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CVT18

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CVT18 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.

CVT18 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:

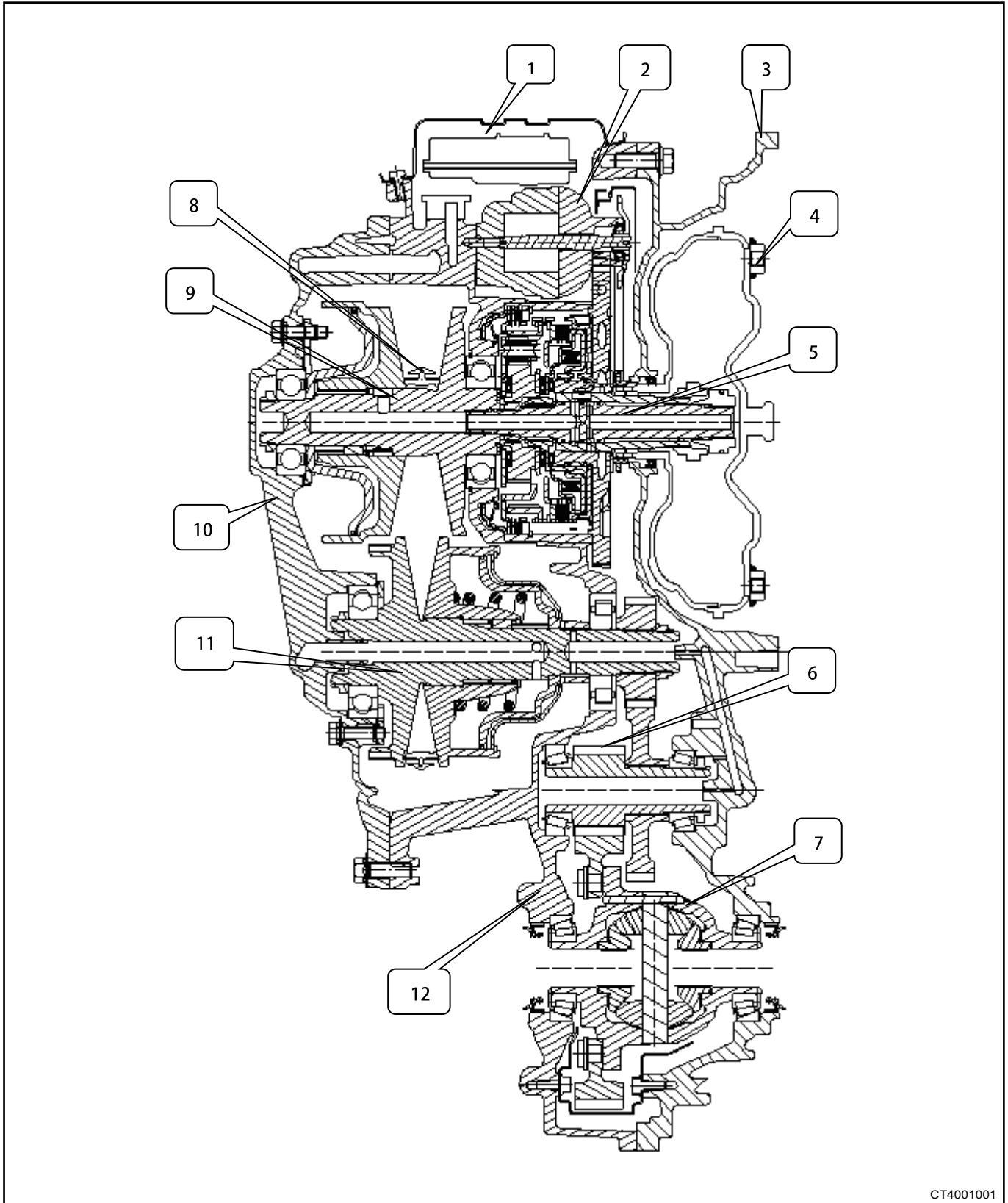
1. Transmission Control Unit (TCU) sends command signals to the solenoid valves in hydraulic system according to the requirements under the vehicle driving conditions (vehicle speed, load, engine speed, etc.).
2. When the piston cavity pressure of hydraulic drive and driven conical pressure plates is 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

Items	Parameters
Type	CVT18
Type	Continuously Variable Transmission (CVT)
Layout	Transverse front-drive
Start Clutch Device	Hydraulic torque converter
Control Method	Electronic hydraulic control
Dimensions (L × W × H)	366mm × 570mm × 425mm
Weight (Dry Weight)	75 Kg
Central Distance	190mm
Maximum Allowable Input Torque	180 N·m
Final Drive Ratio	6.07
Pulley Speed Ratio Range	0.396 - 2.526
Fluid Type	CVTF WCF-1 (CVTF for short)
Transmission Fluid Capacity	7.2 ± 0.2 L

Transmission Composition

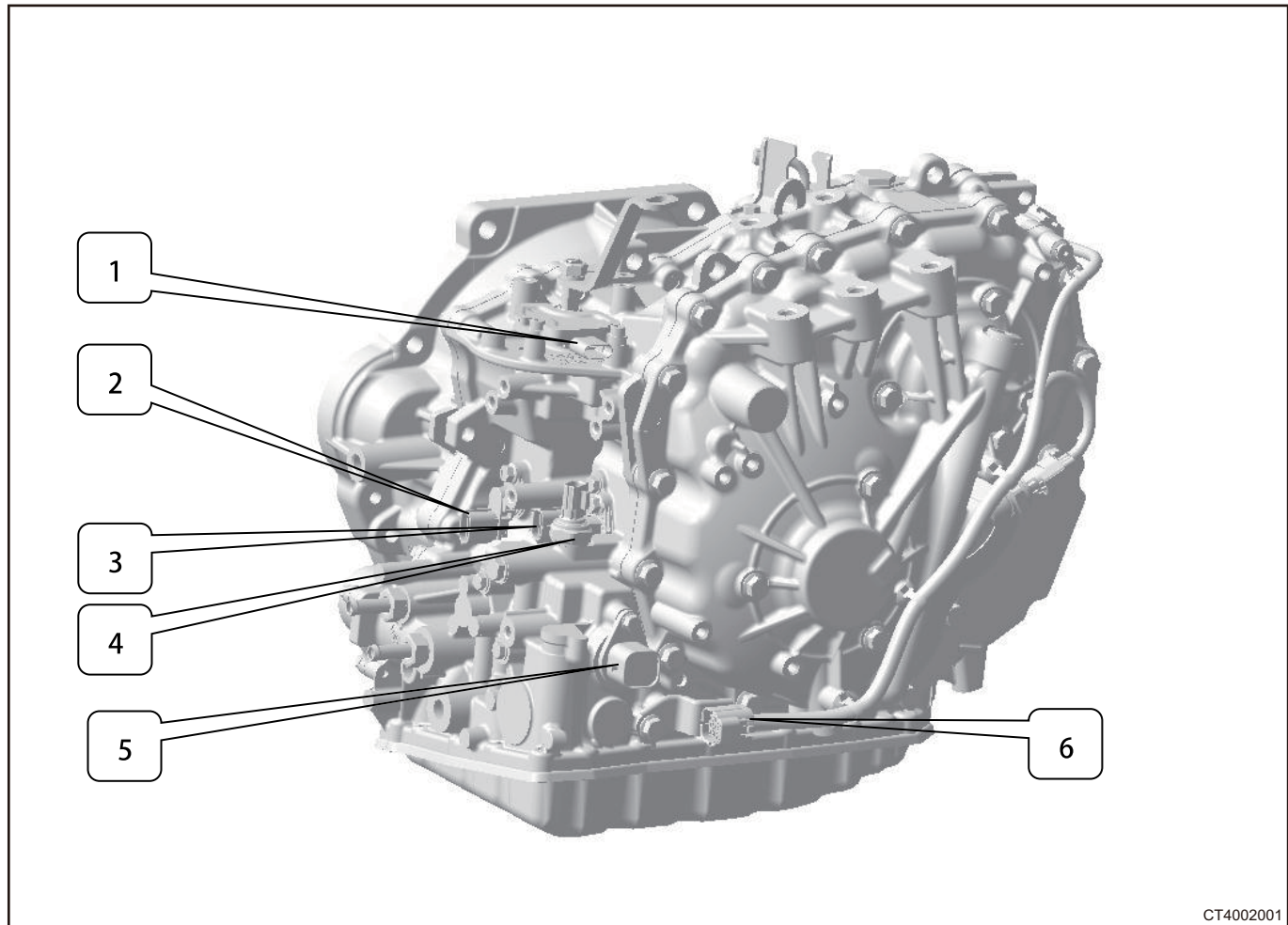
Internal Structure Schematic Diagram



CT4001001

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

Electronic Components Introduction



CT4002001

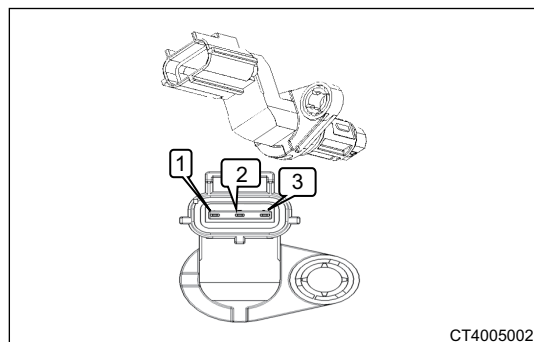
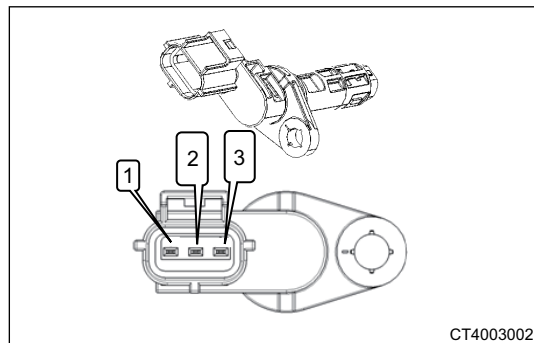
1	Range Switch	2	Speed Sensor (Turbine)
3	Speed Sensor (Input Shaft)	4	Oil Pressure Sensor (Input Shaft)
5	Wire Harness Connector (Valve Body Wire Harness)	6	Transmission Peripheral Wire Harness Assembly

Speed Sensor

CVT18 series CVT uses two types and 3 speed sensors in total:

1. Pin Definition

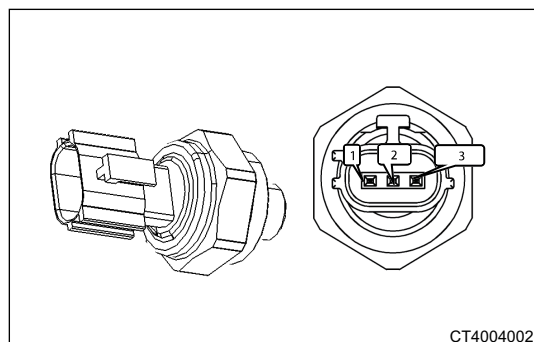
PIN	Definition
1	Ground
2	Signal
3	Power Supply

**Oil Pressure Sensor**

0CF28 series CVT uses two oil pressure sensors in total:

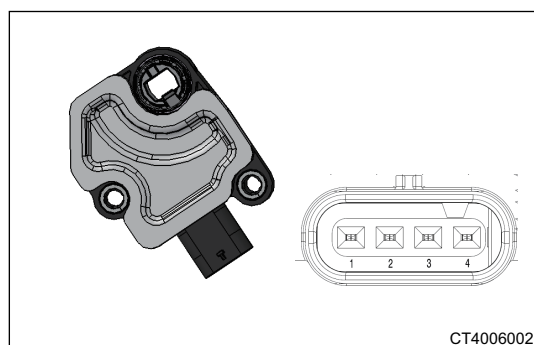
1. Pin Definition

PIN	Definition
1	Ground
2	Signal
3	Power Supply

**Range Switch**

1. Pin Definition

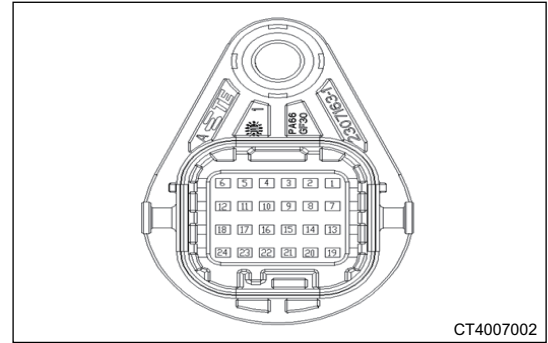
PIN	Definition
1	Power Supply
2	Output Signal 1
3	Ground
4	Output Signal 2



Wire Harness Main Connector

1. Pin Definition

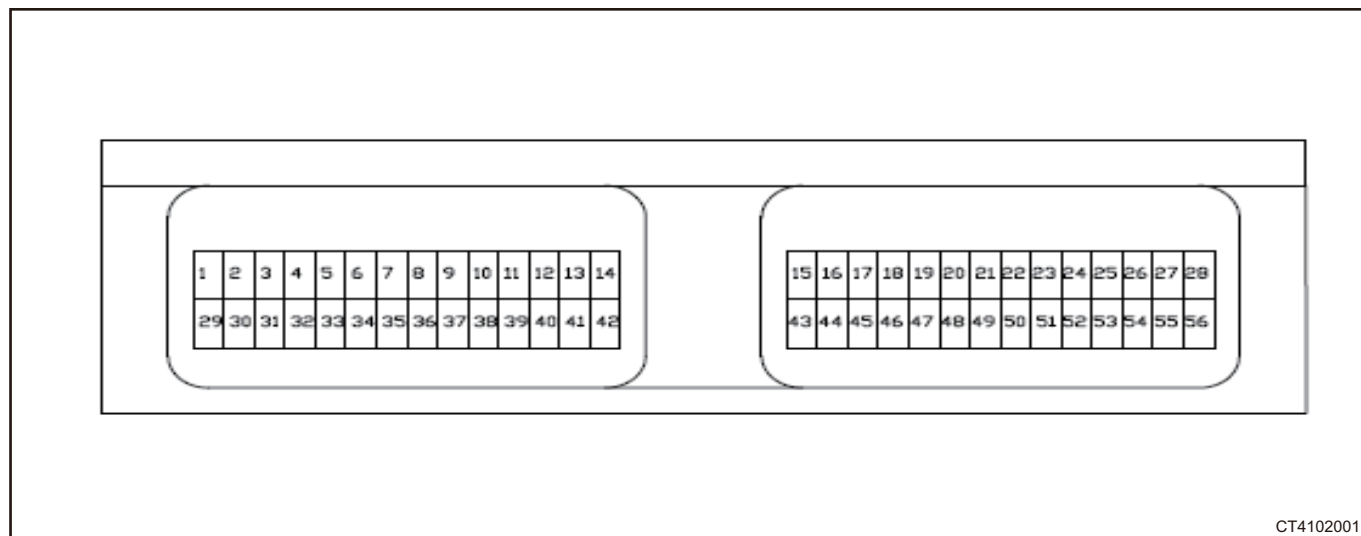
PIN	Definition
1	Null
2	Null
3	Null
4	Null
5	Null
6	Null
7	Oil Temperature Signal +
8	Oil Temperature Signal -
9	Input Shaft Solenoid Valve Signal +
10	Input Shaft Solenoid Valve Signal -
11	TC Solenoid Valve Signal +
12	TC Solenoid Valve Signal -
13	Main Oil Pressure Solenoid Valve Signal +
14	Main 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

Automatic Transmission Control Unit



CT4102001

PIN	Definition	PIN	Definition
1	Hydraulic Torque Converter/Clutch Control Valve Low Side Control	29	Main Oil Pressure/P Gear Lock 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	P Gear Lock Control Valve High Side Control
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	NC	35	NC
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

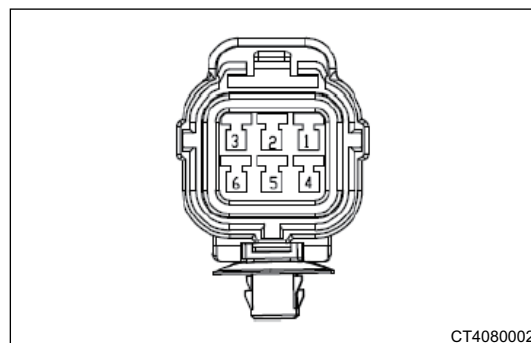
PIN	Definition	PIN	Definition
12	Transmission Oil Temperature Sensor Ground	40	NC
13	Transmission Oil Temperature Sensor Signal	41	NC
14	Input Pulley Shaft Oil Pressure Sensor Signal	42	NC
15	Output Pulley Shaft Oil Pressure Sensor Signal	43	NC
16	Range Sensor Signal 1	44	Range Sensor Signal 2
17	NC	45	NC
18	NC	46	Downshift
19	NC	47	Upshift
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	Manual Mode	51	KL30
24	NC	52	KL30
25	NC	53	KL30
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 power, KL30 is the battery power

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



Wire harness assembly troubleshooting

Tool: Digital multimeter.

Measurement method: Take the fault of input shaft oil pressure sensor line as an example, first unplug the wiring harness assembly connector and output shaft oil pressure sensor wiring harness terminal connector.

Firstly, check wire harness connector appearance: Check each PIN for looseness, disengagement, corrosion, aging or damage, etc.

Secondly, according to the definition of connector PIN, use the multimeter red and black probes to contact the corresponding PIN of wire harness assembly connector and output shaft oil pressure sensor wire harness end connector, the PIN corresponds to the following:

Pin Definition	Wire Harness Assembly Connector PIN Serial Number	Output Shaft Oil Pressure Sensor Wire Harness End Connector
Output Shaft Oil Pressure Sensor Power Supply	3	Power Supply
Output Shaft Oil Pressure Sensor Signal	2	Signal
Output Shaft Oil Pressure Sensor Ground	1	Ground

1. If:

- There is continuity between wire harness assembly connector pin 3 and output shaft oil pressure sensor wire harness end connector power supply, but there is no continuity to other pins of output shaft oil pressure sensor wire harness end connector.
- There is continuity between wire harness assembly connector pin 2 and output shaft oil pressure sensor wire harness end connector signal, but there is no continuity to other pins of output shaft oil pressure sensor wire harness end connector.
- There is continuity between wire harness assembly connector pin 1 and output shaft oil pressure sensor wire harness end connector ground, but there is no continuity to other pins of output shaft oil pressure sensor wire harness end connector.

If the above three conditions are met, the wire harness is not faulty; if any condition is not met, the wire harness is faulty.

2. If there is no continuity in any of the three sets of PINs, the wire harness is faulty.

3. Other sensors are tested and analyzed for line faults in the same way.

User Instructions

CVT18 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, CVT18 series CVT can also provide: M gear (manual mode), SPORT mode etc.

Caution

- Manual mode and SPORT mode can be switched by shift lever.
- Mode priority: Manual mode has the highest priority. When manual mode and SPORT mode are triggered at the same time, the system defaults to manual mode.

Before using a vehicle equipped with CVT18 series CVT, you need to know the following information:

1. Each TCU is required to perform self-learning upon first operation.
2. 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;
3. When engine speed exceeds idling speed, do not shift transmission from stop gear (N or P) to driving gear (D or R);
4. 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;
5. If accelerator pedal is depressed suddenly during driving, the transmission will quickly shift to low gear, engine speed and power will increase;
6. 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.

Transmission Self-Learning

Transmission self-learning should be performed in following conditions, failure to do so may cause unsmooth gear shifting and starting:

1. When the vehicle comes off the line;
2. Replace TCU with a new one;
3. Replace valve body assembly, hydraulic torque converter, forward and reverse clutch set and transmission.

The transmission needs to clear the self-learning value with diagnostic tester after replacing the above components. After the vehicle power is turned off and then on again, when the transmission malfunction light is flashing, perform self-learning according to the self-learning steps of hydraulic torque converter lock clutch, forward clutch and reverse clutch; Transmission malfunction light will turn off automatically after all the self-learning operations are completed.

The specific operation of hydraulic torque converter lock clutch self-learning is as follows:

1. Start the engine and shift to D;
2. Accelerate the vehicle to 50 Kph;
3. Release the accelerator pedal and do not depress the brake pedal. The vehicle will slide to below 10 kph;
4. Repeat steps 2 and 3 for three times;
5. Turn off the ignition key and self-learning is completed after waiting for 10 seconds.

The specific operation of forward clutch self-learning is as follows:

1. Release the electrical parking brake after starting the engine;
2. Depress the brake pedal and shift to N, shift to D after waiting for 2 seconds, release brake pedal after waiting for 10 seconds in D, and to creep speed;
3. Repeat step 2 for more than five times;

4. Turn off the ignition key and self-learning is completed after waiting for 10 seconds.

The specific operation of reverse clutch self-learning is as follows:

1. Release the electrical parking brake after starting the engine;
2. Depress the brake pedal and shift to N, shift to R after waiting for 2 seconds, release brake pedal after waiting for 10 seconds in R, and to creep speed;
3. Repeat step 2 for more than five times;
4. Turn off the ignition key and self-learning is completed after waiting for 10 seconds.

Caution

- In order to achieve a good driving effect under various operating conditions, it is necessary to perform self-learning under high temperature, low temperature and normal temperature.
- Make sure that the transmission is fault-free before self-learning operation.

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;
- The shift mechanism is equipped with a parking lock. To shift the shift lever from P, the brake pedal must be depressed and the vehicle is in KEY ON state;
 - If the shift lever cannot be shifted from P, it can be unlocked by mechanical unlocking. For details, please refer to the technical guidance document issued by shift mechanism design department.
- 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 turn off the engine and shift to N gear while vehicle is running at high speed and, 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.

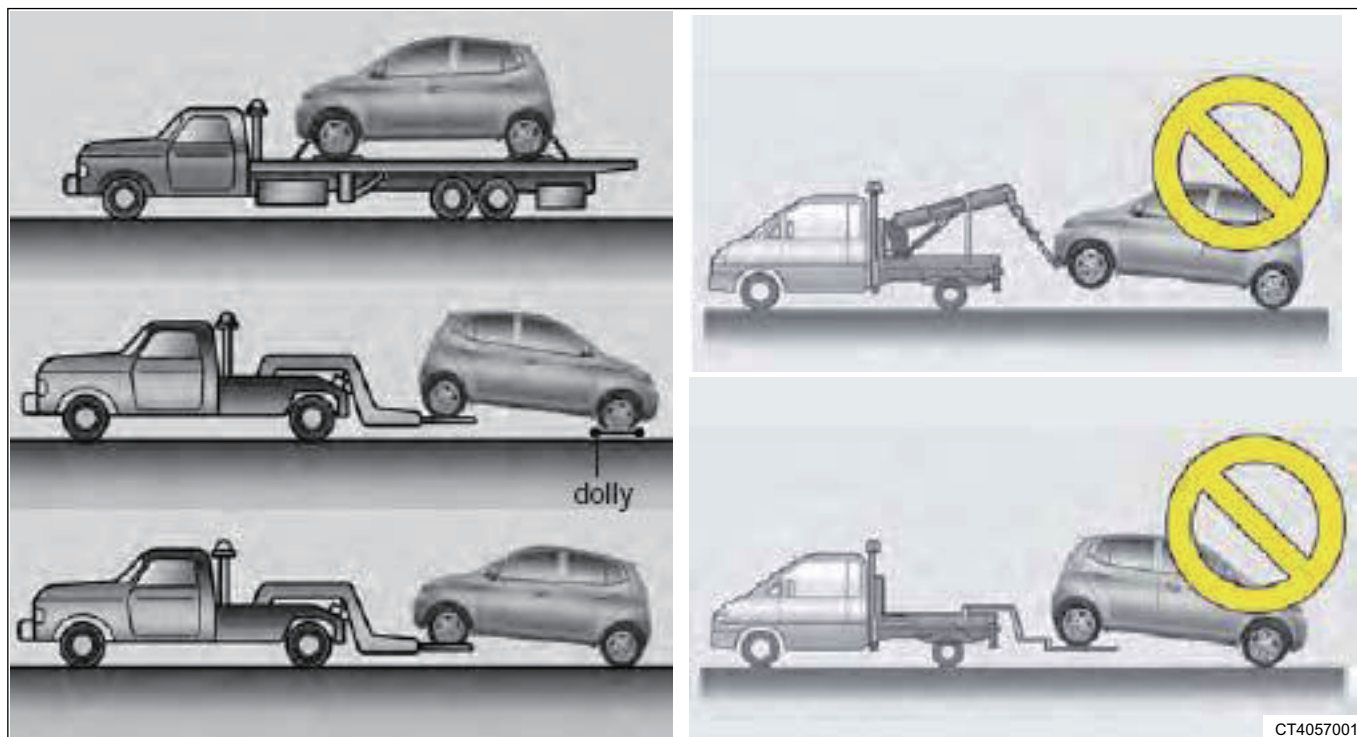
Vehicle Towing

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

CVT18 series CVT can only use genuine CVTF WCF-1 oil:

Oil Brand	Capacity
CVTF WCF-1	7.2 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.

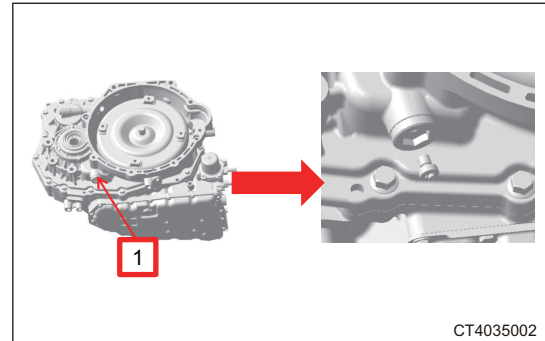
Caution

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

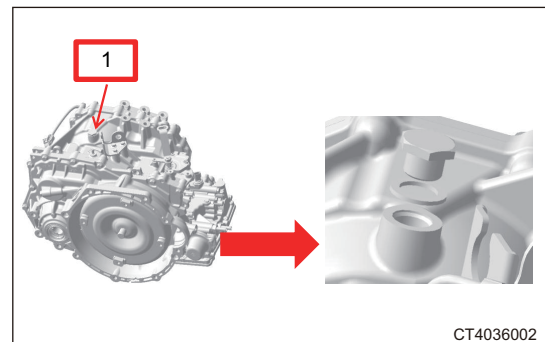
Oil Level Inspection

Please check the oil level in the following order:

1. After the vehicle has been running on the road for a period of time, the transmission oil temperature reaches $80 \pm 5^{\circ}\text{C}$ (it can be measured with a diagnostic tester).
2. Stop the vehicle on a level surface and pull up the parking brake handle.
3. 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.
4. Raise the vehicle with a lift, keep it level, wipe off dust and oil stains around the plug, and remove the overflow plug assembly (1).



5. If there is transmission oil overflow at overflow port, tighten overflow plug assembly until transmission oil does not overflow. If there is no transmission oil overflowing, remove hexagon head bolt of filler port (1), add transmission with 0.5 L transmission oil from filler port above transmission, remove overflow plug assembly until transmission oil does not overflow, and tighten overflow plug assembly (if seal ring is damaged, replace it with a new one), the tightening torque is 6 - 9 N·m.
6. Replace the filler port bolt gasket and tighten the filler port bolt above the transmission case with a tightening torque of 42 - 50 N·m.



⚠ Caution

- It is not allowed to increase the automatic transmission oil temperature by depressing on the accelerator rapidly at idling.
- 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 fluid is too high, the rotating parts of transmission will stir liquid to produce foam while rotating at high speed, which will produce same result as previous one.

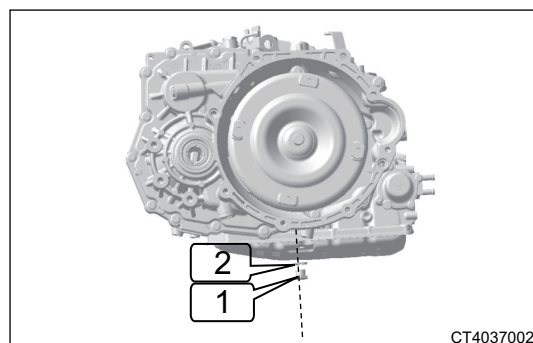
Oil Replacement

⚠ 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.

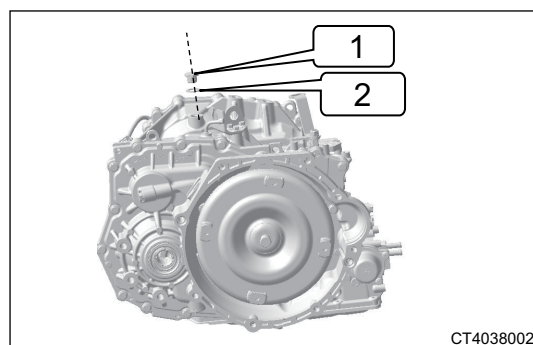
1. Lift up the vehicle on the lift.

- Remove the transmission drain plug (1) and flat washer (2).



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

- Remove drain plug (1) and flat washer (2) above the transmission case, and add new ATF oil from transmission case filler port.



Caution

- When replacing, the filling amount is the drained ATF oil.
- If it is a new transmission, it is not necessary to drain the oil. Add 5.4 ± 0.1 L of oil directly.

- Check the oil level as required after filling.

Caution

- Flat washer is a non-reusable component, and new one must be used during each time it is dismantled.
- 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

- First, remove other parts of the vehicle that affect the removal of transmission in accordance with relevant technical requirements;
- 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 CVT18 transmission totally has: 3 speed sensors, 2 oil pressure sensors, 1 range switch, 1 wire harness main connector, 1 transmission peripheral wire harness assembly and 1 TCU.

⚠ 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.

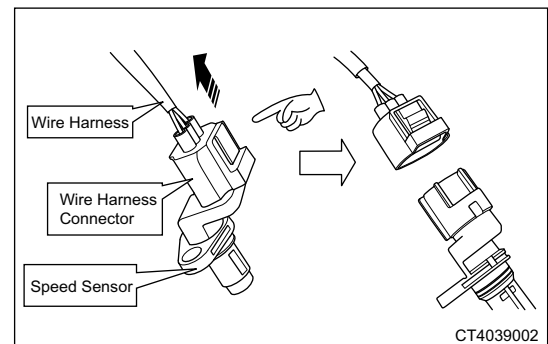
Speed Sensor Connector

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.

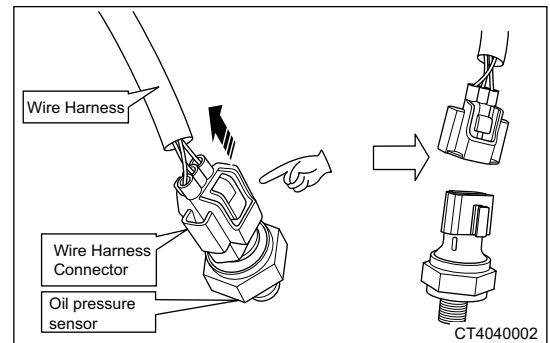
⚠ Caution

- 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.

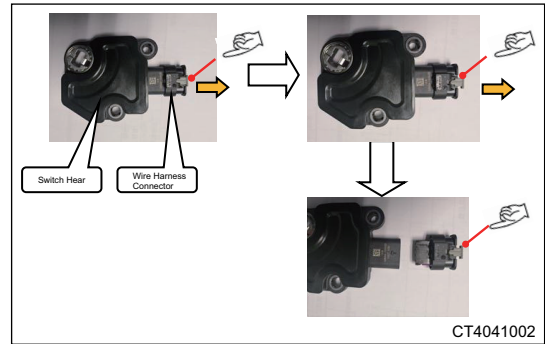
⚠ Caution

- 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. Push out the gray buckle as shown in the direction of the 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. Separate the wire harness connector.
4. 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.

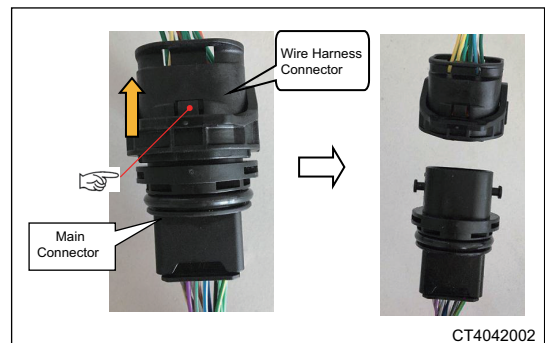
Wire Harness Main Connector

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

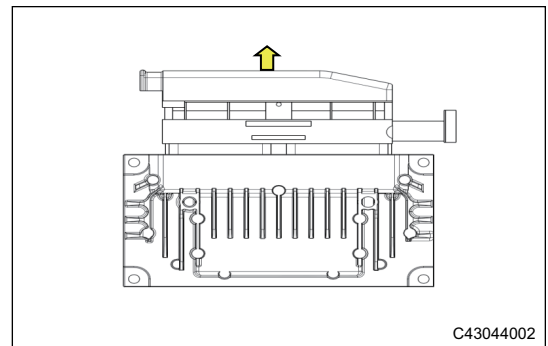
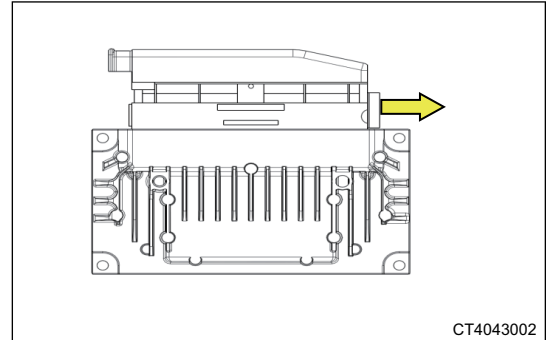
1. Installation is in the reverse order of removal.

⚠ 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.

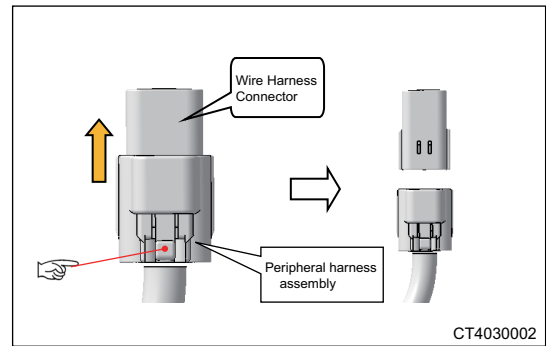
⚠ Caution

- 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 up the wire harness connector at the same time.



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

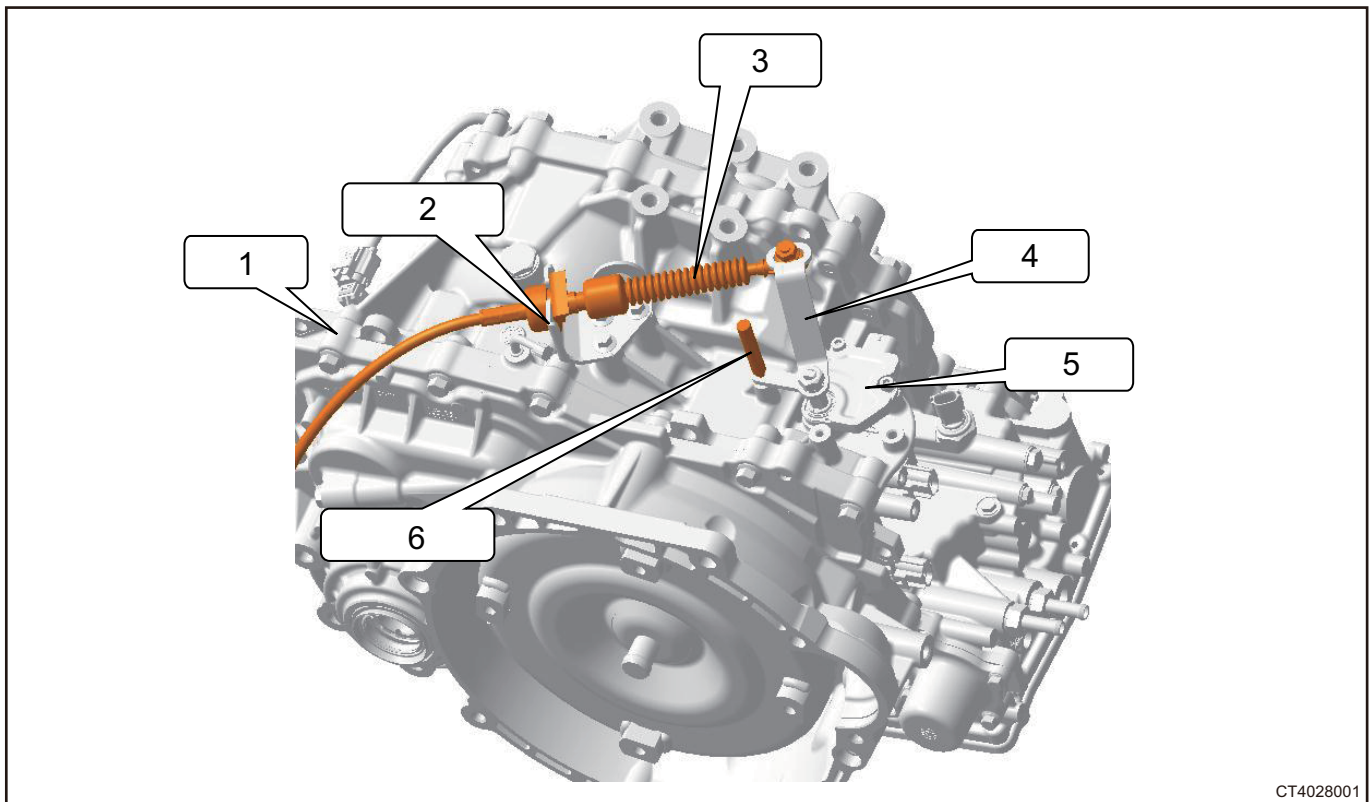
Installation

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.

Shift Cable and Transmission Separation/Assembly



1	Transmission Assembly	2	Shift Cable Bracket
3	Shift Cable	4	Shift Arm
5	Range Switch	6	Dowel Pin

Removal

1. Put the shift lever in cab to N position (the transmission shift arm is also in N position accordingly).
2. At this time, the positioning hole on the shift arm is aligned with the positioning hole on the transmission case, and insert the dowel pin into it.
3. Separate the shift cable from the shift arm; separate the shift cable from the shift cable bracket.
4. Remove the dowel pin.

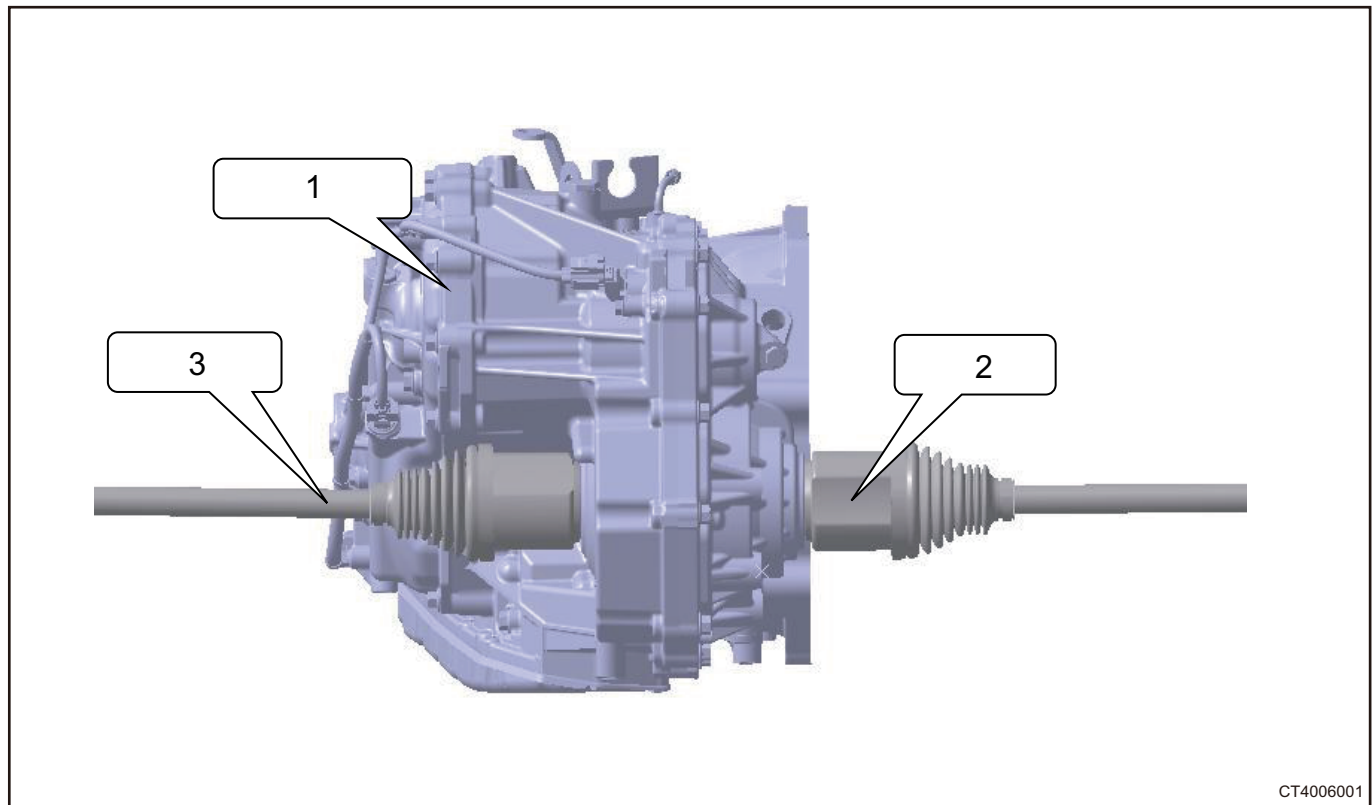
Installation

1. Install shift cable and shift cable bracket in place.
2. Align the positioning hole on the shift arm with the positioning hole on the range switch and insert the dowel pin.
3. Put the shift lever in cab to N position.
4. Install shift cable and shift arm in place.
5. Remove the dowel pin.

Caution

- When removing and installing the shift cable bracket, be sure to use the correct dowel pins as required to avoid faults such as misalignment of gears.
- Since the connection form between the shift cable and the transmission is not exactly the same for different vehicles, the tools used in the removal process are also different, so refer to the vehicle maintenance manual for details.
- The detailed technical requirements for the separation/installation of shift cable and shift arm, and the separation/installation of shift cable and shift cable need to be performed by referring to the vehicle maintenance manual.

Left/Right Propeller Shaft Removal and Installation



CT4006001

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.

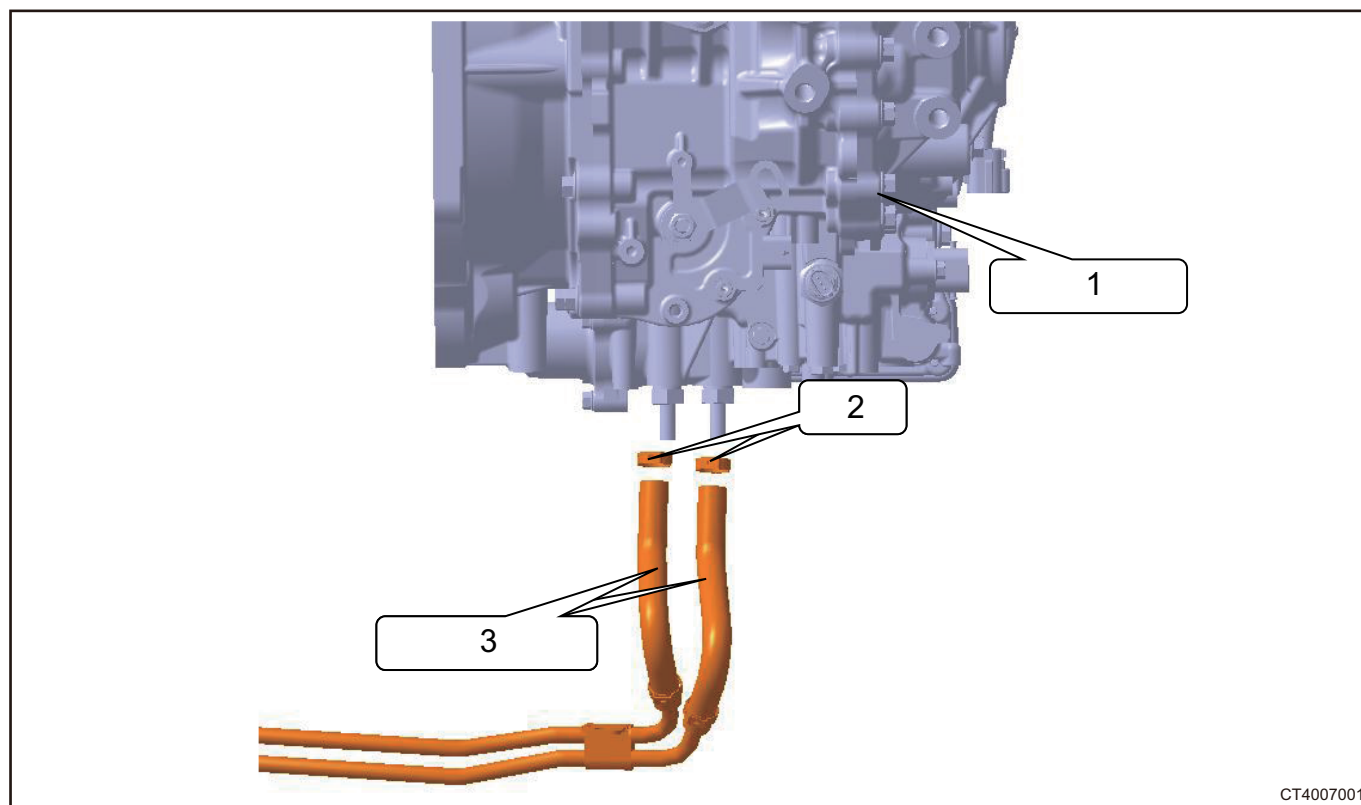
Installation

1. Replace differential oil seal with a new one.
2. Install spline protective sleeve on the external splines where the left/right propeller shaft and the transmission are matched.
3. Align the left/right propeller shaft with the spline hole in the differential drive shaft gear and install it into the transmission.
4. After making sure that the external splines on the left/right propeller shaft have passed the differential oil seal, remove the spline protective sleeve.
5. 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



CT4007001

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.

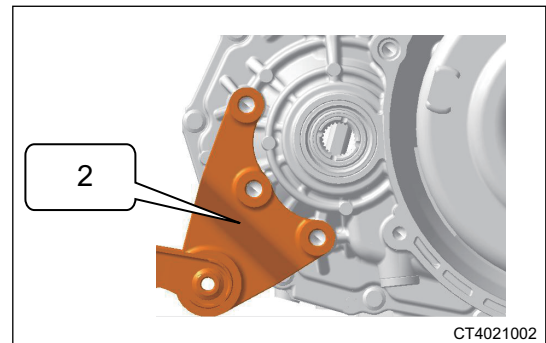
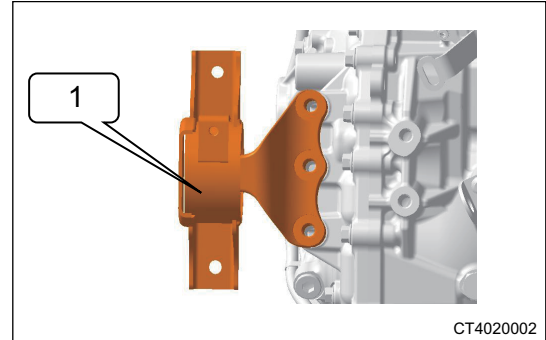
⚠ Caution

- 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

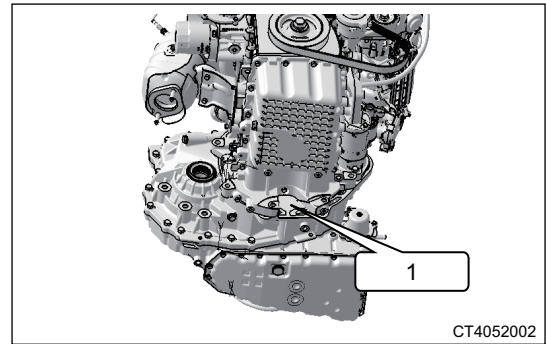
- During removal and installation, do not operate violently to avoid damaging the transmission.
- Before removing and installing the tightening bolts, it is necessary to check whether the threaded holes of the transmission are damaged. If there is any abnormality, it needs to be repaired.
- Different 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

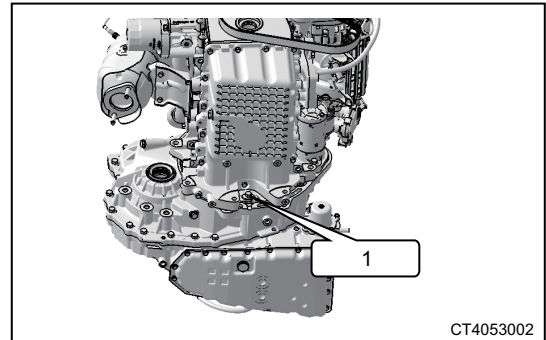
Removal

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 sealing plate (1).



5. Check if the hydraulic torque converter coupling bolts (1) 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.

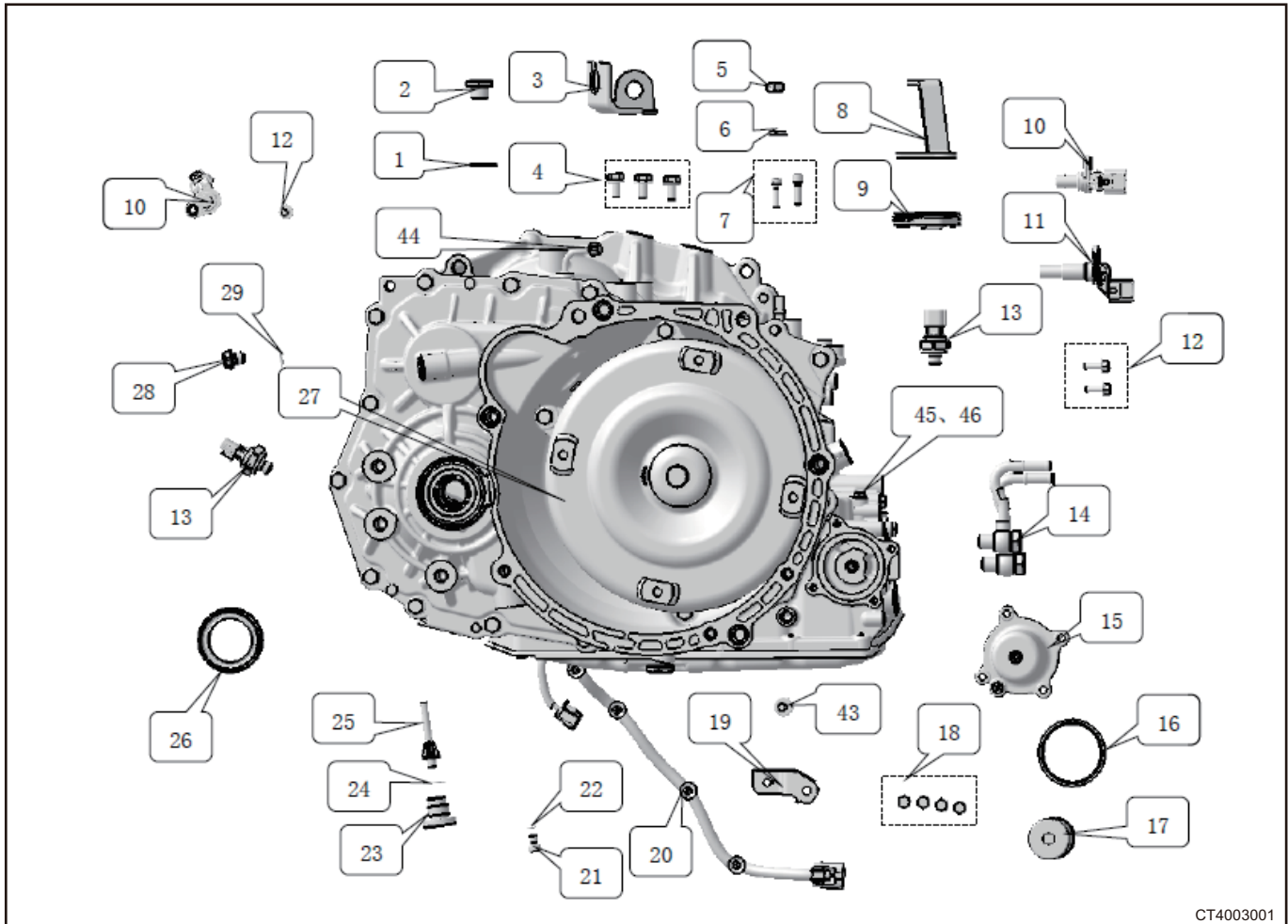
Caution

- 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.

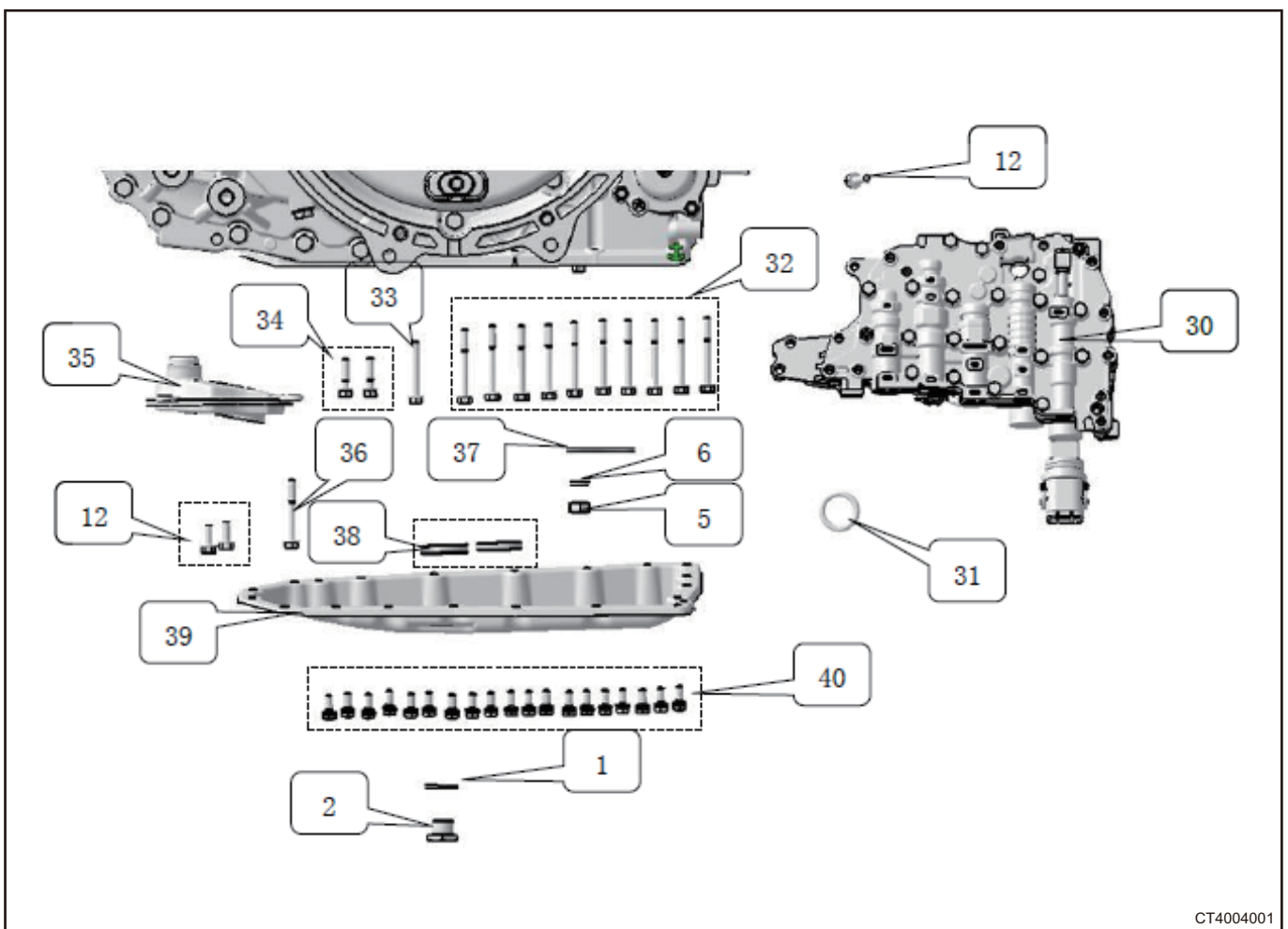
Repairable List

⚠ Caution

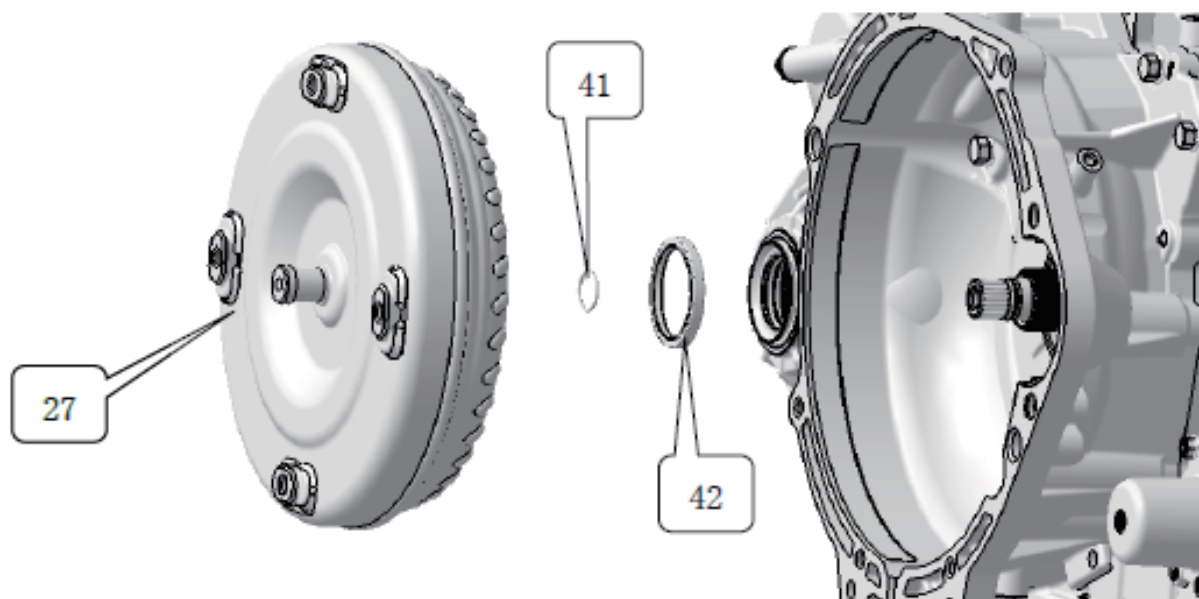
- Compared with traditional manual transmission, the removal, installation and repair of automatic transmission requires higher requirements. The repair or replacement of all components needs to be performed under the guidance of professional technicians of Wanliyang Company.
- Do not remove or replace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



CT4003001



CT4004001



CT4005001

No.	Part No.	Part Name	Quantity	Repair Qualification	Note
1	QR523-1701103	Drain Plug Flat Washer	1	C	★
2	QR523-1701102	Drain Plug	1	C	42 - 50 N·m
3	CVT18A-1504110EA	Shift Cable Bracket Assembly	1	C	
4	025CHA-1504132	Cable Bracket Bolt	3	C	13 - 15 N·m
5	Q341C10F36	Nut	2	C	18 - 25 N·m
6	Q40310F9	Spring Washer	2	C	★
7	Q218B0622F36	Inner Hexagon Socket Cap Screw	2	C	8 - 10 N·m
8	CVT18B-1504102	Shift Arm	1	C	
9	025CHA-1504220 or 0CF25A-1504220BA	Range Sensor	1	C	
10	025CHA-1504240 025CHA-1504240BA	Speed Sensor (Short)	2	C	
11	025CHA-1504230 025CHA-1504230BA	Speed Sensor (Long)	1	C	

No.	Part No.	Part Name	Quantity	Repair Qualification	Note
12	Q1880616F36	Hexagon Flange Bolt - Extra Large Series M6X16	6	C	8 - 10 N·m
13	025CHA-1504210	Oil Pressure Sensor	2	C	
14	/	Cooling Pipe Assembly	2	C	☆
15	025CHA-1506501	External Filter Case	1	C	
16	025CHA-1506531	Gasket - External Filter and Transmission Case	1	C	
17	025CHA-1506510	External Filter Assembly	1	C	
18	Q1860620F36	Hexagon Flange Bolt - Extra Large Series	4	C	8 - 10 N·m
19	CVT18B-1504116	Wire Harness Bracket	1	C	
20	CVT18B-1506500	Transmission Peripheral Wire Harness Assembly	1	C	
21	0CF25B-1501115GA	Overflow Plug	1	C	6 - 9 N·m
22	6AF28A-1507082	O-ring	1	C	
23	0CF25B-1501113GA	Drain Plug	1	C	39 - 49 N·m
24	6AF28A-1507072	O-ring	1	C	
25	/	Oil Drain Guide Pipe	1	C	☆
26	019CHA-1502106	Differential Oil Seal	2	C	★
27	/	Hydraulic Torque Converter Assembly	1	C	☆
28	019CHA-1502172	Oil Pressure Detection Bolt	2	C	19 - 25 N·m
29	019CHA-1502171	Oil Pressure Detection Bolt (M12) O-ring	2	C	
30	/	Valve Body and Wire Harness Assembly	1	C	☆
31	025CHA-1502606	Valve Body and Transmission Case O-Ring	1	C	
32	Q1860655F36	Hexagon Flange Bolt - Extra Large Series	10	C	8 - 10 N·m
33	Q1860645F36	Hexagon Flange Bolt - Extra Large Series	1	C	8 - 10 N·m
34	Q1860625F36	Hexagon Flange Bolt - Extra Large Series	1	C	8 - 10 N·m

No.	Part No.	Part Name	Quantity	Repair Qualification	Note
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-1506532	Manual Shift Valve Drive Arm	1	C	
38	025CHA-1506522	Magnet	2	C	
39	025CHA-1506521	Valve Body Case	1	C	★
40	Q1410616F61	Hexagon Head Bolt and Conical Spring Washer Set M6 x 16	19	C	8 - 10 N·m
41	025CHA-1509103	Input Shaft to Hydraulic Torque Converter O-ring	1	C	
42	025CHA-1502204	Hydraulic Torque Converter Oil Seal	1	C	★
43	Q1820814F36	Hexagon Flange Bolt	1	C	20 - 26 N·m
44	025CHA - 1502126	Breather Cap	1	C	
45	019CHA-1502182	Oil Pressure Detection Bolt	4	C	8 - 10 N·m
46	019CHA-1502181	Oil Pressure Detection Bolt (M8) O-ring	4	C	
47	/	Case Seal Gum	1	C	★
48	025CHA-4004011	Automatic Transmission Oil (CVTF WCF-1)	7.2 L	C	△
49	/	Torque Converter Case	1	A	
50	018CHA-1502230	Differential Lower Oil Deflector Assembly	1	A	
51	025CHA-1504133	Positioning Bolt	7	A	8 - 10 N·m
52	018CHA-1502202	Oil Guide Pipe	1	A	
53	025CHA-1502203	Oil Guide Pipe Bracket	1	A	
54	FQ1420616F34E	Hexagon Head Bolt and Spring Washer Set M6×16	1	A	8 - 10 N·m
55	018CHA-1502570	Differential Assembly		A	
56	018CHA-1502500	Output Shaft Assembly		A	
57	018CHA-1502205	Differential Upper Oil Deflector	1	A	

No.	Part No.	Part Name	Quantity	Repair Qualification	Note
58	Q32006F36	Hexagon Flange Nut M6	2	A	8 - 10 N·m
59	018CHA-1502616	Sprocket Oil Deflector	1	A	
60	019CHA-1502528	Differential Adjusting Shim	1	A	Option
61	018CHA-1508500 or CVT18A-1508500BA	Chain	1	A	
62	018CHA-1508400	Driven Sprocket Assembly	1	A	
63	018CHA-1502602	Oil Pump Bracket	1	A	
64	025CHA-1508301	Drive Sprocket	1	A	
65	025CHA-1502608	Hexagon Flange Bolt	2	A	20 - 26 N·m
66	025CHA-1502617	Chain Oil Deflector	1	A	
67	Q1860835F36	Hexagon Flange Bolt - Extra Large Series	1	A	20 - 26 N·m
68	019CHA-1502117	Bearing Baffle Plate O- ring	1	A	
69	025CHA-1508100 or 025CHA-1508100BA	Oil Pump Assembly	1	A	
70	Q218B0870F36	Inner Hexagon Socket Cap Screw	3	A	20 - 26 N·m
71	025CHA-1502601	Sprocket Snap Ring	1	A	
72	018CHA-1509200	Planet Carrier Assembly	1	A	
73	025CHA-1509300	Sun Gear Set	1	A	
74	025CHA-1502604	Forward Clutch Thrust Bearing	1	A	Option
75	025CHA-1502618	Planetary Gear Train Thrust Bearing	2	A	
76	019CHA-1502531	Thrust Bearing	1	A	
77	018CHA-1509100	Input Shaft and Forward Clutch Assembly	1	A	
78	FQ186C1035F36	Hexagon Flange Bolt - Extra Large Series	17	A	
79	FQ186C1030F36	Hexagon Flange Bolt - Extra Large Series	1	A	
80	025CHA-1502603	Washer between Drive Sprocket and Oil Separator	1	A	

No.	Part No.	Part Name	Quantity	Repair Qualification	Note
81	025CHA-1508206	Forward Clutch Seal Ring	2	A	
82	Q1860830F36	Hexagon Flange Bolt - Extra Large Series	7	A	20 - 26 N·m
83	025CHA-1508210	Oil Separator Assembly	1	A	
84	025CHA-1502108	Output Shaft Adjusting Shim	1	A	Option
85	025CHA-1504130	Gear Positioning Steel Sheet Set	1	A	
86	025CHA-1502127	Breather Pipe	1	A	★
87	/	Transmission Bare Machin Assembly	1		

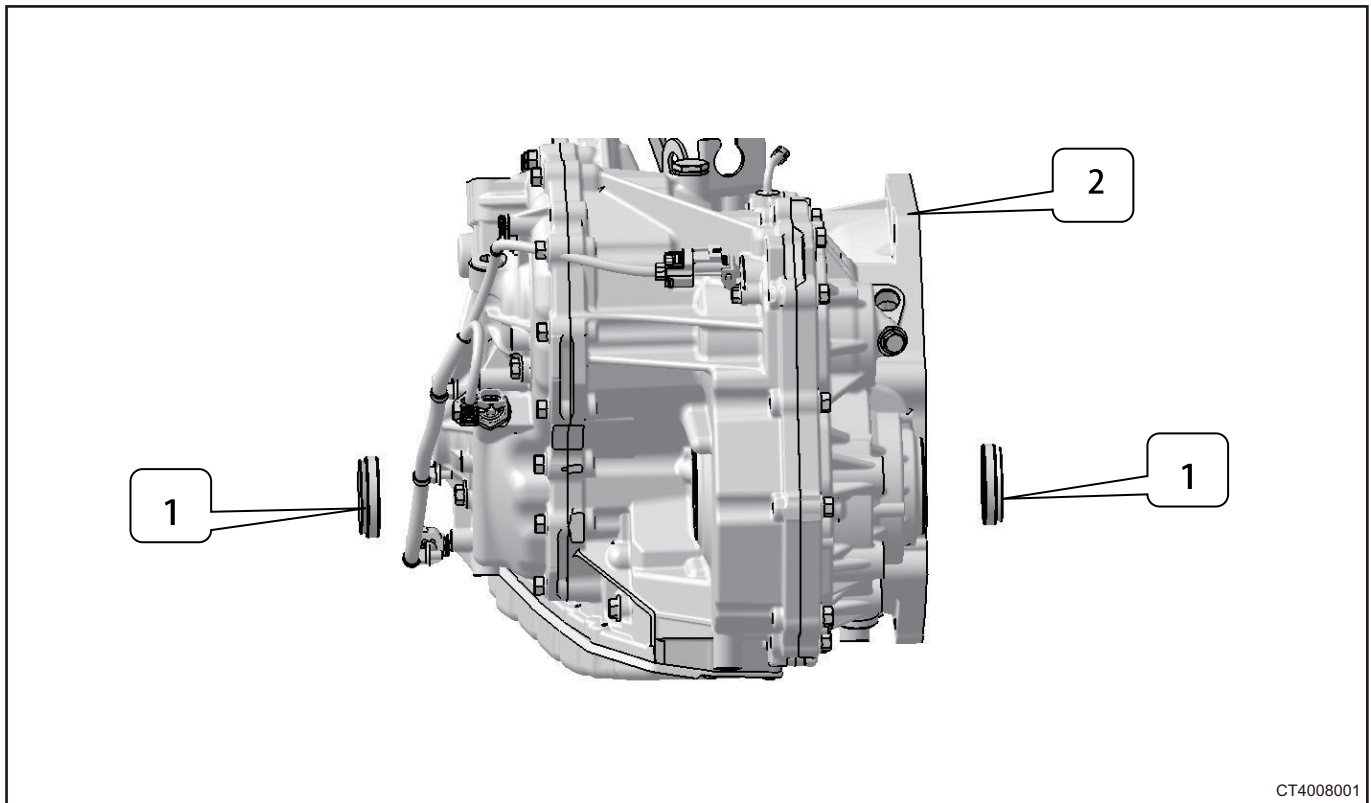
Hint:

- A Qualification: Only refers to Wanliyang, Wanliyang has the qualification to repair all components of CVT18 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!

⚠ 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



CT4008001

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.

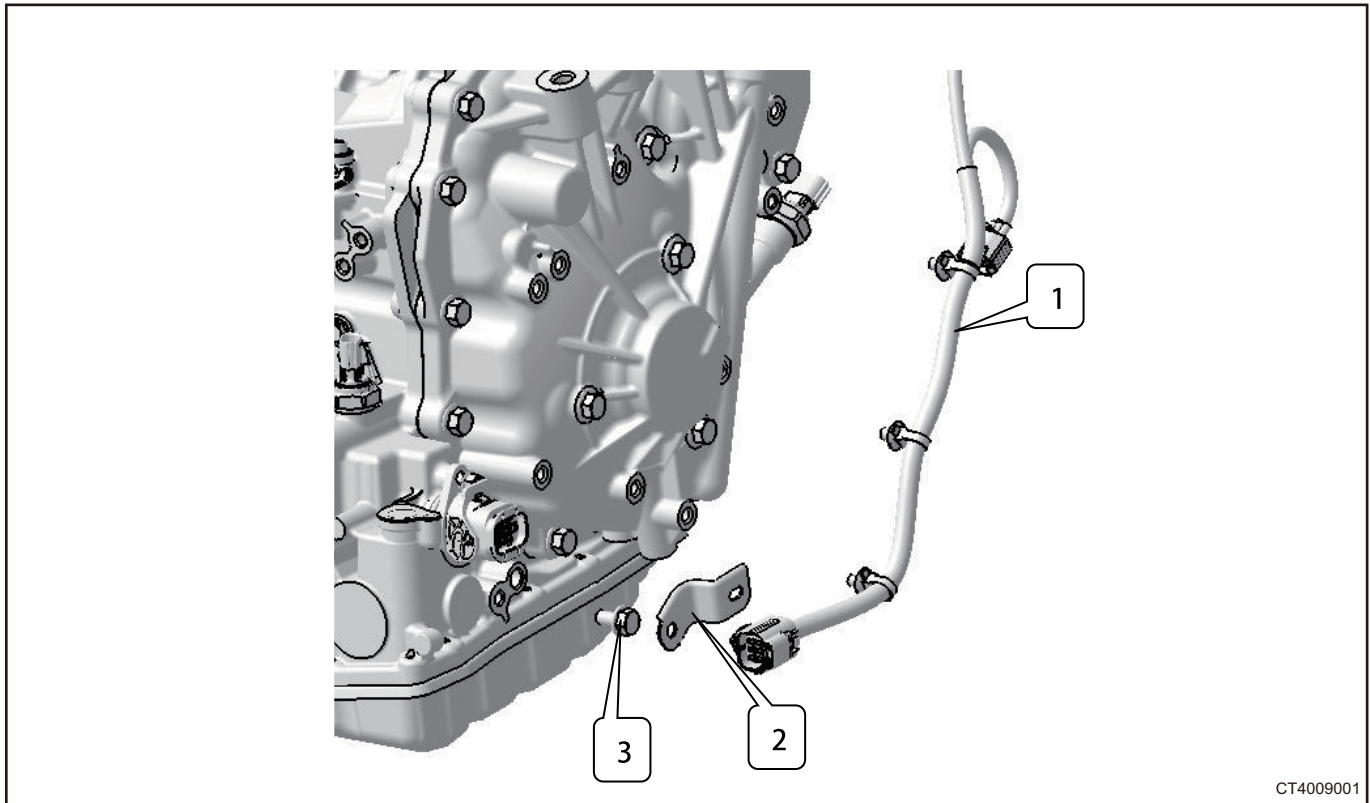
Installation

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 Replacement



CT4009001

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

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 13# socket, and remove the fixing bracket.

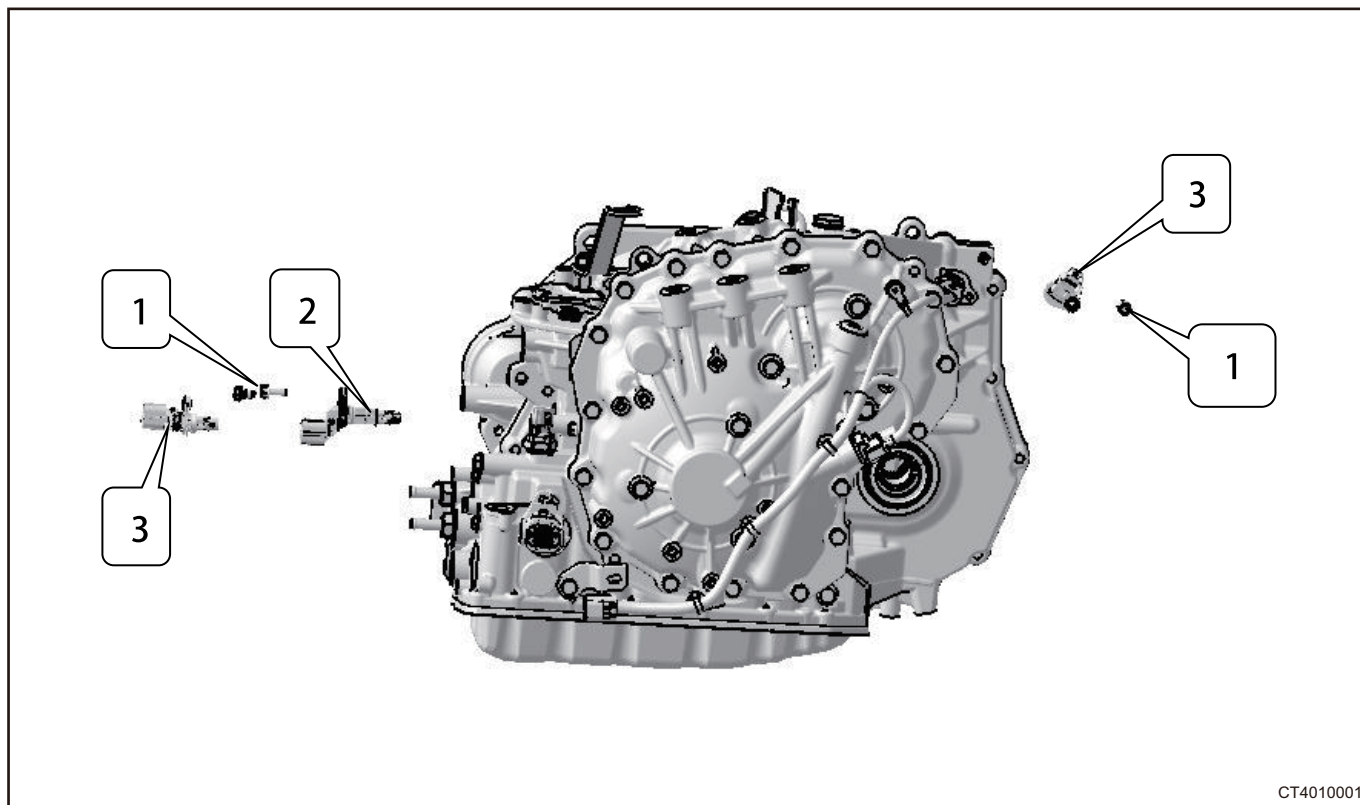
Installation

1. Install the bracket according to the position as shown in the illustration.
2. Install hexagon flange bolt and tighten.

Tightening torque: 20 - 26 N·m

3. Install the peripheral wire harness assembly.

Speed Sensor Assembly Removal and Replacement



CT4010001

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

Removal

1. Unscrew the hexagon flange bolt from the sensor.
2. Remove the speed sensor assembly.

Installation

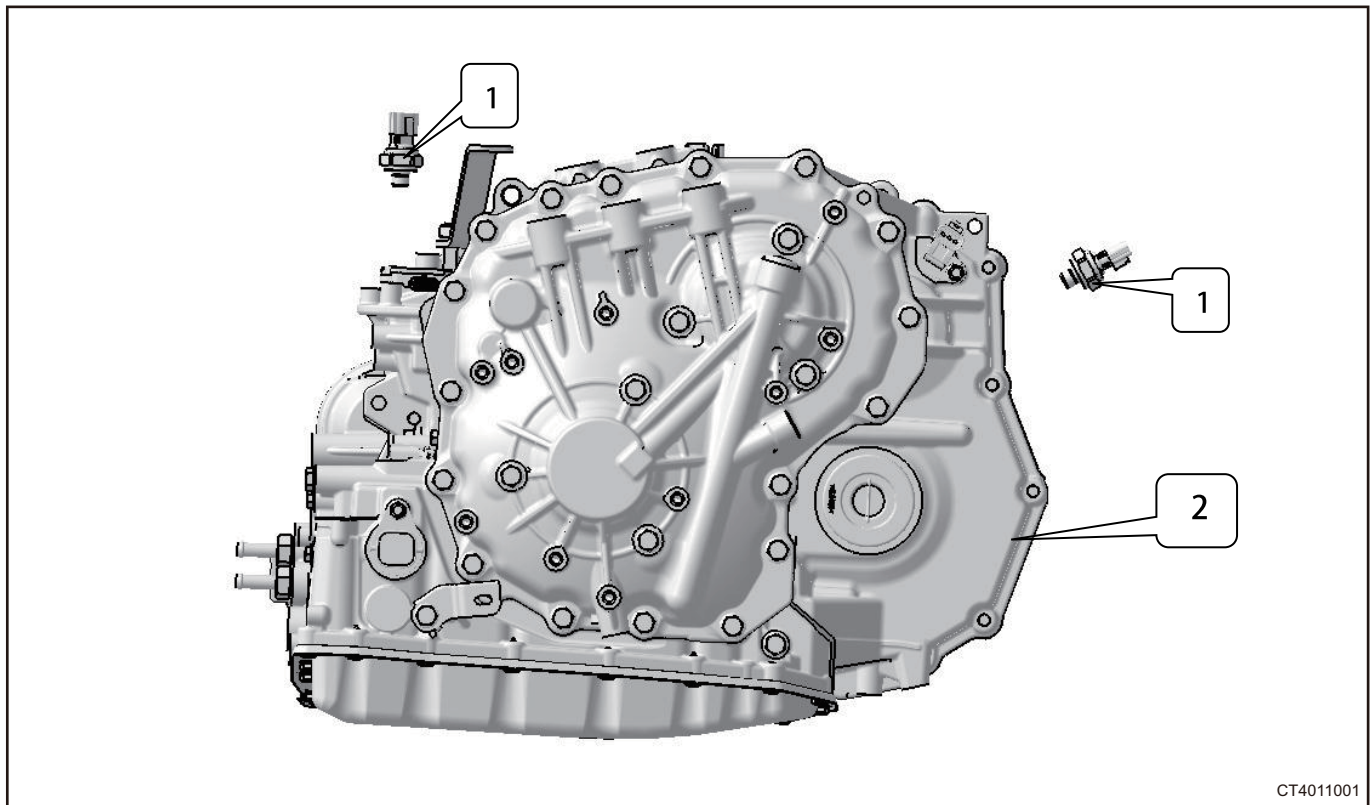
1. Apply proper amount of automatic transmission oil to sensor O-ring.
2. Install the sensor in place.
3. Install the bolt and tighten it.

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



CT4011001

1	Oil Pressure Sensor Assembly	2	Transmission Assembly
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Removal

1. Unscrew the oil pressure sensor assembly.

Installation

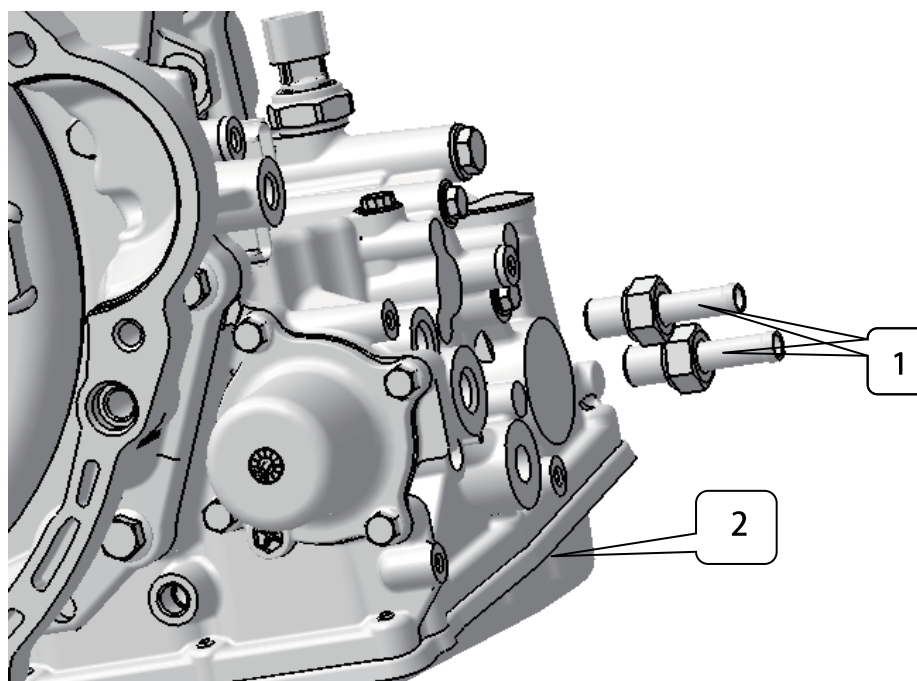
1. Apply proper amount of automatic transmission oil to sensor O-ring.
2. Install and pre-tighten the sensor in place, then tighten it.

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



CT4012001

1	Cooling Pipe Assembly	2	Transmission Assembly
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Removal

1. Remove the cooling pipe assembly with socket.

Installation

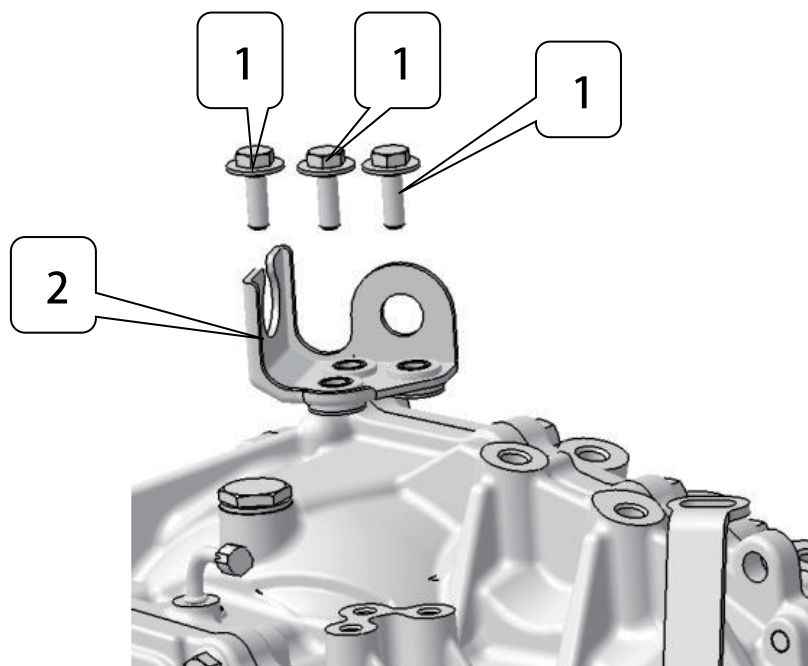
1. Place a gasket at the contact position between oil pipe and the case.
2. Pre-tighten the cooling pipe assembly in place, then tighten it.

Tightening torque: 40 - 45 N·m

Caution

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

Shift Cable Bracket Assembly Removal and Replacement



CT4014001

1	Cable Bracket Bolt	2	Shift Cable Bracket Assembly
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Removal

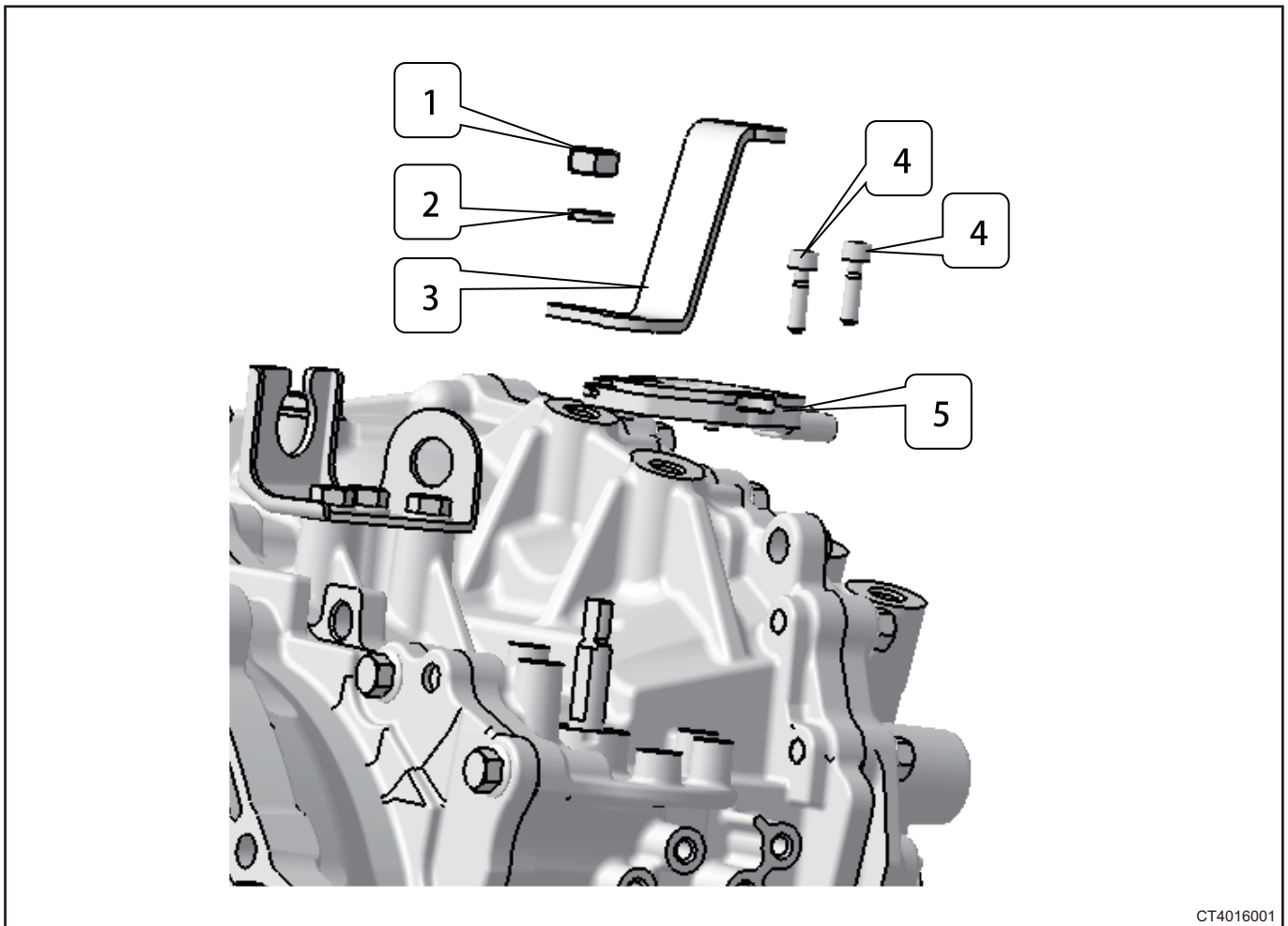
1. Unscrew the two hexagon flange bolts as shown in the figure above.
2. Remove shift cable bracket assembly.

Installation

1. In the reverse order of removal, install shift cable bracket assembly in place.
2. Install two hexagon flange bolts.

Tightening torque: 13 - 15 N·m

Shift Arm and Range Switch Removal and Replacement

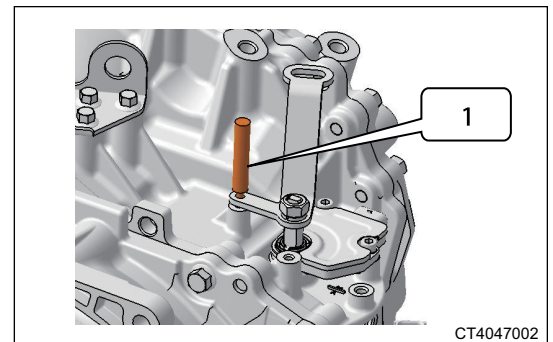


CT4016001

1	Nut	2	Spring Washer
3	Shift Arm	4	Inner Hexagon Socket Cap Screw
5	Range Sensor		

Removal

1. Align the positioning holes on shift arm and transmission case, and insert the dowel pin into it (as shown in the illustration).



CT4047002

2. Remove hexagon nuts on shift arm.
3. Remove the spring washer.
4. Remove the dowel pin.
5. Remove the shift arm.
6. Remove two inner hexagon socket cap screws fixing the range switch.
7. Remove the range sensor.

Installation

1. In the reverse order of removal, install range sensor in place.
2. Install shift arm in place, so that it's positioning hole is aligned with the positioning hole on transmission case.
3. Insert dowel pin in positioning hole.
4. Install spring washer.
5. Install Hexagon nut and tighten it.

Tightening torque: 18 - 25 N·m

6. Install two hexagon flange bolts and tighten it.

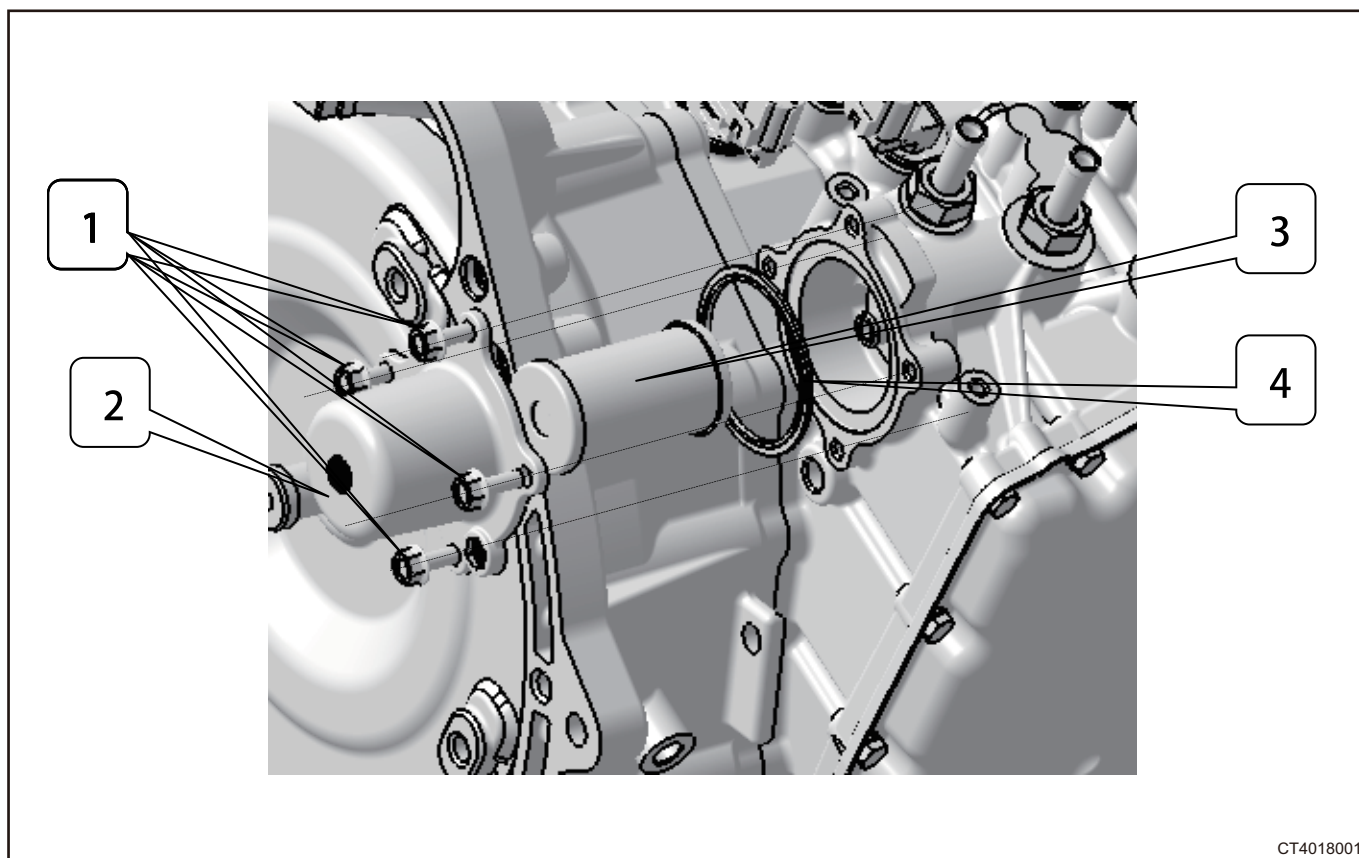
Tightening torque: 8 - 10 N·m

7. Remove the dowel pin.

Caution

- Elastic washer-shift arm (Q40310F9) is a non-reusable product, do not reuse it.
- The shift arm assembled according to this procedure is in the N gear position.
- In order to ensure the accuracy of vehicle shift, dowel pin should also be used when connecting the vehicle shift cable and shift arm:
 - Put the shift lever in cab to N position and hold it there;
 - Insert dowel pin into positioning hole of shift arm and transmission case;
 - Connect the shift cable;
 - Remove the dowel pin;
 - At this time, the vehicle is in N position.

External Filter Assembly Replacement



CT4018001

1	Hexagon Flange Bolt - Extra Large Series M6X16	2	External Filter Case
3	External Filter Assembly	4	Gasket - External Filter and Transmission Case

Removal

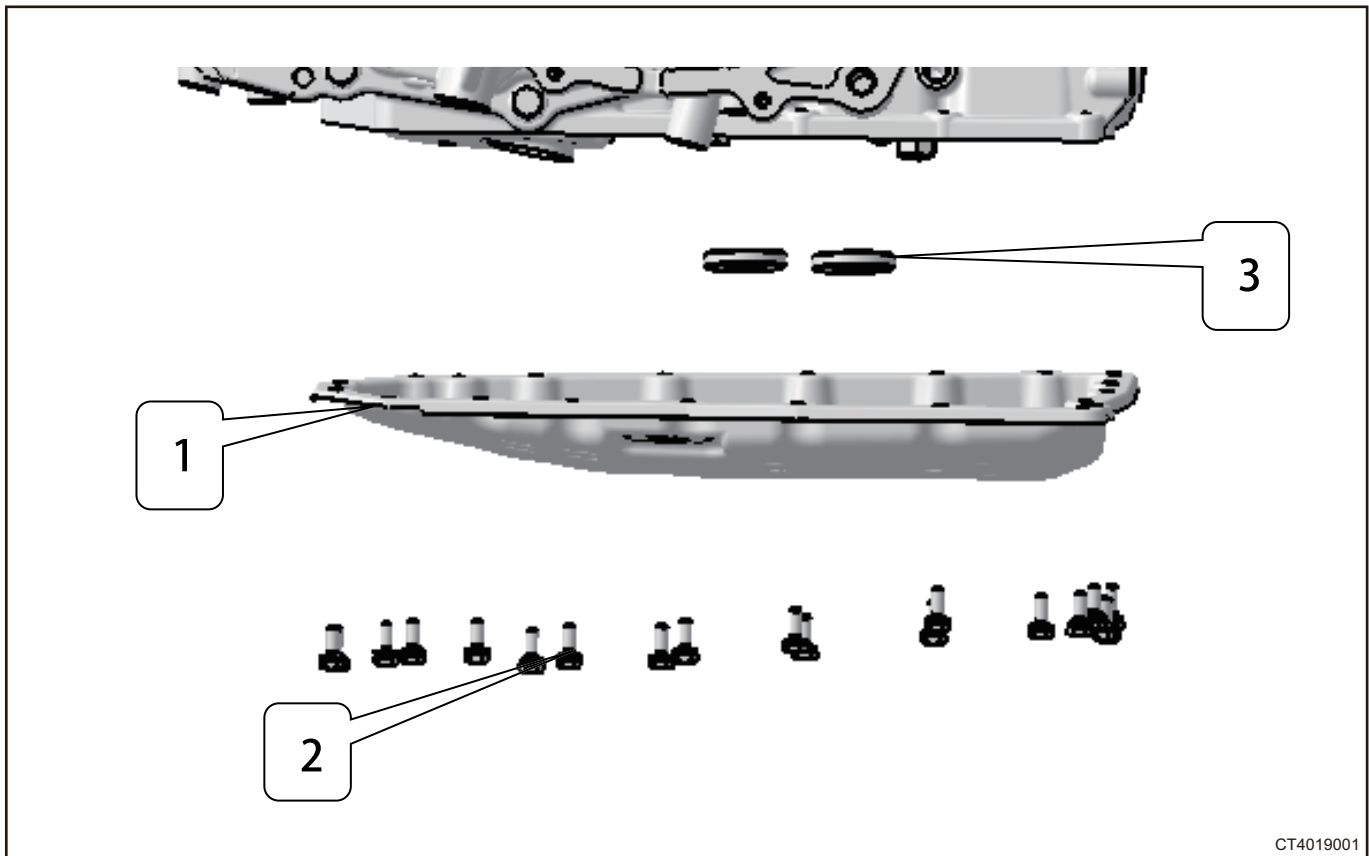
1. Unscrew the coupling bolt between external filter case and transmission case.
2. Remove the external filter case.
3. Remove the external filter assembly.
4. Remove the gasket - external filter and transmission case.

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



CT4019001

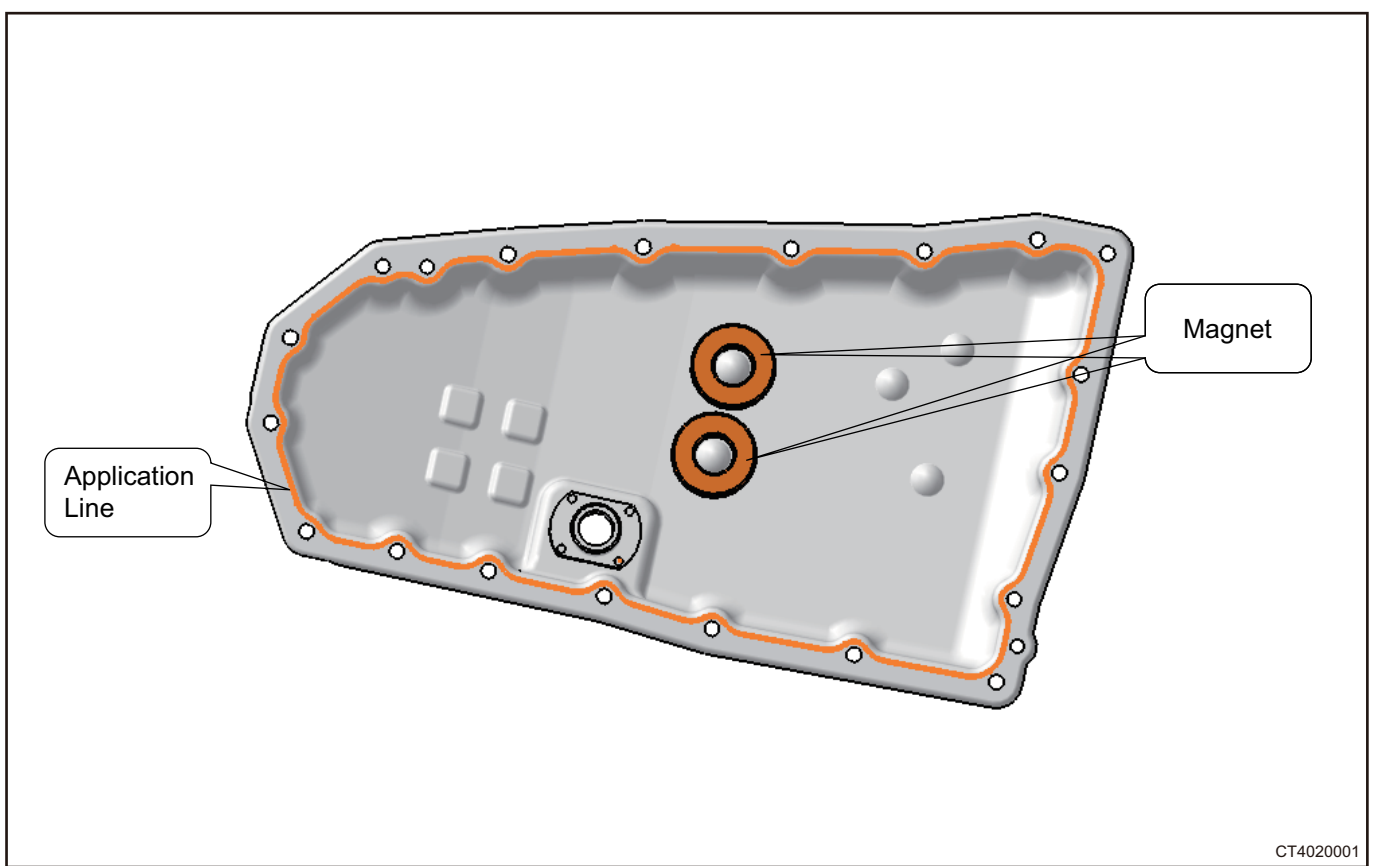
1	Valve Body Case	2	Hexagon Head Bolt and Conical Spring Washer Set M6 x 16
3	Magnet		

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.

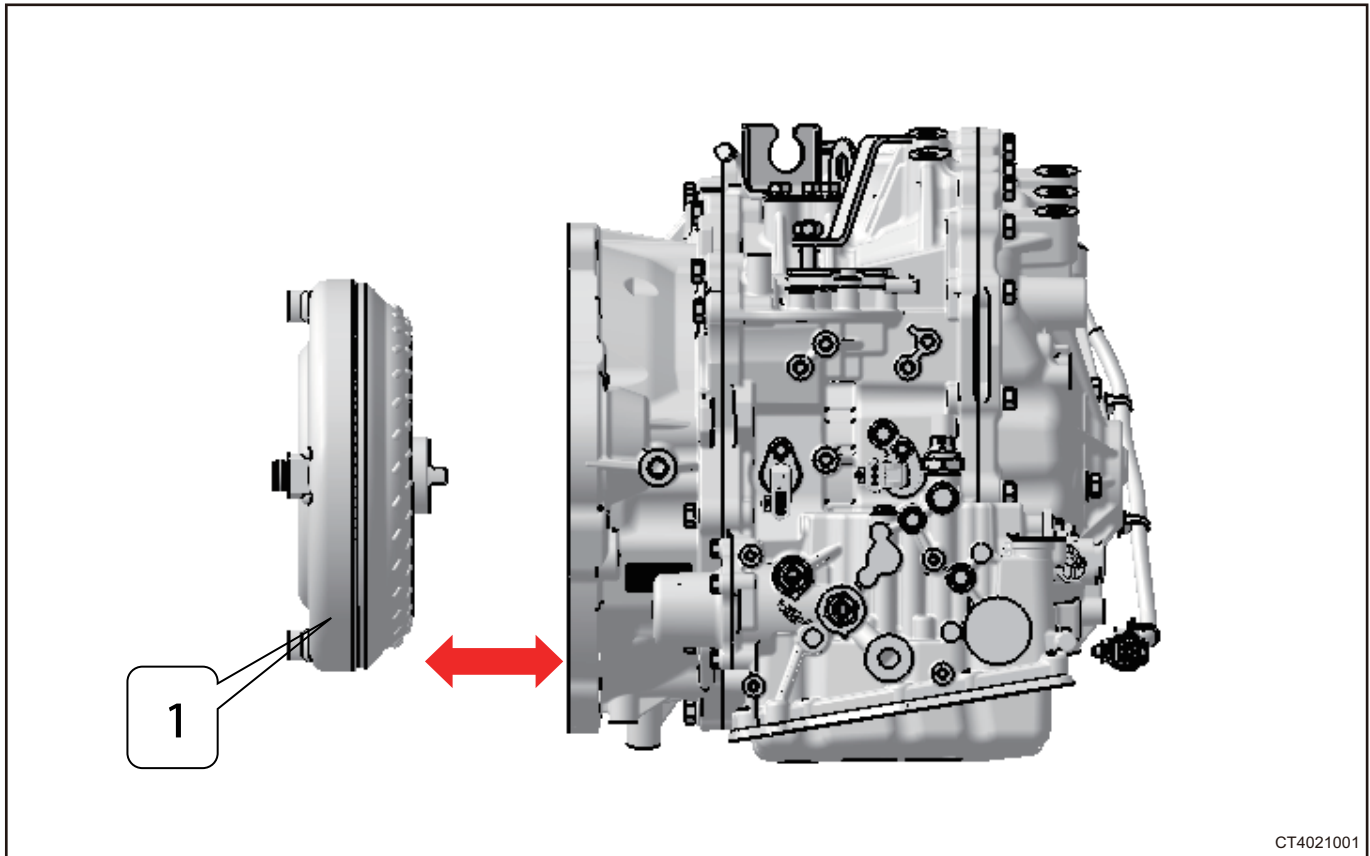


CT4020001

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



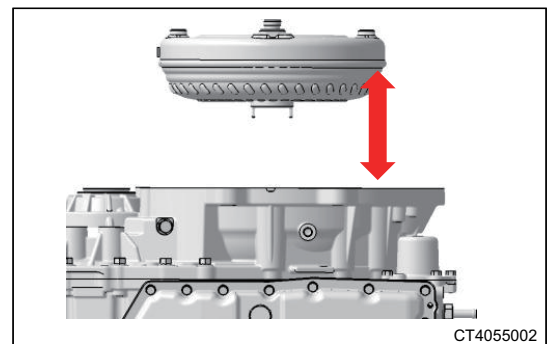
1	Hydraulic Torque Converter Assembly		
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Removal

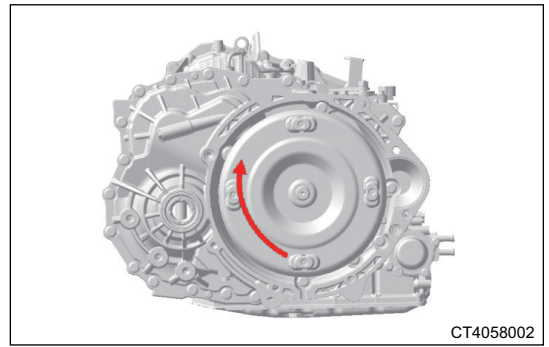
1. As guide, screw 2 M10 bolts into the diagonal threaded holes of hydraulic torque converter.
2. Pull hydraulic torque converter out smoothly from transmission.

Installation

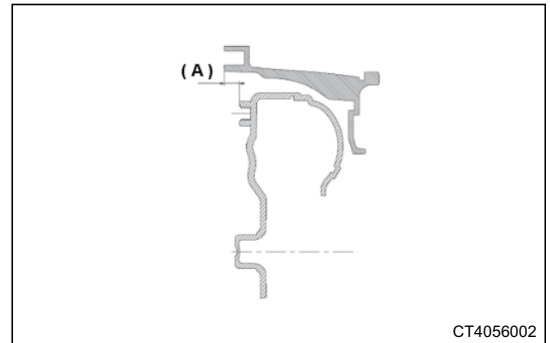
1. Apply proper amount of automatic transmission oil to hydraulic torque converter claws accessory.
2. Align hydraulic torque converter claws with drive sprocket grooves inside transmission, and install it into transmission smoothly.



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



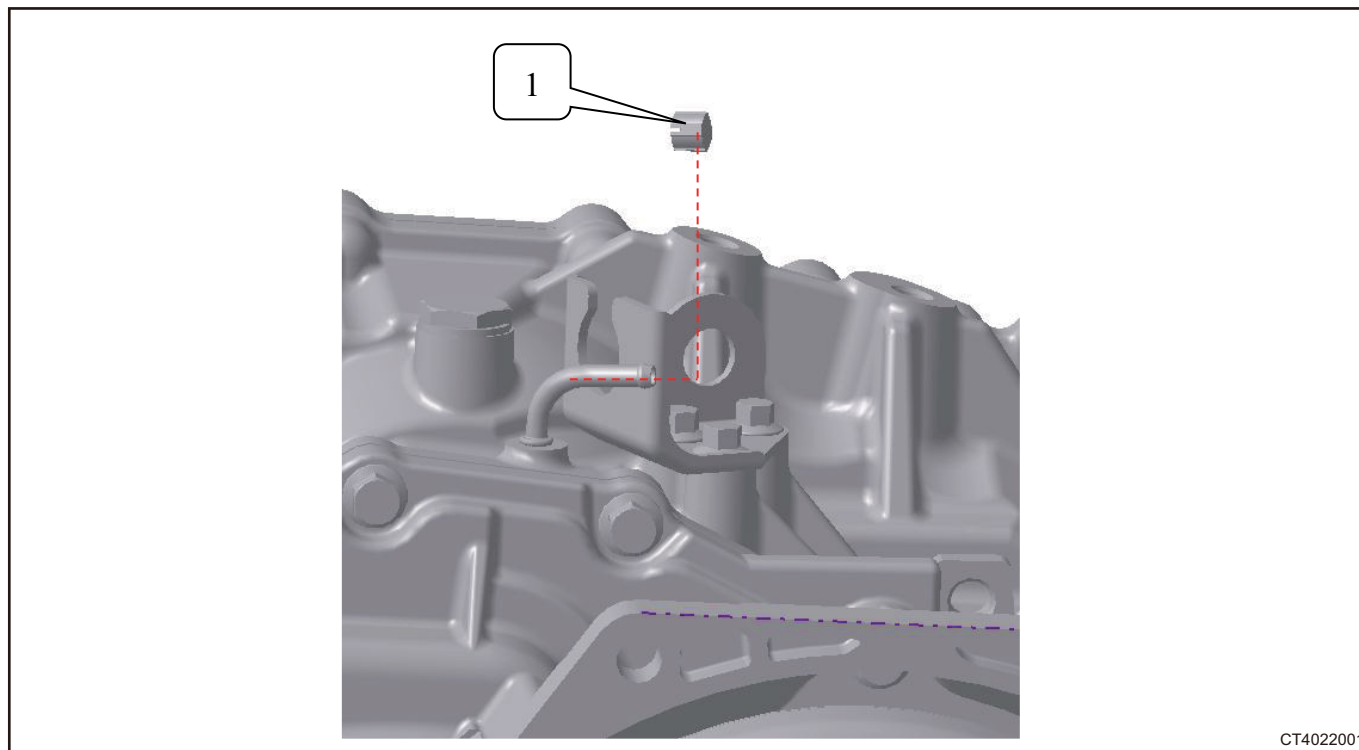
4. Check the installation dimension A of hydraulic torque converter. The dimension A is required to be larger than 10.7mm.



⚠ 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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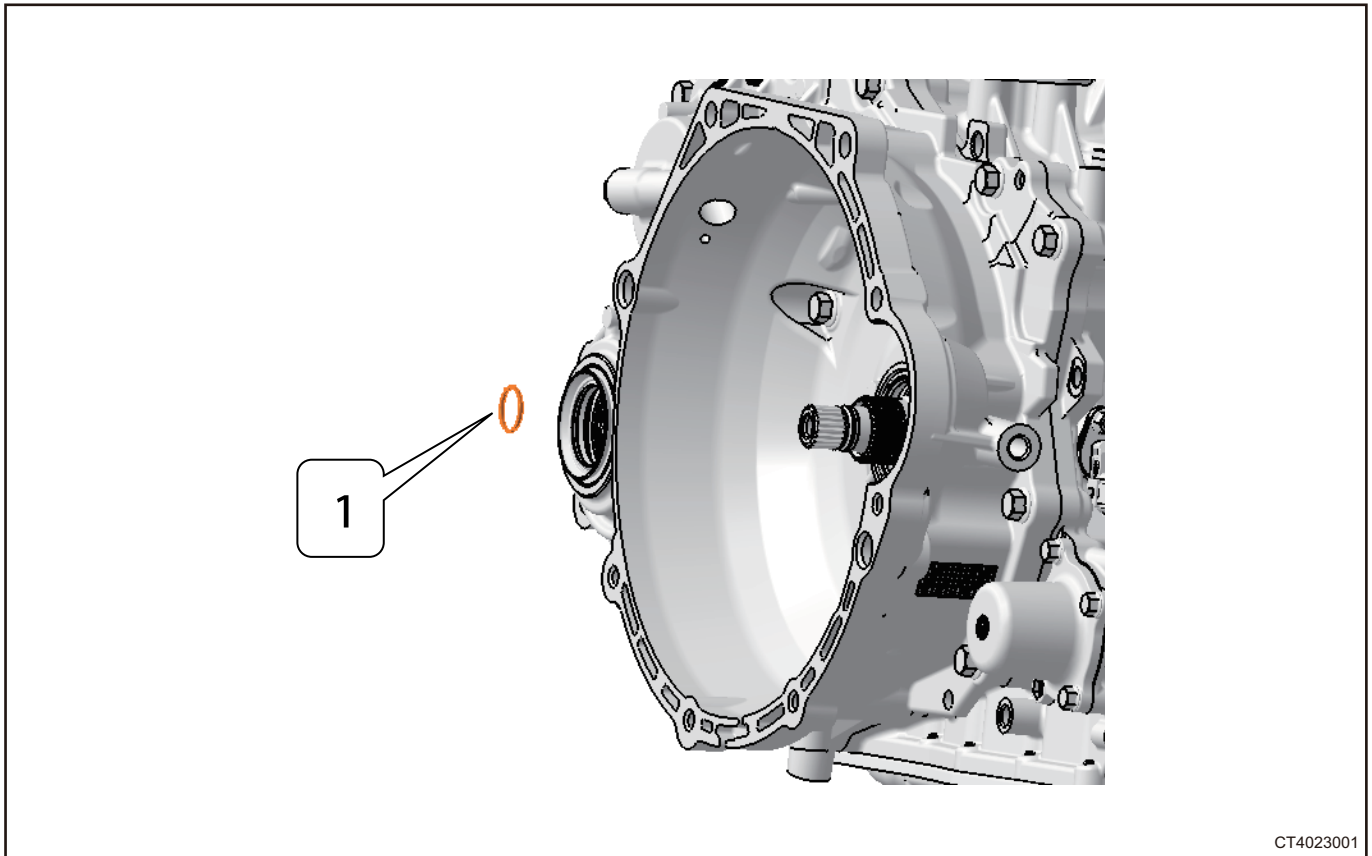
Removal

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



CT4023001

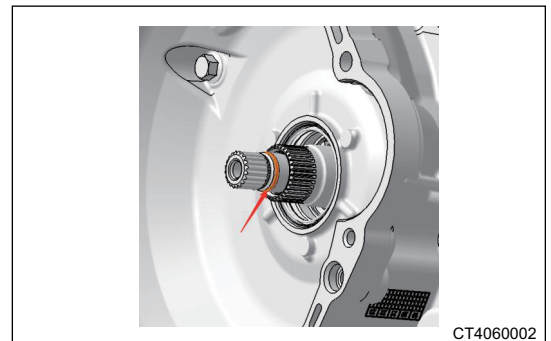
1	Input Shaft to Hydraulic Torque Converter O-ring		
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Removal

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.

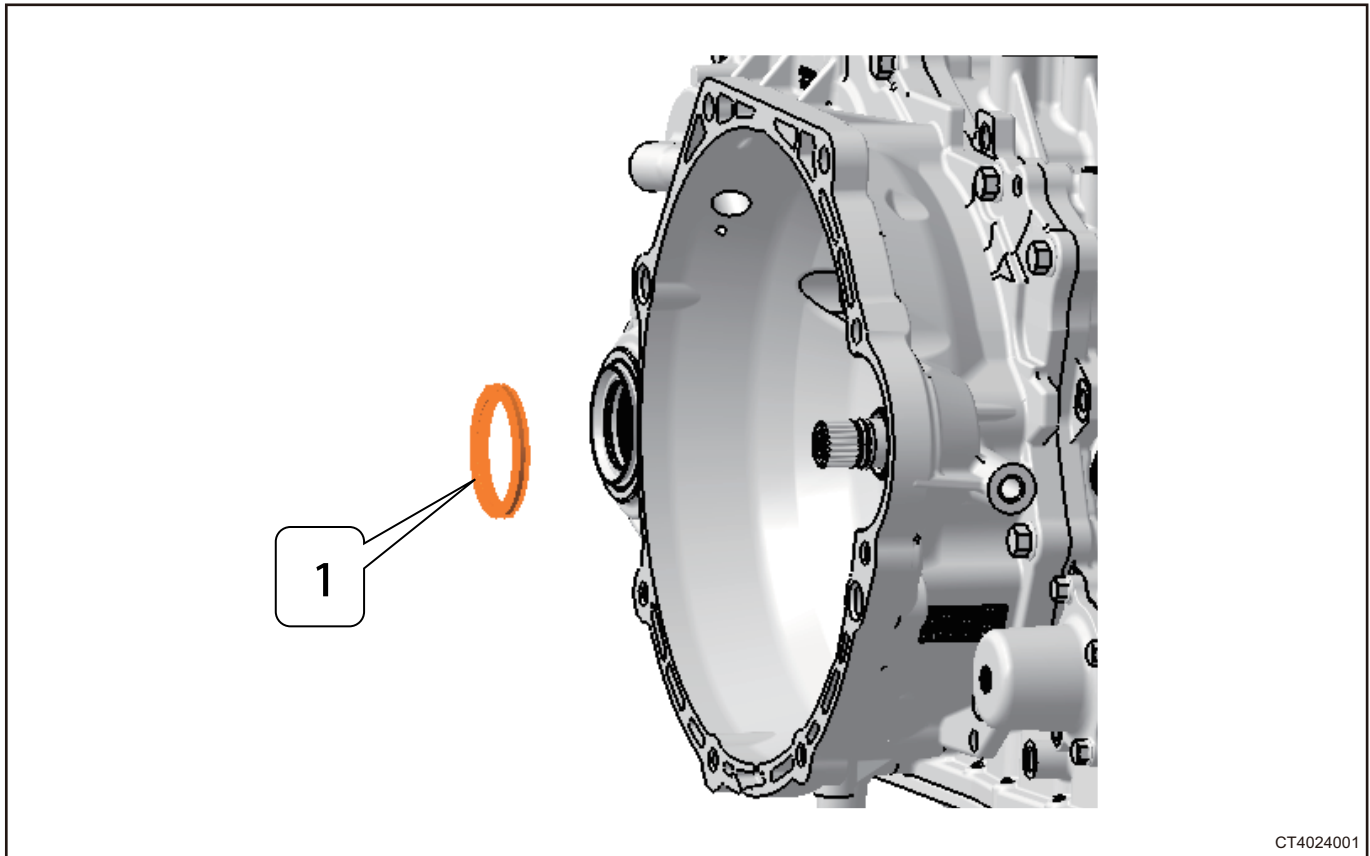
Installation

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.



CT4060002

Hydraulic Torque Converter Oil Seal Removal and Replacement



CT4024001

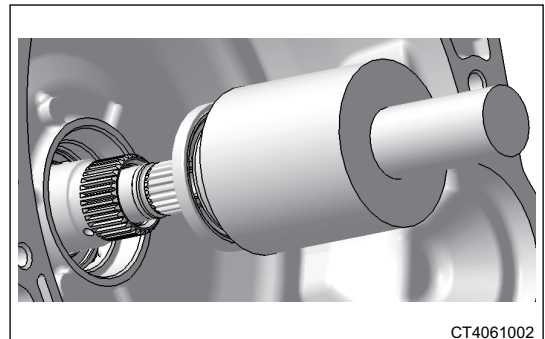
1	Hydraulic Torque Converter Oil Seal		
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Removal

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.

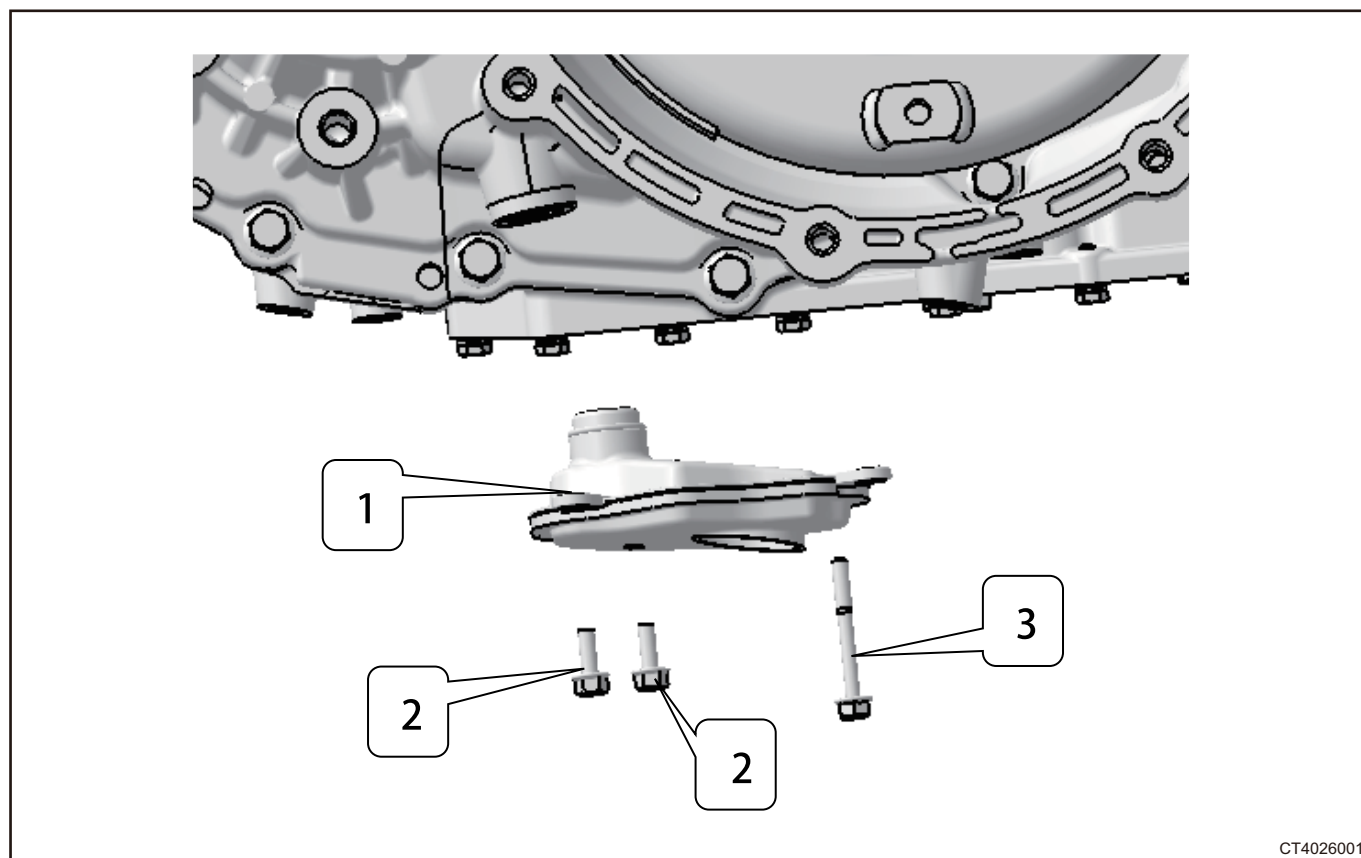


CT4061002

⚠ Caution

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

Oil Pump Filter Assembly Removal and Replacement



CT4026001

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.

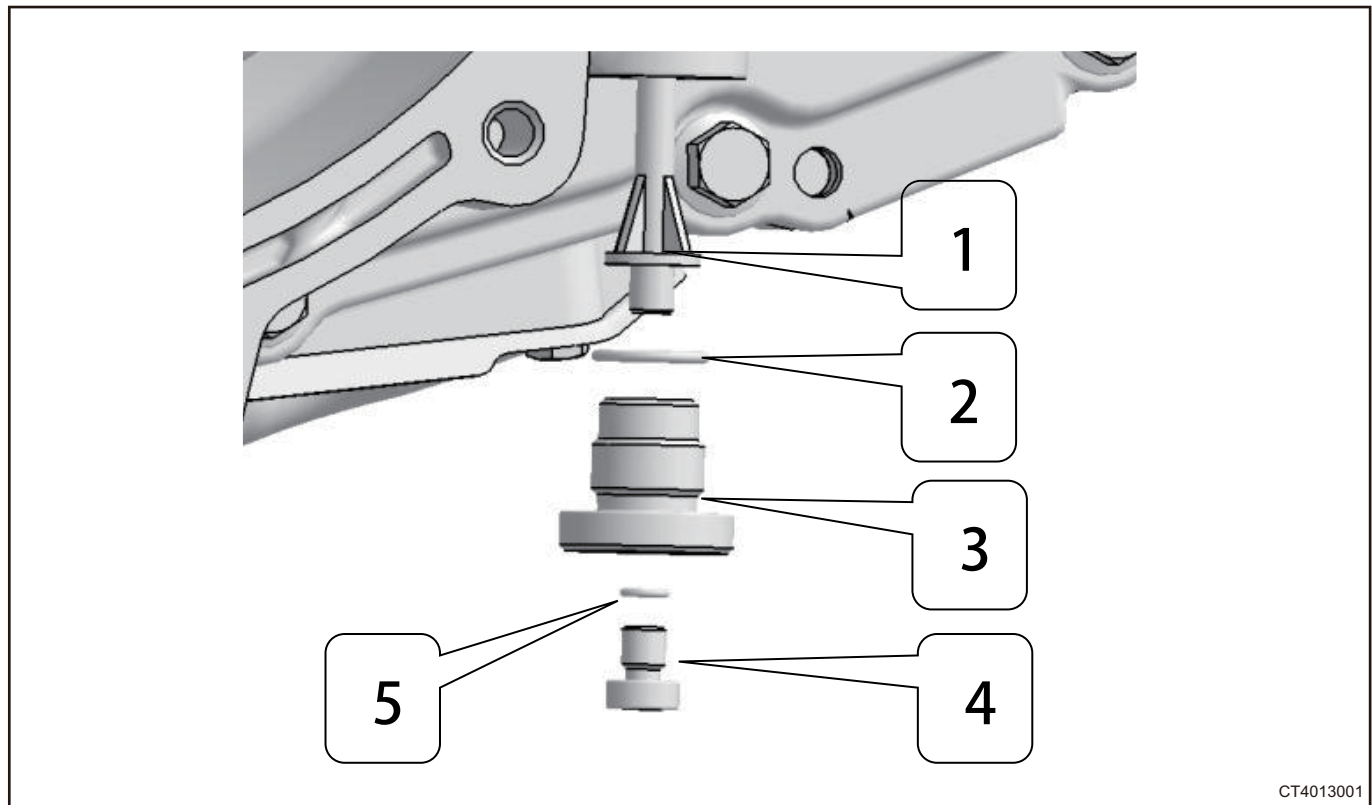
Installation

1. Apply a small amount of automatic transmission oil to the D-ring position of the 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.

Drain/Overflow Plug Assembly Removal and Replacement



CT4013001

1	Oil Drain Guide Pipe	2	O-ring
3	Drain Plug	4	Overflow Plug
5	O-ring		

Removal

1. Remove overflow plug assembly with 40# TORX inner hexagon.
2. Remove the drain plug assembly with 17# inner hexagon.

Installation

1. Install oil drain guide pipe to drain plug.
2. Apply a small amount of automatic transmission oil to the O-ring, and install it to drain plug.
3. Install drain plug assembly to torque converter case with 17# inner hexagon.

Tightening torque: 39 - 49 N·m

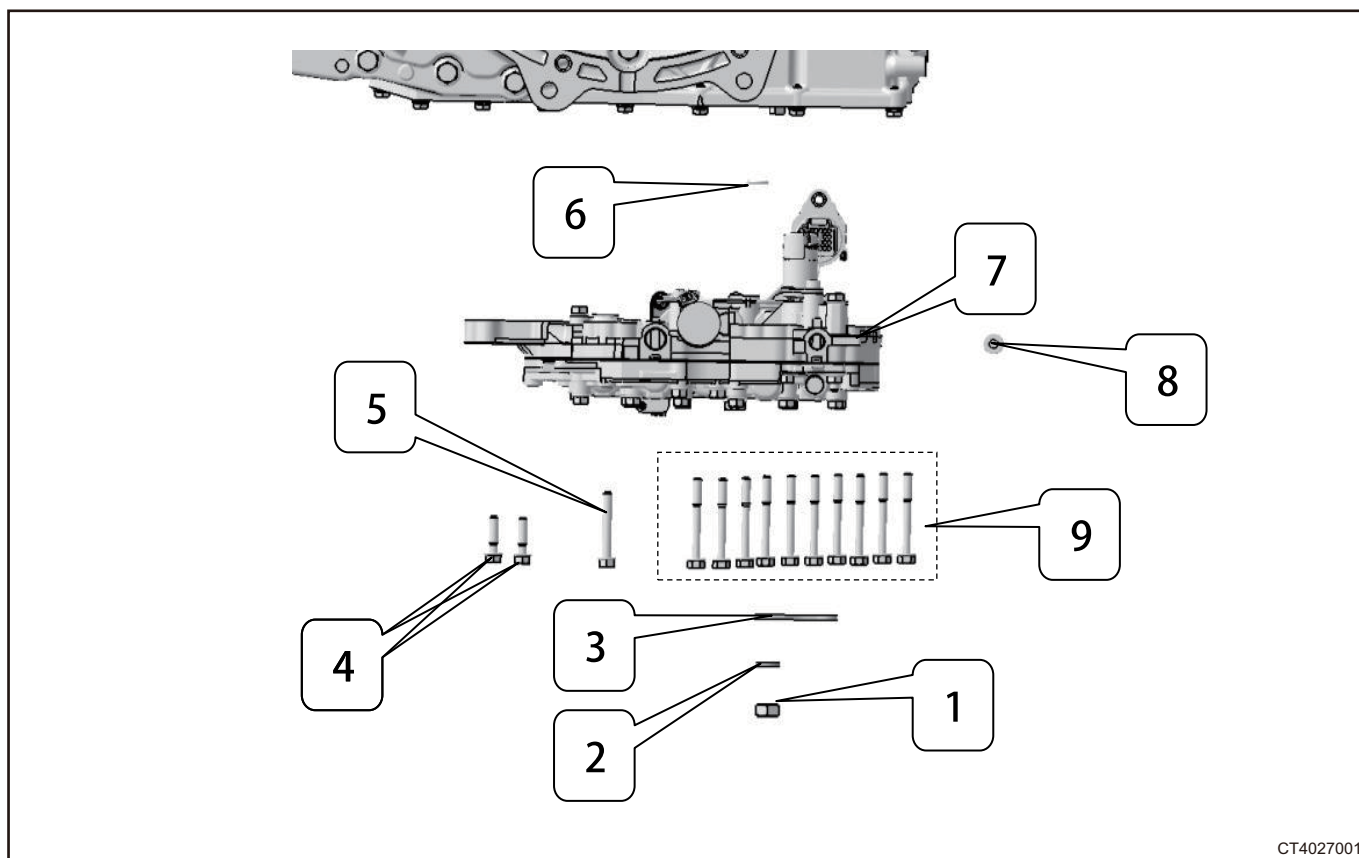
4. Apply a small amount of automatic transmission oil to the O-ring, and install it to overflow plug.
5. Install overflow plug assembly to drain plug with 40# TORX inner hexagon.

Tightening torque: 6 - 9 N·m

⚠ Caution

- Oil drain guide pipe, O-ring (6AF28A-1507072) and drain plug constitute drain plug assembly.
- Overflow plug and O-ring (6AF28A-1507082) constitute overflow plug assembly.
- Pay attention to the O-ring during removal and installation. If it is damaged, replace it with a new one.

Valve Body and Wire Harness Assembly Removal and Replacement



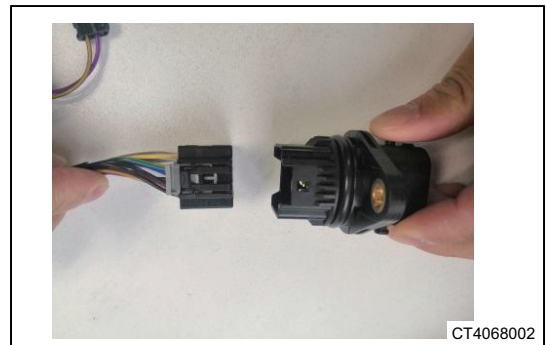
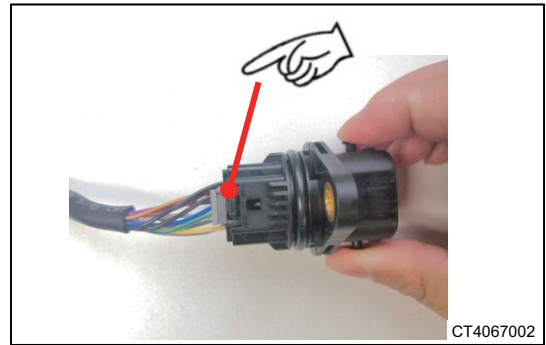
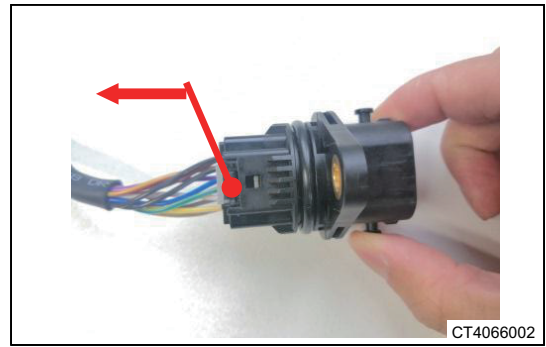
CT4027001

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		

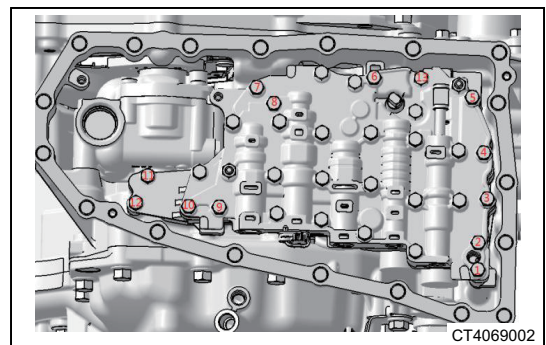
Removal

1. Remove the oil pump filter assembly.
2. Secure shift arm in N position with dowel pin (shift arm removal/installation tool).
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.



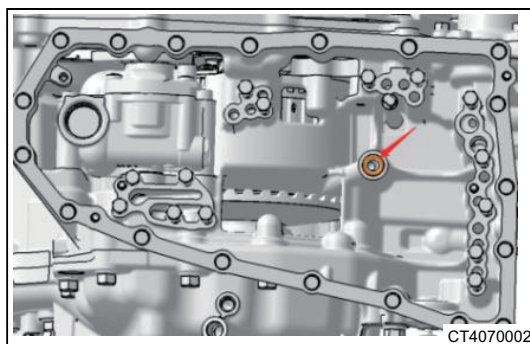
5. Remove the fixing bolts between valve body and transmission case with 10# socket, there are 13 bolts in total, the specific position is shown in the illustration.



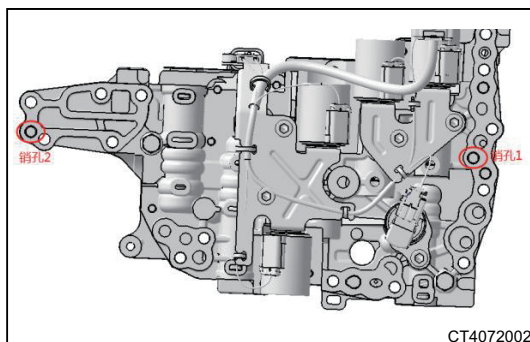
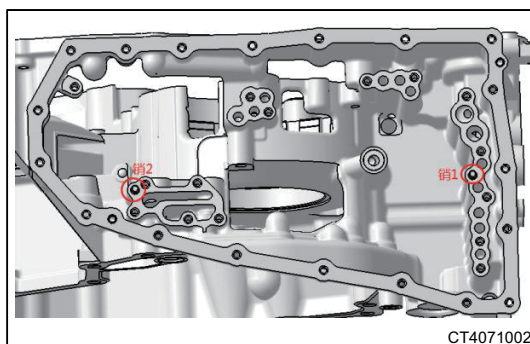
6. Remove the valve body and wire harness assembly, and valve body and transmission case O-ring.

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. Secure shift arm in N position with dowel pin (shift arm removal/installation tool).
6. Install manual shift valve drive arm, spring washer and nut.

Tightening torque: 18 - 25 N·m

7. 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

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.

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"> Wire harness fault Solenoid valve fault TCU internal fault 	<ul style="list-style-type: none"> Vehicle does not move even in gear Lack of power when accelerating Transmission warning light comes on
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"> Wire harness fault Solenoid valve fails TCU internal fault 	<ul style="list-style-type: none"> Vehicle does not move even in gear Lack of power when accelerating Transmission warning light comes on
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 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"> Solenoid valve wire harness fault Solenoid valve fails TCU internal fault 	<ul style="list-style-type: none"> Vehicle does not move even in gear Lack of power when accelerating
P097100	Secondary Solenoid Short to BAT	When TCU detects that the solenoid		

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
		valve is short to power supply, the fault is established		<ul style="list-style-type: none"> Transmission warning light comes on
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		
P272100	Clutch 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"> Solenoid valve wire harness fault Solenoid valve fails TCU internal fault 	<ul style="list-style-type: none"> Large shift shock Transmission malfunction light comes on
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		
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"> Solenoid valve wire harness fault Solenoid valve fails TCU internal fault 	<ul style="list-style-type: none"> Hydraulic torque converter clutch slips Transmission malfunction light comes on
P272700	TCC Solenoid Open Load	When TCU detects that the solenoid valve is open, the fault is established		

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
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		
P093000	Shiftlock Solenoid Short to GND	When the feedback current of the P gear lock solenoid valve is lower than or higher than the set of threshold, the fault is established	<ul style="list-style-type: none"> • Wire harness fault • Solenoid valve fails 	<ul style="list-style-type: none"> • Shift lever cannot be shifted out of P • Transmission malfunction light comes on
P093100	Shiftlock Solenoid Short to BAT			
P092800	Shiftlock Solenoid Open Load			
P092900	Shiftlock Solenoid Short to BAT or Open			
P171900	Without PEPS	The vehicle has been configured with PEPS module, but no effective EOL anti-theft matching information has been detected at present, the fault is established	<ul style="list-style-type: none"> • Non-original TCU • TCU did not complete EOL successfully 	<ul style="list-style-type: none"> • P gear cannot be unlocked • Transmission malfunction light comes on
P172000	Anti-theft verification fails	TCU and IMMO anti-theft check failed, the fault is established	<ul style="list-style-type: none"> • Non-original TCU • Invalid TCU anti-theft matching information • PEPS controller is abnormal • IMMO controller is abnormal 	<ul style="list-style-type: none"> • P gear cannot be unlocked • Transmission malfunction light comes on
P084300	Primary Pressure Sensor Short to BAT	When the transmission input pulley shaft oil pressure is lower than or higher than the set threshold, the fault is established	<ul style="list-style-type: none"> • Incorrect installation of input pulley pressure sensor • Poor contact or short in input pulley shaft pressure sensor line 	<ul style="list-style-type: none"> • Lack of power when accelerating • Transmission malfunction light comes on
P084200	Primary Pressure Sensor 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	<ul style="list-style-type: none"> • Incorrect installation of output pulley shaft pressure sensor 	<ul style="list-style-type: none"> • Lack of power when accelerating • Transmission malfunction light comes on
P084700	Secondary Pressure Sensor Short to GND			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
		threshold, the fault is established	<ul style="list-style-type: none"> Poor contact or short in output pulley shaft pressure sensor line 	
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"> Poor contact or short in pressure sensor line 	<ul style="list-style-type: none"> Lack of power when accelerating Transmission malfunction light comes on
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"> Poor contact or short in pressure sensor line 	<ul style="list-style-type: none"> Lack of power when accelerating Transmission malfunction light comes on
P079200	Primary Speed Sensor Fault	When the input speed is equal to 0 during driving, the fault is established	<ul style="list-style-type: none"> Incorrect installation of input pulley speed signal sensor Poor contact or short in input pulley shaft speed sensor line 	<ul style="list-style-type: none"> Clutch, hydraulic torque converter slip Lack of power when accelerating Transmission malfunction light comes on
P072100	Secondary Speed Sensor Fault	When the output speed is equal to 0 during driving, the fault is established	<ul style="list-style-type: none"> Incorrect installation of output pulley speed signal sensor Poor contact or short in output pulley shaft speed sensor line 	<ul style="list-style-type: none"> Lack of power when accelerating Transmission malfunction light comes on
P071600	Turbine speed sensor fault	When the turbine speed is equal to 0 during driving, the fault is established	<ul style="list-style-type: none"> Incorrect installation of turbine speed sensor Poor contact or short in turbine speed sensor wire harness 	<ul style="list-style-type: none"> Large shift shock Lack of power when accelerating Transmission malfunction light comes on
P094000	Oil Temperature Sensor Short to BAT/OL	When the CVT oil temperature sensor voltage exceeds the	<ul style="list-style-type: none"> Oil temperature sensor failure 	<ul style="list-style-type: none"> Lack of power when accelerating

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
P093900	Oil Temperature Sensor Short to GND	threshold, the fault is established	<ul style="list-style-type: none"> Wire harness fault 	<ul style="list-style-type: none"> Transmission warning light comes on
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"> Abnormality in electronic shift actuator Range switch is abnormal Abnormality in wire harness, connector or terminal TCU operates abnormally 	<ul style="list-style-type: none"> Vehicle cannot be started Large shift shock Transmission malfunction light and MIL light come on
P280300	Range Sensor SCB	When the range switch is short to power supply, the fault is established		
P280200	Range Sensor SCG/OL	When the range switch is short to ground, the fault is established		
P280500	Range Sensor Signal Check	When the check error occurs for range switch 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"> Transmission electrical appliances fail Transmission hydraulic system failure Abnormality in engine actual torque Abnormal wear of transmission components 	<ul style="list-style-type: none"> Vehicle does not move even in gear Lack of power when accelerating Transmission malfunction light comes on
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"> Pulley shaft pressure sensor signal fault Pulley shaft pressure control solenoid valve fault Hydraulic system fault 	<ul style="list-style-type: none"> Lack of power when accelerating Vehicle does not move even in gear Transmission malfunction light comes on
P279800	Secondary Pressure Control Issue			
P081E00	Clutch (Reverse) Slip	When the forward/reverse clutch input and output speed difference has a	<ul style="list-style-type: none"> Turbine speed sensor fault 	<ul style="list-style-type: none"> Lack of power when accelerating
P081100	Clutch (Drive) Slip			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
		large slip differential speed after engaging or locking, the fault is established	<ul style="list-style-type: none"> Clutch Control Solenoid Valve Fault Hydraulic system leakage Clutch lining damaged 	<ul style="list-style-type: none"> Vehicle does not move even in gear Shift shock Transmission malfunction light comes on
P089400	TCC Slip	When there is a large slip differential speed after the hydraulic torque converter locking clutch is engaged, the fault is established	<ul style="list-style-type: none"> Hydraulic torque converter locking control solenoid valve fault Wire harness fault Hydraulic control circuit fault Hydraulic torque converter fault 	<ul style="list-style-type: none"> Lack of power when accelerating Transmission malfunction light comes on
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"> CVT oil temperature sensor failure 	<ul style="list-style-type: none"> Lack of power when accelerating
P176700	Trans Oil Temperature Critical	When the oil temperature is higher than 135°C, the fault is established	<ul style="list-style-type: none"> Transmission cooling system failure 	<ul style="list-style-type: none"> Transmission malfunction light flashes
P086300	Solenoid Driver Communication Failure	TCU detects the corresponding abnormality, triggering the diagnosis	<ul style="list-style-type: none"> The vehicle abnormality causes TCU can not operate normally, such as the power supply is abnormal TCU hardware is abnormal 	<ul style="list-style-type: none"> TCU cannot operate normally Transmission fault light is on, MIL light will be on except P162F00 and P070200
P062F00	NVM Broken			
P162F00	NVM Save Failure			
P060400	RAM Fault			
P060500	ROM Fault			
P160C00	PLL Fault			
P060B00	AD Fault			
P060700	Time Slice Fault			
P060A00	Monitor Unit Fault			
P160B00	VDD Out of Range			
P061300	Safety Other Fault			
P060C00	Watchdog Failure			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
U014087	Lost Communication with BCM	TCU cannot obtain or receive the signal on CAN network	<ul style="list-style-type: none"> Relevant controller sensor failure Abnormal vehicle CAN network 	<ul style="list-style-type: none"> Lack of power when accelerating Abnormal shifting Brake and stall The vehicle is in Limp Home mode TCU operates abnormally
U010087	Lost Communication with ECM			
U012987	Lost communication with BSM			
U012687	Lost Communication with SAM			
U042281	BCM Signal Invalid			
U040181	EMS Signal Invalid			
U041881	BSM Signal Invalid			
U042881	SAM Signal Invalid			
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			

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
P095600	Manual Mode Fault	When three (M, M+, M-), two (M+, M-) signals exist in manual mode, or M/M+/M- is detected when it is not in D gear, the fault is established	<ul style="list-style-type: none"> Abnormality in wire harness, connector or terminal Abnormality in manual mode switch TCU operates abnormally 	<ul style="list-style-type: none"> Manual mode cannot respond Transmission malfunction light comes on
U007388	CAN Bus Off	CAN network fails, and TCU cannot communicate with other controllers	<ul style="list-style-type: none"> Short in CAN bus CAN modules of other nodes in the vehicle CAN network are abnormal 	<ul style="list-style-type: none"> TCU cannot operate normally Transmission malfunction light comes on
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"> Poor wire harness contact Sensor hardware fault 	<ul style="list-style-type: none"> Transmission malfunction light comes on
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"> Poor wire harness contact Sensor hardware fault 	<ul style="list-style-type: none"> Transmission malfunction light comes on
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"> Poor wire harness contact Sensor hardware fault 	<ul style="list-style-type: none"> Transmission malfunction light comes on
P084500	Unreasonable Secondary Pressure Signal			
U300617	High Supply Voltage	During the operating process of TCU, when TCU power supply voltage is	<ul style="list-style-type: none"> Low battery voltage 	<ul style="list-style-type: none"> TCU resets

DTC	DTC Definition	Fault Detection Condition	Possible Cause	Possible Impact of Fault
		greater than 16 V, TCU system is over voltage	<ul style="list-style-type: none"> Wire harness is malfunctioning 	<ul style="list-style-type: none"> Solenoid valve operates abnormally Sensor operates abnormally CAN bus is abnormal
U300616	Low Supply Voltage	During the operating process of TCU, when TCU power supply voltage is lower than 9 V, TCU system is under voltage		
P070200	Safety Cut Off Test Failure	TCU detects the corresponding abnormality, triggering the diagnosis	<ul style="list-style-type: none"> The vehicle abnormality causes TCU can not operate normally, such as the power supply is abnormal TCU hardware is abnormal 	<ul style="list-style-type: none"> TCU cannot operate normally Transmission malfunction light comes on

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 ≥ 40 kph;
 - > Slow down until the vehicle stops running and power off;
 - > Start again, vehicle is normally driven, and the vehicle speed is required to be ≥ 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 automatically.

DTC Diagnosis Procedure

Power Supply Fault

DTC	U300617	High Supply Voltage
DTC	U300616	Low Supply Voltage

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; 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

3 Check wire harness

- (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 Switch Fault

DTC	P070600	Range Switch Signal Out of Range
DTC	P280300	Range Sensor SCB
DTC	P280200	Range Sensor SCG/OL
DTC	P280500	Range Sensor Signal Check

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.

1 Check wire harness connector

- (a) Turn ignition switch to OFF, disconnect the range sensor connector and TCU connector, and 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 if shift is adjusted to a proper position

- (a) Check if shift is adjusted to a proper position.

NG

Readjust the shift; perform DTC clearing operation

OK

3 Check voltage of each pin

- (a) Connect the TCU, disconnect range sensor and wire harness terminal connector from engine compartment, vehicle is powered on, and use a multimeter to measure the voltage of range sensor signal pin to ground:

- 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

OK

4 Check wire harness

(a) Unplug the TCU and check for continuity between range sensor connector and TCU wire harness connector - check the range switch connector terminal GND and TCU connector terminal PIN37, they should be conductive:

- 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.

OK

Go to step 5, exchange verification

NG

5 Exchange verification

(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.

OK

Replace sensor or TCU; perform DTC clearing operation;

NG

Contact relevant transmission technical personnel for inspection**TCU Hardware Fault**

DTC	P086300	Solenoid Driver Communication Failure
DTC	P062F00	NVM Broken
DTC	P162F00	NVM Save Failure
DTC	P060400	RAM Fault
DTC	P060500	ROM Fault
DTC	P160C00	PLL Fault
DTC	P060B00	AD Fault
DTC	P060700	Time Slice Fault
DTC	P060A00	Monitor Unit Fault
DTC	P160B00	VDD Out of Range

DTC	P061300	Safety Other Fault
DTC	P070200	Safety Cut Off Test Failure
DTC	P060C00	Watchdog Failure

Description

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

⚠ Caution

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

1**Power off and restart**

(a) Power off, and wait for a few minutes before power on; read if the fault is still the current fault.

OK

Replace TCU

NG

Contact relevant transmission technical personnel for inspection**TCU CAN Bus Off**

DTC	U007388	CAN Bus Off
------------	----------------	--------------------

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.

PEPS Fault

DTC	P171900	TCU Without Correct EOL
------------	----------------	--------------------------------

Description

TCU checks according to the vehicle off-line EOL information and if the current vehicle is equipped with PEPS module.

Hint:

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

1**Check TCU**

(a) Check if it is the original TCU, for example: check if the VIN of the vehicle is consistent with the VIN stored inside the TCU.

Inconsi-
stent

Determine the source of TCU, check the model by reading the TCU software version, and make anti-theft matching again

Consiste-
nt

2 Check TCU EOL information

(a) Refer to vehicle Repair Manual for fault inspection, such as reading the EOL matching status.

Immobilizer Fault

DTC	P172000	Anti-theft verification fails
------------	----------------	--------------------------------------

Description

TCU and IMMO verify anti-theft algorithm, control P gear unlock.

Hint:

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

1 Check TCU

(a) Check if it is the original TCU, for example: check if the VIN of the vehicle is consistent with the VIN stored inside the TCU.

Inconsi-
stent

Determine the source of TCU, check the model by reading the TCU software version, and make anti-theft matching again

Consiste-
nt

2 Check TCU anti-theft matching information

(a) Refer to vehicle Repair Manual for fault inspection.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

3 Check PEPS controller module

(a) Check if PEPS module is on-line.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

4	Check IMMO controller module
----------	-------------------------------------

(a) Refer to vehicle Repair Manual for fault inspection.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

Contact relevant transmission technical personnel for inspection

Manual Mode Fault

DTC	P095600	Manual Mode Fault
-----	---------	-------------------

Description

The transmission manual mode signal is processed by TCU circuit, and the low level signal is valid. It 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.

1	Check connector
----------	------------------------

(a) Turn ignition switch to OFF.

(b) Disconnect TCU 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) Use a multimeter to check for continuity of TCU wire harness terminal connector at different gears.

(b) Use a multimeter to check for continuity of TCU wire harness terminal connector at different gears and M mode:

- Shift the shift lever to P, R, N and L, and check terminals 23, 46 and 47, there should be no continuity between them and body ground;
- Shift the shift lever to M, and check terminals 20 and 23, there should be continuity between them and body ground, and no continuity between others and body ground;
- Shift the shift lever to M+, and check terminals 20, 23 and 47, there should be continuity between them and body ground, and no continuity between others and body ground;
- Shift the shift lever to M-, and check terminals 20, 23 and 46, there should be continuity between them and body ground, and no continuity between others and body ground.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

3	Check manual mode switch
----------	---------------------------------

(a) Refer to vehicle Repair Manual for fault inspection.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

Contact relevant transmission technical personnel for inspection

Turbine Speed Sensor Fault

DTC	P071600	Turbine Speed Sensor Fault
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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
----------	------------------------

(a) Turn ignition switch to OFF.

(b) Disconnect the turbine speed sensor connector 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

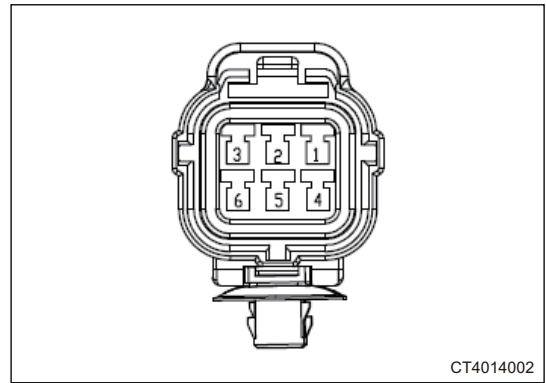
2	Check wire harness
----------	---------------------------

(a) Turn ignition switch to OFF, pull out TCU connector and turbine speed sensor connector.

(b) 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;
- Check TCU terminal 38 and turbine speed sensor wire harness terminal connector signal terminal, they should be conductive;
- Check TCU terminal 22 and turbine speed sensor wire harness terminal connector power supply terminal, they should be conductive.

(c) Turbine speed sensor PINs are defined in the following figure.



Name	Sensor Connector	Sensor Adapter Connector (Female)	Vehicle Adapter Connector (Male)	TCU Connector Terminal	Continuity Condition
Input/Output Pulley Shaft Pressure Sensor Ground	GND	1	3	37	Continuity
Output Pulley Shaft Pressure Sensor Signal	Vout	2	2	15	Continuity
Output Pulley Shaft Pressure Sensor Power Supply	VB	3	1	26	Continuity
Turbine/Output Pulley Shaft Speed Sensor Power Supply	VB	4	6	22	Continuity
Output Pulley Shaft Speed Sensor Signal	Vout	5	5	39	Continuity
Turbine/Output Pulley Shaft Speed Sensor Ground	GND	6	4	9	Continuity

⚠ Caution

- The definition of the transmission terminal adapter connector is the opposite of the definition of the vehicle wire harness terminal connector.

(d) Use a multimeter to measure the continuity of the different PINs in the power supply and ground sections of the turbo speed sensor in the table above.

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

OK → **Contact relevant transmission technical personnel for inspection**

Input Pulley Speed Sensor Fault

DTC	P079200	Primary Speed Sensor Fault
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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, and perform DTC clearing operation

OK

2 Check wire harness

- (a) Turn ignition switch to OFF, pull out TCU connector and input shaft speed sensor wire harness terminal 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;
 - Check TCU connector terminal 10 and input pulley speed sensor signal terminal, they should be conductive;
 - Check TCU connector terminal 21 and input pulley speed sensor power supply terminal, they should be conductive;

NG

Repair or replace as needed, and perform DTC clearing operation

OK

Contact relevant transmission technical personnel for inspection

Output Pulley Speed Sensor Fault

DTC	P072100	Secondary Speed Sensor Fault
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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.

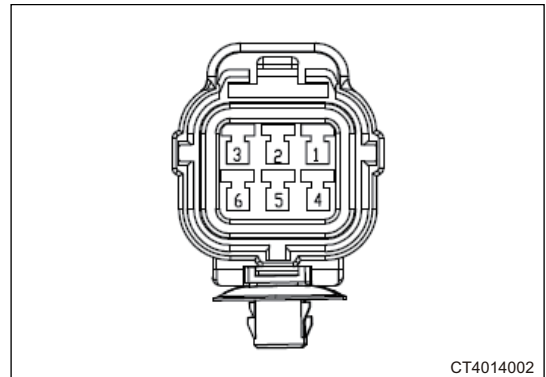
NG

Repair or replace as needed; Perform DTC clearing operation

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;
 - Check TCU connector terminal 39 and output pulley speed sensor signal terminal, they should be conductive;
 - Check TCU connector terminal 22 and output pulley speed sensor power supply terminal, they should be conductive;
- (c) Output shaft speed sensor PINs are defined in the following figure.



CT4014002

Name	Sensor Connector	Sensor Adapter Connector (Female)	Vehicle Adapter Connector (Male)	TCU Connector Terminal	Continuity Condition
Input/Output Pulley Shaft Pressure Sensor Ground	GND	1	3	37	Continuity
Output Pulley Shaft Pressure Sensor Signal	Vout	2	2	15	Continuity
Output Pulley Shaft Pressure Sensor Power Supply	VB	3	1	26	Continuity

Name	Sensor Connector	Sensor Adapter Connector (Female)	Vehicle Adapter Connector (Male)	TCU Connector Terminal	Continuity Condition
Turbine/Output Pulley Shaft Speed Sensor Power Supply	VB	4	6	22	Continuity
Output Pulley Shaft Speed Sensor Signal	Vout	5	5	39	Continuity
Turbine/Output Pulley Shaft Speed Sensor Ground	GND	6	4	9	Continuity

⚠ Caution

- The definition of the transmission terminal adapter connector is the opposite of the definition of the vehicle wire harness terminal connector.

(d) Use a multimeter to measure the continuity of the different PINs in the power supply, signal and ground sections of the output shaft speed sensor in the table above.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

Contact relevant transmission technical personnel for inspection

Input Pulley Oil Pressure Sensor Signal Abnormal

DTC	P084300	Primary Pressure Sensor Short to BAT
DTC	P084200	Primary Pressure Sensor Short to GND

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 installation position of sensor

(a) Check if installation position of sensor is correct.

NG

Reinstall it in the correct position

OK

2

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.

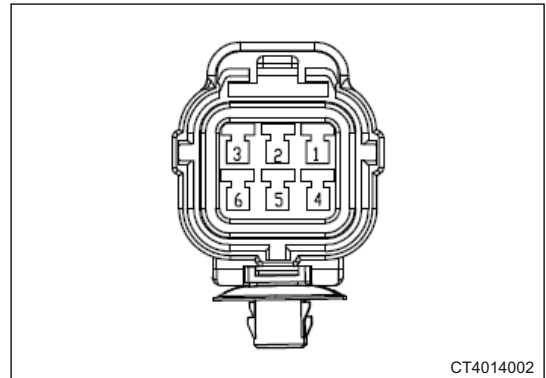
NG

Repair or replace as needed; Perform DTC clearing operation

OK

3 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;
 - 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;
- (c) Input pressure sensor PINs are defined in the following figure.



CT4014002

Name	Sensor Connector	Sensor Adapter Connector (Female)	Vehicle Adapter Connector (Male)	TCU Connector Terminal	Continuity Condition
Input/Output Pulley Shaft Pressure Sensor Ground	GND	1	3	37	Continuity
Output Pulley Shaft Pressure Sensor Signal	Vout	2	2	15	Continuity
Output Pulley Shaft Pressure Sensor Power Supply	VB	3	1	26	Continuity
Turbine/Output Pulley Shaft Speed Sensor Power Supply	VB	4	6	22	Continuity
Output Pulley Shaft Speed Sensor Signal	Vout	5	5	39	Continuity
Turbine/Output Pulley Shaft Speed Sensor Ground	GND	6	4	9	Continuity

⚠ Caution

- The definition of the transmission terminal adapter connector is the opposite of the definition of the vehicle wire harness terminal connector.

- (d) Use a multimeter to measure the continuity of the different PINs in the ground sections of the input pulley shaft pressure sensor in the table above.

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

OK **Contact relevant transmission technical personnel for inspection**

Input Pressure Sensor Power Supply Fault

DTC	P171000	Primary Pressure Sensor Supply Abnormal
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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.

Refer to P084300 and P084200 for troubleshooting. If the fault is cleared, perform DTC clearing operation.

Output Pulley Oil Pressure Sensor Signal Abnormal

DTC	P084800	Secondary Pressure Sensor Short to BAT
DTC	P084700	Secondary Pressure Sensor Short to GND

Description

TCU detects the transmission output pulley shaft pressure through output 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 installation position of sensor

- (a) Check if installation position of sensor is correct.

NG **Reinstall it in the correct position**

OK

2 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.

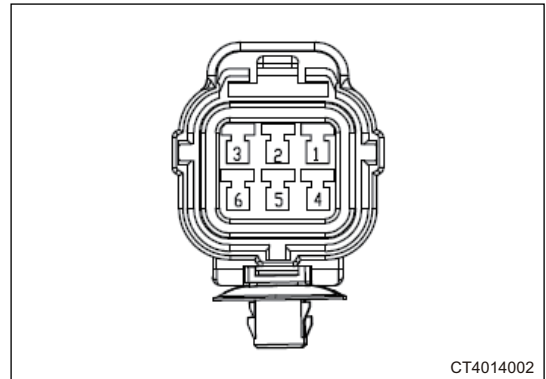
NG **Repair or replace as needed, perform DTC clearing operation**

3 Check wire harness

(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 of different pins:

- Use a multimeter to check TCU terminal 37 and output shaft pressure sensor ground terminal, they should be conductive;
- Use a multimeter to check TCU terminal 15 and output shaft pressure sensor signal terminal, they should be conductive;
- Use a multimeter to check TCU terminal 26 and output shaft pressure sensor power supply terminal, they should be conductive;

(b) Output pressure sensor PINs are defined in the following figure.



CT4014002

Name	Sensor Connector	Sensor Adapter Connector (Female)	Vehicle Adapter Connector (Male)	TCU Connector Terminal	Continuity Condition
Input/Output Pulley Shaft Pressure Sensor Ground	GND	1	3	37	Continuity
Output Pulley Shaft Pressure Sensor Signal	Vout	2	2	15	Continuity
Output Pulley Shaft Pressure Sensor Power Supply	VB	3	1	26	Continuity
Turbine/Output Pulley Shaft Speed Sensor Power Supply	VB	4	6	22	Continuity
Output Pulley Shaft Speed Sensor Signal	Vout	5	5	39	Continuity
Turbine/Output Pulley Shaft Speed Sensor Ground	GND	6	4	9	Continuity

⚠ Caution

- The definition of the transmission terminal adapter connector is the opposite of the definition of the vehicle wire harness terminal connector.

(c) Use a multimeter to measure the continuity of the different PINs in the ground, signal and power supply sections of the output pulley shaft pressure sensor in the table above.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

Contact relevant transmission technical personnel for inspection

Output Pulley Pressure Sensor Power Supply Fault

DTC	P171100	Secondary Pressure Sensor Supply Abnormal
------------	----------------	--

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.

Refer to P084800 and P084700 for troubleshooting. If the fault is cleared, perform DTC clearing operation.

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

- 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.
- 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 solenoid valve connector from transmission, and use a multimeter to measure the continuity of different PINs:
- Check the transmission solenoid valve connector PIN13 and TCU connector terminal PIN32, they should be conductive;
 - Check the transmission solenoid valve connector PIN14 and TCU connector terminal PIN29, they should be conductive.

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 Pin32 and Pin29, the resistance should be: $5.3 \pm 0.3 \Omega$.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

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

- (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 solenoid valve connector from transmission, and use a multimeter to measure the continuity of different PINs:

- Check the transmission solenoid valve connector PIN9 and TCU connector terminal PIN34, they should be conductive;
- Check the transmission solenoid valve connector PIN10 and TCU connector terminal PIN2, they should be conductive.

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 resistance should be: $5.3 \pm 0.3 \Omega$.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

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 solenoid valve connector from transmission, and use a multimeter to measure the continuity of different PINs:
- Check the transmission solenoid valve connector PIN17 and TCU connector terminal PIN6, they should be conductive;
 - Check the transmission solenoid valve connector PIN18 and TCU connector terminal PIN30, they should be conductive.

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 resistance should be: $5.3 \pm 0.3 \Omega$.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

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
DTC	P272700	TCC Solenoid Open Load
DTC	P272800	TCC 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; Perform DTC clearing operation

OK

2 Check wire harness

- (a) Pull out the solenoid valve connector from transmission, and use a multimeter to measure the continuity of different PINs:
- Check the transmission solenoid valve connector PIN11 and TCU connector terminal PIN4, they should be conductive;
 - Check the transmission solenoid valve connector PIN12 and TCU connector terminal PIN1, they should be conductive.

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 resistance should be: $5.3 + 0.2/- 0.4 \Omega$.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

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; 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 PIN15 and TCU connector terminal PIN3, they should be conductive;
 - Check the transmission solenoid valve connector PIN16 and TCU connector terminal PIN1, they should be conductive.

NG

Repair or replace as needed; Perform DTC clearing operation

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 Pin 1, the resistance should be: $5.3 \pm 0.3 \Omega$.

OK

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

OK

Contact relevant transmission technical personnel for inspection

Shift Lock Control Solenoid Valve Fault

DTC	P093000	Shiftlock Solenoid Short to GND
DTC	P093100	Shiftlock Solenoid Short to BAT
DTC	P092800	Shiftlock Solenoid Short To Load
DTC	P092900	Shiftlock Solenoid Short To BAT Or Open

Description

Shift lock control solenoid valve is used for P gear lock function. When the vehicle is powered on, the driver can unlock and shift out of P gear by pressing the brake pedal.

⚠ 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 solenoid valve connector from transmission, and use a multimeter to measure the continuity of different PINs:
- Check shift lock wire harness connector positive and TCU connector terminal PIN31, they should be conductive;
 - Check shift lock wire harness connector negative and TCU connector terminal PIN29, they should be conductive.

NG

Repair or replace as needed; Perform DTC clearing operation

OK

3 Check Shift Lock solenoid valve

- (a) Connect shift mechanism solenoid valve connector.
- (b) Use a multimeter to measure the resistance between TCU connector PIN31 and PIN29, the resistance range: 10 Ω - 32 Ω.



Repair or replace as needed; Perform DTC clearing operation



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

- 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.

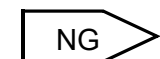


Repair or replace as needed; Perform DTC clearing operation

OK

2 Check wire harness

- Pull out the transmission solenoid valve connector and TCU connector, and use a multimeter to measure the continuity of different PINs:
 - Check the solenoid valve connector PIN7 and TCU connector terminal PIN13, they should be conductive;
 - Check the solenoid valve connector PIN8 and TCU connector terminal PIN12, they should be conductive.



Repair or replace as needed; Perform DTC clearing operation

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

Repair or replace as needed; Perform DTC clearing operation

OK

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; Perform DTC clearing operation

OK

2

Check transmission cooling system

- (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.



Forward/Reverse Clutch Fault

DTC	P081E00	Clutch (Reverse) Slip
DTC	P081100	Clutch (Drive) Slip

Description

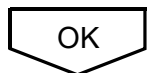
The clutch control is used to achieve quick, smooth engagement of D/R gear.

Caution

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

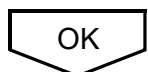
1	Check turbine speed sensor
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- (a) Refer to inspection method for turbine speed sensor.



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



3	Check hydraulic system
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- (a) Contact relevant transmission technical personnel for clutch pressure inspection.



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 DTC.

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

DTC	P071500	Unreasonable Turbine Speed Signal
DTC	P079100	Unreasonable Primary Speed Signal
DTC	P072000	Unreasonable Secondary Speed Signal

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

- Refer to P071600 wire harness troubleshooting method for P071500.
- Refer to P079200 wire harness troubleshooting method for P079100.
- Refer to P072100 wire harness troubleshooting method for P072000.



Repair or replace as needed; Perform DTC clearing operation

OK

2 Check sensor

- 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

DTC	P093700	Unreasonable Oil Temperature Signal
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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; Perform DTC clearing operation

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; Perform DTC clearing operation

OK

Contact relevant transmission technical personnel for inspection

Pressure Control Abnormal Fault

DTC	P279700	Primary Pressure Control Issue
DTC	P279800	Secondary Pressure Control Issue

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

DTC	P084000	Unreasonable Primary Pressure Signal
DTC	P084500	Unreasonable Secondary Pressure Signal

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.

1	Check wire harness
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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; Perform DTC clearing operation

OK

2	Verify pressure sensor
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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

Repair or replace as needed; Perform DTC clearing operation

NG

Contact relevant transmission technical personnel for inspection

Ratio Error Fault

DTC	P073000	Ratio Error
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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.

1	Check transmission electrical appliances
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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

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.