B1150 Under Voltage(B+)
B1151 Over Voltage(B+)

FAILURE DIAGNOSIS

The immobilizer unit monitors the supply voltage, and sets a diagnostic trouble code if the undervoltage or overvoltage is detected.

Item		Judgement criteria	Possible cause
P1150	How to diagnose	Monitoring voltage	- Relevant wirings (short/open) - Battery - Charging system - Immobilizer Unit
	DTC set value	Battery voltage < 16.5 V	
	Diagnosis time	1 sec.	
	Restoring condition	Battery voltage > 7 V(0.5 sec.)	
P1151	How to diagnose	Monitoring voltage	
	DTC set value	Battery voltage >16.5 V	
	Diagnosis time	1 sec.	
	Restoring condition	Battery voltage < 16 V(0.5 sec.)	

Modification basis	
Application basis	
Affected VIN	

COMPONENTS

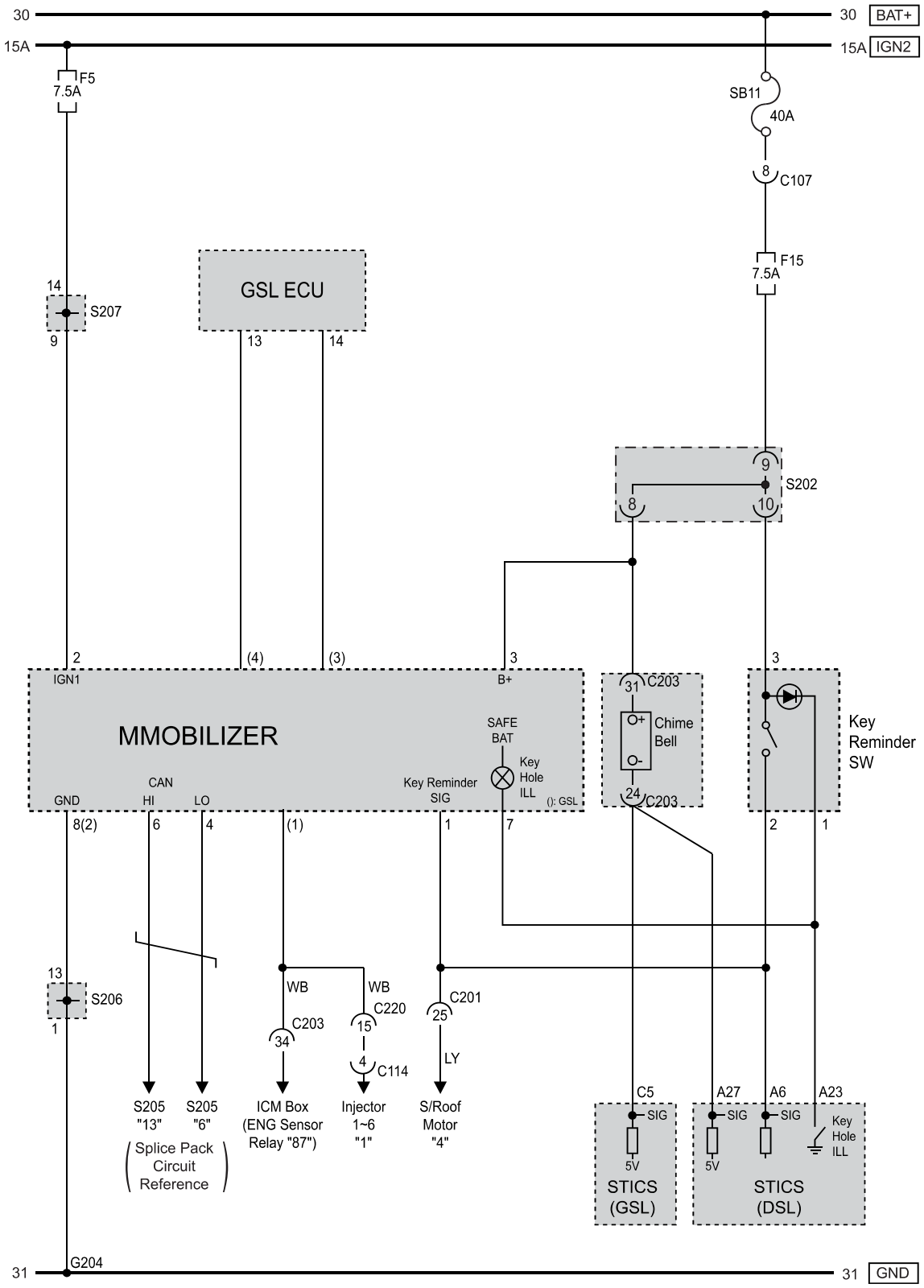
1. Component Location

2. Component Description

The immobilizer unit sends the signal that the transponder authentication is completed to the EMS (ECU) via P-CAN communication. Immobilizer authentication is carried out between the immobilizer unit and EMS (ECU) to enable the EMS (ECU) to control the engine normally. It is essential to secure normal recharge voltage and battery voltage to operate the system without any problem.

PARTIAL CIRCUIT DIAGRAM

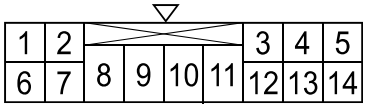
1. Partial Circuit Diagram



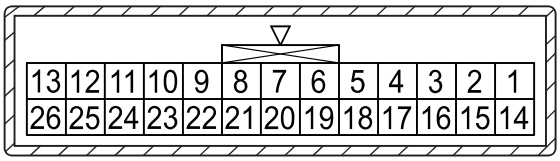
Modification basis	
Application basis	
Affected VIN	

PARTIAL CIRCUIT DIAGRAM

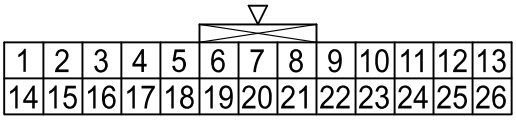
2. Connector Appearance



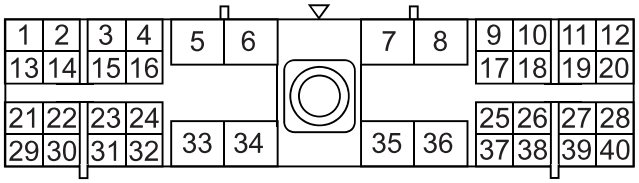
C107_F
W/H Main
(Eng Room Fuse Box)



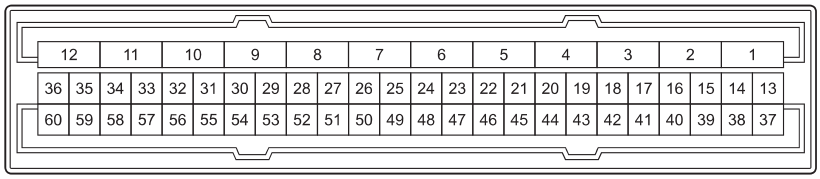
C201_M
W/H Roof

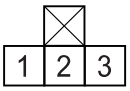


C201_F
W/H Main

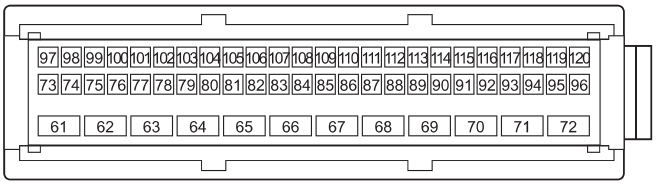


C203_F
W/H Main(ICM Box A)

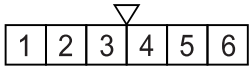




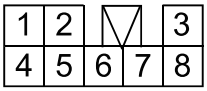
Key Reminder SW



GSL ECU

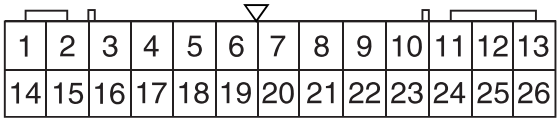


S/Roof Motor

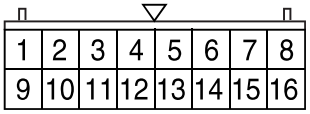


IMMO
(D20DTR)

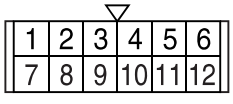
A



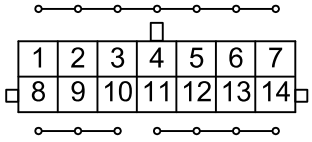
B



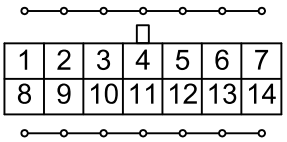
C



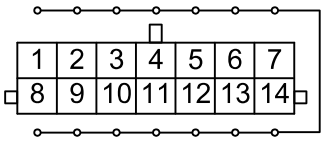
STICS



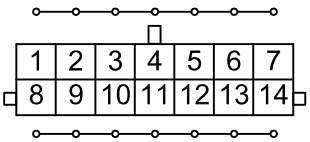
S202



S205(P-CAN)



S206(GND)



S207

SCAN DIAGNOSIS

1. Fault Diagnosis

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Clear any diagnostic trouble code (DTC).

2. Sensor Output

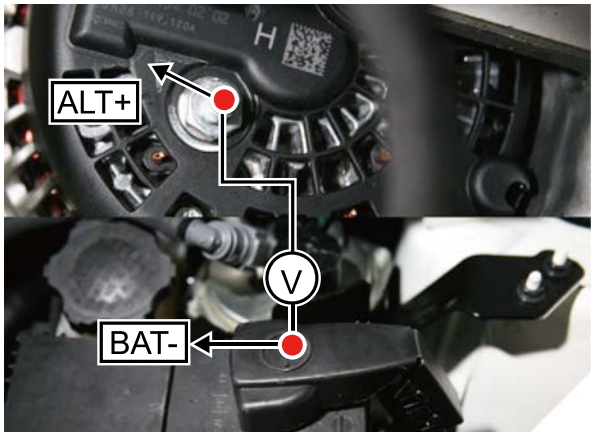
1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Check the item "Supply voltage level".

NOTE

Check if the corresponding DTC is also set in other systems in which the code related to battery voltage can be checked. If so, check the procedures in "Charge system check". If the DTC is set in this system only, check the procedures in "Wiring Check".

Modification basis	
Application basis	
Affected VIN	

CHECK METHOD

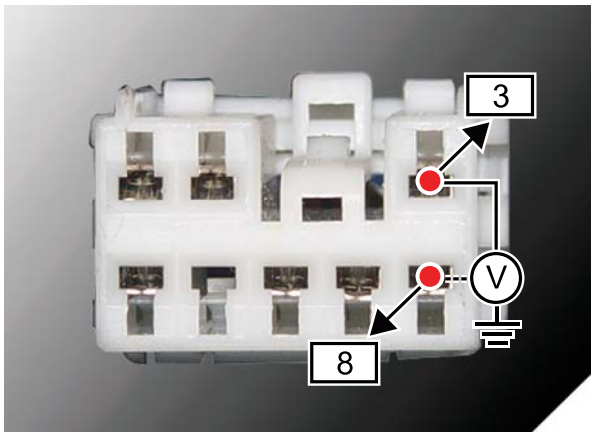


1. Check Charging System

1) Start the engine.
2) Get the vehicle air conditioner, head lamp and other electrical load to work.
3) Measure the voltages on the alternator terminal B and the battery.

Measuring voltage	
Tester connection	Specified value
Alternator terminal B ↔ Battery (−)	Battery voltage (from 7 V to 16.5 V)
Battery (+) ↔ Battery (−)	

NG Check the battery and battery charge system, and repair as necessary.



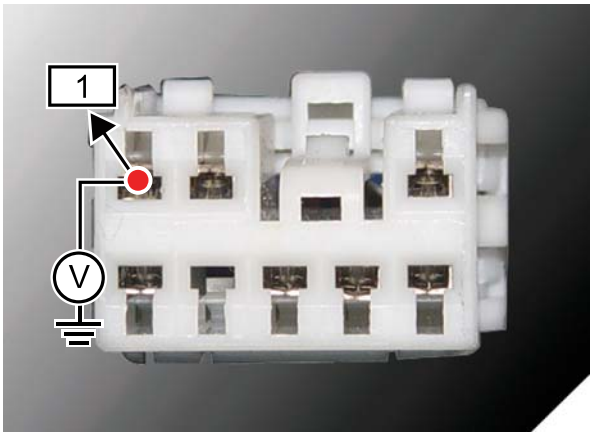
2. Check Power Wire

1) Turn the ignition switch to the "OFF" position.
2) Disconnect the immobilizer unit connector.
3) Turn the ignition switch to the "ON" position.
4) Measure the voltage between the power wire terminal No. 3 and ground wire (body) terminal No. 8 of the connector to the immobilizer unit wiring.

Measuring voltage	
Tester connection (to wiring)	Specified value
Terminal No. 3 ↔ Terminal No. 8 (body)	Battery voltage (from 7 V to 16.5 V)

NG Check the power wire or ground wire for open/short circuit and repair as necessary.

CHECK METHOD



3. Check Signal Wire

1) Turn the ignition switch to the "OFF" position.
2) Disconnect the immobilizer unit connector.
3) Insert the key into the key cylinder.
4) Measure the voltage between the signal wire terminal No. 1 of the connector to the immobilizer unit wiring and the body ground.

Measuring voltage	
Tester connection (to wiring)	Specified value
Terminal No. 1 ↔ Body	Key inserted to key cylinder: battery voltage

NG Repair the open circuited signal wire.

4. Final Service Check

- This is to check the serviced item again for the last time after the service is completed.
- Erase DTC(s) again on the diagnostic device.
- Test drive the vehicle and check the vehicle has recovered its normal condition.

NG Perform the inspection procedures again after replacing the immobilizer unit.

OK Service completed (System normal)

NOTE

- When the immobilizer unit or transponder (REKES key) is replaced, perform "Transponder Registration" and "EMS Registration" using a diagnostic device. Up to 5 transponders can be registered.
- Always register both old key and replaced key since registering a transponder clears the information of previously registered transponder.

Modification basis	
Application basis	
Affected VIN	

B1152 PCAN Bus Off

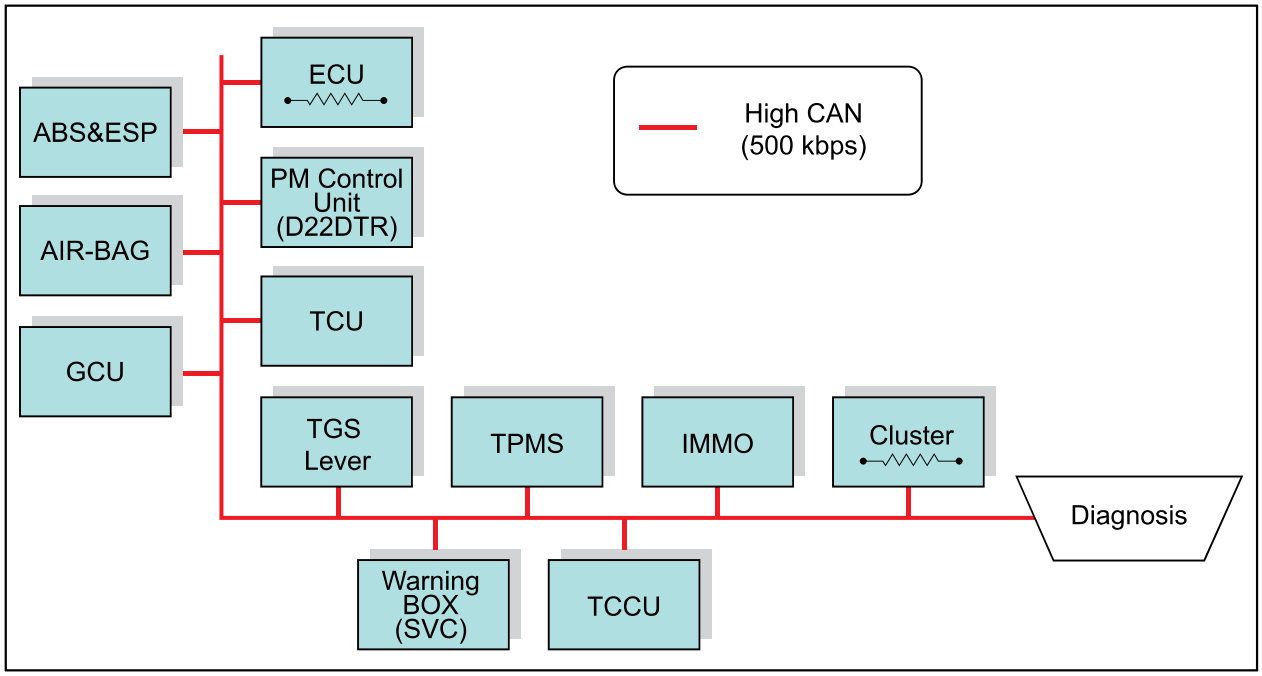
FAILURE DIAGNOSIS

The immobilizer unit monitors the CAN communication, and sets a diagnostic trouble code (DTC) if the CAN signal is not received.

Items	Judgement criteria	Possible cause
How to diagnose	Communication time out	- CAN communication wiring (open/short circuit) - ECU
Diagnostic condition	IGN ON	
DTC set value	CAN communication error: bus OFF	
Diagnosis time	2 sec.	
Restoring condition	Received CAN communication signal normally	

COMPONENTS

1. Component location



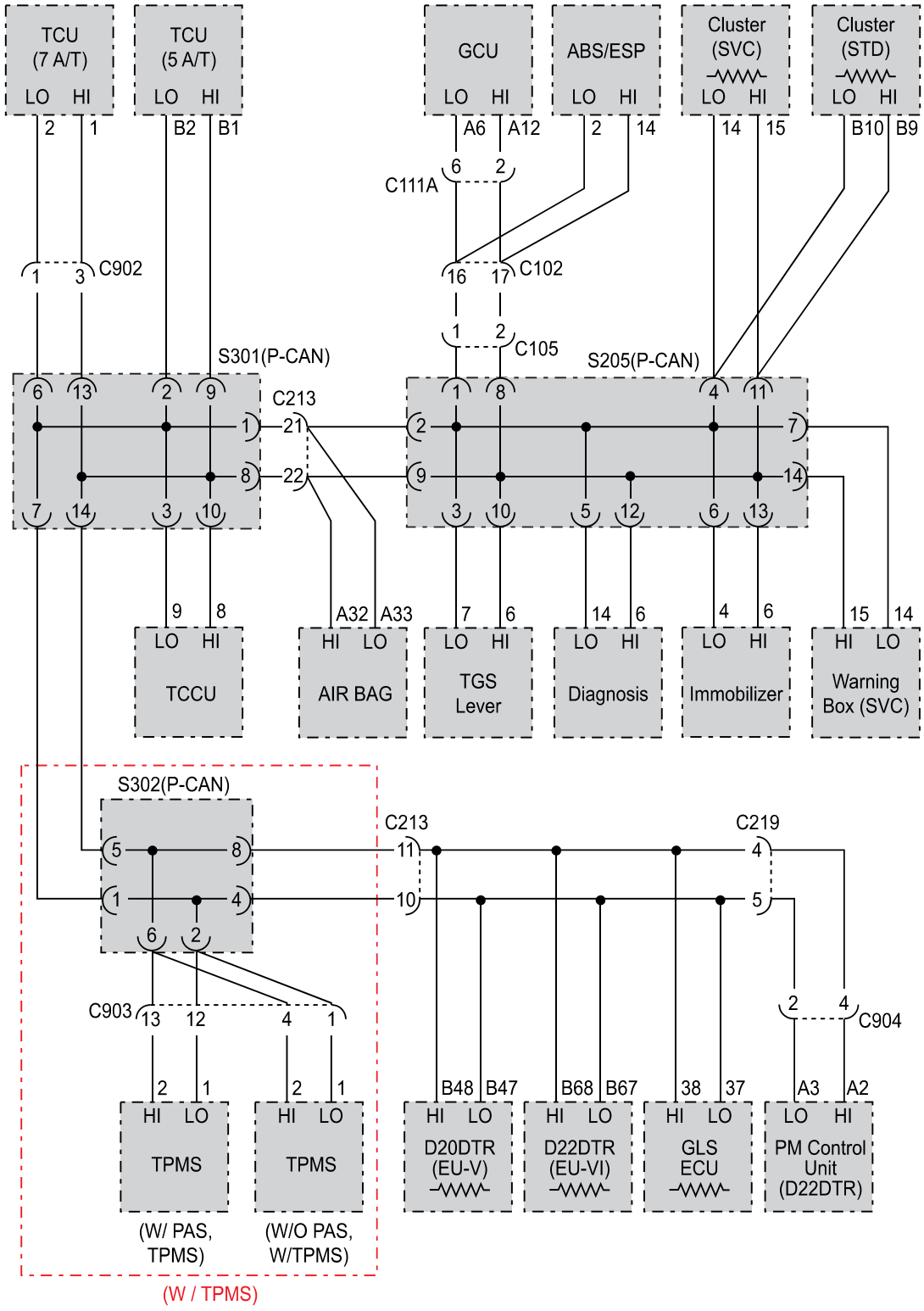
2. COMPONENTS

The CAN topology communicates with other system units.
The ECU, PM Control Unit (D22DTR), GCU, TCU, TGS lever, TCCU, ABS/ESP, immobilizer unit, TPMS, air bag, warning box and clusters use high CAN communication with high speed.
Terminating resistors are installed in ECU and instrument cluster.

Modification basis	
Application basis	
Affected VIN	

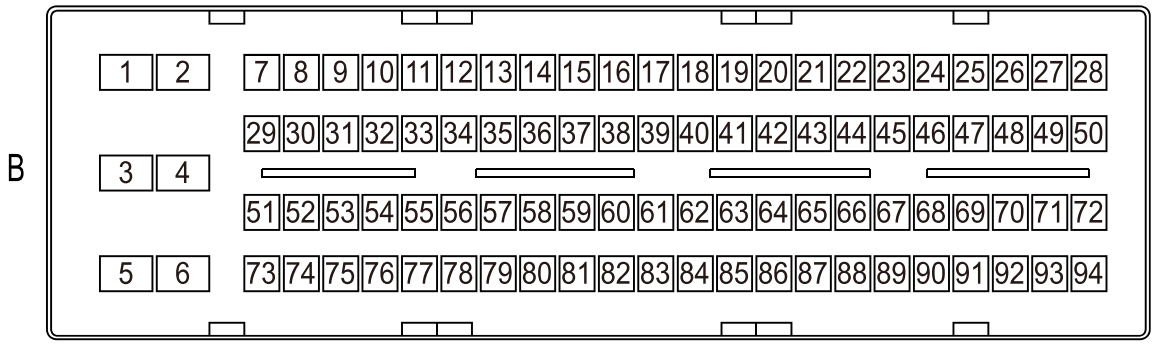
PARTIAL CIRCUIT DIAGRAM

1. PARTIAL CIRCUIT DIAGRAM

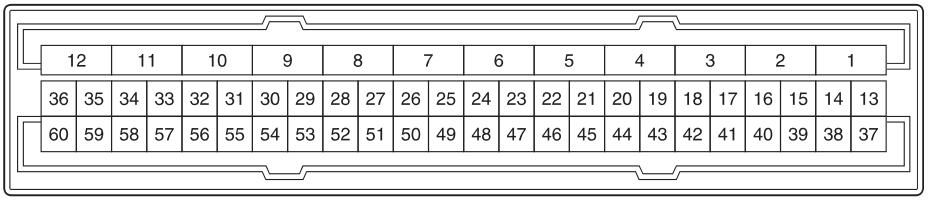


PARTIAL CIRCUIT DIAGRAM

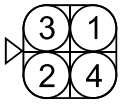
2. Connector appearance



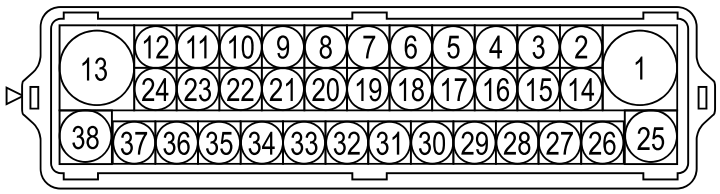
D22DTR(EU-VI) ECU



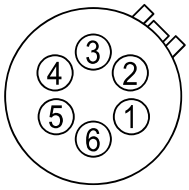
GSL ECU



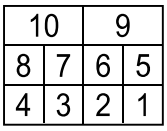
PM Control A



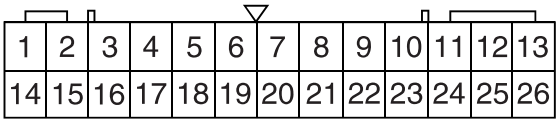
ABS/ESP



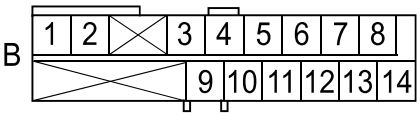
TCU



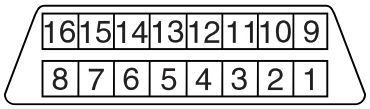
TGS Lever



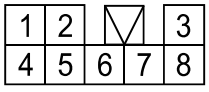
TCCU



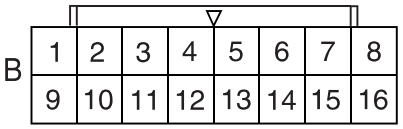
TCU(5-A/T)



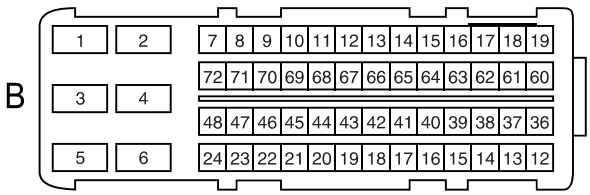
Diagnosis



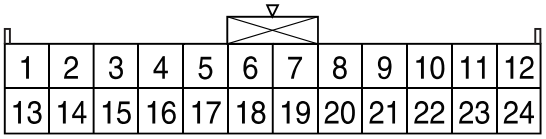
Immobilizer



Cluster(STD)



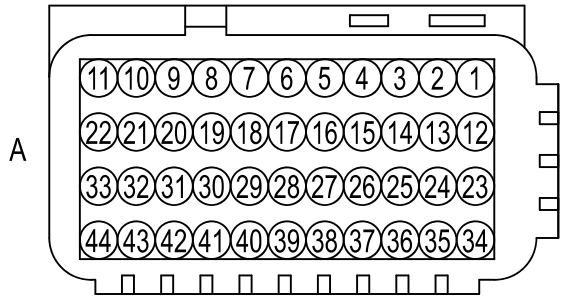
D20DTR(EU-V)ECU



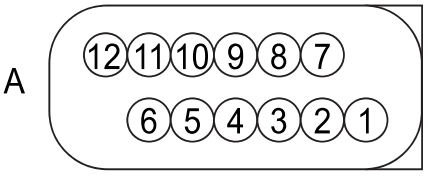
Cluster(SVC)

Modification basis	
Application basis	
Affected VIN	

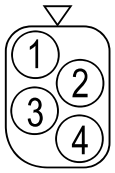
PARTIAL CIRCUIT DIAGRAM



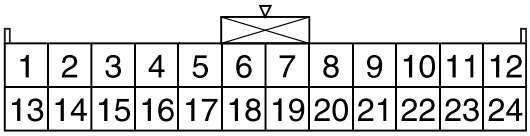
Air-Bag Unit



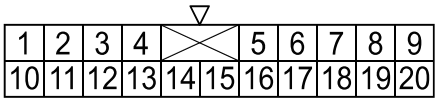
Glow Control Unit



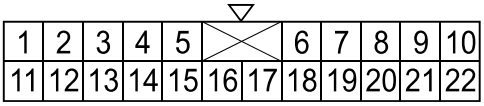
TPMS Unit



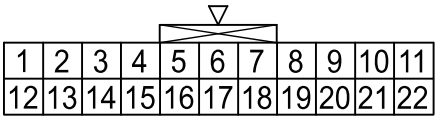
Warning Box(SVC)



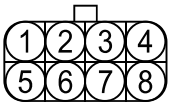
C102_F
W/H Eng
(Eng Room Fuse Box)



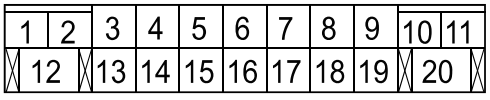
C105_F
W/H Eng
(Eng Room Fuse Box)



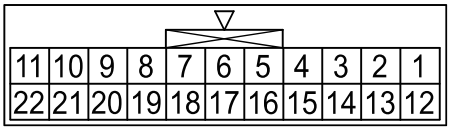
C213_F
W/H Main



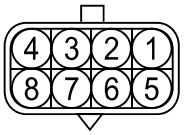
C111A_F
W/H Eng



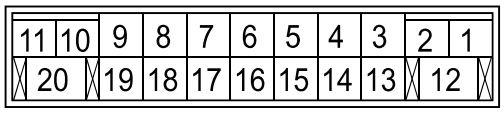
C219_F
W/H Main



C213_M
W/H Floor(LH)

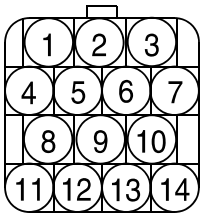


C111A_M
W/H Eng Main

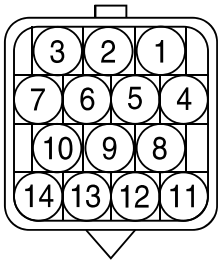


C219_M
W/H Floor(RH)

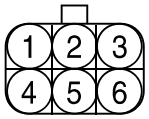
PARTIAL CIRCUIT DIAGRAM



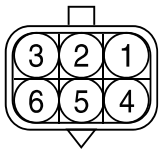
C903_F
W/H Floor(LH)
(PAS, RR FOG)



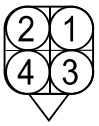
C903_M
W/H Parking Aid
(PAS, RR FOG)



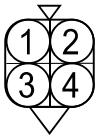
C903_F
W/H Floor(LH)
(W/O PAS, RR FOG)



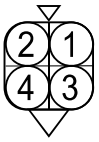
C903_M
W/H Parking Aid
(W/O PAS, RR FOG)



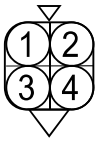
C902_M
W/H Floor(LH)
(7A/T)



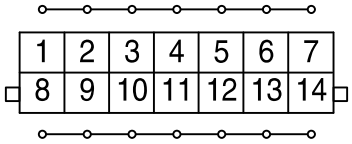
C902_F
W/H TM
(7A/T)



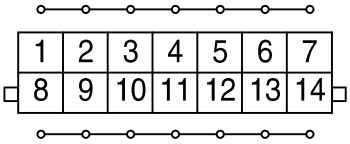
C904_M
W/H Floor
(RH)



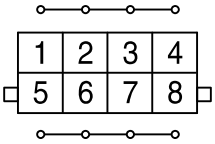
C904_F
W/H PM
Control



S205(P-CAN)



S301(P-CAN)



S302(P-CAN)

Modification basis	
Application basis	
Affected VIN	

SCAN DIAGNOSIS

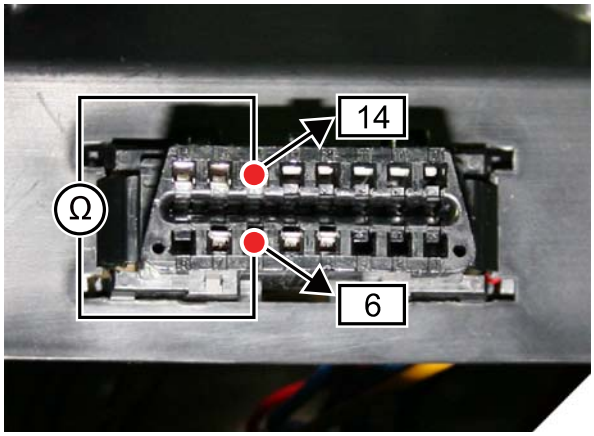
1. Fault Diagnosis

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Clear any diagnostic trouble code (DTC).

NOTE

If the DTC occurs persistently, refer to the procedure described in the section "Check method".

CHECK METHOD



1. Check CAN Communication Line (P_CAN)

1) Turn the ignition switch to the "OFF" position.
2) Measure the terminal resistance between the terminals No. 6 P_CAN HIGH and No. 14 P_CAN LOW on the self-diagnosis connector according to each measuring condition.
3) Measurement condition
   - With connector installed (measurement 1)
   - With ECU connector removed (measurement 2)
   - With Cluster connector removed (measurement 3)

Measuring resistance	
Tester connection (to wiring)	Specified value
Terminal No. 6 ↔ Terminal No. 14	Approx. 60 Ω (measurement 1)
	Approx. 120 Ω (measurement 2)
	Approx. 120 Ω (measurement 3)

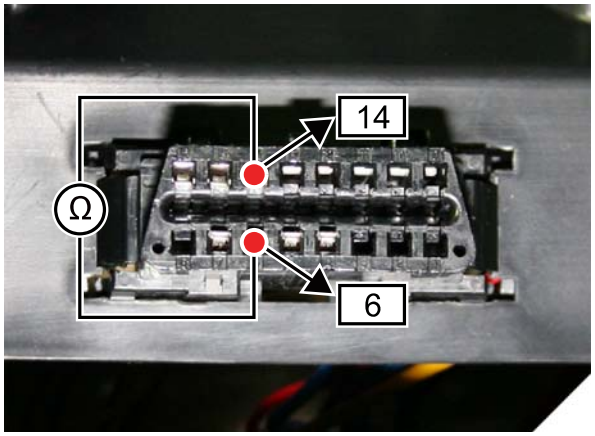
NOTE

The ECU and Cluster have the terminal resistance of 120 Ω and the terminal resistance of about 60 Ω is measured with the ECU and Cluster connectors connected.

NG If the resistance cannot be measure, inspect the unit or check the wiring for open circuit.

Modification basis	
Application basis	
Affected VIN	

CHECK METHOD

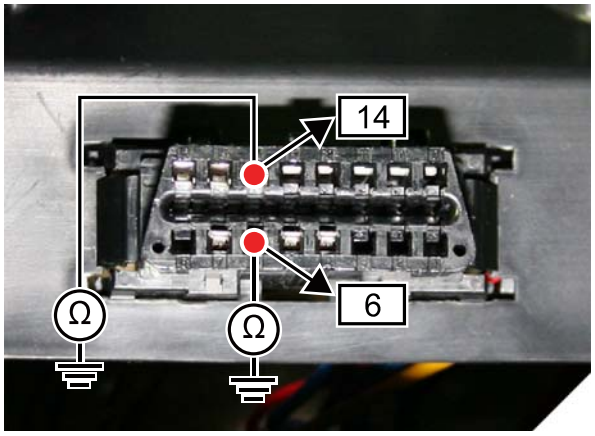


2. Check CAN Communication Line For Short

1) Turn the ignition switch to the "OFF" position.
2) Disconnect all unit connectors which communicate through the CAN communication line.
3) Measure the resistance between the terminals No. 6 P_CAN HIGH and No. 14 P_CAN LOW on the self-diagnosis connector.

Measuring resistance	
Tester connection (to wiring)	Specified value
Terminal No. 6 ↔ Terminal No. 14	Infinite Ω

NG Repair the CAN communication line which has a short circuit.



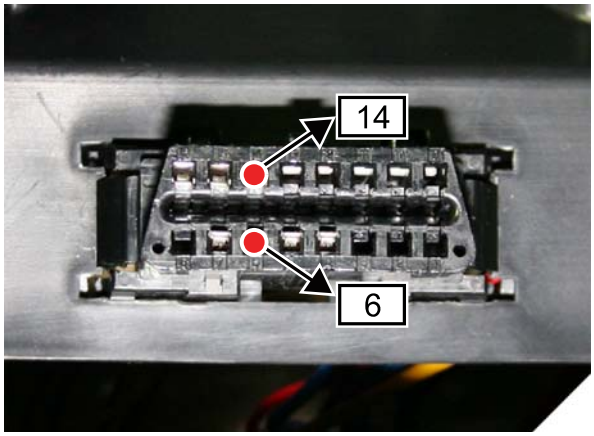
3. Check CAN Communication Line For Short Circuit (GND)

1) Turn the ignition switch to the "OFF" position.
2) Disconnect all unit connectors which communicate through the CAN communication line.
3) Measure the resistances between the terminals No. 6 P_CAN HIGH and No. 14 P_CAN LOW on the self-diagnosis connector and body ground.

Measuring resistance	
Tester connection (to wiring)	Specified value
Terminal No. 6 ↔ Body	Infinite Ω
Terminal No. 14 ↔ Body	

NG Repair the CAN communication line which has a short circuit to ground.

CHECK METHOD



4. Check CAN Communication Line For Open

1) Turn the ignition switch to the "OFF" position.
2) Disconnect all unit connectors which communicate through the CAN communication line.
3) Measure the resistance between the terminal No. 6 P_CAN HIGH on the self-diagnosis connector and P_CAN HIGH terminal on each unit.
4) Measure the resistance between the terminal No. 14 P_CAN LOW on the self-diagnosis connector and P_CAN LOW terminal on each unit.

Measuring voltage	
Tester connection (to wiring)	Specified value
Terminal No. 6 ↔ P_CAN HIGH terminal on each unit	Approx. 0 Ω
Terminal No. 14 ↔ P_CAN LOW terminal on each unit	

NG → Repair the CAN communication line which has an open circuit.

5. Final Service Check

- This is to check the serviced item again for the last time after the service is completed.
- Erase DTC(s) again on the diagnostic device.
- Test drive the vehicle and check the vehicle has recovered its normal condition.

NG → Perform the inspection procedures again after replacing the problematic unit.

OK → Service completed (System normal)

Modification basis	
Application basis	
Affected VIN	

B1153 Transponder Fail

FAILURE DIAGNOSIS

The immobilizer unit sets a diagnostic trouble code (DTC) if data from the transponder does not correspond to data from the EMS.

Items	Judgement criteria	Possible cause
How to diagnose	Communication status from transponder	- Faulty transponder - Immobilizer coil - Immobilizer system
Diagnostic condition	During transponder authentication	
DTC set value	- Transponder coding fails - Transponder authentication fails - Transponder reading fails	
Diagnosis time	As soon as judgement is given	
Restoring condition	Authentication success	

NOTE

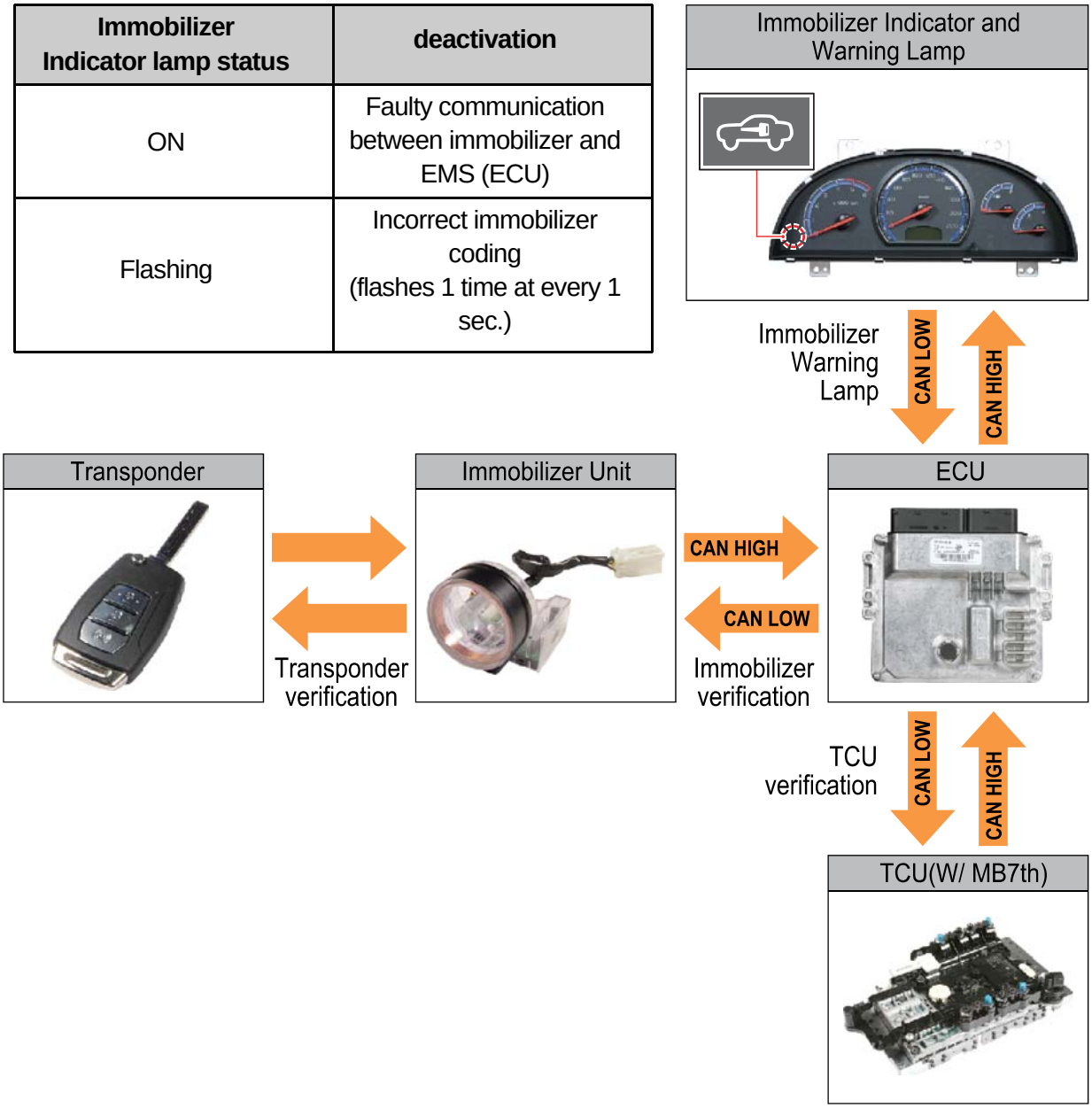
For the vehicle with the immobilizer, there can be a problem in starting the vehicle or the system error:

- When two or more immobilizer keys come into contact with (each) other(s).
- When the key is close to any device sending or receiving electromagnetic fields or waves other than Ssangyong products.
- When the key is close to any electronic or electric devices such as lighting equipment, security keys or security cards.
- When the key is close to a magnetic or metal object or a battery.

COMPONENTS

1. Component Location

Immobilizer Indicator lamp status	deactivation
ON	Faulty communication between immobilizer and EMS (ECU)
Flashing	Incorrect immobilizer coding (flashes 1 time at every 1 sec.)



2. Component Description

When turning the ignition key to the ON position, the power is supplied to the immobilizer unit and EMS (ECU). The ECU communicates with the immobilizer unit to verify the key and transponder. If it is valid, the ECU starts to control the engine or immobilizer indicator (illumination or flashing) when the ignition key is turned to the START position.
Once the key is verified, valid key verification time is provided for 10 seconds and the engine can be started by turning the ignition key to the engine START position during this verification time. If the ignition key is turned to the START position again after the 10 seconds of verification time, the key verification should be reperformed.

Modification basis	
Application basis	
Affected VIN	

SCAN DIAGNOSIS

1. Fault Diagnosis

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Clear any diagnostic trouble code (DTC).

2. Sensor Output

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Check the item "Immo coding Status, Immobilizer Coding Key Count Status".

Item	Specified value
Immo coding Status	Registered: OK Nonregistered: defective
Immobilizer Coding Key Count Status	Displays number of currently registered transponders

NG If "Nonregistered" is displayed, perform the procedure "Transponder Registration and EMS Registration".

3. Transponder Registration and EMS Registration

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Select the item "Transponder registration" on the immobilizer diagnosis menu.
4) Follow the instructions on the screen for diagnosis to perform "Transponder registration".
5) Select "EMS registration" and follow the instruction on the screen to perform "EMS registration".

NOTE

- When the immobilizer unit or transponder (REKES key) is replaced, perform "Transponder Registration" and "EMS Registration" using a diagnostic device. Up to 5 transponders can be registered.
- Always register both old key and replaced key since registering a transponder clears the information of previously registered transponder.

CHECK METHOD

1. Final Service Check

- This is to check the serviced item again for the last time after the service is completed.
- Erase DTC(s) again on the diagnostic device.
- Test drive the vehicle and check the vehicle has recovered its normal condition.

NG — Perform the inspection procedures again after replacing the transponder (REKES key) or immobilizer unit.

OK — Service completed (System normal)

NOTE

- When the immobilizer unit or transponder (REKES key) is replaced, perform "Transponder Registration" and "EMS Registration" using a diagnostic device. Up to 5 transponders can be registered.
- Always register both old key and replaced key since registering a transponder clears the information of previously registered transponder.

Modification basis	
Application basis	
Affected VIN	

B1154 ECU Fail

FAILURE DIAGNOSIS

The immobilizer unit sets a diagnostic trouble code (DTC) if EMS authentication fails while the immobilizer authentication is in progress.

Items	Judgement criteria	Possible cause
How to diagnose	Communication status from transponder	- EMS coding status - Immobilizer Coding status
Diagnostic condition	During EMS authentication	
DTC set value	- No response from immobilizer - No response from EMS - Signal from FBS/out of procedure	
Diagnosis time	As soon as judgement is given	
Restoring condition	Normal response received	

NOTE

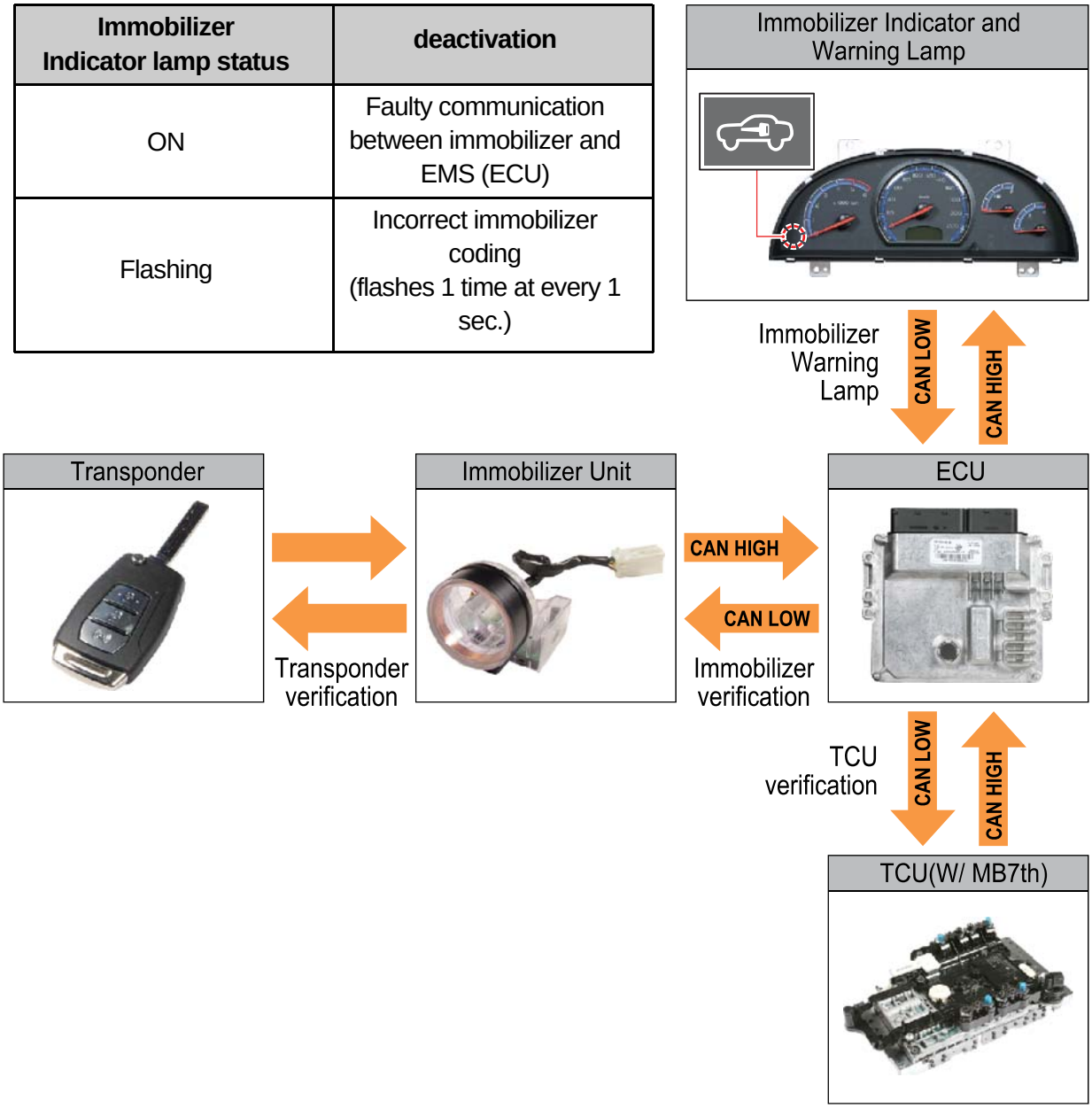
For the vehicle with the immobilizer, there can be a problem in starting the vehicle or the system error:

- When two or more immobilizer keys come into contact with (each) other(s).
- When the key is close to any device sending or receiving electromagnetic fields or waves other than Ssangyong products.
- When the key is close to any electronic or electric devices such as lighting equipment, security keys or security cards.
- When the key is close to a magnetic or metal object or a battery.

COMPONENTS

1. Component Location

Immobilizer Indicator lamp status	deactivation
ON	Faulty communication between immobilizer and EMS (ECU)
Flashing	Incorrect immobilizer coding (flashes 1 time at every 1 sec.)



2. Component Description

When turning the ignition key to the ON position, the power is supplied to the immobilizer unit and EMS (ECU). The ECU communicates with the immobilizer unit to verify the key and transponder. If it is valid, the ECU starts to control the engine or immobilizer indicator (illumination or flashing) when the ignition key is turned to the START position.
Once the key is verified, valid key verification time is provided for 10 seconds and the engine can be started by turning the ignition key to the engine START position during this verification time. If the ignition key is turned to the START position again after the 10 seconds of verification time, the key verification should be reperformed.

Modification basis	
Application basis	
Affected VIN	

SCAN DIAGNOSIS

1. Fault Diagnosis

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Clear any diagnostic trouble code (DTC).

2. Sensor Output

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Check the item "Immo coding Status, Immobilizer Coding Key Count Status".

Item	Specified value
Immo coding Status	Registered: OK Nonregistered: defective
Immobilizer Coding Key Count Status	Displays number of currently registered transponders

NG If "Nonregistered" is displayed, perform the procedure "Transponder Registration and EMS Registration".

3. Transponder Registration and EMS Registration

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Select the item "Transponder registration" on the immobilizer diagnosis menu.
4) Follow the instructions on the screen for diagnosis to perform "Transponder registration".
5) Select "EMS registration" and follow the instruction on the screen to perform "EMS registration".

NOTE

- When the immobilizer unit or transponder (REKES key) is replaced, perform "Transponder Registration" and "EMS Registration" using a diagnostic device. Up to 5 transponders can be registered.
- Always register both old key and replaced key since registering a transponder clears the information of previously registered transponder.

B1155 Key Reminder S/W error

FAILURE DIAGNOSIS

The immobilizer unit monitors the signal from the key reminder switch and sets a diagnostic trouble code (DTC) if the key reminder switch is detected as not operating.

Items	Judgement criteria	Possible cause
How to diagnose	Monitoring voltage	- Relevant wiring (open) - Key reminder switch
Diagnostic condition	IGN ON	
DTC set value	Key reminder switch detected as not operating with IGN ON	
Diagnosis time	-	
Restoring condition	Key reminder switch operates normally	

Modification basis	
Application basis	
Affected VIN	

COMPONENTS

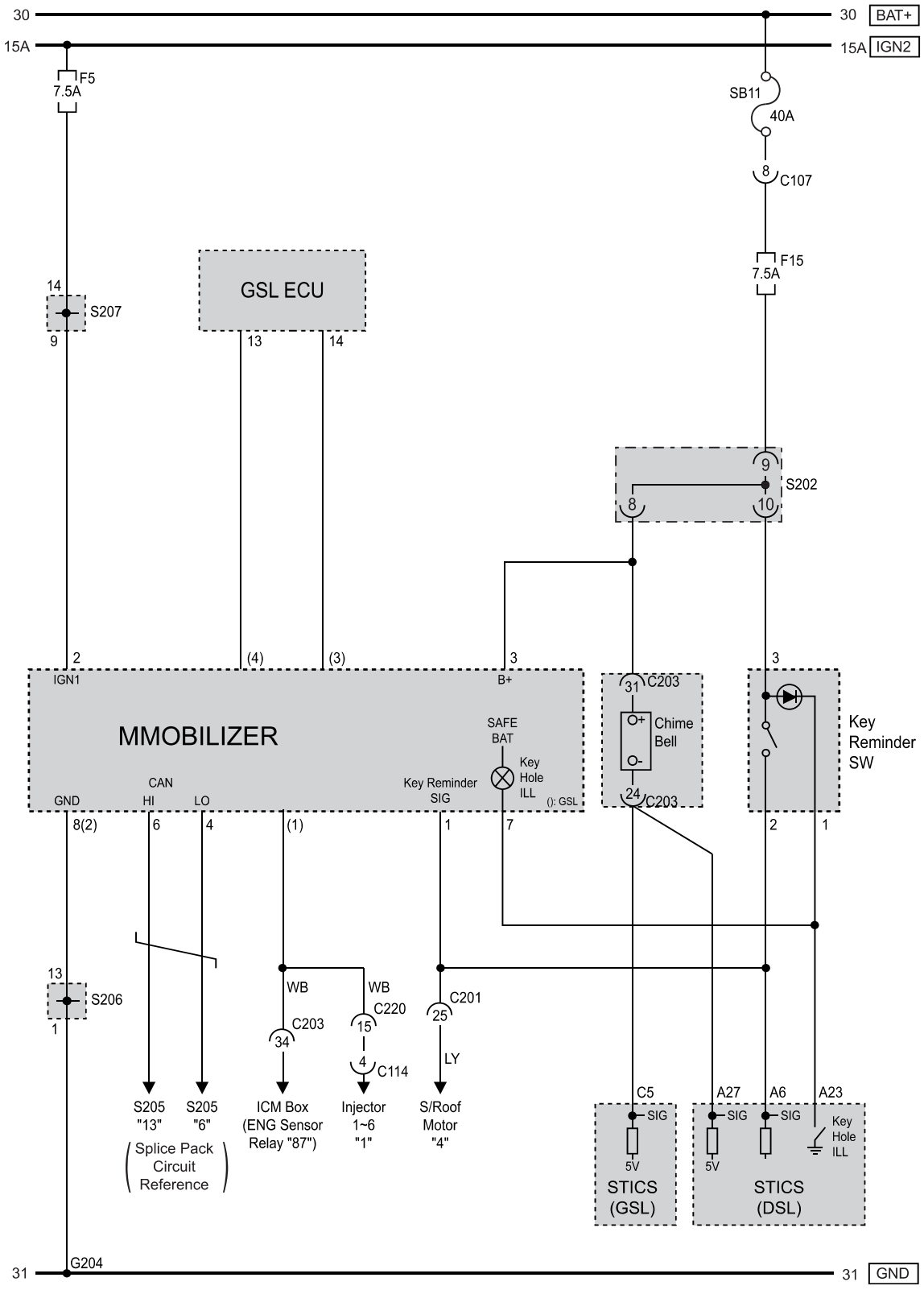
1. Component Location

2. Component Description

The immobilizer unit sets a diagnostic trouble code (DTC) if no response signal is sent from the immobilizer unit as the immobilizer recognizes that the key is not inserted when the ignition key is turned to the "ON" position. In other words, it sets a trouble code if the immobilizer unit recognizes that the key is not inserted because the immobilizer unit cannot utilize the memory of the key (transponder).

PARTIAL CIRCUIT DIAGRAM

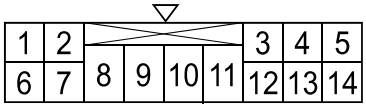
1. Partial Circuit Diagram



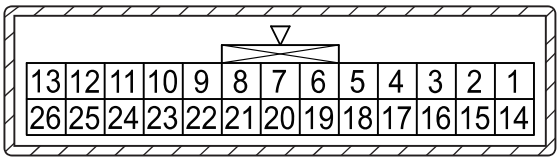
Modification basis	
Application basis	
Affected VIN	

PARTIAL CIRCUIT DIAGRAM

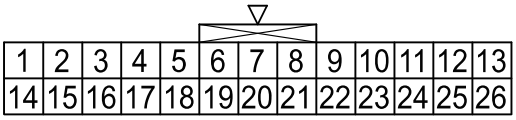
2. Connector Appearance



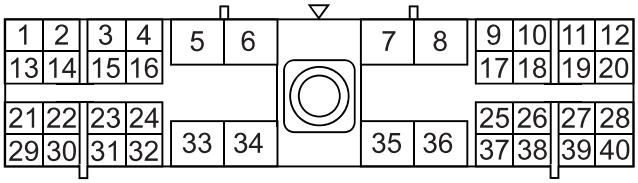
C107_F
W/H Main
(Eng Room Fuse Box)



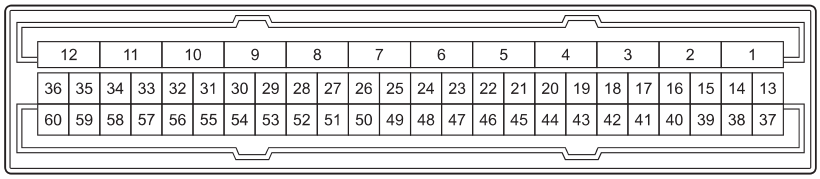
C201_M
W/H Roof

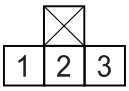


C201_F
W/H Main

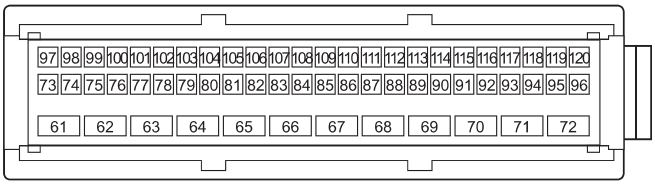


C203_F
W/H Main(ICM Box A)

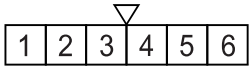




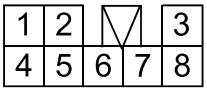
Key Reminder SW



GSL ECU

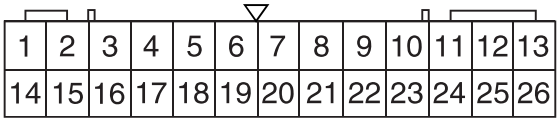


S/Roof Motor

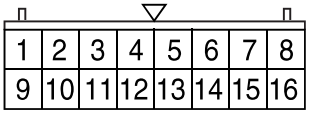


IMMO
(D20DTR)

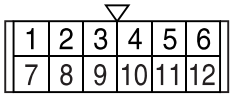
A



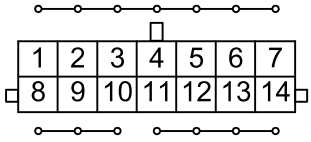
B



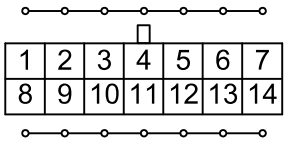
C



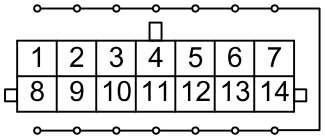
STICS



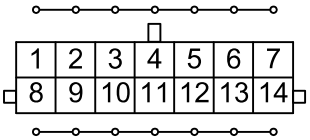
S202



S205(P-CAN)



S206(GND)



S207

SCAN DIAGNOSIS

1. Fault Diagnosis

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Clear any diagnostic trouble code (DTC).

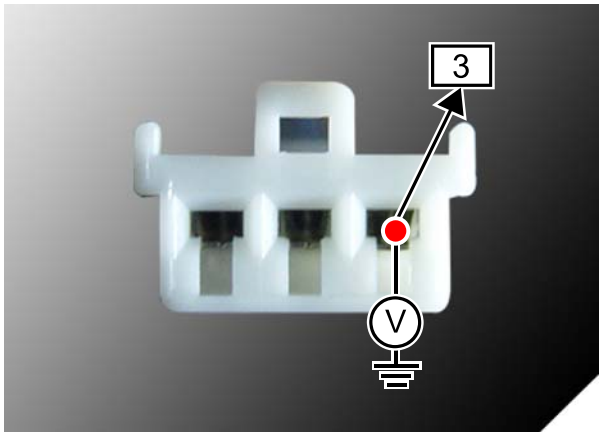
2. Sensor Output

1) Connect the DSM to the OBD2 connector.
2) Turn the ignition switch to the "ON" position.
3) Check the item "Immobilizer Read Key Remind Switch Input".

Item	Condition	Specified value
Immobilizer Read Key Remind Switch Input	Insert the key into the key cylinder.	ON

Modification basis	
Application basis	
Affected VIN	

CHECK METHOD

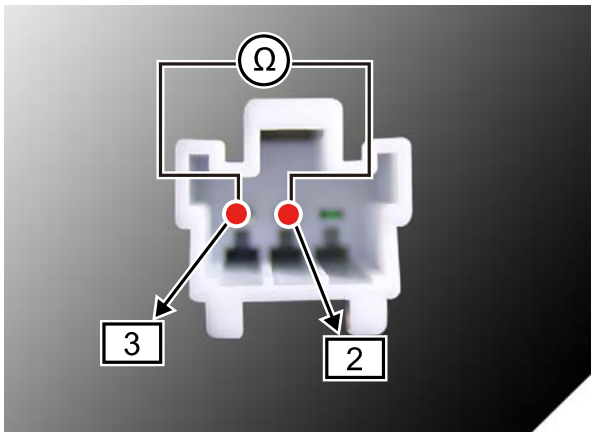


1. Check Power Wire

1) Turn the ignition switch to the "OFF" position.
2) Disconnect the key reminder switch connector.
3) Measure the voltage between the power wire terminal No. 3 of the connector to the key reminder switch wiring and the body ground.

Measuring voltage	
Tester connection (to wiring)	Specified value
Terminal No. 3 ↔ Body	Battery voltage

NG Check if the fuse and wiring between the key reminder switch power terminals are not open and repair if necessary.



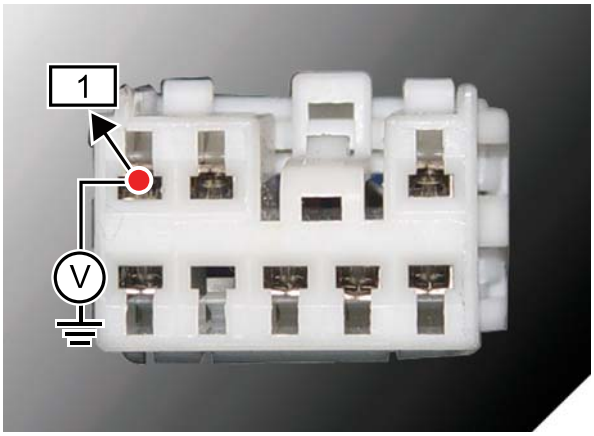
2. Checking Component

1) Turn the ignition switch to the "OFF" position.
2) Disconnect the key reminder switch connector.
3) Insert the key into the key cylinder.
4) Measure the resistance between the terminals No. 2 and 3 of the connector to the key reminder switch.

Measuring resistance	
Tester connection (component side)	Specified value
Terminal No. 2 ↔ Terminal No. 3	Key inserted to key cylinder: approx. 0 Ω

NG Replace the key reminder switch unit.

CHECK METHOD



3. Check Power Wire

1) Turn the ignition switch to the "OFF" position.
2) Disconnect the immobilizer unit connector.
3) Insert the key into the key cylinder.
4) Measure the voltage between the signal wire terminal No. 1 of the connector to the immobilizer unit wiring and the body ground.

Measuring voltage	
Tester connection (to wiring)	Specified value
Terminal No. 1 ↔ Body	Key inserted to key cylinder: battery voltage

NG Repair the open circuited signal wire.

4. Final Service Check

- This is to check the serviced item again for the last time after the service is completed.
- Erase DTC(s) again on the diagnostic device.
- Test drive the vehicle and check the vehicle has recovered its normal condition.

NG Perform the inspection procedures again after replacing the immobilizer unit.

OK Service completed (System normal)

NOTE

- When the immobilizer unit or transponder (REKES key) is replaced, perform "Transponder Registration" and "EMS Registration" using a diagnostic device. Up to 5 transponders can be registered.
- Always register both old key and replaced key since registering a transponder clears the information of previously registered transponder.

Modification basis	
Application basis	
Affected VIN	