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# **HEATER & AIR CONDITIONING CONTROL SYSTEM**

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# **DIAGNOSIS AND REPAIR WORKFLOW**

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[AUTOMATIC AIR CONDITIONER]

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How to Perform Trouble Diagnosis For Quick And Ad	ccurate Repair INFOID:000000011560754
WORK FLOW	
1.LISTEN TO CUSTOMER COMPLAINT	
Listen to customer complaint. Get detailed information about the cotom occurs.	and environment when the symp-
>> GO TO 2.	
2.CHECK FOR SERVICE BULLETINS	1
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, "Operational check."	tional 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 N	Matrix Chart".
Can a symptom be duplicated?	Hattix Chart.
>> GO TO 5.	
5. PERFORM THE FRONT AIR CONTROL SELF-DIAGNOSIS	
Perform front air control self-diagnosis. Refer to <u>HAC-21</u> , <u>"Front Air</u>	Control Self-Diagnosis".
>> If any diagnostic trouble codes set. Refer to HAC-21	, "Front Air Control Self-Diagnosis Code
<ul><li>Chart".</li><li>Confirm the repair by performing operational check. Re</li></ul>	
	,

# **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

[AUTOMATIC AIR CONDITIONER]

INFOID:0000000011560755

# INSPECTION AND ADJUSTMENT

# Operational Check

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

# Conditions : Engine running and at normal operating temperature

# CHECKING MEMORY FUNCTION

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

If NG, go to trouble diagnosis procedure for 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 HAC-23, "Mode Door Motor Diagnosis Procedure".

If OK, continue the check.

### NOTE:

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

# CHECKING RECIRCULATION (♥, ♥ ONLY)

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

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

If OK, continue the check.

### NOTE:

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

# CHECKING TEMPERATURE DECREASE

- 1. Rotate temperature control dial (drive or passenger) counterclockwise until 18°C (60°F) is displayed.
- Check for cold air at appropriate discharge air outlets.

If NG, listen for sound of air mix door motor operation. If OK, go to trouble diagnosis procedure for <u>HAC-83</u>, <u>"Component Function Check"</u>. If air mix door motor appears to be malfunctioning, go to <u>HAC-28</u>, <u>"Air Mix Door Motor (Driver) Component Function Check"</u>.

# **INSPECTION AND ADJUSTMENT**

### < BASIC INSPECTION >

[AUTOMATIC AIR CONDITIONER]

If OK, continue the check.

# CHECKING TEMPERATURE INCREASE

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

If NG, listen for sound of air mix door motor operation. If OK, go to trouble diagnosis procedure for <u>HAC-91</u>, <u>"Component Function Check"</u>. If air mix door motor appears to be malfunctioning, go to <u>HAC-28</u>, "Air Mix Door <u>Motor (Driver) Component Function Check"</u>.

If OK, continue with next check.

### CHECK A/C SWITCH

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

### NOTE:

If current mode setting is DEF or D/F, compressor clutch will already be engaged and cannot be turned off. If NG, go to trouble diagnosis procedure for <u>HAC-49</u>, "<u>Magnet Clutch Diagnosis Procedure</u>". If OK, continue with next check.

### CHECKING AUTO MODE

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

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

If all operational checks are OK (symptom cannot be duplicated), go to malfunction Simulation Tests in <a href="HAC-5">HAC-5</a>, "How to Perform Trouble Diagnosis For Quick And Accurate Repair" and perform tests as outlined to simulate driving conditions environment. If symptom appears. Refer to <a href="HAC-82">HAC-82</a>, "Symptom Matrix Chart", and perform applicable trouble diagnosis procedures.

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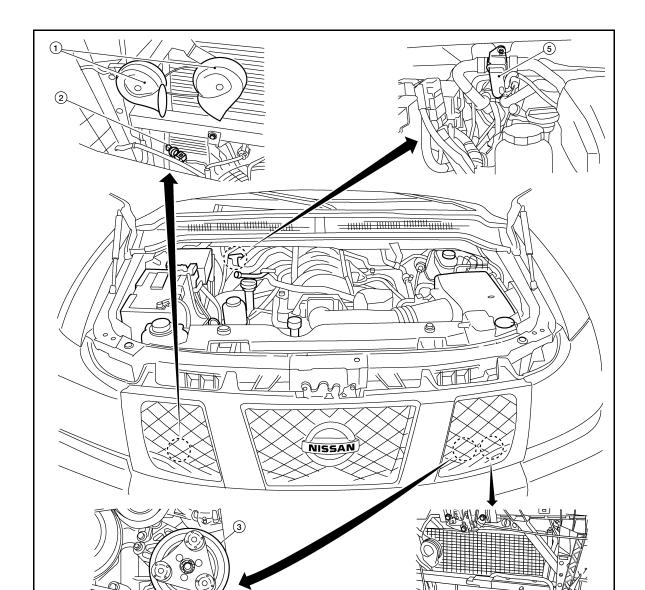
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# SYSTEM DESCRIPTION

# **FUNCTION INFORMATION**

**Component Part Location** 

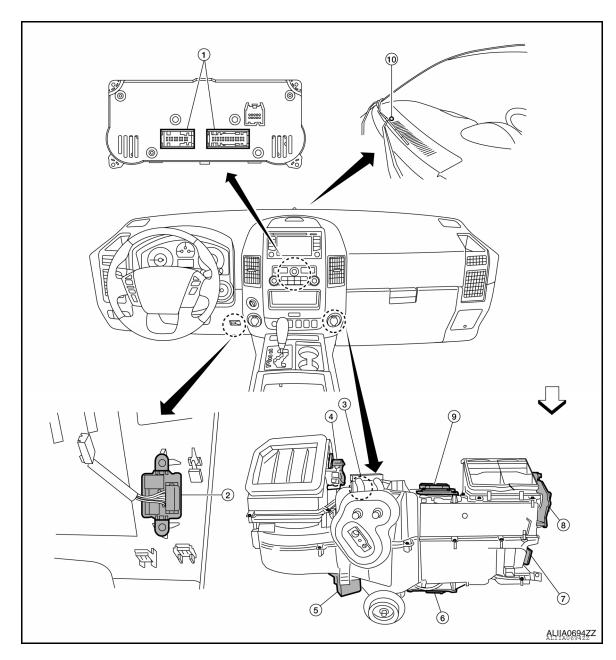
**ENGINE COMPARTMENT** 



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

**(4)** 

# 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:0000000011560759

# REFRIGERANT PRESSURE SENSOR

The refrigerant system is protected against excessively high or low pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends a voltage signal to the ECM. The ECM de-energizes the A/C relay to disengage the magnetic compressor clutch when pressure on the high pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (28 kg/cm², 398 psi), or below about 120 kPa (1.22 kg/cm², 17.4 psi).

# PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 2,990 kPa (30.5 kg/

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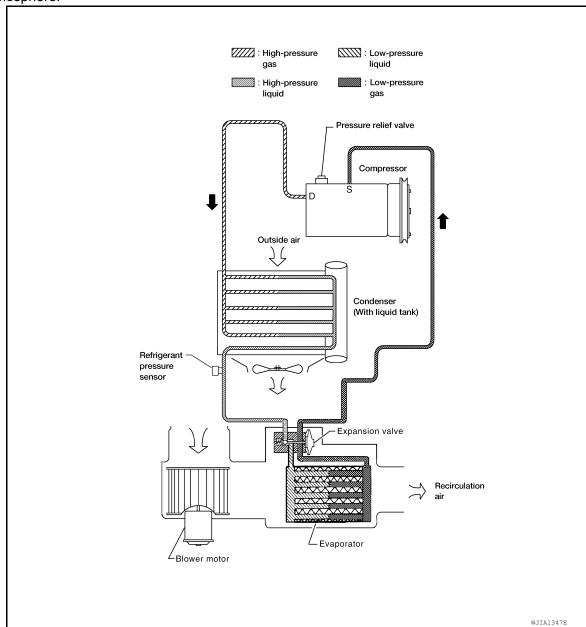
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cm<sup>2</sup>, 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



# **AUTOMATIC AIR CONDITIONER SYSTEM**

# Control System Diagram

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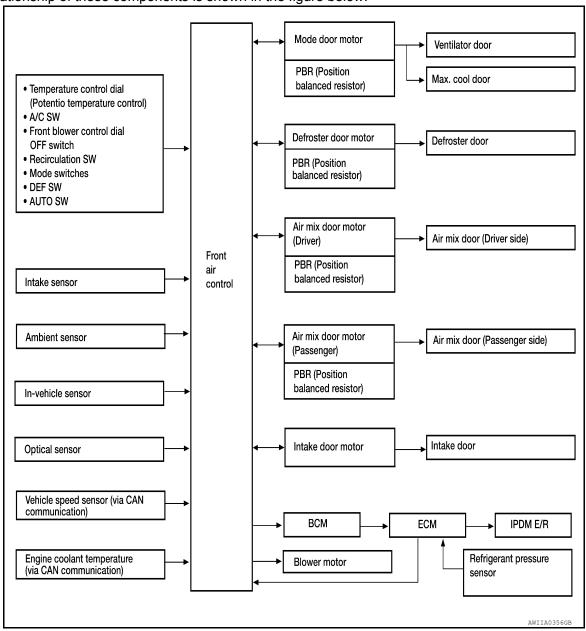
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# **CONTROL SYSTEM**

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 A/C W DUAL AVITA18252Z

### **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.)

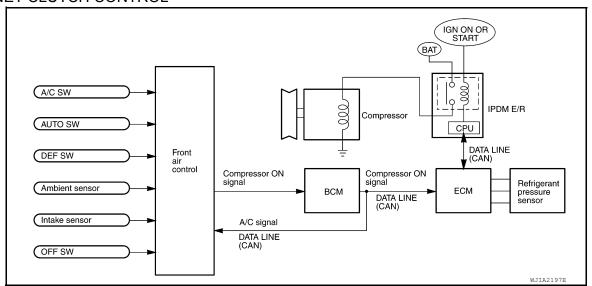
### MODE SWITCHES

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

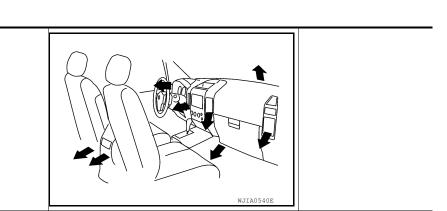


When A/C switch or DEF switch is pressed, front air control inputs compressor ON signal to BCM. BCM sends compressor ON signal to ECM and front air control, via CAN communication line.

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



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

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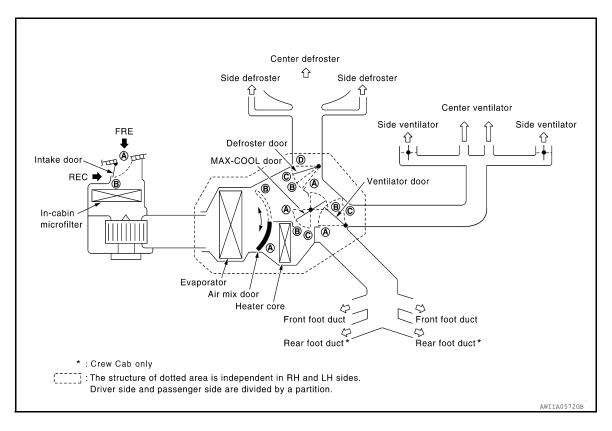
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# **Switches And Their Control Function**

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Position		MOD	ESW		DEF	sw	REC	SW	Tempera	ture co	ntrol dial	OFF
or	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF	/		7	sw
switch	→.•	_ > .*		<b>W</b> •	_	DNT C	€	<b>₹</b> >	(	AUTO	7)	
		+/~	+,~	+,~	-> ф <-	0	÷ • :	0	COLD	~	нот	OFF (5)
Ventilator door	<b>(A)</b>	B	©	©	©		_	_				©
MAX-COOL door	<b>(A)</b>	B	B	B	©		_	_				B
Defroster door	<b>(D)</b>	<b>(D)</b>	<b>O</b> or <b>©</b>	B	<b>(A)</b>						©	
Intake door		_	_		B		<b>(A)</b>	B				B
Air mix door		_					— (A) AUTO (B)					
		_										
											AWI	IA0359GB

# **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 Commonant Inspection!
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.	

Revision: November 2014 HAC-17 2015 Titan NAM

# **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)

**COMMON ITEM** 

COMMON ITEM: CONSULT Function (BCM - COMMON ITEM)

INFOID:0000000011875462

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# APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM:

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

# SYSTEM APPLICATION

BCM can perform the following functions:

				Direct D	Diagnosti	c Mode		
System	Sub System	Ecu Identification	Self Diagnostic Result	Data Monitor	Active Test	Work support	Configuration	CAN Diag Support Mntr
Door lock	DOOR LOCK			×	×	×		
Rear window defogger	REAR DEFOGGER			×	×			
Warning chime	BUZZER			×	×			
Interior room lamp timer	INT LAMP			×	×	×		
Remote keyless entry system	MULTI REMOTE ENT			×	×	×		
Exterior lamp	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				×			

# **AIR CONDITIONER**

# **DIAGNOSIS SYSTEM (BCM)**

< SYSTEM DESCRIPTION >

[AUTOMATIC AIR CONDITIONER]

AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)

VFOID:0000000011875463

# **DATA MONITOR**

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

# **SELF-DIAGNOSIS FUNCTION**

# [AUTOMATIC AIR CONDITIONER]

# **SELF-DIAGNOSIS FUNCTION**

# Front Air Control Self-Diagnosis

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# A/C SYSTEM SELF-DIAGNOSIS FUNCTION

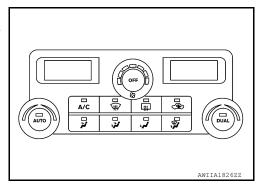
The self-diagnosis function is built into the front air control to quickly locate the cause of malfunctions.

# DESCRIPTION

The self-diagnostic system diagnoses sensors, CAN system, and battery voltage on front air control Refer to applicable sections (items) for details. Fault codes (if any are present) will be displayed in the ambient temperature display area. Refer to <a href="HAC-21">HAC-21</a>, "Front Air Control Self-Diagnosis Code Chart".

### SELF-DIAGNOSTIC MODE

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



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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-59, "In-Vehicle Sensor Diagnosis Procedure"				
31	In-vehicle sensor circuit out of range (high)	TIAC-59, III-Verlicle Serisor Diagnosis Procedure				
40	Ambient sensor circuit short	HAC-56, "Ambient Sensor Diagnosis Procedure"				
41	Ambient sensor circuit open	HAC-50. Ambient Sensor Diagnosis Procedure				
50	Optical sensor (Driver) circuit open or short	HAC-62, "Optical Sensor Diagnosis Procedure"				
52	Optical sensor (Passenger) circuit open or short					
56	Intake sensor circuit short	HAC-64. "Intake Sensor Diagnosis Procedure"				
57	Intake sensor circuit open	1170-04, Illiane 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

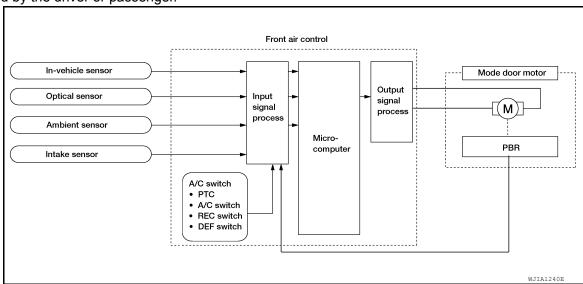
Component Parts

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**

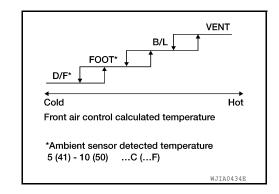
The mode door position (vent, B/L, foot, D/F, and defrost) is set by the front air control by means of the mode door motor. When a mode door position is selected on the front air control, voltage is applied to one circuit of the mode door motor while ground is applied to the other circuit, causing the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

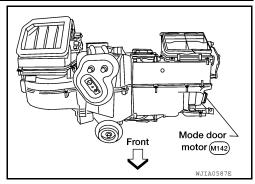


# **MODE DOOR MOTOR**

# < 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:0000000011560770

### 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-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 <a href="HAC-23">HAC-23</a>, "Mode Door Motor Diagnosis Procedure".

# Mode Door Motor Diagnosis Procedure

INFOID:0000000011560771

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 <a href="HAC-17">HAC-17</a>, "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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Revision: November 2014 HAC-23 2015 Titan NAM

# **MODE DOOR MOTOR**

# < DTC/CIRCUIT DIAGNOSIS >

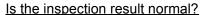
# [AUTOMATIC AIR CONDITIONER]

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M49 (A) and the mode door motor harness connector M142 (B).
- 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.

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

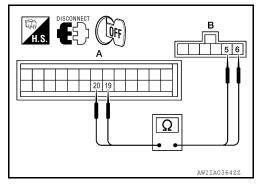
 Check continuity between front air control harness connector M49 terminals 19, 20 and ground.

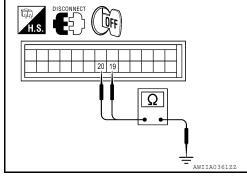
Connector	Terminal	_	Continuity	
M49	19	Ground	No	
	20	Ground	140	



YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

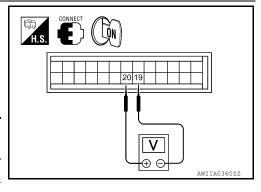




# 3.CHECK FRONT AIR CONTROL FOR MODE DOOR MOTOR POWER AND GROUND

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

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



# Is the inspection result normal?

YES >> GO TO 4.

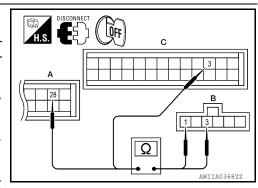
NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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

- 1. Turn ignition switch OFF.
- 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	163

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



# < DTC/CIRCUIT DIAGNOSIS >

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

### Is the inspection result normal?

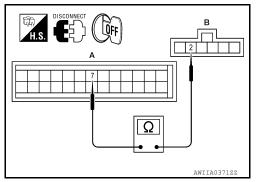
YES >> GO TO 5.

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



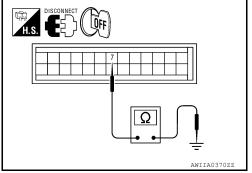
Check continuity between front air control harness connector M49 terminal 7 and ground.

Connector	Terminal	_	Continuity
M49	7	Ground	No

# Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness as necessary.

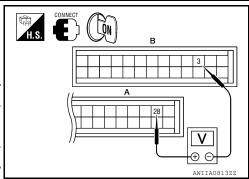


# 6.CHECK FRONT AIR CONTROL FOR 5 VOLT REFERENCE (VREF), VREF RETURN, AND FEEDBACK SIGNAL

- 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 >

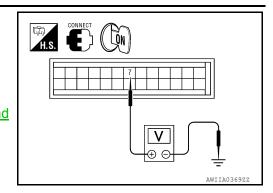
# [AUTOMATIC AIR CONDITIONER]

Commonton	Townsiand		\ /alta ==
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".



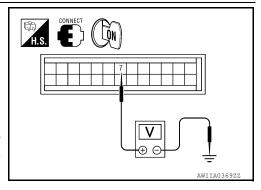
# 7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

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



# AIR MIX DOOR MOTOR

# System Description

### INFOID:0000000011560772

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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:

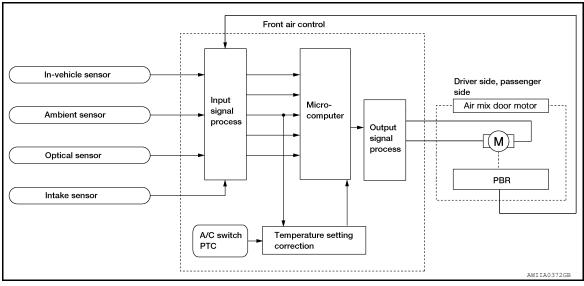
- Front air control
- Air mix door motors (driver, passenger)
- PBR (built-into air mix door motors)
- · In-vehicle sensor
- · Ambient sensor
- · Optical sensor
- · Intake sensor

### **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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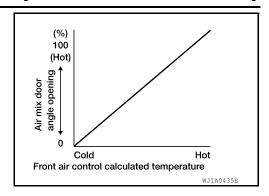
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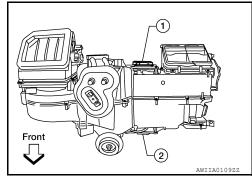
Air Mix Door Control Specification



### 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

INFOID:0000000011560773

# 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.
- Check for hot air at discharge air outlets.

>> GO TO 2.

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

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

# Can a symptom be duplicated?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-28, "Air Mix Door Motor (Driver) Diagnosis Procedure".

# Air Mix Door Motor (Driver) Diagnosis Procedure

INFOID:0000000011560774

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)".
- 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.

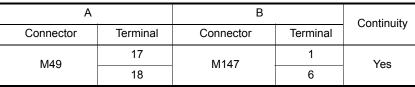
> • Inspect air mix door (driver) for mechanical failure and repair if necessary. If air mix door (driver) is OK, refer to HAC-83, "Component Function Check" for insufficient cooling or HAC-91, "Component Function Check" for insufficient heating.

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	Connector Terminal	
M49	17	M147	1	Yes
14149	18	191147	6	163



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

Connector	Terminal	_	Continuity
M49	17	Ground	No
IVI <del>4</del> 3	18	Ground	NO

# Is the inspection result normal?

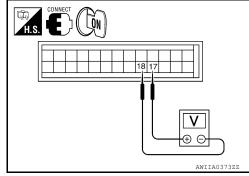
YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

# $3. {\sf CHECK}$ 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	Terminals		Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voitage (Approx.)	
M49	17	18	While rotating temperature control dial (driver) from 32°C (90°F) to 18°C (60°F)	Battery voltage	
IVI <del>43</del>	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?

**HAC-29** Revision: November 2014 2015 Titan NAM Н

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# < DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 4.

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

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

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connectors.
- 3. Check continuity between front air control harness connector M49 (C) terminal 3, connector M50 (A) terminal 28 and air mix door motor (driver) harness connector M147 (B) terminals 3, 2.

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

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

Connector	Terminal	_	Continuity
M49 (C)	3	Cround	No
M50 (A)	28	Ground	140

# Is the inspection result normal?

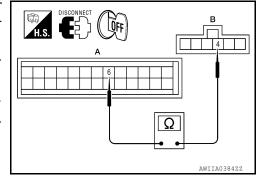
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

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

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



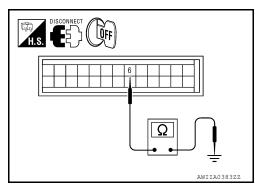
2. Check continuity between front air control harness connector M49 terminal 6 and ground.

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

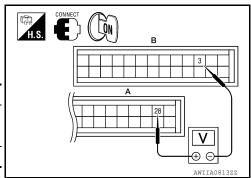
# AIR MIX DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 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



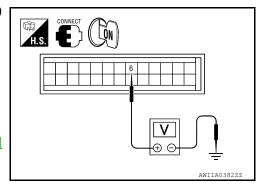
4. Check voltage between front air control harness connector M49 terminal 6 and ground.

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 <u>VTL-8</u>, "Removal and <u>Installation"</u>.



# 7.CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

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

Connector	Terminal	_	Voltage (Approx.)
M49	6	Ground	0.2 to 4.8 Volts

# Is the inspection result normal?

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

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

# CONNECT CON AMILAO 382ZZ

# Air Mix Door Motor (Passenger) Component Function Check

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

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

# >> GO TO 2.

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

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

# Can a symptom be duplicated?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>HAC-32, "Air Mix Door Motor (Passenger) Diagnosis Procedure".</u>

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# Air Mix Door Motor (Passenger) Diagnosis Procedure

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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)".
- 3. Observe "PAS MIX FDBCK" voltage while rotating temperature control dial (passenger) between 32°C (90°F) and 18°C (60°F).

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

### Is the inspection result normal?

YES

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

NO >> GO TO 2.

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

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

А	В		В	
Connector	Terminal	Connector	Terminal	Continuity
M49	14	M143	1	Yes
10149	2	IVITAS	6	163

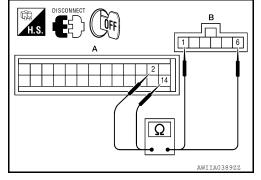
Check continuity between front air control harness connector M49 terminals 2, 14 and ground.

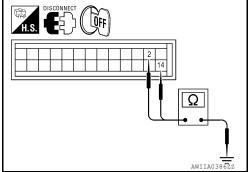
Connector	Terminal	_	Continuity
M49	14	Ground	No
10149	2	Ground	INO

# Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.





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

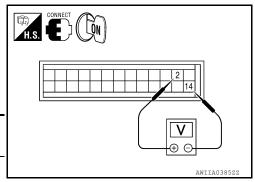
# AIR MIX DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

- Reconnect front air control harness connector.
- Turn ignition switch ON.
- 3. Rotate temperature control dial (passenger) to 32°C (90°F).
- 4. Check voltage between front air control harness connector M49 terminal 2 and terminal 14 while rotating temperature control dial (passenger) to 18°C (60°F) and back to 32°C (90°F).

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition		
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?

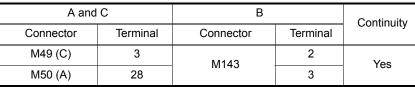
YES >> GO TO 4.

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.
- Disconnect the front air control harness connectors. 2.
- 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	С	В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M49 (C)	3	M143	2	Yes
M50 (A)	28	IVITAS	3	165



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

Connector	Terminal	_	Continuity	
M49 (C)	3	Ground	No	
M50 (A)	28	Giodila	140	

### Is the inspection result normal?

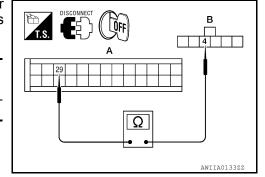
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

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

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



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# AIR MIX DOOR MOTOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

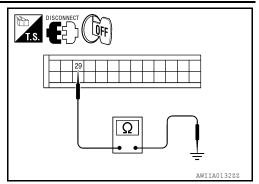
Check continuity between front air control harness connector M50 terminal 29 and ground.

Connector	Terminal	_	Continuity
M50	29	Ground	No

# Is the inspection result normal?

YES >> GO TO 6.

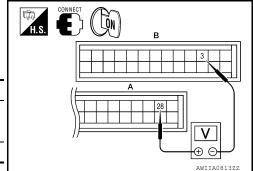
NO >> Repair or replace harness as necessary.



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

- 1. Reconnect front air control harness connectors.
- Turn ignition switch ON.
- 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	



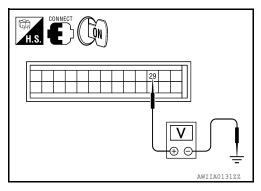
 Check voltage between front air control harness connector M50 terminal 29 and ground.

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>.



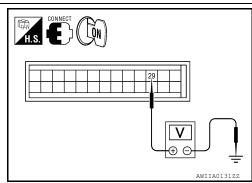
# 7. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

- 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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".



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

# INTAKE DOOR MOTOR

# System Description

### INFOID:0000000011560777

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### SYSTEM DESCRIPTION

### SYMPTOM:

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

# SYSTEM DESCRIPTION

### Component Parts

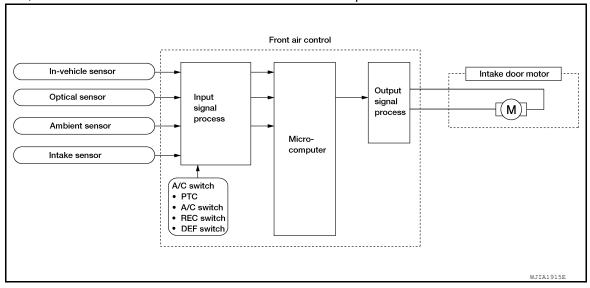
Intake door control system components are:

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

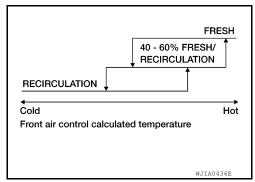
### System Operation

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

Revision: November 2014 HAC-35 2015 Titan NAM

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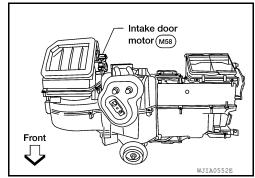
# INTAKE DOOR MOTOR

### < 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:0000000011560778

# INSPECTION FLOW

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

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

### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <a href="HAC-36">HAC-36</a>, "Intake Door Motor Diagnosis Procedure".

# Intake Door Motor Diagnosis Procedure

INFOID:0000000011560779

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

### SYMPTOM:

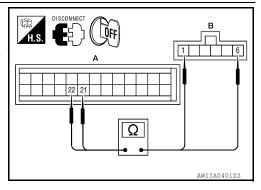
- Intake door does not change.
- Intake door motor does not operate normally.

# 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.

А		В		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M49	21	M58	6	Yes
	22	IVISO	1	



# **INTAKE DOOR MOTOR**

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

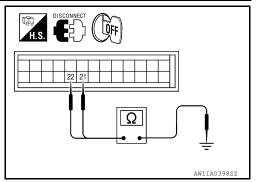
Check continuity between front air control harness connector M49 terminals 21, 22 and ground.

Connector	Terminal	_	Continuity
M49	21	Ground	No
	22	Gloulia	NO

# Is the inspection result normal?

YES >> GO TO 3.

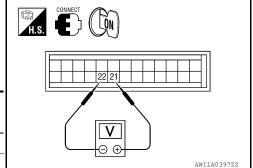
NO >> Repair or replace harness as necessary.



# 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 (Approx.)	
Connector	(+)	(-)	Condition	voitage (Approx.)	
M49	21	22	Self-diagnostic mode (opening)	Battery voltage	
IVI49	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

#### INFOID:0000000011560780

#### SYSTEM DESCRIPTION

#### Component Parts

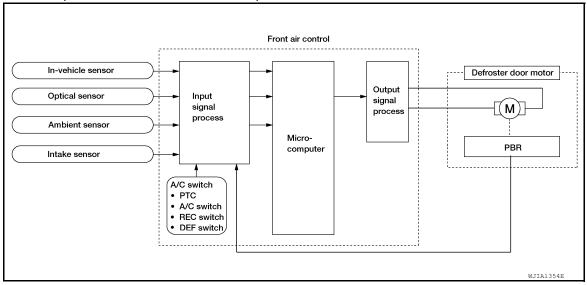
Defroster door control system components are:

- · 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.

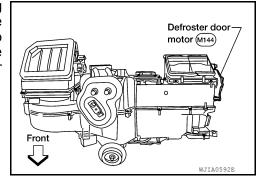
In the AUTO mode, the front air control determines defroster door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature.



#### 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:0000000011560781

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.

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

- 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.

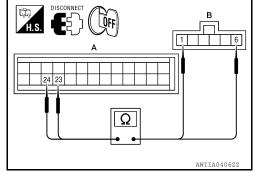
Inspect defroster door for mechanical failure. Refer to VTL-17, "Removal and Installation".

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]

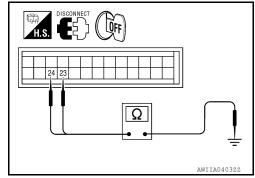
 Check continuity between front air control harness connector M49 terminals 23, 24 and ground.

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

# Is the inspection result normal?

YES >> GO TO 3.

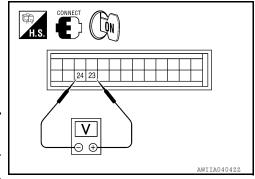
NO >> Repair or replace harness as necessary.



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

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

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voitage (Approx.)	
M49	23	24	Following defroster switch ( ) on	Battery voltage	
IVITO	24	23	Following defroster switch ( ) off	Battery voltage	



# Is the inspection result normal?

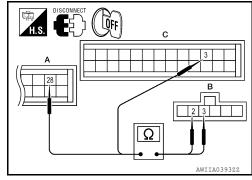
YES >> GO TO 4.

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

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

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

A and	С	В	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M49 (C)	3	M144	2	Yes
M50 (A)	28	101144	3	162



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

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

# Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

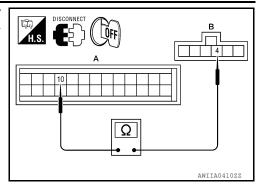
5. CHECK PBR FEEDBACK SIGNAL CIRCUIT FOR OPEN AND SHORT TO GROUND

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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

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



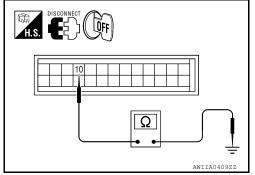
2. Check continuity between front air control harness connector M49 terminal 10 and ground.

Connector	Terminal	_	Continuity
M49	10	Ground	No

# Is the inspection result normal?

YES >> GO TO 6.

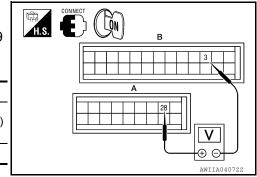
NO >> Repair or replace harness as necessary.



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

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

А		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 10 and ground.

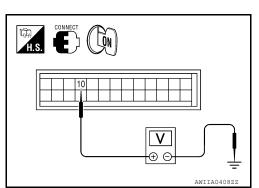
Connector	Terminal	_	Voltage (Approx.)
M49	10	Ground	0 Volts

# 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 >

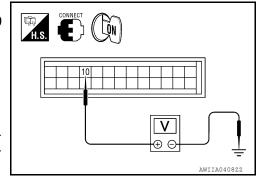
# [AUTOMATIC AIR CONDITIONER]

- 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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".
- NO >> Replace the defroster door motor. Refer to <u>VTL-17</u>, <u>"Removal and Installation"</u>.



# System Description

#### INFOID:0000000011560783

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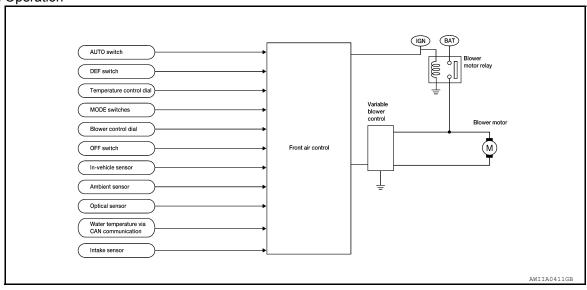
# SYSTEM DESCRIPTION

#### 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



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#### **Automatic Mode**

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

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

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

#### Starting Blower Speed Control

Start up from cold soak condition (Automatic mode).

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

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

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

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

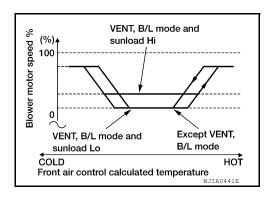
Blower Speed Compensation - Sunload

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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

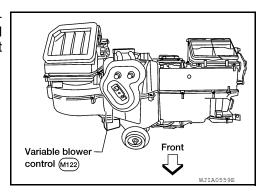
**Blower Speed Control Specification** 



#### COMPONENT DESCRIPTION

#### Variable Blower Control

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



# Front Blower Motor Component Function Check

INFOID:0000000011560784

# 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:0000000011560785

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

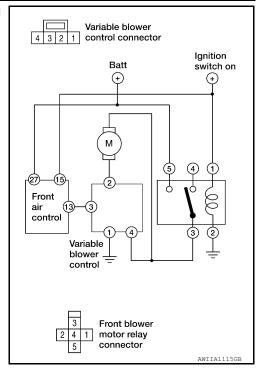
SYMPTOM: Blower motor operation is malfunctioning.

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 HAC-69. "Front Air Control Terminals Reference Values".

# Fuses are good.

# Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 9.

# 2.CHECK FRONT BLOWER MOTOR POWER SUPPLY CIRCUIT

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

#### 2 - Ground : Battery voltage

#### Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 3.

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

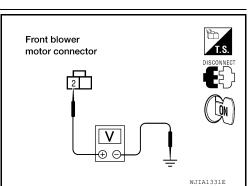
- Turn ignition switch OFF.
- Disconnect front blower motor relay. 2.
- Check voltage between front blower motor relay harness connector M107 terminal 5 and ground.

#### 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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**HAC-45** Revision: November 2014 2015 Titan NAM

# < 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.

# ${f 5.}$ CHECK FRONT BLOWER MOTOR RELAY (SWITCH SIDE) CIRCUIT FOR OPEN

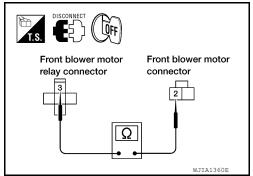
Check continuity between front blower motor relay harness connector M107 terminal 3 and front blower motor harness connector M62 terminal 2.

# 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.
- 2. 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

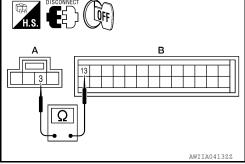
- Disconnect front air control connector.
- Check continuity between front air control harness connector M49 (B) terminal 13 and variable blower control harness connector M122 (A) terminal 3.

# 13 - 3 : Continuity should exist.

#### Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.



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

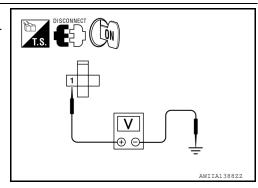
- 1. Turn ignition switch ON.
- Check voltage between front blower motor relay harness connector M107 terminal 1 and ground.

# 1 - Ground : Battery voltage

#### Is the inspection result normal?

YES >> GO TO 9.

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



#### < DTC/CIRCUIT DIAGNOSIS >

# 9. REPLACE FUSES

- 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

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

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

# 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 HAC-48, "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.

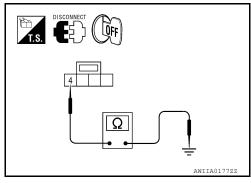
#### 1 - 2 : Continuity should exist.

# Is the inspection result normal?

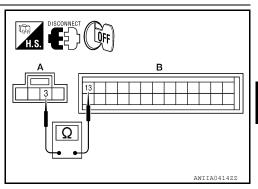
YES >> GO TO 14.

NO >> Repair harness or connector.

# $14.\mathtt{CHECK}$ VARIABLE BLOWER CONTROL GROUND CIRCUIT



[AUTOMATIC AIR CONDITIONER]



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# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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

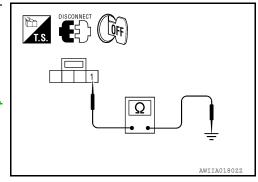
#### 1 - Ground

# : 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.

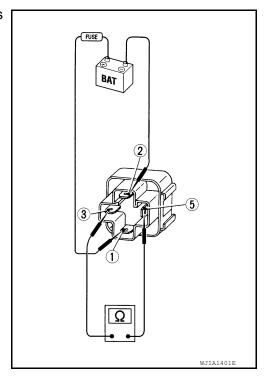


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# Front Blower Motor Component Inspection

# **COMPONENT INSPECTION**

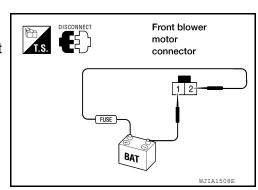
Check continuity between terminals 3, and 5 by supplying 12 volts and ground to coil side terminals 1 and 2 of relay.



#### 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:0000000011560787

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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:0000000011560788

#### 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

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

# DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

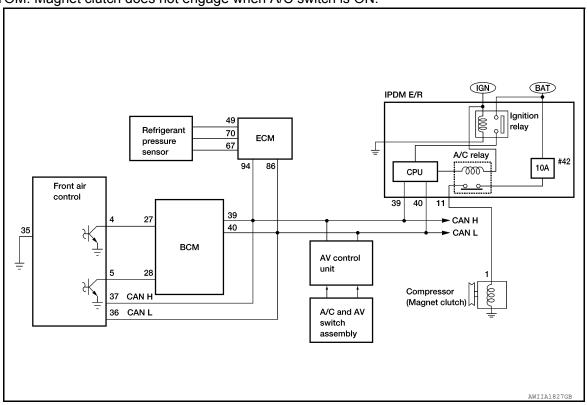
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Revision: November 2014 HAC-49 2015 Titan NAM

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 <a href="HAC-21">HAC-21</a>, "Front Air Control Self-Diagnosis".

#### Is the inspection result normal?

YES >> GO TO 2.

NO

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

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

# 2.PERFORM AUTO ACTIVE TEST

Refer to PCS-11, "Diagnosis Description".

#### Does magnet clutch operate?

YES >> • ®WITH CONSULT

GO TO 5.

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• 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.

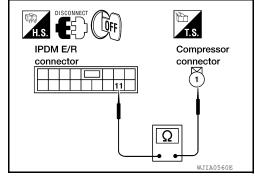
 Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

# 11 – ground : Continuity should not exist.

# Is the inspection result normal?

YES >> GO TO 4.

Revision: November 2014



#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Repair harness or connector.

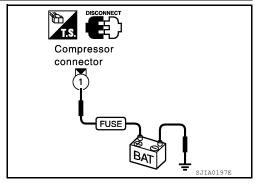
# 4. CHECK MAGNET CLUTCH CIRCUIT

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

# Is the inspection result normal?

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

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



# 5. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to <u>BCS-24</u>, "AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)".

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

# Is the inspection result normal?

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

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

- 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?

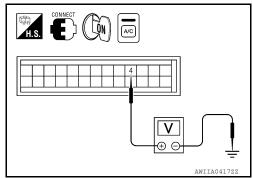
YES >> GO TO 7.

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	4	Ground	A/C switch: ON	Approx. 0V
IVI49	4	Giodila	A/C switch: OFF	Approx. 5V



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#### Is the inspection result normal?

YES >> GO TO 8.

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# **MAGNET CLUTCH**

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

NO-1 >> If the voltage is approx. 5V when A/C switch is ON, replace front air control Refer to <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-56, "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.	(-)		<b>.</b>
F54	70	Ground	A/C switch: ON	Approx. 1.0 - 4.0V

#### Is the inspection result normal?

YES >> GO TO 9.

NO >> Refer to EC-488, "Diagnosis Procedure".

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to <u>BCS-24, "AIR CONDITIONER: CONSULT Function (BCM - AIR CONDITIONER)"</u>.

FRONT BLOWER CONTROL : FAN ON SIG ON

**DIAL ON** 

FRONT BLOWER CONTROL : FAN ON SIG OFF

**DIAL OFF** 

# Is the inspection result normal?

YES >> GO TO 12. NO >> GO TO 10.

10. Check circuit continuity between BCM and front air control

- 1. Turn ignition switch OFF.
- 2. Disconnect BCM connector and front air control connector.
- Check continuity between BCM harness connector M18 (A) terminal 28 and front air control harness connector M49 (B) terminal 5.

# 28 - 5 Continuity should exist.

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

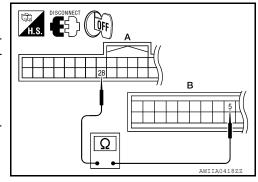
# 28 - ground Continuity should not exist.

# Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

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



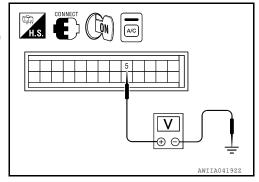
# **MAGNET CLUTCH**

# < 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.	(-)		, and the second
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-56</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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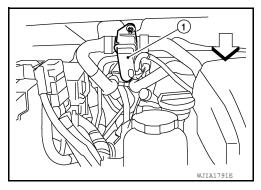
# WATER VALVE CIRCUIT

Description INFOID:000000011560790

#### 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:0000000011560791

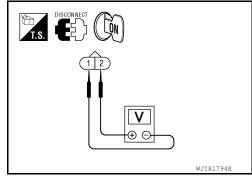
Regarding Wiring Diagram information, refer to HAC-71, "Wiring Diagram - Automatic Air Conditioner".

# 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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".

NO >> Repair harness or connector.

# **WATER VALVE CIRCUIT**

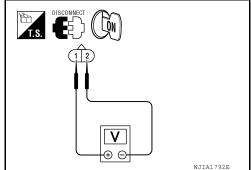
# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

# 3. CHECK WATER VALVE POWER AND GROUND CIRCUITS

- 1. Rotate temperature control dial (driver) to 18°C (60°F).
- 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.

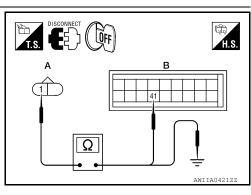
4. Check continuity between water valve harness connector F68 (A) terminal 1 and ground.

# 1 - Ground : Continuity should not exist.

# Is the inspection result normal?

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

NO >> Repair harness or connector.



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# AMBIENT SENSOR

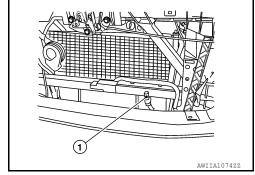
# **Component Description**

#### INFOID:0000000011560792

#### 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.

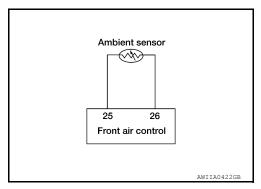
# Ambient Sensor Diagnosis Procedure

INFOID:0000000011560793

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 >

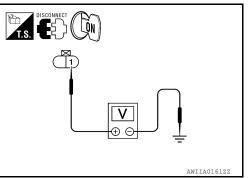
# [AUTOMATIC AIR CONDITIONER]

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

#### 1 - Ground : Approx. 5V

# Is the inspection result normal?

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



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

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

#### 2 - 26 : Continuity should exist.

# Is the inspection result normal?

YES >> GO TO 3.

NO

NO >> Repair harness or connector.

# 3. CHECK AMBIENT SENSOR

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

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

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

Replace ambient sensor. Refer to HA-45, "Removal and Installation". >> 1.

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.
- 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".

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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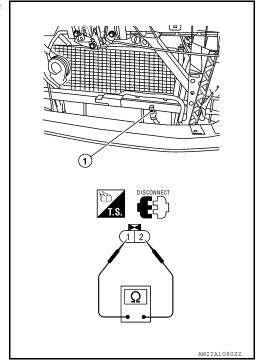
# **AMBIENT SENSOR**

# < 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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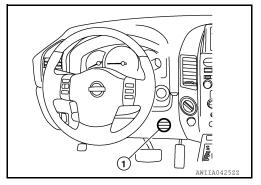
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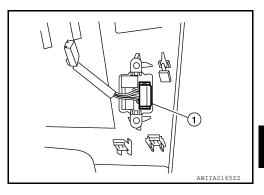
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#### COMPONENT DESCRIPTION

#### 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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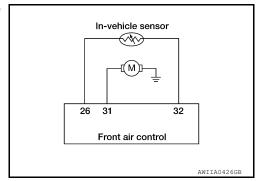
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# In-Vehicle Sensor Diagnosis Procedure

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 >

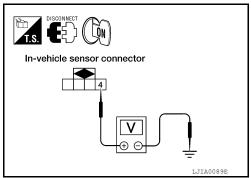
# [AUTOMATIC AIR CONDITIONER]

- 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 VTL-9, "Removal and Installation".
  - 2. Go to HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

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

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between in-vehicle sensor harness connector M32 (B) terminal 4 and front air control harness connector M50 (A) terminal 32.

# 4 - 32 : Continuity should exist.

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

# 4 - Ground Continuity should not exist.

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# Is the inspection result normal?

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

NO >> Repair harness or connector.

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

# **IN-VEHICLE SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

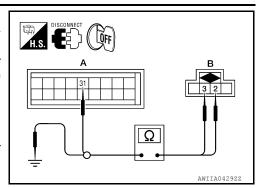
# [AUTOMATIC AIR CONDITIONER]

- 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.



# Is the inspection result normal?

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

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

NO >> Repair harness or connector.

# In-Vehicle Sensor Component Inspection

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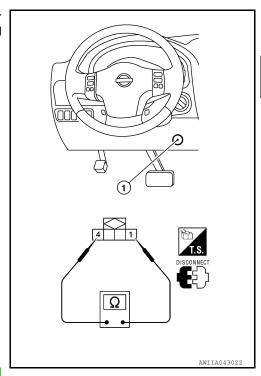
# COMPONENT INSPECTION

In-vehicle Sensor

After disconnecting in-vehicle sensor connector M32, measure resistance between terminals 1 and 4 at sensor component side, using the table below.

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

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



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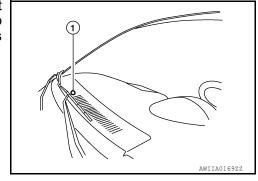
# OPTICAL SENSOR

# Component Description

#### INFOID:0000000011560798

#### COMPONENT DESCRIPTION

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



# OPTICAL INPUT PROCESS

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

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

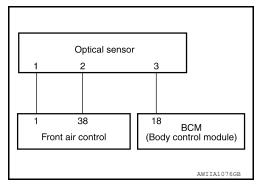
# Optical Sensor Diagnosis Procedure

INFOID:0000000011560799

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.



 ${f 1}.$ CHECK CIRCUIT CONTINUITY BETWEEN OPTICAL SENSOR AND FRONT AIR CONTROL

# **OPTICAL SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

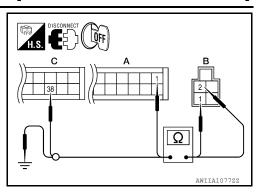
1. Turn ignition switch OFF.

- 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.

4. 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

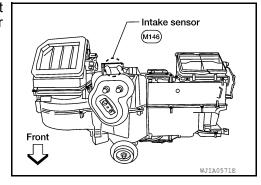
# System Description

#### INFOID:0000000011560800

#### 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.



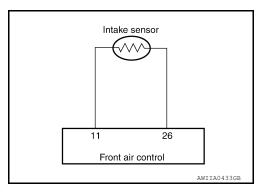
# Intake Sensor Diagnosis Procedure

INFOID:0000000011560801

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.



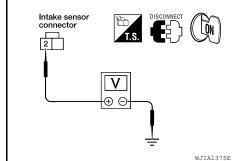
# 1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

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

# 2 - Ground : Approx. 5V

# Is the inspection result normal?

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



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

# INTAKE SENSOR

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 (B) terminal 1 and front air control harness connector M49 (A) terminal 26.

# 1 - 26 : Continuity should exist.

# Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

# 3. CHECK INTAKE SENSOR

Check intake sensor. Refer to HAC-65, "Intake Sensor Component Inspection".

# Is the inspection result normal?

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

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

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

2. Go to <a href="HAC-21">HAC-21</a>, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

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

- Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 (B) terminal 2 and front air control harness connector M49 (A) terminal 11.

# 2 - 11 : Continuity should exist.

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

# 2 - Ground : Continuity should not exist.

Is the inspection result normal?

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

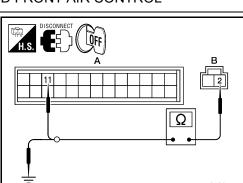
2. Go to HAC-21, "Front Air Control Self-Diagnosis" and perform self-diagnosis.

NO >> Repair harness or connector.

# Intake Sensor Component Inspection

# COMPONENT INSPECTION

Intake Sensor



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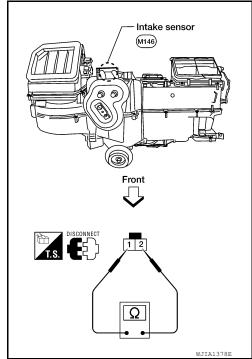
# **INTAKE SENSOR**

# < DTC/CIRCUIT DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

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

Temperature °C (°F)	Resistance 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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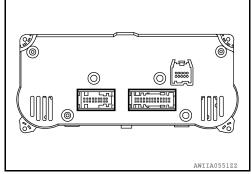
# COMPONENT DESCRIPTION

# 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.

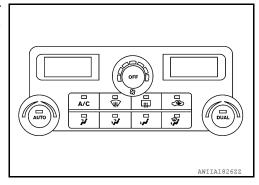
The front air control is unitized with control mechanisms. When the various switches and temperature dials are operated, data is input to the front air control.

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.



# HAC

# Front Air Control Component Function Check

SYMPTOM: A/C system does not come on.

# INSPECTION FLOW

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

- 1. Press AUTO switch.
- Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures).

#### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-67, "Front Air Control Power and Ground Diagnosis Procedure".

# Front Air Control Power and Ground Diagnosis Procedure

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

DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

**HAC-67** Revision: November 2014 2015 Titan NAM

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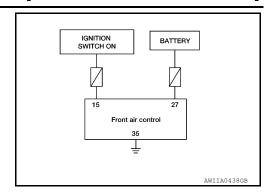
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# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

# < DTC/CIRCUIT DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

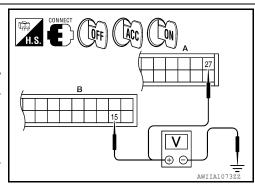
SYMPTOM: A/C system does not come on.



# 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>HAC-69, "Front Air Control Terminals Reference Values"</u>.
  - If fuses are OK, check harness for open circuit. Repair or replace as necessary.
  - If fuses are NG, replace fuse and check harness for short circuit. Repair or replace as necessary.

# 2. CHECK GROUND CIRCUIT FOR FRONT AIR CONTROL

- 1. Turn ignition switch OFF.
- Disconnect front air control connectors.
- Check continuity between front air control harness connector M50 terminal 35 and ground.

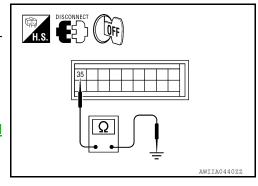
#### 35 - Ground

# : 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.

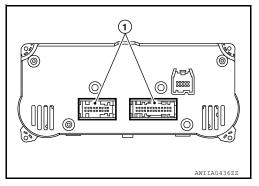


# **ECU DIAGNOSIS INFORMATION**

# 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

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 12
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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

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# AIR CONDITIONER CONTROL

# < ECU DIAGNOSIS INFORMATION >

# [AUTOMATIC AIR CONDITIONER]

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

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

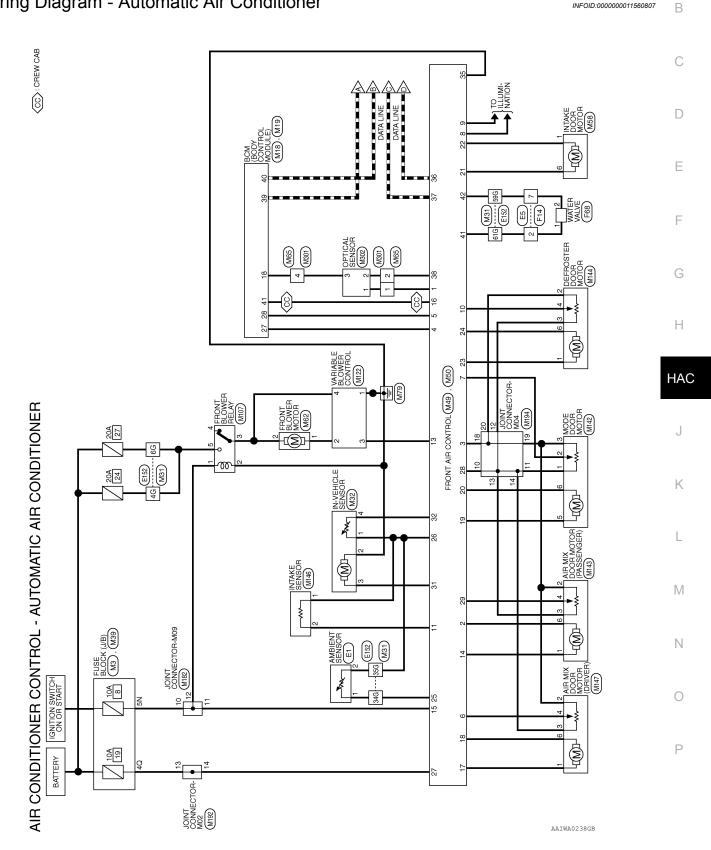
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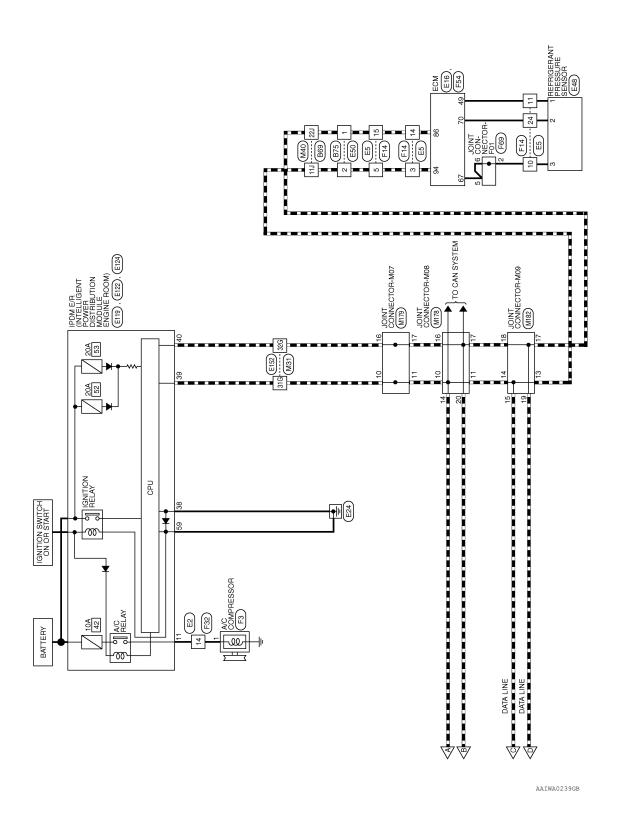
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# **WIRING DIAGRAM**

# AIR CONDITIONER CONTROL

Wiring Diagram - Automatic Air Conditioner





Connector No. M19 Connector Name BCM (BODY CONTROL MODULE) Connector Color WHITE	(所) H.S.	Terminal No. Color of Wire Signal Name 41 Y/B REAR DEFOGGER SW				Connector No M32		Connector Color WHITE			H.S.		Terminal No. Color of Signal Name	V/R	2 O/B -	3 BR/Y –	4 LG/R –		
	1 15 16 17 18 19 20 4 35 36 37 38 39 40																		
M18 MODULE) WHITE	6 7 8 9 10 11 12 13 14 26 27 28 29 30 31 32 33 34	Signal Name KEYLESS AND AUTO	AIRCON SW	BLOWER FAN SW	CAN-H		Signal Name	1	I	ı	ı	1	1	1 1					
Connector Name BCM (B MODUL Connector Color WHITE	S. 21 22 23 24 5 21 22 23 24 25	Terminal No. Color of Wire 18	W/R	28 L/R	39 L P P		Terminal No. Wire						1	59G W/G					
		Ten	1				Leu												
Connector Name   MS	3N 2N 1N 8N 7N 6N 5N 4N	rof Signal Name				M31	WIRE TO WIRE	WHITE		[	16 26 36 46 56	66 76 86 96 106		226236246256266276286296306	31 ศาราชาสาราสาราสาราสาราสาราสาราสาราสารา	42G 43G 44G 45G 46G 47G 48G 49G 50G	20 530 540 556 560 570 580 590 600 610		
Connector No.   No.   Connector Color   No.   Connector Color   No.   Connector Color   No.   No	所 H.S.	Terminal No. Wire SN Y/G				Coppositor No	e e				H.S.			5   0	3463	9 4	5195		
Ţ																		AAIIA0617GB	

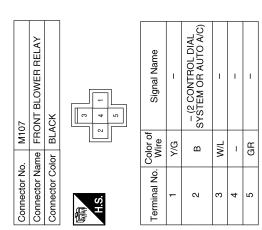
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Signal Name -		Signal Name	DRVR BLND DR A	DRVR BLND DR B	PNL/FLR DR A	PNL/FLR DR B	RECIBC DR1 B	DEFROST DR A	DEFROST DR B	AMBIENT TEMP SEN	SENSOR RETURN			
Color of Wire L		Color of Wire	M/G	G	BR/W	P/L	) c	) <u>e</u>	P/B	۵	N/R			
Terminal No. 111		Terminal No.	17	18	19	20	2 %	23	24	25	26			
M40 WIRE TO WIRE	11   21   31   41   51   51   10   10   10   10   10   1	Signal Name	PNL/FLR DR FB	ILLUM +	ILLUM -	DEFROST FEEDBACK	EVAP TEMP SENSOR	1	FRONT BLWR SPEED	PASS BLND DR A	NDI	HEAH DEF HEQ		
	11.1 [23] [31] [22] [33] [31] [32] [33] [31] [32] [33] [33] [33] [33] [33] [33] [33	Color of Wire	GR	R/L	BB	LG/B	L/B	ı	G/R	Ø/W	5/\G	۵/۲		
Connector No. Connector Name	(S) H	Terminal No.	7	80	6	10	11	12	13	14	15	91		
M39 FUSE BLOCK (J/B) WHITE	Signal Name	i c	(WITH AUTO A/C)	4CK		8 7 6 5 4 3 2 1 21 20 19 18 17 16 15 14			oigilai	SENLF	PASS BLND DR B	AC REQ	FAN ON	DRVR BLND DR FF
e z	Color of Wire Y/R			olor BLACK		12 11 10 9		Color of	Wire	0/0	٥	- M/H	L/R	SB
Connector No. Connector Name Connector Color	Terminal No.	Connector No.	Collifector Name	Connector Color		13 12	Ш	- L		- 0	V a	0 4	2	9
		l												

	INTAKE DOOR MOTOR		2 8	Signal Name	1	
M58		BLACK	1 2 3 4	Color of Wire	0	A/B
r No.	r Name	r Color		Š Š Š		C
Connector No.	Connector Name	Connector Color	H.S.	Terminal No.	-	٣

Signal Name	IN-CAR TEMP SEN	_	I	GNĐ	CAN-L	CAN-H	SUN LD SEN RGHT	_	_	WATER VALVE A	WATER VALVE B	I	_
Color of Wire	LG/R	ı	ı	В	Д	٦	N/M	ı	1	J//L	W/G	ı	-
Terminal No. Wire	32	33	34	32	36	28	38	39	40	14	42	43	44

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



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

Q.	FRONT BLOWER MOTOR	BLACK		Signal Name	-	1	
. M62				Color of Wire	ΓW	M/L	
Connector No.	Connector Name	Connector Color	画 H.S.	Terminal No.	-	2	

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Connector No.	o. M143	13
Connector Name		AIR MIX DOOR MOTOR (PASSENGER)
Connector Color		BLACK
(本) H.S.	1 2	3 4 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
Terminal No. Wire	Color of Wire	Signal Name
-	G/W	ı
2	۵	ı
c	>	

Signal Name	ı	1	ı	1	1	
Color of Wire	G/W	Д	>	W/H	_	
Terminal No. Wire	-	2	3	4	9	

			1		_		_	_	_
21	AIR MIX DOOR MOTOR (DRIVER)	4CK	3 4 4 5 6	Signal Name	_	_	ı	ı	_
o. M147	me AIR MO	olor BL/	1 2	Color of Wire	W/G	Ь	Υ	SB	В
Connector No.	Connector Name	Connector Color   BLACK	H.S.	Terminal No.	-	2	3	4	9

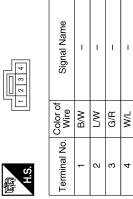
M142	MODE DOOR MOTOR	BLACK	1 2 3 4 5 6
Connector No.	Connector Name	Connector Color BLACK	H.S.

Signal Name	ı	1	ı	ı	ı
Color of Wire	Υ	GR	Ь	BR/W	P/L
Terminal No. Wire	1	2	ဧ	5	9

46	INTAKE SENSOR	AY		Signal Name
. M146		lor GRAY		Color of Wire
Connector No.	Connector Name	Connector Color	麻 H.S.	Terminal No.

WR L/B

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



44	DEFROSTER DOOR MOTOR	BLACK	2 3 4 5 6	Signal Name	_	_	I	_	
. M144		-		Color of Wire	LG	Д	>	LG/B	
Connector No.	Connector Name	Connector Color	南 H.S.	Terminal No. Wire	1	2	8	4	

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Connector No. M182 Connector Name JOINT CONNECTOR-M09 Connector Color GREEN	20 19 18 77 66 5 4 8 2 1 1	Signal Name	1	1	ı	ı	ı	1	I	ı	I		WIRE TO WIRE	ш	4	Signal Name	ı	ı	ı						
Name JOINT C	20 19 18 17 1	lo. Color of Wire	J//G	J//G	J//G	T	_	Г	А	۵.	۵.	No. M301		Color WHITE	1 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Vo. Wire	0/5	N/M	4						
Connector No. Connector Color	雨 H.S.	Terminal No.	9	Ξ	12	13	14	15	17	18	19	Connector No.	Connector Name	Connector Color	H.S.	Terminal No.	-	2	4						
7																									
M179 JOINT CONNECTOR-M07 WHITE	7 6 5 4 3 2 1 17 16 15 14 13 12 11	Signal Name	1	1	ı	ı							JOINT CONNECTOR-M04		9 8 7 6 5 4 3 2 1 20 19 18 17 16 15 14 13 12 11 10	Signal Name	ı	I	1	ı	_	_	ı	1	
	20 19 18	Color of Wire	_	_	۵	Д						D. M194	ame JOINT	olor BLUE	20 19 18 17	Color of Wire	>	>	>	>-	Υ	Ь	۵	۵	
Connector Name Connector Color	原 H.S.	Terminal No.	10	Ξ	16	17						Connector No.	Connector Name	Connector Color	原动 H.S.	Terminal No.	9	Ξ	12	13	14	18	19	20	
M178 JOINT CONNECTOR-M08 WHITE	19 18 77 66 15 14 13 12 11 10	Signal Name	ı	ı	ı	I	ı	Ι					Connector Name JOINT CONNECTOR-M02	Z	5 4 3 2 1 15 14 13 12 11 10	Signal Name	ı	1							
	9 8 10 10 18 1	Color of Wire	_	_	_	۵	۵	Ь				). M192	ame JOINT	olor GREEN	20 19 18 17 16 15 14 13 18 17 16 15 14 13 14 14 13 14 13 14 13 14 13 14 13 14 13 14 13 14 13 14 13 14 13 14 14 13 14 14 13 14 13 14 13 14 13 14 13 14 13 14 13 14 13 14 13 14 13 14 14 13 14 14 13 14 13 14 14 13 14 14 13 14 14 13 14 14 13 14 14 13 14 14 13 14 14 13 14 14 13 14 14 14 13 14 14 14 14 14 14 14 14 14 14 14 14 14	O	Y/R	Y/R							
Connector Name Connector Color	H.S.	Terminal No.	10	1	14	16	17	20				Connector No.	Connector Na	Connector Color	斯 H.S.	Terminal No.	13	14							
																					A	ATTA	.0618	3GB	

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Signal Name

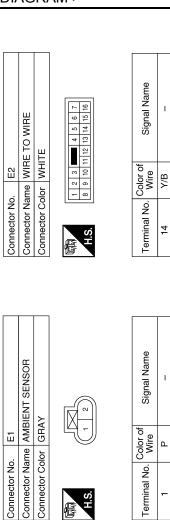
Color of Wire

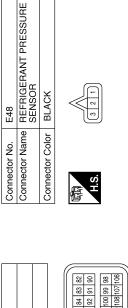
Terminal No.

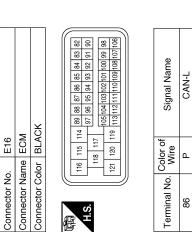
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R/Y B/W В

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	CK	114 89 88 87 86 85 84	97 96 95 94 93 92	105 104 103 102 101 100	119 113 112 111 110 109 106		Signal Nam	CAN-L	CAN-H
ב	lor BLACK	116 115 1	-	-	121 120 1		Color of Wire	Д	_
COILIECTOI INAILIE   LOIN	Connector Color		H.S.			Ŋ	Terminal No.	98	94

Connector No.	M302
Connector Name	Connector Name OPTICAL SENSOR
Connector Color WHITE	WHITE
管	2 3

Signal Name	I	ı	-
Color of Wire	0/9	N/N	Р
Terminal No. Wire	1	2	3

N/R

Connector No.	E5
Connector Name WIRE TO WIRE	WIRE TO WIRE
Connector Color WHITE	WHITE
	1 1 0 0 0 1 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0

Signal Name	ı	ı	ı	ı	I	ı	ı	I	I
Color of Wire	Y/L	_	_	M/G	В	R/Υ	Ъ	Ь	B/W
Terminal No. Wire	2	က	2	7	10	-	14	15	24

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	А
POWER DISTRIBUTION MODULE ENGINE ROOM) WHITE  String 18 37 46 45 44 43  Tof Signal Name  CAN-H  CAN-H  CAN-H  CAN-H  CAN-L  CAN-H  CAN-L  CAN-H  CAN-L  CAN-H  CAN-L  CAN-H  CAN-L  CAN-H  CAN-H  CAN-L  CAN-	В
	C
Connector No.  Connector Name  Connector Color  Connector Color  Connector Name  Connector Name  Connector Name  Connector No.  38  40  40  63  63  326  336  336  616  7  616  7	E
	F
C   C   C   C   C   C   C   C   C   C	G
E119	Н
	HAG
Connector Name Connector No. Connector No. Connector No. Connector No. Terminal No. Color	J
	K
WIRE TO WIRE BROWN  r of Signal Name  E124  IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)  BLACK  Signal Name  or of Signal Name  re GND (POWER)	L
Color of Signal	M
nector No nector	N
S S S S S ABITA1426GB	0
	Р

Signal Name

Color of Wire

Terminal No.

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	E TO WIRE	TE	7 6 5 4	Signal Name	ı
F32	me WIR	or WHI	7 6 15	Color of Wire	Y/B
Connector No.	Connector Name WIRE TO WIRE	Connector Color WHITE	H.S.	Terminal No. Wire	14
			3 12 1		

7 6 5 4	of Signal Name	ı				
16	Color o	Y/B				
H.S.	Terminal No. Wire	14				
24 23 22 21 20 19 18 17 16 15 14 13 12	Signal Name	ı	ı	ı	ı	
11 10 9 8 24 23 22 21	Vo. Color of Wire	Y/L	_	_	M/G	
<del>-                                      </del>	ò					ĺ

Signal Name	ı	1	1	1	1	1	1	-	1
Color of Wire	Y/L	_	_	W/G	В	R/Y	Ь	Ь	B/W
Terminal No. Wire	2	က	2	7	10	11	14	15	24

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Connector Name WATER VALVE

Connector No. F69
Connector Name JOINT CONNECTOR-F01

GRAY

Connector Color

λŧ		Signal Name	1	ı
r GRAY		Color of Wire	۸/L	W/G
Connector Color	H.S.	Terminal No.	-	2

Connector No.	. F3	
Connector Na	me A/C	Connector Name A/C COMPRESSOR
Connector Color BLACK	lor BLA	CK
原 H.S.		
Terminal No.	Color of Wire	Signal Name

Connector Name | WIRE TO WIRE

F14

Connector No.

Connector Color WHITE

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					~	ŀ	-
					8	69	3
					8	61	5
					79	90	3
					82	65	3
					64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81	58	3
					9/	57	5
					72	95	3
					74	25	3
					33	54	5
		~			72	53	3
_	≥	BLACK			7	65	3
F54	$\Box$	Ž			2	15	5
ш.	ш				66	05	3
	ne	5			88	67	P
ġ.	lar	2			29	48	2
ž	١٢	ž			99	47	F
퓽	당	퓽			8	46	ř
ne	ıne	l e	H.S.		26	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62	2
Connector No.	Connector Name ECM	Connector Color	停工	Ш	63	44	ŧ
O	0	O		6	_		

Signal Name	AVCC (PDPRES)	GND-A	PD PRESS
Color of Wire	R/Y	В	B/W
Terminal No.	49	29	02

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	F
B75 WIRE TO WIRE BROWN  or of Signal Name	G H
Connector No. B75  Connector Name WIRE TO WIRE  Connector Color of BROWN  Terminal No. Wire  2 L  2 L  3 L  4 Signa  4 Signa	HAC
	J K
B69	L
Connector No. B69  Connector Name WIRE TO WIRE  Connector Color WHITE  SM 44) 34 24 74 14 14 14 14 14 14 14 14 14 14 14 14 14	M
Connector No. Connector Nam Connector Colo 11.0 22.0	0

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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.	HAC-67	
A/C system cannot be controlled.	Go to Self-diagnosis Function.	<u>HAC-21</u>	
Air outlet does not change.	Co to Trouble Diagnosis Precedure for Mode Deer Motor	HAC-23	
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u> </u>	
Discharge air temperature does not change.	Co to Trouble Diagnosis Presedure for Air Miy Door Motor	HAC 29	
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 Intoke Deer Meter	HAC-36	
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>11AC-30</u>	
Defroster door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Defroster Door Motor.	HAC-39	
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	HAC-44	
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	HAC-49	
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	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.	<u>HAC-21</u>	
Memory function does not operate.	Go to Trouble Diagnosis Procedure for Memory Function.	HAC-94	

# **INSUFFICIENT COOLING**

<	SYN	ЛРΤ	MC	DIA	GNC	วรเร	>

YES >> GO TO 9.

[AUTOMATIC AIR CONDITIONER]

INSUFFICIENT COOLING	
Component Function Check	/-
SYMPTOM: Insufficient cooling	Е
INSPECTION FLOW	
1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE DECREASE	,
Press the AUTO switch.	
<ol> <li>Turn temperature control dial (driver) counterclockwise until 18°C (60°F) is displayed.</li> <li>Check for cold air at discharge air outlets.</li> </ol>	
Can the symptom be duplicated?	
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> .	F
<u>Does another symptom exist?</u> YES >> Refer to <u>HAC-82</u> , "Symptom Matrix Chart".	
NO >> System OK.	
3. CHECK FOR SERVICE BULLETINS	(
Check for any service bulletins.	
	-
>> GO TO 4.	
4.PERFORM SELF-DIAGNOSIS	Н
Perform self-diagnosis Refer to <u>HAC-21</u> , <u>"Front Air Control Self-Diagnosis"</u> . <u>Is the inspection result normal?</u>	
YES >> GO TO 5.	
NO >> Refer to HAC-21. "Front Air Control Self-Diagnosis Code Chart".	
5.CHECK DRIVE BELTS	
Check compressor belt tension. Refer to EM-13, "Checking Drive Belts".	ŀ
Is the inspection result normal?	
YES >> GO TO 6. NO >> Adjust or replace compressor belt. Refer to EM-13, "Removal and Installation".	
6. CHECK AIR MIX DOOR OPERATION	
Check and verify air mix door mechanism for smooth operation. Refer to HAC-28, "Air Mix Door Motor (Driver)	ľ
Component Function Check".	
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 (Driver) Diagnosis Proce-	
dure" or HAC-32, "Air Mix Door Motor (Passenger) Diagnosis Procedure".	
7. CHECK COOLING FAN MOTOR OPERATION	(
Check and verify cooling fan motor for smooth operation. Refer to EC-380, "Overall Function Check".	
Does cooling fan motor operate correctly?	ı
YES >> GO TO 8.  NO >> Check cooling fan motor. Refer to <u>EC-381, "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 <a href="HAC-95">HAC-95</a>, "Working with HFC-134a (R-134a)".

# 11. CHECK FOR EVAPORATOR FREEZE UP

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

#### Does evaporator freeze up?

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

NO >> GO TO 12.

# 12. CHECK REFRIGERANT PRESSURE

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

#### Is the inspection result normal?

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

NO >> GO TO 13.

# 13. CHECK AIR DUCTS

Check ducts for air leaks.

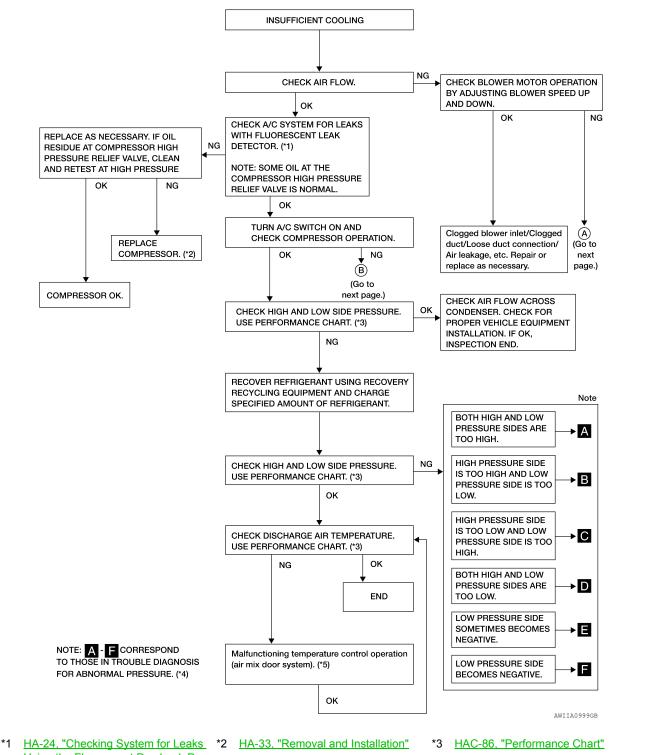
### Is the inspection result normal?

YES >> System OK.

NO >> Repair air leaks.

# Diagnostic Work Flow

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- 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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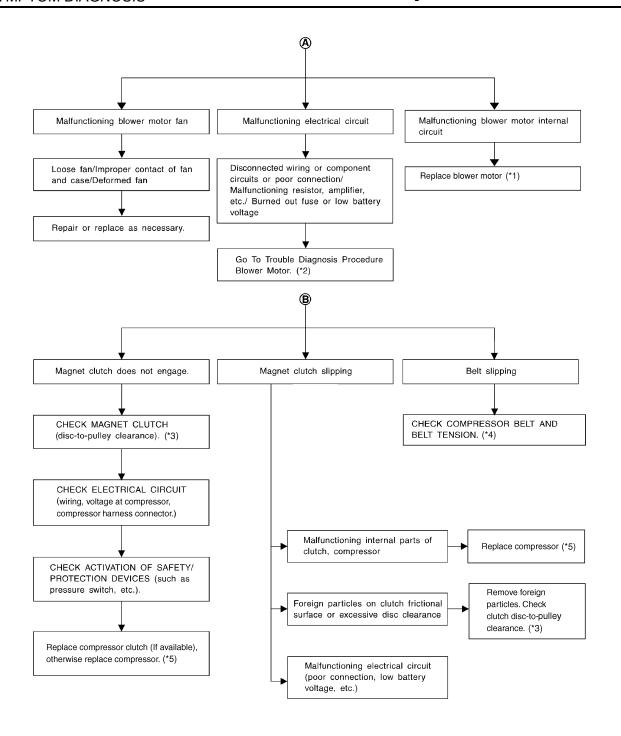
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- \*1 HA-33, "Removal and Installation"
- \*2 HAC-44, "Front Blower Motor Component Function Check"
- \*2 HAC-44, "Front Blower Motor Com- \*3 HA-33, "Removal and Installation"
- \*4 EM-13, "Checking Drive Belts"
- \*5 HA-31, "Removal and Installation"

### **Performance Chart**

INFOID:0000000011560811

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

### Ambient Air Temperature-to-operating Pressure Table

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

# Trouble Diagnoses for Abnormal Pressure

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

**HAC-87** Revision: November 2014 2015 Titan NAM Н

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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 speci- fied pressure is obtained.
Both high- and low-pressure sides are too high.	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.
	Low-pressure pipe is not cold.  When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm², 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.)  Air in refrigeration cycle	Evacuate and recharge system.
AC359A	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cooling system.
	<ul> <li>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>Plates are sometimes covered with frost.</li> </ul>	<ul> <li>Excessive liquid refrigerant on low-pressure side</li> <li>Excessive refrigerant discharge flow</li> <li>Expansion valve is open a little compared with the specification.</li> <li>Improper expansion valve adjustment</li> </ul>	Replace expansion valve.

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

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

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

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 proper 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.

# **INSUFFICIENT COOLING**

# [AUTOMATIC AIR CONDITIONER]

Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	<ul> <li>There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low.</li> <li>Liquid tank inlet and expansion valve are frosted.</li> </ul>	Liquid tank inside is slightly clogged.	Replace liquid tank.     Check oil for contamination.
	<ul> <li>Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank.</li> <li>Expansion valve inlet may be frosted.</li> <li>Temperature difference occurs somewhere in high-pressure side.</li> </ul>	High-pressure pipe located between liquid tank and expansion valve is clogged.	<ul> <li>Check and repair malfunctioning parts.</li> <li>Check oil for contamination.</li> </ul>
Both high- and low-pressure sides are too low.	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge.  ↓ Leaking fittings or components.	Check refrigerant system for leaks. Refer to HA-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.	<ul> <li>Remove foreign particles by using compressed air.</li> <li>Check oil for contamination.</li> </ul>
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	<ul><li>Check and repair malfunctioning parts.</li><li>Check oil for contamination.</li></ul>
	Air flow volume is too low.	Evaporator is frozen.	Check intake sensor circuit. Refer to HAC-64. "Intake Sensor Diagnosis Procedure". Repair evaporator fins. Replace evaporator. Refer to HAC-44, "Front Blower Motor Component Function Check".
ow-pressure Side Sometimes	Becomes Negative		
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.	<ul> <li>Air conditioning system does not function and does not cy- clically cool the compart- ment air.</li> <li>The system constantly func- tions for a certain period of time after compressor is stopped and restarted.</li> </ul>	Refrigerant does not discharge cyclically.   Moisture is frozen at expansion valve outlet and inlet.  Water is mixed with refrigerant.	<ul> <li>Drain water from refrigerant or replace refrigerant.</li> <li>Replace liquid tank.</li> </ul>

Low-pressure Side Becomes Negative

# **INSUFFICIENT COOLING**

# < SYMPTOM DIAGNOSIS >

# [AUTOMATIC AIR CONDITIONER]

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles.  If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant.  If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air).  If either of the above methods cannot correct the malfunction, replace expansion valve.  Replace liquid tank.  Check oil for contamination.

### **INSUFFICIENT HEATING**

<	SYI	ΜРТ	MO	DIA	GNC	2.12.0	>

### [AUTOMATIC AIR CONDITIONER]

#### INSUFFICIENT HEATING Α Component Function Check INFOID:0000000011560813 SYMPTOM: Insufficient heating INSPECTION FLOW ${f 1.}$ CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TEMPERATURE INCREASE Press the AUTO switch. Turn the temperature control dial (driver) clockwise until 32°C (90°F) is displayed. Check for hot air at discharge air outlets. D Can this symptom be duplicated? YES >> GO TO 2. NO >> Perform complete system operational check. Refer to <a href="HAC-6">HAC-6</a>, "Operational Check". Е 2.CHECK FOR SERVICE BULLETINS Check for any service bulletins. F >> GO TO 3. 3.PERFORM SELF-DIAGNOSIS Perform self-diagnosis. Refer to HAC-21, "Front Air Control Self-Diagnosis". Is the inspection results normal? Н YES >> GO TO 4. NO >> Refer to HAC-21, "Front Air Control Self-Diagnosis Code Chart". 4. CHECK ENGINE COOLING SYSTEM HAC Check for proper engine coolant level. Refer to CO-10, "Inspection". Check hoses for leaks or kinks. 2. Check radiator cap. Refer to CO-10, "Inspection". Check for air in cooling system. >> GO TO 5. K $oldsymbol{5}.$ CHECK AIR MIX DOOR OPERATION Check the operation of the air mix door. Is the inspection result normal? YES >> GO TO 6. NO >> Check the air mix door motor circuit. Refer to HAC-28, "Air Mix Door Motor (Driver) Component Function Check". M **6.**CHECK AIR DUCTS Check for disconnected or leaking air ducts. N Is the inspection result normal? YES >> GO TO 7. NO >> Repair all disconnected or leaking air ducts. 7.CHECK HEATER HOSE TEMPERATURES Start engine and warm it up to normal operating temperature. Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be warm. Is the inspection result normal? YES >> Hot inlet hose and a warm outlet hose: GO TO 8. NO >> • Inlet hose cold: GO TO 11. · Both hoses warm: GO TO 9. 8.CHECK ENGINE COOLANT SYSTEM

### **INSUFFICIENT HEATING**

#### < SYMPTOM DIAGNOSIS >

#### [AUTOMATIC AIR CONDITIONER]

Check engine coolant temperature sensor. Refer to EC-192, "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 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 <u>VTL-15, "Removal and Installation"</u>.

# 11. CHECK WATER VALVE

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

### Is the inspection result normal?

YES >> System OK.

NO >> Replace water valve.

# **NOISE**

# Component Function Check

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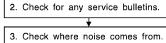
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SYMPTOM: Noise

INSPECTION FLOW

1. Confirm symptom by performing the following operational check. If OK (symptom can not be duplicated), perform complete operational check (\*1).

If NG (symptom is confirmed), continue with STEP-2 following.



4. Check compressor belt and belt tension. NG

(\*2)

Expansion valve

Replace expansion

The line is fixed

Fix the line with

rubber or some

vibration absorbing material.

Loose Belt

Re-adjust belt tension.

directly to the body.

valve. (\*4)

5. Check refrigerant high and low pressure. Use performance chart. (\*3)

Refrigerant line

Belt

The line is not

Fix the line tightly.

Side of belt is worn

Inspect and repair

pulley alignment.

out.

fixed.

Check for noise in Inspect the compressor clutch all modes and

Compressor

temperature and pulley and settings. idler pulley. Noise is OK NG

Check blower Check for Replace commotor for forrefrigerant pressor clutch eign particles. line-to-compressor and pulley or idler pulley (\*5) interference

Check disc-to-pulley

Check torque of compressor mounting bolts. (\*7)

OK

Replace compressor (\*7)

and liquid tank. (\*9)

clearance. (\*6)

Check blower motor and fan for wear

Blower motor

constant

ΟK Check and adjust compressor oil. (\*8)

Check air discharge ducts for obstructions, foreign materials or air leakage.

Noise is

intermittent.

\*2 EM-13, "Checking Drive Belts"

\*5 HA-33, "Removal and Installation"

HA-31, "Removal and Installation"

HAC-86, "Performance Chart"

HA-33, "Removal and Installation"

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HA-41, "Removal and Installation"

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HAC-6, "Operational Check"

HA-43, "Removal and Installation" HA-31, "Removal and Installation"

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# **MEMORY FUNCTION DOES NOT OPERATE**

< SYMPTOM DIAGNOSIS >

[AUTOMATIC AIR CONDITIONER]

INFOID:0000000011560815

# MEMORY FUNCTION DOES NOT OPERATE

# Memory Function Check

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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 <a href="HAC-6">HAC-6</a>, "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 <a href="HAC-21">HAC-21</a>, "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.

### 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 three minutes before performing any service.

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

#### WARNING:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed compressor failure is likely to occur. Refer to <a href="HA-4">HA-4</a>, "Contaminated Refrigerant". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.
- Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
- Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.
- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

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

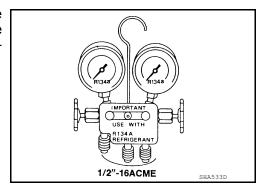
- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location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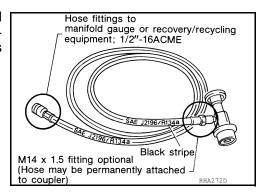
#### MANIFOLD GAUGE SET

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

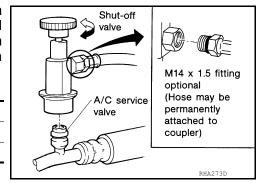
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shutoff devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



### 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 (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	ALIIA06922Z
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AVIIA04782Z

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### **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION >

[MANUAL A/C (TYPE 1)]

## DIAGNOSIS AND REPAIR WORKFLOW

How to Perform Trouble Diagnosis For Quick And Accurate Repair

INFOID:0000000011560820

**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-114, "Front Air Control Self-Diagnosis".

- >> If any diagnostic trouble codes set. Refer to <u>HAC-114, "Front Air Control Self-Diagnosis Code Chart"</u>.
- >> Confirm the repair by performing operational check. Refer to HAC-99, "Operational Check".

### 6. REPAIR OR REPLACE

Repair or replace the specific parts.

>> GO TO 7.

# 7. FINAL CHECK

Final check.

#### Is the inspection result normal?

YES >> Inspection End.

NO >> GO TO 4.

#### INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MANUAL A/C (TYPE 1)]

# INSPECTION AND ADJUSTMENT

Operational Check INFOID:0000000011560821

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

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

#### CHECKING DISCHARGE AIR

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

Mode door position is checked in the next step.

If NG, go to trouble diagnosis procedure for HAC-116, "Mode Door Motor Diagnosis Procedure". If OK, continue the check.

#### NOTE:

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

### CHECKING RECIRCULATION (♥, ♥ ONLY)

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

If NG, go to trouble diagnosis procedure for HAC-126, "Intake Door Motor Diagnosis Procedure". If OK, continue the check.

#### NOTE:

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

#### CHECKING TEMPERATURE DECREASE

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

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

If OK, continue the check.

#### CHECKING TEMPERATURE INCREASE

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

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

If OK, continue with next check.

#### CHECK A/C SWITCH

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

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**HAC-99** Revision: November 2014 2015 Titan NAM

### **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 <a href="HAC-137">HAC-137</a>, "Magnet Clutch Diagnosis Procedure".

If all operational checks are OK (symptom cannot be duplicated), go to <u>HAC-98</u>, "How to <u>Perform Trouble Diagnosis For Quick And Accurate Repair"</u> and perform tests as outlined. If symptom appears, refer to <u>HAC-166</u>, "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)]	AVIIA04782Z

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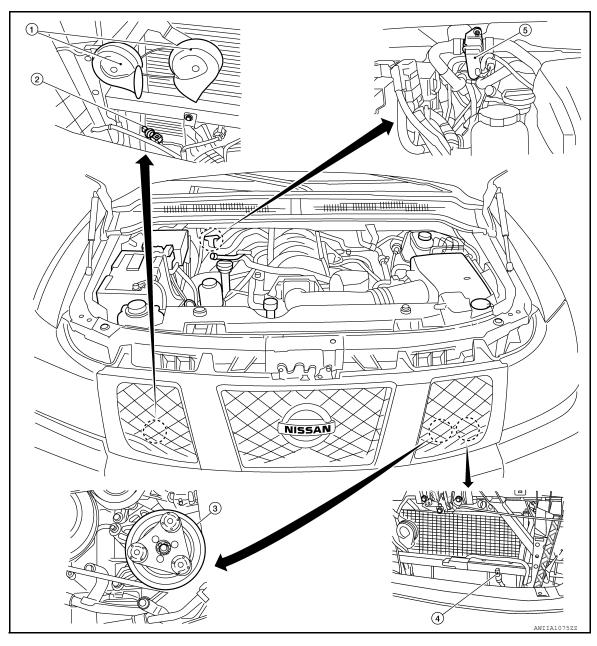
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# **FUNCTION INFORMATION**

# **Component Part Location**

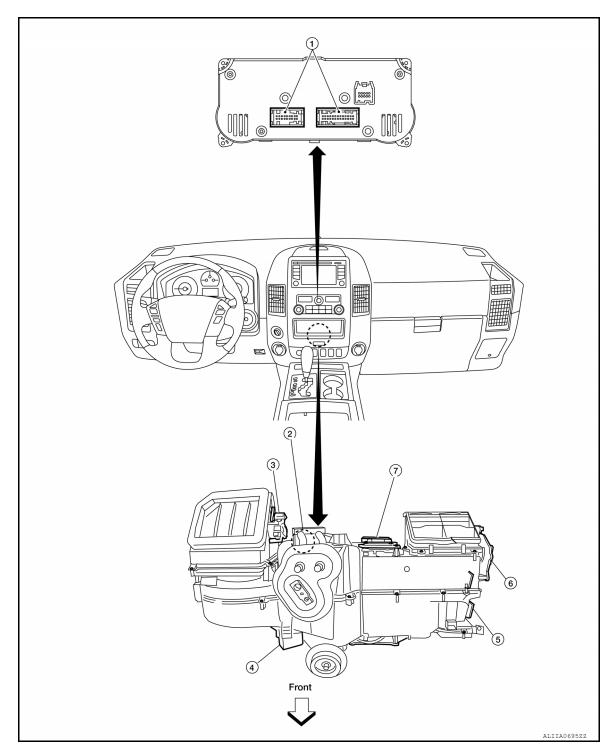
### **ENGINE COMPARTMENT**





- 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

### 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

INFOID:0000000011560824

Symptom	Reference Page		
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.		
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 Door Mater	LIA C 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 Presedure for Air Mix Deer Mater	HAC 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 Travible Diagnosis Breasdays for Intella Dear Mater	UAC 106	
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**

INFOID:0000000011560826

#### REFRIGERANT PRESSURE SENSOR

The refrigerant system is protected against excessively high or low pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends a voltage signal to the ECM. The ECM de-energizes the A/C relay to disengage the magnetic compressor clutch when pressure on the high pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (28 kg/cm², 398 psi), or below about 120 kPa (1.22 kg/cm², 17.4 psi).

# PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 2,990 kPa (30.5 kg/

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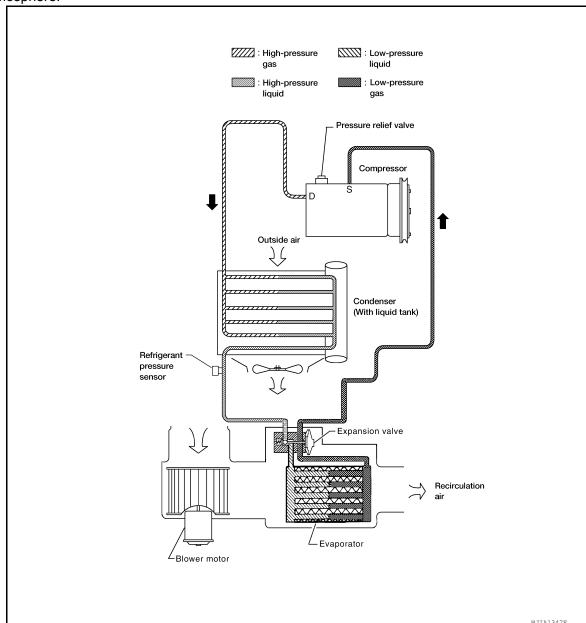
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cm<sup>2</sup>, 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



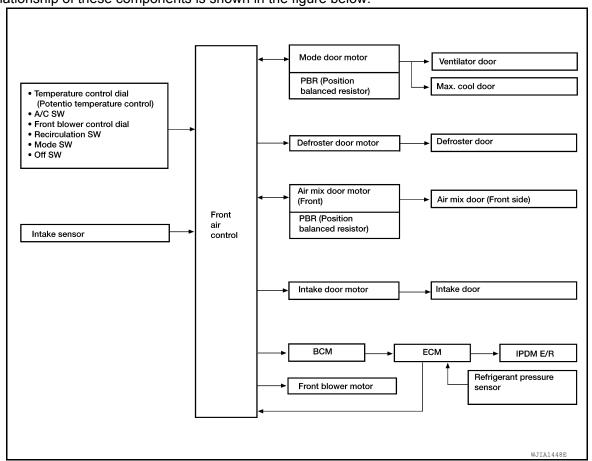
# MANUAL AIR CONDITIONER SYSTEM

# Control System Diagram

#### INFOID:0000000011560827

#### **CONTROL SYSTEM**

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



# **Control System Description**

#### INFOID:0000000011560828

### **CONTROL OPERATION**

# \**\** (\$) ři A/C

**HAC-107** 

Front air control

2015 Titan NAM

Revision: November 2014

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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

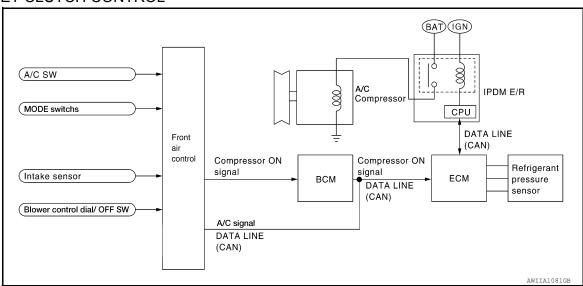
The compressor is ON or OFF.

(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

INFOID:0000000011560829

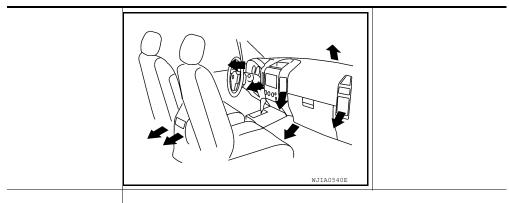
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Mode door position	Air outlet/distribution				
	Vent	Foot	Defroster		
*;	95%	5%	_		
*	60%	40%	_		
·,i	_	70%	30%		
m);	_	60%	40%		
<b>(#)</b>	_	10%	90%		

# Switches And Their Control Function

INFOID:0000000011560830



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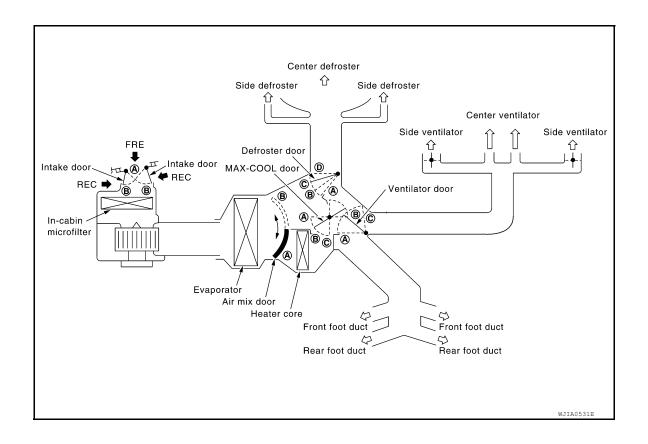
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Position		MOD	E SW		DEF	SW	REC	SW	Tempe	rature	switch	OFF
or	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF			//	SW
switch Door	→•	<b>,</b> > .*		W.	FRONT		<b>(E)</b>		MAX A/C •			
	~	+/~	<b>+</b> ~	+/~	-> ♦ =	0	> ∳ <	0	COLD	~	нот	A/C
Ventilator door	<b>(A)</b>	lacksquare	©	©	©		_	_		_		©
MAX-COOL door	<b>(A)</b>	$^{f B}$	B	lacksquare	©		_	_		_		lacksquare
Defroster door	<b>©</b>	<b>(D)</b>		lacksquare	<b>(A)</b>		_					<b>©</b>
Intake door		_	_		B		A	B		_		lacksquare
Air mix door		_	_		_		_	_	<b>(A)</b>		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	LAC 144 "Ambient Concer Diagnosis Precedure"
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	HAC-147, IIIIake Selisoi 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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# **DIAGNOSIS SYSTEM (BCM)**

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 1)]

# DIAGNOSIS SYSTEM (BCM)

**COMMON ITEM** 

COMMON ITEM: CONSULT Function (BCM - COMMON ITEM)

INFOID:0000000011875474

#### APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM:

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

#### SYSTEM APPLICATION

BCM can perform the following functions:

				Direct D	Diagnosti	c Mode		
System	Sub System	Ecu Identification	Self Diagnostic Result	Data Monitor	Active Test	Work support	Configuration	CAN Diag Support Mntr
Door lock	DOOR LOCK			×	×	×		
Rear window defogger	REAR DEFOGGER			×	×			
Warning chime	BUZZER			×	×			
Interior room lamp timer	INT LAMP			×	×	×		
Remote keyless entry system	MULTI REMOTE ENT			×	×	×		
Exterior lamp	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				×			

# **AIR CONDITIONER**

# **DIAGNOSIS SYSTEM (BCM)**

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 1)]

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

NFOID:0000000011875475

#### **DATA MONITOR**

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

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[MANUAL A/C (TYPE 1)]

## **SELF-DIAGNOSIS FUNCTION**

# Front Air Control Self-Diagnosis

INFOID:0000000011560834

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

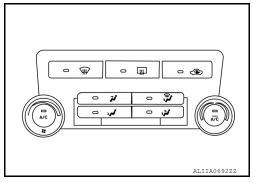
The self-diagnosis function is built into the front air control to quickly locate the cause of malfunctions.

#### **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.



#### Front Air Control Self-Diagnosis Code Chart INFOID:000000011560835

#### 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-144, "Ambient Sensor Diagnosis Procedure"			
41	Ambient sensor circuit open	TIAC-144, Ambient Sensor Diagnosis Procedure			
56	Intake sensor circuit short	- HAC-147, "Intake Sensor Diagnosis Procedure"			
57	Intake sensor circuit open	11/10-147, Intake Sensor Diagnosis Frocedure			
80	CAN bus fault	LAN-14, "Trouble Diagnosis Flow Chart"			
90	Stuck button	VTL-8. "Removal and Installation"			

## MANUAL A/C IDENTIFICATION TABLE

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

# **DTC/CIRCUIT DIAGNOSIS**

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	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:0000000011560837

#### 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

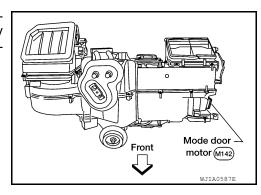
#### System Operation

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:0000000011560838

#### INSPECTION FLOW

# ${f 1}.$ 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 <a href="HAC-116">HAC-116</a>, "Mode Door Motor Diagnosis Procedure".

# Mode Door Motor Diagnosis Procedure

INFOID:0000000011560839

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

#### SYMPTOM:

Air outlet does not change.

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#### < 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 <a href="HAC-111">HAC-111</a>, <a href="CONSULT Function">"CONSULT Function (HVAC)"</a>.
- 3. Observe "MODE FDBCK" voltage while cycling front air control mode switch through all modes.

Monitor Item	Condition	Results
MODE FDBCK	Cycle mode switch through all modes, D/F (��), VENT (�), B/L (�), and FOOT(�)	Voltage varies between D/F ( ) and VENT ( ), and between VENT ( ) and B/L ( ).

#### Is the inspection result normal?

YES >> • Mode door motor is OK.

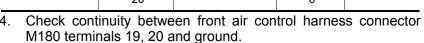
• Inspect mode door for mechanical failure. Refer to VTL-19, "Removal and Installation".

NO >> GO TO 2.

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

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

Α		В	Continuity	
Connector	Terminal	Connector Termin		Continuity
M180	19	M142	5	Yes
IVI 100	20	101142	6	165



Connector	Terminal	_	Continuity
M180	19	- Ground No	
W 100	20	Ground	140

#### Is the inspection result normal?

YES >> GO TO 3.

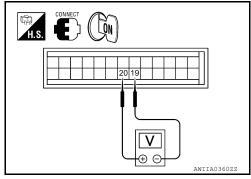
NO >> Repair or replace harness as necessary.

# DISCONNECT OFF AWIIA0361ZZ

# 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	voilage (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	С	В		Continuity
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	NU

#### Is the inspection result normal?

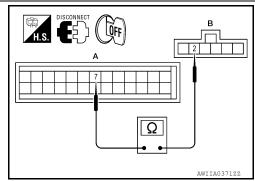
YES >> GO TO 5.

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



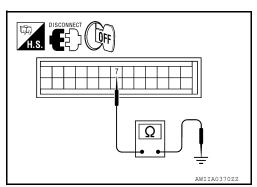
2. Check continuity between front air control harness connector M180 terminal 7 and ground.

Connector	Terminal	_	Continuity
M180	7	Ground	No

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness as necessary.



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

#### MODE DOOR MOTOR

#### < DTC/CIRCUIT DIAGNOSIS >

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

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

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

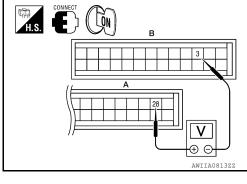
4. Check voltage between front air control harness connector M180 terminal 7 and ground.

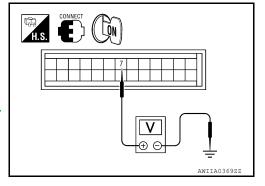
Connector	Terminal	_	Voltage (Approx.)
M180	7	Ground	0 Volts

#### Is the inspection result normal?

YES >> GO TO 7.

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





# 7. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

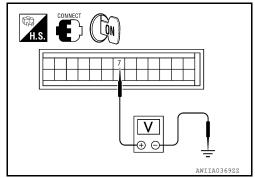
- 1. Reconnect the mode door motor harness connector M142.
- 2. Check voltage between front air control harness connector M180 terminal 7 and ground.

Connector	Terminal	_	Voltage (Approx.)
M180	7	Ground	0.2 to 4.8 Volts

#### Is the inspection result normal?

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

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



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#### AIR MIX DOOR MOTOR

## System Description

#### INFOID:0000000011560840

#### SYSTEM DESCRIPTION

#### SYMPTOM:

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

#### SYSTEM DESCRIPTION

#### Component Parts

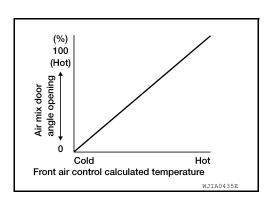
Air mix door control system components are:

- · 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.

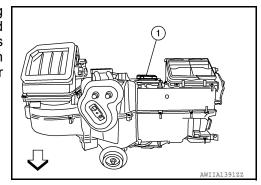
Air Mix Door Control Specification



#### 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:0000000011560841

#### INSPECTION FLOW

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

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

Revision: November 2014 HAC-120 2015 Titan NAM

>> 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 HAC-121, "Air Mix Door Motor Diagnosis Procedure".

## Air Mix Door Motor Diagnosis Procedure

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

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.

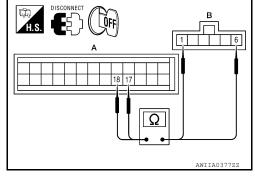
Inspect air mix door for mechanical failure and repair if necessary. If air mix door is OK, refer to
 <u>HAC-167</u>, "Component Function Check" for insufficient cooling or <u>HAC-175</u>, "Component Function Check" for insufficient heating.

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.

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



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#### < DTC/CIRCUIT DIAGNOSIS >

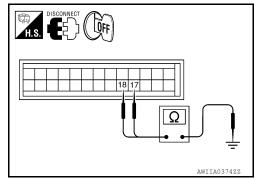
 Check continuity between front air control harness connector M180 terminals 17, 18 and ground.

Connector	Terminal	_	Continuity
M180	17	Ground	No
WITOO	18	Ground	140

#### Is the inspection result normal?

YES >> GO TO 3.

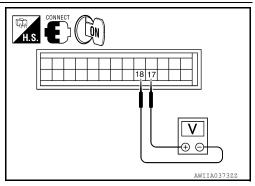
NO >> Repair or replace harness as necessary.



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

- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Rotate temperature control dial to 32°C (90°F).
- 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.)
Connector	(+)	(-)	Condition	voitage (Approx.)
M180	17	18	While rotating temperature control dial from 32°C (90°F) to 18°C (60°F)	Battery voltage
IVITOU	18	17	While rotating temperature control dial from 18°C (60°F) to 32°C (90°F)	Battery voltage



#### Is the inspection result normal?

YES >> GO TO 4.

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

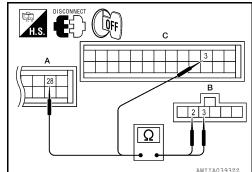
# 4. CHECK AIR MIX DOOR MOTOR PBR CIRCUITS FOR OPEN AND SHORT TO GROUND

- 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, connector M181 (A) terminal 28 and air mix door motor harness connector M147 (B) terminals 3, 2.

A and	С	В	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M180 (C)	3	M147	2	Yes
M181 (A)	28	IVIT+7	3	163

M181 (A) 28 3

4. Check continuity between front air control harness connector 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.

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

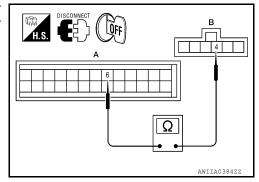
#### AIR MIX DOOR MOTOR

#### < 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



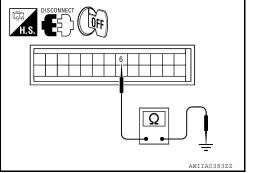
2. Check continuity between front air control harness connector M180 terminal 6 and ground.

Connector	Terminal	_	Continuity
M180	6	Ground	No

#### Is the inspection result normal?

YES >> GO TO 6.

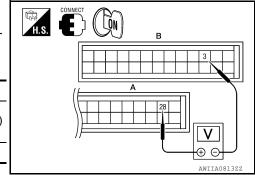
NO >> Repair or replace harness as necessary.



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.

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



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

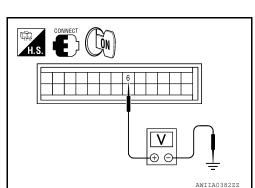
Connector	Terminal	_	Voltage (Approx.)
M180	6	Ground	0 Volts

#### Is the inspection result normal?

YES >> GO TO 7.

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





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#### **AIR MIX DOOR MOTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

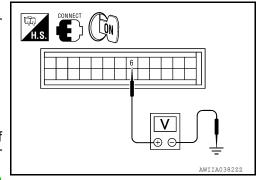
[MANUAL A/C (TYPE 1)]

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

Connector	Terminal	_	Voltage (Approx.)
M180	6	Ground	0.2 to 4.8 Volts

#### Is the inspection result normal?

- YES >> Inspect air mix door for binding or mechanical failure. If air mix door moves freely, replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".
- NO >> Replace air mix door motor. Refer to <u>VTL-20, "Removal and Installation"</u>.



#### INTAKE DOOR MOTOR

# System Description

#### INFOID:0000000011560843

#### SYSTEM DESCRIPTION

#### SYMPTOM:

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

#### SYSTEM DESCRIPTION

#### Component Parts

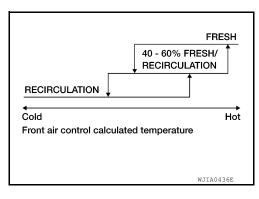
Intake door control system components are:

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

#### System Operation

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

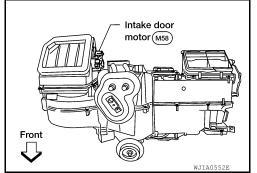
Intake Door Control Specification



#### COMPONENT DESCRIPTION

#### Intake door motor

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



# Intake Door Motor Component Function Check

#### INFOID:0000000011560844

#### INSPECTION FLOW

1.confirm symptom by performing operational check - rec ( $extbf{ extbf{c}}$ )

- Press the vent mode switch (\*\*).
- 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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#### < 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

INFOID:0000000011560845

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

#### DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

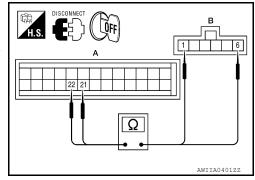
#### SYMPTOM:

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

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M180 (A) and the intake door motor harness connector M58 (B).
- 3. 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	Terminal	Connector	Terminal	Continuity
M180	21	M58	6	Yes
101 100	22	IVIJO	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	INO

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

YES >> GO TO 3.

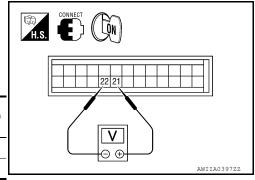
NO >> Repair or replace harness as necessary.

# H.S. CE OFF

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

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

Connector	Tern	ninals	Condition	Voltage (Approx.)	
Connector	(+)	(-)	Condition	voltage (Approx.)	
M180	21	22	Self-diagnostic mode (opening)	Battery voltage	
IVITOU	22	21	Self-diagnostic mode (closing)	Battery voltage	



#### Is the inspection result normal?

YES >> Inspect intake air door for binding or mechanical failure. If intake air door moves freely, replace the intake air door motor. Refer to <a href="VTL-18">VTL-18</a>. "Removal and Installation".

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

#### **DEFROSTER DOOR MOTOR CIRCUIT**

#### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

#### DEFROSTER DOOR MOTOR CIRCUIT

# System Description

#### INFOID:0000000011560846

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#### SYSTEM DESCRIPTION

#### Component Parts

Defroster door control system components are:

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

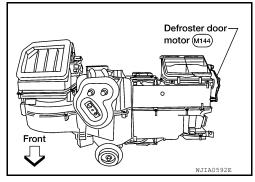
#### **System Operation**

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

#### COMPONENT DESCRIPTION

#### Defroster door motor

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



# Defroster Door Motor Component Function Check

#### INFOID:0000000011560847

#### 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

INFOID:0000000011560848

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.

< DTC/CIRCUIT DIAGNOSIS >

- 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.

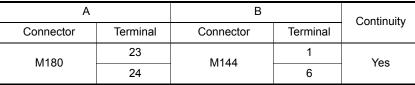
Inspect defroster door for mechanical failure. Refer to <u>VTL-17, "Removal and Installation"</u>.

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.

Α	A B		Continuity	
Connector	Terminal	Connector Terminal		Continuity
M180	23	M144	1	Yes
WITOU	24	101144	6	162



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

Connector	Terminal	_	Continuity
M180	23	Ground	No
	24	Ground	NO

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

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[MANUAL A/C (TYPE 1)]

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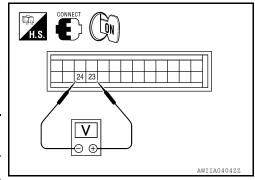
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# 3.CHECK FRONT AIR CONTROL FOR DEFROSTER DOOR MOTOR POWER AND GROUND

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



#### Is the inspection result normal?

YES >> GO TO 4.

#### **DEFROSTER DOOR MOTOR CIRCUIT**

#### < DTC/CIRCUIT DIAGNOSIS >

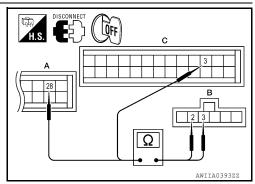
[MANUAL A/C (TYPE 1)]

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

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

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

A and	С	В	Continuity	
Connector	Terminal	Connector Terminal		Continuity
M180 (C)	3	M144	2	Yes
M181 (A)	28	101144	3	163



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?

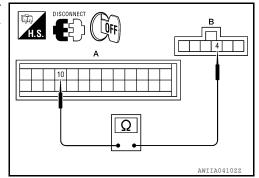
YES >> GO TO 5.

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



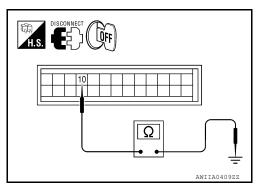
Check continuity between front air control harness connector M180 terminal 10 and ground.

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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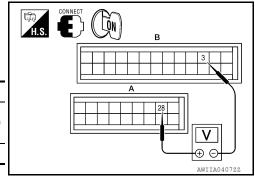
#### **DEFROSTER DOOR MOTOR CIRCUIT**

#### < DTC/CIRCUIT DIAGNOSIS >

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

- 1. Reconnect front air control harness connectors.
- 2. Turn ignition switch ON.
- 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



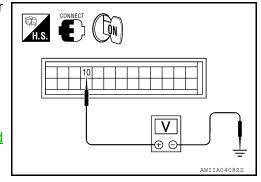
4. Check voltage between front air control harness connector M180 terminal 10 and ground.

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

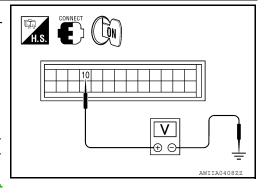
- Reconnect the defroster door motor harness connector M144.
- Check voltage between front air control harness connector M180 terminal 10 and ground.

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

#### Is the inspection result normal?

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

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



# System Description

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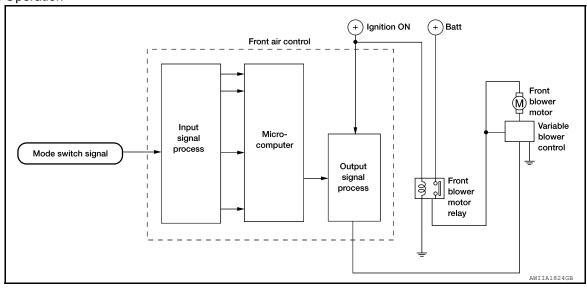
#### SYSTEM DESCRIPTION

#### Component Parts

Blower speed control system components are:

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

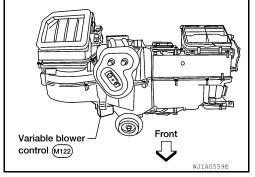
#### System Operation



## COMPONENT DESCRIPTION

#### Variable Blower Control

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



# Front Blower Motor Component Function Check

INFOID:0000000011560850

#### INSPECTION FLOW

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

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

#### Is the inspection result normal?

YES >> Inspection End.

**HAC-131** Revision: November 2014 2015 Titan NAM

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#### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

>> Go to diagnosis procedure. Refer to HAC-132, "Front Blower Motor Diagnosis Procedure".

## Front Blower Motor Diagnosis Procedure

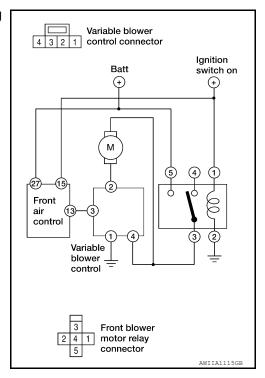
INFOID:0000000011560851

Regarding Wiring Diagram information, refer to HAC-155, "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 HAC-153. "Front Air Control Terminals Reference Values".

#### Fuses are good.

#### Is the inspection result normal?

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

# 2.CHECK FRONT BLOWER MOTOR POWER SUPPLY CIRCUIT

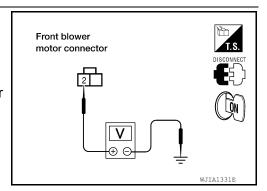
- Turn ignition switch OFF.
- Disconnect front blower motor connector.
- Turn ignition switch ON.
- 4. Press the A/C switch.
- 5. Rotate blower control dial to maximum speed.
- Check voltage between front blower motor harness connector M62 terminal 2 and ground.

#### 2 - Ground

: Battery voltage

#### Is the inspection result normal?

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



#### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

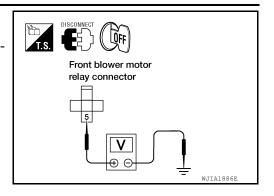
- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor relay.
- Check voltage between front blower motor relay harness connector M107 terminal 5 and ground.

#### 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

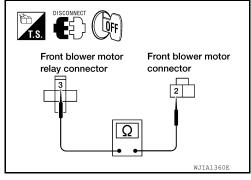
Check continuity between front blower motor relay harness connector M107 terminal 3 and front blower motor harness connector M62 terminal 2.

#### 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.

#### Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair harness or connector.

# 7. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

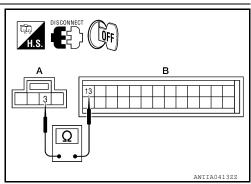
- 1. Disconnect front air control connector.
- 2. Check continuity between front air control harness connector M180 (B) terminal 13 and variable blower control harness connector M122 (A) terminal 3.

# 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)]

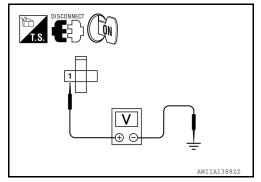
- Turn ignition switch ON.
- Check voltage between front blower motor relay harness connector M107 terminal 1 and ground.

#### 1 - Ground : Battery voltage

#### Is the inspection result normal?

YES >> GO TO 9.

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



## 9. REPLACE FUSES

- Replace fuses.
- Activate the front blower motor.

#### Does the fuse blow?

YES >> GO TO 10.

NO >> Inspection End.

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

- Turn ignition switch OFF.
- Disconnect front blower motor connector and variable blower control connector.
- Check continuity between variable blower control harness connector 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 HAC-131, "Front Blower Motor Component Function Check".

#### Is the inspection result normal?

YES >> GO TO 13.

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

# 13.CHECK BLOWER MOTOR GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

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

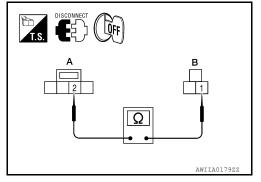
Check continuity between front blower motor harness connector M62 (B) terminal 1 and variable blower control harness connector M122 (A) terminal 2.

## 1 - 2 : Continuity should exist.

#### Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair harness or connector.



# 14. CHECK VARIABLE BLOWER CONTROL GROUND CIRCUIT

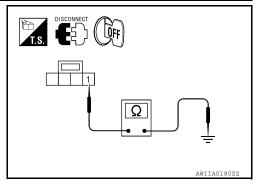
Check continuity between variable blower control harness connector M122 terminal 1 and ground.

# 1 - Ground : Continuity should exist.

#### Is the inspection result normal?

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

NO >> Repair harness or connector.

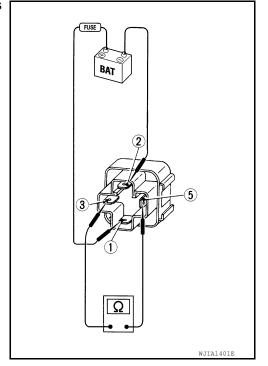


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#### Front Blower Motor Component Inspection

#### 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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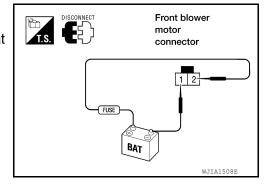
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## < DTC/CIRCUIT DIAGNOSIS >

[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

INFOID:0000000011560854

#### INSPECTION FLOW

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

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

#### Is the inspection result normal?

YES >> Inspection End.

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

## Magnet Clutch Diagnosis Procedure

INFOID:0000000011560855

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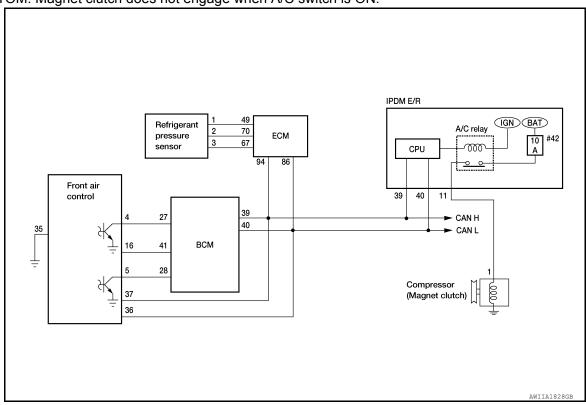
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SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



# 1. CHECK INTAKE AND AMBIENT SENSOR CIRCUITS

Check intake and ambient sensors. Refer to <a href="HAC-114">HAC-114</a>, "Front Air Control Self-Diagnosis".

#### Is the inspection result normal?

YES >> GO TO 2.

NO

>> • Malfunctioning intake sensor. Refer to <a href="HAC-147">HAC-147</a>, "Intake Sensor Diagnosis Procedure".

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

## PERFORM AUTO ACTIVE TEST

Refer to PCS-11, "Diagnosis Description".

#### Does magnet clutch operate?

YES >> • (♠)W

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

#### 11 – 1 : Continuity should exist.

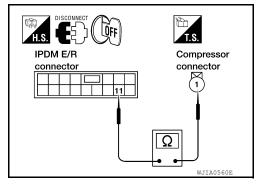
4. Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

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

#### Is the inspection result normal?

YES >> GO TO 4.

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#### < DTC/CIRCUIT DIAGNOSIS >

NO >> Repair harness or connector.

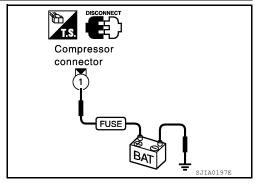
# f 4.CHECK MAGNET CLUTCH CIRCUIT

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".



# 5. CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to <u>BCS-24</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 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?

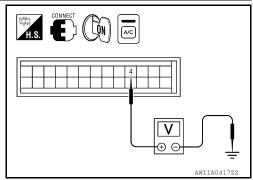
YES >> GO TO 7.

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
IVI 100	4	Giodila	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-56, "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.	(-)			
F54	70	Ground	A/C switch: ON	Approx. 1.0 - 4.0V	

#### Is the inspection result normal?

YES >> GO TO 9.

NO >> Refer to EC-488, "Diagnosis Procedure".

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to <u>BCS-24, "AIR CONDITIONER: CONSULT Function (BCM - AIR CONDITIONER)"</u>.

FRONT BLOWER CONTROL : FAN ON SIG ON

**DIAL ON** 

FRONT BLOWER CONTROL : FAN ON SIG OFF

**DIAL OFF** 

#### Is the inspection result normal?

YES >> GO TO 12. NO >> GO TO 10.

# 10.check circuit continuity between BCM and front air control

- Turn ignition switch OFF.
- Disconnect BCM connector and front air control connector.
- Check continuity between BCM harness connector M18 (A) terminal 28 and front air control harness connector M180 (B) terminal 5.

# 28 - 5 Continuity should exist.

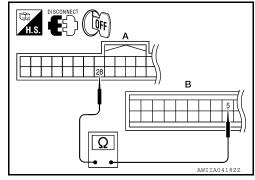
- Check continuity between BCM harness connector M18 (A) terminal 28 and ground.
  - 28 ground Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

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



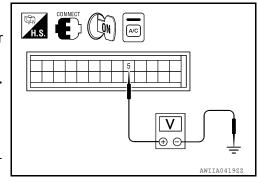
#### **MAGNET CLUTCH**

#### < 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-56</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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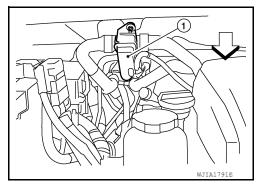
#### WATER VALVE CIRCUIT

**Description** 

#### COMPONENT DESCRIPTION

#### Water Valve

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



# Water Valve Diagnosis Procedure

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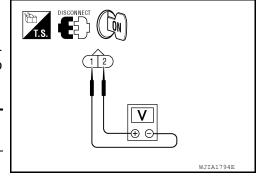
Regarding Wiring Diagram information, refer to <u>HAC-155</u>, "Wiring Diagram - <u>Manual With 2 Control Dial System"</u>.

#### 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?

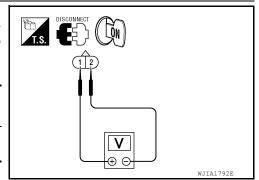
YES >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

NO >> Repair harness or connector.

# 3. CHECK WATER VALVE POWER AND GROUND CIRCUITS

- 1. Rotate temperature control dial to maximum cold.
- 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
	(+)	(-)	Condition	(Approx.)
Water valve: F68	1	2	Rotate temperature control dial	Battery voltage



#### Is the inspection result normal?

YES >> Replace the water valve.

NO >> GO TO 4.

# 4. CHECK WATER VALVE CONTROL OUTPUT CIRCUIT

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

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

#### 1 - 41 : Continuity should exist.

Check continuity between water valve harness connector F68

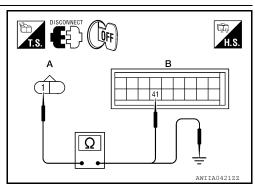
 (A) terminal 1 and ground.

## 1 - Ground : Continuity should not exist.

#### Is the inspection result normal?

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

NO >> Repair harness or connector.



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#### AMBIENT SENSOR

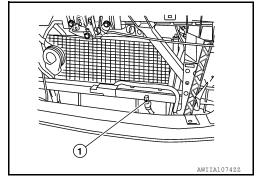
## **Component Description**

#### INFOID:0000000011560858

#### 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.

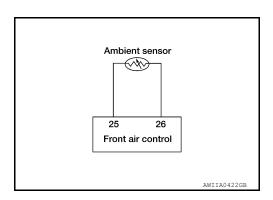
This prevents constant adjustments due to momentary conditions, such as stopping after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front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

## Ambient Sensor Diagnosis Procedure

INFOID:0000000011560859

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

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



1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND

### AMBIENT SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

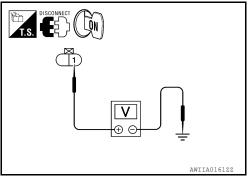
[MANUAL A/C (TYPE 1)]

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

#### 1 - Ground : Approx. 5V

#### Is the inspection result normal?

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



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

- Turn ignition switch OFF.
- Disconnect front air control connector.
- 3. Check continuity between ambient sensor harness connector E1 (B) terminal 2 and front air control harness connector M180 (A) terminal 26.

#### 2 - 26 : Continuity should exist.

### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

# 3. CHECK AMBIENT SENSOR

Check the ambient sensor circuit. Refer to HAC-144, "Ambient Sensor Diagnosis Procedure". Is the inspection result normal?

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

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

NO Replace ambient sensor. Refer to HA-45, "Removal and Installation". >> 1.

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

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

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

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

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

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

# Is the inspection result normal?

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

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

NO >> Repair harness or connector.

# Ambient Sensor Component Inspection

## COMPONENT INSPECTION

**Ambient Sensor** 

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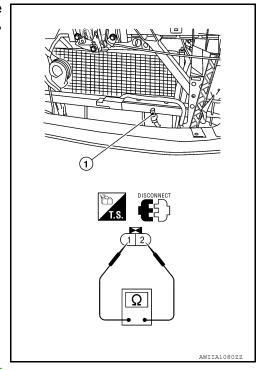
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### < DTC/CIRCUIT DIAGNOSIS >

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

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

# **INTAKE SENSOR**

# System Description

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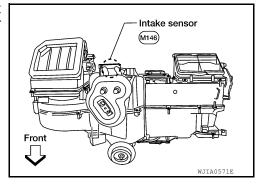
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#### COMPONENT DESCRIPTION

#### 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.



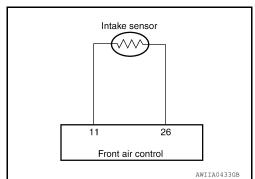
# Intake Sensor Diagnosis Procedure

INFOID:0000000011560862

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.



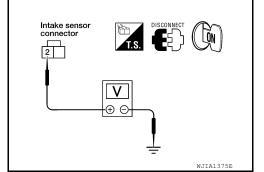
# 1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

- 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 <a href="VTL-8">VTL-8</a>, "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.

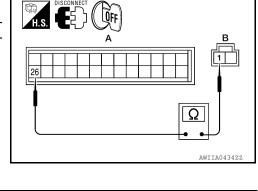
# Intake Sensor Component Inspection

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#### COMPONENT INSPECTION

Intake Sensor



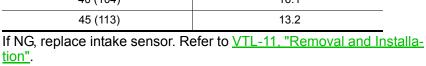
## **INTAKE SENSOR**

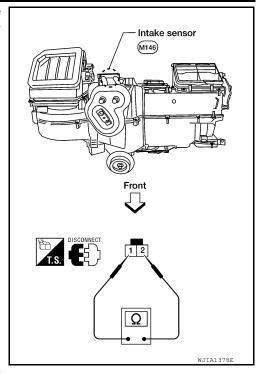
### < DTC/CIRCUIT DIAGNOSIS >

## [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 $\Omega$
-15 (5)	209.0
-10 (14)	160.0
-5 (23)	123.0
0 (32)	95.8
5 (41)	74.9
10 (50)	58.9
15 (59)	46.7
20 (68)	37.3
25 (77)	30.0
30 (86)	24.2
35 (95)	19.7
40 (104)	16.1
45 (113)	13.2





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# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

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# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

# Component Description

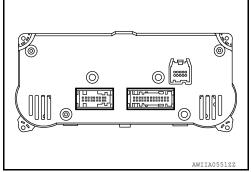
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## COMPONENT DESCRIPTION

#### Front Air Control

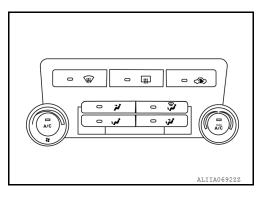
The front air control has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, defroster door motor, blower motor and A/C compressor are then controlled.

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.



#### INFOID:0000000011560865

# 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

- Turn the blower control dial clockwise to low speed.
- Press the A/C Turn the blower control dial clockwise to low speed.
- 3. Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>HAC-150</u>, "Front Air Control Power and Ground Diagnosis Procedure".

# Front Air Control Power and Ground Diagnosis Procedure

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

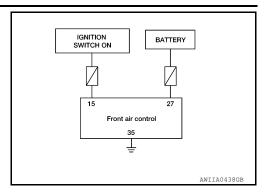
#### DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

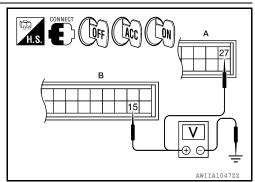
SYMPTOM: A/C system does not come on.



# 1. CHECK POWER SUPPLY CIRCUITS FOR FRONT AIR CONTROL

- 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 HAC-153, "Front Air Control Terminals Reference Values".
  - 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.

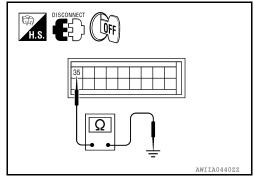
#### 35 - Ground

: 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

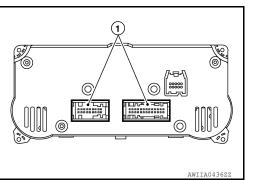
Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	ALIIA0692ZZ
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AMIIA0478ZZ

INFOID:0000000011560868

# 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
<del>-</del>	v v / F\$		ON	A/C switch ON	0V
5	L/R	Fan ON signal	ON	Blower switch OFF	5V
<u> </u>		. 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	vvaler varve	ON	Water valve closed	0V
42	W/G	Water valve	ON	Water valve open	0V
44	W/G	vvalci vaive	ON	Water valve closed	Battery voltage

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

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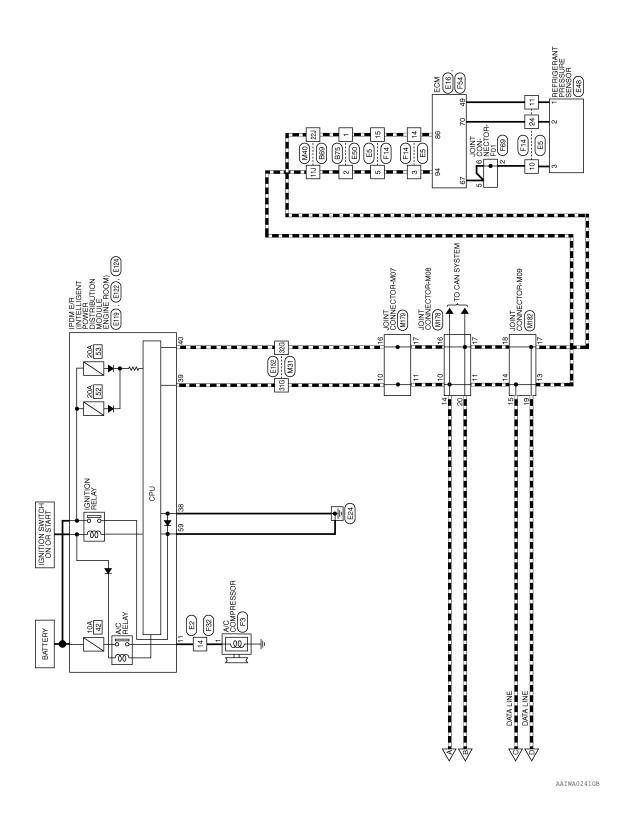
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# WIRING DIAGRAM

# AIR CONDITIONER CONTROL

Wiring Diagram - Manual With 2 Control Dial System

В С CC CREW CAB D Е F Н AIR CONDITIONER CONTROL - MANUAL WITH 2 CONTROL DIAL SYSTEM (13) HAC M181 J FRONT AIR CONTROL (M180) 20A K LJOINT CONNECTOR-M04 (M194) (E152) (M31) INTAKE SENSOR (M146) M \$ JOINT CONNECTOR-M09 (M182) M31 Ν IGNITION SWITCH ON OR START 0 \$ Р 10A BATTERY



M19 BCM (BODY CONTROL MODULE) WHITE  RRANGE RATE RATE  1 51 52 53 54 55  1 51 52 53 54 55  1 51 52 53 54 55  Signal Name  Rear Defogger SW	M39 FUSE BLOCK (J/B) WHITE Signal Name R Signal Name R	A B
M19   M019   M019   M019   M0119   M	Connector No. M39 Connector Name FUSE BLOC Connector Color WHITE  Sociol Solution  Terminal No. Wire Sign  4Q Y/R	D E
ROL DIAL		F
VITH 2 CONT  ODY CONTROL  E)  Signal Name  AIRCON SW  LOWER FAN SW  CAN-H  CAN-H	Signal Name	G H
Or No. M18 Sor Name BCM (B MODUL Cor Color WHITE S 6 7 8 9 10 24 25 26 27 28 29 30 30 4	Oolor of Wire Wine Wine Wine Wine Wine Wine Wine Win	НА
Connector No.   Connector Name   Connector Name   Connector Color   Connector Name   Connector Na	Terminal No. 4G 6G 6G 32G 32G 35G 59G 61G	J
		K
_     o	M31  NWHITE  WHITE  1G 2G 3G 4G 5G  1G 2G 3G 3G 3G 5G  1G 2G 3G 3G 3G 3G  1G 2G 3G 3G 3G 3G  1G 3G 3G 3G 3G  1G 3G 3G 3G  1G  1G 3G  1G  1G 3G  1G  1G 3G  1G  1G 3G  1G  1G  1G 3G  1G  1G  1G  1G  1G  1G  1G  1G  1G	L
AIR CONDITIONER CONTRO  Connector No. M3 Connector Color WHITE  M.S. Nine No. Wire Signal Nam  5N Y/G -	ctor No.	N
AIR COnne Conne Conne Termin	O O O O O O O O O O O O O O O O O O O	0
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Conpector No	MAO						Γ
Connector Name	- 1	WIRE TO WIRE	Terminal No.	Wire	Signal Name	Connector Name INTAKE DOOR MOTOR	Τ
Connector Color	r WHITE	111	117	_	ı		
	4		227	۵	ı	_	
原 H.S.	1 6	1. 2. 3. 4.1 5.1 6.1 7.1 8.1 9.4 10.1				H.S.	
<u>-</u>	11J 12J 13J 14J 22J 23J 24J	11.1 12.1 13.1 14.1 15.1 16.1 17.1 18.1 19.1 20.1 21.1 22.1 23.1 24.1 25.1 25.1 25.1 25.1 25.1 25.1 25.1 25				Terminal No. Color of Wire Signal Name	
	1 00 100 100	1 1 20 1 20 1 20 1 20 1 20 1 20 1 30 1 40 1 44 1				1 0 -	
امنا رم	51.0 52.0 53.0 54.0 62.0 63.0 64.0	1   22   23   24   24   24   24   24   24				6 G/B –	
	71) 72) 73) 74)	77.1 72.1 72.1 72.1 72.1 72.1 72.1 72.1					
	96	91. 921 931 941 953					
Connector No.	M62		Connector No.	o. M107	7(	Connector No. M122	
Connector Name Connector Color		FRONT BLOWER MOTOR BLACK	Connector Name Connector Color		FRONT BLOWER RELAY BLACK	Connector Name DIAL SYSTEM OR AUTO	
	난				3	Connector Color WHITE	
H.S.		7	H.S.		4 0	H.S.	
Terminal No.	Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name	Terminal No. Color of Wire Signal Name	
-	ΓW	1	-	Y/G	I	1 B/W –	
2	M/L	ı	2	В	- (2 CONTROL DIAL SYSTEM OR AUTO A/C)	2 LW -	
			ო	M/L	ı		
			4	ı	ı		
			2	GR	1		

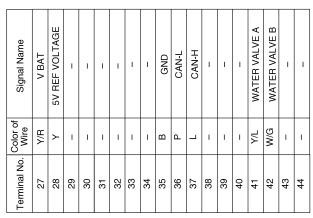
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		a a						-M07		2 1 12 11 10	<u>ə</u>							
KE SENSOR	[2]	Signal Name	1	1				JOINT CONNECTOR-M07	ш	6 5 4 3 16 15 14 13	Signal Name	1	1	I	I			
Connector No. M146 Connector Name INTAKE SENSOR Connector Color GRAY			- V/B	9/			or No. M179			9 8 7	I No. Wire	_		۵	Д.			
Connector No. Connector Col	H.S.	Terminal No.	- 0	N			Connector No.	Connect	Connect	赋 H.S.	Terminal No.	10	=	16	17			
	]																	
DEFROSTER DOOR MOTOR BLACK	3 4 5 6	Signal Name	1	1   1	1 1	ı		JOINT CONNECTOR-M08		7 6 5 4 3 2 1 1 10 17 16 15 14 13 12 11 10	Signal Name	I	I	1	ı	ı	1	
	1 2 3 4	O,	LG	r >	LG/B	P/B	No. M178	Vame JOINT	Color WHITE	9 8	o. Wire	_	l l	l L	۵	<u> </u>	<u>a</u>	
Connector Name	原 H.S.	Terminal No.	- 0	N (c	9 4	9	Connector No.	Connector Name	Connector Color	是 H.S.	Terminal No.	10	11	14	16	17	50	
										I								
Connector Color BLACK	3 4 5 6	Signal Name	I	1   1	1	1		X DOOR R (DRIVER)		3 4 5 6	Signal Name	1	_	I	1	1		
ame MODE	1 2	္ပိ>	> 6	<u> </u>	BR/W	P/L	). M147	ame AIR MIX MOTOR	olor BLACK	1 2 1	Color of Wire	W/G	Ь	<b>&gt;</b>	SB	5		
Connector Name	H.S.	Terminal No.	- 0	v «	2 2	9	Connector No.	Connector Name AIR MIX DOOR MOTOR (DRIVER)	Connector Color	原 H.S.	Terminal No.	-	2	3	4	9		
																_	ABIIA1417GB	

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Connector No.	M181
Connector Name	Connector Name (WITH MANUAL 2 CONTROL CONTROL DIAL SYSTEM)
Connector Color WHITE	WHITE





Terminal No.	Color of Wire	Signal Name
10	LG/B	DEFROST FEEDBACK
11	L/B	EVAP TEMP SENSOR
12	1	1
13	G/R	FRONT BLWR SPEED
14	1	ı
15	Y/G	V IGN
16	Y/B	REAR DEF REQUEST
17	W/G	DRVR BLND DR A
18	G	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	ГG	DEFROST DR A
24	P/B	DEFROST DR B
25	Ь	AMB TEMP SEN
26	V/R	SENS RETURN

													ľ
Connector No.	ġ		Σ	M180	_								
Connector Name (WITH MANUAL 2 CONTROL DIAL SYSTEM)	Van	<u>e</u>	ES3	FRONT AIR CC (WITH MANUAI DIAL SYSTEM)	トーの	₹Ş\		FRONT AIR CONTROL (WITH MANUAL 2 CON DIAL SYSTEM)	2 C	일은	.片	Į Į	
Connector Color BLACK	응	Ž	ᆸ	AC	×								
													_ F
itit	13	12	Ξ	9	6	8	7	13 12 11 10 9 8 7 6 5 4 3 2	4	က	2	-	
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Signal Name	ı	ı	V REF RET	AC REQ	FAN ON	DRVR BLND DR FB	PNL/FLR DR FB	+ ILLUM +	ILLUM -
Color of Wire	ı	1	Д	W/R	L/R	SB	GR	B/L	BR
Terminal No.	-	2	3	4	2	9	2	8	6

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Terminal No.   Color of   Signal Name   13   Y/R   -	H.S. [9   8   7   6   5   4   3   2   1   1   1   1   1   1   1   1   1
Terminal No.   Color of   Signal Name   13   Y/R     -	Color of
13   Y/R       14   Y/R       Connector No.   E2     Connector Name   WIRE TO WIRE     Connector Color   WHITE     Connector Color   WHITE     Connector Color   WHITE     Terminal No.   Color of   Signal Name     14   Y/B	D N
14   Y/R	10 Y
Connector No.   E2   Connector Name   WIRE TO WIRE   Connector Color   WHITE   S   F   T   T   T   T   T   T   T   T   T	- <del> </del>
Connector No.   E2   Connector Name   WIRE TO WIRE   Connector Color   WHITE	12 Y
Connector No.   E2   Connector Name   WIRE TO WIRE   Connector Color   WHITE   S   S   S   S   S   S   S   S   S	14 Y –
Connector No.   E2   Connector Name   WIRE TO WIRE   Connector Color   WHITE   Signal Name   Signa	18 P –
P	19 P
Connector No.   E2   Connector Name   WIRE TO WIRE   Connector Color   WHITE   Connector Color   WHITE   Signal Name   Color of   Signal Name   Terminal No.   Color of   Signal Name   Terminal No.   VWire   Signal Name   Terminal No.   VWire   Signal Name   Terminal No.   VWire   Signal Name   Terminal No.   Color of   Signal Name   Terminal No.   VWire   Signal Name   Terminal No.   Color of   Signal Name   Terminal No.   VWire   Signal Name   Terminal No.   Color of   Signal Name   Terminal Na	20 P
Connector No.   E2   Connector Name   WIRE TO WIRE   Connector Color   WHITE	_
Connector No.   E2	
Connector Name   WIRE TO WIRE	Connector No. E5
GRAY   Connector Color   WHITE	Connector Name WIRE TO WIRE
S	Connector Color WHITE
lat No. Color of Signat Name Terminal No. Wire Signat Name 14 Y/B – 14 Y/B	1 2 3 4 5 6
P – 14 Y/B – – 14 V/B	Terminal No. Color of Wire Signal Name
G/A	
1	3 -
2	- I
	7 W/G –
10	10 B –
=	11 R/Y –
14	14 P –
15	15 P –
24	24 B/W –

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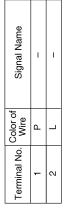


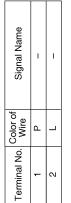
Signal Name

Color of Wire ₽ B/W В

Terminal No.

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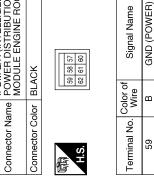


E124	Connector Name POWER DISTRIBUTION MODULE ENGINE ROOM)	3LACK
Connector No.	Connector Name	Connector Color BLACK

E122

Connector No.

Connector Name Connector Color



IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
WHITE
42 41 40 39 38 37

11 40 39 38 37	17 46 45 44 43	
41 40	47 46	
42	48	

Signal Name	GND (SIGNAL)	CAN-H	CAN-L
Color of Wire	В	7	Ь
Terminal No.	38	39	40

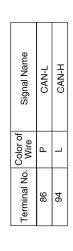
E16	CM	LACK		114 89 88 87 86 85 84 83 82	97 96 95 94 93 92 91 90	1	105 104 103 102 101 100 99 98	119 113 112 111 110 109 108 107 106
Connector No.	Connector Name ECM	Connector Color BLACK		116 115 114	S	118 117		121 120 119

Connector

BLACK

Connector Color

Connector No. E48



	ġ.	Terminal No.	11
9 8 7 6 18 17 16 15		Color of Wire	Y/B
9 8 7 6 5 4 3 18 17 16 15 14 13 12 11 10		Signal Name	A/C COMPRESSOF

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Connector Name   A/C COMPRESSOR   Connector Color   BLACK   H.S.   Color of   Signal Name   1   Y/B   -	Connector No.   F32   Connector Name   WIRE TO WIRE   Connector Color   WHITE
	Signal Name
Wire   W/R   W/G   W/G	Color of Wire P P P P P P P P P P P P P P P P P P P
4G 6G 6G 32G 34G 35G 59G 61G	Terminal No. 11 11 15 24 24
Connector Name   WIRE TO WIRE	Connector No. F14  Connector Name WIRE TO WIRE  Connector Color WHITE  Time in

Revision: November 2014 HAC-163 2015 Titan NAM

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Connector No. F54	Connector No. F68	Connector No. F69
Connector Name ECM	Connector Name WATER VALVE	Connector Name JOINT CONNECTOR-F01
Connector Color BLACK	Connector Color   GRAY	Connector Color GRAY
Q. Q.	<	4
(83 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80		
1		
Terminal No. Color of Signal Name	Terminal No. Color of Signal Name	Terminal No. Color of Signal Name
Wile D/V	D	ב ב
B 8		n a
70 B/W PD PRESS		
Connector No.   B69	Color of	Connector No.   B75
e	l erminal No. Wire Signal Name	l e
Connector Color WHITE		Connector Color BROWN
	22J P –	
5 4 3 2 11		
100 80 73 81		
21.1 200 150 150 150 150 150 150 150 150 150 1		Terminal No. Color of Wire Signal Name
300 280 280 273 280 273 280 223 223		- d
41) 40) 380 881 871 38.] 35.] 34.] 32.] 31.] 501 401 401 401 47.] 46.] 47.] 40.]		2 L – –
81.1 80.0 75.0 77.0 76.0 75.0 75.0 75.0 75.0 77.0 75.0 75.0 75		
951 954 952 953 951 951 951 951 951 951 951 951 951 951		

## 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)]	AMIIA047822

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## AIR CONDITIONER CONTROL

## < SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 1)]

# AIR CONDITIONER CONTROL

# Symptom Matrix Chart

INFOID:0000000011560871

## SYMPTOM TABLE

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

YES >> GO TO 8.

NO >> Check cooling fan motor. Refer to EC-381, "Diagnosis Procedure".

8.CHECK WATER VALVE OPERATION

Check and verify water valve for smooth operation. Refer to HAC-142, "Description".

Does water valve operate correctly?

YES >> GO TO 9.

**HAC-167** Revision: November 2014 2015 Titan NAM

#### 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 <u>HAC-178</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-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 <u>HAC-168</u>, "<u>Diagnostic Work Flow</u>".

NO >> GO TO 13.

# 13. CHECK AIR DUCTS

Check ducts for air leaks.

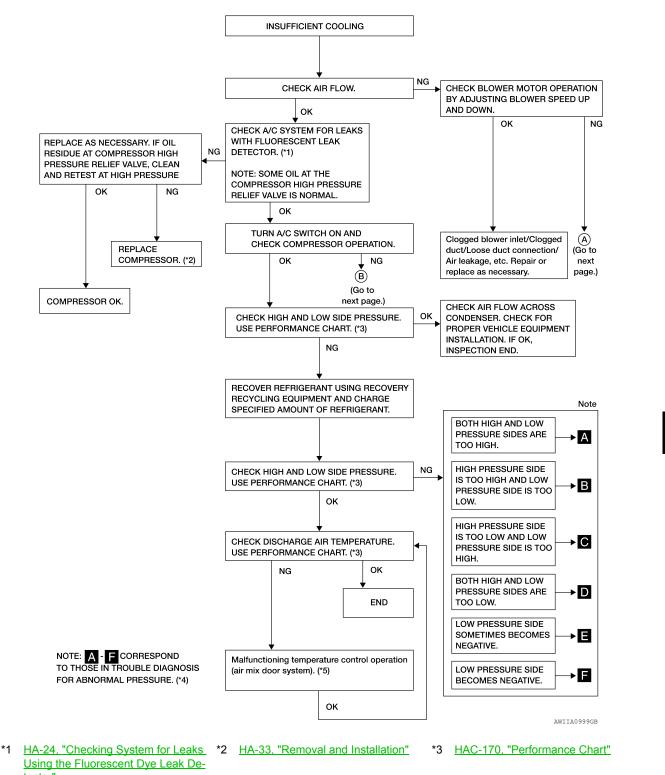
#### Is the inspection result normal?

YES >> System OK.

NO >> Repair air leaks.

# Diagnostic Work Flow

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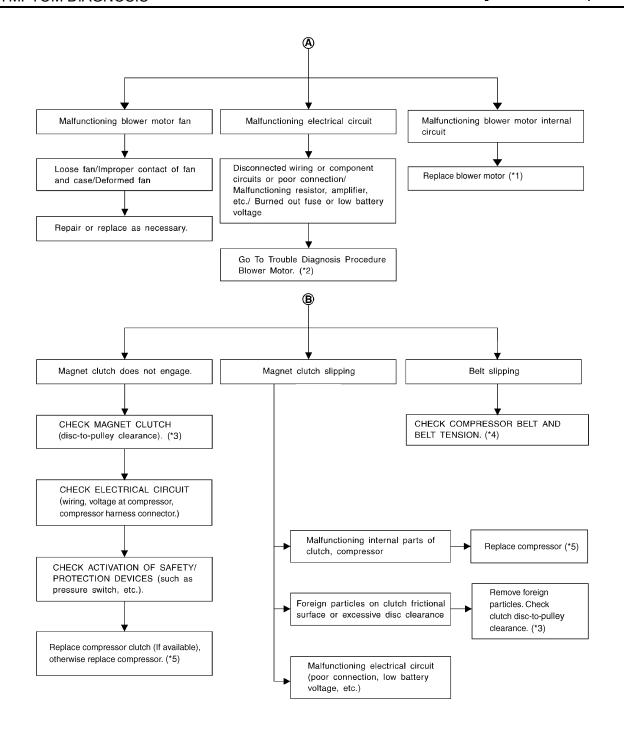
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- \*1 VTL-12, "Removal and Installation"
- \*2 HAC-131, "Front Blower Motor Com- \*3 HA-33, "Removal and Installation" ponent Function Check"
- \*4 EM-13, "Checking Drive Belts"
- \*5 HA-33, "Removal and Installation"

#### 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

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

#### Ambient Air Temperature-to-operating Pressure Table

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

# Trouble Diagnoses for Abnormal Pressure

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

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

Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until speci- fied pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance  ↓  1. Condenser fins are clogged.  2. Improper fan rotation of cooling fan	<ul> <li>Clean condenser.</li> <li>Check and repair cooling fan if necessary.</li> </ul>
	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.
	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cooling system.
	<ul> <li>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>Plates are sometimes covered with frost.</li> </ul>	<ul> <li>Excessive liquid refrigerant on low-pressure side</li> <li>Excessive refrigerant discharge flow</li> <li>Expansion valve is open a little compared with the specification.</li> <li>Improper expansion valve adjustment</li> </ul>	Replace expansion valve.

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

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

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

# **INSUFFICIENT COOLING**

# [MANUAL A/C (TYPE 1)]

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper.  ↓  Damaged inside compressor packings.	Replace compressor.
(IO HI) AC356A	sides.		Replace compressor.
Soth High- and Low-pressure S	Sides are Too Low		
Gauge indication	Refrigerant cycle	Probable cause	Corrective action
	There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	Replace liquid tank.     Check oil for contamination.
	Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. Expansion valve inlet may be frosted. Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	<ul> <li>Check and repair malfunctioning parts.</li> <li>Check oil for contamination.</li> </ul>
Both high- and low-pressure sides are too low.	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge. ↓ Leaking fittings or components.	Check refrigerant system for leaks. Refer to HA-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.	<ul> <li>Remove foreign particles by using compressed air.</li> <li>Check oil for contamination.</li> </ul>
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	Check and repair malfunctioning parts.     Check oil for contamination.
	Air flow volume is too low.	Evaporator is frozen.	Check intake sensor circuit. Refer to HAC-147, "Intake Sensor Diagnosis Procedure". Repair evaporator fins. Replace evaporator. Refer to HAC-131, "Front Blower Motor Component Function Check".

Low-pressure Side Sometimes Becomes Negative

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

INSUFFICIENT REATING	
< SYMPTOM DIAGNOSIS >	[MANUAL A/C (TYPE 1)]
INSUFFICIENT HEATING	
Component Function Check	INFOID:0000000011560876
SYMPTOM: Insufficient heating	
INSPECTION FLOW	
1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK - TE	EMPERATURE INCREASE
<ol> <li>Turn the blower control dial to low speed.</li> <li>Turn the temperature control dial clockwise to maximum heat</li> <li>Check for hot air at discharge air outlets.</li> </ol> Can this symptom be duplicated?	
YES >> GO TO 2.  NO >> Perform complete system operational check. Refer to HAC-99  2.CHECK FOR SERVICE BULLETINS	"Operational Check".
Check for any service bulletins.	
>> If equipped with NAVI, GO TO 3. >> If not equipped with NAVI, GO TO 4.	
3.PERFORM SELF-DIAGNOSIS	
Perform self-diagnosis. Refer to <u>HAC-114</u> , "Front Air Control Self-Diagnosi  Is the inspection results normal?  YES >> GO TO 4.  NO >> Refer to <u>HAC-166</u> , "Symptom Matrix Chart".	<u>s"</u> .
4. CHECK ENGINE COOLING SYSTEM	
<ol> <li>Check for proper engine coolant level. Refer to <u>CO-10, "Inspection"</u>.</li> <li>Check hoses for leaks or kinks.</li> <li>Check radiator cap. Refer to <u>CO-10, "Inspection"</u>.</li> <li>Check for air in cooling system.</li> </ol>	
>> GO TO 5.	
5. CHECK AIR MIX DOOR OPERATION	
Check the operation of the air mix door.  Is the inspection result normal?	
YES >> GO TO 6. NO >> Check the air mix door motor circuit. Refer to HAC-120, "Air M Check".	x Door Motor Component Function
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	
<ol> <li>Start engine and warm it up to normal operating temperature.</li> <li>Touch both the inlet and outlet heater hoses. The inlet hose should be warm.</li> </ol>	hot and the outlet hose should be
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	

• 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-192, "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.

# **NOISE**

# Component Function Check

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SYMPTOM: Noise

INSPECTION FLOW

1. Confirm symptom by performing the following operational check. If OK (symptom can not be duplicated), perform complete operational check (\*1). If NG (symptom is confirmed), continue with STEP-2 following. 2. Check for any service bulletins. 3. Check where noise comes from. 4. Check compressor belt and belt tension. NG (\*2) 5. Check refrigerant high and low pressure. Use performance chart. (\*3) Blower motor Compressor Expansion valve Refrigerant line Belt Inspect the com-Check for noise in Replace expansion pressor clutch all modes and valve. (\*4) temperature and pulley and settings. idler pulley. Noise is OK NG constant Check blower Check for Replace com-The line is not The line is fixed motor for forrefrigerant pressor clutch fixed. directly to the body. eign particles. line-to-compressor and pulley or idler pulley (\*5) interference Fix the line tightly. Check blower Check disc-to-pulley Fix the line with motor and fan rubber or some clearance. (\*6) for wear vibration absorbing material. Check torque of compressor mounting bolts. (\*7) ΟK Check and adjust Loose Belt Side of belt is worn compressor oil. out. (\*8)OK Noise is Re-adjust belt tension. Inspect and repair intermittent. pulley alignment. Replace compressor (\*7) Check air discharge and liquid tank. (\*9) ducts for obstructions, foreign materials or air leakage.

\*1 HAC-99, "Operational Check"

\*2 EM-13, "Checking Drive Belts"

\*3 EM-13, "Checking Drive Belts"

\*4 HA-43, "Removal and Installation"\*7 HA-31, "Removal and Installation"

\*5 HA-33, "Removal and Installation"

\*6 HA-33, "Removal and Installation"

HA-31, "Removal and Installation" \*9 HA-41

\*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 three minutes before performing any service.

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

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#### **WARNING:**

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed compressor failure is likely to occur. Refer to <a href="HA-4">HA-4</a>, "Contaminated Refrigerant". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.
- Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
- Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers
- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

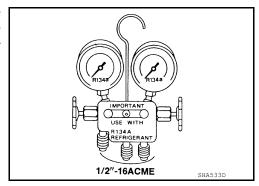
#### If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

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

# Precaution for Service Equipment

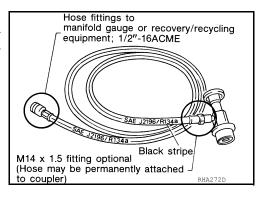
#### MANIFOLD GAUGE SET

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



## SERVICE HOSES

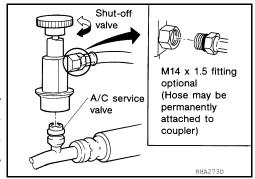
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shutoff devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



## SERVICE COUPLERS

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

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



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# **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	ALIIA06922Z
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AVIIA04782Z

## **DIAGNOSIS AND REPAIR WORKFLOW**

DIAGNOSIS AND REPAIR WORKFLOW	
< BASIC INSPECTION > [MANUAL A/C (TYPE 2	2)]
DIAGNOSIS AND REPAIR WORKFLOW	
How to Perform Trouble Diagnosis For Quick And Accurate Repair	60882
WORK FLOW	
1.LISTEN TO CUSTOMER COMPLAINT	
Listen to customer complaint. Get detailed information about the conditions and environment when the syntom occurs.	<del></del>
>> 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, "Operational Check"</u> .	
>> GO TO 4.	
4.GO TO APPROPRIATE TROUBLE DIAGNOSIS	
Go to appropriate trouble diagnosis. Refer to HAC-243, "Symptom Matrix Chart".	
0.0 7.0 5	
>> GO TO 5.  5.REPAIR OR REPLACE	ŀ
Repair or replace the specific parts.	
>> GO TO 7.	
6. FINAL CHECK	
Final check.	
Is the inspection result normal?	
YES >> Inspection End. NO >> GO TO 4.	

#### INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

[MANUAL A/C (TYPE 2)]

## INSPECTION AND ADJUSTMENT

Operational Check

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

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

#### CHECKING BLOWER

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

If NG, go to trouble diagnosis procedure for <u>HAC-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 <a href="HAC-252">HAC-252</a>, "Component Function Check". If air mix door motor appears to be malfunctioning, go to <a href="HAC-202">HAC-202</a>, "Air Mix Door Motor Diagnosis Procedure".

If OK, continue with next check.

#### CHECK A/C SWITCH

- 1. Press A/C switch.
- Confirm that the compressor clutch engages (sound or visual inspection).

#### NOTE:

If current mode setting is DEF or D/F, compressor clutch will already be engaged and cannot be turned off.

#### **INSPECTION AND ADJUSTMENT**

#### < BASIC INSPECTION >

[MANUAL A/C (TYPE 2)]

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

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[MANUAL A/C (TYPE 2)]

# SYSTEM DESCRIPTION

# MANUAL A/C IDENTIFICATION TABLE

Application Table

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

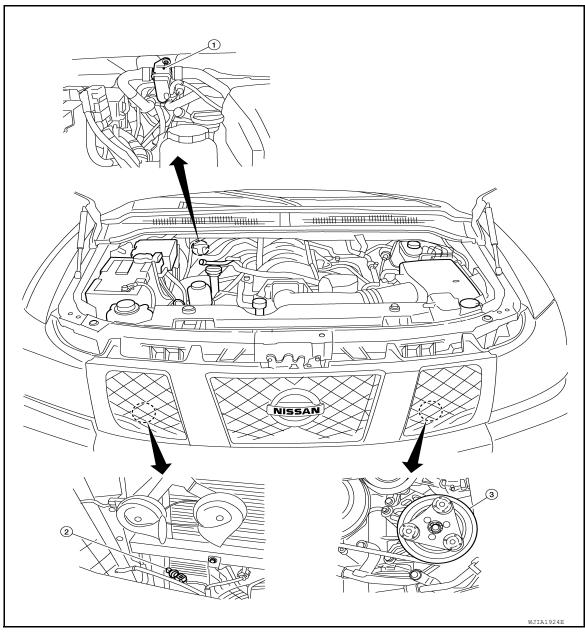
# [MANUAL A/C (TYPE 2)]

INFOID:0000000011560885

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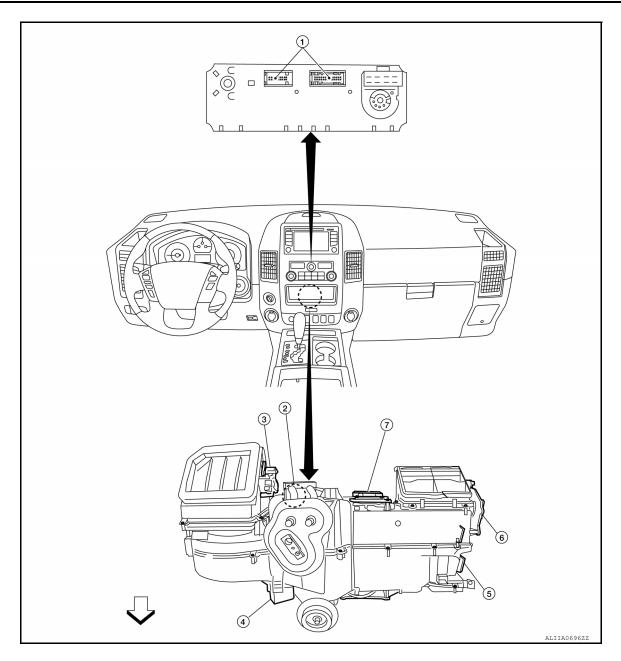
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- 1. Front air control M176, M177
- 4. Variable blower control M121
- 7. Air mix door motor M147
- 2. Intake sensor M146
- 5. Mode door motor M142
- 3. Intake door motor M58
- 6. Defroster door motor M144

## **FUNCTION INFORMATION**

## < SYSTEM DESCRIPTION >

# [MANUAL A/C (TYPE 2)]

# Symptom Table

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Symptom	Reference Page		
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	HAC-227	
Air outlet does not change.	Co to Trouble Diagnosis Procedure for Made Deer Motor	HAC 107	
Mode door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Mode Door Motor.	<u>HAC-197</u>	
Discharge air temperature does not change.	Co to Trouble Diagnosis Procedure for Air Miy Door Motor	HAC 201	
Air mix door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor.	<u>HAC-201</u>	
Intake door does not change.	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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INFOID:0000000011560887

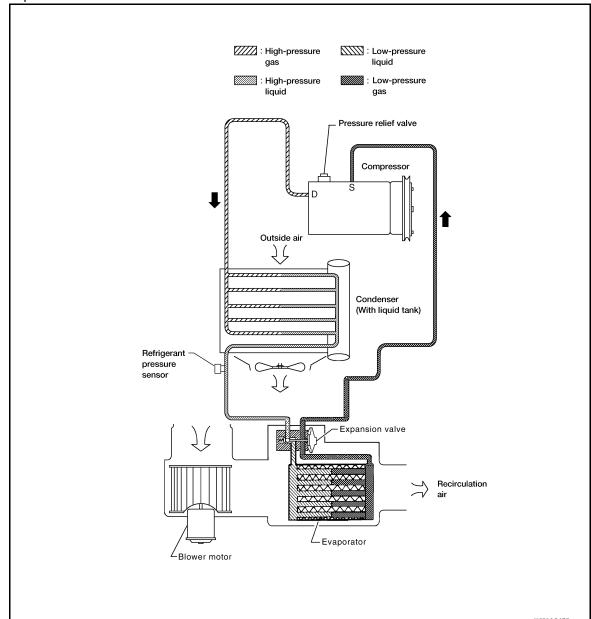
#### REFRIGERANT PRESSURE SENSOR

The refrigerant system is protected against excessively high or low pressures by the refrigerant pressure sensor, located on the condenser. If the system pressure rises above or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends a voltage signal to the ECM. The ECM de-energizes the A/C relay to disengage the magnetic compressor clutch when pressure on the high pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (28 kg/cm², 398 psi), or below about 120 kPa (1.22 kg/cm², 17.4 psi).

## PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 2,990 kPa (30.5 kg/

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



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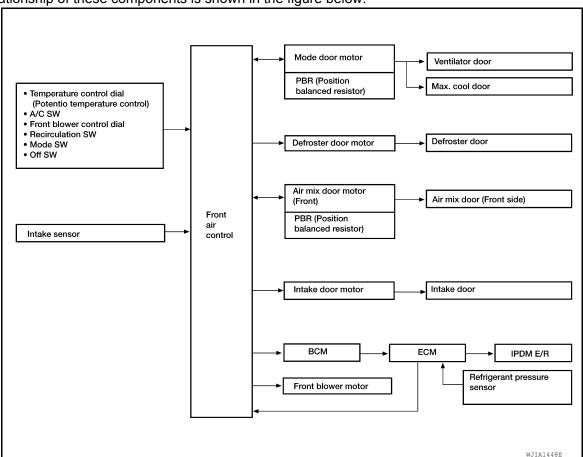
# MANUAL AIR CONDITIONER SYSTEM

# Control System Diagram

#### INFOID:0000000011560889

#### **CONTROL SYSTEM**

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

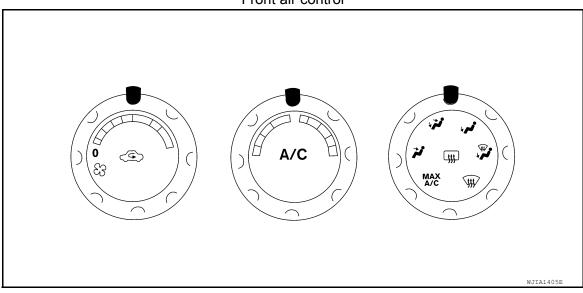


# Control System Description

INFOID:0000000011560890

#### **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

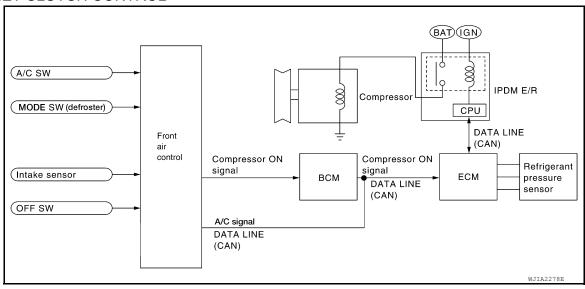
The compressor is ON or OFF.

(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.

**HAC-191** 

# Discharge Air Flow

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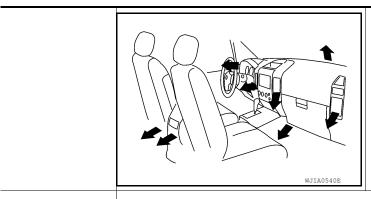
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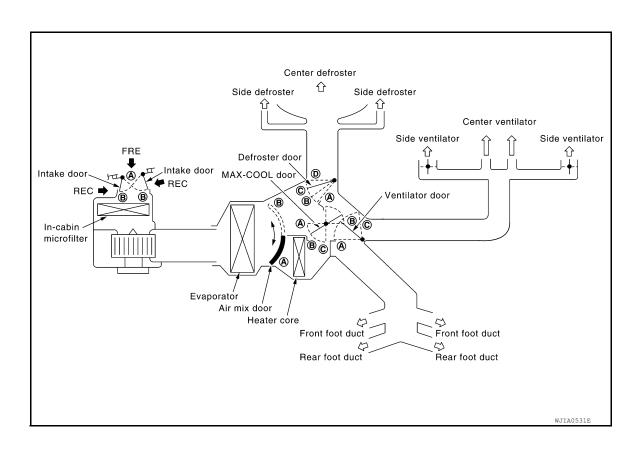
2015 Titan NAM



Mode door position	le door position Air outlet		
	Vent	Foot	Defroster
~;	95%	5%	_
Ÿ	60%	40%	_
·,i	_	70%	30%
	_	60%	40%
<b>\tag{P}</b>	_	10%	90%

# Switches And Their Control Function

INFOID:0000000011560892



## MANUAL AIR CONDITIONER SYSTEM

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 2)]

Position		MOD	E SW		DEF	SW	REC	SW	Tempe	erature	switch	OFF
or	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF	(	J	\	sw
switch	<b>→ •</b>	_ <b>&gt;</b> .		<b>(4)</b>	_	₹ \ 140	Ç	<b>₹</b> >	(>)	A/C	(1)	
	<b>~</b>	+/~	+,~	+,~	<u>-</u>	0	÷ • =	0	COLD	~	нот	
Ventilator door	<b>(A)</b>	B	©	©	©		_	_				©
MAX-COOL door	<b>(A)</b>	B	B	B	©		_	_				B
Defroster door	<b>(D)</b>	<b>(D)</b>	<b>O</b> or <b>©</b>	B	<b>(A)</b>	_	_	_		_		©
Intake door		_	_		B		<b>(A)</b>	B				B
Air mix door		_	_				_	_	A		B	

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# **DIAGNOSIS SYSTEM (BCM)**

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 2)]

# DIAGNOSIS SYSTEM (BCM)

**COMMON ITEM** 

COMMON ITEM: CONSULT Function (BCM - COMMON ITEM)

INFOID:0000000011875476

#### APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM:

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

#### SYSTEM APPLICATION

BCM can perform the following functions:

				Direct D	Diagnosti	c Mode		
System	Sub System	Ecu Identification	Self Diagnostic Result	Data Monitor	Active Test	Work support	Configuration	CAN Diag Support Mntr
Door lock	DOOR LOCK			×	×	×		
Rear window defogger	REAR DEFOGGER			×	×			
Warning chime	BUZZER			×	×			
Interior room lamp timer	INT LAMP			×	×	×		
Remote keyless entry system	MULTI REMOTE ENT			×	×	×		
Exterior lamp	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				×			

## **AIR CONDITIONER**

# **DIAGNOSIS SYSTEM (BCM)**

< SYSTEM DESCRIPTION >

[MANUAL A/C (TYPE 2)]

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

IFOID:0000000011875477

#### **DATA MONITOR**

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

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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	ALIIA06922Z
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AWIIA0478ZZ

[MANUAL A/C (TYPE 2)]

#### MODE DOOR MOTOR

## System Description

#### INFOID:0000000011560896

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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

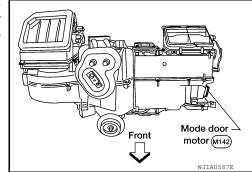
#### System Operation

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.



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# Mode Door Motor Component Function Check

#### INSPECTION FLOW

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

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

#### NOTE:

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

#### Is the inspection result normal?

YES >> Inspection End.

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

## Mode Door Motor Diagnosis Procedure

INFOID:0000000011560898

INFOID:0000000011560897

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

#### SYMPTOM:

Air outlet does not change.

**HAC-197** Revision: November 2014 2015 Titan NAM

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- · Mode door motor does not operate normally.

 ${f 1}$  .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).
- 3. 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	IVITAZ	6	165

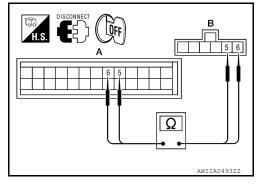
 Check continuity between front air control harness connector M176 terminals 5, 6 and ground.

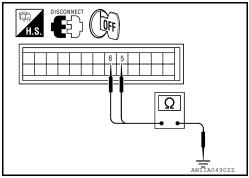
Connector	Terminal	_	Continuity	
M176	5	Ground	No	
IVI I 7 O	6	Giodila	INO	

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

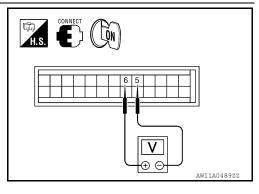




# 2.CHECK FRONT AIR CONTROL FOR MODE DOOR MOTOR POWER AND GROUND

- 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	
WITO	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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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

#### MODE DOOR MOTOR

## < DTC/CIRCUIT DIAGNOSIS >

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

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

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

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

H.S. DISCONNECT OFF	
2 15	
B 11 3 11	
Ω AWIIA0498ZZ	

Connector	Terminal —		Continuity	
M176	2	Ground	No	
	15	Ground	140	

#### Is the inspection result normal?

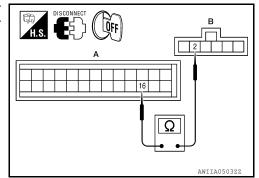
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

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

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



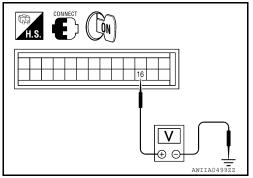
Check continuity between front air control harness connector M176 terminal 16 and ground.

Connector	Terminal	_	Continuity
M176	16	Ground	No

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace harness as necessary.



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

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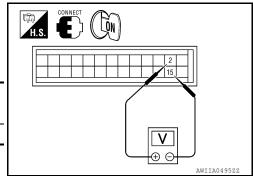
#### MODE DOOR MOTOR

#### < DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

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

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



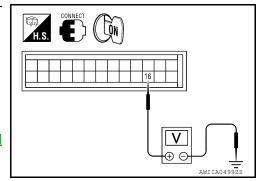
4. Check voltage between front air control harness connector M176 terminal 16 and ground.

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

#### Is the inspection result normal?

YES >> GO TO 7.

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



## 6. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

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

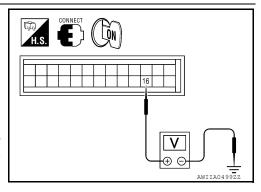
Connector	Terminal	_	Voltage (Approx.)
M176	16	Ground	0.2 to 4.8 Volts

#### 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:0000000011560899

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#### SYSTEM DESCRIPTION

#### SYMPTOM:

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

#### SYSTEM DESCRIPTION

#### Component Parts

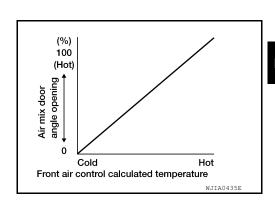
Air mix door control system components are:

- 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.

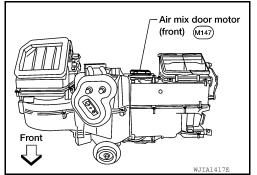
Air Mix Door Control Specification



#### 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:0000000011560900

#### INSPECTION FLOW

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

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

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>> GO TO 2.

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

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

#### Is the inspection result normal?

YES >> Inspection End.

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

## Air Mix Door Motor Diagnosis Procedure

INFOID:0000000011560901

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

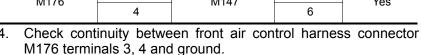
#### SYMPTOM:

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

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

- 1. Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector 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

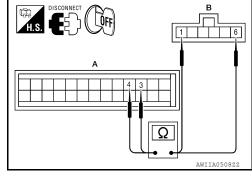


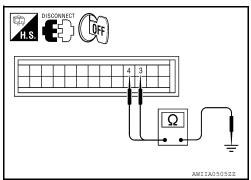
Connector	Terminal	_	Continuity
M176	3	Ground	No
	4	Ground	NO

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness as necessary.





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

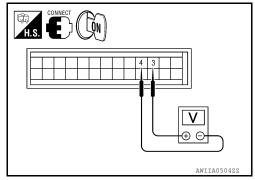
#### **AIR MIX DOOR MOTOR**

#### < 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	voltage (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?

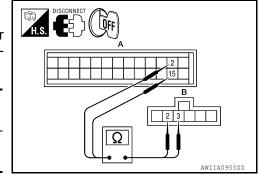
YES >> GO TO 4.

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

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

- Turn ignition switch OFF.
- 2. Disconnect the front air control harness connector M176 (A).
- 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.

А		В		Continuity
Connector	Terminal	Connector Terminal		Continuity
M176	15	M147	2	Yes
IVI 1 7 O	2	101147	3	165



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

Connector	Terminal	_	Continuity
M176	15	Ground	No
	2	Glound	INO

#### Is the inspection result normal?

YES >> GO TO 5.

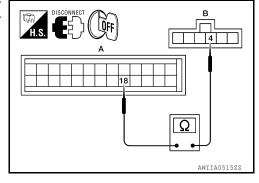
NO

>> Repair or replace harness as necessary.

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

 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 >

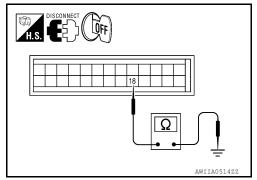
Check continuity between front air control harness connector M176 terminal 18 and ground.

Connector	Terminal	_	Continuity
M176	18	Ground	No

#### Is the inspection result normal?

YES >> GO TO 6.

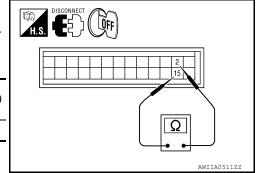
NO >> Repair or replace harness as necessary.



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

- 1. 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 AWIIA051322

# 6. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

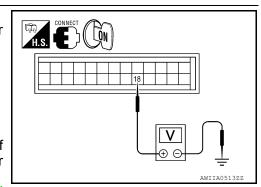
- Reconnect the air mix door motor harness connector M147.
- 2. Check voltage between front air control harness connector M176 terminal 18 and ground.

Connector	Terminal	_	Voltage (Approx.)
M176	18	Ground	0.2 to 4.8 Volts

#### Is the inspection result normal?

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

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



#### INTAKE DOOR MOTOR

# System Description

#### INFOID:0000000011560902

#### SYSTEM DESCRIPTION

#### SYMPTOM:

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

#### SYSTEM DESCRIPTION

#### Component Parts

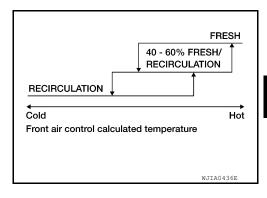
Intake door control system components are:

- Front air control
- Intake door motor (PBR built into the intake door motor)
- · Intake sensor

#### **System Operation**

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

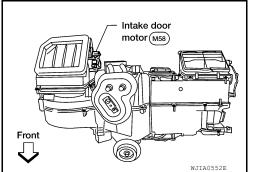
Intake Door Control Specification



#### COMPONENT DESCRIPTION

#### Intake door motor

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



# Intake Door Motor Component Function Check

#### INFOID:0000000011560903

#### 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.
- 3. Press REC ( ) switch again. The REC ( ) indicator should go out.
- 4. Listen for intake door position change (you should hear blower sound change slightly).

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#### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to HAC-206, "Intake Door Motor Diagnosis Procedure"

## Intake Door Motor Diagnosis Procedure

INFOID:0000000011560904

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

#### DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

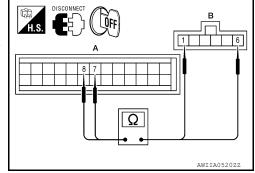
#### SYMPTOM:

- · 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.

А		В	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
M176	8	M58	6	Yes
WITTO	7	IVIJO	1	163



 Check continuity between front air control harness connector M176 terminals 8, 7 and ground.

Connector	Terminal	_	Continuity
M176	8	Ground	No
W176	7	Ground	INO

# H.S. DISCONNECT OFF

#### Is the inspection result normal?

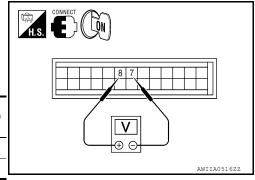
YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

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

- 1. Reconnect front air control harness connector.
- 2. Turn ignition switch ON.
- 3. Check voltage between front air control harness connector M176 terminal 8 and terminal 7 while placing the HVAC system into self-diagnostic mode.

Connector	Tern	ninals	Condition	Voltage (Approx.)
Connector	(+)	(-)	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 <a href="VTL-18">VTL-18</a>, "Removal and Installation".
- NO >> Replace front air control. Refer to VTL-8, "Removal and Installation".

#### DEFROSTER DOOR MOTOR CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

## DEFROSTER DOOR MOTOR CIRCUIT

# System Description

INFOID:0000000011560905

#### SYSTEM DESCRIPTION

#### Component Parts

Defroster door control system components are:

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

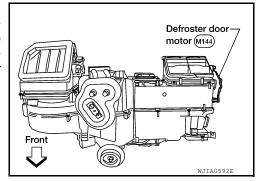
#### System Operation

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

#### COMPONENT DESCRIPTION

#### Defroster door motor

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



# Defroster Door Motor Component Function Check

INFOID:0000000011560906

#### 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

INFOID:0000000011560907

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

#### SYMPTOM:

Defroster door does not change.

Revision: November 2014

· Defroster door motor does not operate normally.

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

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#### DEFROSTER DOOR MOTOR CIRCUIT

### < DTC/CIRCUIT DIAGNOSIS >

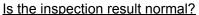
#### [MANUAL A/C (TYPE 2)]

- 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
WITO	20	101144	6	165

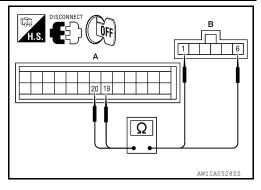
 Check continuity between front air control harness connector M176 terminals 19, 20 and ground.

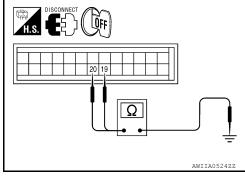
Connector	Terminal	_	Continuity
M176	19	Ground	No
	20	Ground	INU



YES >> GO TO 3.

NO >> Repair or replace harness as necessary.

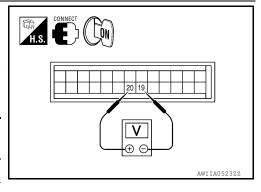




# 2.CHECK FRONT AIR CONTROL FOR DEFROSTER DOOR MOTOR POWER AND GROUND

- 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.

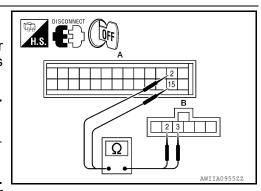
NO >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

# 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.

A		В		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M176	2	M144	3	Yes	
WITTO	15	101144	2	163	

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



#### < DTC/CIRCUIT DIAGNOSIS >

Connector	Terminal	_	Continuity
M176	2	Ground	No
	15	Giodila	NO

#### Is the inspection result normal?

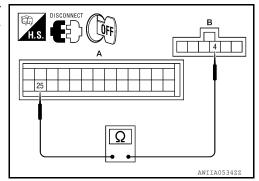
YES >> GO TO 5.

NO >> Repair or replace harness as necessary.

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

1. Check continuity between front air control harness connector M176 (A) terminal 25 and defroster door motor harness connector M144 (B) terminal 4.

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



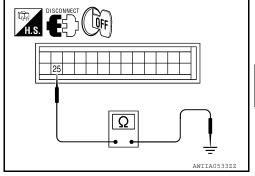
Check continuity between front air control harness connector M176 terminal 25 and ground.

Connector	Terminal	_	Continuity
M176	25	Ground	No

#### Is the inspection result normal?

YES >> GO TO 6.

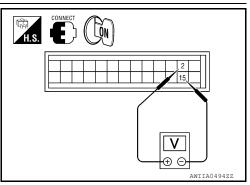
NO >> Repair or replace harness as necessary.



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

- 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	(+)	Connector	(-)	voilage (Approx.)
M176	2	M176	15	5 Volts



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#### **DEFROSTER DOOR MOTOR CIRCUIT**

#### < 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 AWIIA053222

# 6. CHECK FRONT AIR CONTROL FOR FEEDBACK SIGNAL

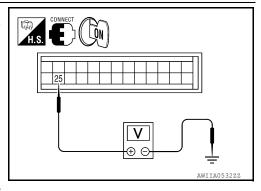
- 1. Reconnect the defroster door motor harness connector M144.
- 2. Check voltage between front air control harness connector M176 terminal 25 and ground.

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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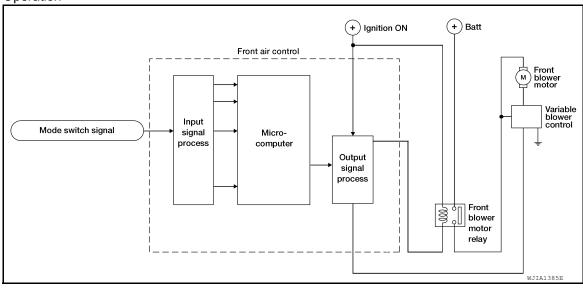
## SYSTEM DESCRIPTION

#### **Component Parts**

Blower speed control system components are:

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

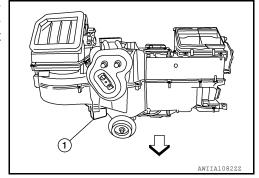
#### **System Operation**



#### 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:0000000011560909

#### **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 <a href="HAC-212">HAC-212</a>. "Front Blower Motor Diagnosis Procedure"

Revision: November 2014 HAC-211 2015 Titan NAM

## Front Blower Motor Diagnosis Procedure

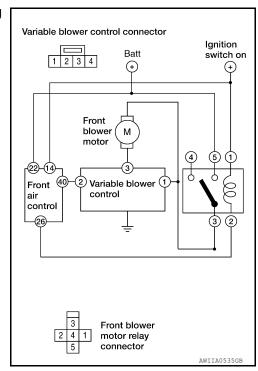
INFOID:0000000011560910

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>HAC-230</u>, <u>"Front Air Control Terminals Reference Values"</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

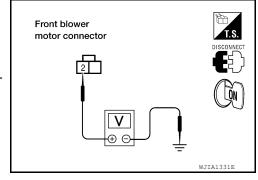
- 1. Turn ignition switch OFF.
- 2. Disconnect front blower motor connector.
- 3. Turn ignition switch ON.
- 4. Press the A/C switch.
- 5. Rotate blower control dial to maximum speed.
- Check voltage between front blower motor harness connector M62 terminal 2 and ground.

#### 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.

# Front blower motor relay connector WJIA1886E

# 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

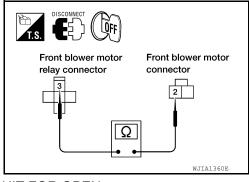
Check continuity between front blower motor relay harness connector M107 terminal 3 and front blower motor harness connector M62 terminal 2.

#### 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

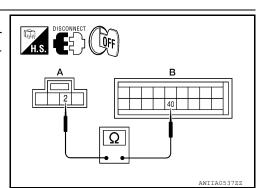
- 1. Disconnect front air control connector.
- Check continuity between front air control harness connector M177 (B) terminal 40 and variable blower control harness connector M121 (A) terminal 2.

# 40 - 2 : 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 2)]

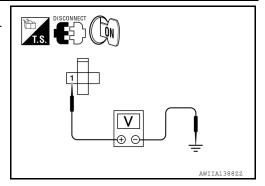
- Turn ignition switch ON.
- Check voltage between front blower motor relay harness connector M107 terminal 1 and ground.

#### 1 - Ground : Battery voltage

#### Is the inspection result normal?

YES >> GO TO 9.

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



## 9. REPLACE FUSES

- Replace fuses.
- Activate the front blower motor.

#### Does the fuse blow?

YES >> GO TO 10.

NO >> Inspection End.

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

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

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

#### Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

# 11. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

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

#### 40 - 2 : Continuity should exist.

#### Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair harness or connector.

# 12. CHECK FRONT BLOWER MOTOR

Check front blower motor. Refer to HAC-211, "Front Blower Motor Component Function Check".

#### Is the inspection result normal?

YES >> GO TO 13.

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

# 13.CHECK BLOWER MOTOR GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

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

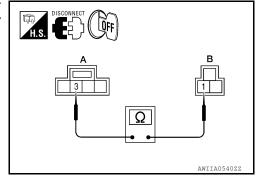
Check continuity between front blower motor harness connector M62 (B) terminal 1 and variable blower control harness connector M121 (A) terminal 3.

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

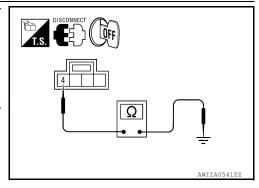
Check continuity between variable blower control harness connector M121 terminal 4 and ground.

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.

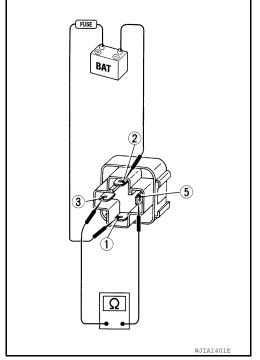


INFOID:0000000011560911

## 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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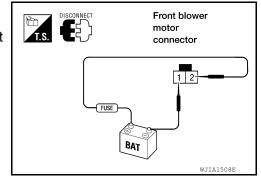
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## < DTC/CIRCUIT DIAGNOSIS >

[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** [MANUAL A/C (TYPE 2)] < DTC/CIRCUIT DIAGNOSIS > MAGNET CLUTCH System Description INFOID:0000000011560912 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 sen-When intake air temperature is higher than the preset value, the compressor turns ON. The compressor turns OFF when intake air temperature is lower than the preset value. Magnet Clutch Component Function Check INFOID:0000000011560913 INSPECTION FLOW 1.confirm symptom by performing operational check - magnet clutch Turn ignition switch ON. Turn the blower control dial to low speed and press the A/C switch. 3. Rotate mode control dial to vent mode (\*\*). 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. >> Go to diagnosis procedure. Refer to HAC-217, "Magnet Clutch Diagnosis Procedure". NO Magnet Clutch Diagnosis Procedure

INFOID:0000000011560914

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

DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

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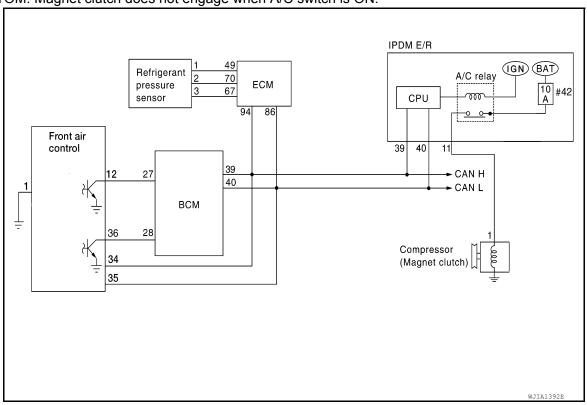
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SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



# 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 <a href="HAC-224">HAC-224</a>, "Intake Sensor Diagnosis Procedure".

# 2. PERFORM AUTO ACTIVE TEST

Refer to PCS-11, "Diagnosis Description".

#### Does magnet clutch operate?

YES >> • ®WITH CONSULT 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

### 11 – 1 : Continuity should exist.

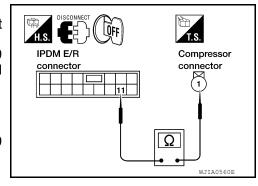
4. Check continuity between IPDM E/R harness connector E119 terminal 11 and ground.

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

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.



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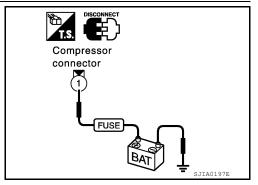
# 4. CHECK MAGNET CLUTCH CIRCUIT

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

#### Is the inspection result normal?

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

NO >> Replace magnet clutch. Refer to HA-33, "Removal and Installation".



H.S. PSCONNECT OFF

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# CHECK BCM INPUT (COMPRESSOR ON) SIGNAL

Check compressor ON/OFF signal. Refer to BCS-24, "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.

 $\mathsf{6}.$ CHECK CIRCUIT CONTINUITY BETWEEN BCM AND FRONT AIR CONTROL

- Turn ignition switch OFF.
- Disconnect BCM connector and front air control connector.
- Check continuity between BCM harness connector M18 (A) terminal 27 and front air control harness connector M176 (B) terminal 12.

#### 27 - 12 Continuity should exist.

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

#### Continuity should not exist. 27 - ground

#### Is the inspection result normal?

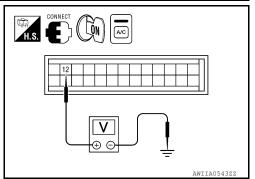
YES >> GO TO 7.

NO >> Repair harness or connector.

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

- Reconnect BCM connector and front air control connector. 1.
- Turn ignition switch ON.
- 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
WITTO	12	Orodria	A/C switch: OFF	Approx. 5V



Is the inspection result normal?

YES >> GO TO 8. N

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**HAC-219** Revision: November 2014 2015 Titan NAM

#### < 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-56, "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.	(-)		<b>.</b>
F54	70	Ground	A/C switch: ON	Approx. 1.0 - 4.0V

#### Is the inspection result normal?

YES >> GO TO 9.

NO >> Refer to EC-488, "Diagnosis Procedure".

9. CHECK BCM INPUT (FAN ON) SIGNAL

Check FAN ON/OFF signal. Refer to <u>BCS-24, "AIR CONDITIONER: CONSULT Function (BCM - AIR CONDITIONER)"</u>.

FRONT BLOWER CONTROL : FAN ON SIG ON

**DIAL ON** 

FRONT BLOWER CONTROL : FAN ON SIG OFF

**DIAL OFF** 

#### Is the inspection result normal?

YES >> GO TO 12. NO >> GO TO 10.

# 10.check circuit continuity between BCM and front air control

- 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.

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

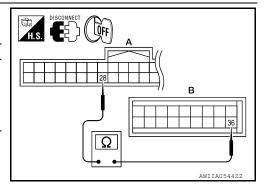
# 28 - ground Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair harness or connector.

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



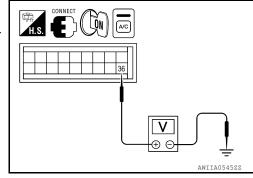
### **MAGNET CLUTCH**

### < 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.	(-)		3
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-56, "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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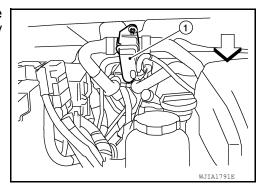
### WATER VALVE CIRCUIT

Description INFOID:000000011560915

#### 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:0000000011560916

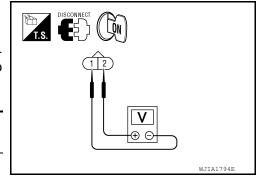
Regarding Wiring Diagram information, refer to <u>HAC-232</u>, "Wiring Diagram - <u>Manual With 3 Control Dial System"</u>.

#### DIAGNOSTIC PROCEDURE FOR WATER VALVE

# 1. CHECK WATER VALVE POWER AND GROUND CIRCUITS

- Disconnect water valve connector F68.
- 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	Te	erminals	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 M177.
- Check continuity between water valve harness connector F68

   (A) terminal 2 and front air control harness connector M177 (B) terminal 30.

#### 2 - 30 : Continuity should exist.

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

# 2 - Ground : Continuity should not exist.

#### Is the inspection result normal?

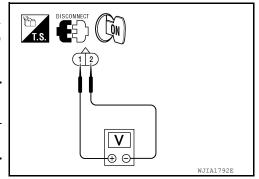
YES >> Replace front air control. Refer to <a href="VTL-8">VTL-8</a>, "Removal and Installation".

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



#### Is the inspection result normal?

YES >> Replace the water valve.

NO >> GO TO 4.

# 4. CHECK WATER VALVE CONTROL OUTPUT CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector M177.
- Check continuity between water valve harness connector F68

   (A) terminal 1 and front air control harness connector M177 (B) terminal 29.

### 1 - 29 : Continuity should exist.

Check continuity between water valve harness connector F68

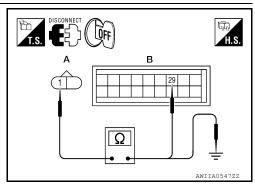
 (A) terminal 1 and ground.

# 1 - Ground : Continuity should not exist.

#### Is the inspection result normal?

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

NO >> Repair harness or connector.



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# **INTAKE SENSOR**

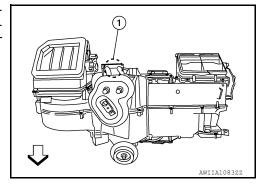
# **System Description**

#### INFOID:0000000011560917

#### 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.



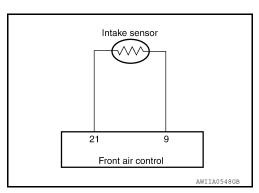
# Intake Sensor Diagnosis Procedure

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

#### DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted.



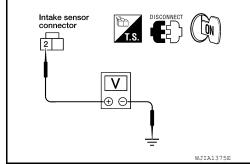
# 1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

- 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)]

- 1. Turn ignition switch OFF.
- 2. Disconnect front air control connector.
- Check continuity between intake sensor harness connector M146 (B) terminal 1 and front air control harness connector 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 <a href="VTL-8">VTL-8</a>, "Removal and Installation".

NO >> Replace intake sensor. Refer to <a href="VTL-11">VTL-11</a>, "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?

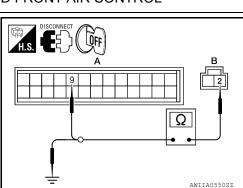
YES >> Replace front air control. Refer to VTL-8, "Removal and Installation".

NO >> Repair harness or connector.

# Intake Sensor Component Inspection

#### COMPONENT INSPECTION

Intake Sensor



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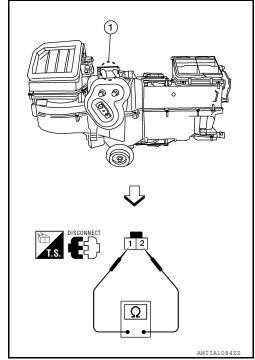
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Revision: November 2014 HAC-225 2015 Titan NAM

### < DTC/CIRCUIT DIAGNOSIS >

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

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



If NG, replace intake sensor. Refer to  $\underline{\text{VTL-11}}$  , "Removal and Installation".

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

# Component Description

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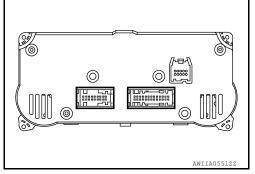
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#### COMPONENT DESCRIPTION

#### Front Air Control

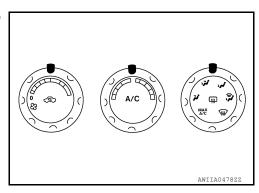
The front air control has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, defroster door motor, blower motor and A/C compressor are then controlled.

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



### Potentio Temperature Control (PTC)

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



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# Front Air Control Component Function Check

SYMPTOM: A/C system does not come on.

#### INSPECTION FLOW

# 1. CONFIRM SYMPTOM BY PERFORMING OPERATIONAL CHECK

- 1. Turn the blower control dial clockwise to low speed.
- Press the A/C switch.
- Confirm that the compressor clutch engages (sound or visual inspection).

#### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>HAC-227, "Front Air Control Power and Ground Diagnosis Procedure".</u>

# Front Air Control Power and Ground Diagnosis Procedure

INFOID:0000000011560922

INFOID:0000000011560921

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

#### DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

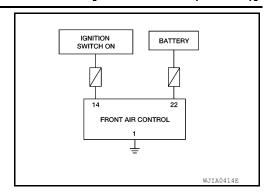
Revision: November 2014 HAC-227 2015 Titan NAM

# POWER SUPPLY AND GROUND CIRCUIT FOR CONTROLLER

< DTC/CIRCUIT DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

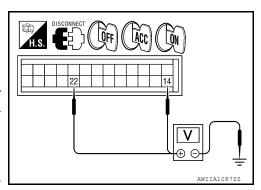
SYMPTOM: A/C system does not come on.



# 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		Ignit	ion switch pos	sition
	(+)				
front air control connector	Terminal No.	(-)	OFF	ACC	ON
M176	14	Ground	Approx. 0V	Approx. 0V	Battery voltage
WITTO	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 <u>HAC-230, "Front Air Control Terminals Reference Values"</u>.
  - If fuses are OK, check harness for open circuit. Repair or replace as necessary.
  - If fuses are NG, replace fuse and check harness for short circuit. Repair or replace as necessary.

# 2. CHECK GROUND CIRCUIT FOR FRONT AIR CONTROL

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

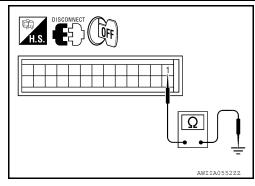
# 1 - Ground

: Continuity should exist.

#### Is the inspection result normal?

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

NG >> Repair harness or connector.



# MANUAL A/C IDENTIFICATION TABLE

< ECU DIAGNOSIS INFORMATION >

[MANUAL A/C (TYPE 2)]

# **ECU DIAGNOSIS INFORMATION**

# MANUAL A/C IDENTIFICATION TABLE

Application Table

Manual A/C Type	Description	Visual Identification
Manual A/C (Type 1)	Two Control Dial System	ALIIA06922Z
Manual A/C (Type 2)	Three Control Dial System [with variable blower control (VBC)]	AMIIA0478ZZ

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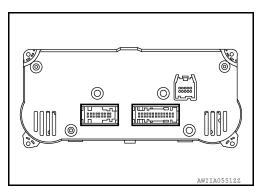
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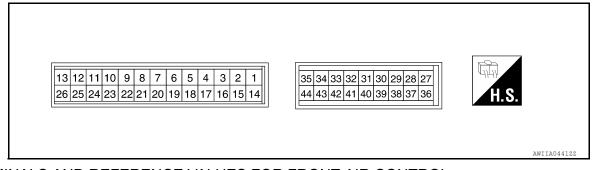
# AIR CONDITIONER CONTROL

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

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

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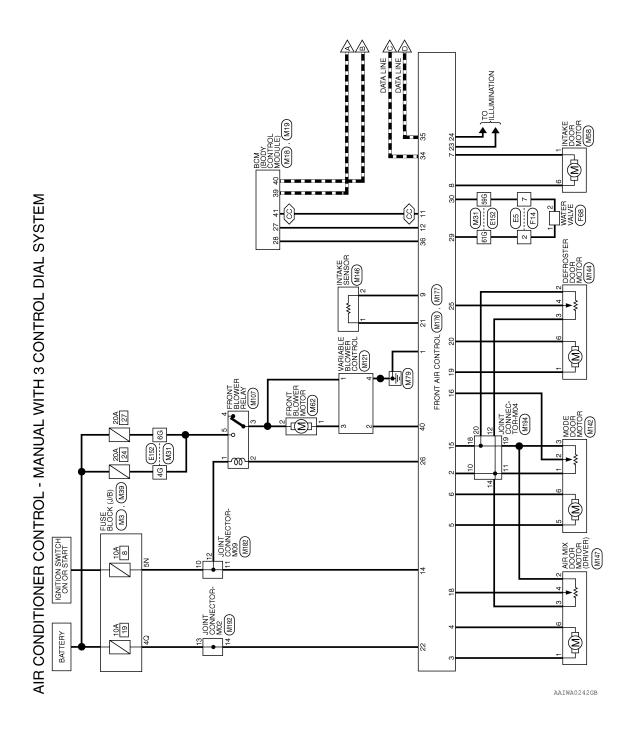
# WIRING DIAGRAM

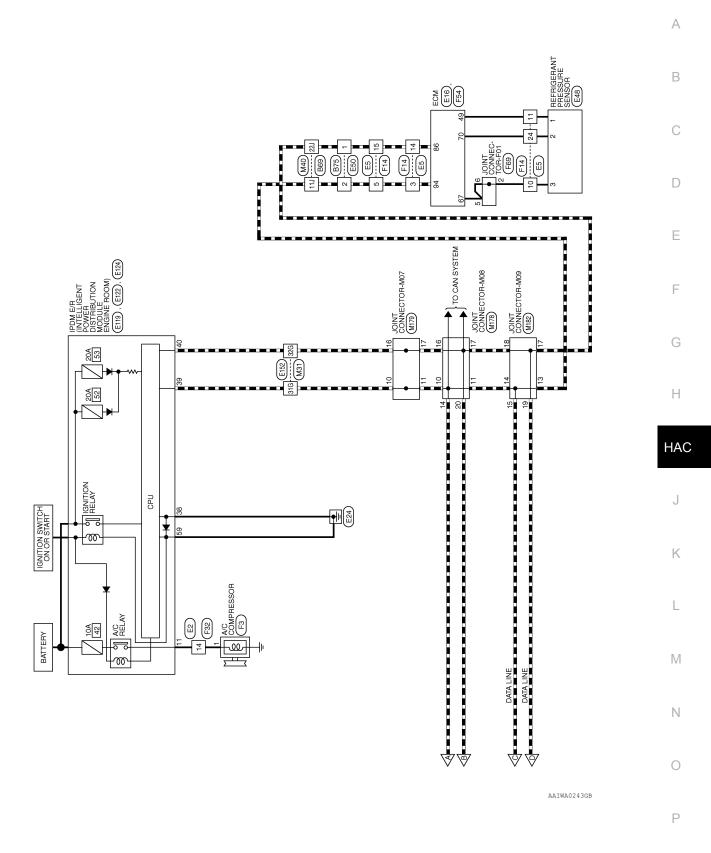
# AIR CONDITIONER CONTROL

Wiring Diagram - Manual With 3 Control Dial System

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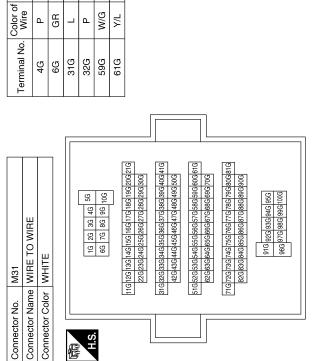




Revision: November 2014 HAC-233 2015 Titan NAM

Signal Name

Connector No.	o. M39	6
Connector Name	ame FU	FUSE BLOCK (J/B)
Connector Color	olor WHITE	IITE
H.S.	808	30 20 10 80 70 80 50 40
Terminal No.	Color of Wire	Signal Name
40	Y/R	1



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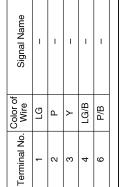
Connector Name   INTAKE DOOR MOTOR   Connector Name   INTAKE DOOR MOTOR   Connector Color   BLACK   Connector Color   Connector   Color of   Color of	Connector No Connector Con	Color of Signal Name	
Wire Signal Name L – P – P	M107 FRONT BLOWER RELAY BLACK	Virge Signal Name  V/G(3 CONTROL DIAL  R/B SYSTEM WITHOUT  AUTO A/C)  W/L	
Terminal No. Col	Connector No. Connector Color Connector Color	7 Color	
Connector No. M40  Connector Name WIRE TO WIRE  Connector Color WHITE  13 23 34 45 54 56 57 58 54 60 60 60 60 60 60 60 60 60 60 60 60 60	Connector No. M62 Connector Color BLOWER MOTOR Connector Color BLACK  LIS	Terminal No. Color of Signal Name  1 L/W –   2 W/L –	

Revision: November 2014 HAC-235 2015 Titan NAM

(O	Connector Name INTAKE SENSOR	١٨	Fell (Fell )	Signal Name	1	-
. M146	me INT/	lor GRA	<u> </u>	Color of Wire	N/R	L/B
Connector No.	Connector Na	Connector Color GRAY	崎 H.S.	Terminal No.	-	2

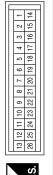
Signal Name	AC REQUEST	1	V IGN	V REF RETURN	PANEL/FLOOR FEEDBACK	ı	DRIVER BLEND FEEDBACK	DEFROST CW	DEFROST CCW	SENSOR RETURN	V BAT	ILLUM +	ILLUM -	DEFROST FEEDBACK	FRONT BLOWER REQUEST
Color of Wire	W/R	1	Y/G	۵	GR	ı	SB	LG	P/B	N/R	Y/R	R/L	BR	LG/B	B/B
Terminal No.	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

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

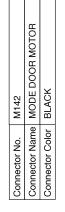


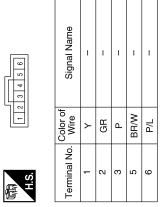
ı		M176	
_			ľ
>		Connector No.	

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



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





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





Signal Name	1	I	I	1	I
Color of Wire	M/G	Ь	<b>\</b>	SB	В
Terminal No.	-	2	က	4	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	M/G	WATER VALVE CLOSE -
31	ı	ı
32	ı	ı
33	-	I
34	٦	CAN-H
32	Ь	CAN-L
36	L/R	FAN ON
37	ı	-
38	-	-
39	1	_
40	G/R	VBC OUTPUT

Connector No.	M177
Connector Name	FRONT AIR CONTROL (WITH MANUAL 3 CONTROL DIAL SYSTEM)
Connector Color GREEN	GREEN
H.S.	35 34 33 32 31 30 29 28 27 36 34 34 43 42 41 40 39 38 37 36

34 33 32 31 30 29 28 27 36 43 42 41 40 39 38 37 36	Signal Name	ı	1	WATER VALVE OPEN +
35 34 33 44 43 42	Color of Wire	ı	1	A/L
明 H.S.	Terminal No.	27	58	59

			,													
82	JOINT CONNECTOR-M09	GREEN		7 6 6 4 3 0 1	17 16 15 14 13		Signal Name	1	1	ı	-	_	1	1	ı	1
). M182				o c	+		Color of Wire	Y/G	Y/G	Y/G	٦	٦	L	Ь	Ь	Д
Connector No.	Connector Name	Connector Color			HS:	J	Ferminal No.	10	Ξ	12	13	14	15	17	18	19

Signal Name

Color of Wire

Terminal No.

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10 11 11 12 12

Connector No.	No.	M179
Connector	Name	Connector Name JOINT CONNECTOR-M07
Connector Color WHITE	Color	WHITE
H.S.	20 19	20 19 18 17 16 15 14 13 12 11 10

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Connector No.	M178
Connector Name	Connector Name JOINT CONNECTOR-M08
Connector Color WHITE	WHITE
H.S.	0 8 7 6 5 4 3 2 1 1 0 20 19 18 17 16 15 14 13 12 11 10

	Connector	管
)	Ŏ	

Signal Name	1	ı	_	ı	I	1
Color of Wire	_	_	7	Д	Ь	Ь
Terminal No. Wire	10	11	14	16	17	20

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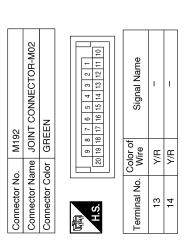
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	RE TO WIRE	IITE	3	f Signal Name	
Connector No. E2	Connector Name WIRE TO WIRE	Connector Color WHITE	所 (1 2 3 (8 9 10	Terminal No. Wire	27

94	JOINT CONNECTOR-M04	JE .	-	7 6 5 4 3 2 1 17 16 15 14 13 12 11 10	Signal Name	I	I	I	-	I	1	I	
M194		lor BLUE	ΙIΙ	20 19 18	Color of Wire	>	>	>	>	۵	۵	۵	
Connector No.	Connector Name	Connector Color		H.S.	Terminal No.	10	11	12	14	18	19	20	



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

SENSOR	CK		Signal Name	I	ı	1
SEN	or BLACK		Color of Wire	R/Υ	B/W	۳
	Connector Color	是 H.S.	Terminal No.	1	2	c
		· <u> </u>				

Connector No.	E16
Connector Name ECM	ECM
Connector Color BLACK	BLACK
_	116 115 114 89 88 87 86 85 84 83 82
H.S.	97 96 95 94 93 92 91 90
/11 811	105 100 100 100 100 100 100
	102 104 103 102 101 100 33
121 12	120 119 113 112 111 110 109 108 107 106

Signal Name		CAN-L	C-NICO
Color of		<b>-</b>	ı
Terminal No.	90	00 00	5

	WIRE		1 2 3 4 5 6 6 6 7 8 9 10 11 1 10 13 14 15 16 17 18 19 90 01 20 20 20 20 20 20 20 20 20 20 20 20 20	Signal Name	1	1	1	ı	-	ı	ı
E5	WIRE TO WIRE	WHITE	3 4 5 6	Color of Wire	J/L		_	M/G	В	R/Υ	<u>а</u>
9	Vame	Solor	1 2 13 13 13		<b>\</b>			>	_	<u>«</u>	
Connector No.	Connector Name	Connector Color	唇	Terminal No.	2	3	2	7	10	11	14

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	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)		[7	39 38 37 15 44 43	Signal Name	GND (SIGNAL)	CAN-H	CAN-L		Signal Name	ı	ı	_	-	-	ı											E
E122	Je J	or WHITE		42     41     40     39     38       48     47     46     45     44	Color of Wire	В		Д.	-	Color of Wire	۵	GR	_	<u>a</u>	W/G	Y/L											]
Connector No.	Connector Name	Connector Color	Œ	H.S.	Terminal No.	38	39	40		Terminal No.	4G	99	31G	32G	59G	61G											[
													Г								L				7		F
	LIGENT 3UTION E ROOM)		[	20	Signal Name	A/C COMPRESSOR								16	59		14G13G12G11G 24G23G22G	246 336 336	446436426	54G53G52G51G	64G 63G 62G	74G73G72G71G	11G	96G			(
6	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)	ITE		9 8 7 6 6 3 4 3 18 17 16 15 14 13 12 11 10		A/C COMF				E152	TE IO WIRE	1		56 46 36 26	96 86 76		21G20G19G118G17G16G15G14G13G12G11G 30G29G28G27G26G25G24G23G22G	416/406/38/6/37/6/36/6/5/5/3/6/3/6/3/6/3/6/3/6/3/6/3/6/	50G 49G 48G 47G 46G 45G 44G 43G 42G	610 60 G 59 G 58 G 57 G 56 G 55 G 54 G 53 G 52 G 51 G	70G ଚେପ ହେପ 7େପ ଚେପ 5େପ ବେପ ସେ ପ୍ରଥେ	81G80G79G78G77G76G75G74G73G72G71G	95G 94G 93G 92G 91G	100G99G 98G 97G			I
No. E119		-		9 8 7	Color of Wire	Y/B				_	_	_				0	2162061	4194093	5064	6196095	7096	81G80G7					Н
Connector No.	Connector Name	Connector Color		H.S.	Terminal No.	=				Connector No.	Connector Name			SH													
									Г																		ŀ
	'IRE				Signal Name	1	1			H. C.	POWER DISTRIBUTION	NGINE ROOM)						Signal Name	GND (POWER)								I
E50	WIRE TO WIRE BROWN		2 1							E124	OWER DIS	10DULE E	BLACK		59 58 57	62 61 60			GN								N
	r Name M				No. Wire	<u> </u>			İ			-						No. Wire	В								1
Connector No.	Connector Name		SI		Terminal No.	-	2			Connector No.	Connector Name		Connector Color	4	A TO	Ŋ.		Terminal No.	29								(
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Connector No.	<u></u> 만		Connector No. F14	Connector No.	F32
Connector Name A/C COMPRES Connector Color BLACK	ar A/C	CK	Connector Name WIRE TO WIRE Connector Color WHITE	Connector Name   WIRE TO WIRE Connector Color   WHITE	VIRE TO WIRE
H.S.			11 10 9 8 7 6 5 4 3 2 1 24 23 22 21 20 19 18 17 16 15 14 13 12 H.S.	(中)	7 6 5 4
Terminal No.	Color of Wire Y/B	Signal Name	Terminal No. Wire Signal Name 2 Y/L –	Terminal No. Wire	of Signal Name
			3 F		
			11 R/Y -		
			15 P – 24 B/W –		
Connector No. Connector Name	F54 ne ECM	🗴	Connector No. F68 Connector Name WATER VALVE	Connector No.	F69 JOINT CONNECTOR-F01
Connector Color	-	BLACK	Connector Color GRAY	Connector Color	GRAY
H.S.			H.S.	原 H.S.	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )
Col.   Col.	68 69 70 49 50 51 30 31 32 11 12 13	70 77 72 73 74 75 76 77 78 79 80 81 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
Terminal No.	Color of Wire	Signal Name	Terminal No.   Color of   Signal Name	Color of Terminal No. Wire	of Signal Name
49	R/Y	AVCC (PDPRES)	1 Y/L –	2 B	ı
	В	GND-A	2 W/G -	2 B	1
70	B/W	PD PRESS		9 9	ı

# **AIR CONDITIONER CONTROL**

< WIRING DIAGRAM >

# [MANUAL A/C (TYPE 2)]

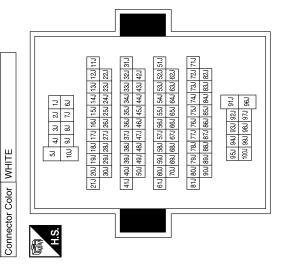
	: TO WIRE	NN	<b>5</b>	Signal Name	ı	ı
B75	ne WIRE	or BRO		Color of Wire	۵	_
Connector No.	Connector Name WIRE TO WIRE	Connector Color BROWN	廟 H.S.	Terminal No.	-	2

Signal Name	1	-	
Color of Wire	٦	Ь	
Terminal No.	11J	22J	

Connector Name WIRE TO WIRE

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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)]	AVC A/C WAX

# **AIR CONDITIONER CONTROL**

# < SYMPTOM DIAGNOSIS >

# [MANUAL A/C (TYPE 2)]

# AIR CONDITIONER CONTROL

# Symptom Matrix Chart

#### INFOID:0000000011560927

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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-197
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 Precedure for Intoke Deer Meter	HAC 205
Intake door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	<u>HAC-205</u>
Defroster door motor is malfunctioning.	Go to Trouble Diagnosis Procedure for Defroster Door Motor.	<u>HAC-207</u>
Front blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Front Blower Motor.	<u>HAC-211</u>
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.	<u>HAC-244</u>
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	<u>HAC-252</u>
Noise	Go to Trouble Diagnosis Procedure for Noise.	HAC-254

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[MANUAL A/C (TYPE 2)]

INFOID:0000000011560928

### INSUFFICIENT COOLING

# Component Function Check

SYMPTOM: Insufficient cooling

INSPECTION FLOW

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

- 1. Rotate the blower control dial to the low speed.
- 2. Turn temperature control dial counterclockwise to maximum cold.
- Check for cold air at discharge air outlets.

#### Can the symptom be duplicated?

YES >> GO TO 3.

NO >> GO TO 2.

# $\mathbf{2}$ . CHECK FOR ANY SYMPTOMS

Perform a complete operational check for any symptoms. Refer to <a href="HAC-182">HAC-182</a>, "Operational Check".

# Does another symptom exist?

YES >> Refer to HAC-243, "Symptom Matrix Chart".

NO >> System OK.

### 3.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

# 4. CHECK DRIVE BELTS

Check compressor belt tension. Refer to EM-13, "Checking Drive Belts".

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Adjust or replace compressor belt. Refer to EM-13, "Removal and Installation".

# 5.CHECK AIR MIX DOOR OPERATION

Check and verify air mix door mechanism for smooth operation. Refer to <u>HAC-201, "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-380, "Overall Function Check".

### Does cooling fan motor operate correctly?

YES >> GO TO 7

NO >> Check cooling fan motor. Refer to EC-381, "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".

# 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.

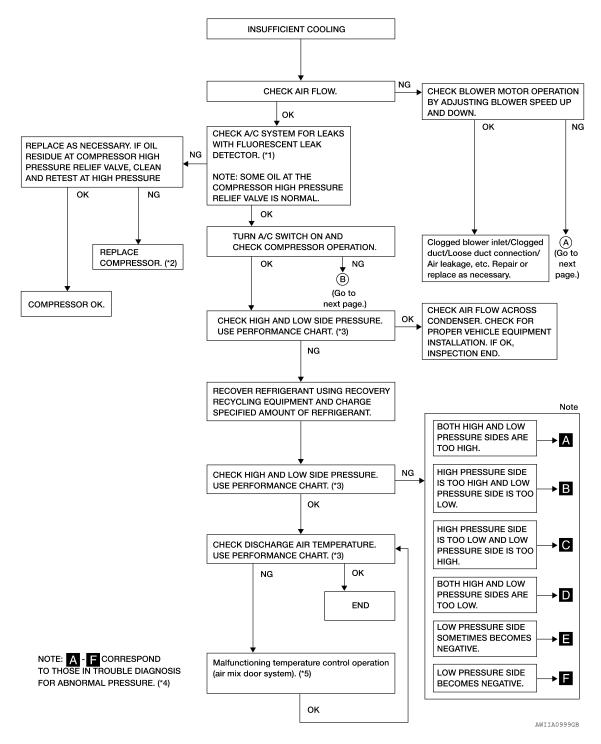
Diagnostic Work Flow

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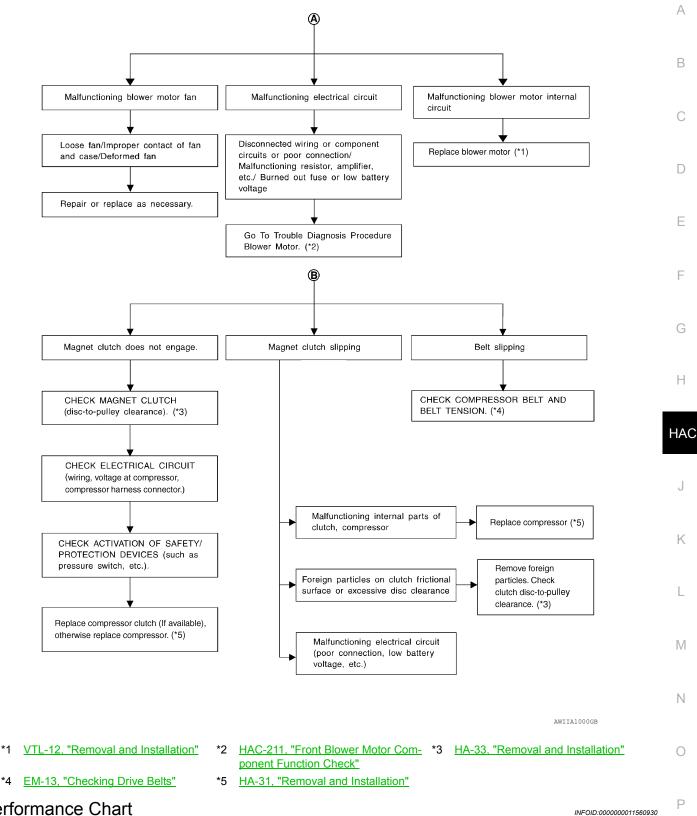
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- \*1 HA-24, "Checking System for Leaks Using the Fluorescent Dye Leak Detector"
- \*4 HAC-248, "Trouble Diagnoses for Abnormal Pressure"
- \*1 HA-24. "Checking System for Leaks \*2 HA-33. "Removal and Installation"
  - \*5 HAC-201, "Air Mix Door Motor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



#### Performance Chart

### **TEST CONDITION**

Testing must be performed as follows:

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

### Ambient Air Temperature-to-operating Pressure Table

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

# Trouble Diagnoses for Abnormal Pressure

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

### **INSUFFICIENT COOLING**

### < SYMPTOM DIAGNOSIS >

[MANUAL A/C (TYPE 2)]

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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	<ul> <li>Clean condenser.</li> <li>Check and repair cooling fan if necessary.</li> </ul>
Both high- and low-pressure sides are too high.	<ul> <li>Low-pressure pipe is not cold.</li> <li>When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm², 28 psi). It then decreases gradually thereafter.</li> </ul>	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.)  Air in refrigeration cycle	Evacuate and recharge system.
# # AC359A	Engine tends to overheat.	Engine cooling systems mal- function.	Check and repair engine cooling system.
	<ul> <li>An area of the low-pressure pipe is colder than areas near the evaporator outlet.</li> <li>Plates are sometimes covered with frost.</li> </ul>	<ul> <li>Excessive liquid refrigerant on low-pressure side</li> <li>Excessive refrigerant discharge flow</li> <li>Expansion valve is open a little compared with the specification.</li> <li>Improper expansion valve adjustment</li> </ul>	Replace expansion valve.

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

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

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

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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.
(O) 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
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.	<ul> <li>Remove foreign particles by using compressed air.</li> <li>Check oil for contamination.</li> </ul>
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	Check and repair malfunctioning parts.     Check oil for contamination.
	Air flow volume is too low.	Evaporator is frozen.	Check intake sensor circuit. Refer to HAC-224, "Intake Sensor Diagnosis Procedure". Repair evaporator fins. Replace evaporator. Refer to HAC-211, "Front Blower Motor Component Function Check".

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action	
Low-pressure side sometimes becomes negative.	<ul> <li>Air conditioning system does not function and does not cyclically cool the compartment air.</li> <li>The system constantly functions for a certain period of time after compressor is stopped and restarted.</li> </ul>	Refrigerant does not discharge cyclically.   Moisture is frozen at expansion valve outlet and inlet.  Water is mixed with refrigerant.	Drain water from refrigerant or replace refrigerant.     Replace liquid tank.	
₽ ₽ ₽ <sub>AC354A</sub>				

# Low-pressure Side Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles.  If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant.  If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air).  If either of the above methods cannot correct the malfunction, replace expansion valve.  Replace liquid tank.

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[MANUAL A/C (TYPE 2)]

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

#### Can this symptom be duplicated?

YES >> GO TO 2.

NO >> Perform complete system operational check. Refer to <u>HAC-182</u>, "Operational Check".

# 2.CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 3.

# ${f 3}.$ CHECK ENGINE COOLING SYSTEM

- Check for proper engine coolant level. Refer to <u>CO-10, "Inspection"</u>.
- 2. Check hoses for leaks or kinks.
- 3. Check radiator cap. Refer to CO-10, "Inspection".
- 4. Check for air in cooling system.

>> GO TO 4.

### 4. CHECK AIR MIX DOOR OPERATION

Check the operation of the air mix door.

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Check the air mix door motor circuit. Refer to <a href="HAC-201">HAC-201</a>, "Air Mix Door Motor Component Function Check".

# 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-192, "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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< SYMPTOM DIAGNOSIS > [MANUAL A/C (TYPE 2)]	
Check heater hoses for proper installation.	
Is the inspection result normal?	Α
YES >> System OK. NO >> 1. Back flush heater core.	
NO >> 1. Back flush heater core. 2. Drain the water from the system.	В
<ol> <li>Refill system with new engine coolant. Refer to CO-11, "Changing Engine Coolant".</li> </ol>	
4. GO TO 9 to retest.	
9. CHECK HEATER HOSE TEMPERATURES	С
<ol> <li>Start engine and warm it up to normal operating temperature.</li> <li>Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be</li> </ol>	
warm.	D
Is the inspection result normal?	
YES >> System OK. NO >> Replace heater core. Refer to <u>VTL-15, "Removal and Installation"</u> .	Е
10.check water valve	
Check the operation of the water valve. Refer to <u>HAC-222</u> , "Water Valve <u>Diagnosis Procedure"</u> .	_
Is the inspection result normal?	F
YES >> System OK.	
NO >> Replace water valve.	G
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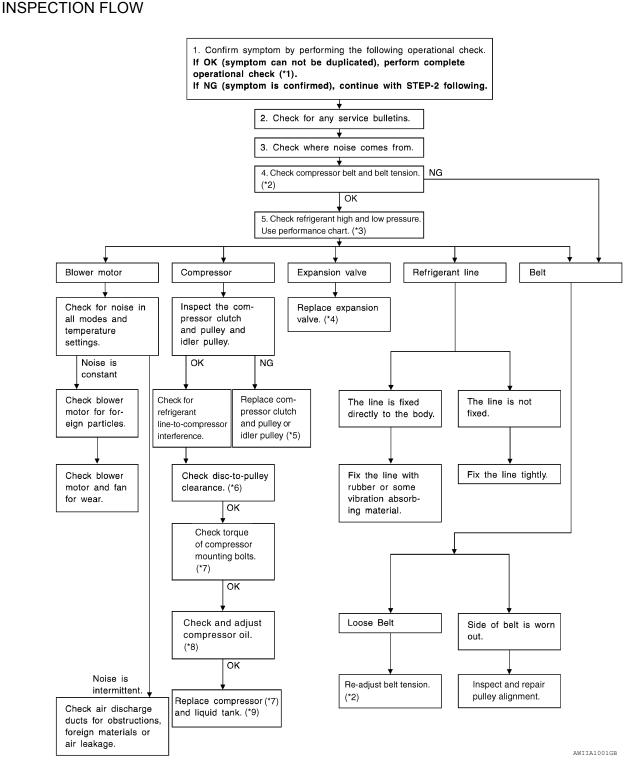
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### NOISE

# Component Function Check

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SYMPTOM: Noise



- HAC-182, "Operational Check"
- \*2 EM-13, "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 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 three minutes before performing any service.

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

#### WARNING:

- CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed compressor failure is likely to occur. Refer to <a href="HA-4">HA-4</a>, "Contaminated Refrigerant". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.
- Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.
- The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
- When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
- When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
- Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.
- Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.

CONTAMINATED REFRIGERANT

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#### < PRECAUTION >

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

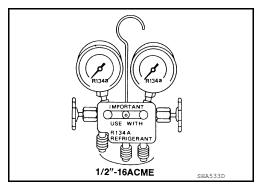
- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location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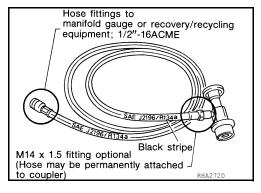
#### MANIFOLD GAUGE SET

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	

