TRANSMISSION

Electronic Shift Lever

Warnings and Precautions

Warnings

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

1. When removing electronic shift module assembly, be sure to wear safety equipment to prevent accidents.

Precautions

In order to avoid dangerous operation and damage to the vehicle, always follow the instructions below before repair.

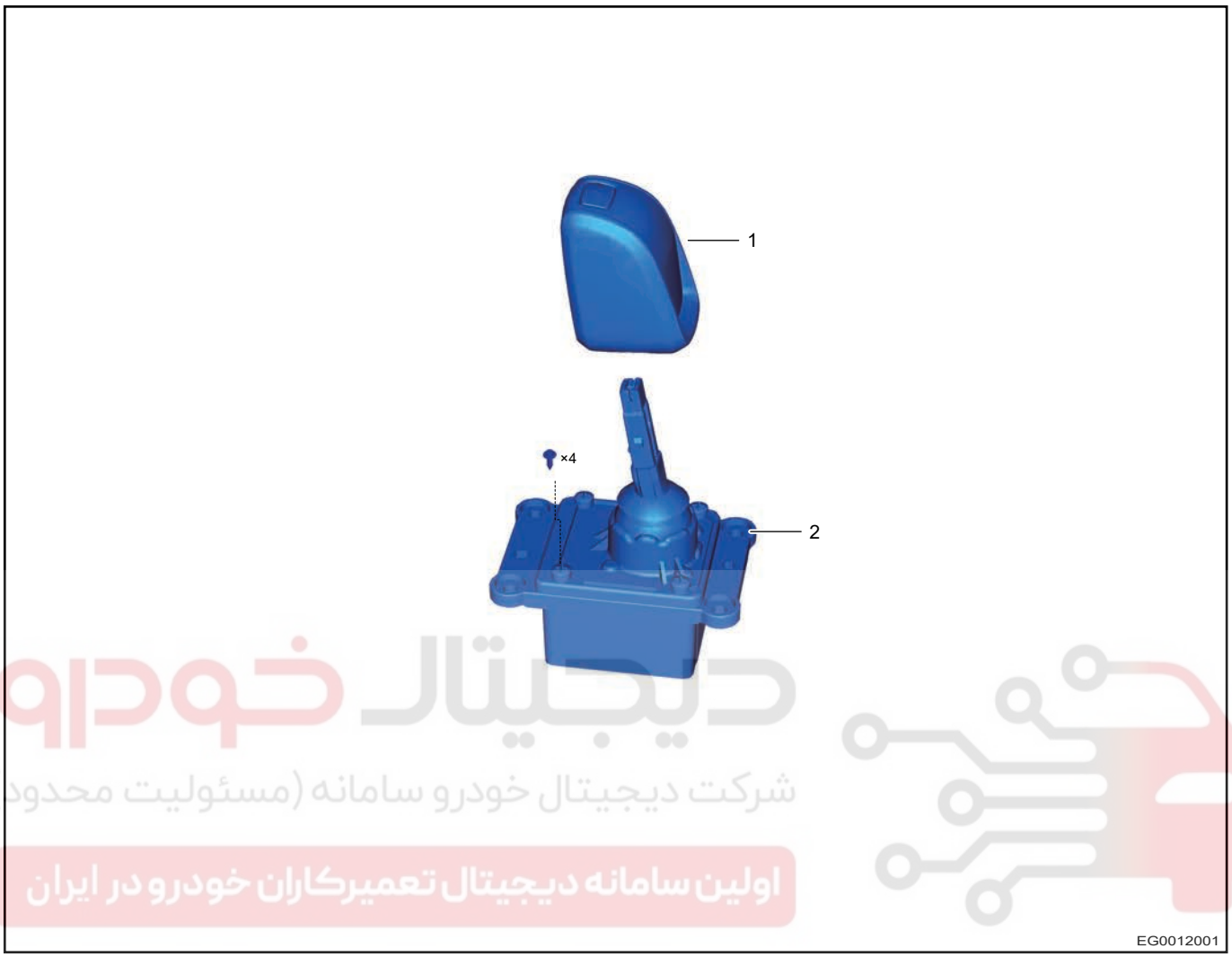
1. Appropriate force should be applied, when removing upper cover plate body. Be careful not to operate roughly.

System Overview

System Description

Automatic shift control mechanism (EGS) and transmission are not connected in a traditional mechanical way, but a safer and faster electronic control mode, eliminating the traditional mechanical shift mode, and all using electronic signals for substitution. Its advantage is that the driver's wrong shift operation will be judged by the computer to see if it will cause damage to the transmission, so as to better protect the transmission and correct the bad shift habits. As a luxurious, high-technology configuration, electronic shift lever eliminates the traditional mechanical shifting mechanism and provides us with a more convenient operation. However, if there is a fault or short circuit, the electronic shifting mechanism is unable to release the current gear, we can only rely on the trailer and rescue.

Components Diagram



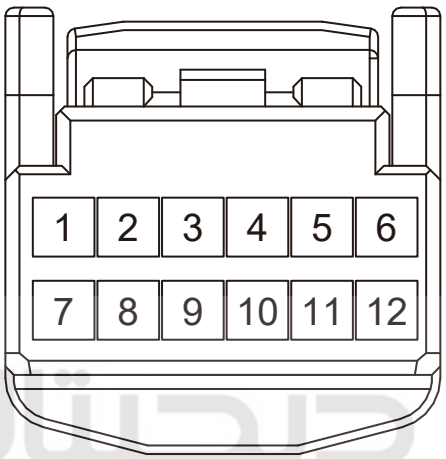
1	Shift Knob Assembly	2	Electronic Shift Module Assembly

Electronic shift module collects vehicle speed and other signals through CAN network and transmits gear signal to TCU. TCU collects signals input from sensors and other devices to shift gear.

System Circuit Diagram

Terminal Definition

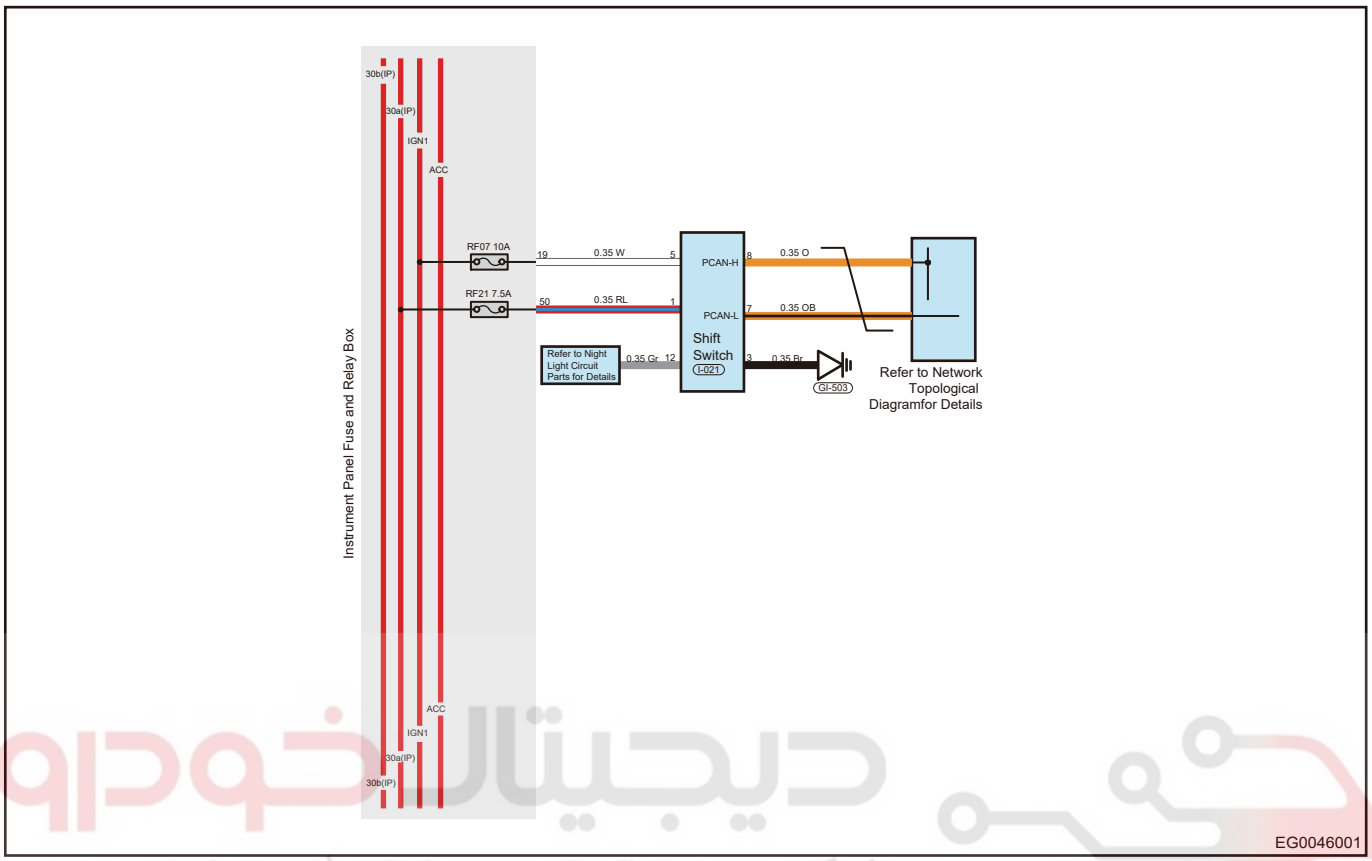
Automatically Shift Control Mechanism Assembly Terminal Definition



EG0045001

Terminal No.	Description	Terminal No.	Description
1	Constant Power Supply	7	P-CAN L
2	-	8	P-CAN H
3	CND	9	-
4	-	10	-
5	IG Power Supply	11	-
6	-	12	Background Light Power Supply

Circuit Diagram



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.

Problem	Suspected Area
• Lost communication between automatic shift control mechanism and engine control module • Lost communication between automatic shift control mechanism and transmission control module • Lost communication between automatic shift control mechanism and brake system control module • Lost communication between automatic shift control mechanism and brake system control module • Lost communication between automatic shift control mechanism and instrument cluster control module • Lost communication between automatic shift control mechanism and body control module	Wire harness or connector damaged
	CAN bus hardware circuit malfunction
	Damaged electronic shift knob
	EGS module
	It is possible that associated module had been replaced when battery is not removed

DTC Confirmation Procedure

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

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

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.
- 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 wiggling test.
- Check for broken, bent, protruded or corroded terminals.
- Check transmission control system 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:

- 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 any additional accessories interfere with ground circuit.
- 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.

Diagnosis Procedure

Use following procedures to troubleshoot the electronic shift system.

1	**Vehicle brought to workshop**

Next

2	**Check battery voltage.**

Check if battery voltage is normal.

- Standard voltage: Not less than 12 V.

NG → **Replace battery**

OK

3	**Customer problem analysis**

Next

4	**Read fault code**

Result

No DTC → **Perform repair according to problem symptoms table**

DTC occurs

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

Result

No DTC → **Troubleshoot according to Intermittent DTC malfunction procedures**

DTC occurs

6	**Repair according to Diagnostic Trouble Code (DTC) chart**

Next

7	**Adjust, repair or replace**

Next

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

Next → **End**

Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
C1950-16	Battery Voltage Below Threshold
C1951-17	Battery Voltage Above Threshold
C1952-00	FW Stuck
C1953-00	BW Stuck
C1954-00	TIP+ Stuck
C1955-00	TIP- Stuck
C1956-49	Light Detection Fault
C1957-49	Heavy Detection Fault
C1958-48	Program Cycle Violated
C1959-13	Park Button 1 Open Circuit
C195A-11	Park Button 1 Short to GND
C195C-92	Park Button Stuck
C195D-13	Park Button 2 Open Circuit
C195E-11	Park Button 2 Short to GND
C195F-12	Park Button 2 Short to VCC
C1960-92	Park Button 2 Pressed for 60s
C1961-38	Invalid PWM for Overlight
C1962-46	Calibration Parameters be Corruped
U0073-88	CAN Bus Off
U0100-87	Lost Communication with EMS
U0101-87	Lost Communication with TCU
U0129-87	Lost Communication with BSM
U0155-87	Lost Communication with ICM
U0401-81	Invalid Data Received from EMS-Invalid Serial Data Received
U0402-81	Invalid Data Received from TCU
U0418-81	Invalid Data Received from BSM-Invalid Serial Data Received
U0423-81	Invalid Data Received from ICM
U0140-87	Lost Communication with BCM

DTC diagnosis procedure

DTC	C1950-16	Battery Voltage Below Threshold
DTC	C1951-17	Battery Voltage Above Threshold

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1950-16	Battery Voltage Below Threshold	ENGINE START STOP switch is in ON and engine is running	• Battery failure • Fuse malfunction • Wire harness or connector failure • Electronic shift module failure
C1951-17	Battery Voltage Above Threshold		

DTC Confirmation Procedure

- 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	**Check battery voltage**

(a) Check if battery voltage is normal.
(b) Check battery voltage with voltage band of multimeter.

NG → **Check and repair battery**

OK ↓

2	**Check fuse**

(a) Check if fuses RF07 and RF21 are blown.

NG → **Replace fuse**

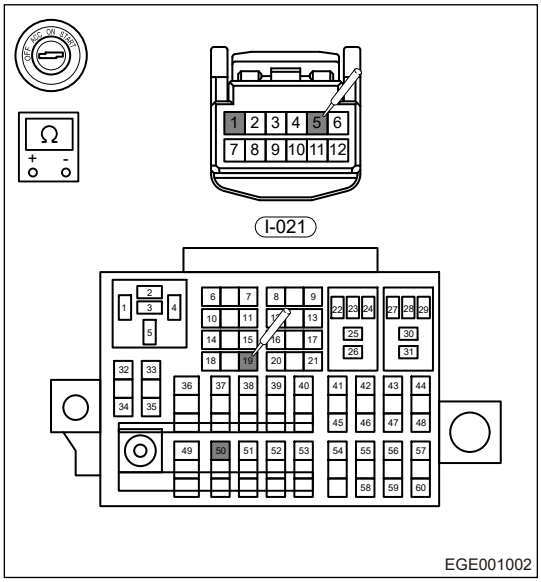
OK ↓

3	**Check power supply circuit**

(a) Turn ENGINE START STOP switch to OFF.
(b) Disconnect the negative battery cable.
(c) Disconnect the electronic shift connector.
(d) Using a digital multimeter, check for open between connector and instrument panel fuse and relay box wire harness according to table below.

(e) Check for continuity between electronic shift connector and instrument panel fuse and relay box wire harness.

Multimeter Connection	Condition	Specified Condition
I-021 (5) - Instrument panel fuse and relay box (19)	Always	Less than 1 Ω
I-021 (1) - Instrument panel fuse and relay box (50)	Always	Less than 1 Ω



NG → **Repair or replace related wire harness**

OK

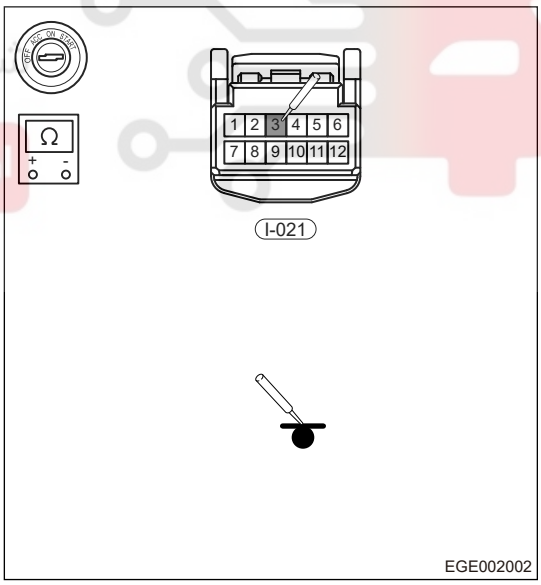
4	Check electronic shift module ground

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the automatic shift control mechanism connector.

(c) Check continuity between electronic shift connector I-021 (3) and body ground with multimeter ohm band.

Multimeter Connection	Condition	Specified Condition
I-021 (3) - Body ground	Always	Less than 1 Ω



NG → **Repair or replace ground wire harness or ground point**

OK

5	Reconfirm DTCs

(a) Connect all the connectors.
(b) Connect the negative battery cable.
(c) Turn ENGINE START STOP switch to ON.
(d) Check if DTC exists.

OK	**Confirm that system is normal**
NG	**Replace electronic shift control mechanism assembly**

DTC	**C1952-00**	**FW/TIP+ Button Stuck**
DTC	**C1953-00**	**BW/TIP- Button Stuck**
DTC	**C1954-00**	**TIP+ Stuck**
DTC	**C1955-00**	**TIP- Stuck**
DTC	**C1956-49**	**Light Detection Fault**
DTC	**C1957-49**	**Heavy Detection Fault**
DTC	**C1958-48**	**Program Cycle Violated**
DTC	**C1959-13**	**Park Button 1 Open Circuit**
DTC	**C195A-11**	**Park Button 1 Short to GND**
DTC	**C195B-12**	**Park Button 1 Short to Power Supply**
DTC	**C195C-92**	**Park Button Stuck**
DTC	**C195D-13**	**Park Button 2 Open Circuit**
DTC	**C195E-11**	**Park Button 2 Short to GND**
DTC	**C195F-12**	**Park Button 2 Short to VCC**
DTC	**C1960-92**	**Park Button 2 Pressed for 60s**
DTC	**C1961-38**	**Invalid PWM for Overlight**

Description

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1952-00	FW Stuck	ENGINE START STOP switch is in ON and engine is running	• Wire harness or connector failure • Electronic shift control mechanism assembly failure
C1953-00	BW Stuck		
C1954-00	TIP+ Stuck		
C1955-00	TIP- Stuck		
C1956-49	Light Detection Fault		
C1957-49	Heavy Detection Fault		
C1958-48	Program Cycle Violated		
C1959-13	Park Button 1 Open Circuit		

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C195A-11	Park Button 1 Short to GND		
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C195E-11	Park Button 2 Short to GND		
C195F-12	Park Button 2 Short to VCC		
C1960-92	Park Button 2 Pressed for 60s		
C1961-38	Invalid PWM for Overlight		

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

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

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

1	**Check electronic shift connector**

(a) Turn off all electrical equipment and ENGINE START STOP switch.
(b) Disconnect the negative battery cable.
(c) Disconnect the electronic shift module connector.
(d) Check if wire harnesses are worn, pierced, pinched or partially broken.
(e) Check for broken, bent, protruded or corroded terminals.

NG → **Repair or replace electronic shift module**

OK

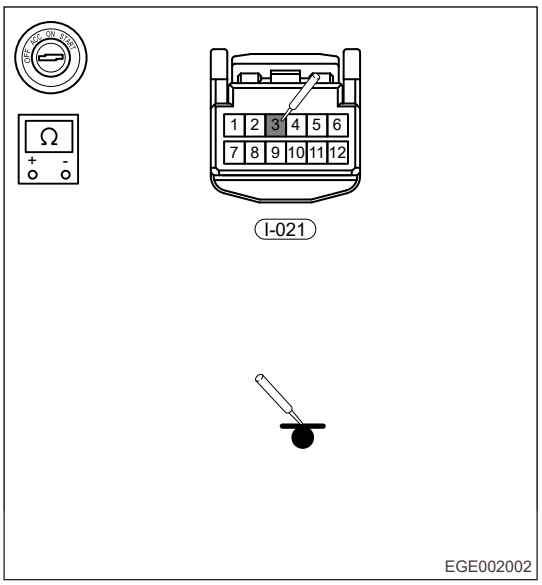
2	Check electronic shift module ground

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the automatic shift control mechanism connector.

(c) Check continuity between electronic shift connector I-021 (3) and body ground with multimeter ohm band.

Multimeter Connection	Condition	Specified Condition
I-021 (3) - Body ground	Always	Less than 1 Ω



NG → **Repair or replace ground wire harness or ground point**

OK

3	Check electronic shift module

(a) Turn ENGINE START STOP switch to OFF.

(b) 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.

NG → **Replace shift module**

OK

4	Reconfirm DTCs

(a) Connect all the connectors.

(b) Connect the negative battery cable.

(c) Turn ENGINE START STOP switch to ON.

(d) Check if DTC exists.

OK → **Confirm that system is normal**

NG → **Replace electronic shift control mechanism assembly**

DTC	**U0073-88**	**CAN Bus Off**
DTC	**U0100-87**	**Lost Communication with EMS**
DTC	**U0101-87**	**Lost Communication with TCU**
DTC	**U0129-87**	**Lost Communication with BSM**
DTC	**U0155-87**	**Lost Communication with ICM**
DTC	**U0140-87**	**Lost Communication with BCM**
DTC	**U0401-81**	**Invalid Data Received from EMS-Invalid Serial Data Received**
DTC	**U0402-81**	**Invalid Data Received from TCU**
DTC	**U0418-81**	**Invalid Data Received from BSM-Invalid Serial Data Received**
DTC	**U0423-81**	**Invalid Data Received from ICM**
DTC	**U0140-87**	**Lost Communication with BCM**

DTC	DTC Definition	DTC Detection Condition	Possible Cause
U0073-88	CAN Bus Off	ENGINE START STOP switch is in ON and engine is running	• Battery failure • Wire harness or connector failure • Electronic shift module failure • CAN network failure
U0100-87	Lost Communication with EMS		
U0101-87	Lost Communication with TCU		
U0129-87	Lost Communication with BSM		
U0155-87	Lost Communication with ICM		
U0140-87	Lost Communication with BCM		
U0401-81	Invalid Data Received from EMS-Invalid Serial Data Received		
U0402-81	Invalid Data Received from TCU		
U0418-81	Invalid Data Received from BSM-Invalid Serial Data Received		
U0423-81	Invalid Data Received from ICM		
U0140-87	Lost Communication with BCM		

DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Turn ENGINE START STOP switch to ON.
- Use the diagnostic tester to record and clear DTCs stored in the system.

- Turn ENGINE START STOP switch to OFF and wait several seconds.
- Turn ENGINE START STOP switch to ON and check DTCs in the system again.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by the DTC is intermittent.

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

1	**(Refer to CAN system)**

On-Vehicle Service

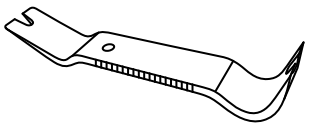
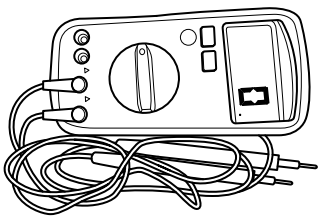
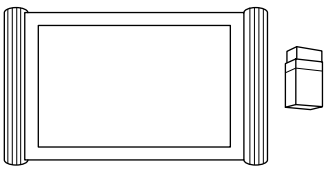
Specifications

Torque Specifications

Component	Tightening Torque
Electronic Shift Control Mechanism Assembly Fixing Screw	5 ± 1 N m

Tools

General Tools

Tool Name	Tool Drawing
Interior Crow Plate	 S00020
Digital Multimeter	 S00002
X-431 PAD Diagnostic Tester	 S00001

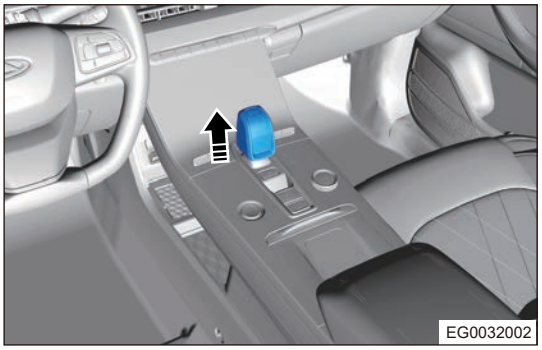
Electronic Shift Knob

Removal

Warning
• Be sure to wear safety equipment to prevent accidents, when removing shift knob assembly. • Appropriate force should be applied, when removing shift knob assembly. Be careful not to operate roughly.

1. Disconnect the negative battery cable.
2. Remove the shift knob assembly.

a. Remove shift lever assembly in direction of arrow.



Installation

Caution
• Insert shift knob assembly along the direction of shift knob of shift control mechanism, until shift knob reaches the lower limit (there will be a slight sound of a snap ring in place), and shift knob can not be pushed down. • Slightly apply force to push the knob upward after assembly, confirm it is assembled in place. • Do not hit the lever to avoiding damaging connector.

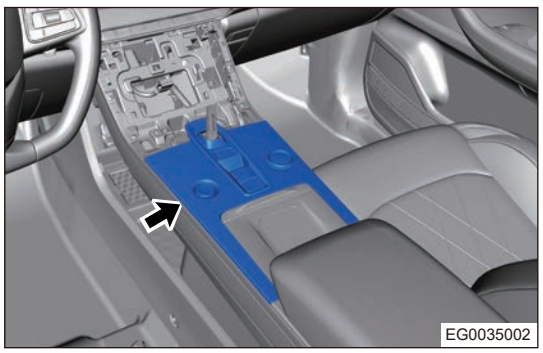
1. Installation is in the reverse order of removal.

Electronic Shift Control Mechanism Assembly

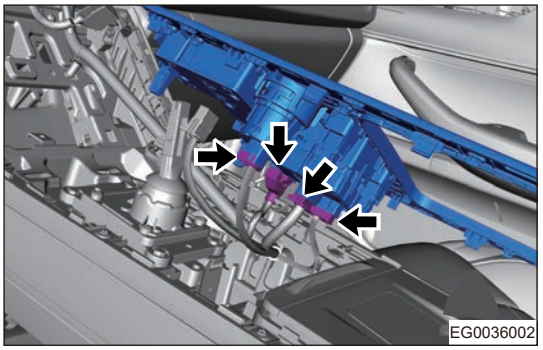
Removal

Warning
• When removing shift control mechanism assembly, be sure to wear safety equipment to prevent accidents. • Appropriate force should be applied, when removing shift control mechanism assembly. Be careful not to operate roughly.

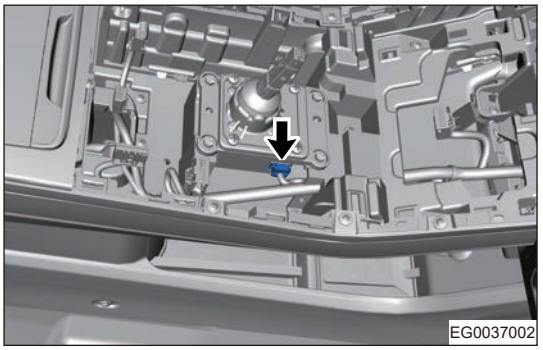
1. Turn ignition switch to OFF.
2. Disconnect the negative battery cable.
3. Remove A/C control panel assembly.
4. Remove the shift lever.
5. Using an interior crow plate, carefully remove the auxiliary fascia console control panel assembly (arrow).



6. Disconnect each connector (arrow), and remove the auxiliary fascia console control panel assembly.

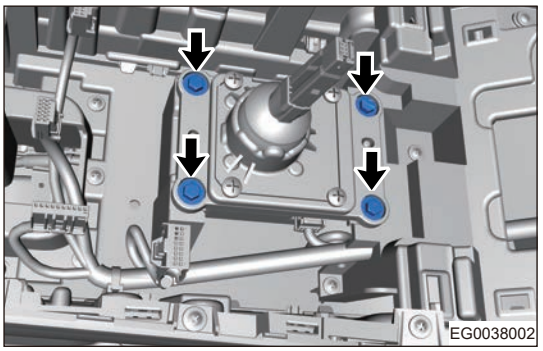


7. Disconnect the electronic shift control mechanism assembly wire harness connector (arrow).



8. Remove 4 fixing bolts (arrow) and electronic shift control mechanism assembly.

   Tightening torque: 5 ± 1 N•m



Installation

Caution
• Insert shift knob assembly along the direction of shift knob of shift control mechanism, until shift knob reaches the lower limit (there will be a slight sound of a snap ring in place), and shift knob can not be pushed down. • Slightly apply force to push the knob upward after assembly, confirm it is assembled in place. • Do not hit the lever to avoiding damaging connector.

1. Installation is in the reverse order of removal.

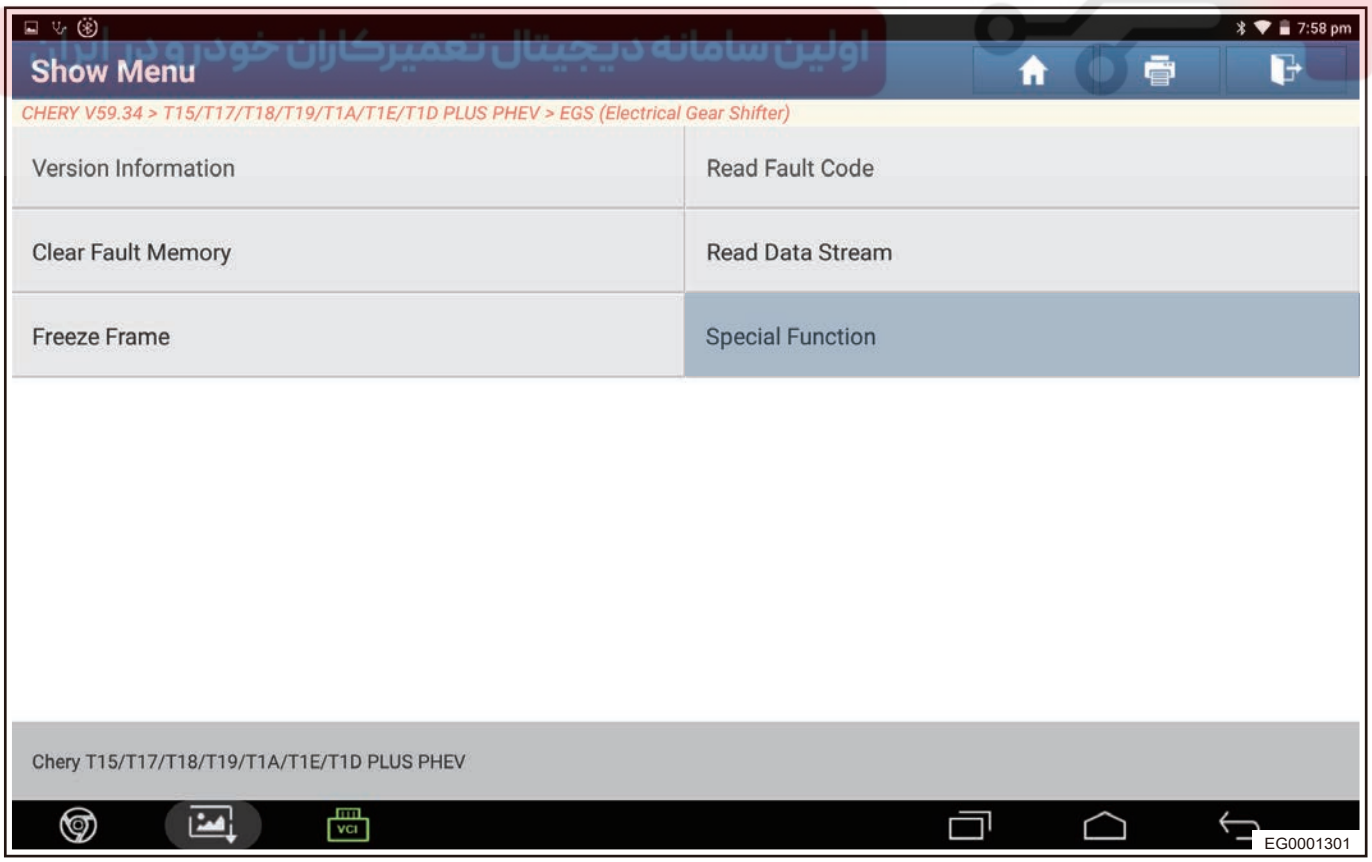
Matching learning

Caution
• It is necessary to write module VIN code with a diagnostic tester when replacing the EGS module.

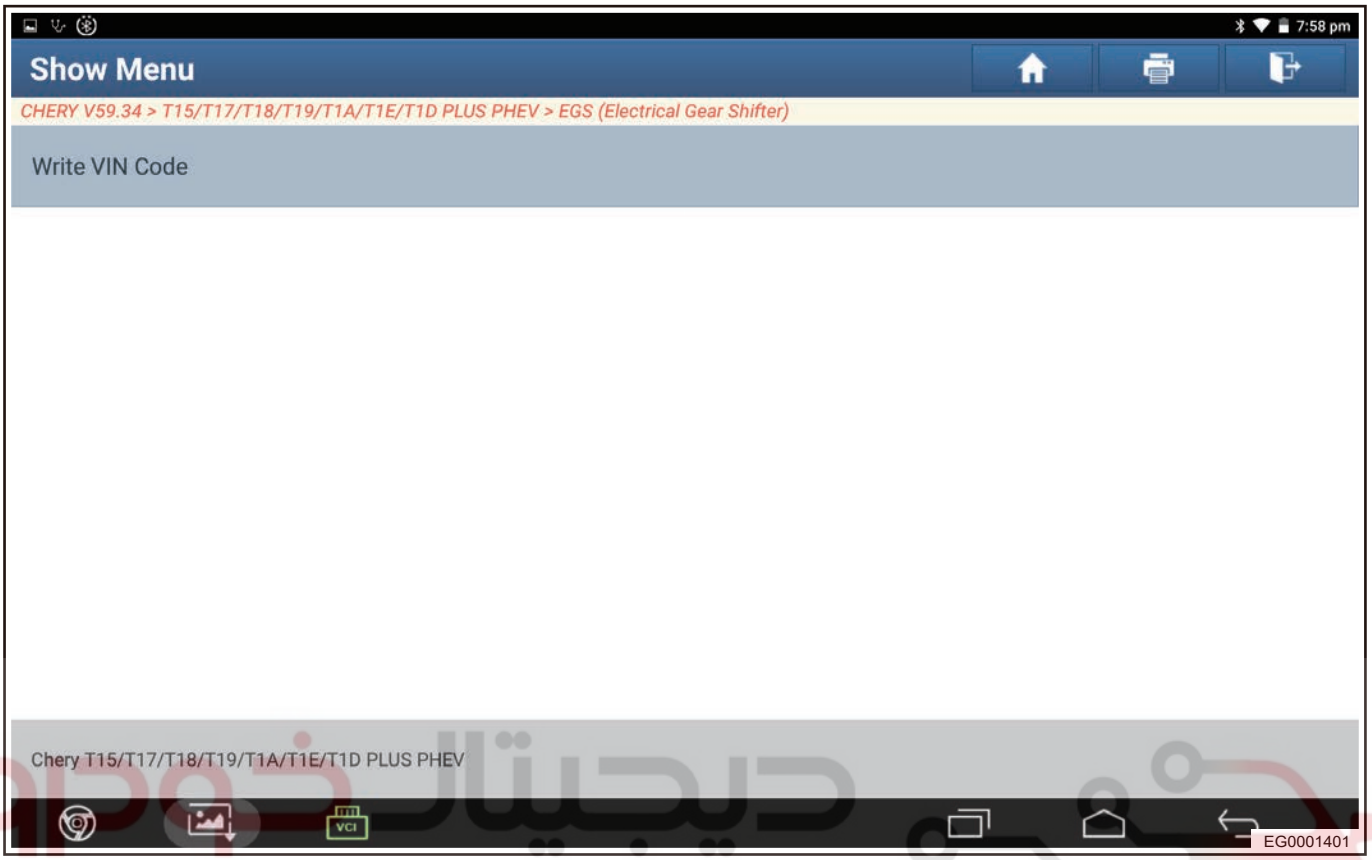
1. Connect the diagnostic tester. Turn ENGINE START STOP switch to ON.
2. Select “T1D” model.

3. Enter next screen and click “System Selection”.
4. Enter next screen, and click “EGS (Electronic Shift)”.

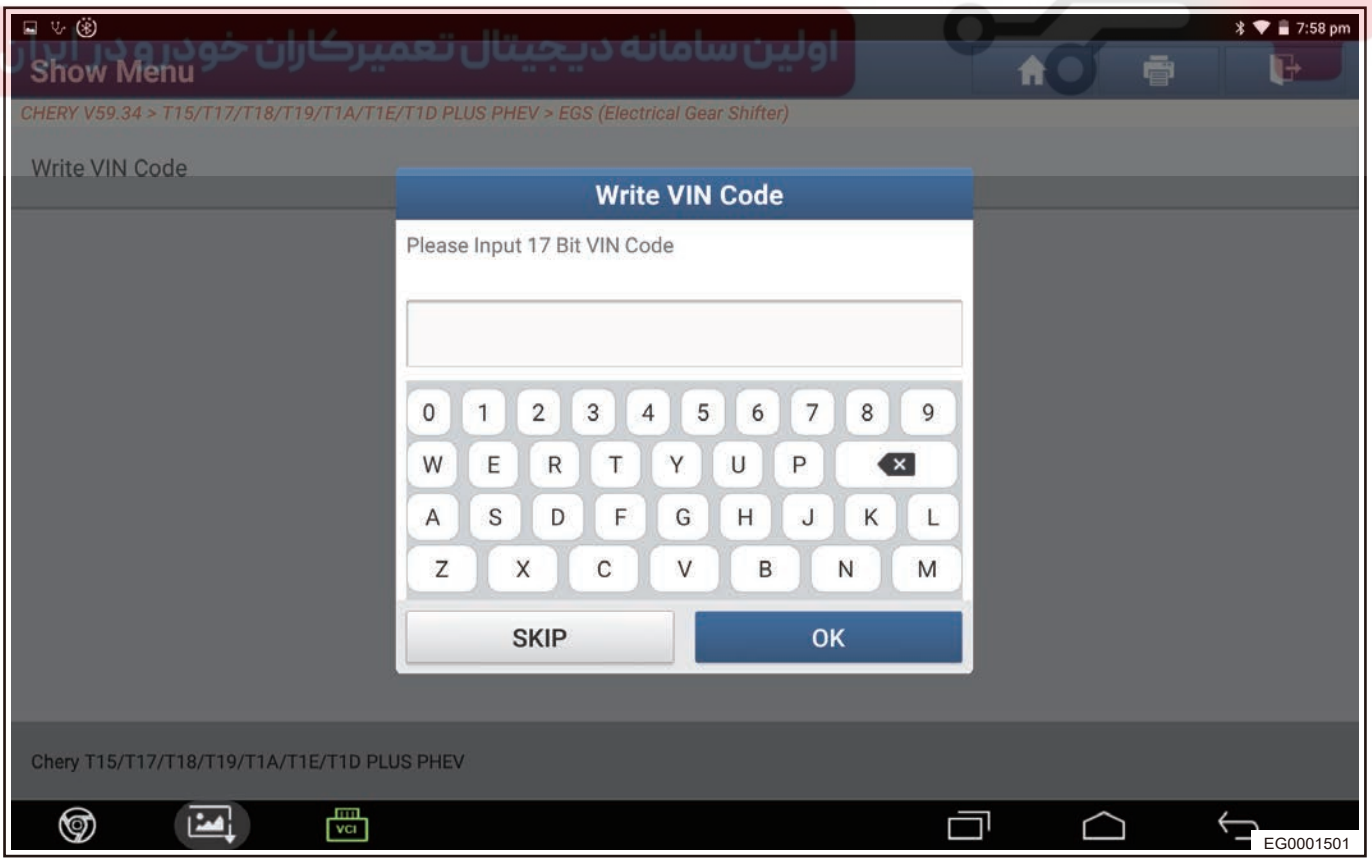
5. Enter next screen and click “Special Function”.



6. Click “Write VIN Code”.



7. Operates according to prompt on diagnostic tester screen.
8. Write VIN code.



9. It is written successfully.