TROUBLE CODE DIAGNOSIS

TCU DIAGNOSTIC SYSTEM OVERVIEW

NOTICE

- **To prevent Transmission Control Module (TCM) damage. The ignition key must be OFF when disconnection or reconnection the power to the TCM (for example bttery cable, TCM pigtail connector, TCM fuse, jumper cables, etc.).**

When the TCU detects a system fault, a Diagnostic Trouble Code (DTC) is set in the TCU. This code is present while the fault conditions are met and is stored as a 'History DTC' until cleared. Condition for setting and clearing each TCU DTC are provided in the relevant sections.

In the case where the vehicle type is certified for Eure On-Board Diagnostic (EOBD) compliance, the Engine Control Module (ECM) provides the communication link to the EOBD scan tool to pass on any EOBD relevant codes from the TCU. The table below contains a list of all supported DTCs and the classification of each for EOBD purposes. Where a type B DTC has been set in an EOBD vehicle, the response to the fault may include action by the ECM, including the illumination of the Malfunction Indicator Lamp (MIL). Refer to Engine Control, for details on EOBD system function, checks and fault clearing.

CLEARING TROUBLE CODES

TCU DTCs should be cleared after repairs have been completed. Some diagnostic tables will tell you to clear the codes before using the chart, which will help to find the cause of the problem more quickly. Always note the DTCs present before clearing - this information may be helpful in the diagnostic process.

DIAGNOSTIC TROUBLE CODES

DTC Code	Defective	Cause and Action
P0707	Low gear position sensor input	Cause: - Gear position sensor signal of the inhibitor switch is lower than the normal value (defective gear position sensor) - Specified value of gear position sensor signal: 0.87 V Symptom: - Cannot shift to 1st, 3rd and 4th gear. - Torque converter clucth stops from its operation. Action: - Check gear position sensor for short to ground. - Check inhibitor switch and TCU connector for proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P0708	High gear position sensor input	Cause: - Gear position sensor signal of the inhibitor switch is higher than the normal value (defective inhibitor switch) - Specified value of inhibitor switch: 4.12 V Symptom: - Cannot shift to 1st, 3rd and 4th gear position. - Torque converter clucth stops from its operation. Action: - Check gear position sensor for short to B+. - Check inhibitor switch and TCU connector for proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.

DTC Code	Defective	Cause and Action
P0741	Torque converter clutch cannot be engaged	Cause: - Torque conver clutch cannot be engaged even when solenoid valve (S7) is operated. - The rpm of engine and output shaft is not consistent with the selected shift's gear ratio. • Allowable slip rpm of torque converter:100 rpm Symptom: - Torque converter clutch cannot be locked Action: - Check solenoid valve (S7) wiring for short to ground or open circuit. - Replace solenoicd valve (S7) if necessary. - Check T/M connector TCU connector for their proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P0742	Torque converter clutch engaged	Cause: - Torque conver clutch is engaged when solenoid valve (S7) is not operated. - The rpm of engine and output shaft is not consistent with the characteristic under the condition with torque converter not engaged. • Allowable slip rpm of torque converter < 50 rpm Symptom: - Torque converter clutch is locked. Action: - Check solenoid valve (S7) wiring for short to B+. - Replace solenoicd valve (S7) if necessary. - Check T/M connector TCU connector for their proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P0710	Defective T/M oil temperature sensor	Cause: - Oil temperature of T/M exceeds the specified value. • Oil temperature sensor voltage > 4.88 V • Oil temperature sensor voltage < 0.21 V Symptom: - Oil temperature is fixed to 120°C - Shifting impression is poor. Action: - Check T/M oil temperature sensor for short or open circuit. - Check T/M connector and TCU connector for proper connection. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 3 seconds.
P0790	Defective W/N/P mode switch	Cause: - The W/N/P mode switch's connection is intermittently disconnected (the input of the mode switch changes rapidly). Symptom: - The switch is fixed to normal mode. Action: - Check W/N/P mode switch input circuit for short or open circuit. - Check W/N/P mode switch wiring. - Replace W/N/P mode switch if necessary. - Returns to the normal operation if the failure does not occur within 3 seconds.

DTC Code	Defective	Cause and Action
P1703	Abnormal engine rpm (CAN)	Cause: - The engine rpm signal (CAN) is out of specified value or there is no engine rpm signal. • Engine rpm < 0 rpm • Engine rpm > 7000 rpm Symptom: - The engine rpm corresponding to the max. engine torque is applyed to the shifting condition. Action: - Check ECU and TCU connectors for poor contact. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 3 seconds.
P1704	Abnormal output shaft rpm (CAN)	Cause: - The output shaft signal (CAN) is out of specified value or there is no output shaft signal. • Output shaft rpm < 0 rpm • Output shaft rpm > 9000 rpm - The actual vehicle speed is 0 while other signals indicate that vehicle is moving. Symptom: - Cannot shift down by limiting the engine rpm to prevent the engine from overrunning. Action: - Check ECU and TCU connectors for poor contact. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 3 seconds and the rpm is over 0.
P1708	Low TCU supply voltage	Cause: - The TCU supply voltage is low or there is no measured voltage value. Symptom: - Cannot shift to 1st gear position. - Cannot shift to other gear positions due to the low supply voltage. - No. 6 solenoid valve (S6) stops from its operation. Action: - Check TCU terminal for poor contact, bending or deformation. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P1709	High TCU supply voltage	Cause: - The TCU supply voltage is high. • TCU supply voltage > 16.5 V Symptom: - All solenoid valves stop from their operation when high battery voltage is detected. - Enters into the emergency mode. Action: - Check TCU terminal for short to B+ or short to ground. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.

DTC Code	Defective	Cause and Action
P1713	Defective accelerator pedal signal (CAN)	Cause: - The accelerator pedal signal (CAN) is out of the specified value. • Accelerator pedal signal < 0 % • Accelerator pedal signal > 100 % Symptom: - Cannot shift to 4th gear position. - Torque converter clucth stops from its operation. - The interior default value is applied for shift determination (if the accelerator pedal signal is defective, ECU selects the default value and sends it and error message to TCU via CAN line). - The accelerator pedal signal is not used for P, R, N B2. Action: - Check ECU and TCU connectors for poor contact and their terminals for bend or deformation. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P1714	Defective vehicle coding	Cause: - The vehicle coding stored in EEPROM is defective (self-test when IGN ON). Symptom: - Determines the vehicle coding value via CAN communication or selects 0 for the coding value. - Shifting impression is poor. Action: - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1715	Abnormal VPS offset	Cause: - VPS (Variable pressure solenoid valve) is used for controlling clutch and band pressure while shifting. - The VPS offset stored in EEPROM is incorrect (self-test when IGN ON). • VPS offset > 120 mA Symptom: - Shifting impression is poor. Action: - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1717	Defective RAM	Cause: - RAM operates abnormally. (self-test when IGN ON) Symptom: - No output signal. - Enters into the emergency mode. Action: - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1718	Defective ROM	Cause: - The program memory is defective (self-test when IGN ON). - The calculated checksum value is not consistent with the stored checksum value. Symptom: - No output signal. - Enters into the emergency mode. Action: - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

CHANGED BY	
EFFECTIVE DATE	
AFFECTED VIN	

DTC Code	Defective	Cause and Action
P1719	Abnormal CAN communication	Cause: - Cannot use information necessary for TCU via CAN communication. Symptom: - The default value is used for all CAN signals. - Enters into the emergency mode. Action: - Check ECU and TCU connectors wiring for poor contact. - Check ECU and TCU connectors' terminals for bend or deformation. - Replace TCU if necessary. - Returns to the normal operation if the failure does not occur within 30 seconds.
P1720	Defective EEPROM	Cause: - EEPROM memory is defective. - The calculated checksum value is not consistent with the stored checksum value or the error occurs in EEPROM communication. (self-test when IGN ON) Symptom: - Determines the vehicle coding value via CAN communication or selects 0 for the coding value. - Shifting impression is poor. Action: - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1722	Incorrect vehicle model	Cause: - Cannot detect the vehicle coding through EEPROM or CAN communication. Symptom: - Selects 0 for the coding value. - Enters into the emergency mode. Action: - Check TCU connector and terminals for poor contact. - DTC disappears after turning ignition from OFF to ON.
P1733	No. 1 solenoid valve open	Cause: - The No. 1 solenoid valve operates with the No. 2 solenoid valve to control the oil flow for the 1-2 shift valve. - The No.1 solenoid valve internal circuit or solenoid valve wiring is open. - The solenoid valve connection is short to B+. Symptom: - The No. 1 solenoid valve is OFF. - Enters into the emergency mode. Action: - Check No. 1 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.1 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

DTC Code	Defective	Cause and Action
P1734	No. 2 solenoid valve open	Cause: - The No. 2 solenoid valve operates with the No. 1 solenoid valve to control the oil flow for the 2-3 shift valve. - The No. 2 solenoid valve circuit is open. - The solenoid valve connection is short to B+. Symptom: - The No. 2 solenoid valve is OFF. - Enters into the emergency mode. Action: - Check No. 2 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.2 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1735	No. 3 solenoid valve open	Cause: - The No. 3 solenoid valve operates with the No. 4 solenoid valve to shift smoothly and control the shifting order. - The No. 3 solenoid valve turns the clutch regulator valve ON and OFF. - The No. 3 solenoid valve circuit is open. - The solenoid valve connection is short to B+. Symptom: - The No. 3 solenoid valve is OFF. - Shifting impression is poor. Action: - Check No. 3 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.3 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

DTC Code	Defective	Cause and Action
P1736	No. 4 solenoid valve open	Cause: - The No. 4 solenoid valve operates with the No. 3 solenoid valve to shift smoothly and control the shifting order. - The No. 4 solenoid valve turns the clutch regulator valve ON and OFF. - The No. 4 solenoid valve circuit is open. - The solenoid valve connection is short to B+. Symptom: - The No. 4 solenoid valve is OFF or ON. - Shifting impression is poor. Action: - Check No. 4 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.4 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1737	No. 5 solenoid valve open	Cause: - The No. 5 solenoid valve is a variable solenoid valve to change the pressure for shifting. - The No. 5 solenoid valve circuit is open. - The solenoid valve connection is short to B+. Symptom: - The No. 4 solenoid valve is always OFF. - Shifting impression is poor. Action: - Check No. 5 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 3.6 ~ 5.5Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.5 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1738	No. 6 solenoid valve open	Cause: - The No. 6 solenoid valve is used to set the hydraulic line pressure to HIGH/LOW level. - The No. 6 solenoid valve circuit is open. - The solenoid valve connection is short to B+. Symptom: - The hydraulic line pressure is high. (No. 6 solenoid valve stops its operation) - Cannot to shift to 1st gear position. Action: - Check No. 6 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 6 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

DTC Code	Defective	Cause and Action
P1739	No. 7 solenoid valve open	Cause: - The No. 7 solenoid valve controls the operation of the torque converter clutch. - The No. 7 solenoid valve circuit is open. - The solenoid valve connection is short to B+. Symptom: - The No. 7 solenoid valve stops its operation (OFF). - The torque converter clutch cannot be locked. Action: - Check No. 7 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 7 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1741	No. 1 solenoid valve short	Cause: - The No. 1 solenoid valve operates with the No. 2 solenoid valve to control the oil flow for the 1-2 shift valve. - The No. 1 solenoid valve circuit is short to ground. Symptom: - The No. 1 solenoid valve is OFF. - Enters into the emergency mode. Action: - Check No. 1 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.1 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1742	No. 2 solenoid valve short	Cause: - The No. 2 solenoid valve operates with the No. 1 solenoid valve to control the oil flow for the 2-3 shift valve. - The No. 2 solenoid valve circuit is short to ground. Symptom: - The No. 2 solenoid valve is OFF. - Enters into the emergency mode. Action: - Check No. 2 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 2 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

DTC Code	Defective	Cause and Action
P1743	No. 3 solenoid valve short	Cause: - The No. 3 solenoid valve operates with the No. 4 solenoid valve to shift smoothly and control the shifting order. - The No. 3 solenoid valve turns the clutch regulator valve ON and OFF. - The No. 3 solenoid valve circuit is short to ground. Symptom: - The No. 3 solenoid valve is OFF. - Shifting impression is poor. Action: - Check No. 3 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 3 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1744	No. 4 solenoid valve short	Cause: - The No. 4 solenoid valve operates with the No. 3 solenoid valve to shift smoothly and control the shifting order. - The No. 4 solenoid valve turns the clutch regulator valve ON and OFF. - The No. 4 solenoid valve circuit is short to ground. Symptom: - The No. 4 solenoid valve is OFF. - Shifting impression is poor. Action: - Check No. 4 solenoid valve wiring and connector (especially its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 4 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1745	No. 5 solenoid valve short	Cause: - The No. 5 solenoid valve is a variable solenoid valve to change the pressure for shifting. - The No. 5 solenoid valve circuit is short to ground. Symptom: - The No. 4 solenoid valve is always OFF. - Shifting impression is poor. Action: - Check No. 5 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 3.6 ~ 5.5Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No.5 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.

DTC Code	Defective	Cause and Action
P1746	No. 6 solenoid valve short	Cause: - The No. 6 solenoid valve is used to set the hydraulic line pressure to HIGH/LOW level. - The No. 6 solenoid valve circuit is short to ground. Symptom: - The hydraulic line pressure is high. (No. 6 solenoid valve stops its operation) - Cannot to shift to 1st gear position. Action: - Check No. 6 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value : 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 6 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.
P1747	No. 7 solenoid valve short	Cause: - The No. 7 solenoid valve controls the operation of the torque converter clutch. - The No. 7 solenoid valve circuit is short to ground. Symptom: - The No. 7 solenoid valve stops its operation (OFF). - The torque converter clutch cannot be locked. Action: - Check No. 7 solenoid valve wiring and connector (especially, its ground condition). - Specified resistance value: 22 ~ 30Ω - Check TCU connector for proper connection and its terminal for bend or deformation. - Replace No. 7 solenoid valve if necessary. - Replace TCU if necessary. - DTC disappears after turning ignition from OFF to ON.