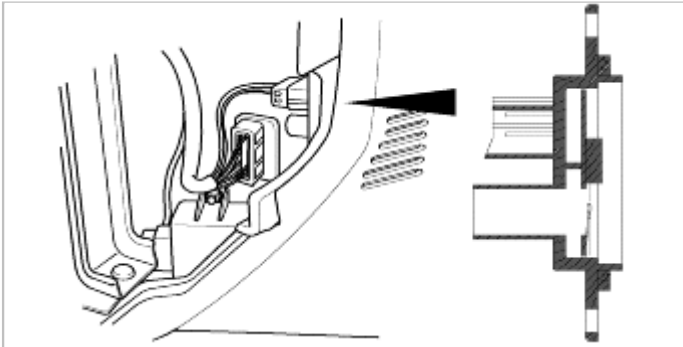
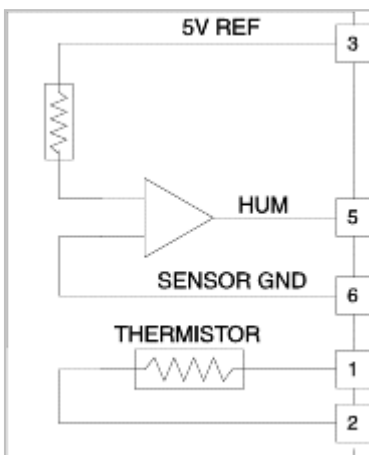


INSPECTION

In-car air temperature sensor is located at crash pad. It is installed with humidity sensor.



It will detect interior temperature, which will be used for discharge temperature control, sensor failsafe, temperature door control, blower motor level control, A/C auto control.

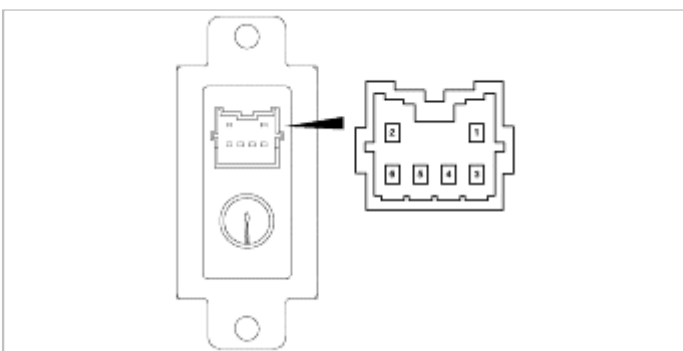


Check resistance of the sensor

Temperature [°C(°F)]	Resistance between 1 and 2 ($\Omega \pm 3\%$)
18 (64.4)	3403
21 (69.8)	2976
25 (77.0)	2500
28 (82.4)	2199
32 (89.6)	1862

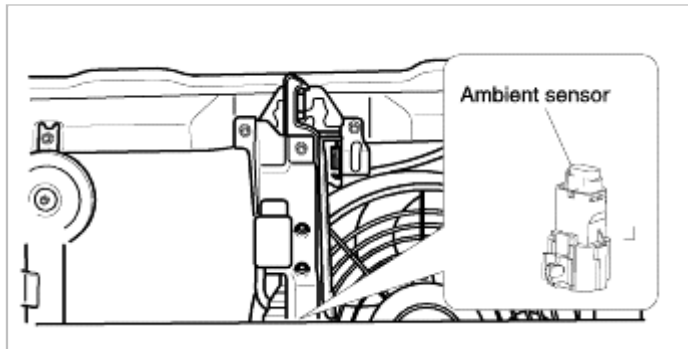
NOTE

Negative type thermistor, that resistance will rise with lower temperature, and reduce with higher temperature.

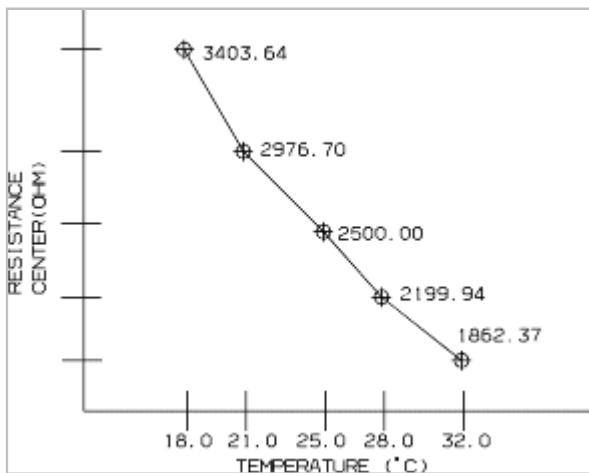


DESCRIPTION

1. The air temperature sensor is located at the front of the engine radiator and detects ambient air temperature. It is a negative type thermistor; resistance will increase with lower temperature, and decrease with higher temperatures.

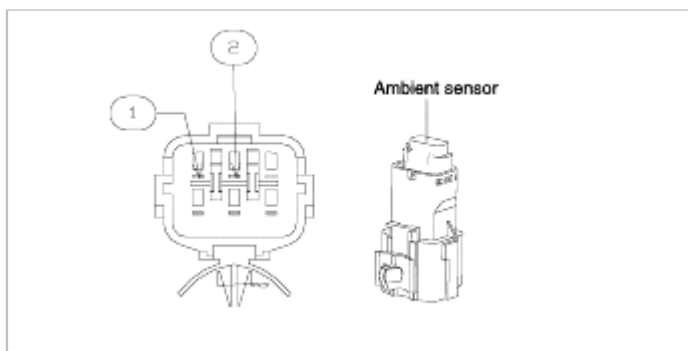


2. The sensor output will be used for discharge temperature sensor, sensor fail-safe, temperature regulation door control, blower motor level control, mix mode control and in-car humidity control.

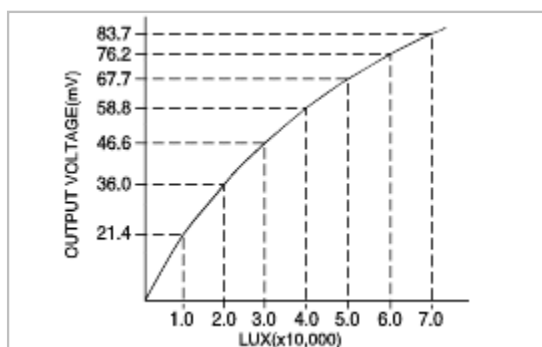


CHECK

Temperature [°C(F°)]	Resistance between 1 and 2 ($\Omega \pm 3\%$)
18 (64.4)	3403
21 (69.8)	2976
25 (77.0)	2500
28 (82.4)	2199
32 (89.6)	1862

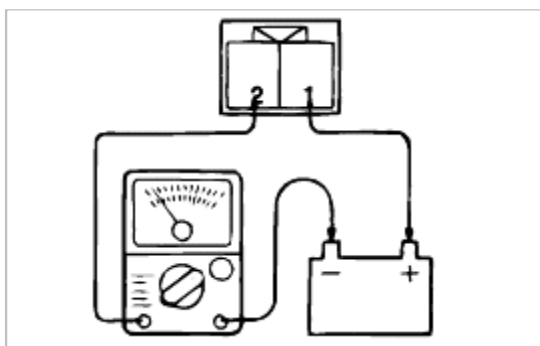


DESCRIPTION



NOTE

Emit intensive light toward driver side and passenger side using a lamp, and check the voltage change between terminals 1 & 2.



SWITCH OPERATION AND FEATURES

1. Full auto air conditioning system: One-touch button type.
2. Manual air conditioning system: Combination of dial switch and one-touch button.

CONTROL PANEL SWITCHES WILL GENERATE BUZZER SOUND ON OPERATION

Button	Function	Display	System operation	Replacing switch and system operation
TEMP	Setting temp.	<ul style="list-style-type: none"> • Setting temperature indication(17°C → 32°C Scale: 0.5°C) • (62°F → 90°F Scale: 1°F) • User may chose the temperature indication between °C/°F. • 17°C=62°F • 32°C=90°F • 25°C=77°F • °C / °F transfer press the temp down button for 3 seconds during pressing AMB button. 	<ol style="list-style-type: none"> 1. The switch will operate temperature door to regulate cool/warm air ratio and resultingly control discharge air control. 2. The switch will raise up or lower down the temperature by unit of 0.5. 3. Setting at 17°C (62°F) will provide max. cooling, and setting at 32°C (90°F) will provide max. heating. 4. Switching off→on, it will be displayed the temperature setting just before the previous switching-off. 5. In shifting 17.5°C (63°F) → 17°C (62°F) or 31.5°C (89°F) → 32°C (90°F), raising temperature setting will generate buzzer sound 3 times at interval of 0.1seconds. 6. Lowering temperature setting at 17°C (62°F) or raising 	<ul style="list-style-type: none"> • When the switch is off, the system will be off. • When the temp. s/w is on, the setting temperature will be up/down.

			<p>temperature setting at 32°C (90°F), it will generate buzzer sound 3 times at interval of 0.1 sec.</p> <p>7. Pressing repeatedly on: Shift one unit every 0.7 second. Holding down: First shift in 0.7 seconds and then shift every 0.3 seconds (buzzer sound for 0.1 second upon each shift)</p>	
AUTO (Auto control)	Auto control of air conditioning system	"AUTO" will be displayed on control panel.	<ol style="list-style-type: none"> The system will provide auto control of the below features on the basis of temperature setting: <ul style="list-style-type: none"> Temperature door Mode door Intake door (Shift between fresh air/recirculation) Blower speed Compressor. "AUTO" will be disappeared upon releasing AUTO switch. Features except manually selected switches will be controlled automatically upon releasing auto switch. 	<ul style="list-style-type: none"> Off→System Off Blower switch : Manually control blower MODE : Manually control discharge mode A/C : Manually control compressor on/off. Fresh air : Manually control fresh air Recirculation : Manually control recirculation Defroster : Manually control defroster (when air conditioning system is on and recirculation selected)
AMB	Indicate ambient air temperature	<ul style="list-style-type: none"> "AMB" lamp will be indicated. Ambient air temperature indication. Other lamps will go out. 	<ol style="list-style-type: none"> Pressing AMB switch, any previous indication will go out and "AMB" lamp and ambient air 	<ul style="list-style-type: none"> AMB: Pressing the AMB switch when ambient air temperature is indicated, ambient air temperature

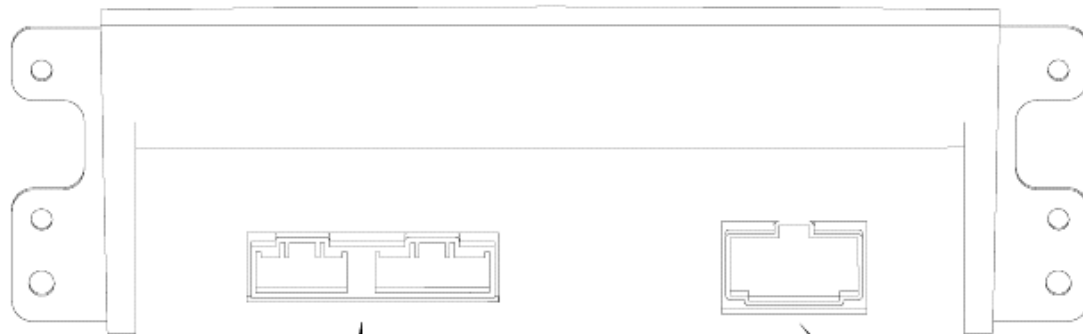
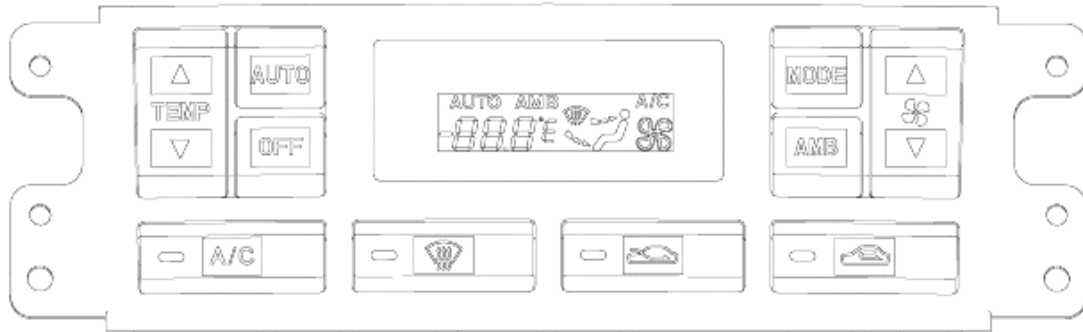
			temperature will come on 5 seconds, and then it will return to the previous indication just before pressing AMB switch.	indication will be extinguished. <ul style="list-style-type: none"> • Other switches: Pressing another switch when the ambient air temperature is indicated, ambient air temperature indication will be extinguished and selected.
INTAKE	Recirculation	<ul style="list-style-type: none"> • Recirculation lamp will come on. • "AUTO" lamp will go out. 	Fix intake door at the circulation position.	<ul style="list-style-type: none"> • INTAKE : REC. Control • OFF S/W : FRE. Fix • AUTO : Auto Control
	Fresh air	<ul style="list-style-type: none"> • Fresh air lamp will come on. • "AUTO" lamp will go out. 	Fix intake door at the fresh air position.	
Blower fan speed UP/DOWN	Blower fan speed, UP/DOWN control	Fan indication : on/off	<ol style="list-style-type: none"> 1. The speed will shift up/down based on the current fan level. 2. Switching on a switch except fan switch at "off" condition, the speed will rise steadily from LOW to the target speed. (Require 6 seconds from LOW to HI). 3. Shifting a step will take 0.7 seconds when pressing the switch once. Holding on the switch, a shift will occur every 0.3 seconds and buzzer sounds for 0.1 second. 4. Pressing UP switch at HI position or DOWN switch at LOW position, buzzer sound will 	<ul style="list-style-type: none"> • AUTO: Auto control • OFF : System off • Fan speed control: Manually control blower fan speed.
	Output increment step by step			
	Fan speed levels and voltages - Auto cooling : No level(4.5V~B+) - Auto heating: No level(4.5V~B+) - Manual control : 6 levels (4.0V~B+)			

			occur 5 times at 0.15 second interval.	
A/C Air conditioning switch	Compressor on/off control	<ul style="list-style-type: none"> • A/C lamp (on/off) • AUTO lamp off 	Airconditioning on/off	<ul style="list-style-type: none"> • A/C: A/C on/off, manual control. • OFF: System off. • AUTO: Auto control. • DEF: Defroster, manual control.
MODE (Discharge mode)	Mode door control VENT, FLOOR, B/L, MIX	MODE indication (on/off) AUTO lamp off	<ol style="list-style-type: none"> 1. Fix mode door at B/L or MIX 2. Manual operating mode switch, the switch will shift in the order of VENT-B/L-FLOOR-MIX 	<ul style="list-style-type: none"> • MODE: Shift control in order of Vent-B/L-Floor-Mix-Vent. • DEF: Defroster, manual control. • AUTO: Auto control
DEF (Defroster) <ul style="list-style-type: none"> • Remove moisture/frost on windshield. 	DEF control	<ul style="list-style-type: none"> • DEF indicator lamp on • DEF indication on • A/C lamp on • INTAKE indicator lamp off • AUTO indicator lamp off 	<ol style="list-style-type: none"> 1. Mode door: Fixed at defroster. 2. Intake door: Fresh air control (Selecting recirculation is enabled). 3. A/C: on (Compressor will be controlled on/off based on detected ambient temperature). 4. Prevails over max. cooling and max. heating. 5. Prevails over mix mode control 	<ul style="list-style-type: none"> • AUTO: System auto control. • MODE: Discharge mode, manual control (release the defroster control). • A/C: A/C on/off, manual control • DEF: Return to the previous condition before selecting DEF switch.
OFF	Blower off	<ul style="list-style-type: none"> • VFD on • Indicator lamps on 	<ol style="list-style-type: none"> 1. Blower fan speed off. 2. Compressor off. 3. Intake door: Fixed at the fresh. 4. Temperature door: Auto control. 5. Mode door : Auto control 6. AMB : Pressing AMB switch after system off, "AMB" 	<ul style="list-style-type: none"> • AUTO: Auto control. • Blower speed: Return to MANUAL LOW. • Others: Return to the previous condition before system off
				<ul style="list-style-type: none"> • A/C: Airconditioning on. • Others: Return to

			<p>lamp/ambient air temperature will come on for 5 seconds and then go out.</p>	<p>the previous condition before system off.</p>
		<ul style="list-style-type: none"> • INTAKE(recirculation/fresh air) control at the system off condition <ol style="list-style-type: none"> 1. Selecting the fresh air switch at the recirculation position after system off : It will shift to the fresh air position and turn on the fresh indicator lamp. The VFD will be held on. 2. Selecting the recirculation switch at the fresh air position after system off : It will shift to the recirculation position and turn on the recirculation indicator lamp. The VFD will be held on. 3. Other switches will be held off at the above condition. 	<ul style="list-style-type: none"> • MODE: Hold at the previous condition before system off. (Auto control is released). • Others: Return to the previous condition before system off. 	
				<ul style="list-style-type: none"> • DEF: Shift to defroster mode • A/C : Air conditioning on • Intake : Fresh air • Others: Return to the previous condition before system off
				<ul style="list-style-type: none"> • TEMP: Auto control. • Others: Return to the previous condition before system off.

FULL AUTOMATIC AIR CONDITIONER (FATC)

CONTROL RANEL



B1	B2	B3	B4	B5	B6	B7	B8	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
B9	B10	B11	B12	B13	B14	B15	B16	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20

C1	C2	C3	C4
C5	C6	C7	C8

Connector Pin Description

Item	PIN NO.	PIN Name	Item	PIN NO.	PIN Name
Main Connector (A)	A1	IG1 (METER 10A)	Main Connector (B)	B1	MAX HI RELAY
	A2	MODE BI/L		B2	CHECKER COUPLER (OPEN)
	A3	MODE D/H		B3	N.C
	A4	A/C SELECT HIGH		B4	N.C

A5	MIX PBR	Main Connector (C)	B5	N.C
A6	MIX HOT		B6	AQS SENSOR
A7	SENSOR GND		B7	AMB SENSOR
A8	INTAKE FRE		B8	BATT
A9	-		B9	BLOWER MOTOR FEEDBACK
A10	ILL-		B10	P/TR-BASE
A11	GND		B11	N.C
A12	MODE VENT		B12	N.C
A13	MODE HEAT		B13	N.C
A14	MODE DEF		B14	HUMIDITY SENSOR
A15	A/C THERMO HIGH		B15	INCAR SENSOR
A16	MIX COOL		B16	SUN SENSOR
A17	DUCT SENSOR		C1	N.C
A18	VCC (5V) : SENSOR		C2	N.C
A19	INTAKE REC		C3	N.C
A20	ILL+		C4	N.C
			C5	N.C
			C6	N.C
			C7	N.C
			C8	N.C

DEFROST LOGIC

1. Defrost logic

Mode	A/C output	A/C indicator	Intake
Vent, B/L, Floor	Previous	Previous	Fresh (Except auto)
Mix, Defrost	ON	Previous	Previous

NOTE

- At initial the battery on, the A/C is off and the intake is changed to fresh status.
- At blower switch off, the intake is changed to fresh status.
- The A/C button enables to change the A/C button indicator status, but A/C output is always on at defrost and mix mode.

2. Dissolution & Reinstatement of logic

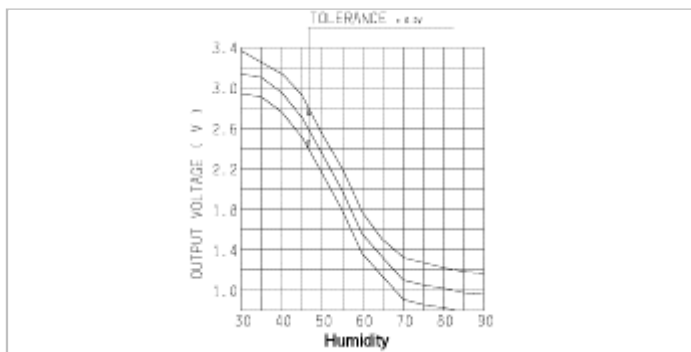
- (1) Turn off the blower switch
- (2) Move to defrost mode
- (3) Press the recirculation button 5 times within 3 seconds. On keeping A/C button selected.
- (4) Indicator of recirculation button is flashed 3 times
- (5) Dissolution & reinstatement of logic is completed.
- (6) A/C and intake status is initialized to "A/C off" and "fresh status"

NOTE

When the battery happens to be disconnected or discharged, the logic is reinstated.

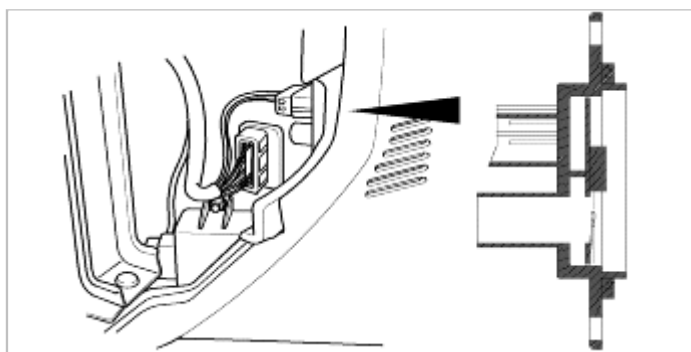
HUMIDITY SENSOR

1. Humidity sensor is located at crush pad and detected in-car humidity for in-car humidity control.



2. If ambient air temperature or in-car humidity is outside certain range, it will turn on A/C to control in-car humidity preventing in-car fogging.

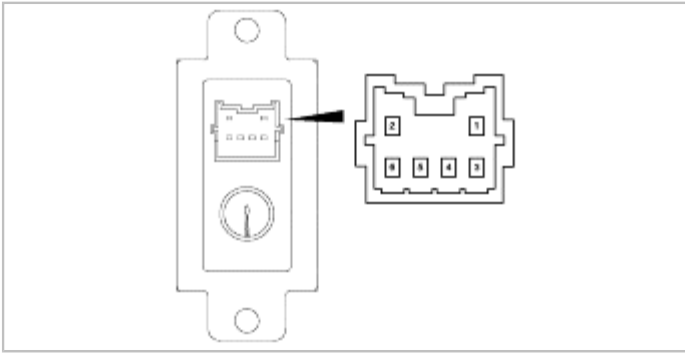
Air conditioner operation depending on ambient temperature and humidity.



SENSOR OUTPUT

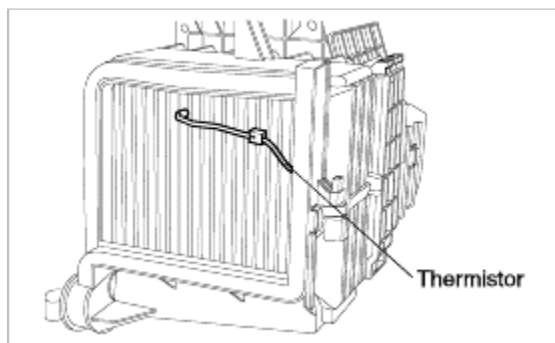
Tolerance : 2%

Humidity (%)	Voltage between 5 and 6(V)
30	3.13
35	3.07
40	2.94
45	2.67
50	2.35
55	2.01
60	1.54
65	1.29
70	1.12
75	1.05
80	1.01
85	0.98
90	0.94



SENSOR CHECKING

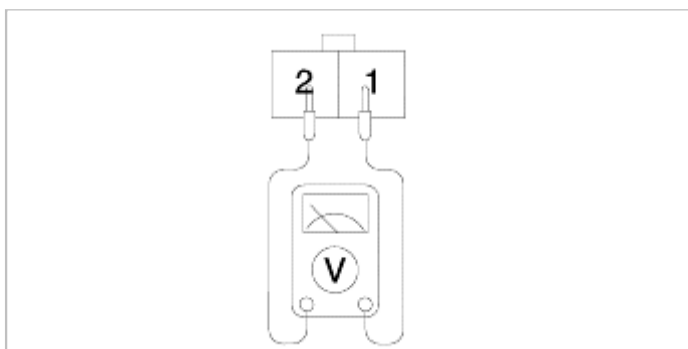
The thermistor is an NTC device.



Thermistor check

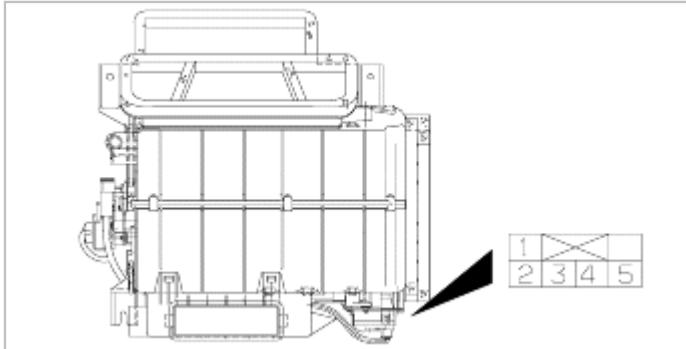
1. Remove the glove box.
2. Start the engine.
3. Turn on the air conditioner.
4. Using the multi-tester, check the output voltage between terminals 1 and 2 in the thermistor.

Thermistor	Operating temperature	Output voltage
ON	37.4 ±32.5°F (3.0±0.3°C)	12V
OFF	32.9 ±32.5°F (0.5±0.3°C)	0V



INSPECTION

1. Temperature control actuator is installed in the heater unit case. The control switches and the vent duct switch will operate actuator to regulate the temperature and discharge air.

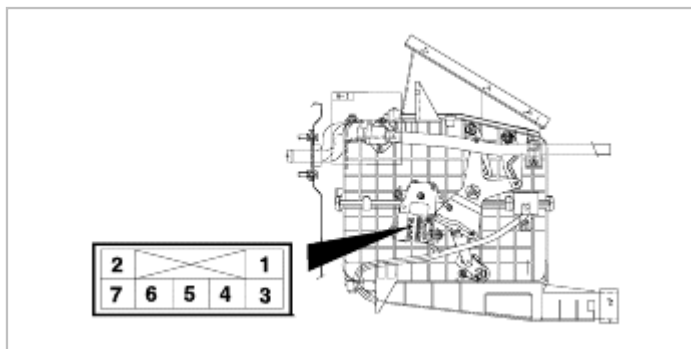


2. Verify that the temp actuator operates to the warm position when connecting 12V to the terminal 1 and grounding terminal 2.
3. Verify that the temp actuator operates to the cool position when connecting in the reverse.
4. Temp. switch terminal voltage check.

Terminal	Voltage	Remark
1	12V (+,-)	Change Polarity
2	12V (+,-)	Change Polarity
3	5V	Sensor Voltage
4	Change with resistance	Variable Resistance
5	Ground	Ground

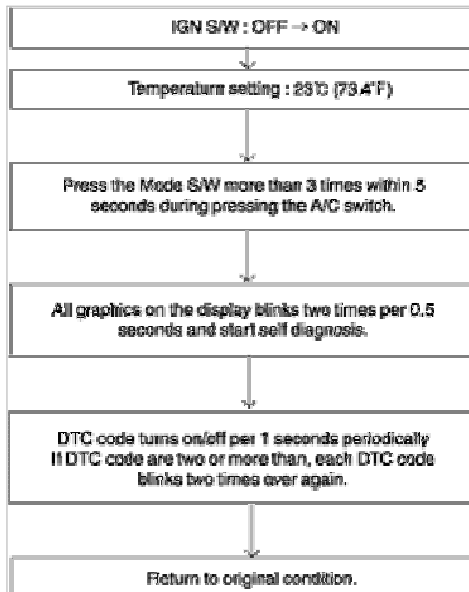
INSPECTION

1. Apply 12V to mode actuator terminal 2 and ground terminal 1.
2. Verify that the mode actuator operates as below when grounding terminals 7, 6, 5, 4 and 3 in sequence.
VENT → BI/LEVEL → HEAT → D/F → DEF



SORENTO(BL) >2006 > G 3.5 DOHC > Heating,Ventilation, Air Conditioning
DIAGNOSIS SYSTEM
OPERATION METHOD (SELF-DIAGNOSIS)

The F.A.T.C. module self test feature will detect electrical malfunction and provide error codes for system components with suspected failures.


FAIL SAFE FUNCTION

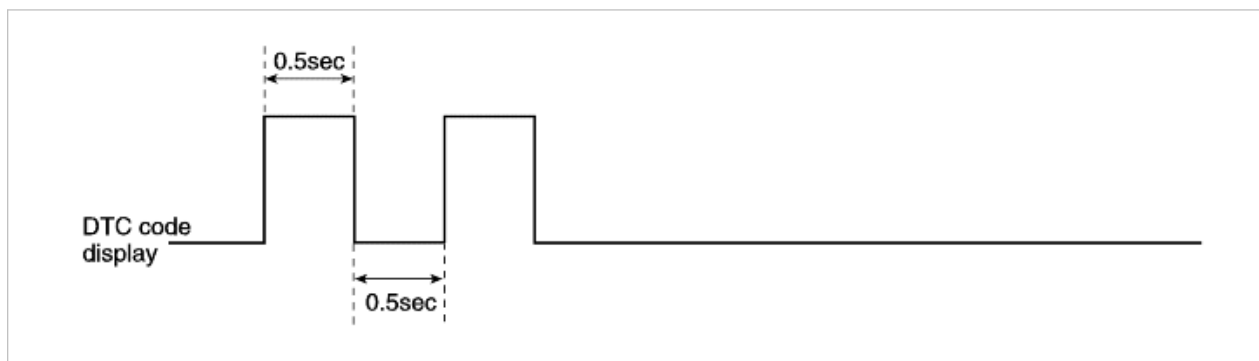
No.	Item	Failure	FAIL SAFE Function
E1	In-car temperature sensor	Open/Short	25°C (77°F) alternate value control
E2	Ambient temperature sensor	Open/Short	25°C (77°F) alternate value control
E3	Thermistor		-2°C (28.4°F) alternate value control
E5	Photo sensor (Sun sensor)	Open/Short	-
E6	Temperature door potentiometer	Open/Short setup temperature	For 17°C (62°F) to 24.5°C (76°F), Set to maximum cooling position. For 25°C (77°F) to 32°C (90°F), Set to maximum heating position.

HOW TO READ SELF-DIAGNOSTIC CODE

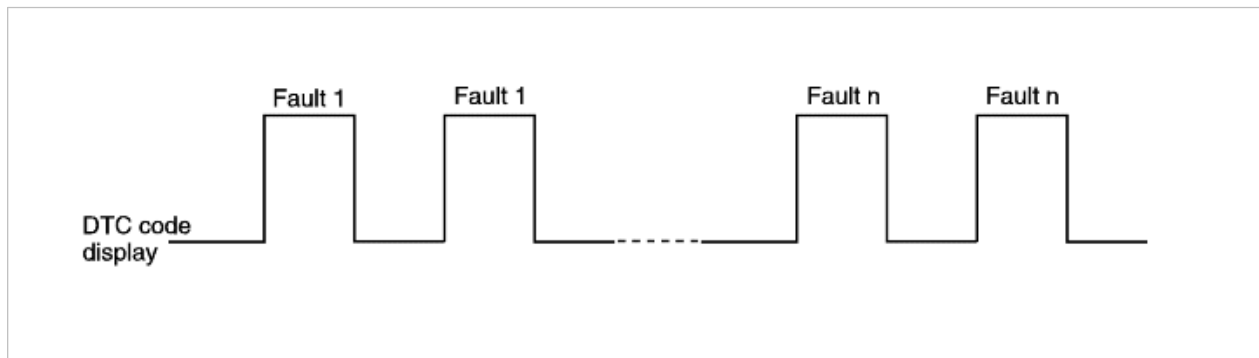
- After the display panel flickers three times every 0.5 second, the corresponding error code flickers on the setup temperature display panel every 0.5 second and will show two figures.
- If error code is more than two, each code flickers 2 times in sequence.

FAULT CODE DISPLAY

- DTC code is one



2. DTC code is more than two



DTC CHART

1. Set the temp door at the center position and turn off the A/C system during the DTC check.
2. If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below.

DTC code	Detection item	Trouble area
E0	Normal	-
E1	Open/Shorted incar sensor circuit.	<ul style="list-style-type: none"> • Incar sensor • Harness or connector between incar sensor and A/C control assembly • A/C control assembly
E2	Open/Shorted Ambient sensor circuit.	<ul style="list-style-type: none"> • Ambient sensor • Harness or connector between ambient sensor and A/C control assembly. • A/C control assembly.
E3	Open/Shorted Thermistor sensor.	<ul style="list-style-type: none"> • Thermistor sensor • Harness or connector between evap. sensor and A/C control assembly • A/C control assembly
E5	Open/Shorted photo sensor.	<ul style="list-style-type: none"> • Photo sensor • Harness or connector between photo sensor and A/C control assembly. • A/C control assembly.
E6	Open or shorted temp. door potentiometer. Defective temp. door potentiometer.	<ul style="list-style-type: none"> • Harness or connector between temp. door potentiometer and A/C control assembly • Temp. door potentiometer