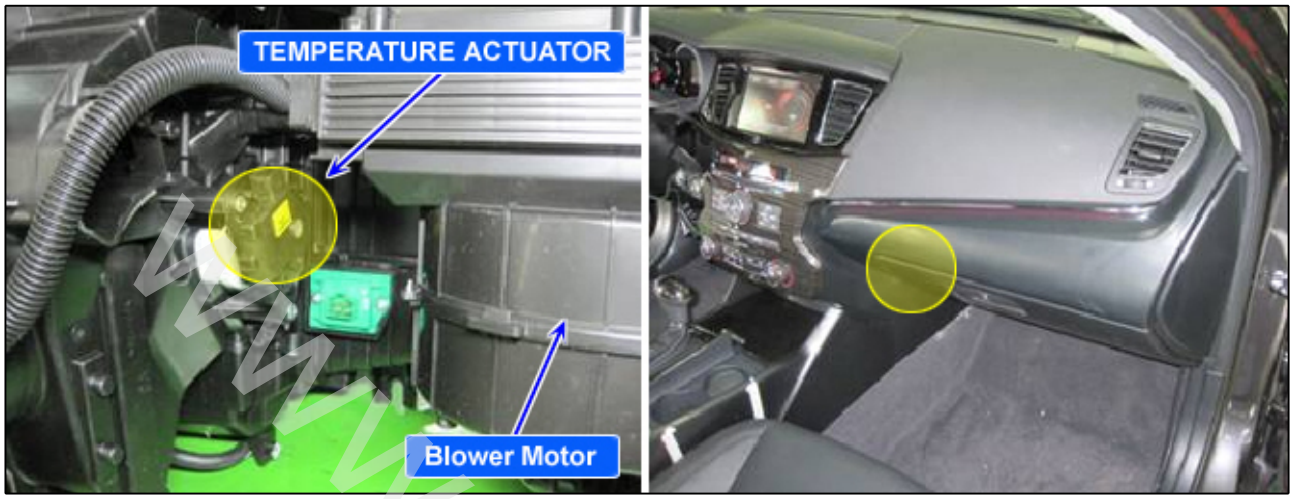
B1204 Air Mix Potentiometer Open (Low)–Passenger

Component Location



YG12AC0B120411

General Description

Temperature control actuator located at heater unit. 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

The Airconditioner Control Module sets DTC B1204 if the Feed Back signal of Passenger Temperature Actuator has been detected open or below 0.1V for 0.3 seconds.

DTC Detecting Condition

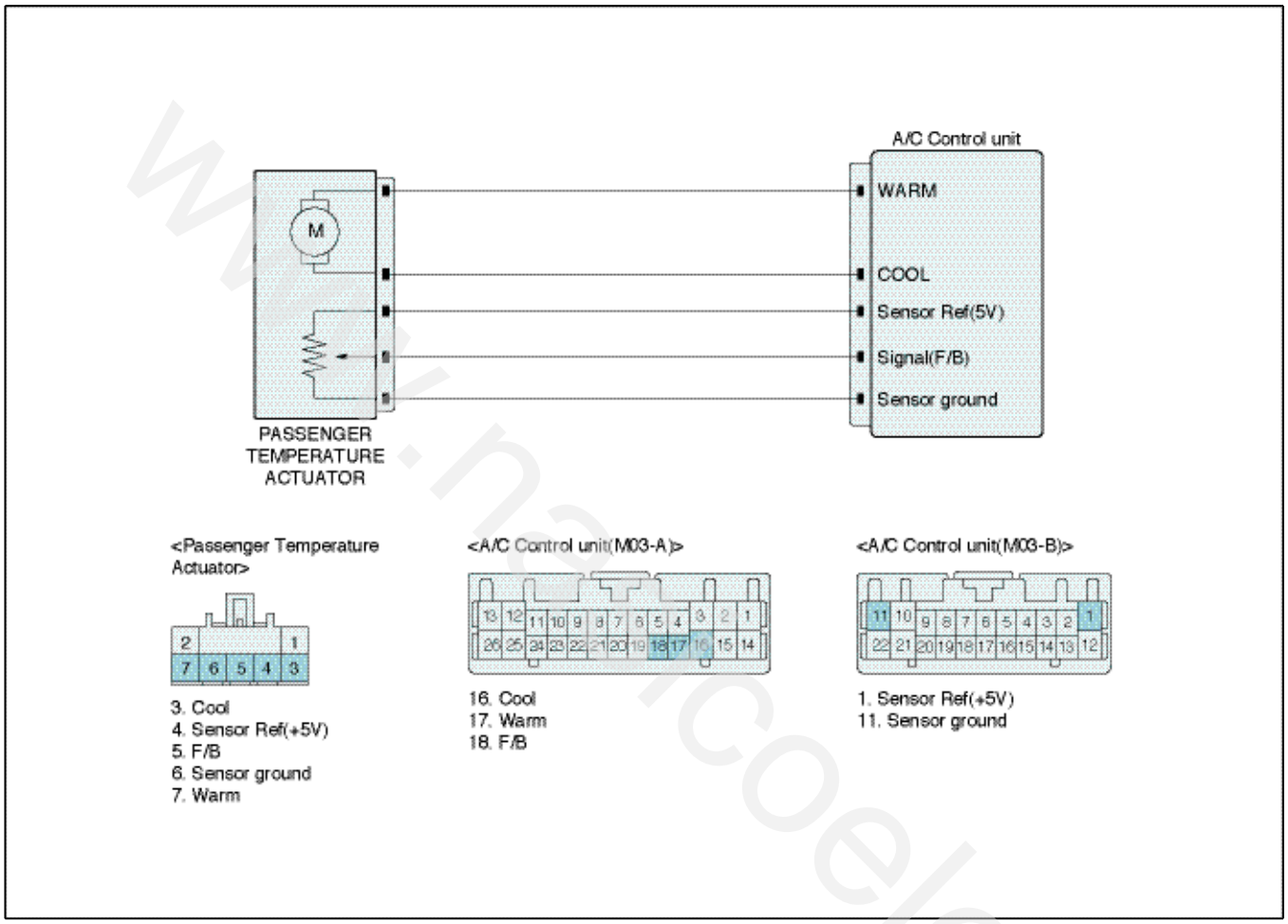
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor connection of connected part 2. Open in signal circuit (Feedback circuit), Power circuit or Ground Circuit 3. Faulty passenger air mix actuator 4. Faulty A/C control unit
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal has been detected open or below 0.1 V for 0.3 seconds	
Failsafe	• setting temperature : 16℃(62.6˚F)-24℃(76.1˚F) fix at max. cooling position • setting temperature : 25℃(77˚F)-31℃(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	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



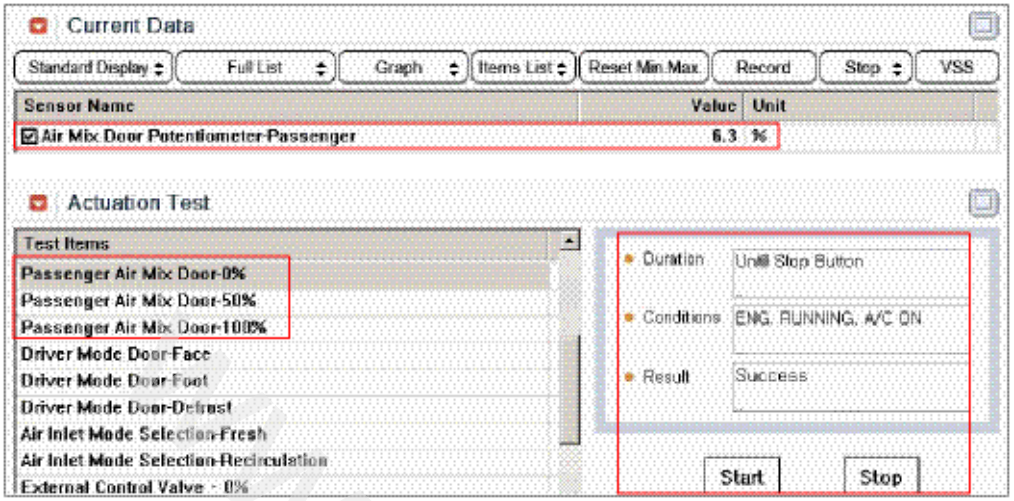
VG12AC50B1204D

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 "Air Mix Door Potentiometer-Passenger" parameter on the current data with scantool.
4. Perform Actuation Test for "Passenger Air Mix Door - 0% / 50% / 100%.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer 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 .



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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/Repair " procedure.

Terminal and 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.

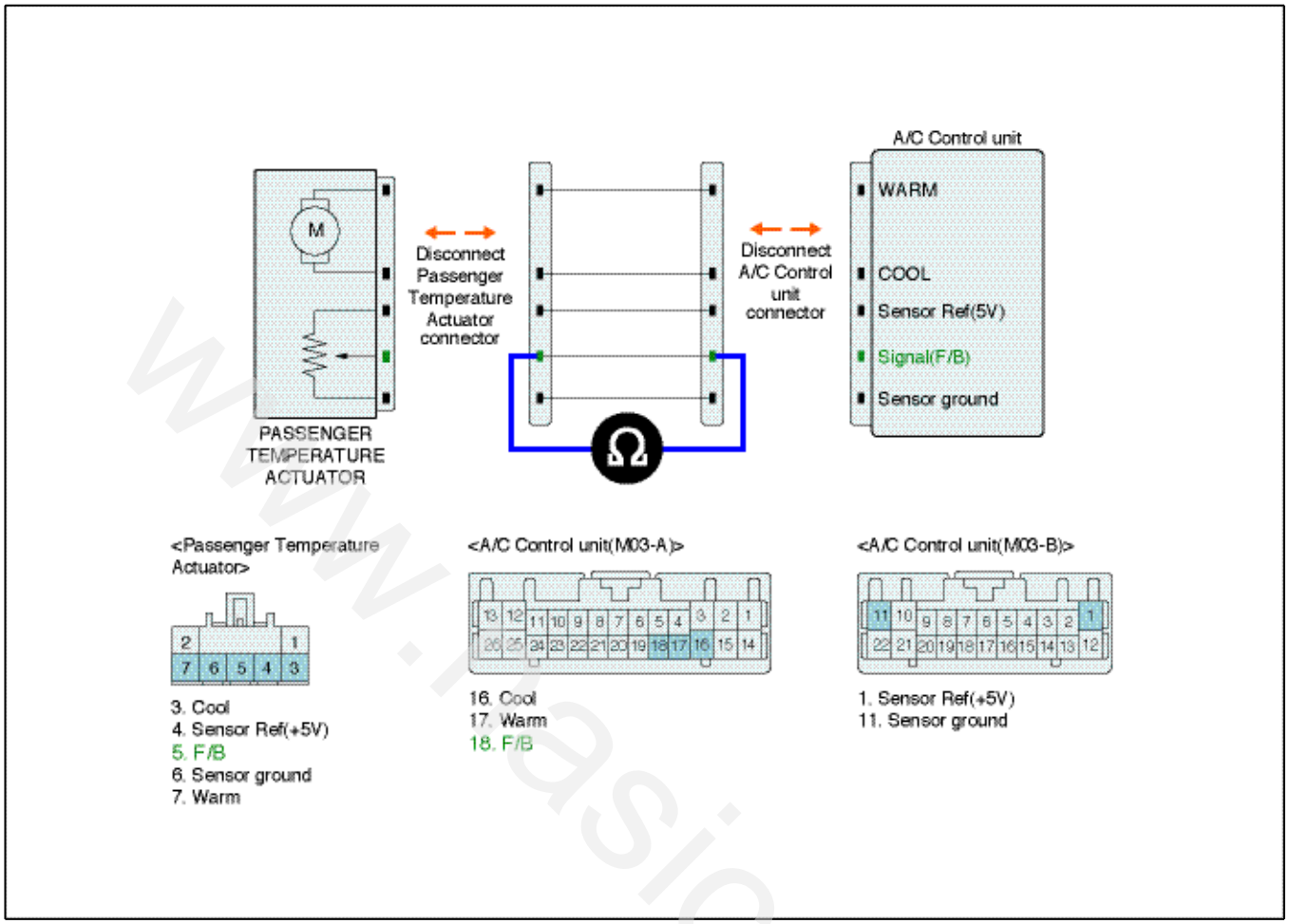
NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B120431

4. Is the measured resistance within specification?

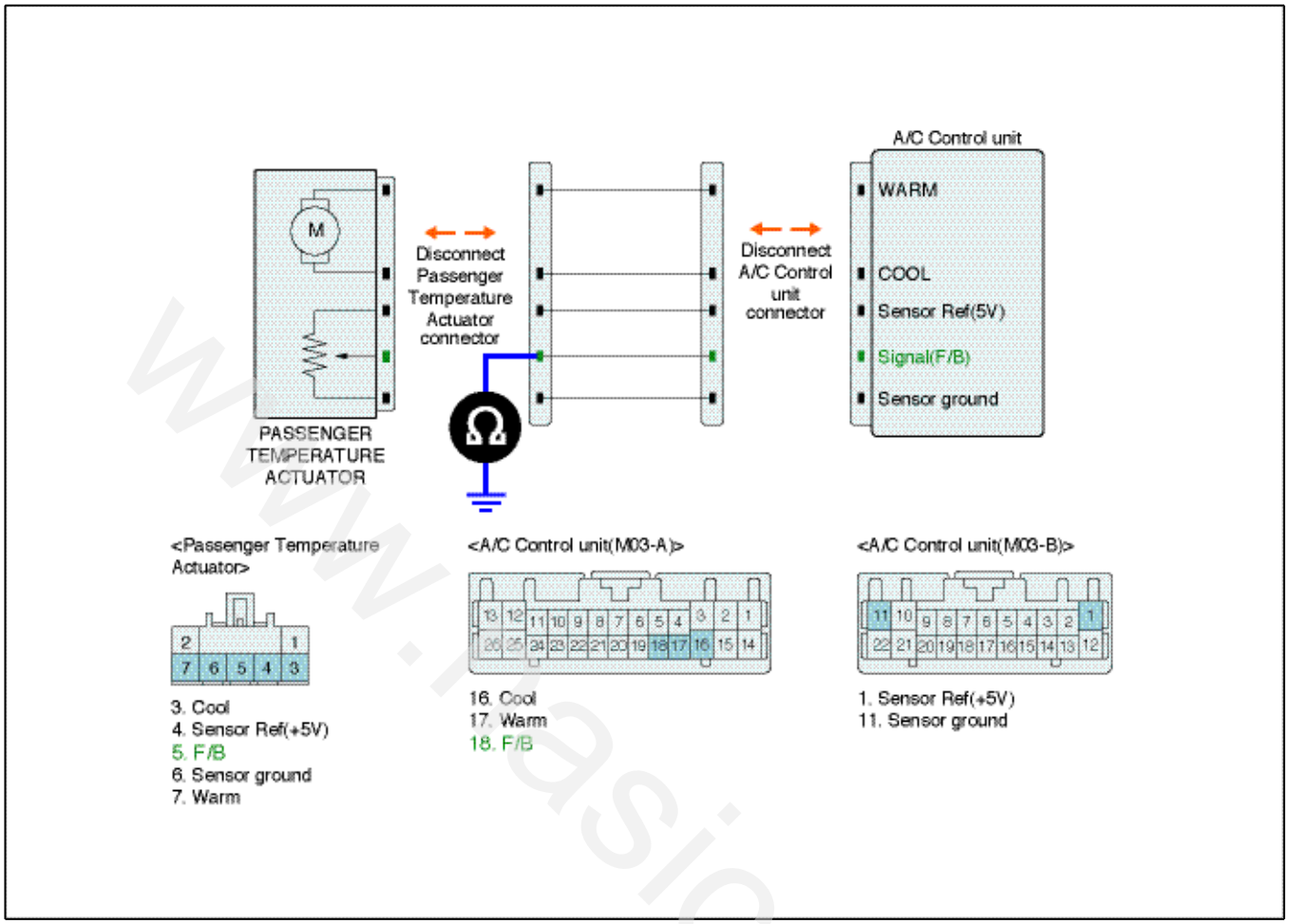
YES ▶ Go to "Check short to ground in harness" as follows.

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 passenger air mix actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of passenger air mix actuator harness connector and chassis ground .

Specification : Infinity



VG12AC50B120432

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection" procedure.

NO ▶ Check for short to ground in control harness .

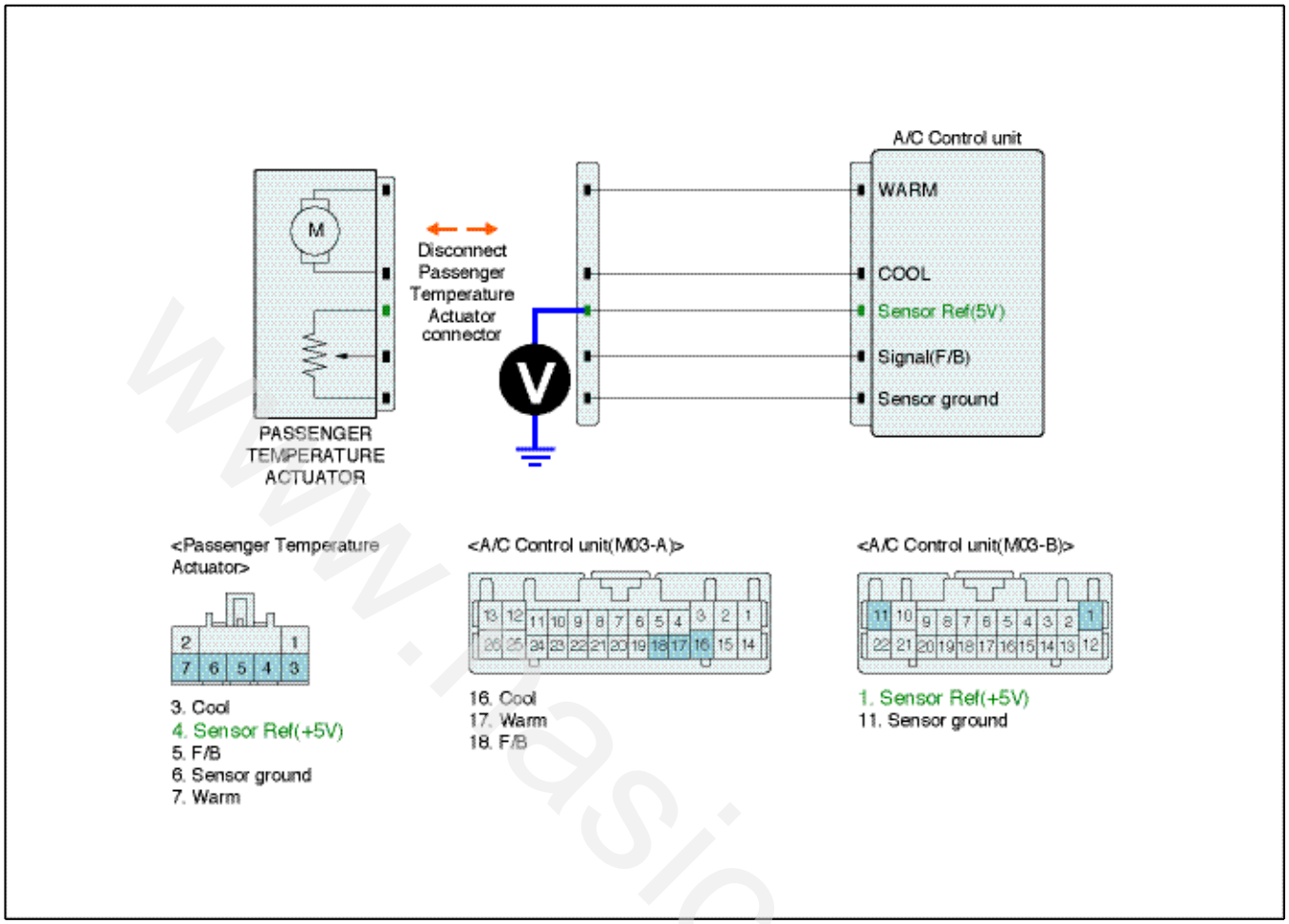
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

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

Specification : approx. 5V



VG12AC50B120433

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

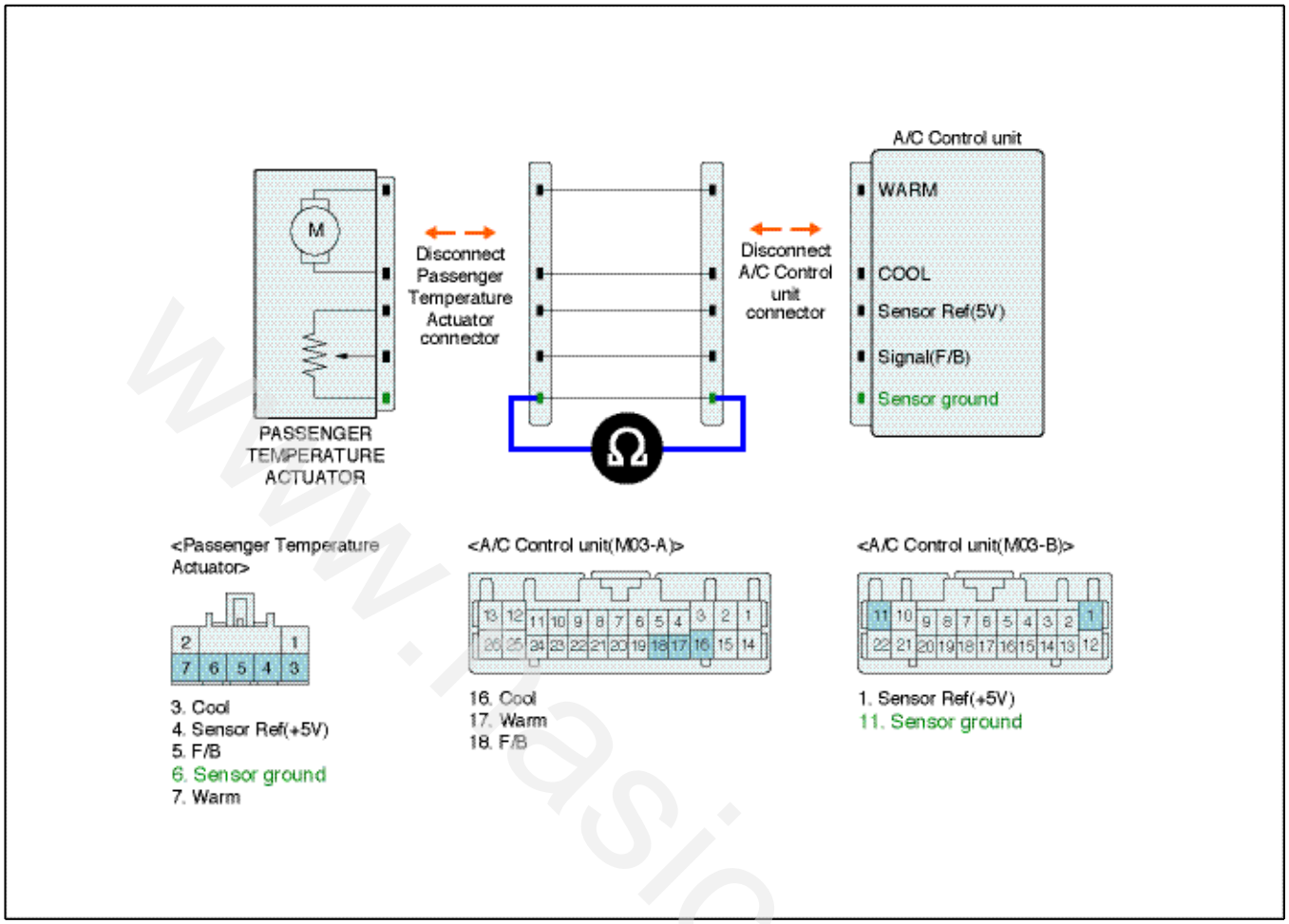
NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B120434

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

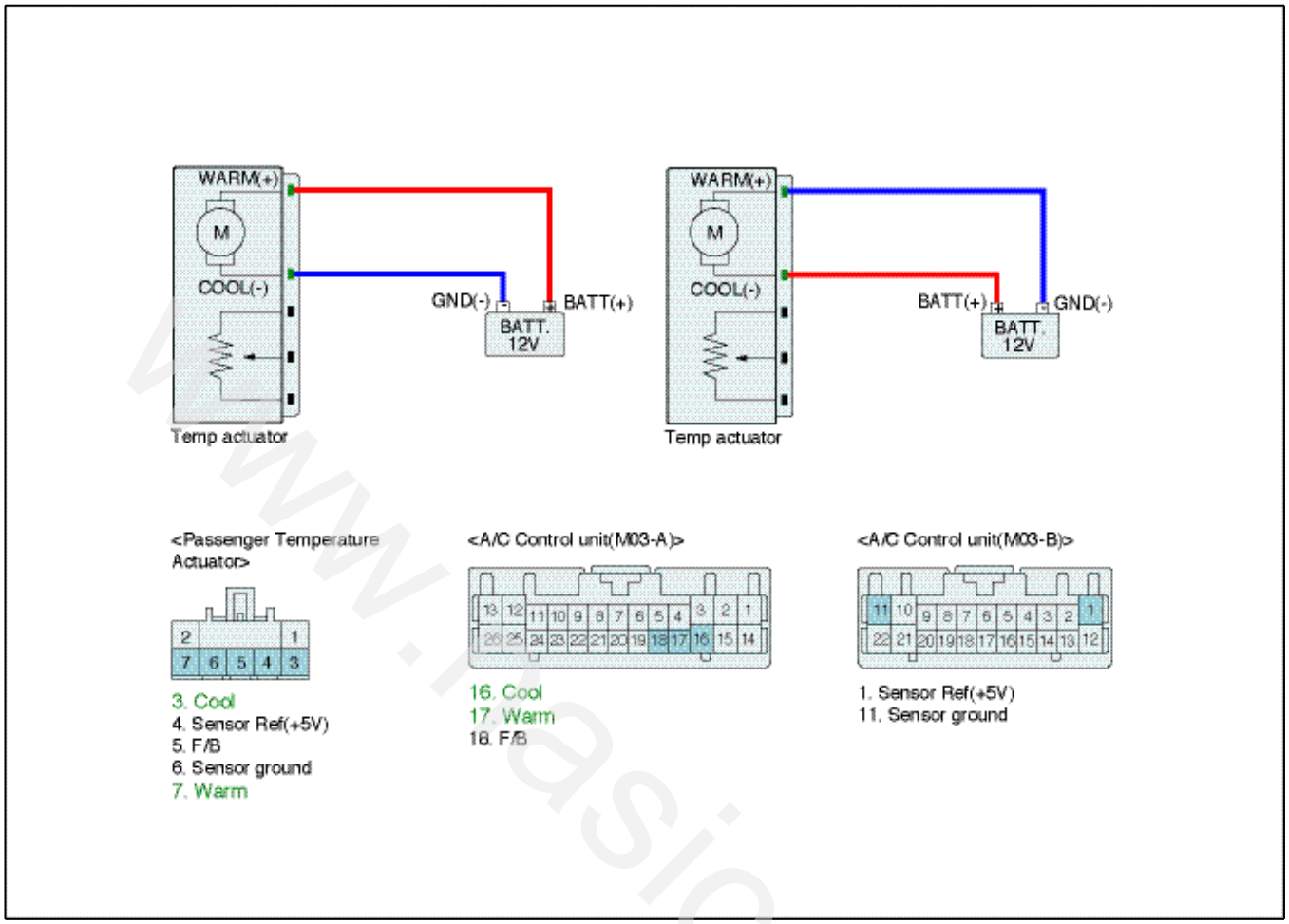
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check passenger air mix actuator

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of passenger 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)



VG12AC50B120441

Fig.1)

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

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

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

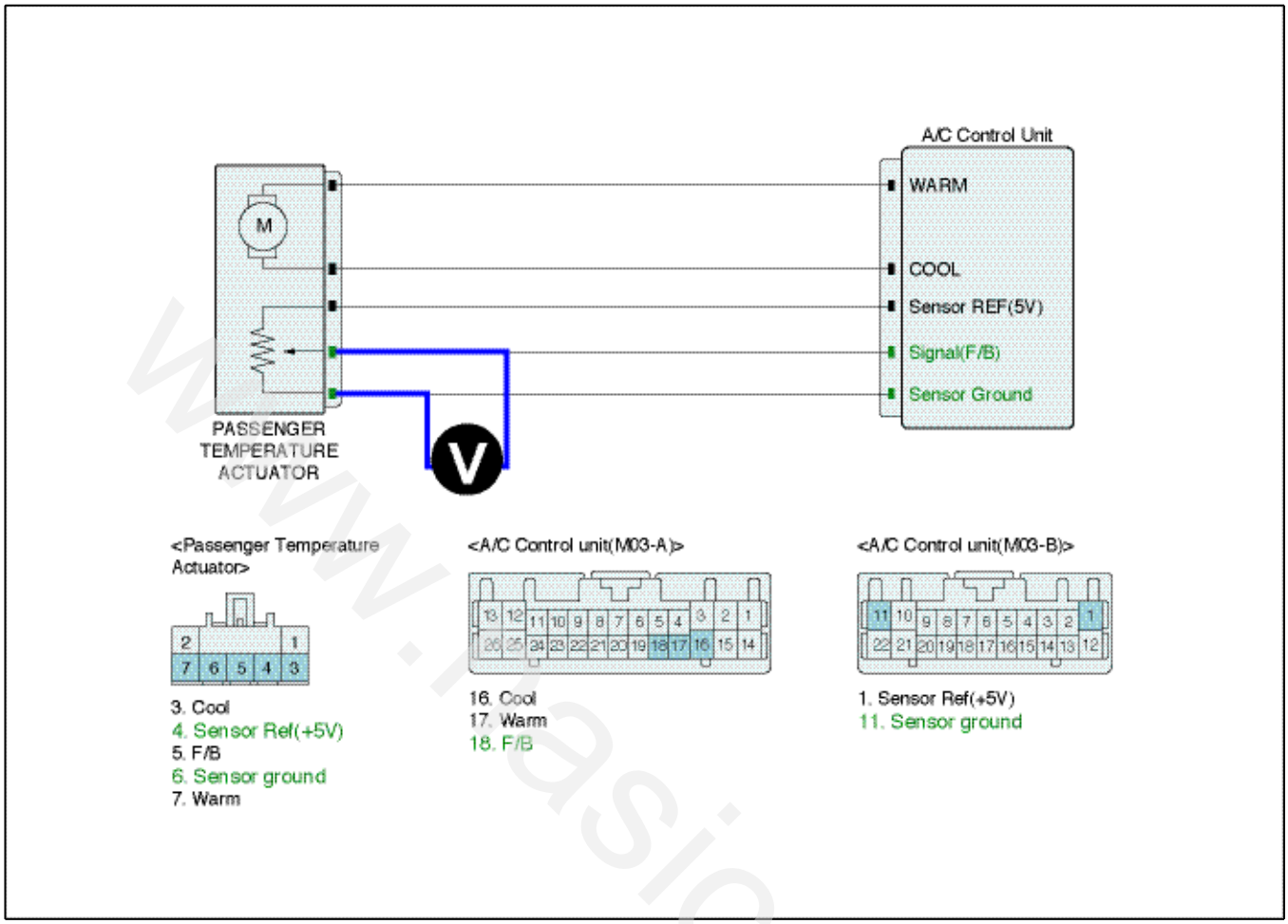
YES ▶ Go to "Check potentiometer" procedure.

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

■ Check potentiometer

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

Specification : Refer the specifications in Fig.2)



VG12AC50B120442

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

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

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 passenger air mix actuator and check for proper operation. If the problem is corrected, replace passenger 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.

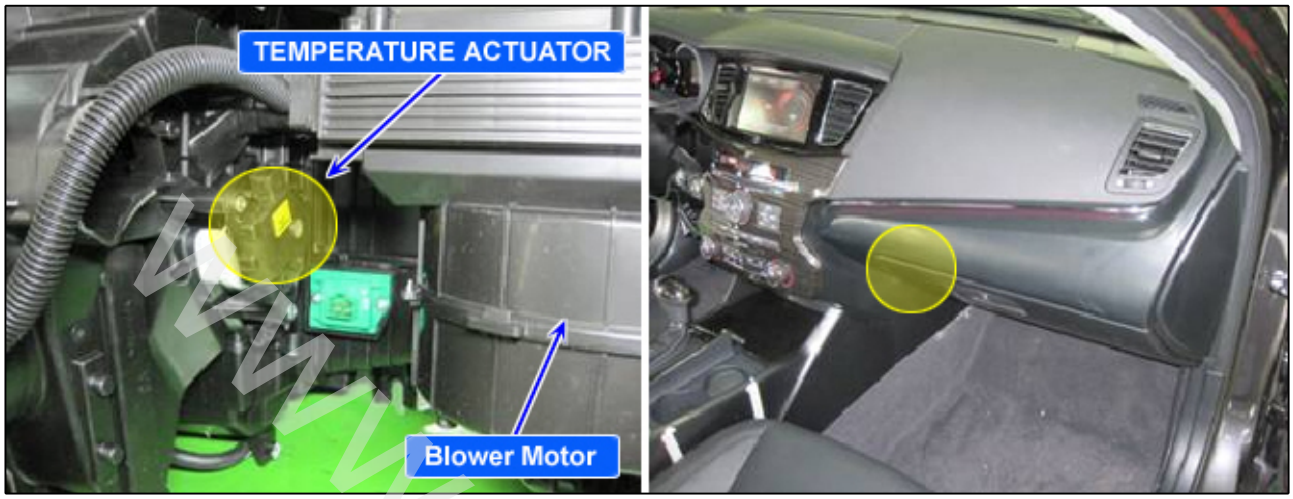
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1205 Air Mix Potentiometer Short (High)–Passenger

Component Location



YG12AC0B120411

General Description

Temperature control actuator located at heater unit. 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

The Airconditioner Control Module sets DTC B1205 if the Feed Back signal of Passenger Temperature Actuator has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

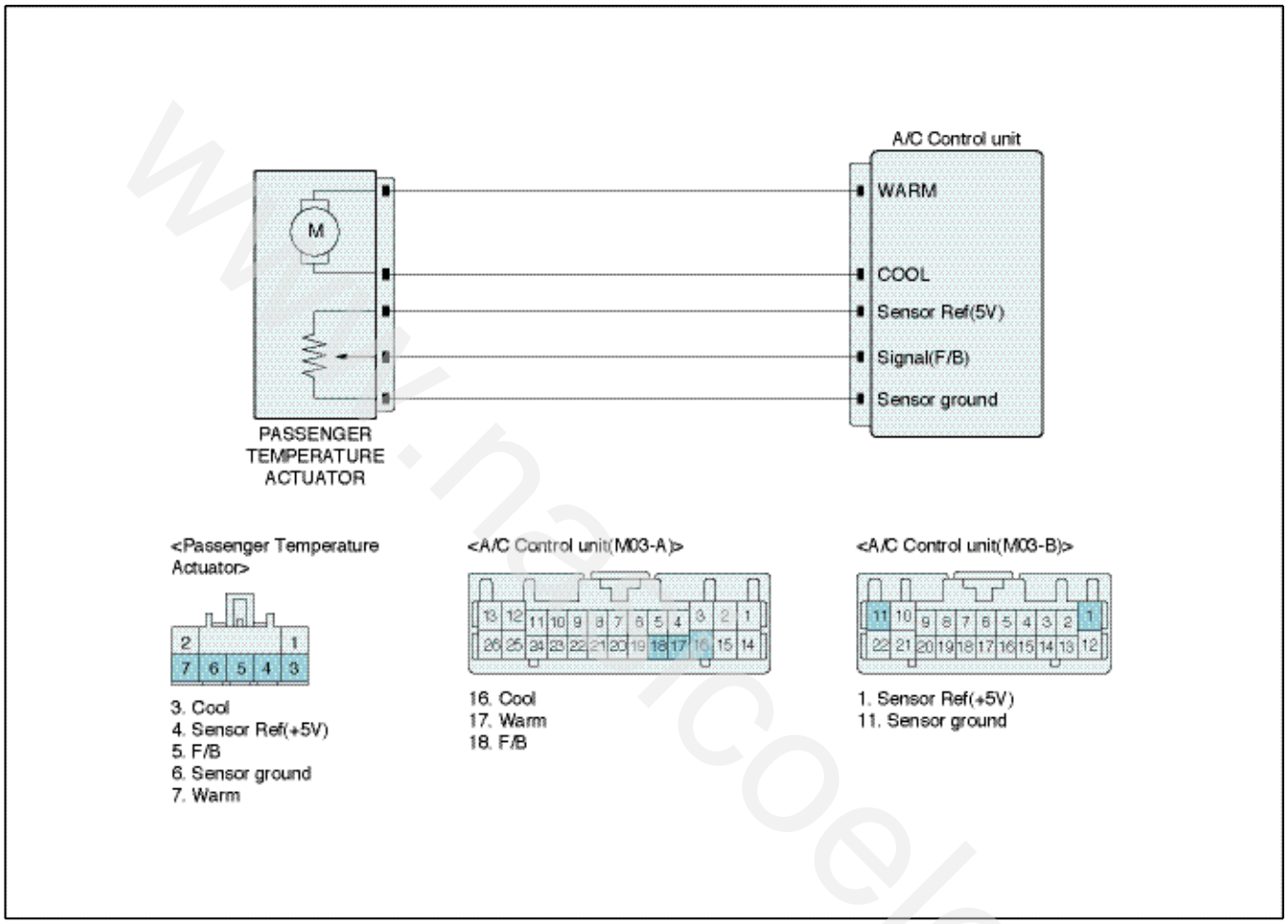
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short to battery in signal(Feedback) circuit 2. Faulty passenger air mix actuator 3. Faulty A/C control unit
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback ciruit has been detected over 4.9V for 0.3 seconds	
Failsafe	• setting temperature :16℃(62.6˚F)-24℃(76.1˚F) fix at max. cooling position • setting temperature : 25℃(77˚F)-31℃(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	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



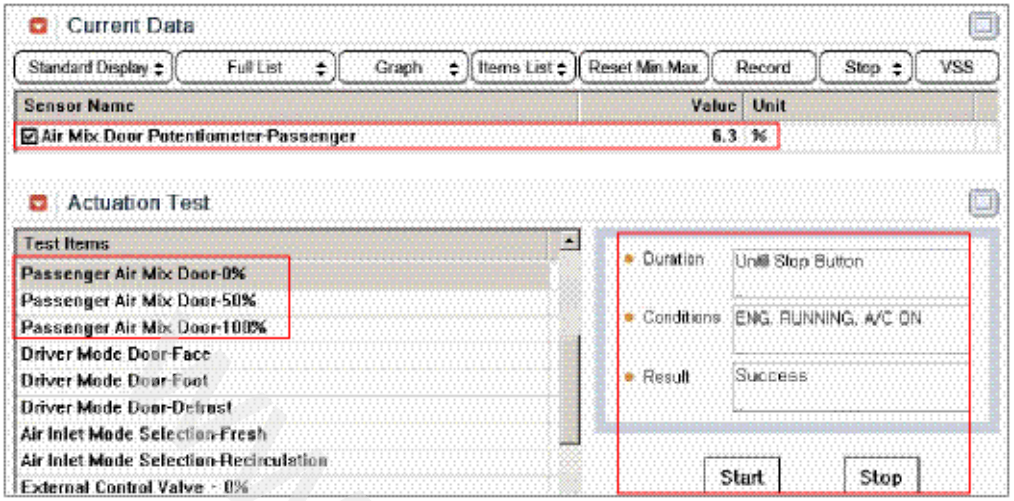
VG12AC50B1204D

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 "Air Mix Door Potentiometer-Passenger" parameter on the current data with scantool.
4. Perform Actuation Test for "Passenger Air Mix Door - 0% / 50% / 100%.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer 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 .



VG12AC0B120421S

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/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

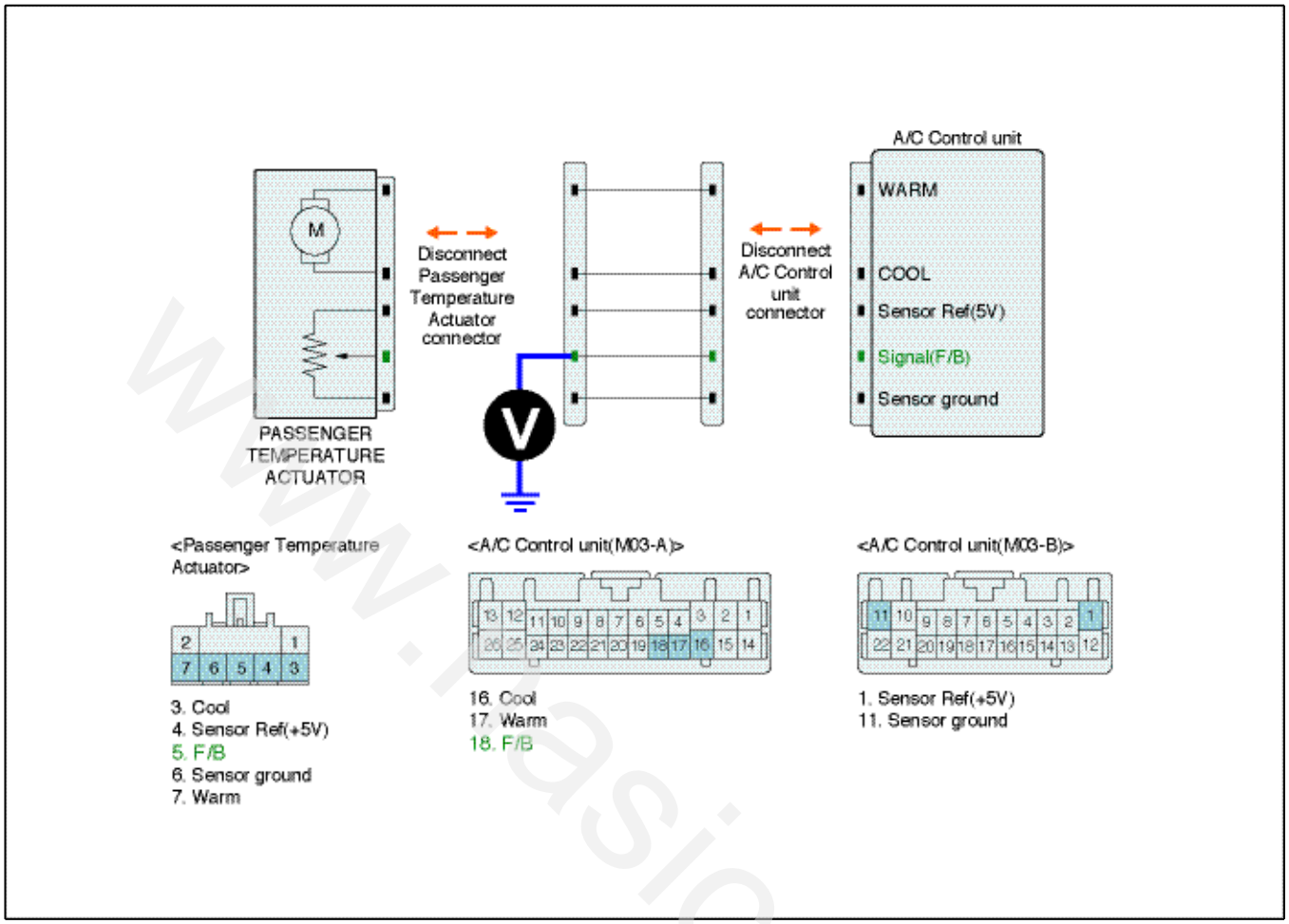
NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

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

Specification : 0V



VG12AC50B120531

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

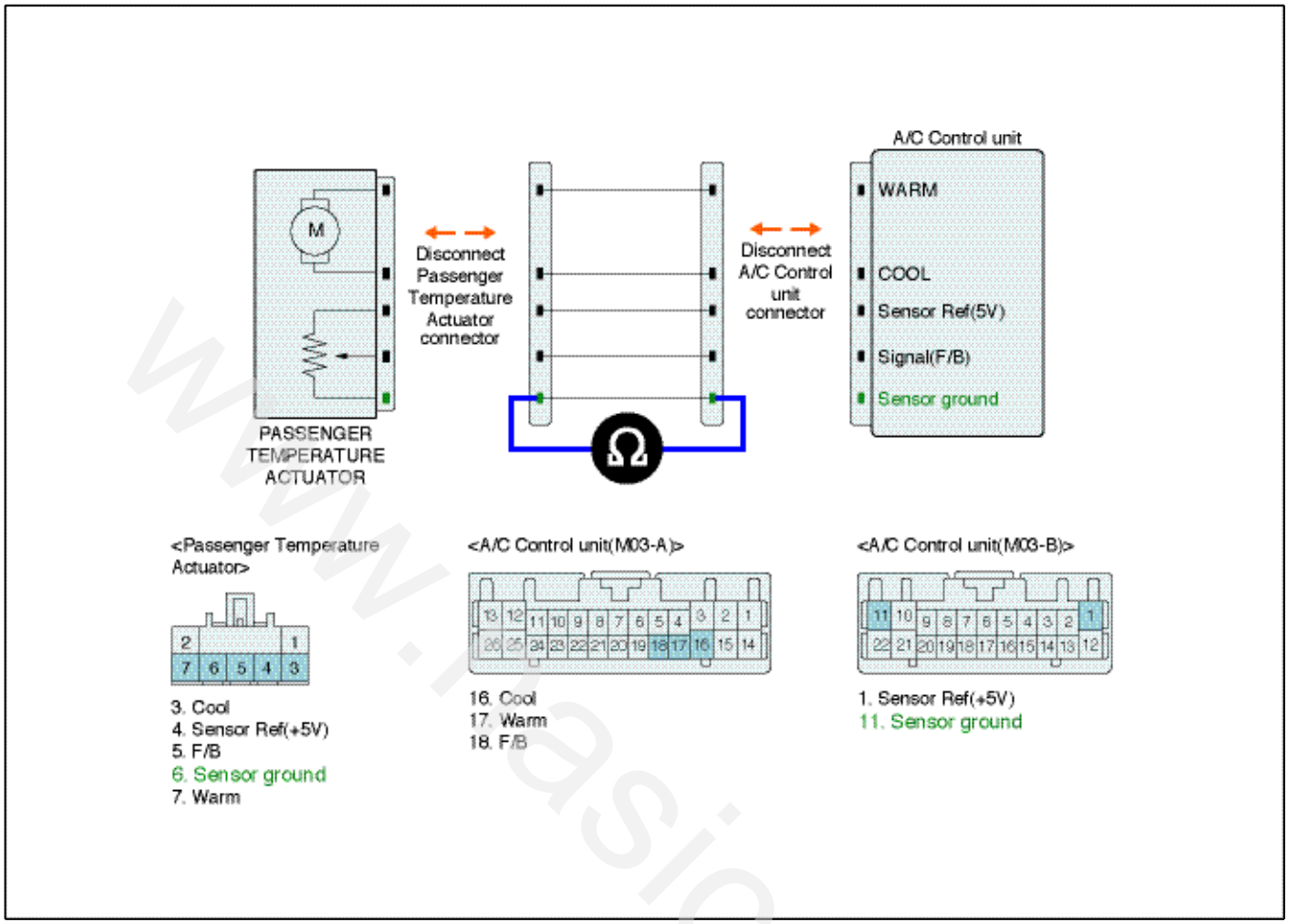
NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B120532

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

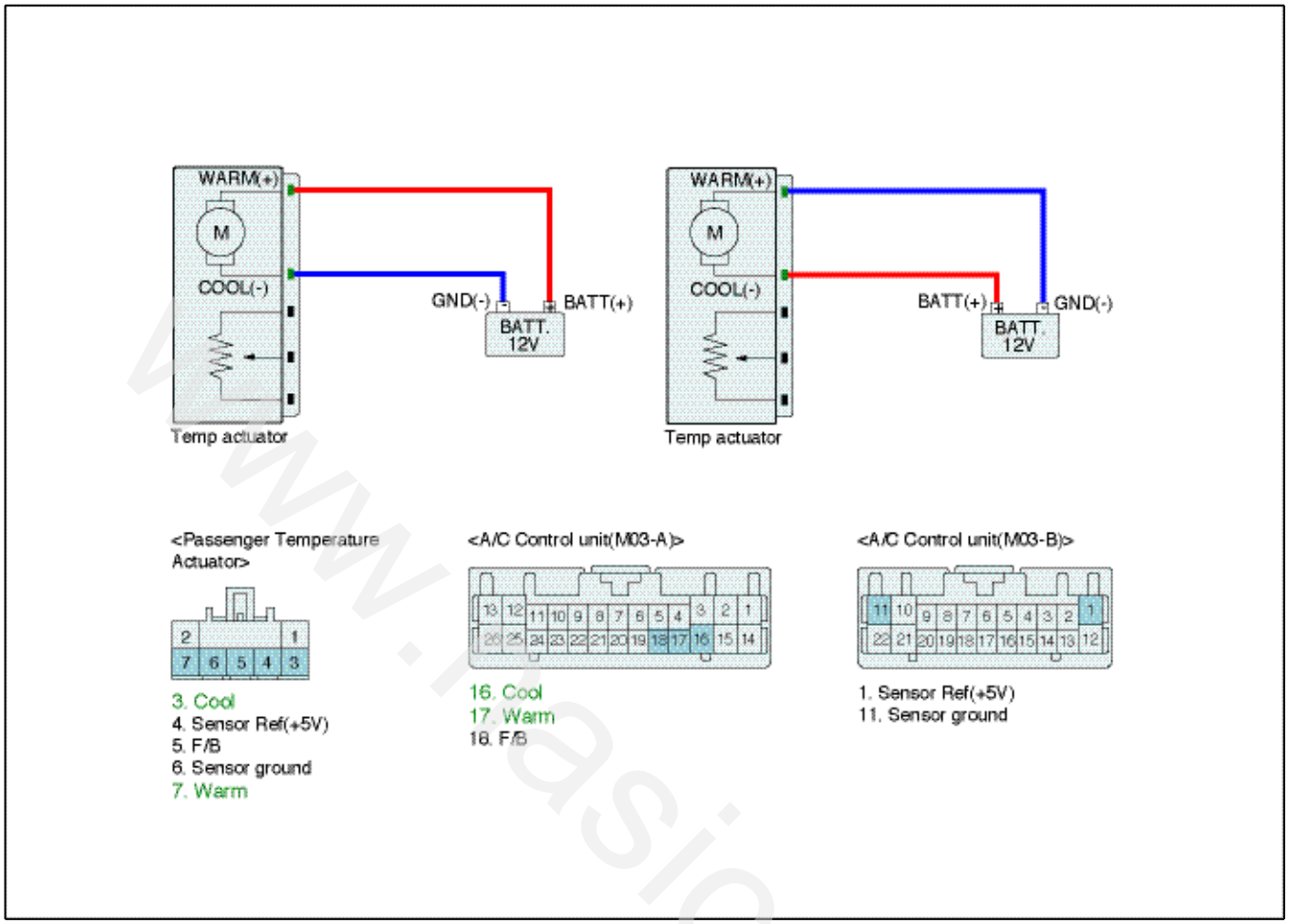
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check passenger air mix actuator

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of passenger 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)



VG12AC50B120541

Fig.1)

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

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

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

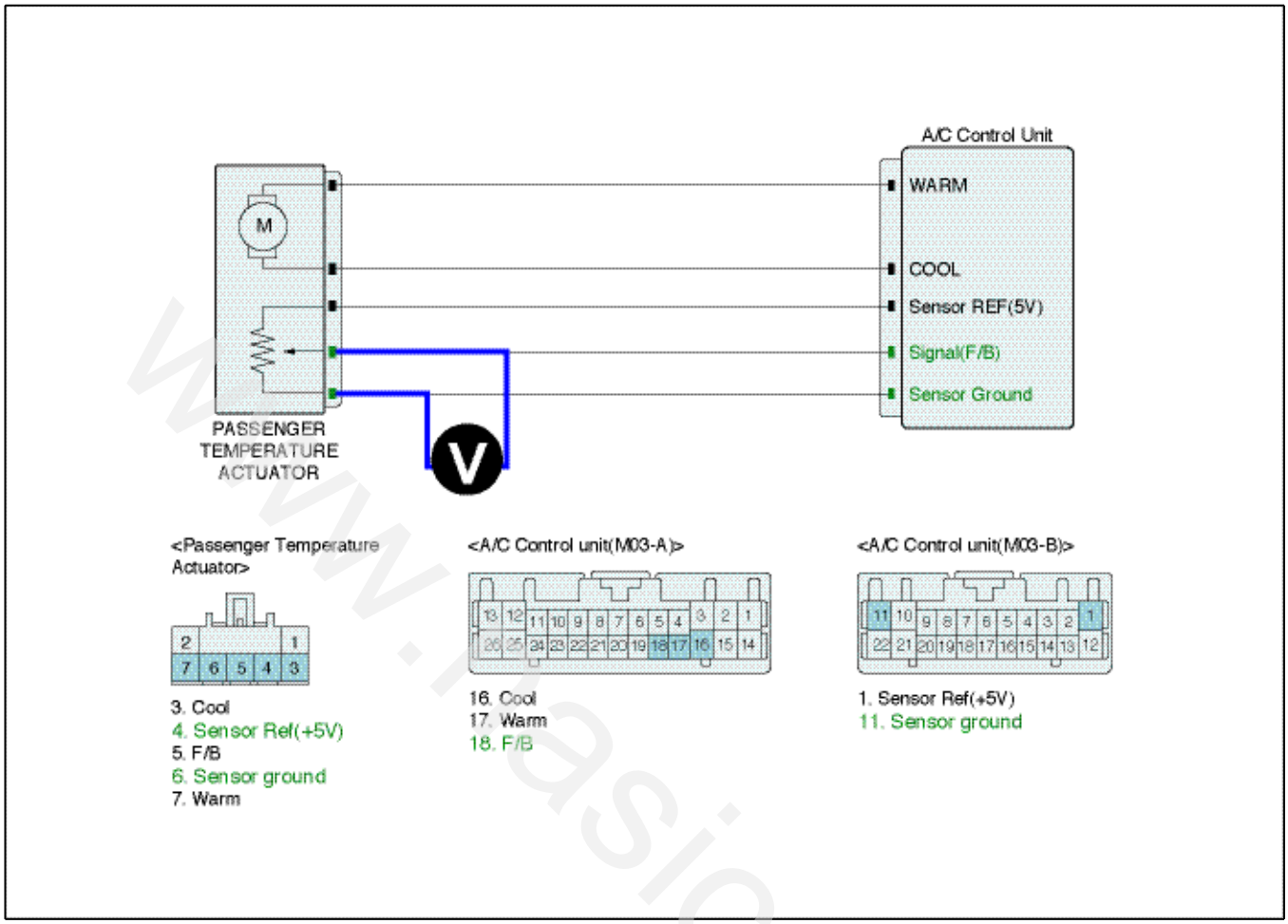
YES ▶ Go to "Check potentiometer" procedure.

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

■ Check potentiometer

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

Specification : Refer the specifications in Fig.2)



VG12AC50B120542

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

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

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 passenger air mix actuator and check for proper operation. If the problem is corrected, replace passenger 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.

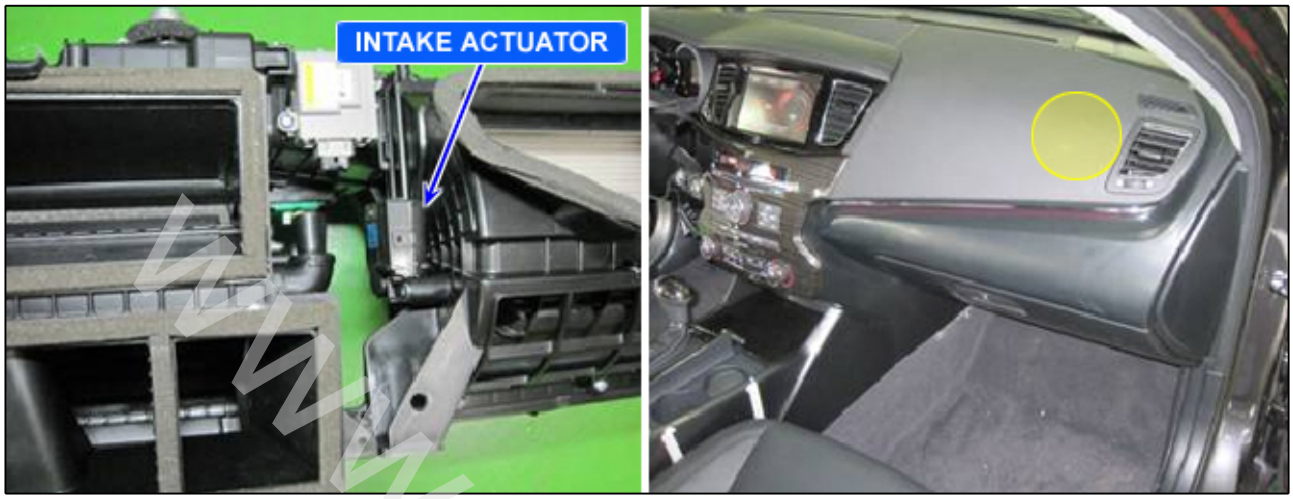
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1208 Intake Potentiometer Open (Low)

Componet Location



YG12AC0B120811

General Description

The actuator contains a motor that changes intake door position and a potentiometer that monitors position of the door. When the driver changes the air intake switch, the ECU operates intake door motor to turn the intake door to the intended position. (in the FRESH mode, the intake door is closed. In REC mode, the intake door is opened) During operation the potentiometer delivers an intake door position to the A/C ECU.

DTC Description

The Airconditioner Control Module sets DTC B1208 if the Feed Back signal of Intake Actuator has been detected open or below 0.1V for 0.3 seconds.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor connection of connected part 2. Open circuit in signal/power harness 3. Short circuit in signal/power harness 4. Faulty Intake potentiometer
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback circuit has been detected open or below 0.1 V for 0.3 seconds	
Failsafe	• Setting mode : REC Fix at REC position • Setting mode : Except REC Fix at FRE position	

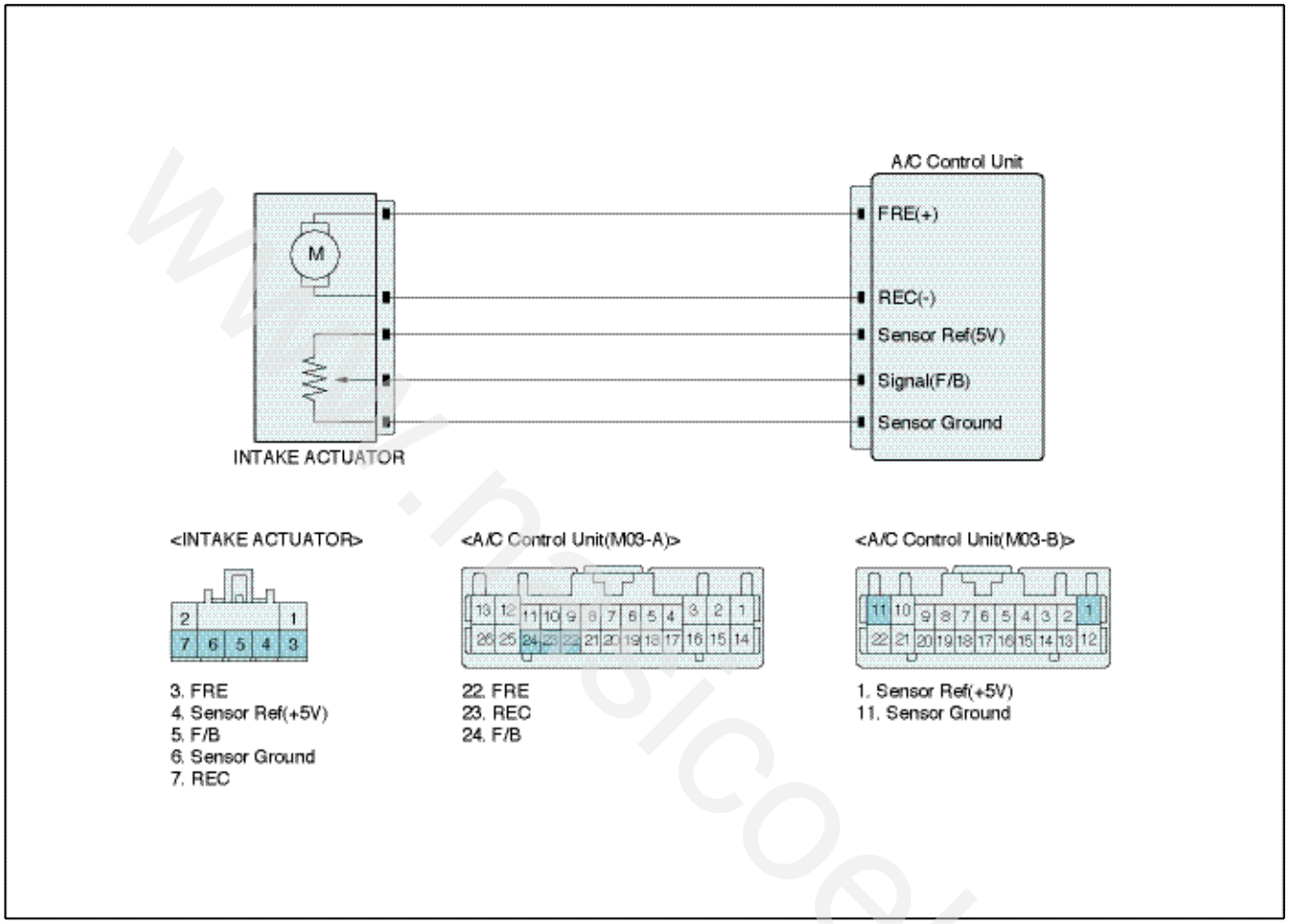
Specification

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

Door position	Voltage
FRE	0.3±0.15V

Door position	Voltage
REC	4.65±0.15V

Diagnostic Circuit Diagram



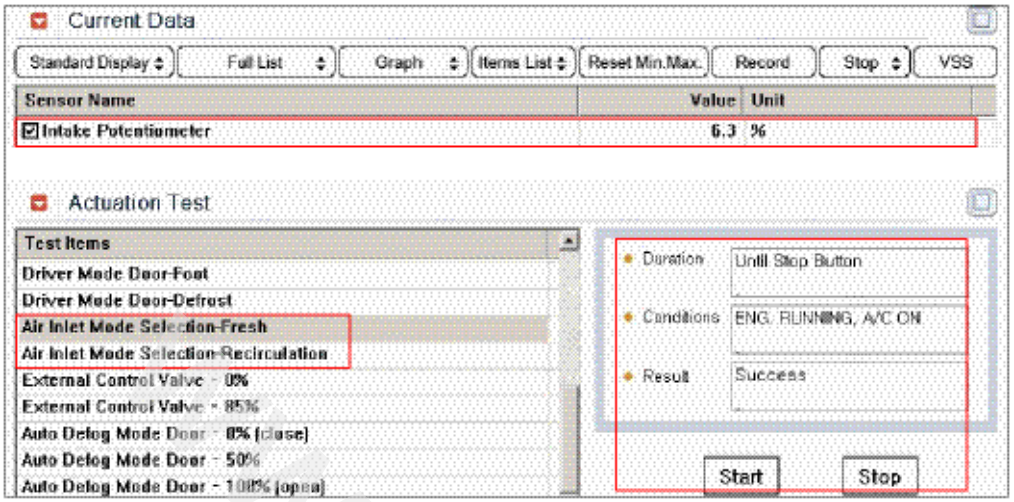
VG12AC50B1208D

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%.



VG12AC0B120821S

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

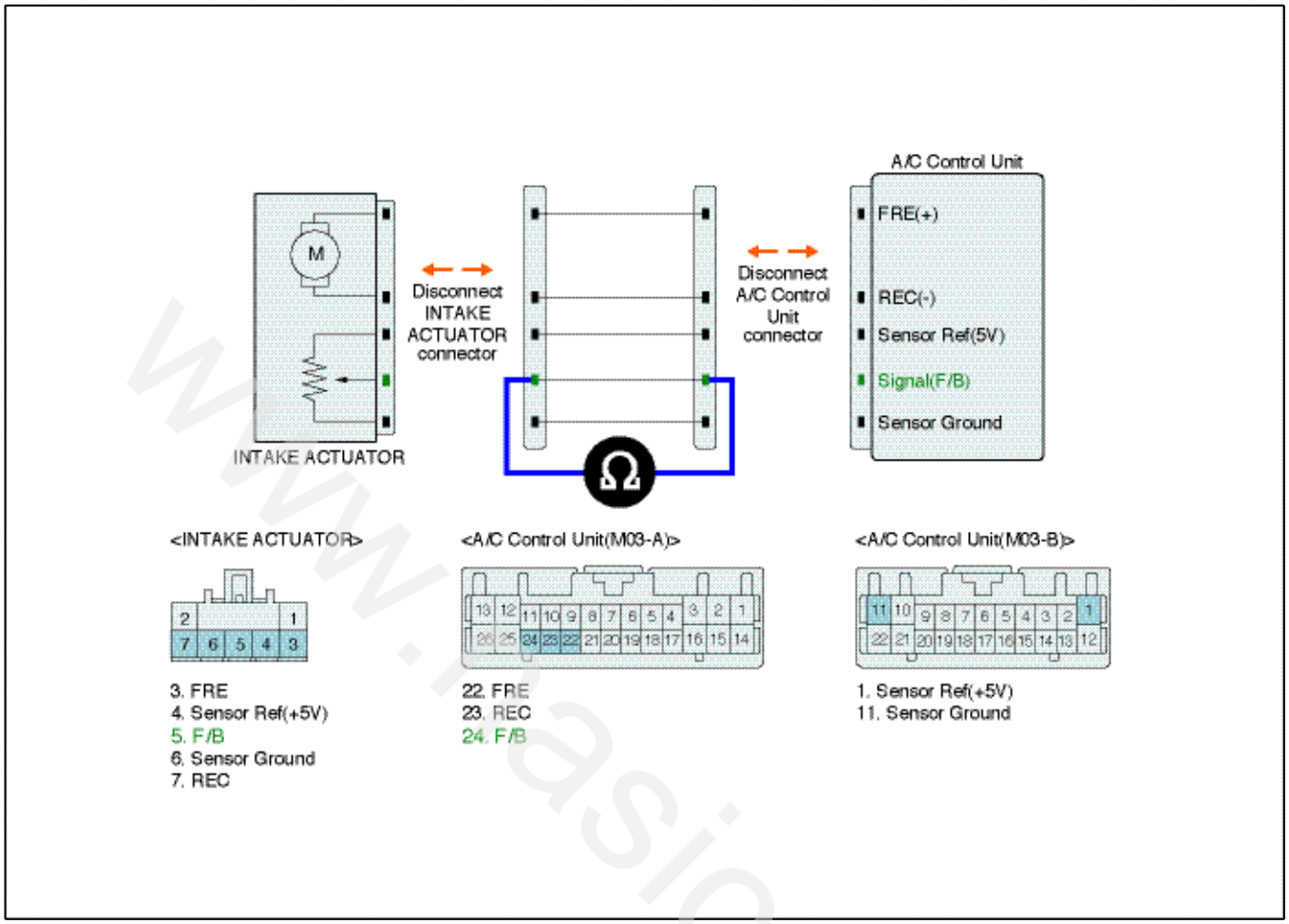
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B120831

4. Is the measured resistance within specification?

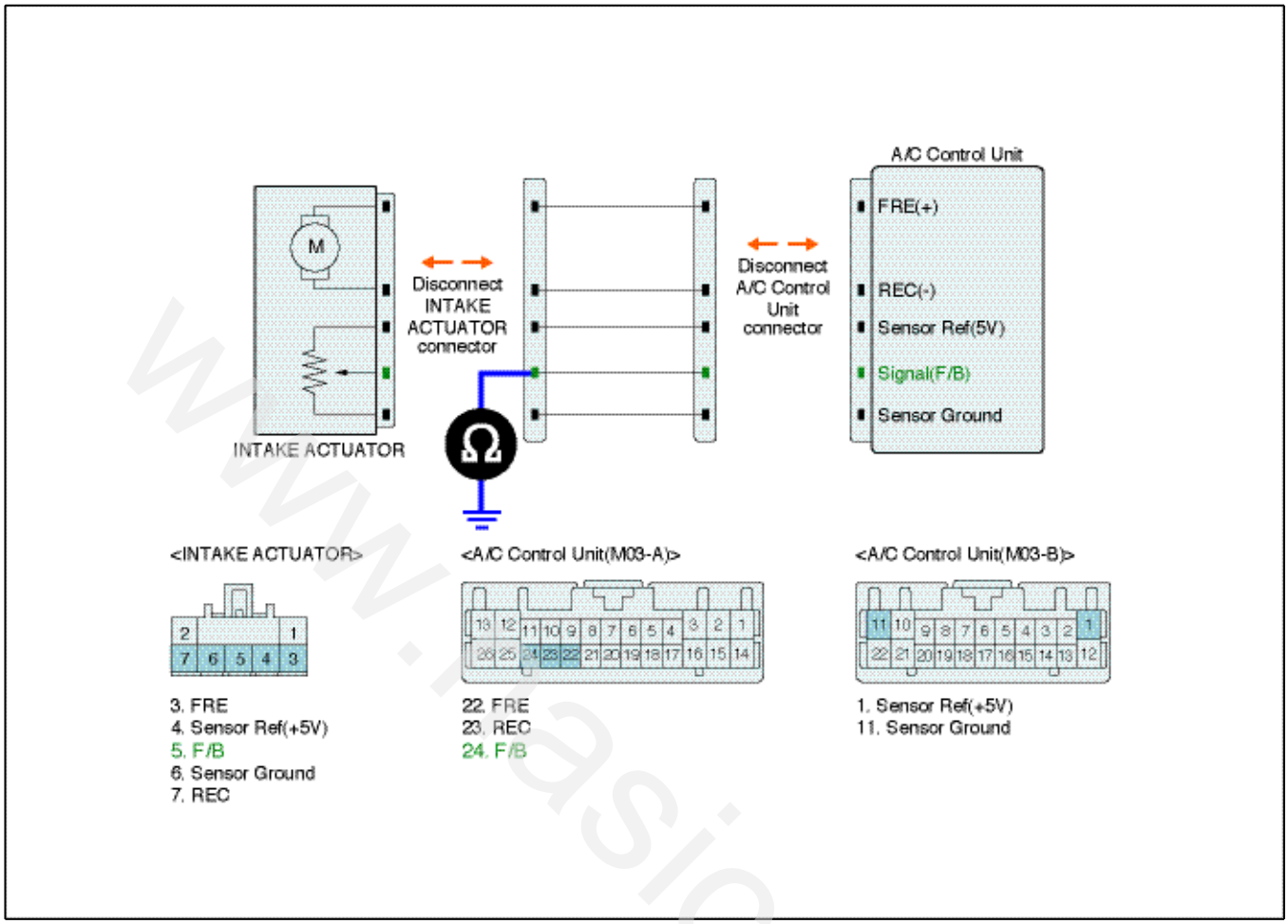
YES ▶ Go to "Check short to ground in harness" as follows.

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



VG12AC50B120832

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection" procedure.

NO ▶ Check for short to ground in control harness .

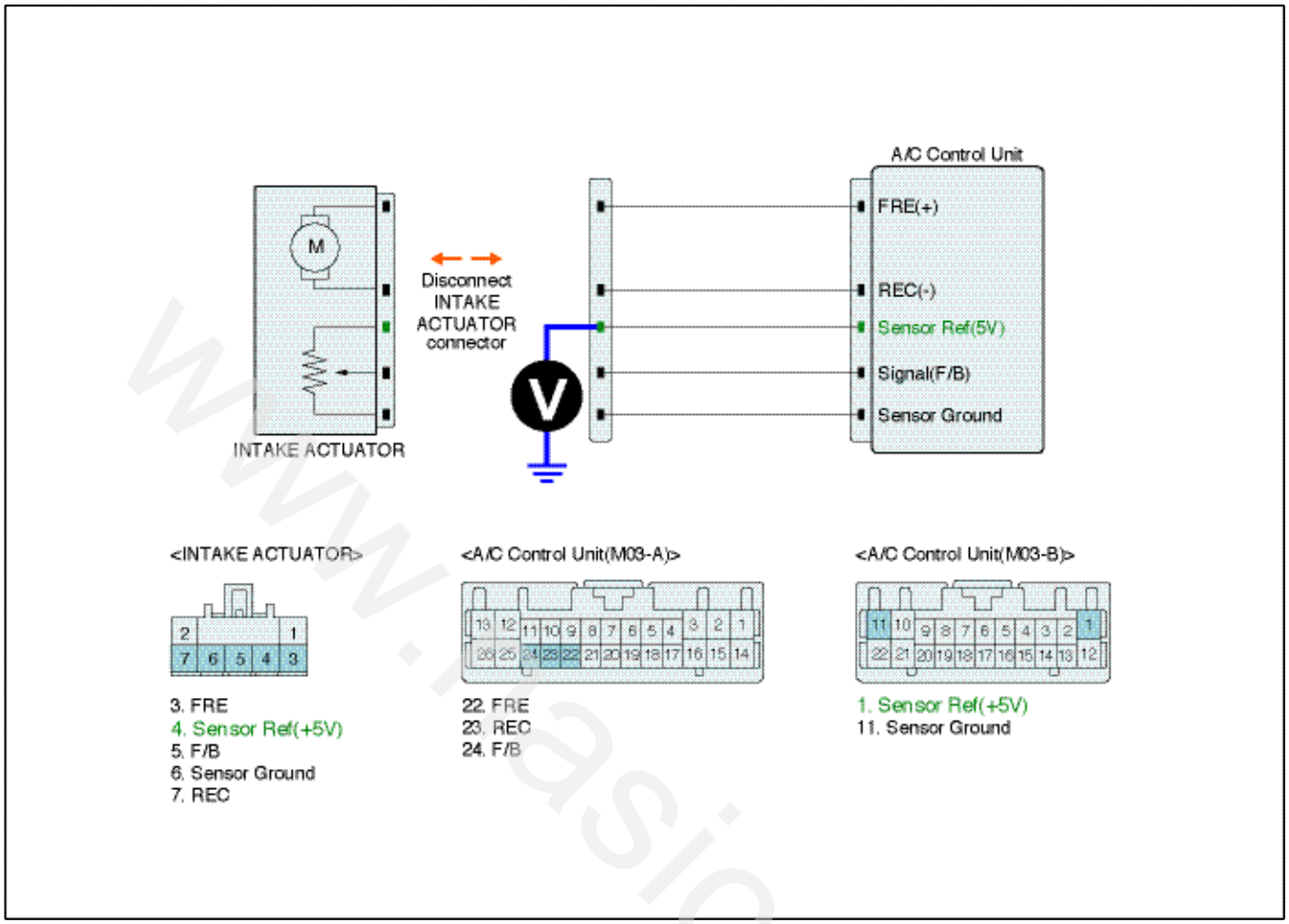
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B120833

5. Is the measured voltage within specification?

YES ▶ Go to " Component inspection" procedure.

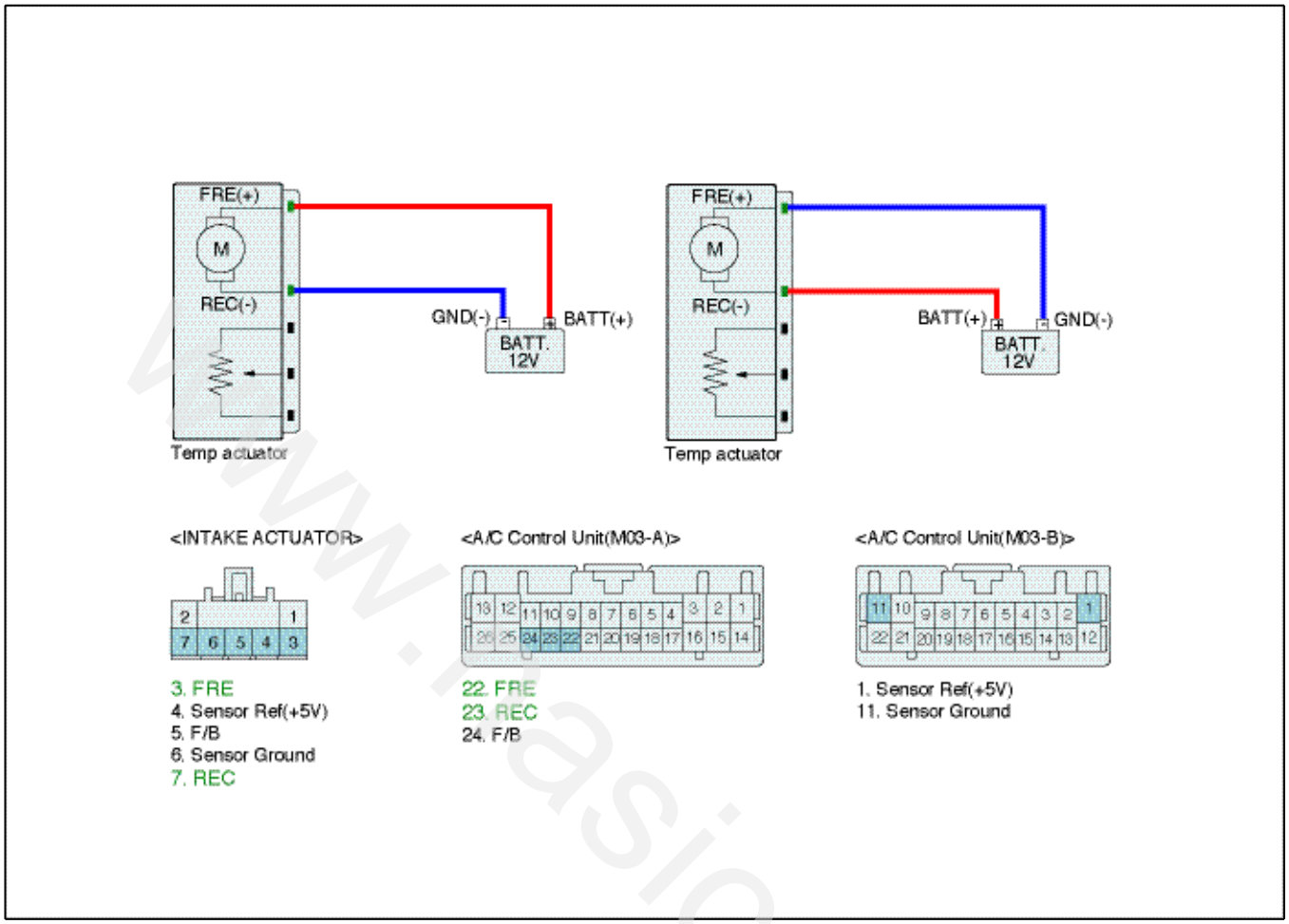
NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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)



VG12AC50B120841

Fig.1)

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

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

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

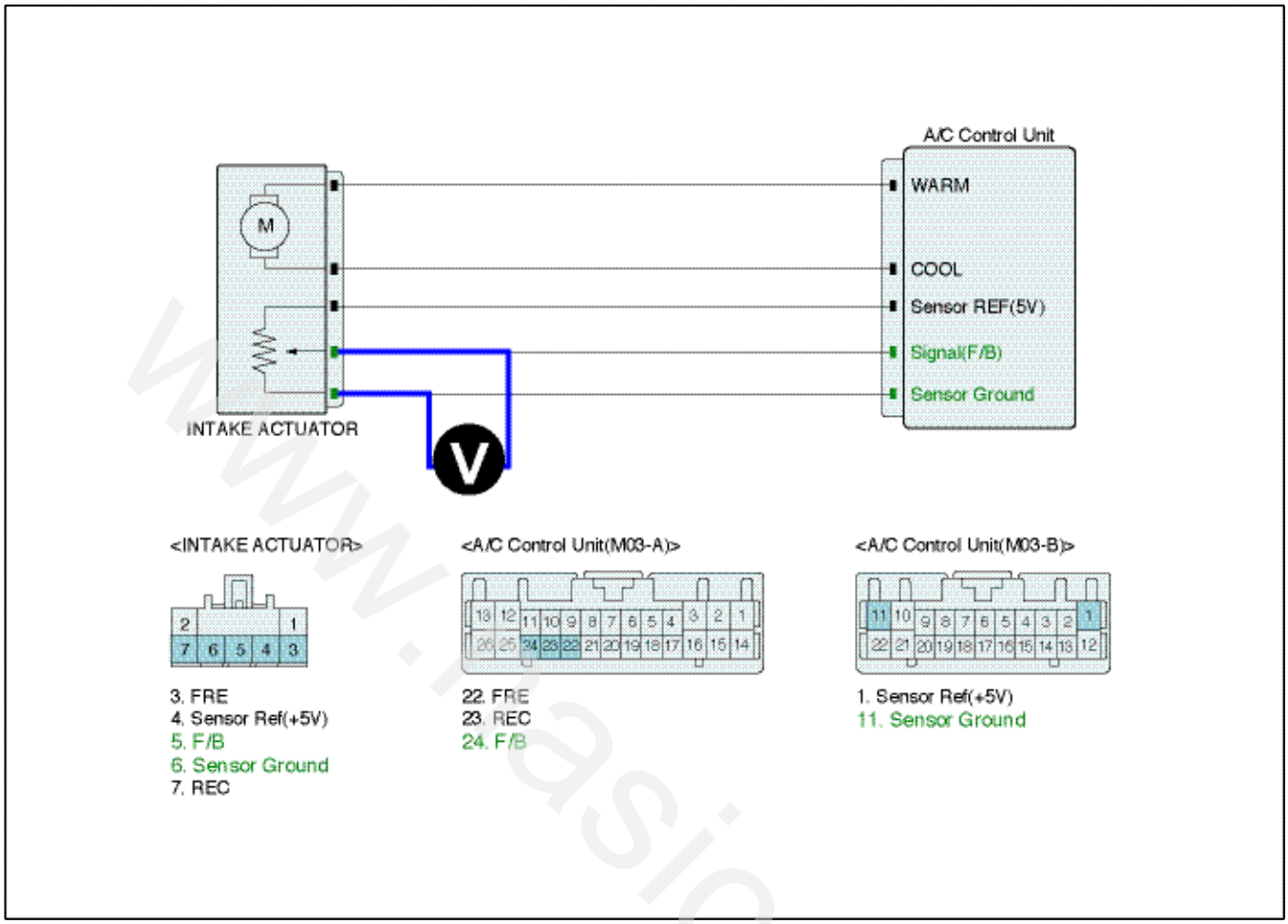
YES ▶ Go to "Check potentiometer" procedure.

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)



VG12AC50B120842

Fig.2)

Door position	Voltage
FRE	0.3±0.15V
REC	4.65±0.15V

Fig.2) ※ Voltage value of intake potentiometer as a function of intake door position.

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.

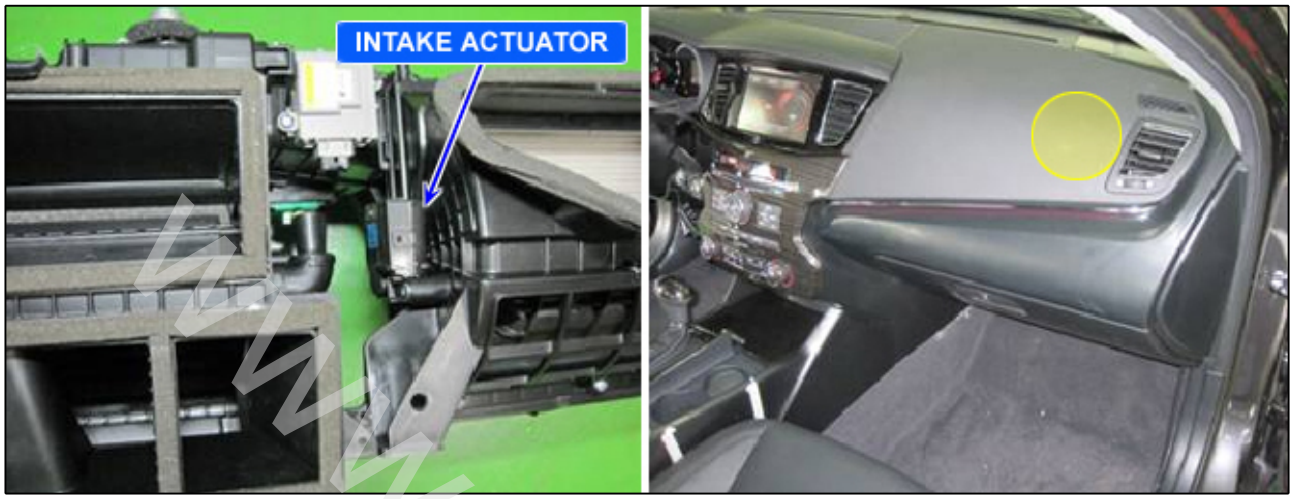
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1209 Intake Potentiometer Short (High)

Componet Location



YG12AC0B120811

General Description

The actuator contains a motor that changes intake door position and a potentiometer that monitors position of the door. When the driver changes the air intake switch, the ECU operates intake door motor to turn the intake door to the intended position. (in the FRESH mode, the intake door is closed. In REC mode, the intake door is opened) During operation the potentiometer delivers an intake door position to the A/C ECU.

DTC Description

The Airconditioner Control Module sets DTC B1209 if the Feed Back signal of Intake Actuator has been detected over 4.9V for 0.3 seconds.

DTC Detecting Condition

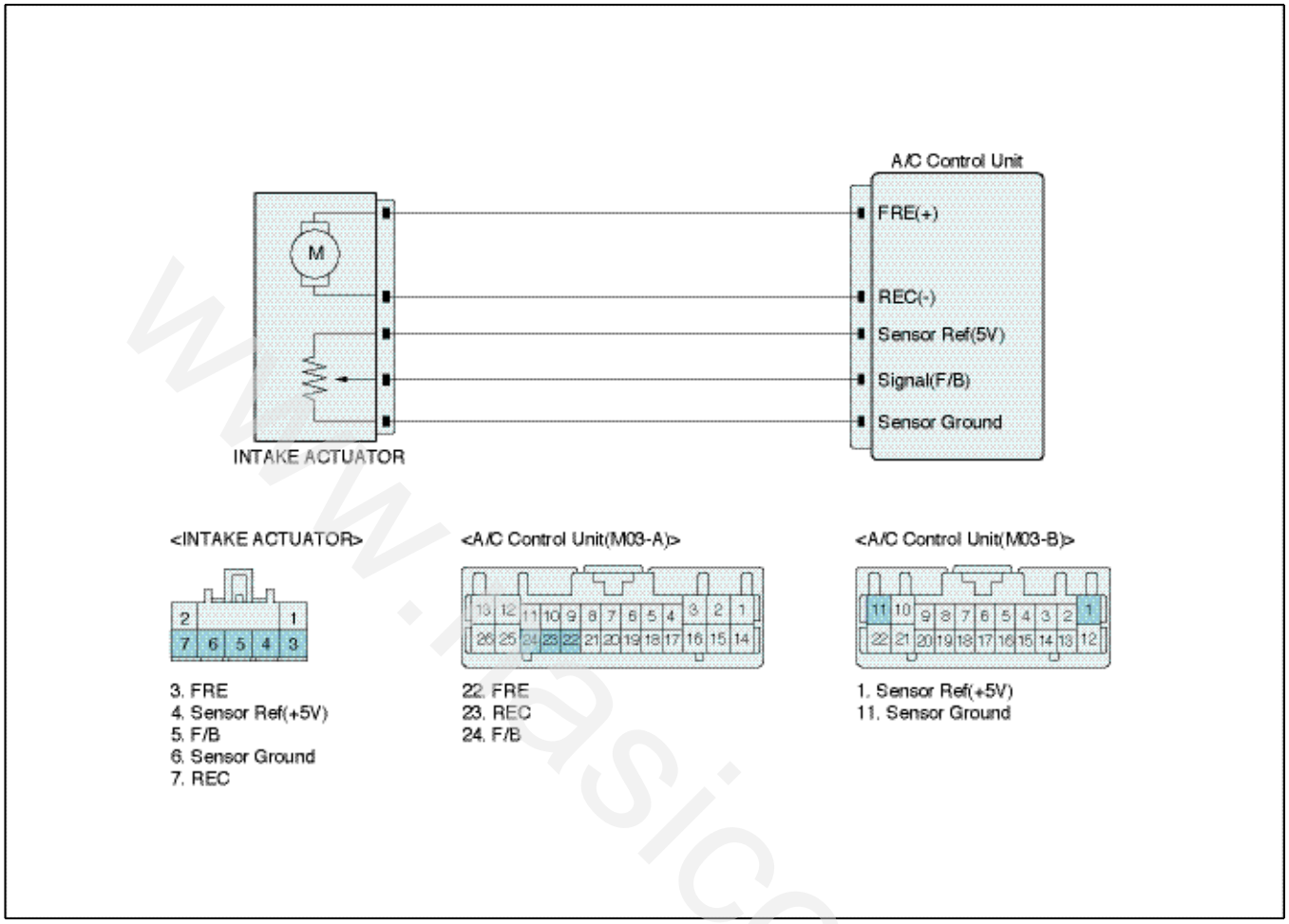
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short to battery in signal(Feed-back) circuit 2. Open in ground circuit 3. Faulty Intake Actuator 4. Faulty Air Conditioner Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback circuit has been detected over 4.9V for 0.3 seconds	
Failsafe	• Intake Actuator is moved and fixed at FRE position if F-RE 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	0.3±0.15V
REC	4.65±0.15V

Diagnostic Circuit Diagram



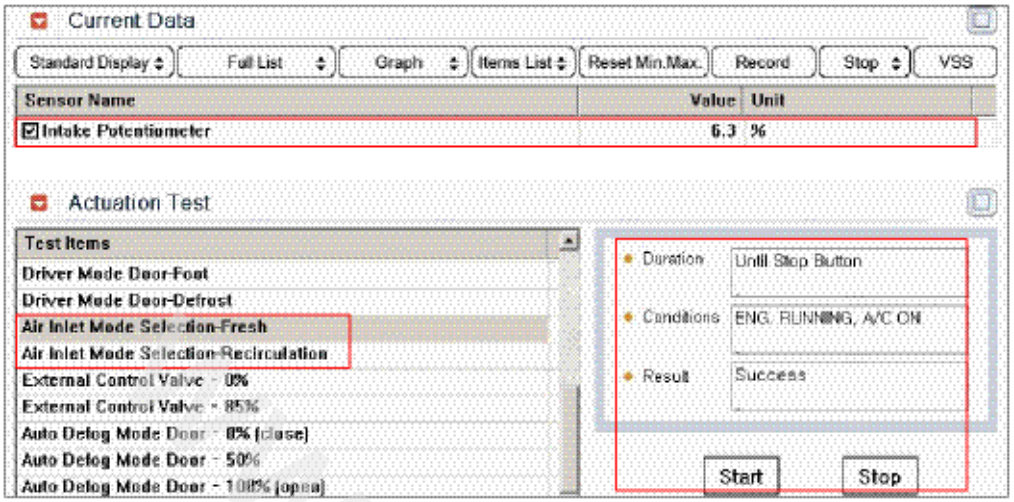
VG12AC50B1208D

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%.



VG12AC0B120821S

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

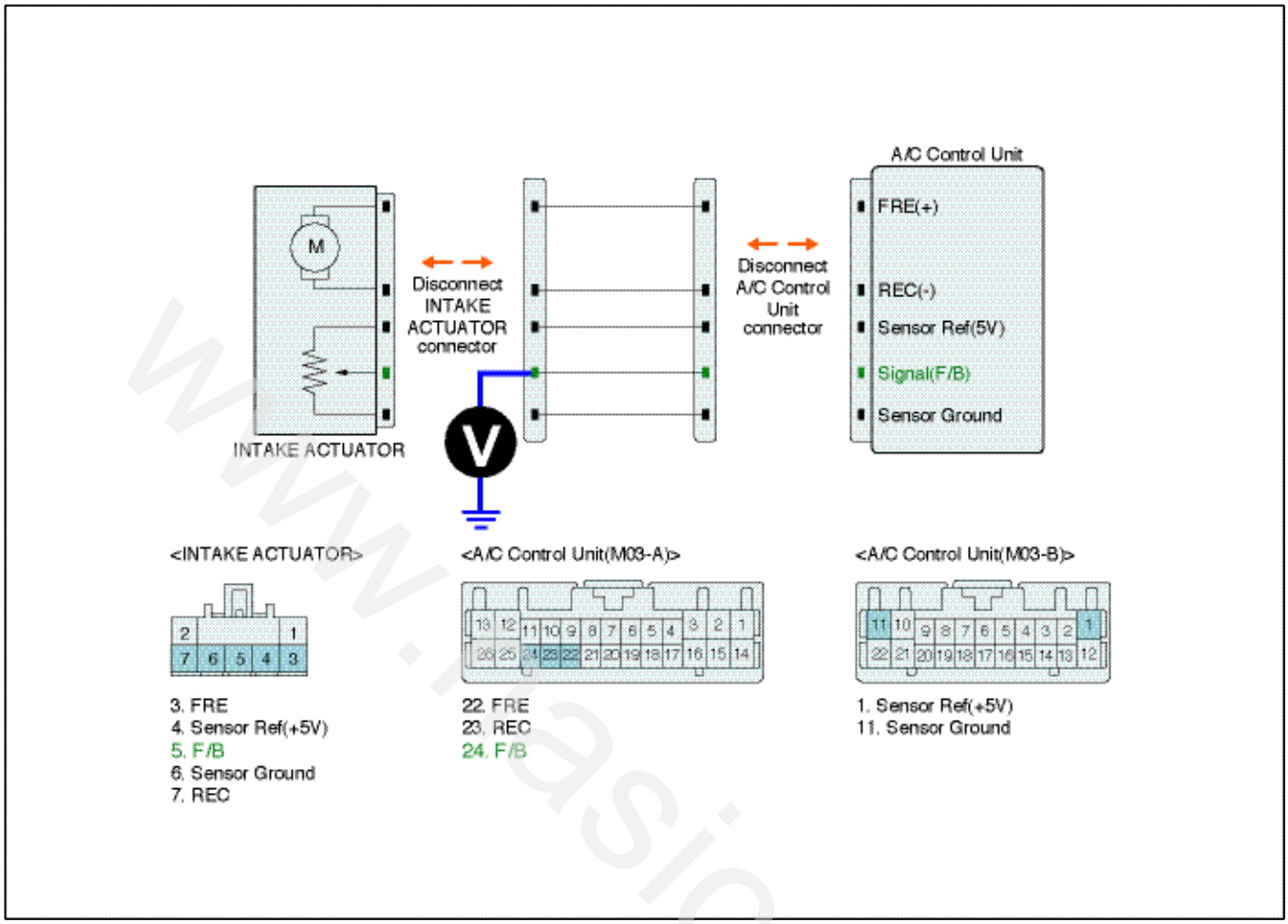
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B120931

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

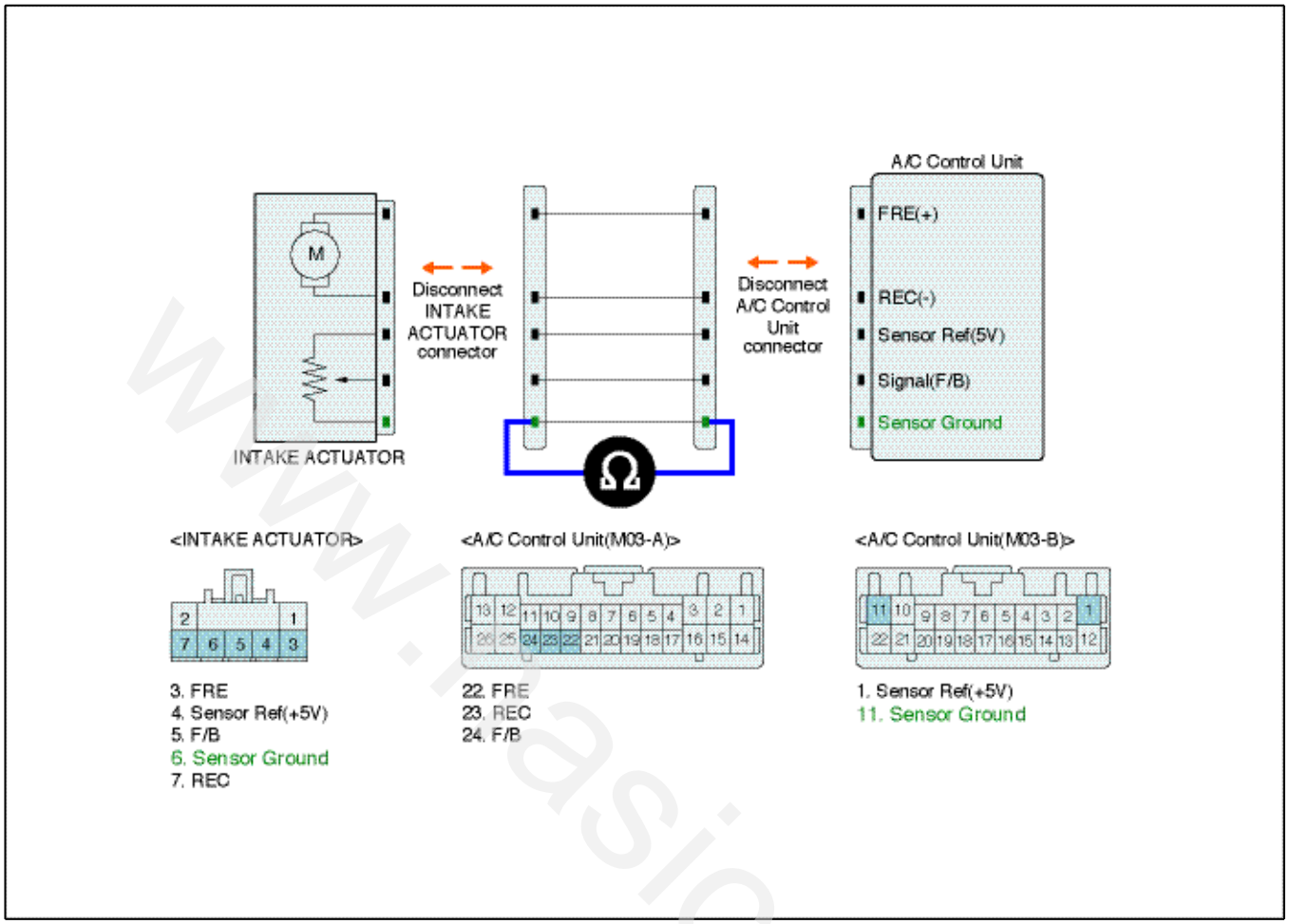
NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B120932

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure.

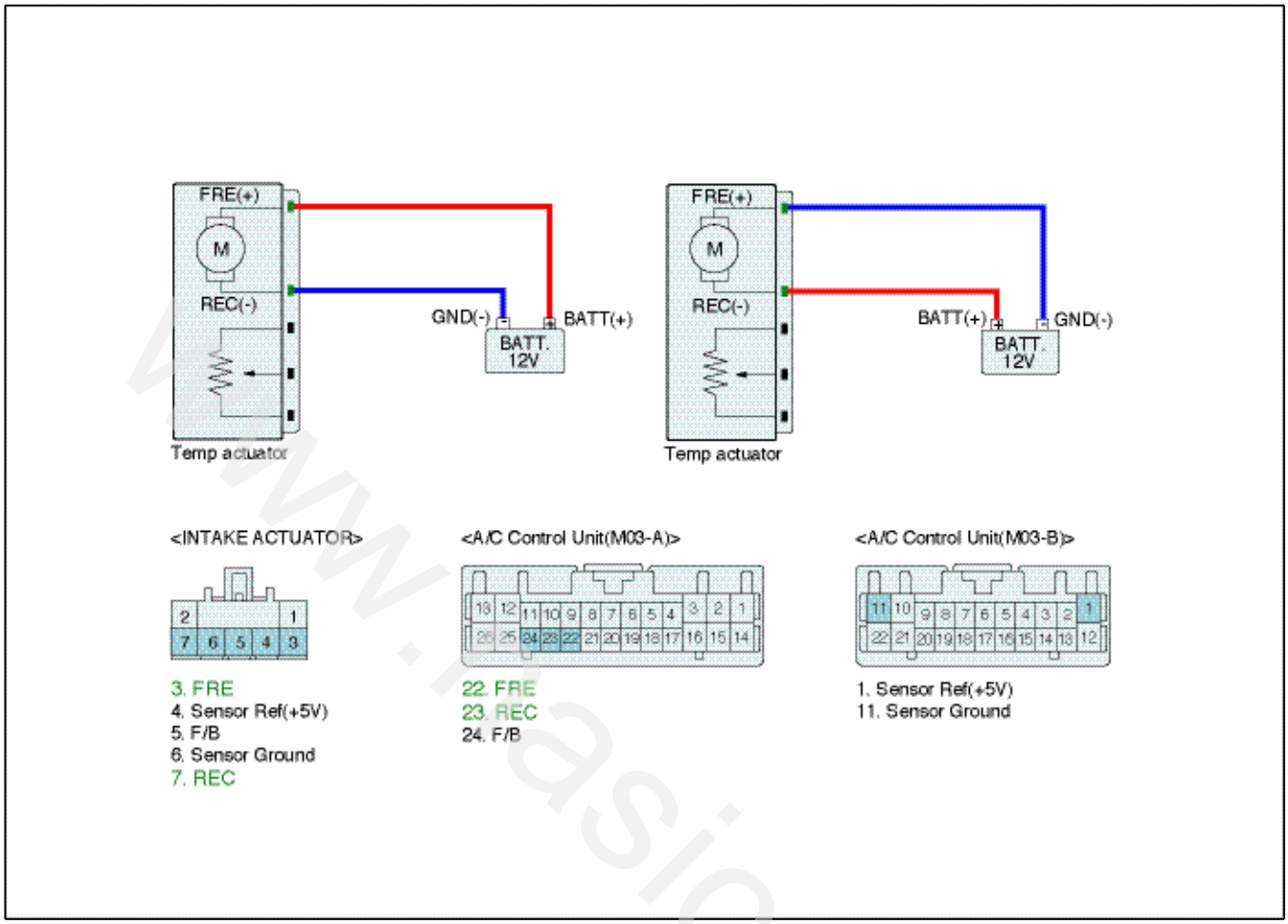
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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)



VG12AC50B120941

Fig.1)

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

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

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

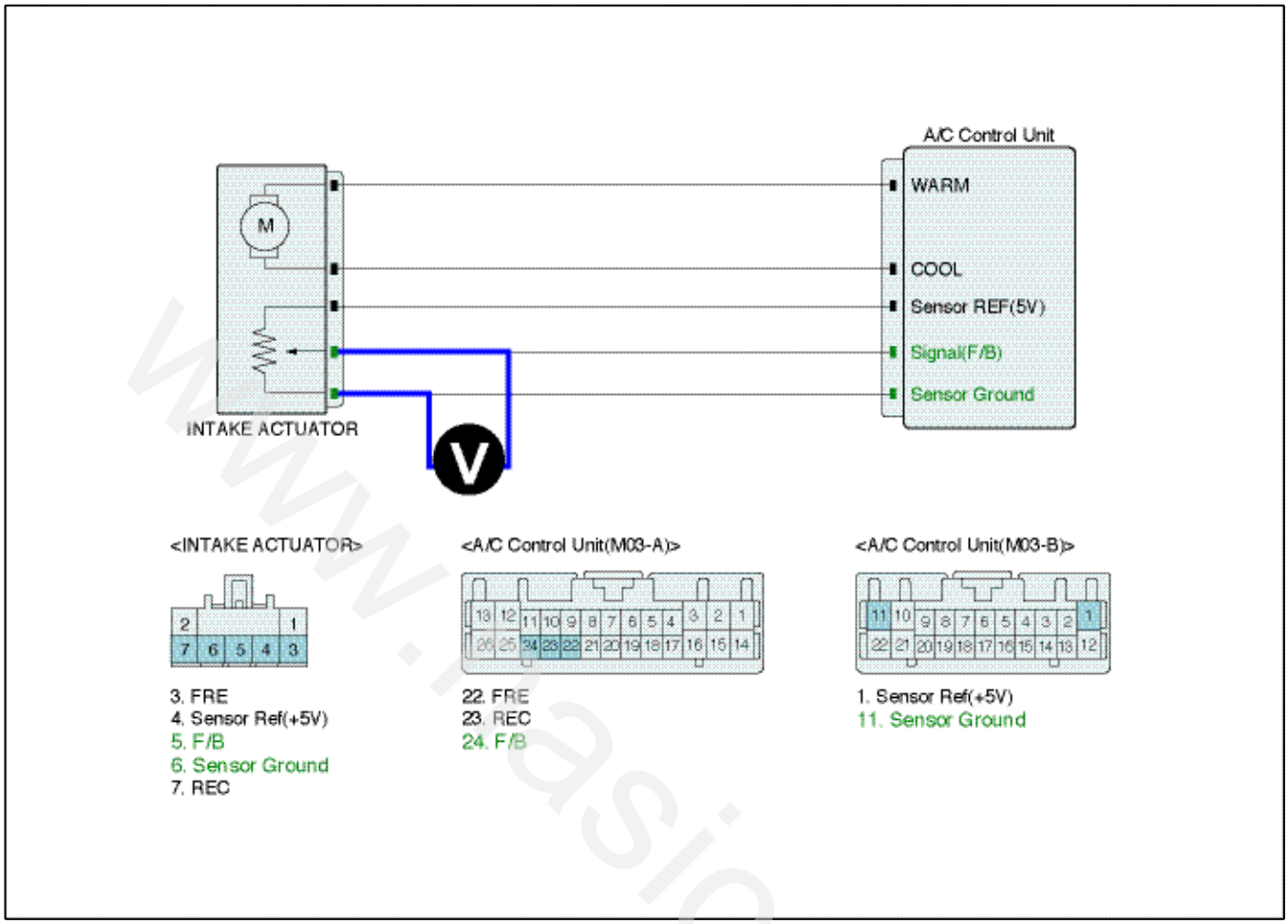
YES ▶ Go to "Check potentiometer" procedure.

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)



VG12AC50B120942

Fig.2)

Door position	Voltage
FRE	0.3±0.15V
REC	4.65±0.15V

Fig.2) ※ Voltage value of intake potentiometer as a function of intake door position.

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.

B1233 In-Car Temperature Sensor Short (Low)

Componet Location

YG12AC0B123311

General Description

The In Car Tenperature Sensor contains a thermistor which measures the temperature of the inside the vehicle. The signal, based on the resistance value, is delivered to the HVAC control unit. This information is used to control the vent output temperature.

DTC Description

DTC B1233 sets if the In-Car Temperature Sensor signal is at or below 0.1V for 0.3 seconds.

DTC Detecting Condition

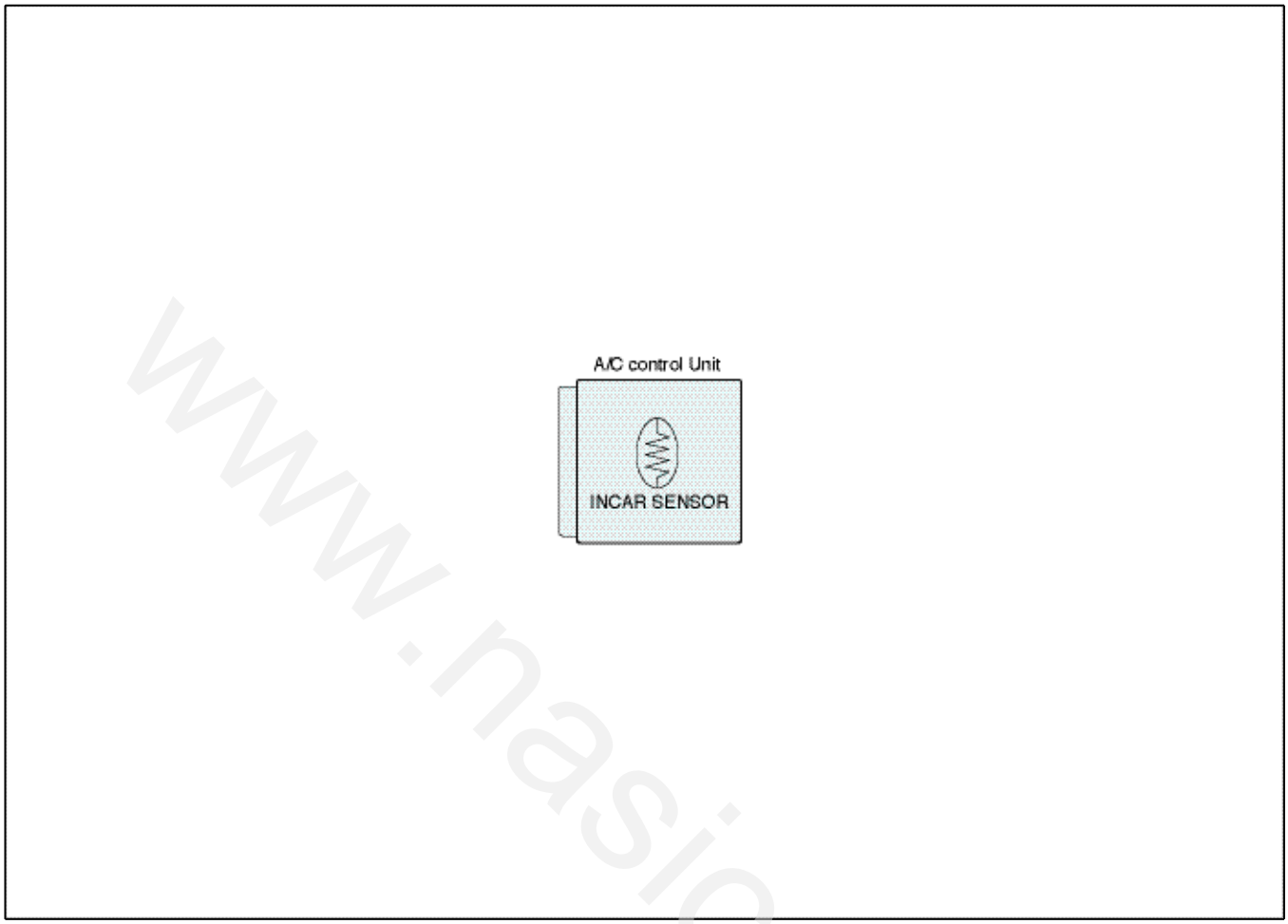
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short circuit in harness 2. Faulty incar temp.sensor 3. Faulty A/C Control Unit
Enable Conditions	• Ignition ON	
Threshold value	• Sensor signal is at or below 0.1V for 0.3 seconds	
Failsafe	• Substituded In-Car Temp. = 25℃ (77˚F)	

Specification

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

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	285.6	20/68	37.4
-10/14	169	30/86	24.1
0/32	97.7	40/104	15.9
10/50	59.67	50/122	10.8

Diagnostic Circuit Diagram



VG12AC50B1233D

Monitor Scantool data

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

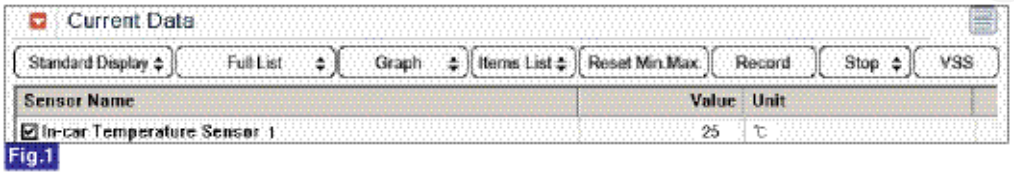


Fig.1

VG12AC0B123321S

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

4. Is the Incar temperature sensor normal ?

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 ▶ 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.

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.

B1234 In-Car Temperature Sensor Open (High)

Componet Location

YG12AC0B123311

General Description

The In Car Tenperature Sensor contains a thermistor which measures the temperature of the inside the vehicle. The signal, based on the resistance value, is delivered to the HVAC control unit. This information is used to control the vent output temperature.

DTC Description

DTC B1234 sets if In-Car temperature sensor signal is at or over 4.9V for 0.3 seconds.

DTC Detecting Condition

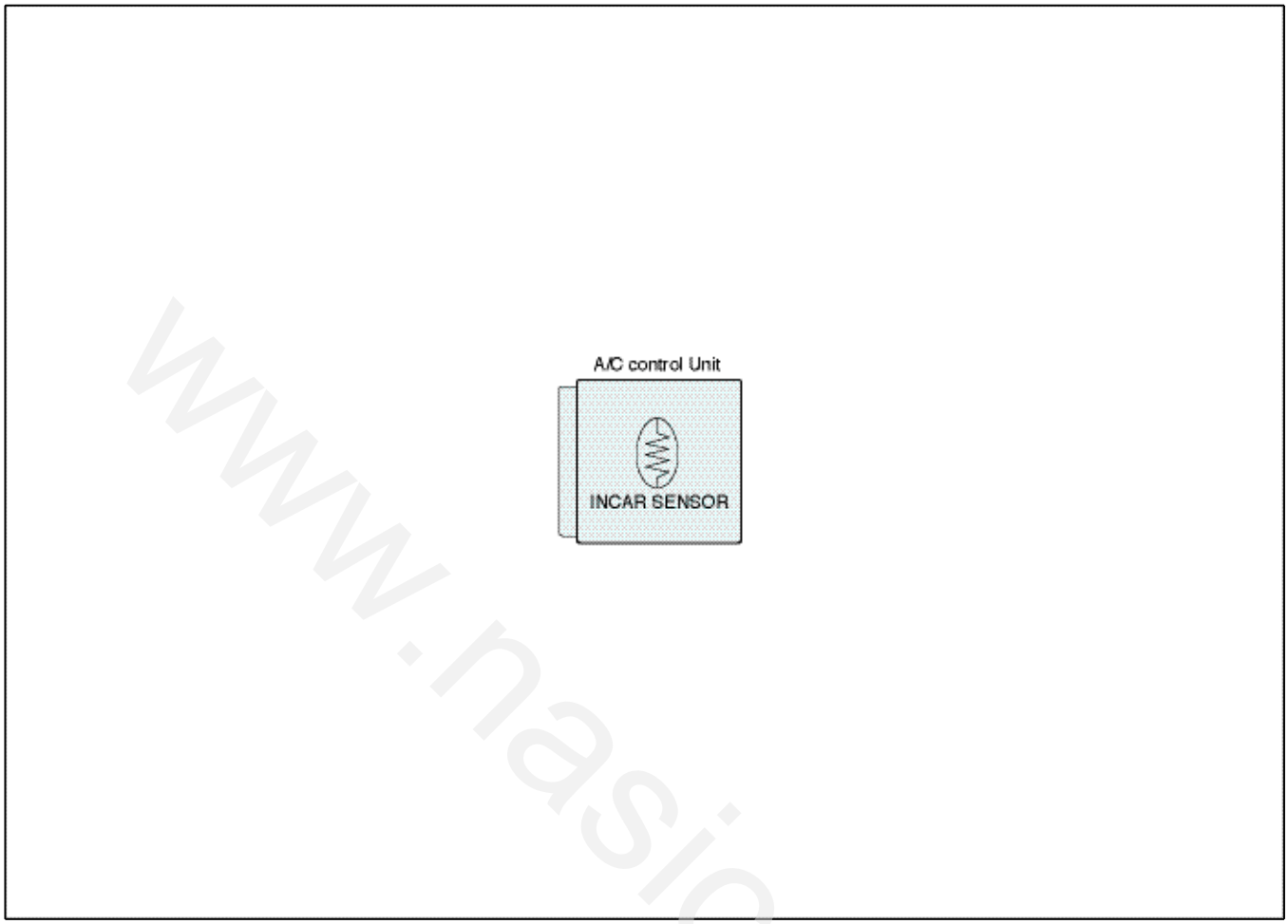
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Open in signal circuit 2. Short to battery in signal circuit 3. Faulty In-Car temperature sensor 4. Faulty A/C Control Unit
Enable Conditions	• Ignition ON	
Threshold value	• Sensor signal is at or over 4.9V for 0.3 seconds	
Failsafe	• Substituded In-Car Temp. = 25℃ (77˚F)	

Specification

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

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	285.6	20/68	37.4
-10/14	169	30/86	24.1
0/32	97.7	40/104	15.9
10/50	59.67	50/122	10.8

Diagnostic Circuit Diagram



VG12AC50B1233D

Monitor Scantool data

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

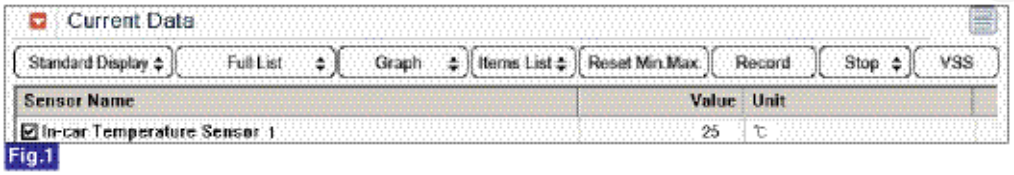


Fig.1

VG12AC0B123321S

Fig.1) Parameter of "INCAR TEMP.SENSOR1" will be fixed at 25℃(77˚F), if there is any fault in INCAR SENSOR.

4. Is the Incar temperature sensor normal ?

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 ▶ 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.

Verification of Vehicle Repair

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

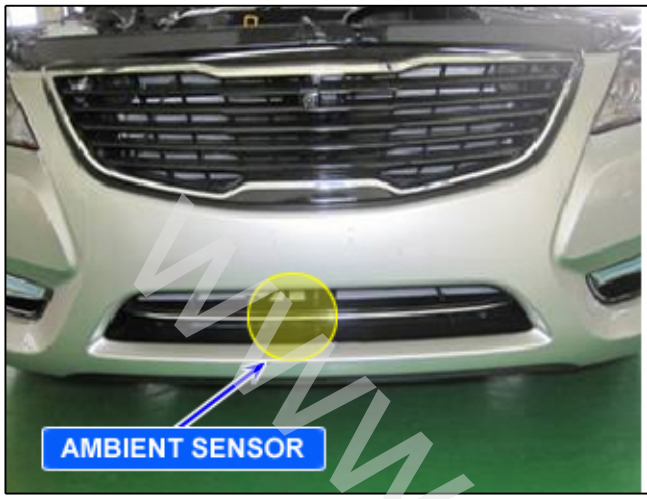
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1237 Ambient Temperature Sensor Short (Low)

Componet Location



YG12AC0B123711

General Description

The Ambient Temperature is a NTCT type thermistor and is use for temperature regulation including blower motor level and mix mode control .

DTC Description

DTC B1237 sets if the Ambient Sensor signal is at or below 0.1V for 0.3 seconds.

DTC Detecting Condition

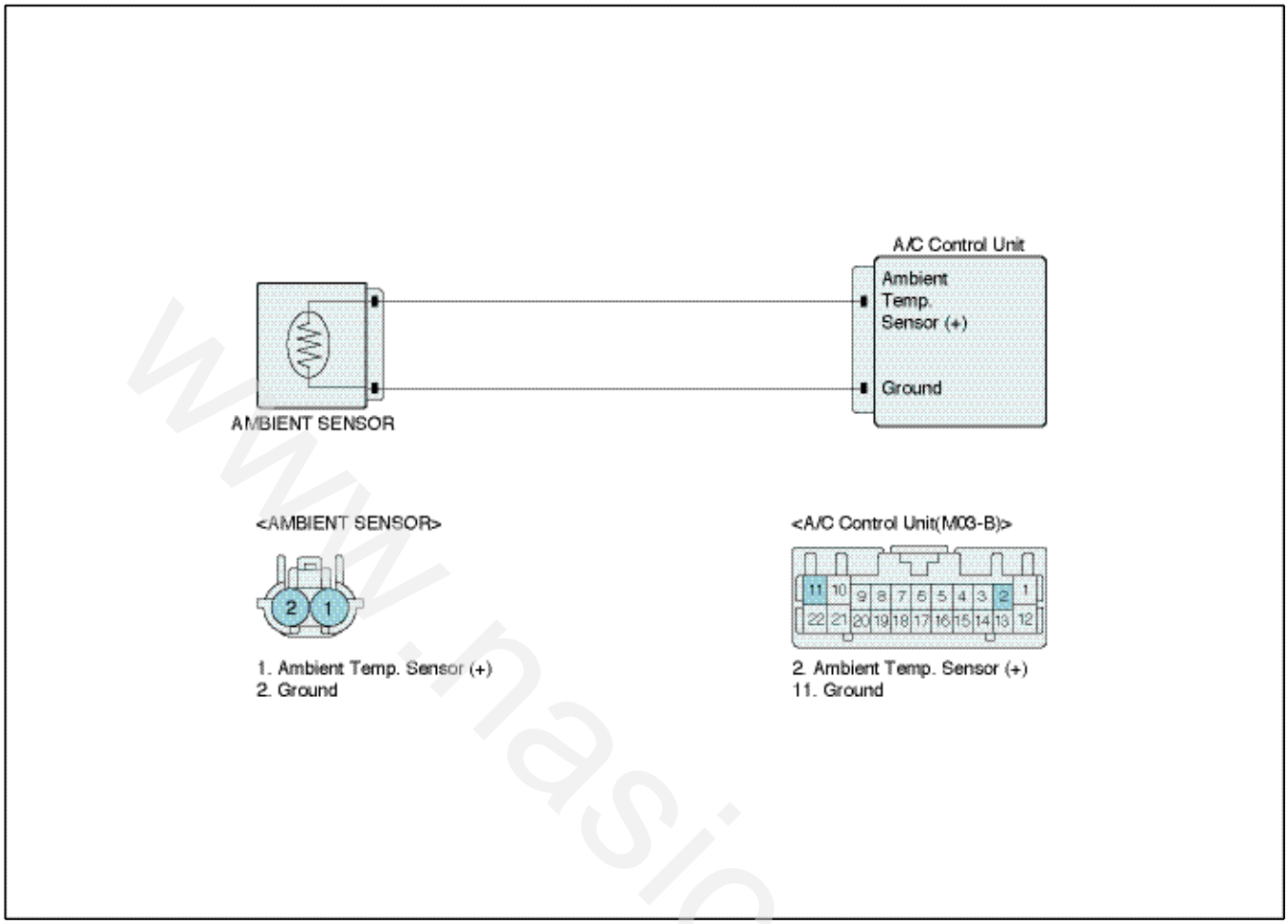
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short in signal circuit 2. Faulty Ambient Sensor 3. Faulty A/C control Module
Enable Conditions	• Ignition ON	
Threshold value	• Sensor signal is at or below 0.1V for 0.3 seconds	
Failsafe	• Displayed '--' and A/C control Module regards and co-ntrols it as 20℃(68˚F)	

Specification

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

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30		

Diagnostic Circuit Diagram



VG12AC50B1237D

Monitor Scantool data

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

Fig.1

VG12AC0B123721S

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

4. Is the ambient sensor abnormal ?

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

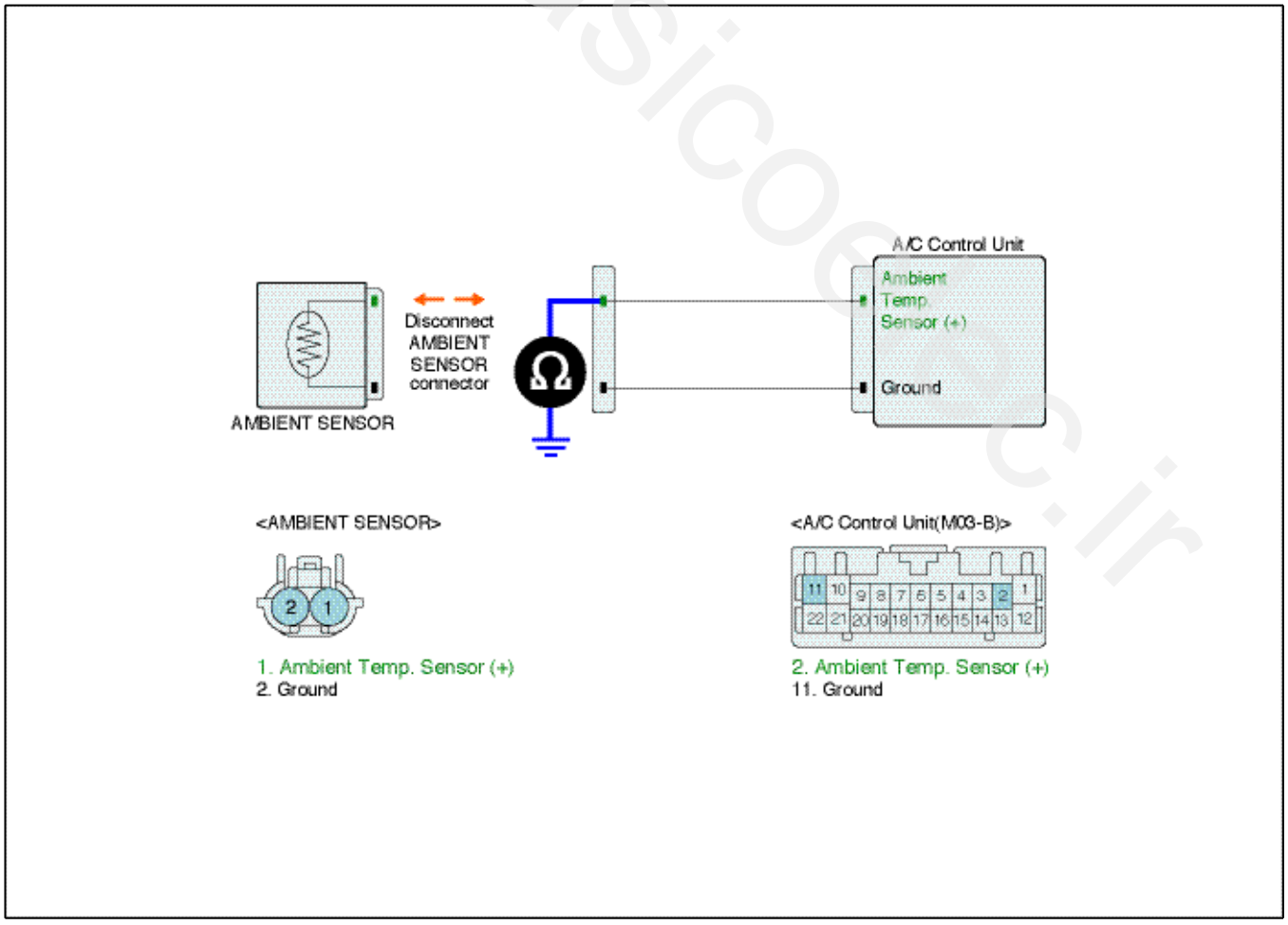
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B123731

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

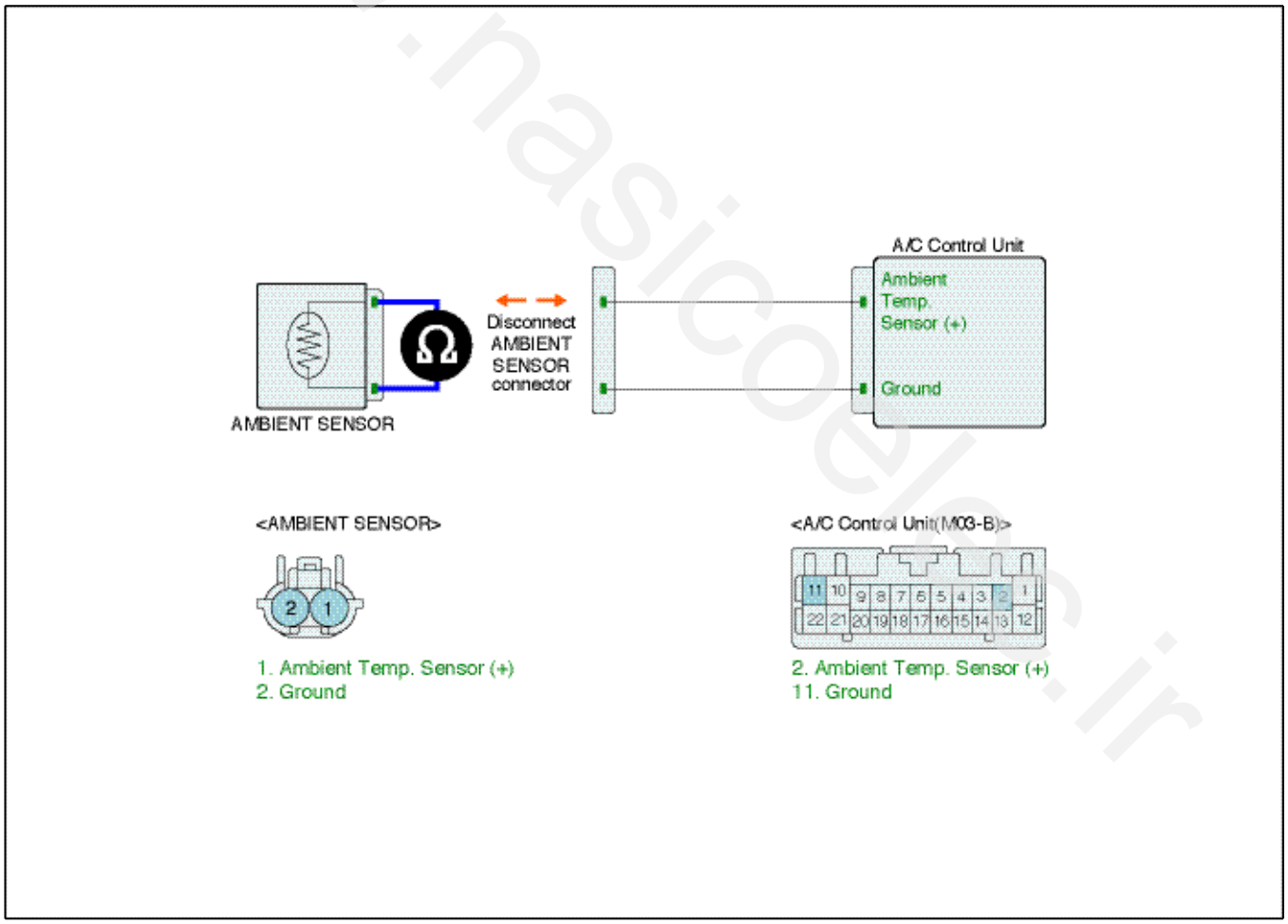
NO ▶ Check for short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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)



VG12AC50B123741

Fig.1)

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	271.4	50/122	11

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
0/32	95.1	60/140	7.58
25/77	30		

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

※ The actual value may differ from it according to various engine condition.

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

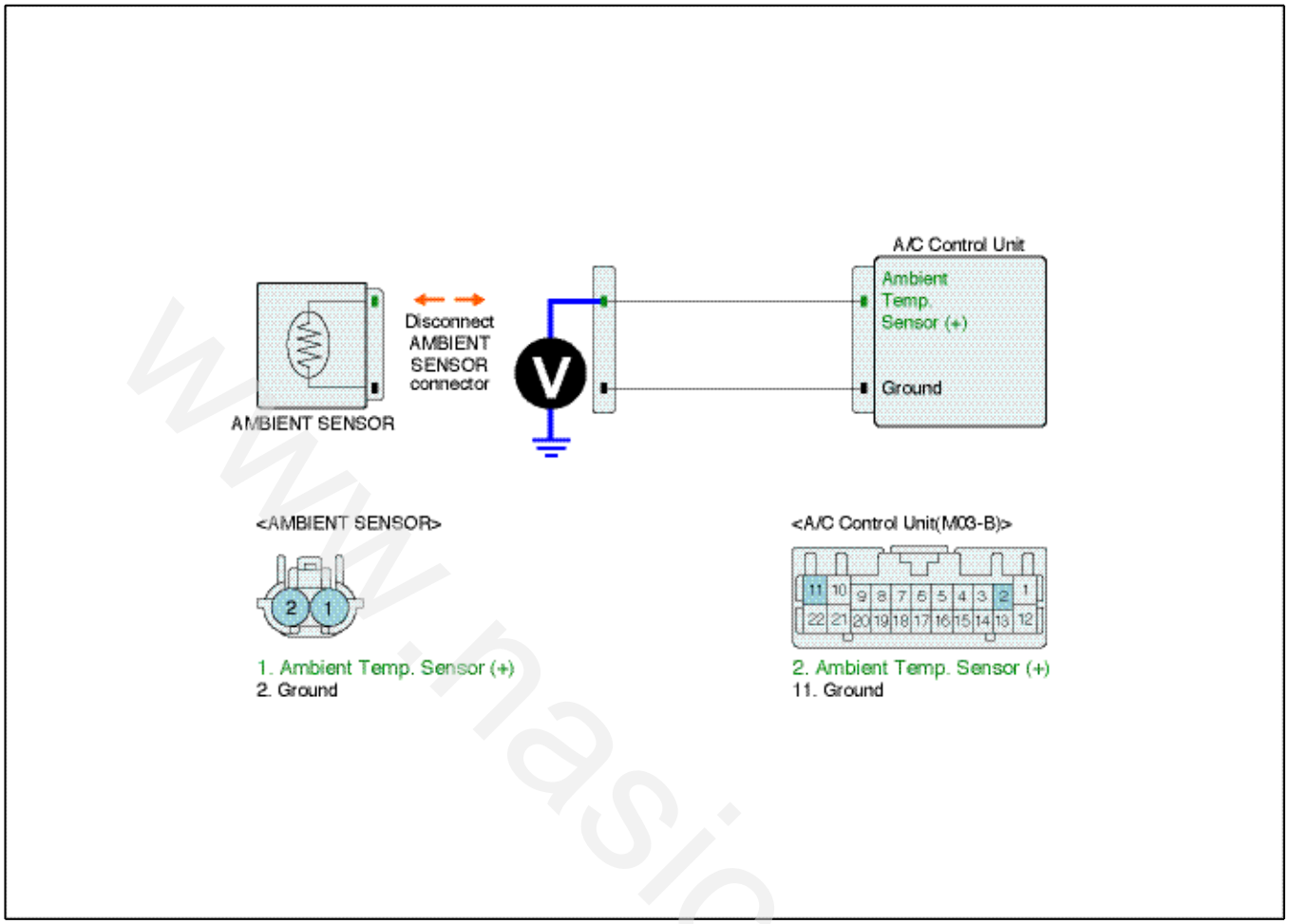
YES ▶ Go to "Check A/C-ECU" procedure.

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



VG12AC50B123742

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.

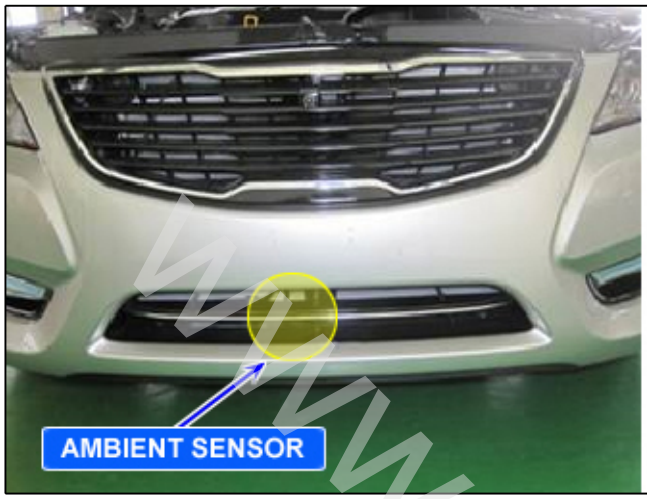
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1238 Ambient Temperature Sensor Open (High)

Componet Location



YG12AC0B123711

General Description

The Ambient Temperature is a NTCT type thermistor and is use for temperature regulation including blower motor level and mix mode control .

DTC Description

DTC B1238 sets if Ambient Temperature sensor signal is at or over 4.9V for 0.3 seconds.

DTC Detecting Condition

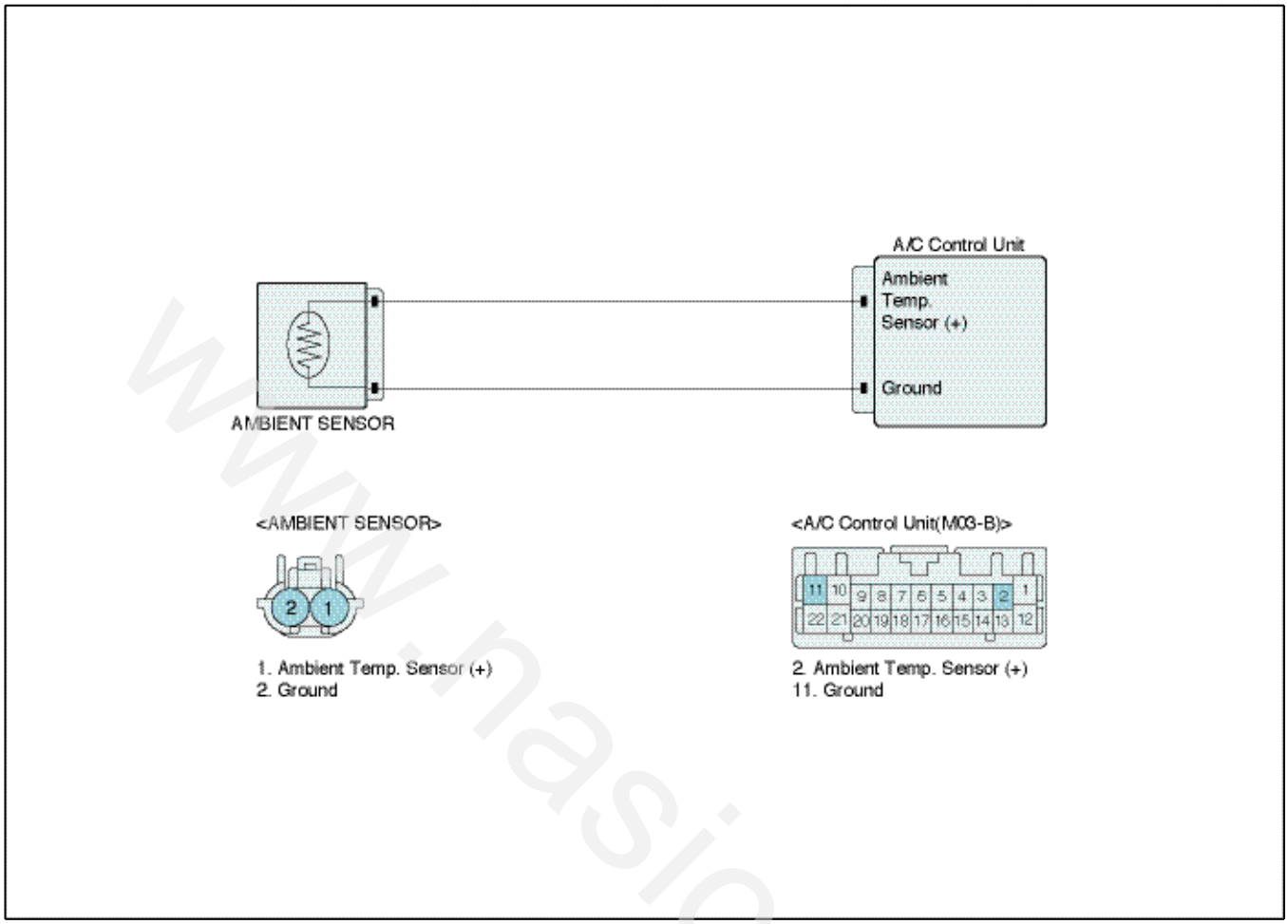
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor Connection in harness 2. Open in signal circuit 3. Shrot to battery in signal circuit 4. Faulty Ambient Temperature sensor 5. Faulty air condtioner control Module
Enable Conditions	• Ignition ON	
Threshold value	• Ambient Temperature sensor signal is at or over 4.9V for 0.3 seconds	
Failsafe	• Displayed '--' and A/C control Module regards and controls it as 20℃(68˚F)	

Specification

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

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-20/-4	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30		

Diagnostic Circuit Diagram



VG12AC50B1237D

Monitor Scantool data

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

Fig.1

VG12AC0B123721S

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

4. Is the ambient sensor abnormal ?

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

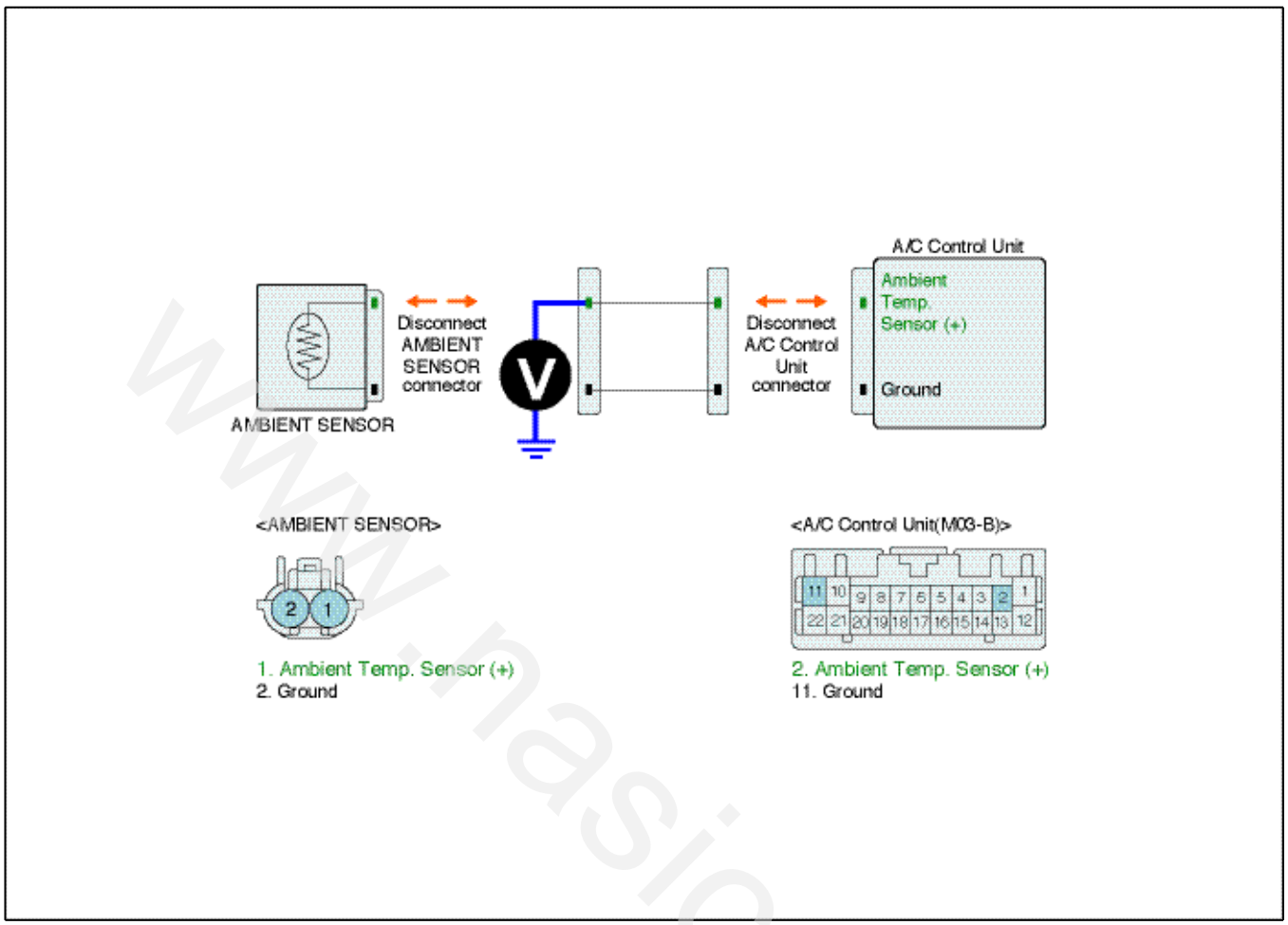
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B123831

5. Is the measured voltage within specification?

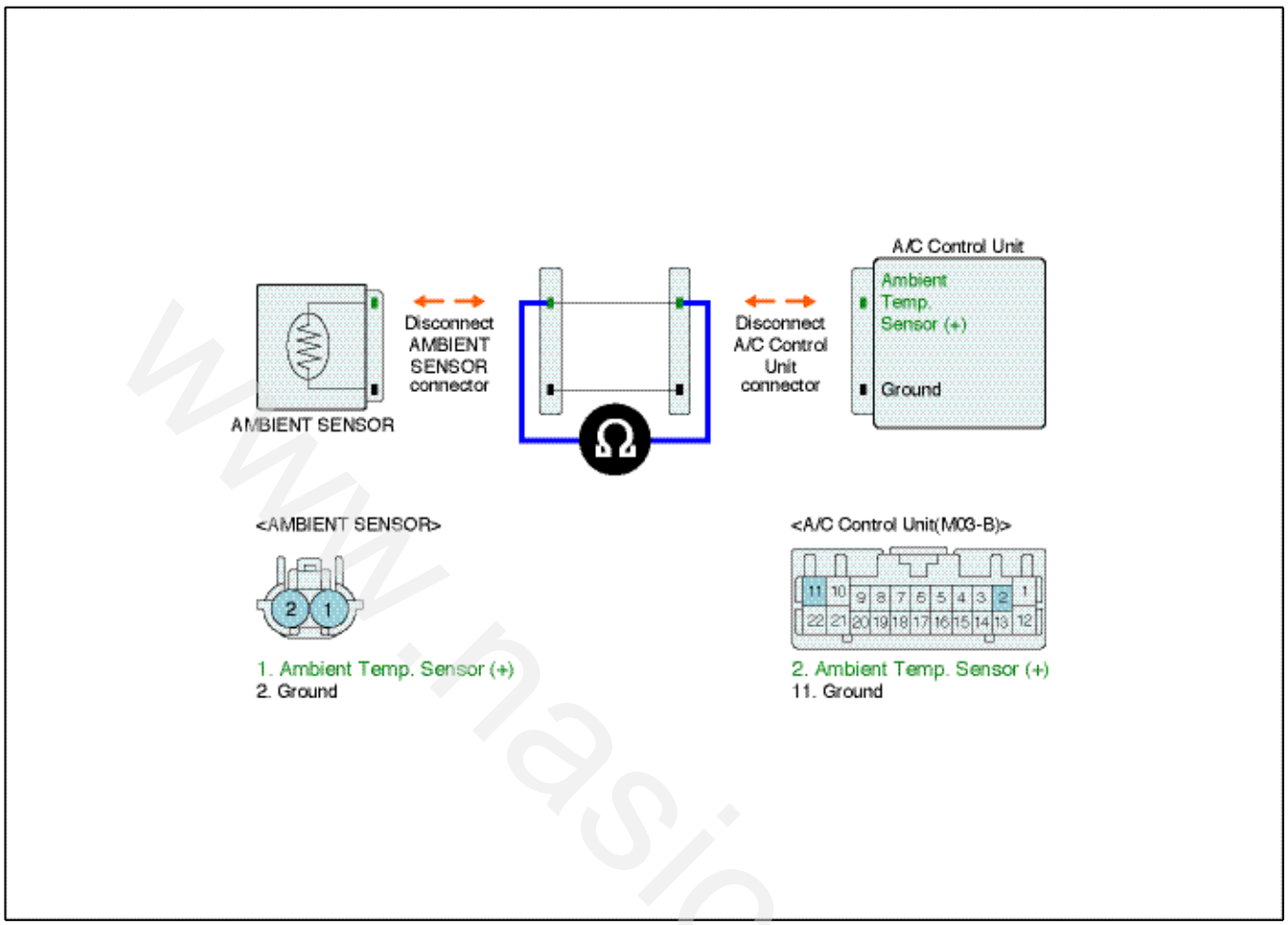
YES ▶ Go to "Check for open in harness" as follows .

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



VG12AC50B123832

4. Is the measured resistance within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

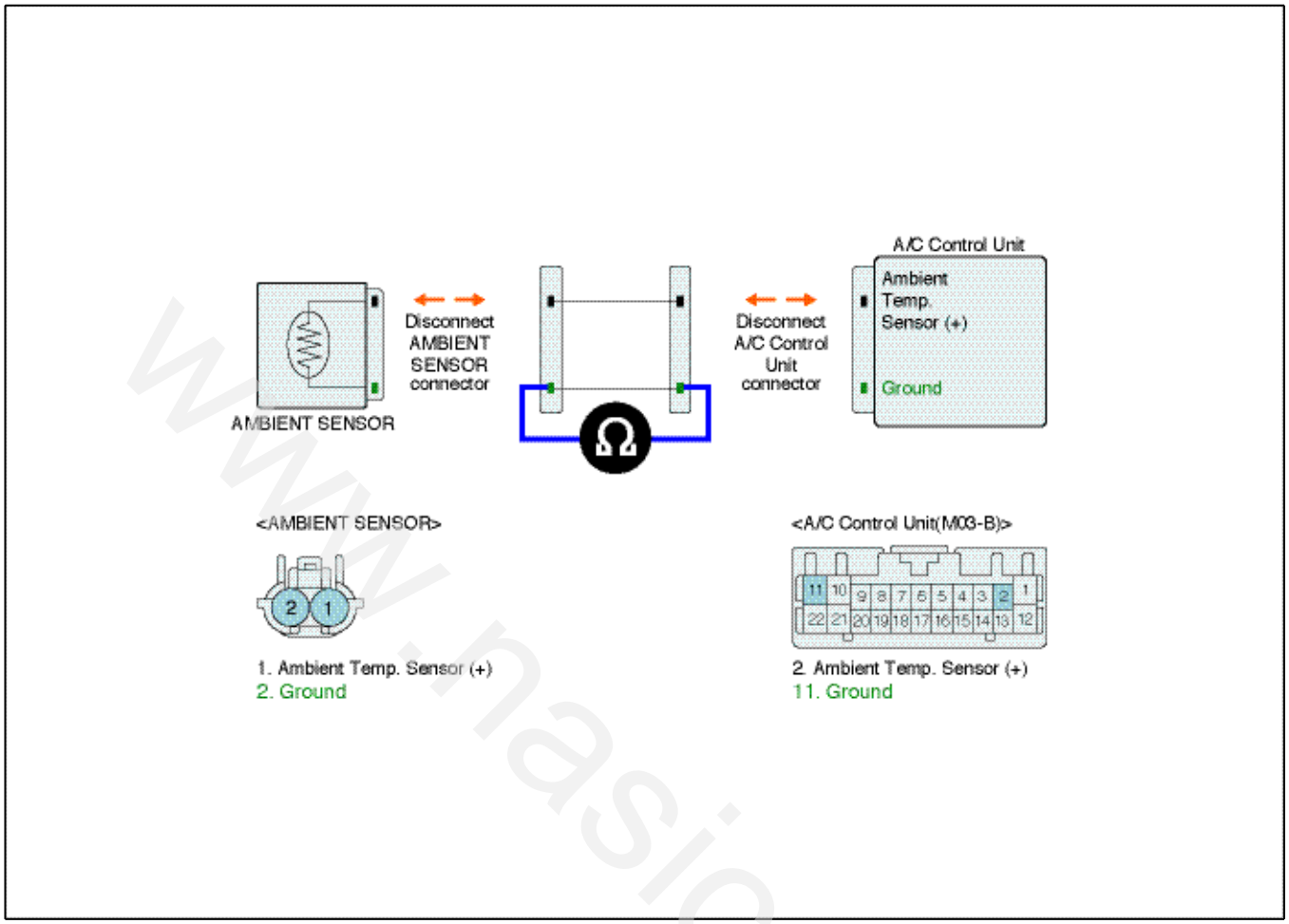
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B123833

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

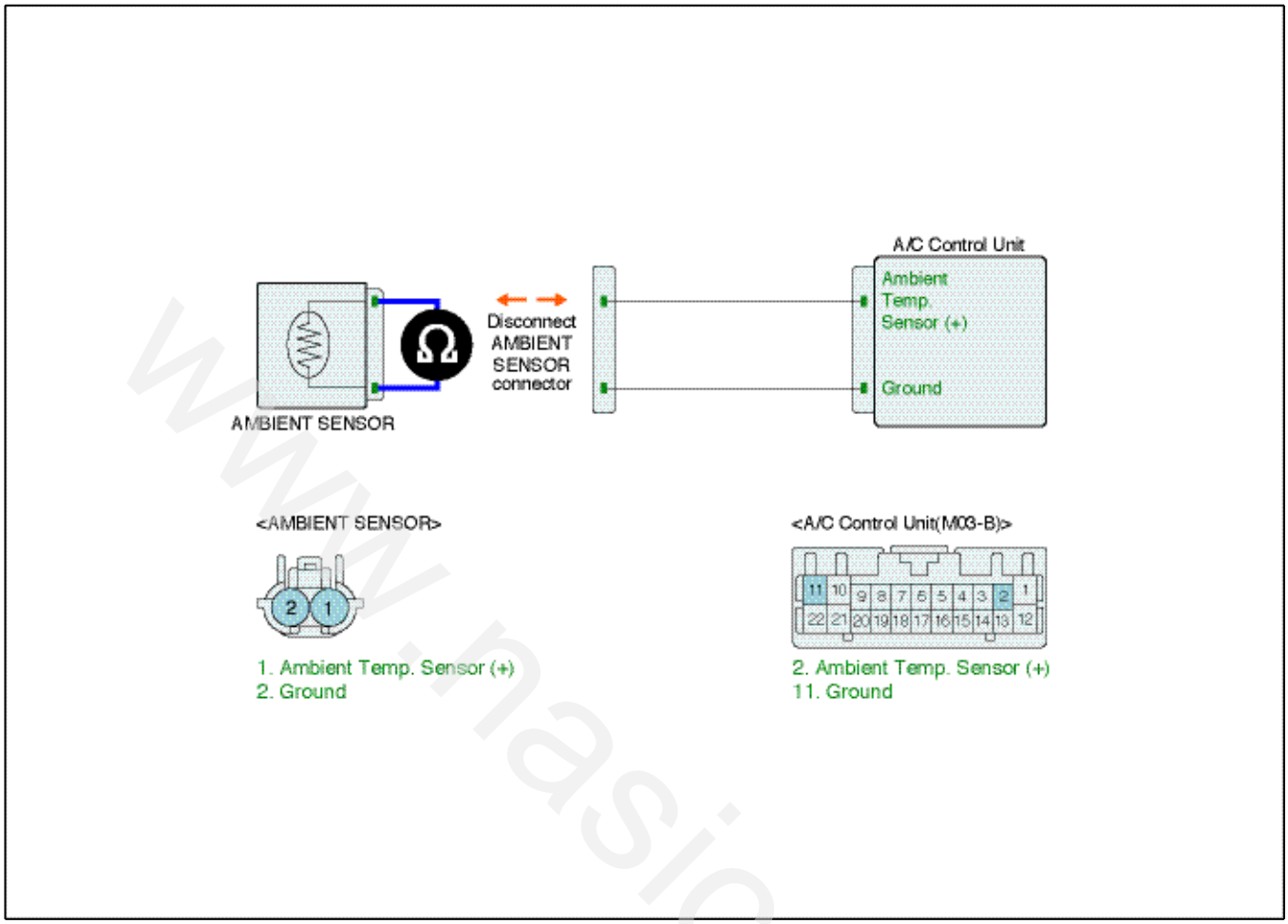
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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)



VG12AC50B123841

Fig.1)

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
-20/-4	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30		

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

※ The actual value may differ from it according to various engine condition.

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

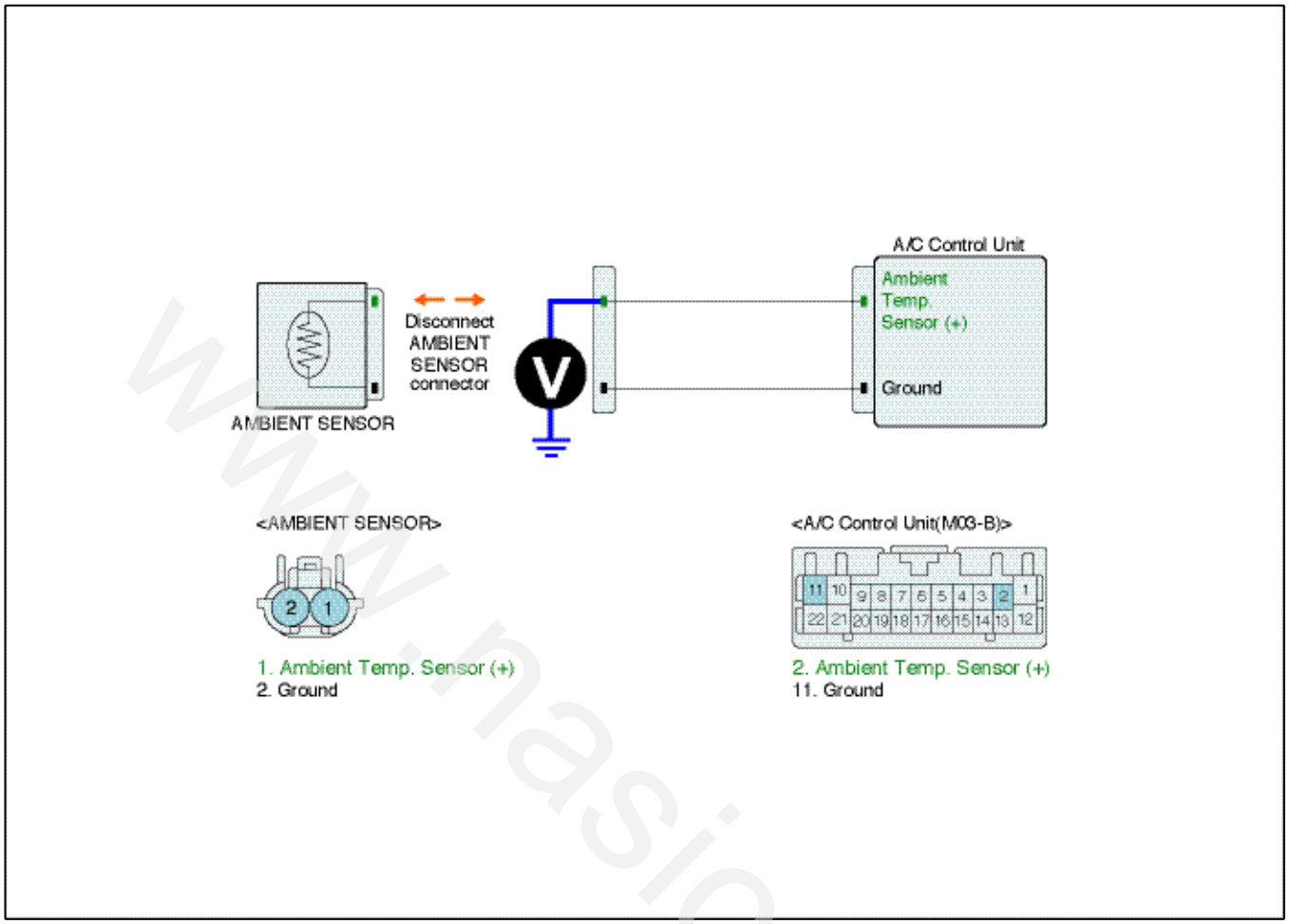
YES ▶ Go to "Check A/C-ECU" procedure.

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



VG12AC50B123842

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.

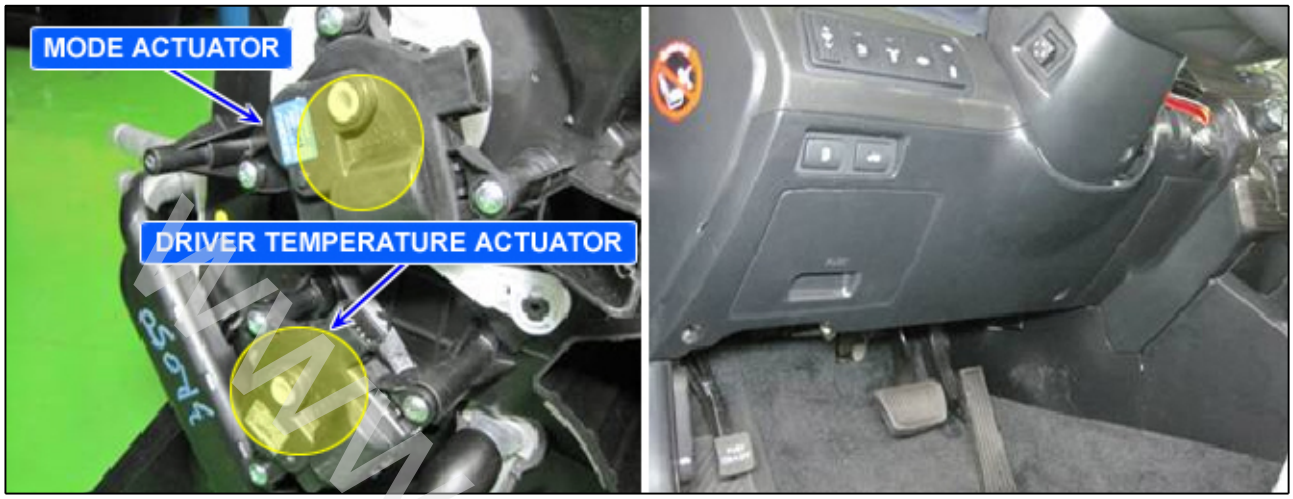
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1241 Evaporator Sensor Short (Low)

Componet Location



YG12AC0B124111

General Description

The Evaporator sensor is located on the AC/heater boxand it detects the evaporator core temperature. When the core temperature is below the threshold value, the A/C ECU interrupts the compressor relay in order to prevent evaporator freezing.

DTC Description

DTC B1241 sets if the Evaporator Sensor signal is at or below 0.1V for 0.3 seconds.

DTC Detecting Condition

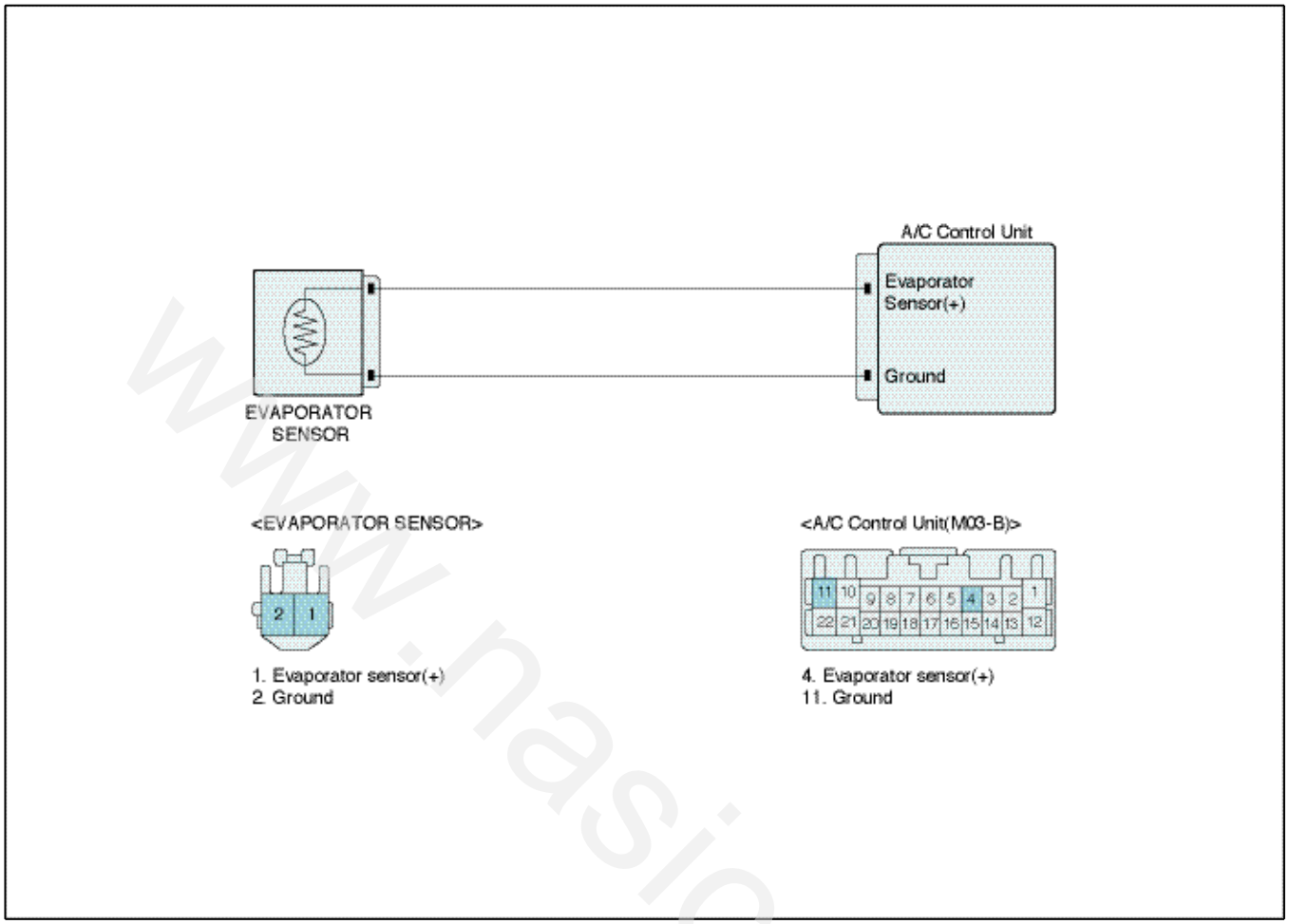
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short circuit in harness 2. Faulty Evaporator sensor 3. Faulty A/C Control Unit
Enable Conditions	• Ignition ON	
Threshold value	• Evaporator Sensor signal is at or below 0.1V for 0.3 seconds.	
Failsafe	• Control with the value of -2℃(28.4˚F)	

Specification

※ Resistance value of evaporator sensor as a function of temperature.

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-25/14	43.3	20/68	12.1
0/32	27.6	30/86	8.3
10/50	18	40/104	5.8

Diagnostic Circuit Diagram



VG12AC50B1241D

Monitor Scantool data

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

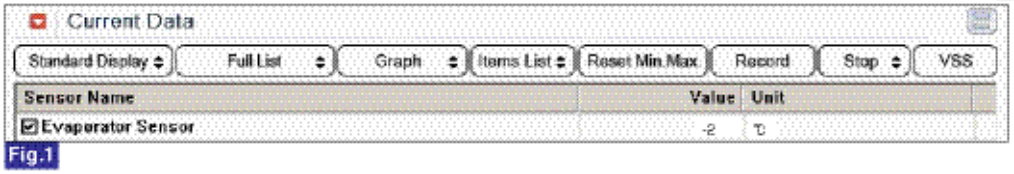


Fig.1

VG12AC0B124121S

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

4. Is the Evaporator Sensor abnormal ?

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

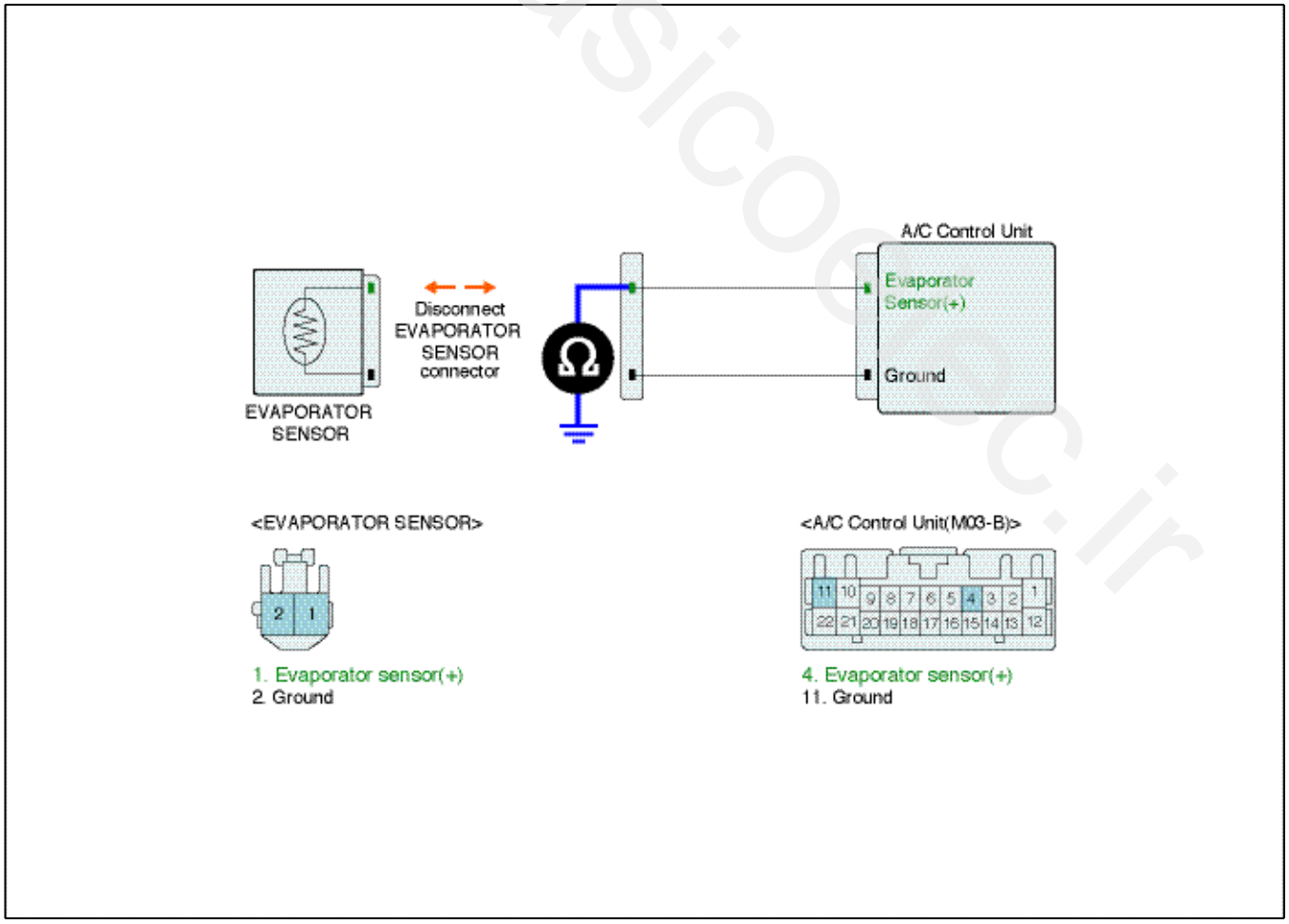
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B124131

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

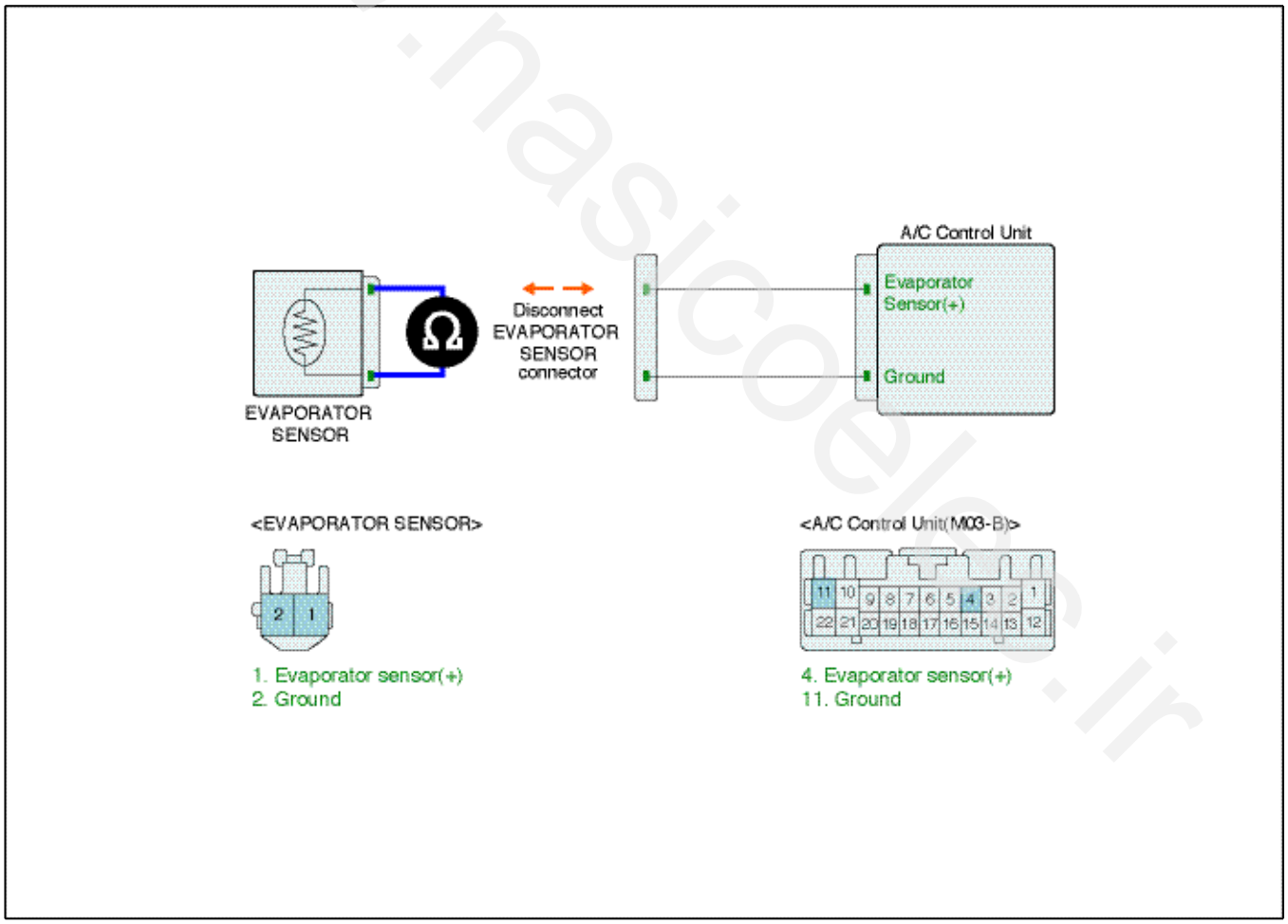
NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Evaporator 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)



VG12AC50B124141

Fig.1)

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-25/14	43.3	20/68	12.1

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
0/32	27.6	30/86	8.3
10/50	18	40/104	5.8

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

※ The actual value may differ from it according to various engine condition.

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

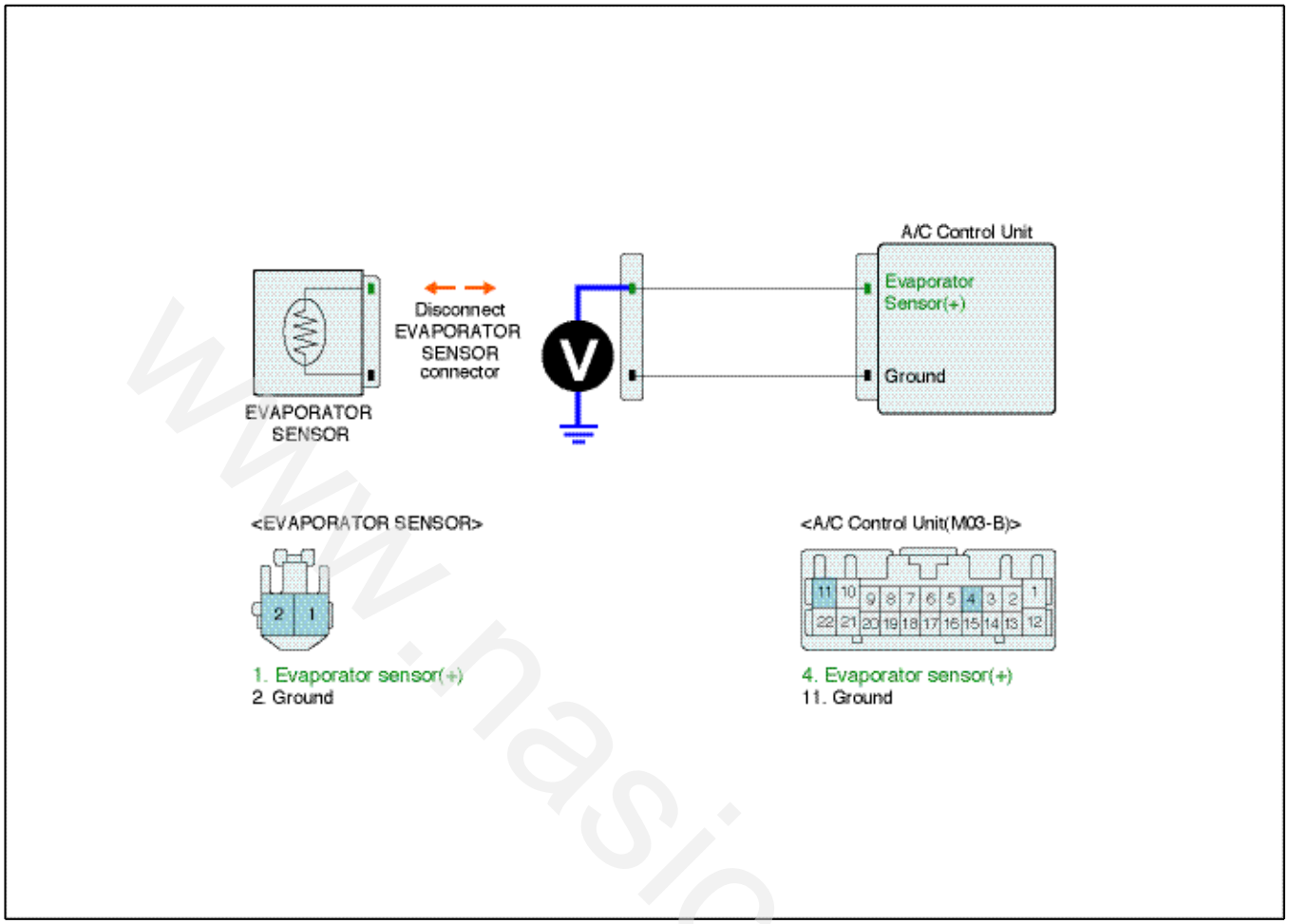
YES ▶ Go to "Check A/C-ECU" procedure.

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



VG12AC50B124142

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.

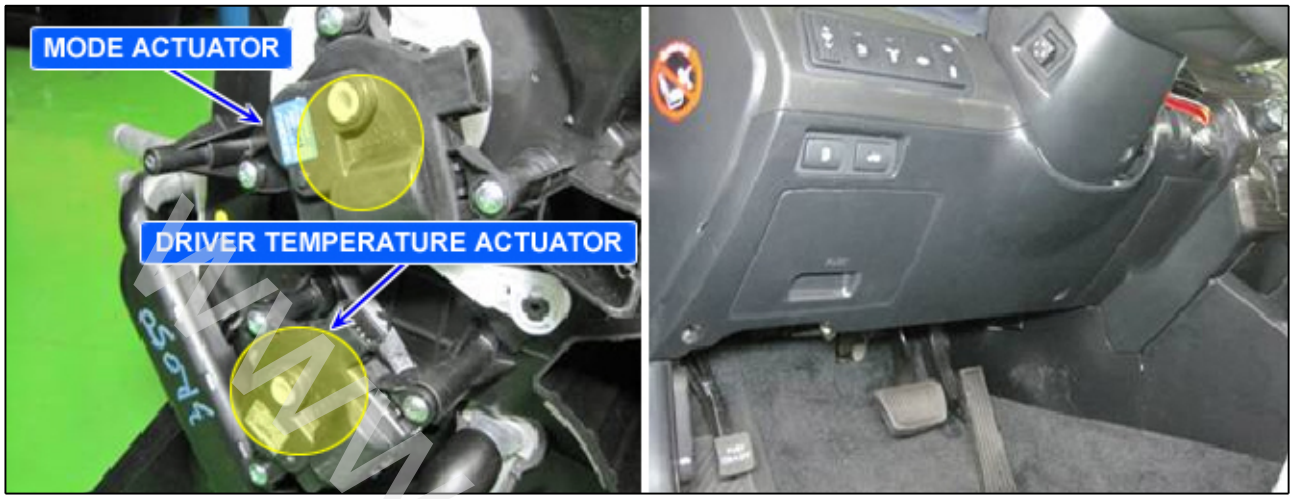
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1242 Evaporator Sensor Open (High)

Componet Location



YG12AC0B124111

General Description

The Evaporator sensor is located on the AC/heater boxand it detects the evaporator core temperature. When the core temperature is below the threshold value, the A/C ECU interrupts the compressor relay in order to prevent evaporator freezing.

DTC Description

DTC B1242 sets if Evaporator sensor signal is at or over 4.9V for 0.3 seconds.

DTC Detecting Condition

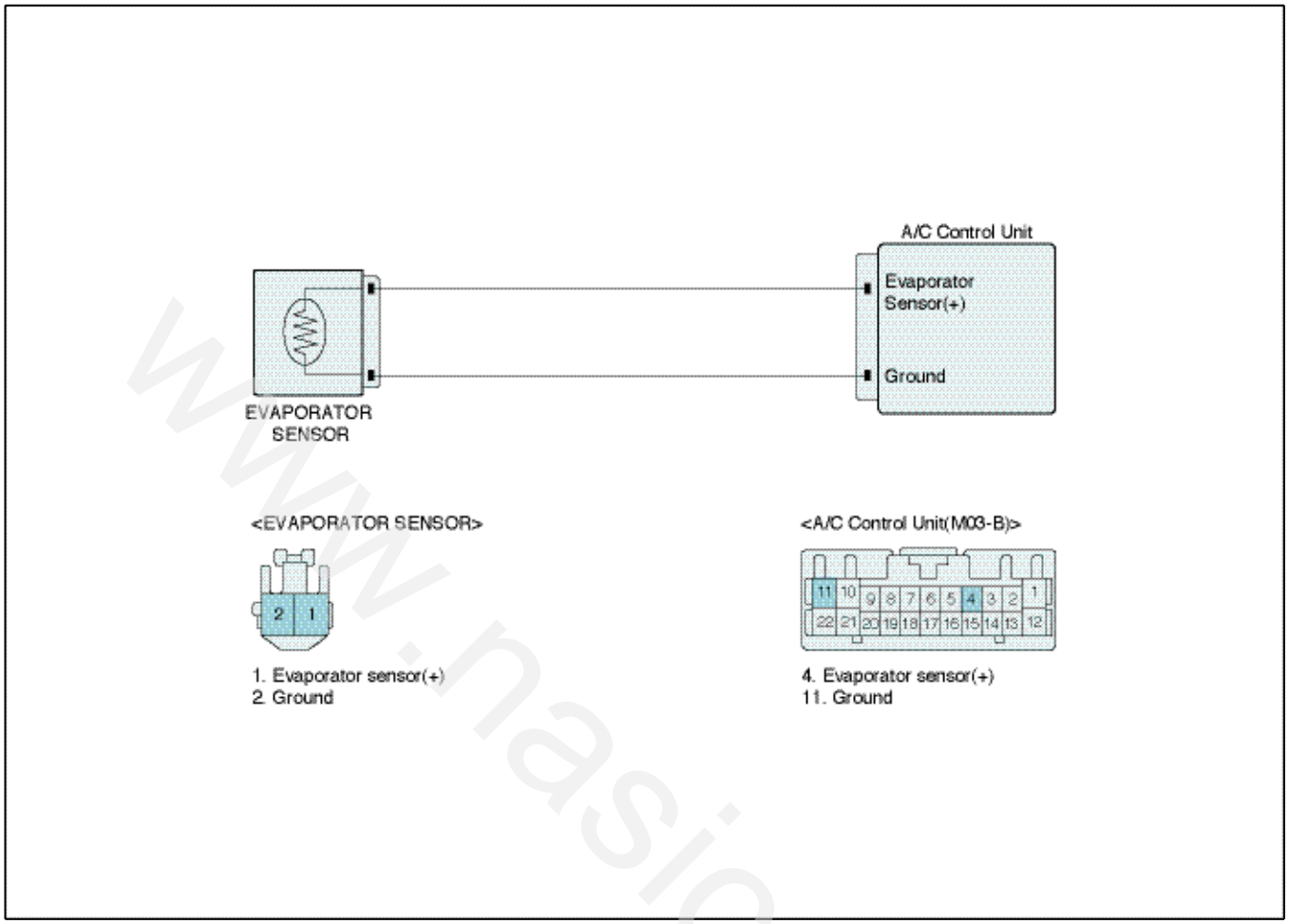
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Open in signal circuit 2. Short to battery in signal circuit 3. Faulty Evaporator sensor 4. Faulty Air conditioner control Unit
Enable Conditions	• Ignition ON	
Threshold value	• Evaporator sensor signal is at or over 4.9V for 0.3 seconds.	
Failsafe	• Control with the value of -2℃(28.4˚F)	

Specification

※ Resistance value of evaporator sensor as a function of temperature.

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-25/14	43.3	20/68	12.1
0/32	27.6	30/86	8.3
10/50	18	40/104	5.8

Diagnostic Circuit Diagram



VG12AC50B1241D

Monitor Scantool data

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

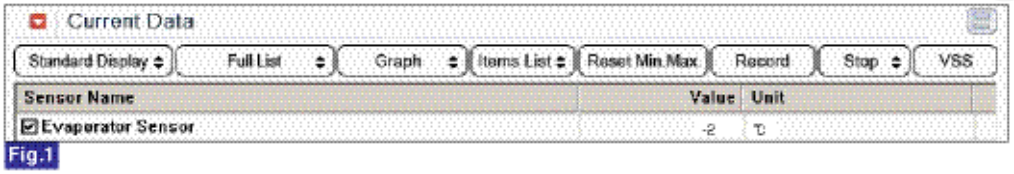


Fig.1

VG12AC0B124121S

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

4. Is the Evaporator Sensor abnormal ?

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

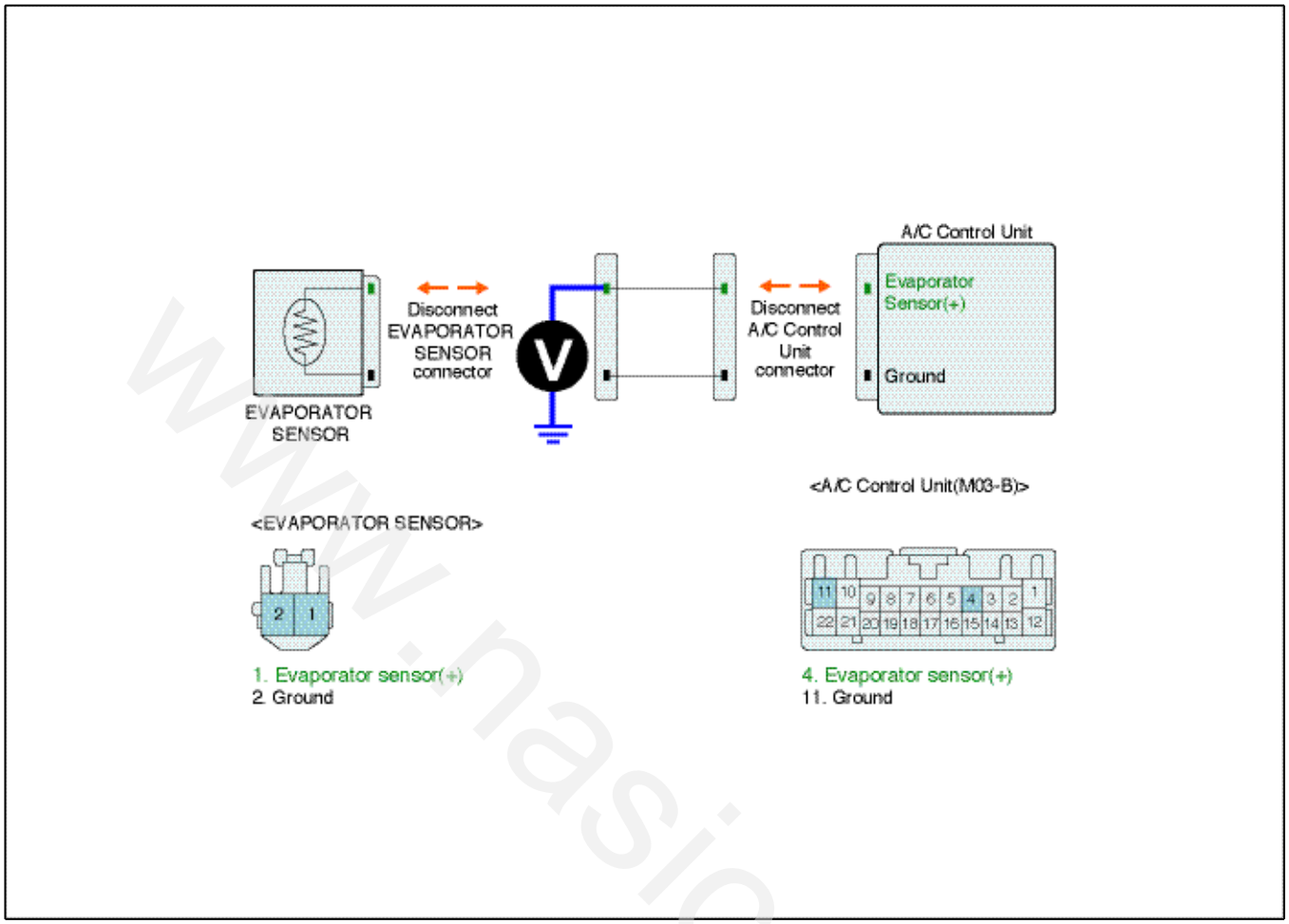
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B124231

5. Is the measured voltage within specification?

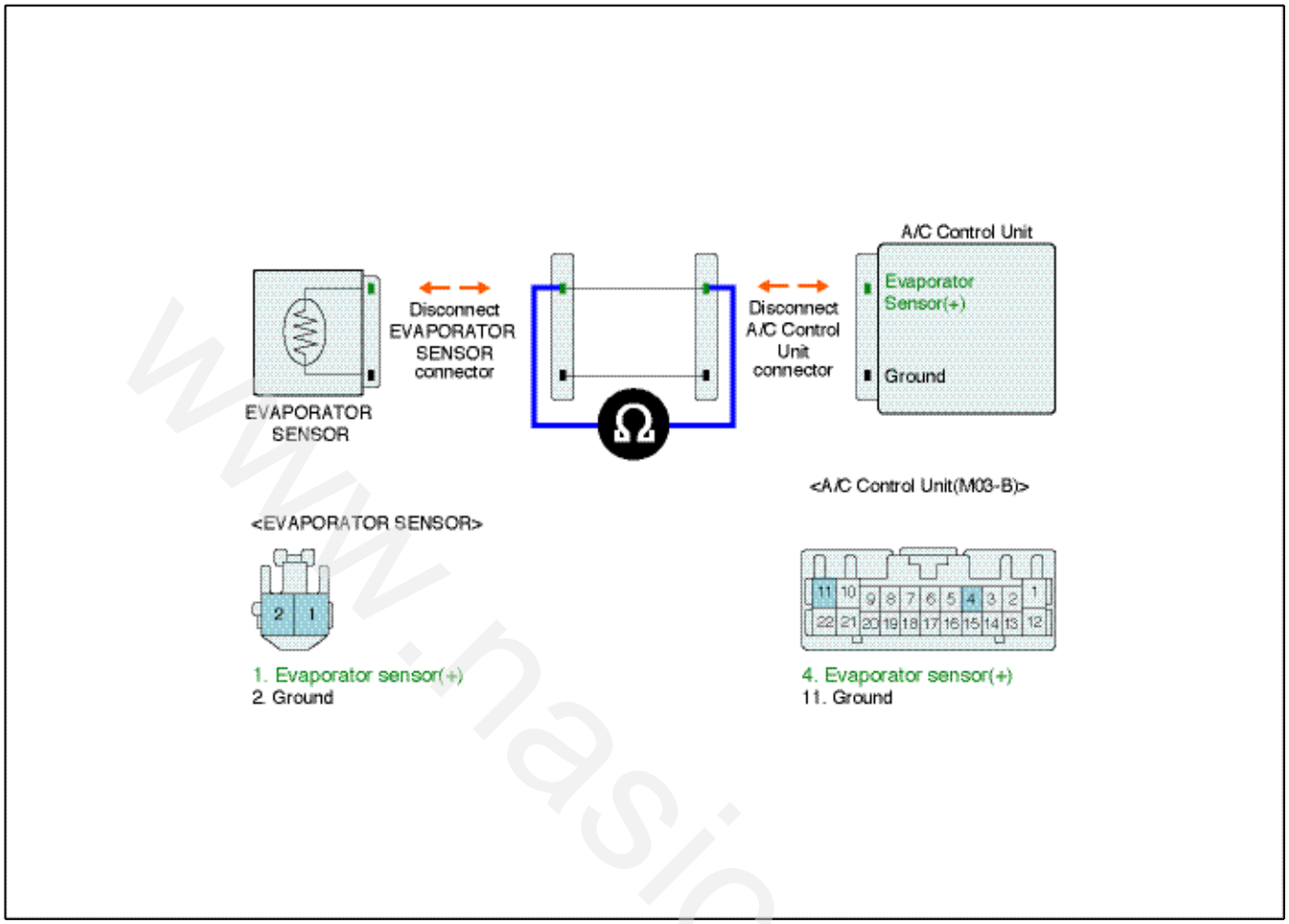
YES ▶ Go to "Check for open in harness" as follows .

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



VG12AC50B124232

4. Is the measured resistance within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

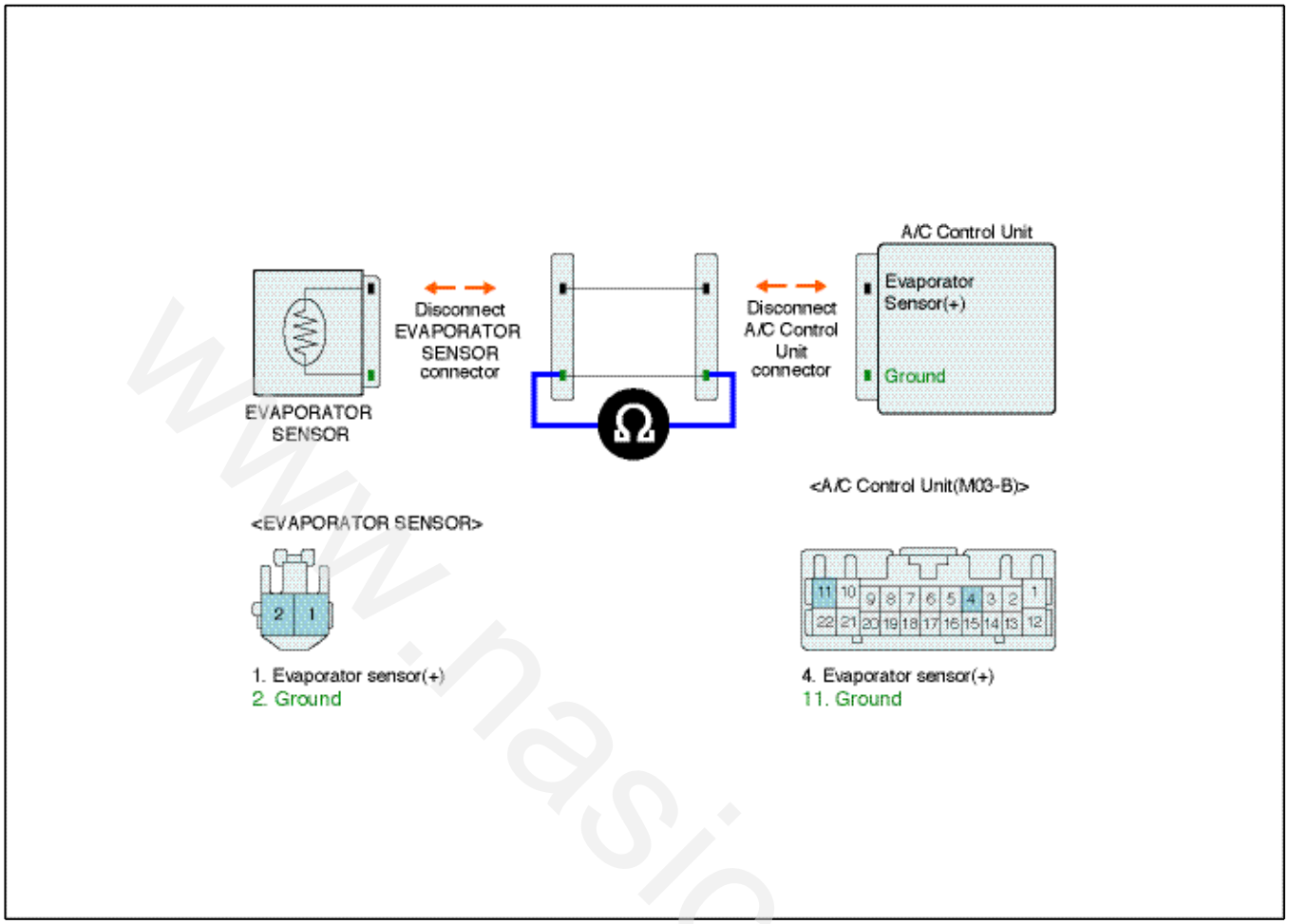
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B124233

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

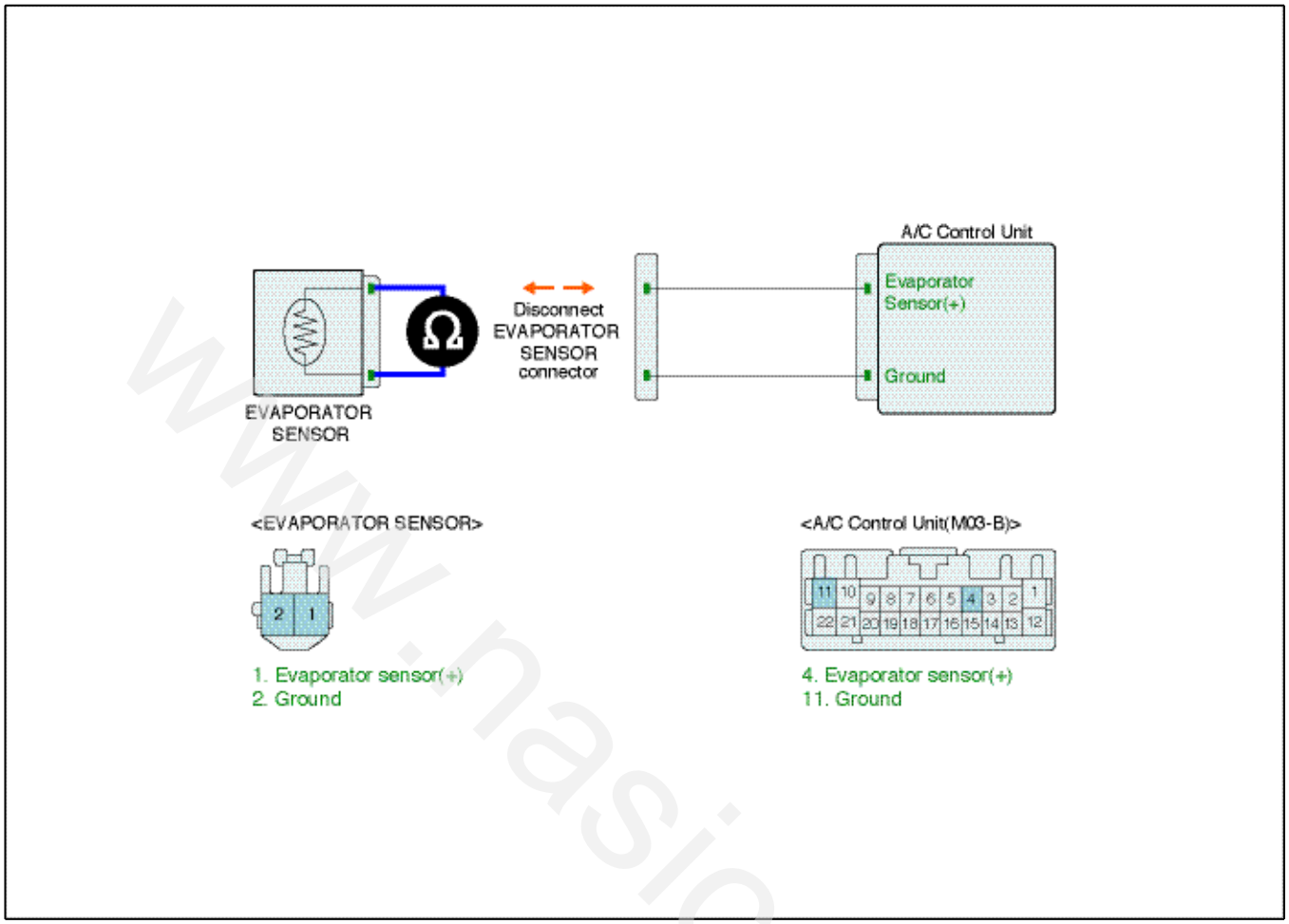
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Evaporator 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)



VG12AC50B124241

Fig.1)

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
-25/14	43.3	20/68	12.1
0/32	27.6	30/86	8.3
10/50	18	40/104	5.8

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

※ The actual value may differ from it according to various engine condition.

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

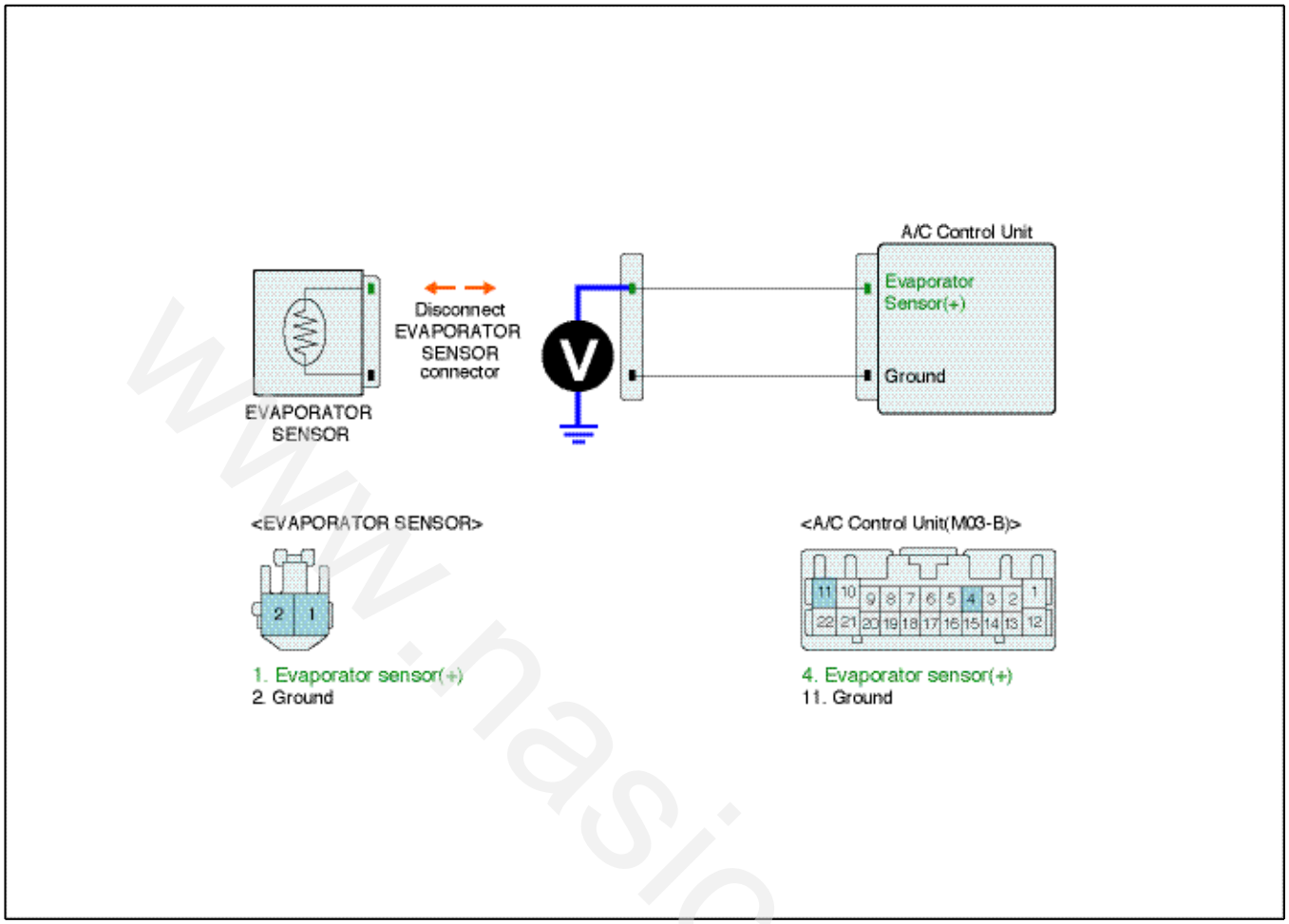
YES ▶ Go to "Check A/C-ECU" procedure.

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



VG12AC50B124242

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.

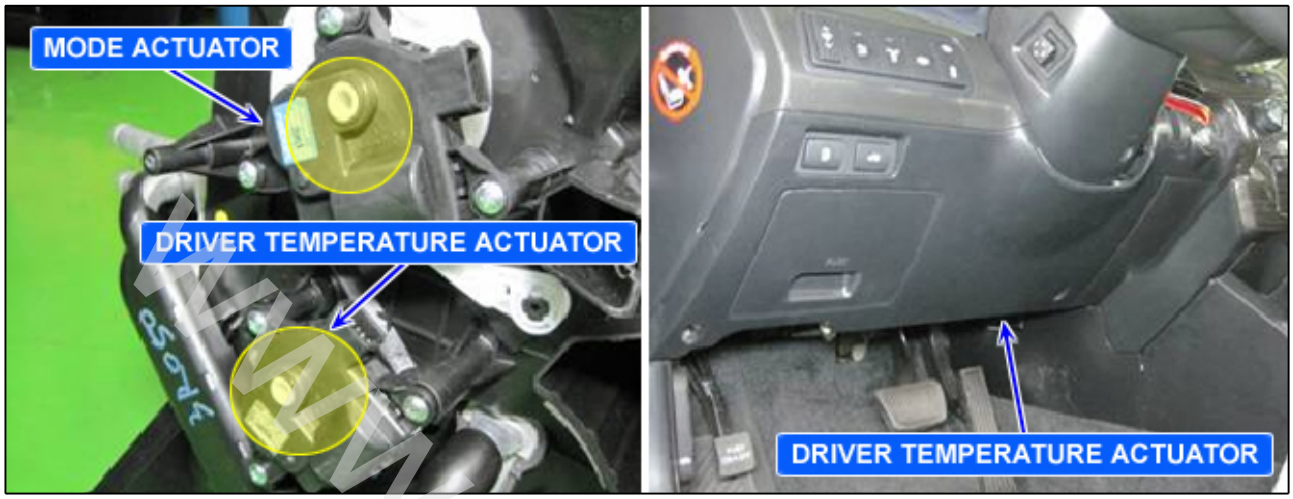
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1245 Air Mix Potentiometer Open (Low)-Driver

Componet Location



YG12AC0B124511

General Description

The Air Mix actuator contains a motor that changes temp door position and a potentiometer that monitors position of temp door. Temperature control actuator regulates the temperature by operating temp door motor. The potentiometer delivers temp door position to the A/C ECU .

DTC Description

DTC B1245 sets if the Driver Temperature Actuator Sensor signal is at or below 0.1V for 0.3 seconds.

DTC Detecting Condition

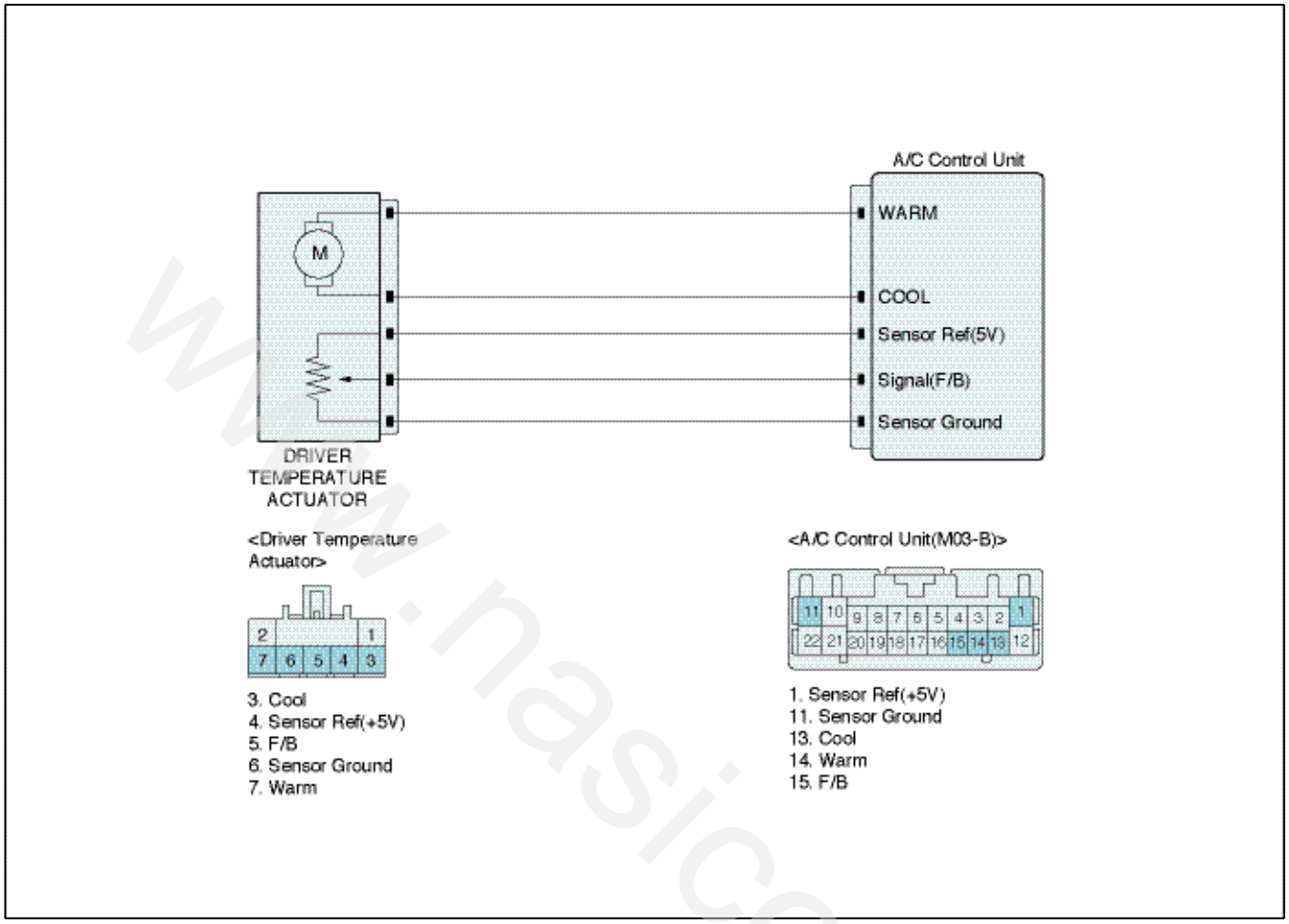
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor Conection in harness 2. Open in signal(Feedback signal), power and ground circuit 3. Faulty Driver Temperature Actuator 4. Faulty Air condition Contorl Modole
Enable Conditions	• Ignition ON	
Threshold value	• Driver Temperature Actuator Sensor signal is at or below 0.1V for 0.3 seconds.	
Failsafe	• Setting temperature : 16℃(62.6˚F)-24℃(76.1˚F), fix at max. cooling position • Setting temperature : 25℃(77˚F)-31℃(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	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



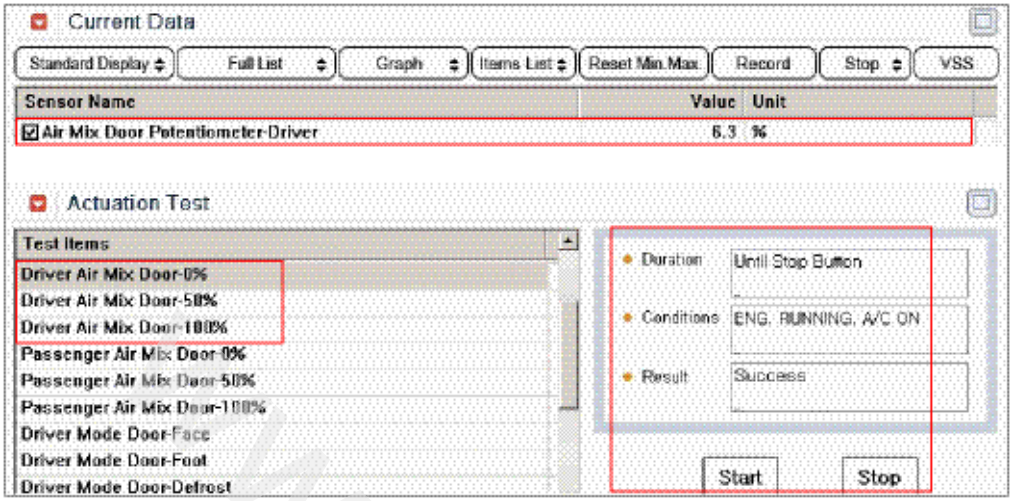
VG12AC50B1245D

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after 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.



VG12AC0B124521S

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/Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

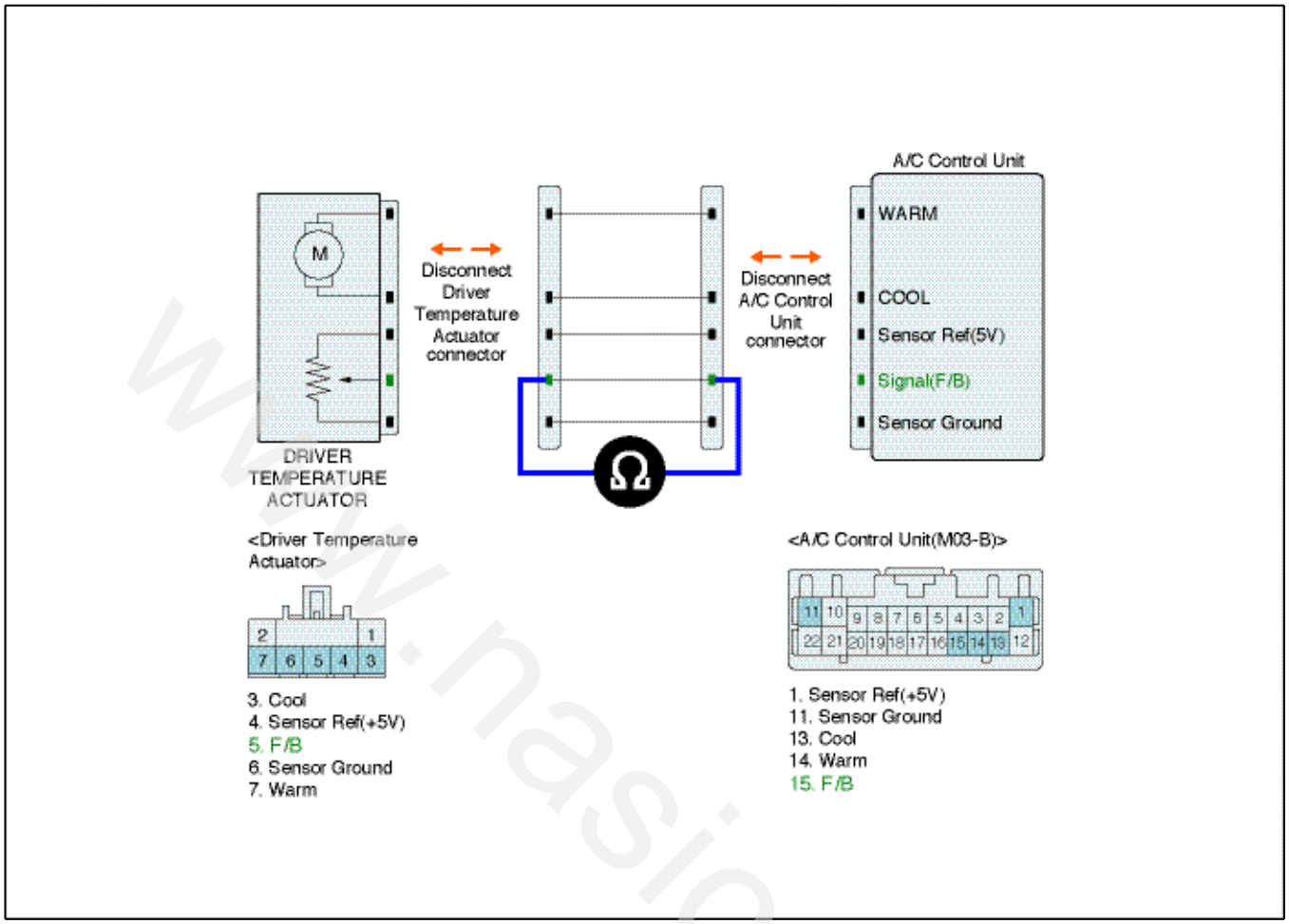
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B124531

4. Is the measured resistance within specification?

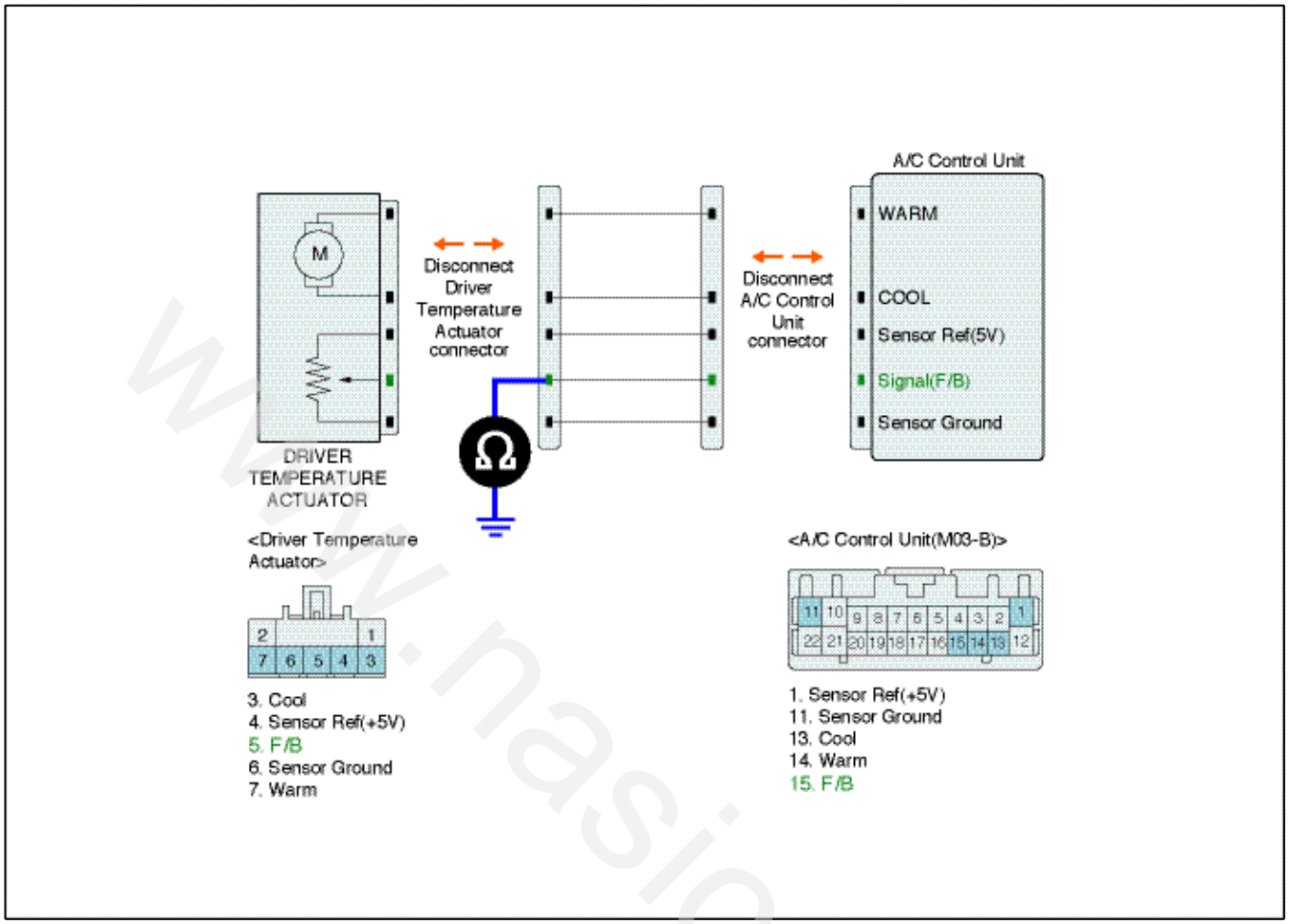
YES ▶ Go to "Check short to ground in harness" as follows.

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



VG12AC50B124532

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness .

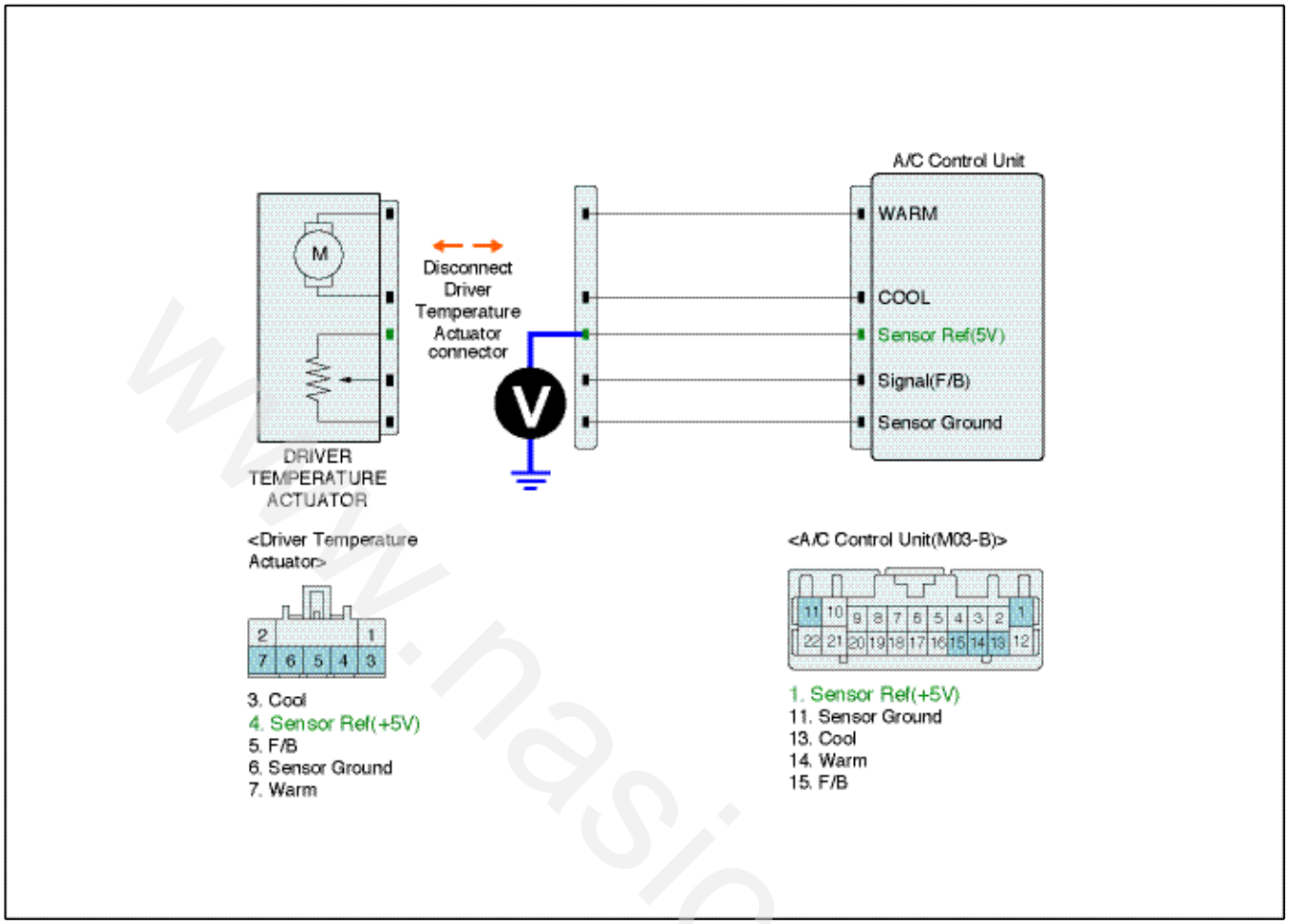
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B124533

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

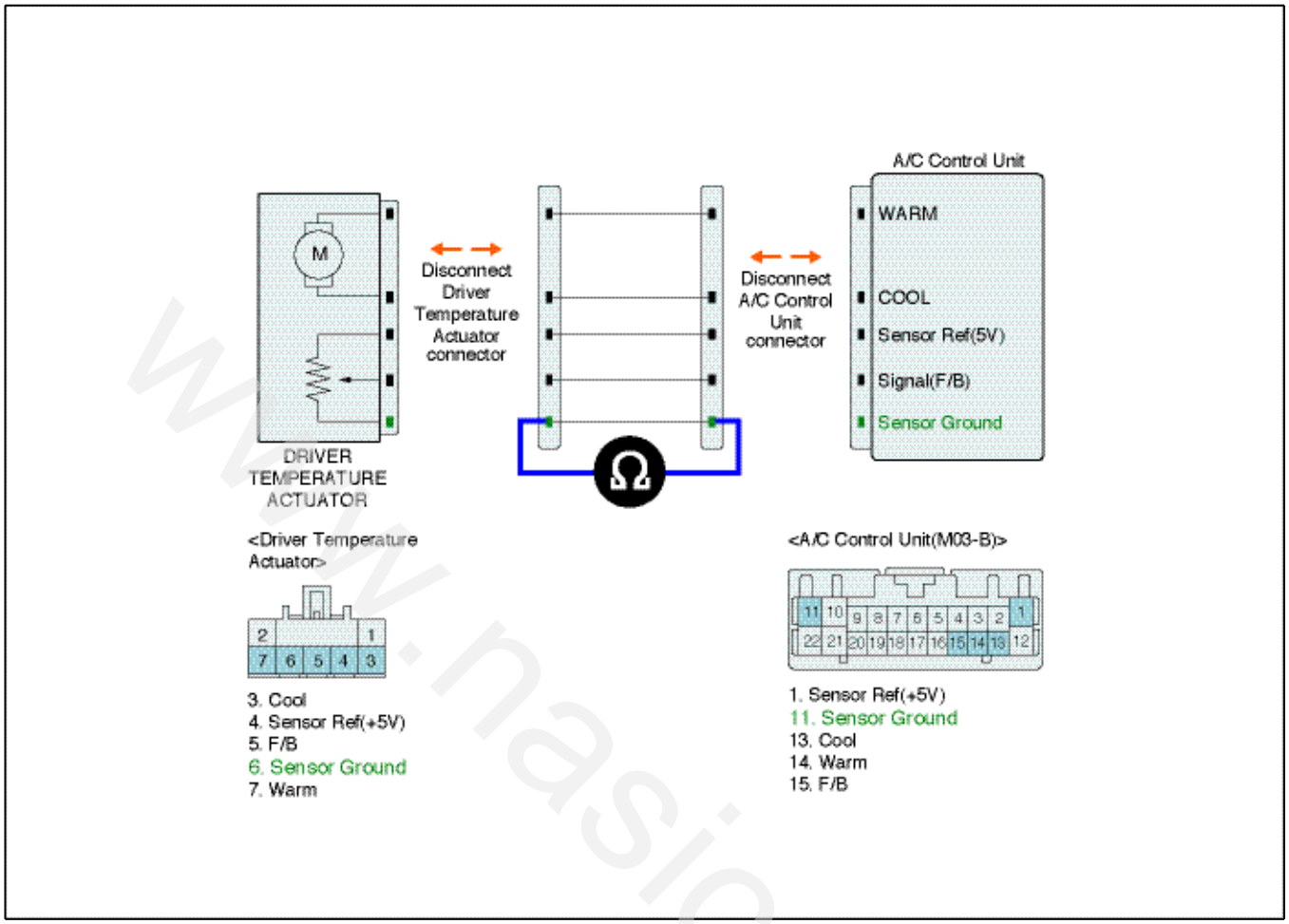
NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B124534

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

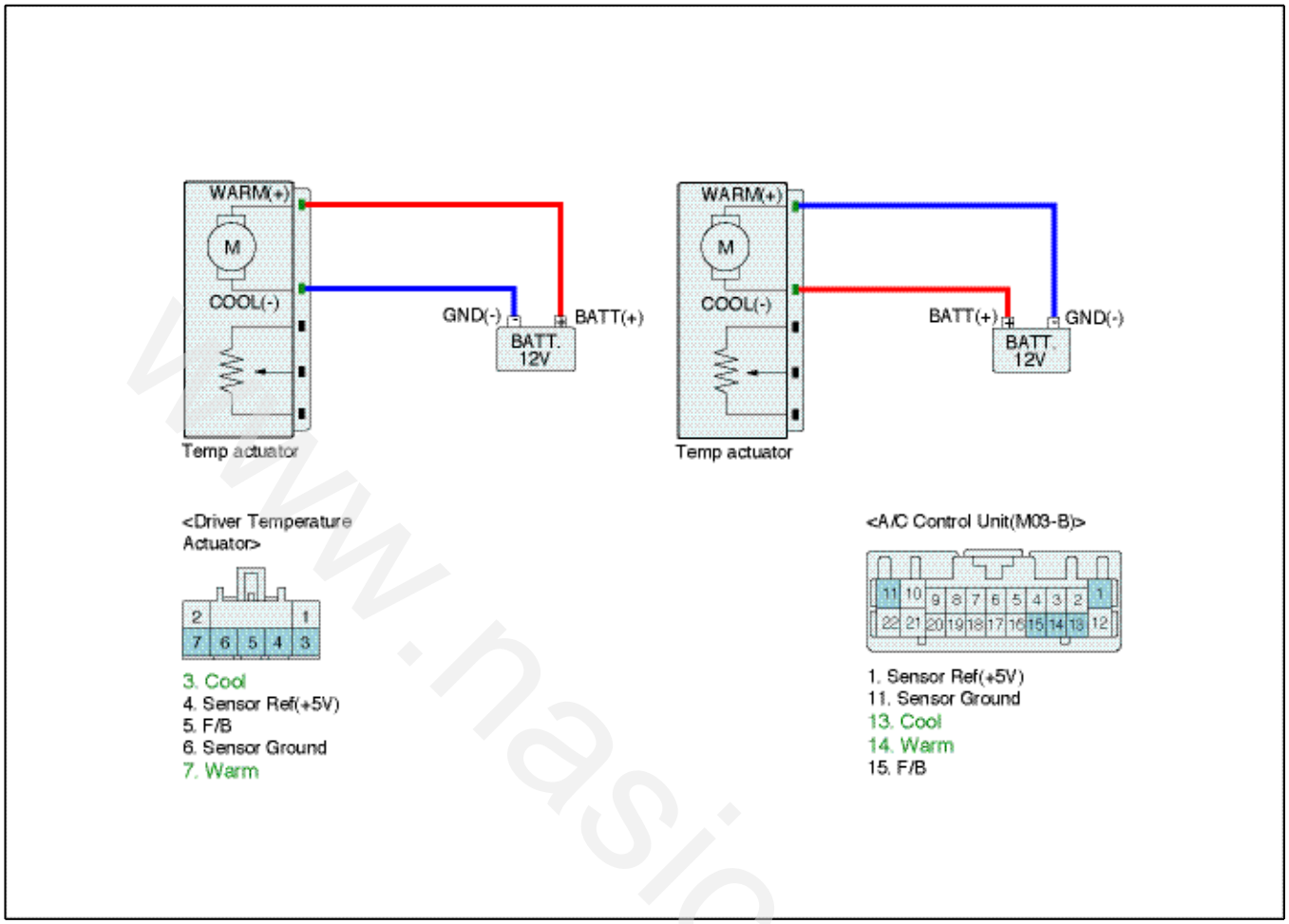
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver 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)



VG12AC50B124541

Fig.1)

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

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

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

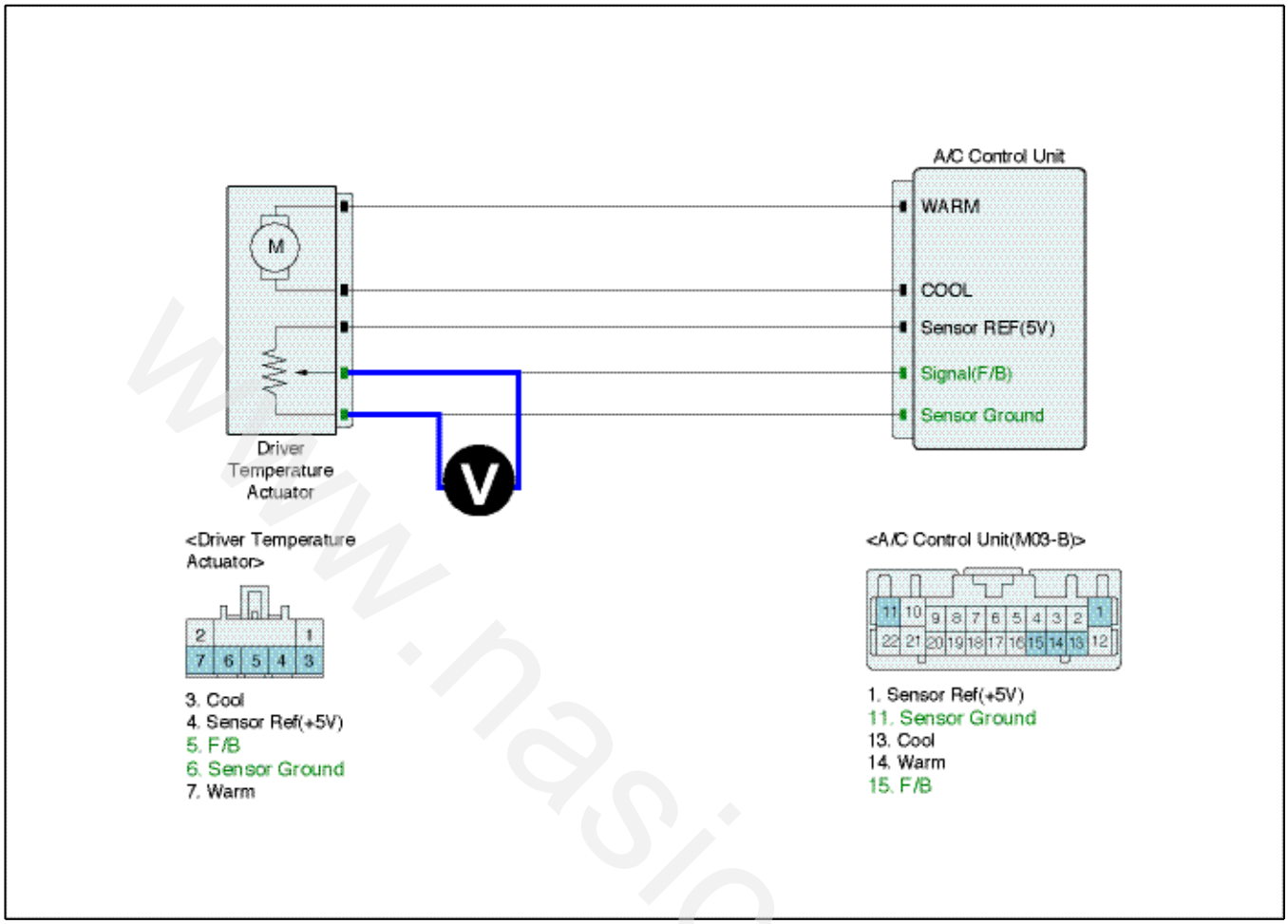
YES ▶ Go to "Check potentiometer" procedure.

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)



VG12AC50B124542

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

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

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.

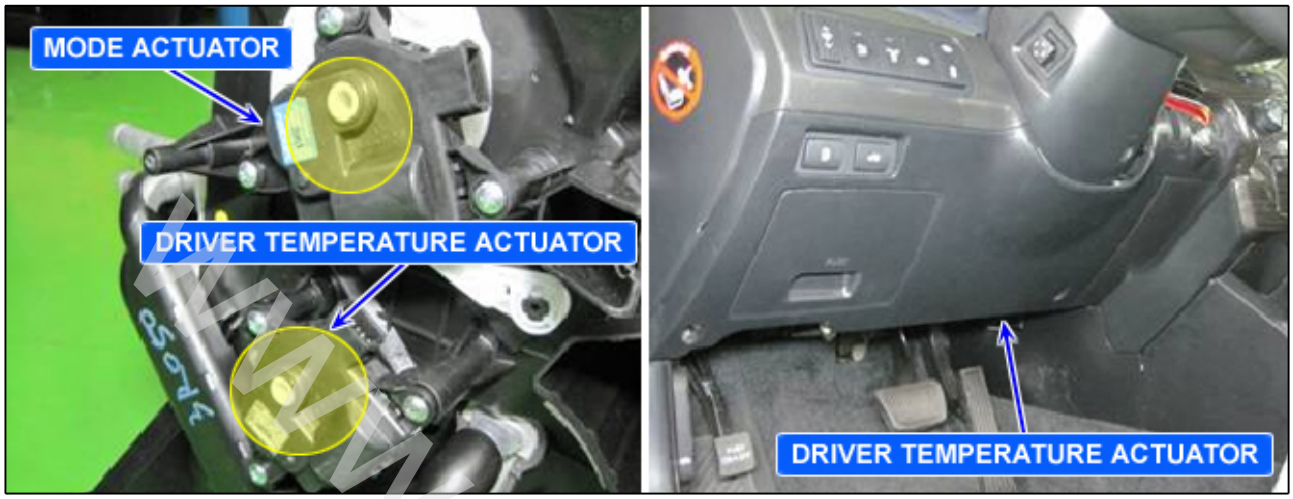
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1246 Air Mix Potentiometer Short (High)-Driver

Componet Location



YG12AC0B124511

General Description

The Air Mix actuator contains a motor that changes temp door position and a potentiometer that monitors position of temp door. Temperature control actuator regulates the temperature by operating temp door motor. The potentiometer delivers temp door position to the A/C ECU .

DTC Description

DTC B1246 sets if Driver Temperature Actuator sensor signal is at or over 4.9V for 0.3 seconds.

DTC Detecting Condition

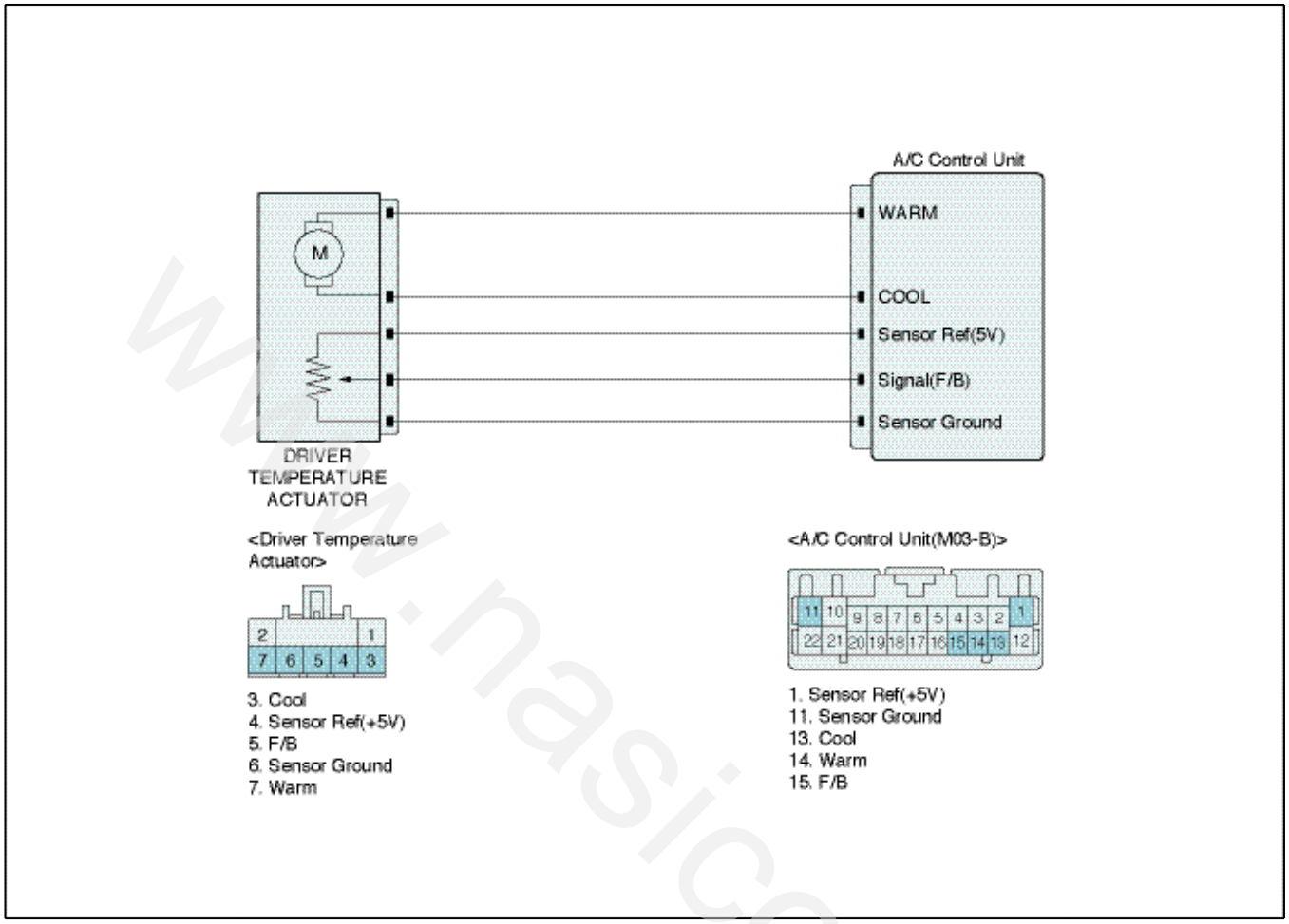
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short to battery in signal circuit(Feedback signal) 2. Faulty Driver temperature Actuator 3. Air conditioner Control Module
Enable Conditions	• Ignition ON	
Threshold value	• Driver Temperature Actuator sensor signal is at or over 4.9V for 0.3 seconds.	
Failsafe	• If the Driver set temperature is below 24℃(76.1˚F) right before fail detection, Actuator is operated and fixed to Cool Postion. • Actuator is operated and fixed to Warm Position if set temperature is over 25℃(77˚F)	

Specification

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

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



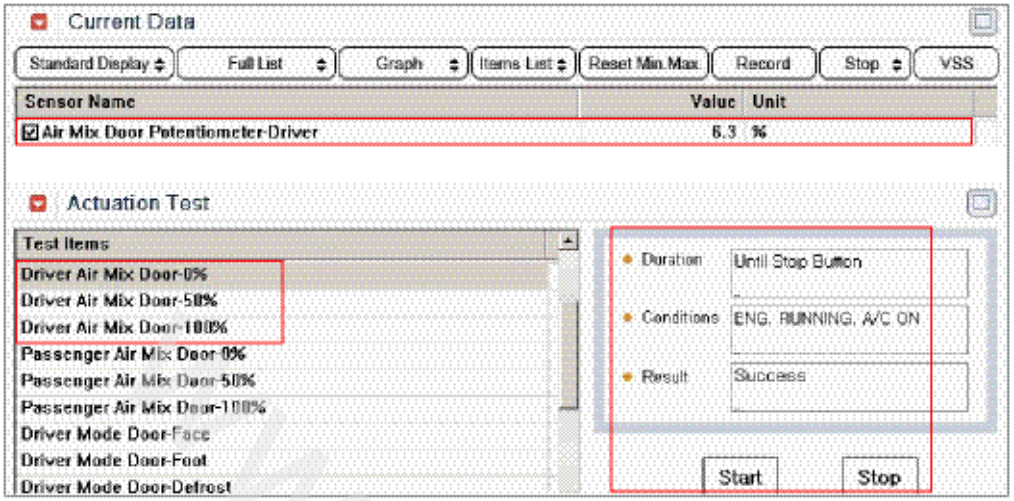
VG12AC50B1245D

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after 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.



VG12AC0B124521S

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/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

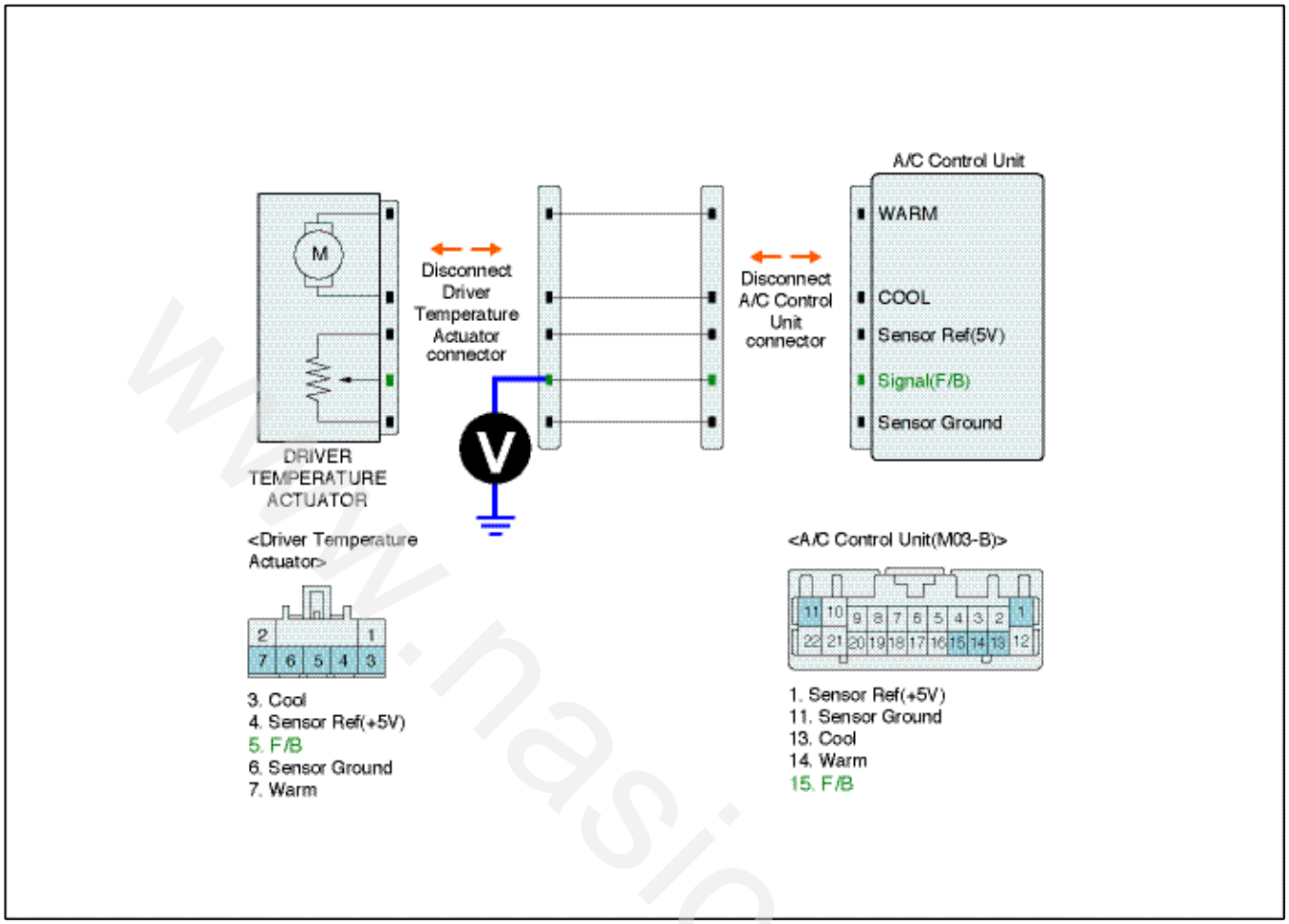
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B124631

5. Is the measured resistance within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

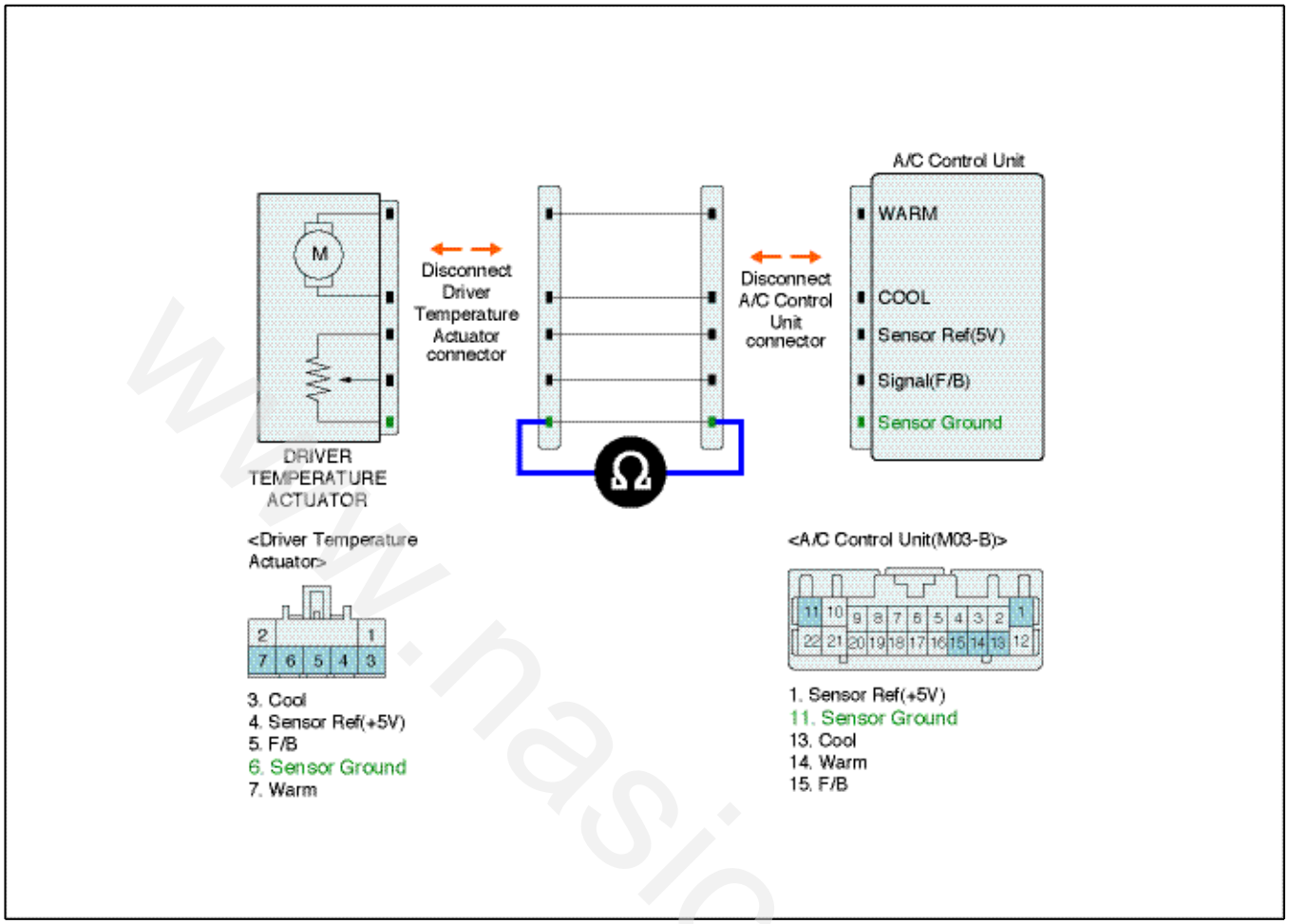
NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B124632

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

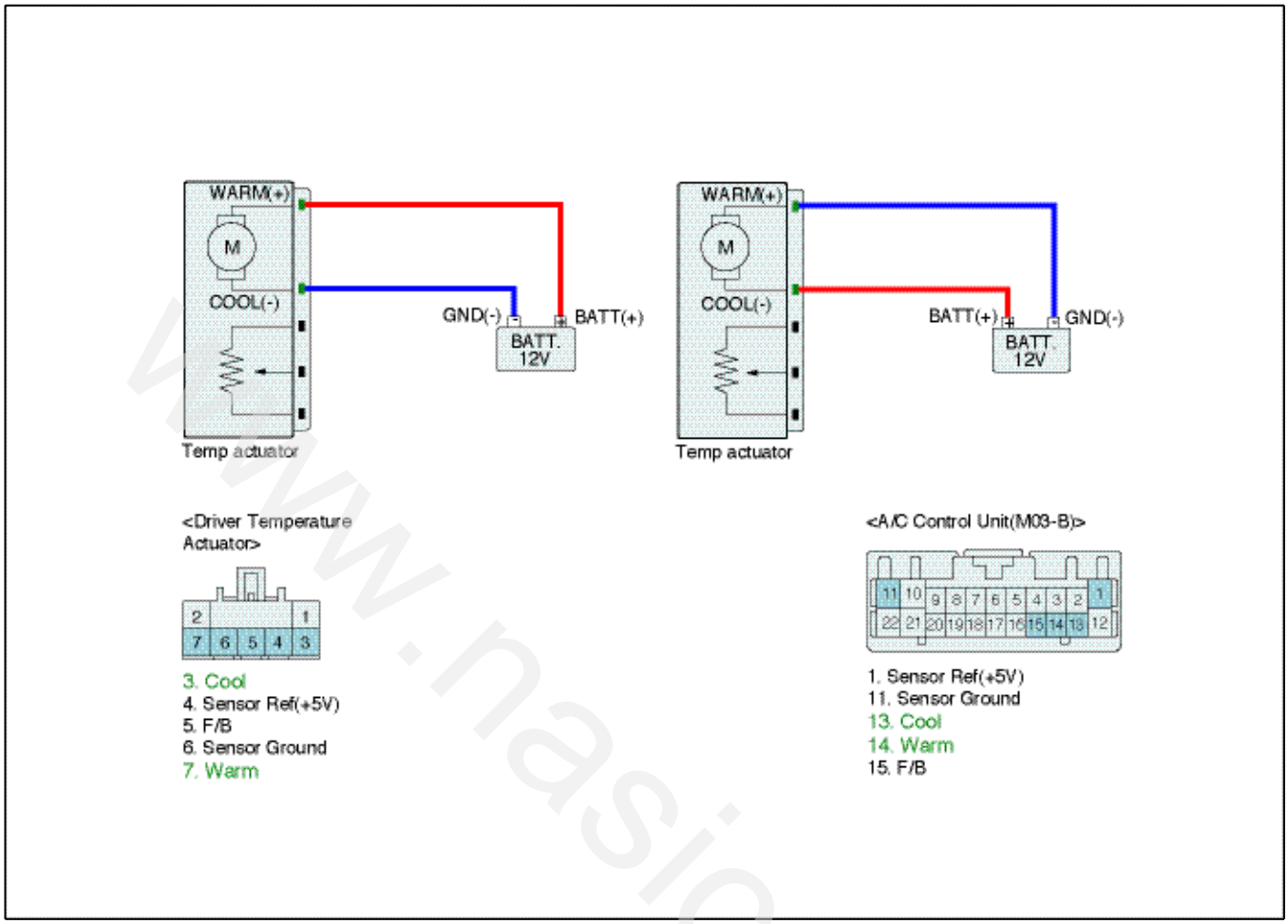
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Driver 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)



VG12AC50B124641

Fig.1)

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

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

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

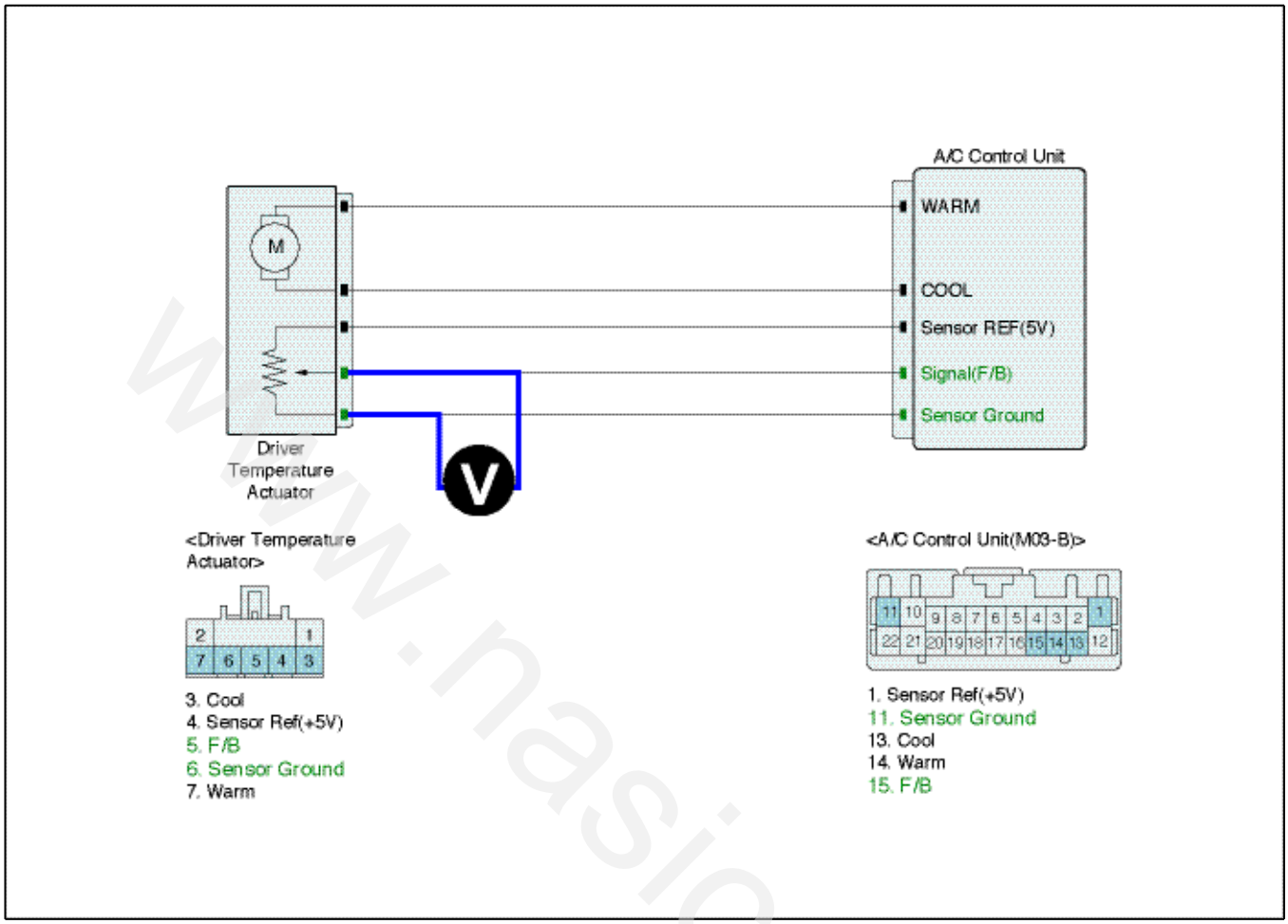
YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix a-ctuator 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)



VG12AC50B124642

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

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

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.

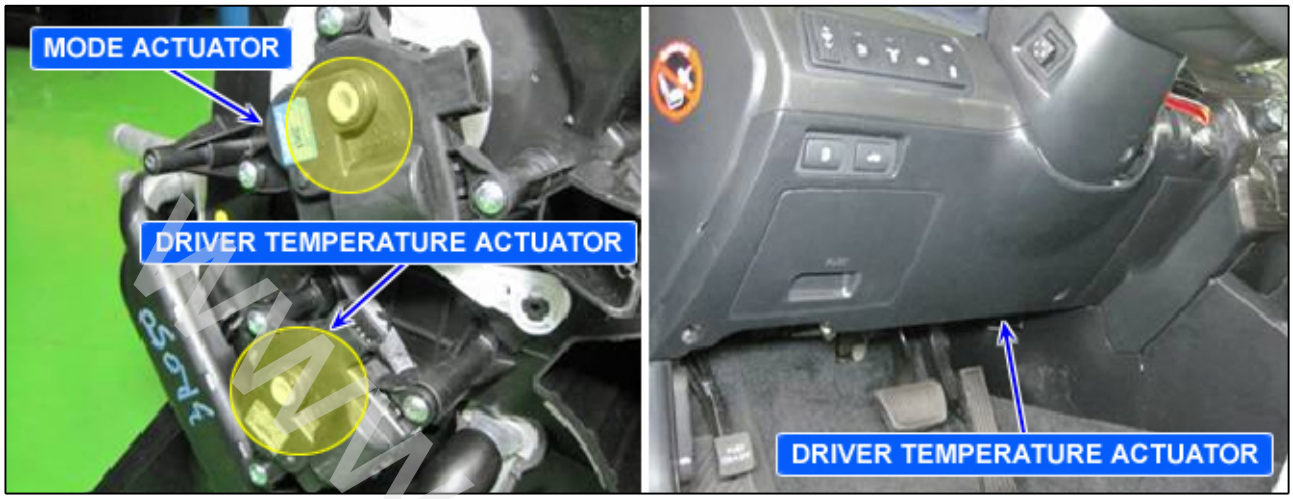
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1249 Direction Potentiometer Open (Low)-Driver

Componet Locations



YG12AC0B124511

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

DTC B1249 sets if the Mode Actuator Sensor signal is at or below 0.1V for 0.3 seconds.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor Connection in harness 2. Open in signal (Feedback signal), Power or Gruoud circuit 3. Faulty Mode Actuator 4. Faulty Air conditioner Control Unit
Enable Conditions	• Ignition ON	
Threshold value	• Mode Actuator Sensor signal is at or below 0.1V for 0.3 seconds	
Failsafe	• If the Mode actuator is placed at Vent mode right before fail detection, Actuator is operated and fixed to Vent Mode Postion. • The others mode are selected, Actuator is moved to DEF mode position	

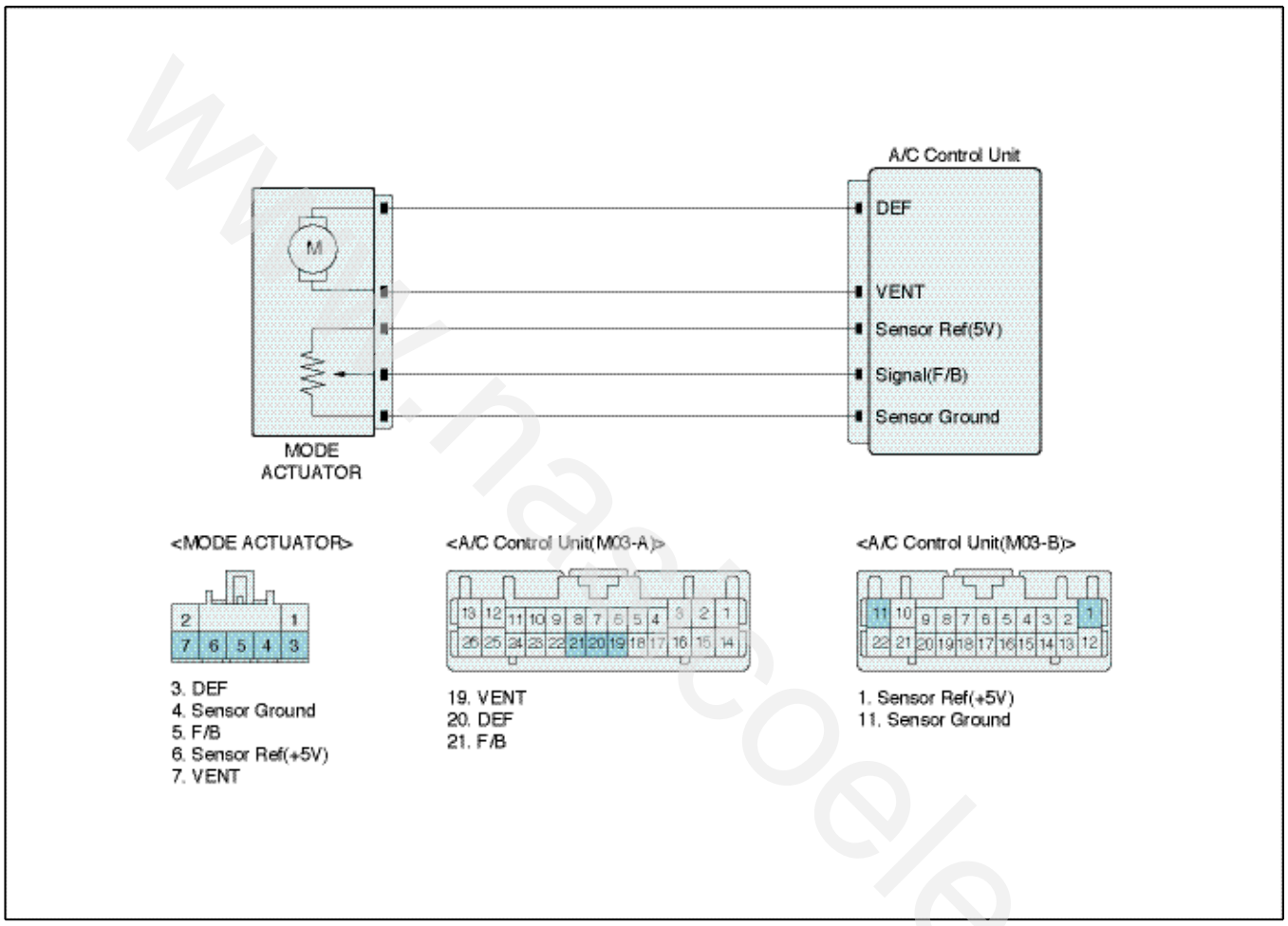
Specification

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

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V

Mode Door Position	Voltage
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

Diagnostic Circuit Diagram



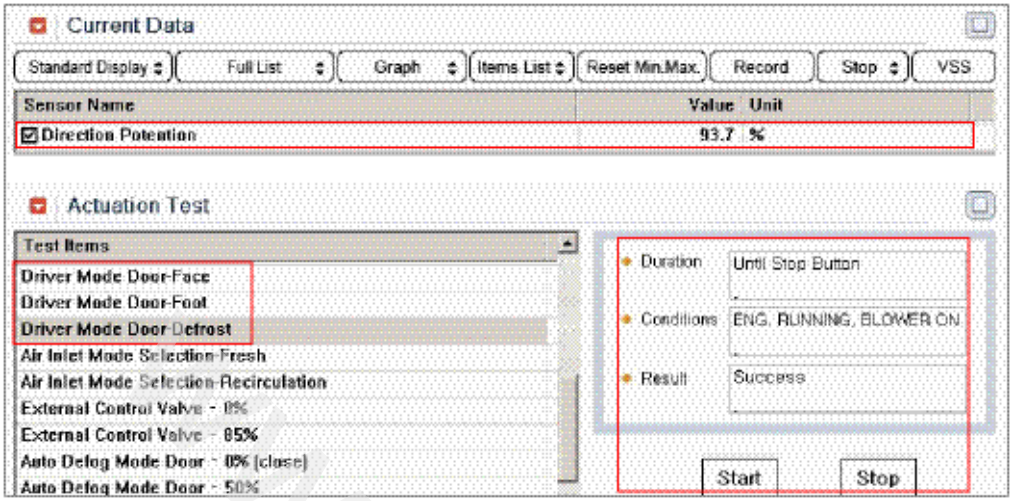
VG12AC50B1249D

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after 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%.



VG12AC0B124921S

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/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

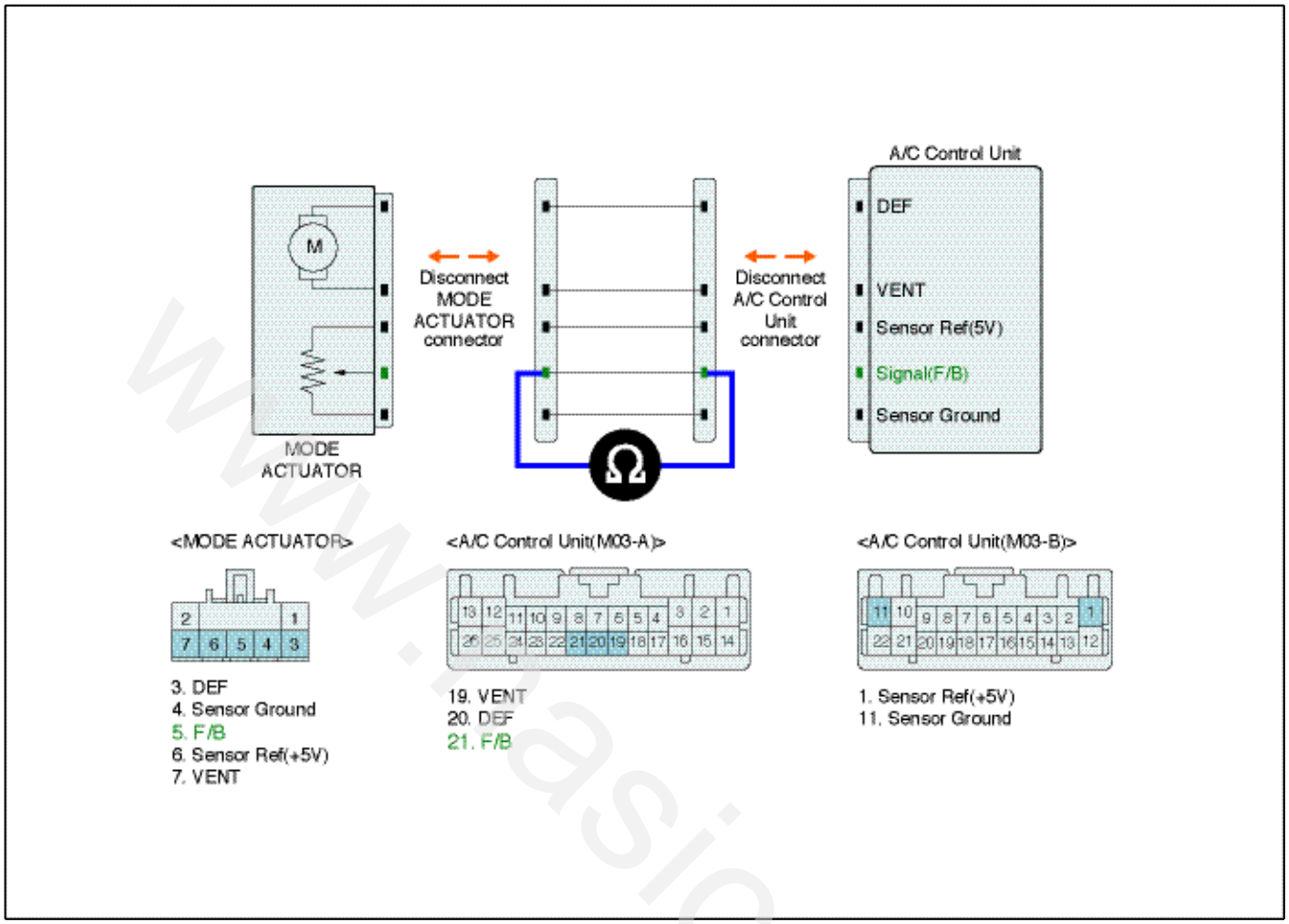
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B124931

4. Is the measured resistance within specification?

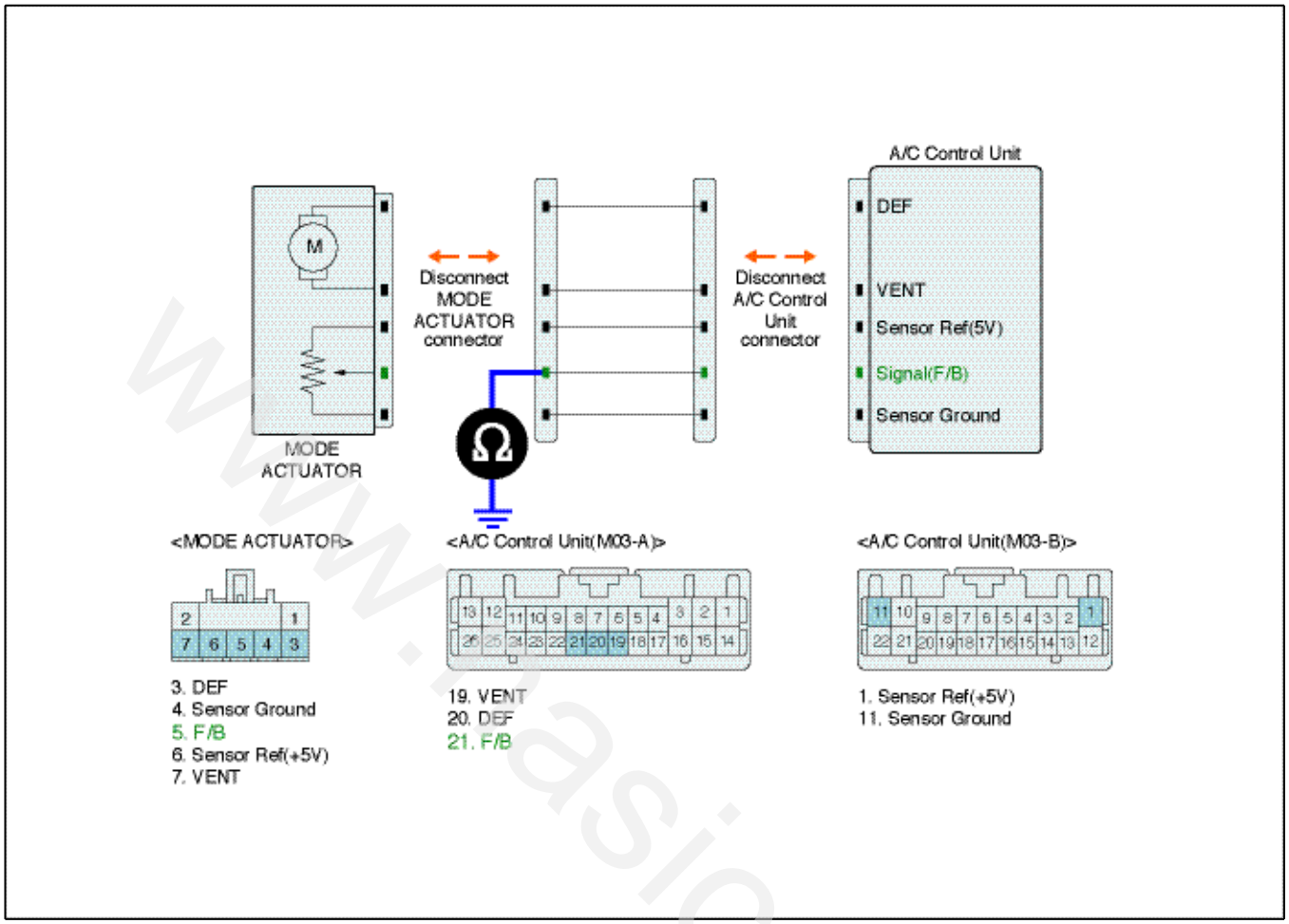
YES ▶ Go to "Check short to ground in harness" as follows.

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



VG12AC50B124932

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection " procedure.

NO ▶ Check for short to ground in control harness .

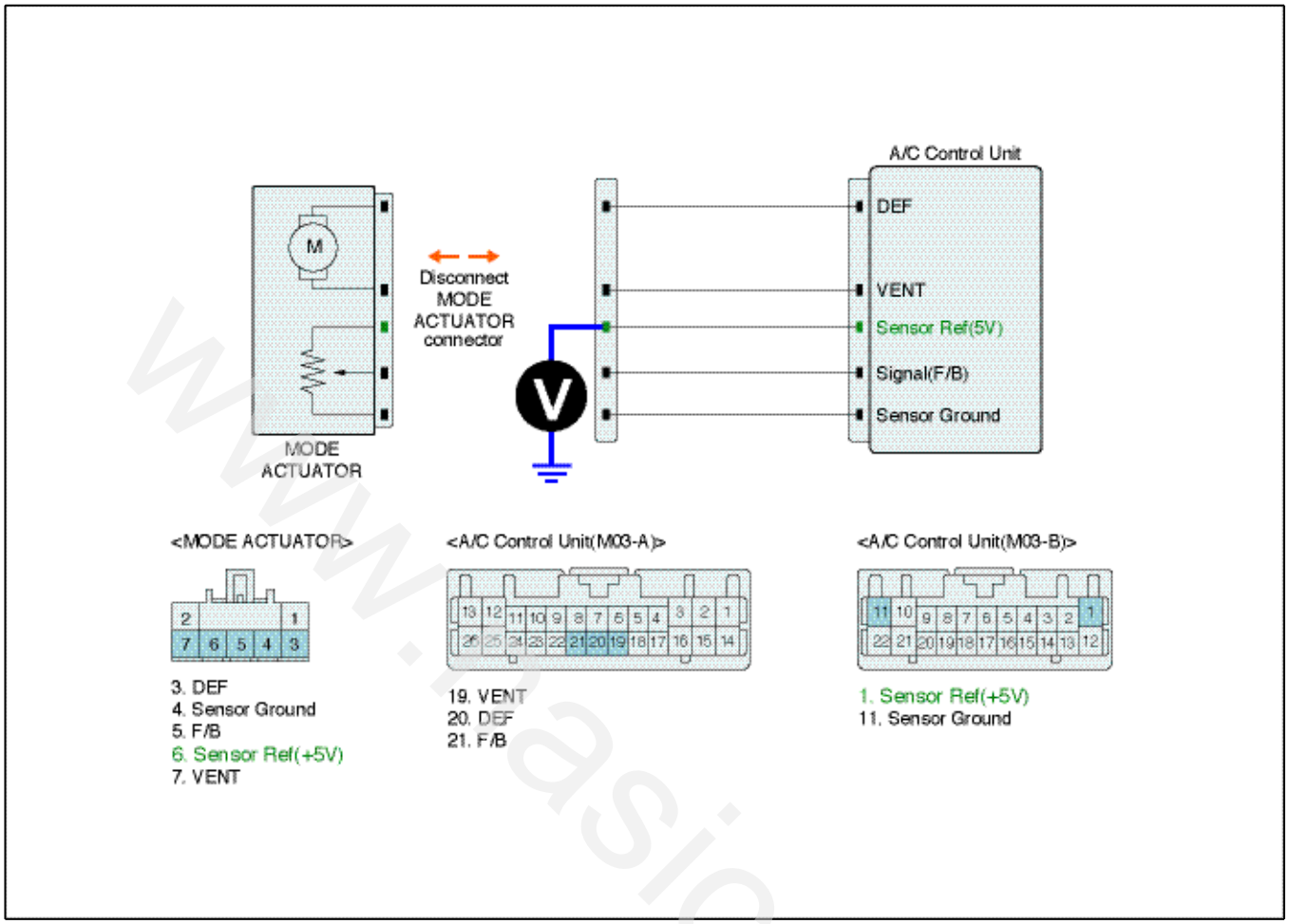
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B124933

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

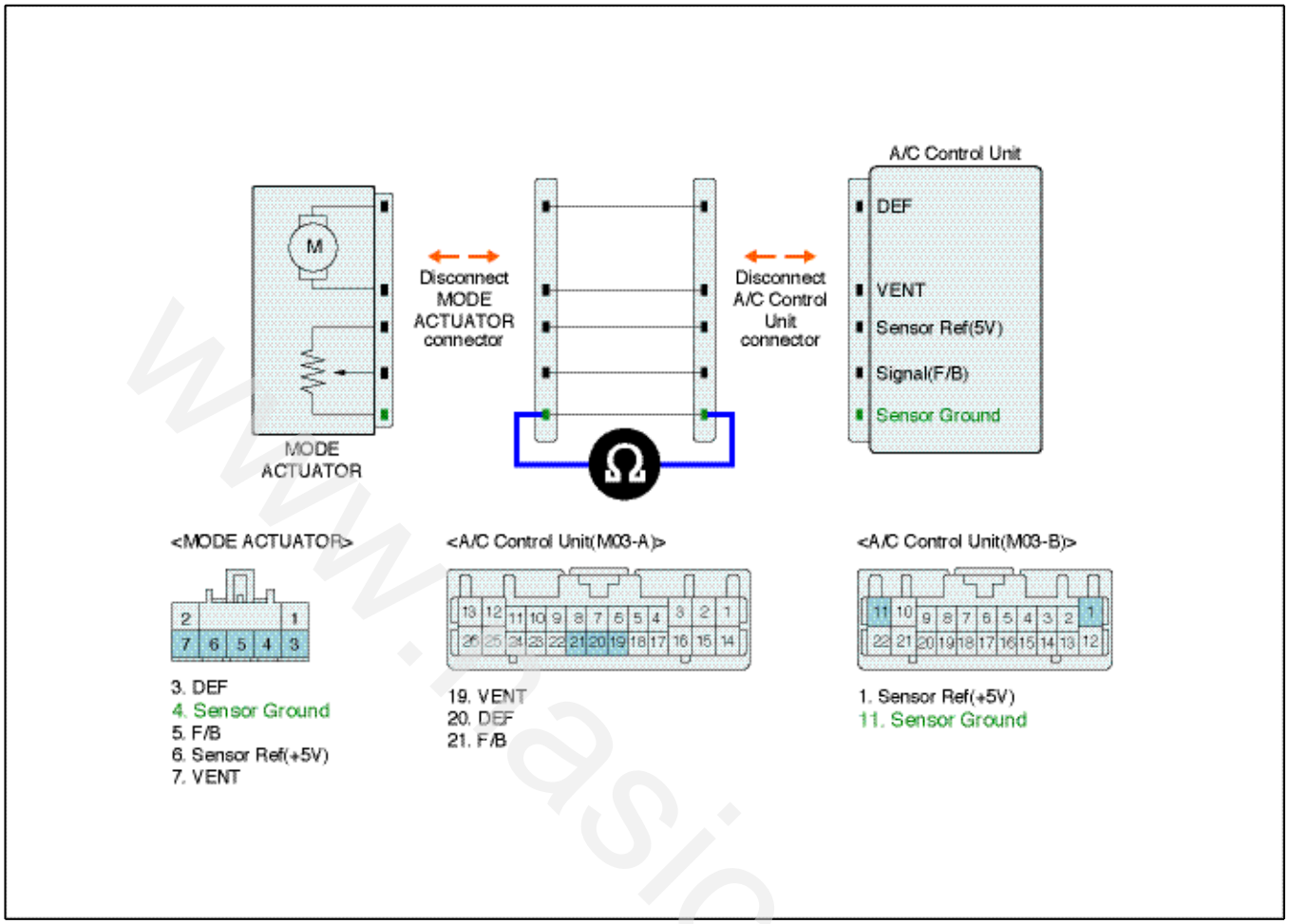
NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B124934

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

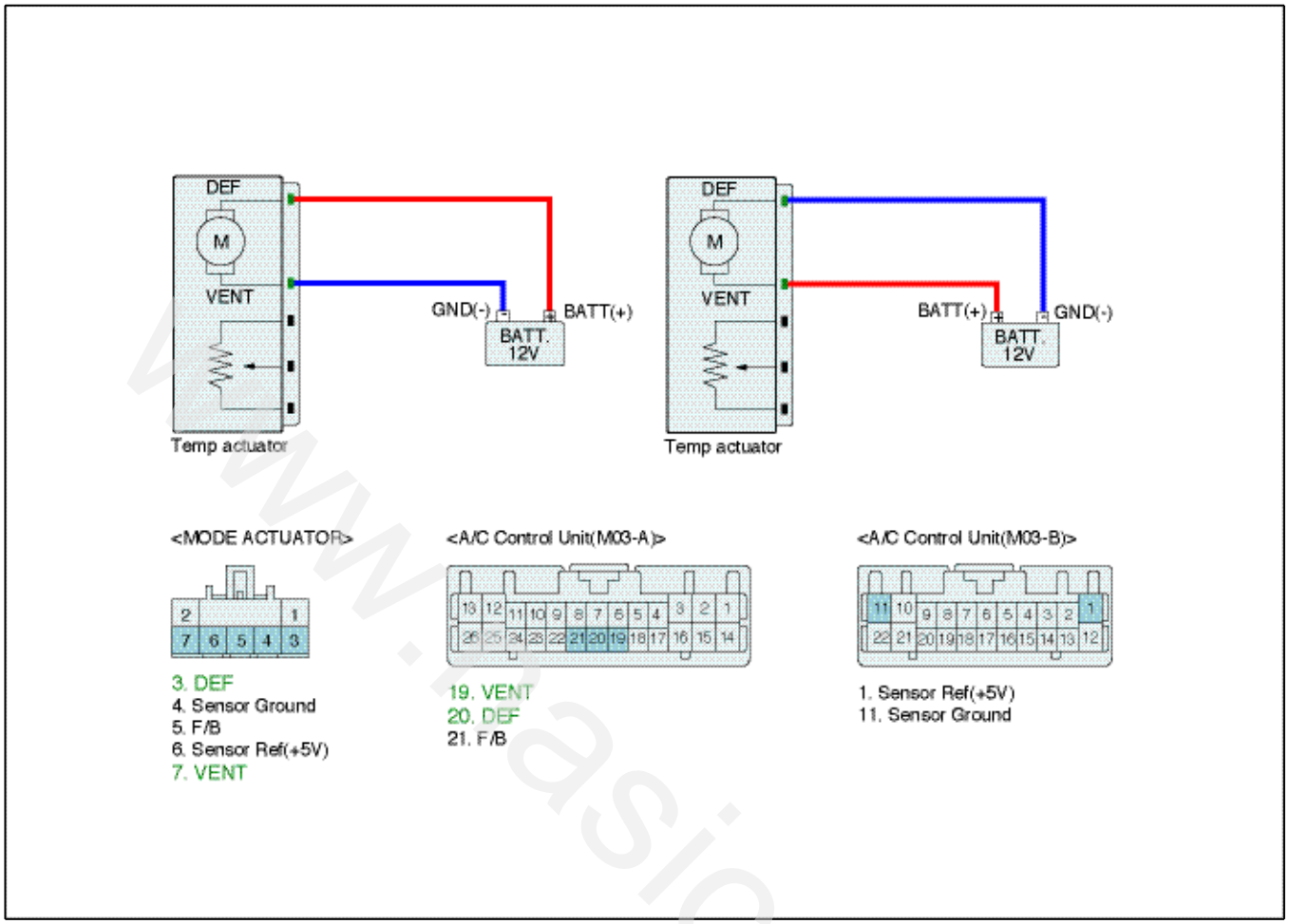
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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 DEF(+) of Driver Direction actuator and (-) terminal to VENT(-). (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. (DEF (+) and VENT(-)). (Component side)

Specification : Refer the specifications in Fig.1)



VG12AC50B124941

Fig.1)

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

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

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

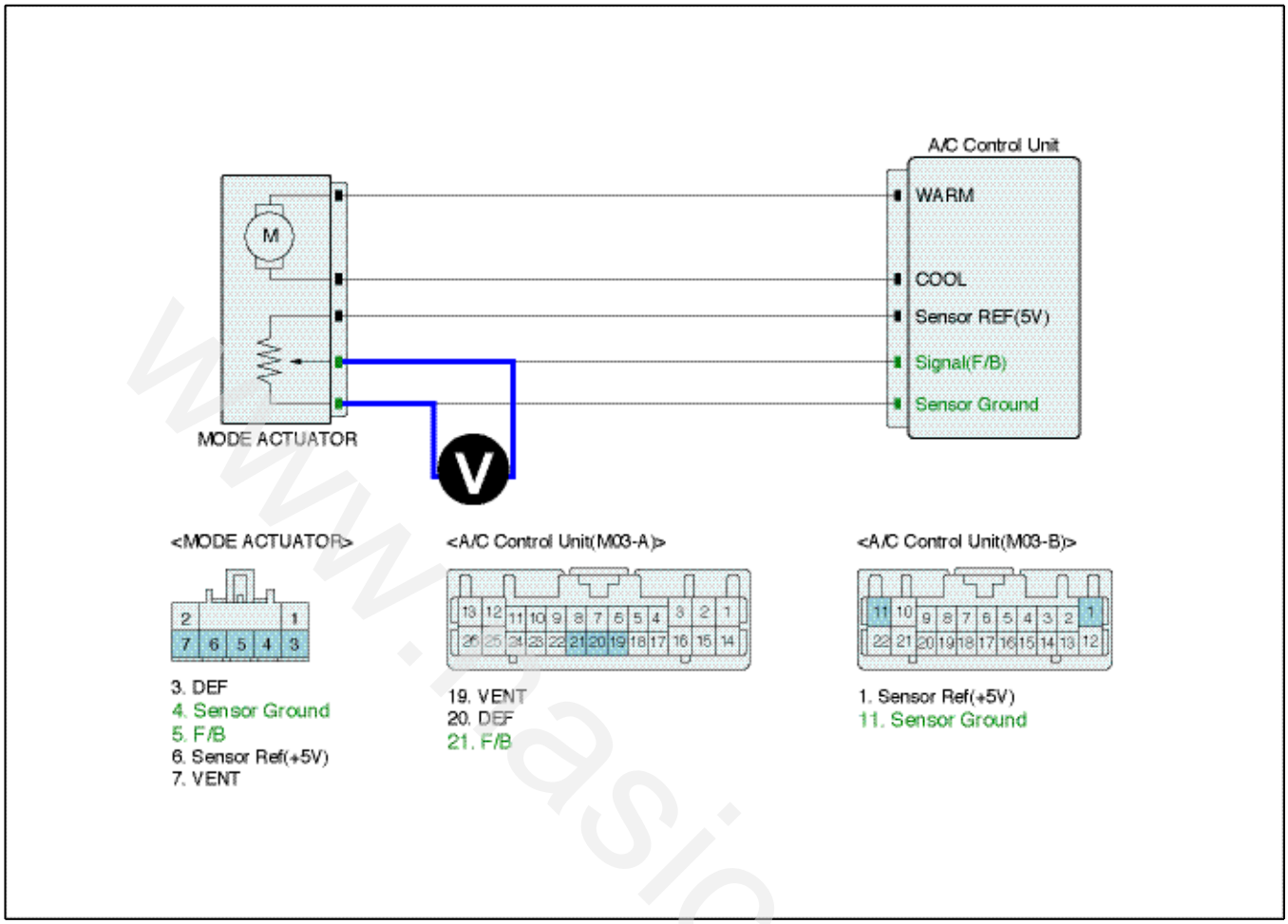
YES ▶ Go to "Check potentiometer" procedure.

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)



VG12AC50B124942

Fig.2)

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

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

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.

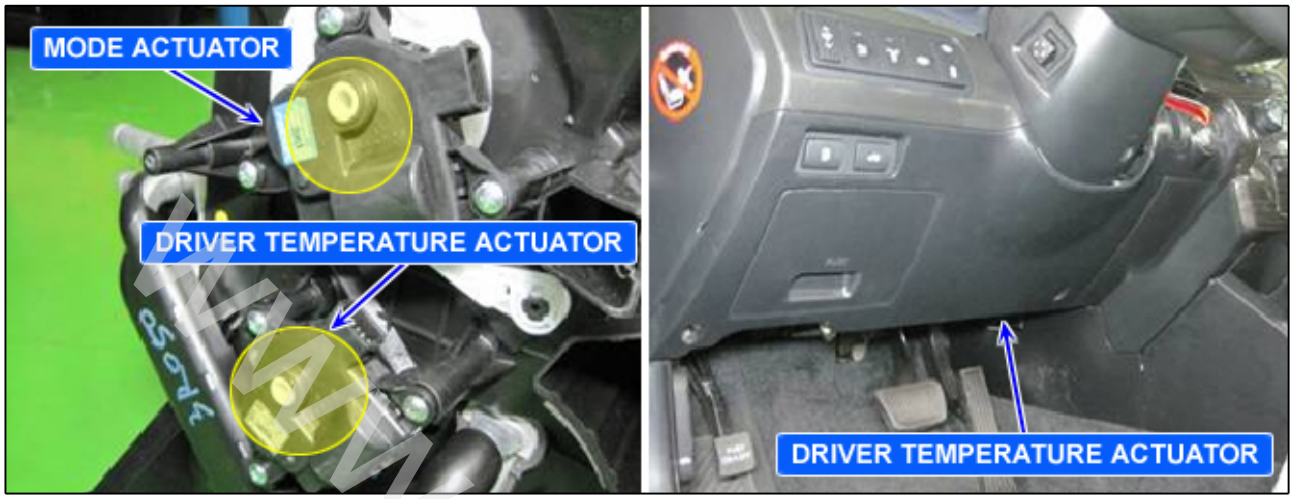
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1250 Direction Potentiometer Short (High)-Driver

Componet Location



YG12AC0B124511

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

DTC B1250 sets if Mode Actuator sensor signal is at or over 4.9V for 0.3 seconds.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short in signal circuit(Feedback signal) 2. Faulty Mode Actuator 3. Faulty Air conditioner Control Module
Enable Conditions	• Ignition ON	
Threshold value	• Mode Actuator sensor signal is at or over 4.9V for 0.3 seconds	
Failsafe	• If the Mode actuator is placed at Vent mode right before fail detection, Actuator is operated and fixed to Vent Mode Postion. • In case of the others, Actuator is moved to DEF mode position	

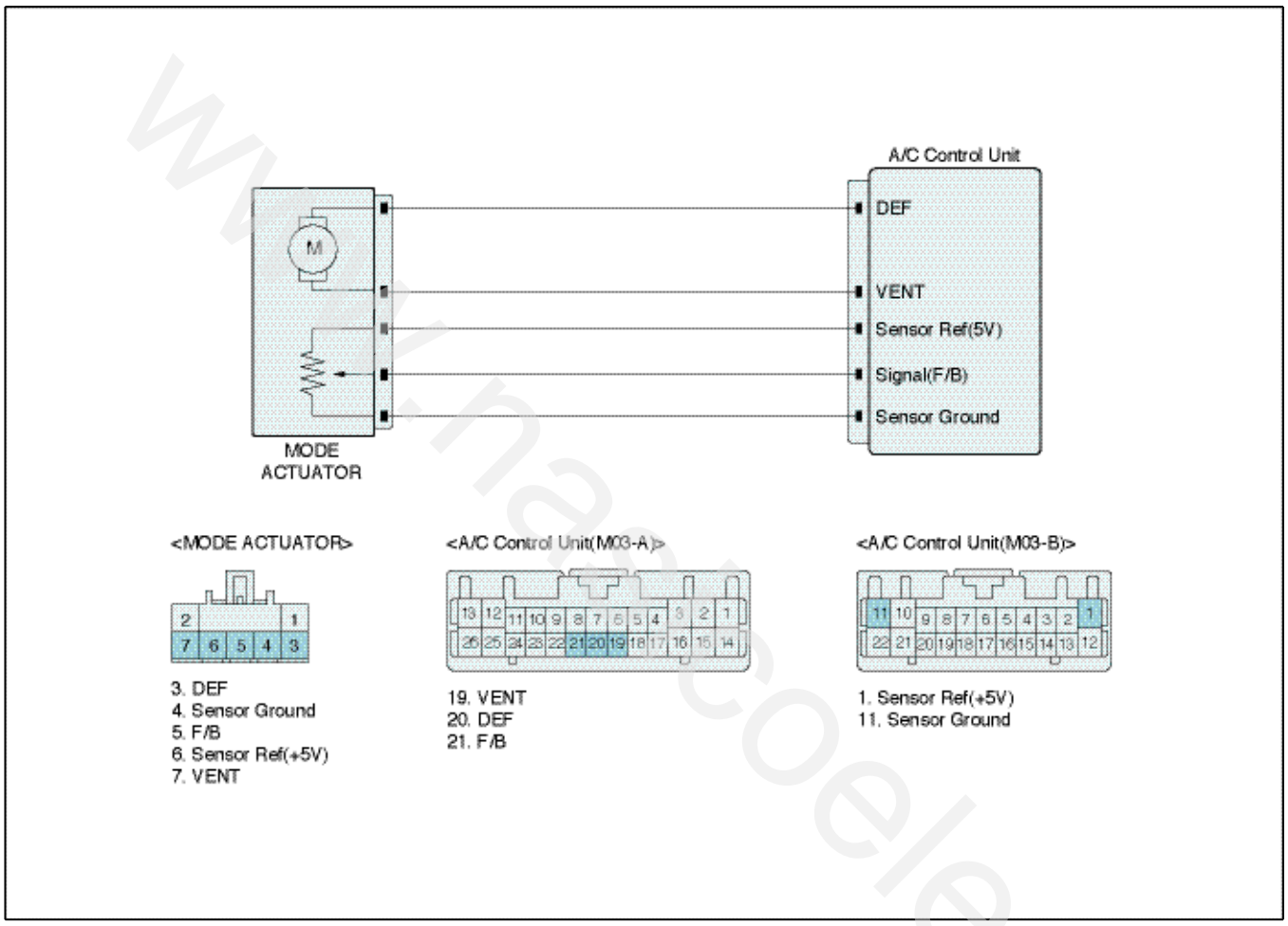
Specification

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

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V

Mode Door Position	Voltage
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

Diagnostic Circuit Diagram



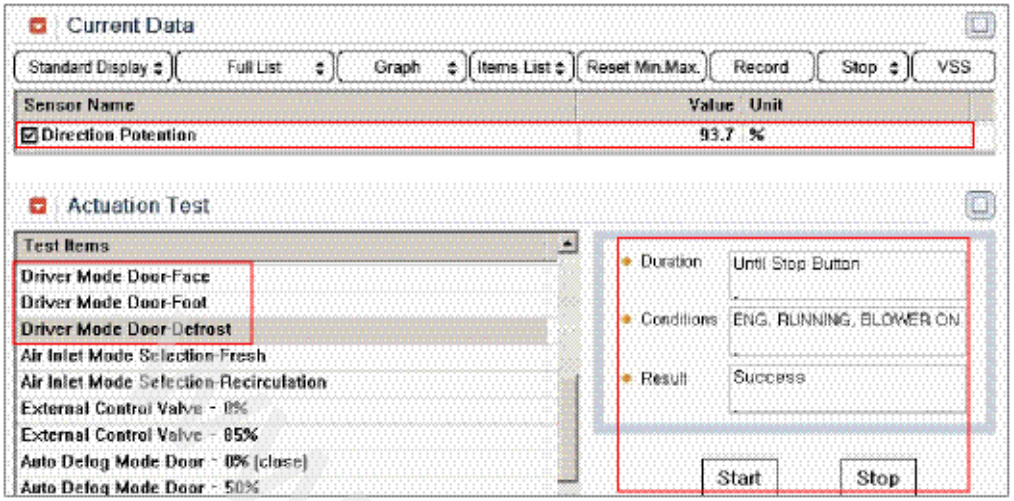
VG12AC50B1249D

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after 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%.



VG12AC0B124921S

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/Repair" procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

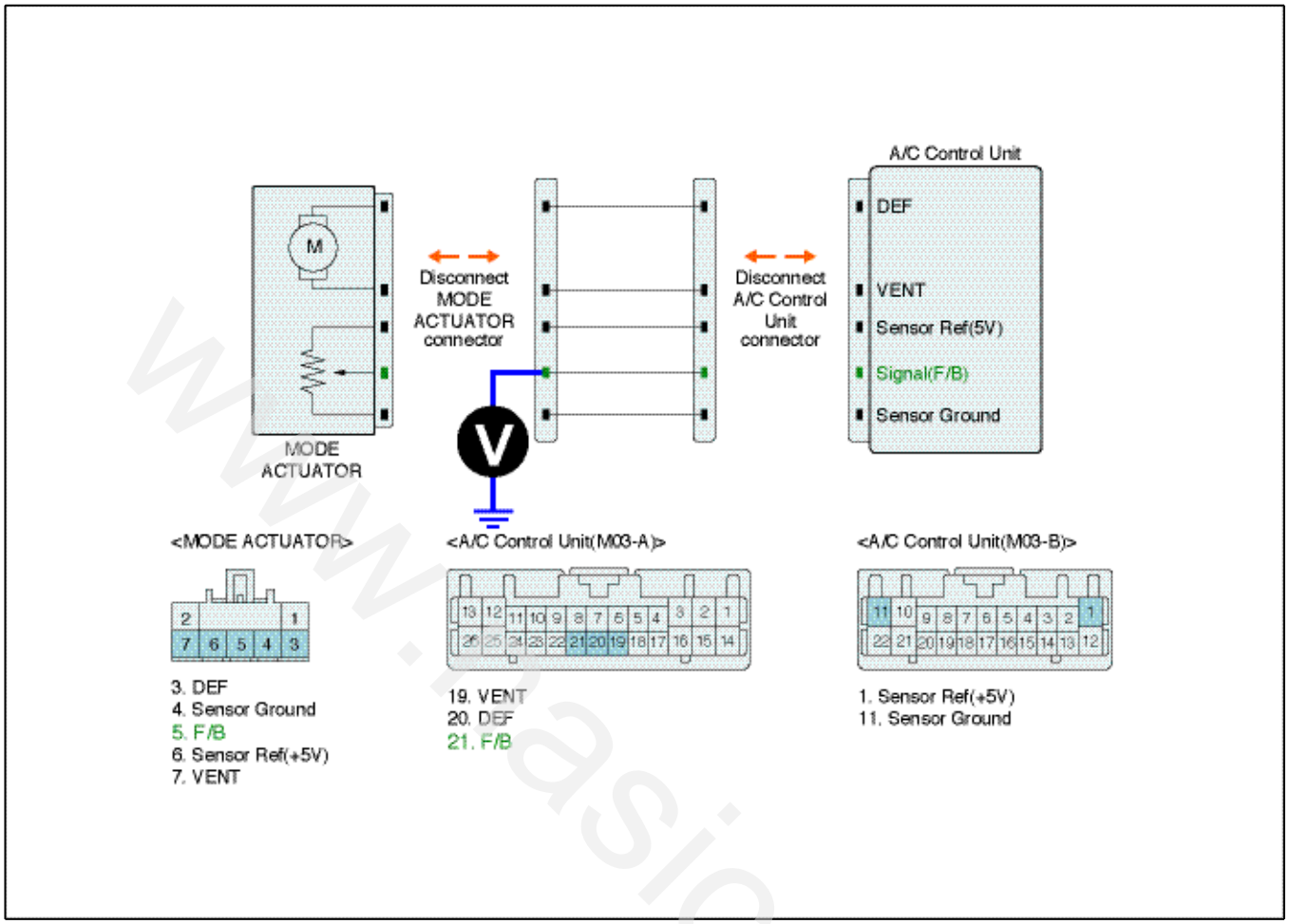
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B125031

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection " procedure.

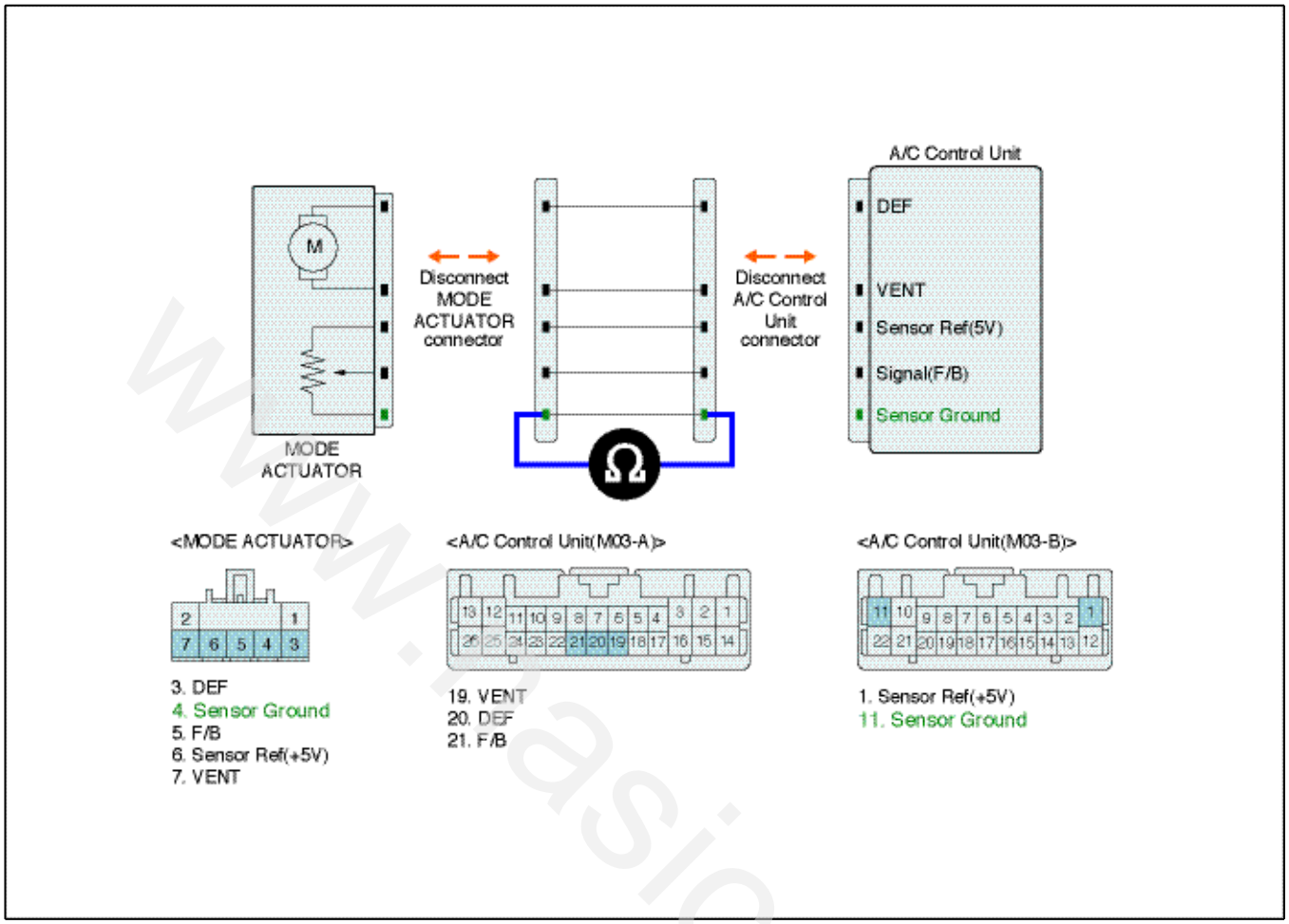
NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B125032

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

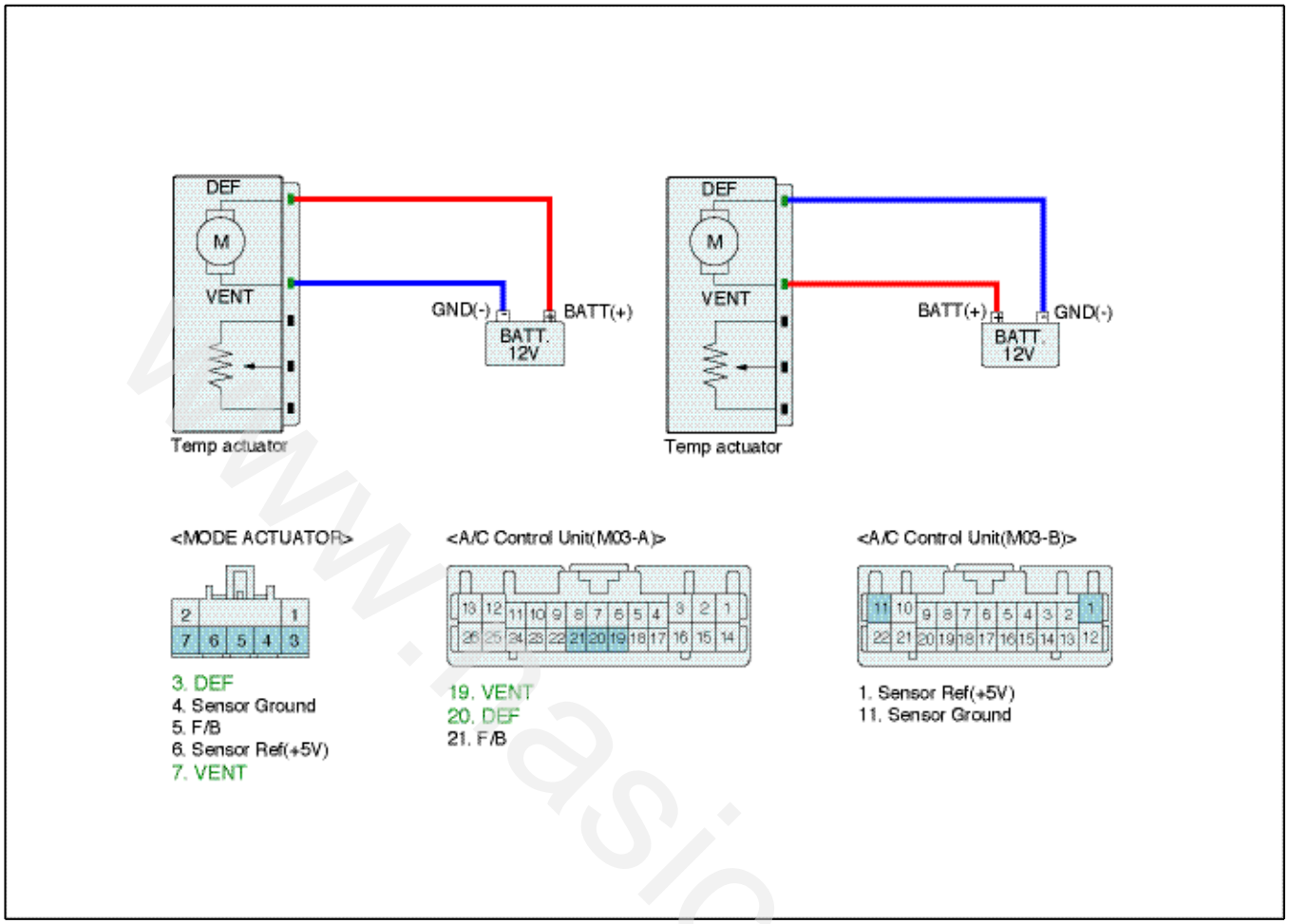
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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 DEF(+) of Driver Direction actuator and (-) terminal to VENT(-). (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. (DEF(+) and VENT(-)). (Component side)

Specification : Refer the specifications in Fig.1)



VG12AC50B125041

Fig.1)

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

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

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

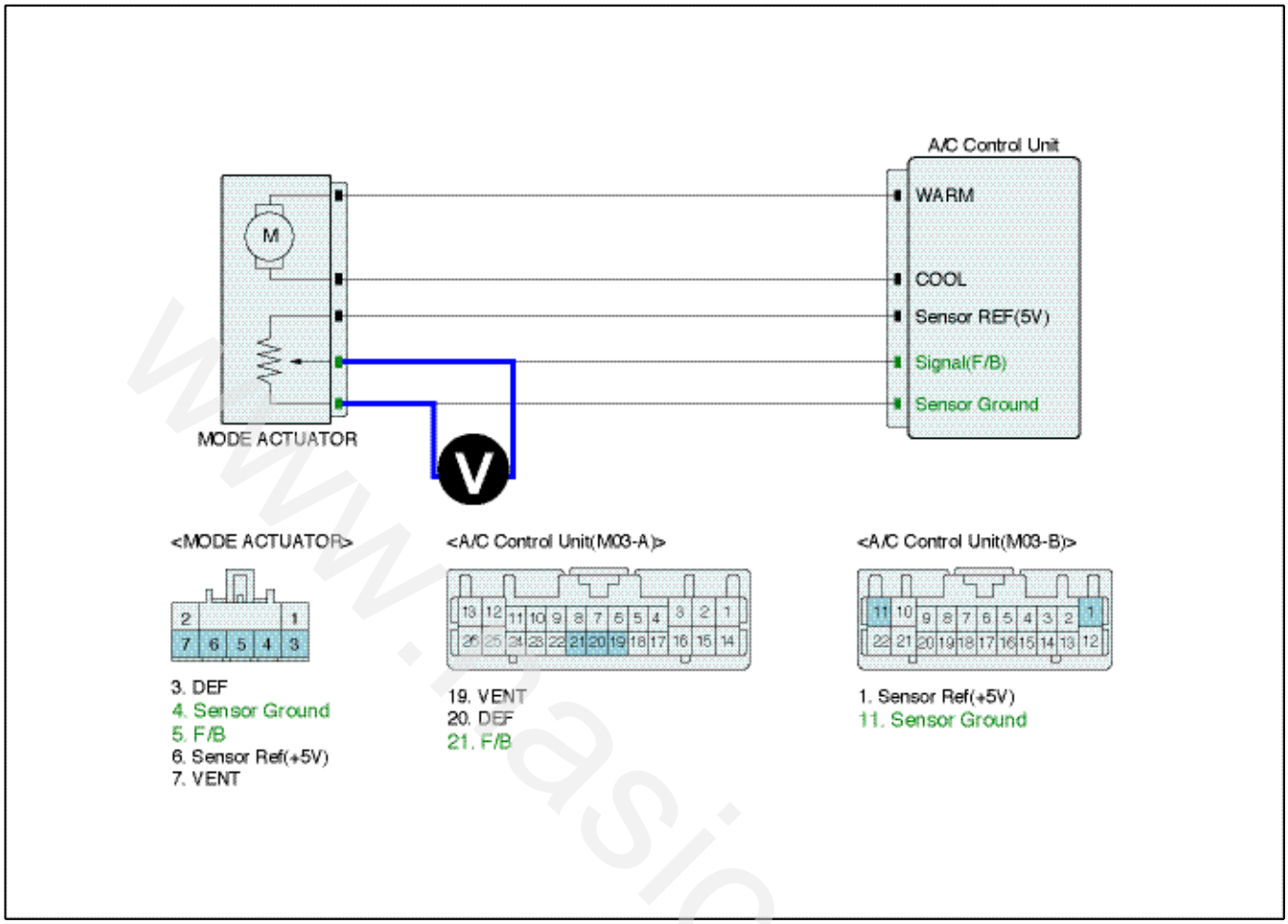
YES ▶ Go to "Check potentiometer" procedure.

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)



VG12AC50B125042

Fig.2)

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

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

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.

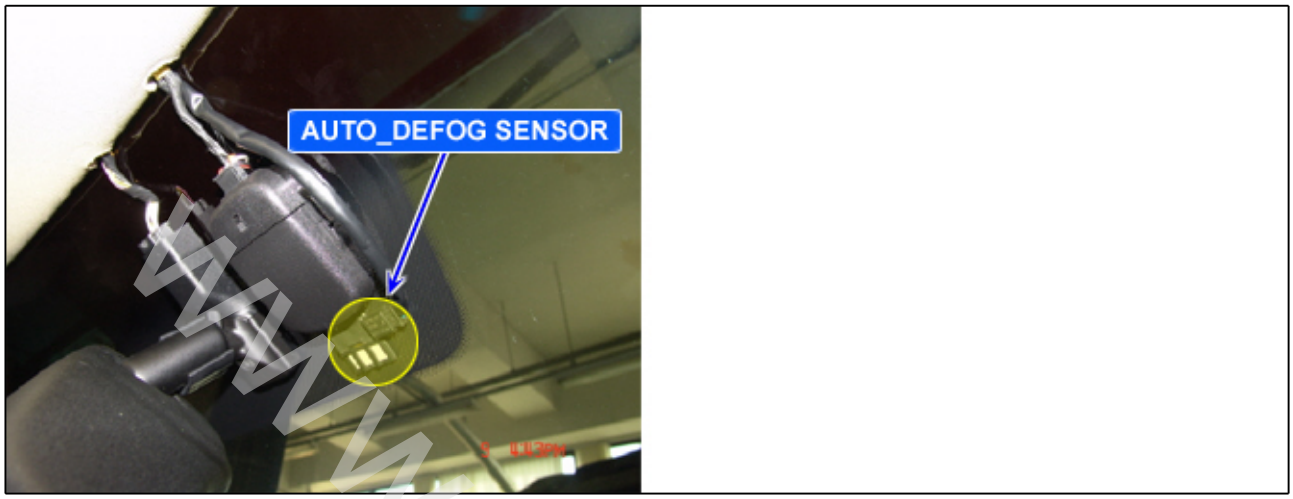
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1281 Humidity Sensor Short (Low) – AUTO Defog

Componet Location



YG12AC0B128111

General Description

Auto defogger sensor is installed on front window glass. Auto defogger sensor judges and sends signal for the occurance of moisture in advance of blowing out the wind for defogging. Air conditioner control module receives signal from auto defogger and performs restraining moisture and eliminating in advance with automatically controlling Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator.

DTC Description

The Air conditioner Control Module sets DTC B1281 if The signal from auto defogger sensor has been detected short to ground in ground circuit for 2 seconds.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor connection in harness 2. Open or short in signal circuit 3. Open or short in power circuit 4. Faulty Auto defogger sensor a-ctuator 5. Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Short to ground in signal circuit for 2 seconds	
Failsafe	• Air Conditioner Control Module Controls humidity as 0 %	

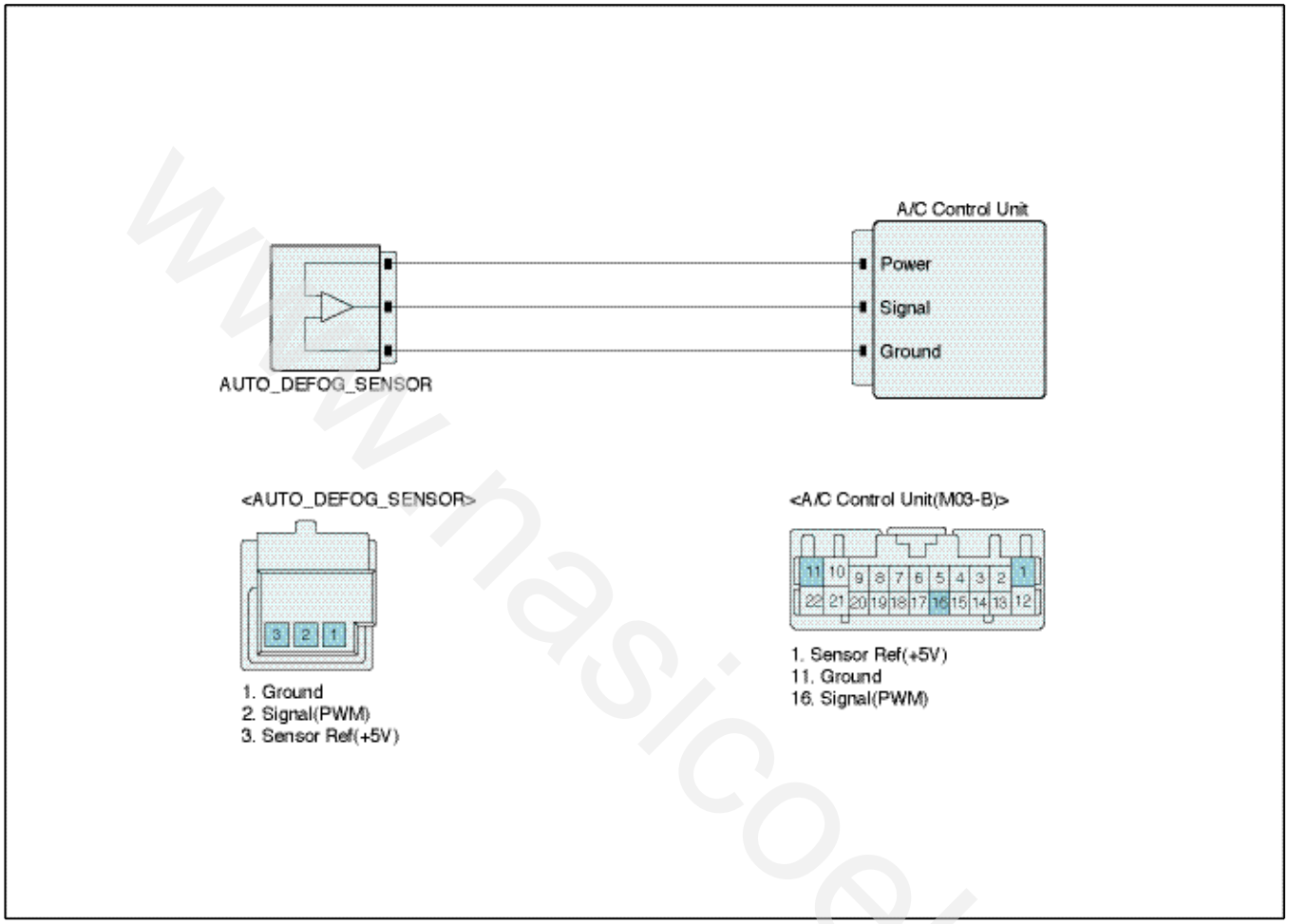
Specification

※ Hz of Defogger sensor according to Humidity

(%RH)	(Hz)	(%RH)	(Hz)
0	37.19	60	34.8
20	36.4	80	34

(%RH)	(Hz)	(%RH)	(Hz)
40	35.6	100	33.2

Diagnostic Circuit Diagram



VG12AC50B1281D

Monitor Scantool data

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

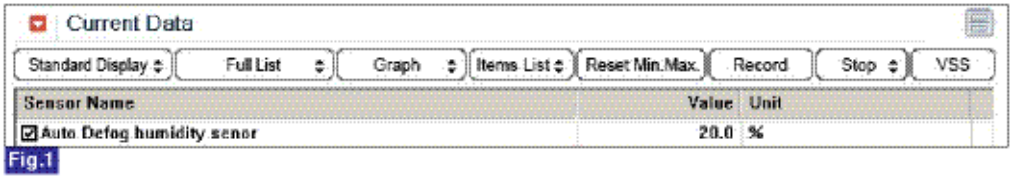


Fig.1

VG12AC0B128121S

Fig.1) If the DTC related auto defogger sensor is set, Air conditior control Module regards and controls humidity as 0%.

4. Is the defogger sensor normal ?

YES ▶ Go to "Inspection & 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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

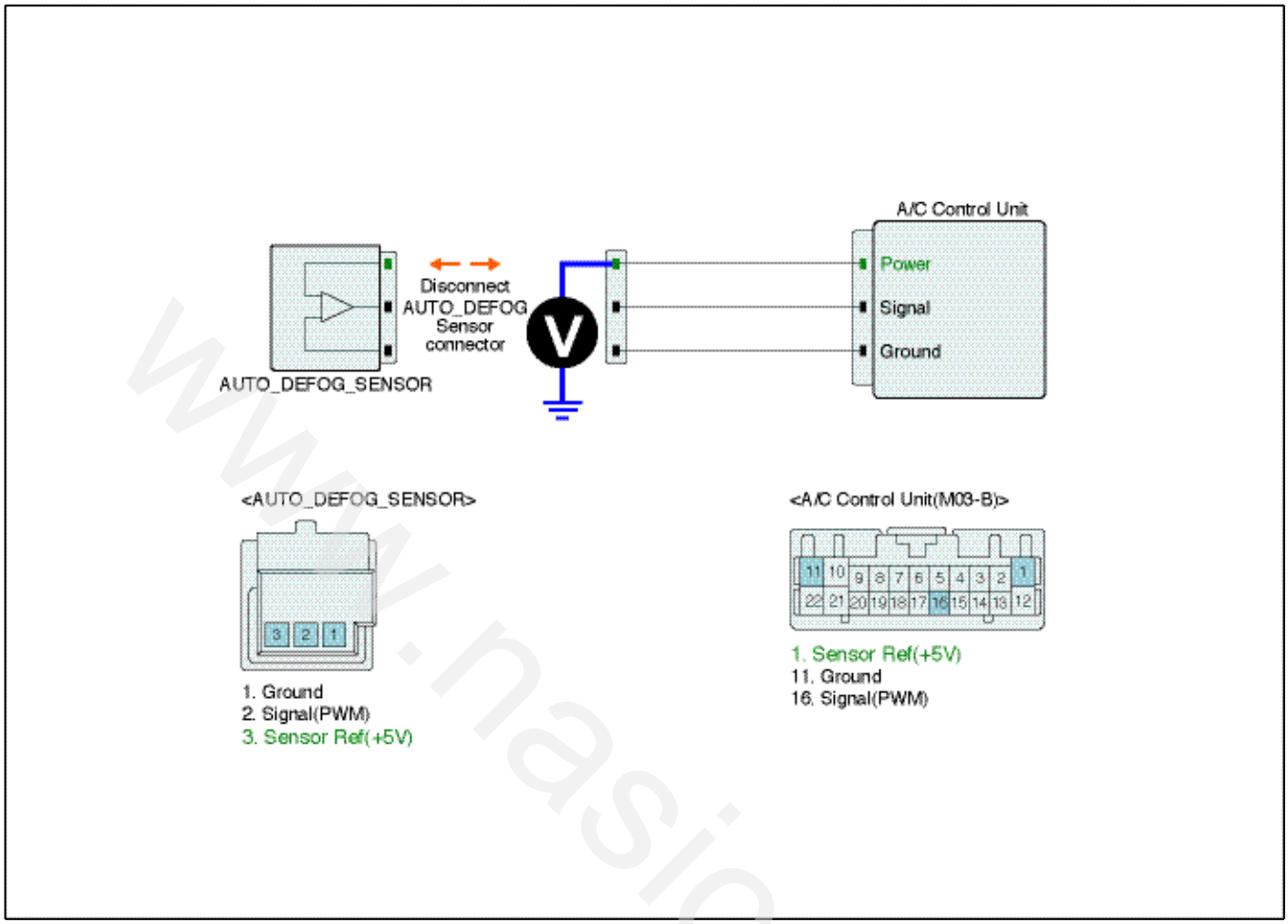
NO ▶ Go to "W/Harness Inspection" procedure.

Power Circuit Inspection

■ Check power in harness

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

Specification : approx. 5V



VG12AC50B128131

5. Is the measured voltage within specification?

YES ▶ Go to " Signal circuit Inspection" procedure .

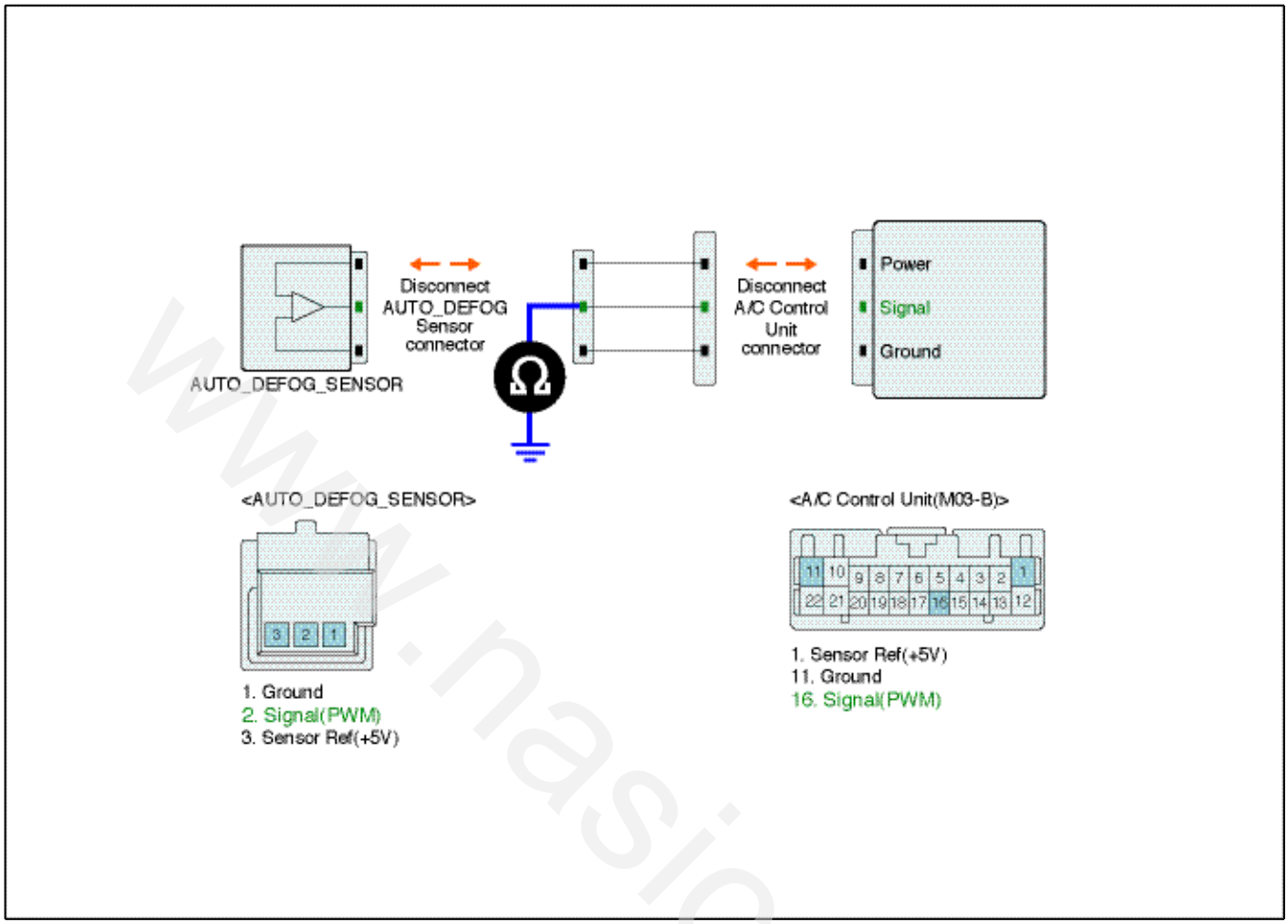
NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Signal Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and A/C control unit main harness connector.
3. Measure resistance between Sensor ground(-) terminal of Auto Defog sensor harness connector and chassis ground .

Specification : Infinity



VG12AC50B128132

4. Is the measured resistance within specification?

YES ▶ Go to "Check for open in harness" as follows .

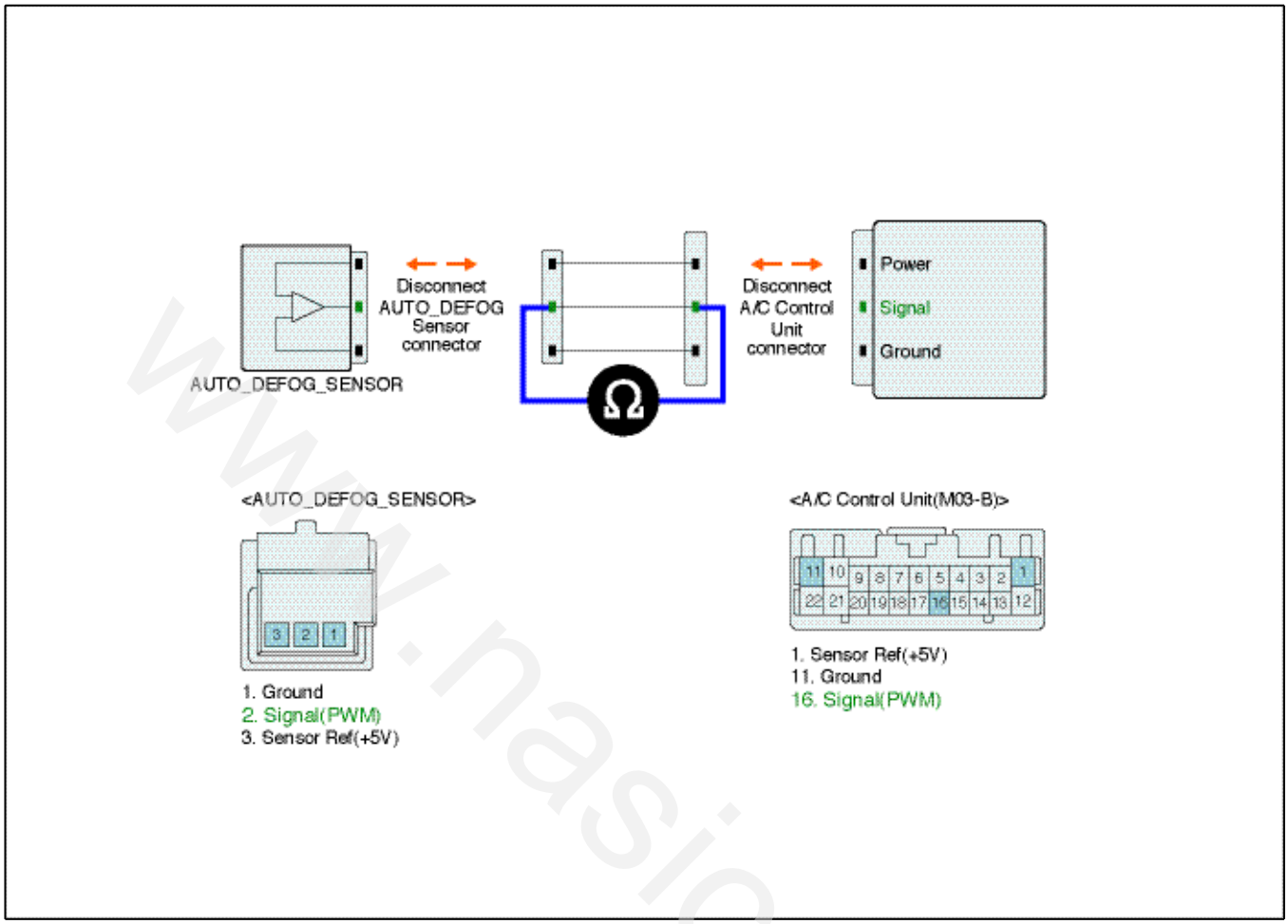
NO ▶ Check for short to ground in control harness .

▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B128133

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 Auto Defog sensor

1. Connect scantool with Diagnostic Connector.
2. Warm up the engine to normal temperature after engine starts.
3. Select and monitor "Auto defogger sensor" parameter with scantool.
4. Check frequency or the value of auto Defog sensor is changed on the scantool by increasing or decreasing humidity near the defog sensor.

Specification : Refer the specifications in Fig.1)

VG12AC0B128141S

Fig.1)

(%RH)	(Hz)	(%RH)	(Hz)
0	37.19	60	34.8
20	36.4	80	34
40	35.6	100	33.2

Fig.1) ※ The frequency of auto defog sensor according to the humidity

5. Is the measured value within the specification ?

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 Auto Defog sensor and check for proper operation. If the problem is corrected, replace Auto Defog sensor 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.

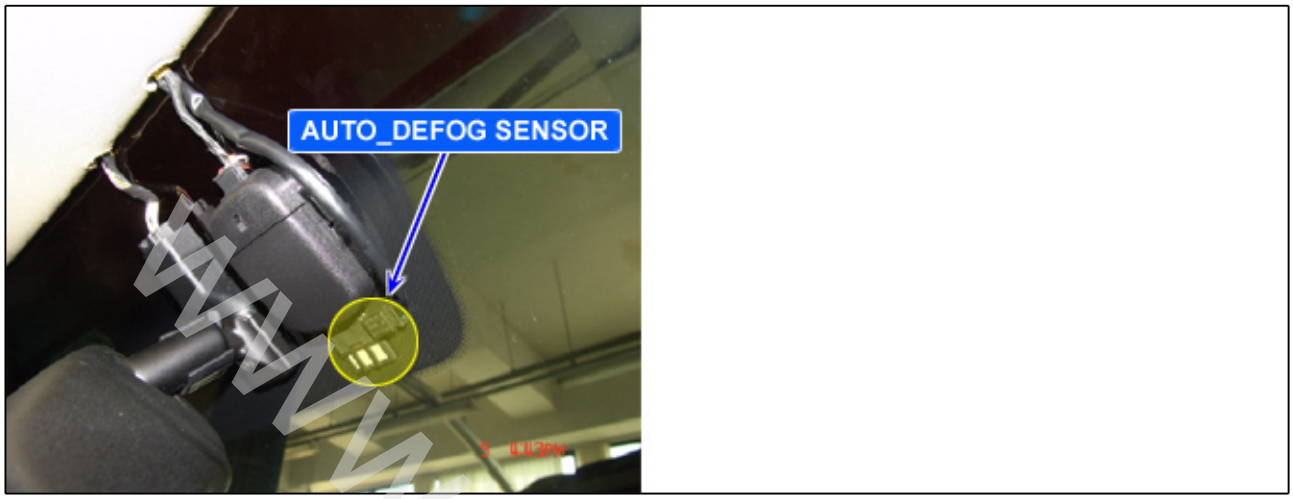
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1282 Humidity Sensor Open (High) - AUTO Defog

Componet Location



YG12AC0B128111

General Description

Auto defogger sensor is installed on front window glass. Auto defogger sensor judges and sends signal of the occurance of moisture in advance of blowing out the wind for defogging. Air conditioner control module receives signal from auto defogger and performs restraining moisture and eliminating in advance with automatically controlling Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator.

DTC Description

The Air conditioner Control Module sets DTC B1282 if The signal from auto defogger sensor has been detected open for 2 seconds.

DTC Detecting Condition

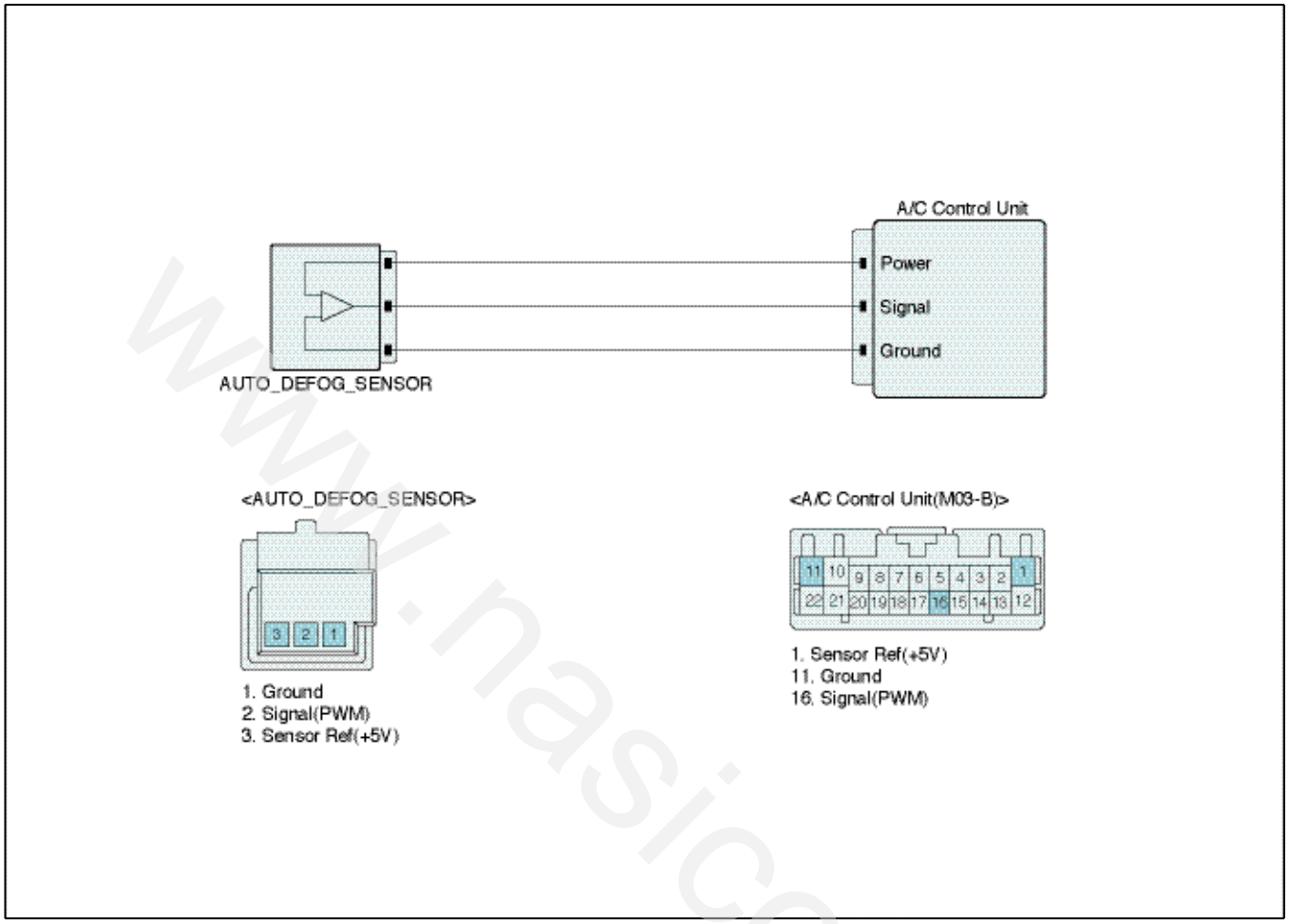
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor connection in harness 2. Short in signal circuit 3. Faulty Auto Defog sensor 4. Faulty Air conditioner Control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Open for 2 seconds	
Failsafe	• Air Conditioner Control Module Controls humidity as 0 %	

Specification

※ Hz of Defogger sensor according to Humidity

(%RH)	(Hz)	(%RH)	(Hz)
0	37.19	60	34.8
20	36.4	80	34
40	35.6	100	33.2

Diagnostic Circuit Diagram



VG12AC50B1281D

Monitor Scantool data

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

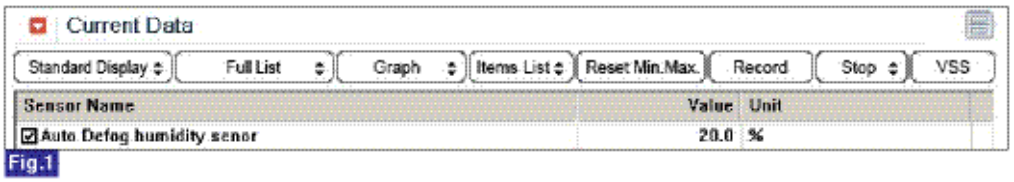


Fig.1

VG12AC0B128121S

Fig.1) If the DTC related auto defogger sensor is set, Air conditior control Module regards and controls humidity as 0%.

4. Is the defogger sensor abnormal ?

YES ▶ Go to "Inspection & 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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

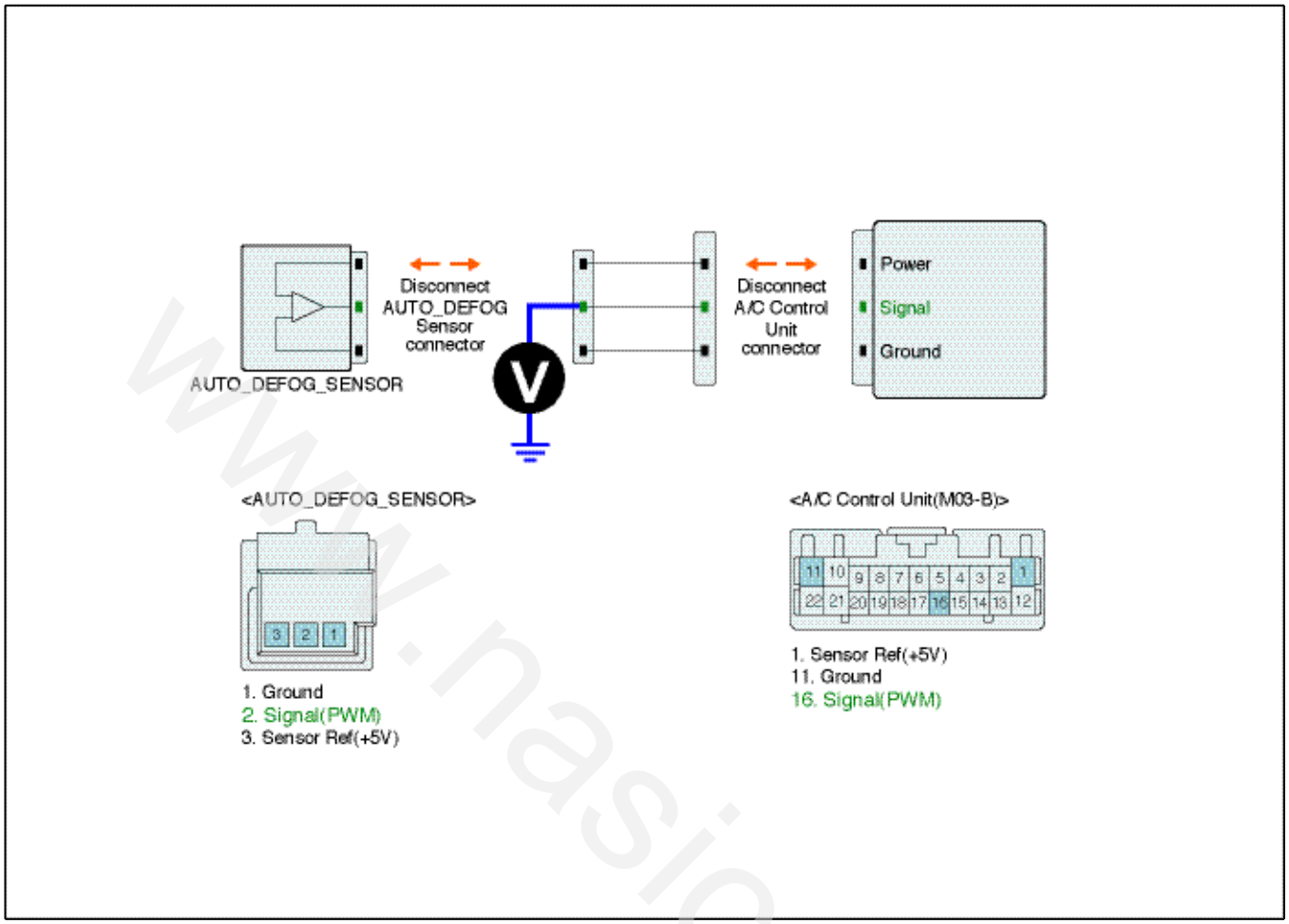
NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

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

Specification : approx. 0V



VG12AC50B128231

5. Is the measured voltage within specification?

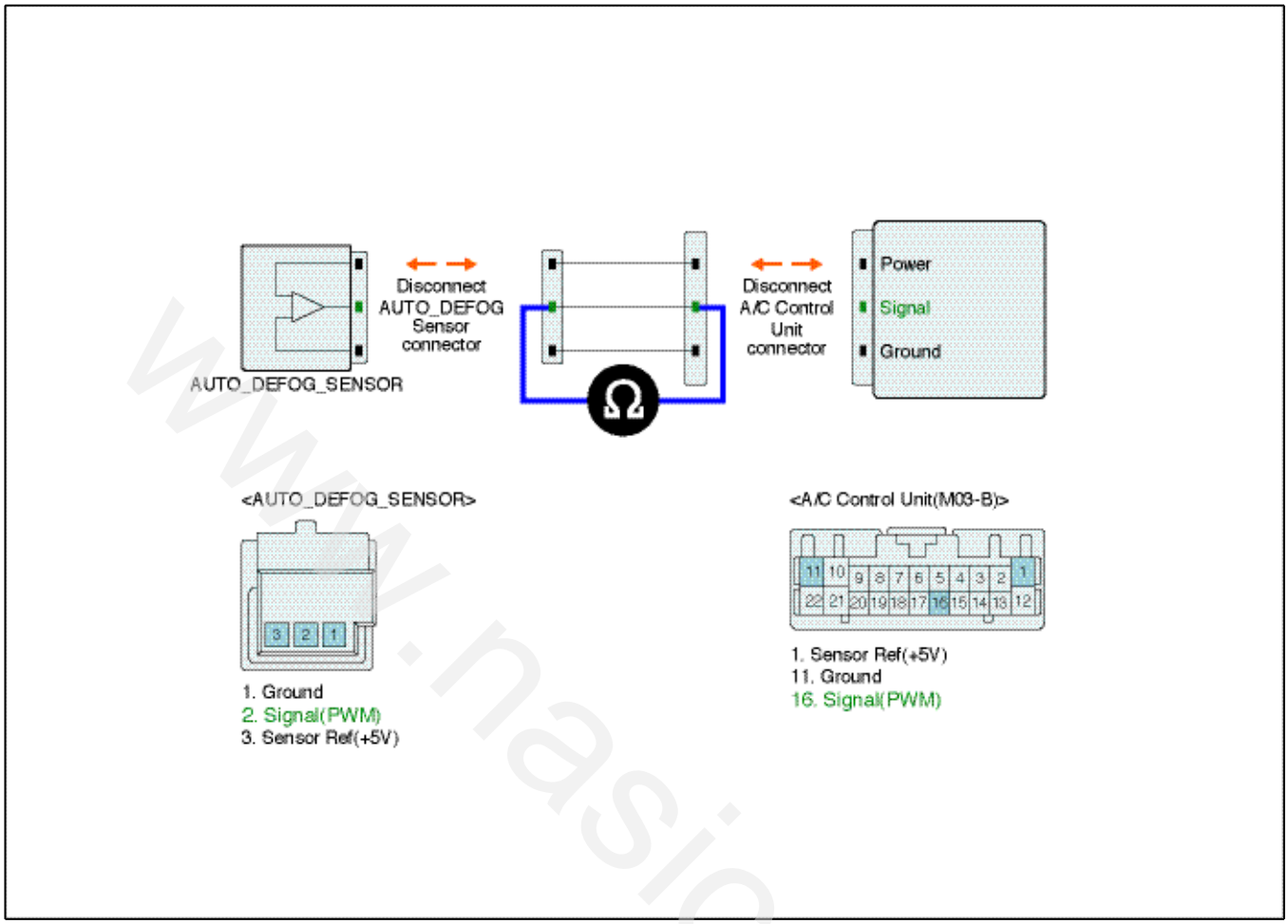
YES ▶ Go to "Check for open in harness" as follows .

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

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B128232

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 Auto Defog sensor

1. Connect scantool with Diagnostic Connector.
2. Warm up the engine to normal temperature after engine starts.
3. Select and monitor "Auto defogger sensor" parameter with scantool.
4. Check frequency or the value of auto Defog sensor is changed on the scantool by increasing or decreasing humidity near the defog sensor.

Specification : Refer the specifications in Fig.1)

VG12AC0B128141S

Fig.1)

(%RH)	(Hz)	(%RH)	(Hz)
0	37.19	60	34.8
20	36.4	80	34
40	35.6	100	33.2

Fig.1) ※ The frequency of auto defog sensor according to the humidity

5. Is the measured value within the specification ?

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 Auto Defog sensor and check for proper operation. If the problem is corrected, replace Auto Defog sensor 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.

B1283 Direction Potentiometer Open (Low) - AUTO Defog

Componet Location

YG12AC0B128311

General Description

Auto defogger sensor is installed on front window glass. For safety driving, Auto defogger sensor judges and sends signal of the occurance of moisture in advance of blowing out the wind for defogging with improvement of visiablilty and comfort.

While controlling the temperature and Mode(direction of wind) set by driver, if the humidity is higher than certain level, Air condtioner control Module automatically controls auto defogging mode. Air conditioner control module changes to go back to the previous driver set mode, if the humidity is decreased.

Air conditioner control Module automatically controls Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator in accordance with the amount of humidity on the front glass.

DTC Description

The Air conditioner Control Module sets DTC B1283 if The signal from auto defogger sensor has been detected 0.1V for 0.3 seconds.

DTC Detecting Condition

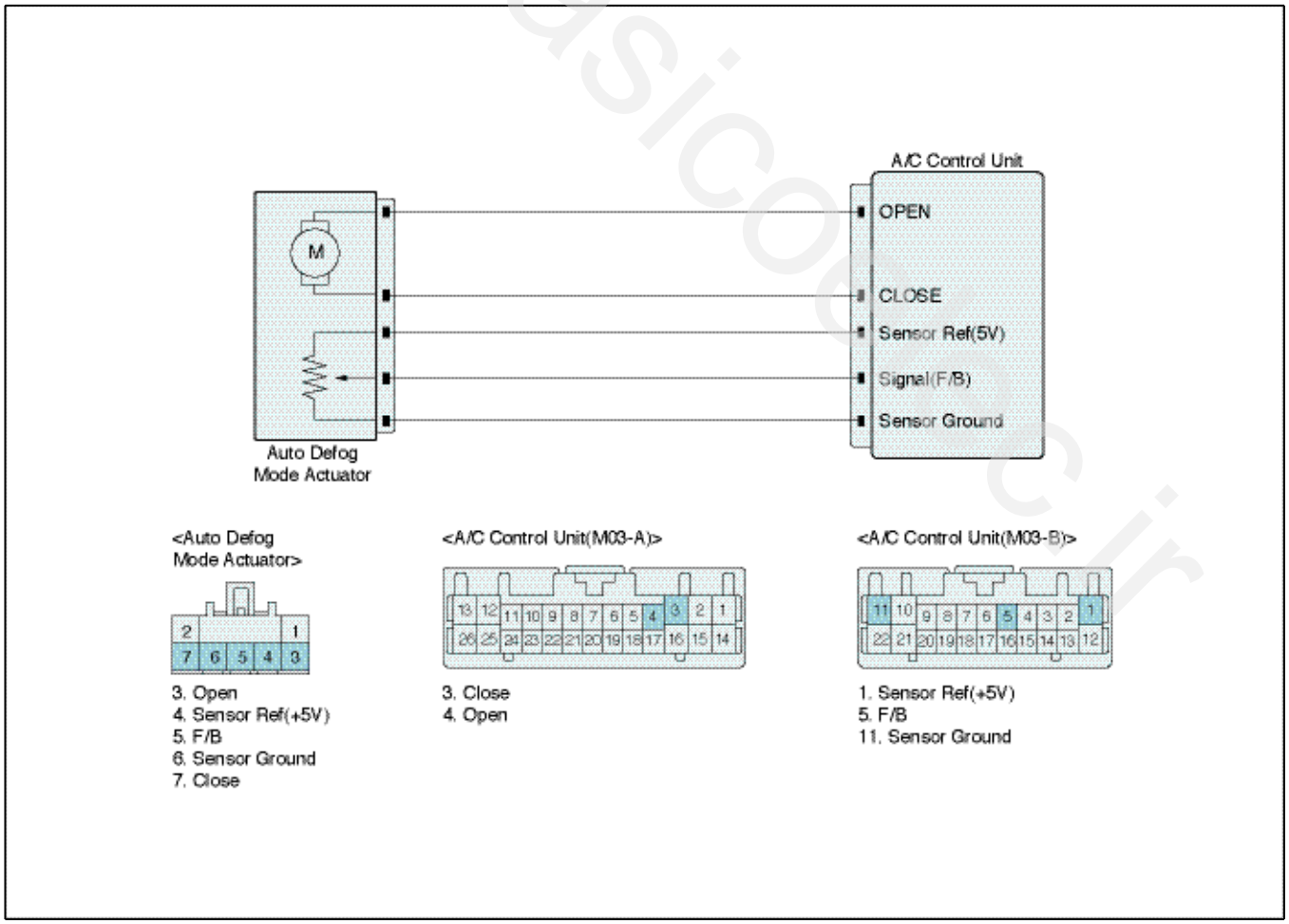
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor Contact in harness 2. Open or short in signal (Feed-back signal) circuit 3. Open or short in power circuit 4. Faulty Auto defogger actuator 5. Faulty Air conditioner control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Feedback signal has been detected open or below 0.1 V for 0.3 seconds	
Failsafe	• If selected Mode was VENT, it is moved and fixed at C-lose position • If the others mode, it is moved and fixed at Open posit-ion	

Specification

※ Voltage output according to Actuator position

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

Diagnostic Circuit Diagram



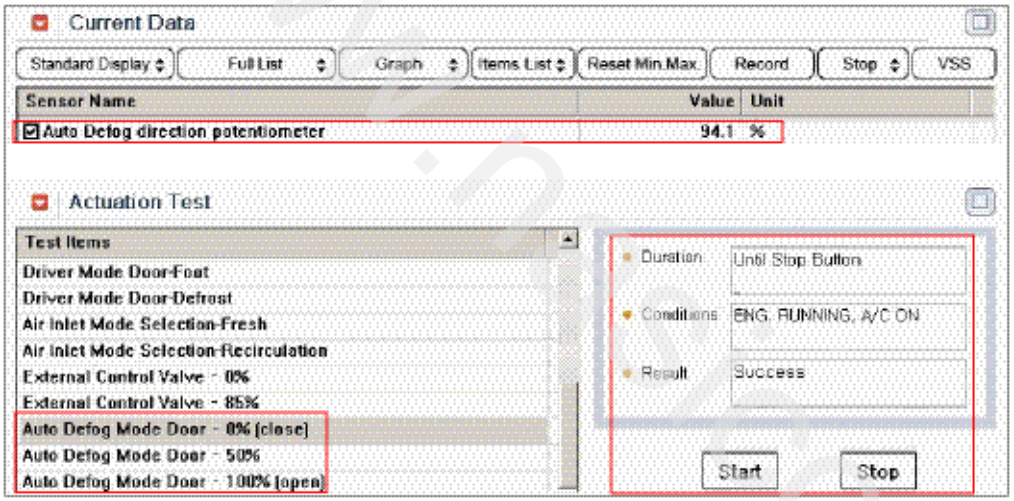
VG12AC50B1283D

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start
3. Select and monitor "Auto defoger mode direction potentioner" parameter on current data.
4. Perform Actuation Test for "Auto Defoger Mode Door -0%(close)/50%/100%(open)" in order.
5. Check that the value of auto defoger mode actuator is changed with performing actuation test.

Specification : 0%(close) : About 90%, 50% : About 55%, 100%(open) : About 20%.



VG12AC0B128321S

6. Does the value of auto defoger mode actuator follow the specification ?

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

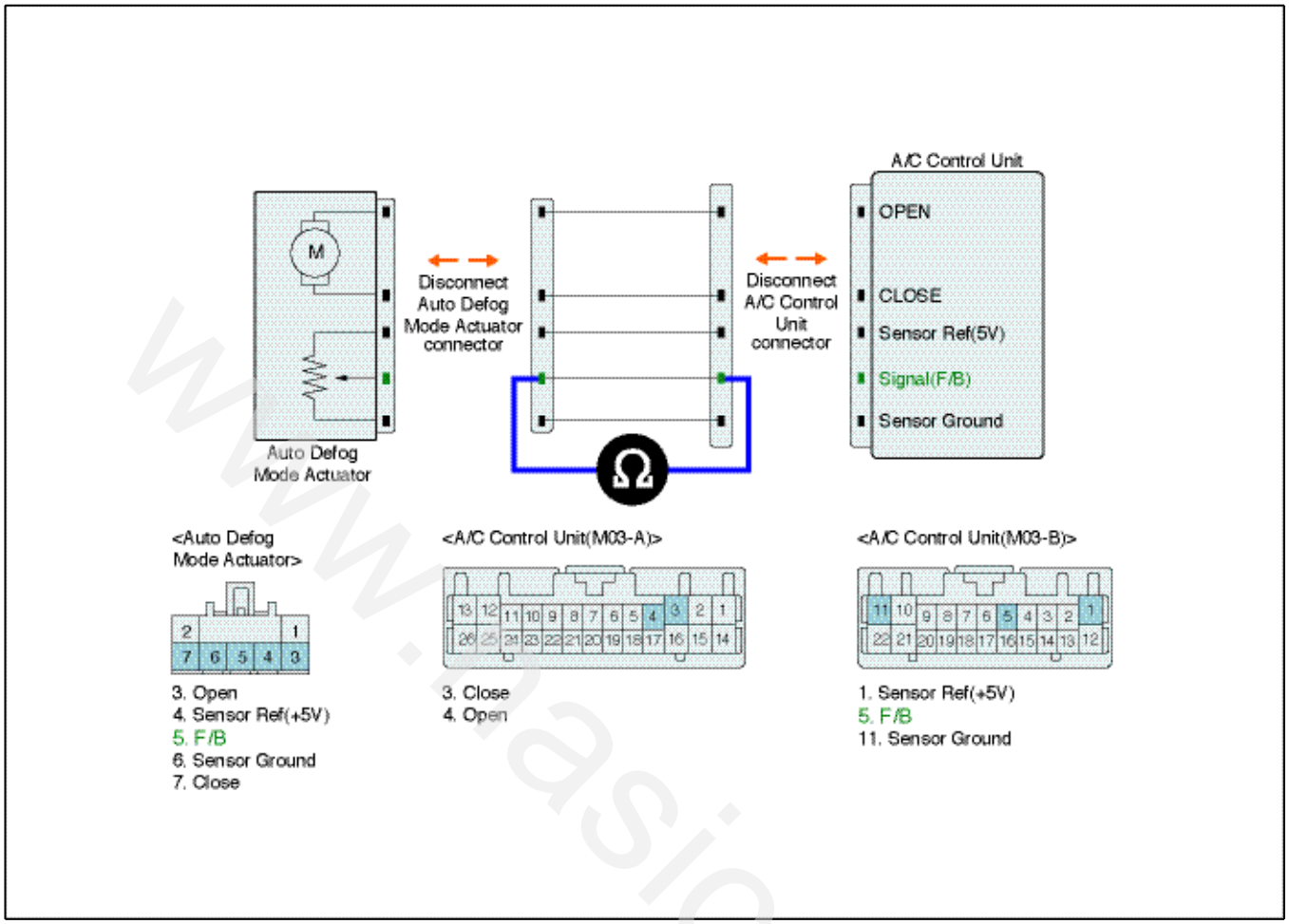
NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B128331

4. Is the measured resistance within specification?

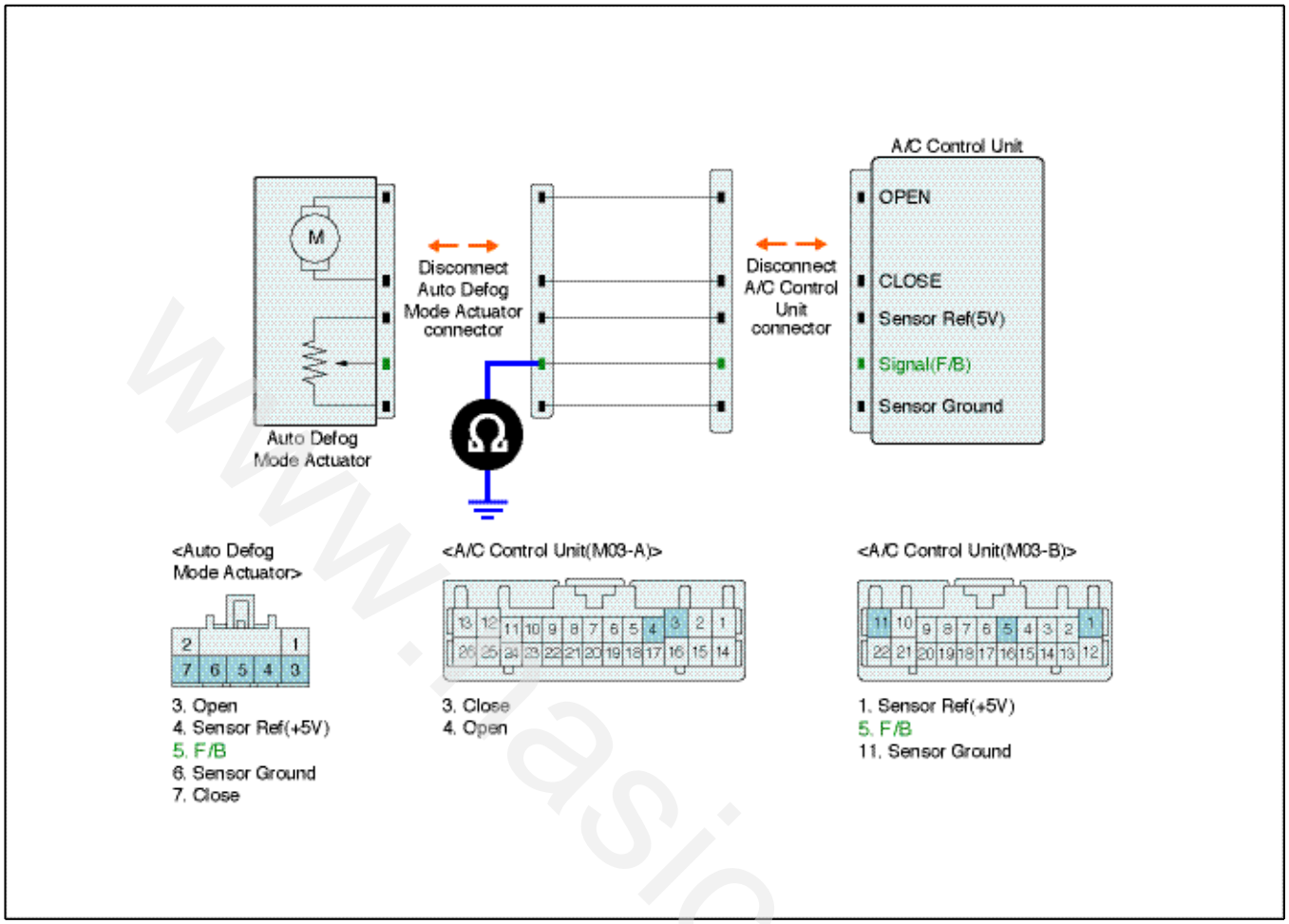
YES ▶ Go to "Check short to ground in harness" as follows.

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 Auto Defog actuator and A/C control unit main harness connector.
3. Measure resistance between Signal(F/B) terminal of Auto Defog actuator harness connector and chassis ground .

Specification : Infinity



VG12AC50B128332

4. Is the measured resistance within specification?

YES ▶ Go to "Power circuit Inspection" procedure.

NO ▶ Check for short to ground in control harness .

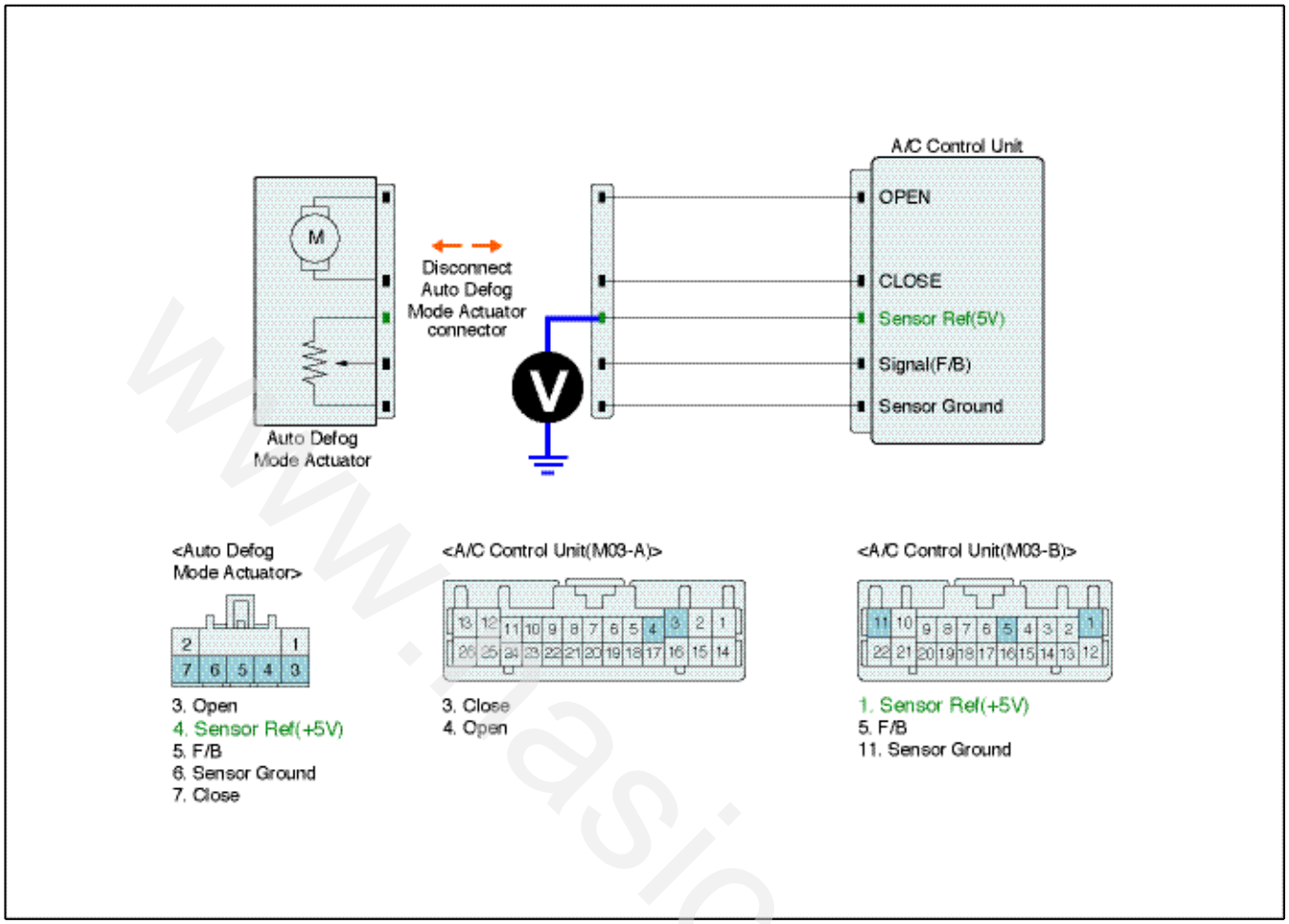
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check power in harness

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

Specification : approx. 5V



VG12AC50B128333

5. Is the measured voltage within specification?

YES ▶ Go to " Component inspection" procedure .

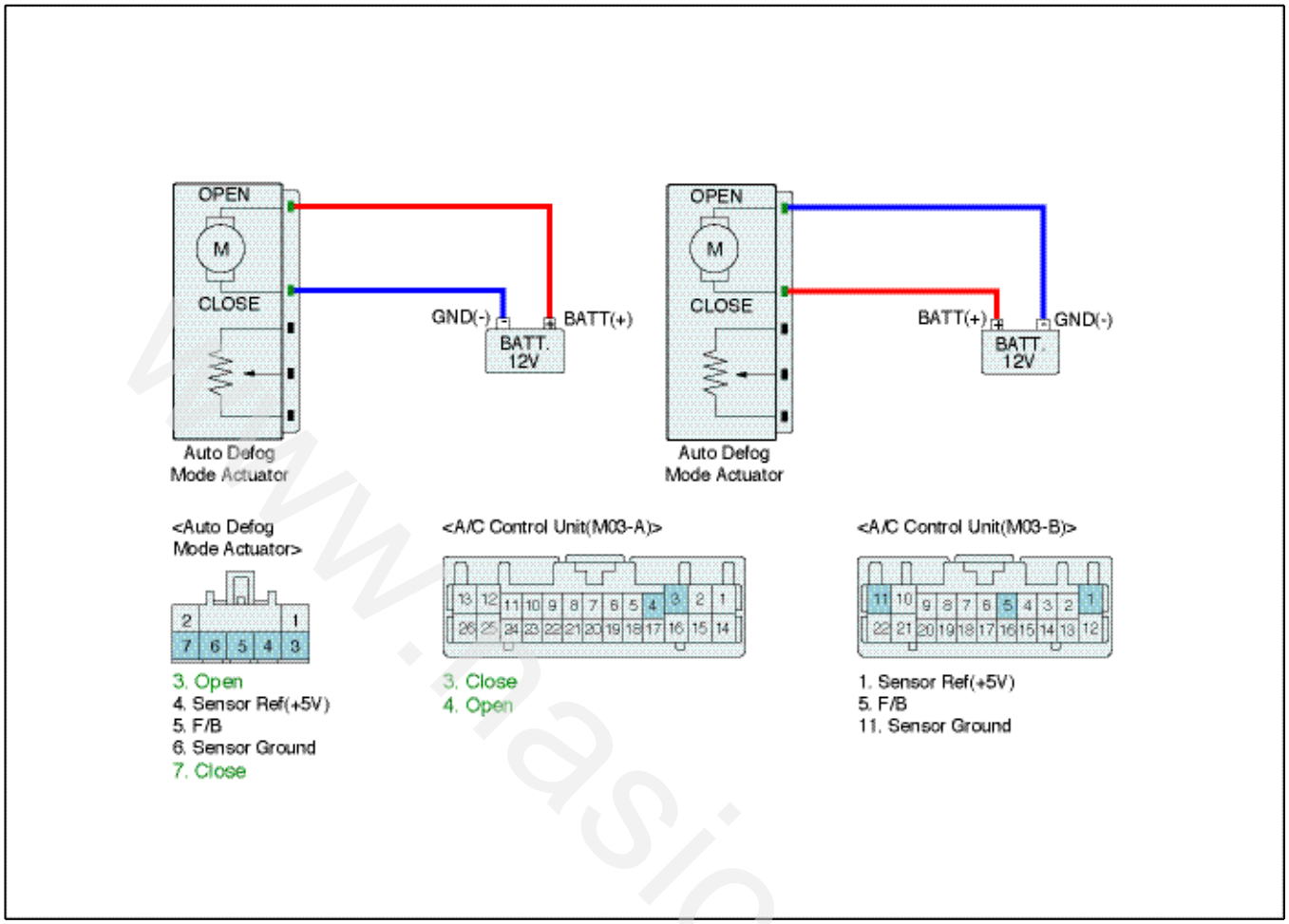
NO ▶ Check for open and short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Auto Defog actuator

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

Specification : Refer the specifications in Fig.1)



VG12AC50B128341

Fig.1)

Actuator harness	OPEN(+)	CLOSE(-)	Door position
Battery terminal	12 V	ground	OPEN
	ground	12 V	CLOSE

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

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

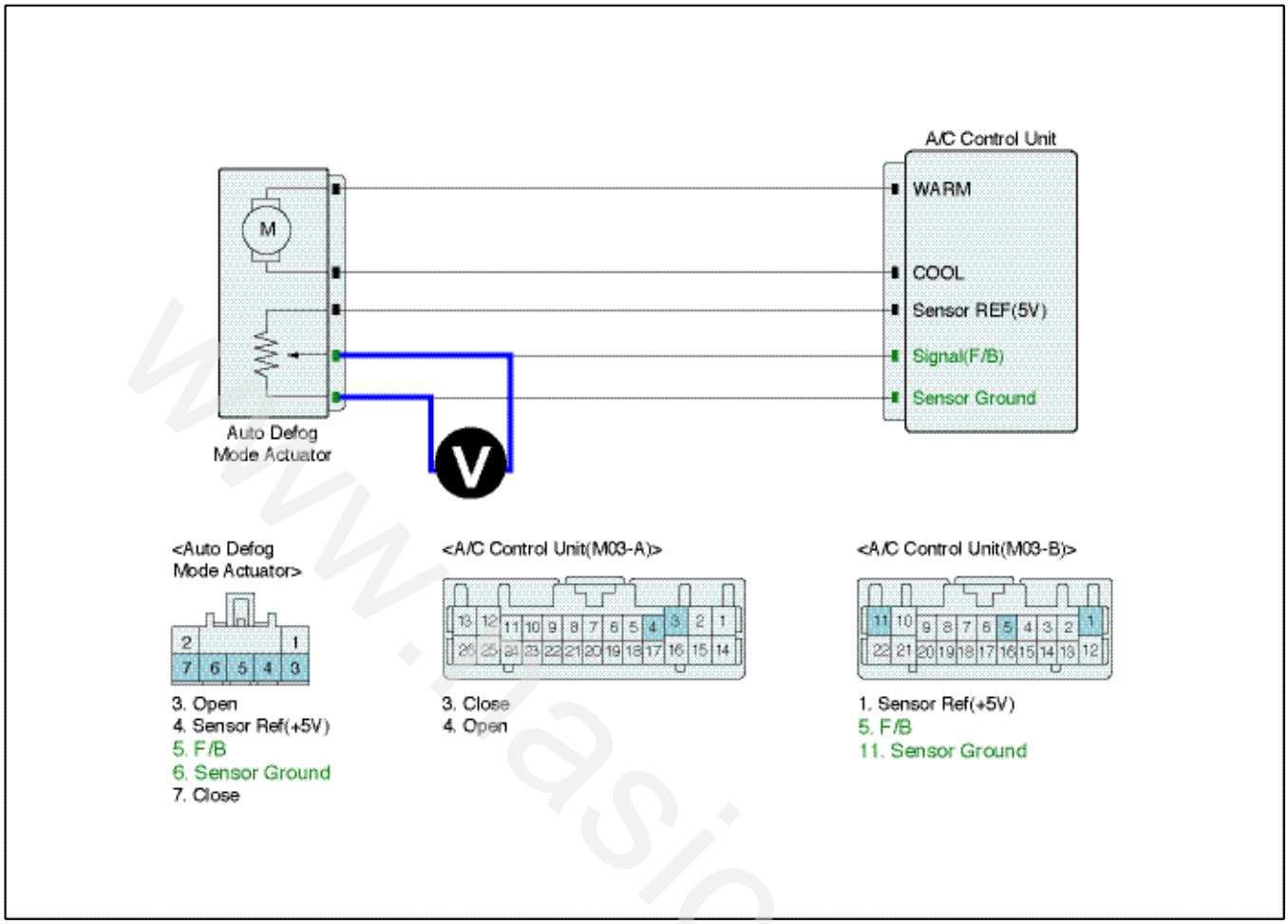
YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

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

Specification : Refer the specifications in Fig.2)



VG12AC50B128342

Fig.2)

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

Fig.2) ※ Voltage value of Auto Defog actuator as a function of position of mode switch.

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 Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog 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.

B1284 Direction Potentiometer Short (High) - Auto Defog

Componet Location

YG12AC0B128311

General Description

Auto defogger sensor is installed on front window glass. For safety driving, Auto defogger sensor judges and sends signal of the occurance of moisture in advance of blowing out the wind for defogging with improvement of visiablilty and comfort.

While controlling the temperature and Mode(direction of wind) set by driver, if the humidity is higher than certain level, Air condtioner control Module automatically controls auto defogging mode. Air conditioner control module changes to go back to the previous driver set mode, if the humidity is decreased.

Air conditioner control Module automatically controls Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator in accordance with the amount of humidity on the front glass.

DTC Description

The Air conditioner Control Module sets DTC B1284 if The signal from auto defogger mode actuator has been detected 4.9V for 0.3 seconds.

DTC Detecting Condition

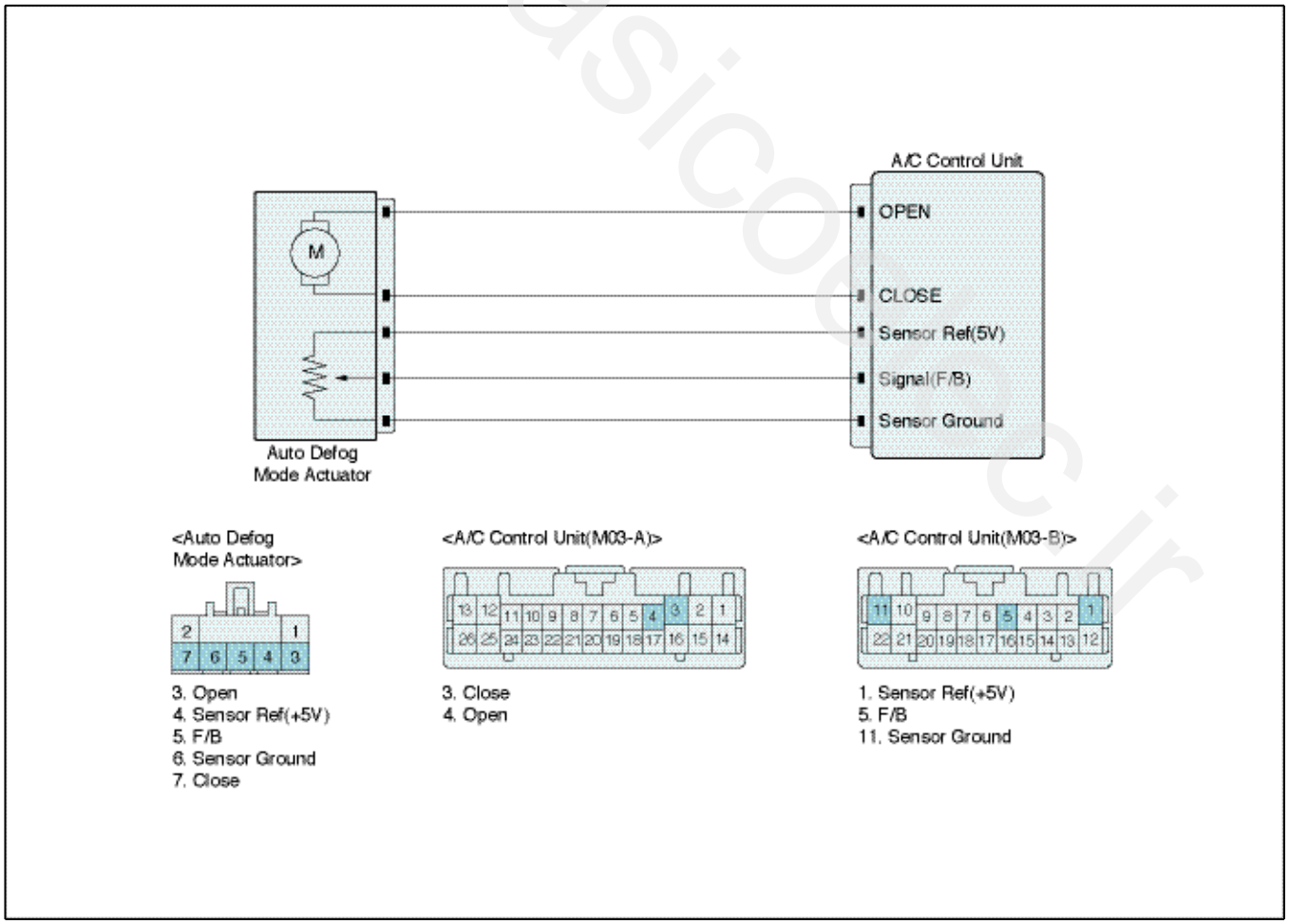
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short to battery in signal(Feedback signal) circuit 2. Open in ground circuit 3. Faulty auto defoger mode actuator 4. Faulty Air conditioner control Module
Enable Conditions	• IG KEY ON	
Threshold value	• The signal from auto defogger sensor has been detected 4.9V for 0.3 seconds.	
Failsafe	• If selected Mode was VENT, it is moved and fixed at Close position • If the others mode, it is moved and fixed at Open position	

Specification

※ Voltage output according to Actuator position

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

Diagnostic Circuit Diagram



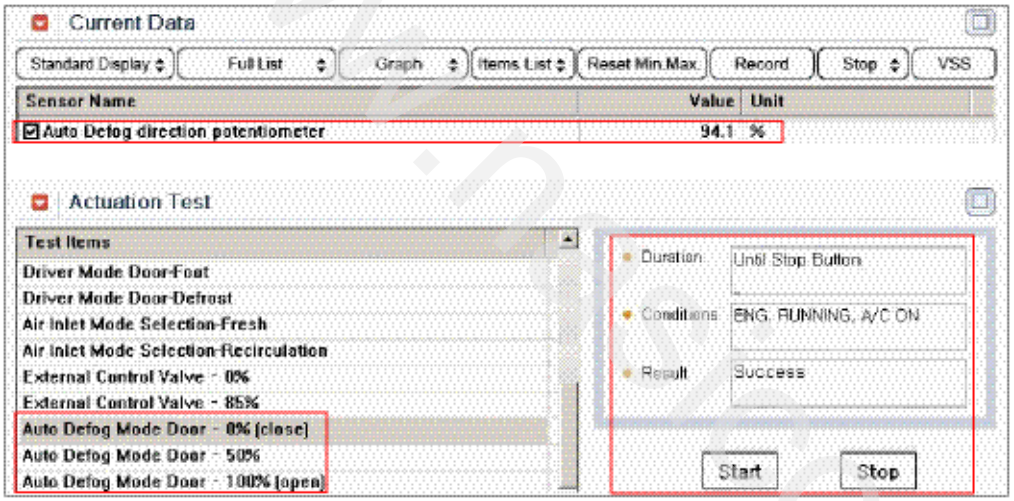
VG12AC50B1283D

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start.
3. Select and monitor "Auto defoger mode direction potentioner" parameter on current data.
4. Perform Actuation Test for "Auto Defoger Mode Door -0%(close)/50%/100%(open)" in order.
5. Check that the value of auto defoger mode actuator is changed with performing actuation test.

Specification : 0%(close) : About 90%, 50% : About 55%, 100%(open) : About 20%.



VG12AC0B128321S

6. Does the value of auto defoger mode actuator follow the specification ?

YES ▶ This is a intermittent problem caused by po-or 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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

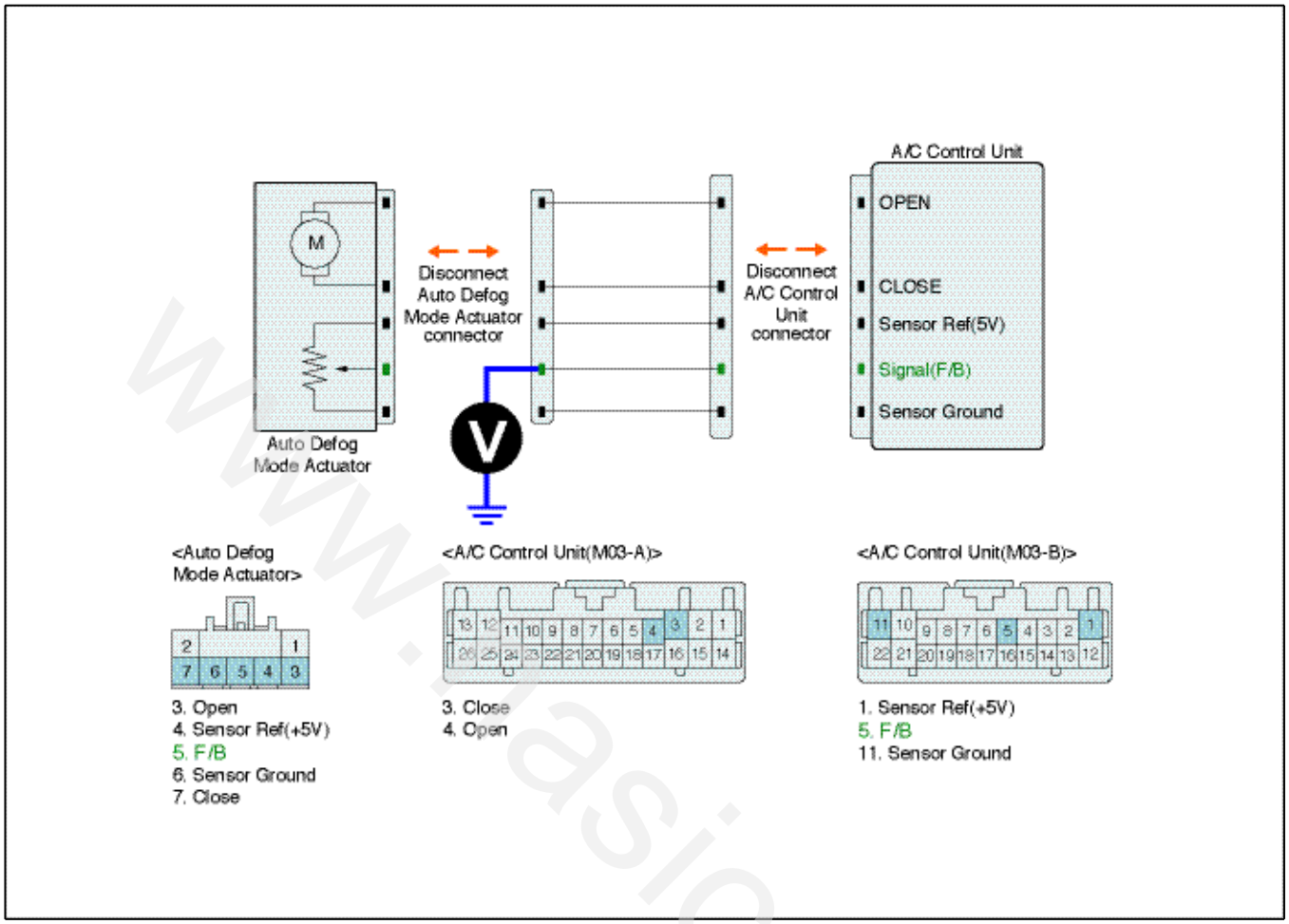
NO ▶ Go to "W/Harness Inspection" procedure.

Signal Circuit Inspection

■ Check short to battery in harness

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

Specification : approx. 0V



VG12AC50B128431

5. Is the measured voltage within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

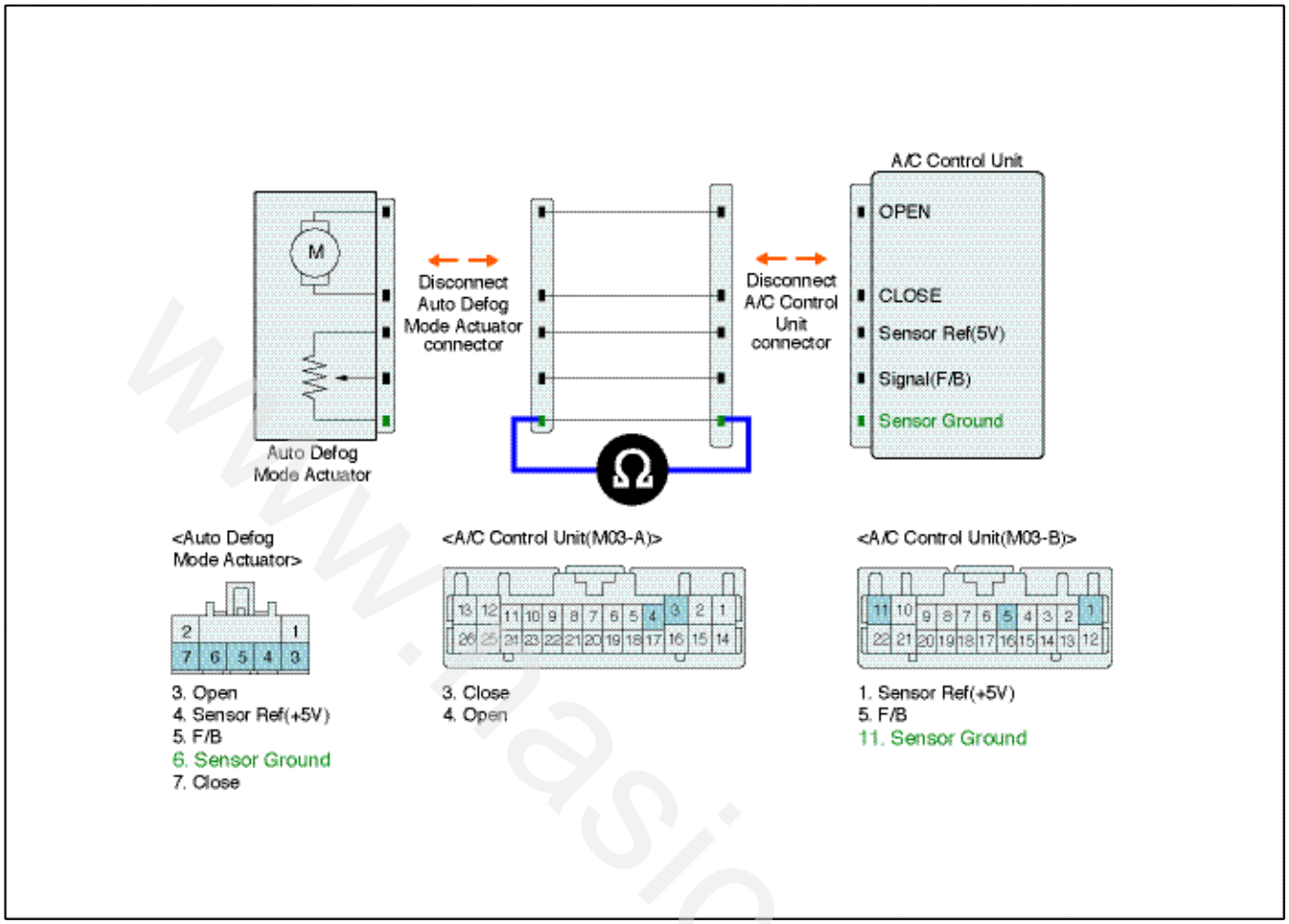
NO ▶ Check for short to battery in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check power in harness

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

Specification : 1Ω below



VG12AC50B128432

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

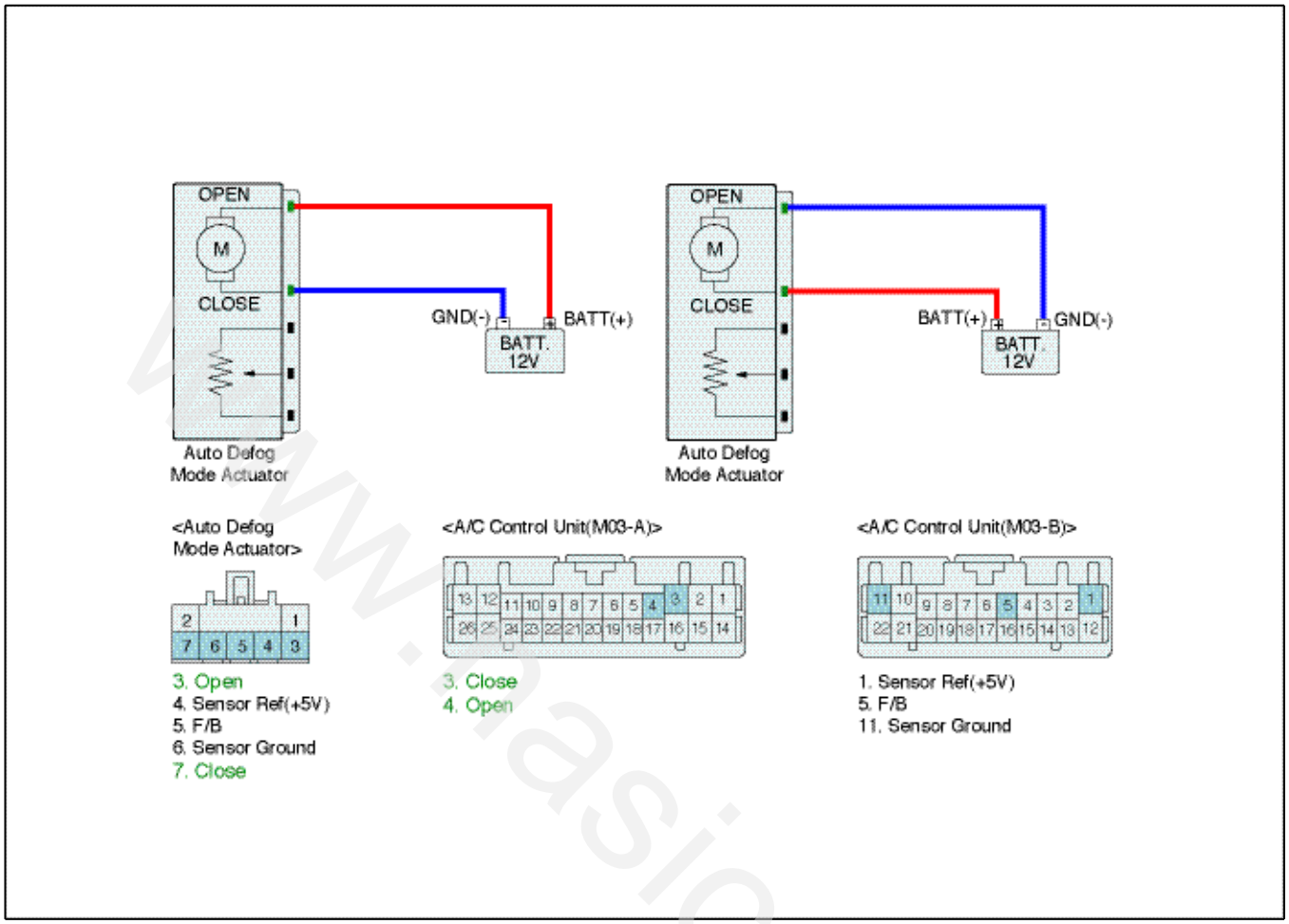
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check Auto Defog actuator

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

Specification : Refer the specifications in Fig.1)



VG12AC50B128441

Fig.1)

Actuator harness	OPEN(+)	CLOSE(-)	Door position
Battery terminal	12 V	ground	OPEN
	ground	12 V	CLOSE

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

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

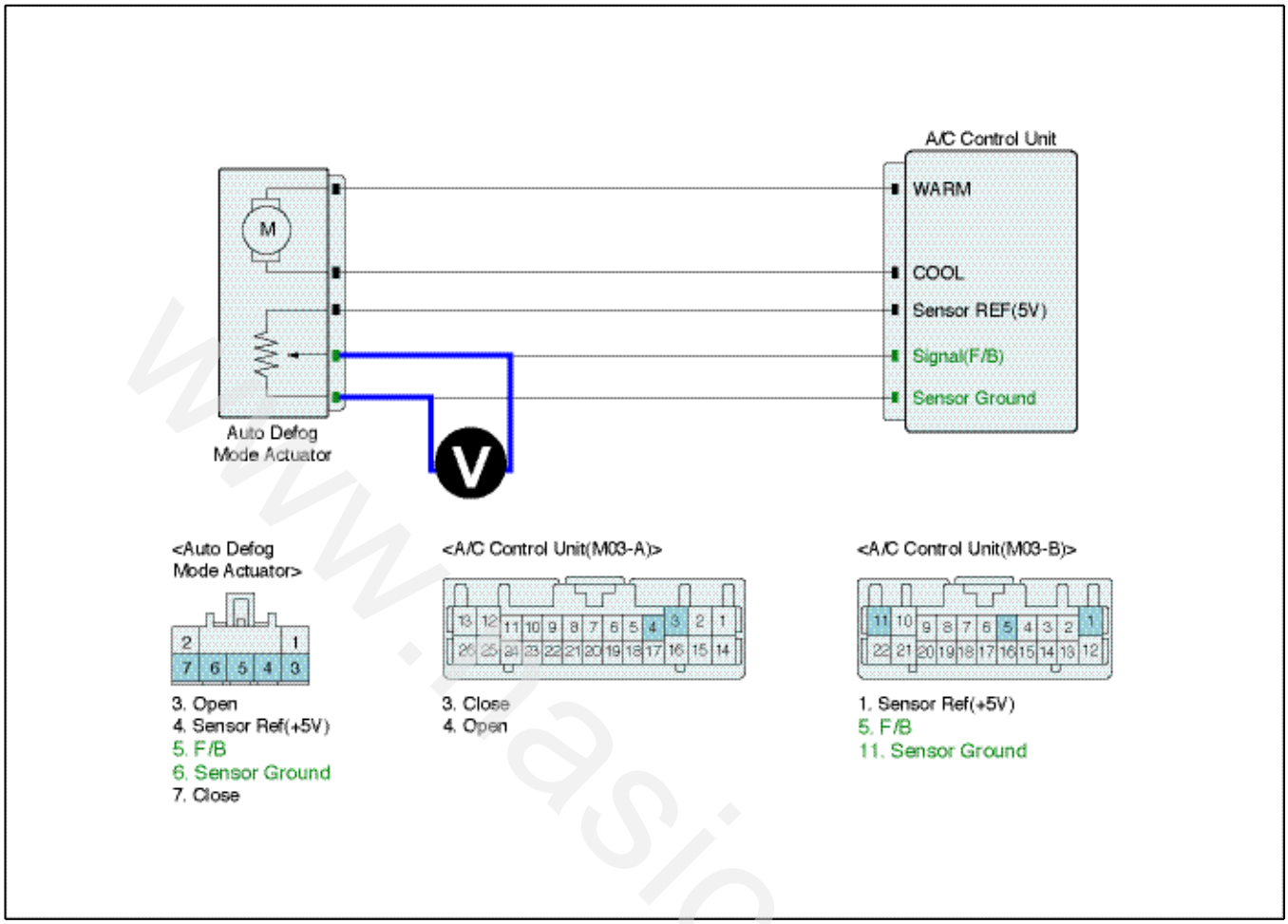
YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

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

Specification : Refer the specifications in Fig.2)



VG12AC50B128442

Fig.2)

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

Fig.2) ※ Voltage value of Auto Defog actuator as a function of position of mode switch.

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 Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog 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.

B1285 Direction Control Motor -AUTO Defog

Componet Location

YG12AC0B128311

General Description

Auto defogger sensor is installed on front window glass. For safety driving, Auto defogger sensor judges and sends signal of the occurance of moisture in advance of blowing out the wind for defogging with improvement of visiablilty and comfort.

While controlling the temperature and Mode(direction of wind) set by driver, if the humidity is higher than certain level, Air condtioner control Module automatically controls auto defogging mode. Air conditioner control module changes to go back to the previous driver set mode, if the humidity is decreased.

Air conditioner control Module automatically controls Intake actuator, A/C, Defogger actuator, Blower motor rpm, Mode actuator in accordance with the amount of humidity on the front glass.

DTC Description

The Air conditioner Control Module sets DTC B1285 if auto defogger mode actuator has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

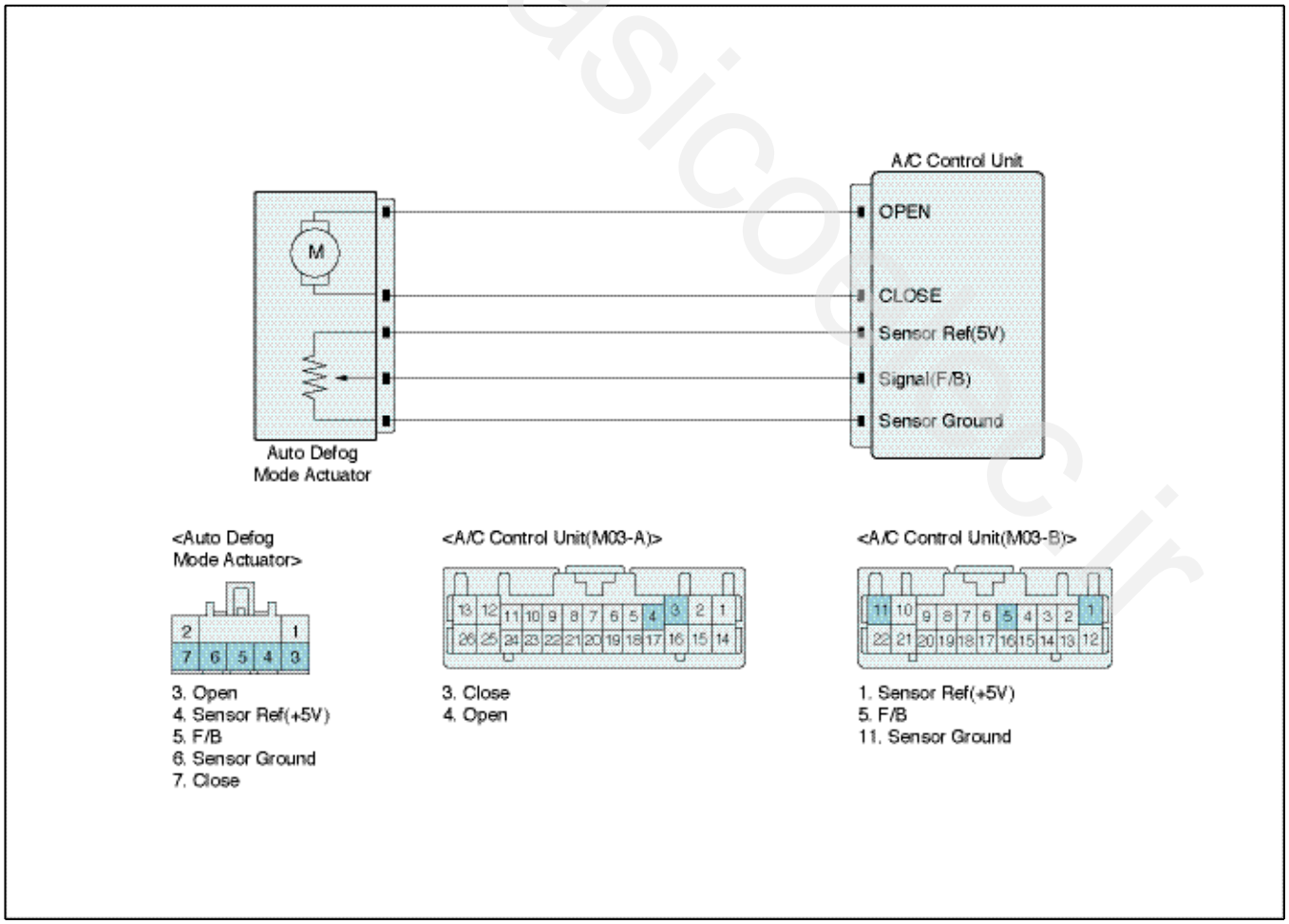
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor contact in harness 2. Open or short in motor power circuit 3. Faulty auto defoger mode actuator 4. Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

※ The voltage of auto defoger mode actuator in accordance with position

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

Diagnostic Circuit Diagram



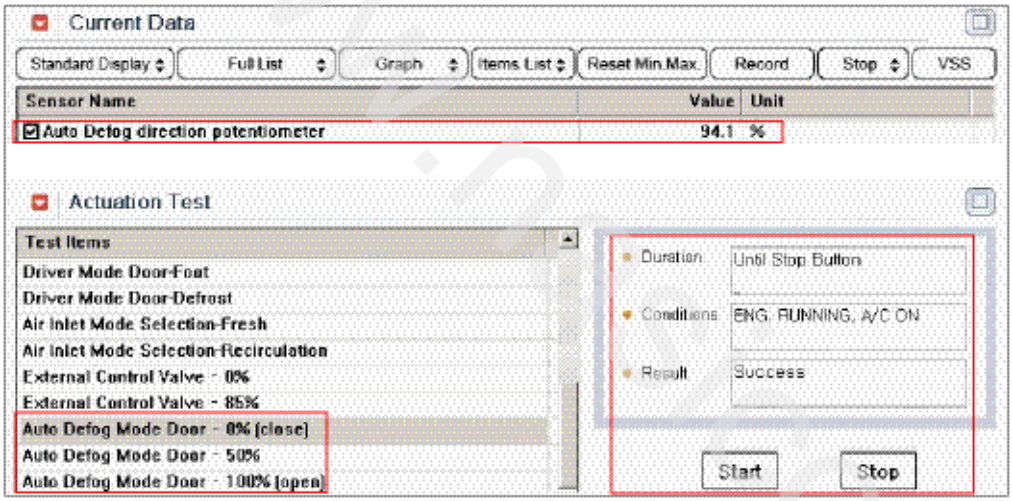
VG12AC50B1283D

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal temperature after engine start.
3. Select and monitor"Auto defoger mode actuator" parameter on current data.
4. Perform Actuation Test for "auto defoger actuator -0%(close)/50%/100%(open)" in order.
5. Check that the value of auto defoger mode actuator is changed with performing actuation test.

Specification : 0%(close) : About 90%, 50% : About 55%, 100%(open) : About 20%.



VG12AC0B128321S

6. Does the value of auto defoger mode actuator follow the specification ?

YES ▶ This is a intermittent problem caused by po-or 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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

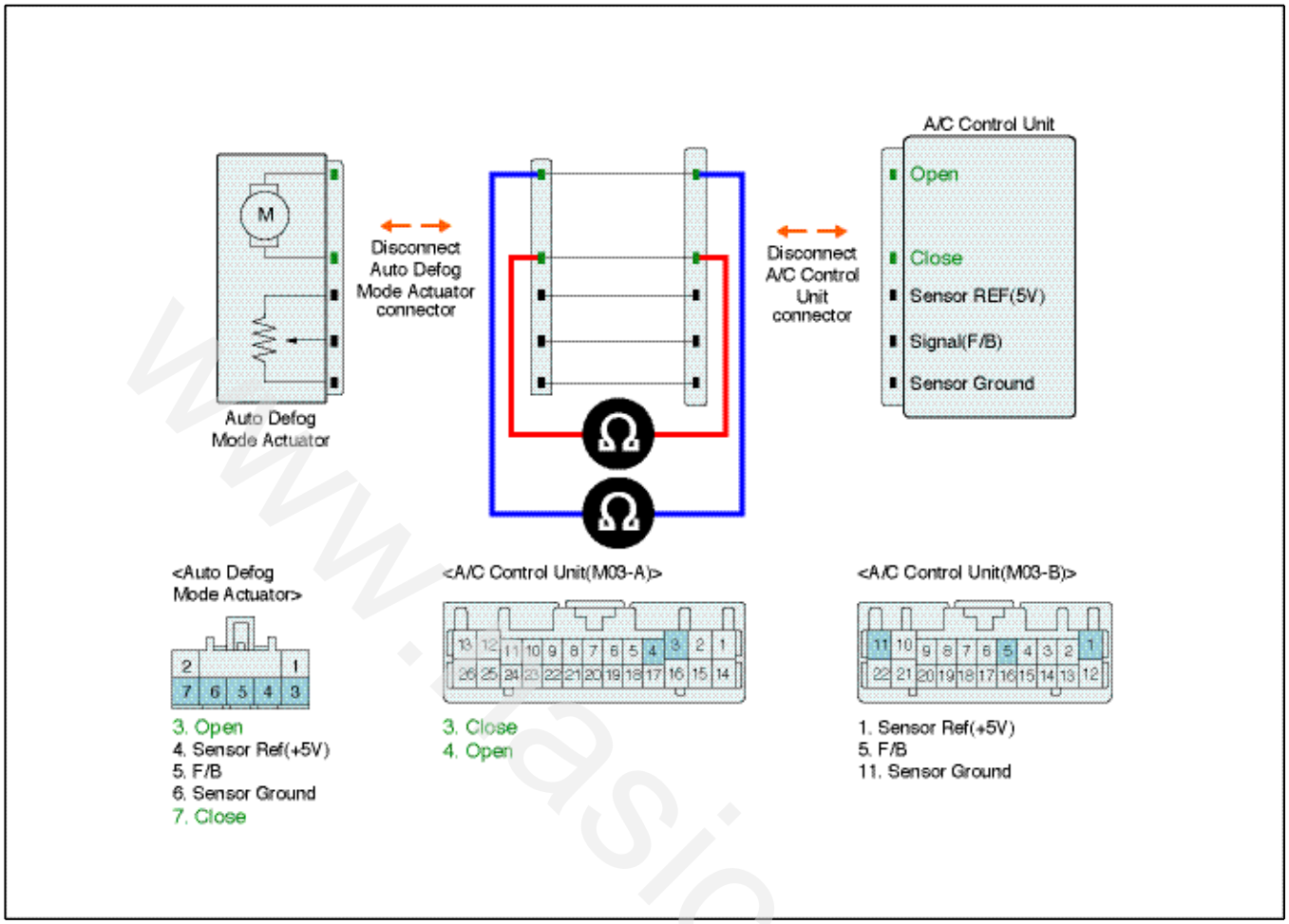
NO ▶ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

1. Ignition "OFF"
2. Disconnect Auto Defog sensor and A/C control unit main harness connector.
3. Measure resistance between OPEN terminal of Auto Defog sensor harness connector and OPEN terminal of A/C-ECU harness connector.
4. Measure resistance between CLOSE terminal of Auto Defog sensor harness connector and CLOSE terminal of A/C-ECU harness connector.

Specification : 1Ω below



VG12AC50B128531

5. Is the measured resistance within specification?

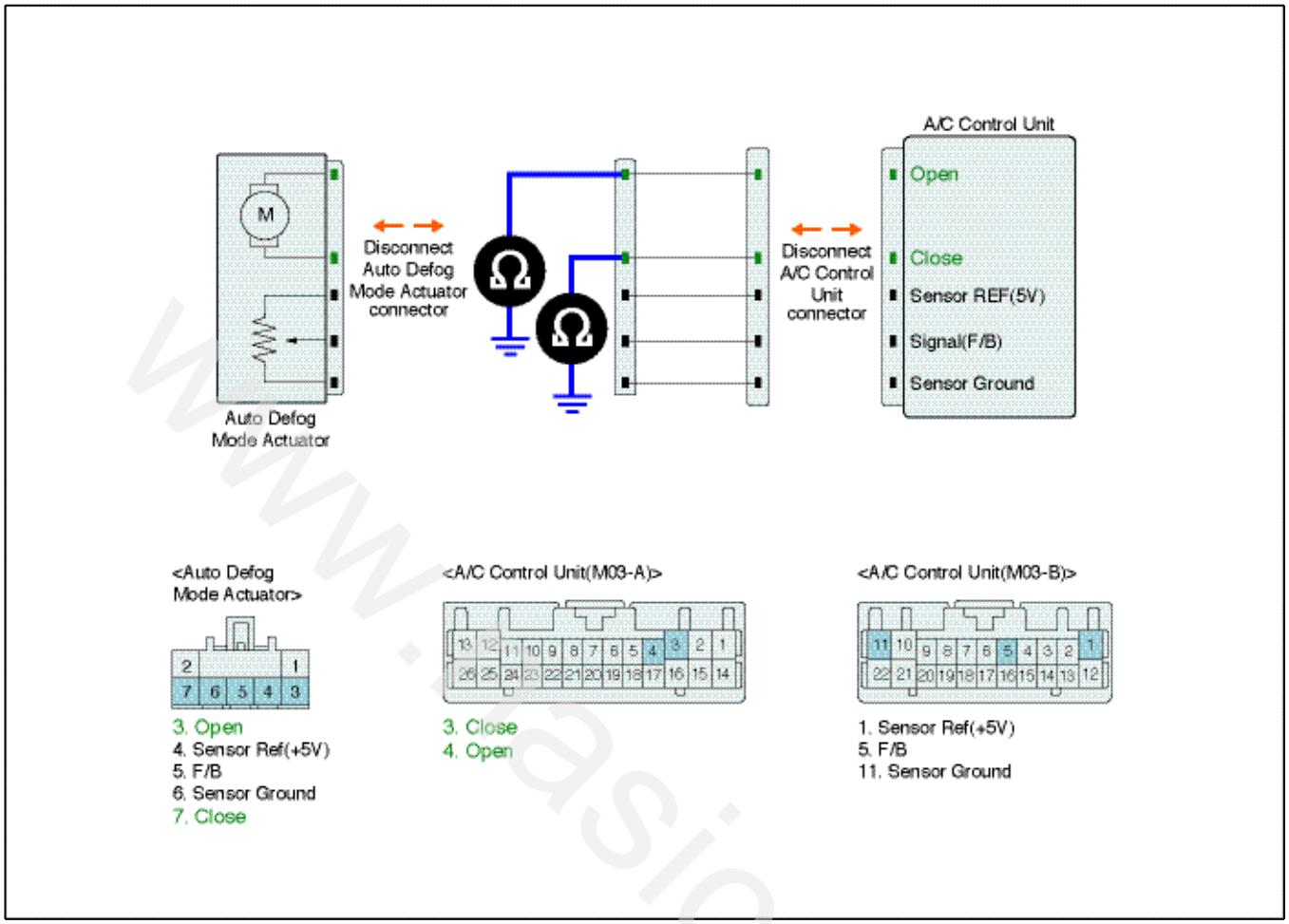
YES ▶ Go to "Check short to ground in harness" as follows.

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 Auto Defog actuator and A/C control unit main harness connector.
3. Measure resistance between OPEN terminal of Auto Defog actuator harness connector and chassis ground.
4. Measure resistance between CLOSE terminal of Auto Defog actuator harness connector and chassis ground.

Specification : Infinity



VG12AC50B128532

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

NO ▶ Check for short to ground in control harness .

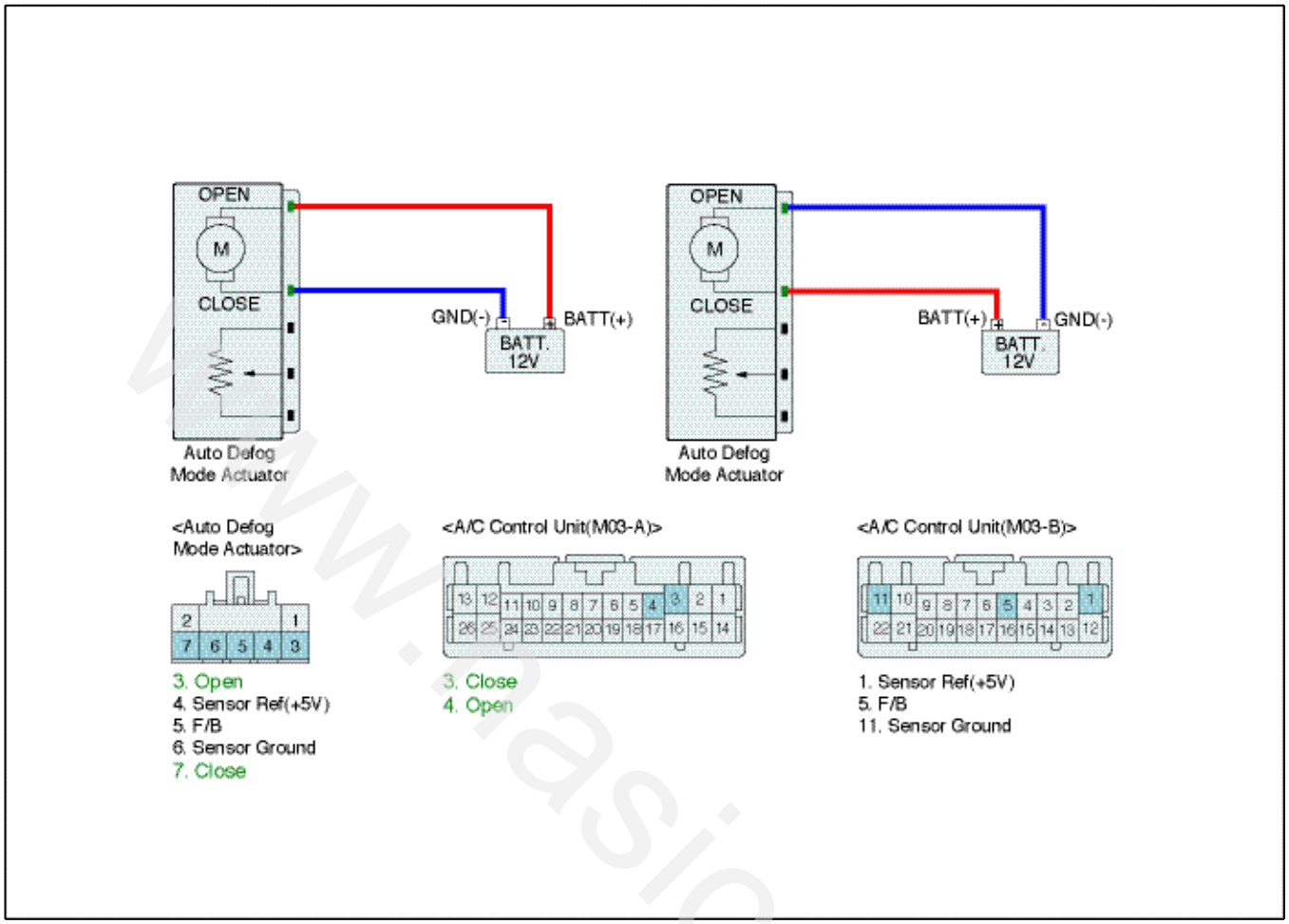
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Specification : Refer the specifications in Fig.1)

Component Inspection

■ Check Auto Defog actuator

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



VG12AC50B128541

Fig.1)

Actuator harness	OPEN(+)	CLOSE(-)	Door position
Battery terminal	12 V	ground	OPEN
	ground	12 V	CLOSE

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

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

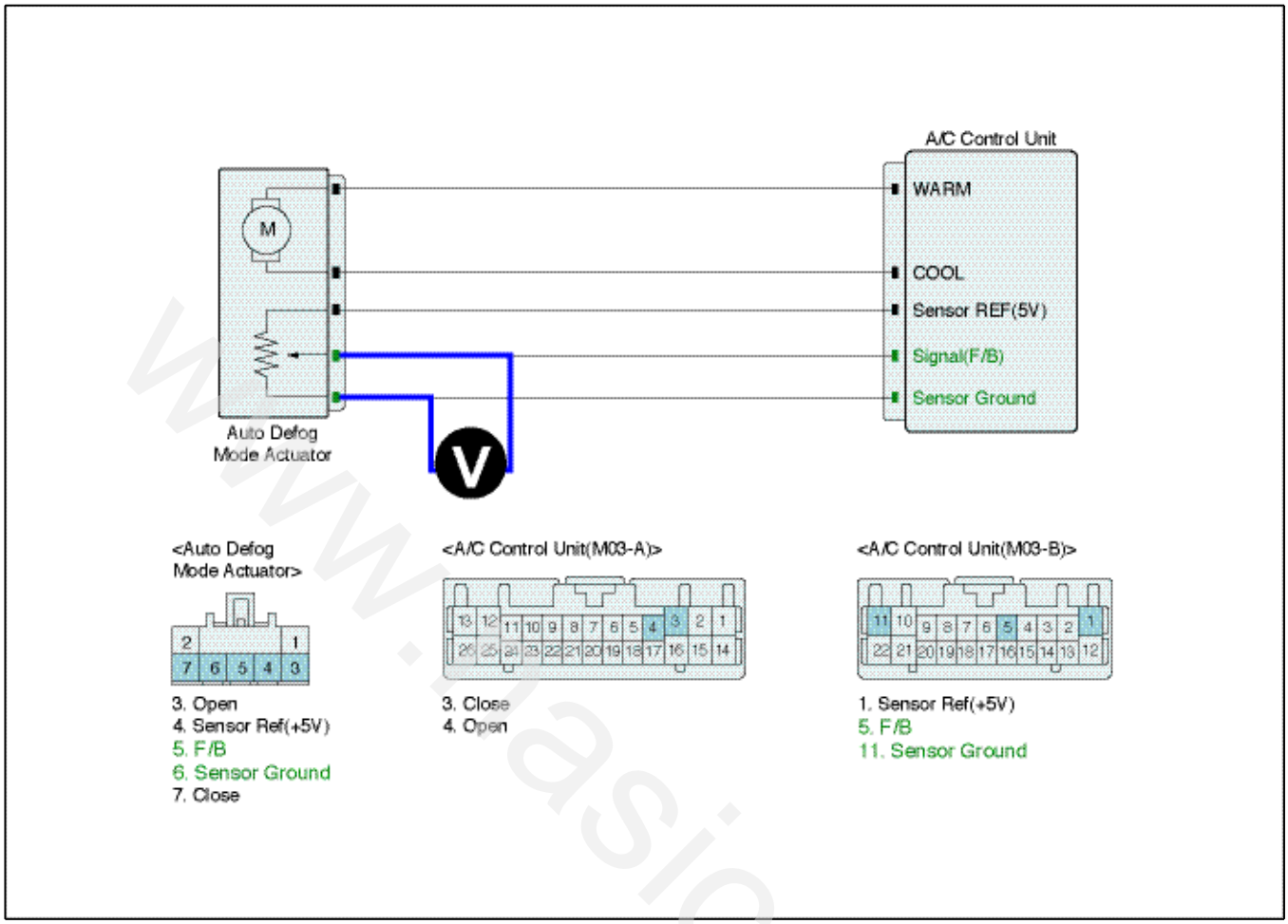
YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog actuator and then go to "Verification of Vehicle Repair" procedure.

■ Check potentiometer

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

Specification : Refer the specifications in Fig.2)



VG12AC50B128542

Fig.2)

Door position	Voltage
CLOSE(VENT, B/L)	About 4.7V
FLOOR	About 3.94V
MIX	About 3.29V
OPEN(DEF)	About 1V

Fig.2) ※ Voltage value of Auto Defog actuator as a function of position of mode switch.

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 Auto Defog actuator and check for proper operation. If the problem is corrected, replace Auto Defog 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.

B1672 APT Sensor Fault – CAN Signal

Componet Location

YG12AC0B167211

General Description

Air conditioner control module receives air conditioner refrigerants pressure from ECM via CAN in order to judge how much refrigeratnts pressure is in the line. If the air conditioner pressure is abnormal, it is used for signal not to control the air conditioner compressor.

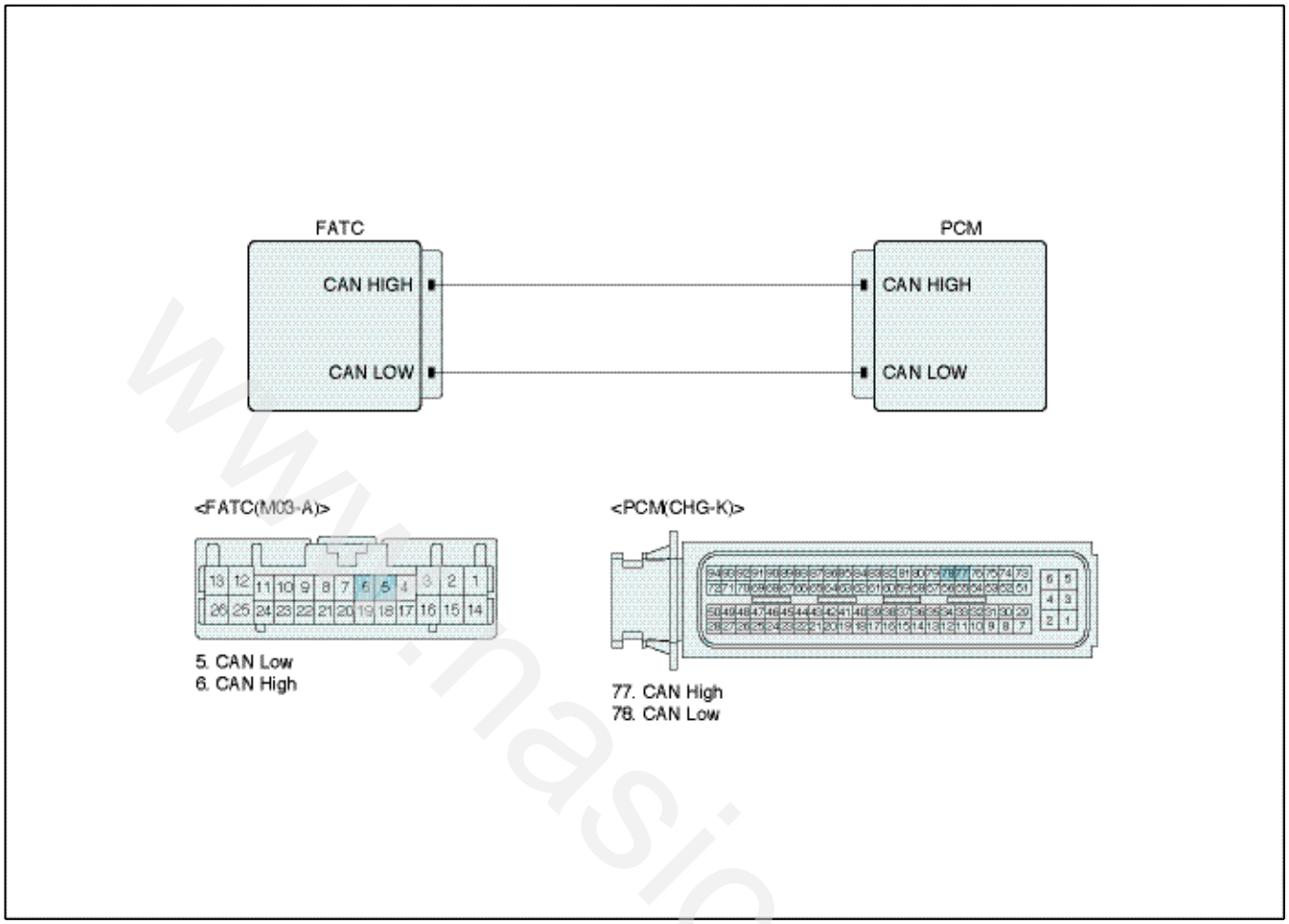
DTC Description

The Air conditioner Control Module sets DTC B1672 if APT signal has not been received through the CAN signal.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Check CAN signal	1. Faulty Air conditioner Pressure Sensor 2. CAN communication
Enable Conditions	• IG KEY ON	
Threshold value	• No receiving CAN signal for 1.5 seconds or Receiving Error value	
Failsafe	• Substitued APT value as '0'	

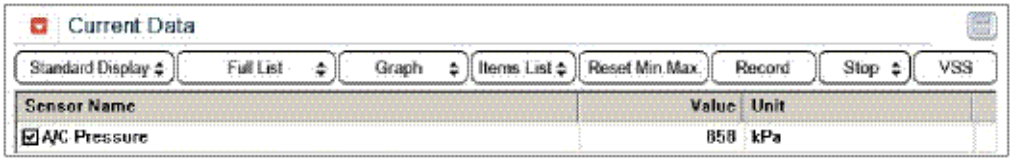
Diagnostic Circuit Diagram



VG12AC50B1672D

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Check that there is DTC on the engine side.
3. Check engine first if there is any DTC on the engine side and confirm that it is erasable.
4. If no DTC, select "air conditioner pressure sensor" parameter on the engine side.
5. Check that the value of air conditioner pressure sensor is changable with A/C SW ON and OFF.



VG12AC0B167221S

6. Is the air conditioner pressure sensor normal ?

YES ▶ Check that there is any CAN related DTC and then, repair or replace as necessary. Finally, check that is possible to clear this DTC.
▶ This is a intermittent problem caused by poor contact of Control Module.
▶ 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 ▶ Check air conditioner pressure sensor, circuit, or related component. Repair or replace as necessary 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.

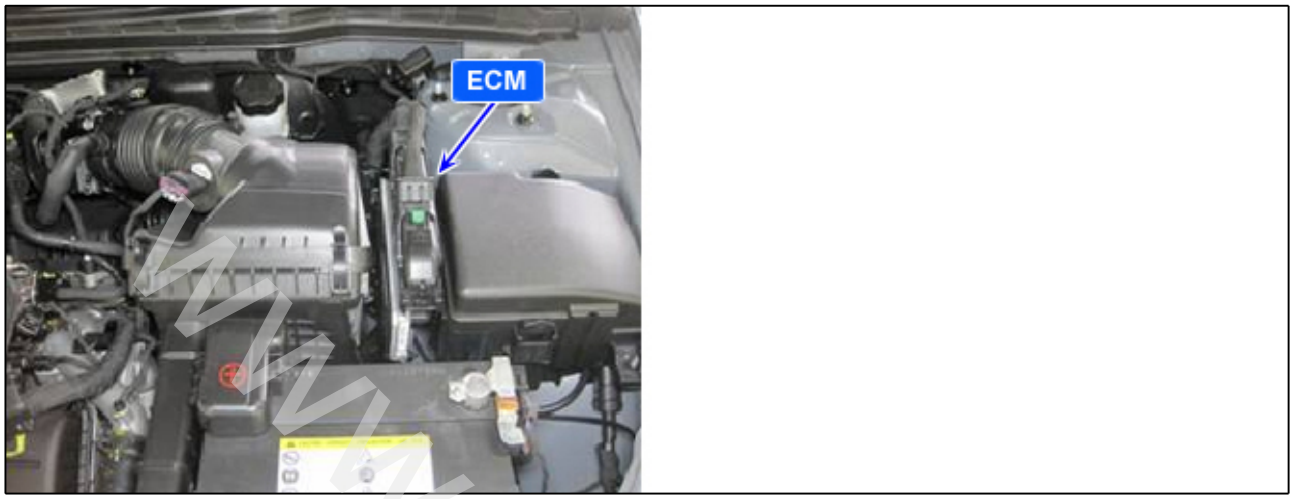
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1685 Engine RPM fault – CAN Signal

Componet Location



YG12AC0B168511

General Description

In order to make a variable control for a compressor based on engine's load, the air-conditioner control module receives its engine RPM signals from the engine ECU.

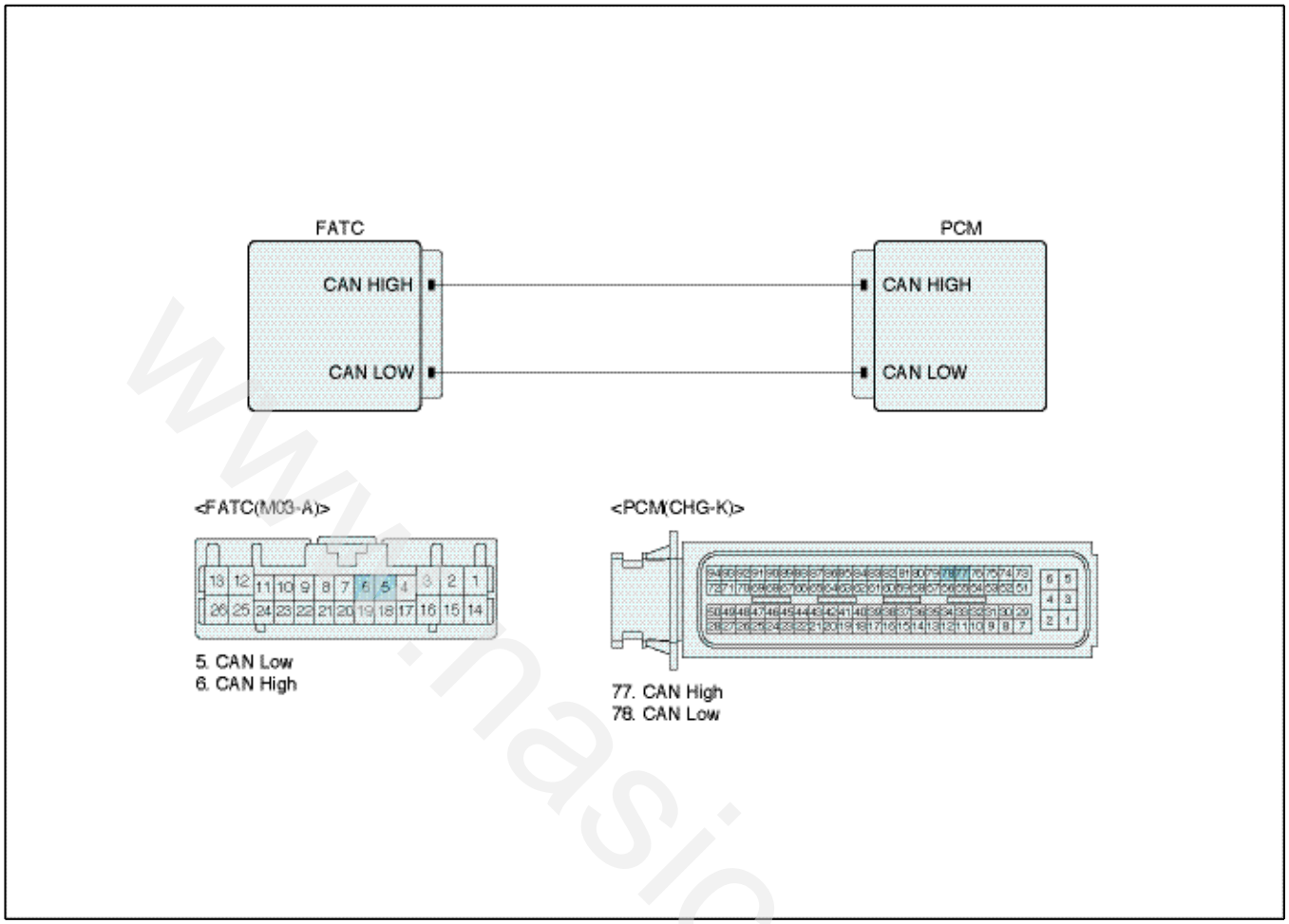
DTC Description

The Air conditioner Control Module sets DTC B1685 if Engine RPM signal has not been received through the CAN signal.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Check CAN signal	1. Faulty Engine RPM 2. CAN communication
Enable Conditions	• IG KEY ON	
Threshold value	• No signal via CAN for 1.5 seconds or receiving Error v-alue	
Failsafe	• Substitued Engine RPM value as '0'	

Diagnostic Circuit Diagram



VG12AC50B1672D

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Check that there is DTC on the ENGINE side.
3. Check ENGINE first if there is any DTC on the ENGINE side and confirm that it is erasable.
4. If no DTC, select "Engine RPM" parameter on the ENGINE side.
5. Check.
   ■ Check Engine RPM is changeable together with Engine RPM changes.
6. Is the Engine RPM normal ?

YES ▶ Check that there is any CAN related DTC and then, repair or replace as necessary. Finally, check that is possible to clear this DTC.
▶ This is a intermittent problem caused by poor contact of Control Module.
▶ 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 ▶ Check Engine RPM, circuit, or related component. Repair or replace as necessary 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.

B1686 Vehicle Speed Sensor Fault – CAN Signal

Componet Location

YG12AC0B168611

General Description

Air conditioner Control Module detects ambient temperature only when vehicle is driving. To judge wheather vehicle is driving or not, Air conditioner control module receives vehicle speed signal from VDC through the CAN signal.

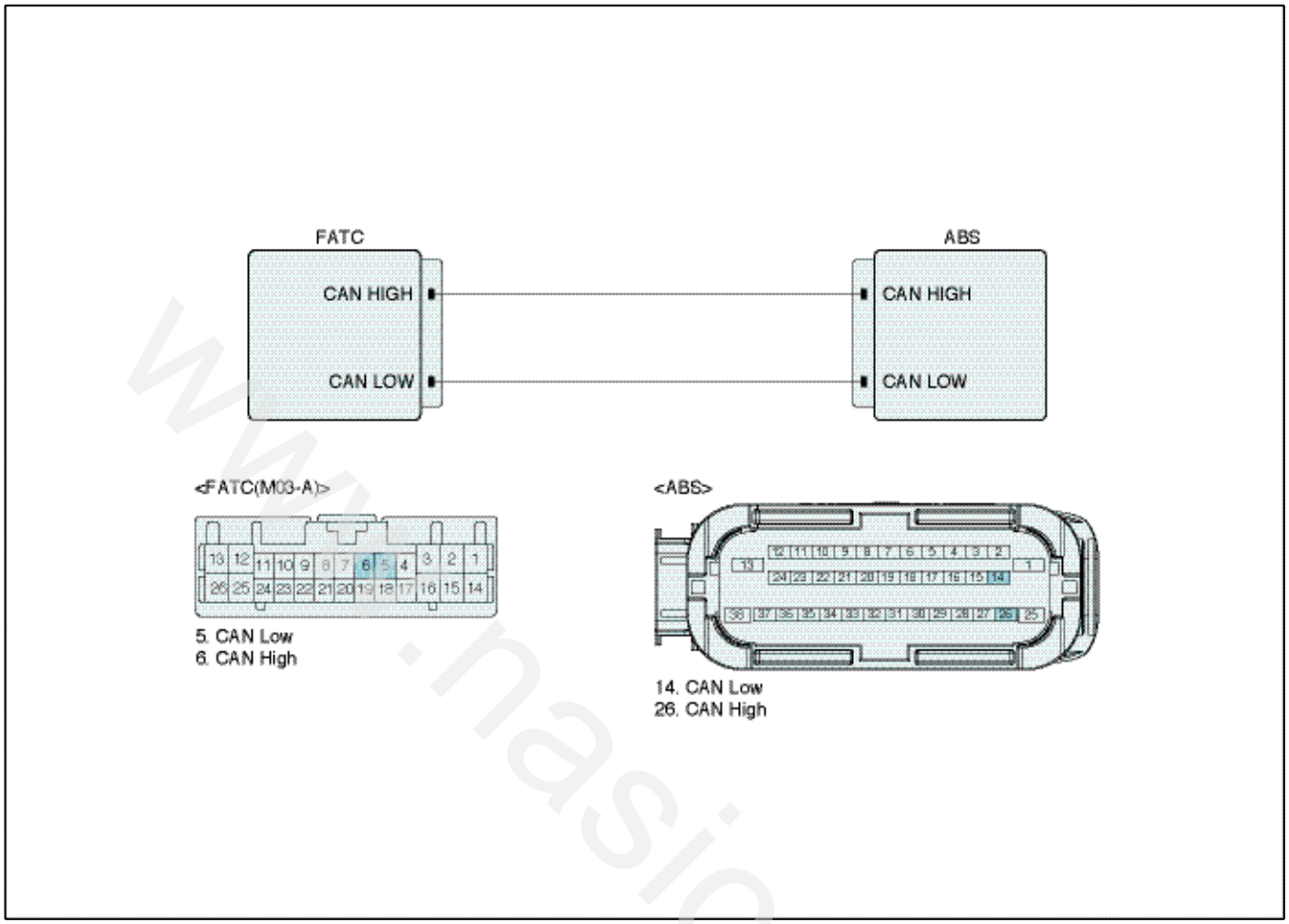
DTC Description

The Air conditioner Control Module sets DTC B1686 if vehicle speed signal has not been received through the CAN signal.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Check CAN signal	1. Faulty wheel Speed Sensor 2. CAN communication
Enable Conditions	• IG KEY ON	
Threshold value	• No signal via CAN for 1.5 seconds or receiving Error v-alue	
Failsafe	• Substitued vehicle speed value as '0'	

Diagnostic Circuit Diagram



VG12AC50B1686D

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Check that there is DTC on the VDC side.
3. Check VDC first if there is any DTC on the VDC side and confirm that it is erasable.
4. If no DTC, select "Wheel Speed sensor" parameter on the VDC side.
5. Check that the value of wheel speed sensor is changable with driving the vehicle.

   ■ Check wheel speed is changeable together with vehicle speed changes
6. Is the wheel speed sensor normal ?

YES ▶ Check that there is any CAN related DTC and then, repair or replace as necessary. Finally, check that is possible to clear this DTC
▶ This is a intermittent problem caused by poor contact of Control Module.
▶ 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 ▶ Check wheel speed sensor, circuit, or related component. Repair or replace as necessary 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.

B1687 Engine Coolant Temperature Sensor Circuit - CAN Signal

Componet Location

YG12AC0B168711

General Description

In case of engine cold starting, Air conditioner control module receies engine coolant temperature sensor signal through the CAN signal so that Mode is changed to DEF with controlling mode actuator.

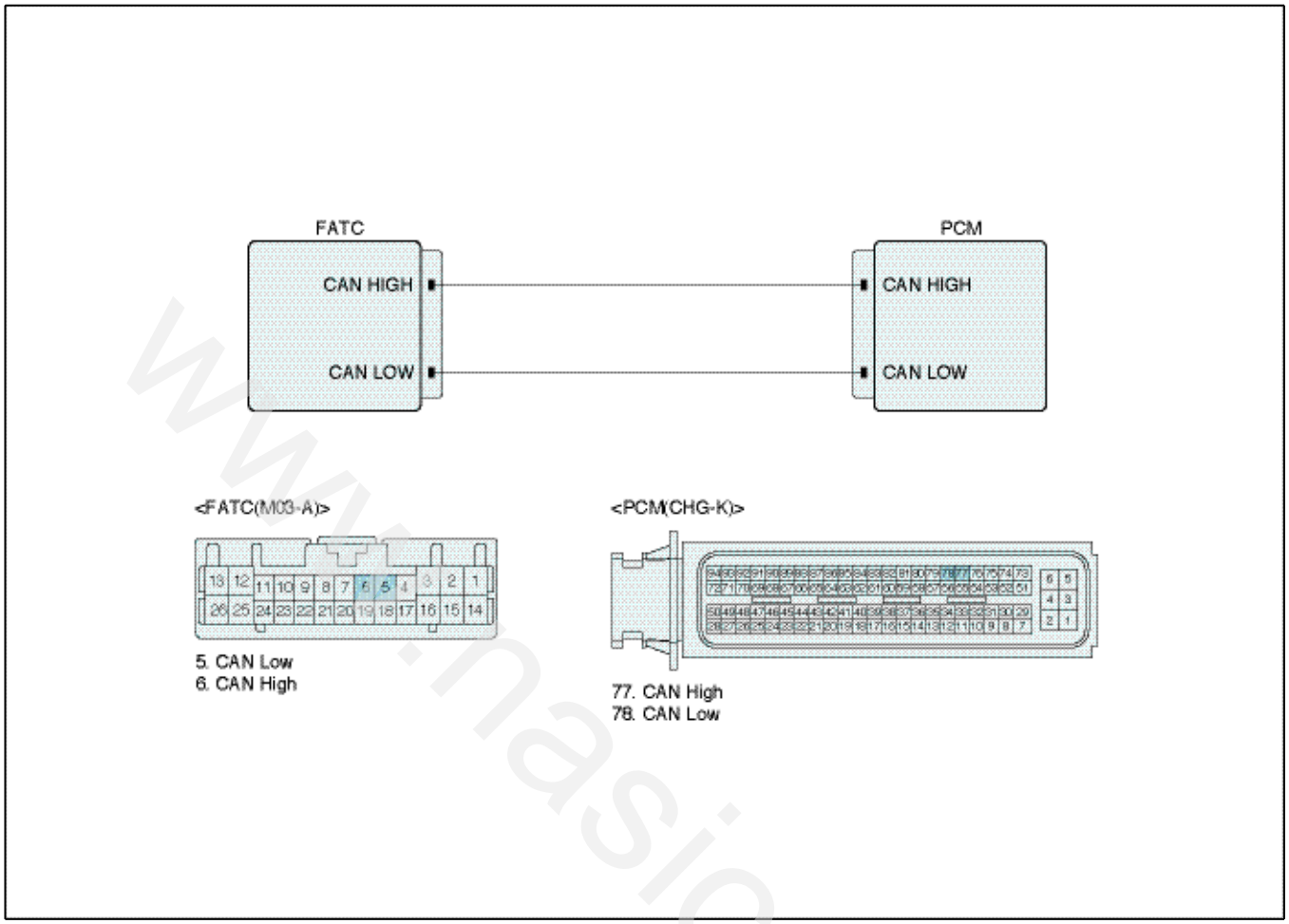
DTC Description

Air conditioner Control Module sets DTC B1687 if engine temperature sensor signal has not been received through the CAN signal.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Check CAN signal	1. Faulty engine coolant temperature sensor 2. CAN communication
Enable Conditions	• IG KEY ON	
Threshold value	• No signal via CAN for 1.5 seconds or receiving Error value	
Failsafe	• Regarded it as -2℃(28.4˚F)	

Diagnostic Circuit Diagram



VG12AC50B1672D

Monitor Scantool data

1. Connect scantool with diagnostic connector.
2. Check that there is DTC on the VDC side.
3. Check Engine first if there is any DTC on the engine side and confirm that it is erasable.
4. If no DTC, select "engine coolant temperature sensor" parameter on the engine side.
5. Check that the value of engine coolant temperature is changable according to engine temperature change.

VG12AC0B168721S

6. Is the engine coolant temperature sensor normal ?

YES ▶ Check that there is any CAN related DTC and then, repair or replace as necessary. Finally, check that is possible to clear this DTC.
▶ This is a intermittent problem caused by poor contact of Control Module.
▶ 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 ▶ Check engine coolant temperature sensor, circuit, or related component. Repair or replace as necessary 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.

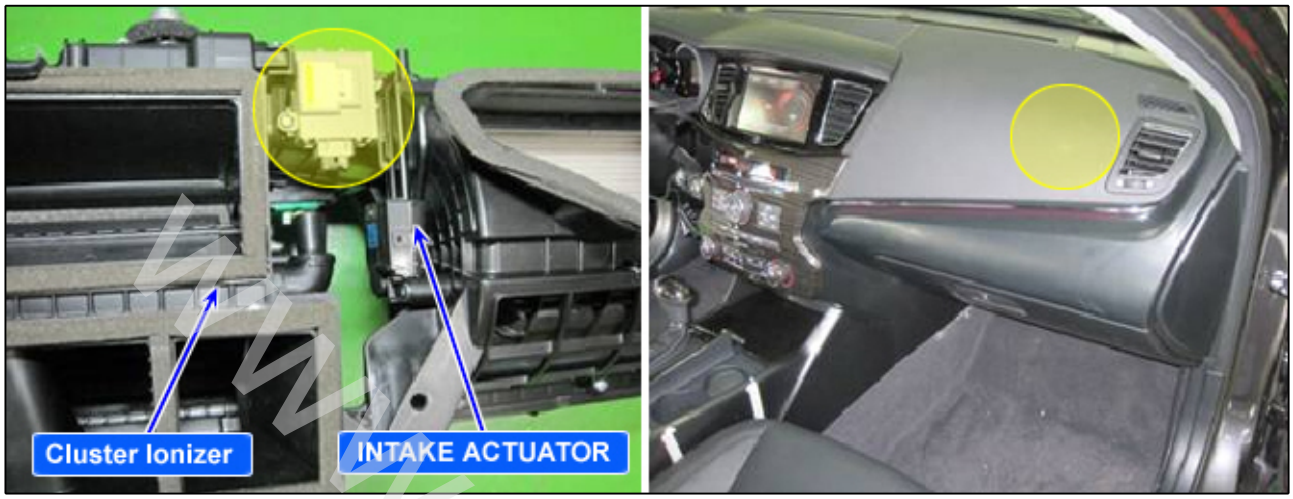
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1688 Cluster Ionizer Fault

Component Location



YG12AC0B168811

General Description

The Cluster Ionizer makes a disinfection and decomposition of a bad smell from the air-conditioner or inflow air. And it cleans inside air of a vehicle.

When running an air-conditioner or heater, it starts with "CLEAN MODE" on it and repeats from "CLEAN MODE" to "ION MODE" and from "ION MODE" to "CLEAN MODE" every 15 minutes.

In the CLEAN MODE, the cluster ionizer generates negative ions and positive ions and makes a disinfection and decomposition of a bad smell from the air-conditioner or an inflow air. The cluster ionizer has functions as follows; a deodorization effect, a disinfection effect, and an air-cleaning effect.

It has an operation indicator lamp on the upper side of its display area and shows whether it is operaing or not.

In the ION MODE, the cluster ionizer generates negative ions and cleans inside air of a vehicle.It has an opeation indicator lamp on the lower side of its display area and shows whether if is operating or not.

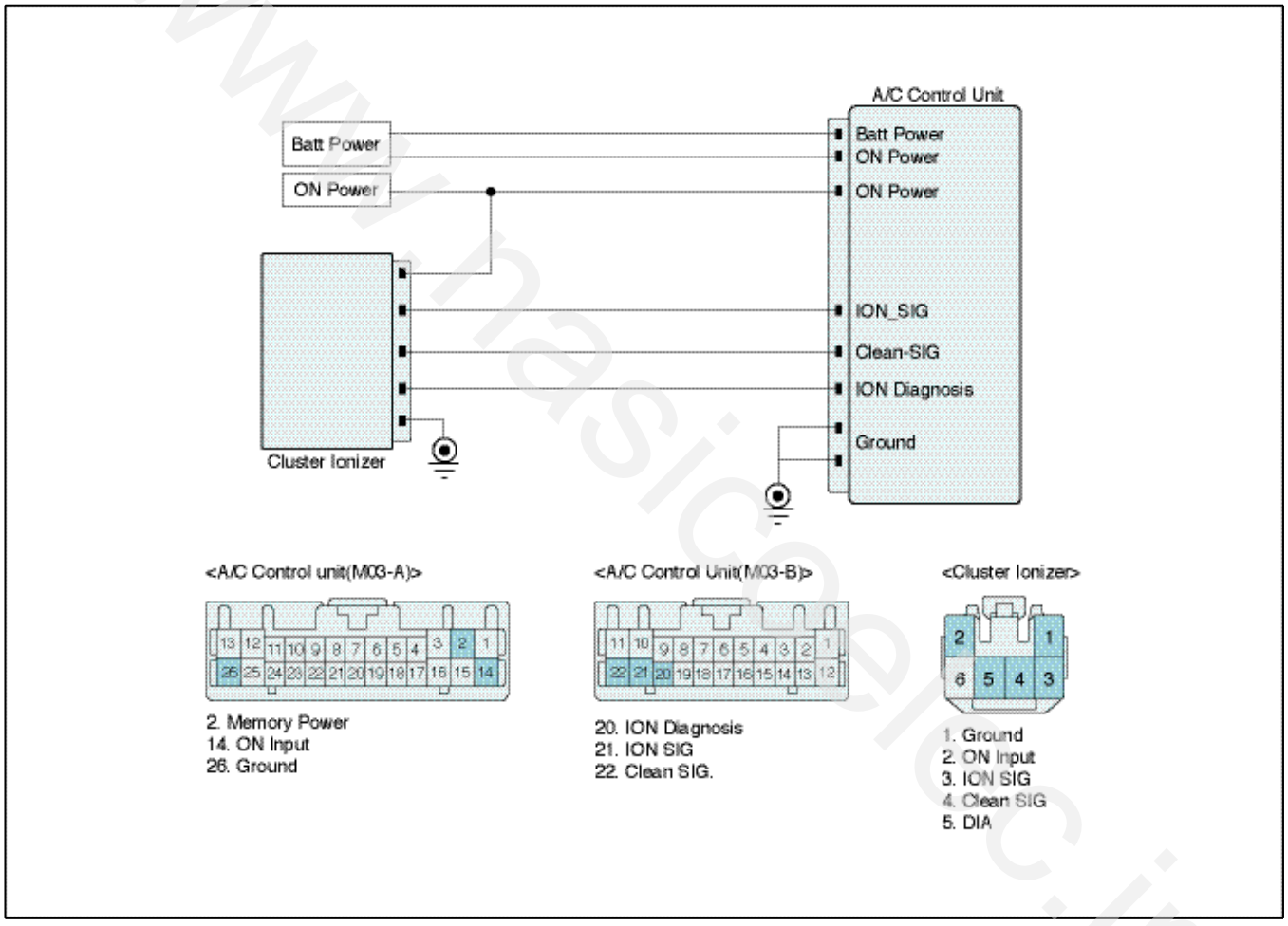
DTC Description

If the voltage of the cluster ionizer's diagnosis line is lower than 1.5V, the air-control module sets DTC B1688.

DTC Detectiong Condition

Item	Detecting Condition	Possible cause
DTC Strategy	• Check Cluster Ionizer	1. Poor connection in wireharness. 2. Open in power or signal or ground circuit. 3. Short to ground in power or signal or ground circuit. 4. Faulty Cluster Ionizer.
Enable Conditions	• IG KEY ON	
Threshold value	• After IGN KEY ON, when the voltage keeps lower than 1.5V for more than 2 seconds	
Failsafe	• The cluster ionizer does not run any more.	

Diagnostic Circuit Diagram



VG12AC50B1688D

Terminal and 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.

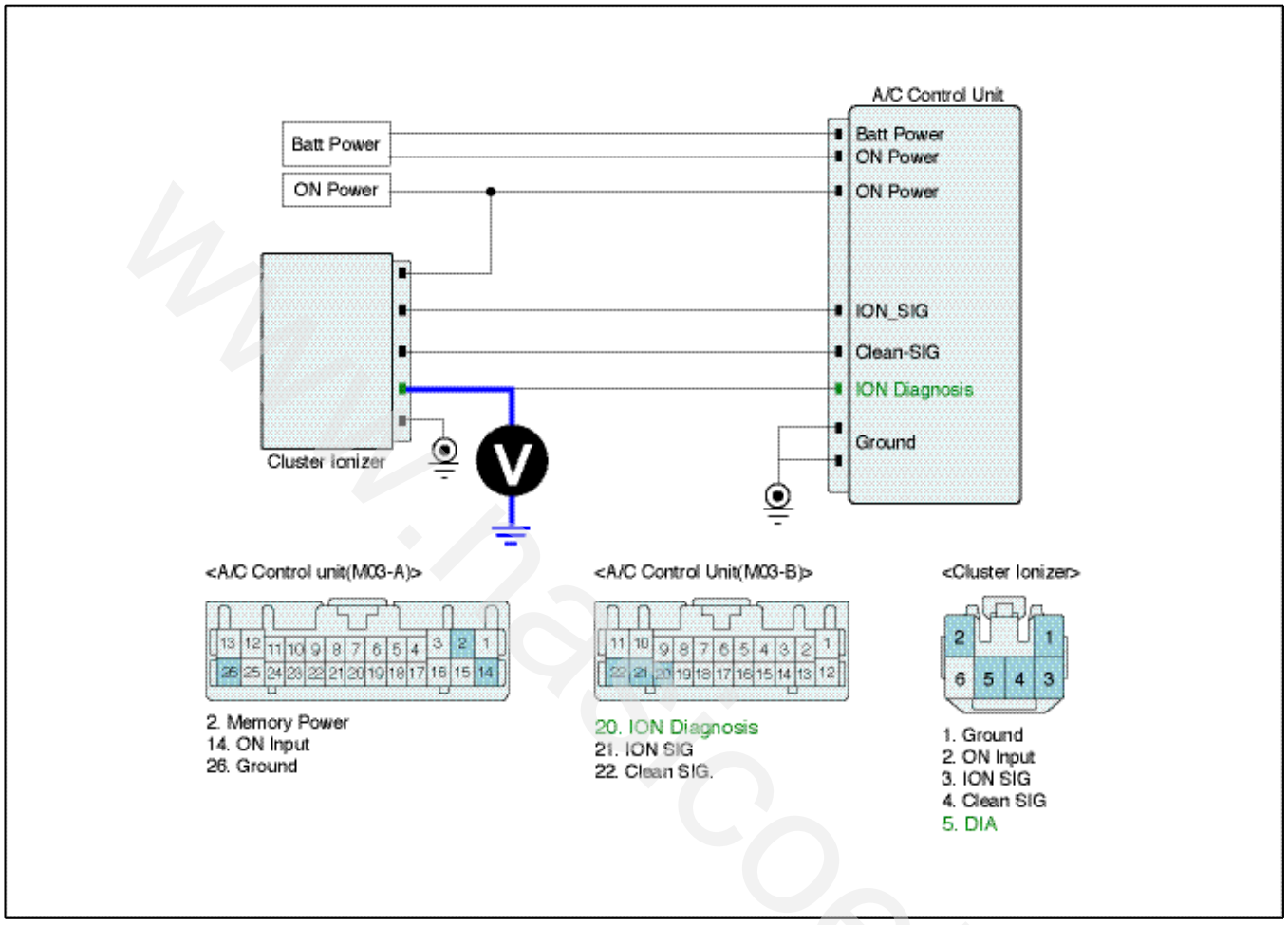
Diagnosis Circuit Inspection

■ Check power in harness

1. Ignition "ON"
2. Measure voltage between Diagnosis terminal of Cluster Ionizer harness connector and chassis ground.

Specification

2)At below 1.5V: Cluster Ionizer is abnormal.



VG12AC50B168831

3. Is the measured voltage below 1.5V?

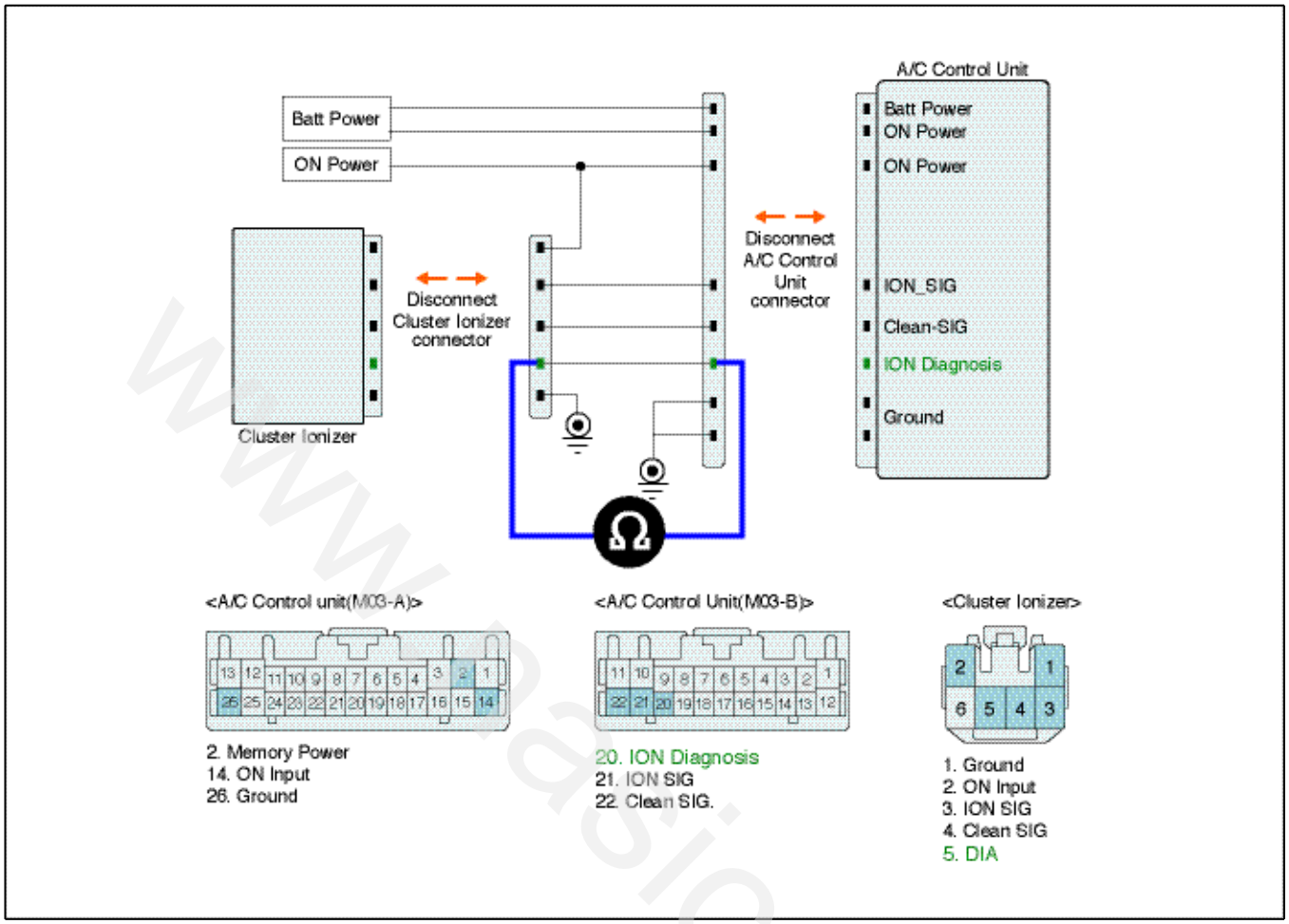
YES ▶ Go to Next Inspection procedure.

NO ▶ 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.
▶ Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.
▶ Go to Next Inspection procedure.

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B168832

4. Is the measured resistance within specification?

YES ▶ Go to Next Inspection procedure.

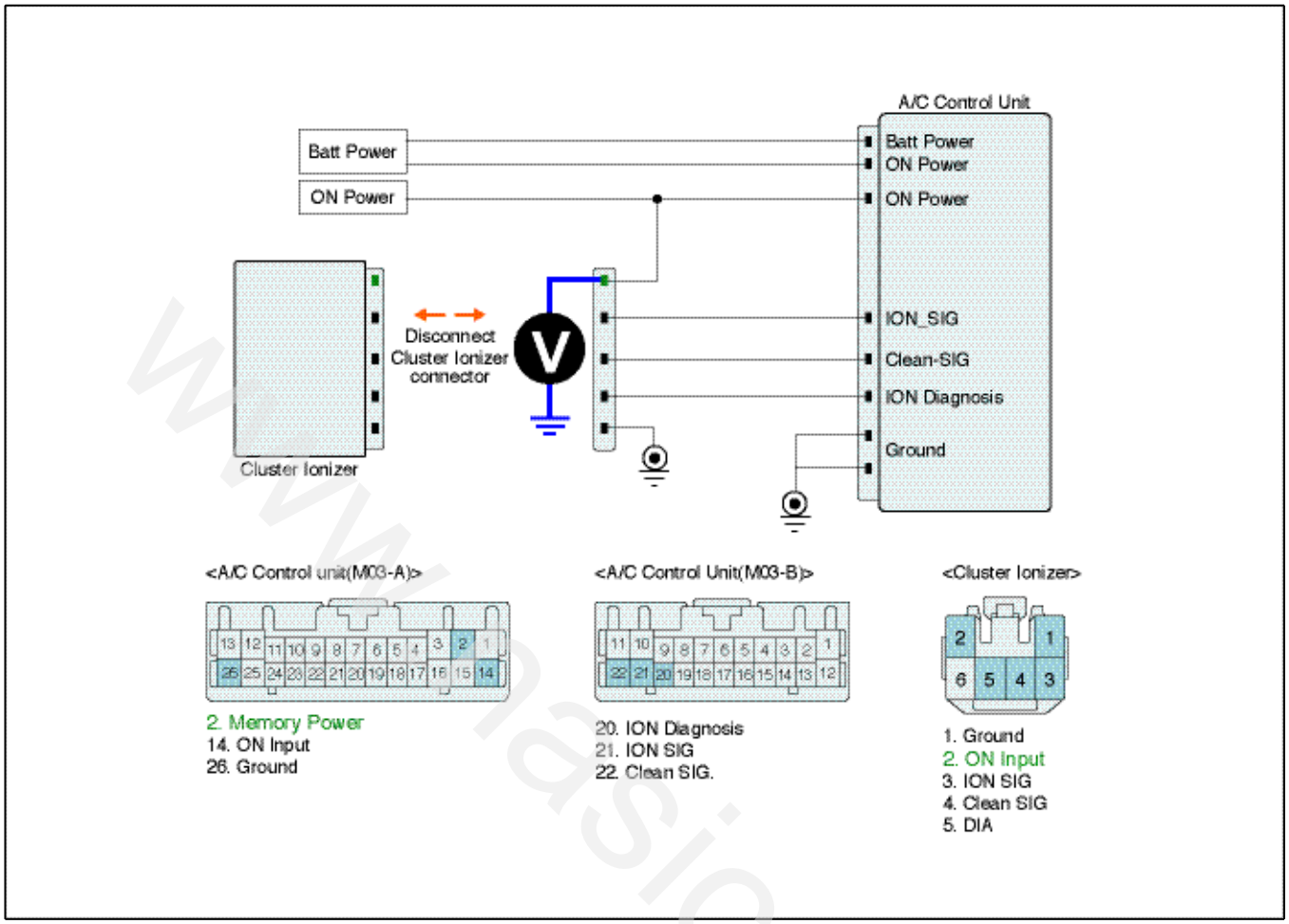
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Power Circuit Inspection

■ Check for open in harness

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

Specification : BATT.



VG12AC50B168833

5. Is the measured voltage within specification?

YES ▶ Go to Next Inspection procedure.

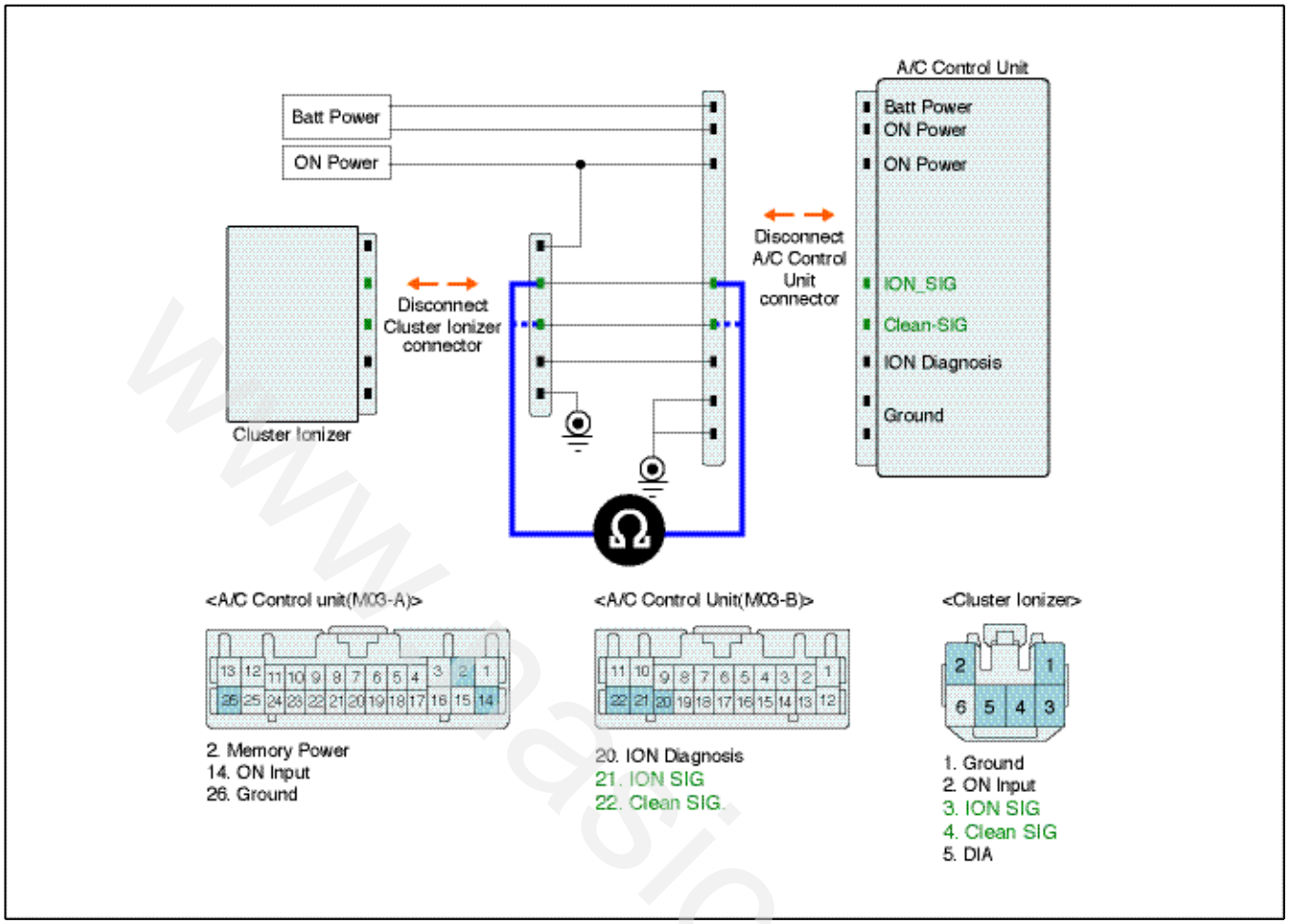
NO ▶ Check for open or short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Signal Circuit Inspection

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B168834

4. Is the measured resistance within specification?

YES ▶ 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.
▶ Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration,or damage.

NO ▶ Check for open in harness.
▶ Substitute with a known-good Cluster Ionizer and check for proper operation. If the problem is corrected, replace Cluster Ionizer 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.

B1691 D/CLOCK Reference high

Componet Location

YG12AC0B169111

General Description

The Clock is a equipment to show its current time.The window to display a time shows its current time and a outside temperature of a vehicle.To display its outer temperature, the Clock needs a supply power.

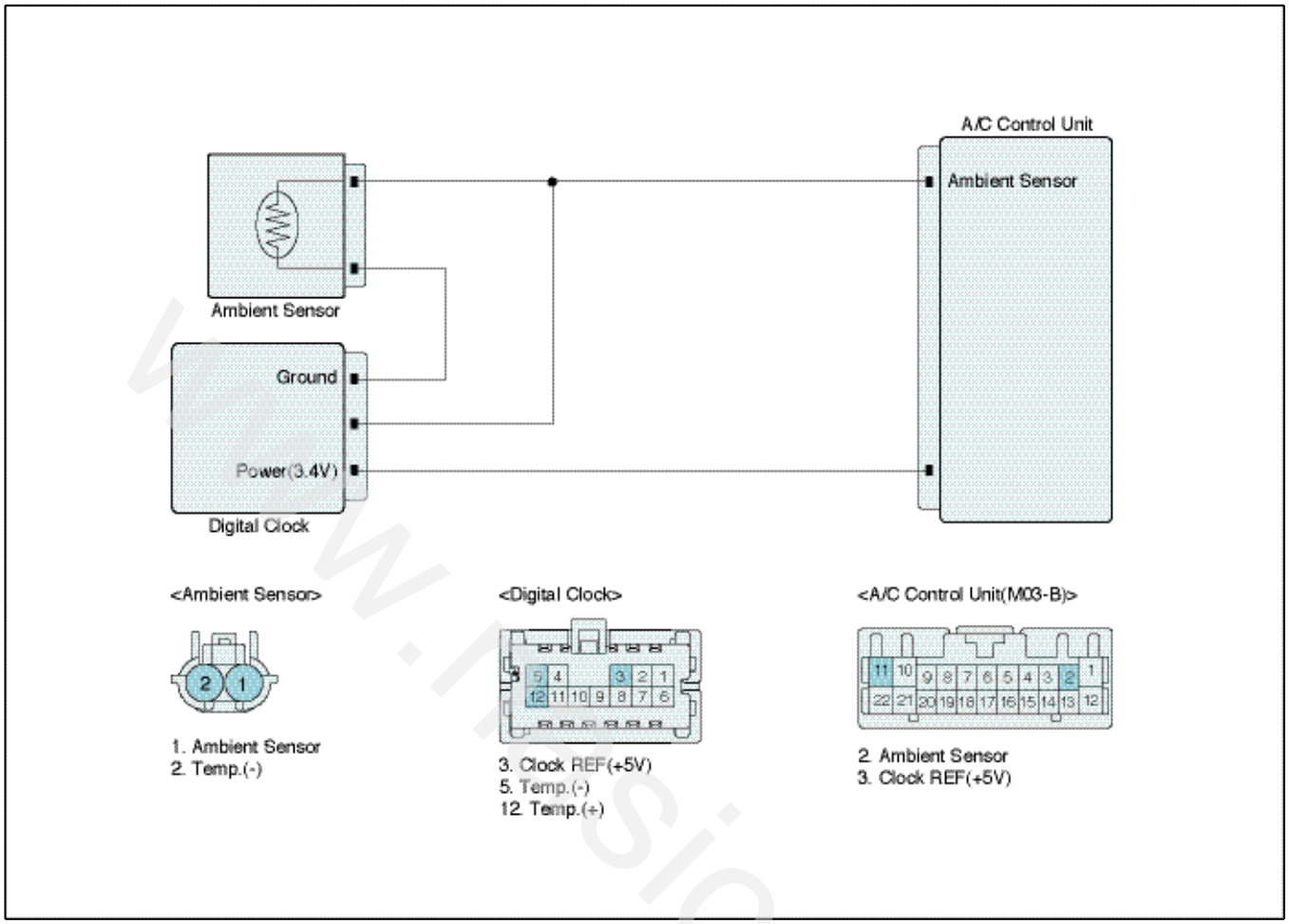
DTC Description

The Air-conditioner Control Unit sets DTC B1691 if its clock's supply power is more than 3.75 V for more than 0.3 second.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Open in signal circuit 2. Short to battery in signal circuit 3. Faulty Digital Clock 4. Faulty Air conditioner control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Digital Clock has been detected over 3.75V for 0.3 seconds	
Failsafe	• The Ambient Sensor is not affected by the Clock's Referece power	

Diagnostic Circuit Diagram



VG12AC50B1691D

※ Power of Digital Clock

	Connected	Disconnected
Voltage	approximately 3.4V	approximately 5V

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

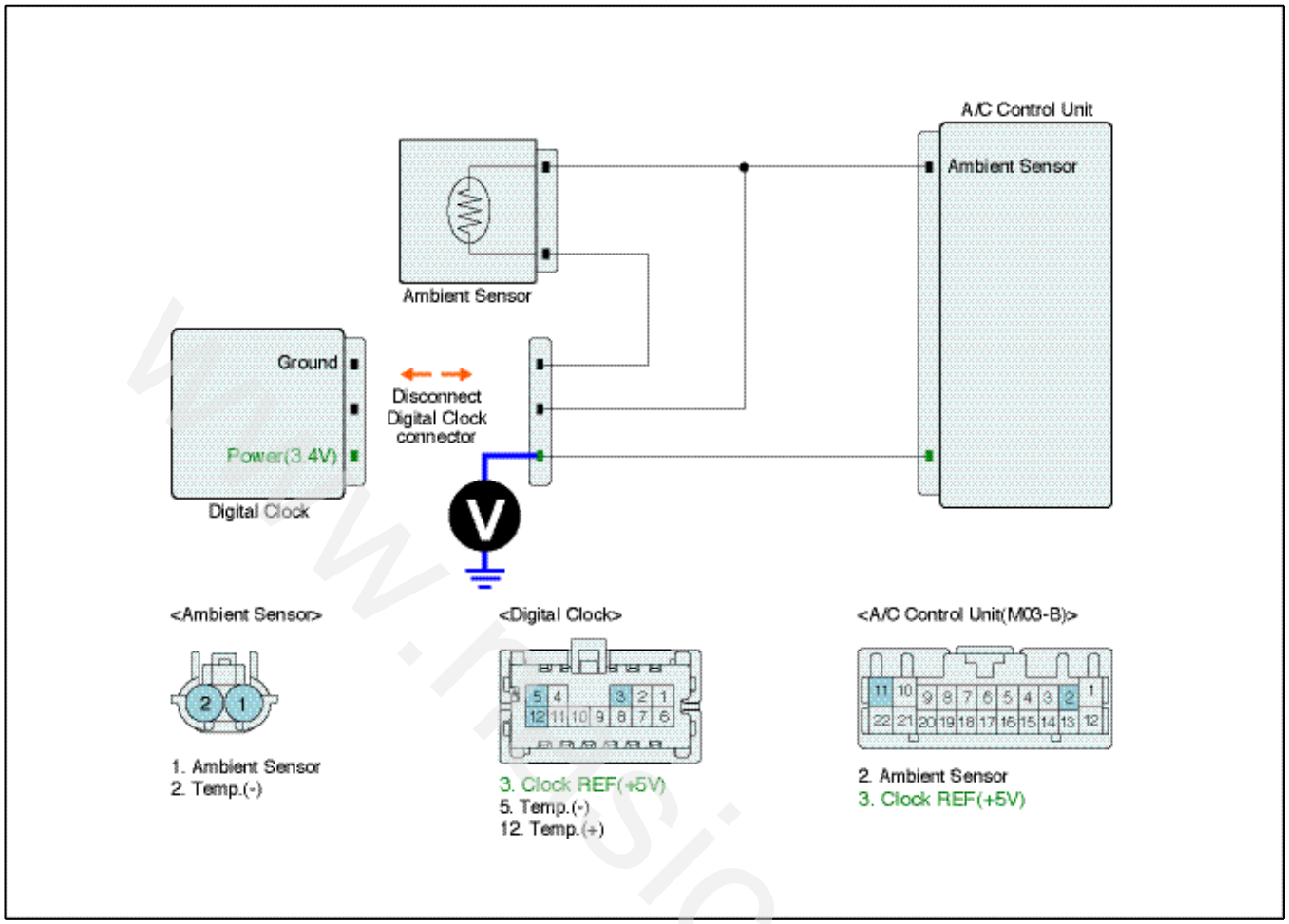
NO ▶ Go to "W/Harness Inspection" procedure.

Power Circuit Inspection

■ Check short to battery in harness

1. Ignition "OFF"
2. Disconnect Digital Clock and harness connector.
3. Ignition "ON"
4. Measure voltage between Power terminal of Digital Clock harness connector and chassis ground.

Specification : approximately 5V



VG12AC50B169131

5. Is the measured voltage within specification?

YES ▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.
▶ Substitute with a known-good Digital Clock and check for proper operation. If the problem is corrected, replace Digital Clock and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Check for short to battery in harness.
▶ Repair as necessary 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.

B1692 D/CLOCK Reference low

Componet Location

YG12AC0B169111

General Description

The Clock is a equipment to show its current time. The window to display a time shows its current time and a outside temperature of a vehicle. To display its outer temperature, the Clock needs a supply power.

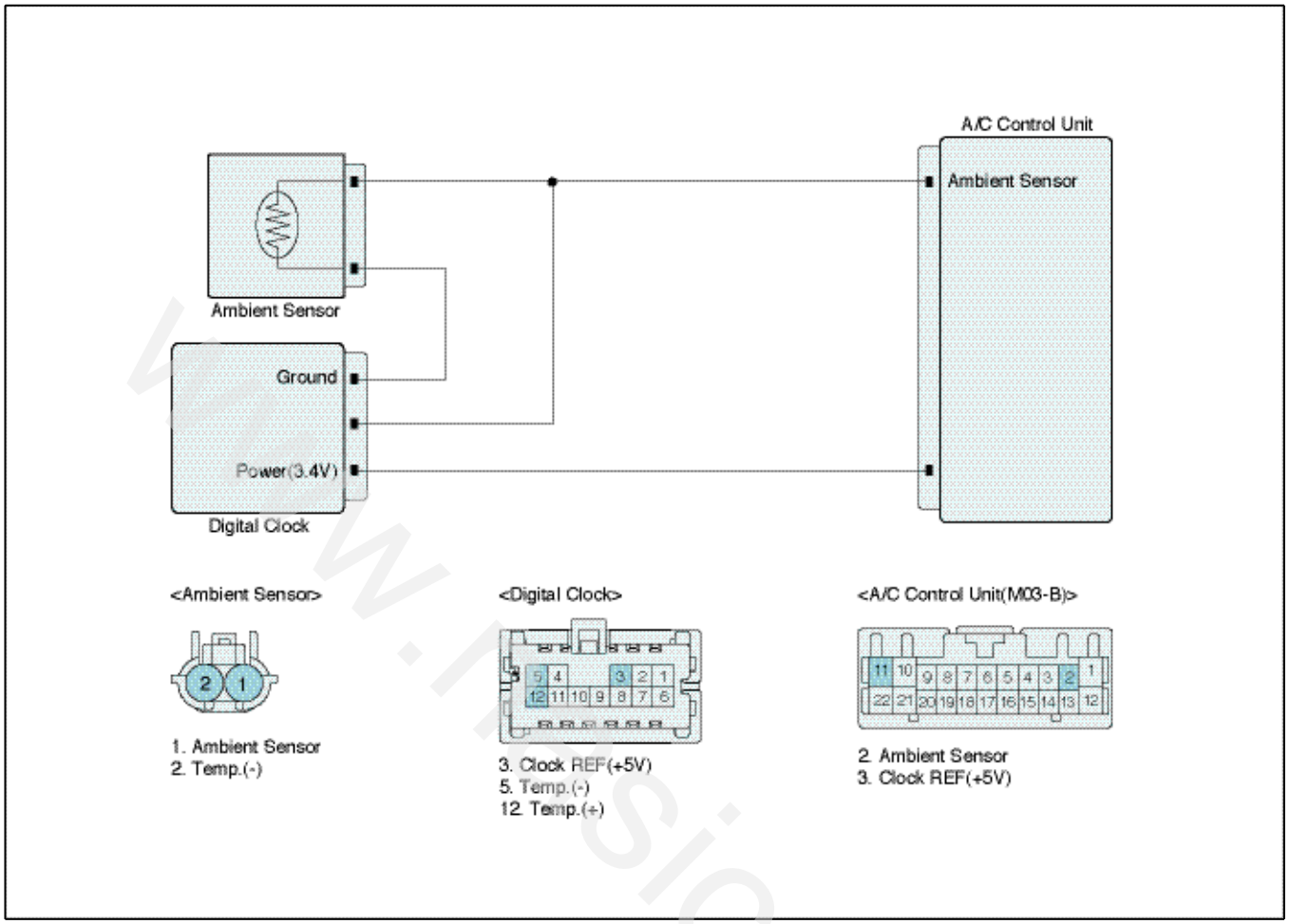
DTC Description

The Air-conditioner Control Unit sets DTC B1692 if its clock's supply power is lower than 3.05 V for more than 0.3 second.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short circuit in harness 2. Faulty Digital Clock 3. Faulty A/C Control Unit
Enable Conditions	• IG KEY ON	
Threshold value	• Digital Clock has been detected below 01.V for 0.3 seconds.	
Failsafe	• The Ambient Sensor is not affected by the Clock's Referece power(5V)	

Diagnostic Circuit Diagram



VG12AC50B1691D

※ Power of Digital Clock

	Connected	Disconnected
Voltage	approximately 3.4V	approximately 5V

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

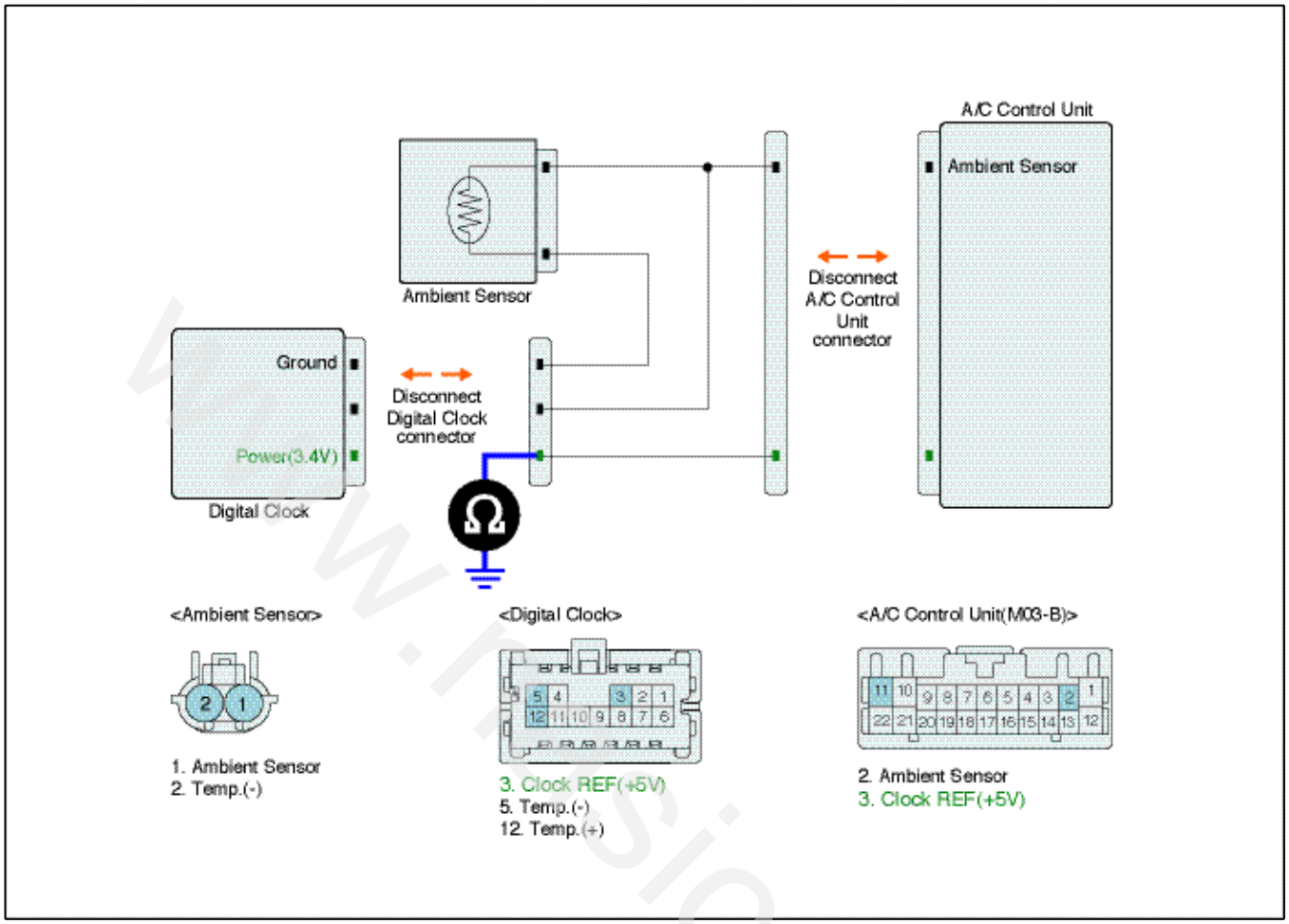
NO ▶ Go to "W/Harness Inspection" procedure.

Power Circuit Inspection

■ Check short to ground in harness

1. Ignition "OFF"
2. Disconnect Digital Clock and Connect A/C control unit main harness connector.
3. Measure resistance between Power terminal of Digital Clock harness connector and chassis ground.

Specification : Infinity



VG12AC50B169231

4. Is the measured resistance within specification?

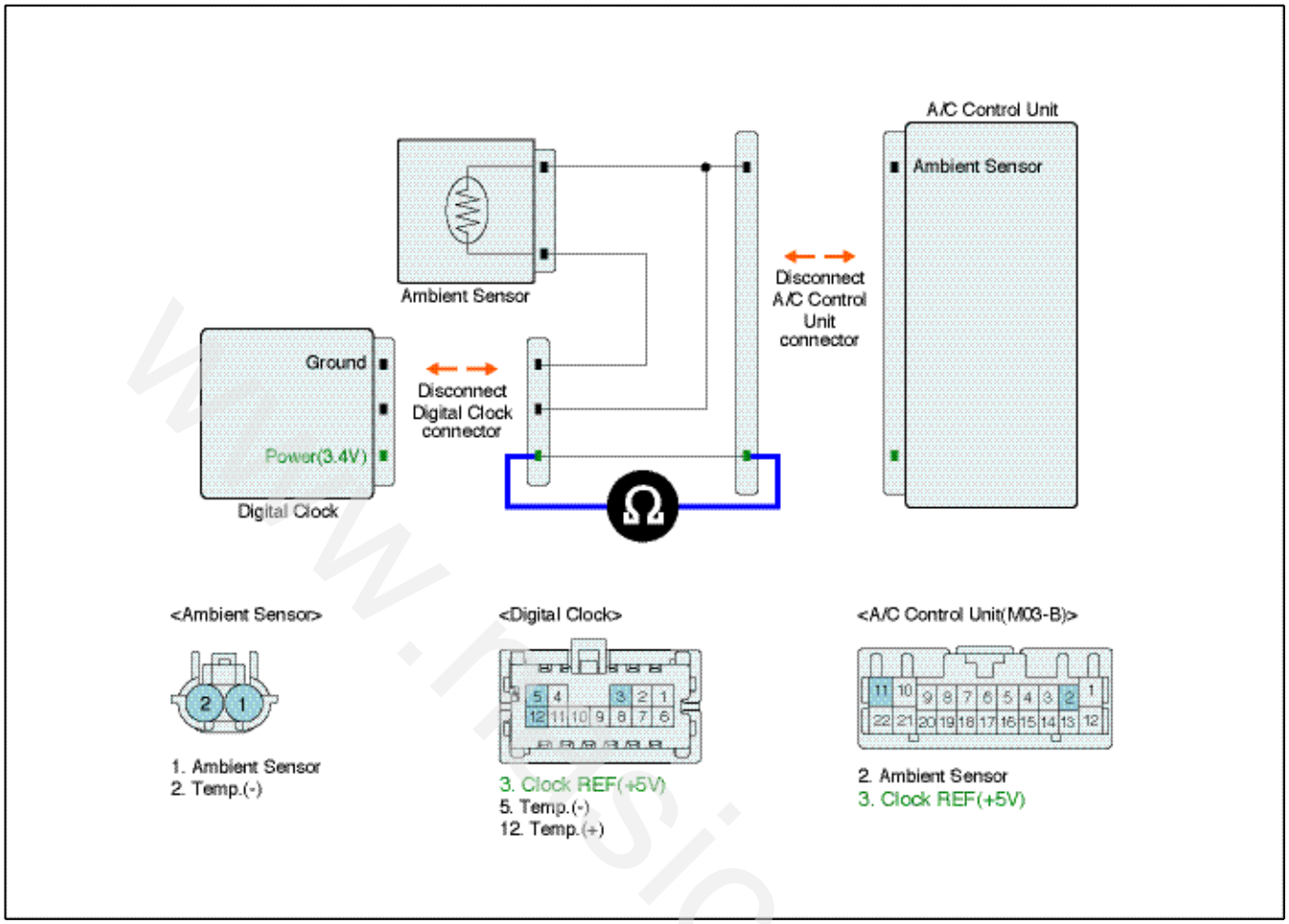
YES ▶ Go to Next procedure.

NO ▶ Check for short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B169232

4. Is the measured resistance within specification?

YES ▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.
▶ Substitute with a known-good Digital Clock and check for proper operation. If the problem is corrected, replace Digital Clock and then go to "Verification of Vehicle Repair" procedure.

NO ▶ Check for open in harness.
▶ Repair as necessary 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.

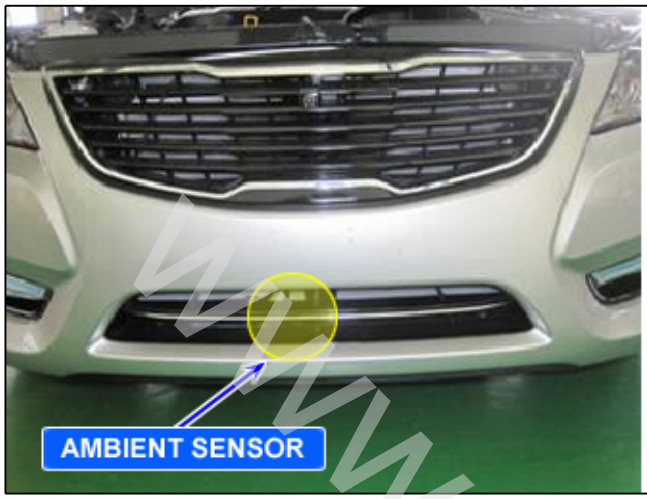
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1693 Ambient temperature sensor fault(D/CLOCK Only)

Componet Location



YG12AC0B169311

General Description

The Ambient Temperature is a NTCT type thermistor and is use for temperature regulation including blower motor level and mix mode control.

DTC Description

The Air conditioner Control Module sets DTC B1693 if Ambient sensor has been detected over 4.7V for 0.3 seconds. The Air-conditioner Control Unit sets DTC B1693 if an Ambient temperature sensor is not installed.

DTC Detecting Condition

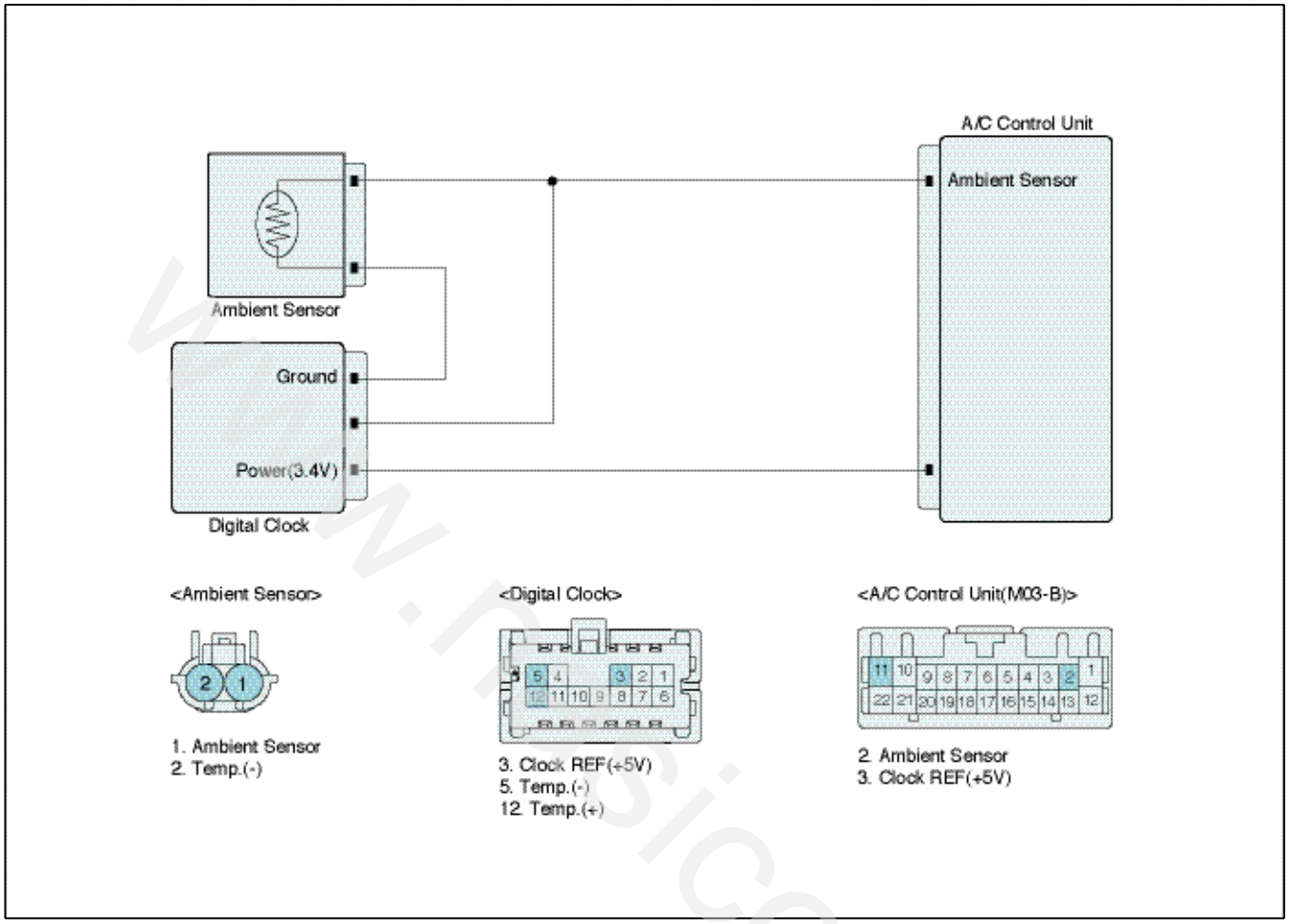
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor Connection in harness 2. Open in signal circuit 3. Shrot to battery in signal circuit 4. Ambient temperature sensor is not installed 5. Faulty air condtioner control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Ambient Temperature sensor has been detected over 4.7V for 0.3 seconds • Ambient temperature sensor is not installed	
Failsafe	• Displayed '--' and A/C control Module regards and controls it as 20℃(68˚F)	

Specification

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

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-10/14	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30	-	-

Diagnostic Circuit Diagram



VG12AC50B1691D

※ Power of Digital Clock

	Connected	Disconnected
Voltage	approximately 3.4V	approximately 5V

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 "Ambient Air Temperature sensor" parameter.

Fig.1

VG12AC0B169321S

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

4. Is the ambient sensor abnormal ?

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

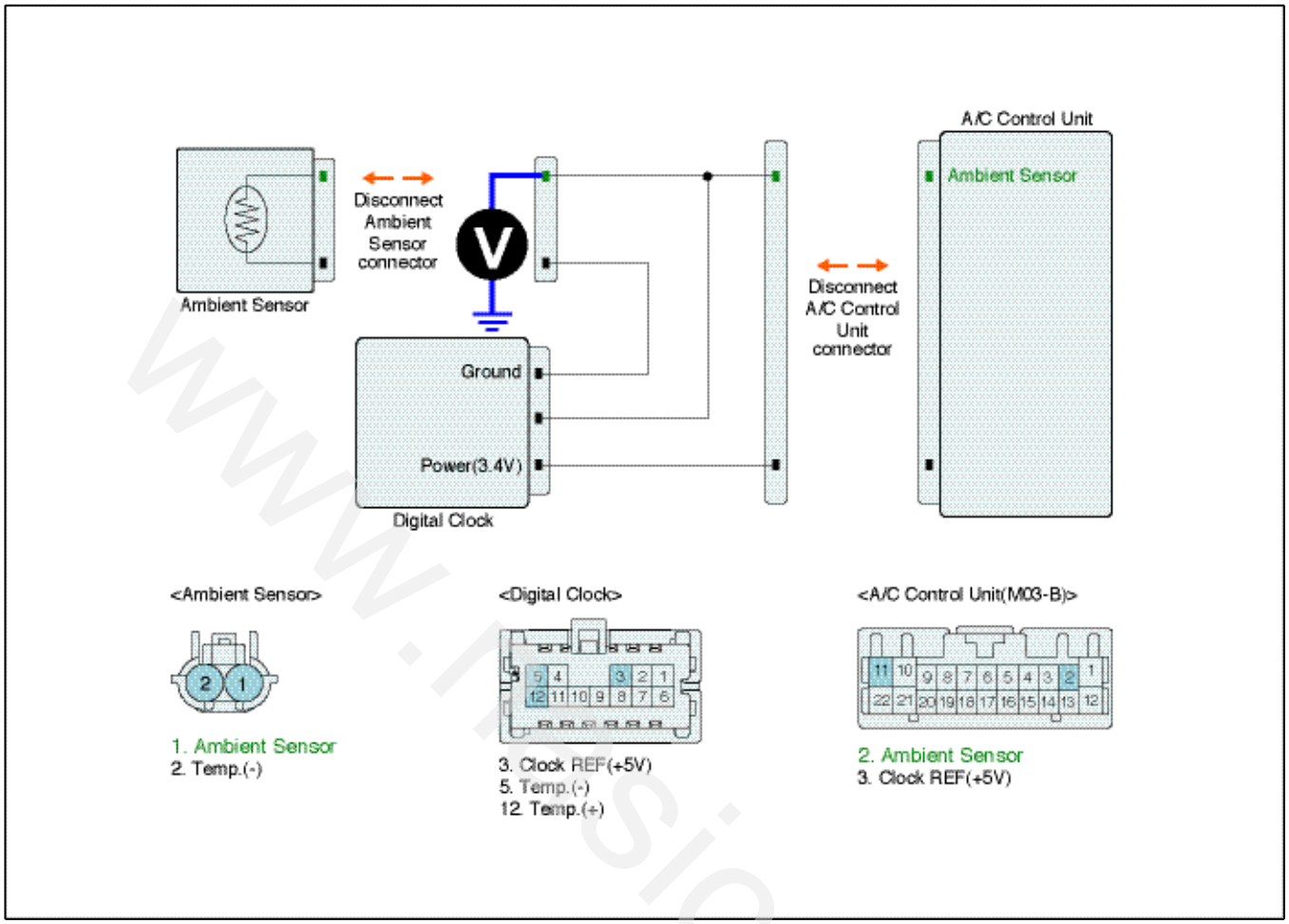
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B169331

5. Is the measured voltage within specification?

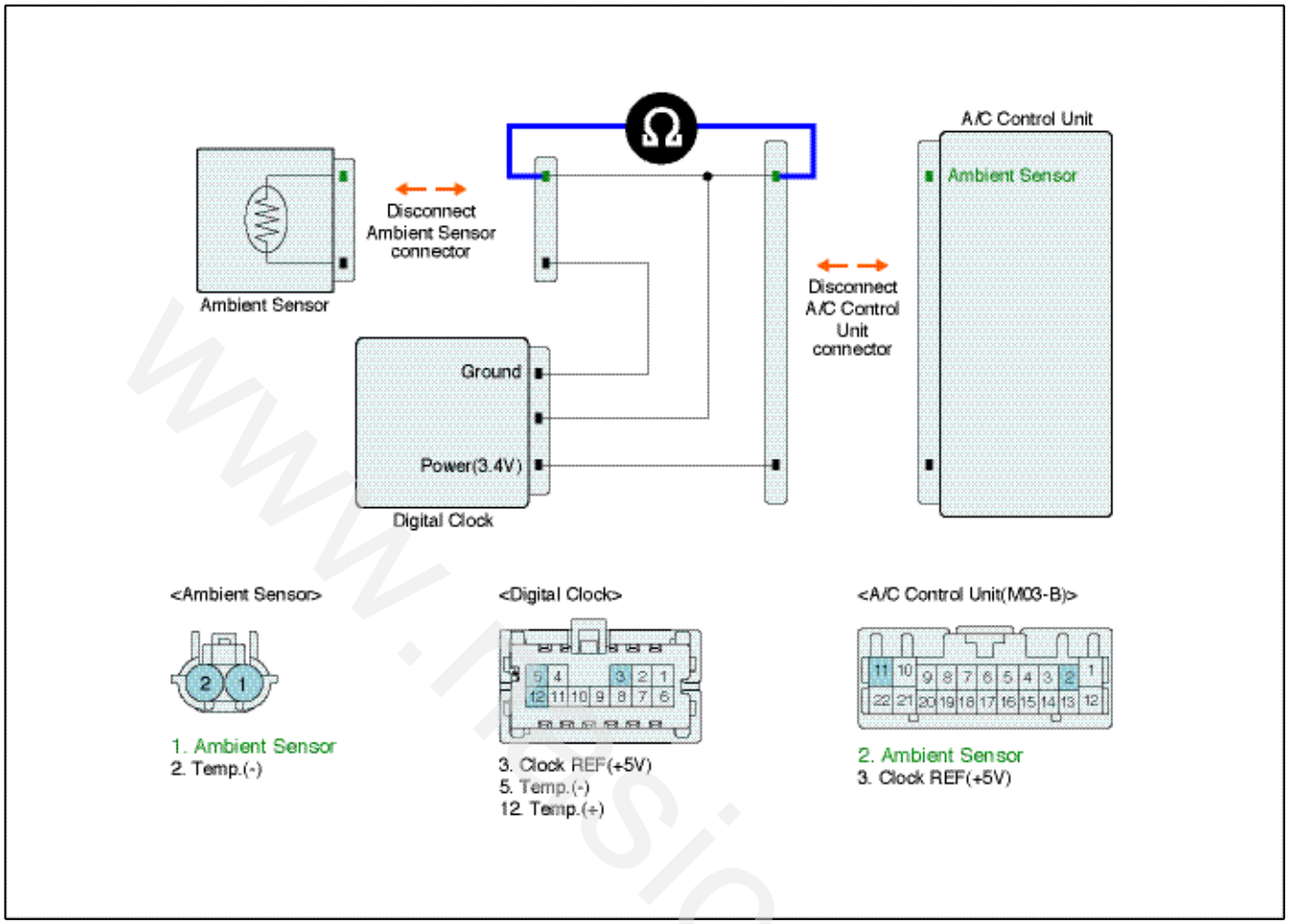
YES ▶ Go to "Check for open in harness" as follows .

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



VG12AC50B169332

4. Is the measured resistance within specification?

YES ▶ Go to "Ground circuit Inspection" procedure .

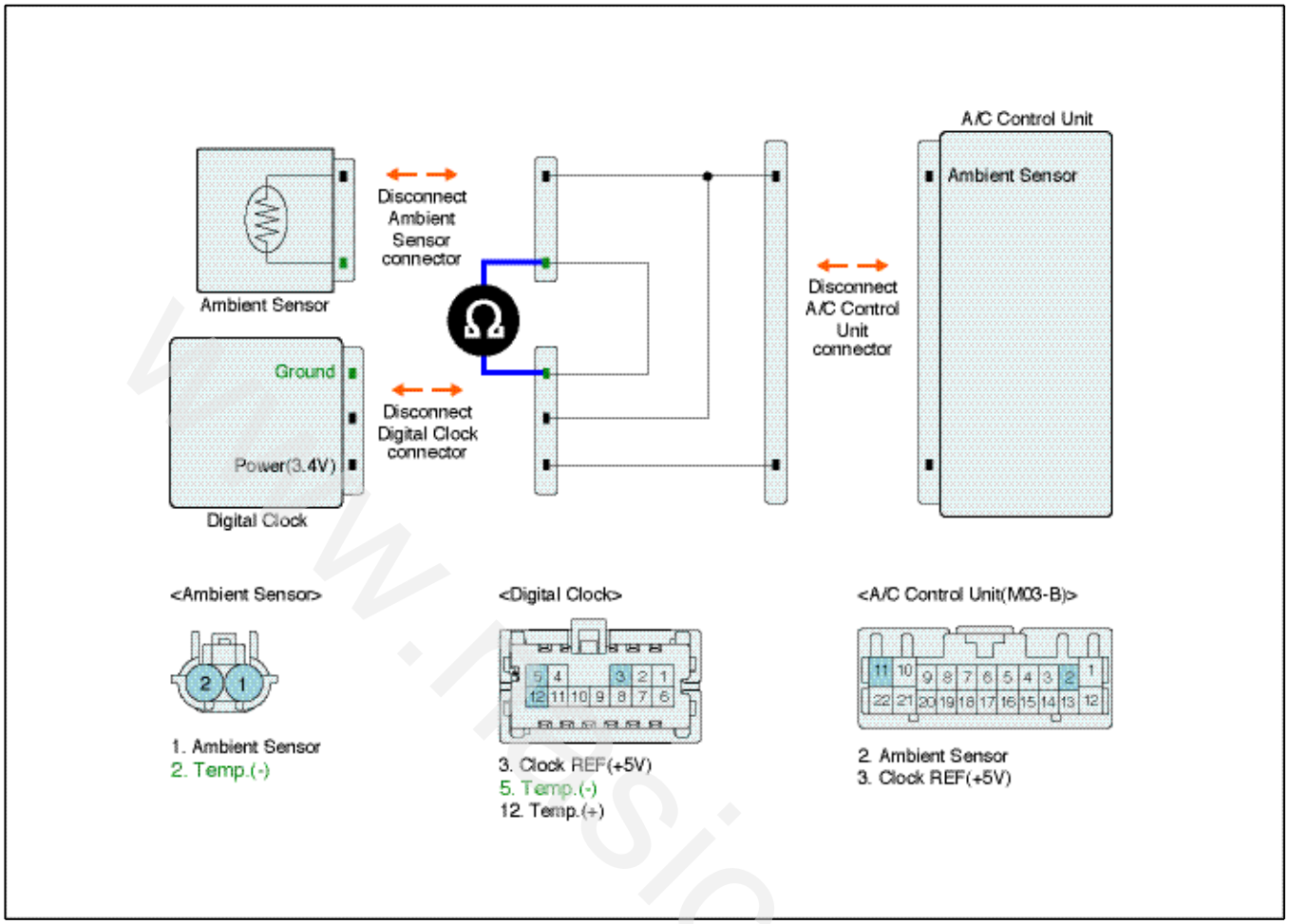
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Ground Circuit Inspection

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B169333

4. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure .

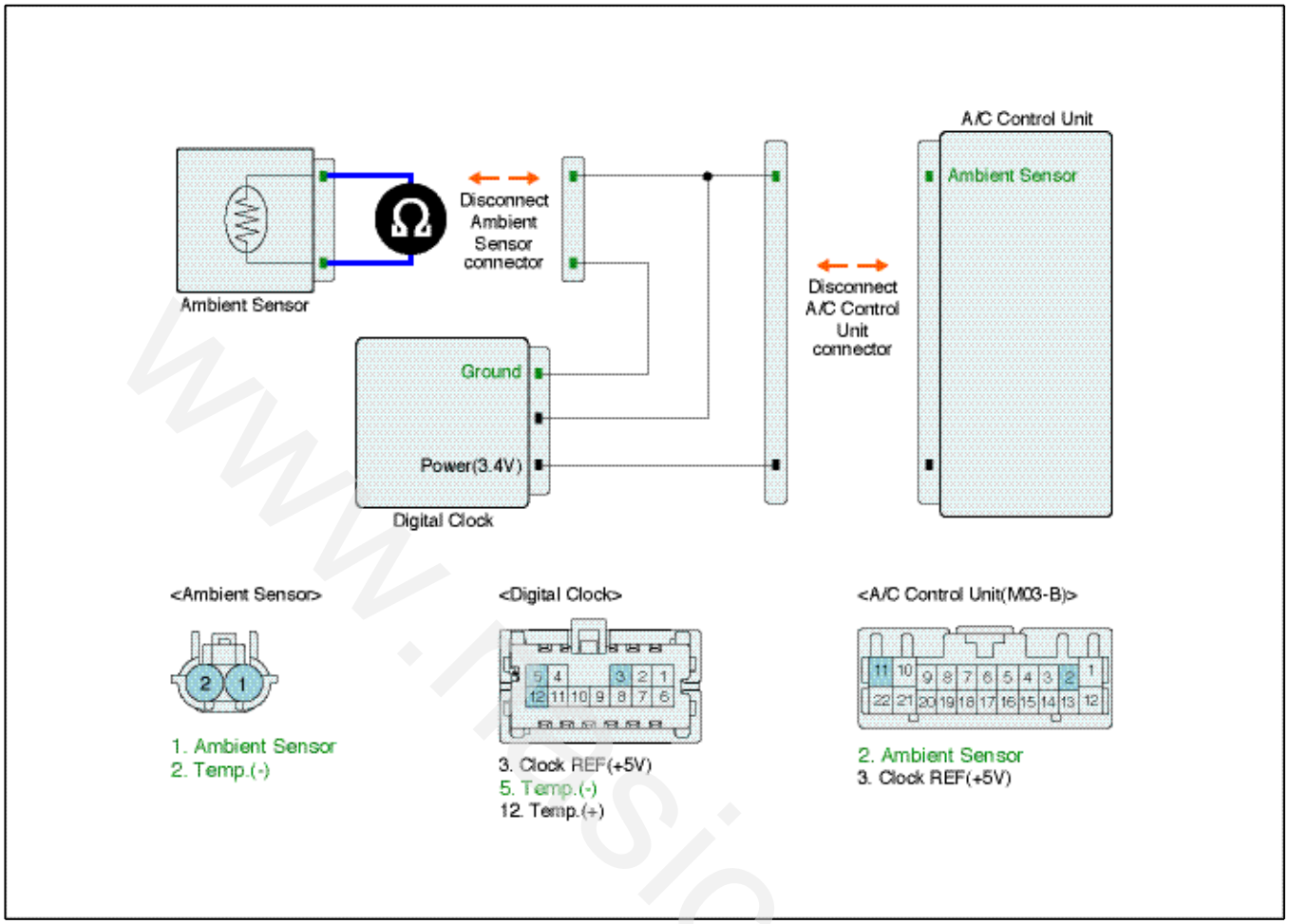
NO ▶ Check for open in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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



VG12AC50B169341

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
-100/14	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30	-	-

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

※ The actual value may differ from it according to various engine condition.

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

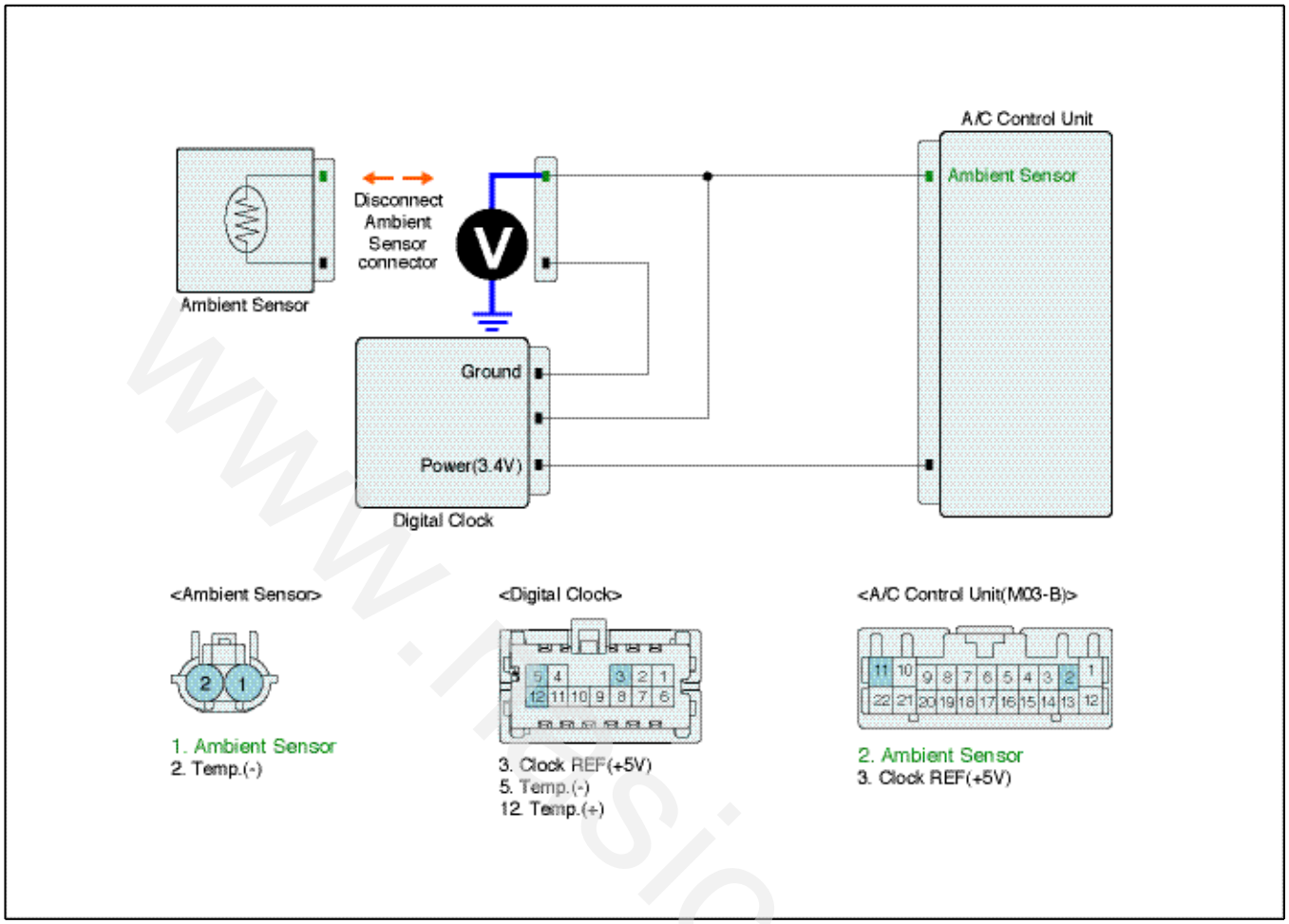
YES ▶ Go to "Check A/C-ECU" procedure.

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



VG12AC50B169342

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.

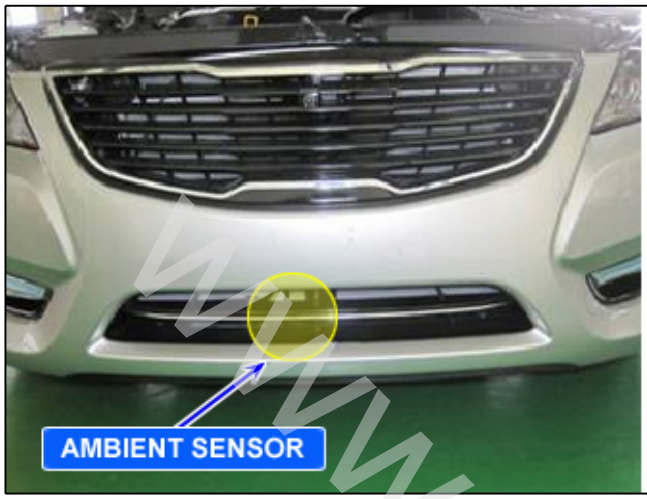
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1694 Ambient temperature sensor open/short(D/CLOCK Only)

Componet Location



YG12AC0B169311

General Description

The Ambient Temperature is a NTCT type thermistor and is use for temperature regulation including blower motor level and mix mode control .

DTC Description

The Air conditioner Control Module sets DTC B1694 if Ambient sensor has been detected below 0.1V for 0.3 seconds.

DTC Detecting Condition

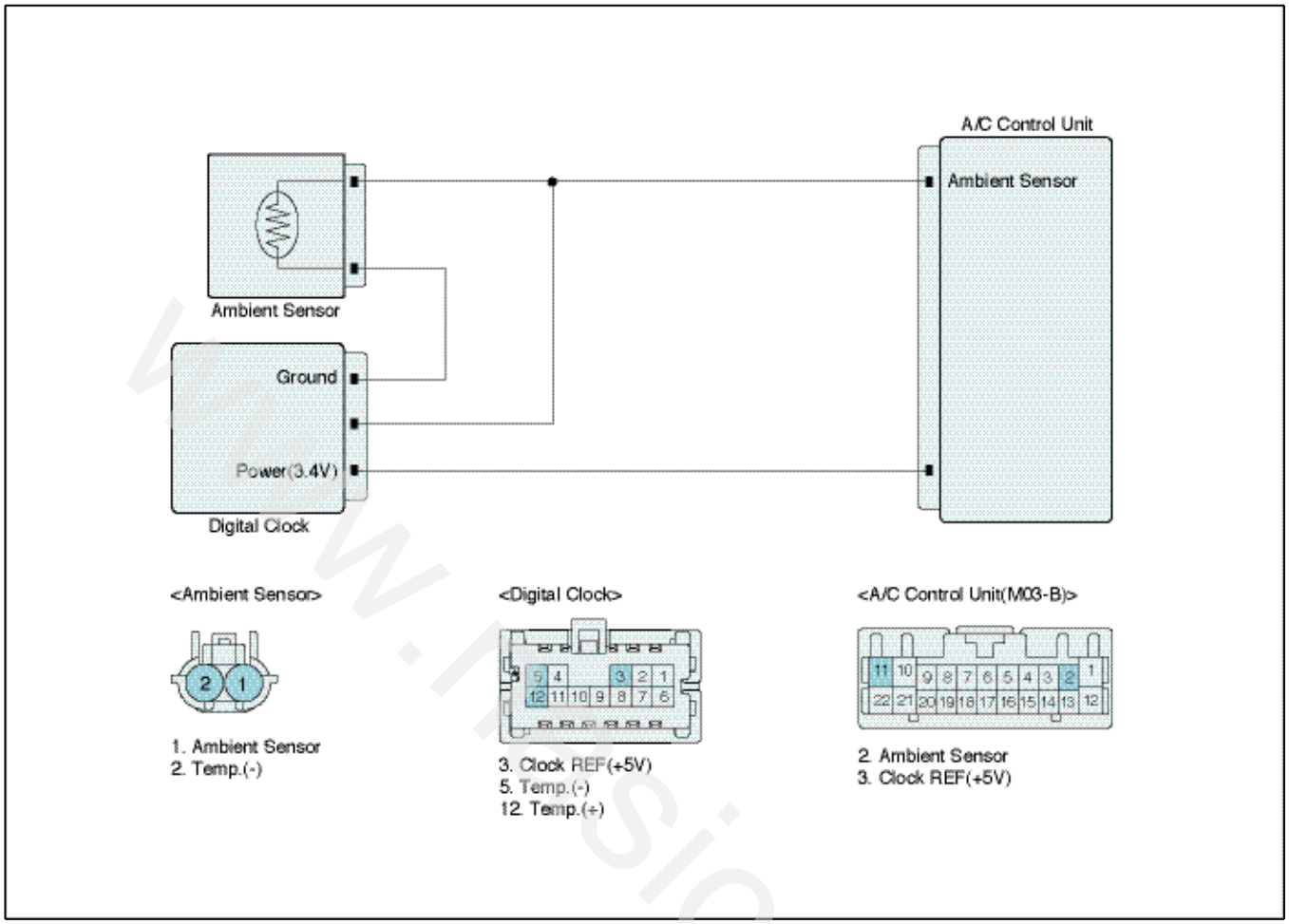
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Short in signal circuit 2. Faulty Ambient Sensor 3. Faulty A/C control Module
Enable Conditions	• IG KEY ON	
Threshold value	• Ambient sensor has been dtected 0.1V for 0.3 seconds .	
Failsafe	• Displayed '--' and A/C control Module regards and co-ntrols it as 20℃(68˚F)	

Specification

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

Temperature(℃/˚F)	Resistance(kΩ)	Temperature(℃/˚F)	Resistance(kΩ)
-10/14	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30	-	-

Diagnostic Circuit Diagram



VG12AC50B1691D

※ Power of Digital Clock

	Connected	Disconnected
Voltage	approximately 3.4V	approximately 5V

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 "Ambient Air Temperature sensor" parameter.

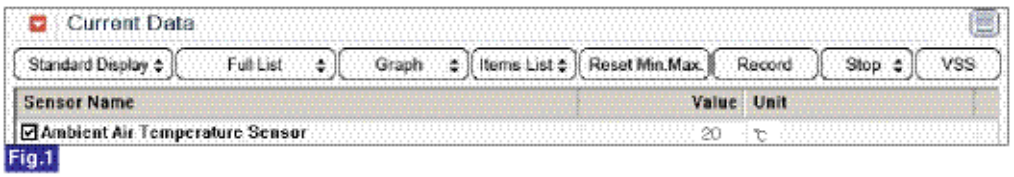


Fig.1

VG12AC0B169321S

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

4. Is the ambient sensor abnormal ?

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

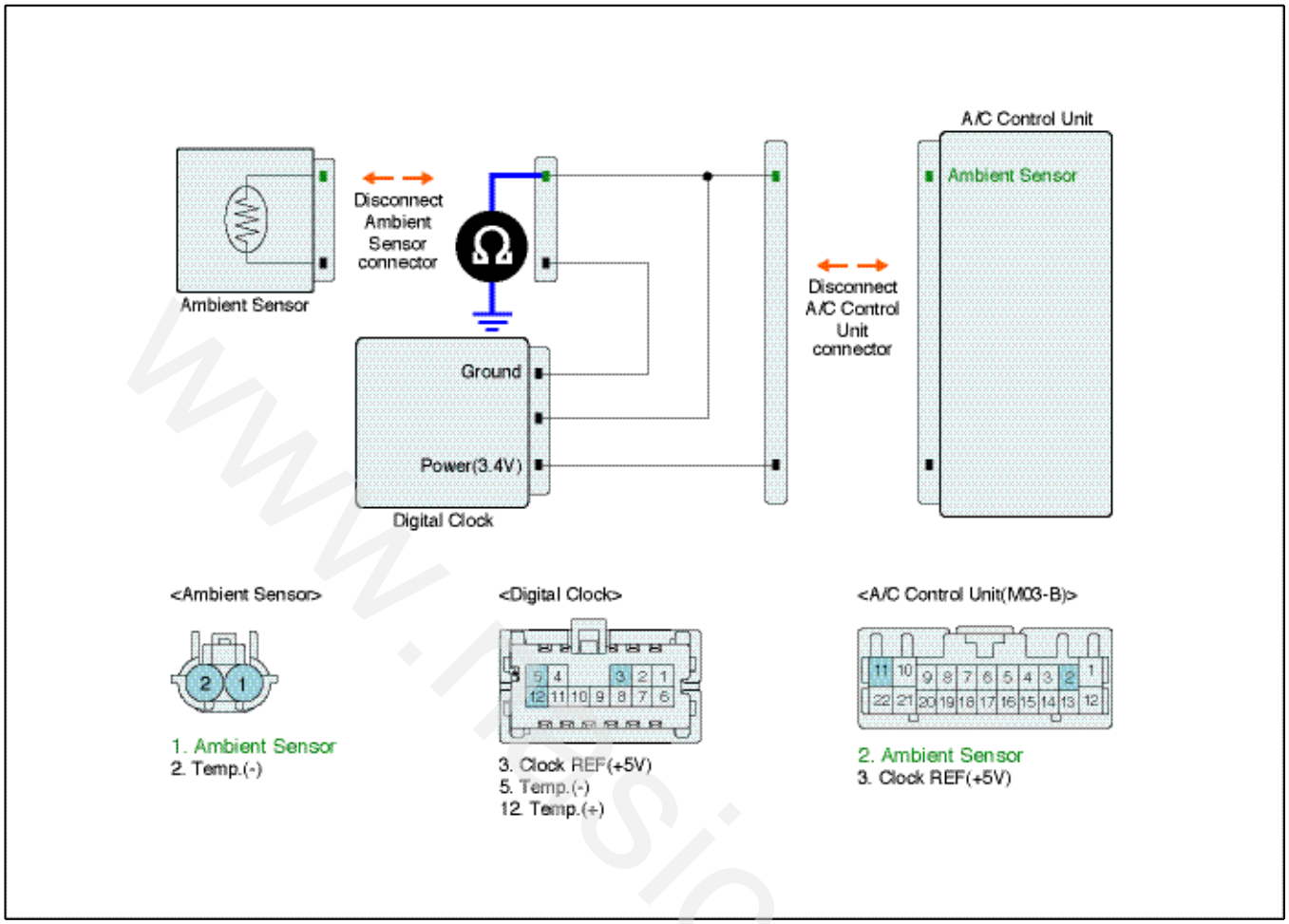
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B169431

5. Is the measured voltage within specification?

YES ▶ Go to " Component inspection" procedure .

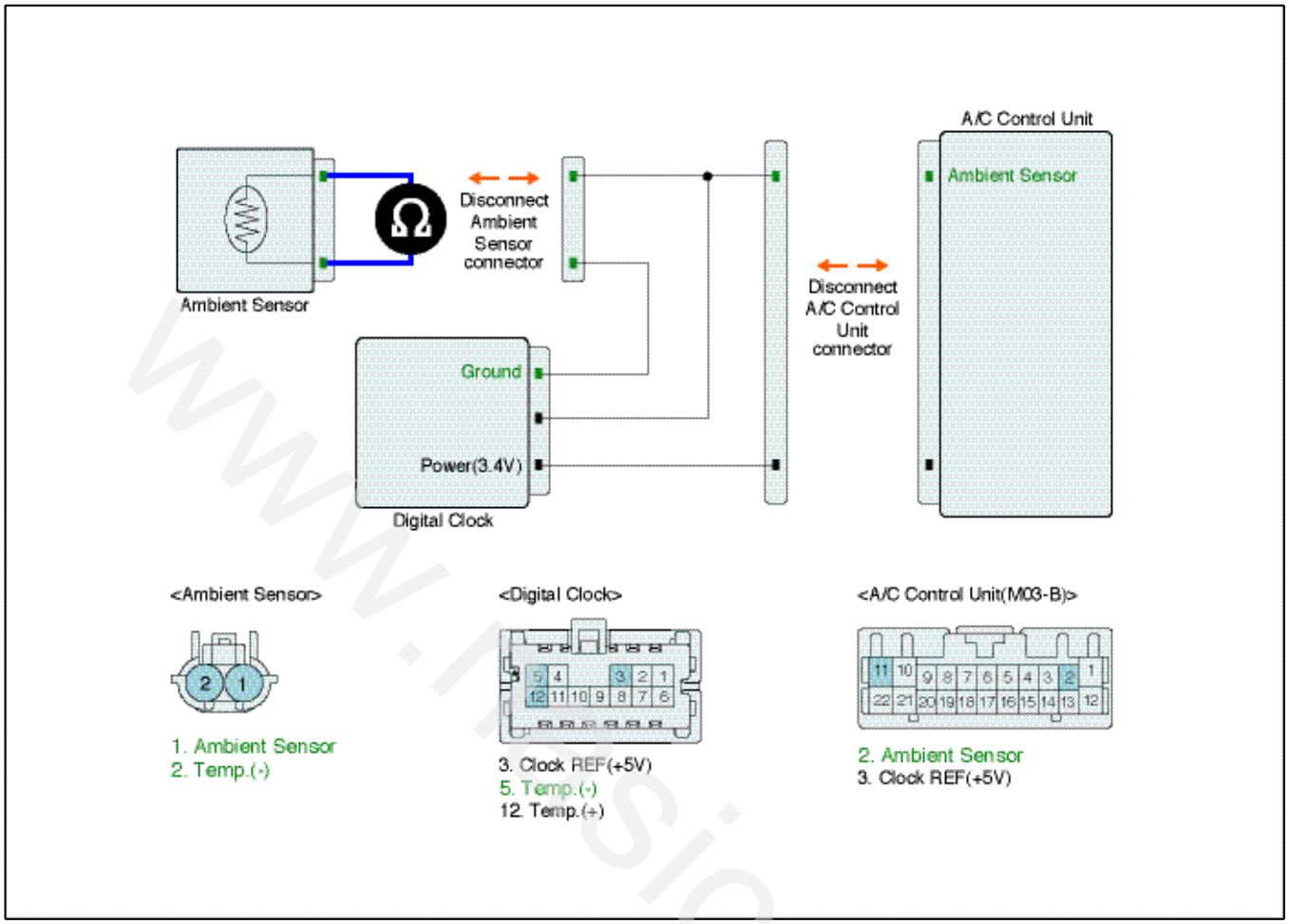
NO ▶ Check for short to ground in harness.
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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)



VG12AC50B169441

Fig.1)

Temperature(℃/℉)	Resistance(kΩ)	Temperature(℃/℉)	Resistance(kΩ)
-10/14	271.4	50/122	11
0/32	95.1	60/140	7.58
25/77	30	-	-

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

※ The actual value may differ from it according to various engine condition.

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

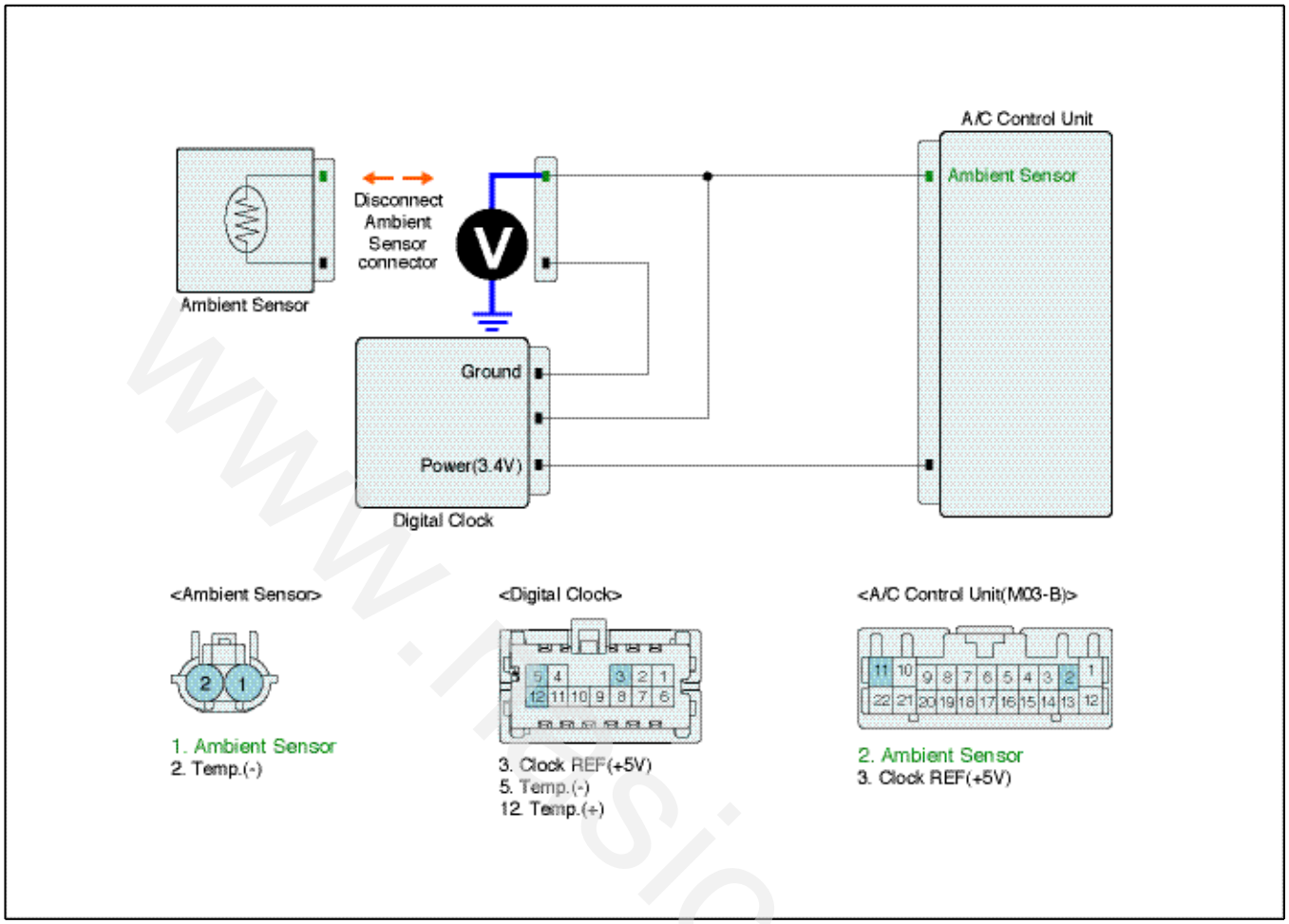
YES ▶ Go to "Check A/C-ECU" procedure.

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



VG12AC50B169442

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.

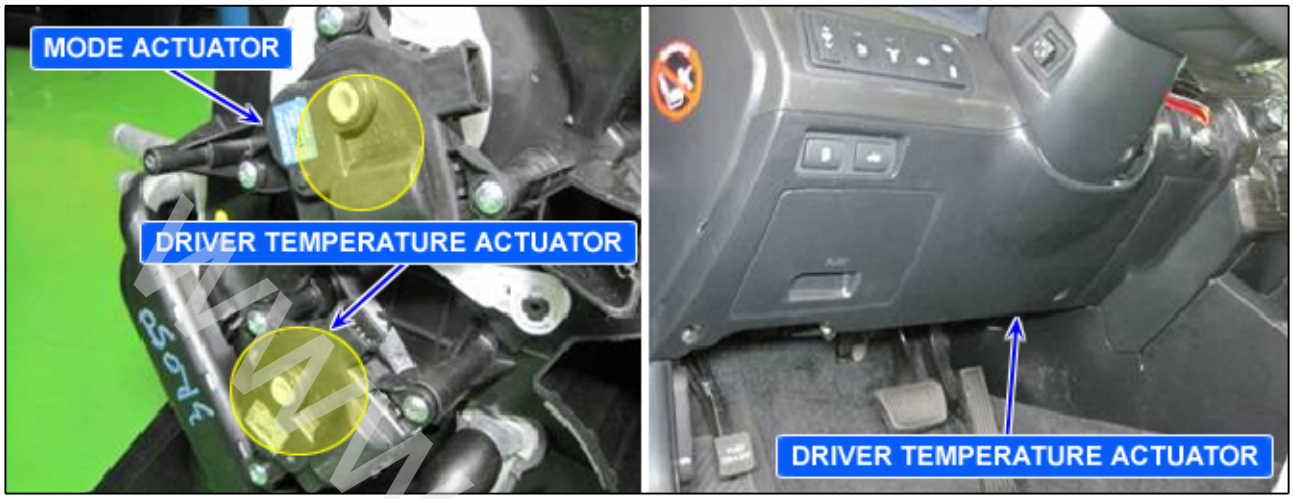
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2406 Air Mix Motor-Driver

Componet Location



YG12AC0B240611

General Description

The Air Mix actuator contains a motor that changes temp door position and a potentiometer that monitors position of temp door. Temperature control actuator regulates the temperature by operating temp door motor. The potentiometer delivers temp door position to the A/C ECU .

DTC Description

The 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 40 seconds.

DTC Detecting Condition

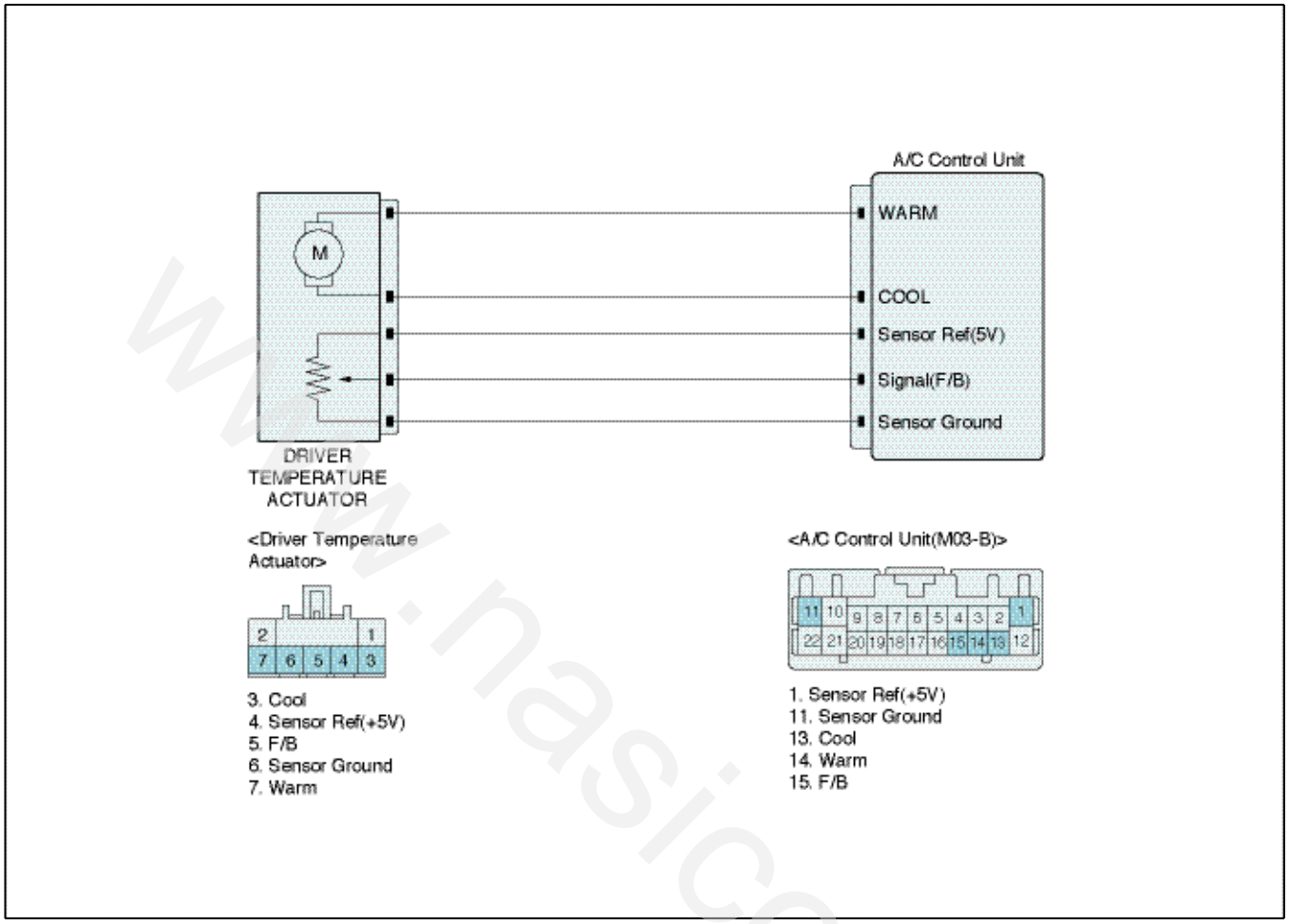
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor contact in harness 2. Open or short in motor power circuit 3. Faulty Driver air mix actuator 4. Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

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

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



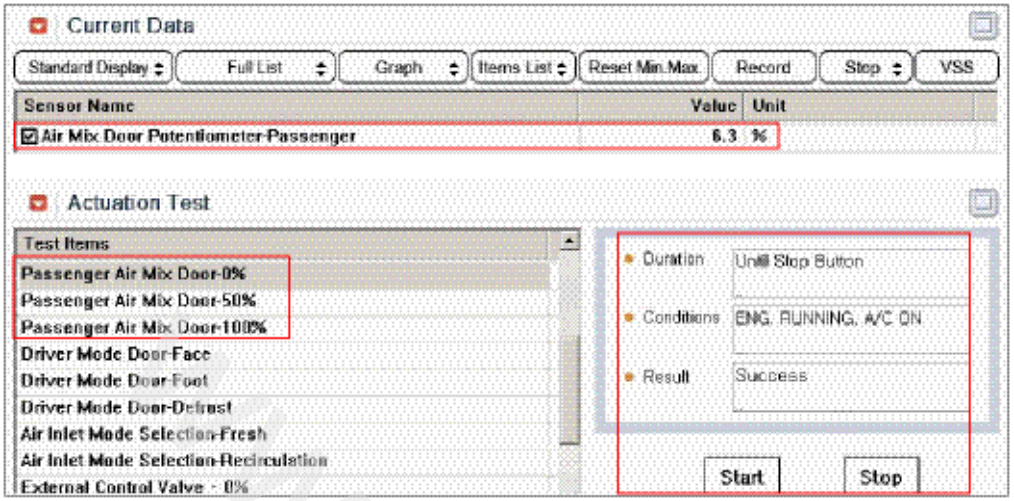
VG12AC50B1245D

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after 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 .



VG12AC0B240621S

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/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

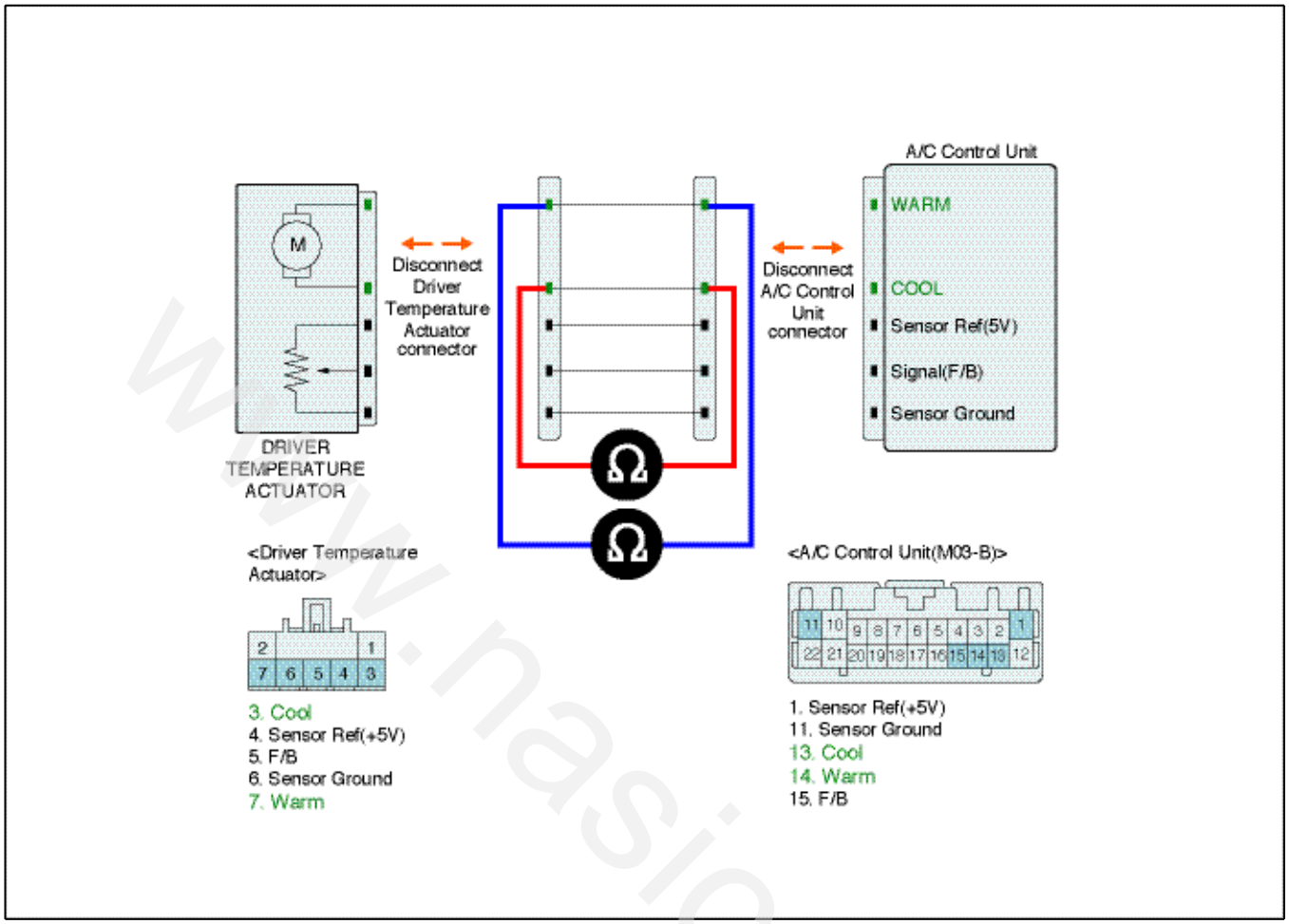
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B240631

5. Is the measured resistance within specification?

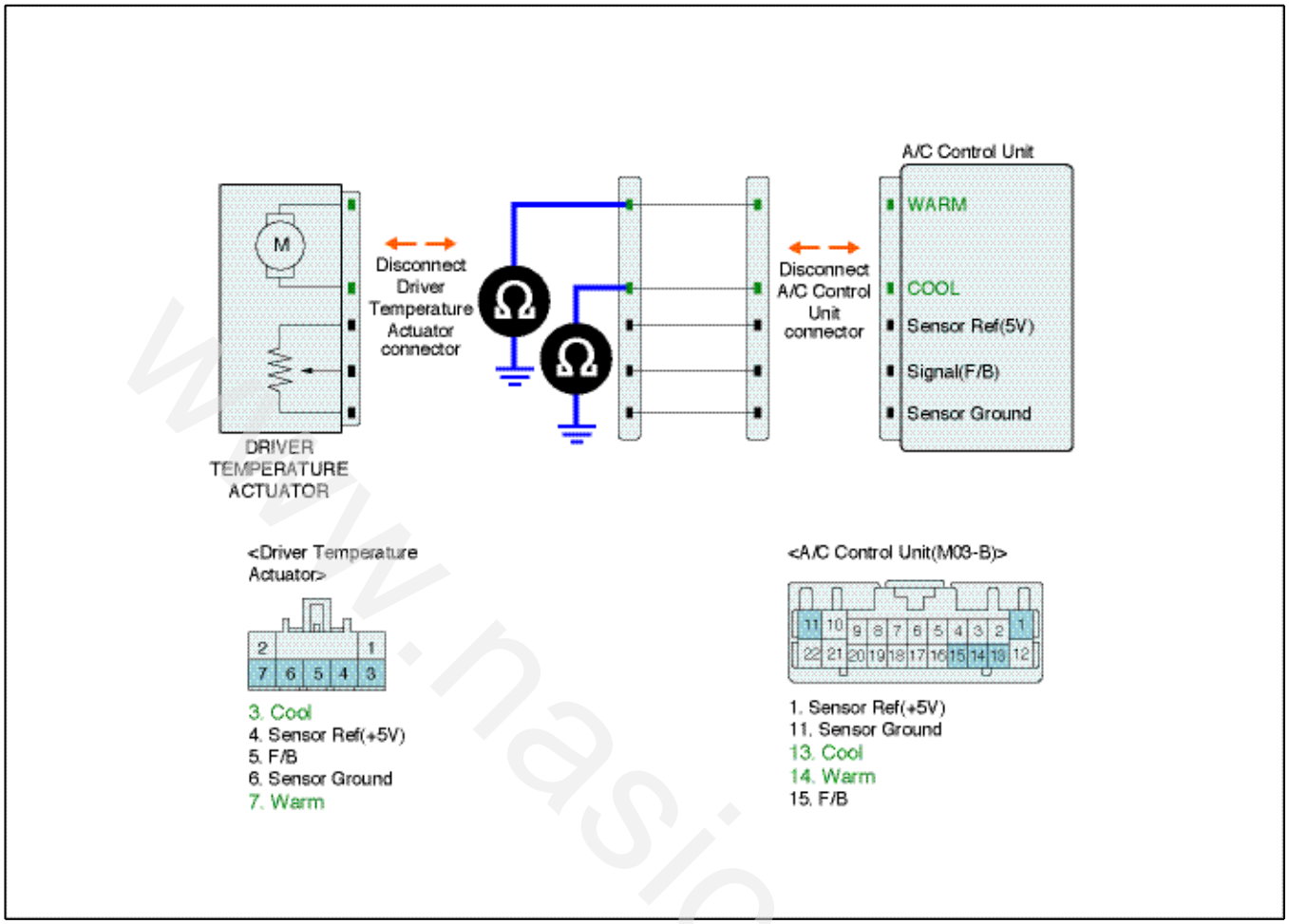
YES ▶ Go to "Check short to ground in harness" as follows.

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



VG12AC50B240632

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection " procedure .

NO ▶ Check for short to ground in control harness .

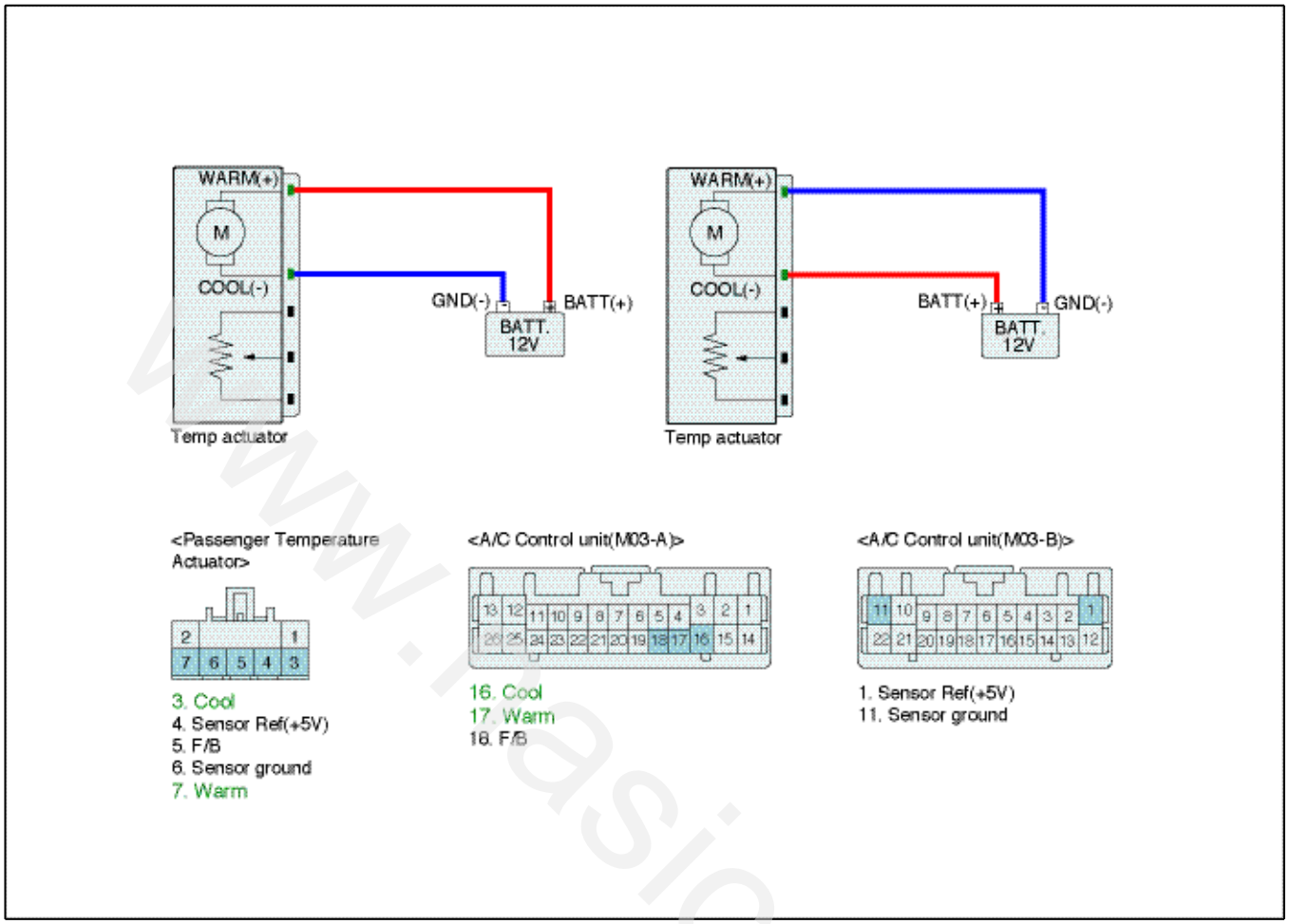
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Specification : Refer the specifications in Fig.1)

Component Inspection

■ Check Driver 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)



VG12AC50B240641

Fig.1)

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

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

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

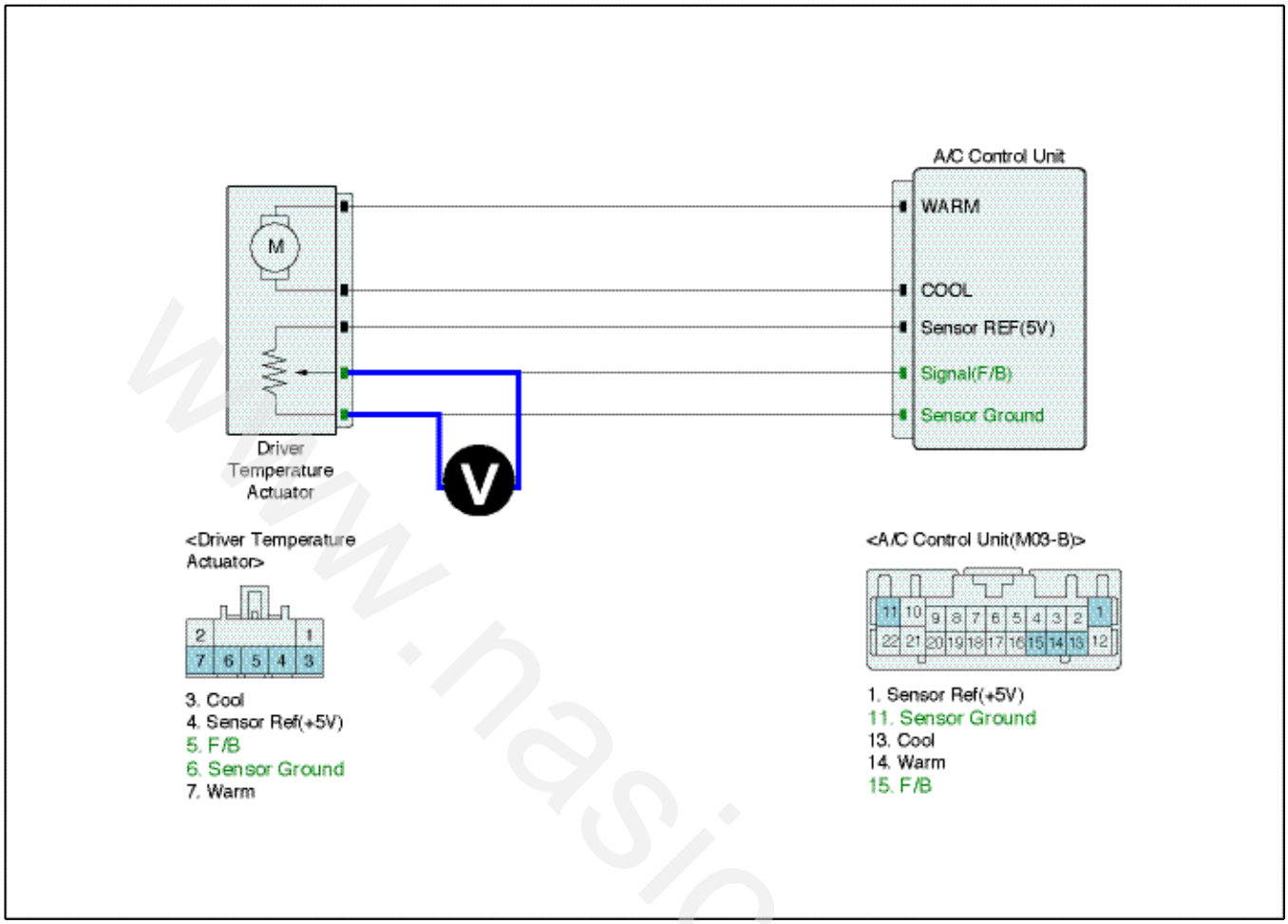
YES ▶ Go to "Check potentiometer" procedure.

NO ▶ Substitute with a known-good Driver air mix actuator and check for proper operation. If the problem is corrected, replace Driver air mix a-ctuator 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)



VG12AC50B240642

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

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

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.

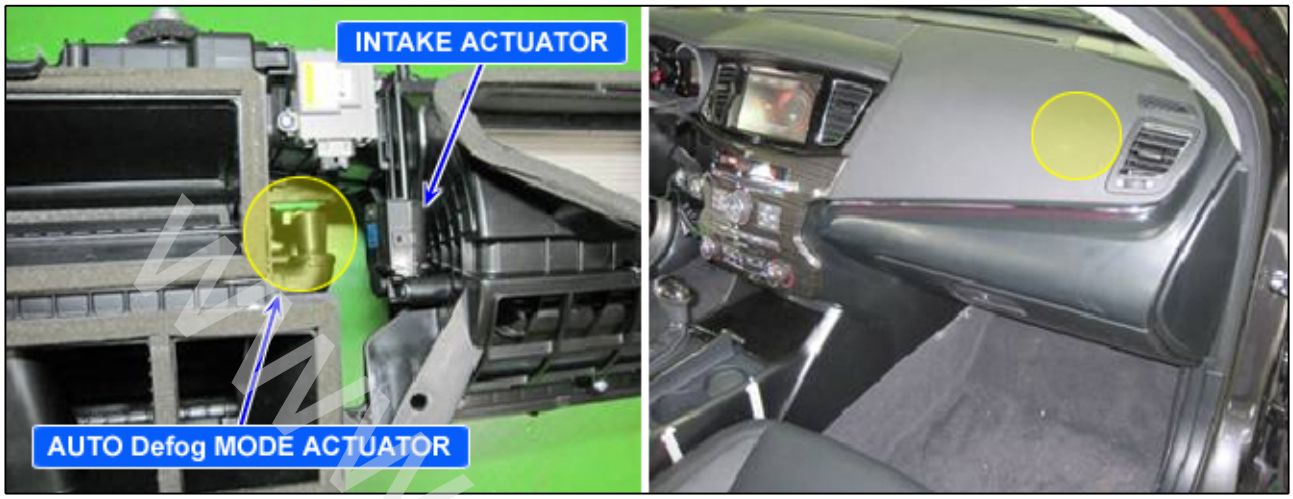
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2408 Intake Motor

Componet Location



YG12AC0B240811

General Description

The actuator contains a motor that changes intake door position and a potentiometer that monitors position of the door. When the driver changes the air intake switch, the ECU operates intake door motor to turn the intake door to the intended position. (in the FRESH mode, the intake door is closed. In REC mode, the intake door is opened) During operation the potentiometer delivers an intake door position to the A/C ECU.

DTC Description

The Air conditioner Control Module sets DTC B2408 if Intake actuator has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

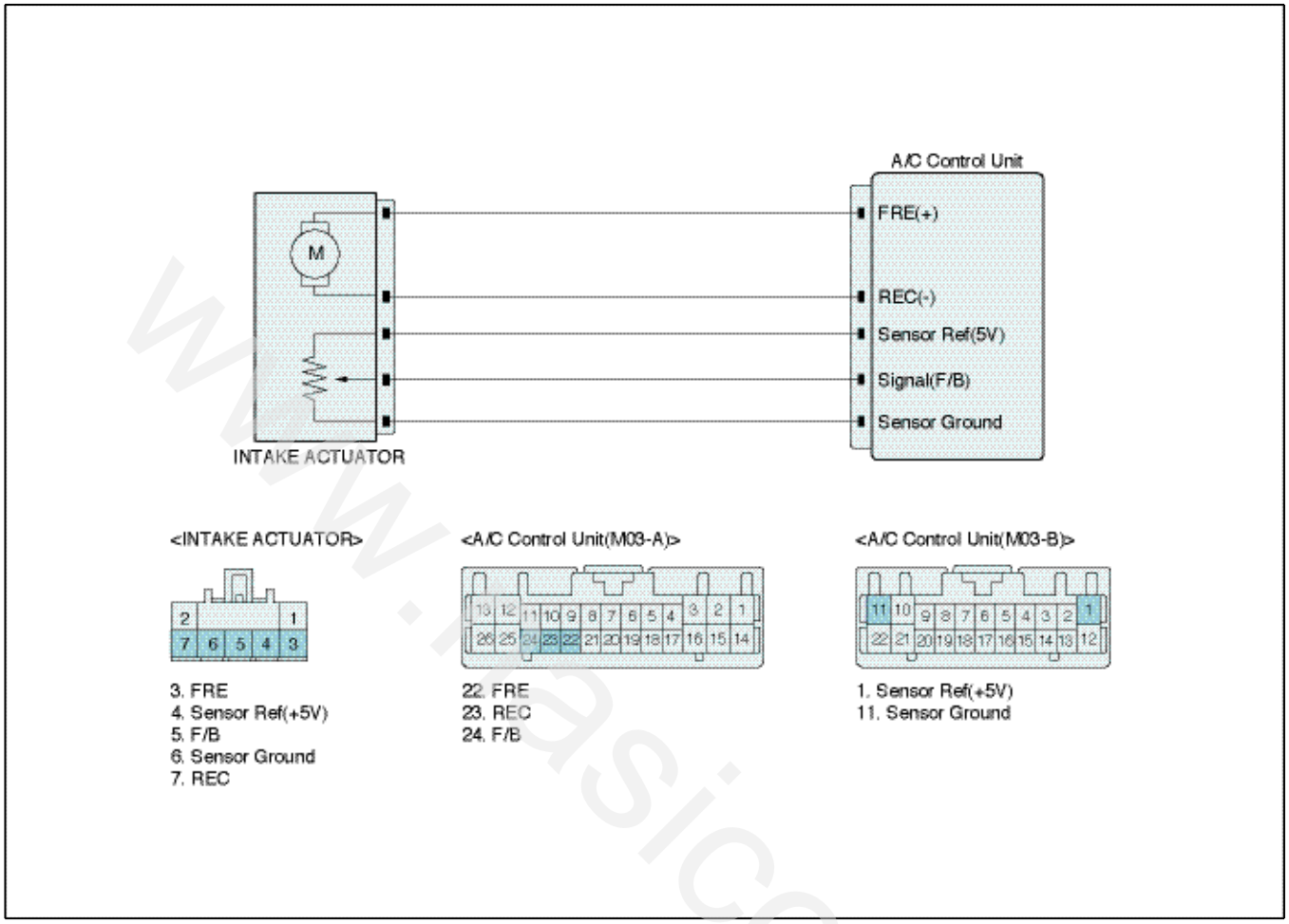
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor contact in harness 2. Open or short in motor power circuit 3. Faulty Intake actuator 4. Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

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

Door position	Voltage
FRE	0.3±0.15V
REC	4.7±0.15V

Diagnostic Circuit Diagram



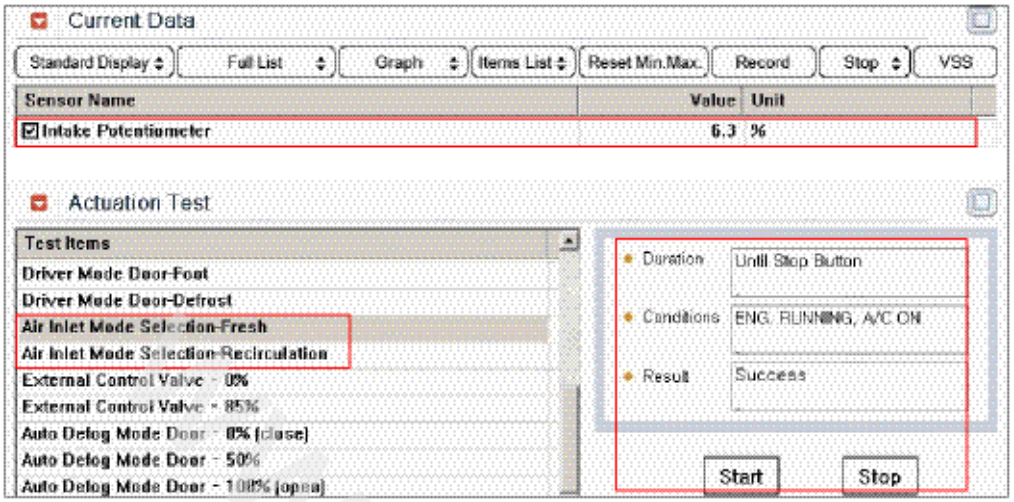
VG12AC50B1208D

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%.



VG12AC0B240821S

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 and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

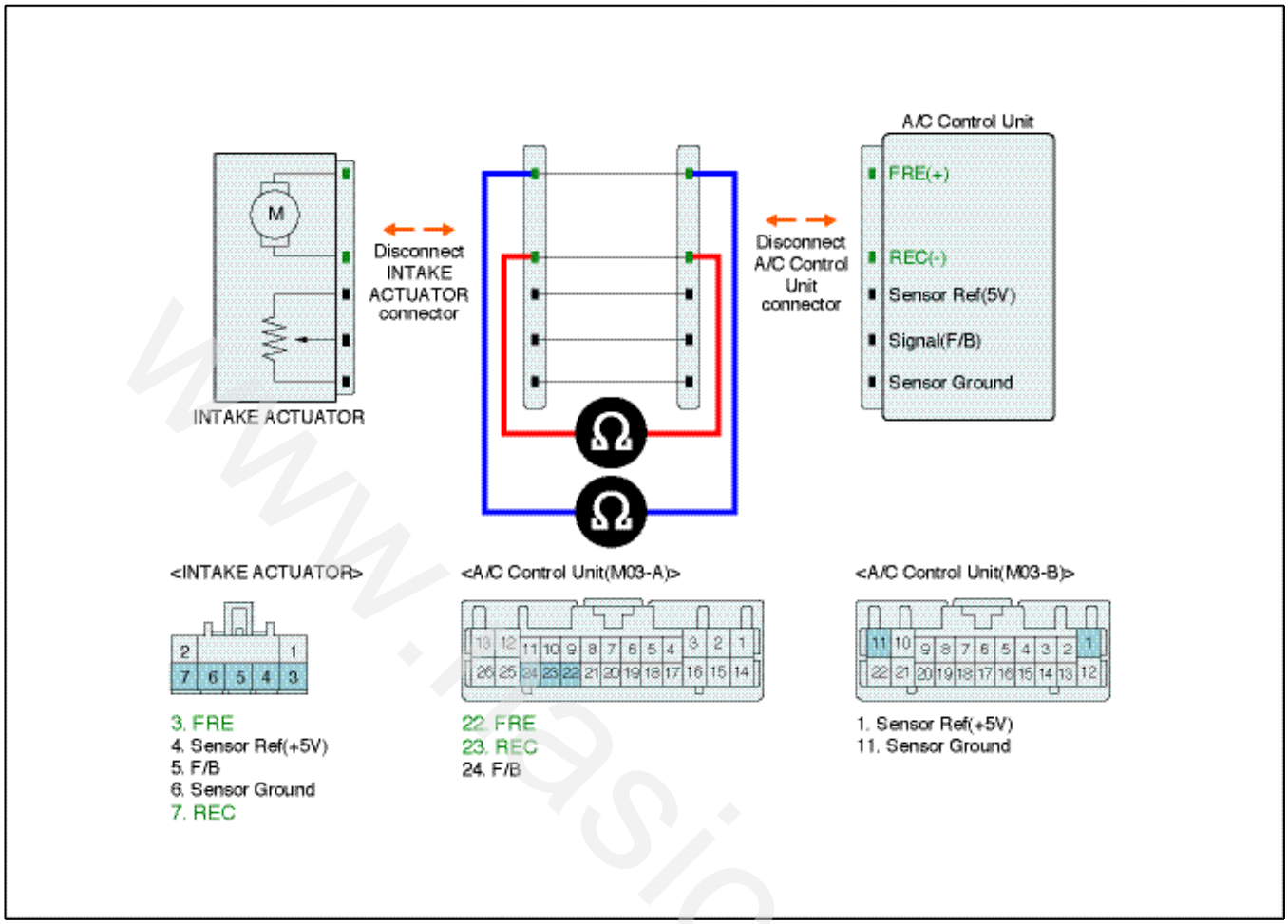
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B240831

5. Is the measured resistance within specification?

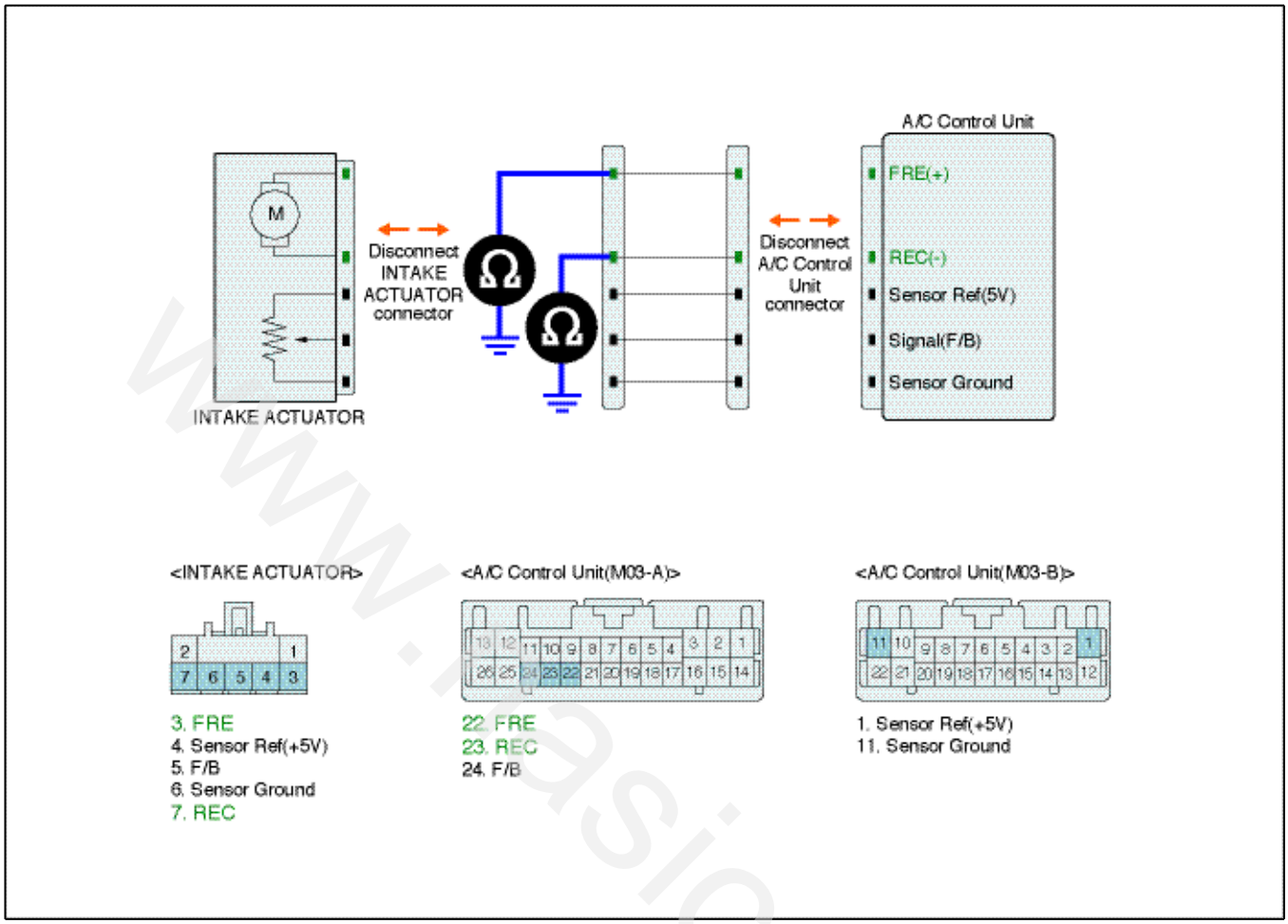
YES ▶ Go to "Check short to ground in harness" as follows.

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



VG12AC50B240832

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure.

NO ▶ Check for short to ground in control harness .

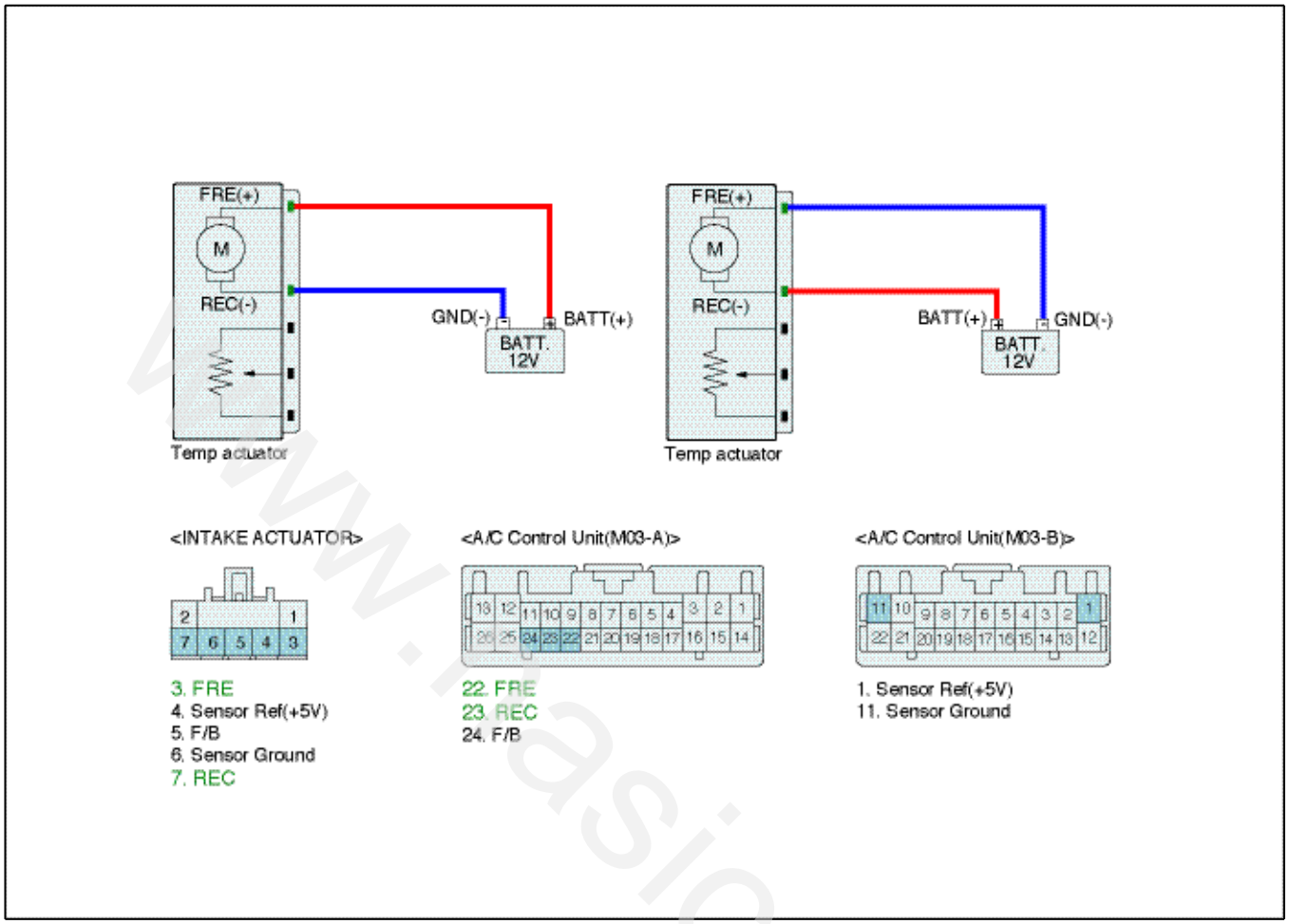
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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)



VG12AC50B240841

Fig.1)

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

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

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

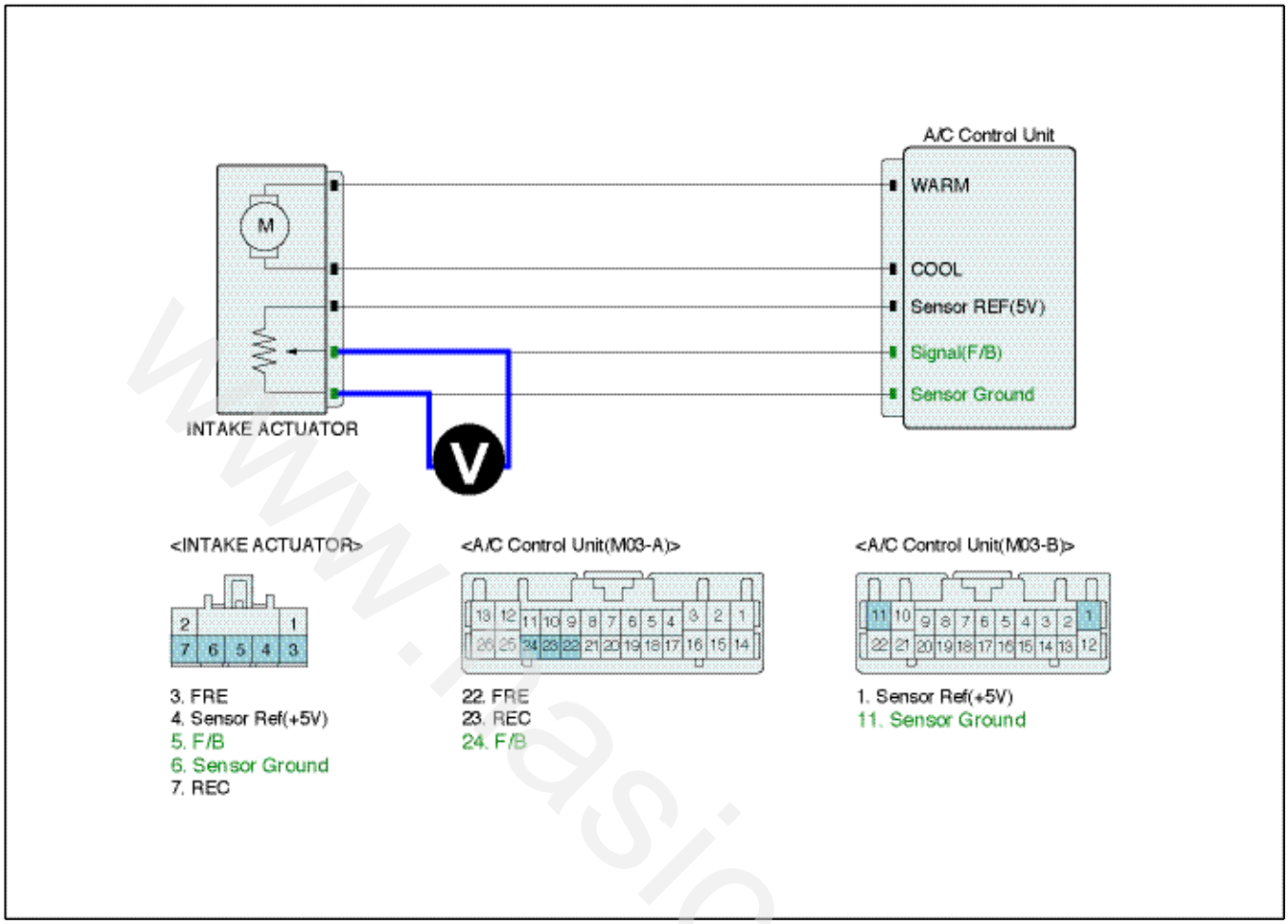
YES ▶ Go to "Check potentiometer" procedure.

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)



VG12AC50B240842

Fig.2)

Door position	Voltage
FRE	0.3±0.15V
REC	4.7±0.15V

Fig.2) ※ Voltage value of intake potentiometer as a function of intake door position.

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.

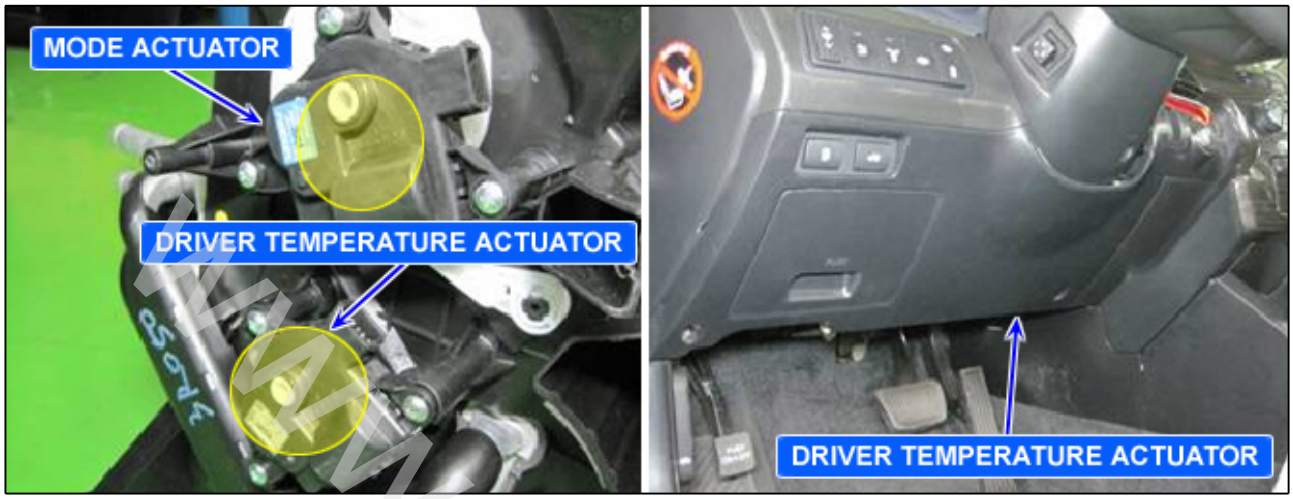
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2409 Direction Control Motor-Driver

Componet Location



YG12AC0B240911

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

The 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 40 seconds.

DTC Detecting Condition

Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor contact in harness 2. Open or short in motor power circuit 3. Faulty Driver Direction actuator 4. Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

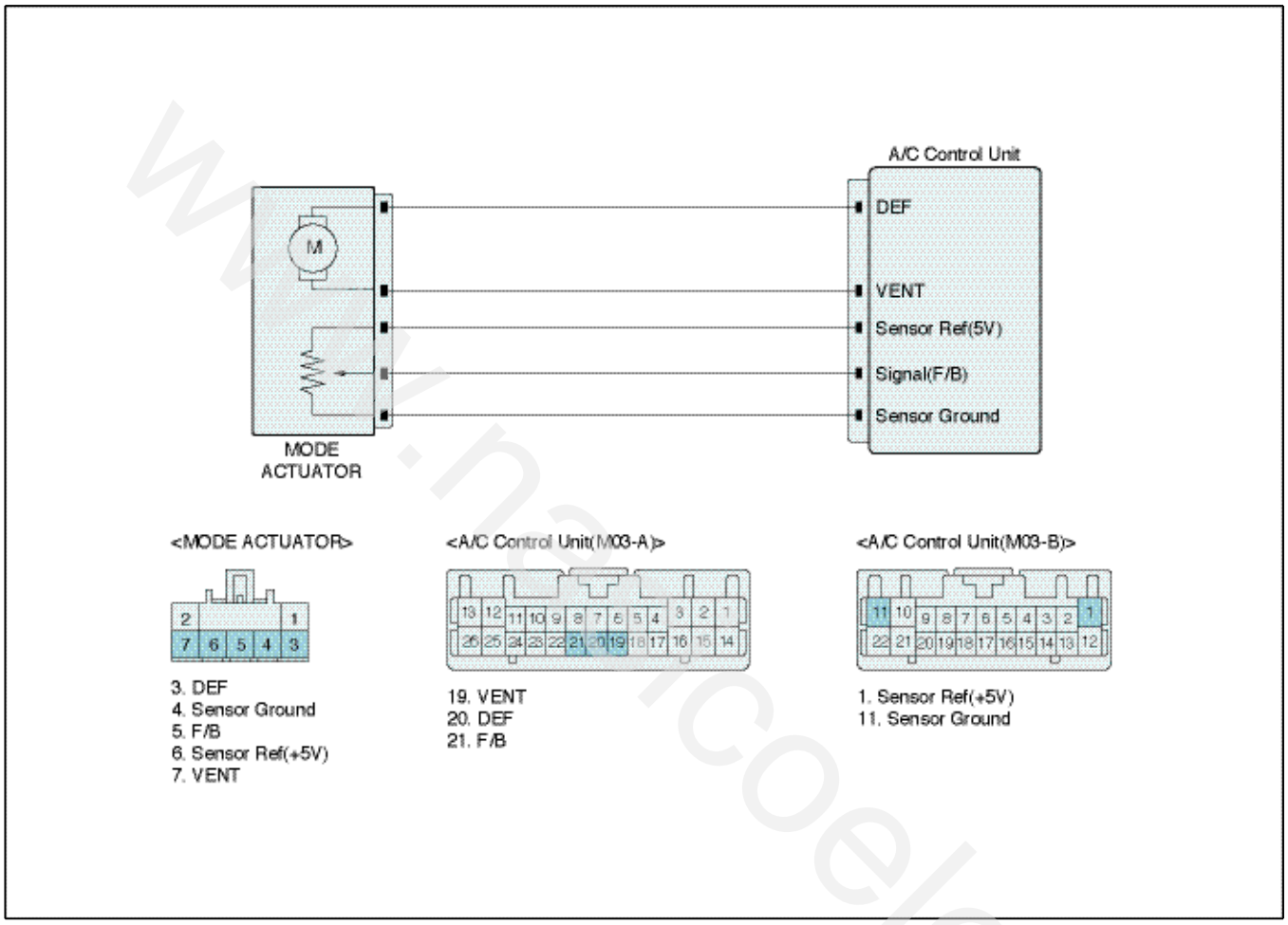
Specification

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

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V

Mode Door Position	Voltage
MIX	3.6±0.4V
DEF	4.7±0.15V

Diagnostic Circuit Diagram



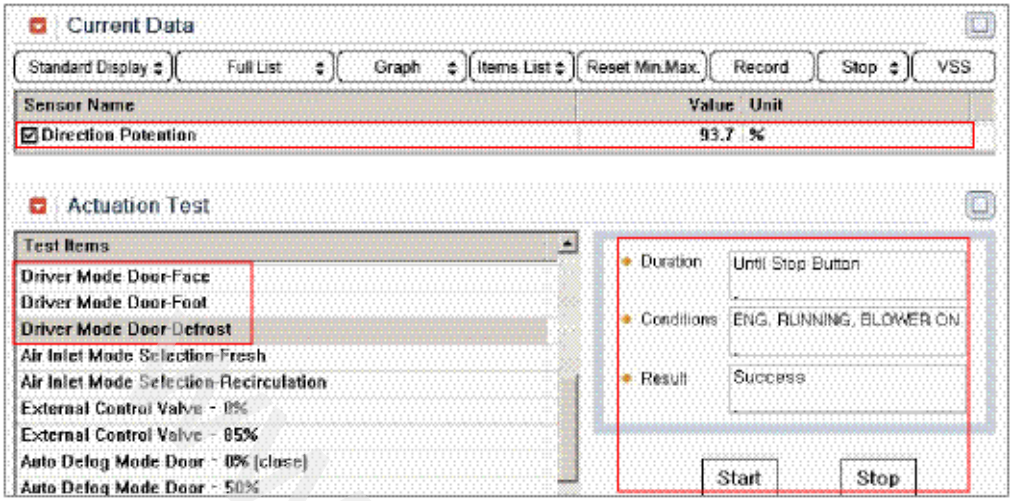
VG12AC50B1249D

Monitor Scantool data

■ Actuation Test

1. Connect scantool with diagnostic connector.
2. Warm up the engine to normal engine temperature after 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%.



VG12AC0B240921S

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/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

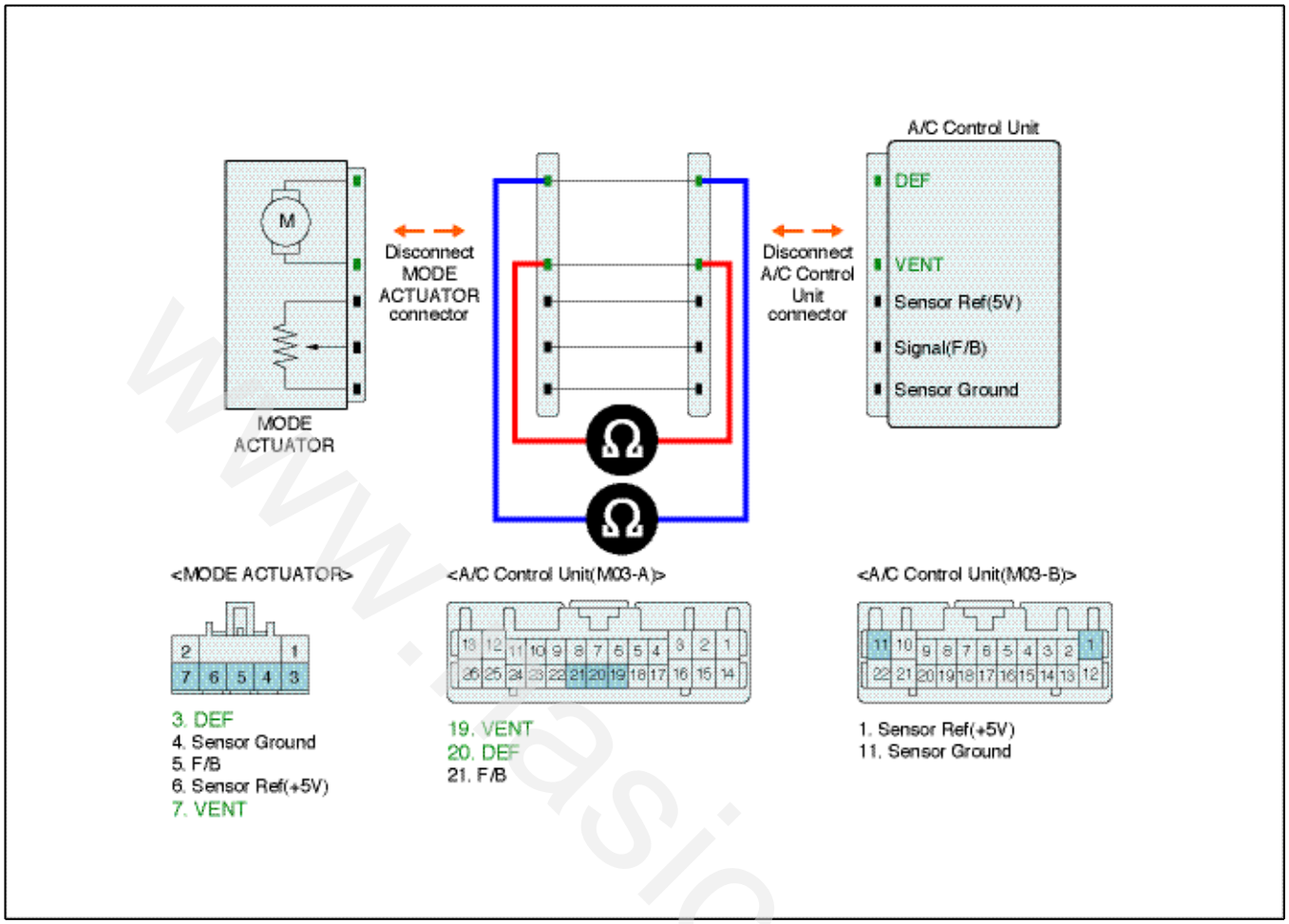
NO ▶ Go to "W/Harness Inspection" procedure.

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



VG12AC50B240931

5. Is the measured resistance within specification?

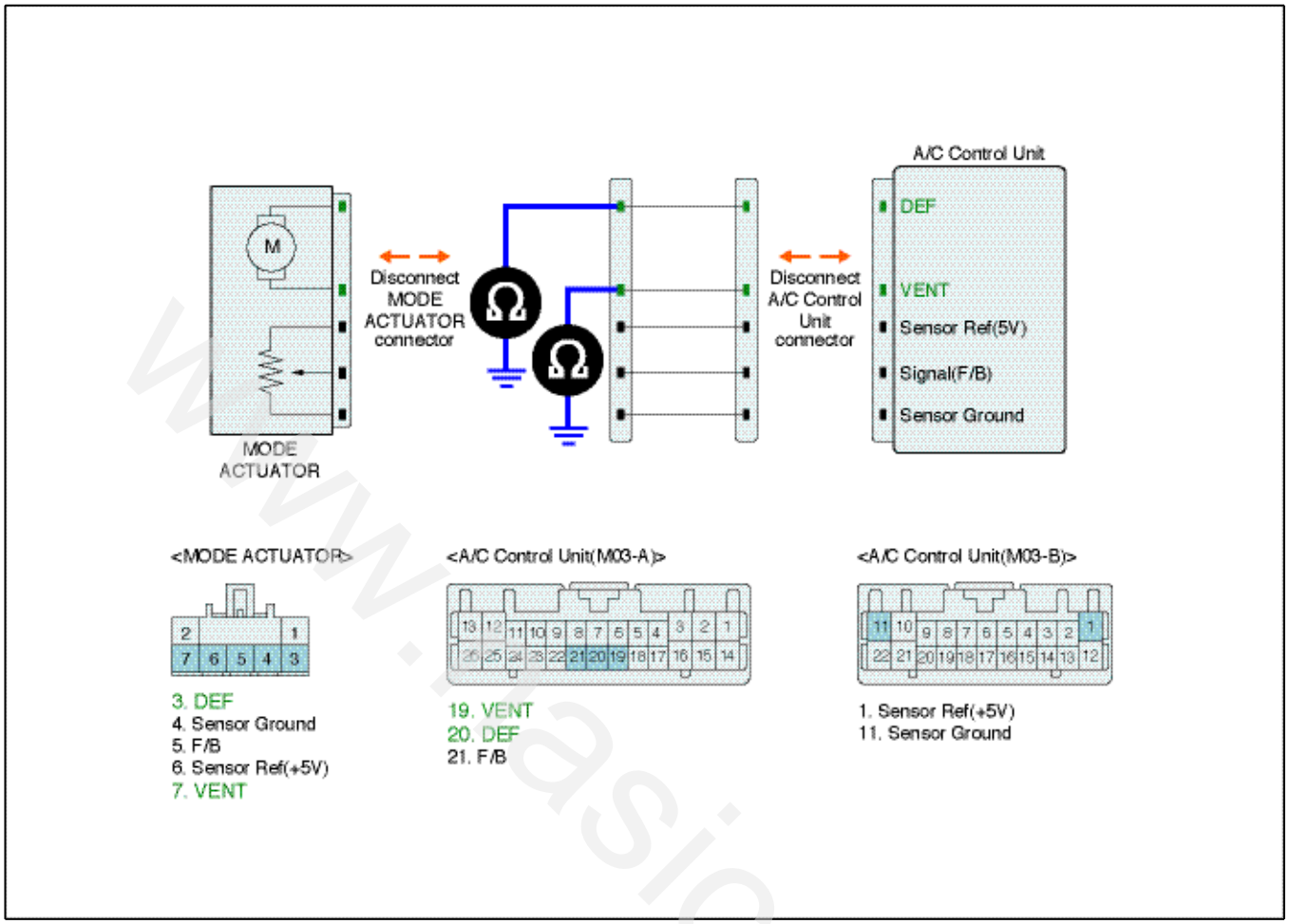
YES ▶ Go to "Check short to ground in harness" as follows.

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



VG12AC50B240932

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure.

NO ▶ Check for short to ground in control harness .

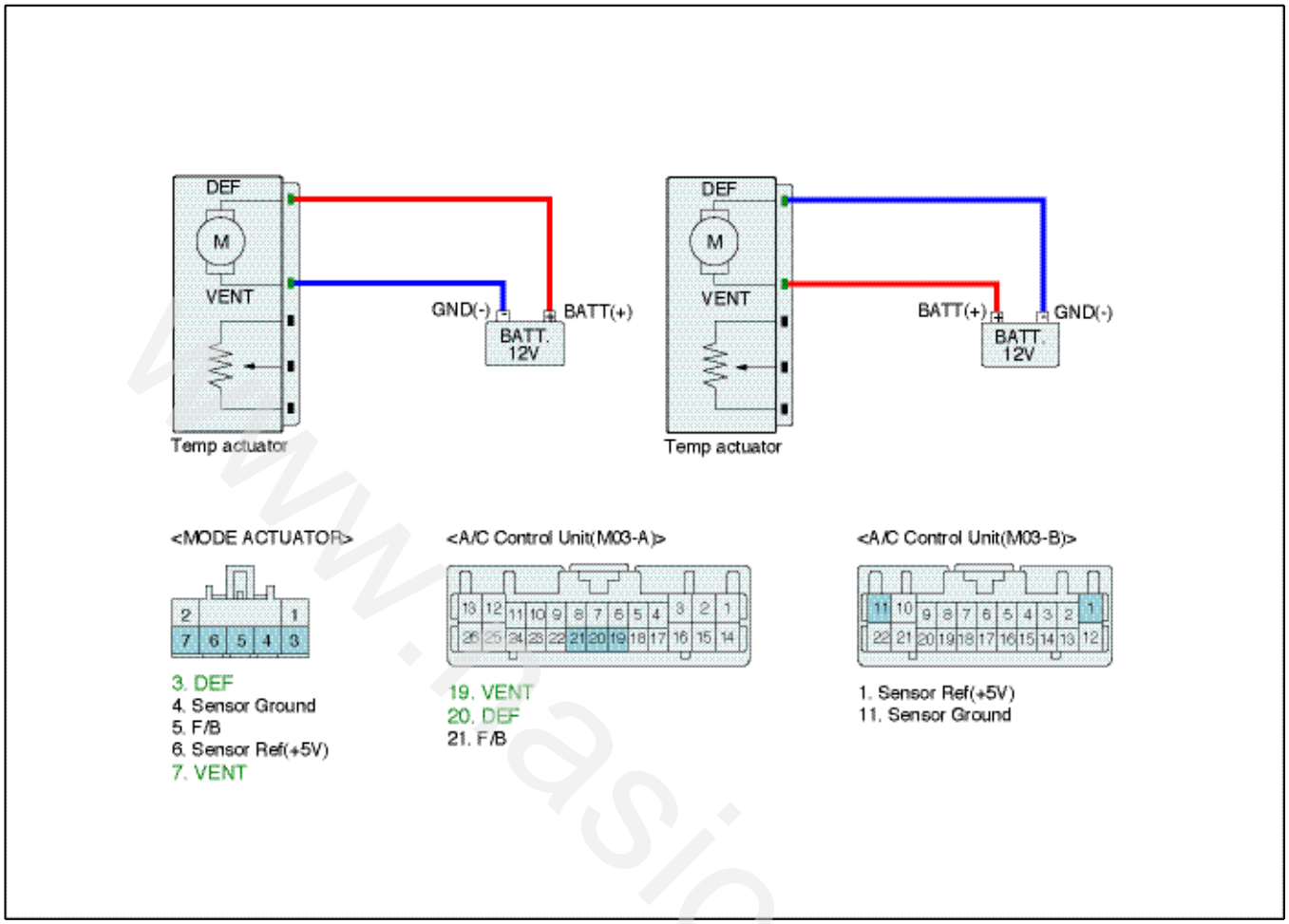
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

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 DEF(+) of Driver air mix actuator and (-) terminal to VENT(-). (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. (DEF(+) and VENT(-)). (Component side)

Specification : Refer the specifications in Fig.1)



VG12AC50B240941

Fig.1)

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

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

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

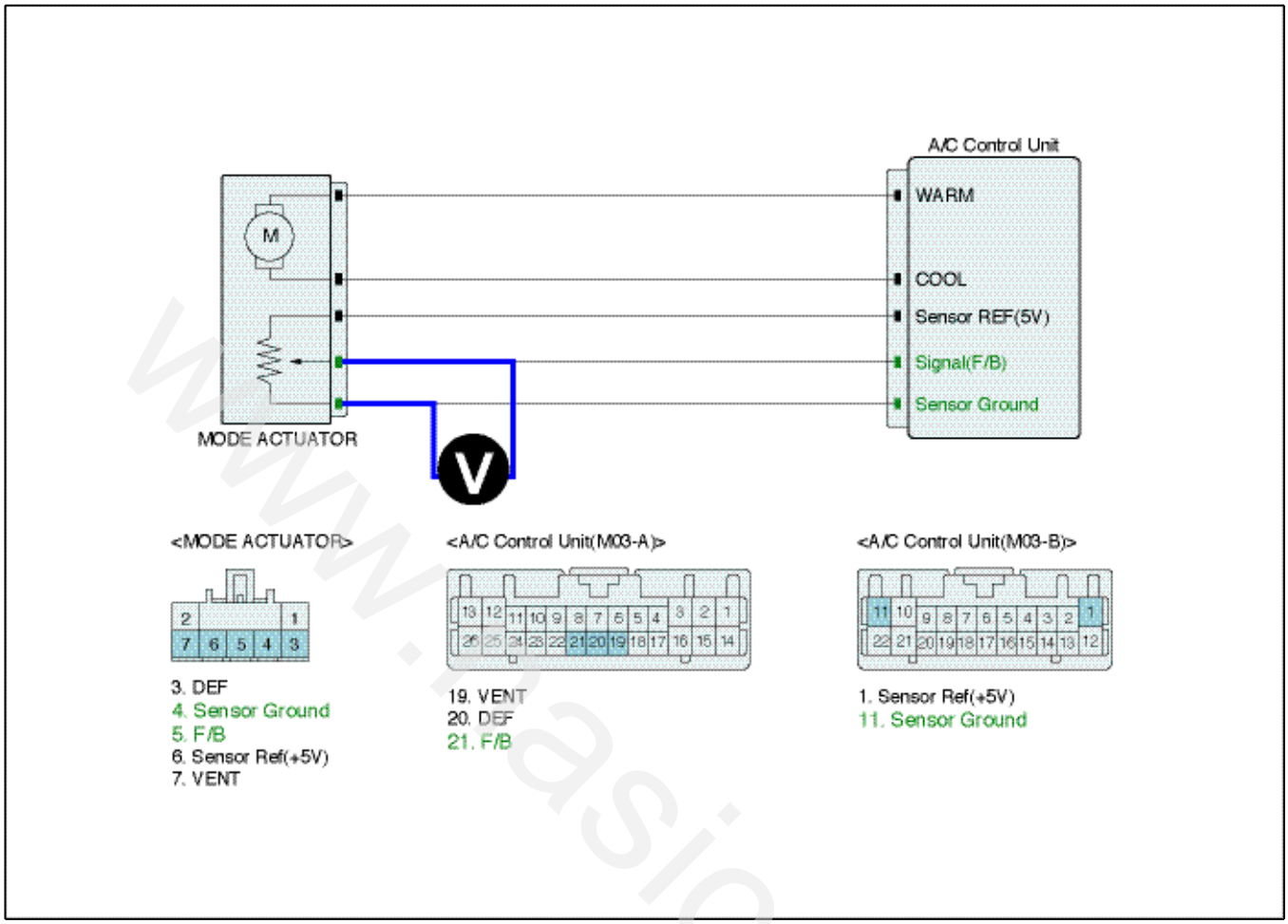
YES ▶ Go to "Check potentiometer" procedure.

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 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)



VG12AC50B240942

Fig.2)

Mode Door Position	Voltage
VENT	0.3±0.15V
BI-LEVEL	1.4±0.4V
FLOOR	2.5±0.4V
MIX	3.6±0.4V
DEF	4.7±0.15V

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

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.

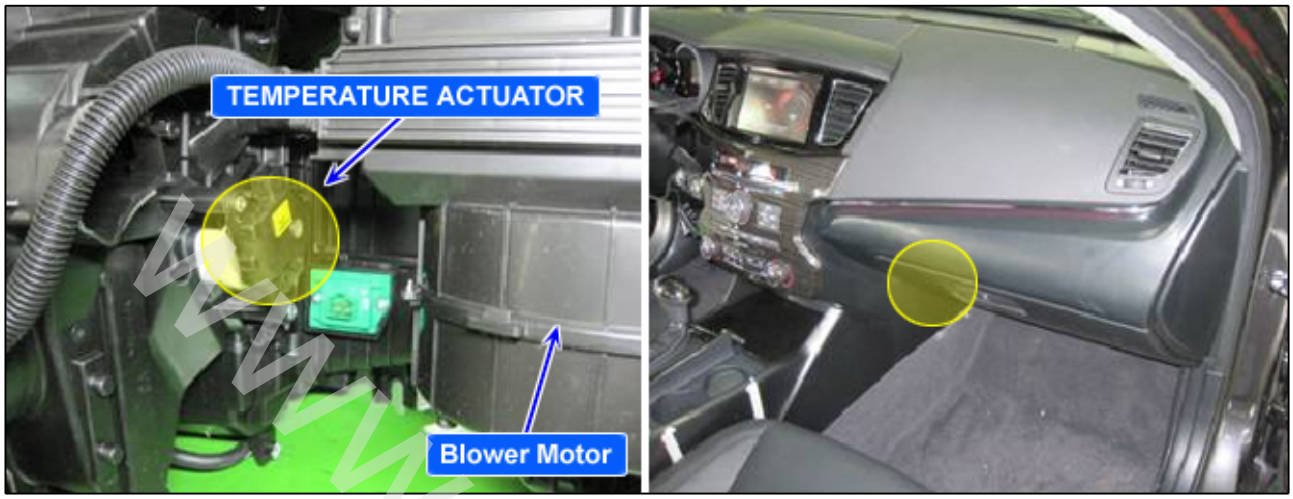
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B2415 Air Mix Door Motor-Passenger

Componet Location



YG12AC0B241511

General Description

Temperature control actuator located at heater unit. 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

The Air conditioner Control Module sets DTC B2415 if passenger air mix actuator has not been moved to the mode,where air condition control module controls, within 40 seconds.

DTC Detecting Condition

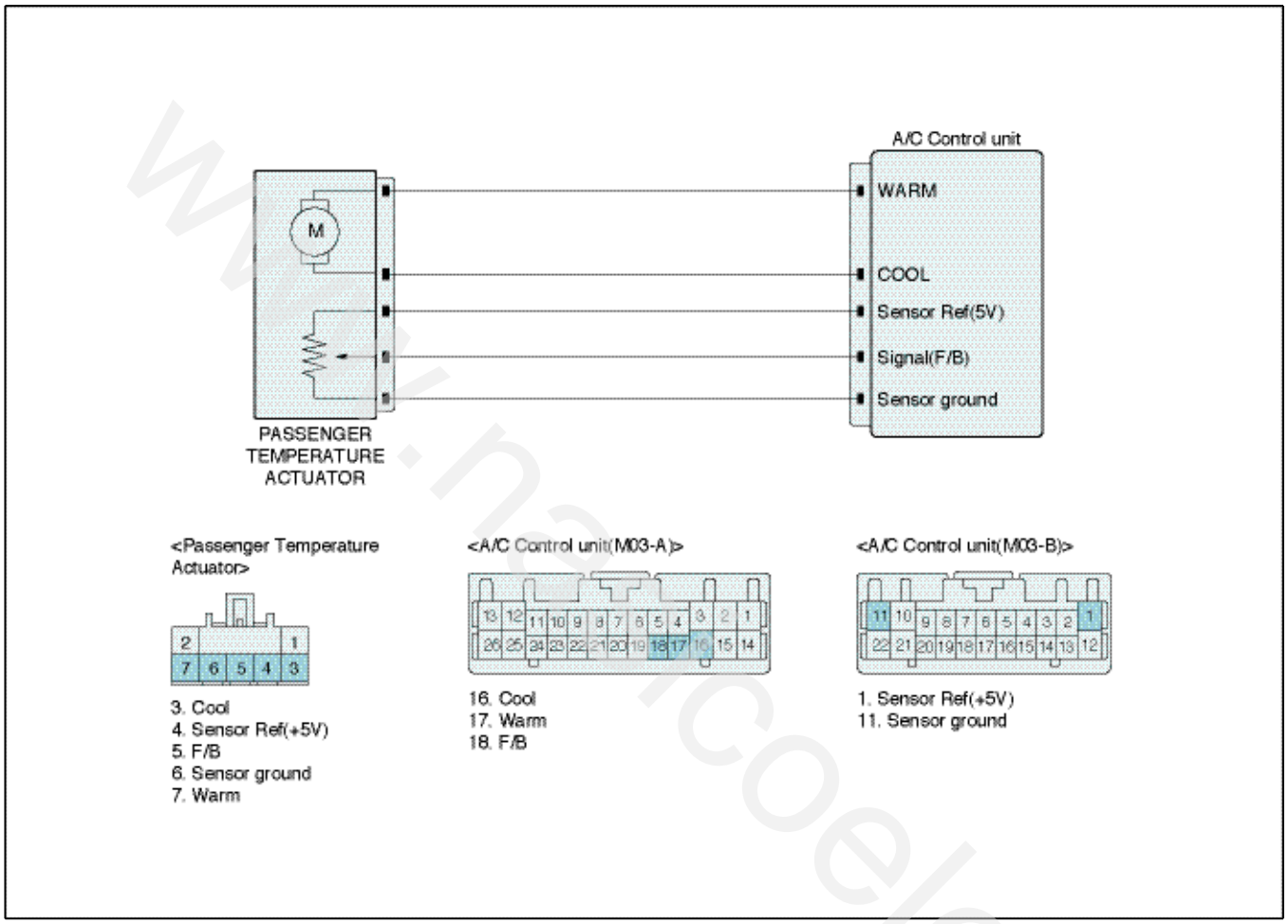
Item	Detecting Condition	Detecting Condition
DTC Strategy	• Voltage check	1. Poor contact in harness 2. Open or short in motor power circuit 3. Faulty passenger air mix actuator 4. Faulty air conditioner control module
Enable Conditions	• IG KEY ON	
Threshold value	• No movement to controlled mode position for 40 seconds	
Failsafe	• Fixed as current position	

Specification

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

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

Diagnostic Circuit Diagram



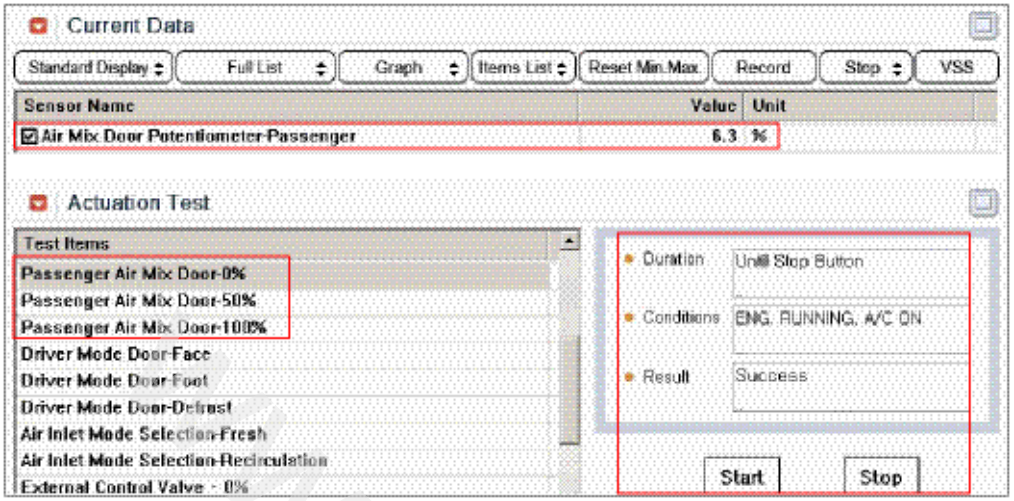
VG12AC50B1204D

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 "Air Mix Door Potentiometer-Passenger" parameter on the current data with scantool.
4. Perform Actuation Test for "Passenger Air Mix Door - 0% / 50% / 100%.
5. With performing Actuation test, check that the value of Air Mix Door Potentiometer 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 .



VG12AC0B241521S

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/Repair " procedure.

Terminal and Connector Inspection

1. Many malfunctions in the electrical system are caused by poor connection. 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.

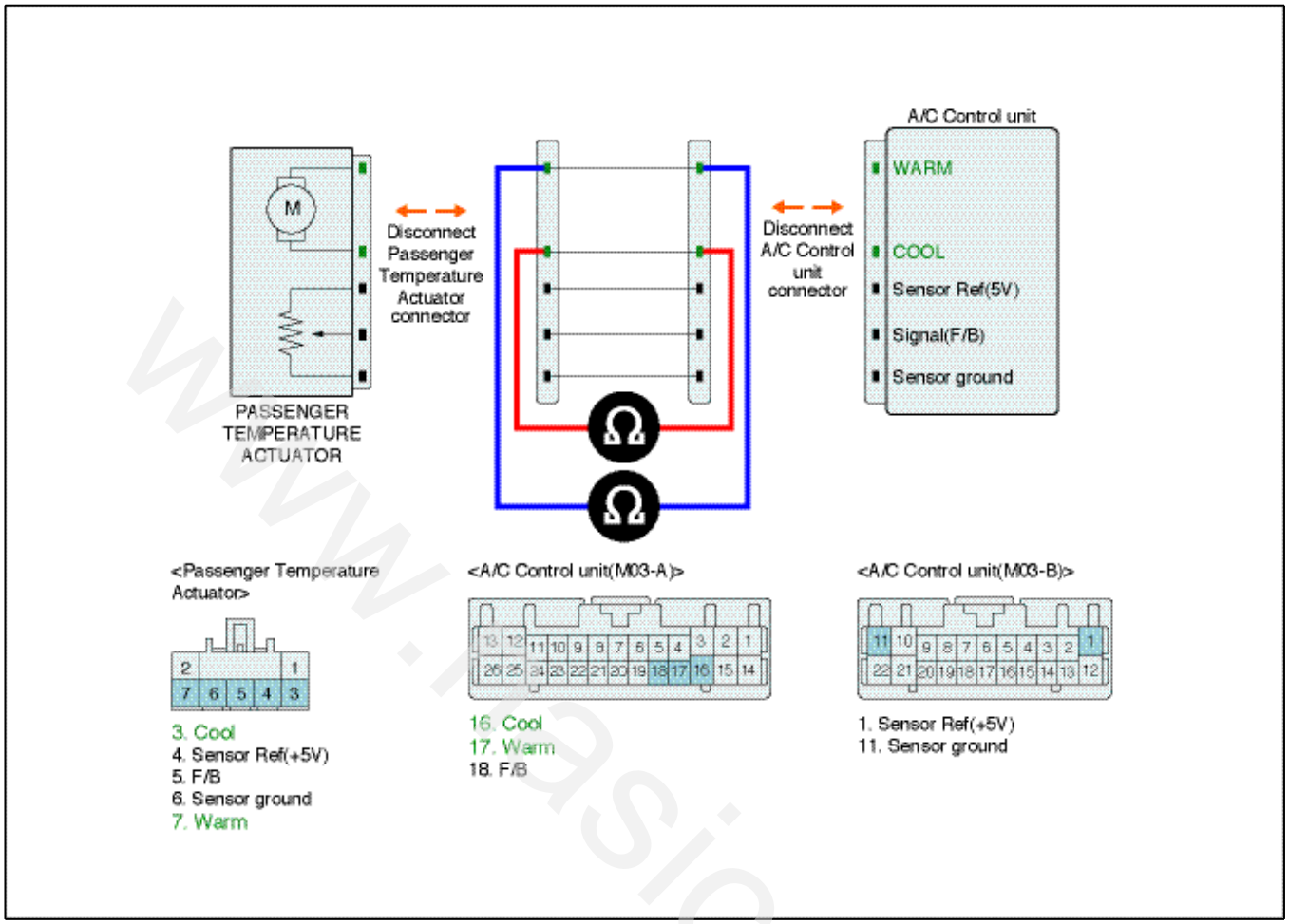
NO ▶ Go to "W/Harness Inspection" procedure.

Control Circuit Inspection

■ Check for open in harness

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

Specification : 1Ω below



VG12AC50B241531

5. Is the measured resistance within specification?

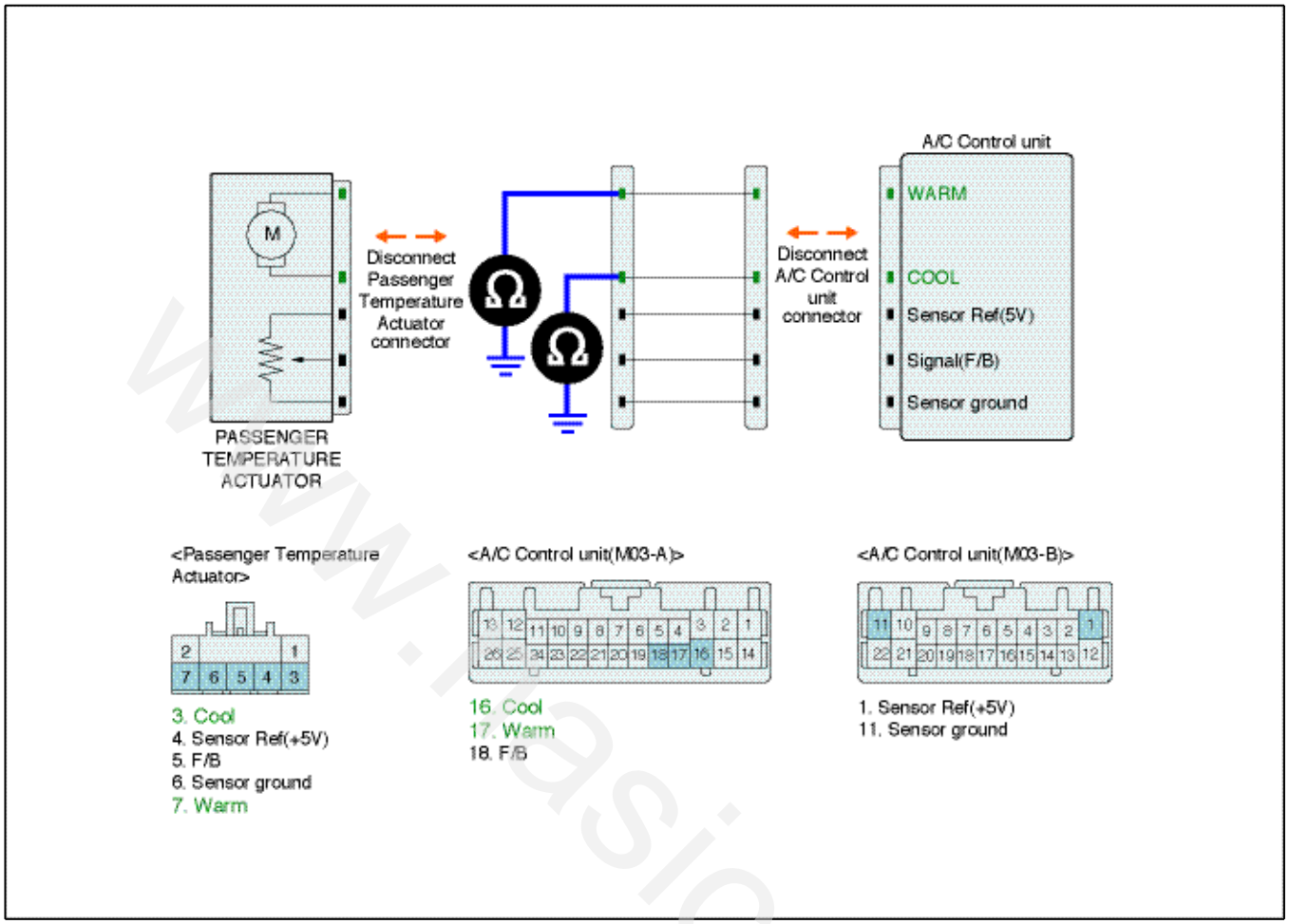
YES ▶ Go to "Check short to ground in harness" as follows.

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 passenger air mix actuator and A/C control unit main harness connector.
3. Measure resistance between WARM terminal of passenger air mix actuator harness connector and chassis ground.
4. Measure resistance between COOL terminal of passenger air mix actuator harness connector and chassis ground.

Specification : Infinity



VG12AC50B241532

5. Is the measured resistance within specification?

YES ▶ Go to " Component inspection" procedure.

NO ▶ Check for short to ground in control harness .

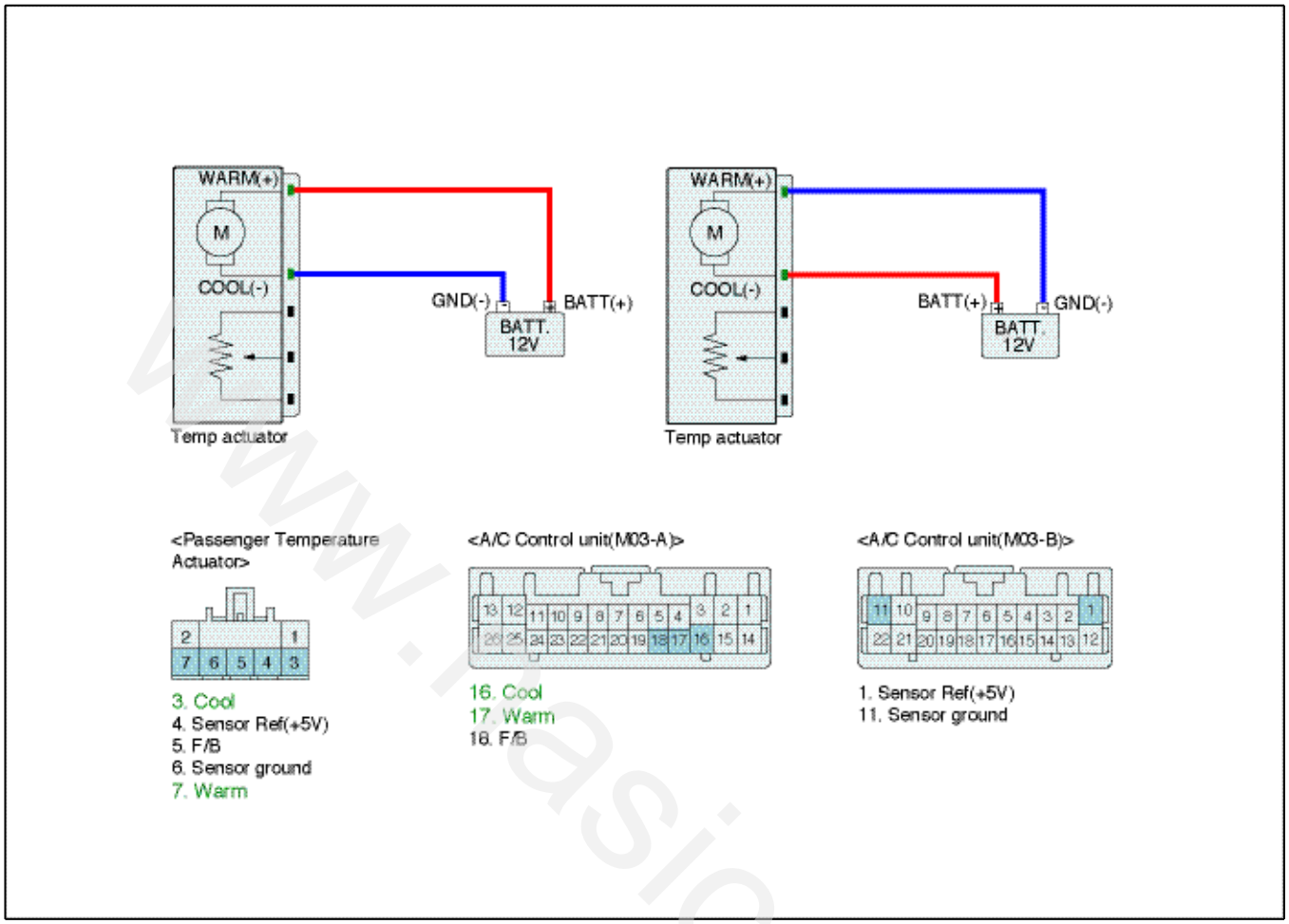
▶ Repair as necessary and then go to "Verification of Vehicle Repair" procedure.

Component Inspection

■ Check passenger air mix actuator

1. Ignition "OFF"
2. Disconnect passenger air mix actuator and A/C control unit main harness connector.
3. Connect (+) terminal of battery to WARM(+) of passenger 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)



VG12AC50B241541

Fig.1)

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

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

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

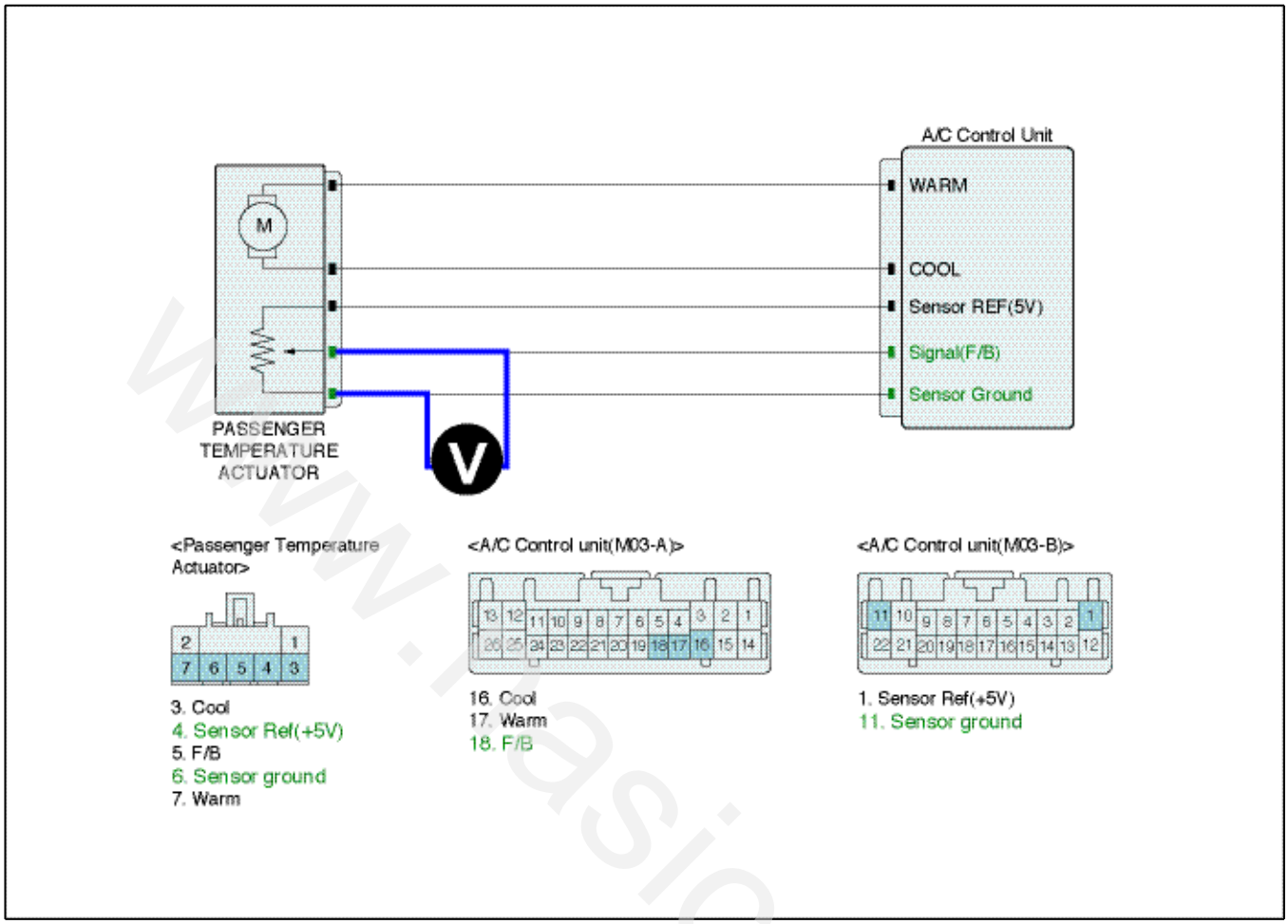
YES ▶ Go to "Check potentiometer" procedure.

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

■ Check potentiometer

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

Specification : Refer the specifications in Fig.2)



VG12AC50B241542

Fig.2)

Door position	Voltage
Max. cool	0.3±0.15V
Max. warm	4.7±0.15V

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

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 passenger air mix actuator and check for proper operation. If the problem is corrected, replace passenger 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.

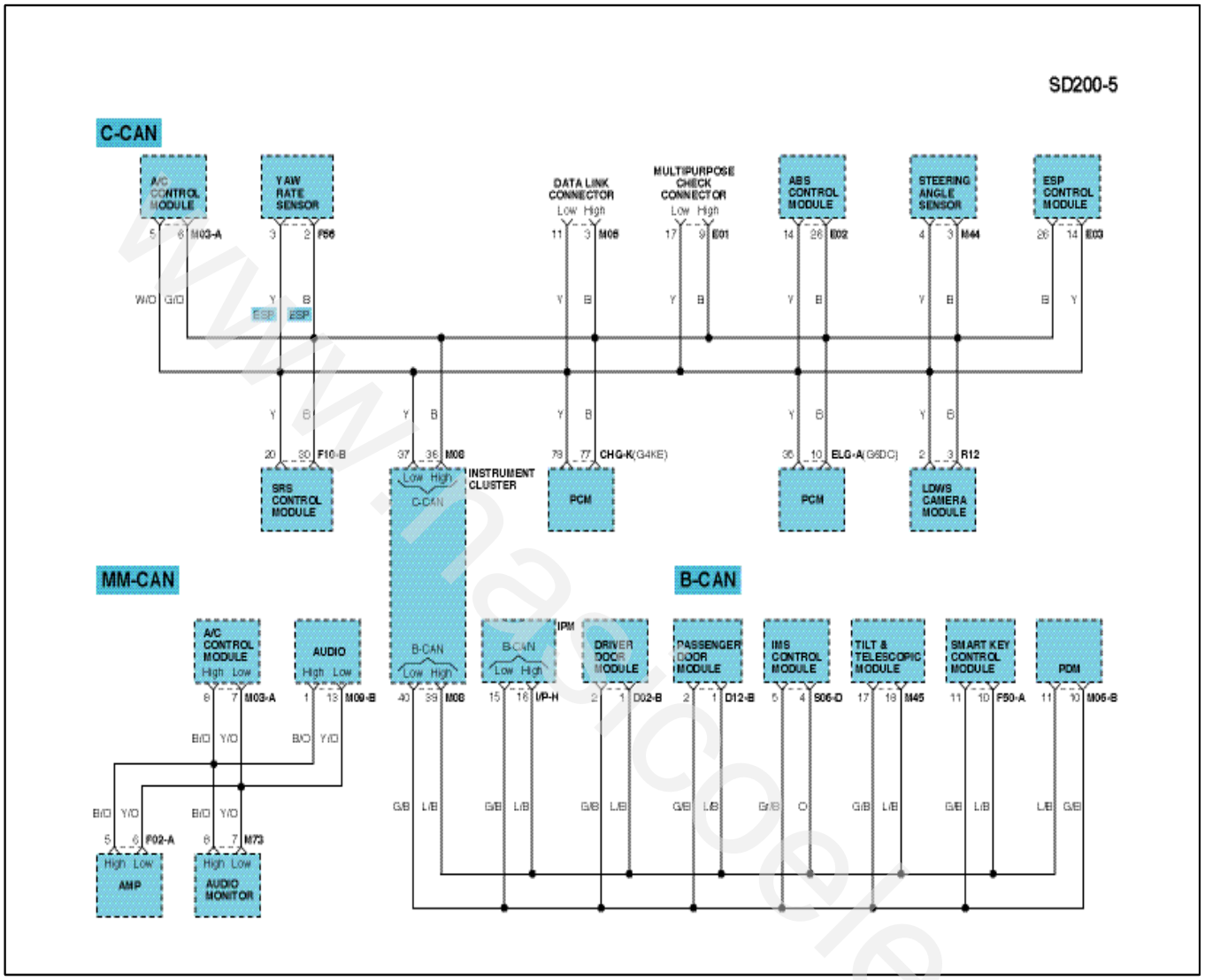
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

FC00 DTC 가이드 전체회로도 입력用

Full Circuit Diagram



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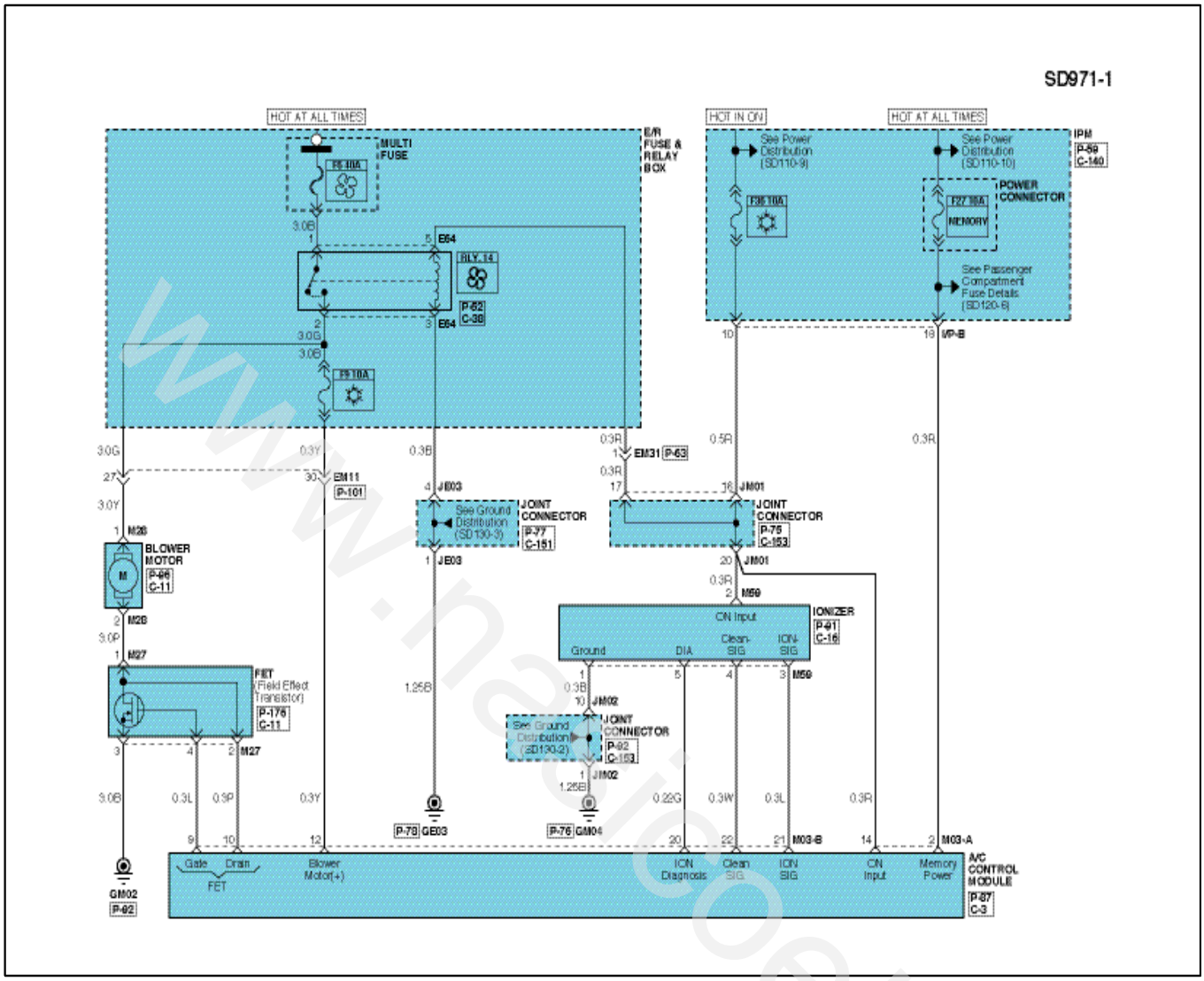

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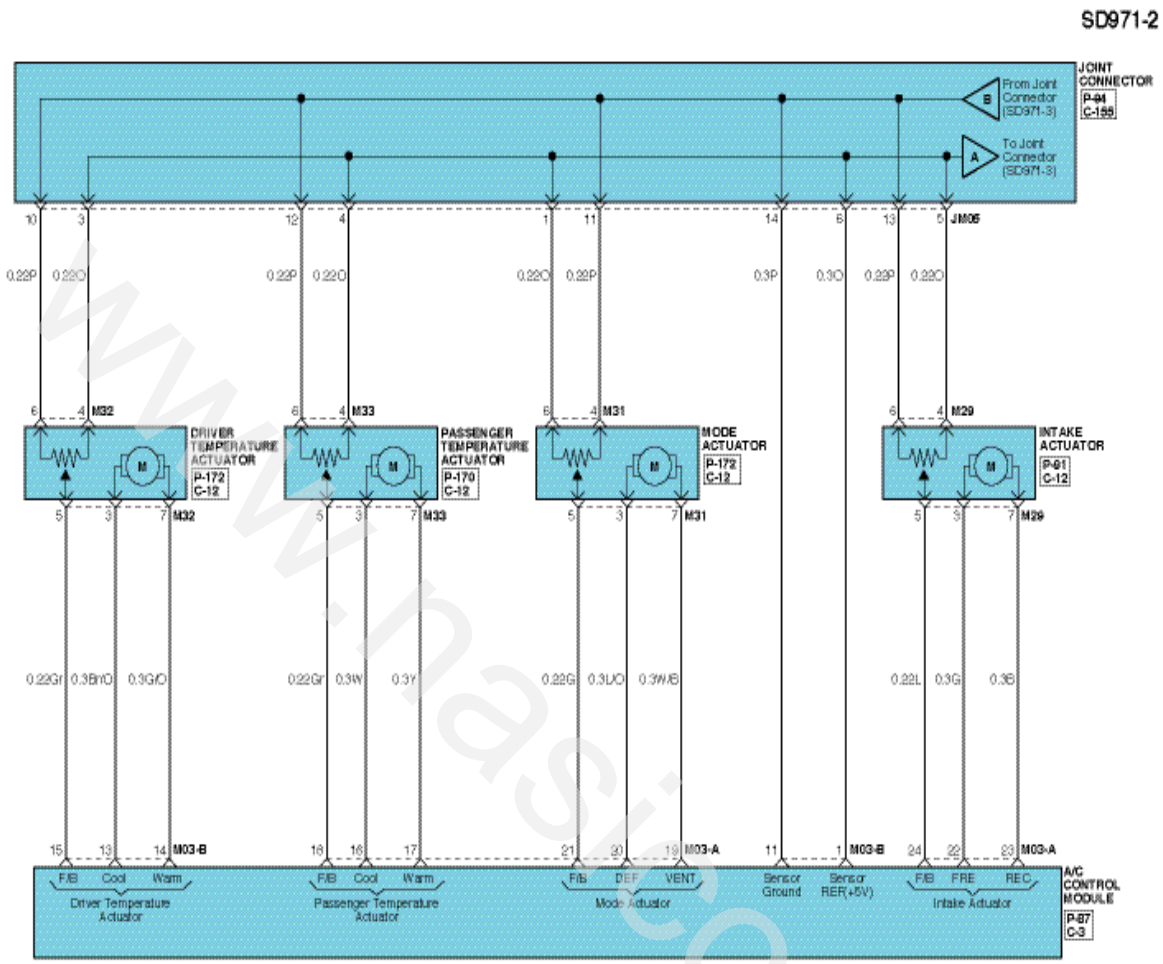

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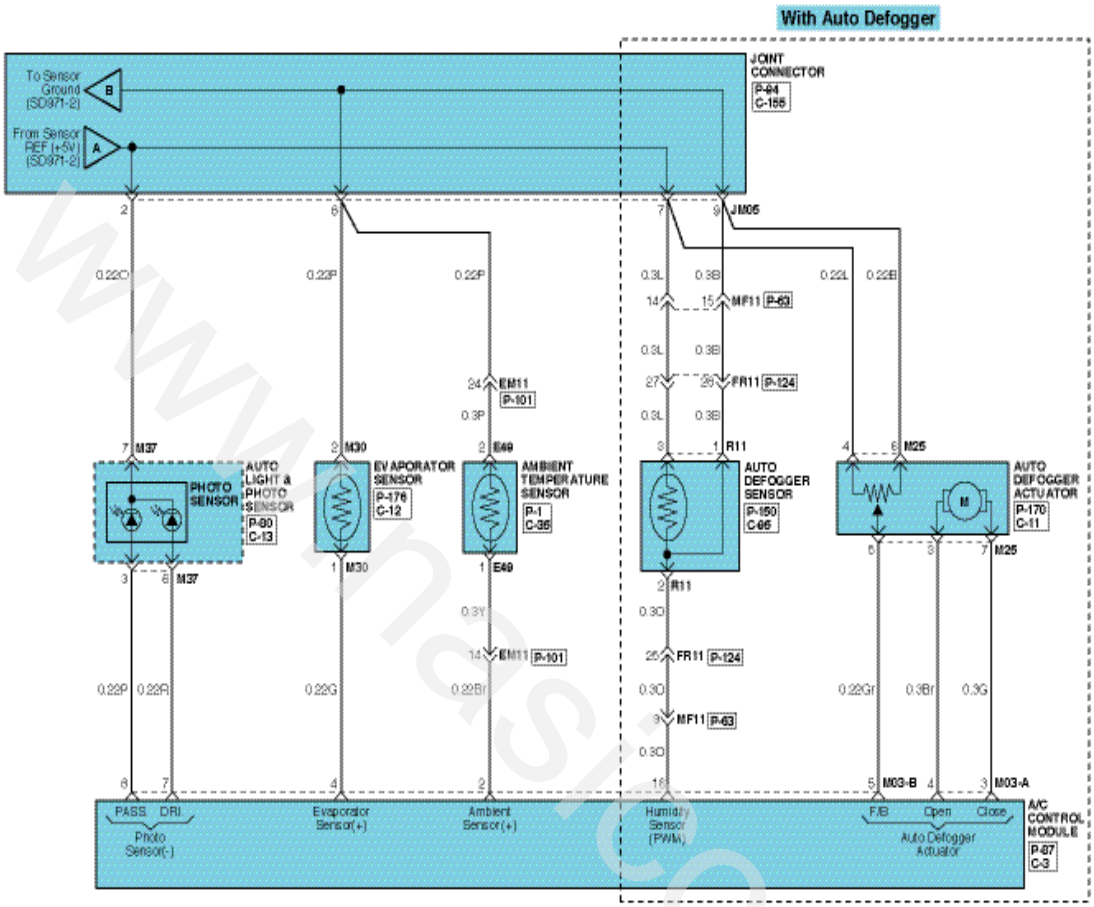
SD971-3



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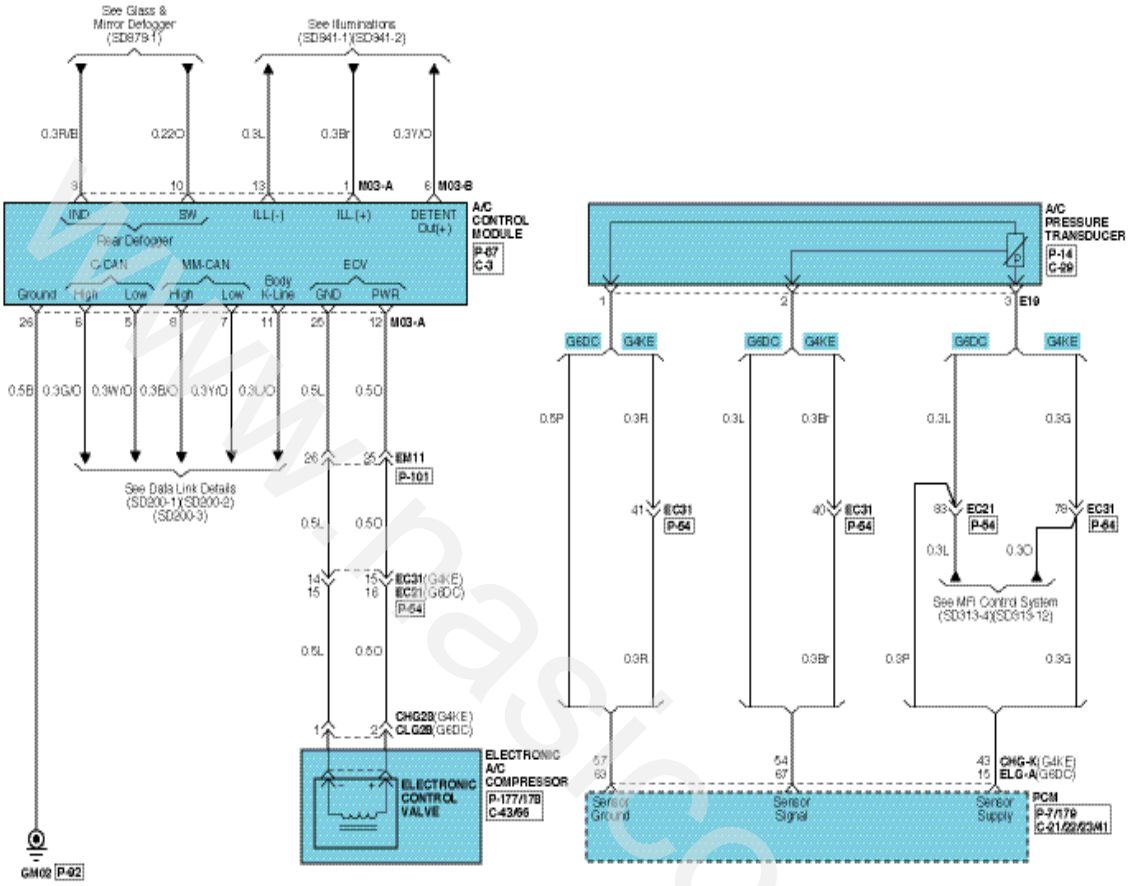
SD971-4



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