ	I	I	٩	
Terminal No.	18	19	20	21	22	23	24	25	26	

Signal Name	IGN	I	1	I	I	1	I	I	MODE CCW	I	I	I	
Color of Wire	W/G	I	σ	ВВ	I	I	I	-	щ	-	I	I	
Terminal No. Color of Wire	9	7	8	6	10	11	12	13	14	15	16	17	

Connector No.	No		2	M49										
Connector Name FRONT AIR CONTROL (MANUAL WITH TYPE 2)	Na	ше	ш. —	μĂ	SZ	ĽĂ	AP L	°.≦	ÖΈ	ĻΓ	ЪĞ	200	-	
Connector Color BLACK	ပိ	<u>c</u>			9	×								
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	13	13 12 11 10 9 8 7 6 5	Ħ	10	6	8	7	9	5	4	3	2	-	
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	9 8 7 6 5 4 3 2	22 21 20 19 18 17 16	Signal Name
	1 10	4 23	Color of Wire
	13 12 11	25 2	₹0 Col
L	¢.	26	No.
ą		H.S.	Terminal No.

Signal Name	MODE CW	BLEND DR CW	BLEND DR CCW	Ι	I	
Color of Wire	ВВ	×	GR	Ι	I	
Terminal No. Wire	-	2	e	4	5	

Connector No.	M51
Connector Name	Connector Name FRONT BLOWER SWITCH
Connector Color WHITE	WHITE

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

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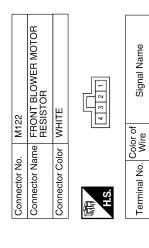
Signal Name	I	I	I	I	I	I	ļ
Color of Wire	I	ВВ	SB	В	I	Ι	Y
Ferminal No. Color of Wire	1	2	3	4	5	9	7

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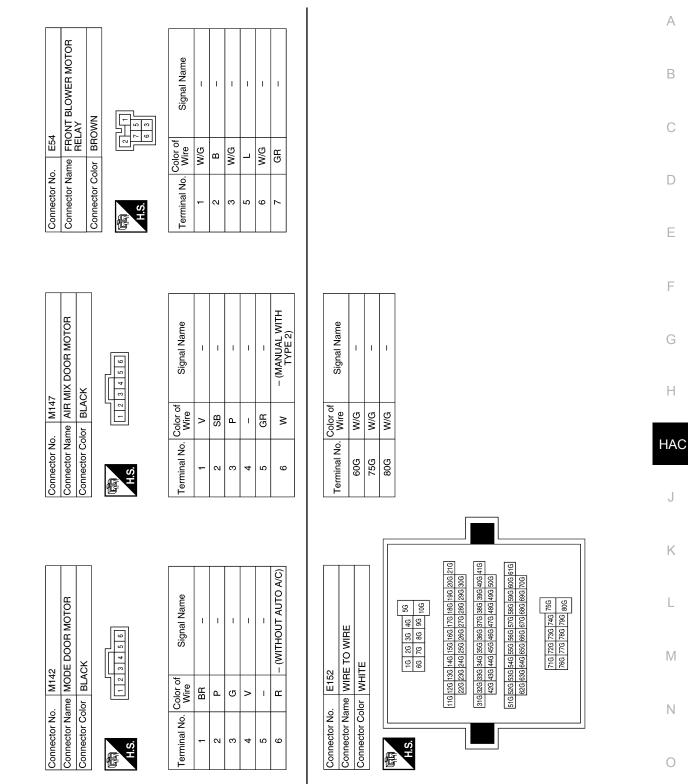


Signal Name	I	I
Color of Wire	L	W/G
Terminal No.	-	2

Signal Name	I	BATT	GND	MODE FEED BACK	BLEND FEED BACK	V REF ACTR (5V)	I	
Il No. Color of Wire	I	В/Ү	ш	>	SB	ŋ	I	
I No.								



# [MANUAL A/C (TYPE 2)]



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# SYMPTOM DIAGNOSIS MANUAL A/C IDENTIFICATION TABLE

# Application Table

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Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System [with variable blower control (VBC)]	
Manual A/C (Type 2)	Three Control Dial System [without variable blower con- trol (VBC)]	AWIIA122822

# < SYMPTOM DIAGNOSIS > AIR CONDITIONER CONTROL

# Symptom Matrix Chart

# SYMPTOM TABLE

Symptom	Reference Page		_
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	<u>HAC-196</u>	C
Air outlet does not change.	Ca ta Travilla Diagnacia Dracadura far Mada Daar Matar	110.0 170	
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-172</u>	Г
Discharge air temperature does not change.	Co to Trouble Diagnosis Droodure for Air Mir Door Mater	110.0 177	- L
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u>HAC-177</u>	
Intake door does not change.	Os te Traville Diamasia Drassdura fas latella Dasa Matar	110.0 400	E
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>HAC-180</u>	
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-182	
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-189	
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-214	
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-222	G
Noise	Go to Trouble Diagnosis Procedure for Noise.	<u>HAC-224</u>	

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**Component Function Check** 

SYMPTOM: Insufficient cooling

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE

1. Turn temperature control dial counterclockwise to maximum cold.

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-90, "Operational Check".

Does another symptom exist?

YES >> Refer to <u>HAC-142</u>, "Symptom Matrix Chart".

NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

**4.**CHECK DRIVE BELTS

Check compressor belt tension. Refer to <u>EM-14, "Checking Drive Belts"</u> (QR25DE) or <u>EM-129, "Checking</u> <u>Drive Belts"</u> (VQ40DE).

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Adjust or replace compressor belt. Refer to <u>EM-14</u>, "Adjustment" (QR25DE) or <u>EM-129</u>, "Adjustment" (VQ40DE).
- **5.**CHECK AIR MIX DOOR OPERATION

Check and verify air mix door mechanism for smooth operation.

Does air mix door operate correctly?

- YES >> GO TO 6.
- NO >> Repair or replace air mix door control linkage.

**6**.CHECK COOLING FAN MOTOR OPERATION

Check and verify cooling fan motor for smooth operation. Refer to EC-922, "Component Inspection".

Does cooling fan motor operate correctly?

YES >> GO TO 7.

NO >> Check cooling fan motor. Refer to <u>EC-366. "Diagnosis Procedure"</u> (QR25DE) or <u>EC-837. "Diagno-</u> <u>sis Procedure"</u> (VQ40DE).

# 7.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.

>> GO TO 8.

**8.**CHECK REFRIGERANT PURITY

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?

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< SYMPTOM DIAGNOSIS > [MANUAL A/C (TYPE 2)]	
YES >> GO TO 9. NO >> Check contaminated refrigerant. Refer to <u>HA-4, "Contaminated Refrigerant"</u> .	4
9. CHECK FOR EVAPORATOR FREEZE UP	1
Start engine and run A/C. Check for evaporator freeze up.	F
Does evaporator freeze up?	
YES >> Perform diagnostic work flow. Refer to <u>HAC-215, "Diagnostic Work Flow"</u> . NO >> GO TO 10.	(
10.CHECK REFRIGERANT PRESSURE	C
Check refrigerant pressure with manifold gauge connected. Refer to HAC-217. "Performance Chart".	
Is the inspection result normal?	
YES >> Perform diagnostic work flow. Refer to <u>HAC-215, "Diagnostic Work Flow"</u> . NO >> GO TO 11.	
11.CHECK AIR DUCTS	E
Check ducts for air leaks.	
Is the inspection result normal?	F
YES >> System OK.	
NO >> Repair air leaks.	
Diagnostic Work Flow	(

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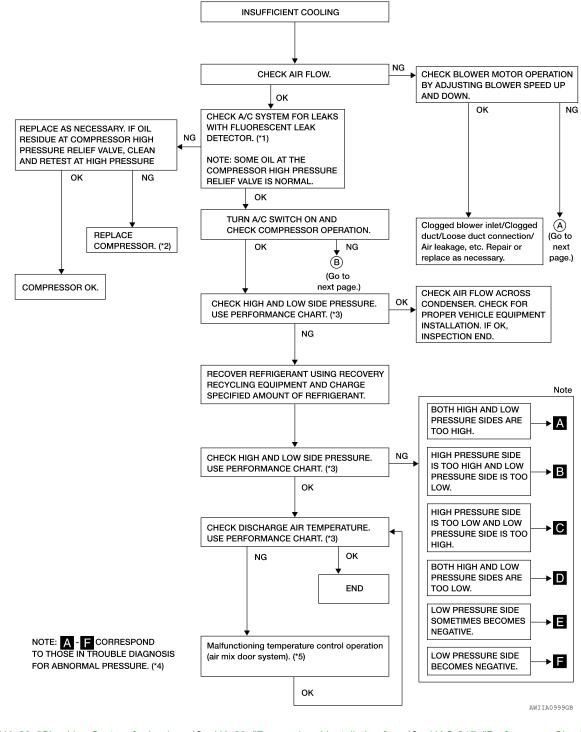
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#### < SYMPTOM DIAGNOSIS >



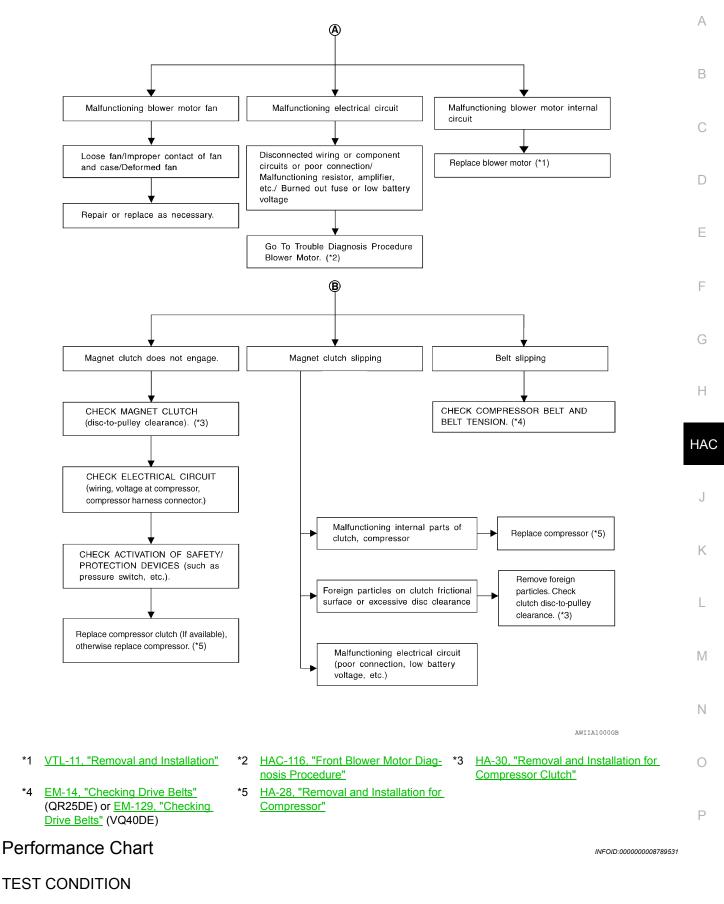
- Using the Fluorescent Dye Leak Detector"
- \*1 HA-20, "Checking System for Leaks \*2 HA-28, "Removal and Installation for \*3 HAC-217, "Performance Chart" Compressor"
- \*4 HAC-218, "Trouble Diagnoses for Abnormal Pressure"
- \*5 HAC-177, "Air Mix Door Motor Diag-

nosis Procedure"

**Revision: December 2012** 

#### < SYMPTOM DIAGNOSIS >

#### [MANUAL A/C (TYPE 2)]



Testing must be performed as follows:

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#### < SYMPTOM DIAGNOSIS >

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
Solution 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 ai	r) at blower assembly inlet	Discharge air temperature at center ventilator		
Relative humidity %	Air temperature °C (°F)	°C (°F)		
	20 (68)	5.3 - 6.5 (42 - 44)		
-	25 (77)	9.7 - 11.5 (49 - 53)		
50 - 60	30 (86)	13.8 - 16.3 (57 - 61)		
	35 (95)	18.0 - 21.2 (64 - 70)		
	40 (104)	22.2 - 25.7 (72 - 78)		
	20 (68)	6.5 - 7.7 (44 - 46)		
	25 (77)	11.5 - 13.3 (53 - 56)		
60 - 70	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)	Low-pressure (Suction side)	
Relative humidity %	Air temperature °C (°F)	kPa (kg/cm <sup>2</sup> , psi)	kPa (kg/cm <sup>2</sup> , psi)	
	20 (68)	680 - 840 (6.94 - 8.57, 98.6 - 121.8)	160 - 198 (1.63 - 2.02, 23.2 - 28.7)	
-	25 (77)	800 - 985 (8.16 - 10.05, 116.0 - 142.8)	198 - 245 (2.02 - 2.50, 28.7 - 35.5)	
50 - 70	30 (86)	940 - 1,150 (9.59 - 11.73, 136.3 - 166.8)	225 - 278 (2.30 - 2.84, 32.6 - 40.3)	
	35 (95)	1,160 - 1,410 (11.83 - 14.38, 168.2 - 204.5)	273 - 335 (2.78 - 3.42, 39.6 - 48.6)	
-	40 (104)	1,325 - 1,620 (13.52 - 16.52, 192.1 - 234.9)	325 - 398 (3.32 - 4.06, 47.1 - 57.7)	

# **Trouble Diagnoses for Abnormal Pressure**

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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).

#### < SYMPTOM DIAGNOSIS >

#### Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	Pressure is reduced soon af- ter water is splashed on con- denser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until speci- fied pressure is obtained.
	Air suction by cooling fan is in- sufficient.	<ul> <li>Insufficient condenser cooling performance</li> <li>↓</li> <li>1. Condenser fins are clogged.</li> <li>2. Improper fan rotation of cooling fan</li> </ul>	<ul> <li>Clean condenser.</li> <li>Check and repair cooling fan if necessary.</li> </ul>
h high- and low-pressure sides too high.	<ul> <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 con- denser (After compressor operation stops, high-pressure decreas- es too slowly.) ↓ Air in refrigeration cycle	Evacuate and recharge system.
<b>В В В</b> АСЗ59А	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cool- ing system.
	<ul> <li>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>Plates are sometimes cov-</li> </ul>	<ul> <li>Excessive liquid refrigerant on low-pressure side</li> <li>Excessive refrigerant dis- charge flow</li> <li>Expansion valve is open a lit- tle compared with the speci-</li> </ul>	Replace expansion valve.
	ered with frost.	fication. ↓ Improper expansion valve ad- justment	

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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts lo- cated between compressor and condenser are clogged or crushed.	<ul> <li>Check and repair or replace malfunctioning parts.</li> <li>Check oil for contamination.</li> </ul>
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High-pressure Side is Too Low and Low-pressure Side is Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action	(
High-pressure side is too low and low-pressure side is too high.	High- and low-pressure sides become equal soon after com- pressor operation stops.	Compressor pressure opera- tion is improper. ↓ Damaged inside compressor packings.	Replace compressor.	ŀ
	No temperature difference be- tween high- and low-pressure sides.	Compressor pressure opera- tion is improper. ↓ Damaged inside compressor packings.	Replace compressor.	

Revision: December 2012

#### < SYMPTOM DIAGNOSIS >

# Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action		
Determine the second se	<ul> <li>There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low.</li> <li>Liquid tank inlet and expan- sion valve are frosted.</li> </ul>	Liquid tank inside is slightly clogged.	<ul> <li>Replace liquid tank.</li> <li>Check oil for contamination.</li> </ul>		
	<ul> <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 oc- curs somewhere in high- pressure side.</li> </ul>	High-pressure pipe located be- tween liquid tank and expan- sion valve is clogged.	<ul> <li>Check and repair malfunc- tioning parts.</li> <li>Check oil for contamination.</li> </ul>		
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or compo- nents.	Check refrigerant system for leaks. Refer to <u>HA-22, "Check-</u> ing of Refrigerant Leaks".		
	There is a big temperature dif- ference between expansion valve inlet and outlet while the valve itself is frosted.	<ul> <li>Expansion valve closes a little compared with the specification.</li> <li>↓</li> <li>1. Improper expansion valve adjustment.</li> <li>2. Malfunctioning expansion valve.</li> <li>3. Outlet and inlet may be clogged.</li> </ul>	<ul> <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> <li>Check and repair malfunc- tioning parts.</li> <li>Check oil for contamination.</li> </ul>		
	Air flow volume is too low.	Evaporator is frozen.	<ul> <li>Check intake sensor circuit. Refer to <u>HAC-125</u>, "Intake <u>Sensor Diagnosis Proce-</u> <u>dure"</u>.</li> <li>Replace compressor.</li> <li>Repair evaporator fins.</li> <li>Replace evaporator.</li> <li>Refer to <u>HAC-115</u>, "Front <u>Blower Motor Component</u> <u>Function Check"</u>.</li> </ul>		

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Gauge indication Refrigerant cycle		Corrective action
Low-pressure side sometimes be- comes negative.	<ul> <li>Air conditioning system does not function and does not cy- clically cool the compart- ment air.</li> <li>The system constantly func- tions for a certain period of time after compressor is stopped and restarted.</li> </ul>	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expan- sion valve outlet and inlet. ↓ Water is mixed with refrigerant.	<ul> <li>Drain water from refrigerant or replace refrigerant.</li> <li>Replace liquid tank.</li> </ul>

Low-pressure Side Becomes Negative

#### < SYMPTOM DIAGNOSIS >

# [MANUAL A/C (TYPE 2)]

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
ow-pressure side becomes nega- ve.	Liquid tank or front/rear side of expansion valve's pipe is frost- ed or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	<ul> <li>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.</li> <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>

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# **INSUFFICIENT HEATING**

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# **Component Function Check**

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 >> GO TO 2.

NO >> Perform complete operational check. Refer to <u>HAC-159</u>, "Operational Check".

2.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

# **3.**CHECK ENGINE COOLING SYSTEM

- Check for proper engine coolant level. Refer to <u>CO-11, "System Inspection"</u> (QR25DE) or <u>CO-39, "System Inspection"</u> (VQ40DE).
- 2. Check hoses for leaks or kinks.
- 3. Check radiator cap. Refer to <u>CO-11, "System Inspection"</u> (QR25DE) or <u>CO-39, "System Inspection"</u> (VQ40DE).
- 4. Check for air in cooling system.

#### >> GO TO 4.

# **4.**CHECK AIR MIX DOOR OPERATION

Check the operation of the air mix door.

- Is the inspection result normal?
- YES >> GO TO 5.
- NO >> Check the air mix door motor circuit. Refer to <u>HAC-177, "Air Mix Door Motor Component Function</u> <u>Check"</u>.

# **5.**CHECK AIR DUCTS

Check for disconnected or leaking air ducts.

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair all disconnected or leaking air ducts.

#### **O**.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 >> Hot inlet hose and a warm outlet hose: GO TO 7.
- NO >> Both hoses warm: GO TO 8.

#### 7.CHECK ENGINE COOLANT SYSTEM

Check engine coolant temperature sensor. Refer to <u>EC-183, "Component Inspection"</u> (QR25DE) or <u>EC-650,</u> "Component Inspection" (VQ40DE).

Is the inspection result normal?

YES >> System OK.

NO >> Repair or replace as necessary. Retest.

# HAC-222

# < SYMPTOM DIAGNOSIS >

8.CHECK HEATER HOSES	Δ
Check heater hoses for proper installation.	$\cap$
Is the inspection result normal?	
YES >> System OK.	В
NO >> 1. Back flush heater core.	
2. Drain the water from the system.	
<ol> <li>Refill system with new engine coolant. Refer to <u>CO-12, "Changing Engine Coolant"</u> (QR25DE) or <u>CO-40, "Changing Engine Coolant"</u> (VQ40DE).</li> </ol>	С
4. GO TO 9 to retest.	
9. CHECK HEATER HOSE TEMPERATURES	
	D
<ol> <li>Start engine and warm it up to normal operating temperature.</li> <li>Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be</li> </ol>	
2. Touch both the iniet and outlet heater hoses. The iniet hose should be not and the outlet hose should be warm.	_
Is the inspection result normal?	E
YES >> System OK.	
NO >> Replace heater core. Refer to VTL-19, "Removal and Installation".	F
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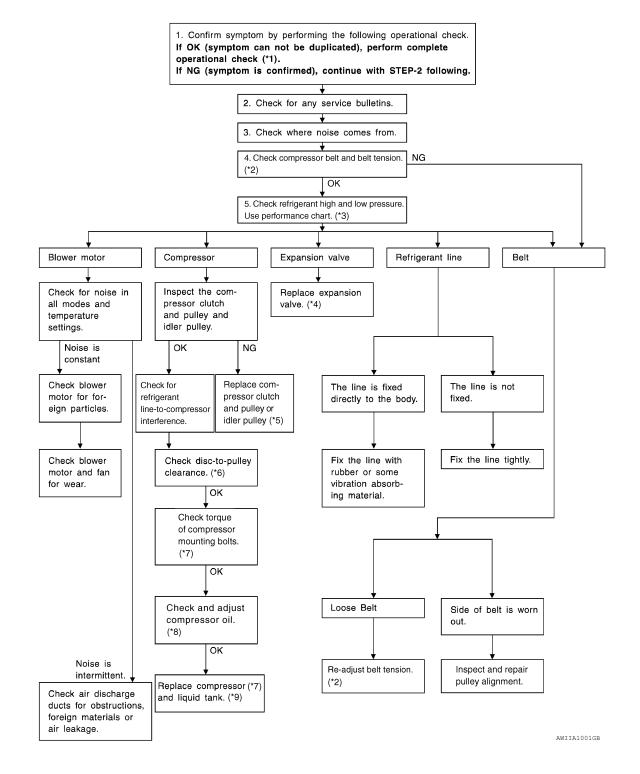
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# NOISE

# **Component Function Check**

SYMPTOM: Noise

**INSPECTION FLOW** 



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# NOISE

#### < SYMPTOM DIAGNOSIS >

*1	HAC-90, "Operational Check"	*2	EM-14. "Checking Drive Belts" (QR25DE) or EM-129. "Checking Drive Belts" (VQ40DE)	*3	HAC-217. "Performance Chart"	A
*4	HA-40, "Removal and Installation"	*5	HA-30, "Removal and Installation for Compressor Clutch"	*6	HA-30, "Removal and Installation for Compressor Clutch"	В
*7	HA-28, "Removal and Installation for Compressor"	*8	HA-18, "Maintenance of Oil Quantity in Compressor"	*9	HA-37, "Removal and Installation"	С

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# < PRECAUTION > PRECAUTION PRECAUTIONS

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

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)

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#### 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 <u>HA-4</u>, <u>"Contaminated Refrigerant"</u>. 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

# PRECAUTIONS

#### < PRECAUTION >

#### [MANUAL A/C (TYPE 2)]

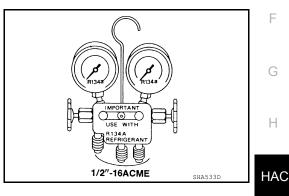
#### If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into A 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

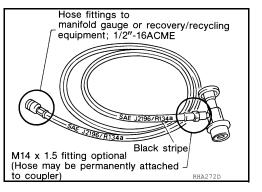
#### MANIFOLD GAUGE SET

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

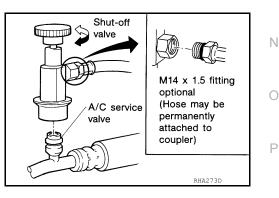
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shutoff devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



#### 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



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