
TRANSMISSION

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13.1 TRANSMISSION CONTROL SYSTEM

1 Warnings and Precautions

1.1 Warning

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

- (1) Be sure to read precautions for SRS airbag before removing steering wheel.

1.2 Precautions

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

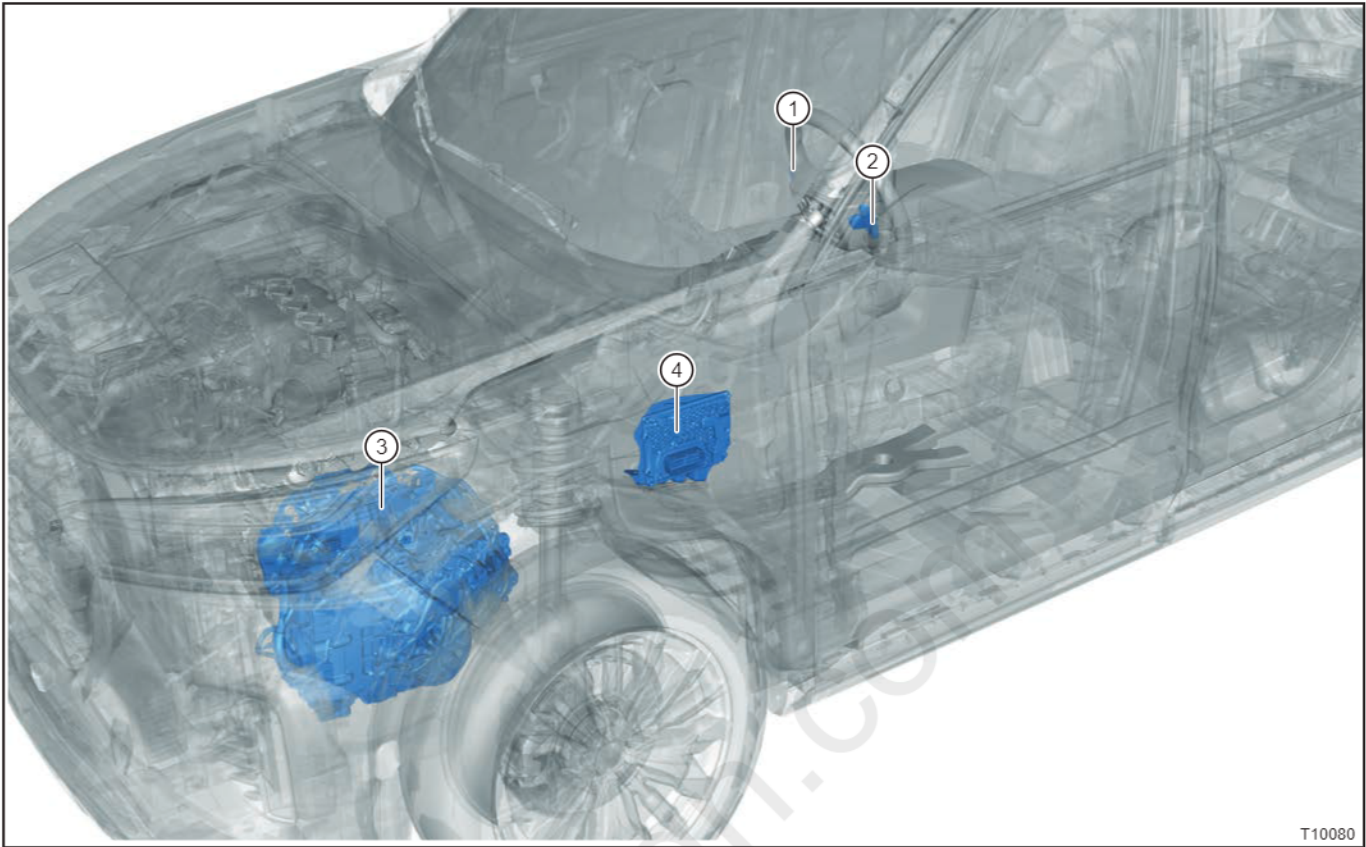
- (4) TCU bolts are non-reusable parts, which must be replaced after each removal.
- (5) TCU bolts are pre-coated parts. Residual sealant should be cleaned from threaded hole of housing before assembly.
- (6) If TCU is replaced with a new one, fresh correct TCU software with diagnostic tester.
- (7) During disassembly and assembly of TCU, antistatic equipment should be worn to avoid damage to electronic components in TCU.

2 System Overview

2.1 Description

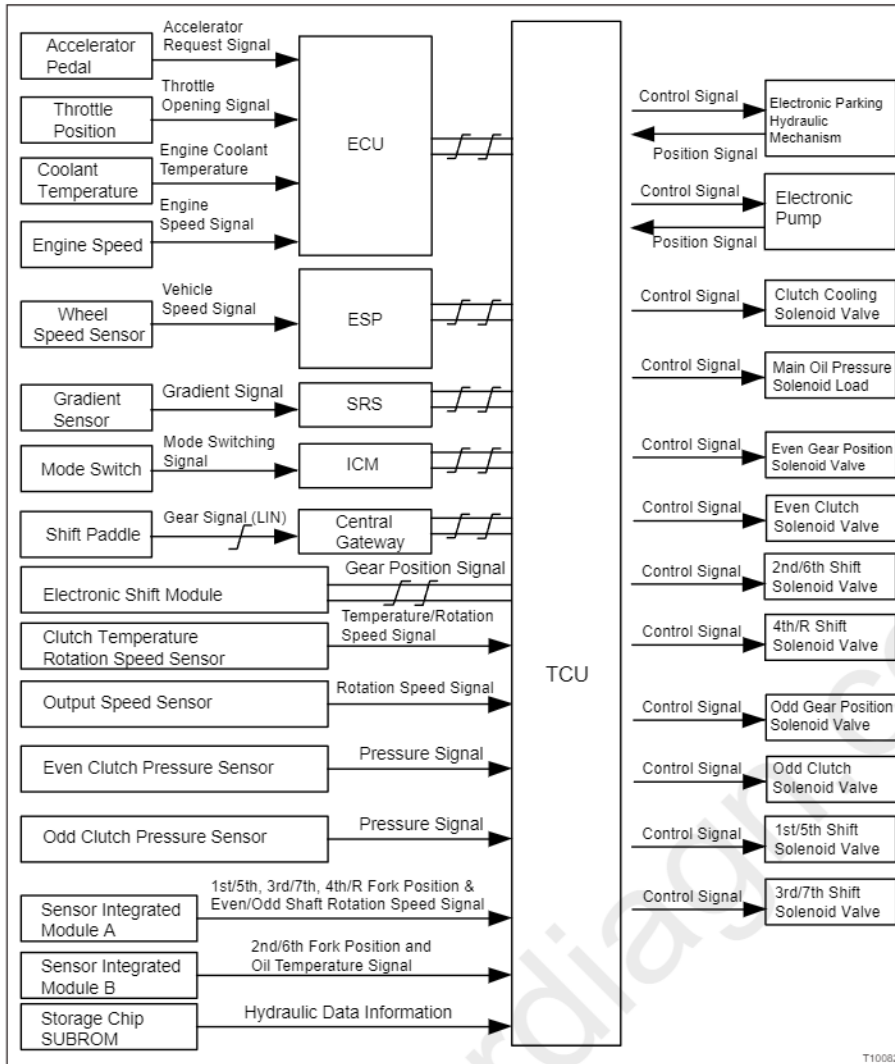
The transmission control system (Dual Clutch Transmission (DCT)) is composed of Transmission Control Module (TCU), shift motor and button-type electronic shift module, etc. The connection between button-type electronic shift module and transmission adopts a safer and faster electronic control mode, other than a traditional mechanical way, which eliminates the traditional mechanical shift mode and adopts electronic signals. Its advantage is that the driver's wrong shift operation will be judged by the computer to see if it will cause damage to the transmission, so as to better protect the transmission and correct the bad shift habits. However, if there is a fault or short circuit, the electronic shifting mechanism will be unable to release the current gear, we can only rely on the trailer and rescue.

2.2 System Component Diagram



1	Right Shift Paddle	3	Transmission Assembly
2	Left Shift Paddle	4	Transmission Control Module

2.3 System Schematic Diagram



- The transmission control module collects signals from ECU (accelerator pedal, throttle opening, engine temperature, speed and other signals), ESP (wheel speed signal, etc.), SRS (gradient signal, etc.), button-type electronic shift module (gear position) through CAN network, TCU collects input signals from sensors and other devices to operate transmission.
 - The upshift/downshift signal of shift paddle is transmitted to central gateway module through CAN network signal and multi-function steering wheel connector, and then the central gateway module transmits the signal to TCU module through CAN network signal.

2.4 Usage Method of Shift Paddle

Using gear shift paddle of steering wheel can switch gear quickly with both hands on steering wheel.

(1) Manual mode: When the shift lever is in D position, push it to the left to enter manual mode.

- 1) Downshift: Reduce one gear each time toggling.
- 2) Upshift: Raise one gear each time toggling.

⚠ Caution

- Within the allowable range of engine speed, the transmission will be locked in one gear which can be selected manually. When the vehicle is driving on a long downhill road, it is recommended to manually select a lower gear to better control the vehicle speed and reduce the braking force loss caused by frequent or prolonged depressing on brake pedal.
- It is recommended to manually select the lower gear position when the vehicle is out of trap or crossing wading pavement to obtain more wheel driving force and avoid water entering the exhaust line.

(2) Temporary manual mode: Enter the temporary manual mode by toggling shift paddle once.

1) Downshift: In temporary manual mode, reduce one gear each time toggling.

2) Upshift: In temporary manual mode, raise one gear each time toggling.

Hint:

- If the shift is not performed by shift paddle within a certain period of time (15 s) and the shift lever is in D position, the system will switch to automatic mode again.
- Press shift paddle “+” and “-” simultaneously to exit temporary manual mode.

⚠ Caution

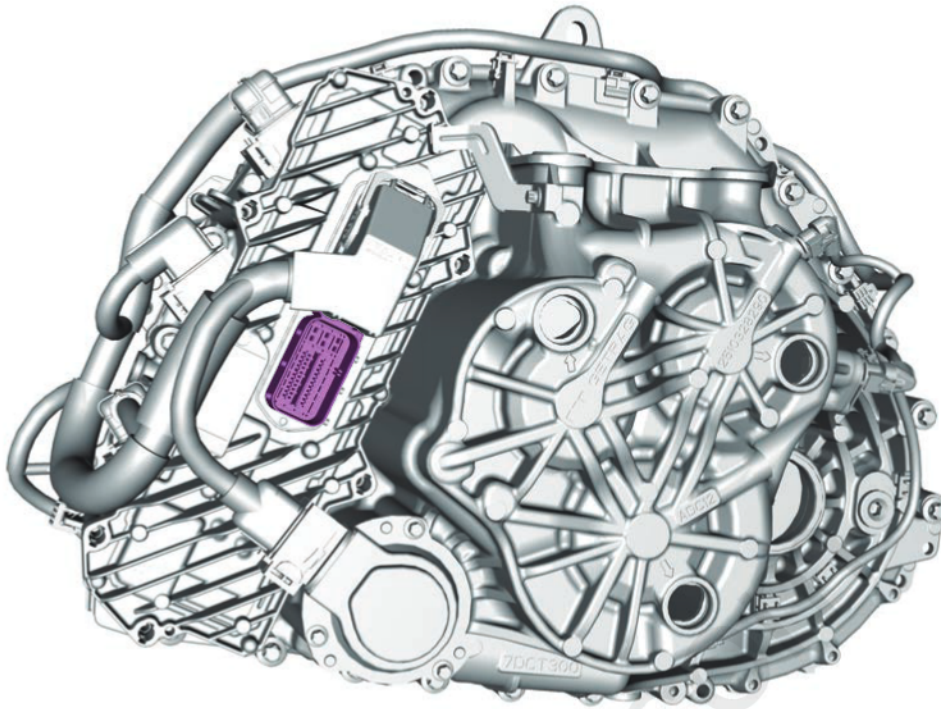
- When shifting in temporary manual mode, the system will automatically calculate. Only when engine speed and vehicle speed are appropriate, the upshifting or downshifting operation can be performed.
- When performing shifting by shift paddle on steering wheel in auto mode, the system will be switched to temporary manual mode.

3 System Circuit Diagram

3.1 Module Terminal Definition

■ TCU Connector Terminal Definition

TCU Connector A



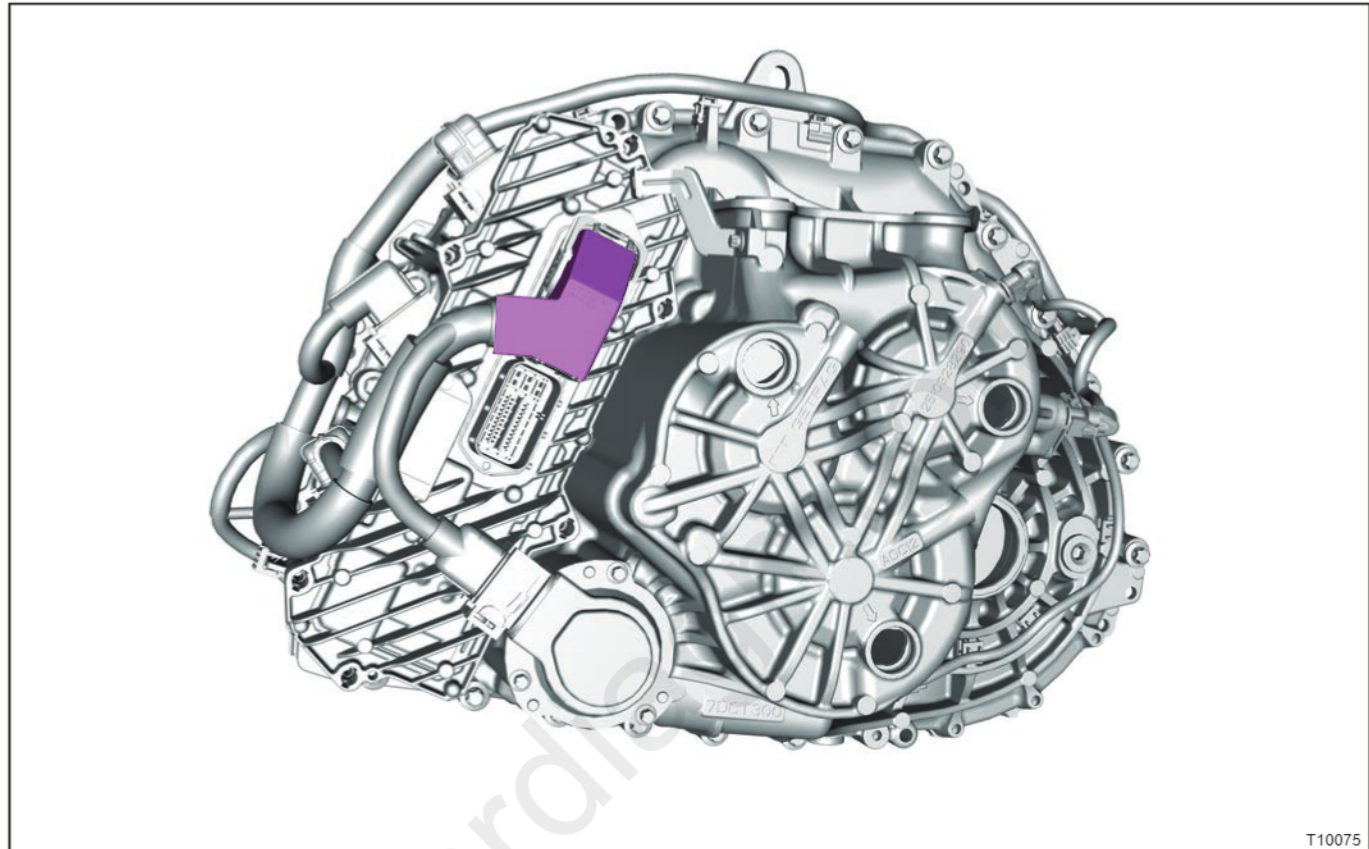
T10074

Terminal Inspection		Pin Definition	Detection Condition	Measured Value
Multimeter Positive	Multimeter Negative			
A1	Body ground	KL30 power supply	Power ON	12V
A2	Body ground	Ground	Power ON	0V
A3	Body ground	KL30 power supply	Power ON	12V
A4	Body ground	Ground	Power ON	0V
A5	Body ground	KL30 power supply	Power ON	12V
A6	Body ground	Ground	Power ON	0V
A7	/	/	/	/
A8	/	/	/	/
A9	/	/	/	/
A10	/	/	/	/
A11	/	/	/	/
A12	/	/	/	/
A13	/	/	/	/
A14	/	/	/	/
A15	/	/	/	/
A16	/	/	/	/
A17	/	/	/	/

A18	Body ground	KL30 power supply	Power ON	12V
A19	/	/	/	/
A20	/	/	/	/
A21	Body ground	CAN-H	Power ON	2.7V
A22	Body ground	CAN-L	Power ON	2.3V
A23	/	/	/	/
A24	/	/	/	/
A25	/	/	/	/
A26	/	/	/	/
A27	/	/	/	/
A28	/	/	/	/
A29	/	/	/	/
A30	/	/	/	/
A31	Body ground	KL15 power supply	Power ON	12V
A32	/	/	/	/
A33	/	/	/	/
A34	Body ground	CAN-H	Power ON	2.7V
A35	Body ground	CAN-L	Power ON	2.3V
A36	/	/	/	/
A37	/	/	/	/
A38	/	/	/	/
A39	/	/	/	/
A40	/	/	/	/
A41	/	/	/	/
A42	/	/	/	/
A43	/	/	/	/
A44	/	/	/	/
A45	/	/	/	/
A46	/	/	/	/
A47	/	/	/	/
A48	/	/	/	/
A49	/	/	/	/
A50	/	/	/	/
A51	/	/	/	/
A52	/	/	/	/
A53	/	/	/	/

A54	/	/	/	/
A55	/	/	/	/
A56	/	/	/	/
A57	/	/	/	/
A58	/	/	/	/

TCU Connector B



T10075

Terminal Inspection		Pin Definition	Detection Condition	Measured Value
Multimeter Positive	Multimeter Negative			
B1	Body ground	Clutch motor 2 phase U	Power ON	0.3V
B2	Body ground	Clutch motor 2 phase V	Power ON	0.3V
B3	Body ground	Clutch motor 2 phase W	Power ON	0.3V
B4	Body ground	Clutch motor 1 phase U	Power ON	0.3V
B5	Body ground	Clutch motor 1 phase V	Power ON	0.3V
B6	Body ground	Shift motor 1 phase U	Power ON	9V
B7	Body ground	Shift motor 1 phase V	Power ON	9V

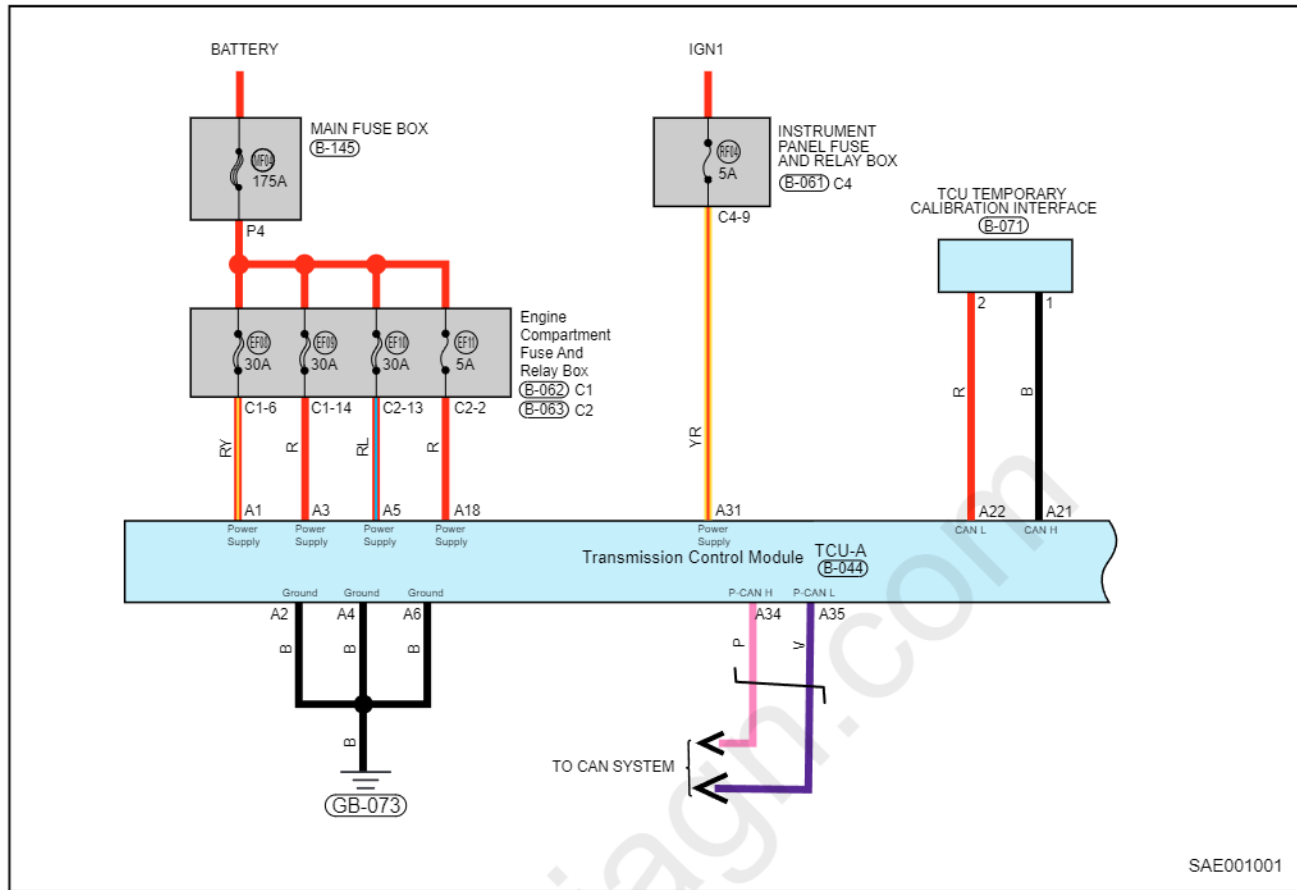
B8	Body ground	Shift motor 1 phase W	Power ON	9V
B9	Body ground	Shift motor 2 phase U	Power ON	9V
B10	Body ground	Clutch motor 1 phase W	Power ON	0.3V
B11	Body ground	Cooling motor phase U	Power ON	0V
B12	Body ground	Cooling motor phase V	Power ON	0V
B13	Body ground	Cooling motor phase W	Power ON	0V
B14	Body ground	Shift motor 2 phase V	Power ON	9V
B15	Body ground	Shift motor 2 phase W	Power ON	9V
B16	Body ground	Cooling motor Hall sensor 1 signal	Power ON	0.5V
B17	Body ground	Shift motor 2 Hall sensor 1 signal	Power ON	5 V
B18	Body ground	Shift motor 1 Hall sensor 1 signal	Power ON	0.5V
B19	Body ground	Clutch motor 2 Hall sensor 1 signal	Power ON	2.8V
B20	Body ground	Clutch motor 1 Hall sensor 1 signal	Power ON	2.8V
B21	Body ground	Clutch motor 1 Hall sensor power supply	Power ON	5 V
B22	Body ground	Clutch motor 1 position signal	Power ON	-
B23	Body ground	Temperature sensor signal	Power ON	0V
B24	Body ground	Pressure sensor 2 signal	Power ON	0V
B25	Body ground	Pressure sensor 1 signal	Power ON	0V
B26	Body ground	Output shaft speed sensor signal	Power ON	-
B27	Body ground	Input shaft speed sensor 2 signal	Power ON	9V
B28	Body ground	Input shaft speed sensor 1 signal	Power ON	9V
B29	Body ground	Cooling motor Hall sensor 2 signal	Power ON	5 V

B30	Body ground	Shift motor 2 Hall sensor 2 signal	Power ON	0V
B31	Body ground	Shift motor 1 Hall sensor 2 signal	Power ON	0V
B32	Body ground	Clutch motor 2 Hall sensor 2 signal	Power ON	0V
B33	Body ground	Clutch motor 1 Hall sensor 2 signal	Power ON	0V
B34	Body ground	Clutch motor 2 sensor power supply	Power ON	5 V
B35	Body ground	Clutch motor 2 position signal	Power ON	-
B36	Body ground	Temperature sensor ground	Power ON	0V
B37	Body ground	Pressure sensor 2 ground	Power ON	0V
B38	Body ground	Pressure sensor 1 ground	Power ON	0V
B39	Body ground	Output shaft speed sensor power supply	Power ON	-
B40	Body ground	Input shaft speed sensor 2 power supply	Power ON	0V
B41	Body ground	Input shaft speed sensor 1 power supply	Power ON	9V
B42	Body ground	Cooling motor Hall sensor 3 signal	Power ON	0.5V
B43	Body ground	Shift motor 2 Hall sensor 3 signal	Power ON	0.5V
B44	Body ground	Shift motor 1 Hall sensor 3 signal	Power ON	0.5V
B45	Body ground	Clutch motor 2 Hall sensor 3 signal	Power ON	2.8V
B46	Body ground	Clutch motor 1 Hall sensor 3 signal	Power ON	5 V
B47	Body ground	Shift motor 1 Hall sensor power supply	Power ON	0V
B48	Body ground	Shift motor 1 position signal	Power ON	0V
B49	Body ground	Shift motor 2 Hall sensor 3 signal	Power ON	5 V
B50	Body ground	Pressure sensor 2 power supply	Power ON	5 V

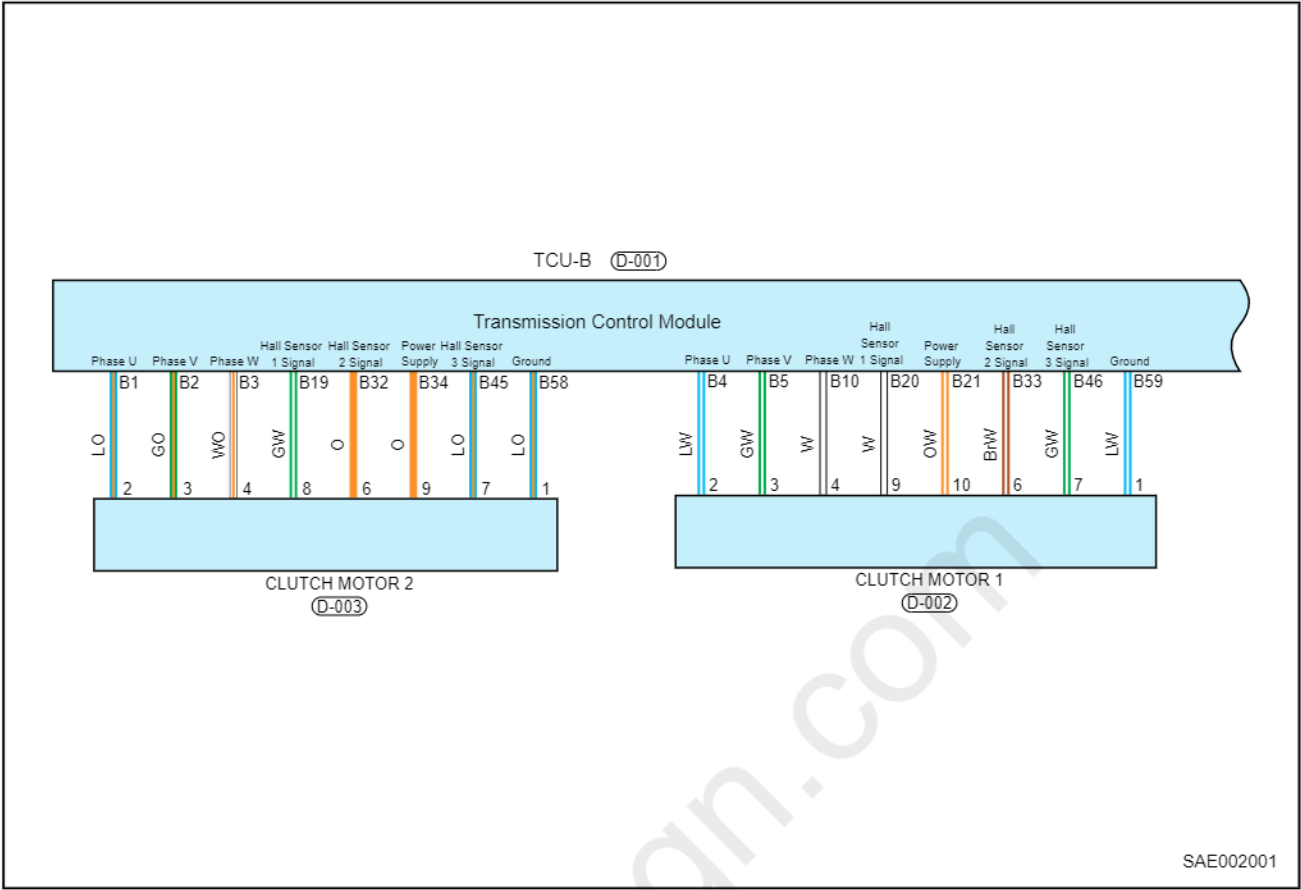
B51	Body ground	Pressure sensor 1 power supply	Power ON	5 V
B52	Body ground	Electromagnetic shield	Power ON	-
B53	Body ground	Range sensor power supply	Power ON	-
B54	Body ground	Range sensor signal 1	Power ON	-
B55	Body ground	Cooling motor sensor ground	Power ON	0V
B56	Body ground	Shift motor 2 Hall sensor signal ground	Power ON	0V
B57	Body ground	Shift motor 1 Hall sensor signal ground	Power ON	0V
B58	Body ground	Clutch motor 2 Hall sensor signal ground	Power ON	0V
B59	Body ground	Clutch motor 1 Hall sensor signal ground	Power ON	0V
B60	Body ground	Cooling motor sensor power supply	Power ON	0V
B61	Body ground	Shift motor 2 position signal	Power ON	2V
B62	/	/	/	/
B63	/	/	/	/
B64	/	/	/	/
B65	Body ground	Electromagnetic shield	Power ON	-
B66	Body ground	Range sensor ground	Power ON	-
B67	Body ground	Range sensor 2 signal	Power ON	-

3.2 Circuit Diagram

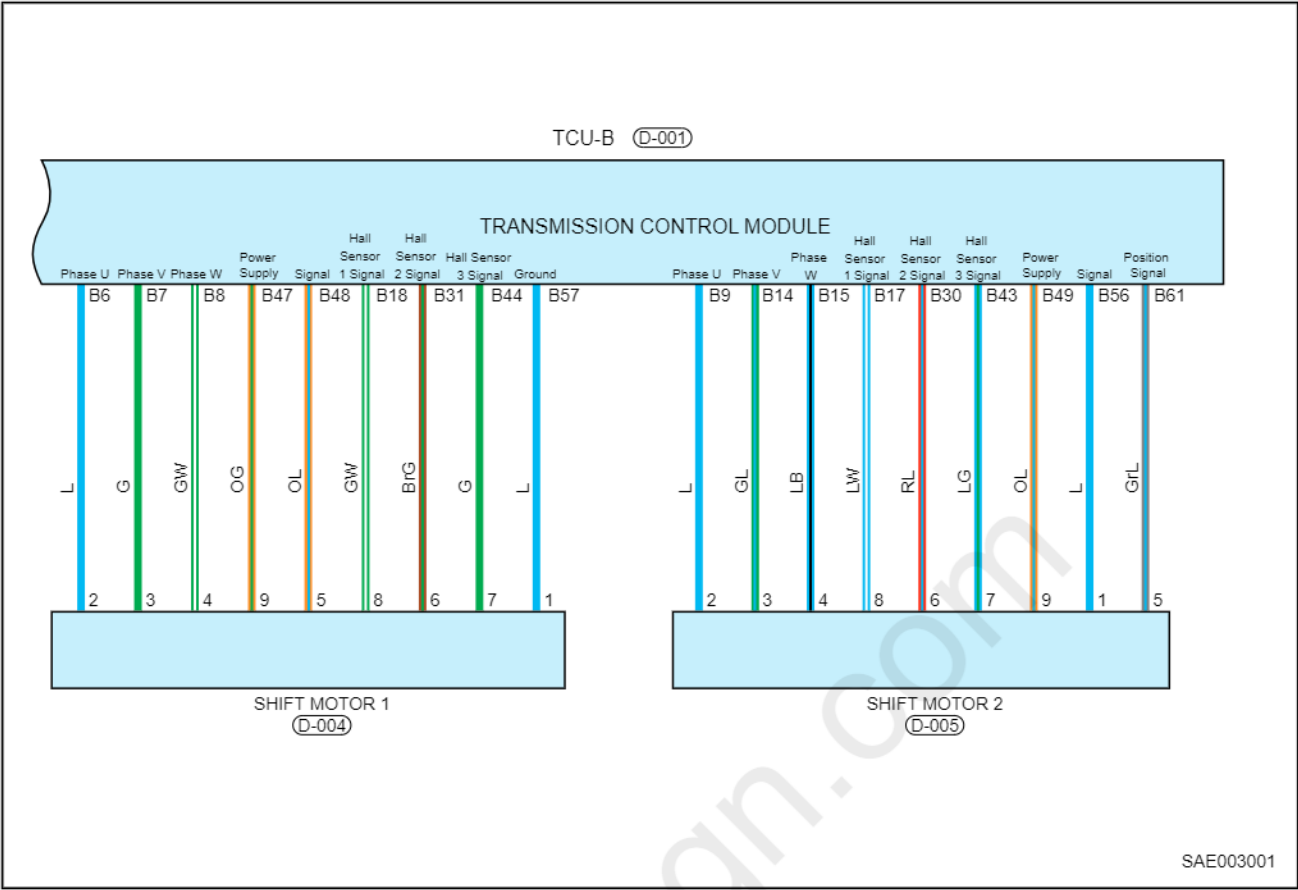
■ Transmission Management System (Page 1 of 5)



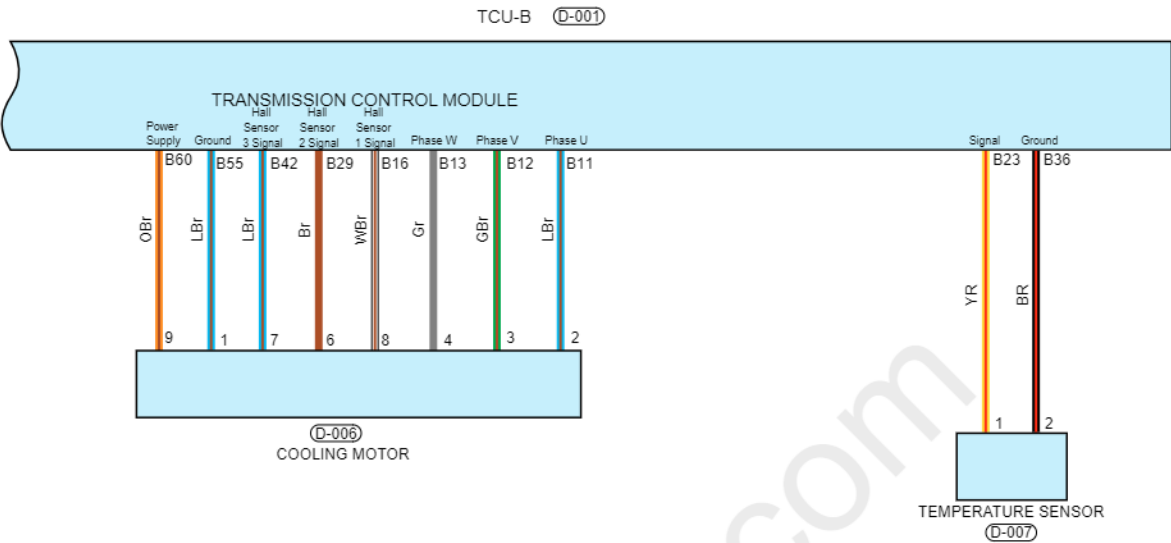
■ Transmission Management System (Page 2 of 5)



■ Transmission Management System (Page 3 of 5)

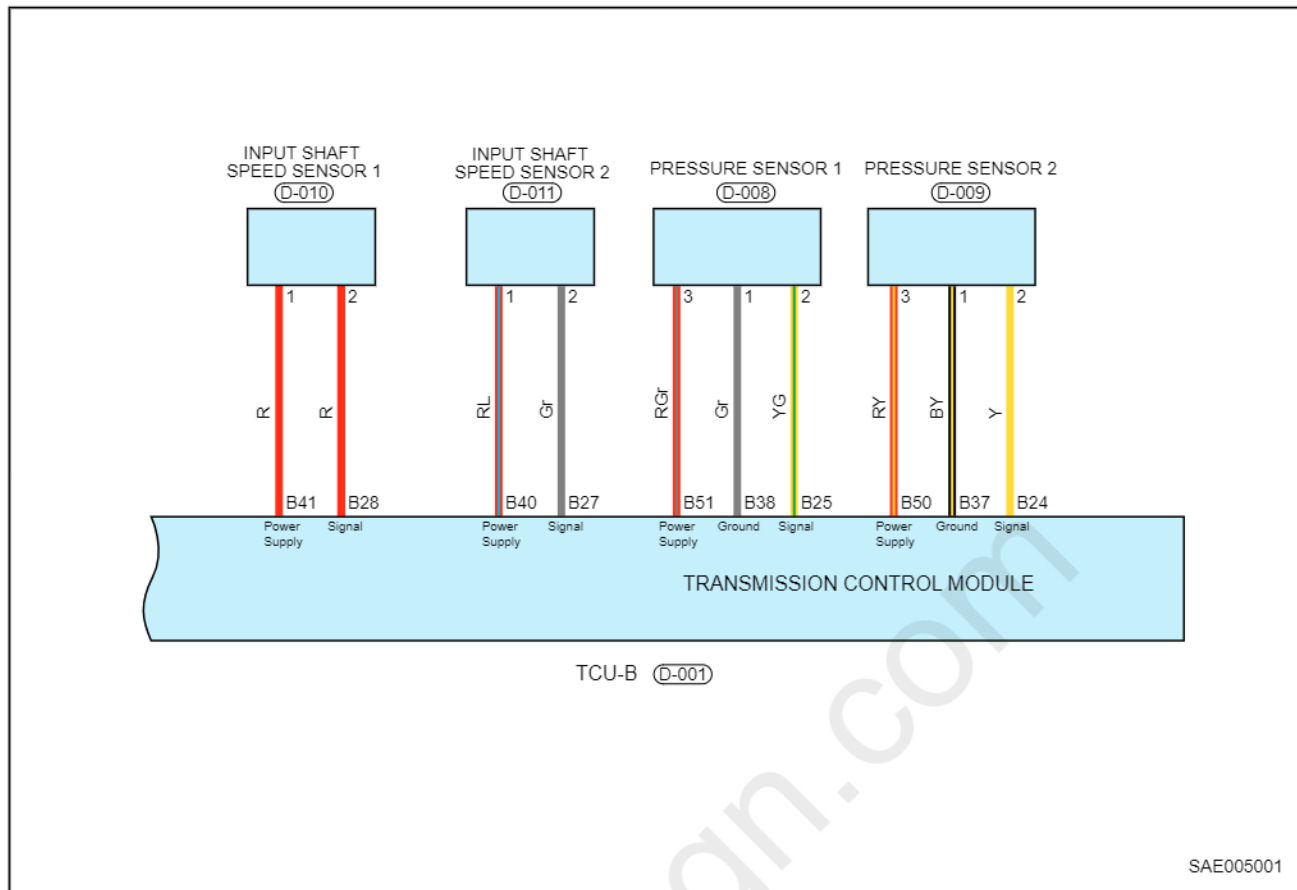


■ Transmission Management System (Page 4 of 5)



SAE004001

■ Transmission Management System (Page 5 of 5)



4 Diagnostic Information and Steps

4.1 Diagnostic Tester Menu

- (1) Connect diagnostic tester and click "EXEED".
- (2) Click model "New TXL".

Show Menu	
EXEED V10.61 > Diagnostic Program	
TX/TXL	LX
VX	New TXL
TX(2021)	Generic Service
Exeed	
SAE050001	

(3) Click "System Selection" .

Show Menu	
EXEED V10.61 > New TXL	
Health Report	
System Selection	
ECU Online Programming	
Exeed New TXL	
SAE051001	

(4) Click "Transmission Control Unit" .

Show Menu

Home

Print

Share

EXEED V10.61 > New TXL > System Selection

EMS (Engine Management System)	TCU (Transmission Control Unit)
BCM (Body Control Module)	ESP(IEPB)(Electronic Stability Program (Integration Electrical Park Brake))
EPS (Electronic Power Steering)	AIPM (Integrated Panel Module)
CLM (Climate Module)	DMC (Infotainment Domain Controller)
AVM (Around View Monitor Module)	PDC (Parking Distance Control)
BSDL (Blind Spot Detection Left)	BSDR (Blind Spot Detection Right)
PEPS (Passive Entry And Passive Start System)	FCM (Front Camera Module)

Exeed New TXL

SAE052001

(5) Enter the next screen of Transmission Control Unit.

- 1) “Read Current DTC” screen.
- 2) “Read History DTC” screen.
- 3) “Clear DTC” screen.

Show Menu



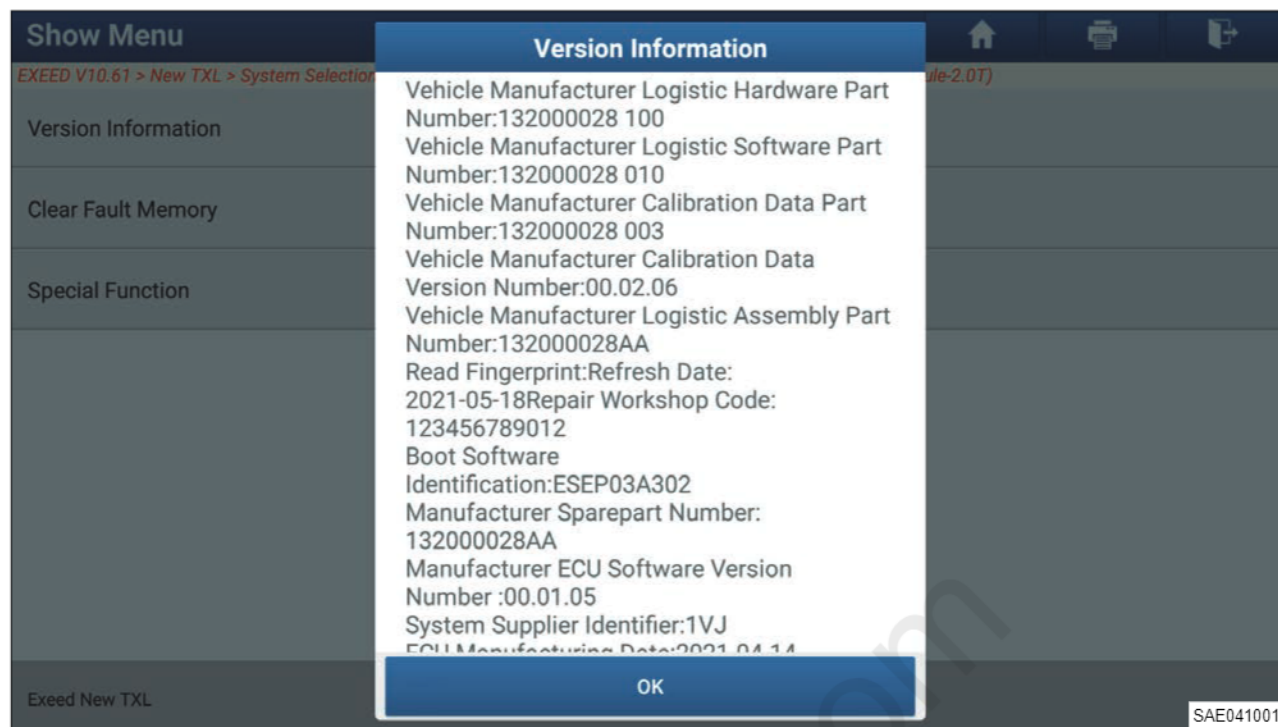
EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)

Version Information	Read Fault Code
Clear Fault Memory	Read Data Stream
Special Function	

Exeed New TXL

SAE040001

(6) Click “Version Information” to read basic version information.



4.2 DTC Confirmation Procedure

Confirm that battery voltage is 12V or more before performing following procedures.

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

4.3 Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Monitor diagnostic tester (the latest software) data that is related to this circuit.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Check for broken, bent, protruded or corroded terminals.
- Inspect sensors and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Use data recorder and/or oscilloscope to help diagnose intermittent malfunctions.
- Remove the Transmission Control Unit (TCU) from malfunctioning vehicle and install it to a new vehicle to perform a test. If DTC cannot be cleared, TCU is malfunctioning. If DTC can be cleared, reinstall TCU to original vehicle.

4.4 Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit operates. Circuits are very sensitive to proper grounding. A loose or corroded ground can seriously affect the control circuit. Check the ground points as follows:

- Remove ground bolt or nut.
- Check all contact surfaces for tarnish, dirt and rust, etc.
- Clean as necessary to ensure that contact is in good condition.
- Reinstall ground bolt or nut securely.
- Check if any additional accessories interfere with ground circuit.
- If several wire harnesses are crimped into one ground terminal, check for proper crimp condition. Make sure that all wire harnesses are clean and securely fastened while providing a proper ground path.

4.5 System Diagnosis Procedure

Hint:

- Use following procedures to troubleshoot the transmission system.

1	Vehicle brought to workshop	Next
2	Check battery voltage	
	Check if battery voltage is normal. Standard condition Standard voltage: Not less than 12V. NG Replace battery. OK	
3	Customer problem analysis	Next
4	Read DTCs	
	NG Repair according to Problem Symptoms Table. OK	
5	Read DTCs (current DTC and history DTC)	
	NG Troubleshoot according to intermittent DTC fault flow.	

OK

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

Next

7 Adjust, repair or replace

Next

8 Conduct test and confirm malfunction has been repaired

Next

End.

4.6 Diagnostic Trouble Code (DTC) Chart

Transmission Control System

Hint:

- History trouble code cannot be reported, otherwise it will affect the use by customer.

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180803h	PWM Monitoring ISS Odd Transmission Path: Pulse Width Failure	Detected longer or shorter pulses are invalid	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check whether battery input voltage, current consumption and appearance of TCU are stable - Check sensor - Check TCU
P181812h	Voltage Level Monitoring ISS Odd Transmission Path: Electrical Signal Short to Bat	Detected signal voltage is higher than threshold		
P180814h	Voltage Level Monitoring ISS Odd Transmission Path: Electrical Signal Short to Ground or Open Circuit	Detected signal voltage is lower than threshold		
P18081Ch	Voltage Level Monitoring ISS Odd Transmission Path: Supply Voltage Out of Range High	Detected power supply voltage is higher than threshold		
P18081Dh	Voltage Level Monitoring ISS Odd Transmission Path: Supply Voltage Out of Range Low	Detected power supply voltage is lower than threshold		
P180837h	Frequency Monitoring ISS Odd Transmission Path: Frequency Failure	Signal frequency is too high	Wire harness or connector failure	

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180894h	Jump Detection ISS Odd Transmission Path	First jump time is less than first timer threshold; If the timer is not currently running and the speed jump is detected, the start time value is stored. Input signal value must jump above calibration value, and maintain the new value for at least 20 ms or higher/lower than the first jump. It cannot effectively detect the peak of single signal	- TCU power supply voltage failure - Sensor failure - TCU failure	
P180829h	Speed Monitoring ISS Odd Transmission Path	Wheel speed sensor and input shaft speed are unreasonable	- Wire harness or connector failure - Sensor failure	- Check wire harness or connector - Check sensor

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180903h	PWM Monitoring ISS Even Transmission Path: Pulse Width Failure	Detected longer or shorter pulses are invalid	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check whether battery input voltage, current consumption and appearance of TCU are stable - Check for sensor failure - Check TCU
P180911h	Voltage Level Monitoring ISS Even Transmission Path: Electrical Signal Short to Ground or Open Circuit	Detected signal voltage is lower than threshold		
P180912h	Voltage Level Monitoring ISS Even Transmission Path: Supply Voltage Short to Bat	Detected signal voltage is higher than threshold		
P18091Ch	Voltage Level Monitoring ISS Even Transmission Path: Supply Voltage Out of Range High	Detected power supply voltage is higher than threshold		
P18091Dh	Voltage Level Monitoring ISS Even Transmission Path: Supply Voltage Out of Range Low	Detected power supply voltage is lower than threshold		
P181912h	Voltage Level Monitoring ISS Even Transmission Path:	Detected power supply voltage is		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
	Electrical Signal Short to Bat	higher than threshold		
P180914h	Voltage Level Monitoring ISS Even Transmission Path: Electrical Signal Short To Ground Or Open Circuit	Detected power supply voltage is lower than threshold		
P180937h	Frequency Monitoring ISS Even Path: Frequency Failure	Signal frequency is too high		
P180994h	Jump Detection ISS Even Transmission Path	First jump time is less than first timer threshold; If the timer is not currently running and the speed jump is detected, the start time value is stored. Input signal value must jump above calibration value, and maintain the new value for at least 20 ms or higher/lower than the first jump. It cannot effectively detect the peak of single signal		
P180929h	Speed Monitoring ISS Even Transmission Path	Wheel speed sensor and input shaft speed are unreasonable	• Wire harness or connector failure • Mechanical installation failure • Wheel speed sensor failure • TCU failure	• Check wire harness or connector • Check installation of sensor • Check wheel speed sensor • Check TCU
DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180013h	Phases Monitoring Clutch Actuator 1: Open Circuit	Clutch motor threshold is lower than lower limit	• Wire harness or connector failure • Sensor failure • TCU failure	• Check wire harness or connector • Check sensor • Check TCU
P180012h	Phases Monitoring Clutch Actuator 1: Short to Bat	Clutch motor threshold is higher than upper limit		
P180015h	Phases Monitoring Clutch Actuator 1: Short to Battery or Open Circuit	Clutch motor threshold is higher than upper limit		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180011h	Phases Monitoring Clutch Actuator 1: Short to Ground	Clutch motor threshold is lower than lower limit		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180113h	Phases Monitoring Clutch Actuator 2: Open Circuit	Clutch motor threshold is higher than upper limit	- Wire harness or connector failure - Clutch motor failure - TCU failure	- Check wire harness or connector - Check clutch motor - Check TCU
P180115h	Phases Monitoring Clutch Actuator 2: Short to Battery or Open Circuit	Clutch motor threshold is lower than lower limit		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180213h	Phases Monitoring Shift Actuator 1: Open Circuit	Clutch motor threshold is lower than lower limit	- Wire harness or connector failure - Shift motor failure - TCU failure	- Check wire harness or connector - Check shift motor - Check TCU
P180292h	Phases Monitoring Shift Actuator 1: Performance or Incorrect Operation	Power level driver reports that there is internal failure or regular power level has been turned off.		
P180212h	Phases Monitoring Shift Actuator 1: Short to Bat	Clutch motor threshold is higher than upper limit		
P180215h	Phases Monitoring Shift Actuator 1: Short to Battery or Open Circuit	Phase 1, phase 2 or phase 3 ground, phase voltage L3 is above 250 mV		
P180211h	Phases Monitoring Shift Actuator 1: Short to Ground	1. Depends on motor position: L1_PWM, L2_GND, L3_OFF: $10\% < L1 < 100\%$, phase voltage $L1 < \text{threshold}$; 2. Depends on motor position: L2_PWM, L3_GND, L1_OFF: $10\% < L2 < 100\%$, phase voltage $L2 < \text{threshold}$; 3. L3_PWM, L1_GND, L2_OFF, $10\% < L3 < 100\%$ phase voltage $L3 < \text{threshold}$; 4. In three-state mode: phase voltage $L3 < 0.25 \text{ V}$		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182B62h	Clutch 1 Torque Too Low (GETRAG)	Slip rate of estimated clutch 1 torque - actual engine torque is beyond upper limit	Clutch slips	Check clutch system
P182C62h	Clutch 2 Torque Too Low (GETRAG)	Slip rate of estimated clutch 2 torque - actual engine torque is beyond upper limit		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181C2Ah	Pressure Sensor 1 Output Stuck at Certain Value	Pressure gradient of filtered clutch 1 s less than detected gradient threshold jammed by tps	- Wire harness or connector failure - Sensor failure - TCU failure - Transmission assembly failure	- Check wire harness or connector - Check sensor - Check TCU - Check transmission
P181C92h	Comparison Target to Current Pressure Sensor 1, Pressure too High	Current clutch pressure > temperature and desired pressure related pressure deviation threshold high and desired pressure dynamic related offset (- Deviation is calculated by pressure rate and delay factor)		
P181D92h	Comparison Target to Current Pressure Sensor 1, Pressure too Low	Current clutch pressure < temperature and desired pressure related pressure deviation threshold high and desired pressure dynamic related offset (- Deviation is calculated by pressure rate and delay factor)		
P181C28h	Pressure Sensor 1 Offset too High	Clutch 1 pressure > clutch pressure offset maximum threshold or clutch 1 pressure < clutch pressure offset minimum threshold		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181C27h	Pressure Sensor 1 Inplausible High Gradient	Clutch 1 pressure - clutch 1 original pressure > within the duration of clutch pressure failure gradient, the threshold of clutch pressure failure gradient is greater than clutch pressure failure gradient		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181E92h	Comparison Target to Current Pressure Sensor 2, Pressure too High	Pressure gradient of filtered clutch 2 s less than detected gradient threshold jammed by tps	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check pressure sensor - Check TCU
P181E2Ah	Pressure Sensor 2 Output Stuck at Certain Value	Current clutch pressure > and desired pressure related pressure deviation threshold high and desired pressure dynamic related offset (- Deviation is calculated by pressure rate and delay factor)		
P181F92h	Comparison Target to Current Pressure Sensor 2, Pressure too Low	Current clutch pressure < temperature and desired pressure related pressure deviation threshold high and desired pressure dynamic related offset (- Deviation is calculated by pressure rate and delay factor)		
P181E28h	Pressure Sensor 2 Offset too High	Clutch 2 pressure > clutch pressure offset maximum threshold or clutch 1 pressure < clutch pressure offset minimum threshold		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181E27h	Pressure Sensor 2 Inplausible High Gradient	Clutch 2 pressure - clutch 1 original pressure > within the duration of clutch pressure failure gradient, the threshold of clutch pressure failure gradient is greater than clutch pressure failure gradient		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180411h	Phases Monitoring Cooling Actuator: Short to Ground	Case 1, case 2: Depends on motor position: L1_PWM, L2_GND, L3_OFF: $10\% < L1_PWM < 100\%$ and phase voltage $L1 < \text{threshold}$ or L2_PWM, L3_GND, L1_OFF: $10\% < L2_PWM < 100\%$ and phase voltage $L2 < \text{threshold}$ or L3_PWM, L1_GND, L2_OFF: $10\% < L3_PWM < 100\%$ and phase voltage $L3 < \text{threshold}$. For case 1, it depends on the position of irrotational motor, whether the fault can be detected. Case 3 (three-state mode): phase voltage $L3 < 0.25\text{ V}$; Case 4 (- power level test): phase voltage $L3 < 0.25\text{ V}$	• Wire harness or connector failure • Cooling pump failure • TCU failure	• Check wire harness or connector • Check cooling pump • Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180412h	Phases Monitoring Cooling Actuator: Short to Bat	Case 1, case 2: It depends on motor position: L1_PWM, L2_GND, L3_OFF: $(0\% < L1_PWM < 90\%$ and phase voltage L1 > threshold) or phase voltage L2 > threshold or L2_PWM, L3_GND, L1_OFF: $(0\% < L2_PWM < 90\%$ and phase voltage L2 > threshold) or phase voltage L3 > threshold or L3_PWM, L1_GND, L2_OFF: $(0\% < L3_PWM < 90\%$ and phase voltage L3 > threshold) or phase voltage L1 > threshold. For case 1, it depends on the position of irrotational motor, whether the fault can be detected. Case 3: IPT PWM = 0 and motor current > 10 A during test		
P180413h	Phases Monitoring Cooling Actuator: Open Circuit	Divert shunt resistor voltage < PWM threshold voltage		
P1805F0h	Clutch Cooling Pump Motor Speed Check (too High)	Difference between actual pump speed and expected pump speed > cooling pump speed difference threshold and expected pump speed * cooling pump speed factor		
P1805F1h	Clutch Cooling Pump Motor Speed Check (too Low)	Difference between actual pump speed and expected pump speed < - (cooling pump speed difference threshold and expected pump speed * cooling pump speed factor)		
P1805F2h	Clutch Cooling Pump Motor Speed	Actual pump speed <= minimum pump speed threshold		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
	Check (Unexpected Zero or Negative)			
P18054Bh	Temperature Monitoring Cooling Actuator Powerstage (Overtemperature)	Cooling water pump heat load index $\geq$ cooling water pump heat load threshold		
P180E11h	Voltage Level Monitoring Sensor Clutch Cooling Motor: Supply Voltage Short Circuit to Ground	The timer is zero when power supply is abnormal, and the power supply voltage level is lower than maximum threshold of sensor power regulator, and the sensor power supply voltage is lower than SG threshold		
P180E1Ch	Voltage Level Monitoring Sensor Clutch Cooling Motor: Supply Voltage Out of Range High	Power supply voltage $>$ motor power supply voltage upper limit threshold		
P180E1Dh	Voltage Level Monitoring Sensor Clutch Cooling Motor: Supply Voltage Out of Range Low	Power supply voltage $<$ motor power supply voltage lower limit threshold		
P180415h	Phases Monitoring Cooling Actuator: Short to Battery or Open Circuit	Phase 1, phase 2 or phase 3 ground and phase voltage L3 is above 250 mV		
P180492h	Phases Monitoring Cooling Actuator: Performance or Incorrect Operation	Power level driver reports that there is internal failure or general power level has been turned off		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
U041686h	Speed Monitoring (CAN) Wheel Speed FL Invalid	Corresponding signal == 0xFFFF (-invalid) or corresponding sensor status signal == 0x1 (invalid)	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
U041686h	Speed Monitoring (CAN) Wheel Speed FR Invalid			
U041686h	Speed Monitoring (CAN) Wheel Speed RL Invalid			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
U041686h	Speed Monitoring (CAN) Wheel Speed RR Invalid			
U040186h	Brake Pedal (CAN) Signal Invalid			
U040186h	Engine Idling (CAN) Signal Invalid			
U041786h	Clutch Cooling Cooling Pump Motor Powerstage (Overtemperature)			
U040186h	Accelerator Pedal (CAN) Signal Invalid			
U042386h	Environment Temperature (CAN) Signal Invalid			
U040186h	Driver Torque Request (CAN) Signal Invalid			
U040186h	Engine Min. Torque (CAN) Signal Invalid			
U040186h	Engine Max. Torque (CAN) Signal Invalid			
U040186h	Engine Temperature (CAN) Signal Invalid			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181415h	Voltage Level Monitoring Oil Temperature Sensor: Signal Short-to-Battery or Open Load	Signal voltage > temperature sensor Scb threshold	- Wire harness or connector failure - TCU failure	- Check wire harness or connector - Check TCU
P181411h	Voltage Level Monitoring Oil Temperature Sensor: Signal Short-to-GND	Signal voltage < temperature sensor scg threshold		
P181311h	Voltage Level Monitoring Oil Temperature Sensor: Supply Voltage Short to Ground	The timer is zero when power supply is abnormal, and the power supply voltage level is lower than maximum threshold of sensor power regulator, and the sensor power supply voltage is	- Wire harness or connector failure - Oil temperature sensor failure - TCU failure	- Check wire harness or connector - Check oil temperature sensor - Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
		lower than SG threshold.		
P181312h	Voltage Level Monitoring Oil Temperature Sensor: Supply Voltage Short to Battery	Power supply voltage level of sensor power regulator is lower than maximum threshold and the sensor power voltage is higher than SB threshold.		
P181317h	Voltage Level Monitoring Oil Temperature Sensor: Supply Voltage Out of Range High	Power supply voltage > temperature sensor power supply voltage upper limit		
P181316h	Voltage Level Monitoring Oil Temperature Sensor: Supply Voltage Out of Range Low	Power supply voltage < Temperature sensor power supply voltage lower limit		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180092h	Phases Monitoring Clutch Actuator 1: Performance or Incorrect Operation	Power level driver reports that there is internal failure or general power level has been turned off	- Wire harness or connector failure - Clutch actuator failure - TCU failure	- Check wire harness or connector - Check clutch actuator - Check TCU
P180111h	Phases Monitoring Clutch Actuator 2: Short to Ground	Case 1, case 2: It depends on motor position: L1_PWM, L2_GND, L3_OFF: $10\% < L1_PWM < 100\%$; phase voltage L1 < threshold or L2_PWM, L3_GND, L1_OFF: $10\% < L2_PWM < 100\%$; phase voltage L2 < threshold or L3_PWM, L1_GND, L2_OFF: $10\% < L3_PWM < 100\%$; phase voltage L3 < threshold. For case 1, it depends on the position of irrotational motor, whether the fault can be detected. Case 3 (three-state mode):	- Wire harness or connector failure - Clutch motor failure - TCU failure	- Check wire harness or connector - Check clutch motor - Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
		phase voltage L3 < 0.25 V. Case 4 (- power level test): phase voltage L3 < 0.25 V		
P180112h	Phases Monitoring Clutch Actuator 2: Short Circuit to Battery	Case 1, case 2: It depends on motor position: L1_PWM, L2_GND, L3_OFF: (0% < L1_PWM < 90% and phase voltage L1 > threshold) or phase voltage L2 > threshold or L2_PWM, L3_GND, L1_OFF: (0% < L2_PWM < 90% and phase voltage L2 > threshold) or phase voltage L3 > threshold or L3_PWM, L1_GND, L2_OFF: (0% < L3_PWM < 90% and phase voltage L3 > threshold) or phase voltage L1 > threshold. For case 1, it depends on the position of irrotational motor, whether the fault can be detected. Case 3: IPT PWM = 0 and motor current > 10 A during test		
P180192h	Phases Monitoring Clutch Actuator 2: Performance or Incorrect Operation	Power level driver reports that there is internal failure or general power level has been turned off		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180229h	Shift Actuator 1 Motor Speed Check	Drum speed > drum speed threshold	- Wire harness or connector failure - TCU failure	- Check wire harness or connector - Check TCU
P18024Bh	Temperature Monitoring Shift Actuator 1 Powerstage (Overtemperature)	Shift motor 1 heat load index >= Shift motor 1 heat load threshold	- Wire harness or connector failure - TCU failure	- Check wire harness or connector - Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180262h	Signal Level Correlation Monitoring Shift Actuator 1	Incremental position signal calculated from Hall sensor - PWM position signal from absolute sensor > position difference error		
P180311h	Phases Monitoring Shift Actuator 2: Short to Ground	Case 1, case 2: It depends on motor position: L1_PWM, L2_GND, L3_OFF: $10\% < L1_PWM < 100\%$ and phase voltage $L1 < \text{threshold}$ or L2_PWM, L3_GND, L1_OFF: $10\% < L2_PWM < 100\%$ and phase voltage $L2 < \text{threshold}$ or L3_PWM, L1_GND, L2_OFF: $10\% < L3_PWM < 100\%$ and phase voltage $L3 < \text{threshold}$. For case 1, it depends on the position of irrotational motor, whether the fault can be detected. Case 3 (three-state mode): phase voltage $L3 < 0.25\text{ V}$ Case 4 (-power level test): phase voltage $L3 < 0.25\text{ V}$	• Wire harness or connector failure • TCU failure • Shift motor failure	• Check wire harness or connector • Check shift motor • Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180313h	Phases Monitoring Shift Actuator 2: Open Circuit	Motor threshold is lower than lower limit		
P180315h	Phases Monitoring Shift Actuator 2: Short to Battery or Open Circuit	Phase 1, phase 2 or phase 3 ground and phase voltage L3 is above 250 mV	• Wire harness or connector failure • TCU failure • Shift motor failure	• Check wire harness or connector • Check shift motor • Check TCU
P180329h	Shift Actuator 2 Motor Speed Check	Drum speed > drum speed threshold		
P18034Bh	Temperature Monitoring Shift Actuator 2 Powerstage (Overtemperature)	Shift motor 2 heat load index $\geq$ Shift motor 2 heat load threshold		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180362h	Signal Level Correlation Monitoring Shift Actuator 2	Incremental position signal calculated from Hall sensor - PWM position signal from absolute sensor > position difference error		
P180392h	Phases Monitoring Shift Actuator 2: Performance or Incorrect Operation	Power level driver reports that there is internal failure or regular power level has been turned off		
P180312h	Phases Monitoring Shift Actuator 2: Short to Bat	Case 1, case 2: It depends on motor position: L1_PWM, L2_GND, L3_OFF: (0% < L1_PWM < 90% and phase voltage L1 > threshold) or phase voltage L2 > threshold or L2_PWM, L3_GND, L1_OFF: (0% < L2_PWM < 90% and phase voltage L2 > threshold) or phase voltage L3 > threshold or L3_PWM, L1_GND, L2_OFF: (0% < L3_PWM < 90% and phase voltage L3 > threshold) or phase voltage L1 > threshold. For case 1, it depends on the position of irrotational motor, whether the fault can be detected. Case 3: IPT PWM = 0 and motor current > 10 A during test		
DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P18064Bh	Temperature Monitoring Clutch Actuator 1 Powerstage (Overtemperature)	Motor heat load index >= Heat load threshold	- Wire harness or connector failure - Clutch motor 2 failure - TCU failure	- Check wire harness or connector - Check clutch motor 2 - Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P1806F1h	Clutch 1 Motor Speed Check (too Low)	(Pressure sensor status is invalid and clutch 1 brake actual speed < clutch 1 theoretical brake minimum speed) or (pressure sensor status is valid and clutch 1 brake actual speed = 0 and theoretical brake speed is required speed torque/ pressure for starting > clutch pump speed threshold)		
P18074Bh	Temperature Monitoring Clutch Actuator 2 Powerstage (Overtemperature)	Clutch 2 heat load index >= Clutch 2 heat load threshold		
P1807F1h	Clutch 2 Motor Speed Check (too Low)	(Pressure sensor status is invalid and clutch 1 brake actual speed < clutch 1 theoretical brake minimum speed) or (pressure sensor status is valid and clutch 1 brake actual speed = 0 and theoretical brake speed is required speed torque/ pressure for starting > clutch pump speed threshold)		
DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180811h	Voltage Level Monitoring ISS Odd Transmission Path: Supply Voltage Short to Ground	Power supply voltage < threshold	- Wire harness or connector failure - ISS sensor failure - TCU failure	- Check wire harness or connector - Check ISS sensor - Check TCU
P180812h	Voltage Level Monitoring ISS Odd Transmission Path: Supply Voltage Short to Bat	Power supply voltage > threshold		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180A11h	Voltage Level Monitoring of Actuator Sensor Clutch 2: Supply Voltage Short Circuit to Ground	The timer is zero when power supply is abnormal, power supply voltage level of sensor power regulator is lower than maximum threshold and the sensor power voltage is lower than SG threshold	- Wire harness or connector failure - Clutch motor 2 failure - TCU failure	- Check wire harness or connector - Check clutch motor 2 - Check TCU
P180A12h	Voltage Level Monitoring Actuator Sensor Clutch 2: Supply Voltage Short Circuit to Battery	The timer is zero when power supply is abnormal, power supply voltage level of sensor power regulator is lower than maximum threshold and the sensor power voltage is higher than SB threshold		
P180A1Ch	Voltage Level Monitoring Actuator Sensor Clutch 2: Supply Voltage Out of Range High	Power supply voltage > upper limit		
P180A1Dh	Voltage Level Monitoring Actuator Sensor Clutch 2: Supply Voltage Out of Range Low	Power supply voltage < upper limit		
DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180B11h	Voltage Level Monitoring of Actuator Sensor Clutch 1: Supply Voltage Short Circuit to Ground	The timer is zero when power supply is abnormal, power supply voltage level of sensor power regulator is lower than maximum threshold and the sensor power voltage is lower than SG threshold	- Wire harness or connector failure - Clutch motor 1 failure - TCU failure	- Check wire harness or connector - Check clutch motor - Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180B12h	Voltage Level Monitoring of Actuator Sensor Clutch 1: Supply Voltage Short Circuit to Battery	The timer is zero when power supply is abnormal, power supply voltage level of sensor power regulator is lower than maximum threshold and the sensor power voltage is higher than SB threshold		
P180B1Ch	Voltage Level Monitoring of Actuator Sensor Clutch 1: Supply Voltage Out of Range High	Power supply voltage > upper limit		
P180B1Dh	Voltage Level Monitoring of Actuator Sensor Clutch 1: Supply Voltage Out of Range Low	Power supply voltage < upper limit		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180C11h	Voltage Level Monitoring Sensor Shift Motor 1: Supply Voltage Short Circuit to Ground	The timer is zero when power supply is abnormal, power supply voltage level of sensor power regulator is lower than maximum threshold and the sensor power voltage is lower than SG threshold	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P180F11h	Voltage Level Monitoring Pressure Sensor 1: Supply Voltage Short to Ground			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180C12h	Voltage Level Monitoring Sensor Shift Motor 1: Supply Voltage Short Circuit to Battery	The timer is zero when power supply is abnormal, power supply voltage level of sensor power regulator is lower than maximum threshold and the sensor power voltage is higher than SB threshold	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P180E12h	Voltage Level Monitoring Sensor Clutch Cooling Motor: Supply Voltage Short Circuit to Battery			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180F12h	Voltage Level Monitoring Pressure Sensor 1: Supply Voltage Short to Battery			
DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180C1Ch	Voltage Level Monitoring Sensor Shift Motor 1: Supply Voltage Out of Range High	Power supply voltage > upper limit	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P180F1Ch	Voltage Level Monitoring Pressure Sensor 2: Supply Voltage Out of Range High			
DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180C1Dh	Voltage Level Monitoring Sensor Shift Motor 1: Supply Voltage Out of Range Low	Power supply voltage < upper limit	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P18111Dh	Voltage Level Monitoring Pressure Sensor 2: Supply Voltage Out of Range Low			
DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180D11h	Voltage Level Monitoring Sensor Shift Motor 2: Supply Voltage Short Circuit to Ground	The timer is zero when power supply is abnormal, power supply voltage level of sensor power regulator is lower than maximum threshold and the sensor power voltage is lower than SG threshold	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P181111	Voltage Level Monitoring Pressure Sensor 2: Supply Voltage Short to Ground			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180D12h	Voltage Level Monitoring Sensor Shift Motor 2: Supply Voltage Short Circuit to Battery	The timer is zero when power supply is abnormal, power supply voltage level of sensor power regulator is lower than maximum threshold and the sensor power voltage is higher than SB threshold	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P181112	Voltage Level Monitoring Pressure Sensor 2: Supply Voltage Short to Ground			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180D1Ch	Voltage Level Monitoring Sensor Shift Motor 2: Supply Voltage Out of Range High	Power supply voltage > upper limit	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P18111Ch	Voltage Level Monitoring Pressure Sensor 2: Supply Voltage Out of Range High			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P180D1Dh	Voltage Level Monitoring Sensor Shift Motor 2: Supply Voltage Out of Range Low	Power supply voltage < upper limit	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P18111Dh	Voltage Level Monitoring Pressure Sensor 2: Supply Voltage Out of Range Low			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181011h	Voltage Level Monitoring Pressure Sensor 1: Signal Short to Ground	Pressure sensor signal voltage < signal SCG percentage	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P181211h	Voltage Level Monitoring Pressure Sensor 2: Signal Short to Ground			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181015h	Voltage Level Monitoring Pressure Sensor 1: Signal Short to Battery or Open Circuit	Pressure sensor signal voltage > TPS1 signal SCG percentage	• Wire harness or connector failure • Sensor failure • TCU failure	• Check wire harness or connector • Check sensor • Check TCU
P181215h	Voltage Level Monitoring Pressure Sensor 2: Signal Short to Battery or Open Circuit			
P18101Ch	Voltage Level Monitoring Pressure Sensor 1: Signal Out of Range High	Pressure sensor signal >= TPS signal upper limit or threshold		
P18121Ch	Voltage Level Monitoring Pressure Sensor 2: Signal Out of Range High			
P18101Dh	Voltage Level Monitoring Pressure Sensor 1: Signal Out of Range Low	Pressure sensor signal <= TPS signal upper limit or threshold		
P18121Dh	Voltage Level Monitoring Pressure Sensor 2: Signal Out of Range Low			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181516h	Voltage Level Monitoring Temperature Sensor 1: Circuit Voltage Below Threshold	Signal voltage < sensor lower limit	• Wire harness or connector failure • Sensor failure • TCU failure	• Check wire harness or connector • Check sensor • Check TCU
P181616h	Voltage Level Monitoring Temperature Sensor 2: Circuit Voltage Below Threshold			
P181716h	Voltage Level Monitoring Temperature Sensor 3: Circuit Voltage Below Threshold			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181517h	Voltage Level Monitoring Temperature Sensor 1: Circuit Voltage Above Threshold	Signal voltage < sensor upper limit		
P181617h	Voltage Level Monitoring Temperature Sensor 2: Circuit Voltage Above Threshold			
P181717h	Voltage Level Monitoring Temperature Sensor 3: Circuit Voltage Above Threshold			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181892h	Target Position Not Reached in a Defined Time, Changed Position to N or P	During transmission in P, the driver requests transmission in R or N or D or M, or during transmission in R or N or D or M, the driver requests transmission in P, and this gear is not used after waiting	• Wire harness or connector failure • Shift module failure • TCU failure	• Check wire harness or connector • Check shift module • Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181992h	Clutch 1 Position Signal	Check valid Hall mode: Hall mode is 0 or 7 or Hall mode has sequence error	• Wire harness or connector failure • Motor failure • TCU failure	• Check wire harness or connector • Check motor • Check TCU
P181A92h	Clutch 2 Position Signal			
P182092h	Hall Plausi Shift Actuator 1			
P182192h	Hall Plausi Shift Actuator 2			
P182292h	Hall Plausi Cooling Actuator	Check valid Hall mode: Hall mode is 000 or 111 or Hall mode has sequence error		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P181B22h	Jump Detection of Oil Temperature Value	Temperature gradient of oil pan > temperature gradient threshold of oil pan is greater than temperature gradient value of oil pan	- Wire harness or connector failure - Transmission oil loss - TCU failure	- Check wire harness or connector - Check transmission oil - Check TCU
P181B2Ah	Oil Temperature Value is Stuck	Comparison of actual oil temperature and oil temperature < minimum change of oil temperature is longer than the observation time of D45		
P181B64h	Offset Detection of Oil Temperature Value	Oil pan temperature - ambient temperature > D45 temperature offset error		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182035h	PWM Duty Monitoring Shift Actuator 1 Out of Range High	Signal duty ratio < minimum duty ratio of motor position sensor	- Wire harness or connector failure - Motor failure - TCU failure	- Check wire harness or connector - Check shift module - Check TCU
P182135	PWM Duty Monitoring Shift Actuator 2 Out of Range High			
P182034h	PWM Duty Monitoring Shift Actuator 1 Out of Range Low	Signal duty ratio > maximum duty ratio of motor position sensor		
P182134	PWM Duty Monitoring Shift Actuator 2 Out of Range Low			
P182037h	Carrier Frequency Monitoring Shift Actuator 1 Out of Range High	Signal carrier cycle time < minimum value of motor position sensor		
P182137h	Carrier Frequency Monitoring Shift Actuator 2 Out of Range High			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182036h	Carrier Frequency Monitoring Shift Actuator 1 Out of Range Low	Signal carrier cycle time > maximum value of motor position sensor		
P182136h	Carrier Frequency Monitoring Shift Actuator 2 Out of Range Low			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182372h	Engagement Failure Detection Odd Transmission Path	Timeout detection: The different stages of the participation process (until reaching the participating position) should be completed within the specified participation time (- different time for each stage). Or block detection: At different stages of the engagement (- brake movement should be expected), the shift drum position should be monitored. If the position difference (10 ms) between two task calls is lower than the position difference threshold, the block debounce time should be used to eliminate the error. Number of meshing attempts > Meshing retry threshold (- depending on gear)		
P182373h	Disengagement Failure Detection Odd Transmission Path			
P182472h	Engagement Failure Detection Even Transmission Path			
P182473h	Disengagement Failure Detection Even Transmission Path			
			• Wire harness or connector failure • Shift drum motor failure • TCU failure	• Check wire harness or connector • Check shift drum motor • Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182394h	Gear Jump Detection Odd Transmission Path	ISS odd path-OSS * gear ratio of meshing gear > calibrated output speed difference 1 or (ISS odd path-OSS * gear ratio of meshing gear > calibrated output speed difference 2 and OSS > calibrated output speed) and exceeded single detection time or (- nominal gear cannot be reached, and the controller has been turned off (the gear mesh window has been reached) and the position difference exceeds the threshold (- depending on gear)), and the number of gear jumps > gear jump threshold (- depending on gear)	• Wire harness or connector failure • ISS1 sensor failure • TCU failure	• Check wire harness or connector • Check ISS1 sensor • Check TCU
P182494h	Gear Jump Detection Even Transmission Path	ISS2 even path-OSS * gear ratio of meshing gear > calibrated output speed difference 1 or (ISS odd path-OSS * gear ratio of meshing gear > calibrated output speed difference 2 and OSS > calibrated output speed) and exceeded single detection time or (- nominal gear cannot be reached, and the controller has been turned off (the gear mesh window has been reached) and the position difference exceeds the threshold (- depending on gear)), and the number of gear jumps > gear jump threshold (- depending on gear)	• Wire harness or connector failure • ISS2 sensor failure • TCU failure	• Check wire harness or connector • Check ISS2 sensor • Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182577h	Shiftdrum 1 Movement Monitoring (- Unexpected Shiftdrum 1 Standstill)	Drum displacement is not detected (The ratio between theoretical displacement drum position change rate and actual displacement drum position change rate < minimum position ratio or > maximum position ratio) Note: The displacement drum position should be calculated from the position model	- Wire harness or connector failure - TCU failure	- Check wire harness or connector - Check TCU
P182677h	Shiftdrum 2 Movement Monitoring (- Unexpected Shiftdrum 2 Standstill)			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182707h	Synchronization Failure Odd Transmission Path	Shift drum position > Pos threshold (- depending on gear) and ABS (input shaft speed - target input shaft speed) > speed threshold (- depending on gear) and number of gear meshing attempts > meshing retry threshold (- depending on gear)	- Wire harness or connector failure - Sensor failure - TCU failure	- Check wire harness or connector - Check sensor - Check TCU
P182807h	Synchronization Failure Even Transmission Path			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182929h	Continuous Monitoring of Mechanical End Stop Shift Drum 1	Position difference between learned shift drum block and measured shift drum mechanical end > mechanical end	- Wire harness or connector failure - Shift drum failure - TCU failure	- Check wire harness or connector - Check shift drum - Check TCU
P182A29h	Continuous Monitoring of Mechanical End Stop Shift Drum 2			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182D98h	Temperature Monitoring Clutch 1	Normalized clutch stress level $\geq$ (- clutch stress level threshold + clutch stress level hyst)	/	/
P182E98h	Temperature Monitoring Clutch 2			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P182F98h	Temperature Monitoring Sump Oil Temperature	Oil pan pressure >= (oil pan pressure level + oil pan pressure + oil pan pressure)	/	/
P183098h	Temperature Monitoring Clutch1, Clutch2 and Sump Oil Temperature for 1st Warning Level / Functional Degradation Level	Clutch protection warning level 1 is set according to clutch temperature, oil temperature, vehicle speed, depressing pedal or not.		
P183198h	Temperature Monitoring Clutch1, Clutch2 and Sump Oil Temperature for 2nd Warning Level / Functional Degradation Level	Clutch protection warning level 2 is set according to clutch temperature, oil temperature, vehicle speed, depressing pedal or not.		
DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P183277h	Monitoring Park Lock Position	Unreasonable position monitoring	- Wire harness or connector failure - Range sensor failure - TCU failure	- Check wire harness or connector - Check range sensor - Check TCU
P183307h	Clutch 1 Drag Torque Detection	The odd path of input shaft speed is more than the engine speed, and the calculated torque is more than the resistance tq threshold ins gt eng, the odd path of input shaft speed is less than the engine speed ,and the calculated torque is more than the resistance tq threshold ins lt eng	- Unlearned clutch - Clutch failure - TCU failure	- Check clutch self-learning - Check clutch - Check TCU
P183407h	Clutch 2 Drag Torque Detection			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P183592h	Shift Drum 1 Teach-in Failure	The actuator cannot be moved; Because the actuator is in the wrong direction, the measured shift drum length is outside the specified window, the shift drum signal is invalid or the learning was suspended 3 times as the power level was turned off.	- Wire harness or connector failure - Transmission range sensor failure - TCU failure - Shift drum motor failure	- Check for wire harness or connector failure - Check transmission range sensor - Check TCU - Check shift drum motor
P183692h	Shift Drum 2 Teach-in Failure			

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P183796h	Welding Fracture Monitoring	(Drive shaft speed / non-drive shaft > standardized shaft speed difference). (The gradient of driven shaft speed < speed gradient threshold) and (the sum of gears meshed on two gears of transmission (- external clutch torque > (depending on tq offset of gear combination + maximum (engine static torque, torque required by driver) + tq factor depending on gear combination * max (engine static torque, torque required by driver))) and (internal clutch torque < internal clutch torque = one third))	Clutch failure	Check clutch

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P183816h	Voltage Level Monitoring High Power Supply Undervoltage 1st Threshold	High power battery voltage $\leq$ vbatt under voltage threshold	- Battery failure - Alternator failure	- Check battery - Check for alternator failure
P183916h	Voltage Level Monitoring High Power Supply Undervoltage 2nd Threshold	Low power battery voltage > (vperm over voltage threshold + vperm over voltage lag)	- Wire harness or connector failure - TCU failure	- Check wire harness or connector - Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P183817h	Voltage Level Monitoring High Power Supply Overvoltage 1st Threshold	High power battery voltage $\geq$ (vbatt over voltage threshold + vperm over voltage lag)		
P183A16h	Voltage Level Monitoring Low Power Supply Undervoltage	Low power battery voltage $\leq$ vperm under voltage threshold		
P183917h	Voltage Level Monitoring High Power Supply Overvoltage 2nd Threshold	High power battery voltage $\geq$ (vbatt over voltage threshold 2 + vbatt over voltage lag 2)		
P183A17h	Voltage Level Monitoring Low Power Supply Overvoltage	Low power battery voltage $>$ (vperm over voltage threshold + vperm over voltage lag)		

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P183B4Bh	Temperature Monitoring TCU (Overtemperature)	Temperature exceeds the maximum temperature of PCB.	TCU temperature is abnormal	Check TCU

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
P183C47	Base SW Test Result of the Initial Cut off Test	The IPT status of Mot A is abnormal, the IPT status of Mot B is abnormal, the IPT status of Mot C is abnormal, the IPT status of Mot D is abnormal or the IPT status of Mot E is abnormal	- Wire harness or connector failure - TCU failure	- Check wire harness or connector - Check TCU
P183D42h	Analyse EEPROM Values	The EEPROM check will be performed on the hardware supplier side. Handling procedure for EEPROM reports an error		
P330047h	Level 2 Safety Goal SZ1: Unwanted Engine Torque Increase	Reset SZ1 mark to TRUE and reset SZ1 mark complement to FALSE	/	/
P330147h	Level 2 Safety Goal SZ2: Unwanted	Reset SZ2 mark to TRUE and reset SZ2	/	/

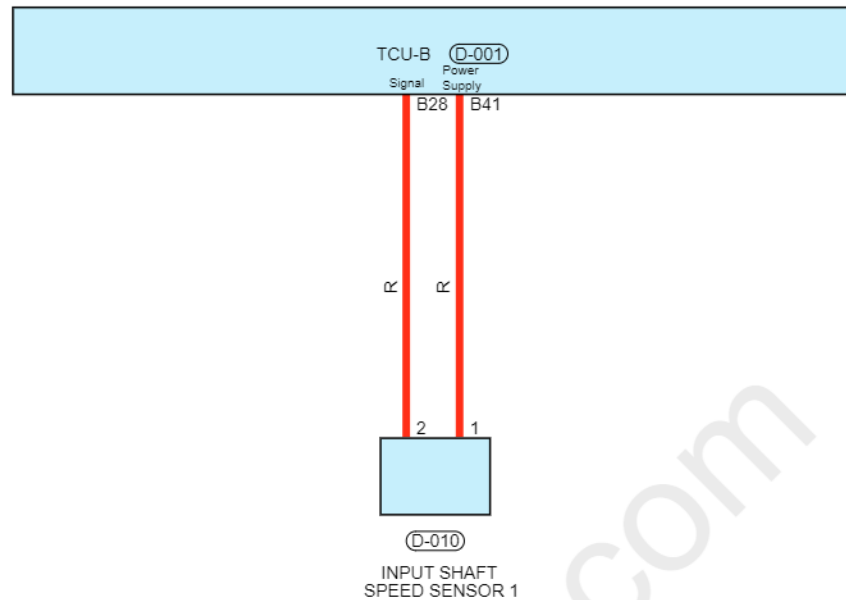
DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
	Launch in Wrong Direction	mark complement to FALSE		
P330247h	Level 2 Safety Goal SZ3: Unwanted Shifting to R While Driving	Reset SZ3 mark to TRUE and reset SZ3 mark complement to FALSE	/	/
P330447h	Level 2 Safety Goal SZ6a: Unwanted Downshift (Inside Allowed Input Shaft Speed Range)	Reset SZ6 mark to TRUE and reset SZ6 mark complement to FALSE	/	/
P330547h	Level 2 Safety Goal SZ6b: Unwanted Downshift (Outside Allowed Input Shaft Speed Range)	Reset SZ6b mark to TRUE and reset SZ6b mark complement to FALSE	/	/
P330647h	Level 2 Safety Goal SZ7: Clutch Tie-up	Reset SZ2 mark to TRUE and reset SZ2 mark complement to FALSE	/	/
P330747h	Level 2 Safety Goal SZ8: Clutch Overspeed	Reset SZ2 mark to TRUE and reset SZ2 mark complement to FALSE	/	/
P330847h	Level 2 Safety Goal SZ13: Unwanted Disengaging P	Reset SZ13 mark to TRUE and reset SZ13 mark complement to FALSE	/	/
P330947h	Level 2 Safety Goal SZ14: P Not Engaging	Reset SZ14 mark to TRUE and reset SZ14 mark complement to FALSE	/	/
P330A47h	Level 2 Safety Goal SZ16: Unwanted Engaging of P	Reset SZ16 mark to TRUE and reset SZ16 mark complement to FALSE	/	/
P330B47h	Level 2 Safety Goal SZ19a: Wrong Display Position P	Reset SZ19a mark to TRUE and reset SZ19a mark complement to FALSE	/	/
P330C47h	Level 2 Safety Goal SZ19b: Wrong Display Position D/ R	Reset SZ19b mark to TRUE and reset SZ19b mark complement to FALSE	/	/
P330D47h	Level 2 Safety Goal SZ19c: Wrong	Reset SZ19c mark to TRUE and reset SZ19c mark	/	/

DTC	DTC Definition	Detection Condition	Possible Cause	Repair Advice
	Display Position N/P	complement to FALSE		
P331047h	level 2 Safety Goal Memory Protection	Reset MEMPROT_ERR mark to TRUE and reset MEMPROT_ERR mark complement to FALSE	/	/
P331147h	level 2 Safety Goal Calibration Pointer Protection	Reset CALPTR_ERR mark to TRUE and reset CALPTR_ERR mark complement to FALSE	/	/
P332047h	Level 3 Safety Function Has Become Active	Reset reason information > 0 and (reset reason information < 11 or reset reason information > 11)	/	/

4.7 DTC Diagnosis Procedure

DTC	P180803h	PWM Monitoring ISS Odd Transmission Path: Pulse Width Failure
DTC	P181812h	Voltage Level Monitoring ISS Odd Transmission Path: Electrical Signal Short to Bat
DTC	P180814h	Voltage Level Monitoring ISS Odd Transmission Path: Electrical Signal Short to Ground or Open Circuit
DTC	P18081Ch	Voltage Level Monitoring ISS Odd Transmission Path: Supply Voltage Out of Range High
DTC	P18081Dh	Voltage Level Monitoring ISS Odd Transmission Path: Supply Voltage Out of Range Low
DTC	P180837h	Frequency Monitoring ISS Odd Transmission Path: Frequency Failure
DTC	P180894h	Jump Detection ISS Odd Transmission Path
DTC	P180829h	Speed Monitoring ISS Odd Transmission Path

Circuit Diagram



SAE006001

Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to ON.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- (4) If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- (5) Only use a digital multimeter to measure voltage of electronic system.
- (6) Refer to any Technical Bulletin that may apply to this malfunction.
- (7) Visually check the related wire harness.
- (8) Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- (9) If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

 Caution

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

1 Check battery

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

NG

Replace battery.

OK

2 Check alternator

(a) Check generating capacity of alternator.

NG

Replace alternator.

OK

3 Check odd input shaft speed sensor connector

(a) Turn ENGINE START STOP switch to OFF.

(b) Disconnect the negative battery cable.

(c) Disconnect odd input shaft speed sensor connector D-010 and TCU connector D-001.

(d) Check connector for poor connection or contact.

NG

Reinstall or repair, replace connector.

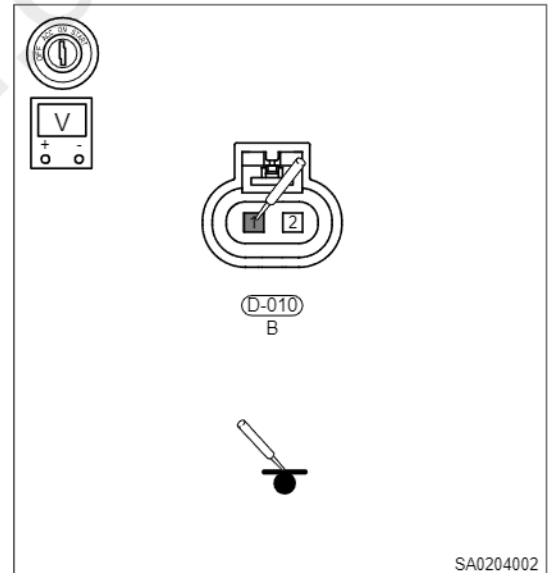
OK

4 Check odd input shaft speed sensor power supply voltage

(a) Turn ENGINE START STOP switch to ON.

(b) (Online detection) Using a digital multimeter, measure voltage of terminal 1 of odd input shaft speed sensor connector D-010.

Multimeter Connection	Condition	Specified Condition
D-010 (1) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG

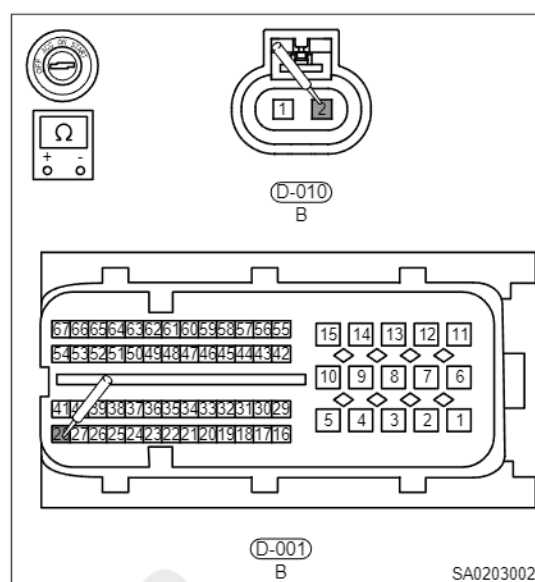
Check and repair wire harness between D-010 (1) and TCU.

OK

5 Check odd input shaft speed sensor signal circuit

- (a) Turn ENGINE START STOP switch to OFF, disconnect the negative battery cable.
- (b) Disconnect the TCU connector D-001.
- (c) Check wire harness between input shaft speed sensor and ECU terminal.

Multimeter Connection	Condition	Specified Condition
D-001 (28) - D-010 (2)	Always	Resistance $\leq 1 \Omega$



NG

Replace or repair wire harness or connector (- Input shaft sensor - TCU).

OK

6

Check odd input shaft speed sensor

- (a) Disconnect the negative battery cable.
- (b) Check if resistance between two terminals of input shaft speed sensor is normal.

NG

Replace odd input shaft speed sensor.

OK

7

Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTC.
- (c) Start the engine.
- (d) Check if the same DTCs are output.

OK

System operates normally.

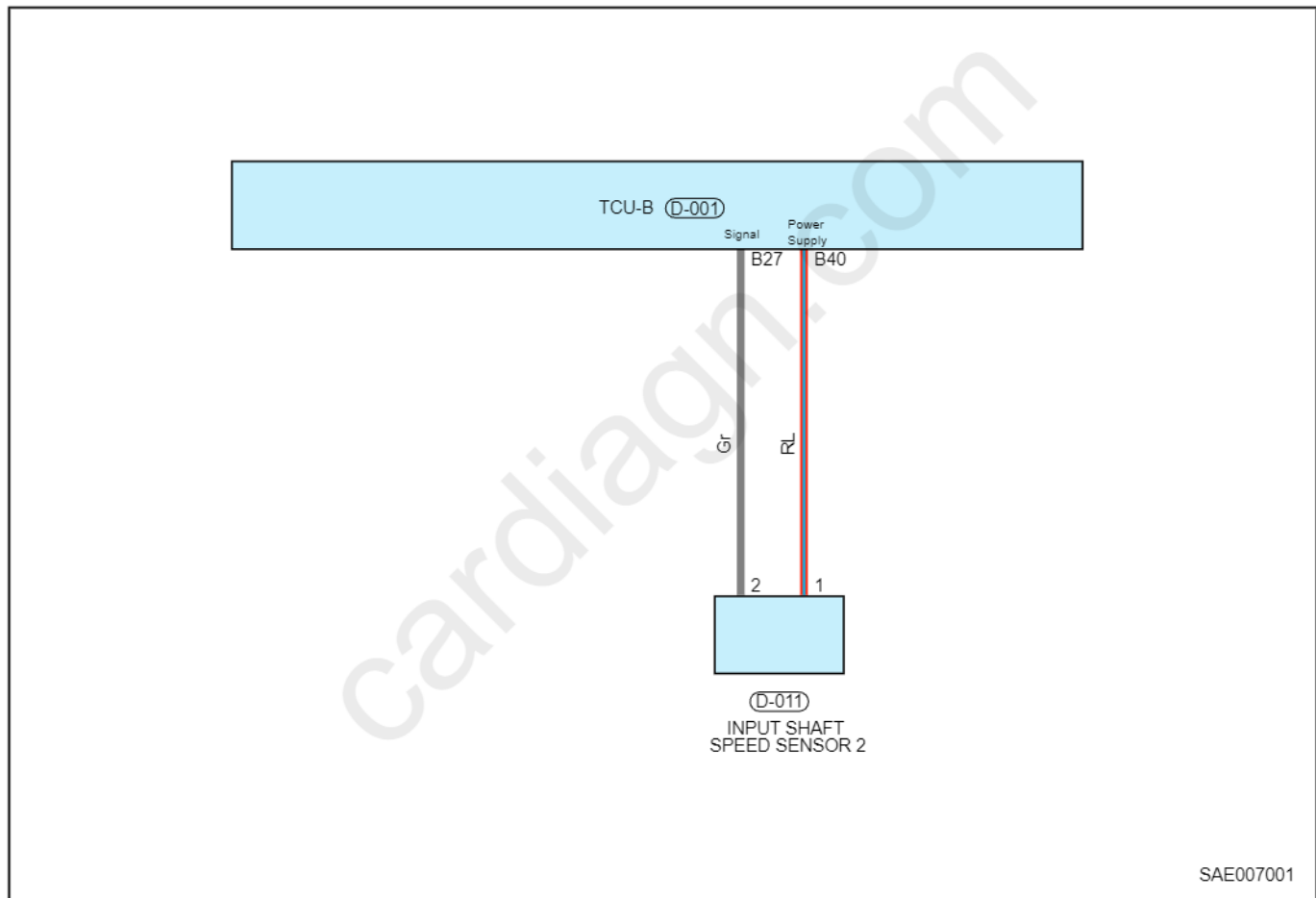
NG

Replace TCU control module assembly and perform self-learning.

DTC	P180903h	PWM Monitoring ISS Even Transmission Path: Pulse Width Failure
DTC	P180911h	Voltage Level Monitoring ISS Even Transmission Path: Electrical Signal Short to Ground or Open Circuit
DTC	P180912h	Voltage Level Monitoring ISS Even Transmission Path: Supply Voltage Short to Bat

DTC	P18091Ch	Voltage Level Monitoring ISS Even Transmission Path: Supply Voltage Out of Range High
DTC	P18091Dh	Voltage Level Monitoring ISS Even Transmission Path: Supply Voltage Out of Range Low
DTC	P181912h	Voltage Level Monitoring ISS Even Transmission Path: Electrical Signal Short to Bat
DTC	P180914h	Voltage Level Monitoring ISS Even Transmission Path: Electrical Signal Short to Ground or Open Circuit
DTC	P180994h	Jump Detection ISS Even Transmission Path
DTC	P180929h	Speed Monitoring ISS Even Transmission Path

Circuit Diagram



SAE007001

Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to ON.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- (4) If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- (5) Only use a digital multimeter to measure voltage of electronic system.
- (6) Refer to any Technical Bulletin that may apply to this malfunction.
- (7) Visually check the related wire harness.
- (8) Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.

- (9) If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

⚠ Caution

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

1 Check battery

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

NG

Replace battery.

OK

2 Check alternator

- (a) Check generating capacity of alternator.

NG

Replace alternator.

OK

3 Check even input shaft speed sensor connector

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Disconnect even input shaft speed sensor connector D-011 and TCU connector D-001.
 (d) Check connector for poor connection or contact.

NG

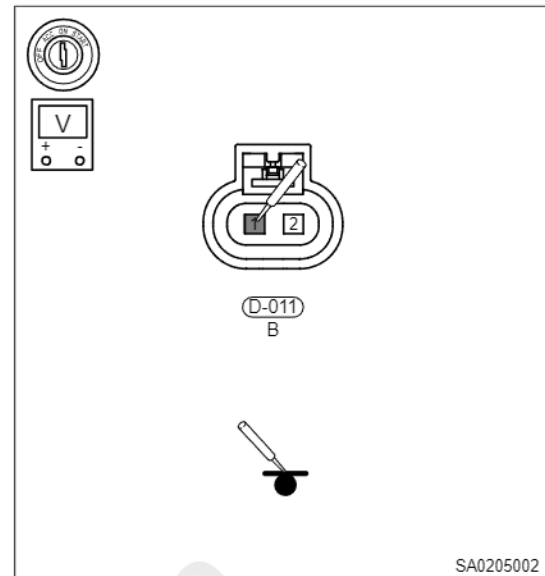
Reinstall or repair, replace connector.

OK

4 Check power supply voltage of even input shaft speed sensor

- (a) Turn ENGINE START STOP switch to ON.
- (b) (Online detection) Using a digital multimeter, measure voltage of terminal 1 of even input shaft speed sensor connector D-011.

Multimeter Connection	Condition	Specified Condition
D-011 (1) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG

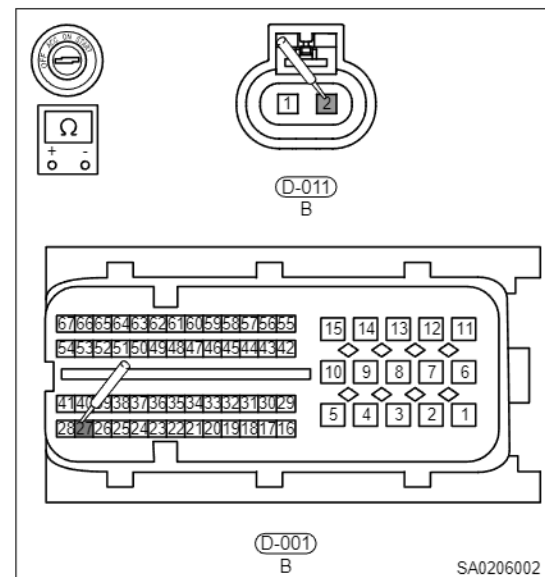
Check and repair wire harness between D-011 (1) and TCU.

OK

5 Check even input shaft speed sensor signal circuit

- (a) Turn ENGINE START STOP switch to OFF, disconnect the negative battery cable.
- (b) Disconnect the TCU connector D-001.
- (c) Check wire harness between input shaft speed sensor and TCU terminal.

Multimeter Connection	Condition	Specified Condition
D-001 (27) - D-011 (2)	Always	Resistance $\leq 1 \Omega$



NG

Replace wire harness or connector (Input shaft sensor - TCU).

OK

6 Check even input shaft speed sensor

- (a) Disconnect the negative battery cable.
- (b) Check if resistance between two terminals of input shaft speed sensor is normal.

NG

Replace even input shaft speed sensor.

OK

7

Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTC.
- (c) Start the engine.
- (d) Check if the same DTCs are output.

OK

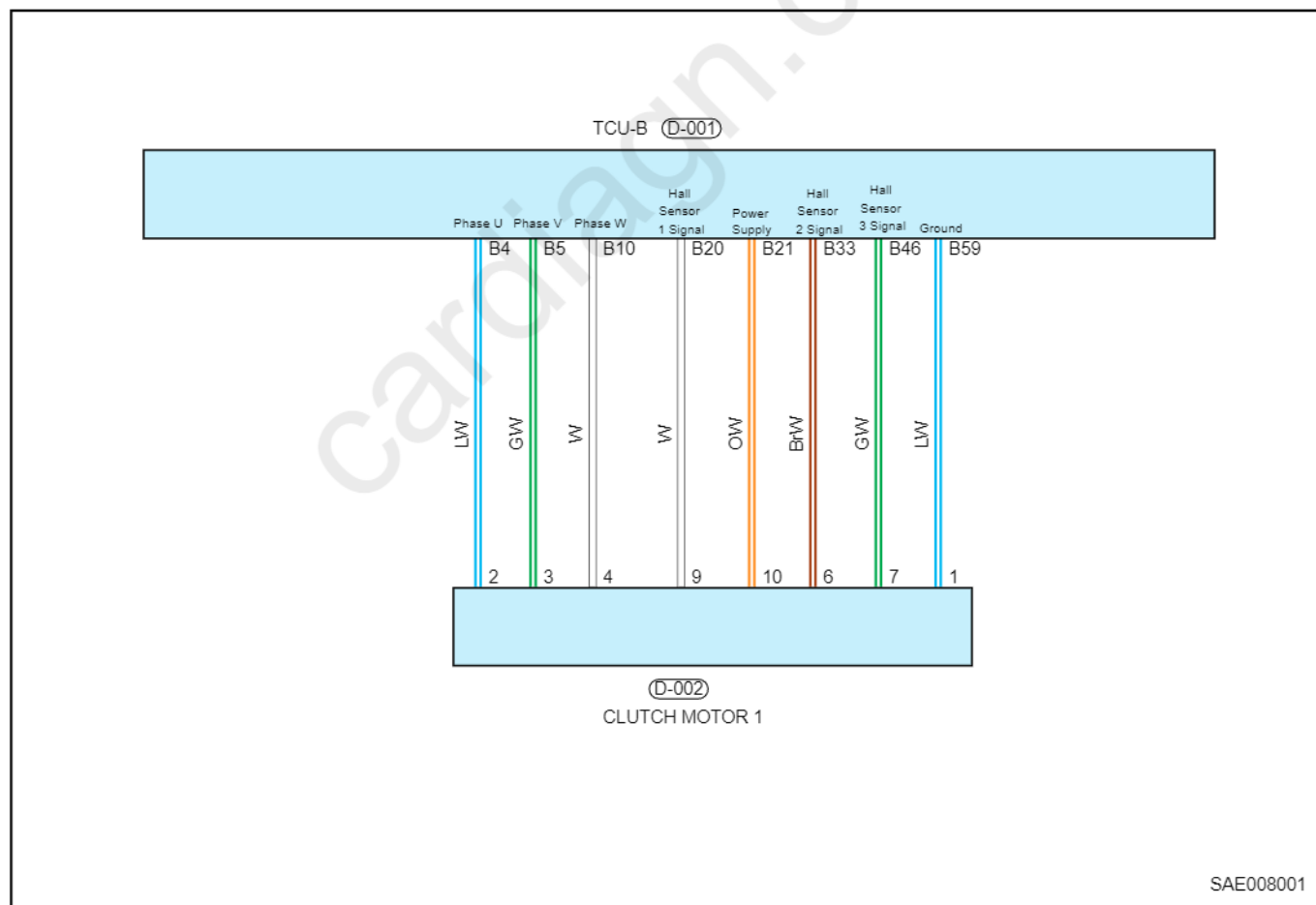
System operates normally.

NG

Replace TCU control module assembly and perform self-learning.

DTC	P180013h	Phases Monitoring Clutch Actuator 1: Open Circuit
DTC	P180012h	Phases Monitoring Clutch Actuator 1: Short to Bat
DTC	P180011h	Phases Monitoring Clutch Actuator 1: Short to Ground

Circuit Diagram



Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to ON.

- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- (4) If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- (5) Only use a digital multimeter to measure voltage of electronic system.
- (6) Refer to any Technical Bulletin that may apply to this malfunction.
- (7) Visually check the related wire harness.
- (8) Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- (9) If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

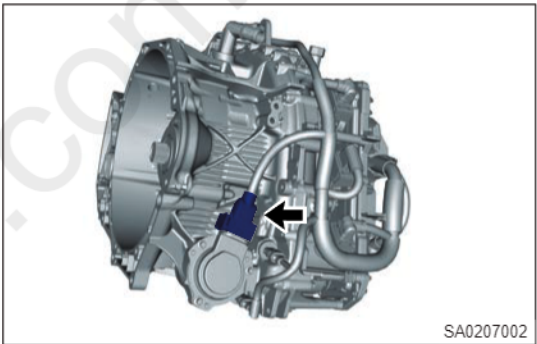
 **Caution**

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

1

Check clutch actuator motor 1 connector

(a) Check if clutch actuator motor 1 connector D-002 (arrow) is connected infirmly, damaged or cracked.



NG

Repair or replace connector.

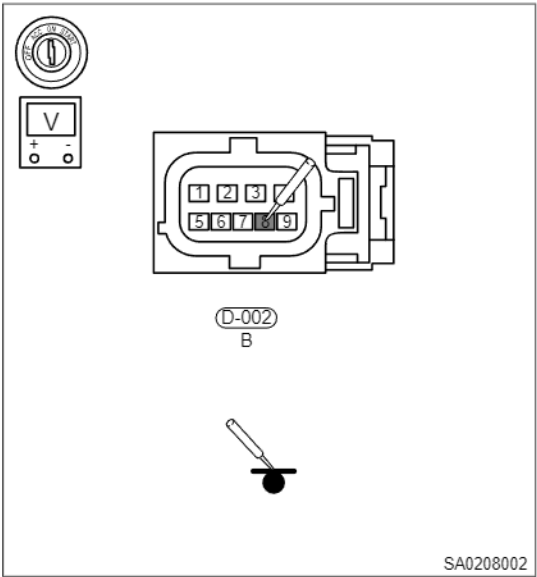
OK

2

Check clutch actuator motor 1 power supply voltage

- (a) Turn ENGINE START STOP switch to ON.
- (b) Check the voltage between clutch actuator motor 1 connector terminal (8) and ground.
- Check for Open

Multimeter Connection	Condition	Specified Condition
D-002 (8) - Body ground	ENGINE START STOP switch ON	5 V



NG

Repair or replace power supply wire harness between clutch actuator motor 1 and TCU.

OK

3 Check clutch actuator motor 1 circuit

- (a) Disconnect the TCU connector D-001.
 (b) Check wire harness between clutch actuator motor 1 connector terminal and TCU connector terminal.
 Check for Open

Multimeter Connection	Condition	Specified Condition
D-002 (6) - D-001 (33)	Always	Resistance $\leq 1 \Omega$
d-002(7) - D-001(46)	Always	Resistance $\leq 1 \Omega$
D-002 (9) - D-001 (20)	Always	Resistance $\leq 1 \Omega$

Check for Short

Multimeter Connection	Condition	Specified Condition
D-002 (6, 7, 9) or D-001 (33, 46, 20) - Body ground	Always	Resistance ∞
D-002 (6, 7, 9) or D-001 (33, 46, 20) - Body ground	Always	Resistance ∞

NG

Repair or replace wire harness or connector (- Clutch actuator motor 1 - TCU)

OK

4 Check clutch actuator motor 1

- (a) Check the clutch actuator motor 1.

NG

Replace clutch actuator motor 1.

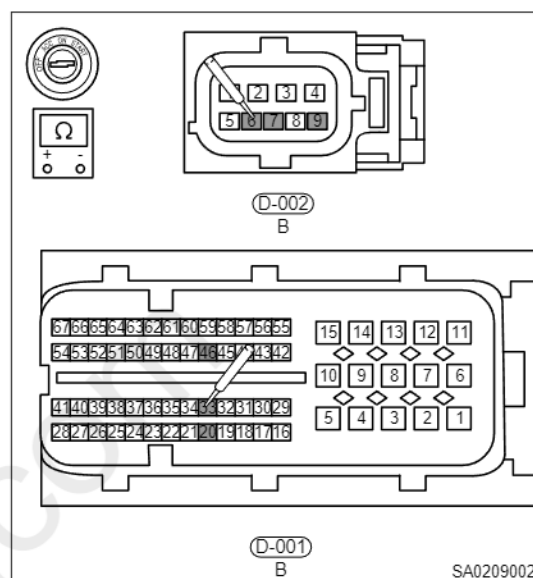
OK

5 Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTC.
 (c) Perform self-learning of clutch motor.
 (d) Start the engine.
 (e) Check if the same DTCs are output.

OK

System operates normally.

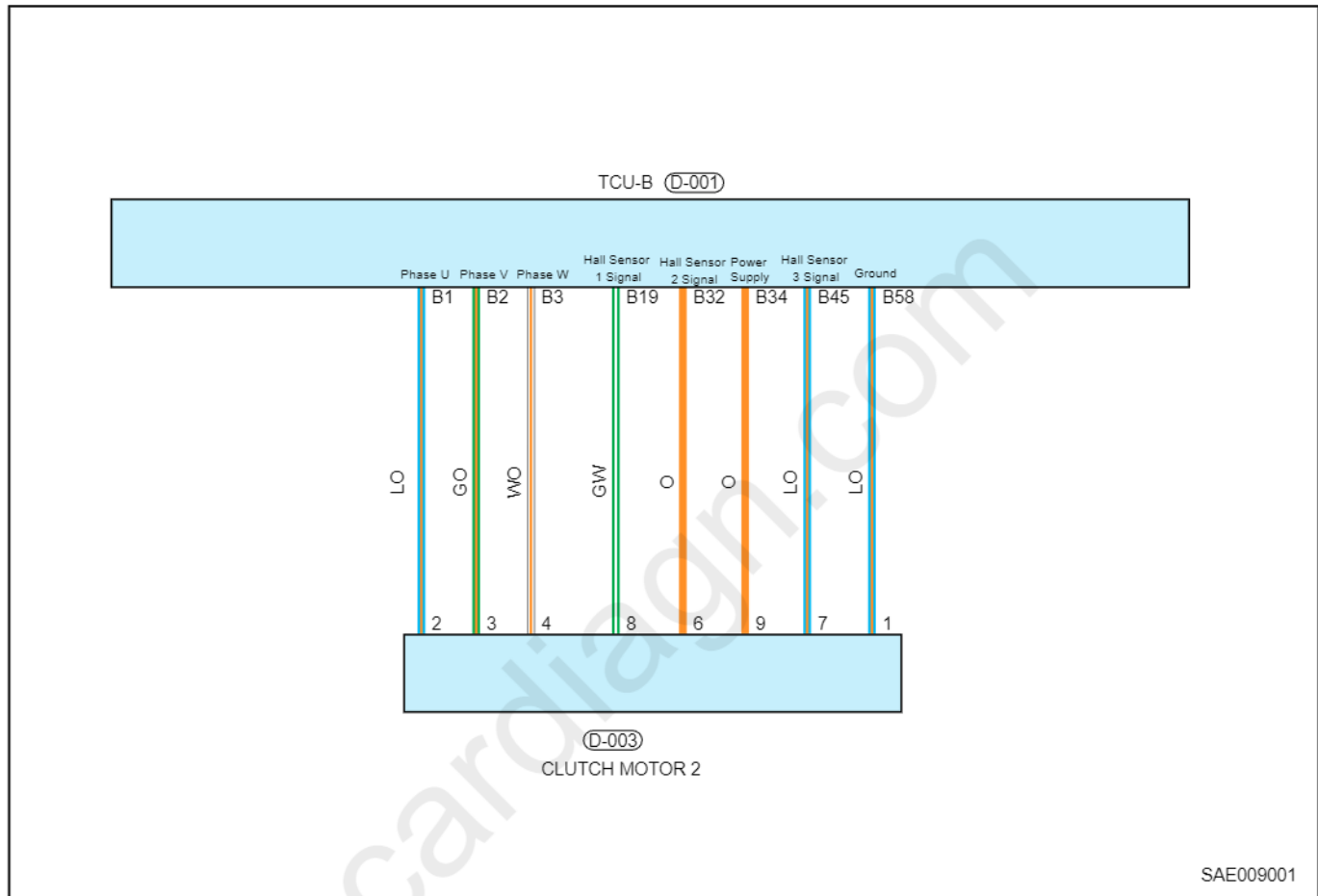


NG

Replace TCU control module assembly and perform self-learning.

DTC	P180113h	Phases Monitoring Clutch Actuator 2: Open Circuit
DTC	P180115h	Phases Monitoring Clutch Actuator 2: Short to Battery or Open Circuit

Circuit Diagram

**Confirmation Procedure**

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

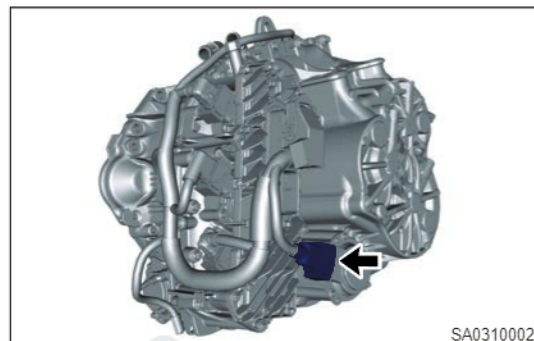
- (1) Turn ENGINE START STOP switch to ON.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- (4) If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- (5) Only use a digital multimeter to measure voltage of electronic system.
- (6) Refer to any Technical Bulletin that may apply to this malfunction.
- (7) Visually check the related wire harness.
- (8) Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- (9) If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

⚠ Caution

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

1 Check clutch actuator motor 2 connector

- (a) Check if clutch actuator motor 2 connector D - 003 (arrow) is connected infirmly, damaged or cracked.



NG

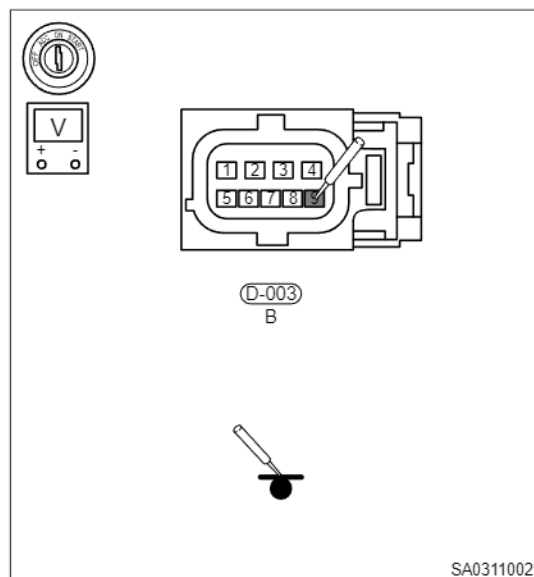
Repair or replace connector.

OK

2 Check clutch actuator motor 2 power supply voltage

- (a) Turn ENGINE START STOP switch to ON.
 (b) Check the voltage between clutch actuator motor 2 connector terminal (1) and ground.

Multimeter Connection	Condition	Specified Condition
D-003 (9) - Ground	ENGINE START STOP switch ON	5 V



NG

Repair or replace power supply wire harness between clutch actuator motor 2 and TCU.

OK

3 Check clutch actuator motor 2 circuit

- (a) Disconnect the TCU connector D-001.
- (b) Check wire harness between clutch actuator motor 2 connector terminal and TCU connector terminal.
- Check for Open

Multimeter Connection	Condition	Specified Condition
D-003 (6) - D-001 (32)	Always	Resistance $\leq 1 \Omega$
D-003 (7) - D-001 (45)	Always	Resistance $\leq 1 \Omega$
D-003(8) - B-D-001(19)	Always	Resistance $\leq 1 \Omega$

Check for Short

Multimeter Connection	Condition	Specified Condition
D-003 (6, 7, 8) or D-001 (19, 45, 32) - Body ground	Always	Resistance ∞
D-003 (2, 3, 4) or D-001 (19, 45, 32) - Battery positive	Always	Resistance ∞

NG

Repair or replace wire harness or connector (- Clutch actuator motor 2 - TCU).

OK

4

Check clutch actuator motor 2

- (a) Check the clutch actuator motor 2.

NG

Replace clutch actuator motor 2.

OK

5

Reconfirm DTCs

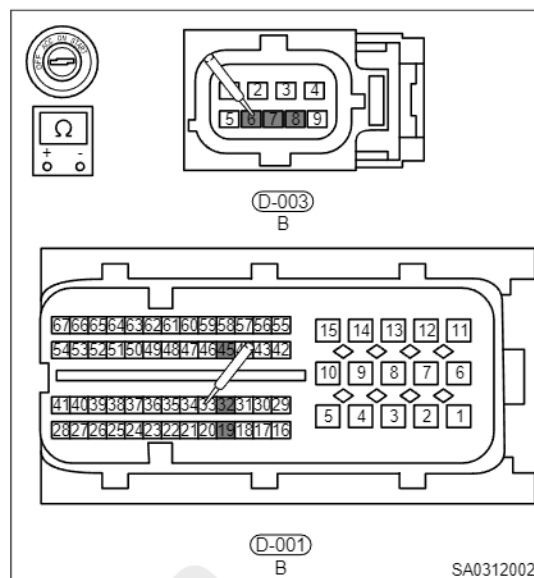
- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTC.
- (c) Perform self-learning of clutch motor.
- (d) Start the engine.
- (e) Check if the same DTCs are output.

OK

System operates normally.

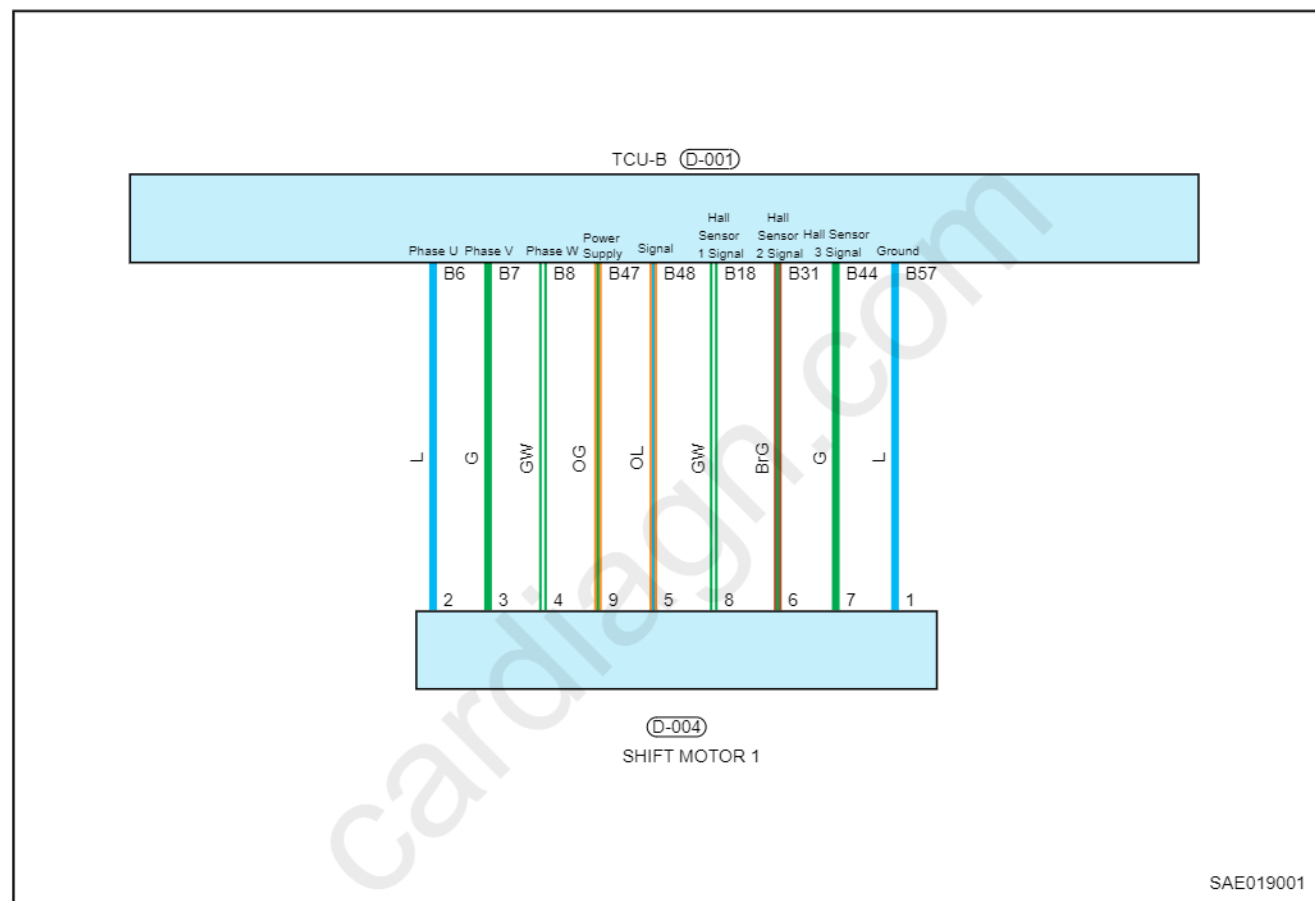
NG

Replace TCU control module assembly and perform self-learning.



DTC	P180213h	Phases Monitoring Shift Actuator 1: Open Circuit
DTC	P180292h	Phases Monitoring Shift Actuator 1: Performance or Incorrect Operation
DTC	P180212h	Phases Monitoring Shift Actuator 1: Short to Bat
DTC	P180215h	Phases Monitoring Shift Actuator 1: Short to Battery or Open Circuit
DTC	P180211h	Phases Monitoring Shift Actuator 1: Short to Ground

Circuit Diagram



⚠ Caution

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- (4) If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- (5) Only use a digital multimeter to measure voltage of electronic system.
- (6) Refer to any Technical Bulletin that may apply to this malfunction.
- (7) Visually check the related wire harness.

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

 **Caution**

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

1

Check shift motor 1 connector

(a) Check if shift motor 1 connector D-004 is connected infirmly, damaged or cracked.

NG

Repair or replace connector.

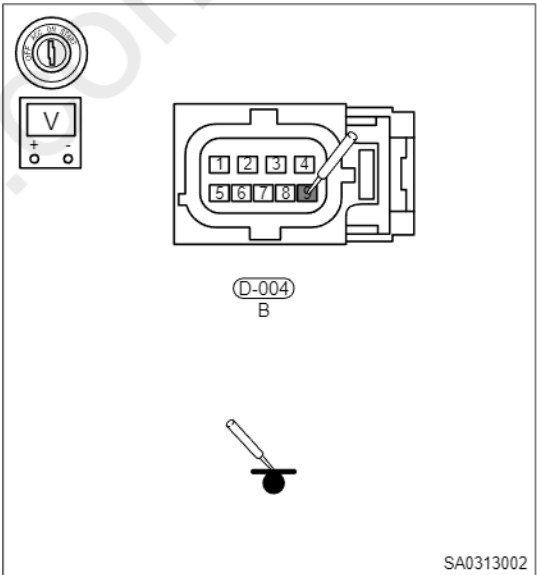
OK

2

Check shift motor 1 power supply voltage

- (a) Turn ENGINE START STOP switch to ON.
- (b) Check voltage between shift motor 1 connector terminal (9) and ground.
- Check for Open

Multimeter Connection	Condition	Specified Condition
D-004 (9) - Ground	ENGINE START STOP switch ON	5 V



NG

Repair or replace power supply wire harness between shift motor 1 and TCU.

OK

3

Check shift motor 1 circuit

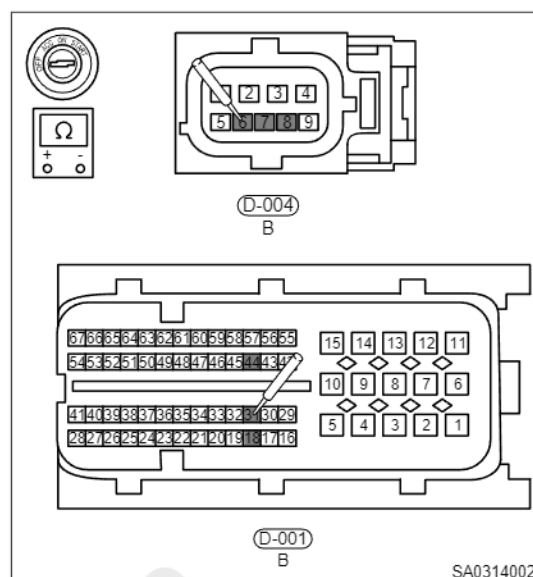
- (a) Disconnect the TCU connector D-001.
 (b) Check wire harness between shift motor 1 connector terminal and TCU connector terminal.

Check for Open

Multimeter Connection	Condition	Specified Condition
D-004(6) - D-001(31)	Always	Resistance $\leq 1 \Omega$
D-004(7) - D-001(44)	Always	Resistance $\leq 1 \Omega$
D-004(8) - D-001(18)	Always	Resistance $\leq 1 \Omega$

Check for Short

Multimeter Connection	Condition	Specified Condition
D-004 (6, 7, 8) or D-001 (31, 44, 18) - Body ground	Always	Resistance ∞



NG

Repair or replace wire harness or connector (- Shift motor 1 - TCU).

OK

4

Check shift motor 1

- (a) Check the shift motor 1.

NG

Replace shift motor 1.

OK

5

Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTC.
 (c) Perform self-learning of clutch motor.
 (d) Start the engine.
 (e) Check if the same DTCs are output.

OK

System operates normally.

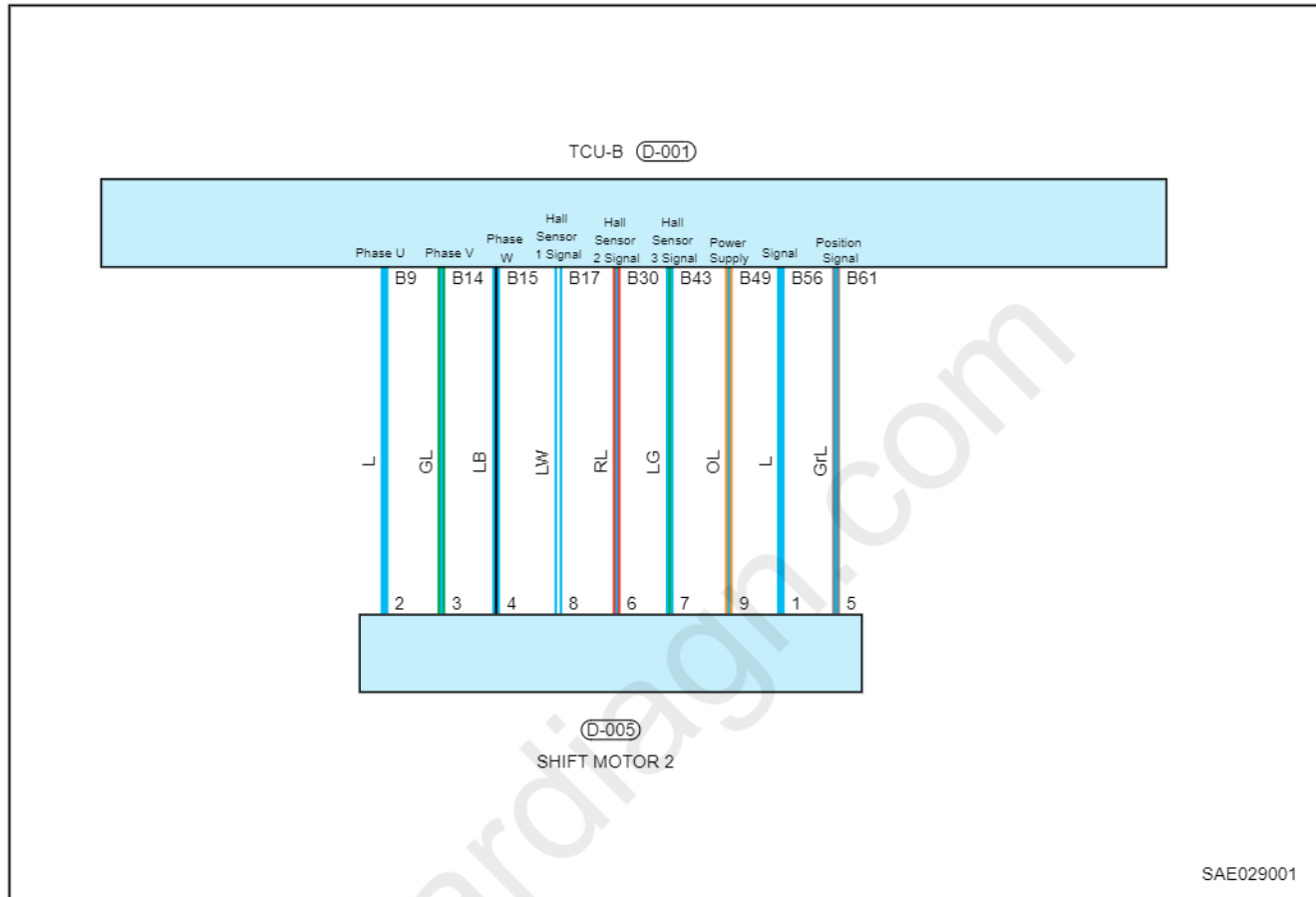
NG

Replace TCU control module assembly and perform self-learning.

DTC	P180313h	Phases Monitoring Shift Actuator 2: Open Circuit
DTC	P180392h	Phases Monitoring Shift Actuator 2: Performance or Incorrect Operation
DTC	P180312h	Phases Monitoring Shift Actuator 2: Short to Bat

DTC	P180315h	Phases Monitoring Shift Actuator 2: Short to Battery or Open Circuit
DTC	P180311h	Phases Monitoring Shift Actuator 2: Short to Ground
DTC	P180329h	Shift Actuator 2 Motor Speed Check

Circuit Diagram



⚠ Caution

- **When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.**

Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- (4) If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- (5) Only use a digital multimeter to measure voltage of electronic system.
- (6) Refer to any Technical Bulletin that may apply to this malfunction.
- (7) Visually check the related wire harness.
- (8) Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- (9) If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

⚠ Caution

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

1 Check shift motor 2 connector

(a) Check if shift motor 2 connector D-005 is connected infirmly, damaged or cracked.

NG

Repair or replace connector.

OK

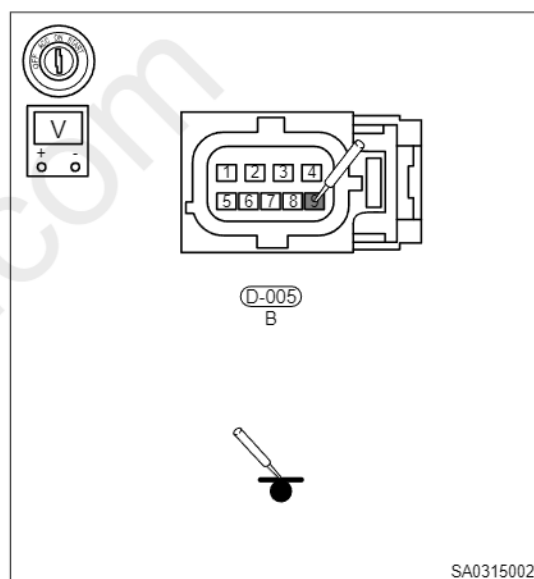
2 Check shift motor 2 power supply voltage

(a) Turn ENGINE START STOP switch to ON.

(b) Check voltage between shift motor 2 connector terminal (9) and ground.

Check for Open

Multimeter Connection	Condition	Specified Condition
D-005 (9) - Ground	ENGINE START STOP switch ON	5 V



NG

Repair or replace power supply wire harness between shift motor 2 and TCU.

OK

3 Check shift motor 2 circuit

- (a) Disconnect the TCU connector D-001.
- (b) Check wire harness between shift motor 2 connector terminal and TCU connector terminal.
- Check for Open

Multimeter Connection	Condition	Specified Condition
D-005 (6) - D-001 (30)	Always	Resistance $\leq 1 \Omega$
D-005 (7) - D-001 (43)	Always	Resistance $\leq 1 \Omega$
D-005 (8) - D-001 (17)	Always	Resistance $\leq 1 \Omega$

Check for Short

Multimeter Connection	Condition	Specified Condition
D-005 (6, 7, 8) or D-001 (30, 43, 17) - Body ground	Always	Resistance ∞

NG

Repair or replace wire harness or connector (- Shift motor 2 - TCU).

OK

4

Check shift motor 2

- (a) Check the shift motor 2.

NG

Replace shift motor 2

OK

5

Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Use diagnostic tester to clear DTC.
- (c) Perform self-learning of clutch motor.
- (d) Start the engine.
- (e) Check if the same DTCs are output.

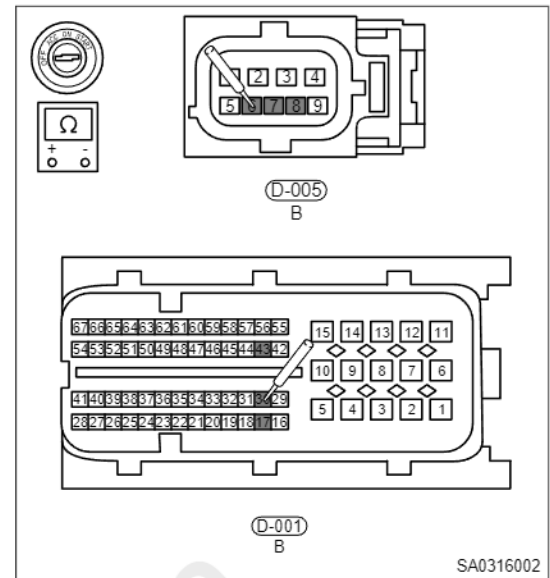
OK

System operates normally.

NG

Replace TCU control module assembly and perform self-learning.

DTC	P182B62h	Clutch 1 Torque Too Low (GETRAG)
DTC	P182C62h	Clutch 2 Torque Too Low (GETRAG)



⚠ Caution

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
- (4) If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
- (5) Only use a digital multimeter to measure voltage of electronic system.
- (6) Refer to any Technical Bulletin that may apply to this malfunction.
- (7) Visually check the related wire harness.
- (8) Check and clean all Transmission Control Unit (TCU) ground related to latest DTC.
- (9) If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

⚠ Caution

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

1 Check clutch system

(a) Check the clutch system.

NG

Replace clutch system.

OK**2 Reconfirm DTCs**

(a) Turn ENGINE START STOP switch to ON.

(b) Use diagnostic tester to clear DTC.

(c) Start the engine.

(d) Check if the same DTCs are output.

OK

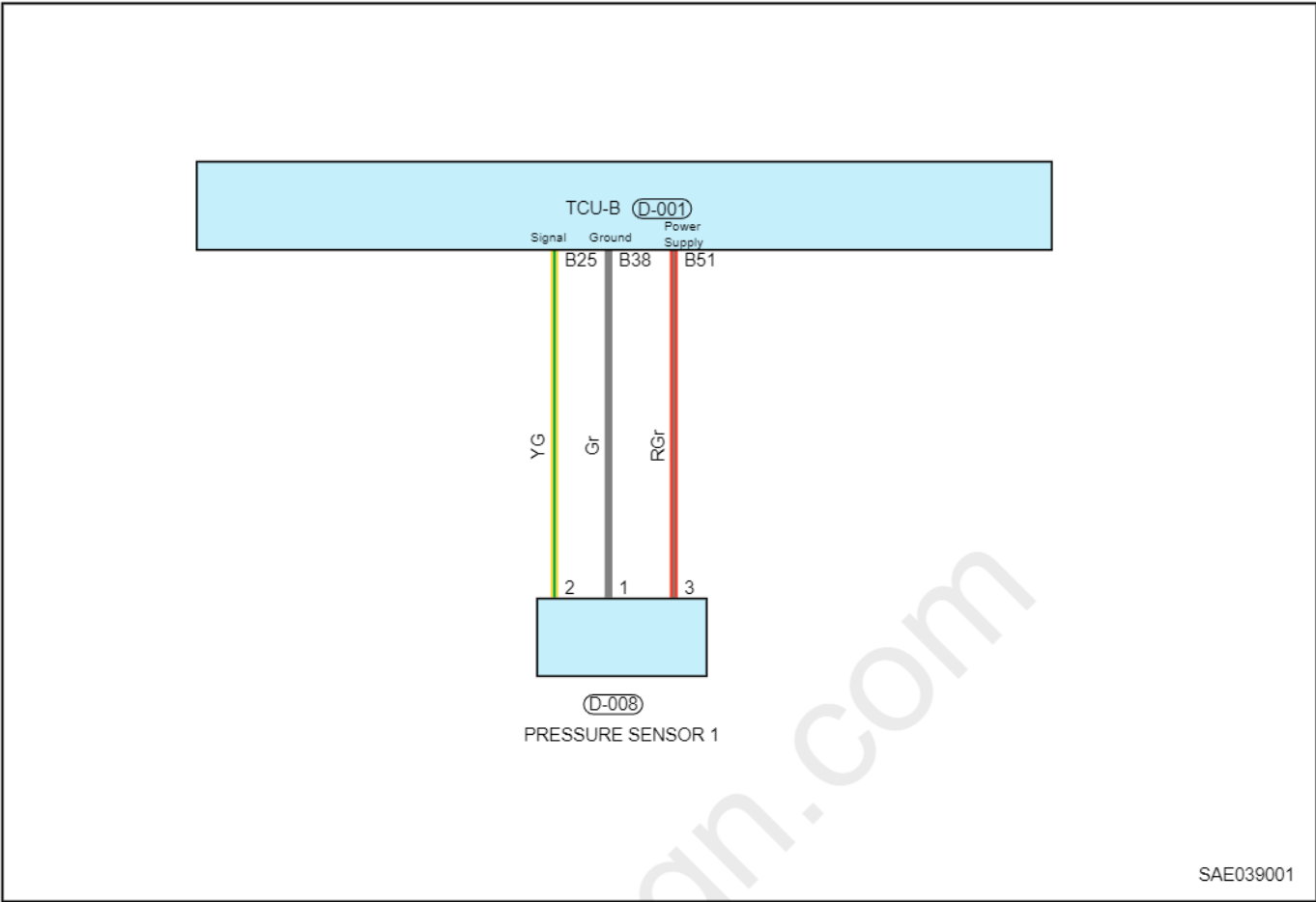
System operates normally.

NG

Replace TCU control module assembly and perform self-learning.

DTC	P181C2Ah	Pressure Sensor 1 Output Stuck at Certain Value
DTC	P181C92h	Comparison Target to Current Pressure Sensor 1, Pressure too High
DTC	P181D92h	Comparison Target to Current Pressure Sensor 1, Pressure too Low
DTC	P181C28h	Pressure Sensor 1 Offset too High
DTC	P181C27h	Pressure Sensor 1 Implausible High Gradient

Circuit Diagram



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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Turn ENGINE START STOP switch to ON.
- (4) Using a diagnostic tester, record and clear DTCs.
- (5) Start engine and warm it up to normal operating temperature, and then select Read DTC.
- (6) Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- (7) If DTC is not detected, malfunction is intermittent.

Caution

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

1

Check pressure sensor 1 connector

(a) Check A/C pressure sensor 1 connector D-008 for poor contact or looseness.

NG

Reinstall or repair, replace connector.

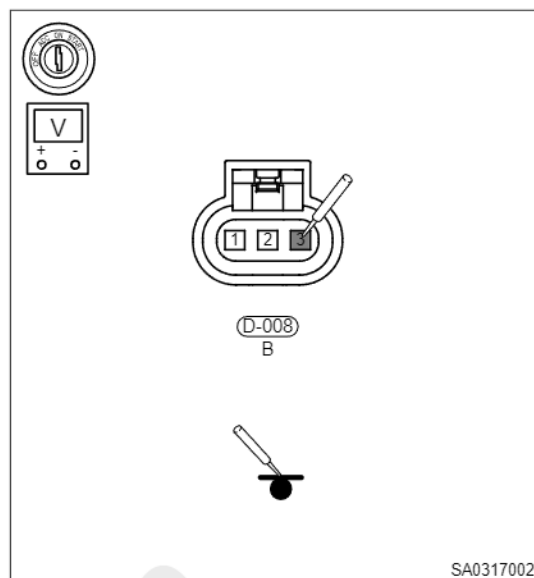
OK

2

Check pressure sensor 1 power supply voltage

- (a) Turn ENGINE START STOP switch to ON.
- (b) (Online detection) Using a digital multimeter, measure voltage of terminal 3 of pressure sensor 1 connector D-008.

Multimeter Connection	Condition	Specified Condition
D-008 (3) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG

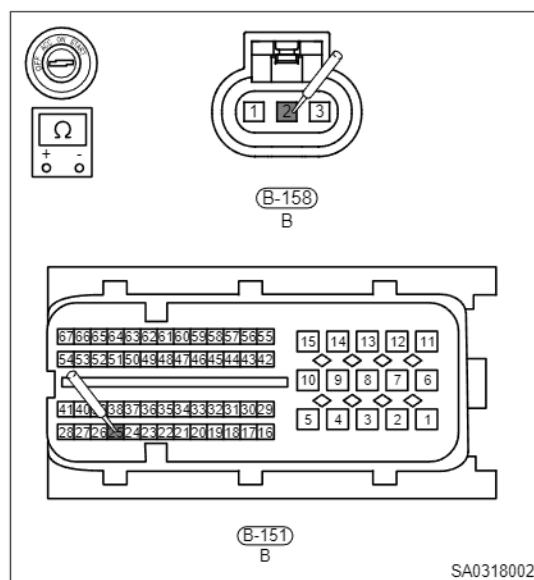
Replace or repair pressure sensor power supply wire harness.

OK

3 Check pressure sensor 1 signal circuit

- (a) Turn ENGINE START STOP switch to OFF and disconnect negative battery cable.
- (b) Disconnect the pressure sensor 1 and TCU connectors.
- (c) Check wire harness between pressure sensor 1 connector terminal and TCU connector terminal.

Multimeter Connection	Condition	Specified Condition
D-008 (2) - D-001 (25)	Always	Resistance $\leq 1 \Omega$



NG

Replace wire harness or connector (Pressure sensor 1 - TCU).

OK

4 Check pressure sensor 1

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check sensor connection part for debris, ice, oil and damage.

NG

Replace pressure sensor 1.

OK

5

Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Turn ENGINE START STOP switch to ON.
 (c) Using a diagnostic tester, read ECU DTC.
 (d) Check if DTC still exists.

OK

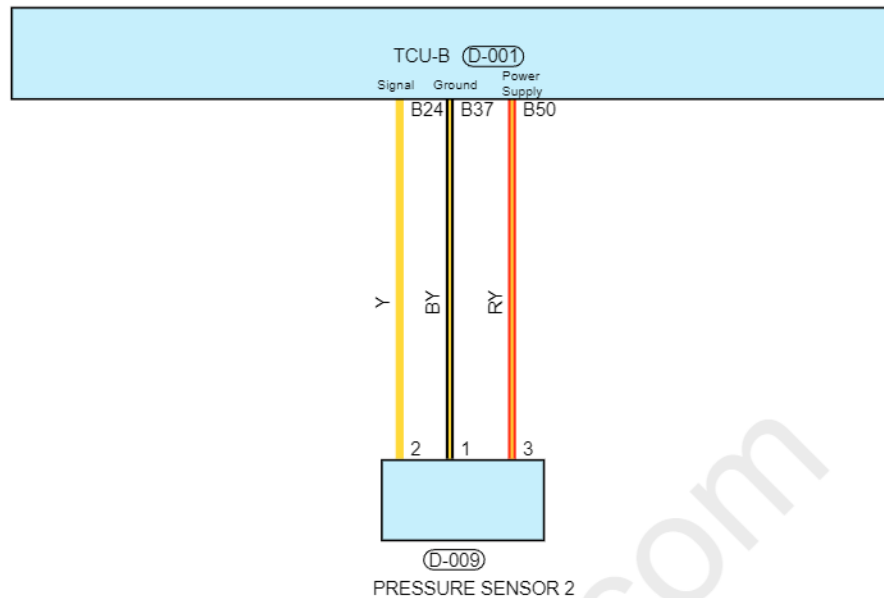
System operates normally.

NG

Replace TCU control module assembly and perform self-learning.

DTC	P181E92h	Comparison Target to Current Pressure Sensor 2, Pressure too High
DTC	P181E2Ah	Pressure Sensor 2 Output Stuck at Certain Value
DTC	P181F92h	Comparison Target to Current Pressure Sensor 2, Pressure too Low
DTC	P181E28h	Pressure Sensor 2 Offset too High
DTC	P181E27h	Pressure Sensor 2 Implausible High Gradient

Circuit Diagram



SAE049001

Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Turn ENGINE START STOP switch to ON.
- (4) Using a diagnostic tester, record and clear DTCs.
- (5) Start engine and warm it up to normal operating temperature, and then select Read DTC.
- (6) Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- (7) If DTC is not detected, malfunction is intermittent.

⚠ Caution

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

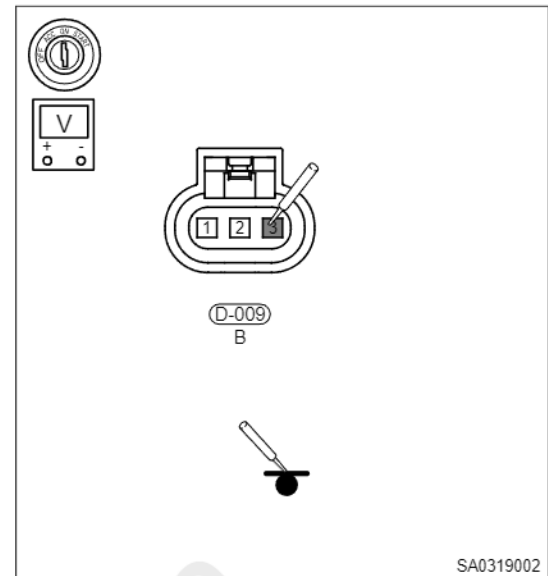
1 Check pressure sensor 2 connector

(a) Check pressure sensor 2 connector D-009 for poor contact or looseness.

NG**Reinstall or repair, replace connector.****OK****2 Check pressure sensor 2 power supply voltage**

- (a) Turn ENGINE START STOP switch to ON.
- (b) (Online detection) Using a digital multimeter, measure voltage of terminal 3 of pressure sensor 2 connector D-009.

Multimeter Connection	Condition	Specified Condition
D-009 (3) - Body ground	ENGINE START STOP switch ON	Not less than 12 V



NG

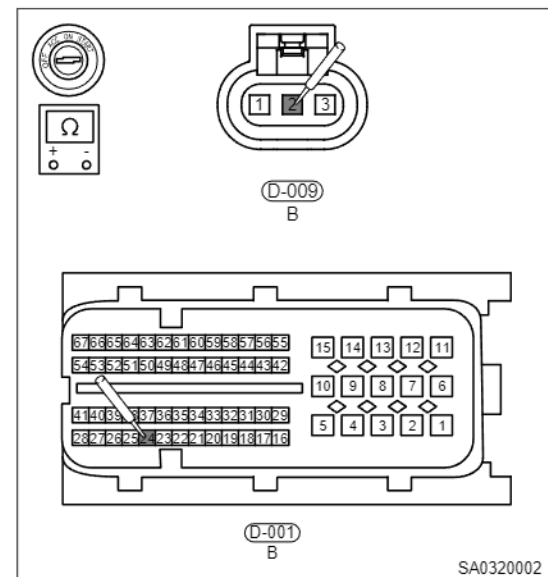
Replace or repair pressure sensor power supply wire harness.

OK

3 Check pressure sensor 2 signal circuit

- (a) Turn ENGINE START STOP switch to OFF and disconnect negative battery cable.
- (b) Disconnect the pressure sensor 2 and TCU connectors.
- (c) Check wire harness between pressure sensor 2 connector terminal and TCU connector terminal.

Multimeter Connection	Condition	Specified Condition
D-009 (2) - Body ground	Always	Resistance $\leq 1 \Omega$



NG

Replace wire harness or connector (Pressure sensor 2 - TCU).

OK

4 Check pressure sensor 2

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check sensor connection part for debris, ice, oil and damage.

NG

Replace pressure sensor 2.

OK

5

Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Turn ENGINE START STOP switch to ON.
 (c) Using a diagnostic tester, read ECU DTC.
 (d) Check if DTC still exists.

OK

System operates normally.

NG

Replace TCU control module assembly and perform self-learning.

DTC	P180411h	Phases Monitoring Cooling Actuator: Short to Ground
DTC	P180412h	Phases Monitoring Cooling Actuator: Short to Bat
DTC	P180413h	Phases Monitoring Cooling Actuator: Open Circuit
DTC	P1805F0h	Clutch Cooling Pump Motor Speed Check (too High)
DTC	P1805F1h	Clutch Cooling Pump Motor Speed Check (too Low)
DTC	P1805F2h	Clutch Cooling Pump Motor Speed Check (Unexpected Zero or Negative)
DTC	P18054Bh	Temperature Monitoring Cooling Actuator Powerstage (Overtemperature)
DTC	P180E11h	Voltage Level Monitoring Sensor Clutch Cooling Motor: Supply Voltage Short Circuit to Ground
DTC	P180E1Ch	Voltage Level Monitoring Sensor Clutch Cooling Motor: Supply Voltage Out of Range High
DTC	P180E1Dh	Voltage Level Monitoring Sensor Clutch Cooling Motor: Supply Voltage Out of Range Low
DTC	P180415h	Phases Monitoring Cooling Actuator: Short to Battery or Open Circuit
DTC	P180492h	Phases Monitoring Cooling Actuator: Performance or Incorrect Operation

Circuit Diagram

Show Menu	
EXEED V10.61 > New TXL > System Selection > BCM (Body Control Module)	
Writing BCM Configuration Data	Write VIN Code
TPMS Wheel Unit ID Write-In	Learning TPMS
Outside Mirror Automatic Function Setting	Front Windshield Heating Function Setting
Exeed New TXL	
SAE059001	

Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Turn ENGINE START STOP switch to ON.
- (4) Using a diagnostic tester, record and clear DTCs.
- (5) Start engine and warm it up to normal operating temperature, and then select Read DTC.
- (6) Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- (7) If DTC is not detected, malfunction is intermittent.

Caution

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

1 Check cooling motor connector

- (a) Check if cooling motor connector D-006 is connected infirmly, damaged or cracked.

NG

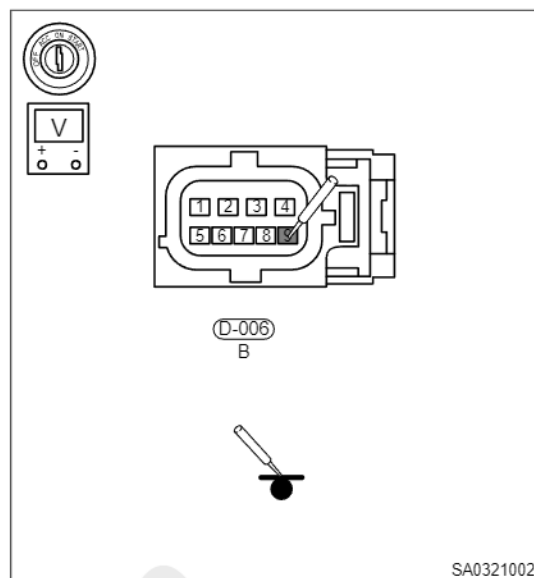
Repair or replace connector.

OK

2 Check cooling motor power supply voltage

- (a) Turn ENGINE START STOP switch to ON.
- (b) Check voltage between cooling motor connector terminal D-006 (9) and ground.

Multimeter Connection	Condition	Specified Condition
D-006 (9) - Ground	ENGINE START STOP switch ON	5 V



NG

Repair or replace power supply wire harness between cooling motor and TCU.

OK

3 Check cooling motor signal circuit

- (a) Disconnect the TCU connector D-001.
- (b) Check wire harness between cooling motor connector terminal and TCU connector terminal.
Check for Open

Multimeter Connection	Condition	Specified Condition
D-006 (6) - D-001 (29)	Always	Resistance $\leq 1 \Omega$
D-006 (7) - D-001 (42)	Always	Resistance $\leq 1 \Omega$
D-006 (8) - D-001 (16)	Always	Resistance $\leq 1 \Omega$

Check for Short

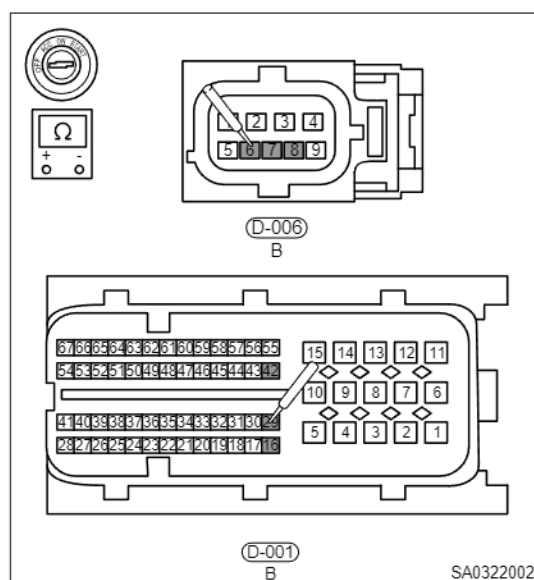
Multimeter Connection	Condition	Specified Condition
D-006 (6, 7, 8) or D-001 (29, 42, 16) - Body ground	Always	Resistance ∞

NG

Repair or replace wire harness or connector (- Cooling motor - TCU).

OK

4 Check cooling motor



(a) Check the cooling motor.

NG

Replace cooling motor.

OK

5

Reconfirm DTCs

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTC.
 (c) Perform self-learning of clutch motor.
 (d) Start the engine.
 (e) Check if the same DTCs are output.

OK

System operates normally.

NG

Replace TCU control module assembly and perform self-learning.

DTC	U041686h	Speed Monitoring (CAN) Wheel Speed FL Invalid
DTC	U041686h	Speed Monitoring (CAN) Wheel Speed FR Invalid
DTC	U041686h	Speed Monitoring (CAN) Wheel Speed RL Invalid
DTC	U041686h	Speed Monitoring (CAN) Wheel Speed RR Invalid
DTC	U040186h	Brake Pedal (CAN) Signal Invalid
DTC	U040186h	Engine Idling (CAN) Signal Invalid
DTC	U041786h	Hand Brake (CAN) Signal Invalid
DTC	U040186h	Accelerator Pedal (CAN) Signal Invalid
DTC	U042386h	Environment Temperature (CAN) Signal Invalid
DTC	U040186h	Driver Torque Request (CAN) Signal Invalid
DTC	U040186h	Engine Min. Torque (CAN) Signal Invalid
DTC	U040186h	Engine Max. Torque (CAN) Signal Invalid
DTC	U040186h	Engine Temperature (CAN) Signal Invalid

Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Turn ENGINE START STOP switch to ON.
- (4) Using a diagnostic tester, record and clear DTCs.
- (5) Start engine and warm it up to normal operating temperature, and then select Read DTC.
- (6) Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- (7) If DTC is not detected, malfunction is intermittent.



Caution

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

1 Read DTCs

- (a) Connect the DTC decoding tester.
 (b) Read all DTCs.

NG

Check the fault causes indicated by DTCs and repair faulty area.

OK**2 Check TCU ground point**

- (a) Turn ENGINE START STOP switch to OFF.
 (b) Disconnect the negative battery cable.
 (c) Check the TCU ground point GB-073.

NG

Repair or replace ground wire harness or ground point.

OK**3 Check TCU wire harness connector**

- (a) Disconnect the TCU wire harness connector.
 (b) Check the TCU wire harness connector.

NG

Repair or replace connector.

OK**4 Reconfirm DTCs**

- (a) Connect the negative battery cable.
 (b) Use diagnostic tester to clear DTC.
 (c) Start the engine.
 (d) Check if the same DTCs are output.

OK

If system operates normally, replace TCU and perform self-learning.

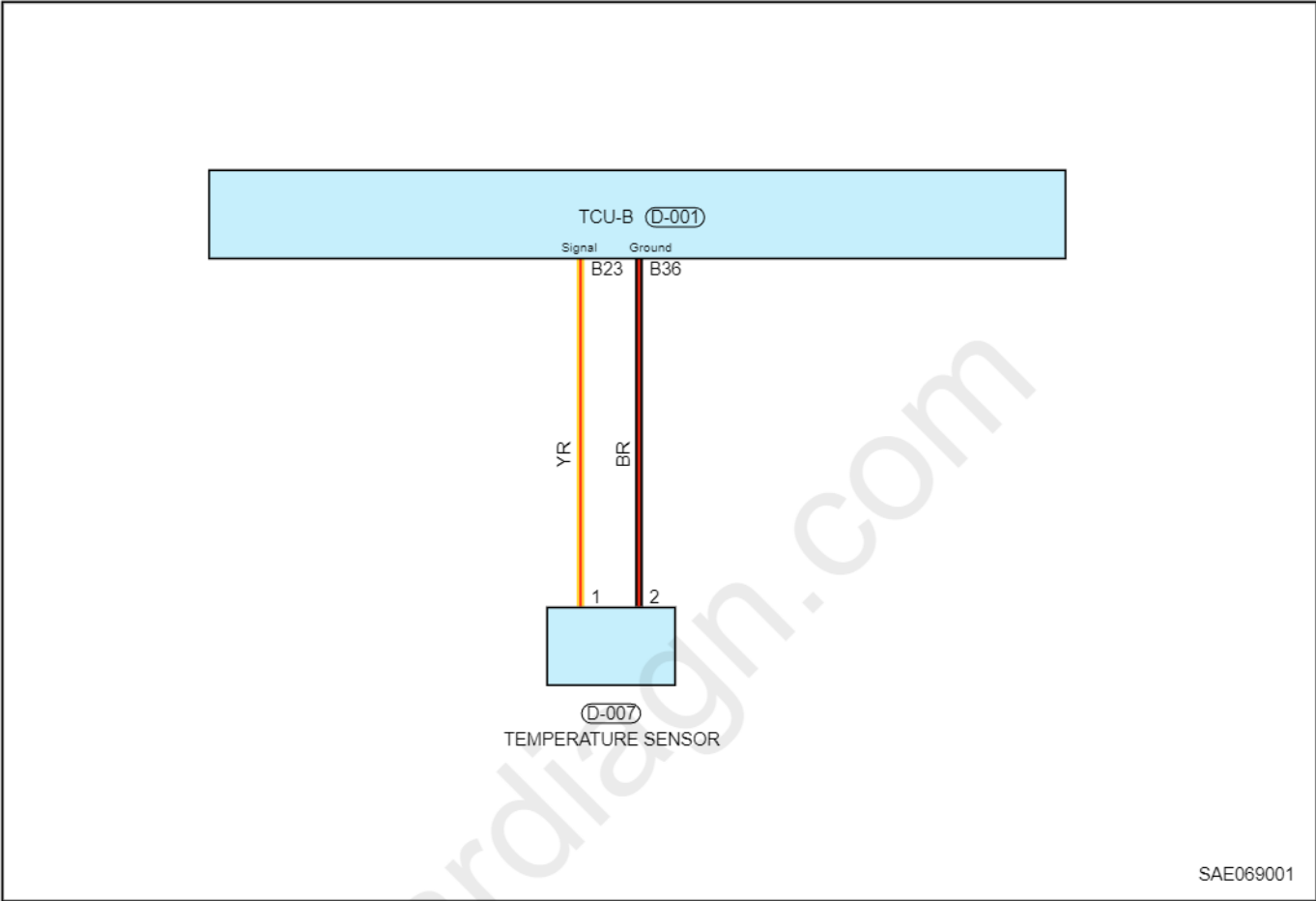
NG

If DTC still exists, replace transmission and perform self-learning.

DTC	P181415h	Voltage Level Monitoring Oil Temperature Sensor: Signal Short-to-Battery or Open Load
DTC	P181411h	Voltage Level Monitoring Oil Temperature Sensor: Signal Short-to-GND
DTC	P181311h	Voltage Level Monitoring Oil Temperature Sensor: Supply Voltage Short to Ground
DTC	P181312h	Voltage Level Monitoring Oil Temperature Sensor: Supply Voltage Short to Battery

DTC	P181317h	Voltage Level Monitoring Oil Temperature Sensor: Supply Voltage Out of Range High
DTC	P181316h	Voltage Level Monitoring Oil Temperature Sensor: Supply Voltage Out of Range Low

Circuit Diagram



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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Turn ENGINE START STOP switch to ON.
- (4) Using a diagnostic tester, record and clear DTCs.
- (5) Start engine and warm it up to normal operating temperature, and then select Read DTC.
- (6) Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- (7) If DTC is not detected, malfunction is intermittent.

Caution

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

1

Check oil temperature sensor connector

(a) Check oil temperature sensor connector D-007 for poor contact or looseness.

NG

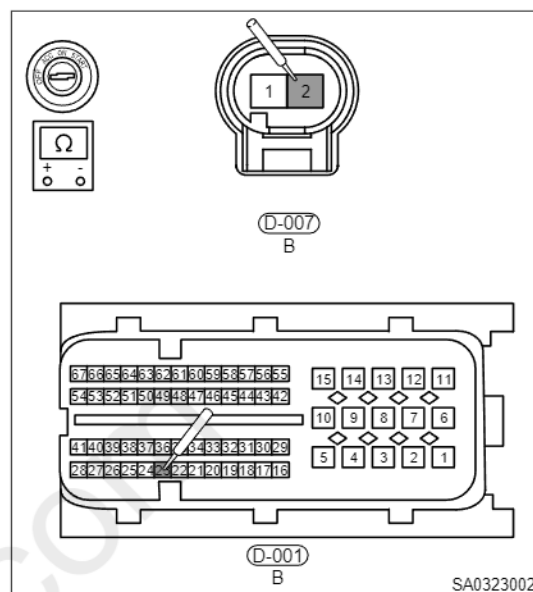
Reinstall or repair, replace connector.

OK

2 Check oil temperature sensor signal circuit

- (a) Turn ENGINE START STOP switch to OFF and disconnect negative battery cable.
- (b) Disconnect oil temperature sensor connector and TCU connector.
- (c) Check wire harness between oil temperature sensor connector terminal and TCU connector terminal.

Multimeter Connection	Condition	Specified Condition
D-007(2) - D-001(23)	Always	Resistance $\leq 1 \Omega$



NG

Replace wire harness or connector (Oil temperature sensor - TCU)

OK

3 Check oil temperature sensor

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Check oil sensor connection part for debris, ice, oil and damage.

NG

Replace oil temperature sensor.

OK

4 Reconfirm DTCs

- (a) Connect the negative battery cable.
- (b) Turn ENGINE START STOP switch to ON.
- (c) Using a diagnostic tester, read ECU DTC.
- (d) Check if DTC still exists.

OK

System operates normally.

NG

Replace TCU control module assembly and perform self-learning.

DTC	U010000h	Engine Node 1 (EMS_1/2/3/4/5/7/9 Included) Lost
DTC	U040182h	Engine Node 1 (EMS_1/2/3/4/5/7/9 Included) alivecounter Authentication Fails
DTC	U040183h	Engine Node 1 (EMS_1/2/3/4/5/7/9 Included) CRC Authentication Fails
DTC	U015100h	Brake System Node 1 (ACM_1/2 Included) Lost
DTC	U011400h	AWD_1 Lost
DTC	U014000h	BCM_1 Lost
DTC	U042282h	BCM_1 Alive Counter Authentication Fails
DTC	U042283h	BCM_1 CRC Authentication Fails
DTC	U012800h	EPB_1 Lost
DTC	U041782h	EPB_1 Alive Counter Authentication Fails
DTC	U041783h	EPB_1 CRC Authentication Fails
DTC	U012200h	ESC_2 Lost
DTC	U041682h	Brake System Node 5 (ESC_2/3/4/6/7 Included) Alive Counter Authentication Fails
DTC	U041683h	Brake System Node 5 (ESC_2/3/4/6/7 Included) CRC Authentication Fails
DTC	U015500h	Instrument Cluster Node 1 (IPC_3/5/7 Included) CAN Lost
DTC	U024800h	Instrument Cluster Node 2 (PEPS_4 Included) CAN Lost
DTC	U010300h	EGS_1 Lost
DTC	U040482h	EGS_1 Alive Counter Authentication Fails
DTC	U040483h	EGS_1 CRC Authentication Fails
DTC	U240500h	MFS_2 Lost
DTC	U240582h	MFS_2 Alive Counter Authentication Fails
DTC	U240583h	MFS_2 CRC Authentication Fails
DTC	U021200h	SCM_1 Lost

Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Turn ENGINE START STOP switch to ON.
- (4) Using a diagnostic tester, record and clear DTCs.
- (5) Start engine and warm it up to normal operating temperature, and then select Read DTC.
- (6) Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- (7) If DTC is not detected, malfunction is intermittent.

1	(Refer to CAN system)
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DTC	P1E01-00	Battery Voltage Below Threshold
DTC	P1E02-00	Battery Voltage Above Threshold

DTC Confirmation Procedure

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

- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Turn ENGINE START STOP switch to ON.
- (4) Use the diagnostic tester to record and clear DTCs stored in lighting system.
- (5) Turn ENGINE START STOP switch to OFF and wait for several seconds.
- (6) Turn ENGINE START STOP switch to ON, select "Read DTC" .
- (7) If DTC is detected, malfunction indicated by DTC is current.
- (8) If DTC is not detected, malfunction indicated by DTC is intermittent.

⚠ Caution

- When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

Diagnosis Procedure**1 Check battery voltage**

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

NG**Check and repair battery.****OK****2 Check fuse RF12**

- (a) Check if fuse RF12 is blown or no power.

NG**Replace or repair fuse.****OK****3 Check supply circuit**

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the negative battery cable.
- (c) Disconnect the electronic shift module connector I-043.
- (d) Using a digital multimeter, check for open between connectors B-144 and I-043 according to table below.

Standard Condition

Multimeter Connection	Condition	Specified Condition
B-144(15) - I-043(5)	Always	$\leq 1 \Omega$

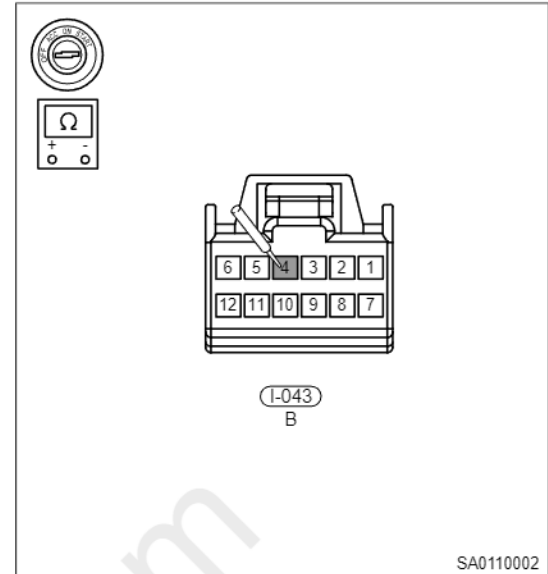
NG**Repair or replace related wire harness.****OK**

4

Inspect ground

- (a) Turn ENGINE START STOP switch to OFF.
- (b) Disconnect the electronic shift module connector I-043.
- (c) Check continuity between I-043 (4) and body ground with multimeter ohm band.

Multimeter Connection	Condition	Specified Condition
I-043 (4) - Body ground	ENGINE START STOP switch "OFF"	$\leq 1 \Omega$



NG

Repair and replace ground point.

OK

5

Reconfirm DTCs

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

OK

System operates normally.

NG

Replace EGS control module assembly.

DTC	U0100-00	Lost Communication with EMS
DTC	U0101-00	Lost Communication with TCU
DTC	U0122-00	Lost Communicate with ESC
DTC	U0140-00	Lost Communication with BCM
DTC	U0155-00	Lost Communicate with IPC
DTC	U0248-00	Lost Communicate with PEPS
DTC	U0401-81	Invalid DLC Received from EMS
DTC	U0401-86	Invalid Data Received from EMS
DTC	U0402-81	Invalid DLC Received from TCU
DTC	U0402-82	Invalid Count Received from TCU
DTC	U0402-83	Invalid CRC Received from TCU
DTC	U0402-86	Invalid Data Received from TCU

DTC	U0416-81	Invalid DLC Received from ESC
DTC	U0416-86	Invalid Data Received from ESC
DTC	U0422-81	Invalid DLC Received from BCM
DTC	U0422-86	Invalid Data Received from BCM
DTC	U0423-81	Invalid DLC Received from IPC
DTC	U0423-86	Invalid Data Received from IPC
DTC	U0426-81	Invalid DLC Received from PEPS
DTC	U0426-86	Invalid Data Received from PEPS

DTC Confirmation Procedure

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

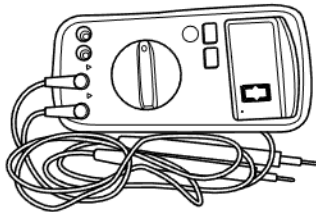
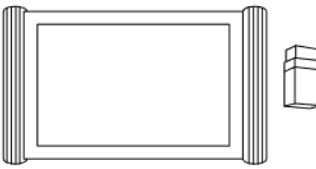
- (1) Turn ENGINE START STOP switch to OFF.
- (2) Connect diagnostic tester (the latest software) to data link connector.
- (3) Turn ENGINE START STOP switch to ON.
- (4) Use the diagnostic tester to record and clear DTCs stored in lighting system.
- (5) Turn ENGINE START STOP switch to OFF and wait for several seconds.
- (6) Turn ENGINE START STOP switch to ON, select "Read DTC".
- (7) If DTC is detected, malfunction indicated by DTC is current.
- (8) If DTC is not detected, malfunction indicated by DTC is intermittent.

Diagnosis

1	(Refer to CAN system)
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5 On-vehicle Service

5.1 Tools

Tool Name	Tool Drawing
Digital multimeter	 S00002
Diagnostic tester	 S00001

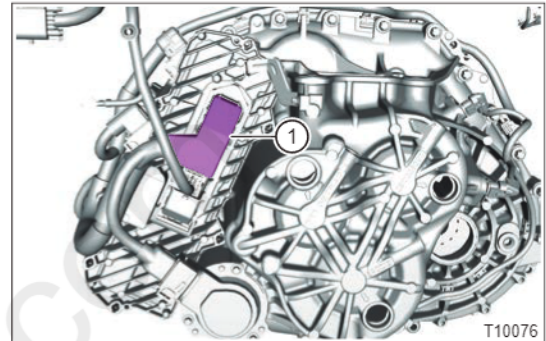
5.2 Replacement of Transmission Control Unit

■ Removal

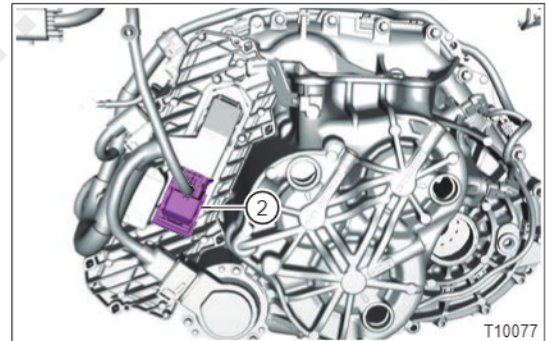
Warning

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

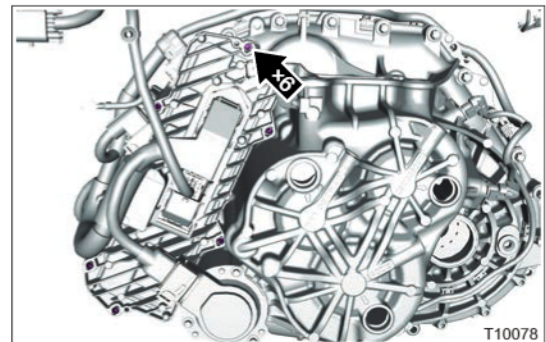
- (1) Turn off all electrical equipment and the ENGINE START STOP switch
- (2) Disconnect the negative battery cable.
- (3) Remove the engine compartment lower protector assembly.
- (4) Disconnect the transmission control unit connector (1).



- (5) Disconnect the transmission control unit connector (2).



- (6) Remove 6 fixing bolts from transmission control unit.



■ Installation

Caution

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

- (1) Install 6 fixing bolts to transmission control unit.

Tightening torque: 8.5- 9.5 N•m

- (2) Connect the transmission control unit connector (1).
- (3) Connect the transmission control unit connector (2).
- (4) Install the engine compartment lower protector assembly.
- (5) Connect the negative battery cable.
- (6) Connect diagnostic tester, read and clear DTCs.

■ TCU Transmission Replacement Self-Learning

- (1) The self-learning trigger conditions shall meet the followings: Vehicle is powered on; engine shuts down; shift lever is in P; brake pedal is depressed; vehicle is stationary; clutch is disengaged; battery voltage is sufficient (at least over 10 V).
- (2) When P position is lost, vehicle is powered off abnormally, transmission software (large software version span) updates, it is necessary to perform shift drum learning. Self-learning process: Generally speaking, after transmission software is written, keep vehicle in power on status and depress brake pedal to complete the shift drum self-learning automatically. In addition, the self-learning process can also be completed by using transmission shift drum self-learning in diagnostic tester and depressing and holding brake pedal.

■ Transmission Self-Learning

If battery is disconnected immediately after ENGINE START STOP switch is switched to OFF mode, the gear may be lost after connecting the battery. At this time, it is necessary to perform self-learning of shift drum and clutch position until the vehicle can run normally.

Transmission self-learning operation steps:

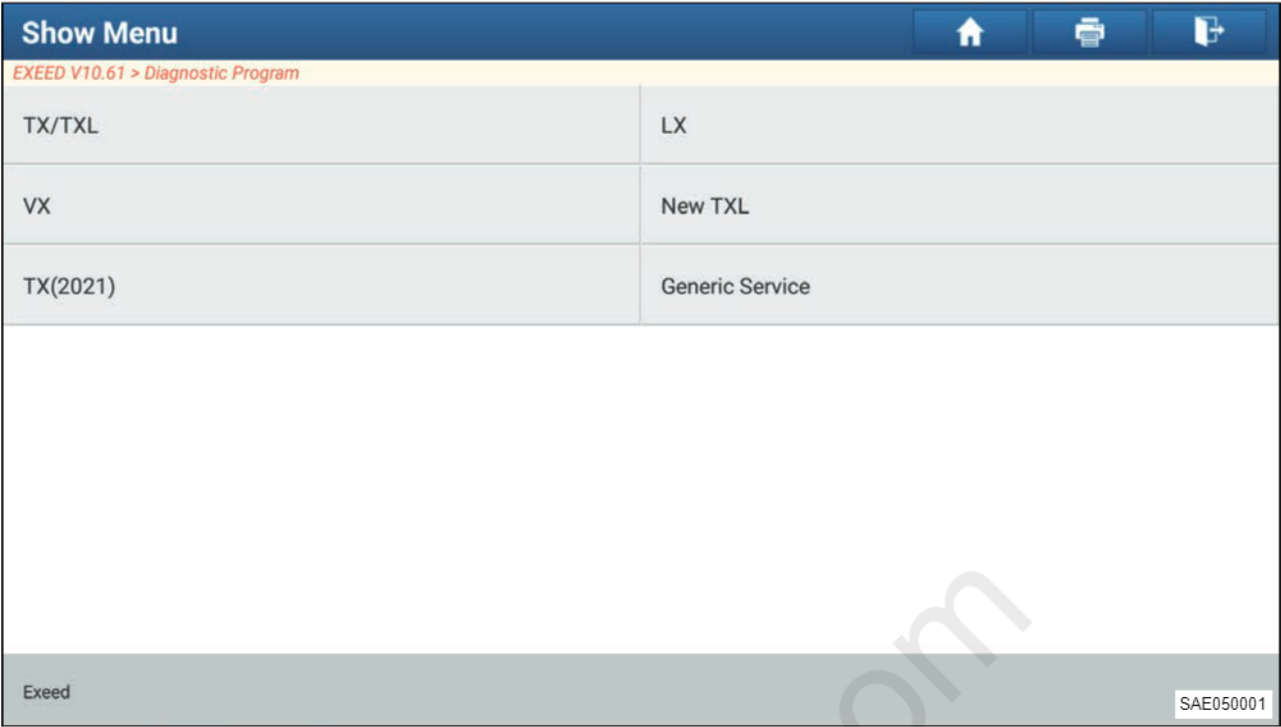
- (1) Connect battery, and turn ENGINE START STOP switch to ON mode.
- (2) Press the brake pedal firmly and keep it for more than 30 seconds until the instrument cluster shows the P gear. At this time, the transmission will complete the self-learning operation.
- (3) If P gear is not displayed, disconnect the negative battery cable, repeat operation steps 1 and 2 until the instrument cluster shows the P gear.

If it still cannot drive normally after carrying out above operations continuously, it is necessary to confirm if the vehicle self-learning meets the following conditions:

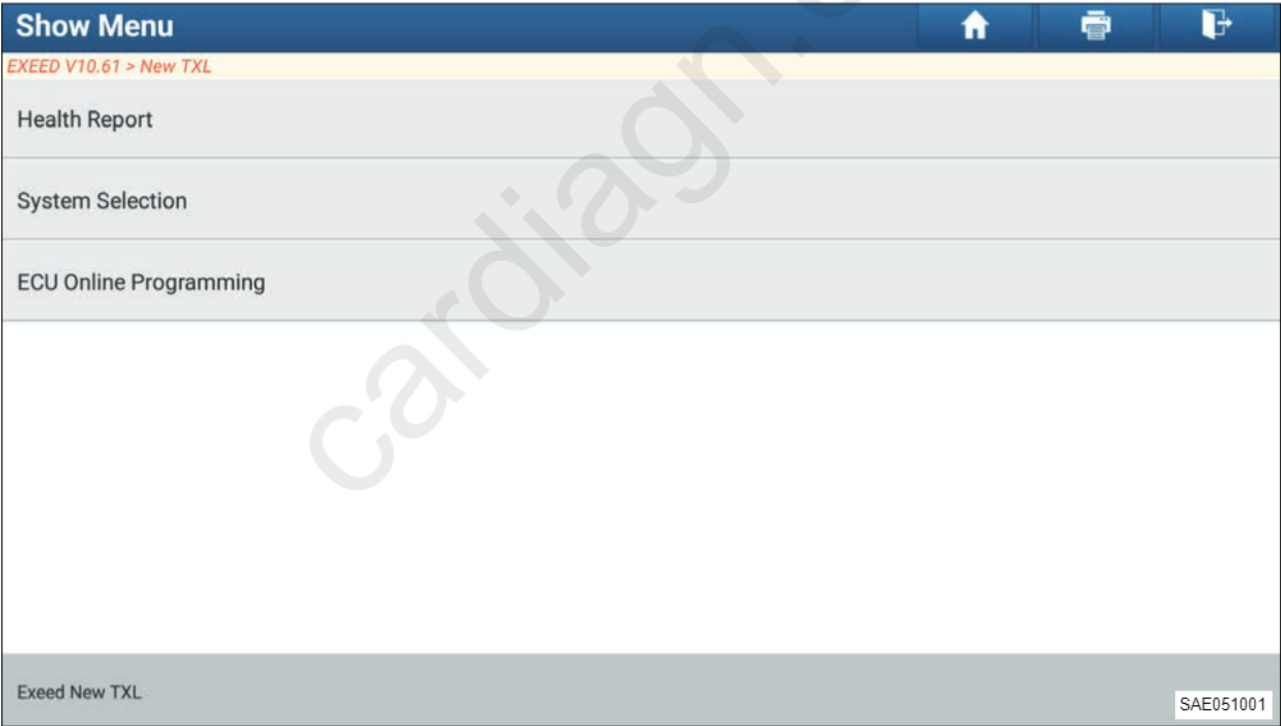
- (1) Battery voltage is higher than 10 V;
- (2) Four wheel speed sensors are normal without any fault;
- (3) Brakes pedal is normal without any fault;
- (4) Transmission power supply is normal, transmission wire harness and sensor and actuator are connected properly.

■ Writing VIN Code

- (1) Connect diagnostic tester, turn ENGINE START STOP switch to ON.
- (2) Select the model "New TXL" .



(3) Enter next interface and click “System Selection” .



(4) Enter next interface and click “TCU (Transmission Control Unit)” .

Show Menu	
EXEED V10.61 > New TXL > System Selection	
EMS (Engine Management System)	TCU (Transmission Control Unit)
BCM (Body Control Module)	ESP(IEPB)(Electronic Stability Program (Integration Electrical Park Brake))
EPS (Electronic Power Steering)	AIPM (Integrated Panel Module)
CLM (Climate Module)	DMC (Infotainment Domain Controller)
AVM (Around View Monitor Module)	PDC (Parking Distance Control)
BSDL (Blind Spot Detection Left)	BSDR (Blind Spot Detection Right)
PEPS (Passive Entry And Passive Start System)	FCM (Front Camera Module)
Exeed New TXL	
SAE052001	

(5) Enter next interface and click “Special function” .

Show Menu	
EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)	
Version Information	Read Fault Code
Clear Fault Memory	Read Data Stream
Special Function	
Exeed New TXL	
SAE053001	

(6) Enter next interface and click “Writing VIN Code” .

Show Menu				
EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)				
VIN Data Write-In	Solenoid Wash			
Fork Position Selflearning	Cluth TouchPoint SelfLearning			
Clutch Perk Curve SelfLearning	Reset EEPROM			
Read SubRom				
Exeed New TXL				
SAE054001				

- (7) Note that "TCU (automatic transmission control unit) VIN code can only be written once and cannot be cleared, please operate carefully!" .
- (8) Input 17-digit VIN code.

■ Fork Position Self-learning

- (1) Connect diagnostic tester, turn ENGINE START STOP switch to ON.
- (2) Select the model "New TXL" .

Show Menu	
EXEED V10.61 > Diagnostic Program	
TX/TXL	LX
VX	New TXL
TX(2021)	Generic Service
Exeed	
SAE050001	

- (3) Enter next interface and click "System Selection" .

Show Menu	
EXEED V10.61 > New TXL	
Health Report	
System Selection	
ECU Online Programming	
Exeed New TXL	
SAE051001	

- (4) Enter next interface and click "TCU (Transmission Control Unit)" .

Show Menu

EXEED V10.61 > New TXL > System Selection

EMS (Engine Management System)	TCU (Transmission Control Unit)
BCM (Body Control Module)	ESP(IEPB)(Electronic Stability Program (Integration Electrical Park Brake))
EPS (Electronic Power Steering)	AIPM (Integrated Panel Module)
CLM (Climate Module)	DMC (Infotainment Domain Controller)
AVM (Around View Monitor Module)	PDC (Parking Distance Control)
BSDL (Blind Spot Detection Left)	BSDR (Blind Spot Detection Right)
PEPS (Passive Entry And Passive Start System)	FCM (Front Camera Module)

Exeed New TXL

SAE052001

(5) Enter next interface and click “Special function” .

Show Menu

EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)

Version Information	Read Fault Code
Clear Fault Memory	Read Data Stream
Special Function	

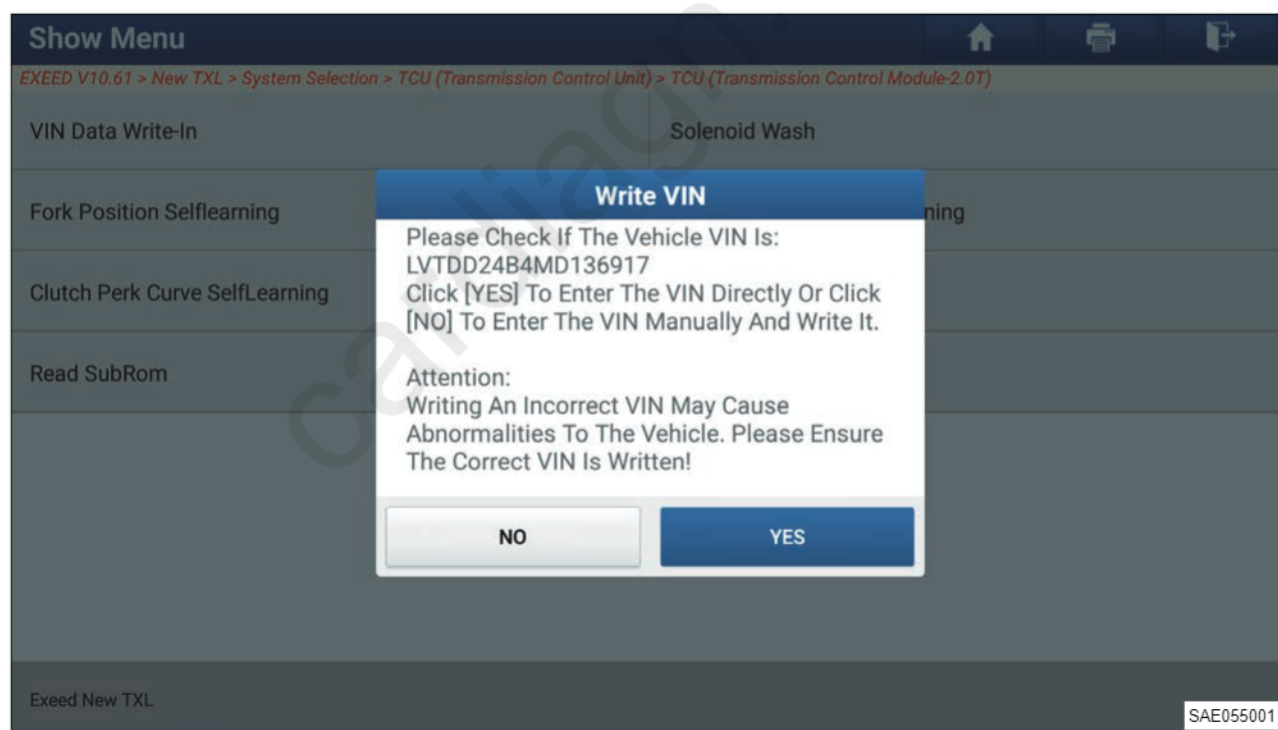
Exeed New TXL

SAE053001

(6) Enter next interface and click “Fork Position Self-learning” .



(7) Learning condition.



(8) Click “OK” to perform fork position self-learning.

■ Clutch PC Curve Self-learning

- (1) Connect diagnostic tester, turn ENGINE START STOP switch to ON.
- (2) Select the model "New TXL" .

Show Menu				
EXEED V10.61 > Diagnostic Program				
TX/TXL	LX			
VX	New TXL			
TX(2021)	Generic Service			
Exeed				
SAE050001				

(3) Enter next interface and click “System Selection” .

Show Menu				
EXEED V10.61 > New TXL				
Health Report				
System Selection				
ECU Online Programming				
Exeed New TXL				
SAE051001				

(4) Enter next interface and click “TCU (Transmission Control Unit)” .

Show Menu	
EXEED V10.61 > New TXL > System Selection	
EMS (Engine Management System)	TCU (Transmission Control Unit)
BCM (Body Control Module)	ESP(IEPB)(Electronic Stability Program (Integration Electrical Park Brake))
EPS (Electronic Power Steering)	AIPM (Integrated Panel Module)
CLM (Climate Module)	DMC (Infotainment Domain Controller)
AVM (Around View Monitor Module)	PDC (Parking Distance Control)
BSDL (Blind Spot Detection Left)	BSDR (Blind Spot Detection Right)
PEPS (Passive Entry And Passive Start System)	FCM (Front Camera Module)
Exeed New TXL	
SAE052001	

(5) Enter next interface and click “Special function” .

Show Menu	
EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)	
Version Information	Read Fault Code
Clear Fault Memory	Read Data Stream
Special Function	
Exeed New TXL	
SAE053001	

(6) Enter next interface and click “Clutch PC Curve Self-learning” .

Show Menu	
EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)	
VIN Data Write-In	Solenoid Wash
Fork Position Selflearning	Cluth TouchPoint SelfLearning
Clutch Perk Curve SelfLearning	Reset EEPROM
Read SubRom	
Exeed New TXL	
SAE054001	

(7) Learning condition.

Show Menu	
EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)	
VIN Data Write-In	Solenoid Wash
Fork Position Selflearning	Cluth TouchPoint SelfLearning
Clutch Perk Curve SelfLearning	
Read SubRom	
Exeed New TXL	
SAE056001	

Fork Position Selflearning

Conditions: Vehicle Is Standstill (No Throttle), P-position, Stable Engine Idle Speed, Stable Engine Torque, Normal Temperature (Transmission Oil Temperature Not Higher Than 70degC), Transmission No Fault

CANCEL OK

(8) Click "OK" to perform clutch PC curve self-learning.

■ Clutch TP Point Self-learning

- (1) Connect diagnostic tester, turn ENGINE START STOP switch to ON.
- (2) Select the model "New TXL" .

Show Menu	
EXEED V10.61 > Diagnostic Program	
TX/TXL	LX
VX	New TXL
TX(2021)	Generic Service
Exeed	
SAE050001	

- (3) Enter next interface and click "System Selection" .

Show Menu	
EXEED V10.61 > New TXL	
Health Report	
System Selection	
ECU Online Programming	
Exeed New TXL	
SAE051001	

- (4) Enter next interface and click "TCU (Transmission Control Unit)" .

Show Menu

Home

Print

Share

EXEED V10.61 > New TXL > System Selection

EMS (Engine Management System)	TCU (Transmission Control Unit)
BCM (Body Control Module)	ESP(IEPB)(Electronic Stability Program (Integration Electrical Park Brake))
EPS (Electronic Power Steering)	AIPM (Integrated Panel Module)
CLM (Climate Module)	DMC (Infotainment Domain Controller)
AVM (Around View Monitor Module)	PDC (Parking Distance Control)
BSDL (Blind Spot Detection Left)	BSDR (Blind Spot Detection Right)
PEPS (Passive Entry And Passive Start System)	FCM (Front Camera Module)

Exeed New TXL

SAE052001

(5) Enter next interface and click “Special function” .

Show Menu

EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)

Version Information	Read Fault Code
Clear Fault Memory	Read Data Stream
Special Function	

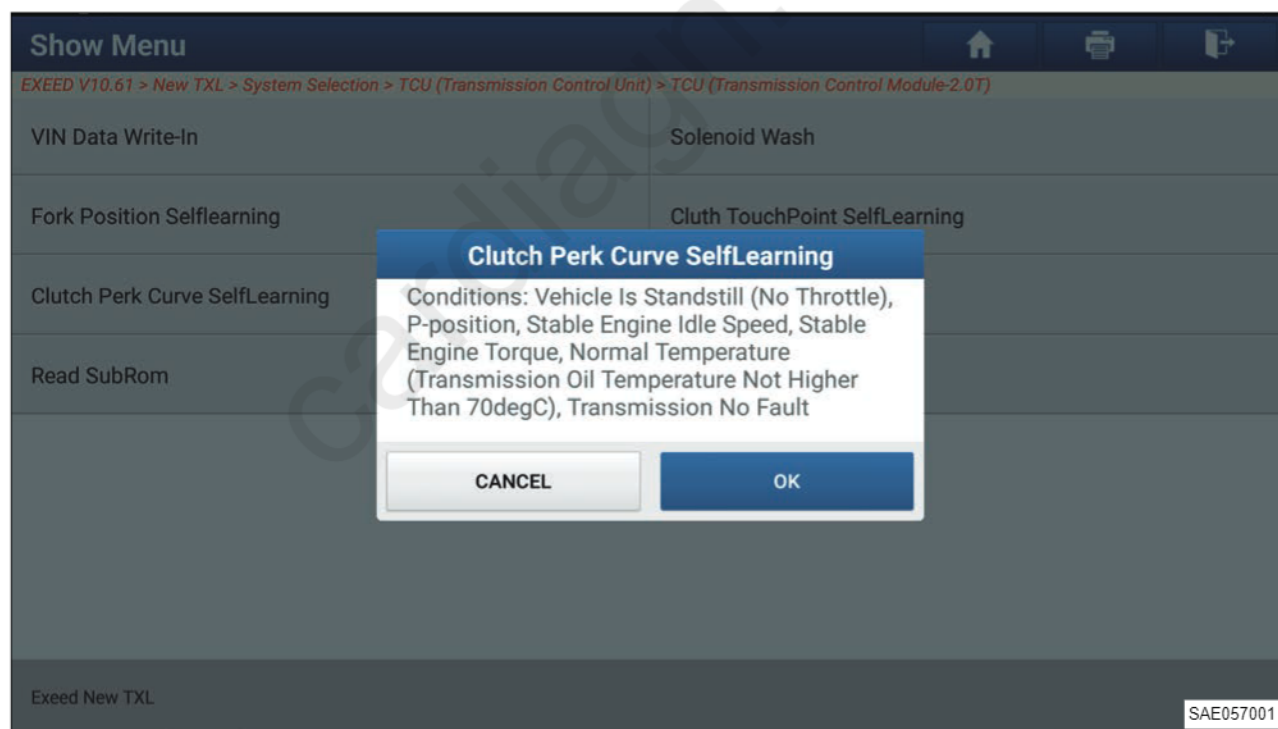
Exeed New TXL

SAE053001

(6) Enter next interface and click “Clutch TP Point Self-learning” .



(7) Learning condition.



(8) Click “OK” to perform clutch TP point self-learning.

■ Clutch Solenoid Valve Scour

- (1) Connect diagnostic tester, turn ENGINE START STOP switch to ON.
- (2) Select the model "New TXL" .



- (3) Enter next interface and click "System Selection" .



- (4) Enter next interface and click "TCU (Transmission Control Unit)" .

Show Menu	
EXEED V10.61 > New TXL > System Selection	
EMS (Engine Management System)	TCU (Transmission Control Unit)
BCM (Body Control Module)	ESP(IEPB)(Electronic Stability Program (Integration Electrical Park Brake))
EPS (Electronic Power Steering)	AIPM (Integrated Panel Module)
CLM (Climate Module)	DMC (Infotainment Domain Controller)
AVM (Around View Monitor Module)	PDC (Parking Distance Control)
BSDL (Blind Spot Detection Left)	BSDR (Blind Spot Detection Right)
PEPS (Passive Entry And Passive Start System)	FCM (Front Camera Module)
Exeed New TXL	
SAE052001	

(5) Enter next interface and click “Special function” .

Show Menu	
EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)	
Version Information	Read Fault Code
Clear Fault Memory	Read Data Stream
Special Function	
Exeed New TXL	
SAE053001	

(6) Enter next interface and click “Clutch Solenoid Valve Scour” .

Show Menu	
EXEED V10.61 > New TXL > System Selection > TCU (Transmission Control Unit) > TCU (Transmission Control Module-2.0T)	
VIN Data Write-In	Solenoid Wash
Fork Position Selflearning	Cluth TouchPoint SelfLearning
Clutch Perk Curve SelfLearning	Reset EEPROM
Read SubRom	

Exeed New TXL SAE054001

(7) Learning condition.

Cluth TouchPoint SelfLearning

Conditions: Vehicle Is Standstill (No Throttle), P-position, Stable Engine Idle Speed, Stable Engine Torque, Normal Temperature (Transmission Oil Temperature Not Higher Than 70degC), Transmission No Fault

CANCEL OK

Exeed New TXL SAE058001

(8) Click “OK” and perform clutch solenoid valve scour.