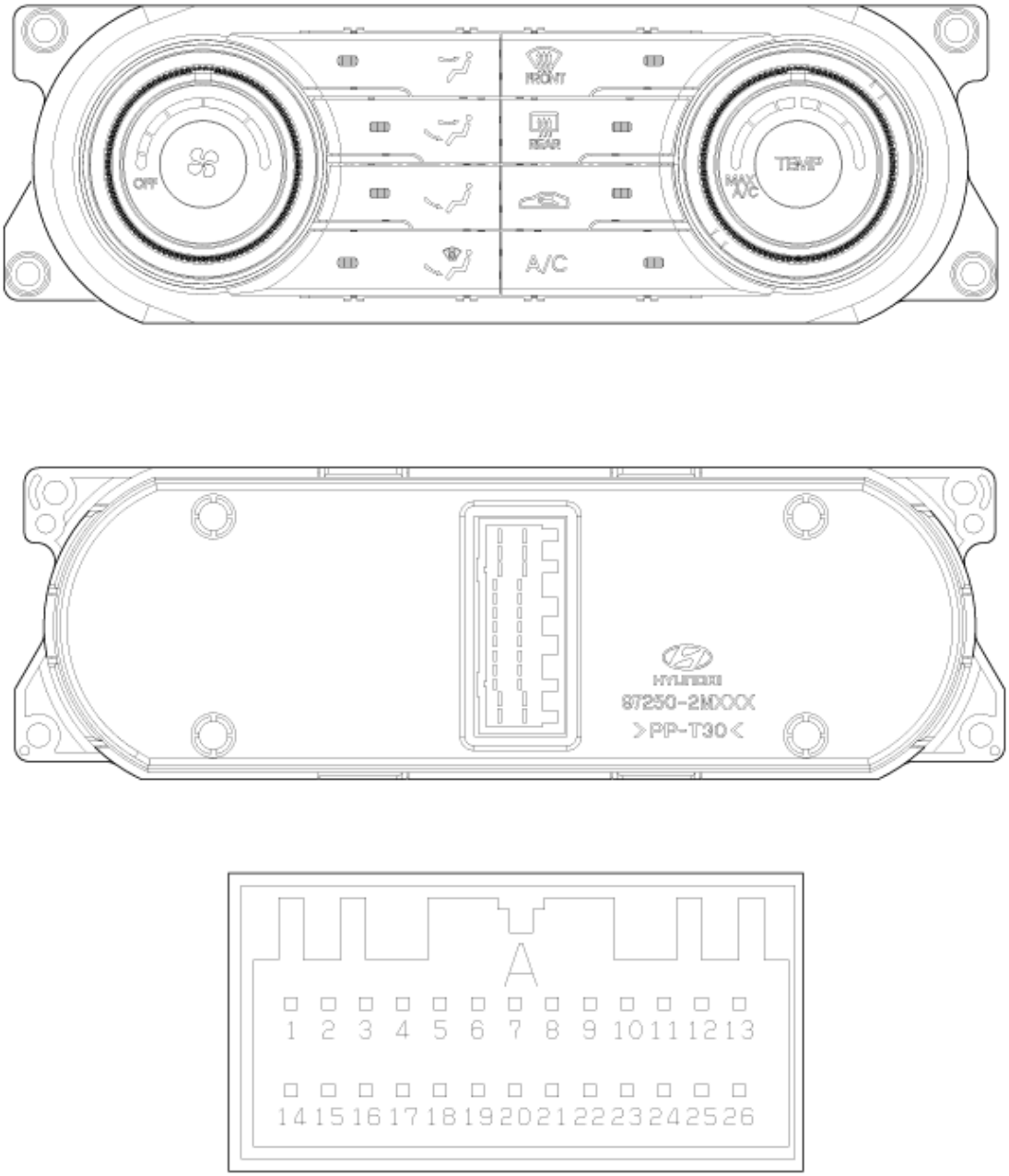
Component



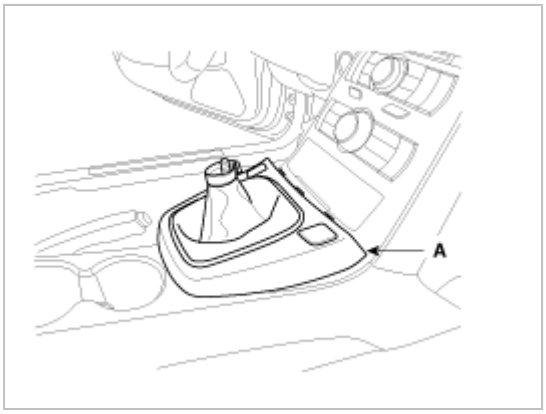
Connector Pin Function

Connector	Pin no.	Function
Connector(A)	1	Battery
	2	Tail lamp (ILL+)
	3	IGN2
	4	Power mosfet (gate)
	5	Mode actuator(Vent)
	6	Mode actuator(Def)

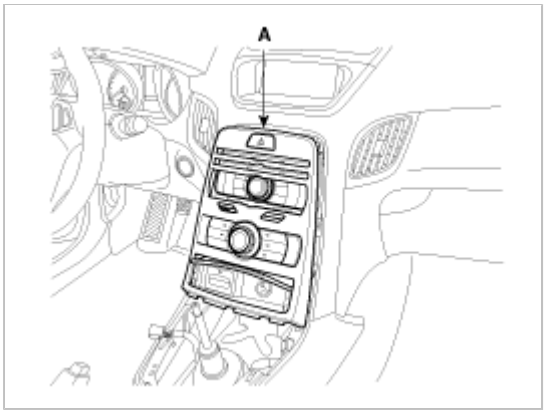
	7	Temp actuator(Cool)
	8	Temp actuator(Warm)
	9	Intake actuator(Fre)
	10	Intake actuator(Rec)
	11	N,C
	12	Rheostat (ILL-)
	13	N,C
	14	Vref(5V)
	15	Blower motor(+)
	16	Power mosfet(Drain)
	17	Mode actuator F/B
	18	Temp actuator F/B
	19	Intake actuator F/B
	20	Evaporator sensor (+)
	21	A/C select(High)
	22	A/C Output(HigH)
	23	RR Def switch
	24	RR Def indicator
	25	GND
	26	Sensor GND

Replacement

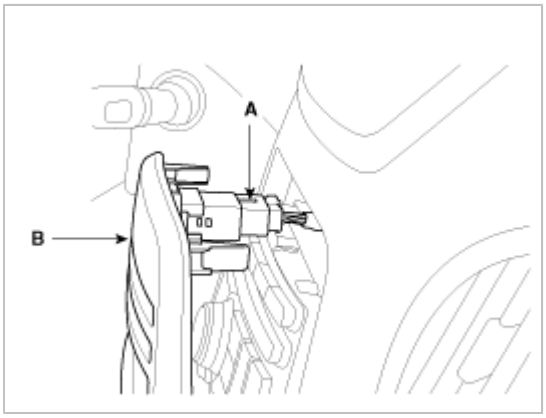
1. Disconnect the negative (-) battery terminal.
2. Remove the console upper cover(A).

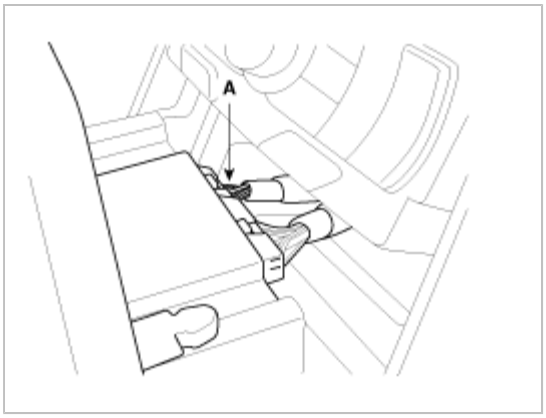


3. Remove the center facia pannel (A).

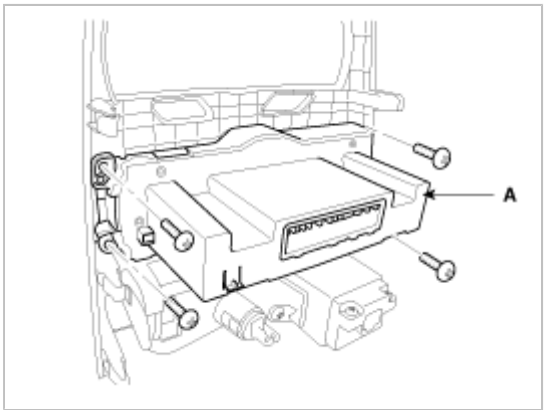


4. Disconnect the connector(A) and then remove the center facia pane (B)l.





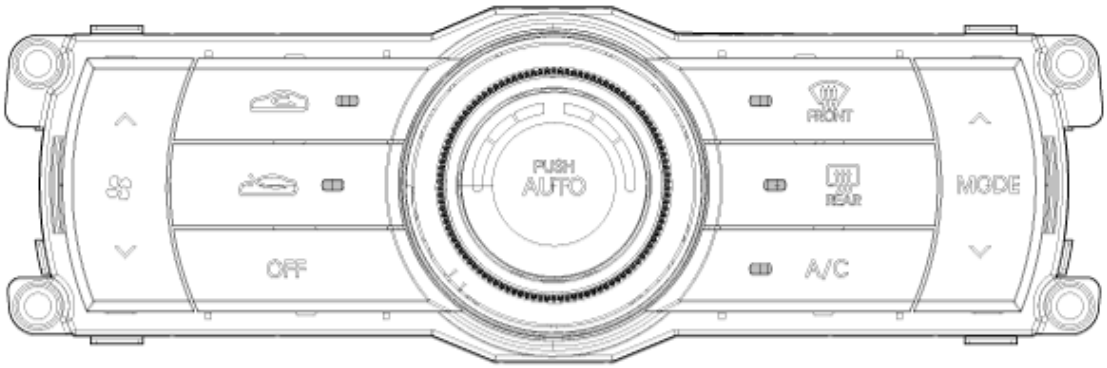
5. Remove the heater &A/C controller (A) from center facia panel.

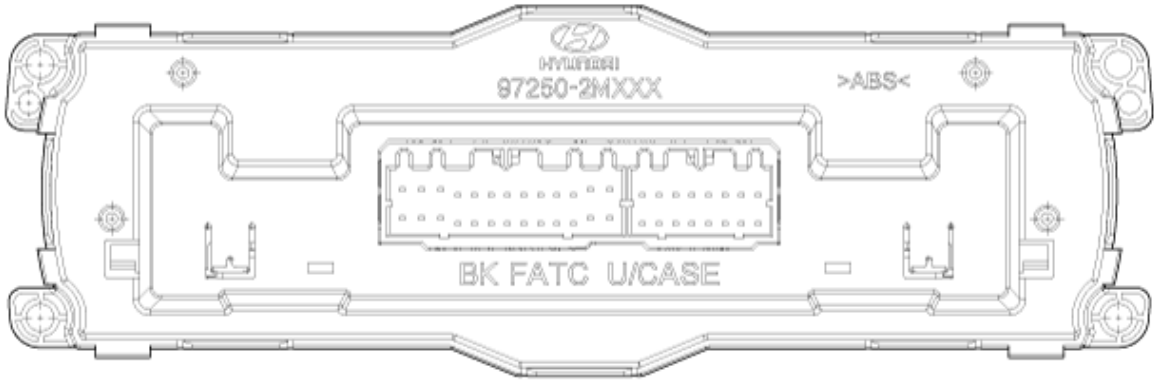


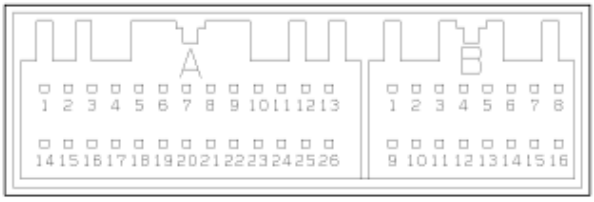
6. Installation is the reverse order of removal.

GENESIS COUPE(BK) >2010 > G 2.0 DOHC > Heating,Ventilation, Air Conditioning > Controller > Heater & A/C Control Unit(Full Automatic) > Components and Components Location

Component







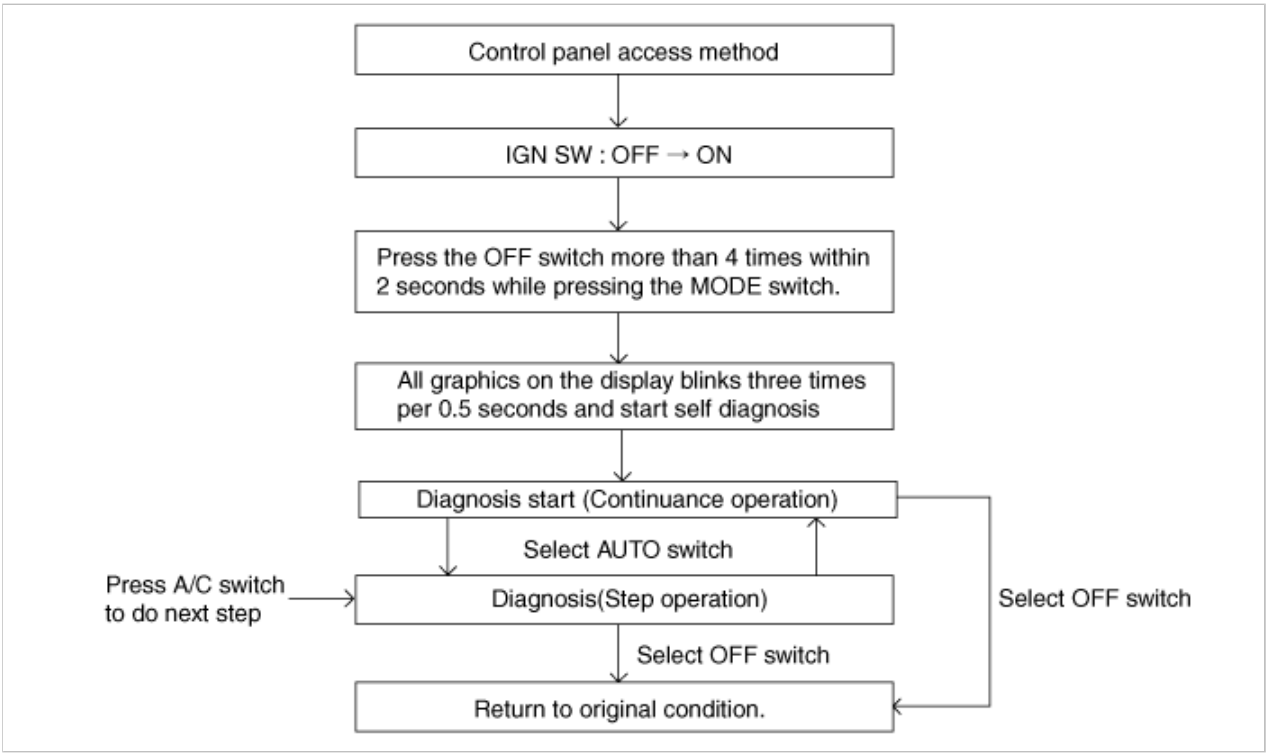
Connector Pin Function

Connector	Pin	Function	Connector	Pin	Function
Connector (A)	1	Battery	Connector (B)	1	N,C
	2	Tail lamp(ILL+)		2	N,C
	3	IGN2		3	Incar sensor
	4	Power mosfet(Gate)		4	Speed sensor
	5	Mode actuator(Vent)		5	Ambient sensor
	6	Mode actuator(Def)		6	HI-Scan

	7	Temp actuator(Cool)		7	N,C
	8	Temp actuator(Warm)		8	N,C
	9	Intake actuator(Fre)		9	Photo sensor(+)
	10	Intake actuator(Rec)		10	Photo sensor(-)
	11	N,C		11	Water sensor(-)
	12	Rheostat(ILL-)		12	N,C
	13	N,C		13	N,C
	14	Vref(5V)		14	Multi media can(L)
	15	Blower motor(+)		15	Multi media can(H)
	16	Power mosfet(Drain)		16	GND
	17	Mode actuator F/B			
	18	Temp actuator F/B			
	19	Intake actuator F/B			
	20	Evaporator sensor			
	21	A/C Select(High)			
	22	A/C Output(High)			
	23	RR Def switch			
	24	RR Def indicator			
	25	GND			
	26	Sensor GND			

SELF-DIAGNOSIS

1. Self-diagnosis process



NOTE

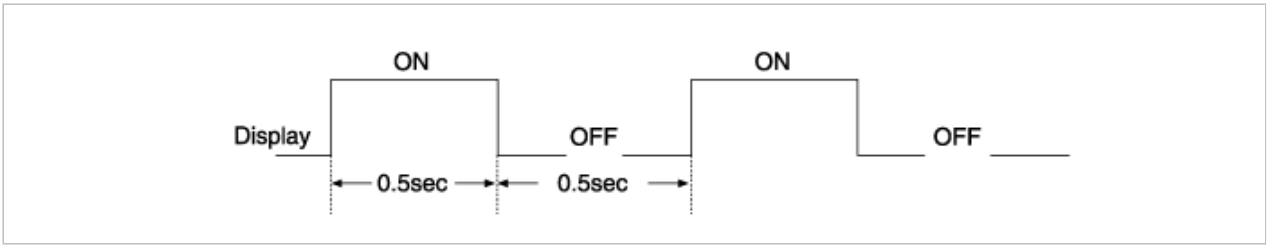
DTC data can be retrieved from the control panel directly or from the DLC using the Hi-Scan Pro.

2. How to read self-diagnostic code
   After the display panel flickers three times every 0.5 second, the corresponding fault code flickers on the setup temperature display panel every 0.5 second and will show two figures. Codes are displayed in numerical format.

Fault code

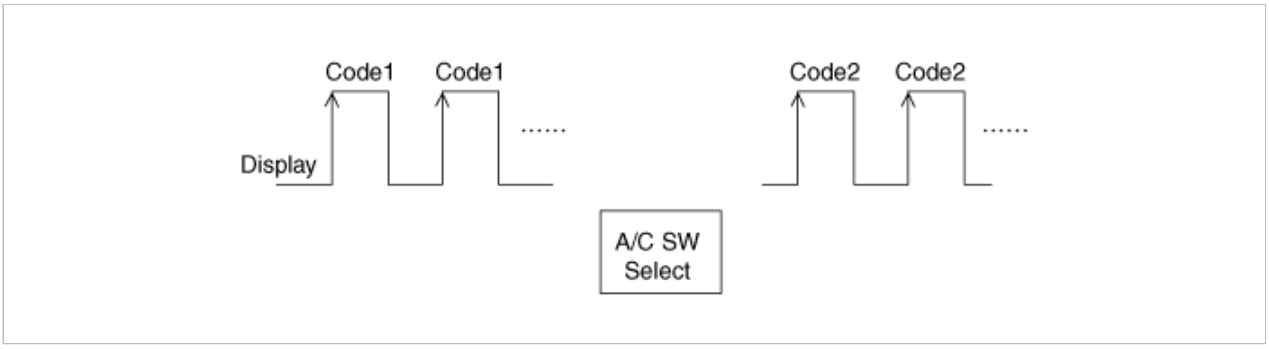
NO.	Fail description
00	Normal
11	Incar sensor OPEN
12	Incar sensor SHORT
13	Ambient sensor OPEN
14	Ambient SHORT
15	Water temp sensor OPEN
16	Water temp sensor SHORT
17	Evaporator sensor OPEN
18	Evaporator sensor SHORT
19	Temp potentiometer OPEN/SHORT
20	Temp potentiometer FAULT
21	Mode potentiometer OPEN/SHORT
22	Mode potentiometer FAULT
25	Intake potentiometer OPEN/SHORT
26	Intake potentiometer FAULT

3. Fault code display
   (1) Continuance operation : DTC code is one



   (2) Continuance operation : DTC code is more two

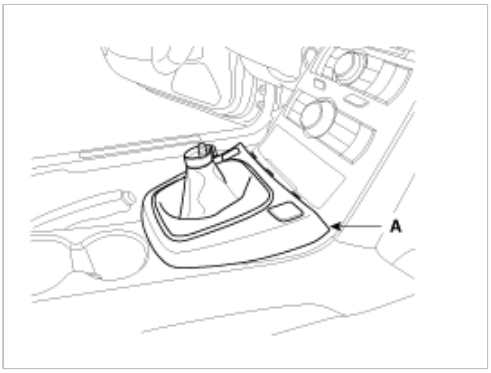
   (3) Step operation
      A. Nomal or one fault code is same a continuance
      B. DTC code is more two



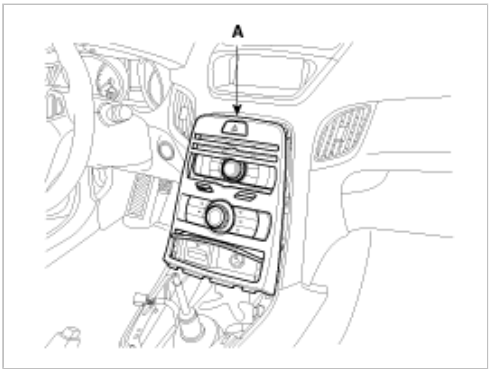
4. If fault codes are displayed during the check, Inspect malfunction causes by referring to fault codes.
5. Fail safe
   (1) Incar sensor : Control with the value of 23°C(73°F)
   (2) Ambient temperature sensor: Control with the value of 20°C(67°F)
   (3) Evaporator temperature sensor: Control with the value of -2°C(28.4°F)
   (4) Water temperature sensor : Control with the value of 85°C (185°F)
   (5) Temperature control actuator (Air mix potentiometer):
      If temperature setting 17°C-24.5°C, fix at maximum cooling position.
      If temperature setting 25°C-32°C, fix at maximum heating position
   (6) Mode control actuator (Direction potentiometer):
      Fix vent position, while selecting vent mode.
      Fix defrost position, while selecting all except vent mode.
   (7) Intake control actuator :
      Fix fresh position, while selecting fresh mode.
      Fix recirculation position, while selecting recirculation mode.

Replacement

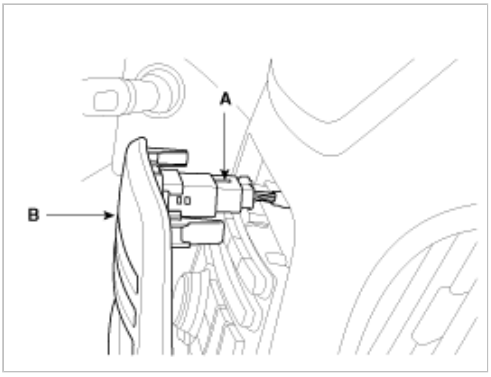
1. Disconnect the negative (-) battery terminal.
2. Remove the console upper cover(A).

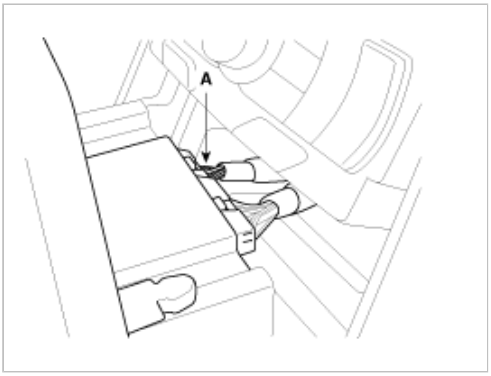


3. Remove the center facia pannel (A).

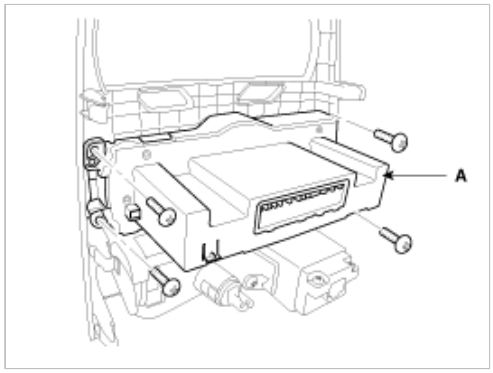


4. Disconnect the connector(A) and then remove the center facia panel (B).





5. Remove the heater & A/C controller (A) from center facia panel.



6. Installation is the reverse order of removal.

GENESIS COUPE(BK) >2010 > G 2.0 DOHC > Heating,Ventilation, Air Conditioning > Controller > B1202 Heater Water Temperature Sensor Open(High)

General Description

Engine coolant temperature sensor is located in the engine coolant passage of the cylinder head for detecting the engine coolant temperature.. It contains negative type themistor whoses resistance value is in inverse proportion to temperature. Resistance of watersensor that varies with temperature makes signal voltage of A/C ECU change. In this way A/C ECU detects temperature. Signal of water sensor is used for cold engine lockout control - When the driver operates the heater before the engine is warmed up enough, to prevent driver from unpleasantness of cold air. the heater control unit reduces blower motor speed until coolant temperature reaches the threshold value.

DTC Description

Air conditioner Control Module sets DTC B1202 if Engine coolant temperature sensor has been detected over 4.9V for 4sec.

DTC Detecting Condition

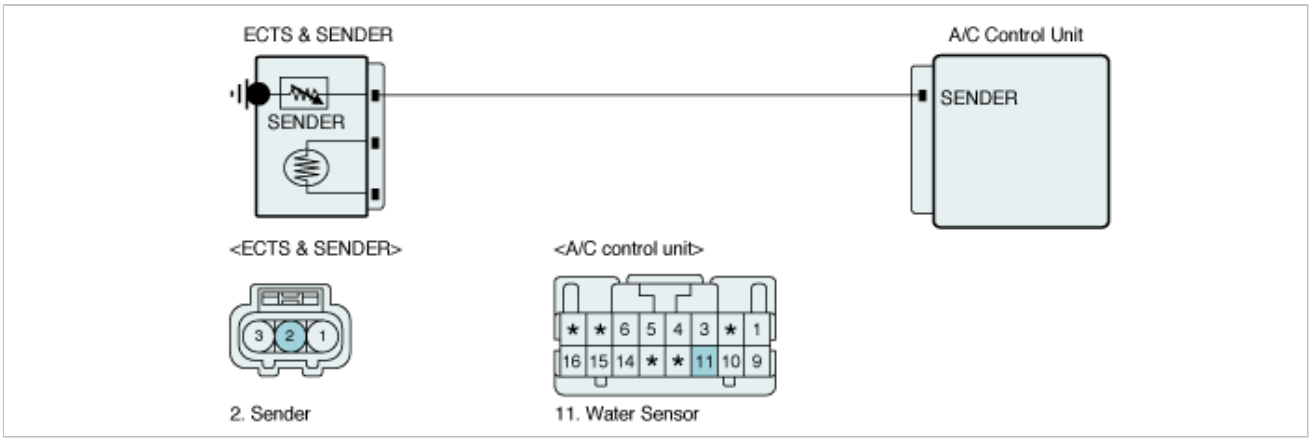
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Poor connection of connected part • Open circuit in signal/power harness • Short circuit in signal/power harness • Faulty Engine coolant temperature sensor • Faulty A/C Control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Engine coolant temperature sensor has been detected over 4.9V for 4sec.	
Fail safe	• Control with the value of 85°C(185°F)	

Specification

※ Resistance value of Engine coolant temperature sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	45.9	40/104	3.27
0/32	25	60/140	1.4
20/68	8.43	80/176	0.7

Diagnostic Circuit Diagram



Monitor Scantool Data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Water temperature sensor" parameter.

Fig 1) Parameter of "WATER TEMP.SENSOR" will be fixed at 85°C(185°F), if there is any fault in INCAR SENSOR.

4. Is the Water temperature sensor normal ?

YES	▸ Go to "Inspection and Repair" procedure.
NO	▸ This is a intermittent problem caused by poor contact of component or Control Unit. ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check power in harness

1. Ignition "OFF".
2. Disconnect Water temp.sensor and Connect A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Power terminal of Water temp.sensor harness connector and chassis ground.

Specification : 0V

5. Is the measured voltage within specification?

YES	▸ Go to "Check for open in harness" as follows.
NO	▸ Check for short to battery in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Water temp.sensor and A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Water temp.sensor harness connector and Signal(+) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

	▸ Go to " Component inspection " procedure.

YES	
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Incar temp.sensor

1. Ignition "OFF".
2. Disconnect Water temp.sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Water temp.sensor harness connector and Sensor ground harness connector.

Specification : Refer the specifications in fig.1

FIG.1) ※ Specifications : Resistance value of Water sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	45.9	40/104	3.27
0/32	25	60/140	1.4
20/68	8.43	80/176	0.7

4. Is "resistance" display near the specified value?

YES	▸ Go to "Check A/C-ECU" procedure.
NO	▸ Substitute with a known-good Water temp.sensor and check for proper operation. If the problem is corrected, replace Water temp.sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF".
2. Disconnect Water temp.sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Water temp.sensor harness connector and chassis ground.

Specification : Approx. 5V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

GENESIS COUPE(BK) >2010 > G 2.0 DOHC > Heating,Ventilation, Air Conditioning > Controller > B1203 Heater Water Temperature Sensor Short(Low)

General Description

Engine coolant temperature sensor is located in the engine coolant passage of the cylinder head for detecting the engine coolant temperature.. It contains negative type themistor whoses resistance value is in inverse proportion to temperature. Resistance of watersensor that varies with temperature makes signal voltage of A/C ECU change. In this way A/C ECU detects temperature. Signal of water sensor is used for cold engine lockout control - When the driver operates the heater before the engine is warmed up enough, to prevent driver from unpleasantness of cold air. the heater control unit reduces blower motor speed until coolant temperature reaches the threshold value.

DTC Description

Air conditioner Control Module sets DTC B1203 if Engine coolant temperature sensor has been detected open or below 0.1V for 4sec.

DTC Detecting Condition

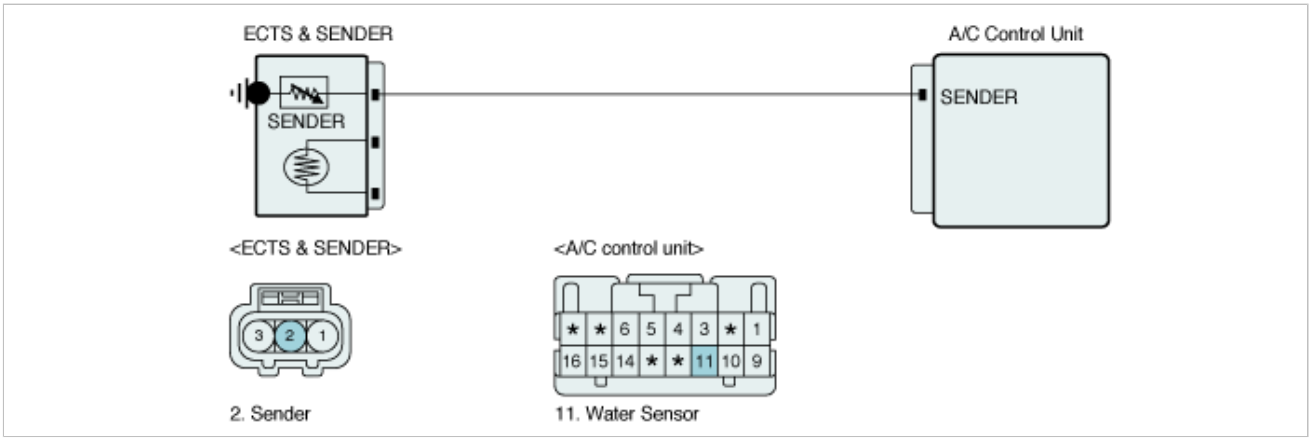
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Poor connection in wireharness • Open in signal circuit • Short to battery in signal circuit • Faulty Engine coolant temperature sensor • Faulty A/C Control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Engine coolant temperature sensor has been detected open or below 0.1V for 4sec.	
Fail safe	• Control with the value of 85°C(185°F)	

Specification

※ Resistance value of Engine coolant temperature sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	45.9	40/104	3.27
0/32	25	60/140	1.4
20/68	8.43	80/176	0.7

Diagnostic Circuit Diagram



Monitor Scantool Data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Water temperature sensor" parameter.

Fig 1) Parameter of "WATER TEMP.SENSOR" will be fixed at 85°C(185°F), if there is any fault in INCAR SENSOR.

4. Is the Water temperature sensor normal ?

YES	▸ Go to "Inspection and Repair" procedure.
NO	▸ This is a intermittent problem caused by poor contact of component or Control Unit. ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to ground in harness

1. Ignition "OFF".
2. Disconnect Water temp.sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Water temp.sensor harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for short to ground in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Incar temp.sensor

1. Ignition "OFF".
2. Disconnect Water temp.sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Water temp.sensor harness connector and Sensor ground harness connector.

Specification : Refer the specifications in fig.1

FIG.1) ※ Specifications : Resistance value of Water sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	45.9	40/104	3.27
0/32	25	60/140	1.4
20/68	8.43	80/176	0.7

4. Is "resistance" display near the specified value?

YES	▸ Go to "Check A/C-ECU" procedure.
NO	▸ Substitute with a known-good Water temp.sensor and check for proper operation. If the problem is corrected, replace Water temp.sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF".
2. Disconnect Water temp.sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Water temp.sensor harness connector and chassis ground.

Specification : Approx. 5V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

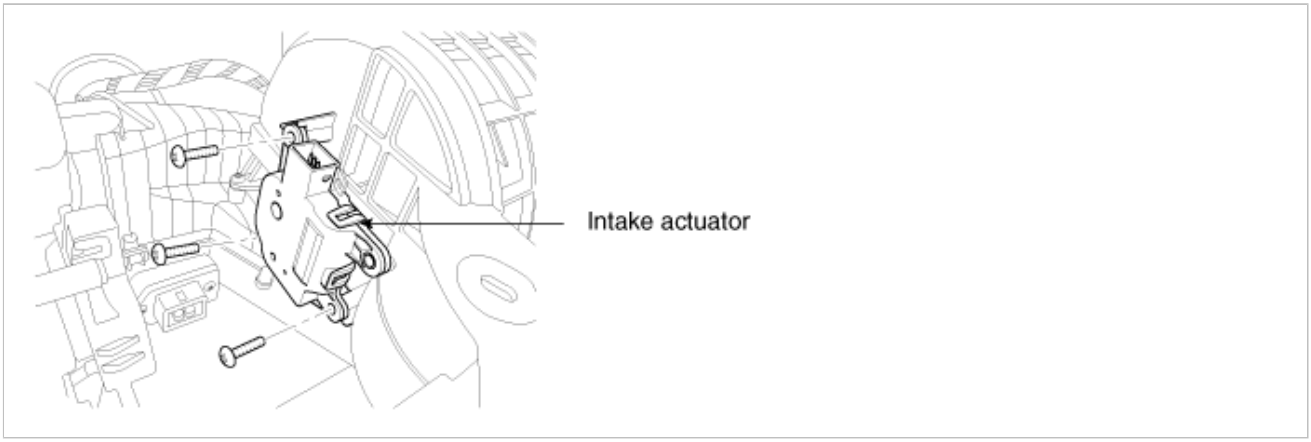
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

It contains intake motor that changes intake door position and potentiometer that monitors position of intake door. When driver operates the intake switch, ECU receives mode signal from intake switch and operates intake door motot to turn intake door to intended position. (with FRE mode signal, intake door is closed and with REC mode signal, intake door is opened)
In operation, potentiometer delivers intake door position transformed into voltage value to A/C ECU.

DTC Description

Airconditioner Control Module sets DTC B1208 if the Feed Back signal of Intake Actuator has been detected open or below 0.1V for 100 ms.

DTC Detecting Condition

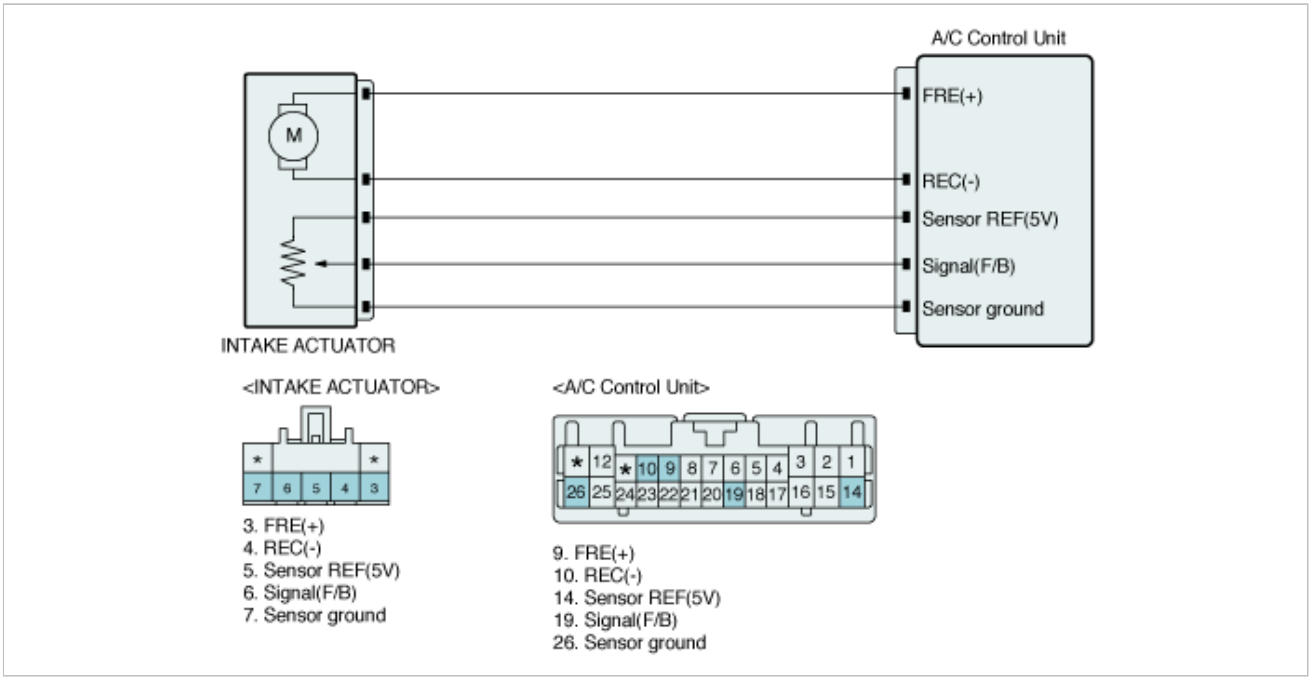
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Poor connection of connected part • Open circuit in signal/power harness • Short circuit in signal/power harness • Faulty Intake potentiometer
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback circuit has been detected open or below 0.1V for 100ms.	
Fail safe	• Setting mode : REC Fix at REC position • Setting mode : Except REC Fix at FRE position	

Specification

※ Voltage value of Intake potentiometer as a function of position of Intake door

Door position	Voltage
FRE	0.45V
REC	4.55V

Diagnostic Circuit Diagram

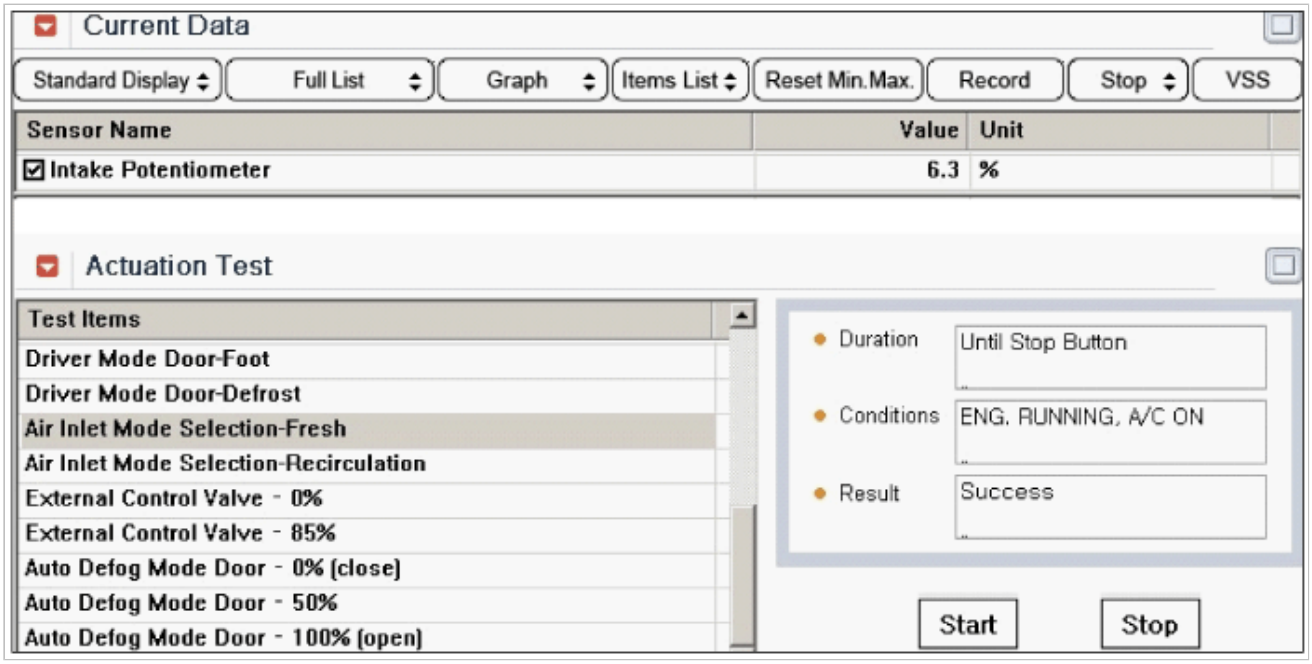


Monitor Scantool Data

■ Check Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start.
3. Select " Intake Potentiometer " parameter on the current data with scantool.
4. Perform Actuation Test for " Air Inlet Mode Selection - Reculation /Fresh in order.
5. With performing Actuation test, check that the value of each position sensors are changing.

Specification - Recirculation : About 90%, Fresh : About 10%.



6. Are the value of each position sensors changed when performing actuation test ?

YES	▸ This is a intermittent problem caused by poor contact of component or Control Unit ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or

	damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to " Inspection/Repair " procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Intake actuator harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to "Check short to ground in harness" as follows.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Intake actuator harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES	▸ Go to "Power circuit Inspection " procedure.
NO	▸ Check for short to ground in control harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF".
2. Disconnect Intake actuator and Connect A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Sensor REF(5V) terminal of Intake actuator harness connector and chassis ground.

Specification : Approx. 5V

5. Is the measured voltage within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for open and short to ground in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Intake actuator

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to FRE(+) of intake actuator and (-) terminal to REC(-) .(Component side)
4. Verify that the actuator operates to the REC position.
5. Verify that the temperature actuator operates to the FRE position with reverse connecting.(REC(-) and FRE(+)) (Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

Actuator harness	FRE(+)	REC(-)	Door position
Battery terminal	12 V	Ground	FRE
	Ground	12 V	REC

6. Is "Door position" display near the specified value?

YES	▸ Go to "Check potentiometer" procedure.
NO	▸ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(F/B) terminal of Intake actuator harness connector and chassis ground .(Component side)

Specification : Refer the specifications in fig.2

FIG.2) Specifications : Voltage value of intake potentiometer as a function of intake door position.

Door position	Voltage
FRE	0.45V
REC	4.55V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

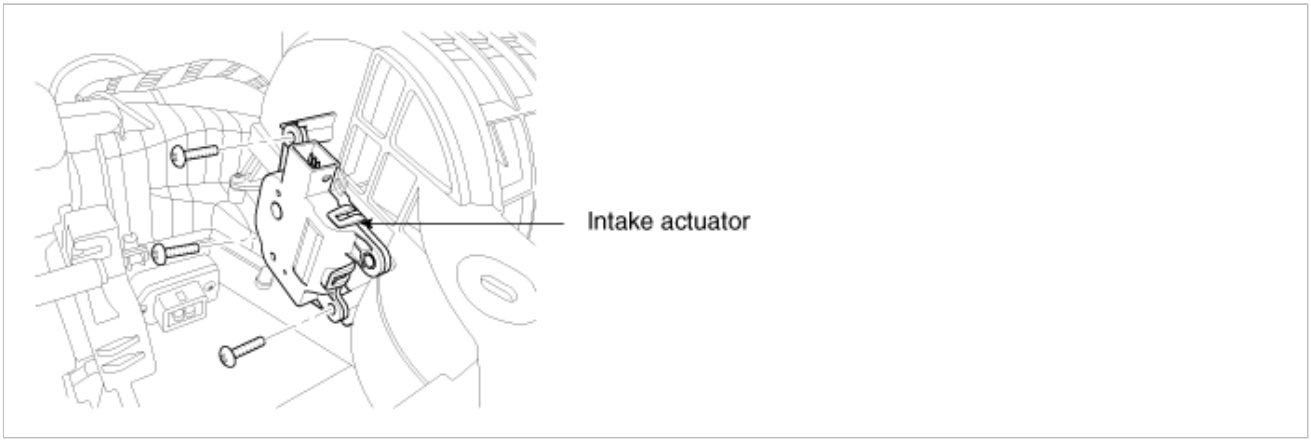
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

It contains intake motor that changes intake door position and potentiometer that monitors position of intake door. When driver operates the intake switch, ECU receives mode signal from intake switch and operates intake door motot to turn intake door to intended position. (with FRE mode signal, intake door is closed and with REC mode signal, intake door is opened)
In operation, potentiometer delivers intake door position transformed into voltage value to A/C ECU.

DTC Description

Airconditioner Control Module sets DTC B1209 if the Feed Back signal of Intake Actuator has been detected over 4.9V for 100ms.

DTC Detecting Condition

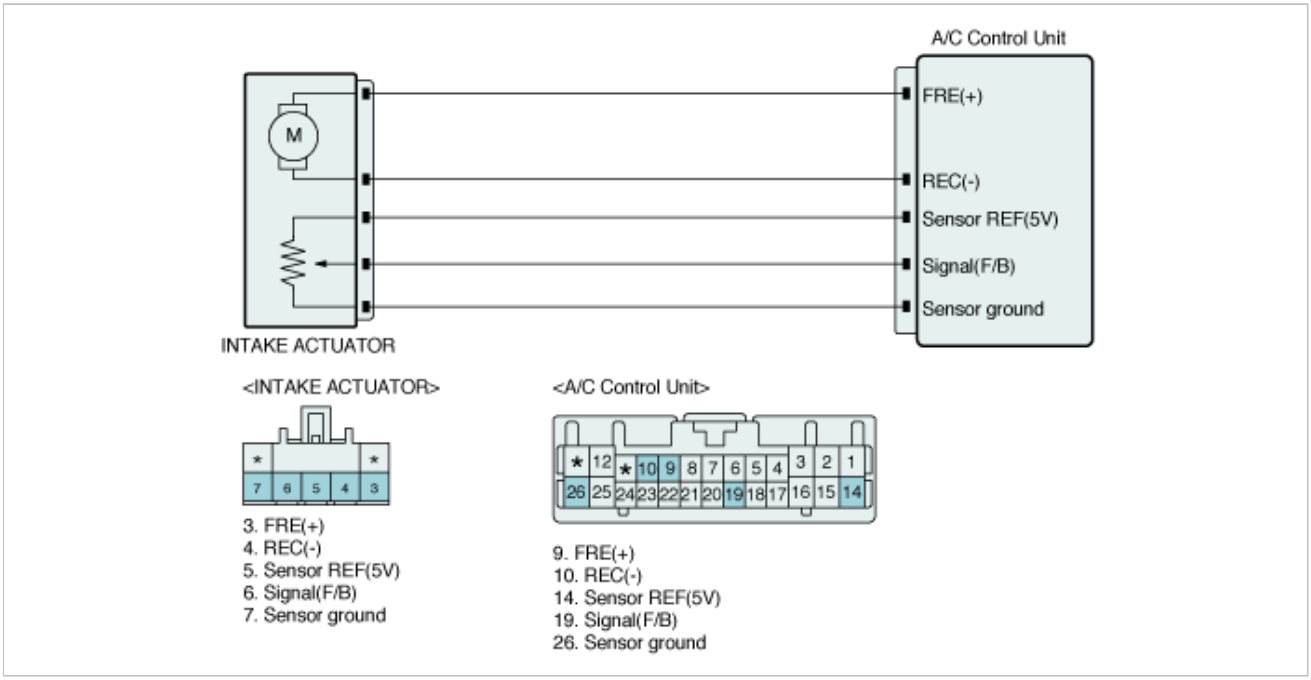
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Short to battery in signal (Feedback) circuit • Open in ground circuit • Faulty Intake Actuator • Faulty Air Conditioner Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback circuit has been detected over 4.9V for 100ms.	
Fail safe	• Intake Actuator is moved and fixed at FRE position if FRE is selected or REC position if REC is selected.	

Specification

※ Voltage value of Intake potentiometer as a function of position of Intake door

Door position	Voltage
FRE	0.45V
REC	4.55V

Diagnostic Circuit Diagram

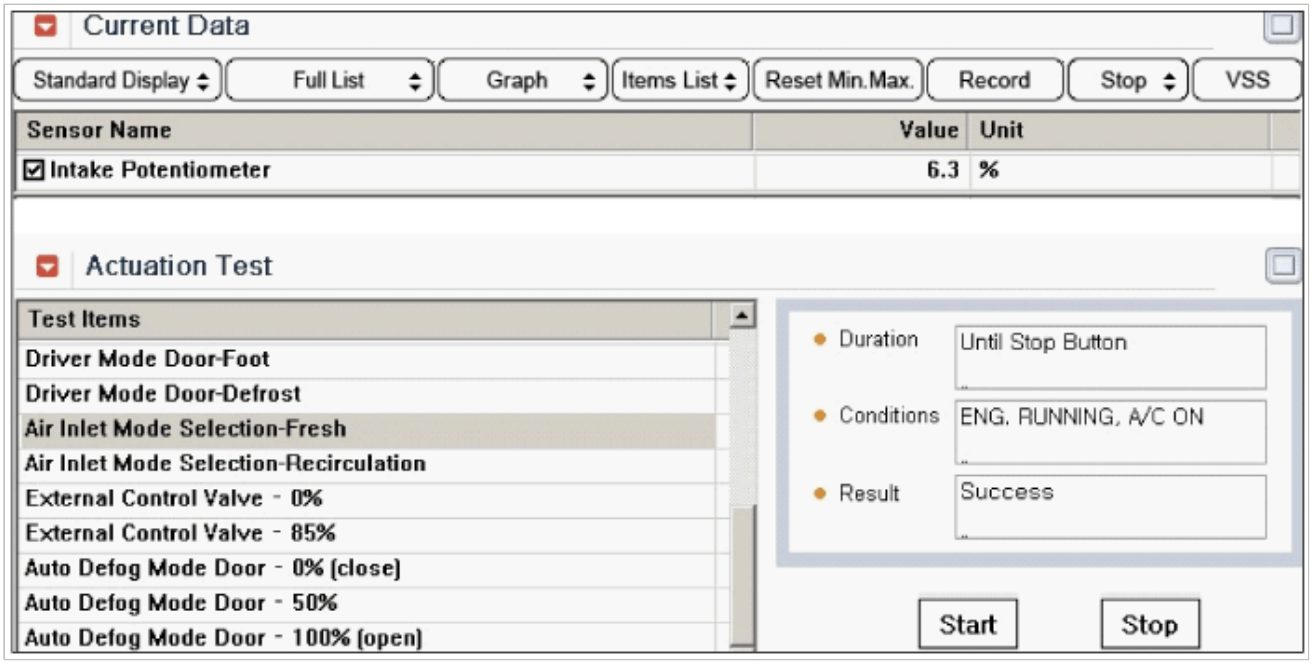


Monitor Scantool Data

■ Check Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start.
3. Select " Intake Potentiometer " parameter on the current data with scantool.
4. Perform Actuation Test for " Air Inlet Mode Selection - Reculation /Fresh in order.
5. With performing Actuation test, check that the value of each position sensors are changing.

Specification - Recirculation : About 90%, Fresh : About 10%.



6. Are the value of each position sensors changed when performing actuation test ?

YES	▸ This is a intermittent problem caused by poor contact of component or Control Unit ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or

	damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to " Inspection/Repair " procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of Intake actuator harness connector and chassis ground.

Specification : 0V

5. Is the measured voltage within specification?

YES	▸ Go to "Ground circuit Inspection " procedure.
NO	▸ Check for short to battery in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Intake actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Intake actuator

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.

3. Connect (+) terminal of battery to FRE(+) of intake actuator and (-) terminal to REC(-) .(Component side)
4. Verify that the actuator operates to the REC position.
5. Verify that the temperature actuator operates to the FRE position with reverse connecting.(REC(-) and FRE(+)) (Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

Actuator harness	FRE(+)	REC(-)	Door position
Battery terminal	12 V	Ground	FRE
	Ground	12 V	REC

6. Is "Door position" display near the specified value?

YES	▸ Go to "Check potentiometer" procedure.
NO	▸ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(F/B) terminal of Intake actuator harness connector and chassis ground .(Component side)

Specification : Refer the specifications in fig.2

FIG.2) Specifications : Voltage value of intake potentiometer as a function of intake door position.

Door position	Voltage
FRE	0.45V
REC	4.55V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

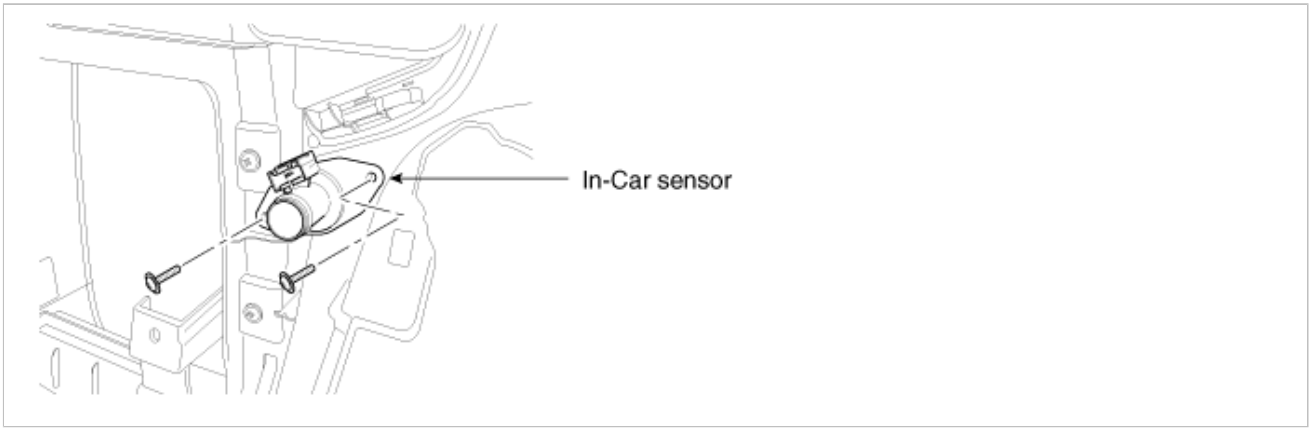
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

It contains a thermistor which measures the temperature of the inside. The signal,decided by the resistance value which changes in accordance with perceived inside temperature, is delivered to heater control unit. According to this signal, the control unit regulates incar temperature to intended value.

DTC Description

Air conditioner Control Module sets DTC B1233 if Incar temperature sensor has been detected below 0.1V for 4sec.

DTC Detecting Condition

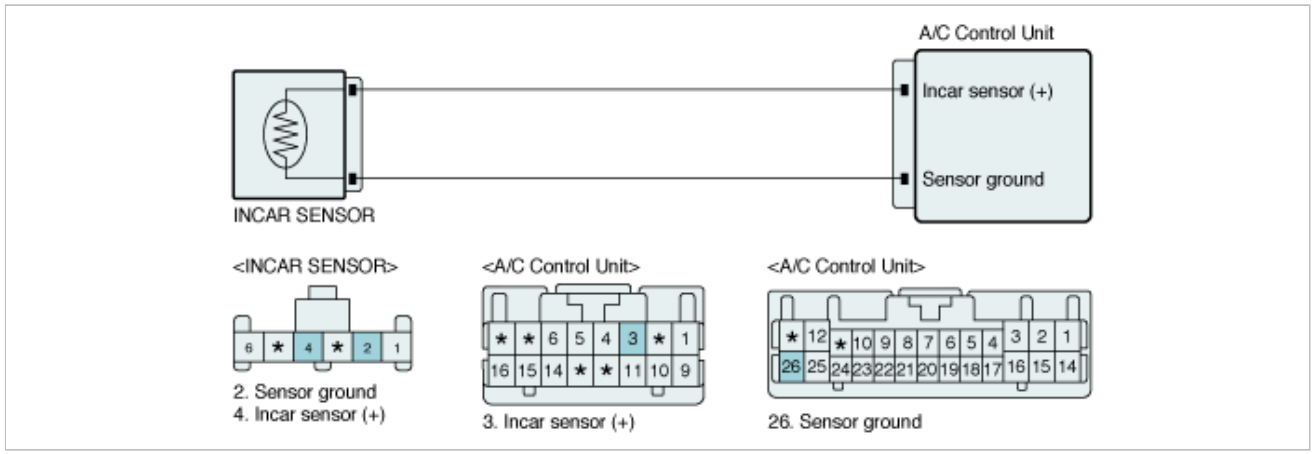
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Short circuit in harness • Faulty incar temp.sensor • Faulty A/C Control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Incar temperature sensor has been detected 0.1V for 4sec.	
Fail safe	• Control with the value of 23°C(73.4°F)	

Specification

※ Resistance value of incar temp sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	164	10/50	59
0/32	97	20/68	37.4
5/41	75.96	40/104	15.9

Diagnostic Circuit Diagram



Monitor Scantool Data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "In-car temperature sensor" parameter.

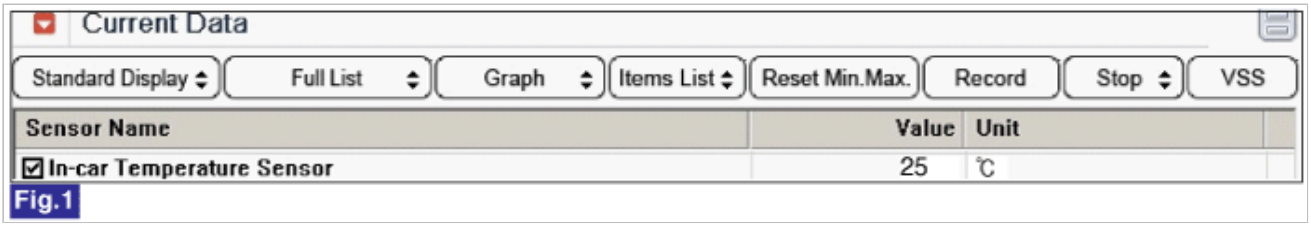


Fig 1) Parameter of "INCAR TEMP.SENSOR" will be fixed at 25°C(77°F), if there is any fault in INCAR SENSOR.

4. Is the Incar temperature sensor normal ?

YES	▸ Go to "Inspection and Repair" procedure.
NO	▸ This is a intermittent problem caused by poor contact of component or Control Unit. ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to ground in harness

1. Ignition "OFF".
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of incar temp.sensor harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for short to ground in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Incar temp.sensor

1. Ignition "OFF".
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Incar temp.sensor harness connector and Sensor ground harness connector .(Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Specifications : Resistance value of incar sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	164	10/50	59
0/32	97	20/68	37.4
5/41	75.96	40/104	15.9

4. Is "resistance" display near the specified value?

YES	▸ Go to "Check A/C-ECU" procedure.
NO	▸ Substitute with a known-good Incar temp.sensor and check for proper operation. If the problem is corrected, replace Incar temp.sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF".
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Incar temp.sensor harness connector and chassis ground .(Component side)

Specification : Approx. 5V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

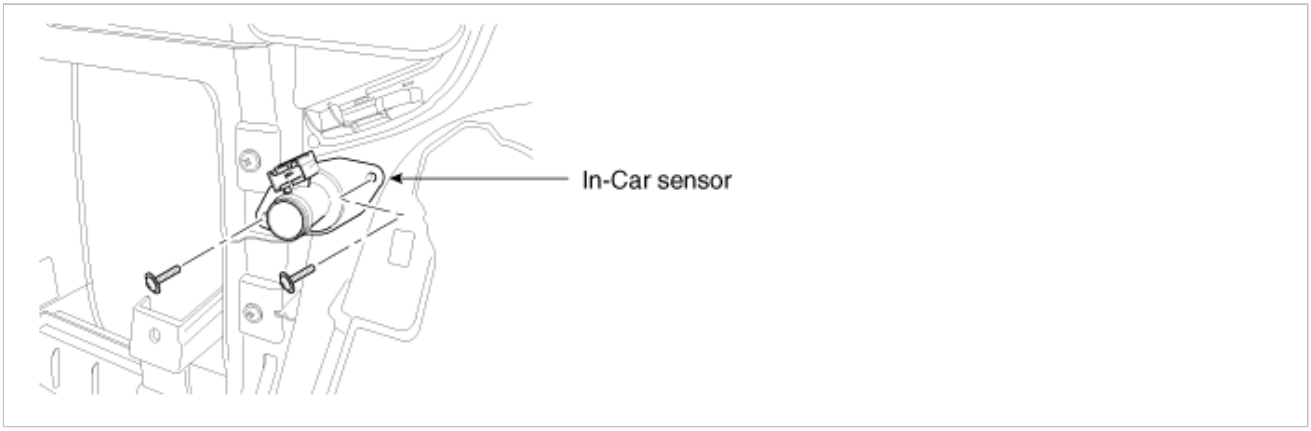
After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.

NO	▸ System is performing to specification at this time.

Componet Location



General Description

It contains a thermistor which measures the temperature of the inside. The signal,decided by the resistance value which changes in accordance with perceived inside temperature, is delivered to heater control unit. According to this signal, the control unit regulates incar temperature to intended value.

DTC Description

Air conditioner Control Module sets DTC B1234 if Incar temperature sensor has been detected over 4.9V for 4sec.

DTC Detecting Condition

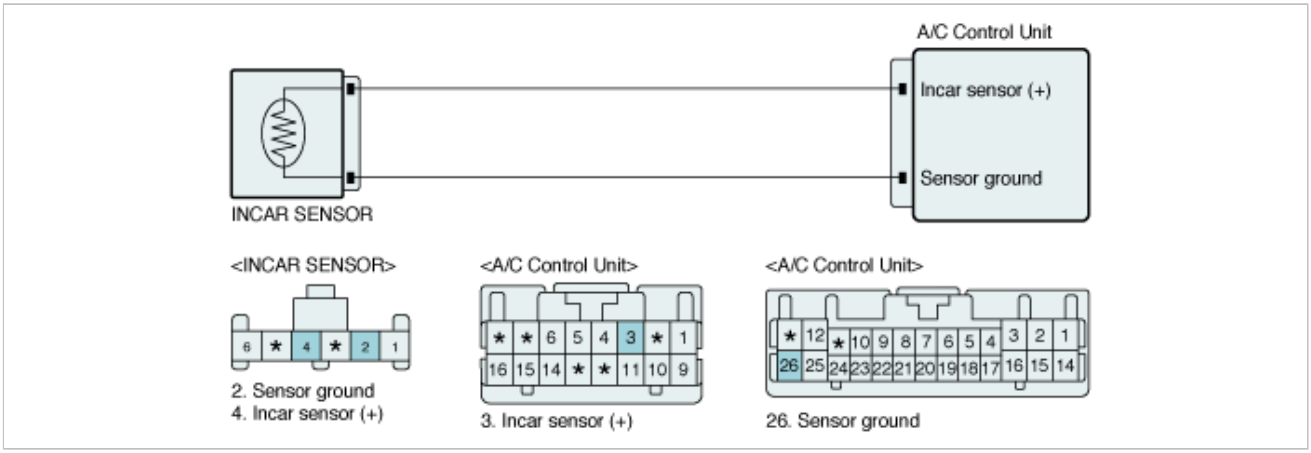
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Poor connection in wireharness • Open in signal circuit • Short to battery in signal circuit • Faulty Incar temperature sensor • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Incar temperature sensor has been dtected over 4.9V for 100ms.	
Fail safe	• Control with the value of 23°C(73.4°F)	

Specification

※ Resistance value of incar temp sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	164	10/50	59
0/32	97	20/68	37.4
5/41	75.96	40/104	15.9

Diagnostic Circuit Diagram



Monitor Scantool Data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "In-car temperature sensor" parameter.

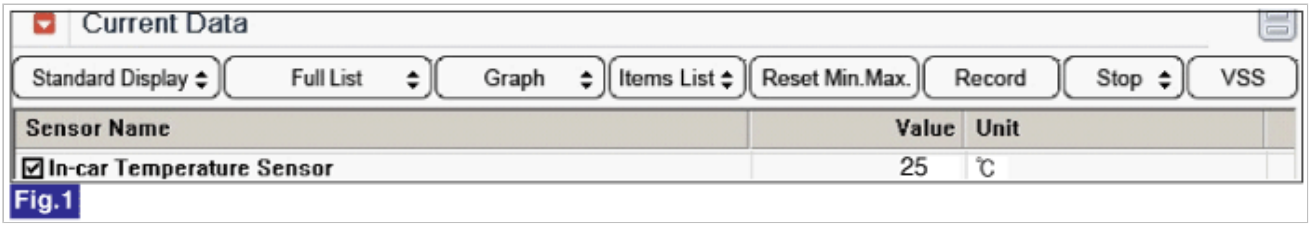


Fig 1) Parameter of "INCAR TEMP.SENSOR" will be fixed at 25°C(77°F), if there is any fault in INCAR SENSOR.

4. Is the Incar temperature sensor normal ?

YES	▸ Go to "Inspection and Repair" procedure.
NO	▸ This is a intermittent problem caused by poor contact of component or Control Unit. ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check power in harness

1. Ignition "OFF".
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Power terminal of Incar temp.sensor harness connector and chassis ground.

Specification : 0V

5. Is the measured voltage within specification?

YES	▸ Go to "Check for open in harness" as follows.
NO	▸ Check for short to battery in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Incar temp.sensor and A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Incar temp.sensor harness connector and Signal(+) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to "Ground circuit Inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Incar temp.sensor and A/C control unit main harness connector.
3. Measure resistance between ground terminal of Incar temp.sensor harness connector and ground terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Incar temp.sensor

1. Ignition "OFF".
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Incar temp.sensor harness connector and Sensor ground harness connector .(Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Specifications : Resistance value of incar sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	164	10/50	59
0/32	97	20/68	37.4

5/41	75.96	40/104	15.9

4. Is "resistance" display near the specified value?

YES	▸ Go to "Check A/C-ECU" procedure.
NO	▸ Substitute with a known-good Incar temp.sensor and check for proper operation. If the problem is corrected, replace Incar temp.sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF".
2. Disconnect Incar temp.sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Incar temp.sensor harness connector and chassis ground .(Component side)

Specification : Approx. 5V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

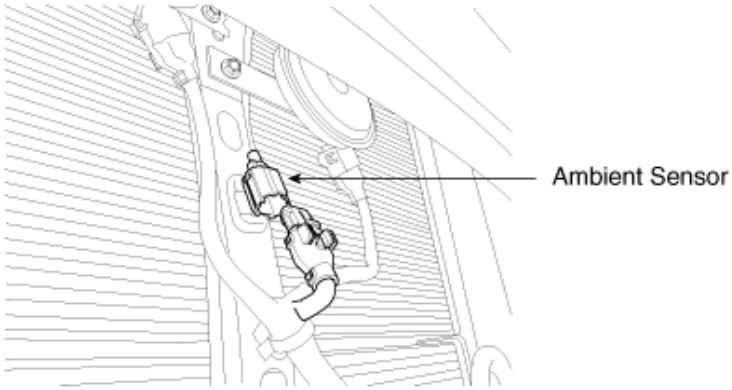
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

It is a negative type thermistor whose resistance is inversely proportional to temperature. Its output is used for sensor fail-safe, temperature regulation door lock, blower motor level control, mix mode control.

DTC Description

Air conditioner Control Module sets DTC B1237 if Ambient sensor has been detected below 0.1V for 4sec.

DTC Detecting Condition

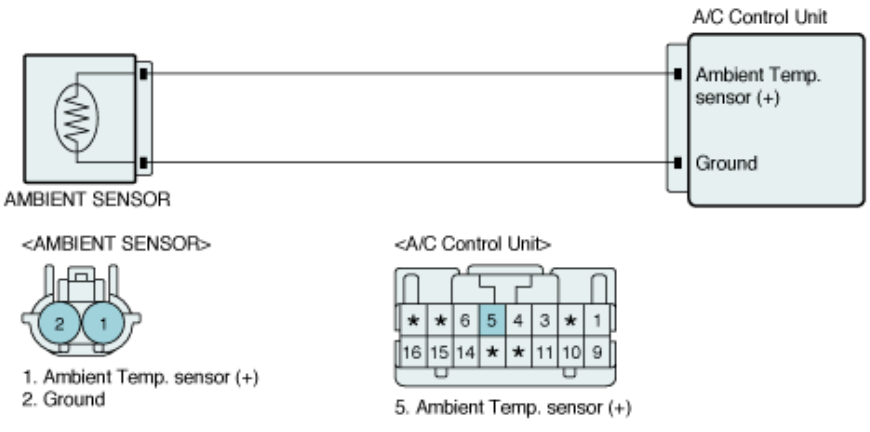
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Short in signal circuit • Faulty Ambient Sensor • Faulty A/C control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Ambient sensor has been dtected 0.1V for 4sec.	
Fail safe	• Control with the value of 20°C(68°F)	

Specification

※ Resistance value of incar temp sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-20/-4	284.5	10/50	59.6
-10/14	164.2	30/86	24.18
0/32	97.5	50/122	10.8

Diagnostic Circuit Diagram



Monitor Scantool Data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Ambient Air Temperature sensor" parameter.

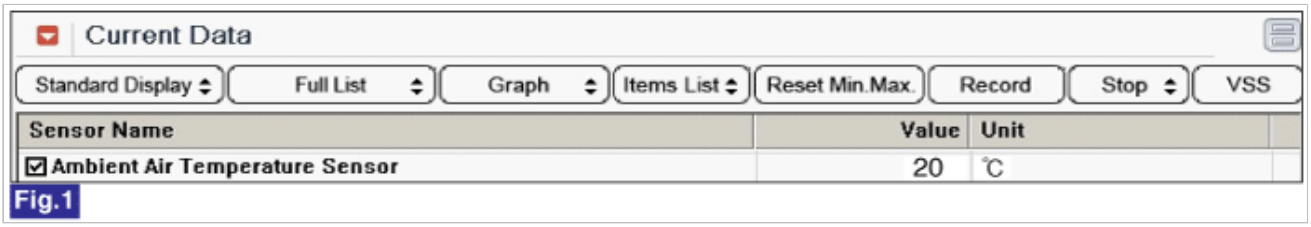


Fig 1) Parameter of "Ambinent Sensor" will be fixed at 20°C(68°F), if there is any fault in Ambient Sensor.

4. Is the ambient sensor normal ?

YES	▸ Go to "Inspection and Repair" procedure.
NO	▸ This is a intermittent problem caused by poor contact of component or Control Unit. ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check power in harness

1. Ignition "OFF".
2. Disconnect Ambient sensor and Connect A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Power terminal of Ambient sensor harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for short to ground in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Ambient sensor

1. Ignition "OFF".
2. Disconnect ambient sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of ambient sensor harness connector and Sensor ground harness

connector .(Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Specifications : Resistance value of ambient sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-20/-4	284.5	10/50	59.6
-10/14	164.2	30/86	24.18
0/32	97.5	50/122	10.8

4. Is "resistance" display near the specified value?

YES	▸ Go to "Check A/C-ECU" procedure.
NO	▸ Substitute with a known-good ambient sensor and check for proper operation. If the problem is corrected, replace ambient sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF".
2. Disconnect Ambient Temp. sensor (+) and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Ambient Temp. sensor (+) harness connector and chassis ground . (Component side)

Specification : Approx. 5V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

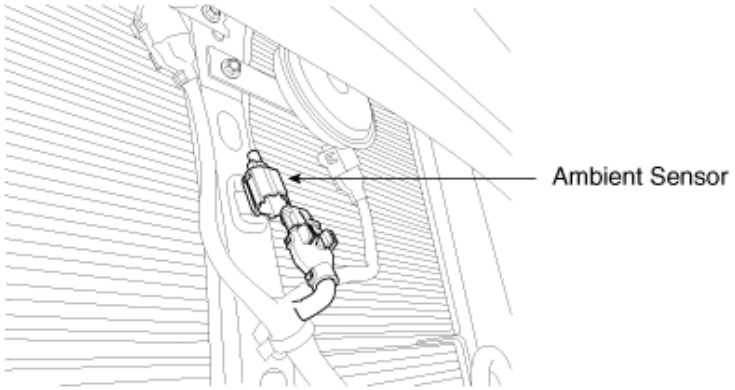
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

It is a negative type thermistor whose resistance is inversely proportional to temperature. Its output is used for sensor fail-safe, temperature regulation door lock, blower motor level control, mix mode control.

DTC Description

Air conditioner Control Module sets DTC B1238 if Ambient sensor has been detected over 4.9V for 4sec.

DTC Detecting Condition

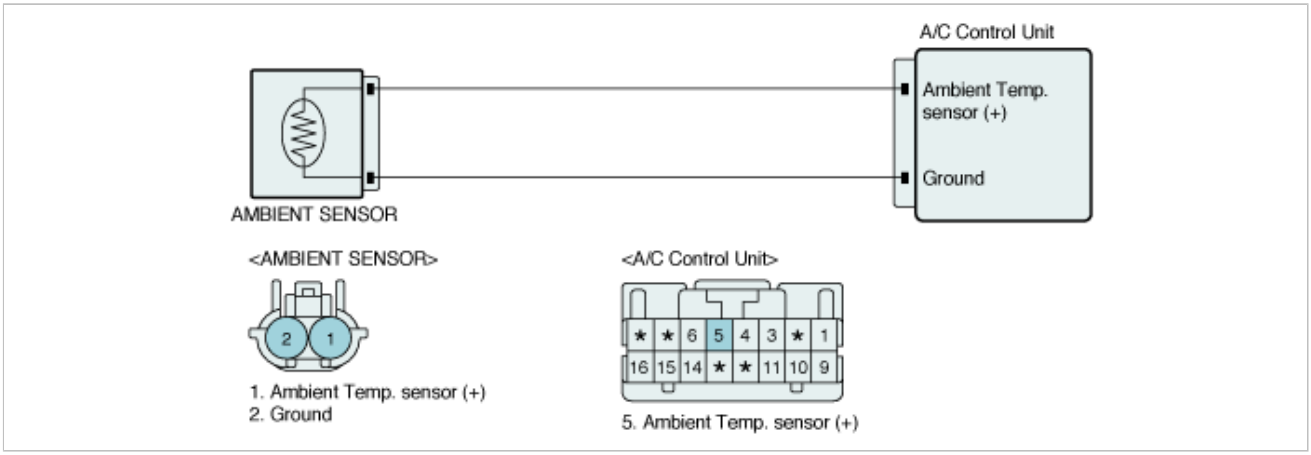
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Poor Connection in harness • Open in signal circuit • Shrot to battery in signal circuit • Faulty Ambient Temperature sensor • Faulty air condtioner control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Ambient Temperature sensor has been detected over 4sec.	
Fail safe	• Control with the value of 20°C(68°F)	

Specification

※ Resistance value of incar temp sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-20/-4	284.5	10/50	59.6
-10/14	164.2	30/86	24.18
0/32	97.5	50/122	10.8

Diagnostic Circuit Diagram



Monitor Scantool Data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Ambient Air Temperature sensor" parameter.

Fig 1) Parameter of "Ambinent Sensor" will be fixed at 20°C(68°F), if there is any fault in Ambient Sensor.

4. Is the ambient sensor normal ?

YES	▸ Go to "Inspection and Repair" procedure.
NO	▸ This is a intermittent problem caused by poor contact of component or Control Unit. ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF".
2. Disconnect ambient sensor and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of ambient sensor harness connector and chassis ground.

Specification : 0V

5. Is the measured voltage within specification?

YES	▸ Go to "Check for open in harness" as follows.
NO	▸ Check for short to battery in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect ambient sensor and A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of ambient sensor harness connector and Signal(+) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to "Ground circuit Inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect ambient sensor and A/C control unit main harness connector.
3. Measure resistance between ground terminal of ambient sensor harness connector and ground terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Ambient sensor

1. Ignition "OFF".
2. Disconnect ambient sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of ambient sensor harness connector and Sensor ground harness connector .(Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Specifications : Resistance value of ambient sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-20/-4	284.5	10/50	59.6
-10/14	164.2	30/86	24.18

0/32	97.5	50/122	10.8

4. Is "resistance" display near the specified value?

YES	▸ Go to "Check A/C-ECU" procedure.
NO	▸ Substitute with a known-good ambient sensor and check for proper operation. If the problem is corrected, replace ambient sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF".
2. Disconnect Ambient Temp. sensor (+) and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Ambient Temp. sensor (+) harness connector and chassis ground . (Component side)

Specification : Approx. 5V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

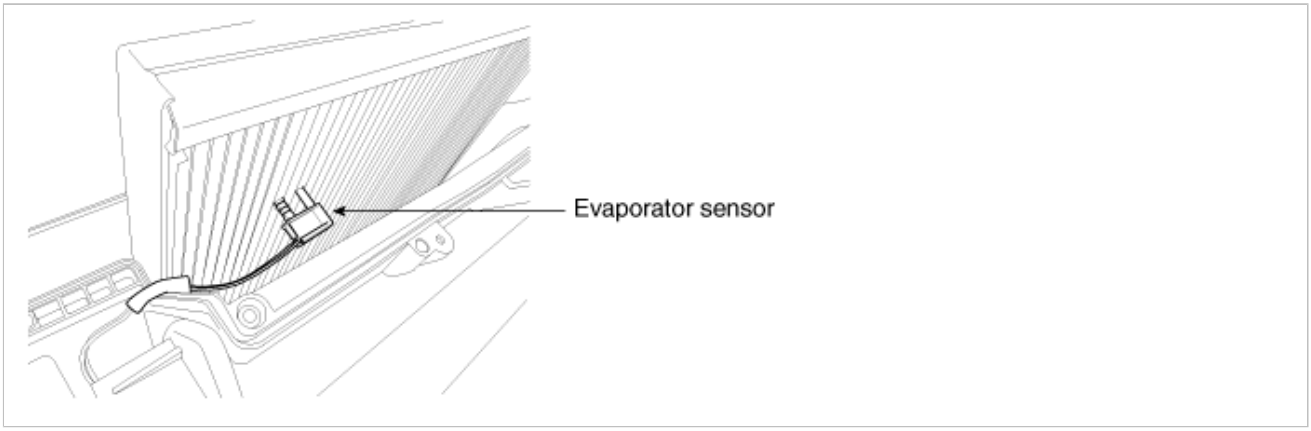
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

The Evaporator sensor located on heater unit detects the core temperature. It is a negative type thermistor whose resistance is inversely proportional to temperature. Evaporator sensor transforms measured temperature into voltage value and delivers it to A/C ECU. when core temperature is blow threshold value, A/C ECU interrupts compressor relay power, in order to prevent evaporator freezing by excessive cooling.

DTC Description

Air conditioner Control Module sets DTC B1241 if Evaporator sensor has been detected below 0.1V for 4sec.

DTC Detecting Condition

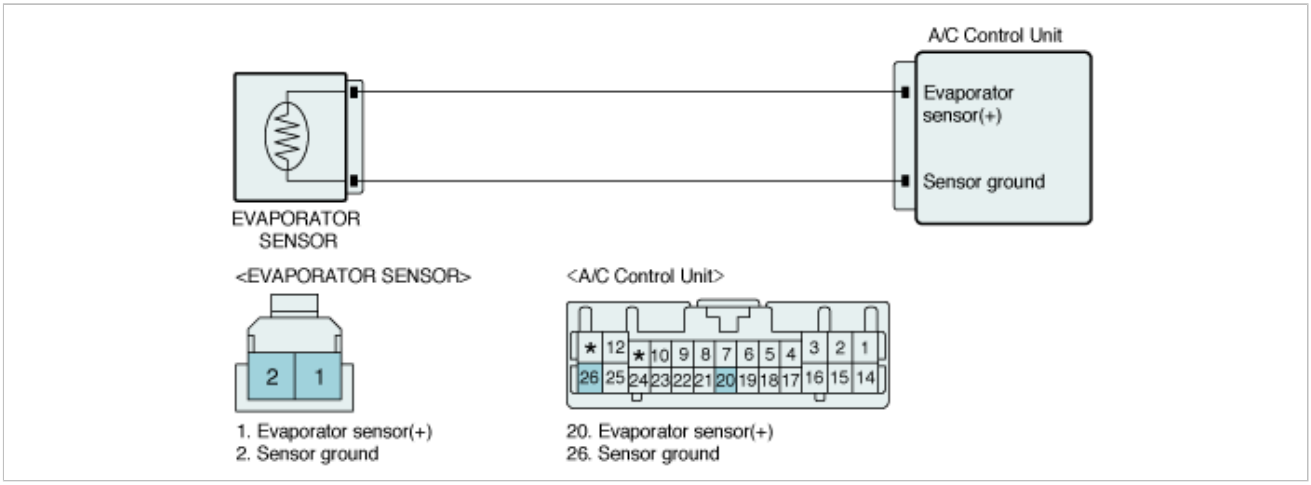
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Short circuit in harness • Faulty Evaporator sensor • Faulty A/C Control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Evaporator sensor has been detected below 01.V for 4sec.	
Fail safe	• Control with the value of -2°C(28.4°F)	

Specification

※ Resistance value of incar temp sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	18	5/41	9.1
-5/23	14.25	10/50	7.3
0/32	11	20/68	4.8

Diagnostic Circuit Diagram



Monitor Scantool Data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Evaporator sensor" parameter on scantool.

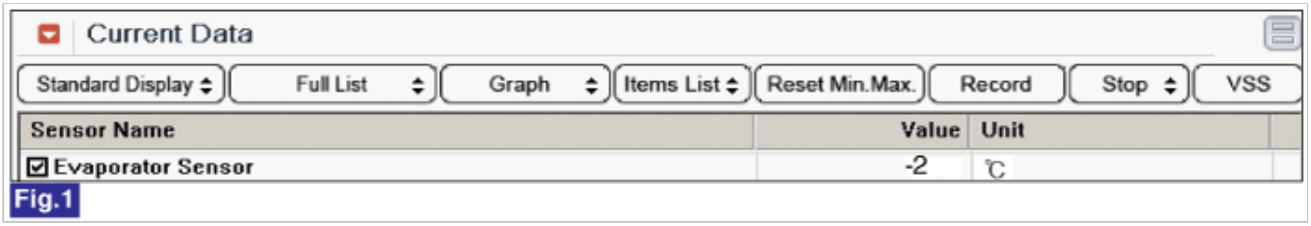


Fig 1) Parameter of "Evaporator Sensor" will be fixed at -2°C(28.4°F), if there is any fault in Evaporator Sensor.

4. Is the Evaporator Sensor normal ?

YES	▸ Go to "Inspection and Repair" procedure.
NO	▸ This is a intermittent problem caused by poor contact of component or Control Unit. ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to ground in harness

1. Ignition "OFF".
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Evaporator sensor harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for short to ground in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Incar temp.sensor

1. Ignition "OFF".
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Evaporator sensor harness connector and Sensor ground harness connector .(Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Specifications : Resistance value of Evaporator sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	18	5/41	9.1
-5/23	14.25	10/50	7.3
0/32	11	20/68	4.8

4. Is "resistance" display near the specified value?

YES	▸ Go to "Check A/C-ECU" procedure.
NO	▸ Substitute with a known-good Evaporator sensor and check for proper operation. If the problem is corrected, replace Evaporator sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF".
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Evaporator sensor harness connector and chassis ground .(Component side)

Specification : Approx. 5V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

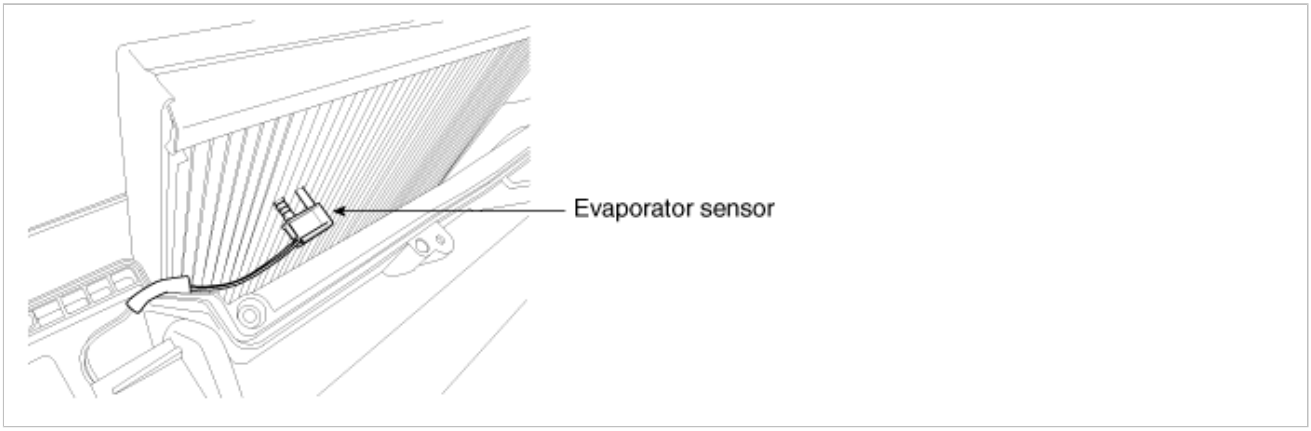
After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.

NO	▸ System is performing to specification at this time.

Componet Location



General Description

The Evaporator sensor located on heater unit detects the core temperature. It is a negative type thermistor whose resistance is inversely proportional to temperature. Evaporator sensor transforms measured temperature into voltage value and delivers it to A/C ECU. when core temperature is blow threshold value, A/C ECU interrupts compressor relay power, in order to prevent evaporator freezing by excessive cooling.

DTC Description

Air conditioner Control Module sets DTC B1242 if Evaporator sensor has been detected over 4.9V for 4sec.

DTC Detecting Condition

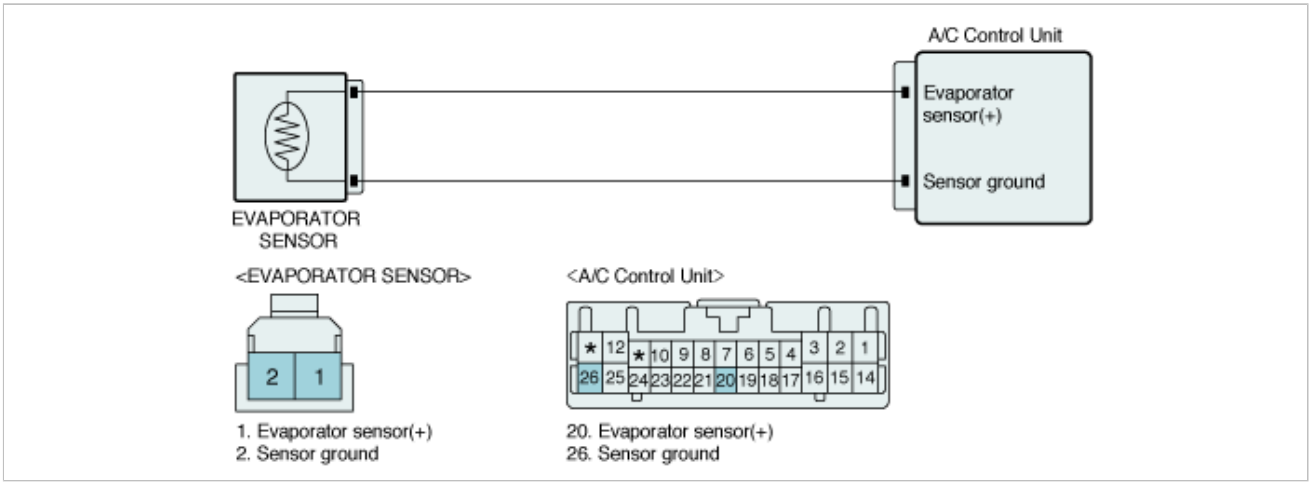
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Open in signal circuit • Short to battery in signal circuit • Faulty Evaporator sensor • Faulty Air conditioner control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Evaporator sensor has been detected over 4.9V for 4sec.	
Fail safe	• Control with the value of -2°C(28.4°F)	

Specification

※ Resistance value of incar temp sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	18	5/41	9.1
-5/23	14.25	10/50	7.3
0/32	11	20/68	4.8

Diagnostic Circuit Diagram



Monitor Scantool Data

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Evaporator sensor" parameter on scantool.

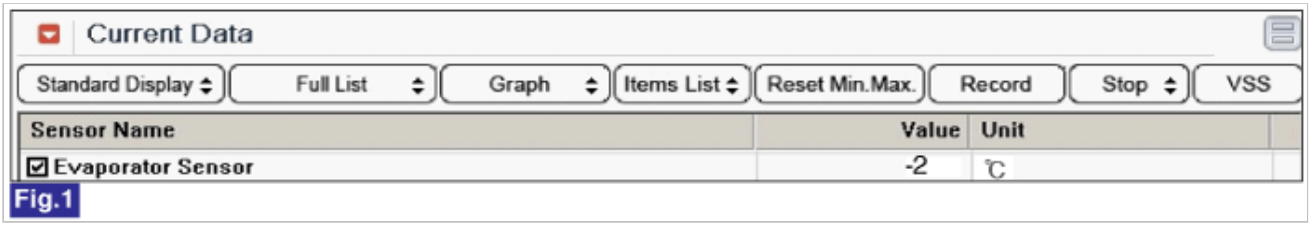


Fig 1) Parameter of "Evaporator Sensor" will be fixed at -2°C(28.4°F), if there is any fault in Evaporator Sensor.

4. Is the Evaporator Sensor normal ?

YES	▸ Go to "Inspection and Repair" procedure.
NO	▸ This is a intermittent problem caused by poor contact of component or Control Unit. ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF".
2. Disconnect Evaporator sensor and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of Evaporator sensor harness connector and chassis ground.

Specification : 0V

5. Is the measured voltage within specification?

YES	▸ Go to "Check for open in harness" as follows.
NO	▸ Check for short to battery in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Evaporator sensor and A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Evaporator sensor harness connector and Signal(+) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to "Ground circuit Inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Evaporator sensor and A/C control unit main harness connector.
3. Measure resistance between ground terminal of Evaporator sensor harness connector and ground terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Incar temp.sensor

1. Ignition "OFF".
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Measure resistance between Signal(+) terminal of Evaporator sensor harness connector and Sensor ground harness connector .(Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Specifications : Resistance value of Evaporator sensor as a function of temperature.

Temperature(°C/°F)	Resistance(kΩ)	Temperature(°C/°F)	Resistance(kΩ)
-10/14	18	5/41	9.1

-5/23	14.25	10/50	7.3
0/32	11	20/68	4.8

4. Is "resistance" display near the specified value?

YES	▸ Go to "Check A/C-ECU" procedure.
NO	▸ Substitute with a known-good Evaporator sensor and check for proper operation. If the problem is corrected, replace Evaporator sensor and then go to "Verification of Vehicle Repair" procedure.

■ Check A/C-ECU

1. Ignition "OFF".
2. Disconnect Evaporator sensor and Connect A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(+) terminal of Evaporator sensor harness connector and chassis ground .(Component side)

Specification : Approx. 5V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good A/C-ECU and check for proper operation. If the problem is corrected, replace A/C-ECU and then go to "Verification of Vehicle Repair" procedure.

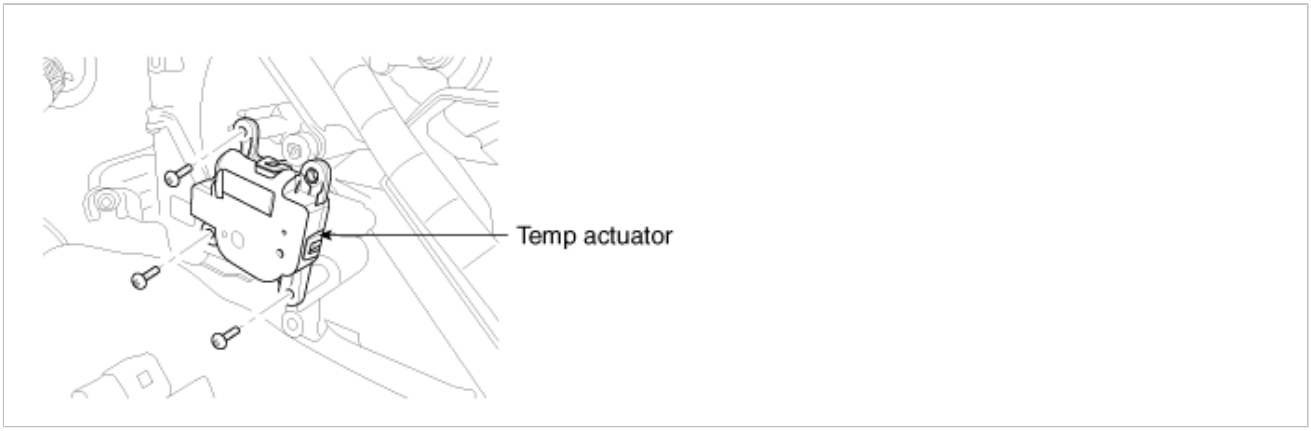
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

It contains temp motor that changes temp door position and potentiometer that monitors position of temp door.Temperature control actuator regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temp door by operating temp motor and then temperature will be regulated by the hot/cold air ratio decided by position of temp door. In operation, potentiometer delivers temp door position transformed into voltage value to A/C ECU .

DTC Description

Air conditioner Control Module sets DTC B1245 if Feedback signal of Driver Temperature Actuator has been detected open or below 0.1V for 100ms.

DTC Detecting Condition

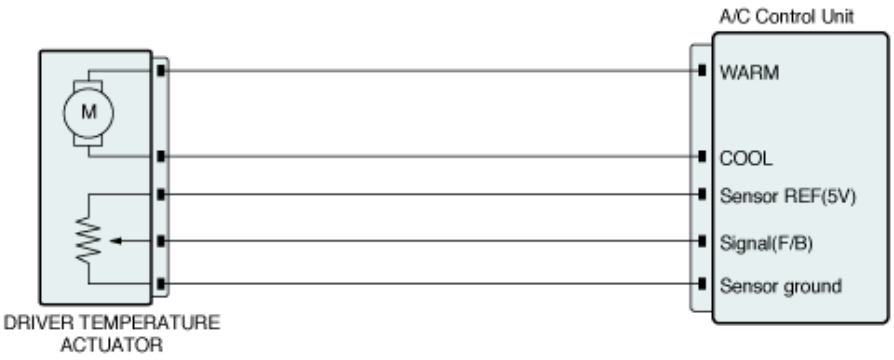
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Poor Conection in harness • Open in signal(Feedback signal), power and ground circuit • Faulty Driver Temperature Actuator • Faulty Air condition Contorl Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of Driver Temperature Actuator has been detected open or below 0.1V for 100ms.	
Fail safe	• Setting temperature : 17~24.5°C(63°F~76.1°F), fix at max. cooling position • Setting temperature : 25°C~32°C(77°F~ 89.6°F), fix at max. heating position	

Specification

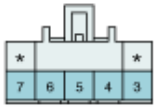
※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.45V
Max.warm	4.55V

Diagnostic Circuit Diagram

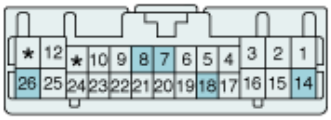


<DRIVER TEMPERATURE ACTUATOR>



3. WARA
4. COOL
5. Sensor ground
6. Signal(F/B)
7. Sensor REF(5V)

<A/C Control Unit>



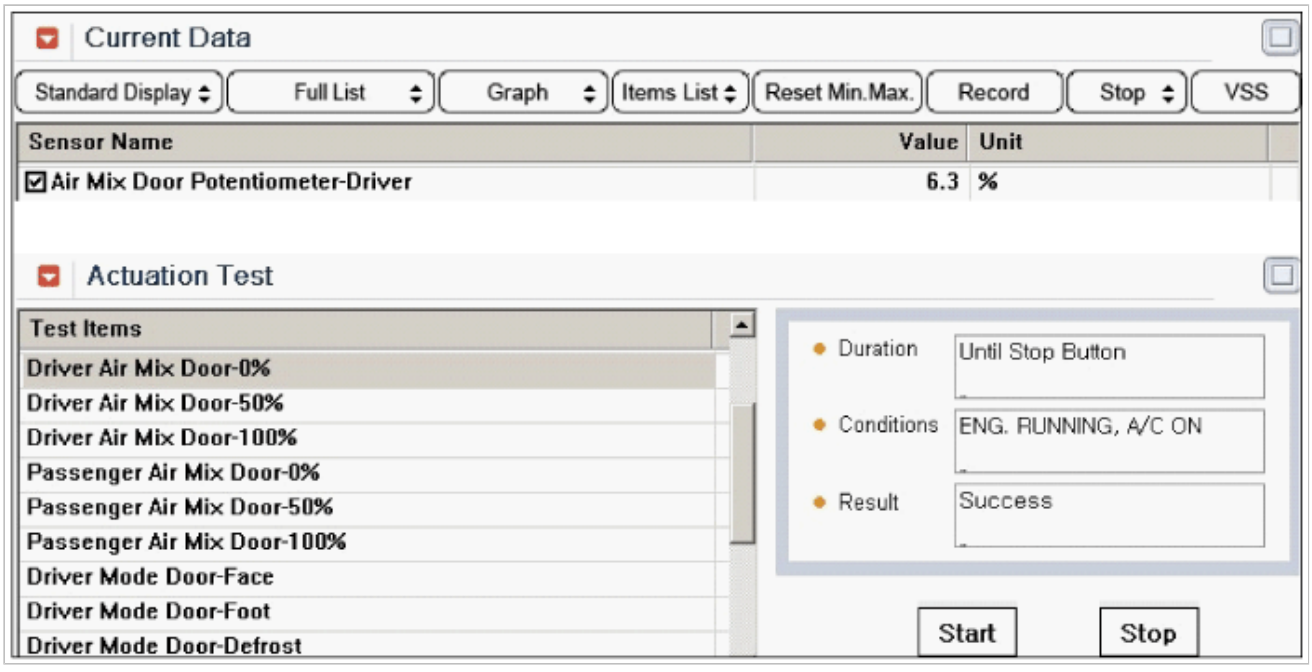
7. COOL
8. WARM
14. Sensor REF(5V)
18. Signal(F/B)
26. Sensor ground

Monitor Scantool Data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Air Mix Door Potentioner-Driver" parameter on scantool.
4. Select and perform Actuation test Air Mix Door Potentioner-Driver - 0% / 50% / 100% in order.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer follows is changed and close to the value of Actuation Test.

Specification : Check that the value of Air Mix Door Potentiometer at current data should be close to the value of the acutation test.



6. Does the value of current data follow in accordance with the each actuation test ?

YES	▸ This is a intermittent problem caused by poor contact of component or Control Unit ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to " Inspection and Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Driver air mix actuator harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to "Check short to ground in harness" as follows.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Driver air mix actuator harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES	▸ Go to "Power circuit Inspection " procedure.
NO	▸ Check for short to ground in control harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and Connect A/C control unit main harness connector.
3. Ignition "ON".

4. Measure voltage between Sensor REF(5V) terminal of Driver air mix actuator harness connector and chassis ground.

Specification : Approx. 5V

5. Is the measured voltage within specification?

YES	▸ Go to "Ground circuit Inspection " procedure.
NO	▸ Check for open and short to ground in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check passenger air mix actuator

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Driver air mix actuator and (-) terminal to COOL(-) .(Component side)
4. Verify that the temperature actuator operates to the cool position.
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	Ground	Max.warm
	Ground	12 V	Max.cool

6. Is "Door position" display near the specified value?

YES	▸ Go to "Check potentiometer" procedure.
NO	▸ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF".

2. Connect Driver air mix actuator and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in fig.2

FIG.2) Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.45V
Max.warm	4.55V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

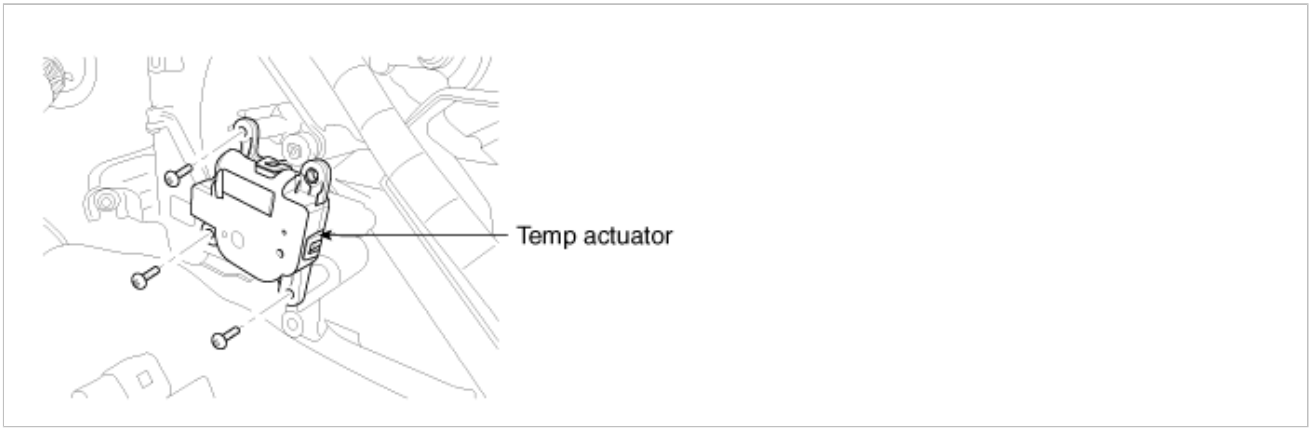
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

It contains temp motor that changes temp door position and potentiometer that monitors position of temp door.Temperature control actuator regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temp door by operating temp motor and then temperature will be regulated by the hot/cold air ratio decided by position of temp door. In operation, potentiometer delivers temp door position transformed into voltage value to A/C ECU .

DTC Description

Air conditioner Control Module sets DTC B1246 if Feedback signal of Driver Temperature Actuator has been detected over 4.9V for 100ms.

DTC Detecting Condition

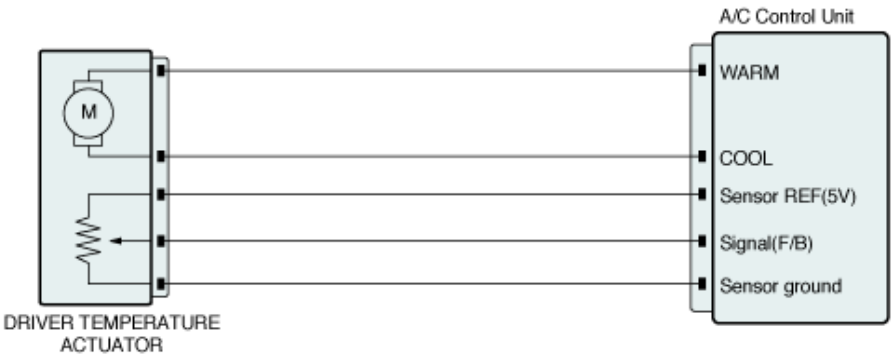
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Short to battery in signal circuit (Feedback signal) • Faulty Driver temperature Actuator • Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of Driver Temperature Actuator has been detected over 4.9V for 100ms.	
Fail safe	• Setting temperature : 17~24.5°C(63°F~76.1°F), fix at max. cooling position • Setting temperature : 25°C~32°C(77°F~ 89.6°F), fix at max. heating position	

Specification

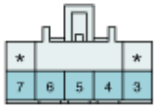
※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.45V
Max.warm	4.55V

Diagnostic Circuit Diagram

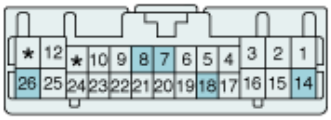


<DRIVER TEMPERATURE ACTUATOR>



3. WARA
4. COOL
5. Sensor ground
6. Signal(F/B)
7. Sensor REF(5V)

<A/C Control Unit>



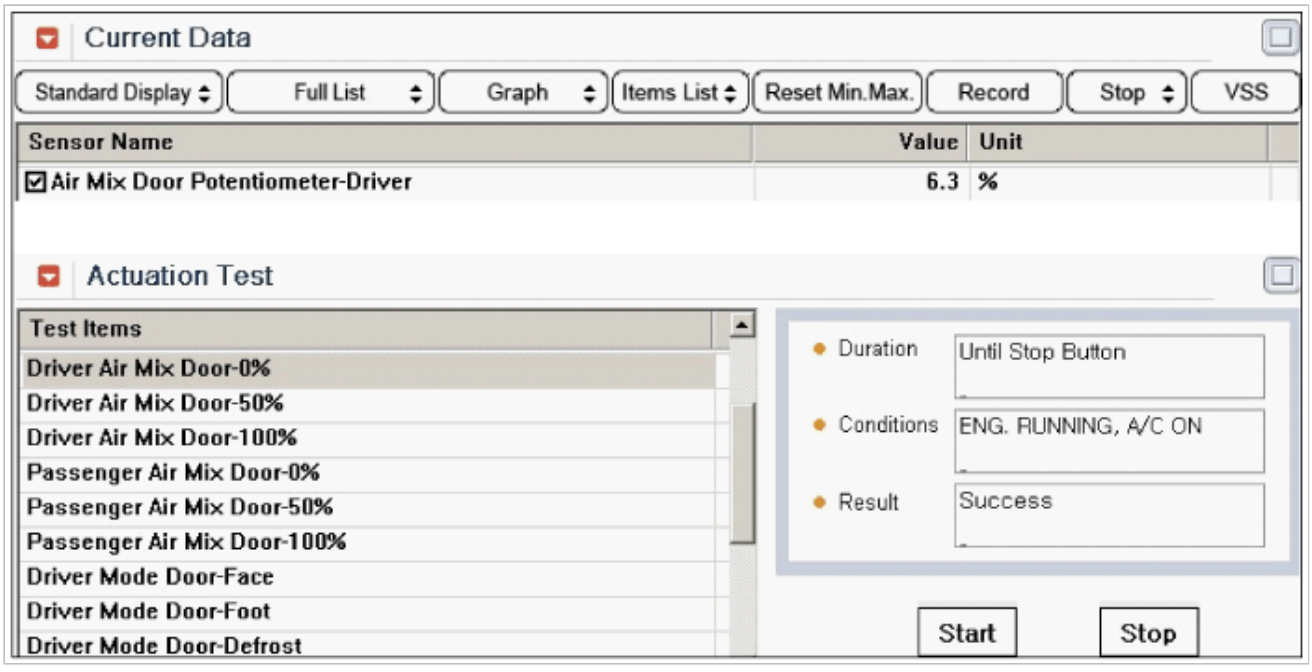
7. COOL
8. WARM
14. Sensor REF(5V)
18. Signal(F/B)
26. Sensor ground

Monitor Scantool Data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Air Mix Door Potentioner-Driver" parameter on scantool.
4. Select and perform Actuation test Air Mix Door Potentioner-Driver - 0% / 50% / 100% in order.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer follows and close to the value of Actuation Test.

Specification : Check that the value of Air Mix Door Potentiometer at current data should be close to the value of the acutation test.



6. Does the value of current data follow in accordance with the each actuation test ?

YES	▸ This is a intermittent problem caused by poor contact of component or Control Unit ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to " Inspection and Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of Driver air mix actuator harness connector and chassis ground.

Specification : 0V

5. Is the measured voltage within specification?

YES	▸ Go to "Ground circuit Inspection " procedure.
NO	▸ Check for short to battery in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check passenger air mix actuator

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Driver air mix actuator and (-) terminal to COOL(-) .(Component side)
4. Verify that the temperature actuator operates to the cool position.
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	Ground	Max.warm
	Ground	12 V	Max.cool

6. Is "Door position" display near the specified value?

YES	▸ Go to "Check potentiometer" procedure.
NO	▸ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF".
2. Connect Driver air mix actuator and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in fig.2

FIG.2) Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.45V
Max.warm	4.55V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

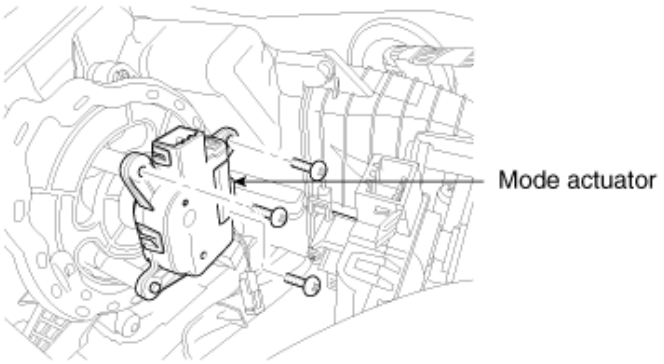
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

The mode control actuator mounted on heater unit adjusts position of mode door by operating Direction Motor based on signal of A/C control unit. Pressing mode select switch makes the mode control actuator shift in order of vent→ B/L → floor → mix.

DTC Description

Air conditioner Control Module sets DTC B1249 if Feedback signal of Mode Actuator has been detected below 0.1V for 100ms.

DTC Detecting Condition

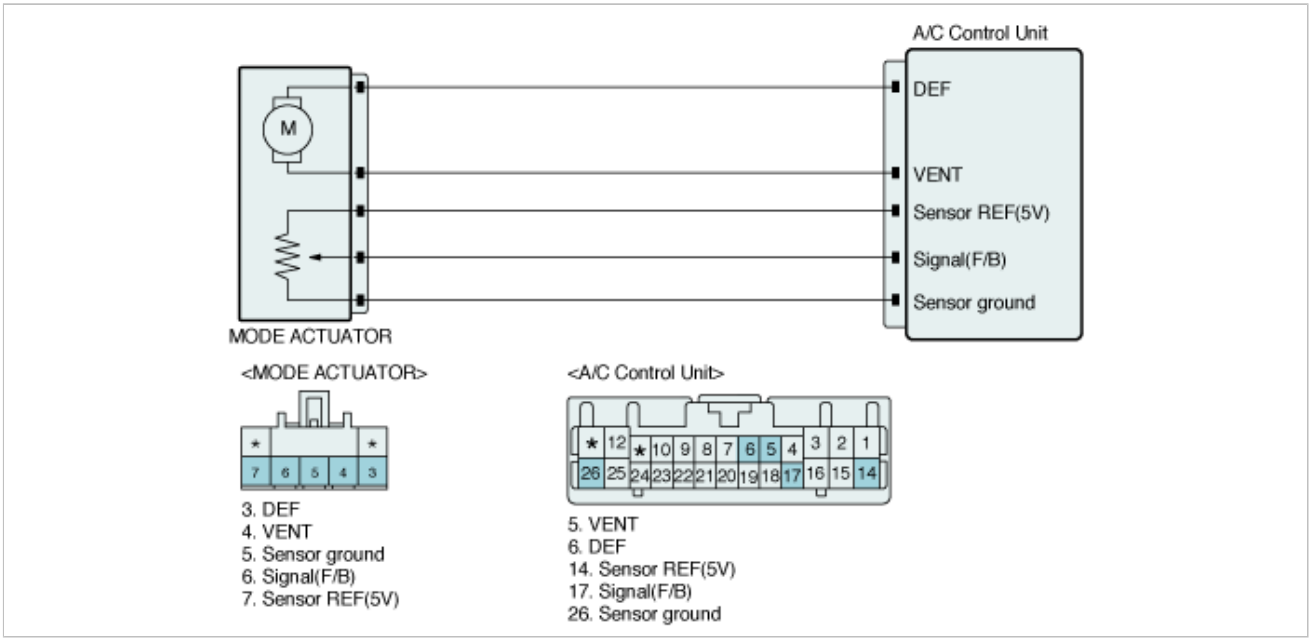
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Pooer Connection in harness • Open in signal (Feedback signal),Power or Gruoud circuit • Faulty Mode Actuator • Faulty Air conditioner Control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of Mode Actuator has been detected below 0.1V for 100ms.	
Fail safe	• Setting mode : VENT Fix at VENT position • Setting mode : Except VENT Fix at DEF position	

Specification

※ Voltage value of potentiometer as a function of mode door position.

Mode Door Position	Voltage
VENT	0.5±0.2V
BI-LEVEL	1.5±0.2V
FLOOR	2.6±0.3V
MIX	3.5±0.2V
DEF	4.5±0.2V

Diagnostic Circuit Diagram

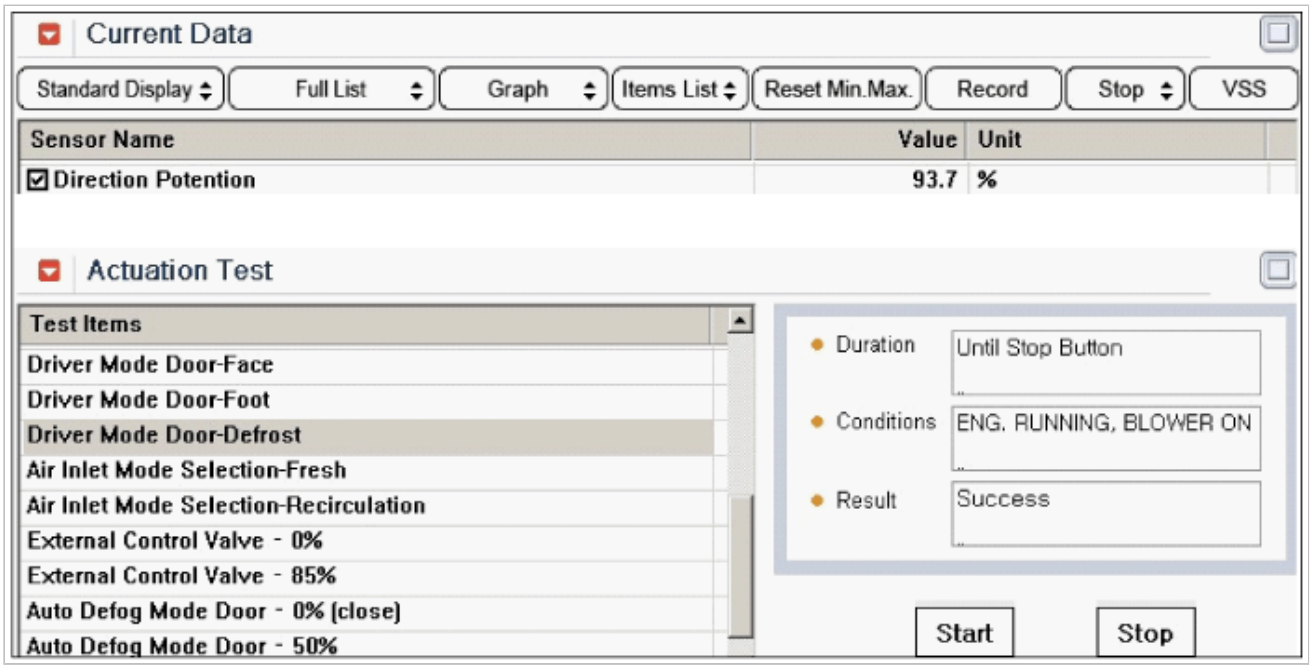


Monitor Scantool Data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Direction Potention" parameter on scantool.
4. Select and perform Actuation test Driver Mode Door - Face / Foot / Defrost in order.
5. Check that the value of all the parameters are changed when performing the actuation test.

Specification : Face - About below 10%, Foot : About 50%, Defrost : About 90%.



6. Are all the parameters changed when performing Actuation test ?

YES	▸ This is a intermittent problem caused by poor contact of component or Control Unit ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.

	▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to " Inspection and Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Driver Direction actuator harness connector and Signal(F/B) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to "Check short to ground in harness" as follows.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Driver Direction actuator harness connector and chassis ground.

Specification : Infinity

4. Is the measured resistance within specification?

YES	▸ Go to "Power circuit Inspection " procedure.
NO	▸ Check for short to ground in control harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and Connect A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Sensor REF(5V) terminal of Driver Direction actuator harness connector and chassis ground.

Specification : Approx. 5V

5. Is the measured voltage within specification?

YES	▸ Go to "Ground circuit Inspection " procedure.
NO	▸ Check for open and short to ground in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Driver Direction actuator harness connector and Sensor ground (-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver Direction actuator

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Driver Direction actuator and (-) terminal to COOL(-) .(Component side)
4. Verify that the temperature actuator operates to the cool position.
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

Actuator harness	DEF (+)	VENT (-)	Door position
Battery terminal	12 V	Ground	VENT.Mode
	Ground	12 V	DEF.Mode

6. Is "Door position" display near the specified value?

YES	▸ Go to "Check potentiometer" procedure.
NO	▸ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF".
2. Connect Driver Direction actuator and A/C control unit main harness connector.
3. Ignition "ON".

4. Measure voltage between Signal(F/B) terminal of Driver Direction actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in fig.2

FIG.2) ※ Voltage value of Direction potentiometer as a function of position of mode switch

Mode Door Position	Voltage
VENT	0.5±0.2V
BI-LEVEL	1.5±0.2V
FLOOR	2.6±0.3V
MIX	3.5±0.2V
DEF	4.5±0.2V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

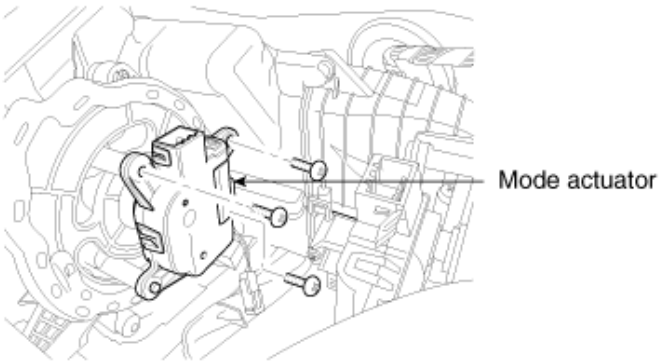
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

The mode control actuator mounted on heater unit adjusts position of mode door by operating Direction Motor based on signal of A/C control unit. Pressing mode select switch makes the mode control actuator shift in order of vent→ B/L → floor → mix.

DTC Description

Air conditioner Control Module sets DTC B1250 if Feedback signal of Mode Actuator has been detected over 4.9V for 100ms.

DTC Detecting Condition

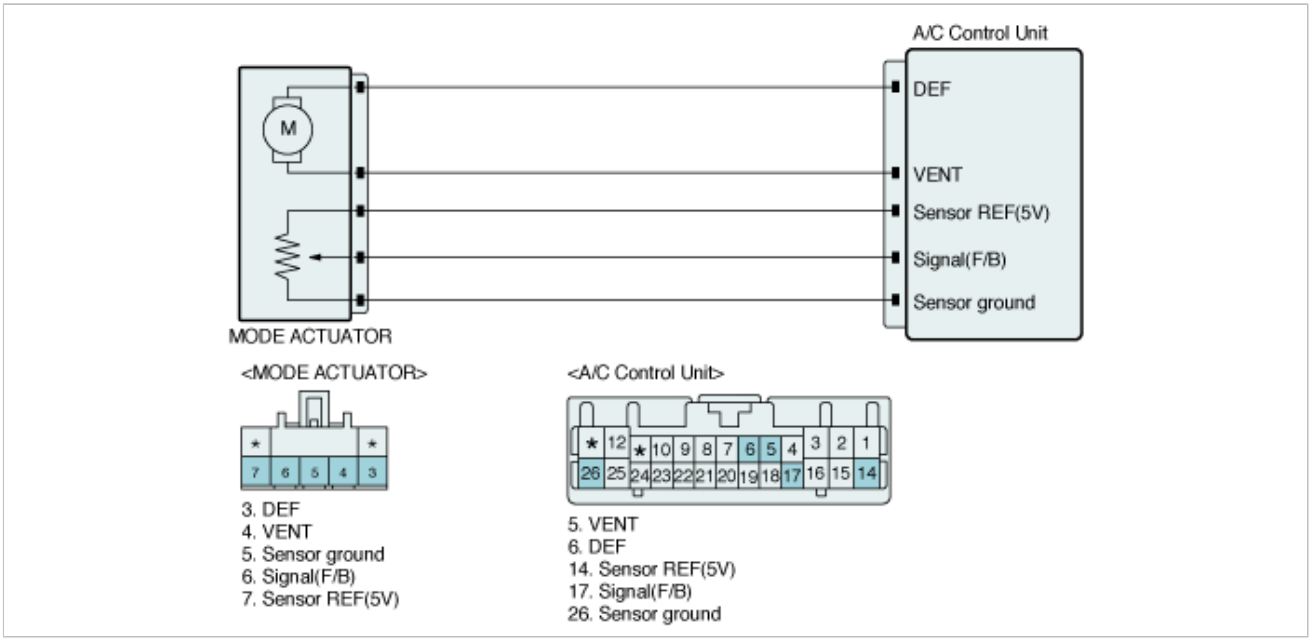
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Short in signal circuit(Feedback signal) • Faulty Mode Actuator • Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal of Mode Actuator has been detected over 4.9V for 100ms.	
Fail safe	• Setting mode : VENT Fix at VENT position • Setting mode : Except VENT Fix at DEF position	

Specification

※ Voltage value of potentiometer as a function of mode door position.

Mode Door Position	Voltage
VENT	0.5±0.2V
BI-LEVEL	1.5±0.2V
FLOOR	2.6±0.3V
MIX	3.5±0.2V
DEF	4.5±0.2V

Diagnostic Circuit Diagram

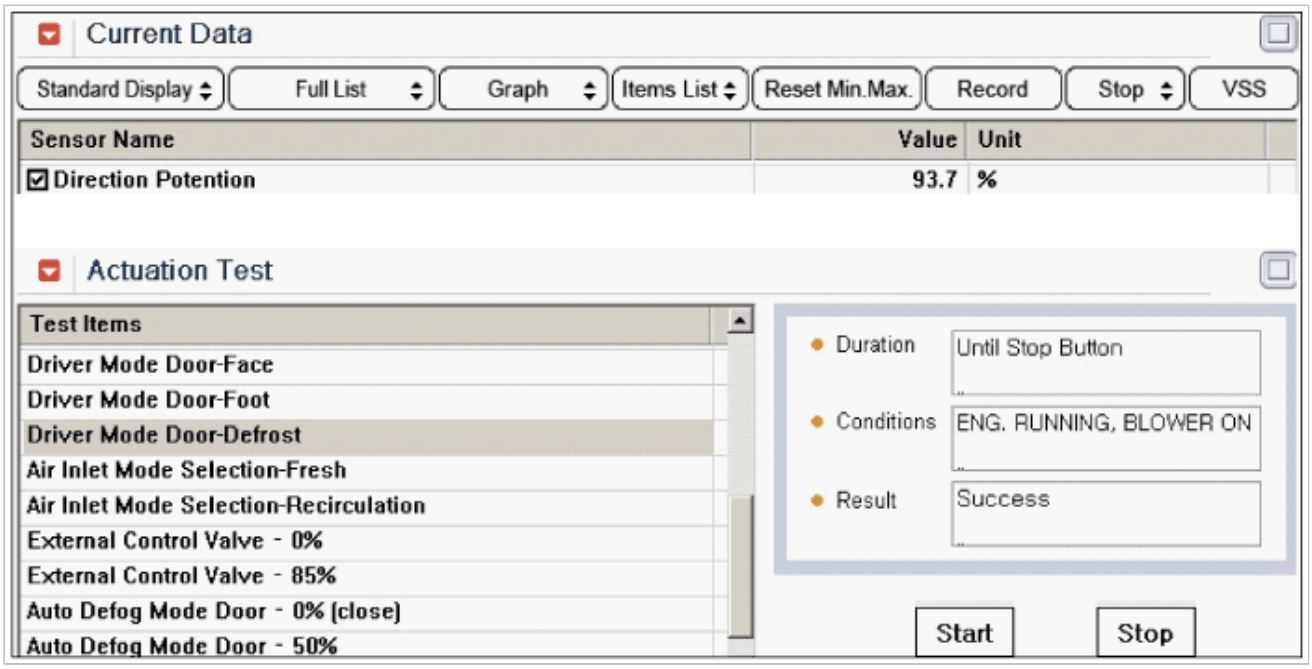


Monitor Scantool Data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Direction Potention" parameter on scantool.
4. Select and perform Actuation test Driver Mode Door - Face / Foot / Defrost in order.
5. Check that the value of all the parameters are changed when performing the actuation test.

Specification : Face - About below 10%, Foot : About 50%, Defrost : About 90%.



6. Are all the parameters changed when performing Actuation test ?

YES	▸ This is a intermittent problem caused by poor contact of component or Control Unit ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.

	▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to " Inspection and Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of Driver Direction actuator harness connector and chassis ground.

Specification : 0V

5. Is the measured voltage within specification?

YES	▸ Go to "Ground circuit Inspection " procedure.
NO	▸ Check for short to battery in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Driver Direction actuator harness connector and Sensor ground (-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

4. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver Direction actuator

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Driver Direction actuator and (-) terminal to COOL(-) .(Component side)

4. Verify that the temperature actuator operates to the cool position.
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

Actuator harness	DEF (+)	VENT (-)	Door position
Battery terminal	12 V	Ground	VENT.Mode
	Ground	12 V	DEF.Mode

6. Is "Door position" display near the specified value?

YES	▸ Go to "Check potentiometer" procedure.
NO	▸ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF".
2. Connect Driver Direction actuator and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of Driver Direction actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in fig.2

FIG.2) ※ Voltage value of Direction potentiometer as a function of position of mode switch

Mode Door Position	Voltage
VENT	0.5±0.2V
BI-LEVEL	1.5±0.2V
FLOOR	2.6±0.3V
MIX	3.5±0.2V
DEF	4.5±0.2V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

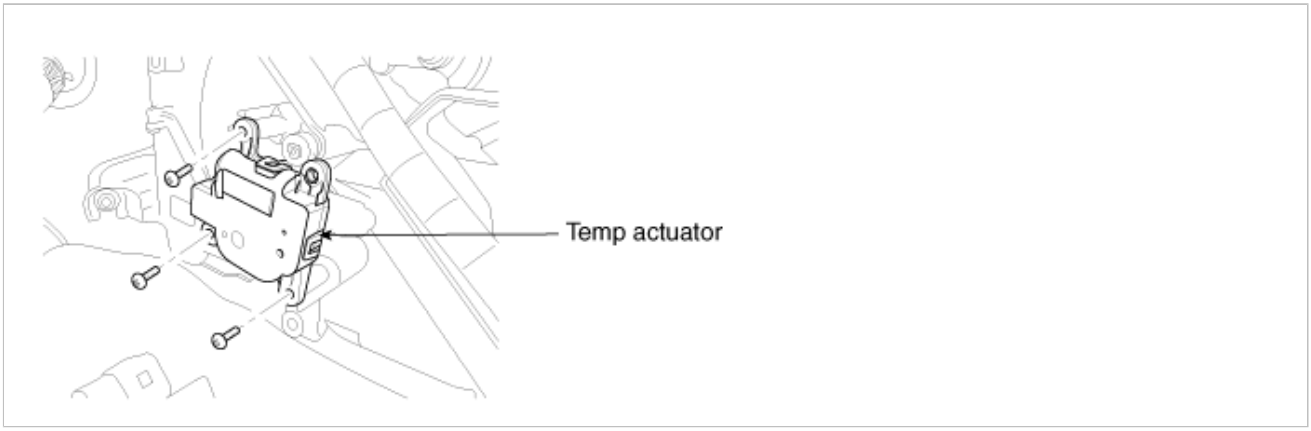
After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.

NO	▸ System is performing to specification at this time.

Componet Location



General Description

It contains temp motor that changes temp door position and potentiometer that monitors position of temp door.Temperature control actuator regulates the temperature by the procedure as follows. Signal from control unit adjusts position of temp door by operating temp motor and then temperature will be regulated by the hot/cold air ratio decided by position of temp door. In operation, potentiometer delivers temp door position transformed into voltage value to A/C ECU .

DTC Description

Air conditioner Control Module sets DTC B2406 if Driver air mix actuator has not been moved to the mode,where air condition control module controls, within 10 seconds.

DTC Detecting Condition

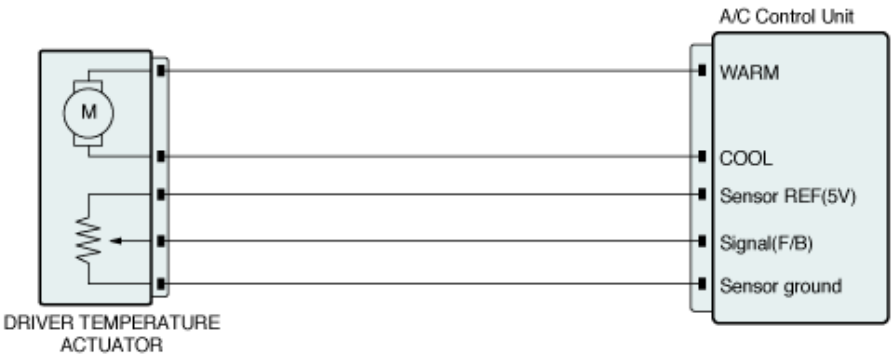
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty Driver air mix actuator • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 10 seconds.	
Fail safe	• Fixed as current position	

Specification

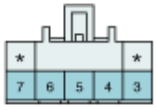
※ Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.45V
Max.warm	4.55V

Diagnostic Circuit Diagram

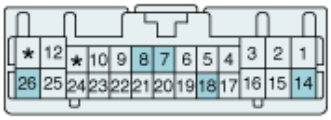


<DRIVER TEMPERATURE ACTUATOR>



3. WARA
4. COOL
5. Sensor ground
6. Signal(F/B)
7. Sensor REF(5V)

<A/C Control Unit>



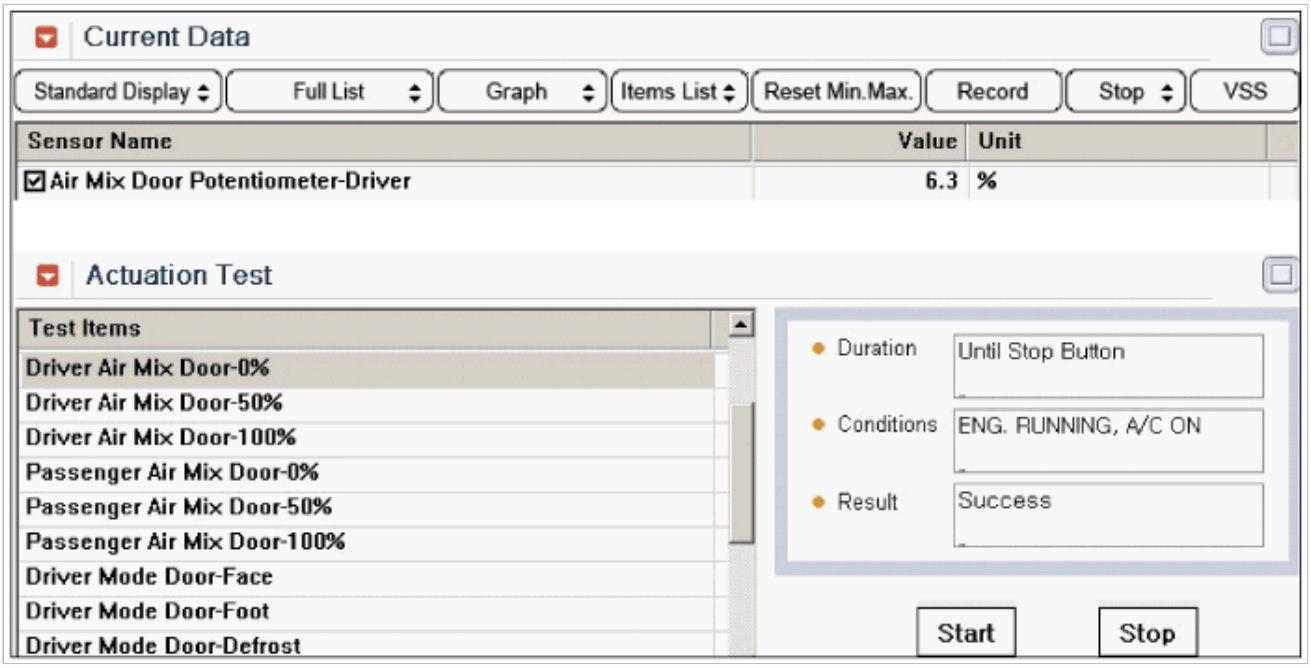
7. COOL
8. WARM
14. Sensor REF(5V)
18. Signal(F/B)
26. Sensor ground

Monitor Scantool Data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Air Mix Door Potentioner-Driver" parameter on scantool.
4. Select and perform Actuation test Air Mix Door Potentioner-Driver - 0% / 50% / 100% in order.
5. Check that the value of all the parameters are changed when performing the actuation test.

Specification : Check that the value of Air Mix Door Potentiometer at current data should be close to the value of the acutation test .



6. Does the value of current data follow in accordance with the each actuation test ?

	▸ This is a intermittent problem caused by poor contact of component or Control Unit

YES	▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to " Inspection and Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of Driver air mix actuator harness connector and WARM terminal of A/C-ECU harness connector.
4. Measure resistance between COOL terminal of Driver air mix actuator harness connector and COOL terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES	▸ Go to "Check short to ground in harness" as follows.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF".
2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of Driver air mix actuator harness connector and chassis ground.
4. Measure resistance between COOL terminal of Driver air mix actuator harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure .
NO	▸ Check for short to ground in control harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check passenger air mix actuator

1. Ignition "OFF".

2. Disconnect Driver air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of Driver air mix actuator and (-) terminal to COOL(-) .(Component side)
4. Verify that the temperature actuator operates to the cool position.
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

Actuator harness	WARM(+)	COOL(-)	Door position
Battery terminal	12 V	Ground	Max.warm
	Ground	12 V	Max.cool

6. Is "Door position" display near the specified value?

YES	▸ Go to "Check potentiometer" procedure.
NO	▸ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF".
2. Connect Driver air mix actuator and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of Driver air mix actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in fig.2

FIG.2) Voltage value of Air Mix potentiometer as a function of temp door position.

Door position	Voltage
Max. cool	0.45V
Max.warm	4.55V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix actuator and then go to "Verification of Vehicle Repair" procedure.

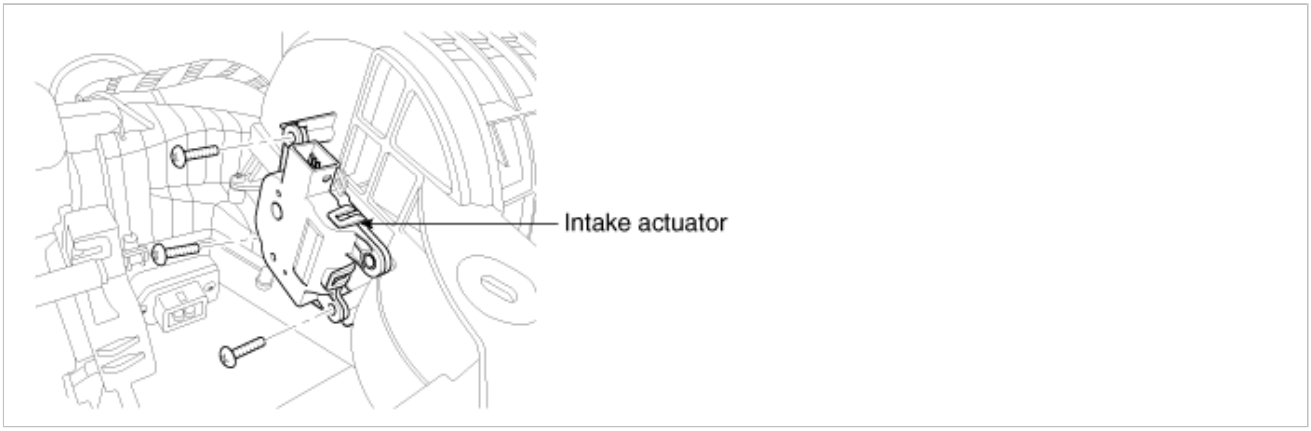
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

It contains intake motor that changes intake door position and potentiometer that monitors position of intake door. When driver operates the intake switch, ECU receives mode signal from intake switch and operates intake door motot to turn intake door to intended position. (with FRE mode signal, intake door is closed and with REC mode signal, intake door is opened)
In operation, potentiometer delivers intake door position transformed into voltage value to A/C ECU.

DTC Description

Air conditioner Control Module sets DTC B2408 if Intake actuator has not been moved to the mode,where air condition control module controls, within 10 seconds.

DTC Detecting Condition

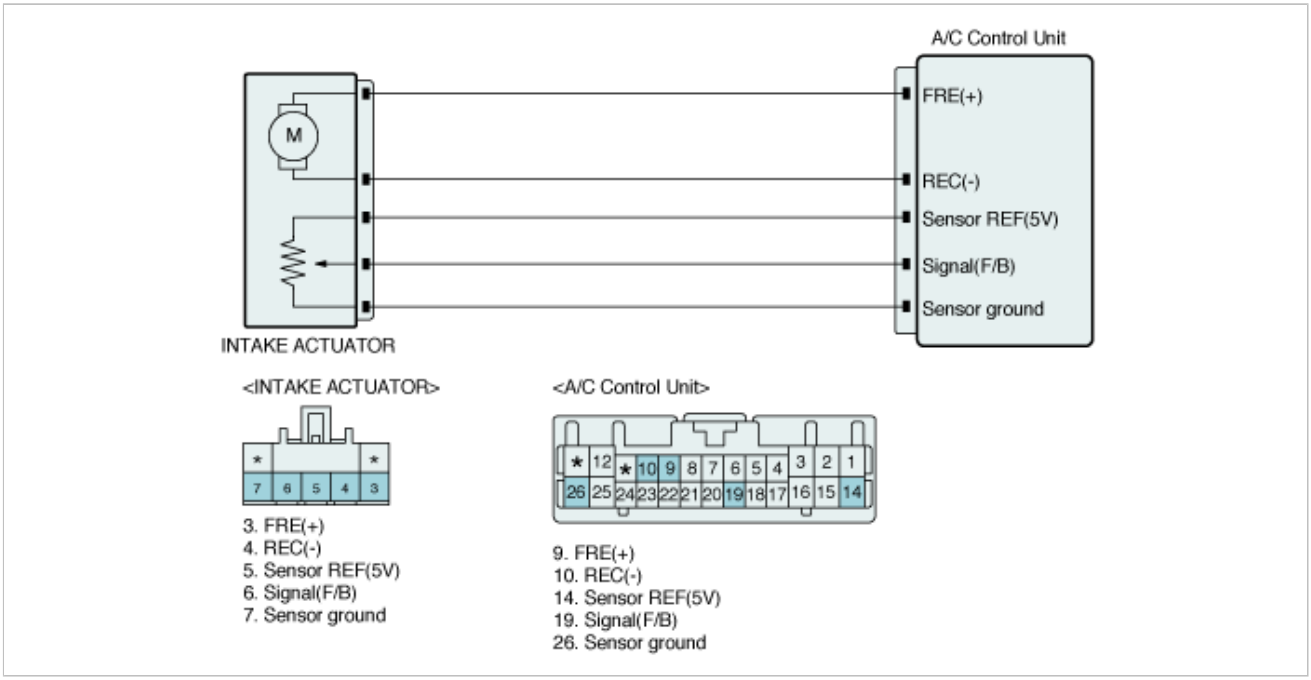
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty Intake actuator • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 10 seconds	
Fail safe	• Fixed as current position	

Specification

※ Voltage value of Intake potentiometer as a function of position of Intake door

Door position	Voltage
FRE	0.45V
REC	4.55V

Diagnostic Circuit Diagram

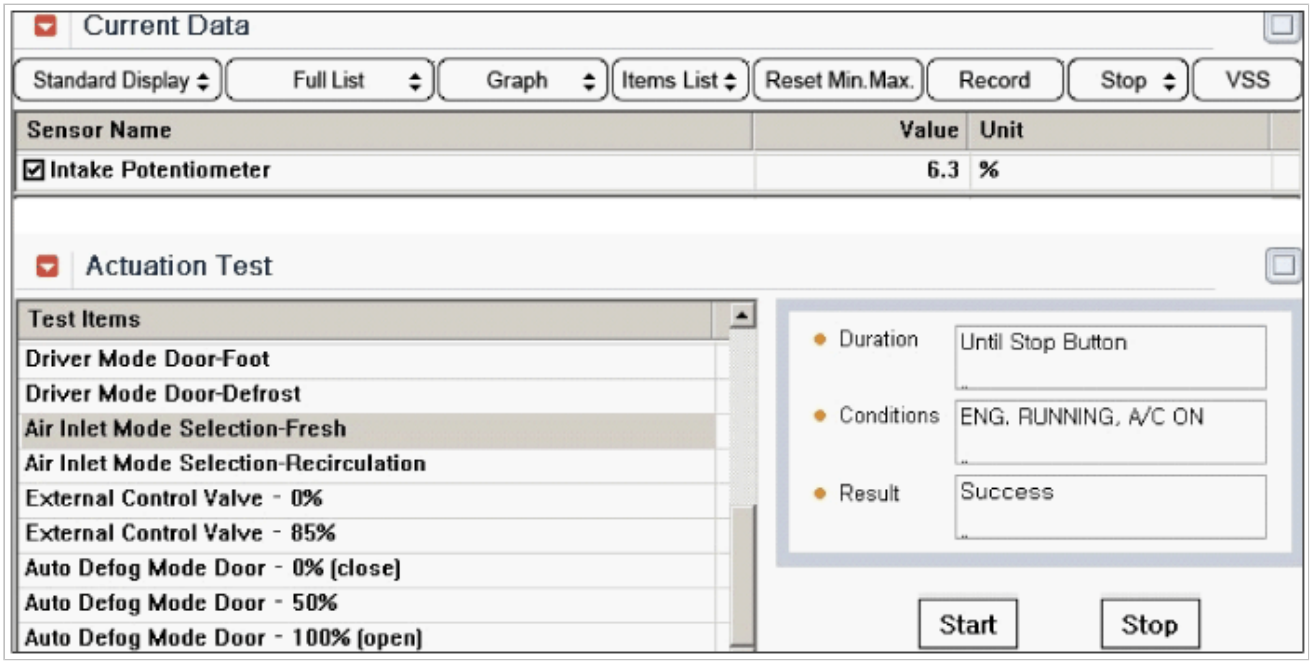


Monitor Scantool Data

■ Check Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start.
3. Select " Intake Potentiometer " parameter on the current data with scantool.
4. Perform Actuation Test for " Air Inlet Mode Selection - Reculation /Fresh in order.
5. With performing Actuation test, check that the value of each position sensors are changing.

Specification - Recirculation : About 90%, Fresh : About 10%.



6. Are the value of each position sensors changed when performing actuation test ?

YES	▸ This is a intermittent problem caused by poor contact of component or Control Unit ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or

	damage of connector. ▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to " Inspection/Repair " procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between FRE(+) terminal of Intake actuator harness connector and FRE(+) terminal of A/C-ECU harness connector.
4. Measure resistance between REC(-) terminal of Intake actuator harness connector and REC(-) terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES	▸ Go to "Check short to ground in harness" as follows.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Measure resistance between FRE(+) terminal of Intake actuator harness connector and chassis ground.
4. Measure resistance between REC(-) terminal of Intake actuator harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure .
NO	▸ Check for short to ground in control harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Intake actuator

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.

3. Connect (+) terminal of battery to FRE(+) of intake actuator and (-) terminal to REC(-) .(Component side)
4. Verify that the actuator operates to the REC position.
5. Verify that the temperature actuator operates to the FRE position with reverse connecting.(REC(-) and FRE(+)) (Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

Actuator harness	FRE(+)	REC(-)	Door position
Battery terminal	12 V	Ground	FRE
	Ground	12 V	REC

6. Is "Door position" display near the specified value?

YES	▸ Go to "Check potentiometer" procedure.
NO	▸ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF".
2. Disconnect Intake actuator and A/C control unit main harness connector.
3. Ignition "ON"(ENGINE "OFF").
4. Measure voltage between Signal(F/B) terminal of Intake actuator harness connector and chassis ground .(Component side)

Specification : Refer the specifications in fig.2

FIG.2) Specifications : Voltage value of intake potentiometer as a function of intake door position.

Door position	Voltage
FRE	0.45V
REC	4.55V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good Intake actuator and check for proper operation. If the problem is corrected, replace Intake actuator and then go to "Verification of Vehicle Repair" procedure.

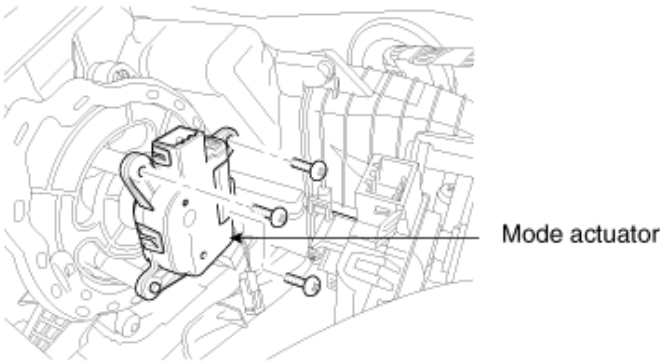
Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.

Componet Location



General Description

The mode control actuator mounted on heater unit adjusts position of mode door by operating Direction Motor in accordance with signal of A/C control unit. Pressing mode select switch makes the mode control actuator shift in order of vent→ B/L → floor → mix.

DTC Description

Air conditioner Control Module sets DTC B2409 if Driver Direction actuator has not been moved to the mode,where air condition control module controls, within 10 seconds.

DTC Detecting Condition

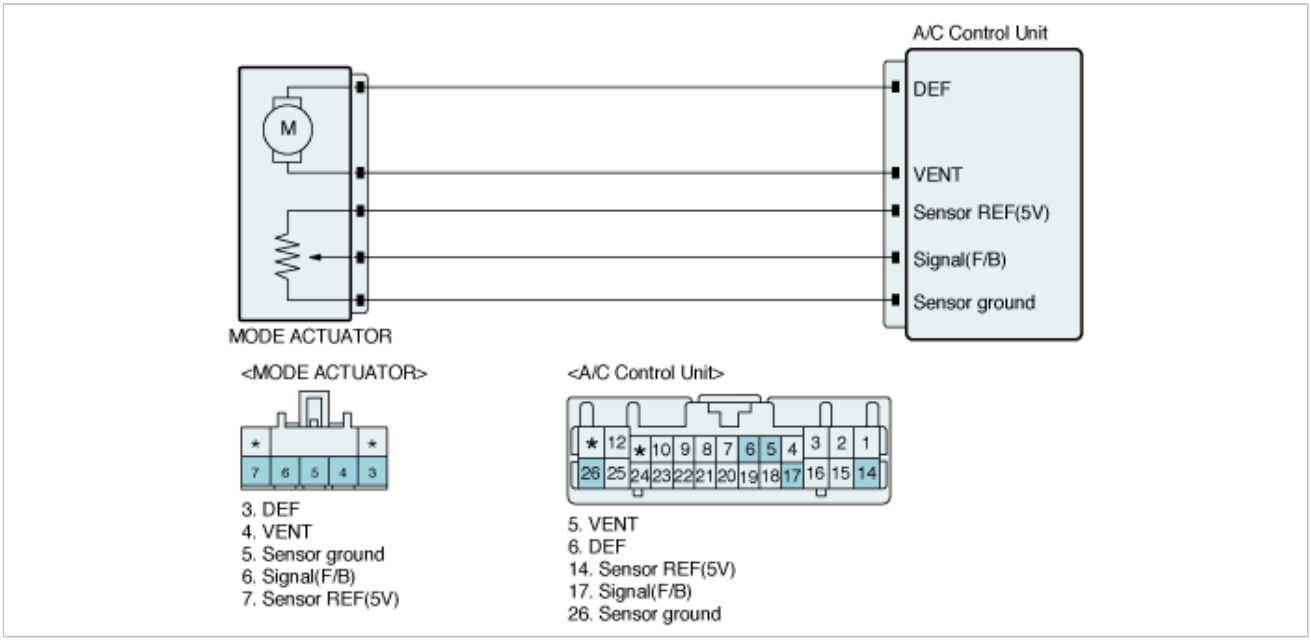
Item	Detecting Condition	Possible Cause
DTC Strategy	• Voltage check	• Poor contact in harness • Open or short in motor power circuit • Faulty Driver Direction actuator • Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 10 seconds	
Fail safe	• Fixed as current position	

Specification

※ Voltage value of potentiometer as a function of mode door position.

Mode Door Position	Voltage
VENT	0.5±0.2V
BI-LEVEL	1.5±0.2V
FLOOR	2.6±0.3V
MIX	3.5±0.2V
DEF	4.5±0.2V

Diagnostic Circuit Diagram

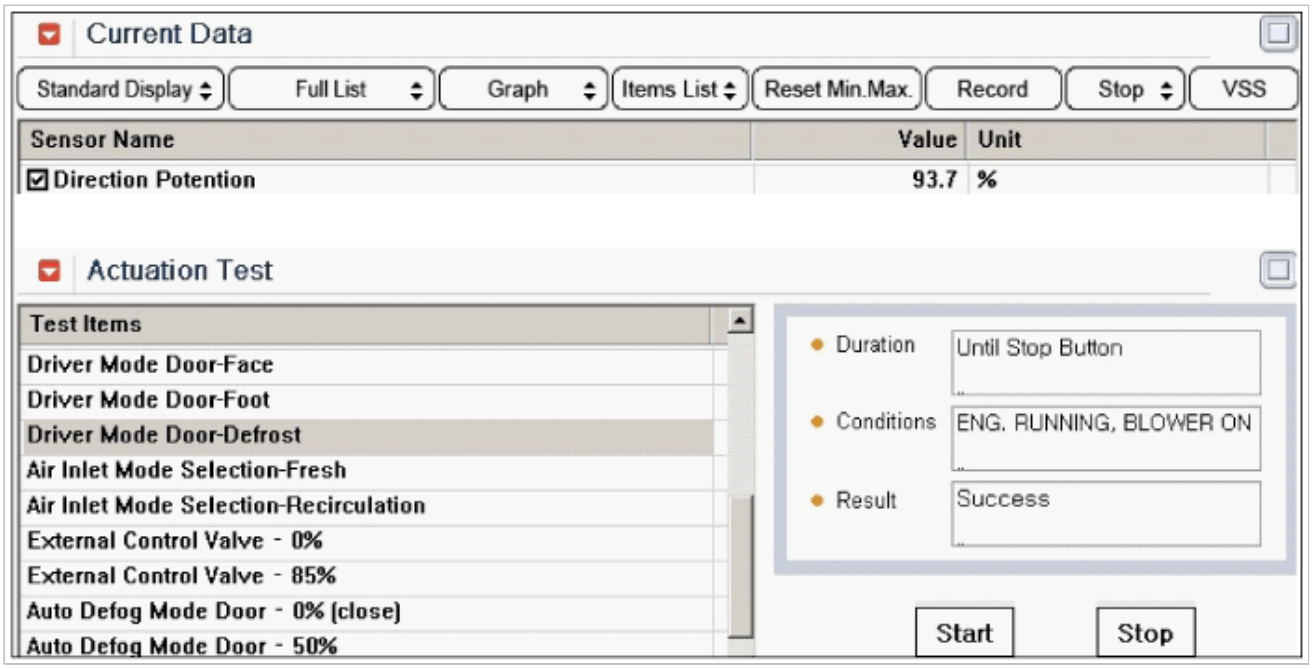


Monitor Scantool Data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature afte engine starts.
3. Select and monitor "Direction Potention" parameter on scantool.
4. Select and perform Actuation test Driver Mode Door - Face / Foot / Defrost in order.
5. Check that the value of all the parameters are changed when performing the actuation test.

Specification : Face - About below 10%, Foot : About 50%, Defrost : About 90%.



6. Are all the parameters changed when performing Actuation test ?

YES	▸ This is a intermittent problem caused by poor contact of component or Control Unit ▸ Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector.

	▸ Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to " Inspection and Repair" procedure.

Terminal & Connector Inspection

1. Many malfunctions in the electrical system are caused by poor harness and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
3. Has a problem been found?

YES	▸ Repair as necessary and go to "Verification of Vehicle Repair" procedure.
NO	▸ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between DEF terminal of Driver Direction actuator harness connector and DEF terminal of A/C-ECU harness connector.
4. Measure resistance between VENT terminal of Driver Direction actuator harness connector and VENT terminal of A/C-ECU harness connector.

Specification : 1Ω below

5. Is the measured resistance within specification?

YES	▸ Go to "Check short to ground in harness" as follows.
NO	▸ Check for open in harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check short to ground in harness

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.
3. Measure resistance between DEF terminal of Driver Direction actuator harness connector and chassis ground.
4. Measure resistance between VENT terminal of Driver Direction actuator harness connector and chassis ground.

Specification : Infinity

5. Is the measured resistance within specification?

YES	▸ Go to " Component inspection " procedure .
NO	▸ Check for short to ground in control harness. ▸ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver Direction actuator

1. Ignition "OFF".
2. Disconnect Driver Direction actuator and A/C control unit main harness connector.

3. Connect (+) terminal of battery to WARM(+) of Driver Direction actuator and (-) terminal to COOL(-) .(Component side)
4. Verify that the temperature actuator operates to the cool position.
5. Verify that the temperature actuator operates to the warm position with reverse connecting.(WARM(+) and COOL(-)) . (Component side)

Specification : Refer the specifications in fig.1

FIG.1) ※ Function of the actuator motor according to terminal connection type. (observe safety regulations)

Actuator harness	DEF (+)	VENT (-)	Door position
Battery terminal	12 V	Ground	VENT.Mode
	Ground	12 V	DEF.Mode

6. Is "Door position" display near the specified value?

YES	▸ Go to "Check potentiometer" procedure.
NO	▸ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

1. Ignition "OFF".
2. Connect Driver Direction actuator and A/C control unit main harness connector.
3. Ignition "ON".
4. Measure voltage between Signal(F/B) terminal of Driver Direction actuator harness connector and Sensor ground(-) terminal of A/C-ECU harness connector .(Component side)

Specification : Refer the specifications in fig.2

FIG.2) ※ Voltage value of Direction potentiometer as a function of position of mode switch

Mode Door Position	Voltage
VENT	0.5±0.2V
BI-LEVEL	1.5±0.2V
FLOOR	2.6±0.3V
MIX	3.5±0.2V
DEF	4.5±0.2V

5. Is "voltage" display near the specified value?

YES	▸ Check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "Verification of Vehicle Repair" procedure.
NO	▸ Substitute with a known-good Driver Direction actuator and check for proper operation. If the problem is corrected, replace Driver Direction actuator and then go to "Verification of Vehicle Repair" procedure.

Verification of Vehicle Repair

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES	▸ Go to the applicable troubleshooting procedure.
NO	▸ System is performing to specification at this time.