# HEATER & AIR CONDITIONING CONTROL SYSTEM

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AIR MIX DOOR MOTOR

# [WITHOUT 7 INCH DISPLAY]

# BASIC INSPECTION DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000010842228 B

А

**OVERALL SEQUENCE** 



JMKIA8652GB

< BASIC INSPECTION >

# **1.**GET INFORMATION FOR SYMPTOM

- 1. Get detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurs).
- 2. Check operation condition of the function that is malfunctioning.

## >> GO TO 2.

# 2.CHECK DTC

- 1. Check DTC.
- 2. Perform the following procedure if DTC is detected.
- Record DTC and freeze frame data (Print them out using CONSULT.)
- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.
- 3. Check related service bulletins for information.

## Are any symptoms described and any DTC detected?

Symptom is described, DTC is detected>>GO TO 3. Symptom is described, DTC is not detected>>GO TO 4. Symptom is not described, DTC is detected>>GO TO 5.

## **3.**CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer. Also study the normal operation and fail-safe related to the symptom. Verify relation between the symptom and the condition when the symptom is detected.

## >> GO TO 5.

## **4.**CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer. Verify relation between the symptom and the condition when the symptom is detected.

## >> GO TO 6.

## **5.**PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the detected DTC, and then check that DTC is detected again. At this time, always connect CONSULT to the vehicle, and check self diagnostic results in real time. If two or more DTCs are detected, refer to DTC INSPECTION PRIORITY CHART, and determine trouble diagnosis order.

## NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.

If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIR-MATION PROCEDURE.

## Is DTC detected?

YES >> GO TO 7.

NO >> Check according to <u>GI-44, "Intermittent Incident"</u>.

6. Detect malfunctioning system by symptom diagnosis

Detect malfunctioning system according to SYMPTOM DIAGNOSIS based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

## Is the symptom described?

- YES >> GO TO 7.
- NO >> Monitor input data from related sensors or check voltage of related module terminals using CON-SULT.
- 7. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >	[WITHOUT 7 INCH DISPLAY]
Inspect according to Diagnosis Procedure of the system.	
Is malfunctioning part detected?	
YES >> GO TO 8.	
NO >> Check according to <u>GI-44, "Intermittent Incident"</u> .	
${f S}$ .REPAIR OR REPLACE THE MALFUNCTIONING PART	
1. Repair or replace the malfunctioning part.	
<ol> <li>Reconnect parts or connectors disconnected during Diagnosis Proceed mont</li> </ol>	lure again after repair and replace-
<ol> <li>Check DTC. If DTC is detected, erase it.</li> </ol>	
>> GO TO 9	
when DTC is detected in step 2, perform DTC CONFIRMATION PROCED malfunction is repaired securely	JRE again, and then check that the
When symptom is described by the customer, refer to confirmed sympton	n in step 3 or 4, and check that the
symptom is not detected.	• •
Is DTC detected and does symptom remain?	
YES-1 >> DTC is detected: GO TO 7.	
YES-2 >> Symptom remains: GO TO 4.	2
>> before returning the vehicle to the customer, always erase DT	0.

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Description & Inspection

INFOID:000000010842229

## DESCRIPTION

The purpose of the operational check is to check that the individual system operates normally.

## Check condition : Engine running at normal operating temperature.

# 1.CHECK BLOWER MOTOR

- 1. Start the engine.
- 2. Operate the fan control dial. Check that the fan speed changes. Check the operation for all fan speeds.
- 3. Leave blower on maximum speed.
- Is the inspection result normal?

YES >> GO TO 2.

NO >> Blower motor system malfunction. Refer to HAC-53, "Diagnosis Procedure".

# 2. CHECK DISCHARGE AIR

1. Turn mode control dial to each position.

 Check that the air outlets change according to each indicated air outlet by placing a hand in front of the outlets. Refer to <u>VTL-3</u>, "System Description".

## Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Mode door system malfunction. Refer to <u>HAC-44. "Diagnosis Procedure"</u>.
- **3.**CHECK INTAKE AIR
- 1. Press intake switch to set the air outlet to recirculation.
- 2. The REC indicator turns ON.
- 3. Listen to intake sound and confirm air inlets change.
- 4. Press intake switch again to set the air outlet to fresh air intake.
- 5. The FRE indicator turns ON.
- 6. Listen to intake sound and confirm air inlets change.
- Is the inspection result normal?
- YES >> GO TO 4.
- NO >> Intake door system malfunction. Refer to <u>HAC-46, "Diagnosis Procedure"</u>.

## **4.**CHECK A/C SWITCH

- 1. Press the A/C switch.
- 2. Check that the indicator of the A/C switch turns ON. Check visually and by sound that the compressor operates.
- 3. Press the A/C switch again.
- 4. Check that the indicator of the A/C switch turns OFF. Check that the compressor stops.

## Is the inspection result normal?

YES >> GO TO 5.

NO >> Magnet clutch system malfunction. Refer to <u>HAC-57, "Diagnosis Procedure"</u>.

## **5.**CHECK DISCHARGE AIR TEMPERATURE

Operate the temperature control dial. Check that the discharge air temperature changes.

## Is the inspection result normal?

YES >> GO TO 6.

NO >> Air mix door malfunction. Refer to <u>HAC-42, "Diagnosis Procedure"</u>.

**6.**CHECK TEMPERATURE DECREASE

- 1. Operate the compressor.
- 2. Operate the temperature control dial and lower the set temperature to 18.0°C (60°F).
- 3. Check that the cool air blows from the outlets.

Is the inspection result normal?

< BASIC INSPECTION >		[WITHOUT 7 INCH DISPLAY]
YES >> GO TO 7.		_
NO >> Insufficient cooling. Refer to <u>HAC-75, "Diagnosis Procedure"</u> .		
CHECK TEMPERATURE INCRE	ASE	
<ol> <li>Turn temperature control dial and</li> <li>Check that warm air blows from</li> <li>the inspection result permet?</li> </ol>	nd raise temperature setting to 32.0 n outlets.	°C (90°F) after warming up the engine.
NO >> Insufficient heating. Ret	fer to <u>HAC-77, "Diagnosis Procedur</u>	-e".
<b>3.</b> CHECK AUTO MODE		
Operate the fun control dial and	mode control dial to AUTO position	n.
<ol> <li>Operate the temperature contro ature or fan speed varies deper ature)</li> </ol>	ol dial. Check that the fan speed or inding on the ambient temperature, i	air outlet changes (the air flow temper- n-vehicle temperature, and set temper-
s the inspection result normal?		
YES >> INSPECTION END		
NO >> Refer to <u>HAC-74</u> , "Diag	nosis Chart By Symptom" and perfe	orm the appropriate diagnosis.
emperature Setting Trimme	er	INFOID:000000010842230
DESCRIPTION		
t the temperature felt by the custon setting the A/C auto amp control te	ner is different than the air flow tem	perature controlled by the temperature pensate for the temperature setting
Perform "TEMP SET CORRECT" of	HVAC work support item.	
Work support items	Display (°F)	
	6	3.0
	5	2.5
	4	2.0
	3	1.5
	2	1.0
	1	0.5
TEMP SET CORRECT	0 (initial status)	0 (initial status)
	-1	-0.5
	-2	-1.0
	-3	-1.5
		-2.0

## NOTE:

• When -3.0°C (-6°F) is corrected on the temperature setting set as 25.0°C (77°F), the temperature controlled by A/C auto amp. is 25.0°C (77°F) - 3.0°C (-6°F) = 22.0°C (72°F) and the temperature becomes lower than the temperature setting.

-5

-6

Ρ • When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of the difference between the set temperature and control temperature may be cancelled.

# Foot Position Setting Trimmer

INFOID:0000000010842231

-2.5

-3.0

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## DESCRIPTION

In FOOT mode, the air blowing to DEF can change ON/OFF.

< BASIC INSPECTION >

# HOW TO SET

Perform the "BLOW SET" of HVAC work support item.

Work support items	Display	Defroster door position	
		Auto control	Manual control
	Mode 1	OPEN	CLOSE
BLOW SET	Mode 2 (initial status)	OPEN	OPEN
	Mode 3	CLOSE	OPEN
	Mode 4	CLOSE	CLOSE

## NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of the discharge air mix ratio in FOOT mode may be cancelled.

## Inlet Port Memory Function (FRE)

INFOID:000000010842232

## DESCRIPTION

- If the ignition switch is turned to the OFF position while the FRE indicator is set to ON (fresh air intake), "Perform the memory" or "Do not perform the memory" of FRE indicator ON (fresh air intake) condition can be selected.
- If "Perform the memory" was set, the FRE indicator will be ON (fresh air intake) when turning the ignition switch to the ON position again.
- If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.

## HOW TO SET

(B) With CONSULT

Perform the "FRE MEMORY SET" of HVAC work support item.

Work support items	Display	Setting		
FRE MEMORY SET	WITHOUT	Perform the memory of manual FRE		
	WITH (initial status)	Do not perform the memory of manual FRE (auto control)		

## NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of the FRE memory function may be cancelled.

# Inlet Port Memory Function (REC)

INFOID:000000010842233

## DESCRIPTION

- If the ignition switch is turned to the OFF position while the REC indicator is set to ON (recirculation), "Perform the memory" or "Do not perform the memory" of REC indicator ON (recirculation) condition can be selected.
- If "Perform the memory" was set, the REC indicator will be ON (recirculation) when turning the ignition switch to the ON position again.
- If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.

## HOW TO SET

With CONSULT

Perform the "REC MEMORY SET" of HVAC work support item.

Work support items	Display	Setting		
REC MEMORY SET	WITHOUT (initial status)	Perform the memory of manual REC		
	WITH	Do not perform the memory of manual REC (auto control)		

## NOTE:

## < BASIC INSPECTION >

## [WITHOUT 7 INCH DISPLAY]

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When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of the REC memory function may be cancelled.

INFOID:000000010842234

# SYSTEM DESCRIPTION COMPRESSOR CONTROL FUNCTION

Description

PRINCIPLE OF OPERATION

Functional circuit diagram



CAN (1) : A/C ON switch signal : Blower fan ON signal RX, TX : A/C switch signal

: Fan ON signal

: Defroster signal

CAN (2) : A/C compressor request signal

Functional initial inspection chart

Control unit Diagnosis Item		Location				
Control unit	L	Jagnosis nem	A	В	С	D
		Self-diagnosis	×		—	—
A/C auto amp.	(E)"HVAC"	Data monitor	×		_	_
		Active test	×		—	×
ECM (B)"ENGINE"	Self-diagnosis (CAN system diagnosis)	—	—	×	—	
		Data monitor	—	×	×	—
IPDM E/R	Self-diagnosis (CAN system diagnosis)	_	_	_	×	
	Data monitor				×	—
	Auto active test	·	—	—	—	×

# **COMPRESSOR CONTROL FUNCTION**

# [WITHOUT 7 INCH DISPLAY]

< SYSTEM DESCRIPTION >	TEM DESCRIPTION > [WITHOUT 7 INCH DISPLAY]			
Fail-safe	INFOID:000000010842235	Δ		
FAIL-SAFE FUNCTION When a communication malfunction seconds or more, control the air cond	between A/C auto amp. and A/C control continued for approximately 30 itioning system under the following conditions.	3		
Compressor	: ON			
Air outlet	: AUTO	2		
Air inlet	: FRE (Fresh air intake)			
Fan speed	: AUTO			
Preset temperature	: Setting before communication malfunction	J		
Component Parts Location	INFOID:000000010842236			
	(4) (3) (C) (B)	_		



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# **COMPRESSOR CONTROL FUNCTION**

## < SYSTEM DESCRIPTION >

- 7. Magnet clutch
- 10. Air mix door motor
- 13. A/C auto amp.
- A. Installed on the compressor
- D. Located on the evaporator

**Component Description** 

- 8. ECV
- 11. Mode door motor
- B. Installed to the blower unit assembly C. (RH)
- E. Behind of the cluster lid C

- [WITHOUT 7 INCH DISPLAY]
- 9. Intake door motor
- 12. Intake sensor
  - Installed to the heater & cooling unit assembly (RH)

INFOID:000000010842237

Component	Description		
Ambient sensor	HAC-43, "Description"		
In-vehicle sensor	HAC-41, "Description"		
Intake sensor	HAC-45, "Description"		
Sunload sensor	HAC-53, "Description"		
Air mix door motor	HAC-57, "Description"		
Mode door motor	EC-527, "Description"		
Intake door motor	HAC-29, "Description"		
A/C control	The operation of the A/C control is communicated with the A/C auto amp. via communication line.		
A/C auto amp.	HAC-32, "Description"		
Blower motor	HAC-38, "Description"		
Magnet clutch	HAC-57, "Description"		
ECV	HAC-59, "Description"		
Refrigerant pressure sensor	HAC-52, "Description"		

## < SYSTEM DESCRIPTION >

# [WITHOUT 7 INCH DISPLAY]

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INFOID:000000010842238

# AUTOMATIC AIR CONDITIONING SYSTEM

## System Diagram



# System Description

## OUTLINE

• Automatic air conditioning system is controlled by each function of A/C auto amp., ECM and IPDM E/R.

Control by A/C auto amp. - Air outlet control	Ν
- Temperature control	
- Air inlet control	0
- Air flow control	0
- Compressor control	
- Door motor control (LCU communication control)	
	Р

#### Control by ECM

- Cooling fan control. (Refer to <u>EC-89, "System Description"</u>.)
- Air conditioning cut control. (Refer to EC-69, "System Description".)

#### Control by IPDM E/R

- Relay control. (Refer to <u>PCS-4, "System Description"</u>.)
- Cooling fan control. (Refer to PCS-6. "System Description".)

# HAC-15

INFOID:0000000010842239

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## < SYSTEM DESCRIPTION >

 Controller (A/C control) transmits the commands for air conditioning system operation to A/C auto amp. via communication line.

## OPERATION

Controller (A/C Control)



## Switch Operation

Mode control dial	<ul> <li>Selects mode position to an optimal position.</li> <li>When AUTO is selected, the mode position is controlled automatically.</li> <li>When D/F or DEF is selected while blower motor is activated, and air conditioning system becomes the following state.</li> <li>Compressor: ON</li> <li>Air inlet: Fresh air intake</li> </ul>
Temperature control dial	Selects set temperature within a range between 18°C (60°F) - 32°C (90°F). <b>NOTE:</b> When air conditioning system is in the OFF position, set temperature can be selected depending on temperature control dial operation.

## < SYSTEM DESCRIPTION >

# [WITHOUT 7 INCH DISPLAY]

Fan control dial	<ul> <li>Selects fan speed within a range between 1st - 25th speed.</li> <li>When AUTO is selected, fan speed is controlled automatically.</li> <li>When OFF is selected, air conditioning system becomes the following state.</li> <li>Air conditioning system: OFF</li> <li>Air inlet: Fresh air intake</li> <li>Air outlet: FOOT</li> </ul>	A B
A/C switch	Turns the compressor control (switch indicator) between ON ⇔ OFF each time while blower is activated. NOTE: When A/C switch turns OFF, air inlet changes to fresh air intake.	С
Intake switch	<ul> <li>Selects air inlet changes between recirculation (REC) ⇔ fresh air intake (FRE) each time.</li> <li>FRE indicator ON: Fresh air intake</li> <li>REC indicator ON: Recirculation</li> <li>Press and held for 2 seconds or more, intake switch indicator lamp blinks 2 times and air inlet is set to automatic control. (Air intake switch indicator indicates air inlet state during automatic control.)</li> <li>NOTE:</li> <li>When air conditioning system is in the OFF position, air inlet can be selected.</li> <li>When mode control dial is in the D/F or DEF position, air inlet cannot be selected to REC.</li> <li>When intake switch is set to REC, the compressor is turned ON.</li> </ul>	D
Rear window defogger switch	Turns rear window defogger (switch indicator) between ON ⇔ OFF each time. Rear window defogger system details. Refer to <u>DEF-99, "WITHOUT NAVIGATION : System Descrip-</u> tion".	F

## AIR OUTLET CONTROL

- While air outlet is in automatic control, A/C auto amp. selects the mode door position depending on a target air mix door angle and outlet air temperature calculated from sunload.
- If ambient temperature is excessively low, D/F is selected to prevent windshield fogging when air outlet is set to FOOT.



## TEMPERATURE CONTROL

- When ignition switch is in the ON position, A/C auto amp. always automatically controls temperature regardless of air conditioning system operational state.
- A/C auto amp. calculates the target air mix door opening angle e and sunperature, in-vehicle temperature, ambient temperature, and sunload.
  Air mix door is controlled depending on the comparison of current air mix door opening angle and target air mix door opening angle.
  Regardless of in-vehicle temperature, ambient temperature and sunload, air mix door is fixed at the fixed state.
- temperature is 18.0°C (60°F), and at the fully hot position when set temperature is 32.0°C (90°F).

## AIR INLET FUNCTION



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## < SYSTEM DESCRIPTION >

While air inlet is in automatic control, A/C auto amp. selects air inlet (fresh air intake, 20 % fresh air intake, or recirculation) depending on set temperature, in-vehicle temperature, and ambient temperature.

FRESH 20% FRESH RECIRCULATION
Cold A/C auto amp. calculated temperature Hot

[WITHOUT 7 INCH DISPLAY]

JPIIA0634GB

## AIR FLOW CONTROL

Description

- A/C auto amp. changes duty ratio of blower motor drive signal and controls air flow continuously. When air flow is increased, duty ratio of blower motor drive signal gradually increases to prevent a sudden increase in air flow.
- In addition to manual control and automatic control, air flow control is compose of starting fan speed control, low coolant temperature starting control, high in-vehicle temperature starting control, blower speed control at door motor operation, and fan speed control at voice recognition.

## Automatic Air Flow Control

- A/C auto amp. decides target air flow depending on target air mix door opening angle.
- A/C auto amp. changes duty ratio of blower motor drive signal and controls air flow continuously so that air flow matches to target air flow.
- When air outlet is VENT or B/L, the minimum air flow is changed depending on sunload.



Starting Fan Speed Control

When blower motor is activated, A/C auto amp. gradually increases duty ratio of blower fan drive signal to prevent a sudden increase in discharge air flow. (It takes approximately 8 seconds for air flow to reach HI from LOW)



Low Coolant Temperature Starting Control

## < SYSTEM DESCRIPTION >

If the engine coolant temperature is 56°C (133°F) or less, to prevent a cold discharged air flow, A/C auto amp. suspends blower motor activation for the maximum 150 seconds depending on target air mix door opening angle. After this, blower fan drive signal is increased gradually, and blower motor is activated.



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High In-vehicle Temperature Starting Control

When evaporator temperature is high [intake air temperature sensor value is 35°C (95°F) or more], to prevent a hot discharged air flow, A/C auto amp. suspends blower motor activation for approximately 3 seconds so that evaporator is cooled by refrigerant.

#### Fan speed Control at Door Motor Operation

When mode door motor is activated while air flow is more than the specified value, A/C auto amp. reduces temporarily fan speed so that mode door moves smoothly.

#### Fan speed Control at Voice Recognition

When the voice control (voice command) switch is operated during air flow automatic control, A/C auto amp. decreases the air flow of the blower motor once and controls the air flow so as not to disturb the voice recognition function. This control continues while voice recognition function is operating.

## COMPRESSOR CONTROL

Description

- When the compressor activation condition is satisfied while blower motor is activated, A/C auto amp. transmits A/C ON signal and blower fan ON signal to ECM via CAN communication.
- ECM judges that the compressor can be activated depending on each sensors state (refrigerant pressure sensor signal, throttle opening angle sensor signal, and others). And transmits A/C compressor request signal to IPDM E/R via CAN communication.
- IPDM E/R turns A/C relay ON and activates the compressor depending on request from ECM.

## Compressor Protection Control at Pressure Malfunction

When high-pressure side value that is detected by refrigerant pressure sensor is as per the following state, ECM requests IPDM E/R to turn A/C relay OFF and stops the compressor.

- 3.12 MPa (31.8 kg/cm<sup>2</sup>·G) or more (When the engine speed is less than 1,500 rpm)
- 2.74 MPa (27.9 kg/cm<sup>2</sup>·G) or more (When the engine speed is 1,500 rpm or more)
- 0.14 MPa (1.4 kg/cm<sup>2</sup>·G) or less

## Compressor Oil Circulation Control

When the engine starts while the engine coolant temperature is 56°C (133°F) or less, ECM activates the compressor for approximately 6 seconds and circulates the compressor lubricant once.

## Low Temperature Protection Control

When intake air temperature sensor detects that air temperature after passing through evaporator is  $-5^{\circ}C$  (23°F) or less, A/C auto amp. requests ECM to turn the compressor OFF, and stops the compressor.

When the air temperature returns to 1°C (34°F) or more, the compressor is activated.



#### Operating Rate Control

When set temperature is other than fully cold or air outlet is "VENT", "B/L" or "FOOT" A/C auto amp. controls the compressor activation depending on ambient temperature.

## < SYSTEM DESCRIPTION >

## Air Conditioning Cut Control

When the engine is running in excessively high load condition, ECM requests IPDM E/R to turn A/C relay OFF, and stops the compressor. Refer to <u>EC-69</u>, "System Description" for details.

## DOOR MOTOR CONTROL



- LCU (Local Control Unit) is built in to each door motor. And detects door position by PBR (Potentio Balance Resistor).
- A/C auto amp. communicates with each LCU via communication line. And receives each door position feedback signal from each LCU.
- Each LCU controls each door to the appropriate position depending on the control signal from A/C auto amp. when the door movement is complete, transmits the signal of door movement completion to A/C auto amp.

## FAIL-SAFE CONTROL

When a communication malfunction occurs between A/C auto amp. and A/C control for 30 seconds or more, A/C auto amp. automatically controls air outlet and fan speed, fixes air inlet to fresh air intake, maintains set temperature data before the communication malfunction, and activates the compressor. Even if the condition before the communication error occurs is A/C OFF, A/C auto amp. turns the compressor ON with following conditions.

Compressor	: ON
Air outlet	: AUTO
Air inlet	: FRE (Fresh air intake)
Fan speed	: AUTO
Preset temperature	: Setting before communication malfunction

SWITCHES AND THEIR CONTROL FUNCTIONS

## < SYSTEM DESCRIPTION >

[WITHOUT 7 INCH DISPLAY]



Revision: 2014 September

HAC-21

# < SYSTEM DESCRIPTION >

\*: Models for Mexico

Switch /Dial position		Door position				
		Ventilator door	Max. cool door	Defroster door	Intake door	Air mix door
	AUTO			AUTO		
	~;	E	Н	K	_	
Mode control	ÿ	F	I	ĸ		
dial	ٿي.			L		
	<b>\$</b> }	G	J	М	А	—
	¥			N	А	
Intoko owitah	Ē				B*	
Intake Switch	Ś				A*	
	Full cold 18.0°C (60°F)		_	_		С
Temperature control dial	18.5°C -31.5°C (61°F - 89°F)				_	AUTO
	Full hot 32.0°C (90°F)					D
Fan control dial	OFF	G	J	L	А	

\*: Inlet status is displayed by indicator when activating automatic control

# AIR DISTRIBUTION

Discharge air flow					
Made position indication	Air outlet/distribution				
	Ventilator	Foot	Defroster		
~;	100%	—	—		
ÿ	60%	40%	_		
ن.	12%	62%	26%		
Ţ	10%	52%	38%		
Ŵ	—	-	100%		

## < SYSTEM DESCRIPTION >

# [WITHOUT 7 INCH DISPLAY]

# **Component Parts Location**

INFOID:000000010842240

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INFOID:000000010842241

Component	Description
Ambient sensor	HAC-43, "Description"
In-vehicle sensor	HAC-41, "Description"

## < SYSTEM DESCRIPTION >

[WITHOUT 7 INCH DISPLAY]

Component	Description	
Intake sensor	HAC-45, "Description"	
Sunload sensor	HAC-53. "Description"	
Air mix door motor	HAC-57, "Description"	
Mode door motor	EC-527, "Description"	
Intake door motor	HAC-29, "Description"	
A/C control	The operation of the A/C control is communicated with the A/C auto amp. via communication line.	
A/C auto amp.	HAC-32, "Description"	
Blower motor	HAC-38. "Description"	
Magnet clutch	HAC-57, "Description"	
ECV	HAC-59. "Description"	
Refrigerant pressure sensor	HAC-52, "Description"	

# **DIAGNOSIS SYSTEM (HVAC)**

## < SYSTEM DESCRIPTION >

# **DIAGNOSIS SYSTEM (HVAC)**

# **CONSULT** Function

CONSULT performs the following functions via CAN communication with A/C auto amp.

Diagnostic mode	Description	
Self diagnostic result	Displays the diagnosis results judged by A/C auto amp.	
Data monitor	Displays the input/output signal of A/C auto amp.	
Active test	The signals used to activate each device are forcibly supplied from A/C auto amp.	
Work support	Changes the setting for each setting function.	
ECU identification	Displays the part number of A/C auto amp.	

### NOTE:

Diagnosis should be performed with the engine running. Door motor operation speeds become slower and NO results may be returned even for normal operation if battery voltage drops below 12 V during self-diagnosis.

## SELF-DIAGNOSIS RESULTS

Refer to HAC-72, "DTC Index".

#### DATA MONITOR

#### NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Disp	lav	item	list

Display item list			Н
Monitor item [L	Jnit]	Description	
COMP REQ SIG	[On/Off]	Displays A/C switch ON/OFF status transmitted to other units via CAN communication	
FAN REQ SIG	[On/Off]	Displays fan switch ON/OFF status transmitted to other units via CAN communication	HAC
AMB TEMP SEN	[°C]	Ambient sensor value converted from ambient sensor signal received from ambient sensor	
IN-VEH TEMP	[°C]	In-vehicle sensor value converted from in-vehicle sensor signal received from in-vehicle sensor	J
INT TEMP SEN	[°C]	Intake sensor value converted from intake sensor signal received from intake sensor	K
SUNLOAD SEN	[w/m <sup>2</sup> ]	Sunload sensor value converted from sunload sensor signal received from sunload sensor	r.
AMB SEN CAL	[°C]	Ambient sensor value calculated by A/C auto amp.	1
IN-VEH CAL	[°C]	In-vehicle sensor value calculated by A/C auto amp.	
INT TEMP CAL	[°C]	Intake sensor value calculated by A/C auto amp.	
SUNL SEN CAL	[w/m <sup>2</sup> ]	Sunload sensor value calculated by A/C auto amp.	M
FAN DUTY		Duty ratio of blower motor judged by A/C auto amp.	
XM		Target discharge air temperature judged by A/C auto amp. depending on the tempera- ture setting and the value from each sensor	Ν
ENG COOL TEMP	[°C]	Water temperature signal value received from ECM via CAN communication	
VEHICLE SPEED	[Mph (km/h)]	Vehicle speed signal value received from meter via CAN communication	0

## ACTIVE TEST

Test item	Description	
ALL SEG	The signals used to activate A/C control indicator are forcibly supplied from A/C auto amp.	
HVAC TEST	The operation check of air conditioning system can be performed by selecting the mode. Refer to the following table for the conditions of each mode.	

Check each output device

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INFOID:000000010842242

# **DIAGNOSIS SYSTEM (HVAC)**

## < SYSTEM DESCRIPTION >

	Test item						
	MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6	MODE 7
Mode door position	VENT	B/L 1	B/L 2	FOOT	D/F	DEF	_
Intake door position	REC	REC	20% FRE	FRE	FRE	FRE	_
Air mix door position	FULL COLD	FULL COLD	FULL HOT	FULL HOT	FULL HOT	FULL HOT	_
Blower motor control signal duty ratio	37%	91%	65%	65%	65%	91%	_
Magnet clutch	ON	ON	OFF	OFF	ON	ON	_
ECV duty ratio	100%	100%	0%	0%	50%	100%	_

## NOTE:

• Perform the inspection of each output device after starting the engine because the compressor is operated.

• If the Mode 7 is selected, the malfunction is displayed but it is normal.

## WORK SUPPORT

Work item	Description	Refer to
TEMP SET CORRECT (Temperature setting trimmer)	If the temperature felt by the customer is different than the air flow temperature controlled by the temperature setting, the A/C auto amp. control temperature can be adjusted to compensate for the temperature setting.	HAC-9. "Temperature Set- ting Trimmer"
FRE MEMORY SET [Inlet port memory function (FRE)]	<ul> <li>If the ignition switch is turned to the OFF position while the FRE indicator is set to ON (fresh air intake), "Perform the memory" or "Do not perform the memory" of FRE indicator ON (fresh air intake) condition can be selected.</li> <li>If "Perform the memory" was set, the FRE indicator will be ON (fresh air intake) when turning the ignition switch to the ON position again.</li> <li>If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.</li> </ul>	HAC-10, "Inlet Port Mem- ory Function (FRE)"
REC MEMORY SET [Inlet port memory function (REC)]	<ul> <li>If the ignition switch is turned to the OFF position while the REC indicator is set to ON (recirculation), "Perform the memory" or "Do not perform the memory" of REC indicator ON (recirculation) condition can be selected.</li> <li>If "Perform the memory" was set, the REC indicator will be ON (recirculation) when turning the ignition switch to the ON position again.</li> <li>If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.</li> </ul>	HAC-10, "Inlet Port Mem- ory Function (REC)"
BLOWER SET (Foot position setting trimmer)	In FOOT mode, the air blowing to DEF can change ON/OFF.	HAC-9, "Foot Position Setting Trimmer"

## NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of WORK SUPPORT may be cancelled.

# DTC/CIRCUIT DIAGNOSIS U1000 CAN COMM CIRCUIT

# Description

INFOID:000000010842243

INFOID:000000010842244

INFOID:000000010842245

[WITHOUT 7 INCH DISPLAY]

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-board multiplex communication line with high data communication speed and excellent error detection ability. A modern vehicle is equipped with many ECMs, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, 2 control units are connected with 2 communication lines (CAN-L-line and CAN-H-line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

# DTC Logic

## DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible cause	
U1000	CAN COMM CIRCUIT	When A/C auto amp. is not transmitting or receiving CAN communication signal for 2 or more seconds.	CAN communication system	(

# Diagnosis Procedure

# **1.**PERFORM SELF-DIAGNOSIS

()With CONSULT

- 1. Turn the ignition switch ON and wait for 2 seconds or more.
- 2. Perform the "SELF-DIAGNOSIS".
- 3. Check if any DTC is detected in the self-diagnostic results.

Is DTC "U1000" displayed?

- YES >> Perform the diagnosis for the CAN communication system. Refer to <u>LAN-15</u>, "Trouble Diagnosis <u>Flow Chart</u>".
- NO >> Perform the intermittent malfunction diagnosis. Refer to <u>GI-44, "Intermittent Incident"</u>.

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# < DTC/CIRCUIT DIAGNOSIS >

# U1010 CONTROL UNIT (CAN)

# Description

Initial diagnosis of A/C auto amp.

**DTC Logic** 

INFOID:000000010842247

INFOID:000000010842248

INFOID:000000010842246

DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diag- nosis of CAN controller of A/C auto amp.	A/C auto amp.

# **Diagnosis Procedure**

**1.**REPLACE A/C AUTO AMP.

When DTC "U1010" is detected, replace A/C auto amp.

>> INSPECTION END

## < DTC/CIRCUIT DIAGNOSIS >

# B257B, B257C AMBIENT SENSOR

# Description

## AMBIENT SENSOR

- The ambient sensor (1) is installed to the hood lock stay.
- The ambient sensor converts the ambient temperature detected with thermistor into the voltage, and the A/C auto amp. inputs this voltage.



- The A/C auto amp. inputs the temperature detected with the ambient sensor as the ambient temperature.
- Perform the correction of the temperature detected with the ambient sensor for air conditioning control and for ambient temperature display.
- Since the engine heat influences on the ambient sensor during idling condition, the A/C auto amp. retards the ambient temperature indication of the combination meter to avoid the effect of steep temperature change.
- Select and use the initial value of ambient temperature data depending on the coolant temperature when turning the ignition switch from OFF to ON. Use the detection temperature of the ambient sensor at low coolant temperature [less than approximately 56°C (133°F)]. Use the memory data (before the ignition switch is OFF) when the engine is warming up [approximately 56°C (133°F) or more].
- Do not perform the correction of the ambient temperature when the detection temperature of the ambient temperature is less than approximately -29°C (-20°F) (for ambient temperature display) or less than approximately -20°C (-4°F) (for air conditioning control).

## SET TEMPERATURE CORRECTION

The A/C auto amp. performs the correction to the target temperature set by the temperature control dial so as to match the temperature felt by the passengers depending on the ambient temperature detected with the ambient sensor and controls it so that the interior air temperature is always the most suitable.

# **DTC Logic**

DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible causes	N
B257B		The ambient sensor recognition tempera- ture is too high.	<ul> <li>Ambient sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Short in the ambient sensor circuit)</li> </ul>	N
B257C	AMBIENT SENSOR	The ambient sensor recognition tempera- ture is too low.	<ul> <li>Ambient sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Open in the ambient sensor circuit)</li> </ul>	С

## DTC CONFIRMATION PROCEDURE

## **1.**PERFORM SELF-DIAGNOSIS

## With CONSULT

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

• If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-27, "DTC Logic"</u> or <u>HAC-28, "DTC Logic"</u>.

# **HAC-29**

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INFOID:000000010842250



# **B257B, B257C AMBIENT SENSOR**

## < DTC/CIRCUIT DIAGNOSIS >

[WITHOUT 7 INCH DISPLAY]

 If there is an open circuit in the ambient sensor, A/C auto amp registers extreme cold [-30°C (-22°F)] and adjusts the temperature control warmer.

Is DTC "B257B" or "B257C" displayed?

YES >> Perform the diagnosis for the ambient sensor. Refer to <u>HAC-30, "Diagnosis Procedure"</u>. NO >> INSPECTION END

## Diagnosis Procedure

INFOID:000000010842251

# 1.CHECK AMBIENT SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.

- 2. Disconnect ambient sensor connector.
- 3. Turn the ignition switch ON.

4. Check voltage between ambient sensor harness connector and ground.

(+)		(-)	
Ambier	t sensor		Voltage (Approx.)
Connector	Terminal		
E76	1	Ground	5 V

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 4.

# 2. CHECK AMBIENT SENSOR CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. connector.
- 3. Check for continuity between the ambient sensor harness connector and A/C auto amp harness connector.

Ambient sensor		A/C auto amp.		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
E76	2	M66	37	Existed	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

# **3.**CHECK AMBIENT SENSOR

Check the ambient sensor components. Refer to HAC-31. "Component Inspection".

Is the inspection result normal?

- YES >> Replace the A/C auto amp.
- NO >> Replace the ambient sensor.

**4.**CHECK AMBIENT SENSOR CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. connector.
- Check for continuity between the ambient sensor harness connector and A/C auto amp. harness connector.

Ambier	Ambient sensor		ito amp.	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E76	1	M66	35	Existed

4. Check for continuity between ambient sensor harness connector and ground.

# **B257B, B257C AMBIENT SENSOR**

## < DTC/CIRCUIT DIAGNOSIS >

[WITHOUT 7 INCH DISPLAY]

Ambient sensor			Continuity	A
Connector	Terminal		Continuity	
E76	1	Ground	Not existed	R
Le die e lie ein e ette				-

Is the inspection result normal?

YES >> Replace the A/C auto amp.

NO >> Repair the harnesses or connectors.

## Component Inspection

# 1.CHECK AMBIENT SENSOR

- 1. Turn the ignition switch OFF.
- 2. Remove the ambient sensor. Refer to <u>HAC-87, "Exploded View"</u>.
- Check the resistance between the ambient sensor terminals. Refer to the applicable table for the normal value.

Tor	minal	Condition	Posistance: k()	
Ten	IIIIai	Temperature: °C (°F)	PC (°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	
1	2	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	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the ambient sensor.

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## < DTC/CIRCUIT DIAGNOSIS >

# B2578, B2579 IN-VEHICLE SENSOR

in-vehicle sensor area via the aspirator duct.

# Description

ASPIRATOR

## **IN-VEHICLE SENSOR**

- The in-vehicle sensor (1) is installed to the instrument lower panel LH.
- The in-vehicle sensor converts the interior air temperature of the passenger room sucked by the aspirator detected with the thermistor into the voltage, and the A/C auto amp. inputs this voltage.



INFOID:000000010842253





## INTERIOR AIR TEMPERATURE CORRECTION

- The A/C auto amp. inputs the temperature detected with the in-vehicle sensor as the interior air temperature.
- · Perform the correction of the temperature detected with the in-vehicle sensor for each air conditioning control.

# **DTC** Logic

INFOID:000000010842254

[WITHOUT 7 INCH DISPLAY]

DTC DETECTION LOGIC

# B2578, B2579 IN-VEHICLE SENSOR

## < DTC/CIRCUIT DIAGNOSIS >

[WITHOUT 7 INCH DISPLAY]

DTC	Items (CONSULT screen term	s) Diagno	stic item is detected when	Possible causes	А
B2578		The in-veh ature is too	icle sensor recognition temper- b high.	<ul> <li>In-vehicle sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Short in the in-vehicle sensor circuit)</li> </ul>	В
B2579	IN-VEHICLE SENSOR	The in-veh ature is too	icle sensor recognition temper- o low.	<ul> <li>In-vehicle sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Open in the in-vehicle sensor circuit)</li> </ul>	С
DTC CON	NFIRMATION PROC	EDURE			D
1.PERFC	ORM SELF-DIAGNOSI	S			
With CO 1. Perfor 2. Check NOTE:	DNSULT rm the "SELF-DIAGNO < if any DTC is detected	SIS". d in the self-di	agnostic results.		E
If DTC is a HAC-27.	Displayed along with D	1C "U1000" 0 3. "DTC Logic"	r "U1010", first diagnose f	the DTC "U1000" or "U1010". Refer to	
Is DTC "B	2578" or "B2579" displa	aved?			_
YES > NO >	<ul> <li>Perform the diagnos</li> <li>INSPECTION END</li> </ul>	is for the in-ve	ehicle sensor. Refer to <u>HA</u>	<u>C-33, "Diagnosis Procedure"</u> .	G
Diagnos	sis Procedure			INFOID:000000010842255	Н
1.CHECK	( IN-VEHICI E SENSO		JPPLY CIRCUIT		
<ol> <li>Disco</li> <li>Turn t</li> <li>Check</li> </ol>	nnect the in-vehicle ser he ignition switch ON. < voltage between in-ve	nsor connecto ehicle sensor	r. narness connector and gr	ound.	J
	(+)	(-	-)		
In	-vehicle sensor				Κ
Connec	tor Terminal	-	-		
M61	1	Gro	und	5 V	
Is the insp YES > NO > 2.CHECH	ection result normal? > GO TO 2. > GO TO 4. < IN-VEHICLE SENSO		ONTINUITY-		M
<ol> <li>Turn t</li> <li>Disco</li> <li>Check</li> <li>necto</li> </ol>	he ignition switch OFF. nnect the A/C auto am < for continuity betwee r.	p. connector. n the in-vehic	le sensor harness conne	ctor and A/C auto amp. harness con-	N
In	-vehicle sensor	A/C au	o amp.		0
Connec	tor Terminal	Connector	Terminal	Continuity	
M61	2	M66	37	Existed	Ρ
Is the insp YES > NO > <b>3.</b> CHECH	ection result normal? > GO TO 3. > Repair the harnesse < IN-VEHICLE SENSO	s or connecto	rs.		

Check the in-vehicle sensor components. Refer to HAC-34, "Component Inspection".

# HAC-33

# B2578, B2579 IN-VEHICLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

## Is the inspection result normal?

- YES >> Replace the A/C auto amp.
- NO >> Replace the in-vehicle sensor.

**4.**CHECK IN-VEHICLE SENSOR CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. connector.
- 3. Check for continuity between the in-vehicle sensor harness connector and A/C auto amp. harness connector.

In-vehicle sensor		A/C auto amp.		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M61	1	M66	36	Existed	

4. Check for continuity between in-vehicle sensor harness connector and ground.

In-vehicle sensor			Continuity	
Connector	Terminal		Continuity	
M61	1	Ground	Not existed	

Is the inspection result normal?

YES >> Replace the A/C auto amp.

NO >> Repair the harnesses or connectors.

# **Component Inspection**

1.CHECK IN-VEHICLE SENSOR

1. Turn the ignition switch OFF.

2. Remove the in-vehicle sensor. Refer to HAC-88, "Exploded View".

3. Check the resistance between the in-vehicle sensor terminals. Refer to the applicable table for the normal value.

Tor	minal	Condition	Posistanco: kO
Terrininar		Temperature: °C (°F)	
		-15 (5)	12.73
		-10 (14)	9.92
		-5 (23)	7.80
		0 (32)	6.19
	1 2	5 (41)	4.95
		10 (50)	3.99
1		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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the in-vehicle sensor.

## < DTC/CIRCUIT DIAGNOSIS >

# B2581, B2582 INTAKE SENSOR

# Description

## INTAKE SENSOR

- Intake sensor (1) is located on the evaporator (2).
- The intake sensor converts the evaporator passing air temperature detected with thermistor into the voltage, and the A/C auto amp. inputs this voltage.



- The A/C auto amp. inputs the temperature detected with the intake sensor as the evaporator passing air temperature.
- Perform the correction of the temperature detected with the intake sensor for air conditioning control.
- The A/C auto amp. performs the correction so that the recognition intake temperature changes depending on the difference between the detected intake temperature and the recognition intake temperature. If the difference is large, the changing is early. The changing becomes slow as the difference becomes small.

# **DTC Logic**

## DTC DETECTION LOGIC

	1			
DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible causes	
B2581	INTAKE SENSOR	The intake sensor recognition temperature is too high.	<ul> <li>Intake sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Short in the intake sensor circuit)</li> </ul>	J
B2582		The intake sensor recognition temperature is too low.	<ul> <li>Intake sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Open in the intake sensor circuit)</li> </ul>	r

## DTC CONFIRMATION PROCEDURE

## **1.**PERFORM SELF-DIAGNOSIS

## (B) With CONSULT

1. Perform the "SELF-DIAGNOSIS".

2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-27, "DTC Logic"</u> or <u>HAC-28, "DTC Logic"</u>.

Is DTC "B2581" or "B2582" displayed?

YES >> Perform the diagnosis for the intake sensor. Refer to <u>HAC-35, "Diagnosis Procedure"</u>. NO >> INSPECTION END

## Diagnosis Procedure

# 1. CHECK INTAKE SENSOR POWER SUPPLY CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect the intake sensor connector.
- 3. Turn the ignition switch ON.

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# B2581, B2582 INTAKE SENSOR

## < DTC/CIRCUIT DIAGNOSIS >

## 4. Check voltage between intake sensor harness connector and ground.

(+)		(–)		
Intake	sensor		Voltage (Approx.)	
Connector	Terminal			
M205	1	Ground	5 V	

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 4.

# 2. CHECK INTAKE SENSOR CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. connector.
- 3. Check for continuity between the intake sensor harness connector and A/C auto amp. harness connector.

Intake sensor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M205	2	M66	37	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

**3.**CHECK INTAKE SENSOR

Check the intake sensor components. Refer to HAC-36, "Component Inspection".

Is the inspection result normal?

YES >> Replace the A/C auto amp.

NO >> Replace the intake sensor.

4.CHECK INTAKE SENSOR CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. connector.

3. Check for continuity between the intake sensor harness connector and A/C auto amp. harness connector.

Intake sensor		A/C auto amp.		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M205	1	M66	16	Existed	

4. Check for continuity between intake sensor harness connector and ground.

Intake sensor			Continuity
Connector	Terminal	-	Continuity
M205	1	Ground	Not existed.

## Is the inspection result normal?

YES >> Replace the A/C auto amp.

NO >> Repair the harnesses or connectors.

## Component Inspection

# **1.**CHECK INTAKE SENSOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the intake sensor connector. Refer to <u>HAC-90, "Exploded View"</u>.
- 3. Check the resistance between the intake sensor terminals. Refer to the applicable table for the normal value.

# HAC-36

INFOID:000000010842260
### B2581, B2582 INTAKE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

Torr	minal	Condition	Bagistanagi kQ
Terrinia		Temperature: °C (°F)	Resistance. K2
		-15 (5)	12.28
		-10 (14)	9.58
		-5 (23)	7.55
		0 (32)	6.00
		5 (41)	4.81
		10 (50)	3.88
1	2	15 (59)	3.16
		20 (68)	2.59
		25 (77)	2.14
		30 (86)	1.77
		35 (95)	1.48
		40 (104)	1.24
		45 (113)	1.05

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the intake sensor.

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#### < DTC/CIRCUIT DIAGNOSIS >

# B2630, B2631 SUNLOAD SENSOR

### Description

#### SUNLOAD SENSOR

- The sunload sensor (1) is installed to the front defroster grille LH.
- The sunload sensor converts the sunload amount (illuminance) into the current value with the photodiode. The A/C auto amp. calculates this current value to the voltage and inputs it.



#### SUNLOAD AMOUNT CORRECTION

- The A/C auto amp. inputs the sunload amount detected with the sunload sensor.
- Perform the correction of the sunload amount detected with the sunload sensor for each air conditioning control.
- When the sunload amount suddenly changes, for example when entering a tunnel, perform the correction so that the recognition sunload amount of the A/C auto amp. changes slowly.

#### DTC Logic

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### DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible causes
B2630	SUNLOAD SENSOR	Detected calorie at sunload sensor 2832 W/m <sup>2</sup> (2436 kcal/m <sup>2</sup> ·h) or more	<ul> <li>Sunload sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Short in the sunload sensor circuit)</li> </ul>
B2631		Detected calorie at sunload sensor 64.7 W/m <sup>2</sup> (56 kcal/m <sup>2</sup> ·h) or less	<ul> <li>Sunload sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Open in the sunload sensor circuit)</li> </ul>

#### DTC REPRODUCTION PROCEDURE

### **1.**PERFORM SELF-DIAGNOSIS

#### (I) With CONSULT

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

- If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to HAC-27, "DTC Logic" or HAC-28, "DTC Logic".
- Sunload sensor may register a malfunction when indoors, at dusk, or at other times when light is insufficient. When performing the diagnosis indoors, use a lamp (60 W or more) that is pointed at the sunload sensor.

Is DTC "B2630" or "B2631" displayed?

- YES >> Perform the diagnosis for the sunload sensor. Refer to <u>HAC-38</u>, "<u>Diagnosis Procedure</u>".
- NO >> INSPECTION END

### Diagnosis Procedure

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#### **1.**CHECK SUNLOAD SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.

2. Disconnect the sunload sensor connector.

# **HAC-38**

INFOID:000000010842261

#### B2630, B2631 SUNLOAD SENSOR > [WITHOUT 7 INCH DISPLAY]

# < DTC/CIRCUIT DIAGNOSIS >

# 3. Turn the ignition switch ON.

4. Check voltage between sunload sensor harness connector and ground.

	+)	(-	-)		
Sunload	d sensor			Voltage (Approx.)	
Connector	Terminal	-	-	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
M46	1	Gro	und	5 V	(
Is the inspection YES >> GC NO >> GC 2.CHECK SUN	<u>n result normal?</u> ) TO 2. ) TO 4. NLOAD SENSO	R CIRCUIT CO	NTINUITY		I
<ol> <li>Turn the igi</li> <li>Disconnect</li> <li>Check for c nector.</li> </ol>	nition switch OF the A/C auto an continuity betwe	F. np. connector. en the sunload	sensor harness c	onnector and the A/C auto amp. harnes	ss con-
Sunload	d sensor	A/C aut	o amp.		
Connector	Terminal	Connector	Terminal	Continuity	
M46	2	M66	37	Existed	(
2. Connect th 3. Check the s ls the inspection YES >> Rel	e A/C auto amp sunload sensor n result normal? place the A/C au	. connector. components. R	efer to <u>HAC-39, "</u>	Component Inspection".	
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for c	place the sunloa NLOAD SENSO nition switch OF the A/C auto an continuity betwee	ad sensor. R CIRCUIT CO F. mp. connector. en the sunload	NTINUITY	onnector and A/C auto amp. harness c	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for c tor. Sunload	place the sunloa NLOAD SENSO nition switch OF the A/C auto an continuity betwe	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload	NTINUITY sensor harness c	onnector and A/C auto amp. harness c	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for content tor. Sunload Connector	place the sunloa NLOAD SENSO nition switch OF the A/C auto ar continuity betwe d sensor Terminal	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector	NTINUITY sensor harness c to amp. Terminal	onnector and A/C auto amp. harness c	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for content tor. Sunload Connector M46	place the sunloa NLOAD SENSO nition switch OF the A/C auto an continuity betwe d sensor Terminal 1	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector M66	NTINUITY sensor harness o to amp. Terminal 15	onnector and A/C auto amp. harness c Continuity Existed	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for c tor. Sunload Connector M46 4. Check for c	place the sunloa NLOAD SENSO nition switch OF the A/C auto ar continuity betwe d sensor Terminal 1 continuity betwee	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector M66 en sunload sens	NTINUITY sensor harness of to amp. Terminal 15 sor harness conn	onnector and A/C auto amp. harness c Continuity Existed ector and ground.	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for c tor. Sunload Connector M46 4. Check for c	place the sunloa NLOAD SENSO nition switch OF the A/C auto ar continuity betwe d sensor Terminal 1 continuity betwee	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector M66 en sunload sens	NTINUITY sensor harness of to amp. Terminal 15 sor harness conn	onnector and A/C auto amp. harness c Continuity Existed ector and ground.	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for content Sunload Connector M46 4. Check for content Sunload Connector	place the sunloa place the sunloa NLOAD SENSO inition switch OF the A/C auto an continuity between d sensor 1 continuity between d sensor Terminal Continuity between d sensor	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector M66 en sunload sens	NTINUITY sensor harness of to amp. Terminal 15 sor harness conn	onnector and A/C auto amp. harness c Continuity Existed ector and ground. Continuity	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for c tor. Sunload Connector M46 4. Check for c Sunload Connector M46	place the sunloa NLOAD SENSO nition switch OF the A/C auto ar continuity betwe d sensor Terminal 1 continuity betwee d sensor Terminal 1	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector M66 en sunload sen: - Gro	NTINUITY sensor harness c to amp. Terminal 15 sor harness conn - und	onnector and A/C auto amp. harness c Continuity Existed ector and ground. Continuity Not existed	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for c tor. Sunload Connector M46 4. Check for c Sunload Connector M46 Is the inspection	place the sunloa NLOAD SENSO nition switch OF the A/C auto ar continuity betwe d sensor 1 continuity betwee d sensor 1 continuity betwee d sensor 1 n result normal?	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector M66 en sunload sen: Gro	NTINUITY sensor harness c o amp. Terminal 15 sor harness conn - und	onnector and A/C auto amp. harness c Continuity Existed ector and ground. Continuity Not existed	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for c tor. Sunload Connector M46 4. Check for c Sunload Connector M46 Is the inspection YES >> Re	place the sunloa NLOAD SENSO nition switch OF the A/C auto ar continuity betwe d sensor Terminal 1 continuity betwee d sensor Terminal 1 n result normal? place A/C auto a	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector M66 en sunload sen Gro	NTINUITY sensor harness c o amp. Terminal 15 sor harness conn - und	onnector and A/C auto amp. harness c Continuity Existed ector and ground. Continuity Not existed	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for content 4. Check for content M46 4. Check for content Connector M46 1. Turn the ign Sunload Connector M46 1. Check for content Sunload Connector M46 1. Check for content Sunload Connector M46 1. Check for content Sunload Connector M46 1. Check for content Sunload Connector M46 1. Check for content Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector M46 Sunload Connector Con	place the sunloa place the sunloa NLOAD SENSO inition switch OF the A/C auto ar continuity betwe d sensor Terminal 1 continuity betwe d sensor Terminal 1 n result normal? place A/C auto a pair the harness	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector M66 en sunload sens Gro Camp. Ses or connector	NTINUITY sensor harness c o amp. Terminal 15 sor harness conn und rs.	onnector and A/C auto amp. harness c Continuity Existed ector and ground. Continuity Not existed	connec-
NO >> Re 4.CHECK SUN 1. Turn the ign 2. Disconnect 3. Check for content 4. Check for content M46 4. Check for content Sunload Connector M46 4. Check for content Sunload Connector M46 1. Turn the ign Sunload Connector M46 1. Check for content Sunload Connector M46 1. Check for content Sunload Connector M46 Connector M46 Connector M46 Connector M46 Connector Connector M46 Connector Connector M46 Connector Connector M46 Connector	place the sunloa place the sunloa NLOAD SENSO inition switch OF the A/C auto ar continuity between d sensor Terminal 1 continuity between d sensor Terminal 1 n result normal? place A/C auto a pair the harness Inspection	Ad sensor. R CIRCUIT CO F. mp. connector. en the sunload A/C aut Connector M66 en sunload sens Gro Camp. Ses or connector	NTINUITY sensor harness c o amp. Terminal 15 sor harness conn - und rs.	onnector and A/C auto amp. harness c Continuity Existed ector and ground. Continuity Not existed	connec-

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### B2630, B2631 SUNLOAD SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

#### 1. Turn the ignition switch ON.

2. Check the input voltage from the sunload sensor between the A/C auto amp. harness connector and ground. Refer to the applicable table for the normal value.



NOTE:

- When checking indoors, use a lamp of approximately 60 W. Move the lamp towards and away from the sensor to check.
- The sunload amount produced by direct sunshine in fair weather is equivalent to approximately 0.77 kW/m<sup>2</sup> (662 kcal/m<sup>2</sup>·h).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace the sunload sensor.

#### B2632, B2633 AIR MIX DOOR MOTOR PBR

#### < DTC/CIRCUIT DIAGNOSIS >

# B2632, B2633 AIR MIX DOOR MOTOR PBR

#### Description

#### AIR MIX DOOR MOTOR

- The air mix door motor (1) is installed to the heater & cooling unit assembly.
- The LCU (Local Control Unit) is installed to each door motor so as to perform the multiplex communication control (LAN) between each door motor of the mode door motor, air mix door motor and intake door motor in one communication line.
- When each LCU receives the control signal (combination of the pulse wave with two types of amplitude) from the A/C auto amp., it moves each door to the appropriate position based on the door position detection signal of each PBR (Potentio Balance Resistor). When the movement was completed, each LCU transmits the signal that reports the movement completion to the A/C auto amp.

### **DTC Logic**



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#### DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible causes
B2632		Air mix door PBR position 95% or more	<ul> <li>Air mix door motor (PBR internal circuit is short)</li> <li>A/C auto amp.</li> <li>Harness and connector (LAN communication line is open or shorted)</li> </ul>
B2633	DR AIR WIX DOOR WOT	Air mix door PBR position 5% or less	<ul> <li>Air mix door motor (PBR internal circuit is open)</li> <li>A/C auto amp.</li> <li>Harness and connector (LAN communication line is open or shorted)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

### **1.**PERFORM SELF-DIAGNOSIS

#### ()With CONSULT

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

- If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-27. "DTC Logic"</u> or <u>HAC-28. "DTC Logic"</u>.
- If all of door motors DTC (B2632 B2655) are detected, check door motor communication circuit. Refer to <u>HAC-49, "Diagnosis Procedure"</u>.

Is DTC "B2632" or "B2633" displayed?

YES >> Perform the diagnosis of air mix door motor system. Refer to <u>HAC-42, "Diagnosis Procedure"</u>. NO >> GO TO 2.

2. FUNCTION INSPECTION

- 1. Turn temperature dial and raise temperature setting to 32.0°C (90°F) after warming up the engine.
- 2. Check that warm air blows from outlets.
- 3. Operate the compressor.
- 4. Operate the temperature control dial and lower the set temperature to 18.0°C (60°F).
- 5. Check that the cool air blows from the outlets.

Does it operate normally?

### HAC-41

### B2632, B2633 AIR MIX DOOR MOTOR PBR

#### < DTC/CIRCUIT DIAGNOSIS >

[WITHOUT 7 INCH DISPLAY]

YES >> INSPECTION END

NO >> Check the air mix door motor system installation condition. Repair or replace the malfunctioning parts.

### **Diagnosis Procedure**

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### **1.**CHECK BATTERY VOLTAGE OF AIR MIX DOOR MOTOR

- 1. Turn the ignition switch ON.
- 2. Check voltage between the air mix door motor harness connector and ground.

(+) (-)		Valtara	
Air mix d	oor motor		(Approx.)
Connector	Terminal		
M204	1	Ground	12 V

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the harnesses or connectors.

2.check signal of air mix door motor

Check output waveform between the air mix door motor harness connector and ground with the oscilloscope.

(+)		(-)	
Air mix door motor			Output waveform
Connector	Terminal	—	
M204	3	Ground	(V) 15 10 5 0 

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

# $\mathbf{3}.$ Check ground circuit of air mix door motor

1. Turn the ignition switch OFF.

2. Disconnect the air mix door motor connector.

3. Check for continuity between the air mix door motor harness connector and ground.

Air mix door motor			Continuity
Connector	Terminal		Continuity
M204	2	Ground	Existed

Is the inspection result normal?

- YES >> Replace the air mix door motor.
- NO >> Repair the harnesses or connectors.

### B2636, B2637, B2638, B2639, B2654, B2655 MODE DOOR MOTOR < DTC/CIRCUIT DIAGNOSIS > [WITHOUT 7 INCH DISPLAY]

# B2636, B2637, B2638, B2639, B2654, B2655 MODE DOOR MOTOR

### Description

#### MODE DOOR MOTOR

- The mode door motor (1) is installed to the heater & cooling unit assembly.
- The LCU (Local Control Unit) is installed to each door motor so as to perform the multiplex communication control (LAN) between each door motor of the mode door motor, air mix door motor and intake door motor in one communication line.
- When each LCU receives the control signal (combination of the pulse wave with two type of amplitude) from the A/C auto amp., it moves each door to the appropriate position based on the door position detection signal of each PBR (Potentio Balance Resistor). When the movement was completed, each LCU transmits the signal that reports the movement completion to the A/C auto amp.



# DTC Logic



INFOID:000000010842268

#### DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible cause	
B2636	DR VENT DOOR FAIL	When the malfunctioning door position is detected at VENT position		-
B2637	DR B/L DOOR FAIL	When the malfunctioning door position is detected at B/L position	Mode door motor (PRP internal	HA
B2638	DR D/F1 DOOR FAIL	When the malfunctioning door position is detected at FOOT position	<ul> <li>indue door motor (FBR memain circuit is open or shorted)</li> <li>A/C auto amp.</li> </ul>	
B2639	DR DEF DOOR FAIL	When the malfunctioning door position is detected at DEF position	Harness and connector (LAN communication line is open or chorted)	J
B2654	D/F2 DOOR FAIL	When the malfunctioning door position is detected at D/F position		K
B2655	B/L2 DOOR FAIL	When the malfunctioning door position is detected at B/L2 position	]	_

#### DTC CONFIRMATION PROCEDURE

**1.**PERFORM SELF-DIAGNOSIS

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

- If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-27, "DTC Logic"</u> or <u>HAC-28, "DTC Logic"</u>.
- If all of door motors DTC (B2632 B2655) are detected, check door motor communication circuit. Refer to HAC-49. "Diagnosis Procedure".

Is DTC " B2636 ", " B2637 ", "B2638 ", "B2639 ", "B2654 " or "B2655 " displayed?

YES >> Perform the diagnosis of mode door motor system. Refer to <u>HAC-44, "Diagnosis Procedure"</u>. NO >> GO TO 2.

#### 2.FUNCTION INSPECTION

- 1. Turn mode control dial to each position.
- Check that the air outlets change according to each indicated air outlet by placing a hand in front of the outlets. Refer to <u>VTL-3</u>, "System Description".

#### Does it operate normally?

- YES >> INSPECTION END
- NO >> Check the mode door system installation condition. Repair or replace the malfunctioning parts.

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#### B2636, B2637, B2638, B2639, B2654, B2655 MODE DOOR MOTOR IRCUIT DIAGNOSIS > [WITHOUT 7 INCH DISPLAY]

#### < DTC/CIRCUIT DIAGNOSIS >

### Diagnosis Procedure

INFOID:000000010842270

1. CHECK MODE DOOR MOTOR POWER SUPPLY CIRCUIT

- 1. Turn the ignition switch ON.
- 2. Check voltage between the mode door motor harness connector and ground.

(	(+) (-)		) / =   + = = =
Mode door motor			(Approx.)
Connector	Terminal		
M203	1	Ground	12 V

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the harnesses or connectors.

2. CHECK MODE DOOR MOTOR SIGNAL

Check output waveform between the mode door motor harness connector and ground with the oscilloscope.

(	+)	(-)	
Mode door motor			Output waveform
Connector	Terminal		
M203	3	Ground	(V) 10 5 0 

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

# $\mathbf{3}.$ check mode door motor ground circuit

- 1. Turn the ignition switch OFF.
- 2. Disconnect the mode door motor connector.
- 3. Check for continuity between the mode door motor harness connector and ground.

Mode door motor		_	Continuity
Connector	Terminal	—	Continuity
M203	2	Ground	Existed

Is the inspection result normal?

YES >> Replace the Mode door motor.

NO >> Repair the harnesses or connectors.

### B263D, B263E, B263F INTAKE DOOR MOTOR

#### < DTC/CIRCUIT DIAGNOSIS >

# B263D, B263E, B263F INTAKE DOOR MOTOR

#### Description

#### INFOID:00000001084227

#### INTAKE DOOR MOTOR

- The intake door motor (1) is installed to the blower unit.
- The LCU (Local Control Unit) is installed to each door motor so as to perform the multiplex communication control (LAN) between each door motor of the mode door motor, air mix door motor and intake door motor in one communication line.
- When each LCU receives the control signal (combination of the pulse wave with two type of amplitude) from the A/C auto amp., it moves each door to the appropriate position based on the door position detection signal of each PBR (Potentio Balance Resistor). When the movement was completed, each LCU transmits the signal that reports the movement completion to the A/C auto amp.



[WITHOUT 7 INCH DISPLAY]

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### DTC DETECTION LOGIC

DTC Logic

DTC	Items	Diagnostic item is detected when	Possible cause	0
	(CONSULT screen terms)			
B263D	FRE DOOR FAIL	When the malfunctioning intake door position is detected at FRE position	<ul> <li>Intake door motor (PBR internal circuit is open or shorted)</li> </ul>	Н
B263E	20P FRE DOOR FAIL	When the malfunctioning intake door position is detected at 20%FRE position	<ul><li> A/C auto amp.</li><li> Harness and connector</li></ul>	
B263F	REC DOOR FAIL	When the malfunctioning intake door position is detected at REC position	(LAN communication line is open or shorted)	
DTC CO	NFIRMATION PROCEDURE			J
1.PERFC	DRM SELF-DIAGNOSIS			0
With CO	DNSULT			Κ
1. Perfo	rm the "SELF-DIAGNOSIS". ( if any DTC is detected in the s	elf-diagnostic results		
NOTE:	Charly DTC is detected in the s	en-diagnostic results.		
• If DTC is	s displayed along with DTC "U10	00" or "U1010", first diagnose the DT	C "U1000" or "U1010". Refer to	L
• If all of (	, " <u>DTC Logic"</u> of <u>HAC-28, "DTC</u> door motors DTC (B2632 - B264	<u>Logic</u> . 55) are detected check door motor.	communication circuit Refer to	
HAC-49	, "Diagnosis Procedure".			М
Is DTC " E	3263D ", " B263E " or "B263F " ?			1 V 1
YES >	Perform the diagnosis of intak	e door motor system. Refer to <u>HAC-</u>	46, "Diagnosis Procedure".	
NO >	> GO TO 2.			Ν
2.FUNCT	FION INSPECTION			
1. Press	intake switch to set the air outle	et to recirculation.		0
2. The R	REC indicator turns ON.			0
3. LISTER	i to intake sound and confirm air	iniets change. ir outlet to fresh air intake		
5. The F	RE indicator turns ON.			Р
6. Lister	to intake sound and confirm air	inlets change.		

#### Does it operate normally?

- YES >> INSPECTION END
- NO >> Check the intake door system installation condition. Repair or replace the malfunctioning parts.

Revision: 2014 September

### HAC-45

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#### B263D, B263E, B263F INTAKE DOOR MOTOR [WITHOUT 7 INCH DISPLAY]

# < DTC/CIRCUIT DIAGNOSIS >

### Diagnosis Procedure

INFOID:000000010842273

# 1. CHECK BATTERY VOLTAGE OF INTAKE DOOR MOTOR

- 1. Turn the ignition switch ON.
- 2. Check voltage between the intake door motor harness connector and ground.

(	+)	(-)	
Intake d	oor motor	(Approx.)	
Connector	Terminal		
M206	1	Ground	12 V

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the harnesses or connectors.

2. CHECK INTAKE DOOR MOTOR SIGNAL

Check output waveform between the intake door motor harness connector and ground with the oscilloscope.

(	+)	(–)	
Intake de	oor motor		Output waveform
Connector	Terminal		
M206	3	Ground	(V) 15 10 5 0 → ← 20 ms SJIA1453J

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

# **3.**CHECK INTAKE DOOR MOTOR GROUND CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect the intake door motor connector.
- 3. Check for continuity between the intake door motor harness connector and ground.

Intake door motor			Continuity	
Connector	Terminal		Continuity	
M206	2	Ground	Existed	

Is the inspection result normal?

YES >> Replace the Intake door motor.

NO >> Repair the harnesses or connectors.

			MER SUFFET AND G		
NCH DISPLAY]	WITHOUT 7 IN		>	T DIAGNOSIS >	< DTC/CIRCUI
		Т	D GROUND CIRCUI	UPPLY AND	POWER SI
				AMP.	A/C AUTO A
INFOID:000000010842274			osis Procedure	MP. : Diagnos	A/C AUTO A
				3E	1.CHECK FUS
		(J/B)].	d 19, located in the fuse block	s [Nos. 3, 6 and 1	Check 10A fuse NOTE:
		<u>.</u> .	<u>and terminal Arrangemen</u>	<u>Fuse, Connecto</u>	Relef to <u>PG-99,</u> Is the inspection
				TO 2.	YES >> GO
		cuit.	fter repairing the applicable ci	place the fuse afte	NO >> Rep
			OWER SUPPLY CIRCUIT	AUTO AMP. POW	<b>2.</b> CHECK A/C
		or and ground.	F. np. connector. C auto amp. harness connecto	nition switch OFF. the A/C auto amp age between A/C a	<ol> <li>Turn the igr</li> <li>Disconnect</li> <li>Check volta</li> </ol>
	Voltage		(-)	+)	(+
on	nition switch positio	lg		to amp.	A/C aut
ON	ACC	OFF	—	Terminal	Connector
Battery voltage	Battery voltage	Approx. 0 V		17	
Battery voltage	Approx. 0 V	Approx. 0 V	Ground	20	M66
Battery voltage	Battery voltage	Battery voltage		40	
				/ IO 3.	YES >> GO
		ctor and ground.	ees or connectors. RCUIT CONTINUITY F. A/C auto amp. harness conne	pair the harnesses AUTO AMP. CIRC nition switch OFF. inuity between A/C	NO >> Rep 3.CHECK A/C 1. Turn the igr 2. Check conti
	ity	ctor and ground. Continu	es or connectors. RCUIT CONTINUITY F. A/C auto amp. harness conne —	pair the harnesses AUTO AMP. CIRC nition switch OFF. inuity between A/C	NO >> Rep 3.CHECK A/C 1. Turn the igr 2. Check conti A/C aut
	ity	ctor and ground. Continu	es or connectors. RCUIT CONTINUITY F. A/C auto amp. harness conne 	AUTO AMP. CIRC AUTO AMP. CIRC nition switch OFF. inuity between A/C to amp. Terminal	NO >> Rep 3.CHECK A/C 1. Turn the igr 2. Check conti A/C aut Connector
	ity	ctor and ground. Continu Existe	ees or connectors. RCUIT CONTINUITY F. A/C auto amp. harness conne — Ground	AUTO AMP. CIRC AUTO AMP. CIRC nition switch OFF. inuity between A/C to amp. Terminal 19 39	NO >> Rep 3.CHECK A/C 1. Turn the igr 2. Check conti A/C aut Connector M66
INFOID:000000010842275	ity	ctor and ground. Continu Existe	ees or connectors. RCUIT CONTINUITY F. A/C auto amp. harness conne — Ground Sees or connectors. Ses Procedure WER SUPPLY CIRCUIT	AUTO AMP. CIRC AUTO AMP. CIRC inuity between A/C to amp. Terminal 19 39 result normal? SPECTION END bair the harnesses OL OL : Diagnosi	NO >> Rep 3.CHECK A/C 1. Turn the igr 2. Check conti A/C aut Connector M66 Is the inspection YES >> INS NO >> Rep A/C CONTR A/C CONTR 1.CHECK A/C

# POWER SUPPLY AND GROUND CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

(	+)	(-)	
A/C o	control		Voltage
Connector	Terminal		
M67	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.

- NO >> Check 10A fuse (No. 3, located in the fuse block). Refer to <u>PG-99, "Fuse, Connector and Termi-</u> nal Arrangement".
  - If fuse is OK, check harness for open circuit. Repair or replace if necessary.
  - If fuse is NG, replace fuse and check for short circuit. Repair or replace if necessary.

# 2. CHECK A/C CONTROL CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Check continuity between A/C control harness connector and ground.

A/C o	control		Continuity
Connector	Terminal		Continuity
M67	6	Ground	Existed

Is the inspection result normal?

YES >> Replace the A/C control.

NO >> Repair the harnesses or connectors.

# DOOR MOTOR COMMUNICATION CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

# [WITHOUT 7 INCH DISPLAY]

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INFOID:0000000010842277

# DOOR MOTOR COMMUNICATION CIRCUIT

# Description



- LCU (Local Control Unit) is built in to each door motor. And detects door position by PBR (Potentio Balance) Resistor).
- A/C auto amp. communicates with each LCU via communication line. And receives each door position feedback signal from each LCU.
- Each LCU control each door to the appropriate position depending on the control signal from A/C auto amp. When the door movement was completed, transmits the signal of door movement completion to A/C auto amp.

### **Diagnosis** Procedure

#### NOTE:

If all of door motors DTC are detected, check this circuit.

**1.**CHECK COMMUNICATION SIGNAL

- 1. Turn the ignition switch ON.
- Check output waveform between A/C auto amp. harness connector and ground with the oscilloscope. 2.

(+	-)	(–)		
A/C aut	o amp.		Output waveform	
Connector	Terminal	—		L
M66	10	Ground	$(v) \\ 15 \\ 10 \\ + 4 \\ $	M
ls the inspection YES >> GO	n result normal? TO 3.		00000	0

NO >> GO TO 2.

 $\mathbf{Z}$ .CHECK COMMUNICATION SIGNAL CIRCUIT FOR SHORT

1. Turn the ignition switch OFF.

- Disconnect the following connectors: 2.
- A/C auto amp.
- Mode door motor
- Intake door motor
- Air mix door motor
- Check continuity between A/C auto amp. harness connector and ground. 3.

# **HAC-49**

# DOOR MOTOR COMMUNICATION CIRCUIT

#### < DTC/CIRCUIT DIAGNOSIS >

A/C auto amp.			Continuity	
Connector	Terminal		Continuity	
M66	10	Ground	Not existed	

Is the inspection result normal?

YES >> Replace A/C auto amp.

NO >> Repair the harnesses or connectors.

**3.**CHECK COMMUNICATION SIGNAL CIRCUIT FOR OPEN

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. and the mode door motor connectors.
- 3. Check continuity between A/C auto amp. harness connector and the mode door motor harness connector.

A/C auto amp.		Mode door motor		Continuity	
Connector	Terminal	Connector	onnector Terminal		
M66	10	M203	3	Existed	

Is the inspection result normal?

YES >> Replace A/C auto amp.

NO >> Repair the harnesses or connectors.

# A/C CONTROL SIGNAL CIRCUIT

A/C CONT	ROL SIGN	AL CIRCU	IT		Δ
Diagnosis P	rocedure			INFOID:000000010842278	A
<b>1.</b> SELF-DIAG	NOSIS RESULT	CHECK			В
With CONSU 1. Perform the 2. Check if an NOTE:	JLT e "SELF-DIAGN iy DTC is displa	OSIS RESULT	S" of HVAC. diagnosis results	5.	С
If DTC is displated by the second sec	yed along with <u>Logic"</u> or <u>HAC-</u>	DTC "U1000" o <u>28, "DTC Logic</u> '	r "U1010", first ( <u>'</u> .	diagnose the DTC "U1000" or "U1010". Refer to	D
Is any DTC dis	<u>played?</u>				
YES >> Pe	rform the diagr	osis that is ap	plicable to the	sensor and actuator. Refer to HAC-72, "DTC	_
NO >> GC	) TO 2.				
2.снеск тх	(A/C CONTROL	$\rightarrow$ A/C AUTO	AMP.) CIRCUIT	CONTINUITY	
1. Turn the ig	nition switch OF	F.			F
<ol> <li>Disconnect</li> <li>Check con</li> </ol>	the A/C contro tinuity between	A/C and the A/C an	uto amp. connec ness connector	and A/C auto amp. harness connector.	
	<b>,</b>				G
A/C o	control	A/C au	to amp.	Continuity	
Connector	Terminal	Connector	Terminal		Н
M67	5	M66	6	Existed	
4. Check con	tinuity between	A/C control har	ness connector	and ground.	НΔ
A/C o	control			Oractionality	
Connector	Terminal	-	—	Continuity	
M67	5	Gro	ound	Not existed	J
Is the inspectio YES >> GC NO >> Re <b>3.</b> CHECK RX	n result normal? ) TO 3. pair harness or (A/C AUTO AM	connector. P. $\rightarrow$ A/C CON <sup>-</sup>	TROL) CIRCUIT	CONTINUITY	K
<ol> <li>Disconnect</li> <li>Check cont</li> </ol>	the A/C contro tinuity between	l and the A/C au A/C control har	uto amp. connec ness connector	ctor. and A/C auto amp. harness connector.	L
A/C o	control	A/C au	to amp.	Orationity	M
Connector	Terminal	Connector	Terminal	Continuity	
M67	4	M66	7	Existed	NI
3. Check con	tinuity between	A/C control har	ness connector	and ground.	IN
A/C d	control				0
Connector	Terminal	-	_	Continuity	0
M67	4	Gro	ound	Not existed	
Is the inspectio	n result normal?	2	L. L		Ρ
YES >> Pe	rform trouble dia	agnosis for the .	A/C control. Ref	er to HAC-47, "A/C CONTROL : Diagnosis Pro-	
NO >> Re	pair harness or	connector.			

< DTC/CIRCUIT DIAGNOSIS >

### < DTC/CIRCUIT DIAGNOSIS > A/C AUTO AMP.

Description

### A/C AUTO AMP. (A/C AUTO AMPLIFIER)

- The A/C auto amp. (1) has a built-in microcomputer which processes information sent from various sensors needed for air conditioning system operation.
- The air mix door motor, mode door motor, intake door motor, blower motor and the compressor are then controlled.
- When the various switches and dials are operated, data is input to the A/C auto amp. from the A/C control via communication line.
- Self-diagnosis functions are also built into A/C auto amp. to provide quick check of malfunctions in the auto air conditioning system.

# **Component Function Check**



INFOID:000000010842280

INFOID:000000010842279

# 1.CHECK OPERATION

- 1. Operate the fan control dial to AUTO position.
- 2. Operate the temperature control dial. Check that the fan speed or discharge air changes (the discharge air temperature or fan speed varies depending on the ambient temperature, in-vehicle temperature, and set temperature).

#### Does it operate normally?

YES >> INSPECTION END

NO >> Perform the diagnosis for the A/C auto amp. Refer to <u>HAC-52, "Diagnosis Procedure"</u>.

# Diagnosis Procedure

INFOID:000000010842281

# **1.** INSPECTION BY FAIL-SAFE FUNCTION

- 1. Turn the ignition switch ON.
- 2. After approximately 30 seconds, check that the air conditioning system is operated by the fail-safe function. Refer to <u>HAC-71, "Fail-safe"</u>.

#### Is the fail-safe function operated?

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

 $\sim 3000$  > 0002.

2.CHECK A/C AUTO AMP. POWER SUPPLY CIRCUIT AND GROUND CIRCUIT

Check A/C auto amp. power supply circuit and ground circuit. Refer to <u>HAC-47, "A/C AUTO AMP. : Diagnosis</u> <u>Procedure"</u>.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace parts depending on the inspection results.

**3.**CHECK A/C CONTROL SIGNAL CIRCUIT

Check the A/C control signal circuit. Refer to <u>HAC-51. "Diagnosis Procedure"</u>.

Is the inspection result normal?

- YES >> Replace A/C auto amp.
- NO >> Repair or replace parts according to the inspection results.

# < DTC/CIRCUIT DIAGNOSIS >

# BLOWER MOTOR

# Description

- The blower motor utilizes a brush-less motor with a rotating magnet.
- Quietness is improved over previous motors where the brush was the point of contact and the coil rotated.



2. Check that the blower motor control signal changes according to each indicator number.

INFOID:000000010842282

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# **BLOWER MOTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

	Test item						
	MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6	MODE 7
Blower fan motor control sig- nal duty ratio	37%	91%	65%	65%	65%	91%	_

NOTE:

· Perform the inspection of each output device after starting the engine because the compressor is operated.

• If the Mode 7 is selected, the malfunction is displayed but it is normal.

#### Does it operate normally?

YES >> INSPECTION END

NO >> GO TO 3.

# ${\bf 3.}$ Check blower motor power supply circuit

#### 1. Turn the ignition switch OFF.

2. Disconnect the blower motor connector.

3. Turn the ignition switch ON.

4. Check voltage between blower motor harness connector and ground.

(	+)	(–)	
Blowe	r motor		Voltage
Connector	Terminal		
M109	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 7.

#### **4.**CHECK BLOWER MOTOR GROUND CIRCUIT

1. Turn the ignition switch OFF.

2. Check for continuity between blower motor harness connector and ground.

Blower motor			Continuity	
Connector	Terminal		Continuity	
M109	3	Ground	Existed	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair the harnesses or connectors.

**5.**CHECK BLOWER MOTOR CIRCUIT CONTINUITY

1. Disconnect the A/C auto amp. connector.

2. Check for continuity between the blower motor harness connector and A/C auto amp. harness connector.

Blowe	r motor	A/C auto amp.		Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M109	2	M66	32	Existed	

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair the harnesses or connectors.

**6.**CHECK A/C AUTO AMP. OUTPUT SIGNAL

1. Reconnect blower motor connector and A/C auto amp. connector.

2. Turn the ignition switch ON.

3. Set the mode control dial to VENT position.

#### HAC-54

# **BLOWER MOTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

[WITHOUT 7 INCH DISPLAY]

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4. Change fan speed from Lo to Hi, and check duty ratios between blower motor harness connector and ground by using an oscilloscope.

#### NOTE:

Calculate the drive signal duty ratio as shown in the figure. T2 = Approx. 1.6 ms

Blower motor		Condition	Duty ratio
Connector	Terminal	Fan speed (manual) VENT mode	(Approx.)
		1st	25 %
M109	2	5th	33 %
		10th	43 %
		15th	53 %
		20th	63 %
		25th	81 %



Is the inspection result normal?

- YES >> Replace blower motor after confirming the fan air flow does not change.
- NO >> Replace the A/C auto amp.

### 7. CHECK BLOWER MOTOR CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect the blower motor connector and fuse block (J/B) connector.
- 3. Check the continuity between the blower motor harness connector and fuse block (J/B) harness connector.

Blowe	r motor	Fuse block (J/B)		Continuity		
Connector	Terminal	Connector	Terminal	Continuity		
M109	1	M1	ЗA	Evisted		
10103	I	IVI I	8A			
Check for continuity between blower motor harness connector and ground.						

Blowe	r motor		Continuity
Connector Terminal			Continuity
M109	1	Ground	Not existed
1 4 1 4 4	10		

#### Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair the harnesses or connectors.

#### 8.CHECK FUSE

Check 15A fuses [Nos. 21 and 22, located in the fuse block (J/B)]. **NOTE:** 

Refer to PG-99, "Fuse, Connector and Terminal Arrangement".

#### Is the inspection result normal?

YES >> Inspection the power supply circuit. Refer to <u>PG-39</u>, "Wiring Diagram - IGNITION POWER SUP-<u>PLY -"</u>.

NO >> Replace the fuse after repairing the applicable circuit.

#### Component Inspection

**1.**CHECK BLOWER MOTOR

1. Remove the blower motor. Refer to <u>VTL-13, "Exploded View"</u>.

INFOID:0000000010842285

# **BLOWER MOTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

### 2. Check that the blower motor turns smoothly.

- Is the inspection result normal?
- YES >> INSPECTION END
- NO >> Replace the blower motor.

### [WITHOUT 7 INCH DISPLAY]



# **MAGNET CLUTCH**

< DTC/CIRCU	IT DIAGNOSIS	; >		[WITHOUT 7 INCH DISPLAY]
MAGNET	CLUTCH			
Description				INFOID:000000010842286
The magnet clu	Itch is the devic	e that drives the	e compressor w	ith the signal from IPDM E/R.
Component	Function Ch	neck		INFOID:000000010842287
1. СНЕСК ОРІ	ERATION			
<ol> <li>Turn the fa</li> <li>Press the A</li> <li>Check that operates.</li> <li>Press the A</li> <li>Check that</li> </ol>	n control dial O A/C switch. the indicator c A/C switch again the indicator o	N. If the A/C switc n. f the A/C switch	h turns ON. Ch n turns OFF. Cl	neck visually and by sound that the compressor
stops. <u>Does it operate</u> YES >> INS NO >> Go	normally? SPECTION ENI to diagnosis pr	) ocedure. Refer	to <u>HAC-57, "Di</u>	agnosis Procedure".
Diagnosis P	rocedure			INFOID:000000010842288
1.снеск сн	ARGED REFRI	GERANT		
the gauge. Refe Is there refriger YES >> GC NO >> Ch	covery/recycling er to <u>HA-32, "In</u> ant? ) TO 2. eck for refrigera	g recharging equipsection".	tecting fluoresc	ent leak detector. Refer to <u>HA-24, "Leak Test"</u> .
		OPERATION		mania Departmention"
Does it operate       YES     >> GC       NO     >> GC       3.CHECK MAN	normally? ) TO 6. ) TO 3. GNET CLUTCH	IVI E/R. Relei lu	<u>PCS-10, Diac</u>	nosis Description.
<ol> <li>Turn the ig</li> <li>Disconnect</li> <li>Directly ap</li> </ol>	nition switch OF the magnet cluply the battery v	F. Itch connector. voltage to the m	agnet clutch. C	neck for operation visually and by sound.
YES >> GC NO >> Re	<u>normally?</u> ) TO 4. place magnet c ssor Clutch".	lutch. Refer to <u>I</u>	HA-35, "MAGN	ET CLUTCH : Removal and Installation of Com-
4.CHECK MA	GNET CLUTCH	I CIRCUIT CON	ITINUITY	
<ol> <li>Turn the ig</li> <li>Disconnect</li> <li>Check cont</li> </ol>	nition switch OF IPDM E/R con tinuity between	F. nector. the magnet clut	ch harness con	nector and IPDM E/R harness connector.
IPD	/I E/R	Magne	t clutch	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E7	48	F43	1	Existed

4. Check for continuity between IPDM E/R harness connector and ground.

# **MAGNET CLUTCH**

#### < DTC/CIRCUIT DIAGNOSIS >

IPD	M E/R		Continuity	•
Connector	Terminal		Continuity	
E7				
Is the inspection result	normal?			•
YES >> GO TO 5. NO >> Repair the	harnesses and connec	ctors.		
<b>5.</b> CHECK FUSE				
Check 10A fuse (No. 4 <b>NOTE:</b> Refer to <u>PG-101, "Fus</u>	9, located in the IPDM	E/R). nal Arrangement".		
Is the inspection result	normal?	-		
YES >> Replace II NO >> Replace th	PDM E/R. he fuse after repairing th	ne applicable circuit.		
<b>O.</b> CHECK SELF-DIA	GNOSIS RESULT CHE	CK		
With CONSULT  Perform the "SELF Check if any DTC NOTE: If DTC is displayed alc HAC-27, "DTC Logic"	F-DIAGNOSIS". is detected in the self-d ong with DTC "U1000" c or <u>HAC-28. "DTC Logic</u>	liagnostic results. pr "U1010", first diagnos 	se the DTC "U1000" or	"U1010". Refer to
Is any DIC displayed?	-			

YES >> Perform the diagnosis that is applicable to the sensor and actuator. Refer to <u>HAC-72, "DTC</u> <u>Index"</u>.

NO >> GO TO 7.

**7.**CHECK A/C AUTO AMP. OUTPUT SIGNAL

With CONSULT

- i. Perform the "DATA MONITOR" of HVAC. Refer to <u>HAC-61, "Reference Value"</u>.
- 2. Check A/C ON signal and blower fan ON switch signal.

Monitor item	Condition	Status
	A/C switch: OFF	Off
	A/C switch: ON	On
	Fan control dial: OFF	Off
TANKEQOW	Fan control dial: ON	On

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> Replace A/C auto amp.

**8.**CHECK REFRIGERANT PRESSURE SENSOR

Check the refrigerant pressure sensor. Refer to EC-527, "Diagnosis Procedure".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Repair or replace the malfunctioning parts.

# ECV (ELECTRICAL CONTROL VALVE)

#### < DTC/CIRCUIT DIAGNOSIS >

# ECV (ELECTRICAL CONTROL VALVE)

Description					INFOID:000000010842289	
The ECV (elec amount of refrig	trical control v Jerant when neo	alve) is installed or cessary.	n the compressor	and controls it	for emitting appropriate	В
Diagnosis P	rocedure				INFOID:000000010842290	
1.CHECK FUS	SE .					С
Check 10A fuse <b>NOTE:</b> Refer to <u>PG-99</u>	e [No. 3, located	d in the fuse block ( ctor and Terminal A	J/B)]. rrangement".			D
Is the inspection YES >> GC NO >> Rej	TO 2. blace the fuse a	fter repairing the ap	oplicable circuit.			E
<b>Z</b> .CHECK EC	POWER SUP					F
<ol> <li>Disconnect</li> <li>Turn the igr</li> <li>Check volta</li> </ol>	the ECV conne nition switch ON age between the	ector. I. e ECV harness coni	nector and ground			G
(-	+)	(–)				Н
EC	CV	_		Voltage		
Connector	Terminal					
F44	2	Ground		Battery voltage		HA
Is the inspection YES >> GC NO >> Rej <b>3.</b> CHECK EC\	n result normal <sup>2</sup> TO 3. Dair the harness / CONTROL SI	ses or connectors.				J
With CONSU 1. Turn the igr 2. Connect the 3. Perform the 4. Check outp	LT nition switch OF e ECV connect e "HVAC TEST" ut waveform be	F. or. : MODE 5 of HVAC atween the A/C auto	active test mode. amp. harness con	nector and grou	nd with the oscilloscope.	K
(+)		(_)				

(.	+)	(-)			М
A/C au	ito amp.		Condition	Output waveform	101
Connector	Terminal				
				Duty ratio: approx. 50 %	Ν
M66	24	Ground	HVAC TEST: MODE 5	10 10 5 0 	0
				SJIA1607E	Р

Is the inspection result normal?

YES >> Replace the compressor.

NO >> GO TO 4.

4. CHECK CONTINUITY BETWEEN ECV AND A/C AUTO AMP.

1. Turn the ignition switch OFF.

2. Disconnect the ECV connector.

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# ECV (ELECTRICAL CONTROL VALVE)

#### < DTC/CIRCUIT DIAGNOSIS >

#### 3. Disconnect the A/C auto amp. connector.

4. Check continuity between the ECV harness connector and A/C auto amp. harness connector.

ECV		A/C au	ito amp.	Continuity
Connector	Terminal	Connector	ector Terminal	
F44	3	M66	24	Existed

5. Check for continuity between the ECV harness connector and ground.

E	CV		Continuity	
Connector	Connector Terminal		Continuity	
F44	3	Ground	Not existed	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair the harnesses or connectors.

# 5.CHECK ECV

Check continuity between the ECV connector terminals.

ECV				Continuity
Connector	Terminal	Connector	Terminal	Continuity
F44	2	F44	3	Existed

Is the inspection result normal?

YES >> Replace the A/C auto amp.

NO >> Replace the compressor.

ECU DIAGNOSIS INFORMATION A/C AUTO AMP.

#### Reference Value

#### CONSULT DATA MONITOR REFERENCE VALUES

#### NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item	Co	Condition	
COMP REQ SIG	Engine: Run at idle after warming up	A/C switch: ON (Compressor operation sta- tus)	On
		A/C switch: OFF	Off
	Engine: Run at idle after	Blower motor: ON	On
FAN REQ SIG	warming up	Blower motor: OFF	Off
AMB TEMP SEN	Ignition switch ON	_	–22 – 131°F (–30 – 55°C)
IN-VEH TEMP	Ignition switch ON	_	–22 – 131°F (–30 – 55°C)
INT TEMP SEN	Ignition switch ON	_	–22 – 131°F (–30 – 55°C)
SUNLOAD SEN	Ignition switch ON	_	0 – 1045 w/m <sup>2</sup> (0 – 900 kcal/m <sup>2</sup> ·h)
AMB SEN CAL	Ignition switch ON	—	–22 – 131°F (–30 – 55°C)
IN-VEH CAL	Ignition switch ON	—	−22 − 131°F (−30 − 55°C)
INT TEMP CAL	Ignition switch ON	_	–22 – 131°F (–30 – 55°C)
SUNL SEN CAL	Ignition switch ON	_	0 – 1045 w/m <sup>2</sup> (0 – 900 kcal/m <sup>2</sup> ·h)
	Engine: Run at idle after	Blower motor: ON	25 – 81
FAN DUTY	warming up	Blower motor: OFF	0
XM	Ignition switch ON	_	-100 - 155
ENG COOL TEMP	Ignition switch ON	_	Values depending on cool- ant temperature
VEHICLE SPEED	Driving	_	Equivalent to speedometer reading

#### **TERMINAL LAYOUT**



Revision: 2014 September

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INFOID:000000010842291

#### < ECU DIAGNOSIS INFORMATION >

Termin (Wire o	al No. color)	Description		Condition	Value	
+	_	Signal name	Input/ Output	Condition	(Approx.)	
1 (L)	Ground	CAN - H	Input/ Output	_	_	
2 (P)	Ground	CAN - L	Input/ Output	_	_	
6 (L)	Ground	Communication signal (AMP-SW)	Input	_	_	
7 (P)	Ground	Communication signal (SW - AMP)	Output	_	_	
10 (BR)	Ground	A/C LAN signal	Input/ Output	Ignition switch ON	(V) 10 5 0 •••••••••••••••••••••••••••••••	
11 (Y)	Ground	Each door motor power sup- ply	_	Ignition switch ON	12 V	
15 (O)	Ground	Sunload sensor signal	Input	_	0 – 4.8 V Output voltage varies with sunload amount	
16 (R)	Ground	Intake sensor signal	Input	_	0 – 4.8 V Output voltage varies with intake temperature	
17 (L)	Ground	ACC power supply	_	Ignition switch ACC	Battery voltage	
19 (B)	Ground	Ground	_	Ignition switch ON	0 V	
20 (G)	Ground	Ignition power supply		Ignition switch ON	Battery voltage	
24 (O)	Ground	ECV signal	Output	<ul> <li>Ignition switch ON</li> <li>Active test: MODE 5</li> </ul>	(V) 15 0 5 0 	
32 (P)	Ground	Blower motor control signal	Output	<ul> <li>Ignition switch ON</li> <li>Fan speed: 1st speed (manual)</li> </ul>	(v) 6 4 2 0 	
34 (G)	Ground	A/C auto amp. connecting recognition signal	Output	Ignition switch ON	5 V	
35 (V)	Ground	Ambient sensor signal	Input	_	0 – 4.8 V Output voltage varies with ambient temperature	

#### < ECU DIAGNOSIS INFORMATION >

### [WITHOUT 7 INCH DISPLAY]

Termin (Wire o	al No. color)	Description		Condition	Value	
+	_	Signal name	Input/ Output	Condition	(Approx.)	
36 (LG)	Ground	In-vehicle sensor signal	Input	_	0 – 4.8 V Output voltage varies with in-vehi- cle temperature	В
37 (GR)	Ground	Sensor ground	_	Ignition switch ON	0 V	С
39 (B)	Ground	Ground		Ignition switch ON	0 V	D
40 (Y)	Ground	Battery power supply		Ignition switch OFF	Battery voltage	

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#### < ECU DIAGNOSIS INFORMATION >



72         GR         -           73         GR         -           73         GR         -           74         G         -           75         SB         -           76         Y         -           76         Y         -           76         Y         -           76         Y         -           77         SB         -           76         Y         -           77         Y         -           70         W         -           70         W         -           80         W         -           80         M         -           20         W         -	Connector Type RS02FB	Terminal Color Of Signal Name [Specification] No. Wire 2 P	Corrector No. ET7 Connector hame WIRE TO WIRE Connector Type RK03FB	Terminal Color Of Sgnal Name [Specification] No. Write 2 L
Corrector No. E6 Commetor Name Prover to Final Unit of the Contract of the Co	Terminal Color Of Vine         Signal Name (Specification)           No.         Vine         Signal Name (Specification)           39         P         -         -           40         L         -         -         -           41         B/V         -         -         -           43         SB         -         -         -           45         G         -         -         -	46 V	Corrector Type THEOFW-CS12-M4	49         8G            51         V            53         W            54         V            55         SG            56         LG            57         V            58         LG            59         P            59         BR            59         N
YSTEM (WITHOUT NAVI) 39 P	52 R	HS 13 13 13 13 13 13 13 13 13 13	Terminal         Color Of         Signal Rame [Specification]           No.         Wire         Signal Rame [Specification]           6         L         -           7         V         -           12         B/W         -           13         V         -           14         V         -           12         B/W         -           13         V         -           14         U         -           15         V         -           16         U         -           25         G         -           27         Y         -	28 L 1 33 GR · · ·
AUTOMATIC AIR CONDITIONING S Corrector Name WIRE TO WIRE corrector Type SAA30MB RS6 SI28 Corrector Type SAA30MB RS6 SI28 Correct	Terminal No.         Color Of Wire         Signal Name [Specification]           1         L/Y         -           2         SHELD         -           3         L/B         -           4         SHELD         -           5         BR         -	9         ¥           10         ×         ·           11         ×         ·           12         SB         ·           13         SB         ·           14         G         ·	15         R         .           16         LG         .           17         GR         .           18         Y         .           19         Y         .           19         Y         .           19         Y         .           20         BG         .           21         SB         .           23         Y         .           23         Y         .	28         L           23         L           30         R           31         BR           32         Y           33         SB           34         H           35         SH           36         GR           37         SHELD           38         L

# [WITHOUT 7 INCH DISPLAY]

JRIWC2818GB

19         P           21         ER           22         C           23         F           24         LG           27         C           28         ER           29         F           20         F           21         K           22         F           23         F           24         F           25         K           26         K           27         K           28         K           29         K           20         K           21         K           22         K           23         K           24         K           25         K           26         K	
Connector Na.     E172       Connector Name     REFRIGERANT PRESSURE SENSOR       Connector Name     Refrigerant pressure sensor       Connector Name     None       Connector Name     Refrigerant pressure sensor       Connector Name     Refrigerant pressure sensor       Connector Name     Connector Name       Name     Sander Press       Name     Sander Press       Name     Sander Name       Name     Sander	
AUTOMATIC AIR CONDITIONING :	

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[WITHOUT 7 INCH DISPLAY]

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37         GR         SENSOR GROUND           39         B         GROUND           40         Y         BATTERY POWER SUPPLY	Conrector No. M67 Conrector Name A/C CONTROL Connector Type TH10FB-NH		
Connector No. M61 Connector Name IN-VEHOLE SENSOR Connector Type A02FW	HIS 12	Terminal     Color Of Nue     Senson span hume (Specification)       No.     Nue     Senson span hume (Specification)       2     Corrector No.     Mis       Corrector No.     Mis     Senson span hume (Specification)       Corrector No.     Mis     Alor       Corrector No.     Alor     Alor       Corrector No.     Mis     Alor       Corrector No.     Mis     Alor       Mis     Mis     Alor       Mis     Alor     Corrector No.       Mis     Corrector No.     Alor       Mis     Corrector No.	
YSTEM (WITHOUT NAVI) comedia Na. M53 connector Name connector Type Th:24FW-NH	H.S. 123456091012 15161718192021222324	Terminal         Color of Nu         Signal Manne (Specification)           No.         Nree         Signal Manne (Specification)           1         V         BATTERY POWER SUPPLY           2         O         VEHCLE SPEED SIGNAL, (2-NLSE)           4         V         VEHCLE SPEED SIGNAL, (2-NLSE)           6         R         Nether Supper Vence)           10         L         Nether Supper Vence)           11         V         Vence SPEED SIGNAL, (2-NLSE)           12         C         Nether Supper Vence)           13         L         Nether Series SIGNAL, (2-NLSE)           14         V         Vence Series SIGNAL, (2-NLSE)           15         L         Convencion scient, (nether netter-meric)           16         R         And SiGNAL, (2-NLSE)           17         B         And Convencion scient, (nether netter-meric)           18         V         And BEINT SENSOR SIGNAL, (2-NLSE)           19         V         And BEINT SENSOR (2-NLSE)           21         L         And BEINT SENSOR (2-NLSE)           22         L         And BEINT SENSOR (2-NLSE)           23         B         CANLH           23         Y         PLEL LEVEL SENSOR GOUND <td></td>	
AUTOMATIC AIR CONDITIONING S' Corrector No. M24 Corrector Neme DATA LINK CONNECTOR Corrector Type BD16FW	Hs. 1345678	Terminal No.     Color Nine     Signal Name [Specification]       3     V     - (Cotype models]       3     V     - (Cotype models]       4     B     - (Cotype models]       11     V     - (Cotype models]       12     M     V	

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# < ECU DIAGNOSIS INFORMATION >

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Corrector No. M204 Corrector Name AIR MIX DOOR MOTOR Corrector Type A05FW	Terrinial     Color Of No.     Signal Name (Specification)       No.     0.000100100113     Signal Name (Specification)       2     E     0.000101010101       2     E     A/C LAN SIGNAL       Corrector Name     INTAKE SENSOR     Signal Name (Specification)       Ormedor No.     MZ05     Domedor No.       Corrector Name     INTAKE SENSOR     Domedor No.       Corrector Type     Troutery     Domedor No.       Total     Troutery     Troutery       Ormedor No.     MZ05     Domedor No.       Ormedor No.     MZ05     Domedor No.       Ormedor No.     MZ05     Domedor No.       Total     Troutery     Troutery       Total     Troutery     Troutery       Total     Total     Total	
44     L       45     ER       45     V       46     V       20medor No.     M201       Connector Name     WIRE TO WIRE       Connector Type     A06MW	Terrinial Color Of No. 10 2 2 2 2 2 2 2 2 2 2 2 2 2	No.         Wrre         old in terms chemication in terms           1         C         Door Morther Ruther (Floater model)           1         L         Door Morther Ruther (Floater model)           2         B         School R Ruther (Floater model)           3         L         A/C LAN SIGNAL.
YSTEM (WITHOUT NAVI) Connector No. M109 Connector Name BLOWER MOTOR Connector Type NSCORTWA3	Terminal         Color         Signal Name (Specification)           No.         V/rec         Signal Name (Specification)           1         L         LE/OWER MOTOR POWER SUPPLY           3         B         BLOWER MOTOR POWER SUPPLY           Corrector Name         M116           Corrector Name         M116           Corrector Name         WIRE TO WIRE           Mile Name         Corrector Name           No         -           No         -           No         -	20         G         -           28         B         -           29         LG         -           30         LG         -           31         O         -           33         G         -           42         G         -           43         P         -
AUTOMATIC AIR CONDITIONING S 2000etor Name ECM 2000etor Name ECM 2000etor Type Red FOV-R28-R-LH-Z 2000etor Type Red FOV-R28-R-LH-Z 2000et	Terminal         Color OI         Signal Name [Specification]           80         P         A. CCELENUTOR FEELIN COSTINO SEGGRA 1           91         R         A.CCELENUTOR FEELIN COSTINO SEGGRA 1           92         L         SERSOR POWER SUPPLY           910         W.         SERSOR POWER SUPPLY           101         SB         P. A.CCELENUTOR FEELIN PERSISARE 2           102         CR         EVANO COMPL.           103         CR         EVANO COMPL.           104         CR         ENSOR POWER SUPPLY           105         CR         EVANO COMPL.           106         W         FERRICERANT PRESSURE SENSOR           107         P         SENSOR POWER SUPPLY           108         FERRICERANT PRESSURE SENSOR           109         V         FERRICERANT PRESSURE SENSOR           101         P         SENSOR POWER SUPPLY           112         P         SENSOR ROUND           113         P         CAN COMMUNICATIONLINE           114         Y         DATA LINK CONNECTOR           122         P         CAN COMMUNICATIONLINE           123         B         ECM AGOLUND           124         RECOM CONNECTOR         SENO	

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< ECU DIAGNOSIS INFORMATION >

### A/C AUTO AMP.

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# Fail-safe

#### INFOID:000000010842293

#### FAIL-SAFE FUNCTION

AUTOMATIC AIR CONDITIONING SYSTEM (WITHOUT NAVI)

When a communication malfunction between A/C auto amp. and A/C control continued for approximately 30 seconds or more, control the air conditioning system under the following conditions.

Compressor	: ON
Air outlet	: AUTO
Air inlet	: FRE (Fresh air intake)
Fan speed	: AUTO
Preset temperature	: Setting before communication malfunction

# DTC Inspection Priority Chart

< ECU DIAGNOSIS INFORMATION >

INFOID:000000010842294

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)
1	U1000: CAN COMM CIRCUIT     U1010: CONTROL UNIT (CAN)
2	<ul> <li>B2578: IN-VEHICLE SENSOR</li> <li>B2579: IN-VEHICLE SENSOR</li> <li>B2571: AMBIENT SENSOR</li> <li>B2572: AMBIENT SENSOR</li> <li>B2582: INTAKE SENSOR</li> <li>B2630: SUNLOAD SENSOR</li> <li>B2631: SUNLOAD SENSOR</li> <li>B2632: DR AIR MIX DOOR MOT</li> <li>B2633: DR AIR MIX DOOR MOT</li> <li>B2636: DR VENT DOOR FAIL</li> <li>B2637: DR B/L DOOR FAIL</li> <li>B2639: DR DEF DOOR FAIL</li> <li>B2630: FRE DOOR FAIL</li> <li>B2631: SUP FRE DOOR FAIL</li> <li>B2631: SUP FRE DOOR FAIL</li> <li>B2631: SUP FRE DOOR FAIL</li> <li>B2635: REC DOOR FAIL</li> <li>B2635: B/L2 DOOR FAIL</li> <li>B2655: B/L2 DOOR FAIL</li> </ul>

# **DTC** Index

INFOID:000000010842295

DTC	Items (CONSULT screen terms)	Reference
U1000	CAN COMM CIRCUIT	HAC-27, "DTC Logic"
U1010	CONTROL UNIT (CAN)	HAC-28, "DTC Logic"
B2578	IN-VEHICLE SENSOR	HAC-32, "DTC Logic"
B2579	IN-VEHICLE SENSOR	HAC-32, "DTC Logic"
B257B	AMBIENT SENSOR	HAC-29, "DTC Logic"
B257C	AMBIENT SENSOR	HAC-29, "DTC Logic"
B2581	INTAKE SENSOR	HAC-35, "DTC Logic"
B2582	INTAKE SENSOR	HAC-35, "DTC Logic"
B2630 <sup>*</sup>	SUNLOAD SENSOR	HAC-38, "DTC Logic"
B2631 <sup>*</sup>	SUNLOAD SENSOR	HAC-38, "DTC Logic"
B2632	DR AIR MIX DOOR MOT	HAC-41, "DTC Logic"
B2633	DR AIR MIX DOOR MOT	HAC-41, "DTC Logic"
B2636	DR VENT DOOR FAIL	HAC-43, "DTC Logic"
B2637	DR B/L DOOR FAIL	HAC-43, "DTC Logic"
B2638	DR D/F1 DOOR FAIL	HAC-43, "DTC Logic"
# A/C AUTO AMP.

# < ECU DIAGNOSIS INFORMATION >

# [WITHOUT 7 INCH DISPLAY]

DTC	Items (CONSULT screen terms)	Reference	A
B2639	DR DEF DOOR FAIL	HAC-43, "DTC Logic"	
B263D	FRE DOOR FAIL	HAC-45, "DTC Logic"	F
B263E	20P FRE DOOR FAIL	HAC-45, "DTC Logic"	L
B263F	REC DOOR FAIL	HAC-45, "DTC Logic"	
B2654	D/F2 DOOR FAIL	HAC-43, "DTC Logic"	С
B2655	B/L2 DOOR FAIL	HAC-43, "DTC Logic"	

\*: Perform self-diagnosis under sunshine. When performing indoors, aim a light (more than 60 W) at sunload sensor, otherwise self-diagnosis indicates even though the sunload sensor is functioning normally.

#### NOTE:

If all of door motors DTC (B2632, B2633, B2636, B2637, B2638, B2639, B263D, B263E, B263F, B2654 and B2655) are detected, check door motor communication circuit. Refer to <u>HAC-49, "Description"</u>.

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# SYMPTOM DIAGNOSIS AUTOMATIC AIR CONDITIONING SYSTEM

# **Diagnosis Chart By Symptom**

INFOID:000000010842296

Symptom	Check item	Reference
A/C system does not activate.	Power supply and ground circuit	<ul> <li><u>HAC-47, "A/C AUTO AMP. : Diagnosis</u> <u>Procedure"</u> (A/C auto amp.)</li> <li><u>HAC-47, "A/C CONTROL : Diagnosis</u> <u>Procedure"</u> (A/C control)</li> </ul>
	A/C control signal circuit	HAC-51, "Diagnosis Procedure"
A/C system cannot be controlled.	A/C auto amp.	HAC-52, "Diagnosis Procedure"
<ul><li>Air outlet does not change.</li><li>Mode door motor does not operate normally.</li></ul>	Mode door motor	HAC-44, "Diagnosis Procedure"
<ul> <li>Discharge air temperature does not change.</li> <li>The air mix door motor does not operate normally.</li> </ul>	Air mix door motor	HAC-42, "Diagnosis Procedure"
<ul><li>Intake door does not change.</li><li>Intake door motor does not operate normally.</li></ul>	Intake door motor	HAC-46. "Diagnosis Procedure"
Blower motor operation is malfunctioning.	Blower motor	HAC-53, "Diagnosis Procedure"
Magnet clutch does not operate.	Magnet clutch	HAC-57, "Diagnosis Procedure"
Insufficient cooling	ECV	HAC-59, "Diagnosis Procedure"
<ul> <li>No cool air comes out. (Air flow volume is normal.)</li> </ul>	Insufficient cooling	HAC-75, "Diagnosis Procedure"
<ul> <li>Insufficient heating</li> <li>No warm air comes out. (Air flow volume is normal.)</li> </ul>	Insufficient heating	HAC-77, "Diagnosis Procedure"
<ul> <li>Noise</li> <li>Noise is heard when the A/C system operates.</li> </ul>	Noise	HAC-80, "Diagnosis Procedure"

# **INSUFFICIENT COOLING**

	Δ
Description INFOID:000000010842297	
Symptom <ul> <li>Insufficient cooling</li> </ul>	В
No cool air comes out. (Air flow volume is normal.)	0
Diagnosis Procedure	C
1.CHECK MAGNET CLUTCH OPERATION	D
<ol> <li>Turn the ignition switch ON.</li> <li>Turn the fan control dial ON.</li> <li>Press the A/C switch.</li> <li>Check that the indicator of the A/C switch turns ON. Check visually and by sound that the compressor</li> </ol>	E
<ul> <li>operates.</li> <li>5. Press the A/C switch again.</li> <li>6. Check that the indicator of the A/C switch turns OFF. Check that the compressor stops.</li> <li><u>Is the inspection result normal?</u></li> </ul>	F
YES >> GO TO 2. NO >> Magnet clutch system malfunction. Refer to <u>HAC-57, "Diagnosis Procedure"</u> . <b>2.</b> CHECK DRIVE BELT	G
Check tension of the drive belt. Refer to <u>EM-18, "Checking"</u> . <u>Is the inspection result normal?</u> YES GO TO 3	Н
NO >> Adjust or replace drive belt depending on the inspection results. 3.CHECK REFRIGERANT CYCLE PRESSURE	HAC
Connect the recovery/recycling recharging equipment to the vehicle and perform the pressure inspection with the gauge. Refer to <u>HA-7</u> , "Symptom Table". Is the inspection result normal?	J
YES >> GO TO 4. NO >> Repair or replace the parts depending on the inspection results. <b>4.</b> CHECK PERFORMANCE CHART	Κ
Connect recovery/recycling recharging equipment to the vehicle and perform the performance test. Refer to HA-32, "Inspection".	L
YES $>>$ GO TO 5. NO $>>$ GO TO 7. 5 CHECK AMBIENT TEMPERATURE DISPLAY	Μ
Check that there is not much difference between actual ambient temperature and indicated temperature on information display in combination meter.	Ν
<u>Is the inspection result normal?</u> YES >> GO TO 6. NO >> Perform the diagnosis for the A/C auto amp. connection recognition signal. Refer to <u>MWI-56.</u> <u>"Diagnosis Procedure"</u> .	0
6. CHECK SETTING OF TEMPERATURE SETTING TRIMMER	Ρ
<ul> <li>With CONSULT</li> <li>Select "TEMP SET CORRECT" of HVAC work support item. Refer to <u>HAC-9</u>, "<u>Temperature Setting Trimmer</u>".</li> <li>Check that the temperature setting trimmer is set to "+ direction".</li> </ul>	

NOTE:

The control temperature can be set with the setting of the temperature setting trimmer.

# **INSUFFICIENT COOLING**

#### < SYMPTOM DIAGNOSIS >

3. Set the difference between the set temperature and control temperature to "0".

>> INSPECTION END

# 7. CHECK CHARGED REFRIGERANT AMOUNT

1. Connect recovery/recycling recharging equipment to the vehicle and discharge the refrigerant.

2. Recharge with the proper amount of refrigerant.

#### Are the symptoms solved?

YES >> INSPECTION END

NO >> Refer to <u>HAC-74</u>, "Diagnosis Chart By Symptom" and perform the appropriate diagnosis.

#### **INSUFFICIENT HEATING** А Description INFOID:000000010842299 В Symptom Insufficient heating No warm air comes out. (Air flow volume is normal.) Diagnosis Procedure INFOID:000000010842300 CHECK COOLING SYSTEM 1. Check the engine coolant level and check for leakage. Refer to <u>CO-11. "Inspection"</u>. Check radiator cap. Refer to CO-15, "RESERVOIR TANK CAP : Inspection". 2. Check water flow sounds of the engine coolant. Refer to CO-12, "Refilling". 3. Is the inspection result normal? YES >> GO TO 2. NO >> Refill the engine coolant and repair or replace the parts depending on the inspection results. 2. CHECK OPERATION Turn temperature dial and raise temperature setting to 32.0°C (90°F) after warming up the engine. 1. 2. Check that warm air blows from the outlets. Is the inspection result normal? YES >> INSPECTION END Н NO >> GO TO 3. ${f 3.}$ CHECK SETTING OF TEMPERATURE SETTING TRIMMER With CONSULT HAC Select "TEMP SET CORRECT" of HVAC work support item. Refer to HAC-9. "Temperature Setting Trim-1. mer". 2. Check that the temperature setting trimmer is set to "- direction". NOTE: The control temperature can be set by the temperature setting trimmer. Set the difference between the set temperature and control temperature to "0". 3 Are the symptoms solved? Κ >> INSPECTION END YES NO >> GO TO 4. L **4.**CHECK SELF-DIAGNOSIS RESULT CHECK With CONSULT Perform the "SELF-DIAGNOSIS". 1. M Check if any DTC is detected in the self-diagnostic results. 2 NOTE: If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to HAC-27, "DTC Logic" or HAC-28, "DTC Logic". Ν Is any DTC displayed? >> Perform the diagnosis that is applicable to the sensor and the door motor. Refer to HAC-72, "DTC YES Index". NO >> GO TO 5. **5.**CHECK EACH OUTPUT DEVICE P With CONSULT 1 Select "HVAC TEST" of HVAC active test item. Refer to HAC-25, "CONSULT Function". NOTE: Perform the ACTIVE TEST after starting the engine because the compressor is operated. 2. Refer to the table and check the outlet, inlet, air flow temperature, blower motor control signal, magnet clutch operation, and air mix ratio. Visually check each operating condition, by listening for noise, touching

air outlets with a hand, etc.

< SYMPTOM DIAGNOSIS >

# **INSUFFICIENT HEATING**

#### < SYMPTOM DIAGNOSIS >

	Test item						
	MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6	MODE 7
Mode door position	VENT	B/L 1	B/L 2	FOOT	D/F	DEF	_
Intake door position	REC	REC	20% FRE	FRE	FRE	FRE	_
Air mix door position	FULL COLD	FULL COLD	FULL HOT	FULL HOT	FULL HOT	FULL HOT	_
Blower fan motor control sig- nal duty ratio	37%	91%	65%	65%	65%	91%	_
Magnet clutch	ON	ON	OFF	OFF	ON	ON	_
ECV duty ratio	100%	100%	0%	0%	50%	100%	_

#### NOTE:

• Perform the inspection of each output device after starting the engine because the compressor is operated.

• If the MODE 7 is selected, the malfunction is displayed but it is normal.

Discharge air flow				
Made position indication	Air outlet/distribution			
mode position indication	VENT	FOOT	DEF	
7	100%	_	—	
Ÿ	60%	40%	—	
ن.	12%	62%	26%	
	10%	52%	38%	
¥	—	—	100%	

#### Does it operate normally?

YES >> GO TO 6.

NO-1 >> Air outlet does not change. Refer to HAC-44, "Diagnosis Procedure".

NO-2 >> Air inlet does not change. Refer to <u>HAC-46, "Diagnosis Procedure"</u>.

NO-3 >> Discharge air temperature does not change. Refer to HAC-42, "Diagnosis Procedure".

NO-4 >> Blower motor does not operate normally. Refer to <u>HAC-53, "Diagnosis Procedure"</u>.

NO-5 >> Magnet clutch does not operate. Refer to <u>HAC-57, "Diagnosis Procedure"</u>.

#### **6.**CHECK AIR LEAKAGE FROM DUCT

Check duct and nozzle, etc. of the air conditioning system for air leakage.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace parts depending on the inspection results.

**1**.CHECK HEATER HOSE INSTALLATION CONDITION

Check the heater hose installation condition visually (for twists, crushes, etc.).

#### Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace parts depending on the inspection results.

# 8.CHECK TEMPERATURE OF HEATER HOSE

- 1. Check the temperature of inlet hose and outlet hose of heater core.
- 2. Check that the inlet side of heater core is hot and the outlet side is slightly lower than/almost equal to the inlet side.

#### **CAUTION:**

Always perform the temperature inspection in a short period of time because the engine coolant temperature is very hot.

Is the inspection result normal?

YES >> GO TO 9.

# **INSUFFICIENT HEATING**

# [WITHOUT 7 INCH DISPLAY]

< SYM	IPTOM DIAGNOSIS >	[WITHOUT 7 INCH DISPLAY]
NO	>> Replace the heater core after performing the TO 1.	procedures after the cooling system inspection. GO
9.ref	PLACE HEATER CORE	
Replac	ce the heater core. Refer to HA-46, "Exploded View	<u>v"</u> .
Are syr	mptoms solved?	
YES	>> INSPECTION END	
NO	>> Perform the procedures again after the coolin	ng system inspection. GO TO 1.

# < SYMPTOM DIAGNOSIS >

# NOISE

# Description

SymptomNoise

• Noise is heard when the A/C system operates.

# Diagnosis Procedure

# **1.**CHECK OPERATION

- 1. Operate the A/C system and check the operation. Refer to HAC-8, "Description & Inspection".
- 2. Check the parts where noise is occurring.

# Can the parts where noise is occurring be checked?

- YES-1 >> Noise from blower motor: GO TO 2.
- YES-2 >> Noise from compressor: GO TO 3.
- YES-3 >> Noise from expansion valve: GO TO 4.
- YES-4 >> Noise from cooler piping (pipe, flexible hose): GO TO 6.
- YES-5 >> Noise from drive belt: GO TO 7.
- NO >> INSPECTION END

# 2. CHECK BLOWER MOTOR

- 1. Remove blower motor.
- 2. Remove foreign materials that are in the blower unit.
- 3. Check the noise from blower motor again.

#### Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace blower motor.

# 3.CHECK COMPRESSOR

Perform trouble diagnosis for the compressor and check the compressor. Refer to <u>HA-9</u>, "<u>Symptom Table</u>". Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Refill the refrigerant or replace the compressor depending on the inspection results.

# **4.**CHECK WITH GAUGE PRESSURE

Perform the diagnosis with the gauge pressure. Refer to <u>HA-7, "Trouble Diagnosis For Unusual Pressure"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 5.

NO >> Repair or replace parts depending on the inspection results.

# **5.**CHECK EXPANSION VALVE

1. Correct the refrigerant with recovery/recycling recharging equipment.

- 2. Recharge with the proper amount of the collected refrigerant after recycling or new refrigerant.
- 3. Check for the noise from expansion valve again.

#### Are the malfunction solved?

- YES >> INSPECTION END
- NO >> Replace expansion valve.

# $\mathbf{6}$ .Check cooler piping (pipe, flexible hose)

1. Check the cooler piping (pipes, flexible hoses) (for deformation and damage, etc.).

2. Check the installation condition of clips and brackets, etc. of the cooler piping (pipes, flexible hoses).

#### Is the inspection result normal?

YES >> Fix the line with rubber or come vibration absorbing material.

NO >> Repair or replace parts depending on the inspection results.

**7.**CHECK DRIVE BELT

INFOID:0000000010842301

INFOID:000000010842302

	NOIDE		
< SYMF	PTOM DIAGNOSIS >	[WITHOUT 7 INCH DISPLAY]	
Check t	ension of the drive belt. Refer to <u>EM-18. "Checking"</u> .		
<u>Is the in</u>	spection result normal?		А
YES NO	<ul><li>&gt;&gt; Check the noise from the compressor: GO TO 3.</li><li>&gt;&gt; Adjust or replace drive belt depending on the inspection results.</li></ul>		
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# < PRECAUTION > PRECAUTION PRECAUTIONS EXCEPT FOR MEXICO

# EXCEPT FOR MEXICO : Precautions 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 "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

#### WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".
- Never 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:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

EXCEPT FOR MEXICO : Precaution for Battery Service

INFOID:000000010842304

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

# FOR MEXICO

# FOR MEXICO : 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. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

#### WARNING:

Always observe the following items for preventing accidental activation.

• To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.

# PRECAUTIONS

< PRECAUTION >

# [WITHOUT 7 INCH DISPLAY]

- 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 "SRS AIR BAG".
- Never 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:

- Always observe the following items for preventing accidental activation.
- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never 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.
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# FOR MEXICO : Precaution for Battery Service

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

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Revision: 2014 September

# < REMOVAL AND INSTALLATION > REMOVAL AND INSTALLATION A/C CONTROL BASE AUDIO

BASE AUDIO : Exploded View

INFOID:000000010842307

INFOID:000000010842308



1. Cluster lid C 2. A/C control

# **BASE AUDIO : Removal and Installation**

# REMOVAL

- 1. Remove cluster lid C. Refer to <u>IP-13, "Exploded View"</u>.
- 2. Remove fixing screws (A), and then remove A/C control (1).



INSTALLATION Install in the reverse order of removal. BOSE AUDIO WITHOUT NAVIGATION

# A/C CONTROL

# < REMOVAL AND INSTALLATION >

# [WITHOUT 7 INCH DISPLAY]

# BOSE AUDIO WITHOUT NAVIGATION : Exploded View

#### INFOID:000000010842309

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# BOSE AUDIO WITHOUT NAVIGATION : Removal and Installation

# REMOVAL

- 1. Remove A/C auto amp.. Refer to HAC-86, "Exploded View".
- 2. Remove fixing screws (A), and then remove A/C control (1).



INSTALLATION Install in the reverse order of removal.

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# A/C AUTO AMP.

**Exploded View** 

INFOID:000000010842311

[WITHOUT 7 INCH DISPLAY]



- 1. Audio unit
- 4. Bracket RH

# **Removal and Installation**

INFOID:000000010842312

# REMOVAL

- Remove audio unit. Refer to AV-65, "Exploded View". 1.
- Remove fixing screws (A), and then remove A/C auto amp. (1). 2.



**INSTALLATION** Install in the reverse order of removal.

# [WITHOUT 7 INCH DISPLAY]

# < REMOVAL AND INSTALLATION >

# AMBIENT SENSOR

# **Exploded View**

1. Ambient sensor



# Removal and Installation

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# REMOVAL

- 1. Remove engine under cover. Refer to EXT-41, "ENGINE UNDER COVER : Exploded View".
- 2. Disconnect ambient sensor connector, and then remove ambient sensor (1) from bracket.



INSTALLATION Install in the reverse order of removal.

# **IN-VEHICLE SENSOR**

**Exploded View** 

INFOID:000000010842317



- 1. In-vehicle sensor
- 2. Instrument lower panel LH

# Removal and Installation

# REMOVAL

- 1. Remove instrument lower panel LH. Refer to IP-13, "Exploded View".
- 2. Remove fixing screw (A), and then remove in-vehicle sensor (1).



INSTALLATION Install in the reverse order of removal. INFOID:000000010842318

# Exploded View

1. Sunload sensor



# **Removal and Installation**

# REMOVAL Disconnect sunload sensor connector, and then remove sunload sensor.

#### **INSTALLATION**

Install in the reverse order of removal.

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SUNLOAD SENSOR

# INTAKE SENSOR

**Exploded View** 

INFOID:000000010842321

[WITHOUT 7 INCH DISPLAY]



|--|

4. Evaporator

10. Cooler pipe grommet

5. O-ring

2.

- Evaporator cover
- 8. Air mix door motor

Intake sensor bracket

3.

6.

9.

Intake sensor

12. Expansion valve

Low-pressure evaporator pipe

O-ring

11. High-pressure evaporator pipe

13. O-ring

7.

14. O-ring

Refer to GI-4, "Components" for symbols in the figure.

# Removal and Installation

INFOID:000000010842322

# REMOVAL

- 1. Remove high-pressure evaporator pipe and low-pressure evaporator pipe. Refer to <u>HA-51, "Exploded</u> <u>View"</u>.
- 2. Disconnect intake sensor connector.
- 3. Slide evaporator (1) toward the right side of the vehicle (as shown in the figure), and then remove intake sensor (2).



# INSTALLATION

Note the following items, and then install in the reverse order of removal.

# **HAC-90**

#### 2015 370Z

#### **CAUTION:**

- Replace O-rings with new ones. Then apply the compressor oil to them when installing.
- Mark the mounting position of intake sensor bracket prior to removal so that the reinstalled sensor can be located in the same position.
- Never rotate the bracket insertion part when removing and installing the intake sensor.
- Check for leakages when recharging refrigerant. Refer to HA-24, "Leak Test".

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# **REFRIGERANT PRESSURE SENSOR**

# < REMOVAL AND INSTALLATION >

# [WITHOUT 7 INCH DISPLAY]

# REFRIGERANT PRESSURE SENSOR

**Exploded View** 

INFOID:000000010842323



- 1. 4.

- O-ring
- 7. Condenser pipe assembly 8. Radiator & condenser assembly

Refer to GI-4, "Components" for symbols in the figure.

# Removal and Installation

# REMOVAL

- Remove liquid tank. Refer to HA-42, "Exploded View". 1.
- Fix the liquid tank (1) using a vise (A). Remove the refrigerant 2. pressure sensor (2) using a wrench (B). **CAUTION:**

Be careful not to damage liquid tank.



# **INSTALLATION**

Note the following items, and then install in the reverse order of removal. **CAUTION:** 

- Replace O-ring with new one. Then apply compressor oil to them when installing.
- Check for leakages when recharging refrigerant. Refer to HA-24, "Leak Test".

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# < REMOVAL AND INSTALLATION > DOOR MOTOR

[WITHOUT 7 INCH DISPLAY]

# Exploded View

INFOID:000000010842325

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- 1. Remove instrument lower panel RH. Refer to <u>IP-13, "Exploded View"</u>.
- 2. Remove ECM.
- 3. Disconnect intake door motor connector.
- 4. Remove fixing screws (A), and then remove intake door motor (1).



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# < REMOVAL AND INSTALLATION > INSTALLATION

Install in the reverse order of removal. MODE DOOR MOTOR

# MODE DOOR MOTOR : Removal and Installation

# REMOVAL

- 1. Remove blower unit assembly. Refer to <u>VTL-13</u>, "Exploded View".
- 2. Disconnect mode door motor connector.
- 3. Remove fixing screws (A), and then remove mode door motor (1).



INSTALLATION Install in the reverse order of removal. AIR MIX DOOR MOTOR

AIR MIX DOOR MOTOR : Removal and Installation

INFOID:000000010842328

# REMOVAL

1. Set the temperature at full cold. CAUTION:

The angle may be out, when installing the air mix door motor to the air mix door, unless the above procedure is performed.

- 2. Disconnect the battery cable from the negative terminal.
- 3. Remove instrument lower panel RH. Refer to IP-13, "Exploded View".
- 4. Disconnect air mix door motor connector.
- 5. Remove fixing screws (A), and then remove air mix door motor (1).



INSTALLATION Install in the reverse order of removal.

Revision: 2014 September

INFOID:000000010842327

# BASIC INSPECTION DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

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**OVERALL SEQUENCE** 



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DETAILED FLOW

< BASIC INSPECTION >

# **1.**GET INFORMATION FOR SYMPTOM

- 1. Get detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurs).
- 2. Check operation condition of the function that is malfunctioning.

#### >> GO TO 2.

# 2.CHECK DTC

- 1. Check DTC.
- 2. Perform the following procedure if DTC is detected.
- Record DTC and freeze frame data (Print them out using CONSULT.)
- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.
- 3. Check related service bulletins for information.

#### Are any symptoms described and any DTC detected?

Symptom is described, DTC is detected>>GO TO 3. Symptom is described, DTC is not detected>>GO TO 4. Symptom is not described, DTC is detected>>GO TO 5.

#### **3.**CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer. Also study the normal operation and fail-safe related to the symptom. Verify relation between the symptom and the condition when the symptom is detected.

# >> GO TO 5.

# **4.**CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer. Verify relation between the symptom and the condition when the symptom is detected.

# >> GO TO 6.

# **5.**PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the detected DTC, and then check that DTC is detected again. At this time, always connect CONSULT to the vehicle, and check self diagnostic results in real time. If two or more DTCs are detected, refer to DTC INSPECTION PRIORITY CHART, and determine trouble diagnosis order.

#### NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.

If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIR-MATION PROCEDURE.

# Is DTC detected?

YES >> GO TO 7.

NO >> Check according to <u>GI-44, "Intermittent Incident"</u>.

6. Detect malfunctioning system by symptom diagnosis

Detect malfunctioning system according to SYMPTOM DIAGNOSIS based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

#### Is the symptom described?

- YES >> GO TO 7.
- NO >> Monitor input data from related sensors or check voltage of related module terminals using CON-SULT.
- 7. DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION > [WITH 7 INCH DISF	PLAY]
Inspect according to Diagnosis Procedure of the system.	
Is malfunctioning part detected?	
YES >> GO TO 8.	
NO >> Check according to <u>GI-44, "Intermittent Incident"</u> .	
<b>O</b> .REPAIR OR REPLACE THE MALFUNCTIONING PART	
1. Repair or replace the malfunctioning part.	
<ol> <li>Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and remont</li> </ol>	place-
3. Check DTC. If DTC is detected, erase it.	
>> GO TO 9.	
9.FINAL CHECK	
When DTC is detected in step 2, perform DTC CONFIRMATION PROCEDURE again, and then check the	hat the
malfunction is repaired securely.	
When symptom is described by the customer, refer to confirmed symptom in step 3 or 4, and check the	hat the
la DTC detected and deas symptom remain?	
<u>IS DTC detected and does symptom remain?</u>	
YES-1 >> Symptom remains: GO TO 4	
NO >> Before returning the vehicle to the customer, always erase DTC.	
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Description & Inspection

INFOID:000000010842330

[WITH 7 INCH DISPLAY]

# DESCRIPTION

The purpose of the operational check is to check that the individual system operates normally.

#### Check condition : Engine running at normal operating temperature.

# **1.**CHECK MEMORY FUNCTION

- 1. Turn the ignition switch ON.
- 2. Set temperature control dial to 32.0°C (90°F).
- 3. Press the OFF switch.
- 4. Turn the ignition switch OFF.
- 5. Turn the ignition switch ON.
- 6. Press the AUTO switch.
- 7. Check that the set temperature is maintained.
- Is the inspection result normal?

YES >> GO TO 2.

NO >> Memory function malfunction. Refer to <u>HAC-171, "Diagnosis Procedure"</u>.

# 2. CHECK BLOWER MOTOR

1. Start the engine.

- 2. Operate the fan control dial. Check that the fan speed changes. Check the operation for all fan speeds.
- 3. Leave blower on maximum speed.

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Blower motor system malfunction. Refer to <u>HAC-142, "Diagnosis Procedure"</u>.

# **3.**CHECK DISCHARGE AIR

1. Operate MODE switch and DEF switch.

 Check that the air outlets change according to each indicated air outlet by placing a hand in front of the outlets. Refer to <u>VTL-3</u>, "System Description".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Mode door system malfunction. Refer to <u>HAC-135</u>, "Diagnosis Procedure".

**4.**CHECK INTAKE AIR

- 1. Press intake switch to set the air outlet to recirculation.
- 2. The REC indicator turns ON.
- 3. Listen to intake sound and confirm air inlets change.
- 4. Press intake switch again to set the air outlet to fresh air intake.
- 5. The FRE indicator turns ON.
- 6. Listen to intake sound and confirm air inlets change.

#### Is the inspection result normal?

YES >> GO TO 5.

NO >> Intake door system malfunction. Refer to <u>HAC-137, "Diagnosis Procedure"</u>.

#### **5.**CHECK A/C SWITCH

- 1. Press the A/C switch.
- 2. Check that the indicator of the A/C switch turns ON. Check visually and by sound that the compressor operates.
- 3. Press the A/C switch again.
- 4. Check that the indicator of the A/C switch turns OFF. Check that the compressor stops.
- Is the inspection result normal?
- YES >> GO TO 6.
- NO >> Magnet clutch system malfunction. Refer to <u>HAC-146, "Diagnosis Procedure"</u>.

# **HAC-98**

< BASIC INSPECTION > [WITH / INCH DISPLAY]	
6. CHECK DISCHARGE AIR TEMPERATURE	
Operate the temperature control dial. Check that the discharge air temperature changes.	ľ
Is the inspection result normal?	
YES >> GO TO 7.	E
NO >> Air mix door malfunction. Refer to <u>HAC-133, "Diagnosis Procedure"</u> .	
<b><i>I</i></b> .CHECK TEMPERATURE DECREASE	
1. Operate the compressor.	(
2. Operate the temperature control dial and lower the set temperature to 18.0°C (60°F).	
3. Check that the cool all blows from the outlets.	Γ
NO >> Insufficient cooling. Refer to HAC-164. "Diagnosis Procedure".	
8. CHECK TEMPERATURE INCREASE	E
$\frac{1}{1}$ Turn temperature control dial and raise temperature setting to 22.0°C (00°E) after warming up the anging	
2. Check that warm air blows from outlets.	г
Is the inspection result normal?	Г
YES >> GO TO 9.	
NO >> Insufficient heating. Refer to <u>HAC-166, "Diagnosis Procedure"</u> .	(
9. CHECK AUTO MODE	
<ol> <li>Press the AUTO switch, and then check that "AUTO" is shown on the display.</li> <li>Operate the temperature control dial. Check that the fan speed or air outlet changes (the air flow temperature or fan speed varies depending on the ambient temperature, in-vehicle temperature, and set temperature).</li> </ol>	ŀ
Is the inspection result normal?	H
YES >> INSPECTION END	
NO >> Refer to <u>HAC-163, "Diagnosis Chart By Symptom"</u> and perform the appropriate diagnosis.	
Temperature Setting Trimmer	0
DESCRIPTION	ŀ
If the temperature felt by the customer is different than the air flow temperature controlled by the temperature setting the $A/C$ auto amp, control temperature can be adjusted to compensate for the temperature setting	
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Perform "TEMP SET CORRECT" of HVAC work support item	
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#### < BASIC INSPECTION >

Work support items	Display (°F)	Display (°C)
	6	3.0
	5	2.5
	4	2.0
	3	1.5
	2	1.0
	1	0.5
TEMP SET CORRECT	0 (initial status)	0 (initial status)
	-1	-0.5
	-2	-1.0
	-3	-1.5
	-4	-2.0
	-5	-2.5
	-6	-3.0

#### NOTE:

When −3.0°C (−6°F) is corrected on the temperature setting set as 25.0°C (77°F), the temperature controlled by A/C auto amp. is 25.0°C (77°F) − 3.0°C (−6°F) = 22.0°C (72°F) and the temperature becomes lower than the temperature setting.

• When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of the difference between the set temperature and control temperature may be cancelled.

# Foot Position Setting Trimmer

INFOID:000000010842332

#### DESCRIPTION

In FOOT mode, the air blowing to DEF can change ON/OFF.

#### HOW TO SET

#### (I) With CONSULT

Perform the "BLOW SET" of HVAC work support item.

Work support itoms	Display	Defroster door position		
work support tierns	Display	Auto control	Manual control	
	Mode 1	OPEN	CLOSE	
DI OW SET	Mode 2 (initial status)	OPEN	OPEN	
BLOW SET	Mode 3	CLOSE	OPEN	
	Mode 4	CLOSE	CLOSE	

#### NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of the discharge air mix ratio in FOOT mode may be cancelled.

# Inlet Port Memory Function (FRE)

INFOID:000000010842333

#### DESCRIPTION

- If the ignition switch is turned to the OFF position while the FRE indicator is set to ON (fresh air intake), "Perform the memory" or "Do not perform the memory" of FRE indicator ON (fresh air intake) condition can be selected.
- If "Perform the memory" was set, the FRE indicator will be ON (fresh air intake) when turning the ignition switch to the ON position again.
- If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.

#### HOW TO SET

#### < BASIC INSPECTION >

# [WITH 7 INCH DISPLAY]

INFOID:000000010842334

#### With CONSULT

Perform the "FRE MEMORY SET" of HVAC work support item.

Work support items	Display	Setting	
	WITHOUT	Perform the memory of manual FRE	В
	WITH (initial status)	Do not perform the memory of manual FRE (auto control)	

#### NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of the FRE memory function may be cancelled.

# Inlet Port Memory Function (REC)

#### DESCRIPTION

- If the ignition switch is turned to the OFF position while the REC indicator is set to ON (recirculation), "Perform the memory" or "Do not perform the memory" of REC indicator ON (recirculation) condition can be selected.
- If "Perform the memory" was set, the REC indicator will be ON (recirculation) when turning the ignition switch to the ON position again.
- If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.

#### HOW TO SET

#### With CONSULT

Perform the "REC MEMORY SET" of HVAC work support item.

Work support items	Display	Setting	
REC MEMORY SET	WITHOUT (initial status)	Perform the memory of manual REC	
	WITH	Do not perform the memory of manual REC (auto control)	HAC

#### NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of the REC memory function may be cancelled.

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# SYSTEM DESCRIPTION COMPRESSOR CONTROL FUNCTION

Description

# PRINCIPLE OF OPERATION

Functional circuit diagram



CAN (1) : A/C ON switch signal : Blower fan ON signal CAN (2) : A/C compressor request signal

Functional initial inspection chart

×: Applicable

Control unit Di			Location			
		iagnosis item	A	В	С	D
A/C auto amp. 🕒 "HVAC"	Self-diagnosis	×	—	—	_	
	Data monitor	×	—	—	_	
		Active test	×	—	—	×
ECM (E) "ENGINE"	Self-diagnosis function (CAN system diagnosis)	—	—	×	—	
	Data monitor	—	×	×	_	
IPDM E/R	Self-diagnosis function (CAN system diagnosis)	_	_	_	×	
		Data monitor	—		×	_
Auto active test						×

# Fail-safe

INFOID:000000010842336

# FAIL-SAFE FUNCTION

Revision: 2014 September

# **COMPRESSOR CONTROL FUNCTION**

#### < SYSTEM DESCRIPTION >

#### [WITH 7 INCH DISPLAY]

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When a communication malfunction between A/C auto amp. and AV control unit and preset switch continued for approximately 30 seconds or more, control the air conditioning system under the following conditions.

Compressor	: ON	
Air outlet	: AUTO	E
Air inlet	: FRE (Fresh air intake)	
Fan speed	: AUTO	
Preset temperature	: Setting before communication malfunction	(

# **Component Parts Location**



- 8.
  - 11. Mode door motor
- 9. Intake door motor
- 12. Intake sensor

13. A/C auto amp.

Air mix door motor

1. 4.

7.

10.

# **COMPRESSOR CONTROL FUNCTION**

#### < SYSTEM DESCRIPTION >

- A. Installed on the compressor
- D. Located on the evaporator
- B. Installed to the blower unit assembly C. (RH)

Behind of the cluster lid C

Ε.

Installed to the heater & cooling unit assembly (RH)

[WITH 7 INCH DISPLAY]

INFOID:000000010842338

# **Component Description**

Component	Description
Ambient sensor	HAC-120, "Description"
In-vehicle sensor	HAC-123. "Description"
Intake sensor	HAC-126, "Description"
Sunload sensor	HAC-129, "Description"
Air mix door motor	HAC-132, "Description"
Mode door motor	HAC-134, "Description"
Intake door motor	HAC-136, "Description"
A/C auto amp.	HAC-141, "Description"
Blower motor	HAC-142, "Description"
Magnet clutch	HAC-146, "Description"
ECV	HAC-148, "Description"
Refrigerant pressure sensor	EC-527, "Description"
Preset switch	The preset switch integrated with the controller for A/C operation and AV switch is installed to the center of the instrument panel. The operation and display data of the preset switch are commu- nicated with the A/C auto amp. through AV control unit via CAN communication.

# < SYSTEM DESCRIPTION >

# [WITH 7 INCH DISPLAY]

INFOID:000000010842339

А

# AUTOMATIC AIR CONDITIONING SYSTEM

# System Diagram



# System Description

# OUTLINE

• Automatic air conditioning system is controlled by each function of A/C auto amp., ECM and IPDM E/R.

Control by A/C auto amp. - Air outlet control	Ν
- Temperature control	
- Air inlet control	0
- Air flow control	0
- Compressor control	
- Door motor control (LCU communication control)	
	Ρ

#### Control by ECM

- Cooling fan control. (Refer to <u>EC-89, "System Description"</u>.)
- Air conditioning cut control. (Refer to EC-69, "System Description".)

#### Control by IPDM E/R

- Relay control. (Refer to PCS-4, "System Description".)
- Cooling fan control. (Refer to PCS-6. "System Description".)

# **HAC-105**

INFOID:0000000010842340

Μ

#### < SYSTEM DESCRIPTION >

[WITH 7 INCH DISPLAY]

· Controller (preset switch) transmits the commands for air conditioning system operation to AV control unit via communication line, then AV control unit transmits the commands to A/C auto amp. via CAN communication. A/C auto amp. transmits each indication information to AV control unit via CAN communication. AV control unit displays each indication information that is received.

#### **OPERATION AND DISPLAY**

A/C Display

- Air conditioning system state is indicated on the display.
- When "Status" on multifunction switch is pressed while air conditioning system is in the ON position, the display changes to state indication display of air conditioning system. When air conditioning system is operated while navigation system or audio system is displayed, air conditioning system state is indicated in the lower portion of display for several seconds.
- When MODE switch is pressed while air conditioning system is in the OFF position, state indication display is indicated for several seconds.



Controller (Preset Switch)



1. Intake switch

- **DEF** switch 2.
- 4. Rear window defogger switch
- 7. AUTO switch / Temperature control dial

Switch Operation

- MODE switch 5.

- A/C switch / Fan control dial 3.
- OFF switch 6.

# < SYSTEM DESCRIPTION >

[WITH 7 INCH DISPLAY]

Intake switch	<ul> <li>Selects air inlet between recirculation (REC) ⇔ fresh air intake (FRE) each time.</li> <li>REC indicator OFF: Fresh air intake</li> <li>REC indicator ON: Recirculation</li> <li>Press and held for 2 seconds or more, intake switch indicator blinks 2 times and air inlet is set to automatic control.</li> <li>NOTE:</li> <li>When air conditioning system is in the OFF position, air inlet can be selected.</li> <li>When MODE switch and DEF switch is in the D/F or DEF position, air inlet cannot be selected to REC.</li> </ul>	A B C
DEF switch	<ul> <li>Turns DEF mode (switch indicator) between ON ⇔ OFF each time while air conditioning system is in the ON position.</li> <li>When DEF mode is turned ON, air conditioning system becomes the following state.</li> <li>Air outlet: DEF</li> <li>Compressor: ON</li> <li>Air inlet: FRE</li> <li>Blower fan: Automatic control (If fan speed other than AUTO is selected before pressing DEF switch, fan speed is manual control.)</li> <li>When DEF mode is turned OFF, air conditioning system state returns to the previous state before DEF mode is selected. But, the following state is continued.</li> <li>Intake switch: FRE When DEF switch is pressed while air conditioning system is in the OFF position.</li> <li>Air conditioning system is turned ON and becomes the following state.</li> <li>Air outlet: DEF</li> <li>Compressor: ON</li> <li>Air inlet: FRE</li> <li>Blower fan: Automatic control</li> <li>When DEF mode is turned OFF, entire air conditioning system is set to auto mode.</li> <li>NOTE:</li> <li>When DEF mode turns ON while air conditioning system is neutomatic control ("AUTO" is indicated), automatic control is released "AUTO" turns OFF)</li> </ul>	D F G H
A/C switch	<ul> <li>Turns the compressor control (A/C switch indicator) between ⇔ OFF each time.</li> <li>When A/C switch turns OFF, air conditioning system becomes the following state.</li> <li>NOTE:</li> <li>When the compressor control (A/C switch indicator) is in the OFF position, air inlet is fresh air intake (FRE).</li> <li>When blower motor is in the OFF position, the compressor control cannot be activated.</li> </ul>	J
Fan control dial	<ul> <li>Selects blower speed is within a range of 1st – 7th speed.</li> <li>NOTE:</li> <li>When fan control dial is rotated while air conditioning system is in the OFF position, air conditioning system is activated.</li> <li>When fan control dial is operated while air conditioning system is in automatic control (AUTO is indicated), automatic control is released (AUTO turns OFF).</li> </ul>	K
Rear window defogger switch	Turns rear window defogger (switch indicator) between ON $\Leftrightarrow$ OFF each time. Rear window defogger system details. Refer to <u>DEF-97, "WITH NAVIGATION : System Description"</u> .	M
MODE switch	<ul> <li>Selects air outlet sequentially from VENT⇒B/L⇒FOOT⇒D/F⇒VENT each time.</li> <li>NOTE:</li> <li>When air conditioning system is in the OFF position, air outlet can be selected</li> <li>When MODE switch is pressed while air conditioning system is in automatic control ("AUTO" is indicated), automatic control is released ("AUTO" turns OFF).</li> </ul>	Ν
OFF switch	<ul> <li>Turns air conditioning system OFF.</li> <li>When air conditioning system turns OFF, air inlet and air outlet become the following state.</li> <li>Air inlet: FRE (except REC is manually selected.)</li> <li>Air outlet: FOOT</li> </ul>	0

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#### < SYSTEM DESCRIPTION >

[WITH 7 INCH DISPLAY]

AUTO switch	Turns the switch indicator lamp and "AUTO" indicator on the display ON, and then air conditioning system starts automatic control. <b>NOTE:</b> When air outlet is not selected manually, air outlet changes to automatic control.
Temperature control dial	<ul> <li>Selects set temperature within a range between 18.0° (60°F) – 32.0°C (90°F) at a rate of 0.5°C (1.0°F) each time the dial is rotated.</li> <li>Clockwise rotation: Set temperature increases.</li> <li>Counterclockwise rotation: Set temperature decreases.</li> <li>NOTE:</li> <li>When air conditioning system is in the OFF position, set temperature can be selected only while air conditioning system state (when MODE switch is pressed) is indicated on the display.</li> </ul>

#### AIR OUTLET CONTROL

- While air outlet is in automatic control, A/C auto amp. selects the mode door position depending on a target air mix door angle and outlet air temperature calculated from sunload.
- If ambient temperature is excessively low, D/F is selected to prevent windshield fogging when air outlet is set to FOOT.



(%) 100

(Hot)

0

Cold

Air mix door opening angle

# **TEMPERATURE CONTROL**

- When ignition switch is in the ON position, A/C auto amp. always automatically controls temperature regardless of air conditioning system operational state.
- A/C auto amp. calculates the target air mix door opening angle depending on set temperature, in-vehicle temperature, ambient temperature, and sunload.
- Air mix door is controlled depending on the comparison of current air mix door opening angle and target air mix door opening angle.
- Regardless of in-vehicle temperature, ambient temperature, and sunload, air mix door is fixed at the fully cold position when set temperature is 18.0°C (60°F), and at the fully hot position when set temperature is 32.0°C (90°F).

# AIR INLET FUNCTION

While air inlet is in automatic control, A/C auto amp. selects air inlet (fresh air intake, 20% fresh air intake, or recirculation) depending on set temperature, in-vehicle temperature, and ambient temperature.



A/C auto amp. calculated temperature

# AIR FLOW CONTROL

Description

- A/C auto amp. changes duty ratio of blower motor drive signal and controls air flow continuously. When air flow is increased, duty ratio of blower motor drive signal gradually increases to prevent a sudden increase in air flow.
- In addition to manual control and automatic control, air flow control is compose of starting fan speed control, low coolant temperature starting control, high in-vehicle temperature starting control, fan speed control at door motor operation, and fan speed control at voice recognition.

# **HAC-108**

Hot

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## < SYSTEM DESCRIPTION >

# [WITH 7 INCH DISPLAY]

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## Automatic Air Flow Control

- A/C auto amp. decides target air flow depending on target air mix door opening angle.
- A/C auto amp. changes duty ratio of blower motor drive signal and controls air flow continuously so that air flow matches to target air flow.
- When air outlet is VENT or B/L, the minimum air flow is changed depending on sunload.

Starting Fan Speed Control

When blower motor is activated, A/C auto amp. gradually increases duty ratio of blower fan drive signal to prevent a sudden increase in discharge air flow. (It takes approximately 8 seconds for air flow to reach HI from LOW)





Low coolant temperature starting control characteristic (%) Target duty ratio AUTO Engine coolant temperature 56 °C Low coolant temperature starting control T. Blower motor regulatory time (T<approximately 150 seconds) JSIIA1529GB

Low Coolant Temperature Starting Control

If the engine coolant temperature is 56°C (133°F) or less, to prevent a cold discharged air flow, A/C auto amp. suspends blower motor activation for the maximum 150 seconds depending on target air mix door opening angle. After this, blower fan drive signal is increased gradually, and blower motor is activated.

#### High In-vehicle Temperature Starting Control

When evaporator temperature is high [intake air temperature sensor value is 35°C (95°F) or more], to prevent a hot discharged air flow, A/C auto amp. suspends blower motor activation for approximately 3 seconds so that evaporator is cooled by refrigerant.

#### Fan speed Control at Door Motor Operation

When mode door motor is activated while air flow is more than the specified value, A/C auto amp. reduces temporarily fan speed so that mode door moves smoothly.

#### Fan speed Control at Voice Recognition

When the voice control (voice command) switch is operated during air flow automatic control, A/C auto amp. decreases the air flow of the blower motor once and controls the air flow so as not to disturb the voice recognition function. This control continues while voice recognition function is operating.

#### COMPRESSOR CONTROL

Description

• When the compressor activation condition is satisfied while blower motor is activated, A/C auto amp. transmits A/C ON signal and blower fan ON signal to ECM via CAN communication.

# HAC-109

#### < SYSTEM DESCRIPTION >

#### [WITH 7 INCH DISPLAY]

- ECM judges that the compressor can be activated depending on each sensors state (refrigerant pressure sensor signal, throttle opening angle sensor signal, and others). And transmits A/C compressor request signal to IPDM E/R via CAN communication.
- IPDM E/R turns A/C relay ON and activates the compressor depending on request from ECM.

#### Compressor Protection Control at Pressure Malfunction

When high-pressure side value that is detected by refrigerant pressure sensor is as per the following state, ECM requests IPDM E/R to turn A/C relay OFF and stops the compressor.

- 3.12 MPa (31.8 kg/cm<sup>2</sup>·G) or more (When the engine speed is less than 1,500 rpm)
- 2.74 MPa (27.9 kg/cm<sup>2</sup>·G) or more (When the engine speed is 1,500 rpm or more)
- 0.14 MPa (1.4 kg/cm<sup>2</sup>·G) or less

#### **Compressor Oil Circulation Control**

When the engine starts while the engine coolant temperature is 56°C (133°F) or less, ECM activates the compressor for approximately 6 seconds and circulates the compressor lubricant once.

#### Low Temperature Protection Control

When intake air temperature sensor detects that air temperature after passing through evaporator is  $-5^{\circ}C$  (23°F) or less, A/C auto amp. requests ECM to turn the compressor OFF, and stops the compressor.

When the air temperature returns to 1°C (34°F) or more, the compressor is activated.



#### Operating Rate Control

When set temperature is other than fully cold or air outlet is "VENT", "B/L" or "FOOT" A/C auto amp. controls the compressor activation depending on ambient temperature.

#### Air Conditioning Cut Control

When the engine is running in excessively high load condition, ECM requests IPDM E/R to turn A/C relay OFF, and stops the compressor. Refer to <u>EC-69</u>, "System Description" for details.

#### DOOR MOTOR CONTROL



- LCU (Local Control Unit) is built in to each door motor. And detects door position by PBR (Potentio Balance Resistor).
- A/C auto amp. communicates with each LCU via communication line. And receives each door position signal from each LCU.
- Each LCU controls each door to the appropriate position depending on the control signal from A/C auto amp. when the door movement is complete, transmits the signal of door movement completion to A/C auto amp.

#### FAIL-SAFE CONTROL

#### < SYSTEM DESCRIPTION >

#### [WITH 7 INCH DISPLAY]

When a communication malfunction occurs between A/C auto amp. and AV control unit or preset switch for 30 seconds or more, A/C auto amp. automatically controls air outlet and fan speed, fixes air inlet to fresh air intake, maintains set temperature data before the communication malfunction, and activates the compressor. Even if the condition before the communication error occurs is A/C OFF, A/C auto amp. turns the compressor ON with following conditions.

Compressor	: ON
Air outlet	: AUTO
Air inlet	: FRE (Fresh air intake)
Fan speed	: AUTO
Preset temperature	: Setting before communication malfunction

SWITCHES AND THEIR CONTROL FUNCTIONS

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Revision: 2014 September

#### < SYSTEM DESCRIPTION >



Revision: 2014 September

HAC-112

# < SYSTEM DESCRIPTION >

[WITH 7 INCH DISPLAY]

\*: Models for Mexico

Switch /Dial position			DOOR position					
		Ventilator door	Max. cool door	Defroster door	Intake door	Air mix door		
AUTO switch	ON				AUTO			
		ジ	E	Н	K			
Mada awitab		ジ	F	Ι	n	—		
wode switch		i			L			
	:			J	М	А	1 —	
DEF switch	ŧ	ON				А		
Intoko owitah		ON	-			B*		
		OFF					A*	
Temperature 1 control dial	Ful 18.0°	ll cold C (60°F)		_	_		С	
	ature 18.5°C -31.5°C dial (61°F - 89°F)					—	AUTO	
	Full hot 32.0°C (90°F)						D	
ł	OFF switch		G	J	L	А		

\*: Inlet status is displayed by indicator when activating automatic control

# AIR DISTRIBUTION

	Discharg	ge air flow		/
Made position indication		Air outlet/distribution		
	VENT	FOOT	DEF	
ッ	100%	—	—	
<i>v</i>	60%	40%	—	
ن.	12%	62%	26%	_ 1
	10%	52%	38%	
¥	—	_	100%	_ [

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## < SYSTEM DESCRIPTION >

# **Component Parts Location**

INFOID:000000010842341

[WITH 7 INCH DISPLAY]



**Component Description** 

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Α.

Component	Description	
Ambient sensor	HAC-120. "Description"	
In-vehicle sensor	HAC-123, "Description"	

## < SYSTEM DESCRIPTION >

[WITH 7 INCH DISPLAY]

Component	Description
Intake sensor	HAC-126, "Description"
Sunload sensor	HAC-129, "Description"
Air mix door motor	HAC-132, "Description"
Mode door motor	HAC-134, "Description"
Intake door motor	HAC-136, "Description"
A/C auto amp.	HAC-141, "Description"
Blower motor	HAC-142, "Description"
Magnet clutch	HAC-146, "Description"
ECV	HAC-148, "Description"
Refrigerant pressure sensor	EC-527, "Description"
Preset switch	The preset switch integrated with the controller for A/C operation and AV switch is installed to the center of the instrument panel. The operation and display data of the preset switch are commu- nicated with the A/C auto amp. through AV control unit via CAN communication.

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Revision: 2014 September

# **DIAGNOSIS SYSTEM (HVAC)**

# **CONSULT** Function

CONSULT performs the following functions via CAN communication with A/C auto amp.

Diagnostic mode	Description
Self diagnostic result	Displays the diagnosis results judged by A/C auto amp.
Data monitor	Displays the input/output signal of A/C auto amp.
Active test	The signals used to activate each device are forcibly supplied from A/C auto amp.
Work support	Changes the setting for each setting function.
ECU identification	Displays the part number of A/C auto amp.

#### NOTE:

Diagnosis should be performed with engine running. Door motor operation speeds become slower and NO results may be returned even for normal operation if battery voltage drops below 12 V during self-diagnosis.

#### SELF-DIAGNOSIS RESULTS

Refer to HAC-161, "DTC Index".

#### DATA MONITOR

#### NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Disp	lay	item	list

Monitor item [Unit]		Description
COMP REQ SIG	[On/Off]	Displays A/C switch ON/OFF status transmitted to other units via CAN communication
FAN REQ SIG	[On/Off]	Displays fan switch ON/OFF status transmitted to other units via CAN communication
AMB TEMP SEN	[°C]	Ambient sensor value converted from ambient sensor signal received from ambient sensor
IN-VEH TEMP	[°C]	In-vehicle sensor value converted from in-vehicle sensor signal received from in-vehicle sensor
INT TEMP SEN	[°C]	Intake sensor value converted from intake sensor signal received from intake sensor
SUNLOAD SEN	[w/m <sup>2</sup> ]	Sunload sensor value converted from sunload sensor signal received from sunload sensor
AMB SEN CAL	[°C]	Ambient sensor value calculated by A/C auto amp.
IN-VEH CAL	[°C]	In-vehicle sensor value calculated by A/C auto amp.
INT TEMP CAL	[°C]	Intake sensor value calculated by A/C auto amp.
SUNL SEN CAL	[w/m <sup>2</sup> ]	Sunload sensor value calculated by A/C auto amp.
FAN DUTY		Duty ratio of blower motor judged by A/C auto amp.
XM		Target discharge air temperature judged by A/C auto amp. depending on the tempera- ture setting and the value from each sensor
ENG COOL TEMP	[°C]	Water temperature signal value received from ECM via CAN communication
VEHICLE SPEED	[Mph (km/h)]	Vehicle speed signal value received from meter via CAN communication

#### ACTIVE TEST

Test item	Description
HVAC TEST	The operation check of air conditioning system can be performed by selecting the mode. Refer to the following table for the conditions of each mode.

Check each output device

# **DIAGNOSIS SYSTEM (HVAC)**

#### < SYSTEM DESCRIPTION >

## [WITH 7 INCH DISPLAY]

	Test item					А		
	MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6	MODE 7	
Mode door position	VENT	B/L 1	B/L 2	FOOT	D/F	DEF	_	В
Intake door position	REC	REC	20% FRE	FRE	FRE	FRE	—	
Air mix door position	FULL COLD	FULL COLD	FULL HOT	FULL HOT	FULL HOT	FULL HOT	_	
Blower motor control signal duty ratio	37%	91%	65%	65%	65%	91%	_	С
Magnet clutch	ON	ON	OFF	OFF	ON	ON	_	
ECV duty ratio	100%	100%	0%	0%	50%	100%	_	D

#### NOTE:

• Perform the inspection of each output device after starting the engine because the compressor is operated.

• If the Mode 7 is selected, the malfunction is displayed but it is normal.

#### WORK SUPPORT

Work item	Description	Refer to	F
TEMP SET CORRECT (Temperature setting trimmer)	If the temperature felt by the customer is different than the air flow temperature controlled by the temperature setting, the A/C auto amp. control temperature can be adjusted to compensate for the temperature setting.	HAC-99. "Temperature Setting Trimmer"	G
FRE MEMORY SET [Inlet port memory function (FRE)]	<ul> <li>If the ignition switch is turned to the OFF position while the FRE indicator is set to ON (fresh air intake), "Perform the memory" or "Do not perform the memory" of FRE indicator ON (fresh air intake) condition can be selected.</li> <li>If "Perform the memory" was set, the FRE indicator will be ON (fresh air intake) when turning the ignition switch to the ON position again.</li> <li>If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.</li> </ul>	HAC-100. "Inlet Port Memory Function (FRE)"	H HA J
REC MEMORY SET [Inlet port memory function (REC)]	<ul> <li>If the ignition switch is turned to the OFF position while the REC indicator is set to ON (recirculation), "Perform the memory" or "Do not perform the memory" of REC indicator ON (recirculation) condition can be selected.</li> <li>If "Perform the memory" was set, the REC indicator will be ON (recirculation) when turning the ignition switch to the ON position again.</li> <li>If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.</li> </ul>	HAC-101, "Inlet Port Memory Function (REC)"	K
BLOWER SET (Foot position setting trimmer)	In FOOT mode, the air blowing to DEF can change ON/OFF.	HAC-100, "Foot Position Setting Trimmer"	
NOTE:			Ν

#### NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10 V or less, the setting of WORK SUPPORT may be cancelled.

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# DTC/CIRCUIT DIAGNOSIS U1000 CAN COMM CIRCUIT

# Description

INFOID:000000010842344

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-board multiplex communication line with high data communication speed and excellent error detection ability. A modern vehicle is equipped with many ECMs, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, 2 control units are connected with 2 communication lines (CAN-L-line and CAN-H-line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

Refer to LAN-26, "CAN Communication Signal Chart" for details of the communication signal.

# DTC Logic

INFOID:000000010842345

## DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible cause
U1000	CAN COMM CIRCUIT	When A/C auto amp. is not transmitting or receiving CAN communication signal for 2 or more seconds.	CAN communication system

# Diagnosis Procedure

INFOID:000000010842346

## **1.**PERFORM SELF-DIAGNOSIS

() With CONSULT

- 1. Turn the ignition switch ON and wait for 2 seconds or more.
- 2. Perform the "SELF-DIAGNOSIS".
- 3. Check if any DTC is detected in the self-diagnostic results.

Is DTC "U1000" displayed?

- YES >> Perform the diagnosis for the CAN communication system. Refer to <u>LAN-15</u>, "Trouble Diagnosis <u>Flow Chart</u>".
- NO >> Perform the intermittent malfunction diagnosis. Refer to <u>GI-44, "Intermittent Incident"</u>.

U1010 CONTROL UNIT (CAN)

# Description

Initial diagnosis of A/C auto amp.

**DTC** Logic

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INFOID:000000010842348

# DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible cause	
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diag- nosis of CAN controller of A/C auto amp.	A/C auto amp.	_
Diagnosis	Procedure		INFOID:000000010842349	E

Diagnosis Procedure

# **1.**REPLACE A/C AUTO AMP.

When DTC "U1010" is detected, replace A/C auto amp.

>> INSPECTION END

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[WITH 7 INCH DISPLAY]

# B257B, B257C AMBIENT SENSOR

## Description

#### AMBIENT SENSOR

- The ambient sensor (1) is installed to the hood lock stay.
- The ambient sensor converts the ambient temperature detected with thermistor into the voltage, and the A/C auto amp. inputs this voltage.



#### AMBIENT TEMPERATURE CORRECTION

- The A/C auto amp. inputs the temperature detected with the ambient sensor as the ambient temperature.
- Perform the correction of the temperature detected with the ambient sensor for air conditioning control and for ambient temperature display.
- Since the engine heat influences on the ambient sensor during idling condition, the A/C auto amp. retards the ambient temperature indication of the combination meter to avoid the effect of steep temperature change.
- Select and use the initial value of ambient temperature data depending on the coolant temperature when turning the ignition switch from OFF to ON. Use the detection temperature of the ambient sensor at low coolant temperature [less than approximately 56°C (133°F)]. Use the memory data (before the ignition switch is OFF) when the engine is warming up [approximately 56°C (133°F) or more].
- Do not perform the correction of the ambient temperature when the detection temperature of the ambient temperature is less than approximately -29°C (-20°F) (for ambient temperature display) or less than approximately -20°C (-4°F) (for air conditioning control).

#### SET TEMPERATURE CORRECTION

The A/C auto amp. performs the correction to the target temperature set by the temperature control dial so as to match the temperature felt by the passengers depending on the ambient temperature detected with the ambient sensor and controls it so that the interior air temperature is always the most suitable.

## DTC Logic

INFOID:000000010842351

## DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible causes
B257B		The ambient sensor recognition tempera- ture is too high.	<ul> <li>Ambient sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Short in the ambient sensor circuit)</li> </ul>
B257C	ANDENT SENSOR	The ambient sensor recognition tempera- ture is too low.	<ul> <li>Ambient sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Open in the ambient sensor circuit)</li> </ul>

## DTC CONFIRMATION PROCEDURE

# **1.**PERFORM SELF-DIAGNOSIS

#### (B) With CONSULT

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

• If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-118. "DTC Logic"</u> or <u>HAC-119. "DTC Logic"</u>.

# **HAC-120**

# **B257B, B257C AMBIENT SENSOR**

< DTC/CIRCU	IT DIAGNOSIS	\$>	_	[WITH 7 INCH DISPLAY]	
• If there is an	open circuit in	the ambient sen	sor, A/C auto am	p registers extreme cold [-30°C (-22°F)] and	
adjusts the te	emperature cont	rol warmer.			А
VES >> Po	form the diago	<u>spiayed?</u>	iont concor Pofor	to HAC 121 "Diagnosis Procedure"	
NO >> INS	SPECTION ENI			to HAC-121, Diagnosis Procedure.	В
Diagnosis P	rocedure			INF01D:000000010842352	
1. СНЕСК АМ	BIENT SENSO	R POWER SUP	PLY CIRCUIT		С
1. Turn the ig	nition switch OF	F.			
2. Disconnec	t ambient sense	or connector.			D
<ol> <li>Turn the ig</li> <li>Check volt</li> </ol>	age between ar	v. nbient sensor ha	arness connector	and ground.	
	5			5	_
(	(+)	(-	-)		
Ambier	nt sensor		_	voltage (Approx.)	
Connector	Terminal				F
E76	1	Gro	und	5 V	
<u>Is the inspectio</u> YES >> GO	n result normal <sup>®</sup> TO 2.	<u>?</u>			G
NO >> GC	D TO 4.				
Z.CHECK AM	BIENT SENSO	R CIRCUIT CON	NTINUITY		Н
<ol> <li>Disconnec</li> <li>Check for a tor.</li> </ol>	t the A/C auto a continuity betwe	mp. connector. een the ambient	sensor harness c	connector and A/C auto amp harness connec-	HA
Ambier	nt sensor	A/C aut	o amp.	Continuity	J
Connector	Terminal	Connector	Terminal	Continuity	0
E76	2	M66	37	Existed	
Is the inspectio	n result normal	<u>?</u>			Κ
YES >> GC	) TO 3.				
			15.		L
J.CHECK AM	BIENT SENSO	K			
Check the amb	ent sensor con	nponents. Refer	to <u>HAC-122, "Cor</u>	nponent Inspection".	
	$\frac{1}{10000000000000000000000000000000000$	<u>r</u> uto amp			M
NO >> Re	place the ambie	ent sensor.			
4. СНЕСК АМ	BIENT SENSO	R CIRCUIT CON	NTINUITY		Ν
1. Turn the ig	nition switch OF	FF.			
<ol> <li>Disconnec</li> <li>Check for other.</li> </ol>	t the A/C auto a continuity betwe	mp. connector. en the ambient	sensor harness c	onnector and A/C auto amp. harness connec-	0
					Ľ
Ambier	nt sensor	A/Caut	o amp.		- P

Ambient sensor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E76	1	M66	35	Existed

4. Check for continuity between ambient sensor harness connector and ground.

# **B257B, B257C AMBIENT SENSOR**

#### < DTC/CIRCUIT DIAGNOSIS >

Ambient sensor			Continuity
Connector	Terminal	—	Continuity
E76	1	Ground	Not existed

Is the inspection result normal?

YES >> Replace the A/C auto amp.

NO >> Repair the harnesses or connectors.

## Component Inspection

# 1.CHECK AMBIENT SENSOR

- 1. Turn the ignition switch OFF.
- 2. Remove the ambient sensor. Refer to HAC-177, "Exploded View".
- 3. Check the resistance between the ambient sensor terminals. Refer to the applicable table for the normal value.

Ter	minal	Condition Temperature: °C (°F)	Resistance: $k\Omega$
		-15 (5)	12.73
		-10 (14)	9.92
		-5 (23)	7.80
		0 (32)	6.19
		5 (41)	4.95
		10 (50)	3.99
1	2	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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the ambient sensor.

# B2578, B2579 IN-VEHICLE SENSOR

## Description

ASPIRATOR

#### **IN-VEHICLE SENSOR**

- The in-vehicle sensor (1) is installed to the instrument lower panel LH.
- The in-vehicle sensor converts the interior air temperature of the passenger room sucked by the aspirator detected with the thermistor into the voltage, and the A/C auto amp. inputs this voltage.

The aspirator (1) generates the vacuum by the air blown from the heater & cooling unit and draws the air of the passenger room to the

in-vehicle sensor area via the aspirator duct.







# INTERIOR AIR TEMPERATURE CORRECTION

- The A/C auto amp. inputs the temperature detected with the in-vehicle sensor as the interior air temperature.
- Perform the correction of the temperature detected with the in-vehicle sensor for each air conditioning control.

DTC Logic

## DTC DETECTION LOGIC

INFOID:000000010842355

[WITH 7 INCH DISPLAY]

INFOID:000000010842354

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# B2578, B2579 IN-VEHICLE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible causes
B2578	IN-VEHICLE SENSOR	The in-vehicle sensor recognition temper- ature is too high.	<ul> <li>In-vehicle sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Short in the in-vehicle sensor circuit)</li> </ul>
B2579		The in-vehicle sensor recognition temper- ature is too low.	<ul> <li>In-vehicle sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Open in the in-vehicle sensor circuit)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

## **1.**PERFORM SELF-DIAGNOSIS

#### (D) With CONSULT

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-118, "DTC Logic"</u> or <u>HAC-119, "DTC Logic"</u>.

#### Is DTC "B2578" or "B2579" displayed?

YES >> Perform the diagnosis for the in-vehicle sensor. Refer to HAC-124, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

# 1. CHECK IN-VEHICLE SENSOR POWER SUPPLY CIRCUIT

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

(+)		(–)	M. K.	
In-vehicle sensor			(Approx.)	
Connector	Terminal			
M61	1	Ground	5 V	

#### Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 4.

2. CHECK IN-VEHICLE SENSOR CIRCUIT CONTINUITY-

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. connector.
- Check for continuity between the in-vehicle sensor harness connector and A/C auto amp. harness connector.

In-vehicle sensor		A/C au	ito amp.	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
M61	2	M66	37	Existed	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

**3.**CHECK IN-VEHICLE SENSOR

Check the in-vehicle sensor components. Refer to HAC-125, "Component Inspection".

	ļ	B2578, B25	79 IN-VEHICL	E SENSOR	
DTC/CIRCUI	T DIAGNOSIS	S >		[WITH 7 INC	H DISPLAY]
the inspection	result normal	?			
YES >> Rep	lace the A/C a	uto amp.			
NO >> Rep	place the in-ver	nicle sensor.			
CHECK IN-V	EHICLE SENS		CONTINUITY		
Turn the ign Disconnect Check for c nector.	ition switch OF the A/C auto a ontinuity betwo	F. mp. connector. een the in-vehic	cle sensor harness	connector and A/C auto amp.	harness con-
In-vehicle	e sensor	A/C au	to amp.		
Connector	Terminal	Connector	Terminal	Continuity	
M61	1	M66	36	Existed	
Check for c	ontinuity betwe	en in-vehicle se	ensor harness con	nector and ground.	
In-vehicle	sensor				
Connector	Terminal	-	-	Continuity	
M61	1	Gro	bund	Not existed	
Turn the ign Remove the Check the r value.	ition switch OF in-vehicle ser esistance betw	F. nsor. Refer to <u>H</u> . reen the in-vehi	AC-178. "Exploded cle sensor termina	<u>I View"</u> . s. Refer to the applicable table <sup>-</sup>	for the normal
	Co	ndition		_	
Terminal	Tempera	ture: °C (°F)	Resistance: $k\Omega$		
		15 (5)	12.73		
	-1	0 (14)	9.92		
	-5	5 (23)	7.80		
	0	(32)	6.19		
	5	(41)	4.95		
	10	0 (50)	3.99		
1 2	15	5 (59)	3.24		
	20	0 (68)	2.65		
	25	5 (77)	2.19		
	30	0 (86)	1.81		
	35	5 (95)	1.51		
	40	(104)	1.27		
1	45	(112)	1 07		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the in-vehicle sensor.

# B2581, B2582 INTAKE SENSOR

## Description

#### INTAKE SENSOR

- Intake sensor (1) is located on the evaporator (2).
- The intake sensor converts the evaporator passing air temperature detected with thermistor into the voltage, and the A/C auto amp. inputs this voltage.



- The A/C auto amp. inputs the temperature detected with the intake sensor as the evaporator passing air temperature.
- Perform the correction of the temperature detected with the intake sensor for air conditioning control.
- The A/C auto amp. performs the correction so that the recognition intake temperature changes depending on the difference between the detected intake temperature and the recognition intake temperature. If the difference is large, the changing is early. The changing becomes slow as the difference becomes small.

# **DTC Logic**

INFOID:000000010842359

#### DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible causes
B2581		The intake sensor recognition temperature is too high.	<ul> <li>Intake sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Short in the intake sensor circuit)</li> </ul>
B2582		The intake sensor recognition temperature is too low.	<ul> <li>Intake sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Open in the intake sensor circuit)</li> </ul>

## DTC CONFIRMATION PROCEDURE

## **1.**PERFORM SELF-DIAGNOSIS

#### () With CONSULT

1. Perform the "SELF-DIAGNOSIS".

2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-118, "DTC Logic"</u> or <u>HAC-119, "DTC Logic"</u>.

Is DTC "B2581" or "B2582" displayed?

YES >> Perform the diagnosis for the intake sensor. Refer to <u>HAC-126, "Diagnosis Procedure"</u>. NO >> INSPECTION END

## **Diagnosis** Procedure

# 1. CHECK INTAKE SENSOR POWER SUPPLY CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect the intake sensor connector.
- 3. Turn the ignition switch ON.

INFOID:000000010842360



# B2581, B2582 INTAKE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 7 INCH DISPLAY]

#### 4. Check voltage between intake sensor harness connector and ground.

(+)     (-)       Intake sensor	
Connector     Terminal	
M205     1     Ground     5 V       s the inspection result normal?       YES     >> GO TO 2.       NO     >> GO TO 4.	
s the inspection result normal? YES >> GO TO 2. NO >> GO TO 4.	
YES $>>$ GO TO 2. NO $>>$ GO TO 4.	
NO >> GO TO 4.	
CHECK INTAKE SENSOR CIRCUIT CONTINUITY	
. Turn the ignition switch OFF.	
2. Disconnect the A/C auto amp. connector.	
<ol><li>Check for continuity between the intake sensor harness connector and A/C a</li></ol>	ito amp. harness connector.
Intake senser $\Lambda/C$ auto amp	
Connector Terminal Connector Terminal	
M205 2 M66 37 Existed	
a the inspection result normal?	
$YES \implies GO TO 3.$ NO $\implies$ Repair the harnesses or connectors	
$\mathbf{S}$ out or initial constants of connectors.	
J. CHECK INTAKE SENSOR	
Check the intake sensor components. Refer to <u>HAC-127, "Component Inspection</u>	<u>-</u> -
s the inspection result normal?	
YES >> Replace the A/C auto amp.	
NO >> Replace the intake sensor.	
CHECK INTAKE SENSOR CIRCUIT CONTINUITY	
1. Turn the ignition switch OFF.	
2. Disconnect the A/C auto amp. connector.	_
<ol><li>Check for continuity between the intake sensor harness connector and A/C a</li></ol>	ito amp. harness connector.
Connector Terminal Connector Terminal Continuity	
M205 1 M66 16 Existed	
M205 1 M66 16 Existed	
I. Check for continuity between intake sensor harness connector and ground.	
Continuit	
Connector Ierminal	
Connector         Terminal           M205         1         Ground         Not existent	·
Connector     Terminal       M205     1     Ground     Not existe       s the inspection result normal?	·
Connector     Terminal       M205     1     Ground     Not existe       s the inspection result normal?     YES     >> Replace the A/C auto amp.	·
Connector     Terminal       M205     1     Ground     Not existe       s the inspection result normal?       YES     >> Replace the A/C auto amp.       NO     >> Repair the harnesses or connectors.	·
Connector     Terminal       M205     1     Ground     Not existe       s the inspection result normal?       YES     >> Replace the A/C auto amp.       NO     >> Repair the harnesses or connectors.       Component Inspection	INFOID:00000001084236;
Connector       Terminal         M205       1       Ground       Not existe         s the inspection result normal?         YES       >> Replace the A/C auto amp.         NO       >> Repair the harnesses or connectors.         Component Inspection	INFOID:00000001084236

- 1. Turn the ignition switch OFF.
- 2. Disconnect the intake sensor connector. Refer to <u>HAC-180</u>, "Exploded View".
- 3. Check the resistance between the intake sensor terminals. Refer to the applicable table for the normal value.

# HAC-127

# B2581, B2582 INTAKE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

Torr	minal	Condition	Registeres: kO
Terminal		Temperature: °C (°F)	Resistance. K22
		-15 (5)	12.28
		-10 (14)	9.58
		-5 (23)	7.55
	2	0 (32)	6.00
		5 (41)	4.81
		10 (50)	3.88
1		15 (59)	3.16
		20 (68)	2.59
		25 (77)	2.14
		30 (86)	1.77
		35 (95)	1.48
		40 (104)	1.24
		45 (113)	1.05

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the intake sensor.

# B2630, B2631 SUNLOAD SENSOR

# Description

#### SUNLOAD SENSOR

- The sunload sensor (1) is installed to the front defroster grille LH.
- The sunload sensor converts the sunload amount (illuminance) into the current value with the photodiode. The A/C auto amp. calculates this current value to the voltage and inputs it.



#### SUNLOAD AMOUNT CORRECTION

- The A/C auto amp. inputs the sunload amount detected with the sunload sensor.
- Perform the correction of the sunload amount detected with the sunload sensor for each air conditioning control.
- When the sunload amount suddenly changes, for example when entering a tunnel, perform the correction so G that the recognition sunload amount of the A/C auto amp. changes slowly.

# DTC Logic

INFOID:000000010842363

## DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible causes	HAC
B2630	- SUNLOAD SENSOR	Detected calorie at sunload sensor 2832 W/m <sup>2</sup> (2436 kcal/m <sup>2</sup> ·h) or more	<ul> <li>Sunload sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Short in the sunload sensor circuit)</li> </ul>	J
B2631		Detected calorie at sunload sensor 64.7 W/m <sup>2</sup> (56 kcal/m <sup>2</sup> ·h) or less	<ul> <li>Sunload sensor</li> <li>A/C auto amp.</li> <li>Harness and connector (Open in the sunload sensor circuit)</li> </ul>	K

## DTC REPRODUCTION PROCEDURE

## **1.**PERFORM SELF-DIAGNOSIS

#### (B)With CONSULT

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

- If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-118. "DTC Logic"</u> or <u>HAC-119. "DTC Logic"</u>.
- Sunload sensor may register a malfunction when indoors, at dusk, or at other times when light is insufficient. When performing the diagnosis indoors, use a lamp (60 W or more) that is pointed at the sunload sensor.

Is DTC "B2630" or "B2631" displayed?

YES >> Perform the diagnosis for the sunload sensor. Refer to <u>HAC-129</u>, "<u>Diagnosis Procedure</u>". NO >> INSPECTION END

## Diagnosis Procedure

#### INFOID:000000010842364

## **1.**CHECK SUNLOAD SENSOR POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.

2. Disconnect the sunload sensor connector.

# HAC-129

INFOID:000000010842362

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# B2630, B2631 SUNLOAD SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

# 3. Turn the ignition switch ON.

4. Check voltage between sunload sensor harness connector and ground.

(+)		(-)	M. Hanne	
Sunload sensor			(Approx.)	
Connector	Terminal			
M46	1	Ground	5 V	

Is the inspection result normal?

YES >> GO TO 2.

NO >> GO TO 4.

# 2. CHECK SUNLOAD SENSOR CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. connector.
- Check for continuity between the sunload sensor harness connector and the A/C auto amp. harness connector.

Sunload sensor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M46	2	M66	37	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

# 3. CHECK SUNLOAD SENSOR

- 1. Connect the sunload sensor connector.
- 2. Connect the A/C auto amp. connector.
- 3. Check the sunload sensor components. Refer to HAC-130, "Component Inspection".

#### Is the inspection result normal?

- YES >> Replace the A/C auto amp.
- NO >> Replace the sunload sensor.

## 4.CHECK SUNLOAD SENSOR CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. connector.
- Check for continuity between the sunload sensor harness connector and A/C auto amp. harness connector.

Sunload sensor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	Continuity
M46	1	M66	15	Existed

4. Check for continuity between sunload sensor harness connector and ground.

Sunload sensor			Continuity	
Connector	Terminal		Continuity	
M46	1	Ground	Not existed	

Is the inspection result normal?

YES >> Replace A/C auto amp.

NO >> Repair the harnesses or connectors.

**Component Inspection** 

**1.**CHECK SUNLOAD SENSOR

# B2630, B2631 SUNLOAD SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

#### 1. Turn the ignition switch ON.

2. Check the input voltage from the sunload sensor between the A/C auto amp. harness connector and A ground. Refer to the applicable table for the normal value.



• The sunload amount produced by direct sunshine in fair weather is equivalent to approximately 0.77 kW/m<sup>2</sup> (662 kcal/m<sup>2</sup>·h).

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace the sunload sensor.

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# B2632, B2633 AIR MIX DOOR MOTOR PBR

#### < DTC/CIRCUIT DIAGNOSIS >

# B2632, B2633 AIR MIX DOOR MOTOR PBR

## Description

#### AIR MIX DOOR MOTOR

- The air mix door motor (1) is installed to the heater & cooling unit assembly.
- The LCU (Local Control Unit) is installed to each door motor so as to perform the multiplex communication control (LAN) between each door motor of the mode door motor, air mix door motor and intake door motor in one communication line.
- When each LCU receives the control signal (combination of the pulse wave with two types of amplitude) from the A/C auto amp., it moves each door to the appropriate position based on the door position detection signal of each PBR (Potentio Balance Resistor). When the movement was completed, each LCU transmits the signal that reports the movement completion to the A/C auto amp.

# DTC Logic



## DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible causes
B2632	DR AIR MIX DOOR MOT	Air mix door PBR position 95% or more	<ul> <li>Air mix door motor (PBR internal circuit is short)</li> <li>A/C auto amp.</li> <li>Harness and connector (LAN communication line is open or shorted)</li> </ul>
B2633		Air mix door PBR position 5% or less	<ul> <li>Air mix door motor (PBR internal circuit is open)</li> <li>A/C auto amp.</li> <li>Harness and connector (LAN communication line is open or shorted)</li> </ul>

## DTC CONFIRMATION PROCEDURE

## **1.**PERFORM SELF-DIAGNOSIS

()With CONSULT

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

- If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-118, "DTC Logic"</u> or <u>HAC-119, "DTC Logic"</u>.
- If all of door motors DTC (B2632 B2655) are detected, check door motor communication circuit. Refer to HAC-139, "Diagnosis Procedure".

Is DTC "B2632" or "B2633" displayed?

YES >> Perform the diagnosis of air mix door motor system. Refer to <u>HAC-133, "Diagnosis Procedure"</u>. NO >> GO TO 2.

2.FUNCTION INSPECTION

- 1. Turn temperature dial and raise temperature setting to 32.0°C (90°F) after warming up the engine.
- 2. Check that warm air blows from outlets.
- 3. Operate the compressor.
- 4. Operate the temperature control dial and lower the set temperature to 18.0°C (60°F).
- 5. Check that the cool air blows from the outlets.

Does it operate normally?

## HAC-132

INFOID:000000010842366

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# B2632, B2633 AIR MIX DOOR MOTOR PBR

#### < DTC/CIRCUIT DIAGNOSIS >

YES >> INSPECTION END

>> Check the air mix door motor system installation condition. Repair or replace the malfunctioning А parts.

#### **Diagnosis** Procedure INFOID:0000000010842368 В 1. CHECK BATTERY VOLTAGE OF AIR MIX DOOR MOTOR 1. Turn the ignition switch ON. 2. Check voltage between the air mix door motor harness connector and ground. (+) (-) D Voltage Air mix door motor (Approx.) Connector Terminal M204 Е 1 Ground 12 V Is the inspection result normal? YES >> GO TO 2. F NO >> Repair the harnesses or connectors. 2.CHECK SIGNAL OF AIR MIX DOOR MOTOR Check output waveform between the air mix door motor harness connector and ground with the oscilloscope. (-) (+) Н

Air mix do	oor motor		Output waveform
Connector	Terminal		
M204	3	Ground	(v) 15 10 5 10 5 10 5 10 5 10 10 10 10 10 10 10 10 10 10
the inspection	n result normal	?	

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

# ${f 3.}$ CHECK GROUND CIRCUIT OF AIR MIX DOOR MOTOR

1. Turn the ignition switch OFF. Μ 2. Disconnect the air mix door motor connector. 3. Check for continuity between the air mix door motor harness connector and ground. Ν Air mix door motor Continuity Connector Terminal M204 2 Existed Ground Is the inspection result normal? YES >> Replace the air mix door motor.

NO >> Repair the harnesses or connectors.

NO

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# B2636, B2637, B2638, B2639, B2654, B2655 MODE DOOR MOTOR < DTC/CIRCUIT DIAGNOSIS > [WITH 7 INCH DISPLAY]

# B2636, B2637, B2638, B2639, B2654, B2655 MODE DOOR MOTOR

## Description

INFOID:000000010842369

#### MODE DOOR MOTOR

- The mode door motor (1) is installed to the heater & cooling unit assembly.
- The LCU (Local Control Unit) is installed to each door motor so as to perform the multiplex communication control (LAN) between each door motor of the mode door motor, air mix door motor and intake door motor in one communication line.
- When each LCU receives the control signal (combination of the pulse wave with two type of amplitude) from the A/C auto amp., it moves each door to the appropriate position based on the door position detection signal of each PBR (Potentio Balance Resistor). When the movement was completed, each LCU transmits the signal that reports the movement completion to the A/C auto amp.



INFOID:000000010842370

# DTC Logic

DTC DETECTION LOGIC

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible cause
B2636	DR VENT DOOR FAIL	When the malfunctioning door position is detected at VENT position	
B2637	DR B/L DOOR FAIL	When the malfunctioning door position is detected at B/L position	Made deer meter (PPP internal
B2638	DR D/F1 DOOR FAIL	When the malfunctioning door position is detected at FOOT position	<ul> <li>Mode door motor (PBK internal circuit is open or shorted)</li> <li>A/C auto amp.</li> </ul>
B2639	DR DEF DOOR FAIL	When the malfunctioning door position is detected at DEF position	Harness and connector (LAN communication line is open or shorted)
B2654	D/F2 DOOR FAIL	When the malfunctioning door position is detected at D/F position	or shorted)
B2655	B/L2 DOOR FAIL	When the malfunctioning door position is detected at B/L2 position	

#### DTC CONFIRMATION PROCEDURE

**1.**PERFORM SELF-DIAGNOSIS

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

- If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-118. "DTC Logic"</u> or <u>HAC-119. "DTC Logic"</u>.
- If all of door motors DTC (B2632 B2655) are detected, check door motor communication circuit. Refer to <u>HAC-139, "Diagnosis Procedure"</u>.

Is DTC " B2636 ", " B2637 ", "B2638 ", "B2639 ", "B2654 " or "B2655 " displayed?

YES >> Perform the diagnosis of mode door motor system. Refer to <u>HAC-135, "Diagnosis Procedure"</u>. NO >> GO TO 2.

#### 2.FUNCTION INSPECTION

- 1. Turn mode control dial to each position.
- Check that the air outlets change according to each indicated air outlet by placing a hand in front of the outlets. Refer to <u>VTL-3</u>, "System Description".

Does it operate normally?

- YES >> INSPECTION END
- NO >> Check the mode door system installation condition. Repair or replace the malfunctioning parts.

# B2636, B2637, B2638, B2639, B2654, B2655 MODE DOOR MOTOR

[WITH 7 INCH DISPLAY] < DTC/CIRCUIT DIAGNOSIS > **Diagnosis** Procedure INFOID:000000010842371 А 1. CHECK MODE DOOR MOTOR POWER SUPPLY CIRCUIT 1. Turn the ignition switch ON. В 2. Check voltage between the mode door motor harness connector and ground. (+)(-) Voltage Mode door motor (Approx.) Connector Terminal M203 1 12 V Ground D Is the inspection result normal? YES >> GO TO 2. Е NO >> Repair the harnesses or connectors. 2. CHECK MODE DOOR MOTOR SIGNAL Check output waveform between the mode door motor harness connector and ground with the oscilloscope. F (+) (-) Mode door motor Output waveform Connector Terminal Н M203 3 Ground HAC -20 ms SJIA1453J Is the inspection result normal? >> GO TO 3. YES NO >> Repair the harnesses or connectors. Κ 3.CHECK MODE DOOR MOTOR GROUND CIRCUIT 1. Turn the ignition switch OFF. 2. Disconnect the mode door motor connector. L 3. Check for continuity between the mode door motor harness connector and ground. Μ Mode door motor Continuity Connector Terminal M203 2 Ground Existed Ν Is the inspection result normal? YES >> Replace the Mode door motor. >> Repair the harnesses or connectors. NO

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## B263D, B263E, B263F INTAKE DOOR MOTOR

#### < DTC/CIRCUIT DIAGNOSIS >

# B263D, B263E, B263F INTAKE DOOR MOTOR

## Description

INFOID:000000010842372

[WITH 7 INCH DISPLAY]

## INTAKE DOOR MOTOR

- The intake door motor (1) is installed to the blower unit.
- The LCU (Local Control Unit) is installed to each door motor so as to perform the multiplex communication control (LAN) between each door motor of the mode door motor, air mix door motor and intake door motor in one communication line.
- When each LCU receives the control signal (combination of the pulse wave with two type of amplitude) from the A/C auto amp., it moves each door to the appropriate position based on the door position detection signal of each PBR (Potentio Balance Resistor). When the movement was completed, each LCU transmits the signal that reports the movement completion to the A/C auto amp.



INFOID:000000010842373

## DTC DETECTION LOGIC

DTC Logic

DTC	Items (CONSULT screen terms)	Diagnostic item is detected when	Possible cause
B263D	FRE DOOR FAIL	When the malfunctioning intake door position is detected at FRE position	<ul> <li>Intake door motor (PBR internal circuit is open or shorted)</li> </ul>
B263E	20P FRE DOOR FAIL	When the malfunctioning intake door position is detected at 20%FRE position	<ul><li> A/C auto amp.</li><li> Harness and connector</li></ul>
B263F	REC DOOR FAIL	When the malfunctioning intake door position is detected at REC position	(LAN communication line is open or shorted)

#### DTC CONFIRMATION PROCEDURE

#### **1.**PERFORM SELF-DIAGNOSIS

#### With CONSULT

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

- If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-118, "DTC Logic"</u> or <u>HAC-119, "DTC Logic"</u>.
- If all of door motors DTC (B2632 B2655) are detected, check door motor communication circuit. Refer to <u>HAC-139, "Diagnosis Procedure"</u>.

#### Is DTC " B263D ", " B263E " or "B263F " displayed?

YES >> Perform the diagnosis of intake door motor system. Refer to <u>HAC-137, "Diagnosis Procedure"</u>. NO >> GO TO 2.

## 2.FUNCTION INSPECTION

- 1. Press intake switch to set the air outlet to recirculation.
- 2. The intake switch indicator is turned ON.
- 3. Listen to intake sound and confirm air inlets change.
- 4. Press intake switch again to set the air outlet to fresh air intake.
- 5. The intake switch indicator is turned OFF.
- 6. Listen to intake sound and confirm air inlets change.

#### Does it operate normally?

- YES >> INSPECTION END
- NO >> Check the intake door system installation condition. Repair or replace the malfunctioning parts.

# HAC-136

#### B263D, B263E, B263F INTAKE DOOR MOTOR WITH 7 INCH DISPLAY

# < DTC/CIRCUIT DIAGNOSIS >

## **Diagnosis Procedure**

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# 1. CHECK BATTERY VOLTAGE OF INTAKE DOOR MOTOR

- 1. Turn the ignition switch ON.
- 2. Check voltage between the intake door motor harness connector and ground.

(+)		(-)	
Intake door motor			(Approx.)
Connector	Terminal		
M206	1	Ground	12 V

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the harnesses or connectors.

2. CHECK INTAKE DOOR MOTOR SIGNAL

Check output waveform between the intake door motor harness connector and ground with the oscilloscope.

(-	+)	(-)		
Intake do	oor motor		Output waveform	G
Connector	Terminal			
M206	3	Ground	(V) 15 10 5 0 • • 20 ms SJIA1453J	HAC
Is the inspection	n result normal'	?		

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

# ${\it 3.}$ Check intake door motor ground circuit

- 1. Turn the ignition switch OFF.
- 2. Disconnect the intake door motor connector.

3. Check for continuity between the intake door motor harness connector and ground.

Intake door motor			Continuity	
Connector	Terminal	—	Continuity	
M206	2	Ground	Existed	

Is the inspection result normal?

YES >> Replace the Intake door motor.

NO >> Repair the harnesses or connectors.

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# POWER SUPPLY AND GROUND CIRCUIT A/C AUTO AMP.

# A/C AUTO AMP. : Diagnosis Procedure

INFOID:000000010842375

[WITH 7 INCH DISPLAY]

# **1.**CHECK FUSE

Check 10A fuses [Nos. 3, 6 and 19, located in the fuse block (J/B)]. **NOTE:** 

Refer to PG-99, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the fuse after repairing the applicable circuit.

2. CHECK A/C AUTO AMP. POWER SUPPLY CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. connector.

3. Check voltage between A/C auto amp. harness connector and ground.

(	+)	(-)	Voltage		
A/C au	to amp.		Ignition switch position		on
Connector	Terminal		OFF	ACC	ON
	17		Approx. 0 V	Battery voltage	Battery voltage
M66	20	Ground	Approx. 0 V	Approx. 0 V	Battery voltage
	40		Battery voltage	Battery voltage	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

**3.**CHECK A/C AUTO AMP. CIRCUIT CONTINUITY

1. Turn the ignition switch OFF.

2. Check continuity between A/C auto amp. harness connector and ground.

A/C auto amp.			Continuity	
Connector	Terminal	—	Continuity	
Mee	19	Ground	Existed	
MOO	39	Giodila	Existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair the harnesses or connectors.

# DOOR MOTOR COMMUNICATION CIRCUIT

## < DTC/CIRCUIT DIAGNOSIS >

# [WITH 7 INCH DISPLAY]

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INFOID:0000000010842377

# DOOR MOTOR COMMUNICATION CIRCUIT

# Description



- LCU (Local Control Unit) is built in to each door motor. And detects door position by PBR (Potentio Balance) Resistor).
- A/C auto amp. communicates with each LCU via communication line. And receives each door position feedback signal from each LCU.
- Each LCU control each door to the appropriate position depending on the control signal from A/C auto amp. When the door movement was completed, transmits the signal of door movement completion to A/C auto amp.

# **Diagnosis** Procedure

#### NOTE:

If all of door motors DTC are detected, check this circuit.

**1.**CHECK COMMUNICATION SIGNAL

- 1. Turn the ignition switch ON.
- Check output waveform between A/C auto amp. harness connector and ground with the oscilloscope. 2.

				K
(-	+)	(-)		1.
A/C au	to amp.		Output waveform	
Connector	Terminal			L
M66	10	Ground	(v) 15 10 5 0 • • • 20 ms SJIA1453J	M
Is the inspection	n result normal	?		0
YES >> GO	TO 3.			0

NO >> GO TO 2.

2.CHECK COMMUNICATION SIGNAL CIRCUIT FOR SHORT

Turn the ignition switch OFF. 1.

- Disconnect the following connectors: 2.
- A/C auto amp.
- Mode door motor
- Intake door motor
- Air mix door motor
- Check continuity between A/C auto amp. harness connector and ground. 3.

# **HAC-139**

# DOOR MOTOR COMMUNICATION CIRCUIT

## < DTC/CIRCUIT DIAGNOSIS >

[WITH 7 INCH DISPLAY]

A/C auto amp.			Continuity	
Connector	Terminal	—	Continuity	
M66	10	Ground	Not existed	

Is the inspection result normal?

YES >> Replace A/C auto amp.

NO >> Repair the harnesses or connectors.

**3.**CHECK COMMUNICATION SIGNAL CIRCUIT FOR OPEN

- 1. Turn the ignition switch OFF.
- 2. Disconnect the A/C auto amp. and the mode door motor connectors.
- 3. Check continuity between A/C auto amp. harness connector and the mode door motor harness connector.

A/C au	to amp.	Mode de	oor motor	Continuity
Connector	Terminal	Connector	ector Terminal	
M66	10	M203	3	Existed

Is the inspection result normal?

YES >> Replace A/C auto amp.

NO >> Repair the harnesses or connectors.

# < DTC/CIRCUIT DIAGNOSIS > A/C AUTO AMP.

# Description

## A/C AUTO AMP. (A/C AUTO AMPLIFIER)

- The A/C auto amp. (1) has a built-in microcomputer which processes information sent from various sensors needed for air conditioning system operation.
- The air mix door motor, mode door motor, intake door motor, blower motor and the compressor are then controlled.
- When the various switches and temperature control dial are operated, data is input to the A/C auto amp. from the AV control unit using CAN communication.
- Self-diagnosis functions are also built into A/C auto amp. to provide quick check of malfunctions in the auto air conditioning system.

# **Component Function Check**



## INFOID:0000000010842379

INFOID:000000010842380

# **1.**CHECK OPERATION

- 1. Press the AUTO switch, and then check that "AUTO" is shown on the display.
- 2. Operate the temperature control dial. Check that the fan speed or discharge air changes (the discharge air temperature or fan speed varies depending on the ambient temperature, in-vehicle temperature, and set temperature).

#### Does it operate normally?

YES >> INSPECTION END

NO >> Perform the diagnosis for the A/C auto amp. Refer to HAC-141, "Diagnosis Procedure".

# Diagnosis Procedure

## **1.**INSPECTION BY FAIL-SAFE FUNCTION

- 1. Turn the ignition switch ON.
- After approximately 30 seconds, check that the air conditioning system is operated by the fail-safe function (the operation display of air conditioning system is not performed). Refer to <u>HAC-160, "Fail-safe"</u>.

#### Is the fail-safe function operated?

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

# 2.CHECK A/C AUTO AMP. POWER SUPPLY CIRCUIT AND GROUND CIRCUIT

Check A/C auto amp. power supply circuit and ground circuit. Refer to HAC-138, "A/C AUTO AMP. : Diagnosis	ЪЛ
Procedure".	IVI
Is the inspection result normal?	

YES >> GO TO 3.NO >> Repair or replace parts depending on the inspection results.

**3.**CHECK PRESET SWITCH

Check the preset switch. Refer to AV-197, "Symptom Table".

Is the inspection result normal?

YES >> Replace A/C auto amp.

NO >> Repair or replace parts according to the inspection results.

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# BLOWER MOTOR

# Description

- The blower motor utilizes a brush-less motor with a rotating magnet.
- Quietness is improved over previous motors where the brush was the point of contact and the coil rotated.





# **Component Function Check**

# **1.**CHECK OPERATION

1. Warm up the engine.

2. Operate the fan control dial. Check that the fan speed and indicator unit are switched for all fan speeds.

# Does it operate normally?

YES >> INSPECTION END

NO >> Perform the diagnosis for the blower motor. Refer to <u>HAC-146, "Diagnosis Procedure"</u>.

# Diagnosis Procedure

INFOID:000000010842383

INFOID:000000010842382

# **1.**SELF-DIAGNOSIS RESULT CHECK

#### With CONSULT

1. Perform the "SELF-DIAGNOSIS".

2. Check if any DTC is detected in the self-diagnostic results.

#### NOTE:

If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-118, "DTC Logic"</u> or <u>HAC-119, "DTC Logic"</u>.

## Is any DTC displayed?

- YES >> Perform the diagnosis that is applicable to the sensor and actuator. Refer to <u>HAC-161, "DTC</u> <u>Index"</u>.
- NO >> GO TO 2.

## 2. PERFORM ACTIVE TEST

## With CONSULT

- i. Perform the "HVAC TEST" of HVAC active test item.
- 2. Check that the blower motor control signal changes according to each indicator number.

# **BLOWER MOTOR**

## < DTC/CIRCUIT DIAGNOSIS >

				Test item			
	MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6	MODE 7
Blower fan motor control sig- nal duty ratio	37%	91%	65%	65%	65%	91%	_
NOTE: Perform the inspection of If the Mode 7 is selected Does it operate normally? YES >> INSPECTION	f each output , the malfunct I END	device after si ion is displaye	tarting the engi ed but it is norn	ine because th nal.	e compressor	is operated.	
NO >> GO TO 3. CHECK BLOWER MO							
<ol> <li>Disconnect the blowe</li> <li>Turn the ignition switc</li> <li>Check voltage betwee</li> </ol>	r motor con h ON. en blower n	nector.	ss connecto	r and groun	d.		
(+)		(-)					
Blower motor		_			Voltage		
Connector Termina	1						
M109 1		Groun	d	E	Battery voltage		
<ol> <li>Turn the ignition switc</li> <li>Check for continuity b</li> </ol>	h OFF. etween blo	wer motor I	narness con	nector and	ground.		
Blower motor		_			Continuity		
M109 3	11	Groun	d		Existed	<u> </u>	
s the inspection result no YES >> GO TO 5. NO >> Repair the ha D.CHECK BLOWER MO I. Disconnect the A/C a 2. Check for continuity b	rmal? rnesses or TOR CIRCI uto amp. cc etween the	connectors JIT CONTII onnector. blower mo	NUITY tor harness	connector a	and A/C auto	o amp. harr	ness connector.
Blower motor		A/C auto	amp.		<b>0</b>		
Connector Termina	al Co	nnector	Terminal		Continuity		
M109 2		M66	32		Existed		
s the inspection result no YES >> GO TO 6. NO >> Repair the ha CHECK A/C AUTO AN Reconnect blower mo	rmal? rnesses or IP. OUTPU	connectors T SIGNAL tor and A/C	auto amp	connector			
<ol> <li>Turn the ignition switc</li> <li>Set the MODE contro</li> <li>Change fan speed fra ground by using an os</li> </ol>	h ON. I dial to VEI om Lo to F scilloscope.	NT position li, and cheo	ck duty ratio	os between	blower mot	tor harness	connector and

# HAC-143

# NOTE:

Calculate the drive signal duty ratio as shown in the figure. T2 = Approx. 1.6 ms

Blower motor		Condition	Duty ratio	
Connector	Terminal	Fan speed (manual) VENT mode	(Approx.)	
	2	1st	25 %	
		2nd	33 %	
		3rd	41 %	
M109		4th	51 %	
		5th	61 %	
		6th	69 %	
		7th	81 %	



Is the inspection result normal?

YES >> Replace blower motor after confirming the fan air flow does not change.

NO >> Replace the A/C auto amp.

7. CHECK BLOWER MOTOR CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect the blower motor connector and fuse block (J/B) connector.
- Check the continuity between the blower motor harness connector and fuse block (J/B) harness connector.

Blowe	Blower motor		ock (J/B)	Continuity
Connector	Terminal	Connector	Connector Terminal	
M100	1	M1	ЗA	Existed
	I		8A	Existed

4. Check for continuity between blower motor harness connector and ground.

Blowe	r motor		Continuity	
Connector	Terminal		Continuity	
M109	1	Ground	Not existed	

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair the harnesses or connectors.

## 8.CHECK FUSE

Check 15A fuses [Nos. 21 and 22, located in the fuse block (J/B)]. NOTE:

Refer to PG-99, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

- YES >> Inspection the power supply circuit. Refer to <u>PG-39</u>, "Wiring Diagram IGNITION POWER SUP-<u>PLY -"</u>.
- NO >> Replace the fuse after repairing the applicable circuit.

# Component Inspection

INFOID:000000010842384

**1.**CHECK BLOWER MOTOR

1. Remove the blower motor. Refer to <u>VTL-13, "Exploded View"</u>.
#### **BLOWER MOTOR**

#### < DTC/CIRCUIT DIAGNOSIS >

#### 2. Check that the blower motor turns smoothly.

- Is the inspection result normal?
- YES >> INSPECTION END
- NO >> Replace the blower motor.

[WITH 7 INCH DISPLAY]

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Revision: 2014 September

#### **MAGNET CLUTCH**

#### < DTC/CIRCUIT DIAGNOSIS > MAGNET CLUTCH

#### Description

The magnet clutch is the device that drives the compressor with the signal from IPDM E/R.

#### **Component Function Check**

**1.**CHECK OPERATION

- 1. Turn the fan control dial ON.
- 2. Press the A/C switch.
- 3. Check that the indicator of the A/C switch turns ON. Check visually and by sound that the compressor operates.
- 4. Press the A/C switch again.
- Check that the indicator of the A/C switch turns OFF. Check visually and by sound that the compressor stops.

Does it operate normally?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>HAC-146</u>, "Diagnosis Procedure".

#### Diagnosis Procedure

**1.**CHECK CHARGED REFRIGERANT

Connect the recovery/recycling recharging equipment to the vehicle and perform the pressure inspection with the gauge. Refer to <u>HA-32</u>, "Inspection".

Is there refrigerant?

YES >> GO TO 2.

NO >> Check for refrigerant leakages detecting fluorescent leak detector. Refer to <u>HA-24, "Leak Test"</u>.

2. CHECK MAGNET CLUTCH OPERATION

Perform auto active test of IPDM E/R. Refer to PCS-10, "Diagnosis Description".

Does it operate normally?

YES >> GO TO 6. NO >> GO TO 3.

3.CHECK MAGNET CLUTCH

- 1. Turn the ignition switch OFF.
- 2. Disconnect the magnet clutch connector.
- 3. Directly apply the battery voltage to the magnet clutch. Check for operation visually and by sound.

Does it operate normally?

YES >> GO TO 4.

NO >> Replace magnet clutch. Refer to <u>HA-35</u>, "<u>MAGNET CLUTCH</u> : <u>Removal and Installation of Compressor Clutch</u>".

#### 4. CHECK MAGNET CLUTCH CIRCUIT CONTINUITY

- 1. Turn the ignition switch OFF.
- 2. Disconnect IPDM E/R connector.
- 3. Check continuity between the magnet clutch harness connector and IPDM E/R harness connector.

IPDN	M E/R	Magne	et clutch	Continuity
Connector	Terminal	Connector	Terminal	Continuity
E7	48	F43	1	Existed

4. Check for continuity between IPDM E/R harness connector and ground.

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INFOID:000000010842386

INFOID:000000010842387

## **MAGNET CLUTCH**

#### < DTC/CIRCUIT DIAGNOSIS >

IPDM	E/R			A
Connector	Terminal		Continuity	
E7	48	Ground	Not existed	В
Is the inspection result n	ormal?			
YES >> GO TO 5.	arnesses and conner	otors		
5.CHECK FUSE				C
Check 10A fuse (No. 49	, located in the IPDM	E/R).		D
Refer to PG-101, "Fuse,	Connector and Term	inal Arrangement".		
Is the inspection result n	ormal?			
YES >> Replace IPE	DM E/R.			E
NO >> Replace the	fuse after repairing t	he applicable circuit.		
<b>O.</b> CHECK SELF-DIAGN	NOSIS RESULT CHE	СК		F
With CONSULT				
<ol> <li>Perform the "SELF-I</li> <li>Check if any DTC is</li> </ol>	DIAGNOSIS". detected in the self-r	liagnostic results		
NOTE:				G
If DTC is displayed alon	g with DTC "U1000" (	or "U1010", first diagno	ose the DTC "U1000" or "U1010". R	efer to
Is any DTC displayed?	<u> </u>	<u>yic</u> .		Н
YES >> Perform the	diagnosis that is an	policable to the senso	r and actuator. Refer to HAC-161.	"DTC
Index".				
NO >> GO TO 7.				HAC
I .CHECK A/C AUTO A	MP. OUTPUT SIGNA	L		
With CONSULT				J
<ol> <li>Perform the "DATA I</li> <li>Check A/C ON sign:</li> </ol>	MONITOR″ of HVAC. al and blower fan ON	Refer to <u>HAC-150, "Re</u> switch signal	eterence Value".	
		ownon orginal.		
Monitor item	Cor	ndition	Status	Γ.
	A/C switch: OFF	Off		
COMP REQ SIG	A/C switch: ON	On		L
	Fan control dial:	OFF Off		
TANKEQ 5W	Fan control dial:	ON On		NA
Is the inspection result n	ormal?			IVI
YES >> GO TO 8.				
NO >> Replace A/C	auto amp.	10.05		Ν
	ANT PRESSURE SEP	NSOR		
Check the refrigerant pro	essure sensor. Refer	to <u>EC-527, "Diagnosis</u>	Procedure".	$\cap$
Is the inspection result n	ormal?			0
NO >> Repair or re	עמש אוי place the malfunction	ing parts.		
		<b>U F</b> == 1		Р

#### ECV (ELECTRICAL CONTROL VALVE)

#### < DTC/CIRCUIT DIAGNOSIS >

## ECV (ELECTRICAL CONTROL VALVE)

#### Description

The ECV (electrical control valve) is installed on the compressor and controls it for emitting appropriate amount of refrigerant when necessary.

#### **Diagnosis Procedure**

#### **1.**CHECK FUSE

Check 10A fuse [No. 3, located in the fuse block (J/B)].

NOTE:

Refer to PG-99, "Fuse, Connector and Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the fuse after repairing the applicable circuit.

#### 2. CHECK ECV POWER SUPPLY CIRCUIT

1. Turn the ignition switch OFF.

2. Disconnect the ECV connector.

- 3. Turn the ignition switch ON.
- 4. Check voltage between the ECV harness connector and ground.

(	+)	(–)	
E	CV		Voltage
Connector	Terminal		
F44	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the harnesses or connectors.

**3.**CHECK ECV CONTROL SIGNAL

#### With CONSULT

- 1. Turn the ignition switch OFF.
- 2. Connect the ECV connector.
- 3. Perform the "HVAC TEST": MODE 5 of HVAC active test mode.
- 4. Check output waveform between the A/C auto amp. harness connector and ground with the oscilloscope.

(	+)	(-)		
A/C au	ito amp.		Condition	Output waveform
Connector	Terminal			
M66	24	Ground	HVAC TEST: MODE 5	Duty ratio: approx. 50 %

Is the inspection result normal?

YES >> Replace the compressor.

#### **4.**CHECK CONTINUITY BETWEEN ECV AND A/C AUTO AMP.

1. Turn the ignition switch OFF.

2. Disconnect the ECV connector.

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INFOID:000000010842389

## ECV (ELECTRICAL CONTROL VALVE)

#### < DTC/CIRCUIT DIAGNOSIS >

[WITH 7 INCH DISPLAY]

#### 3. Disconnect the A/C auto amp. connector.

4. Check continuity between the ECV harness connector and A/C auto amp. harness connector.

EC	CV	A/C aut	o amp.	Continuity	1
Connector	Terminal	Connector	Terminal	Continuity	В
F44	3	M66	24	Existed	
5. Check for c	ontinuity betwe	en the ECV har	ness connector a	nd ground.	С
	ECV			Continuity	
Connecto	r	Terminal	—	Continuity	D
F44		3	Ground	Not existed	
YES >> GO NO >> Rep 5.CHECK EC\	n result normal <sup>:</sup> TO 5. Dair the harnes: /	<u>?</u> ses or connector	'S.		E
Check continuit	y between the	ECV connector t	erminals.		F
	E	CV		Oractionity	G
Connector	Terminal	Connector	Terminal	Continuity	
F44	2	F44	3	Existed	
Is the inspection	n result normal'	?			П

YES >> Replace the A/C auto amp.

NO >> Replace the compressor.

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## ECU DIAGNOSIS INFORMATION A/C AUTO AMP.

#### Reference Value

INFOID:000000010842390

#### CONSULT DATA MONITOR REFERENCE VALUES

#### NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor item	Con	dition	Value/Status
COMP REQ SIG	Engine: Run at idle after warming up	A/C switch: ON (Compressor operation sta- tus)	On
		A/C switch: OFF	Off
	Engine: Run at idle after	Blower motor: ON	On
FAIL REQ SIG	warming up	Blower motor: OFF	Off
AMB TEMP SEN	Ignition switch ON	—	–22 – 131°F (−30 – 55°C)
IN-VEH TEMP	Ignition switch ON	—	–22 – 131°F (−30 – 55°C)
INT TEMP SEN	Ignition switch ON	—	–22 – 131°F (−30 – 55°C)
SUNLOAD SEN	Ignition switch ON	_	0 – 1045 w/m <sup>2</sup> (0 – 900 kcal/m <sup>2</sup> ⋅h)
AMB SEN CAL	Ignition switch ON	—	–22 – 131°F (–30 – 55°C)
IN-VEH CAL	Ignition switch ON	—	–22 – 131°F (−30 – 55°C)
INT TEMP CAL	Ignition switch ON	—	–22 – 131°F (−30 – 55°C)
SUNL SEN CAL	Ignition switch ON	_	0 – 1045 w/m <sup>2</sup> (0 – 900 kcal/m <sup>2</sup> ·h)
	Engine: Run at idle after	Blower motor: ON	25 – 81
FAN DOTT	warming up	Blower motor: OFF	0
XM	Ignition switch ON	_	-100 - 155
ENG COOL TEMP	Ignition switch ON		Values depending on cool- ant temperature
VEHICLE SPEED	Driving	_	Equivalent to speedometer reading

#### TERMINAL LAYOUT



PHYSICAL VALUES

## A/C AUTO AMP.

#### < ECU DIAGNOSIS INFORMATION >

#### [WITH 7 INCH DISPLAY]

Termir (Wire	nal No. color)	Description		Oraclitica	Value
+	_	Signal name	Input/ Output	Condition	(Approx.)
1 (L)	Ground	CAN - H	Input/ Output		_
2 (P)	Ground	CAN - L	Input/ Output	_	_
10 (BR)	Ground	A/C LAN signal	Input/ Output	Ignition switch ON	(V) 15 10 5 0 •••••20 ms SJIA1453J
11 (Y)	Ground	Each door motor power sup- ply	_	Ignition switch ON	12 V
15 (O)	Ground	Sunload sensor signal	Input	_	0 – 4.8 V Output voltage varies with sunload amount
16 (R)	Ground	Intake sensor signal	Input	_	0 – 4.8 V Output voltage varies with intake temperature
17 (L)	Ground	ACC power supply	—	Ignition switch ACC	Battery voltage
19 (B)	Ground	Ground	_	Ignition switch ON	0 V
20 (G)	Ground	Ignition power supply	_	Ignition switch ON	Battery voltage
24 (O)	Ground	ECV signal	Output	<ul><li>Ignition switch ON</li><li>Active test: MODE 5</li></ul>	(V) 10 5 0 ++++0.5 ms 5 JIA1607E
32 (P)	Ground	Blower motor control signal	Output	<ul> <li>Ignition switch ON</li> <li>Fan speed: 1st speed (manual)</li> </ul>	(V) 6 4 2 0 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
34 (G)	Ground	A/C auto amp. connecting recognition signal	Output	Ignition switch ON	5 V
35 (V)	Ground	Ambient sensor signal	Input	_	0 – 4.8 V Output voltage varies with ambient temperature
36 (LG)	Ground	In-vehicle sensor signal	Input	_	0 – 4.8 V Output voltage varies with in-vehi- cle temperature
37 (GR)	Ground	Sensor ground	_	Ignition switch ON	0 V

Revision: 2014 September

## A/C AUTO AMP.

#### < ECU DIAGNOSIS INFORMATION >

#### [WITH 7 INCH DISPLAY]

Termin (Wire o	al No. color)	Description		Condition	Value
+	_	Signal name	Input/ Output	Condition	(Approx.)
39 (B)	Ground	Ground		Ignition switch ON	0 V
40 (Y)	Ground	Battery power supply		Ignition switch OFF	Battery voltage



Revision: 2014 September



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< ECU DIAGNOSIS INFORMATION >

## Revision: 2014 September

-	19 P	20 0	22 G -	23 Y -	24 LG -	25 V -	27 GR -	28 BR -	29 L -	30 R	31 P	33 SB	34 0 -	36 GR -	37 SHIELD -	38 W -	39 Y -	40 G	41 B -	42 GR -	43 R	45 SB -	46 SHIELD -	47 W/L -	48 LG -	49 O/L		51 W			Connector No. F43	Connector Name COMPRESSOR		Connector Type RS01FB	đ		HS N			ł		Terminal Color Of	No. Wire Signal Name (Specification)	1 0 MAGNET CLUTCH POWER SUPPLY		
	Connector No. E172	Connector Name REFRIGERANT PRESSURE SENSOR	Connector Type RK03FB				CH CH	((123))			Terminal Color Of	No. Wire Signal Name [Specification]	1	2	3			Connector No. F1	Connector Name WIRE TO WIRE		Connector Type SAA36FB-RS8-SHZ8		UNNV 2 11 10 9 2 1 7	16 15 14 13 3	25 20 23 23 23 13 13 13 13	244 030 03 21 03 03 22 22 0 2	2015/15/0 404 404 104 404 104 404 104 404 104 10		Terminal Color Of	No. Wire Signal Name [Specification]	1 LV -	2 SHIELD -	3 L/B -	4 SHIELD -		- 6	- ×	- > (	10 6		13 0	14 LG -	15 BR -	16 Y -	17 W -	18 LG -
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## A/C AUTO AMP.

< ECU DIAGNOSIS INFORMATION >

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< ECU DIAGNOSIS INFORMATION >

	Connector No.	M61	3/ 2	R SENSOR GROUND	_
<ul> <li>COMBINATION METER</li> <li>TH24FW-NH</li> </ul>	Connector Nam Connector Type	IN-VEHICLE SENSOR	39 40 Y	GROUND BATTERY POWER SUPPLY	
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VEHICLE SPEED SIGNAL (8-PULSE) [Except for Mexico] ILLUMINATION CONTROL SIGNAL	Connector No. Connector Nam	MOD INC AUTO AMP.		GROUND	
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AMBIENT SENSOR SIGNAL				-	-
A/C AUTO AMP. CONNECTION RECOGNITION SIGNAL AMBIENT SENSOR GROUND			Connector No.	M86	_
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FUEL LEVEL SENSOR GROUND	2 P	CAN-L			
	9	TX (AMP_CONT)	F		
	10 P	K (CONT_AMP)	H.S.		
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	5 5 7	ACC POWER SUPPLY			
	19 B	GROUND	Terminal Colo	· Of Signal Namo [Socification]	_
	20 G	IGNITION POWER SUPPLY	No. Wi	e signal Name (specification)	
	24 0	ECV SIGNAL	65 C	PARKING BRAKE SIGNAL	_
	26 R	REAR WINDOW DEFOGGER FEEDBACK SIGNAL	67 L	COMPOSITE IMAGE GND	_
	27 L	REAR WINDOW DEFOGGER ON SIGNAL	88	COMPOSITE IMAGE SIGNAL	
	32 5 - P	BLOWER MUTOR CONTROL SIGNAL		IT MICKOPHONE GND	_
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## A/C AUTO AMP.

#### < ECU DIAGNOSIS INFORMATION >

[WITH 7 INCH DISPLAY]



JRIWC2831GB

INFOID:000000010842392

# Fail-safe

#### FAIL-SAFE FUNCTION

< ECU DIAGNOSIS INFORMATION >

When a communication malfunction between A/C auto amp. and AV control unit and preset switch continued for approximately 30 seconds or more, control the air conditioning system under the following conditions.

#### A/C AUTO AMP.

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INFOID:000000010842393

Compressor	: ON
Air outlet	: AUTO
Air inlet	: FRE (Fresh air intake)
Fan speed	: AUTO
Preset temperature	: Setting before communication malfunction

#### DTC Inspection Priority Chart

< ECU DIAGNOSIS INFORMATION >

ne perform inspections one by one based on the following priority

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)	
1	U1000: CAN COMM CIRCUIT     U1010: CONTROL UNIT (CAN)	E
	<ul> <li>B2578: IN-VEHICLE SENSOR</li> <li>B2579: IN-VEHICLE SENSOR</li> <li>B257B: AMBIENT SENSOR</li> <li>B257C: AMBIENT SENSOR</li> <li>B257C: AMBIENT SENSOR</li> </ul>	F
	<ul> <li>B2581: INTAKE SENSOR</li> <li>B2630: SUNLOAD SENSOR</li> <li>B2631: SUNLOAD SENSOR</li> </ul>	G
2	B2632: DR AIR MIX DOOR MOT     B2633: DR AIR MIX DOOR MOT     B2636: DR VENT DOOR FAIL     B2637: DR B/L DOOR FAIL	F
	<ul> <li>B2638: DR D/F1 DOOR FAIL</li> <li>B2639: DR DEF DOOR FAIL</li> <li>B2635: FRE DOOR FAIL</li> <li>B2635: FRE DOOR FAIL</li> </ul>	HA
	<ul> <li>B263E: 20P FRE DOOR FAIL</li> <li>B263F: REC DOOR FAIL</li> <li>B2654: D/F2 DOOR FAIL</li> <li>B2655: B/L2 DOOR FAIL</li> </ul>	L

## **DTC** Index

INFOID:000000010842394

DTC	Items (CONSULT screen terms)	Reference	L
U1000	CAN COMM CIRCUIT	HAC-118, "DTC Logic"	_
U1010	CONTROL UNIT (CAN)	HAC-119, "DTC Logic"	M
B2578	IN-VEHICLE SENSOR	HAC-123, "DTC Logic"	
B2579	IN-VEHICLE SENSOR	HAC-123, "DTC Logic"	
B257B	AMBIENT SENSOR	HAC-120, "DTC Logic"	N
B257C	AMBIENT SENSOR	HAC-120, "DTC Logic"	
B2581	INTAKE SENSOR	HAC-126, "DTC Logic"	0
B2582	INTAKE SENSOR	HAC-126, "DTC Logic"	_ 0
B2630 <sup>*</sup>	SUNLOAD SENSOR	HAC-129, "DTC Logic"	
B2631 <sup>*</sup>	SUNLOAD SENSOR	HAC-129, "DTC Logic"	P
B2632	DR AIR MIX DOOR MOT	HAC-132, "DTC Logic"	
B2633	DR AIR MIX DOOR MOT	HAC-132, "DTC Logic"	
B2636	DR VENT DOOR FAIL	HAC-134, "DTC Logic"	_
B2637	DR B/L DOOR FAIL	HAC-134, "DTC Logic"	_
B2638	DR D/F1 DOOR FAIL	HAC-134, "DTC Logic"	

## A/C AUTO AMP.

#### < ECU DIAGNOSIS INFORMATION >

DTC	Items (CONSULT screen terms)	Reference
B2639	DR DEF DOOR FAIL	HAC-134, "DTC Logic"
B263D	FRE DOOR FAIL	HAC-136, "DTC Logic"
B263E	20P FRE DOOR FAIL	HAC-136, "DTC Logic"
B263F	REC DOOR FAIL	HAC-136, "DTC Logic"
B2654	D/F2 DOOR FAIL	HAC-134, "DTC Logic"
B2655	B/L2 DOOR FAIL	HAC-134, "DTC Logic"

\*: Perform self-diagnosis under sunshine. When performing indoors, aim a light (more than 60 W) at sunload sensor, otherwise self-diagnosis indicates even though the sunload sensor is functioning normally.

#### NOTE:

If all of door motors DTC (B2632, B2633, B2636, B2637, B2638, B2639, B263D, B263E, B263F, B2654 and B2655) are detected, check door motor communication circuit. Refer to <u>HAC-139</u>, "Description".

#### **AUTOMATIC AIR CONDITIONING SYSTEM**

#### < SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS AUTOMATIC AIR CONDITIONING SYSTEM

## Diagnosis Chart By Symptom

INFOID:000000010842395 В

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Symptom	Check item	Reference
A/C system does not activate.	Power supply and ground circuit	HAC-138, "A/C AUTO AMP. : Diagnosis Procedure"
A/C system cannot be controlled.	A/C auto amp.	HAC-141, "Diagnosis Procedure"
<ul><li>Air outlet does not change.</li><li>Mode door motor does not operate normally.</li></ul>	Mode door motor	HAC-135, "Diagnosis Procedure"
<ul> <li>Discharge air temperature does not change.</li> <li>The air mix door motor does not operate normally.</li> </ul>	Air mix door motor	HAC-133. "Diagnosis Procedure"
<ul><li>Intake door does not change.</li><li>Intake door motor does not operate normally.</li></ul>	Intake door motor	HAC-137, "Diagnosis Procedure"
Blower motor operation is malfunctioning.	Blower motor	HAC-142, "Diagnosis Procedure"
Magnet clutch does not operate.	Magnet clutch	HAC-146, "Diagnosis Procedure"
Insufficient cooling	ECV	HAC-148, "Diagnosis Procedure"
<ul> <li>No cool air comes out. (Air flow volume is normal.)</li> </ul>	Insufficient cooling	HAC-164, "Diagnosis Procedure"
<ul> <li>Insufficient heating</li> <li>No warm air comes out. (Air flow volume is normal.)</li> </ul>	Insufficient heating	HAC-166, "Diagnosis Procedure"
<ul> <li>Noise</li> <li>Noise is heard when the A/C system operates.</li> </ul>	Noise	HAC-169, "Diagnosis Procedure"
<ul> <li>Memory function does not operate normally.</li> <li>The setting is not maintained. (It returns to the initial condition)</li> </ul>	Memory function	HAC-171, "Diagnosis Procedure"

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## **INSUFFICIENT COOLING**

#### Description

INFOID:000000010842396

[WITH 7 INCH DISPLAY]

Symptom	

- Insufficient cooling
- No cool air comes out. (Air flow volume is normal.)

#### Diagnosis Procedure

INFOID:000000010842397

#### **1.**CHECK MAGNET CLUTCH OPERATION

- 1. Turn the ignition switch ON.
- 2. Turn the fan control dial ON.
- 3. Press the A/C switch.
- 4. Check that the indicator of the A/C switch turns ON. Check visually and by sound that the compressor operates.
- 5. Press the A/C switch again.
- 6. Check that the indicator of the A/C switch turns OFF. Check that the compressor stops.

Is the inspection result normal?

NO >> Magnet clutch system malfunction. Refer to HAC-146. "Diagnosis Procedure".

2.CHECK DRIVE BELT

Check tension of the drive belt. Refer to EM-18, "Checking".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Adjust or replace drive belt depending on the inspection results.

3.CHECK REFRIGERANT CYCLE PRESSURE

Connect the recovery/recycling recharging equipment to the vehicle and perform the pressure inspection with the gauge. Refer to <u>HA-7</u>, "Symptom Table".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace the parts depending on the inspection results.

**4.**CHECK PERFORMANCE CHART

Connect recovery/recycling recharging equipment to the vehicle and perform the performance test. Refer to <u>HA-32</u>, "Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 7.

**5.**CHECK AMBIENT TEMPERATURE DISPLAY

Check that there is not much difference between actual ambient temperature and indicated temperature on information display in combination meter.

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Perform the diagnosis for the A/C auto amp. connection recognition signal. Refer to <u>MWI-56.</u> <u>"Diagnosis Procedure"</u>.

#### $\mathbf{6}$ .CHECK SETTING OF TEMPERATURE SETTING TRIMMER

#### (I) With CONSULT

- 1. Select "TEMP SET CORRECT" of HVAC work support item. Refer to <u>HAC-99, "Temperature Setting Trim-</u> mer".
- Check that the temperature setting trimmer is set to "+ direction". NOTE:

The control temperature can be set with the setting of the temperature setting trimmer.

## **INSUFFICIENT COOLING**

## [WITH 7 INCH DISPLAY]

3. Set the difference between the set temperature and control temperature to "0".	٨
>> INSPECTION END	~
7. CHECK CHARGED REFRIGERANT AMOUNT	В
<ol> <li>Connect recovery/recycling recharging equipment to the vehicle and discharge the refrigerar</li> <li>Recharge with the proper amount of refrigerant.</li> </ol>	nt.
Are the symptoms solved?	С
YES >> INSPECTION END NO >> Refer to HAC-163. "Diagnosis Chart By Symptom" and perform the appropriate diag	nosis.
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< SYMPTOM DIAGNOSIS >

## INSUFFICIENT HEATING

#### Description

INFOID:000000010842398

- Symptom
- Insufficient heating
- No warm air comes out. (Air flow volume is normal.)

#### Diagnosis Procedure

INFOID:000000010842399

#### **1.**CHECK COOLING SYSTEM

- 1. Check the engine coolant level and check for leakage. Refer to <u>CO-11, "Inspection"</u>.
- 2. Check radiator cap. Refer to <u>CO-15, "RESERVOIR TANK CAP : Inspection"</u>.
- Check water flow sounds of the engine coolant. Refer to <u>CO-12, "Refilling"</u>.

#### Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Refill the engine coolant and repair or replace the parts depending on the inspection results.

#### 2. CHECK OPERATION

1. Turn temperature dial and raise temperature setting to 32.0°C (90°F) after warming up the engine.

2. Check that warm air blows from the outlets.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 3.

#### 3.CHECK SETTING OF TEMPERATURE SETTING TRIMMER

#### With CONSULT

- 1. Select "TEMP SET CORRECT" of HVAC work support item. Refer to <u>HAC-99, "Temperature Setting Trim-</u> <u>mer"</u>.
- 2. Check that the temperature setting trimmer is set to "– direction". **NOTE:**

The control temperature can be set by the temperature setting trimmer.

3. Set the difference between the set temperature and control temperature to "0".

#### Are the symptoms solved?

YES >> INSPECTION END

NO >> GO TO 4.

**4.**CHECK SELF-DIAGNOSIS RESULT CHECK

#### With CONSULT

- 1. Perform the "SELF-DIAGNOSIS".
- 2. Check if any DTC is detected in the self-diagnostic results.

NOTE:

If DTC is displayed along with DTC "U1000" or "U1010", first diagnose the DTC "U1000" or "U1010". Refer to <u>HAC-118, "DTC Logic"</u> or <u>HAC-119, "DTC Logic"</u>.

#### Is any DTC displayed?

YES >> Perform the diagnosis that is applicable to the sensor and the door motor. Refer to <u>HAC-161.</u> <u>"DTC Index"</u>.

NO >> GO TO 5.

**5.**CHECK EACH OUTPUT DEVICE

With CONSULT

- Select "HVAC TEST" of HVAC active test item. Refer to <u>HAC-116, "CONSULT Function"</u>. NOTE:
  - Perform the ACTIVE TEST after starting the engine because the compressor is operated.
- 2. Refer to the table and check the outlet, inlet, air flow temperature, blower motor control signal, magnet clutch operation, and air mix ratio. Visually check each operating condition, by listening for noise, touching air outlets with a hand, etc.

#### **INSUFFICIENT HEATING**

## < SYMPTOM DIAGNOSIS >

#### [WITH 7 INCH DISPLAY]

				Test item			
	MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6	MODE 7
Mode door position	VENT	B/L 1	B/L 2	FOOT	D/F	DEF	_
Intake door position	REC	REC	20% FRE	FRE	FRE	FRE	_
Air mix door position	FULL COLD	FULL COLD	FULL HOT	FULL HOT	FULL HOT	FULL HOT	—
Blower fan motor control sig- nal duty ratio	37%	91%	65%	65%	65%	91%	—
Magnet clutch	ON	ON	OFF	OFF	ON	ON	_
ECV duty ratio	100%	100%	0%	0%	50%	100%	—
<ul><li>Perform the inspection o</li><li>If the MODE 7 is selected</li></ul>	of each output c d, the malfunct	levice after star tion is displayed	ting the engine	e because the c al.	compressor is o	operated.	
		Dis		V	tion		
Mode position indication		VENT	A				
<u> </u>		100%		_			
۲ ب		60%		400/			
······································		1.20/		40%			
		12%		62%		20%	
		10%		52%		38%	
\#/		_		_		100%	
		- Refer to H	AC-135 "D	iagnosis Pro	cedure"		
NO-2 >> Air inlet does NO-3 >> Discharge air NO-4 >> Blower motor NO-5 >> Magnet clutch CHECK AIR LEAKAGE the inspection result no YES >> GO TO 7. NO >> Repair or repl CHECK HEATER HOS theck the heater hose ins	not change. temperature does not op does not o FROM DU tc. of the air <u>rmal?</u> ace parts de E INSTALL/	e. Refer to HA Refer to HA e does not cl perate norma perate. Refe CT conditioning epending on ATION CON	AC-135, "D C-137, "Dia nange. Refe Illy. Refer to r to <u>HAC-14</u> system for the inspecti DITION Ily (for twists	iagnosis Pro ignosis Proc r to <u>HAC-13</u> <u>HAC-142, "</u> 6, "Diagnos air leakage. on results.	ocedure". edure". 3, "Diagnosis P Diagnosis P is Procedure is c.).	is Procedure rocedure". ≘".	<u>"</u>
NO-2 >> Air inlet does NO-3 >> Discharge air NO-4 >> Blower motor NO-5 >> Magnet clutch CHECK AIR LEAKAGE Check duct and nozzle, et the inspection result no YES >> GO TO 7. NO >> Repair or repl CHECK HEATER HOS check the heater hose ins the inspection result no YES >> GO TO 8. NO >> Repair or repl	not change. temperature does not op does not o E FROM DU tc. of the air rmal? ace parts de E INSTALL/ stallation cor rmal?	e. Refer to HA Refer to HA e does not cl perate norma perate. Refe CT conditioning epending on ATION CON ndition visual	AC-135, "D C-137, "Dia nange. Refe Illy. Refer to r to HAC-14 system for the inspecti DITION Ily (for twists	iagnosis Pro ignosis Proc r to <u>HAC-13</u> <u>HAC-142, "</u> 6, "Diagnos air leakage. on results.	ocedure". edure". 3, "Diagnosis P is Procedure	is Procedure" rocedure". ∋"	<u>"</u> .
NO-2 >> Air inlet does NO-3 >> Discharge air NO-4 >> Blower motor NO-5 >> Magnet clutch CHECK AIR LEAKAGE check duct and nozzle, et the inspection result no YES >> GO TO 7. NO >> Repair or repl CHECK HEATER HOS check the heater hose ins the inspection result no YES >> GO TO 8. NO >> Repair or repl CHECK TEMPERATUR	not change. temperature does not op does not o E FROM DU tc. of the air <u>rmal?</u> ace parts de SE INSTALL/ stallation cor <u>rmal?</u> ace parts de RE OF HEA	e. Refer to HA Refer to HA e does not cl perate norma perate. Refe CT conditioning epending on ATION CON ndition visual epending on TER HOSF	AC-135, "D C-137, "Dia nange. Refe Ily. Refer to r to HAC-14 system for the inspecti DITION Ily (for twists the inspecti	iagnosis Pro ignosis Proc r to <u>HAC-13</u> <u>HAC-142, "</u> 6, "Diagnos air leakage. on results. s, crushes, e on results.	o <u>cedure"</u> . <u>edure"</u> . <u>3, "Diagnosis P</u> <u>is Procedure</u> 	is Procedure rocedure". e".	<u>.</u> .

YES >> GO TO 9.

#### **INSUFFICIENT HEATING**

#### < SYMPTOM DIAGNOSIS >

NO >> Replace the heater core after performing the procedures after the cooling system inspection. GO TO 1.

## **9.**REPLACE HEATER CORE

Replace the heater core. Refer to <u>HA-46, "Exploded View"</u>.

#### Are symptoms solved?

- YES >> INSPECTION END
- NO >> Perform the procedures again after the cooling system inspection. GO TO 1.

< SYMPTOM DIAGNOSIS >	[WITH 7 INCH DISPLAY]
NOISE	٨
Description	INFOID:000000010842400
Symptom <ul> <li>Noise</li> <li>Noise is heard when the A/C system operates.</li> </ul>	В
Diagnosis Procedure	INFOID:000000010842401
1.CHECK OPERATION	
<ol> <li>Operate the A/C system and check the operation. Refer to <u>HAC-98</u>, "Descr</li> <li>Check the parts where noise is occurring.</li> </ol>	iption & Inspection".
<u>Can the parts where noise is occurring be checked?</u> YES-1 >> Noise from blower motor: GO TO 2. YES-2 >> Noise from compressor: GO TO 3. YES-3 >> Noise from expansion value: GO TO 4	E
YES-4 >> Noise from cooler piping (pipe, flexible hose): GO TO 6. YES-5 >> Noise from drive belt: GO TO 7. NO >> INSPECTION END	F
2.CHECK BLOWER MOTOR	G
<ol> <li>Remove blower motor.</li> <li>Remove foreign materials that are in the blower unit.</li> <li>Check the noise from blower motor again.</li> <li>Is the inspection result pormal?</li> </ol>	Н
YES >> INSPECTION END NO >> Replace blower motor.	НА
3. CHECK COMPRESSOR	
Perform trouble diagnosis for the compressor and check the compressor. Refer <u>Is the inspection result normal?</u> YES >> INSPECTION END	to <u>HA-9, "Symptom Table"</u> . J
NO >> Refill the refrigerant or replace the compressor depending on the in $4$ CHECK WITH CALLEE RESSURE	spection results.
Perform the diagnosis with the gauge pressure. Refer to HA-7. "Trouble Diagno	sis For Unusual Pressure".
Is the inspection result normal? YES >> GO TO 5.	
5. CHECK EXPANSION VALVE	M
<ol> <li>Correct the refrigerant with recovery/recycling recharging equipment.</li> <li>Recharge with the proper amount of the collected refrigerant after recycling</li> <li>Check for the noise from expansion valve again.</li> </ol>	or new refrigerant.
Are the malfunction solved? YES >> INSPECTION END	0
6.CHECK COOLER PIPING (PIPE, FLEXIBLE HOSE)	_
<ol> <li>Check the cooler piping (pipes, flexible hoses) (for deformation and damage</li> <li>Check the installation condition of clips and brackets, etc. of the cooler pipir</li> </ol>	e, etc.). ng (pipes, flexible hoses).
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; Fix the line with rubber or come vibration absorbing material.</li> <li>NO &gt;&gt; Repair or replace parts depending on the inspection results.</li> </ul>	
7.CHECK DRIVE BELT	

#### < SYMPTOM DIAGNOSIS >

Check tension of the drive belt. Refer to EM-18, "Checking".

Is the inspection result normal?

- YES
- >> Check the noise from the compressor: GO TO 3. >> Adjust or replace drive belt depending on the inspection results. NO

## MEMORY FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS > [WITH 7 INCH DISP	LAY]
MEMORY FUNCTION DOES NOT OPERATE	
Description	A)010842402
<ul><li>Symptom</li><li>Memory function does not operate normally.</li><li>The setting is not maintained. (It returns to the initial condition.)</li></ul>	В
Diagnosis Procedure	C 0010842403
1.CHECK OPERATION	D
<ol> <li>Turn the ignition switch ON.</li> <li>Set temperature control dial to 32.0°C (90°F).</li> <li>Press the OFF switch.</li> <li>Turn the ignition switch OFF.</li> <li>Turn the ignition switch ON.</li> </ol>	E
<ul> <li>6. Press the AUTO switch.</li> <li>7. Check that the set temperature is maintained.</li> <li><u>Is the inspection result normal?</u></li> </ul>	F
YES $\rightarrow$ INSPECTION END NO $\rightarrow$ GO TO 2. 2.CHECK POWER SUPPLY AND GROUND CIRCUIT OF A/C AUTO AMP.	G
Check power supply and ground circuit of the A/C auto amp. Refer to <u>HAC-138</u> , "A/C AUTO AMP. : Diag <u>Procedure"</u> .	<u>inosis</u> <sub>H</sub>
Is the inspection result normal?         YES       >> Replace the A/C auto amp.         NO       >> Repair or replace malfunctioning parts.	HA
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# < PRECAUTION > PRECAUTION PRECAUTIONS EXCEPT FOR MEXICO

#### EXCEPT FOR MEXICO : Precautions 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 "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

#### WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".
- Never 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:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

#### EXCEPT FOR MEXICO : Precautions Necessary for Steering Wheel Rotation After

Battery Disconnection

INFOID:000000010842405

#### CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- Before removing and installing any control units, first turn the ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

#### **OPERATION PROCEDURE**

1. Connect both battery cables.

Supply power using jumper cables if battery is discharged.

2. Turn the ignition switch to ACC position. (At this time, the steering lock will be released.)

## PRECAUTIONS

#### < PRECAUTION >

#### [WITH 7 INCH DISPLAY]

INFOID:000000010842406

- Disconnect both battery cables. The steering lock will remain released with both battery cables discon-3 nected and the steering wheel can be turned.
- 4 Perform the necessary repair operation.
- 5 When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock В when the ignition switch is turned to LOCK position.)
- Perform self-diagnosis check of all control units using CONSULT.

#### EXCEPT FOR MEXICO : Precaution for Battery Service

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the D window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

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#### FOR MEXICO : Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" INFOID:000000010842407

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. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

#### WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Ser-J vice 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:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- . When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

FOR MEXICO : Precautions Necessary for Steering Wheel Rotation After Battery Dis-Ν connection

#### INFOID:000000010842408

#### **CAUTION:**

Comply with the following cautions to prevent any error and malfunction.

- Before removing and installing any control units, first turn the ignition switch to the LOCK position, then disconnect both battery cables.
- Ρ After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

#### **HAC-173**

INFOID:000000010842409

#### OPERATION PROCEDURE

- Connect both battery cables.
   NOTE: Supply power using jumper cables if battery is discharged.
- 2. Turn the ignition switch to ACC position. (At this time, the steering lock will be released.)
- 3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
- 4. Perform the necessary repair operation.
- 5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
- 6. Perform self-diagnosis check of all control units using CONSULT.

## FOR MEXICO : Precaution for Battery Service

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

## < REMOVAL AND INSTALLATION > **REMOVAL AND INSTALLATION** PRESET SWITCH

**Exploded View** 

DISASSEMBLY



#### REMOVAL

Remove preset switch. Refer to AV-224, "Exploded View".

#### **INSTALLATION**

Install in the reverse order of removal.

[WITH 7 INCH DISPLAY]

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## A/C AUTO AMP.

## **Exploded View**

DISASSEMBLY

INFOID:000000010842412



1. AV control unit

2. Bracket LH

3. A/C auto amp.

4. Bracket RH

#### **Removal and Installation**

REMOVAL

- 1. Remove AV control unit. Refer to AV-211, "Exploded View".
- 2. Remove fixing screws (A), and then remove A/C auto amp. (1).



INSTALLATION Install in the reverse order of removal.

[WITH 7 INCH DISPLAY]

INFOID:000000010842413

#### [WITH 7 INCH DISPLAY]

#### < REMOVAL AND INSTALLATION >

## AMBIENT SENSOR

#### **Exploded View**

1. Ambient sensor



#### Removal and Installation

INFOID:000000010842415

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#### REMOVAL

- 1. Remove engine under cover. Refer to EXT-41, "ENGINE UNDER COVER : Exploded View".
- 2. Disconnect ambient sensor connector, and then remove ambient sensor (1) from bracket.



INSTALLATION Install in the reverse order of removal.

## **IN-VEHICLE SENSOR**

#### **Exploded View**

INFOID:000000010842416



- 1. In-vehicle sensor
- 2. Instrument lower panel LH

#### Removal and Installation

#### REMOVAL

- 1. Remove instrument lower panel LH. Refer to <u>IP-13, "Exploded View"</u>.
- 2. Remove fixing screw (A), and then remove in-vehicle sensor (1).



INSTALLATION Install in the reverse order of removal. INFOID:000000010842417

## SUNLOAD SENSOR

## Exploded View

1. Sunload sensor



#### Removal and Installation

# REMOVAL Disconnect sunload sensor connector, and then remove sunload sensor.

#### INSTALLATION

Install in the reverse order of removal.

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INFOID:000000010842418

Revision: 2014 September

## INTAKE SENSOR

**Exploded View** 

INFOID:000000010842420

[WITH 7 INCH DISPLAY]



1. Heater & cooling unit assembly
-----------------------------------

4. Evaporator

- 5. O-ring
- 7. Evaporator cover
- 10. Cooler pipe grommet
- 13. O-ring

- 8. Air mix door motor
- 11. High-pressure evaporator pipe

Intake sensor bracket

3.

6.

9.

Intake sensor

12. Expansion valve

Low-pressure evaporator pipe

O-ring

14. O-ring

2.

Refer to GI-4, "Components" for symbols in the figure.

## Removal and Installation

INFOID:000000010842421

#### REMOVAL

- 1. Remove high-pressure evaporator pipe and low-pressure evaporator pipe. Refer to <u>HA-51, "Exploded</u> <u>View"</u>.
- 2. Disconnect intake sensor connector.
- 3. Slide evaporator (1) toward the right side of the vehicle (as shown in the figure), and then remove intake sensor (2).



#### INSTALLATION

Note the following items, and then install in the reverse order of removal.

#### HAC-180
#### < REMOVAL AND INSTALLATION >

#### CAUTION:

- Replace O-rings with new ones. Then apply the compressor oil to them when installing.
- Mark the mounting position of intake sensor bracket prior to removal so that the reinstalled sensor can be located in the same position.
- Never rotate the bracket insertion part when removing and installing the intake sensor.
- Check for leakages when recharging refrigerant. Refer to <u>HA-24, "Leak Test"</u>.

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## < REMOVAL AND INSTALLATION >

# REFRIGERANT PRESSURE SENSOR

Exploded View

INFOID:000000010842422

[WITH 7 INCH DISPLAY]



Refer to <u>GI-4, "Components"</u> for symbols in the figure.

# Removal and Installation

## REMOVAL

- 1. Remove liquid tank. Refer to <u>HA-42, "Exploded View"</u>.
- 2. Fix the liquid tank (1) using a vise (A). Remove the refrigerant pressure sensor (2) using a wrench (B). CAUTION:

Be careful not to damage liquid tank.



## INSTALLATION

Note the following items, and then install in the reverse order of removal. **CAUTION:** 

- Replace O-ring with new one. Then apply compressor oil to them when installing.
- Check for leakages when recharging refrigerant. Refer to HA-24, "Leak Test".

INFOID:000000010842423

# < REMOVAL AND INSTALLATION > DOOR MOTOR

# Exploded View

INFOID:000000010842424

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[WITH 7 INCH DISPLAY]



## REMOVAL

- 1. Remove instrument lower panel RH. Refer to IP-13, "Exploded View".
- 2. Remove ECM.

Revision: 2014 September

- 3. Disconnect intake door motor connector.
- 4. Remove fixing screws (A), and then remove intake door motor (1).



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### < REMOVAL AND INSTALLATION >

INSTALLATION Install in the reverse order of removal. MODE DOOR MOTOR

## MODE DOOR MOTOR : Removal and Installation

## REMOVAL

- 1. Remove blower unit assembly. Refer to <u>VTL-13</u>, "Exploded View".
- 2. Disconnect mode door motor connector.
- 3. Remove fixing screws (A), and then remove mode door motor (1).



INSTALLATION Install in the reverse order of removal. AIR MIX DOOR MOTOR

# AIR MIX DOOR MOTOR : Removal and Installation

INFOID:000000010842427

## REMOVAL

1. Set the temperature at full cold. CAUTION: The angle may be out, when inst

The angle may be out, when installing the air mix door motor to the air mix door, unless the above procedure is performed.

- 2. Disconnect the battery cable from the negative terminal.
- 3. Remove instrument lower panel RH. Refer to IP-13, "Exploded View".
- 4. Disconnect air mix door motor connector.
- 5. Remove fixing screws (A), and then remove air mix door motor (1).



INSTALLATION Install in the reverse order of removal.

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INFOID:000000010842426