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# **HEATER & AIR CONDITIONING CONTROL SYSTEM**

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# **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION >	[AUTOMATIC AIR CONDITIONER]
BASIC INSPECTION	
DIAGNOSIS AND REPAIR WORKFLOW	A
How to Perform Trouble Diagnosis For Quick And Acc	curate Repair INFOID:00000006164670
WORK FLOW	
1.LISTEN TO CUSTOMER COMPLAINT	C
Listen to customer complaint. Get detailed information about the cortom occurs.	nditions and environment when the symp-
>> GO TO 2	
2.CHECK FOR SERVICE BULLETINS	E
Check for any service bulletins.	
>> GO TO 3.	F
3. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK	
Verify the symptom with operational check. Refer to HAC-6, "Operat	ional Check".
Can a symptom be duplicated? YES >> GO TO 4	
NO >> GO TO 5	H
4.GO TO APPROPRIATE TROUBLE DIAGNOSIS	
Go to appropriate trouble diagnosis. Refer to HAC-82, "Symptom M	atrix Chart".
Can a symptom be duplicated? >> GO TO 5.	
5. PERFORM THE FRONT AIR CONTROL SELF-DIAGNOSIS	J
Perform front air control self-diagnosis. Refer to HAC-21, "Front Air Control self-diagnosis."	Control Self-Diagnosis".
>> If any diagnostic trouble codes set. Refer to HAC-21,	"Front Air Control Self-Diagnosis Code
<ul><li><u>Chart"</u>.</li><li>&gt;&gt; Confirm the repair by performing operational check. Ref</li></ul>	er to HAC-6, "Operational Check".
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# **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

[AUTOMATIC AIR CONDITIONER]

# INSPECTION AND ADJUSTMENT

# Operational Check

INFOID:0000000006164671

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 HAC-94, "Memory Function Check".

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 HAC-44, "Front Blower Motor Diagnosis Procedure".

If OK, continue with next check.

#### CHECKING DISCHARGE AIR

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

Mode door position is checked in the next step.

If NG, go to trouble diagnosis procedure for HAC-23, "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 (♥, ♥ ONLY)

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

If NG, go to trouble diagnosis procedure for <u>HAC-36</u>, "Intake <u>Door Motor Diagnosis Procedure"</u>.

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 ( ) is not allowed in DEF ( ) D/F ( ) or FOOT ( ).

#### CHECKING TEMPERATURE DECREASE

- 1. Rotate temperature control dial (drive or passenger) counterclockwise until 18°C (60°F) is displayed.
- 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-83</u>, <u>"Component Function Check"</u>. If air mix door motor appears to be malfunctioning, go to <u>HAC-28</u>, <u>"Air Mix Door Motor (Driver) Component Function Check"</u>.

# **INSPECTION AND ADJUSTMENT**

#### < BASIC INSPECTION >

[AUTOMATIC AIR CONDITIONER]

If OK, continue the check.

# CHECKING TEMPERATURE INCREASE

- 1. Rotate temperature control dial clockwise (drive or passenger) until 32°C (90°F) is displayed.
- 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-91</u>, <u>"Component Function Check"</u>. If air mix door motor appears to be malfunctioning, go to <u>HAC-28</u>, "Air Mix Door <u>Motor (Driver) Component Function Check"</u>.

If OK, continue with next check.

#### CHECK A/C SWITCH

- 1. Press A/C switch when AUTO switch is ON, or in manual mode.
- 2. 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 <u>HAC-49</u>, "<u>Magnet Clutch Diagnosis Procedure</u>". If OK, continue with next check.

#### CHECKING AUTO MODE

- Press AUTO switch.
- 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 <u>HAC-67</u>, "Front Air Control Power and Ground Diagnosis <u>Procedure"</u>, then if necessary, trouble diagnosis procedure for <u>HAC-49</u>, "Magnet Clutch Diagnosis <u>Procedure"</u>.

If all operational checks are OK (symptom cannot be duplicated), go to malfunction Simulation Tests in <a href="HAC-5">HAC-5</a>, "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 <a href="HAC-82">HAC-82</a>, "Symptom Matrix Chart", and perform applicable trouble diagnosis procedures.

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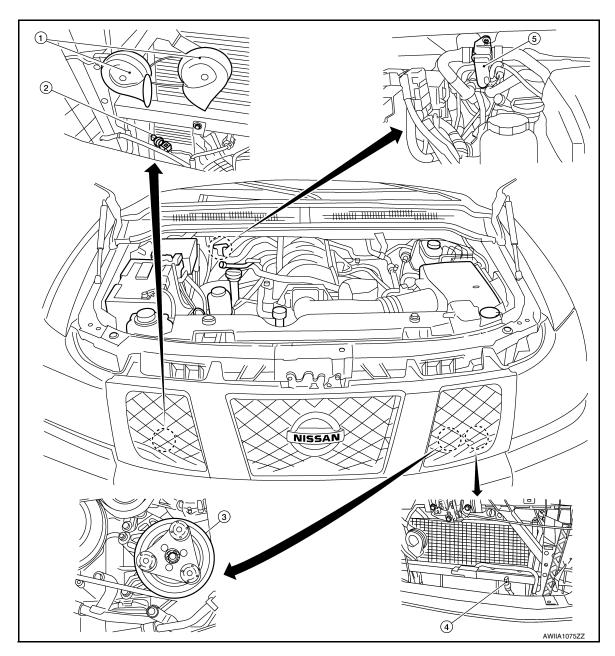
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# SYSTEM DESCRIPTION

# **FUNCTION INFORMATION**

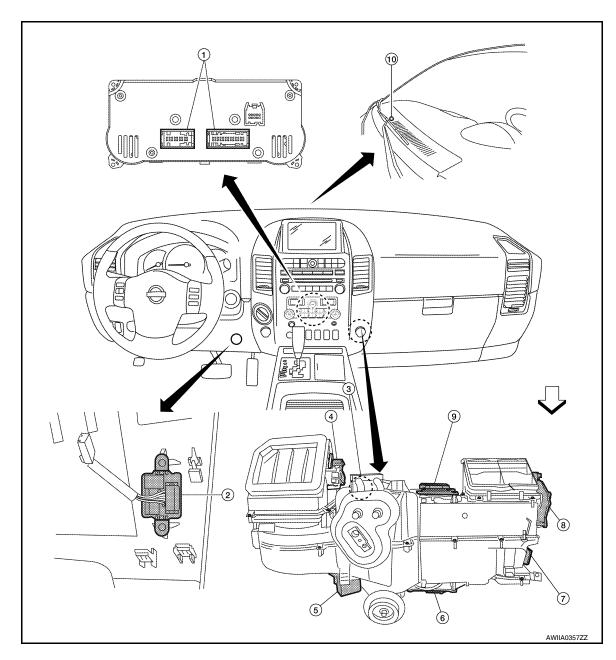
**Component Part Location** 

# **ENGINE COMPARTMENT**



- 1. Horn (view with grille removed)
- 4. Ambient sensor E1 (view with grille removed)
- . Refrigerant pressure sensor E48
- . Water valve F68
- 3. A/C compressor F3

# PASSENGER COMPARTMENT



- 1. Front air control M49, M50
- 4. Intake door motor M58
- 7. Mode door motor M142
- 10. Optical sensor M302
- 2. In-vehicle sensor M32
- 5. Variable blower control M122
- 8. Defroster door motor M144

- 3. Intake sensor M146
- 6. Air mix door motor (Passenger) M143
- 9. Air mix door motor (driver) M147

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# **FUNCTION INFORMATION**

# < SYSTEM DESCRIPTION >

# [AUTOMATIC AIR CONDITIONER]

# Symptom Table

INFOID:0000000006164673

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	<u>HAC-67</u>
A/C system cannot be controlled.	Go to Self-diagnosis Function.	<u>HAC-21</u>
Air outlet does not change.	Co to Trouble Diagnosis Precedure for Made Deer Meter	HAC 22
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-23</u>
Discharge air temperature does not change.	Co to Trouble Diagnosis Precedure for Air Mix Deer Meter	HAC-28
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u> </u>
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	HAC-36
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for make Door Wotor.	<u>HAC-30</u>
Defroster door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Defroster Door Motor.	HAC-39
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-44
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-49
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	<u>HAC-83</u>
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	<u>HAC-91</u>
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-93
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	HAC-21
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	<u>HAC-94</u>

# REFRIGERATION SYSTEM

# < SYSTEM DESCRIPTION >

[AUTOMATIC AIR CONDITIONER]

# REFRIGERATION SYSTEM

# Refrigerant Cycle

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# 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

#### INFOID:0000000006164675

# 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/cm², 398 psi), or below about 120 kPa (1.22 kg/cm², 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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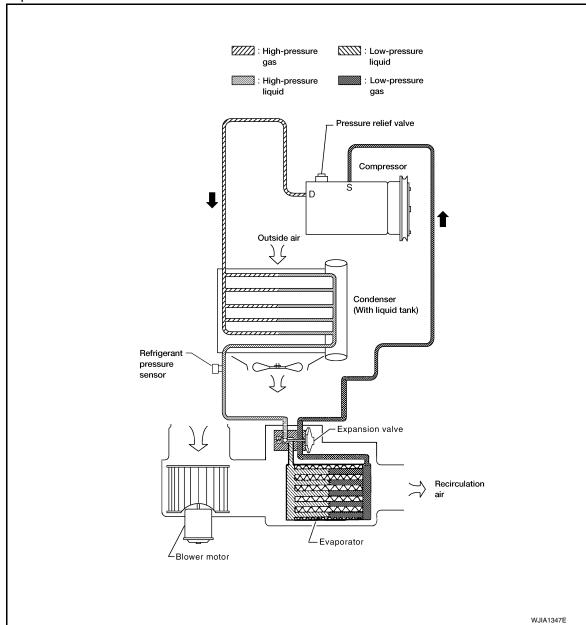
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cm<sup>2</sup>, 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



# **AUTOMATIC AIR CONDITIONER SYSTEM**

< SYSTEM DESCRIPTION >

[AUTOMATIC AIR CONDITIONER]

# **AUTOMATIC AIR CONDITIONER SYSTEM**

# Control System Diagram

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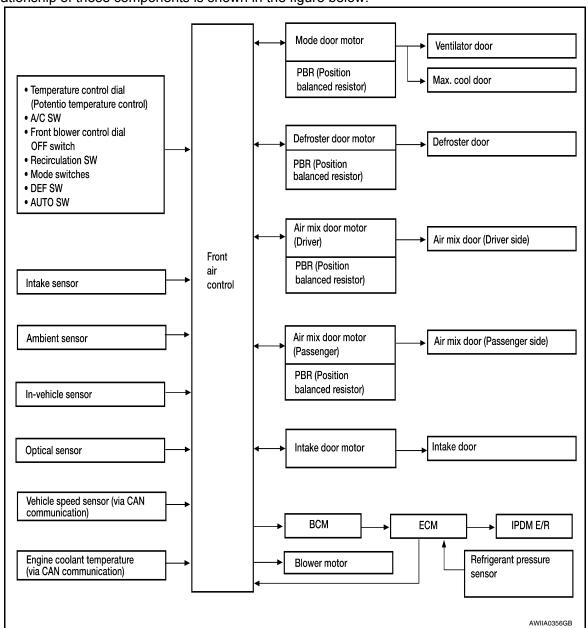
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# **CONTROL SYSTEM**

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

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CONTROL OPERATION

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# Front air control OFF **- |** □ A/C □ **₩** DUAL - **»**

#### **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.

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· 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 ( ) SWITCH

- When REC switch is ON, REC switch indicator turns ON, and air inlet is set to REC.
- · When REC switch is turned OFF, or when compressor is turned from ON to OFF, REC switch is automatically turned OFF. REC mode can be re-entered by pressing REC switch again.
- REC switch is not operated when DEF switch is turned ON, 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 (CREW CAB)

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

#### **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.)

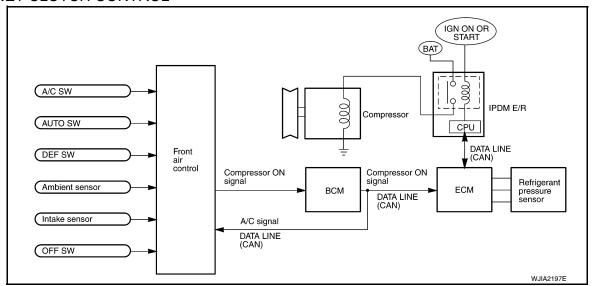
#### MODE SWITCHES

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.

# 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

Mode door position	Air outlet/distribution						
	Vent	Foot	Defroster				
*;	95%	5%	_				
**	60%	40%	_				
ų,	_	70%	30%				
m;	_	60%	40%				
<b>(III)</b>	_	10%	90%				

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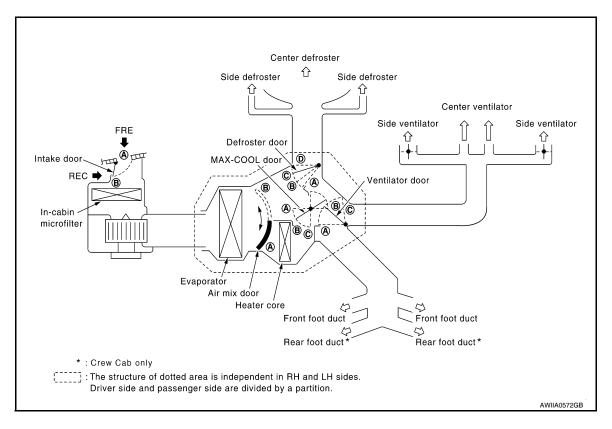
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# Switches And Their Control Function

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Position		MOD	E SW		DEF	SW	REC	sw	Temperat	ture cor	ntrol dial	
or	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF			\	SW
switch	<b>→</b> •	. * *		<b>W</b> •	_	FRONT		<b>₽</b>	(	AUTO	2)	OFF
		**	+,,~	+,~	<b>→</b>	0		0	COLD	~	нот	OFF III
Ventilator door	A	lacksquare	©	©	©		_	_				©
MAX-COOL door	<b>(A)</b>	B	B	B	©		_	_				B
Defroster door	<b>(D)</b>	<b>(D)</b>	<b>O</b> or <b>©</b>	B	A				©			
Intake door		_	_		B		A B —		B			
Air mix door		_	_				— (A) AUTO (B)					
												_
											AWI	IIA0359GB

# **DIAGNOSIS SYSTEM (HVAC)**

< SYSTEM DESCRIPTION >

# [AUTOMATIC AIR CONDITIONER]

# DIAGNOSIS SYSTEM (HVAC)

# CONSULT-III Function (HVAC)

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CONSULT-III 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.
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.

# **SELF-DIAGNOSIS**

Display Item List

DTC	Description	Reference page
B2573	Battery voltage out of range	CHG-4, "Work Flow"
B2578	In-vehicle sensor circuit out of range (low)	HAC-59. "In-Vehicle Sensor Diagnosis Procedure"
B2579	In-vehicle sensor circuit out of range (high)	HAC-59. III-Verlicle Serisor Diagnosis Procedure
B257B	Ambient sensor circuit short	HAC-57, "Ambient Sensor Component Inspection"
B257C	Ambient sensor circuit open	TIAC-57, Ambient Sensor Component inspection
B257F	Optical sensor (Driver) circuit open or short	HAC-62, "Optical Sensor Diagnosis Procedure".
B2580	Optical sensor (Passenger) circuit open or short	HAC-02, Optical Serisor Diagnosis Procedure.
B2581	Intake sensor circuit short	HAC-65, "Intake Sensor Component Inspection"
B2582	Intake sensor circuit open	11/10-00, Intake Sensor Component Inspection
B2587	Stuck button	VTL-8, "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.
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.
AMB TEMP SEN	"°C"	Displays ambient sensor signal.
EVAP TEMP SEN	"°C"	Displays intake sensor signal.
INCAR TMP SEN	"°C"	Displays in-vehicle sensor signal.
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"	Displays air mix door motor (passenger) feedback signal.
DEF FDBCK	"V"	Displays defroster door motor feedback signal.
RECIRC	"ON/OFF"	Displays recirculation switch signal.
DEFROST	"ON/OFF"	Displays defroster switch signal.
AUTO	"ON/OFF"	Displays AUTO switch signal.
A/C	"ON/OFF"	Displays A/C switch signal.

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# **DIAGNOSIS SYSTEM (HVAC)**

# < SYSTEM DESCRIPTION >

# [AUTOMATIC AIR CONDITIONER]

Monitor item	Value	Contents
L TEMP UP	"ON/OFF"	Displays driver side temperature control dial (temp increase) signal.
L TEMP DOWN	"ON/OFF"	Displays driver side temperature control dial (temp decrease) signal.
R TEMP UP	"ON/OFF"	Displays passenger temperature control dial (temp increase) signal.
R TEMP DOWN	"ON/OFF"	Displays passenger temperature control dial (temp decrease) signal.
RR DEFOG	"ON/OFF"	Displays rear defroster request signal.
FAN UP	"ON/OFF"	Displays blower motor (blower speed increase) signal.
FAN DOWN	"ON/OFF"	Displays blower motor (blower speed decrease) signal.
MODE SELECT	"DTNT"	Displays selected mode position.
DUAL MODE	"ON/OFF"	Displays dual mode status.
MODE D STATUS	"V"	Displays mode d status signal.

# [AUTOMATIC AIR CONDITIONER]

# **DIAGNOSIS SYSTEM (BCM)**

# CONSULT-III Function (BCM - COMMON ITEM)

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# APPLICATION ITEM

CONSULT-III 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	HEADLAMP			×	×	×		
Wiper and washer	WIPER			×	×	×		
Turn signal and hazard warning lamps	zard warning lamps FLASHER			×	×			
Air conditioner	AIR CONDITIONER			×				
Combination switch	COMB SW			×				
BCM	BCM	×	×			×	×	×
Immobilizer	IMMU		×	×	×			
Interior room lamp battery saver	BATTERY SAVER			×	×	×		
Vehicle security system	THEFT ALM			×	×	×		
RAP system	RETAINED PWR			×	×	×		
Signal buffer system	SIGNAL BUFFER			×	×			
TPMS	AIR PRESSURE MONITOR		×	×	×	×		
Panic alarm system	PANIC ALARM				×			

CONSULT-III Function (BCM - AIR CONDITIONER)

INFOID:0000000006625982

**DATA MONITOR** 

Revision: August 2010 HAC-19 2011 Titan

# **DIAGNOSIS SYSTEM (BCM)**

# < SYSTEM DESCRIPTION >

# [AUTOMATIC AIR CONDITIONER]

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**

# [AUTOMATIC AIR CONDITIONER]

# **SELF-DIAGNOSIS FUNCTION**

# Front Air Control Self-Diagnosis

#### INFOID:0000000006164683

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

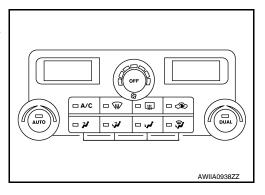
The self-diagnosis function is built into the front air control to quickly locate the cause of malfunctions.

# 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 <a href="HAC-21">HAC-21</a>, "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 ( ) to enter self diagnostic mode.
- 4. Turn ignition switch OFF to exit out of self-diagnostic mode.



INFOID:0000000006164684

# Front Air Control Self-Diagnosis Code Chart

# SELF-DIAGNOSTIC CODE CHART

Code No.	Reference page				
03	Battery voltage out of range	CHG-4, "Work Flow"			
30	In-vehicle sensor circuit out of range (low)				
31	In-vehicle sensor circuit out of range (high)	HAC-59, "In-Vehicle Sensor Diagnosis Procedure"			
40	Ambient sensor circuit short	LIAC EC "Ambient Concer Diagnosis Dreed are"			
41	Ambient sensor circuit open	HAC-56, "Ambient Sensor Diagnosis Procedure"			
50	Optical sensor (Driver) circuit open or short	HAC-62, "Optical Sensor Diagnosis Procedure"			
52	Optical sensor (Passenger) circuit open or short				
56	Intake sensor circuit short	LIAC CA "Intoka Canaca Diagnosis Dracadius"			
57	Intake sensor circuit open	HAC-64, "Intake Sensor Diagnosis Procedure"			
80	CAN bus fault	LAN-14, "Trouble Diagnosis Flow Chart"			
90	Stuck button	VTL-8, "Removal and Installation"			

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# DTC/CIRCUIT DIAGNOSIS

# MODE DOOR MOTOR

# System Description

#### INFOID:0000000006164685

#### SYSTEM DESCRIPTION

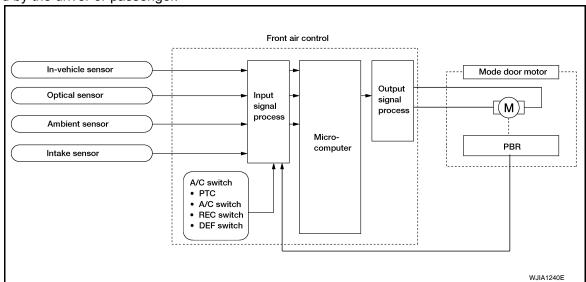
# Component Parts

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**

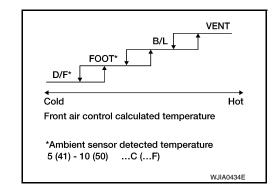
The mode door position (vent, B/L, foot, D/F, and defrost) is set by the front air control by means of the mode door motor. When a mode door position is selected on the front air control, voltage is applied to one circuit of the mode door motor while ground is applied to the other circuit, causing the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

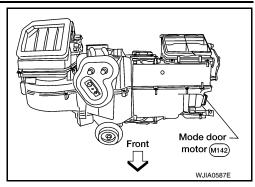


# MODE DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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.



Mode Door Motor Component Function Check

INFOID:0000000006164686

# INSPECTION FLOW

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

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

#### NOTE:

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

# Is the inspection result normal?

YFS >> Inspection End.

>> Go to diagnosis procedure. Refer to HAC-23, "Mode Door Motor Diagnosis Procedure". NO

# Mode Door Motor Diagnosis Procedure

INFOID:0000000006708574

Regarding Wiring Diagram information, refer to HAC-71, "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

- Turn ignition switch ON.
- Using CONSULT-III, check "MODE FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to HAC-17. "CONSULT-III Function (HVAC)".
- 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 ( ), 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-19, "Removal and Installation".

NO >> GO TO 2.

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

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# **MODE DOOR MOTOR**

# < DTC/CIRCUIT DIAGNOSIS >

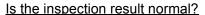
# [AUTOMATIC AIR CONDITIONER]

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M49 (A) and the mode door motor harness connector M142 (B).
- 3. Check continuity between front air control harness connector M49 (A) terminals 19, 20 and the mode door motor harness connector M142 (B) terminals 5, 6.

А		В	Continuity	
Connector	Connector Terminal		Terminal	Continuity
M49	19	M142	5	Yes
10149	20	IVI 142	6	ies

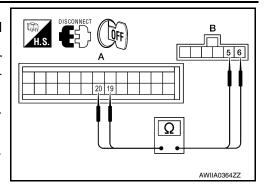
 Check continuity between front air control harness connector M49 terminals 19, 20 and ground.

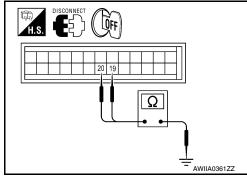
Connector	Terminal	_	Continuity	
M49	19	Ground	No	
WHO	20	Ground	140	



YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

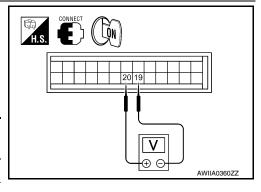




# 3.CHECK FRONT AIR CONTROL FOR MODE DOOR MOTOR POWER AND GROUND

- Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Press the mode switch to the D/F ( ) mode.
- 4. Check voltage between front air control harness connector M49 terminal 19 and terminal 20 while pressing the mode switch to the VENT (\*\*), and then the B/L (\*\*) mode.

Connector	Terminals		Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	Voltage (Approx.)	
M49	19	20	D/F ( ) mode to VENT ( ) mode	Battery voltage	
10149	20	19	VENT ( ) mode to B/L ( ) mode	Battery voltage	



# Is the inspection result normal?

YES >> GO TO 4.

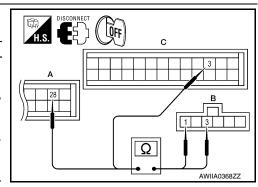
NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connectors.
- Check continuity between front air control harness connector M49 (C) terminal 3, and M50 (A) terminal 28 and the mode door motor harness connector M142 (B) terminals 1, 3.

A and	С	В	Continuity	
Connector	Connector Terminal		Terminal	Continuity
M49 (C)	3	M142	3	Yes
M50 (A)	28	IVITAZ	1	100

4. Check continuity between front air control harness connector M49 (C) terminal 3, M50 (A) terminal 28 and ground.



# < DTC/CIRCUIT DIAGNOSIS >

Connector	Terminal	_	Continuity	
M49 (C)	3	Ground	No	
M50 (A)	28	Ground	NO	

# Is the inspection result normal?

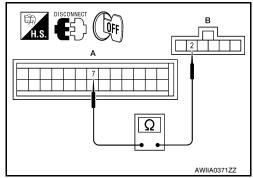
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

 Check continuity between front air control harness connector M49 (A) terminal 7 and mode door motor harness connector M142 (B) terminal 2.

А		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M49	7	M142	2	Yes



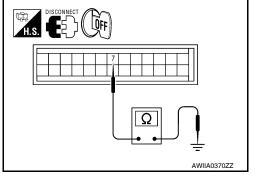
Check continuity between front air control harness connector M49 terminal 7 and ground.

Connector	Terminal	_	Continuity
M49	7	Ground	No

# Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness as necessary.

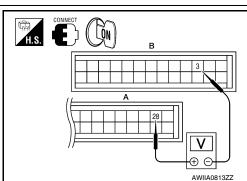


# 6.CHECK FRONT AIR CONTROL FOR 5 VOLT REFERENCE (VREF), VREF RETURN, AND FEEDBACK SIGNAL

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M49 (B) terminal 3, and M50 (A) terminal 28.

Α		В		
Connector	Terminals	Connector	Terminals	Voltage (Approx.)
Connector	(+)	Connector	(-)	voltage (Approx.)
M50	28	M49	3	5 Volts

 Check voltage between front air control harness connector M49 terminal 7 and ground.



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# MODE DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

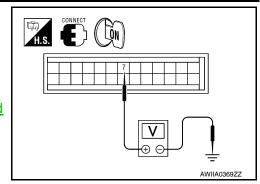
# [AUTOMATIC AIR CONDITIONER]

Connector	Terminal	_	Voltage (Approx.)
M49	7	Ground	0 Volts

# Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and Installation".



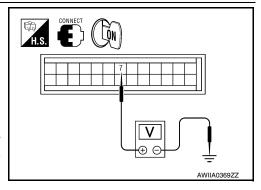
# 7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- 1. Reconnect the mode door motor harness connector M142.
- 2. Check voltage between front air control harness connector M49 terminal 7 and ground.

Connector	Terminal	_	Voltage (Approx.)
M49	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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".
- NO >> Replace the mode door motor. Refer to <u>VTL-19</u>, "Removal and Installation".



# AIR MIX DOOR MOTOR

# System Description

#### INFOID:0000000006164688

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#### SYSTEM DESCRIPTION

#### 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:

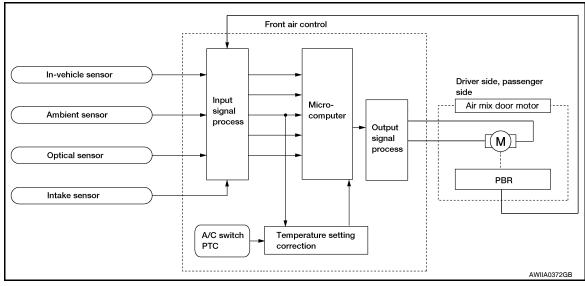
- Front air control
- Air mix door motors (driver, passenger)
- PBR (built-into air mix door motors)
- · In-vehicle sensor
- · Ambient sensor
- · Optical sensor
- · Intake sensor

#### 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



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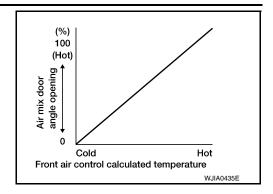
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# [AUTOMATIC AIR CONDITIONER]

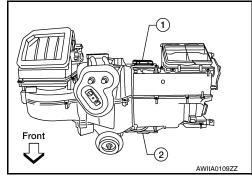
Air Mix Door Control Specification



#### 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:0000000006164689

# 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 HAC-28, "Air Mix Door Motor (Driver) Diagnosis Procedure".

# Air Mix Door Motor (Driver) Diagnosis Procedure

INFOID:0000000006708575

Regarding Wiring Diagram information, refer to HAC-71, "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 VOLTAGE

1. Turn ignition switch ON.

# [AUTOMATIC AIR CONDITIONER]

- Using CONSULT-III, check "DVR MIX FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to HAC-17, "CONSULT-III Function (HVAC)".
- 3. 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
DVR MIX FDBCK	Rotate temperature control dial (driver) between 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.

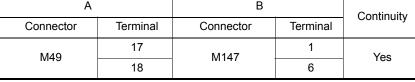
> • Inspect air mix door (driver) for mechanical failure and repair if necessary. If air mix door (driver) is OK, refer to HAC-83, "Component Function Check" for insufficient cooling or HAC-91, "Component Function Check" for insufficient heating.

NO >> GO TO 2.

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M49 (A) and the air mix door motor (driver) harness connector M147 (B).
- 3. Check continuity between front air control harness connector M49 (A) terminals 17, 18 and the air mix door motor (driver) harness connector M147 (B) terminals 1, 6.

А		В	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M49	17	M147	Yes	
17149	18	101147	6	165



Check continuity between front air control harness connector M49 terminals 17, 18 and ground.

Connector	Terminal	_	Continuity	
M49	17	Ground	No	
M49	18	Ground		

# Is the inspection result normal?

YES >> GO TO 3.

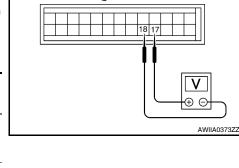
NO >> Repair or replace harness as necessary.

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# $3. {\sf CHECK}$ FRONT AIR CONTROL FOR AIR MIX DOOR MOTOR (DRIVER) POWER AND GROUND

- Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Rotate temperature control dial (driver) to 32°C (90°F).
- 4. Check voltage between front air control harness connector M49 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		
M49	17	18	While rotating temperature control dial (driver) from 32°C (90°F) to 18°C (60°F)	Battery voltage	
IVI <del>4</del> 3	18	17	While rotating temperature control dial (driver) from 18°C (60°F) to 32°C (90°F)	Battery voltage	



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Is the inspection result normal?

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# < DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 4.

NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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 M49 (C) terminal 3, connector M50 (A) terminal 28 and air mix door motor (driver) harness connector M147 (B) terminals 3, 2.

A and C		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M49 (C)	3	M147	2	Yes
M50 (A)	28	IVIT <del>4</del> 7	3	163

4. Check continuity between front air control harness connector M49 (C) terminal 3, M50 (A) terminal 28 and ground.

Connector	Terminal	_	Continuity	
M49 (C)	3	Ground	No	
M50 (A)	28	Giodila		

## Is the inspection result normal?

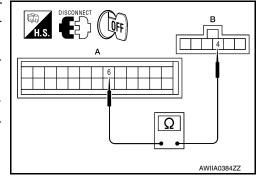
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

 Check continuity between front air control harness connector M49 (A) terminal 6 and air mix door motor (driver) harness connector M147 (B) terminal 4.

А	A		В	
Connector	Terminal	Connector Terminal		Continuity
M49	6	M147	4	Yes



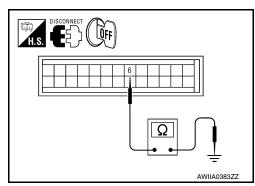
Check continuity between front air control harness connector M49 terminal 6 and ground.

Connector	Terminal	_	Continuity
M49	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

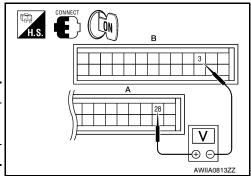
# AIR MIX DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M49 (B) terminal 3, and M50 (A) terminal 28.

Α		В		
Connector	Terminals	Connector	Terminals	Voltage (Approx.)
Connector	(+)	Connector	(-)	voltage (Approx.)
M50	28	M49	3	5 Volts



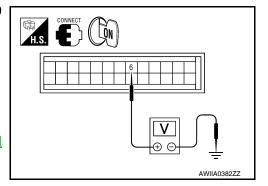
4. Check voltage between front air control harness connector M49 terminal 6 and ground.

Connector	Terminal	_	Voltage (Approx.)
M49	6	Ground	0 Volts

# Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and <u>Installation"</u>.



# 7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- Reconnect the air mix door motor (driver) harness connector M147.
- Check voltage between front air control harness connector M49 terminal 6 and ground.

Connector	Terminal	_	Voltage (Approx.)
M49	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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".

NO >> Replace air mix door motor (driver). Refer to VTL-20, "Removal and Installation".

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# Air Mix Door Motor (Passenger) Component Function Check

INSPECTION FLOW

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

- 1. Turn the temperature control dial (passenger) clockwise until 32°C (90°F) is displayed.
- 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 (passenger) counterclockwise until 18°C (60°F) is displayed.
- 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-32, "Air Mix Door Motor (Passenger) Diagnosis Procedure"</u>.

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# Air Mix Door Motor (Passenger) Diagnosis Procedure

INFOID:0000000006708576

Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

#### SYMPTOM:

- · Discharge air temperature does not change.
- · 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**
- Turn ignition switch ON.
- Using CONSULT-III, check "PAS MIX FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to HAC-17, "CONSULT-III Function (HVAC)".
- 3. 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) between 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 HAC-83, "Component Function Check" for insufficient cooling or HAC-91, "Component Function Check" for insufficient heating.

NO >> GO TO 2.

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

- Turn ignition switch OFF.
- Disconnect the front air control harness connector M49 (A) and the air mix door motor (passenger) harness connector M143 (B).
- Check continuity between front air control harness connector M49 (A) terminals 2, 14 and the air mix door motor (passenger) harness connector M143 (B) terminals 1, 6.

А		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M49	14	M143	1	Yes
IVI <del>4</del> 9	2	101143	6	163

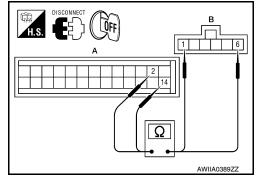
Check continuity between front air control harness connector M49 terminals 2, 14 and ground.

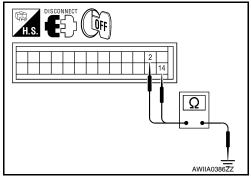
Connector	Terminal	— Continuity	
M49	14	Ground	No
	2	Ground	INO

# Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.





3.check front air control for air mix door motor (passenger) power and ground

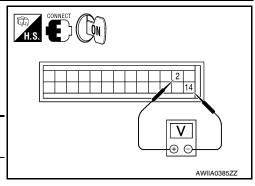
# AIR MIX DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

- Reconnect front air control harness connector.
- Turn ignition switch ON.
- 3. Rotate temperature control dial (passenger) to 32°C (90°F).
- 4. Check voltage between front air control harness connector M49 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.)	
Connector	(+)	(-)	Condition	Voltage (Approx.)	
M49	2	14	While rotating temperature control dial (passenger) from 32°C (90°F) to 18°C (60°F)	Battery voltage	
		2	While rotating temperature control dial (passenger) from 18°C (60°F) to 32°C (90°F)	Battery voltage	



#### Is the inspection result normal?

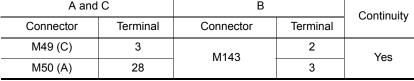
YES >> GO TO 4.

NO >> Replace front air control Refer to VTL-8, "Removal and Installation".

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

- Turn ignition switch OFF.
- Disconnect the front air control harness connectors. 2.
- Check continuity between front air control harness connector M49 (C) terminal 3 and M50 (A) terminal 28 and air mix door motor (passenger) harness connector M143 (B) terminals 2, 3.

A and	С	В		
Connector	Terminal	Connector Terminal		Continuity
M49 (C)	3	M143	2	Yes
M50 (A)	28	101143	3	ies



4. Check continuity between front air control harness connector M49 (C) terminal 3, M50 (A) terminal 28 and ground.

Connector	Terminal	— Continuit	
M49 (C)	3	Ground	No
M50 (A)	28	Glound	NO

#### Is the inspection result normal?

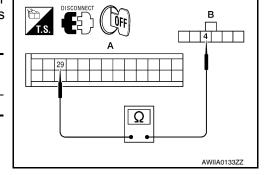
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

Check continuity between front air control harness connector M50 (A) terminal 29 and air mix door motor (passenger) harness connector M143 (B) terminal 4.

А		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M50	29	M143	4	Yes



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**HAC-33** 2011 Titan Revision: August 2010

# AIR MIX DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

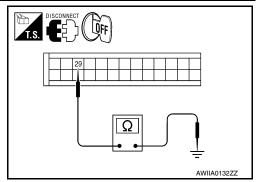
Check continuity between front air control harness connector M50 terminal 29 and ground.

Connector	Terminal	_	Continuity
M50	29	Ground	No

# Is the inspection result normal?

YES >> GO TO 6.

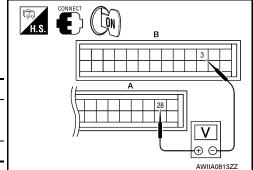
NO >> Repair or replace harness as necessary.



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

- Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M49 (B) terminal 3, and M50 (A) terminal 28.

Α		В		
Connector	Terminals	Connector -	Terminals	Voltage (Approx.)
	(+)		(-)	
M50	28	M49	3	5 Volts



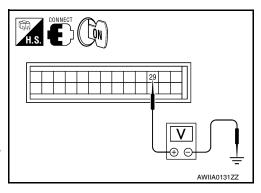
 Check voltage between front air control harness connector M50 terminal 29 and ground.

Connector	Terminal	_	Voltage (Approx.)
M50	29	Ground	0 Volts

# Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and Installation".



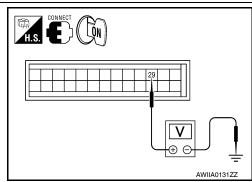
# 7. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- Reconnect the air mix door motor (passenger) harness connector M143.
- 2. Check voltage between front air control harness connector M50 terminal 29 and ground.

Connector	Terminal	_	Voltage (Approx.)
M50	29	Ground	0.2 to 4.8 Volts

# Is the inspection result normal?

YES >> Inspect air mix door (passenger) for binding or mechanical failure. If air mix door (passenger) moves freely, replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".



NO >> Replace the air mix door motor (passenger). Refer to <a href="VTL-20">VTL-20</a>, "Removal and Installation".

# INTAKE DOOR MOTOR

# System Description

#### INFOID:0000000006164693

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#### SYSTEM DESCRIPTION

#### SYMPTOM:

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

# SYSTEM DESCRIPTION

#### Component Parts

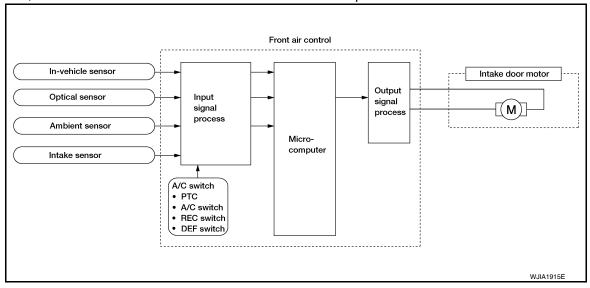
Intake door control system components are:

- Front air control
- Intake door motor (PRB built into the intake door motor)
- · In-vehicle sensor
- · Ambient sensor
- Optical sensor
- · Intake sensor

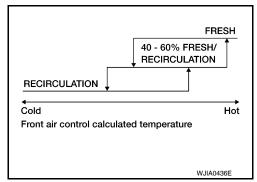
#### **System Operation**

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.

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.



Intake Door Control Specification



COMPONENT DESCRIPTION

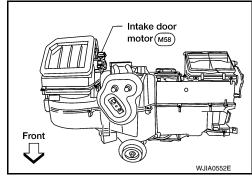
# INTAKE DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

Intake door motor

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



# Intake Door Motor Component Function Check

INFOID:0000000006164694

# INSPECTION FLOW

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

- Press the mode switch to vent mode(\*).
- 2. Press REC ( ) switch. The REC ( ) indicator should illuminate.
- 3. Press REC ( ) switch again. The REC ( ) indicator should go out.
- 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 <a href="HAC-36">HAC-36</a>, "Intake Door Motor Diagnosis Procedure".

# Intake Door Motor Diagnosis Procedure

INFOID:0000000006708577

Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

#### SYMPTOM:

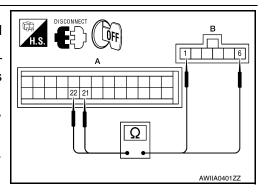
- Intake door does not change.
- · Intake door motor does not operate normally.

# DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

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

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M49 (A) and the intake door motor harness connector M58 (B).
- Check continuity between front air control harness connector M49 (A) terminals 21, 22 and the intake door motor harness connector M58 (B) terminals 1, 6.

Α		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M49	21	M58	6	Yes
	22		1	



# **INTAKE DOOR MOTOR**

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

4. Check continuity between front air control harness connector M49 terminals 21, 22 and ground.

Connector	Terminal	_	Continuity
M49	21	Ground	No
IVI <del>4</del> 9	22	Glound	INO

# 11.S. **E** 2 (QFF)

# Is the inspection result normal?

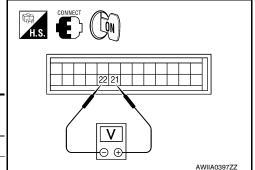
YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

# $2. \mathsf{CHECK}$ 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 M49 terminal 21 and terminal 22 while placing the HVAC system into self-diagnostic mode.

Connector		ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition		
M49	21	22	Self-diagnostic mode (opening)	Battery voltage	
10143	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 <a href="VTL-18">VTL-18</a>, "Removal and Installation".

NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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# System Description

### INFOID:0000000006164696

### SYSTEM DESCRIPTION

### Component Parts

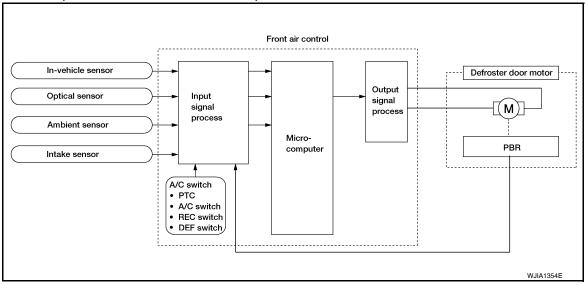
Defroster door control system components are:

- Front air control
- Defroster door motor
- PBR (Built into defroster door motor)
- · In-vehicle sensor
- · Ambient sensor
- Optical sensor
- · Intake sensor

### System Operation

The front air control determines defroster door position based on the position of the defroster switch. When the defroster switch is depressed, the defroster door motor rotates directing air to the defroster ducts. When any mode other than defroster is selected, the defroster motor rotates in the opposite direction closing off air flow to the defroster ducts.

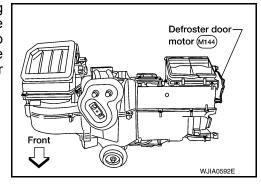
In the AUTO mode, the front air control determines defroster door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature.



### COMPONENT DESCRIPTION

### Defroster door motor

The defroster door motor is attached to the front heater & cooling unit assembly. The front air control sends a voltage to rotate to the defroster door directing the air flow either to the defroster ducts, or to the foot ducts, depending on which way the voltage and ground are applied to the motor leads. Motor rotation is conveyed to a lever which activates the defroster door.



**Defroster Door Motor Component Function Check** 

INFOID:0000000006164697

### < DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

# 1.confirm symptom by performing operational check - defroster door

- 1. Select vent (\*) mode.
- 2. Press the defrost switch ( ). Defroster indicator should illuminate.
- 3. Listen for defroster door position change (blower sound should change slightly).

# Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>HAC-39</u>, "<u>Defroster Door Motor Diagnosis Procedure</u>".

# Defroster Door Motor Diagnosis Procedure

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Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

### SYMPTOM:

- · Defroster door does not change.
- · Defroster door motor does not operate normally.

# $1. {\sf CHECK\ DEFROSTER\ DOOR\ MOTOR\ POSITION\ BALANCED\ RESISTOR\ (PBR)\ FEEDBACK\ VOLTAGE}$

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

Monitor Item	Condition	Results
DEF FDBCK	Cycle mode switch through all modes, D/F (***), VENT (***), B/L (***), FOOT(***), and press DEF (************************************	Voltage varies between 0.2 and 4.8 volts.

### Is the inspection result normal?

YES >> • Defroster door motor is OK.

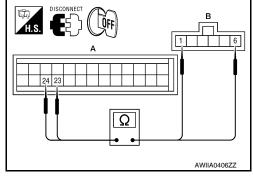
Inspect defroster door for mechanical failure. Refer to <u>VTL-17</u>, "Removal and Installation".

NO >> GO TO 2.

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M49 (A) and the defroster door motor harness connector M144 (B).
- 3. Check continuity between front air control harness connector M49 (A) terminals 23, 24 and the defroster door motor harness connector M144 (B) terminals 1, 6.

А		В		Continuity	
Connector	Terminal	Connector Terminal		Continuity	
M49	23	M144		Yes	
10149	24	101 144	6	165	



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# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

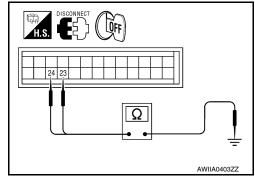
4. Check continuity between front air control harness connector M49 terminals 23, 24 and ground.

Connector	Terminal	_	Continuity
M49	23	Ground	No
1419	24	Giodila	110

# Is the inspection result normal?

YES >> GO TO 3.

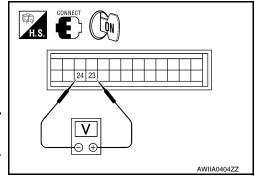
NO >> Repair or replace harness as necessary.



# 3.check front air control for defroster door motor power and ground

- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Press the mode switch to the VENT (\*) mode.
- Check voltage between front air control harness connector M49 terminal 23 and terminal 24 while pressing the defroster switch (₩).

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voltage (Approx.)	
M49	23	24	Following defroster switch ( ) on	Battery voltage	
WI <del>-1</del> 5	24	23	Following defroster switch ( ) off	Battery voltage	



# Is the inspection result normal?

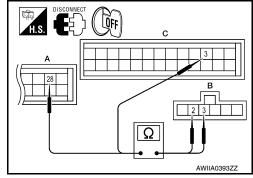
YES >> GO TO 4.

NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

# 4. CHECK DEFROSTER DOOR MOTOR PBR CIRCUITS FOR OPEN AND SHORT TO GROUND

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connectors M49 (C) and M50 (A).
- Check continuity between front air control harness connector M49 (C) terminal 3, and M50 (A) terminal 28 and the defroster door motor harness connector M144 (B) terminals 2, 3.

A and	С	В	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M49 (C)	3	M144	2	Yes
M50 (A)	28	101144	3	165



4. Check continuity between front air control harness connector M49 (C) terminal 3, M50 (A) terminal 28 and ground.

Connector	Terminal	_	Continuity	
M49 (C)	3	Ground	No	
M50 (A)	28	Ground	NO	

# Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

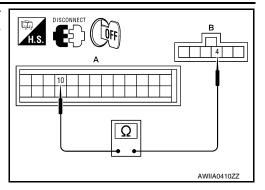
5. CHECK PBR FEEDBACK SIGNAL CIRCUIT FOR OPEN AND SHORT TO GROUND

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

 Check continuity between front air control harness connector M49 (A) terminal 10 and defroster door motor harness connector M144 (B) terminal 4.

А		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M49	10	M144	4	Yes



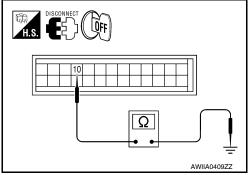
2. Check continuity between front air control harness connector M49 terminal 10 and ground.

Connector	Terminal	_	Continuity
M49	10	Ground	No

# Is the inspection result normal?

YES >> GO TO 6.

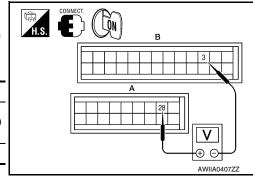
NO >> Repair or replace harness as necessary.



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.
- 3. Check voltage between front air control harness connector M49 (B) terminal 3, and M50 (A) terminal 28.

Α		В	
Terminals	Connector	Terminals	Voltage (Approx.)
(+)	Connector	(-)	voltage (Approx.)
28	M49	3	5 Volts
	(+)	(+) Connector	(+) Connector (-)



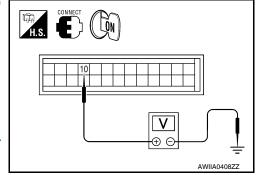
 Check voltage between front air control harness connector M49 terminal 10 and ground.

Connector	Terminal	_	Voltage (Approx.)
M49	10	Ground	0 Volts

# Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and Installation".



7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

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# < DTC/CIRCUIT DIAGNOSIS >

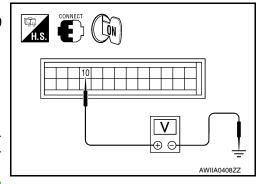
# [AUTOMATIC AIR CONDITIONER]

- 1. Reconnect the defroster door motor harness connector M144.
- 2. Check voltage between front air control harness connector M49 terminal 10 and ground.

Connector	Terminal	_	Voltage (Approx.)
M49	10	Ground	0.2 to 4.8 Volts

### Is the inspection result normal?

- YES >> Inspect defroster door for binding or mechanical failure. If defroster door moves freely, replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".
- NO >> Replace the defroster door motor. Refer to <u>VTL-17</u>, <u>"Removal and Installation"</u>.



# System Description

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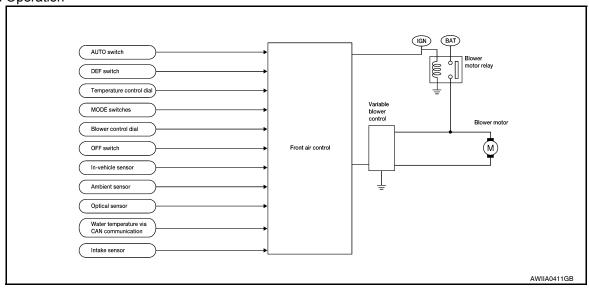
# SYSTEM DESCRIPTION

# **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).

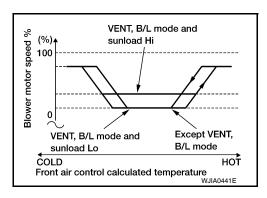
Blower Speed Compensation - Sunload

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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.

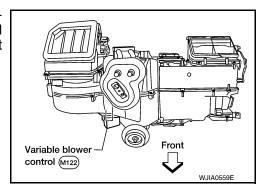
**Blower Speed Control Specification** 



### COMPONENT DESCRIPTION

### Variable Blower Control

The variable blower control 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

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# INSPECTION FLOW

# 1.confirm symptom by performing operational check - front blower

- Rotate the blower control dial clockwise once. Blower motor should operate in low speed.
- Rotate the blower control dial clockwise, and continue checking blower speed until all speeds are checked.

### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-44, "Front Blower Motor Diagnosis Procedure".

# Front Blower Motor Diagnosis Procedure

INFOID:0000000006164701

Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

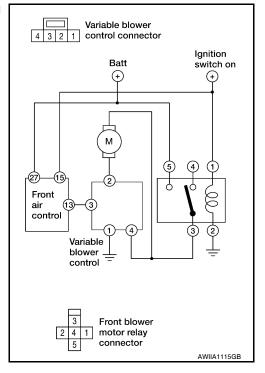
SYMPTOM: Blower motor operation is malfunctioning.

DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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



# 1. CHECK FUSES

Check 20A fuses [No. 24 and 27 (Located in the fuse and fusible link box)]. For fuse layout. Refer to <u>PG-73.</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

- Turn ignition switch OFF.
- 2. Disconnect front blower motor connector.
- 3. Turn ignition switch ON.
- 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 11.

NO >> GO TO 3.

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

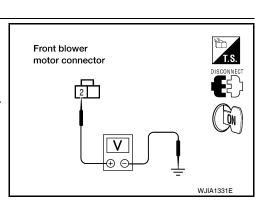
- Turn ignition switch OFF.
- 2. Disconnect front blower motor relay.
- Check voltage between front blower motor relay harness connector M107 terminal 5 and ground.

# 5 - Ground : Battery voltage

### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.



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### < DTC/CIRCUIT DIAGNOSIS >

# 4. CHECK FRONT BLOWER MOTOR RELAY

Turn ignition switch OFF.

Check front blower motor relay. Refer to HAC-48, "Front Blower Motor Component Inspection".

### Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace front blower motor relay.

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

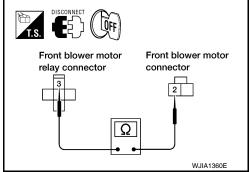
Check continuity between front blower motor relay harness connector M107 terminal 3 and front blower motor harness connector M62 terminal 2.

# 3 - 2 : Continuity should exist.

### Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector.



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

- 1. Disconnect variable blower control harness connector.
- Check continuity between front blower motor relay harness connector M107 (A) terminals 3 and variable blower control harness connector M122 (B) terminal 4.

# 3 - 4 : Continuity should exist.

# Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair harness or connector.

# 

# 7.CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

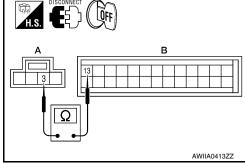
- 1. Disconnect front air control connector.
- Check continuity between front air control harness connector M49 (B) terminal 13 and variable blower control harness connector M122 (A) terminal 3.

# 13 - 3 : Continuity should exist.

### Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.



# $8.\mathsf{CHECK}$ FRONT BLOWER MOTOR RELAY (COIL SIDE) POWER SUPPLY

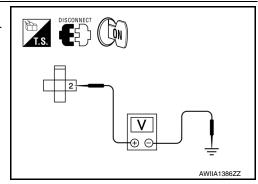
- Turn ignition switch ON.
- Check voltage between front blower motor relay harness connector M107 terminal 2 and ground.

# 2 - Ground : Battery voltage

### Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair front blower motor ground circuit or connector.



### < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

# 9.REPLACE FUSES

- 1. Replace fuses.
- 2. Activate the front blower motor.

### Does the fuse blow?

YES >> 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 M122 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 VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

- Disconnect front air control connector.
- Check continuity between front air control harness connector M49 (B) terminal 13 and variable blower control harness connector M122 (A) terminal 3.

# 13 - 3 : Continuity should exist.

# Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair harness or connector.

# 12. CHECK FRONT BLOWER MOTOR

Check front blower motor. Refer to <u>HAC-48</u>, "Front Blower Motor Component Inspection".

# Is the inspection result normal?

YES >> GO TO 13.

NO >> Replace front blower motor. Refer to <a href="VTL-12">VTL-12</a>, "Removal and Installation".

# 13. CHECK BLOWER MOTOR GROUND CIRCUIT

Check continuity between front blower motor harness connector M62 (B) terminal 1 and variable blower control harness connector M122 (A) terminal 2.

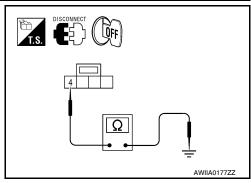
# 1 - 2 : Continuity should exist.

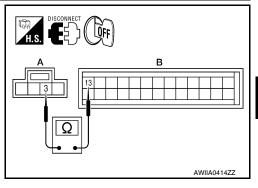
# Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair harness or connector.

# 14. CHECK VARIABLE BLOWER CONTROL GROUND CIRCUIT





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# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

Check continuity between variable blower control harness connector M122 terminal 1 and ground.

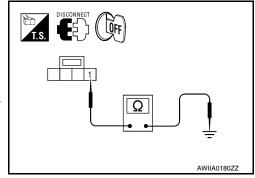
### 1 - Ground

# : Continuity should exist.

# Is the inspection result normal?

YES >> Replace variable blower control. Refer to <u>VTL-22</u>. "Removal and Installation".

NO >> Repair harness or connector.

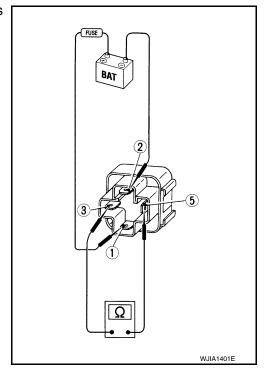


INFOID:0000000006164702

# Front Blower Motor Component Inspection

# **COMPONENT INSPECTION**

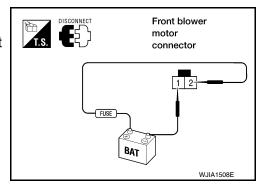
Check continuity between terminals 3, and 5 by supplying 12 volts and ground to coil side terminals 1 and 2 of relay.



### 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.



# [AUTOMATIC AIR CONDITIONER]

# MAGNET CLUTCH

# System Description

### INFOID:0000000006164703

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# 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.

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

# Magnet Clutch Component Function Check

INFOID:0000000006164704

### INSPECTION FLOW

# $1. {\hbox{\rm confirm symptom by performing operational check - magnet clutch}}\\$

- 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 >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>HAC-49</u>, "Magnet Clutch Diagnosis Procedure".

# Magnet Clutch Diagnosis Procedure

INFOID:0000000006708579

Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

### DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

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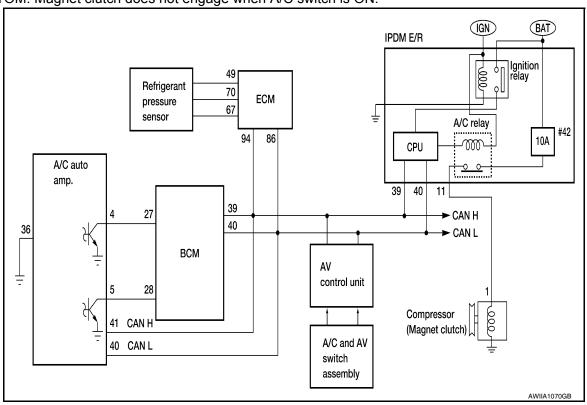
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SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



# 1. CHECK INTAKE AND AMBIENT SENSOR CIRCUITS

Check intake and ambient sensors. Refer to <u>HAC-21, "Front Air Control Self-Diagnosis"</u>.

Is the inspection result normal?

YES >> GO TO 2.

NO

>> • Malfunctioning intake sensor. Refer to <a href="HAC-64">HAC-64</a>, "Intake Sensor Diagnosis Procedure".

• Malfunctioning ambient sensor. Refer to HAC-56, "Ambient Sensor Diagnosis Procedure".

# PERFORM AUTO ACTIVE TEST

Refer to PCS-11, "Diagnosis Description".

### Does magnet clutch operate?

YES >> • @WITH CONSULT-III

GO TO 5.

• NWITHOUT CONSULT-III GO 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.

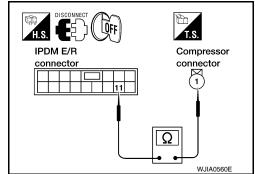
4. Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

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

# Is the inspection result normal?

YES >> GO TO 4.

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### < DTC/CIRCUIT DIAGNOSIS >

NO >> Repair harness or connector.

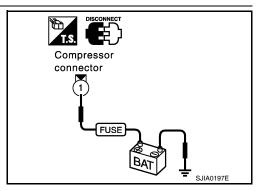
# 4. CHECK MAGNET CLUTCH CIRCUIT

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

# Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to <u>PCS-28</u>, "Removal and <u>Installation of IPDM E/R"</u>.

NO >> Replace magnet clutch. Refer to <u>HA-33</u>, "Removal and <u>Installation for Compressor Clutch"</u>.



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# 5. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to HAC-19, "CONSULT-III 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

- Turn ignition switch OFF.
- 2. Disconnect BCM connector and front air control connector.
- Check continuity between BCM harness connector M18 (A) terminal 27 and front air control harness connector M49 (B) terminal 4.

# 27 - 4 Continuity should exist.

Check continuity between BCM harness connector M18 (A) terminal 27 and ground.

# 27 - ground Continuity should not exist.

### Is the inspection result normal?

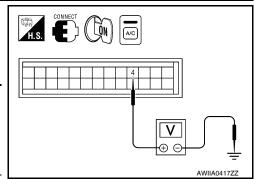
YES >> GO TO 7.

NO >> Repair harness or connector.

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

- 1. Reconnect BCM connector and front air control connector.
- Turn ignition switch ON.
- Check voltage between front air control harness connector M49 terminal 4 and ground.

	Terminals			
(+)				
Front air con- trol connec- tor	Terminal No.	(-)	Condition	Voltage
M49	4	Ground	A/C switch: ON	Approx. 0V
WI <del>-1</del> 3	۲	Orodria	A/C switch: OFF	Approx. 5V



Is the inspection result normal?

YES >> GO TO 8.

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# **MAGNET CLUTCH**

# < DTC/CIRCUIT DIAGNOSIS >

### [AUTOMATIC AIR CONDITIONER]

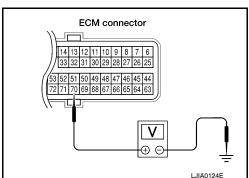
NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control Refer to <a href="VTL-8">VTL-8</a>. <a href=""WTL-8">"Removal and Installation"</a>.

NO-2 >> If the voltage is approx. 0V when A/C switch is OFF, replace BCM. Refer to BCS-53, "Removal and Installation".

# 8. CHECK REFRIGERANT PRESSURE SENSOR

- 1. Start engine.
- 2. Check voltage between ECM harness connector F54 terminal 70 and ground.

Terminals					
(+)			Condition	Voltage	
ECM con- nector	Terminal No.	(-)		J	
F54	70	Ground	A/C switch: ON	Approx. 0.36 - 3.88V	
			· ·	·	



# Is the inspection result normal?

YES >> GO TO 9.

NO >> Refer to EC-465, "Diagnosis Procedure".

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to HAC-19, "CONSULT-III Function (BCM - AIR CONDITIONER)".

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.
- 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 5.

# 28 - 5 Continuity should exist.

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

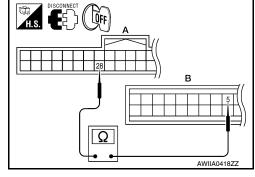
# 28 - ground Continuity should not exist.

### Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

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



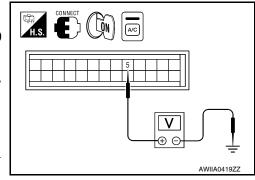
# **MAGNET CLUTCH**

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

- 1. Reconnect BCM connector and front air control connector.
- 2. Turn ignition switch ON.
- Check voltage between front air control harness connector M49 terminal 5 and ground.

	Terminals			
(+)			Condition	Voltage
Front air con- trol connector	Terminal No.	(-)		2 22 9
M49	5	Ground	A/C switch: ON Blower motor operates	Approx. 0V
			A/C switch: OFF	Approx. 5V



# Is the inspection result normal?

YES >> GO TO 12.

NO-1 >> If the voltage is approx. 5V when blower motor is ON, replace front air control. Refer to <u>VTL-8</u>. "Removal and Installation".

NO-2 >> If the voltage is approx. 0V when blower motor is OFF, replace BCM. Refer to BCS-53, "Removal and Installation".

# 12. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-4, "System Description".

- BCM ECM
- ECM IPDM E/R
- ECM Front air control

# Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-28, "Removal and Installation of IPDM E/R".

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

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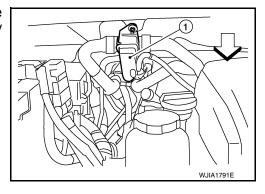
# WATER VALVE CIRCUIT

Description INFOID:000000006164708

### COMPONENT DESCRIPTION

### Water Valve

The water valve (1) cuts the flow of engine coolant to the heater core to allow for maximum cooling during A/C operation. It is controlled by the front air control.



# Water Valve Diagnosis Procedure

INFOID:0000000006164707

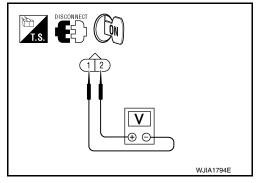
Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

# DIAGNOSTIC PROCEDURE FOR WATER VALVE

# 1. CHECK WATER VALVE POWER AND GROUND CIRCUITS

- Disconnect water valve connector F68.
- 2. Turn ignition switch ON.
- 3. Rotate temperature control dial (driver) to 32°C (90°F).
- 4. Check voltage between water valve harness connector F68 terminal 1 and terminal 2 while rotating temperature control dial (driver) to 18°C (60°F).

Connector	Terminals		Condition	Voltage	
Connector	(+)	(-)	Condition	(Approx.)	
Water valve: F68	2	1	Rotate temperature control dial	Battery voltage	



### Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

# 2.CHECK WATER VALVE CONTROL OUTPUT CIRCUIT

- 1. Turn ignition switch OFF.
- Disconnect front air control connector M50.
- Check continuity between water valve harness connector F68

   (A) terminal 2 and front air control harness connector M50 (B) terminal 42.

# 2 - 42 : Continuity should exist.

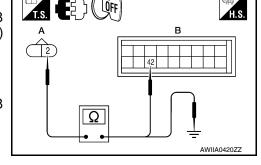
4. Check continuity between water valve harness connector F68 terminal 2 and ground.

# 2 - Ground : Continuity should not exist.

# Is the inspection result normal?

YES >> Replace front air control. Refer to VTL-8, "Removal and Installation".

NO >> Repair harness or connector.



# **WATER VALVE CIRCUIT**

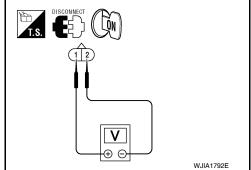
# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

# 3. CHECK WATER VALVE POWER AND GROUND CIRCUITS

- 1. Rotate temperature control dial (driver) to 18°C (60°F).
- 2. Check voltage between water valve harness connector F68 terminal 1 and terminal 2 while rotating temperature control dial (driver) to 32°C (90°F).

Connector	Terminals		Condition	Voltage	
Connector	(+)	(-)	Condition	(Approx.)	
Water valve: F68	1	2	Rotate temperature control dial	Battery voltage	



# Is the inspection result normal?

YES >> Replace the water valve.

NO >> GO TO 4.

# 4. CHECK WATER VALVE CONTROL OUTPUT CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector M50.
- Check continuity between water valve harness connector F68

   (A) terminal 1 and front air control harness connector M50 (B) terminal 41.

# 1 - 41 : Continuity should exist.

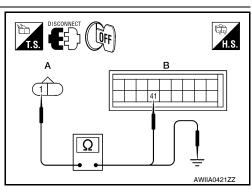
4. Check continuity between water valve harness connector F68 (A) terminal 1 and ground.

# 1 - Ground : Continuity should not exist.

### Is the inspection result normal?

YES >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and Installation".

NO >> Repair harness or connector.



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# AMBIENT SENSOR

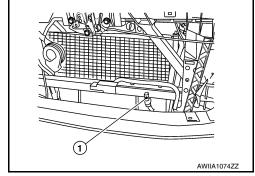
# **Component Description**

INFOID:0000000006164708

### 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°C (0.6°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.

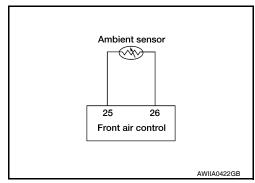
# Ambient Sensor Diagnosis Procedure

INFOID:0000000006164709

Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

### DIAGNOSTIC PROCEDURE FOR AMBIENT SENSOR

SYMPTOM: Ambient sensor circuit is open or shorted. Using the Consult-III, DTC B257B or B257C is displayed. Without Consult-III, 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 >

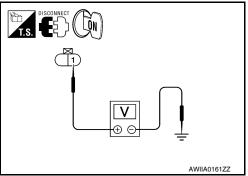
# [AUTOMATIC AIR CONDITIONER]

- 1. Disconnect ambient sensor connector.
- 2. Turn ignition switch ON.
- 3. Check voltage between ambient sensor harness connector E1 terminal 1 and ground.

# 1 - Ground : Approx. 5V

# Is the inspection result normal?

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



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

- Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- 3. Check continuity between ambient sensor harness connector E1 (B) terminal 2 and front air control harness connector M49 (A) terminal 26.

# 2 - 26 : Continuity should exist.

# Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

# 3. CHECK AMBIENT SENSOR

Check the ambient sensor circuit. Refer to <u>HAC-57</u>, "<u>Ambient Sensor Component Inspection</u>". Is the inspection result normal?

- YES >> 1. Replace front air control. Refer to VTL-8, "Removal and Installation".
  - 2. GO TO HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
- NO >> 1. Replace ambient sensor. Refer to HA-45, "Removal and Installation".
  - 2. GO TO HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

# ${f 4.}$ 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 E1 (B) terminal 1 and front air control harness connector M49 (A) terminal 25.

# 1 - 25 : Continuity should exist.

4. Check continuity between ambient sensor harness connector E1 (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-8, "Removal and Installation".

2. GO TO HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> Repair harness or connector.

# Ambient Sensor Component Inspection

# COMPONENT INSPECTION

**Ambient Sensor** 

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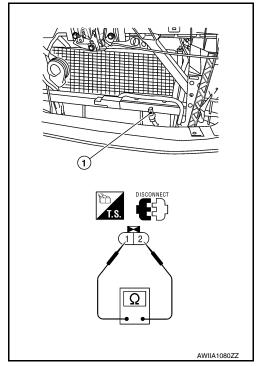
# **AMBIENT SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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

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



If NG, replace ambient sensor. Refer to <u>HA-45, "Removal and Installation"</u>.

# **IN-VEHICLE SENSOR**

# Component Description

### INFOID:0000000006164711

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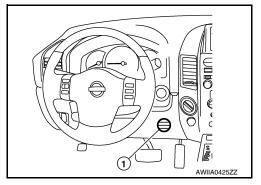
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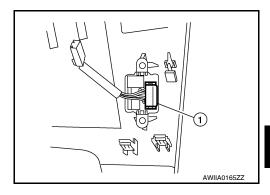
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### COMPONENT DESCRIPTION

### 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.





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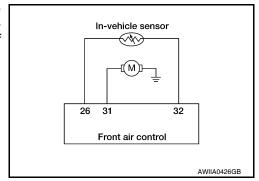
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# In-Vehicle Sensor Diagnosis Procedure

Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

### DIAGNOSTIC PROCEDURE FOR IN-VEHICLE SENSOR

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



# 1. CHECK IN-VEHICLE SENSOR CIRCUIT

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

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

2. CHECK VOLTAGE BETWEEN IN-VEHICLE SENSOR AND GROUND

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# **IN-VEHICLE SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

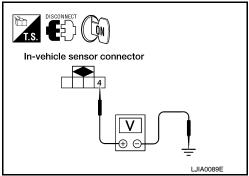
# [AUTOMATIC AIR CONDITIONER]

- 1. Disconnect in-vehicle sensor connector.
- 2. Turn ignition switch ON.
- Check voltage between in-vehicle sensor harness connector M32 terminal 4 and ground.

# 4 - Ground : Approx. 5V.

### Is the inspection result normal?

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



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

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector M49.
- Check continuity between in-vehicle sensor harness connector M32 (B) terminal 1 and front air control harness connector M49 (A) 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-61, "In-Vehicle Sensor Component Inspection".

### Is the inspection result normal?

- YES >> 1. Replace front air control. Refer to VTL-8, "Removal and Installation".
  - 2. Go to HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
- NO >> 1. Replace in-vehicle sensor. Refer to VTL-9, "Removal and Installation".
  - 2. Go to HAC-21, "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 M32 (B) terminal 4 and front air control harness connector M50 (A) terminal 32.

# 4 - 32 : Continuity should exist.

 Check continuity between in-vehicle sensor harness connector M32 (B) terminal 4 and ground.

# 4 - Ground Continuity should not exist.

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# Is the inspection result normal?

- YES >> 1. Replace front air control. Refer to VTL-8, "Removal and Installation".
  - 2. Go to HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> Repair harness or connector.

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

# **IN-VEHICLE SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

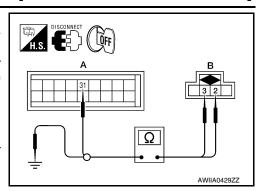
# [AUTOMATIC AIR CONDITIONER]

- Turn ignition switch OFF.
- 2. Disconnect front air control connector and in-vehicle sensor con-
- 3. Check continuity between in-vehicle sensor harness connector M32 (B) terminal 3 and front air control harness connector M50 (A) terminal 31.

3 - 31 : Continuity should exist.

Check continuity between in-vehicle sensor harness connector M32 (B) terminal 3 and ground.

> : Continuity should exist. 2 - Ground 3 - Ground : Continuity should not exist.



# Is the inspection result normal?

>> 1. Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

Go to HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> Repair harness or connector.

# In-Vehicle Sensor Component Inspection

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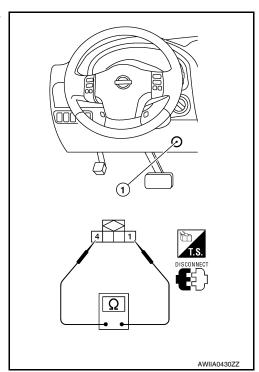
### COMPONENT INSPECTION

In-vehicle Sensor

After disconnecting in-vehicle sensor connector M32, 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-9, "Removal and Installation".



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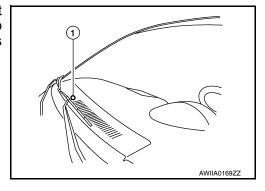
# **OPTICAL SENSOR**

# **Component Description**

### INFOID:0000000006164714

### 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.



### 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.

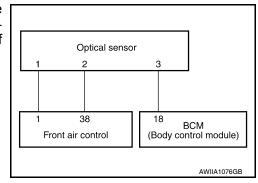
# Optical Sensor Diagnosis Procedure

INFOID:0000000006164715

Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

# DIAGNOSTIC PROCEDURE FOR OPTICAL SENSOR

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



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

# **OPTICAL SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

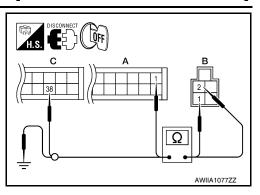
# [AUTOMATIC AIR CONDITIONER]

- 1. Turn ignition switch OFF.
- Disconnect front air control connector and optical sensor connector.
- 3. Check continuity between optical sensor harness connector M302 (B) terminals 1 and 2 and front air control harness connector M50 (C) terminal 38 and M49 (A) terminal 1.

1 - 1 : Continuity should exist.

2 - 38 : Continuity should exist.

 Check continuity between optical sensor harness connector M302 (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 M302 (B) terminal 3 and BCM harness connector M18 (A) terminal 18.

3 - 18 : Continuity should exist.

Check continuity between optical sensor harness connector M302 (B) terminal 4 and ground.

3 - Ground : Continuity should not exist.

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# Is the inspection result normal?

YES >> Replace optical sensor. Refer to VTL-10, "Removal and Installation".

NO >> Repair harness or connector.

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# INTAKE SENSOR

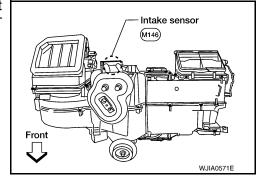
# System Description

### INFOID:0000000006164716

### 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.



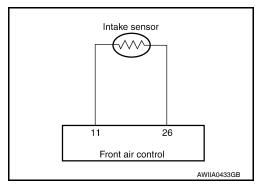
# Intake Sensor Diagnosis Procedure

INFOID:0000000006164717

Regarding Wiring Diagram information, refer to HAC-71. "Wiring Diagram - Automatic Air Conditioner".

# DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

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



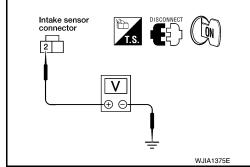
# 1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

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

### 2 - Ground : Approx. 5V

### Is the inspection result normal?

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



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

# INTAKE SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 (B) terminal 1 and front air control harness connector M49 (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-65, "Intake Sensor Component Inspection".

# Is the inspection result normal?

YES >> 1. Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

2. Go to HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> 1. Replace intake sensor. Refer to <u>VTL-11, "Removal and Installation"</u>.

2. Go to HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

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

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

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Is the inspection result normal?

YES >> 1. Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

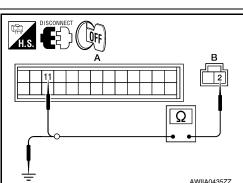
2. Go to HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> Repair harness or connector.

# Intake Sensor Component Inspection

COMPONENT INSPECTION

Intake Sensor



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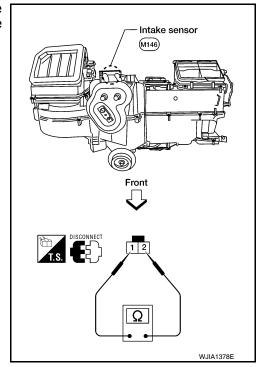
# **INTAKE SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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  $\underline{\text{VTL-11}}$  , "Removal and Installation".

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

# Component Description

### INFOID:0000000006164719

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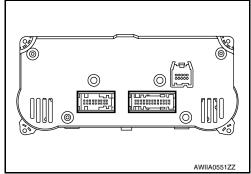
### COMPONENT DESCRIPTION

### 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, defroster door motor, blower motor and compressor are then controlled.

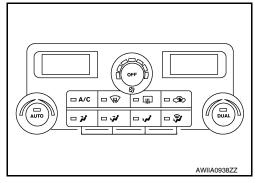
The front air control is unitized with control mechanisms. When the various switches and temperature dials are operated, data is input to the front air control.

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



# Potentio Temperature Control (PTC)

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.



# HAC

# 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.
- 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-67, "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-71, "Wiring Diagram - Automatic Air Conditioner".

# DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

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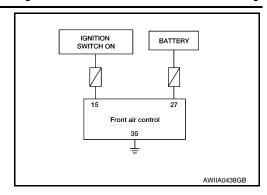
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# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

# < DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

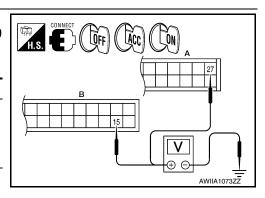
SYMPTOM: A/C system does not come on.



# 1. CHECK POWER SUPPLY CIRCUITS FOR FRONT AIR CONTROL

- 1. Turn ignition switch ON.
- Check voltage between front air control harness connector M49
   (B) terminal 15 and M50 (A) terminal 27, and ground.

Terminals			Ignition switch position		
	(+)				
front air control connector	Terminal No.	(-)	OFF	ACC	ON
M49	15	Ground	Approx. 0V	Approx. 0V	Battery voltage
M50	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 <a href="PG-73">PG-73</a>, "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.
- Disconnect front air control connectors.
- Check continuity between front air control harness connector M50 terminal 35 and ground.

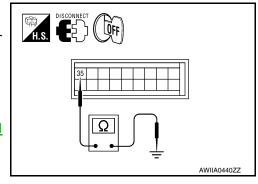
# 35 - Ground

# : Continuity should exist.

# Is the inspection result normal?

OK >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and <u>Installation"</u>.

NG >> Repair harness or connector.

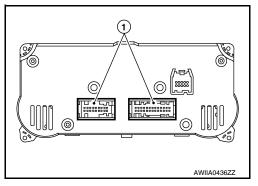


# **ECU DIAGNOSIS INFORMATION**

# AIR CONDITIONER CONTROL

# Front Air Control Terminals Reference Values

Measure voltage between each terminal and ground by following Terminals and Reference Value for front air control (1).



# 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

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



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### TERMINALS AND REFERENCE VALUES FOR FRONT AIR CONTROL

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
1	G/O	Optical sensor (driver)	ON	-	0 - 5V
2	L	Air mix door motor (passenger) CCW	ON	-	Battery voltage
3	Р	V ref ACTR (ground)	ON	-	5V
4	W/R	Compressor ON signal	ON	A/C switch OFF	5V
4	VV/PC	Compressor ON signal	ON	A/C switch ON	0V
5	L/R	For ON signal	ON	Blower switch OFF	5V
5	L/K	Fan ON signal	ON	Blower switch ON	0V
6	SB	Air mix door motor (driver) feedback	ON	-	0 - 5V
7	GR	Mode door motor feedback	ON	-	0 - 5V
8	R/L	Illumination +	ON	Park lamps ON	Battery voltage
9	BR	Illumination -	-	Park lamps ON	(V) 15 10 5 0 200 ms
10	LG/B	Defroster door motor feedback	ON	-	0 - 5V
11	L/B	Intake sensor	ON	-	0 - 5V
13	G/R	Variable blower control	ON	-	0 - 5V
14	G/W	Air mix door motor (passenger) CW	ON	Clockwise rotation	Battery voltage

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# AIR CONDITIONER CONTROL

# < ECU DIAGNOSIS INFORMATION >

# [AUTOMATIC AIR CONDITIONER]

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
15	Y/G	Power supply for IGN	ON	-	Battery voltage
16	Y/B	Rear Defogger request *1	ON		Battery voltage
17	W/G	Air mix door motor (driver) CW	ON	Clockwise rotation	Battery voltage
18	G	Air mix door motor (driver) CCW	ON	Counterclockwise rotation	Battery voltage
19	BR/W	Mode door motor CW	ON	Clockwise rotation	Battery voltage
20	P/L	Mode door motor CCW	ON	Counterclockwise rotation	Battery voltage
21	G/B	Intake door motor CCW	ON	Counterclockwise rotation	Battery voltage
22	0	Intake door motor CW	ON	Clockwise rotation	Battery voltage
23	LG	Defroster door motor CW	ON	Clockwise rotation	Battery voltage
24	P/B	Defroster door motor CCW	ON	Counterclockwise rotation	Battery voltage
25	Р	Ambient sensor	ON	-	0 - 5V
26	V/R	Sensor ground	ON	-	0V
27	Y/R	Power supply for BAT	-	-	Battery voltage
28	Y	V ref ACTR (5V)	ON	-	0 - 5V
29	R/W	Air mix door motor (passenger) feed-back	ON	-	0 - 5V
31	BR/Y	In-vehicle sensor motor (+)	ON	-	Battery voltage
32	LG/R	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	W/V	Optical sensor (passenger)	ON	-	0 - 5V
41	Y/L	Water valve	ON	Water valve open	Battery voltage
				Water valve closed	0V
42	W/G	Water valve	ON	Water valve open	0V
				Water valve closed	Battery voltage

<sup>\*1:</sup> If equipped

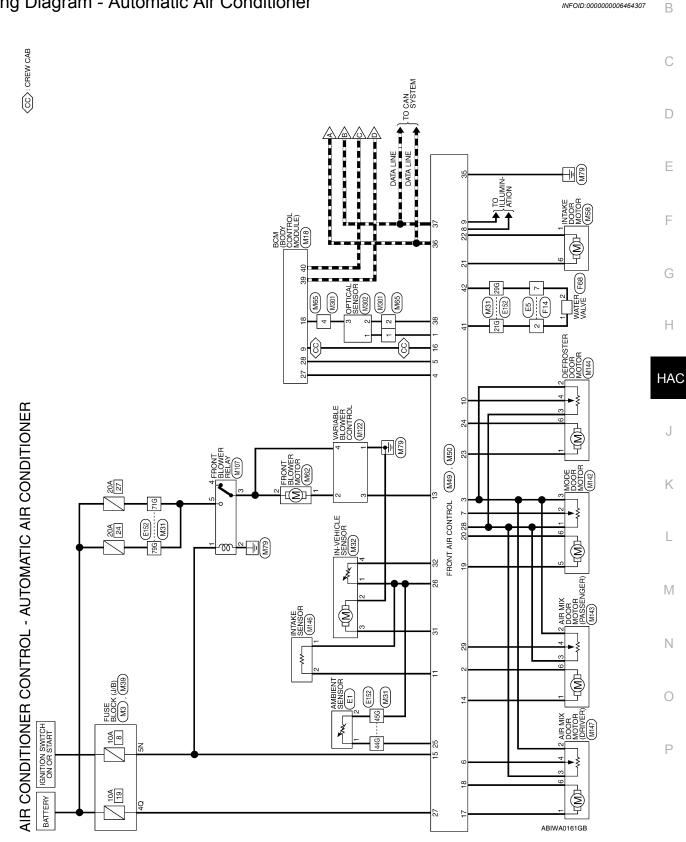
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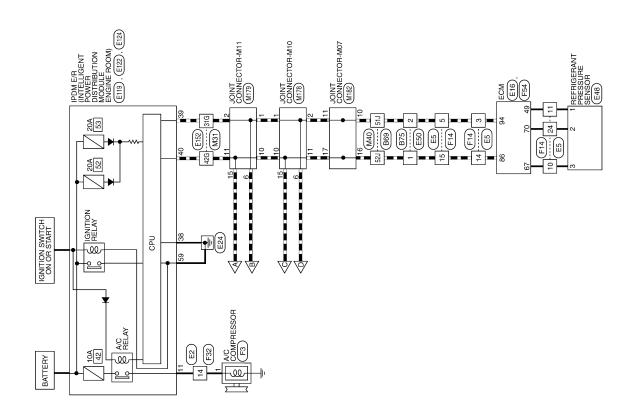
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# WIRING DIAGRAM

# AIR CONDITIONER CONTROL

Wiring Diagram - Automatic Air Conditioner





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REAR DEFOGGER SW
KEYLESS & AUTO
LIGHT SENSOR GND

Y/B

Signal Name

**BLOWER FAN SW** 

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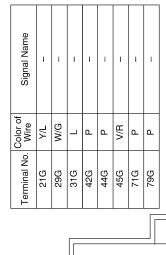
**AIRCON SW** 

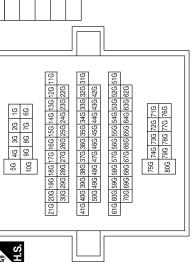
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# AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC AIR CONDITIONER

Torminal No		6	18	27	28	39	40		
Connector No. M18	or Name   BCM (BODY CONTROL	MODÙLE)	Connector Color WHITE					26 27 28 29 30 31 32 33 34 35 36 37	
Connect	Connect		Connecte	d		H.S.	1	21 22 23	
3	Connector Name   FUSE BLOCK (J/B)	HITE		3N	8N 7N 6N 5N 4N			Signal Name	ı
lo. M	lame FL	M					Color	Wire	Y/G
Connector No. M3	Connector N	Connector Color WHITE		匠	H.S.			Terminal No. Wire	2N

				1						
		Connector Name IN-VEHICLE SENSOR	TE		3 2 1	Signal Name	ı	ı	ı	1
f	M32	ne IN-V	or WHI		4	Color of Wire	N/R	O/B	BR/Y	LG/R
	Connector No.	Connector Nai	Connector Color WHITE		H.S.	Terminal No.	-	2	8	4
				<u>-</u>						





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Connector Name WIRE TO WIRE

M31

Connector No.

Connector Color WHITE

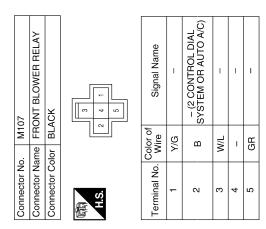
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Terminal No.   Color of   Signal Name	51J L –	52J P –						Color of Signal Name	Aviie P/L	G/B	22 O RECIRC DR1 B	97	24 P/B DEFROST DR B	25 P AMBIENT TEMP SEN	26 V/R SENSOR RETURN								
Connector No. M40 Connector Name WIRE TO WIRE	yr WHITE	_	5.5 4.1 3.1 2.2 1.1 1.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5	21) 220 150 150 151 151 151 151 151 151 151 15	11.1 40.1 39.1 38.1 37.2 50.1 50.1 50.1 50.1 50.1 50.1 50.1 50.1	61.1 (60.1 59.1 56.1 57.1 56.1 55.1 57.1 55.1 57.1 57.1 57.1 56.1 55.1 57.1 57.1 56.1 56.2 57.1 57.1 56.1 57.1 56.1 57.1 56.1 57.1 57.1 56.1 57.1 57.1 57.1 57.1 57.1 57.1 57.1 57	753   774   753   725   774   759   775	Color of Signal Name			L/B EVAP TEMP SENSOR		ĬĬ.	PASS	Y/G IGN		G DRVR BLND DR B	BR/W PNL/FLR DR A					
Connector No.	Connector Color		是 H.S.	217	410	613		Terminal No	_	2	=	12	13	41	15	1 2	18	19					
E BLOCK (J/B)			90   20   10   80   70   80   70   80   50   40	Signal Name	ı				FRONT AIR CONTROL (WITH AUTO A/C)	X		8 7 6 5 4 3 2 1	20 19 18 17 16		Signal Name	SUN LD SEN LFT	PASS BLND DR B	V REF RET	AC REQ	DRVR BLND DR FF	PNL/FLR DR FB	ILLUM +	ILLUM -
Connector No. M39 Connector Name FUSE BLOCK (J.	Connector Color WHITE		(京成 H.S.	Terminal No. Wire	4Q Y/R			Connector No. M49	Connector Name FROM	Connector Color BLACK		13 12 11 10 9 1	22		Terminal No. Wire	1 G/O	2 L		4 W/R			8 R/L	9 BR

Connector No.         M58           Connector Name         INTAKE DOOR MOTOR           Connector Color         BLACK           H.S.         [123456]           Terminal No.         Wire         Signal Name           1         O         -           6         G/B         -		I		1			
Connector No. M58 Connector Name INTAM Connector Color BLAC H.S. Terminal No. Wire  1 0 6 G/B		KE DOOR MOTOR	×	4 5	Signal Name	1	ı
Connector No. Connector Nam Connector Colo H.S. H.S.  Terminal No. 6	M58	e INTA	r BLAC	1 2 3	Solor of Wire	0	G/B
	Connector No.	Connector Nam	Connector Colo	H.S.		-	9

Signal Name	IN-CAR TEMP SEN	-	1	GND	CAN-L	CAN-H	SUN LD SEN RGHT	1	ı	WATER VALVE A	WATER VALVE B	ı	_
Color of Wire	LG/R	-	1	В	Ь	Γ	N/M	1	1	J//K	M/G	ı	_
Terminal No.	32	33	34	32	36	28	38	39	40	14	42	43	44

	FRONT AIR CONTROL (WITH AUTO A/C)	Ш	F	35 84 83 82 81 90 29 28 27 86 44 42 42 41 40 39 88 87 86	Signal Name	V BAT	5V REF VOLTAGE	PASS BLND DR FB	1	IN-CAR TMP MTR+
M50		or BLUE		35 34 33 44 43 42	Color of Wire	Y/R	>	R/W	-	BR/Y
Connector No.	Connector Name	Connector Color	Į į	स्प्रम H.S.	Terminal No.	27	28	59	30	31



Connector No.	). M65	35
Connector Name		WIRE TO WIRE
Connector Color		WHITE
副 H.S.	4	3 2 1
Terminal No. Wire	Color of Wire	Signal Name
-	0/9	ı
2	N/M	I
4	Ф	ı

FRONT BLOWER MOTOR	Ϋ́	رتا ا	Signal Name	ı	_
	lor BLACK		Color of Wire	ΓW	M/L
Connector Name	Connector Color	更 H.S.	Terminal No.	-	2

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erminal	-	2	

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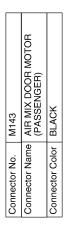
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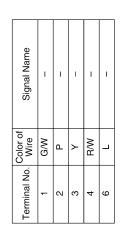
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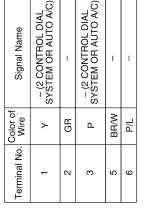
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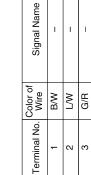
Connector No.	M142
nector Name	Connector Name MODE DOOR MOTOR
Connector Color BLACK	BLACK





M122	VARIABLE BLOWER CONTROL (2 CONTROL DIAL SYSTEM OR AUTO A/C)	WHITE	
Connector No.	Connector Name	Connector Color WHITE	

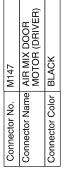




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onnector No.	M147
onnector Name   AIR MIX DOOR   MOTOR (DRIVE	AIR MIX DOOR MOTOR (DRIVER)
onnector Color BLACK	BLACK



Mire N//G Y//G Y Y Y Y G SB	Signal Name	ı	1	ı	_	-
8- -	Color of Wire	W/G	Ь	>	SB	В
Color of Wire   W/G   Wire   W/G     Color of   Color	Terminal No.	-	2	ဧ	4	9

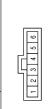


M146

Connector No.



Signal Na	I	I	
Color of Wire	N/R	L/B	
Ferminal No.	-	5	



Connector Name DEFROSTER DOOR MOTOR

M144

Connector No.

BLACK

Connector Color





Signal Name	ı	1	ı	-	I
Color of Wire	LG	Ь	٨	LG/B	P/B
Terminal No.	·	2		7	9

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# AIR CONDITIONER CONTROL

# [AUTOMATIC AIR CONDITIONER]

< WIRING DIAGRAM >

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M182	JOINT CONNEC	WHITE	8 7 6 5 4 3 2 18 17 16 15 14 13 12		r of Signal Name	1	1	1	1	-		
Connector No.	Connector Name JOINT CONNECTOR-M07	Connector Color WHITE	(19) (20) (19)		Terminal No. Wire	10 L	11	16 P	17 P	_		
62	Connector Name JOINT CONNECTOR-M11	JE	7 6 5 4 3 2 1		Signal Name	ı	-	ı	1	1	1	
. M179	Ime JOI	lor BLUE	9 8 8 8 18		Color of Wire	_	٦	٦	Ь	Ь	۵	
Connector No.	Connector Na	Connector Color	明.S.	•	Terminal No.	-	2	9	10	11	15	
82	Connector Name JOINT CONNECTOR-M10	JE	7 6 5 4 3 2 1 17 16 15 14 13 12 11 10		Signal Name	I	I	I	I			
M178	me JOI	lor BLUE	9 8 8 8 8 8 8 8 8 9 8 9 8 9 8 9 9 9 9 9		Color of Wire	_	_	۵	Ъ			
Connector No.	onnector Na	Connector Color	H.S.		Terminal No. Wire	-	9	10	15			

	NSOR			Signal Name	1	1
П	MBIENT SE	iRAY	<u> </u>			
	me A	or G		Color of Wire	۵	V/R
Connector No.	Connector Name   AMBIENT SENSOR	Connector Color GRAY	原列 H.S.	Terminal No.	-	2

)2	OPTICAL SENSOR	ITE		Signal Name	ı	ı	I
M302		lor WHITE		Color of Wire	G/0	N/M	Ь
Connector No.	Connector Name	Connector Color	崎南 H.S.	Terminal No.	-	2	3

01	WIRE TO WIRE	WHITE	2 3 4	Signal Name	_	-	_
. M301	l			Color of Wire	0/5	N/M	Ь
Connector No.	Connector Name	Connector Color	原 H.S.	Terminal No. Wire	-	2	4

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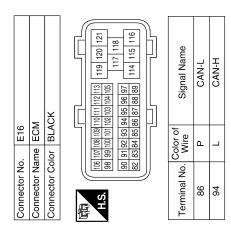
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	WIRE TO WIRE	WHITE	4 15 16 T 18 19 20 21 22 23 24
	Connector Name WIRE TO WIRE	Connector Color WHITE	12 3 H.S.

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Connector No.

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Connector No.

Signal Name
Color of
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Sig	Color of Wire	Terminal No.

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me WIH	lor WHI	8 9 10 1	Color of Wire	A/A
Connector Name   WIRE 10 WIRE	Connector Color WHITE	明 H.S.	Terminal No.	1/1

Connector No.	). E119	6
Connector Name		IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	olor WH	11
H.S.	9 8 7 6	6
Terminal No.	Color of Wire	Signal Name
11	Y/B	A/C COMPRESSOR



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Signal Nan	I	I	
Color of Wire	Ь	٦	
Terminal No.	1	2	

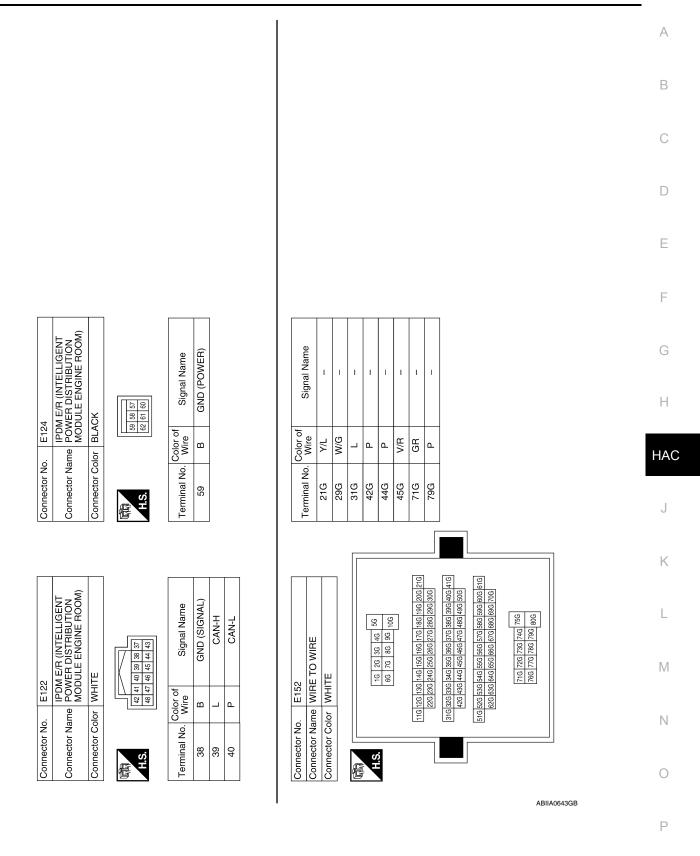
Connector No.	E48
Connector Name	Connector Name REFRIGERANT PRESSURE SENSOR
Connector Color	BLACK





Signal Name	ı	I	-
Color of Wire	R/Y	B/W	В
Terminal No.	-	2	3

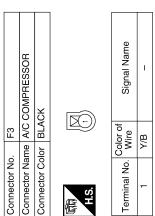
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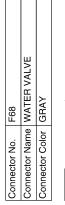


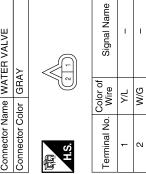
Connector No.	. F32	
Connector Name WIRE TO WIRE	me WIR	E TO WIRE
Connector Color WHITE	lor WHI	Œ
原 H.S.	7 6 15	7 6 5 4 3 2 1 16 15 14 13 12 11 10 9 8
Terminal No. Wire	Color of Wire	Signal Name
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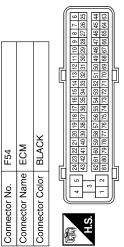
Connector No.	2	١.	₽	F14	١.									
Connector Name WIRE TO WIRE	Ra	me	>	≒	끭	2	>	≝	ш					
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Signal Name	Î	I	ĺ	Î	1	I	Î	İ	-
Color of Wire	J//L	٦	٦	M/G	В	R/Υ	Ь	Д	B/W
Terminal No. Wire	2	3	5	7	10	11	14	15	24









2	BLACK		24 23 22 21 20 19 18 17 16 15 14 13 12 11 11 10 8 4 3 4 3 3 2 3 1 30 29 2	62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 48 8 180 79 78 77 76 75 74 73 72 71 70 69 68 67 6	Signal Name	AVCC (PDPRES)	GND -A	PD PRESS
3		[	2	2 62 61 6 81 80 7	Color of Wire	₽V	ш	B/W
	Connector Color	[		2	Terminal No.	49	29	20

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#### **AIR CONDITIONER CONTROL**

# [AUTOMATIC AIR CONDITIONER]

< WIRING DIAGRAM >

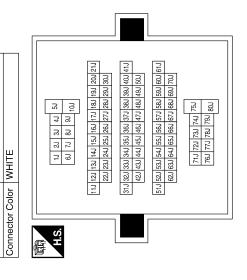
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		E TO WIRE	NMC	<u>                                      </u>	Signal Name	ı	1
270		me WIF	lor BRC		Color of Wire	۵	_
Oly rotocaco	COLINECTO NO.	Connector Name WIRE TO WIRE	Connector Color BROWN	崎 H.S.	Terminal No.	-	2

Signal Name	1	1
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Connector Name WIRE TO WIRE

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Connector No.



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#### AIR CONDITIONER CONTROL

# [AUTOMATIC AIR CONDITIONER]

# SYMPTOM DIAGNOSIS

# AIR CONDITIONER CONTROL

# Symptom Matrix Chart

#### INFOID:0000000006164724

#### SYMPTOM TABLE

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-67
A/C system cannot be controlled.	Go to Self-diagnosis Function.	<u>HAC-21</u>
Air outlet does not change.	Co to Trouble Diagnosis Precedure for Mode Deer Motor	HAC-23
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u> MAC-23</u>
Discharge air temperature does not change.	Co to Trouble Diagnosis Precedure for Air Mix Door Motor	HAC-28
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u> </u>
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	HAC-36
Intake door motor is malfunctioning.	Go to Houble Diagnosis Procedure for intake Door Motor.	<u>HAC-30</u>
Defroster door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Defroster Door Motor.	HAC-38
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-44
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-49
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-83
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	<u>HAC-91</u>
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-93
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	HAC-67
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	HAC-94

# **INSUFFICIENT COOLING**

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YES

>> GO TO 9.

#### [AUTOMATIC AIR CONDITIONER]

#### INSUFFICIENT COOLING Α Component Function Check INFOID:0000000006164725 SYMPTOM: Insufficient cooling INSPECTION FLOW 1.confirm symptom by performing operational check - temperature decrease Press the AUTO switch. Turn temperature control dial (driver) counterclockwise until 18°C (60°F) is displayed. Check for cold air at discharge air outlets. D Can the symptom be duplicated? YES >> GO TO 3. NO >> GO TO 2. Е $\mathbf{2}.$ CHECK FOR ANY SYMPTOMS Perform a complete operational check for any symptoms. Refer to HAC-6, "Operational Check". Does another symptom exist? YFS >> Refer to HAC-82, "Symptom Matrix Chart". >> System OK. NO 3.CHECK FOR SERVICE BULLETINS Check for any service bulletins. Н >> GO TO 4. 4. PERFORM SELF-DIAGNOSIS HAC Perform self-diagnosis Refer to HAC-21, "Front Air Control Self-Diagnosis". Is the inspection result normal? YES >> GO TO 5. NO >> Refer to HAC-21, "Front Air Control Self-Diagnosis Code Chart". 5.CHECK DRIVE BELTS Check compressor belt tension. Refer to EM-13, "Checking Drive Belts". Is the inspection result normal? YES >> GO TO 6. NO >> Adjust or replace compressor belt. Refer to EM-13, "Removal and Installation". 6.CHECK AIR MIX DOOR OPERATION Check and verify air mix door mechanism for smooth operation. Refer to HAC-28, "Air Mix Door Motor (Driver) Component Function Check". Does air mix door operate correctly? YES >> GO TO 7. Ν NO >> Check air mix door motor circuit. Refer to HAC-28, "Air Mix Door Motor (Driver) Diagnosis Procedure" or HAC-32, "Air Mix Door Motor (Passenger) Diagnosis Procedure". 7.CHECK COOLING FAN MOTOR OPERATION Check and verify cooling fan motor for smooth operation. Refer to EC-439, "Component Inspection". Does cooling fan motor operate correctly? Р YES >> GO TO 8. NO >> Check cooling fan motor. Refer to EC-439, "Diagnosis Procedure". 8.CHECK WATER VALVE OPERATION Check and verify water valve for smooth operation. Refer to HAC-54. "Description". Does water valve operate correctly?

Revision: August 2010 HAC-83 2011 Titan

#### **INSUFFICIENT COOLING**

#### < SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

NO >> Check water valve circuit. Refer to <u>HAC-54</u>, "Water Valve Diagnosis Procedure".

# 9.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 10.

# 10. 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 11.

NO >> Check contaminated refrigerant. Refer to <a href="HAC-95">HAC-95</a>, "Working with HFC-134a (R-134a)".

# 11. 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 <u>HAC-84, "Diagnostic Work Flow"</u>.

NO >> GO TO 12.

# 12. CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to HAC-86. "Performance Chart".

#### Is the inspection result normal?

YES >> Perform performance test diagnoses. Refer to HAC-84, "Diagnostic Work Flow".

NO >> GO TO 13.

# 13. CHECK AIR DUCTS

Check ducts for air leaks.

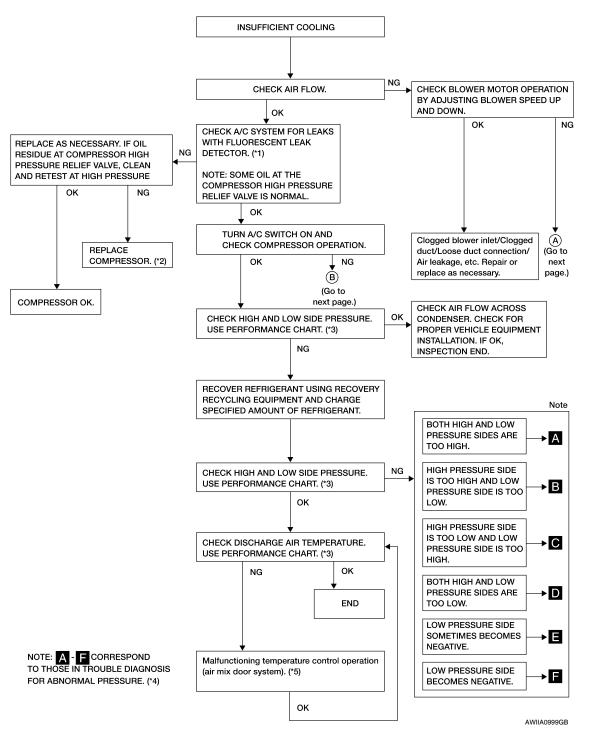
#### Is the inspection result normal?

YES >> System OK.

NO >> Repair air leaks.

# Diagnostic Work Flow

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- \*1 HA-24, "Checking System for Leaks \*2 Using the Fluorescent Dye Leak Detector"
- \*4 normal Pressure"
- HA-33, "Removal and Installation for \*3 HAC-86, "Performance Chart" Compressor Clutch"
- HAC-87, "Trouble Diagnoses for Ab- \*5 HAC-28, "Air Mix Door Motor (Driver) Component Function Check"

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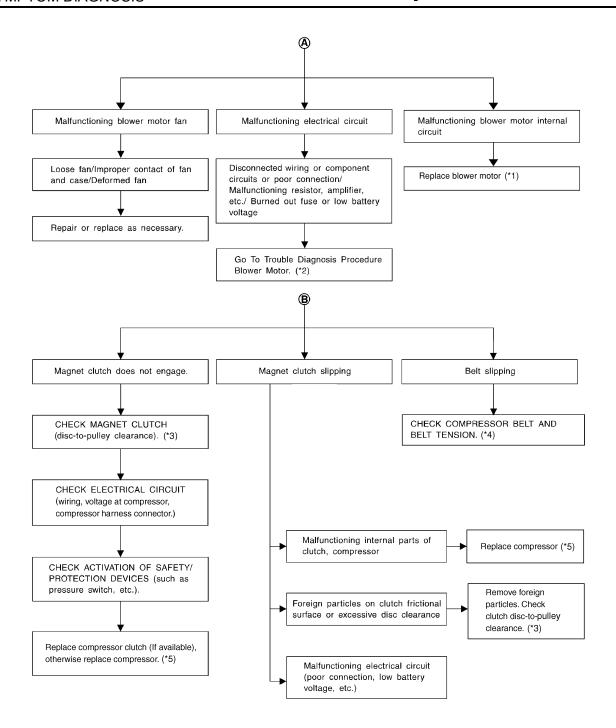
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- Compressor Clutch"
- \*4 EM-13, "Checking Drive Belts"
- \*1 HA-33, "Removal and Installation for \*2 HAC-44, "Front Blower Motor Component Function Check"
  - \*5 HA-32, "Removal and Installation for Compressor"

\*3 HA-33, "Removal and Installation for Compressor Clutch"

# Performance Chart

INFOID:0000000006164727

#### **TEST CONDITION**

Testing must be performed as follows:

#### **INSUFFICIENT COOLING**

#### < SYMPTOM DIAGNOSIS >

#### [AUTOMATIC AIR CONDITIONER]

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Vehicle location	Indoors or in the shade (in a well-ventilated place)	
Doors	Closed	
Door window	Open	
Hood	Open	
TEMP.	Max. COLD	
Mode switch	(Ventilation) set	
Recirculation (REC) switch	(Recirculation) set	
# Blower speed	Max. speed set	
Engine speed	Idle speed	
Operate the air conditioning system	n for 10 minutes before taking measurements.	

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

Inside air (Recirculating air) at blower assembly inlet		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

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)	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).

Revision: August 2010 HAC-87 2011 Titan

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# [AUTOMATIC AIR CONDITIONER]

Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until specified pressure is obtained.
Α	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance  ↓  1. Condenser fins are clogged.  2. Improper fan rotation of cooling fan	<ul> <li>Clean condenser.</li> <li>Check and repair cooling fan if necessary.</li> </ul>
Both high- and low-pressure sides are too high.	Low-pressure pipe is not cold.  When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm², 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.)  Air in refrigeration cycle	Evacuate and recharge system.
A A AC359A	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cooling system.
	<ul> <li>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>Plates are sometimes covered with frost.</li> </ul>	<ul> <li>Excessive liquid refrigerant on low-pressure side</li> <li>Excessive refrigerant discharge flow</li> <li>Expansion valve is open a little compared with the specification.</li> <li>Improper expansion valve adjustment</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 located 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 compressor operation stops.	Compressor pressure operation is improper.  Understand the compressor packings.	Replace compressor.
LO (HI)  AC356A	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper.  Understand the compressor packings.	Replace compressor.

#### **INSUFFICIENT COOLING**

#### < SYMPTOM DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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 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 occurs somewhere in high-pressure side.</li> </ul>	High-pressure pipe located between liquid tank and expansion valve is clogged.	<ul> <li>Check and repair malfunctioning parts.</li> <li>Check oil for contamination.</li> </ul>
Both high- and low-pressure sides are too low.	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components.	Check refrigerant system for leaks. Refer to HA-23, "Checking of Refrigerant Leaks".
LO HI PAC353A	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification.  1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	<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 malfunctioning parts.</li><li>Check oil for contamination.</li></ul>
	Air flow volume is too low.	Evaporator is frozen.	Check intake sensor circuit. Refer to HAC-64, "Intake Sensor Diagnosis Procedure". Repair evaporator fins. Replace evaporator. Refer to HAC-44, "Front Blower Motor Component Function Check".
ow-pressure Side Sometimes	Becomes Negative		
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes 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 expansion 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

# **INSUFFICIENT COOLING**

# [AUTOMATIC AIR CONDITIONER]

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	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.  If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant.  If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air).  If either of the above methods cannot correct the malfunction, replace expansion valve.  Replace liquid tank.

#### **INSUFFICIENT HEATING**

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#### [AUTOMATIC AIR CONDITIONER]

#### INSUFFICIENT HEATING Α Component Function Check INFOID:0000000006164729 SYMPTOM: Insufficient heating INSPECTION FLOW ${f 1.}$ CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE Press the AUTO switch. Turn the temperature control dial (driver) clockwise until 32°C (90°F) is displayed. Check for hot air at discharge air outlets. D Can this symptom be duplicated? YES >> GO TO 2. NO >> Perform complete system operational check. Refer to <a href="HAC-6">HAC-6</a>, "Operational Check". Е 2.CHECK FOR SERVICE BULLETINS Check for any service bulletins. >> GO TO 3. 3.PERFORM SELF-DIAGNOSIS Perform self-diagnosis. Refer to HAC-21, "Front Air Control Self-Diagnosis". Is the inspection results normal? Н YES >> GO TO 4. NO >> Refer to HAC-21, "Front Air Control Self-Diagnosis Code Chart". 4. CHECK ENGINE COOLING SYSTEM HAC Check for proper engine coolant level. Refer to CO-10, "Inspection". Check hoses for leaks or kinks. 2. Check radiator cap. Refer to CO-10, "Inspection". Check for air in cooling system. >> GO TO 5. K $oldsymbol{5}.$ 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 HAC-28, "Air Mix Door Motor (Driver) Component Function Check". M **6.**CHECK AIR DUCTS Check for disconnected or leaking air ducts. N Is the inspection result normal? YES >> GO TO 7. NO >> Repair all disconnected or leaking air ducts. 7.CHECK HEATER HOSE TEMPERATURES 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 warm. Is the inspection result normal? YES >> Hot inlet hose and a warm outlet hose: GO TO 8. NO >> • Inlet hose cold: GO TO 11. · Both hoses warm: GO TO 9. 8.CHECK ENGINE COOLANT SYSTEM

#### **INSUFFICIENT HEATING**

#### < SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

Check engine coolant temperature sensor. Refer to EC-177, "Component Inspection".

#### 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 f

- >> 1. Back flush heater core.
  - 2. Drain the water from the system.
  - 3. Refill system with new engine coolant. Refer to CO-11, "Changing Engine Coolant".
  - 4. GO TO 10 to retest.

# 10. CHECK HEATER HOSE TEMPERATURES

- 1. Start engine and warm it up to normal operating temperature.
- 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 <a href="VTL-15">VTL-15</a>, "Removal and Installation".

# 11. CHECK WATER VALVE

Check the operation of the water valve. Refer to HAC-54, "Water Valve Diagnosis Procedure".

#### Is the inspection result normal?

YES >> System OK.

NO >> Replace water valve.

# NOISE

# Component Function Check

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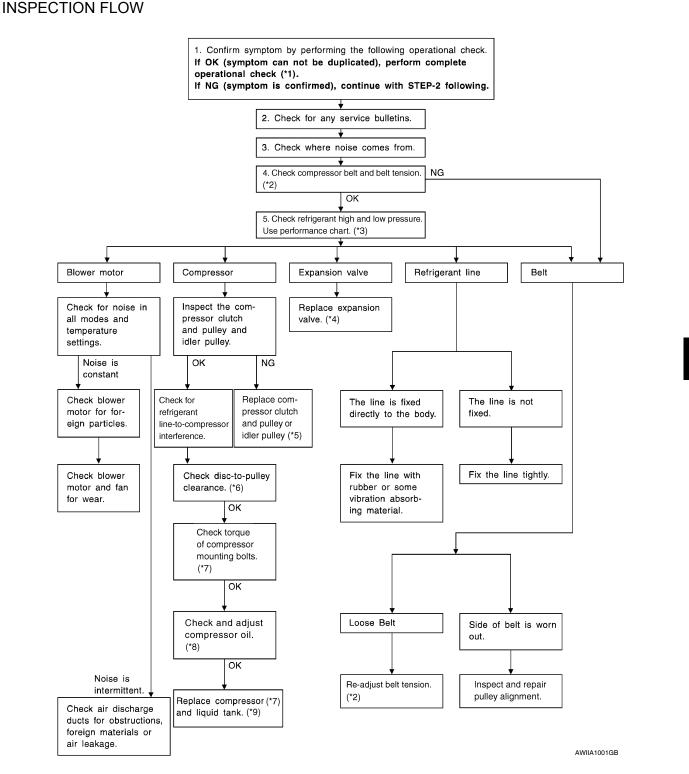
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SYMPTOM: Noise



- \*1 HAC-6, "Operational Check"
- HA-43, "Removal and Installation for \*5 **Expansion Valve**"
- Compressor"
- \*2 EM-13, "Checking Drive Belts"
- HA-33, "Removal and Installation for \*6 Compressor Clutch"
- HA-32, "Removal and Installation for \*8 HA-32, "Removal and Installation for \*9 Compressor"
- \*3 HAC-86, "Performance Chart"
- HA-33, "Removal and Installation for Compressor Clutch"
- HA-41, "Removal and Installation for Condenser"

#### **MEMORY FUNCTION DOES NOT OPERATE**

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

# MEMORY FUNCTION DOES NOT OPERATE

# Memory Function Check

INFOID:0000000006164731

SYMPTOM: Memory function does not operate.

#### INSPECTION FLOW

# 1.confirm symptom by performing operational check - memory function

- Set the temperature to 32°C (90°F).
- Rotate the front blower control dial (driver) to turn system OFF.
- Turn ignition switch OFF.
- 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 the symptom be duplicated?

YES >> GO TO 3.

>> GO TO 2. NO

# 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-21, "Front Air Control Self-Diagnosis".

#### Are any self-diagnosis codes present?

YES >> Refer to HAC-21, "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-67, "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?

YES >> Refer to HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair".

>> Replace front air control. Refer to VTL-8, "Removal and Installation". NO

# **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)

#### **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 <a href="HA-4">HA-4</a>, "Contaminated Refrigerant". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.
- Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
- Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.
- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

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Revision: August 2010 HAC-95 2011 Titan

#### [AUTOMATIC AIR CONDITIONER]

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

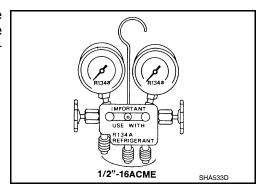
- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location 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

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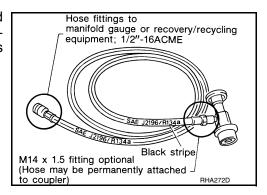
#### MANIFOLD GAUGE SET

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

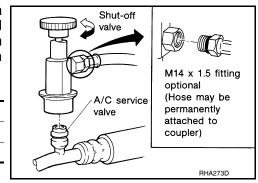
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shutoff devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



#### 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



#### MANUAL A/C IDENTIFICATION TABLE

< BASIC INSPECTION >

[MANUAL A/C (TYPE 1)]

# **BASIC INSPECTION**

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

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#### DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[MANUAL A/C (TYPE 1)]

#### DIAGNOSIS AND REPAIR WORKFLOW

How to Perform Trouble Diagnosis For Quick And Accurate Repair

INFOID:0000000006164736

#### **WORK FLOW**

# 1.LISTEN TO CUSTOMER COMPLAINT

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

>> GO TO 2

# 2. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

# 3. VERIFY THE SYMPTOM WITH OPERATIONAL CHECK

Verify the symptom with operational check. Refer to HAC-99, "Operational Check".

>> GO TO 4

# 4.GO TO APPROPRIATE TROUBLE DIAGNOSIS

Go to appropriate trouble diagnosis. Refer to HAC-166, "Symptom Matrix Chart".

- >> If equipped with NAVI, GO TO 5.
- >> If equipped without NAVI, GO TO 6.

# 5. PERFORM THE FRONT AIR CONTROL SELF-DIAGNOSIS

Perform front air control self-diagnosis. Refer to HAC-21, "Front Air Control Self-Diagnosis".

- >> If any diagnostic trouble codes set. Refer to <u>HAC-21</u>, "Front Air Control Self-Diagnosis Code Chart".
- >> Confirm the repair by performing operational check. Refer to HAC-6, "Operational Check".

#### 6. REPAIR OR REPLACE

Repair or replace the specific parts.

>> GO TO 7

#### 7. FINAL CHECK

Final check.

#### Is the inspection result normal?

YES >> Inspection End

NO >> GO TO 4

#### INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MANUAL A/C (TYPE 1)]

#### INSPECTION AND ADJUSTMENT

Operational Check INFOID:0000000006164737

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

If NG, go to trouble diagnosis procedure for HAC-132, "Front Blower Motor Diagnosis Procedure". If OK, continue with next check.

#### CHECKING DISCHARGE AIR

- 1. Press each MODE switch and the DEF w switch.
- Each MODE position indicator should illuminate.
- Confirm that discharge air comes out according to the air distribution table. Refer to HAC-109, "Discharge Air Flow".

Mode door position is checked in the next step.

If NG, go to trouble diagnosis procedure for HAC-116, "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 (♥, ♥ ONLY)

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

If NG, go to trouble diagnosis procedure for HAC-126, "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 ( 🖎 ) is not allowed in DEF ( 📦 ) D/F ( 😻 ) or FOOT ( 🤞 ).

#### CHECKING TEMPERATURE DECREASE

- 1. Rotate temperature control dial counterclockwise until maximum cold.
- Check for cold air at appropriate discharge air outlets.

If NG, listen for sound of air mix door motor operation. If OK, go to trouble diagnosis procedure for HAC-167. "Component Function Check". If air mix door motor appears to be malfunctioning, go to HAC-121. "Air Mix Door Motor Diagnosis Procedure".

If OK, continue the check.

#### CHECKING TEMPERATURE INCREASE

- 1. Rotate temperature control dial clockwise until maximum hot.
- Check for hot air at appropriate discharge air outlets.

If NG, listen for sound of air mix door motor operation. If OK, go to trouble diagnosis procedure for HAC-175. "Component Function Check". If air mix door motor appears to be malfunctioning, go to HAC-120, "Air Mix Door Motor Component Function Check".

If OK, continue with next check.

#### CHECK A/C SWITCH

- 1. Press A/C switch.
- A/C switch indicator will turn ON.

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**HAC-99** Revision: August 2010 2011 Titan

#### **INSPECTION AND ADJUSTMENT**

#### < BASIC INSPECTION >

[MANUAL A/C (TYPE 1)]

· 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 <u>HAC-137</u>, "<u>Magnet Clutch Diagnosis Procedure</u>". If all operational checks are OK (symptom cannot be duplicated), go to HAC-98, "How to Perform Trouble

Diagnosis For Quick And Accurate Repair" and perform tests as outlined. If symptom appears, refer to HAC-166. "Symptom Matrix Chart" and perform applicable trouble diagnosis procedures.

#### MANUAL A/C IDENTIFICATION TABLE

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 1)]

# SYSTEM DESCRIPTION

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

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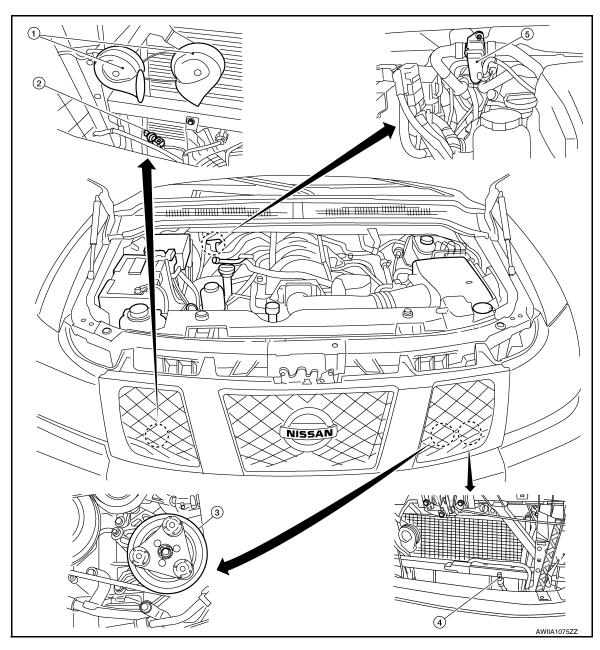
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# **FUNCTION INFORMATION**

# **Component Part Location**

#### **ENGINE COMPARTMENT**

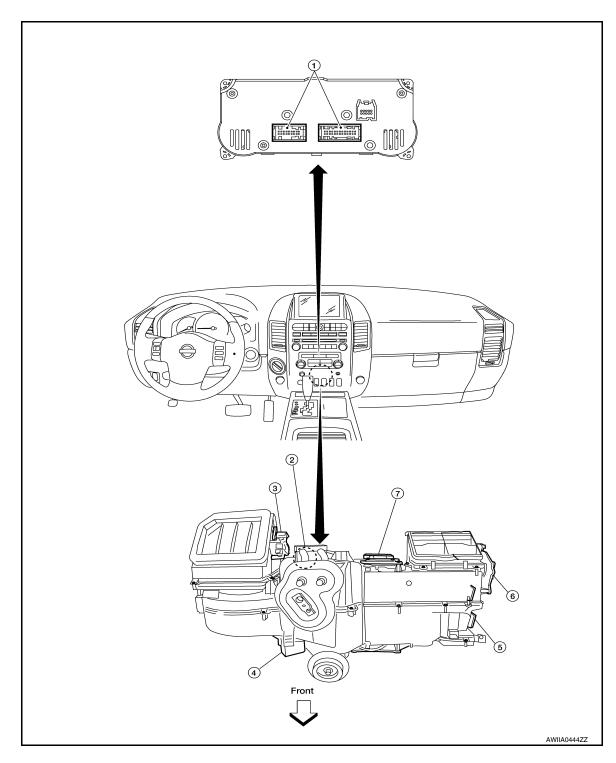
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- 1. Horn (view with grille removed)
- Ambient sensor E1 (view with grille 5. removed)
- Refrigerant pressure sensor E48 (view with grille removed)
- Water valve F68

3. A/C compressor F3

#### PASSENGER COMPARTMENT



- 1. Front air control M180, M181
- 4. Variable blower control M122
- 7. Air mix door motor M147
- 2. Intake sensor M146
- 5. Mode door motor M142
- 3. Intake door motor M58
- 6. Defroster door motor M144

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# Symptom Table

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Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-150
A/C system cannot be controlled.	Go to Self-diagnosis Function.	HAC-114
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	HAC-116
Mode door motor is malfunctioning.		
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	HAC-120
Air mix door motor is malfunctioning.		
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	HAC-126
Intake door motor is malfunctioning.		
Defroster door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Defroster Door Motor.	HAC-127
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-132
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-137
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-167
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-175
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-177
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	HAC-114

#### REFRIGERATION SYSTEM

#### < SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 1)]

#### REFRIGERATION SYSTEM

# Refrigerant Cycle

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#### 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

#### INFOID:0000000006164742

#### 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/cm², 398 psi), or below about 120 kPa (1.22 kg/cm², 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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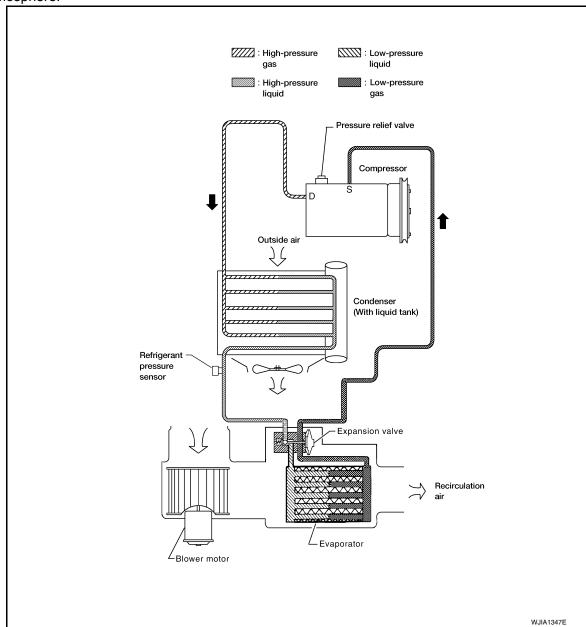
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cm<sup>2</sup>, 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



# MANUAL AIR CONDITIONER SYSTEM

# Control System Diagram

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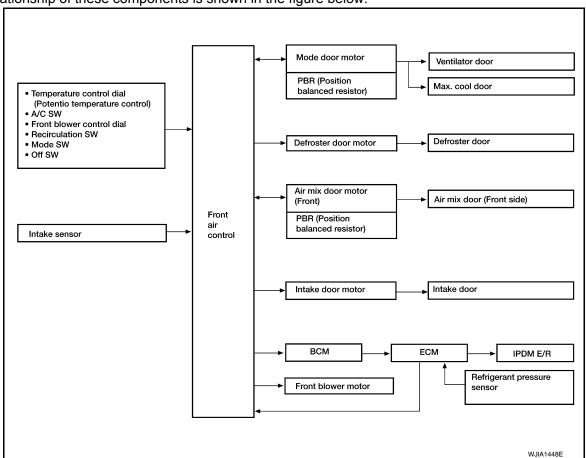
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#### **CONTROL SYSTEM**

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



# Control System Description

#### INFOID:0000000006164744

#### **CONTROL OPERATION**

# Front air control A/C AWIIA0445ZZ

#### MANUAL AIR CONDITIONER SYSTEM

#### < SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 1)]

#### TEMPERATURE CONTROL DIAL

Increases or decreases the set temperature.

#### RECIRCULATION ( ) SWITCH

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

#### **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/OFF SWITCH

- The blower speed is manually controlled with this dial.
- 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 position.

#### A/C SWITCH

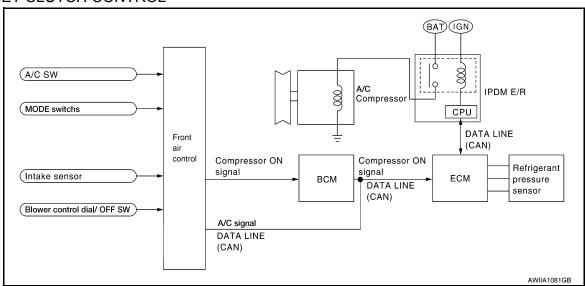
The compressor is ON or OFF.

(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.

#### 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

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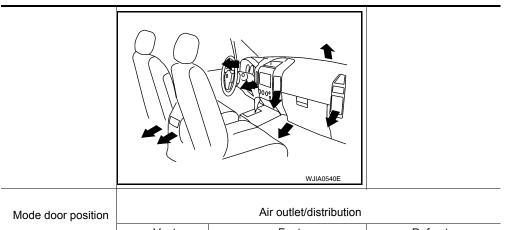
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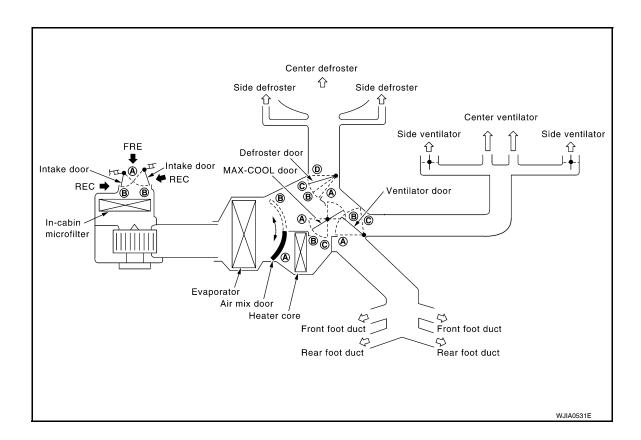
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Mode door position	Air outlet/distribution				
	Vent	Foot	Defroster		
~;	95%	5%	_		
Ÿ	60%	40%	_		
· i	_	70%	30%		
<b>*</b>		60%	40%		
<b>W</b>	_	10%	90%		

## Switches And Their Control Function

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## MANUAL AIR CONDITIONER SYSTEM

[MANUAL A/C (TYPE 1)]

Position		MOD	E SW		DEF	SW	REC	SW	Tempe	rature	switch	OFF
or	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF			/	SW
switch	<b>→</b> •	.*.		<b>W</b> •	FR	TAC	<b>E</b>		MAX A/C			
		+/~	<b>*</b>	+,~	-> ♦ =	0	> ∳ <	0	COLD	~	нот	A/C
Ventilator door	<b>(A)</b>	B	©	©	©		_	_	<u> </u>		•	©
MAX-COOL door	<b>(A)</b>	B	B	B	©		_	_				B
Defroster door	<b>(D)</b>	<b>(D)</b>		₿	<b>(A)</b>		_	_				©
Intake door		_			B		A	B				₿
Air mix door		_	_		_		_	_	<b>(A)</b>		B	

## **DIAGNOSIS SYSTEM (HVAC)**

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 1)]

# **DIAGNOSIS SYSTEM (HVAC)**

# CONSULT-III Function (HVAC)

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CONSULT-III 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.
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.

## **SELF-DIAGNOSIS**

Display Item List

DTC	Description	Reference page
B2573	Battery voltage out of range	CHG-4, "Work Flow"
B257B	Ambient sensor circuit short	HAC-144, "Ambient Sensor Diagnosis Procedure"
B257C	Ambient sensor circuit open	HAC-144. Ambient Sensor Diagnosis Procedure
B2581	Intake sensor circuit short	HAC-147, "Intake Sensor Diagnosis Procedure"
B2582	Intake sensor circuit open	TINO-147, Illiane oction Diagriosis Procedure
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.
IGN VIA CAN	"ON/OFF"	Displays ignition switch signal.
AMB TEMP SEN	"°C"	Displays ambient sensor signal.
EVAP TEMP SEN	"°C"	Displays intake sensor signal.
MODE FDBCK	"V"	Displays mode door motor feedback signal.
DVR MIX FDBCK	"V"	Displays air mix door motor feedback signal.
DEF FDBCK	"V"	Displays defroster door motor feedback signal.
RECIRC	"ON/OFF"	Displays recirculation switch signal.
DEFROST	"ON/OFF"	Displays defroster switch signal.
A/C	"ON/OFF"	Displays A/C switch signal.
L TEMP UP	"ON/OFF"	Displays driver side temperature control dial (temp increase) signal.
L TEMP DOWN	"ON/OFF"	Displays driver side temperature control dial (temp decrease) signal.
RR DEFOG	"ON/OFF"	Displays rear defroster request signal.
FAN UP	"ON/OFF"	Displays blower motor (blower speed increase) signal.
FAN DOWN	"ON/OFF"	Displays blower motor (blower speed decrease) signal.
MODE SELECT	"DTNT"	Displays blower motor (blower speed decrease) signal.
FAN DOWN	"ON/OFF"	Displays blower motor (blower speed decrease) signal.

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[MANUAL A/C (TYPE 1)]

# **DIAGNOSIS SYSTEM (BCM)**

# CONSULT-III Function (BCM - COMMON ITEM)

INFOID:0000000006625985

## **APPLICATION ITEM**

CONSULT-III 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	HEADLAMP			×	×	×		
Wiper and washer	WIPER			×	×	×		
Turn signal and hazard warning lamps	FLASHER			×	×			
Air conditioner	AIR CONDITIONER			×				
Combination switch	COMB SW			×				
BCM	BCM	×	×			×	×	×
Immobilizer	IMMU		×	×	×			
Interior room lamp battery saver	BATTERY SAVER			×	×	×		
Vehicle security system	THEFT ALM			×	×	×		
RAP system	RETAINED PWR			×	×	×		
Signal buffer system	SIGNAL BUFFER			×	×			
TPMS	AIR PRESSURE MONITOR		×	×	×	×		
Panic alarm system	PANIC ALARM				×			

CONSULT-III Function (BCM - AIR CONDITIONER)

INFOID:0000000006625986

**DATA MONITOR** 

# **DIAGNOSIS SYSTEM (BCM)**

## < SYSTEM DESCRIPTION >

# [MANUAL A/C (TYPE 1)]

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.

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## **SELF-DIAGNOSIS FUNCTION**

## Front Air Control Self-Diagnosis

INFOID:0000000006164751

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

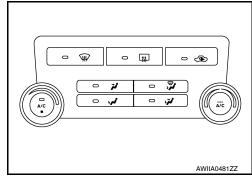
The self-diagnosis function is built into the front air control to quickly locate the cause of malfunctions.

## **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 (if equipped). Refer to <a href="HAC-114">HAC-114</a>, "Front Air Control Self-Diagnosis Code Chart".

## SELF-DIAGNOSTIC MODE

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



INFOID:0000000006164752

## Front Air Control Self-Diagnosis Code Chart

## SELF-DIAGNOSTIC CODE CHART

Code No.	Reference page				
03	Battery voltage out of range	CHG-4, "Work Flow"			
40	Ambient sensor circuit short	HAC 56 "Ambient Concer Diagnosis Dresedure"			
41	Ambient sensor circuit open	HAC-56, "Ambient Sensor Diagnosis Procedure"			
56	Intake sensor circuit short	HAC-64, "Intake Sensor Diagnosis Procedure"			
57	Intake sensor circuit open	MAC-04, Illiake Selisor Diagnosis Procedure			
80	CAN bus fault	LAN-14, "Trouble Diagnosis Flow Chart"			
90	Stuck button	VTL-8, "Removal and Installation"			

## MANUAL A/C IDENTIFICATION TABLE

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

# **DTC/CIRCUIT DIAGNOSIS**

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

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[MANUAL A/C (TYPE 1)]

## MODE DOOR MOTOR

## System Description

INFOID:0000000006164754

#### 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

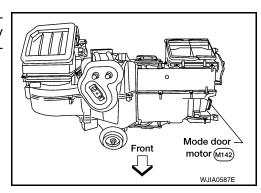
## System Operation

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



# Mode Door Motor Component Function Check

INFOID:0000000006164755

#### INSPECTION FLOW

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

- 1. Press each mode switch and press the  $\mathbf{w}$  (DEF) switch. Each position indicator should illuminate.
- Confirm that discharge air comes out according to the air distribution table. Refer to <u>HAC-109</u>, "<u>Discharge 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 <a href="HAC-116">HAC-116</a>, "Mode Door Motor Diagnosis Procedure".

# Mode Door Motor Diagnosis Procedure

INFOID:0000000006164756

Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - Manual With 2 Control Dial System".

#### SYMPTOM:

Air outlet does not change.

## < DTC/CIRCUIT DIAGNOSIS >

· 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-III, check "MODE FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to <a href="HAC-111">HAC-111</a>, <a href="CONSULT-III Function">"CONSULT-III Function</a> (HVAC)".
- 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 (��), 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-19, "Removal and Installation".

NO >> GO TO 2.

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M180 (A) and the mode door motor harness connector M142 (B).
- 3. Check continuity between front air control harness connector M180 (A) terminals 19, 20 and the mode door motor harness connector M142 (B) terminals 5, 6.

Α		В	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M180	19	M142	5	Yes
	20	IVITAZ	6	165

 Check continuity between front air control harness connector M180 terminals 19, 20 and ground.

Connector	Terminal	_	Continuity
M180	19	Ground	No
W 100	20	Ground	NO

## Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

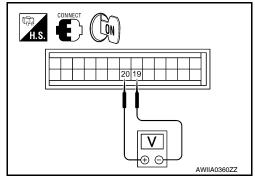
# H.S. DISCONNECT OFF

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# $3. \mathsf{CHECK}$ FRONT AIR CONTROL FOR MODE DOOR MOTOR POWER AND GROUND

- Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- Press the mode switch to the D/F ( ) mode.
- 4. Check voltage between front air control harness connector M180 terminal 19 and terminal 20 while pressing the mode switch to the VENT (\*\*), and then the B/L (\*\*) mode.

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Oomiccio	(+)	(-)	Condition		
M180	19	20	D/F ( ) mode to VENT ( ) mode	Battery voltage	
WITOO	20	19	VENT ( ) mode to B/L ( ) mode	Battery voltage	



## Is the inspection result normal?

YES >> GO TO 4.

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## < DTC/CIRCUIT DIAGNOSIS >

NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

## 4. CHECK MODE DOOR MOTOR 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 M180 (C) terminal 3, and M181 (A) terminal 28 and the mode door motor harness connector M142 (B) terminals 1, 3.

A and	С	В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M180 (C)	3	M142	3	Yes
M181 (A)	28	101142	1	165

 Check continuity between front air control harness connector M180 (C) terminal 3, M181 (A) terminal 28 and ground.

, ,			•
Connector	Terminal	_	Continuity
M180 (C)	3	Ground	No
M181 (A)	28	Ground	INU

## Is the inspection result normal?

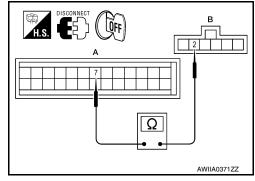
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

 Check continuity between front air control harness connector M180 (A) terminal 7 and mode door motor harness connector M142 (B) terminal 2.

А	Α			Continuity
Connector	Terminal	Connector	Terminal	Continuity
M180	7	M142	2	Yes



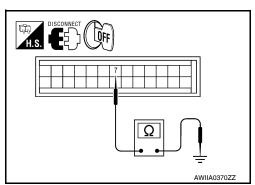
2. Check continuity between front air control harness connector M180 terminal 7 and ground.

Connector	Terminal	_	Continuity
M180	7	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

## **MODE DOOR MOTOR**

## < DTC/CIRCUIT DIAGNOSIS >

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

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M180 (B) terminal 3, and M181 (A) terminal 28.

Α		В		
Connector	Terminals	Connector	Terminals	Voltage (Approx.)
Connector	(+)	Connector	(-)	voltage (Approx.)
M181	28	M180	3	5 Volts

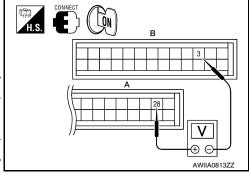
4. Check voltage between front air control harness connector M180 terminal 7 and ground.

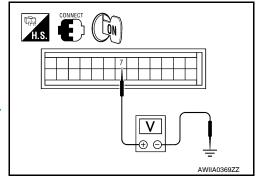
Connector	Terminal	_	Voltage (Approx.)
M180	7	Ground	0 Volts

## Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and Installation".





# 7. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

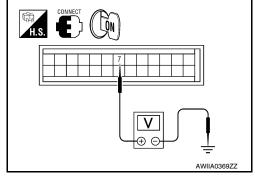
- 1. Reconnect the mode door motor harness connector M142.
- 2. Check voltage between front air control harness connector M180 terminal 7 and ground.

Connector	Terminal	_	Voltage (Approx.)
M180	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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".

NO >> Replace the mode door motor. Refer to <u>VTL-19</u>, "Removal and Installation".



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## System Description

#### INFOID:0000000006164757

#### SYSTEM DESCRIPTION

#### SYMPTOM:

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

## SYSTEM DESCRIPTION

#### Component Parts

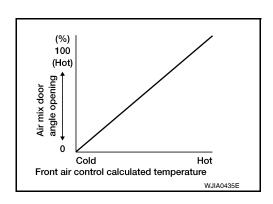
Air mix door control system components are:

- · Front air control
- Air mix door motor
- · Position balanced resistor (PBR) (built-into air mix door motors)
- · 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.

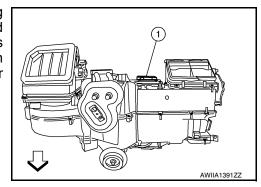
Air Mix Door Control Specification



#### COMPONENT DESCRIPTION

#### Air Mix Door Motors

The air mix door motor (1) is attached to the front heater & cooling unit assembly. The 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.



INFOID:0000000006164758

## Air Mix Door Motor Component Function Check

## INSPECTION FLOW

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

- Turn the temperature control dial clockwise to maximum hot.
- Check for hot air at discharge air outlets.

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>> GO TO 2.

# 2.confirm symptom by performing operational check - temperature decrease

- 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 <a href="HAC-121">HAC-121</a>, "Air Mix Door Motor Diagnosis Procedure".

## Air Mix Door Motor Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - Manual With 2 Control Dial System".

SYMPTOM:

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

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

- 1. Turn ignition switch ON.
- Using CONSULT-III, check "DVR MIX FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to <u>HAC-111</u>, "CONSULT-III Function (HVAC)".
- 3. Observe "DVR MIX FDBACK" voltage while rotating temperature control dial between 32°C (90°F) and 18°C (60°F).

Monitor Item	onitor Item Condition Re	
DVR MIX FDBCK	Rotate temperature control dial between 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 is OK.

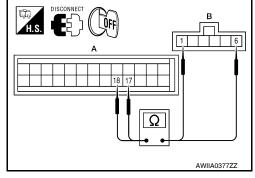
Inspect air mix door for mechanical failure and repair if necessary. If air mix door is OK, refer to
 <u>HAC-167</u>, "Component Function Check" for insufficient cooling or <u>HAC-175</u>, "Component Function Check" for insufficient heating.

NO >> GO TO 2.

# 2.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 M180 (A) and the air mix door motor harness connector M147 (B).
- 3. Check continuity between front air control harness connector M180 (A) terminals 17, 18 and the air mix door motor harness connector M147 (B) terminals 1, 6.

А		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M180	17	M147	1	Yes
WITOU	18	IVI 147	6	165



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## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

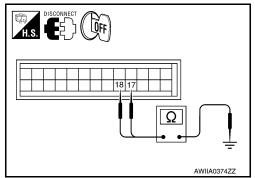
4. Check continuity between front air control harness connector M180 terminals 17, 18 and ground.

Connector	Terminal	_	Continuity
M180	17	Ground	No
IVITOO	18	Ground	NO

## Is the inspection result normal?

YES >> GO TO 3.

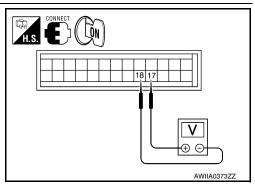
NO >> Repair or replace harness as necessary.



# $3. \mathsf{check}$ front air control for air mix door motor power and ground

- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Rotate temperature control dial to 32°C (90°F).
- 4. Check voltage between front air control harness connector M180 terminal 17 and terminal 18 while rotating temperature control dial to 18°C (60°F) and back to 32°C (90°F).

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voitage (Approx.)	
M180	17	18	While rotating temperature control dial from 32°C (90°F) to 18°C (60°F)	Battery voltage	
IVITOU	18	17	While rotating temperature control dial 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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connectors.
- Check continuity between front air control harness connector M180 (C) terminal 3, connector M181 (A) terminal 28 and air mix door motor harness connector M147 (B) terminals 3, 2.

A and	С	В	Continuity	
Connector	Terminal	Terminal Connector		Continuity
M180 (C)	3	M147	2	Yes
M181 (A)	28	IVI I 47	3	165

 Check continuity between front air control harness connector M180 (C) terminal 3, M181 (A) terminal 28 and ground.

Connector	Terminal	_	Continuity
M180 (C)	3	Ground	No
M181 (A)	28	Glound	NO

## Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

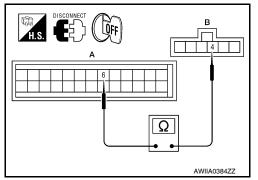
## 5. CHECK PBR FEEDBACK SIGNAL CIRCUIT FOR OPEN AND SHORT TO GROUND

## < DTC/CIRCUIT DIAGNOSIS >

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

 Check continuity between front air control harness connector M180 (A) terminal 6 and air mix door motor harness connector M147 (B) terminal 4.

А		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M180	6	M147	4	Yes



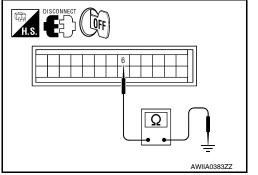
Check continuity between front air control harness connector M180 terminal 6 and ground.

Connector	Terminal	_	Continuity
M180	6	Ground	No

## Is the inspection result normal?

YES >> GO TO 6.

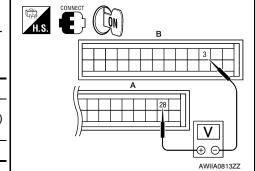
NO >> Repair or replace harness as necessary.



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.
- 3. Check voltage between front air control harness connector M180 (B) terminal 3, and M181 (A) terminal 28.

А		В		
Connector	Terminals	Connector	Terminals	Voltage (Approx.)
Connector	(+)	Connector	(-)	voitage (Approx.)
M181	28	M180	3	5 Volts



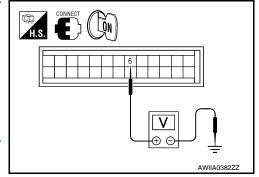
 Check voltage between front air control harness connector M180 terminal 6 and ground.

Connector	Terminal	_	Voltage (Approx.)
M180	6	Ground	0 Volts

## Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and Installation".



7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

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## < DTC/CIRCUIT DIAGNOSIS >

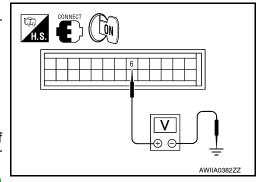
[MANUAL A/C (TYPE 1)]

- 1. Reconnect the air mix door motor harness connector M147.
- Check voltage between front air control harness connector M180 terminal 6 and ground.

Connector	Terminal	_	Voltage (Approx.)
M180	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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".
- NO >> Replace air mix door motor. Refer to <u>VTL-20, "Removal and Installation".</u>



## INTAKE DOOR MOTOR

# System Description

#### INFOID:0000000006164760

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#### SYSTEM DESCRIPTION

#### SYMPTOM:

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

## SYSTEM DESCRIPTION

#### Component Parts

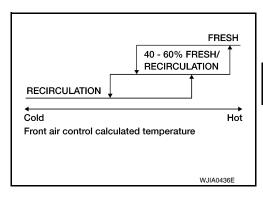
Intake door control system components are:

- Front air control
- Intake door motor (PRB built into the intake door motor)
- · Ambient sensor
- · 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.

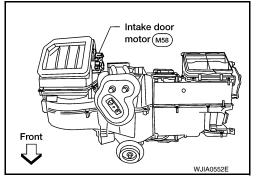
Intake Door Control Specification



## COMPONENT DESCRIPTION

#### Intake door motor

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



# Intake Door Motor Component Function Check

#### INFOID:0000000006164761

## INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - REC ( $extit{4.5}$ )

- Press the vent mode switch (\*).
- 2. Press REC ( ) switch. The REC ( ) jindicator should illuminate.
- 3. Press REC ( ) switch again. The REC ( ) indicator should go out.
- 4. Listen for intake door position change (you should hear blower sound change slightly).

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## Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-126, "Intake Door Motor Diagnosis Procedure".

## Intake Door Motor Diagnosis Procedure

INFOID:0000000006164762

Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - Manual With 2 Control Dial System".

#### DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

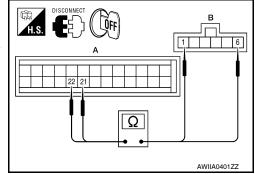
#### SYMPTOM:

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

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M180 (A) and the intake door motor harness connector M58 (B).
- Check continuity between front air control harness connector M180 (A) terminals 21, 22 and the intake door motor harness connector M58 (B) terminals 1, 6.

A		В	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M180	21	M58	6	Yes
WITOU	22	IVISO	1	163



 Check continuity between front air control harness connector M180 terminals 21, 22 and ground.

Connector	Terminal	1	Continuity
M180	21	Ground	No
W1700	22	Ground	NO

# AWIIA0398ZZZ

## Is the inspection result normal?

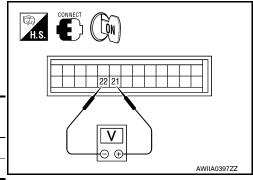
YES >> GO TO 3.

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.
- 3. Check voltage between front air control harness connector M180 terminal 21 and terminal 22 while placing the HVAC system into self-diagnostic mode.

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voltage (Approx.)	
M180	21	22	Self-diagnostic mode (opening)	Battery voltage	
IVITOU	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 <a href="VTL-18">VTL-18</a>, "Removal and Installation".

NO >> Replace front air control. Refer to VTL-8, "Removal and Installation".

## **DEFROSTER DOOR MOTOR CIRCUIT**

## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

## DEFROSTER DOOR MOTOR CIRCUIT

# System Description

#### INFOID:0000000006164763

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## SYSTEM DESCRIPTION

## Component Parts

Defroster door control system components are:

- Front air control
- Defroster door motor
- Position balanced resistor (PBR) (Built into defroster door motor)
- · Ambient sensor
- · Intake sensor

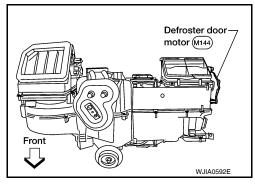
## **System Operation**

The front air control determines defroster door position based on the position of the defroster switch. When the defroster switch is depressed, the defroster door motor rotates directing air to the defroster ducts. When any mode other than defroster is selected, the defroster motor rotates in the opposite direction closing off air flow to the defroster ducts.

#### COMPONENT DESCRIPTION

#### Defroster door motor

The defroster door motor is attached to the front heater & cooling unit assembly. The front air control sends a voltage to rotate to the defroster door directing the air flow either to the defroster ducts, or to the floor ducts, depending on which way the voltage and ground are applied to the motor leads. Motor rotation is conveyed to a lever which activates the defroster door.



# Defroster Door Motor Component Function Check

## INFOID:0000000006164764

#### INSPECTION FLOW

# 1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - DEFROSTER DOOR

- Select vent (\*) mode.
- 2. Press the defrost switch ( ). Defroster indicator should illuminate.
- 3. Listen for defroster door position change (blower sound should change slightly).

## Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-127, "Defroster Door Motor Diagnosis Procedure"

## Defroster Door Motor Diagnosis Procedure

INFOID:0000000006164765

Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - Manual With 2 Control Dial System".

## SYMPTOM:

- · Defroster door does not change.
- Defroster door motor does not operate normally.

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## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

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- $1. {\sf check\ Defroster\ Door\ Motor\ Position\ Balanced\ resistor\ (PBR)\ feedback\ voltage}$
- 1. Turn ignition switch ON.
- 2. Using CONSULT-III, check "DEF FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to <a href="HAC-111">HAC-111</a>, <a href="CONSULT-III Function">"CONSULT-III Function (HVAC)"</a>.
- Observe "DEF FDBCK" voltage while cycling front air control mode switch through all modes and pressing DEF switch.

Monitor Item	Condition	Results
DEF FDBCK	Cycle mode switch through all modes, D/F (), VENT (), B/L (), FOOT(), and press DEF ()	Voltage varies between 0.2 and 4.8 volts.

## Is the inspection result normal?

YES >> • Defroster door motor is OK.

• Inspect defroster door for mechanical failure. Refer to VTL-17, "Removal and Installation".

NO >> GO TO 2.

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

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M180 (A) and the defroster door motor harness connector M144 (B).
- Check continuity between front air control harness connector M180 (A) terminals 23, 24 and the defroster door motor harness connector M144 (B) terminals 1, 6.

A		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M180	23	M144	1	Yes
WITOU	24	101144	6	165

 Check continuity between front air control harness connector M180 terminals 23, 24 and ground.

Connector	Terminal	_	Continuity
M180	23	Ground	No
	24	Ground	NO

## Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

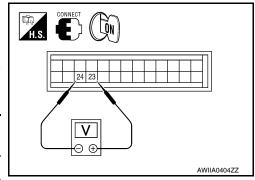
# DISCONNECT OFF 24 23 AWIIA0403ZZ

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# 3. CHECK FRONT AIR CONTROL FOR DEFROSTER DOOR MOTOR POWER AND GROUND

- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- Press the mode switch to the VENT (♥) mode.
- Check voltage between front air control harness connector M180 terminal 23 and terminal 24 while pressing the defroster switch (₩).

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voltage (Approx.)	
M180	23	24	Following defroster switch ( ) on	Battery voltage	
100	24	23	Following defroster switch ( ) off	Battery voltage	



## Is the inspection result normal?

YES >> GO TO 4.

## **DEFROSTER DOOR MOTOR CIRCUIT**

## < DTC/CIRCUIT DIAGNOSIS >

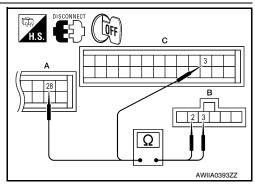
[MANUAL A/C (TYPE 1)]

NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

# 4. CHECK DEFROSTER DOOR MOTOR PBR CIRCUITS FOR OPEN AND SHORT TO GROUND

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connectors M180 (C) and M181 (A).
- 3. Check continuity between front air control harness connector M180 (C) terminal 3, and M181 (A) terminal 28 and the defroster door motor harness connector M144 (B) terminals 2, 3.

A and C		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M180 (C)	3	M144	2	Yes
M181 (A)	28	IVI 1 <del>44</del>	3	162



4. Check continuity between front air control harness connector M180 (C) terminal 3, M181 (A) terminal 28 and ground.

Connector	Terminal	_	Continuity
M180 (C)	3	Ground	No
M181 (A)	28	Glound	NO

## Is the inspection result normal?

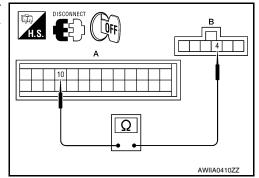
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

 Check continuity between front air control harness connector M180 (A) terminal 10 and defroster door motor harness connector M144 (B) terminal 4.

А		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M180	10	M144	4	Yes



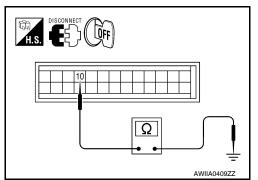
Check continuity between front air control harness connector M180 terminal 10 and ground.

Connector	Terminal	_	Continuity
M180	10	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

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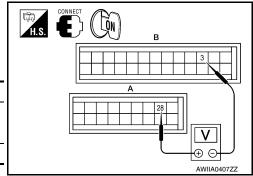
## DEFROSTER DOOR MOTOR CIRCUIT

## < DTC/CIRCUIT DIAGNOSIS >

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

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M180 (B) terminal 3, and M181 (A) terminal 28.

Α		В		
Connector	Terminals	Connector	Terminals	Voltage (Approx.)
Connector	(+)	Connector	(-)	voltage (Approx.)
M181	28	M180	3	5 Volts



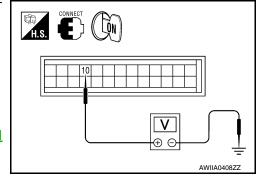
4. Check voltage between front air control harness connector M180 terminal 10 and ground.

Connector	Terminal	_	Voltage (Approx.)
M180	10	Ground	0 Volts

## Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and <u>Installation"</u>.



# 7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

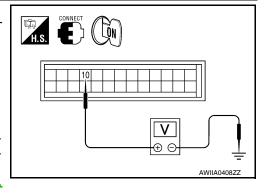
- 1. Reconnect the defroster door motor harness connector M144.
- Check voltage between front air control harness connector M180 terminal 10 and ground.

Connector	Terminal	_	Voltage (Approx.)
M180	10	Ground	0.2 to 4.8 Volts

## Is the inspection result normal?

YES >> Inspect defroster door for binding or mechanical failure. If defroster door moves freely, replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

NO >> Replace the defroster door motor. Refer to <u>VTL-17</u>. "Removal and Installation".



# System Description

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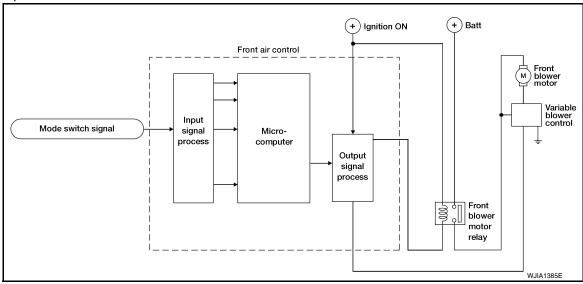
# SYSTEM DESCRIPTION

## Component Parts

Blower speed control system components are:

- Front air control
- Variable blower control
- Front blower motor relay
- · Front blower motor
- · Ambient sensor
- · Intake sensor

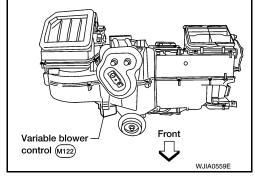
## System Operation



## COMPONENT DESCRIPTION

#### Variable Blower Control

The variable blower control 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

INFOID:0000000006164767

## INSPECTION FLOW

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

- 1. Rotate the blower control dial clockwise once. Blower motor should operate in low speed.
- 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.

**HAC-131** Revision: August 2010 2011 Titan

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## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

NO >> Go to diagnosis procedure. Refer to <a href="HAC-132">HAC-132</a>, "Front Blower Motor Diagnosis Procedure".

## Front Blower Motor Diagnosis Procedure

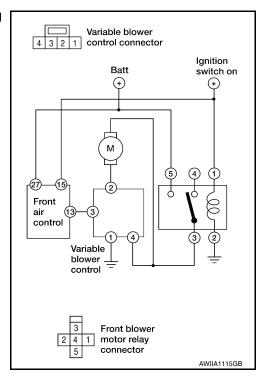
INFOID:0000000006164768

Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring <u>Diagram - Manual With 2 Control Dial System"</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 20A fuses [No. 24 and 27 (Located in the fuse and fusible link box)]. For fuse layout. Refer to PG-72. "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.
- 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.

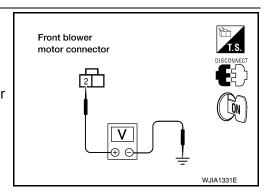
#### 2 - Ground

## : Battery voltage

## Is the inspection result normal?

YES >> GO TO 11. NO >> GO TO 3.

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



## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor relay.
- Check voltage between front blower motor relay harness connector M107 terminal 5 and ground.

## 5 - Ground : Battery voltage

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.

# Front blower motor relay connector S WJIA1886E

# 4. CHECK FRONT BLOWER MOTOR RELAY

Turn ignition switch OFF.

Check front blower motor relay. Refer to HAC-135, "Front Blower Motor Component Inspection".

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace front blower motor relay.

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

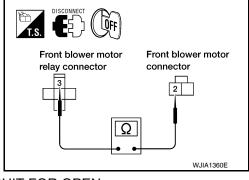
Check continuity between front blower motor relay harness connector M107 terminal 3 and front blower motor harness connector M62 terminal 2.

## 3 - 2 : Continuity should exist.

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector.



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

- Disconnect variable blower control harness connector.
- Check continuity between front blower motor relay harness connector M107 (A) terminals 3 and variable blower control harness connector M122 (B) terminal 4.

## 3 - 4 : Continuity should exist.

#### Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair harness or connector.

# 7. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

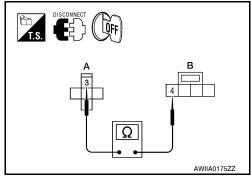
- 1. Disconnect front air control connector.
- Check continuity between front air control harness connector M180 (B) terminal 13 and variable blower control harness connector M122 (A) terminal 3.

# 13 - 3 : Continuity should exist.

## Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.



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

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## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

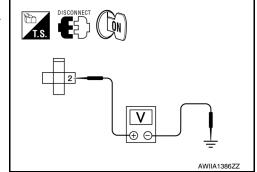
- Turn ignition switch ON.
- Check voltage between front blower motor relay harness connector M107 terminal 2 and ground.

#### 2 - Ground : Battery voltage

#### Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair front blower motor ground circuit or connector.



# 9. REPLACE FUSES

- Replace fuses.
- Activate the front blower motor.

## Does the fuse blow?

YES >> GO TO 10.

NO >> Inspection End.

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

- Turn ignition switch OFF.
- Disconnect front blower motor connector and variable blower control connector.
- Check continuity between variable blower control harness connector M122 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 VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

- 1. Disconnect front air control connector.
- Check continuity between front air control harness connector M180 (B) terminal 13 and variable blower control harness connector M122 (A) terminal 3.

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

#### Is the inspection result normal?

NO >> Repair harness or connector.

## YES >> GO TO 12.

# 12. CHECK FRONT BLOWER MOTOR

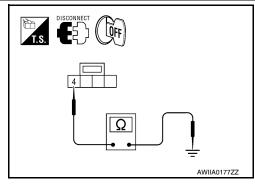
Check front blower motor. Refer to HAC-131, "Front Blower Motor Component Function Check".

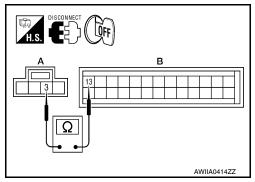
## Is the inspection result normal?

YES >> GO TO 13.

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

## 13.check blower motor ground circuit





## < DTC/CIRCUIT DIAGNOSIS >

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

Check continuity between front blower motor harness connector M62 (B) terminal 1 and variable blower control harness connector M122 (A) terminal 2.

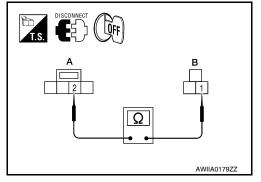
1 - 2

: Continuity should exist.

Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair harness or connector.



# 14. CHECK VARIABLE BLOWER CONTROL GROUND CIRCUIT

Check continuity between variable blower control harness connector M122 terminal 1 and ground.

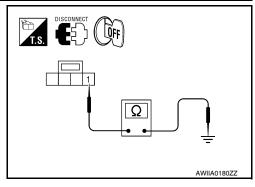
1 - Ground

: Continuity should exist.

Is the inspection result normal?

YES >> Replace variable blower control. Refer to <u>VTL-22</u>, "Removal and Installation".

NO >> Repair harness or connector.

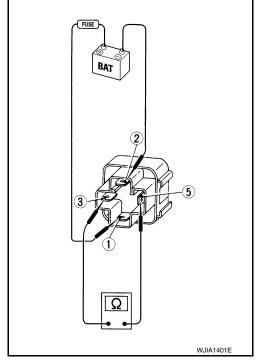


INFOID:0000000006164769

## Front Blower Motor Component Inspection

## COMPONENT INSPECTION

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



Front Blower Motor

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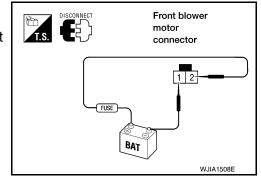
Revision: August 2010 HAC-135 2011 Titan

## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

Confirm smooth rotation of the blower motor.

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



## MAGNET CLUTCH

# **System Description**

#### INFOID:0000000006164770

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## 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.

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

## Magnet Clutch Component Function Check

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#### INSPECTION FLOW

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

- Turn ignition switch ON.
- 2. Turn the blower control dial to low speed and 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 >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>HAC-137</u>, "Magnet Clutch Diagnosis Procedure".

## Magnet Clutch Diagnosis Procedure

INFOID:0000000006164772

INFOID:0000000006164771

Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - Manual With 2 Control Dial System".

#### DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

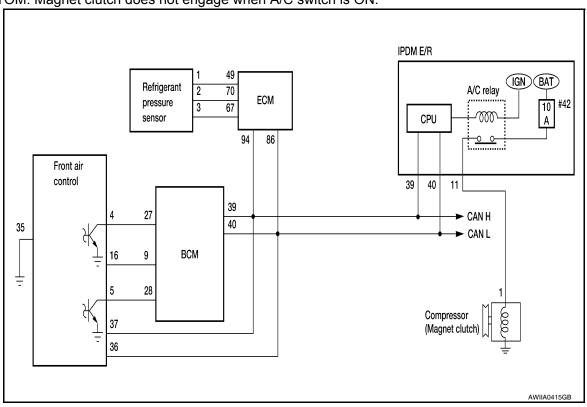
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Revision: August 2010 HAC-137 2011 Titan

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 <u>HAC-114</u>, "Front Air Control Self-Diagnosis".

Is the inspection result normal?

YES >> GO TO 2.

NO

>> • Malfunctioning intake sensor. Refer to HAC-147, "Intake Sensor Diagnosis Procedure".

• Malfunctioning ambient sensor. Refer to HAC-144, "Ambient Sensor Diagnosis Procedure".

## PERFORM AUTO ACTIVE TEST

Refer to PCS-11, "Diagnosis Description".

#### Does magnet clutch operate?

YES >> • (P)WITH CO

>> • • WITH CONSULT-III GO TO 5.

• WITHOUT CONSULT-III

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

## 11 – 1 : Continuity should exist.

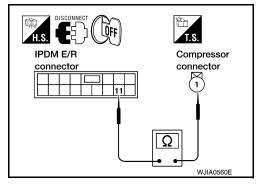
4. Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

## 11 – ground : Continuity should not exist.

## Is the inspection result normal?

YES >> GO TO 4.





#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Repair harness or connector.

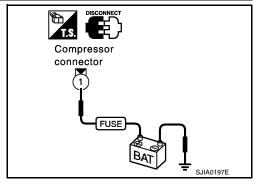
## 4. CHECK MAGNET CLUTCH CIRCUIT

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

## Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to <u>PCS-28</u>, "Removal and Installation of IPDM E/R".

NO >> Replace magnet clutch. Refer to <u>HA-33</u>, "Removal and Installation for Compressor Clutch".



H.S. CISCONNECT OFF

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# 5. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to HAC-112, "CONSULT-III Function (BCM - AIR CONDITIONER)".

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

#### Is the inspection result normal?

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

6. CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

- Turn ignition switch OFF.
- Disconnect BCM connector and front air control connector.
- Check continuity between BCM harness connector M18 (A) terminal 27 and front air control harness connector M180 (B) terminal 4.

## 27 - 4 Continuity should exist.

Check continuity between BCM harness connector M18 (A) terminal 27 and ground.

## 27 - ground Continuity should not exist.

#### Is the inspection result normal?

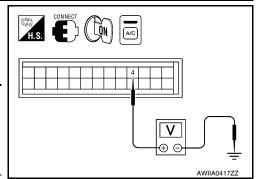
YES >> GO TO 7.

NO >> Repair harness or connector.

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

- 1. Reconnect BCM connector and front air control connector.
- 2. Turn ignition switch ON.
- Check voltage between front air control harness connector M180 terminal 4 and ground.

	Terminals			
(+)				
front air con- trol connec- tor	Terminal No.	(-)	Condition	Voltage
M180	4	Ground	A/C switch: ON	Approx. 0V
	7	Oround	A/C switch: OFF	Approx. 5V



Is the inspection result normal?

YES >> GO TO 8.

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[MANUAL A/C (TYPE 1)]

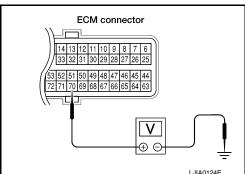
NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control. Refer to <u>VTL-8</u>. "Removal and Installation".

NO-2 >> If the voltage is approx. 0V when A/C switch is OFF, replace BCM. Refer to BCS-53, "Removal and Installation".

## 8. CHECK REFRIGERANT PRESSURE SENSOR

- 1. Start engine.
- 2. Check voltage between ECM harness connector F54 terminal 70 and ground.

Terminals				_
(	(+)		Condition	Voltage
ECM con- nector	Terminal No.	(-)		· o.tago
F54	70	Ground	A/C switch: ON	Approx. 0.36 - 3.88V



## Is the inspection result normal?

YES >> GO TO 9.

NO >> Refer to EC-465, "Diagnosis Procedure".

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to HAC-112, "CONSULT-III Function (BCM - AIR CONDITIONER)".

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 M180 (B) terminal 5.

# 28 - 5 Continuity should exist.

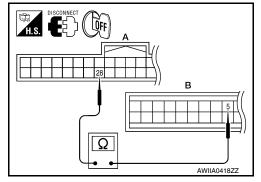
- Check continuity between BCM harness connector M18 (A) terminal 28 and ground.
  - 28 ground Continuity should not exist.

## Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

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



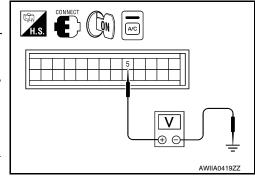
## **MAGNET CLUTCH**

## < DTC/CIRCUIT DIAGNOSIS >

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

- 1. Reconnect BCM connector and front air control connector.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M180 terminal 5 and ground.

	Terminals	Condition	Voltage	
(+)				
front air con- trol connector	Terminal No.	(-)		J
M180	5	Ground	A/C switch: ON Blower motor operates	Approx. 0V
			A/C switch: OFF	Approx. 5V



## Is the inspection result normal?

YES >> GO TO 12.

NO-1 >> If the voltage is approx. 5V when blower motor is ON, replace front air control. Refer to <u>VTL-8</u>. "Removal and Installation".

NO-2 >> If the voltage is approx. 0V when blower motor is OFF, replace BCM. Refer to <u>BCS-53</u>, "Removal and Installation".

# 12. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-4, "System Description".

- BCM ECM
- ECM IPDM E/R
- ECM Front air control

## Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-28, "Removal and Installation of IPDM E/R".

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

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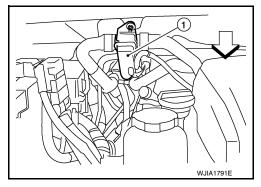
## WATER VALVE CIRCUIT

Description INFOID:000000006164773

#### COMPONENT DESCRIPTION

#### Water Valve

The water valve (1) cuts the flow of engine coolant to the heater core to allow for maximum cooling during A/C operation. It is controlled by the front air control.



## Water Valve Diagnosis Procedure

INFOID:0000000006164774

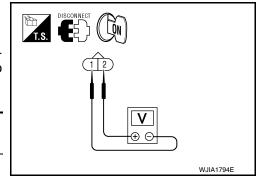
Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - <u>Manual With 2 Control Dial System"</u>.

## DIAGNOSTIC PROCEDURE FOR WATER VALVE

# 1. CHECK WATER VALVE POWER AND GROUND CIRCUITS

- 1. Disconnect water valve connector F68.
- 2. Turn ignition switch ON.
- 3. Rotate temperature control dial to maximum heat.
- 4. Check voltage between water valve harness connector F68 terminal 1 and terminal 2 while rotating temperature control dial to maximum cold.

Connector	Terminals		Condition	Voltage
	(+)	(-)	Condition	(Approx.)
Water valve: F68	2	1	Rotate temperature control dial	Battery voltage



#### Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

# 2.CHECK WATER VALVE CONTROL OUTPUT CIRCUIT

- Turn ignition switch OFF.
- Disconnect front air control connector M181.
- Check continuity between water valve harness connector F68

   (A) terminal 2 and front air control harness connector M181 (B) terminal 42.

## 2 - 42 : Continuity should exist.

Check continuity between water valve harness connector F68

 (A) terminal 2 and ground.

## 2 - Ground : Continuity should not exist.

## Is the inspection result normal?

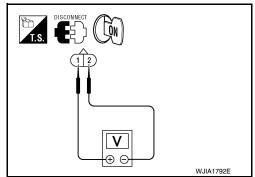
YES >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

NO >> Repair harness or connector.

# 3. CHECK WATER VALVE POWER AND GROUND CIRCUITS

- 1. Rotate temperature control dial to maximum cold.
- Check voltage between water valve harness connector F68 terminal 1 and terminal 2 while rotating temperature control dial to maximum heat.

Connector	Terminals		Condition	Voltage
Connector	(+)	(-)	Condition	(Approx.)
Water valve: F68	1	2	Rotate temperature control dial	Battery voltage



## Is the inspection result normal?

YES >> Replace the water valve.

NO >> GO TO 4.

# 4. CHECK WATER VALVE CONTROL OUTPUT CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector M181.
- Check continuity between water valve harness connector F68

   (A) terminal 1 and front air control harness connector M181 (B) terminal 41.

## 1 - 41 : Continuity should exist.

Check continuity between water valve harness connector F68

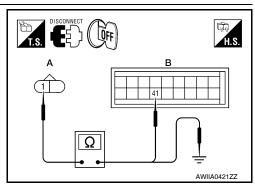
 (A) terminal 1 and ground.

## 1 - Ground : Continuity should not exist.

## Is the inspection result normal?

YES >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

NO >> Repair harness or connector.



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## AMBIENT SENSOR

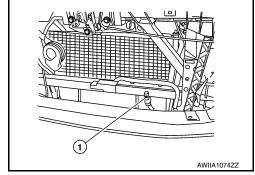
## Component Description

INFOID:0000000006164775

#### 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°C (0.6°F) per 100 seconds.

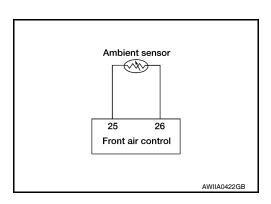
This prevents constant adjustments due to momentary conditions, such as stopping after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front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

## Ambient Sensor Diagnosis Procedure

INFOID:0000000006164776

Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - Manual With 2 Control Dial System".

DIAGNOSTIC PROCEDURE FOR AMBIENT SENSOR SYMPTOM: Ambient sensor circuit is open or shorted.



1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND

### AMBIENT SENSOR

### < DTC/CIRCUIT DIAGNOSIS >

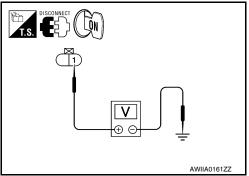
[MANUAL A/C (TYPE 1)]

- Disconnect ambient sensor connector.
- Turn ignition switch ON.
- 3. Check voltage between ambient sensor harness connector E1 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

- Turn ignition switch OFF.
- Disconnect front air control connector.
- 3. Check continuity between ambient sensor harness connector E1 (B) terminal 2 and front air control harness connector M180 (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-144, "Ambient Sensor Diagnosis Procedure".

## Is the inspection result normal?

- YES >> 1. Replace front air control. Refer to VTL-8, "Removal and Installation".
  - GO TO HAC-114, "Front Air Control Self-Diagnosis" and perform self-diagnosis.
- NO Replace ambient sensor. Refer to HA-45, "Removal and Installation". >> 1.
  - GO TO HAC-114, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

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

- 1. Turn ignition switch OFF.
- Disconnect front air control connector.
- 3. Check continuity between ambient sensor harness connector E1 (B) terminal 1 and front air control harness connector M180 (A) terminal 25.

#### 1 - 25 : Continuity should exist.

4. Check continuity between ambient sensor harness connector E1 (B) terminal 1 and ground.

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

# Is the inspection result normal?

YES >> 1. Replace front air control. Refer to VTL-8, "Removal and Installation".

GO TO HAC-114, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> Repair harness or connector.

## Ambient Sensor Component Inspection

#### COMPONENT INSPECTION

**Ambient Sensor** 

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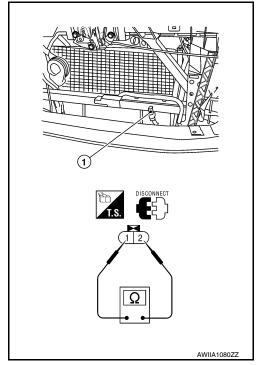
INFOID:0000000006164777

AWIIA1040ZZ

### < DTC/CIRCUIT DIAGNOSIS >

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

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



If NG, replace ambient sensor. Refer to  $\underline{\text{HA-45.}}$  "Removal and Installation".

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

## **INTAKE SENSOR**

# **System Description**

#### INFOID:0000000006164778

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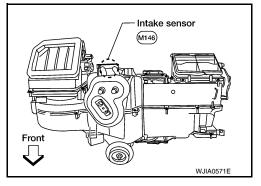
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#### COMPONENT DESCRIPTION

#### 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.



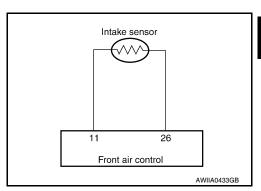
# Intake Sensor Diagnosis Procedure

INFOID:0000000006164779

Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - Manual With 2 Control Dial System".

## DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted.



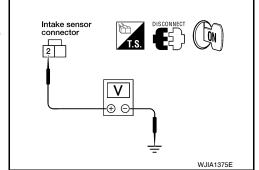
# 1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

- 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 >

[MANUAL A/C (TYPE 1)]

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 (B) terminal 1 and front air control harness connector M180 (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-148, "Intake Sensor Component Inspection".

### Is the inspection result normal?

YES >> 1. Replace front air control. Refer to <u>VTL-8</u>, "Removal and Installation".

2. Go to <u>HAC-114</u>, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> 1. Replace intake sensor. Refer to VTL-11, "Removal and Installation".

2. Go to HAC-114, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

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

- Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 (B) terminal 2 and front air control harness connector M180 (A) terminal 11.

### 2 - 11 : Continuity should exist.

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

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

# Is the inspection result normal?



2. Go to HAC-114, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> Repair harness or connector.

## Intake Sensor Component Inspection

INFOID:0000000006164780

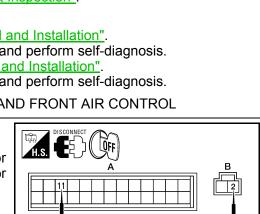
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#### COMPONENT INSPECTION

Intake Sensor



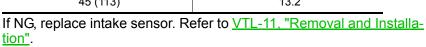
## **INTAKE SENSOR**

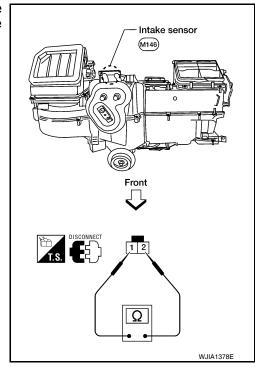
## < DTC/CIRCUIT DIAGNOSIS >

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

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

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





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## POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

## POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

## Component Description

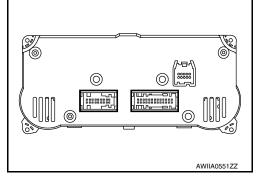
INFOID:0000000006164781

#### COMPONENT DESCRIPTION

#### Front Air Control

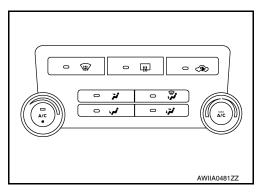
The front air control has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, defroster door motor, blower motor and A/C compressor are then controlled.

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.



### 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 control dial.



# Front Air Control Component Function Check

INFOID:0000000006164782

SYMPTOM: A/C system does not come on.

### INSPECTION FLOW

# 1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - AUTO MODE

- 1. Turn the blower control dial clockwise to low speed.
- 2. Press the A/C Turn the blower control dial clockwise to low speed.
- 3. 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 <u>HAC-150</u>, "Front Air Control Power and Ground Diagnosis Procedure".

# Front Air Control Power and Ground Diagnosis Procedure

INFOID:0000000006164783

Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring <u>Diagram - Manual With 2 Control Dial System"</u>.

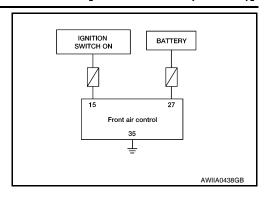
### DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

## POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

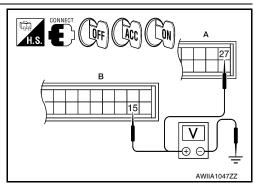
SYMPTOM: A/C system does not come on.



# 1. CHECK POWER SUPPLY CIRCUITS FOR FRONT AIR CONTROL

- 1. Turn ignition switch ON.
- 2. Check voltage between front air control harness connector M180 (B) terminal 15 and M181 (A) terminal 27, and ground.

	Terminals		Igni	tion switch pos	sition
	(+)				
Front air control connector	Terminal No.	(-)	OFF	ACC	ON
M180	15	Ground	Approx. 0V	Approx. 0V	Battery voltage
M181	27	Ground	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-72, "Terminal 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.
- Disconnect front air control connectors.
- Check continuity between front air control harness connector M181 terminal 35 and ground.

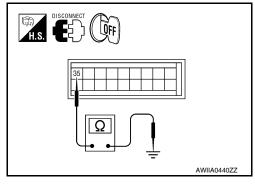
### 35 - Ground

: Continuity should exist.

## Is the inspection result normal?

OK >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and <u>Installation"</u>.

NG >> Repair harness or connector.



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# **ECU DIAGNOSIS INFORMATION**

# MANUAL A/C IDENTIFICATION TABLE

Application Table

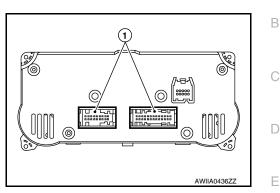
Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

INFOID:0000000006164785

## AIR CONDITIONER CONTROL

## Front Air Control Terminals Reference Values

Measure voltage between each terminal and ground by following Terminals and Reference Value for front air control (1).



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

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



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## TERMINALS AND REFERENCE VALUES FOR FRONT AIR CONTROL

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
3	Р	V ref ACTR (ground)	ON	-	5V
4 W/R Compressor ON signal		ON	A/C switch OFF	5V	
<b>-</b>	V V / 「C		ON	A/C switch ON	0V
5	L/R	Fan ON signal	ON	Blower switch OFF	5V
	L/1X	. an Ort signal	ON	Blower switch ON	0V
6	SB	Air mix door motor feedback	ON	-	0 - 5V
7	GR	Mode door motor feedback	ON	-	0 - 5V
8	R/L	Illumination +	ON	Park lamps ON	Battery voltage
9	BR	Illumination -	-	Park lamps ON	(V) 15 10 5 0 200 ms
10	LG/B	Defroster door motor feedback	ON	-	0 - 5V
11	L/B	Intake sensor	ON	-	0 - 5V
13	G/R	Variable blower control	ON	-	0 - 5V
15	Y/G	Power supply for IGN	ON	-	Battery voltage
16	Y/B	Rear defogger request *1	ON	-	Battery voltage
17	W/G	Air mix door motor CW	ON	Clockwise rotation	Battery voltage
18	G	Air mix door motor CCW	ON	Counterclockwise rotation	Battery voltage

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## AIR CONDITIONER CONTROL

## < ECU DIAGNOSIS INFORMATION >

# [MANUAL A/C (TYPE 1)]

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
19	BR/W	Mode door motor CW	ON	Clockwise rotation	Battery voltage
20	P/L	Mode door motor CCW	ON	Counterclockwise rotation	Battery voltage
21	G/B	Intake door motor CCW	ON	Counterclockwise rotation	Battery voltage
22	0	Intake door motor CW	ON	Clockwise rotation	Battery voltage
23	LG	Defroster door motor CW	ON	Clockwise rotation	Battery voltage
24	P/B	Defroster door motor CCW	ON	Counterclockwise rotation	Battery voltage
25	Р	Ambient sensor	ON	-	0 - 5V
26	V/R	Sensor ground	ON	-	0V
27	Y/R	Power supply for BAT	-	-	Battery voltage
28	Υ	V ref ACTR (5V)	ON	-	0 - 5V
35	В	Ground	-	-	0V
36	Р	CAN-L	ON	-	0 - 5V
37	L	CAN-H	ON	-	0 - 5V
41	Y/L	Water valve	ON	Water valve open	Battery voltage
41	1/L	water valve	ON	Water valve closed	0V
42	W/G	Water valve	ON	Water valve open	0V
44	vv/G	vvalci valve	ON	Water valve closed	Battery voltage

<sup>\*1:</sup> If equipped

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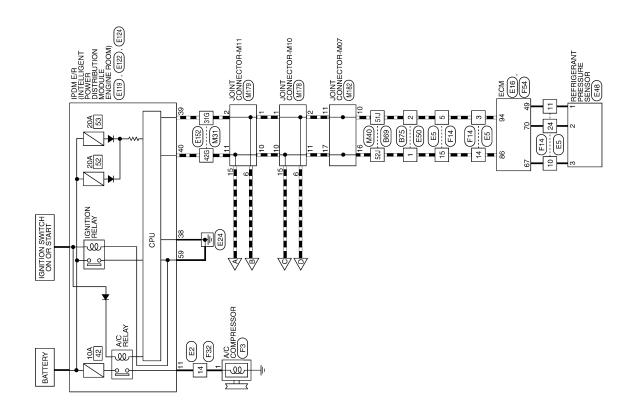
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# WIRING DIAGRAM

# AIR CONDITIONER CONTROL

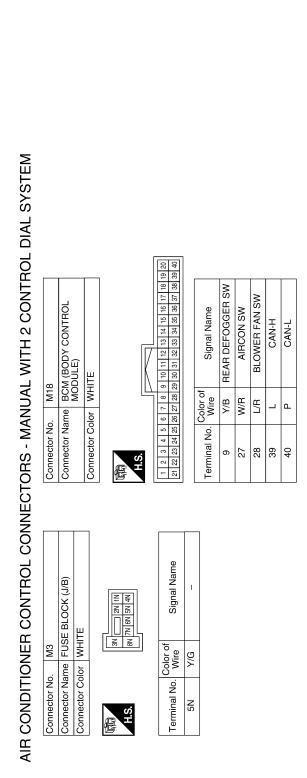
Wiring Diagram - Manual With 2 Control Dial System

С CC CREW CAB D Е F Н AIR CONDITIONER CONTROL - MANUAL WITH 2 CONTROL DIAL SYSTEM HAC J M181 M180 K FRONT AIR CONTROL E152 L M M31 Ν IGNITION SWITCH ON OR START 0 Р 10A BATTERY



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//B)							Signal Name	_		
M39 FUSE BLOCK (J/B)	· L		0,00	80 70 60 50 40			Signal			
<u> </u>		_		08 07 07		_	. Wire	Y/R		
Connector No.	Connector Color			Į.	5		l erminal No.	4Q		
Vame										
Signal Name	1	1				1	ı			
Color of Wire	\/L	M/G	_	۵	۵	N/R	۵	۵		
Terminal No.	21G	29G	31G	42G	44G	45G	71G	79G		•
			[[							
				16			46 136 126 116	בים בים בים	14G   43G   42G   42G   42G   53G   52G   51G   42G   63G   62G   62G   71G   71G   76G   63G   63G	
WIRE TO WIRE	WHITE			56 46 36 26	8		21G 20G 19G 18G 17G 16G 15G 14G 13G	200 200 200 200 200 200 200 200 200 200	50G 49G 48G 47G 46G 45G 44G 43G     70G 69G 68G 67G 66G 65G 64G 63G     70G 69G 69G 67G 66G 65G 64G 63G     75G 74G 73G 77G 77G 77G     80G 73G 77G 77G 77G 77G 77G 77G 77G 77G 77	
le l		_					216 206		100	
Connector No.	Connector Color		E	O I						
									ABIIA0017GB	

Connector Name WIRE TO WIRE Connector Color WHITE	Connector Name INT	INTAKE DOOR MOTOR BLACK	Connector Name Connector Color		M62 FRONT BLOWER MOTOR BLACK
5.51 4.4 3.3 2.2 1.1 10.0 9.0 8.0 7.7 6.0	H.S.	3 4 5 6	S.H.		(Fa)
21.) 20.0 19.0 18.0 17.0 16.0 15.0 14.0 13.0 12.0 11.J 30.0 28.0 28.0 27.0 28.0 28.0 28.0 28.0 22.0	Terminal No. Wire	Signal Name	Terminal No.	Color of Wire	Signal Name
41.0 40.0 39.0 38.0 37.0 38.0 38.0 38.0 38.0 38.0 38.0	1 %	1 1	- 0	N/I	1
500 1500 1500 1500 1500 1500 1500 1500			1	1	
755 744 735 725 775 801 759 769 775 769					
Color of Signal Name					
-					
M107	Connector No. M122	22	Connector No.	. M142	
Connector Name FRONT BLOWER RELAY Connector Color BLACK	VAF Connector Name COI	VARIABLE BLOWER CONTROL (2 CONTROL DIAI SYSTEM OR AUTO	Connector Name		MODE DOOR MOTOR BLACK
8	Connector Color WH	A/C) WHITE	E	֓֟֟֓֓֓֓֓֓֓֓֓֟֟֓֓֓֓֓֟֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	
2 4 1			H.S.	1 2 3	4 5 6
	<b>⊘</b> ;	2 3 4	Terminal No.	Color of Wire	Signal Name
Wire Signal Name	Terminal No. Wire	Signal Name	,		- (2 CONTROL DIAL
- 5/A			- 1		SYSIEM OR AUTO AVO
B - (2 CONTROL DIAL SYSTEM OR AUTO A/C)		ı	2	GR	COTINGO ()
M/L –		ı	е	۵.	SYSTEM OR AUTO A/C)
1	4 W/L	1	2	BR/W	1
GR –			ď	č	1

	A B
Connector No.   M147  Connector Name   AIR MIX DOOR   MOTOR (DRIVER)  Connector Color of   Signal Name   1   W/G   -	С
Connector No. M147 Connector Name AIR W Connector Color of Wire  1 W/G 3 Y 3 Y 6 G 6 G	D
Connector No. Connector Nam Connector Colc  Terminal No. 6 6	Е
	F
Connector No. M146  Connector Name INTAKE SENSOR  Connector Color of Signal Name  1 V/R -  2 L/B -  Connector No. M179  Connector Name JOINT CONNECTOR-M11  Connector Color of Signal Name  1 L -  2 L -  2 L -  3 Signal Name  1 L -  2 L -  4 Signal Name  1 L -  2 L -  2 L -  4 Signal Name  1 L -  2 L -  4 Signal Name  1 L -  2 L -  4 Signal Name  1 L -  2 L -  4 Signal Name  1 L -  10 P -  11 P -  11 P -  11 P -  15 P -  16 P -  17 P -  18 P -  19 P -  10 P -  11 P P -  12 P -  13 P P -  14 P P -  15 P P -  16 P P P -  17 P P P P P P P P P P P P P P P P P P P	G
M146   SE   SE   SE   SE   SE   SE   SE   S	Н
Connector No. M146  Connector Name INTAKE SENSOR  Connector Name INTAKE SENSOR  Connector Name INTAKE SENSOR  Terminal No. Wire  Connector Name JOINT CONNECTO  Connector Name JOINT CONNECTO  Connector Color of Signal Name  1	HAC
	J
	K
Connector No. M144  Connector Name DEFROSTER DOOR MOTOR  Connector Color of Signal Name  1 LG/B	L
M144   Signal Na   Signal Na	M
Connector No.  Connector Name Connector Color  1	N
Connec Connec Connec Connec Connec Connec	0

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Revision: August 2010 HAC-159 2011 Titan

AMB TEMP SEN SENS RETURN

Signal Name

Color of Wire

Terminal No.

33 35

DEFROST DR A DEFROST DR B

RECIRC DRI B RECIRC DRI A

0 2

Connector No. M182  Connector Name JOINT CONNECTOR-M07  Connector Color WHITE	Nam No.			WHIT WHIT			\[ \frac{1}{2} \		C    2	6     -	3-M07	
H.S.	8	<u></u>	₽	<u> </u>	20  19  18  17  16  15  14  13  12  11  10	5	4	<u>₽</u>	2	=]	9	

Signal Name	1	
Color of Wire	_	
Terminal No.	10	

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16



偃	H.S.

	_			•	_		•	•	•	•	_
I	ı	GND	CAN-L	CAN-H	1	_	1	WATER VALVE A	WATER VALVE B	_	-
ı	I	В	۵	٦	I	_	1	J//L	W/G	_	_

8 8 9

41 42 43 44

M180	FRONT AIR CONTROL (WITH MANUAL 2 CONTROL DIAL SYSTEM)	LACK
Connector No. N	Connector Name (\)	Connector Color BLACK

DEFROST FEEDBACK EVAP TEMP SENSOR

LG/B

9

9

Signal Name

Color of Wire

Terminal No.

FRONT BLWR SPEED

G/R

12 13 4 15

REAR DEF REQUEST DRVR BLND DR A DRVR BLND DR B

16

W/G

1 18

V IGN

Ϋ́Ğ ΥB PNL/FLR DR A PNL/FLR DR B

BR/W

19

Q

P/L G/B

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	-	7	Ш	l
Γ	N	15	Ш	
ľ	က	16	Ш	
ľ	4	17	Ш	
ľ	2	18	Ш	
Γ	9	19	Ш	
ľ	7	20	Ш	
Γ	œ	21	Ш	
Γ	6	22	Ш	
ľ	9	23	Ш	
Γ	Ξ	24	Ш	
Γ	12	25	Ш	
ſ	3	26	Ш	

Signal Name	I	1	V REF RET	AC REQ	FAN ON	DRVR BLND DR FB	PNL/FLR DR FB	ILLUM +	ILLUM -
Color of Wire	-	1	Ъ	W/R	L/R	SB	GR	B/L	BR
Terminal No.	ŀ	2	3	4	2	9	2	8	6

Connector No. M181  FRONT AIR CONTROL  Connector Name (WITH MANUAL 2 CONTROI



36

Signal Name	V BAT	5V REF VOLTAGE	-	ı	-	1
Color of Wire	Y/R	>	1	1	1	ı
erminal No.	27	28	29	30	31	32

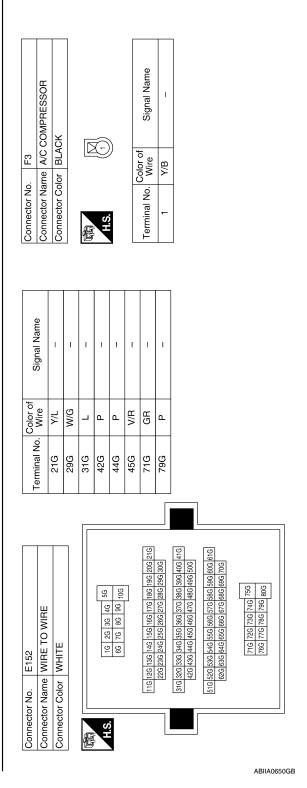
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Connector No.   E5   Connector Name   WIRE TO WIRE	Connector No. E50 Connector Name WIRE TO WIRE Connector Color BROWN  Terminal No. Wire  1 P	A B C D
Connector No.   E2	Connector No.   E48   Connector Name   REFRIGERANT PRESSURE   SENSOR   Connector Color   BLACK	F G H
Connector No. E1 Connector Name AMBIENT SENSOR Connector Color GRAY  H.S. Terminal No. Wire Signal Name  1 P - 2  2 V/R - 1	Connector No.   E16   Connector Name   ECM   Connector Color   BLACK   Connector Color   BLACK	K L M

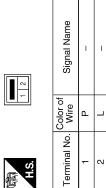
Revision: August 2010 HAC-161 2011 Titan

Connector No. E119	Connector No.	. E122		Connector No.	E124	
Connector Name POWER DISTRIBUTION MODULE ENGINE ROOM)	Connector Nar	me POW	Connector Name POWER DISTRIBUTION MODULE ENGINE ROOM)	Connector Nan	me POW	Connector Name POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	Connector Color WHITE	lor WHIT		Connector Color BLACK	or BLA(	X
H.S.	是 H.S.	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	40 38 38 37	€ S.H.S.	62 29	61 60 61 857
Terminal No. Wire Signal Name	Terminal No.	Color of Wire	Signal Name	Terminal No. Wire	Solor of Wire	Signal Name
11 Y/B A/C COMPRESSOR	38	В	GND (SIGNAL)	29	В	GND (POWER)
	39	_	CAN-H			
	40	۵	CAN-L			



		9 8 7 6 28 27 26 25 17 46 45 44	56 65 64 63												_						
		24222222222222222222222222222222222222	73 72 71 70 69 68 67 6		Signal Name	DPRES)	D-A	RESS				Qinnal Name									
ECM	BLACK	2 21 20 19 18 17 2 41 40 39 38 37 36 1 60 59 58 57 56 55	0 79 78 77 76 75 74			A	GND-A	PD PRESS													
<u>e</u>	-		7   8   8   8   8   8   8   8   8   8		Color of Wire	₹	В	B/W				Color of	- Mile	۵ د							
Connector Name	Connector Color	H.S.			Terminal No.	49	29	20				Terriman No.		217							
																					J
		3 2 1 8 8 1		Name											2	11)   120   130   140   150   150   150   150   150   151   151   150   151   151   150   150   151   150	28J 29J 30J	31.1 32.1 33.3 34.1 35.1 36.1 37.2 38.1 39.1 40.1 41.1 42.1 43.1 44.1 45.1 46.1 47.1 48.1 49.1 50.1	51.1 52.2 53.3 54.1 55.1 56.1 57.1 58.1 59.3 60.0 61.1 62.2 62.1 62.1 63.1 64.1 65.1 65.1 65.1 65.2 62.1 67.0	5.5	
E TO WIRE	핃	4 11 12 11		Signal Name	I								E TO WIRE	띧	21 22 22 23 44	14) 15) 16) 17) 18)	22J 23J 24J 25J 26J 27J 28J 29J 30J	34) 35J 36J 37J 44J 45J 46J 47J	52J 53J 54J 55J 56J 57J 58J 59J 60J 62J 63J 64J 65J 66J 67J 68J 69J 70J	71.3 72.3 73.3 74.3 75.3 76.3 77.3 78.3 79.3 80.3	
me WIRI	lor WHI	7 6 5 14 16 15 14	Jo rolo	Wire	Y/B							. B69	me WIRI	lor WHITE		11.12.13	22.1 23.1	31J 32J 33J 42J 43J	51J 52J 53J 62J 63J	77	
Connector Name WIRE TO WIRE	Connector Color WHITE	原 H.S.		Terminal No.	14							Connector No.	Connector Name WIRE TO WIRE	Connector Color	H.S.						
																Г			٦		
MIRE		11 101 9 8 7 6 5 4 3 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Signal Name	ı	ı	1		ı	1	1			ALVE				Signal Name	1 1			
WIRE TO WIRE	WHITE	7   20   19   18										8	ATER V/	GRAY	2 - 1 - 2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -				_		
ame WIR	olor WI	1 10 9 8	O.	Y/L		٧ / V	<u></u>	₽Y	۵	۵ ×	:     	o. F68	ame W,			-	. j	√/L W/G			
Connector Name	Connector Color	H.S.	Terminal No.	2	ကျ	٥ ٢	, 0+	=	14	15		Connector No.	Connector Name WATER VALVE	Connector Color	H.S.		Terminal No.	-   0			

Connector No.	B75
Connector Name WIRE TO WIRE	WIRE TO WIRE
Connector Color BROWN	BROWN



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## MANUAL A/C IDENTIFICATION TABLE

< SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

# SYMPTOM DIAGNOSIS

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

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## AIR CONDITIONER CONTROL

## < SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

# **AIR CONDITIONER CONTROL**

# Symptom Matrix Chart

INFOID:0000000006164788

## **SYMPTOM TABLE**

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-150
A/C system cannot be controlled.	Go to Self-diagnosis Function.	HAC-114
Air outlet does not change.	Co to Trouble Diagnosis Precedure for Made Deer Meter	HAC 116
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-116</u>
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	HAC-120
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for All Mix Door Motor.	<u>HAC-120</u>
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	HAC-125
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u> </u>
Defroster door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Defroster Door Motor.	HAC-127
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-131
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	<u>HAC-137</u>
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-167
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-175
Noise	Go to Trouble Diagnosis Procedure for Noise.	<u>HAC-177</u>
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	<u>HAC-67</u>

## **INSUFFICIENT COOLING**

INSUFFICIENT COOLING	FREADULAL A/A/TYPE (***
< SYMPTOM DIAGNOSIS >	[MANUAL A/C (TYPE 1)]
INSUFFICIENT COOLING	
Component Function Check	INFOID:000000000616478
SYMPTOM: Insufficient cooling	
INSPECTION FLOW	
1.confirm symptom by performing operational check - tei	MPERATURE DECREASE
<ol> <li>Rotate the blower control dial to the low speed.</li> <li>Turn temperature control dial counterclockwise to maximum cold.</li> <li>Check for cold air at discharge air outlets.</li> <li>Can the symptom be duplicated?</li> </ol>	
YES >> GO TO 3. NO >> GO TO 2.	
2.CHECK FOR ANY SYMPTOMS	
Perform a complete operational check for any symptoms. Refer to <a href="HAC-99">HAC-99</a> .  Does another symptom exist?  YES >> Refer to <a href="HAC-166">HAC-166</a> . "Symptom Matrix Chart".  NO >> System OK.	<u>"Operational Check"</u> .
3.CHECK FOR SERVICE BULLETINS	
Check for any service bulletins.	
>> If equipped with NAVI, GO TO 4. >> If not equipped with NAVI, GO TO 5.  4.PERFORM SELF-DIAGNOSIS	
Perform self-diagnosis Refer to <u>HAC-114, "Front Air Control Self-Diagnosis"</u>	
Is the inspection result normal?	
YES >> GO TO 5. NO >> Refer to <u>HAC-166, "Symptom Matrix Chart"</u> .	
5.check drive belts	
Check compressor belt tension. Refer to EM-13, "Checking Drive Belts".	
Is the inspection result normal?	
YES >> GO TO 6. NO >> Adjust or replace compressor belt. Refer to EM-13, "Removal a	nd Installation".
6. CHECK AIR MIX DOOR OPERATION	
Check and verify air mix door mechanism for smooth operation. Refer to HA ponent Function Check".	C-120, "Air Mix Door Motor Com
Does air mix door operate correctly?  YES >> GO TO 7.	on Motor Diagnostic Diagnot a "
NO >> Check air mix door motor circuit. Refer to <a href="HAC-121">HAC-121</a> , "Air Mix Do 7. CHECK COOLING FAN MOTOR OPERATION	or iviotor Diagnosis Procedure".
Check and verify cooling fan motor for smooth operation. Refer to <u>EC-358</u> , "	Overall Function Check"
Does cooling fan motor operate correctly?  YES >> GO TO 8.	S. S. S. I. G. I STORY CHOOK
NO >> Check cooling fan motor. Refer to EC-359, "Diagnosis Procedur $8.$ CHECK WATER VALVE OPERATION	<u>e"</u> .
	crintion"
Check and verify water valve for smooth operation. Refer to <a href="HAC-142">HAC-142</a> , "Des <a href="Does water valve operate correctly?">Does water valve operate correctly?</a> YES >> GO TO 9.	<u>cripuori </u> .

Revision: August 2010 HAC-167 2011 Titan

### INSUFFICIENT COOLING

### < SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

NO >> Check water valve circuit. Refer to <u>HAC-142</u>, "Water Valve Diagnosis Procedure".

# 9.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 10.

# 10. 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 11.

NO >> Check contaminated refrigerant. Refer to <a href="HAC-178">HAC-178</a>, "Working with HFC-134a (R-134a)".

# 11. 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 <u>HAC-168</u>, "<u>Diagnostic Work Flow</u>".

NO >> GO TO 12.

# 12. CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to <u>HAC-170</u>, "<u>Performance Chart"</u>. Is the inspection result normal?

YES >> Perform performance test diagnoses. Refer to <u>HAC-168</u>, "<u>Diagnostic Work Flow</u>".

NO >> GO TO 13.

# 13. CHECK AIR DUCTS

Check ducts for air leaks.

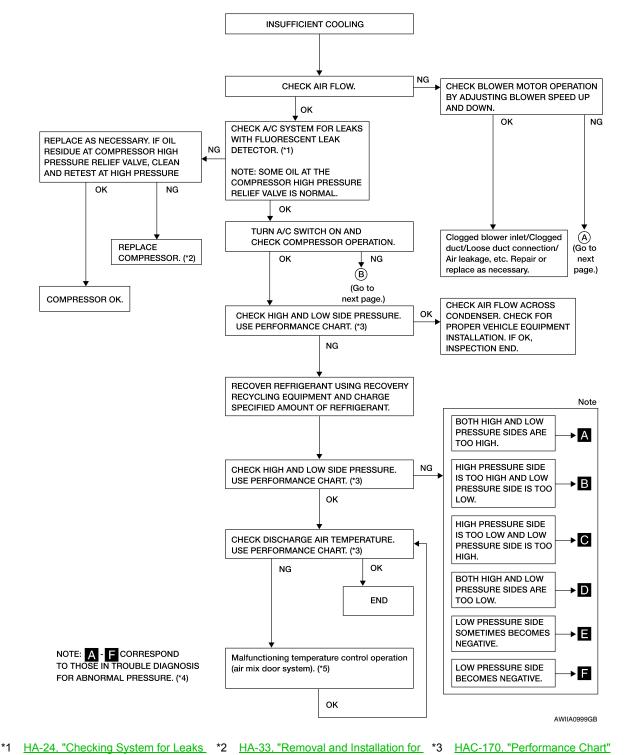
### Is the inspection result normal?

YES >> System OK.

NO >> Repair air leaks.

# Diagnostic Work Flow

INFOID:0000000006164790



- \*1 HA-24, "Checking System for Leaks Using the Fluorescent Dye Leak Detector"
- \*4 HAC-171, "Trouble Diagnoses for Abnormal Pressure"
- 2 HA-33, "Removal and Installation for Compressor Clutch"
  \*3 HAC-170, "Performance Chart"
- \*5 HAC-120, "Air Mix Door Motor Component Function Check"

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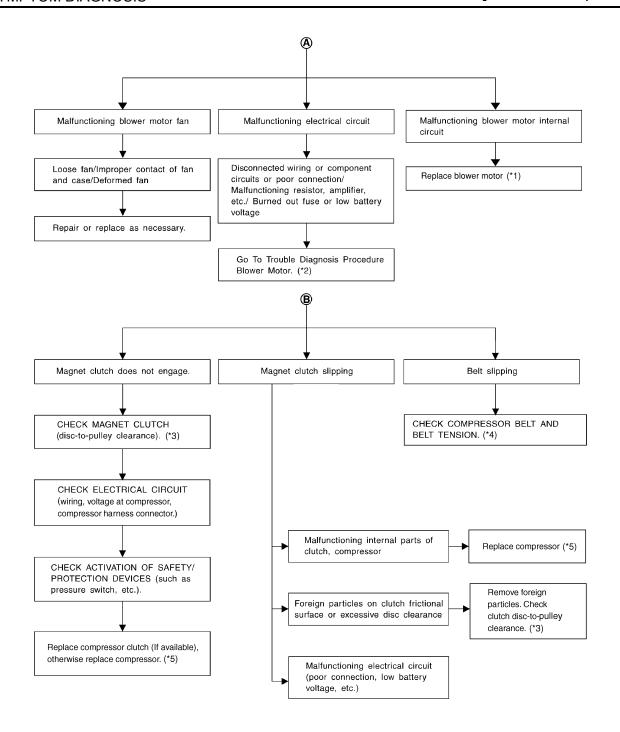
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- \*1 VTL-12, "Removal and Installation"
- ponent Function Check"
- \*2 HAC-131, "Front Blower Motor Com- \*3 HA-33, "Removal and Installation for Compressor Clutch"
- \*4 EM-13, "Checking Drive Belts"
- \*5 HA-33, "Removal and Installation for Compressor Clutch"

## **Performance Chart**

INFOID:0000000006164791

### **TEST CONDITION**

Testing must be performed as follows:

## **INSUFFICIENT COOLING**

### < SYMPTOM DIAGNOSIS >

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

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Indoors or in the shade (in a well-ventilated place)
Closed
Open
Open
Max. COLD
(Ventilation) set
(Recirculation) set
Max. speed set
Idle speed

### **TEST READING**

Recirculating-to-discharge Air Temperature Table

nside air (Recirculating air) at blower assembly inlet		Discharge oir temperature at center ventilator	
Relative humidity %	Air temperature °C (°F)	Discharge air temperature at center ventilator °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

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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 stan-

dard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until speci- fied pressure is obtained.
Α	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance  ↓  1. Condenser fins are clogged.  2. Improper fan rotation of cooling fan	Clean condenser. Check and repair cooling fan if necessary.
Both high- and low-pressure sides are too high.	Low-pressure pipe is not cold.  When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm², 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.)  Air in refrigeration cycle	Evacuate and recharge system.
AC359A	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cooling system.
	<ul> <li>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>Plates are sometimes covered with frost.</li> </ul>	<ul> <li>Excessive liquid refrigerant on low-pressure side</li> <li>Excessive refrigerant discharge flow</li> <li>Expansion valve is open a little compared with the specification.</li> <li>Improper expansion valve adjustment</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 located 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

## **INSUFFICIENT COOLING**

# [MANUAL A/C (TYPE 1)]

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 compressor operation stops.	Compressor pressure operation is improper.  Understand the compressor packings.	Replace compressor.
(O) (H)  AC356A	palkings mode compressed		Replace compressor.
Both High- and Low-pressure S	Sides are Too Low		
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	Replace liquid tank.     Check oil for contamination.
	Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. Expansion valve inlet may be frosted. Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	Check and repair malfunctioning parts. Check oil for contamination.
Both high- and low-pressure sides are too low.	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components.	Check refrigerant system for leaks. Refer to HA-23, "Checking of Refrigerant Leaks".
(O) (HI)  AC353A	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification.   1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	<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.	Check and repair malfunctioning parts.     Check oil for contamination.
	Air flow volume is too low.	Evaporator is frozen.	Check intake sensor circuit. Refer to HAC-147, "Intake Sensor Diagnosis Procedure". Repair evaporator fins. Replace evaporator. Refer to HAC-131, "Front Blower Motor Component Function Check".

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes 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 expansion valve outlet and inlet.  Water is mixed with refrigerant.	Drain water from refrigerant or replace refrigerant.     Replace liquid tank.

## Low-pressure Side Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	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.  If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant.  If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air).  If either of the above methods cannot correct the malfunction, replace expansion valve.  Replace liquid tank.

## **INSUFFICIENT HEATING**

< SYMPTOM DIAGNOSIS >	[MANUAL A/C (TYPE 1)]
INSUFFICIENT HEATING	_
Component Function Check	INFOID:000000006164793
SYMPTOM: Insufficient heating	
INSPECTION FLOW	
1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEM	DERATURE INCREASE
Turn the blower control dial to low speed.	ETATIONE INTONE/TOE
Turn the blower control dial clockwise to maximum heat	
3. Check for hot air at discharge air outlets.	
Can this symptom be duplicated?	
YES >> GO TO 2.  NO >> Perform complete system operational check. Refer to <u>HAC-99</u> , "C	nerational Check"
2.CHECK FOR SERVICE BULLETINS	
Check for any service bulletins.	
>> If equipped with NAVI, GO TO 3.	
>> If not equipped with NAVI, GO TO 4.	
3.PERFORM SELF-DIAGNOSIS	
Perform self-diagnosis. Refer to <u>HAC-114</u> , "Front Air Control Self-Diagnosis".	
Is the inspection results normal?	
YES >> GO TO 4.	
NO >> Refer to HAC-166, "Symptom Matrix Chart".	
4.CHECK ENGINE COOLING SYSTEM	
<ol> <li>Check for proper engine coolant level. Refer to <u>CO-10, "Inspection"</u>.</li> <li>Check hoses for leaks or kinks.</li> </ol>	
3. Check radiator cap. Refer to CO-10, "Inspection".	
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-120</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.	
YES >> GO TO 7.  NO >> Repair all disconnected or leaking air ducts.	
7. CHECK HEATER HOSE TEMPERATURES	
Start engine and warm it up to normal operating temperature.	
<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 heater hoses.</li> </ol>	ot and the outlet hose should be
warm.	
Is the inspection result normal?	
YES >> Hot inlet hose and a warm outlet hose: GO TO 8.	

Revision: August 2010 HAC-175 2011 Titan

NO

>> • Inlet hose cold: GO TO 11.
• Both hoses warm: GO TO 9.

### **INSUFFICIENT HEATING**

### < SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

# 8. CHECK ENGINE COOLANT SYSTEM

Check engine control temperature sensor. Refer to EC-177, "Component Inspection".

### Is the inspection result normal?

YES >> System OK.

>> Repair or replace as necessary. Retest. NO

# 9. CHECK HEATER HOSES

Check heater hoses for proper installation.

### Is the inspection result normal?

YES >> System OK.

>> 1. Back flush heater core. NO

- 2. Drain the water from the system.
- Refill system with new engine coolant. Refer to <u>CO-11. "Changing Engine Coolant"</u>.
   GO TO 10 to retest.

# 10. CHECK HEATER HOSE TEMPERATURES

- 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 warm.

#### Is the inspection result normal?

YES >> System OK.

NO >> Replace heater core. Refer to VTL-15, "Removal and Installation".

# 11. CHECK WATER VALVE

Check the operation of the water valve. Refer to HAC-142, "Water Valve Diagnosis Procedure".

### Is the inspection result normal?

YES >> System OK.

NO >> Replace water valve.

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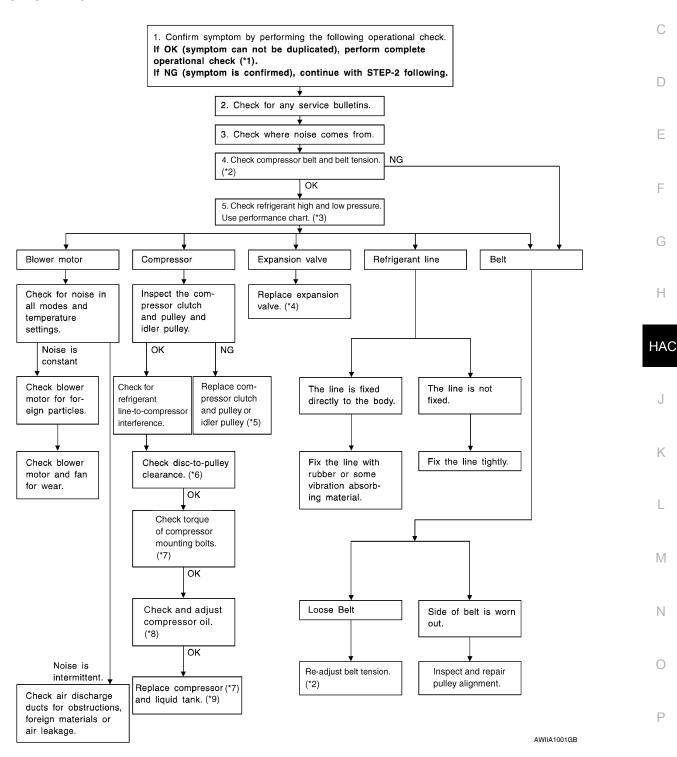
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## **NOISE**

## Component Function Check

SYMPTOM: Noise

INSPECTION FLOW



- \*1 HAC-99, "Operational Check"
- HA-43, "Removal and Installation for \*5 **Expansion Valve**"
- Compressor"
- \*2 EM-13, "Checking Drive Belts"
- HA-33, "Removal and Installation for \*6 Compressor Clutch"
- HA-32, "Removal and Installation for \*8 HA-32, "Removal and Installation for \*9 Compressor"
- \*3 EM-13, "Checking Drive Belts"
- HA-33, "Removal and Installation for Compressor Clutch"
- HA-41, "Removal and Installation for Condenser"

# **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)

INFOID:0000000006164796

#### **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 <a href="HA-4">HA-4</a>, "Contaminated Refrigerant". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.
- Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
- Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers
- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

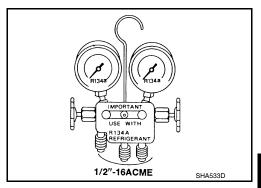
### If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- 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

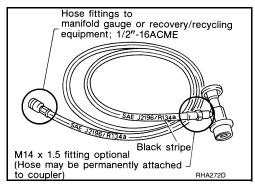
#### MANIFOLD GAUGE SET

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

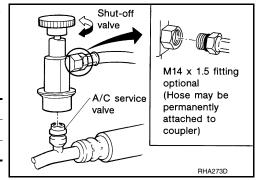
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shutoff devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



### 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



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[MANUAL A/C (TYPE 2)]

# **BASIC INSPECTION**

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

### **DIAGNOSIS AND REPAIR WORKFLOW**

DIAGNOSIS AND REPAIR WORKFLOW	
< BASIC INSPECTION > [MANUAL A/C (TYPE 2	)]
DIAGNOSIS AND REPAIR WORKFLOW	
How to Perform Trouble Diagnosis For Quick And Accurate Repair	<b>1</b> 799
WORK FLOW	
1.LISTEN TO CUSTOMER COMPLAINT	
Listen to customer complaint. Get detailed information about the conditions and environment when the symtom occurs.	<del>_</del> p-
>> 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 <u>HAC-182</u> , "Operational Check".	
>> GO TO 4	
4.GO TO APPROPRIATE TROUBLE DIAGNOSIS	
Go to appropriate trouble diagnosis. Refer to <u>HAC-243</u> , "Symptom Matrix Chart".	
	_
>> GO TO 5.  5.REPAIR OR REPLACE	ŀ
Repair or replace the specific parts.	
>> GO TO 7	
6. FINAL CHECK	
Final check.	
Is the inspection result normal?	
YES >> Inspection End. NO >> GO TO 4	

### INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MANUAL A/C (TYPE 2)]

### 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 BLOWER

- 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-212</u>, <u>"Front Blower Motor Diagnosis Procedure"</u>. If OK, continue with next check.

### CHECKING DISCHARGE AIR

- 1. Rotate MODE control dial to each position and the DEF m mode.
- Confirm that discharge air comes out according to the air distribution table. Refer to <u>HAC-191</u>, "<u>Discharge</u> Air Flow".

Mode door position is checked in the next step.

If NG, go to trouble diagnosis procedure for <u>HAC-197</u>, "<u>Mode Door Motor Diagnosis Procedure</u>". 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 (♥, ♥ ONLY)

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

If NG, go to trouble diagnosis procedure for <u>HAC-206</u>, "Intake <u>Door Motor Diagnosis Procedure"</u>. 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 ( ) is not allowed in DEF ( ) D/F ( ) or FOOT ( ).

### CHECKING TEMPERATURE DECREASE

- Rotate temperature control dial counterclockwise until maximum cold.
- 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-244</u>, <u>"Component Function Check"</u>. If air mix door motor appears to be malfunctioning, go to <u>HAC-202</u>, "Air Mix <u>Door Motor Diagnosis Procedure"</u>.

If OK, continue the check.

### CHECKING TEMPERATURE INCREASE

- 1. Rotate temperature control dial clockwise until maximum hot.
- 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 <a href="HAC-252">HAC-252</a>, "Component Function Check". If air mix door motor appears to be malfunctioning, go to <a href="HAC-202">HAC-202</a>, "Air Mix Door Motor Diagnosis Procedure".

If OK, continue with next check.

### CHECK A/C SWITCH

- 1. Press A/C switch.
- 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.

### **INSPECTION AND ADJUSTMENT**

### < BASIC INSPECTION >

[MANUAL A/C (TYPE 2)]

If NG, go to trouble diagnosis procedure for <u>HAC-217, "Magnet Clutch Diagnosis Procedure"</u>. If all operational checks are OK (symptom cannot be duplicated), go to <u>HAC-181, "How to Perform Trouble Diagnosis For Quick And Accurate Repair"</u> and perform tests as outlined. If symptom appears, refer to <u>HAC-243, "Symptom Matrix Chart"</u> and perform applicable trouble diagnosis procedures.

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[MANUAL A/C (TYPE 2)]

# SYSTEM DESCRIPTION

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

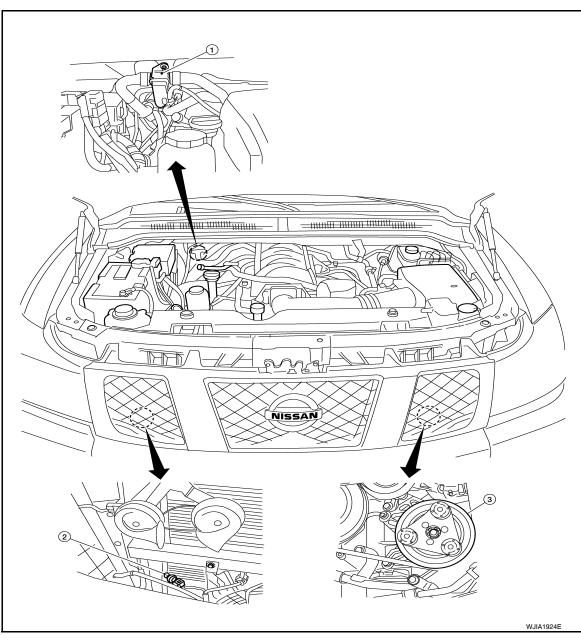
# [MANUAL A/C (TYPE 2)]

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# **FUNCTION INFORMATION**

# **Component Part Location**

### **ENGINE COMPARTMENT**



Water valve F68

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

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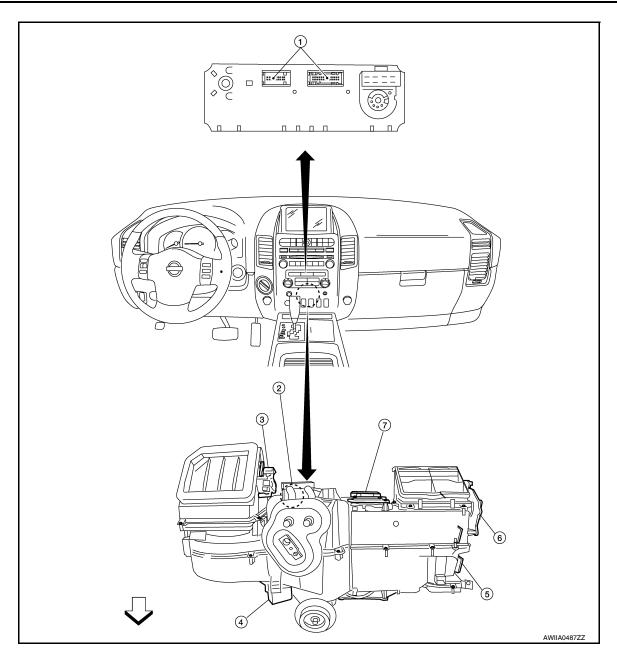
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- 1. Front air control M176, M177
- 4. Variable blower control M121
- 7. Air mix door motor M147
- 2. Intake sensor M146
- 5. Mode door motor M142
- 3. Intake door motor M58
- 6. Defroster door motor M144

### **FUNCTION INFORMATION**

### < SYSTEM DESCRIPTION >

# [MANUAL A/C (TYPE 2)]

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Symptom Table

Symptom	Reference Page		
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-227	
Air outlet does not change.	Co to Trouble Diagnosis Presedure for Made Door Mater	LIAC 407	
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-197</u>	
Discharge air temperature does not change.	Co to Travible Diagnosis Presedure for Air Miy Door Mater	114.0.204	
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	HAC-201	
Intake door does not change.	Co to Travible Diagnosis Presedure for Intella Dear Mater	11AC 20E	
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>HAC-205</u>	
Defroster door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Defroster Door Motor.	HAC-207	
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-211	
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-217	
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-244	
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-252	
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-254	

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### REFRIGERATION SYSTEM

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 2)]

### REFRIGERATION SYSTEM

Refrigerant Cycle

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### 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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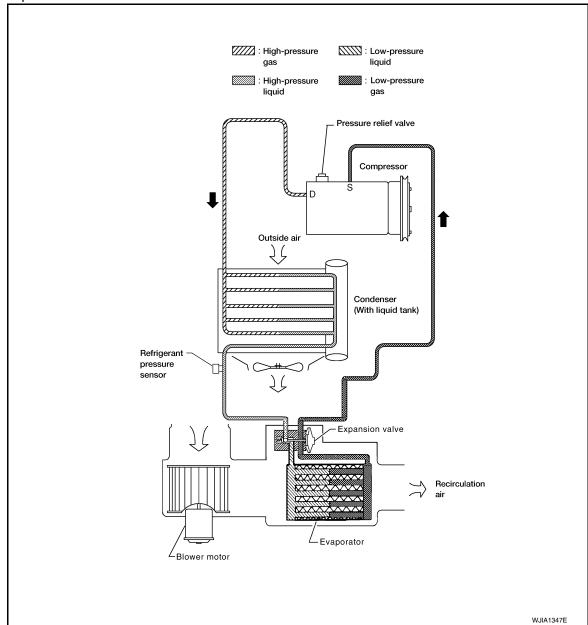
### REFRIGERANT PRESSURE SENSOR

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/cm², 398 psi), or below about 120 kPa (1.22 kg/cm², 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/

 $cm^2$ , 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



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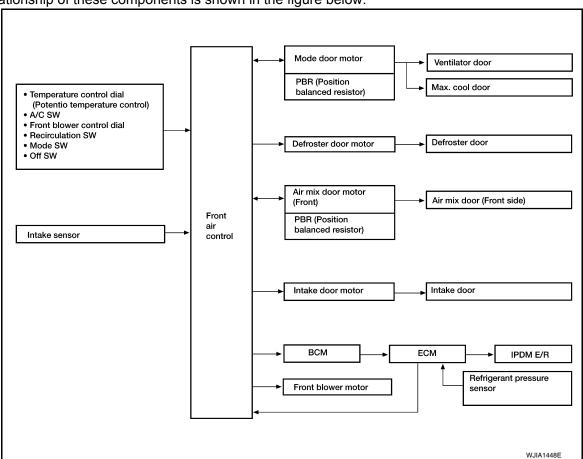
# MANUAL AIR CONDITIONER SYSTEM

# Control System Diagram

### INFOID:0000000006164806

### **CONTROL SYSTEM**

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

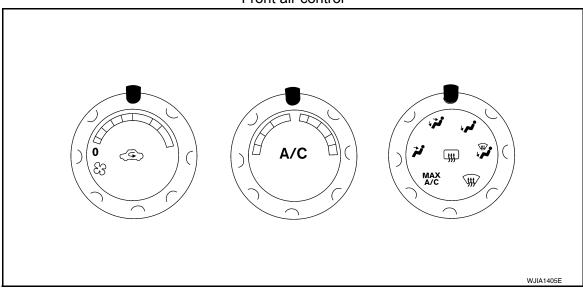


# Control System Description

### INFOID:0000000006164807

### **CONTROL OPERATION**

### Front air control



### MANUAL AIR CONDITIONER SYSTEM

### < SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 2)]

### TEMPERATURE CONTROL DIAL

Increases or decreases the set temperature.

### RECIRCULATION ( ) SWITCH

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

### **BLOWER CONTROL DIAL/OFF SWITCH**

- The blower speed is manually controlled with this dial.
- 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 position.

### A/C SWITCH

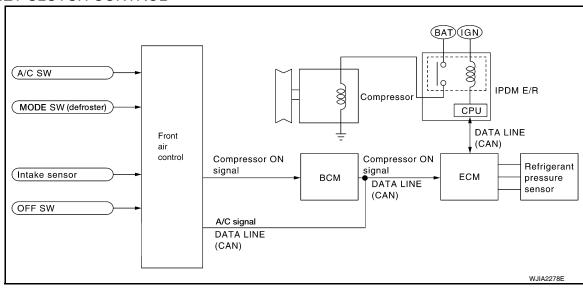
The compressor is ON or OFF.

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

### MODE CONTROL DIAL

Controls the air discharge outlets.

### 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

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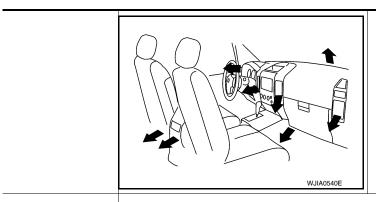
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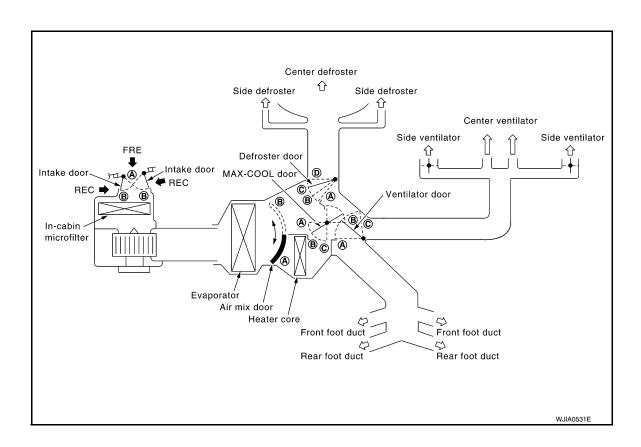
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Mode door position		Air outlet/distribution	
	Vent	Foot	Defroster
~;	95%	5%	_
Ÿ	60%	40%	_
·,i	_	70%	30%
	_	60%	40%
<b>W</b>	_	10%	90%

# Switches And Their Control Function

INFOID:0000000006164809



### MANUAL AIR CONDITIONER SYSTEM

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 2)]

\ Position		MOD	E SW		DEF	sw	REC	SW	Tempe	rature	switch	OFF
or	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF	(-	No. of the last of	<u>``</u>	sw
switch	<b>→ •</b>	.⇒.•		(W)	_	\$\$	Ç	<b>₹</b> >	()(	A/C	)()	
		+,~	<b>+,~</b>	+,~	<u>-`</u> ∳{	0	-> • -	0	COLD	~	нот	90
Ventilator door	<b>(A)</b>	B	©	©	©		_	_		_		©
MAX-COOL door	<b>(A)</b>	B	B	B	©		_	_		_		B
Defroster door	<b>(D)</b>	<b>(D)</b>	<b>O</b> or <b>©</b>	B	<b>(A)</b>	] —	_	_				©
Intake door		_	_		B		<b>(A)</b>	B				B
Air mix door		_	_			1	_	_	<b>(A)</b>		B	

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[MANUAL A/C (TYPE 2)]

# **DIAGNOSIS SYSTEM (BCM)**

# CONSULT-III Function (BCM - COMMON ITEM)

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### **APPLICATION ITEM**

CONSULT-III 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 [	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	HEADLAMP			×	×	×		
Wiper and washer	WIPER			×	×	×		
Turn signal and hazard warning lamps	FLASHER			×	×			
Air conditioner	AIR CONDITIONER			×				
Combination switch	COMB SW			×				
BCM	BCM	×	×			×	×	×
Immobilizer	IMMU		×	×	×			
Interior room lamp battery saver	BATTERY SAVER			×	×	×		
Vehicle security system	THEFT ALM			×	×	×		
RAP system	RETAINED PWR			×	×	×		
Signal buffer system	SIGNAL BUFFER			×	×			
TPMS	AIR PRESSURE MONITOR		×	×	×	×		
Panic alarm system	PANIC ALARM				×			

CONSULT-III Function (BCM - AIR CONDITIONER)

INFOID:0000000006625988

**DATA MONITOR** 

# **DIAGNOSIS SYSTEM (BCM)**

### < SYSTEM DESCRIPTION >

# [MANUAL A/C (TYPE 2)]

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.

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[MANUAL A/C (TYPE 2)]

# **DTC/CIRCUIT DIAGNOSIS**

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

### MODE DOOR MOTOR

# System Description

### INFOID:0000000006164813

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### SYSTEM DESCRIPTION

### Component Parts

Mode door control system components are:

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

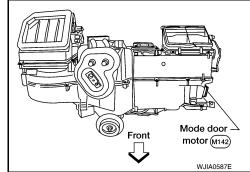
### System Operation

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



# Mode Door Motor Component Function Check

### INFOID:0000000006164814

### INSPECTION FLOW

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

- Rotate the mode control dial and check each position and press the (DEF) mode.
- Confirm that discharge air comes out according to the air distribution table. Refer to HAC-191, "Discharge Air Flow".

### NOTE:

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

### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-197, "Mode Door Motor Diagnosis Procedure"

# Mode Door Motor Diagnosis Procedure

INFOID:0000000006164815

Regarding Wiring Diagram information, refer to HAC-232, "Wiring Diagram - Manual With 3 Control Dial System".

### SYMPTOM:

Air outlet does not change.

**HAC-197** Revision: August 2010 2011 Titan Н

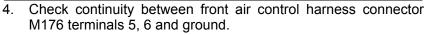
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- · Mode door motor does not operate normally.
- 1. CHECK MODE DOOR MOTOR CIRCUITS FOR OPEN AND SHORT TO GROUND
- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M176 (A) and the mode door motor harness connector M142 (B).
- Check continuity between front air control harness connector M176 (A) terminals 5, 6 and the mode door motor harness connector M142 (B) terminals 5, 6.

Α		В	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M176	5	M142	5	Yes
	6	IVITAZ	6	163

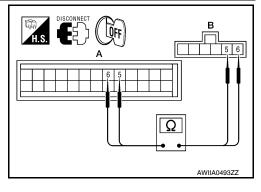


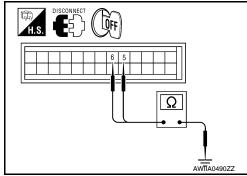
Connector	Terminal		Continuity
M176	5	Ground	No
W170	6	Giodila	INO

### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

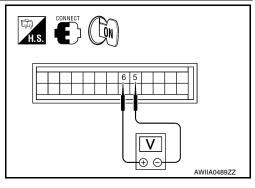




# $2.\mathsf{CHECK}$ FRONT AIR CONTROL FOR MODE DOOR MOTOR POWER AND GROUND

- 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 M176 terminal 5 and terminal 6 while rotating the mode control dial to the VENT (❖), and then the B/L (❖) mode.

Connector	Tern	ninals	Condition	Voltage (Approx.)
Connector	(+)	(-)	Condition	voltage (Approx.)
M176	5	6	Rotating the mode control dial from D/F ( ) mode to VENT ( ) mode	Battery voltage
IVITO	6	5	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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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

### MODE DOOR MOTOR

### < DTC/CIRCUIT DIAGNOSIS >

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

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M176 (A).
- Check continuity between front air control harness connector M176 (A) terminals 2, 15 and the mode door motor harness connector M142 (B) terminals 1, 3.

А		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M176	2	M142	3	Yes
IVITO	15	IVITAZ	1	165

4. Check continuity between front air control harness connector M176 terminals 2, 15 and ground.

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Connector	Terminal	_	Continuity
M176	2	Ground	No
	15	Ground	140

### Is the inspection result normal?

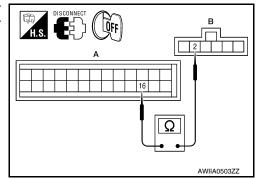
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

 Check continuity between front air control harness connector M176 (A) terminal 16 and mode door motor harness connector M142 (B) terminal 2.

А		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M176	16	M142	2	Yes



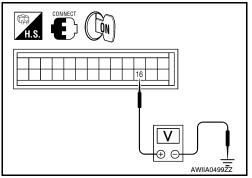
Check continuity between front air control harness connector M176 terminal 16 and ground.

Connector	Terminal	_	Continuity
M176	16	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

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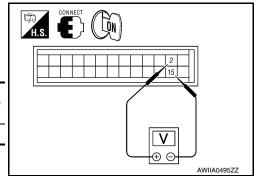
### **MODE DOOR MOTOR**

### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

- Reconnect front air control harness connectors.
- Turn ignition switch ON.
- Check voltage between front air control harness connector M176 terminal 2 and terminal 15.

Connector	Terminals	Connector	Terminals	Voltage (Approx.)
Connector	(+)	Connector	(-)	voltage (Approx.)
M176	2	M176	15	5 Volts



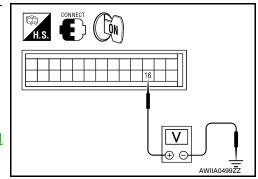
4. Check voltage between front air control harness connector M176 terminal 16 and ground.

Connector	Terminal	_	Voltage (Approx.)
M176	16	Ground	0 Volts

### Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to VTL-8, "Removal and Installation".



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

- Reconnect the mode door motor harness connector M142.
- Check voltage between front air control harness connector M176 terminal 16 and ground.

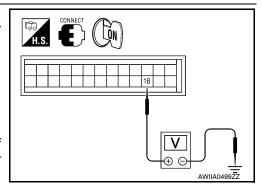
Connector	Terminal	_	Voltage (Approx.)
M176	16	Ground	0.2 to 4.8 Volts

### Is the inspection result normal?

>> Inspect mode door for binding or mechanical failure. If YES mode door moves freely, replace front air control. Refer to <u>VTL-8</u>. "Removal and Installation".

>> Replace the mode door motor. Refer to <u>VTL-19</u>.

NO "Removal and Installation".



### AIR MIX DOOR MOTOR

# System Description

### INFOID:0000000006164816

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### SYSTEM DESCRIPTION

### SYMPTOM:

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

### SYSTEM DESCRIPTION

### Component Parts

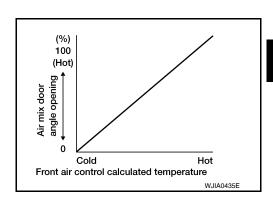
Air mix door control system components are:

- Front air control
- Air mix door motor
- PBR (built-into air mix door motors)
- · 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.

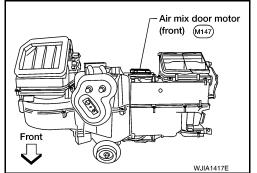
Air Mix Door Control Specification



### COMPONENT DESCRIPTION

### Air Mix Door Motors

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



Air Mix Door Motor Component Function Check

### INFOID:0000000006164817

### INSPECTION FLOW

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

- 1. Turn the temperature control dial clockwise to maximum hot.
- Check for hot air at discharge air outlets.

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>> GO TO 2.

# 2.confirm symptom by performing operational check - temperature decrease

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

### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-202, "Air Mix Door Motor Diagnosis Procedure".

# Air Mix Door Motor Diagnosis Procedure

Regarding Wiring Diagram information, refer to HAC-232, "Wiring Diagram - Manual With 3 Control Dial System".

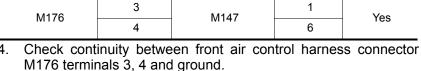
### SYMPTOM:

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

# ${f 1}$ .CHECK AIR MIX DOOR MOTOR CIRCUITS FOR OPEN AND SHORT TO GROUND

- Turn ignition switch OFF.
- Disconnect the front air control harness connector M176 (A) and the air mix door motor harness connector M147 (B).
- Check continuity between front air control harness connector M176 (A) terminals 3, 4 and the air mix door motor harness connector M147 (B) terminals 1, 6.

Α		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M176	3	M147	1	Yes
WITO	4	IVI 147	6	163



Connector	Terminal	_	Continuity
M176	3	Ground	No
	4	Ground	NO

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### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

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

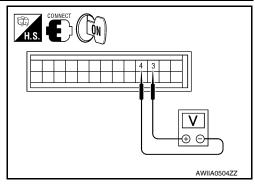
### **AIR MIX DOOR MOTOR**

### < DTC/CIRCUIT DIAGNOSIS >

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

- Reconnect front air control harness connector.
- Turn ignition switch ON.
- 3. Rotate temperature control dial to 32°C (90°F).
- 4. Check voltage between front air control harness connector M176 terminal 3 and terminal 4 while rotating temperature control dial to 18°C (60°F) and back to 32°C (90°F).

Connector	Tern	Terminals Condition		Voltage (Approx.)	
Connector	(+)	(-)	Condition	voltage (Approx.)	
M176	dial from 32°C (90°F) to		While rotating temperature control dial from 32°C (90°F) to 18°C (60°F)	Battery voltage	
M176 4 3		3	While rotating temperature control dial from 18°C (60°F) to 32°C (90°F)	Battery voltage	



### Is the inspection result normal?

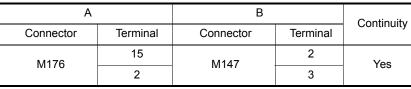
YES >> GO TO 4.

NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M176 (A).
- 3. Check continuity between front air control harness connector M176 (A) terminals 2, 15 and air mix door motor harness connector M147 (B) terminals 2, 3.

A		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M176	15	M147	2	Yes
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Check continuity between front air control harness connector M176 terminals 2, 15 and ground.

DISCONNECT OFF
2 15
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Connector	Terminal	_	Continuity
M176	15	Ground	No
	2	Ground	NO

### Is the inspection result normal?

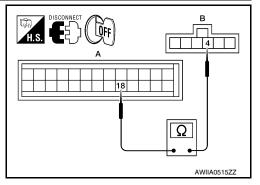
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

Check continuity between front air control harness connector M176 (A) terminal 18 and air mix door motor harness connector M147 (B) terminal 4.

A		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M176	18	M147	4	Yes



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### **AIR MIX DOOR MOTOR**

### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

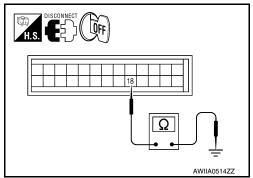
Check continuity between front air control harness connector M176 terminal 18 and ground.

Connector	Terminal	_	Continuity
M176	18	Ground	No

### Is the inspection result normal?

YES >> GO TO 6.

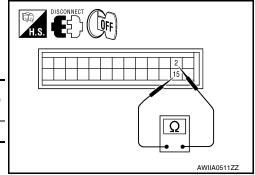
NO >> Repair or replace harness as necessary.



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

- Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M176 terminal 2 and terminal 15.

Connector	Terminal	Connector	Terminal	Voltage (Approx.)
Connector	(+)	Connector	(-)	voitage (Approx.)
M176	2	M176	15	5 Volts



4. Check voltage between front air control harness connector M176 terminal 18 and ground.

Connector	Terminal	_	Voltage (Approx.)
M176	18	Ground	0 Volts

### Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and <u>Installation"</u>.

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# 6. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

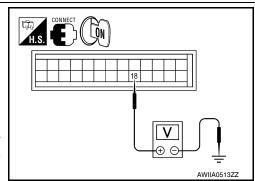
- 1. Reconnect the air mix door motor harness connector M147.
- 2. Check voltage between front air control harness connector M176 terminal 18 and ground.

Connector	Terminal	_	Voltage (Approx.)
M176	18	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-8, "Removal and Installation".

NO >> Replace air mix door motor. Refer to <u>VTL-20, "Removal and Installation"</u>.



### INTAKE DOOR MOTOR

# System Description

### INFOID:0000000006164819

### SYSTEM DESCRIPTION

### SYMPTOM:

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

### SYSTEM DESCRIPTION

### Component Parts

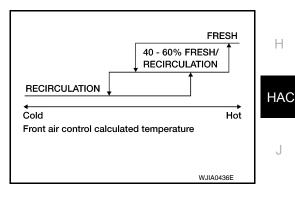
Intake door control system components are:

- Front air control
- Intake door motor (PBR built into the 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.

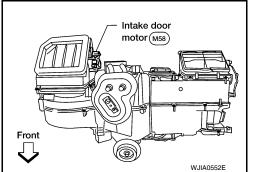
Intake Door Control Specification



### COMPONENT DESCRIPTION

### Intake door motor

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



# Intake Door Motor Component Function Check

### INFOID:0000000006164820

### INSPECTION FLOW

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

- 1. Press the vent mode switch (\*\*).
- 2. Press REC ( ) switch. The REC ( ) indicator should illuminate.
- Press REC ( ) switch again. The REC ( ) indicator should go out.
- Listen for intake door position change (you should hear blower sound change slightly).

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### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-206, "Intake Door Motor Diagnosis Procedure"

### Intake Door Motor Diagnosis Procedure

INFOID:0000000006164821

Regarding Wiring Diagram information, refer to <u>HAC-232</u>, "Wiring <u>Diagram - Manual With 3 Control Dial System"</u>.

### DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

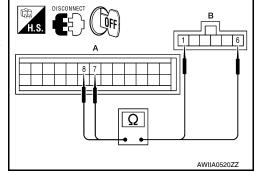
### SYMPTOM:

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

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M176 (A) and the intake door motor harness connector M58 (B).
- Check continuity between front air control harness connector M176 (A) terminals 8, 7 and the intake door motor harness connector M58 (B) terminals 1, 6.

А	A B		Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M176	8	M58	6	Yes
WITTO	7	IVIJO	1	163



 Check continuity between front air control harness connector M176 terminals 8, 7 and ground.

Connector	Terminal —		Continuity
M176	8	Ground	No
	7	Ground	No

# H.S. CED OFF

### Is the inspection result normal?

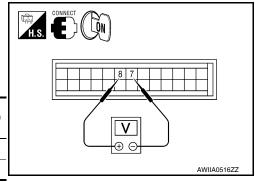
YES >> GO TO 3.

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.
- 3. Check voltage between front air control harness connector M176 terminal 8 and terminal 7 while placing the HVAC system into self-diagnostic mode.

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voltage (Approx.)	
M176	8	7	Self-diagnostic mode (opening)	Battery voltage	
IVITTO	7	8	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 <a href="VTL-18">VTL-18</a>, "Removal and Installation".

NO >> Replace front air control. Refer to VTL-8, "Removal and Installation".

### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

### DEFROSTER DOOR MOTOR CIRCUIT

# System Description

### INFOID:0000000006164822

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### SYSTEM DESCRIPTION

### Component Parts

Defroster door control system components are:

- Front air control
- Defroster door motor
- PBR (Built into defroster door motor)
- · Intake sensor

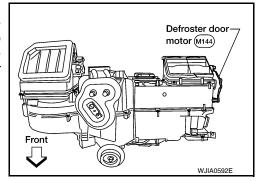
### System Operation

The front air control determines defroster door position based on the position of the defroster switch. When the defroster switch is depressed, the defroster door motor rotates directing air to the defroster ducts. When any mode other than defroster is selected, the defroster motor rotates in the opposite direction closing off air flow to the defroster ducts.

### COMPONENT DESCRIPTION

### Defroster door motor

The defroster door motor is attached to the front heater & cooling unit assembly. The front air control sends a voltage to rotate to the defroster door directing the air flow either to the defroster ducts, or to the floor ducts, depending on which way the voltage and ground are applied to the motor leads. Motor rotation is conveyed to a lever which activates the defroster door.



# **Defroster Door Motor Component Function Check**

INFOID:0000000006164823

### INSPECTION FLOW

# 1.confirm symptom by performing operational check - defroster door

- 1. Select vent (\*) mode.
- Rotate mode control dial to defrost mode ( ).
- Listen for defroster door position change (blower sound should change slightly).

### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-207, "Defroster Door Motor Diagnosis Procedure".

### Defroster Door Motor Diagnosis Procedure

INFOID:0000000006164824

Regarding Wiring Diagram information, refer to <u>HAC-232, "Wiring Diagram - Manual With 3 Control Dial System".</u>

### SYMPTOM:

- Defroster door does not change.
- · Defroster door motor does not operate normally.

# ${f 1}.$ CHECK DEFROSTER DOOR MOTOR CIRCUITS FOR OPEN AND SHORT TO GROUND

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Revision: August 2010 HAC-207 2011 Titan

### < DTC/CIRCUIT DIAGNOSIS >

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

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M176 (A) and the defroster door motor harness connector M144 (B).
- 3. Check continuity between front air control harness connector M176 (A) terminals 19, 20 and the defroster door motor harness connector M144 (B) terminals 1, 6.

А		В	Continuity	
Connector	Terminal	Connector Terminal		Continuity
M176	19	M144	1	Yes
IVI I / O	20	IVI 144	6	168

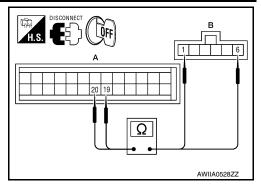
4. Check continuity between front air control harness connector M176 terminals 19, 20 and ground.

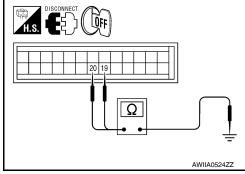
Connector	Terminal	_	Continuity
M176	19	Ground	No
WITTO	20	Ground	140

### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

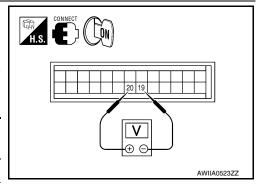




# 2.CHECK FRONT AIR CONTROL FOR DEFROSTER DOOR MOTOR POWER AND GROUND

- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Press the mode switch to the VENT (\*) mode.
- Check voltage between front air control harness connector M176 terminal 19 and terminal 20 while pressing the defroster switch ( ).

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voitage (Approx.)	
M176	19	20	Following defroster switch ( ) on	Battery voltage	
IVITO	20	19	Following defroster switch ( ) off	Battery voltage	



### Is the inspection result normal?

YES >> GO TO 4.

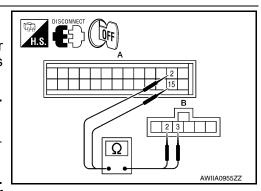
NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M176 (A).
- 3. Check continuity between front air control harness connector M176 (A) terminals 15, 2 and the defroster door motor harness connector M144 (B) terminals 2, 3.

Α		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M176	2	M144	3	Yes
WITTO	15	101144	2	165

4. Check continuity between front air control harness connector M176 terminal 2, 15 and ground.



### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

Connector	Terminal	_	Continuity
M176	2	Ground	No
101170	15	Giodila	INO

### Is the inspection result normal?

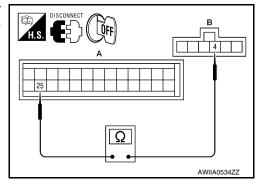
YES >> GO TO 5.

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 M176 (A) terminal 25 and defroster door motor harness connector M144 (B) terminal 4.

А		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M176	25	M144	4	Yes



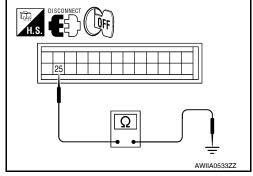
Check continuity between front air control harness connector M176 terminal 25 and ground.

Connector	Terminal	_	Continuity
M176	25	Ground	No

### Is the inspection result normal?

YES >> GO TO 6.

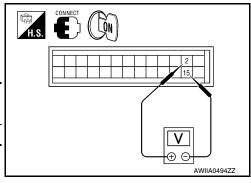
NO >> Repair or replace harness as necessary.



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

- Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M176 terminals 2, 15.

Connector	Terminals	Connector	Terminals	Voltage (Approx.)	
	(+)	Connector	(-)	voltage (Approx.)	
M176	2	M176	15	5 Volts	



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### < DTC/CIRCUIT DIAGNOSIS >

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

 Check voltage between front air control harness connector M176 terminal 25 and ground.

Connector	Terminal	_	Voltage (Approx.)
M176	25	Ground	0 Volts

### Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and <u>Installation"</u>.

# H.S. CONNECT ON EXAMPLE 19 AWIIA0532ZZ

# 6. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

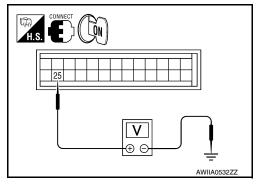
- 1. Reconnect the defroster door motor harness connector M144.
- Check voltage between front air control harness connector M176 terminal 25 and ground.

Connector	Terminal	_	Voltage (Approx.)
M176	25	Ground	0.2 to 4.8 Volts

### Is the inspection result normal?

YES >> Inspect defroster door for binding or mechanical failure. If defroster door moves freely, replace front air control. Refer to <u>VTL-8</u>, "Removal and Installation".

NO >> Replace the defroster door motor. Refer to <u>VTL-17</u>. "Removal and Installation".



### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

# **BLOWER MOTOR CONTROL SYSTEM**

# System Description

### INFOID:0000000006164825

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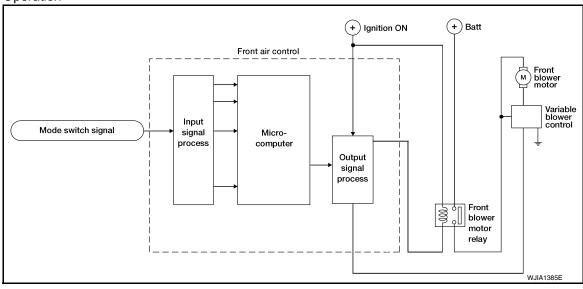
### SYSTEM DESCRIPTION

### Component Parts

Blower speed control system components are:

- Front air control
- Variable blower control
- Front blower motor relay
- · Front blower motor
- · Intake sensor

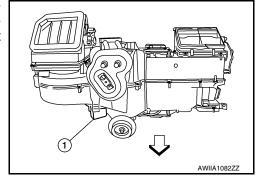
System Operation



### COMPONENT DESCRIPTION

### Variable Blower Control

The variable blower control is located on the cooling unit. The variable blower control (1) 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

### INFOID:0000000006164826

### INSPECTION FLOW

# 1.confirm symptom by performing operational check - front blower

- Rotate the blower control dial clockwise once. Blower motor should operate in low speed.
- 2. Rotate the blower control dial clockwise, and continue checking blower speed until all speeds are checked.

### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-212, "Front Blower Motor Diagnosis Procedure"

**HAC-211** Revision: August 2010 2011 Titan

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## Front Blower Motor Diagnosis Procedure

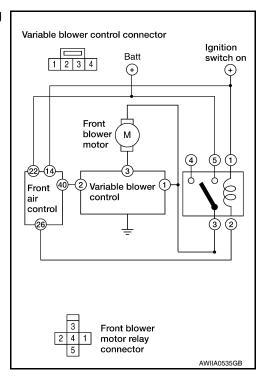
INFOID:0000000006164827

Regarding Wiring Diagram information, refer to <u>HAC-232</u>, "Wiring <u>Diagram - Manual With 3 Control Dial System"</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 20A fuses [No. 24 and 27 (Located in the fuse and fusible link box)]. For fuse layout. Refer to <u>PG-72, "Terminal Arrangement"</u>.

### Fuses are good.

### Is the inspection result normal?

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

# 2.CHECK FRONT BLOWER MOTOR POWER SUPPLY CIRCUIT

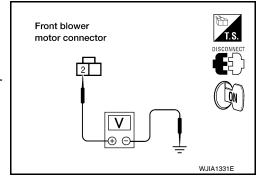
- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor connector.
- 3. Turn ignition switch ON.
- 4. Press the A/C switch.
- 5. Rotate blower control dial to maximum speed.
- Check voltage between front blower motor harness connector M62 terminal 2 and ground.

### 2 - Ground : Battery voltage

### Is the inspection result normal?

YES >> GO TO 11. NO >> GO TO 3.

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



### < DTC/CIRCUIT DIAGNOSIS >

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

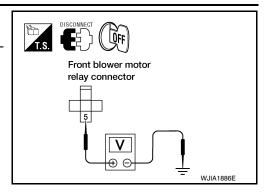
- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor relay.
- Check voltage between front blower motor relay harness connector M107 terminal 5 and ground.

### 5 - Ground : Battery voltage

### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.



# 4. CHECK FRONT BLOWER MOTOR RELAY

Turn ignition switch OFF.

Check front blower motor relay. Refer to HAC-215, "Front Blower Motor Component Inspection".

### Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace front blower motor relay.

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

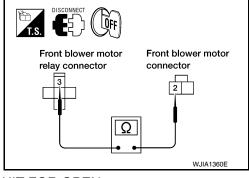
Check continuity between front blower motor relay harness connector M107 terminal 3 and front blower motor harness connector M62 terminal 2.

### 3 - 2 : Continuity should exist.

### Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair harness or connector.



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

- 1. Disconnect variable blower control harness connector.
- Check continuity between front blower motor relay harness connector M107 (A) terminals 3 and variable blower control harness connector M121 (B) terminal 1.

### 3 - 1 : Continuity should exist.

### Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair harness or connector.

# 7. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

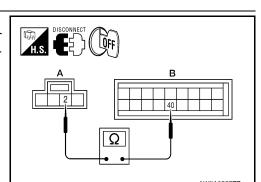
- 1. Disconnect front air control connector.
- Check continuity between front air control harness connector M177 (B) terminal 40 and variable blower control harness connector M121 (A) terminal 2.



### Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.



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

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### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

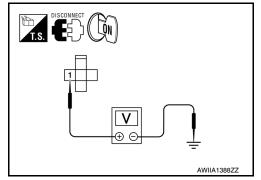
- Turn ignition switch ON.
- Check voltage between front blower motor relay harness connector M107 terminal 1 and ground.

### 1 - Ground : Battery voltage

### Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair front blower motor ground circuit or connector.



### 9. REPLACE FUSES

- Replace fuses.
- Activate the front blower motor.

### Does the fuse blow?

YES >> GO TO 10.

NO >> Inspection End.

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

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

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

### Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

# 11. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

- 1. Disconnect front air control connector.
- Check continuity between front air control harness connector M177 (B) terminal 40 and variable blower control harness connector M121 (A) terminal 2.

### 40 - 2 : Continuity should exist.

### Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair harness or connector.

# AWIIA053777

# 12. CHECK FRONT BLOWER MOTOR

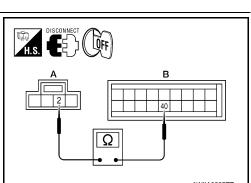
Check front blower motor. Refer to HAC-211, "Front Blower Motor Component Function Check".

### Is the inspection result normal?

YES >> GO TO 13.

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

13.check blower motor ground circuit



AWIIA0539ZZ

: Continuity should exist.

### < DTC/CIRCUIT DIAGNOSIS >

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

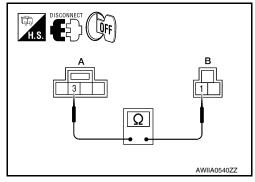
Check continuity between front blower motor harness connector M62 (B) terminal 1 and variable blower control harness connector M121 (A) terminal 3.

1 - 3

Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair harness or connector.



# 14. CHECK VARIABLE BLOWER CONTROL GROUND CIRCUIT

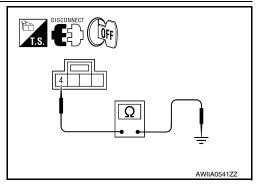
Check continuity between variable blower control harness connector M121 terminal 4 and ground.

4 - Ground : Continuity should exist.

Is the inspection result normal?

YES >> Replace variable blower control. Refer to <u>VTL-22</u>, "Removal and Installation".

NO >> Repair harness or connector.

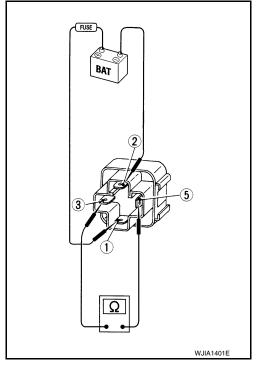


INFOID:0000000006164828

### Front Blower Motor Component Inspection

### COMPONENT INSPECTION

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



Front Blower Motor

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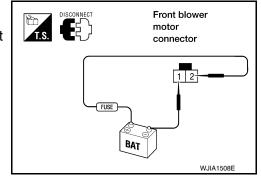
Revision: August 2010 HAC-215 2011 Titan

### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

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	
< DTC/CIRCUIT DIAGNOSIS > [MANUAL A/C (TYPE 2)]	
MAGNET CLUTCH	A
System Description	
SYSTEM DESCRIPTION  The front air control controls compressor operation based on ambient and intake temperature and a signal from ECM.	Е
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.	
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.	
Magnet Clutch Component Function Check	Е
INSPECTION FLOW  1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MAGNET CLUTCH	F
<ol> <li>Turn ignition switch ON.</li> <li>Turn the blower control dial to low speed and press the A/C switch.</li> <li>Rotate mode control dial to vent mode (*).</li> <li>Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)</li> </ol>	(
Is the inspection result normal?  YES >> Inspection End.  NO >> Go to diagnosis procedure. Refer to HAC-217, "Magnet Clutch Diagnosis Procedure".	F
Magnet Clutch Diagnosis Procedure	HA
Regarding Wiring Diagram information, refer to <u>HAC-232</u> , "Wiring <u>Diagram - Manual With 3 Control Dial System"</u> .	
DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH	k

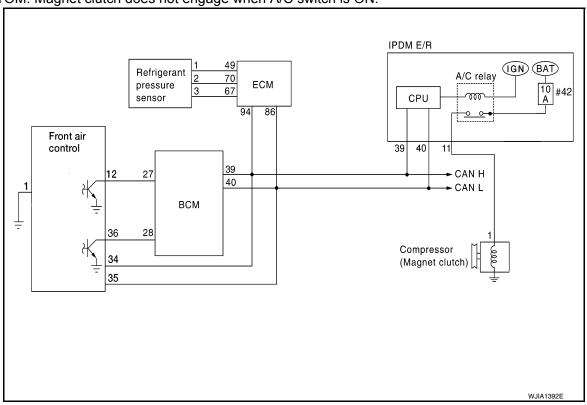
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SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



# 1. CHECK INTAKE SENSOR CIRCUIT

Check intake sensors. Refer to HAC-225, "Intake Sensor Component Inspection".

## Is the inspection result normal?

YES >> GO TO 2.

NO >> Check malfunctioning intake sensor. Refer to <a href="HAC-224">HAC-224</a>, "Intake Sensor Diagnosis Procedure".

# 2. PERFORM AUTO ACTIVE TEST

Refer to PCS-11, "Diagnosis Description".

## Does magnet clutch operate?

YES >> • • WITH CONSULT-III GO TO 5.

• WWITHOUT CONSULT-III GO 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

## 11 – 1 : Continuity should exist.

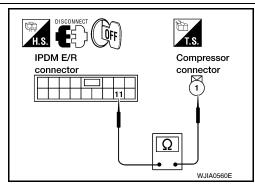
4. Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

## 11 – ground : Continuity should not exist.

## Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.



## < DTC/CIRCUIT DIAGNOSIS >

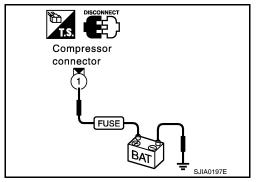
# 4. CHECK MAGNET CLUTCH CIRCUIT

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

## Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to <u>PCS-28</u>, "Removal and Installation of IPDM E/R".

NO >> Replace magnet clutch. Refer to <u>HA-33</u>, "Removal and Installation for Compressor Clutch".



# 5. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to HAC-194, "CONSULT-III Function (BCM - AIR CONDITIONER)".

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

## Is the inspection result normal?

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

# $\mathsf{6}.$ CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

- 1. Turn ignition switch OFF.
- Disconnect BCM connector and front air control connector.
- Check continuity between BCM harness connector M18 (A) terminal 27 and front air control harness connector M176 (B) terminal 12.

## 27 - 12 Continuity should exist.

Check continuity between BCM harness connector M18 (A) terminal 27 and ground.

# 27 - ground Continuity should not exist.

## Is the inspection result normal?

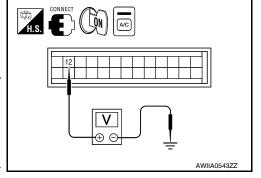
YES >> GO TO 7.

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.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M176 terminal 12 and ground.

	Terminals				
(+)					
front air con- trol connec- tor	Terminal No.	(-)	Condition	Voltage	
M176	76 12 Ground		A/C switch: ON	Approx. 0V	
IVITO	12	Giouna	A/C switch: OFF	Approx. 5V	



## Is the inspection result normal?

YES >> GO TO 8.

NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control. Refer to <u>VTL-8</u>. "Removal and Installation".

R CONTROL

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DISCOMMENT

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Revision: August 2010 HAC-219 2011 Titan

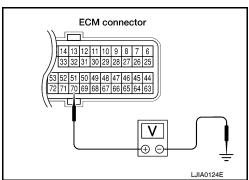
## < DTC/CIRCUIT DIAGNOSIS >

NO-2 >> If the voltage is approx. 0V when A/C switch is OFF, replace BCM. Refer to BCS-53, "Removal and Installation".

# 8. CHECK REFRIGERANT PRESSURE SENSOR

- 1. Start engine.
- 2. Check voltage between ECM harness connector F54 terminal 70 and ground.

	Terminals				
(	(+)		Condition	Voltage	
ECM con- nector	Terminal No.	(-)		, and the second	
F54	70	Ground	A/C switch: ON	Approx. 0.36 - 3.88V	



## Is the inspection result normal?

YES >> GO TO 9.

NO >> Refer to <u>EC-465</u>, "<u>Diagnosis Procedure</u>".

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to HAC-194, "CONSULT-III Function (BCM - AIR CONDITIONER)".

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.
- Disconnect BCM connector and front air control connector.
- Check continuity between BCM harness connector M18 (A) terminal 28 and front air control harness connector M177 (B) terminal 36.

## 28 - 36 Continuity should exist.

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

# 28 - ground Continuity should not exist.

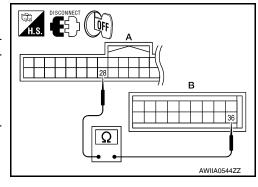
#### Is the inspection result normal?

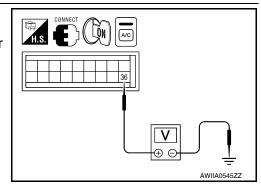
YES >> GO TO 11.

NO >> Repair harness or connector.

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

- 1. Reconnect BCM connector and front air control connector.
- Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M177 terminal 36 and ground.





## **MAGNET CLUTCH**

## < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

	Terminals				
(-	(+)		Condition	Voltage	
front air con- trol connector	Terminal No.	(-)			
M177	36	Ground	A/C switch: ON Blower motor operates	Approx. 0V	
			A/C switch: OFF	Approx. 5V	
Is the inspecti	ion result norr	mal?			
YES >> G	O TO 12.				
NO-1 >> If	the voltage i	s approx. 5V	when blower m	notor is ON.	

NO-1 >> If the voltage is approx. 5V when blower motor is ON, replace front air control. Refer to <u>VTL-8</u>. "Removal and Installation".

NO-2 >> If the voltage is approx. 0V when blower motor is OFF, replace BCM. Refer to <u>BCS-53, "Removal and Installation"</u>.

# 12. CHECK CAN COMMUNICATION

Check CAN communication. Refer to LAN-4, "System Description".

- BCM ECM
- ECM IPDM E/R
- ECM Front air control

## Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-28, "Removal and Installation of IPDM E/R".

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

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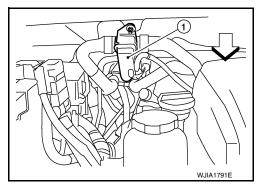
## WATER VALVE CIRCUIT

Description INFOID:000000006164832

## COMPONENT DESCRIPTION

## Water Valve

The water valve (1) cuts the flow of engine coolant to the heater core to allow for maximum cooling during A/C operation. It is controlled by the front air control.



# Water Valve Diagnosis Procedure

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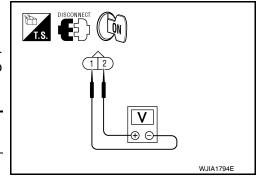
Regarding Wiring Diagram information, refer to <u>HAC-232</u>, "Wiring Diagram - <u>Manual With 3 Control Dial System"</u>.

## DIAGNOSTIC PROCEDURE FOR WATER VALVE

# 1. CHECK WATER VALVE POWER AND GROUND CIRCUITS

- Disconnect water valve connector F68.
- Turn ignition switch ON.
- 3. Rotate temperature control dial to maximum heat.
- Check voltage between water valve harness connector F68 terminal 1 and terminal 2 while rotating temperature control dial to maximum cold.

Connector	Te	erminals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition		
Water valve: F68	2	1	Rotate temperature control dial	Battery voltage	



## Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

# 2.CHECK WATER VALVE CONTROL OUTPUT CIRCUIT

- Turn ignition switch OFF.
- Disconnect front air control connector M177.
- Check continuity between water valve harness connector F68

   (A) terminal 2 and front air control harness connector M177 (B) terminal 30.

## 2 - 30 : Continuity should exist.

 Check continuity between water valve harness connector F68 terminal 2 and ground.

# 2 - Ground : Continuity should not exist.

## Is the inspection result normal?

YES >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

A B B AWIIA0546ZZ

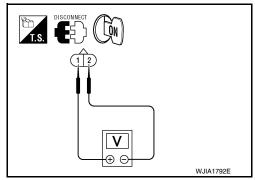
## < DTC/CIRCUIT DIAGNOSIS >

NO >> Repair harness or connector.

# 3. CHECK WATER VALVE POWER AND GROUND CIRCUITS

- 1. Rotate temperature control dial to maximum cold.
- Check voltage between water valve harness connector F68 terminal 1 and terminal 2 while rotating temperature control dial to maximum heat.

Connector	Terminals		Condition	Voltage	
Connector	(+)	(-)	Condition	(Approx.)	
Water valve: F68	1	2	Rotate temperature control dial	Battery voltage	



## Is the inspection result normal?

YES >> Replace the water valve.

NO >> GO TO 4.

# 4. CHECK WATER VALVE CONTROL OUTPUT CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector M177.
- Check continuity between water valve harness connector F68

   (A) terminal 1 and front air control harness connector M177 (B) terminal 29.

## 1 - 29 : Continuity should exist.

Check continuity between water valve harness connector F68

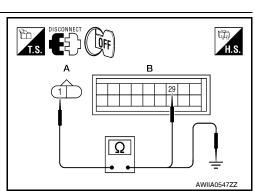
 (A) terminal 1 and ground.

# 1 - Ground : Continuity should not exist.

## Is the inspection result normal?

YES >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

NO >> Repair harness or connector.



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## INTAKE SENSOR

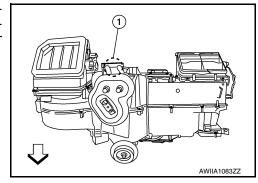
# System Description

#### INFOID:0000000006164834

## COMPONENT DESCRIPTION

## Intake Sensor

The intake sensor (1) 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.



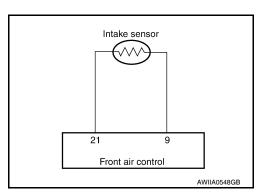
# Intake Sensor Diagnosis Procedure

INFOID:0000000006164835

Regarding Wiring Diagram information, refer to <u>HAC-232</u>, "Wiring <u>Diagram - Manual With 3 Control Dial System"</u>.

## DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted.



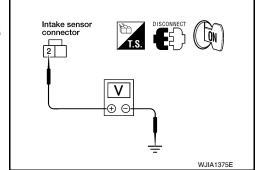
# 1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

- 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

## < DTC/CIRCUIT DIAGNOSIS >

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

- Turn ignition switch OFF.
- Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 (B) terminal 1 and front air control harness connector M176 (A) terminal 21.

#### 1 - 21 : 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-225, "Intake Sensor Component Inspection".

## Is the inspection result normal?

YES >> Replace front air control. Refer to VTL-8, "Removal and Installation".

NO >> Replace intake sensor. Refer to VTL-11, "Removal and Installation".

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

- Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 (B) terminal 2 and front air control harness connector M176 (A) terminal 9.

#### 2 - 9 : Continuity should exist.

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

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

#### Is the inspection result normal?

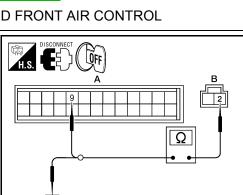
YES >> Replace front air control. Refer to VTL-8, "Removal and Installation".

NO >> Repair harness or connector.

# Intake Sensor Component Inspection

## COMPONENT INSPECTION

Intake Sensor



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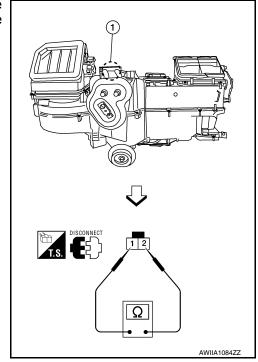
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## < DTC/CIRCUIT DIAGNOSIS >

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

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



If NG, replace intake sensor. Refer to  $\underline{\text{VTL-11}}$  , "Removal and Installation".

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

# Component Description

#### INFOID:0000000006164837

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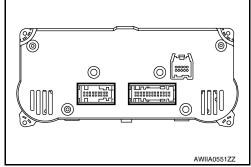
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## COMPONENT DESCRIPTION

## Front Air Control

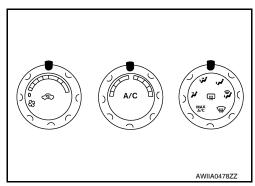
The front air control has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, defroster door motor, blower motor and A/C compressor are then controlled.

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.



## 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 control dial.



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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 the blower control dial clockwise to low speed.
- Press the A/C switch.
- Confirm that the compressor clutch engages (sound or visual inspection).

## Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>HAC-227, "Front Air Control Power and Ground Diagnosis Procedure".</u>

# Front Air Control Power and Ground Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>HAC-232</u>, "Wiring Diagram - Manual With 3 Control Dial System".

## DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

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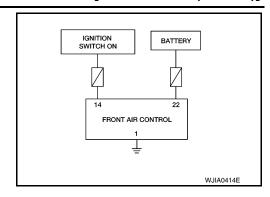
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# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

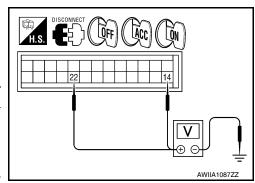
SYMPTOM: A/C system does not come on.



# 1. CHECK POWER SUPPLY CIRCUITS FOR FRONT AIR CONTROL

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connectors.
- 3. Turn ignition switch ON.
- 4. Check voltage between front air control harness connector M176 terminals 14, 22, and ground.

Terminals			Ignition switch position			
(+)						
front air control connector	Terminal No.	(-)	OFF	ACC	ON	
M176	14 M176 Ground		Approx. 0V	Approx. 0V	Battery voltage	
M176	22	Glound	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-72, "Terminal Arrangement".
  - If fuses are OK, check harness for open circuit. Repair or replace as necessary.
  - If fuses are NG, replace fuse and check harness for short circuit. Repair or replace as necessary.

# 2. CHECK GROUND CIRCUIT FOR FRONT AIR CONTROL

- 1. Turn ignition switch OFF.
- Check continuity between front air control harness connector M176 terminal 1 and ground.

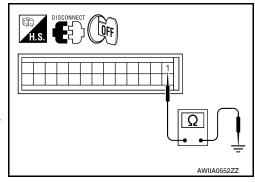
## 1 - Ground

## : Continuity should exist.

## Is the inspection result normal?

OK >> Replace front air control. Refer to <u>VTL-8</u>, "Removal and <u>Installation"</u>.

NG >> Repair harness or connector.



# MANUAL A/C IDENTIFICATION TABLE

< ECU DIAGNOSIS INFORMATION >

[MANUAL A/C (TYPE 2)]

# **ECU DIAGNOSIS INFORMATION**

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

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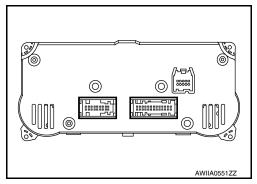
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# AIR CONDITIONER CONTROL

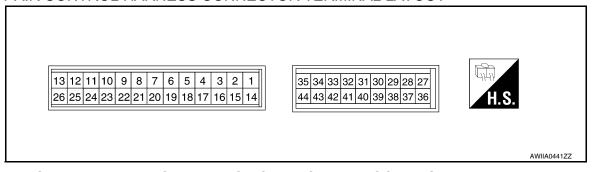
## Front Air Control Terminals Reference Values

INFOID:0000000006164841

Measure voltage between each terminal and ground by following Terminals and Reference Value for front air control (1).



# FRONT AIR CONTROL HARNESS CONNECTOR TERMINAL LAYOUT



## TERMINALS AND REFERENCE VALUES FOR FRONT AIR CONTROL

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
1	В	Ground	-	-	0V
2	Υ	V ref ACTR (5V)	ON	-	0 - 5V
3	W/G	Air mix door motor CW	ON	Clockwise rotation	Battery voltage
4	G	Air mix door motor CCW	ON	Counterclockwise rotation	Battery voltage
5	BR/W	Mode door motor CW	ON	Clockwise rotation	Battery voltage
6	P/L	Mode door motor CCW	ON	Counterclockwise rotation	Battery voltage
7	0	Intake door motor CW	ON	Clockwise rotation	Battery voltage
8	G/B	Intake door motor CCW	ON	Counterclockwise rotation	Battery voltage
9	L/B	Intake sensor	ON	-	0 - 5V
11	Y/B	Rear defogger request *1	ON	-	Battery voltage
12	W/R	Compressor ON signal	ON	A/C switch OFF	5V
12	VV/IX	Compressor ON signal	ON	A/C switch ON	0V
14	Y/G	Power supply for IGN	ON	-	Battery voltage
15	Р	V ref ACTR (ground)	ON	-	5V
16	GR	Mode door motor feedback	ON	-	0 - 5V
18	SB	Air mix door motor feedback	ON	-	0 - 5V
19	LG	Defroster door motor CW	ON	Clockwise rotation	Battery voltage
20	P/B	Defroster door motor CCW	ON	Counterclockwise rotation	Battery voltage
21	V/R	Sensor ground	ON	-	0V
22	Y/R	Power supply for BAT	-	-	Battery voltage
23	R/L	Illumination +	ON	Park lamps ON	Battery voltage

# AIR CONDITIONER CONTROL

# < ECU DIAGNOSIS INFORMATION >

# [MANUAL A/C (TYPE 2)]

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V) (Approx.)
24	BR	Illumination -	-	Park lamps ON	(V) 15 10 5 200 ms PIIA2344E
25	LG/B	Defroster door motor feedback	ON	-	0 - 5V
26	R/B	3 Front blower request ON	ON	Front blower motor OFF	Battery voltage
20	K/D		Front blower motor ON	0V	
29	Y/L	Water valve	ON	Water valve open	Battery voltage
29	1/L	Water valve Water va	Water valve closed	0V	
30	W/G	Water valve	ON	Water valve open	0V
30	W/G	water valve	ON	Water valve closed	Battery voltage
34	L	CAN-H	ON	-	0 - 5V
35	Р	CAN-L	ON	-	0 - 5V
36	L/R	Ean ON signal	ON	Blower switch OFF	5V
30	L/K	_/R Fan ON signal	ON	Blower switch ON	0V
40	G/R	Variable blower control	ON	-	0 - 5V

<sup>\*1:</sup> If equipped

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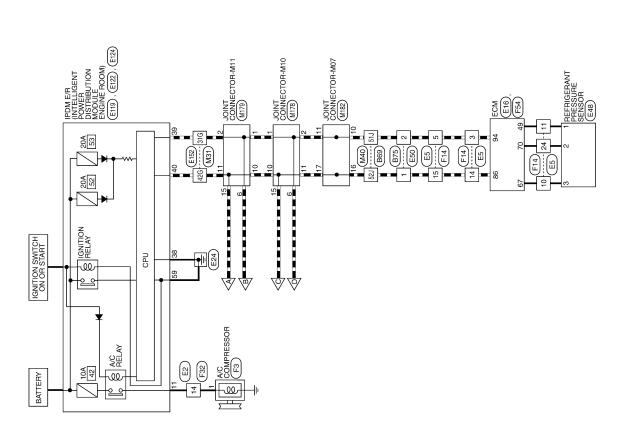
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# WIRING DIAGRAM

# AIR CONDITIONER CONTROL

Wiring Diagram - Manual With 3 Control Dial System

CC : CREW CAB AIR CONDITIONER CONTROL - MANUAL WITH 3 CONTROL DIAL SYSTEM (M177) FRONT AIR CONTROL (M176) 20A 27 (F152) 20A FUSE BLOCK (J/B) (M3), (M39) IGNITION SWITCH ON OR START 40**4** 



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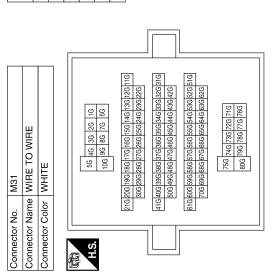
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# AIR CONDITIONER CONTROL CONNECTORS - MANUAL WITH 3 CONTROL DIAL SYSTEM

	[ [ ]						
Connector No. M18 Connector Name BCM (BODY CONTROL MODULE) Connector Color WHITE	9 10 11 12 13 14 15 16 17 18 19 20	Signal Name	REAR DEFOGGER SW	AIRCON SW	BLOWER FAN SW	CAN-H	CAN-L
me BCM MOD or WHIT	6 7 8	Color of Wire	Y/B	W/R	E,	_	۵
Connector No. Connector Name Connector Color	H.S. 12 23 24 25 26 27 28 29	Terminal No.	6	27	28	39	40
				]			
Connector No. M3 Connector Name FUSE BLOCK (J/B) Connector Color WHITE	3N	or of Signal Name	ا ق				
Connector No. M3 Connector Name FUSE E Connector Color WHITE	H.S.	Terminal No. Wire	5N Y/G				

Connector No.	M39	
Connector Name		FUSE BLOCK (J/B)
Connector Color	olor WHITE	щ
是 H.S.	30   08   70   6	30
Terminal No.	Color of Wire	Signal Name
4Ω	Y/R	1

Signal Name	ı	I	ı	ı	ı	1
Color of Wire	Y/L	W/G	٦	Ь	Д	Ь
Terminal No. Wire	21G	29G	31G	42G	71G	79G



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# AIR CONDITIONER CONTROL

< WIRING DIAGRAM >

# [MANUAL A/C (TYPE 2)]

Connector No. M62 Connector Name FRONT BLOWER MOTOR Connector Color BLACK		No. Color of Signal Name  L/W - W/L		M121 VARIABLE BLOWER CONTROL (3 CONTROL DIAL SYSTEM WITHOUT AUTO A/C) WHITE    A	A B C
Connector No. Connector Name Connector Color	H.S.	Terminal No.		Connector No.  Connector Name Connector Color H.S.  Terminal No. Co 7 7 8 8 8 4 8 8	E
M58 INTAKE DOOR MOTOR BLACK	456	Signal Name		lame IOL DIAL TITHOUT A/C)	F
	1 2 8	Color of Wire O O G/B		Color of Wire P/G	Н
Connector No. Connector Name Connector Color	是 H.S.	Terminal No.		Terminal No. 2 2 3 3 4 4 4 H	J
			٦		K
WIRE	31 23 13 88 73 60 361 56 144 143 143 143 143 143 143 143 143 143	2.1   2.0   191	Signal Name	ITA	L
M40 WIRE TO WIRE	50 41 100 90	150   160   170	e e	BLACK BLACK	M
Connector No. Connector Name V	H.S.	A11   A01   A02   A03   A03   A03   A04   A04   A05   A05	Terminal No. Wire 51J L 52J P	onnector No.	N O
	<del></del>			ABIIA0653GB	
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Connector No. M146 Connector Name INTAKE SENSOR Connector Color GRAY	(南) H.S.	Signal Name	1 V/R	_ 2 L/B				Terminal No. Wire Signal Name	12 W/R A	13 -	14 Y/G V IGN	15 P V REF RETURN	3   2   1   16   GR   PANEL/FLOOR   16   16   FEEDBACK   FEEDBACK   16   16   17   17   17   17   17   17	- 21	Name 18 SB DRIVER BLEND		19 LG	20 P/B	V 21 V/R SENS	22 Y/R	PANEL/FLOOR CCW 23 R/L ILLUM + RECIRC 1 CW - 24 RB IIIIM -	, 25 LG/B DEFBO	!	
r No. M144  r Name DEFROSTER DOOR MOTOR	_   [_	Color of	Wire	Д.		P/B			r Name (WITH MANUAL 3 CONTROL	-	r Color   BLACK		13         12         11         10         9         8         7         6         5         4           26         25         24         23         22         21         20         19         18         17	Color of	e Sign			(K	G DRIVER BI		O BECIB	G/B RECIRC	L/B EVAP TE	1
Connector Name	原 HS.	I Coimport	-	2	Е 4	9		Connector No.	Connector Name		Connector Color	•	H.S.		ਲ	-	~ .	m  -	4   "	0	0 2	80	6	10
M142 MODE DOOR MOTOR BLACK	3 4 5 6	Signal Name	SYSTEM WITHOUT		- (3 CONTROL DIAL SYSTEM WITHOUT	AUTO A/C)	1	2	MIX DOOK TOR (DRIVER)	Š				Signal Name	1	ı	I	1	ı					
Connector No. M142 Connector Name MODE Connector Color BLAC	H.S.	Terminal No. Wire	-	2 GR	3	5 BR/W	9 B/L	Connector No. M147	Connector Name   AIR MIX DOOR   MOTOR (DRIVER)	Connector Color BLACK			H.S.	Terminal No. Wire	1 W/G	2 P	3	4 SB	6 G					

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Signal Name	_	-	-	=
Color of Wire	1	-	1	_
Terminal No.	41	42	43	44

30 31 32 33 34 35 35 35 35 35 35 35 35 35 35 35 35 35	W//G   N//G   N/	Signal Name WATER VALVE CLOSE CAN-H CAN-L
36 37 38 39 40	L/R G/R	FAN ON

Connector No.	). M177	2
Connector Name		FRONT AIR CONTROL (WITH MANUAL 3 CONTROL DIAL SYSTEM)
Connector Color	olor BLUE	Ш
原动 H.S.	35 34 33 44 43 42	34 33 32 31 30 29 28 27 38 42 41 40 39 38 37 38
Terminal No.	Color of Wire	Signal Name
27	1	1
28	ı	1
29	J//L	WATER VALVE OPEN +

Connector No.	). M182	
Connector Name		JOINT CONNECTOR-M07
Connector Color	olor WHITE	ш
H.S.	9 8 7 6 5 4 3 20 19 18 17 16 15 14 13	5 4 3 2 1
Terminal No.	Color of Wire	Signal Name
10	٦	1
=	_	1
16	Ь	ı
17	Ь	1

	JOINT CONNECTOR-M11		6 5 4 3 2 1 16 15 14 13 12 11 10	Signal Name	1	_	I	_	I	ı
M179		olor BLUE	9 8 7 6	Color of Wire	_	_	_	Ь	۵	Ф
Connector No.	Connector Name	Connector Color	·····································	Terminal No.	-	2	9	10	11	15

	_	_						
	JOINT CONNECTOR-M10		20 19 18 17 16 15 14 13 12 11 10	Signal Name	1	1	_	ı
M178		or BLUE	9 8 7 6 0 19 18 17 16	Color of Wire	ب	_	Ь	۵
Connector No.	Connector Name	Connector Color	H.S.	Terminal No.	-	9	10	15

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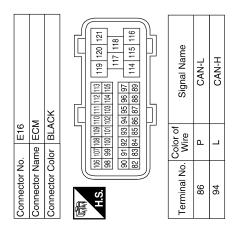
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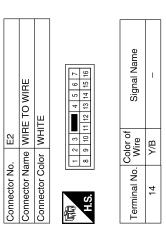
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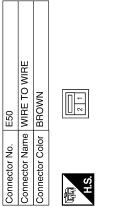
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	WIRE TO WIRE	ITE		1 2 3 4 5 6	Signal Name	ı	ı	1	ı	1	I	I	1	_
. E5	-	lor WHITE		2 3 4 5	Color of Wire	X/L	_	_	W/G	В	R/Υ	۵	۵	B/W
Connector No.	Connector Name	Connector Color	4	H.S.	Terminal No.	2	က	ည	2	10	11	14	15	24



Connector No.	E119	
Connector Name	9	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	or WHI	TE
S. T.	9 8 7 6 (	6
Terminal No.	Color of Wire	Signal Name
=	Y/B	A/C COMPRESSOR



E TO WIRE	BROWN		Signal Na	1	-
ne WIF	-		Color of Wire	Ь	7
Connector Name   WIRE TO WIRE	Connector Color	南 H.S.	Terminal No.	-	2

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

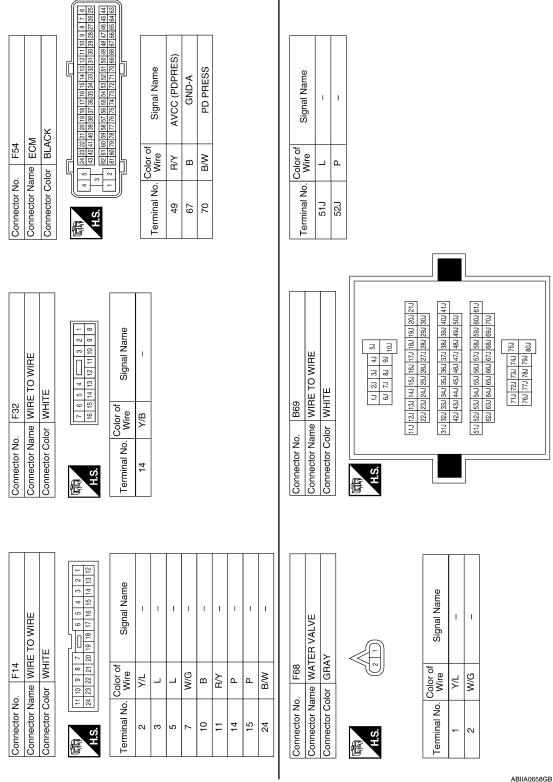


Signal Name	ı	ı	_
Color of Wire	R/Υ	B/W	В
Terminal No.	-	2	3

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Connector No. F3 Connector Name A/C COMPRESSOR Connector Color BLACK  Terminal No. Wire Signal Name  1 Y/B	С
ion F3 Color of Wire Y/B	D
Connector No. Connector Color Connector Color Terminal No.  1 Y	Е
	F
E124 IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) BLACK  Signal Name re Signal Name re Signal Name Re CAND (POWER)  Re CAND (POWER)  Re CAND (POWER)	G
E124 IPDM E/R (IN MODULE ENVER DIST) MODULE ENVER DIST IPDM E/R (IN MODULE ENVER DIST) IPDM E/	Н
	HAG
Connector No.  Connector Name Connector Color Terminal No. Www.  21G Y Color 29G W W 31G V W 22G F 71G G F 71G G G F 79G F F 7	J
	K
PDM E/R (INTELLIGENT   POWER DISTRIBUTION   MODULE ENGINE ROOM)   MODULE ENGINE ROOM   MITE   Signal Name   MITE   CAN-H   P   CAN-H   C	L
POWER   Powe	
POWER DISTRI   Connector Name   POWER DISTRI   MODULE ENGIN     POWER DISTRI   MODULE ENGIN     POWER DISTRI   POWER DISTRIP   POWE	N O
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Connector No.	B75
Connector Name WIRE TO WIRE	WIRE TO WIRE
Connector Color BROWN	BROWN

Signal Name	1	-
Color of Wire	Ь	Г
Terminal No.	-	2

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# SYMPTOM DIAGNOSIS

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	AWIIA0481ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

# **AIR CONDITIONER CONTROL**

# < SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

# AIR CONDITIONER CONTROL

# Symptom Matrix Chart

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# **SYMPTOM TABLE**

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-227
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	HAC 107
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-197</u>
Discharge air temperature does not change.	Co to Trouble Diagnosis Precedure for Air Mix Dear Motor	HAC 201
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u>HAC-201</u>
Intake door does not change.	Co to Trouble Diagnosis Broodure for Inteles Deer Meter	HAC 205
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>HAC-205</u>
Defroster door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Defroster Door Motor.	HAC-207
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-211
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-217
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	HAC-244
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	HAC-252
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-254

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## INSUFFICIENT COOLING

# Component Function Check

SYMPTOM: Insufficient cooling

INSPECTION FLOW

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

- 1. Rotate the blower control dial to the low speed.
- 2. 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.

# $\mathbf{2}$ . CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to <a href="HAC-182">HAC-182</a>, "Operational Check".

# Does another symptom exist?

YES >> Refer to HAC-243, "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 EM-13, "Checking Drive Belts".

## Is the inspection result normal?

YES >> GO TO 5.

NO >> Adjust or replace compressor belt. Refer to EM-13, "Removal and Installation".

# 5.CHECK AIR MIX DOOR OPERATION

Check and verify air mix door mechanism for smooth operation. Refer to <u>HAC-201</u>, "Air Mix Door Motor Component Function Check".

#### Does air mix door operate correctly?

YES >> GO TO 6.

NO >> Check air mix door motor circuit. Refer to HAC-202, "Air Mix Door Motor Diagnosis Procedure".

# 6. CHECK COOLING FAN MOTOR OPERATION

Check and verify cooling fan motor for smooth operation. Refer to EC-439, "Component Inspection".

## Does cooling fan motor operate correctly?

YES >> GO TO 7.

NO >> Check cooling fan motor. Refer to EC-439, "Diagnosis Procedure".

## 7. CHECK WATER VALVE OPERATION

Check and verify water valve for smooth operation. Refer to HAC-222, "Description".

## Does water valve operate correctly?

YES >> GO TO 8.

NO >> Check water valve circuit. Refer to HAC-222, "Water Valve Diagnosis Procedure".

# $oldsymbol{8}.$ CHECK RECOVERY/RECYCLING EQUIPMENT BEFORE USAGE

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

>> GO TO 9.

INSUFFICIENT COOLING	
< SYMPTOM DIAGNOSIS > [MANUAL A/C (TYPE 2)]	
9. CHECK REFRIGERANT PURITY	Δ
<ol> <li>Connect recovery/recycling equipment to vehicle.</li> <li>Confirm refrigerant purity in supply tank using recovery/recycling and refrigerant identifier.</li> </ol>	
	В
YES >> GO TO 10.  NO >> Check contaminated refrigerant. Refer to <u>HAC-255, "Working with HFC-134a (R-134a)"</u> .	
10.check for evaporator freeze up	С
Start engine and run A/C. Check for evaporator freeze up.	
Does evaporator freeze up?	D
YES >> Perform performance test diagnoses. Refer to <u>HAC-245, "Diagnostic Work Flow"</u> .  NO >> GO TO 11.	J
11.check refrigerant pressure	Е
Check refrigerant pressure with manifold gauge connected. Refer to HAC-247, "Performance Chart".	
Is the inspection result normal?	
YES >> Perform performance test diagnoses. Refer to <u>HAC-245, "Diagnostic Work Flow".</u> NO >> GO TO 12.	F
12.check air ducts	
Check ducts for air leaks.	J
Is the inspection result normal?	

Diagnostic Work Flow

>> System OK. >> Repair air leaks.

YES

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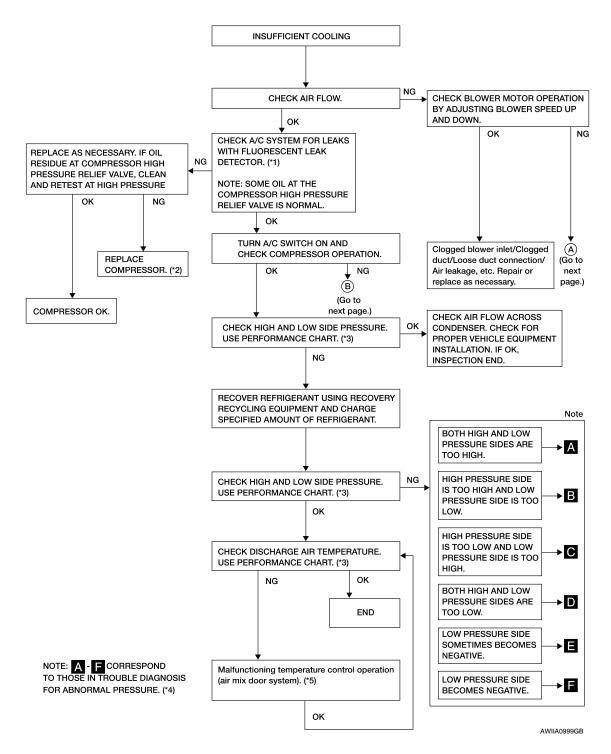
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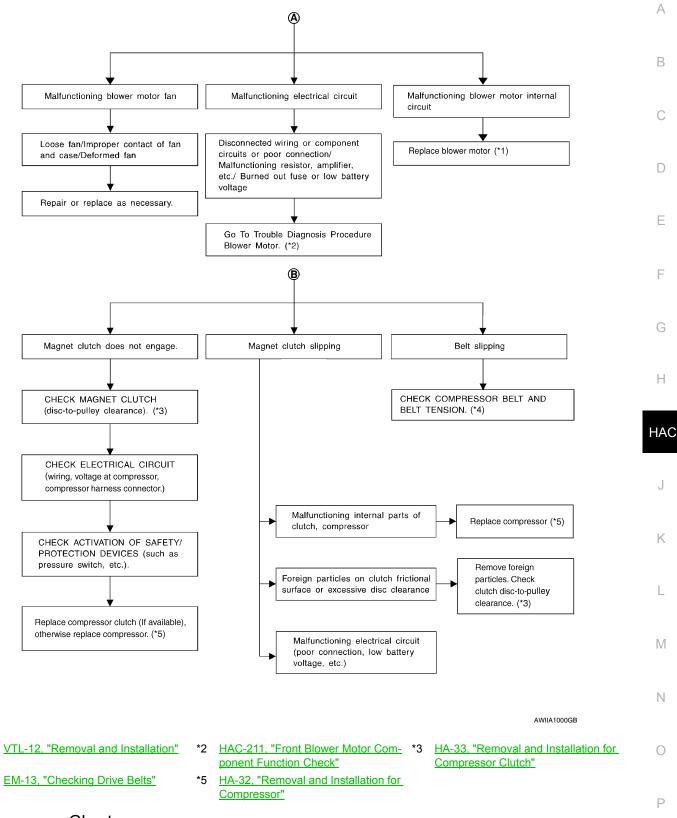
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- Using the Fluorescent Dye Leak Detector"
- \*4 HAC-248, "Trouble Diagnoses for Abnormal Pressure"
- \*1 HA-24, "Checking System for Leaks \*2 HA-33, "Removal and Installation for \*3 HAC-247, "Performance Chart" Compressor Clutch"
  - \*5 HAC-201, "Air Mix Door Motor Component Function Check"



## Performance Chart

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## **TEST CONDITION**

Testing must be performed as follows:

## < SYMPTOM DIAGNOSIS >

Indoors or in the shade (in a well-ventilated place)
Closed
Open
Open
Max. COLD
(Ventilation) set
(Recirculation) set
Max. speed set
Idle speed

## **TEST READING**

Recirculation-to-discharge Air Temperature Table

Inside air (Recirculating air) at blower assembly inlet		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

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)	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

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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 stan-

# **INSUFFICIENT COOLING**

## < SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

dard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until speci- fied pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance  ↓  1. Condenser fins are clogged.  2. Improper fan rotation of cooling fan	Clean condenser. Check and repair cooling fan if necessary.
	<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/cm², 28 psi). It then decreases gradually thereafter.</li> </ul>	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.)  Air in refrigeration cycle	Evacuate and recharge system.
	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cooling system.
	<ul> <li>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>Plates are sometimes covered with frost.</li> </ul>	<ul> <li>Excessive liquid refrigerant on low-pressure side</li> <li>Excessive refrigerant discharge flow</li> <li>Expansion valve is open a little compared with the specification.</li> <li>Improper expansion valve adjustment</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 located 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

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# < SYMPTOM DIAGNOSIS >

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 compressor operation stops.	Compressor pressure operation is improper.  Understand the compressor packings.	Replace compressor.
	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper.  Understand the compressor packings.	Replace compressor.

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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.	There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	Replace liquid tank.     Check oil for contamination.
	Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. Expansion valve inlet may be frosted. Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	Check and repair malfunctioning parts.     Check oil for contamination.
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge.  ↓ Leaking fittings or components.	Check refrigerant system for leaks. Refer to HA-23, "Checking of Refrigerant Leaks".
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification.   1. Improper expansion valve adjustment. 2. Malfunctioning expansion valve. 3. Outlet and inlet may be clogged.	Remove foreign particles by using compressed air. Check oil for contamination.
	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 malfunctioning parts.</li><li>Check oil for contamination.</li></ul>
	Air flow volume is too low.	Evaporator is frozen.	Check intake sensor circuit. Refer to HAC-224, "Intake Sensor Diagnosis Procedure". Repair evaporator fins. Replace evaporator. Refer to HAC-211, "Front Blower Motor Component Function Check".

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes 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 expansion 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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	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.  If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant.  If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air).  If either of the above methods cannot correct the malfunction, replace expansion valve.  Replace liquid tank.

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[MANUAL A/C (TYPE 2)]

## INSUFFICIENT HEATING

# Component Function Check

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SYMPTOM: Insufficient heating

## INSPECTION FLOW

# 1.confirm symptom by performing operational check - temperature increase

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

## Can this symptom be duplicated?

YES >> GO TO 2.

NO >> Perform complete system operational check. Refer to <a href="HAC-182">HAC-182</a>, "Operational Check".

# 2.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

# ${f 3}.$ CHECK ENGINE COOLING SYSTEM

- 1. Check for proper engine coolant level. Refer to CO-10, "Inspection".
- Check hoses for leaks or kinks.
- 3. Check radiator cap. Refer to CO-10, "Inspection".
- 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 <a href="HAC-201">HAC-201</a>, "Air Mix Door Motor Component Function Check".

# 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.

# $oldsymbol{6}$ .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 warm.

## Is the inspection result normal?

YES >> Hot inlet hose and a warm outlet hose: GO TO 7.

NO >> • Inlet hose cold: GO TO 10.

· Both hoses warm: GO TO 8.

## 7. CHECK ENGINE COOLANT SYSTEM

Check engine coolant temperature sensor. Refer to EC-177, "Component Inspection".

## Is the inspection result normal?

YES >> System OK.

NO >> Repair or replace as necessary. Retest.

## 8. CHECK HEATER HOSES

## **INSUFFICIENT HEATING**

[MANUAL A/C (TYPE 2)] < SYMPTOM DIAGNOSIS > Check heater hoses for proper installation. Α Is the inspection result normal? YES >> System OK. NO >> 1. Back flush heater core. 2. Drain the water from the system. В 3. Refill system with new engine coolant. Refer to CO-11, "Changing Engine Coolant". 4. GO TO 9 to retest. 9. CHECK HEATER HOSE TEMPERATURES C 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 D warm. Is the inspection result normal? YES >> System OK. Е NO >> Replace heater core. Refer to VTL-15, "Removal and Installation". 10. CHECK WATER VALVE Check the operation of the water valve. Refer to HAC-222, "Water Valve Diagnosis Procedure". F Is the inspection result normal? YES >> System OK. NO >> Replace water valve. Н

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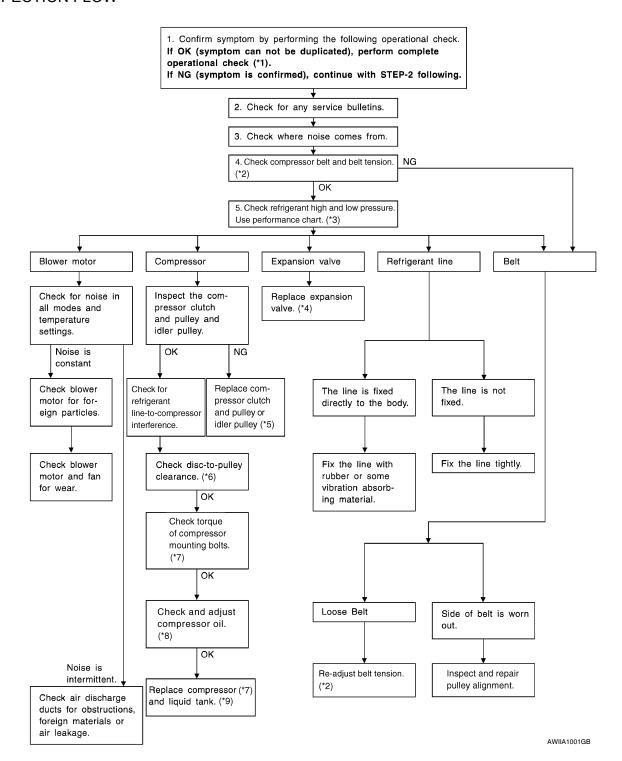
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## NOISE

# Component Function Check

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SYMPTOM: Noise INSPECTION FLOW



- \*1 HAC-182, "Operational Check"
- **Expansion Valve**"
- Compressor"
- \*2 EM-13, "Checking Drive Belts"
- Compressor Clutch"
  - in Compressor"
- \*3 HAC-247, "Performance Chart"
- HA-43, "Removal and Installation for \*5 HA-33, "Removal and Installation for \*6 HA-33, "Removal and Installation for Compressor Clutch"
- \*7 HA-32, "Removal and Installation for \*8 HA-20, "Maintenance of Oil Quantity \*9 HA-41, "Removal and Installation for Condenser"

# **PRECAUTION**

## **PRECAUTIONS**

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRF-TFNSIONER"

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
- 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 HA-4, "Contaminated Refrigerant". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/ Recycling Recharging equipment and Refrigerant Identifier.
- Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
- Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.
- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

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

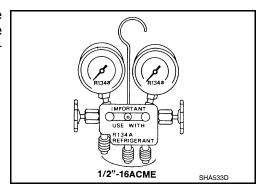
- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location 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

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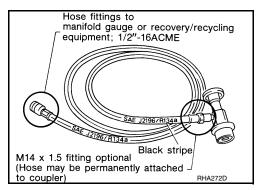
## MANIFOLD GAUGE SET

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

