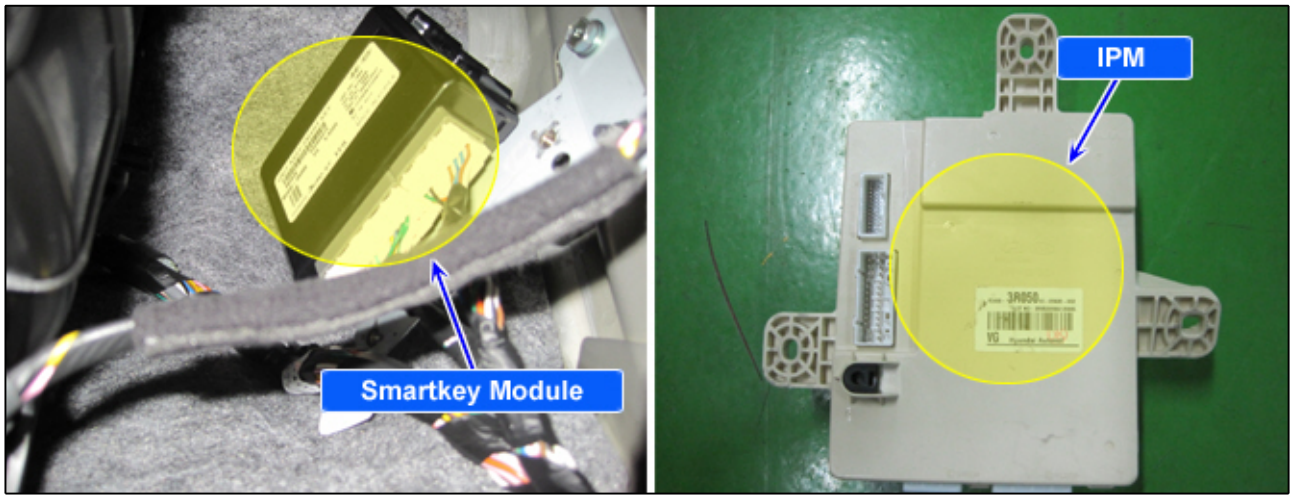
B1602 CAN Error

Component Inspection



VG12SK10B160211

General Description

CAN Communication is a circuit, consists of CAN LOW and CAN HIGH, in order to communicate among control units.

Control Modules are respectively communicating via CAN line in order to control Body Electrical.

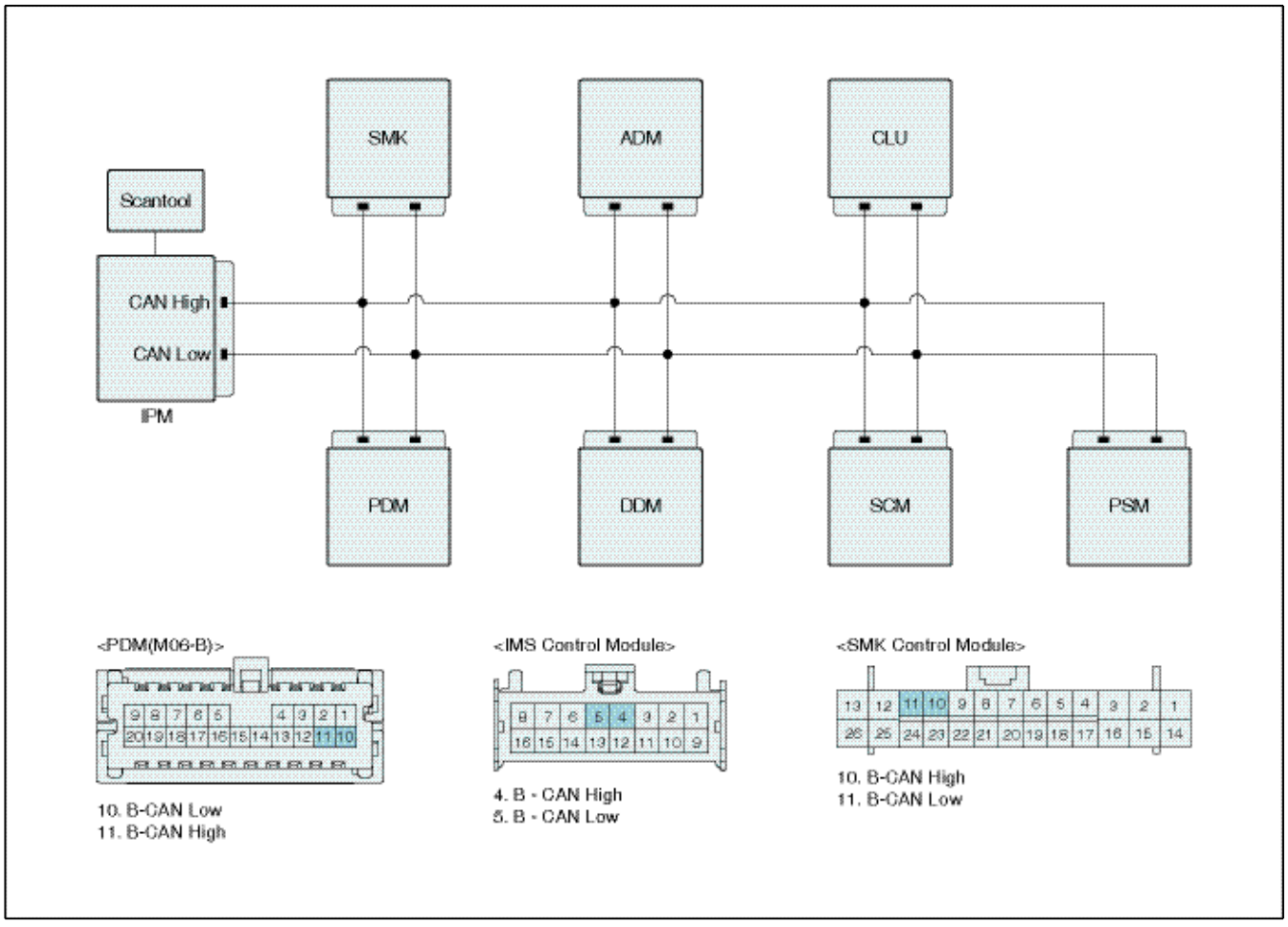
DTC Description

DTC B1602 is set if Smartkey Module detects that CAN HIGH or CAN LOW is short to battery, short to ground, open and short between CAN High and CAN Low each other.

DTC Detecting Condition

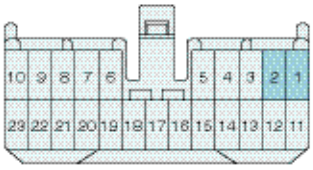
Item	Detecting Condition	Possible Cause
DTC Strategy	• CAN Signal Check	1. Can high : Short to battery 2. Can low : Short to ground 3. Short between CAN high and low wire. 4. Poor contact or open in CAN high or Low 5. Faulty Smartkey Module(PIC IMMO Unit)
Enable Conditions	• IG KEY ON or Engine ON.	
Threshold value	• Received error massage from CAN TRANCEIVER ERR PIN : CAN LINE ERROR * Checked ERR PIN at each 10ms(NORMAL MODE, SLEEP WAITING MODE, DIAGNOSIS MODE) 1) When 'L' LEVEL is detect, plus 1 on ERROR COUNTER. 2) When 'H' LEVEL is detect, minus 40 on ERROR COUNTER. • When ERROR COUNTER value is over 200, ERROR decision. • When CLEAR order is received , set the value to 0.	
Diagnostic Time	• For more than 2 seconds	

Diagnostic Circuit Diagram



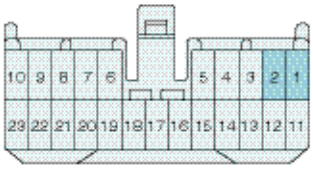
VG12SK10B1602D

<Passenger Door Module>



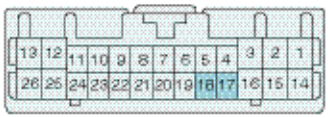
1. B-CAN High
2. B-CAN Low

<Driver Door Module>



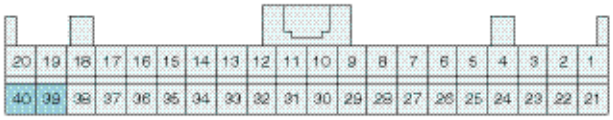
1. B-CAN High
2. B-CAN Low

<Tilt & Telescopic Module>



17. B-CAN Low
18. B-CAN High

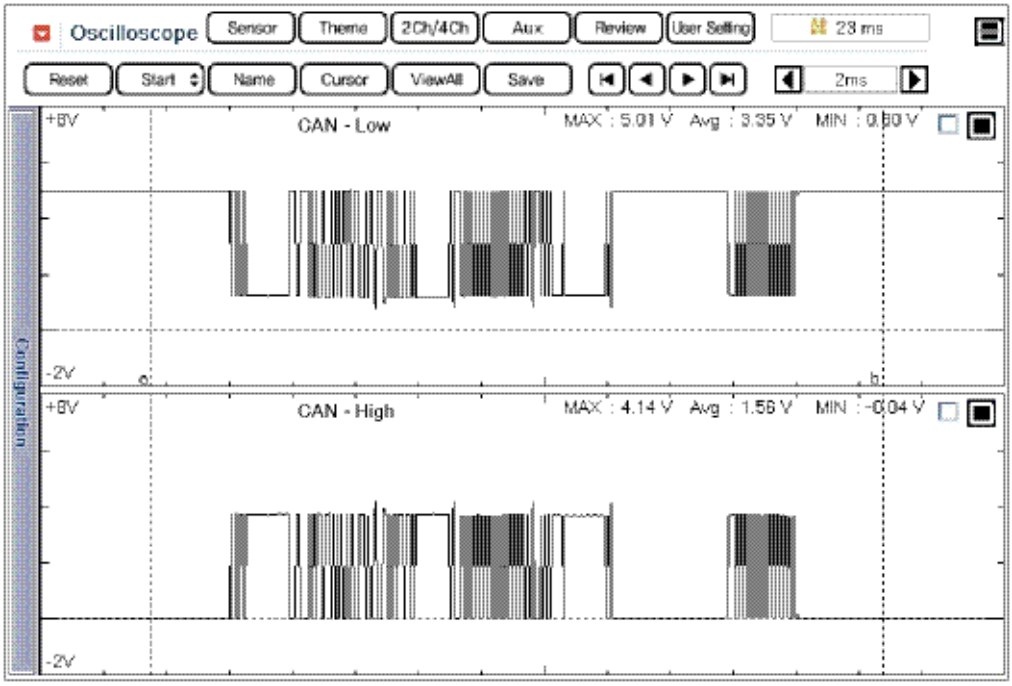
<Instrument Cluster>



39. B-CAN High
40. B-CAN Low

VG12SK10B1602D1

Signal Waveform & Data



YF12SK50B160211S

Monitor Scantool data

■ Check DTC

1. Check DTC with scantool.
2. Check DTC related CAN communication is set on Smartkey Module and every modules.
3. If there is DTC related Module Check the DTC according to troubleshooting guide.
4. Repair and erase the DTC with Scantool.
5. Is the DTC erased?

YES ▶ Check poor connection between harness connector and Smartkey Module or PCM/ECM
: Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. Repair or replace as necessary Repair" procedure.

NO ▶ Go to next 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.

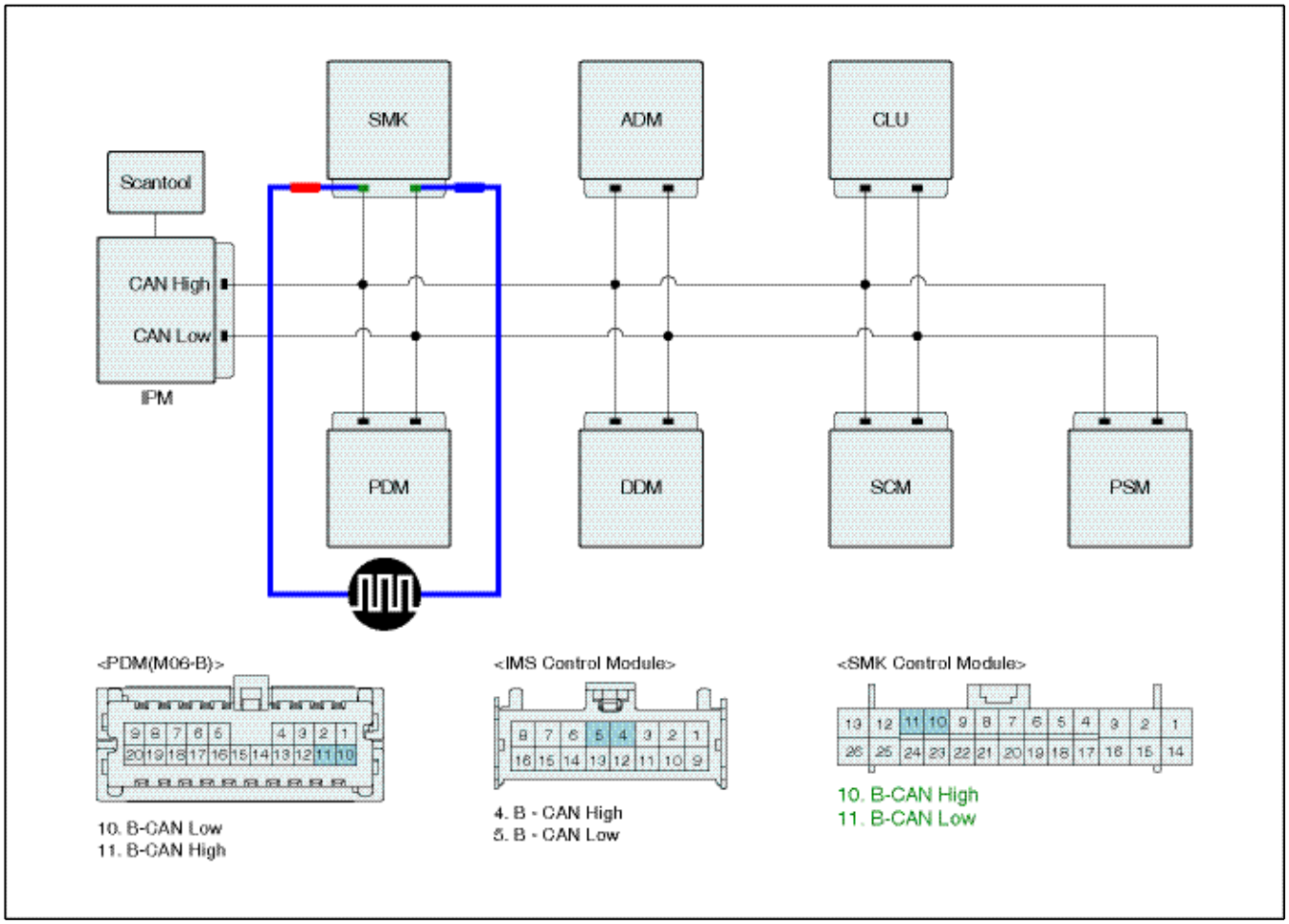
NO ▶ Go to "Check CAN communication Line" procedure.

CAN communication Line Inspection

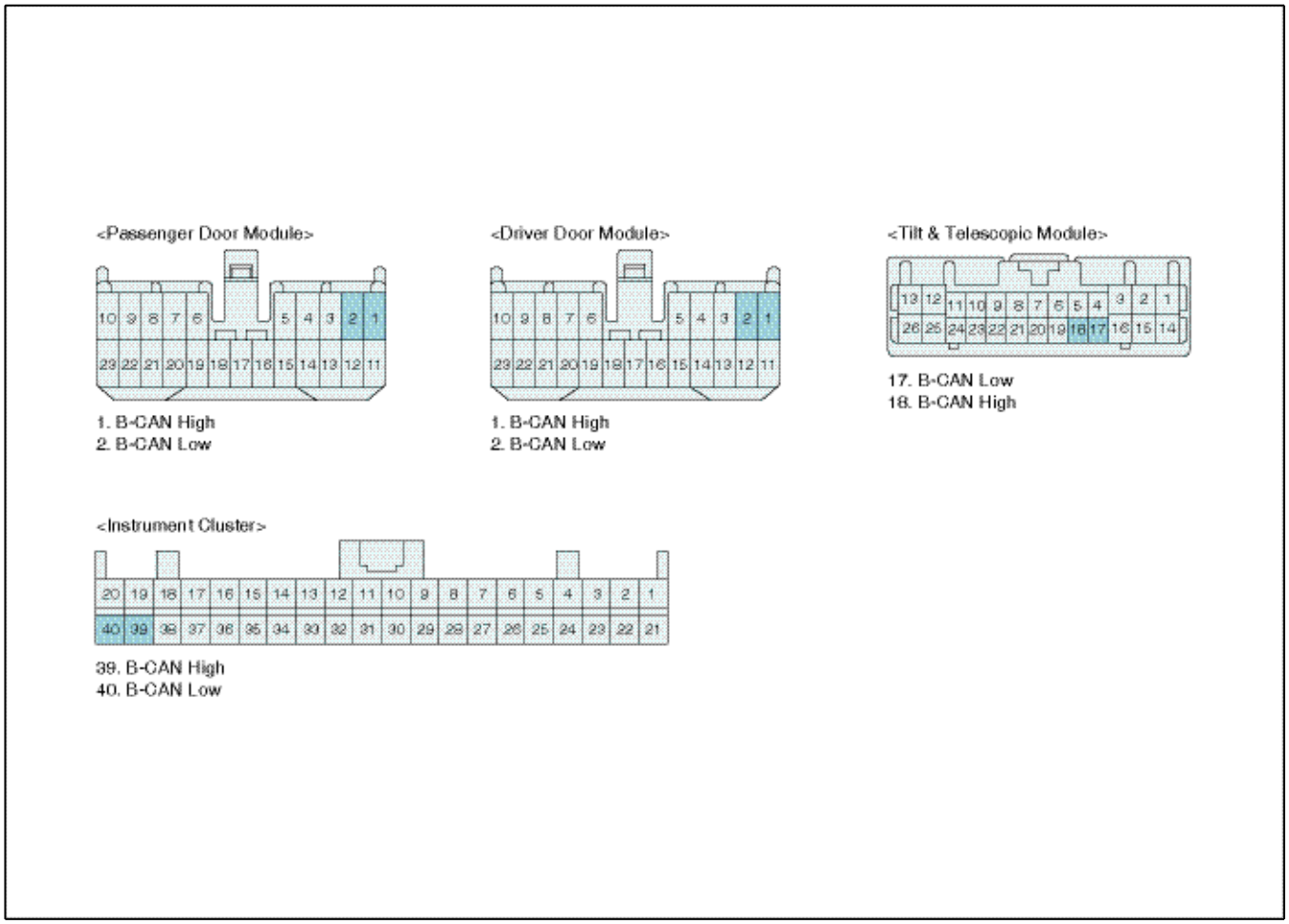
■ Check CAN communication

1. Connect all of control module connector.
2. IG KEY ON.
3. Make CAN communication is wake up status (Ex. . ON/OFF Door SW)
4. Measure signal waveform of B-CAN-HIGH terminal of SMK Module connector and chassis ground.
5. Measure signal waveform of B-CAN-LOW terminal of SMK Module connector and chassis ground.

Specification : Refer to Signal waveform and Data



VG12SK10B160231



VG12SK10B160231-1

6. Is the measrured signal waveform normal?

YES ▶ Check poor connection between harness connector and Smartkey 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.
▶ Disconnect SMK Module, IPM, PDM and Instrument Cluster one by one and then, check that DTC is erased with scantool.
▶ Substitute with a known-good module and check for proper operation. If the problem is corrected, replace module and then go to "Verification of Vehicle Repair" procedure.

NO ▶ If the measured value is battery voltage, check short to battery in CAN line. Repair or replace as necessary. And then, go to "Verification of Vehicle Repair" procedure. In case that Communication is in sleep mode, 12V will be measured. Therefore, check that communication is in Wake up status.
▶ If 0V is detected, Check short to ground, short between CAN high and low each other or open in CAN high or CAN low harness. 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.

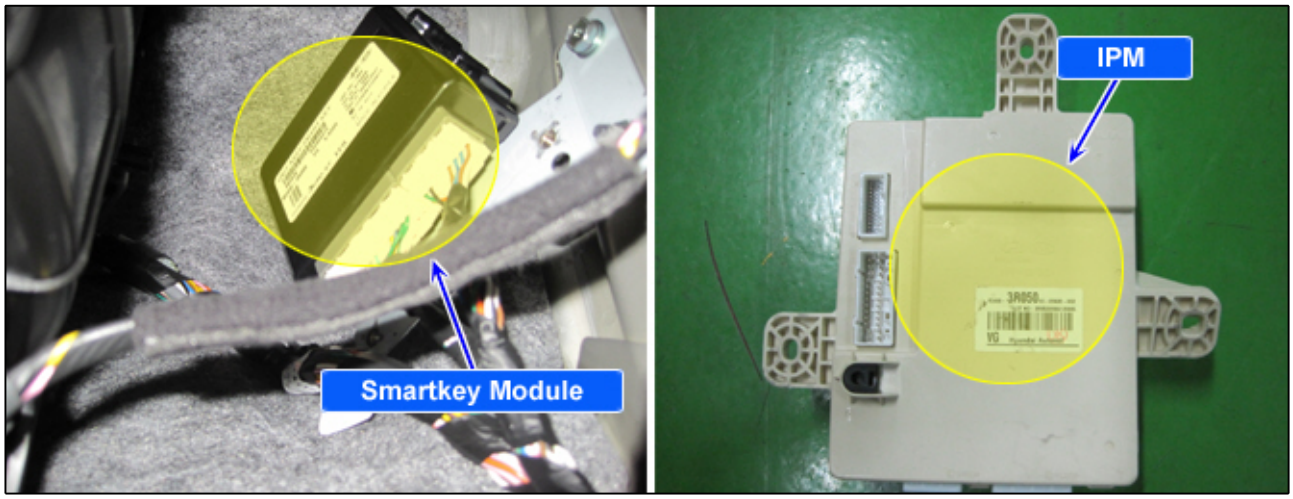
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1603 CAN Bus Off

Component Inspection



VG12SK10B160211

General Description

Smartkey Module sets DTC B1603 if smart key module detects short to battery, short to ground in CAN HIGH and CAN low simultaneously.

This DTC means that both CAN HIGH and CAN LOW line are error. Therefore, CAN communication is not available.

DTC Description

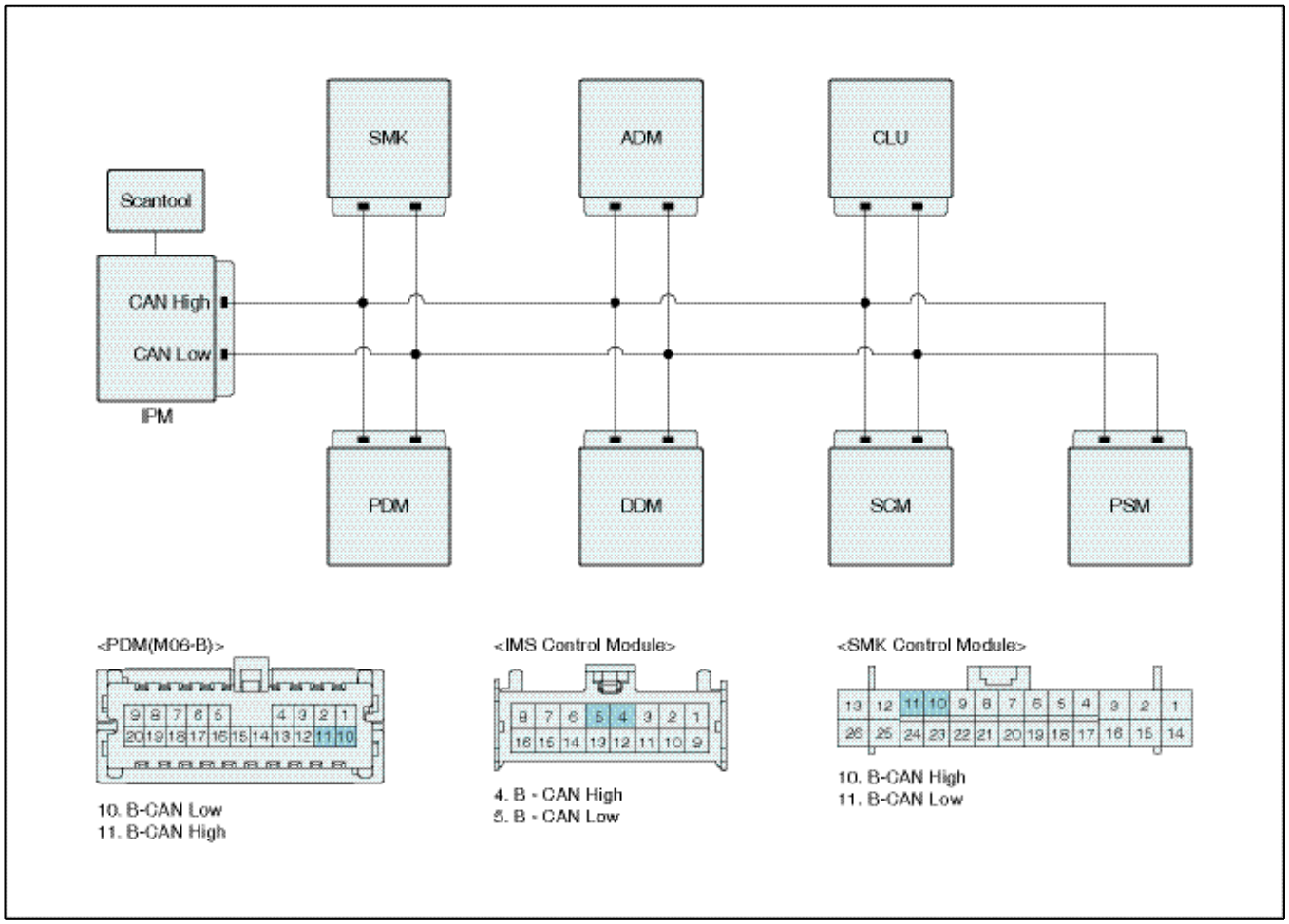
Smartkey Module sets DTC B1603 if smart key module detects short to battery, short to ground in CAN HIGH and CAN low simultaneously.

This DTC means that both CAN HIGH and CAN LOW line are error. Therefore, CAN communication is not available.

DTC Detecting Condition

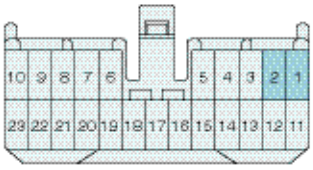
Item	Detecting Condition	Possible Cause
DTC Strategy	• CAN signal check	1. Poor connection 2. Power supply to Smartkey Unit (PIC IMMO Unit) 3. Short to battery or ground in C-AN high or low signal toge 4. Smartkey Unit(PIC IMMO Unit)
Enable Conditions	• IG ON or Engine ON	
Threshold value	• Tx fail is detect after CAN message received from SMK SW	
Diagnostic Time	• Right after DTC detected	

Diagnostic Circuit Diagram



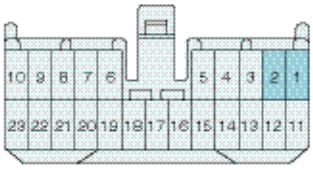
VG12SK10B1602D

<Passenger Door Module>



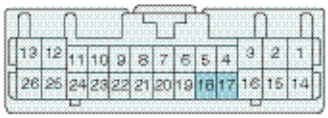
1. B-CAN High
2. B-CAN Low

<Driver Door Module>



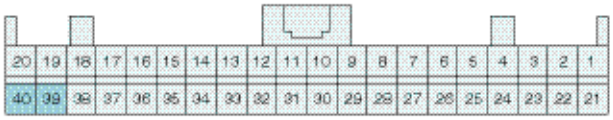
1. B-CAN High
2. B-CAN Low

<Tilt & Telescopic Module>



17. B-CAN Low
18. B-CAN High

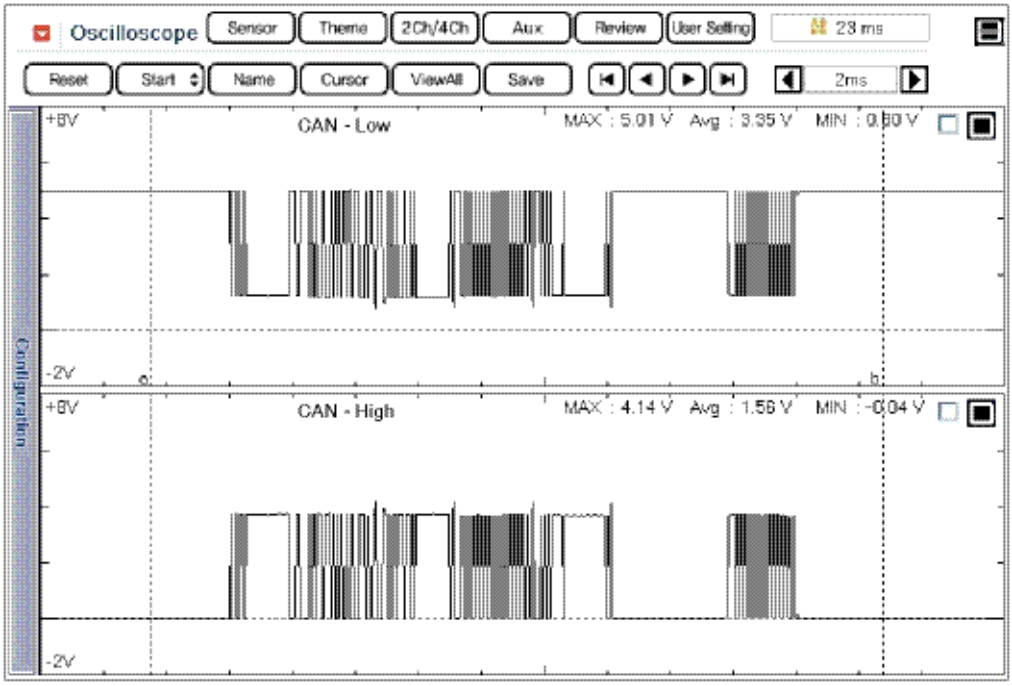
<Instrument Cluster>



39. B-CAN High
40. B-CAN Low

VG12SK10B1602D1

Signal Waveform & Data



YF12SK50B160211S

Monitor Scantool data

■ Check DTC

1. Check DTC with scantool.
2. Check DTC related CAN communication is set on Smartkey Module and every modules.
3. If there is DTC related Module Check the DTC according to troubleshooting guide.
4. Repair and erase the DTC with Scantool.
5. Is the DTC erased?

YES ▶ Check poor connection between harness connector and Smartkey Module or PCM/ECM
: Thoroughly check the looseness, poor connection, bent, corrison, contamination, deformation or damage of connector. Repair or replace as necessary Repair" procedure.

NO ▶ Go to next 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.

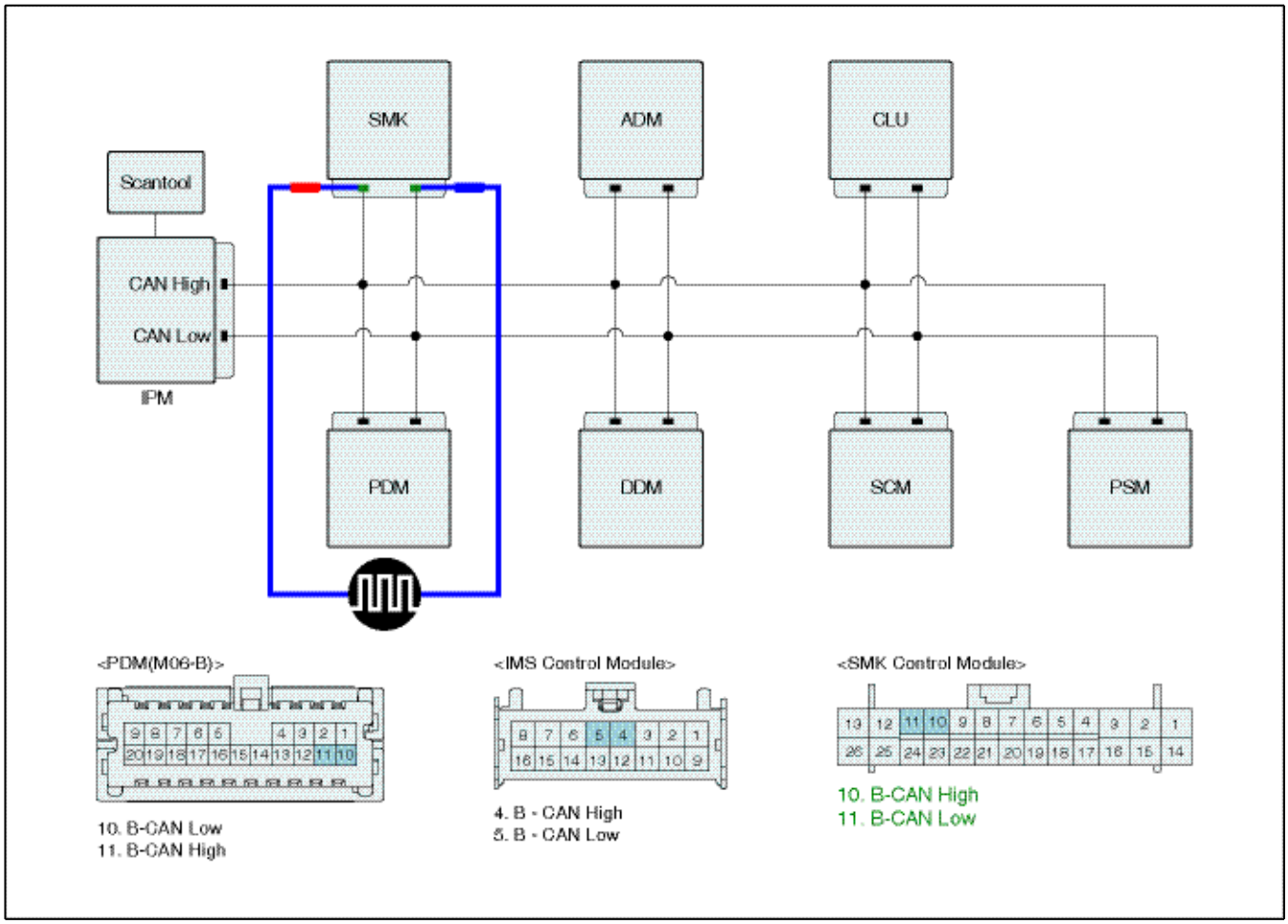
NO ▶ Go to "Check CAN communication Line" procedure.

CAN communication Line Inspection

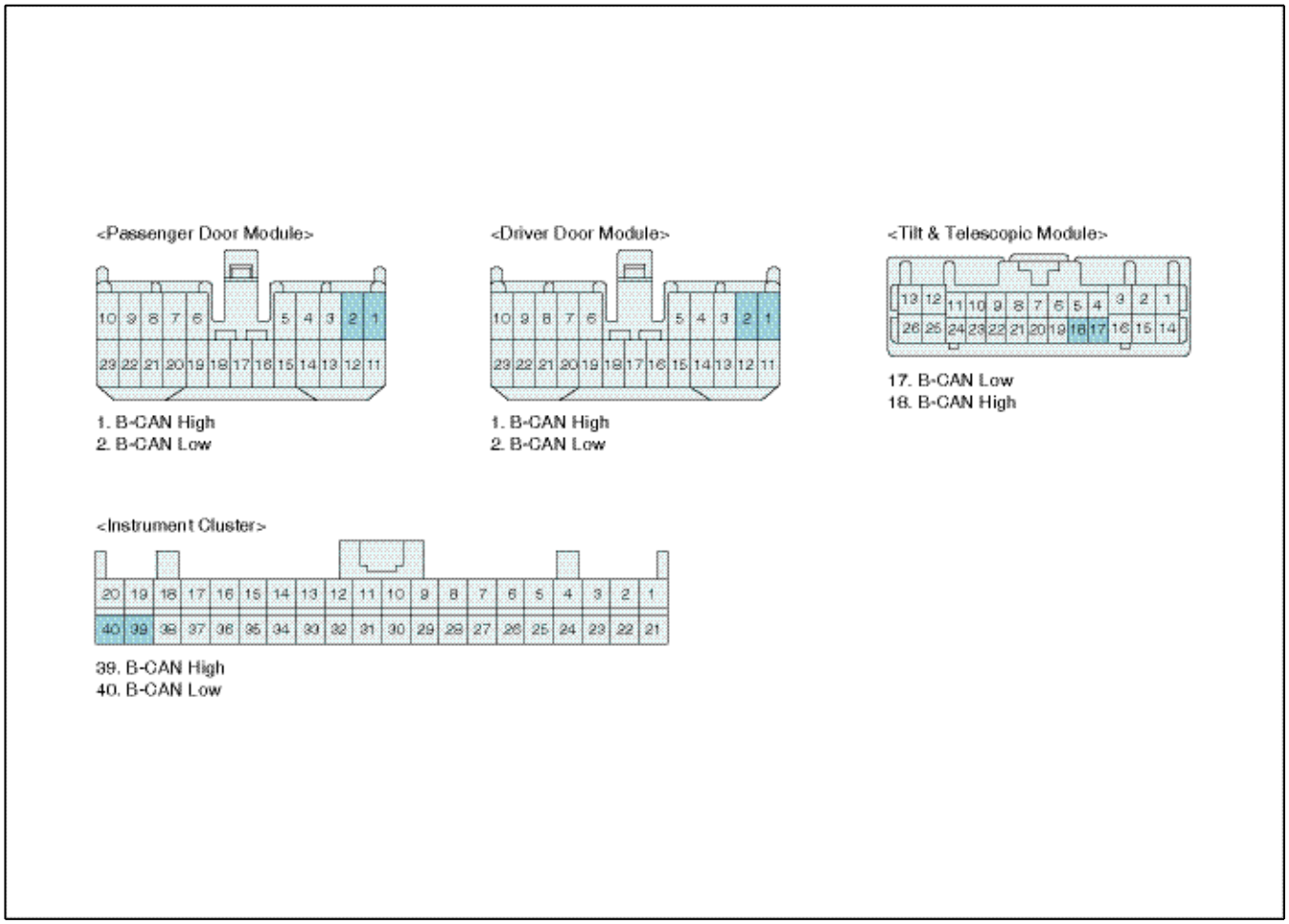
■ Check CAN communication

1. Connect all of control module connector.
2. IG KEY ON.
3. Make CAN communication is wake up status (Ex. . ON/OFF Door SW)
4. Measure signal waveform of B-CAN-HIGH terminal of SMK Module connector and chassis ground.
5. Measure signal waveform of B-CAN-LOW terminal of SMK Module connector and chassis ground.

Specification : Refer to Signal waveform and Data



VG12SK10B160231



VG12SK10B160231-1

6. Is the measrured signal waveform normal?

YES ▶ Check poor connection between harness connector and Smartkey 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.
▶ Disconnect SMK Module, BCM(IPM), PDM and Instrument Cluster one by one and then, check that DTC is erased with scantool.
▶ Substitute with a known-good module and check for proper operation. If the problem is corrected, replace module and then go to "Verification of Vehicle Repair" procedure.

NO ▶ If the measured value is battery voltage, check short to battery in CAN line. Repair or replace as necessary. And then, go to "Verification of Vehicle Repair" procedure. In case that Communication is in sleep mode, 12V will be measured. Therefore, check that communication is in Wake up status.
▶ If 0V is detected, Check short to ground, short between CAN high and low each other or open in CAN high or CAN low harness. 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.

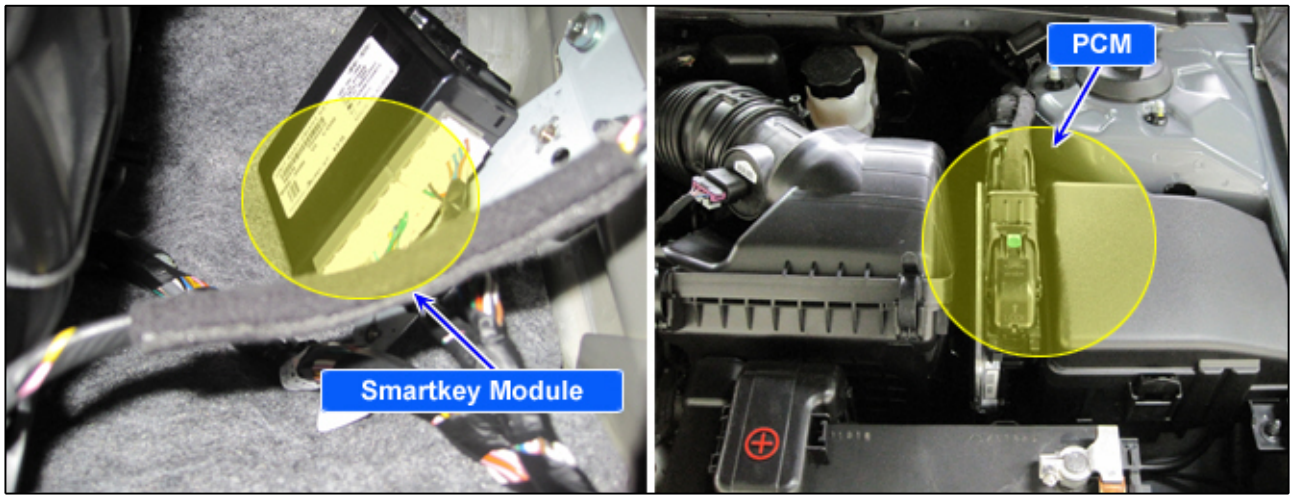
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1625 ECM Communication Data Failure

Component Inspection



VG12SK10B162511

General Description

Smartkey Module communicates with PCM through the serial communication line. If PCM requests authetication from Smartkey Module after IG ON, Smartkey Module check authentication with transponder then, sends this signal to PCM whether authentication is O.K or not.

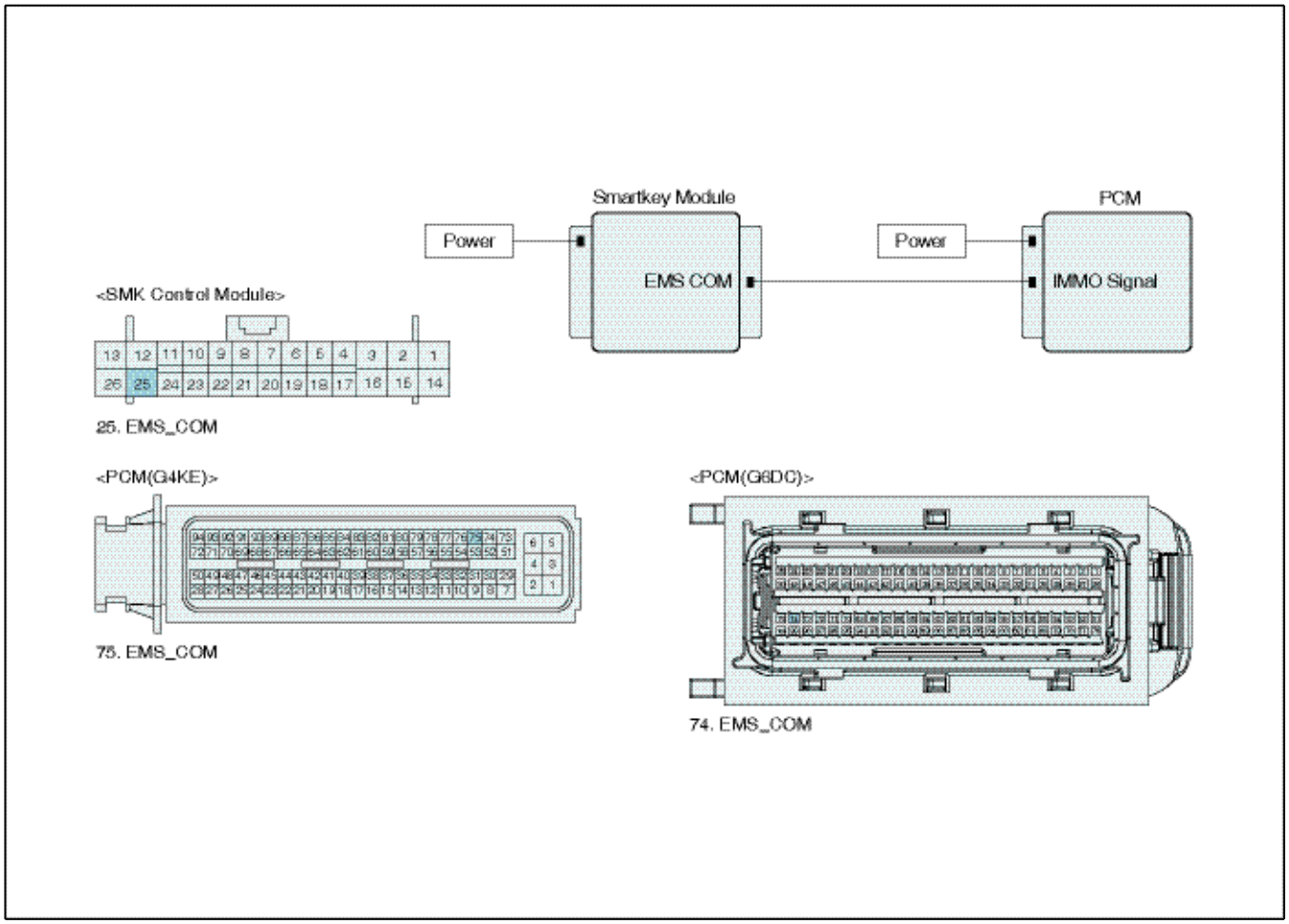
DTC Description

Smartkey Module sets DTC B1625 if Data from ECM is error such as check sum error, Data Frame error, ID Unknown error, Data length error and Time out error.

DTC Detecting Condition

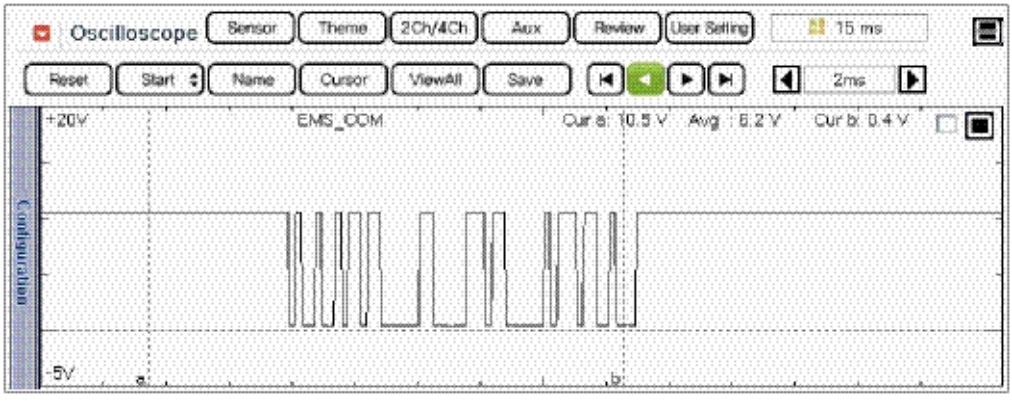
Item	Detecting Condition	Possible Cause
DTC Strategy	• Checking Data stauts receiving from PCM/ECM	1. Poor connection 2. Power supply to Smartkey Unit (SMK IMMO Unit) 3. Communication open/ Short in PCM communication Line 4. Check noise at SMK communi-cation Line coming from PCM 5. Smartkey Unit(SMK IMMO Unit) 6. PCM
Enable Conditions	• Data receiving from PCM/ECM when IGN OFF to ON	
Threshold value	• Fault Data receiving from PCM/ECM	
Diagnostic Time	• DTC sets if PCM/ECM Data errors for 5 times	

Diagnostic Circuit Diagram



VG12SK10B1625D

Signal Waveform & Data



VG12SK10B162511S

Monitor Scantool data

■ Check DTC status

1. Check DTC on the PCM/ECM with Scantool.
2. Check that there is any DTC related PCM/ECM.
3. Perform Troubleshooting the DTC from PCM/ECM with appropriate DTC Troubleshooting Guide first.
4. Repair or replace as necessary after erasing DTC with Scantool.
5. Check DTC on SMK Module side and erase the DTC with scantool.
6. Has the DTC gone after erasing with scantool?

YES ▶ Check poor connection between harness connector and Smartkey Module or PCM/ECM
: 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.

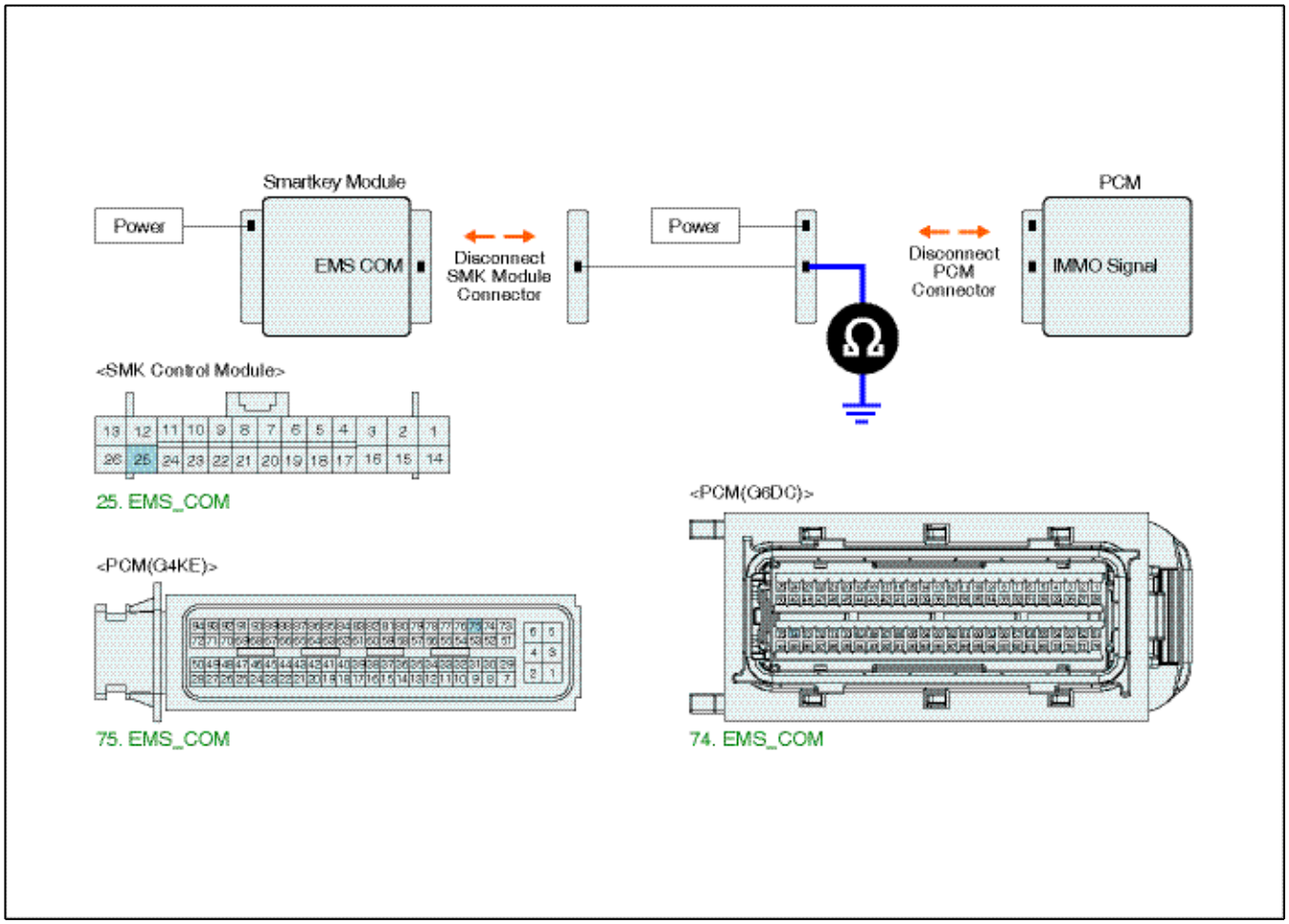
NO ▶ Go to " Check serial commuication Cricuti Inspection" as follow.

Serial Communicatin Circuit Inspection

■ Check short in serial communication line

1. "IG KEY OFF".
2. Disconnect Smartkey Module connector and PCM/ECM connector.
3. Measure resistance between serial communication signal terminal of PCM/ECM harness connector and chassis ground.

Specificatin : Infinite (∞)



VG12SK10B162531

4. Is the measured resistance within specification?

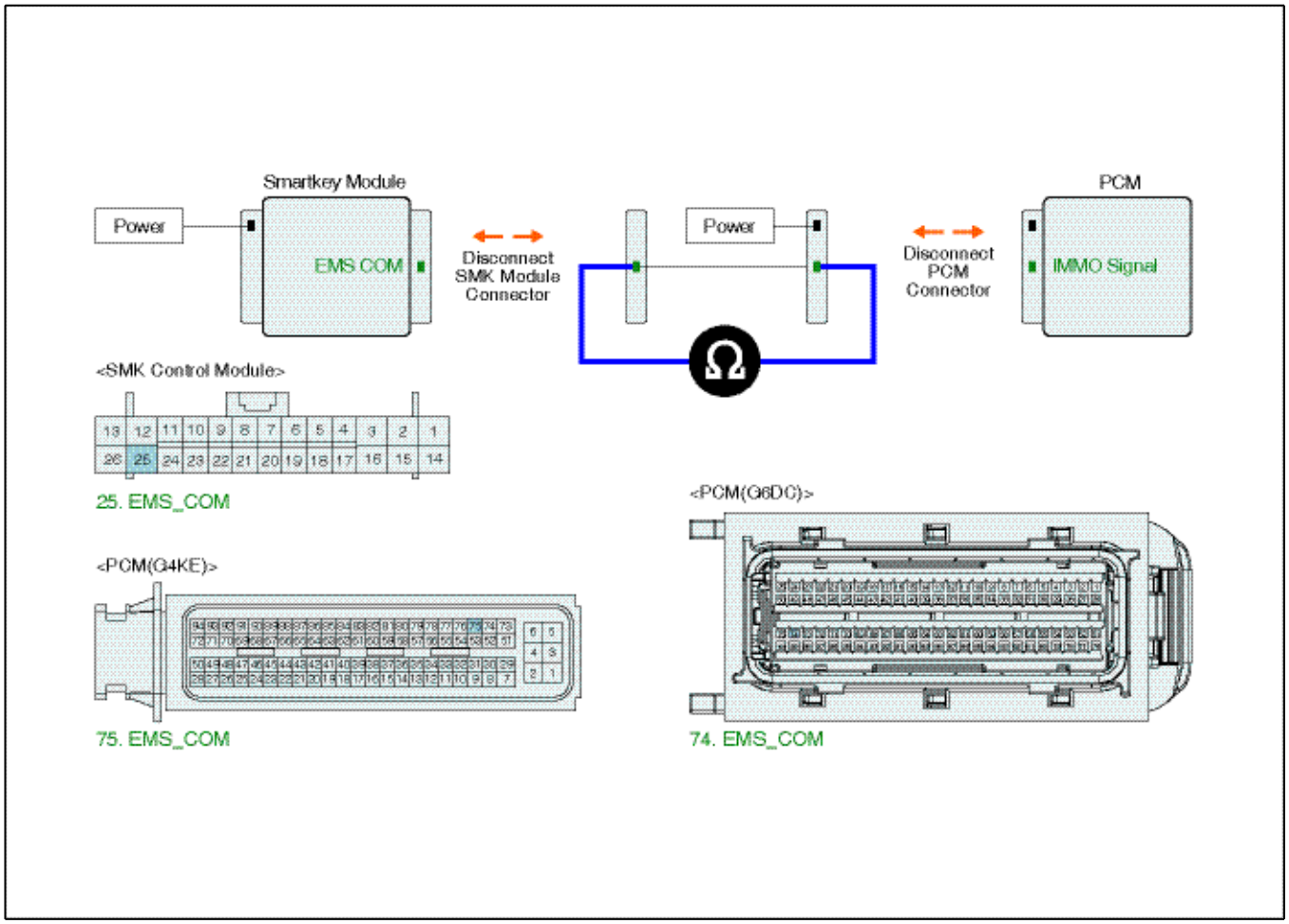
YES ▶ Go to open in harness as follow.

NO ▶ Check short to ground in harness. And then , repair or replace as necessary. Finally, go to "Verification of Vehicle Repair" procedure.

■ Check open in harness

1. IG KEY OFF.
2. Disconnect Smartkey Module connector and PCM/ECM connector.
3. Measure resistance between signal terminal of Smartkey Module harness connector and signal terminal of PCM/ECM harness connector.

Specification : About below 1Ω



VG12SK10B162532

4. Is the measured resistance within specification?

YES ▶ Check poor connection between harness connector and Smartkey Module or PCM/ECM
: 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 open in signal harness. And, repair or replace as necessary 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.

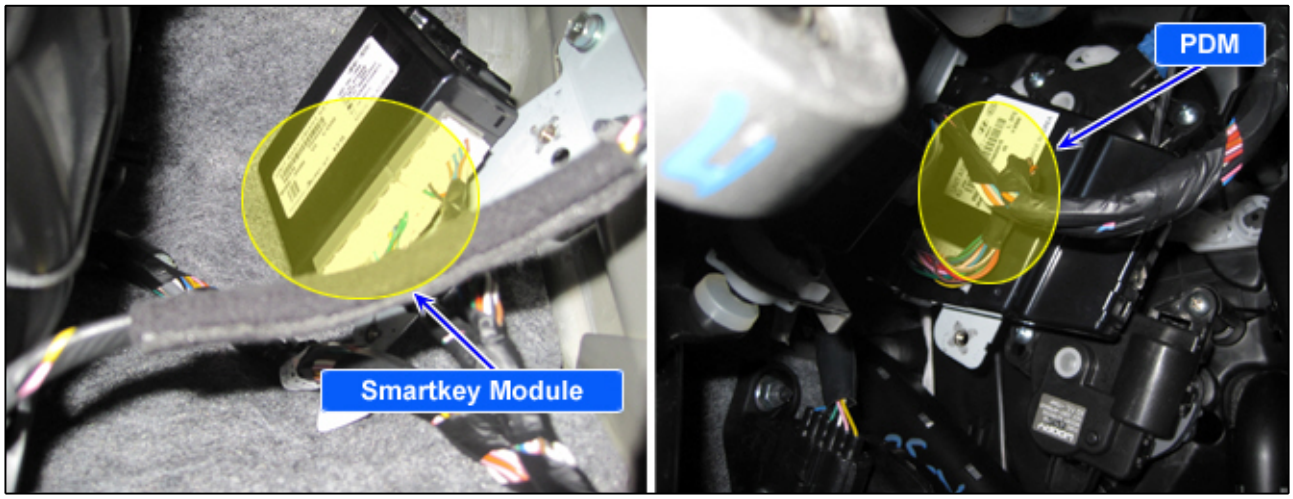
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1689 CAN Time-out PDM

Component Inspection



VG12SK10B168911

General Description

CAN Communication is a circuit, consists of CAN LOW and CAN HIGH, in order to communicate among control units.

Control Modules are respectively communicating via CAN line in order to control Body Electrical.

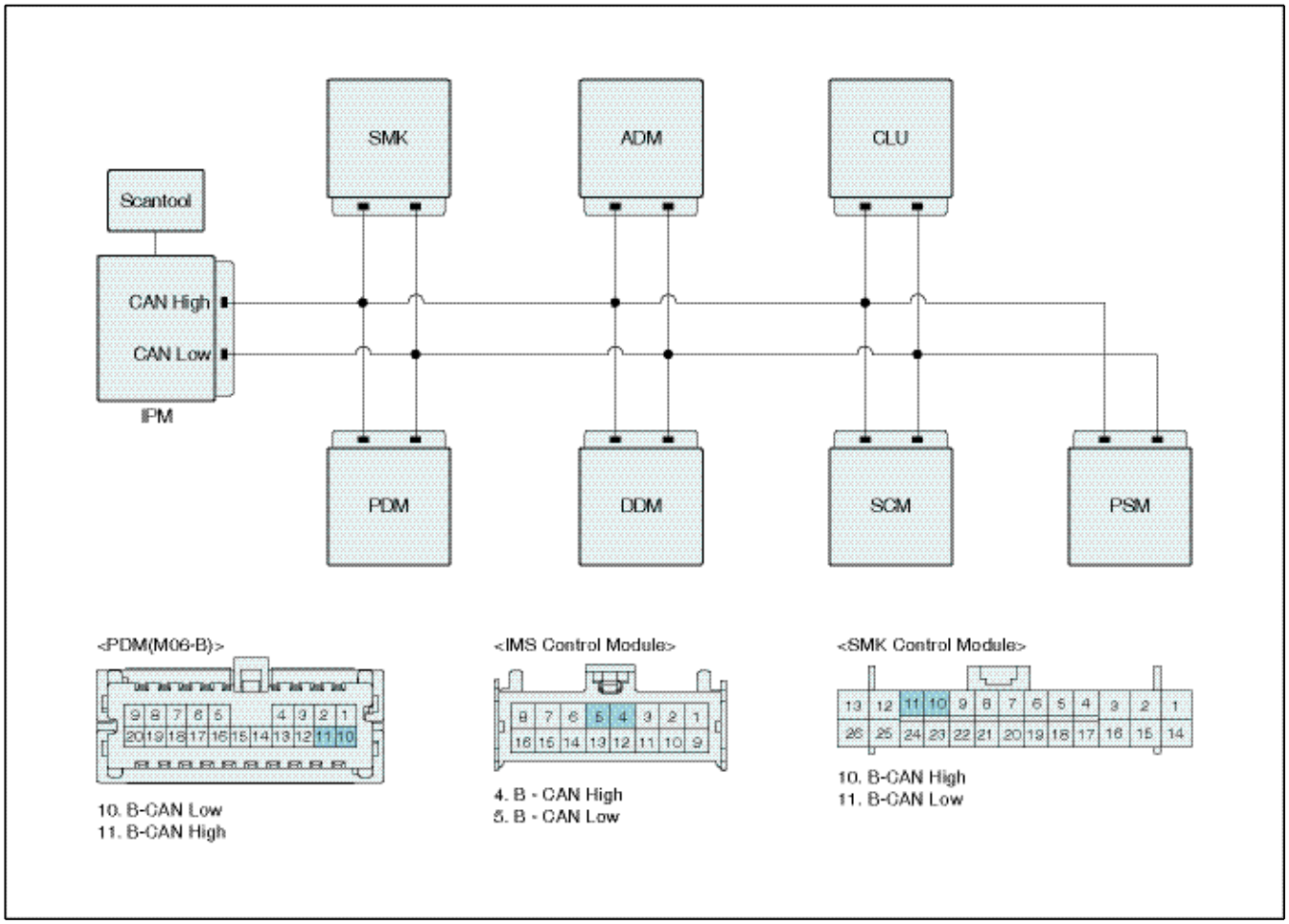
DTC Description

Smart Key module sets DTC B1689 if Smartkey Module have not received CAN signal from PDM for 3 sec.

DTC Detecting Condition

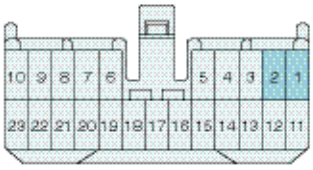
Item	Detecting Condition	Possible Cause
DTC Strategy	• Check CAN message status going to PDM	1. Check PDM installation 2. Check fuses related to PDM 3. Check open in CAN High / Low at PDM 4. Check open in CAN High Low at SMK
Enable Conditions	• SMK IGN ON or Engine ON	
Threshold value	• No can signal message from PDM for 10 sec.	
Diagnostic Time	• Right after DTC detected	

Diagnostic Circuit Diagram



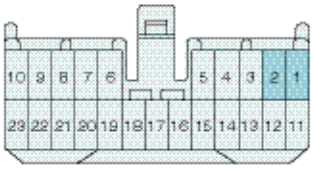
VG12SK10B1602D

<Passenger Door Module>



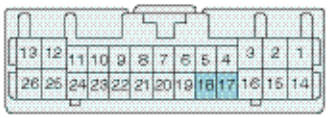
1. B-CAN High
2. B-CAN Low

<Driver Door Module>



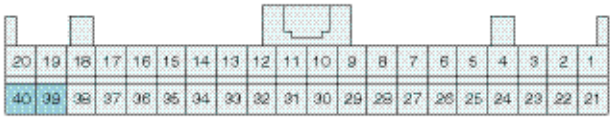
1. B-CAN High
2. B-CAN Low

<Tilt & Telescopic Module>



17. B-CAN Low
18. B-CAN High

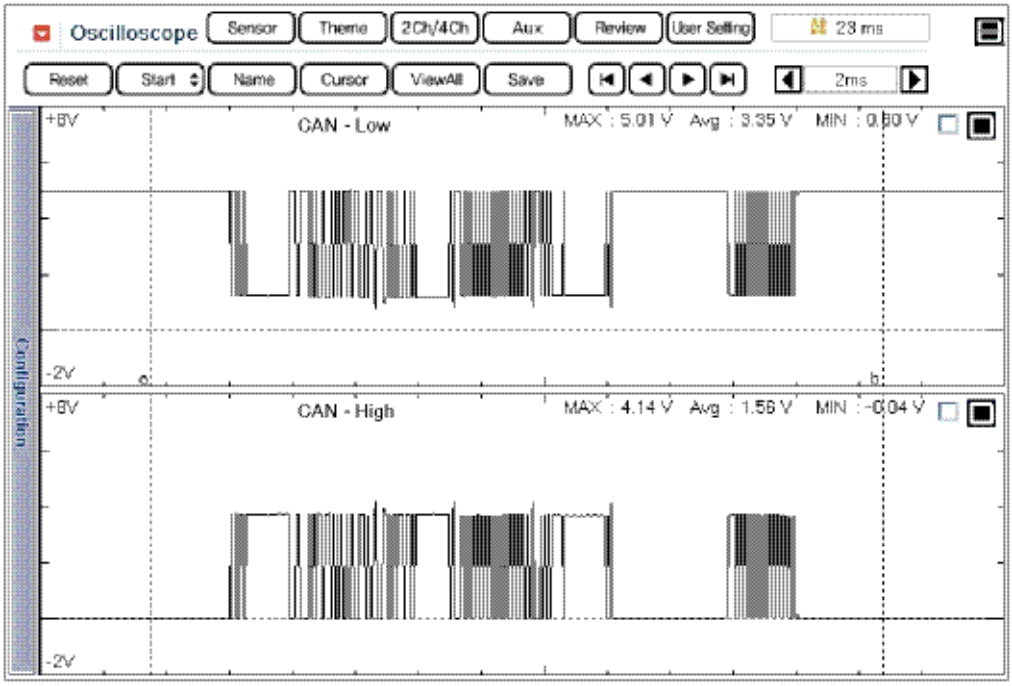
<Instrument Cluster>



39. B-CAN High
40. B-CAN Low

VG12SK10B1602D1

Signal Waveform & Data



YF12SK50B160211S

Monitor Scantool data

■ Check DTC

1. Check DTC with scantool.
2. Check DTC related CAN communication is set on PDM.
3. If there is DTC related PDM, Check the DTC according to troubleshooting guide
4. Repair and erase the DTC with Scantool.
5. Is the DTC erased?

YES ▶ Check poor connection between harness connector and each 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 ▶ Go to next 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.

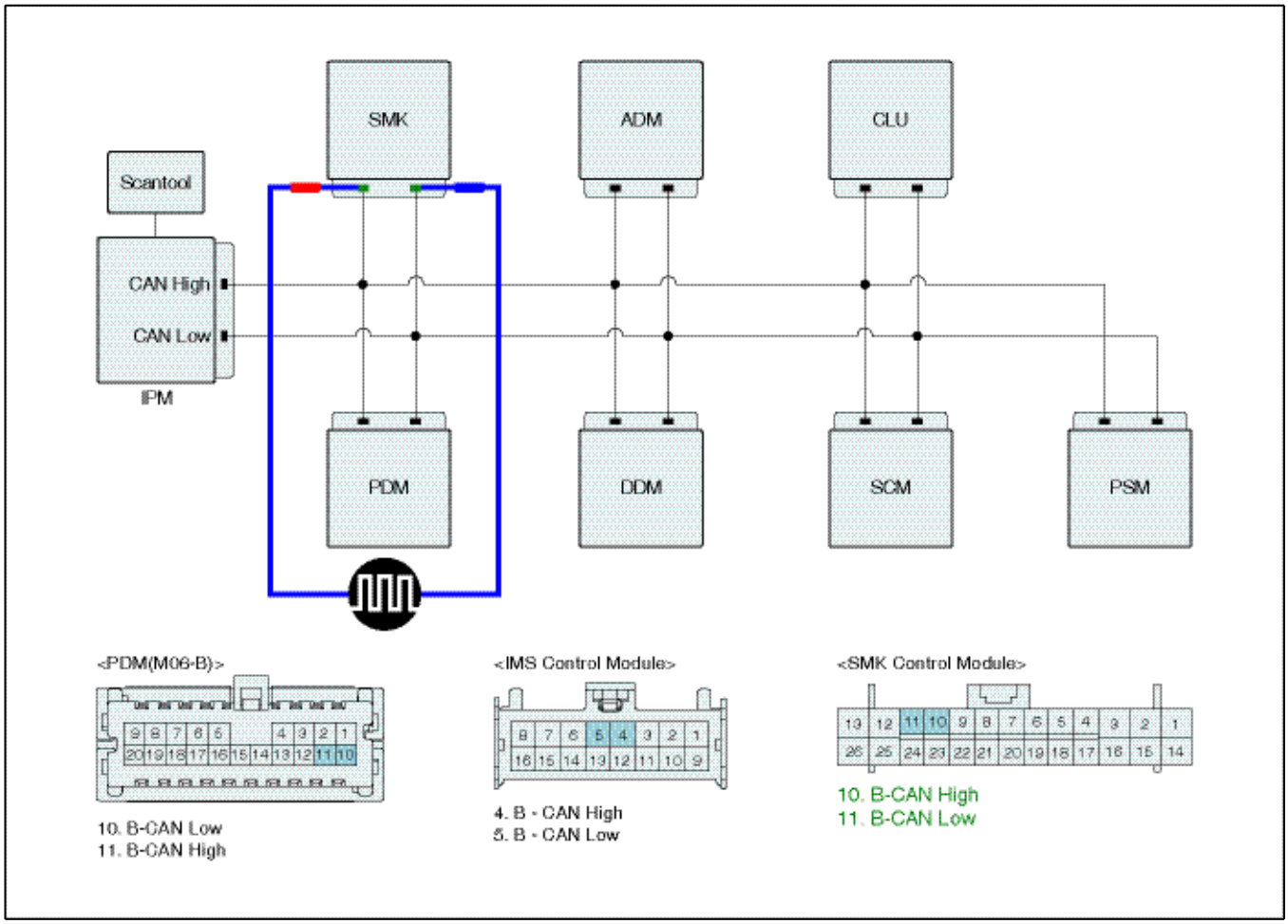
NO ▶ Go to "Check CAN communication Line" procedure.

CAN communication Line Inspection

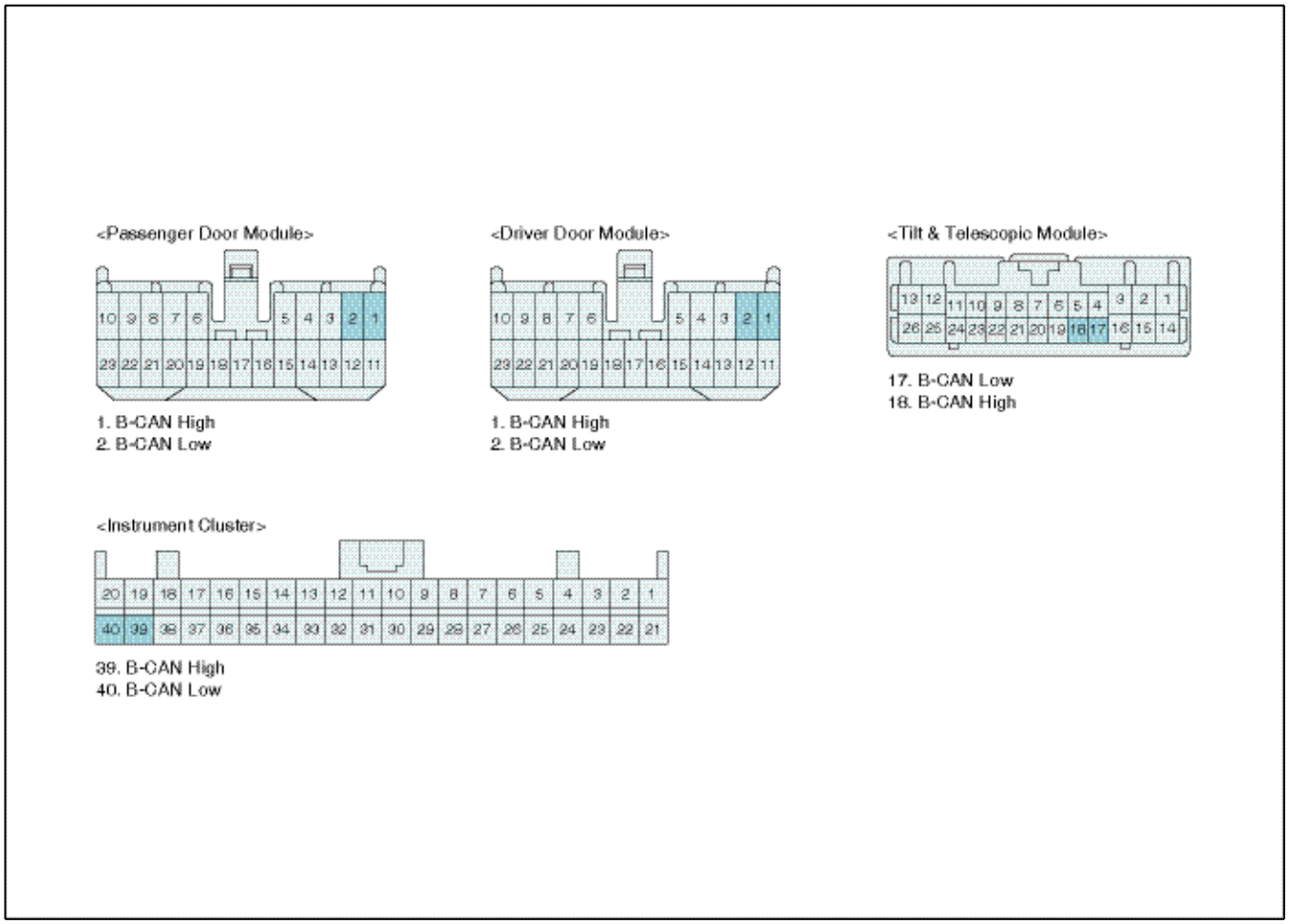
■ Check CAN communication

1. Connect all of control module connector.
2. IG KEY ON.
3. Make CAN communication is wake up status (Ex. . ON/OFF Door SW)
4. Measure signal waveform of B-CAN-HIGH terminal of SMK connector and chassis ground.
5. Measure signal waveform of B-CAN-LOW terminal of SMK Module connector and chassis ground.

Specification : Refer to Signal waveform and Data



VG12SK10B160231



VG12SK10B160231-1

6. Is the measrured signal waveform normal?

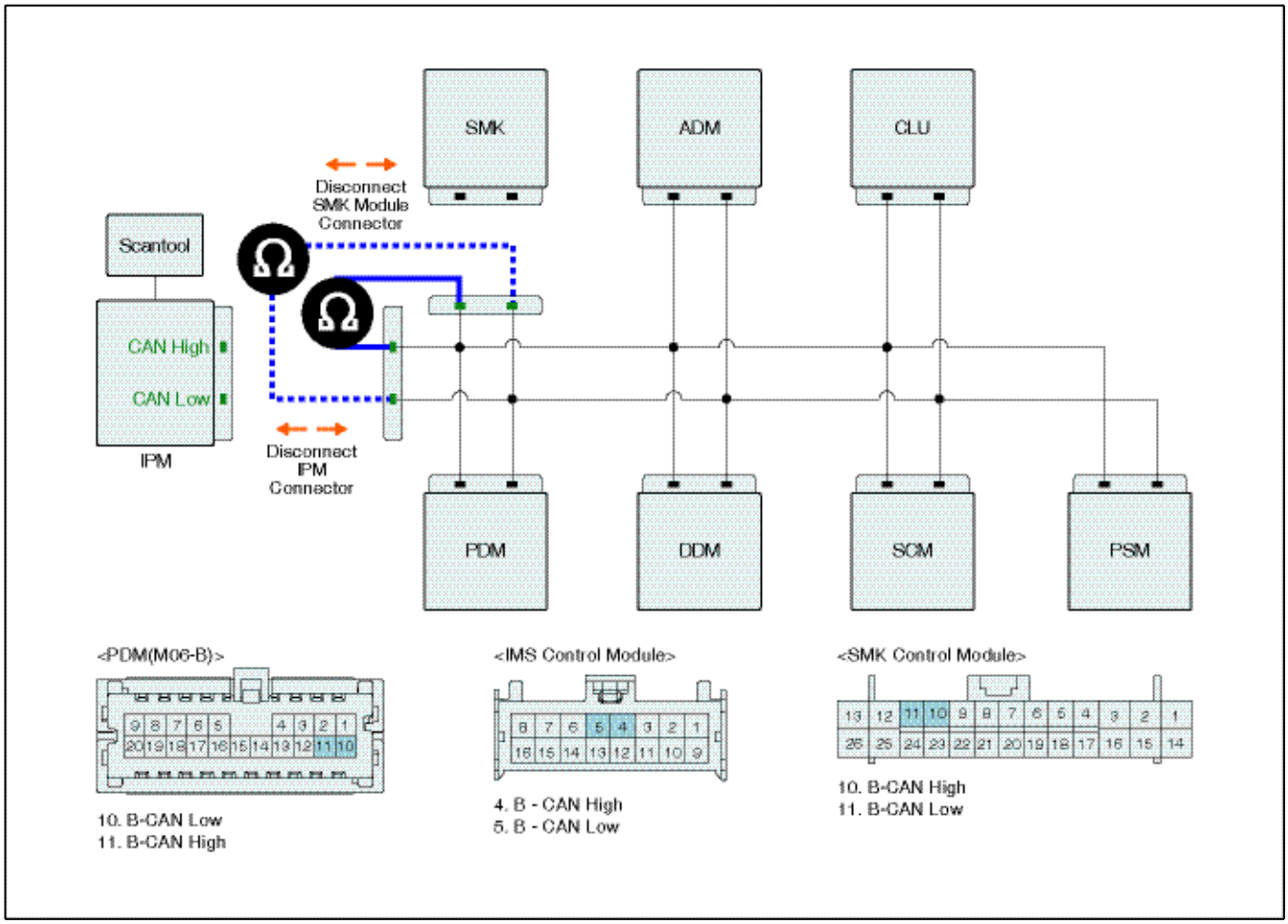
YES ▶ Go to next procedure.

NO ▶ If the measured value is battery voltage, check short to battery in CAN line. Repair or replace as necessary. And then, go to "Verification of Vehicle Repair" procedure. In case that Communication is in sleep mode, 12V will be measured. Therefore, check that communication is in Wake up status.
▶ If 0V is detected, Check short to ground, short between CAN high and low each other or open in CAN high or CAN low harness. Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

■ Check open in CAN communication line

1. IG KEY OFF.
2. Disconnect BCM(IPM), CLU(Cluster), PDM(Power Distribution Module), SMK(Smart Key), RPAS(Rear Parking Assist System) connector.
3. Measure resistance between communication line terminal of Smartkey Module connector and communication line of PDM harness connector.

Specification : About below 1Ω



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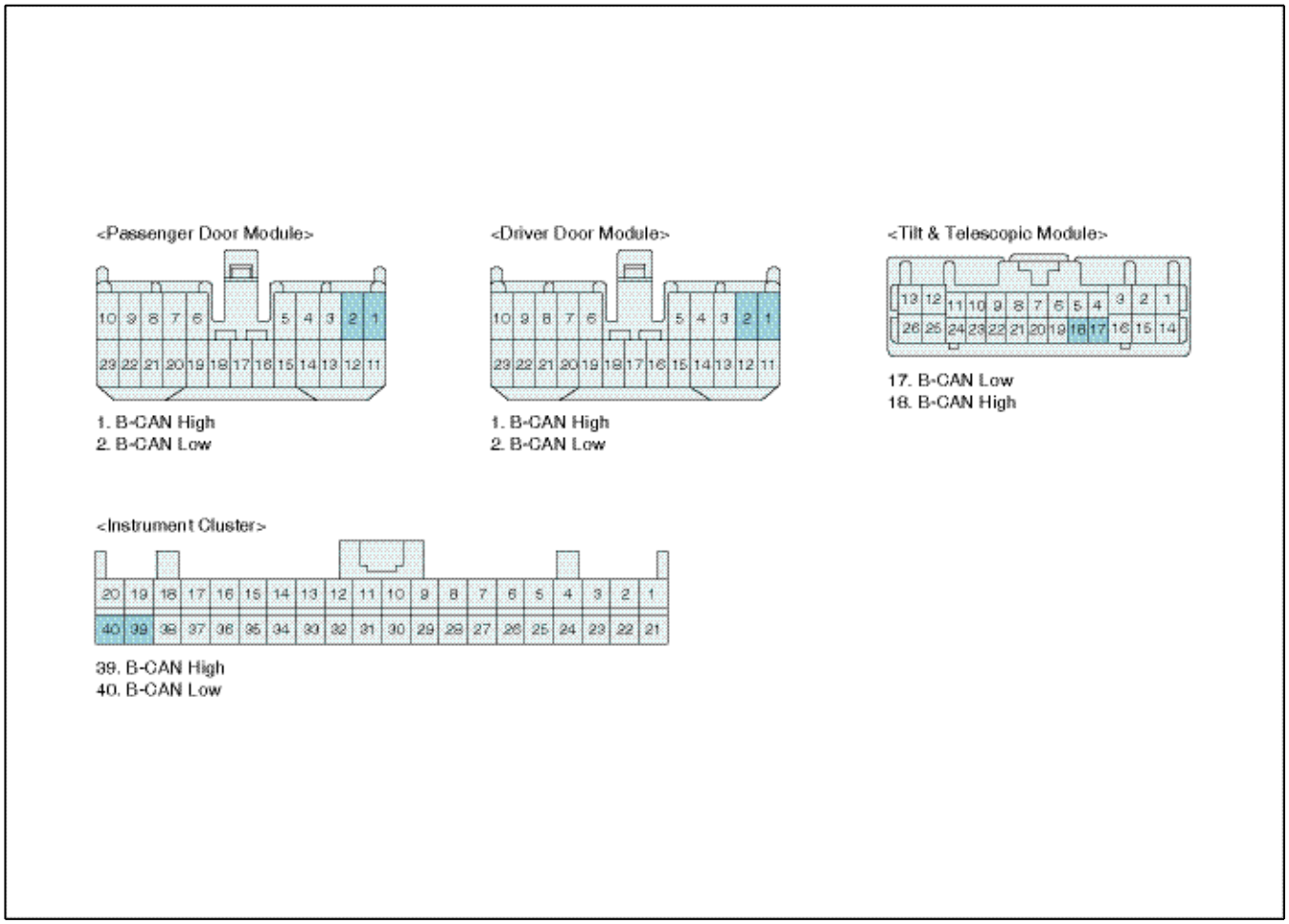


VG12SK10B160231-1

4. Is the measured resistance within specification?

YES ▶ Check poor connection between harness connector and Smartkey Module or PDM
: 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 ▶ Repair or replace open in CAN communication line and 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.

B1971 Parking Position Input Error

Component Inspection

VG12SK10B197111

General Description

Parking Position Switch indicates that Shift Lever is in P range or not.

Smartkey Module decides that engine starting is enable after receiving Parking Position Switch signal.

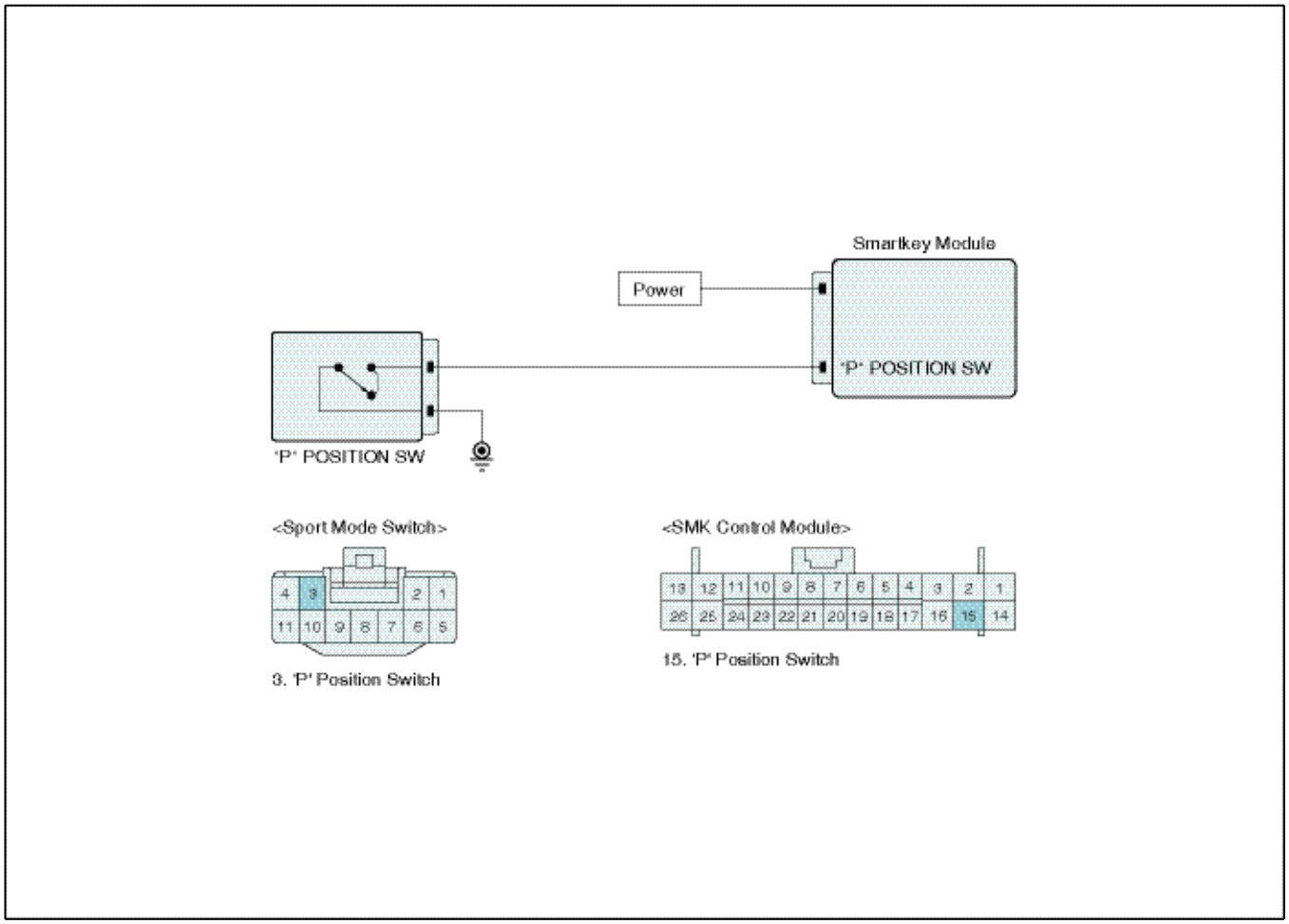
DTC Description

SMARTKEY Module sets DTC B1971 if vehicle speed is over 3km/h while parking switch signal is ON.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• IGN ON • Stop switch ON (Less than 2V) • Vehicle Speed from CLU or PDM over 3km/h	1. Poor Connection in harness 2. Faulty Parking Switch 3. Faulty Smartkey Module
Enable Conditions	• IGN ON • Stop switch ON • Vehicle Speed over 3km/h • Energized battery voltage to Smart Key Unit(SMK ECU)	
Threshold value	• Stop Signal ON : Less than 2V • Stop Signal OFF : Higher than 7V	
Failsafe	• In case of IGN ON, Vehicle Speed over 3km/h and Stop Switch ON for more than 10 sec.	

Diagnostic Circuit Diagram



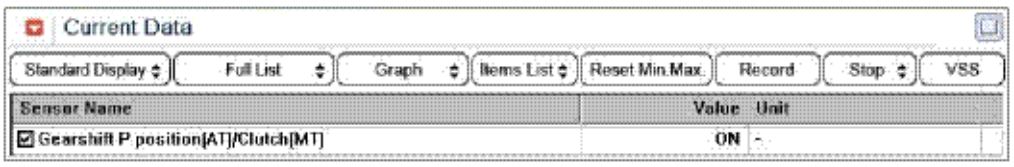
VG12SK10B1971D

Monitor Scantool data

■ Check parking position switch status

1. Connect scantool with diagnostic connector.
2. Check current data with scantool.
3. Check "Shift lever P position" parameter on current data.
4. Check that data is appropriately changeable according to the shift lever position in P or others.

Specification :
P position : ON
Not in P position : OFF



YF12SK50B197121S

5. Is the shift lever P position normal?

YES ▶ Check poor connection between harness connector and Parking Postion switch or Smart-key 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 ▶ 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.

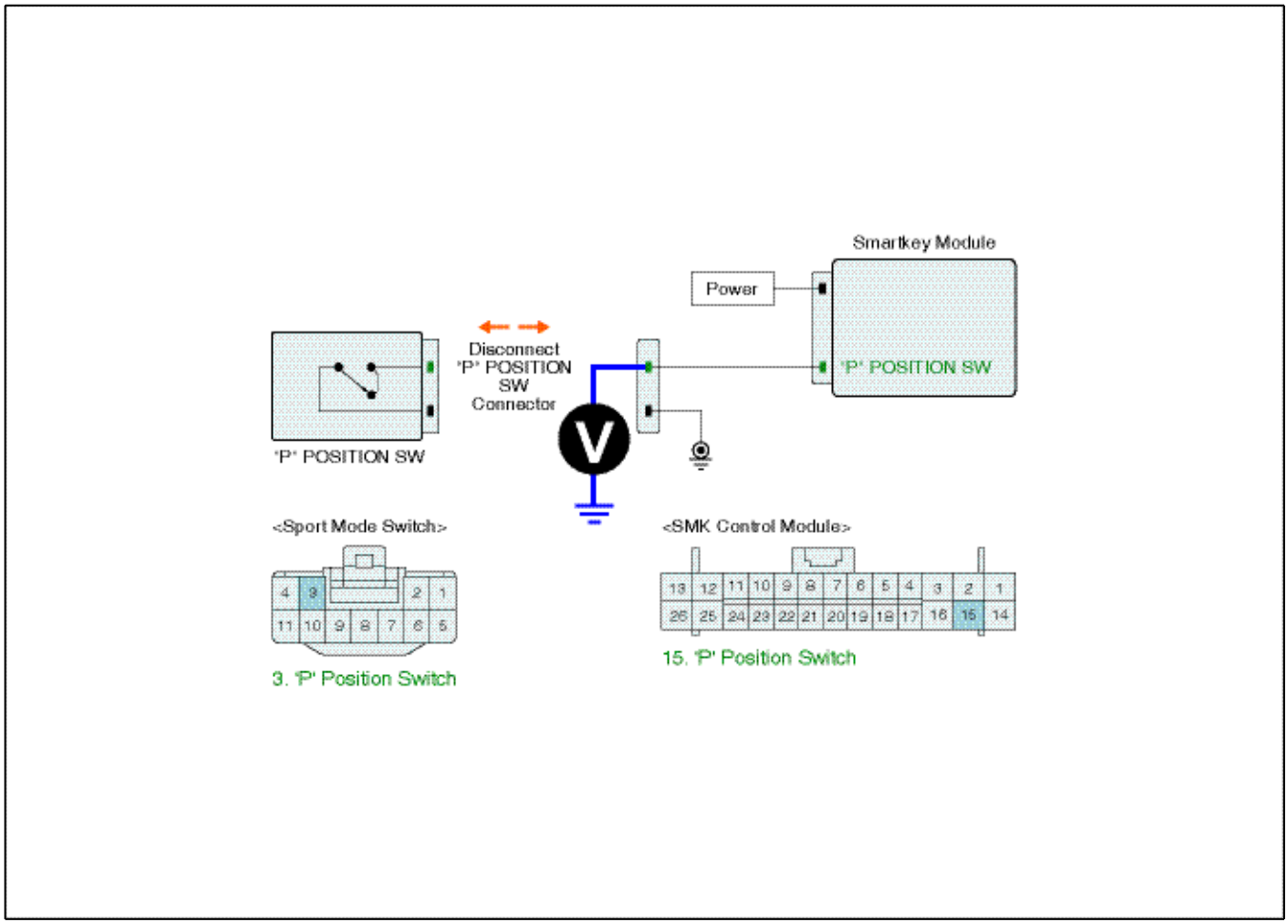
NO ▶ Go to check "signal circuit Inspection" procedure.

Signal Circuit Inspection

■ Check Signal Circuit

1. IG KEY OFF.
2. Disconnect parking position switch connector.
3. IG KEY ON.
4. Measure voltage between signal terminal of parking position switch harness connector and chassis ground.

Specification : Battery Voltage



VG12SK10B197131

5. Is the measured voltage within specification?

YES ▶ Check open in ground harness. And then, repair or replace as necessary, Finally go to "Verification of Vehicle Repair " procedure.

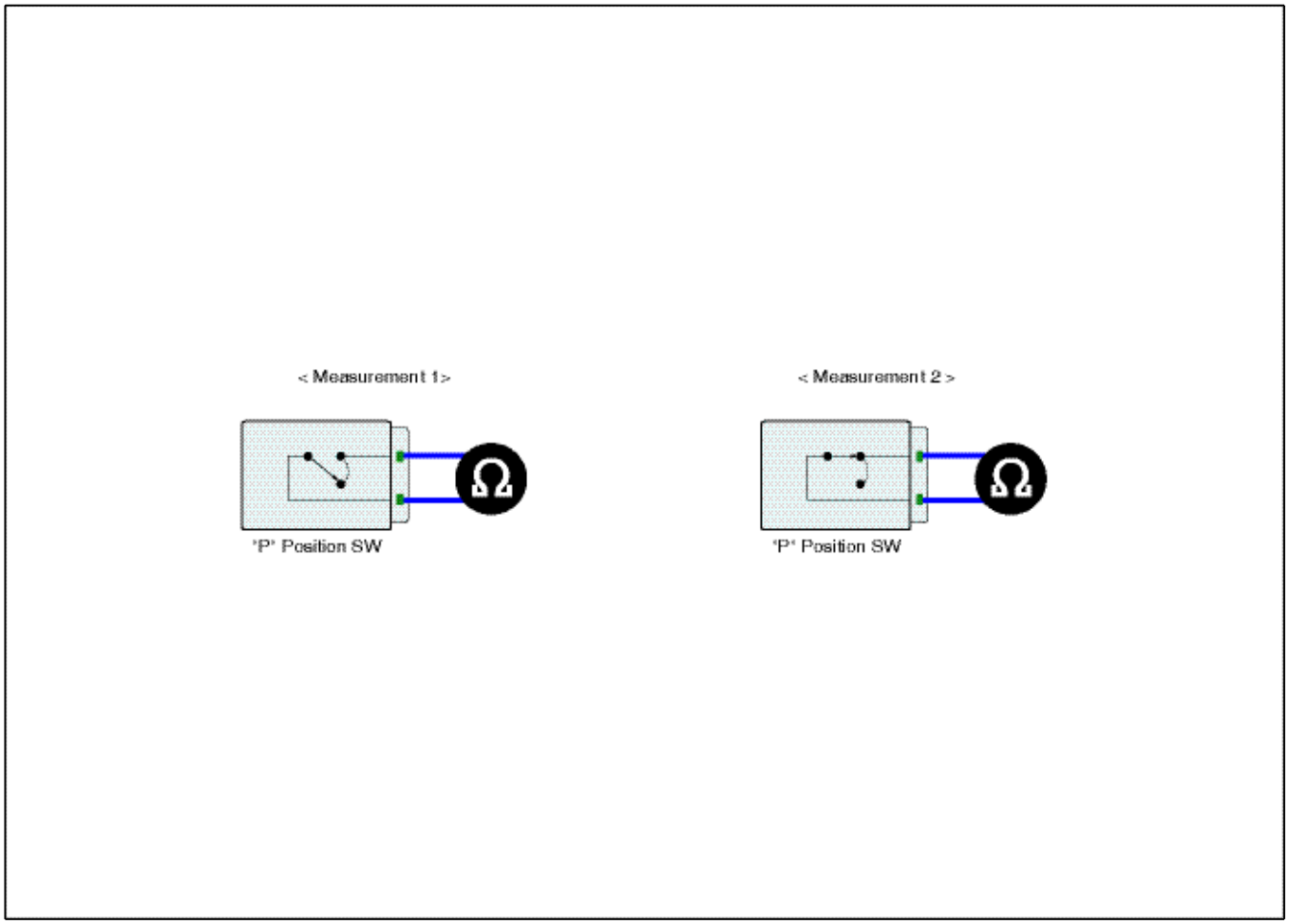
NO ▶ Check open or short to ground in signal harness. And then, repair or replace as necessary finally go to "Verification of Vehicle Repair " procedure.

Component Inspection

■ Check Parking Position Switch

1. IG KEY OFF.
2. Disconnect Parking Position switch connector.
3. Measure resistance between one and the other connector when parking postion switch ON and OFF.

Specification :
Measurement 1 : Infinite (∞)
Measurement 2 : About below 1Ω



VG12SK10B197141

4. Is the measured resistance within specification?

YES ▶ Check poor connection between harness connector and Parking Postion switch or Smartkey 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 ▶ Substitute with a known-good parking position switch and check for proper operation. If the problem is corrected, replace parking postion switch 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.

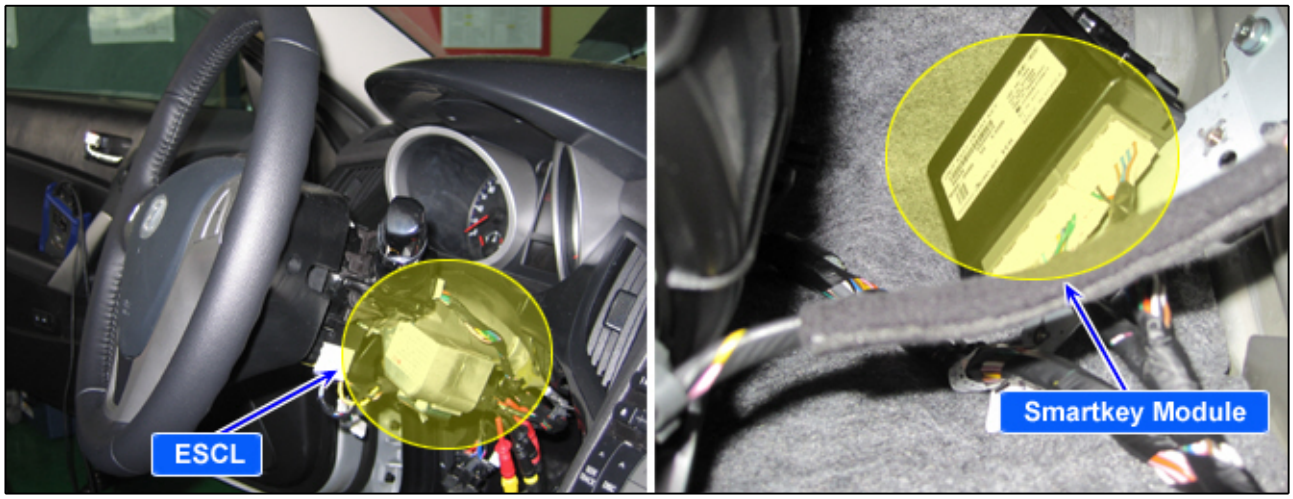
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

B1978 Electric Steering Column Lock Failure

Component Inspection



VG12SK10B197811

General Description

ESCL(Electronic Steering Column Lock) is a system to control the lock or unlock of the Steering Column.

It is installed on steering column and Smartkey Module is located inside of instrument panel, left knee of driver side.

It consists of ESCL control Module, Smartkey Module, PDM and SSB(engine Start Stop Button)

It is operating as follows

1.Pushing SSB → 2. Switch 1 signal goes to PDM, Switch 2 signal goes to SMARTKEY Module → 3.PDM supplies power supply to ESCL → 4.Smartkey Module sends ENABLE signal and operation signal to ESCL → 5.ESCL controls bolt to lock or unlock ESCL → 6.PDM detects ESCL Unlock signal.

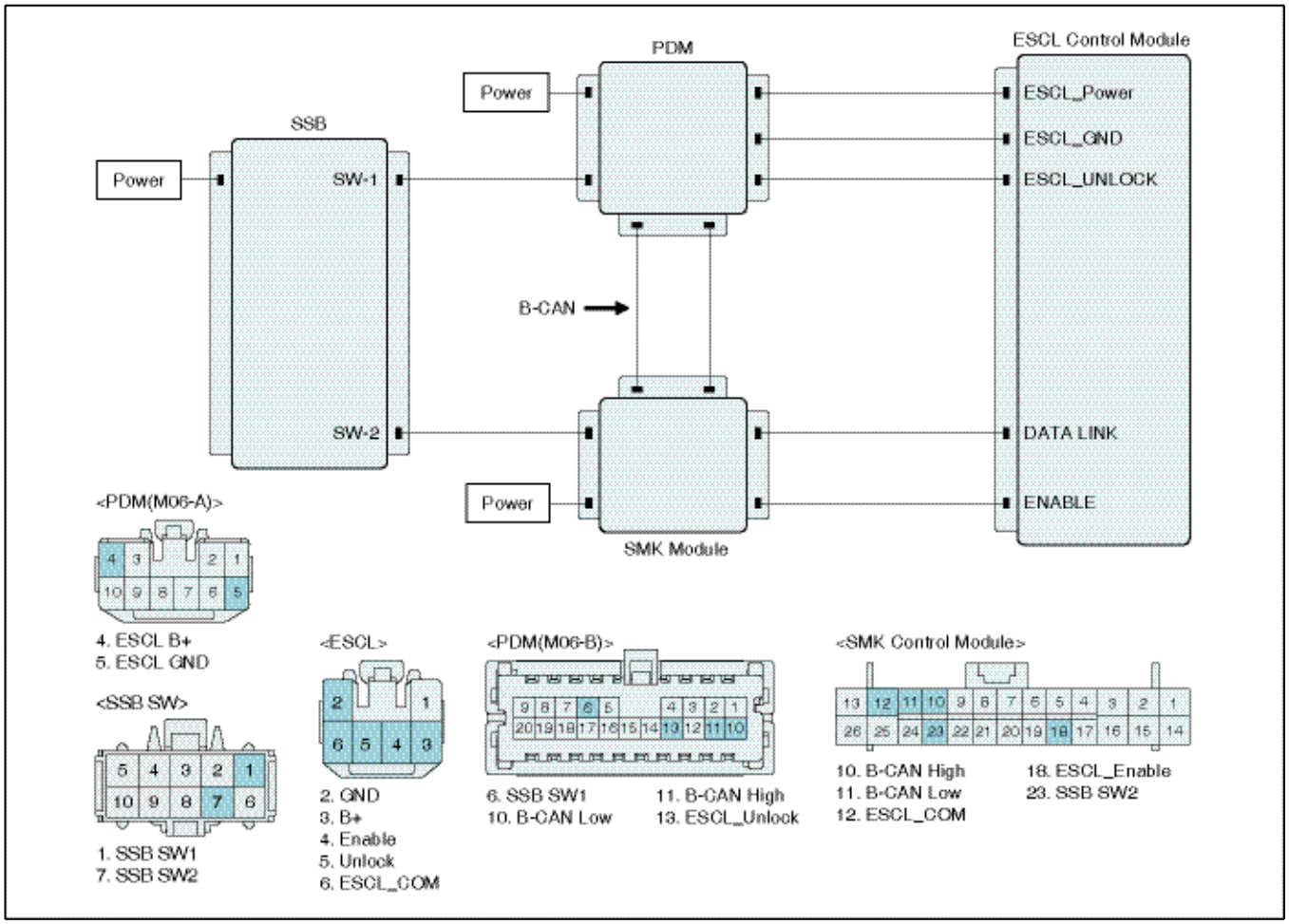
DTC Description

Smartkey Module receives ESCL lock or unlock stuatus signal from ESCL and PDM(via CAN). And then, Smartkey Module compares PDM is lock or unlock signal with ESCL is lock or unlock signal. If the both signals are unmathing, Smartkey Module sets DTC B1978.

DTC Detecting Condition

Item	Detecting Condition	Possible Cause
DTC Strategy	• Check ESCL unlock / Lock status through CAN signal which is receive from PDM. • Check unlock / lock status by communicating with ESCL	1. Poor connectors 2. CAN communication 3. Items related PDM side - Input status of ESCL_Unlock - Power supply status - Open / Short on power circuit 4. Items related SMK side - Open or short on - Open or short on ESCL_DATA LINK line - Open or short on ESCL ENABLE line 5. SMK IMMO Module 6. PDM 7. ESCL controller
Enable Conditions	• When attempting ESCL unlock / lock • When supplying battery voltage to SMK IMMO Module	
Threshold value	• Detected abnormal pin status related ESCL 1. Fault ESCL inside 2. Open and Short to battery / Ground on Power /Ground circuit of ESCL 3. Open or short to battery / Ground of ESCL communication Line 4. Open on ESCL Enable line from SMK 5. Open or short on ESCL_Unlock line to PDM	
Failsafe	• DTC is set when terminal realted ESCL is abnormal more than 5 times.	

Diagnostic Circuit Diagram



VG12SK10B1978D

Monitor Scantool data

■ Check DTC status

1. Check DTC on PDM side with scantool.
2. Check that there is any DTC on PDM side or ESCL side.
3. Inspect DTC related ESCL first if there is any DTC on the PDM side according to DTC troubleshooting guide.
4. After inspetion and repair, erase DTC related ESCL.
5. Erase DTC B1978 ESCL failure on Smartkey Module side.
6. Has the DTC gone after erasing DTC with scantool?

YES ▶ Check poor connection between harness connector and ESCL, PDM or Smartkey 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 ▶ Go to check current dat as follows if there is DTC B1978 ESCL failure.

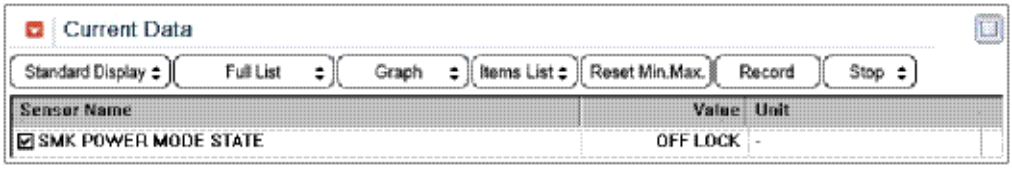
■ Check current Data

1. Select current data parameters related Smartkey Module with scantool.
2. Monitor "ESCL ENABLE" and "SMK State" are normal.
3. Select current data parameter related PDM.
4. Monitor "ESCL BATTERY OUTPUT" , "ESCL GND OUTPUT" and "ESCL UNLOCK STATE INPUT" are normal.

Specification :

- Current Data parameter related Smartkey Module -

1. ESCL ENABLE : It is ON, if IPM sends enable signal to ESCL
2. SMK State : It shows ESCL current status. It shows ESCL FAULURE if there is a failure

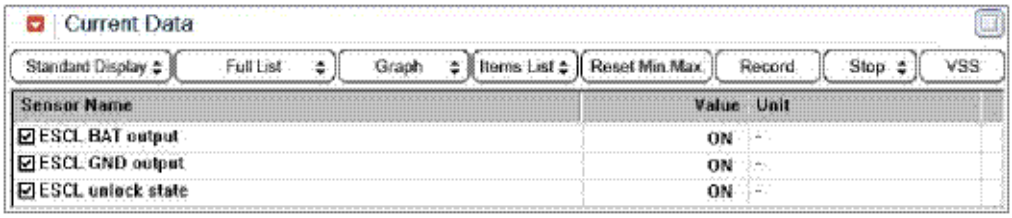


VG12SK10B197821S

Specification :

- Current Data parameter related PDM -

1. ESCL BATTERY OUTPUT : It will be changed form OFF to ON when PDM supplies operation voltage with PDM.
2. ESCL GND OUTPUT : It will be changed form OFF to ON when PDM supplies operation voltage with PDM.
3. ESCL UNLOCK STATE INPUT : In case that ESCL bolts is unlock, it will be ON.



VG12SK10B197822S

5. Are all parameters related ESCL funtioning normally?

YES ▶ Check poor connection between harness connector and ESCL, PDM or Smartkey 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 harness and system related ESCL if " SMK STATE" is shown ESCL FAILURE.
▶ If there is any parameter on the system or harness displayed abnormal, check harness and system.
▶ 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.

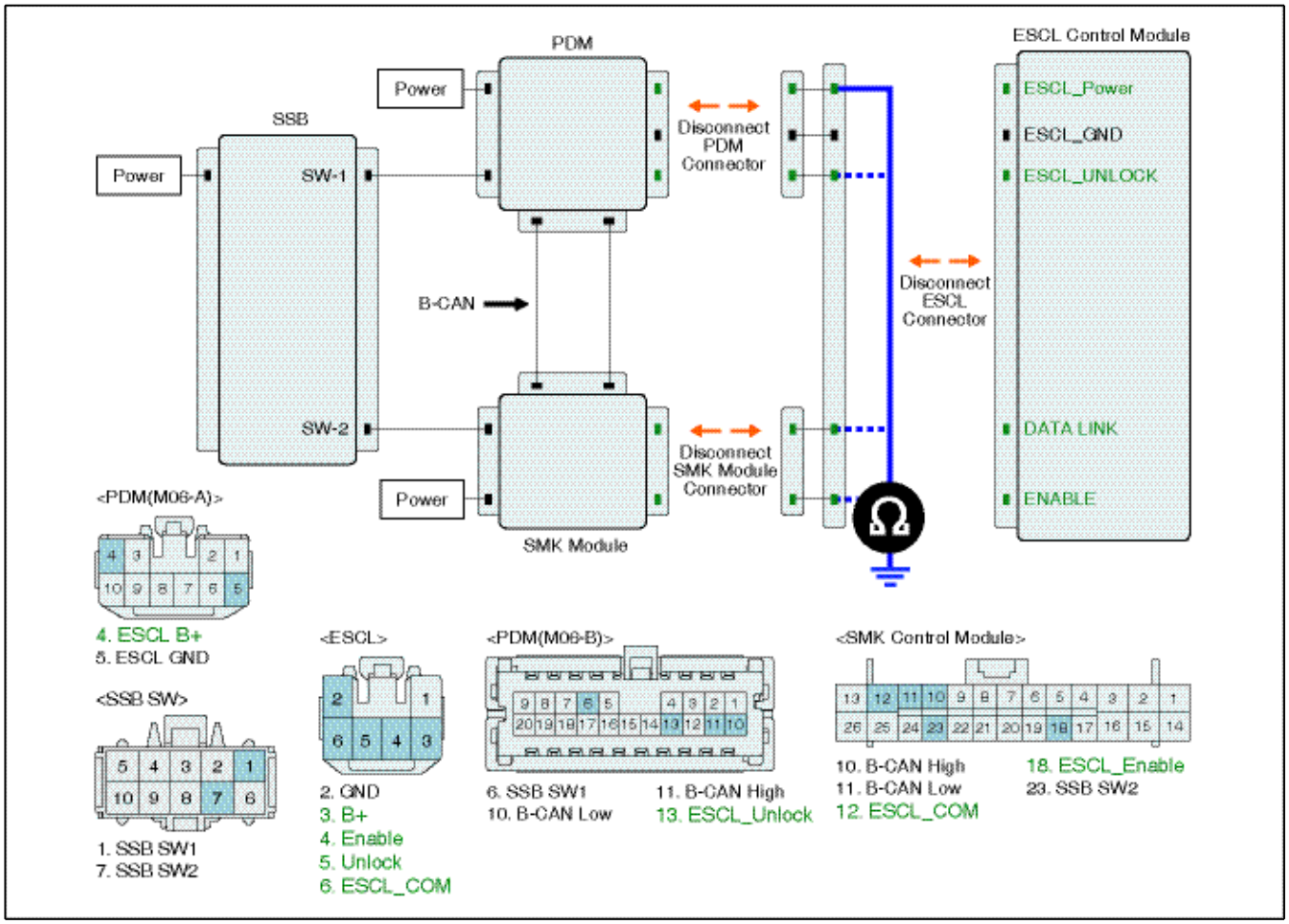
NO ▶ Go to "Check ESCL Circuit " procedure.

Check ESCL Circuit

■ Check short to ground in ESCL circuit

1. IG KEY OFF.
2. Disconnect ESCL control Module, PDM and Smartkey Module connector.
3. Measure resistance between all the terminals of ESCL harness connector and chassis ground.

Specification : Infinite



VG12SK10B197831

4. Is the measured resistance within specification?

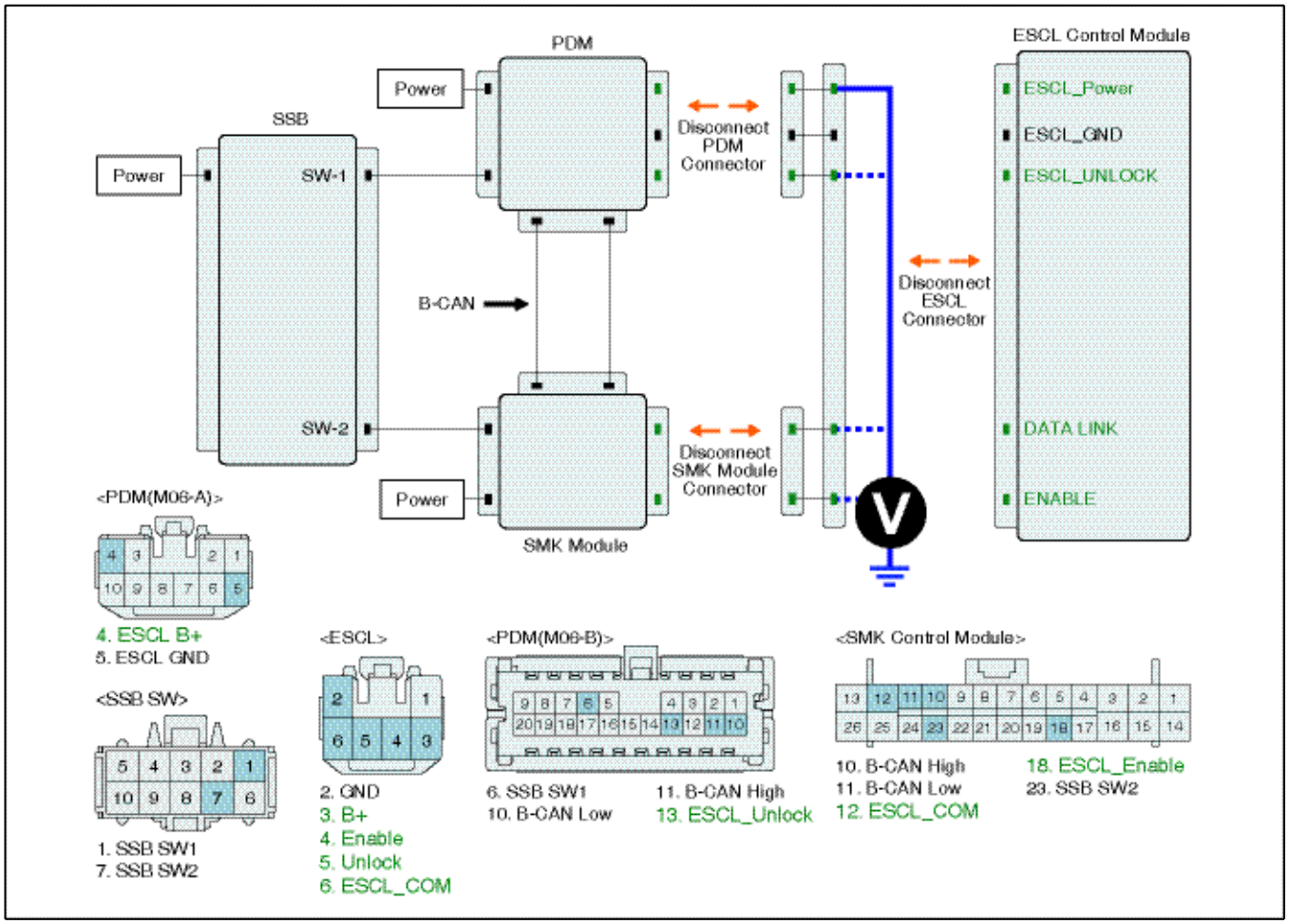
YES ▶ Go to "Check short to battery in ESCL harness " procedure.

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

■ Check short to battery in ESCL harness

1. IG KEY OFF.
2. Disconnect ESCL control Module, PDM and Smartkey Module connector.
3. Measure resistance between each terminal of ESCL control Module harness connector and chassis ground.

Specification : About 0V



VG12SK10B197832

4. Is the measured voltage within specification?

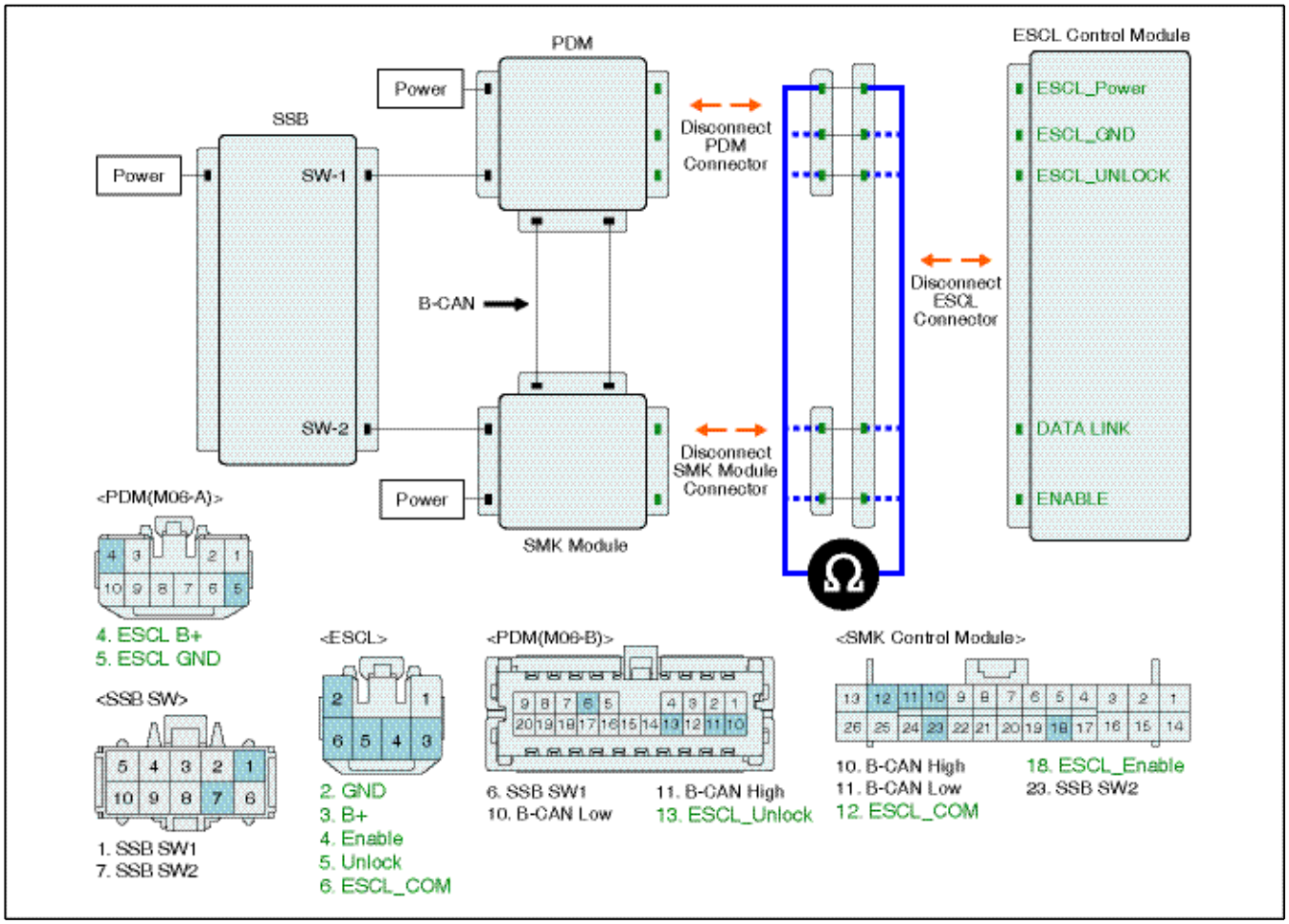
YES ▶ Go to "check open in ESCL harness " as follows.

NO ▶ Repair or replace the short to battery as necessary and then, go to 'Verification of Vehicle Repair" procedure.

■ Check open in ESCL harness

1. IG KEY OFF.
2. Disconnect ESCL control Module, PDM and Smartkey Module connector.
3. Measure resistance between one and the other terminal of ESCL control module harness connector or IPM harness connector.

Specification : About below 1Ω



VG12SK10B197833

4. Is the measured resistance within specification?

YES ▶ Check poor connection between harness connector and ESCL Control Module, PDM or Smartkey 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.
▶ After replacing ESCL control module or Smartkey Module , perform Key teaching procedure with scantool.

NO ▶ Repair open in harness 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.

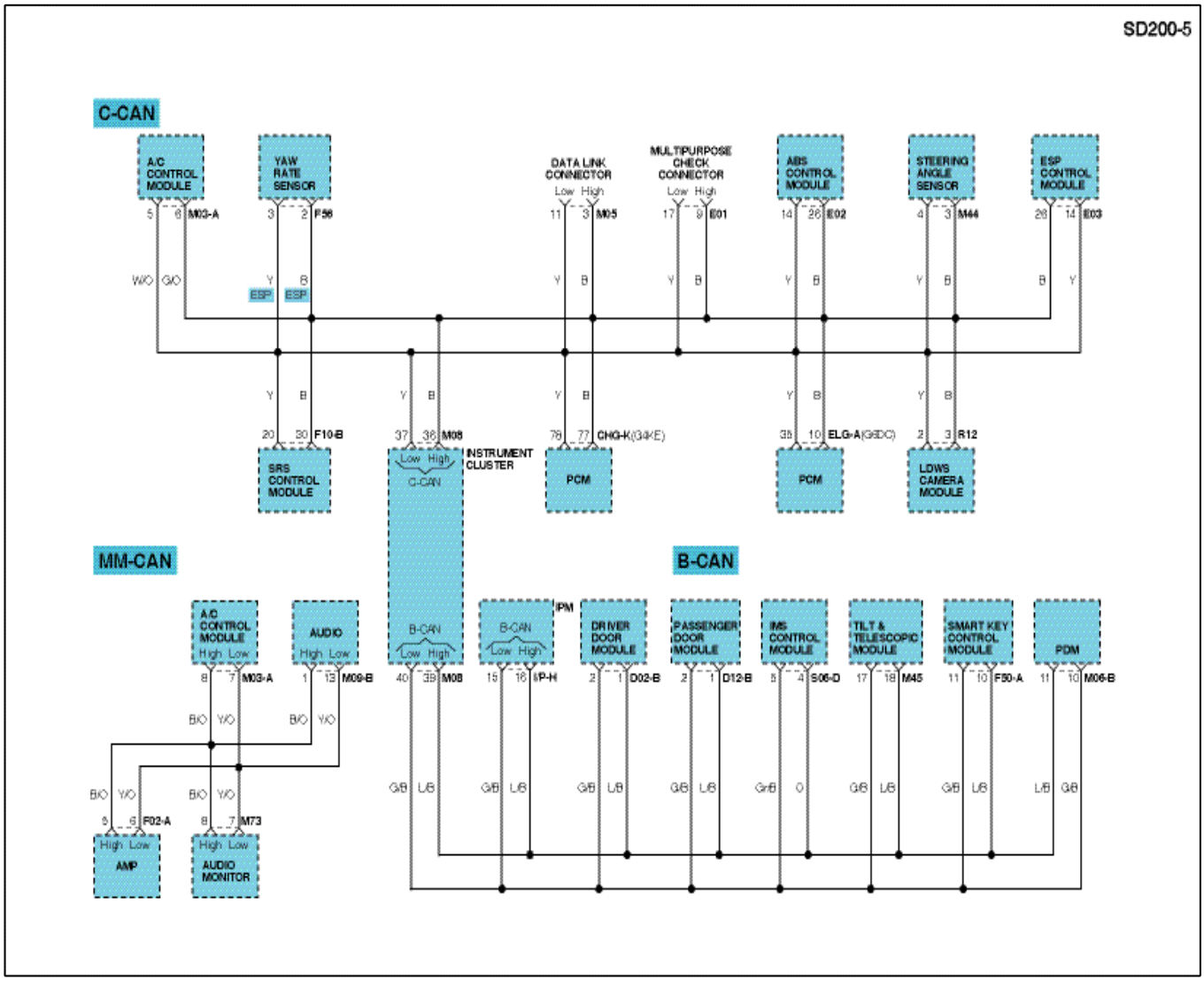
1. Connect scantool and selet "Diagnostic Trouble Codes(DTCs)" mode and then clear DTC.
2. Operate the vehicle and monitor the DTC on the scantool.
3. Are any DTCs present?

YES ▶ Go to the applicable troubleshooting procedure.

NO ▶ System is performing to specification at this time.

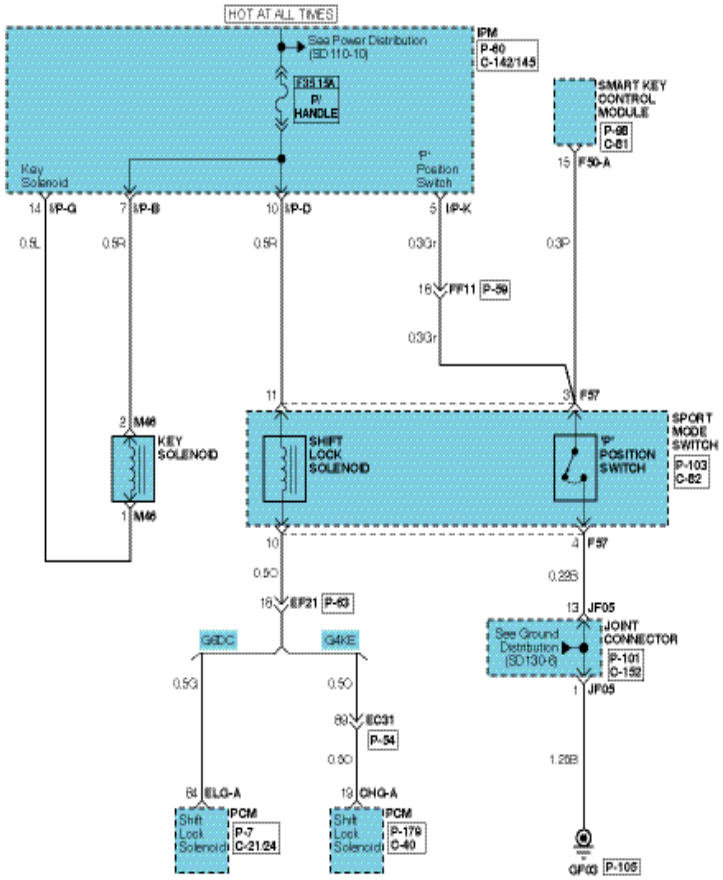
FC00 DTC 가이드 전체회로도 입력用

Full Circuit Diagram



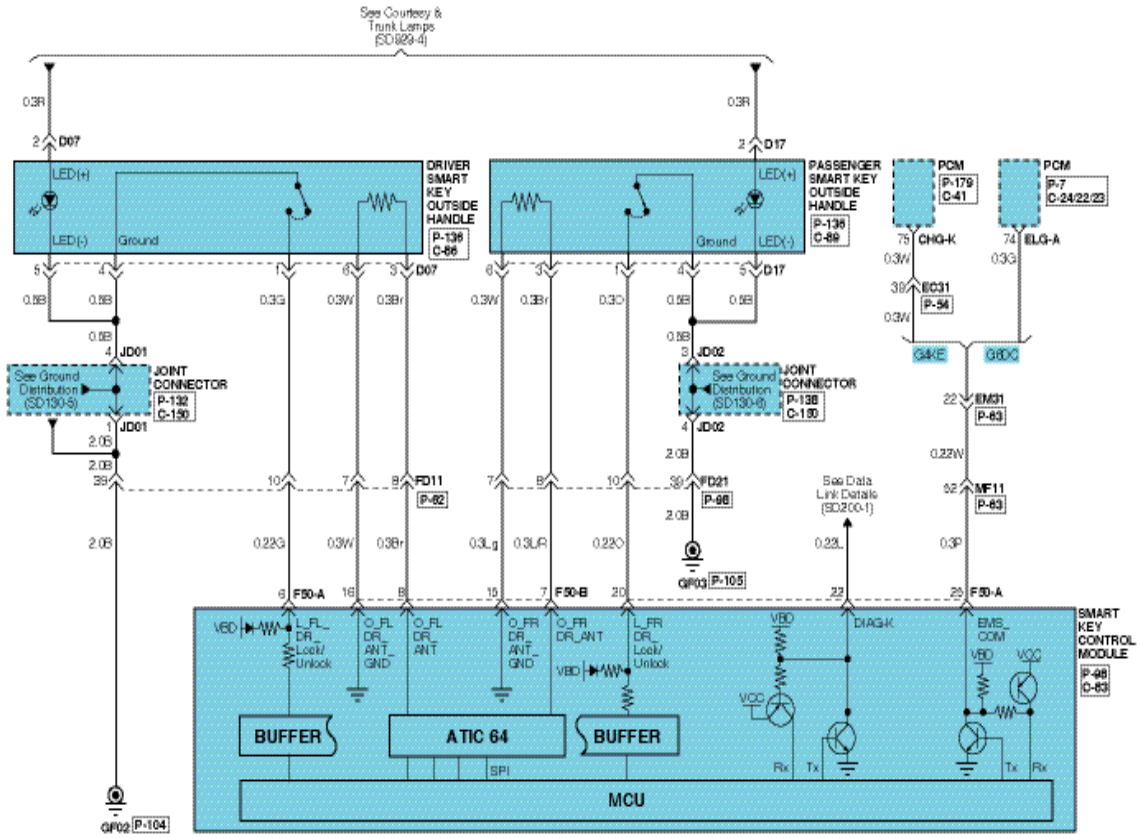
VG12SK10200-5

SD452-1



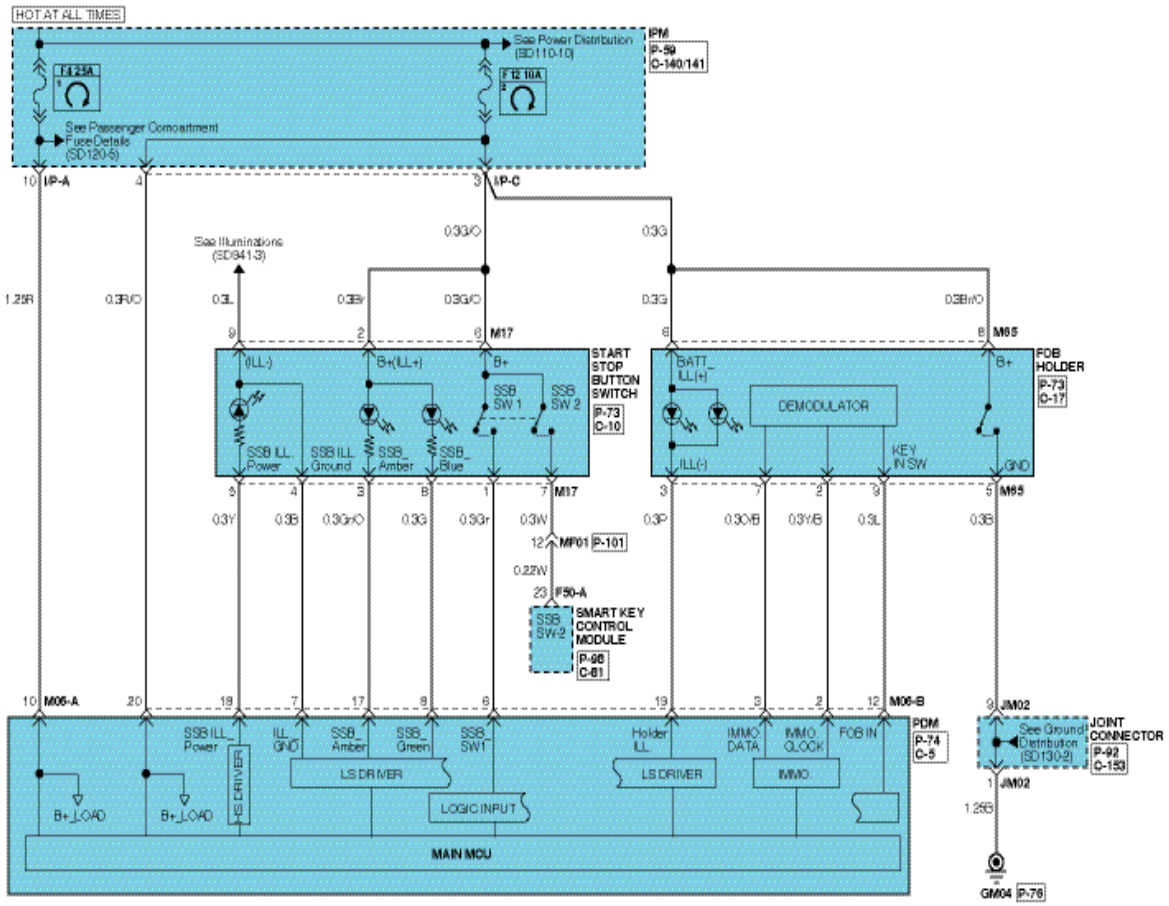
VG12SK10452-1

SD815-2



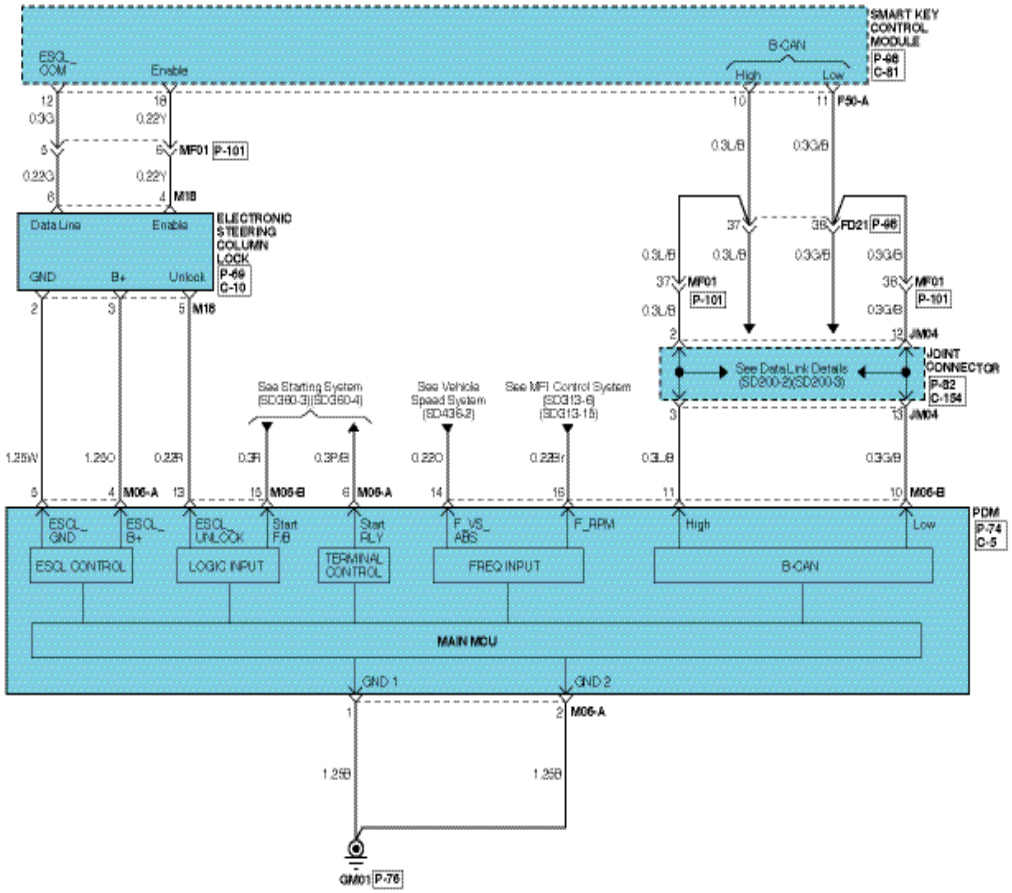
VG12SK10815-2

SD952-2



VG12SK10952-2

SD952-3



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