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HEATER & AIR CONDITIONING CONTROL SYSTEM

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Defroster Door Motor Component Function Check

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DIAGNOSIS AND REPAIR WORKFLOW

[AUTOMATIC AIR CONDITIONER]

< BASIC INSPECTION >	[AUTOMATIC AIR CONDITIONER]
BASIC INSPECTION	
DIAGNOSIS AND REPAIR WORKFLOW	
How to Perform Trouble Diagnosis For Quick And A	Accurate Repair INFOID:000000009882433
WORK FLOW	
1.LISTEN TO CUSTOMER COMPLAINT	
Listen to customer complaint. Get detailed information about the tom occurs.	conditions and environment when the symp-
>> 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-6, "Ope	erational Check".
Can a symptom be duplicated?	
YES >> GO TO 4 NO >> GO TO 5	
4.GO TO APPROPRIATE TROUBLE DIAGNOSIS	
Go to appropriate trouble diagnosis. Refer to HAC-82, "Symptom	Matrix Chart".
Can a symptom be duplicated?	
>> GO TO 5.	
5. PERFORM THE FRONT AIR CONTROL SELF-DIAGNOSIS	
Perform front air control self-diagnosis. Refer to <u>HAC-21. "Front A</u>	<u> Air Control Self-Diagnosis"</u> .
>> If any diagnostic trouble codes set. Refer to <u>HAC-Chart</u> ".	
>> Confirm the repair by performing operational check. F	Refer to HAC-6, "Operational Check".

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[AUTOMATIC AIR CONDITIONER]

INSPECTION AND ADJUSTMENT

Operational Check

INFOID:0000000009882434

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</u>, "<u>Discharge</u> <u>Air Flow</u>".

Mode door position is checked in the next step.

If NG, go to trouble diagnosis procedure for <u>HAC-23</u>, "Mode <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.

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.
- 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.
- 2. Check for hot air at appropriate discharge air outlets.

If NG, listen for sound of air mix door motor operation. If OK, go to trouble diagnosis procedure for <u>HAC-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.
- 2. AUTO indicator should illuminate.
 - If ambient temperature is warm, and selected temperature is cool, confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle, and set temperatures.)

If NG, go to trouble diagnosis procedure for <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 HAC-5, "How to Perform Trouble Diagnosis For Quick And Accurate Repair" and perform tests as outlined to simulate driving conditions environment. If symptom appears. Refer to HAC-82, "Symptom Matrix Chart", and perform applicable trouble diagnosis procedures.

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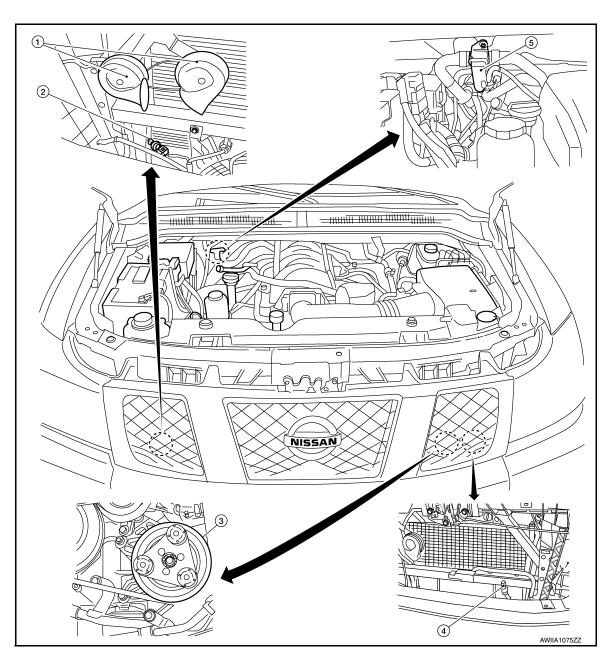
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SYSTEM DESCRIPTION

FUNCTION INFORMATION

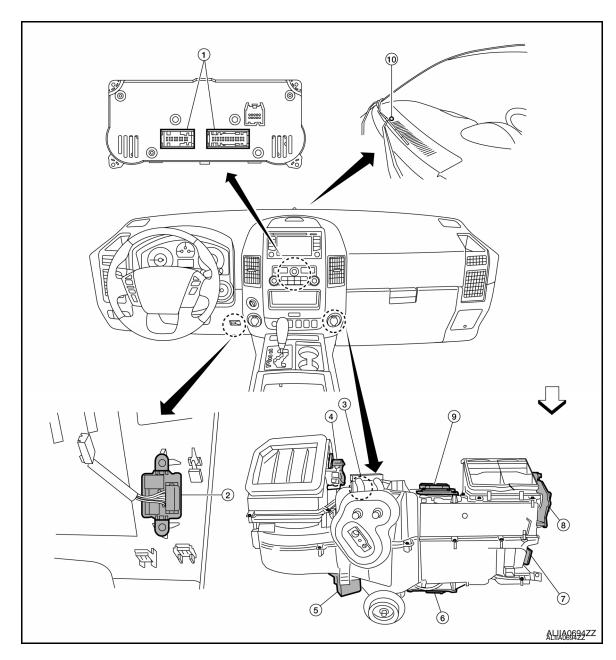
Component Part Location

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

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Symptom	Reference Page		
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	<u>HAC-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 Presedure for Made Dear Meter	1100.00	
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 Dropadure for Air Mir Door Mater	114.0.00	
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u>HAC-28</u>	
Intake door does not change.	Co to Trouble Diagnosis Presedure for Intella Dear Mater	1100.26	
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>HAC-36</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.	<u>HAC-44</u>	
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	<u>HAC-49</u>	
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.	<u>HAC-21</u>	
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	HAC-94	

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:0000000009882438

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).

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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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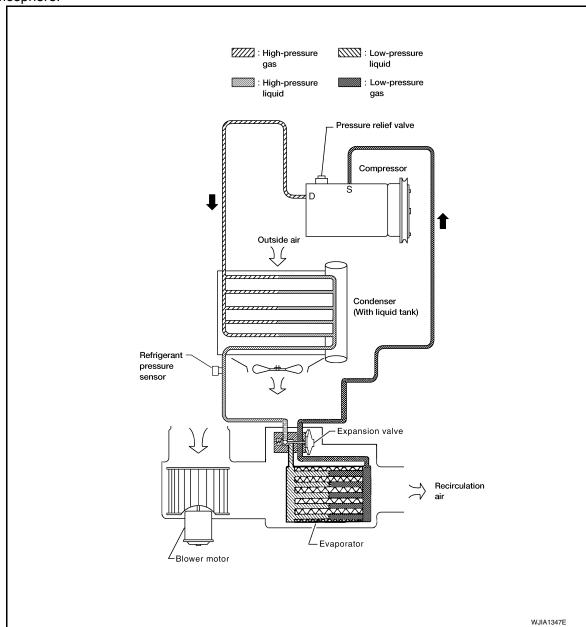
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cm², 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



AUTOMATIC AIR CONDITIONER SYSTEM

Control System Diagram

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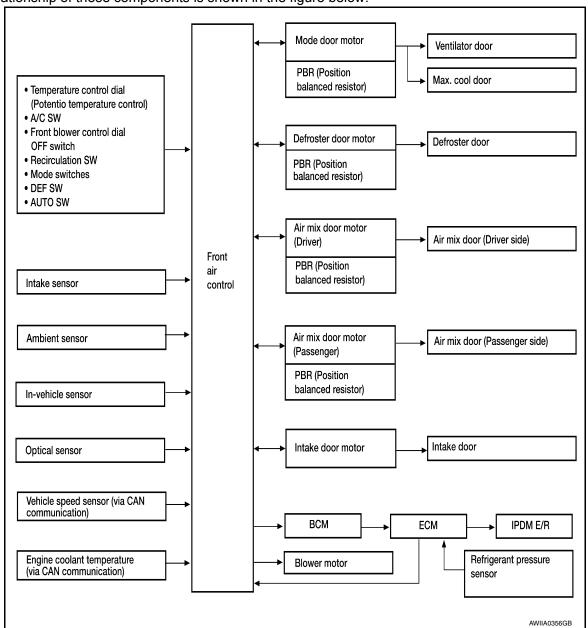
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CONTROL SYSTEM

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

AUTO SWITCH

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

TEMPERATURE CONTROL DIAL (DRIVER)

Increases or decreases the set temperature.

TEMPERATURE CONTROL DIAL (PASSENGER)

Increases or decreases the set temperature.

RECIRCULATION () 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.)

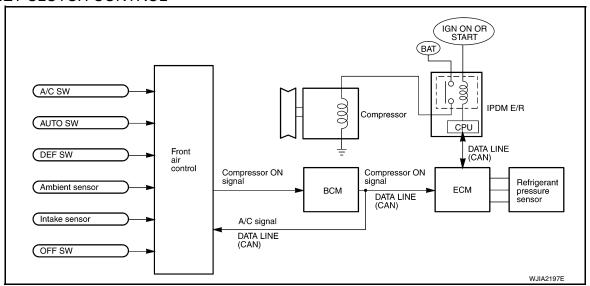
MODE SWITCHES

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

		WJIA0540E	
Mode door position		Air outlet/distribution	
	Vent	Foot	Defroster

Mode door position		Air outlet/distribution			
	Vent	Foot	Defroster		
77	95%	5%	_		
Ç!	60%	40%	_		
ij	_	70%	30%		
	_	60%	40%		
(4)	_	10%	90%		

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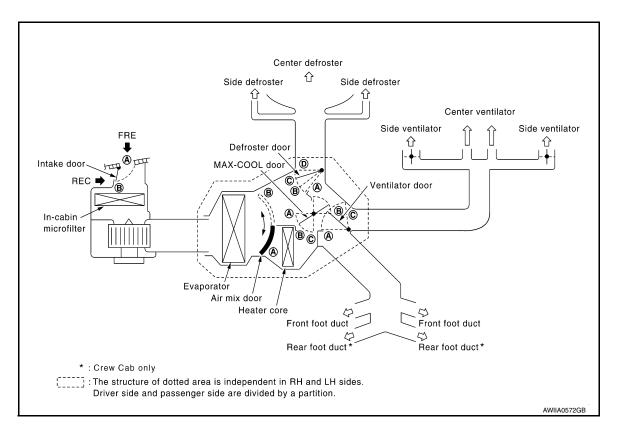
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Switches And Their Control Function

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Position	MODE SW		DEF	sw	REC	SW	Tempera	ture con	trol dial	OFF		
or switch	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF			\	SW
Door	→ •	_⇒.•	_ •	W •	_	TMC	6	₹ >	(AUTO)	(PR)
		+_~	+ ~	+/~	-> ф <	0		0	COLD	~	нот	OFF B
Ventilator door	A	B	©	©	©		_	_				©
MAX-COOL door	(A)	B	B	B	©		_	_				B
Defroster door	(D)	(D)	O or ©	B	(A)						©	
Intake door		_	_		B		(A)	B				B
Air mix door							A	AUTO	B			

DIAGNOSIS SYSTEM (HVAC)

< SYSTEM DESCRIPTION >

[AUTOMATIC AIR CONDITIONER]

DIAGNOSIS SYSTEM (HVAC)

CONSULT Function (HVAC)

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

Diagnostic mode	Description
SELF DIAGNOSTIC RESULT	Displays Front air control self-diagnosis results.
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 (With EXP-800 NI or GR8-1200 NI)" or CHG-7, "Work Flow (Without EXP-800 NI or GR8-1200 NI)"
B2578	In-vehicle sensor circuit out of range (low)	HAC 50 "In Vahiele Capeer Diagnosis Procedure"
B2579	In-vehicle sensor circuit out of range (high)	HAC-59, "In-Vehicle Sensor Diagnosis Procedure"
B257B	Ambient sensor circuit short	HAC 57 "Ambient Conser Component Inspection"
B257C	Ambient sensor circuit open	HAC-57, "Ambient Sensor Component Inspection"
B257F	Optical sensor (Driver) circuit open or short	LIAC 62 "Optical Concer Diagnosis Presedure"
B2580	Optical sensor (Passenger) circuit open or short	HAC-62, "Optical Sensor Diagnosis Procedure".
B2581	Intake sensor circuit short	LIAC 65 Whiteles Consor Company by Bonestian
B2582	Intake sensor circuit open	HAC-65, "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.

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DIAGNOSIS SYSTEM (HVAC)

< SYSTEM DESCRIPTION >

[AUTOMATIC AIR CONDITIONER]

Monitor item	Value	Contents	
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.	
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.	

DIAGNOSIS SYSTEM (BCM)

< SYSTEM DESCRIPTION >

[AUTOMATIC AIR CONDITIONER]

DIAGNOSIS SYSTEM (BCM)

CONSULT Function (BCM - COMMON ITEM)

INFOID:0000000009882444

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APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM.

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

SYSTEM APPLICATION

BCM can perform the following functions.

				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 Function (BCM - AIR CONDITIONER)

INFOID:0000000009882445

DATA MONITOR

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:0000000009882446

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A/C SYSTEM SELF-DIAGNOSIS FUNCTION

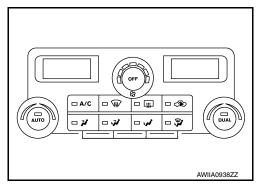
The self-diagnosis function is built into the front air control to quickly locate the cause of malfunctions.

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 HAC-21, "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.



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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 (With EXP-800 NI or GR8-1200 NI)" or CHG-7, "Work Flow (Without EXP-800 NI or GR8-1200 NI)"				
30	In-vehicle sensor circuit out of range (low)	HAC 50 "In Vehicle Sensor Diagnosis Procedure"				
31	In-vehicle sensor circuit out of range (high)	HAC-59, "In-Vehicle Sensor Diagnosis Procedure"				
40	Ambient sensor circuit short	HAC 56 "Ambient Septem Diagnosis Procedure"				
41	Ambient sensor circuit open	HAC-56, "Ambient Sensor Diagnosis Procedure"				
50	Optical sensor (Driver) circuit open or short	LIAC 62 "Ontired Concer Diagnosis Dressedura"				
52	Optical sensor (Passenger) circuit open or short	HAC-62, "Optical Sensor Diagnosis Procedure"				
56	Intake sensor circuit short	HAC 64 "Intoka Sangar Diagnosia Procedura"				
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

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SYSTEM DESCRIPTION

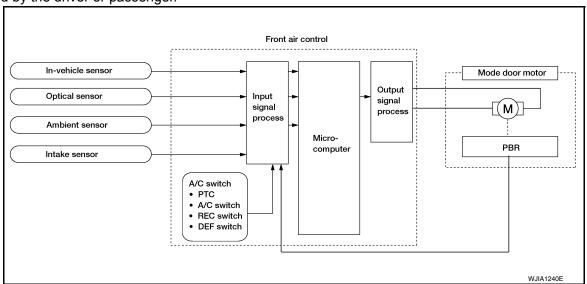
Component Parts

Mode door control system components are:

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

System Operation

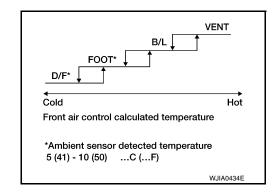
The mode door position (vent, B/L, foot, D/F, and defrost) is set by the front air control by means of the mode door motor. When a mode door position is selected on the front air control, voltage is applied to one circuit of the mode door motor while ground is applied to the other circuit, causing the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

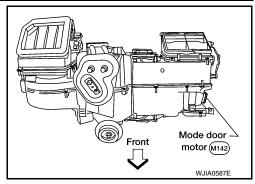


MODE DOOR MOTOR

< 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:0000000009882449

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-15</u>, "<u>Discharge</u> 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-23, "Mode Door Motor Diagnosis Procedure".

Mode Door Motor Diagnosis Procedure

INFOID:0000000009882450

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.

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

- Turn ignition switch ON.
- 2. Using CONSULT, check "MODE FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to HAC-17, "CON-SULT 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	Terminal	Connector	Terminal	Continuity
M49	19	M142	5	Yes
10149	20	IVI 142	6	165

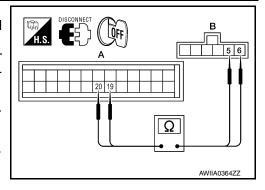
4. Check continuity between front air control harness connector M49 terminals 19, 20 and ground.

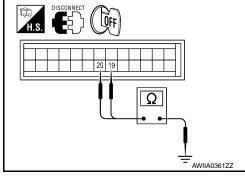
Connector	Terminal	_	Continuity
M49	19	Ground	No
	20	Ground	140



YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

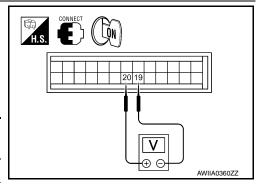




3. CHECK FRONT AIR CONTROL FOR MODE DOOR MOTOR POWER AND GROUND

- 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.)	
	(+)	(-)	Condition	Voltage (Approx.)	
M49	19 20 D/F (💖) mode to VENT (🐪) m		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.

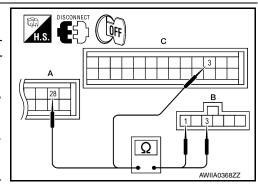
NO >> Replace front air control. Refer to VTL-8, "Removal and Installation".

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

- 1. Turn ignition switch OFF.
- 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	Terminal	Connector	Terminal	Continuity
M49 (C)	3	M142	3	Yes
M50 (A)	28	IVITAZ	1	100

 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	INO	

Is the inspection result normal?

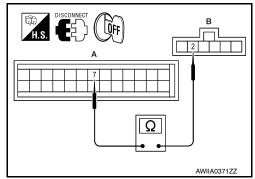
YES >> GO TO 5.

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



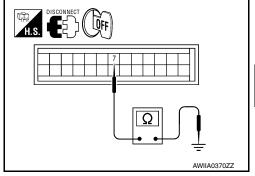
Check continuity between front air control harness connector M49 terminal 7 and ground.

Connector	Terminal	_	Continuity
M49	7	Ground	No

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness as necessary.

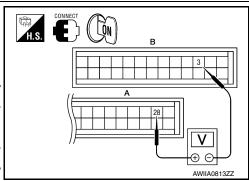


6.CHECK FRONT AIR CONTROL FOR 5 VOLT REFERENCE (VREF), VREF RETURN, AND FEEDBACK SIGNAL

- 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 >

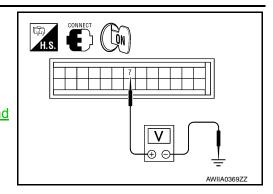
[AUTOMATIC AIR CONDITIONER]

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, "Removal and</u> Installation".



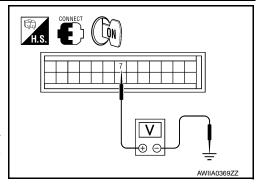
7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- 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 VTL-8, "Removal and Installation".
- NO >> Replace the mode door motor. Refer to <u>VTL-19</u>, <u>"Removal and Installation"</u>.



AIR MIX DOOR MOTOR

System Description

INFOID:0000000009882451

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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:

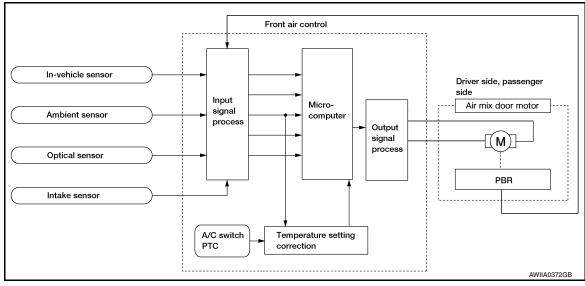
- Front air control
- Air mix door motors (driver, passenger)
- PBR (built-into air mix door motors)
- · In-vehicle sensor
- Ambient sensor
- · Optical sensor
- · Intake sensor

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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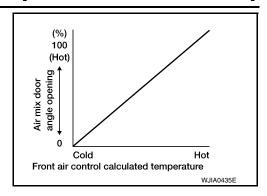
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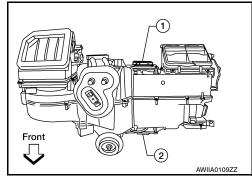
Air Mix Door Control Specification



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

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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.
- 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:0000000009882453

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.

- Using CONSULT, check "DVR MIX FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to HAC-17, "CONSULT 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.

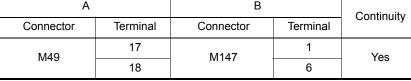
> • Inspect air mix door (driver) for mechanical failure and repair if necessary. If air mix door (driver) is OK, refer to HAC-83, "Component Function Check" for insufficient cooling or HAC-91, "Component Function Check" for insufficient heating.

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.

A		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M49	M49 17 M147		1	Yes
17143	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
WI49	18	Ground	INO

Is the inspection result normal?

YES >> GO TO 3.

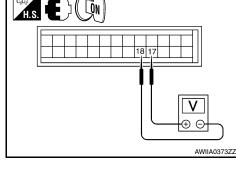
NO >> Repair or replace harness as necessary.

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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 4 3	18	17	While rotating temperature control dial (driver) from 18°C (60°F) to 32°C (90°F)	Battery voltage	



Is the inspection result normal?

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< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 4.

NO >> Replace front air control. Refer to <u>VTL-8</u>, "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	101147	3	100

 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	Giouna	INO

Is the inspection result normal?

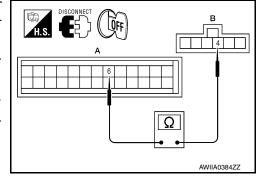
YES >> GO TO 5.

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.

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



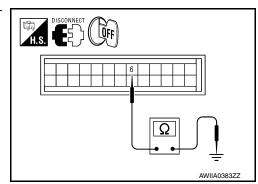
2. Check continuity between front air control harness connector M49 terminal 6 and ground.

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

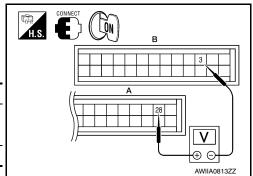
AIR MIX DOOR MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

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

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



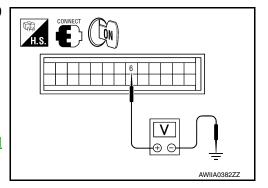
4. Check voltage between front air control harness connector M49 terminal 6 and ground.

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 VTL-8, "Removal and Installation".



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?

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

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

AWIIA0382ZZ

Air Mix Door Motor (Passenger) Component Function Check

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE

- Turn the temperature control dial (passenger) clockwise until 32°C (90°F) is displayed.
- Check for hot air at discharge air outlets.

>> GO TO 2.

2.confirm symptom by performing operational check - temperature decrease

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

Can a symptom be duplicated?

YES >> Inspection End.

>> Go to diagnosis procedure. Refer to HAC-32, "Air Mix Door Motor (Passenger) Diagnosis Proce-NO dure".

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Air Mix Door Motor (Passenger) Diagnosis Procedure

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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, check "PAS MIX FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to HAC-17, "CONSULT Function (HVAC)".
- 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.

>> GO TO 2. NO

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 4 9	2	101143	6	165

Connector	Terminal	_	Continuity
M49	14	Ground	No
10149	2	Ground	INO

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YES

NO >> Repair or replace harness as necessary.

AWIIA0389ZZ

	tinuity betwe als 2, 14 and		rol harness connector	H.S. CFF
Connector	Terminal	_	Continuity	2
M49	14	Ground	No	
10149	2	Glound	INO	Ι Ω
the inspection	n result norm	al?		
YES >> GO	TO 3			

3.CHECK FRONT AIR CONTROL FOR AIR MIX DOOR MOTOR (PASSENGER) POWER AND GROUND

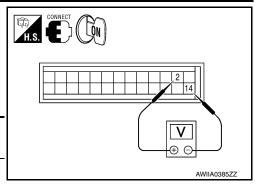
AIR MIX DOOR MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

- 1. Reconnect front air control harness connector.
- 2. 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	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voitage (Approx.)	
M49	2	14	While rotating temperature control dial (passenger) from 32°C (90°F) to 18°C (60°F)	Battery voltage	
11173	14	2	While rotating temperature control dial (passenger) from 18°C (60°F) to 32°C (90°F)	Battery voltage	



Is the inspection result normal?

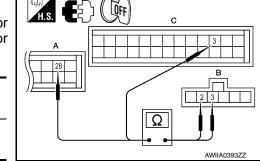
YES >> GO TO 4.

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

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

- 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 and M50 (A) terminal 28 and air mix door motor (passenger) harness connector M143 (B) terminals 2, 3.

A and C		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M49 (C)	3	M143	2	Yes
M50 (A)	28	IVITAS	3	165



 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

<u>Is the inspection result normal?</u>

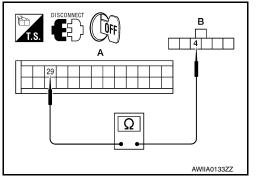
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

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

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



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AIR MIX DOOR MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

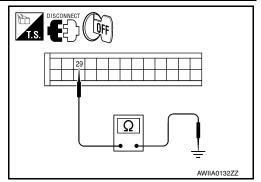
Check continuity between front air control harness connector M50 terminal 29 and ground.

Connector	Terminal	_	Continuity
M50	29	Ground	No

Is the inspection result normal?

YES >> GO TO 6.

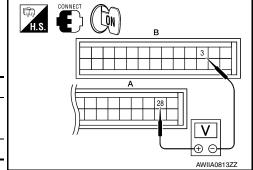
NO >> Repair or replace harness as necessary.



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.)	
	(+)	Connector	(-)	voltage (Approx.)	
M50	28	M49	3	5 Volts	



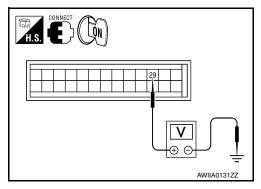
 Check voltage between front air control harness connector M50 terminal 29 and ground.

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 <u>Installation"</u>.



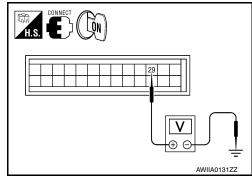
7. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- 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 VTL-8, "Removal and Installation".



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

INTAKE DOOR MOTOR

System Description

INFOID:0000000009882456

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SYSTEM DESCRIPTION

SYMPTOM:

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

SYSTEM DESCRIPTION

Component Parts

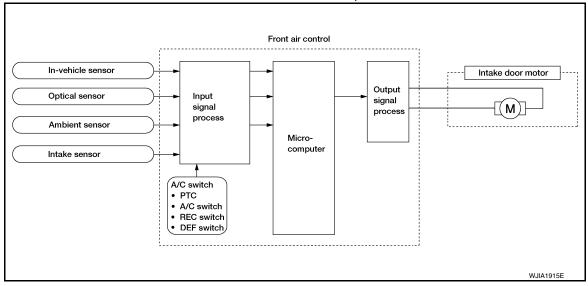
Intake door control system components are:

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

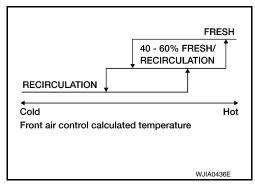
System Operation

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

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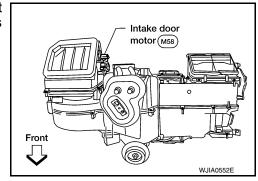
INTAKE DOOR MOTOR

< 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:0000000009882457

INSPECTION FLOW

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

- 1. Press the mode switch to vent mode(*).
- 2. Press REC () switch. The REC () indicator should illuminate.
- 3. Press REC () 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 HAC-36, "Intake Door Motor Diagnosis Procedure".

Intake Door Motor Diagnosis Procedure

INFOID:0000000009882458

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

SYMPTOM:

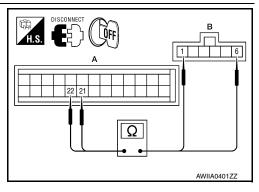
- Intake door does not change.
- Intake door motor does not operate normally.

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	IVIOO	1	



INTAKE DOOR MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

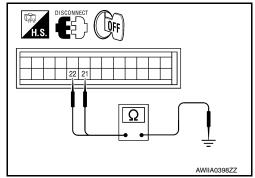
Check continuity between front air control harness connector M49 terminals 21, 22 and ground.

Connector	Terminal	_	Continuity
M49	21	Ground	No
IVI 4 3	22	Ground	NO

Is the inspection result normal?

YES >> GO TO 3.

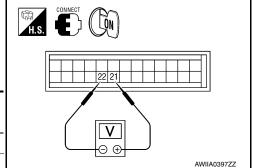
NO >> Repair or replace harness as necessary.



2.check front air control for intake air door motor power and ground

- 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	Tern	ninals	Condition Voltage (Appr		
Connector	(+)	(-)	Condition	voitage (Approx.,	
M49	21	22	Self-diagnostic mode (opening)	Battery voltage	
IVI+3	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 VTL-18, "Removal and Installation".

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

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System Description

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SYSTEM DESCRIPTION

Component Parts

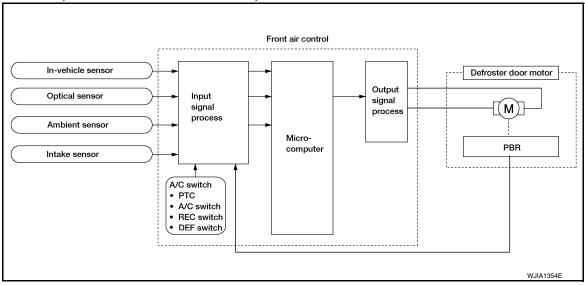
Defroster door control system components are:

- Front air control
- Defroster door motor
- PBR (Built into defroster door motor)
- · 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.

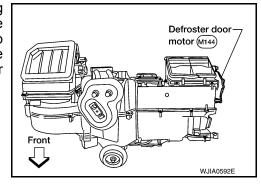
In the AUTO mode, the front air control determines defroster door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature.



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:0000000009882460

INSPECTION FLOW

< 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.
- Using CONSULT, check "DEF FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to <u>HAC-17</u>, "CON-SULT Function (HVAC)".
- 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.

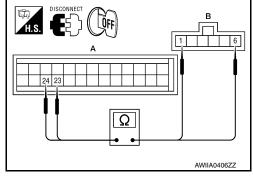
Inspect defroster door for mechanical failure. Refer to VTL-17, "Removal and Installation".

NO >> GO TO 2.

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

- 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	1	Yes
10149	24	101 144	6	165



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< DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

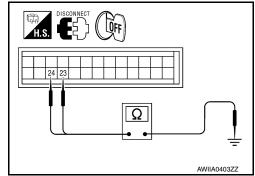
 Check continuity between front air control harness connector M49 terminals 23, 24 and ground.

Connector	Terminal	_	Continuity
MAQ	23	Ground	No
M49	24	Ground	110

Is the inspection result normal?

YES >> GO TO 3.

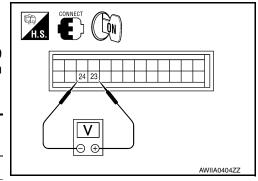
NO >> Repair or replace harness as necessary.



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			
Connector	(+)	(-)	Condition	Voltage (Approx.)	
M49	23	24	Following defroster switch () on	Battery voltage	
IVI -1 3	24	23	Following defroster switch () off	Battery voltage	



Is the inspection result normal?

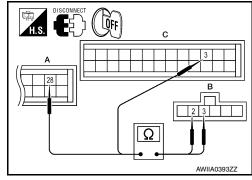
YES >> GO TO 4.

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

4. CHECK 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	162



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

С	onnector	Terminal	_	Continuity
-	И49 (C)	3	Ground	No
1	И50 (A)	28	Ground	140

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]

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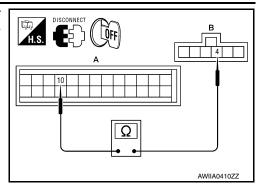
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 Check continuity between front air control harness connector M49 (A) terminal 10 and defroster door motor harness connector M144 (B) terminal 4.

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



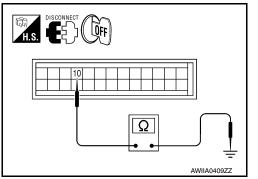
Check continuity between front air control harness connector M49 terminal 10 and ground.

Connector	Terminal	_	Continuity
M49	10	Ground	No

Is the inspection result normal?

YES >> GO TO 6.

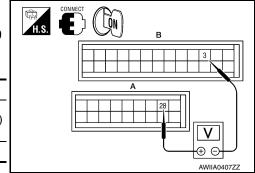
NO >> Repair or replace harness as necessary.



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		
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 10 and ground.

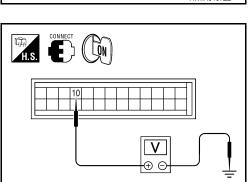
Connector	Terminal	_	Voltage (Approx.)
M49	10	Ground	0 Volts

Is the inspection result normal?

YES >> GO TO 7.

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





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< DTC/CIRCUIT DIAGNOSIS >

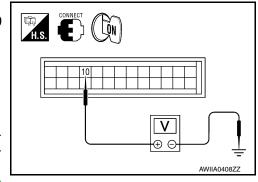
[AUTOMATIC AIR CONDITIONER]

- 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 VTL-8, "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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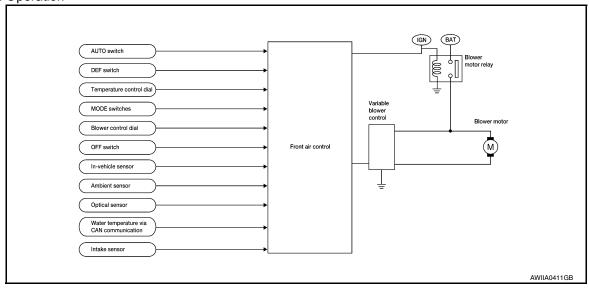
SYSTEM DESCRIPTION

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

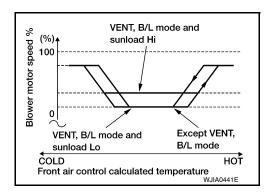
Revision: August 2013 HAC-43 2014 Titan NAM

< 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.

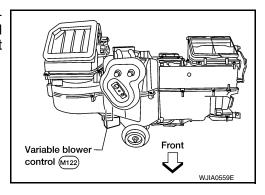
Blower Speed Control Specification



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

INFOID:0000000009882463

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:0000000009882464

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

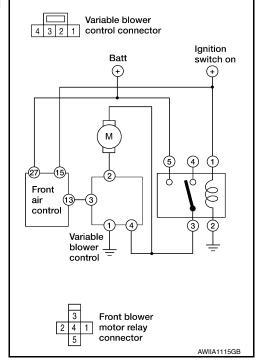
SYMPTOM: Blower motor operation is malfunctioning.

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-77</u>, "Terminal Arrangement".

Fuses are good.

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 9.

2.CHECK FRONT BLOWER MOTOR POWER SUPPLY CIRCUIT

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

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

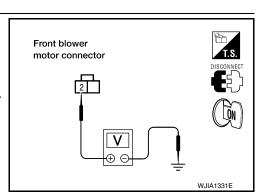
- Turn ignition switch OFF.
- 2. Disconnect front blower motor relay.
- Check voltage between front blower motor relay harness connector M107 terminal 5 and ground.

5 - Ground : Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.



Front blower motor relay 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

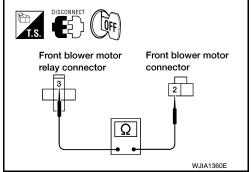
Check continuity between front blower motor relay harness connector M107 terminal 3 and front blower motor harness connector M62 terminal 2.

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.

DISCONNECT OFF

7.CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

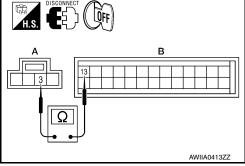
- Disconnect front air control connector.
- Check continuity between front air control harness connector M49 (B) terminal 13 and variable blower control harness connector M122 (A) terminal 3.

13 - 3 : Continuity should exist.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.



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

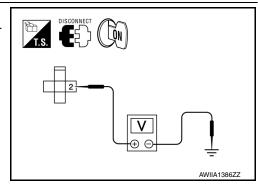
- 1. Turn ignition switch ON.
- Check voltage between front blower motor relay harness connector M107 terminal 2 and ground.

2 - Ground : Battery voltage

Is the inspection result normal?

YES >> GO TO 9.

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



< 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 VTL-12, "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.

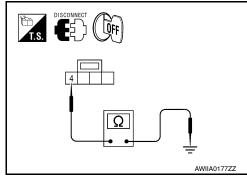
1 - 2 : Continuity should exist.

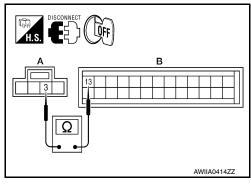
Is the inspection result normal?

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.

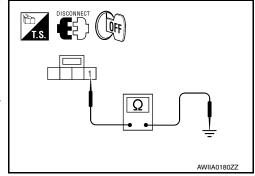
1 - Ground

: 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.

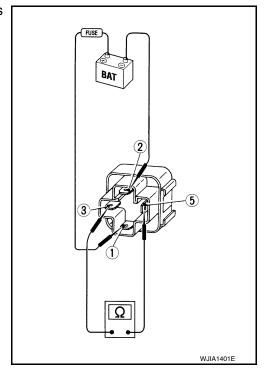


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Front Blower Motor Component Inspection

COMPONENT INSPECTION

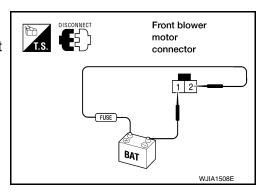
Check continuity between terminals 3, and 5 by supplying 12 volts and ground to coil side terminals 1 and 2 of relay.



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:0000000009882466

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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:0000000009882467

INSPECTION FLOW

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

- 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:0000000009882468

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

DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

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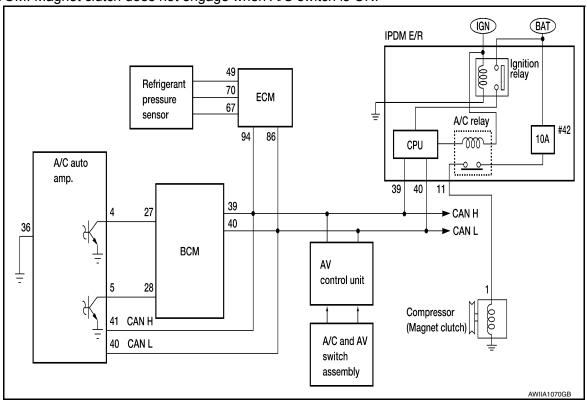
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SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



1. CHECK INTAKE AND AMBIENT SENSOR CIRCUITS

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

Is the inspection result normal?

YES >> GO TO 2.

>> • Malfunctioning intake sensor. Refer to HAC-64, "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 >> • (

NO

NO

- >> ®WITH CONSULT GO TO 5.
 - WITHOUT CONSULT
- GO TO 6. >> 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.

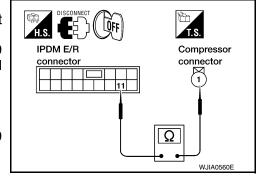
 Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

11 – ground : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 4.

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NO >> Repair harness or connector.

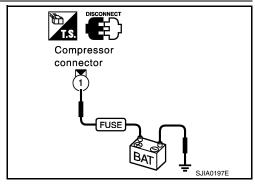
4. CHECK MAGNET CLUTCH CIRCUIT

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. "Removal and</u> Installation".



5. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to <u>BCS-21, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)"</u>.

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?

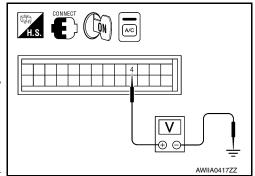
YES >> GO TO 7.

NO >> Repair harness or connector.

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

- 1. Reconnect BCM connector and front air control connector.
- Turn ignition switch ON.
- 3. 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	M49 4		A/C switch: ON	Approx. 0V
10149	4	Ground	A/C switch: OFF	Approx. 5V



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Is the inspection result normal?

YES >> GO TO 8.

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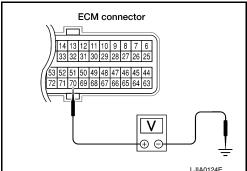
NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control Refer to <u>VTL-8</u>. "Removal and Installation".

NO-2 >> If the voltage is approx. 0V when A/C switch is OFF, replace BCM. Refer to BCS-52, "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.	(-)		1 200
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-481, "Diagnosis Procedure".

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to BCS-21, "AIR CONDITIONER: CONSULT 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 M49 (B) terminal 5.

28 - 5 Continuity should exist.

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

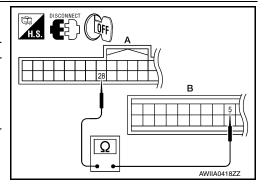
28 - ground Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

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



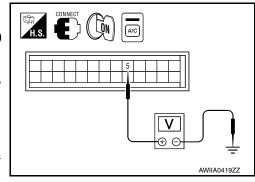
MAGNET CLUTCH

< 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.	(-)		
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 <u>BCS-52</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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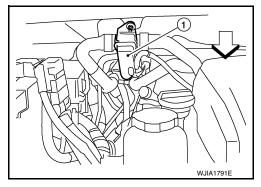
WATER VALVE CIRCUIT

Description INFOID.000000009882469

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:0000000009882470

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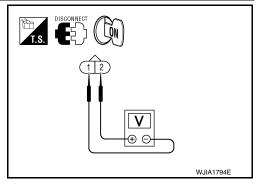
Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

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

- 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.

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WATER VALVE CIRCUIT

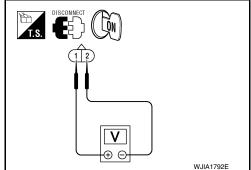
< DTC/CIRCUIT DIAGNOSIS >

[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

- 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.

Check continuity between water valve harness connector F68

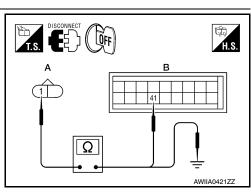
 (A) terminal 1 and ground.

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

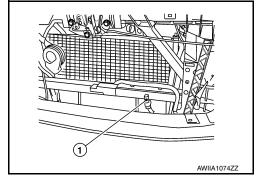
Component Description

INFOID:0000000009882471

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.

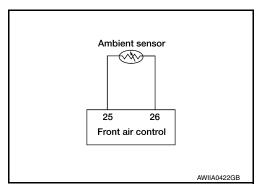
Ambient Sensor Diagnosis Procedure

INFOID:0000000009882472

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, DTC B257B or B257C is displayed. Without CONSULT, code 40 or 41 is indicated on front air control as a result of conducting the front air control self-diagnosis.



1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND

AMBIENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

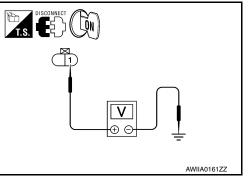
[AUTOMATIC AIR CONDITIONER]

- 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.
- 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 <u>HA-45, "Removal and Installation"</u>.

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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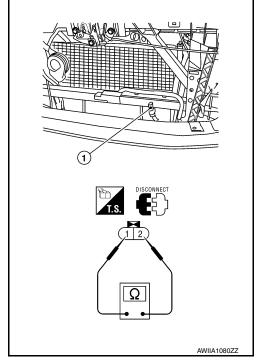
AMBIENT SENSOR

< 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</u>, "Removal and <u>Installation"</u>.

IN-VEHICLE SENSOR

Component Description

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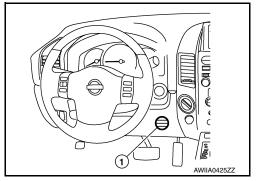
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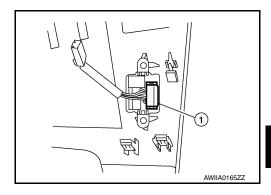
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COMPONENT DESCRIPTION

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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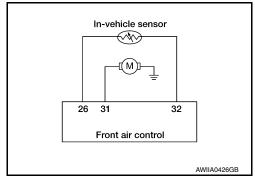
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In-Vehicle Sensor Diagnosis Procedure

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, DTC B2578 or B2579 is displayed. Without a CONSULT, code 30, 31 is indicated on front air control as a result of conducting self-diagnosis.



1. CHECK IN-VEHICLE SENSOR CIRCUIT

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

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

2. CHECK VOLTAGE BETWEEN IN-VEHICLE SENSOR AND GROUND

IN-VEHICLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

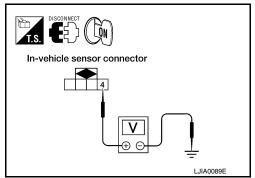
[AUTOMATIC AIR CONDITIONER]

- 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.
- 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 <u>VTL-9</u>, "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 >

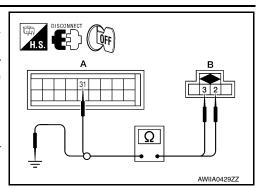
[AUTOMATIC AIR CONDITIONER]

- 1. Turn ignition switch OFF.
- Disconnect front air control connector and in-vehicle sensor connector.
- 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.

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

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



<u>Is the inspection result normal?</u>

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.

In-Vehicle Sensor Component Inspection

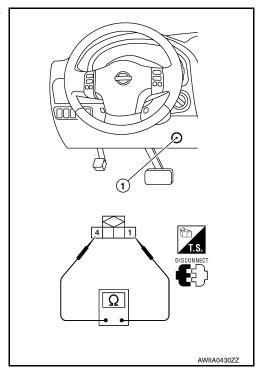
COMPONENT INSPECTION

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.

Resistance kΩ
Resistance K12
21.40
16.15
12.29
9.41
7.27
5.66
4.45
3.51
2.79
2.24
1.80
1.45
1.18

If NG, replace in-vehicle sensor. Refer to <u>VTL-9</u>, "Removal and <u>Installation"</u>.



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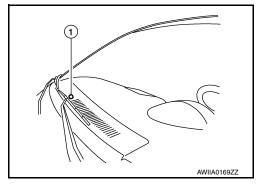
OPTICAL SENSOR

Component Description

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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.

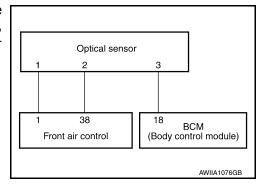
Optical Sensor Diagnosis Procedure

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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, DTC B257F or B2580 is displayed. Without a CONSULT, code 50 or 52 is indicated on front air control as a result of conducting self-diagnosis.



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

OPTICAL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

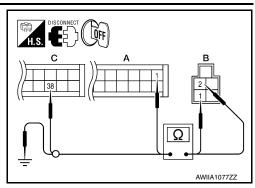
1. Turn ignition switch OFF.

- 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.

DISCONNECT OFF

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

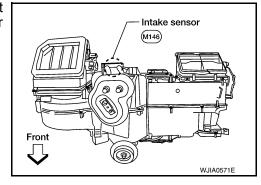
System Description

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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.



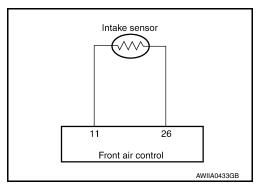
Intake Sensor Diagnosis Procedure

INFOID:0000000009882480

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, DTC B2581 or B2582 is displayed. Without a CONSULT, code 56 or 57 is indicated on front air control as a result of conducting self-diagnosis.



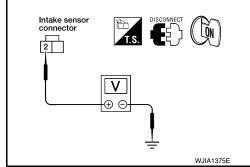
1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

- 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]

- 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 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 VTL-8, "Removal and Installation".

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

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

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

f 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.

: Continuity should exist. 2 - 11

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

2 - Ground : Continuity should not exist.

Is the inspection result normal?

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

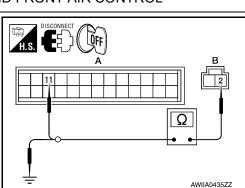
Go to HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> Repair harness or connector.

Intake Sensor Component Inspection

COMPONENT INSPECTION

Intake Sensor



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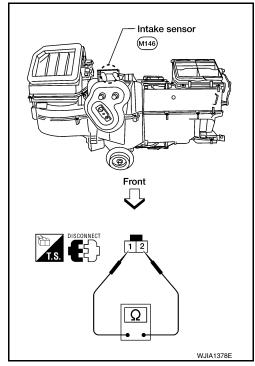
INTAKE SENSOR

< 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 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 >

[AUTOMATIC AIR CONDITIONER]

POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

Component Description

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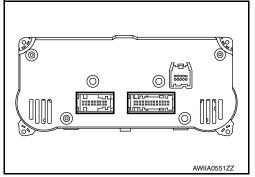
COMPONENT DESCRIPTION

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.

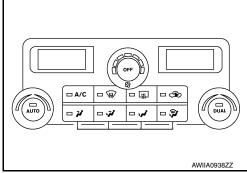
The front air control is unitized with control mechanisms. When the various switches and temperature dials are operated, data is input to the front air control.

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.



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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 - 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

HAC-67 Revision: August 2013 2014 Titan NAM

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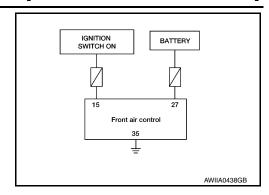
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POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

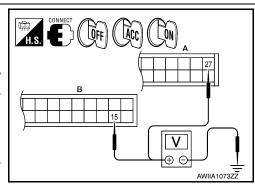
SYMPTOM: A/C system does not come on.



1. CHECK POWER SUPPLY CIRCUITS FOR FRONT AIR CONTROL

- 1. Turn ignition switch ON.
- 2. 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 <u>PG-77, "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.
- 2. Disconnect front air control connectors.
- Check continuity between front air control harness connector M50 terminal 35 and ground.

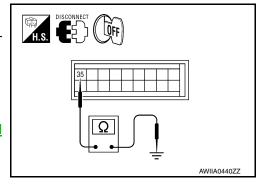
35 - Ground

: Continuity should exist.

Is the inspection result normal?

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

NG >> Repair harness or connector.

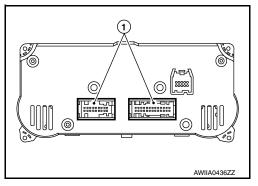


ECU DIAGNOSIS INFORMATION

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/IX	Compressor ON signal	ON	A/C switch ON	0V
5	L/R	Fan ON signal	ON	Blower switch OFF	5V
5	L/K	Fall 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

Revision: August 2013 HAC-69 2014 Titan NAM

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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) feedback	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

^{*1:} If equipped

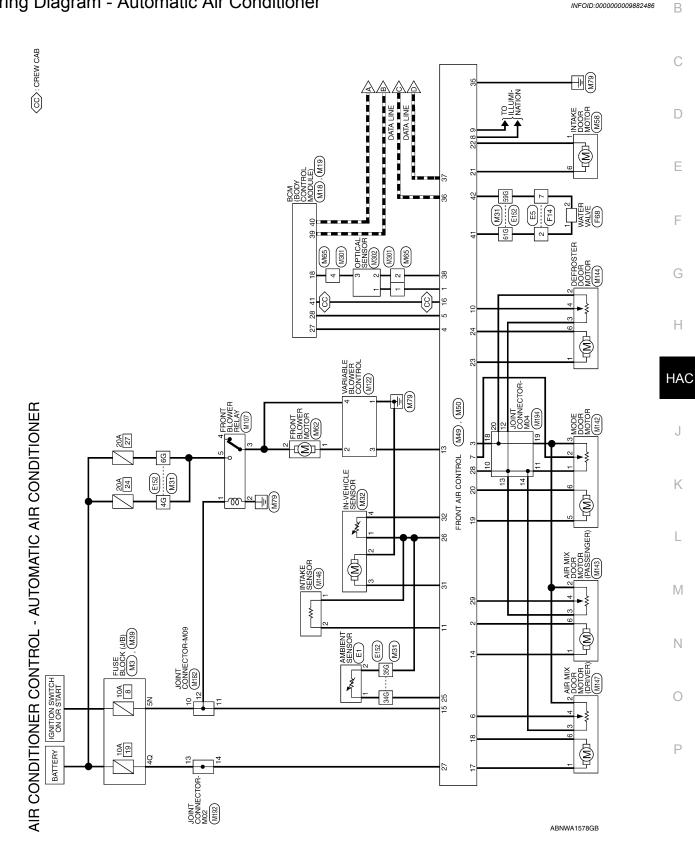
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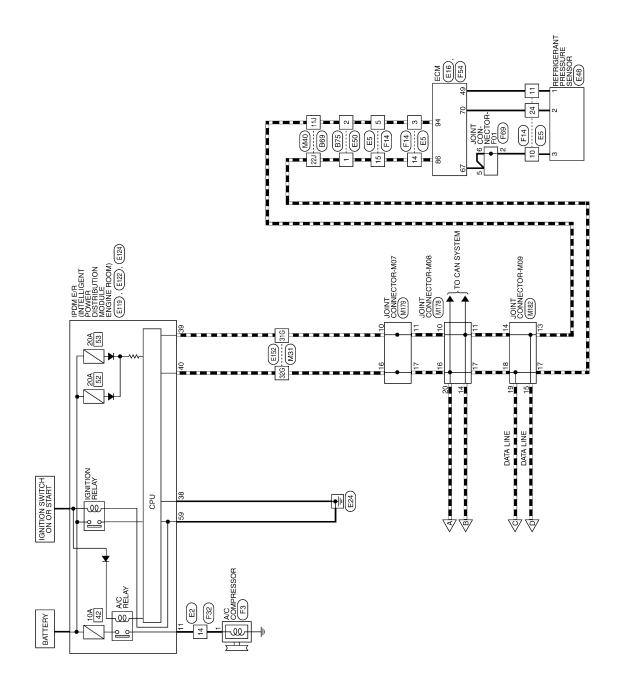
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WIRING DIAGRAM

AIR CONDITIONER CONTROL

Wiring Diagram - Automatic Air Conditioner





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Connector No. M19 Connector Name BCM (BODY CONTROL MODULE) Connector Color WHITE	(南南 50 51 52 53 54 55	Terminal No. Wire Signal Name 41 Y/B REAR DEFOGGER SW				Connector No. M32	Connector Name IN-VEHICLE SENSOR	Connector Color WHITE		H.S.		Color of Simplification	Wire	בי (1 0/B	BH/Y	4 LG/R –						
	3 14 15 16 17 18 19 20 3 34 35 36 37 38 39 40	PS		2						T													
MATIC AIR CON M18 BCM (BODY CONTROL MODULE)	6 7 8 9 10 11 12 13 26 27 28 29 30 31 32 33	Signal Name KEYLESS AND AUTO LIGHT SENSOR GND	AIRCON SW	CAN-H	CAN-L		olgilai Naille	1 1	I	ı	1	I	1	I									
0. M18 ame BCM (E MODUL	2 3 4 5 22 23 24 25	Color of Wire	W/R	7	А	Color of	Wire	a a		۵	Д	N/R	M/G	- XIL									
Connector No. Connector Name Connector Color	H.S.	Terminal No.	27	83 68	40	H		46	31G	32G	34G	35G	29G	61G									
									F]	
Connector Color WHITE CONNITIONER CONNITIONER CONNECTOR'S - AUTOMATIC AIR CONDITIONER Connector Name FUSE BLOCK (J/B) Connector Color WHITE Connector Color Color WHITE Connector Color Color WHITE Color Color Color Color Color Color Co	3N	of Signal Name				M31	WIRE TO WIRE	WHITE		16 26 36 46 56	66 76 86 96 106		11G 12G 13G 14G 15G 16G 17G 18G 19G 20G 21G 22G 22G 21G 22G 22G 22G		31G32G33G34G35G36G37G38G39G40G41G	2G43G44G45G46G47G48G49G50G	51G 52G 53G 54G 55G 56G 57G 58G 59G 60G 61G 62G 63G 64G 65G 66G 67O 68G 69G 70G	71G72G73G74G75G76G77G78G79G80G81G		91G 92G 93G 94G 95G 0APG 97G 98G 99G100G	500000000000000000000000000000000000000		
CONDITION Connector Name F Connector Color M	S.	Terminal No. Wire 5N Y/G				Connector No. N	Connector Name M	Connector Color M					11611		3163;	4	5165	71672	ō]				
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Color of Signal Name	-	ı								Color of	Wire Signal Name	W/G DRVR BLND DR A	G DRVR BLND DR B	BR/W PNL/FLR DR A	PNL/FLR DR	3 RECIRC DRI	A RECIRC DRIB	DEFROST DR	A	V/R SENSOR RETURN			
Terminal No.	117	227									Terminal No.	17	18	19	20	7 8	77 88	24	25	26			
Connector No. M40 Connector Name WIRE TO WIRE	- 1	_	H.S. 10 22 33 44 55 60 72 81 93 100	11.0 [22] [22] [22] [23] [42] [23] [42] [23]	22/23/24/25/26/25/28/29/30/	31.1 (32.1 (32.1 (33.1 (34.1 (35.1 (34.1 (51.1 [52.1 [53.1 [54.1 [55.1 [56.1 [57.1 [58.1 [59.1 [60.1 [67.1 [56.1 [57.1 [58.1 [59.1 [60.1 [67.1 [58.1 [59.1 [70.1 [60.1 [[71.3] [72.3] [72.3] [72.4] [77.5] [72.4] [77.2] [72.4] [80.3] [81.3] [82.3] [8		Color of	l erminal No. Wire Signal Name	7 GR PNL/FLR DR FB	8 R/L ILLUM+	9 BR ILLUM -	10 LG/B DEFROST FEEDBACK	11 L/B EVAP TEMP SENSOR	12	13 G/R FRONT BLWR SPEED	G/W PASS I		16 Y/B REAR DEF REQ		
M39 FISE BLOCK (J/B)		ı	2010 05040	Signal Name	ı							(WITH AUTO A/C)	×		7 6 5 4 3 2	3			SUN LD SEN LFT	PASS BLND DR B	V REF RET	NO NATI	DRVR RI ND DR FE
و	_	-	30 20 1 80 70 60 50 4	Color of Wire	Y/R					M49		-	Solor BLACK		12 11 10 9	20 24 20 25 21			0/0	ا لـ	д <u>м</u>	α/-	5 8
Connector No.	Connector Color		响 H.S.	Terminal No.	40					Connector No.	Connector Name		Connector Color			i Ç		l erminal No	-	2	ε0 4	- 10	9
					_								_	_		_					ABN	IIA39	36GB

	1		ı			1	ı	ı		ı	
	INTAKE DOOR MOTOR	×	I I⊢	9 2 9	Signal Name	ı	ı	ı	ı	ı	I
M58		BLACK	1	1 2 3	Color of Wire	0	1	ı	1	1	G/B
Connector No.	Connector Name	Connector Color									
Conne	Conne	Conne	E	H.S.	Terminal No.	_	2	က	4	2	9
		EN			노 노		٧	В]

Signal Name	IN-CAR TEMP SEN	ı	1	GND	CAN-L	CAN-H	SUN LD SEN RGHT	_	ı	WATER VALVE A	WATER VALVE B	ı	ı
Color of Wire	LG/R	-	1	В	Ь	Γ	W/V	_	1	J//L	M/G	ı	_
Terminal No.	32	33	34	32	36	37	38	39	40	14	42	43	44

	FRONT AIR CONTROL (WITH AUTO A/C)	TE	32 31 30 29 28 27 41 40 39 38 37 36	Signal Name	V BAT	5V REF VOLTAGE	PASS BLND DR FB	-	IN-CAR TMP MTR+
M50		or WHITE	35 34 33 32 44 43 42 41	Color of Wire	Y/R	>	B/W	ı	BR/Y
Connector No.	Connector Name	Connector Color	H.S.	Terminal No.	27	28	58	30	31

	FRONT BLOWER RELAY				Signal Name	ı	- (2 CONTROL DIAL SYSTEM OR AUTO A/C)	1	ı	1
M107	FRONT	BLACK	3	2 4	e of	(5				
	ıme	jo			Color of Wire	Y/G	В	W/L	1	GB
Connector No.	Connector Name	Connector Color		H.S.	Terminal No.	-	5	က	4	5

വ	WIRE TO WIRE	WHITE		Signal Name	_	_	_
. M65		_	4	Color of Wire	G/0	N/M	Ь
Connector No.	Connector Name	Connector Color	H.S.	Terminal No.	-	2	4
			 -				

Connector Name	- la	M62 FBONT BI OWER MOTOR
Connector Color		X
所.S.		(m)
Terminal No.	Color of Wire	Signal Name
-	ΓW	1
2	M/L	ı

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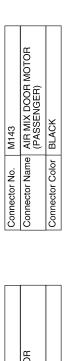
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Signal Name	I	I	I	ı	I	I
Color of Wire	G/W	Ь	Υ	B/W	ı	٦
Terminal No. Wire	1	2	3	4	5	9

Signal Name	ı	I	I	ı	I	1
Color of Wire	G/W	۵	Υ	W/H	ı	٦
Terminal No. Wire	-	2	3	4	5	9

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

Signal Name	-	-	1	_	1	1
Color of Wire	M/G	Ь	>	SB	-	G
Terminal No. Wire	1	2	က	7	2	9

42	MODE DOOR MOTOR	ACK	
Connector No. M142	Connector Name MODE DOOR MOTOR	Connector Color BLACK	



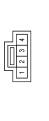
Signal Name	1	ı	ı	ı	ı	I
Color of Wire	>	GR	Ь	1	BR/W	P/L
Terminal No. Wire	1	2	3	4	2	9

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

	[[2]	Signal Nam	I	1
olor GRAY		Color of Wire	N/R	Γ/B
Connector Color	H.S.	Terminal No.	1	7

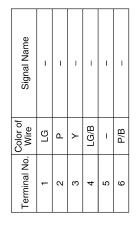
M122	VARIABLE BLOWER CONTROL (2 CONTROL DIAL SYSTEM OR AUTO A/C)	WHITE	
Connector No.	Connector Name	Connector Color WHITE	







M144	DEFROSTER DOOR MOTOR	BLACK	3 4 5 6
Connector No.	Connector Name	Connector Color	



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AIR CONDITIONER CONTROL

[AUTOMATIC AIR CONDITIONER]

	WHITE WHITE	inector Name JOINT CONNECTOR-M07	H.S. H.S. H.S. H.S. H.S. H.S. H.S. H.S.	Signal Name Terminal No. Color of Signal Name Terminal No. Wire Signal Name	- 10	11 //6		1	- 17 P - 13 L -	_ 14 L	_ 15 L _		- 18 P		Connector No. M194 Connector No. M301	R-M02 Connector Name JOINT CONNECTOR-M04 Connector Name	Connector Color BLUE Connector Color WHITE	3 2 1	Signal Name Terminal No. Wire Signal Name Signal Name Signal Name Signal Name	DIM				14 Y –	18 P –	19 P	۵
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Connector No. E2 Connector Name WIRE TO WIRE Connector Color WHITE	(1 2 3 	Terminal No. Color of Wire Signal Name	Connector No. E48
Connector No. E1 Connector Name AMBIENT SENSOR Connector Color GRAY	H.S.	Terminal No. Color of 1 Signal Name 1 P - 2 V/R 1	Connector No. E16
Connector No. M302 Connector Name OPTICAL SENSOR Connector Color WHITE	H.S.	Terminal No.	Connector No. E5 Connector Name WIRE TO WIRE Connector Color WHITE Connector Color WHITE

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	A
POWER DISTRIBUTION MODULE ENGINE ROOM) WHITE 24 14 40 38 38 37 al 47 46 44 43 ar of Signal Name CAN-H	B
Connector No. Connector Name Connector Color Terminal No. W 38 39 40 Terminal No. W Color	8 32 8 32 8 32 8 32 8 32 8 32 8 32 8 32
	F
E/R (INTELLIGENT I'LE ENGINE ROOM) Signal Name Signal Name A/C COMPRESSOR	26 16 16 16 16 16 16 16 16 16 16 16 16 16
E119 POWER DISTRIBUTION MODULE ENGINE ROOM)	Connector Name Wirter Connector Color WHITE 10 WIRE 10
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Connector No.	Connector Name Connector Color Est HA HA The state of
	K
WIRE Signal Name	POWE FA (INTELLIGENT) BLACK Signal Name GND (POWER)
E50 WIRE TO WIR BROWN or of Sign	PDM E/H (IN MODULE ENC Signs of GND (I
Connector No. E50 Connector Name WIRE TO WIRE Connector Color BROWN Terminal No. Wire 1 P Signal 2 L	ctor Name all No. William No.
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Signal Name

Color of Wire ш В Ш

Terminal No. N 2 9

Signal Name

Color of Wire

Terminal No.

Y/L W/G

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AVCC (PDPRES) Signal Name

> ₽Y В

Color of Wire

Terminal No.

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B/W

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Revision: August 2013

Connector No. F32 Connector Name WIRE TO WIRE Connector Color WHITE	T 6 5 4	Terminal No. Wire Signal Name							li	Connector No. F69	Connector Name JOINT CONNECTOR-F01		H.S. (1 2 3 4 5 6
Connector No. F14 Connector Name WIRE TO WIRE Connector Color WHITE	H.S. (11 10 9 8 7 6 5 4 3 2 11 H 19 12	Terminal No. Wire Signal Name 2 Y/L –	3 F	>	10 B	- L	15 P -	24 B/W –		Connector No. F68	Connector Name WATER VALVE		H.S.
Connector No. F3 Connector Name A/C COMPRESSOR Connector Color BLACK	图·	Terminal No. Wire Signal Name									Connector Name ECM	Connector Color BLACK	4 5 (24.22) (22.21.20) 19 18 177 16 15 14 1312 11 10 19 18 17 6 15 14 1312 11 10 19 18 17 6 15 14 1312 11 10 19 18 17 6 15 14 1312 11 10 19 18 17 6 15 14 1312 11 10 19 18 17 6 15 14 13 12 11 10 19 18 17 6 15 14 13 12 11 10 19 18 17 18 15 15 15 15 15 15 15 15 15 15 15 15 15

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			1											— 1				
	WIRE TO WIRE	ПЕ		41 31 23	100 90 70 60	21J 20J 19J 18J 17J 16J 15J 14J 13J 12J 11J 30J 29J 28J 27J 26J 25J 24J 23J 22J		41.0 40.0 39.0 37.0 36.0 35.0 34.0 33.0 32.0 31.0 50.0 49.0 48.0 47.0 46.0 45.0 44.0 43.0 42.0	61.1 60.1 59.1 58.1 57.1 58.1 55.1 54.1 53.1 52.1 51.1	70, 69, 68, 67, 66, 65, 64, 63, 62	81J 80J 79J 78J 77J 76J 75J 74J 73J 73J 71J	90. 89. 88. 87. 86. 85. 84. 83. 82.	051 041 031 021 91J			Signal Name	ı	_
. B69	me WIR	lor WHITE				21.7 20.7 19		41J 40J 36 50J 48	61.1 60.1 50	700 68	813 803 79	907	_		40,100	Color of Wire		Ь
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AIR CONDITIONER CONTROL

[AUTOMATIC AIR CONDITIONER]

SYMPTOM DIAGNOSIS

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.	<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-23
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>ПАС-23</u>
Discharge air temperature does not change.	Co to Trouble Diagnosis Presedure for Air Mix Door Mater	114.0.20
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u>HAC-28</u>
Intake door does not change.	Co to Trouble Diagnosis Precedure for Intella Dear Motor	HAC-36
Intake door motor is malfunctioning.	Go to Trouble 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.	<u>HAC-44</u>
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.	<u>HAC-93</u>
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.	<u>HAC-94</u>

INSUFFICIENT COOLING

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YES >> GO TO 9.

[AUTOMATIC AIR CONDITIONER]

INSUFFICIENT COOLING
Component Function Check
SYMPTOM: Insufficient cooling
INSPECTION FLOW
1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE
1. 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.
Can the symptom be duplicated?
YES >> GO TO 3.
NO >> GO TO 2. 2.CHECK FOR ANY SYMPTOMS
Perform a complete operational check for any symptoms. Refer to <u>HAC-6. "Operational Check"</u> . <u>Does another symptom exist?</u>
YES >> Refer to HAC-82, "Symptom Matrix Chart".
NO >> System OK.
3.CHECK FOR SERVICE BULLETINS
Check for any service bulletins.
>> GO TO 4.
4.PERFORM SELF-DIAGNOSIS
Perform self-diagnosis Refer to HAC-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-14, "Checking Drive Belts".
Is the inspection result normal?
YES >> GO TO 6.
NO >> Adjust or replace compressor belt. Refer to <u>EM-14, "Removal and Installation"</u> . 6.CHECK AIR MIX DOOR OPERATION
Check and verify air mix door mechanism for smooth operation. Refer to <u>HAC-28</u> , "Air Mix Door Motor (<u>Driver</u>) <u>Component Function Check"</u> .
Does air mix door operate correctly?
YES >> GO TO 7.
NO >> Check air mix door motor circuit. Refer to <u>HAC-28</u> , "Air Mix Door Motor (<u>Driver</u>) <u>Diagnosis Procedure</u> ".
7. CHECK COOLING FAN MOTOR OPERATION
Check and verify cooling fan motor for smooth operation. Refer to EC-378, "Overall Function Check".
Does cooling fan motor operate correctly?
YES >> GO TO 8. NO >> Check cooling fan motor. Refer to <u>EC-379, "Diagnosis Procedure"</u> .
8. CHECK WATER VALVE OPERATION
Check and verify water valve for smooth operation. Refer to HAC-54, "Description".
Does water valve operate correctly?

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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 <u>HAC-95</u>, "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 <u>HAC-86. "Performance Chart"</u>.

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.

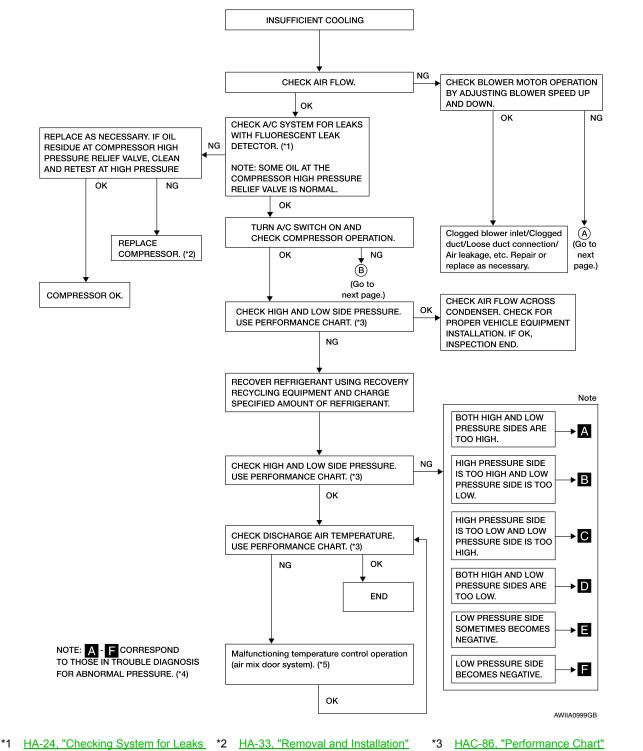
Is the inspection result normal?

YES >> System OK.

NO >> Repair air leaks.

Diagnostic Work Flow

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- Using the Fluorescent Dye Leak Detector"
- *4 HAC-87, "Trouble Diagnoses for Ab- *5 HAC-28, "Air Mix Door Motor (Driver) normal Pressure"
- - Component Function Check"

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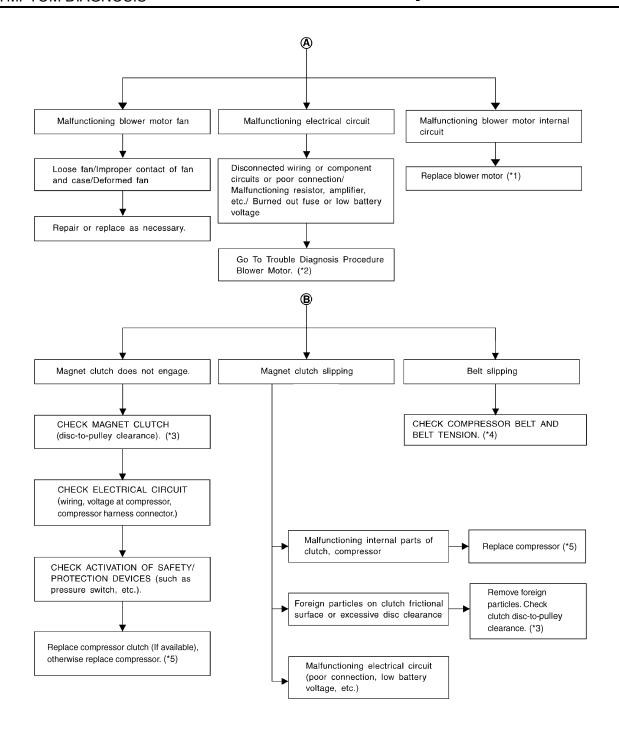
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- *1 HA-33, "Removal and Installation"
- *2 HAC-44, "Front Blower Motor Com- *3 HA-33, "Removal and Installation" ponent Function Check"

- *4 EM-14, "Checking Drive Belts"
- *5 HA-31, "Removal and Installation"

Performance Chart

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TEST CONDITION

Testing must be performed as follows:

INSUFFICIENT COOLING

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

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

Recirculating-to-discharge Air Temperature Table

Inside air (Recirculating ai	r) at blower assembly inlet	Discharge air temperature at center ventilator
Relative humidity %	Air temperature °C (°F)	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

Ambi	ent air	High-pressure (Discharge side)	Low-pressure (Suction side)
Relative humidity %	Air temperature °C (°F)	kPa (kg/cm ² , psi)	kPa (kg/cm ² , 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).

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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.
A	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.
₩ Д АСЗ59А	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cooling system.
	 An area of the low-pressure pipe is colder than areas near the evaporator outlet. Plates are sometimes covered with frost. 	 Excessive liquid refrigerant on low-pressure side Excessive refrigerant discharge flow Expansion valve is open a little compared with the specification. Improper expansion valve adjustment 	Replace expansion valve.

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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
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.	 Check and repair or replace malfunctioning parts. Check oil for contamination.

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.
(IO HI) AC356A	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. Understand the compressor packings.	Replace compressor.

INSUFFICIENT COOLING

[AUTOMATIC AIR CONDITIONER]

Both High- and Low-pressure 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-24, "Checking of Refrigerant Leaks" or HA-26, "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.	 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.	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-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.	Air conditioning system does not function and does not cyclically cool the compartment air. The system constantly functions for a certain period of time after compressor is stopped and restarted.	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

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 drand 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 >

[AUTOMATIC AIR CONDITIONER]

INSUFFICIENT HEATING	Λ
Component Function Check	А
SYMPTOM: Insufficient heating	В
INSPECTION FLOW	
1.confirm symptom by performing operational check - temperature increase	0
 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 <u>HAC-6, "Operational Check"</u> .	Е
2.CHECK FOR SERVICE BULLETINS	
Check for any service bulletins.	F
>> GO TO 3.	Г
3.PERFORM SELF-DIAGNOSIS	
Perform self-diagnosis. Refer to HAC-21, "Front Air Control Self-Diagnosis".	G
Is the inspection results normal?	
YES >> GO TO 4.	Н
NO >> Refer to HAC-21, "Front Air Control Self-Diagnosis Code Chart". 4. CHECK ENGINE COOLING SYSTEM	
	НА
 Check for proper engine coolant level. Refer to <u>CO-10, "Inspection"</u>. Check hoses for leaks or kinks. Check radiator cap. Refer to <u>CO-10, "Inspection"</u>. Check for air in cooling system. 	J
>> GO TO 5. 5.CHECK AIR MIX DOOR OPERATION	K
Check the operation of the air mix door.	
Is the inspection result normal?	L
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.	Ν
Is the inspection result normal? YES >> GO TO 7.	
NO >> Repair all disconnected or leaking air ducts.	0
7. CHECK HEATER HOSE TEMPERATURES	0
 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. 	Ρ
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-191, "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

- >> 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 VTL-15, "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.

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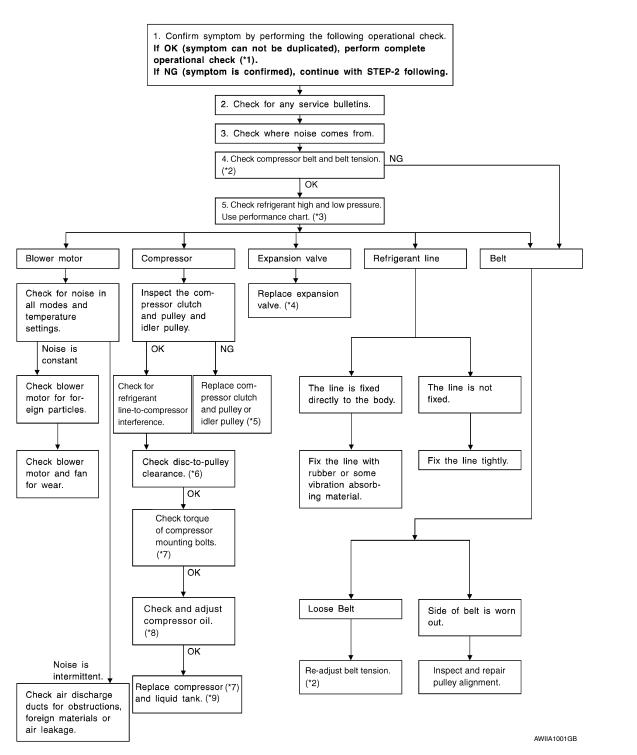
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NOISE

Component Function Check

SYMPTOM: Noise

INSPECTION FLOW



- *1 HAC-6, "Operational Check"
- *2 EM-14, "Checking Drive Belts"
- *3 HAC-86, "Performance Chart"

- *4 HA-43, "Removal and Installation"
- *5 HA-33, "Removal and Installation"
- *6 HA-33, "Removal and Installation"

- *7 HA-31, "Removal and Installation"
- *8 HA-31, "Removal and Installation"

MEMORY FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

INFOID:0000000009882494

MEMORY FUNCTION DOES NOT OPERATE

Memory Function Check

SYMPTOM: Memory function does not operate.

INSPECTION FLOW

1.confirm symptom by performing operational check - memory function

- 1. Set the temperature to 32°C (90°F).
- 2. Rotate the front blower control dial (driver) to turn system OFF.
- 3. Turn ignition switch OFF.
- 4. Turn ignition switch ON.
- 5. Press the AUTO switch.
- 6. Confirm that the set temperature remains at previous temperature.
- 7. Press the OFF switch.

Can the symptom be duplicated?

YES >> GO TO 3.

NO >> GO TO 2.

2.PERFORM COMPLETE OPERATIONAL CHECK

Perform a complete operational check and check for any symptoms. Refer to HAC-6, "Operational Check".

Can a symptom be duplicated?

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

NO >> System OK.

3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. PERFORM SELF-DIAGNOSIS

Perform self-diagnosis to check for any codes. Refer to HAC-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 <u>HAC-67</u>, "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".

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

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 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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Revision: August 2013 HAC-95 2014 Titan NAM

< PRECAUTION >

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

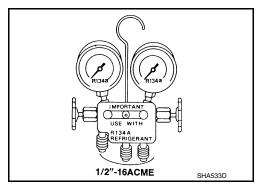
- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location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

Precaution for Service Equipment

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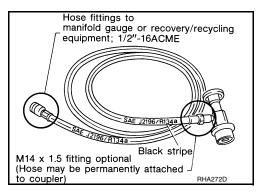
MANIFOLD GAUGE SET

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

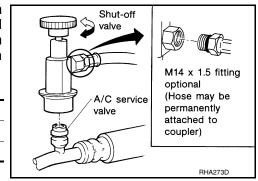
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shutoff devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



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	ALIIA0692ZZ
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

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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

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

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Conditions

: Engine running and at normal operating temperature

CHECKING BLOWER

- 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.

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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.

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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.

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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 2014 Titan NAM Revision: August 2013

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 HAC-137, "Magnet Clutch Diagnosis Procedure". 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	ALIIA0692ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

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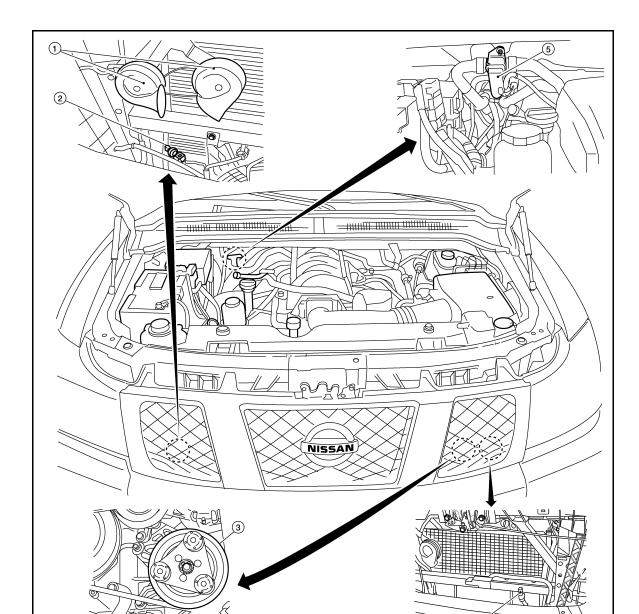
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FUNCTION INFORMATION

Component Part Location

ENGINE COMPARTMENT

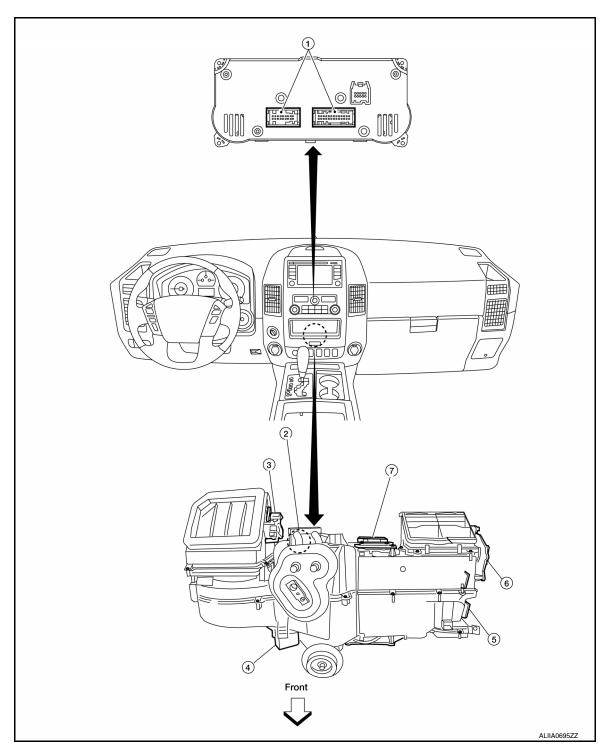


- 1. Horn (view with grille removed)
- Ambient sensor E1 (view with grille 5. removed)
- Refrigerant pressure sensor E48 (view with grille removed)
- Water valve F68

3. A/C compressor F3

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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.	Co to Trouble Diagnosis Dressedure for Made Door Mater	LIAC 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.	Co to Trouble Diagnosis Precedure for Air Mix Deer Mater	UAC 120	
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u>HAC-120</u>	
Intake door does not change.	Co to Trouble Diagnosis Presedure for Inteles Deer Meter	UAC 126	
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>HAC-126</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-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

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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/

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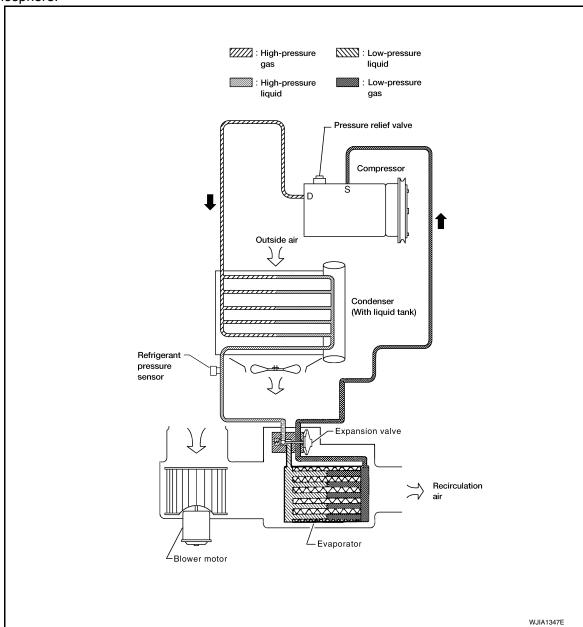
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cm², 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



MANUAL AIR CONDITIONER SYSTEM

Control System Diagram

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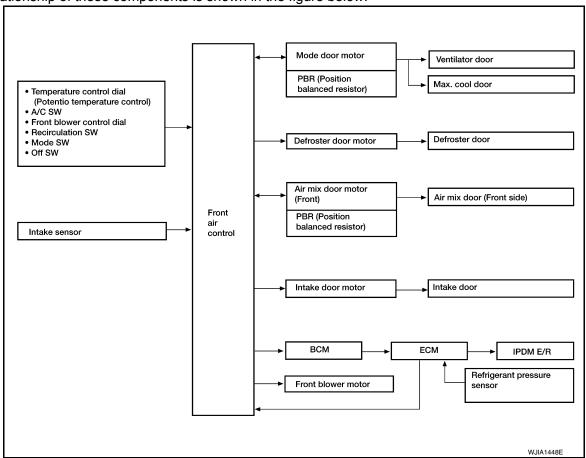
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CONTROL SYSTEM

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:



Front air control

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Control System Description

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CONTROL OPERATION

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Revision: August 2013

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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

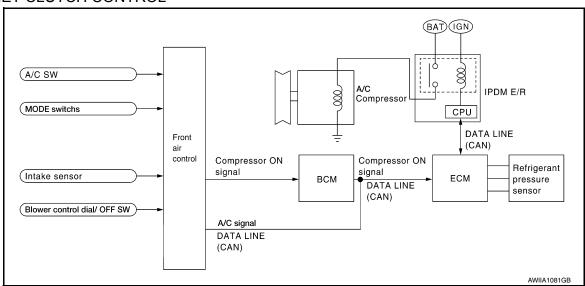
The compressor is ON or OFF.

(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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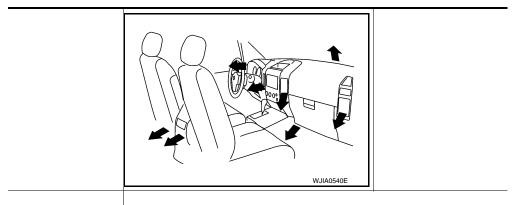
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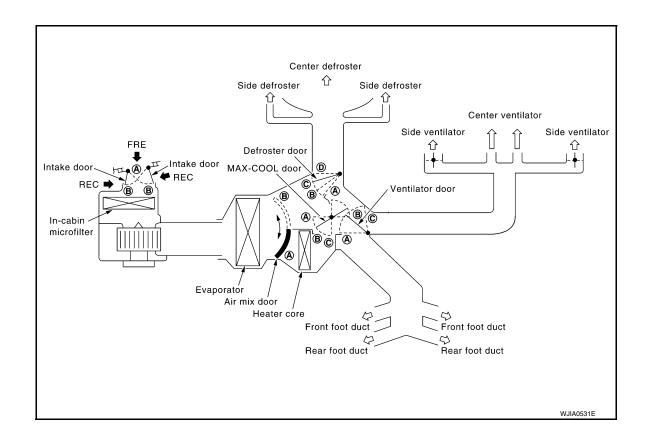
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Mode door position	Air outlet/distribution				
	Vent	Foot	Defroster		
~;	95%	5%	_		
**	60%	40%	_		
~i	_	70%	30%		
ans.	_	60%	40%		
W	_	10%	90%		

Switches And Their Control Function

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Revision: August 2013 HAC-109 2014 Titan NAM

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			<i>y</i>	SW
switch	→ •	;		W •	FRONT		(MAX A/C •			
		+,~	*	+,,~	-> ♦ =	0	> ∳ <	0	COLD	~	нот	A/C
Ventilator door	(A)	B	©	©	©		_	_	<u> </u>			©
MAX-COOL door	(A)	B	B	B	©		_	_				B
Defroster door	(D)	©	O or ©	B	(A)		_					©
Intake door		_	_		B		A	B				B
Air mix door		_	_		_		_	_	(A)		B	

DIAGNOSIS SYSTEM (HVAC)

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 1)]

DIAGNOSIS SYSTEM (HVAC)

CONSULT Function (HVAC)

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

Diagnostic mode	Description
SELF DIAGNOSTIC RESULT	Displays Front air control self-diagnosis results.
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 (With EXP-800 NI or GR8-1200 NI)" or CHG-7, "Work Flow (Without EXP-800 NI or GR8-1200 NI)"
B257B	Ambient sensor circuit short	HAC 444 "Ambient Copper 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	nac-147, intake Sensor Diagnosis 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.	
RR DEFOG	"ON/OFF"	Displays rear defroster request signal.	
MODE SELECT	"DTNT"	Displays blower motor (blower speed decrease) signal.	

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[MANUAL A/C (TYPE 1)]

DIAGNOSIS SYSTEM (BCM)

CONSULT Function (BCM - COMMON ITEM)

INFOID:0000000009882511

APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM.

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

SYSTEM APPLICATION

BCM can perform the following functions.

				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 Function (BCM - AIR CONDITIONER)

INFOID:0000000009882512

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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[MANUAL A/C (TYPE 1)]

SELF-DIAGNOSIS FUNCTION

Front Air Control Self-Diagnosis

INFOID:0000000009882513

A/C SYSTEM SELF-DIAGNOSIS FUNCTION

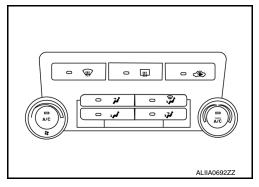
The self-diagnosis function is built into the front air control to quickly locate the cause of malfunctions.

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 <u>HAC-114</u>, "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.



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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 (With EXP-800 NI or GR8-1200 NI)" or CHG-7, "Work Flow (Without EXP-800 NI or GR8-1200 NI)"			
40	Ambient sensor circuit short	HAC-56, "Ambient Sensor Diagnosis Procedure"			
41	Ambient sensor circuit open	- MAC-30, Ambient Sensor Diagnosis Procedure			
56	Intake sensor circuit short	HAC-64, "Intake Sensor Diagnosis Procedure"			
57	Intake sensor circuit open	11AC-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)]

INFOID:0000000009882515

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	ALIIA0692ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

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MODE DOOR MOTOR

System Description

INFOID:0000000009882516

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

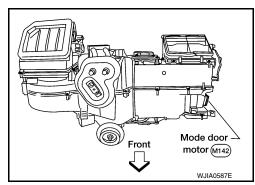
System Operation

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:0000000009882517

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - DISCHARGE AIR

- 1. Press each mode switch and press the 📦 (DEF) switch. Each position indicator should illuminate.
- 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 HAC-116, "Mode Door Motor Diagnosis Procedure".

Mode Door Motor Diagnosis Procedure

INFOID:0000000009882518

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, check "MODE FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to HAC-111, "CONSULT Function (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	В		
Connector	Terminal	Connector	Terminal	Continuity	
M180	19	M142	5	Yes	
WITOU	20	IVITAZ	6	163	

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

Connector	Terminal	_	Continuity
M180	19	Ground No.	
	20	Ground	No

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

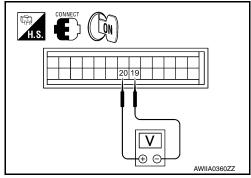
H.S. DISCONNECT OFF

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3.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 M180 terminal 19 and terminal 20 while pressing the mode switch to the VENT (**), and then the B/L (**) mode.

Connector	Term	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voltage (Approx.)	
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 VTL-8, "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	A and C		В	
Connector	Terminal	Connector	Terminal	Continuity
M180 (C)	3	M142	3	Yes
M181 (A)	28	101142	1	162

 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	NO

Is the inspection result normal?

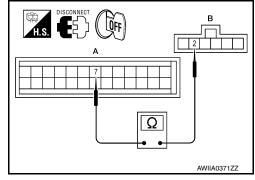
YES >> GO TO 5.

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 7 and mode door motor harness connector M142 (B) terminal 2.

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



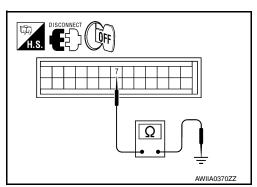
2. Check continuity between front air control harness connector M180 terminal 7 and ground.

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

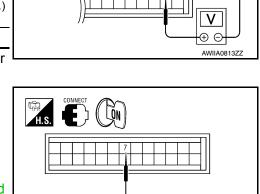
4. Check voltage between front air control harness connector M180 terminal 7 and ground.

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".



H.S. CONNECT

7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

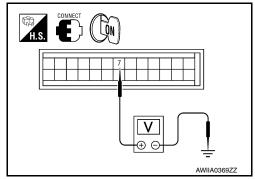
- 1. Reconnect the mode door motor harness connector M142.
- 2. Check voltage between front air control harness connector M180 terminal 7 and ground.

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 VTL-8, "Removal and Installation".

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



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System Description

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SYSTEM DESCRIPTION

SYMPTOM:

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

SYSTEM DESCRIPTION

Component Parts

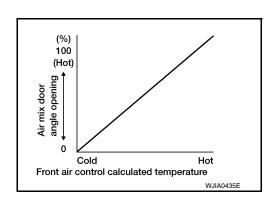
Air mix door control system components are:

- Front air control
- Air mix door motor
- 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.

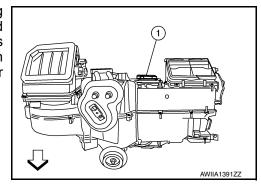
Air Mix Door Control Specification



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.



Air Mix Door Motor Component Function Check

INFOID:0000000009882520

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.

>> 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 <u>HAC-121</u>, "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, check "DVR MIX FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to <u>HAC-111.</u> "CONSULT 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	Condition	Results
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.

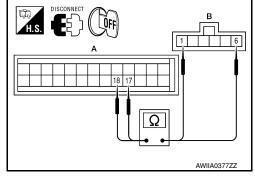
Inspect air mix door for mechanical failure and repair if necessary. If air mix door is OK, refer to
 <u>HAC-167</u>, "Component Function Check" for insufficient cooling or <u>HAC-175</u>, "Component Function Check" for insufficient heating.

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)]

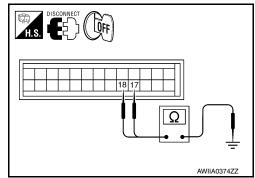
Check continuity between front air control harness connector M180 terminals 17, 18 and ground.

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

Is the inspection result normal?

YES >> GO TO 3.

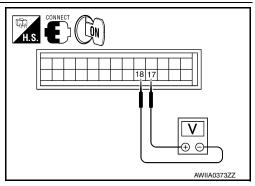
NO >> Repair or replace harness as necessary.



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

- 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 M180 terminal 17 and terminal 18 while rotating temperature control dial to 18°C (60°F) and back to 32°C (90°F).

Connector	Terminals		Condition	Voltage (Approx.)
(+)		(-)	Condition	
M180	17	18	While rotating temperature control dial from 32°C (90°F) to 18°C (60°F)	Battery voltage
IVI TOU	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 VTL-8, "Removal and Installation".

f 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.
- 3. 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	Connector Terminal		Terminal	Continuity
M180 (C)	3	M147	2	Yes
M181 (A)	28	IVI I 47	3	163

Check continuity between front air control harness connector

H.S. DISCONNECT OFF
A B B Ω 22 3 1 1 2 3 1 1 1 2 1 3 1 1 1 1 1 1 1
AWIIA0393ZZ

M180 (C) terminal 3, M181 (A) terminal 28 and ground.

Conne	ctor	Terminal	_	Continuity
M180	(C)	3	Ground	No
M181	(A)	28	Ground	140

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

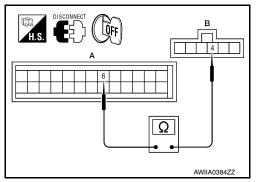
 ${f 5}.$ CHECK PBR FEEDBACK SIGNAL CIRCUIT FOR OPEN AND SHORT TO GROUND

< 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



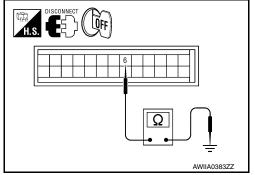
2. Check continuity between front air control harness connector M180 terminal 6 and ground.

Connector	Terminal	_	Continuity
M180	6	Ground	No

Is the inspection result normal?

YES >> GO TO 6.

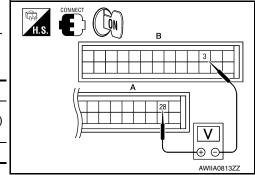
NO >> Repair or replace harness as necessary.



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	(-)	voltage (Approx.)
M181	28	M180	3	5 Volts



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

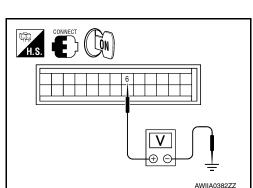
Connector	Terminal	_	Voltage (Approx.)
M180	6	Ground	0 Volts

Is the inspection result normal?

YES >> GO TO 7.

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





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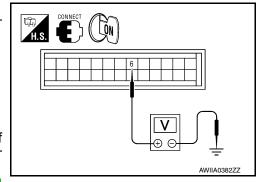
[MANUAL A/C (TYPE 1)]

- 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 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

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SYSTEM DESCRIPTION

SYMPTOM:

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

SYSTEM DESCRIPTION

Component Parts

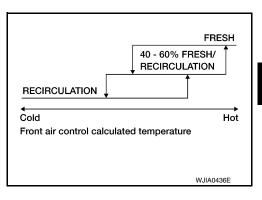
Intake door control system components are:

- 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.

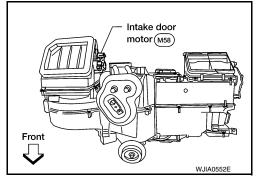
Intake Door Control Specification



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

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INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - REC (

- Press the vent mode switch (*).
- 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).

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< DTC/CIRCUIT DIAGNOSIS >

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

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

DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

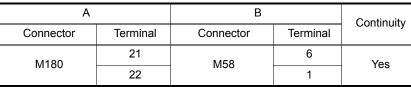
SYMPTOM:

- 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.
- 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.

Α		В	Continuity	
Connector	Connector Terminal		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	_	Continuity
M180	21	Ground	No
	22	Ground	No

Is the inspection result normal?

>> GO TO 3. YES

NO >> Repair or replace harness as necessary.

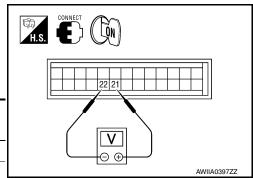
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2.CHECK FRONT AIR CONTROL FOR INTAKE AIR DOOR MOTOR POWER AND GROUND

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

Connector	Terminals (+) (-)		Condition	Voltage (Approx.)	
Connector			Gondidon		
M180	21 22		Self-diagnostic mode (opening)	Battery voltage	
WITOU	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 VTL-18, "Removal and Installation".
- >> Replace front air control. Refer to VTL-8, "Removal and Installation". NO

DEFROSTER DOOR MOTOR CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

DEFROSTER DOOR MOTOR CIRCUIT

System Description

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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

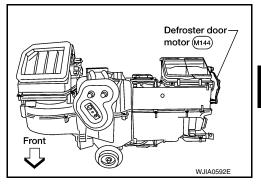
System Operation

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

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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 <u>HAC-127</u>, "<u>Defroster Door Motor Diagnosis Procedure</u>"

Defroster Door Motor Diagnosis Procedure

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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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$1. {\sf check\ Defroster\ Door\ Motor\ Position\ Balanced\ resistor\ (PBR)\ feedback\ voltage}$

- 1. Turn ignition switch ON.
- Using CONSULT, check "DEF FDBCK" in "DATA MONITOR" mode in "HVAC". Refer to HAC-111, "CON-2. SULT Function (HVAC)".
- Observe "DEF FDBCK" voltage while cycling front air control mode switch through all modes and pressing 3. 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.

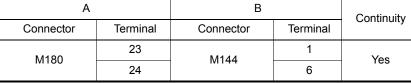
Inspect defroster door for mechanical failure. Refer to <u>VTL-17, "Removal and Installation"</u>.

NO >> GO TO 2.

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

- Turn ignition switch OFF.
- 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	140

Is the inspection result normal?

YES >> GO TO 3.

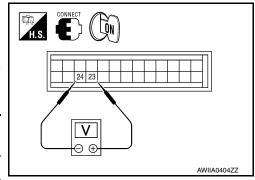
NO >> Repair or replace harness as necessary.

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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	Terminals 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 >

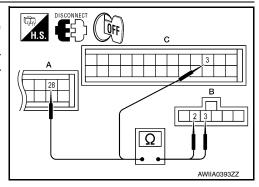
[MANUAL A/C (TYPE 1)]

NO >> Replace front air control. Refer to VTL-8, "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 144	3	165



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?

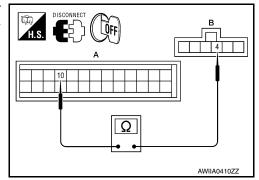
YES >> GO TO 5.

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



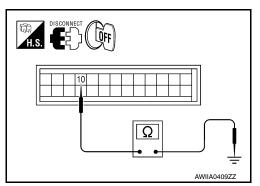
Check continuity between front air control harness connector M180 terminal 10 and ground.

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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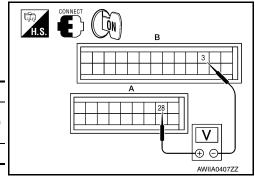
DEFROSTER DOOR MOTOR CIRCUIT

< 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



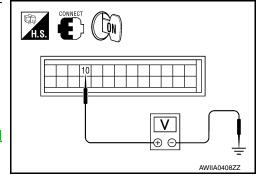
4. Check voltage between front air control harness connector M180 terminal 10 and ground.

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

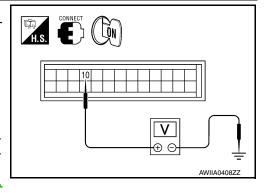
- 1. Reconnect the defroster door motor harness connector M144.
- Check voltage between front air control harness connector M180 terminal 10 and ground.

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 VTL-8, "Removal and Installation".

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



[MANUAL A/C (TYPE 1)]

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BLOWER MOTOR CONTROL SYSTEM

System Description

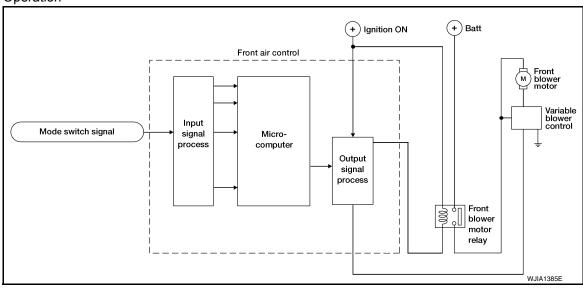
SYSTEM DESCRIPTION

Component Parts

Blower speed control system components are:

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

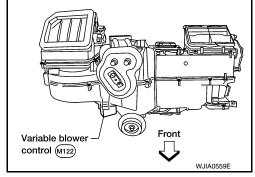
System Operation



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

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.

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< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

NO >> Go to diagnosis procedure. Refer to <u>HAC-132</u>. "Front Blower Motor Diagnosis Procedure".

Front Blower Motor Diagnosis Procedure

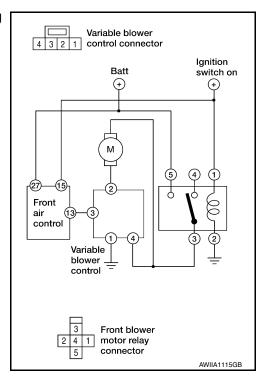
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Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - Manual With 2 Control Dial System".

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-76</u>, <u>"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.
- Disconnect front blower motor connector.
- 3. Turn ignition switch ON.
- 4. Press the A/C switch.
- 5. Rotate blower control dial to maximum speed.
- 6. Check voltage between front blower motor harness connector M62 terminal 2 and ground.

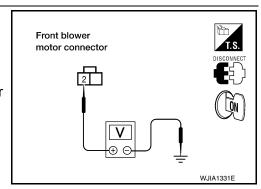
2 - Ground

: Battery voltage

Is the inspection result normal?

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

NO \Rightarrow GO TO 3. 3. CHECK FRONT BLOWER MOTOR RELAY (SWITCH SIDE) POWER SUPPLY CIRCUIT



< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

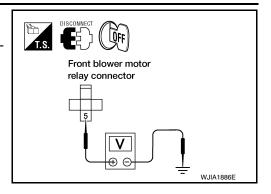
- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor relay.
- Check voltage between front blower motor relay harness connector M107 terminal 5 and ground.

5 - Ground : Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.



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

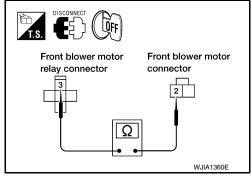
Check continuity between front blower motor relay harness connector M107 terminal 3 and front blower motor harness connector M62 terminal 2.

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.

<u>Is the inspection result normal?</u>

YES >> GO TO 7.

NO >> Repair harness or connector.

7. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

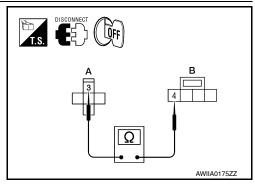
- 1. Disconnect front air control connector.
- Check continuity between front air control harness connector M180 (B) terminal 13 and variable blower control harness connector M122 (A) terminal 3.

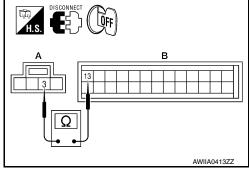
13 - 3 : Continuity should exist.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.





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

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< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

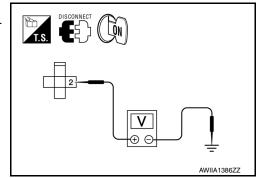
- 1. Turn ignition switch ON.
- Check voltage between front blower motor relay harness connector M107 terminal 2 and ground.

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

- 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.
- 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?

YES >> GO TO 12.

NO >> Repair harness or connector.

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12. CHECK FRONT BLOWER MOTOR

Check front blower motor. Refer to <u>HAC-131</u>, "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)]

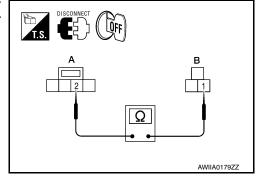
Check continuity between front blower motor harness connector M62 (B) terminal 1 and variable blower control harness connector M122 (A) terminal 2.

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

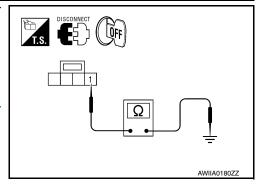
Check continuity between variable blower control harness connector M122 terminal 1 and ground.

1 - Ground : Continuity should exist.

Is the inspection result normal?

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

NO >> Repair harness or connector.

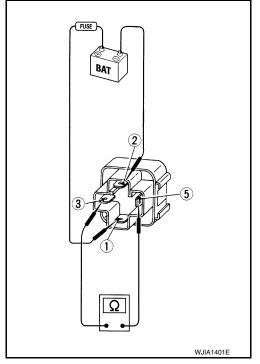


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Front Blower Motor Component Inspection

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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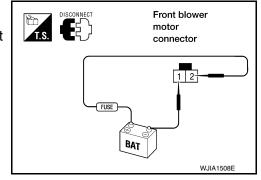
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< DTC/CIRCUIT DIAGNOSIS >

[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

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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

- 1. 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

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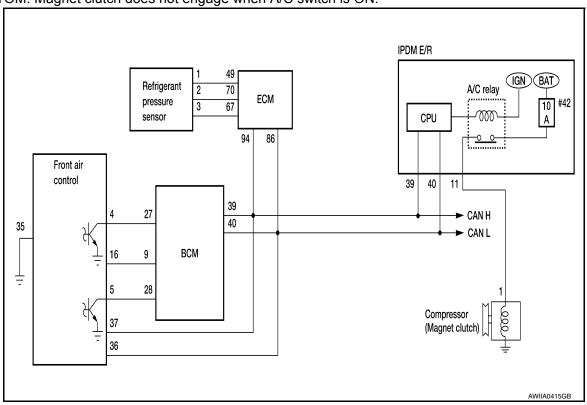
Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - Manual With 2 Control Dial System".

DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

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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 <u>HAC-147</u>, "Intake Sensor Diagnosis Procedure".

Malfunctioning ambient sensor. Refer to <u>HAC-144</u>. "Ambient Sensor Diagnosis Procedure".

PERFORM AUTO ACTIVE TEST

Refer to PCS-11, "Diagnosis Description".

Does magnet clutch operate?

YES

- >> ®WITH CONSULT GO TO 5.
 - WITHOUT CONSULT 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.

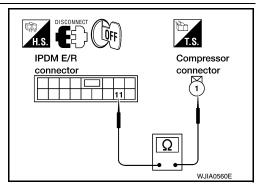
4. Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

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.

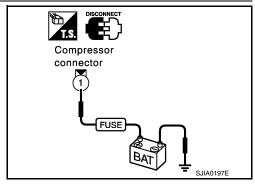
f 4.CHECK MAGNET CLUTCH CIRCUIT

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 Installation".



H.S. DISCONNECT OFF

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5. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to <u>BCS-21, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)"</u>.

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.
- 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 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?

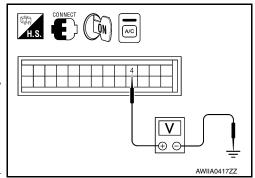
YES >> GO TO 7.

NO >> Repair harness or connector.

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 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
			A/C switch: OFF	Approx. 5V



Is the inspection result normal?

YES >> GO TO 8.

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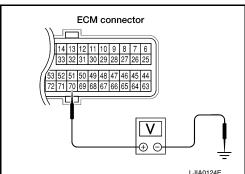
NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control. Refer to <u>VTL-8</u>. "Removal and Installation".

NO-2 >> If the voltage is approx. 0V when A/C switch is OFF, replace BCM. Refer to BCS-52, "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.	(-)		11.0030
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-481, "Diagnosis Procedure".

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to BCS-21, "AIR CONDITIONER: CONSULT 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

- 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.

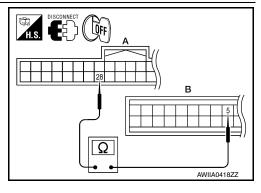
28 - ground Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

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



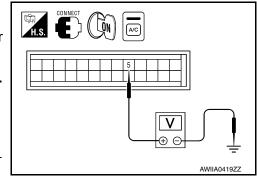
MAGNET CLUTCH

< 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.	(-)		
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-52, "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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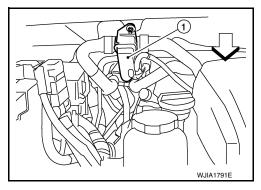
WATER VALVE CIRCUIT

Description INFOID:000000009882538

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:0000000009882536

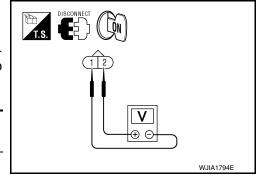
Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - <u>Manual With 2 Control Dial System"</u>.

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
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

- 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 VTL-8, "Removal and Installation".

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WATER VALVE CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

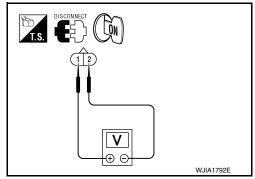
NO >> Repair harness or connector.

3. CHECK WATER VALVE POWER AND GROUND CIRCUITS

1. Rotate temperature control dial to maximum cold.

2. 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.

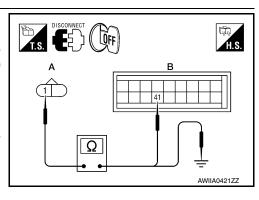
4. Check continuity between water valve harness connector F68 (A) terminal 1 and ground.

1 - Ground : Continuity should not exist.

Is the inspection result normal?

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

NO >> Repair harness or connector.



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AMBIENT SENSOR

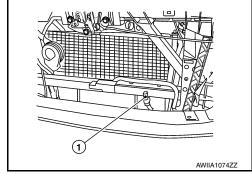
Component Description

INFOID:0000000009882537

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.

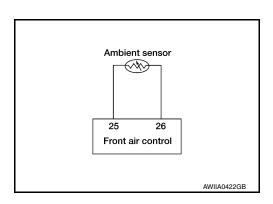
This prevents constant adjustments due to momentary conditions, such as stopping after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front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

Ambient Sensor Diagnosis Procedure

INFOID:0000000009882538

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 >

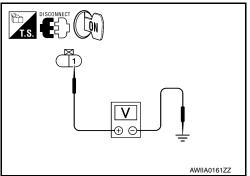
[MANUAL A/C (TYPE 1)]

- 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

- 1. 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 M180 (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-144, "Ambient Sensor Diagnosis Procedure"</u>.

Is the inspection result normal?

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

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 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".
 - 2. 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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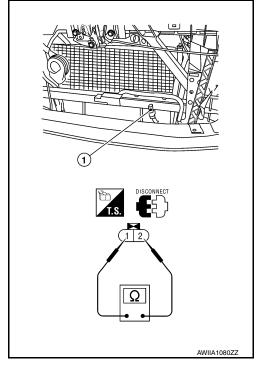
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< DTC/CIRCUIT DIAGNOSIS >

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

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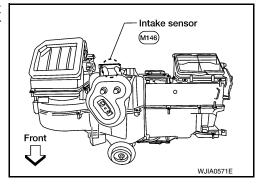
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COMPONENT DESCRIPTION

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.



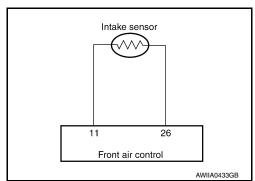
Intake Sensor Diagnosis Procedure

INFOID:0000000009882541

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.



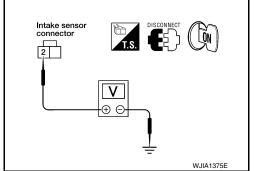
1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

- 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)]

- 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 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?

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

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

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

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

f 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?

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

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

NO >> Repair harness or connector.

Intake Sensor Component Inspection

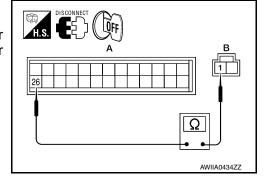
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COMPONENT INSPECTION

Intake Sensor



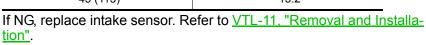
INTAKE SENSOR

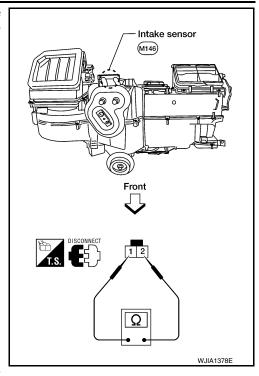
< DTC/CIRCUIT DIAGNOSIS >

[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 k Ω
-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

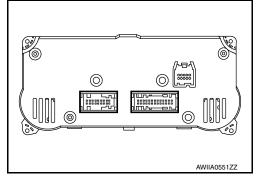
INFOID:0000000009882543

COMPONENT DESCRIPTION

Front Air Control

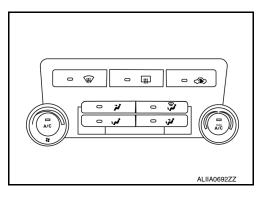
The front air control has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, defroster door motor, blower motor and A/C compressor are then controlled.

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:0000000009882544

SYMPTOM: A/C system does not come on.

INSPECTION FLOW

1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - AUTO MODE

- Turn the blower control dial clockwise to low speed.
- 2. Press the A/C Turn the blower control dial clockwise to low speed.
- 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:0000000009882545

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

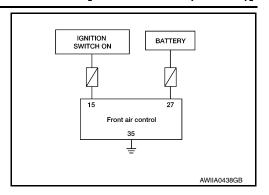
DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

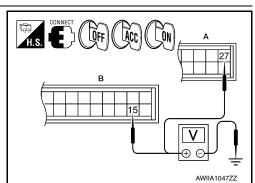
SYMPTOM: A/C system does not come on.



1. CHECK POWER SUPPLY CIRCUITS FOR FRONT AIR CONTROL

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

	Terminals		Ignit	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 PG-76, "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.

$oldsymbol{2}.$ CHECK GROUND CIRCUIT FOR FRONT AIR CONTROL

- Turn ignition switch OFF.
- Disconnect front air control connectors.
- Check continuity between front air control harness connector M181 terminal 35 and ground.

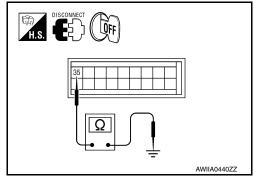
35 - Ground

: Continuity should exist.

Is the inspection result normal?

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

NG >> Repair harness or connector.



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[MANUAL A/C (TYPE 1)]

ECU DIAGNOSIS INFORMATION

MANUAL A/C IDENTIFICATION TABLE

Application Table

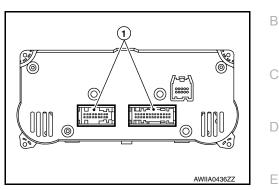
Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	ALIIA0692ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

INFOID:0000000009882547

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
	vv/F		ON	A/C switch ON	0V
5	L/R	Fan ON signal	ON	Blower switch OFF	5V
J		. 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

^{*1:} If equipped

WIRING DIAGRAM

AIR CONDITIONER CONTROL

Wiring Diagram - Manual With 2 Control Dial System

INFOID:0000000009882548 В С CC CREW CAB D Е F Н AIR CONDITIONER CONTROL - MANUAL WITH 2 CONTROL DIAL SYSTEM (3) HAC VARIABLE BLOWER CONTROL (M122) J M181 M180 FRONT AIR CONTROL JJOINT CONNECTOR-M04 (M194) (E152) (M31) L SENSOR (M146) M JOINT CONNECTOR-M09 (M182) M31 IGNITION SWITCH ON OR START 10A 8 10A BATTERY

Α

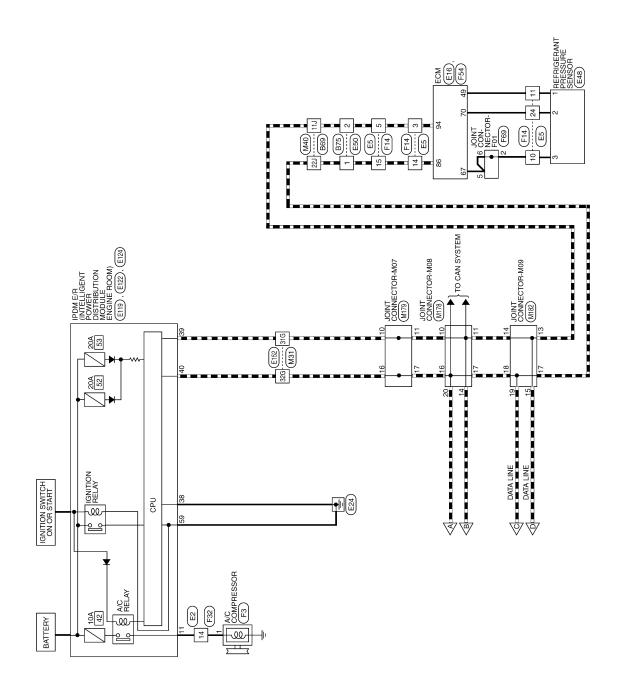
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Connector No. M19 Connector Name BCM (BODY CONTROL MODULE) Connector Color WHITE	Terminal No. Color of Signal Name A. Signal Name A. Y/B REAR DEFOGGER SW Connector Name FUSE BLOCK (J/B) Connector Color WHITE Signal Name H.S. Signal Name A. Signal Name Signal Name A. Y/R	A B C D
CONNECTORS - MANUAL WITH 2 CONTROL DIAL SYSTEM Connector Name BCM (BODY CONTROL Connector Nam MODULE) Connector Color WHITE	#\$\frac{1 \text{ 1 } 2 \text{ 3 } 4 \text{ 5 } 6 \text{ 7 } 8 \text{ 9 } 10 \text{ 11 } 12 \text{ 13 } 14 \text{ 15 } 15 \text{ 16 } 17 \text{ 18 } 19 \text{ 10 } 11 \text{ 12 } 13 \text{ 14 } 15 \text{ 16 } 17 \text{ 18 } 19 \text{ 10 } 10 \text{ 10 } 11 \text{ 12 } 13 \text{ 14 } 15 \text{ 16 } 17 \text{ 18 } 19 \text{ 10 } 10 \text{ 10 } 17 \text{ 18 } 10 \text{ 10 } 10 \text{ 17 } 18 \text{ 15 } 10 \text{ 17 } 18 \text{ 18 } 10 \text{ 10 } 17 \text{ 18 } 10 \text{ 10 } 10 \text{ 10 } 10 \text{ 18 } 10 \text{ 10 } 10 \text	G H HAC
TROL	5N Wire 5N Y/G Minat No. Wire 5N Y/G Minat No. Wire 5N Minat	M ABNIA3944GB

30,000	0440					ŀ
Connector N		TO WIRE	Terminal No.	o. Wire	Signal Name	Connector No. M58 Connector Name INTAKE DOOR MOTOR
Connector Color	color WHITE	Щ	117	_	I	
			22J	۵	ı	-
H.S.		1.0 2.0 3.0 4.0 5.0 6.1 7.1 8.1 9.0 10.0				H.S.
	11.0 12.0 13.0 14 22.0 23.0 24	11.1 [12.1 [13.1 [14.1 [15.1 [16.1 [17.1 [18.1 [18.1 [18.1 [20.1 [21.1]]]]]]]]				Terminal No. Wire Signal Name
	31,132,133,134	31. 32.133.134.135.136.137.138.138.140.141.1				1 0 -
	42) 43) 44	42J 43J 44J 45J 46J 47J 48J 50J				2
	51.152.153.154	51.152.152.152.155.156.157.158.159.160.161.1				- I
	621 631 64					+
	71J 72J 73J 74	71.J 72.J 73.J 74.J 75.J 76.J 77.J 78.J 78.J 80.J 81.J 82.J 83.J 84.J 85.J 86.J 87.J 88.J 89.J 90.J				6 G/B –
	[5, [5,]	100 166 166 176				
1				2107		Octob Management
Connector No.	Jo. Moz	Connector Name FBONT BLOWER MOTOR	Connector Name		FBONT BI OWER BELAY	Connector No. MIZZ
Connector Color	color BLACK	X.	Connector Color		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Connector Name CONTROL (2 CONTROL ODAL SYSTEM OR AUTO
		۲۰۰۰	管			Connector Color WHITE
H.S.		1	S. S.	2 2 2	-	H.S.
Terminal No.	Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name	Terminal No. Wire Signal Name
-	ΓW	ı	-	J/\G	1	1 B/W –
2	M/L	ı	5	B S.	– (2 CONTROL DIAL SYSTEM OR AUTO A/C)	2 LW -
			ო	M/L		W/L
			4	1	I	-
			r ₂	GR	1	

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				優	Terminal No.	=	16			E
	e u		R-M08	13 12 11 10	Jue Jue					[
M144 DEFROSTER DOOR MOTOR BLACK	Signal Name	1 1	M178 JOINT CONNECTOI WHITE	20 19 18 17 16 15 14 13	Signal Name	1	1 1	1 1	_	ŀ
Connector No. M. Connector Name DE Connector Color BL	Color of Color of Wire UG	- 2 6 P/B	Connector No. M178 Connector Name JOINT CONNECTOR-M08 Connector Color WHITE	H.S.	Terminal No. Wire		14 16 P	17 P		Н
									J	ŀ
Connector No. M142 Connector Name MODE DOOR MOTOR Connector Color BLACK I 2 3 4 5 6 H.S.	Signal Name	1 1	DOOR (DRIVER)	4 4 5 6	Signal Name	1	1 1	1 1		
me MODE DC or BLACK	Color of Wire GR	BR/W P/L	me AIR MIX MOTOR or BLACK	1 2 3 4 4 5 6	Color of Wire	<u>a</u> ;	SB ~	1 0	_	
Connector Name Connector Color	Terminal No.	υ ο	Connector No. M147 Connector Name AIR MIX DOOR MOTOR (DRIVER) Connector Color BLACK	南 H.S.	Terminal No.	2	ω 4	9		

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	FRONT AIR CONTROL (WITH MANUAL 2 CONTROL DIAL SYSTEM)	<u> </u>	32 31 30 29 28 27 41 40 39 38 37 36	Signal Name	V BAT	5V REF VOLTAGE	ı	ı	ı	ı	ı	ı	GND	CAN-L	CAN-H	1	ı	-	WATER VALVE A	WATER VALVE B	1	
. M181		lor WHITE	35 34 33 3 44 43 42 4	Color of Wire	Y/R	>	ı	ı	1	1	ı	ı	В	۵	_	ı	ı	I	Y/L	M/G	ı	
Connector No.	Connector Name	Connector Color	明.S.	Terminal No.	27	28	59	30	31	32	33	34	35	36	37	38	39	40	41	42	43	

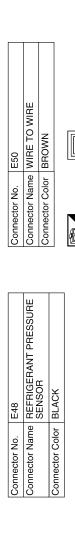
Terminal No.	Color of Wire	Signal Name
10	LG/B	DEFROST FEEDBACK
F	L/B	EVAP TEMP SENSOR
12	ı	1
13	G/R	FRONT BLWR SPEED
14	I	ı
15	J//G	V IGN
16	Y/B	REAR DEF REQUEST
17	W/G	DRVR BLND DR A
18	В	DRVR BLND DR B
19	BR/W	PNL/FLR DR A
20	P/L	PNL/FLR DR B
21	G/B	RECIRC DRI A
22	0	RECIRC DRI B
23	ГС	DEFROST DR A
24	P/B	DEFROST DR B
25	Ъ	AMB TEMP SEN
56	N/R	SENS RETURN

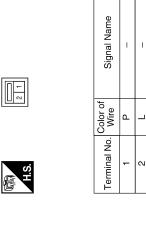
	FRONT AIR CONTROL (WITH MANUAL 2 CONTROL DIAL SYSTEM)	X	9 8 7 6 5 4 3 2 1 22 21 20 19 18 17 16 15 14		Signal Name	İ	ı	V REF RET	AC REQ	FAN ON	DRVR BLND DR FB	PNL/FLR DR FB	ILLUM +	ILLUM -
. M180		lor BLACK	13 12 11 10 26 25 24 23 ;		Color of Wire	ı	ı	۵	W/R	L/R	SB	GR	R/L	BR
Connector No.	Connector Name	Connector Color	H.S.	<u> </u>	Terminal No.	1	2	3	4	വ	9	2	8	6

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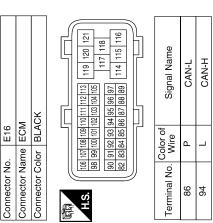
			Α
Connector No. M194 Connector Name JOINT CONNECTOR-M04 Connector Color BLUE	20 19 18 17 16 15 14 13 12 11 10	10 Y	В
Connector No. Connector Name Connector Color	20 19	10 V 11 V 12 14 V 14 V 15 15 15 15 15 15 15	D
Connector No. Connector Nar	品S.	Connector No. Co	Е
			_
Q			F
Connector No. M192 Connector Name JOINT CONNECTOR-M02 Connector Color GREEN	2 1 11 10	Signal Name NMRE Signal Name	G
2 IT CONNE	20 19 18 17 16 15 14 13 12 11 10	$ \circ \circ $	Н
o. M192 ame JOINT C	20 19 18 17	Color of Wire Y/R Y/R	HA
Connector No. Connector Name Connector Color	H.S.	Connector No. Connector Name Connector Name Connector Color Terminal No. 14 14 Y 14 Y 14 Y Y 14 Y Y Y Y Y Y Y Y Y Y Y Y Y	
8 8 8			J
			K
OR-M09	2 1 12 11 10	Name ame	L
Connector No. M182 Connector Name JOINT CONNECTOR-M09 Connector Color GREEN	9 8 7 6 5 4 3 2 20 19 18 17 16 15 14 13 12	Terminal No.	M
M182 JOINT C	9 8 7 0 19 18 17	Color of Wire Wire Wire Wire Wire Wire Wire Wire	
Connector No. Connector Name Connector Color		10 V/G 11 V/G 12 V/G 13 L 14 L 15 L 17 P 18 P 19	Ν
Conne	H.S.	Terminal No. Terminal No. Terminal No. Terminal No.	0
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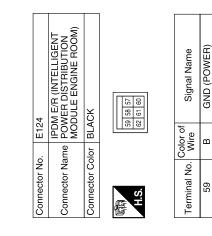
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Connector No.	E122
Connector Name	Connector Name POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	WHITE
原 H.S.	42 41 40 39 38 37

48 47 46 45 44 43	Signal Name	GND (SIGNAL)	CAN-H	CAN-L
48 47	Color of Wire	В	_	Ь
	Terminal No.	38	39	40

Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	WHITE
81 81 81	9 8 7 6 (



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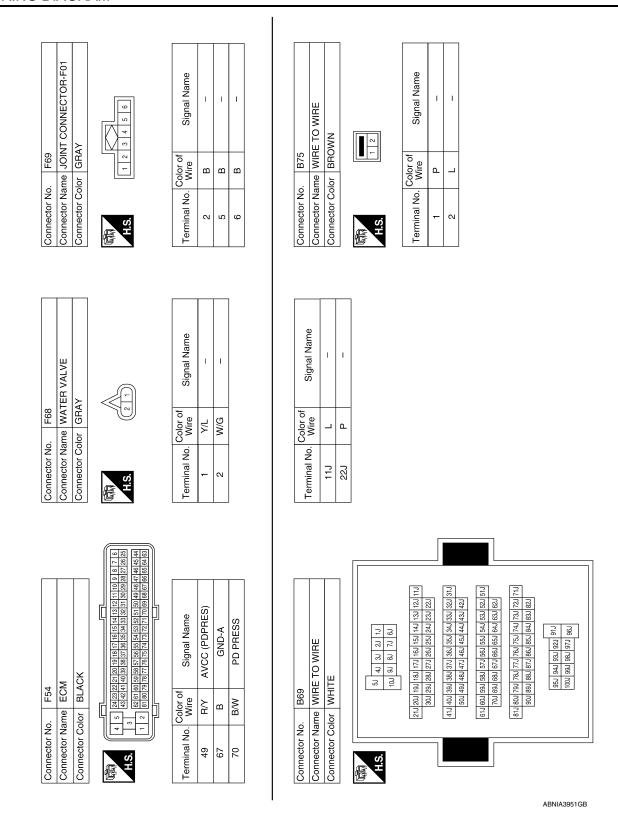
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Connector Name A/C COMPRESSOR Connector Color BLACK	Color of Signal Name Wire Y/B –	F32 MIRE TO WIRE
Connector Name Connector Color 原	Terminal No. W	Connector No. Connector Color H.S. Terminal No. WW
olgna i Name		Signal Name
Wire	W/G Y/L	Color of Wire B/W B/W
4G 6G 31G 32G	35G 59G 61G	Terminal No. 11 14 24 24
\	10G 3c 1c 1c 1c 1c 1c 1c 1c	Connector No. F14 Connector Name WIRE TO WIRE Connector Color WHITE H.S. Title 9 8 7 Title 5 4 3 2 1 Title 5 12 22 22 21 20 19 18 17 16 15 14 13 12 Terminal No. Color of Wire Signal Name 2 Y/L - 3 L - 5 L - 7 W/G - 10 B -

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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	ALIIA0692ZZ
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

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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.	<u>HAC-150</u>	
A/C system cannot be controlled.	Go to Self-diagnosis Function.	HAC-114	
Air outlet does not change.	Co to Trouble Diagnosis Presedure for Made Deer Mater	1100 446	
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-116</u>	
Discharge air temperature does not change.	Co to Trouble Diagnosis Precedure for Air Mix Door Motor	HAC 120	
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	HAC-120	
Intake door does not change.	Co to Trouble Diagnosis Procedure for Intaka Dear Mater	HAC 125	
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>HAC-125</u>	
Defroster door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Defroster Door Motor.	<u>HAC-127</u>	
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.	<u>HAC-167</u>	
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.		

INSUFFICIENT COOLING

INSUFFICIENT COULING	IMANUAL A/C/TYPE 41
< SYMPTOM DIAGNOSIS >	[MANUAL A/C (TYPE 1)]
INSUFFICIENT COOLING	
Component Function Check	INFOID:0000000098825
SYMPTOM: Insufficient cooling	
INSPECTION FLOW	
$1.$ confirm symptom by performing operational check - ${\sf TI}$	EMPERATURE DECREASE
 Rotate the blower control dial to the low speed. Turn temperature control dial counterclockwise to maximum cold. Check for cold air at discharge air outlets. 	
Can the symptom be duplicated? YES >> GO TO 3. NO >> GO TO 2.	
2.CHECK FOR ANY SYMPTOMS	
Perform a complete operational check for any symptoms. Refer to <u>HAC-99</u> <u>Does another symptom exist?</u>	9, "Operational Check".
YES >> Refer to HAC-166, "Symptom Matrix Chart". NO >> System OK.	
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>	5"
Is the inspection result normal?	<u>. </u>
YES >> GO TO 5. NO >> Refer to HAC-166, "Symptom Matrix Chart".	
5. CHECK DRIVE BELTS	
Check compressor belt tension. Refer to EM-14, "Checking Drive Belts".	
Is the inspection result normal? YES >> GO TO 6.	
NO >> Adjust or replace compressor belt. Refer to EM-14, "Removal	and Installation".
6. CHECK AIR MIX DOOR OPERATION	
Check and verify air mix door mechanism for smooth operation. Refer to <u>bonent Function Check</u> ".	HAC-120, "Air Mix Door Motor Com
Does air mix door operate correctly?	
YES >> GO TO 7. NO >> Check air mix door motor circuit. Refer to HAC-121, "Air Mix []	Ooor Motor Diagnosis Procedure".
7. CHECK COOLING FAN MOTOR OPERATION	
Check and verify cooling fan motor for smooth operation. Refer to EC-378	"Overall Function Check".
Does cooling fan motor operate correctly?	
YES >> GO TO 8. NO >> Check cooling fan motor. Refer to <u>EC-379</u> , " <u>Diagnosis Proced</u>	ure".
8. CHECK WATER VALVE OPERATION	
Check and verify water valve for smooth operation. Refer to HAC-142, "De	escription".
Does water valve operate correctly? YES >> GO TO 9.	

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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 HAC-178, "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, "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 HAC-168, "Diagnostic Work Flow".

NO >> GO TO 13.

13. CHECK AIR DUCTS

Check ducts for air leaks.

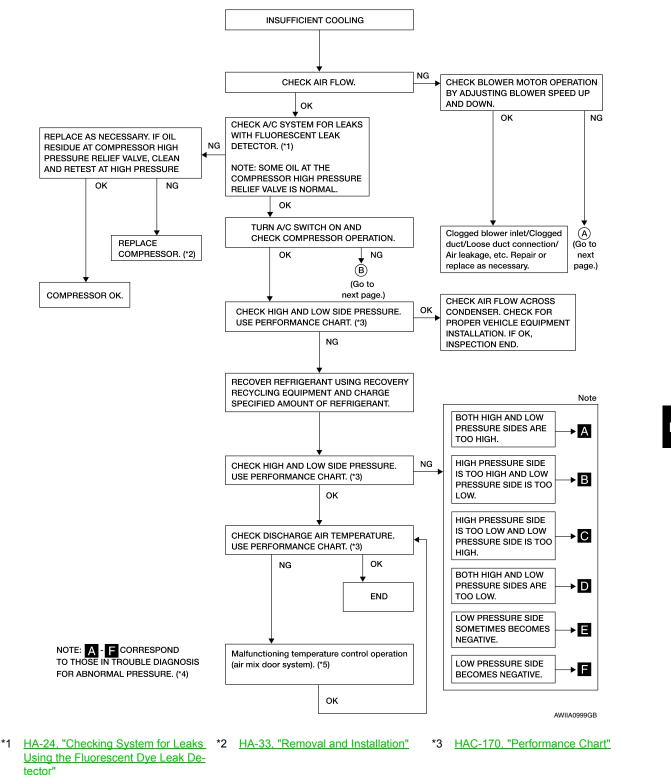
Is the inspection result normal?

YES >> System OK.

NO >> Repair air leaks.

Diagnostic Work Flow

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- Using the Fluorescent Dye Leak Detector"
- *4 HAC-171, "Trouble Diagnoses for Abnormal Pressure"
- *5 HAC-120, "Air Mix Door Motor Component Function Check"

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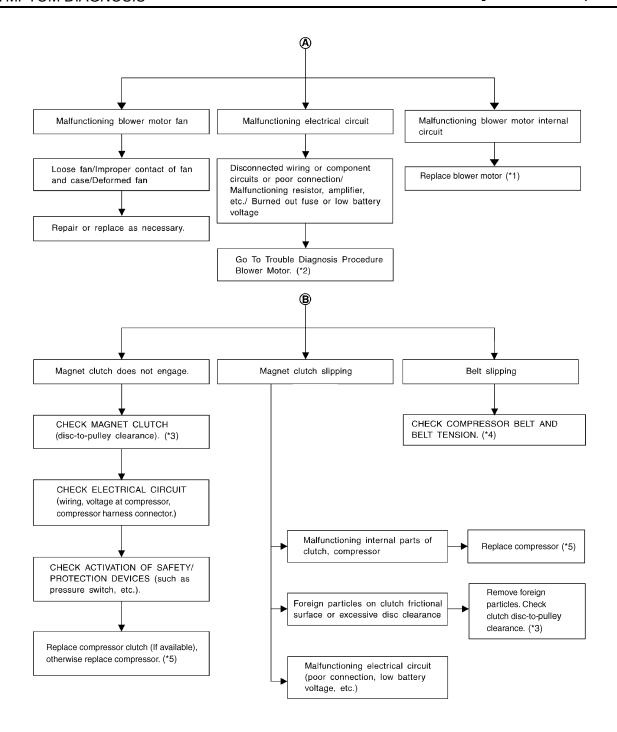
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- *1 VTL-12, "Removal and Installation"
- *2 HAC-131, "Front Blower Motor Com- *3 HA-33, "Removal and Installation" ponent Function Check"
- *4 EM-14, "Checking Drive Belts"
- *5 HA-33, "Removal and Installation"

Performance Chart

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TEST CONDITION

Testing must be performed as follows:

INSUFFICIENT COOLING

< SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

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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 for 10 minutes before taking measurements.			

TEST READING

Recirculating-to-discharge Air Temperature Table

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

Ambient Air Temperature-to-operating Pressure Table

Ambient air		High-pressure (Discharge side)	Low-pressure (Suction side)	
Relative humidity %	Air temperature °C (°F)	kPa (kg/cm ² , psi)	kPa (kg/cm ² , 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 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.
	 An area of the low-pressure pipe is colder than areas near the evaporator outlet. Plates are sometimes covered with frost. 	 Excessive liquid refrigerant on low-pressure side Excessive refrigerant discharge flow Expansion valve is open a little compared with the specification. Improper expansion valve adjustment 	Replace expansion valve.

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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
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.	 Check and repair or replace malfunctioning parts. Check oil for contamination.

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. ↓ Damaged inside compressor packings.	Replace compressor.
(IO) HI) AC356A	No temperature difference between high- and low-pressure sides.	Compressor pressure operation is improper. Understand the compressor packings.	Replace compressor.
oth High- and Low-pressure S	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-24, "Checking of Refrigerant Leaks" or HA-26, "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.	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.	 Air conditioning system does not function and does not cyclically cool the compartment air. The system constantly functions for a certain period of time after compressor is stopped and restarted. 	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

[MANUAL A/C (TYPE 1)] < SYMPTOM DIAGNOSIS > INSUFFICIENT HEATING Α Component Function Check INFOID:0000000009882555 SYMPTOM: Insufficient heating INSPECTION FLOW 1.confirm symptom by performing operational check - temperature increase Turn the blower control dial to low speed. Turn the temperature control dial clockwise to maximum heat 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 HAC-99, "Operational Check". Е 2.CHECK FOR SERVICE BULLETINS Check for any service bulletins. F >> If equipped with NAVI, GO TO 3. >> If not equipped with NAVI, GO TO 4. 3.PERFORM SELF-DIAGNOSIS Perform self-diagnosis. Refer to HAC-114, "Front Air Control Self-Diagnosis". Is the inspection results normal? Н YES >> GO TO 4. NO >> Refer to HAC-166, "Symptom Matrix Chart". 4. CHECK ENGINE COOLING SYSTEM HAC Check for proper engine coolant level. Refer to CO-10, "Inspection". Check hoses for leaks or kinks. Check radiator cap. Refer to CO-10, "Inspection". 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? YFS >> GO TO 6. NO >> Check the air mix door motor circuit. Refer to HAC-120, "Air Mix Door Motor Component Function Check". 6.CHECK AIR DUCTS Check for disconnected or leaking air ducts. Is the inspection result normal? YES >> GO TO 7. NO >> Repair all disconnected or leaking air ducts. 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.

INSUFFICIENT HEATING

< SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

8. CHECK ENGINE COOLANT SYSTEM

Check engine control temperature sensor. Refer to EC-191, "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.

NO >> 1. Back flush heater core.

- - 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

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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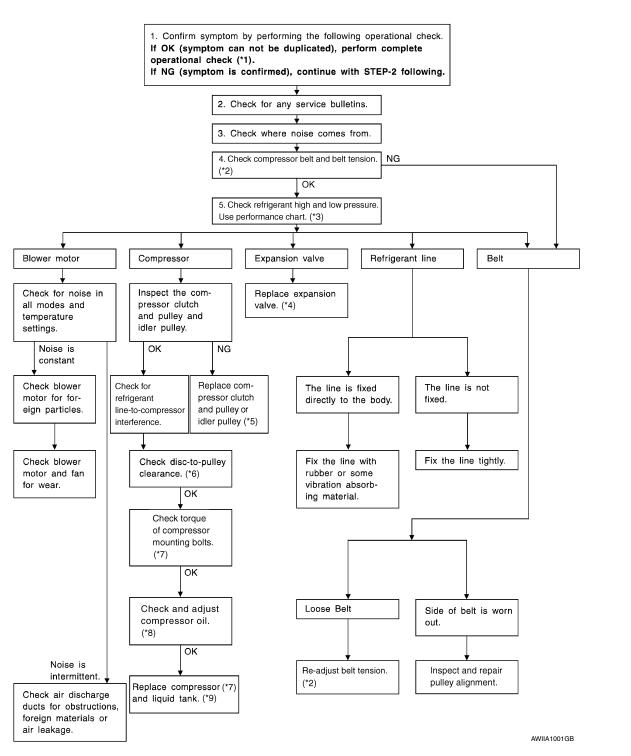
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NOISE

Component Function Check

SYMPTOM: Noise

INSPECTION FLOW



- *1 HAC-99, "Operational Check"
- *2 EM-14, "Checking Drive Belts"
- *3 EM-14, "Checking Drive Belts"

- *4 HA-43, "Removal and Installation"
- *5 HA-33, "Removal and Installation"
- *6 HA-33, "Removal and Installation"

- *7 HA-31, "Removal and Installation"
- *8 HA-31, "Removal and Installation"
- *9 HA-41, "Removal and Installation"

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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 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.

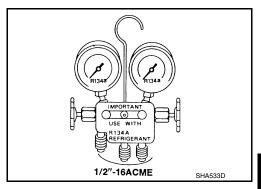
If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- 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

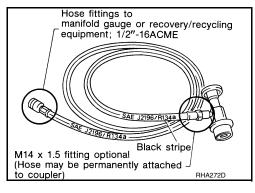
MANIFOLD GAUGE SET

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

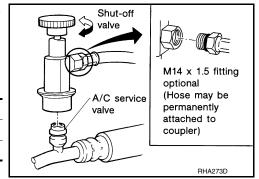
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shutoff devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



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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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	ALIIA0692ZZ
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	2561
WORK FLOW	
1.LISTEN TO CUSTOMER COMPLAINT	
Listen to customer complaint. Get detailed information about the conditions and environment when the symtom occurs.	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	
Repair or replace the specific parts.	_
Tropali of replace the openie 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

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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, "Discharge Air Flow"</u>.

Mode door position is checked in the next step.

If NG, go to trouble diagnosis procedure for <u>HAC-197</u>, "Mode <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.

CHECKING RECIRCULATION (♥, ♥ ONLY)

- 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

- 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 HAC-252, "Component Function Check". If air mix door motor appears to be malfunctioning, go to HAC-202, "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	ALIIA0692ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

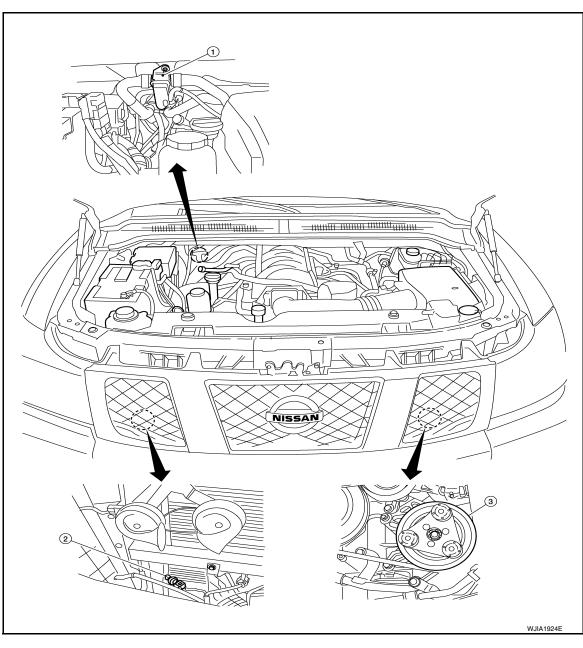
[MANUAL A/C (TYPE 2)]

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FUNCTION INFORMATION

Component Part Location

ENGINE COMPARTMENT



1. Water valve F68

2. Refrigerant pressure sensor E48 (view with grille removed)

3. A/C compressor F3

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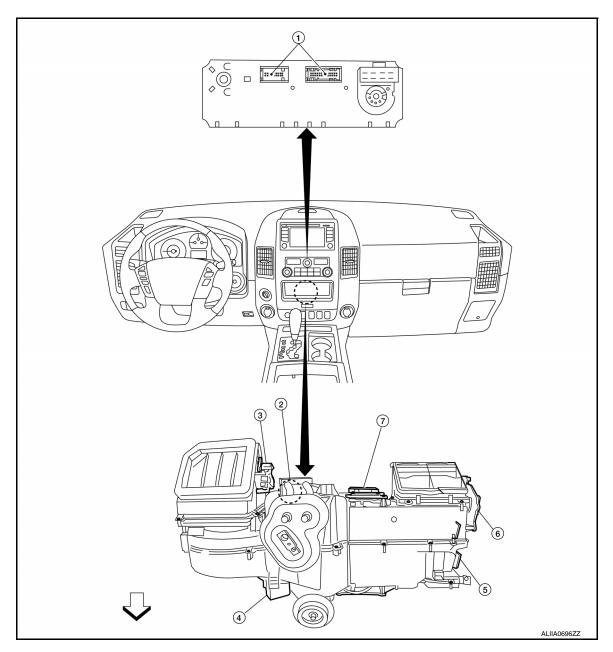
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- 1. Front air control M176, M177
- 4. Variable blower control M121
- 7. Air mix door motor M147
- 2. Intake sensor M146
- 5. Mode door motor M142
- 3. Intake door motor M58
- 6. Defroster door motor M144

FUNCTION INFORMATION

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 2)]

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-197
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-197</u>
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	HAC-201
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for All Milk Door Motor.	<u>HAC-201</u>
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	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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REFRIGERATION SYSTEM

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 2)]

REFRIGERATION SYSTEM

Refrigerant Cycle

REFRIGERANT FLOW

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

Refrigerant System Protection

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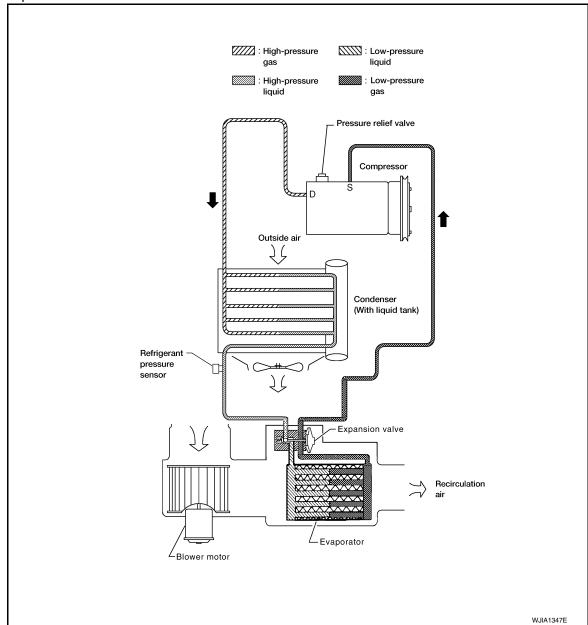
REFRIGERANT PRESSURE SENSOR

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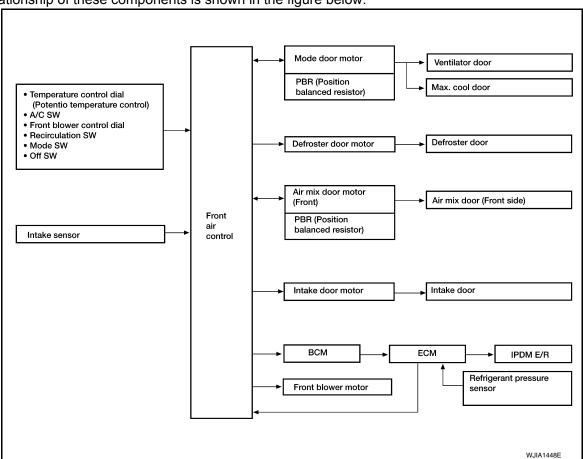
MANUAL AIR CONDITIONER SYSTEM

Control System Diagram

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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:

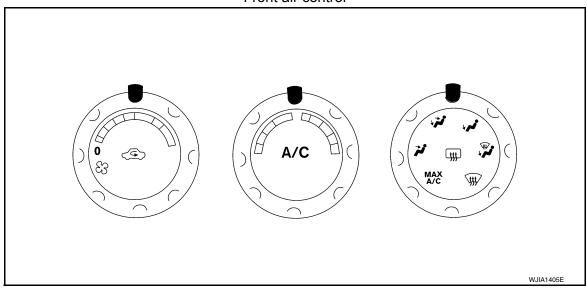


Control System Description

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CONTROL OPERATION

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

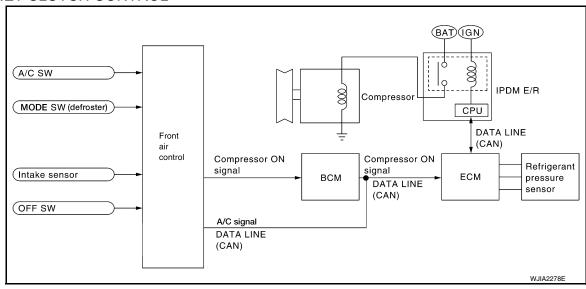
The compressor is ON or OFF.

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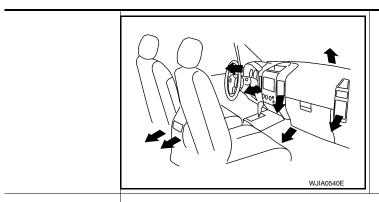
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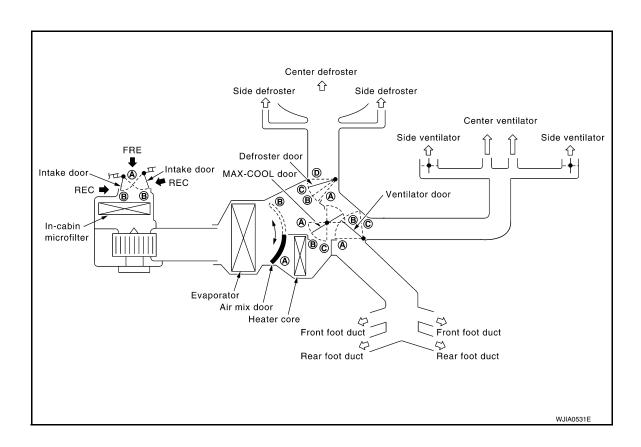
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Mode door position		Air outlet/distribution	
	Vent	Foot	Defroster
~;	95%	5%	_
Ÿ	60%	40%	_
·,i	_	70%	30%
	_	60%	40%
W	_	10%	90%

Switches And Their Control Function

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MANUAL AIR CONDITIONER SYSTEM

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 2)]

Docition		MOD	E SW		DEF	sw	REC	SW	Tempe	rature	switch	OFF
Position	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF	(-		\	sw
switch	→ •	_+ .	_ •	W •		DNT C	Ç	₹ >	(>(A/C	(0)	
		+,~	+,~	+/~	-} • €	0	÷ • =	0	COLD	~	нот	
Ventilator door	(A)	B	©	©	©		_	_		_		©
MAX-COOL door	(A)	B	B	B	©		_	_		_		B
Defroster door	(D)	(D)	O or ©	B	(A)		_	_				©
Intake door		_	_		B		(A)	B				B
Air mix door		_					_	_	(A)		₿	

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DIAGNOSIS SYSTEM (BCM)

CONSULT Function (BCM - COMMON ITEM)

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APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM.

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

SYSTEM APPLICATION

BCM can perform the following functions.

				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 Function (BCM - AIR CONDITIONER)

INFOID:0000000009882573

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	ALIIA0692ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

MODE DOOR MOTOR

System Description

INFOID:0000000009882575

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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

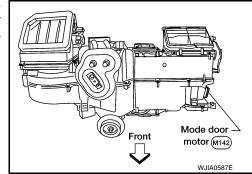
System Operation

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:0000000009882576

INSPECTION FLOW

1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - DISCHARGE AIR

- 1. Rotate the mode control dial and check each position and press the 🗰 (DEF) mode.
- 2. 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 <u>HAC-197</u>, "Mode Door Motor Diagnosis Procedure".

Mode Door Motor Diagnosis Procedure

INFOID:0000000009882577

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

SYMPTOM:

Air outlet does not change.

Revision: August 2013 HAC-197 2014 Titan NAM

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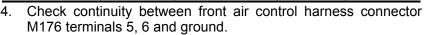
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· Mode door motor does not operate normally.

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.

A		В	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M176	5 M142		5	Yes
W170	6	101142	6	165

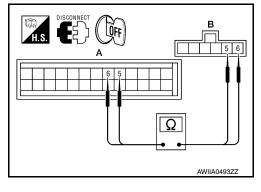


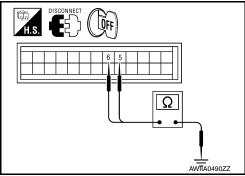
Connector	Terminal	_	Continuity	
M176	5	Ground	No	
IVI 176	6	Ground	INO	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

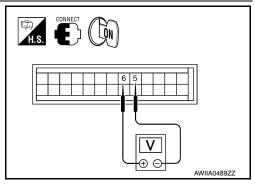




$2.\mathsf{CHECK}$ FRONT AIR CONTROL FOR MODE DOOR MOTOR POWER AND GROUND

- 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		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
WITTO	M176 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 VTL-8, "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	1	Yes
WITTO	15	IVITAL	3	163

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?

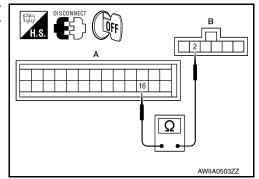
YES >> GO TO 5.

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



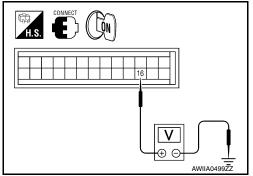
Check continuity between front air control harness connector M176 terminal 16 and ground.

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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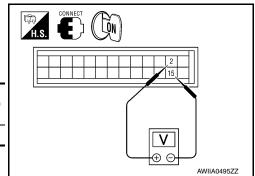
MODE DOOR MOTOR

< 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	(-)	voitage (Approx.)
M176	2	M176	15	5 Volts



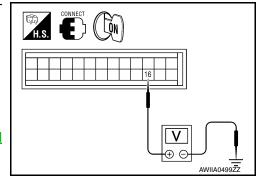
4. Check voltage between front air control harness connector M176 terminal 16 and ground.

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.

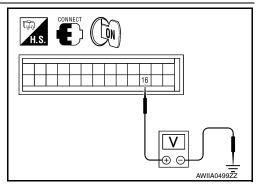
Connector	Terminal	_	Voltage (Approx.)
M176	16	Ground	0.2 to 4.8 Volts

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:0000000009882578

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SYSTEM DESCRIPTION

SYMPTOM:

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

SYSTEM DESCRIPTION

Component Parts

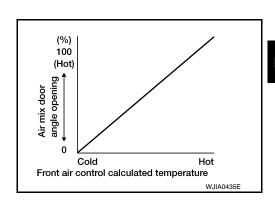
Air mix door control system components are:

- 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.

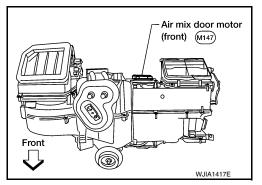
Air Mix Door Control Specification



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:0000000009882579

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.
- 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".

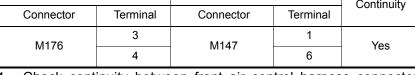
SYMPTOM:

- · 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.

А		В	Continuity	
Connector	Terminal	Connector Terminal		Continuity
M176	3	M147	1	Yes
W170	4	101147	6	165



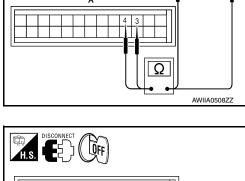
Check continuity between front air control harness connector M176 terminals 3, 4 and ground.

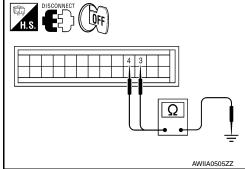
Connector	Terminal	_	Continuity	
M176	3	Ground	No	
IVI 1 7 6	4	Ground	No	

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

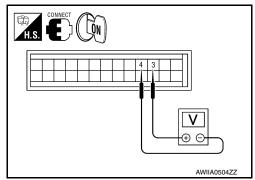
AIR MIX DOOR MOTOR

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

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



Is the inspection result normal?

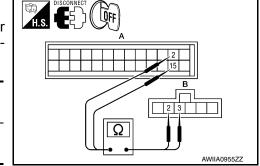
YES >> GO TO 4.

NO >> Replace front air control. Refer to VTL-8, "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
IVI 1 7 O	2	101147	3	165



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

Connector	Terminal	_	Continuity
M176	15	Ground	No
	2	Glound	140

Is the inspection result normal?

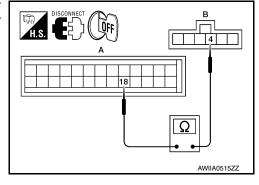
YES >> GO TO 5.

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 18 and air mix door motor harness connector M147 (B) terminal 4.

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



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< DTC/CIRCUIT DIAGNOSIS >

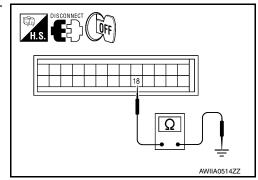
Check continuity between front air control harness connector M176 terminal 18 and ground.

Connector	Terminal	_	Continuity
M176	18	Ground	No

Is the inspection result normal?

YES >> GO TO 6.

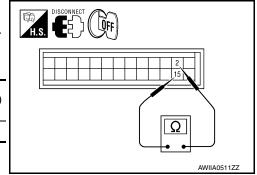
NO >> Repair or replace harness as necessary.



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	(-)	voltage (Approx.)
M176	2	M176	15	5 Volts



 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 Installation".

CONNECT CON 18 18 18 18 AWIIA0513ZZ

6. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

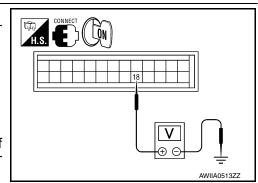
- Reconnect the air mix door motor harness connector M147.
- Check voltage between front air control harness connector M176 terminal 18 and ground.

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:0000000009882581

SYSTEM DESCRIPTION

SYMPTOM:

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

SYSTEM DESCRIPTION

Component Parts

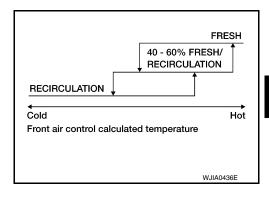
Intake door control system components are:

- 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.

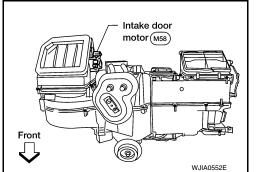
Intake Door Control Specification



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

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:0000000009882583

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

DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

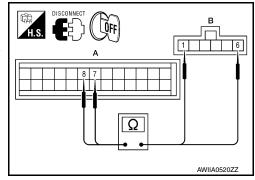
SYMPTOM:

- · 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 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.

A		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M176	8	M58	6	Yes
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 Check continuity between front air control harness connector M176 terminals 8, 7 and ground.

Connector	Terminal	_	Continuity
M176	8	Ground	No
	7	Ground	INO

Is the inspection result normal?

YES >> GO TO 3.

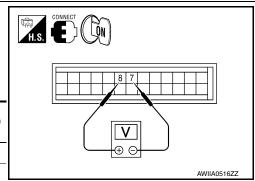
NO >> Repair or replace harness as necessary.

H.S. DISCONNECT OFF

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

- 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	(+)	(-)	Gondidon	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 VTL-18, "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

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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

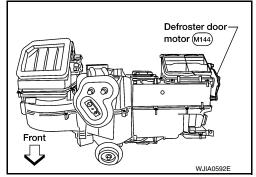
System Operation

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.



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Defroster Door Motor Component Function Check

INSPECTION FLOW

1.confirm symptom by performing operational check - defroster door

- Select vent (*) mode.
- Rotate mode control dial to defrost mode (). 2.
- Listen for defroster door position change (blower sound should change slightly).

Is the inspection result normal?

YES >> Inspection End.

>> Go to diagnosis procedure. Refer to HAC-207, "Defroster Door Motor Diagnosis Procedure". NO

Defroster Door Motor Diagnosis Procedure

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

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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HAC-207 Revision: August 2013 2014 Titan NAM

< DTC/CIRCUIT DIAGNOSIS >

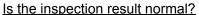
[MANUAL A/C (TYPE 2)]

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M176 (A) and the defroster door motor harness connector M144 (B).
- 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.

Α		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M176	19	M144	1	Yes
IVI I 7 O	20	IVI 144	6	168

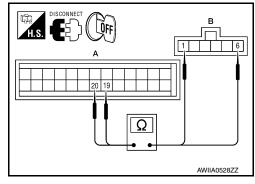
 Check continuity between front air control harness connector M176 terminals 19, 20 and ground.

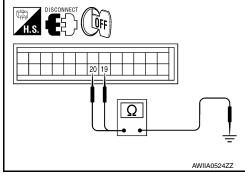
Connector	Terminal	_	Continuity
M176	19	Ground	No
	20	Glound	140



YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

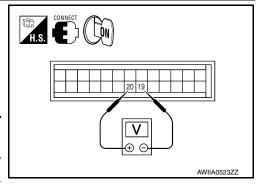




2.CHECK FRONT AIR CONTROL FOR DEFROSTER DOOR MOTOR POWER AND GROUND

- 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	Voltage (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.

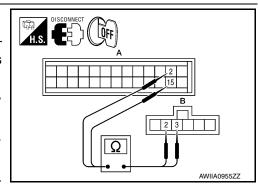
NO >> Replace front air control. Refer to VTL-8, "Removal and Installation".

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

- 1. 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.

А		В		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M176	2	M144	3	Yes	
WITO	15	IVIT 44	2	163	

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
	15	Giodila	

Is the inspection result normal?

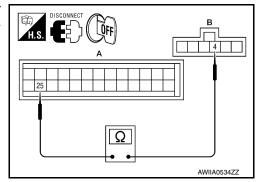
YES >> GO TO 5.

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.

A		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M176	25	M144	4	Yes



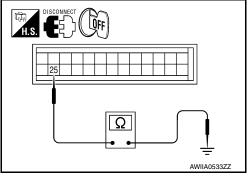
Check continuity between front air control harness connector M176 terminal 25 and ground.

Connector	Terminal	_	Continuity
M176	25	Ground	No

Is the inspection result normal?

YES >> GO TO 6.

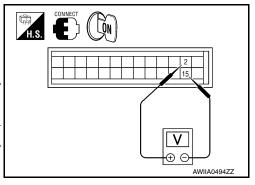
NO >> Repair or replace harness as necessary.



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

- 1. 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 CON 25 AWIIA0532ZZZ

6. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

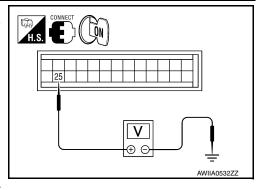
- 1. Reconnect the defroster door motor harness connector M144.
- 2. Check voltage between front air control harness connector M176 terminal 25 and ground.

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".



System Description

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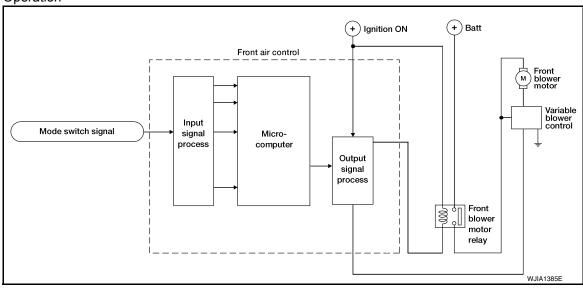
SYSTEM DESCRIPTION

Component Parts

Blower speed control system components are:

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

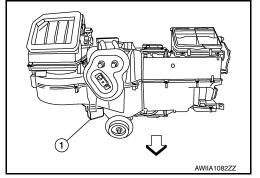
System Operation



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:0000000009882588

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 2013 2014 Titan NAM

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Front Blower Motor Diagnosis Procedure

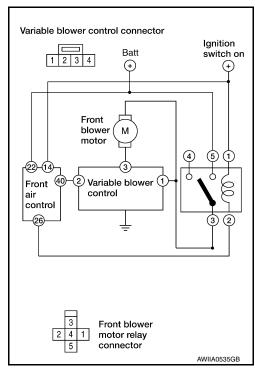
INFOID:0000000009882589

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-76, "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

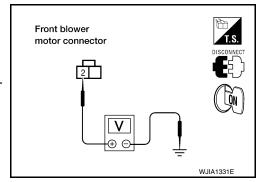
- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor connector.
- 3. Turn ignition switch ON.
- 4. Press the A/C switch.
- 5. Rotate blower control dial to maximum speed.
- Check voltage between front blower motor harness connector M62 terminal 2 and ground.

2 - Ground : Battery voltage

Is the inspection result normal?

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

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



< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

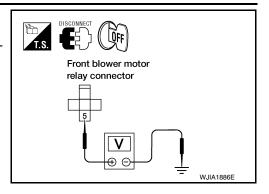
- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor relay.
- Check voltage between front blower motor relay harness connector M107 terminal 5 and ground.

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

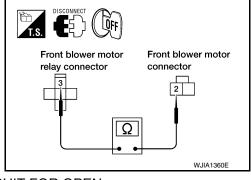
Check continuity between front blower motor relay harness connector M107 terminal 3 and front blower motor harness connector M62 terminal 2.

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.

<u>Is the inspection result normal?</u>

YES >> GO TO 7.

NO >> Repair harness or connector.

7. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

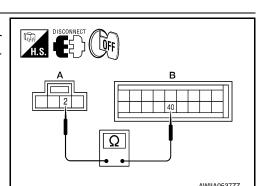
- 1. Disconnect front air control connector.
- Check continuity between front air control harness connector M177 (B) terminal 40 and variable blower control harness connector M121 (A) terminal 2.



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)]

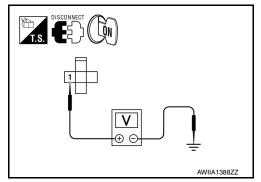
- 1. Turn ignition switch ON.
- 2. Check voltage between front blower motor relay harness connector M107 terminal 1 and ground.

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

- 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 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.

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AWIIA0539ZZ

12. CHECK FRONT BLOWER MOTOR

Check front blower motor. Refer to <u>HAC-211</u>, "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 2)]

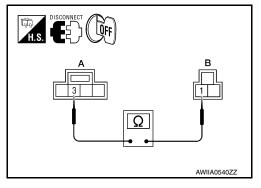
Check continuity between front blower motor harness connector M62 (B) terminal 1 and variable blower control harness connector M121 (A) terminal 3.

1 - 3 : Continuity should exist.

Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair harness or connector.



14. CHECK VARIABLE BLOWER CONTROL GROUND CIRCUIT

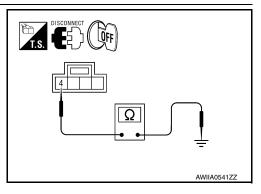
Check continuity between variable blower control harness connector M121 terminal 4 and ground.

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.

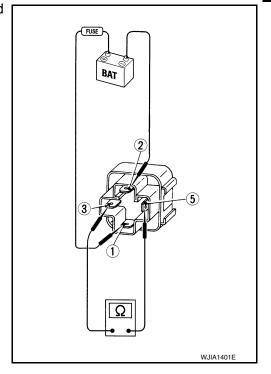


INFOID:0000000009882590

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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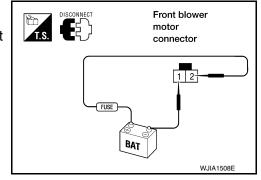
Revision: August 2013 HAC-215 2014 Titan NAM

< 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		
2 Professional Parketteesie	A/C (TYPE 2)]	
MAGNET CLUTCH		Δ
System Description	INFOID:0000000009882591	
SYSTEM DESCRIPTION The front air control controls compressor operation based on ambient and intake temperatur from ECM.	re and a signal	В
Low Temperature Protection Control The front air control will turn the compressor ON or OFF as determined by a signal detected by sor.		
When intake air temperature is higher than the preset value, the compressor turns ON. The compressor turns ON. The compressor turns ON. The compressor turns ON.	mpressor turns	
Magnet Clutch Component Function Check	INFOID:0000000009882592	Е
INSPECTION FLOW		
1.CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - MAGNET CLUTCH		F
 Turn ignition switch ON. Turn the blower control dial to low speed and press the A/C switch. Rotate mode control dial to vent mode (*). Confirm that the compressor clutch engages (sound or visual inspection). (Discharge speed will depend on ambient, in-vehicle and set temperatures.) 	air and blower	G
Is the inspection result normal?		-
YES >> Inspection End. NO >> Go to diagnosis procedure. Refer to HAC-217, "Magnet Clutch Diagnosis Procedure."	<u>re"</u> .	4
Magnet Clutch Diagnosis Procedure	INFOID:0000000009882593	HA

Regarding Wiring Diagram information, refer to $\underline{\mathsf{HAC-232}}$, "Wiring Diagram - Manual With 3 Control Dial System".

DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

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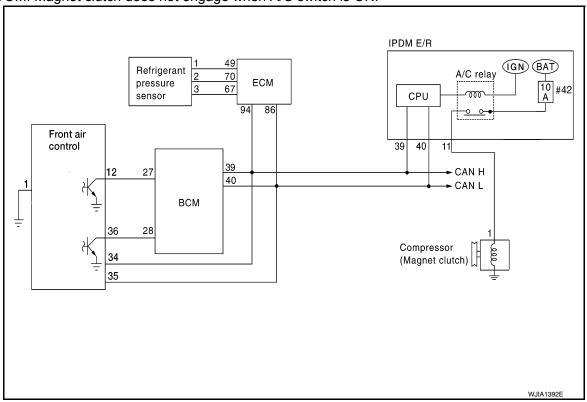
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SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



1. CHECK INTAKE 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 HAC-224, "Intake Sensor Diagnosis Procedure".

2. PERFORM AUTO ACTIVE TEST

Refer to PCS-11, "Diagnosis Description".

Does magnet clutch operate?

YES >> • ®WITH CONSULT GO TO 5.

• WITHOUT CONSULT GO TO 6.

NO >> Check 10A fuse (No. 42, located in IPDM E/R), and GO TO 3.

$3. \mathsf{CHECK}$ CIRCUIT CONTINUITY BETWEEN IPDM E/R AND COMPRESSOR

- 1. Turn ignition switch OFF.
- 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.

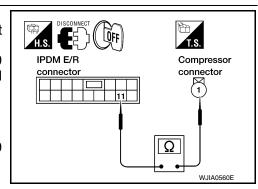
4. Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

11 – ground : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.



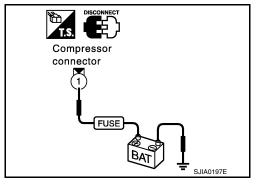
4. CHECK MAGNET CLUTCH CIRCUIT

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, "Removal and</u> Installation".



H.S. PSCONNECT OFF

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5. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to <u>BCS-21</u>, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)".

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

Is the inspection result normal?

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

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 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?

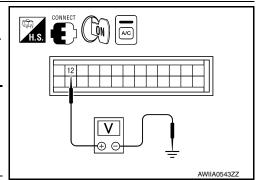
YES >> GO TO 7.

NO >> Repair harness or connector.

.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	12	Ground	A/C switch: ON	Approx. 0V	
101170	12	Ground	A/C switch: OFF	Approx. 5V	



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Is the inspection result normal?

YES >> GO TO 8.

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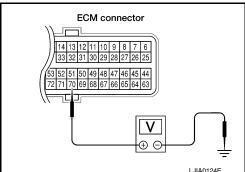
< DTC/CIRCUIT DIAGNOSIS >

- NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control. Refer to <u>VTL-8</u>. "Removal and Installation".
- NO-2 >> If the voltage is approx. 0V when A/C switch is OFF, replace BCM. Refer to BCS-52, "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 EC-481, "Diagnosis Procedure".

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to BCS-21, "AIR CONDITIONER: CONSULT 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 M177 (B) terminal 36.

28 - 36 Continuity should exist.

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

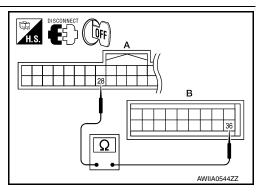
28 - ground Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

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



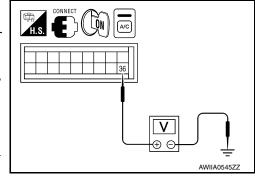
MAGNET CLUTCH

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

- 1. Reconnect BCM connector and front air control connector.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M177 terminal 36 and ground.

	Terminals				
(-	+)		Condition	Voltage	
front air con- trol connector	Terminal No.	(-)			
M177	M177 36 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-52</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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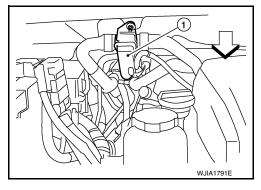
WATER VALVE CIRCUIT

Description INFOID:000000009882594

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:0000000009882595

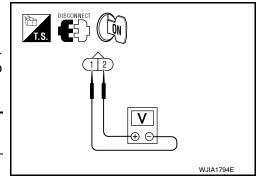
Regarding Wiring Diagram information, refer to <u>HAC-232</u>, "Wiring <u>Diagram - Manual With 3 Control Dial System"</u>.

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.
- 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.

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".

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WATER VALVE CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

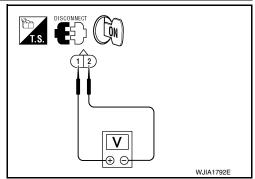
[MANUAL A/C (TYPE 2)]

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

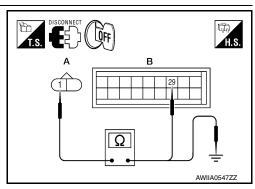
 (A) terminal 1 and ground.

1 - Ground : Continuity should not exist.

Is the inspection result normal?

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

NO >> Repair harness or connector.



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INTAKE SENSOR

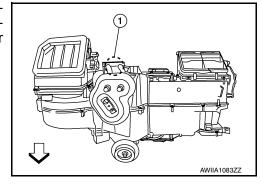
System Description

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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.



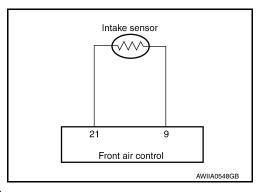
Intake Sensor Diagnosis Procedure

INFOID:0000000009882597

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

DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted.



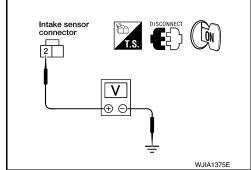
1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

- 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?

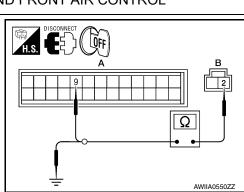
YES >> Replace front air control. Refer to VTL-8, "Removal and Installation".

NO >> Repair harness or connector.

Intake Sensor Component Inspection

COMPONENT INSPECTION

Intake Sensor



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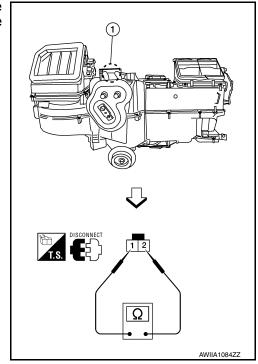
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< DTC/CIRCUIT DIAGNOSIS >

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 <u>VTL-11</u>, "Removal and Installation".

POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

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POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

Component Description

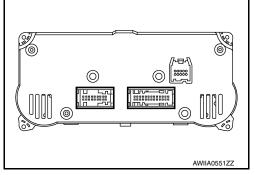
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COMPONENT DESCRIPTION

Front Air Control

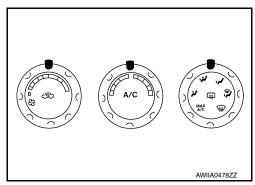
The front air control has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, defroster door motor, blower motor and A/C compressor are then controlled.

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.
- 2. Press the A/C switch.
- 3. 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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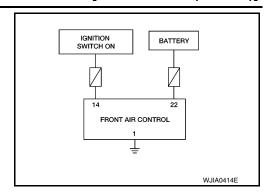
Revision: August 2013 HAC-227 2014 Titan NAM

POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

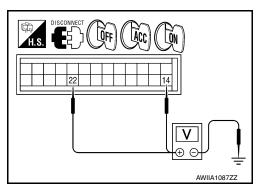
SYMPTOM: A/C system does not come on.



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	Ground	Approx. 0V	Approx. 0V	Battery voltage	
	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-76, "Terminal Arrangement".
 - If fuses are OK, check harness for open circuit. Repair or replace as necessary.
 - If fuses are NG, replace fuse and check harness for short circuit. Repair or replace as necessary.

2. CHECK GROUND CIRCUIT FOR FRONT AIR CONTROL

- 1. Turn ignition switch OFF.
- 2. Check continuity between front air control harness connector M176 terminal 1 and ground.

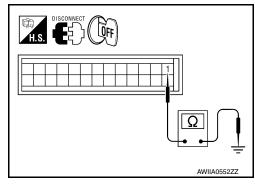
1 - Ground

: Continuity should exist.

Is the inspection result normal?

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

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	ALIIA0692ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

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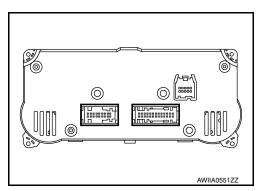
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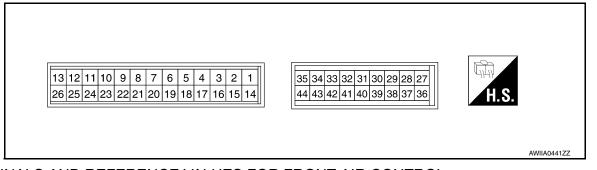
AIR CONDITIONER CONTROL

Front Air Control Terminals Reference Values

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/FC	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 0 200 ms
25	LG/B	Defroster door motor feedback	ON	-	0 - 5V
26	26 R/B	Front blower request	ON	Front blower motor OFF	Battery voltage
20	K/D		Tront blower request	Tront blower request	Front blower motor ON
29	Y/L	Water valve	ON	Water valve open	Battery voltage
29	1/L	vvater varve	ON	Water valve closed	0V
30	W/G	Water valve	ON	Water valve open	0V
30	W/G	vvater varve	ON	Water valve closed	Battery voltage
34	L	CAN-H	ON	-	0 - 5V
35	Р	CAN-L	ON	-	0 - 5V
36	L/R	Fan ON signal	ON	Blower switch OFF	5V
30	L/R	L/R Fan ON signal	ON	Blower switch ON	0V
40	G/R	Variable blower control	ON	-	0 - 5V

^{*1:} If equipped

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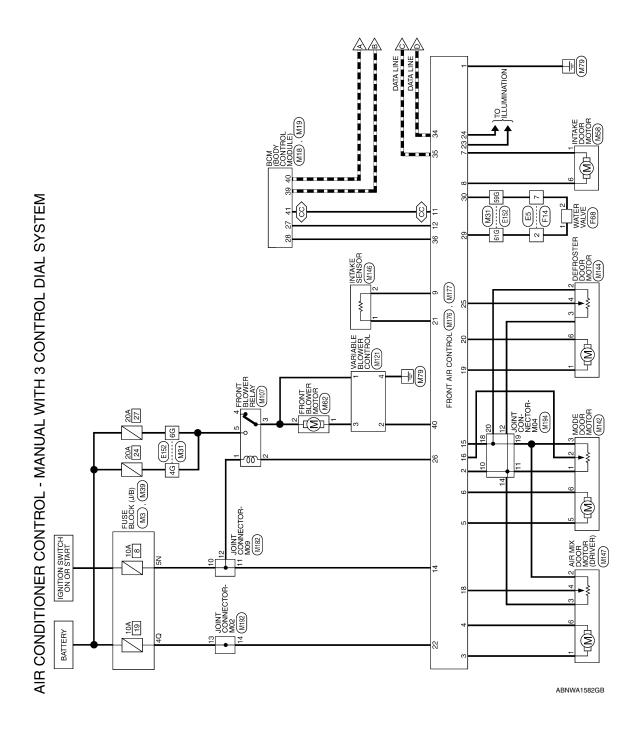
WIRING DIAGRAM

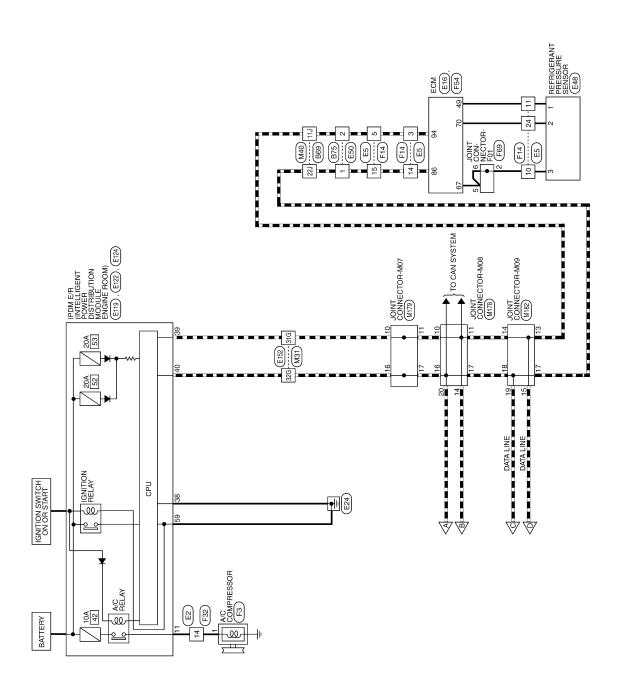
AIR CONDITIONER CONTROL

Wiring Diagram - Manual With 3 Control Dial System

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Vo.	Connector Color WHILE	Terminal No. Wire Signal Name 41 Y/B REAR DEFOGGER SW	Connector No. M39 Connector Name FUSE BLOCK (J/B) Connector Color WHITE		Terminal No. Wire Signal Name 4Q Y/R –		
CTORS - MANUAL WITH 3 CONTROL D Connector No. M18 Connector Name BCM (BODY CONTROL MODULE)	H.S. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 10 10 11 20 13 13 14 15 16 17 18 19 20 10 10 10 10 10 10 10 10 10 10 10 10 10	minal No. Color of Wire Signal Name 27 W/R AIRCON SW 28 L/R BLOWER FAN SW 39 L CAN-H 40 P CAN-L	S S	6G P	61G Y/L –		
AIR CONDITIONER CONTROL CONNECTORS - MANUAL WITH 3 CONTROL DIAL SYSTEM Connector No. M3 Connector Name ECM (BODY CONTROL Connector Name Connector Name	A.S. BN 7N BN SN 4N	Terminal No. Wire Signal Name 5N Y/G –	Connector No. M31 Connector Name WIRE TO WIRE Connector Color WHITE	16 26 36 46 56 66 76 86 90 105	11G 12G 13G 4G 5G 16G 77G 8G 19G 27G 27G 27G 27G 27G 27G 27G 27G 27G 27	S11 G200 G30 G40 G50 G30 G30 G30 G40 G41	900015086 9 98 9 98 9 98 9 98 9 98 9 98 9 98 9

1 10 10 10 10 10 10 10	Connector Name INTAKE DOOR MOTOR Connector Color BLACK Lie 3 4 5 6 Terminal No. Wire Signal Name 1	Connector No. M121 VARIABLE BLOWER CONTROL (3 CONTROL DIAL SYSTEM WITHOUT	Jog Jog	al No. Wire Signa W/L	2 G/R – – 3 L/W – 4 B/W – –		
Terminal No. White To WHRE T					J-L]
Terminal No. White To WHRE T	Signal Name	V VT BLOWER RELA		Signal Name	- (3 CONTROL DI SYSTEM WITHOU AUTO A/C)	1 1	
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	Name WIRI Name WIRI Name WIRI Name WIRI Name Name	No. M62 Color BLA		o. Wire	M/L		
ABNIA3953GB	Connector	Connector	原 H.S.	Terminal N	2		
			·		ABNI	A3953GB	

Connector No.). M146	6
Connector Na	ıme INT/	Connector Name INTAKE SENSOR
Connector Color GRAY	lor GR/	<u> </u>
H.S.	년	
Terminal No.	Color of Wire	Signal Name
-	N/R	ı
c	Q/	

Signal Name	AC REQUEST	ı	V IGN	V REF RETURN	PANEL/FLOOR FEEDBACK	ı	DRIVER BLEND FEEDBACK	DEFROST CW	DEFROST CCW	SENSOR RETURN	V BAT	+ MNTI	ILLUM -	DEFROST FEEDBACK	FRONT BLOWER REQUEST
Color of Wire	M/R	1	Y/G	Ф	GR	1	SB	LG	P/B	N/R	Y/R	B/L	BR	LG/B	B/B
Terminal No.	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

M144	Connector Name DEFROSTER DOOR MOTOR	BLACK	
Connector No.	Connector Name	Connector Color BLACK	

2 6	Signal Name	I	I	I	1	I	I	
3 4	Color of Wire	ГG	Ь	\	LG/B	1	P/B	
H.S.	Terminal No.	ļ	2	ဇ	4	9	9	

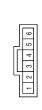
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LG/B	1	B/B		177
4	5	9		

M176	Connector Name (WITH MANUAL 3 CONTR-DIAL SYSTEM)	BLACK	
Connector No.	Connector Name	Connector Color BLACK	



Terminal No.	Color of Wire	Signal Name
-	В	GND
2	>	V REF ACTUATOR 5
က	M/G	DRIVER BLEND CW
4	Б	DRIVER BLEND WCW
5	BR/W	PANEL/FLOOR CW
9	P/L	PANEL/FLOOR CCW
7	0	RECIRC 1 CW
8	G/B	RECIRC 1 CCW
6	L/B	EVAP TEMP SENS
10	ı	I
-	V/R	HB BEOLIECT

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





Signal Name	ı	ı	ı	-	_	ı	
Color of Wire	>	GR	۵	-	BR/W	P/L	
Terminal No. Wire	-	2	က	4	2	9	

M147	Connector Name AIR MIX DOOR MOTOR (DRIVER)	BLACK	3 4 5 6
Connector No.	Connector Name	Connector Color BLACK	H.S.





Signal Name	I	1	ı	_	ı	ı
	W/G	Ь	>	SB	_	5
Terminal No.	-	2	က	4	5	9

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Signal Name	ı	ı	1	1
Color of Wire	ı	1	_	_
Terminal No.	41	42	43	44

Terminal No.	Color of Wire	Signal Name
30	W/G	WATER VALVE CLOSE -
31	1	ı
32	ı	ı
33	-	ı
34	٦	CAN-H
35	Ь	CAN-L
36	L/R	FAN ON
37	ı	-
38	-	_
39	1	_
40	G/R	VBC OUTPUT

Connector No.	Σ	M177	7					
Connector Name (WITH MANUAL 3 CONTROL DIAL SYSTEM)		동투록	FES	₽₹õ	FRONT AIR CC (WITH MANUAI DIAL SYSTEM)	N A C	E S	OL ONTROL
Connector Color GREEN	g	RE	EN					
								-
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Signal N	I	1	WATER \ OPE	
Color of Wire	1	1	Y/L	
erminal No.	27	28	29	

	I						_							
M182	JOINT CONNECTOR-M09	GREEN		7 6 5 4 3 2 1 17 16 15 14 13 12 11 10	Signal Name	1	1	1	1	ı	1	1	I	1
			l I ⊦	20 19 18	Color of Wire	Y/G	Y/G	Y/G	_	_	_	۵	۵	۵
Connector No.	Connector Name	Connector Color		H.S.	Terminal No.	10	11	12	13	14	15	17	18	19

Connector No. M179	Connector Name JOINT CONNECTOR-M07	Connector Color WHITE		987654321	.S.	
Connec	Connec	Connec	The state of the s		S. V.	



Signal Na	ı	_	I	1	
Color of Wire	T	7	Д	Ь	
Terminal No.	10	11	16	17	

Connector No.	No.	M178	17	8								
Connector Name JOINT CONNECTOR-M08	Name	\preceq	5	╘	$\ddot{\circ}$	Z	岁	ပ္ပ	2	œ.	M08	
Connector Color WHITE	Color	∣≥	王	l L	l							
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1		Ш	Ш	Ш	Ш	Ш	Ш	Ш	Ш	Ш	I	
	_	İ	Ì	Ī	ſ	ſ	ſ	ſ	ſ			
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A.S.	20	20 19 18 17 16 15 14 13 12 11 10	18	17	16	15	14	13	12	11	10	
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Signal Name	1	ı	ı	I	1	1
Color of Wire	_	_	_	Ь	۵	Д
Terminal No. Wire	10	11	14	16	17	20

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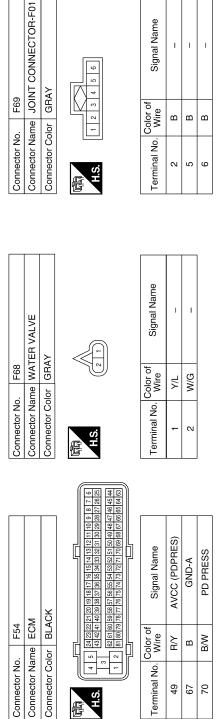
Connector No. E2 Connector Name WIRE TO WIRE Connector Color WHITE 2	Terminal No. Wire Signal Name	Connector No. E48 Connector Name REFRIGERANT PRESSURE SENSOR Connector Color BLACK	Terminal No. Wire Signal Name		
Connector No. M194 Connector Name JOINT CONNECTOR-M04 Connector Color BLUE	Color of Wire Signal Name 10 Υ - 11 Υ - 12 Υ - 14 Υ - 18 P - 19 P - 20 P -	Connector No. E16 Connector Name ECM Connector Color BLACK (106 107 108 109 110 1111 112 113 119 120 121 118 198 99 100 110 120 121 118 118 119 120 121 118 120 121 118 120 121 118 120 121 118 120 121 118 120 121 118 120 121 118 120 121 118 120 121 118 120 121 121 120 121 121 120 121 121 121	Terminal No. Wire Signal Name 86 P CAN-L	. –	
20 19 18 17 16 15 14 13 12 11 10	Color of Signal Name Wire Signal Name Y/R	O WIRE	S/W	B	P - P
Connector No. Connector Name Connector Color	Terminal No.	Connector No. E5 Connector Name WIRE T Connector Color WHITE	2 2	11	15 24

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	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)		[7	39 38 37 45 44 43	Signal Name	GND (SIGNAL)	CAN-H	CAN-L	Signal Name	1	1	1	1	ı	1											
E122		or WHITE		42 41 40 39 48 47 46 45	Color of Wire	В	_	<u>a</u>	Color of Wire	<u>a</u>	GR	_	<u>a</u>	M/G	\/L											
Connector No.	Connector Name	Connector Color	Œ	H.S.	Terminal No.	38	39	40	Terminal No.	4G	99	31G	326	59G	61G											
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	LIGENT SUTION E ROOM)		ſi	9	Signal Name	A/C COMPRESSOR							Ē	5 99	1	14G 13G 12G 11G	246236226	34G33G32G31G 44G43G42G	54G53G52G51G	64G63G62G	74G 73G 72G 71G 84G 83G 82G]	916	30c		
19	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)	WHITE		9 8 7 6 6 3 18 12 11 10 10 11 10 10 11 10 10 11 10 11 10 11 10 11 11		A/C COMI			52	WIRE IO WIRE			56 46 36 26	96 86 76		21G20G19G18G17G16G15G14G13G12G11G	296 286 276 266 256	41G40G39G38G37G36G35G34G33G33G31G 50G49G48G47G46G45G44G43G42G	61 G 60 G 59 G 58 G 57 G 56 G 55 G 54 G 53 G 52 G 51 G	70G 69G 68G 67G 66G 65G 64G 63G 62G	81G80G79G78G77G76G75G74G73G72G71G 90G89G88G87G86G85G84G83G82G		95G 94G 93G 92G 91G			
.No. E119				9 8 7	No. Wire	A//B			-	_						21G20G1	3008	41G40G3	61G60G	7096	81G80G7]				F
Connector No.	Connector Name	Connector Color	Œ	H.S.	Terminal No.	Ξ			Connector No.	Connector Name		€														
								1								Г										
	ш				Signal Name	1	1		<u> </u>	POWER DISTRIBUTION	SINE ROOM)						Signal Name	GND (POWER)								
0	WIRE TO WIRE BROWN		2 1					-	E124	UM E/H (IN)WER DIST	DDULE ENC	BLACK		59 58 57	62 61 60	-		GND								
. No. E50	Name WI Color BR				No. Wire	۵	_				-		Ľ				No. Wire	В								
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Connector No.). F32	
Connector Name WIRE TO WIRE	ame WIF	RE TO WIRE
Connector Color WHITE	olor WH	里
H.S.	7 6 15	7 6 5 4
Terminal No. Wire	Color of Wire	Signal Name
14	Y/B	ı

Connector N	Connector N	Connector C	管	H.S.	Terminal No	14									
	E TO WIRE	型	7 6 5 4 3 2 1	00 19 18 17 16 15 14 13 12	Signal Name	1	1	i	ī	1	ı	ı	ì	-	
F14	ne WIRI	or WHI	8	24 23 22 21 20	Solor of Wire	Y/L	7	_	M/G	В	R/Y	Д	Д	B/W	
Connector No.	Connector Name WIRE TO WIRE	Connector Color WHITE	11 10	H.S.	Terminal No. Wire	2	3	2	7	10	11	14	15	24	
	Connector Name A/C COMPRESSOR	χ		<u>-</u>	Signal Name	ı									
F3	le A/C (ır BLA(<u> </u>	color of Wire	Y/B									
Connector No.	Connector Nam	Connector Color BLACK	E	H.S.	Terminal No. Wire	-									



AIR CONDITIONER CONTROL

< WIRING DIAGRAM >

[MANUAL A/C (TYPE 2)]

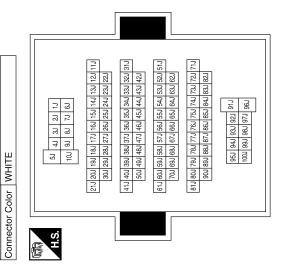
	WIRE TO WIRE	NN		Signal Name	1	1
B75		or BROWN		Color of Wire	۵	Г
Connector No.	Connector Name	Connector Color	崎 H.S.	Terminal No. Wire	-	2

Signal Name	1	_	
Color of Wire	_	Ь	
Terminal No.	110	22J	

Connector Name WIRE TO WIRE

B69

Connector No.



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[MANUAL A/C (TYPE 2)]

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	ALIIA0692ZZ
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 Houble Diagnosis Procedure for Mode Door Motor.	<u>HAC-197</u>	
Discharge air temperature does not change.	Co to Trouble Diagnosis Precedure for Air Mix Door Meter	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 Presedure for Intake Deer Meter	HAC-205	
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	11AC-205	
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 HAC-182, "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-14, "Checking Drive Belts".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Adjust or replace compressor belt. Refer to EM-14, "Removal and Installation".

5.CHECK AIR MIX DOOR OPERATION

Check and verify air mix door mechanism for smooth operation. Refer to <u>HAC-201, "Air Mix Door Motor Component Function Check"</u>.

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-378, "Overall Function Check".

Does cooling fan motor operate correctly?

YES >> GO TO 7.

NO >> Check cooling fan motor. Refer to EC-379, "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 [MANUAL A/C (TYPE 2)] < SYMPTOM DIAGNOSIS > 9. CHECK REFRIGERANT PURITY Connect recovery/recycling equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling and refrigerant identifier. Is the inspection result normal? В YES >> GO TO 10. NO >> Check contaminated refrigerant. Refer to HAC-255, "Working with HFC-134a (R-134a)". 10.CHECK FOR EVAPORATOR FREEZE UP Start engine and run A/C. Check for evaporator freeze up. Does evaporator freeze up? D >> Perform performance test diagnoses. Refer to HAC-245, "Diagnostic Work Flow". NO >> GO TO 11. 11. CHECK REFRIGERANT PRESSURE Е Check refrigerant pressure with manifold gauge connected. Refer to HAC-247, "Performance Chart". Is the inspection result normal? F >> Perform performance test diagnoses. Refer to HAC-245, "Diagnostic Work Flow". YES NO >> GO TO 12. 12. CHECK AIR DUCTS Check ducts for air leaks.

Is the inspection result normal?
YES >> System OK.

NO >> Repair air leaks.

Diagnostic Work Flow

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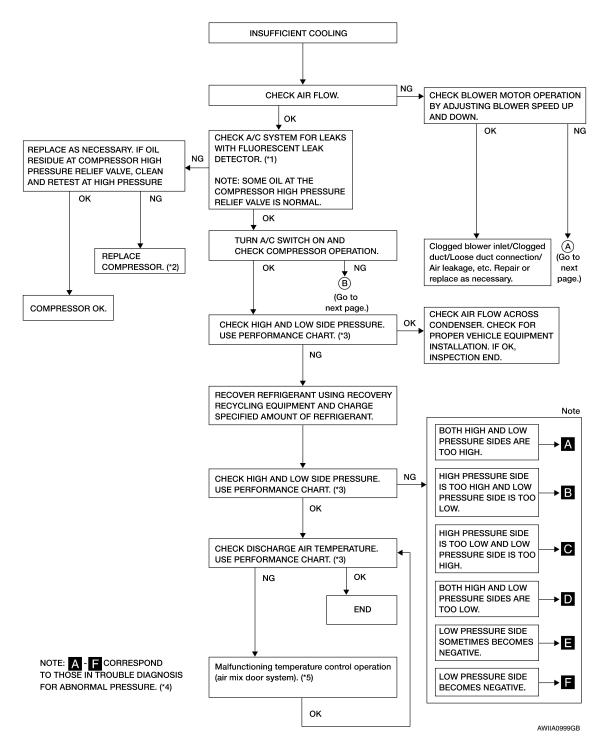
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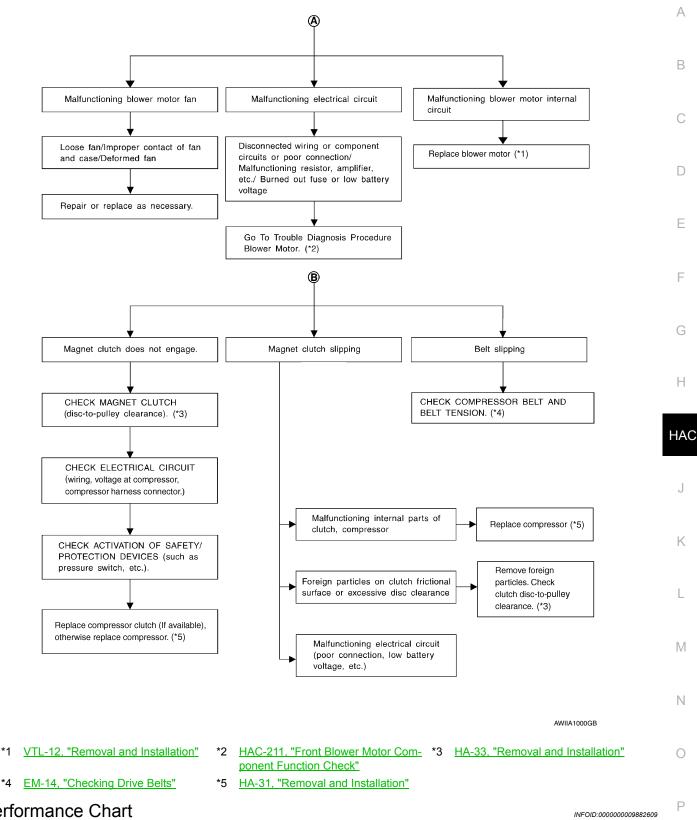
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- 1 HA-24, "Checking System for Leaks Using the Fluorescent Dye Leak Detector"
- *4 HAC-248, "Trouble Diagnoses for Abnormal Pressure"
- *1 HA-24, "Checking System for Leaks *2 HA-33, "Removal and Installation"
 - *5 HAC-201, "Air Mix Door Motor Component Function Check"
- Removal and Installation" *3 HAC-247, "Performance Chart"



Performance Chart

TEST CONDITION

Testing must be performed as follows:

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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 control dial	(Ventilation) set
Recirculation (REC) switch	(Recirculation) set
\$ Blower speed	Max. speed set
Engine speed	Idle speed

TEST READING

Recirculation-to-discharge Air Temperature Table

Inside air (Recirculating a	ir) at blower assembly inlet	Discharge air temperature at center ventilator		
Relative humidity %	Air temperature °C (°F)	°C (°F)		
	20 (68)	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) kPa (kg/cm², psi)	
Relative humidity %	Air temperature °C (°F)	kPa (kg/cm ² , 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 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
	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.
₩ ₩ АСЗ59А	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cooling system.
	 An area of the low-pressure pipe is colder than areas near the evaporator outlet. Plates are sometimes covered with frost. 	 Excessive liquid refrigerant on low-pressure side Excessive refrigerant discharge flow Expansion valve is open a little compared with the specification. Improper expansion valve adjustment 	Replace expansion valve.

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

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
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.	 Check and repair or replace malfunctioning parts. Check oil for contamination.

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.
LO (HI) AC356A	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
	 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 highpressure 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-24, "Checking of Refrigerant Leaks" or HA-26, "Checking of Refrigerant Leaks".
(O) (H) 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.	 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.	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-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

[MANUAL A/C (TYPE 2)]

Gauge indication	Refrigerant cycle	Probable cause	Corrective action	
Low-pressure side sometimes becomes negative.	 Air conditioning system does not function and does not cyclically cool the compartment air. The system constantly functions for a certain period of time after compressor is stopped and restarted. 	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.	(
₩ ₩ AC354A				

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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INSUFFICIENT HEATING

Component Function Check

SYMPTOM: Insufficient heating

INSPECTION FLOW

1.confirm symptom by performing operational check - temperature increase

- 1. Turn the blower control dial to low speed.
- 2. 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 HAC-182, "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 HAC-201, "Air Mix Door Motor Component Function Check".

5. CHECK AIR DUCTS

Check for disconnected or leaking air ducts.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair all disconnected or leaking air ducts.

$oldsymbol{6}$.CHECK HEATER HOSE TEMPERATURES

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

Is the inspection result normal?

YES >> Hot inlet hose and a warm outlet hose: GO TO 7.

NO >> • 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-191, "Component Inspection".

Is the inspection result normal?

YES >> System OK.

NO >> Repair or replace as necessary. Retest.

8. CHECK HEATER HOSES

INSUFFICIENT HEATING

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[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 HAC K L M

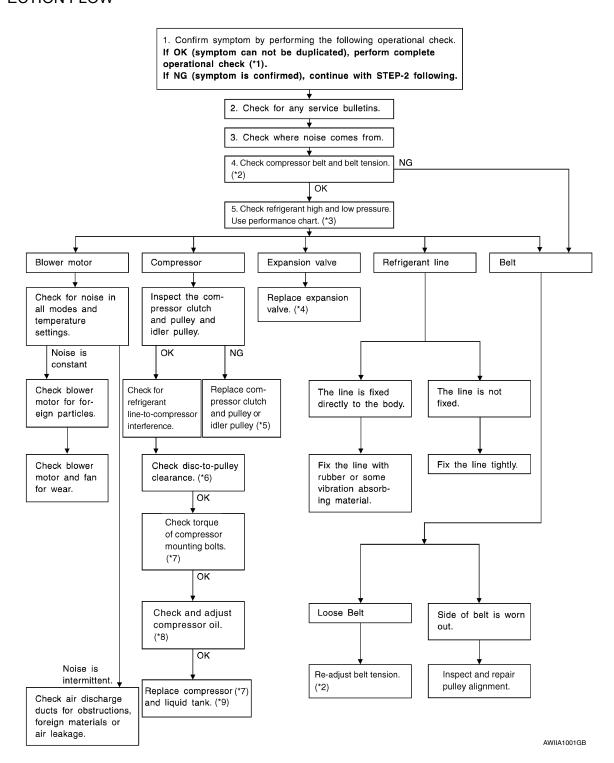
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NOISE

Component Function Check

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SYMPTOM: Noise INSPECTION FLOW



- HAC-182, "Operational Check"
- *2 EM-14, "Checking Drive Belts"
- *3 HAC-247, "Performance Chart"

- HA-43, "Removal and Installation"
- *5 HA-33, "Removal and Installation"
- *6 HA-33, "Removal and Installation"

- HA-31, "Removal and Installation"
- in Compressor"
- *8 HA-22, "Maintenance of Oil Quantity *9 HA-41, "Removal and Installation"

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:

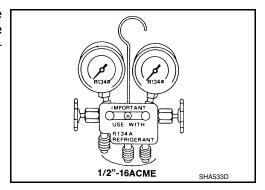
- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location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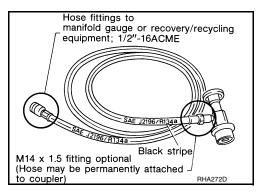
MANIFOLD GAUGE SET

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	

