BODY ELECTRICAL

INSTRUMENT CLUSTER SYSTEM 25 - 2
Warnings and Precautions 25 - 2
Precautions 25 - 2
System Overview 25 - 2
System Components Diagram 25 - 2
System Principle 25 - 2
Operation/Malfunction Indicator 25 - 3
Maintenance Indicator Clearing 25 - 5
Tools 25 - 8
Torque Specifications 25 - 8
Diagnosis & Testing 25 - 9
Problem Symptoms Table 25 - 9
Diagnostic Help 25 - 11
Intermittent DTC Troubleshooting 25 - 11
Ground Inspection 25 - 11
Diagnostic Trouble Code (DTC) Chart 25 - 12
DTC Diagnosis Procedure 25 - 13
B1101-11 25 - 13
B1101-15 25 - 13
B110C-11 25 - 13
B110C-13 25 - 13
B110D-11 25 - 13
B1104-41 25 - 15
U0073-88 25 - 16
U1010-88 25 - 16
U0140-87 25 - 16
U0214-87 25 - 16
U0164-87 25 - 16
U0141-87 25 - 16
U0142-87 25 - 16
U0230-87 25 - 16
U0100-87 25 - 16
U0129-87 25 - 16
U0101-87 25 - 16
U0151-87 25 - 16
U1157-87 25 - 16
U0131-87 25 - 16
U1162-87 25 - 16
U1163-87 25 - 16
U1193-87 25 - 16
U1189-87 25 - 16
U0126-87 25 - 16
U1300-55 25 - 16
ON-VEHICLE SERVICE 25 - 17
Instrument Cluster 25 - 17

INSTRUMENT CLUSTER SYSTEM

Warnings and Precautions

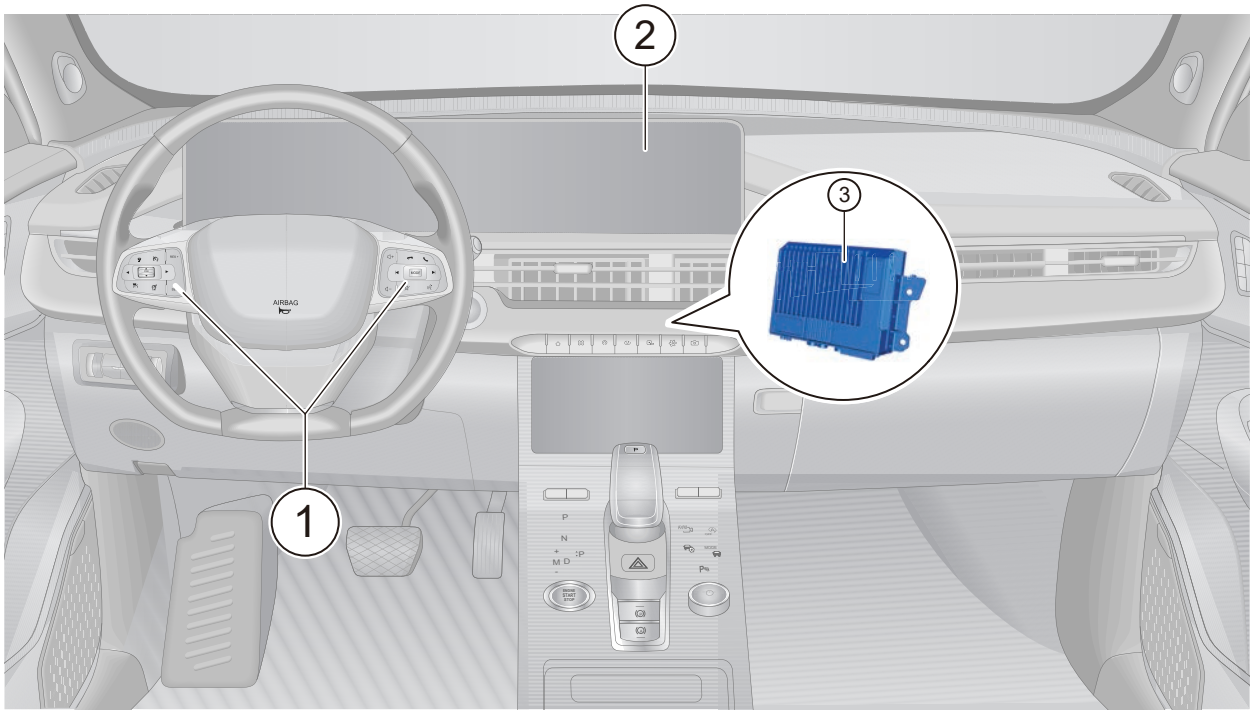
Precautions

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair.

1. Try to prevent interior and body paint from being scratched, 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 instrument cluster. Be careful not to operate roughly.
4. When removing instrument cluster, handle it with care, so as to avoid meter needle and dial from deviating from initial position or becoming looseness caused by collisions.

System Overview

System Components Diagram



1	Steering Wheel Quick Button	2	Hyperscreen
3	Domain Controller		

System Principle

1. A domain controller indicates that at least one server is responsible for the verification of each computer and user connected to the network in "domain" mode, which is equivalent to the guard of a unit, called "Domain Controller (abbreviated for DCM)". In T1D model, domain controller integrates instrument cluster module (ICM) and audio head unit module (RRM) into one module, but both the modules still operate independently by their independent ECU.

2. Domain controller (instrument cluster) part still maintains the traditional instrument cluster function.
3. ESP function has a setting item on instrument cluster. Customer can set it to ON or OFF by themselves. The instrument cluster sends out the state set by customer, and ESP module receives the state and sends out the actual state signal. The setting item of instrument cluster is displayed according to the feedback signal of ESP module.
4. Data between domain controller (instrument cluster) and instrument cluster display is transmitted via low voltage differential signal (LDVS).
5. Multi-function steering wheel controls the domain controller (instrument cluster) by transmitting signal to the central gateway module (CGW) via LIN line, and then transmitting information via CAN line network.
6. Multi-function steering wheel (standard) controls domain controller (instrument cluster) by transmitting information directly via ordinary dedicated line.
7. Oil pressure switch/driver seat belt switch/fuel pump and sensor/brake fluid level are transmitted to the domain controller (instrument cluster) via ordinary dedicated line.
8. Central console switch (driving mode) transmits signal to domain controller (instrument cluster) via ordinary dedicated line.
9. Central console switch (audio power supply switch (standard and comfort models)/LDW/LKA (luxury and exalted models) transmits signal to domain controller (instrument cluster) via ordinary dedicated line.

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.

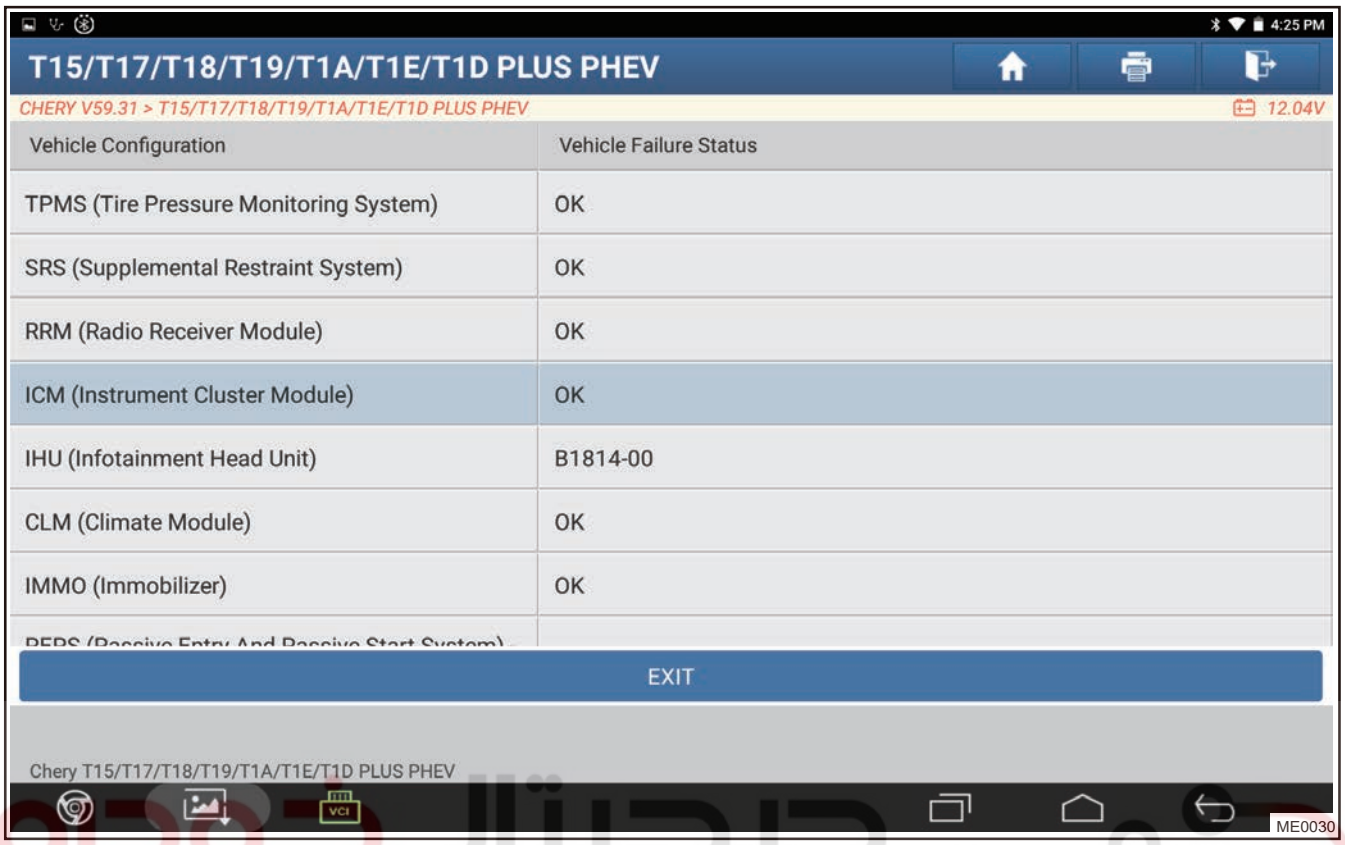
Daytime Running Indicator	
Position Indicator	
Left Turn Light Indicator	
High Beam Indicator	
Front Fog Light Indicator	
Rear Fog Light Indicator	
Intelligent Headlight (IHC) Indicator	
Front Seat Belt Indicator	

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	
Low Fuel Level Warning Light	
Airbag Malfunction Indicator	
Gasoline Particulate Filter (GPF) indicator	
Gasoline Particulate Filter (GPF) malfunction indicator	

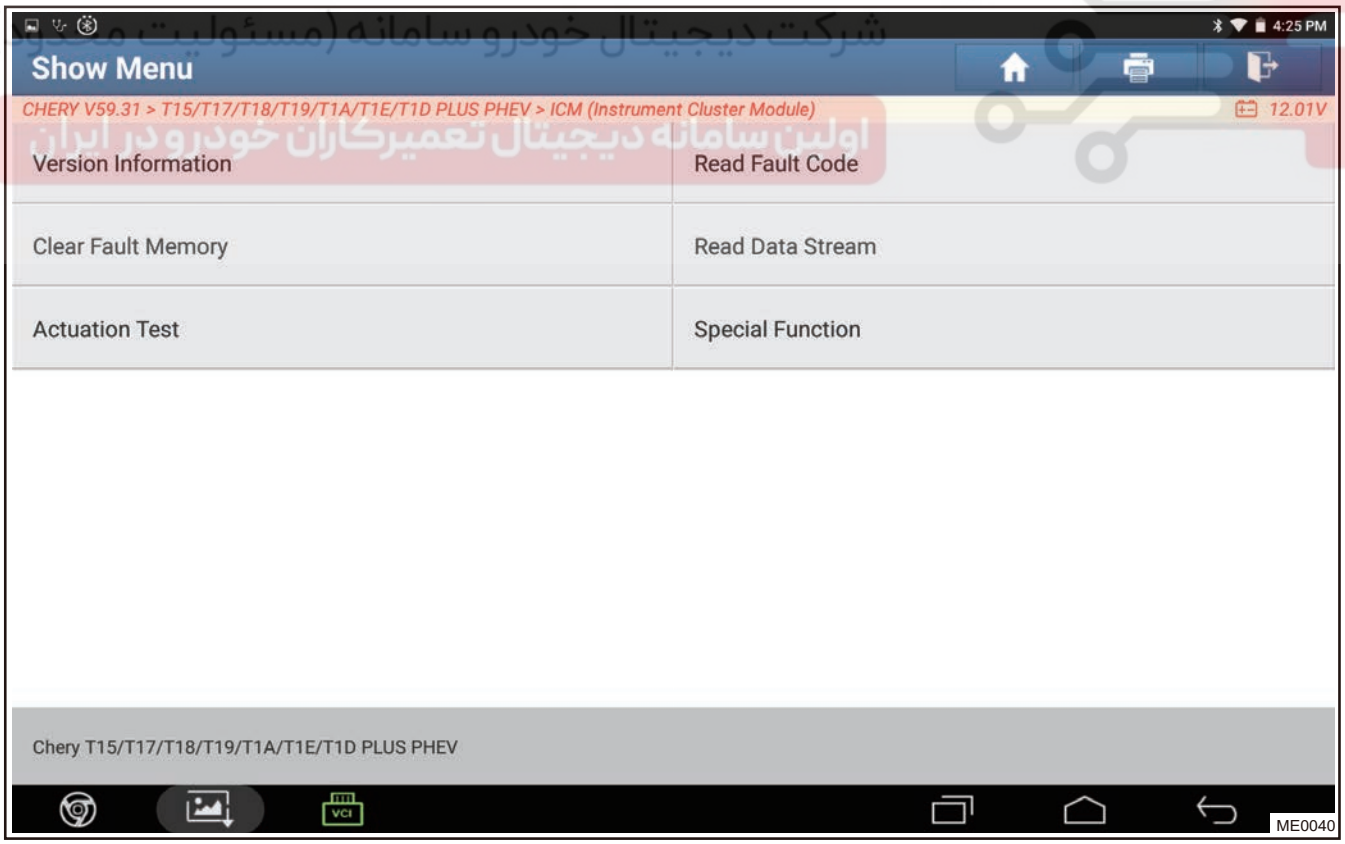
Charging System Indicator	
Engine Warming Up Indicator	
Hight Coolant Temperature Warning Light	
Tire Pressure Malfunction Indicator	
Electric Steering System Malfunction Indicator	
Low Oil Pressure Warning Indicator	
EPC Malfunction Indicator	EPC
Engine Malfunction Indicator	
Transmission Malfunction Indicator	

Maintenance Indicator Clearing

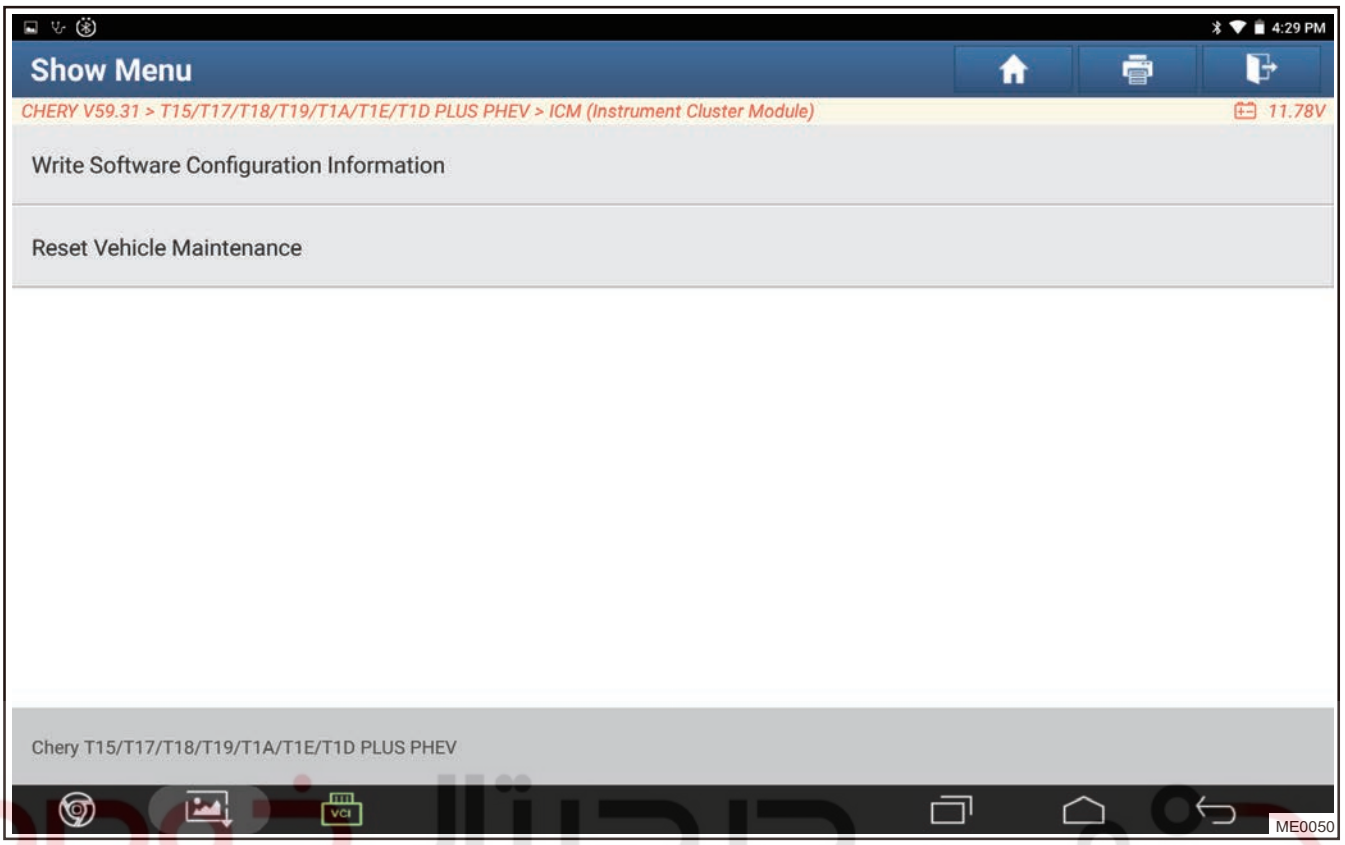
1. Connect the diagnostic tester, turn on ENGINE START STOP switch.
2. Select the model.
3. Enter next screen and click “Instrument Cluster Control System”.



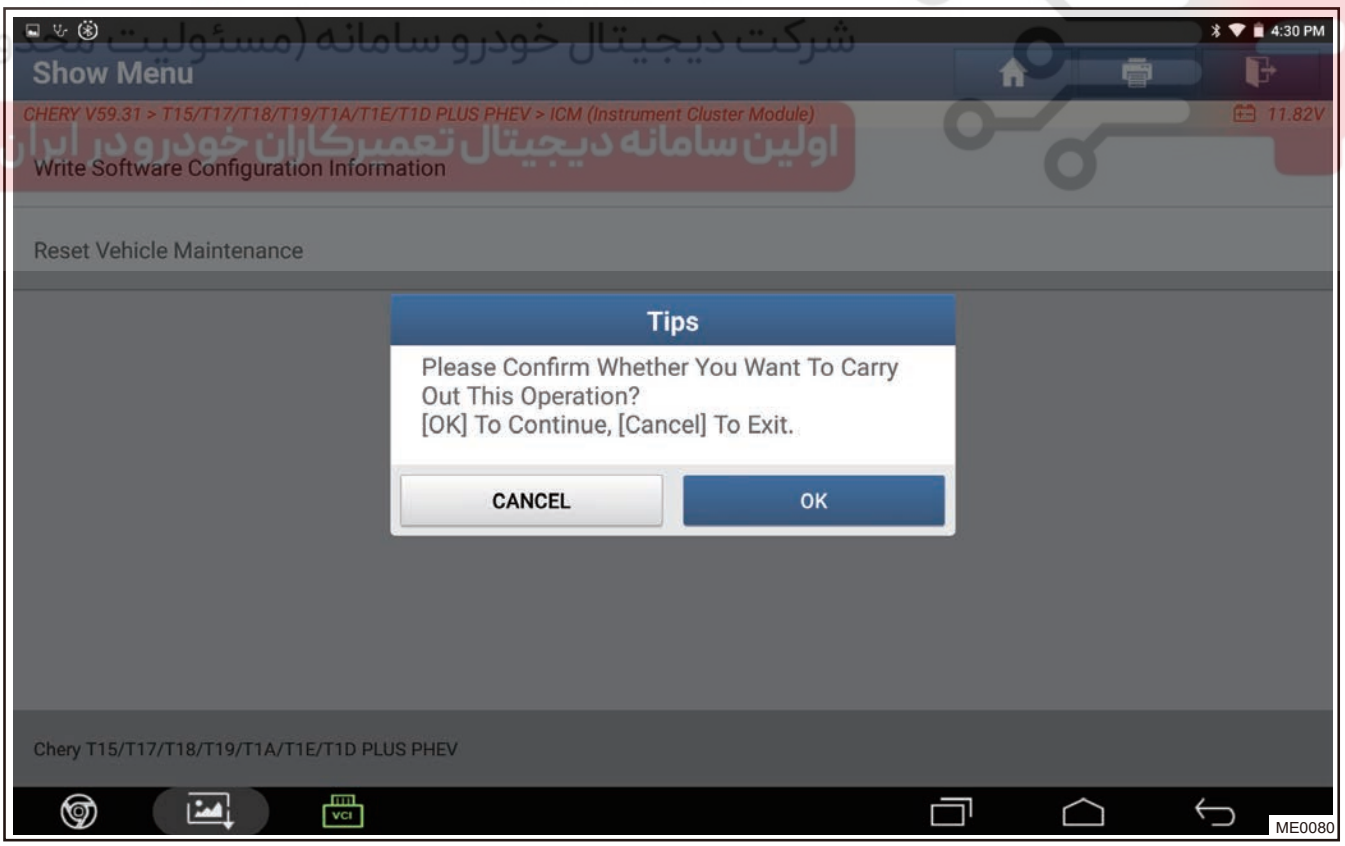
4. Enter next screen and click “Special Function”.



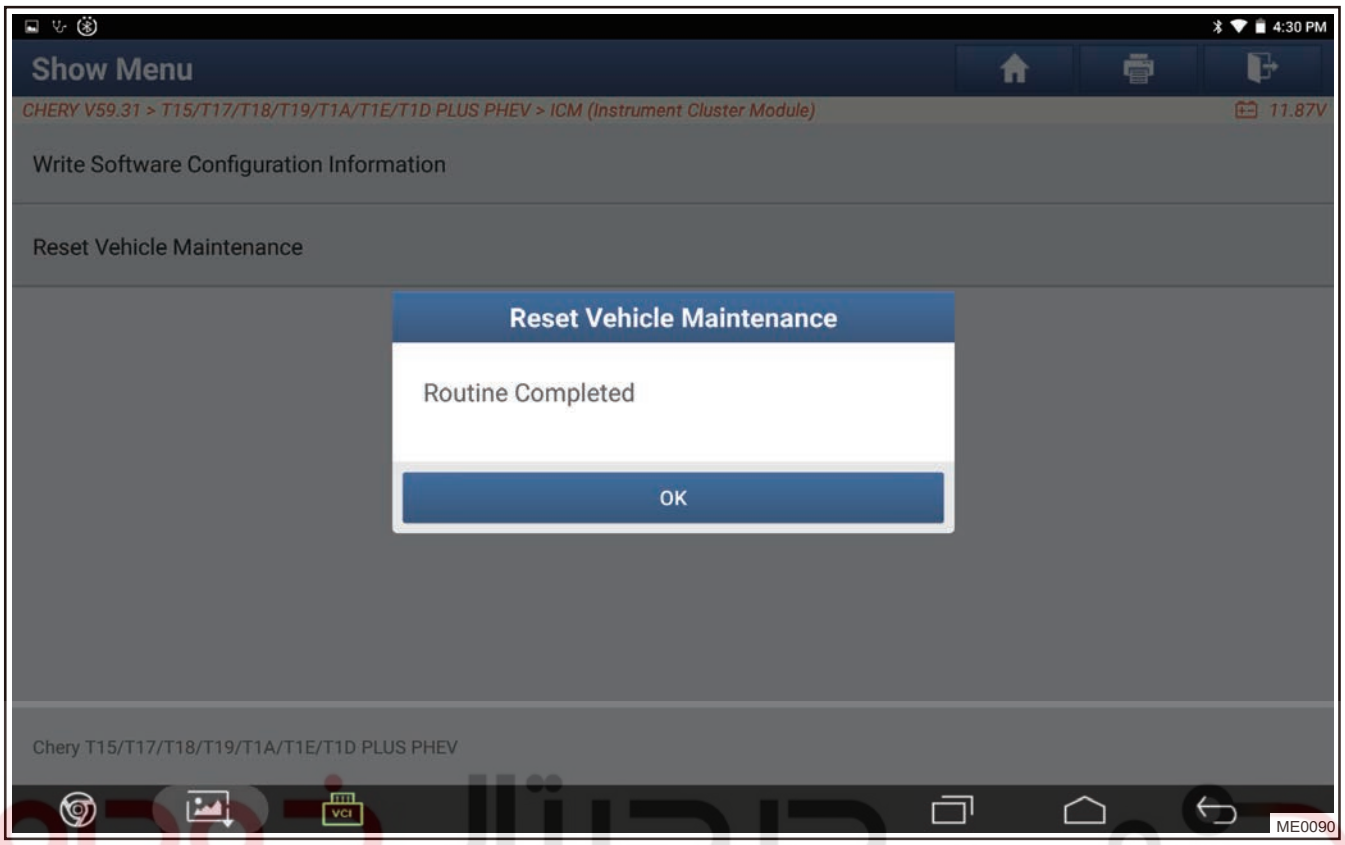
5. Enter next screen and click “Reset Vehicle Maintenance”.



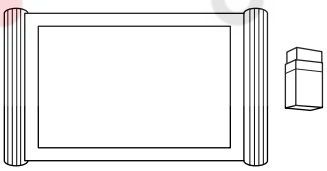
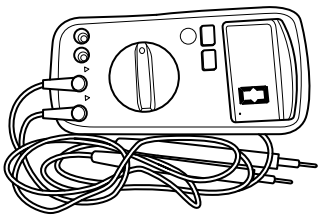
6. Enter next screen and click “OK”.



7. Operation is finished.



Tools

Tool Name	Tool Drawing
X-431 PAD Diagnostic Tester	 RCH0001006
Digital Multimeter	 RCH0002006

Torque Specifications

Description	Torque (N•m)
Hyperscreen Fixing Bolt	5 ± 1 N·m

Diagnosis & Testing

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
Entire instrument cluster does not operate	Fuse
	Domain controller
	Wire harness or connector
Vehicle speed displays abnormally	Wheel speed sensor
	Wire harness or connector
	Domain controller
Tachometer is abnormal	Engine speed sensor
	Domain controller
	Wire harness or connector
	Engine Control Module (ECM)
Fuel gauge is abnormal	Fuel level sensor
	Domain controller
	Wire harness or connector
Position indicator is abnormal	Position light switch (combination light switch assembly)
	Wire harness or connector
	Domain controller
	Body Control Module (BCM)
Turn signal indicator is abnormal	Turn signal light switch (combination light switch assembly)
	Body Control Module (BCM)
	Domain controller
	Wire harness or connector
High beam indicator is abnormal	High beam switch (combination light switch assembly)
	Body Control Module (BCM)
	Domain controller
	Wire harness or connector
Rear fog indicator is abnormal	Rear fog light switch (combination light switch assembly)

Symptom	Suspected Area
	Body Control Module (BCM)
	Domain controller
	Wire harness or connector
Charging system warning light is abnormal	Alternator
	Domain controller
	Wire harness or connector
Low engine oil pressure warning light is abnormal	Engine oil level
	Engine oil pressure switch
	Wire harness or connector
	Domain controller
ABS warning light is abnormal	ABS control unit assembly
	CAN line or connector
	Domain controller
Coolant temperature warning light is abnormal	Coolant level
	Extremely high engine coolant temperature
	Coolant temperature sensor
	Wire harness or connector
	Domain controller
	Body Control Module (BCM)
Engine malfunction warning light is abnormal	CAN line or connector
	Engine Control Module (ECM)
	Domain controller
SRS warning light is abnormal	CAN line or connector
	Airbag control module (SRS)
	Domain controller
Driver seat belt reminder light is abnormal	Driver seat belt buckle switch
	Wire harness or connector
	Domain controller
Front passenger seat belt reminder light is abnormal (If equipped)	Front passenger seat belt buckle switch
	Wire harness or connector
	Domain controller
Brake system warning light is abnormal	Low brake fluid level
	Parking brake switch

Symptom	Suspected Area
	Domain controller
Cruise indicator is abnormal	Cruise switch (multi-function switch)
	Wire harness or connector
	Domain controller
Transmission malfunction warning light is abnormal	Transmission Control Unit (TCU)
	CAN line or connector
	Domain controller
Low tire pressure warning light is abnormal	Low or high tire pressure (tire pressure is not within specified range)
	Domain controller

Diagnostic Help

1. Connect diagnostic tester X-431 3G (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check related wire harness and connector.
7. Check and clean all CD system grounds related to the latest DTCs.
8. If numerous trouble codes are set, refer to circuit diagram and look for any common ground circuit or power supply circuit applied to DTC.

Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harnesses and connectors and observe if signal is interrupt in related circuit.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggling test.
- Look for broken, bent, protruded or corroded terminals.
- Inspect airbag components and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- 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 operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if any additional accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
B1101-11	Fuel System Short Circuit
B1101-15	ICM Fuel System Fault
B110C-11	Fuel PIN21 Short to Ground
B110C-13	Fuel PIN21 Open
B110D-11	Fuel PIN22 Short to Ground
B1104-41	Instrument Cluster EEPROM Data Checksum Error
U0073-88	BD CAN Busoff
U1010-88	IFT CAN Busoff
U0140-87	Lost Communication with BCM
U0214-87	Lost Communication with Passive Entry Passive Start (PEPS)
U0164-87	Lost Communication with A/C Control Unit
U0141-87	Lost Communication with Reversing Radar
U0142-87	Lost Communication with Around View Monitor Module
U0230-87	Lost Communication with PLG
U0100-87	Lost Communication with Engine Control System Module
U0129-87	Lost Communication With Brake System Control Module
U0101-87	Lost Communication with TCU
U0151-87	Lost Communication with Airbag Control Unit
U1157-87	Lost Communication with Blind Spot Detection
U0131-87	Lost Communication with Electronic Power Steering Module
U1162-87	Lost Communication with Front Camera Module
U1163-87	Lost Communication with FRM

DTC	DTC Definition
U1193-87	Lost Communication with Electric Shifting Controller
U1189-87	Lost Communication with MFS
U0126-87	Lost Communication with SAM
U1300-55	Software Configuration Error

DTC Diagnosis Procedure

DTC	**B1101-11**	**Fuel System Short Circuit**
DTC	**B1101-15**	**ICM Fuel System Fault**
DTC	**B110C-11**	**Fuel PIN21 Short to Ground**
DTC	**B110C-13**	**Fuel PIN21 Open**
DTC	**B110D-11**	**Fuel PIN22 Short to Ground**

DTC	DTC Definition	Possible Cause
B1101-11	Fuel System Short Circuit	• Instrument cluster fault • Fuel pump malfunction • Fuel pump wire harness fault
B1101-15	ICM Fuel System Fault	
B110C-11	Fuel PIN21 Short to Ground	
B110C-13	Fuel PIN21 Open	
B110D-11	Fuel PIN22 Short to Ground	

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	**Confirm DTCs**

Use circuit diagram as a guide to perform the following inspection procedures:

(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.

(b) Disconnect fuel pump wire harness connector B-151 and instrument panel wire harness connector I-044.

(c) Check if wire harnesses are worn, pierced, pinched or partially broken.

(d) Check for broken, bent, protruded or corroded terminals.

(e) Check if related connector pins are in good condition.

NG → **Repair or replace wire harness and connector.**

OK

2	**Check fuel pump level sensor resistance**

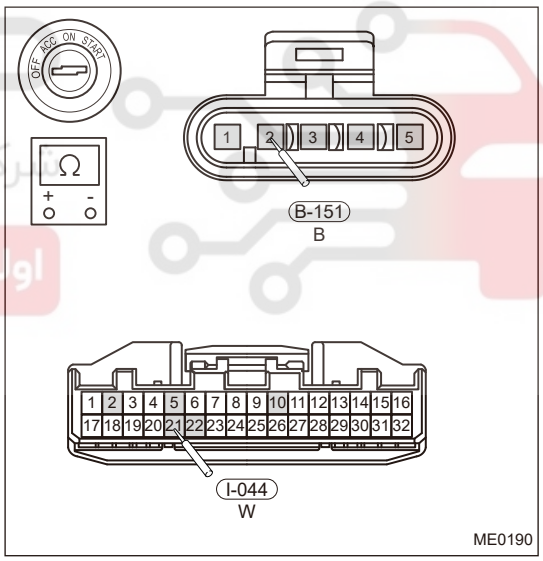
(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.
(b) Disconnect the fuel pump wire harness connector B-151.
(c) Turn fuel float multimeter from low to high to check if resistances between terminals of fuel pump change continuously.

NG → **Replace fuel pump assembly**

OK

3	**Check fuel pump wire harness**

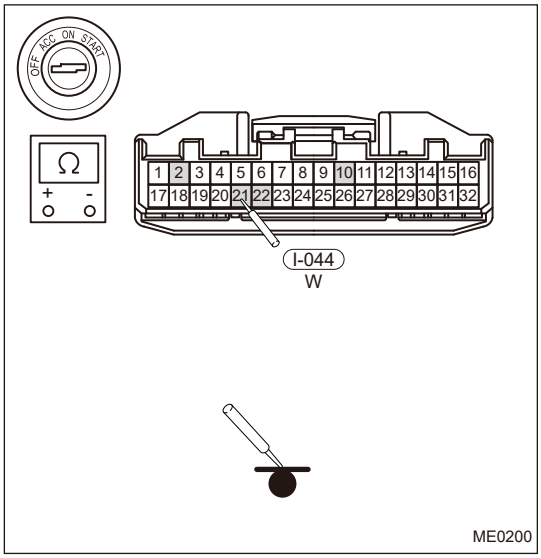
(a) Turn ENGINE START STOP switch to OFF, and disconnect the negative battery cable.
(b) Disconnect the fuel pump wire harness connector B-151.
(c) Using a digital multimeter, check for resistance between connector B-151 and the terminals of instrument panel wire harness connector I-044 to check if there is an open circuit in fuel pump wire harness according to the table below.



Multimeter Connection	Condition	Specified Condition
B-151 (2) - I- 044 (21)	ENGINE START STOP switch “OFF”	< 1 Ω
B-151 (1) - I-044 (22)		< 1 Ω
B-151 (3) - I-044 (5)		< 1 Ω
B-151 (4) - I-044 (10)		< 1 Ω
B-151 (5) - I-044 (2)		< 1 Ω

(d) Using a digital multimeter, measure ground resistance between instrument cluster wire harness connector I-044 and body according to table below.

Multimeter Connection	Condition	Specified Condition
I-044 (2) - Body ground	ENGINE START STOP switch "OFF"	∞
I-044 (10) - Body ground		∞
I-044 (21) - Body ground		∞
I-044 (22) - Body ground		∞



NG → **Repair or replace instrument panel wire harness**

OK →

4	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace domain controller**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	B1104-41	Instrument Cluster EEPROM Data Checksum Error

DTC	DTC Definition	Possible Causes
B1104-41	Instrument Cluster EEPROM Data Checksum Error	Instrument panel internal fault

DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing the following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

Hint:

When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

1	Power off test

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable and wait for 3 minutes to check if it recovers.

NG → **Clear DTCs**

OK

2	Reconfirm DTCs

(a) Connect diagnostic tester and clear DTCs.

(b) Run the vehicle as specified procedure. The operating way should meet the conditions for corresponding fault diagnosis.

(c) Read the fault information and confirm that the fault has been solved.

NG → **Replace domain controller**

OK → **Conduct test and confirm malfunction has been repaired**

DTC	U0073-88	BD CAN Busoff
DTC	U1010-88	IFT CAN Busoff
DTC	U0140-87	Lost Communication with BCM
DTC	U0214-87	Lost Communication with Passive Entry Passive Start (PEPS)
DTC	U0164-87	Lost Communication with A/C Control Unit
DTC	U0141-87	Lost Communication with Reversing Radar
DTC	U0142-87	Lost Communication with Around View Monitor Module
DTC	U0230-87	Lost Communication with PLG
DTC	U0100-87	Lost Communication with Engine Control System Module
DTC	U0129-87	Lost Communication With Brake System Control Module
DTC	U0101-87	Lost Communication with TCU
DTC	U0151-87	Lost Communication with Airbag Control Unit
DTC	U1157-87	Lost Communication with Blind Spot Detection
DTC	U0131-87	Lost Communication with Electronic Power Steering Module
DTC	U1162-87	Lost Communication with Front Camera Module
DTC	U1163-87	Lost Communication with FRM
DTC	U1193-87	Lost Communication with Electric Shifting Controller
DTC	U1189-87	Lost Communication with MFS
DTC	U0126-87	Lost Communication with SAM
DTC	U1300-55	Software Configuration Error

DTC Confirmation Procedure
Refer to CAN communication system

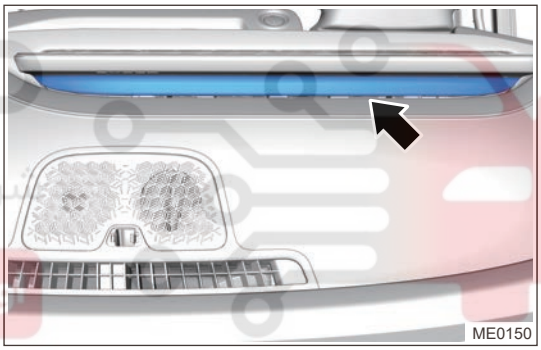
ON-VEHICLE SERVICE

Instrument Cluster

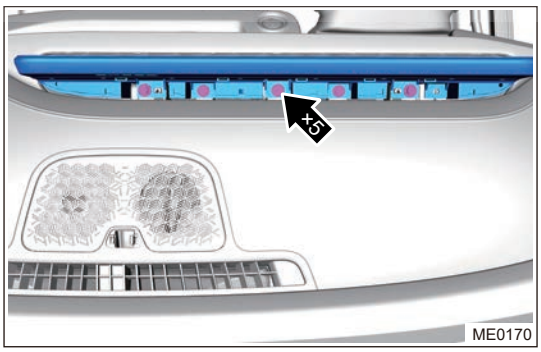
Removal

Warnings
• Be sure to wear necessary safety equipment to prevent accidents, when removing instrument cluster. • Appropriate force should be applied, when removing instrument cluster. Be careful not to operate roughly. • When removing instrument cluster, handle it with care, so as to avoid meter needle and dial from deviating from initial position or becoming looseness caused by collisions.

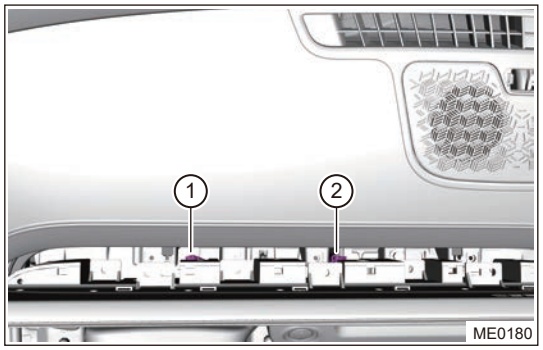
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Using an interior crow plate, pry off screw block cover.



4. Remove 5 fixing bolts from dual LCD.



5. Disconnect instrument cluster connector (1) and DVD connector (2) from dual LCD, and remove dual LCD.



Installation

CAUTION
• Tighten fixing nut to specified torque, when installing dual LCD. • Install connector into place when installing dual LCD. • Check audio system for proper operation, after installing dual LCD.

1. Installation is in the reverse order of removal.