738DHA TRANSMISSION

Transmission Control System

Warnings and Precautions

Warnings

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

1. Be sure to wear safety equipment, when repairing or removing transmission.
2. Vehicles equipped with 738DHA transmission must be towed with front wheels raised off the ground.
3. The specified oil must be used. The other oils may cause damage to transmission.

Precautions

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

1. Be careful not to drop the bolts into transmission when installing.
2. When assembling HCU, pay attention to adjust the position of transmission internal wire harness, so as not to knock and damage to the transmission internal wire harness.
3. After adjustment and repair or replacement of parts, please make sure to clear DTCs with diagnostic tester to avoid misdiagnosis next time. Because TCU will always memory the diagnostic trouble codes even if the battery is disconnected.
4. After replacing the dual clutch transmission or TCU, be sure to use a diagnostic tester to read the shifting and valve body characteristics data of the dual clutch transmission. As the data stored in the original TCU only matches the original dual clutch transmission, and it does not match the newly replaced dual clutch transmission.
5. TCU can store a maximum of 20 DTCs. If the storage space for DTCs is used up, the new DTCs will substitute the historical faults with the lowest priorities.
6. Clutch/transmission overheat failure (P2787/P1849) is overheat protection measures of transmission/ clutch hardware. Usually, after overheat prompt appears, simply stop the vehicle for a rest, then it can work normally. Try to avoid repeated starting with accelerator pedal depressed firmly, which is easy to make oil temperature rise too fast.

System Overview

System Description

DCT (Dual Clutch Transmission) has two clutches, one is related to even gears and reverse gear, and the other is related to odd gears. It is a combination of manual transmission and automatic transmission. It integrates the advantages of manual transmission and automatic transmission.
Advantages:

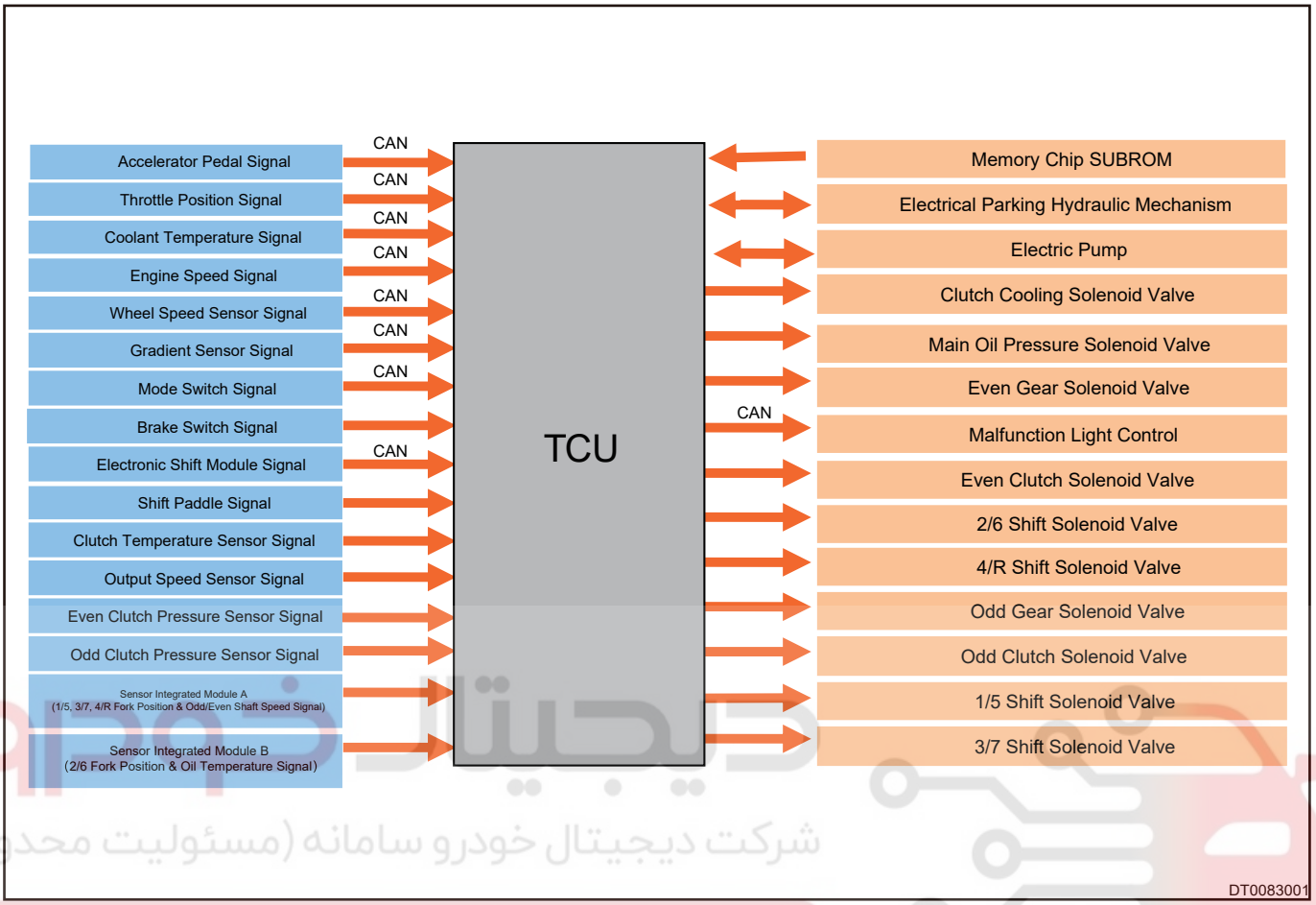
- The maximum input torque is 380 Nm.
- Net weight: Less than 82 kg (excluding weight of dual mass flywheel).
- Wet dual clutch.
- It provides 7+R gears, and speed ratio range is greater than 6.89.
- Compact layout, improved efficiency, optimized shift sticking.
- Quick response, smooth shifting.
- Efficiency is improved.
- Support start and stop function and extended coasting function (additional hardware support is not required).

- Reverse shaft is canceled, making a more compact structure.
- A set of clutches are connected to gear 1/R respectively.
- Standard front column rear ball bearing arrangement, improving efficiency and contributing to platform collinearity.
- Common control for flow valve/pressure valve.
- Protect hydraulic parking, and vehicle can easily achieve gear control.

System Components Diagram

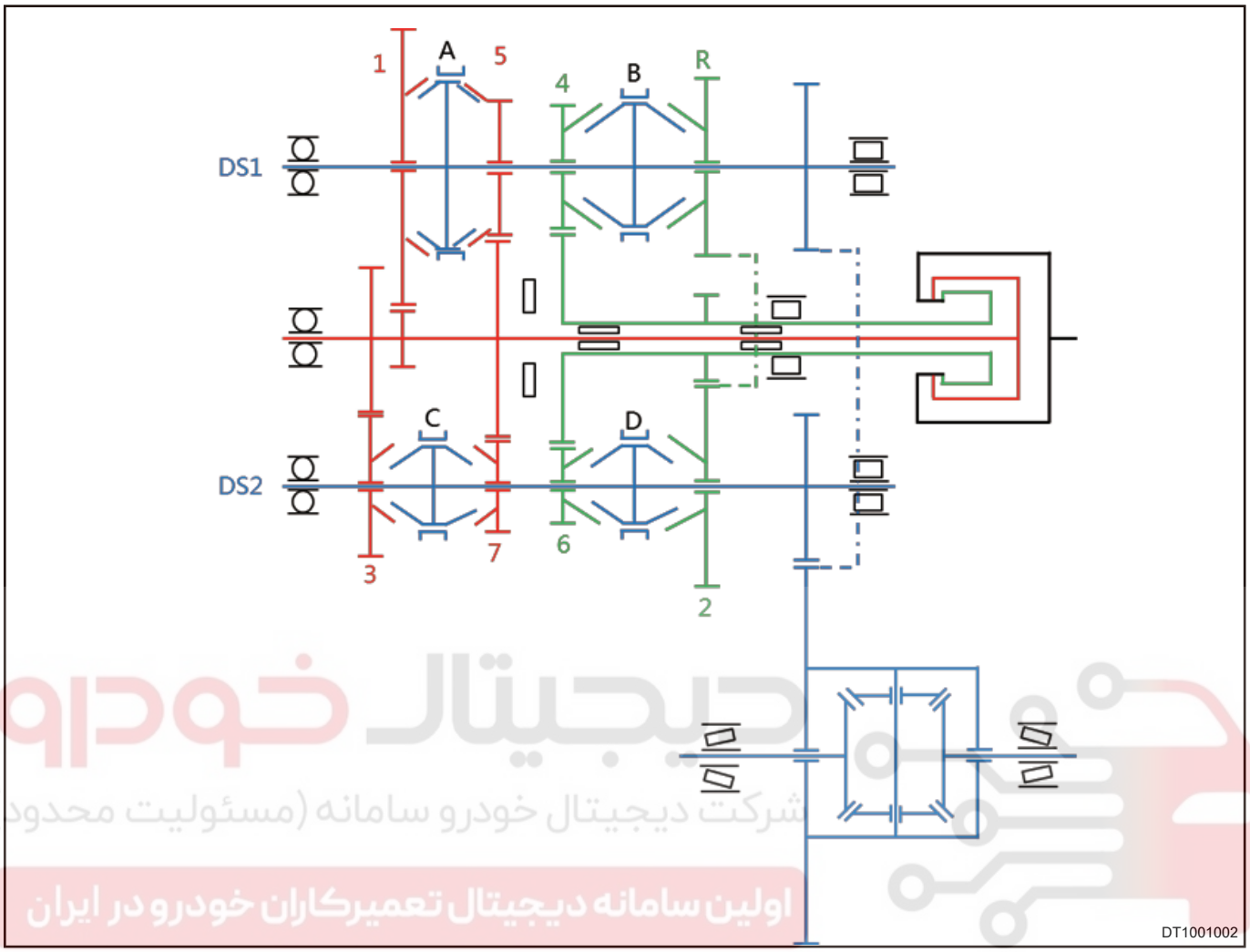
1	Transmission Assembly	2	Transmission Control Module

System Schematic Diagram



- According to the driver’ s driving command and each signal data sent by each sensor on transmission, 738DHA transmission control module (TCU) performs calculation to control engagement or separation of transmission and clutch, and switching of gears while combining signals received from other modules on vehicle via CAN line.
  - Sensor integration module A collects 1\5, 3\7, 4\R fork position sensor signals, even shaft speed signals and odd shaft speed signals.
  - Sensor integration module B collects 2\6 fork position sensor signals and transmission oil temperature signal.
  - The application of memory chip SUBROM in transmission makes up for the difference of transmission characteristics caused by the difference of components and assembly, and provides guarantee for the normal and safe operation of hydraulic system. At the same time, drive efficiency of transmission and driving comfort are improved. In addition to store the hydraulic characteristic data of solenoid valve, SUBROM can also store some important calibration parameters of transmission, so as to optimize the transmission performance, and further improve product quality and market competitiveness.

Internal Principle



The dual clutch transmission uses two clutches (odd/even) that are controlled by electronic system and hydraulic system. For 738DHA, one clutch controls odd gears (1st, 3rd, 5th, and 7th) , and the other clutch controls even gears (2nd, 4th, 6th, and reverse).

- Features: During the whole shifting operation, two sets of clutches operate in turn to ensure that at least one set of gear is outputting power, so as to avoid power interruption condition.

System Layout

- The 1st gear and R gear are controlled by two different clutches to avoid the risk of sticking caused by shifting operation in cold start.
- Reverse shaft is canceled to reduce weight and length of assembly.
- The whole platform adopts deep groove ball + short cylindrical bearing to reduce the towing torque.
- Basic speed ratio range of all platforms is more than 7.

System Function Description

Gear Position Introduction

During operation, automatic mode (P, R, N, D) and manual mode M (+, -) can be selected by driver. The corresponding selected gear information will be displayed in display area of instrument cluster.

- Automatic mode: When transmission is in D position, manual upshift/downshift operation is not required, and automatic upshift/downshift operation will be achieved by vehicle according to vehicle speed.

- Manual mode: When transmission is in D position, push it to right/left to enter manual mode, and push it forward to raise one gear, and push it backward to lower one gear.

Intelligent Real-time 4WD System (AWD)

The vehicle is set to 6 driving modes including NORMAL (Standard mode) / SPORT (Sport mode) / ECO (ECO mode) / SNOW (Snow mode) / MUD (Mud mode) / OFF ROAD (Off road mode). In all modes, 4WD system operates intelligently to realize the automatic switching of 2WD/4WD in real time. Driving mode can also be set manually according to the judgment of road conditions. OFF ROAD (Off road mode) can help you get out of trap under complex road conditions.

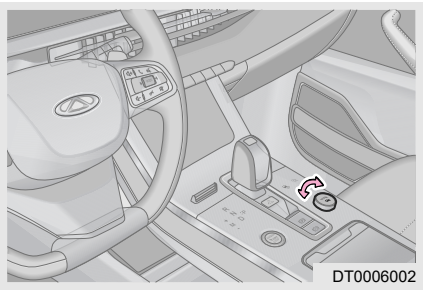
Caution
• When Electronic Stability Program System (ESP) turns off, even if SNOW (Snow mode) / MUD (Mud mode) / OFF ROAD (Off road mode) is selected, the sliding limit and vehicle traction ability of the vehicle will be reduced.

Driving mode introduction:

- NORMAL (Standard mode): Standard mode integrates vehicle power and economy, which is suitable for various roads.
- ECO (ECO mode): ECO mode can improve the fuel economy of vehicle, which is suitable for flat and hard roads such as urban roads and paved roads.
- SPORT (Sport mode): Sport mode can improve power performance of vehicle, bringing higher level of response speed and driving experience. It is suitable for flat roads with few vehicles and wide driving range (For example, highways).
- SNOW (Snow mode): Snow mode is suitable for hard and slippery roads, including snow, icy, grassland, gravel roads, etc.
- MUD (Mud mode): Mud mode is suitable for muddy and uneven roads with a smooth layer of shallow mud or rutted road surface.
- OFF ROAD (Off road mode): Off road mode can improve acceleration performance of vehicle, enhancing vehicle passing ability. It is suitable for off-road driving on mountain roads and vehicle traction.

Driving mode switching method 1:

a. Turn power supply to ON mode, vehicle is stationary or ensure safety driving.
b. Rotate the “MODE” switch on the auxiliary fascia console panel to switch circularly between NORMAL (-Standard mode) / SPORT (Sport mode) / ECO (ECO mode) / SNOW (Snow mode) / MUD (Mud mode) / OFF ROAD (Off road mode); In addition, the corresponding mode icon on the instrument cluster turns on and instrument cluster will switch the corresponding theme mode, accompanied by a voice reminder, prompting that the driving mode switching is successful.


DT0006002

Driving mode switching method 2:

a. Turn power supply to ON mode, vehicle is stationary or ensure safety driving.
b. Rotate the “MODE” switch on the auxiliary fascia console panel, audio head unit pops up the driving mode screen.
c. Click NORMAL (Standard mode) / SPORT (Sport mode) / ECO (ECO mode) / SNOW (Snow mode) / MUD (Mud mode) / OFF ROAD (Off road mode) on driving mode screen; In addition, the corresponding mode icon on the instrument cluster turns on and instrument cluster will switch the corresponding theme mode, accompanied by a voice reminder, prompting that the driving mode switching is successful.

Caution
• When driving mode is switched, instrument cluster will switch the corresponding theme color. • Adaptive Cruise Control System (ACC) performs acceleration slowly in ECO (ECO mode) / SNOW (-Snow mode) / MUD (Mud mode), and Adaptive Cruise Control System (ACC) performs acceleration quickly in SPORT (Sport mode) / OFF ROAD (Off road mode).

Fail-safe Mode
When transmission system fails, fail-safe mode is activated automatically, and the yellow indicator on instrument cluster remains on. The transmission will not operate properly and vehicle speed will gradually decrease and vehicle drives at low speed.

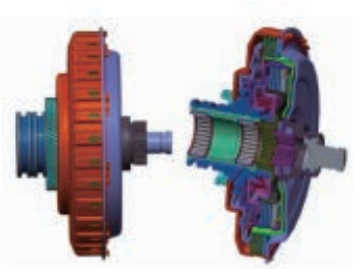
Automatically Shifting to P
When vehicle speed changes from more than 15km/h to 0 (stop), if transmission is in R or D position and driver side door is opened and brake pedal is not depressed, system will shift to P position automatically. If driver side door cannot be closed due to damage, driver can shift the shift lever to R or D position after system shifts to P position automatically, and vehicle can be driven normally.

System Components Description

Technical Characteristics

New generation of wet dual clutch.

- It is considered to adopt BW-CCF series dual clutch;
- Non-high pressure system is more reliable;
- Compact structure, contributing to platform collinearity;
- Special mold costs are not required.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Mixing pump technology. Combination use of mechanical pump and electronic pump can reduce the displacement of mechanical pump and improve the efficiency of system.

- Amount of transmission oil is reduced;
- Start and stop during driving is supported;
- Efficiency is improved.


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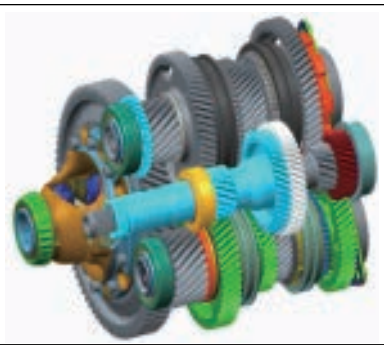
Optimized shaft train arrangement.

- Reverse shaft is canceled, making a more compact structure
- A set of clutches are connected to gear 1/R respectively
- Standard front column rear ball bearing arrangement, improving efficiency and contributing to platform collinearity.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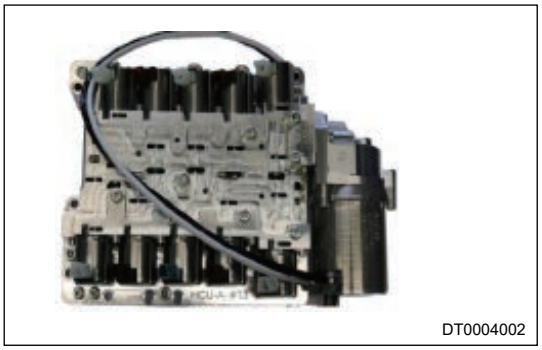
New generation of HCU system.

- Quick response, smooth shifting;
- Protect hydraulic parking, and vehicle can easily achieve gear control;
- Low leaking hydraulic system, high precision solenoid valve, shift actuator separation, universal platform;
- Double control for shift control circuit by flow valve and pressure valve.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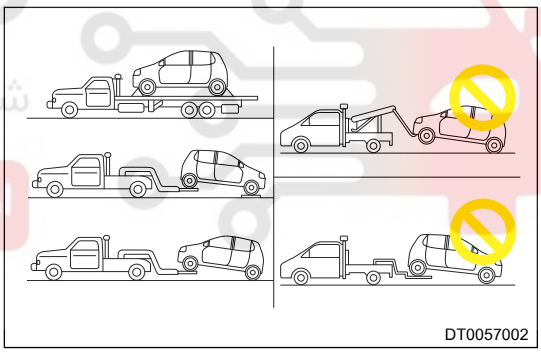
Parking Mechanism

- It is arranged on the output shaft to reduce the weight of parking mechanism and improve the robustness of system (In addition to parking gear, other parts are universal to all platforms).
- It also includes integrated hydraulic automatic parking.

Vehicle Towing

1. Towing using the correct method can avoid unnecessary secondary damage to the vehicle.
   a. Use flatbed truck or large flatbed trolley to tow the vehicle after it is fully supported.
   b. Use hard traction to lift the non-drive wheel while using a small flatbed (ground wheel) to lift the drive wheel and transport it
   c. Use hard traction to lift the drive wheel and transport it.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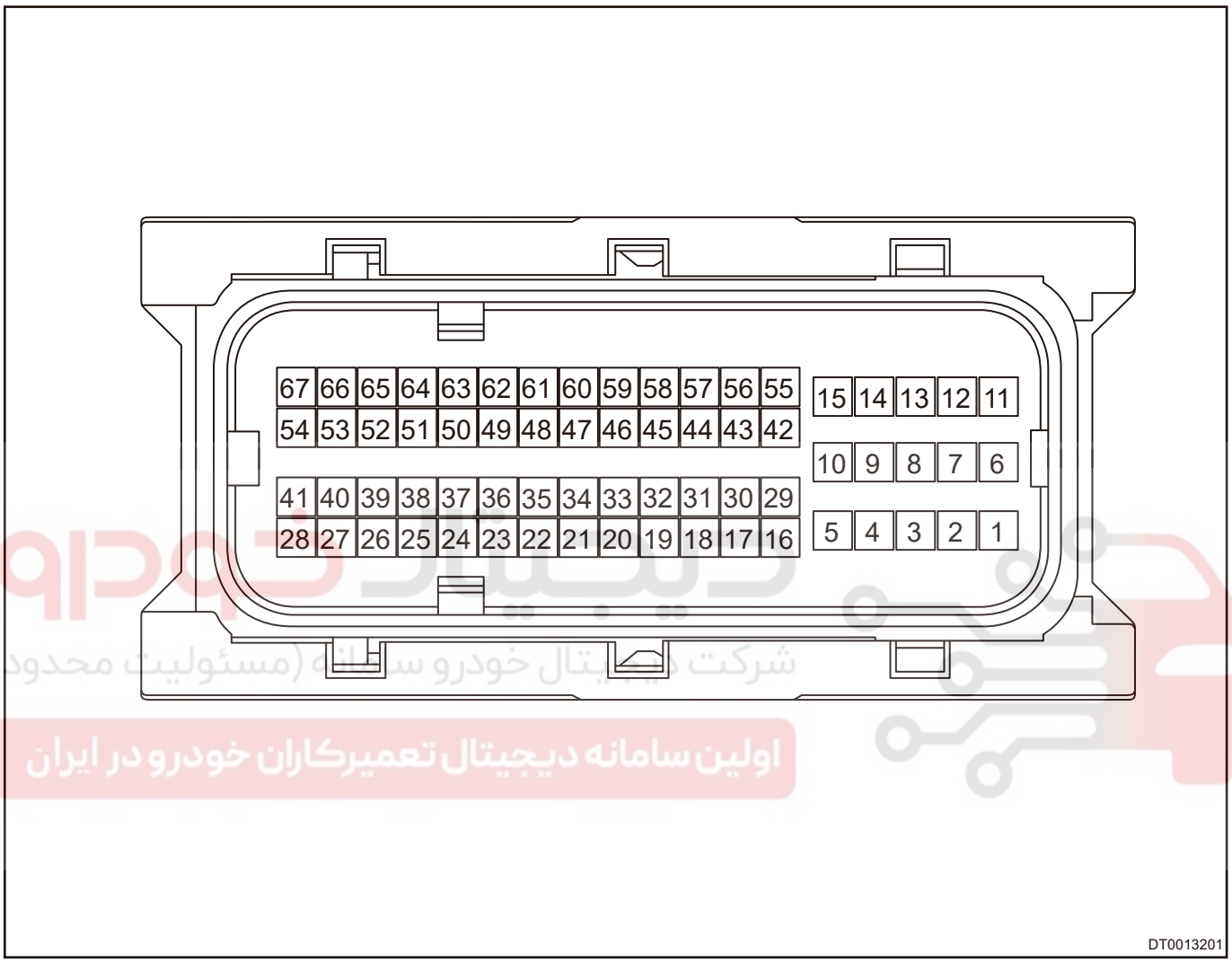
System Circuit Diagram

Module Terminal Definition

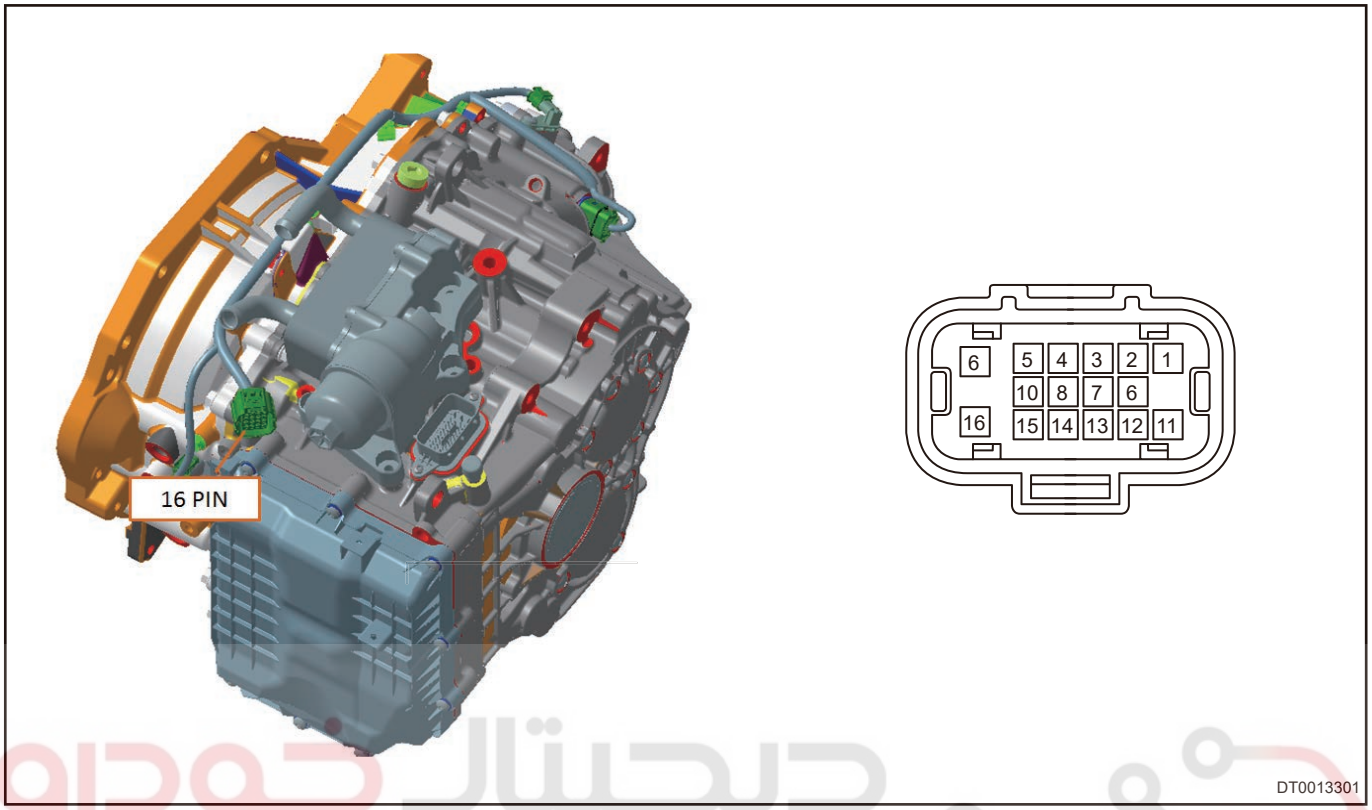
Transmission Control Module PIN



No.	Terminal Definition	No.	Terminal Definition
1	Electronic Pump U Phase	35	Electronic Parking Lock Electromagnet Control
2	Electronic Pump V Phase	36	Electronic Parking Actuator Solenoid Valve Control
3	Electronic Pump W Phase	37	Null
4	Odd Clutch Solenoid Valve Control	38	Clutch Temperature Sensor
5	TCU Ground KL31	39	Transmission Oil Temperature Sensor
6	Solenoid Valve Power Supply 3	40	Null
7	TCU Ground KL31	41	Parking Position Sensor
8	1st/5th Gear Shift Solenoid Valve Control	42	5V Sensor Power Supply 1

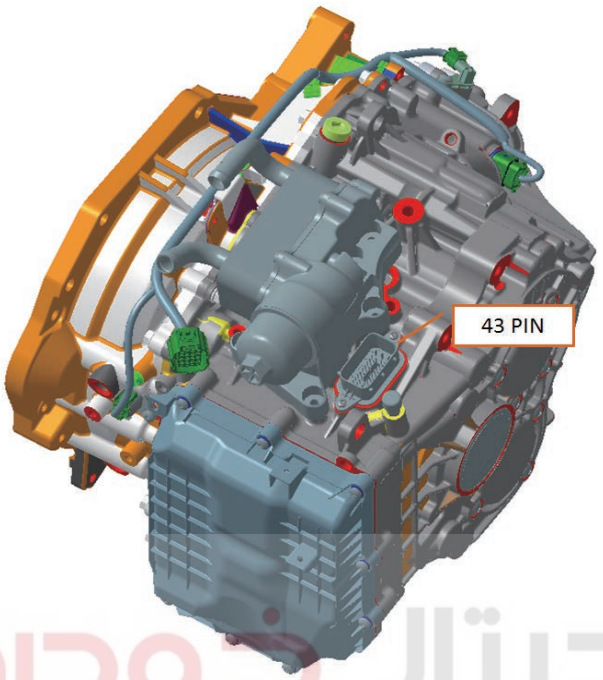
No.	Terminal Definition	No.	Terminal Definition
9	3rd/7th Gear Shift Solenoid Valve Control	43	8V Sensor Power Supply 1
10	Odd Gear Position Solenoid Valve Control	44	Main Oil Pressure Solenoid Valve Control
11	Solenoid Valve Power Supply 1	45	Clutch Cooling Solenoid Valve Control
12	Solenoid Valve Power Supply 2	46	4th/R Gear Shift Solenoid Valve Control
13	TCU Power Supply KL.30 HP	47	2nd/6th Gear Shift Solenoid Valve Control
14	TCU Power Supply KL.30 HP	48	Even Gear Position Solenoid Valve Control
15	TCU Power Supply KL.30 LP	49	Simulation Input Ground 2
16	Electronic Pump Motor Position Sensor V Phase	50	Null
17	Null	51	Even Clutch Pressure Sensor
18	Null	52	Odd Clutch Pressure Sensor
19	CAN High	53	8V Sensor Power Supply 2
20	CAN Low	54	5V Sensor Power Supply 2
21	Null	55	Sub Memory: Chip Selection
22	Null	56	Sub Memory: Clock
23	Null	57	2nd/6th Gear Fork Position Sensor
24	Simulation Input Ground 1	58	4th/R Gear Fork Position Sensor
25	Null	59	Output Speed Sensor
26	Null	60	Clutch Speed Sensor
27	Null	61	Digital Input Ground 2
28	Null	62	Odd Shaft Input Speed Sensor
29	Electronic Pump Motor Position Sensor W Phase	63	Even Shaft Input Speed Sensor
30	Electronic Pump Motor Position Sensor U Phase	64	1st/5th Gear Fork Position Sensor
31	Null	65	3rd/7th Gear Fork Position Sensor
32	Ignition KL15	66	Null
33	Even Clutch Solenoid Valve Control	67	Sub Memory: Read and Write
34	Digital Input Ground 1		

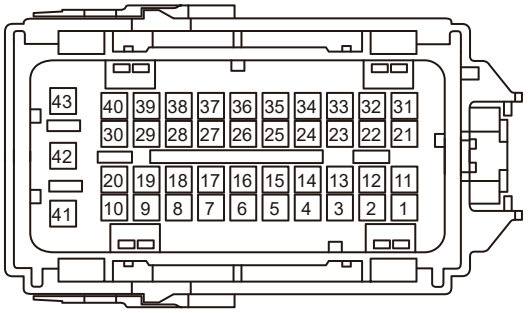
16-PIN Terminal Definition



No.	Terminal Definition	No.	Terminal Definition
1	High Side Drive 3	9	8V Power Supply 2
2	Electronic Parking Hydraulic Valve	10	/
3	Electronic Parking Electromagnet	11	Transmission Output Speed
4	Electronic Parking Position Signal	12	/
5	5V Power Supply 2	13	8V Power Supply 1
6	/	14	Clutch Speed
7	/	15	Sensor Simulation Ground 2
8	Sensor Digital Ground 2	16	Clutch Oil Temperature

43-Pin Terminal Definition





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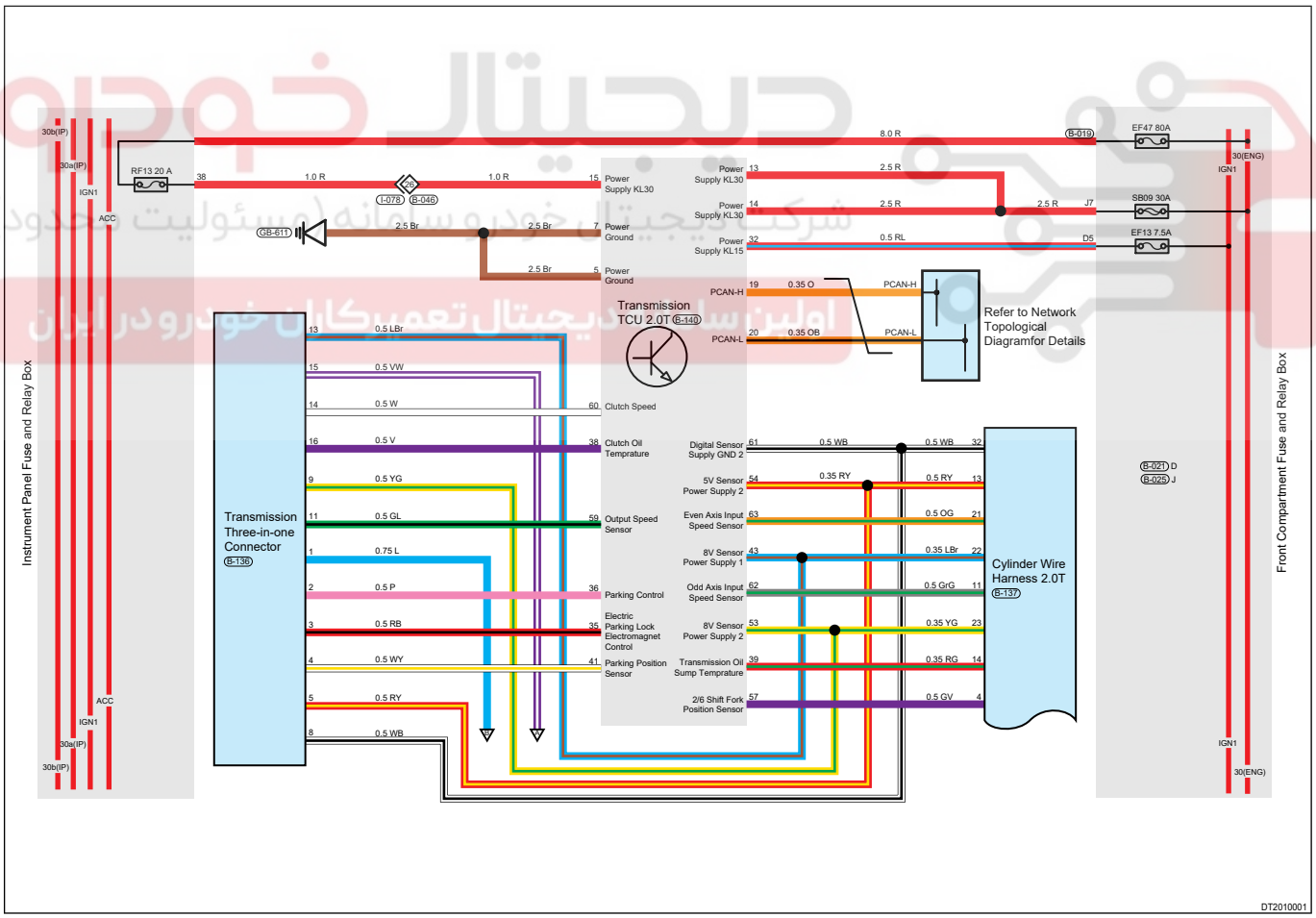
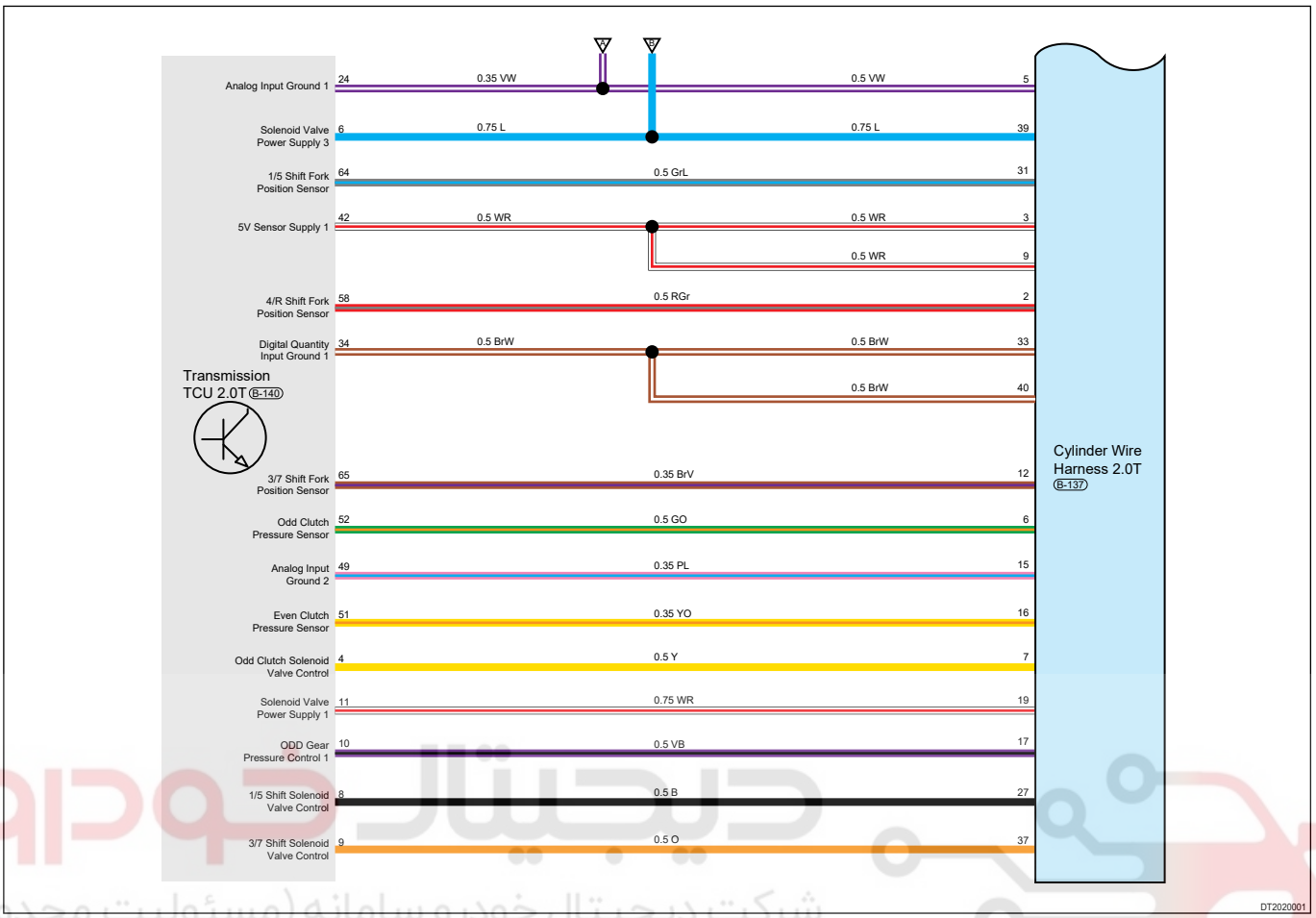
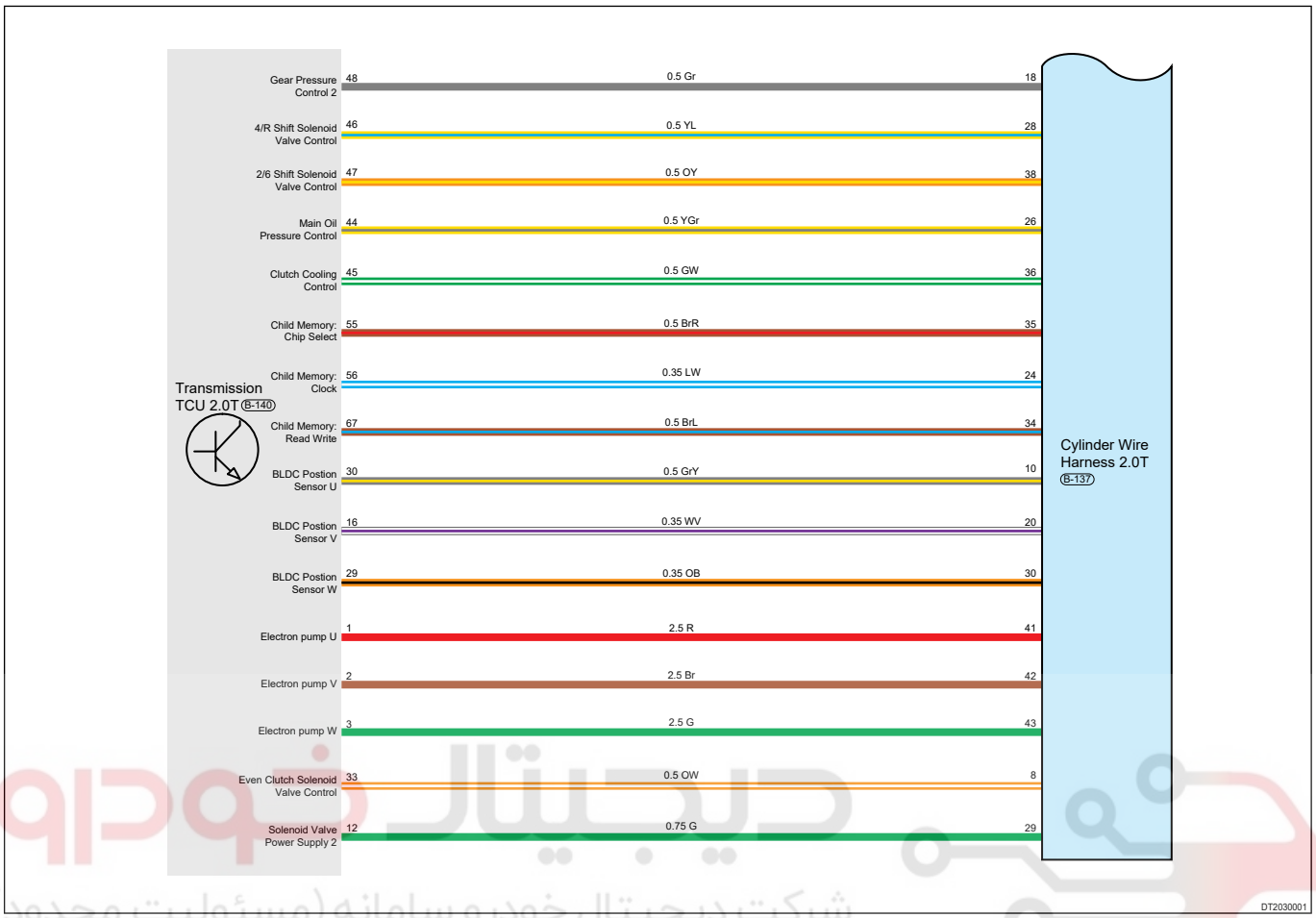
No.	Terminal Definition	No.	Terminal Definition
1	NA	23	8V Sensor Power Supply 2
2	4th/R Gear Fork Position Sensor	24	Sub Memory: Clock
3	5V Sensor Power Supply 1	25	NA
4	2nd/6th Gear Fork Position Sensor	26	Main Oil Pressure Solenoid Valve Control
5	Simulation Input Ground 2	27	1st/5th Gear Shift Solenoid Valve Control
6	Odd Clutch Pressure Sensor	28	4th/R Gear Shift Solenoid Valve Control
7	Odd Clutch Solenoid Valve Control	29	Solenoid Valve Power Supply 2
8	Even Clutch Solenoid Valve Control	30	Electronic Pump Motor Position Sensor W Phase
9	5V Sensor Power Supply 1	31	1st/5th Gear Fork Position Sensor
10	Electronic Pump Motor Position Sensor U Phase	32	Digital Input Ground 2
11	Odd Shaft Input Speed Sensor	33	Digital Input Ground 1
12	3rd/7th Gear Fork Position Sensor	34	Sub Memory: Read and Write
13	5V Sensor Power Supply 2	35	Sub Memory: Chip Selection
14	Transmission Oil Temperature Sensor	36	Clutch Cooling Solenoid Valve Control

No.	Terminal Definition	No.	Terminal Definition
15	Simulation Input Ground 1	37	3rd/7th Gear Shift Solenoid Valve Control
16	Even Clutch Pressure Sensor	38	2nd/6th Gear Shift Solenoid Valve Control
17	Odd Gear Position Solenoid Valve Control	39	Solenoid Valve Power Supply 3
18	Even Gear Position Solenoid Valve Control	40	Digital Input Ground 1
19	Solenoid Valve Power Supply 1	41	Electronic Pump U Phase
20	Electronic Pump Motor Position Sensor V Phase	42	Electronic Pump V Phase
21	Even Shaft Input Speed Sensor	43	Electronic Pump W Phase
22	8V Sensor Power Supply 1		

Circuit Diagram







Diagnosis & Testing

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.

System Diagnosis Procedure

Use following procedures to troubleshoot the transmission control 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 DTCs**

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

Caution

- TCU can store a maximum of 20 DTCs. If the storage space for DTCs is used up, the new DTCs will substitute the historical faults with the lowest priorities.
- Clutch/transmission overheat failure (P2787/P1849) is overheat protection measures of transmission/clutch hardware. Usually, after overheat prompt appears, simply stop the vehicle for a rest, then it can work normally. Try to avoid repeated starting with accelerator pedal depressed firmly, which is easy to make the oil temperature rise too fast.

DTC	DTC Definition
P186547	TCU Internal Malfunction
P186747	TCU Internal Malfunction
P186947	TCU Internal Malfunction
P186849	TCU Internal Malfunction
P065912	HSD1 Power Supply Short to Power Supply
P267112	HSD2 Power Supply Short to Power Supply
P268612	HSD3 Power Supply Short to Power Supply
P267011	HSD2 Power Supply Short to Ground
P065811	HSD1 Power Supply Short to Ground
P268511	HSD3 Power Supply Short to Ground

DTC	DTC Definition
P065713	HSD1 Power Supply Open
P266913	HSD2 Power Supply Open
P268413	HSD3 Power Supply Open
P096013	Main Oil Path Solenoid Valve Open
P096211	Main Oil Path Solenoid Valve Short to Ground
P096312	Main Oil Path Solenoid Valve Short to Power Supply
P188904	Main Oil Path Solenoid Valve Passage Closes Unexpectedly
P188A01	Main Oil Path Solenoid Valve Circuit Error
P074519	Main Oil Path Solenoid Valve Feedback Current Too High
P074818	Main Oil Path Solenoid Valve Feedback Current Too Low
P096413	Lubricant Oil Path Solenoid Valve Open

DTC	DTC Definition
P096611	Lubricant Oil Path Solenoid Valve Short to Ground
P096712	Lubricant Oil Path Solenoid Valve Short to Power Supply
P188B04	Lubricant Oil Path Solenoid Valve Passage Closes Unexpectedly
P188C01	Lubricant Oil Path Solenoid Valve Circuit Error Occurs
P077519	Lubricant Oil Path Solenoid Valve Feedback Current Too High
P077818	Lubricant Oil Path Solenoid Valve Feedback Current Too Low
P182513	Odd Clutch Solenoid Valve Open
P097311	Odd Clutch Solenoid Valve Short to Ground
P097412	Odd Clutch Solenoid Valve Short to Power Supply
P188D04	Odd Clutch Solenoid Valve Passage Closes Unexpectedly
P188E01	Odd Clutch Solenoid Valve Circuit Error
P075019	Odd Clutch Solenoid Valve Feedback Current Too High
P075318	Odd Clutch Solenoid Valve Feedback Current Too Low
P182613	Even Clutch Solenoid Valve Open
P097611	Even Clutch Solenoid Valve Short to Ground
P097712	Even Clutch Solenoid Valve Short to Power Supply
P188F04	Even Clutch Solenoid Valve Passage Closes Unexpectedly
P189001	Even Clutch Solenoid Valve Circuit Error
P075519	Even Clutch Solenoid Valve Feedback Current Too High
P075818	Even Clutch Solenoid Valve Feedback Current Too Low

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DTC	DTC Definition
P182713	Odd Shaft Shift Pressure Solenoid Valve Open
P097911	Odd Shaft Shift Pressure Solenoid Valve Short to Ground
P098012	Odd Shaft Shift Pressure Solenoid Valve Short to Power Supply
P189104	Odd Shaft Shift Pressure Solenoid Valve Passage Closes Unexpectedly
P189201	Odd Shaft Shift Pressure Solenoid Valve Circuit Error Occurs
P076019	Odd Shaft Shift Pressure Solenoid Valve Feedback Current Too High
P076318	Odd Shaft Shift Pressure Solenoid Valve Feedback Current Too Low
P182813	Even Shaft Shift Pressure Solenoid Valve Open

DTC	DTC Definition
P098211	Even Shaft Shift Pressure Solenoid Valve Short to Ground
P098312	Even Shaft Shift Pressure Solenoid Valve Short to Power Supply
P189304	Even Shaft Shift Pressure Solenoid Valve Passage Closes Unexpectedly
P189401	Even Shaft Shift Pressure Solenoid Valve Circuit Error Occurs
P076519	Even Shaft Shift Pressure Solenoid Valve Feedback Current Too High
P076818	Even Shaft Shift Pressure Solenoid Valve Feedback Current Too Low
P182913	4th/R Gear Flow Solenoid Valve Open
P098511	4th/R Gear Flow Solenoid Valve Short to Ground
P098612	4th/R Gear Flow Solenoid Valve Short to Power Supply
P189504	4th/R Gear Flow Solenoid Valve Passage Closes Unexpectedly
P189601	4th/R Gear Flow Solenoid Valve Circuit Error
P077019	4th/R Gear Flow Solenoid Valve Feedback Current Too High
P077318	4th/R Gear Flow Solenoid Valve Feedback Current Too Low
P183013	2nd/6th Gear Flow Solenoid Valve Open
P099411	2nd/6th Gear Flow Solenoid Valve Short to Ground
P099512	2nd/6th Gear Flow Solenoid Valve Short to Power Supply
P189704	2nd/6th Gear Flow Solenoid Valve Passage Closes Unexpectedly
P189801	2nd/6th Gear Flow Solenoid Valve Circuit Error

DTC	DTC Definition
P270619	2nd/6th Gear Flow Solenoid Valve Feedback Current Too High
P270918	2nd/6th Gear Flow Solenoid Valve Feedback Current Too Low
P186213	1st/5th Gear Flow Solenoid Valve Open
P099B11	1st/5th Gear Flow Solenoid Valve Short to Ground
P099C12	1st/5th Gear Flow Solenoid Valve Short to Power Supply
P189904	1st/5th Gear Flow Solenoid Valve Passage Closes Unexpectedly
P189A01	1st/5th Gear Flow Solenoid Valve Circuit Error
P075A19	1st/5th Gear Flow Solenoid Valve Feedback Current Too High
P075D18	1st/5th Gear Flow Solenoid Valve Feedback Current Too Low
P186313	3rd/7th Gear Flow Solenoid Valve Open

DTC	DTC Definition
P099F11	3rd/7th Gear Flow Solenoid Valve Short to Ground
P099F12	3rd/7th Gear Flow Solenoid Valve Short to Power Supply
P189B04	3rd/7th Gear Flow Solenoid Valve Passage Closes Unexpectedly
P189C01	3rd/7th Gear Flow Solenoid Valve Circuit Error
P076A19	3rd/7th Gear Flow Solenoid Valve Feedback Current Too High
P076D18	3rd/7th Gear Flow Solenoid Valve Feedback Current Too Low
P282413	E-park Hydraulic Valve Open
P282712	E-park Hydraulic Valve Short to Power Supply
P282611	E-park Hydraulic Valve Short to Ground
P282F11	E-park Safety Valve Short to Ground
P283012	E-park Safety Valve Short to Power Supply
P282D13	E-park Safety Valve Open
P279912	Motor Short to Power Supply
P279814	Motor Short to Ground or Open
P0B0019	Motor Overcurrent
P279798	Motor Temperature Too High
P188817	Motor Overvoltage
P0B0D49	Internal Motor Fault

DTC	DTC Definition
P183111	5V1 Power Supply Short to Ground
P183212	5V1 Power Supply Short to Power Supply
P183311	5V2 Power Supply Short to Ground
P183412	5V2 Power Supply Short to Power Supply
P183511	8V1 Power Supply Short to Ground
P183612	8V1 Power Supply Short to Power Supply
P183711	8V2 Power Supply Short to Ground
P183812	8V2 Power Supply Short to Power Supply
P0B0A16	Motor Hall Sensor Undervoltage
P0B0B17	Motor Hall Sensor Overvoltage
P189D25	Motor Hall Sensor Undefined Fault
P189E29	Motor Hall Sensor Signal Invalid
U300316	KL30 LP Overvoltage
U300317	KL30 LP Undervoltage
P186616	KL30 HP Open or Short to Ground
P071714	Odd Input Shaft Speed Sensor Short to Ground or Open
P180112	Odd Input Shaft Speed Sensor Short to Power Supply
P276714	Even Input Shaft Speed Sensor Short to Ground or Open
P180212	Even Input Shaft Speed Sensor Short to Power Supply

DTC	DTC Definition
P072214	Output Shaft Speed Sensor Short to Ground or Open
P180312	Output Shaft Speed Sensor Short to Power Supply
P072714	Clutch Speed Sensor Short to Ground or Open
P180412	Clutch Speed Sensor Short to Power Supply
P084214	Odd Clutch Pressure Sensor Short to Ground or Open
P084312	Odd Clutch Pressure Sensor Short to Power Supply
P084714	Even Clutch Pressure Sensor Short to Ground or Open
P084812	Even Clutch Pressure Sensor Short to Power Supply
P093911	Clutch Temperature Sensor Short to Ground
P094015	Clutch Temperature Sensor Short to Power Supply or Open
P071211	Valve Body Oil Temperature Sensor Short to Ground

DTC	DTC Definition
P071315	Valve Body Oil Temperature Sensor Short to Power Supply or Open
P183914	1st/5th Gear Fork Position Sensor Short to Ground or Open
P187412	1st/5th Gear Fork Position Sensor Short to Power Supply
P184014	2nd/6th Gear Fork Position Sensor Short to Ground or Open
P187512	2nd/6th Gear Fork Position Sensor Short to Power Supply
P184114	3rd/7th Gear Fork Position Sensor Short to Ground or Open
P187612	3rd/7th Gear Fork Position Sensor Short to Power Supply
P184214	4th/R Gear Fork Position Sensor Short to Ground or Open
P187712	4th/R Gear Fork Position Sensor Short to Power Supply

DTC	DTC Definition
P187115	E-park Position Sensor Short to Power Supply or Open
P187811	E-park Position Sensor Short to Ground
P071501	Odd Input Shaft Speed Sensor Overrange
P071664	Odd Input Shaft Speed Sensor Rationality Checksum Fails
P276501	Even Input Shaft Speed Sensor Overrange
P276664	Even Input Shaft Speed Sensor Rationality Checksum Fails
P072001	Output Shaft Speed Sensor Overrange
P072139	Output Shaft Speed Sensor Steering Error
P072164	Output Shaft Speed Sensor Rationality Checksum Fails
P072501	Clutch Speed Sensor Overrange
P072664	Clutch Speed Sensor Rationality Checksum Fails
P180564	Odd Shaft Gear Position Speed Ratio Matching Failure
P180664	Even Shaft Gear Position Speed Ratio Matching Failure
P084001	Odd Clutch Pressure Out of Limit
P084137	Difference Between Target and Actual Pressures of Odd Clutch Out of Range
P084136	Difference Between Target and Actual Pressures of Odd Clutch Out of Range
P084124	Zero Shift Occurs in Odd Clutch Pressure
P084501	Even Clutch Pressure Out of Limit

DTC	DTC Definition
P084637	Difference Between Actual and Target Pressures of Even Clutch Out of Range
P084636	Difference Between Target and Actual Pressures of Even Clutch Out of Range

DTC	DTC Definition
P084624	Zero Shift Occurs in Even Clutch Pressure
P071162	Difference Between Clutch Oil Temperature and Valve Body Oil Temperature Too Large
P071685	Odd Input Shaft Speed Out of Upper Limit
P276685	Even Input Shaft Speed Out of Upper Limit
P072185	Output Shaft Speed Out of Upper Limit
P081107	Clutch Slipping is Excessive
P181077	Shifting to 1st Gear Failure
P181177	Shifting Out of 1st Gear Failure
P181277	Shifting to 2nd Gear Failure
P181377	Shifting Out of 2nd Gear Failure
P181477	Shifting to 3rd Gear Failure
P181577	Shifting Out of 3rd Gear Failure
P181677	Shifting to 4th Gear Failure
P181777	Shifting Out of 4th Gear Failure
P181877	Shifting to 5th Gear Failure
P181977	Shifting Out of 5th Gear Failure
P182077	Shifting to 6th Gear Failure

DTC	DTC Definition
P182177	Shifting Out of 6th Gear Failure
P186077	Shifting to 7th Gear Failure
P186177	Shifting Out of 7th Gear Failure
P182277	Shifting to R Gear Failure
P181092	Shifting to 1st Gear Failure from Stationary State
P182292	Shifting to R Gear Failure from Stationary State
P182377	Shifting Out of R Gear Failure
P185007	Unexpected Shifting Out on Odd Shaft

DTC	DTC Definition
P185107	Unexpected Shifting Out on Even Shaft
P185207	Engine Crankshaft Failure
P185307	Transmission Coupling Shaft or Differential Connection Failure
P089392	Odd Shaft Multi-gear Engagement Failure
P182492	Even Shaft Multi-gear Engagement Failure
P278798	Clutch Surface Temperature Too High Failure
P184998	Transmission Temperature Too High Failure
P184592	Simultaneous Engagement Failure Occurs in Dual Clutch

DTC	DTC Definition
P184809	SubRom Read Failure
P185644	EEPROM Checksum Failure
P187277	Shifting to P Gear Failure
P187377	Shifting Out of P Gear Failure
P279785	Motor Speed Out of Upper Limit
P0A1B64	Motor Control Times Out
P190344	TCU Memory Read Failure
P190444	TCU Memory Writing Failure
P190198	CG135 Chip Overtemperature
P190201	CG135 Chip Temperature Error
U010087	EMS Node Communication Missing
U010387	EMS Node Communication Missing
U012287	EMS Node Communication Missing
U014087	BCM Node Communication Missing
U015587	IPC Node Communication Missing
U016487	CLM Node Communication Missing
U040181	EMS Node Data Invalid

DTC	DTC Definition
U040481	EGS Node Data Invalid
U041681	ESC Node Data Invalid
U042281	BCM Node Data Invalid

DTC	DTC Definition
U042381	IPC Node Data Invalid
U042481	CLM Node Data Invalid

DTC Diagnosis Procedure

Main Oil Path Solenoid Valve DTCs

DTC	**P096013**	**Main Oil Path Solenoid Valve Open**
DTC	**P096211**	**Main Oil Path Solenoid Valve Short to Ground**
DTC	**P096312**	**Main Oil Path Solenoid Valve Short to Power Supply**
DTC	**P188904**	**Main Oil Path Solenoid Valve Passage Closes Unexpectedly**
DTC	**P188A01**	**Main Oil Path Solenoid Valve Circuit Error**
DTC	**P074519**	**Main Oil Path Solenoid Valve Feedback Current Too High**
DTC	**P074818**	**Main Oil Path Solenoid Valve Feedback Current Too Low**

Description

DTC	DTC Definition	Possible Cause
P096013	Main Oil Path Solenoid Valve Open	• Battery failure • Alternator failure • Wire harness or connector failure • Main oil path solenoid valve failure • TCU failure
P096211	Main Oil Path Solenoid Valve Short to Ground	
P096312	Main Oil Path Solenoid Valve Short to Power Supply	
P188904	Main Oil Path Solenoid Valve Passage Closes Unexpectedly	
P188A01	Main Oil Path Solenoid Valve Circuit Error	
P074519	Main Oil Path Solenoid Valve Feedback Current Too High	
P074818	Main Oil Path Solenoid Valve Feedback Current Too Low	

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

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

1	**Check battery**

(a) Turn ENGINE START STOP switch to OFF.
(b) Using a multimeter, measure voltage between positive and negative battery terminals.

NG → **Replace battery**

OK

2	**Check alternator**

(a) Check the alternator.

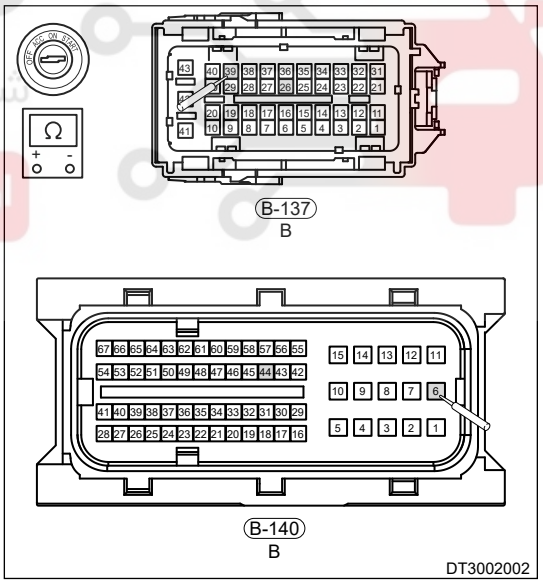
NG → **Replace alternator**

OK

3	**Check main oil path solenoid valve wire harness**

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.
(b) Turn ENGINE START STOP switch to OFF.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-140 (6) - B-137 (39)	Always	Less than 1 Ω
B-140 (44) - B-137 (26)	Always	Less than 1 Ω



NG → **Check and repair main oil path solenoid valve wire harness**

OK

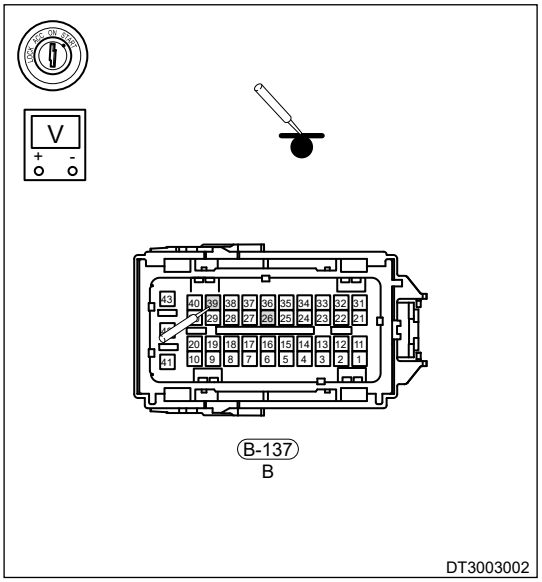
4	**Check voltage of main oil path solenoid valve wire harness connector**

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
B-137 (39) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (26) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short failure to power supply in main oil path solenoid valve**

OK

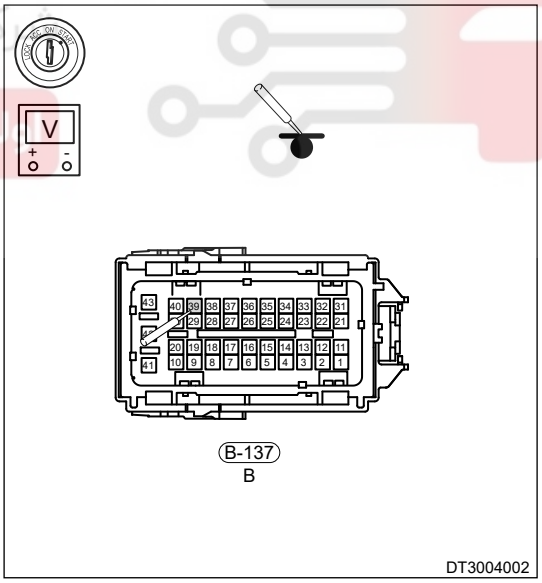
5	Check TCU module output voltage

(a) Connect TCU connector, disconnect connector (B-137) between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) (Online detection) Measure voltage of terminal 39 of connector B-137 between interior wire harness and transmission internal wire harness (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-137 (39) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG → **Repair or replace wire harness between B-137 (39) and TCU**

OK

6	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.

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

NG → **Replace TCU module assembly**

Odd Clutch Solenoid Valve DTCs

DTC	**P182513**	**Odd Clutch Solenoid Valve Open**
DTC	**P097311**	**Odd Clutch Solenoid Valve Short to Ground**
DTC	**P097412**	**Odd Clutch Solenoid Valve Short to Power Supply**
DTC	**P188D04**	**Odd Clutch Solenoid Valve Passage Closes Unexpectedly**
DTC	**P188E01**	**Odd Clutch Solenoid Valve Circuit Error**
DTC	**P075019**	**Odd Clutch Solenoid Valve Feedback Current Too High**
DTC	**P075318**	**Odd Clutch Solenoid Valve Feedback Current Too Low**

Description

DTC	DTC Definition	Possible Cause
P182513	Odd Clutch Solenoid Valve Open	• Battery failure • Alternator failure • Wire harness or connector failure • Odd clutch solenoid valve failure • TCU failure
P097311	Odd Clutch Solenoid Valve Short to Ground	
P097412	Odd Clutch Solenoid Valve Short to Power Supply	
P188D04	Odd Clutch Solenoid Valve Passage Closes Unexpectedly	
P188E01	Odd Clutch Solenoid Valve Circuit Error	
P075019	Odd Clutch Solenoid Valve Feedback Current Too High	
P075318	Odd Clutch Solenoid Valve Feedback Current Too Low	

Circuit Diagram

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.

- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

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

1	**Check battery**

(a) Turn ENGINE START STOP switch to OFF.
(b) Using a multimeter, measure voltage between positive and negative battery terminals.

NG → **Replace battery**

OK →

2	**Check alternator**

(a) Check the alternator.

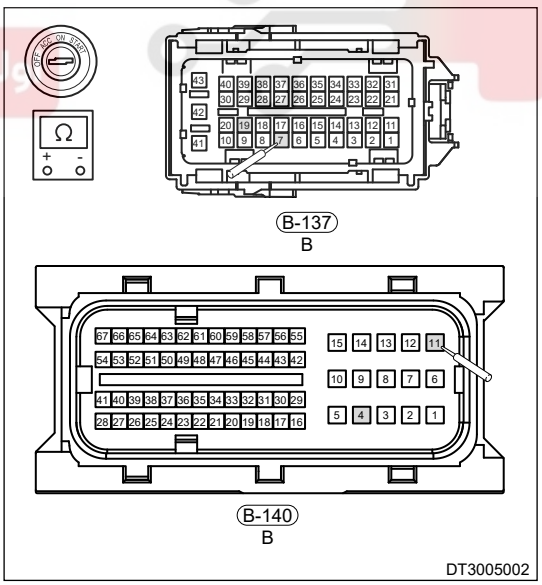
NG → **Replace alternator**

OK →

3	**Check odd clutch solenoid valve wire harness**

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.
(b) Turn ENGINE START STOP switch to OFF.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-140 (4) - B-137 (7)	Always	Less than 1 Ω
B-140 (11) - B-137 (19)	Always	Less than 1 Ω



NG → **Check and repair odd clutch solenoid valve wire harness**

OK →

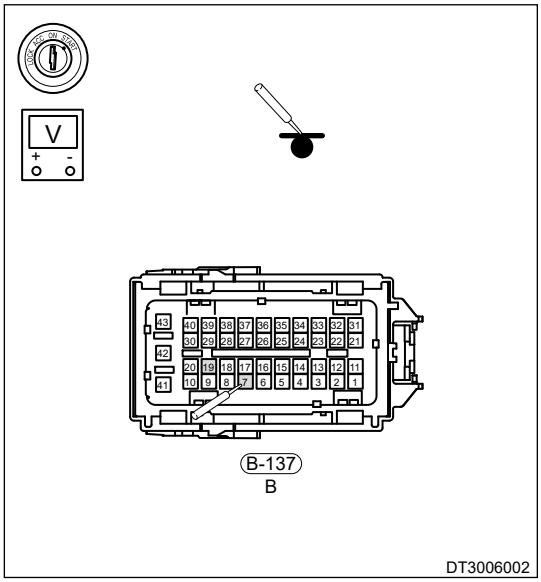
4	**Check voltage of odd clutch solenoid valve wire harness connector**

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
B-137 (19) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (7) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace solenoid valve wire harness or connector**

OK

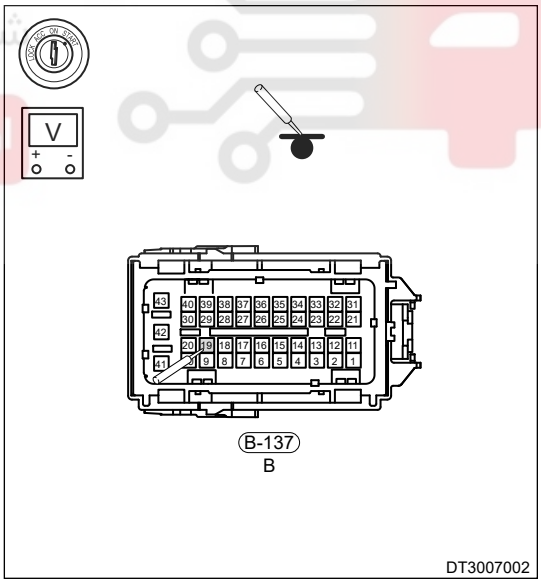
5	**Check TCU module output voltage**

(a) Connect TCU connector, disconnect connector (B-137) between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) (Online detection) Measure voltage of terminal 19 of connector B-137 between interior wire harness and transmission internal wire harness (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-137 (19) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG → **Repair or replace wire harness between B-137 (19) and TCU**

OK

6	**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.

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

NG → **Replace TCU module assembly**

Even Clutch Solenoid Valve DTCs

DTC	**P182613**	**Even Clutch Solenoid Valve Open**
DTC	**P097611**	**Even Clutch Solenoid Valve Short to Ground**
DTC	**P097712**	**Even Clutch Solenoid Valve Short to Power Supply**
DTC	**P188F04**	**Even Clutch Solenoid Valve Passage Closes Unexpectedly**
DTC	**P189001**	**Even Clutch Solenoid Valve Circuit Error**
DTC	**P075519**	**Even Clutch Solenoid Valve Feedback Current Too High**
DTC	**P075818**	**Even Clutch Solenoid Valve Feedback Current Too Low**

Description

DTC	DTC Definition	Possible Cause
P182613	Even Clutch Solenoid Valve Open	• Battery failure • Alternator failure • Wire harness or connector failure • Even clutch solenoid valve failure • TCU failure
P097611	Even Clutch Solenoid Valve Short to Ground	
P097712	Even Clutch Solenoid Valve Short to Power Supply	
P188F04	Even Clutch Solenoid Valve Passage Closes Unexpectedly	
P189001	Even Clutch Solenoid Valve Circuit Error	
P075519	Even Clutch Solenoid Valve Feedback Current Too High	
P075818	Even Clutch Solenoid Valve Feedback Current Too Low	

Circuit Diagram

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.

- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

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

1	**Check battery**

(a) Turn ENGINE START STOP switch to OFF.
(b) Using a multimeter, measure voltage between positive and negative battery terminals.

NG → **Replace battery**

OK

2	**Check alternator**

(a) Check the alternator.

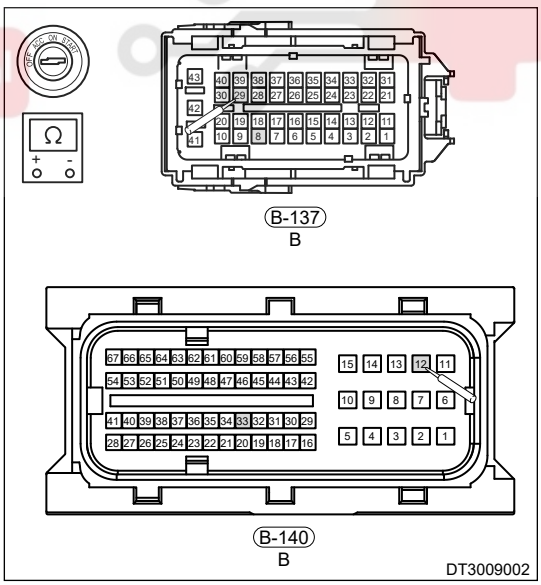
NG → **Replace alternator**

OK

3	**Check even clutch solenoid valve wire harness**

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.
(b) Turn ENGINE START STOP switch to OFF.
(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-140 (12) - B-137 (29)	Always	Less than 1 Ω
B-140 (33) - B-137 (8)	Always	Less than 1 Ω



NG → **Repair or replace even clutch solenoid valve wire harness**

OK

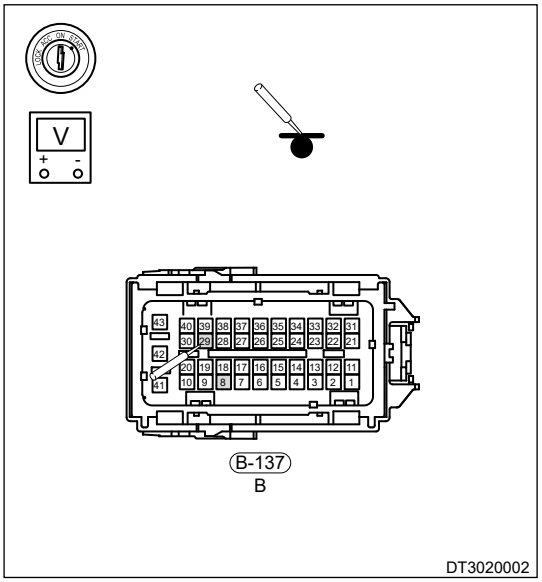
4	**Check voltage of even clutch solenoid valve wire harness connector**

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
B-137 (29) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (8) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace even clutch solenoid valve wire harness**

OK

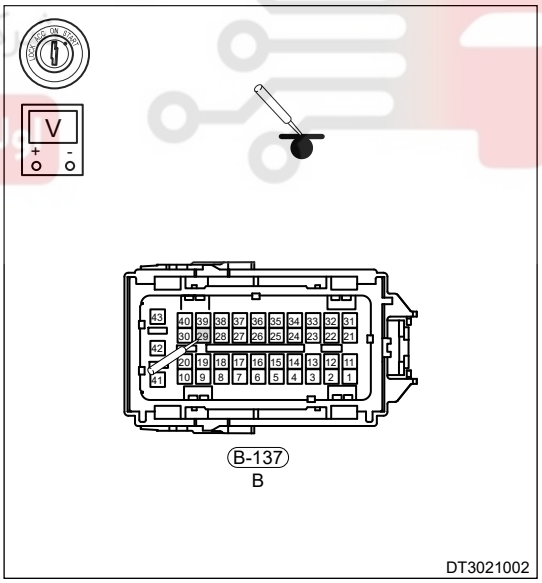
5	Check TCU module output voltage

(a) Connect TCU connector, disconnect connector (B-137) between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) (Online detection) Measure voltage of terminal 29 of connector B-137 between interior wire harness and transmission internal wire harness (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-137 (29) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG → **Repair or replace wire harness between B-137 (29) and TCU**

OK

6	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.

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

NG → **Replace TCU module assembly**

Odd Clutch Pressure Sensor DTCs

DTC	**P084214**	**Odd Clutch Pressure Sensor Short to Ground or Open**
DTC	**P084312**	**Odd Clutch Pressure Sensor Short to Power Supply**

Description

DTC	DTC Definition	Possible Cause
P084214	Odd Clutch Pressure Sensor Short to Ground or Open	• Battery failure • Alternator failure • Wire harness or connector failure • Odd clutch pressure sensor failure • TCU failure
P084312	Odd Clutch Pressure Sensor Short to Power Supply	

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Hint:

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

1	**Check battery**

(a) Turn ENGINE START STOP switch to OFF.

(b) Using a multimeter, measure voltage between positive and negative battery terminals.

NG → **Replace battery**

OK

2	**Check alternator**

(a) Check the alternator.

NG → **Replace alternator**

OK

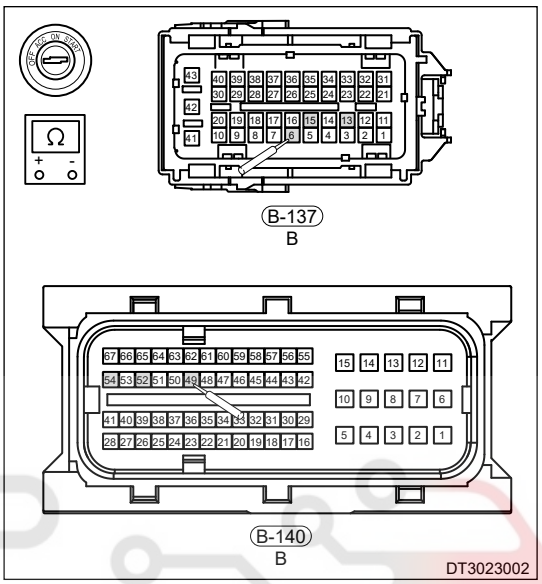
3	Check odd clutch pressure sensor wire harness

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to OFF.

(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-140 (49) - B-137 (15)	Always	Less than 1 Ω
B-140 (52) - B-137 (6)	Always	Less than 1 Ω
B-140 (54) - B-137 (13)	Always	Less than 1 Ω



NG → **Repair or replace odd clutch pressure sensor wire harness or connector**

OK

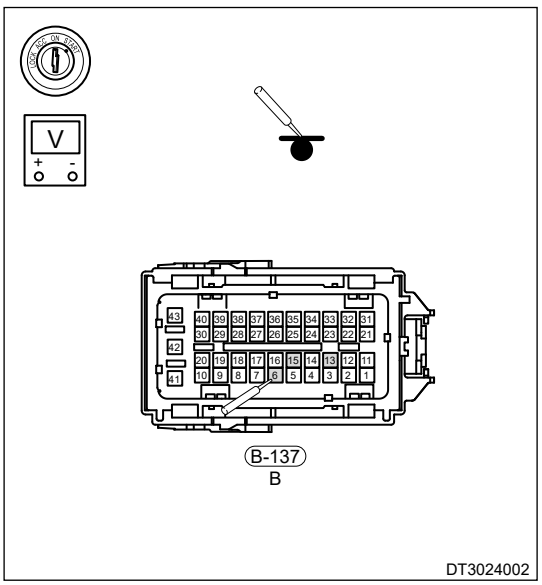
4	Check voltage of odd clutch pressure sensor wire harness connector

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
B-137 (15) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (13) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (6) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace odd clutch pressure sensor wire harness or connector**

OK

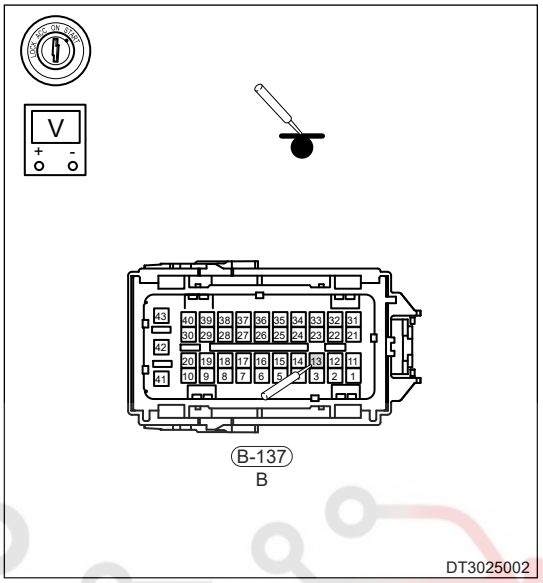
5	Check TCU module output voltage

(a) Connect TCU connector, disconnect connector (B-137) between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) (Online detection) Measure voltage of terminal 13 of connector B-137 between interior wire harness and transmission internal wire harness (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-137 (13) - Body ground	ENGINE START STOP switch ON	Not less than 5V



NG → **Repair or replace wire harness or connector between B-137 (13) and TCU**

OK

6	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.

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

NG → **Replace TCU module assembly**

Even Clutch Pressure Sensor DTCs

DTC	**P084714**	**Even Clutch Pressure Sensor Short to Ground or Open**
DTC	**P084812**	**Even Clutch Pressure Sensor Short to Power Supply**

Description

DTC	DTC Definition	Possible Cause
P084714	Even Clutch Pressure Sensor Short to Ground or Open	• Battery failure • Alternator failure • Wire harness or connector failure • Even clutch pressure sensor failure • TCU failure
P084812	Even Clutch Pressure Sensor Short to Power Supply	

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

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

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

1	**Check battery**

(a) Turn ENGINE START STOP switch to OFF.
(b) Using a multimeter, measure voltage between positive and negative battery terminals.

NG → **Replace battery**

OK

2	**Check alternator**

(a) Check the alternator.

NG → **Replace alternator**

OK

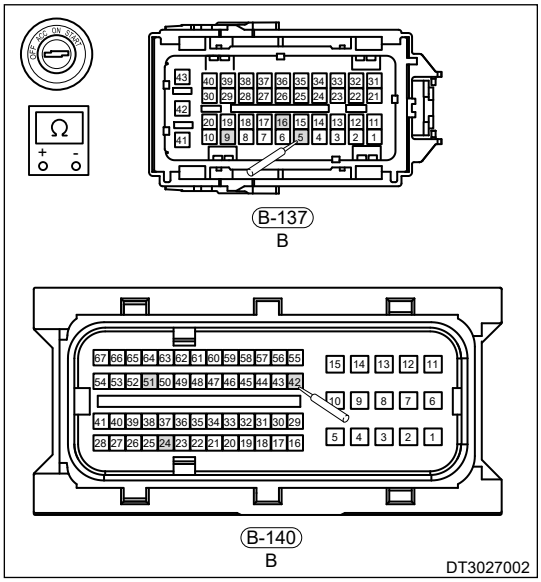
3	**Check even clutch pressure sensor wire harness**

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to OFF.

(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-140 (24) - B-137 (5)	Always	Less than 1 Ω
B-140 (51) - B-137 (16)	Always	Less than 1 Ω
B-140 (42) - B-137 (9)	Always	Less than 1 Ω



NG → **Repair or replace even clutch pressure sensor wire harness or connector**

OK ↓

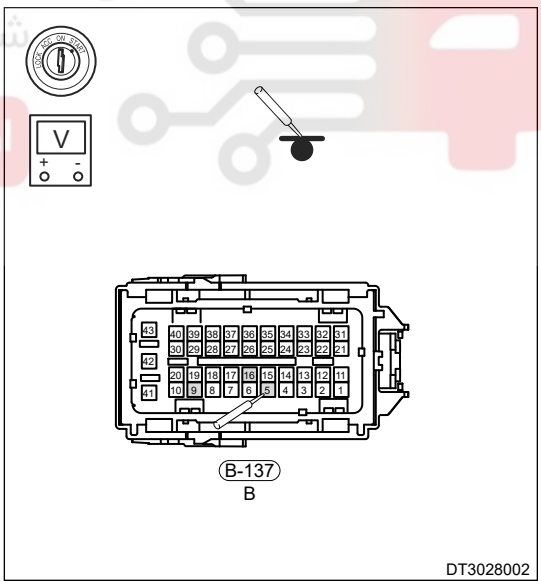
4	**Check voltage of even clutch pressure sensor wire harness connector**

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
B-137 (16) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (9) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (5) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace even clutch pressure sensor wire harness or connector**

OK ↓

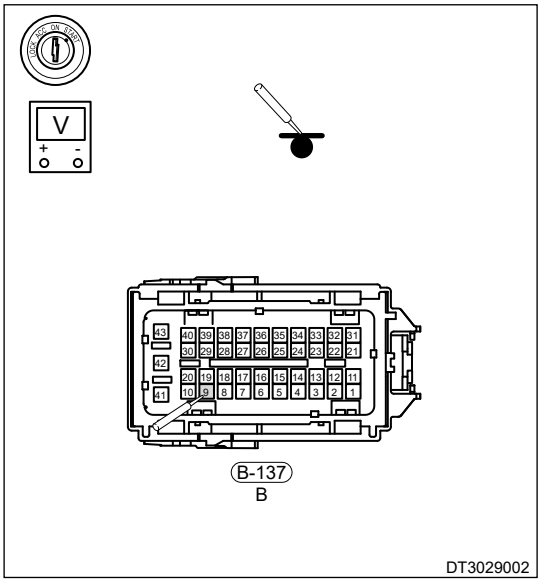
5	**Check TCU module output voltage**

(a) Connect TCU connector, disconnect connector (B-137) between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) (Online detection) Measure voltage of terminal 9 of connector B-137 between interior wire harness and transmission internal wire harness (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-137 (9) - Body ground	ENGINE START STOP switch ON	Not less than 5V



NG → **Repair or replace wire harness or connector between B-137 (9) and TCU**

OK →

6	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.

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

NG → **Replace TCU module assembly**

1st/5th Gear Shift Solenoid Valve DTCs

DTC	**P186213**	**1st/5th Gear Flow Solenoid Valve Open**
DTC	**P099B11**	**1st/5th Gear Flow Solenoid Valve Short to Ground**
DTC	**P099C12**	**1st/5th Gear Flow Solenoid Valve Short to Power Supply**
DTC	**P189904**	**1st/5th Gear Flow Solenoid Valve Passage Closes Unexpectedly**
DTC	**P189A01**	**1st/5th Gear Flow Solenoid Valve Circuit Error**
DTC	**P075A19**	**1st/5th Gear Flow Solenoid Valve Feedback Current Too High**
DTC	**P075D18**	**1st/5th Gear Flow Solenoid Valve Feedback Current Too Low**

Description

DTC	DTC Definition	Possible Cause
P186213	1st/5th Gear Flow Solenoid Valve Open	• Battery failure • Alternator failure • Wire harness or connector failure • TCU failure
P099B11	1st/5th Gear Flow Solenoid Valve Short to Ground	
P099C12	1st/5th Gear Flow Solenoid Valve Short to Power Supply	
P189904	1st/5th Gear Flow Solenoid Valve Passage Closes Unexpectedly	
P189A01	1st/5th Gear Flow Solenoid Valve Circuit Error	
P075A19	1st/5th Gear Flow Solenoid Valve Feedback Current Too High	
P075D18	1st/5th Gear Flow Solenoid Valve Feedback Current Too Low	

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Hint:

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

1	**Check battery**

(a) Turn ENGINE START STOP switch to OFF.

(b) Using a multimeter, measure voltage between positive and negative battery terminals.

NG → **Replace battery**

OK

2	**Check alternator**

(a) Check the alternator.

NG → **Replace alternator**

OK

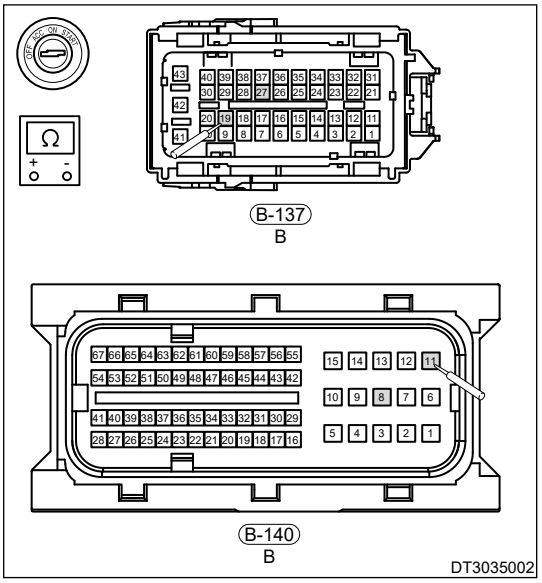
3	Check 1st/5th gear shift solenoid valve wire harness

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to OFF.

(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-140 (8) - B-137 (27)	Always	Less than 1 Ω
B-140 (11) - B-137 (19)	Always	Less than 1 Ω



NG → **Check and repair 1st/5th gear shift solenoid valve wire harness**

OK

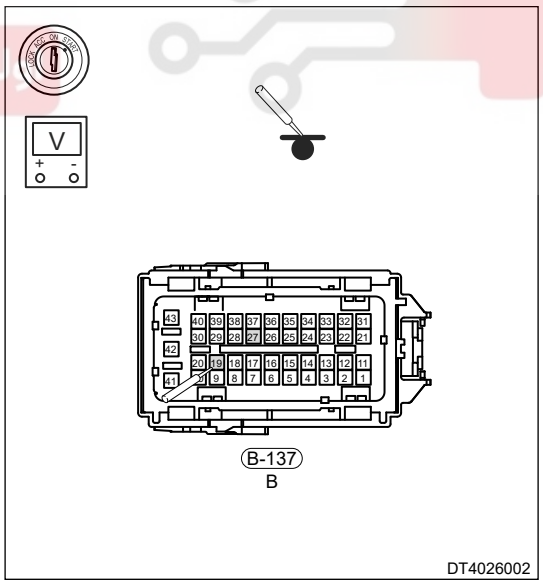
4	Check voltage of 1st/5th gear shift solenoid valve wire harness connector

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
B-137 (19) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (27) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace 1st/5th gear shift solenoid valve wire harness or connector**

OK

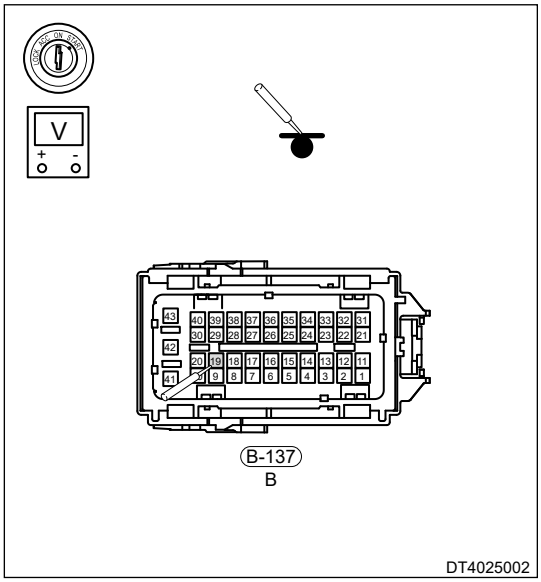
5	Check TCU module output voltage

(a) Connect TCU connector, disconnect connector (B-137) between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) (Online detection) Measure voltage of terminal 19 of connector B-137 between interior wire harness and transmission internal wire harness (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-137 (19) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG → **Repair or replace wire harness or connector between B-137 (19) and TCU**

OK →

6	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.

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

NG → **Replace TCU control module assembly**

3rd/7th Gear Shift Solenoid Valve DTCs

DTC	**P186313**	**3rd/7th Gear Flow Solenoid Valve Open**
DTC	**P099F11**	**3rd/7th Gear Fork Position Sensor Short to Ground**
DTC	**P099F12**	**3rd/7th Gear Flow Solenoid Valve Short to Power Supply**
DTC	**P189B04**	**3rd/7th Gear Flow Solenoid Valve Passage Closes Unexpectedly**
DTC	**P189C01**	**3rd/7th Gear Flow Solenoid Valve Circuit Error**
DTC	**P076A19**	**3rd/7th Gear Flow Solenoid Valve Feedback Current Too High**
DTC	**P076D18**	**3rd/7th Gear Flow Solenoid Valve Feedback Current Too Low**

Description

DTC	DTC Definition	Possible Cause
P186313	3rd/7th Gear Flow Solenoid Valve Open	• Battery failure • Alternator failure • Wire harness or connector failure • TCU failure
P099F11	3rd/7th Gear Fork Position Sensor Short to Ground	
P099F12	3rd/7th Gear Flow Solenoid Valve Short to Power Supply	
P189B04	3rd/7th Gear Flow Solenoid Valve Passage Closes Unexpectedly	
P189C01	3rd/7th Gear Flow Solenoid Valve Circuit Error	
P076A19	3rd/7th Gear Flow Solenoid Valve Feedback Current Too High	
P076D18	3rd/7th Gear Flow Solenoid Valve Feedback Current Too Low	

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Hint:

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

1	**Check battery**

(a) Turn ENGINE START STOP switch to OFF.

(b) Using a multimeter, measure voltage between positive and negative battery terminals.

NG → **Replace battery**

OK

2	**Check alternator**

(a) Check the alternator.

NG → **Replace alternator**

OK

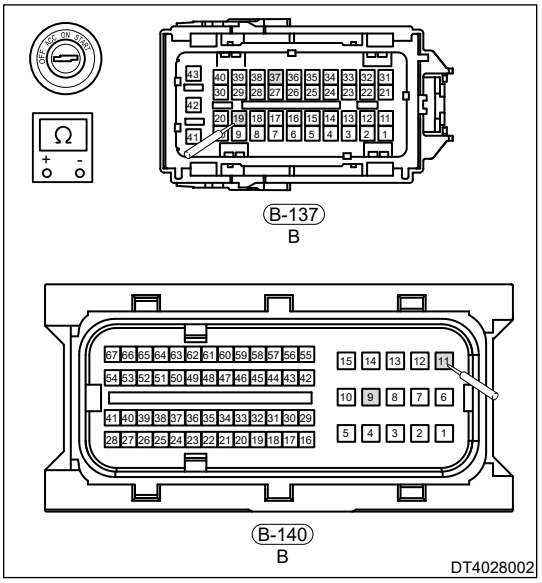
3	Check 3rd/7th gear shift solenoid valve wire harness

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to OFF.

(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-140 (9) - B-137 (37)	Always	Less than 1 Ω
B-140 (11) - B-137 (19)	Always	Less than 1 Ω



NG → **Repair or replace 3rd/7th gear shift solenoid valve wire harness or connector**

OK

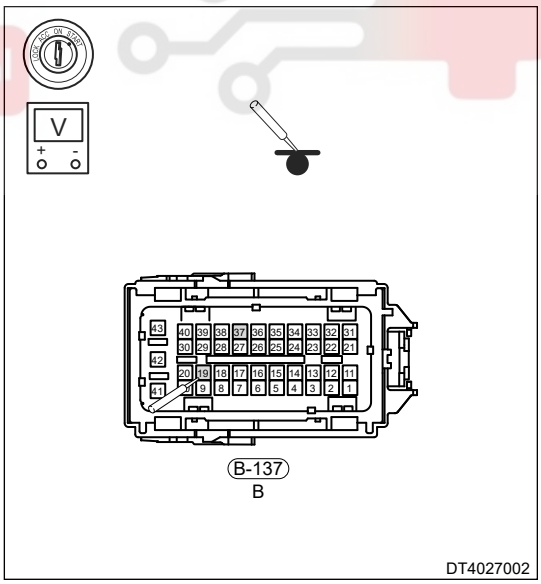
4	Check voltage of 3rd/7th gear shift solenoid valve wire harness connector

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
B-137 (19) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (37) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace 3rd/7th gear shift solenoid valve wire harness or connector**

OK

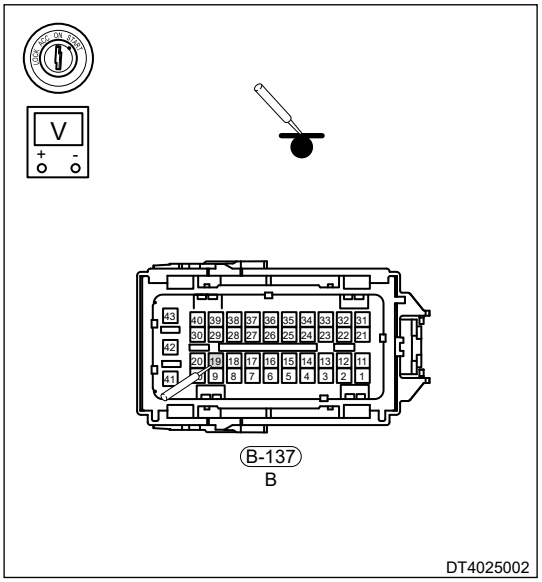
5	Check TCU module output voltage

(a) Connect TCU connector, disconnect connector (B-137) between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) (Online detection) Measure voltage of terminal 19 of connector B-137 between interior wire harness and transmission internal wire harness (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-137 (19) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG → **Repair or replace wire harness or connector between B-137 (19) and TCU**

OK →

6	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.

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

NG → **Replace TCU control module assembly**

2nd/6th Gear Shift Solenoid Valve DTCs

DTC	**P183013**	**2nd/6th Gear Flow Solenoid Valve Open**
DTC	**P099411**	**2nd/6th Gear Flow Solenoid Valve Short to Ground**
DTC	**P099512**	**2nd/6th Gear Flow Solenoid Valve Short to Power Supply**
DTC	**P189704**	**2nd/6th Gear Flow Solenoid Valve Passage Closes Unexpectedly**
DTC	**P189801**	**2nd/6th Gear Flow Solenoid Valve Circuit Error**
DTC	**P270619**	**2nd/6th Gear Flow Solenoid Valve Feedback Current Too High**
DTC	**P270918**	**2nd/6th Gear Flow Solenoid Valve Feedback Current Too Low**

Description

DTC	DTC Definition	Possible Cause
P183013	2nd/6th Gear Flow Solenoid Valve Open	• Battery failure • Alternator failure • Wire harness or connector failure • TCU failure
P099411	2nd/6th Gear Flow Solenoid Valve Short to Ground	
P099512	2nd/6th Gear Flow Solenoid Valve Short to Power Supply	
P189704	2nd/6th Gear Flow Solenoid Valve Passage Closes Unexpectedly	
P189801	2nd/6th Gear Flow Solenoid Valve Circuit Error	
P270619	2nd/6th Gear Flow Solenoid Valve Feedback Current Too High	
P270918	2nd/6th Gear Flow Solenoid Valve Feedback Current Too Low	

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Hint:

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

1	**Check battery**

(a) Turn ENGINE START STOP switch to OFF.

(b) Using a multimeter, measure voltage between positive and negative battery terminals.

NG → **Replace battery**

OK

2	**Check alternator**

(a) Check the alternator.

NG → **Replace alternator**

OK

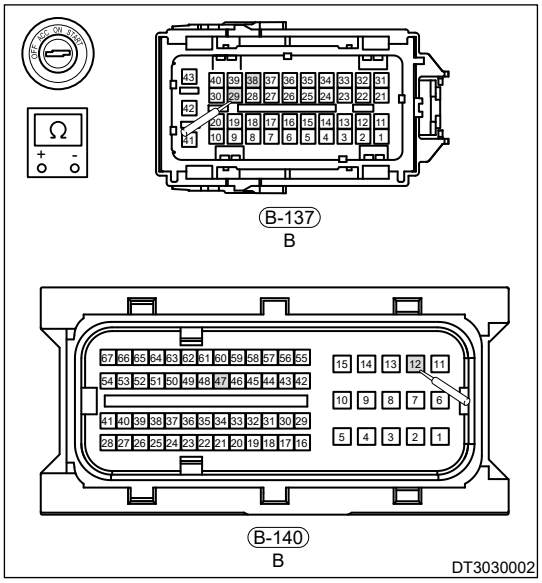
3	Check 2nd/6th gear shift solenoid valve wire harness

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to OFF.

(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-140 (47) - B-137 (38)	Always	Less than 1 Ω
B-140 (12) - B-137 (29)	Always	Less than 1 Ω



NG → **Repair or replace 2nd/6th gear shift solenoid valve wire harness or connector**

OK

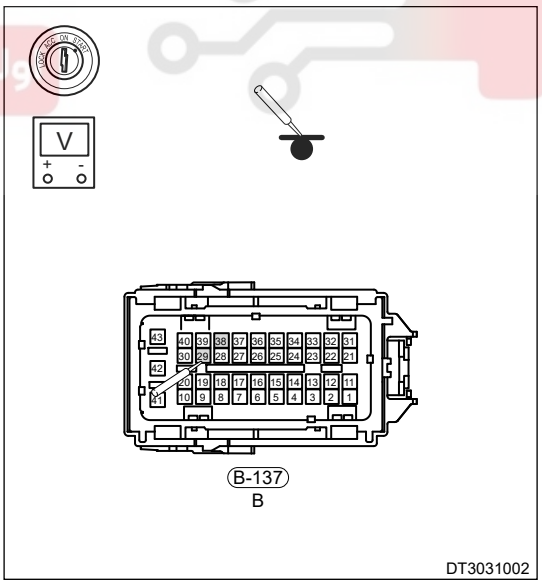
4	Check voltage of 2nd/6th gear shift solenoid valve wire harness connector

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
B-137 (29) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (38) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair or replace 2nd/6th gear shift solenoid valve wire harness or connector**

OK

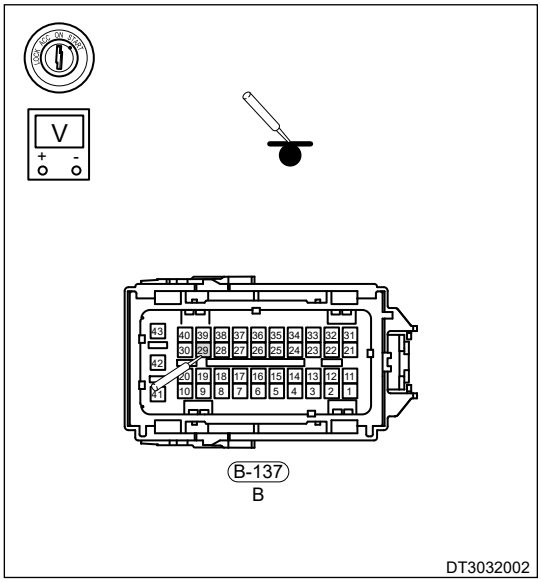
5	Check TCU module output voltage

(a) Connect TCU connector, disconnect connector (B-137) between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) (Online detection) Measure voltage of terminal 29 of connector B-137 between interior wire harness and transmission internal wire harness (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-137 (29) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG → **Repair or replace wire harness or connector between B-137 (29) and TCU**

OK →

6	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.

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

NG → **Replace TCU module assembly**

4th/R Gear Shift Solenoid Valve DTCs

DTC	**P182913**	**4th/R Gear Flow Solenoid Valve Open**
DTC	**P098511**	**4th/R Gear Flow Solenoid Valve Short to Ground**
DTC	**P098612**	**4th/R Gear Flow Solenoid Valve Short to Power Supply**
DTC	**P189504**	**4th/R Gear Flow Solenoid Valve Passage Closes Unexpectedly**
DTC	**P189601**	**4th/R Gear Flow Solenoid Valve Circuit Error**
DTC	**P077019**	**4th/R Gear Flow Solenoid Valve Feedback Current Too High**
DTC	**P077318**	**4th/R Gear Flow Solenoid Valve Feedback Current Too Low**

Description

DTC	DTC Definition	Possible Cause
P182913	4th/R Gear Flow Solenoid Valve Open	• Battery failure • Alternator failure • Wire harness or connector failure • TCU failure
P098511	4th/R Gear Flow Solenoid Valve Short to Ground	
P098612	4th/R Gear Flow Solenoid Valve Short to Power Supply	
P189504	4th/R Gear Flow Solenoid Valve Passage Closes Unexpectedly	
P189601	4th/R Gear Flow Solenoid Valve Circuit Error	
P077019	4th/R Gear Flow Solenoid Valve Feedback Current Too High	
P077318	4th/R Gear Flow Solenoid Valve Feedback Current Too Low	

DTC Confirmation Procedure

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

- Turn ENGINE START STOP switch to ON.
- Connect diagnostic tester (the latest software) to Data Link Connector (DLC).
- Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- If DTC cannot be cleared, malfunction is current.
- Only use a digital multimeter to measure voltage of electronic system.
- Refer to any Technical Bulletin that may apply to this malfunction.
- Visually check the related wire harness.
- Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

Hint:

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

1	**Check battery**

(a) Turn ENGINE START STOP switch to OFF.

(b) Using a multimeter, measure voltage between positive and negative battery terminals.

NG → **Replace battery**

OK ↓

2	**Check alternator**

(a) Check the alternator.

NG → **Replace alternator**

OK ↓

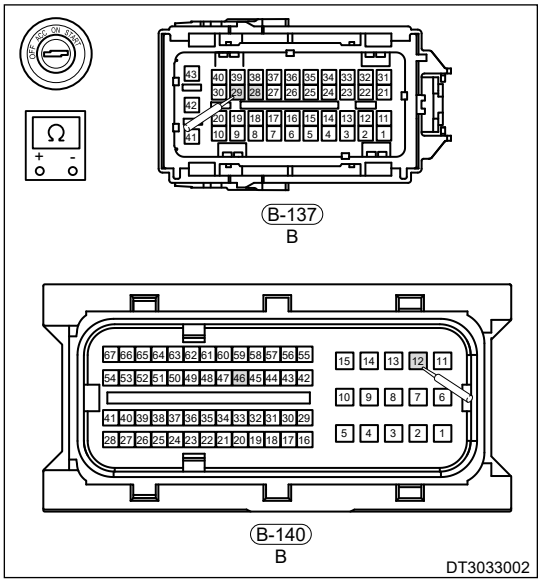
3	Check 4th/R gear shift solenoid valve wire harness

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to OFF.

(c) Perform the resistance inspection.

Multimeter Connection	Condition	Specified Condition
B-140 (46) - B-137 (28)	Always	Less than 1 Ω
B-140 (12) - B-137 (29)	Always	Less than 1 Ω



NG → **Repair or replace 4th/R gear shift solenoid valve wire harness or connector**

OK

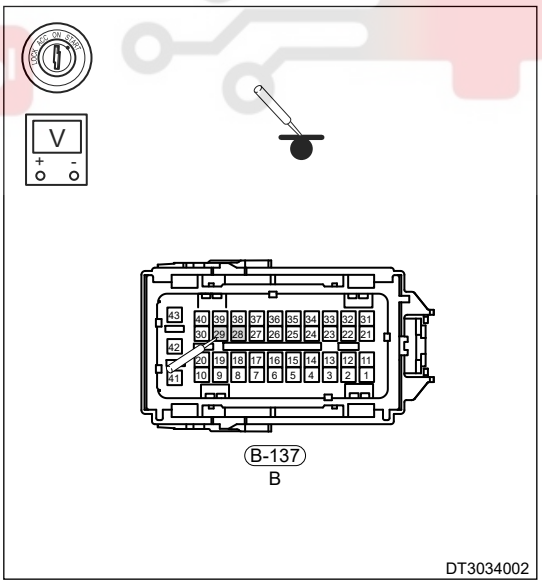
4	Check voltage of 4th/R gear shift solenoid valve wire harness connector

(a) Disconnect TCU connector, connector between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) Perform the voltage inspection.

Multimeter Connection	Condition	Specified Condition
B-137 (29) - Body ground	ENGINE START STOP switch ON	0 V
B-137 (28) - Body ground	ENGINE START STOP switch ON	0 V



NG → **Repair short failure to power supply in 4th/R shift solenoid valve wire harness**

OK

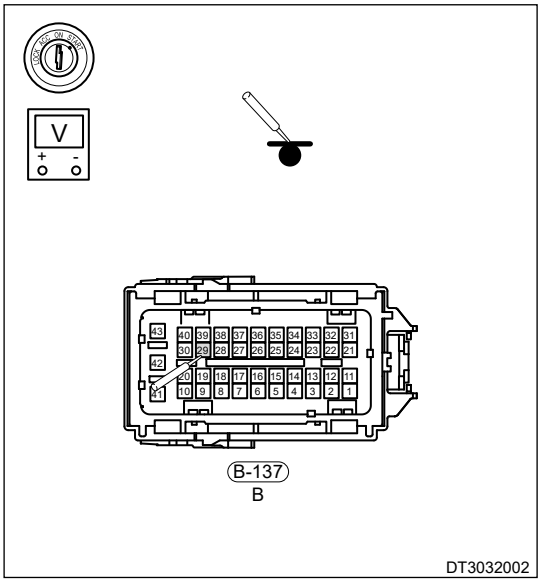
5	Check TCU module output voltage

(a) Connect TCU connector, disconnect connector (B-137) between interior wire harness and transmission internal wire harness.

(b) Turn ENGINE START STOP switch to ON.

(c) (Online detection) Measure voltage of terminal 29 of connector B-137 between interior wire harness and transmission internal wire harness (using a digital multimeter).

Multimeter Connection	Condition	Specified Condition
B-154 (29) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG → **Check and repair wire harness between B-137 (29) and TCU**

OK

6	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.

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

NG → **Replace TCU module assembly**

Hydraulic Parking System DTCs

DTC	P282413	E-park Hydraulic Valve Open
DTC	P282712	E-park Hydraulic Valve Short to Power Supply
DTC	P282611	E-park Hydraulic Valve Short to Ground
DTC	P282F11	E-park Safety Valve Short to Ground
DTC	P283012	E-park Safety Valve Short to Power Supply
DTC	P282D13	E-park Safety Valve Open
DTC	P187115	E-park Position Sensor Short to Power Supply or Open
DTC	P187811	E-park Position Sensor Short to Ground

DTC	DTC Definition	Possible Cause
P282413	E-park Hydraulic Valve Open	• TCU failure • Vehicle power supply system (battery) failure • Transmission failure
P282712	E-park Hydraulic Valve Short to Power Supply	
P282611	E-park Hydraulic Valve Short to Ground	
P282F11	E-park Safety Valve Short to Ground	
P283012	E-park Safety Valve Short to Power Supply	
P282D13	E-park Safety Valve Open	
P187115	E-park Position Sensor Short to Power Supply or Open	
P187811	E-park Position Sensor Short to Ground	

1	**Confirm and clear DTCs**

(a) Malfunction indicator comes on, connect diagnostic tester to vehicle; Confirm and record fault codes and related fault freeze frames; Clear the fault codes.

Next → **Perform rode test**

DTCs recur

2	**Perform battery power supply inspection**

(a) Check battery voltage and check if connecting wire is loose.

NG → **Replace battery or secure connecting wire**

OK

3	**Check resistance between wire harness and ground wire**

(a) Disconnect TCU connector, measure resistance between wire harness and ground wire through female terminal.

NG → **Check and repair wire harness or connector**

OK

4	**Check resistance between transmission internal wire harness and ground wire**

(a) Check resistance between transmission internal wire harness and ground wire.

OK → **Connector intermittent contact fault exists**

NG

5	**Replace vehicle wire harness or connector**

(a) Replace vehicle wire harness or connector.

Fault is solved → **Perform rode test and delivery**

Fault is not solved

6	**Replace TCU**

(a) Replace the TCU.

Fault is solved → **Confirm and replace TCU**

Fault is not solved

7	**Replace transmission case (transmission internal wire harness fault)**

Shift Fault DTCs

DTC	DTC Definition	Possible Cause
P181077, P181177, P181277, P181377, P181477, P181577, P181677, P181777, P181877, P181977, P182077, P182177, P182277, P182377, P186077, P186177, P190607, P190707, P190807, P190907	Shifting In/Shifting Out Failure	• TCU failure • Transmission failure

1	**Confirm and clear DTCs**

(a) Malfunction indicator comes on, connect diagnostic tester to vehicle; Confirm and record fault codes and related fault freeze frames; Clear the fault codes.

Next → **Perform rode test**

DTCs recur

2	**Check transmission oil**

(a) Check transmission oil level and whether there are impurities.

NG → **Replace transmission oil**

OK ↓

3	**Check TCU**

(a) Perform road test after replacing TCU.

OK → **Replace TCU**

NG ↓

4	**Check each solenoid valve**

(a) Disconnect transmission terminal connector, measure resistance between wire harness and ground wire through male terminal.

NG → **Replace hydraulic system**

OK ↓

5	**Check fork position sensor**

(a) Check fork position sensor.

NG → **Repair or replace as necessary**

OK ↓

6	**If transmission fork or synchronizer, or engagement teeth is damaged, replace transmission case**

Simultaneous Gears Engagement DTCs

DTC	**P089392**	**Odd Shaft Multi-gear Engagement Failure**
DTC	**P182492**	**Even Shaft Multi-gear Engagement Failure**

DTC	DTC Definition	Possible Cause
P089392	Odd Shaft Multi-gear Engagement Failure	• TCU failure • Transmission failure
P182492	Even Shaft Multi-gear Engagement Failure	

1	**Confirm and clear DTCs**

(a) Malfunction indicator comes on, connect diagnostic tester to vehicle; Confirm and record fault codes and related fault freeze frames; Clear the fault codes.

OK

2	**When multi-gear engagement fault occurs, front wheel of vehicle will be locked and cannot be pulled properly. The following operations can be repeated unless serious faults cause multi-gear engagement:**

(a) Shift to P and stall, then remove the key;
(b) Turn engine switch on, switch from P to N gear and observe whether there is Gear light on the instrument panel;
(c) If Gear light is still on, repeat steps 1 and 2 3 times

•

Gear light goes off → **Connector intermittent contact fault exists, and check connector pins**

Gear light does not go off

3	**Check TCU**

(a) Perform road test after replacing TCU.

DTCs do not recur → **Replace TCU**

DTC occurs

4	**Check corresponding fork position sensor**

(a) Disconnect transmission terminal connector, measure resistance between wire harness and ground wire through male terminal.

NG → **Repair or replace as necessary**

OK

5	**Check fork position sensor**

(a) Check fork position sensor.

NG → **Repair or replace as necessary**

OK

6	**Check solenoid valve related to shifting**

(a) Check solenoid valve related to shifting.

NG → **Replace hydraulic system**

Unexpected Shifting Out DTCs

DTC	**P185007**	**Unexpected Shifting Out on Odd Shaft**
DTC	**P185107**	**Unexpected Shifting Out on Even Shaft**

DTC	DTC Definition	Possible Cause
P185007	Unexpected Shifting Out on Odd Shaft	• TCU failure • Transmission failure
P185107	Unexpected Shifting Out on Even Shaft	

1	**Confirm and clear DTCs**

(a) Malfunction indicator comes on, connect diagnostic tester to vehicle; Confirm and record fault codes and related fault freeze frames; Clear the fault codes.

Next

2	**Perform rode test**

No DTC → **Connector intermittent contact fault exists, and check connector pins**

DTC occurs

3	**Check transmission oil**

(a) Check transmission oil level and whether there are impurities.

NG → **Replace transmission oil**

OK

4	**Check TCU**

(a) Perform road test after replacing TCU.

No DTC → **Replace TCU**

DTC occurs

5	**Replace transmission case**

Drive Ratio Not Matched DTCs

DTC	**P180564**	**Odd Shaft Drive Ratio Not Matched**
DTC	**P180664**	**Even Shaft Drive Ratio Not Matched**

DTC	DTC Definition	Possible Cause
P180564	Odd Shaft Drive Ratio Not Matched	• TCU failure • Transmission failure
P180664	Even Shaft Drive Ratio Not Matched	

1	**Confirm and clear DTCs**

(a) Malfunction indicator comes on, connect diagnostic tester to vehicle; Confirm and record fault codes and related fault freeze frames; Clear the fault codes.

Next

2	**Perform rode test**

No DTC → **Connector intermittent contact fault exists, and check connector pins**

DTC occurs

3	**Check TCU software version**

(a) Check whether the TCU software version number matches the vehicle.

NG → **Refresh software**

OK

4	**Check TCU**

(a) Perform road test after replacing TCU.

No DTC → **Replace TCU**

DTC occurs

5	**Check odd/even input shaft speed sensor**

NG → **Repair or replace as necessary**

OK

6	**Check fork position sensor**

NG → **Repair or replace as necessary**

Network Malfunction

DTC	DTC Definition	Possible Cause
U010087	EMS Node Communication Missing	Network malfunction
P185107	EMS Node Communication Missing	
U012287	EMS Node Communication Missing	
U014087	BCM Node Communication Missing	
U015587	IPC Node Communication Missing	
U016487	CLM Node Communication Missing	
U040181	EMS Node Data Invalid	
U040481	EGS Node Data Invalid	
U041681	ESC Node Data Invalid	
U042281	BCM Node Data Invalid	
U042381	IPC Node Data Invalid	
U042481	CLM Node Data Invalid	

Refer to CAN Network Diagnosis

SubRom Fault DTCs

DTC	**P184809**	**SubRom Read Failure**
DTC	**P185644**	**EEPROM Checksum Failure**

DTC	DTC Definition	Possible Cause
P184809	SubRom Read Failure	• TCU failure • Wire harness or connector failure • Transmission failure
P185644	EEPROM Checksum Failure	

1	**Confirm and clear DTCs**

(a) Malfunction indicator comes on, connect diagnostic tester to vehicle; Confirm and record fault codes and related fault freeze frames; Clear the fault codes.

Next

2	**Perform rode test**

No DTC → **Connector intermittent contact fault exists, and check connector pins**

DTC occurs

3	Check TCU

(a) Read SubRom again after replacing TCU.

NG → **Replace TCU**

OK

4	Check vehicle wire harness

(a) Perform road test after replacing TCU.

NG → **Replace vehicle wire harness**

OK

5	Check connector

Clutch Fault DTCs

DTC	P081107	Excessive Clutch Slipping

DTC	DTC Definition	Possible Cause
P081107	Excessive Clutch Slipping	• TCU failure • Transmission failure

1	Confirm and clear DTCs

(a) Malfunction indicator comes on, connect diagnostic tester to vehicle; Confirm and record fault codes and related fault freeze frames; Clear the fault codes.

Next

2	Perform rode test

No DTC → **Connector intermittent contact fault exists, and check connector pins**

DTC occurs

3	Check transmission oil

(a) Check transmission oil level and whether there are impurities.

NG → **Replace transmission oil**

OK

4	**Check TCU**

(a) Perform road test after replacing TCU.

OK → **Replace TCU**

NG

5	**Check clutch speed sensor and input shaft speed sensor**

NG → **Repair or replace as necessary**

OK

6	**Check clutch solenoid valve**

NG → **Replace hydraulic system**

Clutch Fault DTCs

DTC	**P184592**	**Simultaneous Engagement Failure Occurs in Dual Clutch**

DTC	DTC Definition	Possible Cause
P184592	Simultaneous Engagement Failure Occurs in Dual Clutch	• TCU failure • Transmission failure

1	**Confirm and clear DTCs**

(a) Malfunction indicator comes on, connect diagnostic tester to vehicle; Confirm and record fault codes and related fault freeze frames; Clear the fault codes.

Next

2	**Perform rode test**

No DTC → **Connector intermittent contact fault exists, and check connector pins**

DTC occurs

3	**Check TCU**

(a) Perform road test after replacing TCU.

No DTC → **Replace TCU**

DTC occurs

4	**Check dual clutch pressure sensor**

NG → **Replace hydraulic system**

OK

5	**Replace transmission case**

Rode Test Operating Condition Table

After vehicle is repaired, perform relevant road test according to the table below and record the relevant results:

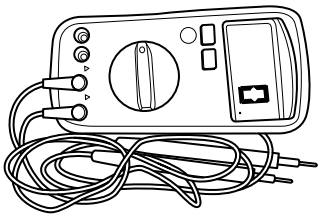
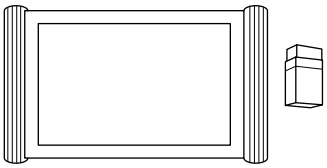
No.	Operating Condition	Test Item	Test Condition	Test Result
1	Stationary on a flat road	1.1	P->R->N->D>N->R->P (3 consecutive times, pause for 2 seconds at each gear)	/
		1.2	P->R->N->D->S-‘M+’ -> ‘M-’ -D->N->R->P (3 consecutive times, pause for 2 seconds at each gear)	/
2	Crawl starting	2.1	With shift lever in R position, brake pedal released, accelerator pedal not depressed, crawl to 5 km/h, depress the accelerator pedal slightly until speed reaches more than 12km/h, then depress brake pedal slightly	/
		2.2	With shift lever in D position, brake pedal released, accelerator pedal not depressed, crawl to 5 km/h, depress the accelerator pedal slightly until speed reaches more than 12km/h, then depress brake pedal slightly	/
3	Upshift/ downshift operation	3.1	With shift lever in D position, depress accelerator pedal in order of 1-2-3-4-5-6 to upshift, and then release the accelerator pedal in order of 6-5-4-3-2-1 to downshift	/
		3.2	With shift lever in S position, depress accelerator pedal in order of 1-2-3 to upshift, and then release accelerator pedal quickly in order of 3-2 to downshift	/
4	Simulate operating condition	4.1	Repeatedly simulate the operating condition for reported failure described by customer	/
5	Self-adaption operating condition	5.1	Turn power switch on to start engine in P gear, shift the shift lever to carry out the following crawl operation: Crawl in D gear until vehicle speed is stable and then stop it, crawl in R gear until vehicle speed is stable and then stop it, repeat this cycle 3 to 5 times.	/

No.	Operating Condition	Test Item	Test Condition	Test Result
		5.2	Use manual mode to switch to M3/M5 (M5 is recommended) for driving, make sure that small pedal opening (5% to 15%), medium opening (20% to 40%) and large opening (more than 50%) in M3/M5 all have a constant total driving time of more than 15 seconds, and repeat 3 to 5 times at each opening.	/
		5.3	Use manual mode to switch to M4/M6 (M6 is recommended) for driving, make sure that small pedal opening (5% to 15%), medium opening (20% to 40%) and large opening (more than 50%) in M4/M6 all have a constant total driving time of more than 15 seconds, and repeat 3 to 5 times at each opening.	/
		5.4	Use manual mode to drive and complete the following gear upshifting process: M1-M2-M3-M4-M5-M6-M7 (it is completed after accelerating vehicle to about 80 kph with acceleration pedal at medium lower opening), after upshifting to each gear, depress accelerator pedal at an opening of 10% to 20% for about 5 seconds, then switch to D mode for normal driving and stop vehicle, pay attention to the whole process and check if there is any fault reported. If a fault is reported, perform self-learning and clearing fault operations again, and then repeat above steps 1 to 4.	/
		5.5	After above driving, turn power supply off and lock vehicle for 1 minute (ensure that the four doors and luggage compartment door are closed), then turn power supply on and start vehicle for normal driving (drive in D mode for about 5 km), deliver vehicle to customer if there is no obvious shock, shaking, abnormal engine speed, etc.	/
		5.6	If there is any shock, shaking, abnormal speed, etc, repeat steps 1 to 5 until no obvious abnormal phenomenon occurs.	/

ON-VEHICLE SERVICE

Tools

General Tools

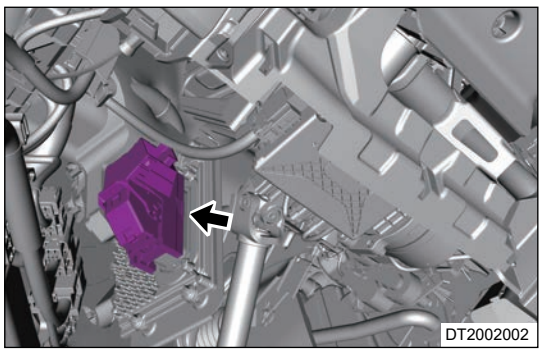
Tool Name	Tool Drawing
Digital Multimeter	 S00002
X-431 PAD Diagnostic Tester	 S00001

Replacement of TCU Module

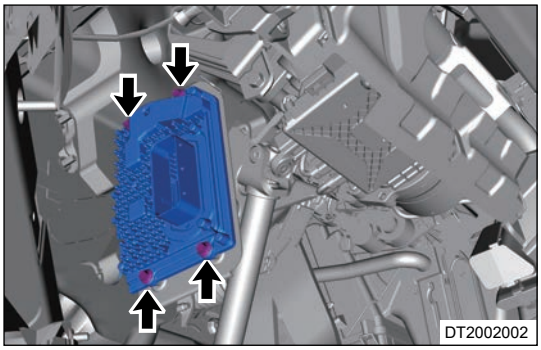
Removal

Warning
• During removal and installation of TCU, antistatic equipment should be worn to avoid damage to electronic components in TCU.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Disconnect the transmission control unit connector (arrow).


DT2002002

4. Remove 4 fixing bolts (arrow) from transmission control unit.



Installation

Caution
• TCU bolts are pre-coated parts. Residual sealant should be cleaned from threaded hole of housing before assembly. • TCU bolts are non-reusable parts, which must be replaced after each removal. • If TCU is replaced with a new one, fresh correct TCU software with diagnostic tester.

1. Install 4 fixing bolts to transmission control unit.

   Tightening torque: 8.5 - 9.5 N·m

2. Connect the transmission control unit connector.
3. Connect the negative battery cable.
4. Connect diagnostic tester, read and clear DTCs.

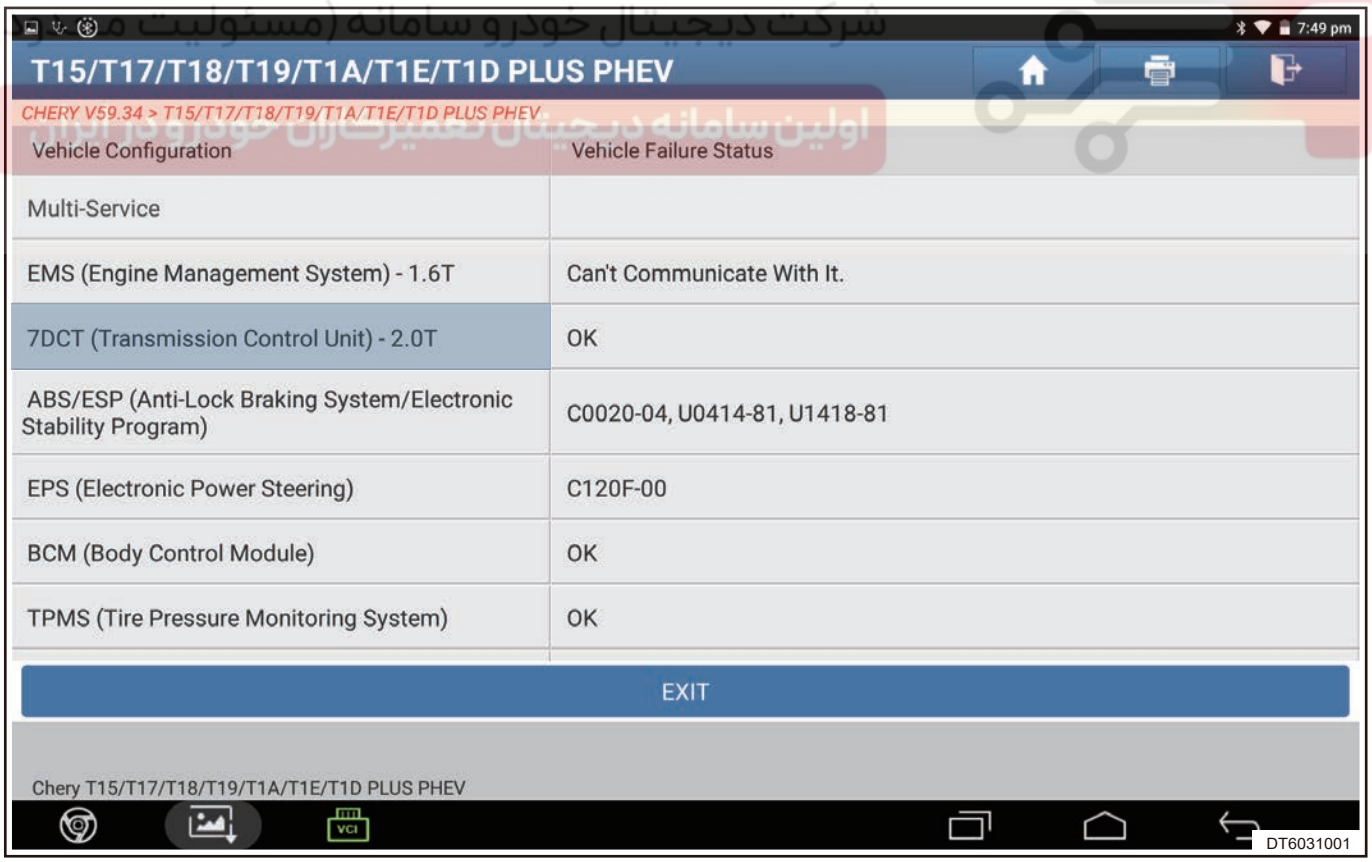
VIN Code Writing

Hint:

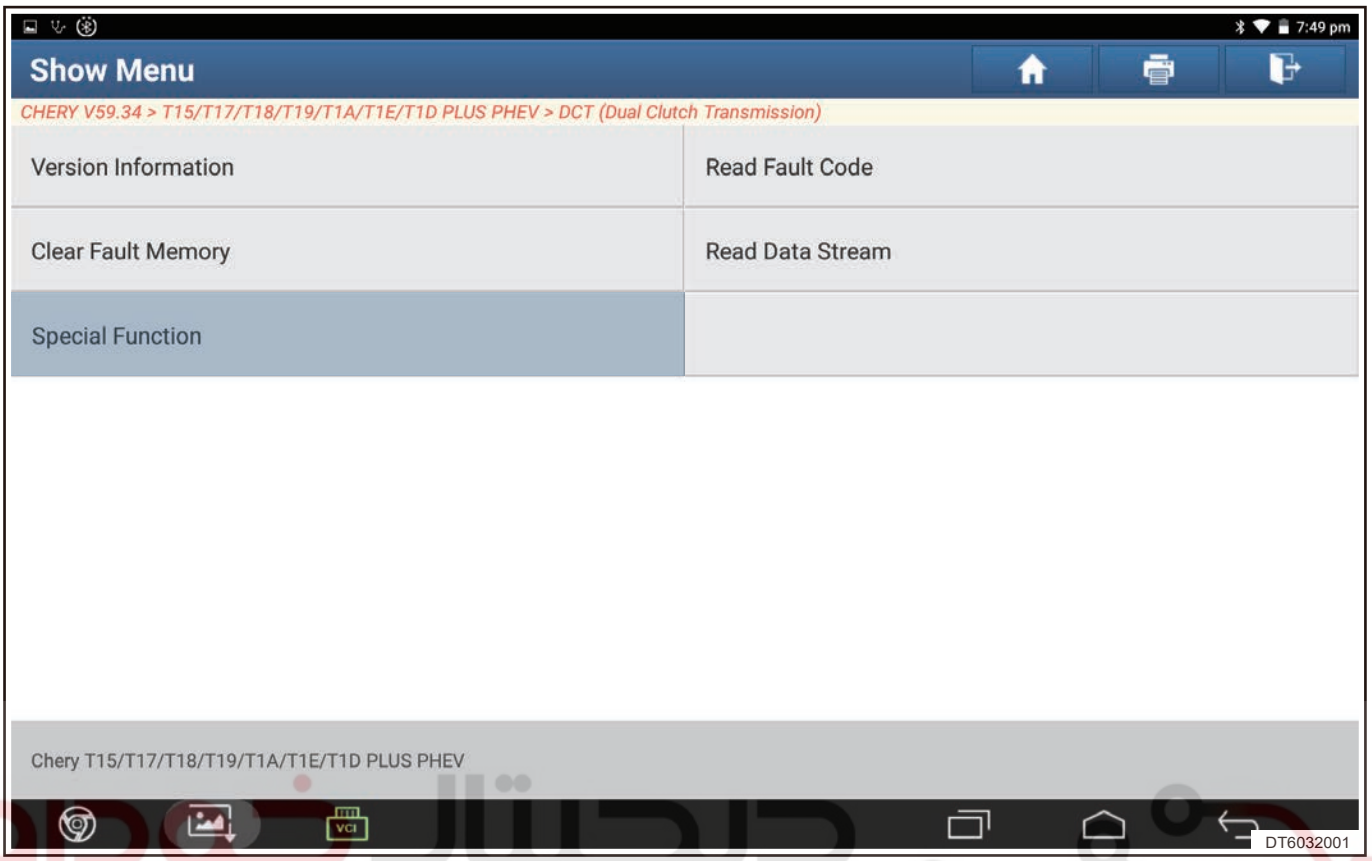
- It is necessary to perform diagnostic tester “VIN Code Writing” after replacing TCU.

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

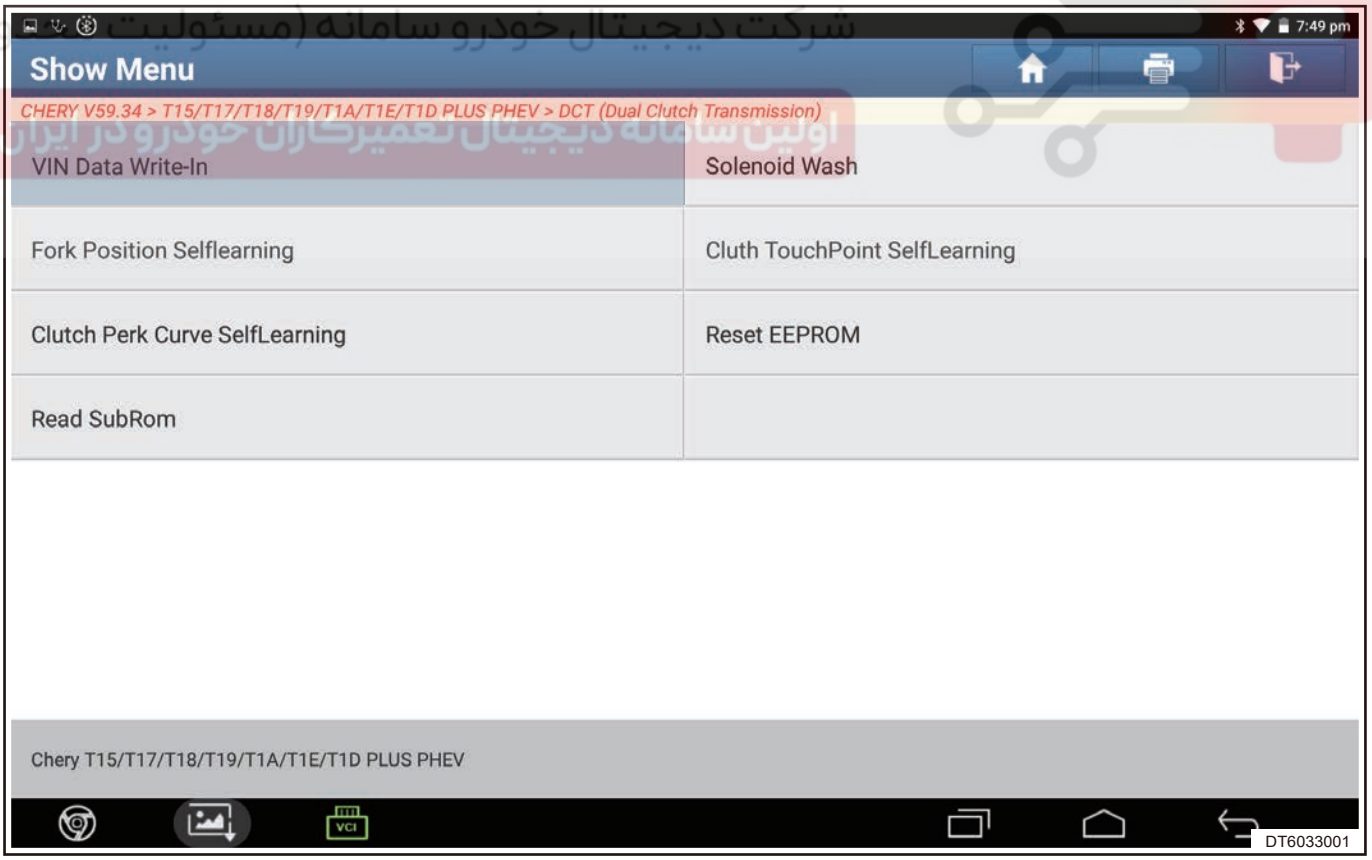
3. Enter next screen and click “TCU (Transmission Control Unit) - 2.0T”.



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

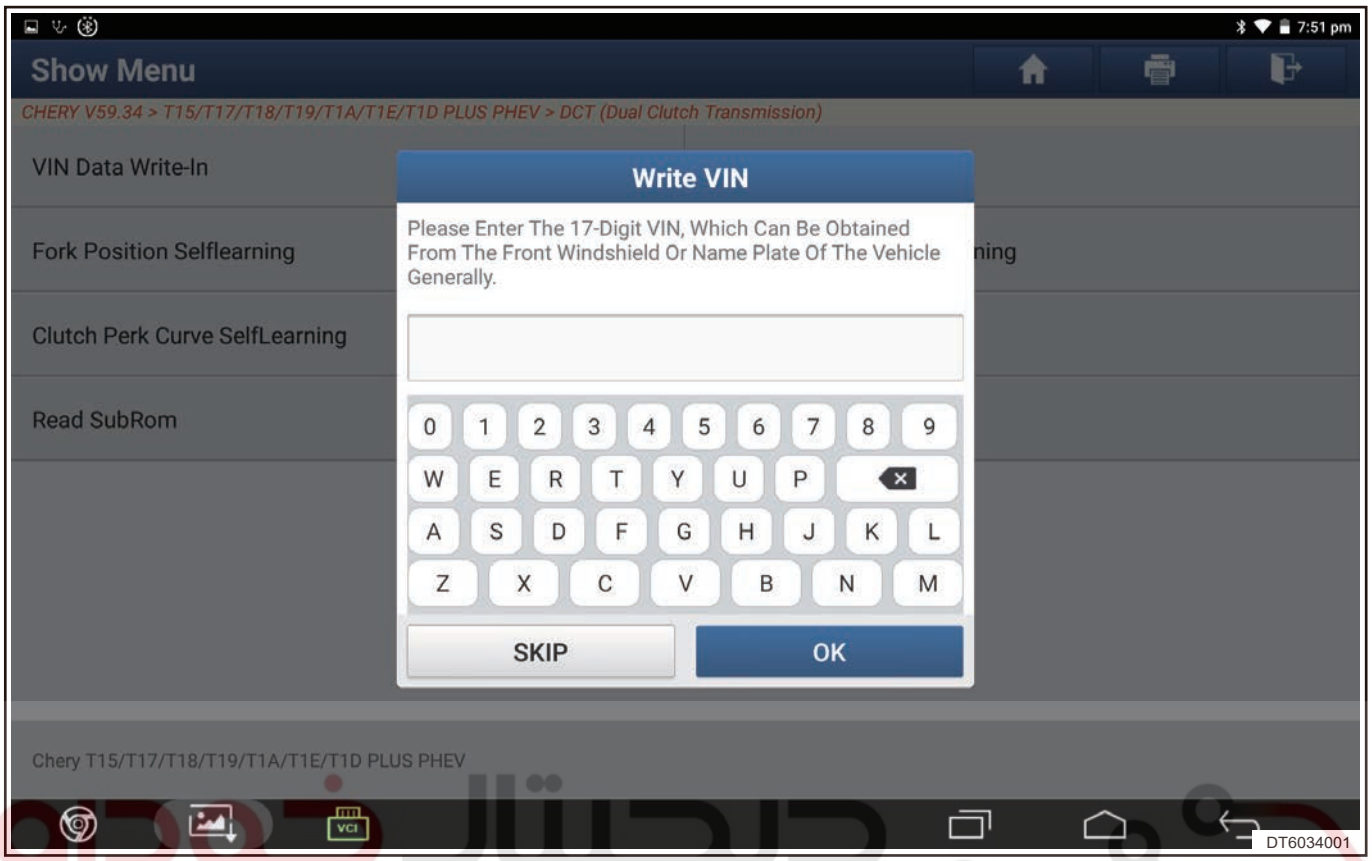


5. Enter next screen and click “VIN Data Write-in”.



6. Input a 17-digit VIN code.

05 - 738DHA TRANSMISSION



Transmission Assembly

Warnings and Precautions

Precautions

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

1. Drain bolt and oil inspection bolt are both non-reusable parts, and replace them with new ones after removal.
2. Transmission oil (Kunlun DCTF-7S) has a service life of 60,000 km.
3. The vehicle must be kept level during refilling.
4. To avoid oil contamination, the container used to store transmission oil must be a special container for (Kunlun DCTF-7S) oil (the container must not be used to store other liquids or items), and the container must be kept clean.
5. In case of oil spillage, the transmission oil needs to be added depends on the actual situation, but it must be ensured that the filled oil can make the position of oil in transmission higher than that of oil inspection bolt before adjusting oil level.
6. Transmission oil (Kunlun DCTF-7S) should be stored under 20 ℃ ± 10 ℃.
7. The oil is a part of (738DHA) transmission system. It must be sent back to manufacturer together with transmission for further analysis if required.

System Overview

System Description

The automatic transmission system is composed of transmission control module and electronic shift module etc. Electronic shift module 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. However, if there is a fault or short circuit, the electronic shift module is unable to release the current gear, we can only rely on the trailer and rescue.

Operation Principle of Clutch

Operation principle of clutch 1

- Hydraulic oil enters clutch 1 servo cylinder (clutch drum) from oil passage of clutch 1, and then hydraulic oil pushes piston of clutch 1 to compress clutch plate, connecting clutch drum with input shaft 1.
- Clutch 2 is disengaged when engaging clutch 1.

Operation principle of clutch 2

- Hydraulic oil enters clutch 2 servo cylinder (clutch drum) from oil passage of clutch 2, and then hydraulic oil pushes piston of clutch 2 to compress clutch plate, connecting clutch drum with input shaft 2.
- Clutch 1 is disengaged when engaging clutch 2.

Parameter Specifications

Transmission oil standard

1. Transmission oil selection standard:

Transmission Oil Type	Standard Capacity
Kunlun DCTF-7S	6.5 ± 0.2 L

2. Operating temperature range:
   - The normal temperature does not exceed 120℃, the transient temperature does not exceed 140℃, the performance will be affected when the ambient temperature is below -30℃ and will fail when it is below -40℃.
3. Period of replacing oil:
   - Replace the transmission oil every 60,000 km, and replace the element of filter cooling module at the same time.
4. Maintenance requirements:
   - The specified oil must be used. The other oils may cause damage to transmission. Such damage is not covered under warranty.

Caution
• The specified oil must be used. The other oils may cause damage to transmission. Such damage is not covered under warranty.

Basic Parameters

Items	Parameters
Model	738DHA
Type	Wet Dual Clutch (DCT)
Layout	Transverse front-drive
Start Clutch Device	Wet dual clutch
Dimensions (L × W × H)	372mm × 562mm × 466mm
Weight (w/o Cooling Oil)	81kg
Central Distance	197.03mm
Maximum Input Speed	6500 rpm
Maximum Allowable Input Torque	380N•m
Gear Ratio Range	6.89
Maximum Pressure of Hydraulic System	26.5 bar
Operating Pressure	Minimum: 3 bar; Maximum: 26.5 bar
Cooling Type	Water cooled

Gear Ratio Parameters

Gear Position	Gear Ratio	Overall Gear Ratio
1st	3.643	17.571
2nd	2.722	10.63
3rd	1.808	7.059
4th	1.047	5.048

Gear Position	Gear Ratio	Overall Gear Ratio
5th	0.816	3.938
6th	0.791	3.087
7th	0.653	2.55
Rev	2.833	13.667
FD 1(154R)	4.824	/
FD 2 (3762)	3.905	/

Torque Specifications

Description	Specifications	Quantity	Preload (Nm)	Torque (Nm)
Hexagon Flange Bolt		12	80 ± 4 Nm + 90 ± 2°	120 - 150
Transmission Internal Wire Harness Fixing Bolt		6	2 - 3	2 - 3
Oil Level Pipe		1	3 ± 1	2 - 4
Inner TORX Hexagon Bolt M6*12	M6*12	6	8 - 10	8 - 10
Pawl Rotary Shaft Fixing Bolt		1	23 ± 2	21 - 25
Output Shaft Locking Bolt		2	60 ± 3Nm + 90 ± 2°	125 - 185
Guide Bolt		2	23 ± 2	21 - 25
Inner Hexagon Pan Head Bolt M6*20		8	9 ± 1	8 - 10
Inner Hexagon Pan Head Bolt M6*30	M6*30	13	9 ± 1	8 - 10
Inner TORX Hexagon Pan Head Bolt M6*25	M6*25	5	5 (± 1) Nm + 37.5 (± 2.5)°	10 - 18
Inner Hexagon Pan Head Bolt M6*58	M6*58	14	4 ± 0.5Nm + 90 ± 2°	8 - 16
Inner Hexagon Oil Plug M18*1.5	M18*1.5	2	63 ± 3	60 - 66
Bearing Locating Plate Fixing Bolt		9	12 ± 1Nm + 90 ± 5°	30 - 55
Hexagon Flange Bolt M8*35	M8*35	25	8 ± 0.5Nm + 90 ± 2°	30 - 58

Component Operation Description

Output Speed Sensor

The sensor is a Hall sensor that can identify the actual speed of output shaft. The computer combines the engine speed sensor and other signals based on this value to accurately control the shift timing, lock clutch operating status, shift time, transmission oil pressure control, etc. This signal is a key signal for the normal shift of automatic transmission.

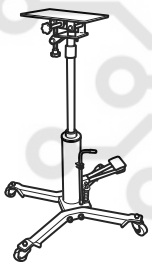
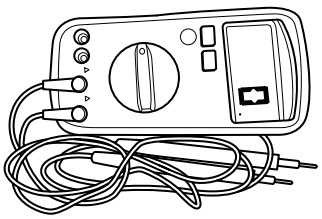
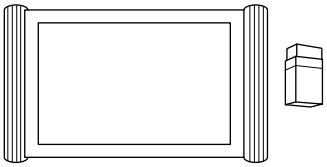
Clutch Temperature Speed Sensor

This sensor integrates clutch temperature sensor and clutch speed sensor. Detecting the temperature of clutch coolant. TCU detects the temperature of clutch coolant in real time to monitor the slipping state of clutch to avoid overheating and burning. This is a negative temperature coefficient resistor. The resistance becomes smaller as the temperature increases.

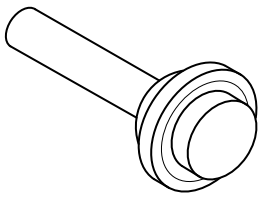
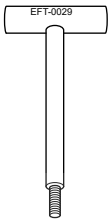
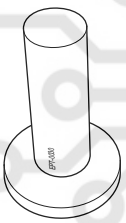
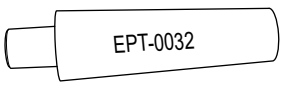
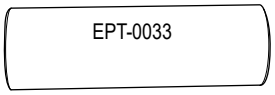
ON-VEHICLE SERVICE

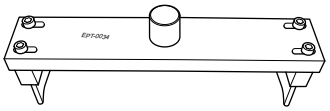
Tools

General Tools

Tool Name	Tool Drawing
Engine Hoist	 S00032
Transmission Carrier	 S00004
Digital Multimeter	 S00002
Diagnostic Tester	 S00001

Special Tools

Tool Name	Tool Drawing
Differential Oil Seal Assembly Fixture	 S00096006
HCU Mould Assembling Pickup Lever	 RCH017006
Input Shaft Cover Plate Knock Fixture	 RCH018006
Clutch Snap Spring Mounting Guide Block	 RCH019006
Clutch Snap Spring Mounting Socket	 RCH020006

Tool Name	Tool Drawing
Clutch Shaft Sealing Cover Assembly Fixture	 RCH021006
Clutch Cover Assembly Oil Seal Protective Sleeve	 RCH022006

Transmission Fluid Inspection

Maintenance period

1. In order to extend the service life of the transmission, it is required to replace the transmission oil once when the vehicle is traveling 60,000 km, and replace the element of filter module at the same time. Inspect regularly. If necessary, replace transmission oil (for example, fault caused by oil shortage or deterioration).

Oil status inspection

1. The new transmission oil should be light yellow, but light yellow is not the quality indicator of the oil. As the vehicle is used, the color of the oil will gradually deepen and eventually become light brown:

CAUTION

- If the oil is dark brown with burnt smell, change it and check vehicle condition;
- If the oil is milky white or turbid, it indicates that the water enters the oil; change the oil, check the leakage point and confirm whether the transmission is damaged.
- If the oil is black and mixed with a large amount of powder, there is abnormal wear in wet clutch, and the clutch needs to be checked and repaired.

Transmission Oil Replacement

Draining/Refilling

Warning

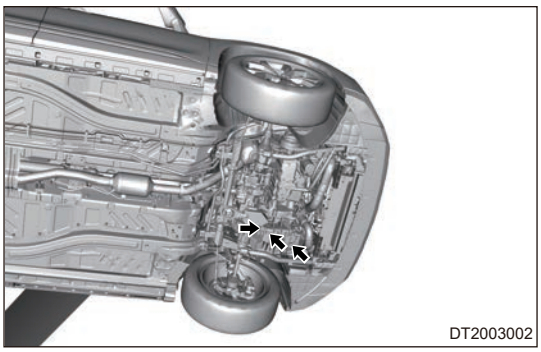
- Be sure to wear necessary safety equipment to prevent accidents.
- Check if safety lock of lift is locked when repairing or inspecting the lifted vehicle.

1. The oil draining will begin within 5 minutes after the engine is shut down.

Caution
• Prerequisites for replacing transmission oil: Transmission oil temperature must be: Between 35 and 45℃.

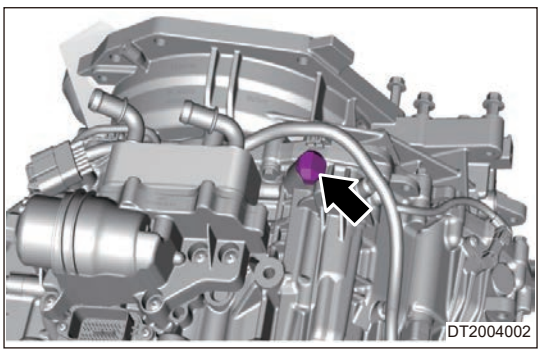
2. Raise vehicle with a lift.
3. Remove the engine lower protector.

4. Remove 3 drain bolts (drain plug bolt in primary chamber/oil level pipe drain plug (overflow pipe)/drain plug in valve body chamber).

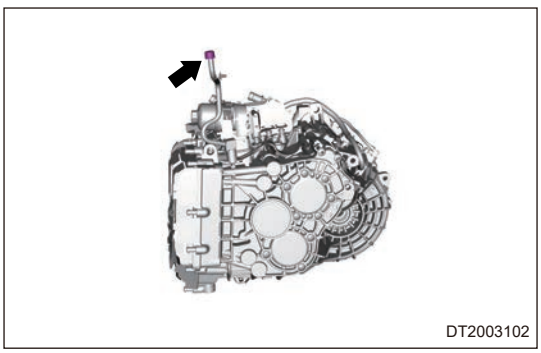

DT2003002

5. Drain the transmission oil.
6. Replace drain bolt and gasket with new ones and tighten the bolt again.
7. Remove the air filter assembly.
8. Remove the battery tray assembly.

9. Remove transmission filler port bolt and gasket (arrow).


DT2004002

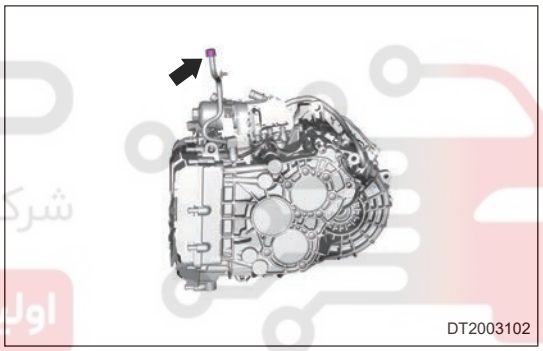
10. Pull out the transmission breather cap (arrow).


DT2003102

11. Add transmission oil from the transmission filler port. The initial filling amount of transmission is 6.5 L Kunlun DCTF 7S gear oil (Reference density: 0.845 Kg/L ((20 ˚C). The whole filling process should be performed at room temperature.
12. Install the transmission breather cap.
13. Install filler port bolt and gasket, and tighten filler port bolt.

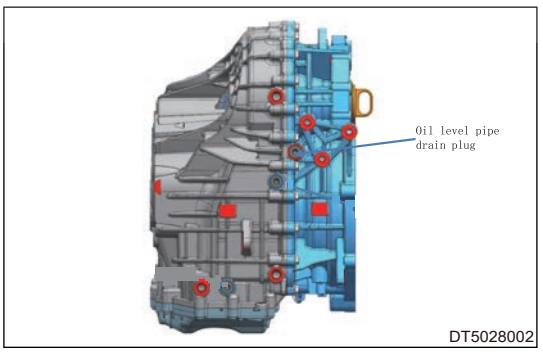
    Tightening torque: 50 ± 5 N·m

14. Raise the vehicle to make wheels raised off the ground about 20 cm.
15. Start the vehicle, transmission is in P position, keep transmission operates for 12 minutes, and transmission oil passage is filled with oil.
16. Depress the brake pedal and shift gears in following order: R-N shift twice, N-D shift twice (During shifting, brake pedal is always depressed); and finally shift to N.
17. Depress the brake pedal, shift to R position, release the pedal and make wheels run for 10 seconds; Depress brake pedal slightly until shift to N position; Repeat once.
18. Depress the brake pedal, shift to D position, release the pedal and make wheels run for 10 seconds; Depress brake pedal slightly until shift to N position; Repeat once.
19. Depress the brake pedal to wheels stop, shift to P position to keep idling, raise the vehicle to a proper position.
20. Pull out the transmission breather cap (arrow).


DT2003102

21. Unscrew drain plug (arrow) with oil level pipe, the excessive oil flows out from the drain plug in a continuous line, and use a container to store the excessive oil; If transmission oil flows out intermittently, reinstall the drain plug and repeat steps: 11 - 20 (Repeat part: Change the filling amount in step 11 to 1 L).

    Tightening torque: 50 ± 5 N·m



DT5028002

22. When the oil in the drain plug hole flows out with drops, tighten the drain plug.

    Tightening torque: 50 ± 5 N·m

23. Stall, clean oil traces of each oil plugs, complete the adding.

Caution

- Transmission oil (Kunlun DCTF-7S) has a service life of 60,000 km, and replace the element of filter cooling module at the same time.
- The vehicle must be kept level during refilling.
- To avoid oil contamination, the container used to store transmission oil must be a special container for (Kunlun DCTF-7S) oil (the container must not be used to store other liquids or items), and the container must be kept clean.
- In case of oil spillage, the transmission oil needs to be added depends on the actual situation, but it must be ensured that the filled oil can make the position of oil in transmission higher than that of oil inspection bolt before adjusting oil level.
- Transmission oil (Kunlun DCTF-7S) should be stored under 20 ℃ ± 10 ℃.
- The oil, a part of 738DHA transmission system, must be sent back to manufacturer together with transmission for further analysis if required.

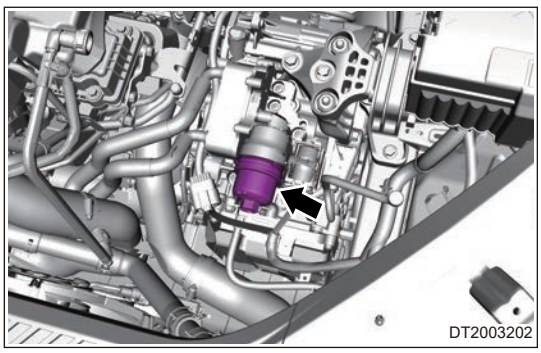
Transmission oil capacity and type are shown in the table below

Model	Oil Type	Total Capacity (After-sales Maintenance Oil Capacity)
738DHA	Kunlun DCTF-7S	6.5 ± 0.2 L

Transmission Oil Element Replacement

Removal

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
4. Remove the battery and battery tray.
5. Drain the transmission oil.
6. Remove transmission element cover (arrow) in counterclockwise direction, and take out element.



Installation

1. Install element and element cover, and tighten element cover.

   Tightening torque: 20 + 5 N·m

2. Fill the transmission oil.
3. Install the battery tray.
4. Install the air filter assembly.
5. Install the battery.

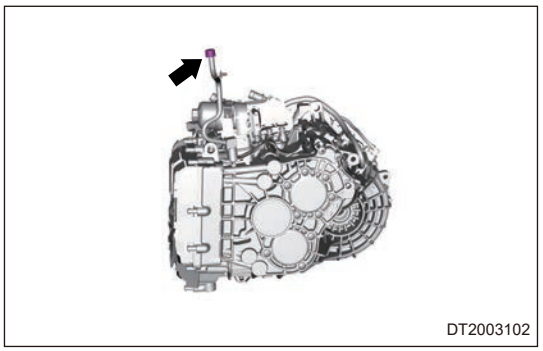
Caution
• It is necessary to replace O-ring after removing. • After installing, start the vehicle and check whether the filter is leaking.

Transmission Breather Cap Replacement

Removal

Warning
• Be sure to wear necessary safety equipment to prevent accidents when repairing. • Try to prevent body paint surface from being scratched during removal.

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
4. Remove the transmission breather cap (arrow).



Installation

1. Install the transmission breather cap.
2. Install the air filter assembly.
3. Connect the negative battery cable.

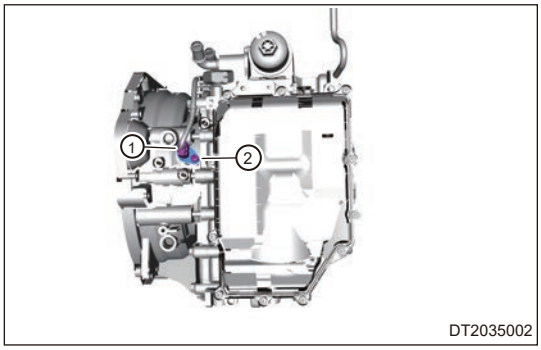
Clutch Temperature Sensor Replacement

Removal

Warning
• Be sure to wear necessary safety equipment to prevent accidents when repairing. • During replacement of sensor, it is necessary to wear anti-static equipment.

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.

4. Disconnect temperature sensor connector (1) and remove fixing bolt (2) from temperature sensor.



5. Remove the temperature sensor.

Installation

1. Install temperature sensor to a proper position on transmission.
2. Install and tighten the fixing bolt to temperature sensor.

   Tightening torque: 8 - 10 N·m

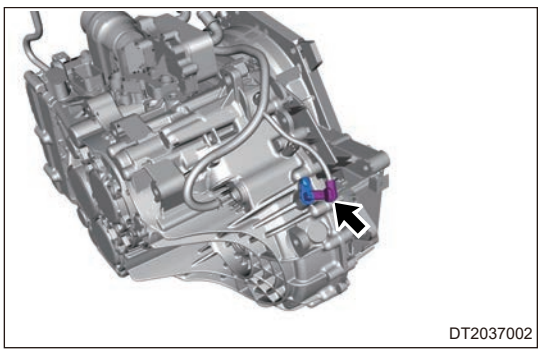
3. Connect the temperature sensor connector.
4. Install the air filter assembly.
5. Connect the negative battery cable.

Output Speed Sensor Replacement

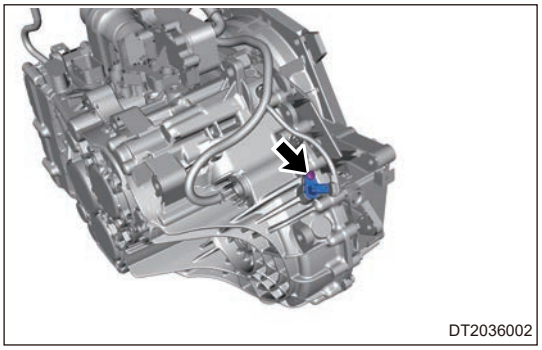
Removal

Warning
• Be sure to wear necessary safety equipment to prevent accidents when repairing. • During replacement of sensor, it is necessary to wear anti-static equipment.

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
4. Remove the battery.
5. Remove the battery tray.
6. Disconnect the output speed sensor connector (arrow).



7. Remove fixing bolt (arrow) from output speed sensor.


DT2036002

8. Remove the output speed sensor.

Installation

1. Install output speed sensor to a proper position on transmission.
2. Install and tighten the fixing bolt to output speed sensor.

   Tightening torque: 8 - 10 N·m

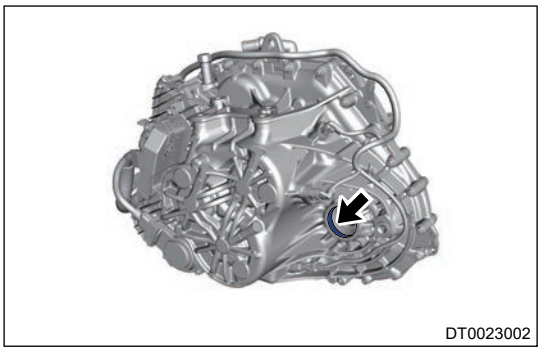
3. Connect the output speed sensor connector.
4. Install the battery tray.
5. Install the battery.
6. Install the air filter assembly.
7. Connect the negative battery cable.

Drive Shaft Oil Seal Replacement

Removal

Warning
• Be sure to wear necessary safety equipment to prevent accidents when repairing. • Try to prevent body paint surface from being scratched during removal. • Use same procedures for right and left sides, procedures listed below are for left side.

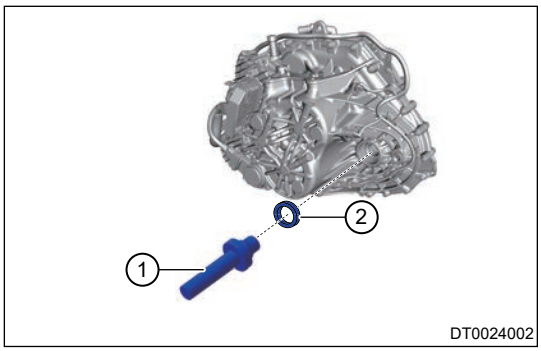
1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Drain the transmission oil.
4. Remove the front left wheel.
5. Remove the front left drive shaft assembly.
6. Remove left drive shaft oil seal (arrow) from transmission assembly.


DT0023002

Installation

Caution
• Ensure that the transmission oil has been drained before removing oil seal. • Be sure to avoid scratching the mating surface between transmission case and clutch housing during removal of drive shaft oil seal. • Drive shaft oil seal is a non-reusable part, which must be replaced after each removal.

1. Using a special tool (1), install drive shaft oil seal (2) into place.



Caution
• Apply a proper amount of MP grease to new oil seal lip. • Do not damage oil seal lip during installation.

2. Install the front left drive shaft assembly.
3. Install the front left wheel.
4. Fill the transmission oil.
5. Connect the negative battery cable.

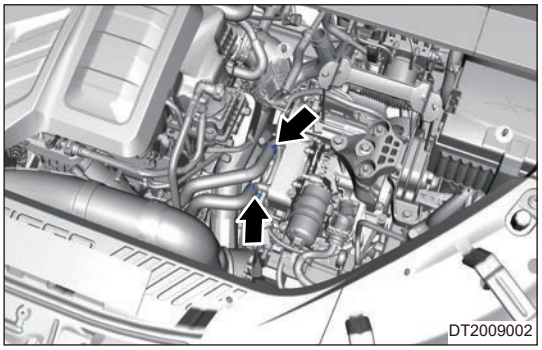
Coolant Connecting Pipe Assembly (Inlet and Outlet Pipes) Replacement

Removal

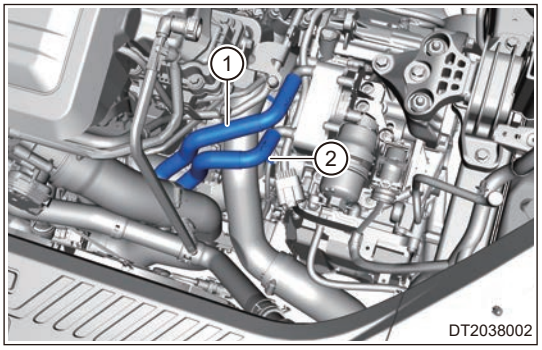
Warning
• Be sure to wear necessary safety equipment to prevent accidents when repairing. • When removing coolant pipe from coolant connecting pipe assembly, be careful not to splash the coolant on electronic parts and the inside of transmission to contaminate transmission oil.

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
4. Remove the battery.
5. Remove the battery tray.
6. Drain the coolant.

7. Remove clamps (arrow) from inlet and outlet pipes.



8. Disengage inlet pipe (1) and (2).



Installation

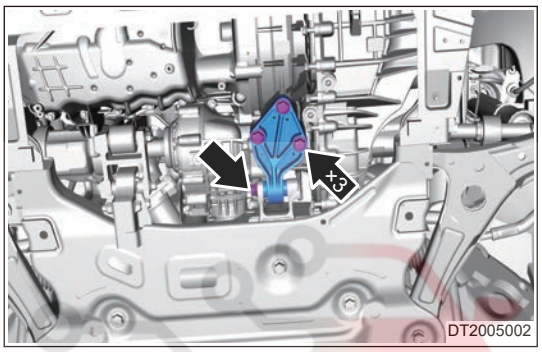
1. Install the inlet pipe.
2. Install clamps to inlet and outlet pipes.
3. Add the coolant.
4. Install the battery tray.
5. Install the battery.
6. Install the air filter assembly.
7. Connect the negative battery cable.

Transmission Assembly

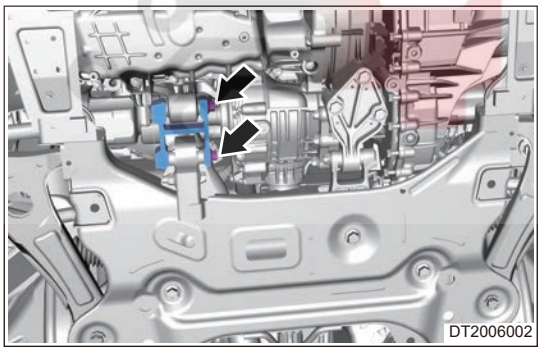
Removal

Caution
• Before removal of power assembly, first drain transmission oil. • During separation of engine and transmission, pay attention not to damage the peripheral accessories of transmission, such as rubber cooling pipe, pressure sensor, etc. If there is any damage, it is necessary to replace it according to requirements.

1. Turn off all electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the battery.
4. Remove the battery tray.
5. Remove the air filter assembly.
6. Remove the front wheel tire.
7. Remove the engine lower protector.
8. Drain the transmission oil.
9. Drain the coolant.
10. Remove the inlet and outlet pipes.
11. Remove the front left/right drive shaft.
12. Disconnect the speed sensor connector and the oil pressure sensor connector, and move away the wire harness.
13. Raise vehicle to a proper height, remove 4 fixing bolts (-arrow) from rear left lower mounting, and remove rear left mounting bracket.



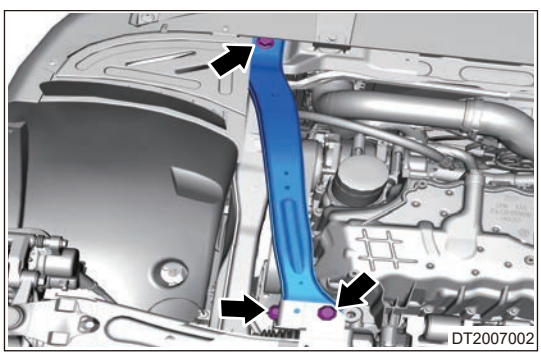
14. Raise vehicle to a proper height, remove 2 fixing bolts from rear right lower mounting, and remove rear right mounting bracket.



15. Raise vehicle to a proper height, remove front left/right lower impact crossmember.

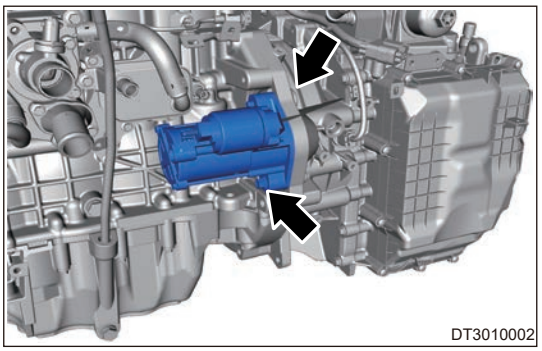
Hint:
Use same removal procedures for left and right sides, here is front right lower impact crossmember.

16. Remove 3 fixing bolts (arrow) from front right lower impact crossmember, and remove impact crossmember.

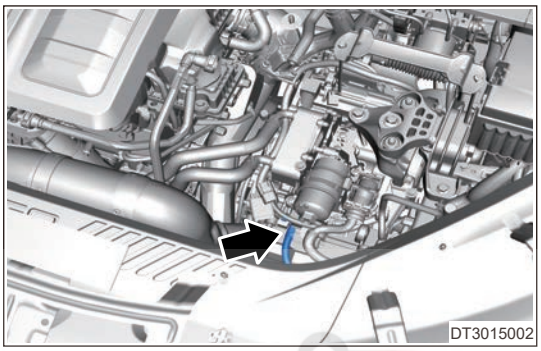


17. Remove the front sub frame assembly.

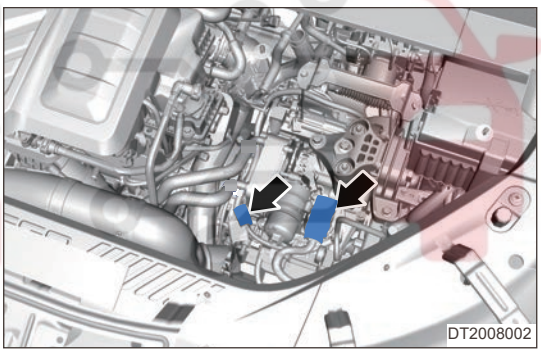
18. Remove 2 fixing bolts (arrow) from starter.



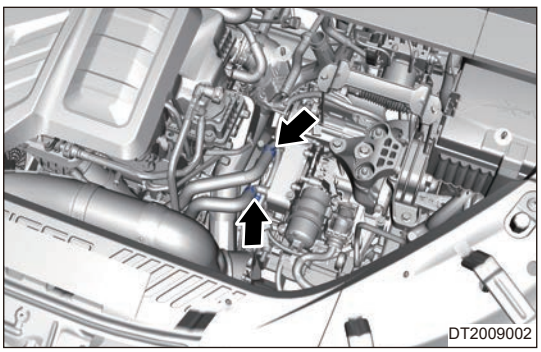
19. Remove the transmission ground wire fixing bolt (arrow).



20. Disconnect the connectors (arrow) from transmission wire harness.

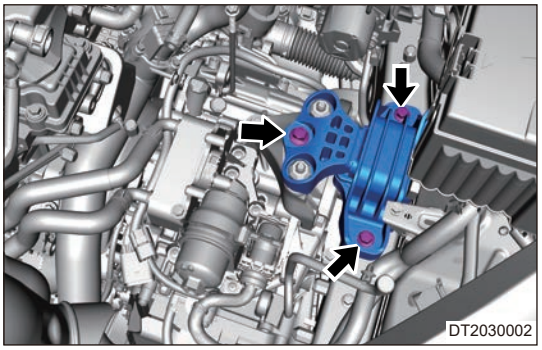


21. Remove cooler pipe clamps (arrow), disengage cooling pipe.

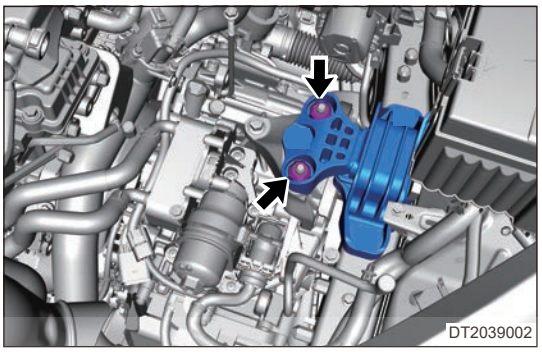


22. Install the engine hoist.
23. Install the transmission carrier.

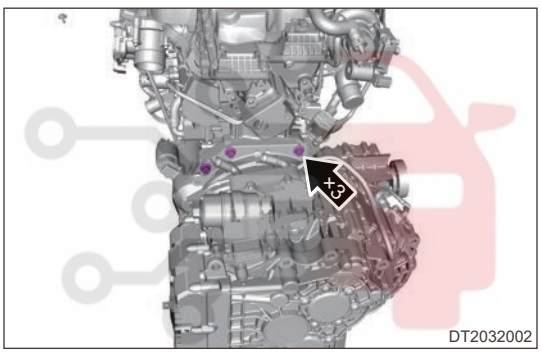
24. Remove 3 fixing bolts (arrow) from left mounting cushion.



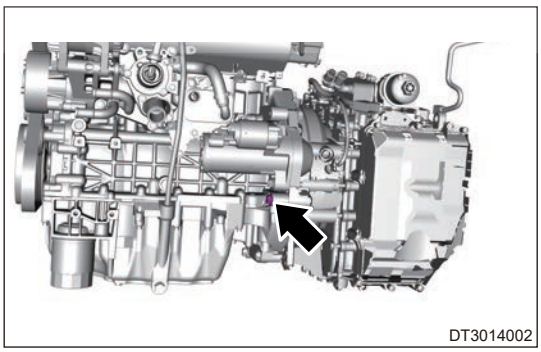
25. Remove 2 fixing nuts (arrow) from left mounting cushion, and remove left mounting cushion.



26. Remove 3 fixing bolts (arrow) between upper part of transmission and engine.

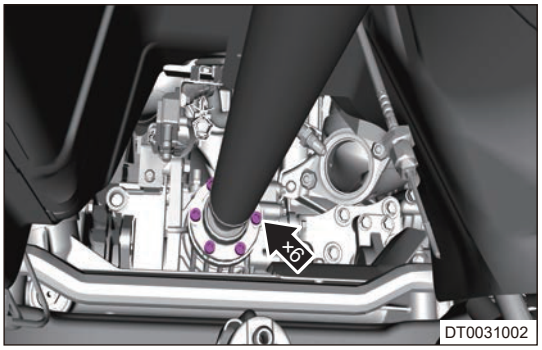


27. Remove 1 fixing bolt (arrow) between front part of transmission and engine.

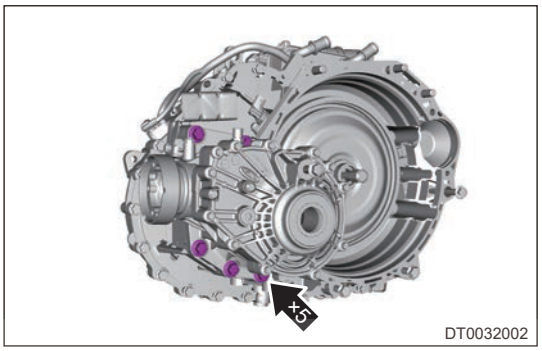


28. Remove the transfer assembly.

a. Remove 6 fixing bolts (arrow) between propeller shaft and PTU output flange surface, and separate propeller shaft and PTU output flange surface.



b. Remove 5 fixing bolts (arrow) between transfer and transmission.

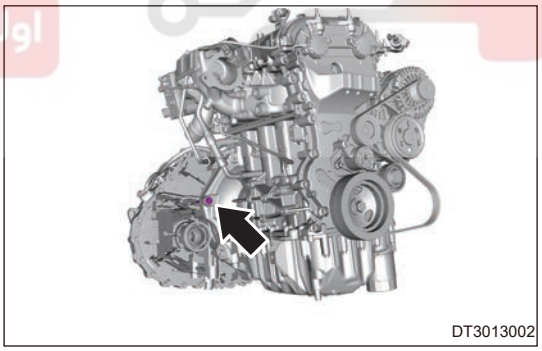


c. Remove the transfer assembly.

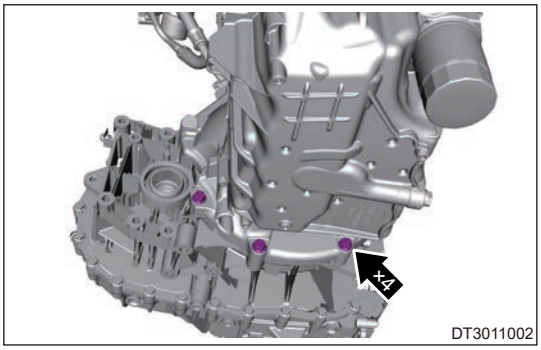
⚠ Warning

- When handling the transfer, please pay attention to the flange surface connected with intermediate shaft and spline connected with transmission differential. Please pay attention to whether O-ring is intact and whether the oil seal is intact to avoid touching the lip of oil seal. Please handle the transfer case with care during whole operation, and do not move the transfer case upside down.

29. Remove 1 fixing bolt (arrow) between rear part of engine and transmission.



30. Remove 3 fixing bolts (arrow) between lower part of engine and transmission.

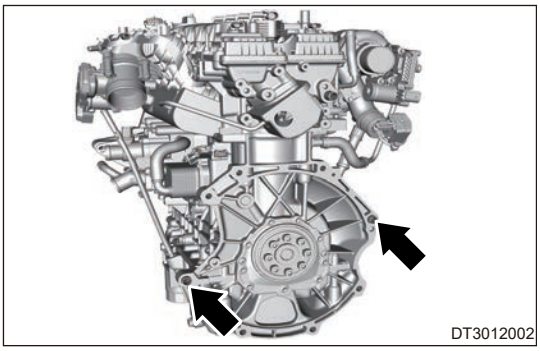


31. Separate transmission and engine assembly, and remove transmission assembly.

Installation

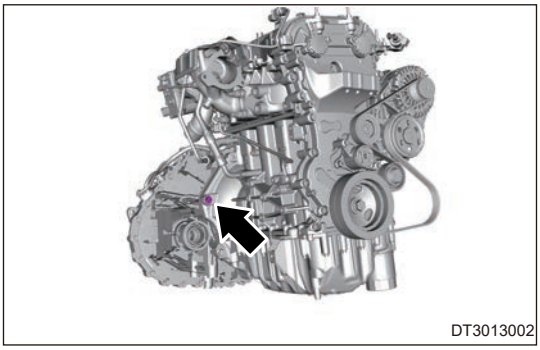
Caution
• Before assembly, the engine cannot be missed to install or sealing plate cannot be bent. • When assembling transmission and engine, the joint surfaces between transmission and engine must be fully contacted before installing coupling bolts between transmission and engine, and then tighten them diagonally and alternately, otherwise it is easy to loose thread of bolt hole on the transmission clutch case. • Teeth-to-teeth (dual clutch spline teeth and dual mass flywheel spline teeth) will occur when transmission and engine are assembled. It can not install assembling bolts or manually press to assemble forcibly. The transmission must be completely disengaged and re-assembled, otherwise it will easily cause the clutch adjusting spring position to deviate, clutch half-clutch point value does not match the joint point value stored in the transmission control unit, and also, vehicle is moved when shifting to driving position, vehicle does not move when depressing accelerator pedal, vehicle jitter will occur when reversing or engine stall will occur when releasing brake pedal in reverse gear.

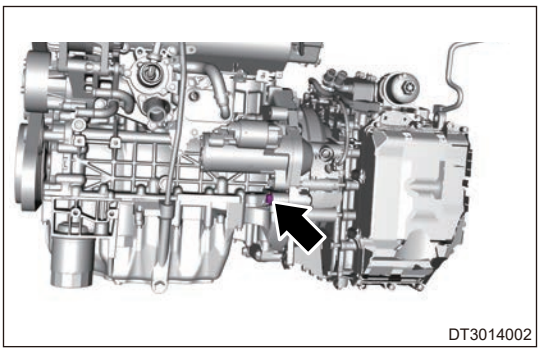
1. Install sealing plate to engine and ensure that dowel pin holes on engine are inserted into the corresponding holes (arrow) of the sealing plate.



2. Align the dowel pin hole of transmission with the dowel pin hole of engine, push the transmission so that the joint surfaces between engine and transmission can be contacted well, and install 2 coupling bolts (arrow) to engine side.

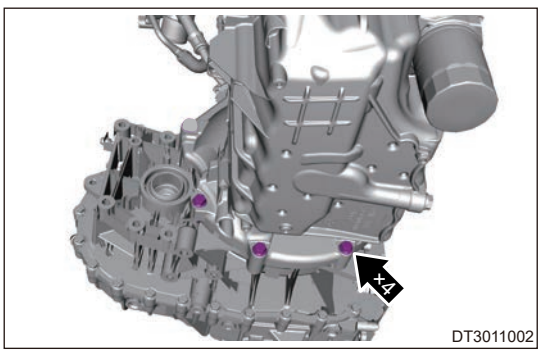
   Tightening torque: 50 ± 5 N·m





3. Install 3 bolts (arrow) between lower part of engine and transmission.

   Tightening torque: 50 ± 5 N·m

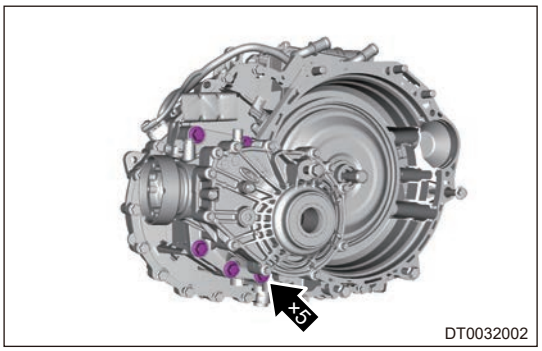


4. Install the transfer assembly.

Warning
• Install transfer spline to differential by turning it left and right, and align the transfer case dowel pin with positioning hole of differential case simultaneously. • When installing 5 tightening bolts between transfer and transmission, follow the order of up, down, left and right and tighten diagonally.

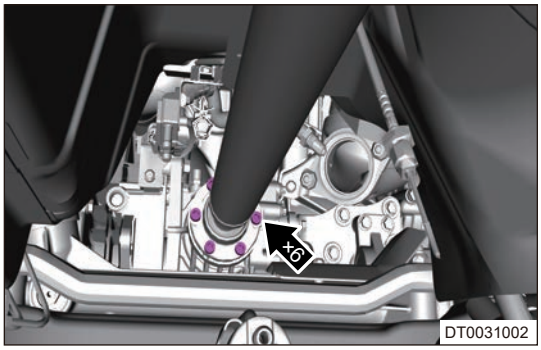
   a. Install 5 fixing bolts (arrow) between transfer and transmission.

      Tightening torque: 120 ± 10 N·m



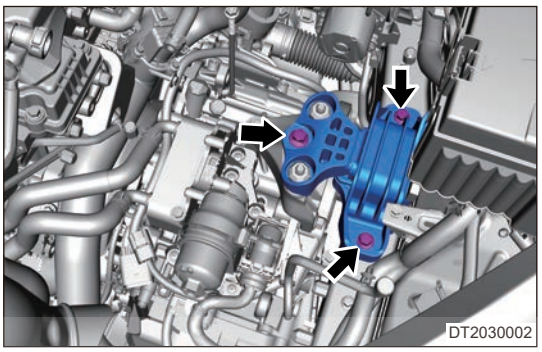
b. Install 6 fixing bolts (arrow) between propeller shaft and PTU output flange surface.

Tightening torque: 33 ± 3 N·m



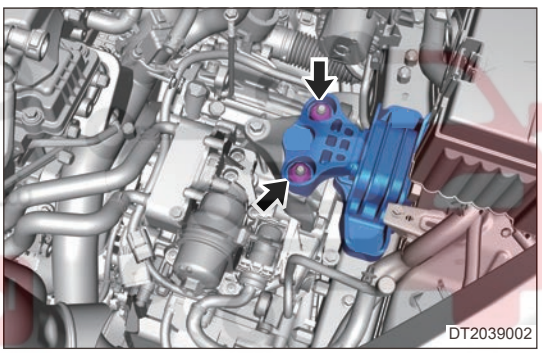
5. Install left mounting cushion and 3 fixing bolts (arrow).

Tightening torque: 110 ± 15 N·m



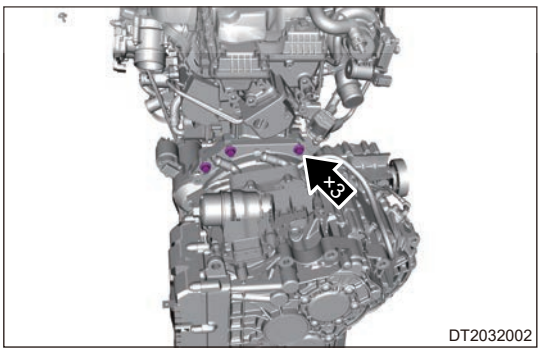
6. Install 2 fixing nuts (arrow) to left mounting cushion.

Tightening torque: 110 ± 15 N·m



7. Install 3 coupling bolts (arrow) between transmission and engine to transmission side.

Tightening torque: 90 ± 9 N·m



8. Connect connectors of transmission wire harness.
9. Connect the inlet and outlet pipes.
10. Install clamps to inlet and outlet pipes.
11. Install the intercooler inlet pipe assembly II.
12. Install the transmission ground wire and secure bolt.
13. Install 2 fixing bolt to starter.
14. Install engine speed sensor and 1 fixing bolt.
15. Connect the engine speed sensor wire harness connector.

16. Install the front sub frame assembly.
17. Install front left/right lower impact beam assembly.
18. Install 2 rear left/right mountings.
19. Install the front left/right drive shaft assembly.
20. Install the front wheels.
21. Fill the transmission oil.
22. Install the battery tray.
23. Install the battery.
24. Install the air filter assembly.
25. Add the coolant.
26. Install the engine trim cover assembly.
27. Connect the negative battery cable.

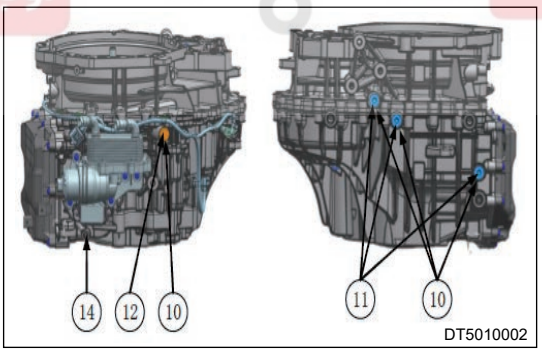
Follow the following process to perform diagnostic tester self-learning after replacing transmission body

1. The vehicle is powered on, shift lever is in P and the vehicle is stationary.
2. Use a diagnostic tester to activate "Reset Memory" function (Routine $31 01 04 05) and get a positive response.
3. Use a diagnostic tester to activate "Read Transmission Storage Data" (Routine $31 01 04 06 01) and get a positive response.
4. The vehicle is powered off and wait for 10 seconds.
5. Replacement is complete.

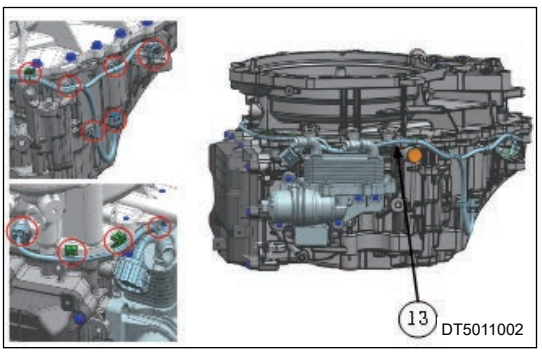
Transmission Assembly Disassembly

Disassembly

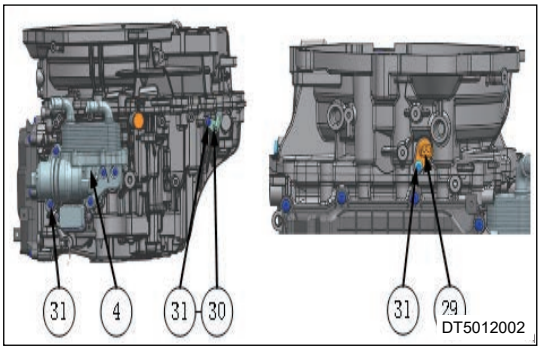
1. Place transmission assembly steadily. Remove breather plug (14) and filler plug (12), oil plug gasket (10), and then remove 3 inner hexagon oil plugs (11) and 3 oil plug gaskets (10). Drain transmission oil.



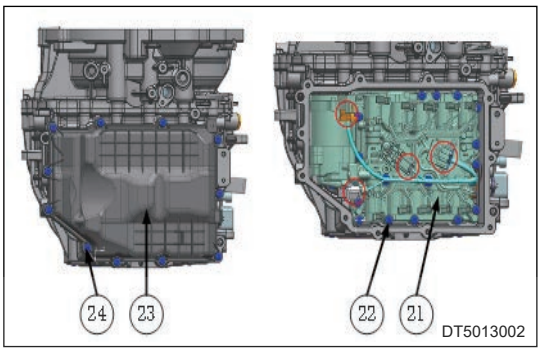
2. Remove connectors and clips as shown in illustration below, and then remove three-in-one wire harness (13).



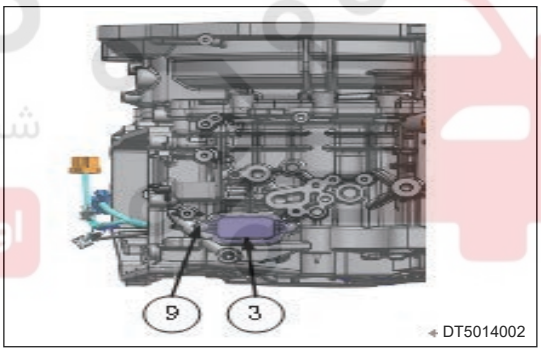
3. Remove 5 filter cooling module fixing bolts (31) and filter cooling module assembly (4); remove fixing bolts (31) and output speed sensor (30) & clutch temperature speed sensor (29).



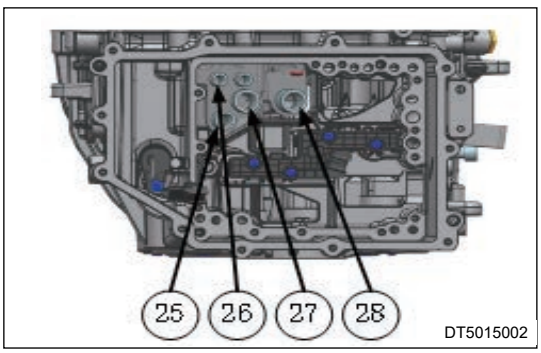
4. Remove 11 valve body cover fixing bolts (24) and valve body cover assembly (23); remove 4 connectors as shown in illustration below and 14 hydraulic system fixing bolts (22), and remove hydraulic system (21) by HCU mould assembling pickup lever, pay attention not to damage transmission wire harness.



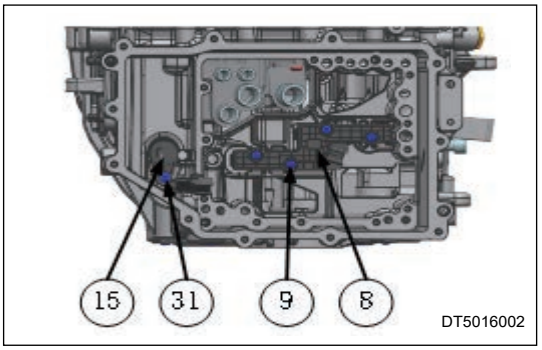
5. Remove 2 fixing bolts (9) from transmission wire harness and take out transmission wire harness assembly (3).



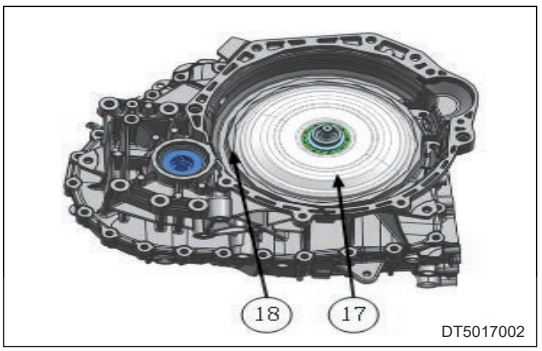
6. Remove oil pump valve body connecting pipe assembly 2 (25), oil pump valve body connecting pipe assembly 3 (26), oil pump valve body connecting pipe assembly 1 (27), oil pump valve body connecting pipe assembly 4 (28).



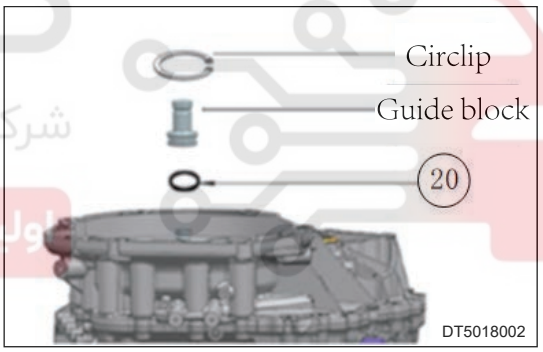
7. Remove fixing bolt (31) and, sensor integrated module B (15); remove 4 fixing bolts (9) and sensor integrated module A (8), pay attention not to drop the bolts into transmission.



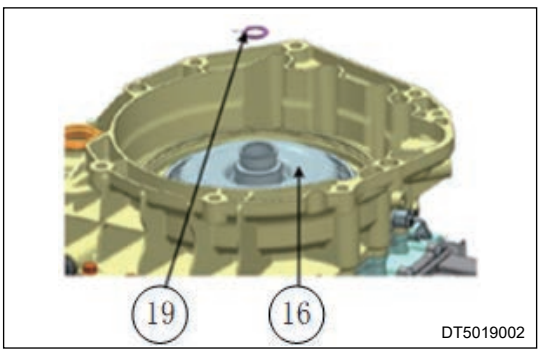
8. Remove fixing snap spring (18) and clutch sealing cover (17), pay attention not to scratch the joint surface between housing and sealing cover.



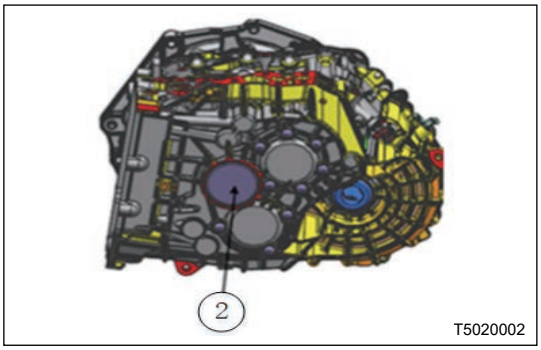
9. Remove snap spring from clutch guide block, take out guide block, and then remove clutch snap spring (20).



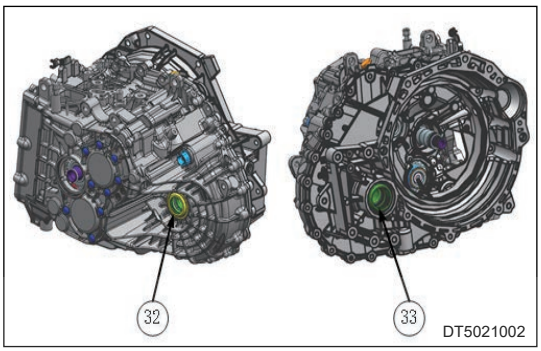
10. Take out clutch adjusting shim (19), remove dual clutch assembly (16) with clutch lifting fixture.



11. Remove input shaft cover plate (2), pay attention not to damage the joint surface between housing and input shaft cover plate.

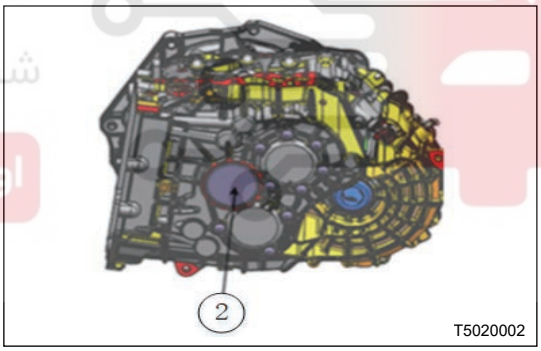


12. Remove half shaft oil seal (32) from main housing side and half shaft oil seal (33) from clutch housing side.

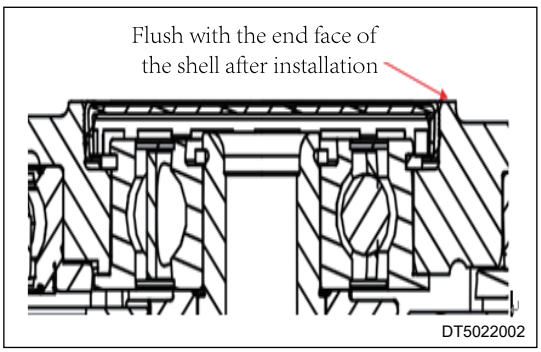


Assembly

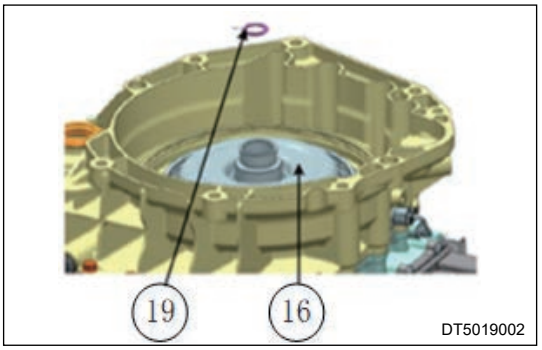
1. Install input shaft cover plate (2) with input shaft cover plate knock fixture.



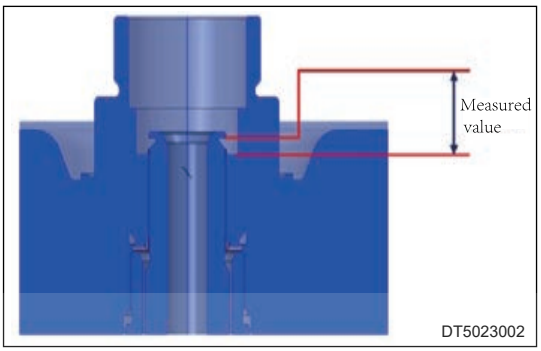
Note: Installation position of cover plate is shown in the following figure.



2. Place transmission assembly steadily. Install dual clutch assembly (16) with a clutch lifting fixture.



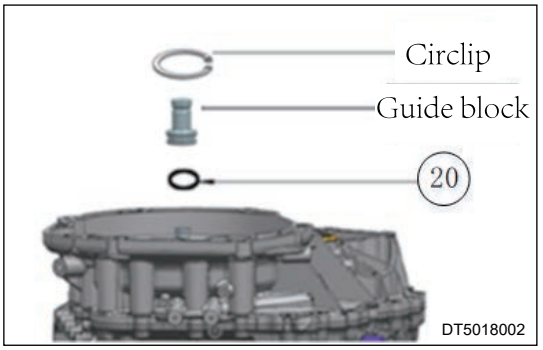
a. Using a clutch measuring fixture, measure the clearance H between end face of clutch and end face of input shaft snap spring groove.



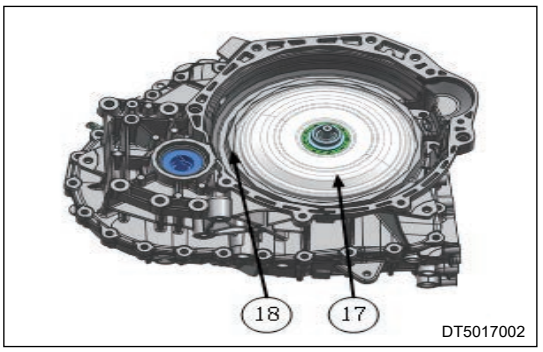
b. Select a appropriate clutch adjusting shim (19) to install to clutch assembly according to the following rules.

X=H-1.6 - 0.2		Thickness of selected adjusting shim
>	<	
1.13	1.15	1.10 ± 0.01
1.15	1.25	1.20 ± 0.01
1.25	1.35	1.30 ± 0.01
1.35	1.45	1.40 ± 0.01
1.45	1.55	1.50 ± 0.01
1.55	1.65	1.60 ± 0.01
1.65	1.75	1.70 ± 0.01
1.75	1.85	1.80 ± 0.01
1.85	1.95	1.90 ± 0.01
1.95	2.05	2.00 ± 0.01
2.05	2.15	2.10 ± 0.01
2.15	2.25	2.20 ± 0.01
2.25	2.35	2.30 ± 0.01
2.35	2.42 (inclusive)	2.40 ± 0.01

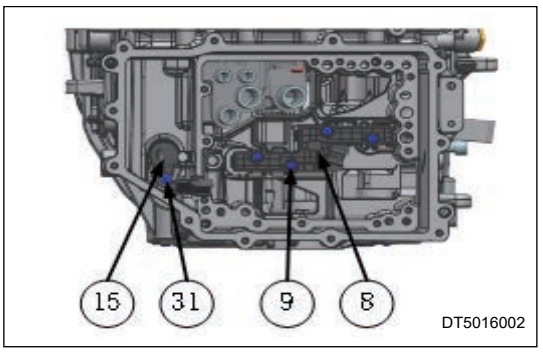
3. Using clutch snap spring mounting guide block and clutch snap spring mounting socket, install clutch snap spring (20), and then install guide block and guide block snap spring.



4. Using clutch sealing cover fixture and clutch sealing cover guide fixture, install clutch sealing cover (17) in place, and then clamp sealing cover to secure snap spring (18).

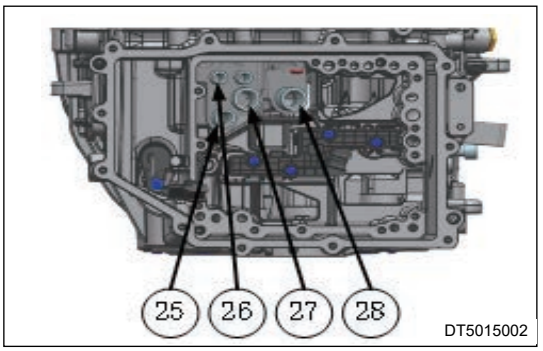


5. Install sensor integrated module A (8) and tighten 4 sensor integrated module A fixing bolts (9), install sensor integrated module B (15) and tighten 1 sensor integrated module B fixing bolt (31).



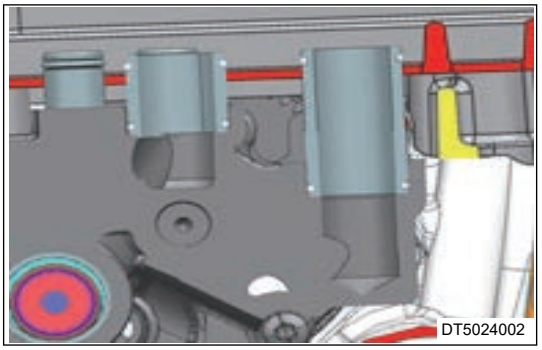
Caution
• Be careful not to drop the bolts into transmission when installing.

6. Install oil pump valve body connecting pipe assembly 2 (25), oil pump valve body connecting pipe assembly 3 (26), oil pump valve body connecting pipe assembly 1 (27), oil pump valve body connecting pipe assembly 4 (28), pay attention to apply transmission oil to O-ring of valve body connecting pipe.

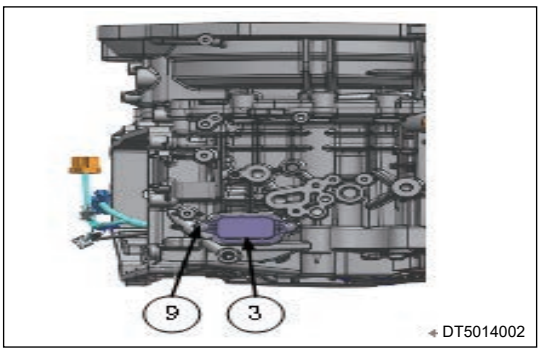


Caution
• Oil pump valve body connecting pipe assembly 1 and oil pump valve body connecting pipe assembly 4 have the same diameter, but the length is different, so do not install them incorrectly.

a. After installing correctly, the two connecting pipe assemblies are at the same height as shown in illustration.



7. Pass transmission wire harness connector assembly (3) through transmission case and install, and then tighten 2 fixing bolts (9) to transmission wire harness connector assembly. Tightening torque: 2 - 3 N·m.

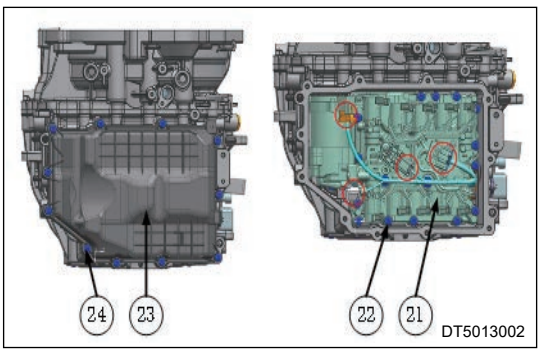


8. Install hydraulic system (21) in place with HCU mould assembling pickup lever and HCU mould assembling guide lever.

Caution
• When HCU is assembled, pay attention to adjust the position of transmission wire harness connector assembly and do not damage it.

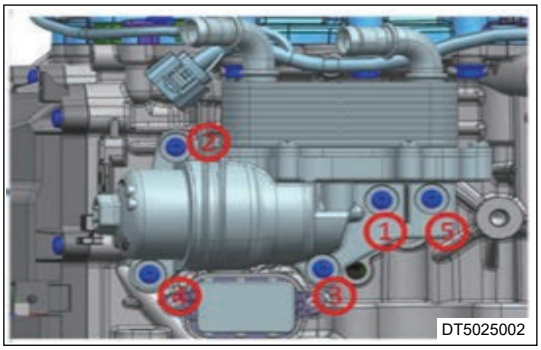
9. Tighten 14 fixing bolts (22) to hydraulic system diagonally, tightening torque: 4 ± 0.5 Nm + 90 ± 2°, connect 4 connectors as shown in illustration, install valve body cover assembly (23) and tighten 11 fixing bolts (24) to valve body cover diagonally.

   Tightening torque: 8 - 10 N·m

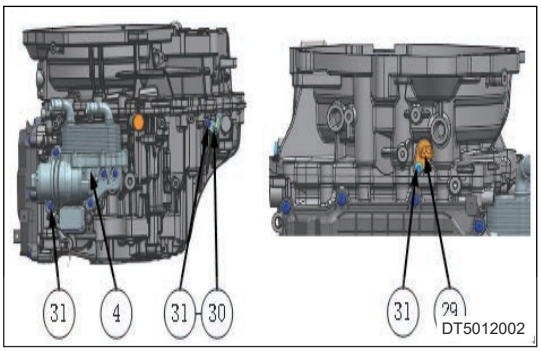


10. Install filter cooling module assembly (4) and tighten 5 fixing bolts (31) to filter cooling module assembly in the order of 1-2-3-4-5-1-2-3 as shown in the illustration below.

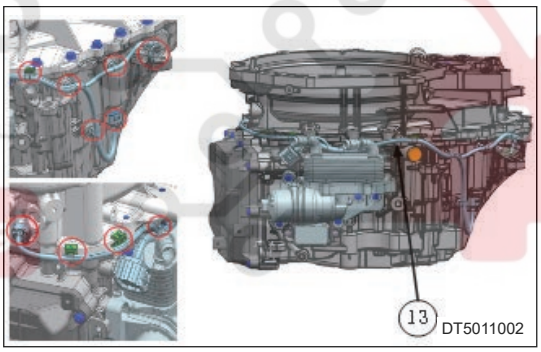
    Tightening torque: 8 - 10 N·m



11. Install output speed sensor (30) and clutch temperature speed sensor (29), and tighten fixing bolts (31) to output speed sensor and clutch temperature speed sensor, tightening torque: 8 - 10 N m.



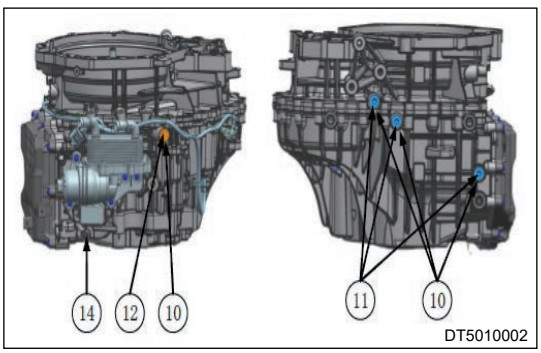
12. Install three-in-one wire harness assembly (13), and connect 7 connectors and clips as shown in illustration.



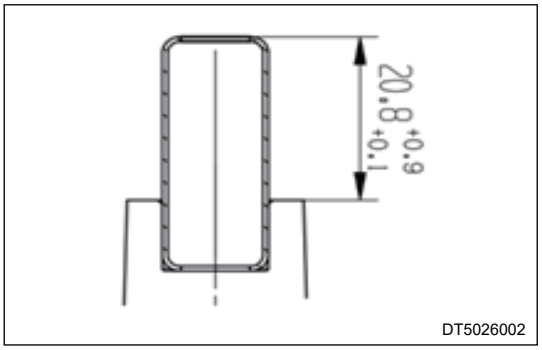
13. Install 3 inner hexagonal oil plugs (11) and oil plug gaskets (10), and tighten 3 inner hexagonal oil plugs, tightening torque: 60 - 66 N·m.

14. Fill transmission oil into transmission from filling port, install oil plug (12) and oil plug gasket (10), and tighten oil plug.

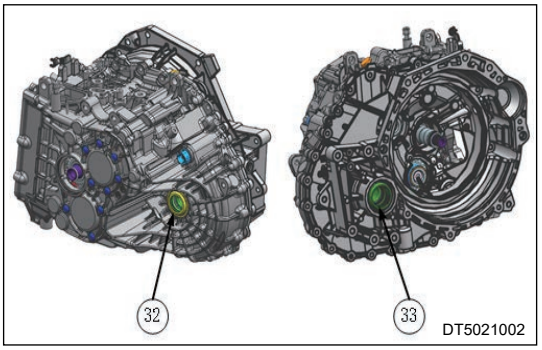
15. Install breather plug assembly (14) with breather plug knock fixture.



a. Note: After breather plug is installed in place, the distance above housing is shown in the following figure.

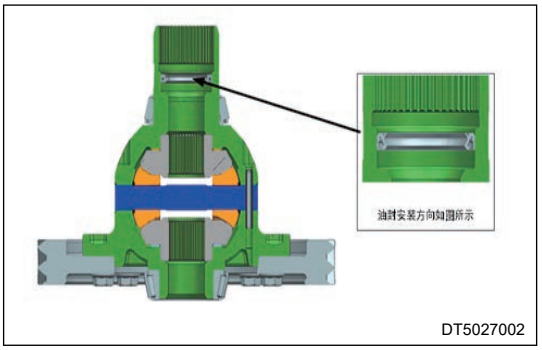


16. Install half shaft oil seal (32) to main housing side.

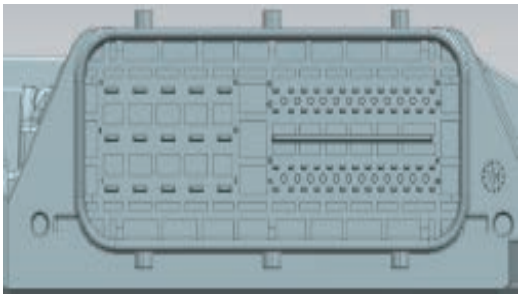
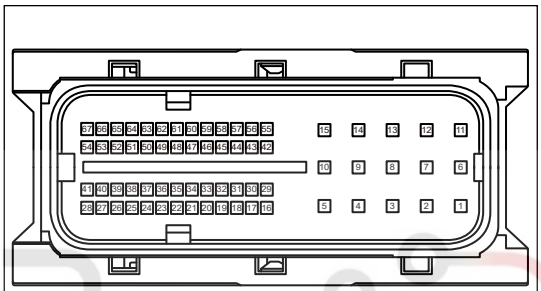
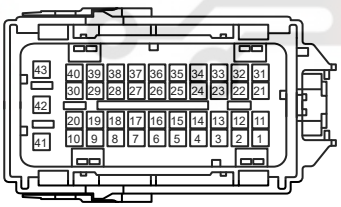
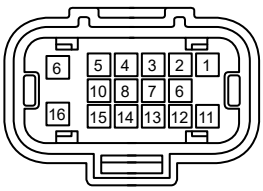


17. Install half shaft oil seal (33) to clutch housing side.

Caution
• The installation direction of oil seal is shown on the right.



Sensor Inspection

Terminal Name	Terminal Image
TCU Terminal Male Connector J1	 DT4010002
TCU Terminal Wire Harness Female Connector J2	 DT4011002
Transmission End Large Connector Female Terminal T1	 DT4012002
Transmission End Small Connector Female Terminal S1	 DT4013002

Fork position sensor 1/5, fork position sensor 2/6, fork position sensor 3/7, fork position sensor 4/R

Detection 1: Detect wire harness terminal of fork position sensor

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of female connector J2 of wire harness side matched with TCU.
2. Measure the resistance value of fork position sensor 1/5 power supply to signal, connect positive terminal to J2-54, the negative terminal to J2-64, read the resistance value.
3. Measure the resistance value of fork position sensor 1/5 signal to ground, connect positive terminal to J2-64, the negative terminal to J2-61, read the resistance value.
4. Measure the resistance value of fork position sensor 2/6 power supply to signal, connect positive terminal to J2-42, the negative terminal to J2-57, read the resistance value.
5. Measure the resistance value of fork position sensor 2/6 signal to ground, connect positive terminal to J2-57, the negative terminal to J2-34, read the resistance value.
6. Measure the resistance value of fork position sensor 3/7 power supply to signal, connect positive terminal to J2-54, the negative terminal to J2-64, read the resistance value.
7. Measure the resistance value of fork position sensor 3/7 signal to ground, connect positive terminal to J2-64, the negative terminal to J2-61, read the resistance value.
8. Measure the resistance value of fork position sensor 4/R power supply to signal, connect positive terminal to J2-42, the negative terminal to J2-58, read the resistance value.
9. Measure the resistance value of fork position sensor 4/R signal to ground, connect positive terminal to J2-58, the negative terminal to J2-34, read the resistance value.
10.

Detection 2: Detect transmission terminal of fork position sensor

1. Disconnect negative battery, unplug corresponding transmission wire harness connector from transmission terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of transmission wire harness connector T1.
2. Measure the resistance value of fork position sensor 1/5 power supply to signal, connect positive terminal to T1-13, the negative terminal to T1-31, read the resistance value.
3. Measure the resistance value of fork position sensor 1/5 signal to ground, connect positive terminal to T1-31, the negative terminal to T1-32, read the resistance value.
4. Measure the resistance value of fork position sensor 2/6 power supply to signal, connect positive terminal to T1-3, the negative terminal to T1-4, read the resistance value.
5. Measure the resistance value of fork position sensor 2/6 signal to ground, connect positive terminal to T1-4, the negative terminal to T1-33, read the resistance value.
6. Measure the resistance value of fork position sensor 3/7 power supply to signal, connect positive terminal to T1-13, the negative terminal to T1-12, read the resistance value.
7. Measure the resistance value of fork position sensor 3/7 signal to ground, connect positive terminal to T1-12, the negative terminal to T1-32, read the resistance value.
8. Measure the resistance value of fork position sensor 4/R power supply to signal, connect positive terminal to T1-3, the negative terminal to T1-2, read the resistance value.
9. Measure the resistance value of fork position sensor 4/R signal to ground, connect positive terminal to T1-2, the negative terminal to T1-33, read the resistance value.

Detection 3: Detect TCU terminal of fork position sensor

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of power supply to fork position sensor 1/5, connect positive terminal to J1-15, the negative terminal to J1-54, read the resistance value.
3. Measure the resistance value of fork position sensor 1/5 power supply to ground, connect positive terminal to J1-54, the negative terminal to J1-5, read the resistance value.
4. Measure the resistance value of power supply to fork position sensor 2/6, connect positive terminal to J1-15, the negative terminal to J1-42, read the resistance value.
5. Measure the resistance value of fork position sensor 2/6 power supply to ground, connect positive terminal to J1-42, the negative terminal to J1-5, read the resistance value.

6. Measure the resistance value of power supply to fork position sensor 3/7, connect positive terminal to J1-15, the negative terminal to J1-54, read the resistance value.
7. Measure the resistance value of fork position sensor 3/7 power supply to ground, connect positive terminal to J1-54, the negative terminal to J1-5, read the resistance value.
8. Measure the resistance value of power supply to fork position sensor 4/R power supply, connect positive terminal to J1-15, the negative terminal to J1-42, read the resistance value.
9. Measure the resistance value of fork position sensor 4/R power supply to ground, connect positive terminal to J1-42, the negative terminal to J1-5, read the resistance value.

Odd input shaft speed sensor, even input shaft speed sensor, output shaft speed sensor, clutch speed sensor

Detection 1: Detect wire harness terminal of speed sensor

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of female connector J2 of wire harness side matched with TCU.
2. Measure the resistance value of odd input shaft speed sensor power supply to signal, connect positive terminal to J2-53, the negative terminal to J2-62, read the resistance value.
3. Measure the resistance value of even input shaft speed sensor power supply to signal, connect positive terminal to J2-43, the negative terminal to J2-63, read the resistance value.
4. Measure the resistance value of output shaft speed sensor power supply to signal, connect positive terminal to J2-53, the negative terminal to J2-59, read the resistance value.
5. Measure the resistance value of clutch speed sensor power supply to signal, connect positive terminal to J2-43, the negative terminal to J2-60, read the resistance value.

Detection 2: Detect transmission terminal of speed sensor

1. Disconnect negative battery, unplug corresponding transmission wire harness connector and small connector from transmission terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of transmission wire harness connector T1 and small connector S1.
2. Measure the resistance value of odd input shaft speed sensor power supply to signal, connect positive terminal to T1-23, the negative terminal to T1-11, read the resistance value.
3. Measure the resistance value of even input shaft speed sensor power supply to signal, connect positive terminal to T1-22, the negative terminal to T1-21, read the resistance value.
4. Measure the resistance value of output shaft speed sensor power supply to signal, connect positive terminal to S1-9, the negative terminal to S1-11, read the resistance value.
5. Measure the resistance value of clutch speed sensor power supply to signal, connect positive terminal to S1-13, the negative terminal to S1-14, read the resistance value.

Detection 3: Detect TCU terminal of speed sensor

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of power supply to odd input shaft speed sensor power supply, connect positive terminal to J1-15, the negative terminal to J1-53, read the resistance value.
3. Measure the resistance value of odd input shaft speed sensor power supply to ground, connect positive terminal to J1-53, the negative terminal to J1-5, read the resistance value.
4. Measure the resistance value of power supply to even input shaft speed sensor power supply, connect positive terminal to J1-15, the negative terminal to J1-43, read the resistance value.
5. Measure the resistance value of even input shaft speed sensor power supply to ground, connect positive terminal to J1-43, the negative terminal to J1-5, read the resistance value.
6. Measure the resistance value of power supply to output shaft speed sensor power supply, connect positive terminal to J1-15, the negative terminal to J1-53, read the resistance value.
7. Measure the resistance value of output shaft speed sensor power supply to ground, connect positive terminal to J1-53, the negative terminal to J1-5, read the resistance value.

8. Measure the resistance value of power supply to clutch speed sensor power supply, connect positive terminal to J1-15, the negative terminal to J1-43, read the resistance value.
9. Measure the resistance value of clutch speed sensor power supply to ground, connect positive terminal to J1-43, the negative terminal to J1-5, read the resistance value.

Solenoid Valve Inspection

Main oil passage, lubricant oil passage solenoid valve

Detection 1: Detect wire harness terminal of main oil passage, lubricating oil passage solenoid valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of female connector J2 of wire harness side matched with TCU.
2. Measure the resistance value of power supply to main oil passage solenoid valve power supply, connect positive terminal to J2-15, the negative terminal to J2-6, read the resistance value.
3. Measure the resistance value of main oil passage solenoid valve power supply to signal, connect positive terminal to J2-6, the negative terminal to J2-44, read the resistance value.
4. Measure the resistance value of main oil passage solenoid valve signal to ground, connect positive terminal to J2-44, the negative terminal to J2-5, read the resistance value.
5. Measure the resistance value of power supply to lubricant oil passage solenoid valve power supply, connect positive terminal to J2-15, the negative terminal to J2-6, read the resistance value.
6. Measure the resistance value of lubricant oil passage solenoid valve power supply to signal, connect positive terminal to J2-6, the negative terminal to J2-45, read the resistance value.
7. Measure the resistance value of lubricant oil passage solenoid valve signal to ground, connect positive terminal to J2-45, the negative terminal to J2-5, read the resistance value.

Detect transmission terminal of main oil passage, lubricant oil passage solenoid valve

1. Disconnect negative battery, unplug corresponding transmission wire harness connector from transmission terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of transmission wire harness connector T1.
2. Measure the resistance value of main oil passage solenoid valve power supply to signal, connect positive terminal to T1-39, the negative terminal to T1-26, read the resistance value.
3. Measure the resistance value of lubricant oil passage solenoid valve power supply to signal, connect positive terminal to T1-39, the negative terminal to T1-36, read the resistance value.

Detection 3: Detect TCU terminal of main oil passage, lubricant oil passage solenoid valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of power supply to main oil passage solenoid valve power of supply, connect positive terminal to J1-15, the negative terminal to J1-6, read the resistance value.
3. Measure the resistance value of main oil passage solenoid valve signal to ground, connect positive terminal to J1-44, the negative terminal to J1-5, read the resistance value.
4. Measure the resistance value of power supply to lubricant oil passage solenoid valve power supply, connect positive terminal to J1-15, the negative terminal to J1-6, read the resistance value.
5. Measure the resistance value of lubricant oil passage solenoid valve signal to ground, connect positive terminal to J1-45, the negative terminal to J1-5, read the resistance value.

Odd clutch, even clutch solenoid valve

Detection 1: Detect wire harness terminal of clutch solenoid valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of female connector J2 of wire harness side matched with TCU.
2. Measure the resistance value of power supply to odd clutch solenoid valve power supply, connect positive terminal to J2-15, the negative terminal to J2-11, read the resistance value.

3. Measure the resistance value of odd clutch solenoid valve power supply to signal, connect positive terminal to J2-11, the negative terminal to J2-4, read the resistance value.
4. Measure the resistance value of odd clutch solenoid valve signal to ground, connect positive terminal to J2-4, the negative terminal to J2-5, read the resistance value.
5. Measure the resistance value of power supply to even clutch solenoid valve power supply, connect positive terminal to J2-15, the negative terminal to J2-12, read the resistance value.
6. Measure the resistance value of even clutch solenoid valve power supply to signal, connect positive terminal to J2-12, the negative terminal to J2-33, read the resistance value.
7. Measure the resistance value of even clutch solenoid valve signal to ground, connect positive terminal to J2-33, the negative terminal to J2-5, read the resistance value.

Detection 2: Detect transmission terminal of clutch solenoid valve

1. Disconnect negative battery, unplug corresponding transmission wire harness connector from transmission terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of transmission wire harness connector T1.
2. Measure the resistance value of odd clutch solenoid valve power supply to signal, connect positive terminal to T1-19, the negative terminal to T1-7, read the resistance value.
3. Measure the resistance value of even clutch solenoid valve power supply to signal, connect positive terminal to T1-29, the negative terminal to T1-8, read the resistance value.

Detection 3: Detect TCU terminal of clutch solenoid valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of power supply to odd clutch solenoid valve power supply, connect positive terminal to J1-15, the negative terminal to J1-11, read the resistance value.
3. Measure the resistance value of odd clutch solenoid valve signal to ground, connect positive terminal to J1-4, the negative terminal to J1-5, read the resistance value.
4. Measure the resistance value of power supply to even clutch solenoid valve power supply, connect positive terminal to J1-15, the negative terminal to J1-12, read the resistance value.
5. Measure the resistance value of even clutch solenoid valve signal to ground, connect positive terminal to J1-33, the negative terminal to J1-5, read the resistance value.

Odd shift pressure, even shift pressure solenoid valve

Detection 1: Detect wire harness terminal of shift pressure solenoid valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of female connector J2 of wire harness side matched with TCU.
2. Measure the resistance value of power supply to odd shift pressure solenoid valve power supply, connect positive terminal to J2-15, the negative terminal to J2-11, read the resistance value.
3. Measure the resistance value of odd shift pressure solenoid valve power supply to signal, connect positive terminal to J2-11, the negative terminal to J2-10, read the resistance value.
4. Measure the resistance value of odd shift pressure solenoid valve signal to ground, connect positive terminal to J2-10, the negative terminal to J2-5, read the resistance value.
5. Measure the resistance value of power supply to even shift pressure solenoid valve power supply, connect positive terminal to J2-15, the negative terminal to J2-12, read the resistance value.
6. Measure the resistance value of even shift pressure solenoid valve power supply to signal, connect positive terminal to J2-12, the negative terminal to J2-48, read the resistance value.
7. Measure the resistance value of even shift pressure solenoid valve signal to ground, connect positive terminal to J2-48, the negative terminal to J2-5, read the resistance value.

Detect transmission terminal of shift pressure solenoid valve

1. Disconnect negative battery, unplug corresponding transmission wire harness connector from transmission terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of transmission wire harness connector T1.

2. Measure the resistance value of odd shift pressure solenoid valve power supply to signal, connect positive terminal to T1-19, the negative terminal to T1-17, read the resistance value.
3. Measure the resistance value of even shift pressure solenoid valve power supply to signal, connect positive terminal to T1-29, the negative terminal to T1-18, read the resistance value.

Detection 3: Detect TCU terminal of clutch solenoid valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of power supply to odd shift pressure solenoid valve power supply, connect positive terminal to J1-15, the negative terminal to J1-11, read the resistance value.
3. Measure the resistance value of odd shift pressure solenoid valve signal to ground, connect positive terminal to J1-10, the negative terminal to J1-5, read the resistance value.
4. Measure the resistance value of power supply to even shift pressure solenoid valve power supply, connect positive terminal to J1-15, the negative terminal to J1-12, read the resistance value.
5. Measure the resistance value of even shift pressure solenoid valve signal to ground, connect positive terminal to J1-48, the negative terminal to J1-5, read the resistance value.

Motor Inspection

Driver motor

Detection 1: Detect wire harness terminal of driver motor

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of female connector J2 of wire harness side matched with TCU.
2. Measure the resistance value of motor power supply to U phase, connect positive terminal to J2-13, the negative terminal to J2-1, read the resistance value.
3. Measure the resistance value of motor power supply to V phase, connect positive terminal to J2-13, the negative terminal to J2-2, read the resistance value.
4. Measure the resistance value of motor power supply to W phase, connect positive terminal to J2-13, the negative terminal to J2-3, read the resistance value.
5. Measure the resistance value of motor U phase to ground, connect positive terminal to J2-1, the negative terminal to J2-5, read the resistance value.
6. Measure the resistance value of motor V phase to ground, connect positive terminal to J2-2, the negative terminal to J2-5, read the resistance value.
7. Measure the resistance value of motor W phase to ground, connect positive terminal to J2-3, the negative terminal to J2-5, read the resistance value.
8. Measure the resistance value of U phase to V phase, connect positive terminal to J2-1, the negative terminal to J2-2, read the resistance value.
9. Measure the resistance value of V phase to W phase, connect positive terminal to J2-2, the negative terminal to J2-3, read the resistance value.
10. Measure the resistance value of W phase to U phase, connect positive terminal to J2-3, the negative terminal to J2-1, read the resistance value.

Detection 2: Detect transmission terminal of driver motor

1. Disconnect negative battery, unplug corresponding transmission wire harness connector from transmission terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of transmission wire harness connector T1.
2. Measure the resistance value of U phase to V phase, connect positive terminal to T1-41, the negative terminal to T1-42, read the resistance value.
3. Measure the resistance value of V phase to W phase, connect positive terminal to T1-42, the negative terminal to T1-43, read the resistance value.
4. Measure the resistance value of W phase to U phase, connect positive terminal to T1-43, the negative terminal to T1-41, read the resistance value.

Detection 3: Detect TCU terminal of driver motor

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of motor power supply to U phase, connect positive terminal to J1-13, the negative terminal to J1-1, read the resistance value.
3. Measure the resistance value of motor power supply to V phase, connect positive terminal to J1-13, the negative terminal to J1-2, read the resistance value.
4. Measure the resistance value of motor power supply to W phase, connect positive terminal to J1-13, the negative terminal to J1-3, read the resistance value.
5. Measure the resistance value of motor U phase to ground, connect positive terminal to J1-1, the negative terminal to J1-5, read the resistance value.
6. Measure the resistance value of motor V phase to ground, connect positive terminal to J1-2, the negative terminal to J1-5, read the resistance value.
7. Measure the resistance value of motor W phase to ground, connect positive terminal to J1-3, the negative terminal to J1-5, read the resistance value.

Hydraulic Parking Inspection

E-Park hydraulic valve

Detection 1: Detect wire harness terminal of E-Park hydraulic valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of female connector J2 of wire harness side matched with TCU.
2. Measure the resistance value of power supply to E-Park hydraulic valve power supply, connect positive terminal to J2-15, the negative terminal to J2-6, read the resistance value.
3. Measure the resistance value of E-Park hydraulic valve signal to ground, connect positive terminal to J2-36, the negative terminal to J2-5, read the resistance value.
4. Measure the resistance value of E-Park hydraulic valve power supply to E-Park hydraulic valve signal, connect positive terminal to J2-6, the negative terminal to J2-36, read the resistance value.

Detection 2: Detect transmission terminal of E-Park hydraulic valve

1. Disconnect negative battery, unplug corresponding small connector from transmission terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of small connector S1.
2. Measure the resistance value of E-Park hydraulic valve power supply to E-Park hydraulic valve signal, connect positive terminal to S1-1, the negative terminal to S1-2, read the resistance value.

Detection 3: Detect TCU terminal of E-Park hydraulic valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of power supply to E-Park hydraulic valve power supply, connect positive terminal to J1-15, the negative terminal to J1-6, read the resistance value.
3. Measure the resistance value of E-Park hydraulic valve signal to ground, connect positive terminal to J1-36, the negative terminal to J1-5, read the resistance value.

E-Park safety valve

Detection 1: Detect wire harness terminal of E-Park safety valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of female connector J2 of wire harness side matched with TCU.
2. Measure the resistance value of power supply to E-Park safety valve power supply, connect positive terminal to J2-15, the negative terminal to J2-6, read the resistance value.
3. Measure the resistance value of E-Park safety valve signal to ground, connect positive terminal to J2-35, the negative terminal to J2-5, read the resistance value.
4. Measure the resistance value of E-Park safety valve power supply to E-Park safety valve signal, connect positive terminal to J2-6, the negative terminal to J2-35, read the resistance value.

Detection 2: Detect transmission terminal of E-Park safety valve

1. Disconnect negative battery, unplug corresponding small connector from transmission terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of small connector S1.
2. Measure the resistance value of E-Park safety valve power supply to E-Park safety valve signal, connect positive terminal to S1-1, the negative terminal to S1-3, read the resistance value.

Detection 3: Detect TCU terminal of E-Park safety valve

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of power supply to E-Park safety valve power supply, connect positive terminal to J1-15, the negative terminal to J1-6, read the resistance value.
3. Measure the resistance value of E-Park safety valve signal to ground, connect positive terminal to J1-35, the negative terminal to J1-5, read the resistance value.

E-Park position sensor

Detection 1: Detect wire harness terminal of E-Park position sensor

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of female connector J2 of wire harness side matched with TCU.
2. Measure the resistance value of E-Park position sensor power supply to signal, connect positive terminal to J2-54, the negative terminal to J2-41, read the resistance value.
3. Measure the resistance value of E-Park position sensor signal to ground, connect positive terminal to J2-41, the negative terminal to J2-61, read the resistance value.

Detection 2: Detect transmission terminal of E-Park position sensor

1. Disconnect negative battery, unplug corresponding small connector from transmission terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of small connector S1.
2. Measure the resistance value of E-Park position sensor power supply to signal, connect positive terminal to S1-5, the negative terminal to S1-4, read the resistance value.
3. Measure the resistance value of E-Park position sensor signal to ground, connect positive terminal to S1-4, the negative terminal to S1-8, read the resistance value.

Detection 3: Detect TCU terminal of E-Park position sensor

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of E-Park position sensor power supply to signal, connect positive terminal to J1-54, the negative terminal to J1-41, read the resistance value.
3. Measure the resistance value of E-Park position sensor signal to ground, connect positive terminal to J1-41, the negative terminal to J1-61, read the resistance value. Measure the resistance value of sensor 4/R power supply, connect positive terminal to J1-15, the negative terminal to J1-42, read the resistance value.
4. Measure the resistance value of fork position sensor 4/R power supply to ground, connect positive terminal to J1-42, the negative terminal to J1-5, read the resistance value.

Detection 3: Detect TCU terminal of E-Park position sensor

1. Disconnect negative battery, unplug corresponding connector from TCU terminal, adjust digital multimeter to ohm band, measure the resistance between the pins of TCU male connector J1.
2. Measure the resistance value of E-Park position sensor power supply to signal, connect positive terminal to J1-54, the negative terminal to J1-41, read the resistance value.
3. Measure the resistance value of E-Park position sensor signal to ground, connect positive terminal to J1-41, the negative terminal to J1-61, read the resistance value. Measure the resistance value of sensor 4/R power supply, connect positive terminal to J1-15, the negative terminal to J1-42, read the resistance value.
4. Measure the resistance value of fork position sensor 4/R power supply to ground, connect positive terminal to J1-42, the negative terminal to J1-5, read the resistance value.

Resistance Inspection Result
There is no short circuit when detection resistance is greater than or equal to 1 megohm. It is a short circuit when detection resistance is low.

Caution
• When measuring resistance value, gently shake wire harness in vertical and horizontal directions.

Matching Learning

Matching learning

Hint:

- Before performing matching and learning of vehicle module, be sure to carefully read the related precautions and perform the operation strictly according to standard working procedures.

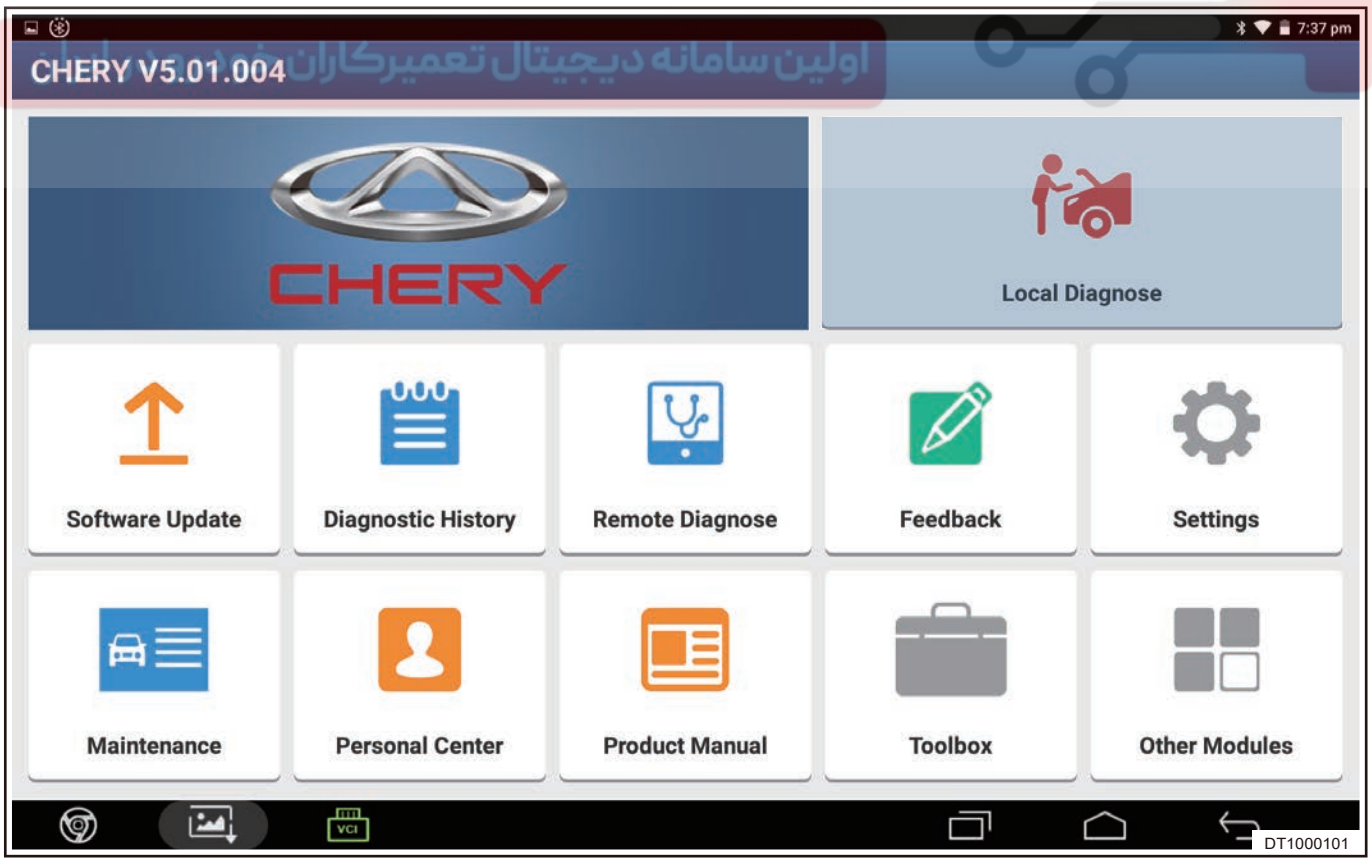
  For matching learning required by transmission control system (dual clutch transmission) (DCT) module under different situations, see table below:

Items	Applicable Situations	Actions Required by Diagnostic Tester	Note
Module replacement	• Module damaged • Module failure	Reset memory	If the provided spare parts are naked spare part (without basic program data), perform software upgrading after VIN code is written
		Read transmission storage data	
		Writing VIN code	
Software upgrading	• Low software version • Software error	Controller Software Refreshing	Refresh data can be requested from Chery after-sales service department
Write VIN Code	Replacement of module	Write VIN code	/
Read transmission storage data	• Replacing transmission body • Transmission controller is replaced • Replacing transmission hydraulic system	Read transmission storage data	After the data is successfully read, the vehicle needs to be powered off for 55 seconds to ensure a complete data storage
Reset memory	• Replacing transmission body • Transmission controller is replaced • Replacing transmission hydraulic system	Reset memory	/

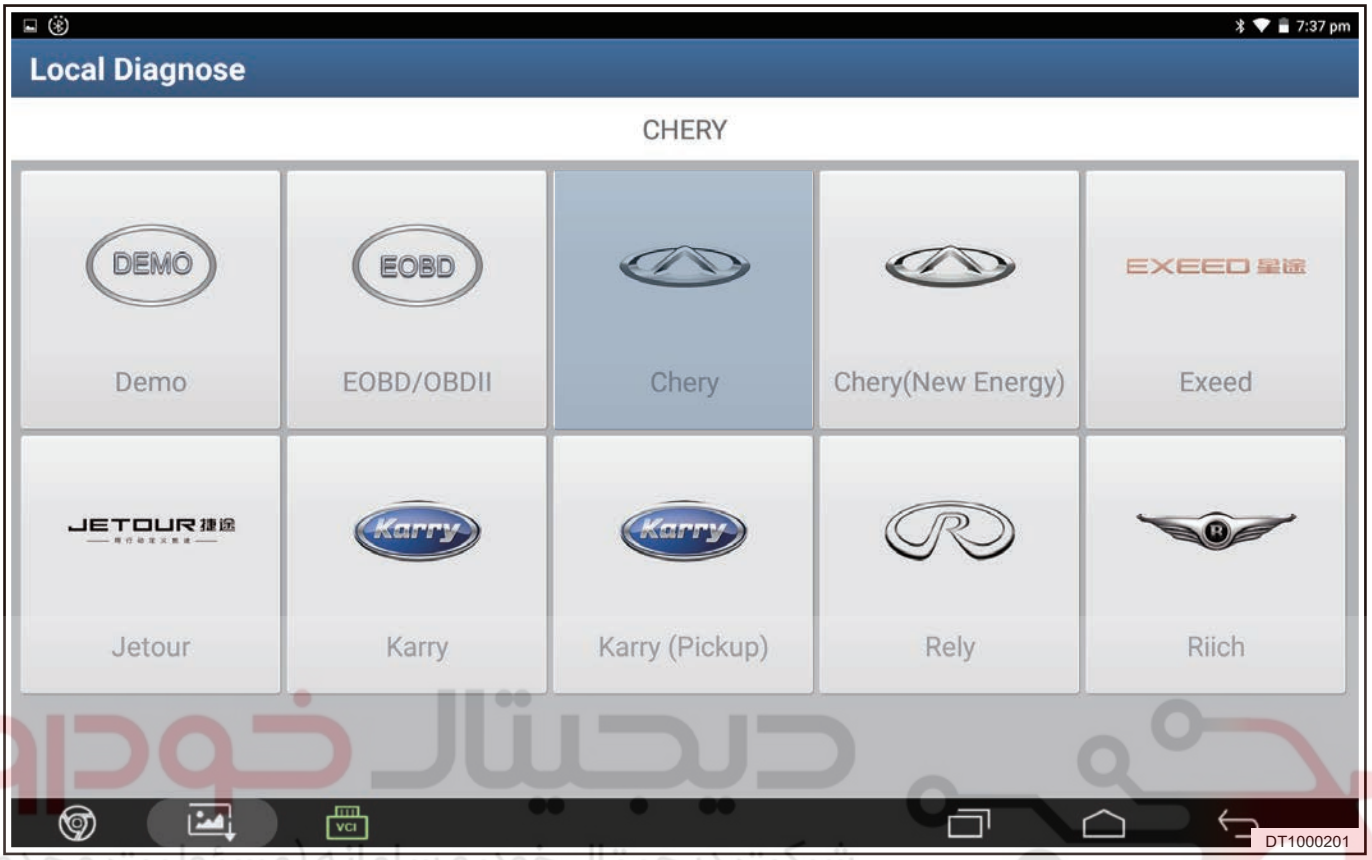
Items	Applicable Situations	Actions Required by Diagnostic Tester	Note
	• Replacing transmission clutch assembly		
Clutch solenoid valve wash	Solenoid valve stuck fault is reported	Clutch solenoid valve wash	After clutch solenoid valve is washed, if fault is still not eliminated, troubleshoot the hardware
Clutch TP point self-learning	• Replacing transmission clutch assembly • Transmission clutch related components are replaced • Replacing transmission hydraulic system • Fork related components are replaced	Clutch TP point self-learning	Transmission offline (EOL) related self-learning has been performed, it is unnecessary to perform self-learning if parts are not changed
Clutch TC curve self-learning		Clutch TC curve self-learning	
Fork Position Self-learning		Fork Position Self-learning	

Controller Software Refreshing

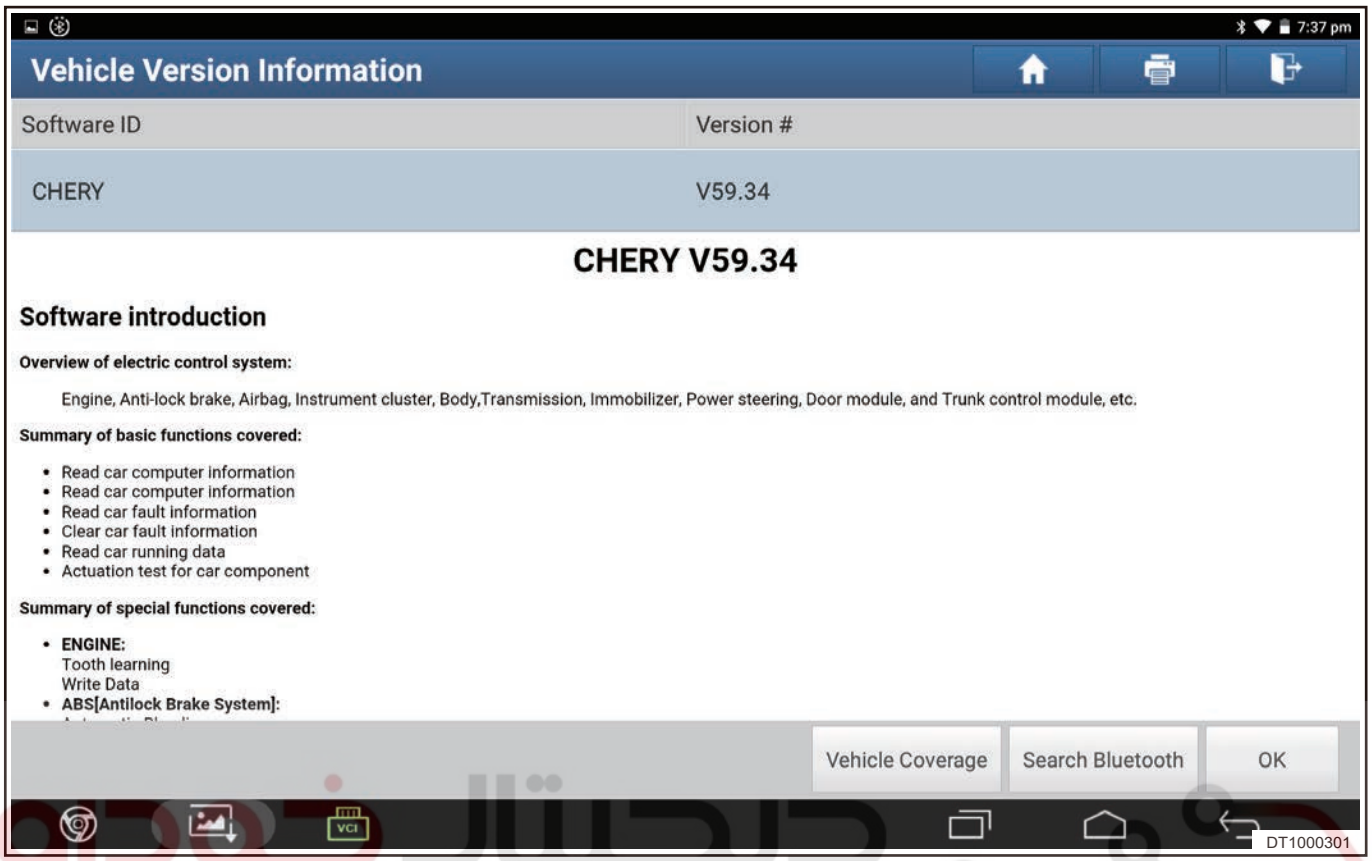
1. Use diagnostic tester to select Traditional Diagnosis.



2. Select Chery on diagnostic tester.

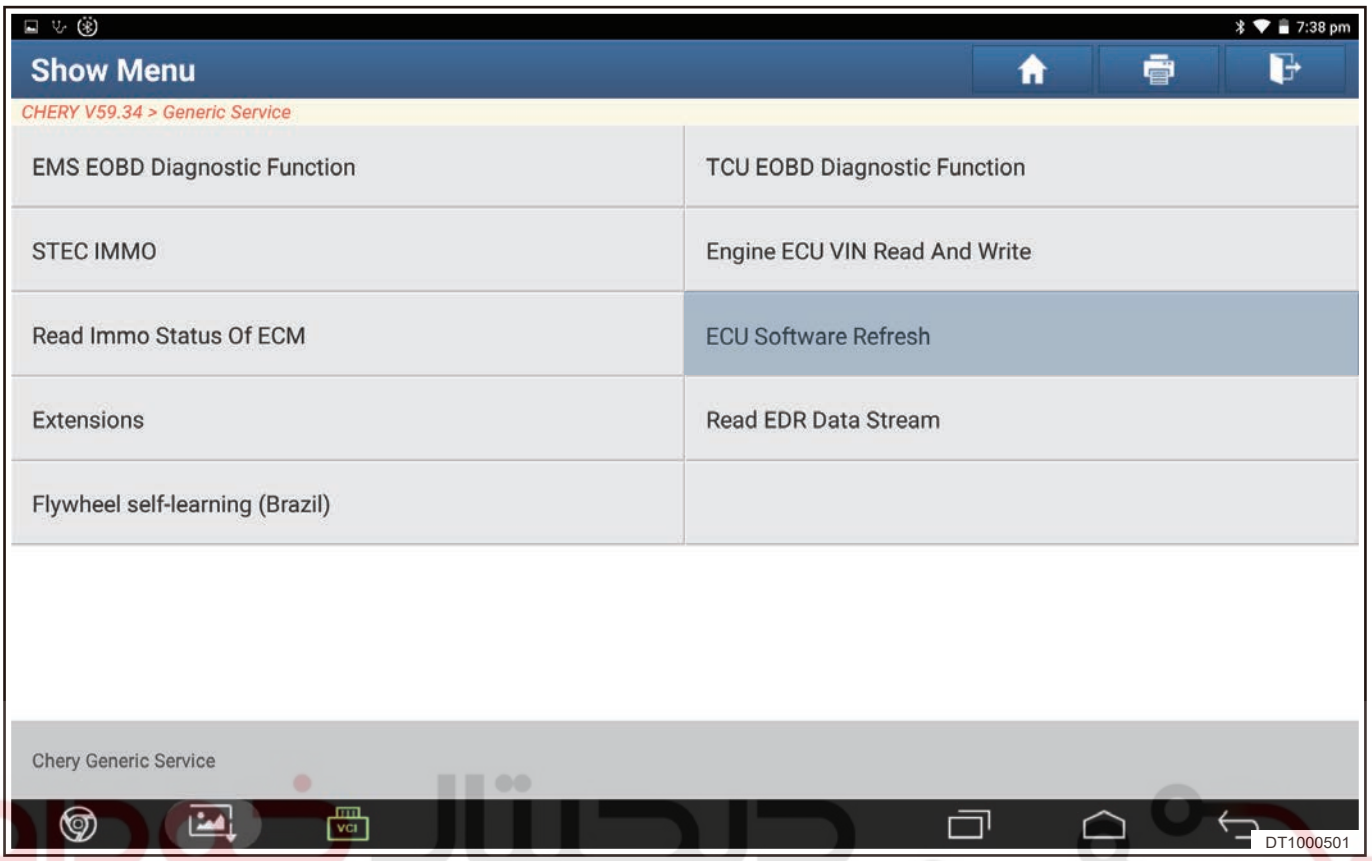


3. Click OK on Vehicle Version Information screen.



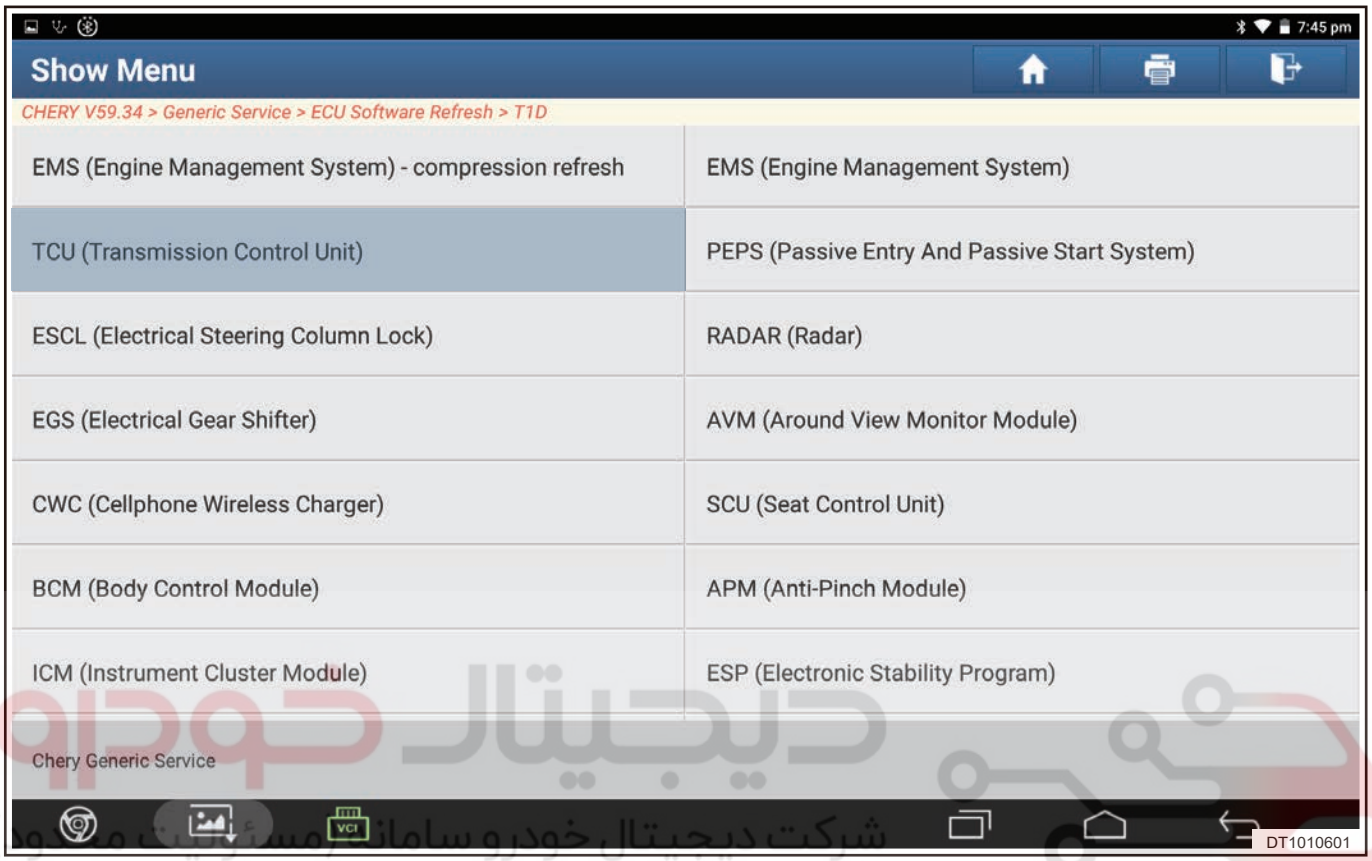
4. Select Generic Service on diagnostic tester.

5. Select ECU Software Refresh on diagnostic tester.

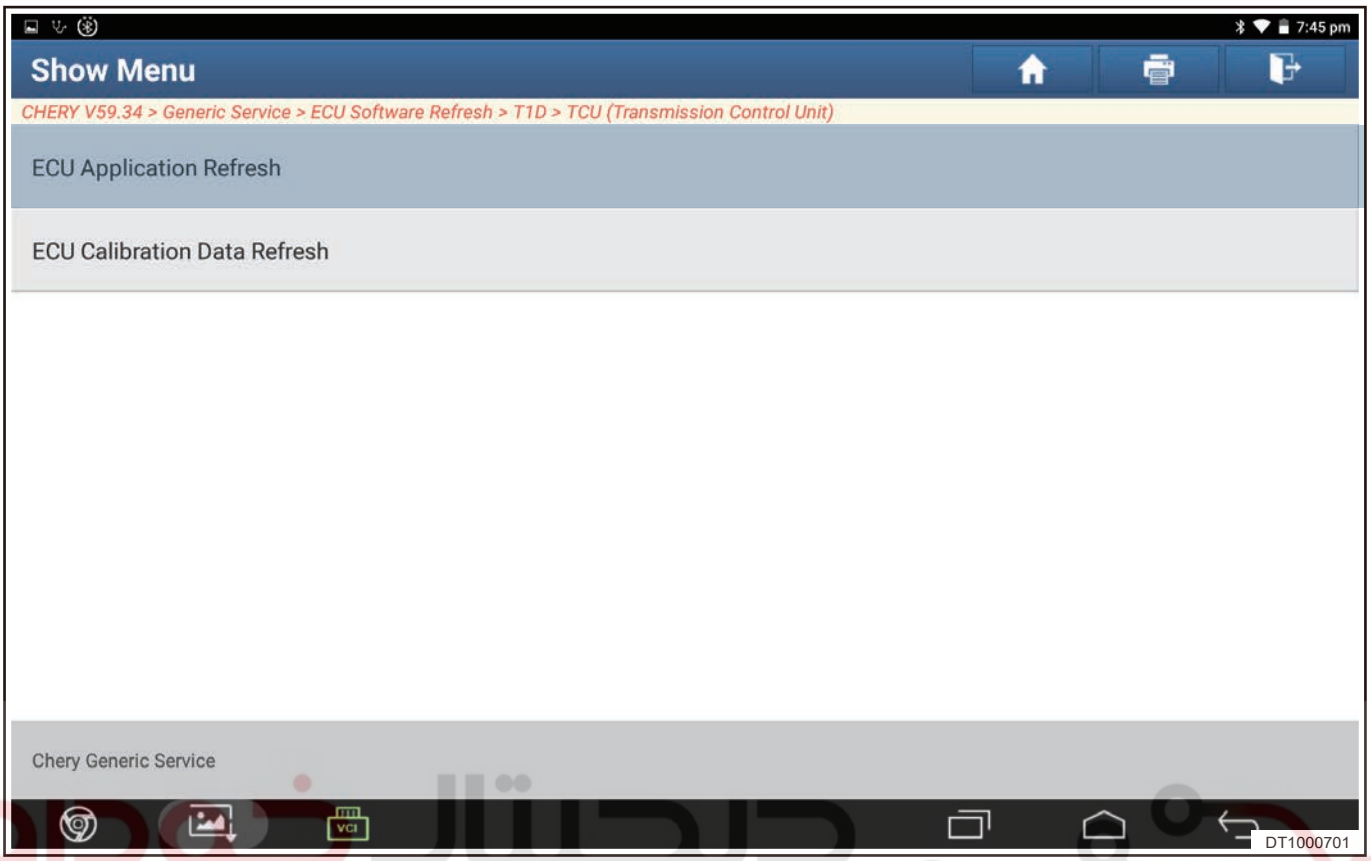


6. Select T1D on diagnostic tester.

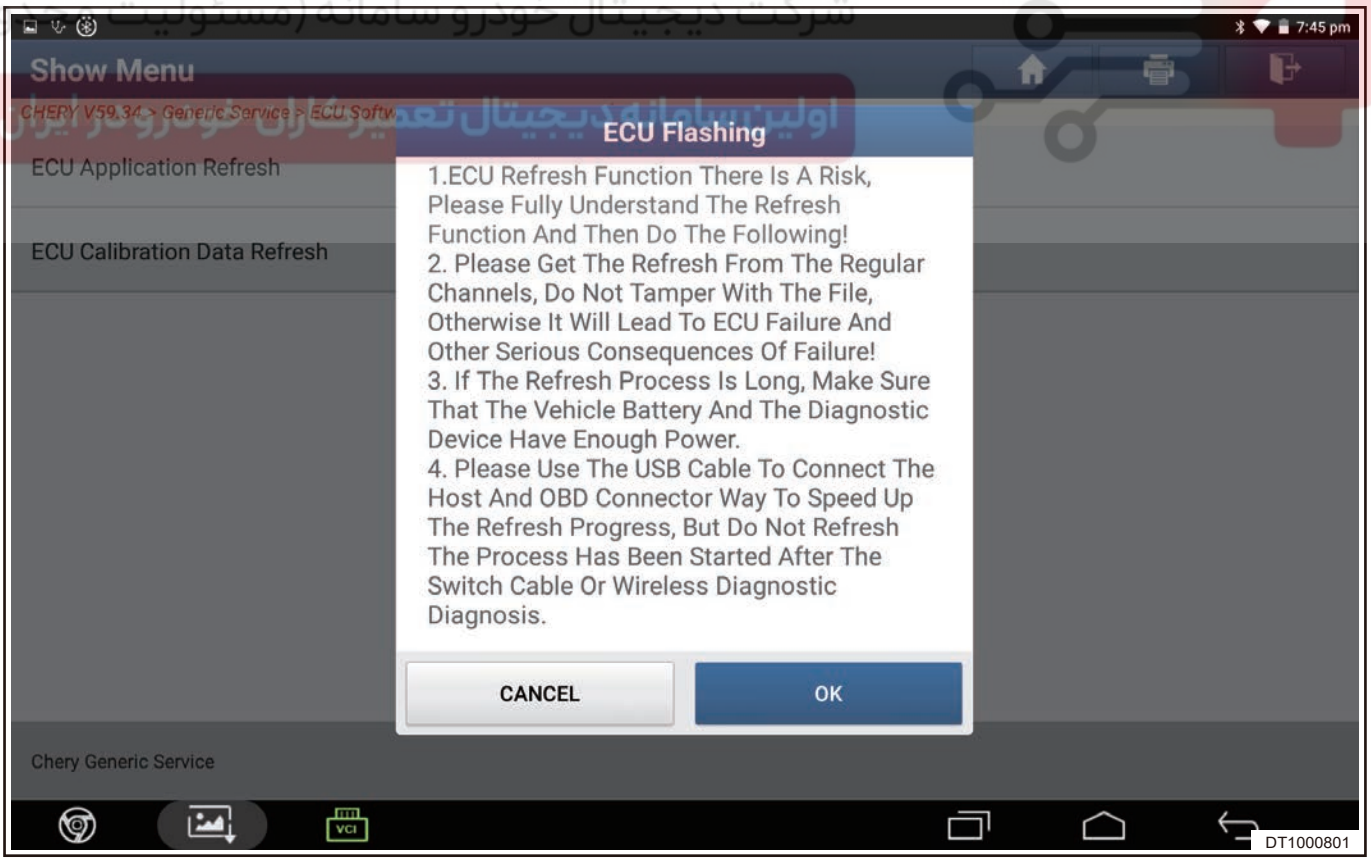
7. Select TCU (Transmission Control Unit) on diagnostic tester.



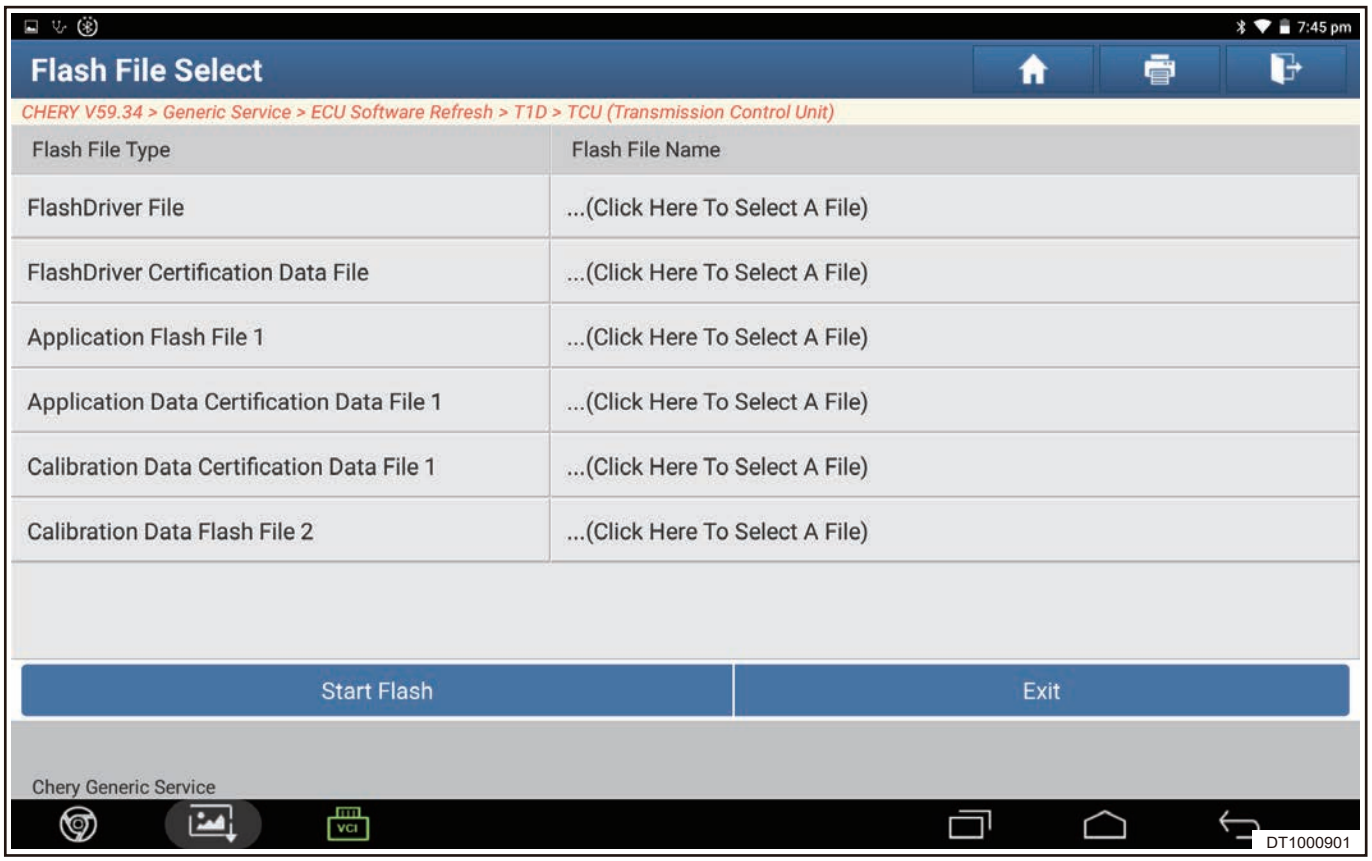
8. Select ECU Application Refresh on diagnostic tester.



9. Select OK on diagnostic tester.



10. Select Refresh Files in Order on diagnostic tester.



11. Select Start to Refresh on diagnostic tester.

Caution
• The picture is for reference only. The selection order of TCU writing package is subject to the latest writing package released by the manufacturer.

12. “Please wait” is displayed on diagnostic tester interface.

Warning
• Power should not be cut during writing.

13. “Writing is successful” is displayed on diagnostic tester interface.

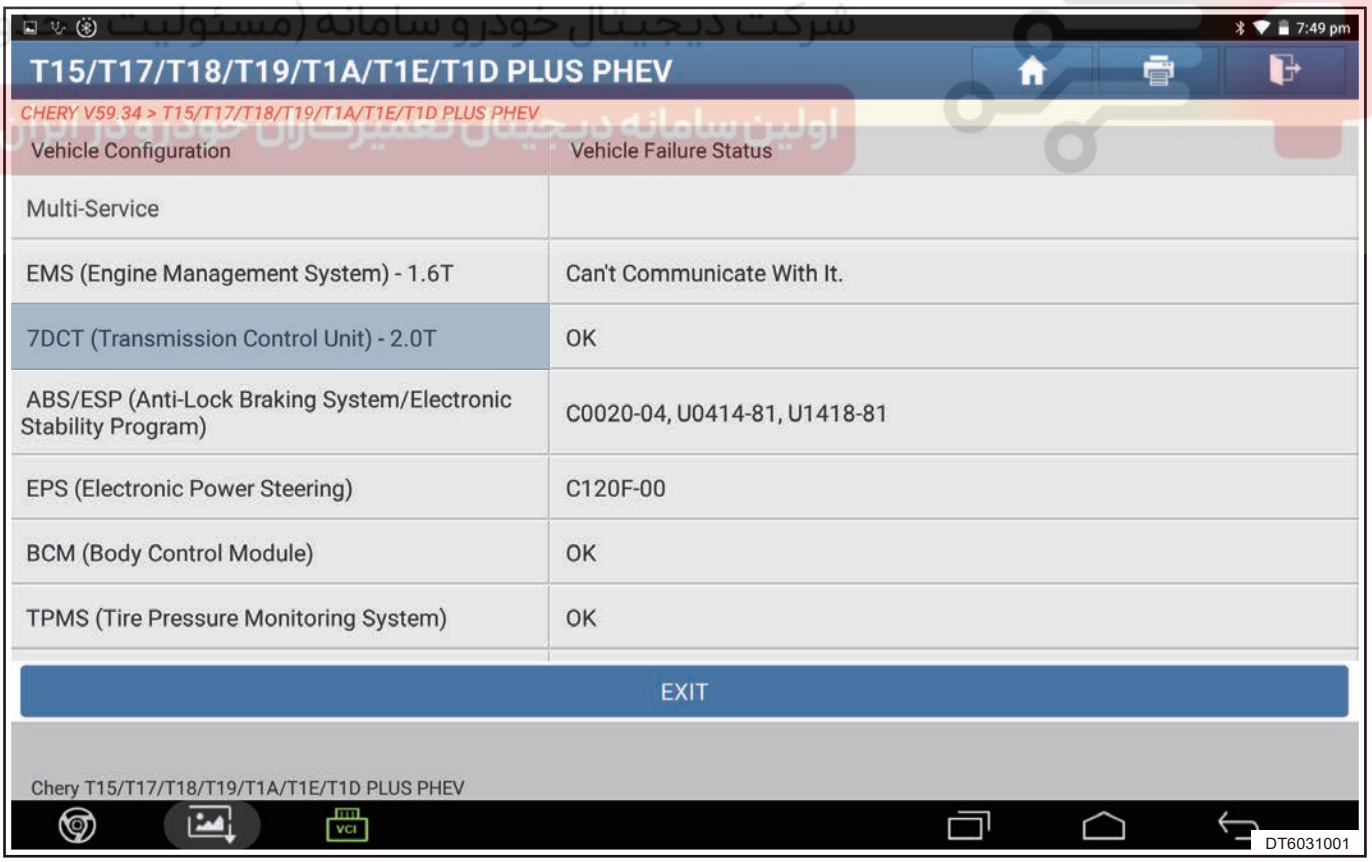
14. The version information must be read for confirmation after writing.

Caution
• The picture is for reference only. Actual version number is subject to the latest writing package released by the manufacturer.

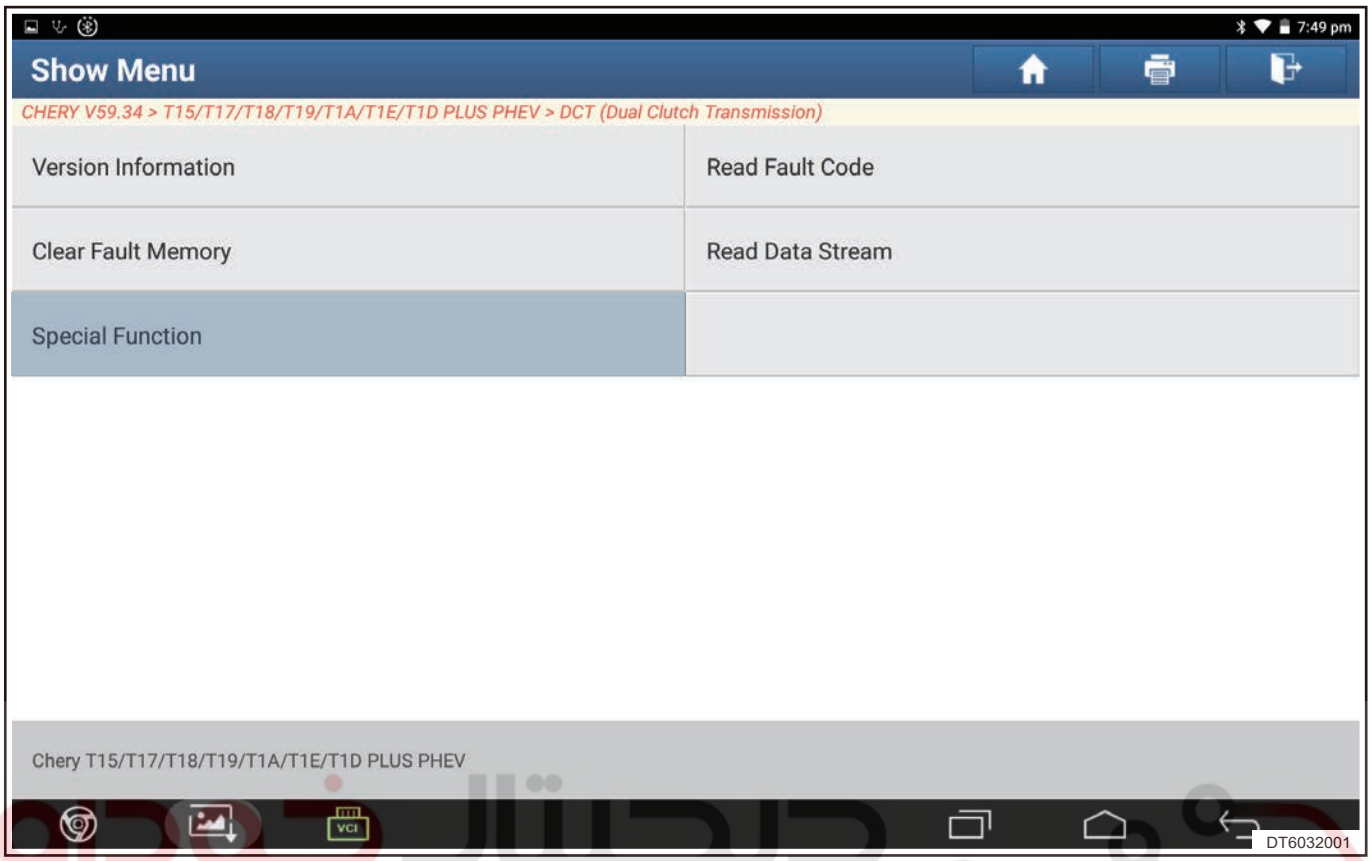
Write VIN Code

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

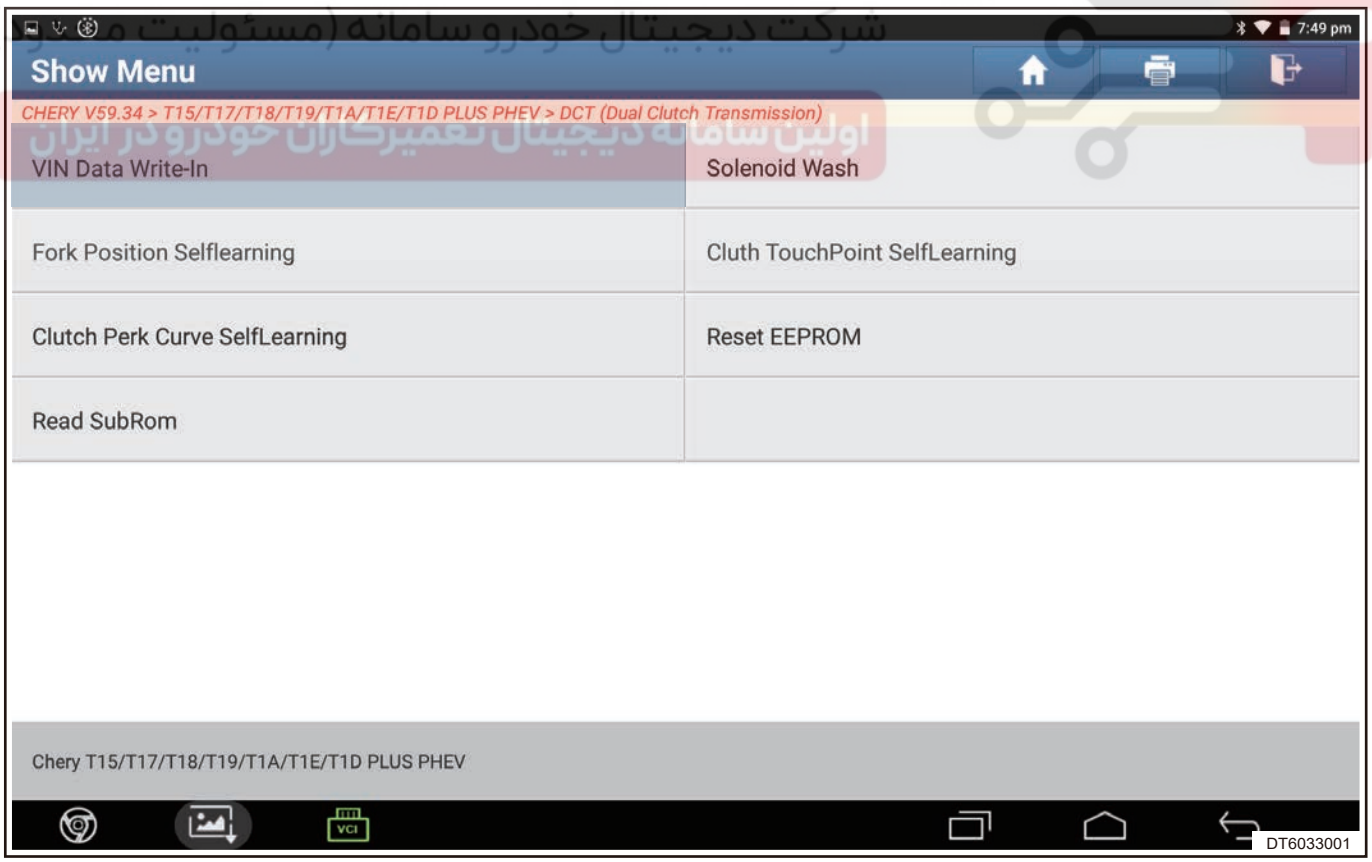
3. Enter next screen and click “TCU (Transmission Control Unit) - 2.0T”.



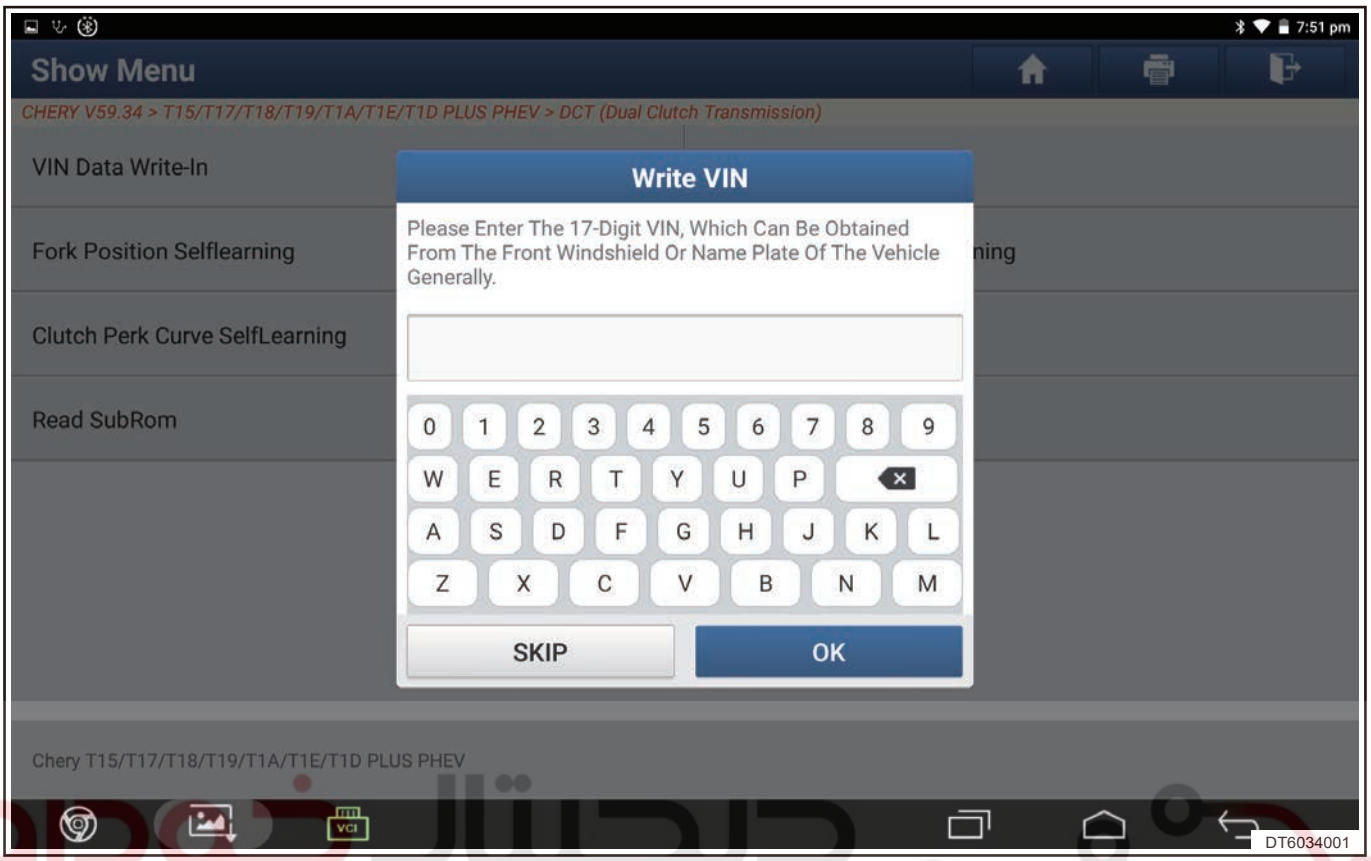
4. Enter next screen and click “Special Function”.



5. Enter next screen and click “VIN Data Write-in”.



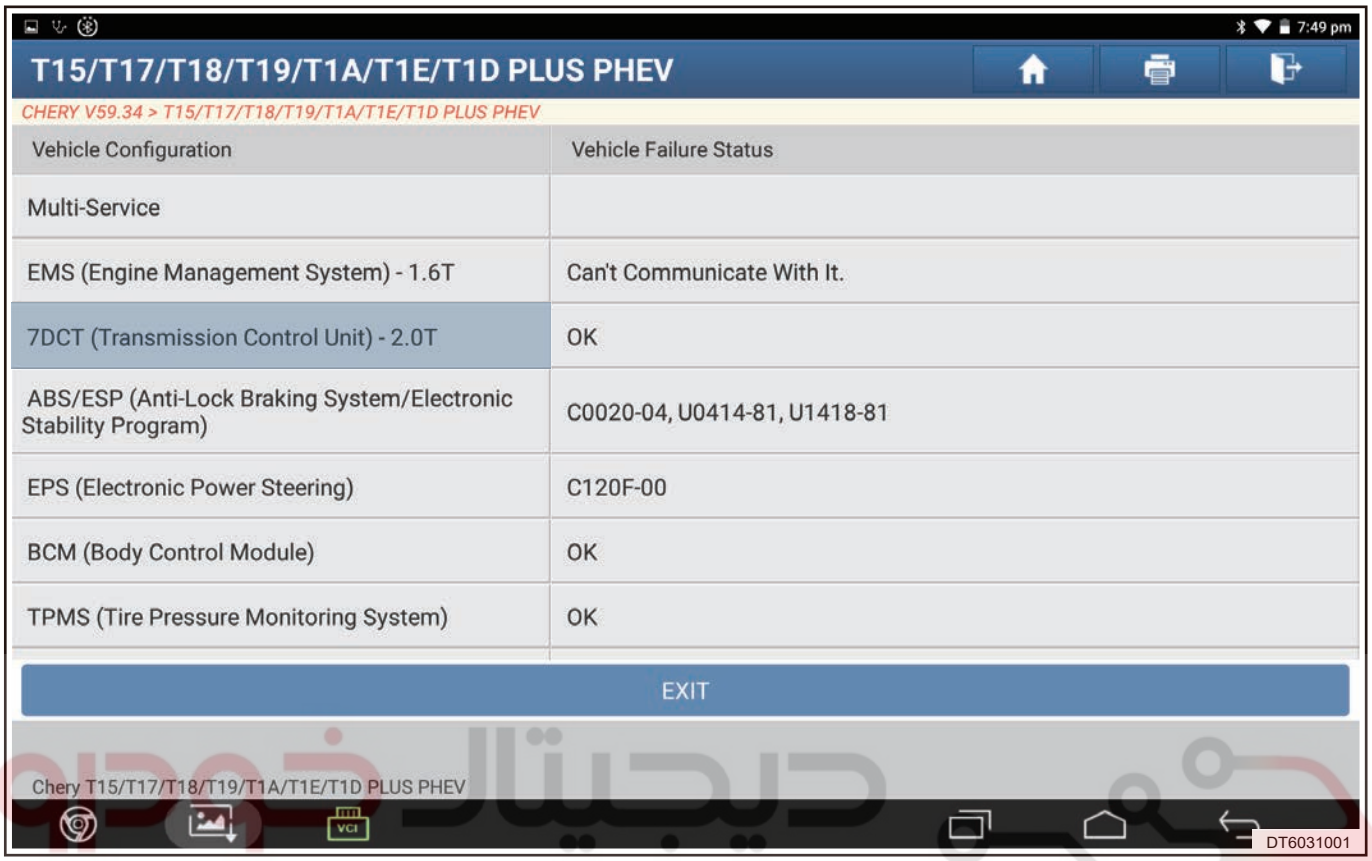
6. Input a 17-digit VIN code.



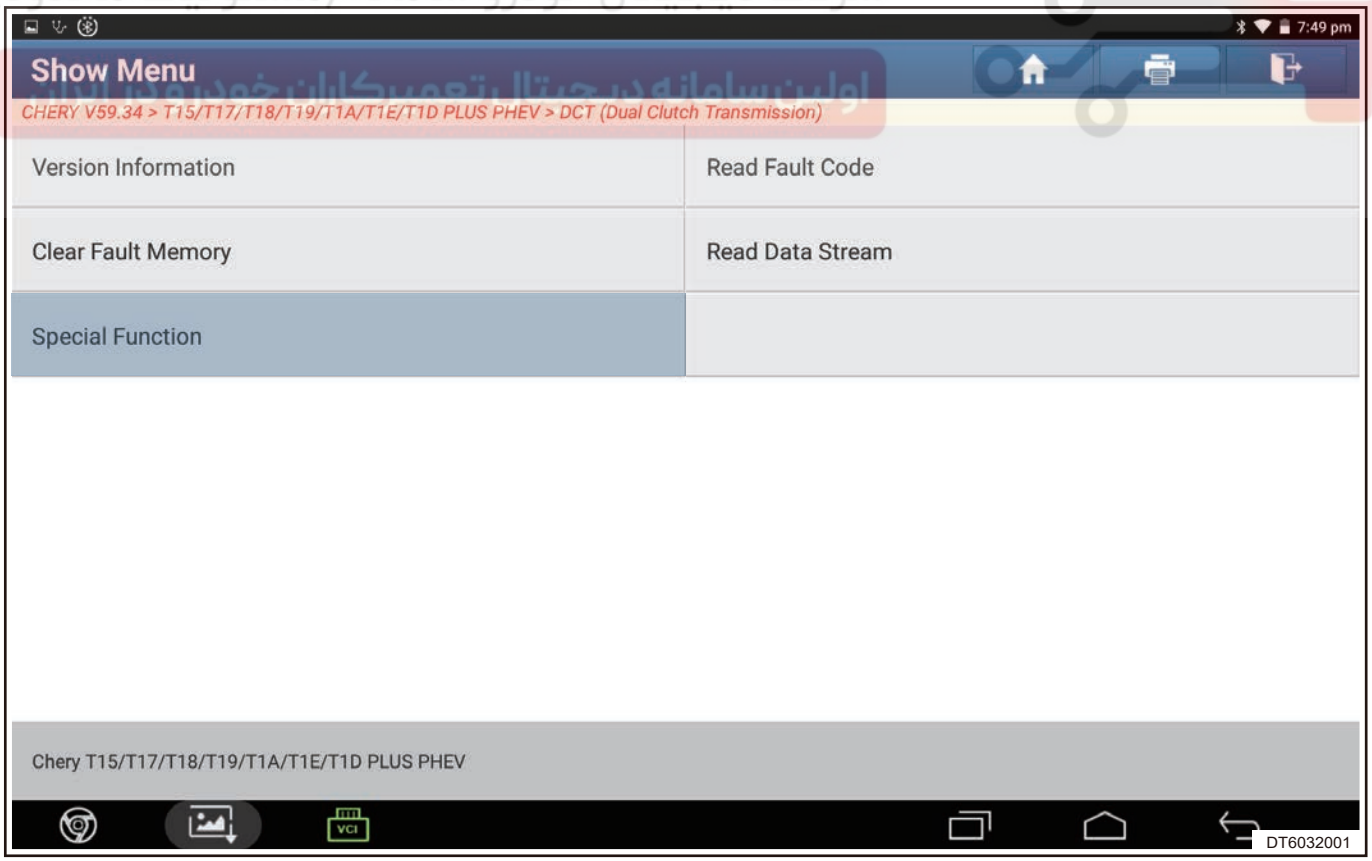
Clutch solenoid valve wash

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

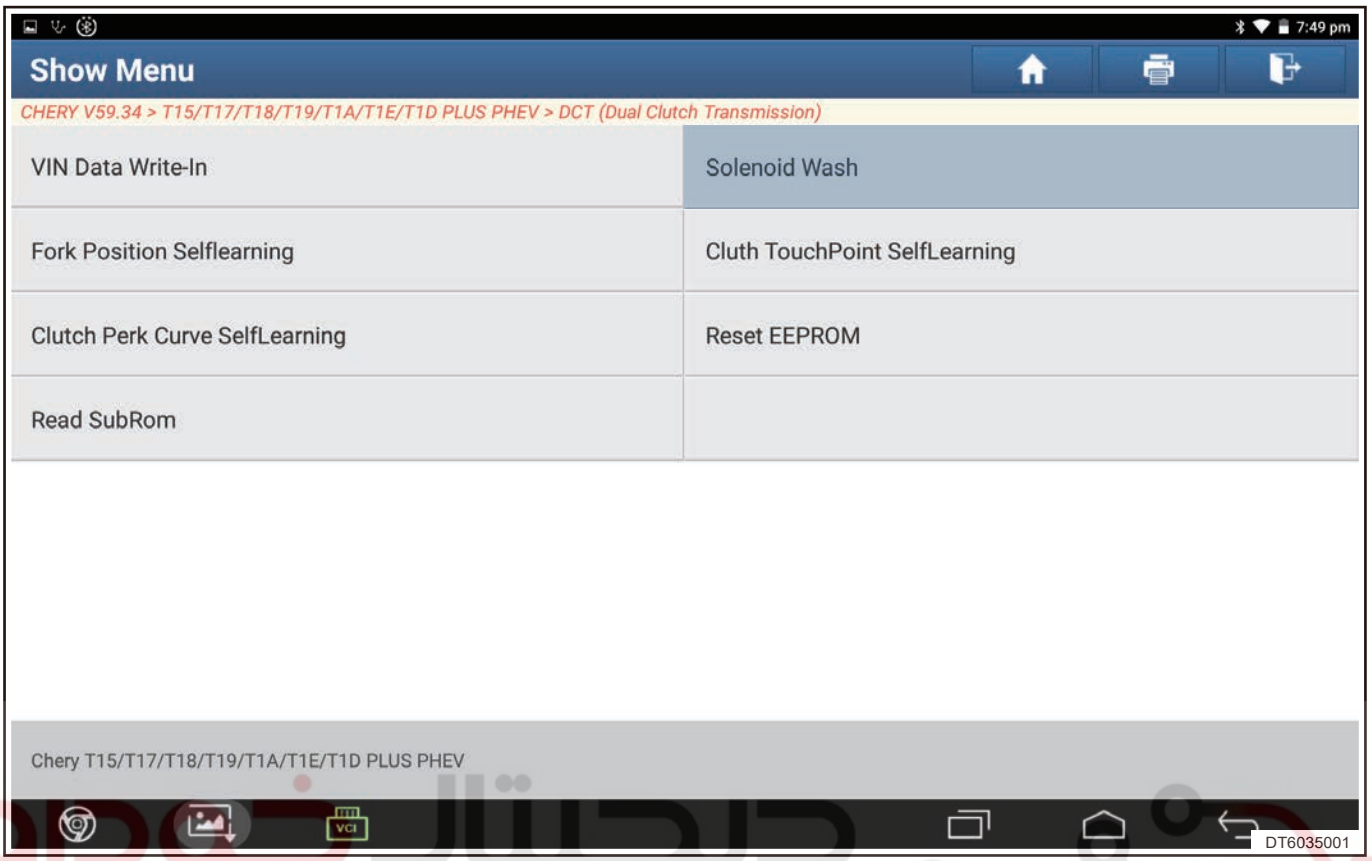
3. Enter next screen and click “TCU (Transmission Control Unit) - 2.0T”.



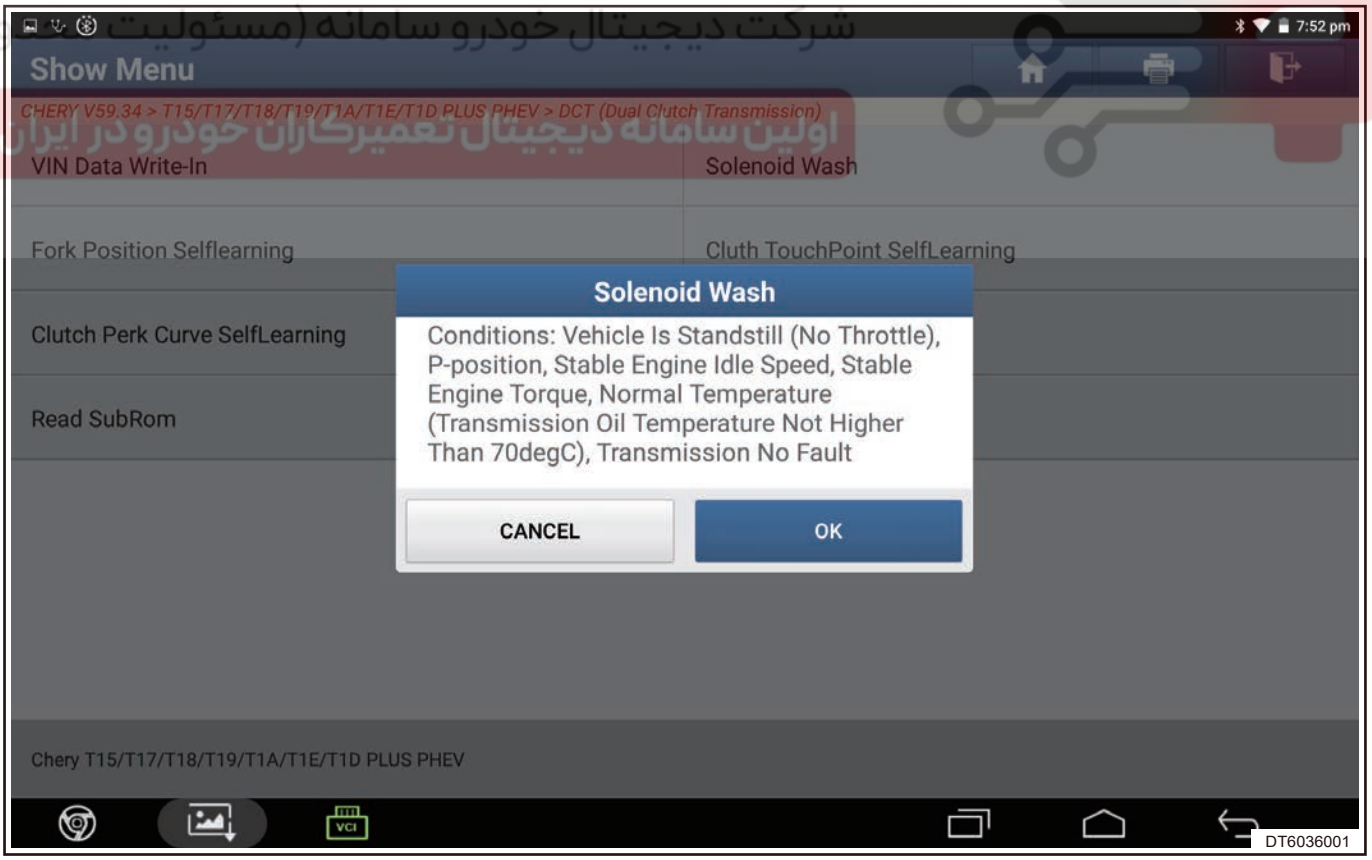
4. Enter next screen and click “Special Function”.



5. Enter next screen and click “Solenoid Wash”.



6. Condition.

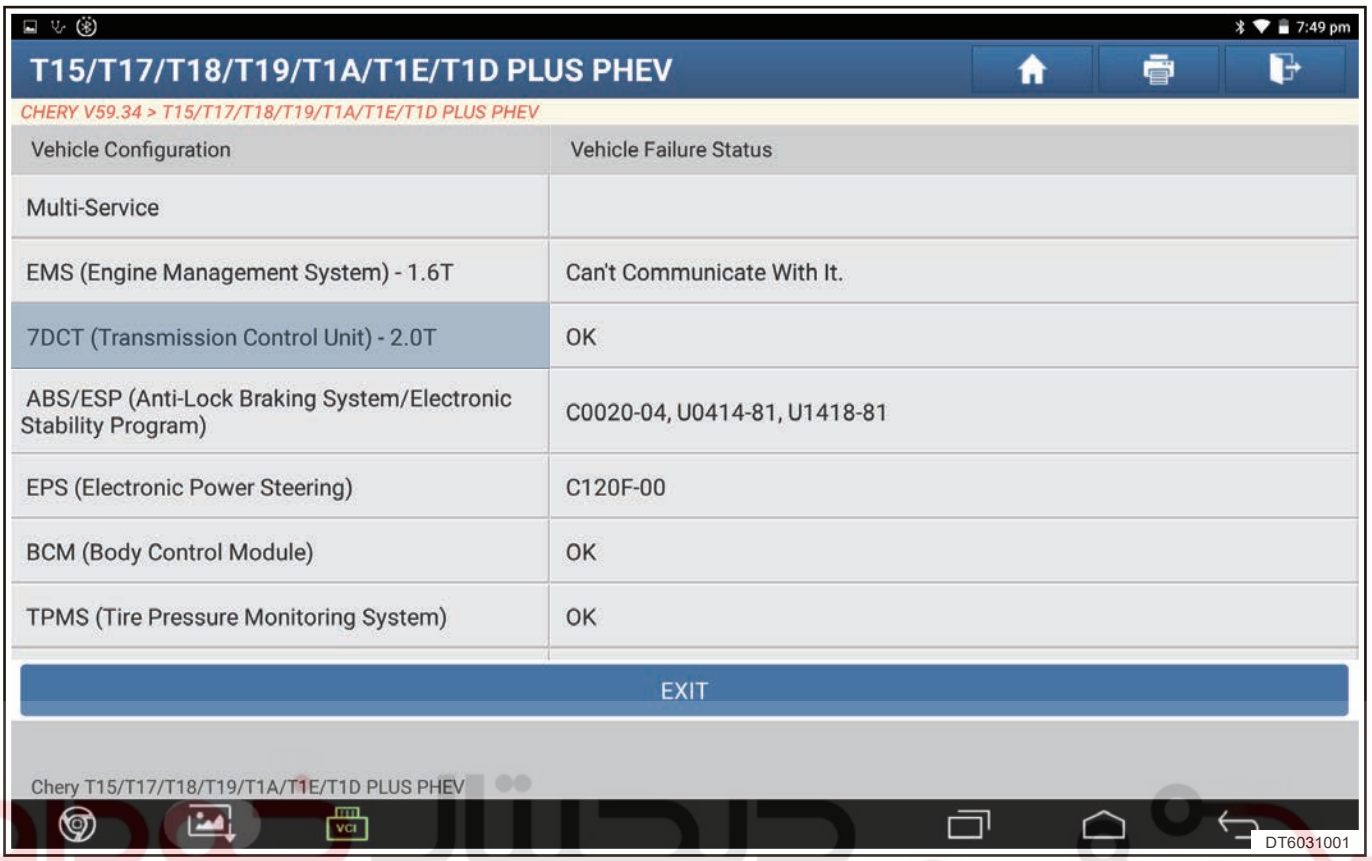


7. Click “OK” and perform clutch solenoid valve wash.

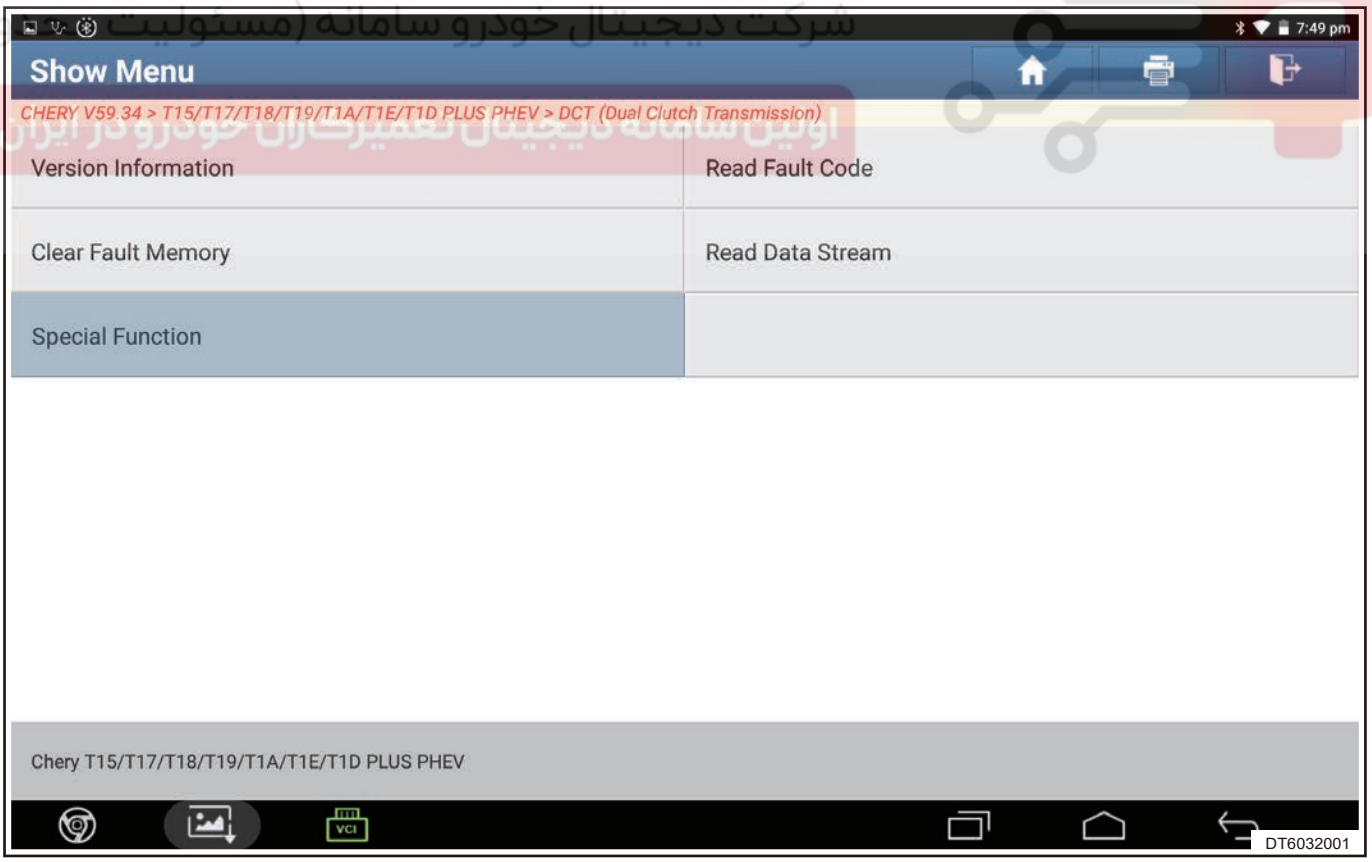
Fork Position Self-learning

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

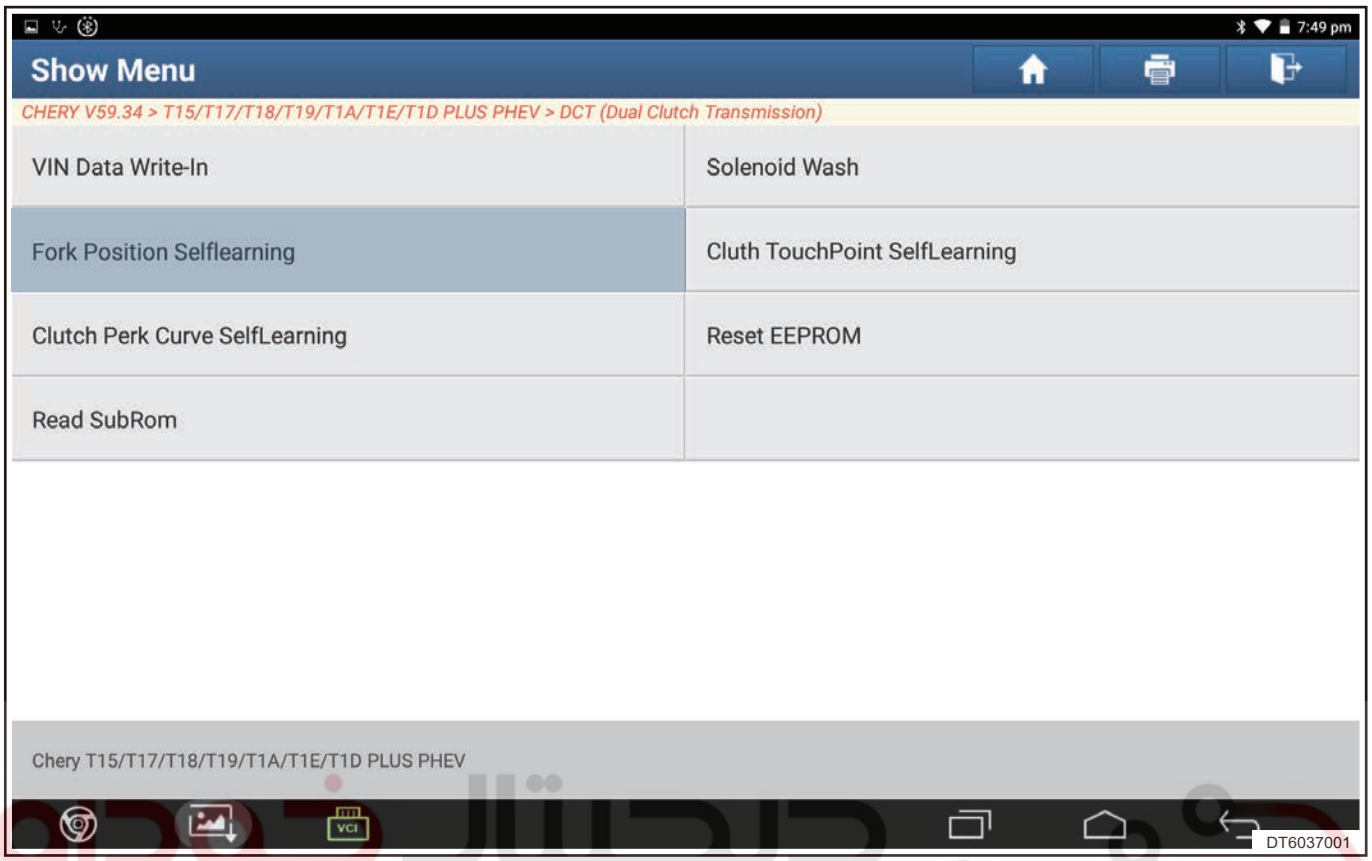
3. Enter next screen and click “TCU (Transmission Control Unit) - 2.0T”.



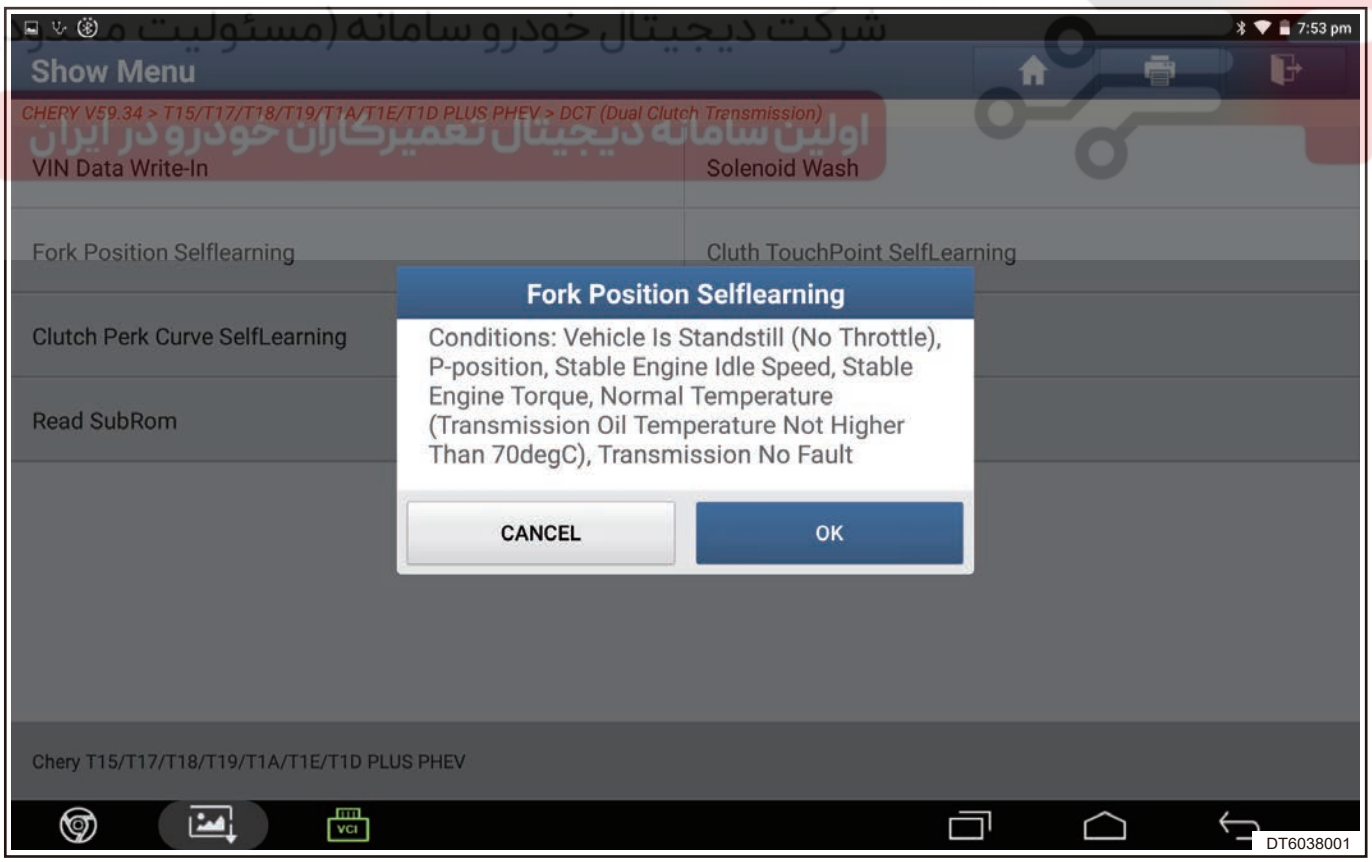
4. Enter next screen and click “Special Function”.



5. Enter next screen and click “Fork Position Selflearning”.



6. Condition.

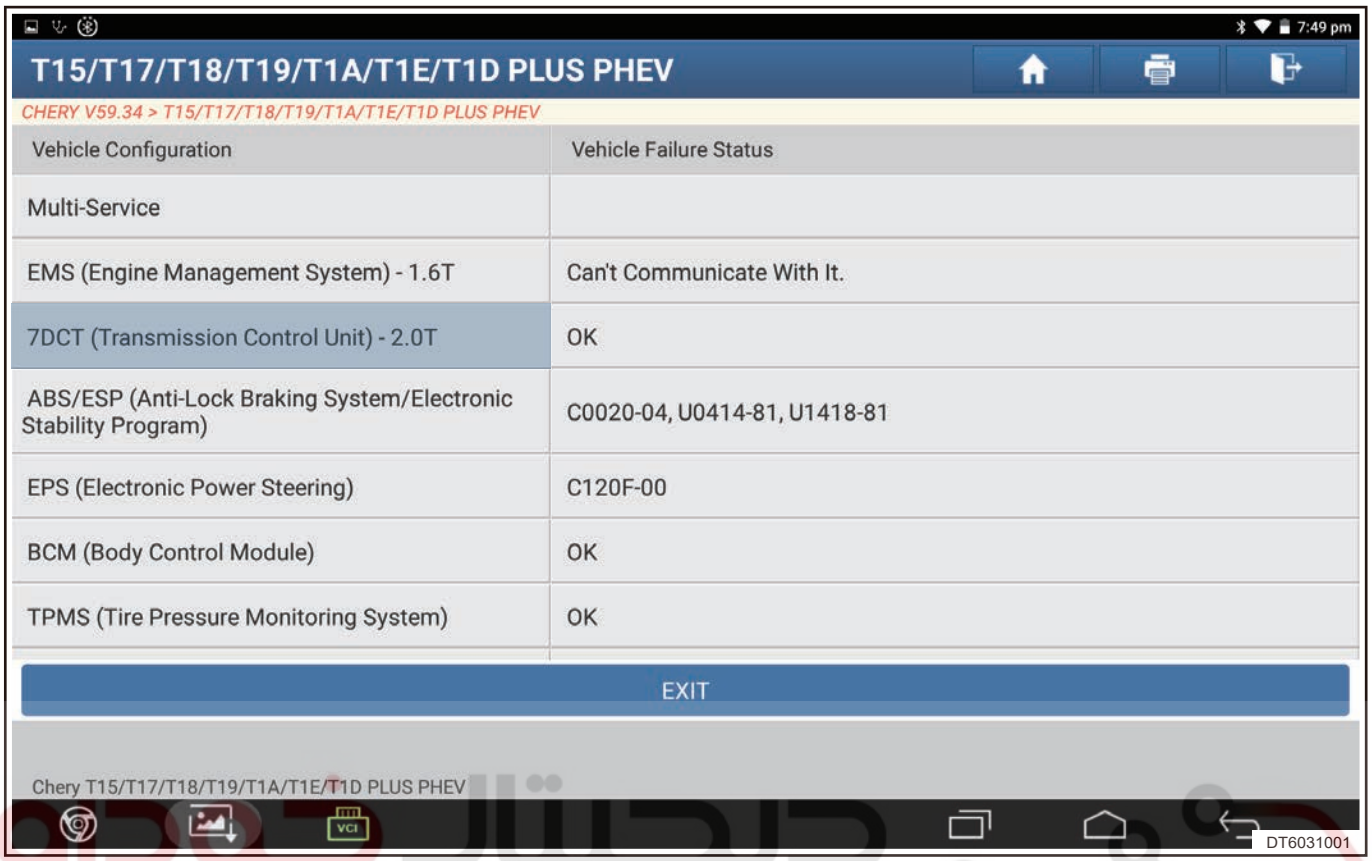


7. Click “OK” to perform fork position self-learning.

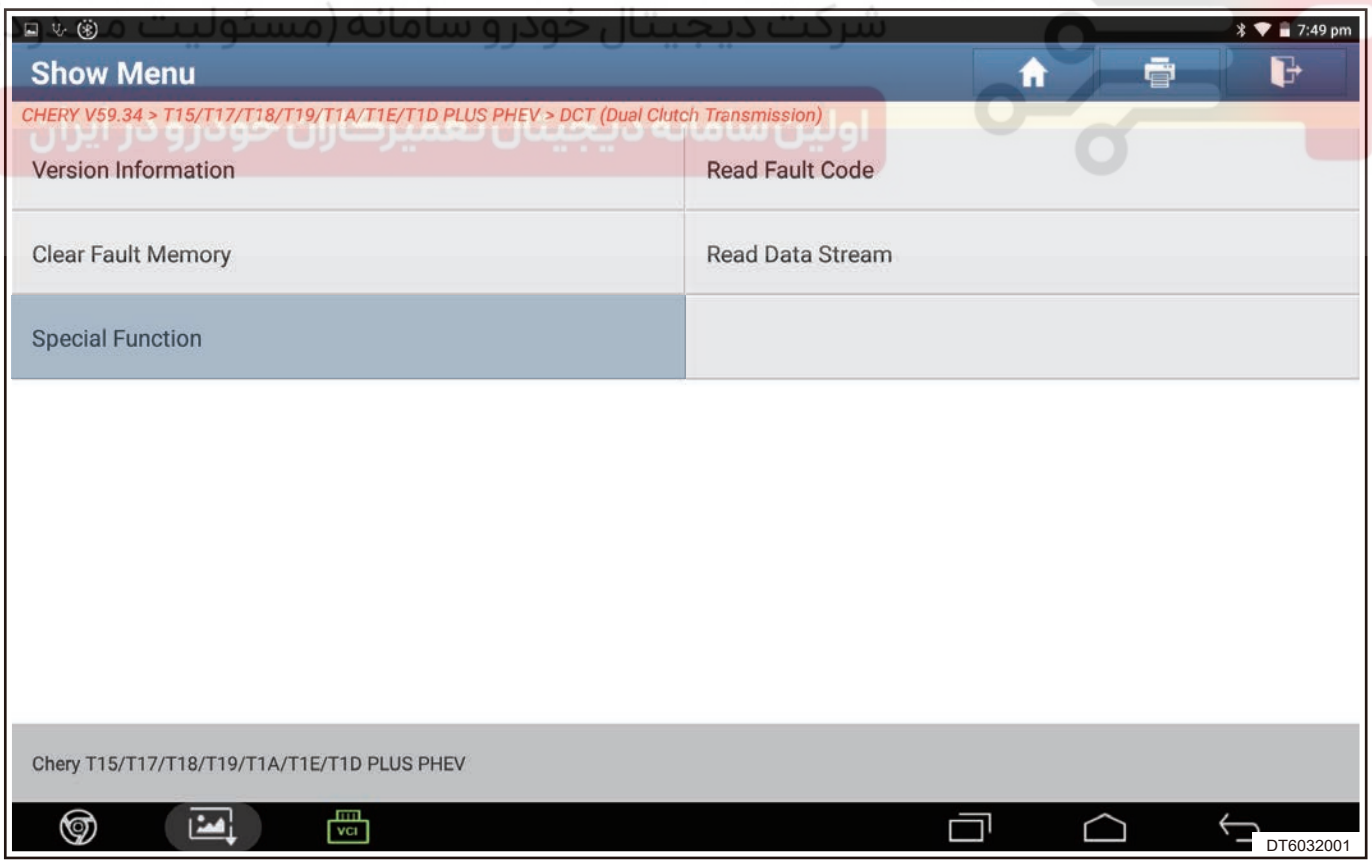
Clutch TP point self-learning

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

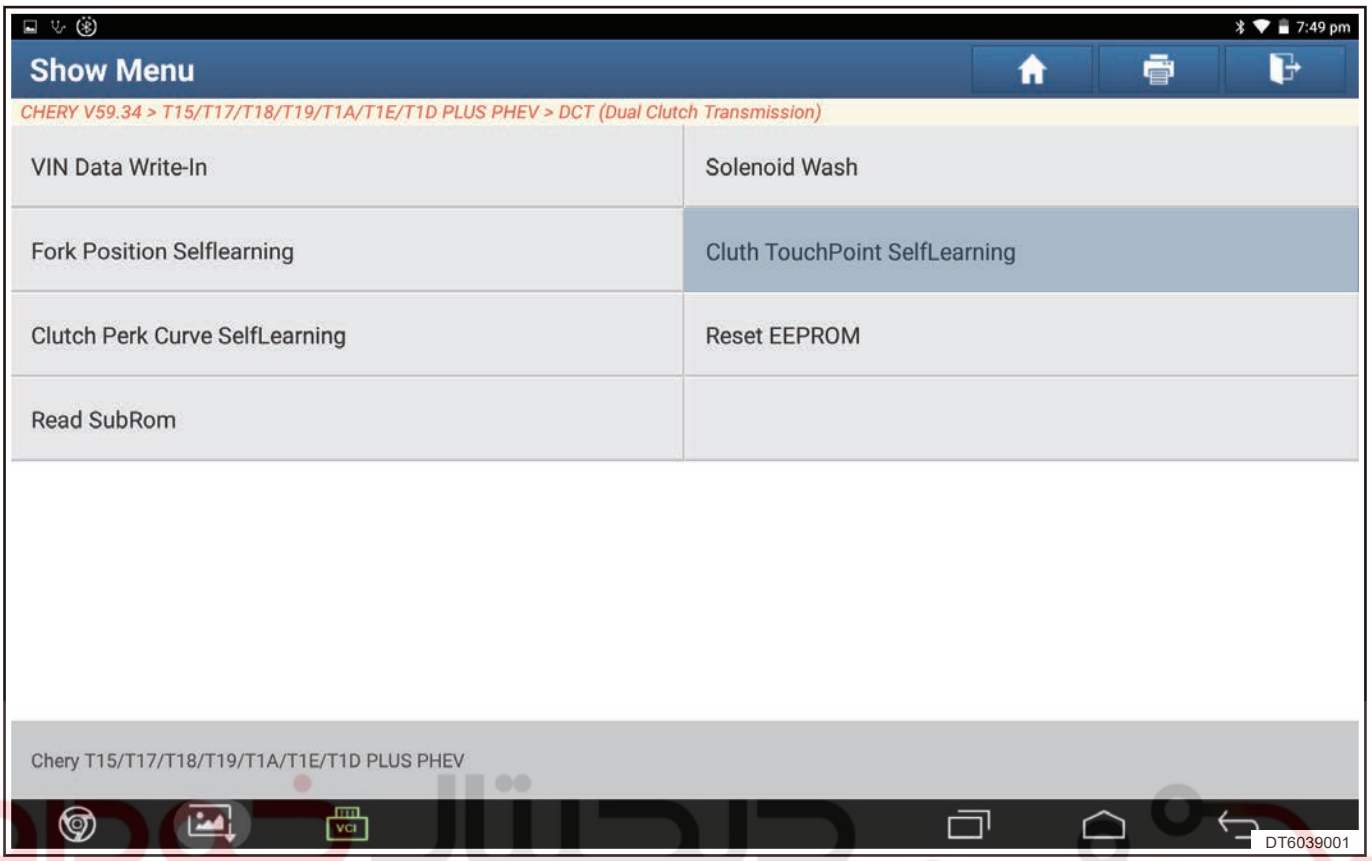
3. Enter next screen and click “TCU (Transmission Control Unit) - 2.0T”.



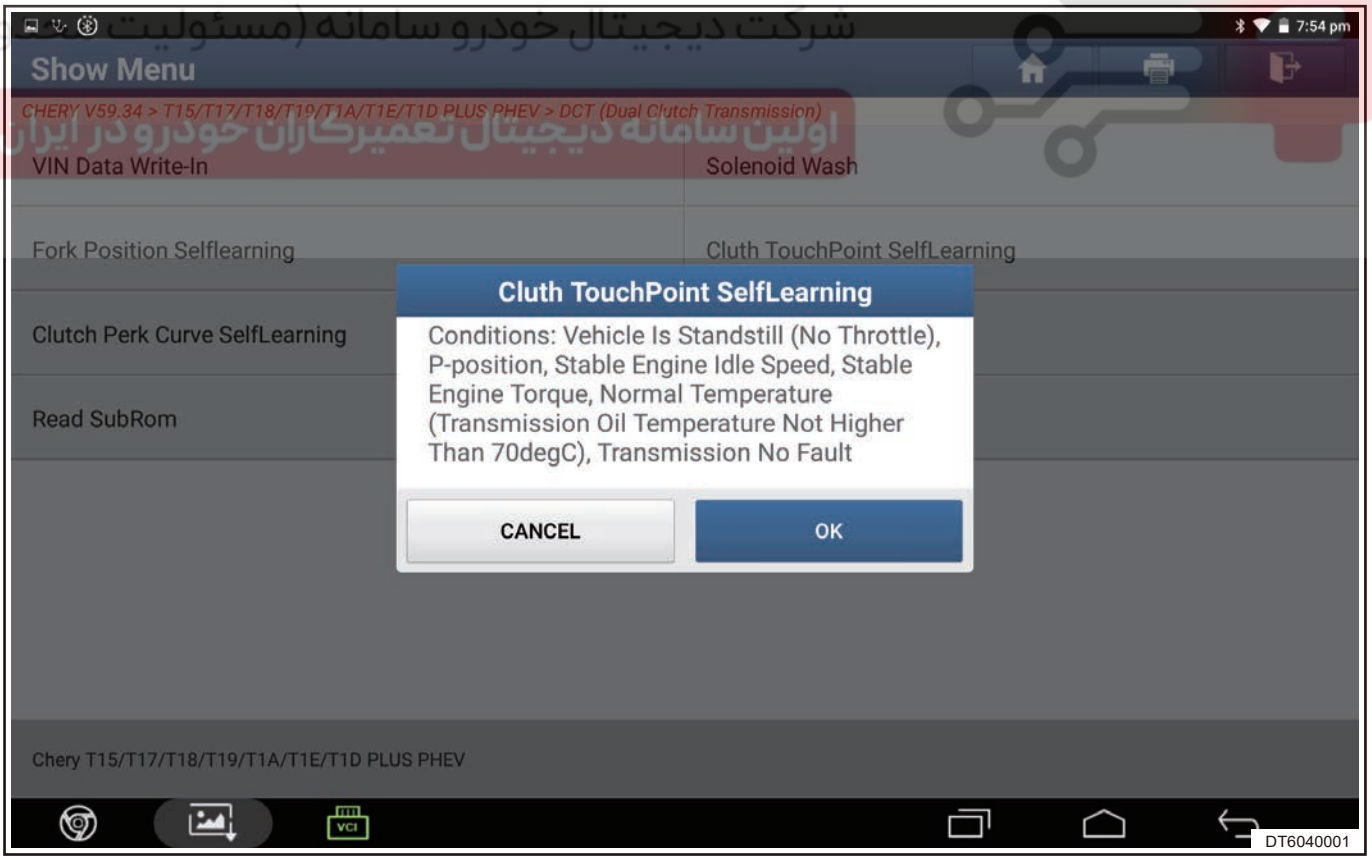
4. Enter next screen and click “Special Function”.



5. Enter next screen and click “Clutch TouchPoint SelfLearning”.



6. Condition.

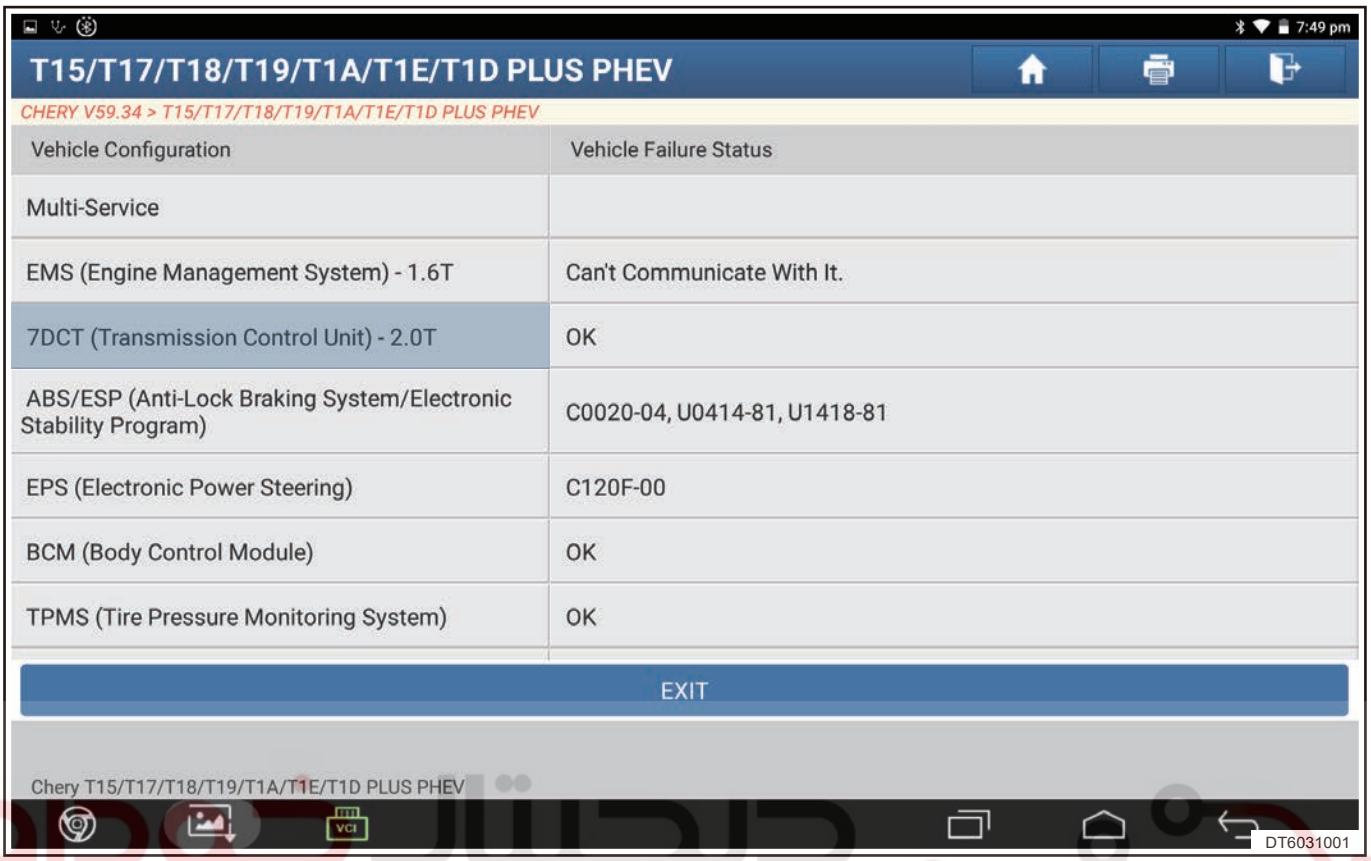


7. Click “OK” to perform clutch TP point self-learning.

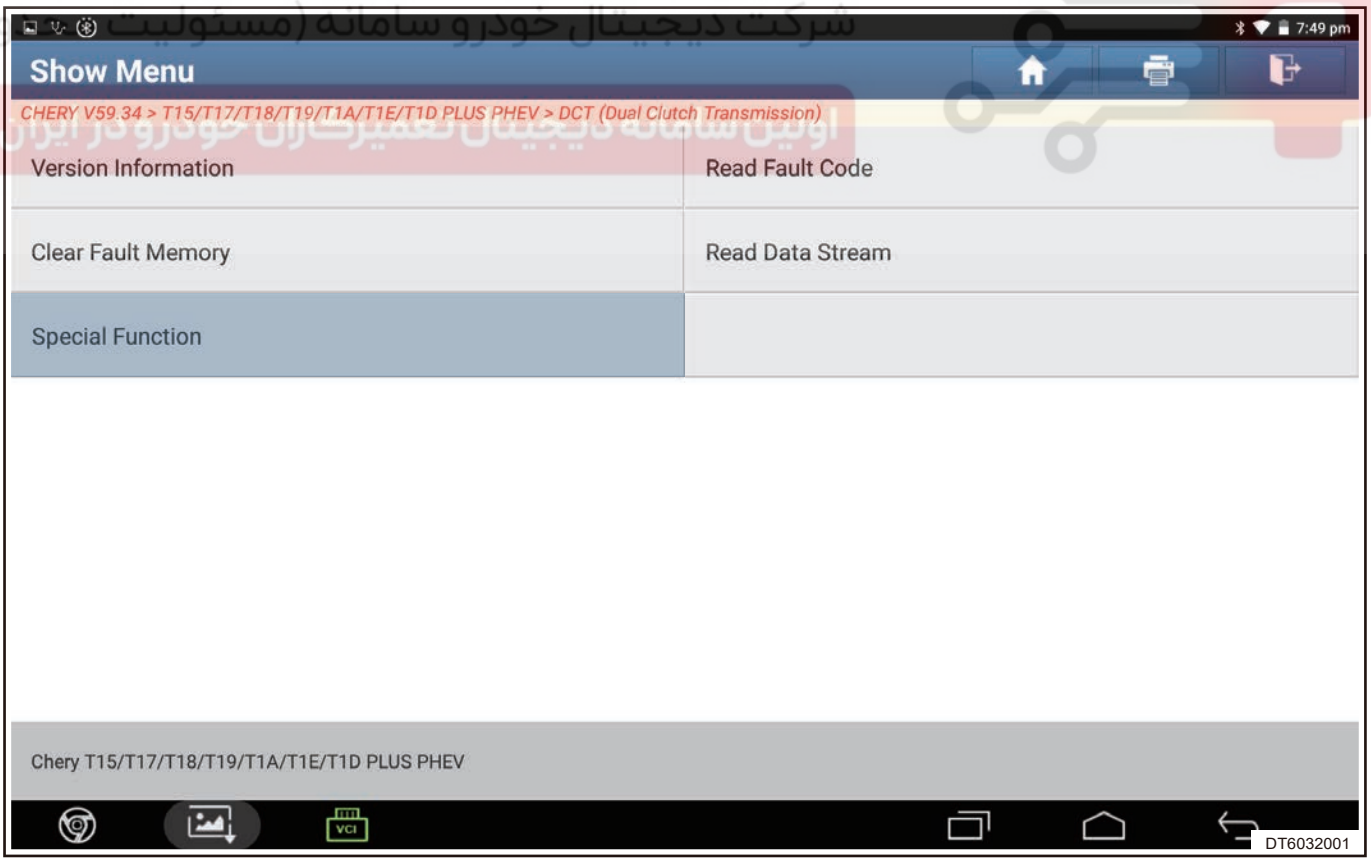
Clutch PC curve self-learning

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

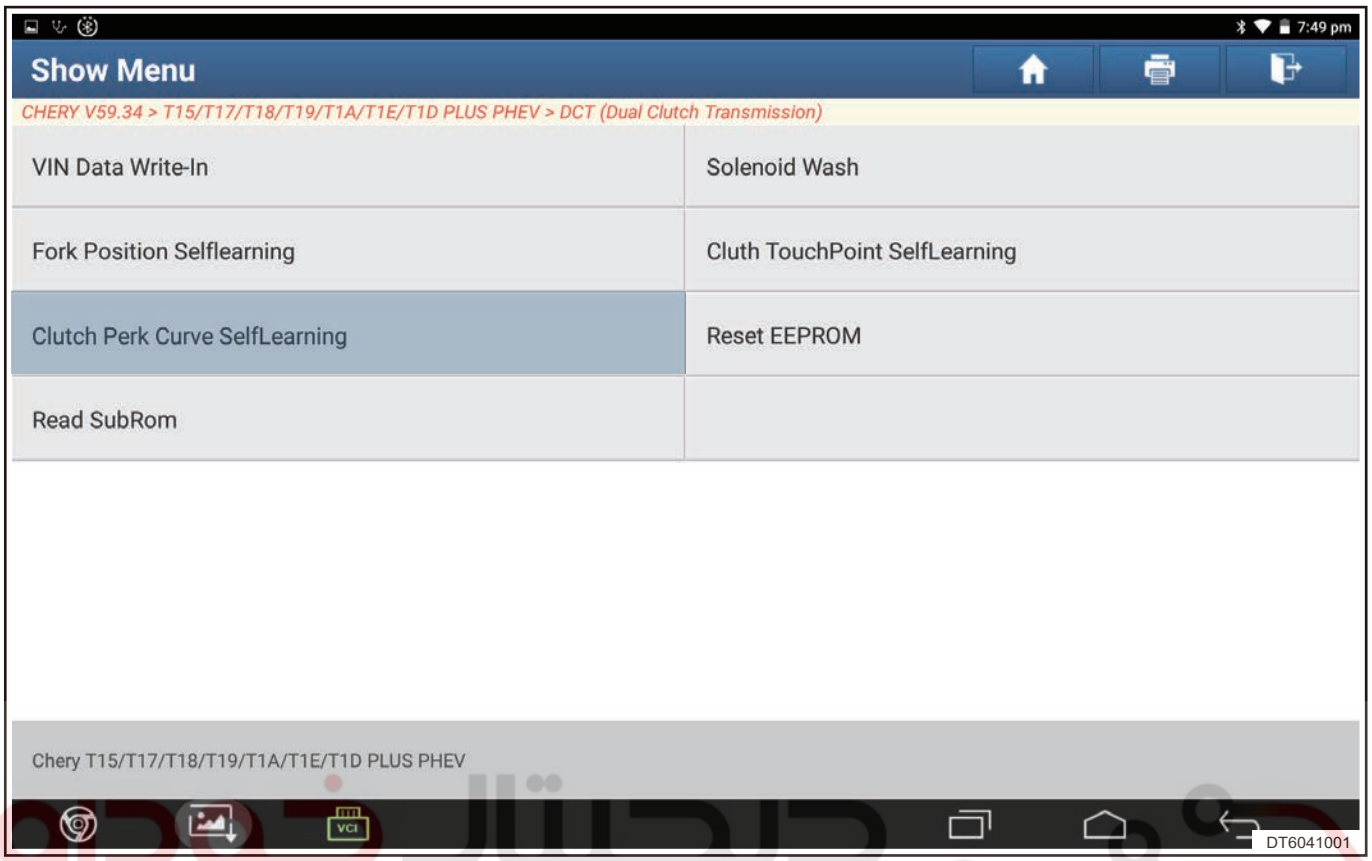
3. Enter next screen and click “TCU (Transmission Control Unit) - 2.0T”.



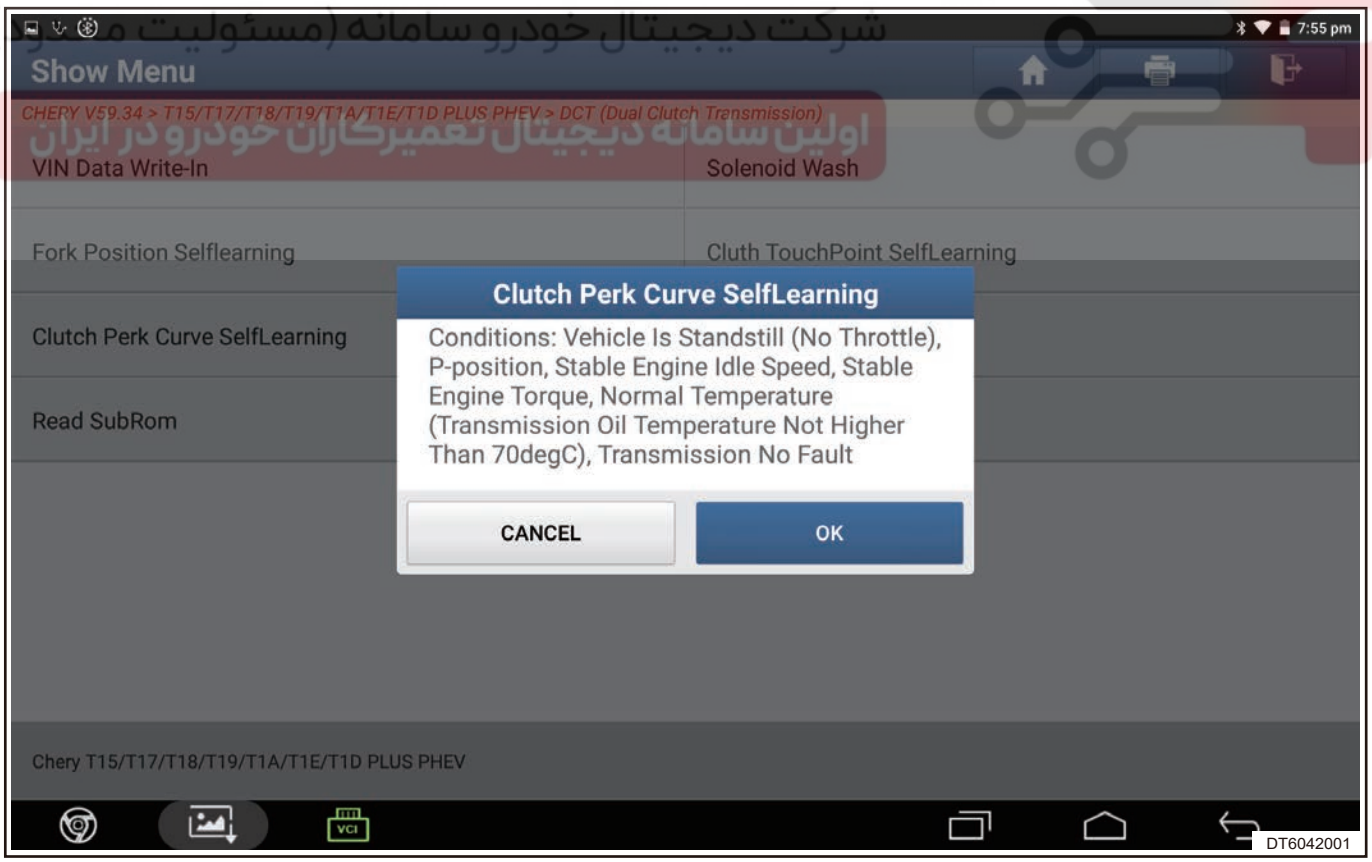
4. Enter next screen and click “Special Function”.



5. Enter next screen and click “Clutch Perk Curve SelfLearning”.



6. Condition.

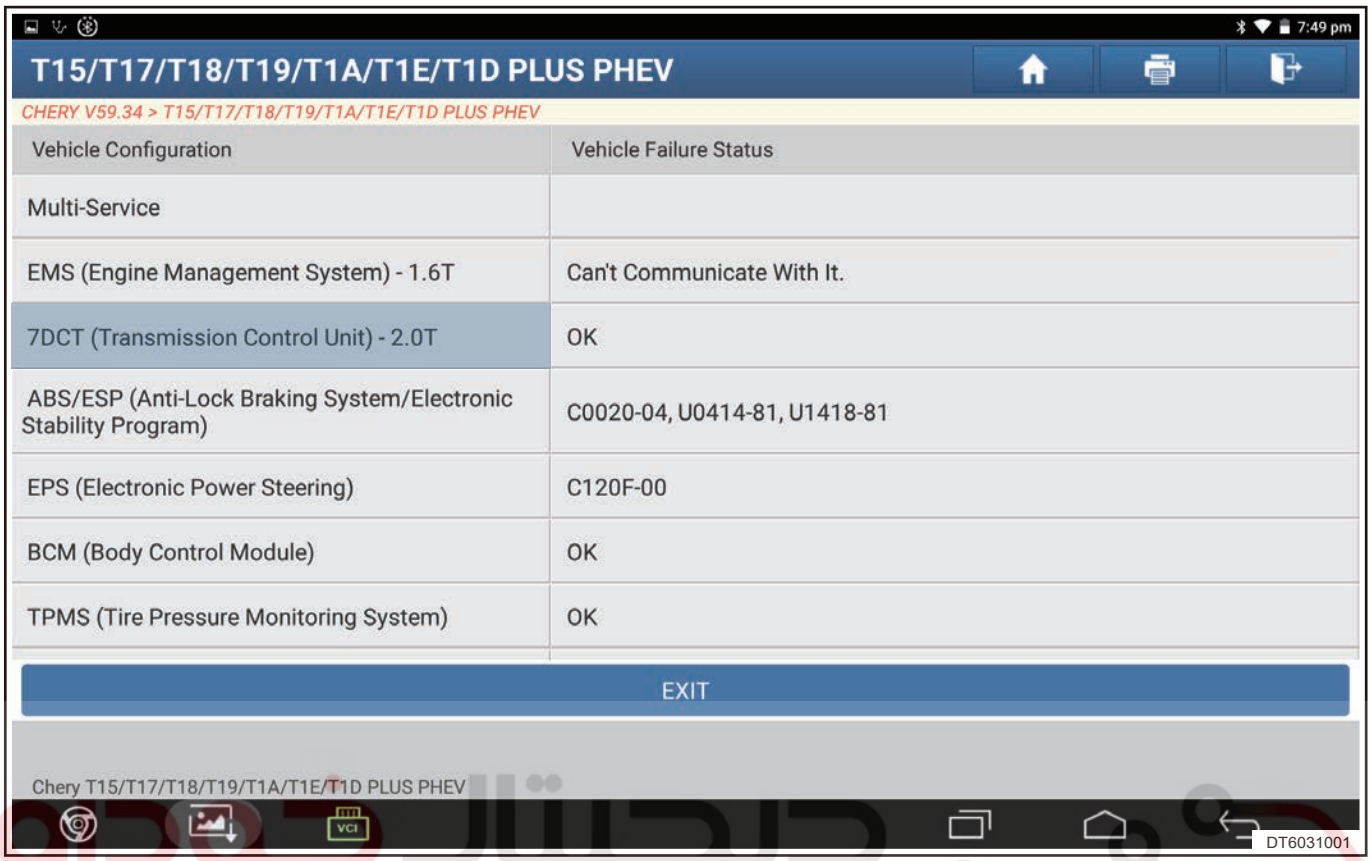


7. Click “OK” to perform clutch PC curve self-learning.

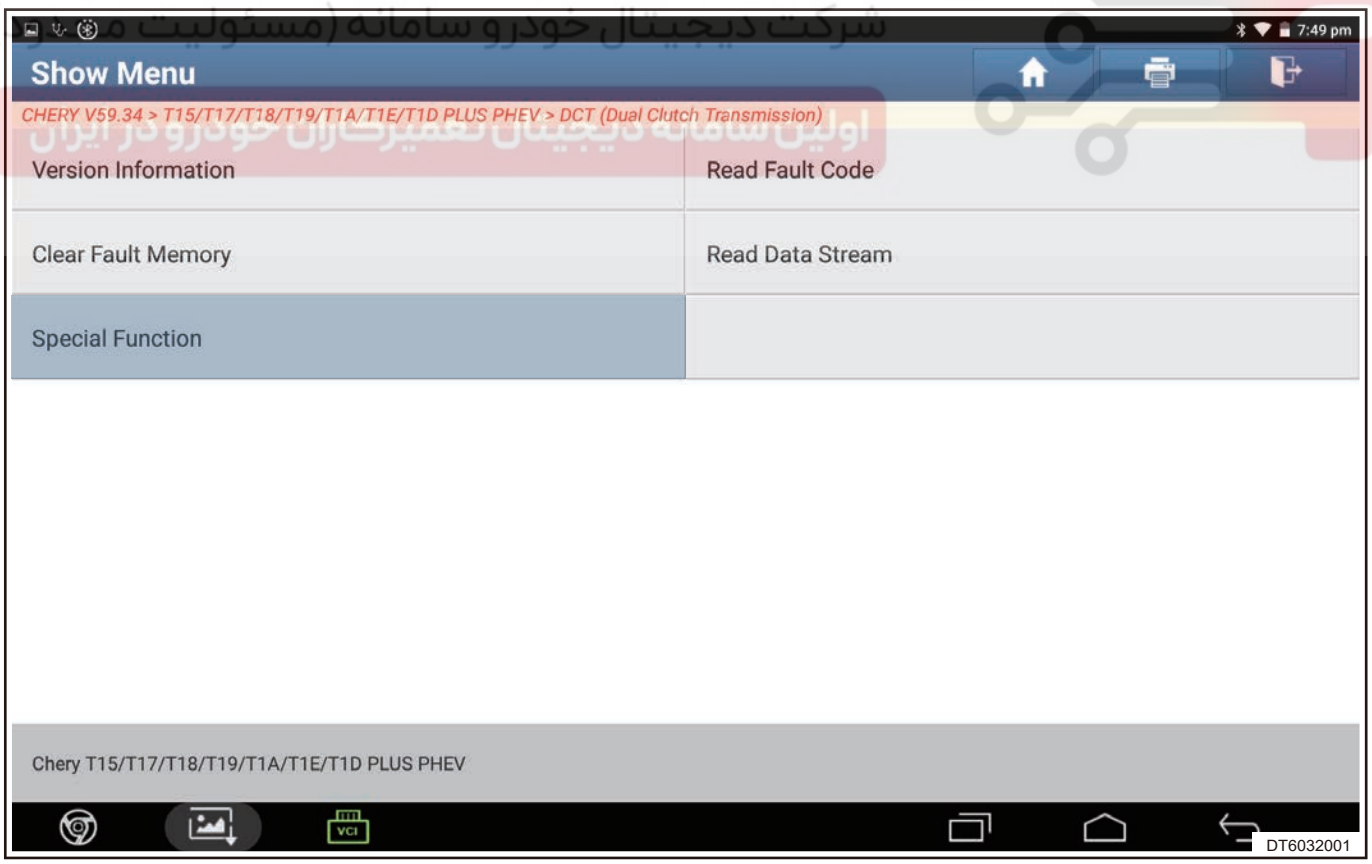
Reset memory

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

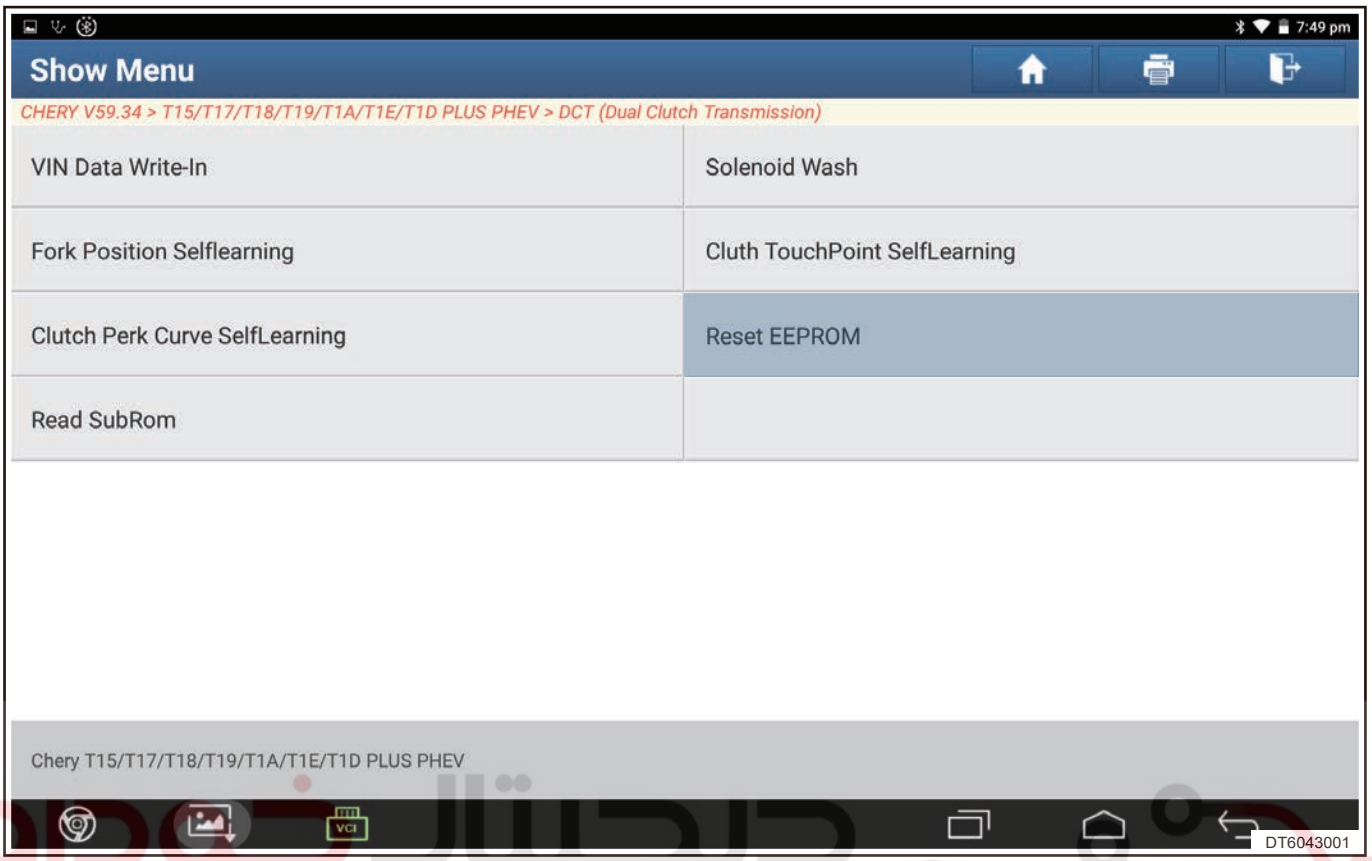
3. Enter next screen and click “TCU (Transmission Control Unit) - 2.0T”.



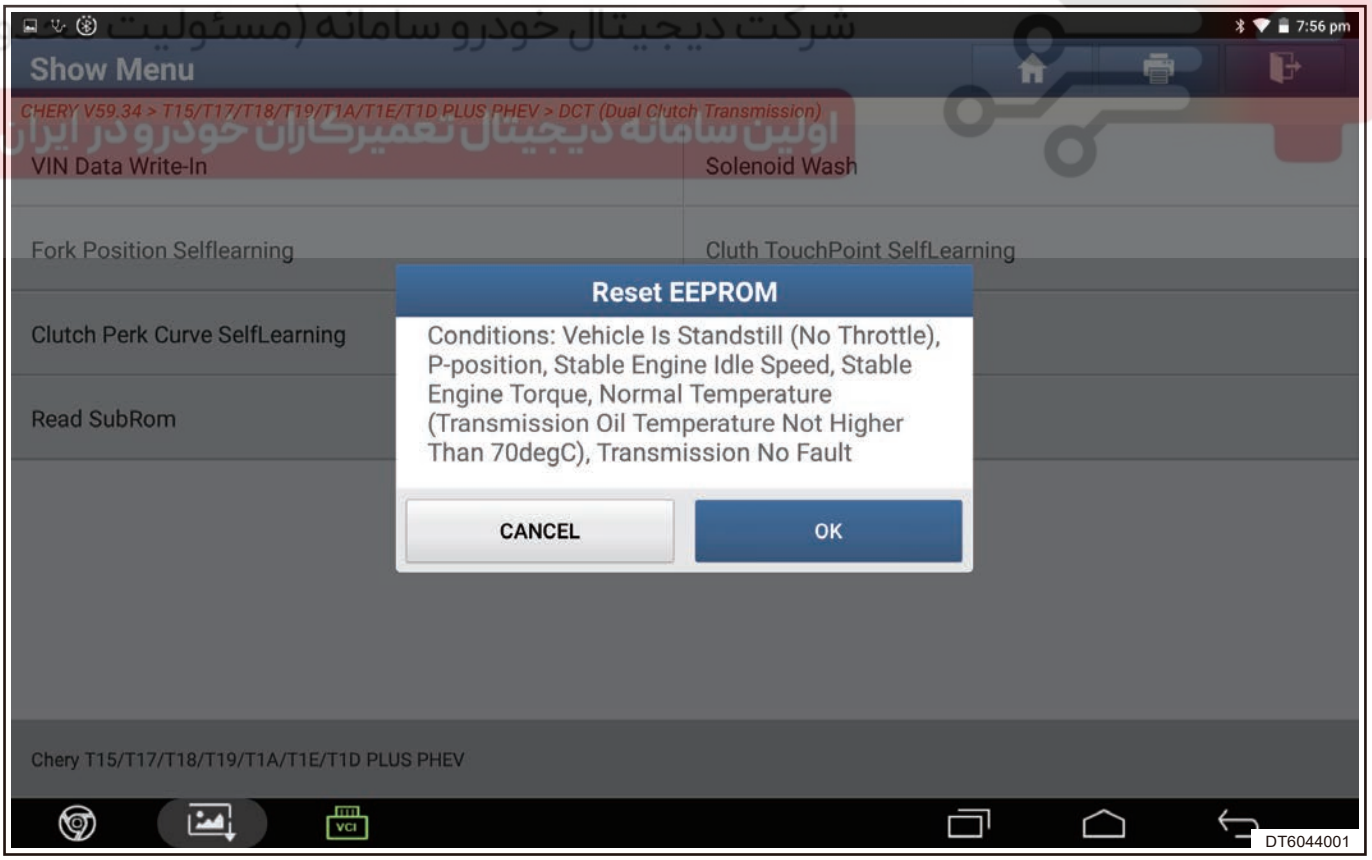
4. Enter next screen and click “Special Function”.



5. Enter next screen and click “Reset Memory”.



6. Condition.

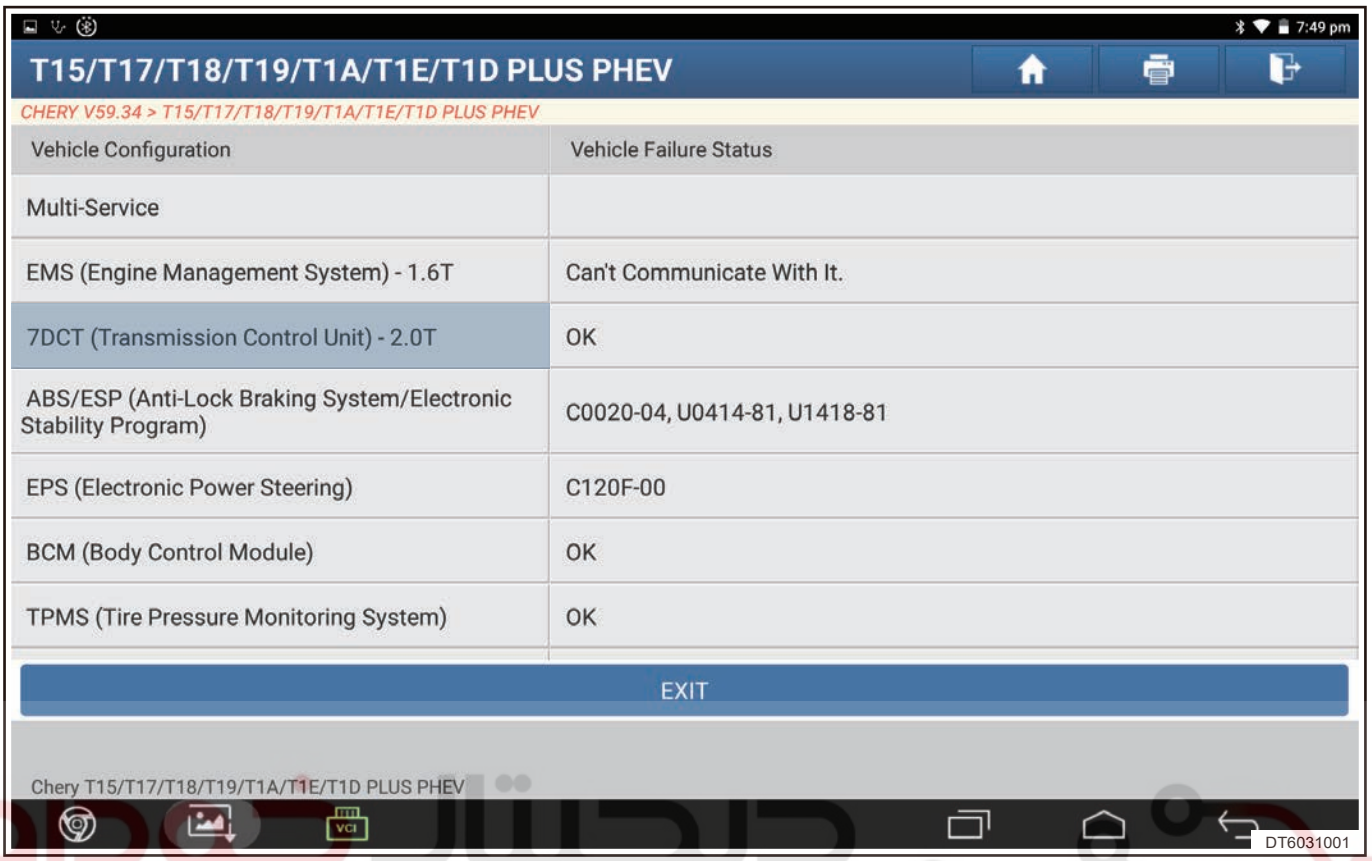


7. Click “OK” to perform memory reset.

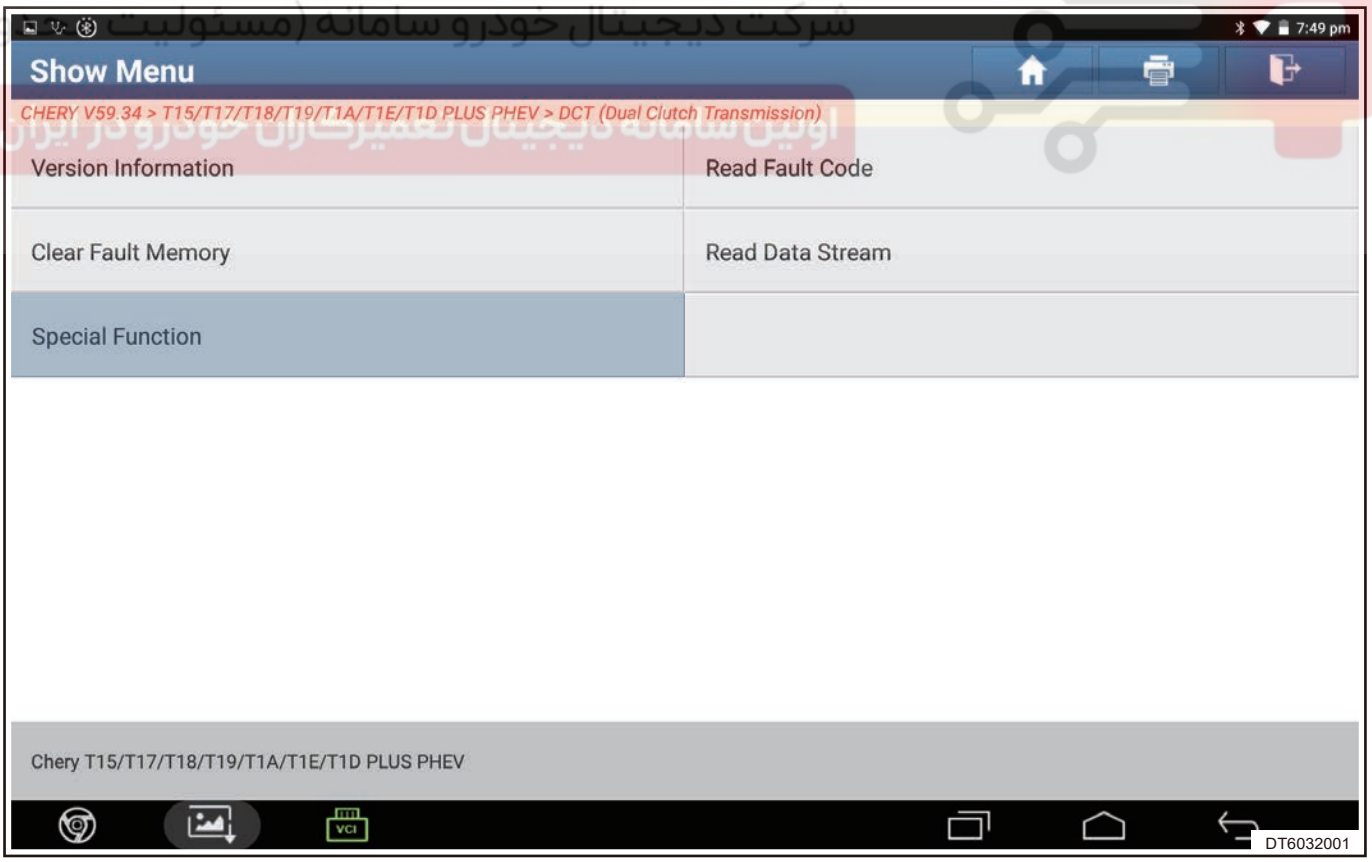
Read transmission storage data

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

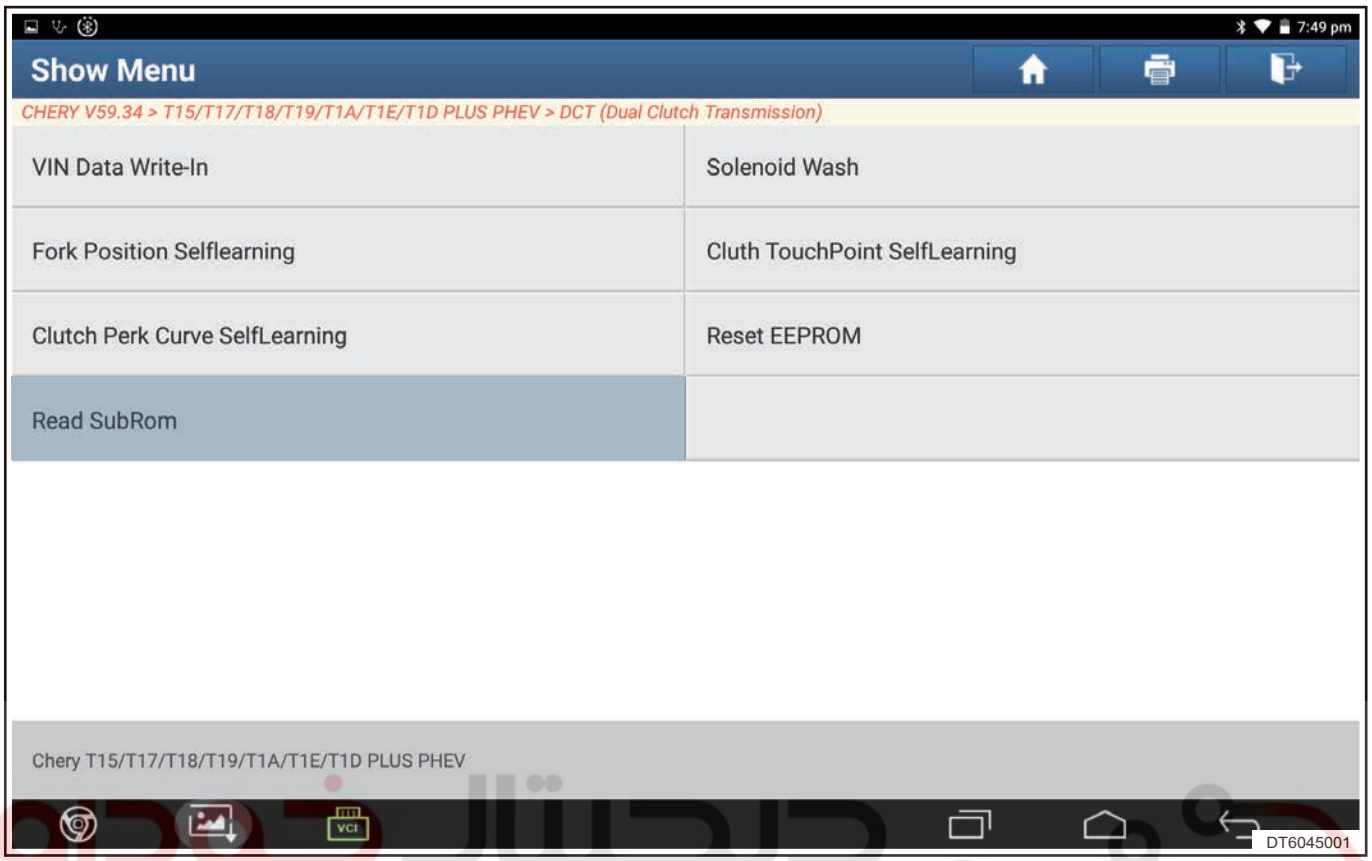
3. Enter next screen and click “TCU (Transmission Control Unit) - 2.0T”.



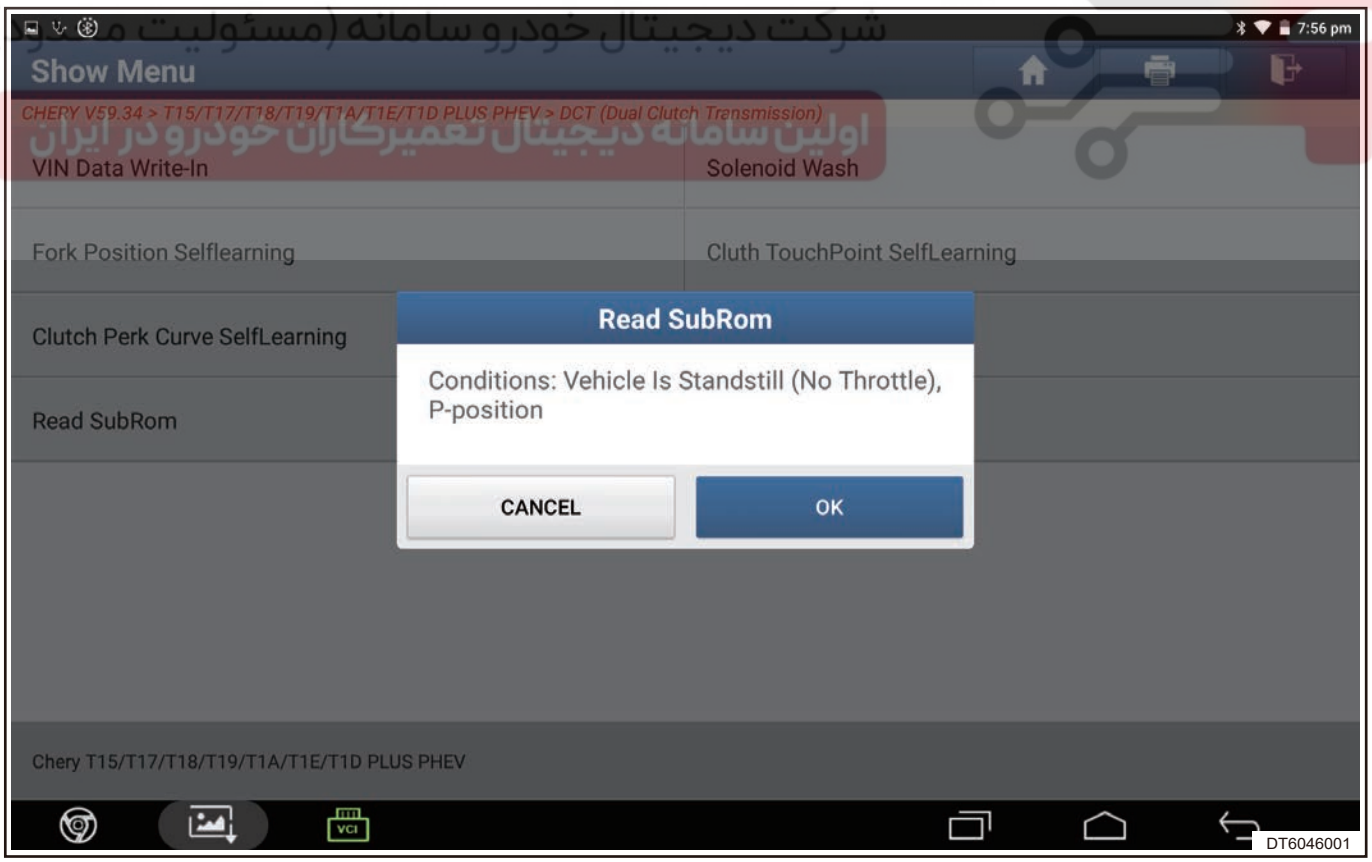
4. Enter next screen and click “Special Function”.



5. Enter next screen, and click “Read SubRom”.



6. Condition.



7. Click “OK” to read transmission storage data.

Diagnostic Tester Operation Process after Replacing Parts

Depend to maintenance needs, the replacement process for transmission or transmission control unit TCU needs to be performed in the following steps:

Caution
• The transmission EOL off-line related self-learning has been completed, and there is no need to perform self-learning without replacing parts.

Hint:
In order to learn more accurate data, the following conditions need to be met when learning clutch engagement point:

- Clutch temperature: 40 - 100 deg
- Engine coolant temperature: 80 - 100 deg
- External ambient temperature: -15 - 50 deg
- Intake temperature: 0 - 55 deg
- Net torque fluctuation at engine flywheel end is within ± 3.5 N m
- Engine speed is lower than 1,200 rpm, engine idle has no change
- Accelerator pedal is not depressed

Replacing transmission body

1. The vehicle is powered on, shift lever is in P and the vehicle is stationary.
2. Use a diagnostic tester to activate "Reset Memory" function (Routine $31 01 04 05) and get a positive response.
3. Use a diagnostic tester to activate “Read Transmission Storage Data" (Routine $31 01 04 06 01) and get a positive response.
4. The vehicle is powered off and wait for 10 seconds.
5. Replacement is complete.

Reset memory

- Self-learning conditions: The vehicle is stationary (accelerator pedal is not depressed), shift lever is in P, stable engine idle, stable engine torque, normal temperature (transmission oil temperature does not exceed 70°C), there is no fault in transmission.
- Reasons for learning failure: 1. BE function request times out; 2. F2 EEPROM Reset is failed.

Read transmission storage data

- Self-learning conditions: The vehicle is stationary (accelerator pedal is not depressed), shift lever is in P
- Reasons for learning failure: 1. BE function request times out; 2. F1 Subrom fails to communicate with TCU.

Replacing transmission control unit (TCU)

1. The vehicle is powered on, shift lever is in P and the vehicle is stationary.
2. Use a diagnostic tester to activate "Reset Memory" function (Routine $31 01 04 05) and get a positive response.
3. Use a diagnostic tester to activate "Read Transmission Storage Data" (Routine $31 01 04 06 01) and get a positive response.
4. Use a diagnostic tester to activate "VIN Code Writing" (2E F1 90 XX XX...).
5. The vehicle is powered off and wait for 10 seconds.
6. Replacement is complete.

Replacing transmission clutch assembly

1. The vehicle is powered on, shift lever is in P, the vehicle is stationary, engine is in idling condition.

2. Use a diagnostic tester to activate "Reset Memory" function (Routine $31 01 04 05) and get a positive response.
3. Use a diagnostic tester to activate "Clutch TP Point Self-learning" (Routine $31 01 04 03) and get a positive response.
4. Use a diagnostic tester to activate "Clutch PC Curve Self-learning" (Routine $31 01 04 04) and get a positive response.
5. The vehicle is powered off and wait for 10 seconds.
6. Replacement is complete.

Reset memory

- Self-learning conditions: The vehicle is stationary (accelerator pedal is not depressed), shift lever is in P, stable engine idle, stable engine torque, normal temperature (transmission oil temperature does not exceed 70°C), there is no fault in transmission.
- Reasons for learning failure: 1. BE function request times out; 2. F2 EEPROM Reset is failed.

Clutch TP point self-learning

- Self-learning conditions: The vehicle is stationary (accelerator pedal is not depressed), shift lever is in P, stable engine idle, stable engine torque, normal temperature (transmission oil temperature does not exceed 70°C), there is no fault in transmission.
- Reasons for learning failure: 1. BC does not find odd clutch contact points; 2. BD does not find even clutch contact point; 3. BE function request times out; 4. D1 temperature condition is not met; 5. D2 transmission is failed (report DFC failure); 6.D3 self-learning engine torque is unstable.

Clutch PC curve self-learning

- Self-learning conditions: The vehicle is stationary (accelerator pedal is not depressed), shift lever is in P, stable engine idle, stable engine torque, normal temperature (transmission oil temperature does not exceed 70°C), there is no fault in transmission.
- Reasons for learning failure: 1. A5 odd/even clutch pressure is out of range; 2. A6 odd clutch pressure is out of range; 3. A7 even clutch pressure is out of range; 4. A8 odd/even clutch pressure curve monotonicity inspection is failed; 5. A9 odd clutch pressure curve monotonicity inspection is failed; 6. AA even clutch pressure curve monotonicity inspection is failed; 7. BE function request times out; 8. D1 temperature condition is not met; 9. D2 transmission is failed (report DFC failure).

Replacing transmission hydraulic system

1. The vehicle is powered on, shift lever is in P, the vehicle is stationary, engine is in idling condition.
2. Use a diagnostic tester to activate "Reset Memory" function (Routine $31 01 04 05) and get a positive response.
3. Use a diagnostic tester to activate "Read Transmission Storage Data" (Routine $31 01 04 06 01) and get a positive response.
4. Use a diagnostic tester to activate "Fork Position Self-learning" (Routine $31 01 04 02) and get a positive response.
5. Use a diagnostic tester to activate "Clutch TP Point Self-learning" (Routine $31 01 04 03) and get a positive response.
6. Use a diagnostic tester to activate "Clutch PC Curve Self-learning" (Routine $31 01 04 04) and get a positive response.
7. The vehicle is powered off and wait for 10 seconds.
8. Replacement is complete.

Fork Position Self-learning

- Self-learning conditions: The vehicle is stationary (accelerator pedal is not depressed), shift lever is in P, stable engine idle, stable engine torque, normal temperature (transmission oil temperature does not exceed 70°C), there is no fault in transmission.
- Reasons for learning failure: 1. The middle position of B0 1/5 gear is abnormal; 2. The middle position of B1 3/7 gear is abnormal; 3. The middle position of B2 2/6 gear is abnormal; 4. The middle position of B3 4/R gear is abnormal; 5. B4 1st gear position is abnormal; 6. B5 2nd gear position is abnormal; 7.

B6 3rd gear position is abnormal; 8. B7 4th gear position is abnormal; 9. B8 5th gear position is abnormal 10. B9 6th gear position is abnormal; 11. BA 7th gear position is abnormal; 12. BB reverse gear position is abnormal; 13. BE function request times out; 14. D2 transmission is failed (report DFC failure).

Reporting solenoid valve stuck malfunction

If solenoid valve stuck malfunction is reported, clutch solenoid valve can be scoured. If the malfunction is not repaired, hardware needs to be checked.

1. The vehicle is powered on, shift lever is in P, the vehicle is stationary, engine is in idling condition.
2. Use a diagnostic tester to activate "Clutch solenoid valve wash" and get a positive response.
3. The vehicle is powered off and wait for 10 seconds.
4. Scour is completed.

Clutch solenoid valve wash

- Self-learning conditions: The vehicle is stationary (accelerator pedal is not depressed), shift lever is in P, stable engine idle, stable engine torque, normal temperature (transmission oil temperature does not exceed 70°C), there is no fault in transmission.
- Reasons for learning failure: 1. C7 odd gear is not in neutral; 2. C8 even gear is not in neutral; 3. BE function request times out; 4. D1 temperature condition is not met; 5. D2 transmission is failed (report DFC failure).