INSTRUMENT CLUSTER

INSTRUMENT CLUSTER

Warnings and Precautions

Precautions

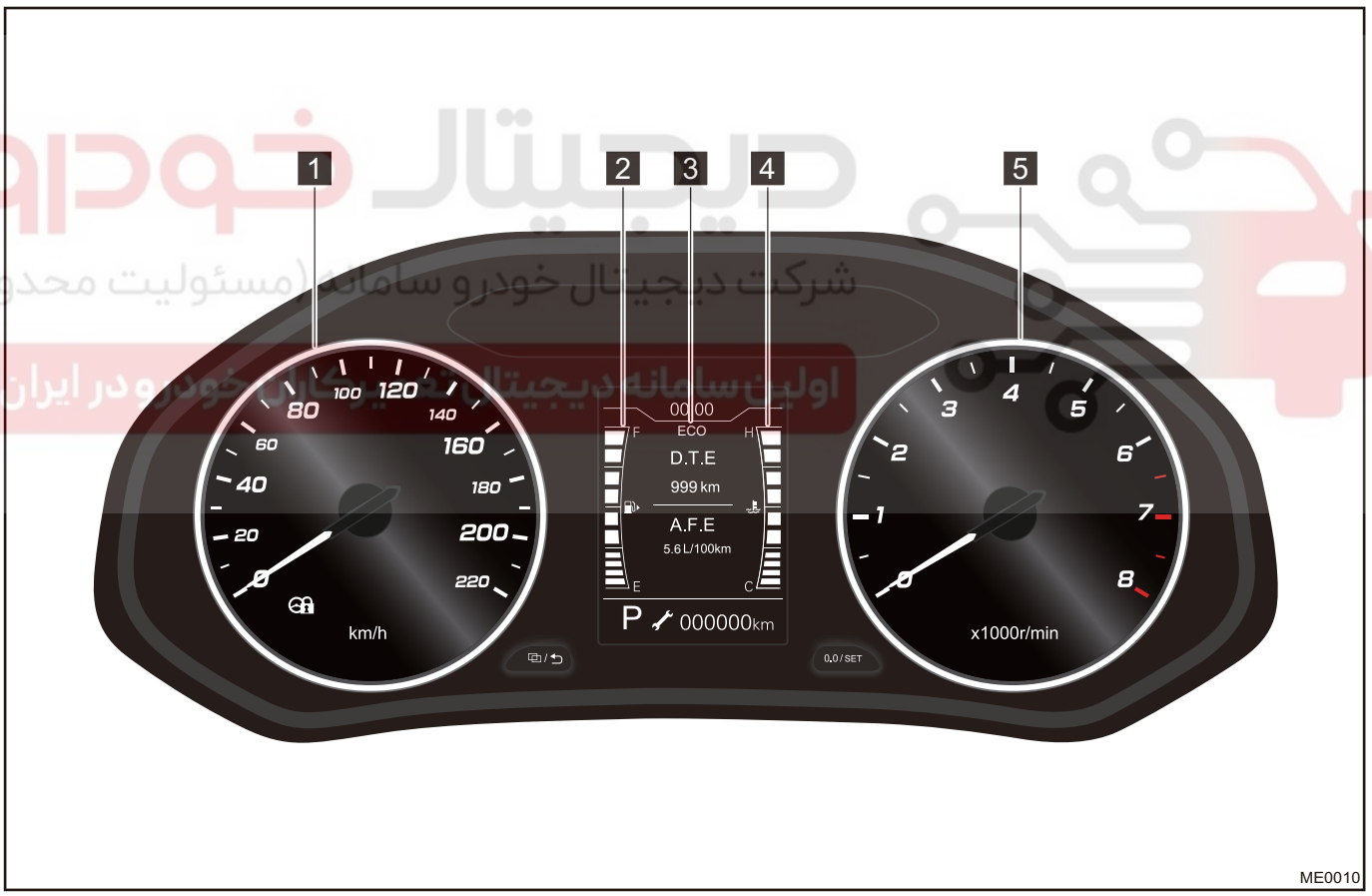
In order to avoid possible property loss, personal injury or death follow the following instructions before maintenance.

1. DO NOT scratch interior and body paint when removing instrument cluster.
2. Be sure to wear necessary safety equipment to prevent accidents, when removing instrument cluster.
3. Appropriate force should be applied, when removing combination cluster. Be careful not to operate roughly.
4. When removing the instrument cluster, handle it with care, so as to avoid bump caused by meter needle and dial looseness or deviation to initial position.

Overview

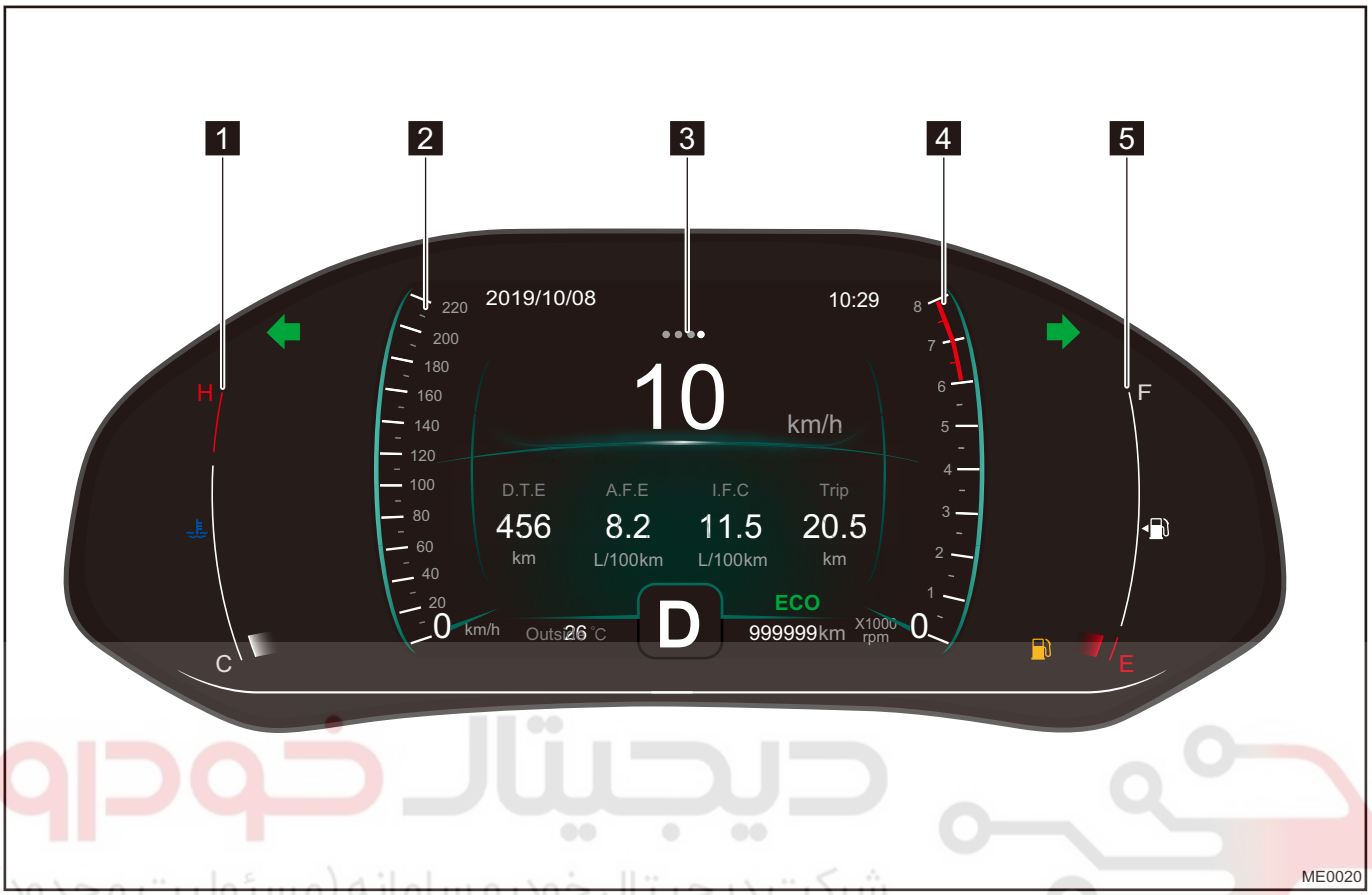
Instrument Cluster

Instrument Cluster (3.5 inch) (If equipped)



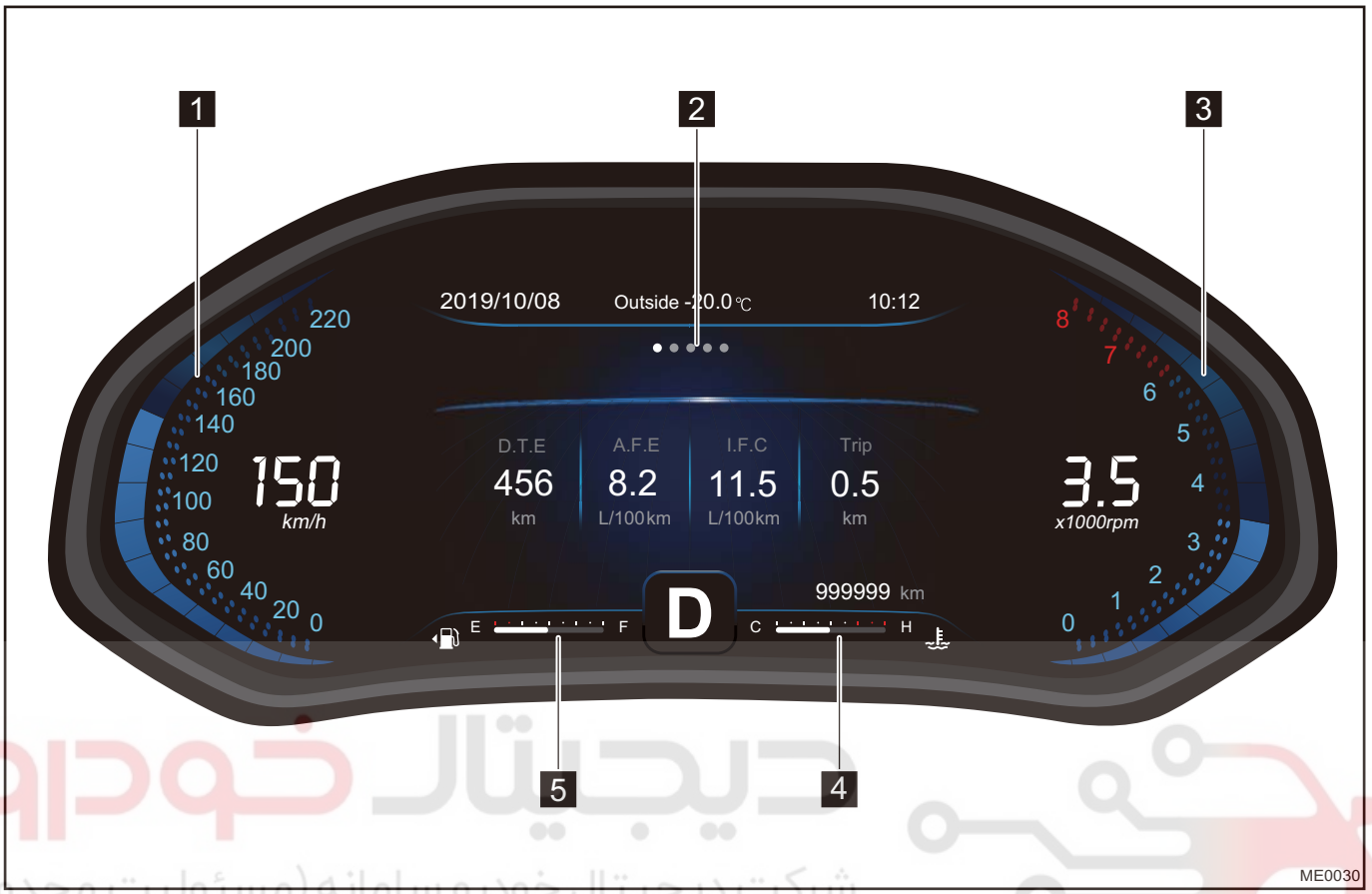
1	Speedometer	4	Coolant Temperature Gauge
2	Fuel Gauge	5	Tachometer
3	Information Display		

Instrument Cluster (7 inch color) (If equipped)



1	Coolant Temperature Gauge	4	Tachometer
2	Speedometer	5	Fuel Gauge
3	Information Display		

Instrument Cluster (7 inch combined) (If equipped)



1	Speedometer	4	Coolant Temperature Gauge
2	Information Display	5	Fuel Gauge
3	Tachometer		

Instrument Cluster (12.3 inch)

1	Speedometer	4	Coolant Temperature Gauge
2	Information Display	5	Fuel Gauge
3	Tachometer		

System Function

Instrument cluster is located above the upper left of instrument panel assembly, which is used to monitor and display the operation status of each system and component in vehicle. Instrument cluster receives signals from each sensor and switch, and displays the operation status of each system through combination meter, operation/malfunction indicator. It also reminds and informs driver by flashing lights and sounding buzzer. As a result, it will be helpful for driver to eliminate possible troubles in time, thus avoiding malfunctions or accidents efficiently.

Operation/Malfunction Indicator

Operation indicator is used to prompt the driver that some system on vehicle is operating and corresponding operation indicator will come on.

Malfunction indicator is used to warn the driver that some system on vehicle is operating and corresponding malfunction indicator will come on or flash.

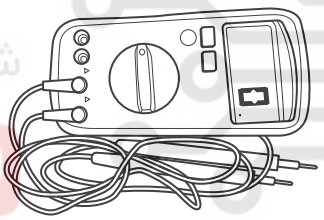
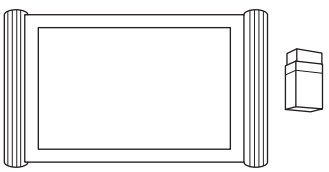
	Daytime Running Indicator
	Position Indicator
	Left Turn Light Indicator
	High Beam Indicator

	Rear Fog Indicator
	Intelligent Headlight (IHC) Indicator
	Intelligent Headlight (IHC) Malfunction Indicator
	Front Seat Belt Indicator
	Rear Seat Belt Indicator
	Brake System Malfunction Indicator
	Electronic Parking Brake System (EPB) Indicator
	Electronic Parking Brake System (EPB) Malfunction Indicator
	Automatic Parking System (AUTO HOLD) Indicator
	Anti-lock Brake System (ABS) Malfunction Indicator
	Hill Descent Control System (HDC) Indicator
	Hill Descent Control System (HDC) Malfunction Indicator
	ESP OFF Indicator
	ESP OFF Indicator
	Auto Emergency Brake System (AEB) Indicator
	Auto Emergency Brake System (AEB) Malfunction Indicator
	Traffic Congestion Assistance System (TJA) / Integrated Cruise Assistance System (ICA) Malfunction Indicator
	Lane Departure Warning System (LDW) Indicator
	Lane Keeping Assist System (LKA) Indicator
	Lane Keeping Assist System (LKA) Malfunction Indicator
	Charging System Indicator
	Hight Coolant Temperature Warning Light

	Low Fuel Level Warning Light
	Airbag Malfunction Indicator
	Tire Pressure Malfunction Indicator
	Electric Steering System Malfunction Indicator
	Low Oil Pressure Warning Indicator
EPC	EPC Malfunction Indicator
	Engine Malfunction Indicator
	Transmission Malfunction Indicator

Special Tools and Equipment

General Tool

Tool Name	Tool
Digital Multimeter	 RCH0002006
Diagnostic Tester	 RCH0001006

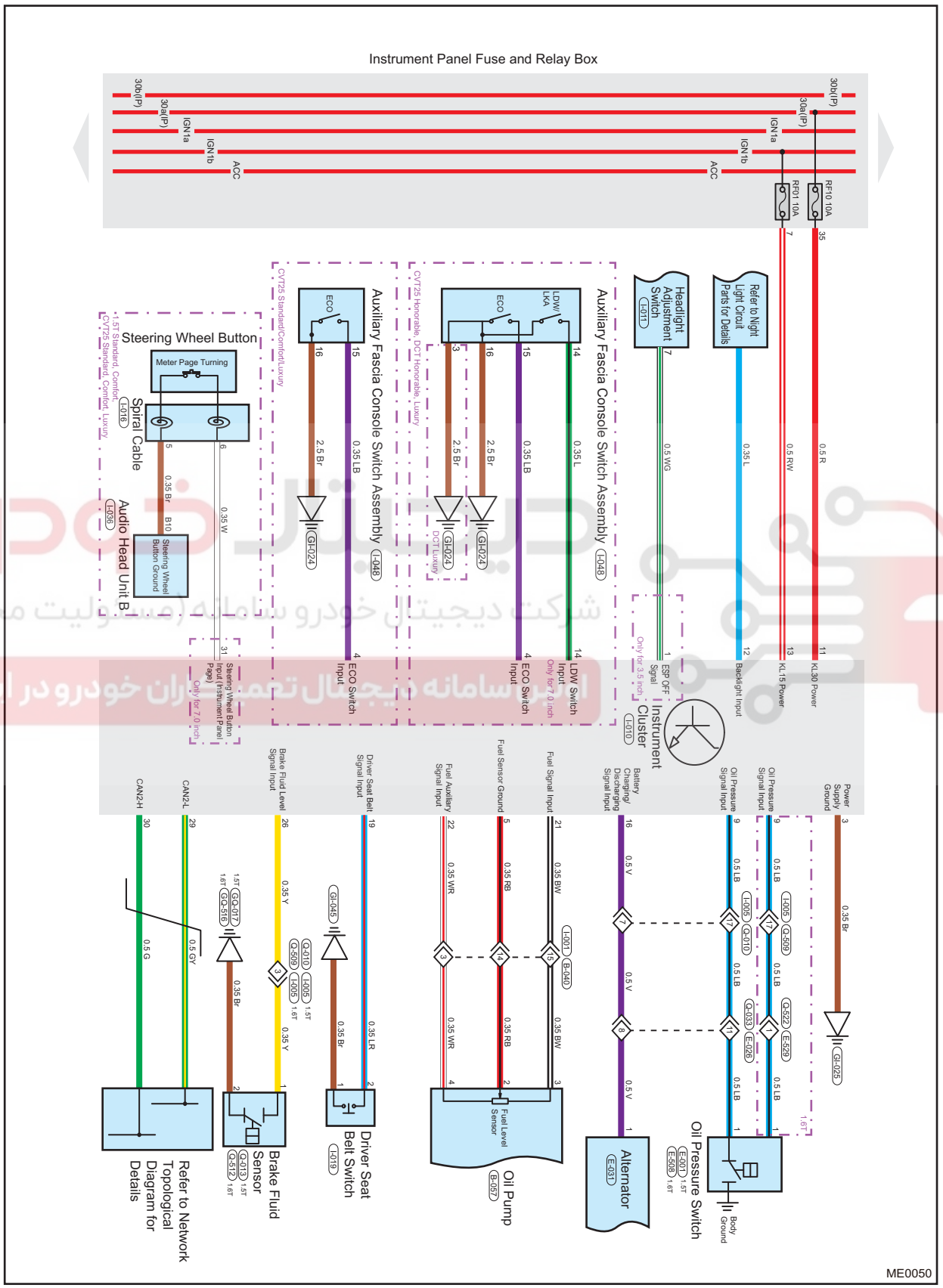
Tightening Torque List

Torque

Item	Tightening Torque
Instrument Cluster Fixing Screw	1.5 ± 0.5 N·m

System Circuit Diagram

Instrument cluster



Diagnostic Information Steps

Diagnosis Procedure

Hint:

Use following procedures to troubleshoot the instrument cluster.

1	**Vehicle brought to workshop**

NEXT

2	**Check battery voltage**

Check if battery voltage is normal.

OK

Standard voltage: Not less than 12 V

Result

Result	Proceed to
OK	A
NG	B

B → **Replace battery**

A

3	**Customer problem analysis**

NEXT

4	**Read DTCs**

Result

Result	Proceed to
DTC	A
No DTC	B

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B → **Perform repair according to Problem Symptoms Table**

A

5	**Read DTCs (current DTC and history DTC)**

Result

Result	Proceed to
DTC	A
No DTC	B

B → **Troubleshoot according to intermittent DTC malfunction procedure**

A

6	**Perform repair according to Diagnostic Trouble Code**

NEXT

7	**Adjust, repair or replace**

NEXT

8	**Conduct test and confirm malfunction has been repaired**

NEXT → **End**

DTC Confirmation Procedure

Confirm that battery voltage is no less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in system.
- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

Intermittent DTC Troubleshooting

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Check for broken, bent, protruded or corroded terminals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit works. Circuits are very sensitive to proper grounding. A loose or corroded ground can affect the control circuit. Check the ground points as follows:

- Remove ground bolt or nut.
- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if add-on accessories interfere with ground circuit.

- If several wire harnesses are crimped into one ground terminal, check for proper crimps. Make sure that all wire harnesses are clean and securely fastened while providing a good ground path.

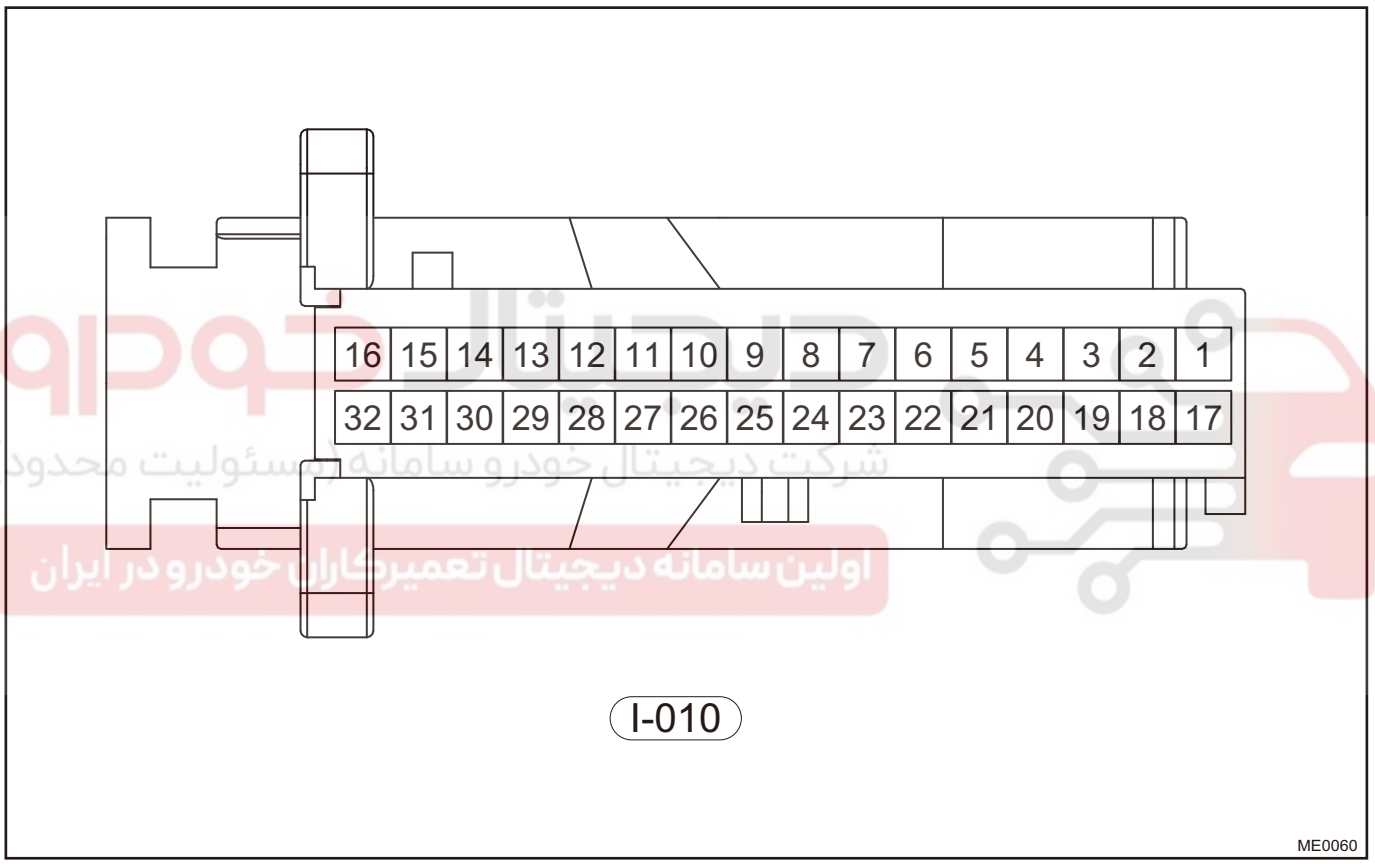
Problem Symptoms Table

Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Instrument cluster does not operate	Fuse
	Instrument cluster
	Wire harness or connector

Instrument Cluster Terminal List



Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	ESP Switch Input	17	\
2	\	18	\
3	Power Supply Ground	19	Driver Seat Belt Signal Input
4	ECO/SPT Switch Input	20	\
5	Fuel Level Sensor Ground	21	Fuel Signal Input
6	\	22	Fuel Auxiliary Signal Input
7	\	23	\
8	\	24	\
9	Oil Pressure Signal Input	25	\
10	\	26	Brake Fluid Level Signal Input
11	KL30	27	\
12	Backlight Input	28	\

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
13	KL15	29	B-CAN1-L
14	LDW Switch Input	30	B-CAN-H
15	\	31	Steering Wheel Button Input (Mode/Setting)
16	Battery Charging/Discharging Signal Input	32	\

DTC Diagnosis

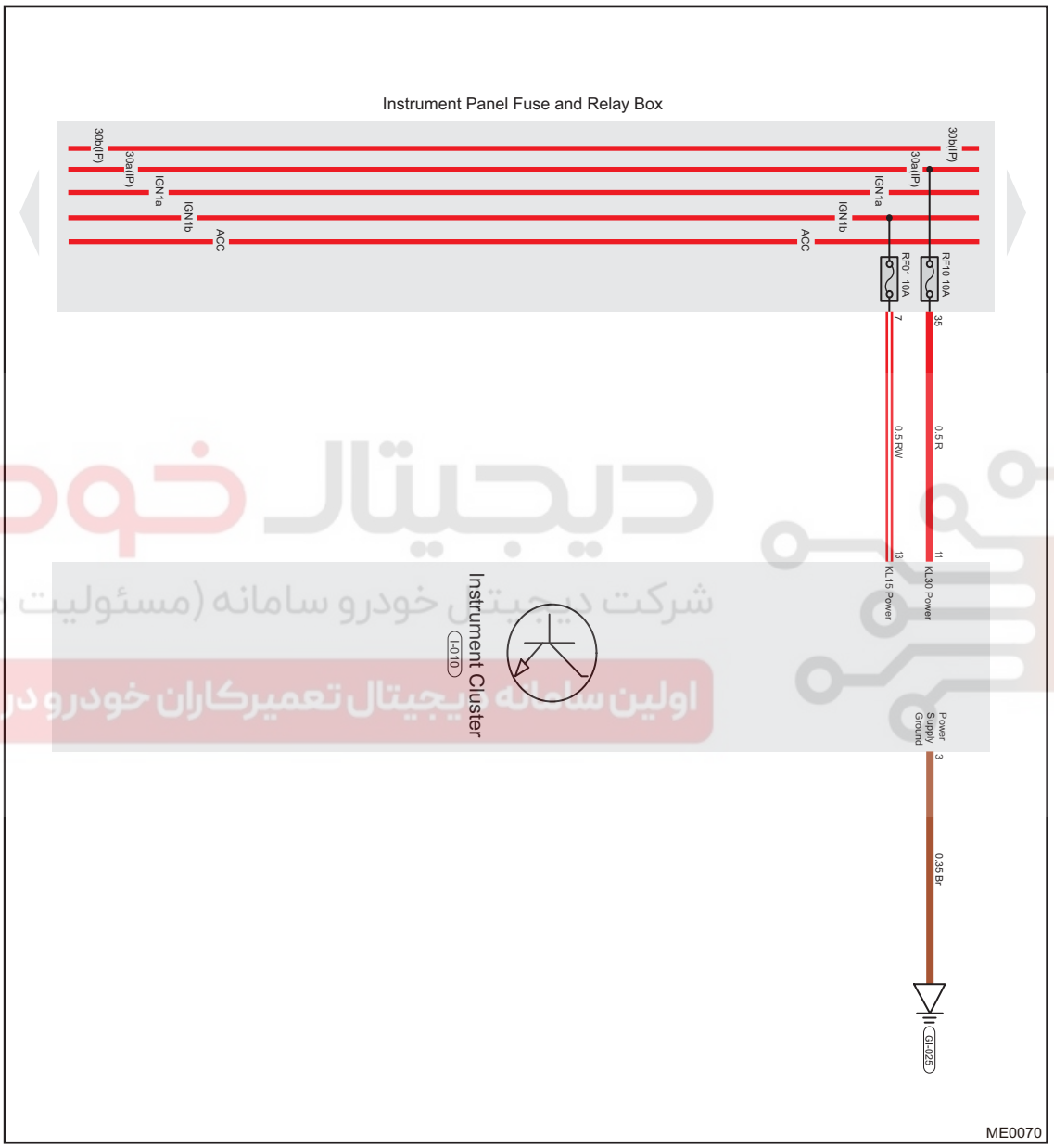
DTC	DTC Definition
B1100-13	Power Supply Fault-Circuit Open
B1100-16	Power Supply Fault-Circuit Voltage Below Threshold
B1100-17	Power Supply Fault-Circuit Voltage Above Threshold
B1101-11	ICM Fuel System Fault-Circuit Short To Ground
B1101-15	ICM Fuel System Fault-Circuit Short To Battery or Open
B1103-00	Airbag Warning Light Fault -No Sub Type Information
B1104-41	EEPROM Checksum Error-General Checksum Failure
B110A-00	Wheel Button Fault-No Sub Type Information
B110C-11	ICM Fuel Master Detect Circuit Fault-Circuit Short To Ground
B110C-13	ICM Fuel Master Detect Circuit Fault-Circuit Open
B110D-11	ICM Fuel Assistant Detect Circuit Fault-Circuit Short To Ground
U0100-87	Lost Communication With Engine Control System Module -Missing Message
U0101-87	Lost Communication With Transmission Control Unit -Missing Message
U0245-87	Lost Communication With IHU-Missing Message
U0129-87	Lost Communication With Brake System Control Module -Missing Message
U0131-87	Lost Communication With Electronic Power Steering Module -Missing Message
U0151-87	Lost Communication With Air Bag Module -Missing Message
U0140-87	Lost Communication With Body Control Module -Missing Message
U0214-87	Lost Communication With Passive Entry Passive Start Unit -Missing Message
U0164-87	Lost Communication With Climate Module -Missing Message
U0141-87	Lost Communication With RADAR-Missing Message
U0142-87	Lost Communication With AVM-Missing Message
U1157-87	Lost Communication With Air Bag Module -Missing Message
U0230-87	Lost Communication With PLG-Missing Message
U1162-87	Lost Communication With FCM-Missing Message
U1163-87	Lost Communication With FRM-Missing Message
U1193-87	Lost Communication With EGS-Missing Message
U1190-87	Lost Communication with ESCL
U1189-87	Lost Communication With MFS-Missing Message
U1300-55	Software Configuration Error-Not Configured

DTC	B1100-13	Power Supply Fault-Circuit Open

DTC	B1100-16	Power Supply Fault-Circuit Voltage Below Threshold

DTC	B1100-17	Power Supply Fault-Circuit Voltage Above Threshold

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
B1100-13	Power Supply Fault-Circuit Open	• ECU internal fault • Related wire harness fault
B1100-16	Power Supply Fault-Circuit Voltage Below Threshold	
B1100-17	Power Supply Fault-Circuit Voltage Above Threshold	

Caution:
When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

1	Check fuse

(a) Check if fuses RF01 (10A) and RF10 (10A) are normal.

Result

Result	Proceed to
OK	A
NG	B

B → **Replace faulty fuse**

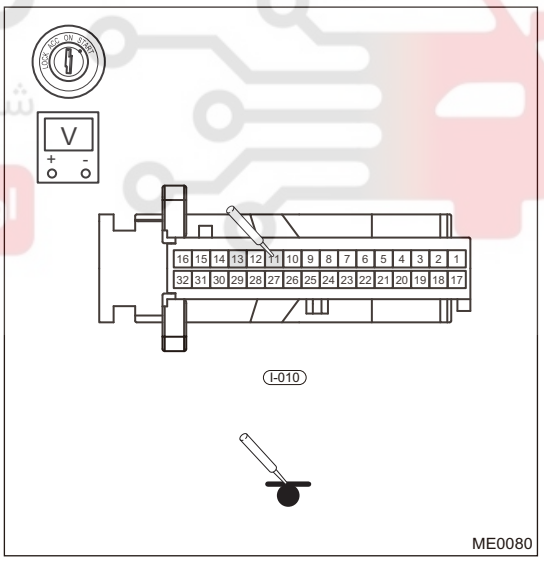
A

2	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the combination cluster connector I-010.
(d) Check if wire harnesses are worn, pinched or broken.
(e) Check if related connector terminals are loosen, broken, bent or corroded.
(f) Check if related connector pins are in good condition.
(g) Turn ENGINE START STOP switch to ON.
(h) Using a digital multimeter, check if the voltage between combination cluster connectors I-010 (11), I-010 (13) and ground is normal according to table below .

OK

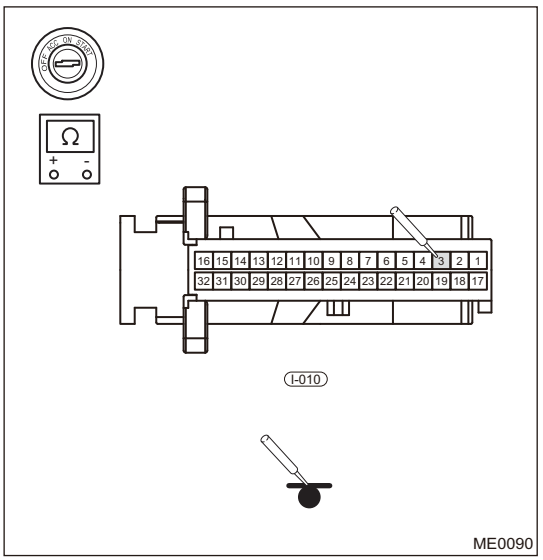
Multimeter Connection	Specified Condition
I-010 (11) - Body ground	Not less than 12V
I-010 (13) - Body ground	Not less than 12V



(i) Using a digital multimeter, check if the continuity between connector I-010 (3) and body ground is normal.

OK

Multimeter Connection	Specified Condition
I-010 (3) - Body ground	⩽ 1 Ω



Result

Result	Proceed to
OK	A
NG	B

B → **Repair or replace wire harness and connector**

A

3	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Check if the same DTCs are still output.

Result

Result	Proceed to
OK	A
NG	B

B → **Replace instrument cluster**

A → **System operates normally**

DTC	B1101-11	ICM Fuel System Fault-Circuit Short To Ground

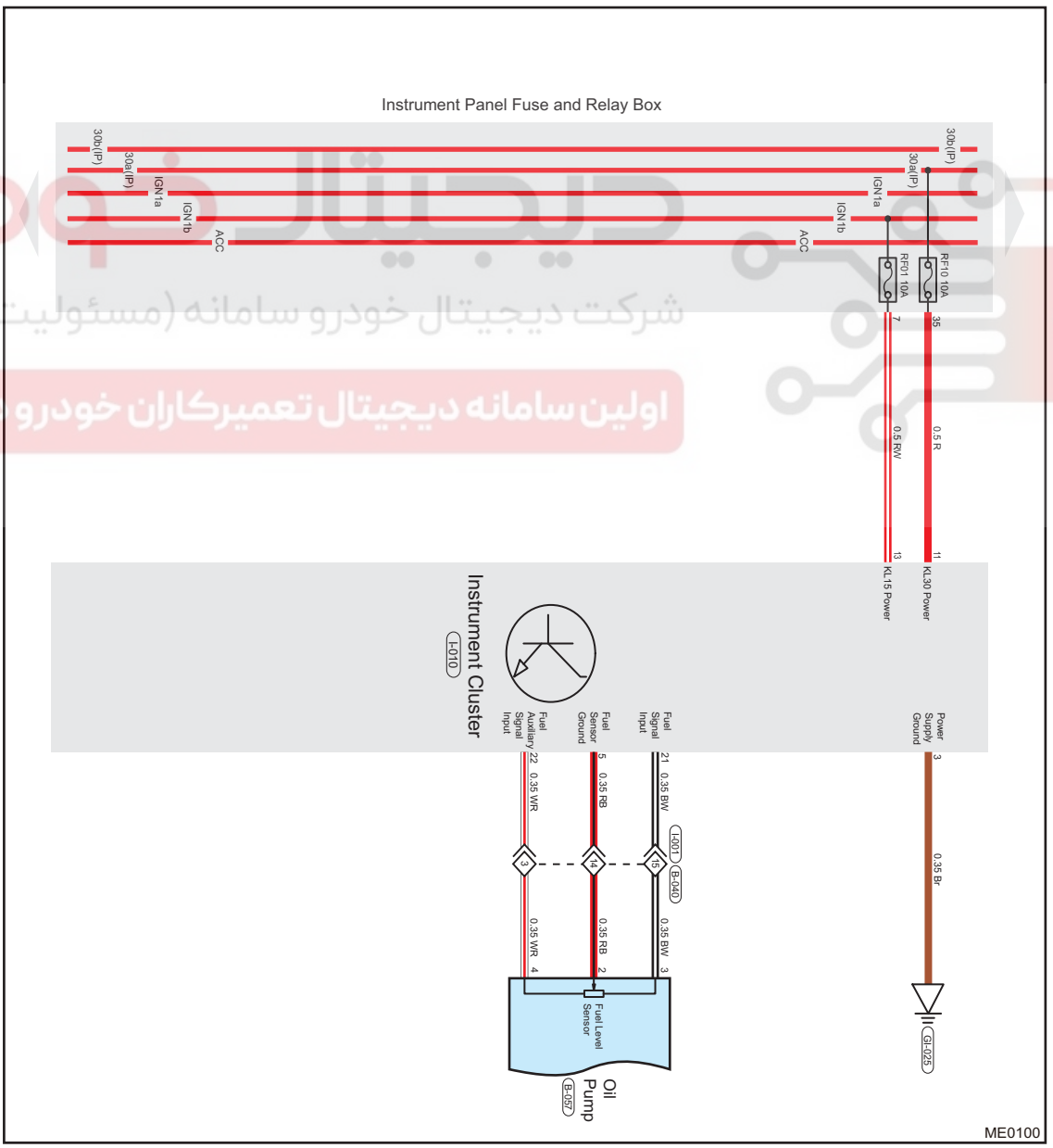
DTC	B1101-15	ICM Fuel SystemFault-Circuit Short To Battery or Open

DTC	B110C-11	ICM Fuel Master Detect Circuit Fault-Circuit Short To Ground

DTC	B110C-13	ICM Fuel Master Detect Circuit Fault-Circuit Open

DTC	B110D-11	ICM Fuel Assistant Detect Circuit Fault-Circuit Short To Ground

Circuit Diagram



Description

DTC	DTC Definition	Possible Cause
B1101-11	ICM Fuel System Fault-Circuit Short To Ground	• ECU internal fault • Related wire harness fault
B1101-15	ICM Fuel SystemFault-Circuit Short To Battery or Open	
B110C-11	ICM Fuel Master Detect Circuit Fault-Circuit Short To Ground	
B110C-13	ICM Fuel Master Detect Circuit Fault-Circuit Open	
B110D-11	ICM Fuel Assistant Detect Circuit Fault-Circuit Short To Ground	

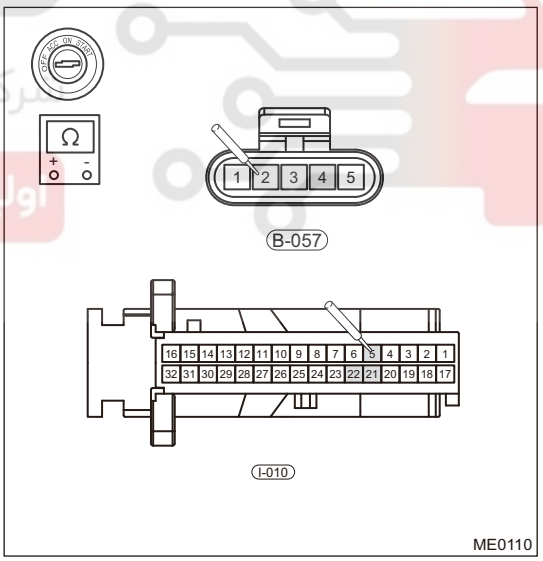
Caution:
When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

1	Check related wire harness and connector

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the combination cluster connector I-010.
(d) Disconnect the fuel pump wire harness connector B-057.
(e) Check if wire harnesses are worn, pinched or broken.
(f) Check if related connector terminals are loosen, broken, bent or corroded.
(g) Check if related connector pins are in good condition.
(h) Using a digital multimeter, check if continuity between combination cluster connectors I-010 (21), I-010 (5), I-010 (22) and oil pump connectors B-057 (3), B-057 (2), B-057 (4) is normal according to table below .

OK

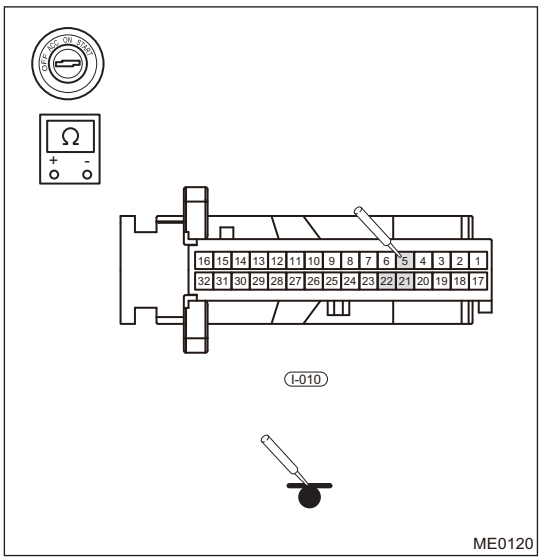
Multimeter Connection	Specified Condition
I-010 (21) - B-057 (3)	⩽ 1 Ω
I-010 (5) - B-057 (2)	⩽ 1 Ω
I-010 (22) - B-057 (4)	⩽ 1 Ω



(i) Using a digital multimeter, check if the continuity between connector I-010 (22), I-010 (5)、I-010 (22) and body ground is normal.

OK

Multimeter Connection	Specified Condition
I-010 (21) - Body ground	∞
I-010 (5) - Body ground	∞
I-010 (22) - Body ground	∞



Result

Result	Proceed to
OK	A
NG	B

B → **Repair or replace wire harness and connector**

A

2	Reconfirm DTCs

(a) Use diagnostic tester to clear DTCs.
(b) Check if the same DTCs are still output.

Result

Result	Proceed to
OK	A
NG	B

B → **Replace instrument cluster**

A → **System operates normally**

DTC	B1104-41	EEprom Checksum Error

Description

DTC No.	DTC Definition	Possible Cause
B1104-41	EEprom Checksum Error	• ECU internal fault

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

1	Cycle dropout test

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable and wait for 3 minutes to connect the negative battery cable.
(c) Use diagnostic tester to clear DTCs.
(d) Start the engine.
(e) Check if the same DTCs are still output.

Result

Result	Proceed to
OK	A
NG	B

B → **Replace instrument cluster**

A → **System operates normally**

DTC	U0100-87	Lost Communication With EMS
DTC	U0101-87	Lost Communication With TCU
DTC	U0245-87	Lost Communication With RRM
DTC	U0129-87	Lost Communication With Brake System Control Module -Missing Message
DTC	U0131-87	Lost Communication With Electronic Power Steering Module -Missing Message
DTC	U0151-87	Lost Communication With Air Bag Module - Missing Message
DTC	U0140-87	Lost Communication With Body Control Module - Missing Message
DTC	U0214-87	Lost Communication With Passive Entry Passive Start Unit -Missing Message
DTC	U0164-87	Lost Communication With Climate Module - Missing Message
DTC	U0141-87	Lost Communication With RADAR-Missing Message
DTC	U0142-87	Lost Communication With AVM-Missing Message
DTC	U1157-87	Lost Communication With Air Bag Module - Missing Message
DTC	U0230-87	Lost Communication With PLG-Missing Message
DTC	U1162-87	Lost Communication With FCM-Missing Message
DTC	U1163-87	Lost Communication With FRM-Missing Message
DTC	U1193-87	Lost Communication With EGS-Missing Message
DTC	U1190-87	Lost Communication with ESCL
DTC	U1189-87	Lost Communication With MFS-Missing Message

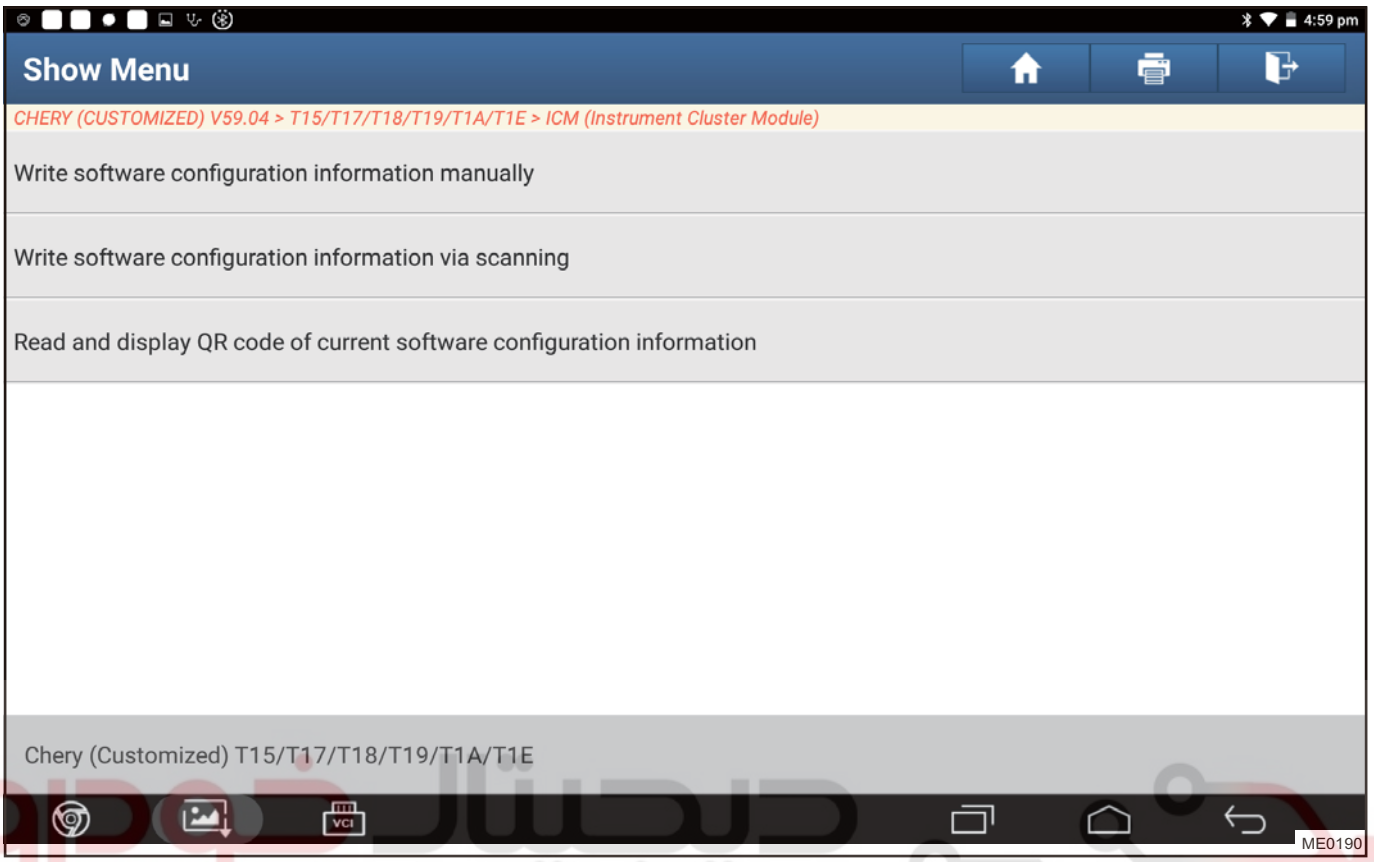
DTC	U1300-55	Software Configuration Error-Not Configured

Refer to CAN communication system

Matching learning

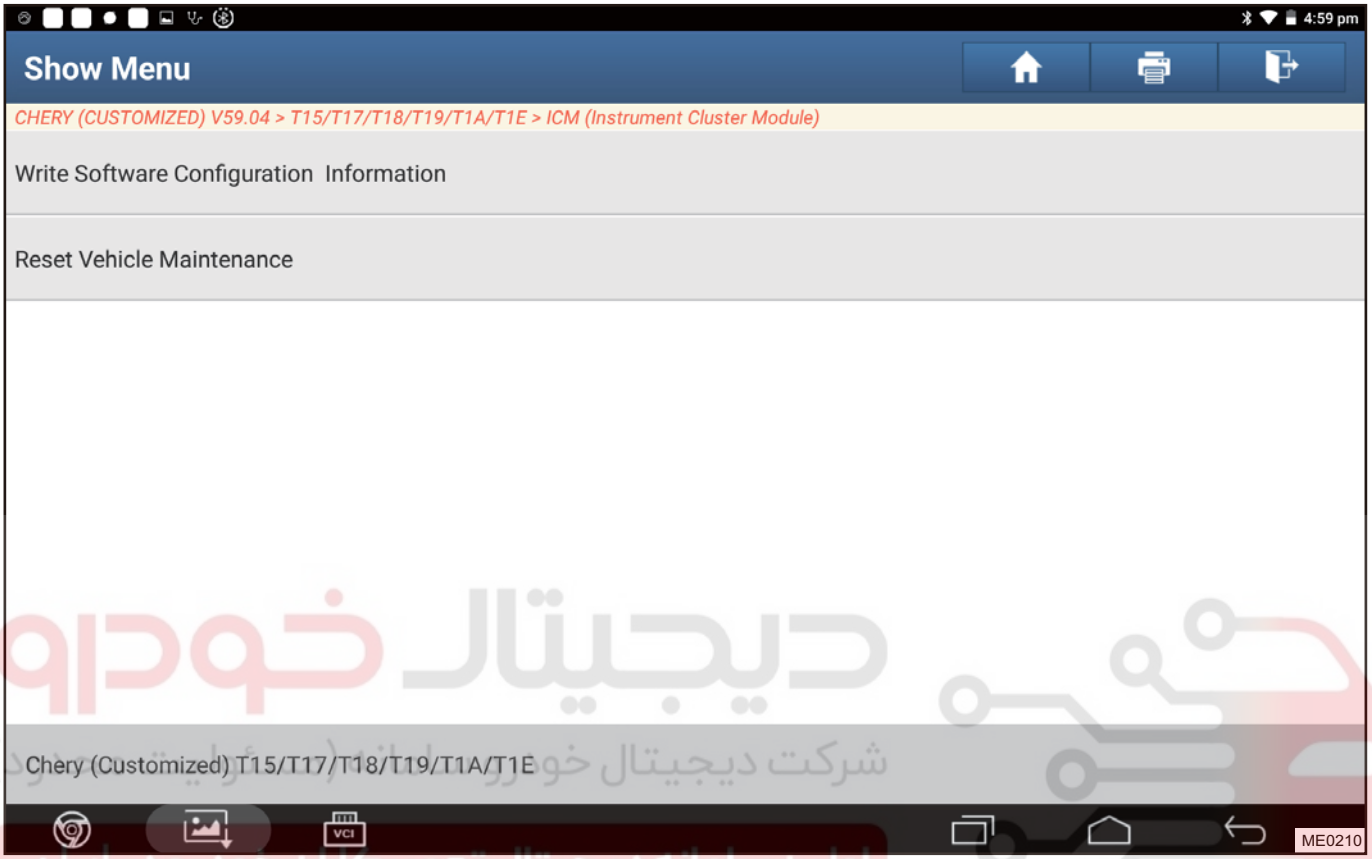
Write software configuration information

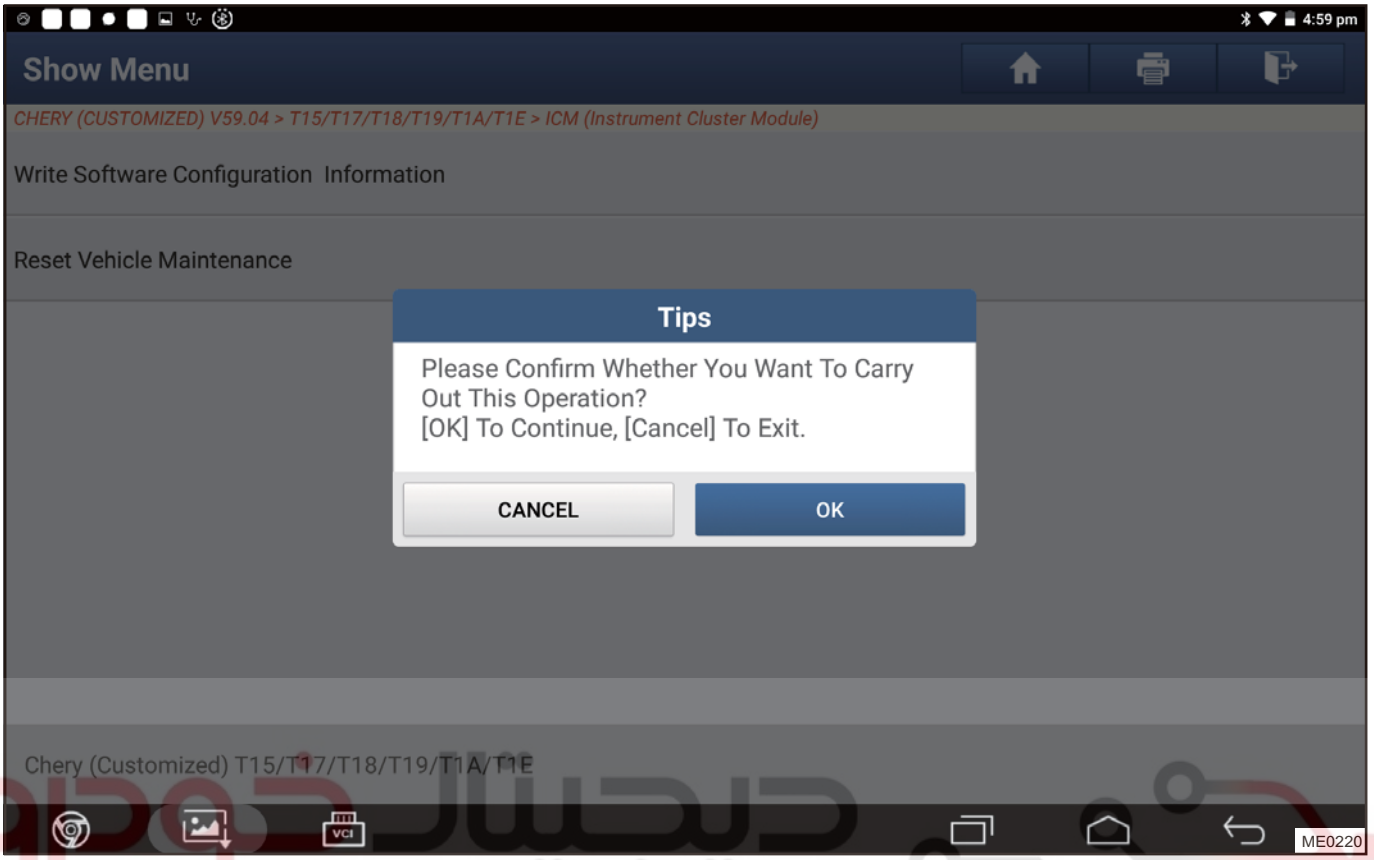
1. Click "ICM (Instrument Cluster Module)"
2. Click "Special Function".
3. Click "Write Software Configuration Information".

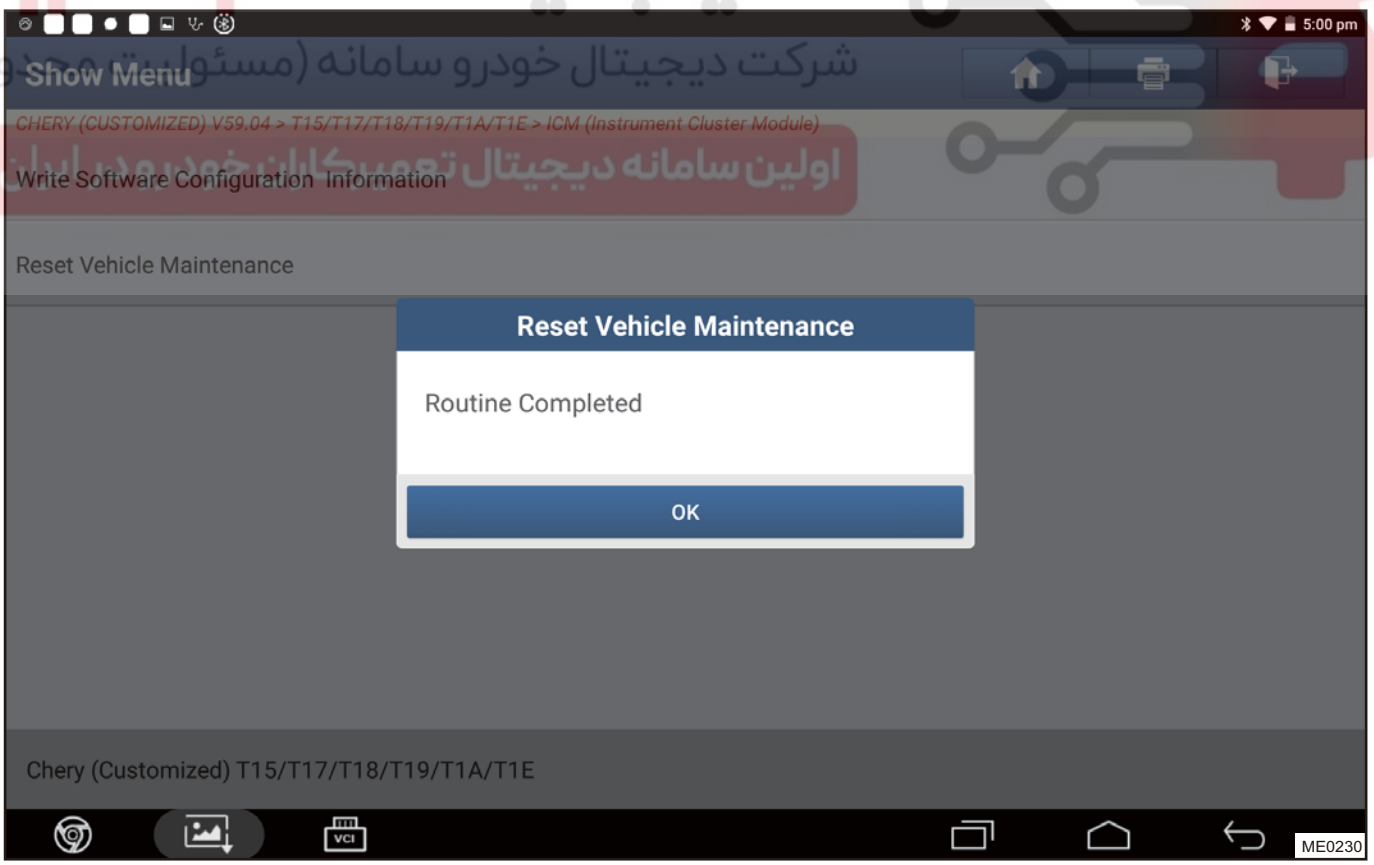


Write software configuration information

1. Click "ICM (Instrument Cluster Module)".
2. Click "Special Function".
3. Click "Vehicle Maintenance Function Reset".







Removal & Installation

Instrument Cluster (3.5 inch/7 inch color/7 inch combined) (If equipped)

Removal

Warning:

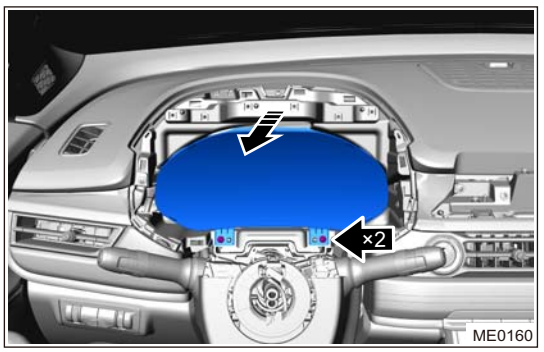
- Be sure to wear necessary safety equipment to prevent accidents, when removing instrument cluster.
- Appropriate force should be applied, when removing combination cluster. Be careful not to operate roughly.
- When removing the instrument cluster, handle it with care, so as to avoid bump caused by meter needle and dial looseness or deviation to initial position.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Adjust steering column to lowest position.
4. Gently shake the front cover of instrument and pull it out in the direction of front cover of instrument cluster.

5. Remove 4 fixing screws from instrument cluster trim frame.

6. Shake instrument cluster trim frame gently to pull it in a direction perpendicular to the surface of display.

7. Remove 2 fixing screws from instrument cluster. Pull out instrument cluster in perpendicular direction until clips return to stopper groove.
   Torque: 1.5 ± 0.5 N·m



8. Disconnect the combination cluster connector and remove combination cluster.

Installation

Installation is in the reverse order of removal.

Instrument Cluster (12.3 inch)

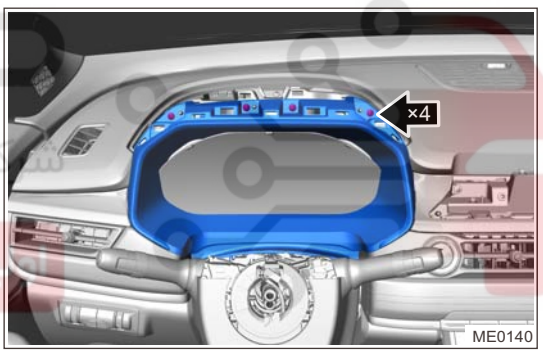
Removal

Warning:

- Be sure to wear necessary safety equipment to prevent accidents, when removing instrument cluster.
- Appropriate force should be applied, when removing combination cluster. Be careful not to operate roughly.
- When removing the instrument cluster, handle it with care, so as to avoid bump caused by meter needle and dial looseness or deviation to initial position.

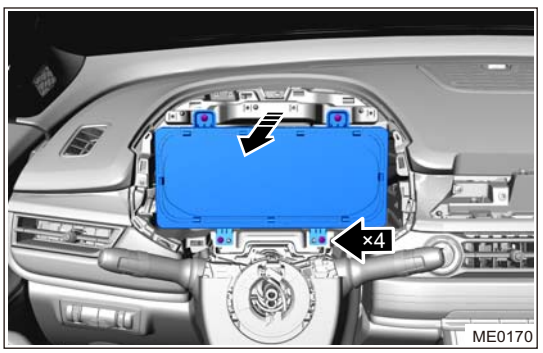
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Adjust steering column to lowest position.
4. Gently shake the front cover of instrument and pull it out in the direction of front cover of instrument cluster.

5. Remove 4 fixing screws from instrument cluster trim frame.



6. Shake instrument cluster trim frame gently to pull it in a direction perpendicular to the surface of display.

7. Remove 4 fixing screws from instrument cluster and pull out it with force in the vertical direction until the clip moves out of stopper groove.
   Torque: 1.5 ± 0.5 N·m



8. Disconnect the combination cluster connector and remove combination cluster.

Installation

Installation is in the reverse order of removal.

- MEMO -