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# 025CHC

## 0CF25+ELECTRONIC SHIFT AUTOMATIC

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# 0CF25+ELECTRONIC SHIFT AUTOMATIC TRANSMISSION

## 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 necessary safety equipment to prevent accidents when removing and repairing.
2. Appropriate force should be applied when removing transmission. Be careful not to operate roughly.

### Precautions

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

1. The components of automatic transmission require high precision. During the disassembly and assembly process, you must be careful not to cause scratches or damage to these components.
2. During the process of engine and transmission separation, pay attention not to damage the peripheral accessories of transmission. If there is any damage, replace it according to the requirements.
3. When inserting the propeller shaft or pulling out the differential, the differential oil seal must not be damaged. If there is any damage, it must be replaced with a new oil seal.
4. The replaced components and oil must be disposed of in accordance with relevant local regulations.
5. To avoid oil contamination, the container used to store transmission oil must be a special container (the container must not be used to store other liquids or items), and the container must be kept clean.
6. In case of oil spillage, the transmission oil needs to be added depends on the actual situation.
7. The oil is a part of transmission system. It must be sent back to manufacturer together with transmission for further analysis if required.

## System Overview

### Basic Introduction

#### Brief Introduction

Continuously Variable Transmission (CVT) is widely used in mid-class to high-class vehicles all over the world due to its good shifting performance.

0CF25+electronic shift series automatic transmission can not only realize the best matching between drive train and engine operating condition within a fairly wide speed ratio range, but also improve the fuel economy of vehicle. At the same time, it also synchronously has functions such as start and stop.

#### Basic Principle

CVT operation is as follows:

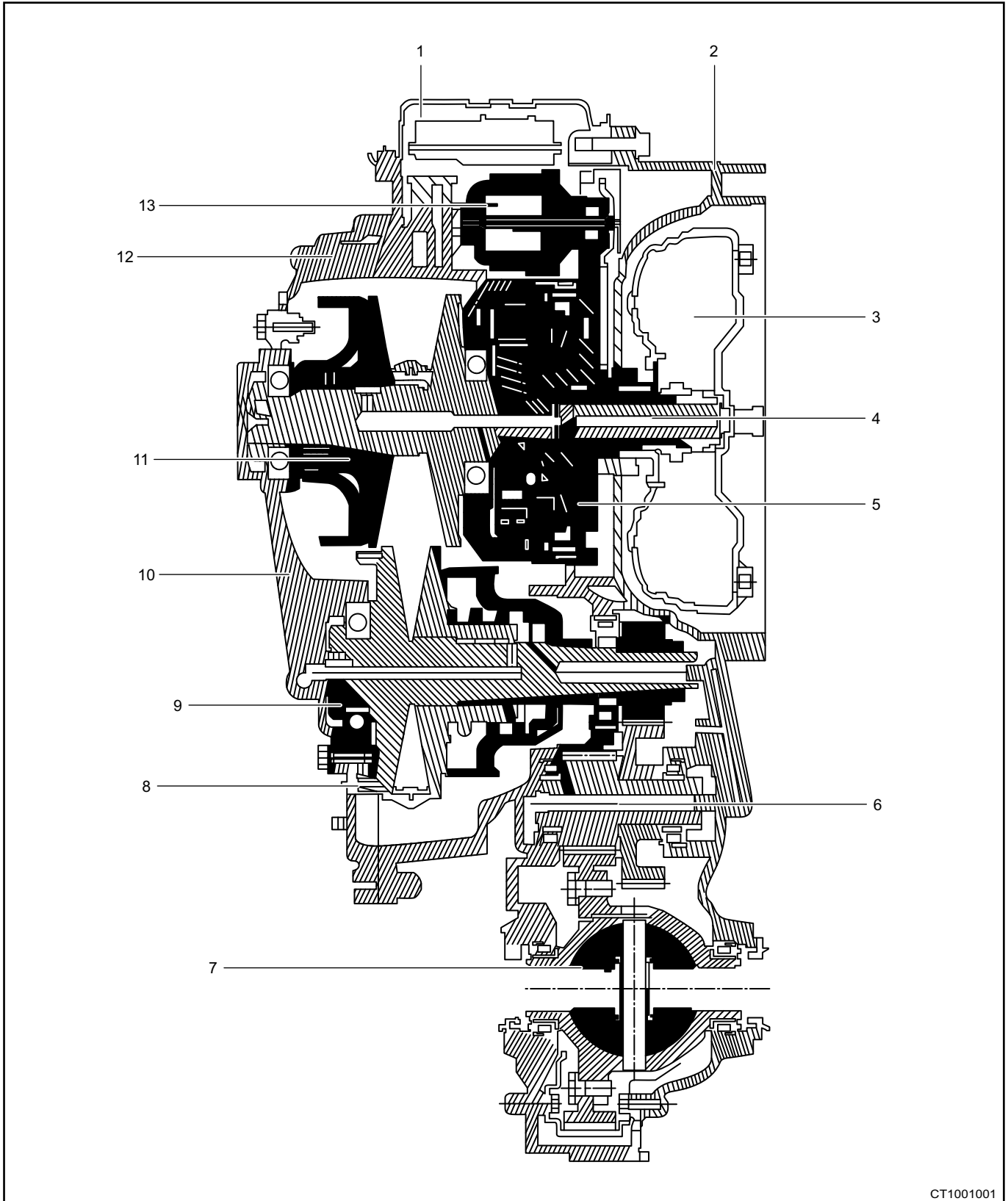
1. Transmission Control Unit (TCU) sends command signals to the solenoid valves in hydraulic system according to the requirements under the vehicle driving conditions (vehicle speed, load, engine speed, etc.).
2. The solenoid valve continuously adjusts the operating state according to the commands from TCU. The combination of solenoid valves in different operating states enables the flow direction and pressure of the hydraulic oil to be adjusted and changed in time, and precisely controls the action of hydraulic actuators (e.g. cylinders, pistons, spool valves, etc.).
3. When the piston cavity pressure of hydraulic drive and driven conical pressure plates is continuously changed, the conical pressure plate generates corresponding axial movement according to the pressure changes, thereby changing the rotating radius of the steel belt, realizing continuous change of the transmission speed ratio and achieving the purpose of stepless speed change.

**Basic Parameters**

<b>Items</b>	<b>Parameters</b>	
Type	0CF25+electronic shift	
Type	Continuously Variable Transmission (CVT)	
Layout	Transverse front-drive	
Start Clutch Device	Hydraulic torque converter	
Control Method	Electronic hydraulic control	
Dimensions (L × W × H)	365 mm × 440 mm × 550 mm	
Weight (w/o Cooling Oil)	85 Kg	
Central Distance	197mm	
Maximum Allowable Input Torque	250 N·m	
Final Drive Ratio	5.4	6.08
Pulley Speed Ratio Range	0.38 - 2.69	
Fluid Type	CVTF WCF-1 (CVTF for short)	
Transmission Fluid Capacity	7.3 ± 0.2 L	

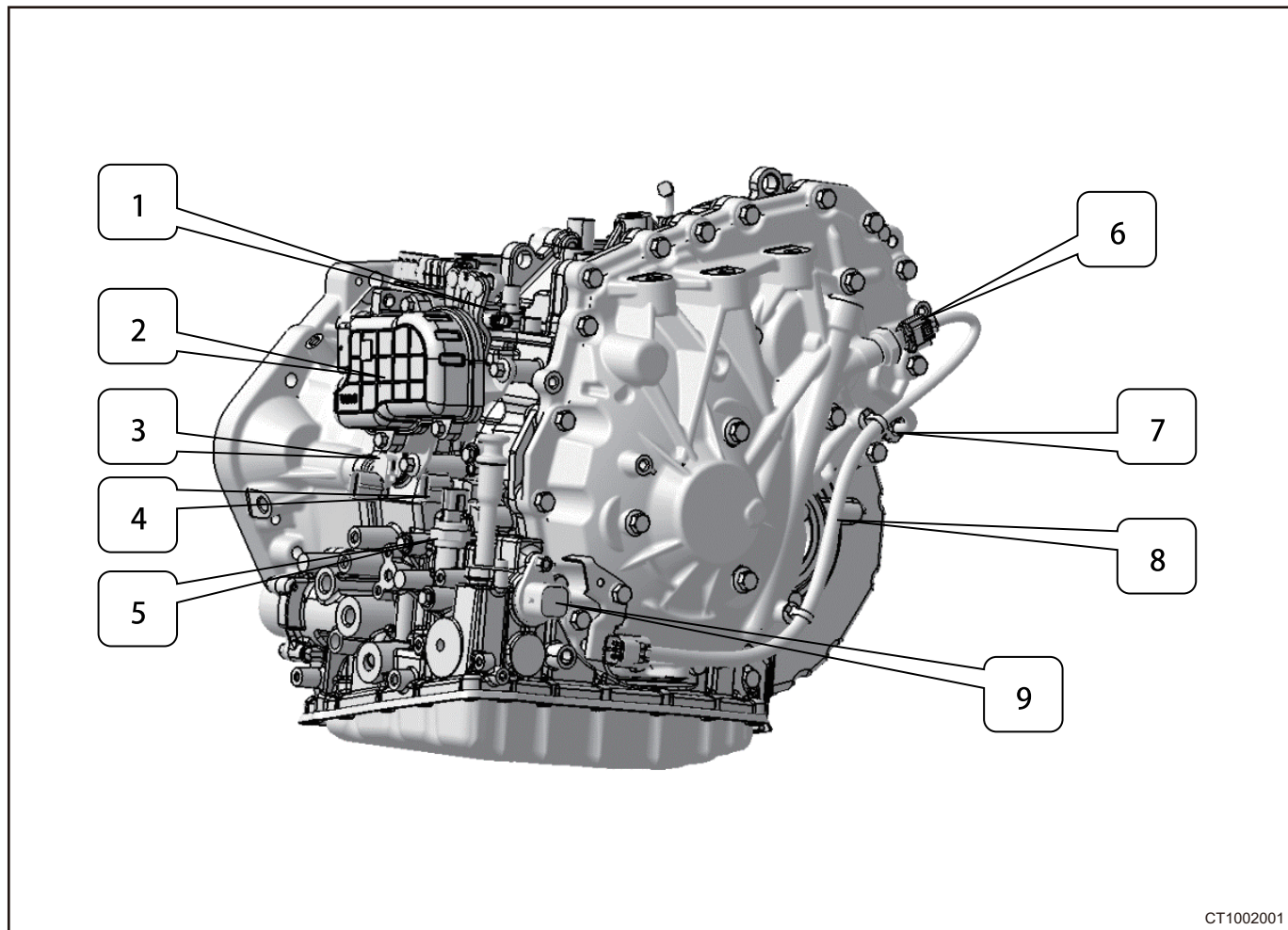
# Transmission Composition

## Internal Structure Schematic Diagram



1	Valve Body Case	2	Torque Converter Case Assembly
3	Hydraulic Torque Converter Assembly	4	Input Shaft Assembly
5	Forward Clutch Assembly	6	Output Shaft Assembly
7	Differential Assembly	8	Steel Belt
9	Output Pulley Shaft Assembly	10	Rear Case Assembly
11	Input Pulley Shaft Assembly	12	Transmission Case Assembly
13	Oil Pump Assembly		

**Electronic Components Introduction**



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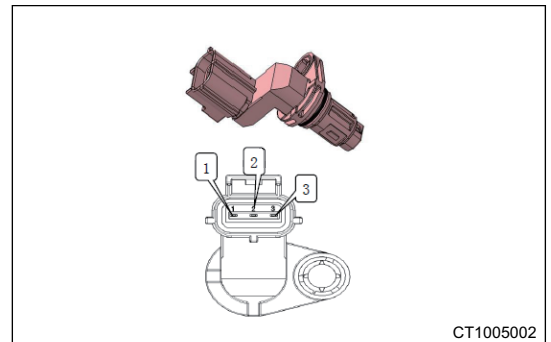
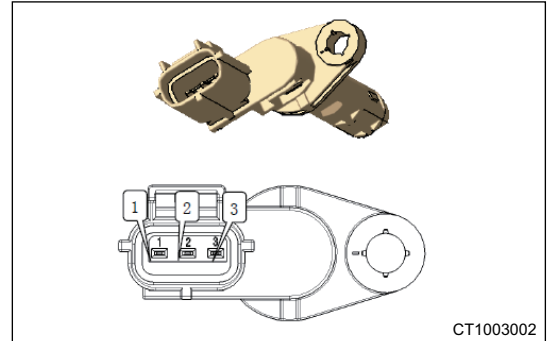
1	Range Switch	2	Electronic Shift Actuator
3	Speed Sensor (Turbine)	4	Speed Sensor (Input Shaft)
5	Oil Pressure Sensor (Primary Shaft)	6	Oil Pressure Sensor (Second Shaft)
7	Speed Sensor (Output Shaft)	8	Transmission Peripheral Wire Harness Assembly
9	Wire Harness Connector		

**Speed Sensor**

0CF25+electronic shift series CVT uses two types and 3 speed sensors in total:

## 1. Pin Definition

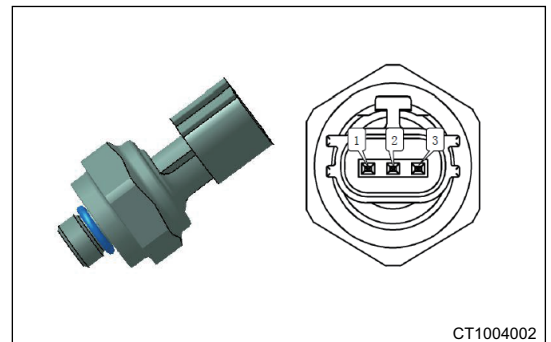
PIN	Pin Definition
1	Ground
2	Signal
3	Power Supply

**Oil Pressure Sensor**

0CF25+electronic shift series CVT uses two oil pressure sensors in total:

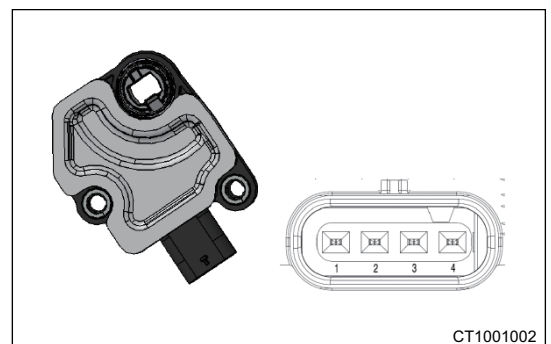
## 1. Pin Definition

PIN	Pin Definition
1	Ground
2	Signal
3	Power Supply

**Range Switch**

## 1. Pin Definition

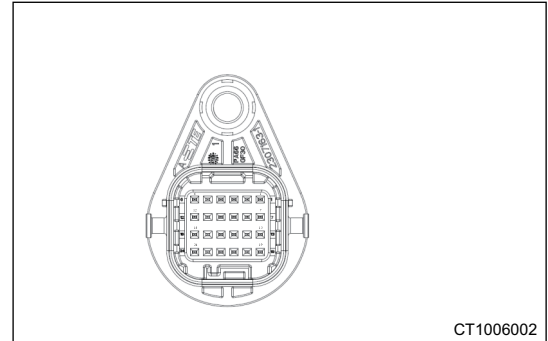
PIN	Pin Definition
1	Power Supply
2	Output Signal 1
3	Ground
4	Output Signal 2



**Wire Harness Main Connector**

## 1. Pin Definition

PIN	Pin Definition
1	Null
2	Null
3	Null
4	Null
5	Null
6	Null
7	Oil Temperature Signal +
8	Oil Temperature Signal -
9	Input Shaft Solenoid Valve Signal +
10	Input Shaft Solenoid Valve Signal -
11	TC Solenoid Valve Signal +
12	TC Solenoid Valve Signal -
13	Main Oil Pressure Solenoid Valve Signal +
14	Main Oil Pressure Solenoid Valve Signal -
15	Clutch Solenoid Valve Signal +
16	Clutch Solenoid Valve Signal -
17	Output Shaft Solenoid Valve Signal +
18	Output Shaft Solenoid Valve Signal -
19	Null
20	Null
21	Null
22	Null
23	Null
24	Null

**Resistance:**

- When measuring PIN 9 - PIN 10 at 20 °C, the resistance is  $5.3 \pm 0.3 \Omega$ ;
- When measuring PIN 11 - PIN 12 at 20 °C, the resistance is  $5 + 0.2/- 0.4 \Omega$ ;
- When measuring PIN 13 - PIN 14 at 20 °C, the resistance is  $5.3 \pm 0.3 \Omega$ ;
- When measuring PIN 15 - PIN 16 at 20 °C, the resistance is  $5.3 \pm 0.3 \Omega$ ;
- When measuring PIN 17 - PIN 18 at 20 °C, the resistance is  $5.3 \pm 0.3 \Omega$ ;
- Measure resistance of PIN 7 - PIN 8, refer to the following table for the relationship between resistance and transmission oil temperature:

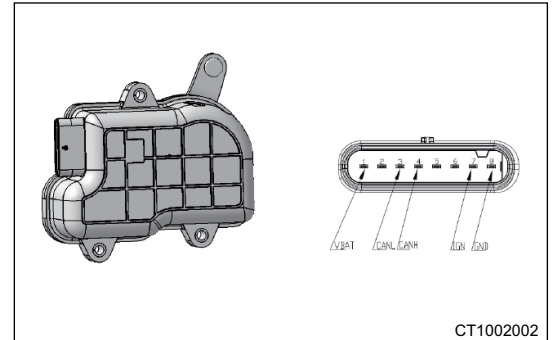


Temperature (°C)	-40	-30	-20	-10	0	10	20	25	30
Resistance (KΩ)	120.33	66.77	38.65	23.24	14.45	9.26	6.10	5.00	4.12
Temperature (°C)	40	50	60	70	80	90	100	110	120
Resistance (KΩ)	2.85	2.01	1.44	1.06	0.78	0.59	0.45	0.35	0.28

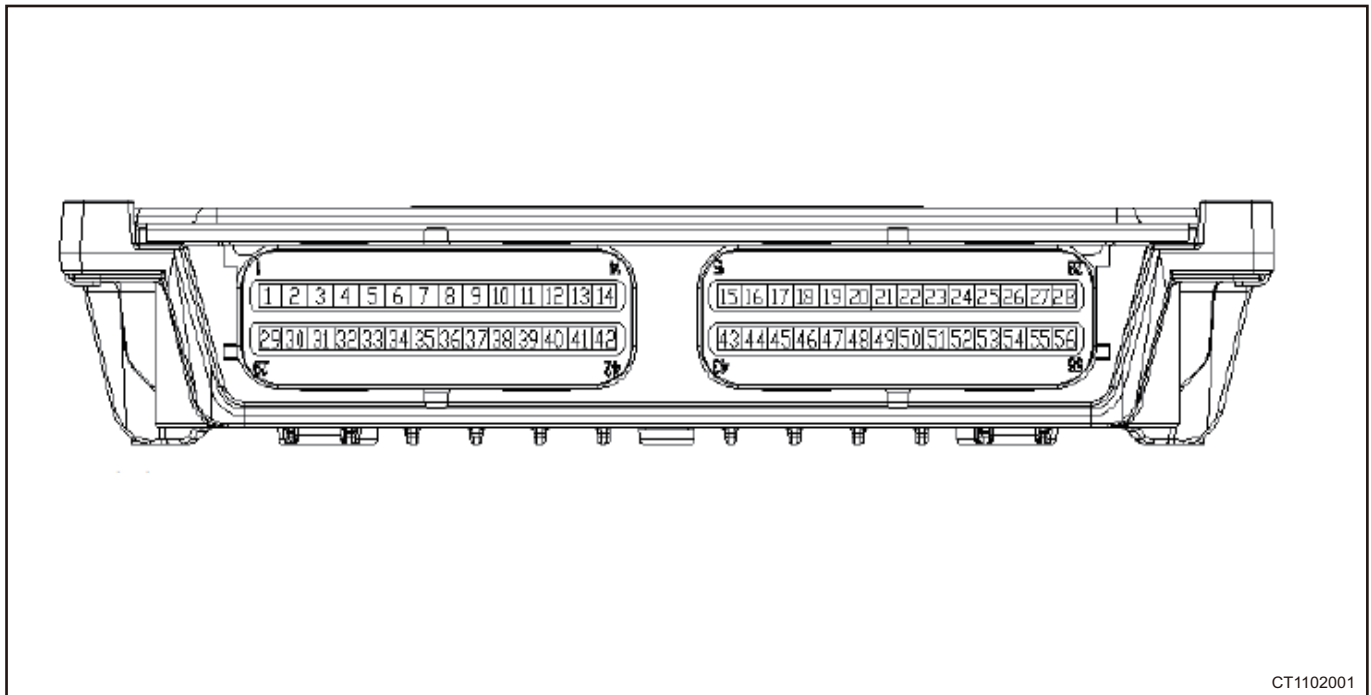
## Electronic Shift Actuator Assembly

### 1. Pin Definition

PIN	Pin Definition
1	Power Supply (VBAT)
2	Null (NC)
3	CAN Signal Low (CANL)
4	CAN Signal High (CANH)
5	Null (NC)
6	Null (NC)
7	KL15 Ignition (IGN)
8	Ground (GND)



## Automatic Transmission Control Unit



<b>PIN</b>	<b>Definition</b>	<b>PIN</b>	<b>Definition</b>
1	Hydraulic Torque Converter/Clutch Control Valve Low Side Control	29	Main Oil Pressure Control Valve Low Side Control
2	Input Pulley Shaft Pressure Control Valve Low Side Control	30	Output Pulley Shaft Pressure Control Valve Low Side Control
3	Clutch Control Valve High Side Control	31	NC
4	Hydraulic Torque Converter Control Valve High Side Control	32	Main Oil Pressure Control Valve High Side Control
5	NC	33	NC
6	Output Pulley Shaft Pressure Control Valve High Side Control	34	Input Pulley Shaft Pressure Control Valve High Side Control
7	Private CAN Low	35	Private CAN High
8	All Vehicle CAN Low	36	All Vehicle CAN High
9	Turbine/Output Pulley Shaft Speed Sensor Ground	37	Range Sensor/Input/Output Pulley Shaft Oil Pressure Sensor Ground
10	Input Pulley Shaft Speed Sensor Signal	38	Turbine Speed Sensor Signal
11	Input Pulley Shaft Speed Sensor Ground	39	Output Pulley Shaft Speed Sensor Signal
12	Transmission Oil Temperature Sensor Ground	40	NC
13	Transmission Oil Temperature Sensor Signal	41	NC
14	Input Pulley Shaft Oil Pressure Sensor Signal	42	NC
15	Output Pulley Shaft Oil Pressure Sensor Signal	43	NC
16	Range Sensor Signal 1	44	Range Sensor Signal 2
17	NC	45	NC
18	NC	46	NC
19	NC	47	NC
20	NC	48	NC
21	Input Pulley Shaft Speed Sensor Power Supply	49	NC
22	Turbine/Output Pulley Shaft Speed Sensor Power Supply	50	NC
23	NC	51	KL30
24	NC	52	KL30
25	NC	53	KL30

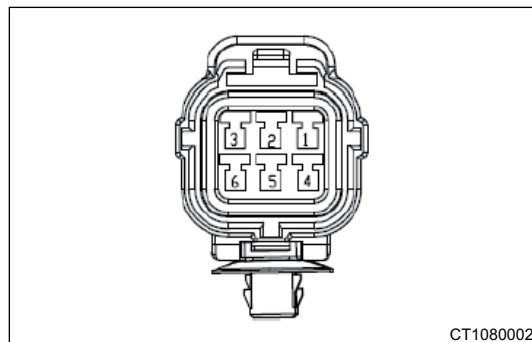
PIN	Definition	PIN	Definition
26	Output Pulley Shaft Oil Pressure Sensor Power Supply	54	Range Sensor/Input Pulley Shaft Oil Pressure Sensor Power Supply
27	Power Supply Ground 1	55	Power Supply Ground 2
28	KL15	56	Power Supply Ground 3

Note: NC is the null pin, KL15 is the switch, KL30 is the battery

### Transmission Peripheral Wire Harness Assembly

#### 1. Pin Definition

PIN	PIN Definition
1	Input/Output Pulley Shaft Pressure Sensor Ground
2	Output Pulley Shaft Pressure Sensor Signal
3	Output Pulley Shaft Pressure Sensor Power Supply
4	Turbine/Output Pulley Shaft Speed Sensor Power Supply
5	Output Pulley Shaft Speed Sensor Signal
6	Turbine/Output Pulley Shaft Speed Sensor Ground



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### User Instructions

0CF25+electronic shift series CVT includes: 1 parking gear (P gear), 1 reverse gear (R gear), 1 neutral gear (N gear) and 1 forward gear (D gear), which can be shifted by the shift lever.

According to the vehicle needs, 0CF25+electronic shift series CVT can also provide: M gear (manual mode), SPORT mode and ECO mode.

#### Caution

- Manual mode can be switched by shift lever.
- Mode priority: Manual mode has the highest priority. SPORT mode and ECO mode cannot be triggered at the same time. When manual mode and SPORT mode (or ECO mode) are triggered at the same time, the system defaults to manual mode.

Before using a vehicle equipped with 0CF25+electronic shift series CVT, you need to know the following information:

1. Before shifting transmission from stop gear (N or P) to driving gear (D or R), set engine to idling status, depress brake pedal or apply parking brake, and release brake pedal and parking brake after gear shifting completes, then vehicle enters driving status;
2. When engine speed exceeds idling speed, do not shift transmission from stop gear (N or P) to driving gear (D or R);
3. If accelerator pedal is depressed suddenly at start-up, the transmission will delay upshifting so that it runs in high speed range, ensuring high power output;
4. If accelerator pedal is depressed suddenly during driving, the transmission will quickly shift to low gear, engine speed and power will increase;

- Vehicles equipped with automatic transmission cannot be started by traction or pushing. If the battery is depleted, it is necessary to use a jumper cable to charge the battery to start the vehicle.

### Electronic Shift Actuator Self-learning

Electronic shift self-learning should be performed in following conditions, otherwise there will be abnormal shifts:

- Replace the electronic shift actuator;
- Electronic shift actuator was removed and installed again;
- Electronic shift part fault code alarms.

The specific operation of self-learning is as follows:

- Vehicle power is turned on without starting;
- First shift to N;
- Then shift to P;
- Finally shift to N;
- Perform self-learning with diagnostic tester (It is required to perform self-learning in N);
- Vehicle power is turned off normally and self-learning is completed.

#### Caution

- The diagnostic tester prompts that the self-learning has failed, first check whether the meter displays N gear;
- If it is not in N, first shift to N position, and then repeat the self-learning according to the above steps;
- If it is in N, adjust the electronic shift connecting rod, and then perform self-learning again according to the above steps.

## Gear Position Introduction

### P (Parking) Gear

Lock the transmission output shaft to prevent the drive wheel from rotating and cooperate with the parking brake when the vehicle stops for a long time.

- When the transmission is in P (or N) gear, the engine can be started, and cannot be started in other gears;
- Shift to P gear only after the vehicle is completely stopped, otherwise the mechanical part of transmission may be damaged;
- Do not use P gear instead of parking brake, and only after the vehicle is completely stopped, pull the parking brake first and then shift to P;
- Do not park on a large slope. The safe parking slope is not more than 30%.

### R (Reverse) Gear

Use this gear to drive backwards.

- Before shifting the shift lever to or out from R, it is necessary to confirm that the vehicle is completely stopped. Otherwise, the transmission may be damaged.

### N (Neutral) Gear

When shifting to N, both the drive wheel and the transmission are in free and idling state, which is suitable for the vehicle to stop for a short time.

- When the transmission is in N (or P) gear, the engine can be started, and cannot be started in other gears;
- If the parking brake is not pulled or the brake pedal is not depressed in N gear, the vehicle can roll on slope, which may cause an accident;
- It is forbidden to shift to N gear while vehicle is running at high speed and engine is stalling and neutral coasting, otherwise the transmission may be damaged.

**D (Driving) Gear**

In normal forward mode of transmission, stepless speed change can be realized, when in this gear, the transmission will automatically select the appropriate speed ratio according to driver's intention.

- Confirm that the vehicle is completely stopped before shifting to D;
- Confirm the surrounding environment and personnel safety before driving in D.

**M (Manual Mode) Gear**

Push the shift lever to M position to execute M mode by default:

- “+” : Push the shift lever to “+” once to increase the transmission by one gear;
- “-” : Push the shift lever to “-” once to decrease the transmission by one gear;

The CVT transmission with n simulated forward gears (the number of simulated gears varies according to demand), which can be switched between M and D gears by pushing the shift lever regardless of whether the vehicle is stationary or running. Unlike the manual transmission, gear shifting is allowed when the accelerator pedal is depressed.

The driver can manually shift up and down to achieve a shift effect similar to that of a manual transmission and experience more driving pleasure.

**⚠ Caution**

- In manual mode, you can switch between 1 to n forward gears in sequence (the number of simulated gears varies according to your needs).
- In manual mode, the driver must perform gear shifting under appropriate working conditions to prevent the engine speed from approaching the red line and running under high load for a long time.
- In manual mode, when the vehicle speed decreases, it will automatically downshift; when the engine speed is too high, the transmission will automatically upshift.
- Shifting in manual mode needs to meet certain throttle conditions and speed conditions. If the conditions are not met, even if the shift lever is pushed, the transmission will not shift.

**ECO Mode**

Press the ECO mode button and TCU selects ECO mode program. Press the mode button again to exit ECO mode.

**⚠ Caution**

- You can decide if you need the ECO mode according to different vehicle needs.

**SPORT Mode**

Press the SPORT mode button and TCU selects SPORT mode program. Press the mode button again to exit SPORT mode.

**⚠ Caution**

- You can decide if you need the SPORT mode according to different vehicle needs.

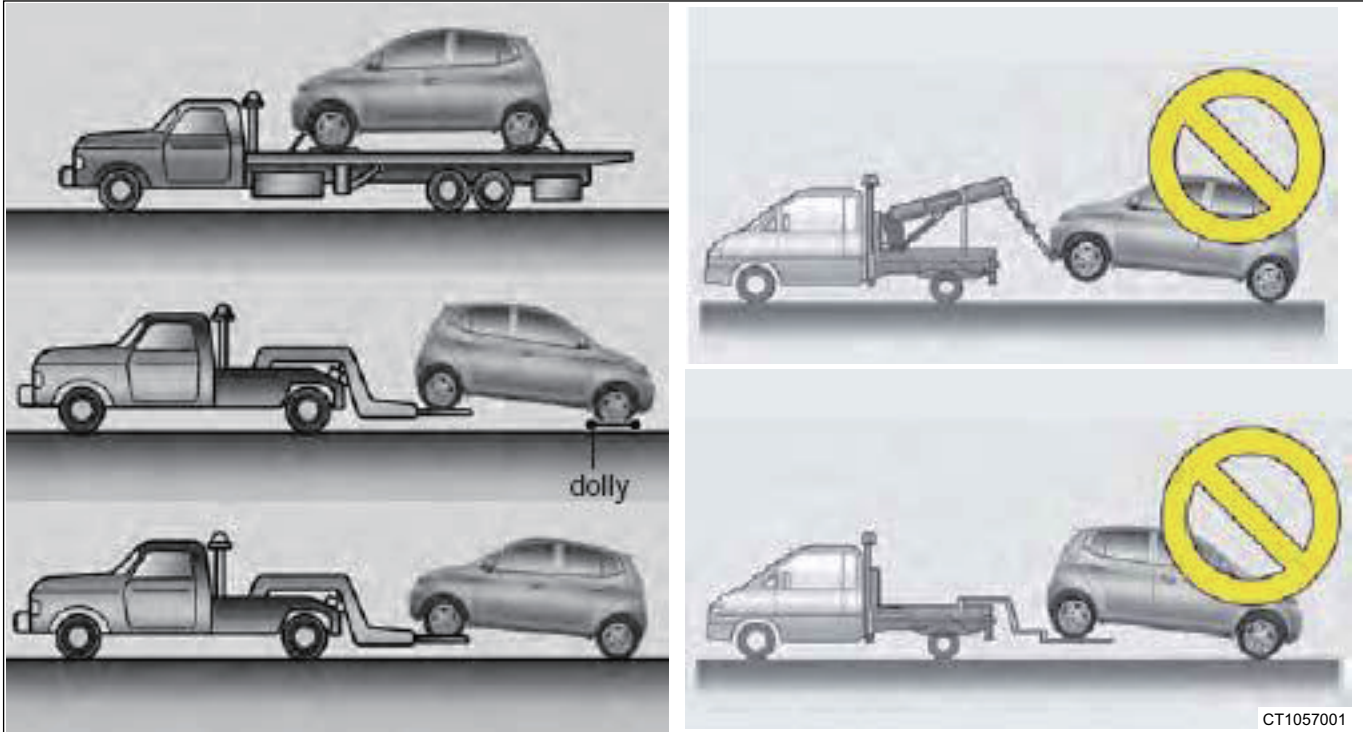
**Vehicle Towing**

Towing using the correct method can avoid unnecessary secondary damage to the vehicle:

- Use flatbed truck or large flatbed trolley to tow the vehicle after it is fully supported;
- Use hard traction to lift the non-drive wheel while using a small flatbed (ground wheel) to lift the drive wheel and transport it;
- Use hard traction to lift the drive wheel and transport it.

**⚠ Caution**

- Do not use soft traction to pull the drive wheel.
- Do not use soft traction to pull the non-drive wheel.

**Transmission Repair****Transmission Oil Maintenance**

Automatic transmission oil is a very important component that provides hydraulic transmission, lubrication, cooling and other functions during the operation of automatic transmission.

**Maintenance Period**

In order to extend the service life of the transmission, it is required to replace the transmission oil and external filter assembly once when the vehicle is traveling 40,000 km, and then it is not necessary to replace it.

**Oil Specifications**

0CF25+electronic shift series CVT can only use genuine CVTF WCF-1 oil:

Oil Brand	Capacity
CVTF WCF-1	7.3 L ± 0.2 L

**Oil Status Inspection**

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:

- 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 CVT, and the transmission needs to be checked and repaired.

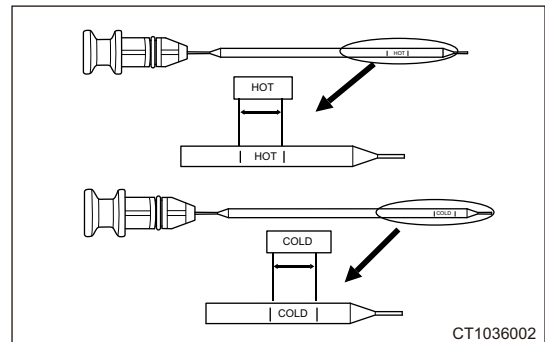
### ⚠ Caution

- The transmission oil must not be replaced by other oil to avoid damage to the transmission.

### Oil Level Inspection

Please check the oil level in the following order:

- After the vehicle has been running on the road for a period of time, the transmission oil temperature reaches  $80 \pm 5^{\circ}\text{C}$  or  $25 \pm 5^{\circ}\text{C}$  (it can be measured with a diagnostic tester);
- Stop the vehicle on a level surface and pull up the parking brake handle;
- When the engine is running at idle speed, depress and hold the brake pedal, shift the gears in the order of R, N and D for three cycles (one reciprocating motion is one cycle), each gear is kept for 5 s, and finally shift the shift lever to "P" or "N" position;
- Wipe off dust and oil stains, etc. around the oil dipstick and sleeve;
- Pull out the oil dipstick from oil dipstick sleeve, wipe the oil dipstick with lint-free paper and insert it into the oil dipstick sleeve set to prevent foreign matter from falling into the transmission.
- Pull out the oil dipstick and record the scale position. If the oil level is within the corresponding scale range, the oil level is normal. If the oil level is not within corresponding scale range, refill or drain oil until oil level is in the middle of corresponding range to achieve best performance of the transmission.



- Finally, insert the oil dipstick into the sleeve and ensure that it is installed in place.

### ⚠ Caution

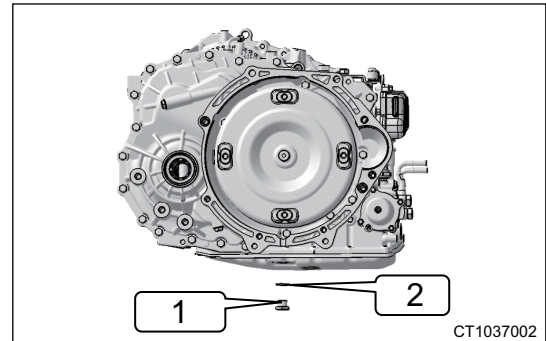
- After repairing the transmission or replacing the oil, the oil level must be controlled in the middle of corresponding range.
- One side of the oil dipstick measures the HOT oil level and the other side measures the COLD oil level.
- It is not allowed to increase the automatic transmission oil temperature by depressing on the accelerator rapidly at idling.
- Please use the "HOT" mark on transmission oil dipstick as the standard for measuring the quantity of transmission oil. The "COLD" (or "C") mark is for reference only.
- Under the hot oil condition of transmission, the temperature of engine, radiator and its piping system is very high, fan may start with it, so care should be taken to avoid burns during operation.
- If the transmission oil level is too low, the transmission oil pump will suck in air while running, resulting in each clutch or brake working badly due to insufficient working pressure.
- If the transmission oil level is too high, the rotating parts of transmission will stir liquid to produce foam while rotating at high speed, which can also result in each clutch or brake working badly due to insufficient working pressure.

## Oil Replacement

### 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. Lift up the vehicle on the lift.
2. Remove the transmission drain plug (1) and flat washer (2).

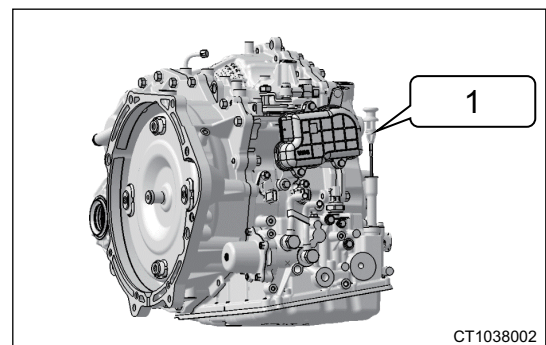


### Caution

- Drain plug flat washer is non-reusable component, and replace it after each removal.

3. Drain the transmission oil.
4. Reinstall and tighten the drain plug, do not miss the seal washer.  
**Tightening torque: 42 - 50 N·m**

5. Pull out the oil dipstick set (1) and fill the new transmission oil from oil dipstick set mounting port.



### Caution

- When replacing, the filling amount is the drained transmission oil amount.
- If it is a new transmission, it is not necessary to drain the oil. Add  $5.5 \pm 0.1$  L of oil directly.

6. Check the oil level as required after filling.
7. Install the oil dipstick set.



**⚠ Caution**

- When wiping the oil dipstick set, use lint-free paper to prevent foreign matter from falling into the transmission.
- There are high-temperature parts in engine compartment. To avoid accidents, remember not to spill ATF on high-temperature parts.
- After the automatic transmission oil is filled, the spilled oil must be wiped.
- When replacing the automatic transmission oil, the oil cooler on vehicle needs to be cleaned.
- The replaced automatic transmission oil needs to be recycled with recycling tools to avoid environmental pollution.

**Power Assembly Separation/Assembly****Power Assembly Separation**

1. First, remove other parts of the vehicle that affect the removal of transmission in accordance with relevant technical requirements;
2. Separate the connector between the vehicle wire harness and transmission;
3. Separate the shift cable from transmission shift arm;
4. Separate the left/right propeller shaft from transmission;
5. Separate the cooling hose from transmission;
6. Separate transmission from engine.

**Assembly of Power Assembly**

1. The assembly of power assembly is in the reverse order of separation.

**Vehicle Wire Harness Connector Removal and Installation**

In order to realize automatic shift, it is necessary to collect transmission data information and provide it to the TCU for automatic shifting. Therefore, the corresponding sensors need to be installed on the transmission, and the signal is transmitted through the wire harness. The connection between the sensor and wire harness is mainly realized by the connector.

The 0CF25+electronic shift transmission totally has: 3 speed sensors, 2 oil pressure sensors, 1 range switch, 1 wire harness main connector, 1 TCU and 1 electronic shift actuator.

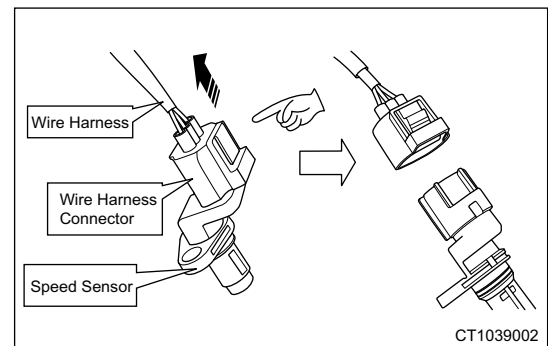
**⚠ Caution**

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, or clip loosening/breaking, or wire harness open circuit.
- In addition to the parts described in this article, other technical requirements for the separation of the vehicle wire harness from the transmission should be performed with reference to the vehicle Repair Manual.

**Speed Sensor Connector****Removal****⚠ Caution**

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Pull up the wire harness connector (arrow) while pressing and holding the connector lock mechanism (-finger direction).



2. Separate the wire harness connector.
3. Removal is completed.

### Installation

1. Installation is in the reverse order of removal.

#### ⚠ Caution

- Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

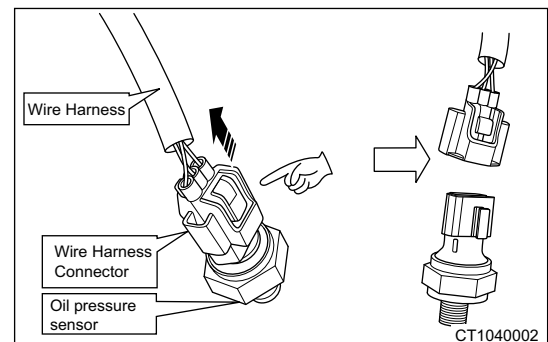
### Oil Pressure Sensor Connector

#### Removal

#### ⚠ Caution

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Pull up the wire harness connector (arrow) while pressing and holding the connector lock mechanism (-finger direction).



2. Separate the wire harness connector.
3. Removal is completed.

### Installation

1. Installation is in the reverse order of removal.

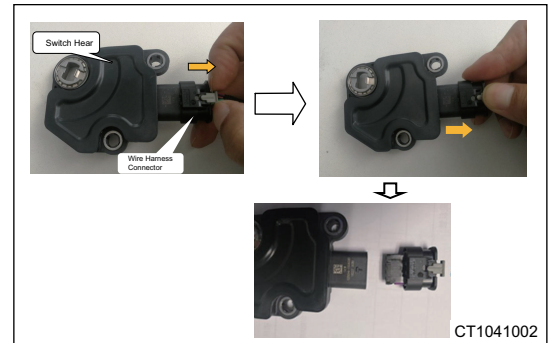
**⚠ Caution**

- Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

**Range Switch Connector****Removal****⚠ Caution**

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Pull out the gray buckle as shown in illustration (arrow).
2. Press down the gray buckle and pull out the wire harness connector in the direction of the arrow at the same time.



3. Removal is completed.

**Installation**

1. Installation is in the reverse order of removal.

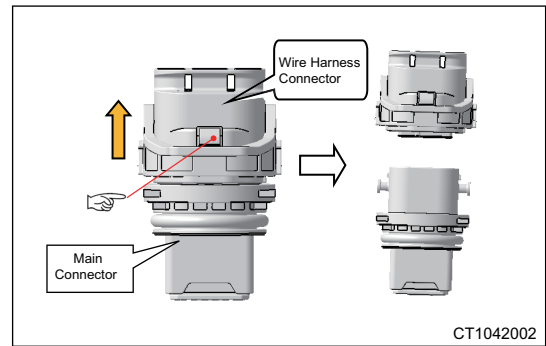
**⚠ Caution**

- When the range sensor is installed and the wire harness connector is inserted into place, please be sure to push the gray locking mechanism on the connector into place to lock the installation position of the connector and the range sensor.
- Make sure that the connector is inserted into place while installing: When it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

**Wire Harness Main Connector****Removal****⚠ Caution**

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Press firmly on the position as shown in the illustration above and flip the handle upward.
2. Pull up the wire harness connector at the same time.



3. Separate the wire harness connector.
4. Removal is completed.

### Installation

1. Installation is in the reverse order of removal.

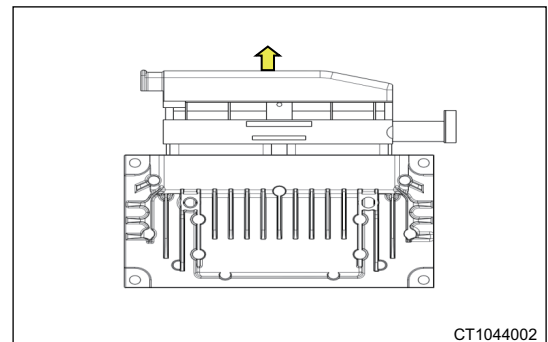
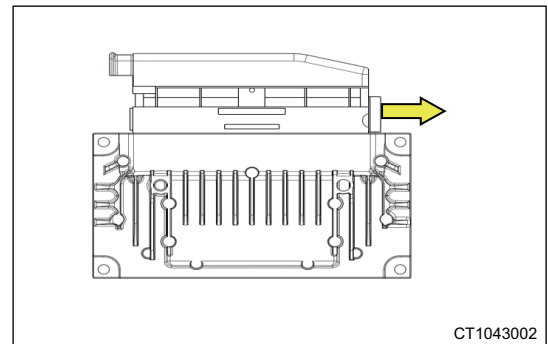
#### Caution

- Make sure that the connector is inserted into place while installing, when it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

### TCU Connector

#### Removal

1. Pull the connector to the right as shown in the illustration above.
2. Pull up the connector as shown in the illustration.



3. Removal is completed.

#### Installation

1. Installation is in the reverse order of removal.

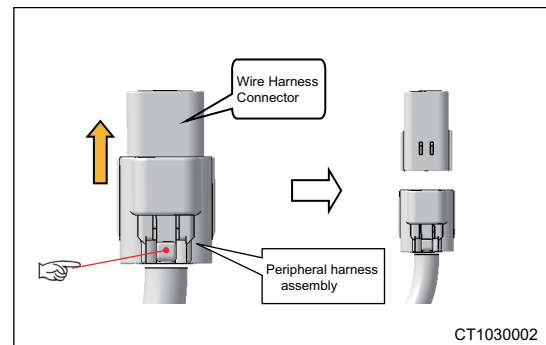
**⚠ Caution**

- Make sure that the connector is inserted into place.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

**Transmission Peripheral Wire Harness Assembly****Removal****⚠ Caution**

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Press firmly on the position as shown in the illustration and pull the wire harness connector at the same time.



2. Separate the wire harness connector.
3. Removal is completed.

**Installation**

1. Installation is in the reverse order of removal.

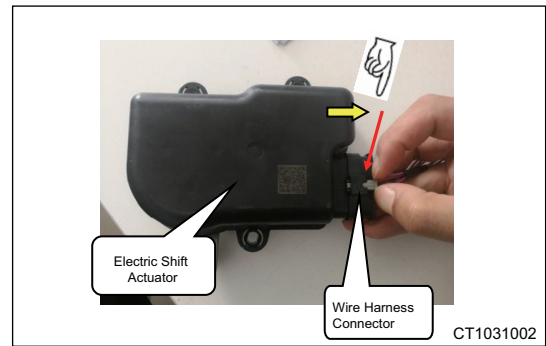
**⚠ Caution**

- Make sure that the connector is inserted into place while installing, when it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

**Electronic Shift Actuator Assembly****Removal****⚠ Caution**

- The connection of connectors mostly uses injection-molded clip structure. Do not pull it strongly to avoid the sensor breaking, clip loosening/breaking and wire harness open circuit.

1. Pull out the gray buckle as shown in illustration.
2. Press down the gray buckle and pull out the wire harness connector in the direction of the arrow at the same time.



3. Removal is completed.

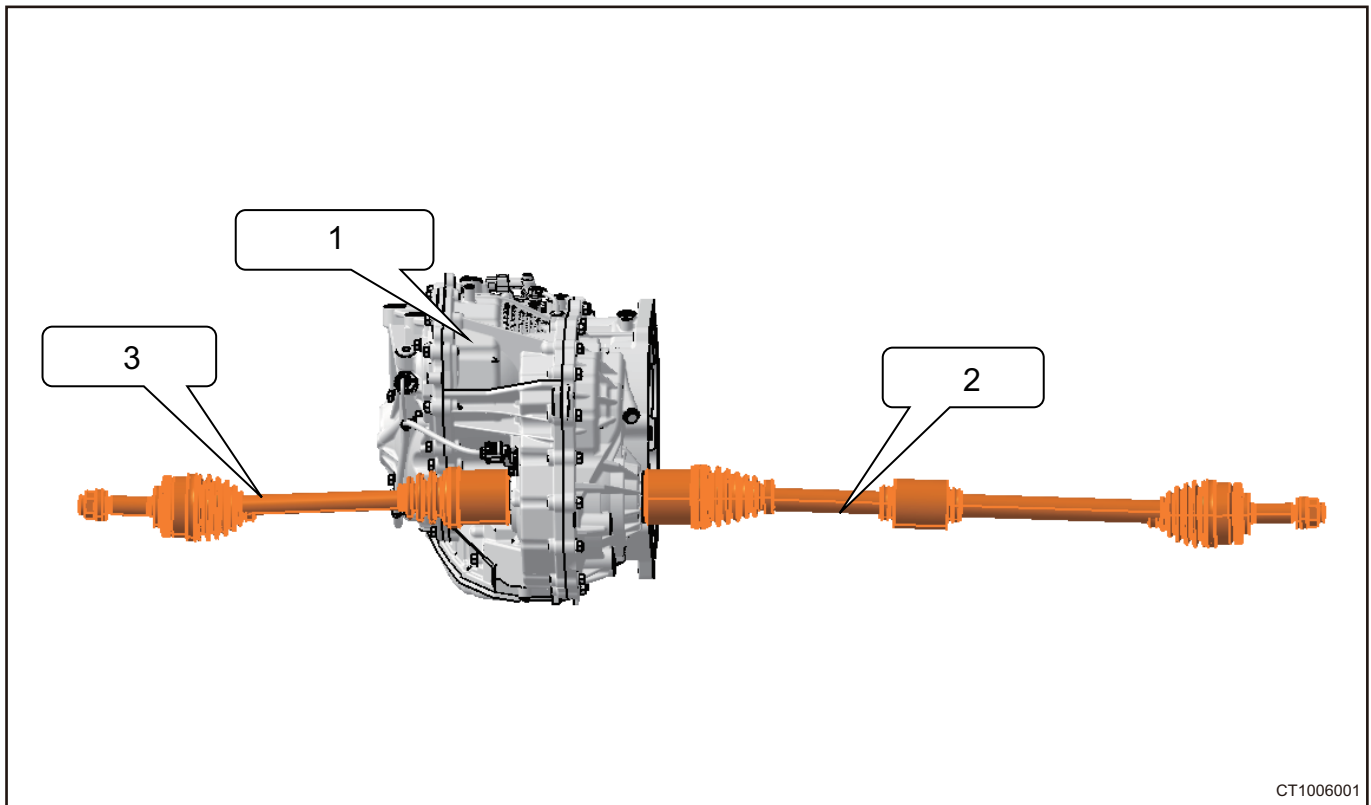
### Installation

1. Installation is in the reverse order of removal.

#### Caution

- When the range sensor is installed and the wire harness connector is inserted into place, please be sure to push the gray locking mechanism on the connector into place to lock the installation position of the connector and the range sensor.
- Make sure that the connector is inserted into place while installing, when it is inserted in place, it will make a "click" sound.
- In the process of disassembly and assembly, alignment is required to avoid the occurrence of bending of pins.

## Left/Right Propeller Shaft Removal and Installation



CT1006001

1	Transmission Assembly	2	Right Propeller Shaft
3	Left Propeller Shaft		

### Removal

1. Insert a flat crowbar into the connection between the left/right propeller shaft and the transmission.
2. Pry the crowbar to remove the left/right propeller shaft from transmission.

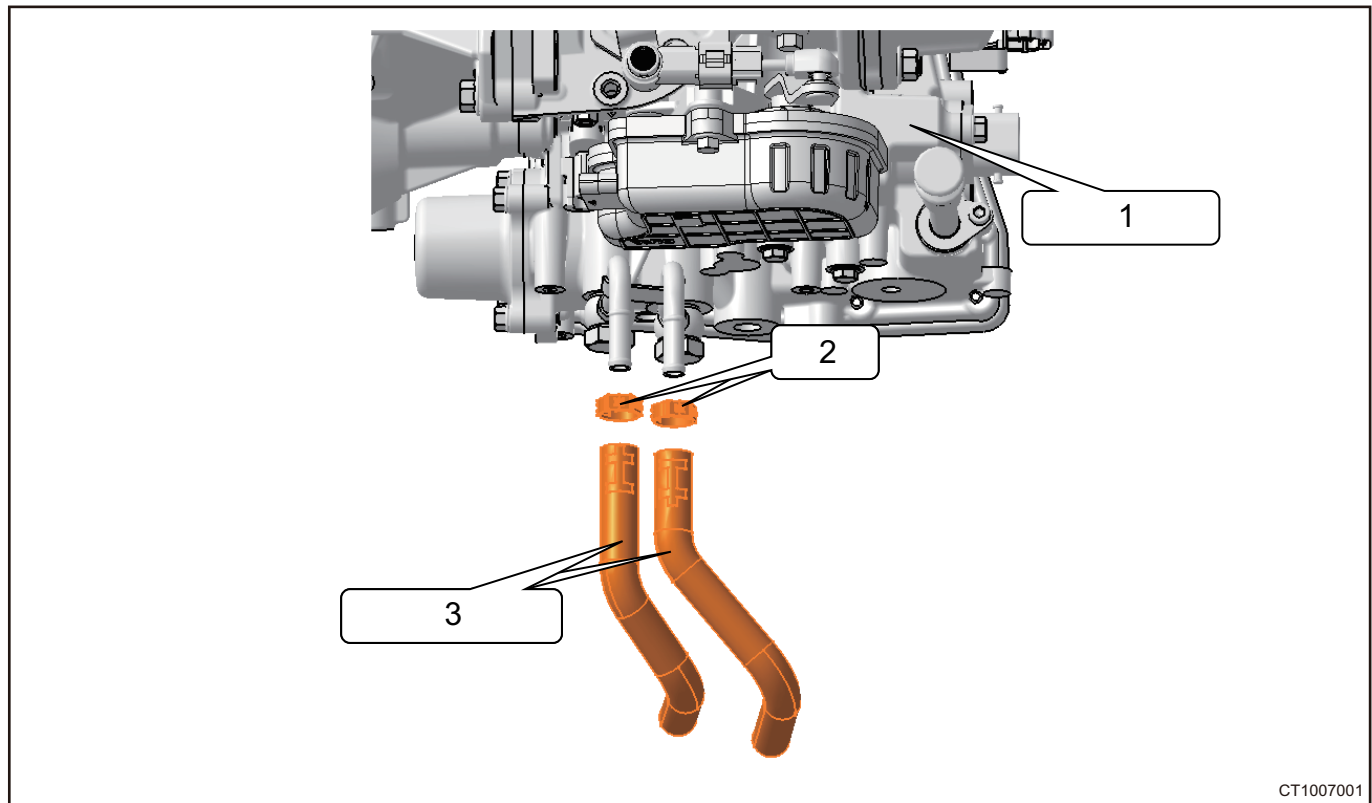
### Installation

1. Install spline protective sleeve on the external splines where the left/right propeller shaft and the transmission are matched.
2. Align the left/right propeller shaft with the spline hole in the differential drive shaft gear and install it into the transmission.
3. After making sure that the external splines on the left/right propeller shaft have passed the differential oil seal, remove the spline protective sleeve.
4. Push the left/right propeller shaft firmly into the transmission to make sure it is in place.

### ⚠ Caution

- Due to the interference fit between the oil seal and the transmission, the oil seal will inevitably be deformed and damaged during removing, and the deformed and damaged parts cannot be used continuously.
- Force is required when removing and installing the left/right propeller shaft, but do not operate violently to avoid damaging the transmission or propeller shaft.
- Other technical requirements for the separation of the left/right propeller shaft from the transmission should be performed with reference to the vehicle Repair Manual.

## Cooling Hose Removal and Installation



CT1007001

1	Transmission Assembly	2	Clamp
3	Transmission Cooling Hose		

### Removal

1. Using a suitable clamp pliers, remove the clamp.
2. Separate the transmission cooling hose from transmission external oil pipe assembly.

### Installation

1. Installation is in the reverse order of removal.

#### **⚠ Caution**

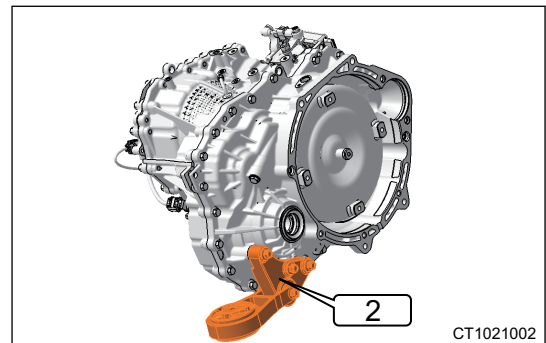
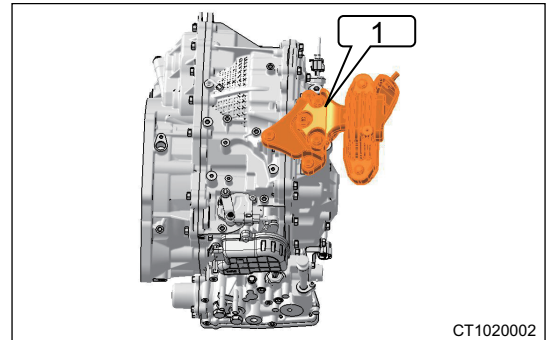
- During removal and installation, do not operate violently to avoid damaging the transmission oil pipe assembly.
- Avoid foreign objects entering the transmission from the oil pipe assembly nozzle.
- The transmission cooling hose is connected to the internal oil passage of the transmission, so it is necessary to ensure that the inside of hose is clean.
- Other technical requirements for the separation of the transmission cooling hose from the transmission should be performed with reference to the technical guidance document of the cooling hose design department.
- Different vehicles use different oil coolers, pipelines and corresponding clamps, and their removal methods and requirements are also different. For details, please refer to the corresponding technical guidance documents to perform.



## Transmission and Mounting Separation/Assembly

### Removal

1. Using suitable ratchet and socket, remove the mounting bolt.
2. Remove the left mounting (1) and rear mounting (2).



### Installation

1. Installation is in the reverse order of removal.

#### Caution

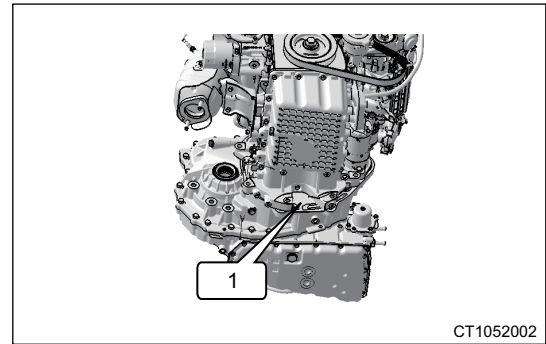
- During removal and installation, do not operate violently to avoid damaging the transmission.
- Before removing and installing the tightening bolts, it is necessary to check whether the threaded holes of the transmission are damaged. If there is any abnormality, it needs to be repaired.
- Different vehicles use different mountings and corresponding fasteners, and their removal methods and requirements are also different. For details, please refer to the corresponding technical guidance documents to perform.

## Transmission and Engine Separation/Assembly

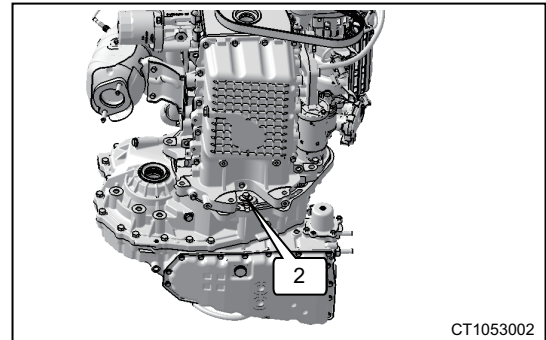
### Removal

1. Put the vehicle on the lift and raise it to a proper height.
2. Drain the transmission oil.
3. Separate the vehicle wire harness, left/right propeller shaft, cooling hose, left/rear mounting from the transmission respectively.

4. Remove the dust plate (1).



5. Check if the hydraulic torque converter coupling bolts (2) are visible, if not, turn the crankshaft until one of them is exposed.



6. Remove the coupling bolts between transmission and engine.
7. Separate transmission from engine.

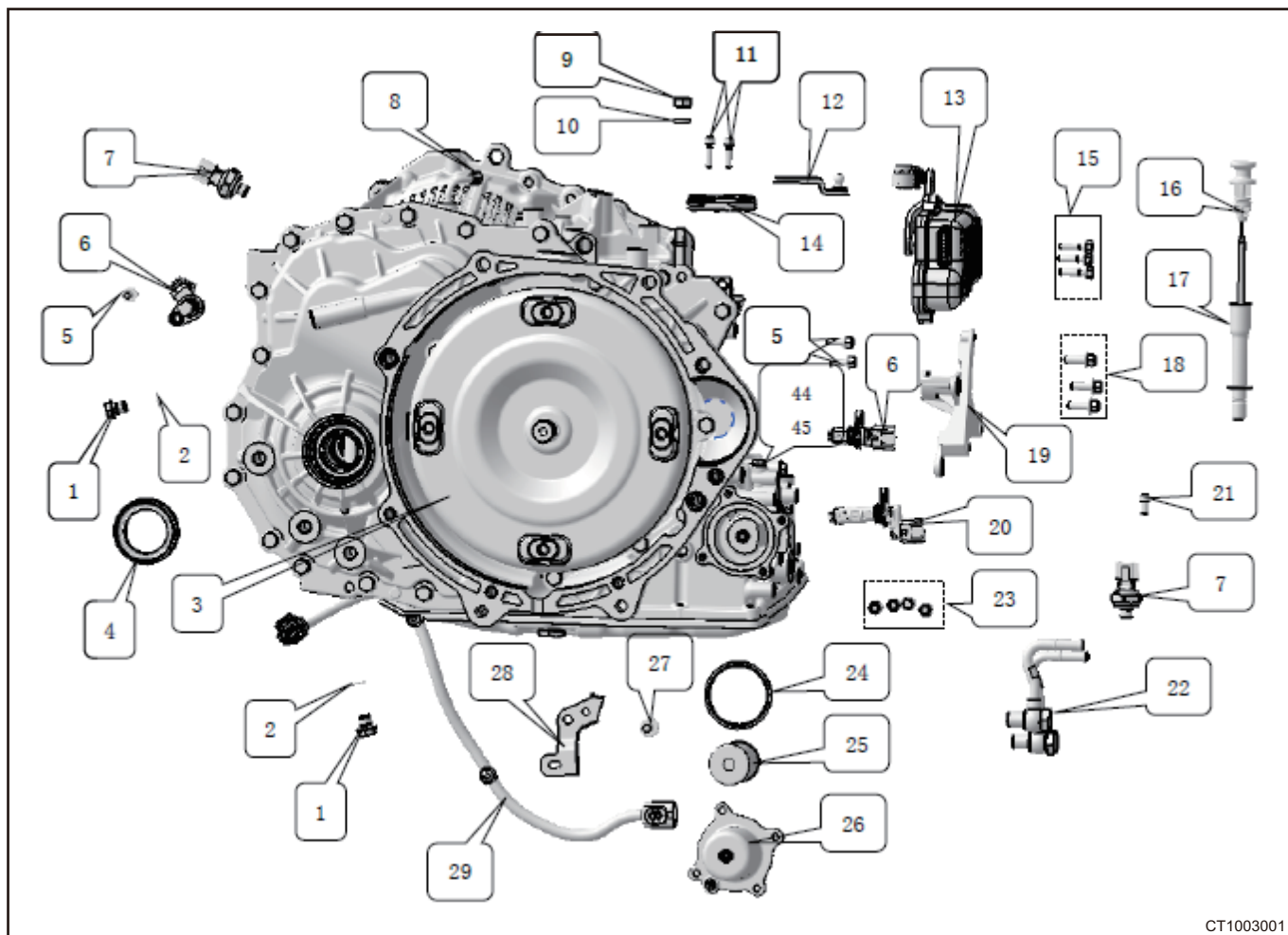
**⚠ Caution**

- It is required to disassemble the transmission and engine after disassembling the power assembly from vehicle as a whole.
- Before removal of power assembly, first drain transmission oil.
- When disassembling the transmission, make sure that the coupling bolts between the hydraulic torque converter and the flexible disc are removed first. The hydraulic torque converter is separated together with the transmission from the engine, engine and transmission are kept as coaxial as possible when separating to avoid the hydraulic torque converter from detaching or falling off. -> If the hydraulic torque converter accidentally falls off, it needs to be reinstalled under the guidance of relevant technicians, do not forcibly install it to avoid damaging the internal components of transmission; -> The hydraulic torque converter is a high-precision component with high requirements for moment of inertia. If it is accidentally bumped and deformed, it needs to be replaced with a new one.
- During separation of engine and transmission, pay attention not to damage the peripheral accessories of transmission, such as cooling pipe, pressure sensor, etc. If there is any damage, it is necessary to replace it according to requirements.
- Different vehicles use different dust plates and different quantities, specifications and coupling direction for coupling bolts between engine and transmission, and their removal methods and requirements are also different. For details, please refer to the corresponding technical guidance documents to perform.

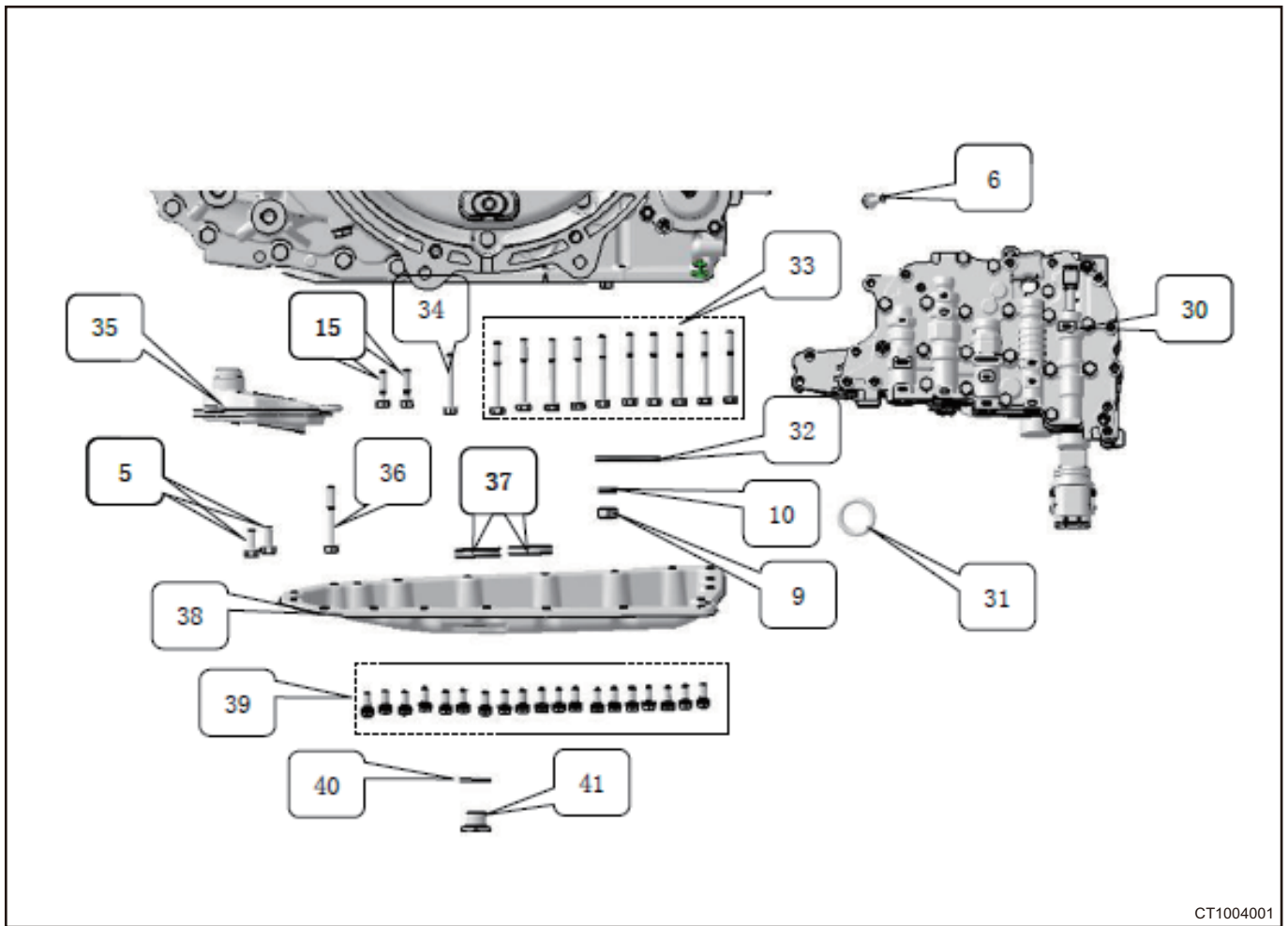
## Repairable List

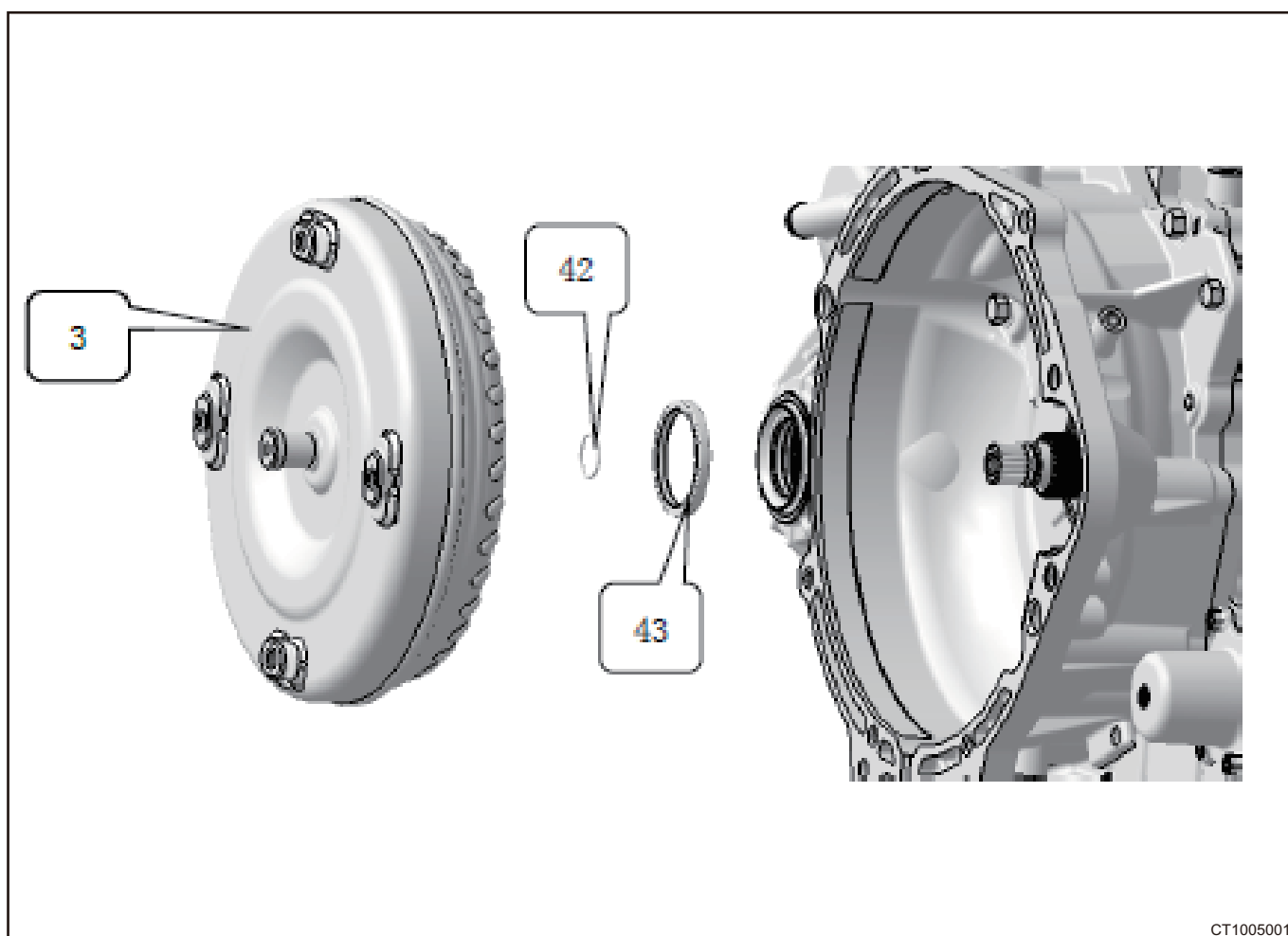
### ⚠ Caution

- Compared with traditional manual transmission, the removal, installation and repair of automatic transmission requires higher requirements. The repair or replacement of all components needs to be performed under the guidance of professional technicians of Wanliyang Company.
- Do not remove or replace the automatic transmission components without permission, so as to avoid secondary damage to the transmission.



CT1003001





CT1005001

No.	Part No.	Part Name	Quantity	Repair Qualification	Note
1	019CHA-1502172	Oil Pressure Detection Bolt	2	C	19 - 25 N·m
2	019CHA-1502171	Oil Pressure Detection Bolt (M12) O-ring	2	C	
3	/	Hydraulic Torque Converter Assembly	1	C	☆
4	019CHA-1502106	Differential Oil Seal	2	C	★
5	Q1880616F36	Hexagon Flange Bolt - Extra Large Series M6X16	6	C	8 - 10 N·m
6	025CHA-1504240 025CHA-1504240BA	Speed Sensor (Short)	2	C	Interconvertible
7	025CHA-1504210	Oil Pressure Sensor	2	C	
8	025CHA - 1502126	Breather Cap	1	C	
9	Q341C10F36	Nut	2	B	18 - 25 N·m
10	Q40310F9	Spring Washer_M10	2	B	★

No.	Part No.	Part Name	Quantity	Repair Qualification	Note
11	Q218B0622F36	Inner Hexagon Socket Cap Screw	2	B	8 - 10 N·m
12	025CHA-1506606 or 0CF25A-1506606BA	Rocker Arm - Transmission	1	B	
13	025CHA-1506600 or 0CF25A-1506600BA	Electronic Shift Module Assembly	1	B	
14	025CHA-1504220 or 0CF25A-1504220BA	Range Sensor	1	B	
15	Q1860625F36	Hexagon Flange Bolt - Extra Large Series	5	B	8 - 10 N·m
16	025CHA-1503210	Oil Dipstick Set	1	C	
17	025CHA-1503220	Oil Dipstick Sleeve Pipe Set	1	C	
18	Q1820820F36	Hexagon Flange Bolt	3	B	19 - 25 N·m
19	025CHA-1506604 or 0CF25A-1506604BA	Electronic Shift Actuator Bracket	1	B	
20	025CHA-1504230 025CHA-1504230BA	Speed Sensor (Long)	1	C	Interconvertible
21	Q218B0612F36	Inner Hexagon Socket Cap Screw	1	C	8 - 10 N·m
22	/	Cooling Pipe Assembly	1	C	☆
23	Q1860620F36	Hexagon Flange Bolt M6x20	4	C	8 - 10 N·m
24	025CHA-1506531	Gasket - External Filter and Transmission Case	1	C	
25	025CHA-1506510	External Filter Assembly	1	C	
26	025CHA-1506501	External Filter Case	1	C	
27	Q1820814F36	Hexagon Flange Bolt	1	C	20 - 26 N·m
28	025CHA-1504118	Fixing Bracket - Peripheral Wire Harness Assembly	1	C	
29	025CHA-1506500BA	Transmission Peripheral Wire Harness Assembly	1	C	
30	025CHA-1506100	Valve Body and Wire Harness Assembly	1	C	
31	025CHA-1502606	Valve Body and Transmission Case O-Ring	1	C	

No.	Part No.	Part Name	Quantity	Repair Qualification	Note
32	025CHA-1506532	Manual Shift Valve Drive Arm	1	C	
33	Q1860655F36	Hexagon Flange Bolt - Extra Large Series	10	C	8 - 10 N·m
34	Q1860645F36	Hexagon Flange Bolt - Extra Large Series	1	C	8 - 10 N·m
35	025CHA-1506400 or OCF25A-1506400BA	Filter Assembly - Oil Pump	1	C	
36	Q1860650F36	Hexagon Flange Bolt - Extra Large Series	1	C	8 - 10 N·m
37	025CHA-1506522	Magnet	2	C	
38	025CHA-1506521	Valve Body Case	1	C	★
39	Q1410616F61	Hexagon Head Bolt and Conical Spring Washer Set M6 x 16	19	C	8 - 10 N·m
40	QR523-1701103	Drain Plug Flat Washer	1	C	★
41	QR523-1701102	Drain Plug	1	C	
42	025CHA-1509103	Input Shaft to Hydraulic Torque Converter O-ring	1	C	
43	025CHA-1502204	Hydraulic Torque Converter Oil Seal	1	C	★
44	019CHA-1502182	Oil Pressure Detection Bolt	4	C	8 - 10 N·m
45	019CHA-1502181	Oil Pressure Detection Bolt (M8) O-ring	4	C	
46	/	Case Seal Gum	/	C	△
47	025CHA-4004011	Automatic Transmission Oil (CVTF WCF-1)	7.3 L	C	△
48	025CHA-1502201X	Torque Converter Case	1	A	
49	025CHA-1502230	Differential Lower Oil Deflector Assembly	1	A	
50	025CHA-1504133	Positioning Bolt	7	A	8 - 10 N·m
51	025CHA-1502202	Oil Guide Pipe	1	A	
52	025CHA-1502203	Oil Guide Pipe Bracket	1	A	
53	FQ1420616F34E	Hexagon Head Bolt and Spring Washer Set M6×16	1	A	8 - 10 N·m

No.	Part No.	Part Name	Quantity	Repair Qualification	Note
54	/	Differential Assembly	1	A	
55	/	Output Shaft Assembly	1	A	
56	025CHA-1502205	Differential Upper Oil Deflector	1	A	
57	Q32006F36	Hexagon Flange Nut M6	2	A	8 - 10 N·m
58	025CHA-1502616	Sprocket Oil Deflector	1	A	
59	513MHA-1701508	Differential Rear Bearing Adjusting Shim	1	A	Option
60	25CHA-1508500 or 0CF25A-1508500BA	Chain	1	A	
61	025CHA-1508400	Driven Sprocket Assembly	1	A	
62	025CHA-1502602	Pressure Plate	1	A	
63	025CHA-1508301	Drive Sprocket	1	A	
64	025CHA-1502608	Hexagon Flange Bolt	2	A	20 - 26 N·m
65	025CHA-1502617	Chain Oil Deflector	1	A	
66	Q1860835F36	Hexagon Flange Bolt - Extra Large Series	1	A	20 - 26 N·m
67	019CHA-1502117	Bearing Baffle Plate O-ring	1	A	
68	025CHA-1508100 or 025CHA-1508100BA	Oil Pump Assembly	1	A	
69	Q218B0870F36	Inner Hexagon Socket Cap Screw	3	A	20 - 26 N·m
70	025CHA-1502601	Sprocket Snap Ring	1	A	
71	025CHA-1509200	Planet Carrier Assembly	1	A	
72	025CHA-1509300	Sun Gear Set	1	A	
73	025CHA-1502604	Forward Clutch Thrust Bearing	1	A	Option
74	025CHA-1502618	Planetary Gear Train Thrust Bearing	3	A	
75	025CHA-1509100	Input Shaft and Forward Clutch Assembly	1	A	
76	FQ186C1035F36	Hexagon Flange Bolt - Extra Large Series	23	A	42 - 54 N·m



No.	Part No.	Part Name	Quantity	Repair Qualification	Note
77	025CHA-1502603	Washer between Drive Sprocket and Oil Separator	1	A	
78	025CHA-1508206	Forward Clutch Seal Ring	2	A	
79	Q1860830F36	Hexagon Flange Bolt - Extra Large Series	7	A	20 - 26 N·m
80	025CHA-1508210	Oil Separator Assembly	1	A	
81	025CHA-1502108	Output Shaft Adjusting Shim	1	A	Option
82	025CHA-1504130	Gear Positioning Steel Sheet Set	1	A	
83	025CHA-1502127	Breather Pipe	1	A	★
84	/	Transmission Assembly/ Transmission Bare Machine Assembly	1		

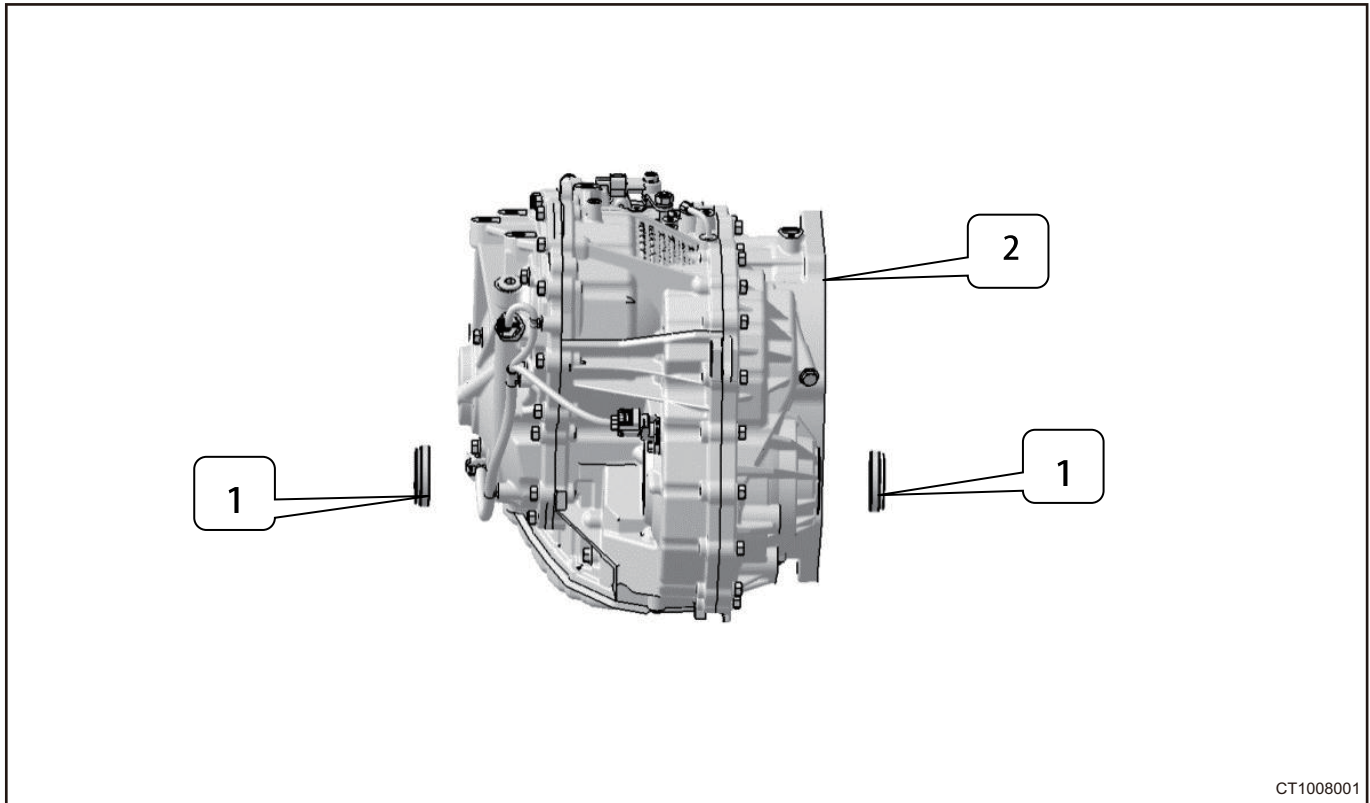
**Hint:**

- A Qualification: Only refers to Wanliyang, Wanliyang has the qualification to repair all components of CVT25 transmission, including but not limited to this repairable list.
- B Qualification: Includes Wanliyang and Wanliyang-approved service stations.
- C Qualification: Includes Wanliyang, Wanliyang-approved service stations and 4S shops.
- ★ means that this part is a non-reusable part, that is, if it is necessary to be disassembled during the maintenance, it must be replaced with a new one.
- ☆ Not all general parts of the series.
- △ Both automatic transmission oil and case seal gum are designated octane number, do not mix them!
- Torque converter case 025CHA-1502201X is a special state for after-sales maintenance, that is, the sealed steel ball has been installed.

**⚠ Caution**

- The automatic transmission is a high-precision component, which has extremely high requirements for cleanliness. Therefore, in the process of repairing and replacing the transmission components, ensure that the site is clean and wear clean gloves (or clean hands) to operate.

## Differential Oil Seal Removal and Replacement



CT1008001

1	Differential Oil Seal	2	Transmission Assembly
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### Removal

1. Use a pry bar to pry the oil seal directly off the transmission.

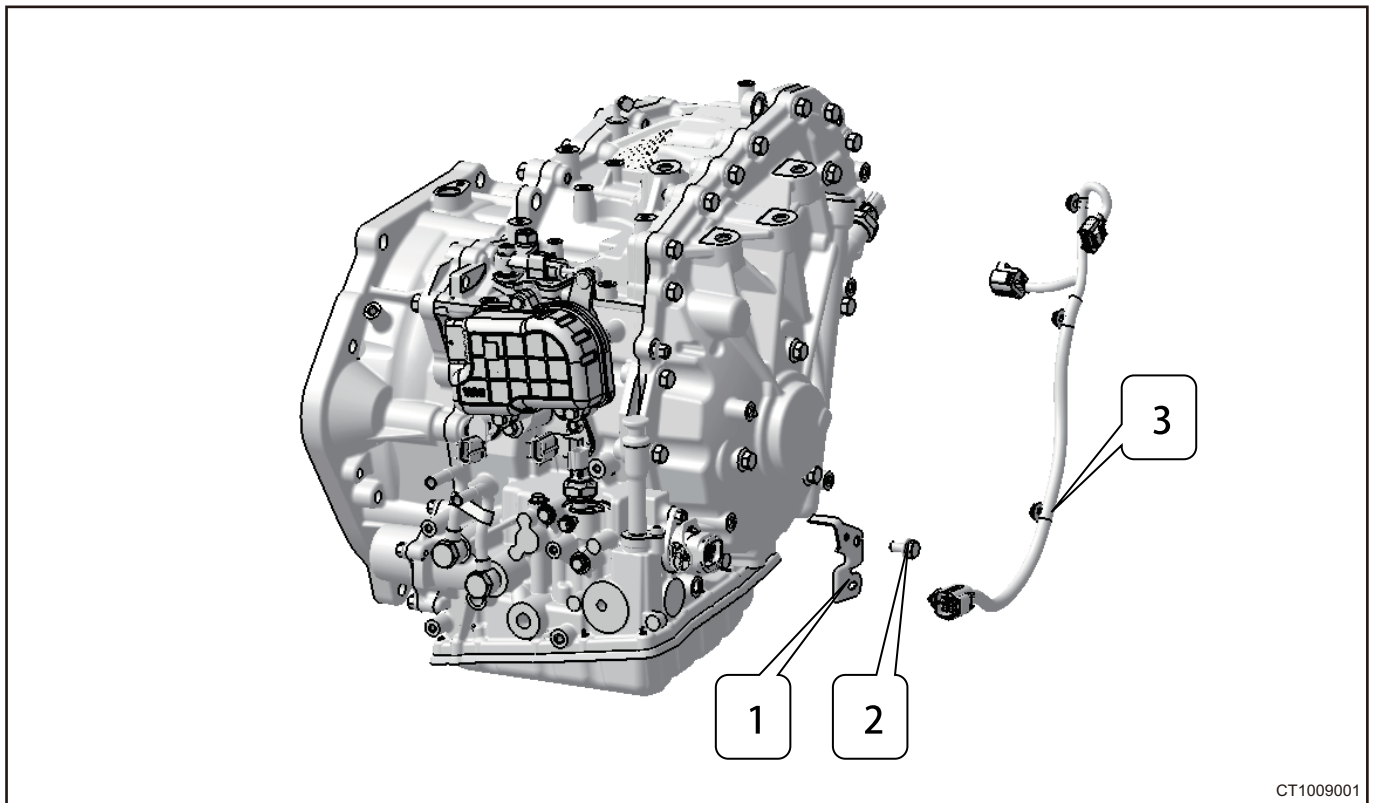
### Installation

1. Apply appropriate amount of automatic transmission oil to the inner and outer race of oil seal.
2. Align the oil seal with the transmission, and install it to the transmission with differential oil seal installation fixture.

### **⚠ Caution**

- Due to the interference fit between the oil seal and the transmission, it will inevitably be deformed and damaged during removing, and the deformed and damaged parts cannot be used continuously.
- Uniform force is required during oil seal installation, and the oil seal should not be deformed or damaged.
- The components of automatic transmission require high precision. During the disassembly and assembly process, you must be careful not to cause scratches or damage to these components, such as the machined surface of the case, etc.
- When connecting the propeller shaft, an oil seal protective sleeve must be used to prevent the splines and snap rings on propeller shaft from damaging the oil seal.
- Verticality shall be ensured during oil seal assembly, and the end surface shall not be tilted.

## Transmission Peripheral Wire Harness Assembly and Fixing Bracket Replacement



1	Fixing Bracket - Peripheral Wire Harness Assembly	2	Hexagon Flange Bolt
3	Transmission Peripheral Wire Harness Assembly		

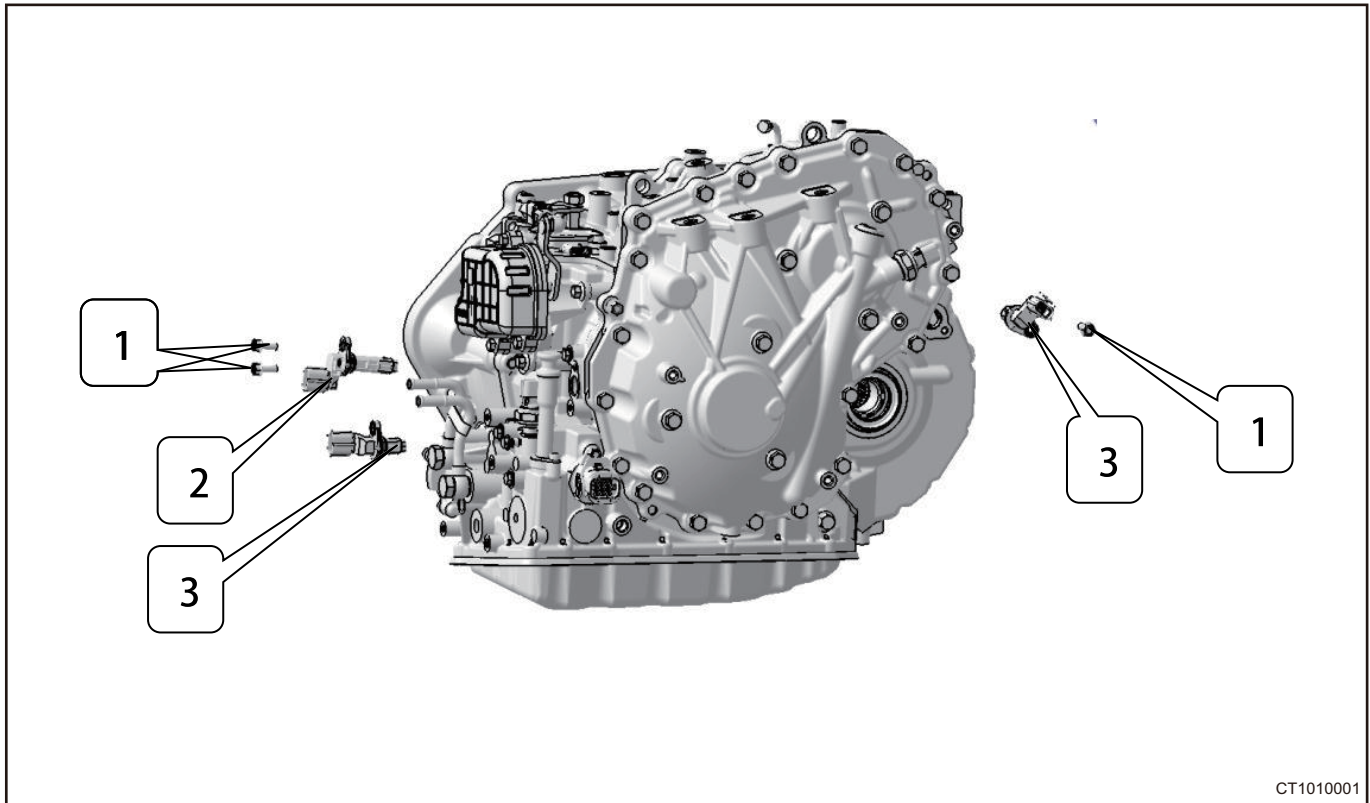
### Removal

1. Remove the sensor connector from the sensor.
2. Pull out the wire harness fixing band from the case fixing hole, and remove the peripheral wire harness assembly.
3. Remove the bracket fixing bolt with 10# socket, and remove the fixing bracket.

### Installation

1. Install the bracket according to the position as shown in the illustration.
2. Install the hexagon flange bolt with tightening torque of 20 - 26 N•m.
3. Install the peripheral wire harness assembly.

## Speed Sensor Assembly Removal and Replacement



CT1010001

1	Hexagon Flange Bolt - Extra Large Series M6X16	2	Speed Sensor (Long)
3	Speed Sensor (Short)		

### Removal

1. Remove the second shaft speed sensor connector from the sensor.
2. Unscrew the hexagon flange bolt from the sensor.
3. Remove the speed sensor assembly.

### Installation

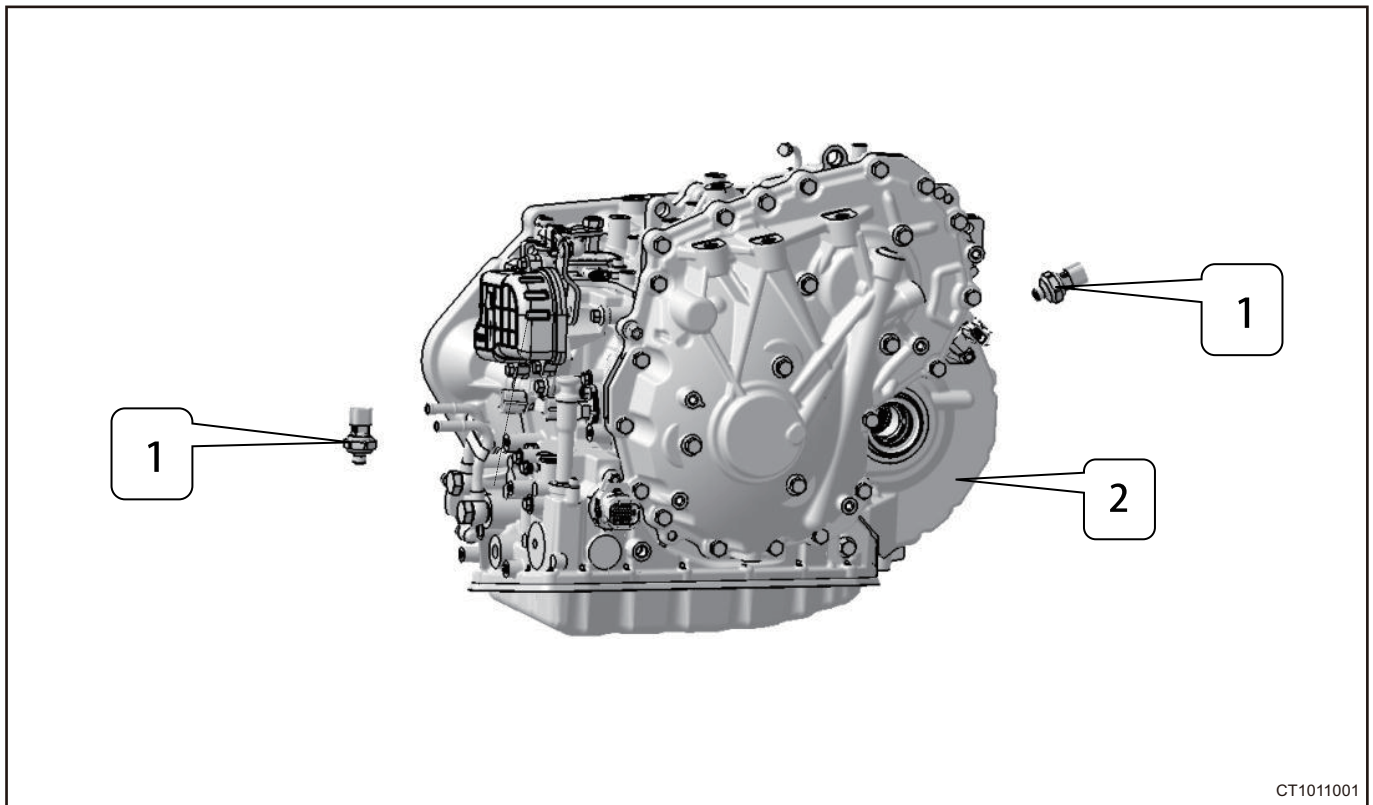
1. Apply proper amount of automatic transmission oil to sensor O-ring.
2. Install the sensor in place.
3. Install the bolt and tighten it.

**Tightening torque: 8 - 10 N·m**

### ⚠ Caution

- When connecting connector, check the pin connecting condition to confirm that the inserted pin is not bent or damaged, and then connect the connector.

## Oil Pressure Sensor Assembly Removal and Replacement



CT1011001

1	Oil Pressure Sensor Assembly	2	Transmission Assembly
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### Removal

1. Remove the second shaft pressure sensor connector from the sensor.
2. Unscrew the oil pressure sensor assembly.

### Installation

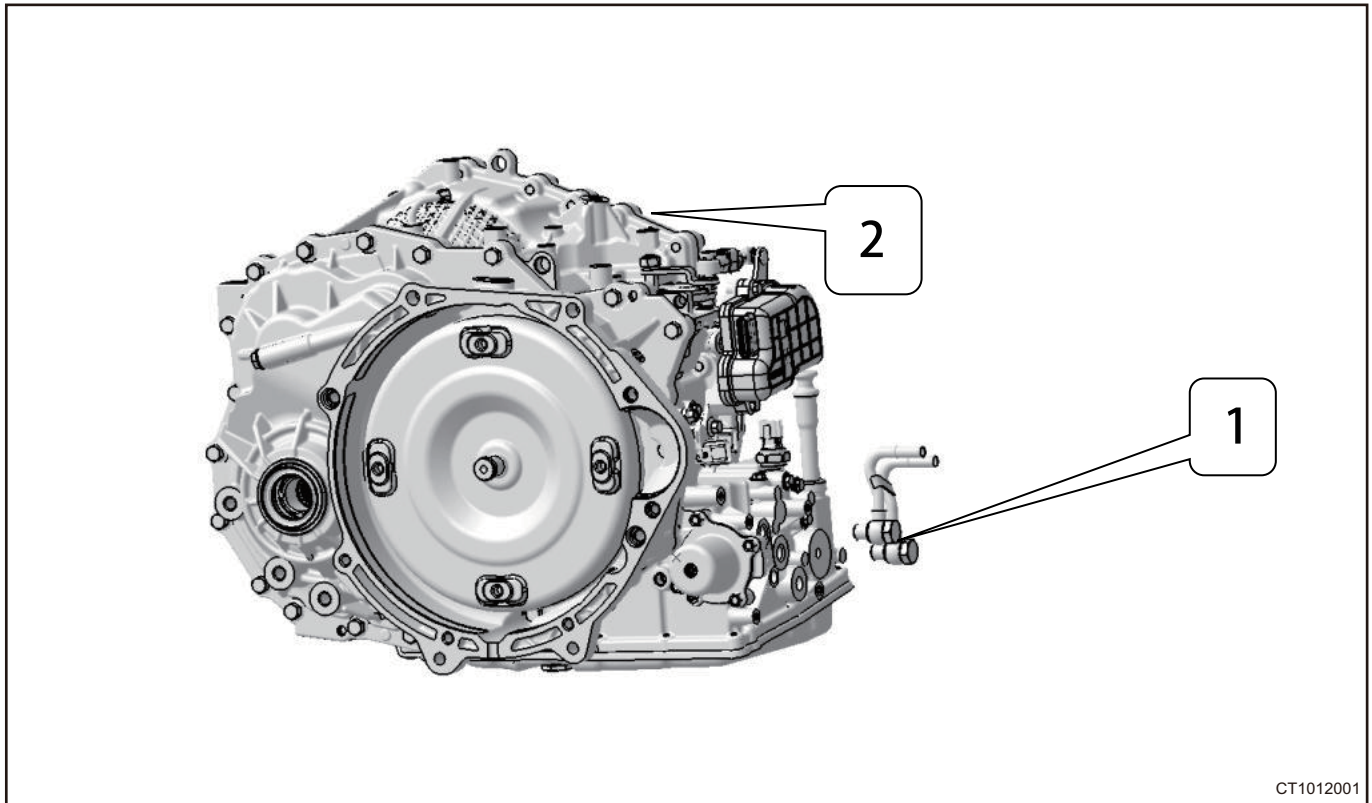
1. Apply proper amount of automatic transmission oil to sensor O-ring.
2. Install and pre-tighten the sensor in place, then tighten it.

**Tightening torque: 15 - 22 N·m**

### ⚠ Caution

- When connecting connector, check the pin connecting condition to confirm that the inserted pin is not bent or damaged, and then connect the connector.

## Cooling Pipe Assembly Removal and Replacement



CT1012001

1	Cooling Pipe Assembly	2	Transmission Assembly
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### Removal

1. Unscrew 2 hollow bolts with socket, and remove the cooling pipe assembly.

### Installation

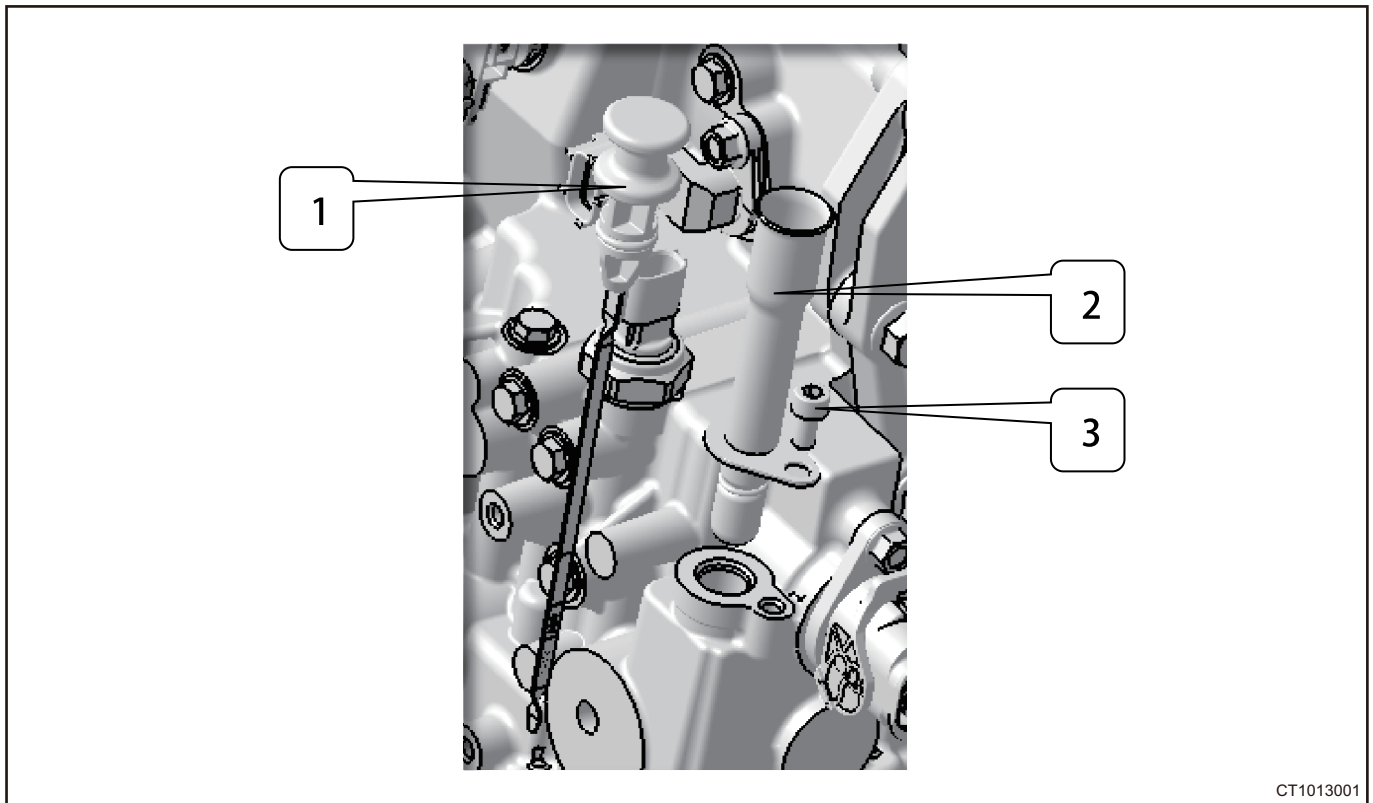
1. Pre-tighten the cooling pipe assembly in place, then tighten it.

**Tightening torque: 40 - 45 N·m**

### Caution

- The washer is a non-reusable product, do not reuse it, and remember not to miss it.

## Oil Dipstick Set, Oil Dipstick Sleeve Pipe Set Removal and Replacement



CT1013001

1	Oil Dipstick Set	2	Oil Dipstick Sleeve Pipe Set
3	Inner Hexagon Socket Cap Screw		

### Removal

1. Pull the oil dipstick set upward firmly.
2. Remove the inner hexagon socket cap screw with an inner hexagon wrench.
3. Pull the oil dipstick sleeve pipe set upward.

### Installation

1. Apply CVTF to the O-ring of oil dipstick sleeve pipe set and install it vertically and firmly to the case.
2. Install the inner hexagon socket cap screw to transmission case.

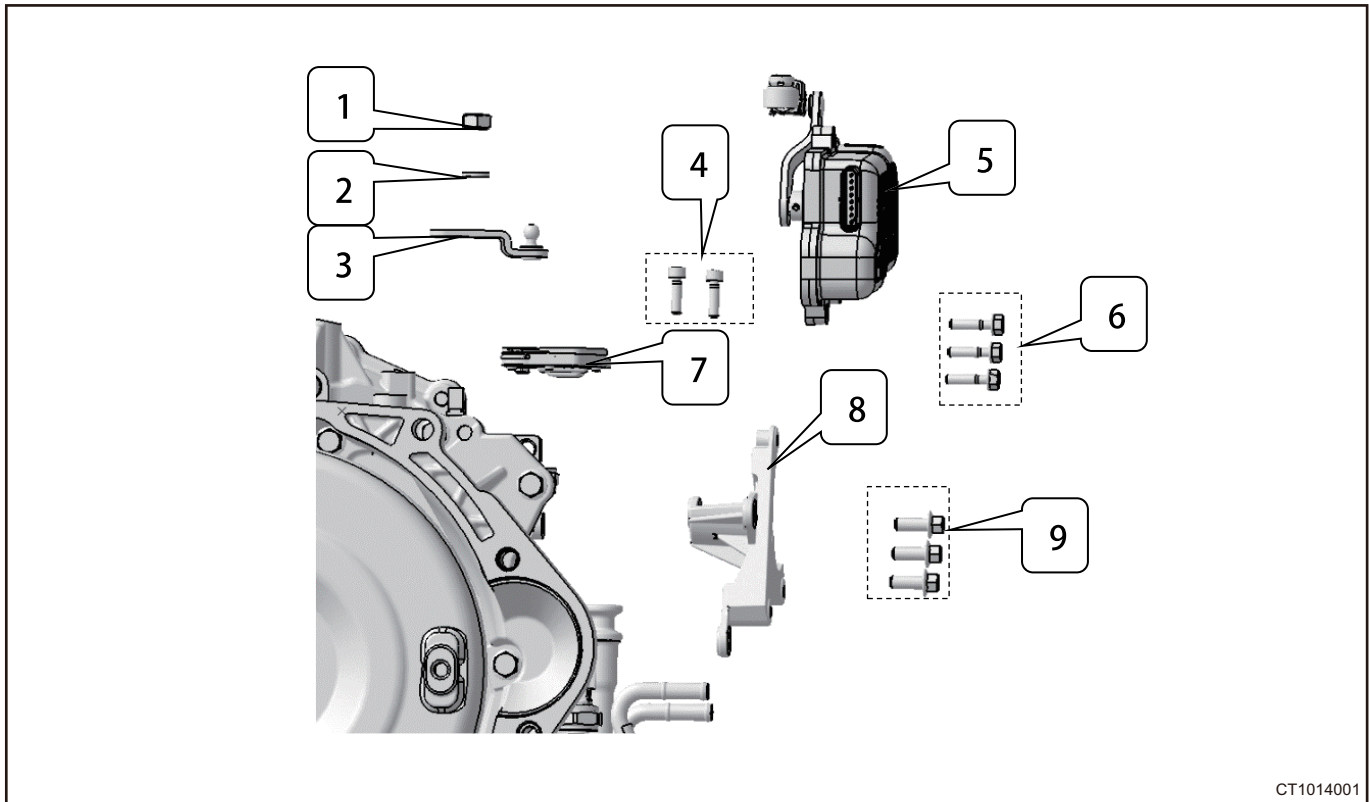
**Tightening torque: 8 - 10 N·m**

3. Apply CVTF to the O-ring of oil dipstick set and install it to oil dipstick sleeve pipe set, be careful to install it in place.

### ⚠ Caution

- Before installation, check if the O-ring is damaged. If it is damaged, replace it with a new one.

## Electronic Shift Actuator Assembly and Electronic Shift Actuator Bracket Removal and Replacement



1	Nut	2	Spring Washer_M10
3	Rocker Arm - Transmission	4	Inner Hexagon Socket Cap Screw
5	Electronic Shift Module Assembly	6	Hexagon Flange Bolt - Extra Large Series
7	Range Sensor	8	Electronic Shift Actuator Bracket
9	Hexagon Flange Bolt		

### Removal

1. Press the electronic shift actuator connecting rod button and pull up to separate the connecting rod from the rocker arm.
2. Remove 3 hexagon flange bolts - extra large series with 10# socket, and remove the electronic shift module assembly.
3. Remove 3 hexagon flange bolts with 10# socket, and remove the electronic shift actuator bracket.
4. Remove the nut with 16# socket, and remove the spring washer\_M10 and rocker arm - transmission.
5. Remove 2 inner hexagon socket cap screws with 5# inner hexagon wrench, and remove the range sensor.

### Installation

1. Install the range sensor in place and screw 2 inner hexagon socket cap screws.

**Tightening torque: 8 - 10 N·m**

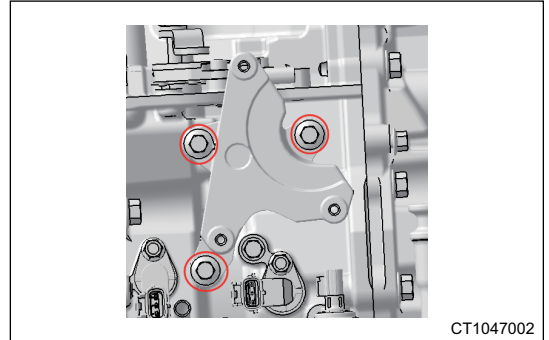


2. Install the transmission rocker arm in place, install the spring washer and tighten the nut.

**Tightening torque: 18 - 25 N·m**

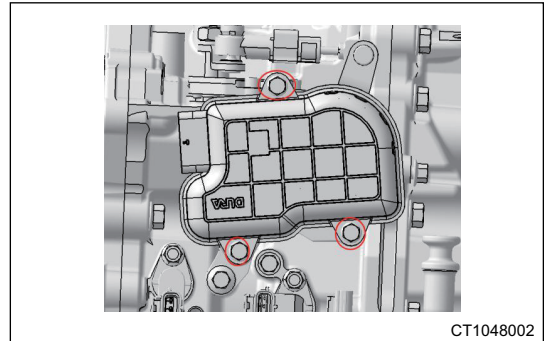
3. Install the electronic shift actuator bracket and fix it with 3 hexagonal flange bolts.

**Tightening torque: 19 - 25 N·m**



4. Install the electronic shift module assembly on the electronic shift actuator bracket, and fix it with 3 hexagon flange bolts-extra large series.

**Tightening torque: 8 - 10 N·m**

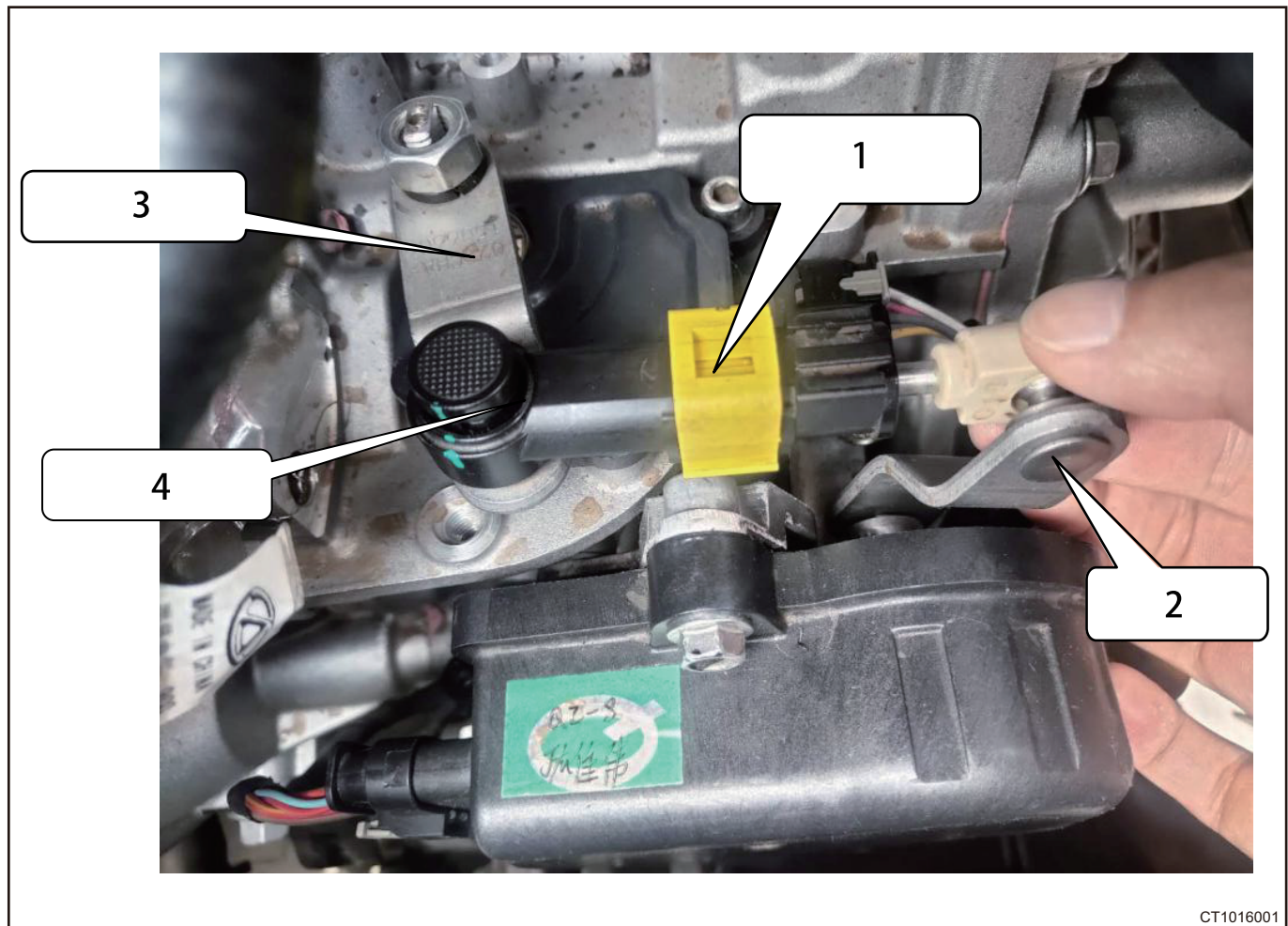


5. Assemble the electronic shift actuator connecting rod to transmission rocker arm.

**⚠ Caution**

- When electronic shift actuator connecting rod is assembled to transmission rocker arm, transmission rocker arm must be in neutral position.
- It is necessary to perform self-learning after removing and installing electronic shift module assembly.

## Electronic Shift Actuator Connecting Rod Removal, Installation and Adjustment



CT1016001

1	Yellow Square Buckle of Connecting Rod	2	Electronic Shift Rocker Arm
3	Transmission Gear Rocker Arm	4	Black Round Buckle of Connecting Rod

### Electronic Shift Connecting Rod Removal

1. Push down the black round buckle of the connecting rod firmly, and then lift the connecting rod strongly to separate the electronic shift connecting rod from the transmission gear rocker arm.
2. Loosen the yellow square buckle of the connecting rod.

### Electronic Shift Connecting Rod Installation

#### Hint:

- The transmission and electronic shift need to be in N gear.
1. Install the black round buckle of electronic shift connecting rod to the transmission gear rocker arm.
  2. Shake the electronic shift rocker arm to the full left and full right position, then adjust the electronic shift rocker arm to the middle position of the full left and full right, and fasten the yellow square buckle of the connecting rod (make sure that both sides of the yellow square buckle of connecting rod are fastened).

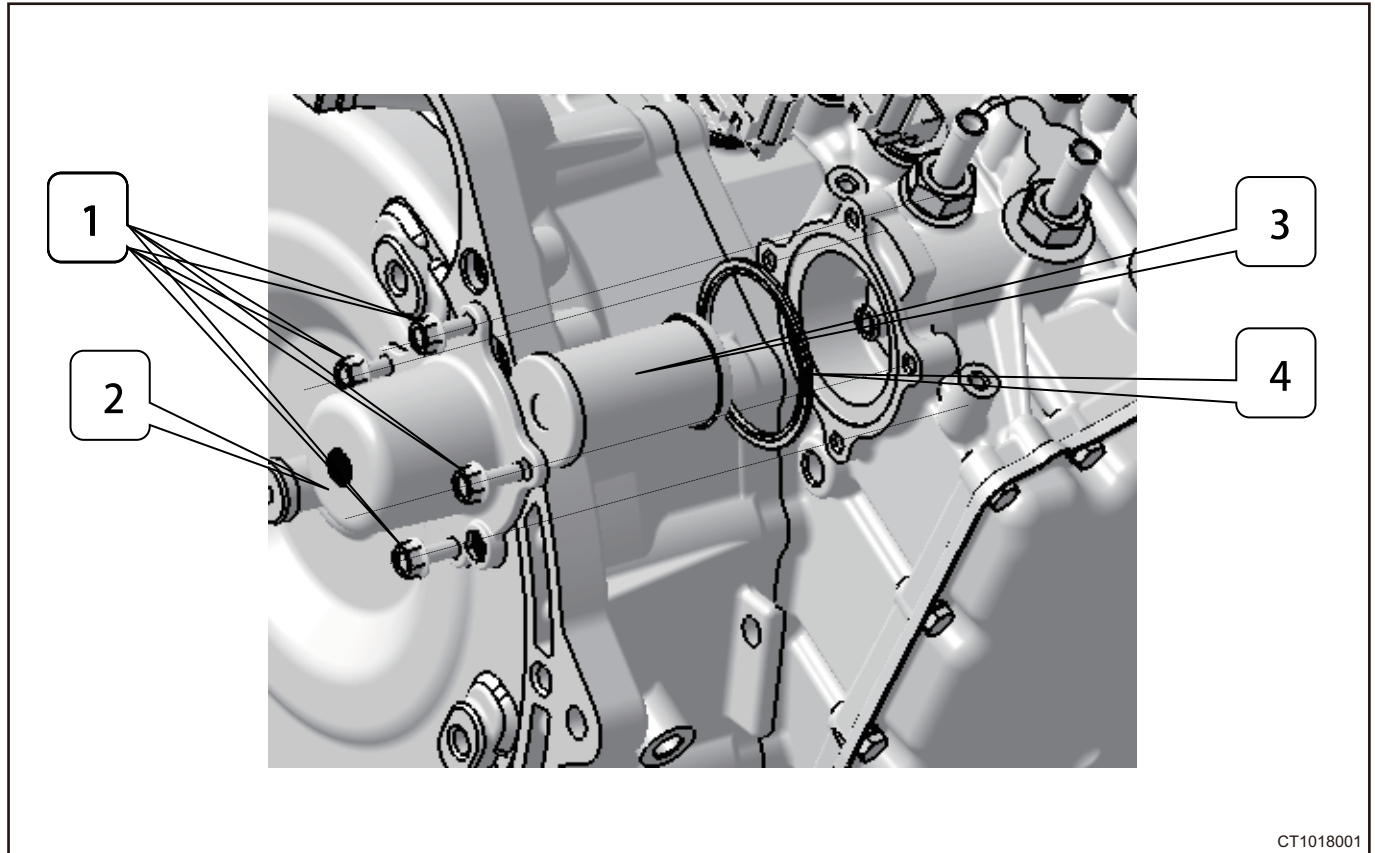
### Electronic Shift Connecting Rod Adjustment

#### Hint:

- The transmission and electronic shift need to be in N gear.

1. Loosen the yellow square buckle of connecting rod, and the black round buckle of connecting rod will not move.
2. Shake the electronic shift rocker arm to the full left and full right position, then adjust the electronic shift rocker arm to the middle position of the full left and full right, and fasten the yellow square buckle of the connecting rod (make sure that both sides of the yellow square buckle of connecting rod are fastened).

## External Filter Assembly Removal and Replacement



CT1018001

1	Hexagon Flange Bolt M6x20	2	External Filter Case
3	External Filter Assembly	4	Gasket - External Filter and Transmission Case

### Removal

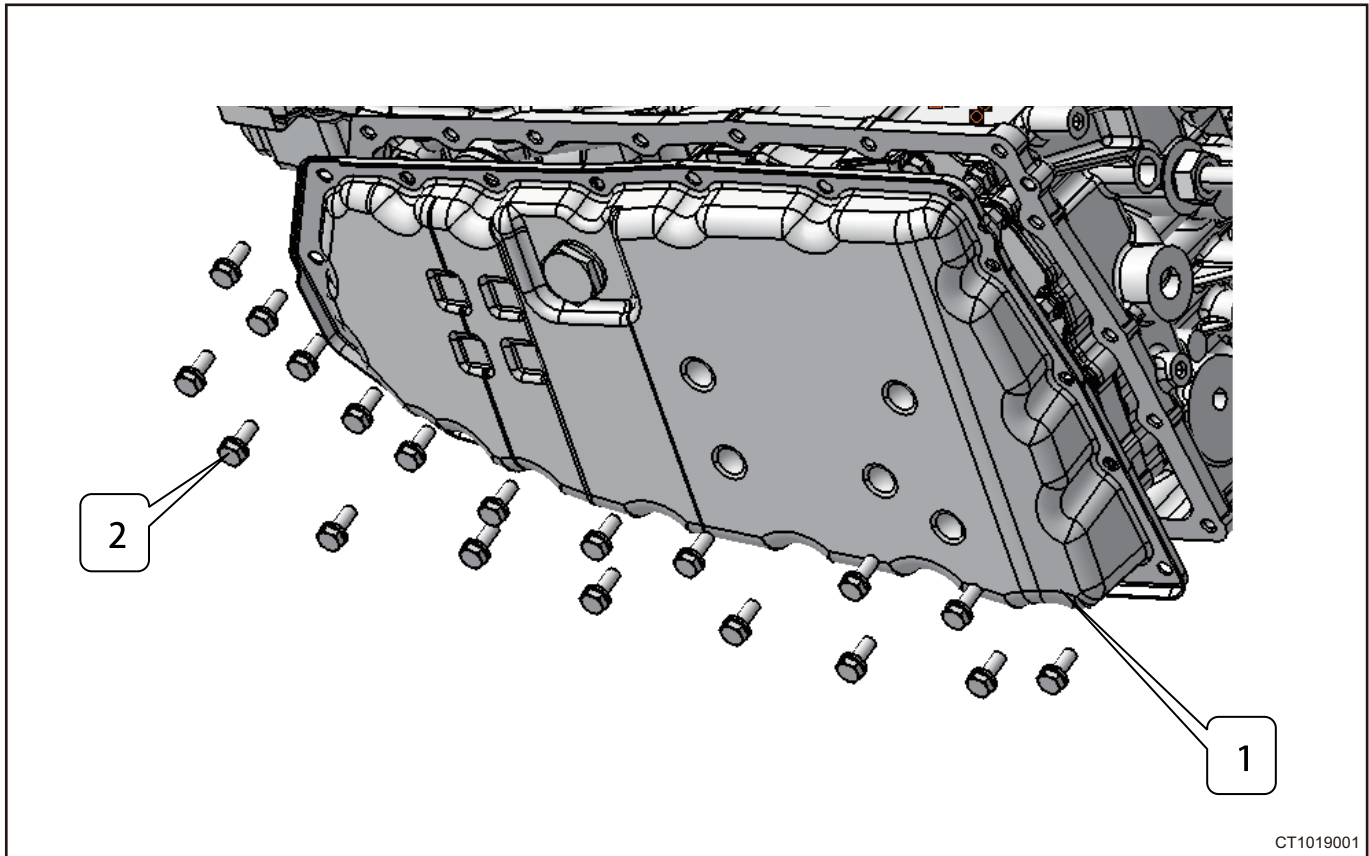
1. Unscrew the coupling bolt between external filter case and transmission case.
2. Remove the external filter case.
3. Remove the external filter assembly.
4. Remove the gasket - external filter and transmission case.

### Installation

1. Insert the external filter assembly opening into the corresponding boss on transmission case.
2. Apply the external filter gasket with CVTF and install it on the transmission case.
3. Cover the external filter case, and the holes are aligned with the holes of transmission case.
4. Install 4 hexagon flange bolts.

**Tightening torque: 8 - 10 N·m**

## Valve Body Case Removal and Replacement



CT1019001

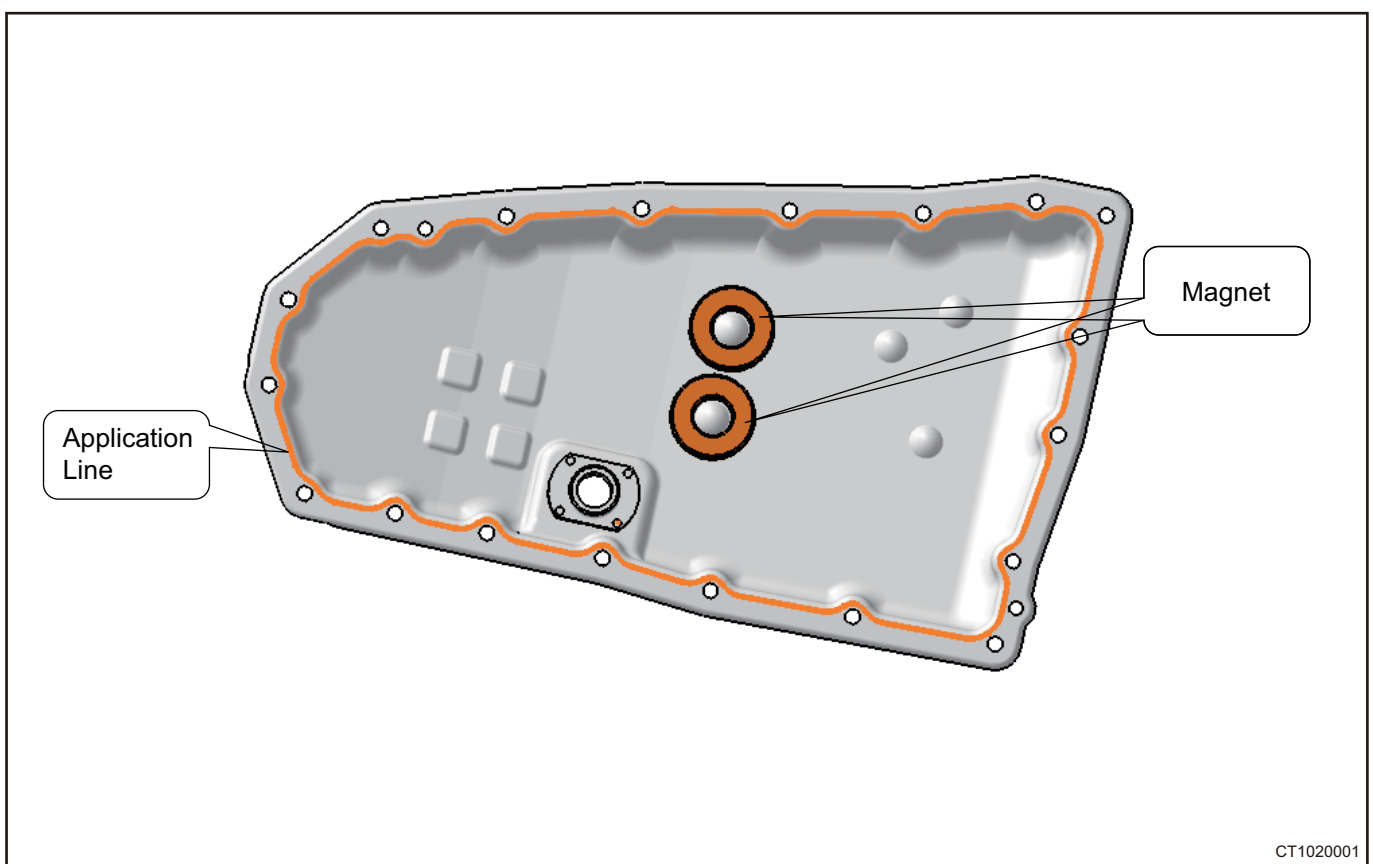
1	Valve Body Case	2	Hexagon Head Bolt and Conical Spring Washer Set M6 x 16
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### Removal

1. Unscrew the coupling bolt between valve body case and transmission case.
2. Use a crowbar against the outer edge of valve body case and tap lightly to remove the valve body case.

### Installation

1. Wipe the case joint surface clean.
2. Install two magnets in the positions shown in the illustration below, wipe the magnets clean before installation.
3. As shown in the illustration below, apply seal gum to the flange surface of valve body case, and the application line needs to be located on the sealing surface inside the bolt mounting hole.

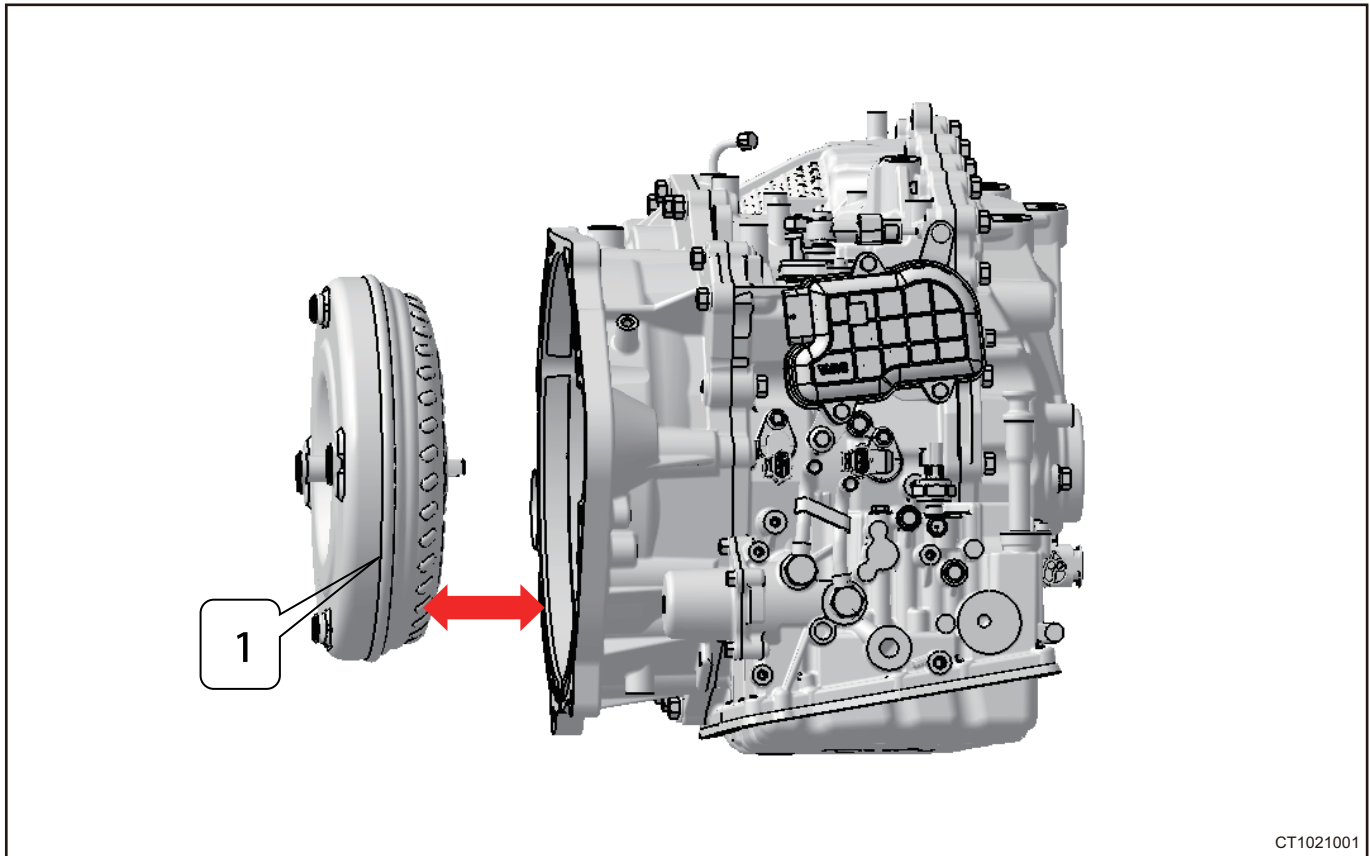


CT1020001

4. Install the valve body case.
5. Install the hexagon head bolt and conical spring washer set.

**Tightening torque: 8 - 10 N·m**

## Hydraulic Torque Converter Assembly Removal and Replacement



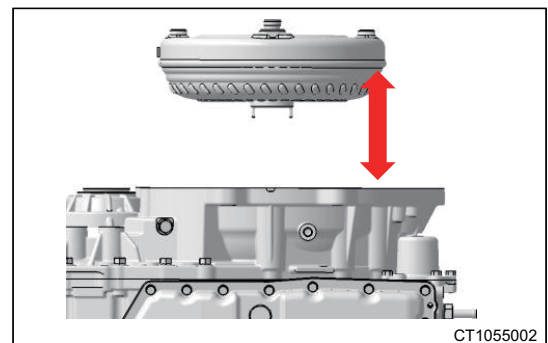
1	Hydraulic Torque Converter Assembly		
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### Removal

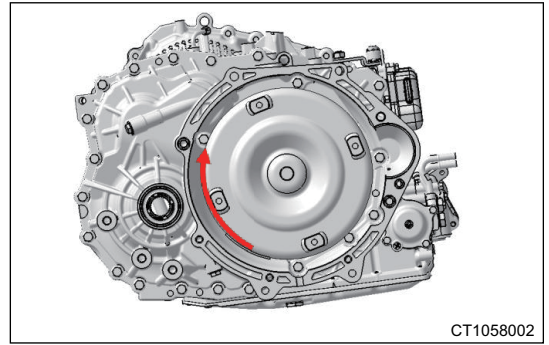
1. To facilitate the removal of hydraulic torque converter, screw 2 M10 bolts into the diagonal threaded holes of hydraulic torque converter.
2. Pull hydraulic torque converter out smoothly from transmission.

### Installation

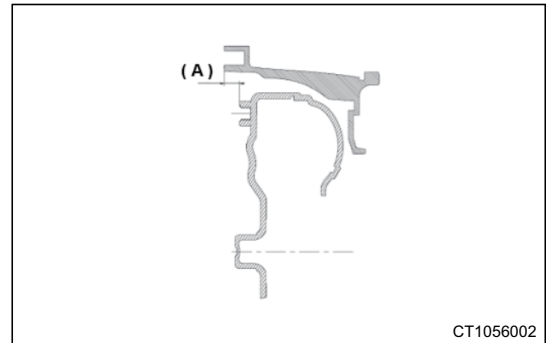
1. Apply proper amount of automatic transmission oil to hydraulic torque converter claws accessory.
2. Align hydraulic torque converter claws with drive sprocket grooves inside transmission, and install it into transmission smoothly.



3. Rotate hydraulic torque converter gently so that claws on hydraulic torque converter completely enter sprocket groove.



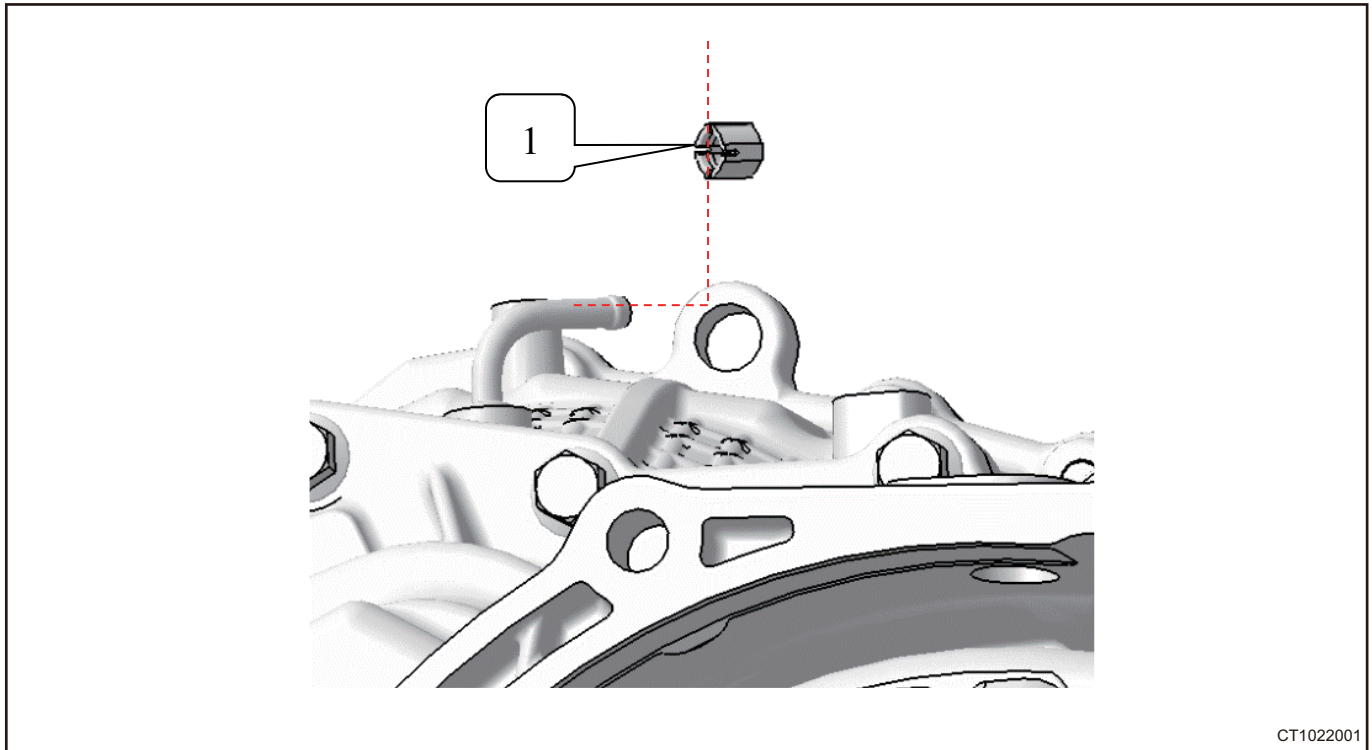
4. Check the installation dimension A of hydraulic torque converter. The dimension A is required to be  $\geq 11.7$  mm.



**⚠ Caution**

- Prevent dust or oil stains and other foreign matters from entering into transmission through hydraulic torque converter oil seal.
- Prevent hydraulic torque converter from damaging hydraulic torque converter oil seal .
- Hydraulic torque converter has high requirements for moment of inertia. Please operate with care and do not cause scratches or damage.

## Breather Cap Removal and Replacement



1	Breather Cap		
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### Removal

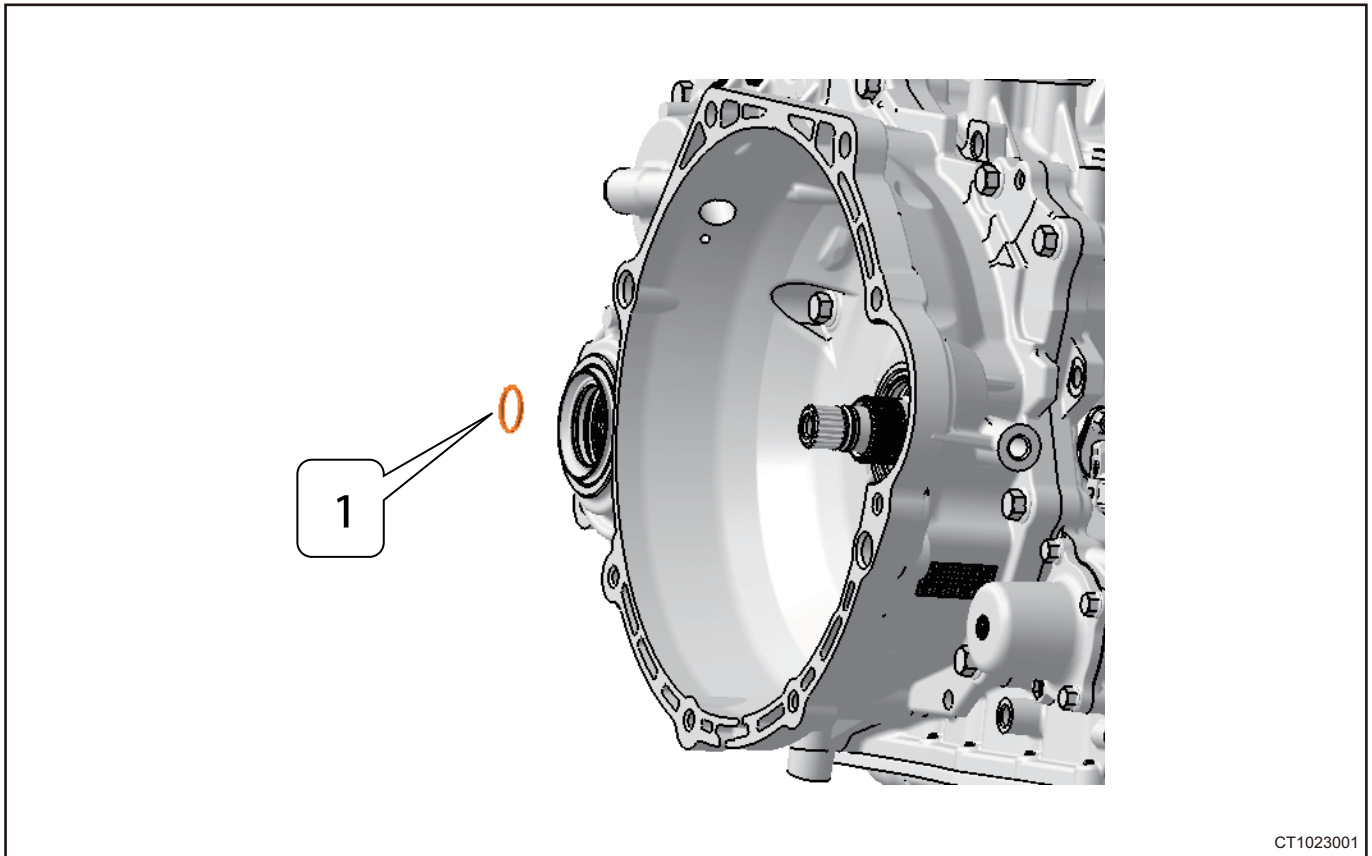
1. Remove the breather cap forcefully.

### Installation

1. Install the breather cap to the breather pipe and install it in place after you hear a "pop".



## Input Shaft to Hydraulic Torque Converter O-ring Removal and Replacement



CT1023001

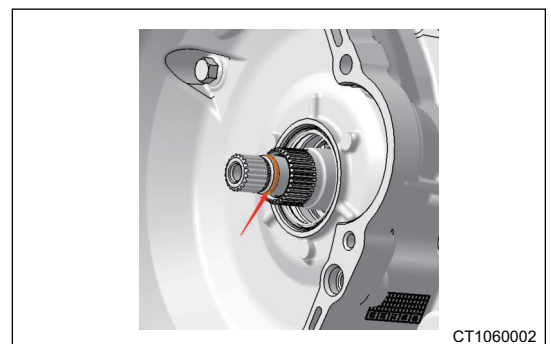
1	Input Shaft to Hydraulic Torque Converter O-ring		
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### Removal

1. Remove the hydraulic torque converter assembly.
2. Gently squeeze both sides of input shaft to hydraulic torque converter O-ring by hand, and slowly remove the input shaft to hydraulic torque converter O-ring.

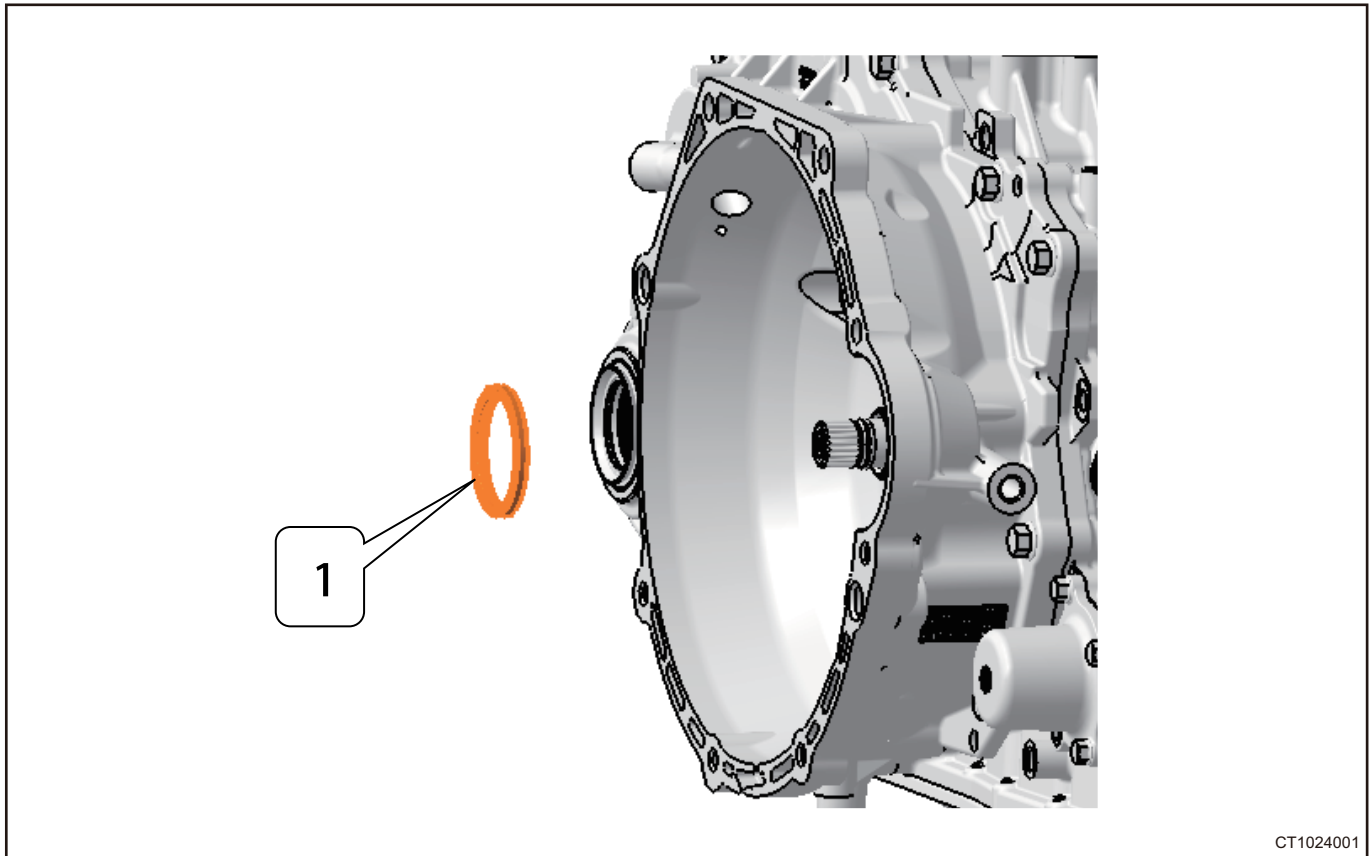
### Installation

1. Apply a small amount of automatic transmission oil on the input shaft to hydraulic torque converter O-ring, and install the O-ring to the position shown in the illustration.



CT1060002

## Hydraulic Torque Converter Oil Seal Removal and Replacement



CT1024001

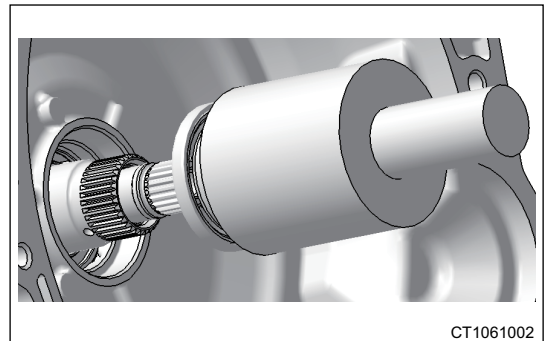
1	Hydraulic Torque Converter Oil Seal		
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### Removal

1. Remove the hydraulic torque converter assembly.
2. Remove the hydraulic torque converter oil seal with a pry bar.

### Installation

1. Apply appropriate amount of automatic transmission oil to the inner and outer race of hydraulic torque converter oil seal.
2. Sleeve the oil seal on the oil seal installation fixture, align the installation position of the transmission, and install it to the transmission with oil seal installation fixture.

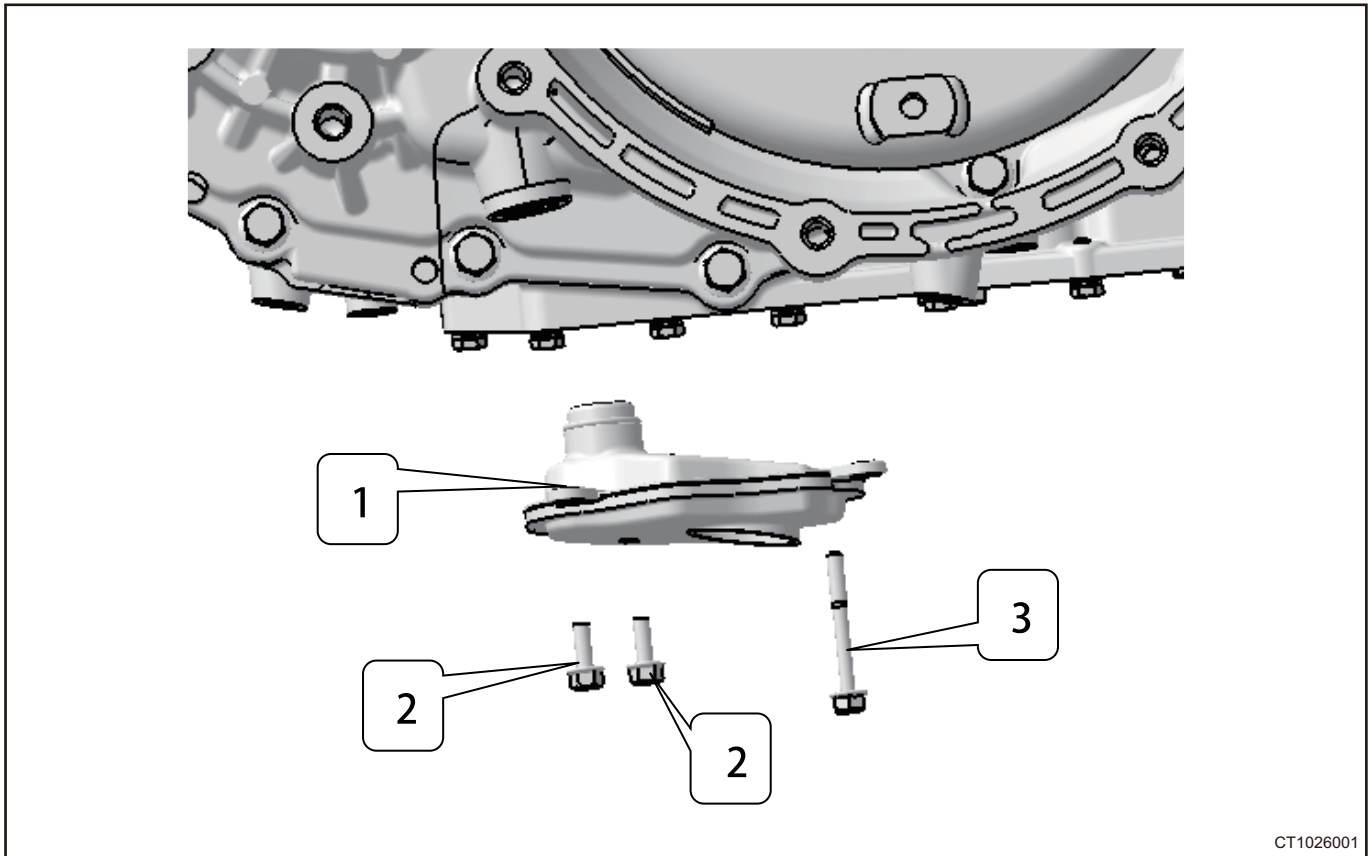


CT1061002

### ⚠ Caution

- When replacing the TC, the hydraulic torque converter oil seal needs to be replaced simultaneously.

## Oil Pump Filter Assembly Removal and Replacement



CT1026001

1	Filter Assembly - Oil Pump	2	Hexagon Flange Bolt - Extra Large Series
3	Hexagon Flange Bolt - Extra Large Series		

### Removal

1. Remove the valve body case.
2. Remove 3 fixing bolts from oil pump filter assembly with 10# socket.
3. Remove the oil pump filter assembly.

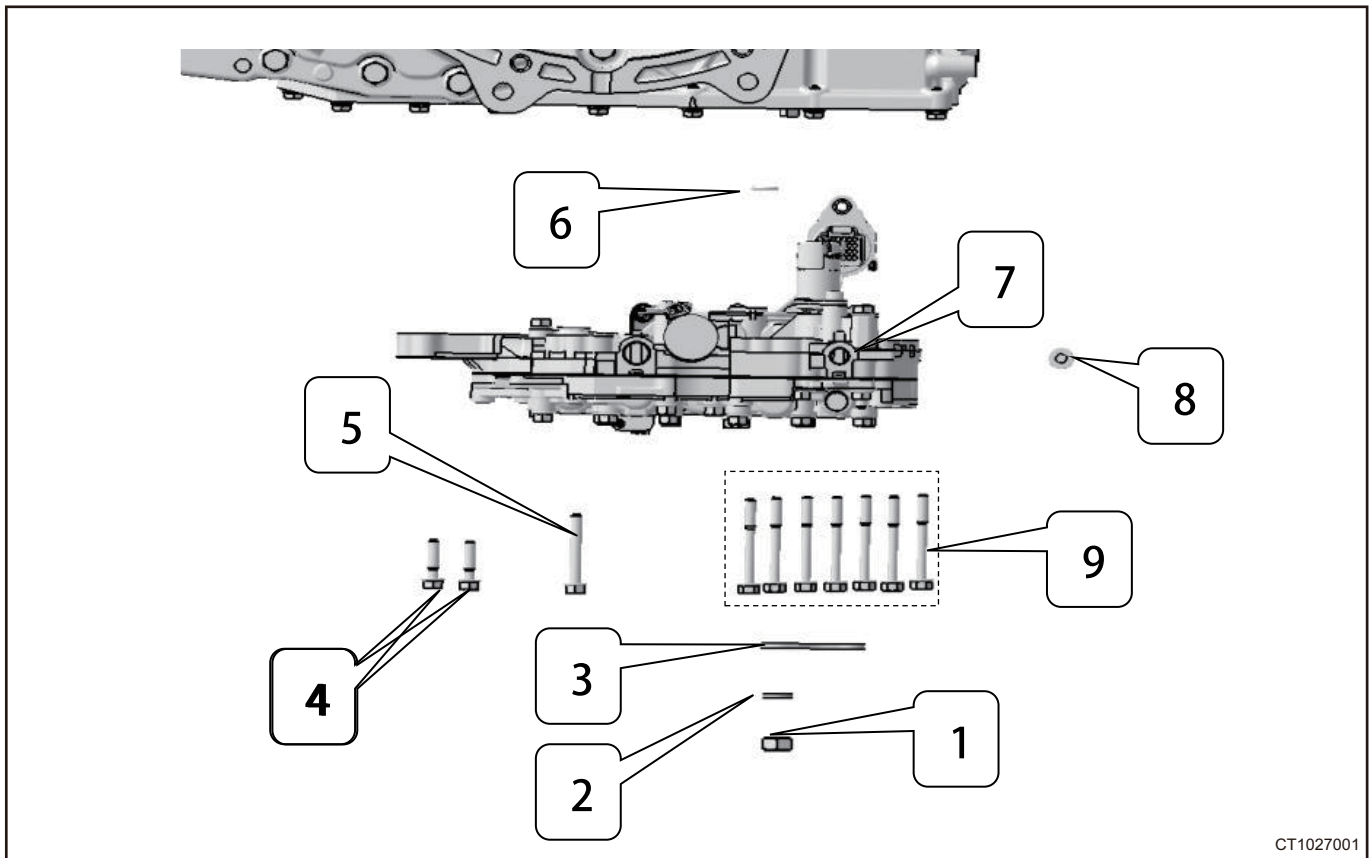
### Installation

1. Apply a small amount of automatic transmission oil to the O-ring of oil pump filter assembly.
2. Install the oil pump filter assembly in place.
3. Install 3 fixing bolts.

**Tightening torque: 8 - 10 N·m**

4. Assemble the valve body case.

## Valve Body and Wire Harness Assembly Removal and Replacement



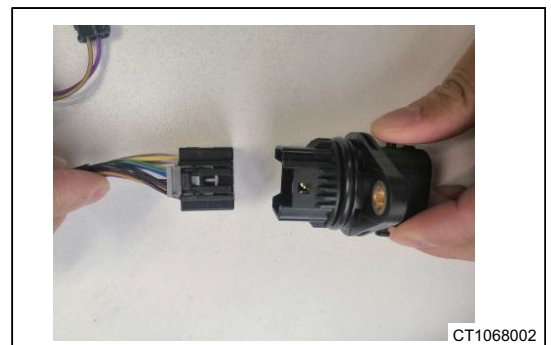
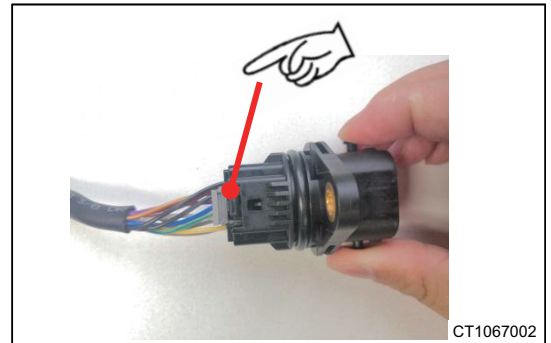
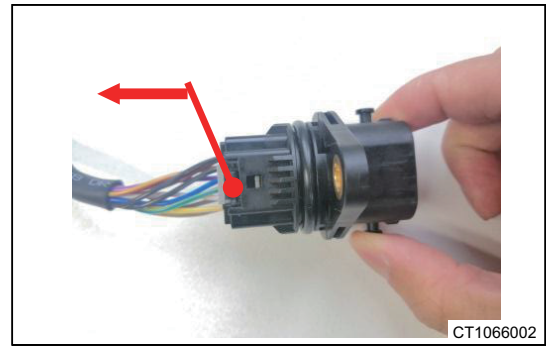
CT1027001

1	Nut	2	Spring Washer_M10
3	Manual Shift Valve Drive Arm	4	Hexagon Flange Bolt - Extra Large Series
5	Hexagon Flange Bolt - Extra Large Series	6	Valve Body and Transmission Case O-Ring
7	Valve Body and Wire Harness Assembly	8	Hexagon Flange Bolt - Extra Large Series M6X16
9	Hexagon Flange Bolt - Extra Large Series		

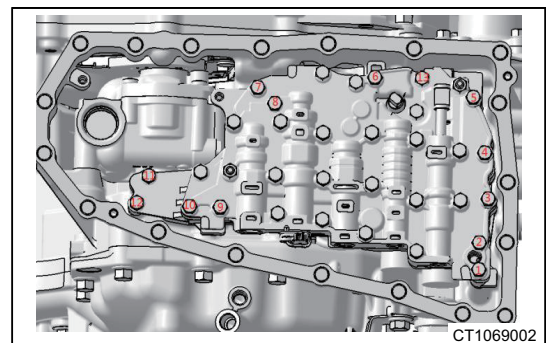
### Removal

1. Separate the electronic shift actuator connecting rod from the rocker arm.
2. Remove the oil pump filter assembly.
3. Remove the nut with 16# socket, and remove the spring washer and manual shift valve drive arm.

4. Remove the fixing bolt (Q1880616F36) between valve body wire harness connector and case with 10# socket, pull out the wire harness connector forcefully, and follow the steps in the illustration to separate the wire harness connector and remove the wire harness connector.



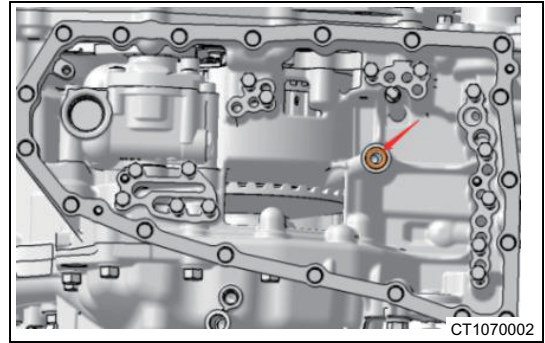
5. Remove the fixing bolts between valve body and transmission case with 10# socket, there are 13 bolts in total, the specific position is shown in the illustration.



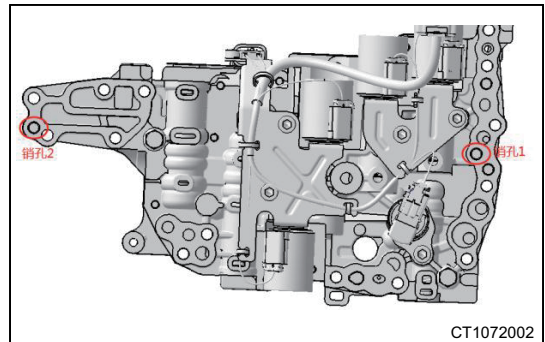
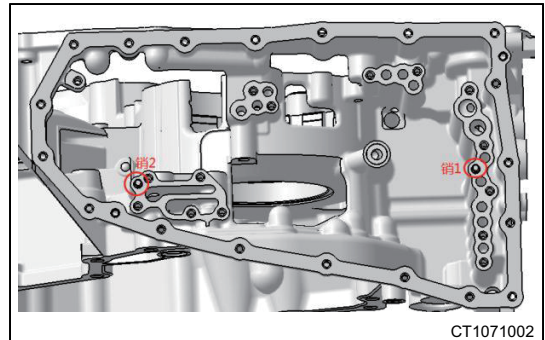
6. Remove the valve body and wire harness assembly, and valve body and transmission case O-ring.

## Installation

1. Apply appropriate amount of automatic transmission oil to the valve body O-ring and transmission case and install them in place.



2. Separate the wire harness assembly connector.
3. Pass the wire harness through the wire harness installation hole of the transmission case, and install the valve body assembly in place according to the positions of the two fixing pins.



4. Install 13 fixing bolts.

**Tightening torque: 8 - 10 N·m**

5. Install manual shift valve drive arm, spring washer and nut.

**Tightening torque: 18 - 25 N·m**

6. Install the wire harness connector to the case with CVTF applying on the connector seal ring, and screw on the fixing bolt.

**Tightening torque: 8 - 10 N·m**

7. Install the oil pump filter assembly.
8. Assemble the electronic shift actuator connecting rod to transmission rocker arm.

**⚠ Caution**

- Make sure O-ring valve body and transmission case are intact.
- Before installing valve body and wire harness assembly, confirm O-ring valve body and transmission case are installed in place.
- When electronic shift actuator connecting rod is assembled to rocker arm transmission, rocker arm transmission position must be consistent with that when it is separated.
- It is necessary to perform self-learning after removing and installing electronic shift module assembly.

**Diagnostic Trouble Code (DTC) Chart**

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
P096200	Line Solenoid Short to GND	When TCU detects that the solenoid valve is short to ground, the fault is established	<ul style="list-style-type: none"> <li>• Wire harness fault</li> <li>• Solenoid valve fails</li> <li>• TCU internal fault</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle does not move even in gear</li> <li>• Lack of power when accelerating</li> <li>• Transmission light and MIL light come on</li> </ul>
P096300	Line Solenoid Short to BAT	When TCU detects that the solenoid valve is short to power supply, the fault is established		
P096000	Line Solenoid Open Load	When TCU detects that the solenoid valve is open, the fault is established		
P096100	Line Solenoid Short to BAT or Open	When TCU detects that the solenoid valve is short to power supply or open, the fault is established		
P096600	Primary Solenoid Short to GND	When TCU detects that the solenoid valve is short to ground, the fault is established	<ul style="list-style-type: none"> <li>• Wire harness fault</li> <li>• Solenoid valve fails</li> <li>• TCU internal fault</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle does not move even in gear</li> <li>• Lack of power when accelerating</li> <li>• Transmission light and MIL light come on</li> </ul>
P096700	Primary Solenoid Short to BAT	TCU detects that the solenoid valve is short to power supply, the fault is established		
P096400	Primary Solenoid Open Load	When TCU detects that the solenoid valve is open, the fault is established		
P096500	Primary Solenoid Short to BAT or Open	When TCU detects that the solenoid valve is short to		

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
		power supply or open, the fault is established		
P097000	Secondary Solenoid Short to GND	When TCU detects that the solenoid valve is short to ground, the fault is established	<ul style="list-style-type: none"> <li>• Wire harness fault</li> <li>• Solenoid valve fails</li> <li>• TCU internal fault</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle does not move even in gear</li> <li>• Lack of power when accelerating</li> <li>• Transmission light and MIL light come on</li> </ul>
P097100	Secondary Solenoid Short to BAT	When TCU detects that the solenoid valve is short to power supply, the fault is established		
P096800	Secondary Solenoid Open Load	When TCU detects that the solenoid valve is open, the fault is established		
P096900	Secondary Solenoid Short to BAT or Open	When TCU detects that the solenoid valve is short to power supply or open, the fault is established		
P272000	Clutch Solenoid Short to GND	When TCU detects that the solenoid valve is short to ground, the fault is established	<ul style="list-style-type: none"> <li>• Wire harness fault</li> <li>• Solenoid valve fails</li> <li>• TCU internal fault</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle does not move even in gear</li> <li>• Lack of power when accelerating</li> <li>• Transmission light and MIL light come on</li> </ul>
P272100	Clutch Solenoid Short to BAT	When TCU detects that the solenoid valve is short to power supply, the fault is established		
P271800	Clutch Solenoid Open Load	When TCU detects that the solenoid valve is open, the fault is established		
P271900	Clutch Solenoid Short to BAT or Open	When TCU detects that the solenoid valve is short to power supply or open, the fault is established		
P272900	TCC Solenoid Short to GND	When TCU detects that the solenoid valve is short to ground, the fault is established	<ul style="list-style-type: none"> <li>• Wire harness fault</li> <li>• Solenoid valve fails</li> <li>• TCU internal fault</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle does not move even in gear</li> </ul>



DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
P273000	TCC Solenoid Short to BAT	When TCU detects that the solenoid valve is short to power supply, the fault is established		<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Transmission light and MIL light come on</li> </ul>
P272700	TCC Solenoid Open Load	When TCU detects that the solenoid valve is open, the fault is established		
P272800	TCC Solenoid Short to BAT or Open	When TCU detects that the solenoid valve is short to power supply or open, the fault is established		
P084300	Primary Pressure Sensor Signal Short to BAT	After TCU detects that the sensor signal is greater than the set threshold when the vehicle is powered on and the engine is not started, the fault is established	<ul style="list-style-type: none"> <li>Incorrect installation of input pulley pressure sensor</li> <li>Poor contact, short or open in input pulley pressure sensor line</li> </ul>	<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Transmission malfunction light and MIL light come on</li> </ul>
P084200	Primary Pressure Sensor Signal Short to GND			
P084800	Secondary Pressure Sensor Short to BAT	When the transmission output pulley shaft sensor Transmission is lower than or higher than the set threshold, the fault is established	<ul style="list-style-type: none"> <li>Incorrect installation of output pulley shaft pressure sensor</li> <li>Poor contact, short or open in output pulley pressure sensor line</li> </ul>	<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Transmission malfunction light and MIL light come on</li> </ul>
P084700	Secondary Pressure Sensor Short to GND			
P171000	Primary Pressure Sensor Supply Abnormal	When the transmission pressure sensor voltage is lower than or higher than the set threshold, the fault is established	<ul style="list-style-type: none"> <li>Poor contact or short in pressure sensor line</li> </ul>	<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Transmission malfunction light and MIL light come on</li> </ul>
P171100	Secondary Pressure Sensor Supply Abnormal	When the transmission pressure sensor voltage is lower than or higher than the set threshold, the fault is established	<ul style="list-style-type: none"> <li>Poor contact or short in pressure sensor line</li> </ul>	<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Transmission malfunction light and MIL light come on</li> </ul>

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
P079200	Primary Speed Sensor Fault	When the input speed is equal to set threshold during driving, the fault is established	<ul style="list-style-type: none"> <li>Incorrect installation of input pulley speed signal sensor</li> <li>Poor contact or short in input pulley speed sensor line</li> </ul>	<ul style="list-style-type: none"> <li>Clutch, hydraulic torque converter slip</li> <li>Lack of power when accelerating</li> <li>Transmission malfunction light comes on</li> </ul>
P072100	Secondary Speed Sensor Fault	When the output speed is equal to set threshold during driving, the fault is established	<ul style="list-style-type: none"> <li>Incorrect installation of output pulley speed signal sensor</li> <li>Poor contact or short in output pulley shaft speed sensor line</li> </ul>	<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Transmission malfunction light comes on</li> </ul>
P071600	Turbine speed sensor fault	When the turbine speed is less than or equal to set threshold during driving, the fault is established	<ul style="list-style-type: none"> <li>Incorrect installation of turbine speed sensor</li> <li>Poor contact or short in turbine speed sensor wire harness</li> </ul>	<ul style="list-style-type: none"> <li>Large shift shock</li> <li>Lack of power when accelerating</li> <li>Transmission malfunction light comes on</li> </ul>
P094000	Oil Temperature Sensor Short to BAT/OL	When the CVT oil temperature sensor voltage exceeds the threshold, the fault is established	<ul style="list-style-type: none"> <li>Oil temperature sensor failure</li> <li>Wire harness fault</li> <li>TCU internal fault</li> </ul>	<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Transmission warning light comes on</li> </ul>
P093900	Oil Temperature Sensor Short to GND			
P070600	Range Switch Signal Out of Range	When TCU detects that there are multiple P/R/N/D gear signals simultaneously or no gear signals, the fault is established	<ul style="list-style-type: none"> <li>Abnormality in electronic shift actuator</li> <li>Abnormality in range sensor</li> <li>Abnormality in wire harness, connector or terminal</li> <li>TCU operates abnormally</li> </ul>	<ul style="list-style-type: none"> <li>Vehicle cannot be started</li> <li>Large shift shock</li> <li>Transmission malfunction light and MIL light come on</li> </ul>
P280300	Range Sensor SCB	When the range sensor signal is short to power supply, the fault is established		
P280200	Range Sensor SCG/OL	When the range sensor signal is short to ground or		

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
		open, the fault is established		
P280500	Range Sensor Signal Check	When the checksum error occurs for range sensor signal, the fault is established		
P073000	Ratio Error	When the absolute value of the difference between target ratio and actual ratio is greater than the set threshold, the fault is established	<ul style="list-style-type: none"> <li>• Transmission electrical appliances fail</li> <li>• Transmission hydraulic system failure</li> <li>• Abnormality in engine actual torque</li> <li>• Abnormal wear of transmission components</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle does not move even in gear</li> <li>• Lack of power when accelerating</li> <li>• Transmission malfunction light and MIL light come on</li> </ul>
P279700	Primary Pressure Control Issue	When the difference between target oil pressure and actual oil pressure is greater than the set threshold, the fault is established	<ul style="list-style-type: none"> <li>• Pulley pressure sensor signal fault</li> <li>• Pulley pressure control solenoid valve fault</li> <li>• Hydraulic system fault</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of power when accelerating</li> <li>• Vehicle does not move even in gear</li> <li>• Transmission malfunction light and MIL light come on</li> </ul>
P279800	Secondary Pressure Control Issue			
P081E00	Clutch (Reverse) Slip	When the forward/reverse clutch input and output speed difference has a large slip differential speed after engaging or locking, the fault is established	<ul style="list-style-type: none"> <li>• Turbine speed sensor fault</li> <li>• Clutch Control Solenoid Valve Fault</li> <li>• Hydraulic system leakage</li> <li>• Clutch lining damaged</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of power when accelerating</li> <li>• Vehicle does not move even in gear</li> <li>• Shift shock</li> <li>• Transmission malfunction light comes on</li> </ul>
P081100	Clutch (Drive) Slip			
P089400	TCC Slip	When there is a large slip differential speed between engine speed and turbine speed after the hydraulic torque converter locking clutch is engaged,	<ul style="list-style-type: none"> <li>• Hydraulic torque converter locking control solenoid valve fault</li> <li>• Wire harness fault</li> <li>• Hydraulic control circuit fault</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of power when accelerating</li> <li>• Transmission malfunction light and MIL light come on</li> </ul>

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
		the fault is established	<ul style="list-style-type: none"> <li>Hydraulic torque converter fault</li> </ul>	
P021800	Trans Oil Temperature Out of Range	When the oil temperature is higher than 128°C, the fault is established	<ul style="list-style-type: none"> <li>CVT oil temperature sensor failure</li> <li>Transmission cooling system failure</li> </ul>	<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Transmission malfunction light flashes</li> </ul>
P176700	Trans Oil Temperature Critical	When the oil temperature is higher than 135°C, the fault is established		
P086300	Solenoid Driver Communication Failure	TCU detects the corresponding abnormality, triggering the diagnosis	<ul style="list-style-type: none"> <li>The vehicle abnormality causes TCU can not operate normally, such as the power supply is abnormal</li> <li>TCU hardware is abnormal</li> </ul>	<ul style="list-style-type: none"> <li>TCU cannot operate normally</li> <li>Transmission malfunction light comes on</li> </ul>
P062F00	NVM Broken			
P162F00	NVM Save Failure			
P060400	RAM Fault			
P060500	ROM Fault			
P160C00	PLL Fault			
P060B00	ADC Fault			
P060700	Time Slice Fault			
P060A00	Monitor Unit Fault			
P160B00	VDD Out of Range			
P061300	Safety Other Fault			
P060C00	Watchdog Failure			
U014087	Lost Communication with BCM	TCU cannot obtain or receive the signal on CAN network	<ul style="list-style-type: none"> <li>Relevant controller sensor failure</li> <li>Abnormal vehicle CAN network</li> </ul>	<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Abnormal shifting</li> <li>Brake and stall</li> <li>The vehicle is in Limp Home mode</li> <li>TCU operates abnormally</li> <li>When U010087, P175000, P175100, U014687 or U119387 occurs, the transmission malfunction light will come on</li> </ul>
U010087	Lost Communication with ECM			
U012987	Lost communication with BSM			
U012687	Lost Communication with SAM			
U014687	Lost Communication with CGW			
U119387	Lost Communication with EGS			
U042281	Invalid Data from BCM			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
U040181	Invalid Data from ECM			
U041881	Invalid Data from BSM			
U042881	Invalid Data from SAM			
P175000	Invalid Engine Speed Signal			
P175100	Invalid Engine Actual Torque Signal			
P175200	Invalid Brake Pedal Signal			
P175300	Invalid Gas Pedal Signal			
P175400	Invalid Vehicle Speed Signal			
P175500	Invalid Front Left Speed Signal			
P175600	Invalid Front Right Speed Signal			
P175700	Invalid Rear Left Speed Signal			
P175800	Invalid Rear Right Speed Signal			
P175900	Invalid Engine Coolant Signal			
P176000	Invalid Odormeter Signal			
P176100	ABS Invalid			
P176200	Invalid Master Cylinder Pressure Signal			
P095600	Manual Mode Fault	<ul style="list-style-type: none"> <li>When in P gear, any signal of M, M+, M- is detected, the fault is established</li> <li>When in D gear, three signals of M, M+, M- are detected at the</li> </ul>	<ul style="list-style-type: none"> <li>Abnormality in wire harness, connector or terminal</li> <li>Abnormality in manual mode switch</li> <li>TCU operates abnormally</li> </ul>	<ul style="list-style-type: none"> <li>Manual mode cannot respond</li> <li>Transmission malfunction light comes on</li> </ul>

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
		<p>same time, the fault is established</p> <ul style="list-style-type: none"> <li>When in D gear, two signals of M+, M- are detected, the fault is established</li> </ul>		
U007388	CAN Bus Off	CAN network fails, and TCU cannot communicate with other controllers	<ul style="list-style-type: none"> <li>Short in CAN bus</li> <li>CAN modules of other nodes in the vehicle CAN network are abnormal</li> </ul>	<ul style="list-style-type: none"> <li>TCU cannot operate normally</li> <li>Transmission malfunction light comes on</li> </ul>
P071500	Unreasonable Turbine Speed Signal	After TCU detects that the sensor signal change rate is greater than the set threshold, the fault is established	<ul style="list-style-type: none"> <li>Poor wire harness contact</li> <li>Sensor hardware fault</li> </ul>	<ul style="list-style-type: none"> <li>Transmission malfunction light comes on</li> </ul>
P079100	Unreasonable Primary Speed Signal			
P072000	Unreasonable Secondary Speed Signal			
P093700	Unreasonable Oil Temperature Signal	When engine is cold, after TCU detects that the deviation between oil temperature sensor signal and ambient temperature is greater than the set threshold, the fault is established	<ul style="list-style-type: none"> <li>Poor wire harness contact</li> <li>Sensor hardware fault</li> </ul>	<ul style="list-style-type: none"> <li>Transmission malfunction light comes on</li> </ul>
P084000	Unreasonable Primary Pressure Signal	After TCU detects that the sensor signal is greater than the set threshold when the vehicle is powered on and the engine is not started, the fault is established	<ul style="list-style-type: none"> <li>Poor wire harness contact</li> <li>Sensor hardware fault</li> </ul>	<ul style="list-style-type: none"> <li>Transmission malfunction light comes on</li> </ul>
P084500	Unreasonable Secondary Pressure Signal			
P178000	SBW CAN Bus Off	The communication between SBW and TCU is abnormal, triggering a fault	<ul style="list-style-type: none"> <li>Open circuit in CAN bus wire harness</li> </ul>	<ul style="list-style-type: none"> <li>SBW cannot operate normally</li> </ul>
P178100	Lost Communication with TCU			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
P178200	Invalid Data From TCU		<ul style="list-style-type: none"> <li>Poor wire harness contact</li> <li>TCU fault</li> <li>SBW fault</li> </ul>	<ul style="list-style-type: none"> <li>Transmission malfunction light comes on</li> </ul>
P178300	SBW Safety Fault	The electronic shift actuator detects the corresponding abnormality, triggering a fault	<ul style="list-style-type: none"> <li>SBW triggers a fault due to the vehicle abnormality, for example, the abnormal KL30 power off</li> <li>SBW Mechanical Fault</li> </ul>	<ul style="list-style-type: none"> <li>SBW cannot operate normally</li> <li>Abnormal shifting</li> <li>Transmission malfunction light comes on</li> </ul>
P178400	SBW Internal Communication Fault			
P178500	SBW External Input Fault	The electronic shift actuator power supply is overvoltage or undervoltage, triggering a fault	<ul style="list-style-type: none"> <li>Undervoltage or overvoltage</li> </ul>	<ul style="list-style-type: none"> <li>Abnormal shifting</li> <li>Transmission light comes on</li> </ul>
P178600	SBW Electrical Fault	The electronic shift actuator detects the corresponding abnormality, triggering a fault	<ul style="list-style-type: none"> <li>SBW triggers a fault due to the vehicle abnormality, for example, the abnormal KL30 power off</li> <li>SBW Mechanical Fault</li> </ul>	<ul style="list-style-type: none"> <li>SBW cannot operate normally</li> <li>Abnormal shifting</li> <li>Transmission malfunction light comes on</li> </ul>
P178700	SBW Over Temperature	The internal temperature of electronic shift actuator is too high, triggering an alarm	<ul style="list-style-type: none"> <li>The electronic shift actuator is damaged</li> <li>The shift of electronic shift actuator is blocked</li> <li>Abnormal vehicle cooling system</li> </ul>	<ul style="list-style-type: none"> <li>Abnormal shifting</li> <li>The electronic shift actuator is damaged</li> <li>Transmission light comes on</li> </ul>
P178800	SBW Not Tuned	The electronic shift actuator detects the corresponding abnormality, triggering a fault	<ul style="list-style-type: none"> <li>SBW triggers a fault due to the vehicle abnormality, for example, the abnormal KL30 power off</li> <li>SBW Mechanical Fault</li> </ul>	<ul style="list-style-type: none"> <li>SBW cannot operate normally</li> <li>Abnormal shifting</li> <li>Transmission malfunction light comes on</li> </ul>
P178900	SBW PID Control Fault			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
P179000	SBW Mechanical Fault	The electronic shift actuator detects that the shift angle change is too small after receiving the shift command or the gear angle change is too large when the shift command is not received	<ul style="list-style-type: none"> <li>The electronic shift connecting rod is not installed in place</li> <li>Electronic shift hardware size problem</li> </ul>	<ul style="list-style-type: none"> <li>Abnormal shifting</li> <li>Transmission malfunction light comes on</li> </ul>
P172500	Lost Communication with SBW	The communication between SBW and TCU is abnormal, triggering a fault	<ul style="list-style-type: none"> <li>Open circuit in CAN bus wire harness</li> <li>Poor wire harness contact</li> <li>TCU fault</li> <li>SBW fault</li> </ul>	<ul style="list-style-type: none"> <li>SBW cannot operate normally</li> <li>Transmission malfunction light comes on</li> </ul>
P172600	Invalid Data From SBW			
P172700	SBW Wrong Action	When the actual gear of electronic shift actuator does not match the target gear, a fault is triggered	<ul style="list-style-type: none"> <li>The electronic shift connecting rod is not installed in place</li> <li>Physical factors prevent electronic shift actuator from shifting</li> <li>Electronic shift actuator hardware problem</li> </ul>	<ul style="list-style-type: none"> <li>Abnormal shifting</li> <li>Transmission malfunction light comes on</li> </ul>
P172888	TCU CAN2 Bus Off	The communication between SBW and TCU is abnormal, triggering a fault	<ul style="list-style-type: none"> <li>Open circuit in CAN bus wire harness</li> <li>Poor wire harness contact</li> <li>TCU fault</li> <li>SBW fault</li> </ul>	<ul style="list-style-type: none"> <li>SBW cannot operate normally</li> <li>Transmission malfunction light comes on</li> </ul>
P173100	EGS Request Invalid	TCU cannot obtain or receive the signal on CAN network	<ul style="list-style-type: none"> <li>Relevant controller sensor failure</li> <li>Abnormal vehicle CAN network</li> </ul>	<ul style="list-style-type: none"> <li>Lack of power when accelerating</li> <li>Abnormal shifting</li> <li>Brake and stall</li> <li>The vehicle is in Limp Home mode</li> <li>TCU operates abnormally</li> </ul>



DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
				<ul style="list-style-type: none"> <li>When U010087, P175000, P175100, U014687 or U119387 occurs, the transmission malfunction light will come on</li> </ul>
P088300	TCU System Over Voltage	During the operating process of TCU, when TCU power supply voltage is greater than 16 V, TCU system is over voltage	<ul style="list-style-type: none"> <li>Low battery voltage</li> </ul>	<ul style="list-style-type: none"> <li>TCU resets</li> <li>Solenoid valve operates abnormally</li> </ul>
P088200	TCU System Under Voltage	During the operating process of TCU, when TCU power supply voltage is lower than 9 V, TCU system is under voltage	<ul style="list-style-type: none"> <li>Wire harness is malfunctioning</li> </ul>	<ul style="list-style-type: none"> <li>Sensor operates abnormally</li> <li>CAN bus is abnormal</li> </ul>
P070200	Safety Cut Off Test Failure	TCU detects the corresponding abnormality, triggering the diagnosis	<ul style="list-style-type: none"> <li>Vehicle wire harness (- transmission solenoid valve related part) is short to ground</li> <li>TCU internal circuit is abnormal</li> </ul>	<ul style="list-style-type: none"> <li>TCU cannot operate normally</li> <li>Transmission malfunction light comes on</li> </ul>

## DTC Diagnosis Description

The possible cause of most faults is due to the poor connection of sensors and wire harness connectors. Therefore, it is necessary to thoroughly check if the connectors and lines corresponding to each fault are loose, poorly connected, winding, corroded, with dirt, aging and other abnormalities.

In view of the fact that some faults may be caused by the failure to clear the history faults in TCU after maintenance, it is necessary to clear DTCs first:

### Clear DTCs

1. IG is in OFF position;
2. Connect the diagnostic tester;
3. IG is in ON position;
4. Enter the automatic transmission (CVT) system, read the DTC;
5. Clear DTCs;
6. Then operate the vehicle according to the fault activation conditions:
  - Vehicle is normally driven, and the vehicle speed is required to be  $\geq 40\text{kph}$ ;
  - Decelerate until the vehicle stops, turn off the vehicle and KL15 power, lock the vehicle, and wait for three minutes;

- Start again, vehicle is normally driven, and the vehicle speed is required to be  $\geq 40$ kph;
7. Check if DTC occurs again;
  8. Transmission system resumes;
  9. Exit the diagnostic system;
  10. Disconnect the diagnostic tester;
  11. IG is in OFF position.

 **Caution**

- For emission type faults, after troubleshooting, three driving cycles must be performed to clear DTCs.

## DTC Diagnosis Procedure

### Power Supply Fault

<b>DTC</b>	<b>P088300</b>	<b>TCU System Over Voltage</b>
<b>DTC</b>	<b>P088200</b>	<b>TCU System Under Voltage</b>

#### Description

The operating voltage of TCU system is the vehicle KL30 input voltage, that is, the battery voltage.

 **Caution**

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

**1 Measure battery voltage**

- (a) Using a multimeter, check if the voltage of the two poles of battery is normal.

NG

**Repair or replace as needed, and perform DTC clearing operation**

OK

**2 Check connector**

- (a) Turn ignition switch to OFF.
- (b) Disconnect TCU and wire harness connector.
- (c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

<b>3</b>	<b>Check wire harness</b>
----------	---------------------------

- (a) Pull out the TCU connector, use a multimeter to measure the voltage of TCU connector terminal KL30 to ground, requirement: 9 - 16 V.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

**Contact relevant transmission technical personnel for inspection**

### Range Sensor Failure

<b>DTC</b>	<b>P070600</b>	<b>Range Switch Signal Out Of Range</b>
<b>DTC</b>	<b>P280300</b>	<b>Range Sensor SCB</b>
<b>DTC</b>	<b>P280200</b>	<b>Range Sensor SCG/OL</b>
<b>DTC</b>	<b>P280500</b>	<b>Range Sensor Signal Check</b>

### Description

The transmission range sensor (PRND) signal is processed by TCU. It is mainly used to judge the driver's intention and provide important information for clutch engagement and transmission control function.

**⚠ Caution**

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

<b>1</b>	<b>Check wire harness connector</b>
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- (a) Turn ignition switch to OFF, disconnect TCU and wire harness terminal connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Perform DTC clearing operation**

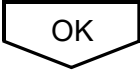
OK

<b>2</b>	<b>Check the voltage of range sensor connector</b>
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- (a) Connect the TCU, disconnect the range sensor connector from engine compartment, vehicle is powered on, and use a multimeter to measure the voltage of range sensor connector.
- Check the range sensor connector GEAR1 and GND, it should be 0 V;
  - Check the range sensor connector GEAR2 and GND, it should be 0 V;
  - Check the range sensor connector power supply pin and sensor GND, it should be 5 V.

NG

**Repair or replace as needed; Perform DTC clearing operation**



**3 Check wire harness**

(a) Unplug the TCU, check the continuity and resistance of range sensor connector to TCU wire harness connector:

- Check range switch connector terminal GND and TCU connector terminal PIN37, they should be conductive and not conductive with other pins;
- Check range switch connector terminal power supply and TCU connector terminal PIN54, they should be conductive and not conductive with other pins;
- Check range switch connector terminal Gear1 and TCU connector terminal PIN16, they should be conductive and not conductive with other pins;
- Check range switch connector terminal Gear2 and TCU connector terminal PIN44, they should be conductive and not conductive with other pins.
- Check the resistance between range switch connector terminal GND and TCU connector terminal PIN37, it should be less than 1 Ω;
- Check the resistance between range switch connector terminal power supply and TCU connector terminal PIN54, it should be less than 1 Ω;
- Check the resistance between range switch connector terminal Gear1 and TCU connector terminal PIN16, it should be less than 1 Ω;
- Check the resistance between range switch connector terminal Gear2 and TCU connector terminal PIN44, it should be less than 1 Ω.

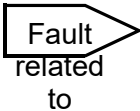


**Repair or replace as needed; Perform DTC clearing operation**

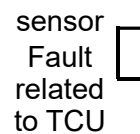


**4 Replace range sensor or TCU with a new one to compare and verify**

(a) Replace the range sensor or TCU with a new one. After clearing the fault, verify whether the fault recurs. At the same time, exchange the range sensor or TCU on the faulty vehicle to another vehicle, and observe if the fault occurs again.



**Replace sensor; perform DTC clearing operation**



**Contact relevant transmission technical personnel for inspection**

**TCU Hardware Fault**

<b>DTC</b>	<b>P086300</b>	<b>Solenoid Driver Communication Failure</b>
<b>DTC</b>	<b>P062F00</b>	<b>NVM Broken</b>
<b>DTC</b>	<b>P162F00</b>	<b>NVM Save Failure</b>



<b>DTC</b>	<b>P060400</b>	<b>RAM Fault</b>
<b>DTC</b>	<b>P060500</b>	<b>ROM Fault</b>
<b>DTC</b>	<b>P160C00</b>	<b>PLL Fault</b>
<b>DTC</b>	<b>P060B00</b>	<b>AD Fault</b>
<b>DTC</b>	<b>P060700</b>	<b>Time Slice Fault</b>
<b>DTC</b>	<b>P060A00</b>	<b>Monitor Unit Fault</b>
<b>DTC</b>	<b>P160B00</b>	<b>VDD Out of Range</b>
<b>DTC</b>	<b>P061300</b>	<b>Safety Other Fault</b>
<b>DTC</b>	<b>P060C00</b>	<b>Watchdog Failure</b>

### Description

If the above faults occur during TCU operation, TCU will operate abnormally due to internal faults of TCU or external factors.

#### **Caution**

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

#### **1 Perform driving cycle**

- (a) Turn off KL15 power, lock the vehicle and wait for 10 minutes before power on; check if the current drive cycle fault becomes history fault.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

#### **2 Replace TCU with a new one to compare and verify**

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU itself is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

### TCU CAN Bus Off

<b>DTC</b>	<b>U007388</b>	<b>CAN Bus Off</b>
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**Description**

TCU is a node on the CAN network and communicates with other nodes of the vehicle through CAN.

**⚠ Caution**

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

Refer to vehicle Repair Manual for troubleshooting.

**Function Safety Cut Off Test Failure**

<b>DTC</b>	<b>P070200</b>	<b>Safety Cut Off Test Failure</b>
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**Description**

If this fault occurs during TCU operation, TCU will operate abnormally due to internal faults of TCU or external factors.

**⚠ Caution**

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

<b>1</b>	<b>Perform driving cycle</b>
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- (a) Turn off KL15 power, lock the vehicle and wait for 10 minutes before power on; check if the current drive cycle fault becomes history fault.

OK Perform DTC clearing operation

NG

<b>2</b>	<b>Check the transmission solenoid valve connector</b>
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- (a) Turn ignition switch to OFF, check TCU and TCU wire harness terminal connector, and confirm that they are installed in place and connected properly.
- (b) Disconnect TCU and TCU wire harness connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

- (c) Pull out the transmission solenoid valve connector, and use a multimeter to measure the continuity condition of different PINs:
- Check the transmission solenoid valve connector PIN7 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN8 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN9 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN10 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN11 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN12 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN13 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN14 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN15 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN16 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN17 and negative battery terminal, the resistance should be infinity;
  - Check the transmission solenoid valve connector PIN18 and negative battery terminal, the resistance should be infinity.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

3

**Replace TCU with a new one to compare and verify**

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

### Manual Mode Fault

<b>DTC</b>	<b>P095600</b>	<b>Manual Mode Fault</b>
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### Description

The transmission manual mode signal is mainly used to judge the driver's intention and provide important information for clutch engagement and transmission control function.

**Hint:**

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

The manual mode switch on the electronic shift configuration model is accomplished by the command sent by the shift lever to TCU through CAN line. If this fault occurs on the vehicle equipped with electronic shift, please contact relevant transmission technical personnel for inspection.

**Turbine Speed Sensor Fault**

<b>DTC</b>	<b>P071600</b>	<b>Turbine Speed Sensor Fault</b>
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**Description**

The turbine speed signal is processed by TCU circuit and is a pulse signal. TCU calculates the turbine speed based on the pulse signal. It is mainly used for hydraulic torque converter locking, clutch engagement and transmission control function.

**⚠ Caution**

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

**1 Check connector**

- Turn ignition switch to OFF.
- Disconnect turbine speed sensor and wire harness terminal connector.
- Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**2 Check wire harness**

- Turn ignition switch to OFF, pull out TCU wire harness connector and turbine speed sensor wire harness terminal connector, and use a multimeter to check for continuity of different pins.
- Use a multimeter to check for continuity between TCU wire harness terminal connector and sensor connector terminal:
  - Check TCU terminal 9 and turbine speed sensor wire harness terminal connector ground terminal, they should be conductive and not conductive with other pins;
  - Check TCU terminal 38 and turbine speed sensor wire harness terminal connector signal terminal, they should be conductive and not conductive with other pins;
  - Check TCU terminal 22 and turbine speed sensor wire harness terminal connector power supply terminal, they should be conductive and not conductive with other pins;

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**3 Check turbine speed sensor**



- (a) Replace turbine speed sensor with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**The turbine speed sensor itself is faulty;  
Using diagnostic tester, clear history DTC**

NG

#### 4 Replace TCU with a new one to compare and verify

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU itself is faulty, and the faulty TCU is  
returned to the factory for inspection;  
Using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical  
personnel for inspection**

### Input Pulley Speed Sensor Fault

<b>DTC</b>	<b>P079200</b>	<b>Primary Speed Sensor Fault</b>
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#### Description

The input pulley shaft speed signal is processed by TCU circuit and is a pulse signal. TCU calculates the input pulley speed based on the pulse signal. It is mainly used for hydraulic torque converter locking, clutch engagement and transmission control function.

#### Caution

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

#### 1 Check TCU connector

- (a) Turn ignition switch to OFF.  
(b) Disconnect input pulley speed sensor and wire harness terminal connector.  
(c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Using  
diagnostic tester, clear history DTC**

OK

#### 2 Check wire harness

- (a) Turn ignition switch to OFF, pull out TCU connector and input pulley speed sensor connector.
- (b) Use a multimeter to check for continuity between TCU wire harness terminal connector and sensor connector terminal:
  - Check TCU connector terminal 11 and input pulley speed sensor ground terminal, they should be conductive and not conductive with other pins;
  - Check TCU connector terminal 10 and input pulley speed sensor signal terminal, they should be conductive and not conductive with other pins;
  - Check TCU connector terminal 21 and input pulley speed sensor power supply terminal, they should be conductive and not conductive with other pins;

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**3 Check input pulley speed sensor**

- (a) Replace input pulley speed sensor with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**The input pulley speed sensor itself is faulty; Using diagnostic tester, clear history DTC**

NG

**4 Replace TCU with a new one**

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU itself is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

**Output Pulley Speed Sensor Fault**

<b>DTC</b>	<b>P072100</b>	<b>Secondary Speed Sensor Fault</b>
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**Description**

The output pulley shaft speed signal is processed by TCU circuit and is a pulse signal. TCU calculates the output pulley speed based on the pulse signal. It is mainly used for vehicle speed and transmission control function.

**⚠ Caution**

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

**1 Check connector**

- (a) Turn ignition switch to OFF.
- (b) Disconnect output pulley speed sensor and wire harness terminal connector.
- (c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**2 Check wire harness**

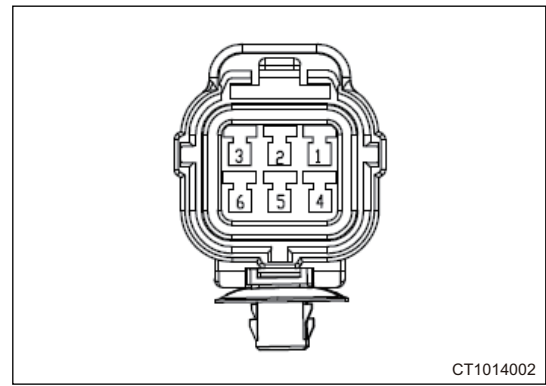
- (a) Turn ignition switch to OFF, pull out TCU wire harness connector and output pulley speed sensor wire harness connector.
- (b) Use a multimeter to check for continuity between TCU wire harness terminal connector and sensor connector terminal:
- Check TCU connector terminal 9 and output pulley speed sensor ground terminal, they should be conductive and not conductive with other pins;
  - Check TCU connector terminal 39 and output pulley speed sensor signal terminal, they should be conductive and not conductive with other pins;
  - Check TCU connector terminal 22 and output pulley speed sensor power supply terminal, they should be conductive and not conductive with other pins;

OK

**Go to step 3 directly, and replace output pulley speed sensor to compare and verify**

- (c) The definition of the transmission terminal adapter connector corresponds to the definition of the vehicle wire harness terminal adapter connector.

Name	Sensor Connector Pin	6PIN Connector Pin	TCU Connector Pin	Continuity Condition
Output Pulley Pressure Sensor Ground	GND	1	37	Continuity
Output Pulley Pressure Sensor Signal	Vout	2	15	Continuity
Output Pulley Pressure Sensor Power Supply	VB	3	26	Continuity
Output Pulley Speed Sensor Power Supply	VB	4	22	Continuity
Output Pulley Speed Sensor Signal	Vout	5	39	Continuity
Output Pulley Speed Sensor Ground	GND	6	09	Continuity



- (d) Use a multimeter to check for continuity between TCU wire harness terminal connector to sensor adapter connector (pin):

- Check TCU connector PIN9 and vehicle wire harness terminal adapter connector PIN6, they should be conductive and not conductive with other pins;
- Check TCU connector PIN39 and vehicle wire harness terminal adapter connector PIN5, they should be conductive and not conductive with other pins;
- Check TCU connector PIN22 and vehicle wire harness terminal adapter connector PIN4, they should be conductive and not conductive with other pins;

- (e) Use a multimeter to check for continuity between sensor adapter connector (pin) to sensor connector:

- Check transmission terminal adapter connector PIN6 and sensor connector ground terminal, they should be conductive and not conductive with other pins;
- Check transmission terminal adapter connector PIN5 and sensor connector signal terminal, they should be conductive and not conductive with other pins;
- Check transmission terminal adapter connector PIN4 and sensor connector power supply terminal, they should be conductive and not conductive with other pins;

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**3 Check output pulley speed sensor**

- (a) Replace output pulley speed sensor with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**The output pulley speed sensor itself is faulty; Using diagnostic tester, clear history DTC**

NG

**4 Replace TCU with a new one to compare and verify**

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU itself is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

**Input Pulley Oil Pressure Sensor Signal Abnormal**

<b>DTC</b>	<b>P084300</b>	<b>Primary Pressure Sensor Short to BAT</b>
<b>DTC</b>	<b>P084200</b>	<b>Primary Pressure Sensor Short to GND</b>

**Description**

TCU detects the transmission input pulley shaft pressure through input pulley shaft pressure sensor.

**⚠ Caution**

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

**1 Check connector**

- (a) Turn ignition switch to OFF.  
 (b) Disconnect input pulley shaft pressure sensor and wire harness terminal connector.  
 (c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**2 Check wire harness**

- (a) Turn ignition switch to OFF, pull out pressure sensor wire harness terminal connector.
- (b) Use a multimeter to measure the continuity and resistance of the different pins:
- Use a multimeter to check TCU connector terminal 37 and input shaft pressure sensor ground terminal, they should be conductive and not conductive with other pins;
  - Use a multimeter to check TCU connector terminal 14 and input shaft pressure sensor signal terminal, they should be conductive and not conductive with other pins;
  - Use a multimeter to check TCU connector terminal 54 and input shaft pressure sensor power supply terminal, they should be conductive and not conductive with other pins;
  - Use a multimeter to check resistance between TCU connector terminal 37 and input shaft pressure sensor ground terminal, it should be less than 1  $\Omega$ ;
  - Use a multimeter to check resistance between TCU connector terminal 14 and input shaft pressure sensor signal terminal, it should be less than 1  $\Omega$ ;
  - Use a multimeter to check resistance between TCU connector terminal 54 and input shaft pressure sensor power supply terminal, it should be less than 1  $\Omega$ .

NG

**Repair or replace as needed, perform DTC clearing operation**

OK

**3 Check input pulley pressure sensor**

- (a) Replace input pulley oil pressure sensor with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**Replace input pulley pressure sensor; Perform DTC clearing operation**

NG

**4 Replace TCU with a new one to compare and verify**

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU itself is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

### Input Pulley Pressure Sensor Power Supply Abnormal

<b>DTC</b>	<b>P171000</b>	<b>Primary Pressure Sensor Supply Abnormal</b>
------------	----------------	--

#### Description

TCU detects the transmission input shaft pressure through pressure sensor.

#### Caution

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

#### **1 Check connector**

- Turn ignition switch to OFF.
- Disconnect input pulley shaft pressure sensor and wire harness terminal connector.
- Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG

**Repair or replace as needed, perform DTC clearing operation**

OK

#### **2 Check voltage of input pulley shaft oil pressure sensor pin**

- Pull out the input pulley shaft oil pressure sensor connector, turn ignition switch to ON.
  - Use a multimeter to check for the voltage between oil pressure sensor connector power supply pin and GND pin, it should be 5V under normal conditions.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

#### **3 Check wire harness**

- Refer to input oil pressure sensor signal abnormal, check the wire harness.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

<b>4</b>	<b>Replace oil pressure sensor with a new one to compare and verify</b>
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- (a) Replace input pulley oil pressure sensor with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

<b>Replace input pulley pressure sensor; Perform DTC clearing operation</b>
---

NG

<b>5</b>	<b>Replace TCU with a new one to compare and verify</b>
----------	---

- (a) Replace TCU to compare and verify whether the current driving cycle fault has been cleared.

OK

<b>TCU itself is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC</b>
---

NG

<b>Contact relevant transmission technical personnel for inspection</b>
---

### Output Pulley Oil Pressure Sensor Signal Abnormal

<b>DTC</b>	<b>P084800</b>	<b>Secondary Pressure Sensor Short to BAT</b>
<b>DTC</b>	<b>P084700</b>	<b>Secondary Pressure Sensor Short to GND</b>

#### Description

TCU detects the transmission output pulley shaft pressure through output pulley shaft pressure sensor.

<b>⚠ Caution</b>
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- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

<b>1</b>	<b>Check connector</b>
----------	------------------------

- (a) Turn ignition switch to OFF.  
 (b) Disconnect output pulley shaft pressure sensor and wire harness terminal connector.  
 (c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG

<b>Repair or replace as needed, perform DTC clearing operation</b>
--

OK

<b>2</b>	<b>Check wire harness</b>
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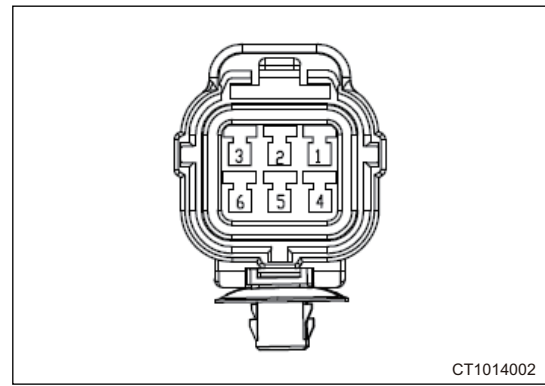
- (a) Turn ignition switch to OFF, pull out TCU wire harness connector and output shaft pressure sensor wire harness terminal connector, and use a multimeter to check for continuity and resistance of different pins:
- Use a multimeter to check TCU terminal 37 and output shaft pressure sensor ground terminal, they should be conductive and not conductive with other pins;
  - Use a multimeter to check TCU terminal 15 and output shaft pressure sensor signal terminal, they should be conductive and not conductive with other pins;
  - Use a multimeter to check TCU terminal 26 and output shaft pressure sensor power supply terminal, they should be conductive and not conductive with other pins;
  - Use a multimeter to check resistance between TCU terminal 37 and output shaft pressure sensor signal terminal, it should be less than 1  $\Omega$ ;
  - Use a multimeter to check resistance between TCU terminal 15 and output shaft pressure sensor signal terminal, it should be less than 1  $\Omega$ ;
  - Use a multimeter to check resistance between TCU terminal 26 and output shaft pressure sensor power supply terminal, it should be less than 1  $\Omega$ .

OK

**Go to step 3 directly, and replace oil pressure sensor to compare and verify**

- (b) The definition of the transmission terminal adapter connector corresponds to the definition of the vehicle wire harness terminal adapter connector.

Name	Sensor Connector Pin	6PIN Connector Pin	TCU Connector Pin	Continuity Condition
Output Pulley Shaft Pressure Sensor Ground	GND	1	37	Continuity
Output Pulley Shaft Pressure Sensor Signal	Vout	2	15	Continuity
Output Pulley Shaft Pressure Sensor Power Supply	VB	3	26	Continuity
Output Pulley Shaft Speed Sensor Power Supply	VB	4	22	Continuity
Output Pulley Shaft Speed Sensor Signal	Vout	5	39	Continuity
Output Pulley Shaft Speed Sensor Ground	GND	6	9	Continuity



- (c) Use a multimeter to check for continuity and resistance between TCU wire harness terminal connector to sensor adapter connector (pin):

- Check TCU connector PIN37 and vehicle wire harness terminal adapter connector PIN1, they should be conductive and not conductive with other pins;
- Check TCU connector PIN15 and vehicle wire harness terminal adapter connector PIN2, they should be conductive and not conductive with other pins;
- Check TCU connector PIN26 and vehicle wire harness terminal adapter connector PIN3, they should be conductive and not conductive with other pins;
- Check the resistance between TCU connector PIN37 and vehicle wire harness terminal adapter connector PIN1, it should be less than 1  $\Omega$ ;
- Check the resistance between TCU connector PIN15 and vehicle wire harness terminal adapter connector PIN2, it should be less than 1  $\Omega$ ;
- Check the resistance between TCU connector PIN26 and vehicle wire harness terminal adapter connector PIN3, it should be less than 1  $\Omega$ ;

- (d) Use a multimeter to check for continuity and resistance between sensor adapter connector (pin) to sensor connector:
- Check transmission terminal adapter connector PIN1 and sensor connector ground terminal, they should be conductive and not conductive with other pins;
  - Check transmission terminal adapter connector PIN2 and sensor connector signal terminal, they should be conductive and not conductive with other pins;
  - Check transmission terminal adapter connector PIN3 and sensor connector power supply terminal, they should be conductive and not conductive with other pins;
  - Check the resistance between transmission terminal adapter connector PIN1 and sensor connector ground terminal, it should be less than 1  $\Omega$ ;
  - Check the resistance between transmission terminal adapter connector PIN2 and sensor connector signal terminal, it should be less than 1  $\Omega$ ;
  - Check the resistance between transmission terminal adapter connector PIN3 and sensor connector power supply terminal, it should be less than 1  $\Omega$ ;

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

### 3 Check output pulley oil pressure sensor

- (a) Replace output pulley oil pressure sensor with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**Replace oil pressure sensor; Perform DTC clearing operation**

NG

### 4 Replace TCU with a new one to compare and verify

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU itself is faulty; using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

#### Output Pulley Pressure Sensor Power Supply Fault

DTC	P171100	Secondary Pressure Sensor Supply Abnormal
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**Description**

TCU detects the transmission output shaft pressure through pressure sensor.

**⚠ Caution**

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

**1 Check connector**

- (a) Turn ignition switch to OFF.  
 (b) Disconnect output pulley shaft pressure sensor and wire harness terminal connector.  
 (c) Check each PIN for looseness, disengagement, bending, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**2 Check voltage of output pulley shaft oil pressure sensor pin**

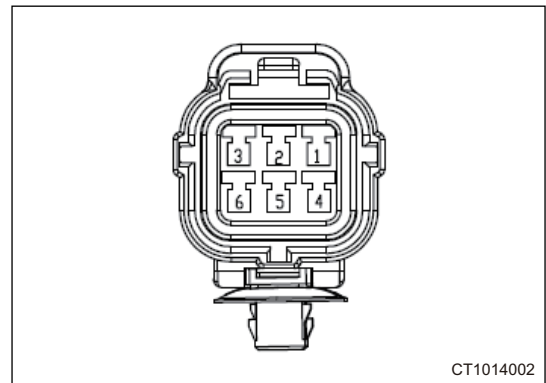
- (a) Pull out the output pulley shaft oil pressure sensor connector, turn ignition switch to ON, use a multimeter to measure the voltage between different pins and ground:
- Use a multimeter to the voltage between oil pressure sensor connector power supply pin and GND, it should be 5V under normal conditions.

OK

**Go to step 4, and replace output pulley pressure sensor to compare and verify**

- (b) The definition of the transmission terminal adapter connector corresponds to the definition of the vehicle wire harness terminal adapter connector:

Name	Sensor Connector Pin	6PIN Connector Pin	TCU Connector Pin	Continuity Condition
Output Pulley Shaft Pressure Sensor Ground	GND	1	37	Continuity
Output Pulley Shaft Pressure Sensor Signal	Vout	2	15	Continuity
Output Pulley Shaft Pressure Sensor Power Supply	VB	3	26	Continuity
Output Pulley Shaft Speed Sensor Power Supply	VB	4	22	Continuity
Output Pulley Shaft Speed Sensor Signal	Vout	5	39	Continuity
Output Pulley Shaft Speed Sensor Ground	GND	6	9	Continuity



- (c) Use a multimeter to measure the voltage between vehicle wire harness terminal adapter connector (pin) and output pulley shaft oil pressure power supply pin:
- Unplug the transmission wire harness terminal sensor adapter connector, check for the voltage between vehicle wire harness terminal adapter connector PIN3 and PIN1, it should be 5 V.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

3

**Check wire harness**

- (a) Refer to input oil pressure sensor signal abnormal, check the wire harness.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

4

**Check pressure sensor**

- (a) Replace output pulley oil pressure sensor with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

Replace output pulley oil pressure sensor; perform DTC clearing operation

NG

5

**Replace TCU with a new one to compare and verify**

- (a) Replace TCU to compare and verify whether the current driving cycle fault has been cleared.

OK

TCU itself is faulty, and the faulty TCU is returned to the factory for inspection; Perform DTC clearing operation

NG

Contact relevant transmission technical personnel for inspection

**Main Oil Pressure Control Solenoid Abnormal**

DTC	P096200	Line Solenoid Short to GND
DTC	P096300	Line Solenoid Short to BAT
DTC	P096000	Line Solenoid Open Load
DTC	P096100	Line Solenoid Short to BAT or Open

**Description**

TCU adjusts the system pressure by controlling this solenoid valve.

**⚠ Caution**

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

1

**Check the solenoid valve connector**

- (a) Turn ignition switch to OFF.
- (b) Check TCU and TCU wire harness terminal connector, and confirm that they are installed in place and connected properly.
- (c) Disconnect TCU and TCU wire harness connector.
- (d) Check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG

**Repair or replace as needed, perform DTC clearing operation**

OK

## 2 Check wire harness

- (a) Pull out the TCU wire harness terminal connector and transmission solenoid valve connector, and use a multimeter to measure the continuity condition of different PINs:
- Check the transmission solenoid valve connector PIN13 and TCU connector terminal PIN32, they should be conductive and not conductive with other pins;
  - Check the transmission solenoid valve connector PIN14 and TCU connector terminal PIN29, they should be conductive and not conductive with other pins.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

## 3 Check main oil pressure control solenoid valve

- (a) Connect the transmission valve body connector.
- (b) Use a multimeter to measure the resistance between TCU connector Pin 32 and Pin 29, the normal resistance range:  $5.3 \pm 0.3 \Omega$ .

NG

**Check main oil pressure control solenoid valve; perform DTC clearing operation**

OK

## 4 Replace TCU with a new one to compare and verify

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU itself is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

### Input Pulley Control Solenoid Abnormal

DTC	P096600	Primary Solenoid Short to GND
DTC	P096700	Primary Solenoid Short to BAT
DTC	P096400	Primary Solenoid Open Load
DTC	P096500	Primary Solenoid Short to BAT or Open

#### Description

TCU adjusts the system pressure by controlling this solenoid valve.

#### Caution

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

1

#### Check connector

- Turn ignition switch to OFF, check TCU and TCU wire harness terminal connector, and confirm that they are installed in place and connected properly.
- Disconnect TCU and TCU wire harness connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG

**Repair or replace as needed, perform DTC clearing operation**

OK

2

#### Check wire harness

- Pull out the TCU wire harness terminal connector and transmission solenoid valve connector, and use a multimeter to measure the continuity condition of different PINs:
  - Check the transmission solenoid valve connector PIN9 and TCU connector terminal PIN34, they should be conductive and not conductive with other pins;
  - Check the transmission solenoid valve connector PIN10 and TCU connector terminal PIN2, they should be conductive and not conductive with other pins.

NG

**Repair or replace as needed, perform DTC clearing operation**

OK

3

#### Check input pulley control solenoid valve



- (a) Connect the transmission valve body connector.  
 (b) Use a multimeter to measure the resistance between TCU connector PIN34 and PIN2, the normal resistance range:  $5.3 \pm 0.3 \Omega$ .

NG

**Replace input pulley control solenoid valve; perform DTC clearing operation**

OK

#### 4 Replace TCU with a new one to compare and verify

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU itself is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

#### Output Pulley Control Solenoid Fault

DTC	P097000	Secondary Solenoid Short to GND
DTC	P097100	Secondary Solenoid Short to BAT
DTC	P096800	Secondary Solenoid Open Load
DTC	P096900	Secondary Solenoid Short to BAT or Open

#### Description

TCU adjusts the system pressure by controlling this solenoid valve.

#### Caution

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

#### 1 Check connector

- (a) Turn ignition switch to OFF.  
 (b) Check TCU and TCU wire harness terminal connector, and confirm that they are installed in place and connected properly.  
 (c) Disconnect TCU and TCU wire harness connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG

**Repair or replace as needed, perform DTC clearing operation**

OK

**2 Check wire harness**

- (a) Pull out the TCU wire harness terminal connector and transmission solenoid valve connector, and use a multimeter to measure the continuity condition of different PINs:
- Check the transmission solenoid valve connector PIN17 and TCU connector terminal PIN6, they should be conductive and not conductive with other pins;
  - Check the transmission solenoid valve connector PIN18 and TCU connector terminal PIN30, they should be conductive and not conductive with other pins.

NG

**Repair or replace as needed, perform DTC clearing operation**

OK

**3 Check output pulley control solenoid valve**

- (a) Connect the transmission valve body connector.
- (b) Use a multimeter to measure the resistance between TCU connector PIN6 and PIN30, the normal resistance range:  $5.3 \pm 0.3 \Omega$ .

NG

**Replace output pulley control solenoid valve; perform DTC clearing operation**

OK

**4 Replace TCU with a new one to compare and verify**

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU itself is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

**Hydraulic Torque Converter Control Solenoid Valve Fault**

DTC	P272900	TCC Solenoid Short to GND
DTC	P273000	TCC Solenoid Short to BAT

<b>DTC</b>	<b>P272700</b>	<b>TCC Solenoid Open Load</b>
<b>DTC</b>	<b>P272800</b>	<b>TCC Solenoid Short to BAT or Open</b>

**Description**

TCU adjusts the system pressure by controlling this solenoid valve.

**⚠ Caution**

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

**1 Check connector**

- (a) Turn ignition switch to OFF, check TCU and TCU wire harness terminal connector, and confirm that they are installed in place and connected properly.
- (b) Disconnect TCU and TCU wire harness connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

**2 Check wire harness**

- (a) Pull out the TCU wire harness terminal connector and transmission solenoid valve connector, and use a multimeter to measure the continuity condition of different PINs:
- Check the transmission solenoid valve connector PIN11 and TCU connector terminal PIN4, they should be conductive and not conductive with other pins;
  - Check the transmission solenoid valve connector PIN12 and TCU connector terminal PIN1, they should be conductive and not conductive with other pins.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

**3 Check hydraulic torque converter control solenoid valve**

- (a) Connect the transmission valve body connector.
- (b) Use a multimeter to measure the resistance between TCU connector PIN4 and PIN1, the normal resistance range:  $5.3 + 0.2/- 0.4 \Omega$ .

NG

**Replace hydraulic torque converter control solenoid valve; perform DTC clearing operation**

OK

**4 Replace TCU with a new one to compare and verify**

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU is faulty, and the faulty TCU is returned to the factory for inspection; using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

**Clutch Control Solenoid Valve Fault**

DTC	P272000	Clutch Solenoid Short to GND
DTC	P272100	Clutch Solenoid Short to BAT
DTC	P271800	Clutch Solenoid Open Load
DTC	P271900	Clutch Solenoid Short to BAT or Open

**Description**

TCU adjusts the system pressure by controlling this solenoid valve.

**⚠ Caution**

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

**1 Check connector**

- (a) Turn ignition switch to OFF, check TCU and TCU wire harness terminal connector, and confirm that they are installed in place and connected properly.
- (b) Disconnect TCU and TCU wire harness connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**2 Check wire harness**

- (a) Pull out the TCU wire harness terminal connector and transmission solenoid valve connector, and use a multimeter to measure the continuity condition of different PINs:
- Check the transmission solenoid valve connector PIN15 and TCU connector terminal PIN3, they should be conductive and not conductive with other pins.
  - Check the transmission solenoid valve connector PIN16 and TCU connector terminal PIN1, they should be conductive and not conductive with other pins.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

### 3 Check clutch control solenoid valve

- (a) Connect the transmission valve body connector.  
 (b) Use a multimeter to measure the resistance between TCU connector PIN3 and PIN1, the normal resistance range:  $5.3 \pm 0.3 \Omega$ .

OK

**Replace clutch control solenoid valve; using diagnostic tester, clear history DTC**

OK

### 4 Replace TCU with a new one to compare and verify

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU is faulty, and the faulty TCU is returned to the factory for inspection; using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

#### Oil Temperature Sensor Fault

DTC	P094000	Oil Temperature Sensor Short to BAT/OL
DTC	P093900	Oil Temperature Sensor Short to GND

#### Description

TCU detects the transmission fluid temperature through oil temperature sensor.

**⚠ Caution**

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

**1 Check connector**

- (a) Turn ignition switch to OFF, check TCU and TCU wire harness terminal connector, and confirm that they are installed in place and connected properly.
- (b) Disconnect TCU and TCU wire harness connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**2 Check wire harness**

- (a) Pull out the transmission solenoid valve connector and TCU connector, and use a multimeter to measure the continuity of different PINs:
- Check solenoid valve connector terminal PIN7 and TCU connector terminal PIN13, they should be conductive and not conductive with other pins;
  - Check solenoid valve connector terminal PIN8 and TCU connector terminal PIN12, they should be conductive and not conductive with other pins.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**3 Check oil temperature sensor**

- (a) Connect the transmission valve body connector, use a multimeter to measure the resistance between TCU connector Pin 13 and Pin 12, and refer to the following table for the relationship between resistance and temperature:

Temperature (°C)	-40	-30	-20	-10	0	10	20	25	30
Resistance (KΩ)	120.33	66.77	38.65	23.24	14.45	9.26	6.10	5.00	4.12

Temperature (°C)	40	50	60	70	80	90	100	110	120
Resistance (KΩ)	2.85	2.01	1.44	1.06	0.78	0.59	0.45	0.35	0.28

NG

Replace oil temperature sensor; using diagnostic tester, clear history DTC

OK

#### 4 Replace TCU with a new one to compare and verify

(a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

TCU is faulty, and the faulty TCU is returned to the factory for inspection; Using diagnostic tester, clear history DTC

NG

Contact relevant transmission technical personnel for inspection

### Transmission Oil Temperature Fault

DTC	P021800	Trans Oil Temperature Out of Range
DTC	P176700	Trans Oil Temperature Critical

#### Description

TCU detects the transmission fluid temperature through oil temperature sensor.

#### ⚠ Caution

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

#### 1 Check wire harness, connector and oil temperature sensor

(a) Refer to P094000 and P093900 faults to check.

NG

Repair or replace as needed; Using diagnostic tester, clear history DTC

OK

<b>2</b>	<b>Check transmission cooling system</b>
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- (a) Refer to vehicle Repair Manual, check if transmission oil cooler installation and line connection, etc. are abnormal.
- (b) Check if vehicle cooling system is abnormal.

<b>NG</b>	<b>Repair or replace faulty area; Perform DTC clearing operation</b>
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**Forward/Reverse Clutch Fault**

<b>DTC</b>	<b>P081E00</b>	<b>Clutch (Reverse) Slip</b>
<b>DTC</b>	<b>P081100</b>	<b>Clutch (Drive) Slip</b>

**Description**

The clutch control is used to achieve quick, smooth engagement of D/R gear.

<b>⚠ Caution</b>
------------------

- |   |
|---|
| <ul style="list-style-type: none"> <li>• When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.</li> </ul> |
|---|

<b>1</b>	<b>Check turbine speed sensor</b>
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- (a) Refer to inspection method for turbine speed sensor.

<b>NG</b>	<b>Repair or replace as needed; Perform DTC clearing operation</b>
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<b>OK</b>
-----------

<b>2</b>	<b>Check clutch control solenoid valve</b>
----------	--

- (a) Refer to inspection method for clutch solenoid valve fault.

<b>NG</b>	<b>Repair or replace as needed; Perform DTC clearing operation</b>
-----------	--

<b>OK</b>
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<b>3</b>	<b>Check hydraulic system for leakage</b>
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- (a) Contact relevant transmission technical personnel for clutch pressure inspection.

<b>NG</b>	<b>Repair or replace as needed; Perform DTC clearing operation</b>
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OK

**4 Check clutch lining**

(a) Contact relevant transmission technical personnel for inspection and analysis.

NG

**Repair or replace as needed; Perform DTC clearing operation**

**Hydraulic Torque Converter Clutch Fault****DTC****P089400****TCC Slip****Description**

TCU obtains the hydraulic torque converter locking control target according to the current driving mode, vehicle speed and accelerator pedal signal, and realizes the locking clutch closing control.

**⚠ Caution**

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

**1 Check hydraulic torque converter locking control solenoid valve and wire harness**

(a) Refer to inspection method for hydraulic torque converter locking control solenoid valve fault, check hydraulic torque converter locking control solenoid valve and wire harness.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

**2 Check hydraulic control circuit**

(a) Contact relevant transmission technical personnel for hydraulic torque converter hydraulic control circuit inspection.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

**3 Check hydraulic torque converter**

(a) Contact relevant transmission technical personnel for hydraulic torque converter inspection.



**Repair or replace as needed; Perform DTC clearing operation**

### Speed Sensor Signal Unreasonable Fault

<b>DTC</b>	<b>P071500</b>	<b>Unreasonable Turbine Speed Signal</b>
<b>DTC</b>	<b>P079100</b>	<b>Unreasonable Primary Speed Signal</b>
<b>DTC</b>	<b>P072000</b>	<b>Unreasonable Secondary Speed Signal</b>

#### Description

TCU detects the transmission turbine speed, input pulley speed and output pulley speed signals through turbine speed sensor, input pulley speed sensor and output pulley speed sensor.

#### Caution

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

#### **1 Check wire harness and connector**

- (a) Refer to P071600 wire harness troubleshooting method for P071500.  
 (b) Refer to P079200 wire harness troubleshooting method for P079100.  
 (c) Refer to P072100 wire harness troubleshooting method for P072000.



**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

#### **2 Check sensor**

- (a) Replace pressure sensor with a new one to compare and verify whether the current driving cycle fault has been cleared.



**Pressure sensor itself is fault, replace the pressure sensor**



**Contact relevant transmission technical personnel for inspection**

### Oil Temperature Sensor Signal Unreasonable Fault

<b>DTC</b>	<b>P093700</b>	<b>Unreasonable Oil Temperature Signal</b>
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#### Description

TCU detects the transmission oil temperature signal through transmission oil temperature sensor.

**⚠ Caution**

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

**1 Check wire harness**

- (a) Refer to the troubleshooting method of DTC P093900 and P094000 for wire harness troubleshooting.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC;**

OK

**2 Check oil temperature sensor**

- (a) Refer to the comparison table of oil temperature sensor resistance and oil temperature, test the resistance of oil temperature sensor.

Refer to the following table for the relationship between resistance and transmission oil temperature:

Temperature (°C)	-40	-30	-20	-10	0	10	20	25	30
Resistance (KΩ)	120.33	66.77	38.65	23.24	14.45	9.26	6.10	5.00	4.12
Temperature (°C)	40	50	60	70	80	90	100	110	120
Resistance (KΩ)	2.85	2.01	1.44	1.06	0.78	0.59	0.45	0.35	0.28

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC;**

OK

**Contact relevant transmission technical personnel for inspection**

**Pressure Control Abnormal Fault**

<b>DTC</b>	<b>P279700</b>	<b>Primary Pressure Control Issue</b>
<b>DTC</b>	<b>P279800</b>	<b>Secondary Pressure Control Issue</b>

**Description**

TCU controls the pulley shaft oil pressure according to the current oil pressure and the target oil pressure to realize gear ratio control.

**⚠ Caution**

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

**1 Check pressure sensor**

(a) Refer to inspection method for pulley shaft pressure sensor fault.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

**2 Inspect pressure control solenoid valve**

(a) Refer to inspection method for pulley shaft pressure control solenoid valve.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

**3 Check hydraulic system**

(a) Make sure that the CAN communication is normal. After 10 seconds of starting the engine, use the refresh tool to collect a piece of data. Data collection requirements:

- P/N idling data
- The normal driving data of the vehicle, the vehicle speed is required to be more than 40 Km/h

NG

**Contact relevant transmission technical personnel for data analysis**

**Oil Pressure Sensor Signal Unreasonable Fault**

<b>DTC</b>	<b>P084000</b>	<b>Unreasonable Primary Pressure Signal</b>
<b>DTC</b>	<b>P084500</b>	<b>Unreasonable Secondary Pressure Signal</b>

**Description**

TCU detects the transmission input shaft and output shaft pressure signals through input shaft and output shaft pressure sensors.

**⚠ Caution**

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

<b>1</b>	<b>Check wire harness</b>
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- (a) Refer to the troubleshooting method of P084200 and P084300 for P084000 wire harness troubleshooting.
- (b) Refer to the troubleshooting method of P084700 and P084800 for P084500 wire harness troubleshooting.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

<b>2</b>	<b>Verify pressure sensor</b>
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- (a) Replace oil pressure sensor with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**Replace oil pressure sensor; using diagnostic tester, clear history DTC**

NG

**Contact relevant transmission technical personnel for inspection**

### Ratio Error Fault

<b>DTC</b>	<b>P073000</b>	<b>Ratio Error</b>
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#### Description

TCU obtains the target ratio according to the current driving mode, vehicle speed and accelerator pedal signal, the actual ratio is calculated according to the input pulley shaft speed and the output pulley shaft speed, and the transmission control module realizes ratio control through comprehensive feedback control according to the above information.

#### Caution

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

<b>1</b>	<b>Check transmission electrical appliances</b>
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- (a) Refer to inspection method for input/output pulley shaft speed signal.

NG

**Repair or replace as needed; Perform DTC clearing operation**

OK

**2 | Check pressure sensor**

(a) Refer to inspection method for input/output pulley shaft pressure sensor.

NG

**Repair or replace as needed; Perform  
DTC clearing operation**

OK

**3 | Inspect pressure control solenoid valve**

(a) Refer to inspection method for input/output pulley shaft pressure control valve.

NG

**Repair or replace as needed; Perform  
DTC clearing operation**

OK

**4 | Check hydraulic system**

(a) Refer to inspection method for input/output pulley pressure signal.

NG

**Repair or replace as needed; Perform  
DTC clearing operation**

OK

**5 | Check engine torque**

(a) Contact relevant technical personnel for engine torque inspection and troubleshooting.

NG

**Repair or replace as needed; Perform  
DTC clearing operation**

OK

**6 | Check transmission components**

(a) Check transmission components for abnormal wear.

NG

Contact relevant transmission technical personnel for analysis

### Network Malfunction

DTC	U014087	Lost Communication with BCM
DTC	U010087	Lost Communication with ECM
DTC	U012987	Lost communication with BSM
DTC	U012687	Lost Communication with SAM
DTC	U042281	BCM Data Received Abnormal
DTC	U040181	ECM Data Received Abnormal
DTC	U041881	BSM Data Received Abnormal
DTC	U042881	SAM Data Received Abnormal
DTC	P175000	Invalid Engine Speed Signal
DTC	P175100	Invalid Engine Actual Torque Signal
DTC	P175200	Invalid Brake Pedal Signal
DTC	P175300	Invalid Gas Pedal Signal
DTC	P175400	Invalid Vehicle Speed Signal
DTC	P175500	Invalid Front Left Speed Signal
DTC	P175600	Invalid Front Right Speed Signal
DTC	P175700	Invalid Rear Left Speed Signal
DTC	P175800	Invalid Rear Right Speed Signal
DTC	P175900	Invalid Engine Coolant Signal
DTC	P176000	Invalid Odormeter Signal
DTC	P176100	ABS Invalid
DTC	P176200	Invalid Master Cylinder Pressure Signal
DTC	U014687	Lost Communication with CGW
DTC	U119387	Lost Communication with EGS
DTC	P173100	EGS Request Invalid

### Description

TCU performs information interaction with other controllers through vehicle CAN.

#### Caution

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

Refer to vehicle Repair Manual for fault inspection operation.

**Electronic Shift Actuator System Malfunction**

DTC	P178300	SBW Safety Fault
DTC	P178400	SBW Internal Communication Fault
DTC	P178600	SBW Electrical Fault
DTC	P178800	SBW Not Tuned
DTC	P178900	SBW PID Control Fault

**Description**

The above faults occur during the operation of electronic shift actuator, indicating that the electronic shift actuator system is operating abnormally.

**⚠ Caution**

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

**1 Check electronic shift actuator**

- (a) Turn off vehicle KL15 power, wait for three minutes, disconnect the positive battery terminal, then power on again and start, perform multiple shift tests.

OK

Using diagnostic tester, clear history DTC

NG

**2 Replace the electronic shift actuator with a new one**

- (a) Replace electronic shift actuator with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

Replace electronic shift actuator; using diagnostic tester, clear history DTC

**Electronic Shift Actuator Network Malfunction**

DTC	P178100	Lost Communication with TCU
DTC	P178200	Invalid Data From TCU
DTC	P172500	Lost Communication with SBW
DTC	P172600	Invalid Data From SBW
DTC	P172888	TCU CAN2 Bus Off
DTC	P178000	SBW CAN Bus Off

**Description**

SBW performs information interaction with TCU through CAN2.



**⚠ Caution**

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

**1 Check connector**

- Turn off vehicle KL15 power, wait for three minutes, disconnect the positive battery terminal.
- Disconnect SBW connector, and check SBW wire harness terminal connector and each PIN of wire harness terminal connector for looseness, disengagement, corrosion, aging or damage, etc.
- Disconnect TCU connector, and check TCU wire harness terminal connector and each PIN of wire harness terminal connector for looseness, disengagement, corrosion, aging or damage, etc.
- Restore connector, power on again and start, perform multiple shift tests.

OK

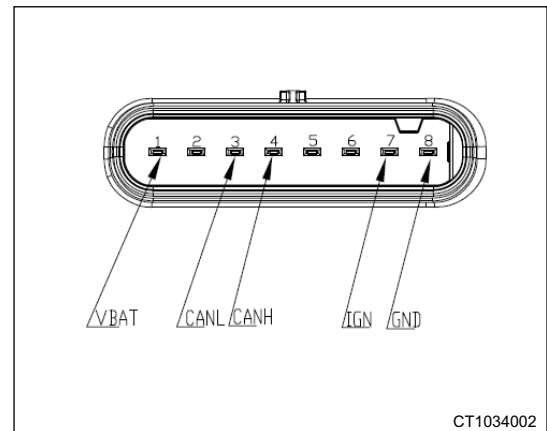
**Using diagnostic tester, clear history DTC**

NG

**2 Check wire harness**

- Electronic shift actuator PIN definition:

PIN No.	Pin Definition
1	Power Supply (VBAT)
2	/
3	CAN Signal Low (CANL)
4	CAN Signal High (CANH)
5	/
6	/
7	KL15 Ignition (IGN)
8	Ground (GND)



- Turn ignition switch to OFF, and disconnect TCU connector.
- Use a multimeter to check if the resistance of TCU wire harness terminal connector PIN7 to PIN35 is about 120  $\Omega$ .
- Use a multimeter to check for connection between TCU connector and SBW connector:
  - Whether TCU connector PIN7 is conductive with SBW connector CAN Low;
  - Whether TCU connector PIN35 is conductive with SBW CAN High.
- There should be no continuity between TCU connector PIN7 and PIN35.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**3 Electronic shift actuator (SBW) compare verification**

- (a) Replace electronic shift actuator with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**Replace electronic shift actuator; using diagnostic tester, clear history DTC**

NG

**4 Replace TCU with a new one to compare and verify**

- (a) Replace TCU with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**TCU is faulty, and the faulty TCU is returned to the factory for inspection; using diagnostic tester, clear history DTC**

**Electronic Shift Actuator Hardware Abnormal**

<b>DTC</b>	<b>P179000</b>	<b>SBW Mechanical Fault</b>
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**Description**

The electronic shift detects an abnormal shift and cannot shift.

**⚠ Caution**

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

**1 Check shift connecting rod installation position.**

- (a) Adjust electronic shift connecting rod position.  
 (b) Perform gear self-learning again.  
 (c) Power off then power on again and start, perform multiple shift tests.

OK

**Using diagnostic tester, clear history DTC**

NG

**2 Electronic shift actuator (SBW) compare verification**

- (a) Replace electronic shift actuator with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**Replace electronic shift actuator; using diagnostic tester, clear history DTC**

### Electronic Shift Actuator Over Temperature

<b>DTC</b>	<b>P178700</b>	<b>SBW Over Temperature</b>
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#### Description

Temperature is monitored inside the electronic shift actuator.

#### **Caution**

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

1

#### **Cool down the electronic shift actuator**

- (a) Power off and lock the vehicle, open the engine compartment cover to cool down for a period of time, then power on and start the vehicle, and check the shift.

OK

**Using diagnostic tester, clear history DTC**

NG

2

#### **Check vehicle cooling system**

- (a) Check vehicle cooling system.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

3

#### **Check electronic shift actuator**

- (a) Perform blocking detection for the shift of electronic shift actuator.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

<b>4</b>	<b>Electronic shift actuator compare verification</b>
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- (a) Replace electronic shift actuator with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**Replace electronic shift actuator; using diagnostic tester, clear history DTC**

**Abnormal Electronic Shift Actuator Action**

<b>DTC</b>	<b>P172700</b>	<b>SBW Wrong Action</b>
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**Description**

The electronic shift actuator will shift to the specified gear after receiving the shift command.

**⚠ Caution**

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

<b>1</b>	<b>Check electronic shift actuator</b>
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- (a) Check if the shift of electronic shift actuator is blocked.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

<b>2</b>	<b>Perform electronic shift self-learning again</b>
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- (a) Refer to the electronic shift self-learning method to relearn.  
 (b) Power off then power on again and start, perform multiple shift tests.

OK

**Using diagnostic tester, clear history DTC**

NG

<b>3</b>	<b>Electronic shift actuator test compare verification</b>
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- (a) Replace electronic shift actuator with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**Replace electronic shift actuator; using diagnostic tester, clear history DTC**

**Abnormal Electronic Shift Actuator Input**

<b>DTC</b>	<b>P178500</b>	<b>SBW External Input Fault</b>
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**Description**

The power supply voltage will affect the operation of electronic shift actuator.

**⚠ Caution**

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

**1 Check connector**

- Turn ignition switch to OFF.
- Disconnect SBW and wire harness terminal connector, and check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**2 Check wire harness**

- Use a multimeter to check for the power supply and connection of SBW wire harness connector:
  - Power on, and check if the voltage of SBW wire harness connector VBAT pin to GND pin is 9 - 16 V;
  - Power on, and check if the voltage of SBW wire harness connector IGN pin to GND pin is 9 - 16 V.

NG

**Repair or replace as needed; Using diagnostic tester, clear history DTC**

OK

**3 Electronic shift actuator compare verification**

- Replace electronic shift actuator with a new one to compare and verify whether the current driving cycle fault has been cleared.

OK

**Replace electronic shift actuator itself; using diagnostic tester, clear history DTC**