3.2 Automatic Transmission

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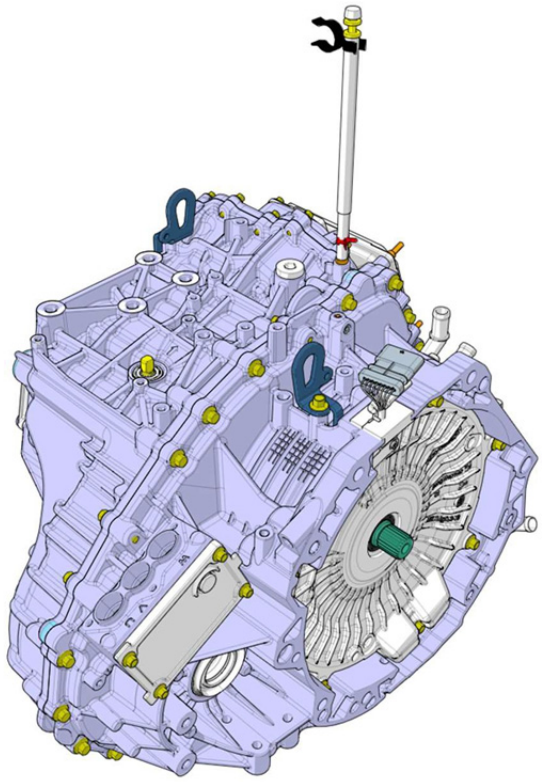
3.2.1 Automatic Transmission

Specifications

Description and Operation

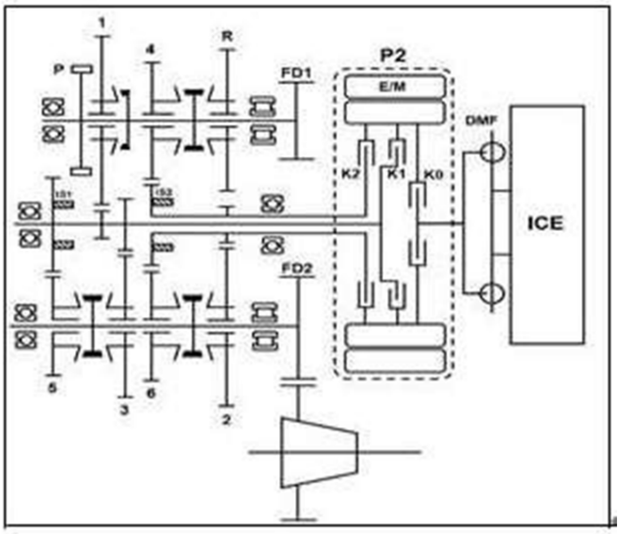
Appearance		
Transmission specification	TM046FDB	
Each gear ratio	1st gear	3.471
	2nd gear	2.905
	3rd gear	1.897
	4th gear	0.976
	5th gear	1.073
	6th gear	0.927
	Reverse gear	2.571
Differential final drive ratio (1st, 4th, Reverse)	4.294	

Differential final drive ratio (2nd, 3rd, 5th, 6th)	3.042
Self-weight	NE series: 119 Kg (with oil)
Maximum torque	400 Nm
Automatic transmission oil specification	DF722 Automatic transmission oil: LVTF-100-5.5
Automatic transmission oil - total amount	NE series: 8.25 ± 0.1 L (new installation), after-sale filling: Refer to following oil level inspection for detail (referring oil amount 6.8 ± 0.1 L)
Maintenance requirement	Automatic transmission and low pressure filter: Replace every 60000 KM or 3 years (which ever comes first)
Oil level adjustment	Overflow type

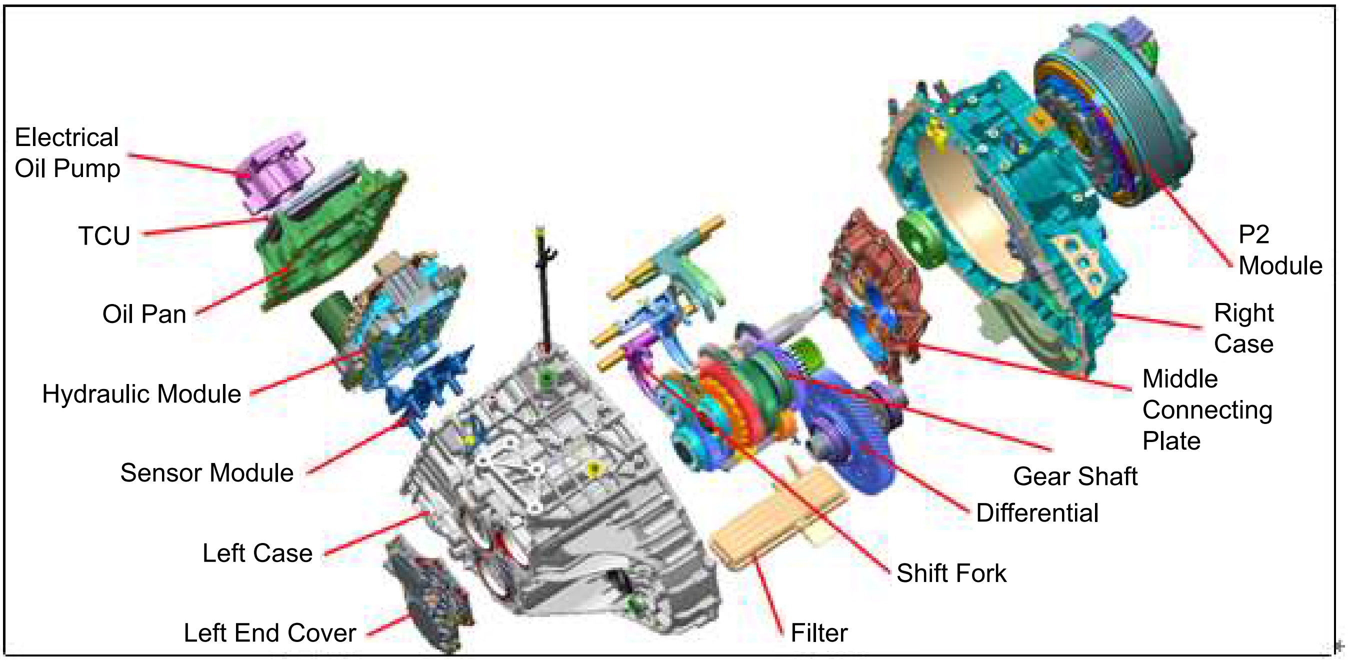
Overview

This transmission assembly is a P2 hybrid transmission, adopting new technologies such as coaxial shaft arrangement, integrated P2 module, high-pressure hydraulic control module, high-performance synchronizer, electronic oil pump and so on, and supports pure electric and hybrid driving.

Schematic Diagram and Structure Diagram



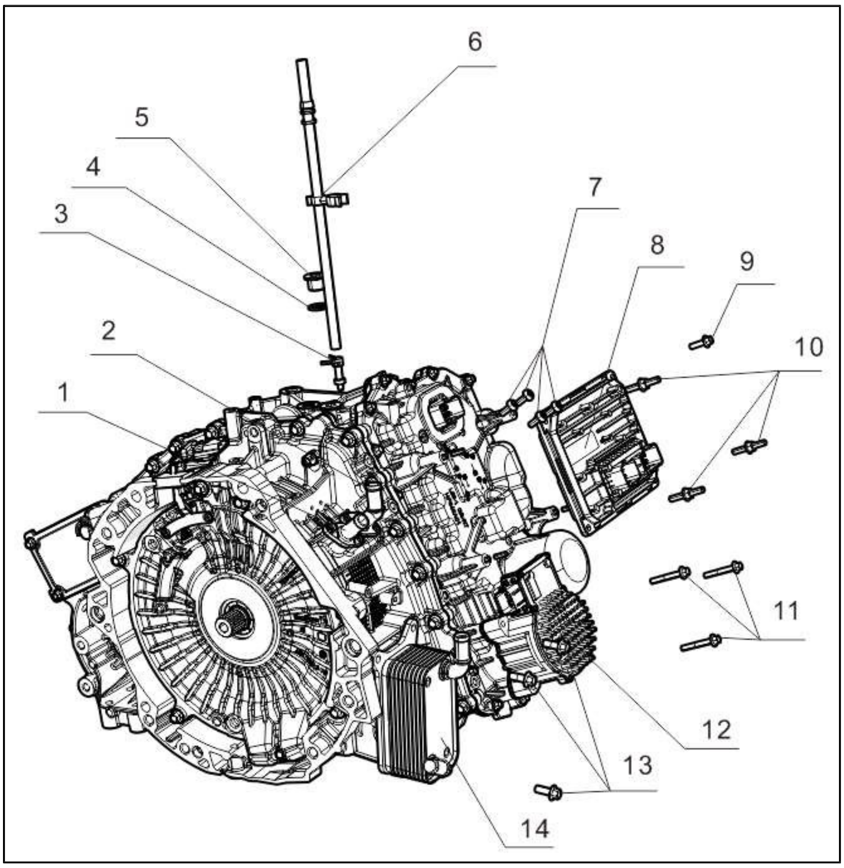
Transmission Schematic Diagram



Transmission Assembly Structure Diagram

Structure Table

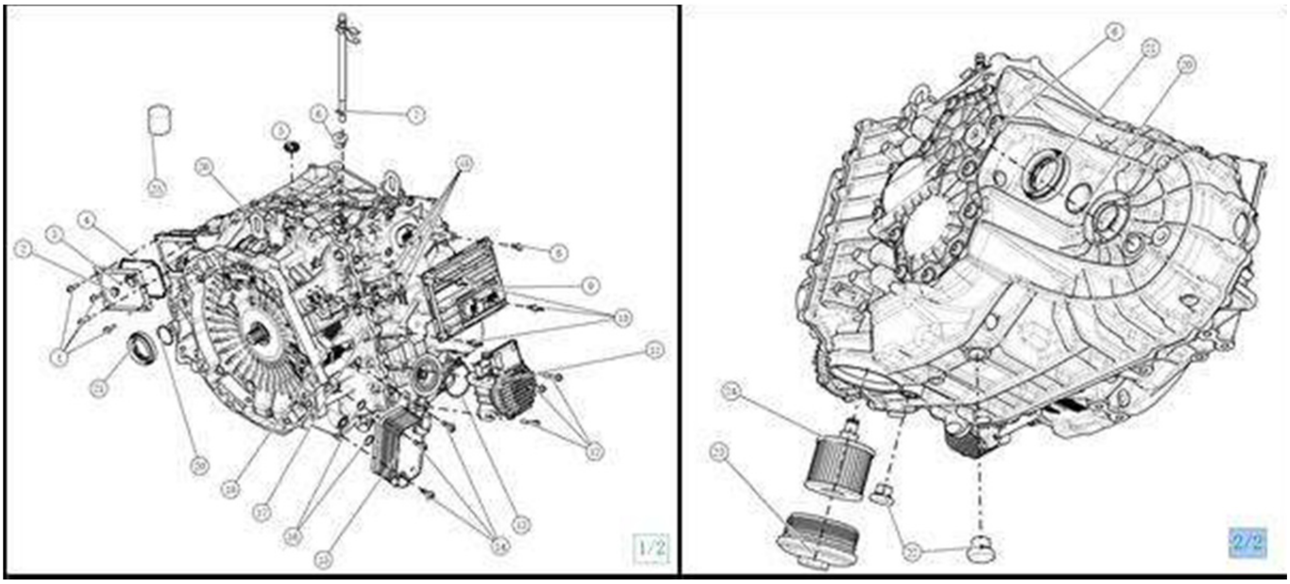
Structure Diagram and Details of Peripheral Parts



No.	Part No.	Description	Quantity	Remark
1	1501842-HF640A01	Oil cooling pipe	1	
2	1501844-HF640A01	Oil cooling pipe inlet pipe	1	
3	1502054-B02	Breather valve body	1	
4	1509217-B02	Drain bolt washer	4	
5	1500070-B02	Filler bolt assembly	4	M18×1.5×13/40 ± 3 Nm
6	1500050-HF640A01	Transmission breather pipe assembly	1	
7	09103060160T088F7	Inner hexagon pan head screw	4	M6×1×16/11 ± 1 Nm
8	3621010-HF640A01	Transmission control unit assembly	1	

9	0938060020QF7	Small type hexagon flange pan bolt	1	Transmission control unit retaining bolt M6×1×20/11 ± 1 Nm
10	1509361-HF640A01	TCU stud	3	M6×1×20/11 ± 1 Nm
11	0938060040QF7	Electronic oil pump retaining bolt	3	M6×1×40/11 ± 1 Nm
12	1507540-HF640A01	Oil pump motor assembly	1	
13	0938080020QF7	Oil cooler retaining bolt	3	M8×1.25×20/22 ± 2 Nm
14	1504210-HF640A01	Transmission oil cooler assembly	1	

HF640 Service Parts



No.	Part No.	Description	Quantity	Remark
1	0938060020QF7	Small type hexagon flange pan bolt	4	High voltage junction box cover retaining bolt M6×1×20, 11 ± 1 Nm
2	1501825-HF640A01	High voltage junction box breather valve	1	
3	1501841-HF640A01	High voltage junction box cover	1	
4	1509151-HF640A01	High voltage junction box seal ring	1	
5	1509123-HF640A01	Shift shaft oil seal	1	
6	1509905-HF640A01	Filler bolt assembly	2	

7	1502060-HF640A01	DCT Automatic transmission breather pipe assembly	1	
8	0938060020QF7	Small type hexagon flange pan bolt	1	Transmission control unit retaining bolt M6×1×20, 11 ± 1 Nm
9	3621010-HF640A01	Transmission control unit assembly	1	
10	1509361-HF640A01	TCU stud	3	
11	1507540-HF640A01	Oil pump motor assembly	1	
12	0938060040QF7	Electronic oil pump retaining bolt	3	
13	1509166-HF640A01	Oil pump motor O-ring	1	
14	0938080020QF7	Small type hexagon flange pan bolt	3	Oil cooler retaining bolt M8×1.25×20, 22 ± 2 Nm
15	1504210-HF640A01	Transmission oil cooler assembly	1	
16	1509164-HF640A01	Oil cooler inlet O-ring	2	
17	1501860-HF640A01	Cooling water pipe inlet pipe assembly	1	
18	09103060160T088F7	Inner hexagon pan head screw	4	Cooling water pipe retaining bolt M6×1×16, 11 ± 1 Nm
19	1501850-HF640A01	Cooling water pipe assembly	1	
20	1509195-HF640A01	Drive shaft gear O-ring	2	
21	1509161-HF640A01	Differential oil seal	2	Left and right differential oil seal
22	1509909-HF640A01	Drain plug assembly	2	
23	1501790-HF640A01	Filter cover assembly	1	
24	1504520-HF640A01	Low pressure filter	1	
25	HG0511000005	DF722 Automatic transmission oil: LVTF-100-5.5	8.5	Automatic transmission model: DF722; Automatic transmission oil: LVTF-100-5.5
26	1500010-CR31	Automatic transmission assembly	1	

Inspection, Removal and Installation Requirement of Transmission Assembly and Component

Note:

1. Removal and installation range

- Strictly in accordance with the spare parts list, the hydraulic module in the transmission contains high pressure components, removal and installation are strictly prohibited.

2. Never operate with power on.

- When removing and installing transmission assembly and components (including electric elements), ensure that the START ENGINE STOP switch is turned off, and disconnect the negative battery cable before servicing the system.
- When transmission oil is not refilled or insufficient, disconnect the battery to prevent oil pump from operating, which may damage oil pump or affects the service life.

3. Prevention of external impurities.

- When removing parts from transmission, be sure to remove dust from the housing.
- The removed parts should be protected with plastic bags to avoid dust.

4. Matching relations between transmission and controller

- After replacing transmission assembly (original TCU), perform motor controller self-learning.
- If the Transmission Control Unit (TCU) is replaced separately, be sure to confirm the software with after-sale service technical support. Do not replace or use it directly. TCU self-learning must be performed in accordance with the operating requirements.

5. Transmission oil type and oil level inspection requirements

- Use only the specified brand of oil, part number: HG0511000005, name: DF722 Automatic transmission oil, LVTF-100-5.5.
- The operation of oil level checking and oil change process should be carried out in strict accordance with the operation requirements to ensure the accuracy of oil quantity.

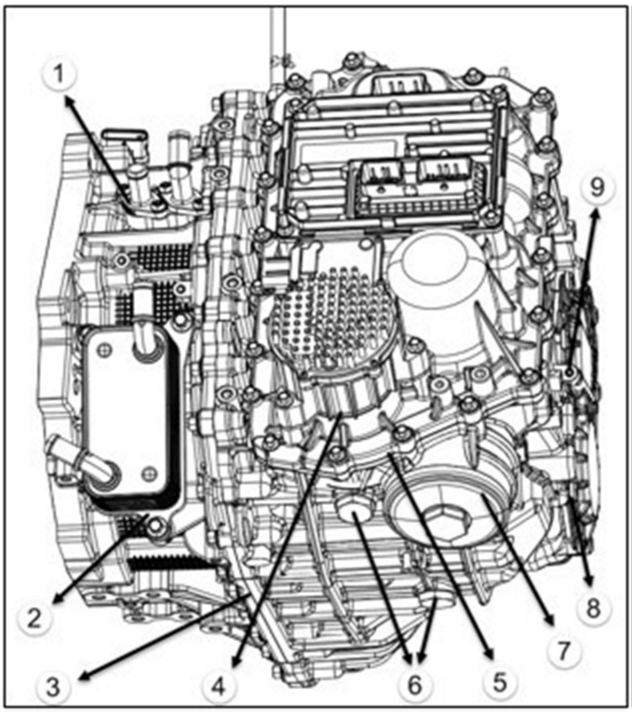
General Inspection

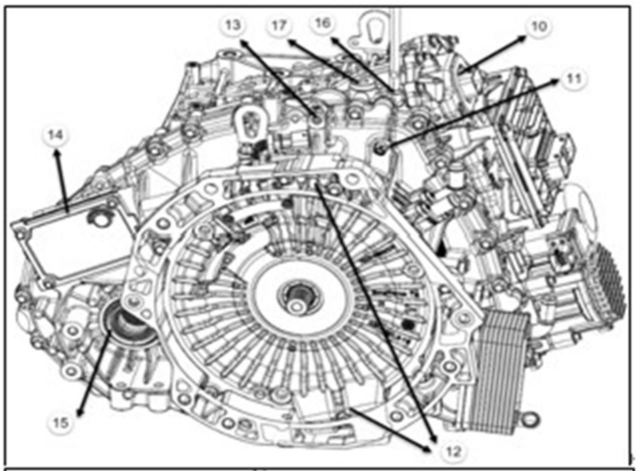
Transmission appearance inspection (before entering):

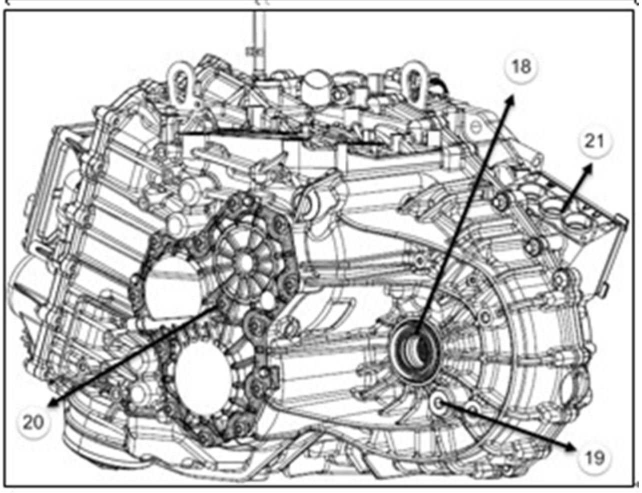
Check the integrity of transmission before installation.
Check the appearance of the connector:
1. Check if the connector is reliable with no looseness, disconnection, dirt and damage.
2. Check if there are oil stains or impurities inside, if the terminals are broken, bent, corroded, etc.
If the plastic plugs of cooling water pipe joint (1), oil cooling pipe joint (2) and high voltage three-phase wiring harness outlet (21) are complete;
Check the transmission appearance for impact: Especially focus the oil cooler pipe joint (2) and cooling water pipe joint (1) and transmission bottom;
Check for oil trace (or coolant signs) according to the appearance check list. Replace it if there is no oil trace (or coolant signs); Otherwise, check if the oil trace (or coolant signs) is caused by leakage.

List 1 Transmission appearance check list

No.	Name	No.	Name
1	Cooling water pipe joint seal surface	12	P2 water jack and P2 housing seal end face
2	Oil cooler seal end face	13	Right case K0 breather valve oil passage plug
3	Left and right case joint surface	14	High voltage junction box cover seal surface
4	Oil pump motor seal end surface	15	Right case differential oil seal
5	Seal surface between oil pan and left case	16	Interface between breath pipe and left case
6	Drain plug sealing surface (2 locations)	17	Filler bolt
7	Filter cover seal surface	18	Left case differential oil seal
8	Seal surface between left case cover and left case	19	Oil level observe hole plug seal end surface
9	Left case cover oil passage plug	20	Left case cover middle bolt seal gasket
10	Oil pan Lead-frame interface	21	High voltage three-phase wiring harness outlet
11	Clutch temperature sensor seal surface		







Transmission appearance inspection (after entering):

1. Transmission vent pipe whole posture should be upward without bending and twist;
2. Connect the connector in place without missing;
3. Oil cooler, P2 motor inlet and outlet water pipes are connected in place without missing or misaligned;
4. If there is interference with sub fame, vehicle body and steering gear;
5. Appearance inspection

After the road test is completed, check each part to see if there is any oil leakage.

Transmission oil level inspection:

1. Park the vehicle on level ground (keep vehicle body level), apply parking brake and shift the shift lever to “P” position.
2. Check if the transmission oil is leaking. Check and repair the oil leaking part if so.
3. When transmission oil temperature reading on diagnostic tool increases to 20℃ ~ 45℃, remove the filler bolt (17) manually and add 200 ml transmission oil with a measuring cup. Socket specification: Inner hexagon.
4. Drain the oil through the diagnostic tool, then immediately remove the oil level observe hole plug (19) manually. Catch the drained oil with a measuring cup. Tighten the oil level observe hole plug (19) manually if oil flows out in line type. Tightening torque 35 ± 3 Nm (note that both the oil level observe hole and refilling hole are required to be replaced with new O-ring seals), for details:

① If no transmission oil flows out, it indicates oil amount is less, repeat the above operation until transmission oil flows out, screw oil level observation hole plug (19);

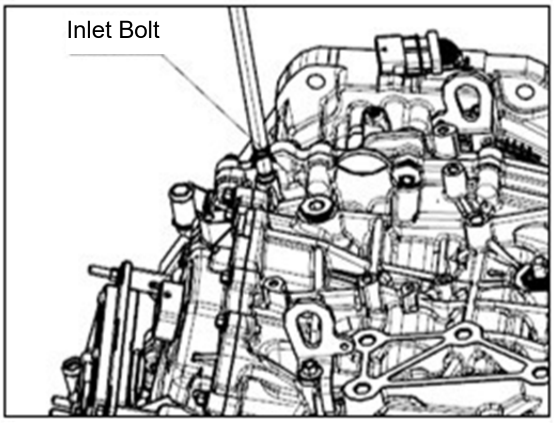
② If the drained amount and filling amount (200 ml) is almost same (tolerance: ± 20 ml), it indicates that the oil level is normal, screw oil level observation hole plug (19);

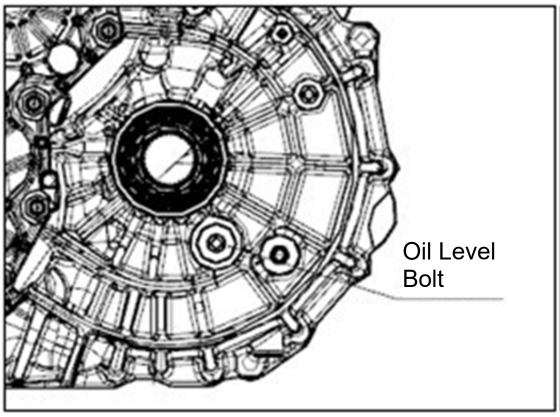
③ If the drained amount is more than filling amount (200 ml), it indicates the original transmission oil amount is more. It is necessary to make sure the oil drained from oil level observe hole is in a fine line shape at this time, then tighten the oil level observation hole plug (19) according to the torque requirements;

④ If the drained amount is less than filling amount (200 ml or more), it indicates the original transmission oil amount is less. It is necessary to make sure the oil drained from oil level observe hole is in a fine line shape at this time, then tighten the oil level observation hole plug (19) according to the torque requirements.

⚠ Caution:

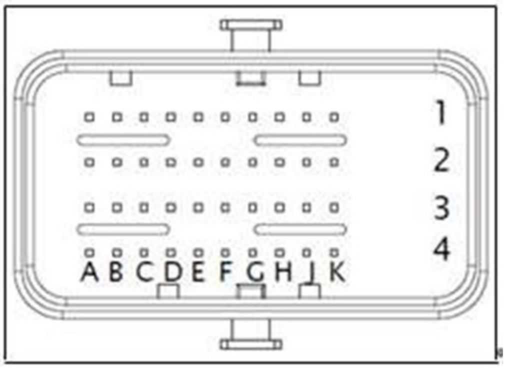
1. It is recommended that all operations after draining with diagnostic tool should be completed within 10 minutes, otherwise the accuracy of the results will be affected.
2. Be sure to complete draining operation according to requirements at specified temperature, otherwise the accuracy of the results will be affected.
3. Too little transmission oil will make the vehicle unable to start or burn out parts such as friction plates of DCT clutch, while too much transmission oil will cause transmission failures such as foaming, oil injection and low drive efficiency.
4. If the used transmission oil does not meet the requirement, transmission failure may be caused.





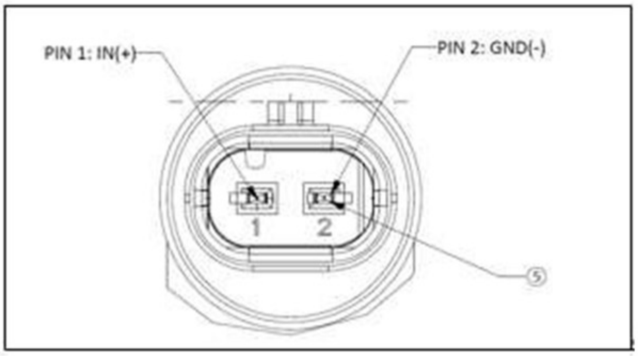
Electrical Interface Definition

- HCU part between engine and transmission



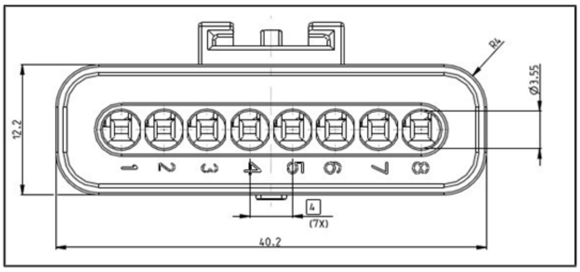
Pin	Function Abbreviation	Rated Current	Imax(A)
A1	5VGND #2		300mA
A2	PV4 Line Solenoid -	1.2 A	2A
A3	K1 Clutch Solenoid +	1.2 A	2A
A4	Speed Sensor Input Shaft K2		50mA
B1	K1 Clutch pressure sensor signal		20mA
B2	PV4 Line Solenoid +	1.2 A	2A
B3	K1 Clutch Solenoid –	1.2 A	2A
B4	8Vref #2		50mA
C1	5Vref #2		300mA
C2	QV4 Solenoid –	1.2 A	2A
C3	QV2 Solenoid +	1.2 A	2A
C4	Position Sensor Rail #4		20mA
D1	Line pressure sensor signal		20mA
D2	QV4 Solenoid +	1.2 A	2A
D3	QV2 Solenoid –	1.2 A	2A
D4	Position Sensor Rail #1		20mA
E1	5VGND #1		300mA
E2	QV3 Solenoid –	1.2 A	2A
E3	K0 Clutch Solenoid +	1.2 A	2A
F1	K0 Clutch pressure sensor signal		20mA
F2	QV3 Solenoid +	1.2 A	2A
F3	K0 Clutch Solenoid –	1.2 A	2 A
F4	QV1 Solenoid +	1.2 A	2 A
G1	5Vref.1		300 mA
G2	ACV Solenoid –	1.2 A	2 A
G3	K2 Clutch Solenoid +	1.2 A	2 A
G4	QV1 Solenoid –	1.2 A	2 A
H1	K2 Clutch pressure sensor signal		20 mA
H2	ACV Solenoid +	1.2 A	2 A
H3	K2 Clutch Solenoid –	1.2 A	2 A
H4	Temp. Sense HCU Oil		20 mA
J1	Speed Sensor IN Shaft K1		50 mA
J2	LV1 Clutch Lube Solenoid –	1.2 A	2 A
J3	PV5 Line Solenoid +	1.2 A	2 A
J4	Position Sensor Rail #2		20 mA
K1	8Vref #1		200 mA
K2	LV1 Clutch Lube Solenoid +	1.2 A	2 A
K3	PV5 Line Solenoid –	1.2 A	2 A
K4	Position Sensor Rail #3		20 mA

• P2 Oil outlet temperature sensor



Pin	Function Abbreviation	Rated Current	Imax (A)
1	Temp. Sense		0.005
2	GND		0.005

• P2 Low voltage module

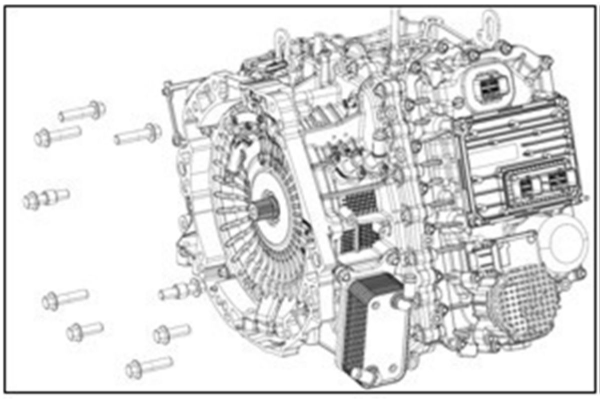


Pin	Function Abbreviation	Rated Voltage /Current	I_{max} (A)
1	Temp+	10 mA	100 mA
2	Temp-	10 mA	100 mA
3	Sin+	10 mA	100 mA
4	Sin-	10 mA	100 mA
5	Cos+	10 mA	100 mA
6	Cos-	10 mA	100 mA
7	Ex-	10 mA	100 mA
8	Ex+	10 mA	100 mA

Removal and Installation

Removal and Installation of Transmission Assembly

1. Removal of transmission assembly
   - Remove the power assembly (engine and transmission assembly) from vehicle according to requirements.



- Remove connecting bolts between transmission and engine.
- Move out the transmission in axial direction to remove it.

2. Assembly of transmission assembly
   - Install the connecting dowel pin between crankcase and transmission
   - Install transmission assembly to engine and tighten 9 connecting bolts between transmission and engine. Torque: 80 ± 5 Nm.

Part No.	Item	Quantity	Torque
1031022-A01	Bolt	7	80 ± 5
1000233-B01-S345	Bolt	2	80 ± 5 Nm
1000013-A01	Connecting dowel pin between crankcase and transmission	2	/

Note:

- When installing or removing the transmission and engine, they must be centered axially and violent shaking is prohibited.
- Replace the transmission assembly, be sure to perform motor controller PEU resolver zero position self-learning. (For details, refer to operation and description in "motor controller")
- If the Transmission Control Unit (TCU) is replaced separately, be sure to confirm the software with after-sale service technical support. Do not replace or use it directly. After replacing the specified TCU as required, it is also necessary to complete the TCU self-learning according to removal and installation operation requirements of Automatic Transmission Control Unit (TCU).

Transmission Oil Change:

1. Park the vehicle on level ground (keep vehicle body level), apply parking brake and shift the shift lever to “P” position.
2. Check whether the transmission oil is leaking. Check and repair the oil leaking part if so.
3. Remove two drain plugs (6) from bottom of left case manually.
4. After draining the transmission oil, clean foreign objects from two drain plugs (6) surface. Replace the O-rings with new ones and tighten two drain plugs (6) manually. Tightening torque: 35 ± 3 Nm.

5. Remove the filler bolt (17) manually. Socket specification: Inner hexagon.

6. Connect the battery after adding 6.8 L of oil to transmission through refill plug hole. When the transmission oil temperature rises to 20℃ ~35℃ as read by the diagnostic tool, start draining procedure. Then immediately remove the observe drain plug (19) to check if oil flows out from the outlet. If the oil flows out in continuous line type, tighten the refill hole bolt (17) and oil level observe hole plug (19); If no oil flows out, add 100 ml of transmission oil with a measuring cup. Observe the oil level observe hole. Tighten the refill hole bolt (17) and oil level observe hole plug (19) manually if fluid flows in continuous line type. Otherwise, add 100 ml of oil again and observe it.

Tightening torque: 35± 3 Nm. Replace O-rings with new ones at the same time.

Caution:

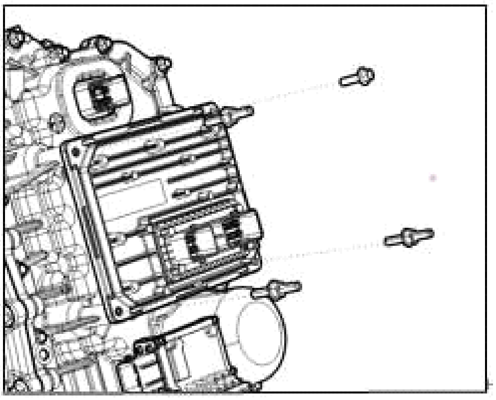
1. It is recommended that all operations after draining with diagnostic tool should be completed within 10 minutes, otherwise the accuracy of the results will be affected.
2. Be sure to complete draining operation according to requirements at specified temperature, otherwise the accuracy of the results will be affected.
3. Before draining the oil, make sure that the battery is disconnected. Do not connect the battery before refilling transmission oil to prevent damage to transmission electronic oil pump.
4. Too little transmission oil will make the vehicle unable to start or burn out parts such as friction plates of DCT clutch, while too much transmission oil will cause transmission failures such as foaming, oil injection and low drive efficiency.
5. If the used transmission oil does not meet the requirement, transmission failure may be caused.

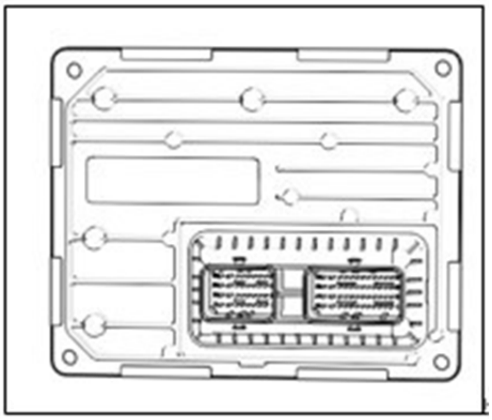
Removal and Installation of Automatic Transmission Control Unit (TCU)

1. Remove the TCU.

• Remove the transmission control unit assembly 3621010- HF640A01. Remove one bolt and three studs and pulling out TCU in vertical direction.

Part No.	Item	Quantity	Specifications
0938060020QF7	Transmission control unit retaining bolt	1	M6×1×20
1509361-HF640A01	TCU stud	3	M6×1×20





Caution:

• Never touch the connector port.

• Handle with care to prevent TCU from being damaged.

• Check connecting terminals of TCU and AT for pin damage, bending, pin hole blockage, foreign matter residues.

2. Installation of TCU

• Install TCU in the place.

• Install one bolt 0938060020QF7 and three studs 1509361-HF640A01 of the TCU. Bolt specification: M6×1×20 mm; Torque: 11 ± 1 Nm.

Removal and Installation of Cooling Water Pipe

1. Remove the cooling water pipe, cooling water pipe inlet pipe

• Remove the cooling water pipe 1501842-HF640A01, cooling water pipe inlet pipe 1501844-HF640A01. Remove two bolts respectively, take out the water pipe, and scrap the cooling water pipe joint seal ring.

Part No.	Item	Quantity	Specifications
1501842-HF640A01F7	Cooling water pipe plug	1	
1501844-HF640A01	Cooling water pipe inlet pipe	1	
1509182-HF640A01	Cooling water pipe joint seal ring	2	
09103060160 T088F7	Cooling water pipe retaining bolt	4	M6×1×16

Caution:

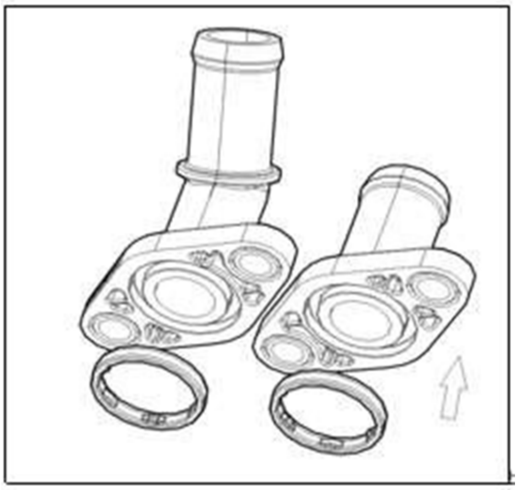
• Do not reuse the seal ring. Replace cooling water pipe together with the seal ring.

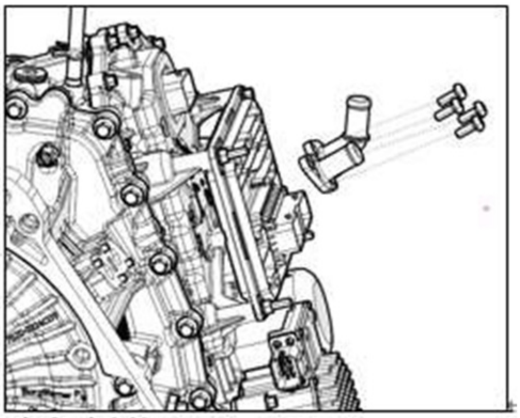
• Cooling water pipe seal ring is prohibited from contacting transmission oil.

2. Installation of cooling water pipe

• The seal ring of cooling water pipe is installed in the concave groove of cooling water pipe. Install it in place, and then install the water pipe on the case.

• Assembling bolt 09103060160T088F7, bolt specification: M6×1×16. Torque: 11 ± 1 Nm.





Removal and Installation of Oil Bump Motor

1. Remove oil pump motor

• Drain transmission oil in advance by referring to the method in "HF640A01 Transmission Oil Level Inspection Method".

• Remove 3 electronic fuel pump retaining bolts 0938060040QF7 respectively. Remove the oil pump motor and scrap the oil pump motor O ring 1509166-HF640A01.

Caution:

• Do not reuse the seal ring.

• Handle with care to prevent oil pump motor from being damaged.

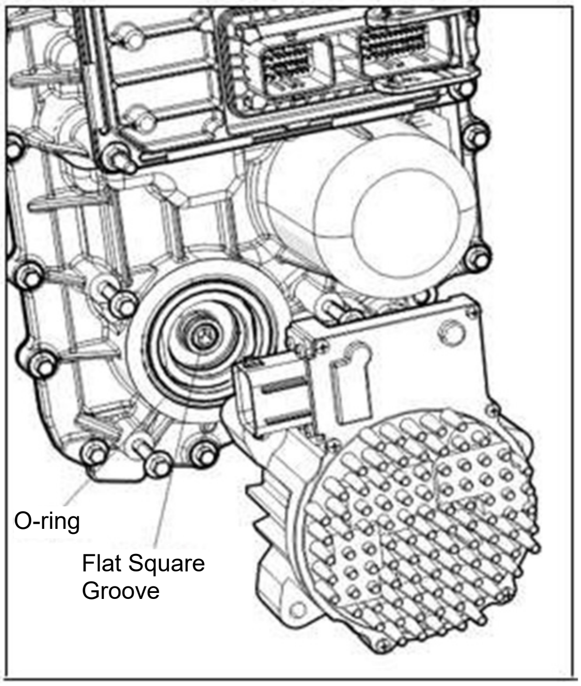
2. Install the oil pump motor

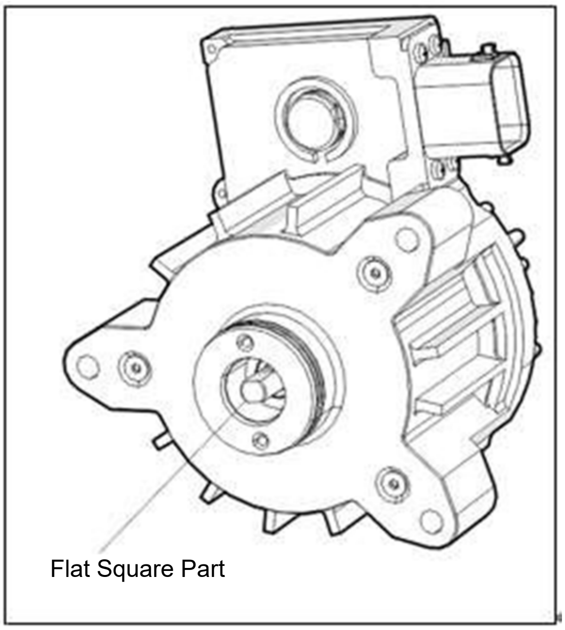
• Clean the installation surface between oil pan and oil pump motor.

• Remove new oil pump motor O-ring 1509166-HF640A01 Install it on the oil pan groove.

• Align the oil pump shaft flat square part with the oil pump flat square groove, and adjust the oil pump posture so that installation point of its bolt is aligned.

• Install the electronic oil pump fixing bolt. Bolt specification: M6×1×40. Torque: 11 ± 1 Nm.





Replacement of Low Pressure Filter

1. Remove element

• Drain transmission oil in advance by referring to the method in "Transmission Oil Change".
• Unscrew the filter cover with outer hexagon wrench, remove the low pressure filter and scrap the filter cover seal ring.

Caution:

• Do not reuse the seal ring.

2. Install low pressure filter

• Install the new low pressure filter in the case.

• Clean the filter cover and replace the seal ring. Install the seal ring into the filter cover concave groove (it is necessary to install the sealing ring with a special tool).

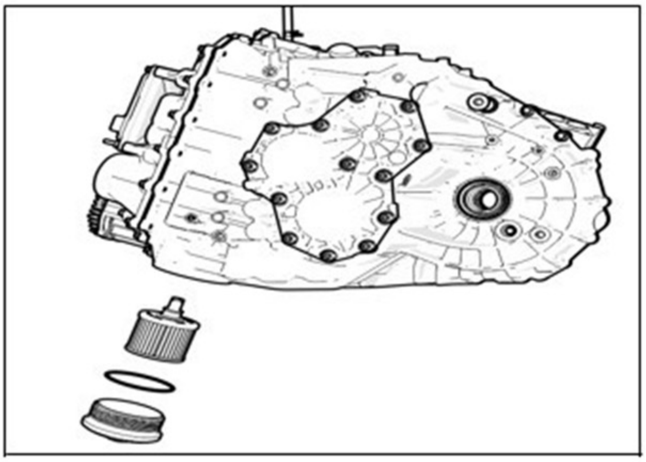
• Install the filter cover. Torque: 60 ± 5 Nm.

3. Add oil and check the oil level according to "Transmission Oil Change", "Transmission Oil Level Inspection".

Caution:

• Perform operation gradually while screwing to prevent filter cover from stuck caused by change of force direction and speed;

• Before assembling the filter cover, make sure that the sealing ring has oil in the whole ring and should be screwed in manually to ensure that the threads of the filter cover are screwed in properly to avoid damaging the threads and causing oil leakage;



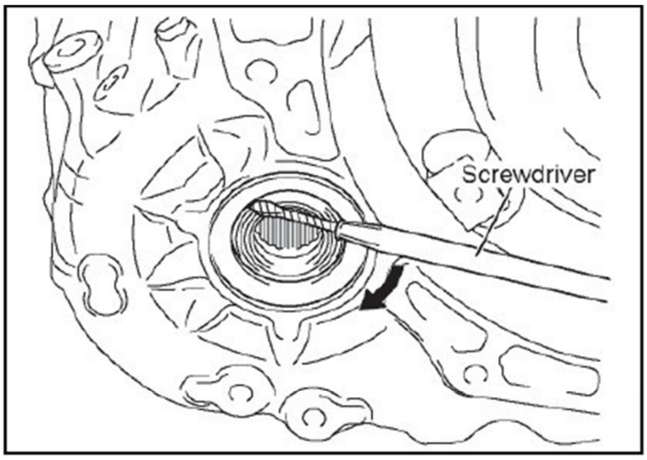
Removal and Installation of Differential Drive Shaft Oil Seal

1. Removal of differential left and right drive shaft oil seal

• Remove left and right drive shafts by referring to “Removal of Drive Shaft”.

• Remove the differential left and right drive shaft oil seals.

• Use a screwdriver to pry off differential left and right drive shaft oil seals.



Caution:

• When removing transmission drive shaft, wrap the screwdriver tip with tape.

2. Installation of differential left and right drive shaft oil seals

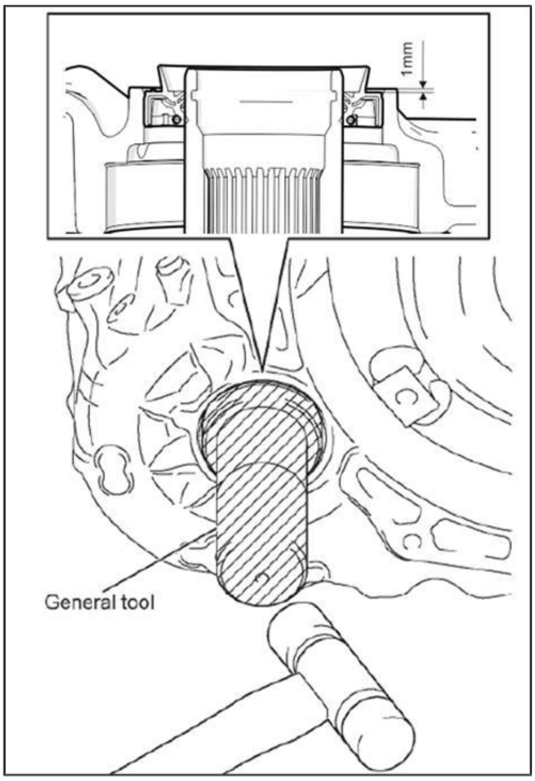
• Use a special tool and hammer to replace oil seal with a new one. Install oil seal to transmission by referring to the method shown in figure. Specification: 1 mm from end face of housing

Caution:

• Be careful not to damage the seal ring.

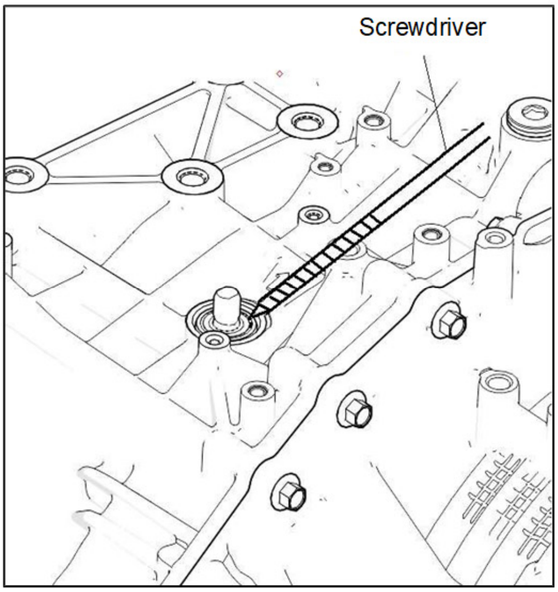
• Be careful not to damage the transmission case hole.

• Make sure the oil seal is installed in the place.



Removal and Installation of Shift Shaft Oil Seal

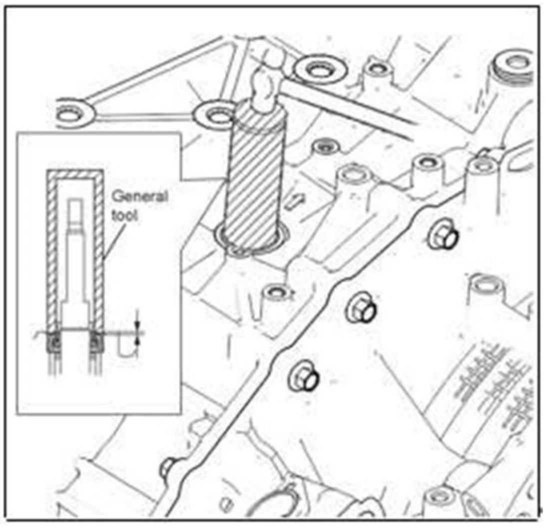
1. Removal of shift shaft oil seal
Use a screwdriver to remove shift shaft oil seal.



Caution:
• When removing seal ring, wrap the screwdriver tip with tape.
• Be careful not to damage the transmission case.
• Be careful not to damage the shift shaft surface.
• Make sure the oil seal is installed in the place.

2. Assembly of shift shaft oil seal

2.1. Use a special tool and hammer to replace oil seal with a new one. Install oil seal to transmission by referring to the method shown in figure.
Specification: Press in the end face of the oil seal 0-2mm from the end of the housing.

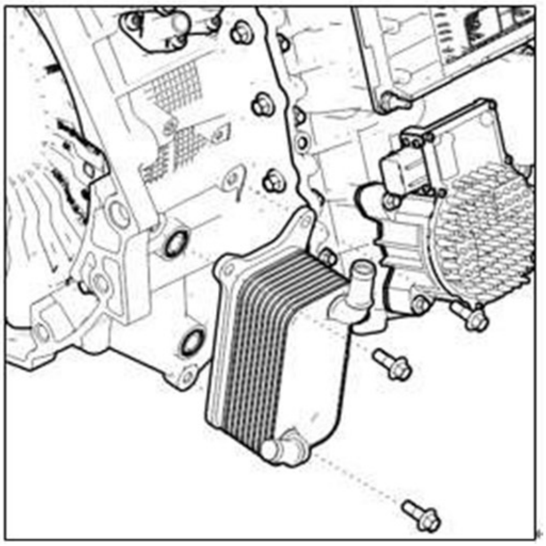


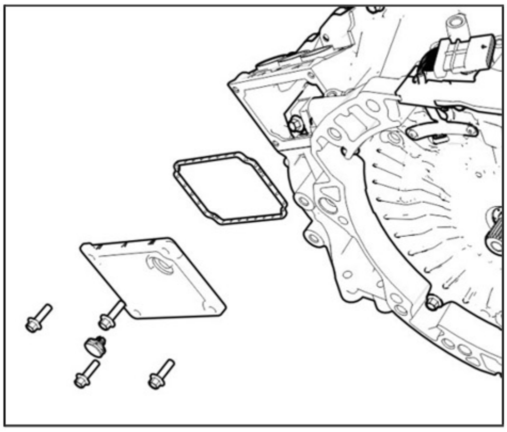
Caution:
• Be careful not to damage the seal ring.

Removal and Installation of Oil Cooler

1. Drain transmission oil in advance by referring to the method in "Transmission Oil Change".
2. Removal of Oil Cooler Assembly
• Use a hexagon bolt socket to remove 3 bolts and oil cooler. Bolt specification: M8×1.25×20.
• Remove 2 O-rings from case, and scrap them.
3. Cleaning parts surface
• Clean the part and case surface of oil cooler.
4. Installation of oil cooler
• Install 2 new O-rings to concave groove of case.
• Install the oil cooler assembly, and then use a hexagon bolt socket to install 3 bolts. Torque: 22 ± 2 Nm. Bolt specification: M8×1.25×20.
5. Add oil and check the oil level according to "Transmission Oil Change", "Transmission Oil Level Inspection".

Caution:
Transmission oil type is DF722 automatic transmission oil; LVTF-100-5.5; Do not add other types of lubricating oil.





Removal and Installation Of High Voltage Junction Box Cover

1. Removal

• Use a tool to remove 4 bolts. Bolt specifications: M6×1×20; Remove the high voltage junction box cover and scrap the high voltage junction box cover gasket.

2. Installation

• Before installation, secure the wiring harness inside the junction box and check if there is oil trace;

• Replace the new gasket, install and tighten the high voltage junction box cover. Bolt torque: 11 ± 1 Nm.

Caution:

• If only the vent valve of high voltage junction box is replaced, it can be removed and replaced directly without removing the high voltage junction box cover.

• Check whether there is oil trace inside the junction box. Do not assemble it if there is oil trace. Contact the manufacturer for repair.

Symptom Diagnosis and Testing

Transmission Oil Pump Motor Symptom Diagnosis and Testing

When the instrument cluster indicates a transmission fault, read the TCU DTC first, and if there is no fault, read IPUMP DTC. Refer to DTC diagnosis procedure index for related contents

Diagnosis Procedure

Step	Operation	Yes	No
1	Connect the diagnostic tool in power off state; Turn the power switch to ON (Ignition on). Diagnostic tool enters IPUMP diagnosis mode, and check if communication with IPUMP system is normal.	Go to step 2	Refer to System Inspection
2	Start the “Read DTC” function, read DTC to check for a fault	Check and repair according to DTC	End

DTC U254000 (Communication Fault)

DTC	DTC Description	Service Operation		
U254000	CAN Bus Off Error	Step	Yes	No
U254100	TCU_27A Message CRC Fault	1. Check if wiring harness is connected normally.	Go to step 2	Repair wiring harness
U254200	TCU_27A Message Rolling Count Fault	2. Check whether the CAN communication of the corresponding controller module of vehicle or node is normal.	Go to step 3	Repair correspond ing module
		3. Replace IPUMP, perform IPUMP self-learning with diagnostic tool after completed.	-	-

DTC P140000 (Power Supply Voltage is Too High or Too Low)

DTC	DTC Description	Service Operation
P140000	Battery Voltage Too High	1. Detect DC-DC output voltage 2. Check if battery circuit is within normal range 3. Check power supply wiring harness circuit
P140100	Power Supply Voltage Excessively Low	

DTC P140200 (Phase Current Overcurrent)

DTC	DTC Description	Service Operation		
		Step	Yes	No
P140200	Oil Pump Motor Phase Current Overcurrent	1. Clear DTC and read again, check if DTC recurs.	Go to step 2	End
		2. Replace IPUMP, clear DTC and read again, check if DTC recurs.	Go to step 3	End
		3. Replace the transmission oil pump	-	-

DTC P140300 (Pre-drive Fault)

DTC	DTC Description	Service Operation		
		Step	Yes	No
P140300	Oil Pump Motor Pre-drive Fault	1. Clear DTC and read again, check if DTC recurs.	Go to step 2	End
		2. Check if battery voltage and power supply circuit are normal?	Go to step 3	
		3. Replace IPUMP, clear DTC and read again, check if DTC recurs.	Go to step 4	-
		4. Replace the transmission oil pump		

DTC P140400 (Controller Over Temperature Fault)

DTC	DTC Description	Service Operation		
		Step	Yes	No
P140400	Oil Pump Motor Controller Over Temperature Fault	1. Clear DTC and read again, check if DTC recurs.	Go to step 2	Read TCU history oil temperature
		2. Replace IPUMP, clear DTC and read again		

DTC P140500/P140600/P140800/P140900 (Internal Fault)

DTC	DTC Description	Service Operation		
P140500	Oil Pump Motor Temperature Sensor Fault	Step	Yes	No
P140600	Oil Pump Motor Position Sensor Fault	1. Clear DTC and read again, check if DTC recurs.	Go to step 2	End
P140800	Oil Pump Motor Voltage Sampling Fault	2. Replace IPUMP, clear DTC and read again		
P140900	Oil Pump Motor Overspeed Fault			

DTC P140700 (Mechanical Fault)

DTC	DTC Description	Service Operation		
		Step	Yes	No
P140700	Oil Pump Motor Block Fault	1. Clear DTC and read again, check if DTC recurs.	Go to step 2	End
P141001	Oil Pump Motor Reverse Rotation Fault	2. Replace IPUMP, clear DTC and read again, check if DTC recurs.	Go to step 3	End
P141101	Oil Pump Motor Speed Too High Fault	3. Replace the transmission oil pump		

Basic Symptom Diagnosis Procedure

First, perform operations from steps (1) to (5) to find out the fault accurately, and then perform the fault diagnosis as follows. Corresponding effective procedures will be provided to troubleshoot the fault each time it is found.

1. Vehicle is brought to service station
2. User problem analysis: Confirm the state and condition at the time the fault occurred together with user, and fill in the Malfunction Inspection Chart. Check and confirm when, where and how the fault occurs.

⚠ Caution: Do not judge the fault subjectively in order to ensure judgment accuracy. In order to confirm fault factually, it is very important to confirm with user about the condition as a fault occurs. Even the faults and repair records, which have occurred before but are unrelated to present, may become the important information, so obtain the information as much as possible.

3. Early inspection.
   (1) Using a multimeter, measure battery voltage when engine stops.

   Standard: 10 - 14 V

   (2) Visually observe if fuse is blown, if wiring harness is open or short as well as the connector connections.
4. Check DTC: Check DTC and vehicle data with diagnostic tool.

⚠ Caution: If no DTC is stored, inspect the fault symptoms. Then carry out road test and function inspection to obtain related date.

   (1) Clear DTC and vehicle data with diagnostic tool.
   (2) After clearing DTC with diagnostic tool, wait for 10s or more after powered off to ensure that the cleared DTCs have been stored in TCU-NVM. Otherwise, the related DTCs can still be read with diagnostic tool after power on again.

   Hint: DTC and freeze frame data cannot be cleared by disconnecting negative battery, always use a diagnostic tool to clear them.

5. Check symptom (check DTC again).

Reproduce the conditions at the time the fault occurred and check DTC according to the data and freeze frame data obtained from user.

6. Perform fault inspection according to DTC

Search according to the corresponding DTC to determine the fault and check the circuit and component at faulty area.

7. Check circuit and component

   According to check result, check the circuit and component at faulty area.

8. Repair fault

   Repair or replace the faulty component.

9. Complete the test
   (1) Check for fault symptom and make sure that problem does not occur again after faulty components are repaired or replaced or connectors at faulty area are adjusted.
   (2) Clear DTC and freeze frame data with diagnostic tool.

Malfunction Inspection Chart

Create a malfunction inspection chart as shown below. It is used to record the information and DTC obtained from user, which will be used as reference for troubleshooting.

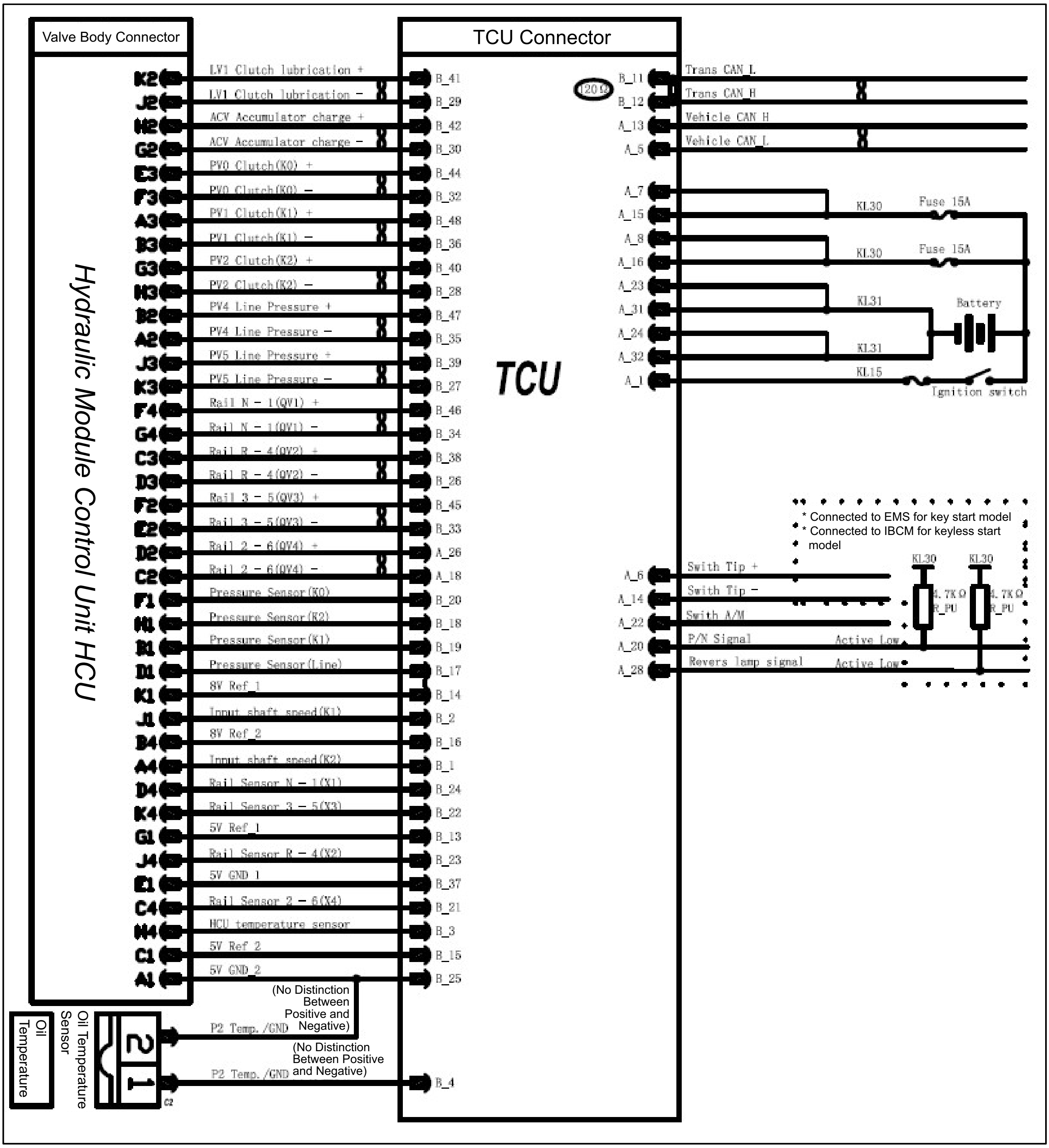
Fault Occurrence Date		Service Date		Mileage	
A/T VIN		Vehicle VIN		Repair Shop Name	
TCM VIN		TCM Software Version No.		Repairer	

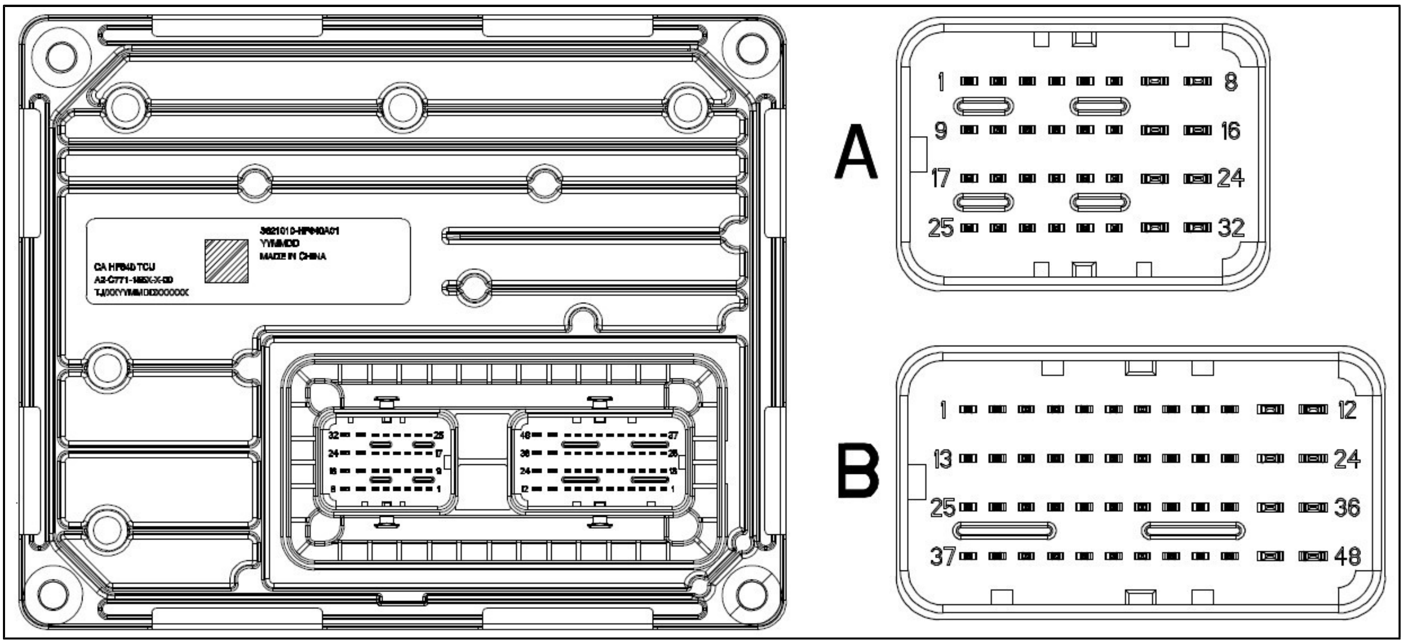
<Symptom Described by User>	
<Fault Symptom Confirmation by Repairer>	
●Conditions When Fault Occurred	
▲Fault Frequency □Often □Frequent □Intermittent ( ) □Not Found by Repairer	
▲Road Condition □Common Road □Expressway □Others ( )	
▲Engine Oil Temperature □Cold □Hot □Paid No Attention	
▲Road Conditions □Uphill □Downhill □Flat □Others ( )	
●Fault Conditions	
□Transmission MIL	1) DTC ( )
	Please Describe Inspection Result
	a. Is Battery or Fuse Faulty? □No Fault □Fuse Blown □Low Voltage
	b. Does MIL Come On Again After Clearing DTC? □No □Yes
	c. Is Connector Status of Transmission and TCU Detected?
	d. If Component is Replaced, Fill in "Replaced Component"
□Vehicle Unable to Move	1) Shift Knob Position: □Special Shifting( ) □It is Possible to Shift at All Positions
	2) a. Engine Idling: (rpm) b. Stall Test (D: rpm R: rpm)
	3) Transmission Oil Temperature Information (Fill Inspection Results in Following Options)
□Coasting Shift □Vibration □Shift Shock □Unable to Shift	1) Shift Knob Position: □P
	2) a. Engine Idling: (rpm) b. Stall Test (D: rpm R: rpm)
	3) Fault Occurrence Conditions: Vehicle Speed (km/h) Throttle Opening (%)
	4) Transmission Oil Temperature Information (Fill Inspection Results in Following Options)
□Noise	1) Noise Type: □Continuous □Intermittent □Beating □Others ( )
	2) Noise: □Accompany with Vehicle Speed □Accompany with Engine Speed
	3) Noise Occurrence Conditions: a. Engine (rpm) b. Vehicle Speed (km/h) c. Throttle Opening (%)
	4) Gear Position at the Time of Fault Occurrence: From ( ) to ( ) Position
	5) Transmission Oil Temperature Information (Fill Inspection Results in Following Options)
□Transmission Leakage	1) Leakage Level: Transmission Oil Temperature Information
	2) Leakage Position
□Others	□Parking Fault □Engine Stalling
	□Others ( )
●Transmission Oil Temperature Inspection	
▲Transmission Oil Level a) Oil Temperature (°C)	
b) Oil Color □Normal □Abnormal (□White □Dark □Oil Mixture)	
▲Transmission Oil Temperature When Fault Occurs (°C)	
<Components to be Repaired>	
□Transmission Components □TCM □Others ( )	

DTC Diagnosis and Testing

- The symptom diagnosis procedure describes process of finding and repairing faults with DTC. (The detailed work procedure is described during each individual inspection.)
- The method of inspecting circuit and component by DTC has been described. (If there is a fault but no fault can be detected, the fault may occur in other systems.
 Therefore, it is necessary to inspect other systems first instead of transmission.)
- According to the inspection, vehicle may be lifted or some components may be removed. Perhaps, the vehicle status at the time of fault will be reproduced, to ensure that the vehicle has been connected to dynamometer and well secured against moving.
- In addition to the specified operation method, the measured resistance needs to be tested under normal temperature. If the resistance is measured at a temperature higher than ambient temperature after vehicle running, there may be a difference between measured value and specified value. Wait until the temperature becomes normal, before performing test again.
- If it is necessary to use battery during the test, do not use the one on vehicle. Prepare a battery separately for inspection.
- Before the inspection, inspect wiring harness route and connector position to ensure that they can return to the original position.
- When unplugging the connector, be careful not to pull it apart.
- When inspecting wiring harness, it is better to connect the diagnostic tool probe to wiring harness terminal.
- When inspecting a component separately, please be careful if diagnostic tool probe or current will contact with component, otherwise, component may be damaged or deformed.
- When connecting a component, such as battery, do not install the electrode in reverse, or the component may be damaged.
- Handle components carefully to prevent damage or influence.
- Before replacing TCM, it is necessary to inspect the input/output of faulty part (refer to “TCM Arrangement”).
- After replacing TCM or transmission unit (internal component), be sure to perform learning value initialization and TCM initialization self-learning. (Refer to Function and Structure).

Connector Terminal Definition





Terminal	Function Abbreviation	Description	Terminal	Function Abbreviation	Description
A_1	KL15	START ENGINE STOP switch signal	B_27	PV5 Line Pressure -	Solenoid valve PV5-
A_18	Rail 2-6 (QV4)-	Solenoid valve QV4-	B_39	PV5 Line Pressure +	Solenoid valve PV5+
A_26	Rail 2-6 (QV4)+	Solenoid valve QV4+	B_4	TempSensor - P2 Oil	P2 Oil temperature sensor
A_11	Sensor - PRND	PRND input	B_16	8VREF2	Speed sensor supply 2
A_20	P/N signal Line	Start permission control	B_28	PV2 K2 Clutch -	Solenoid valve PV2-
A_28	Reverse Lamp	Reverse lamp control	B_40	PV2 K2 Clutch +	Solenoid valve PV2+
A_5	Vehicle CAN_L	Vehicle CAN low	B_17	PressSensor - Line	Line pressure sensor signal
A_13	Vehicle CAN_H	Vehicle CAN high	B_29	LV1 Clutch Lubrication-	Solenoid valve LV1-
			B_41	LV1 Clutch Lubrication +	Solenoid valve LV1+
A_6	TIP+	Manual mode upshift switch	B_18	PressSensor - K2	K2 Pressure sensor signal
A_14	TIP-	Manual mode downshift switch	B_30	ACV -	Solenoid valve ACV-
A_22	Auto/Manual	Sport mode switch	B_42	ACV +	Solenoid valve ACV+
A_7	KL30	Battery voltage	B_19	PressSensor - K1	K1 Pressure sensor signal
A_15	KL30	Battery voltage	B_20	PressSensor - K0	K0 Pressure sensor signal
A_23	KL31	TCU ground	B_32	PV0 K0 Clutch -	Solenoid valve PV0-

Terminal	Function Abbreviation	Description	Terminal	Function Abbreviation	Description
A_31	KL31	TCU ground	B_44	PV0 K0 Clutch +	Solenoid valve PV0+
A_8	KL30	Battery voltage	B_21	PosSen-Rail 2-6 (X4)	Fork 4 position sensor
A_16	KL30	Battery voltage	B_33	Rail 3-5 (QV3) -	Solenoid valve QV3-
A_24	KL31	TCU ground	B_45	Rail 3-5 (QV3) +	Solenoid valve QV3+
A_32	KL31	TCU ground	B_22	PosSen-Rail 3-5 (X3)	Fork 3 position sensor
B_1	Input Shaft K2	2 shaft speed sensor	B_34	Rail N-1 (QV1) -	Solenoid valve QV1-
B_13	5VREF1	5V1_ power supply	B_46	Rail N-1 (QV1) +	Solenoid valve QV1+
B_25	5VGND2	5V2_ground	B_11	Transmission CAN_L	Electrical pump CAN_L
B_37	5VGND1	5V1_ground	B_23	PosSen-Rail R-4 (X2)	Fork 2 position sensor
B_2	Input Shaft K1	1 shaft speed sensor	B_35	PV4 Line Pressure -	Solenoid valve PV4-
B_14	8VREF1	Speed sensor power supply 1	B_47	PV4 Line Pressure +	Solenoid valve PV4+
B_26	Rail R-4 (QV2) -	Solenoid valve QV2-	B_12	Transmission CAN_H	Electrical pump CAN_H
B_38	Rail R-4 (QV2) +	Solenoid valve QV2-	B_24	PosSen-Rail N-1 (X1)	Fork 1 position sensor
B_3	TemSensor - HCU Oil	HCU oil temperature sensor	B_36	PV1 K1 Clutch -	Solenoid valve PV1-
B_15	5VREF2	5V2_ power supply	B_48	PV1 K1 Clutch +	Solenoid valve PV1+

DTC Diagnosis List and Diagnosis Procedure Index

DTC	Description	Diagnosis Procedure Index	Note
P056385	Battery Voltage Too High	Refer to: P056385	
P056284	Power Supply Voltage Excessively Low		
P071584	Input 1 Shaft Speed Sensor Short to Ground / Open	Refer to: P071584	
P071585	Input 1 Shaft Speed Sensor Short to Power Supply		
P1211F0	Input 1 Shaft Speed Check Error		
P071684	Input 2 Shaft Speed Sensor Short to Ground / Open		
P071685	Input 2 Shaft Speed Sensor Short to Power Supply		
P1212F1	Input 2 Shaft Speed Check Error		
P071084	Oil Temperature Sensor Voltage Signal Too Low	Refer to: P071084	
P071085	Oil Temperature Sensor Voltage Signal Too High		
P120084	P2 Outlet Oil Temperature Sensor Signal Too Low		
P120085	P2 Outlet Oil Temperature Sensor Signal Too High		
P066684	TCU PCB Board Temperature Sensor Voltage Signal Too Low	Refer to: P066684	
P066685	TCU PCB Board Temperature Sensor Voltage Signal Too High		
P084008	Clutch 1 Pressure Sensor SENT Protocol Fault	Refer to: P084015	
P084015	Clutch 1 Pressure Sensor Short to GND or Open		
P084011	Clutch 1 Pressure Sensor Short to GND		
P0840F7	Clutch 1 Pressure Sensor Analog Signal Error		
P084508	Clutch 2 Pressure Sensor SENT Protocol Fault		
P084515	Clutch 2 Pressure Sensor Short to GND or Open		
P084511	Clutch 2 Pressure Sensor Short to GND		
P0845F7	Clutch 2 Pressure Sensor Analog Signal Error		
P084A08	Line Pressure Sensor SENT Protocol Fault		
P084A15	Line Pressure Sensor Short to GND or Open		
P084A11	Line Pressure Sensor Short to GND		

DTC	Description	Diagnosis Procedure Index	Note
P084AF7	Line Pressure Sensor Analog Signal Error	Refer to: P084015	
P083A08	Clutch K0 Pressure Sensor SENT Protocol Fault		
P083A15	Clutch K0 Pressure Sensor Short to GND or Open		
P083A11	Clutch K0 Pressure Sensor Short to GND		
P083AF7	Clutch K0 Pressure Sensor Analog Signal Error		
P283108	Fork 1 Position Sensor SENT Protocol Fault	Refer to: P283108	
P283115	Fork 1 Position Sensor Short to GND or Open		
P283111	Fork 1 Position Sensor Short to GND		
P2831F7	Fork 1 Position Sensor Analog Signal Error		
P283608	Fork 2 Position Sensor SENT Protocol Fault		
P283615	Fork 2 Position Sensor Short to GND or Open		
P283611	Fork 2 Position Sensor Short to GND		
P2836F7	Fork 2 Position Sensor Analog Signal Error		
P283B08	Fork 3 Position Sensor SENT Protocol Fault		
P283B15	Fork 3 Position Sensor Short to GND or Open		
P283B11	Fork 3 Position Sensor Short to GND		
P283BF7	Fork 3 Position Sensor Analog Signal Error		
P284008	Fork 4 Position Sensor SENT Protocol Fault		
P284015	Fork 4 Position Sensor Short to GND or Open		
P284011	Fork 4 Position Sensor Short to GND		
P2840F7	Fork 4 Position Sensor Analog Signal Error		
P088512	PN Gear Hard Wire Short to Supply	Refer to: P088512	
P088513	PN Gear Hard Wire Open		
P088511	PN Gear Hard Wire Short to GND		

DTC	Description	Diagnosis Procedure Index	Note
P081312	Backup Lamp Relay Short to Power Supply	Refer to: P081312	
P081313	Reverse Light Relay Open		
P081311	Reverse Light Relay Short to GND		
P074512	PV5 Solenoid High Side Short to Power Supply	Refer to: P074512	
P074513	PV5 Solenoid High Side Open		
P074511	PV5 Solenoid High Side Short to GND		
P0745F8	PV5 Solenoid High Side Current Fluctuation Fault		
P0745F9	PV5 Solenoid High Side Duty Cycle Signal Error		
P0745FA	PV5 Solenoid High Side Over Current		
P0745FB	PV5 Solenoid High Side Function Safety Error		
P074812	PV5 Solenoid Low Side Short to Power Supply		
P074811	PV5 Solenoid Low Side Short to GND		
P077512	QVR4 Flow Valve High Side Short to Power Supply	Refer to: P074512	
P077513	QVR4 Flow Valve High Side Open		
P077511	QVR4 Flow Valve High Side Short to GND		
P0775F8	QVR4 Flow Valve High Side Current Fluctuation Fault		
P0775F9	QVR4 Flow Valve High Side Duty Cycle Signal Fault		
P0775FA	QVR4 Flow Valve High Side Overcurrent		
P0775FB	QVR4 Flow Valve High Side Function Safety Fault		
P077812	QVR4 Flow Valve Low Side Short to Power Supply Fault		
P077811	QVR4 Flow Valve Low Side Short to GND		

DTC	Description	Diagnosis Procedure Index	Note
P079512	QV26 Flow Valve High Side Short to Power Supply Fault	Refer to: P074512	
P079513	QV26 Flow Valve High Side Open		
P079511	QV26 Flow Valve High Side Short to GND		
P0795F8	QV26 Flow Valve High Side Current Fluctuation Fault		
P0795F9	QV26 Flow Valve High Side Duty Cycle Signal Fault		
P0795FA	QV26 Flow Valve High Side Overcurrent		
P0795FB	QV26 Flow Valve High Side Function Safety Fault		
P079812	QV26 Flow Valve Low Side Short to Power Supply Fault		
P079811	QV26 Flow Valve Low Side Short to GND		
P271312	PV2 Flow Valve High Side Short to Power Supply Fault	Refer to: P074512	
P271313	PV2 Pressure Valve High Side Open		
P271311	PV2 Pressure Valve High Side Short to GND		
P2713F8	PV2 Pressure Valve High Side Current Fluctuation Fault		
P2713F9	PV2 Pressure Valve High Side Duty Cycle Signal Fault		
P2713FA	PV2 Pressure Valve High Side Overcurrent		
P2713FB	PV2 Pressure Valve High Side Function Safety Fault		
P271612	PV2 Pressure Valve Low Side Short to Power Supply Fault		
P271611	PV2 Pressure Valve Low Side Short to GND		
P272212	PV4 Pressure Valve High Side Short to Power Supply Fault		
P272213	PV4 Pressure Valve High Side Open		
P272211	PV4 Pressure Valve High Side Short to GND		
P2722F8	PV4 Pressure Valve High Side Current Fluctuation Fault		
P2722F9	PV4 Pressure Valve High Side Duty Cycle Signal Fault		
P2722FA	PV4 Pressure Valve High Side Overcurrent		
P2722FB	PV4 Pressure Valve High Side Function Safety Fault		

DTC	Description	Diagnosis Procedure Index	Note
P272512	PV4 Pressure Valve Low Side Short to Power Supply Fault	Refer to: P074512	
P272511	PV4 Pressure Valve Low Side Short to GND		
P273112	QV35 Flow Valve High Side Short to Power Supply Fault		
P273113	QV35 Flow Valve High Side Open		
P273111	QV35 Flow Valve High Side Short to GND		
P2731F8	QV35 Flow Valve High Side Current Fluctuation Fault		
P2731F9	QV35 Flow Valve High Side Duty Cycle Signal Fault		
P2731FA	QV35 Flow Valve High Side Overcurrent		
P2731FB	QV35 Flow Valve High Side Function Safety Fault		
P273412	QV35 Flow Valve Low Side Short to Power Supply Fault		
P273411	QV35 Flow Valve Low Side Short to GND		
P280712	QV1N Flow Valve High Side Short to Power Supply Fault		
P280713	QV1N Flow Valve High Side Open		
P280711	QV1N Flow Valve High Side Short to GND		
P2807F8	QV1N Flow Valve High Side Current Fluctuation Fault		
P2807F9	QV1N Flow Valve High Side Duty Cycle Signal Fault		
P2807FA	QV1N Flow Valve High Side Overcurrent		
P2807FB	QV1N Flow Valve High Side Function Safety Fault		
P281012	QV1N Flow Valve Low Side Short to Power Supply Fault		
P281011	QV1N Flow Valve Low Side Short to GND		
P281612	PV1 Pressure Valve High Side Short to Power Supply Fault		
P281613	PV1 Pressure Valve High Side Open		
P281611	PV1 Pressure Valve High Side Short to GND		
P2816F8	PV1 Pressure Valve High Side Current Fluctuation Fault		
P2816F9	PV1 Pressure Valve High Side Duty Cycle Signal Fault		

DTC	Description	Diagnosis Procedure Index	Note
P2816FA	PV1 Pressure Valve High Side Overcurrent	Refer to: P074512	
P2816FB	PV1 Pressure Valve High Side Function Safety Fault		
P281912	PV1 Pressure Valve Low Side Short to Power Supply Fault		
P281911	PV1 Pressure Valve Low Side Short to GND		
P281F12	PV0 Pressure Valve High Side Short to Power Supply		
P281F13	PV0 Pressure Valve High Side Open		
P281F11	PV0 Pressure Valve High Side Short to GND		
P281FF8	PV0 Pressure Valve High Side Current Fluctuation Fault		
P281FF9	PV0 Pressure Valve High Side Duty Cycle Signal Fault		
P281FFA	PV0 Pressure Valve High Side Overcurrent		
P281FFB	PV0 Pressure Valve High Side Function Safety Fault		
P282212	PV0 Pressure Valve Low Side Short to Power Supply Fault		
P282211	PV0 Pressure Valve Low Side Short to GND		
P282812	LV1 Flow Valve High Side Short to Power Supply Fault		
P282813	LV1 Flow Valve High Side Open		
P282811	LV1 Flow Valve High Side Short to GND		
P2828F8	LV1 Flow Valve High Side Current Fluctuation Fault		
P2828F9	LV1 Flow Valve High Side Duty Cycle Signal Fault		
P2828FA	LV1 Flow Valve High Side Overcurrent		
P2828FB	LV1 Flow Valve High Side Function Safety Fault		
P282B12	LV1 Flow Valve Low Side Short to Power Supply Fault		
P282B11	LV1 Flow Valve Low Side Short to GND		

DTC	Description	Diagnosis Procedure Index	Note
P075012	ACV Control Valve High Side Short to Power Supply	Refer to: P074512	
P075013	ACV Control Valve High Side Open		
P075011	ACV Control Valve High Side Short to GND		
P0750F8	ACV Control Valve High Side Current Fluctuation Fault		
P0750F9	ACV Control Valve High Side Duty Cycle Signal Fault		
P0750FA	ACV Control Valve High Side Overcurrent		
P0750FB	ACV Control Valve High Side Function Safety Fault		
P075312	ACV Control Valve Low Side Short to Power Supply		
P075311	ACV Control Valve Low Side Short to GND		
U208087	PCU_1C6 Message Reception Timeout	Refer to: U208087	
U208082	PCU_1C6 Message Counter Abnormal		
U208083	PCU_1C6 Message Check Error		
U208487	PCU_1C1 Message Reception Timeout		
U208482	PCU_1C1 Message Counter Abnormal		
U208483	PCU_1C1 Message Check Error		
U208E87	PCU_240 Message Reception Timeout		
U208E82	PCU_240 Message Counter Abnormal		
U208E83	PCU_240 Message Check Error		
U209187	PCU_1B8 Message Reception Timeout		
U209182	PCU_1B8 Message Counter Abnormal		
U209183	PCU_1B8 Message Check Error		
U209487	PCU_32F Message Reception Timeout		
U209482	PCU_32F Message Counter Abnormal		
U209483	PCU_32F Message Check Error		

DTC	Description	Diagnosis Procedure Index	Note
U208986	Power Assembly Torque Signal Invalid	Refer to: U208986	
U208A86	Invalid Power Assembly Torque Signal Without TCU Torque Intervention		
U208B86	K1/K2 Clutch Transmit Torque Request Signal Invalid		
U208386	Accelerate Pedal Position Signal Invalid		
U208586	Brake Pedal Status Signal Invalid		
U208686	Power Assembly Status Signal Invalid		
U209787	PEU_153 Message Reception Timeout	Refer to: U208087	
U209782	PEU_153 Message Counter Abnormal		
U209783	PEU_153 Message Check Error		
U209B87	PEU_35A Message Reception Timeout		
U209B82	PEU_35A Message Counter Abnormal		
U209B83	PEU_35A Message Check Error		
U209E86	Motor Oil Cooling Request Signal Invalid	Refer to: U208986	
U209A86	Motor Speed Signal Invalid Value		
U209F87	EMS_194 Message Reception Timeout	Refer to: U208087	
U209F82	EMS_194 Message Counter Abnormal		
U209F83	EMS_194 Message Check Error		
U20A487	EMS_2E6 Message Reception Timeout		
U20A482	EMS_2E6 Message Counter Abnormal		
U20A483	EMS_2E6 Message Check Error		
U20A786	Engine Coolant Temperature Signal Invalid	Refer to: U208986	
U20A286	Engine Speed Signal Invalid		
U20A386	Engine Flywheel Side Torque Signal Invalid		

DTC	Description	Diagnosis Procedure Index	Note
U20A887	ACM_249 Message Reception Timeout	Refer to: U208087	
U20A882	ACM_249 Message Counter Abnormal		
U20A883	ACM_249 Message Check Error		
U20A786	Actuator Status in P or Non P Signal Invalid	Refer to: U208986	
U20A286	ACM and DCT Actuator Status Signal Invalid		
U20AD87	ESL_24A Message Reception Timeout	Refer to: U208087	
U20AD82	ESL_24A Message Counter Abnormal		
U20AD83	ESL_24A Message Check Error		
U20B0D6	Electronic Shifter Gear Request Signal Invalid	Refer to: U208986	
U20B186	Unlock Button State Signal Invalid		
U20B286	Drive Mode Signal Invalid		
U20B386	Driver P Gear Request Signal Invalid		
U20B487	IPUMP_281 Message Reception Timeout	Refer to: U208087	
U20B482	IPUMP_281 Message Counter Abnormal		
U20B483	IPUMP_281 Message Check Error		
U20B786	Motor Over Temperature Signal Invalid	Refer to: U208986	
U20B886	Motor Over Temperature Fault		
U20B986	Controller Undervoltage Fault / Degrade Mode		
U20BA86	Controller Undervoltage Fault / Fault Mode		
U20BB86	Controller Overvoltage Fault / Degrade Mode		
U20BC86	Controller Overvoltage Fault / Fault Mode		
U20BD86	Controller Over Temperature Pre-alarm / Degrade Mode		

DTC	Description	Diagnosis Procedure Index	Note
U20BE86	Controller Over Temperature Pre-alarm / Fault Mode	Refer to: U208986	
U20BF86	Speed Control Deviation Excessive Fault / Degrade Mode		
U20C086	Speed Control Deviation Excessive Fault / Fault Mode		
U20C186	Controller Over Temperature Fault		
U20C286	Controller Over Current Fault		
U20C386	Controller Drive Fault Signal Fault		
U20C486	Motor Signal Fault		
U20C586	Position Sensor Fault		
U20C686	Controller Temperature Sensor Fault		
U20C786	Motor Over Current Fault		
U20C886	Motor Overspeed Fault		
U20C986	Motor Reverse Rotation Fault		
U20CA88	CAN Bus Off		
P121316	Sensor 5 V Power Supply 1 Voltage Too Low	Refer to: P121316	
P121317	Sensor 5 V Power Supply 1 Voltage Too High		
P121416	Sensor 5 V Power Supply 2 Voltage Too Low		
P121417	Sensor 5 V Power Supply 2 Voltage Too High		
P121616	Sensor 8 V Power Supply 1 Voltage Too Low		
P121617	Sensor 8 V Power Supply 1 Voltage Too High		
P121716	Sensor 8 V Power Supply 2 Voltage Too Low		
P121717	Sensor 8 V Power Supply 2 Voltage Too High		
P120301	Sensor 8 V Power Supply 1 and 2 Simultaneous Fault		
P120401	Sensor 5 V Power Supply 1 and 2 Simultaneous Fault		

DTC	Description	Diagnosis Procedure Index	Note
P121845	Trim Data Not Same	Refer to: P121845	
P122C0A	Bottom NVM Cache Fault Unable To Write Data		
P122D0B	Bottom NVM Cache Fault Data Invalid		
P120504	TCU Internal Fault Reset	Refer to: P120504	
P120604	TCU TRAP Fault		
P120704	TCU RAM Fault		
P120804	TCU ROM Fault		
P120904	TCU Solenoid Valve Off Test Fault		
P120A04	TCU Program Procedure Check Error		
P120B04	TCU OS Mission Error		
P120C04	TCU Chip Self-diagnosis Error		
P120D04	TCU Chip Fault		
P120E04	TCU PSBC Fault		
P120F04	TCU Other Unknown Reset Error		
P121004	Application Layer Function Safety Trigger		
P12A198	Oil Overheat Protect: Transmission Oil Temperature Too High	P12A198	
P12A498	P2 Oil Overheat Protect: P2 Oil Outlet Temperature Too High		
P124298	Clutch Overheat Protect: Clutch 0 Temperature Too High		
P12A598	Clutch Overheat Protect: Clutch 1 Temperature Too High		
P12A798	Clutch Overheat Protect: Clutch 2 Temperature Too High		
P12A398	Oil Temperature Too High: Transmission Oil Temperature Too High		
P12A698	P2 Oil Temperature Too High: P2 Oil Outlet Temperature Too High		
P124398	Clutch Temperature Too High: Clutch 0 Temperature Too High		
P123A98	Clutch Temperature Too High: Clutch 1 Temperature Too High		
P124498	Clutch Temperature Too High: Clutch 2 Temperature Too High		

DTC	Description	Diagnosis Procedure Index	Note
P122E07	1st Gear Dropped	Refer to: P122E07	
P122F07	2nd Gear Dropped		
P123007	3rd Gear Dropped		
P123107	4th Gear Dropped		
P123207	5th Gear Dropped		
P123307	6th Gear Dropped		
P123407	Rev Gear Dropped		
P123500	1st Gear Neutral Time Out	Refer to: P123500	
P123600	2nd Gear Neutral Time Out		
P123700	3rd Gear Neutral Time Out		
P123800	4th Gear Neutral Time Out		
P123B00	5th Gear Neutral Time Out		
P123C00	6th Gear Neutral Time Out		
P123D00	Rev Gear Neutral Time Out		
P123E93	1st Gear Engaged	Refer to: P123E93	
P123F93	2nd Gear Engaged		
P124093	3rd Gear Engaged		
P124193	4th Gear Engaged		
P124593	5th Gear Engaged		
P124693	6th Gear Engaged		
P124793	Rev Gear Engaged		

DTC	Description	Diagnosis Procedure Index	Note
P124894	1st Gear Uncommand	Refer to: P124894	
P124994	2nd Gear Uncommand		
P124A94	3rd Gear Uncommand		
P124B94	4th Gear Uncommand		
P124C94	5th Gear Uncommand		
P124D94	6th Gear Uncommand		
P124E94	Rev Gear Uncommand		
P124F07	Fork 1 Overspeed Error	Refer to: P124F07	
P125007	Fork 2 Overspeed Error		
P125107	Fork 3 Overspeed Error		
P125207	Fork 4 Overspeed Error		
P12531C	Fork 1 Position Out of Range	Refer to: P12531C	
P12551C	Fork 2 Position Out of Range		
P12561C	Fork 3 Position Out of Range		
P12571C	Fork 4 Position Out of Range		
P125862	Clutch 0 Loop Control Error	Refer to: P125862	
P125962	Clutch 1 Loop Control Error		
P125A62	Clutch 2 Loop Control Error		
P125B85	PCB Temperature Sensor Too Low Fault	Refer to: P125B85	
P125C85	PCB Temperature Sensor Too High Fault		
P125D85	Line Pressure Too high Protection	Refer to: P125D85	
P125E85	Line Pressure Too High Fault		

DTC P056385

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P056385	TCM Constant Power Voltage	TCU Constant power voltage KL30 is more than 16 V for 1 second or more	Check battery voltage, TCU wiring harness constant power supply KL30 pin voltage and TCU body	Battery TCU wiring harness TCU
P056284		TCU Constant power voltage KL30 is 9 V or less for 1 second or more		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P056385, P056284? →Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs →No Go to step 2.
2. Check battery	
	A. Measure the battery voltage. Standard voltage: 11 - 14 V Is voltage normal? →Yes Go to step 3. →No Check and repair charging system and battery.

3. Check TCU power supply circuit	
	A. Disconnect the negative battery cable without pressing the START ENGINE STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press the START ENGINE STOP switch once. E. Measure voltage between terminals A_7, A_15, A_8, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? →Yes Go to step 4. →No Check and repair wiring harness fault or replace the wiring harness.
4. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? →Yes Refer to: Intermittent Malfunction Diagnosis Procedure. →No Replace the TCU.

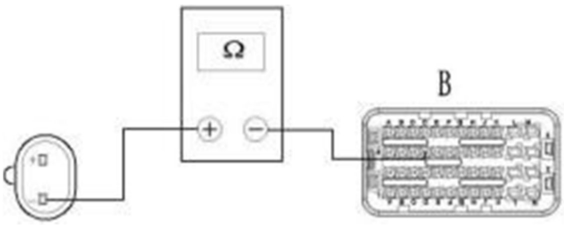
DTC P071584

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P071584	Input 1 Shaft Speed Sensor Short to Ground / Open	After powered on, TCU detects input shaft 1 speed sensor short to ground / open, speed is lower than lower limit of range	Check the input 1 shaft speed sensor and TCU speed sensor pin Is there any abnormality?	Wiring harness or connector input 1 shaft speed sensor
P071585	Input 1 Shaft Speed Sensor Short to Power Supply	After powered on, TCU detects input shaft 1 speed sensor short to power supply, speed is higher than lower limit of range		
P1211F0	Input 1 Shaft Speed Check Error	After powered on, TCU detects input shaft 1 speed correlation error (Check the current input shaft speed according to vehicle speed, wheel speed, 1st / 3rd / 5th gear)		
P071684	Input 2 Shaft Speed Sensor Short to Ground / Open	After powered on, TCU detects input shaft 2 speed sensor short to ground / open, speed is lower than lower limit of range	Check the input 2 shaft speed sensor and TCU speed sensor pin	Wiring harness or connector input 1 shaft speed sensor
P071685	Input 2 Shaft Speed Sensor Short to Power Supply	After powered on, TCU detects input shaft 2 speed sensor short to power supply, speed is higher than lower limit of range		
P1212F1	Input 2 Shaft Speed Check Error	After powered on, TCU detects input shaft 1 speed correlation error (Check the current input shaft speed according to vehicle speed, wheel speed, 2nd / 4th / 6th gear)		

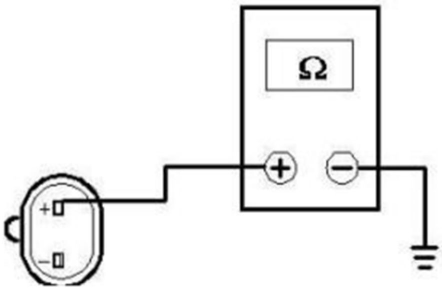
Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. General inspection	
	A. Check input shaft 1/2 speed sensor, output shaft speed sensor wiring harness connector for reliability, falling off, dirts or damage. Are the input shaft 1/2 speed sensor and output shaft wiring harness connector connected normally? →Yes Go to step 2. →No Repair input shaft 1/2 speed sensor and output shaft speed wiring harness connector.
2. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P071584, P071585, P1211F0, P071684, P071685 or P1212F1? →Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs →No Go to step 3.
3. Check input 1/2 shaft speed, output shaft speed in data flow	
	A. Clear DTCs B. Connect diagnostic tool, and read if input 1/2 shaft speed, output shaft speed value of data flow in diagnostic tool are normal while vehicle is driving →Yes Refer to: Intermittent malfunction. →No Go to step 4.

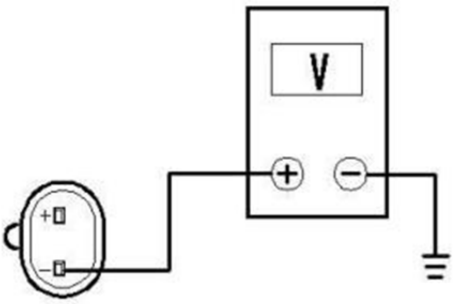
<table>
<tr><td colspan="2">4. Check circuit between input shaft 1/2 speed sensor and TCU</td></tr>
<tr>
<td>
Open circuit:



Short to ground:



Short to power supply:



</td>
<td>
1. Check circuit between input shaft speed sensor and TCU:
A. Disconnect the negative battery cable without pressing the START ENGINE STOP switch.
B. Disconnect wiring harness connector from inner input shaft speed sensor.
C. Disconnect TCU wiring harness connector AB.
D. Connect the negative battery cable.
E. Measure resistance between terminals +, - of input shaft 1/2 speed sensor wiring harness connector and terminals B_14 (-), B_16/B_1, B_2 of TCU wiring harness connector respectively. Check for open circuit.
Standard resistance: Less than 5 Ω.
F. Measure resistance between terminal + of input shaft 1/2 speed sensor wiring harness connector and reliable ground. Check for short to ground.
Standard resistance: 10 kΩ ~ 550 kΩ.
G. Measure voltage between terminal - of input shaft 1/2 speed sensor wiring harness connector and reliable ground. Check for short to power supply.
Standard voltage: 0 V. Is the circuit normal?
→Yes
Go to step 5.
→No
Repair the faulty area of circuit between inner input shaft speed sensor wiring harness connector and TCU wiring harness connector B.
</td>
</tr>
</table>

5. Check input shaft 1/2 speed sensor	
	A. Do not press the ENGINE START STOP switch. B. Remove the input or output shaft speed sensor. C. Install one corresponding good sensor with same model onto this vehicle. D. Perform vehicle driving test. Is the fault repaired? →Yes Replace the sensor. Refer to: Input and Output Shaft Speed Sensor (Automatic Transmission, Removal and Installation). →No Go to step 5.
6. Check TCU power supply circuit	
	A. Disconnect the negative battery cable without pressing the START ENGINE STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press the START ENGINE STOP switch once. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? →Yes Go to step 7. →No Check and repair open fault in circuit between A_7, A_8, A_15, A_16 of TCU wiring harness connector A and power supply positive.

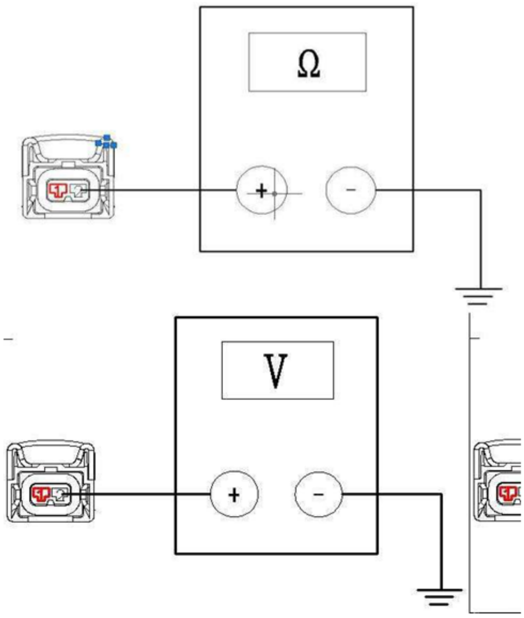
7. Check TCU ground circuit	
	A. Disconnect the negative battery cable without pressing the START ENGINE STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals B_25 and B_37 of TCU wiring harness connector AB and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? →Yes Go to step 8 →No Check and repair open circuit between terminals B_25, B_37 of TCU wiring harness connector AB and ground point. Verify that system is normal.
8. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? →Yes Refer to: Intermittent Malfunction Diagnosis Procedure. →No Replace the TCU.

DTC P071084

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P071084	Oil Temperature Sensor Voltage Signal Too Low	Oil temperature sensor voltage is less than 0.2 V, malfunction remains unchanged for 1 second or more, software judges it as a malfunction	Check whether voltage of oil temperature sensor and TCU speed sensor pin are abnormal	Oil temperature sensor wiring harness and connector Oil temperature sensor
P071085	Oil Temperature Sensor Voltage Signal Too High	Oil temperature sensor voltage is higher than 4.95 V, malfunction remains unchanged for 1 second or more, software judges it as a malfunction		
P120084	P2 Outlet Oil Temperature Sensor Signal Too Low	P2 outlet oil temperature sensor voltage is less than 0.2 V, malfunction remains unchanged for 1 second or more, software judges it as a malfunction		
P120085	P2 Outlet Oil Temperature Sensor Signal Too High	P2 outlet oil temperature sensor voltage is higher than 4.95 V. Malfunction remains unchanged for 1 second or more, software judges it as a malfunction		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. General inspection	
	A. Check automatic transmission wiring harness temperature sensor connector for reliability, falling off, damage, poor contact, aging and looseness, etc. Is it normal? →Yes Go to step 2. →No Repair the faulty area.
2. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P0710? →Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs →No Go to step 3.
3. Check oil temperature sensor data flow	
	A. Read "oil temperature" of automatic transmission data flow with diagnostic tool. Is the data flow normal? →Yes Refer to: Intermittent Malfunction Diagnosis Procedure. →No Go to step 4.
4. Check oil temperature sensor	
	A. Check the oil temperature sensor. Refer to: Oil Temperature Sensor Inspection (Automatic Transmission, General Inspection) Is resistance normal? Standard resistance: 10 kΩ ~ 550 kΩ. →Yes Go to step 5 →No Replace the oil temperature sensor

5. Check circuit between oil temperature sensor and TCU	
	A. Disconnect the negative battery cable without pressing the START ENGINE STOP switch. B. Disconnect the temperature sensor wiring harness connector. C. Disconnect the wiring harness TCU connector A, B. D. Measure resistance between terminal B-15, B16 of TCU connector B and pin 1 of P2 temperature sensor connector / H_4 circuit of connector between engine and transmission. Check for open between circuits. Standard resistance: Less than 5 Ω E. Measure resistance between P2 oil temperature sensor positive (+) terminal and reliable ground. Check for short to ground. Standard resistance: 10 kΩ ~ 550 kΩ. F. Measure voltage between oil temperature sensor connector negative (-) terminal and reliable ground. Check for short to power supply. Standard voltage: 0 V Is temperature sensor circuit normal? →Yes Go to step 6. →No Repair wiring harness between TCU connector and P2 oil temperature sensor, and wiring harness between oil temperature sensor terminals of connector between engine and transmission.
6. Check TCU power supply circuit	
	A. Disconnect the negative battery cable without pressing the START ENGINE STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press the START ENGINE STOP switch once. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? →Yes Go to step 7. →No Check and repair open fault in circuit between A_7, A_8, A_15, A_16 of TCU wiring harness connector A and power supply positive.

7. Check TCU ground circuit	
	A. Disconnect the negative battery cable without pressing the START ENGINE STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals B_25 and B_37 of TCU wiring harness connector AB and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? →Yes Go to step 8 →No Check and repair open circuit between terminals B_25, B_37 of TCU wiring harness connector AB and ground point. Verify that system is normal.
8. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? →Yes Refer to: Intermittent Malfunction Diagnosis Procedure. →No Replace the TCU.

DTC P066684

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P066684	TCU PCB Plate Temperature Sensor Voltage Too Low	After powering on, if TCU detects that voltage of PCB temperature sensor is lower than 0.2 V and malfunction remains for 1 second or more, software judges it as a malfunction	Hardware circuit inspection	TCU
P066685	TCU PCB Plate Temperature Sensor Voltage Too High	After powering on, if TCU detects that voltage of PCB temperature sensor is higher than 4.95 V and malfunction remains for 1 second or more, software judges it as a malfunction		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P066684, P066685? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check if fault still exists	
	A. After reading and clearing DTCs with diagnostic tool, turn power supply to ON or drive vehicle for a certain time Check if DTC P066684, P066685 still occur -> Yes Go to step 3. -> No Refer to: Intermittent Malfunction Diagnosis Procedure.

3. Check TCU power supply circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press ENGINE START STOP switch once. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Check and repair open fault in circuit between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and power supply positive.
4. Check TCU ground circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals B_25 and B_37 of TCU wiring harness connector AB and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair open circuit between terminals B_25, B_37 of TCU wiring harness connector AB and ground point. Verify that system is normal.
5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes

	Refer to: Intermittent Malfunction Diagnosis Procedure. → No Replace the TCU.

DTC P084015

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P084008	Clutch 1 Pressure Sensor SENT Protocol Fault	After powering on, TCU detects the following sensors: Clutch 1 pressure sensor, clutch 2 pressure sensor, line pressure sensor, and clutch K0 pressure sensor, with the following errors for more than 0.1 seconds 1) CRC error or data missing 2) Short to power supply or open 3) Short to ground 4) Analog signal error	Check clutch 1 pressure sensor, clutch 2 pressure sensor, line pressure sensor, clutch K0 pressure sensor and hardware circuit	Each pressure sensor Each wiring harness and connector TCU
P084015	Clutch 1 Pressure Sensor_Short to GND or Open			
P084011	Clutch 1 Pressure Sensor_Short to GND			
P0840F7	Clutch 1 Pressure Sensor Analog Signal Error			
P084508	Clutch 2 Pressure Sensor SENT Protocol Fault			
P084515	Clutch 2 Pressure Sensor_Short to GND or Open			
P084511	Clutch 2 Pressure Sensor_Short to GND			
P0845F7	Clutch 2 Pressure Sensor Analog Signal Error			
P084A08	Line Pressure Sensor SENT Protocol Fault			

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P084A15	Line Pressure Sensor_Short to GND or Open	After powering on, TCU detects the following sensors: Clutch 1 pressure sensor, clutch 2 pressure sensor, line pressure sensor, and clutch K0 pressure sensor, with the following errors for more than 0.1 seconds 1) CRC error or data missing 2) Short to power supply or open 3) Short to ground 4) Analog signal error	Check clutch 1 pressure sensor, clutch 2 pressure sensor, line pressure sensor, clutch K0 pressure sensor and hardware circuit	Each pressure sensor Each wiring harness and connector TCU
P084A11	Line Pressure Sensor_Short to GND			
P084AF7	Line Pressure Sensor Analog Signal Error			
P083A08	Clutch K0 Pressure Sensor SENT Protocol Fault			
P083A15	Clutch K0 Pressure Sensor_Short to GND or Open			
P083A11	Clutch K0 Pressure Sensor_Short to GND			
P083AF7	Clutch K0 Pressure Sensor Analog Signal Error			

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P084008, P084015, P084011 or P0840F7? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check clutch 1 pressure data flow	
	A. Read “clutch 1 pressure” of automatic transmission data flow with diagnostic tool. Is clutch 1 pressure data flow normal？ -> Yes Go to step 3. -> No Contact with transmission after-sale service department for technical support.
3. Check TCU power supply circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press ENGINE START STOP switch once. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No

<table>
<tr><td>Test Conditions</td><td>Details/Results/Actions</td></tr>
<tr><td></td><td>Check and repair open fault in circuit between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and power supply positive.</td></tr>
<tr><td colspan="2">4. Check TCU ground circuit</td></tr>
<tr><td></td><td>A. Disconnect the negative battery cable without pressing ENGINE START STOP switch.
B. Disconnect the TCU wiring harness connector AB.
C. Measure resistance between terminals B_25 and B_37 of TCU wiring harness connector AB and reliable ground point.
Standard resistance: Less than 5 Ω
Is resistance normal?
→ Yes
Go to step 5.
→ No
Check and repair open circuit between terminals B_25, B_37 of TCU wiring harness connector AB and ground point.
Verify that system is normal.</td></tr>
<tr><td colspan="2">5. Check TCU</td></tr>
<tr><td></td><td>A. Remove the TCU.
B. Install the TCU of the vehicle onto another vehicle with well condition.
Is the vehicle in normal condition after installing TCU?
→ Yes
Refer to: Intermittent Malfunction Diagnosis Procedure.
→ No
Replace the TCU.</td></tr>
</table>

Test Conditions	Details/Results/Actions
6. Check for short or open circuit between pressure sensor and TCU circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals B_17, B_19, B_20 and B_37 of TCU wiring harness connector B. Is resistance normal? Standard resistance: 10 kΩ ~ 550 kΩ → Yes Contact with after-sale service staff. → No Replace the transmission assembly wiring harness and verify that system is normal. If the system is abnormal, contact with after-sale service staff.

DTC P283108

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P283108	Fork 1 Position Sensor SENT Protocol Fault	After powering on, TCU detects the following sensors: Fork 1 position sensor, fork 2 position sensor, fork 3 position sensor, fork 4 position sensor, with the following errors for more than 0.1 seconds 1) CRC error or data missing 2) Short to power supply or open 3) Short to ground 4) Analog signal error	Check fork 1 position sensor, fork 2 position sensor, fork 3 position sensor, fork 4 position sensor and hardware circuit	Each fork position sensor Each wiring harness and connector TCU
P283115	Fork 1 Position Sensor_Short to GND or Open			
P283111	Fork 1 Position Sensor_Short to GND			
P2831F7	Fork 1 Position Sensor Analog Signal Error			
P283608	Fork 2 Position Sensor SENT Protocol Fault			
P283615	Fork 2 Position Sensor_Short to GND or Open			
P283611	Fork 2 Position Sensor_Short to GND			
P2836F7	Fork 2 Position Sensor Analog Signal Error			
P283B08	Fork 3 Position Sensor SENT Protocol Fault			
P283B15	Fork 3 Position Sensor_Short to GND or Open			
P283B11	Fork 3 Position Sensor_Short to GND			
P283BF7	Fork 3 Position Sensor Analog Signal Error			
P284008	Fork 4 Position Sensor SENT Protocol Fault			
P284015	Fork 4 Position Sensor_Short to GND or Open			
P284011	Fork 4 Position Sensor_Short to GND			
P2840F7	Fork 4 Position Sensor Analog Signal Error			

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P283108, P283115, P283111, P2831F7, P283608, P283615, P283611, P2836F7, P283B08, P283B15, P283B11, P283BF7, P284011, P284015, P2840F7? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check fork 1, 2, 3, 4 positions	
	A. Connect the diagnostic tool. B. Press ENGINE START STOP switch once. C. Using diagnostic tool, read if data flow "fork positions 1, 2, 3, 4" is normal -> Yes Contact with transmission after-sale service department for technical support. -> No Go to step 3.
3. Check TCU power supply circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press ENGINE START STOP switch once. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Check and repair open fault in circuit between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and power supply positive.

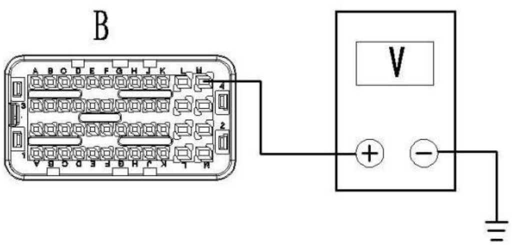
4. Check TCU ground circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals B_25 and B_37 of TCU wiring harness connector AB and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair open circuit between terminals B_25, B_37 of TCU wiring harness connector AB and ground point. Verify that system is normal.
5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Refer to: Intermittent Malfunction Diagnosis Procedure. → No Replace the TCU.
6. Check for short or open circuit between fork position sensor and TCU circuit	
	D. Disconnect the negative battery cable without pressing ENGINE START STOP switch. E. Disconnect the TCU wiring harness connector AB. Measure resistance between terminals B_21, B_22, B_23, B_24 and B_25 of TCU wiring harness connector B. Standard resistance: 10 kΩ ~ 550 kΩ Is resistance normal? → Yes Contact with after-sale service staff. → No Replace the transmission assembly wiring harness and verify that system is normal. If the system is abnormal, contact with after-sale service staff.

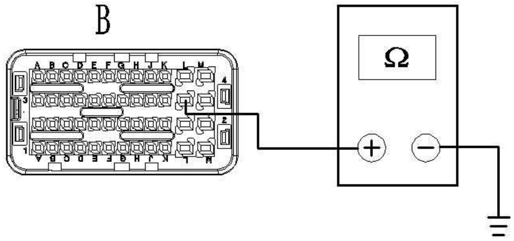
DTC P088512

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P088512	PN Position Hardwire Short to Power Supply	After powering on, if TCU detects that ignition relay is short to power supply for 0.1 seconds or more, software judges it as a malfunction	Check TCU and connector PN hardwire	• Wiring harness • Ignition relay • TCU
P088513	PN Position Hardwire Open	After powering on, if TCU detects that ignition relay is open for 0.1 seconds or more, perform a malfunction judgment by DTC		
P088511	PN Position Hardwire Short to Ground	After powering on, if TCU detects that ignition relay is short to ground for 0.1 seconds or more, software judges it as a malfunction		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. General inspection	
	A. Inspect ignition relay wiring harness connector A for reliability, falling off, damage, poor contact, aging and looseness, etc. Is it normal? → Yes Go to step 2. → No Repair the faulty area.
2. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P088511, P088512 or P088513? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 3.
3. Check TCU power supply circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press ENGINE START STOP switch once. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Check and repair open fault in circuit between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and power supply positive.
4. Check TCU ground circuit	

	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals B_25 and B_37 of TCU wiring harness connector AB and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair open circuit between terminals B_25, B_37 of TCU wiring harness connector AB and ground point. Verify that system is normal.
5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Refer to: Intermittent Malfunction Diagnosis Procedure. → No Replace the TCU.

DTC P081312

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P081312	Short to Ubatt	After powering on, if TCU detects that backup lamp relay is short to power supply for 0.1 seconds or more, software judges it as a malfunction	Check TCU and connector backup lamp hardwire	• Wiring harness • Ignition relay • TCU
P081313	Open Circuit	After powering on, if TCU detects that backup lamp relay is open for 0.1 seconds or more, perform a malfunction judgment by DTC		
P081311	Short to GND	After powering on, if TCU detects that backup lamp relay is short to ground for 0.1 seconds or more, software judges it as a malfunction		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. General inspection	
	A. Check backup lamp relay wiring harness connector A for reliability, falling off, damage, poor contact, aging and looseness, etc. Is it normal? → Yes Go to step 2. → No Repair the faulty area.
2. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P081311, P081312 or P081313? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 3.

3. Check TCU power supply circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press ENGINE START STOP switch once. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Check and repair open fault in circuit between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and power supply positive.
4. Check TCU ground circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals B_25 and B_37 of TCU wiring harness connector AB and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair open circuit between terminals B_25, B_37 of TCU wiring harness connector AB and ground point. Verify that system is normal.
5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Refer to: Intermittent Malfunction Diagnosis Procedure. → No Replace the TCU.

DTC P074512

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P074512	PV5 Solenoid Valve High Side Short to Power Supply	After powering on, if TCU detects that high side of PV5 solenoid valve is short to power supply for 0.1 seconds or more, software judges it as a malfunction	Check TCU and connector PV5 solenoid valve hardwire	Wiring harness PV5 solenoid valve TCU
P074513	PV5 Solenoid Valve High Side Open	After powering on, if TCU detects that high side of PV5 solenoid valve is open for 0.1 seconds or more, software judges it as a malfunction		
P074511	PV5 Solenoid Valve High Side Short to GND	After powering on, if TCU detects that high side of PV5 solenoid valve is short to ground for 0.1 seconds or more, software judges it as a malfunction		
P0745F8	PV5 Solenoid Valve High Side Current Fluctuation Fault	After powering on, if TCU detects PV5 solenoid valve high side current fluctuation fault for 0.1 seconds or more, software judges it as a malfunction		
P0745F9	PV5 Solenoid Valve High Side Duty Cycle Signal Fault	After powering on, TCU detects PV5 solenoid valve high side duty cycle signal fault		
P0745FA	PV5 Solenoid Valve High Side Overcurrent	After powering on, TCU detects PV5 solenoid valve high side overcurrent		
P0745FB	PV5 Solenoid Valve High Side Safety Function Fault	After powering on, TCU detects PV5 solenoid valve high side safety function fault		
P074812	PV5 Solenoid Valve Low Side Short to Power Supply	After powering on, TCU detects PV5 solenoid valve low side short to power supply		
P074811	PV5 Solenoid Valve Low Side Short to GND	After powering on, TCU detects PV5 solenoid valve low side short to ground		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P074511, P074512, P074513, P0745F8 or P0748? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check if switch solenoid valve 1 fault still occurs	
	A. Connect the diagnostic tool. B. After clearing DTC, DTCs P074511, P074512, P074513, P0745F8 still occur -> Yes Contact with transmission after-sale service department for technical support. -> No Go to step 3.
3. Check circuit between switch solenoid valve 1 and TCU	
	A. Do not press ENGINE START STOP switch. B. Disconnect TCU connector AB. C. Measure resistance between terminals AH1 and BM1 of TCU wiring harness connector A, B of automatic transmission. Standard resistance: 30 Ω ≥ R ≥ 10 Ω Is resistance normal? -> Yes Contact with transmission after-sale service department for technical support. -> No Go to step 4.
4. Inspect power supply circuit of TCU	

	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press ENGINE START STOP switch once. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 5. → No Check and repair open fault in circuit between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and power supply positive.
5. Check TCU ground circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals B_25 and B_37 of TCU wiring harness connector AB and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 6. → No Check and repair open circuit between terminals B_25, B_37 of TCU wiring harness connector AB and ground point. Verify that system is normal.
6. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Refer to: Intermittent Malfunction Diagnosis Procedure. → No Replace the TCU.

DTC U208087

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
U208087	PCU_1C6 Message Reception Timeout	TCU detects PCU_1C6, PCU_1C1, PCU_240, PCU_1B8, PCU_32F with the following faults 1. Message receiving timeout 2. Message counter abnormal 3. Message checksum error	Check CAN line and PCU controller	CAN wiring harness and connector PCU controller
U208082	PCU_1C6 Message Counter Abnormal			
U208083	PCU_1C6 Message Checksum Error			
U208487	PCU_1C1 Message Reception Timeout			
U208482	PCU_1C1 Message Counter Abnormal			
U208483	PCU_1C1 Message Checksum Error			
U208E87	PCU_240 Message Reception Timeout			
U208E82	PCU_240 Message Counter Abnormal			
U208E83	PCU_240 Message Checksum Error			
U209187	PCU_1B8 Message Reception Timeout			
U209182	PCU_1B8 Message Counter Abnormal			
U209183	PCU_1B8 Message Checksum Error			
U209487	PCU_32F Message Reception Timeout			
U209482	PCU_32F Message Counter Abnormal			
U209483	PCU_32F Message Checksum Error			

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than U2080, U2084, U2091 or U20894? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check if DTC occurs again	
	A. Connect the diagnostic tool. B. After clearing DTC and turning power supply to ON Are there DTCs U2080, U2084, U2091 and U20894? → Yes Contact with transmission after-sale service department for technical support → No Go to step 3.
3. Check TCU power supply circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Press ENGINE START STOP switch once. E. Measure voltage between terminals B_L4, B_M4, B_K1 of TCU wiring harness connector B and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Inspect and repair the open circuit fault between terminals B_L4, B_M4, B_K1 of TCU wiring harness connector AB and engine compartment fuse and relay box C01 and instrument panel fuse and relay box P01 respectively.

4. Check TCU ground circuit	
	A. Disconnect the negative battery cable without pressing ENGINE START STOP switch. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals B_L3 and B_M3 of TCU wiring harness connector AB and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair open circuit between terminals B_L3, B_M3 of TCU wiring harness connector AB and ground point. Verify that system is normal.
5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Refer to: Diagnosis Procedure for Intermittent Malfunction (3.1.13 Electronic Control System - ME17, Symptom Diagnosis and Testing). → No Replace the TCU.

DTC U208986

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
U208986	Power Assembly Torque Signal Invalid	After powering on, if it detects that related signal position is an invalid value for 0.03s or more, TCU software judges it as a malfunction	/	/
U208A86	Power Assembly Torque Signal Invalid Not Including TCU Torque Intervention			
U208B86	K1/K2 Clutch Transmission Torque Request Signal Invalid			
U208386	Err State Invalid			
U208586	EMS_Brake Pedal Status Signal Invalid			
U208686	Power Assembly Status Signal Invalid			

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. General inspection	
	A. Inspect each relative wiring harness connector for reliability, falling off, damage, poor contact, aging and looseness, etc. Is it normal? → Yes Go to step 2. → No Repair the faulty area.
2. Clear DTC	
	A. Connect the diagnostic tool. B. Clear DTC with diagnostic tool. C. Shake, pull and press diagnostic connector, PCU/ESP/ABS/ECU control module and other module wiring harness connectors. D. Perform DTC diagnosis again using diagnostic tool. Is there DTC U2089? → Yes Go to step 3. → No Refer to: Intermittent Malfunction Diagnosis Procedure
3. Inspect and repair CAN bus circuit	
	A. Inspect and repair CAN bus circuit. Refer to: Diagnostic tool cannot communicate with TCM

DTC U20B786

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
U208087	PCU_1C6 Message Reception Timeout	TCU detects PCU_1C6, PCU_1C1, PCU_240, PCU_1B8, PCU_32F, PEU_35A, EMS_194, EMS_2E6, ACM_249, ESL_24A, IPUMP_281 with the following faults 1. Message receiving timeout 2. Message counter abnormal 3. Message checksum error	Check CAN line and each controller (PCU/PEU/EMS/ESL/ACM/IPUMP)	CAN line and each controller
U208082	PCU_1C6 Message Counter Abnormal			
U208083	PCU_1C6 Message Checksum Error			
U208487	PCU_1C1 Message Reception Timeout			
U208482	PCU_1C1 Message Counter Abnormal			
U208483	PCU_1C1 Message Checksum Error			
U208E87	PCU_240 Message Reception Timeout			
U208E82	PCU_240 Message Counter Abnormal			
U208E83	PCU_240 Message Checksum Error			
U209187	PCU_1B8 Message Reception Timeout			
U209182	PCU_1B8 Message Counter Abnormal			
U209183	PCU_1B8 Message Checksum Error			
U209487	PCU_32F Message Reception Timeout			
U209482	PCU_32F Message Counter Abnormal			

U209483	PCU_32F Message Checksum Error			
U209787	PEU_153 Message Reception Timeout			
U209782	PEU_153 Message Counter Abnormal			
U209783	PEU_153 Message Checksum Error			
U209B87	PEU_35A Message Reception Timeout			
U209B82	PEU_35A Message Counter Abnormal			
U209B83	PEU_35A Message Checksum Error			
U209F87	EMS_194 Message Reception Timeout			
U209F82	EMS_194 Message Counter Abnormal			
U209F83	EMS_194 Message Checksum Error			
U20A487	EMS_2E6 Message Reception Timeout			
U20A482	EMS_2E6 Message Counter Abnormal			
U20A483	EMS_2E6 Message Checksum Error			
U20A887	ACM_249 Message Reception Timeout			
U20A882	ACM_249 Message Counter Abnormal			
U20A883	ACM_249 Message Checksum Error			
U20AD87	ESL_24A Message Reception Timeout			

U20AD82	ESL_24A Message Counter Abnormal			
U20AD83	ESL_24A Message Checksum Error			
U20B487	IPUMP_281 Message Reception Timeout			
U20B482	IPUMP_281 Message Counter Abnormal			
U20B483	IPUMP_281 Message Checksum Error			

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than U20B786, U20B886, U20B986, U20BA86, U20BB86, U20BC86, U20BD86, U20BE86, U20BF86, U20C086, U20C186, U20C286, U20C386, U20C486, U20C586, U20C686, U20C786, U20C886, U20C986? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Refer to: PCU/EMS/PEU/ACM/ESL Controller for troubleshooting

DTC U20B786

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
U20B786	Motor Over Temperature Signal Error Invalid	Electrical fuel pump motor controller over temperature signal invalid	Electrical fuel pump motor and controller	Electrical fuel pump motor and controller
U20B886	Motor Over Temperature Fault	Electrical fuel pump motor over temperature fault		
U20B986	Controller Undervoltage Fault/Degradation Mode	Electrical fuel pump motor controller reports undervoltage degradation fault		
U20BA86	Controller Undervoltage Fault/Fault Mode	Electrical fuel pump motor controller reports undervoltage fault		
U20BB86	Controller Overvoltage Fault/Degradation Mode	Electrical fuel pump motor controller reports overvoltage degradation fault		
U20BC86	Controller Overvoltage Fault/Fault Mode	Electrical fuel pump motor controller reports overvoltage fault		
U20BD86	Controller Over Temperature Pre-alarm/Degradation Mode	Electrical fuel pump motor controller reports over temperature pre-alarm degradation fault		
U20BE86	Controller Over Temperature Pre-alarm/Fault Mode	Electrical fuel pump motor controller reports over temperature pre-alarm fault		
U20BF86	Speed Control Deviation Excessive Fault/Degradation Mode	Electrical fuel pump motor controller reports speed control deviation excessive degradation mode fault		
U20C086	Speed Control Deviation Excessive Fault/Fault Mode	Electrical fuel pump motor controller reports speed control deviation excessive fault		
U20C186	Controller Over Temperature Fault	Electrical fuel pump motor controller reports over temperature fault		
U20C286	Controller Over Current Fault	Electrical fuel pump motor controller reports over current fault		

U20C386	Controller Drive Fault Signal Fault	Electrical fuel pump motor controller drive fault		
U20C486	Motor Signal Fault	Electrical fuel pump motor fault		
U20C586	Position Sensor Fault	Electrical fuel pump motor position sensor fault		
U20C686	Controller Temperature Sensor Fault	Electrical fuel pump motor temperature sensor fault		
U20C786	Motor Over Current Fault	Electrical fuel pump motor controller reports over current fault		
U20C886	Motor Overspeed Fault	Electrical fuel pump motor controller reports overspeed fault		
U20C986	Motor Reverse Fault	Electrical fuel pump motor controller reports reverse fault		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than U20B786, U20B886, U20B986, U20BA86, U20BB86, U20BC86, U20BD86, U20BE86, U20BF86, U20C086, U20C186, U20C286, U20C386, U20C486, U20C586, U20C686, U20C786, U20C886, U20C986? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Refer to: Electrical Fuel Pump Motor Workshop Manual for troubleshooting

DTC P121316

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P121316	Sensor 5 V Power Supply 1 Voltage Too Low	Sensor 5 V power supply 1 voltage is lower than 4.75 V for 50 ms	Check TCU	TCU
P121317	Sensor 5 V Power Supply 1 Voltage Too High	Sensor 5 V power supply 1 voltage is higher than 5.25 V for 50 ms		
P121416	Sensor 5 V Power Supply 2 Voltage Too Low	Sensor 5 V power supply 2 voltage is lower than 4.75 V for 50 ms		
P121417	Sensor 5 V Power Supply 2 Voltage Too High	Sensor 5 V power supply 2 voltage is higher than 5.25 V for 50 ms		
P121616	Sensor 8 V Power Supply 1 Voltage Too Low	Sensor 8 V power supply 1 voltage is lower than 7.5 V for 50 ms		
P121617	Sensor 8 V Power Supply 1 Voltage Too High	Sensor 8 V power supply 1 voltage is higher than 8.5 V for 50 ms		
P121716	Sensor 8 V Power Supply 2 Voltage Too Low	Sensor 8 V power supply 2 voltage is lower than 7.5 V for 50 ms		
P121717	Sensor 8 V Power Supply 2 Voltage Too High	Sensor 8 V power supply 2 voltage is higher than 8.5 V for 50 ms		
P120301	Sensor 8 V Power Supply 1, 2 Fault at the Same Time	Sensor 8 V power supply 1, 2 fault at the same time for 50 ms		
P120401	Sensor 5 V Power Supply 1, 2 Fault at the Same Time	Sensor 5 V power supply 1, 2 fault at the same time for 50 ms		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P121316, P121317, P121416, P121417, P121616, P121617, P121716, P121717, P120301, P120401? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check if DTC still occurs	
	A. Connect the diagnostic tool. B. Clear DTCs. C. After the vehicle is powered on, check if DTC still occurs. -> No Intermittent malfunction, continuous observation -> Yes Go to step 3.
3. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Intermittent malfunction, continuous observation → No Replace the TCU.

DTC P121845

DTC

<table>
<tr><th>DTC</th><th>Description</th><th>Test Conditions</th><th>Inspection Strategy</th><th>Faulty Area</th></tr>
<tr><td>P121845</td><td>Trim Data Not Same</td><td>TCU under-layer detects Trim parameter not same</td><td rowspan="3">Check if TCU and corresponding power supply and ground are abnormal</td><td rowspan="3">TCU</td></tr>
<tr><td>P122C0A</td><td>Under-layer NVM Cache Fault Unable to Write Data</td><td>TCU under-layer unable to write NVM data</td></tr>
<tr><td>P122D0B</td><td>Under-layer NVM Cache Fault Data Invalid</td><td>TCU under-layer detects NVM data invalid</td></tr>
</table>

Diagnosis Procedure

<table>
<tr><th>Test Conditions</th><th>Details/Results/Actions</th></tr>
<tr><td colspan="2">1. Check DTC</td></tr>
<tr><td></td><td>A. Connect the diagnostic tool.
B. Detect automatic transmission system with diagnostic tool.
Is there any DTC other than P121845, P122C0A or P122D08?
→ Yes
Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs
→ No
Go to step 2.</td></tr>
<tr><td colspan="2">2. Check if DTC still occurs</td></tr>
<tr><td></td><td>A. Connect the diagnostic tool.
B. Clear DTCs.
C. After the vehicle is powered on, check if DTC still occurs.
-> No
Go to step 3.
-> Yes
Contact with transmission after-sale service department for technical support.</td></tr>
</table>

3. Check TCU power supply circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Vehicle is powered on. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Check and repair the connectors between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and vehicle.
4. Check TCU ground circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair the open fault in circuit between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and ground point. Verify that system is normal.

5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Intermittent malfunction, continuous observation → No Replace the TCU.

DTC P120504

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P120504	TCU Internal Fault Reset	TCU under-layer detects internal reset	Check if TCU and corresponding power supply and ground are abnormal	TCU
P120604	TCU TRAP Fault	TCU under-layer detects TRAP fault		
P120704	TCU RAM Fault	TCU under-layer detects RAM fault		
P120804	TCU ROM Fault	TCU under-layer detects ROM fault		
P120904	TCU Solenoid Valve Cut Off Test Fault	TCU under-layer detects that solenoid valve cannot be cut off		
P120A04	TCU Program Flow Checksum Error	TCU program flow checksum error		
P120B04	TCU OS Task Error	TCU OS task error		
P120C04	TCU Chip Self-check Error	TCU chip self-check error		
P120D04	TCU Chip Fault	TCU chip fault		
P120E04	TCU PSBC Fault	TCU PSBC fault		
P120F04	TCU Other Unknown Reset Error	TCU other unknown reset error		
P121004	Application Layer Function Security Triggering	Application layer function safety triggering		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P120504, P120604, P120704, P120804, P120A04, P120B04, P120C04, P120D04, P120F04, P121004? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check if DTC still occurs	
	A. Connect the diagnostic tool. B. Clear DTCs. C. After the vehicle is powered on, check if DTC still occurs. -> No Go to step 3. -> Yes Contact with transmission after-sale service department for technical support.

3. Check TCU power supply circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Vehicle is powered on. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Check and repair the connectors between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and vehicle.
4. Check TCU ground circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair the open fault in circuit between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and ground point. Verify that system is normal.

5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Intermittent malfunction, continuous observation → No Replace the TCU.

DTC P12A198

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P12A198	Oil Overheat Protect: Transmission Fluid Temperature Too High	Transmission fluid temperature is higher than 120℃ for 30s	Check if TCU and corresponding power supply and ground are abnormal	Clutch, hydraulic module
P12A498	P2 Oil Overheat Protect: P2 Outlet Oil Temperature Too High	P2 outlet temperature is higher than 115℃		
P124298	Clutch Overheat Protect: Clutch 0 Temperature Too High	K0 clutch plate temperature is higher than 270℃ for 500 ms		
P12A598	Clutch Overheat Protect: Clutch 1 Temperature Too High	K1 clutch plate temperature is higher than 270℃ for 500 ms		
P12A798	Clutch Overheat Protect: Clutch 2 Temperature Too High	K2 clutch plate temperature is higher than 270℃ for 500 ms		
P12A398	Oil Temperature Too High: Transmission Fluid Temperature Too High	Transmission fluid temperature is higher than 140℃ for 5s		
P12A698	P2 Oil Temperature Too High: P2 Outlet Oil Temperature Too High	P2 outlet temperature is higher than 130℃		
P124398	Clutch Overheat Fault: Clutch 0 Temperature Too High	K0 clutch plate temperature is higher than 350℃		
P123A98	Clutch Overheat Fault: Clutch 1 Temperature Too High	K1 clutch plate temperature is higher than 350℃		
P124498	Clutch Overheat Fault: Clutch 2 Temperature Too High	K2 clutch plate temperature is higher than 350℃		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
The above fault is clutch and oil temperature protection record. After the customer stops the current action or the protection strategy works, the fault disappears.	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P12A198, P12A498, P124298, P12A598, P12A798, P12A398, P12A698, P124398, P123A98, P124498? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check if DTC still occurs	
	A. Connect the diagnostic tool. B. Clear DTCs. C. After the vehicle is powered on, drive normally, check if DTC still occurs. -> No Continuous observation -> Yes Go to step 3.
3. Check hydraulic system line pressure	
	A. Connect the diagnostic tool. B. Perform line pressure test. Standard line pressure: 50 - 55 bar Is the inspection of hydraulic system line pressure normal? → Yes Go to step 4. → No Inspect and repair the electrical fuel pump and hydraulic system

4. Inspect transmission fluid	
	A. Turn the power switch to OFF, discharge a little transmission oil and visually observe. Normal color: Cool and transparent Abnormal color: Black and mushy Is the inspection of transmission fluid normal? → Yes Contact with transmission after-sale service department for technical support. → No Replace transmission oil

DTC P122E07

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P122E07	1st Gear Off Fault	Shift fork in 1st gear moves to neutral for more than 2 mm for 10 ms	Check if wire harness, fork position sensor and TCU are abnormal	Wiring harness Fork position sensor TCU Fork and synchronizer
P122F07	2nd Gear Off Fault	Shift fork in 2nd gear moves to neutral for more than 2 mm for 10 ms		
P123007	3rd Gear Off Fault	Shift fork in 3rd gear moves to neutral for more than 2 mm for 10 ms		
P123107	4th Gear Off Fault	Shift fork in 4th gear moves to neutral for more than 2 mm for 10 ms		
P123207	5th Gear Off Fault	Shift fork in 5th gear moves to neutral for more than 2 mm for 10 ms		
P123307	6th Gear Off Fault	Shift fork in 6th gear moves to neutral for more than 2 mm for 10 ms		
P123407	R Gear Off Fault	Shift fork in R gear moves to neutral for more than 2 mm		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
The above fault is clutch and oil temperature protection record. After the customer stops the current action or the protection strategy works, the fault disappears.	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P122E07, P122F07, P123007, P123107, P123207, P123307, P123407? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check and monitor fork displacement value	
	A. Connect the diagnostic tool. B. Clear DTCs. C. Press ENGINE START STOP switch once. D. During normal driving, read "positions of fork 1, 2, 3, 4" data flow with a diagnostic tool and monitor whether the data flow is consistent with the software fault judgment conditions. -> Yes Contact with transmission after-sale service department for technical support. -> No Go to step 3.

3. Check TCU power supply circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Vehicle is powered on. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Check and repair the connectors between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and vehicle.
4. Check TCU ground circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair the open fault in circuit between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and ground point. Verify that system is normal.

5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Go to step 6. → No Replace the TCU.
6. Inspect hydraulic system	A. Connect the diagnostic tool. B. Vehicle is powered on, perform gear shift (1, 2, 3, 4, 5, 6, R) action with a diagnostic tool to confirm if there is any abnormal gear shift. Monitor if the gear shift command is consistent with fork displacement -> Yes Go to step 7. -> No Contact with transmission after-sale service department for technical support, and confirm whether the hydraulic module needs to be replaced for further troubleshooting
7. Check solenoid valve request and feedback current	
	A. Connect the diagnostic tool. B. Vehicle is powered on, perform solenoid valve current test with a diagnostic tool to confirm if there is any abnormal current. Monitor if solenoid valve request current is consistent with actual current -> Yes Contact with transmission after-sale service department for technical support. -> No Contact with transmission after-sale service department for technical support, and confirm whether the solenoid valve needs to be replaced for further troubleshooting

DTC P123500

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P123500	1st Gear to Neutral Fault	1st gear fork fails to return to neutral for more than 500 ms for 3 times in succession	Check if wire harness, fork position sensor and TCU are abnormal	Wiring harness Fork position sensor TCU Fork and synchronizer
P123600	2nd Gear to Neutral Fault	2nd gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123700	3rd Gear to Neutral Fault	3rd gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123800	4th Gear to Neutral Fault	4th gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123B00	5th Gear to Neutral Fault	5th gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123C00	6th Gear to Neutral Fault	6th gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123D00	R Gear to Neutral Fault	R gear fork fails to return to neutral for more than 500 ms for 3 times in succession		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
The above fault is clutch and oil temperature protection record. After the customer stops the current action or the protection strategy works, the fault disappears.	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P123500, P123600, P123700, P123800, P123B00, P123C00, P123D00? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.

2. Check and monitor fork displacement value	
	A. Connect the diagnostic tool. B. Clear DTCs. C. Press ENGINE START STOP switch once. D. During normal driving, read "positions of fork 1, 2, 3, 4" data flow with a diagnostic tool and monitor whether the data flow is consistent with the software fault judgment conditions. -> Yes Contact with transmission after-sale service department for technical support. -> No Go to step 3.
3. Check TCU power supply circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Vehicle is powered on. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4 → No Check and repair the connectors between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and vehicle.

4. Check TCU ground circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair the open fault in circuit between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and ground point. Verify that system is normal.
5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Go to step 6. → No Replace the TCU.
6. Inspect hydraulic system	A. Connect the diagnostic tool. B. Vehicle is powered on, perform gear shift (1, 2, 3, 4, 5, 6, R) action with a diagnostic tool to confirm if there is any abnormal gear shift. Monitor if the gear shift command is consistent with fork displacement -> Yes Go to step 7. -> No Contact with transmission after-sale service department for technical support, and confirm whether the hydraulic module needs to be replaced for further troubleshooting

7. Check solenoid valve request and feedback current	
	A. Connect the diagnostic tool. B. Vehicle is powered on, perform solenoid valve current test with a diagnostic tool to confirm if there is any abnormal current. Monitor if solenoid valve request current is consistent with actual current -> Yes Contact with transmission after-sale service department for technical support. -> No Contact with transmission after-sale service department for technical support, and confirm whether the solenoid valve needs to be replaced for further troubleshooting

DTC P123500

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P123500	1st Gear to Neutral Fault	1st gear fork fails to return to neutral for more than 500 ms for 3 times in succession	Check if wire harness, fork position sensor and TCU are abnormal	Wiring harness Fork position sensor TCU Fork and synchronizer
P123600	2nd Gear to Neutral Fault	2nd gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123700	3rd Gear to Neutral Fault	3rd gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123800	4th Gear to Neutral Fault	4th gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123B00	5th Gear to Neutral Fault	5th gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123C00	6th Gear to Neutral Fault	6th gear fork fails to return to neutral for more than 500 ms for 3 times in succession		
P123D00	R Gear to Neutral Fault	R gear fork fails to return to neutral for more than 500 ms for 3 times in succession		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
The above fault is clutch and oil temperature protection record. After the customer stops the current action or the protection strategy works, the fault disappears.	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P123500, P123600, P123700, P123800, P123B00, P123C00, P123D00? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check and monitor fork displacement value	
	A. Connect the diagnostic tool. B. Clear DTCs. C. Press ENGINE START STOP switch once. D. During normal driving, read "positions of fork 1, 2, 3, 4" data flow with a diagnostic tool and monitor whether the data flow is consistent with the software fault judgment conditions. -> Yes Contact with transmission after-sale service department for technical support. -> No Go to step 3.

3. Check TCU power supply circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Vehicle is powered on. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Check and repair the connectors between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and vehicle.
4. Check TCU ground circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair the open fault in circuit between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and ground point. Verify that system is normal.

5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Go to step 6. → No Replace the TCU.
6. Inspect hydraulic system	A. Connect the diagnostic tool. B. Vehicle is powered on, perform gear shift (1, 2, 3, 4, 5, 6, R) action with a diagnostic tool to confirm if there is any abnormal gear shift. Monitor if the gear shift command is consistent with fork displacement -> Yes Go to step 7. -> No Contact with transmission after-sale service department for technical support, and confirm whether the hydraulic module needs to be replaced for further troubleshooting
7. Check solenoid valve request and feedback current	
	A. Connect the diagnostic tool. B. Vehicle is powered on, perform solenoid valve current test with a diagnostic tool to confirm if there is any abnormal current. Monitor if solenoid valve request current is consistent with actual current -> Yes Contact with transmission after-sale service department for technical support. -> No Contact with transmission after-sale service department for technical support, and confirm whether the solenoid valve needs to be replaced for further troubleshooting

DTC P123E93

DTC

<table>
<tr><th>DTC</th><th>Description</th><th>Test Conditions</th><th>Inspection Strategy</th><th>Faulty Area</th></tr>
<tr><td>P123E93</td><td>1st Gear Stuck Fault</td><td>1st gear fork fails to shift for more than 3 times</td><td rowspan="7">Check if wire harness, fork position sensor and TCU are abnormal</td><td rowspan="7">Wiring harness
Fork position sensor
TCU
Fork and synchronizer</td></tr>
<tr><td>P123F93</td><td>2nd Gear Stuck Fault</td><td>2nd gear fork fails to shift for more than for 3 times</td></tr>
<tr><td>P124093</td><td>3rd Gear Stuck Fault</td><td>3rd gear fork fails to shift for more than 3 times</td></tr>
<tr><td>P124193</td><td>4th Gear Stuck Fault</td><td>4th gear fork fails to shift for more than 3 times</td></tr>
<tr><td>P124593</td><td>5th Gear Stuck Fault</td><td>5th gear fork fails to shift for more than 3 times</td></tr>
<tr><td>P124693</td><td>6th Gear Stuck Fault</td><td>6th gear fork fails to shift for more than 3 times</td></tr>
<tr><td>P124793</td><td>R Gear Stuck Fault</td><td>7th gear fork fails to shift for more than 3 times</td></tr>
</table>

Diagnosis Procedure

<table>
<tr><th>Test Conditions</th><th>Details/Results/Actions</th></tr>
<tr><td colspan="2">1. Check DTC</td></tr>
<tr><td>The above fault is clutch and oil temperature protection record. After the customer stops the current action or the protection strategy works, the fault disappears.</td><td>A. Connect the diagnostic tool.
B. Detect automatic transmission system with diagnostic tool.
Is there any DTC other than P123E93, P123F93, P124093, P124193, P124593, P124693, P124793?
→ Yes
Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs
→ No
Go to step 2.</td></tr>
<tr><td colspan="2">2. Check and monitor fork displacement value</td></tr>
<tr><td></td><td>A. Connect the diagnostic tool.
B. Clear DTCs.
C. Press ENGINE START STOP switch once.
D. During normal driving, read "positions of fork 1, 2, 3, 4" data flow</td></tr>
</table>

	with a diagnostic tool and monitor whether the data flow is consistent with the software fault judgment conditions. -> Yes Contact with transmission after-sale service department for technical support. -> No Go to step 3.
3. Check TCU power supply circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Vehicle is powered on. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4 → No Check and repair the connectors between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and vehicle.
4. Check TCU ground circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair the open fault in circuit between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and ground point. Verify that system is normal.

5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Go to step 6. → No Replace the TCU.
6. Inspect hydraulic system	A. Connect the diagnostic tool. B. Vehicle is powered on, perform gear shift (1, 2, 3, 4, 5, 6, R) action with a diagnostic tool to confirm if there is any abnormal gear shift. Monitor if the gear shift command is consistent with fork displacement -> Yes Go to step 7. -> No Contact with transmission after-sale service department for technical support, and confirm whether the hydraulic module needs to be replaced for further troubleshooting
7. Check solenoid valve request and feedback current	
	A. Connect the diagnostic tool. B. Vehicle is powered on, perform solenoid valve current test with a diagnostic tool to confirm if there is any abnormal current. Monitor if solenoid valve request current is consistent with actual current -> Yes Contact with transmission after-sale service department for technical support. -> No Contact with transmission after-sale service department for technical support, and confirm whether the solenoid valve needs to be replaced for further troubleshooting

DTC P124894

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P124894	1st Gear Unrequested Fault	1st gear fork moving displacement exceeds neutral travel when there is no gear shift command	Check if wire harness, fork position sensor and TCU are abnormal	Wiring harness Fork position sensor TCU Fork and synchronizer
P124994	2nd Gear Unrequested Fault	2nd gear fork moving displacement exceeds neutral travel when there is no gear shift command		
P124A94	3rd Gear Unrequested Fault	3rd gear fork moving displacement exceeds neutral travel when there is no gear shift command		
P124B94	4th Gear Unrequested Fault	4th gear fork moving displacement exceeds neutral travel when there is no gear shift command		
P124C94	5th Gear Unrequested Fault	5th gear fork moving displacement exceeds neutral travel when there is no gear shift command		
P124D94	6th Gear Unrequested Fault	6th gear fork moving displacement exceeds neutral travel when there is no gear shift command		
P124E94	R Gear Unrequested Fault	R gear fork moving displacement exceeds neutral travel when there is no gear shift command		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
The above fault is clutch and oil temperature protection record. After the customer stops the current action or the protection strategy works, the fault disappears.	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P124893, P124993, P124A93, P124B93, P124C93, P124D93, P124E93? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check and monitor fork displacement value	
	A. Connect the diagnostic tool. B. Clear DTCs. C. Press ENGINE START STOP switch once. D. During normal driving, read "positions of fork 1, 2, 3, 4" data flow with a diagnostic tool and monitor whether the data flow is consistent with the software fault judgment conditions. -> Yes Contact with transmission after-sale service department for technical support. -> No Go to step 3.
3. Check TCU power supply circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Vehicle is powered on. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes

	Go to step 4 → No Check and repair the connectors between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and vehicle.
4. Check TCU ground circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair the open fault in circuit between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and ground point. Verify that system is normal.
5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Go to step 6. → No Replace the TCU.

6. Inspect hydraulic system	
	A. Connect the diagnostic tool. B. Vehicle is powered on, perform gear shift (1, 2, 3, 4, 5, 6, R) action with a diagnostic tool to confirm if there is any abnormal gear shift. Monitor if the gear shift command is consistent with fork displacement -> Yes Go to step 7. -> No Contact with transmission after-sale service department for technical support, and confirm whether the hydraulic module needs to be replaced for further troubleshooting
7. Check solenoid valve request and feedback current	
	A. Connect the diagnostic tool. B. Vehicle is powered on, perform solenoid valve current test with a diagnostic tool to confirm if there is any abnormal current. Monitor if solenoid valve request current is consistent with actual current -> Yes Contact with transmission after-sale service department for technical support. -> No Contact with transmission after-sale service department for technical support, and confirm whether the solenoid valve needs to be replaced for further troubleshooting

DTC P124F07

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P124F07	Fork 1 Overspeed Error	Fork 1 speed exceeds 320 mm/s	Check if wire harness, fork position sensor and TCU are abnormal	Wiring harness Fork position sensor TCU Fork and synchronizer
P125007	Fork 2 Overspeed Error	Fork 2 speed exceeds 320 mm/s		
P125107	Fork 3 Overspeed Error	Fork 3 speed exceeds 320 mm/s		
P125207	Fork 4 Overspeed Error	Fork 4 speed exceeds 320 mm/s		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
The above fault is clutch and oil temperature protection record, the customer stop current action or protection strategy operates, the fault disappears.	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P124F07, P125007, P125107 or P125207? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check and monitor fork displacement value	
	A. Connect the diagnostic tool. B. Clear DTCs. C. Press ENGINE START STOP switch once. D. During normal driving, read "positions of fork 1, 2, 3, 4" data flow with a diagnostic tool and monitor whether the data flow is consistent with the software fault judgment conditions. -> Yes Contact with transmission after-sale service department for technical support. -> No Go to step 3.

3. Check TCU power supply circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Vehicle is powered on. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. Standard voltage: 11 - 14 V Is it normal? → Yes Go to step 4. → No Check and repair the connectors between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and vehicle.
4. Check TCU ground circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair the open fault in circuit between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and ground point. Verify that system is normal.

5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Go to step 6. → No Replace the TCU.
6. Inspect hydraulic system	
	A. Connect the diagnostic tool. B. Vehicle is powered on, perform gear shift (1, 2, 3, 4, 5, 6, R) action with a diagnostic tool to confirm if there is any abnormal gear shift. Monitor if the gear shift command is consistent with fork displacement -> Yes Go to step 7. -> No Contact with transmission after-sale service department for technical support, and confirm whether the hydraulic module needs to be replaced for further troubleshooting
7. Check solenoid valve request and feedback current	
	A. Connect the diagnostic tool. B. Vehicle is powered on, perform solenoid valve current test with a diagnostic tool to confirm if there is any abnormal current. Monitor if solenoid valve request current is consistent with actual current -> Yes Contact with transmission after-sale service department for technical support. -> No Contact with transmission after-sale service department for technical support, and confirm whether the solenoid valve needs to be replaced for further troubleshooting

DTC P12531C

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P12531C	Fork 1 Position Out of Range Fault	Fork 1 displacement exceeds 10 mm	Check if wire harness, fork position sensor and TCU are abnormal	Wiring harness Fork position sensor TCU Fork and synchronizer
P12551C	Fork 2 Position Out of Range	Fork 2 displacement exceeds 10 mm		
P12561C	Fork 3 Position Out of Range	Fork 3 displacement exceeds 10 mm		
P12571C	Fork 4 Position Out of Range	Fork 4 displacement exceeds 10 mm		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
The above fault is clutch and oil temperature protection record. After the customer stops the current action or the protection strategy works, the fault disappears.	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P12531C, P12551C, P12561C or P12571C? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check and monitor fork displacement value	
	A. Connect the diagnostic tool. B. Clear DTCs. C. Press ENGINE START STOP switch once. D. During normal driving, read "positions of fork 1, 2, 3, 4" data flow with a diagnostic tool and monitor whether the data flow is consistent with the software fault judgment conditions. → Yes Contact with transmission after-sale service department for technical support. → No Go to step 3.
3. Check TCU power supply circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Connect the negative battery cable. D. Vehicle is powered on. E. Measure voltage between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and reliable ground point. **Standard voltage: 11 - 14 V** Is it normal? → Yes Go to step 4. → No Check and repair the connectors between terminals A_7, A_8, A_15, A_16 of TCU wiring harness connector A and vehicle.

4. Check TCU ground circuit	
	A. The vehicle is powered off, disconnect the negative battery cable. B. Disconnect the TCU wiring harness connector AB. C. Measure resistance between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and reliable ground point. Standard resistance: Less than 5 Ω Is resistance normal? → Yes Go to step 5. → No Check and repair the open fault in circuit between terminals A_23, A_31, A_24, A_32 of TCU wiring harness connector A and ground point. Verify that system is normal.
5. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Go to step 6. → No Replace the TCU.

DTC P125862

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P125862	Clutch 0 Loop Control Error	Difference value between K0 clutch request pressure and actual pressure is higher than 2 bar for 1 second	Check if wiring harness, clutch pressure sensor, hydraulic system and TCU are abnormal	Wiring harness Clutch pressure sensor TCU Hydraulic system
P125962	Clutch 1 Loop Control Error	Difference value between clutch 1 request pressure and actual pressure is higher than 2 bar for 1 second		
P125A62	Clutch 2 Loop Control Error	Difference value between clutch 2 request pressure and actual pressure is higher than 2 bar for 1 second		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
The above fault is clutch and oil temperature protection record. After the customer stops the current action or the protection strategy works, the fault disappears.	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P125862, P125962 or P125A63? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Inspect and monitor clutch pressure sensor electrical value	
	A. Connect the diagnostic tool. B. Clear DTCs. C. Vehicle is powered on, and read "clutch 0, 1, 2 pressure sensor electrical value" data flow with diagnostic tool. Monitor if clutch pressure sensor electrical value is within normal range. **Standard voltage: 250 ± 50 mV** → Yes Go to step 3. → No Contact with transmission after-sale service department for technical support.
3. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Go to step 4. → No Replace the TCU.

4. Inspect clutch build-up capacity	
	A. Connect the diagnostic tool. B. Vehicle is powered on, and perform clutch pressure test with diagnostic tool. Monitor if the maximum value of clutch pressure is within normal range. **Standard voltage: 50 ~ 55 bar** → Yes Contact with transmission after-sale service department for technical support. → No Contact with transmission after-sale service department for technical support, and confirm whether the hydraulic module needs to be replaced for further troubleshooting.

DTC P125B85

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P125B85	PCB Temperature Sensor Too Low	TCU temperature is lower than -40°C for 1 second	Check if TCU is abnormal	TCU
P125C85	PCB Temperature Sensor Too High	TCU temperature is higher than 120℃ for 1 second		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P125B85 or P125C85? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check if DTC still occurs	
	A. Connect the diagnostic tool. B. Clear DTCs. C. After the vehicle is powered on, check if DTC still occurs. → No Go to step 3. → Yes Contact with transmission after-sale service department for technical support.
3. Check TCU	
	A. Remove the TCU. B. Install the TCU of the vehicle onto another vehicle with well condition. Is the vehicle in normal condition after installing TCU? → Yes Contact with transmission after-sale service department for technical support. → No Replace the TCU.

DTC P125D85

DTC

DTC	Description	Test Conditions	Inspection Strategy	Faulty Area
P125D85	Line Pressure Too High Protect	Oil filling time of ACV valve within 60 seconds exceeds 50 seconds	Check if TCU and ACV valves are abnormal	TCU ACV valve
P125E85	Line Pressure Too High	Transmission line pressure exceeds 65 bar for 500 ms		

Diagnosis Procedure

Test Conditions	Details/Results/Actions
1. Check DTC	
	A. Connect the diagnostic tool. B. Detect automatic transmission system with diagnostic tool. Is there any DTC other than P125D85 or P125E85? → Yes Refer to: Refer to the Related Contents of DTC Diagnosis Procedure Index for Other DTCs → No Go to step 2.
2. Check if DTC still occurs	
	A. Connect the diagnostic tool. B. Clear DTCs. C. After the vehicle is powered on, check if DTC still occurs. → No Contact with transmission after-sale service department for technical support. → Yes Go to step 3.

3. Check solenoid valve request and feedback current	
	A. Connect the diagnostic tool. B. Vehicle is powered on, perform solenoid valve current test with a diagnostic tool to confirm if there is any abnormal current. Monitor if solenoid valve request current is consistent with actual current → Yes Go to step 4. → No Contact with transmission after-sale service department for technical support, and confirm whether the solenoid valve needs to be replaced for further troubleshooting
4. Check if electrical fuel pump motor operates normally	
	A. Connect the diagnostic tool. B. Vehicle is powered on, and read electrical fuel pump motor speed with diagnostic tool, and confirm if electrical fuel pump runs continuously. → Yes Contact with transmission after-sale service department for technical support, and confirm electrical fuel pump. → No Contact with transmission after-sale service department for technical support.

3.2.2 Electronic Gearshift Control System

Specifications

Torque Specifications

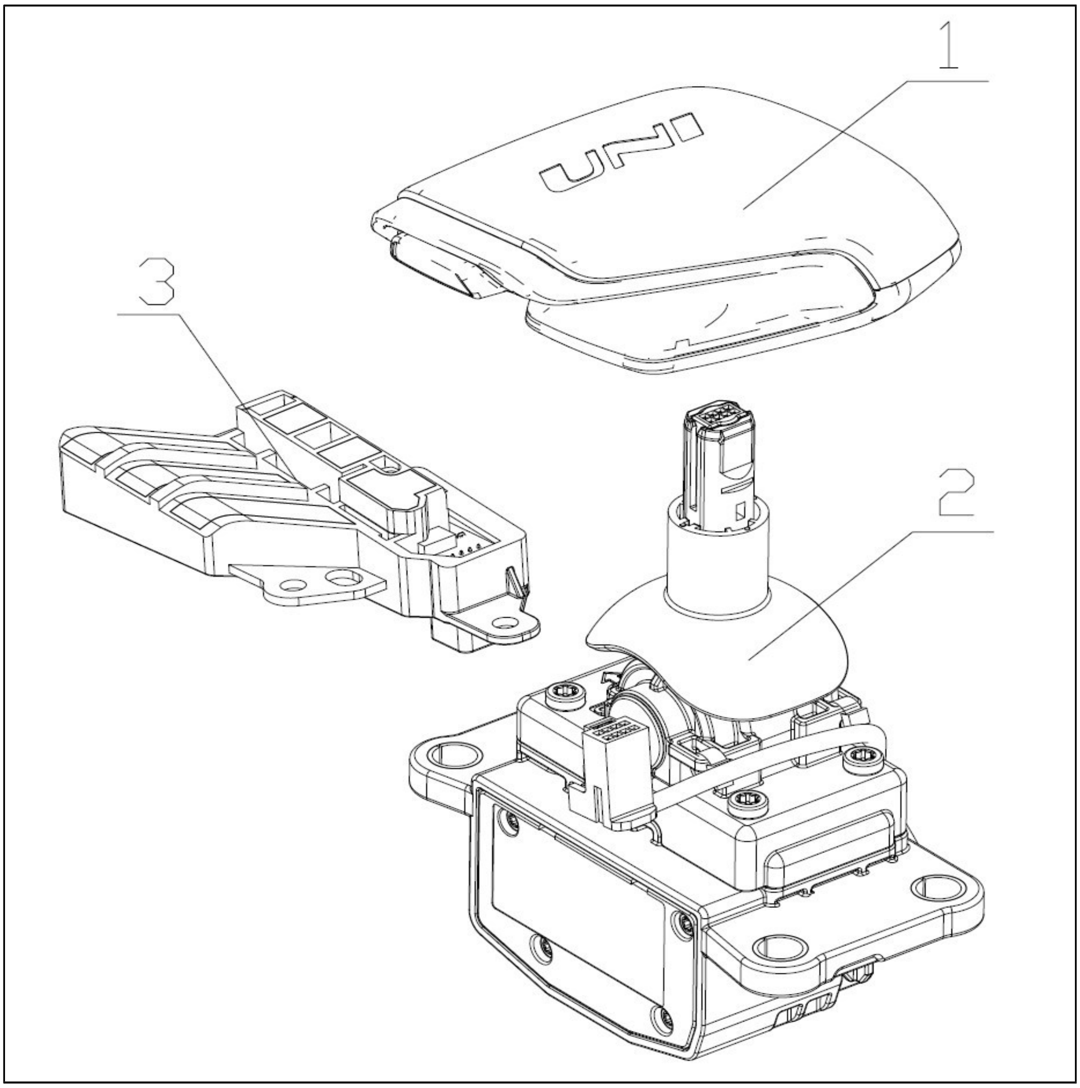
Item	Nm	lb-ft	lb-in
Shift knob assembly	/	/	/
Shift base assembly	4-5	/	/
Gear lamp box assembly	1 ± 0.2	/	/

Description and Operation

System Overview

Gearshift control assembly is a handle type electronic shifter, which adopts 3D Hall sensor. When shift lever moves to a different position, magnet rotates or turns over according to Hall sensor. The Hall sensor sends signal, then current position of the shift lever will be determined by the single-chip microcomputer based on the received signal, and finally converted into CAN signals, which are output to controller TCU. TCU makes logical judgment according to current condition of vehicle, so as to realize shifting.

Components Exploded View



Item	Description	Quantity	Item	Description	Quantity
1	Shift knob assembly	1	2	Shift base assembly	1
3	Gear lamp box assembly	1			

Symptom Diagnosis and Testing

Inspection and Verification

1. Verify customer concern and reproduce fault as necessary.
2. If customer concern cannot be identified, carry out road test or visual inspection according to the table below.
3. If fault can be identified obviously, proceed to the repair process.
4. If fault cannot be identified obviously, please use diagnostic tool to read and analyze vehicle signal and DTC, and inspect if there is a electronic gearshift control assembly DTC. If there is, carry out a precise inspection according to the following Symptom Chart. If the signal of electronic gearshift control assembly is normal, then the fault of gearshift control assembly can be eliminated. Please inspect ACM, TCU or other system components.

Appearance Inspection Chart

Mechanical	
1. Obviously damaged or worn components	2. Loose or lost components, wiring harness damage or falling off

Symptom Chart

Symptom	Possible Causes	Solutions
Instrument cluster indicates “Shifter fault, please check and repair”.	1. Abnormal input power supply voltage of vehicle	A. Repair or replace battery
	2. Signal input and output wiring harnesses fault	B. Check and replace wiring harness assembly
	3. Shift base assembly component is damaged	C. Replace shift base assembly components

Symptom	Possible Causes	Solutions
Vehicle fails to start, and instrument cluster indicates “Please shift to P”.	1. Vehicle is not in P position	A. Vehicle shifts into P position
	2. Loosened or dropped transmission ground wiring harness	A. Check ground wiring harness for good connection.
	3. Abnormal power supply of ECU, TCU, ACM, ESL and other components.	B. Check relative wiring harness assembly for good connection.
	4. Abnormal operation of ECU, TCU, ACM, ESL and other components.	C. Check if corresponding fuse of component in fuse box is normal.
When the unlock button on left side of shift knob is pressed to shift, the instrument cluster still indicates "Please press unlock button to shift", and the symptom reappears after multiple operations.	1. Shift knob and base not inserted in place	A. Pull out and insert shift knob again
	2. Shift knob assembly components damaged	B. Replace shift knob assembly
	3. Shift base is damaged	C. Replace shift base assembly
Press P button on the panel, vehicle does not respond and shift lever does not enter P position, but at this time, RND + and - gears can be switched normally.	1. Central switch box wiring harness is poorly connected	A. Check wiring harness connection
	2. Central switch box component is damaged	B. Replace central switch box assembly
The corresponding RND gear position character strip on gearshift panel does not come on, but at this time, instrument cluster can display gear position normally, and vehicle can be shifted normally.	1. Gear lamp box and base wiring harness is poorly connected	A. Check wiring harness connection
	2. Gear lamp box is damaged	B. Replace gear lamp box assembly

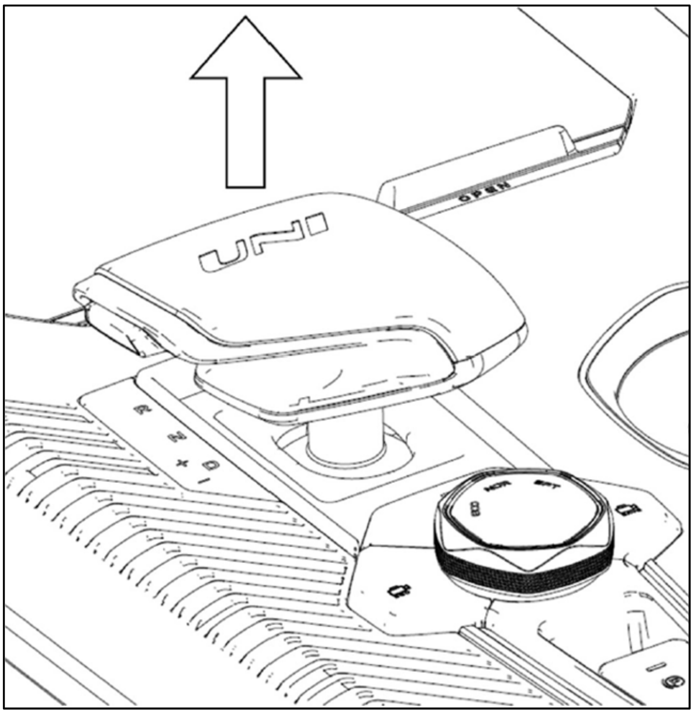
CAUTION: If instrument cluster indicates "P position fault, please check and repair", proceed to the "Electronic Gearshift Actuator Controller Assembly (ACM, TCU)" section in manual for troubleshooting.

Removal and Installation

Removal of Shift Knob Assembly

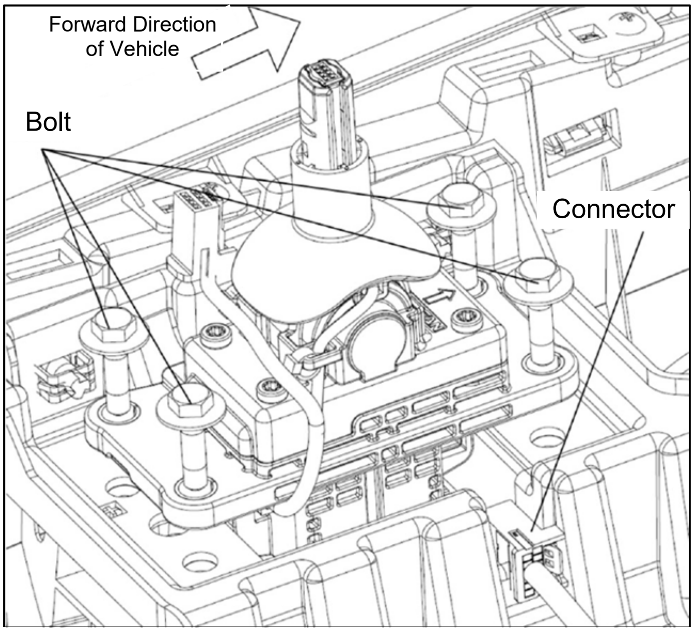
1. Hold the lower part of shift knob assembly with both hands and pull shift knob assembly upward along axis direction of shift control lever until the shift knob assembly is pulled out of the shift lever.
2. After shift knob assembly is removed, check shift knob appearance and internal pins for deflection or damage.

⚠ (CAUTION: Large pulling force (more than approximately 300 N) will be required, in pulling process, do not rotate shift knob left and right, otherwise, connecting part will be damaged.)



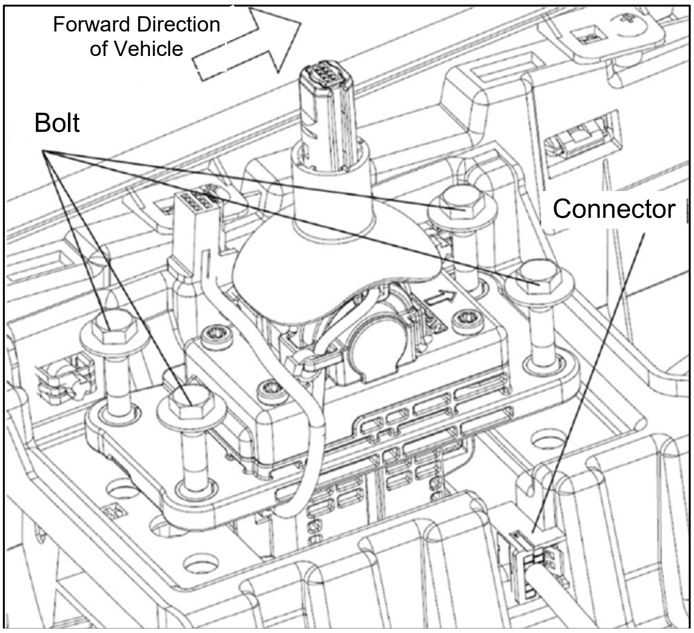
Removal of Shift Base Assembly

1. Remove shift knob assembly by referring to Removal of Shift Knob Assembly.
2. Remove central control box panel by referring to Removal of Central Control Box Panel. After shift knob assembly is removed, check assembly appearance and internal pins for deflection or damage.
3. Remove shift base mounting bolts, then take off 4 bolts with 8 mm socket.
4. Remove shift base assembly from central control box, and unplug connector.



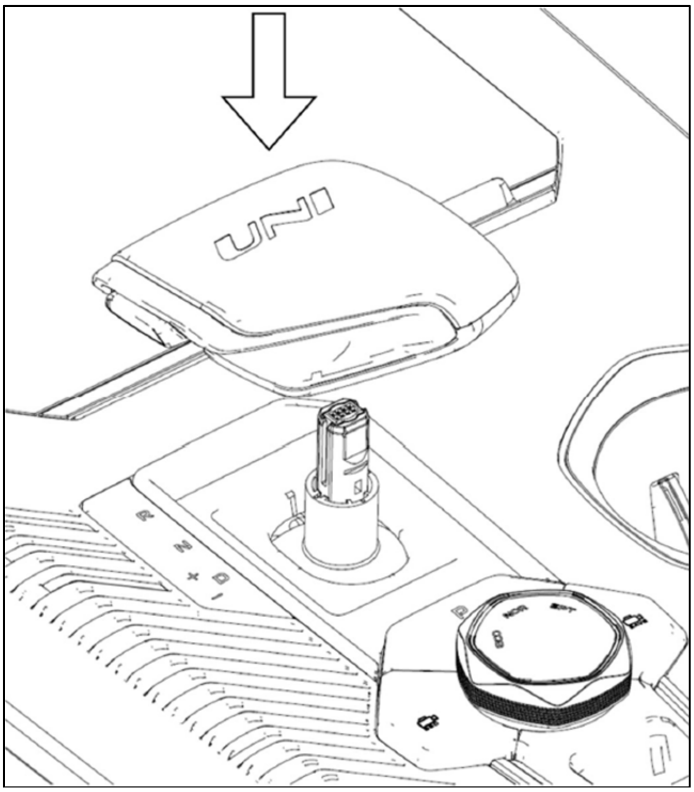
Installation of Shift Base Assembly

1. After inspecting that shift base assembly is in good condition, insert connector into interface of shift base assembly first, and a “click” sound will be heard once inserted in place. After insertion, pull out slightly to inspect if it is inserted in place.
2. Put shift base assembly with inserted wiring harness onto installation position of central control box, fix the assembly with 4 hexagon flange bolts (09103-06012-S112). Tightening torque of bolts is 4 - 5 Nm, and bolt is painted with yellow mark.

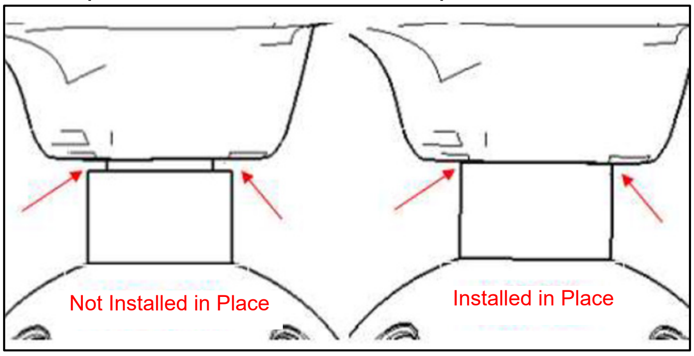


Installation of Shift Knob Assembly

1. After inspecting that shift knob assembly is in good condition, straighten shift knob assembly in direction shown in figure below, align the hole at bottom of shift knob assembly with shift lever, and then slowly insert the shift knob assembly into shift lever, tap shift knob lightly by hand, and a "click" sound will be heard if it is inserted in place.



2. After insertion, hold shift knob assembly and pull it up with an appropriate force to judge if shift knob will come out.
3. Observe if lower edge of shift knob assembly fits well with shift lever (as shown below), and inspect if shift knob is fitted in place.



Precautions

1. When removing or installing shift base, be sure to protect surrounding parts and do not scratch or damage the central control panel and other relevant components.

2. When removing or installing shift base, pay attention to the removal or plugging of its wiring harnesses, make sure that they are plugged in place (a "click" sound will be heard when they are plugged in place), so as to avoid abnormal signal transmission caused by improper plugging.

3. When removing or installing gear lamp box, pay attention to the removal or plugging of its wiring harnesses, make sure they are plugged in place (a "click" sound will be heard when they are plugged in place), so as to avoid abnormal signal transmission caused by improper plugging.

4. When installing shift knob assembly, be sure to observe whether lower edge of shift knob assembly fits well with shift lever. If there is obvious gap or if it is not installed in place, pull out shift knob assembly and inspect if shift knob assembly is intact again, if it is intact, install according to above steps, if it is damaged, replace with a new one and install it.

3.2.3 Flywheel

Specifications

Torque Specifications

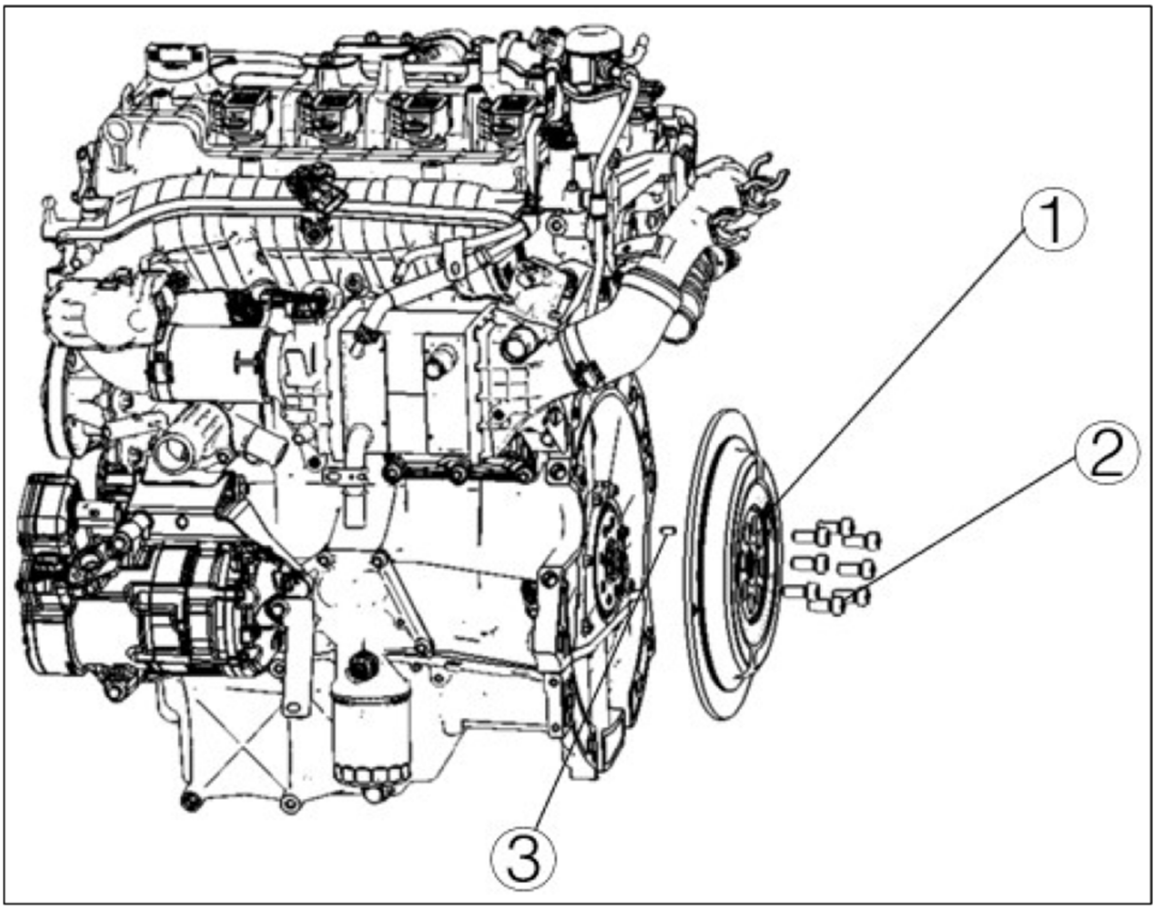
Item	Nm	lb-ft	lb-in
Flywheel bolt	Torque method: (40 ± 2) Nm ＋ (45 ± 2)° Monitoring method: (65 - 115) Nm		

Description and Operation

System Overview

Dual-mass flywheel assembly is installed on crankshaft. By using its own functions to store the energy of the power stroke and overcome the resistance of the auxiliary stroke, it absorbs or releases its kinetic energy, stabilizes the change of crankshaft acceleration and speed during acceleration and deceleration of the crankshaft, so as to make the engine operate stably.

Components Exploded View



Item	Description	Quantity
1	Dual-mass flywheel assembly	1
2	Flywheel bolt	8
3	Flywheel dowel pin	1

Symptom Diagnosis and Testing

Inspection and Verification

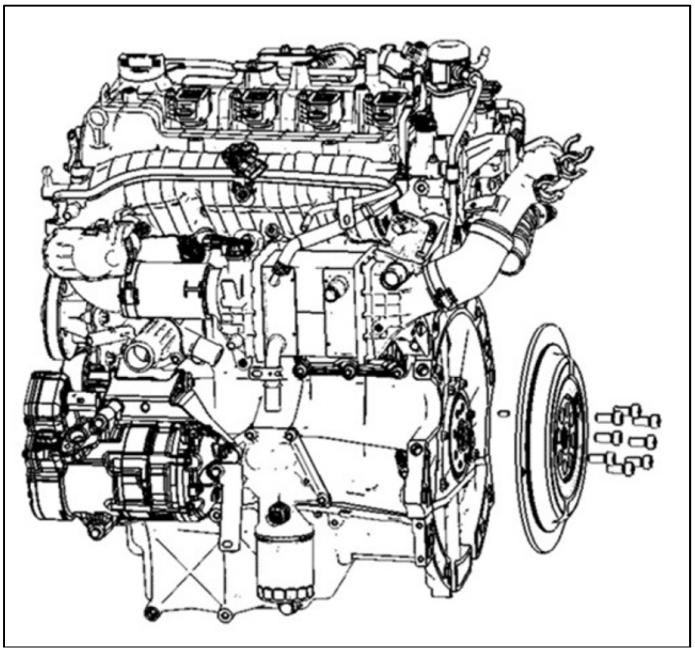
1. Verify customer concern and reproduce fault as necessary.
2. If customer concern cannot be identified, carry out road test or visual inspection according to the table below.
3. If fault can be identified obviously, proceed to the repair process.
4. If fault cannot be identified obviously, carry out a precise inspection according to the Symptom Chart.

Appearance Inspection Chart

Appearance Inspection Chart

Mechanical	
1. Obviously damaged or worn components	2. Loose or lost nuts or bolts

Removal and Installation



Removal

Remove flywheel bolts diagonally. After removal, the same flywheel bolt (self-adhesive glue) can only be used once

Installation

Install flywheel to the corresponding position, tighten flywheel bolt to specified torque symmetrically manually, and the same flywheel bolt (self-adhesive glue) can only be used once.

⚠ CAUTION: If flywheel is damaged, cracked or worn, replace the flywheel ring gear assembly.

⚠ CAUTION: Dual-mass flywheel is composed of the primary flywheel and the secondary flywheel (as shown in the figure below). The secondary flywheel can rotate clockwise and counterclockwise around the flywheel center in static state (the design angle is 5.5° ~ 15.8°). The secondary flywheel can move axially (the maximum single side does not exceed 1.7 mm) around the flywheel center.

The above motion is an inherent feature of the double-mass flywheel, this is not a fault.

3.2.4 Electronic Gearshift Actuator and Controller

Specifications

Torque Specifications

Item	Nm	Note
Electronic gearshift actuator controller assembly retaining nut (M6)	10 ± 1	Final plan of RDE is to integrate electronic gearshift actuator controller with electronic gearshift actuator, and cancel electronic gearshift actuator controller.
Electronic gearshift actuator assembly retaining nut (M6)	10 ± 1	
Electronic gearshift actuator assembly retaining bolt (M6)	10 ± 1	

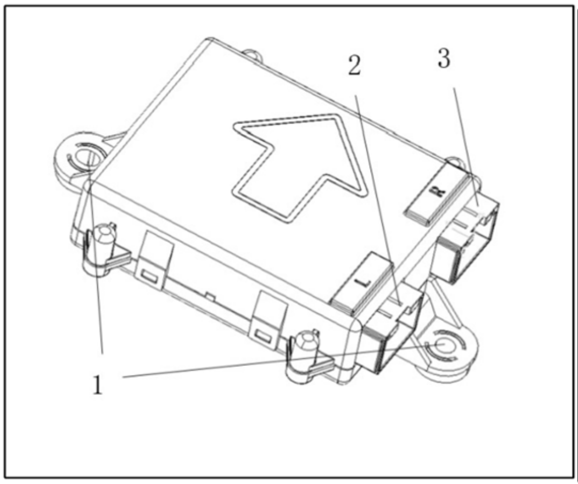
Description and Operation

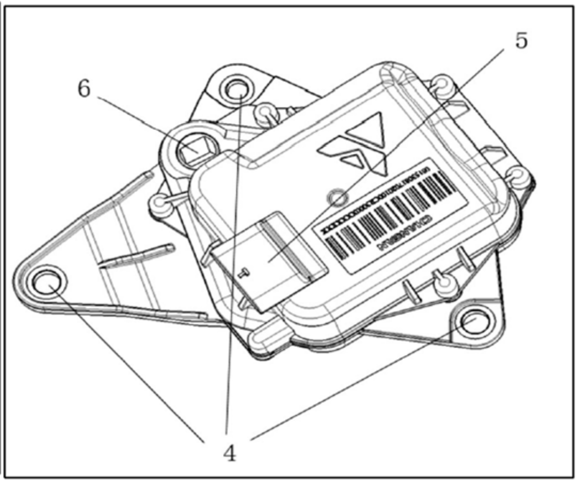
System Overview

The system consists of an electronic gearshift actuator controller assembly (herein after referred to as ACM) and an electronic gearshift actuator assembly (herein after referred to as ARC). ACM is located at the original clutch pedal bracket in the cab, and responsible for vehicle communication and ARC control; ARC is located on transmission case (directly under the engine thermostat), and its torque output hole matches with transmission shift shaft clearance to realize the torque output through motor drive, thus completing the gear shifting action. Position sensors are set in ARC to feed back gear information.

Components Location View

Electronic Gearshift Actuator Controller Assembly (ACM)   Electronic Gearshift Actuator Assembly (ARC)





Item	Belonging Parts	Name
1	ACM	Set hole
2	ACM	Vehicle wiring harness interface
3	ACM	ARC wiring harness interface
4	ARC	Set hole
5	ARC	ACM wiring harness interface
6	ARC	Shift shaft mating hole

Symptom Diagnosis and Testing

⚠ CAUTION: Diagnostic tool calibration for ACM self-learning shall be performed for any of the following repair operations. For specific steps, refer to “Diagnostic Tool Self-learning Procedures of Electronic Gearshift Actuator Controller (ACM)” in this section. The described situations include:

(1) Replacement and removal of ARC

(2) Replacement of ACM

(3) Replacement and removal of transmission

Inspection and Verification

1. Verify customer concern and reproduce fault as necessary.
2. If customer concern cannot be identified, carry out road test or visual inspection according to the table below.
3. If fault can be identified obviously, proceed to the repair process.
4. If fault cannot be identified obviously and instrument panel displays “P fault, please check and repair”, please use diagnostic tool to read and analyze vehicle signal and DTC, and inspect if there is a ACM or ARC DTC. If there is, carry out a precise inspection according to the Symptom Chart. If ACM and ARC signals are normal, then electronic gearshift actuator and controller assembly can be eliminated. Please inspect gearshift control, ESL, TCU or other system components.

Appearance Inspection Chart

Mechanical	
1. Obviously damaged or worn components	2. Loose or lost components, wiring harness damage or falling off

Diagnosis Procedure

Step	Operation	Yes	No
1	Connect the diagnostic tool in power off state; Turn the power switch to ON (ignition on). Diagnostic tool enters ACM diagnosis mode, and inspect if communication with ACM system is normal.	Go to step 2	Refer to System Inspection
2	Start the “Read DTC” function, read DTC to inspect for a fault	Inspect and repair according to DTC	End

Common Fault Diagnosis and Treatment

Power Supply or Wiring Harness Failure

DTC	DTC Description	Service Operation
P1500	Low Supply Voltage	Inspect battery or wiring harness system
P1501	High Supply Voltage	Inspect battery or wiring harness system

ACM Internal Failure

DTC	DTC Description	Service Operation		
		Step	Yes	No
P1504	Position Sensor Power Supply Low	1. Replace ACM, perform ACM self-learning with diagnostic tool after completed.	-	-
P1503	Position Sensor Power Supply High	2. Clear DTC and read again, inspect if DTC recurs.	Inspect other systems	End
P150C	Calibration Error (Applicable to Volume Products)			

ARC Position Hall Sensor Failure/Magnet Failure/Wiring Harness Failure

DTC	DTC Description	Operation		
		Step	Yes	No
P1505	Position Sensor Frequency Error	1. Inspect if wiring harness is connected normally.	Go to step 2	Repair wiring harness
P1506	Sensor is Out of Range	2. Replace ARC, perform ACM self-learning with diagnostic tool after completed.	-	-
		3. Clear DTC and read again, inspect if DTC recurs.	Inspect other systems	End

ARC Error/Transmission Fault

<table>
<tr><td>DTC</td><td>DTC Description</td><td colspan="3">Service Operation</td></tr>
<tr><td>P1509</td><td>H-Bridge Over Current</td><td>Step</td><td>Yes</td><td>No</td></tr>
<tr><td>P150A</td><td>H Bridge Fault Occurred</td><td>1. Replace ACM, perform ACM self-learning with diagnostic tool after completed.</td><td>-</td><td>-</td></tr>
<tr><td>P150E</td><td>H-Bridge Current Low</td><td rowspan="2">2. Clear DTC and read again, inspect if DTC recurs.</td><td rowspan="2">Go to step 3</td><td rowspan="2">End</td></tr>
<tr><td>P1507</td><td>ARC can't Move</td></tr>
<tr><td rowspan="2">P1508</td><td rowspan="2">Shift Timeout</td><td>3. Replace ARC, perform ACM self-learning with diagnostic tool after completed.</td><td>-</td><td>-</td></tr>
<tr><td>4. Clear DTC and read again, inspect if DTC recurs.</td><td>Go to step 5</td><td>End</td></tr>
<tr><td>P150B</td><td>Open in ARC Wiring Harness (PWM+/-)</td><td>5. Inspect if transmission system is normal. (Focus on checking whether the shift shaft is stuck)</td><td>Repair transmission</td><td>End</td></tr>
</table>

Communication Fault

DTC	DTC Description	Service Operation		
P1502	KL15 Failure	Step	Yes	No
U2F47	TCU Communication Error or Lost Communication with TCU	1. Inspect if wiring harness is connected normally.	Go to step 2	Repair wiring harness
U2F41	ESP Message Error or Lost Communication with ESP			
U2F46	CAN Bus-off	2. Check if the CAN communication of the corresponding controller module of vehicle or node is normal.	Go to step 3	Repair corresponding module
U2F43	Lost Communication with EMS			
U2F45	Lost Communication with BCM	3. Replace ACM, perform ACM self-learning with diagnostic tool after completed.	-	-

Actuator Motor Periodic Jitter

<table>
<tr><th rowspan="2">DTC</th><th rowspan="2">DTC Description</th><th colspan="3">Service Operation</th></tr>
<tr><th>Step</th><th>Yes</th><th>No</th></tr>
<tr><td rowspan="5">P150F</td><td rowspan="5">ARC Motor Periodic Jitter (Motor Unstable)</td><td>1. Perform ACM self-learning with diagnostic tool.</td><td>-</td><td>-</td></tr>
<tr><td>2. Clear DTC and read again, inspect if DTC recurs.</td><td>Go to step 3</td><td>End</td></tr>
<tr><td>3. Replace ARC, perform ACM self-learning with diagnostic tool.</td><td>-</td><td>-</td></tr>
<tr><td>4. Clear DTC and read again, inspect if DTC recurs.</td><td>Go to step 5</td><td>End</td></tr>
<tr><td>5. Inspect if transmission system is normal</td><td>Inspect other systems</td><td>Repair transmission</td></tr>
</table>

CAUTION: During repair procedure of ARC motor periodic jitter failure, if the ACM diagnostic tool self-learning fails in step 1, directly go to step 3.

Removal and Installation

⚠ CAUTION: It is necessary to keep vehicle level, straighten the steering wheel, turn off power supply of vehicle and secure the four wheels with wedge blocks during removal and installation of ARC, to prevent accidental vehicle roll-away.

Removal

Part	Electronic Gearshift Actuator Controller Assembly ACM	Electronic Gearshift Actuator Assembly ARC
Step	1. Unplug 2 wiring harness connectors. 2. Remove the ACM. Torque: 10 ± 1 Nm. 3. Removal is completed.	1. Disconnect the wiring harness connector. 2. Remove the ARC. Torque: 10 ± 1 Nm. 3. Removal is completed.

Installation

Part	Electronic Gearshift Actuator Controller Assembly ACM	Electronic Gearshift Actuator Assembly ARC
Step	Installation is in the reverse order of removal.	1.If original part is installed back directly, go to step 2; if a new part is installed, make sure that transmission gearshift shaft is in P position (in P position, drive wheel cannot rotate). 2. Engage ARC shift shaft mating hole 6 to transmission shift shaft while ensuring the alignment of mounting holes. 3. Tighten bolt, torque: 10 ± 1 Nm. 4. Insert wiring harness connector to end the actuator installation.

Diagnostic Tool Self-learning Procedures of Electronic Gearshift Actuator Controller (ACM)

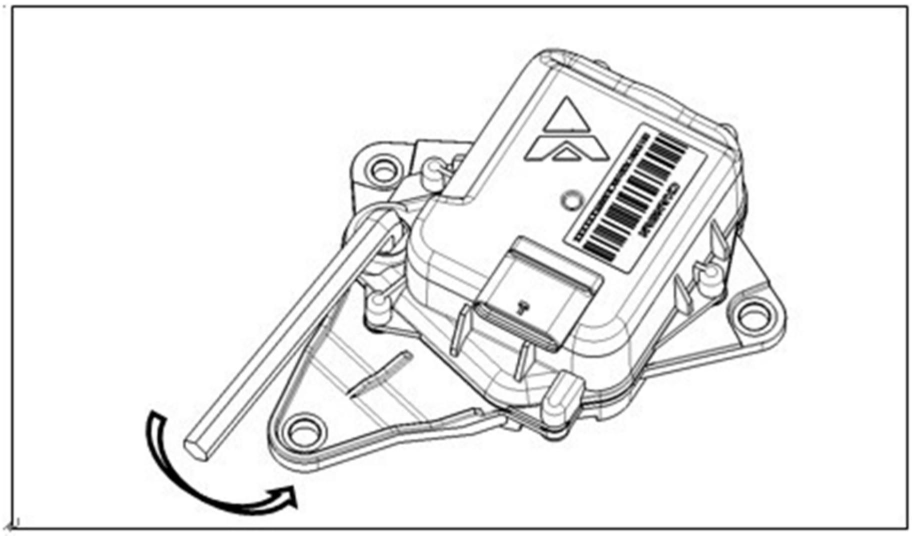
CAUTION: Please shift to P during self-learning. In the whole process, keep vehicle level with engine not started.

1. Connect diagnostic tool with vehicle powered off.
2. Turn the power switch to ON (ignition on).
3. Turn on diagnostic tool, enter the current model directory, and select gearshift actuator control module ACM → diagnostic data version → special function → ACM self-learning in turn.
4. If diagnostic tool interface displays “Do you want to enter ACM self-learning?”, click “Yes”.
5. Wait until “P position calibration is successful” appears on diagnostic tool interface, click “OK”.
6. Wait until “ACM self-learning is finished” appears on diagnostic tool interface, click “exit”.
7. Self-learning is finished.

Manual Unlock from P Position

If transmission cannot shift out of P position due to ACM fault and towing or other operation needs to be performed by unlocking front wheel, manually unlock from P position according to following operation:

1. Apply parking brake, keep vehicle level, and turn the power switch to OFF;
2. Use 8 mm inner hexagon wrench to grip the mating part of transmission gearshift shaft and ARC gearshift shaft, rotate it counterclockwise (top view) by about 22° to realize manual unlock.



CAUTION: (1) If parking brake fails, fix the tire with wedge blocks when unlocking from P position to prevent roll-away.

(2) When ARC internal resistance is high, manually unlock forcibly;

(3) When there is no fault in ARC/ACM, powered-on or powered-off operation can make transmission shift to P position.

3.3 Motor System

Table of Contents Page

3.3.1 Motor Controller Assembly

Specifications

General Specifications

Description	Type
Motor controller assembly	2142100-CR01

Torque Specifications

Description	Nm
Mounting bolt M8×25 between motor controller and bracket	20 ± 2 Nm
Motor controller assembly three-phase wire retaining bolt M8×16	20 ± 2 Nm
Motor controller assembly cover plate retaining bolt M6×16	8 ± 1 Nm

System Overview

Operation Introduction

1. The motor controller controls the output torque of motor with vector control.

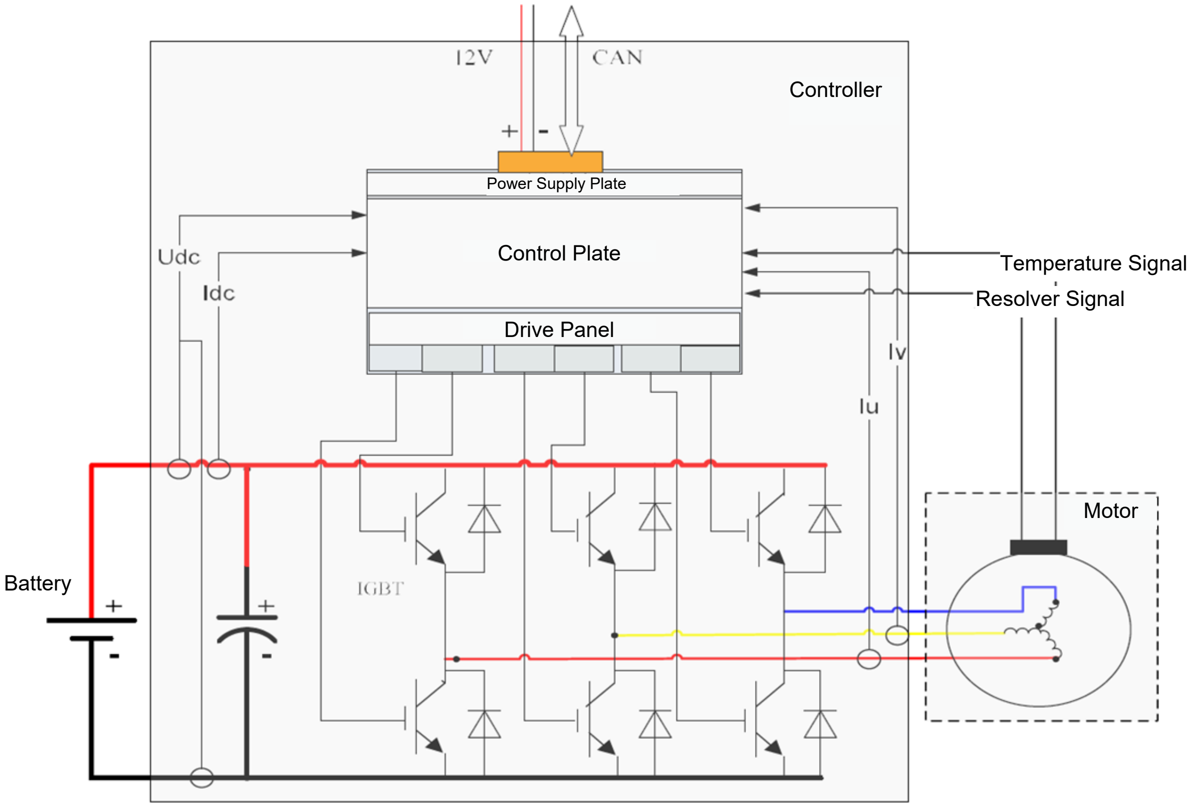


Figure 19 Operation Schematic Diagram of Motor System

Connector Definition

Motor Controller Interface Definition

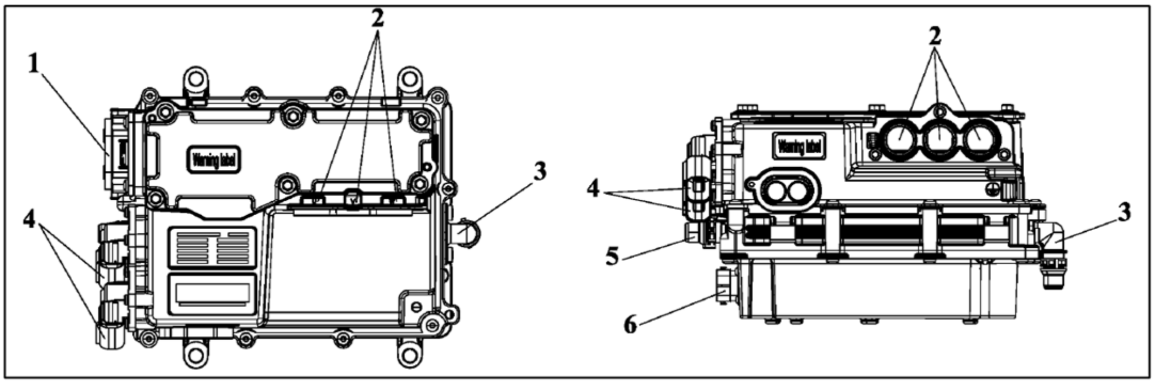


Figure 20 Motor Controller Assembly Structure Details

1. Three-phase power wiring harness interface; 2. DCDC positive output stud; 3. DC bus interface;

4. Cooling water pipe outlet; 5. To electric A/C and PTC high voltage sub wiring harness

6. Motor controller assembly low voltage wiring harness interface; 7. Cooling water pipe inlet.

Low Voltage Connector Interface Definition

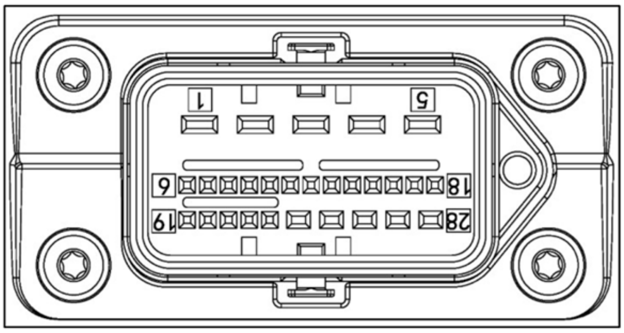


Figure 21 Motor Controller Assembly Low Voltage Connector Pin Schematic Diagram

Signal Description:

Item	Definition	
1	KL30	Low voltage power supply+
2	NA	Low voltage power supply- (grounded by housing)
3	NA	/
4	NA	/
5	KL15	Ignition switch signal
6	SHIELD PIN	Shield ground
7	CANL	Calibration CAN low
8	CANH	Calibration CAN high
9	E_A_NTC0	Motor temperature sensor+
10	M_A_NTC0	Motor temperature sensor-
11	NA	/
12	NA	/
13	NA	/
14	NA	/
15	E_S_PLTIN	High voltage interlock signal input
16	A_S_PLTOUT	High voltage interlock signal output
17	CANL	Communication CANL
18	CANH	Communication CANH
19	NA	/
20	NA	/
21	Resolver SINHI	Resolver sin+
22	Resolver SINLO	Resolver sin-

Item	Definition	
23	Resolver COSHI	Resolver cos+
24	Resolver COSLO	Resolver cos-
25	Resolver ERR_POS	Resolver excitation+
26	Resolver ERR_NEG	Resolver excitation-
27	NA	/
28	NA	/

High Voltage DC Connector Interface Definition

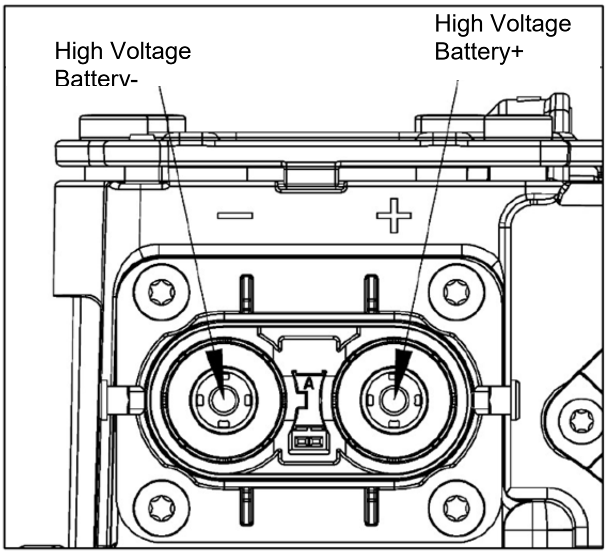


Figure 22 Motor Controller Assembly High Voltage DC Connector Pin Schematic Diagram

Drive Motor Three-phase Connector Interface Definition

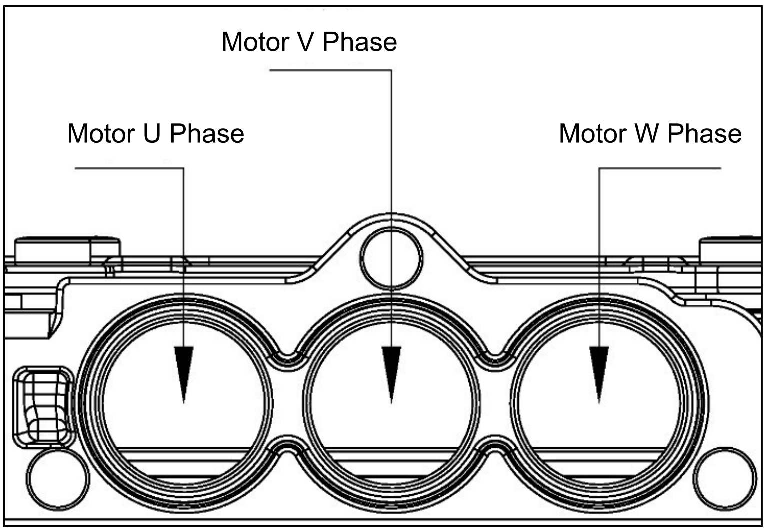


Figure 23 Drive Motor Three-phase Connector
Pin Schematic Diagram

Fault Analysis

When a motor involved or one of motor controller must be replaced, perform motor zero angle self-learning calibration after replacement. Operating method:

1. Check vehicle, then turn the power switch to Keyon
2. Connect the diagnostic tool, turn on diagnostic tool motor self-learning function (it takes 10 s)
3. Self-learning function position: Diagnostic Tool - Motor Controller Assembly PEU - Special Function - Resolver Zero Position Self-Learning
4. After the diagnostic tool prompts that self-learning is successful, disconnect the diagnostic tool, and turn off power supply of vehicle with Keyoff. Wait for 30 seconds and confirm again that vehicle is powered on successfully, indicating that the entire process is completed.

Note: Diagnostic tool zero position learning can be performed successfully once, and multiple operations are unnecessary.

DTC and Troubleshooting Method

DTC: U1C0088

DTC Definition: CAN Bus Off

DTC Reporting Conditions: When vehicle is powered on, times of CAN Bus Off (CAN bus lost) exceed a certain threshold

Possible Fault Causes:

1) Vehicle CAN wiring harness or connector is connected abnormally

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if the vehicle CAN wiring harness and corresponding connector are connected reliably	Yes	Repair wiring harness or connector
		No	Contact manufacturer for help

DTC: U1C0187

DTC Definition: Communication with EMS_2E6 CAN Timeout Fault

DTC Reporting Conditions: When vehicle is powered on, there is no CAN Bus off fault. When KL15 is powered on, EMS_2E6 CAN signal loss is detected for a period of time, a fault is reported.

Possible Fault Causes:

1) EMS is not woke up, connector is detached or damaged

2) CAN signal wiring harness between EMS and PEU is connected abnormally

3) CAN network terminal resistance is abnormal

4) EMS controller is damaged

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Read with diagnostic tool to see if there is any fault in EMS and if other controllers report EMS communication fault	Yes	Go to next step
		No	Perform step 3
2	Refer to the corresponding troubleshooting method of EMS DTC or other controller DTCs	Yes	End
3	Check if CAN signal wiring harness in EMS connector is connected normally (Disconnected/loose/poorly welded, etc.)	Yes	Go to next step
		No	Repair CAN signal wiring harness
4	Check if CAN wiring harness between EMS and PEU is connected normally (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Repair CAN signal wiring harness
5	Check if terminal resistance of CAN wiring harness between EMS and PEU is normal (Standard value is 60 Ω)	Yes	Go to next step
		No	Repair terminal resistor
6	Check if EMS is normal (ABA exchange verification can be performed with normal vehicle)	Yes	Contact manufacturer for help
		No	Repair EMS

DTC: U1C0287

DTC Definition: Communication with GW_324 CAN Timeout Fault

DTC Reporting Conditions: When vehicle is powered on, there is no CAN Busoff fault. When KL15 is powered on, GW_324 CAN signal loss is detected for a period of time, a fault is reported.

Possible Fault Causes:

1) GW connector is detached or damaged

2) CAN signal wiring harness between GW and PEU is connected abnormally

3) CAN network terminal resistance is abnormal

4) GW controller is damaged

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Read with diagnostic tool to see if other controllers report GW communication fault	Yes	Go to next step
		No	Perform step 3
2	Refer to the corresponding troubleshooting method of other controller DTCs	Yes	End
3	Check if CAN signal wiring harness in GW connector is connected normally (Disconnected/loose/poorly welded, etc.)	Yes	Go to next step
		No	Repair CAN signal wiring harness
4	Check if CAN wiring harness between GW and PEU is connected normally (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Repair CAN signal wiring harness
5	Check if terminal resistance of CAN wiring harness between GW and PEU is normal (Standard value is 60 Ω)	Yes	Go to next step
		No	Repair terminal resistor
6	(ABA exchange verification can be performed with normal vehicle)	Yes	Contact manufacturer for help
		No	Repair GW

DTC: U1C0383

DTC Definition: PCU_131 Frame Checksum Error

DTC Reporting Conditions: When vehicle is powered on, there is no CAN Bus off fault. When KL15 is powered on, PCU_131 frame checksum error is detected for a period of time, a fault is reported.

Possible Fault Causes:

1) PCU signal is abnormal or controller is damaged

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Read with diagnostic tool to see if there is any fault in PCU and if other controllers report PCU communication fault	Yes	Go to next step
		No	Perform step 3
2	Refer to the corresponding troubleshooting method of other controller DTCs	Yes	End
3	Check if PCU is normal (ABA exchange verification can be performed with normal vehicle)	Yes	Contact manufacturer for help
		No	Repair PCU

DTC: U1C0482

DTC Definition: PCU_131 Frame Rollingcounter Error

DTC Reporting Conditions: When vehicle is powered on, there is no CAN Bus off fault. When KL15 is powered on, PCU_131 frame rollingcounter error is detected for a period of time, a fault is reported.

Possible Fault Causes:

2) PCU signal is abnormal or controller is damaged

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Read with diagnostic tool to see if there is any fault in PCU and if other controllers report PCU communication fault	Yes	Go to next step
		No	Perform step 3
2	Refer to the corresponding troubleshooting method of other controller DTCs	Yes	End
3	Check if PCU is normal (ABA exchange verification can be performed with normal vehicle)	Yes	Contact manufacturer for help
		No	Repair PCU

DTC: U1C0508

DTC Definition: PCU Node Missing

DTC Reporting Conditions: When vehicle is powered on, there is no CAN Bus off fault. When KL15 is powered on, PCU signal loss is detected for a period of time, a fault is reported.

Possible Fault Causes:

1) PCU is not woke up, connector is detached or damaged

2) CAN signal wiring harness between PCU and PEU is connected abnormally

3) CAN network terminal resistance is abnormal

4) PCU controller is damaged

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Read with diagnostic tool to see if there is any fault in PCU and if other controllers report PCU node missing fault	Yes	Go to next step
		No	Perform step 3
2	Refer to the corresponding troubleshooting method of other controller DTCs	Yes	End
3	Check if CAN signal wiring harness in PCU connector is connected normally (Disconnected/loose/poorly welded, etc.)	Yes	Go to next step
		No	Repair CAN signal wiring harness
4	Check if CAN wiring harness between PCU and PEU is connected normally (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Repair CAN signal wiring harness
5	Check if terminal resistance of CAN wiring harness between PCU and PEU is normal (Standard value is 60 Ω)	Yes	Go to next step
		No	Repair terminal resistor
6	Check if PCU is normal (ABA exchange verification can be performed with normal vehicle)	Yes	Contact manufacturer for help
		No	Repair PCU

DTC: U1C0687

DTC Definition: Communication with PCU_131 CAN Timeout Fault

DTC Reporting Conditions: When vehicle is powered on, there is no CAN Bus off fault. When KL15 is powered on, PCU_131 CAN signal loss is detected for a period of time, a fault is reported.

Possible Fault Causes:

1) PCU is not woke up, connector is detached or damaged

2) CAN signal wiring harness between PCU and PEU is connected abnormally

3) CAN network terminal resistance is abnormal

4) PCU controller is damaged

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Read with diagnostic tool to see if there is any fault in PCU and if other controllers report PCU communication fault	Yes	Go to next step
		No	Perform step 3
2	Refer to the corresponding troubleshooting method of PCU DTC or other controller DTCs	Yes	End
3	Check if CAN signal wiring harness in PCU connector is connected normally (Disconnected/loose/poorly welded, etc.)	Yes	Go to next step
		No	Repair CAN signal wiring harness
4	Check if CAN wiring harness between PCU and PEU is connected normally (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Repair CAN signal wiring harness
5	Check if terminal resistance of CAN wiring harness between PCU and PEU is normal (Standard value is 60 Ω)	Yes	Go to next step
		No	Repair terminal resistor
6	Check if PCU is normal (ABA exchange verification can be performed with normal vehicle)	Yes	Contact manufacturer for help
		No	Repair PCU

DTC: U1C0787

DTC Definition: Communication with TCU_338 CAN Timeout Fault

DTC Reporting Conditions: When vehicle is powered on, there is no CAN Bus off fault. When KL15 is powered on, TCU_338 CAN signal loss is detected for a period of time, a fault is reported.

Possible Fault Causes:

1) TCU is not woke up, connector is detached or damaged

2) CAN signal wiring harness between TCU and PEU is connected abnormally

3) CAN network terminal resistance is abnormal

4) TCU controller is damaged

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Read with diagnostic tool to see if there is any fault in TCU and if other controllers report TCU communication fault	Yes	Go to next step
		No	Perform step 3
2	Refer to the corresponding troubleshooting method of TCU DTC or other controller DTCs	Yes	End
3	Check if CAN signal wiring harness in TCU connector is connected normally (Disconnected/loose/poorly welded, etc.)	Yes	Go to next step
		No	Repair CAN signal wiring harness
4	Check if CAN wiring harness between TCU and PEU is connected normally (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Repair CAN signal wiring harness
5	Check if terminal resistance of CAN wiring harness between TCU and PEU is normal (Standard value is 60 Ω)	Yes	Go to next step
		No	Repair terminal resistor
6	Check if TCU is normal (ABA exchange verification can be performed with normal vehicle)	Yes	Contact manufacturer for help
		No	Repair TCU

DTC: U1C0817

DTC Definition: Low Voltage Battery Power Supply Voltage High

DTC Reporting Conditions: When vehicle is powered on, PEU system operating voltage is higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Low voltage battery is abnormal

2) Measured value of PEU voltage is abnormal

3) DCDC fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	When vehicle is powered off in low voltage condition, check if low voltage battery voltage is normal with a multimeter (Normal low voltage battery voltage is lower than 16 V)	Yes	Go to next step
		No	Replace low voltage battery
2	Read PEU voltage data flow with diagnostic tool to see if it is consistent with the voltage read by multimeter	Yes	Go to next step
		No	Check PEU or contact manufacturer
3	Check if DCDC output voltage is higher than 16 V	Yes	Repair DCDC
		No	Contact manufacturer for help

DTC: U1C0916

DTC Definition: Low Voltage Battery Power Supply Voltage Low

DTC Reporting Conditions: When vehicle is powered on, PEU system operating voltage is lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Low voltage battery is abnormal

2) Measured value of PEU voltage is abnormal

3) PEU low voltage wiring harness is connected abnormally

4) DCDC fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	When vehicle is powered off in low voltage condition, check if low voltage battery voltage is normal with a multimeter (Normal low voltage battery voltage is not lower than 9 V)	Yes	Go to next step
		No	Replace low voltage battery
2	Read PEU voltage data flow with diagnostic tool to see if it is consistent with the voltage read by multimeter	Yes	Go to next step
		No	Check PEU or contact manufacturer
3	Check if PEU low voltage wiring harness is connected normally (Open/short to ground in wiring harness)	Yes	Go to next step
		No	Repair wiring harness
4	Check if DCDC operates normally	Yes	Contact manufacturer for help
		No	Repair DCDC

DTC: P198200

DTC Definition: Current Control Unreasonable Fault

DTC Reporting Conditions: When vehicle is powered on, PEU voltage vector amplitude error exceeds threshold value, or current vector amplitude error exceeds threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor or motor controller ground wire and shielded wire are abnormal

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if motor and PEU ground and shielded wiring harnesses are connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198362

DTC Definition: U Phrase Current Amplitude Unreasonable Fault

DTC Reporting Conditions: When vehicle is powered on and motor runs, the three-phase current amplitude difference should be close to 0 in theory during normal operation of the motor. When the difference between the U phase current and the other two-phase current is greater than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor runs abnormally

2) Three-phase wire U phase is connected abnormally

3) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire U phase between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Inspect if motor operates normally	Yes	Go to next step
		No	Repair motor
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198364

DTC Definition: U Phrase Current Center Line Offset Unreasonable Fault

DTC Reporting Conditions: When vehicle is powered on and motor runs, the three-phase current offset should be close to 0 in theory during normal operation of the motor. When detecting that U phase current offset is greater than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor runs abnormally

2) Three-phase wire U phase is connected abnormally

3) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire U phase between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Inspect if motor operates normally	Yes	Go to next step
		No	Repair motor
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198462

DTC Definition: V Phrase Current Amplitude Unreasonable Fault

DTC Reporting Conditions: When vehicle is powered on and motor runs, the three-phase current amplitude difference should be close to 0 in theory during normal operation of the motor. When the difference between the V phase current and the other two-phase current is greater than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor runs abnormally

2) Three-phase wire V phase is connected abnormally

3) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire V phase between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Inspect if motor operates normally	Yes	Go to next step
		No	Repair motor
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198464

DTC Definition: V Phrase Current Center Line Offset Unreasonable Fault

DTC Reporting Conditions: When vehicle is powered on and motor runs, the three-phase current offset should be close to 0 in theory during normal operation of the motor. When detecting that V phase current offset is greater than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor runs abnormally

2) Three-phase wire V phase is connected abnormally

3) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire V phase between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Inspect if motor operates normally	Yes	Go to next step
		No	Repair motor
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198562

DTC Definition: W Phrase Current Amplitude Unreasonable Fault

DTC Reporting Conditions: When vehicle is powered on and motor runs, the three-phase current amplitude difference should be close to 0 in theory during normal operation of the motor. When the difference between the W phase current and the other two-phase current is greater than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor runs abnormally

2) Three-phase wire W phase is connected abnormally

3) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire W phase between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Inspect if motor operates normally	Yes	Go to next step
		No	Repair motor
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198564

DTC Definition: W Phrase Current Center Line Offset Unreasonable Fault

DTC Reporting Conditions: When vehicle is powered on and motor runs, the three-phase current offset should be close to 0 in theory during normal operation of the motor. When detecting that W phase current offset is greater than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor runs abnormally

2) Three-phase wire W phase is connected abnormally

3) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire W phase between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Inspect if motor operates normally	Yes	Go to next step
		No	Repair motor
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198600

DTC Definition: Motor Overspeed Fault

DTC Reporting Conditions: When vehicle is powered on and motor runs, when detecting that motor speed absolute value exceeds the maximum speed, a fault is reported

Possible Fault Causes:

1) Motor runs abnormally

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Inspect if motor operates normally (Normal vehicle motor speed should not be more than 7300 rpm)	Yes	Go to next step
		No	Repair motor
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198713

DTC Definition: At Least Two-phase Wiring Harnesses Open Fault

DTC Reporting Conditions: When vehicle is powered on and test pulses are applied twice and the phase current is less than threshold during the stator winding open circuit detection process, a fault is reported

Possible Fault Causes:

1) Three-phase wire is connected abnormally

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198800

DTC Definition: Open Circuit Pulse Test Process Failure

DTC Reporting Conditions: When vehicle is powered on and the motor enters pulse test mode, a fault is reported when (1) waiting for zero current timeout in FreeWheeling (idling) condition, (2) the bus voltage drops below the minimum threshold, or (3) the deviation between the stored rotor angle and the actual angle exceeds the maximum threshold

Possible Fault Causes:

1) Three-phase wire is connected abnormally

2) DC bus is connected abnormally

3) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Check if DC bus between power battery and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198913

DTC Definition: U Phase Wiring Harness Open Fault

DTC Reporting Conditions: When vehicle is powered on and the test pulse is applied for first time and U phase current is less than threshold during the stator winding open circuit detection process, U phase is considered to be open and a fault is reported

Possible Fault Causes:

1) Three-phase wire U phase is connected abnormally

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire U phase between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198A13

DTC Definition: V Phase Wiring Harness Open Fault

DTC Reporting Conditions: When vehicle is powered on and the test pulse is applied for the second time and V phase current is less than threshold during the stator winding open circuit detection process, V phase is considered to be open and a fault is reported

Possible Fault Causes:

1) Three-phase wire V phase is connected abnormally

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire V phase between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198B13

DTC Definition: W Phase Wiring Harness Open Fault

DTC Reporting Conditions: When vehicle is powered on and the test pulse is applied for the third time and W phase current is less than threshold during the stator winding open circuit detection process, W phase is considered to be open and a fault is reported

Possible Fault Causes:

1) Three-phase wire W phase is connected abnormally

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if three-phase wire W phase between motor and PEU is connected normally	Yes	Go to next step
		No	Repair wiring harness
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198C00

DTC Definition: Angle Calibration Acceleration Timeout Fault

DTC Reporting Conditions: When calibrating motor zero position angle, the time when the motor accelerates to the threshold frequency exceeds threshold, a fault is reported

Possible Fault Causes:

1) Motor runs abnormally

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if motor can idle freely completely	Yes	Go to next step
		No	Repair motor
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC:P198C04

DTC Definition: Angle Calibration Dwell Timeout Fault

DTC Reporting Conditions:When calibrating motor zero position angle, the motor calibration dwell time exceeds threshold, a fault is reported

Possible Fault Causes:

1) Motor resolver signal and phase order are abnormal

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if motor resolver signal and phase order are normal	Yes	Go to next step
		No	Repair motor resolver
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC:P198D04

DTC Definition: Calibration Angle Status Invalid Fault

DTC Reporting Conditions: When the system does not detect motor zero position calibration angle, a fault is reported

Possible Fault Causes:

1) Angle is not calibrated after replacement of motor or PEU

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if motor angle calibration/zero position learning is correct after replacement of motor or PEU	Yes	Go to next step
		No	Perform motor zero position learning with diagnostic tool
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC:P198E04

DTC Definition: Active Discharge Timeout Fault

DTC Reporting Conditions: In the discharge status, if the high voltage exceeds threshold within the specified time, a fault is reported

Possible Fault Causes:

1) Relay is closed abnormally

2) PEU fault

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if power battery relay can be closed correctly	Yes	Go to next step
		No	Repair relay
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19901B

DTC Definition: Power Module U Phase Temperature Too High

DTC Reporting Conditions: When vehicle is powered on, temperature of power module U phase is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Cooling system is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if cooling system of vehicle, PEU inlet and outlet pipes are normal	Yes	Go to next step
		No	Repair cooling system
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19911B

DTC Definition: Power Module V Phase Temperature Too High

DTC Reporting Conditions: When vehicle is powered on, temperature of power module V phase is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Cooling system is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if cooling system of vehicle, PEU inlet and outlet pipes are normal	Yes	Go to next step
		No	Repair cooling system
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19921B

DTC Definition: Power Module W Phase Temperature Too High

DTC Reporting Conditions: When vehicle is powered on, temperature of power module W phase is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Cooling system is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if cooling system of vehicle, PEU inlet and outlet pipes are normal	Yes	Go to next step
		No	Repair cooling system
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19931C

DTC Definition: Bus Voltage Too High

DTC Reporting Conditions: When vehicle is powered on, voltage of bus is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Power battery voltage is abnormal.
2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if power battery voltage is normal	Yes	Go to next step
		No	Repair power battery
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P199800

DTC Definition: High Voltage Power ON without Pre-charging Fault

DTC Reporting Conditions: When vehicle is powered on, changes of high voltage before and after powering on is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Pre-charging relay is abnormal.
2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if pre-charging relay is normal	Yes	Go to next step
		No	Repair pre-charging relay
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B300

DTC Definition: Resolver Sin/Cos Signal Amplitude Too Large

DTC Reporting Conditions: When vehicle is powered on, large sin/cos amplitude is detected for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B321

DTC Definition: Resolver Sin/Cos Signal Amplitude Lower Than Threshold Value

DTC Reporting Conditions: When vehicle is powered on, sin/cos amplitude is detected to be lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B322

DTC Definition: Resolver Sin/Cos Signal Amplitude Higher Than Threshold Value

DTC Reporting Conditions: When vehicle is powered on, sin/cos amplitude is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B416

DTC Definition: Resolver Cos Signal Voltage Too Low

DTC Reporting Conditions: When vehicle is powered on, cos signal is detected to be lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B412

DTC Definition: Resolver Cos Signal Short to Battery

DTC Reporting Conditions: When vehicle is powered on, cos signal is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B511

DTC Definition: Resolver Cos Signal Short to Ground

DTC Reporting Conditions: When vehicle is powered on, cos signal is detected to be lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B417

DTC Definition: Resolver Cos Signal Voltage Too High

DTC Reporting Conditions: When vehicle is powered on, cos signal is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B606

DTC Definition: Excessive Change in Resolver Angle

DTC Reporting Conditions: When vehicle is powered on, excessive change is detected in resolver angle for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B725

DTC Definition: Resolver Exc Signal Distorted

DTC Reporting Conditions: When vehicle is powered on, resolver Exc signal distortion is detected by comparing excitation signal and reference signal for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.

2) Resolver wiring harness is not connected normally.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P198B1C

DTC Definition: Resolver Exc Signal Voltage Too Low

DTC Reporting Conditions: When vehicle is powered on, Exc signal is detected to be lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.

2) Resolver wiring harness is not connected normally.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19B915

DTC Definition: Resolver Exc Signal Short to Battery

DTC Reporting Conditions: When vehicle is powered on, Exc signal offset value is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.

2) Resolver wiring harness is not connected normally.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19BA14

DTC Definition: Resolver Exc Signal Short to Ground

DTC Reporting Conditions: When vehicle is powered on, Exc signal offset value is detected to be lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.

2) Resolver wiring harness is not connected normally.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19BB01

DTC Definition: Resolver Exc Signal Voltage Too High

DTC Reporting Conditions: When vehicle is powered on, Exc signal is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.

2) Resolver wiring harness is not connected normally.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19BC28

DTC Definition: Signal Amplitude After Resolver Compensation Too High

DTC Reporting Conditions: When vehicle is powered on, signal amplitude after resolver compensation is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.

2) Resolver wiring harness is not connected normally.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19BD18

DTC Definition: Resolver Sin Signal Voltage Too Low

DTC Reporting Conditions: When vehicle is powered on, resolver Sin signal is detected to be lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.

2) Resolver wiring harness is not connected normally.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19BE1B

DTC Definition: Resolver Sin Signal Short to Battery

DTC Reporting Conditions: When vehicle is powered on, resolver Sin signal is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19BF1A

DTC Definition: Resolver Sin Signal Short to Ground

DTC Reporting Conditions: When vehicle is powered on, resolver Sin signal is detected to be lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19BD19

DTC Definition: Resolver Sin Signal Voltage Too High

DTC Reporting Conditions: When vehicle is powered on, resolver Sin signal is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Resolver is abnormal.
2) Resolver wiring harness is not connected normally.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if resolver is normal	Yes	Go to next step
		No	Repair resolver
2	Check if resolver wiring harness and its connection are normal	Yes	Go to next step
		No	Repair resolver wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19C317

DTC Definition: E-Fuse Terminal KL30 Voltage Too High

DTC Reporting Conditions: When vehicle is powered on, KL30 voltage of PEU E-fuse terminal (electronic fuse, not real fuse inside PEU cover plate) is detected to be higher than a certain threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) KL30 voltage of vehicle is abnormal.
2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if voltage of vehicle's low voltage battery is normal	Yes	Go to next step
		No	Repair low voltage battery
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19C416

DTC Definition: E-Fuse Terminal KL30 Voltage Too Low

DTC Reporting Conditions: When vehicle is powered on, KL30 voltage of PEU E-fuse terminal (electronic fuse, not real fuse inside PEU cover plate) is detected to be lower than a certain threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) KL30 voltage of vehicle is abnormal.

2) PEU low voltage wiring harness or its connection is abnormal.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if voltage of vehicle's low voltage battery is normal	Yes	Go to next step
		No	Repair low voltage battery
2	Check if PEU low voltage wiring harness and its connection are normal	Yes	Go to next step
		No	Repair wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19C517

DTC Definition: CY327 Terminal KL30 Voltage Too High

DTC Reporting Conditions: When vehicle is powered on, KL30 voltage of PEU CY327 terminal (power supply chip position on control plate) is detected to be higher than a certain threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) KL30 voltage of vehicle is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if voltage of vehicle's low voltage battery is normal	Yes	Go to next step
		No	Repair low voltage battery
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19C516

DTC Definition: CY327 Terminal KL30 Voltage Too Low

DTC Reporting Conditions: When vehicle is powered on, KL30 voltage of PEU CY327 terminal (power supply chip position on control plate) is detected to be lower than a certain threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) KL30 voltage of vehicle is abnormal.

2) PEU low voltage wiring harness or its connection is abnormal.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if voltage of vehicle's low voltage battery is normal	Yes	Go to next step
		No	Repair low voltage battery
2	Check if PEU low voltage wiring harness and its connection are normal	Yes	Go to next step
		No	Repair wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19C617

DTC Definition: UT30 Circuit Sensor Voltage Too High

DTC Reporting Conditions: When vehicle is powered on, voltage of PEU UT30 (pin 1 position of low voltage connector) is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) KL30 voltage of vehicle is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if voltage of vehicle's low voltage battery is normal	Yes	Go to next step
		No	Repair low voltage battery
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19C616

DTC Definition: UT30 Circuit Sensor Voltage Too Low

DTC Reporting Conditions: When vehicle is powered on, voltage of PEU UT30 (pin 1 position of low voltage connector) is detected to be lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) KL30 voltage of vehicle is abnormal.

2) PEU low voltage wiring harness or its connection is abnormal.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if voltage of vehicle's low voltage battery is normal	Yes	Go to next step
		No	Repair low voltage battery
2	Check if PEU low voltage wiring harness and its connection are normal	Yes	Go to next step
		No	Repair wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19CD00

DTC Definition: Target Operating State Received by CAN Out of Defined Range

DTC Reporting Conditions: When vehicle is powered on, target operating state received by PEU is detected to be out of the defined range for a period of time, a fault is reported.

Possible Fault Causes:

1) The working mode sent by PCU is abnormal.

2) CAN communication wiring harness or its connection between PCU and PEU is abnormal.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if working mode sent by PCU is normal	Yes	Go to next step
		No	Repair PCU
2	Check if CAN communication wiring harness and its connection between PCU and PEU are normal	Yes	Go to next step
		No	Repair wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19CE1B

DTC Definition: 1st NTC Circuit Temperature Too High

DTC Reporting Conditions: When vehicle is powered on, temperature value of motor stator is detected to be higher than a certain threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Cooling system of vehicle is abnormal.

2) Motor NTC circuit or wiring harness or its connection is abnormal.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if cooling system of vehicle operates normally	Yes	Go to next step
		No	Repair cooling system
2	Check if motor NTC circuit or wiring harness or its connection is normal	Yes	Go to next step
		No	Repair NTC circuit or wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19CE1A

DTC Definition: 1st NTC Circuit Temperature Too Low

DTC Reporting Conditions: When vehicle is powered on, temperature value of motor stator is detected to be lower than a certain threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor NTC circuit or wiring harness or its connection is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if motor NTC circuit or wiring harness or its connection is normal	Yes	Go to next step
		No	Repair NTC circuit or wiring harness
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19CF12

DTC Definition: Stator NTC Short to Battery

DTC Reporting Conditions: When vehicle is powered on, temperature AD value of motor stator is detected to be higher than a certain threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor NTC circuit or wiring harness or its connection is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if motor NTC circuit or wiring harness or its connection is normal	Yes	Go to next step
		No	Repair NTC circuit or wiring harness
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19D011

DTC Definition: Stator NTC Short to Ground

DTC Reporting Conditions: When vehicle is powered on, temperature AD value of motor stator is detected to be lower than a certain threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Motor NTC circuit or wiring harness or its connection is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if motor NTC circuit or wiring harness or its connection is normal	Yes	Go to next step
		No	Repair NTC circuit or wiring harness
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19D190

DTC Definition: 1st NTC Circuit Temperature Unreasonable Before and After Switching

DTC Reporting Conditions: When vehicle is powered on, excessive temperature deviation is detected as temperature of motor stator changes, a fault is reported.

Possible Fault Causes:

1) Motor NTC circuit or wiring harness or its connection is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if motor NTC circuit or wiring harness or its connection is normal	Yes	Go to next step
		No	Repair NTC circuit or wiring harness
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19D21E

DTC Definition: Stator Over Temperature Fault

DTC Reporting Conditions: When vehicle is powered on, temperature of motor stator is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Cooling system of vehicle is abnormal.

2) Motor NTC circuit or wiring harness or its connection is abnormal.

3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if cooling system of vehicle operates normally	Yes	Go to next step
		No	Repair cooling system
2	Check if motor NTC circuit or wiring harness or its connection is normal	Yes	Go to next step
		No	Repair NTC circuit or wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19D398

DTC Definition: Coolant Over Temperature Fault

DTC Reporting Conditions: When vehicle is powered on, PEU coolant temperature is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Cooling system of vehicle is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if cooling system of vehicle operates normally	Yes	Go to next step
		No	Repair cooling system
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19D498

DTC Definition: IGBT-Dde Observed Over Temperature Fault

DTC Reporting Conditions: When vehicle is powered on, observed temperature of PEU power module is detected to be higher than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) Cooling system of vehicle is abnormal.

2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if cooling system of vehicle operates normally	Yes	Go to next step
		No	Repair cooling system
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19D500

DTC Definition: Motor Over Temperature Limit Power Indication

DTC Reporting Conditions: When vehicle is powered on, motor over temperature limit power is detected for a period of time, a fault is reported.

Possible Fault Causes:

1) Cooling system of vehicle is abnormal.
2) Motor is faulty.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if cooling system of vehicle operates normally	Yes	Go to next step
		No	Repair cooling system
2	Check if motor operates normally	Yes	Go to next step
		No	Repair motor
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19D600

DTC Definition: Inverter Over Temperature Limit Power Indication

DTC Reporting Conditions: When vehicle is powered on, PEU over temperature limit power is detected for a period of time, a fault is reported.

Possible Fault Causes:

1) Cooling system of vehicle is abnormal.
2) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if cooling system of vehicle operates normally	Yes	Go to next step
		No	Repair cooling system
2	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

DTC: P19DB00

DTC Definition: Bus Voltage Too Low in Trq Mode

DTC Reporting Conditions: When vehicle is powered on, bus voltage in PEU torque mode is detected to be lower than threshold value for a period of time, a fault is reported.

Possible Fault Causes:

1) High voltage output from power battery is abnormal.
2) Bus wiring harness or its connection between power battery and PEU is abnormal.
3) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if high voltage output from power battery is normal	Yes	Go to next step
		No	Repair power battery
2	Check if bus wiring harness or its connection between power battery and PEU is normal	Yes	Go to next step
		No	Repair wiring harness
3	Check if PEU operates normally	Yes	Contact manufacturer for help
		No	Repair PEU

Other DTCs:

Item	DTC	DTC Definition	Possible Fault Causes	Operation Steps
1	P198042	EEP Read Failure	Motor controller (PEU) internal fault	Check if fault disappears after ABA exchange of motor controller with normal vehicle, or contact manufacturer for help
2	P198142	EEP Writing Failure		
3	P198F80	HVMCU UART Interface Overflow Error		
4	P198F81	HVMCU UART Checksum Error		
5	P198F82	HVMCU UART Line Interference Error		
6	P198F83	HVMCU UART Counter Error		
7	P198F84	HVMCU UART Information Reading Timeout Error		
8	P198F85	HVMCU and LVMCU UART Synchronization Error		
9	P198F86	LVMCU UART Checksum Error		
10	P198F87	LVMCU UART Counter Error		
11	P198F09	HVMCU and LVMCU Clock Scale Factor Error		
12	P198F17	HVMCU External Reference Voltage Overvoltage		
13	P198F16	HVMCU External Reference Voltage Undervoltage		
14	P198F88	DMA Bus Counter Error		
15	P198F89	DMA Target Address Error		
16	P198F8A	DMA Peripheral Fault Counter Error		
17	P198F8B	DMA Source Address Error		
18	P198F8C	LVMCU UART Interface Overflow Error		

19	P198F8D	DMA Bus Timestamp Error		
20	P198F8E	DMA Timestamp Target Address Error		
21	P198F8F	DMA Peripheral Timestamp Source Address Error		
22	P198F00	DMA Timestamp Source Address Error		
23	P198F08	LVMCU UART Information Reading Timeout Error		
24	P198F04	LVMCU UART Sending Interface Overflow Error		
25	P19901A	Power Module U Phase Temperature Too Low		
26	P199006	Excessive Temperature Difference Between Power Module U Phase and Other Two Phases		
27	P19911A	Power Module V Phase Temperature Too Low		
28	P199106	Excessive Temperature Difference Between Power Module V Phase and Other Two Phases		
29	P19921A	Power Module W Phase Temperature Too Low		
30	P199206	Excessive Temperature Difference Between Power Module W Phase and Other Two Phases		
31	P199462	Unreasonable Voltage Difference Between High Voltage Sensor and High Voltage Redundant Sensor		
32	P199317	Redundant Bus Voltage Too High		
33	P199517	15 V Emergency Power Supply Overvoltage Fault		
34	P199516	15 V Emergency Power Supply Undervoltage Fault		
35	P199617	15 V Power Supply Overvoltage Fault		
36	P199616	15 V Power Supply Undervoltage Fault		
37	P199700	Infineon 275 Chip IO Terminal Fault		
38	P199900	CPLD Clock Abnormal		
39	P199A04	Hardware Gate Driver High Side Configuration Error		
40	P199A46	Hardware Gate Driver Low Side Configuration Error		
41	P199A49	GateDd Release Status Reported to Lvmcu Through SPI By Gate Driver Inconsistent with that Reported By CPLD		

42	P199B19	High Side Drive Chip Secondary Side Fault (Fault A)		
43	P199B1C	High Side Drive Chip Primary Side Fault (Rdy)		
44	P199B16	High Side Drive Chip Secondary Side Fault (Fault B)		
45	P199B1D	Low Side Drive Chip Secondary Side Fault (Fault A)		
46	P199B00	Low Side Drive Chip Primary Side Fault (Rdy)		
47	P199B01	Low Side Drive Chip Secondary Side Fault (Fault B)		
48	P199C00	Hardware Shutdown Path Fault		
49	P199D1D	Hardware Overcurrent Fault		
50	P199E00	Hardware Gate Driver Reset Status Error		
51	P199F17	Hardware Overvoltage Fault		
52	P19A044	CPLD Corresponding Version ID Value Error		
53	P19A141	Reading Check Error in Current Sensor Parameters Stored in EEP		
54	P19A219	U Phase Current Too Large		
55	P19A218	U Phase Current Too Small		
56	P19A261	Unreasonable Calibration of U Phase Current Sensor		
57	P19A319	V Phase Current Too Large		
58	P19A318	V Phase Current Too Small		
59	P19A361	Unreasonable Calibration of V Phase Current Sensor		
60	P19A419	W Phase Current Too Large		
61	P19A418	W Phase Current Too Small		
62	P19A461	Unreasonable Calibration of W Phase Current Sensor		
63	P19A51D	Phase Current Software Overcurrent Fault		
64	P19A661	Sum of Three-phase Currents Too Large		
65	P19A764	Unreasonable Power Supply Voltage of Current Sensor		
66	P19A900	Unexpected Torque in Motor		
67	P19AA00	Three-phase Current Sum and Amplitude Check Abnormal		
68	P19AB00	Current Sensor Parameter Check Abnormal		

69	P19AC00	Abnormal Status of EE Storing Current Sensor Parameters		
70	P19AD00	PEU Control Mode Check Abnormal		
71	P19AE00	Motor Rotor Angle Check Abnormal		
72	P19AF00	Motor Speed Check Abnormal		
73	P19B000	PEU DC Terminal Voltage Check Abnormal		
74	P19B100	Motor Torque Rationality Check Abnormal		
75	P19B21C	Status Error in Nerror Pin Monitoring TC275		
76	P19C090	Failing to Disable 30 V Converter		
77	P19C100	Serious Error in E-Fuse Related Events		
78	P19C290	E-Fuse Switching Test Failure		
79	P19C319	E-Fuse Current Too High		
80	P19C318	E-Fuse Current Too Low		
81	P19C300	E-Fuse Operating Power Abnormal		
82	P19CA17	Vdd30 Overvoltage		
83	P19CA16	Vdd30 Undervoltage		
84	P19CB17	VDD5G1 Overvoltage		
85	P19CB16	VDD5G1 Undervoltage		
86	P19CC00	VDD5G2 Overvoltage		
87	P19CC01	VDD5G2 Undervoltage		
88	P19CC22	VDD5G3 Overvoltage		
89	P19CC21	VDD5G3 Undervoltage		
90	P19D704	Drive Circuit Configuration Timeout During Active Discharging		
91	P19D801	Chip Hardware Reset		
92	P19D901	Application Layer Software Request Reset		
93	P19DA01	Under Layer Software Request Reset		
94	P19DC01	Under Layer Software Level3 Detected Abnormality		
95	P19DD08	Hardware Gate Driver Chip Eicesil and LVMCU SPI Error		
96	P19DD83	Parity Error Detected in SPI Communication Between Hardware Gate Driver Chips Eicesil and LVMCU		
97	P19DD00	SPI Hardware Fault Detected by LvMcu		

98	P19DD87	Timeout Fault in SPI Communication Between Hardware Gate Driver and LVMCU		
99	P19DE00	CPLD Allowed Output PWM Hardware Check Fault		
100	P19DF00	SPI Communication Fault Between CPLD and LVMCU		
101	P19E000	Motor Torque Comparison Check Abnormal		
102	P19E100	Abnormal L9788 Operation Detected		
103	P19E200	HVMCU Hardware Version Number Check		
104	P19E300	HVMCU Software Version Number Check		
105	P19E400	PUE Controller Received Message Error		
106	P19A800	Motor Offset Angle Unreasonable		
107	P19C362	E-Fuse Terminal KL30 Voltage Unreasonable		
108	P19C562	CY327 Terminal KL30 Voltage Unreasonable		
109	P19C962	UT30 Voltage Unreasonable		

Removal and Installation

High Voltage, Caution!

Precautions

1. Preparation before removal and installation: Turn the key to "OFF" position, disconnect the negative battery cable, and remove the high voltage connector (Figure 24), then measure the voltage between motor controller HVDC+ and HVDC-. If the voltage is higher than 36 V, leave it for a period of time until the measured voltage is lower than 36 V before proceeding to the next step.

2. During removal and installation, the bolts must be tightened according to the torque requirements specified in removal and installation to ensure the reliability of assembly.

Removal

1) First, prepare for removal and installation according to the precautions, unplug the cooling water pipes (3, 5), and ensure that all connector ports are not immersed in water.

2) Remove the high voltage DC bus connector (1) (this step requires a high voltage safety check) and the high voltage branch wire connector (4).

3) Remove the low voltage connector (6).

4) Remove 6 bolts and motor controller cover plate, and remove 3 bolts from internal three-phase wire.

5) Remove the three-phase wiring harness.

6) Remove retaining bolts between motor controller and mounting bracket.

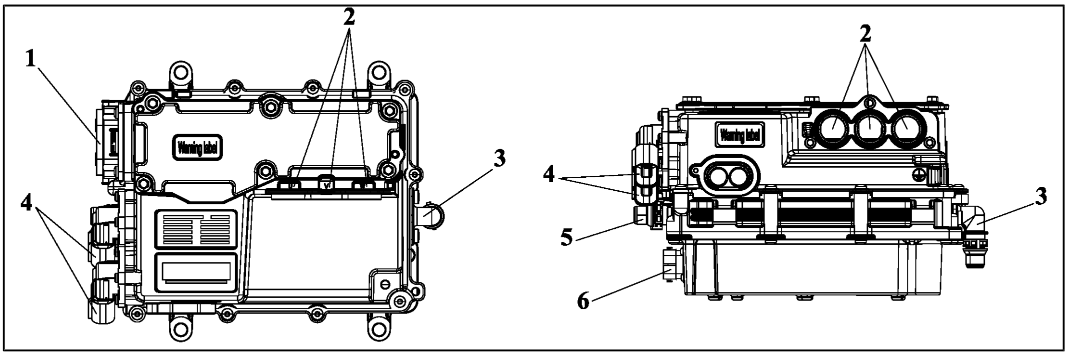
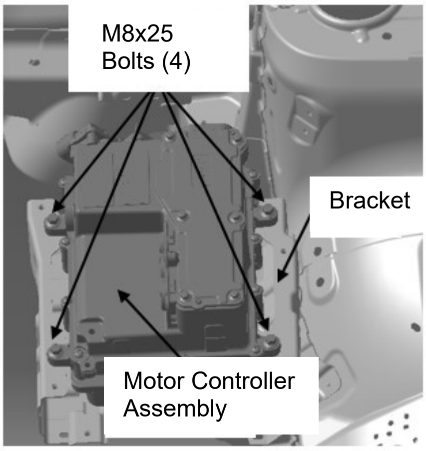
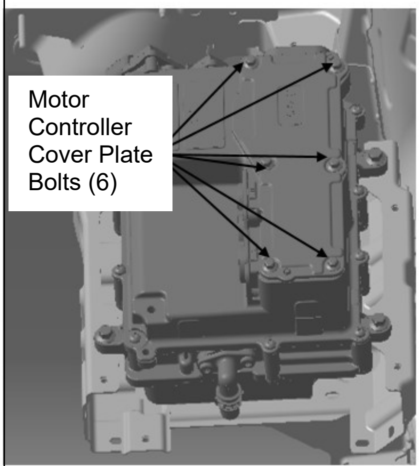
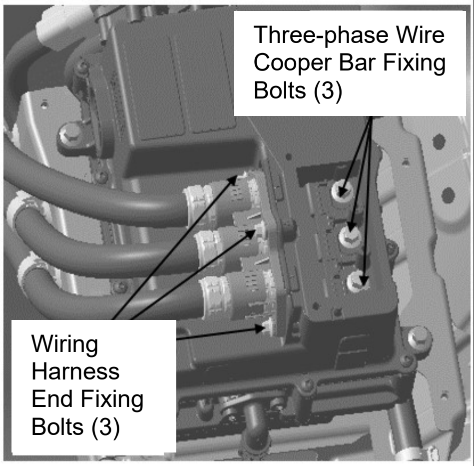


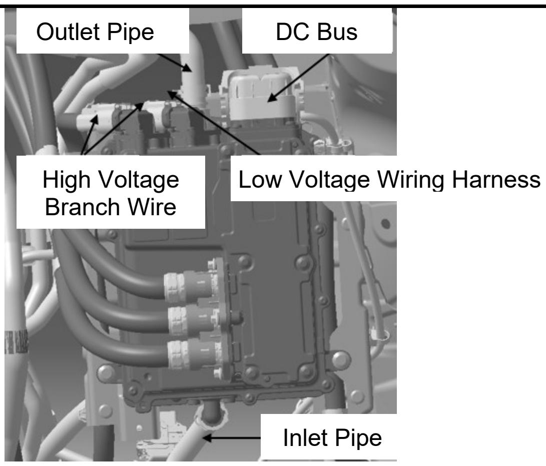
Figure 24 Motor Controller Assembly

1. DC Bus Interface; 2.Three-phase Power Wire Interface; 3. Cooling Water Pipe Inlet; 4. To Electric A/C and PTC High Voltage Branch Wire; 5. Cooling Water Pipe Outlet; 6. Motor Controller Assembly Low Voltage Wiring Harness Interface.

Installation

Installation is in the reverse order of removal, and the basic assembly process is as follows:

Item	Assembly Sequence	Assembly Requirements	Tools/Accessories	Note
1	Motor controller and bracket	 Ⅰ. Precautions for Installation: During the assembly and adjustment, the components should not be bumped, scratched, or damaged; During the entire assembly process, foreign matters such as metal or water are not allowed to enter the interior of connector. Ⅱ. Installation Steps: Steps: Place the motor controller into the corresponding position on the bracket, and screw in 4 M8 bolts with a torque of 20 ± 2 Nm.	Torque wrench	
2	Motor controller and three-phase wire	 Ⅰ. Precautions for Installation: During the assembly and adjustment, the components should not be bumped, scratched, or damaged. During the entire assembly process, foreign matters such as metal or water are not allowed to enter the interior of cover plate and connector. Ⅱ. Installation Steps: Step 1: As shown in figure, remove 6 bolts from motor controller cover plate; Step 2: Install the three-phase wiring harness assembly to the corresponding position, and secure it with 3 M8 bolts and tighten them with a torque of 20 ± 2 Nm; Step 3: Secure 3 bolts on side of the three-phase wiring harness assembly, and refer to the wiring harness assembly part for torque; Step 4: Contrary to step 1, install the motor controller cover plate and secure it with 6 bolts. Torque: 8 ± 1 Nm.	Torque wrench	

3	Motor controller and cooling water pipe, low voltage wiring harness, DC bus, high voltage branch wire	 Ⅰ. Precautions for Installation: During the assembly and adjustment, the components should not be bumped, scratched, or damaged, and ensure that the wiring harness connector and water pipe are installed in place. Ⅱ. Installation Steps: Step 1: Refer to the interface information of motor controller in Figure 24, and connect the low voltage wiring harness, high voltage branch wire, and DC bus into place; Step 2: Align the cooling inlet and outlet pipes with the controller inlet and outlet pipe joints. When a "click" sound is heard, the quick plug water pipe head is connected and locked effectively.		

Special Tools

Tool Name	Usage
Diagnostic tool	Collect operation data during system dynamic operation
Digital multimeter	Check characteristic parameters such as voltage, resistance and current of power system
Insulation gloves	Insulation protection for human body
Insulation tester	Megohm ohmmeter for measuring insulation resistance of various electrical device
Torque wrench	Tighten or remove fasteners (bolts, nuts, etc.)
CAN tool	Collect operation data on CAN bus

3.3.2 Powertrain Control Unit

Specifications

General Specification

Description	Type
Powertrain control unit	2108010-B01

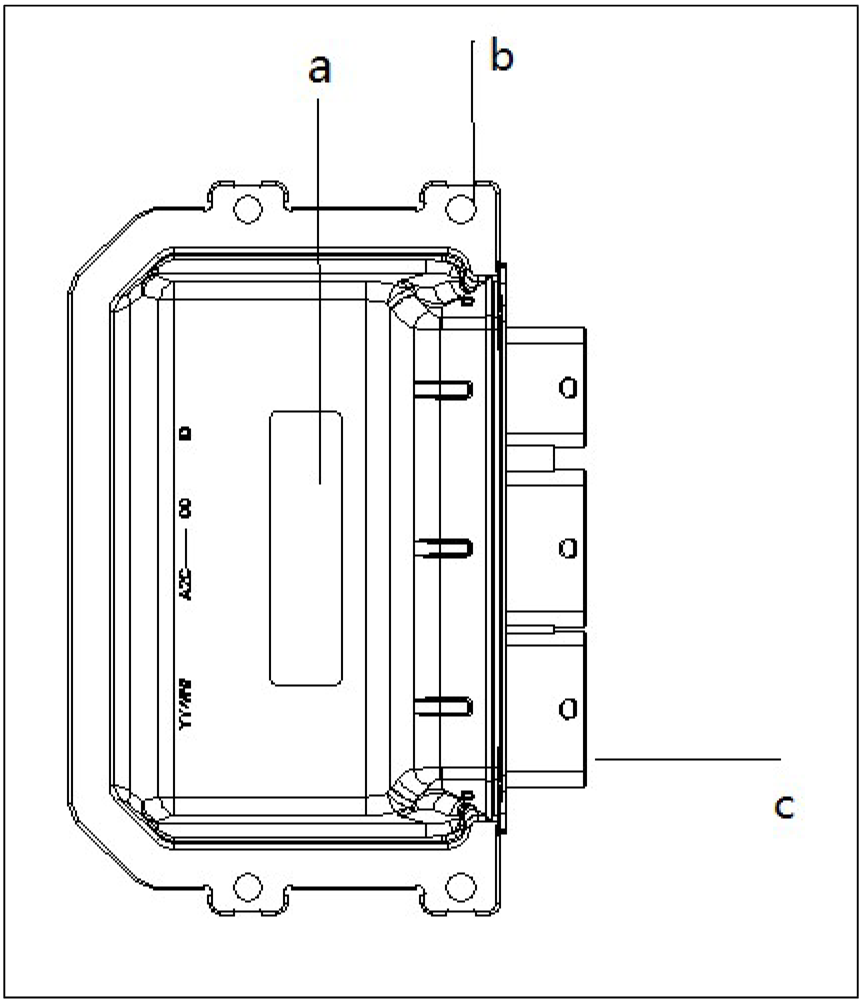
Torque Specification

Description	Torque
Powertrain control unit bracket mounting bolt	10 ± 1 Nm

System Overview

Operation

Powertrain Control Unit (PCU): In the hybrid vehicle control system, it is used to manage the vehicle torque, recovery and optimization control of braking energy and sliding energy, vehicle energy, fault diagnosis and handling, maintenance and communication of CAN network as well as vehicle status monitoring, etc.



Powertrain Control Unit (PCU)

a. PCU label: Displays CHANGAN logo and related software and hardware information.

b. PCU mounting hole: It is used to fix the PCU on mounting bracket.

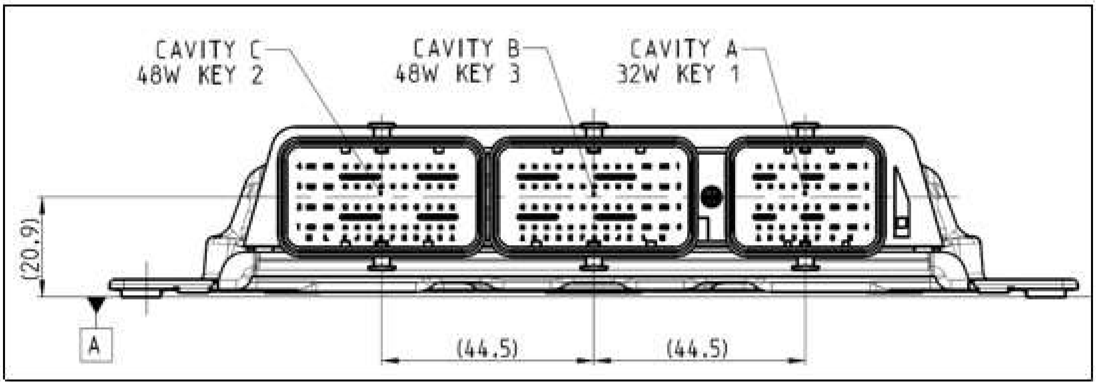
c. PCU connector: It connects with the vehicle wiring harness.

Usage Environment

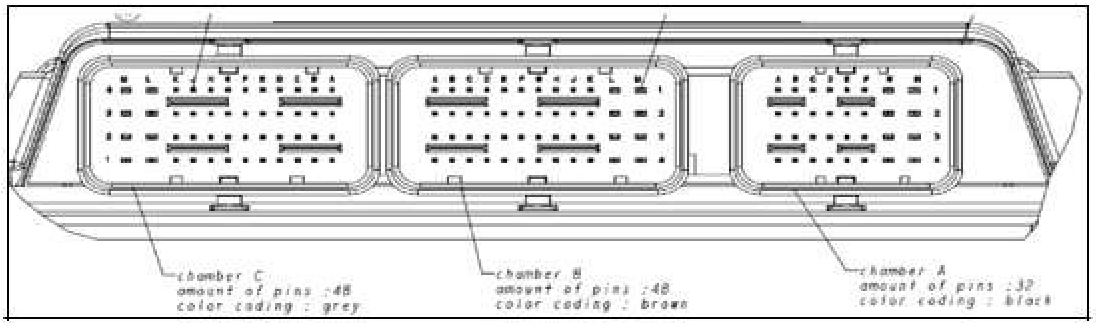
PCU should meet the requirements of this technical condition and be manufactured according to the drawings and technical documents approved by the prescribed procedures:

1) Operating voltage: Nominal voltage is 12 V, rated voltage is 14.0 ± 0.2 V; operating voltage is 9.0 ~ 16.0 V; Static dark current is 2 mA or less, i.e., the current entering the PCU power pin after PCU is shut off completely;
2) PCU metal case must be grounded to the vehicle body;
3) Operating temperature: -30℃ ~ 105℃;
4) Storage environment temperature: -40℃ ~ 120℃;
5) Protection level: IP6K7, IPX9K.

Connector:



Hole positions in end face diagram should correspond to the pins of wire harness end connector



Hole positions in wiring harness end section diagram should correspond to the actual pin of connector

Pin Signal Function Definition

Pin	Function Abbreviation	Imax (A)	Input/ Output
B_C2	Accelerator Pedal Signal 1	1 mA	Input
B_D2	Accelerator Pedal Signal 2	1 mA	Input
B_H1	Rear Axle Motor Clutch Position Signal (PWM)	100 mA	Input
A_B2	DC Quick Charging Seat Temperature Signal 2	10 mA	Input
C_D3	Brake Pedal NO	10 mA	Input

C_E3	Brake Pedal NC	10 mA	Input
C_E4	Crash Signal	10 mA	Input
C_E1	DC Quick Charging Seat Temperature Signal 1	10 mA	Input
B_C1	HVIL IN	10 mA	Input
A_G1	HVIL OUT	4 A	Output
B_B1	PCANH	1 mA	/
B_B2	PCANL	1 mA	/
C_A4	HEVCANH	1 mA	/
C_A3	HEVCANL	1 mA	/
B_A1	EPSCANH	1 mA	/
B_A2	EPSCANL	1 mA	/
C_B4	XCPCANH	1 mA	/
C_B3	XCPCANL	1 mA	/
B_K1	Low Voltage Auxiliary Power Supply+ (A+)	10 mA	Input
C_J3	BCU Wakeup Output	4 A	Output
C_J2	Rear Axle Motor Clutch Electromagnet (HS)	4 A	Output
C_G4	Rear Axle Motor Clutch Electromagnet (LS)	4 A	Output
A_G4	PCU Power Main Relay	1 A	/
B_B4	Accelerator Pedal Pos 1 Power	100 mA	/
C_A2	5V_Sensor	100 mA	
B_A4	Accelerator Pedal Pos 2 Power	100 mA	/
B_L3	PGND_01	15 A	/
B_L4	PGND_02	15 A	/
B_M4	PGND_03	15 A	/
B_C3	Accelerator Pedal Pos 1 GND	100 mA	/
B_D3	Accelerator Pedal Pos 2 GND	100 mA	/
B_H2	Ground_Sensor	100 mA	
C_C2	Ground_Sensor	100 mA	
C_C1	Ground_Sensor	100 mA	
B_L2	VBK	100 mA	Input
B_M1	VBD	3 A	/
B_M2	VBR	15 A	/
B_M3	VBR	15 A	/
B_L1	VBR	15 A	/

DTC Definition and Inspection and Repair Diagnosis Procedure

DTC: P178000

DTC Definition: PCU System Low Voltage Power Supply Overvoltage Error

DTC Reporting Conditions: When key is turned to ON, and the drive power supply voltage is higher than 16 V.

Possible Fault Causes:

1) Lead acid battery is abnormal;

2) PCU drive power supply voltage sampling is abnormal;

3) DCDC is faulty;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	When the vehicle is powered off at low voltage, check if the lead acid battery is normal (Lead acid battery voltage is lower than 16 V)	Yes	Go to next step
		No	Replace lead acid battery
2	Check if the PCU drive power supply voltage in freeze frame data is consistent with the lead acid battery voltage when a malfunction occurs (PCU drive power supply voltage is higher than 16 V and lead acid battery voltage is higher than 15.5 V)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if DCDC operates normally (DCDC output voltage)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P178100

DTC Definition: PCU System Low Voltage Power Supply Undervoltage Error

DTC Reporting Conditions: When key is turned to ON, and the drive power supply voltage is lower than 9 V.

Possible Fault Causes:

1) Drive power supply wiring harness is not connected normally;
2) Drive terminal of drive power supply relay is not connected normally;
3) Drive power supply relay is not closed;
4) DCDC is abnormal and faulty;
5) PCU drive power supply voltage sampling is abnormal;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if drive power supply wiring harness is connected normally (Drive power supply wiring harness is open/short to ground)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if drive wiring harness of drive power supply relay is connected normally (Drive wiring harness of drive relay is open)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if drive power supply relay is normal (The drive relay can be closed)	Yes	Go to next step
		No	Replace drive power supply relay
4	Check if DCDC operates normally (DCDC fault/BMS fault/motor level 4 fault/high voltage interlock fault)	Yes	Go to next step
		No	Perform necessary inspection and repair
5	Check if the PCU drive power supply voltage in freeze frame data is consistent with the lead acid battery voltage when a malfunction occurs (PCU drive power supply voltage is lower than 9 V and lead acid battery voltage is lower than 9.5 V)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P178200

DTC Definition: Drive Power Supply Interface Open

DTC Reporting Conditions: When the drive relay closing request is valid (the system low voltage power-on request is valid), the drive power supply voltage is lower than 3.5 V.

Possible Fault Causes:

1) Drive power supply wiring harness is not connected normally.

2) Drive terminal of drive power supply relay is not connected normally.

3) Drive power supply relay is not closed.

4) PCU drive power supply voltage sampling is abnormal.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if drive power supply interface is connected normally (Drive power supply wiring harness is open/short to ground)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if drive wiring harness of drive power supply relay is connected normally (Drive wiring harness of drive relay is open)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if drive power supply relay is normal (If the drive relay is closed)	Yes	Go to next step
		No	Replace drive power supply relay
4	Check if the PCU drive power supply voltage in freeze frame data is consistent with the lead acid battery voltage when a malfunction occurs (PCU drive power supply voltage is lower than 3.5 V and lead acid battery voltage is lower than 4 V)	Yes	Diagnosis help
		No	Replace PCU

DTC: P178400

DTC Definition: Collision Occurs (Hardwire)

DTC Reporting Conditions: The collision hardwire signal starts timing from 1 to 0 and ends timing from 0 to 1 for time ∈ [190ms, 210ms].

Possible Fault Causes:

1) Collision fault occurs.

2) Collision wiring harness is not connected normally.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if it is normal for collision fault (Real collision fault)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if collision wiring harness is connected normally (Collision wiring harness is in poor contact)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P178500

DTC Definition: Collision Occurs (CAN)

DTC Reporting Conditions: When key is turned to ON, and the collision signal is valid.

Possible Fault Causes:

1) Collision fault occurs.

2) Collision signal is interfered.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if it is normal for collision fault (Real collision fault)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if collision signal (CAN) is normal (If collision signal is sent normally)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P178600

DTC Definition: Collision Signal Short to Ground

DTC Reporting Conditions: When key is turned to ON, and the collision signal maintains at low level continuously.

Possible Fault Causes:

1) Collision signal wiring harness is not connected normally.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if collision signal wiring harness is connected normally (Collision signal wiring harness is short to ground)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P178C00

DTC Definition: 1st Circuit 5 V Power Supply Overvoltage Error

DTC Reporting Conditions: When key is turned to ON, and the 5 V power supply voltage is higher than 5.3 V.

Possible Fault Causes:

1) PCU controller power supply chip is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if 1st circuit 5 V power supply voltage is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P178D00

DTC Definition: 1st Circuit 5 V Power Supply Undervoltage Error

DTC Reporting Conditions: When key is turned to ON, and the 5 V power supply voltage is lower than 4.7 V.

Possible Fault Causes:

1) PCU controller power supply chip etc. is faulty;

2) KL30 voltage is low;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if the voltage of lead acid battery in freeze frame data is normal when a malfunction occurs	Yes	Go to next step
		No	Perform necessary inspection and repair
2	With key turned to ON, check if 1st circuit 5 V power supply voltage is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P178E00

DTC Definition: 2nd Circuit 5 V Power Supply Overvoltage Error

DTC Reporting Conditions: When key is turned to ON, and the 5 V power supply voltage is higher than 5.3 V.

Possible Fault Causes:

1) PCU controller power supply chip etc. is faulty;

2) KL30 voltage is low;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if 1st circuit 5 V power supply voltage is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P178F00

DTC Definition: 2nd Circuit 5 V Power Supply Undervoltage Error

DTC Reporting Conditions: When key is turned to ON, and the 5 V power supply voltage is lower than 4.7 V.

Possible Fault Causes:

1) PCU controller power supply chip etc. is faulty; 2) KL30 voltage is low;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if the voltage of lead acid battery in freeze frame data is normal when a malfunction occurs	Yes	Go to next step
		No	Perform necessary inspection and repair
2	With key turned to ON, check if 1st circuit 5 V power supply voltage is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P179000

DTC Definition: Accelerator Pedal 1 Sensor Overvoltage Error

DTC Reporting Conditions: When key is turned to ON, and the accelerator pedal 1 sensor voltage is higher than 4.876 V.

Possible Fault Causes:

1) 1st circuit 5 V power supply voltage is abnormal; 2) Accelerator pedal 1 sensor voltage wiring harness is not connected normally;

3) Accelerator pedal 1 sensor power supply wiring harness is not connected normally;

4) Parameters of accelerator pedal 1 sensor are abnormal;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if 1st circuit 5 V power supply voltage is normal	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if accelerator pedal 1 sensor voltage wiring harness is connected normally (Short to power supply in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if accelerator pedal 1 sensor power supply wiring harness is connected normally (Short to power supply in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
4	When the accelerator pedal is fully depressed, check if the accelerator pedal 1 sensor resistance meets the design requirements	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P179100

DTC Definition: Accelerator Pedal 1 Sensor Undervoltage Error

DTC Reporting Conditions: When key is turned to ON, and the accelerator pedal 1 sensor voltage is lower than 0.723 V.

Possible Fault Causes:

1) 1st circuit 5 V power supply voltage is abnormal; 2) Accelerator pedal 1 sensor voltage wiring harness is not connected normally;

3) Accelerator pedal 1 sensor power supply wiring harness is not connected normally.

4) Parameters of accelerator pedal 1 sensor are abnormal.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if 1st circuit 5 V power supply voltage is normal	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if accelerator pedal 1 sensor voltage wiring harness is connected normally (Short to ground/open in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if accelerator pedal 1 sensor power supply wiring harness is connected normally (Short to ground/open in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
4	When the accelerator pedal is not depressed, check if the accelerator pedal 1 sensor resistance is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P179200

DTC Definition: Accelerator Pedal 2 Sensor Overvoltage Error

DTC Reporting Conditions: When key is turned to ON, and the accelerator pedal 2 sensor voltage is higher than 2.465 V.

Possible Fault Causes:

1) 2nd circuit 5 V power supply voltage is abnormal; 2) Accelerator pedal 2 sensor voltage wiring harness is not connected normally;

3) Accelerator pedal 2 sensor power supply wiring harness is not connected normally; 4) Parameters of accelerator pedal 2 sensor are abnormal;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if 2nd circuit 5 V power supply voltage is normal	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if accelerator pedal 2 sensor voltage wiring harness is connected normally (Short to power supply in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if accelerator pedal 2 sensor power supply wiring harness is connected normally (Short to power supply in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
4	When the accelerator pedal is fully depressed, check if the accelerator pedal 2 sensor resistance meets the design requirements	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P179300

DTC Definition: Accelerator Pedal 2 Sensor Undervoltage Error

DTC Reporting Conditions: When key is turned to ON, and the accelerator pedal 2 sensor voltage is lower than 0.347 V.

Possible Fault Causes:

1) 2nd circuit 5 V power supply voltage is abnormal; 2) Accelerator pedal 2 sensor voltage wiring harness is not connected normally;

3) Accelerator pedal 2 sensor power supply wiring harness is not connected normally;

4) Parameters of accelerator pedal 2 sensor are abnormal;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if 2nd circuit 5 V power supply voltage is normal	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if accelerator pedal 2 sensor voltage wiring harness is connected normally (Short to ground/open in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if accelerator pedal 2 sensor power supply wiring harness is connected normally (Short to ground/open in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
4	When the accelerator pedal is not depressed, check if the accelerator pedal 2 sensor resistance is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P179400

DTC Definition: High Voltage Interlock Output Signal SCP Error

DTC Reporting Conditions: Key is turned to ON, drive power supply is normal, validity of high voltage interlock output SCP is valid, and high voltage interlock output SCP is valid.

Possible Fault Causes:

1) PEU high voltage interlock interface is abnormal; 2) PTC high voltage interlock interface is abnormal; 3) A/C high voltage interlock interface is abnormal;

4) High voltage interlock wiring harness is abnormal; 5) PCU high voltage interlock interface is abnormal;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU/PEU/PTC/A/C high voltage interlock interface and check if high voltage interlock wiring harness is normal (Short to power supply in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if PCU high voltage interlock interface is normal (Short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if PTC/A/C high voltage interlock interface is normal (Short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
4	Check if PEU high voltage interlock interface is normal (Short to power supply)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P179500

DTC Definition: High Voltage Interlock Output Signal SCG Error

DTC Reporting Conditions: Key is turned to ON, drive power supply is normal, validity of high voltage interlock output SCG is valid, and high voltage interlock output SCG is valid.

Possible Fault Causes:

1) PEU high voltage interlock interface is abnormal; 2) PTC high voltage interlock interface is abnormal; 3) A/C high voltage interlock interface is abnormal;

4) High voltage interlock wiring harness is abnormal; 5) PCU high voltage interlock interface is abnormal;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU/PEU/PTC/A/C high voltage interlock interface and check if high voltage interlock wiring harness is normal (Short to ground in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if PCU high voltage interlock interface is normal (Short to ground)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if PTC/A/C high voltage interlock interface is normal (Short to ground)	Yes	Go to next step
		No	Perform necessary inspection and repair
4	Check if PEU high voltage interlock interface is normal (Short to ground)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P179600

DTC Definition: High Voltage Interlock Output Signal OC Error

DTC Reporting Conditions: Key is turned to ON, drive power supply is normal, validity of high voltage interlock output OC is valid, and high voltage interlock output OC is valid.

Possible Fault Causes:

1) PEU high voltage interlock interface is abnormal; 2) PTC high voltage interlock interface is abnormal; 3) A/C high voltage interlock interface is abnormal;

4) High voltage interlock wiring harness is abnormal; 5) PCU high voltage interlock interface is abnormal;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU/PEU/PTC/A/C high voltage interlock interface and check if high voltage interlock wiring harness is normal (Open in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if PCU high voltage interlock interface is normal (Open)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if PTC/A/C high voltage interlock interface is normal (Open)	Yes	Go to next step
		No	Perform necessary inspection and repair
4	Check if PEU high voltage interlock interface is normal (Open)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P179700

DTC Definition: High Voltage Interlock Input Signal Out of Range

DTC Reporting Conditions: When high voltage interlock output OC/SCP/SCG is invalid, the duty cycle of high voltage interlock is more than 90% or less than 10%

Possible Fault Causes:

1) PCU high voltage interlock output is abnormal.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if PCU high voltage interlock output duty cycle is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P179F00

DTC Definition: Drive Power Supply Relay Control Signal SCP Error

DTC Reporting Conditions: Key is turned to ON, validity of relay control signal SCP is valid, and relay control signal SCP is valid.

Possible Fault Causes:

1) PCU drive power supply relay controller interface is abnormal.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU controller interface, and check if drive power supply relay control interface is normal (Short to power supply)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17A000

DTC Definition: Drive Power Supply Relay Control Signal SCG Error

DTC Reporting Conditions: Key is turned to ON, validity of relay control signal SCG is valid, and relay control signal SCG is valid.

Possible Fault Causes:

1) PCU drive power supply relay controller interface is abnormal.

2) Drive power supply relay control wiring harness is not connected normally.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU controller interface, and check if drive power supply relay control interface is normal (Short to ground)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Disconnect PCU controller interface, and check if drive power supply relay control wiring harness is normal (Short to ground)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17A100

DTC Definition: Drive Power Supply Relay Control Signal OC Error

DTC Reporting Conditions: Key is turned to ON, validity of relay control signal OC is valid, and relay control signal OC is valid.

Possible Fault Causes:

1) PCU drive power supply relay controller interface is abnormal.

2) Drive power supply relay control wiring harness is not connected normally.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU controller interface, and check if drive power supply relay control interface is normal (Open)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Disconnect PCU controller interface, and check if drive power supply relay control wiring harness is normal (Open)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17A200

DTC Definition: BMS Wake-up Signal SCP Error

DTC Reporting Conditions: Key is turned to ON, validity of BMS wake-up signal SCP is valid, and BMS wake-up signal SCP is valid.

Possible Fault Causes:

1) BMS wake-up signal interface is abnormal;

2) BMS wake-up signal wiring harness is not connected normally;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU controller interface, and check if BMS wake-up signal interface is normal (Short to ground)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Disconnect PCU controller interface, and check if BMS wake-up signal•control wiring harness is normal (Short to ground)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17A300

DTC Definition: BMS Wake-up Signal SCG Error

DTC Reporting Conditions: Key is turned to ON, validity of BMS wake-up signal SCG is valid, and BMS wake-up signal SCG is valid.

Possible Fault Causes:

1) BMS wake-up signal interface is abnormal; 2) BMS wake-up signal wiring harness is not connected normally;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU controller interface, and check if BMS wake-up signal interface is normal (Short to ground)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Disconnect PCU controller interface, and check if BMS wake-up signal wiring harness is normal (Short to ground)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17A400

DTC Definition: BMS Wake-up Signal OC Error

DTC Reporting Conditions: Key is turned to ON, validity of BMS wake-up signal OC is valid, and BMS wake-up signal OC is valid.

Possible Fault Causes:

1) BMS wake-up signal interface is abnormal; 2) BMS wake-up signal wiring harness is not connected normally;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU controller interface, and check if BMS wake-up signal interface is normal (Open)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Disconnect PCU controller interface, and check if BMS wake-up signal wiring harness is normal (Open)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17AA00
DTC Definition: PEU Fault Level 1
DTC Reporting Conditions: PEU actively reports its fault level as level 1.
Possible Fault Causes:
1) PEU is faulty.
Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, Check if PEU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17AB00
DTC Definition: PEU Fault Level 2
DTC Reporting Conditions: PEU actively reports its fault level as level 2.
Possible Fault Causes:
1) PEU is faulty.
Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, Check if PEU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17AC00
DTC Definition: PEU Fault Level 3
DTC Reporting Conditions: PEU actively reports its fault level as level 3.
Possible Fault Causes:
1) PEU is faulty.
Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, Check if PEU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17AD00

DTC Definition: PEU Fault Level 4

DTC Reporting Conditions: PEU actively reports its fault level as level 4.

Possible Fault Causes:

1) PEU is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, Check if PEU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to PEU.

DTC: P17AE00

DTC Definition: BMS Fault Level 1

DTC Reporting Conditions: BMS actively reports its fault level as level 1.

Possible Fault Causes:

1) Power battery is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if BMS is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Battery.

DTC: P17AF00

DTC Definition: BMS Fault Level 2

DTC Reporting Conditions: BMS actively reports its fault level as level 2.

Possible Fault Causes:

1) Power battery is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if BMS is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Battery.

DTC: P17B000

DTC Definition: BMS Fault Level 3

DTC Reporting Conditions: BMS actively reports its fault level as level 3.

Possible Fault Causes:

1) Power battery is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if BMS is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Battery.

DTC: P17B100

DTC Definition: BMS Fault Level 4

DTC Reporting Conditions: BMS actively reports its fault level as level 4.

Possible Fault Causes:

1) Power battery is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if BMS is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Battery.

DTC: P17B200

DTC Definition: BMS Fault Level 5

DTC Reporting Conditions: BMS actively reports its fault level as level 5.

Possible Fault Causes:

1) Power battery is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if BMS is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Battery.

DTC: P17B300

DTC Definition: BMS Fault Level 6

DTC Reporting Conditions: BMS actively reports its fault level as level 6.

Possible Fault Causes:

1) Power battery is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if BMS is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Battery.

DTC: P17B400

DTC Definition: BMS Fault Level 7

DTC Reporting Conditions: BMS actively reports its fault level as level 7.

Possible Fault Causes:

1) Power battery is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if BMS is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Battery.

DTC: P17B500

DTC Definition: BMS Fault Level 8

DTC Reporting Conditions: BMS actively reports its fault level as level 8.

Possible Fault Causes:

1) Power battery is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if BMS is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Battery.

DTC: P17B600

DTC Definition: Difficult Engine Start Fault

DTC Reporting Conditions: Engine actively reports a difficult start fault.

Possible Fault Causes:

1) Engine system is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if engine system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Engine.

DTC: P17B700

DTC Definition: Engine Torque Limited Fault

DTC Reporting Conditions: Engine actively reports a torque limited fault.

Possible Fault Causes:

1) Engine system is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if engine system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Engine.

DTC: P17B800

DTC Definition: Engine Idle Limp Fault

DTC Reporting Conditions: Engine actively reports a idle limp fault.

Possible Fault Causes:

1) Engine system is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	With key turned to ON, check if engine system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair. For details, refer to Engine.

DTC: P17B900

DTC Definition: Engine Shutdown Fault

DTC Reporting Conditions: Engine actively reports a shutdown fault.

Possible Fault Causes:

1) Engine system is faulty.

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if engine system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to engine for details

DTC: P17BA00

DTC Definition: Transmission Fault Level 1

DTC Reporting Conditions: The transmission actively reports its fault level as level 1

Possible Fault Causes:

1) Transmission system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if transmission system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to transmission for details

DTC: P17BB00

DTC Definition: Transmission Fault Level 2

DTC Reporting Conditions: The transmission actively reports its fault level as level 2

Possible Fault Causes:

1) Transmission system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if transmission system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to transmission for details

DTC: P17BC00

DTC Definition: Transmission Fault Level 3

DTC Reporting Conditions: The transmission actively reports its fault level as level 4

Possible Fault Causes:

1) Transmission system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if transmission system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to transmission for details

DTC: P17BD00

DTC Definition: Transmission Fault Level 4

DTC Reporting Conditions: The transmission actively reports its fault level as level 4

Possible Fault Causes:

1) Transmission system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if transmission system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to transmission for details

DTC: P17BE00

DTC Definition: Transmission Fault Level 5

DTC Reporting Conditions: The transmission actively reports its fault level as level 5

Possible Fault Causes:

1) Transmission system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if transmission system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to transmission for details

DTC: P17BF00

DTC Definition: Motor Cooling Circuit Fault Level 2

DTC Reporting Conditions: TMS actively reports motor cooling circuit fault level as level 2

Possible Fault Causes:

1) Thermal management system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if thermal management system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to TMS for details

DTC: P17C000

DTC Definition: Motor Cooling Circuit Fault Level 3

DTC Reporting Conditions: TMS actively reports motor cooling circuit fault level as level 3

Possible Fault Causes:

1) Thermal management system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if thermal management system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to TMS for details

DTC: P17C100

DTC Definition: Battery Cooling Circuit Fault Level 2

DTC Reporting Conditions: TMS actively reports battery cooling circuit fault level as level 2

Possible Fault Causes:

1) Transmission system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if thermal management system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to TMS for details

DTC: P17C200

DTC Definition: Motor Cooling Circuit Fault Level 3

DTC Reporting Conditions: TMS actively reports motor cooling circuit fault level as level 3

Possible Fault Causes:

1) Thermal management system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if thermal management system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to TMS for details

DTC: P17C300

DTC Definition: Charger Fault Level 1

DTC Reporting Conditions: OBC actively reports its fault level as level 1

Possible Fault Causes:

1) Charger has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if thermal management system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to OBC for details

DTC: P17C400

DTC Definition: Charger Fault Level 2

DTC Reporting Conditions: OBC actively reports its fault level as level 2

Possible Fault Causes:

1) Charger has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if thermal management system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to OBC for details

DTC: P17C500

DTC Definition: Charger Fault Level 3

DTC Reporting Conditions: OBC actively reports its fault level as level 3

Possible Fault Causes:

1) Charger has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if thermal management system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to OBC for details

DTC: P17C600

DTC Definition: DCDC Fault Level 2

DTC Reporting Conditions: DCDC actively reports its fault level as level 2

Possible Fault Causes:

1) DCDC has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if DCDC is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to DCDC for details

DTC: P17C700

DTC Definition: DCDC Fault Level 3

DTC Reporting Conditions: DCDC actively reports its fault level as level 3

Possible Fault Causes:

1) DCDC has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if DCDC is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to DCDC for details

DTC: P17C600

DTC Definition: DCDC Fault Level 2

DTC Reporting Conditions: DCDC actively reports its fault level as level 2

Possible Fault Causes:

1) DCDC has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if DCDC is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to DCDC for details

DTC: U1E0000 ~ U1E1200

DTC Definition: 0x185 Message Count Error/0x185 Message CRC Error/0x185 TimeOut/0x215 Message Count Error: /0X215 Message CRC Error/0x215 TimeOut/0x235 Message Count Error/0x235 Message CRC Error/0x235 TimeOut/0x285 Message Count Error/0x285 Message CRC Error/0x285 TimeOut/0x305 Message Count Error/0x305 Message CRC Error/0x305 TimeOut/0x325 Message Count Error/0x325 Message CRC Error/0x325 TimeOut/0x3A5 TimeOut

DTC Reporting Conditions: When the wake-up request is valid, BMS has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in BMS low voltage interface

2) Abnormal connection of CAN signal wiring harness between BMS and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the BMS low voltage connector is normal(Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between BMS and PCU is normal(Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between BMS and PCU is normal(Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E1300 ~ U1E1F00

DTC Definition: 0x153 Message Count Error/0x153 Message CRC Error/0x153 TimeOut/0x173 Message Count Error: /0x173 Message CRC Error/0x173 TimeOut/0x213 Message Count Error/0x213 Message CRC Error/0x213 TimeOut/0x35A Message Count Error/0x35A Message CRC Error/0x35A TimeOut/0x5E8 TimeOut

DTC Reporting Conditions: When the wake-up request is valid, PEU has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in PEU low voltage interface

2) Abnormal connection of CAN signal wiring harness between PEU and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the PEU low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between PEU and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between PEU and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E2000 ~ U1E2200

DTC Definition: 0x50 Message Count Error/0x50 Message CRC Error/0x50 TimeOut

DTC Reporting Conditions: When the wake-up request is valid, SRS has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in PCAN low voltage interface of GW

2) Abnormal connection of CAN signal wiring harness between PCAN interface of GW and PCU

3) Abnormal PCAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the PCAN low voltage connector of GW is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between PCAN interface of GW and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if PCAN terminal resistance is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E2300 ~ U1E2800

DTC Definition: 0x24E Message Count Error/0x24E Message CRC Error/0x24E Message TimeOut/0x25E Message Count Error/0x25E Message CRC Error/0x25E Message TimeOut

DTC Reporting Conditions: When the wake-up request is valid, ACC has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in PCAN low voltage interface of GW

2) Abnormal connection of CAN signal wiring harness between PCAN interface of GW and PCU

3) Abnormal PCAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the PCAN low voltage connector of GW is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between PCAN interface of GW and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if PCAN terminal resistance is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E2900 ~ U1E3500

DTC Definition: 0x18A Message Count Error/0x18A Message CRC Error/0x18A TimeOut/0x1A8 Message Count Error/0x1A8 Message CRC Error/0x1A8 TimeOut/0x199 TimeOut/0x1A7 Message Count Error/0x1A7 Message CRC Error/0x1A7 TimeOut/0x338 Message Count Error/0x338 Message CRC Error/0x338 TimeOut

DTC Reporting Conditions: When the wake-up request is valid, TCU has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in TCU low voltage interface

2) Abnormal connection of CAN signal wiring harness between TCU interface and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the TCU low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between TCU and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between TCU and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E3600 ~ U1E4100

DTC Definition: 0x186 Message Count Error/0x186 Message CRC Error/0x186 TimeOut/0x194 Message Count Error/0x194 Message CRC Error/0x194 TimeOut/0x199 TimeOut/0x1B7 Message Count Error/0x1B7 Message CRC Error/0x1B7 TimeOut/0x2E6 Message Count Error/0x2E6 Message CRC Error/0x2E6 TimeOut

DTC Reporting Conditions: When the wake-up request is valid, EMS has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in EMS low voltage interface

2) Abnormal connection of CAN signal wiring harness between EMS interface and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the EMS low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between EMS and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between EMS and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E4A00 ~ U1E4D00

DTC Definition: 0x324 TimeOut/0x366 TimeOut/0x6DE TimeOut/0x32 CTimeOut

DTC Reporting Conditions: When the wake-up request is valid, TMS has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in TMS low voltage interface

2) Abnormal connection of CAN signal wiring harness between TMS interface and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the TMS low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between TMS and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between TMS and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E4F00 ~ U1E5200

DTC Definition: 0x28B TimeOut/0x298 TimeOut/0x262 TimeOut/0x5FF TimeOut

DTC Reporting Conditions: When the wake-up request is valid, BCM has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in BCM low voltage interface

2) Abnormal connection of CAN signal wiring harness between BCM interface and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the BCM low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between BCM and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between BCM and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E5300 ~ U1E5C00

DTC Definition: 0x187 Message Count Error/0x187 Message Check Error/0x187 TimeOut/0x278 Message Count Error/0X278 Message Check Error/0x278 TimeOut/0x208 TimeOut/0x206 TimeOut/0x258 TimeOut/0x277 TimeOut

DTC Reporting Conditions: When the wake-up request is valid, ESP has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in ESP low voltage interface

2) Abnormal connection of CAN signal wiring harness between ESP interface and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the ESP low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between ESP and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between ESP and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E5D00 ~ U1E5F00

DTC Definition: 0x197 Message Count Error/0x197 Message Check Error/0x197 TimeOut

DTC Reporting Conditions: When the wake-up request is valid, EPB has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in EPB low voltage interface

2) Abnormal connection of CAN signal wiring harness between EPB interface and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the EPB low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between EPB and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between EPB and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E6000 ~ U1E6200

DTC Definition: 0x319 Message Count Error/0x319 TimeOut/0x349 TimeOut

DTC Reporting Conditions: When the wake-up request is valid, OBC has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in OBC low voltage interface

2) Abnormal connection of CAN signal wiring harness between OBC interface and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the OBC low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between OBC and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between OBC and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E6300 ~ U1E6800

DTC Definition: 0x31D Message Count Error/0x31D Message Check Error/0x31D TimeOut/0x2E4 Message Count Error/0x2E4 Message Check Error/0x2E4 TimeOut

DTC Reporting Conditions: When the wake-up request is valid, DCDC has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in DCDC low voltage interface;

2) Abnormal connection of CAN signal wiring harness between DCDC interface and PCU;

3) Abnormal CAN network terminal resistance;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the DCDC low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between DCDC and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between DCDC and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17C800

DTC Definition: ASC Protection Flag Bit Fault

DTC Reporting Conditions: PEU actively reports ASC protection flag bit

Possible Fault Causes:

1) PEU has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PEU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to PEU for details

DTC: P17C900

DTC Definition: Power Assembly Stop Request Fault

DTC Reporting Conditions: TCU actively reports power assembly stop fault request

Possible Fault Causes:

1) TCU has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if TCU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to TCU for details

DTC: P17CA00

DTC Definition: K0 Clutch Status Fault

DTC Reporting Conditions: TCU actively reports K0 clutch status fault

Possible Fault Causes:

1) TCU has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if TCU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to TCU for details

DTC: P17CB00

DTC Definition: K1K2 Clutch Status Fault

DTC Reporting Conditions: TCU actively reports K1K2 clutch status fault

Possible Fault Causes:

1) TCU has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if TCU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to TCU for details

DTC: P17CC00

DTC Definition: Main Relay Normally Closed Fault

DTC Reporting Conditions: BCM actively reports main relay normally closed fault

Possible Fault Causes:

1) BCM has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if BCM is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to BCM for details

DTC: U1E69

DTC Definition: NC_IDX_ERR_COM_PCANCanNetwork_BOFF (PCAN Bus Fault)

DTC Reporting Conditions: When the wake-up request is valid, there is a fault in PCAN bus

Possible Fault Causes:

1) Abnormal connection of PCAN signal wiring harness in PCU low voltage interface;

2) Abnormal CAN network terminal resistance;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if PCAN signal wiring harness connection in the PCU low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if PCAN wiring harness terminal resistance is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E6A

DTC Definition: NC_IDX_ERR_COM_HEVCANCanNetwork_BOFF (HEVCAN Bus Fault)

DTC Reporting Conditions: When the wake-up request is valid, there is a fault in HEVCAN bus

Possible Fault Causes:

1) Abnormal connection of HEVCAN signal wiring harness in PCU low voltage interface;

2) Abnormal CAN network terminal resistance;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if HEVCAN signal wiring harness connection in the PCU low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if HEVCAN wiring harness terminal resistance is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17CD00

DTC Definition: NC_IDX_ERR_MON_3 (Safety Integrity Function Monitoring Fault)

DTC Reporting Conditions: When waking-up, PCU reports safety integrity function monitoring fault

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17CE00

DTC Definition: NC_IDX_ERR_MON_3_SW (Safety Integrity Function Monitoring Memory Fault)

DTC Reporting Conditions: When waking-up, PCU reports safety integrity function monitoring memory fault

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17CF00

DTC Definition: NC_IDX_ERR_MON_3_VD (ATIC239 5 V Power Supply Overvoltage/Undervoltage Fault)

DTC Reporting Conditions: When waking-up, PCU reports 5 V power supply overvoltage/undervoltage fault

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17D000

DTC Definition: NC_IDX_ERR_ICSP_ECOP_EveAtic232 (Communication Fault between ATIC232 and MCU)

DTC Reporting Conditions: When waking-up, PCU reports communication fault between ATIC232 and MCU

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17D100

DTC Definition: NC_IDX_ERR_ICSP_ECOP_EveAtic239Ls (Communication Fault between ATIC239 and MCU)

DTC Reporting Conditions: When waking-up, PCU reports a communication fault between ATIC239 and MCU

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17D200

DTC Definition: NC_IDX_ERR_ICSP_ECOP_EveAtic239Ps (Communication Fault between ATIC239 and MCU)

DTC Reporting Conditions: When waking-up, PCU reports a communication fault between ATIC239 and MCU

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17D300

DTC Definition: NC_IDX_ERR_ICSP_ECOP_EveAtic28xPs (Communication Fault between ATIC280 and MCU)

DTC Reporting Conditions: When waking-up, PCU reports a communication fault between ATIC280 and MCU

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17D400

DTC Definition: NC_IDX_ERR_ICSP_ECOP_EveDtsOverTemp (MCU Internal Temperature Fault)

DTC Reporting Conditions: When waking-up, the PCU reports an internal temperature fault in the MCU

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17D500

DTC Definition: NC_IDX_ERR_NVM_E_INTEGRITY_FAILED (NVM Integrity Fault)

DTC Reporting Conditions: When waking-up, the PCU reports a NVM integrity fault

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17D600

DTC Definition: NC_IDX_ERR_NVM_E_WRITE_FAILED (NVM Written Fault)

DTC Reporting Conditions: When waking-up, the PCU reports a NVM written fault

Possible Fault Causes:

1) PCU controller fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17D900

DTC Definition: Accelerator Pedal Fault

DTC Reporting Conditions: During KeyOn, two way accelerator pedal sensors are faulty

Possible Fault Causes:

1) Two way accelerator pedal sensor power supply voltage fault;

2) Two way accelerator pedal sensor voltage fault;

3) One way accelerator pedal sensor power supply voltage fault, two way accelerator pedal sensor power supply voltage fault;

4) One way accelerator pedal sensor voltage fault, two way accelerator pedal sensor power supply voltage fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if PCU controller is normal (Read current DTC)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17DA00

DTC Definition: Accelerator Pedal Synchronization Fault

DTC Reporting Conditions: During KeyOn, consistency of two way accelerator pedal sensor voltage increases

Possible Fault Causes:

1) Acceleration pedal fault;

Troubleshooting Method：

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if accelerator pedal sensor voltage is normal (Synchronization fault)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17DB00

DTC Definition: Brake Pedal Plausibility Fault

DTC Reporting Conditions: During KeyOn, brake pedal signal is 0 or 1

Possible Fault Causes:

1) Brake pedal fault;

2) Abnormal connection of brake pedal sensor wiring harness

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if brake pedal sensor wiring harness connection is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	KeyOn, check if brake pedal is normal (If the signal is 1 or 0)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17DD00 ~ P17DF00

DTC Definition: Engine Shutdown Fault/Engine Crank Start Fault/Engine Running Start Fault

DTC Reporting Conditions: When the engine starts/stops, the engine does not respond to PCU control commands for a certain period of time

Possible Fault Causes:

1) Engine or clutch fault;

2) Abnormal CAN communication;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN communication is normal (CAN communication among PCU, EMS and TCU)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if TCU is normal	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if EMS is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17E200

DTC Definition: All Gears of TCU Not Available

DTC Reporting Conditions: KeyOn, TCU reports that all gears are unavailable

Possible Fault Causes:

1) TCU fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if TCU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to TCU for details

DTC: P17E300

DTC Definition: High Voltage Pre-charging Timeout

DTC Reporting Conditions: KeyOn, failure to complete high voltage pre-charging within a certain period of time

Possible Fault Causes:

1) Abnormal CAN communication;

2) PEU fault;

3) Power battery fault;

4) High voltage interlock fault;

Troubleshooting Method

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN is normal (Communication among PCU, BMS, PEU)	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to CAN for details
2	Check if PCU high voltage interlock state is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if power battery is normal	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to battery for details
4	Check if PEU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to PEU for details

DTC: P17E400

DTC Definition: High Voltage Activation Confirmation Timeout

DTC Reporting Conditions: KeyOn, failure to complete high voltage activation within a certain period of time

Possible Fault Causes:

1) Abnormal CAN communication;

2) PEU fault;

3) Power battery fault;

4) High voltage interlock fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN is normal (Communication among PCU, BMS, PEU)	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to CAN for details
2	Check if PCU high voltage interlock state is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if power battery is normal	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to battery for details
4	Check if PEU is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to PEU for details

DTC: P17E600

DTC Definition: High Voltage Pre-power off Timeout

DTC Reporting Conditions: KeyOff, failure to complete high voltage pre-power off within a certain period of time

Possible Fault Causes:

1) PEU fault;

2) PCU fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if the PEU torque request sent by PCU is normal	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to CAN for details
2	Check if PEU execution torque and speed are normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17E700

DTC Definition: Power Battery Cutoff Timeout

DTC Reporting Conditions: KeyOff, failure to complete high voltage cutoff within a certain period of time

Possible Fault Causes:

1) Abnormal CAN communication;

2) Power battery fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN is normal (Communication between PCU and BMS)	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to CAN for details
2	Check if power battery is normal (Perform high voltage cutoff operation)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17E800

DTC Definition: System High Voltage Discharging Timeout

DTC Reporting Conditions: KeyOff, failure to complete high voltage discharging within a certain period of time

Possible Fault Causes:

1) Abnormal CAN communication;

2) Power battery fault;

3) PEU fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN is normal (Communication between PCU and PEU)	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to CAN for details
2	Check if power battery is normal (If relay is disconnected)	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to battery for details
3	Check if PEU is normal (Perform high voltage discharging operation)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17ED00

DTC Definition: Charging Connection Confirmation Timeout

DTC Reporting Conditions: When charging, failure to receive battery valid charging mode within a certain period of time

Possible Fault Causes:

1) Abnormal CAN communication;

2) Power battery fault;

3) OBC wake-up signal;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Charging gun is not connected, check if OBC wake-up signal is normal (Short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN is normal when charging gun is connected (Communication between PCU and BMS)	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to CAN for details
3	Check if BMS charging mode is normal when charging gun is connected	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17EE00

DTC Definition: Charging Permission Judgment Timeout

DTC Reporting Conditions: When charging, failure to complete high voltage activation or failure to receive vehicle parking valid signal within a certain period of time

Possible Fault Causes:

1) Abnormal CAN communication;

2) Power battery fault;

3) PEU fault;

4) Vehicle is not parked;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN is normal (Communication among PCU, PEU, BMS, EPB, TCU)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	When initiating a charging request, check if the high voltage is fully powered on	Yes	Go to next step
		No	Perform necessary inspection and repair, refer to CAN for details
3	Determine whether the charging determination conditions are met (During KeyOn, P gear is locked or parking brake is locked, and during KeyOff, determine whether the KeyOn signal is valid)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: U1E6B00, U1E6C00

DTC Definition: DCAC_0x399TimeOut/DCAC _0x3A9TimeOut

DTC Reporting Conditions: When the wake-up request is valid, OBC has CRC check error/RollingCounter error/TimeOut fault

Possible Fault Causes:

1) Abnormal connection of CAN signal wiring harness in OBC low voltage interface

2) Abnormal connection of CAN signal wiring harness between OBC and PCU

3) Abnormal CAN network terminal resistance

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if CAN signal wiring harness connection in the OBC low voltage connector is normal (Disconnection/looseness/poor welding, etc)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if CAN wiring harness connection between OBC and PCU is normal (Open/short to ground/short to power supply)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if CAN wiring harness terminal resistance between OBC and PCU is normal (Standard is 60 Ω)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17F200

DTC Definition: DCAC Fault Level 1

DTC Reporting Conditions: OBC actively reports DCAC fault level as level 1.

Possible Fault Causes:

1) Transmission system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if charger system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to OBC for details

DTC: P17F300

DTC Definition: DCAC Fault Level 2

DTC Reporting Conditions: OBC actively reports DCAC fault level as level 2.

Possible Fault Causes:

1) Transmission system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if charger system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to OBC for details

DTC: P17F400

DTC Definition: DCAC Fault Level 3

DTC Reporting Conditions: OBC actively reports DCAC fault level as level 3

Possible Fault Causes:

1) Transmission system has fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	KeyOn, check if charger system is normal	Yes	Diagnosis help
		No	Perform necessary inspection and repair, refer to OBC for details

DTC: P17F600

DTC Definition: HVIL Output Pin Open Circuit High Level Fault

DTC Reporting Conditions: When the driving speed of vehicle is below a certain value, PCU detects a high voltage interlock fault

Possible Fault Causes:

1) Abnormal PEU high voltage interlock interface;

2) Abnormal PTC high voltage interlock interface;

3) Abnormal A/C high voltage interlock interface;

4) Abnormal high voltage interlock wiring harness;

5) Abnormal PCU high voltage interlock interface;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Disconnect PCU/PEU/PTC/A/C high voltage interlock interface and check if the high voltage interlock wiring harness is normal (Short to power supply/open/short to ground in wiring harness)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if PCU high voltage interlock interface is normal (Short to power supply/open/short to ground)	Yes	Go to next step
		No	Perform necessary inspection and repair
3	Check if PTC/A/C high voltage interlock interface is normal (Short to power supply/open/short to ground)	Yes	Go to next step
		No	Perform necessary inspection and repair
4	Check if PEU high voltage interlock interface is normal (Short to power supply/open/short to ground)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

DTC: P17F700

DTC Definition: High Voltage Abnormal Power off Fault

DTC Reporting Conditions: When the high voltage is activated, the power battery exits abnormally

Possible Fault Causes:

1) Low voltage abnormal power off fault;

2) Power battery fault;

Troubleshooting Method:

Item	Operation Steps	Test Result	Subsequent Steps
1	Check if the BMS low voltage power supply is normal in the history freeze frame data (Low voltage power off/voltage too low)	Yes	Go to next step
		No	Perform necessary inspection and repair
2	Check if power battery is normal (Relay control etc.)	Yes	Diagnosis help
		No	Perform necessary inspection and repair

Removal and Installation

High voltage, pay attention!

Precautions

1. Before removal and installation, the high voltage must be cut off (turn the key to the "OFF" position and remove the maintenance switch).

2. Before removal and installation, the negative of lead acid battery must be cut off to ensure that the vehicle control unit has no power at low voltage.

3. During removal and installation, the bolts must be tightened according to the torque requirements specified in removal and installation to ensure the reliability of assembly.

4. Before installation, components with the same part number as the original vehicle must be used. Do not use other replacement parts.

Position Introduction

The vehicle controller is located in the occupant’s cabin, its specific location is shown in Figure 4:

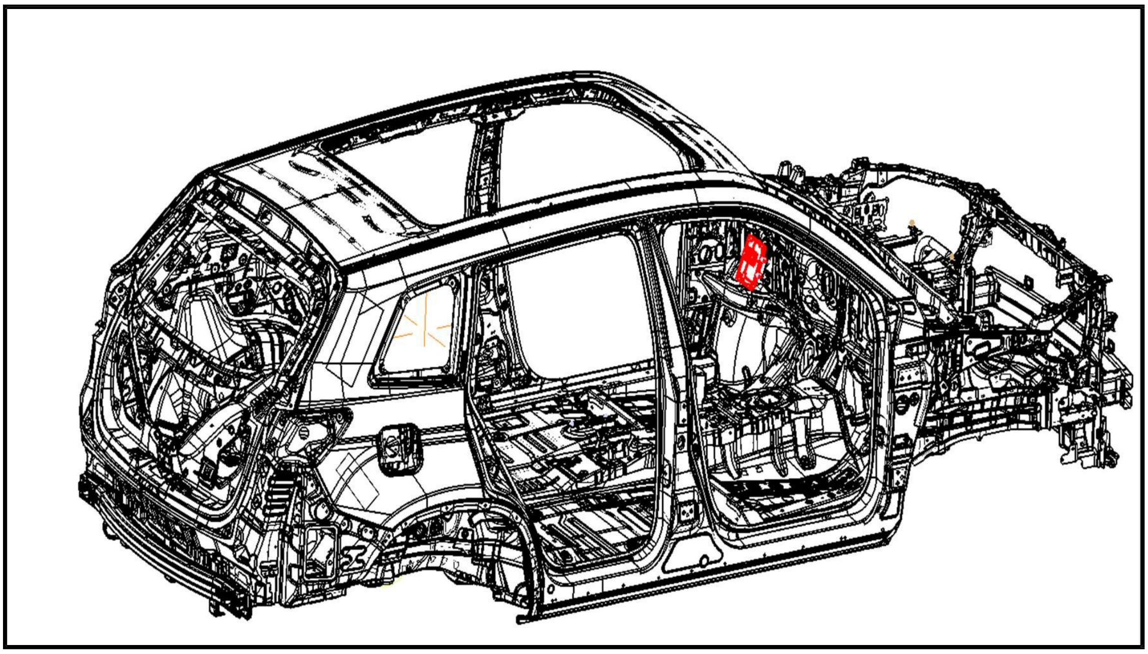
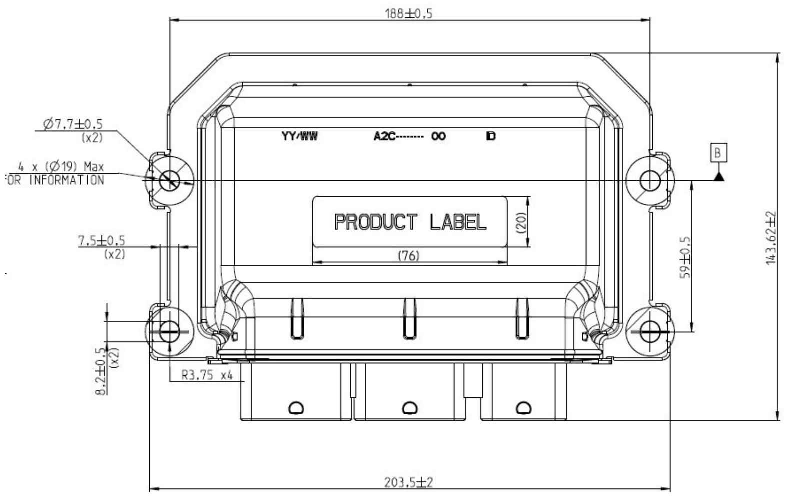


Figure 4 Vehicle Controller Installation Location Schematic Diagram 1

Removal and Installation Method

Item	Assembly Sequence	Assembly Requirements	Tools/ Accessory	Note
1	Remove vehicle controller from body	 Use a torque wrench to remove bolts and nuts and remove vehicle controller. Vehicle controller has 4 mounting holes, and is directly fixed to the vehicle controller bracket below the driver instrument panel with 4 hexagonal flange bolts.	Torque wrench	Installation is in the reverse procedure of removal
2	Theft deterrent learning	1. After the PCU replacement is completed, confirm the status of PCU software. If it is not the latest status, please update the software. 2. Power on the vehicle key, connect diagnostic tool, enter diagnosis interface, read PCU DTC. If there is fault, first troubleshoot it. If not, exit the PCU diagnostic interface, select the PEPS diagnostic interface, and perform PCU theft deterrent learning. During the learning process, please follow the prompts of the diagnostic tool. 3. After the theft deterrent learning is completed, the vehicle is powered off for 10 seconds, then powered on again. Depress the brake pedal, press the ENGINE START STOP switch at the same time. If the vehicle can start normally, the PCU replacement process is completed.	Fault diagnostic tool (KT 700 or higher)	

Tools

Tool Name	Usage
Diagnostic tool	Used to detect DTC and fault information of power system
Digital multimeter	Inspect characteristic parameters such as voltage, resistance and current in pure electric power system
Insulation gloves	Insulate and protect human body

3.3.3 Power Supply System Assembly

Specifications

Description	Type
Power supply system assembly	VAILD62482

Torque Specifications

Description	Nm
4 x Power supply system mounting bolt M8	18.5 - 21.5

Description

Operation Introduction

Power supply system has 3 operation modes:

1. After power-on and initialization, charge the power battery according to CAN bus charging parameter command;

2. After power-on and initialization, supply power to AC electrical equipment according to CAN bus discharging parameter command.

3. After power-on and initialization, supply power to 12 V according to CAN bus depressurization parameter command.

Schematic circuit diagram of power supply system assembly (refer to Figure 1):

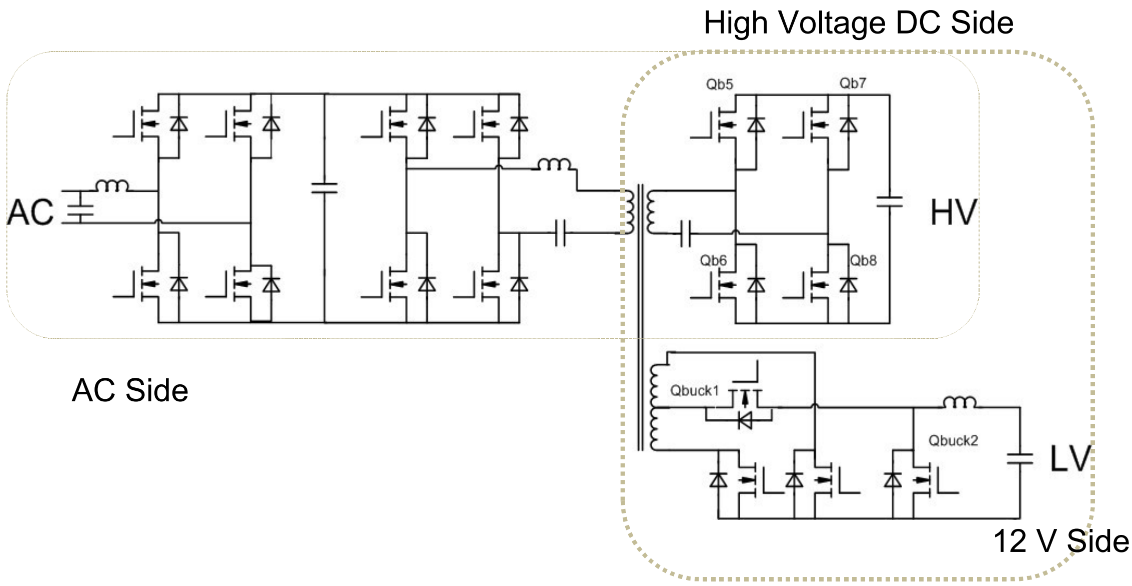


Figure 1 Power Supply System Operation

Connector Definition Introduction

Interface Schematic Diagram (refer to Figure 2)

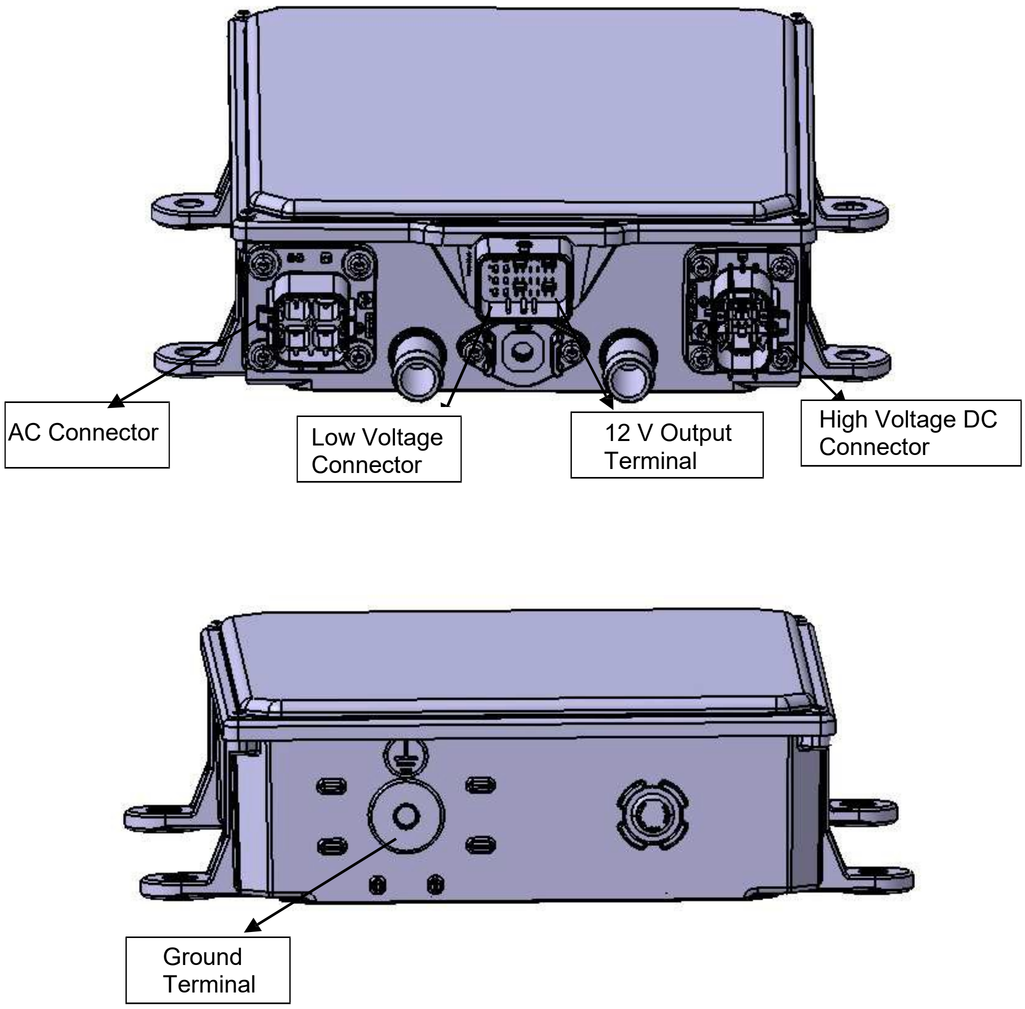


Figure 2 Power Supply System Connector Layout Introduction

AC Input End Connector (refer to Figure 3)

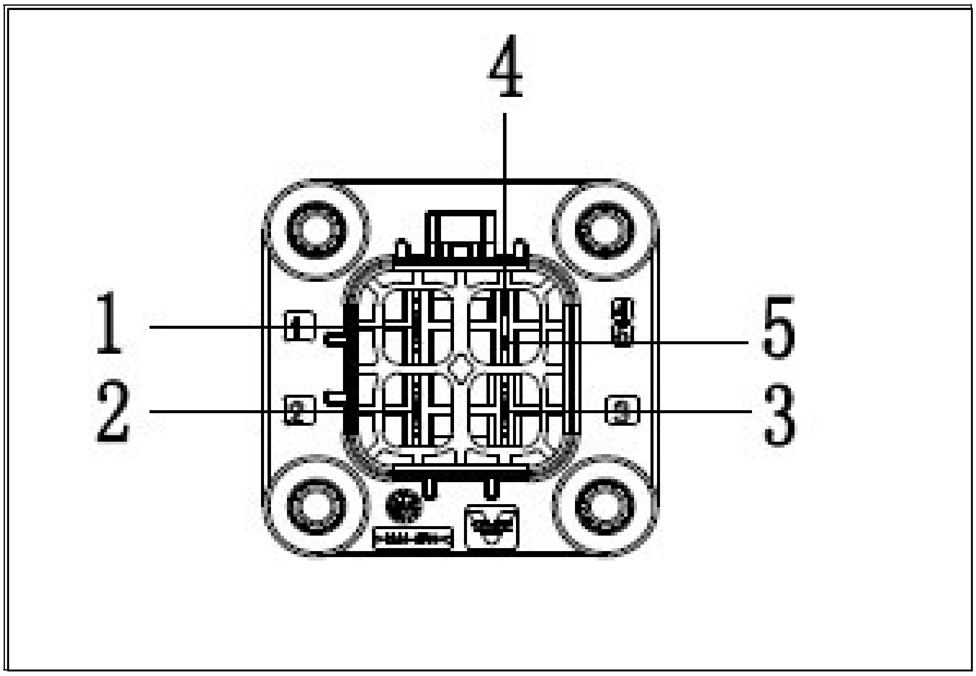


Figure 3 Power Supply System AC Input End Connector Interface Definition

Pin	Definition	Pin	Definition
1	Live wire/L	4	Interlock input
2	Neutral wire/N	5	Interlock output
3	Ground wire/N		

High Voltage DC Output End Connector (refer to Figure 4)

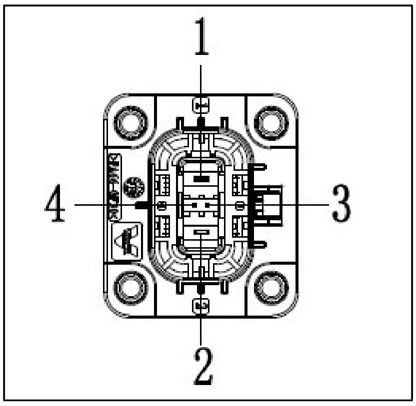


Figure 4 Power Supply System High Voltage DC Output End Connector Interface Definition

Pin	Definition	Pin	Definition
1	Positive/HV+	3	Interlock input
2	Positive/HV-	4	Interlock output

Low Voltage Connector Interface Definition (refer to Figure 5)

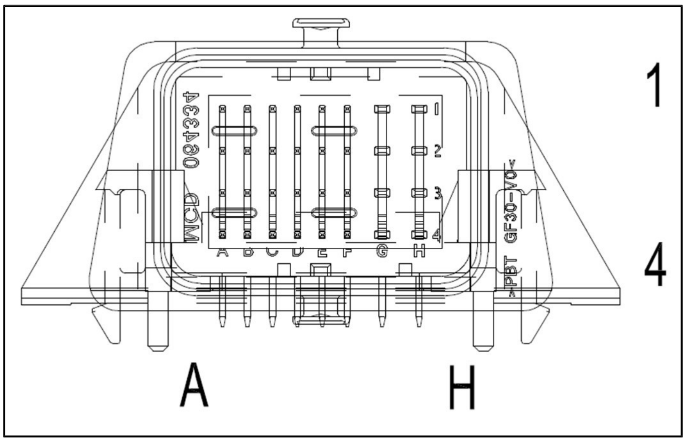


Figure 5 Power Supply System Low Voltage Connector Interface Definition

Pin	Function Abbreviation	Pin	Function Abbreviation
1A	NC	3A	CP_in
1B	NC	3B	NC
1C	NC	3C	Charging port cover plate switch assembly
1D	NC	3D	NC
1E	LED1_R	3E	NC
1F	LED1_G	3F	NTC2_GND
1G	NC	3G	NC
1H	KL30 (12V+)	3H	Elock+
2A	NC	4A	CAN_H
2B	NTC1+	4B	CAN_L
2C	NTC2+	4C	HVIL-in
2D	NTC1_GND	4D	HVIL-out
2E	LED1_B	4E	NC

2F	LED_GND	4F	Elock_sense
2G	NC	4G	KL31(12V-)
2H	NC	4H	Elock-

12 V Positive Output Connector End Definition (refer to Figure 6)

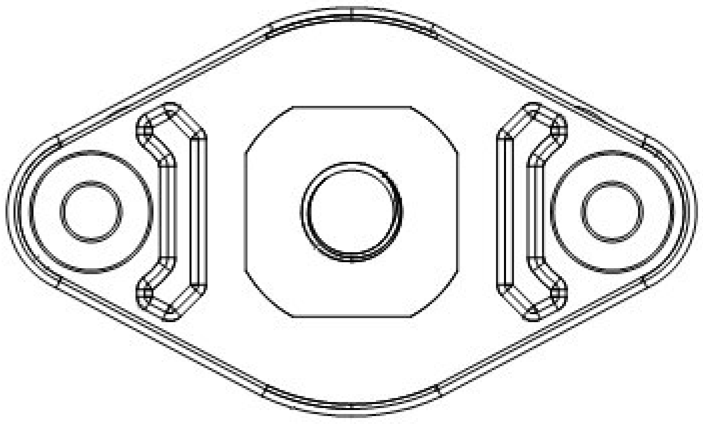


Figure 6 Power Supply System 12 V Positive Output Connector End Definition

Pin	Definition
1	14V+

12 V Negative Output Connector End Definition (refer to Figure 7)

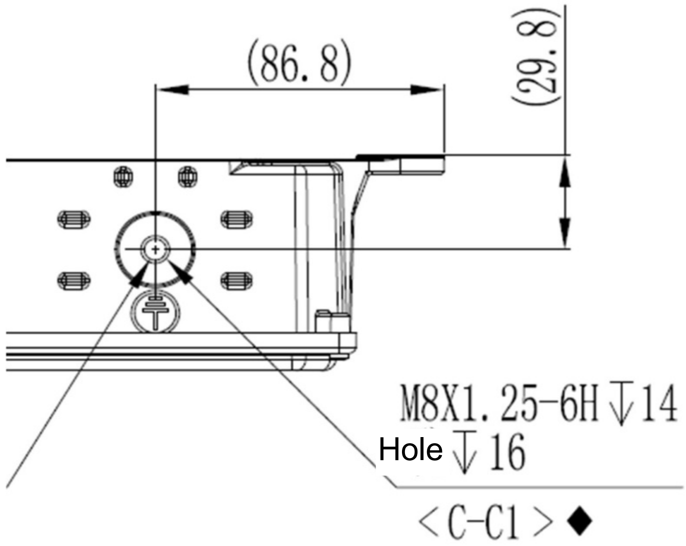


Figure 7 Power Supply System 12 V Negative Output Connector End Definition

Pin	Definition
1	14V-

Fault Analysis

Fault Finding Methods and Inspection Procedures

Correctly connect the power supply system assembly, re-apply high voltage or charge, and use a diagnostic tool to read DTC.

DTC and Troubleshooting Method

P1A8087	Internal SCI Communication Abnormally
P1A8187	The MCU and the Underlying Power Chip 1 Communicate Timeout. The Underlying Power Chip Data Check Fault
P1A8287	Internal Serial Communication 1 Failed
P1A8387	Internal Serial Communication 2 Failed
P1A8417	The Charger Output Overvoltage Shutd
P1A8516	Output Voltage of the Charger is Too Low
P1A8617	Charger Output Low Voltage Shutdown Charger (External Charging Equipment Fault) Input Overvoltage Fault
P1A8717	PFC Voltage of the Charger is Too High
P1A8816	Charger Fault (PFC Undervoltage)
P1A8919	The Charger Input Overload
P1A8A17	Inverter Input Overvoltage Shutdown
P1A8B16	Inverter Input Undervoltage Fault
P1A8C17	Inverter Output Overvoltage Fault
P1A8D18	Overcurrent Fault of Discharge PFC

P1A8E4B	Overtemperature Fault (TEMP2)
P1A8F4B	Overtemperature Fault (PFC)
P1A904B	Overtemperature Fault (LLC1)
P1A914B	Overtemperature Fault (M1)
P1A924B	The Water Temperature is Too Warm
P1A934B	The MOS1 Thermal
P1A944B	The MOS3 Thermal
P1A954B	The LLC2 Thermal
P1A964B	Water Temperature Drop Timeout Failure
P1A974B	Overtemperature Fault (TEMP2)
P1A984B	Overtemperature Fault (WATER)
P1A994B	Overtemperature Fault (PFC)
P1A9A4B	Overtemperature Fault (LLC1)
P1A9B4B	Overtemperature Fault (LLC2)
P1A9C4B	Overtemperature Fault (TEMP1)

P1A9D4B	Overtemperature Fault (AIR)
P1A9E4B	Overtemperature Fault (TEMP3)
P1A9F4B	Overtemperature Fault (Charging Port)
P1AA000	The Charger is Too Low Temperature Shutdown
P1AA100	Inverter Temperature is Too Low
P1AA24B	Charger (PFC) Temperature is Too High
P1AA34B	Charger (AIR) Temperature is Too High
P1AA44B	Charger (LLC1) Temperature Drop is Too High
P1AA54B	Charger (Water Temperature) Too High Temperature Drop
P1AA64B	Charger (MOS1) Temperature is Too High
P1AA74B	Excessive Temperature Drop of the Charger (MOS3)
P1AA84B	Excessive Temperature Drop of the Charger (Temp1)
P1AA94B	Excessive Temperature Drop of the Charger (Temp2)
P1AAA4B	Excessive Temperature Drop of the Charger (Temp3)
P1AAB95	AC Interlock Exception

P1AAC95	AC Interlock Failure
P1AAD00	Insulation Fault
U1B8087	Abnormal Communication between the Charger and BMS
U1B8187	Communication between Inverter and PCU is Abnormal
U1B8288	The Vehicle Power PCAN Bus is Abnormal
1A0000	DCDC High Voltage DC End Input Undervoltage Fault
1A0100	DCDC High Voltage DC End Input Overvoltage Fault
1A0500	DCDC Output Overcurrent Fault
1A0600	DCDC Low Voltage Output End Overvoltage Fault
D2A000	CAN Communication Timeout between DCDC and VCU
1A0C00	DCDC Low Voltage Output End Short Circuit Fault
1A1500	Input Overcurrent
1A1600	Abnormal LV Voltage Feedback
1A1700	Abnormal LV Current Feedback

P1A8087 Internal SCI Communication Abnormally

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Check DTCs. Is there P1A8087? →Yes, request technical support. →No, take corresponding troubleshooting methods based on DTC.

For the following internal initialization faults, refer to "P1A8087 Internal SCI Communication Abnormally" for troubleshooting process

P1A8087	Internal SCI Communication Abnormally
P1A8187	The MCU and the Underlying Power Chip 1 Communicate Timeout. The Underlying Power Chip Data Check Fault
P1A8287	Internal Serial Communication 1 Failed
P1A8387	Internal Serial Communication 2 Failed

P1A8417 Power Supply System Charging Output Overvoltage Off

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8417? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Check power battery voltage	B. In ON position, use diagnostic tool to enter vehicle controller and read if the battery voltage is higher than 460 V. →Yes, go to "Power Battery Service Procedure". →No, go to step 3.
3. Check high voltage connector	C. In OFF position, first unplug the low voltage signal connector, then check whether the high voltage output connector of power supply system and the high voltage input connector of power battery are connected in place, separately disconnect and connect them once; Then connect the slow charging device correctly and recharge, check if the power supply system can charge normally. →Yes, repair is finished. →No, go to step 4.
4. Check high voltage wiring harness	D. In OFF position, first unplug the low voltage signal connector, then unplug high voltage output connector of power supply system end and high voltage input connector of power battery, check if continuity between positive and negative of two wiring harnesses is normal. →Yes, go to step 5. →No, replace high voltage wiring harness, go to step 1.

5. Read DTCs	E. Replace power supply system, connect each connector. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8417? →Yes, request technical support. →No, power supply system can operate normally Repair is finished.

P1A8516 Power Supply System Charging Output Undervoltage Off

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8516? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Check power battery voltage	B. In ON position, use diagnostic tool to enter vehicle controller and read if the battery voltage is less than 210 V. →Yes, go to "Power Battery Service Procedure". →No, go to step 3.
3. Check high voltage connector	C. In OFF position, first unplug the low voltage signal connector, then check whether the high voltage output connector of power supply system and the high voltage input connector of power battery are connected in place, separately disconnect and connect them once; Then connect the slow charging device correctly and recharge, check if the power supply system can charge normally. →Yes, repair is finished. →No, go to step 4.

4. Check high voltage wiring harness	D. In OFF position, first unplug the low voltage signal connector, then unplug high voltage output connector of power supply system end and high voltage input connector of power battery, check if continuity between positive and negative of two wiring harnesses is normal. →Yes, go to step 5. →No, replace high voltage wiring harness, go to step 1.
5. Read DTCs	E. Replace power supply system, connect each connector. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8516? →Yes, request technical support. →No, power supply system can operate normally Repair is finished.

P1A8617 Power Supply System Charging Input Overvoltage Off

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, Connect the slow charging device at APP, correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8617? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Measure grid voltage	B. Measure grid voltage of at the patch panel end with a multimeter. Is grid voltage more than 275VAC? →Yes, please contact the grid personnel. →No, go to step 3.

3. Replace charging pile	C. Replace charging pile. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8617? →Yes, go to step 4. →No, repair or replace charging pile of customer.
4. Check connector	D. Check if the power supply system AC input connector is in good contact, disconnect and reconnect the AC connector once again. Then in ON position, connect the slow charging device correctly and recharge, enter vehicle controller with diagnostic tool, clear the history DTC, read the current DTC. Is there P1A8617? →Yes, go to step 5. →No, repair is finished.
5. Check wiring harness	E. Turn the power switch to OFF, unplug low voltage signal connector and AC input connector, use a multimeter to measure the continuity between connector terminals N\L\PE and charging socket terminals N\L\PE is normal, and check for short in N\L\PE. →Yes, replace wiring harness. →No, go to step 6.
6. Replace power supply system	F. Replace power supply system. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8617? →Yes, request technical support. →No, repair is finished.

P1A8717 PFC Voltage of the Charger is Too High

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Check DTCs. Is there P1A8717? →Yes, request technical support. →No, take corresponding troubleshooting methods based on DTC.

P1A8816 Charger Fault (PFC Undervoltage)

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Check DTCs. Is there P1A8816? →Yes, request technical support. →No, take corresponding troubleshooting methods based on DTC.

P1A8919 Power Supply System The Charger Input Overload

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, Connect the slow charging device at APP, correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8919? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Check input end wiring harness	B. Turn the power switch to OFF, use a multimeter to check power supply system input end wiring harness for short. →Yes, replace wiring harness. → No, go to step 3.
3. Replace power supply system	C. Replace power supply system. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8919? →Yes, request technical support. → No, repair is finished.

P1A8A17 Inverter Input Overvoltage Shutdown

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, press DCAC enabled switch, no load is applied to exterior and re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8A17? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Read data flow	B. Read data flow with diagnostic tool, read power supply system discharge input voltage. Is discharge input voltage more than 465VDC? →Yes, go to step 3. →No, clear DTC, read current fault again. If fault still exist, go to step 3.
3. Replace power supply system	C. Replace power supply system. In ON position, press DCAC enabled switch and re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8A17? →Yes, request technical support. → No, repair is finished.

P1A8B16 Inverter Input Undervoltage Fault

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, press DCAC enabled switch, no load is applied to exterior and re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8B16? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Read data flow	B. Read data flow with diagnostic tool, read power supply system discharge input voltage. Is discharge input voltage more than 225VDC? →Yes, go to step 3. →No, clear DTC, read current fault again. If fault still exist, go to step 3.
3. Replace power supply system	C. Replace power supply system. In ON position, press DCAC enabled switch and re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8B16? →Yes, request technical support. → No, repair is finished.

P1A8C17 Inverter Output Overvoltage Fault

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, press DCAC enabled switch, no load is applied to exterior and re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8C17? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Read data flow	B. Read data flow with diagnostic tool, read power supply system discharge output voltage. Is discharge output voltage more than 250VAC? →Yes, go to step 3. →No, clear DTC, read current fault again. If fault still exist, go to step 3.
3. Replace power supply system	C. Replace power supply system. In ON position, press DCAC enabled switch and re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8C17? →Yes, request technical support. → No, repair is finished.

P1A8D18 Overcurrent Fault of Discharge PFC

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Press DCAC enabled switch, no load applied to exterior, re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8D18? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Unplug AC output connector	B. Unplug AC output connector, press DCAC enabled switch, no load applied to exterior, re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8D18? →Yes, go to step 4. → No, go to step 3.
3. Check output end wiring harness	C. Turn the power switch to OFF, check power supply system discharge output end wiring harness for short. →Yes, replace wiring harness. →No, go to step 1.
4. Replace power supply system	D. Replace power supply system. In ON position, press DCAC enabled switch and re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A8D18? →Yes, request technical support. → No, repair is finished.

P1A8E4B Overtemperature Fault (TEMP2)

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC after running power supply system at full load for 1 hour. Is there P1A8E4B? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Check coolant condition	B. Turn the power switch to OFF, check if the coolant is within a reasonable range. →Yes, go to step 3. →No, fill coolant to the appropriate position.
3. Check cooling water pump	C. Turn the key to ON, check if the cooling water pump (can you feel the vibration when touching the water pump with your hand) is normal? →Yes, go to step 4. → No, replace the cooling water pump.
4. Replace power supply system	D. Replace power supply system, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC after running power supply system at full load for 1 hour. Is there P1A8E4B? →Yes, request technical support. → No, repair is finished.

For the following faults related to overtemperature, refer to "P1A8E4B Overtemperature Fault (Temp2)" for troubleshooting process

P1A8F4B	Overtemperature Fault (PFC)
P1A904B	Overtemperature Fault (LLC1)
P1A914B	Overtemperature Fault (M1)
P1A924B	The Water Temperature is too Warm
P1A934B	Overtemperature Fault (MOS1)
P1A944B	Overtemperature Fault (MOS3)
P1A954B	Overtemperature Fault (LLC2)
P1A964B	Water Temperature Drop Timeout Failure
P1AA24B	Charger (PFC) Temperature is too High
P1AA34B	Charger (AIR) Temperature is too High
P1AA44B	Charger (LLC1) Temperature Drop is too High
P1AA54B	Charger (Water Temperature) too High Temperature Drop
P1AA64B	Charger (MOS1) Temperature is too High
P1AA74B	Excessive Temperature Drop of the Charger (MOS3)
P1AA84B	Excessive Temperature Drop of the Charger (Temp1)
P1AA94B	Excessive Temperature Drop of the Charger (Temp2)
P1AAA4B	Excessive Temperature Drop of the Charger (Temp3)

P1A974 BOvertemperature Fault (TEMP2)

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Press DCAC enabled switch, no load applied to exterior, re-discharge, enter vehicle Control with diagnostic tool, clear the history DTC and read the current DTC after running for discharge at full load for 1 hour. Is there P1A974B? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Check coolant condition	B. Turn the power switch to OFF, check if the coolant is within a reasonable range. →Yes, go to step 3. →No, fill coolant to the appropriate position.
3. Check cooling water pump	C. Turn the key to ON, check if the cooling water pump (can you feel the vibration when touching the water pump with your hand) is normal? →Yes, go to step 4. → No, replace the cooling water pump.
4. Replace power supply system	D. Press DCAC enabled switch, no load applied to exterior, re-discharge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC after running for discharge at full load for 1 hour. Is there P1A974B? →Yes, request technical support. → No, repair is finished.

For the following faults related with discharge, refer to "P1A974B Overtemperature Fault (TEMP2)" for troubleshooting process

P1A984B	Overtemperature Fault (WATER)
P1A994B	Overtemperature Fault (PFC)
P1A9A4B	Overtemperature Fault (LLC1)
P1A9B4B	Overtemperature Fault (LLC2)
P1A9C4B	Overtemperature Fault (TEMP1)
P1A9D4B	Overtemperature Fault (AIR)
P1A9E4B	Overtemperature Fault (TEMP3)
P1A9F4B	Overtemperature Fault (Charging Port)

P1AA000 The Charger is Too Low Temperature Shutdown

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A84? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Move vehicle to a warm environment	B. Move the vehicle to a warm environment and wait for 10 minutes. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A84? →Yes, go to step 3. →No, take corresponding troubleshooting methods based on DTC.
3. Replace power supply system	C. Replace power supply system, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC after running power supply system at full load for 1 hour. Is there P1AA000? →Yes, request technical support. → No, repair is finished.

P1AA100 Inverter Temperature is Too Low, refer to "P1AA000 Inverter Temperature is Too Low" for troubleshooting process

P1AAB95 AC Interlock Exception

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect the slow charging device correctly and re-charge, enter vehicle control with diagnostic tool, clear the history DTC and read the current DTC. Is there P1A95? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Check AC end wiring harness	B. Turn the power switch to OFF, check if the AC end wire terminal is poorly connected. →Yes, replace wiring harness. → No, go to step 3.
3. Replace power supply system	C. Replace power supply system. In ON position, connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there P1AAB95? →Yes, request technical support. → No, repair is finished.

P1AAC95 AC Interlock Exception, refer to "P1AAB95 AC Interlock Exception" for troubleshooting process

P1AAD00 Insulation Fault

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Check DTCs. Is there P1AAD00? →Yes, request technical support. →No, take corresponding troubleshooting methods based on DTC.

U1B8087 Power Supply System Abnormal Communication between the Charger and BMS

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Check DTCs. Is there U1B8087? →Yes, request technical support. →No, take corresponding troubleshooting methods based on DTC.

U1B8187 Communication between Inverter and PCU is Abnormal

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Check DTCs. Is there U1B8187? →Yes, request technical support. →No, take corresponding troubleshooting methods based on DTC.

U1B8288 CAN Busoff

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Connect the slow charging device correctly and re-charge, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Check DTCs. Is there U1B8288? →Yes, request technical support. →No, take corresponding troubleshooting methods based on DTC.

1A0000 DCDC High Voltage DC End Input Undervoltage Fault

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect the device correctly and enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Check DTCs. Is there 1A0000? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Check power battery voltage	B. In ON position, use diagnostic tool to enter vehicle controller and read if the battery voltage is higher than 465 V. →Yes, go to "Power Battery Service Procedure". →No, go to step 3.
3. Check high voltage connector	C. In OFF position, first unplug the low voltage signal connector, then check whether the high voltage DC connector of power supply system and the high voltage input connector of power battery are properly plugged, insert and unplug them separately once; Then connect the device correctly, then turn to ON position again, check if power supply system can supply power to 12 V battery normally. →Yes, repair is finished. →No, go to step 4.

4. Check high voltage wiring harness	D. In OFF position, first unplug the low voltage signal connector, then unplug high voltage DC connector of power supply system end and high voltage input connector of power battery, check if continuity between positive and negative of two wiring harnesses is normal. →Yes, go to step 5. →No, replace high voltage wiring harness, go to step 1.
5. Read DTCs	E. Replace power supply system, connect each connector. In ON position, connect the device correctly, then turn to ON position again, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there 1A0000? →Yes, request technical support. →No, power supply system can operate normally. Repair is finished.

1A0100 DCDC High Voltage DC End Input Overvoltage Fault

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect the device correctly, then turn to ON position again, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there 1A0100? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Check power battery voltage	B. In ON position, use diagnostic tool to enter vehicle controller and read if the battery voltage is less than 225 V. →Yes, go to "Power Battery Service Procedure". →No, go to step 3.

3. Check high voltage connector	C. In OFF position, first unplug the low voltage signal connector, then check whether the high voltage DC connector of power supply system and the high voltage input connector of power battery are properly plugged, insert and unplug them separately once; Then connect the device correctly, then turn to ON position again, check if power supply system can supply power to 12 V battery normally. →Yes, repair is finished. →No, go to step 4.
4. Check high voltage wiring harness	D. In OFF position, first unplug the low voltage signal connector, then unplug high voltage DC connector of power supply system end and high voltage input connector of power battery, check if continuity between positive and negative of two wiring harnesses is normal. →Yes, go to step 5. →No, replace high voltage wiring harness, go to step 1.
5. Read DTCs	E. Replace the power supply system, connect each connector. In ON position, connect the device correctly, then turn to ON position again, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there 1A0100? →Yes, request technical support. →No, power supply system can operate normally. Repair is finished.

1A0500 DCDC Output Overcurrent Fault

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect the device correctly, then turn to ON position again, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there 1A0500? →Yes, go to step 2. →No, take corresponding troubleshooting methods based on DTC.
2. Check low voltage load	B. Check if the low voltage load is too large and if the DCDC output current is higher than 240 A for 20 ms. →Yes, go to "Wiring Harness Service Procedure". →No, go to step 3.
3. Read DTCs	E. Replace power supply system, connect each connector. Connect the device correctly, then turn to ON position again, enter vehicle controller with diagnostic tool, clear the history DTC and read the current DTC. Is there 1A0500? →Yes, request technical support. →No, power supply system can operate normally. Repair is finished.

1A0600 DCDC Low Pressure Output Terminal Overvoltage Fault

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect device correctly, turn to ON position again, use diagnostic tool to enter vehicle controller,clear the history DTC and read the current DTC. Is there 1A0600? →Yes, go to step 2. →No, carry out corresponding troubleshooting according to DTC
2. Check 12 V battery voltage	B. In ON position, use diagnostic tool to enter vehicle controller and read battery voltage, check if the voltage is higher than 17 V for 200 ms. →Yes, go to "12 V Battery Service Procedure". →No, go to step 3.
3. Check 12 V output tightening connection	C. In OFF position, remove low voltage signal connector, and then check if 12 V output bolt connection of power supply system and connection of 12 V battery positive cable are in place, reconnect them once again; then connect device correctly, turn to ON position again, check if power supply system can supply power to 12 V battery normally. →Yes, repair is finished. →No, go to step 4.
4. Check high voltage wiring harness	D. In OFF position, remove low voltage signal connector, and then remove the connection between power supply system 12 V output and 12 V battery positive cable to check for continuity of wiring harness. →Yes, go to step 5. →No, replace wiring harness, go to step 1.
5. Read DTCs	E. Replace power supply system, connect each connector, in ON position, connect device correctly, turn to ON position again, use diagnostic tool to enter vehicle controller,clear the history DTC and read the current DTC. Is there 1A0600? →Yes, request technical support. →No, power supply system can operate normally. Repair is finished.

D2A000 Communication Between PCU of DCDC and VCU Timeout

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect device correctly, turn to ON position again, use diagnostic tool to enter vehicle controller,clear the history DTC and read the current DTC. Is there D2A000? →Yes, request technical support. →No, carry out corresponding troubleshooting according to DTC

1A0C00 Short in DCDC Low Voltage Output End

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect device correctly, turn to ON position again, use diagnostic tool to enter vehicle controller,clear the history DTC and read the current DTC. Is there 1A0500? →Yes, go to step 2. →No, carry out corresponding troubleshooting according to DTC
2. Measure 12 V battery voltage and DCDC output current	B. In charging mode, measured output current of DCDC is greater than 200 A for 100 us, or it is detected that DV/DT is higher than 1 V for 10 uS and voltage is lower than 6.7 V for four consecutive times. →Yes, go to "Electrical Service Procedure". →No, go to step 3.
3. Detect positive/negative impedance at DCDC output end	C. In OFF position, measure DCDC low voltage output impedance (One end is connected to DCDC low voltage positive output, and the other end is connected to power supply system housing) with a multimeter, normal value of impedance is about 20 kΩ. →Yes, request technical support. →No, replace power supply system. Repair is finished.

1A1500 DCDC Input Overcurrent

Test Conditions	Details/Results/Actions
1. Read DTCs	A. In ON position, connect device correctly, turn to ON position again, use diagnostic tool to enter vehicle controller,clear the history DTC and read the current DTC. Is there 1A1500? →Yes, go to step 2. →No, carry out corresponding troubleshooting according to DTC
2. Check low voltage load	B. Check if low voltage load is too large and if DCDC output current is greater than 240 A for 20 ms. →Yes, go to "Wiring Harness Service Procedure". →No, go to step 3.
3. Read DTCs	C. Replace power supply system, connect each connector, connect device correctly, turn to ON position again, use diagnostic tool to enter vehicle controller,clear the history DTC and read the current DTC. Is there 1A1500? →Yes, request technical support. →No, power supply system can operate normally. Repair is finished.

1A1600 LV Abnormal Voltage Feedback

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Connect device correctly, turn to ON position again, use diagnostic tool to enter vehicle controller,clear the history DTC and read the current DTC. Is there 1A1600? →Yes, request technical support. →No, carry out corresponding troubleshooting according to DTC

1A1700 LV Abnormal Current Feedback

Test Conditions	Details/Results/Actions
1. Read DTCs	A. Connect device correctly, turn to ON position again, use diagnostic tool to enter vehicle controller,clear the history DTC and read the current DTC. Is there 1A1700? →Yes, request technical support. →No, carry out corresponding troubleshooting according to DTC

Contact with after-sale service department for technical support if there are other DTCs!

Removal and Installation

High voltage hazard, pay attention to safety!

Precautions

1. Before removal and installation, the high voltage must be cut off and ensure that the charging gun is disconnected. Turn the key to "OFF" position, unplug the maintenance switch, cut off small battery power supply and then perform operation.

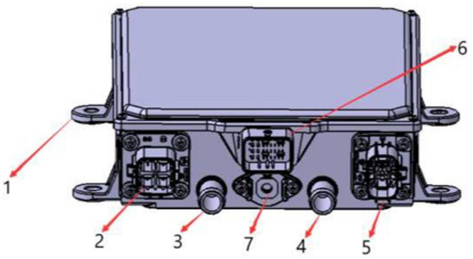
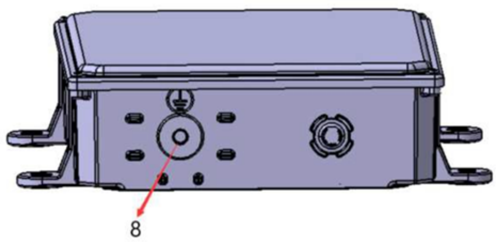
2. During removal and installation, the bolts must be operated according to the specified requirements to ensure the reliability of assembly.

3. Do not remove charging rack assembly upper cover.

4. Protect the connector during removal to avoid liquid entering the connector.

Removal and Installation Procedure of Power Supply System Assembly

Assembly procedures are as follows:

Figure	Assembly Method	Assembly Requirements
	1. Bolt connection 2. Connector connection	Ⅰ. Legend introduction: 1. Bolt mounting hole; 2. AC input connector; 3. Water outlet pipe; 4. Water inlet pipe; 5. High voltage DC connector; 6. Low voltage signal connector; 7. 12 V positive output; 8. Ground wire. Ⅱ. Installation procedures: Step 1: Install power supply system assembly (2139010-NE01) on body with 4 bolts (1031075-A01-S345); Step 2: Secure cooling water pipe of power supply system firmly; Step 3: Secure all connectors and wiring harnesses of power supply system; Ⅲ. Inspection requirements 1. Tightening bolt torque check: (20 ± 1.5) Nm (yellow mark); 2. Tightening bolt torque check of 12 V positive output and ground wire: (15 ± 1.5) Nm (yellow mark); 3. Check cooling water pipe of power supply system, preventing debris from entering; Cooling water pipe of power supply system on vehicle should be installed firmly without falling off after drawing; 4. Check that all connectors are securely connected and are inserted in place (yellow mark).

Hint:

1. Follow the reverse order during removing power supply system assembly.
2. After all installation procedures are completed, bleed air and refill coolant.

Special Tool

Tool Name	Usage
Diagnostic tool	Collect operation data during system dynamic operation
Digital multimeter	Inspect characteristic parameters such as voltage, resistance and current in pure electric power system
Insulation gloves	Insulate and protect human body
Megger	Megohm ohmmeter for measuring insulation resistance of various electrical device
Torque wrench	Tighten or remove fasteners (bolts, nuts etc.)

3.3.4 Power Battery Assembly

Overview

Application Range

Applicable to repair service of power battery assembly (herein after referred to as "battery assembly") for CHANGAN Auto UNI-K PHEV ICA (CD569P-ICA1) model.

Spare Parts

Special tool(s) list provided at beginning of each procedure lists all special tools required to carry out the repair. Illustrations are provided to assist in identifying the special tools when necessary. Special tools can be ordered from Chongqing CHANGAN New Energy Vehicle Technology Co., Ltd.

Special Tool

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Important Safety Instructions

Appropriate service methods and correct repair procedures are essential for the reliability of battery assembly as well as personal safety.

This manual cannot possibly foresee all situations and provide suggestions or cautions as to each. Anyone who departs from the instructions provided in this manual must assure that operation methods, tools and components used neither cause personal injury nor break battery assembly integrity.

Specifications

General Specifications

Item	Specifications
Product Type	XLBA91/XLBA92
Battery Type	Lithium iron phosphate battery
Total Capacity	28.4 kWh
Rated Voltage	326.4 V
Rated Capacity	87 Ah
Weight	230 kg

Torque Specifications

Description	Nm
Connecting bolt between battery pack and vehicle body	110 ± 11

Description and Operation

Composition of Power Battery Assembly

Battery assembly consists of battery module, battery management system, high voltage component, cooper bar, wiring harness, thermal management component and battery box, etc.

Structure Diagram

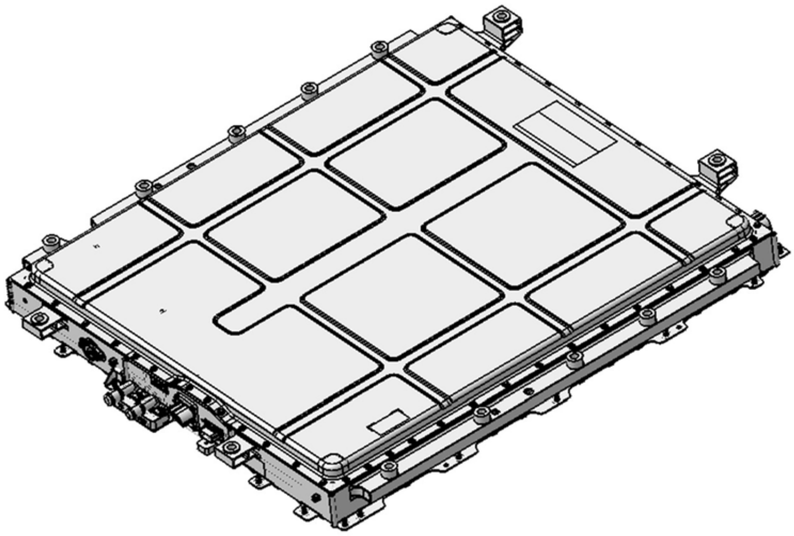


Figure 1 Power Battery Assembly Appearance Diagram

Traceability Information

Battery assembly traceability code meets the requirements of GB/T34014, it is located on battery mounting bracket and lower case separately, refer to the figures below for details:

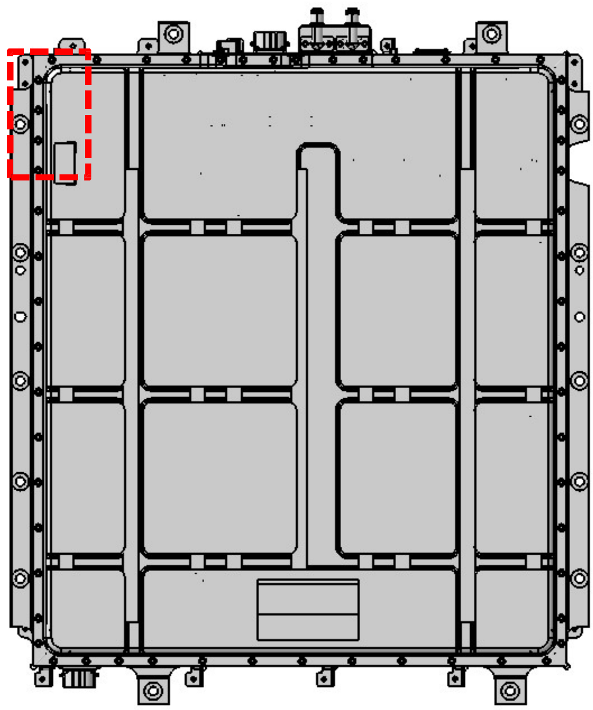


Figure 2 One-dimensional Code Pasting Position of Battery Assembly

Definition of Connector Interface

Definition of High Voltage Connector Interface

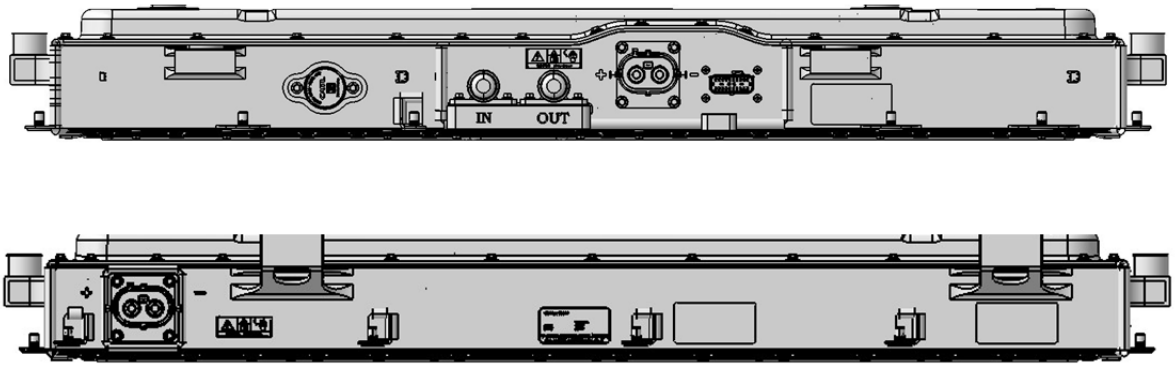


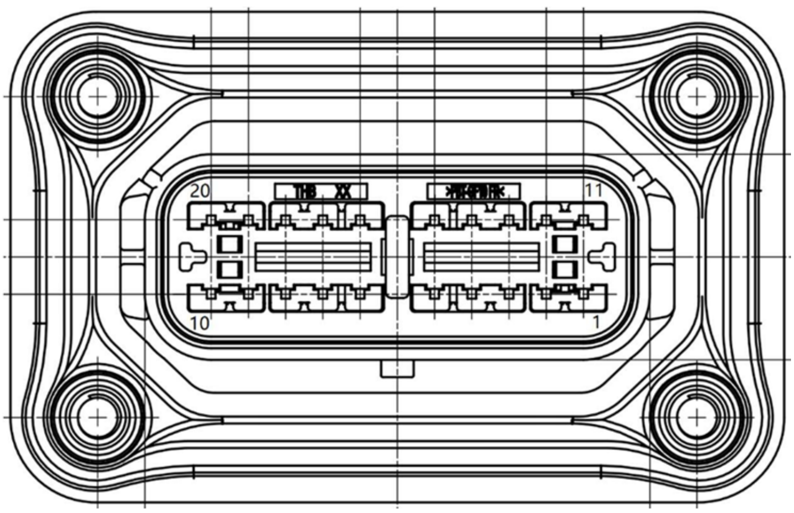
Figure 3 Battery Assembly End Interface Schematic Diagram

Front high voltage output:
2101640-DF10
High voltage connector assembly Ⅰ
Interface definition: Positive left and negative right

Rear high voltage output:
2101640-DF10
High voltage connector assembly Ⅱ
Interface definition: Positive left and negative right

Vehicle low voltage:
PP1570701

Low Voltage Connector Interface Definition



To Vehicle Low Voltage Wiring Harness
(Model: PP1570701)

Figure 4 Schematic Diagram of Connector Terminal Distribution Between Battery Assembly and Vehicle

Signal description:

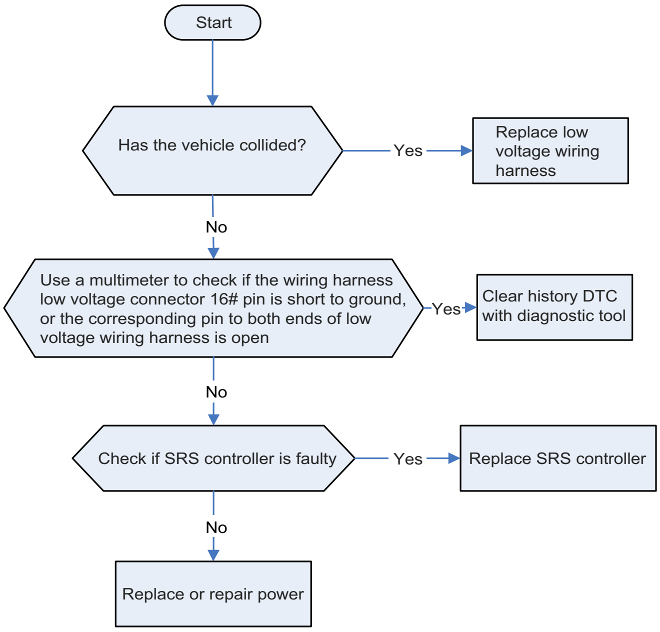
Item	Definition	
1	BcuPwr	Low voltage power supply positive
2	WakeupCtrl	VCU hardwire wake-up
3	CC	CC resistance value collection
4	DCChrg_Rly_HSD	Quick charging relay high side control
5	Quick charging adhesion diagnosis+	Quick charging relay adhesion diagnosis interface+
6	\	Null
7	\	Null
8	BcuInNetCANHi	Battery intranet CAN high
9	DCChrgCANHi	DC CAN high
10	PTCANFDHi	Vehicle CANFD high
11	VBAT_GND	Power ground
12	POWER_GND	Power supply ground
13	CC2	CC2 resistance value collection
14	DcChrg_Rly_LSD	Quick charging relay low side control
15	Quick charging adhesion diagnosis-	Quick charging relay adhesion diagnosis interface-
16	Crash_Sig	Collision hard wire signal
17	\	Null
18	BcuInNetCANLo	Battery intranet CAN low
19	DcChrgCANLo	DC CAN low
20	PTCANFDLo	Vehicle CANFD low

Fault Inspection and Verification

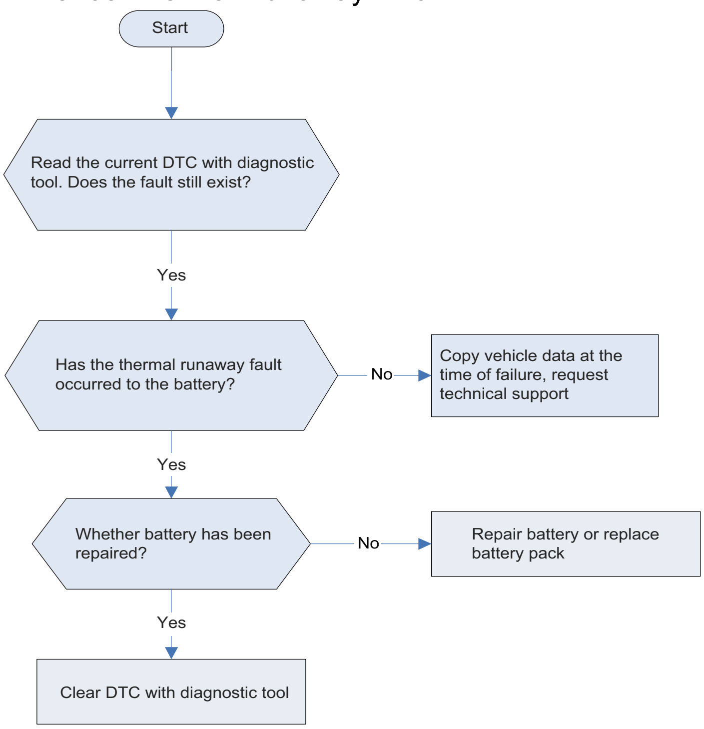
DTC and Troubleshooting Method

Read and record DTCs stored in vehicle controller through diagnostic tool, and troubleshoot DTCs involving battery assembly according to the corresponding DTC troubleshooting procedures as shown in table below:

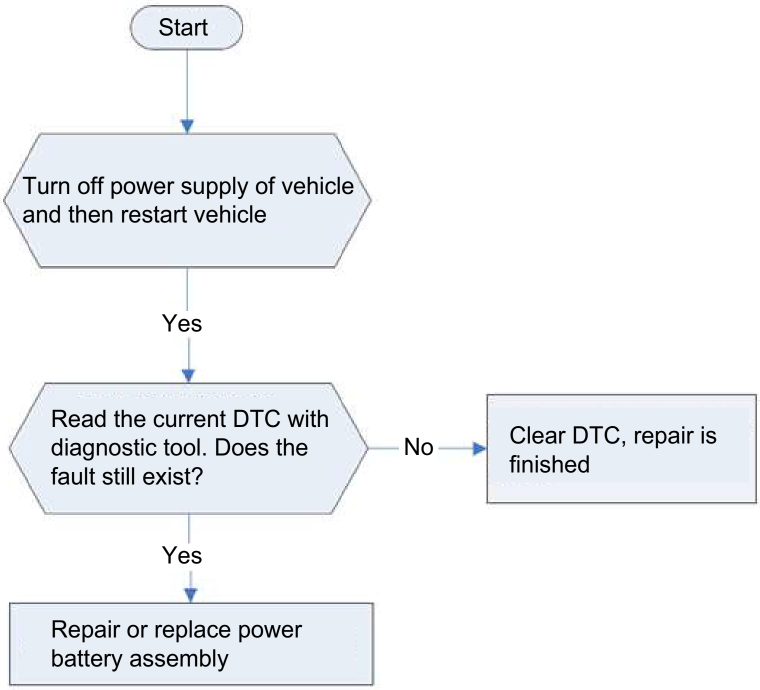
P1B4D07/P1B4D02 Crash Happen



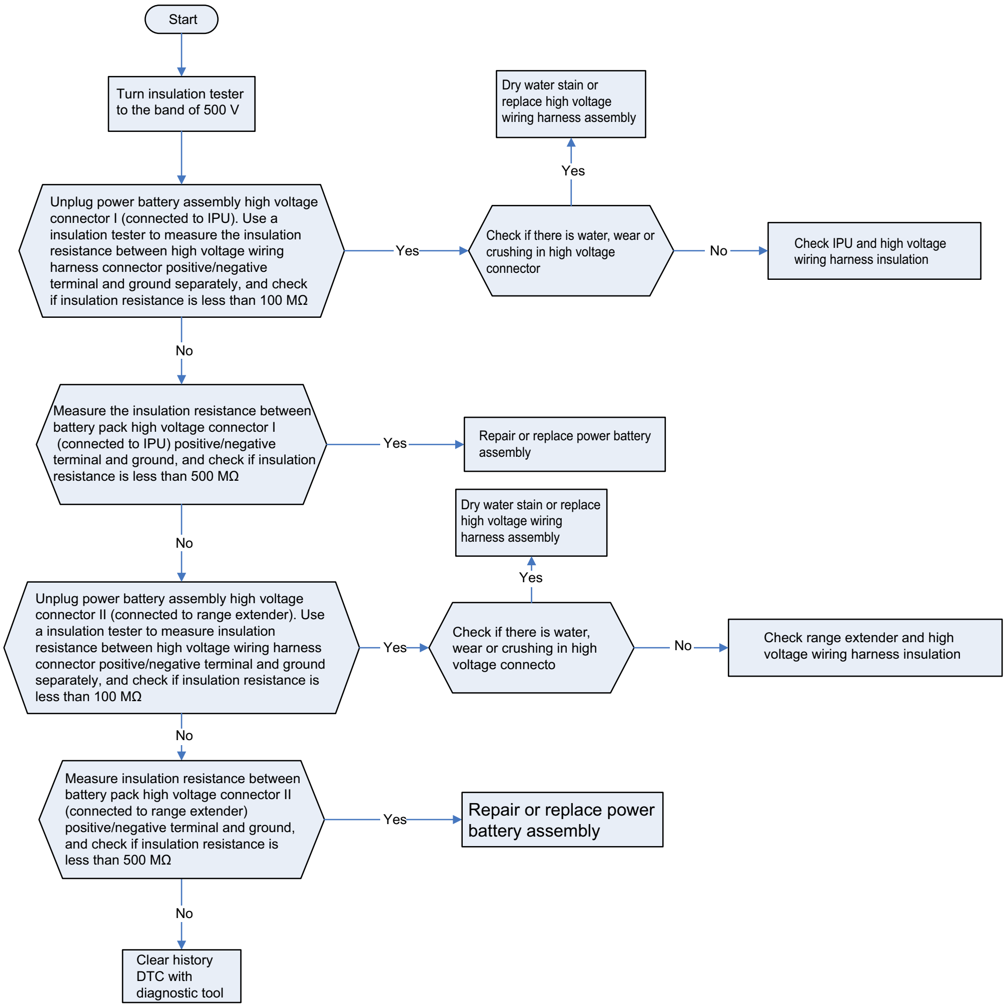
P1B5705 Thermal Runaway Error



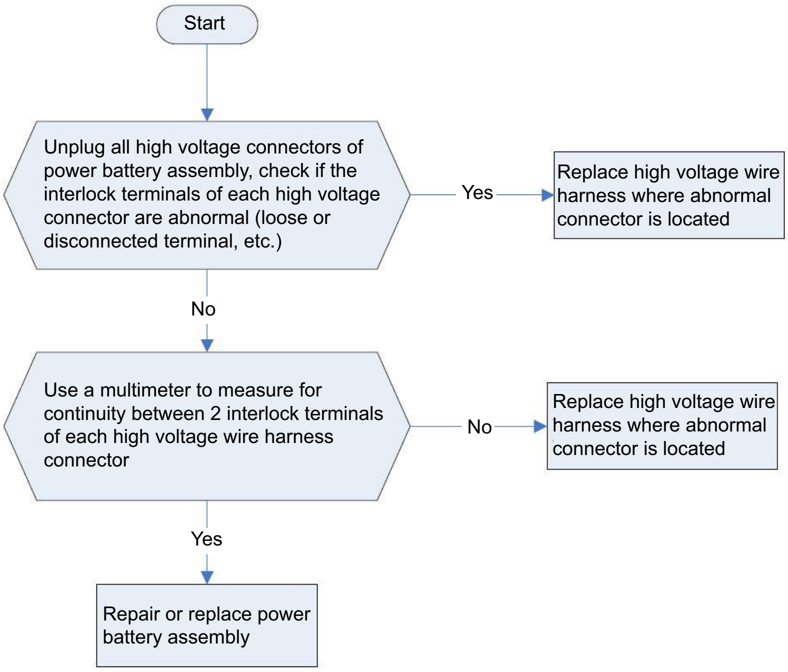
P1D2305 Insulation Module Error



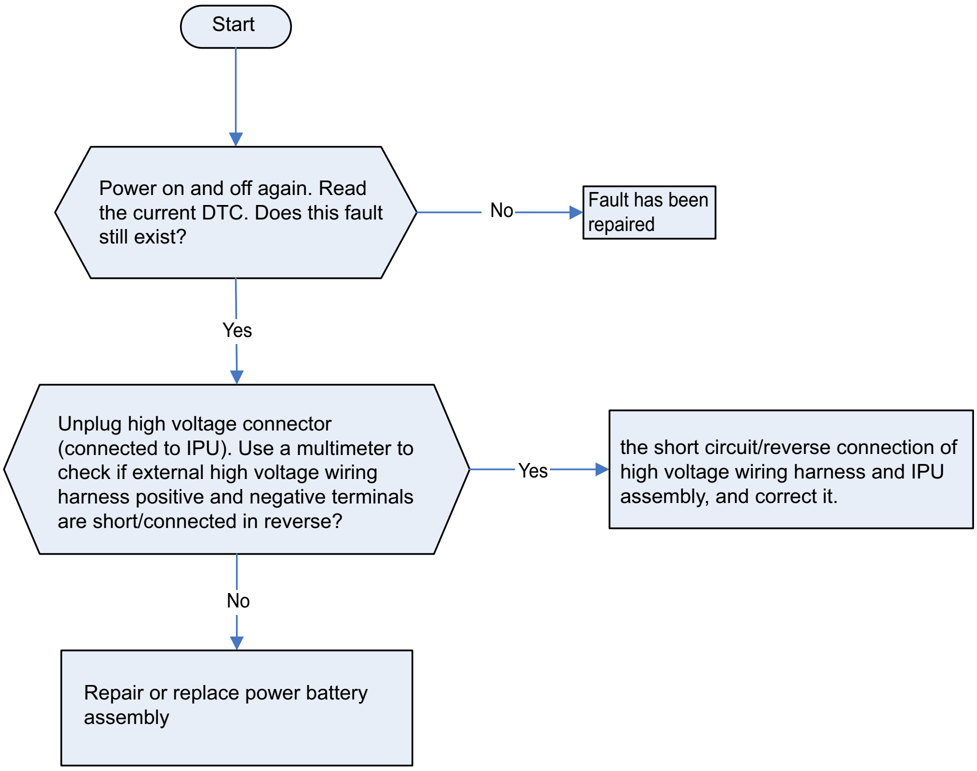
P1B4105 Insulation Error/P1B5305/P1B6F05 Insulation Error Alarm



P1B4E07 Battery Inside HVIL Open



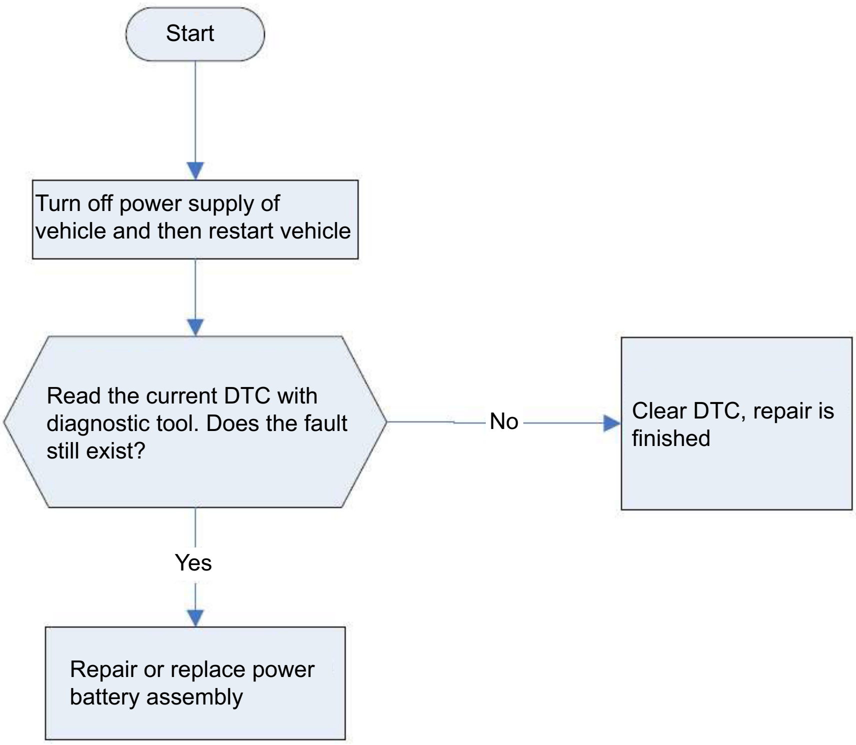
P1B4402 Precharge Error



P1B7102 Precharging Overcurrent (for repair and inspection method, refer to P1B4402)

P1B5502 High Voltage Loop Short Error (for repair and inspection method, refer to P1B4402)

P1B4605 BMS Unexpected Power-off Fault



P1B6D02 Sensor Failure During High Voltage (for repair and inspection method, refer to P1B4605)

P1B1C05 SOH Too Low for 2-Level (for repair and inspection method, refer to P1B4605)

P1DD801 Equalization Circuit Fault (for repair and inspection method, refer to P1B4605)

P1D1D01 Equalization Circuit Overtemperature Fault (for repair and inspection method, refer to P1B4605)

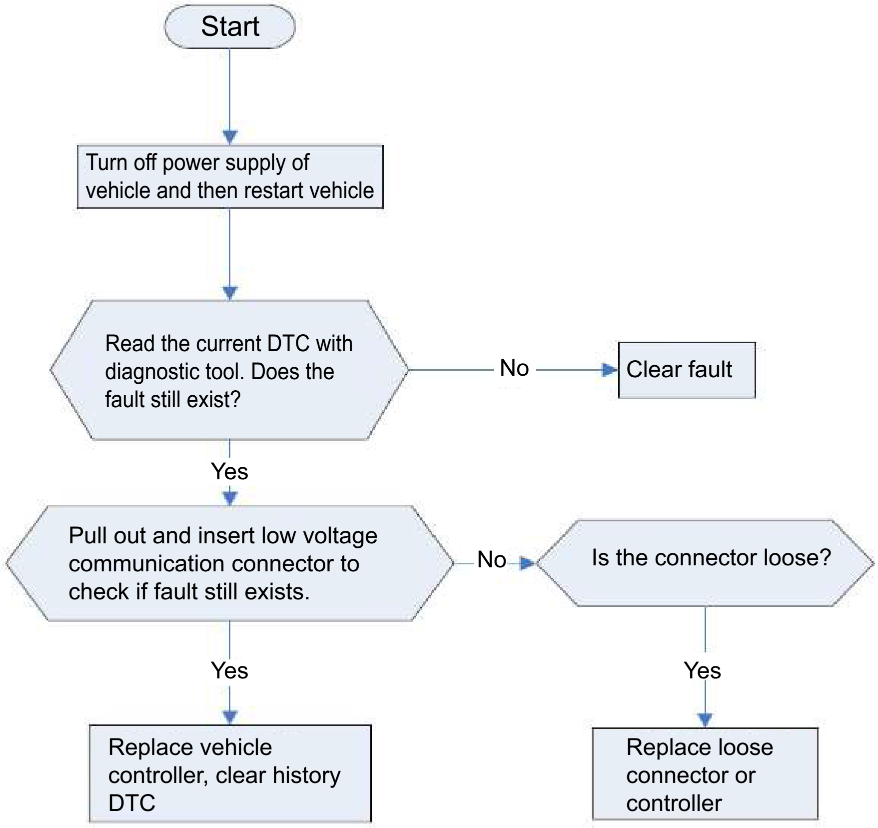
P1D1C01 Equalization Circuit Temperature Invalid Fault (for repair and inspection method, refer to P1B4605)

P1D1205 Unbalanced Battery Cell (for repair and inspection method, refer to P1B4605)

P1B8707 Heating Circuit Disconnection Fault (for repair and inspection method, refer to P1B4605)

P1B4F07/P1B5007/P1B6E75 Battery Inside HVIL Short To Vcc (for repair and inspection method, refer to P1B4605)

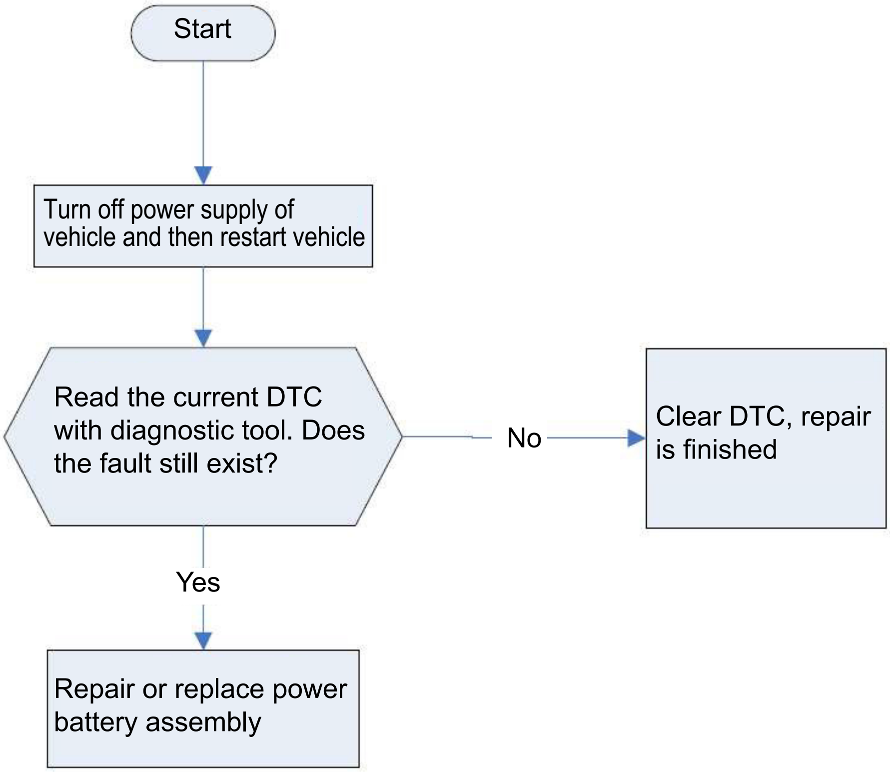
U1C8002 Lost Communication with PCU



P1DEE02 Abnormal communication between the PCU and BMS, CRC Check Error (for repair and inspection method, refer to U1C8002)

P1DF302 Abnormal communication between the PCU and BMS,Counter Error (for repair and inspection method, refer to U1C8002)

U12C202 Intranet CAN Communication Reception Fault



U1C8D02 ACAN BusOff Fault (for repair and inspection method, refer to U12C202)

U1C8E02 SCAN BusOff Fault (for repair and inspection method, refer to U12C202)

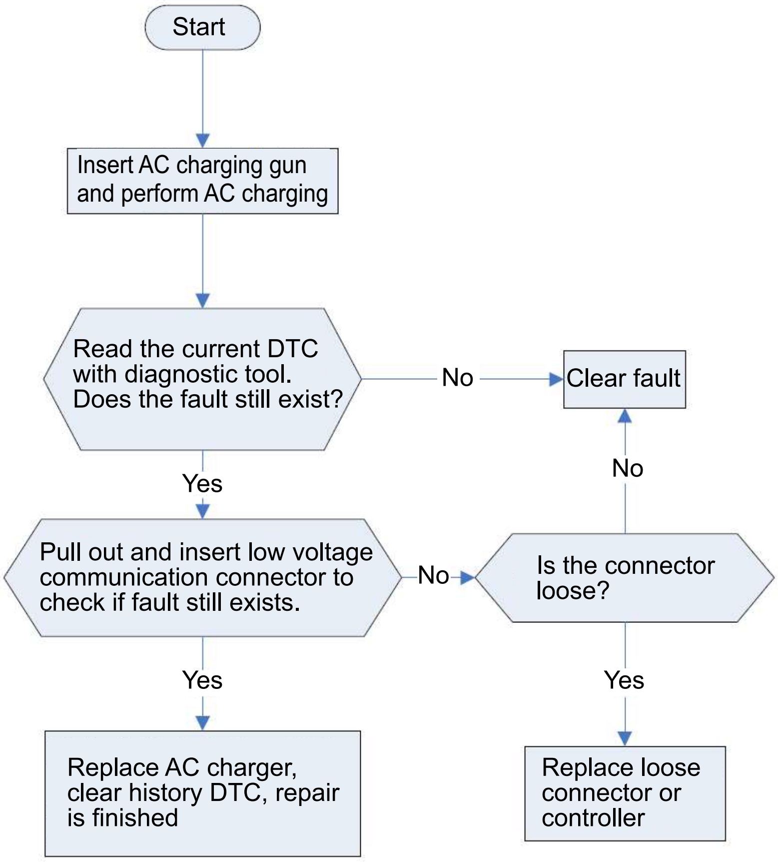
U1C8F02 TCAN BusOff Fault (for repair and inspection method, refer to U12C202)

P1DF902 E2E Fault between BMU and CMC (for repair and inspection method, refer to U12C202)

P1B3A07 SPI Communication Exception for High Voltage Sampling Function (for repair and inspection method, refer to U12C202)

P1B5E01 Thermal Sensor Signal Abnormal Error (for repair and inspection method, refer to U12C202)

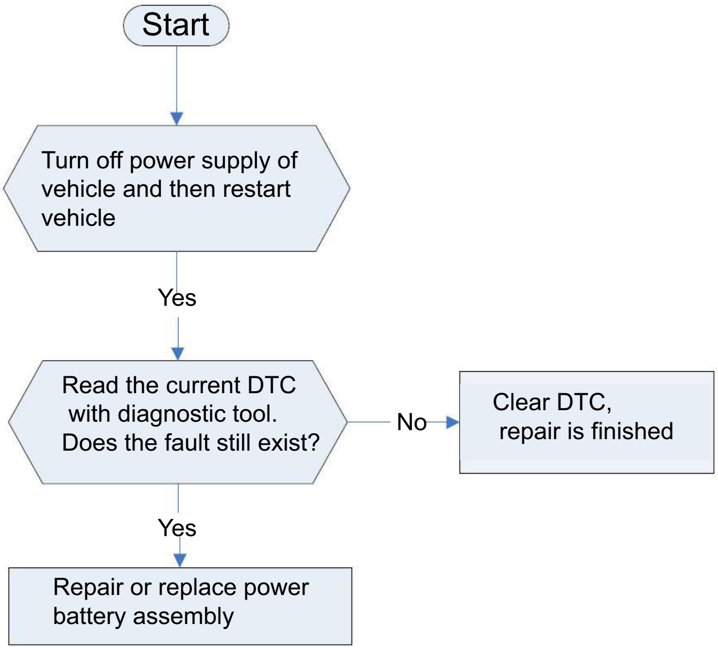
U1C8402 Lost Communication with OBC



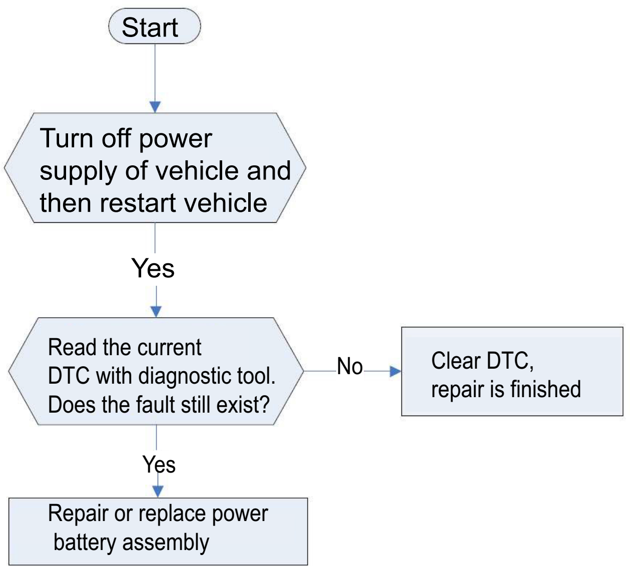
P1DF402 Abnormal communication between the OBC and BMS,Counter Error (for repair and inspection method, refer to U1C8402)

P1DEF02 Abnormal communication between the OBC and BMS, CRC Check Error (for repair and inspection method, refer to U1C8402)

P1B9101 Current Sensor Error (CAB)



P1B2D05 Cell Over Voltage Fault Rank 5



P1B2E05 Cell Under Voltage Fault Rank 5 (for repair and inspection method, refer to P1B2D05)

P1B2505 Cell Over Voltage Fault Rank 4 (for repair and inspection method, refer to P1B2D05)

P1B2605 Cell Under Voltage Fault Rank 4 (for repair and inspection method, refer to P1B2D05)

P1B0805 Cell Over Voltage Fault Rank 3 (for repair and inspection method, refer to P1B2D05)

P1B0B05 Cell Under Voltage Fault Rank 3 (for repair and inspection method, refer to P1B2D05)

P1B2F05 Cell Over Temperature Fault Rank 5 (for repair and inspection method, refer to P1B2D05)

P1B2905 Cell Over Temperature Fault Rank 4 (for repair and inspection method, refer to P1B2D05)

P1B1405 Cell Over Temperature Fault Rank 3 (for repair and inspection method, refer to P1B2D05)

P1B2305 Battery Over Voltage Fault Rank 4 (for repair and inspection method, refer to P1B2D05)

P1B2405 Battery Under Voltage Fault Rank 4 (for repair and inspection method, refer to P1B2D05)

P1B0205 Battery Over Voltage Fault Rank 3 (for repair and inspection method, refer to P1B2D05)

P1B0505 Battery Under Voltage Fault Rank 3 (for repair and inspection method, refer to P1B2D05)

P1D1E01 Sampling Chip Overtemperature Fault (for repair and inspection method, refer to P1B2D05)

P1D0401 Cell Voltage Sample Rationl Error (for repair and inspection method, refer to P1B2D05)

P1D0A01 BMU Overtemperature Fault (for repair and inspection method, refer to P1B2D05)

P1B7801 Total Voltage Sensor Electrical Error (for repair and inspection method, refer to P1B2D05)

P1D0001 Total Voltage Sample Rationl Error (for repair and inspection method, refer to P1B2D05)

P1C1901 Core Voltage Sampling Line Dropout (for repair and inspection method, refer to P1B2D05)

P1B5602 High Voltage Loop of Pack Open Error (for repair and inspection method, refer to P1B2D05)

P1B7001 Module Voltage (Total Voltage of Multiple Cell Monitored by Single Chip) out of range faults (for repair and inspection method, refer to P1B2D05)

P1D0101 Battery Current Sample Rationl Error (for repair and inspection method, refer to P1B2D05)

P1B3E01 First Current Sensor AFE Capture Shunt Temperature Too High Primary/Secondary Fault (for repair and inspection method, refer to P1B2D05)

P1CA601/P1CA901 Temperature Sensor Over Upper Limit Fault/Temperature Sensor Over Lower Limit Fault (for repair and inspection method, refer to P1B2D05)

P1CAC01 Temperature Sensor Medium Fault (for repair and inspection method, refer to P1B2D05)

P1C3A01 Temperature Sensor Severe Fault (for repair and inspection method, refer to P1B2D05)

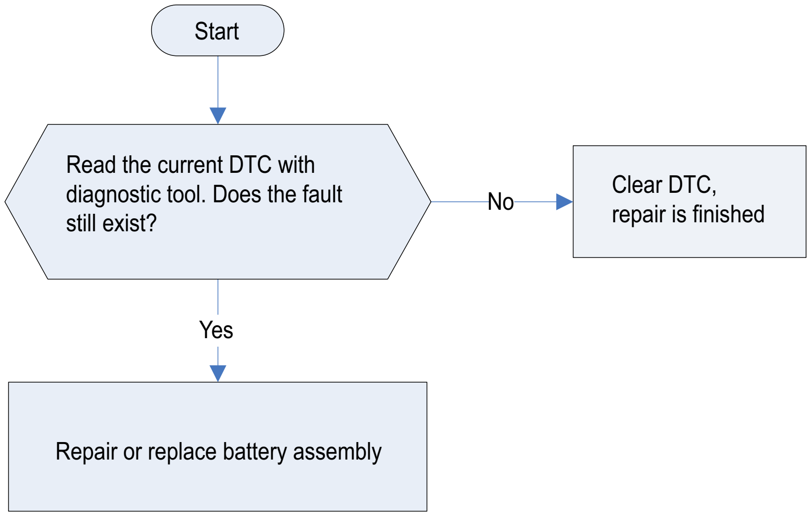
P1CAF01 Sampling Chip Hardware Fault (for repair and inspection method, refer to P1B2D05)

P1B5D01 Thermal Sensor Wakeup Function Error (for repair and inspection method, refer to P1B2D05)

P1B3F01 Atmospheric Pressure Sensor BPS Wake-up BMS Hardwire Fault (for repair and inspection method, refer to P1B2D05)

P1B4001 Failure to Calibrate BPS Low Power Parameter after BMS Initialization (for repair and inspection method, refer to P1B2D05)

P1B3107 Main Positive Relay Circuit Stuck Open



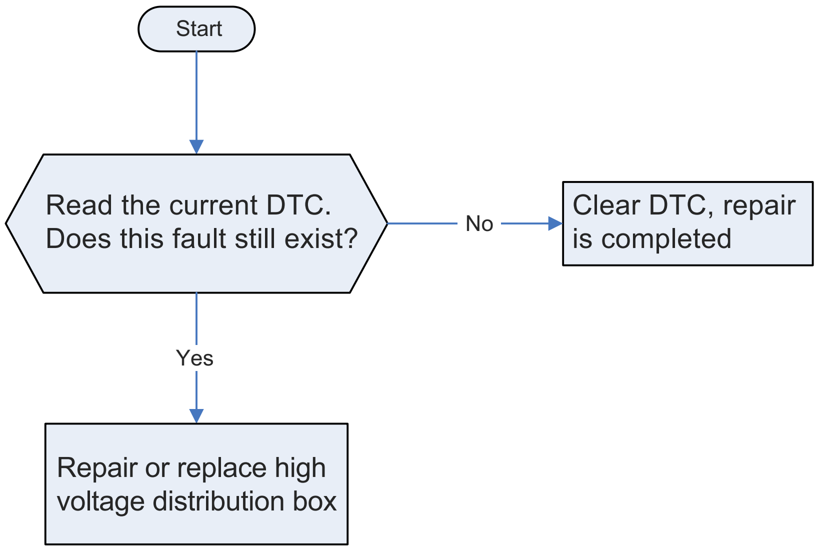
P1B3202 Main Negative Relay Circuit Stuck Closed (for repair and inspection method, refer to P1B3107)

P1B3402 Precharge Relay Circuit Stuck Closed (for repair and inspection method, refer to P1B3107)

P1B3B07 Quick Charging Relay Diagnostic Circuit Fault (for repair and inspection method, refer to P1B3107)

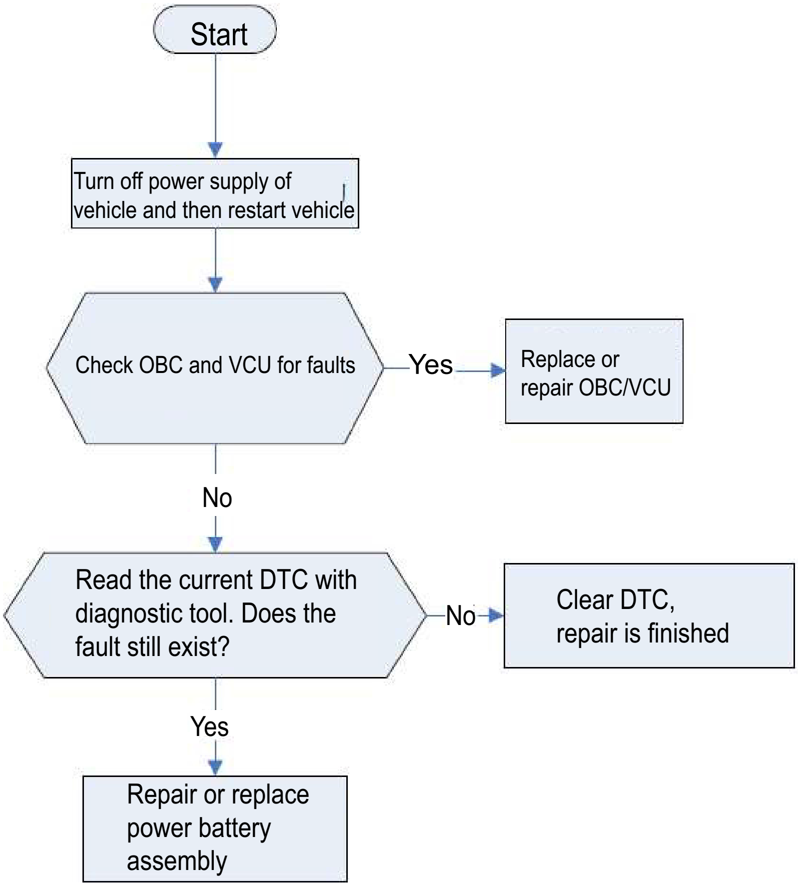
P1B3507 Pre-charging RELAY NOT CLOSING FAULT/Pre-charging Relay Mechanical End Normally Open Fault (for repair and inspection method, refer to P1B3107)

P1B4907 DC Charge Relay Circuit Stuck Closed



P1B4807 DC Charge Relay Circuit Stuck Open (for repair and inspection method, refer to P1B4907)

P1B2105 Charge Current Over Fault Rank 3



P1B2705 Charge Current Over Fault Rank 4 (for repair and inspection method, refer to P1B2105)

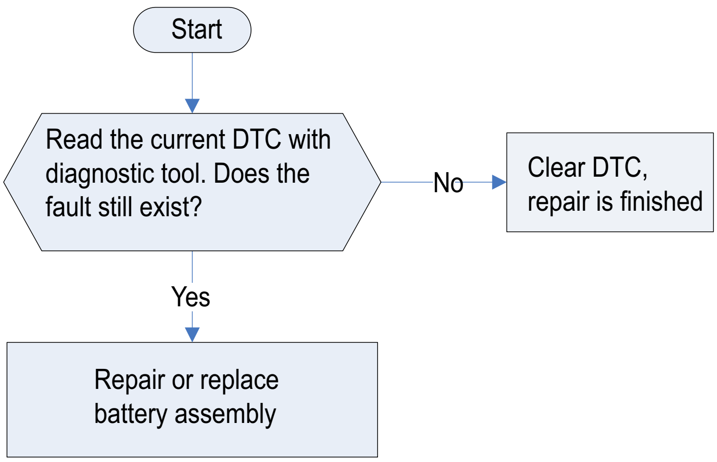
P1B2205 Discharge Current Over Fault Rank 3 (for repair and inspection method, refer to P1B2105)

P1B2805 Discharge Current Over Fault Rank 4 (for repair and inspection method, refer to P1B2105)

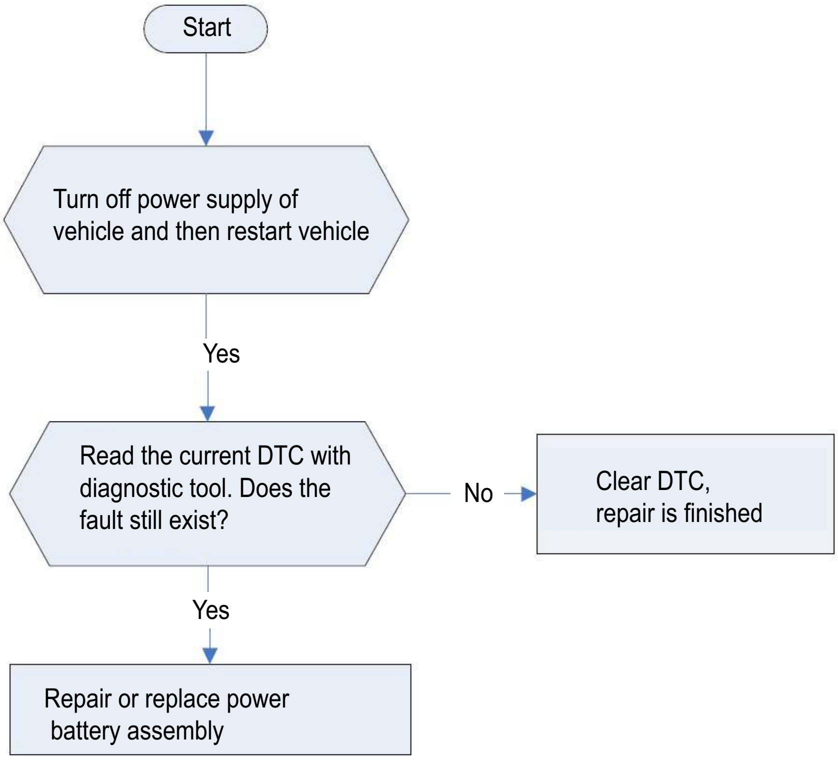
P1B2C05 Discharge Current Over Fault Rank 5 (for repair and inspection method, refer to P1B2105)

P1B2B05 Charge Current Over Fault Rank 5 (for repair and inspection method, refer to P1B2105)

P1B5407 Self Check Error



P1B0505 Battery Under Voltage Fault Rank 3



P1B2405 Battery Under Voltage Fault Rank 4 (repair is the same as P1B0505)

P1B0805 Cell Over Voltage Fault Rank 3

(repair is the same as P1B0505)

P1B2D05 Cell Over Voltage Fault Rank 5 (repair is the same as P1B0505)

P1B2505 Cell Over Voltage Fault Rank 4 (repair is the same as P1B0505)

P1B2605 Cell Under Voltage Fault Rank 4 (repair is the same as P1B0505)

P1B2E05 Cell Under Voltage Fault Rank 5 (repair is the same as P1B0505)

P1B0C05 The Static Voltage Difference of The Cells is Slightly Larger (repair is the same as P1B0505)

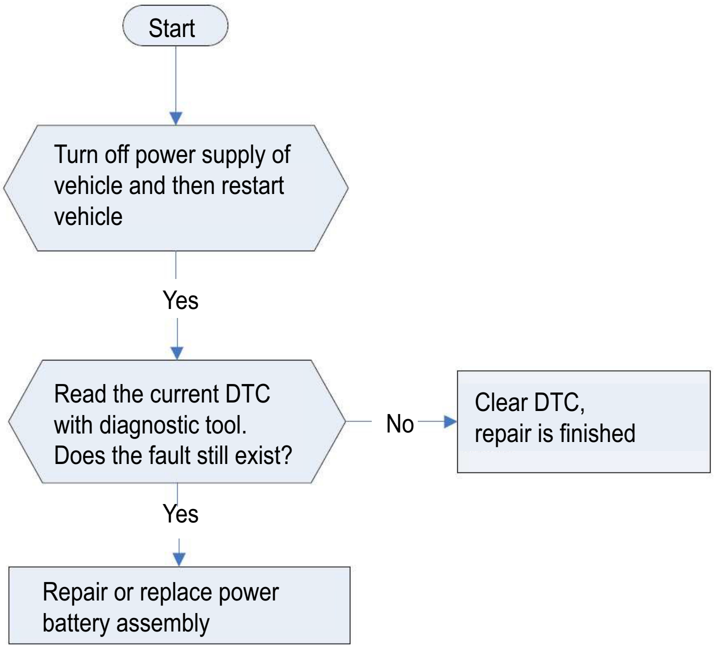
P1B2F05 Cell Over Temperature Fault Rank 5 (repair is the same as P1B0505)

P1B1F05 Excessive Temperature Difference between Battery 1st Class/Faulty Monomer (repair is the same as P1B0505)

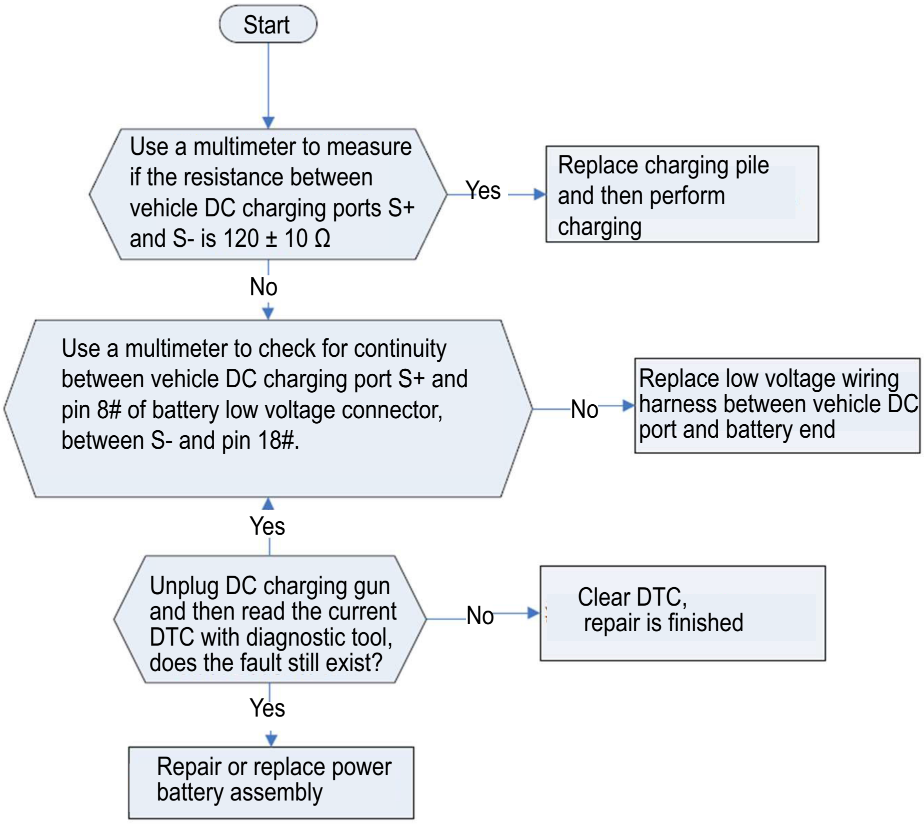
P1D0905/P1B6901 BMS Low Voltage Supply Voltage Too Low, Too High Fault/12 V Supply Voltage Abnormality (repair is the same as 12 V battery fault)

P1B7601 Short in CC2 Ground/Abnormal Power Supply (repair is the same as P1B0505)

P1DF502 Abnormal Communication Between the CMU and BMU, Counter Error



P1D3202 Lost Message with DC OBC (Data Synchronization Signal)



P1D3102 Lost Message with DC OBC (SPN259301) (repair is the same as P1D3202)

P1D3002 Lost Message with DC OBC (SPN256300) (repair is the same as P1D3202)

P1D4302 Lost Message with DC OBC (Maximum Output Capacity) (repair is the same as P1D3202)

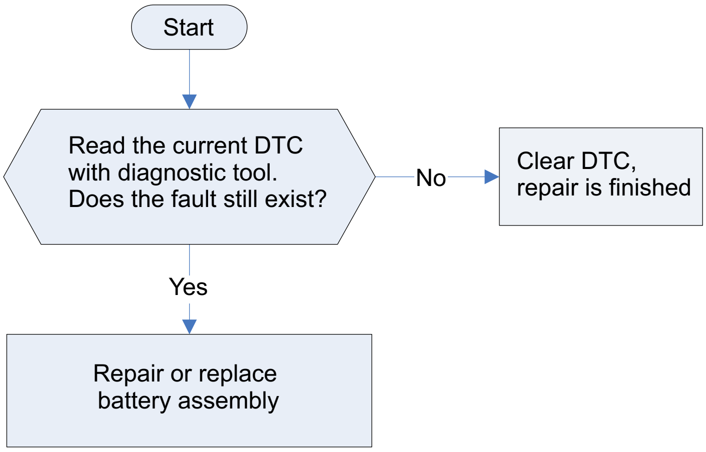
P1D3302 Lost Message with DC OBC (Ready to Charge Signal) (repair is the same as P1D3202)

P1D3402 Lost Message with DC OBC (State of Charge Signal) (repair is the same as P1D3202)

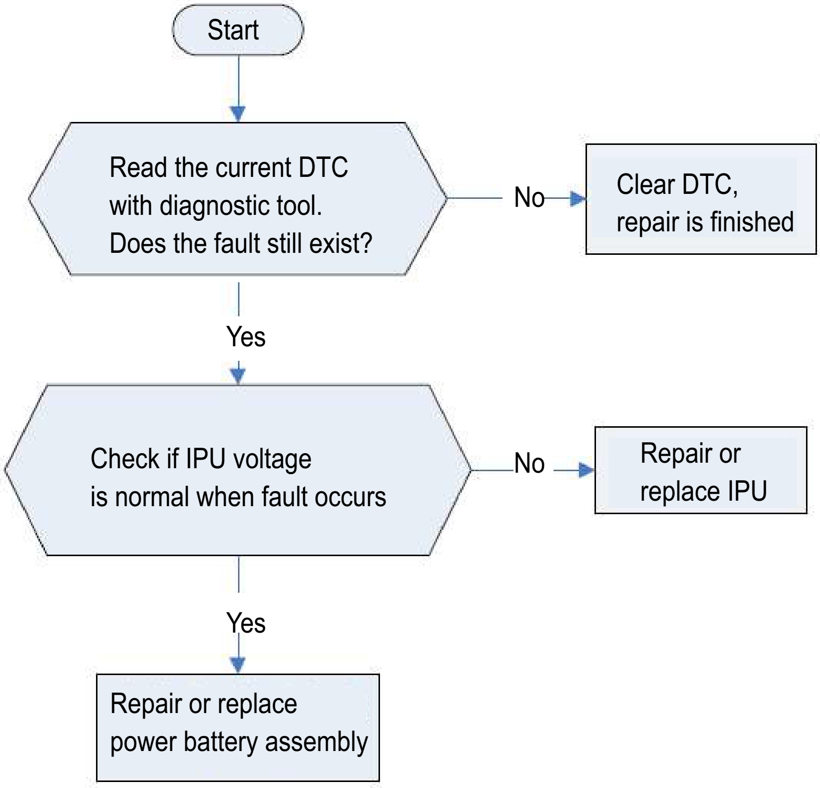
P1D3502 Lost Message with DC OBC (Break Charge) (repair is the same as P1D3202)

P1D3602 Lost Message with DC OBC (Charging Statistics) (repair is the same as P1D3202)

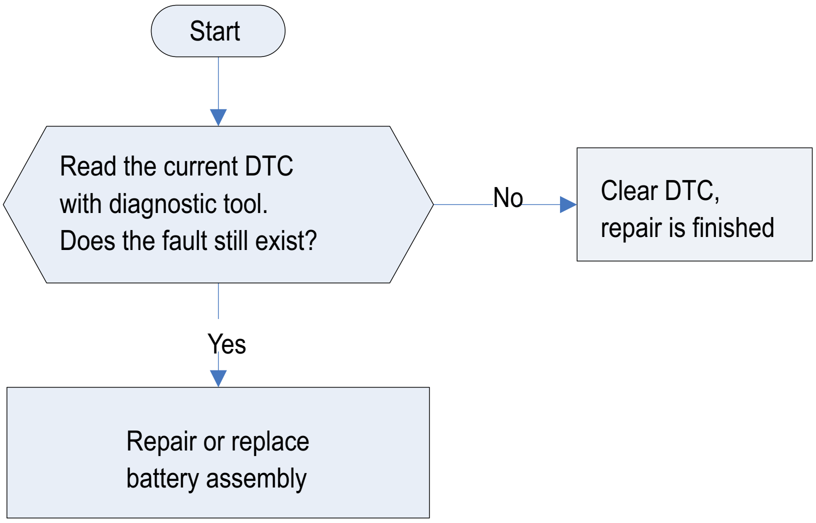
P1B8701 Heater Circuit Open



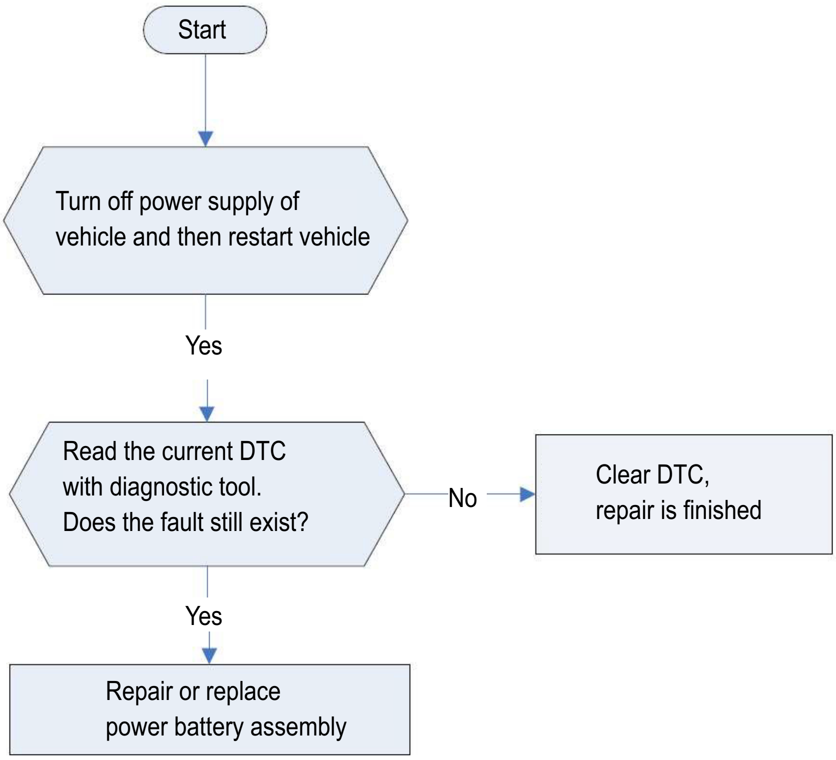
P1B3007 Main Positive Relay Circuit Stuck Closed



P1B8901 Heater Relay Error



P1BA101 Voltage Sample Open of 1# Cell



P1BA201 Voltage Sample Open of 2# Cell (repair is the same as P1BA101)

P1BA301 Voltage Sample Open of 3# Cell (repair is the same as P1BA101)

P1BA401 Voltage Sample Open of 4# Cell (repair is the same as P1BA101)

P1BA501 Voltage Sample Open of 5# Cell (repair is the same as P1BA101)

P1BA601 Voltage Sample Open of 6# Cell (repair is the same as P1BA101)

P1BA701 Voltage Sample Open of 7# Cell (repair is the same as P1BA101)

P1BA801 Voltage Sample Open of 8# Cell (repair is the same as P1BA101)

P1BA901 Voltage Sample Open of 9# Cell (repair is the same as P1BA101)

P1BAA01 Voltage Sample Open of 10# Cell (repair is the same as P1BA101)

P1BAB01 Voltage Sample Open of 11# Cell (repair is the same as P1BA101)

P1BAC01 Voltage Sample Open of 12# Cell (repair is the same as P1BA101)

P1BAD01 Voltage Sample Open of 13# Cell (repair is the same as P1BA101)

P1BAE01 Voltage Sample Open of 14# Cell (repair is the same as P1BA101)

P1BAF01 Voltage Sample Open of 15# Cell (repair is the same as P1BA101)

P1BB001 Voltage Sample Open of 16# Cell (repair is the same as P1BA101)

P1BB101 Voltage Sample Open of 17# Cell (repair is the same as P1BA101)

P1BB201 Voltage Sample Open of 18# Cell (repair is the same as P1BA101)

P1BB301 Voltage Sample Open of 19# Cell (repair is the same as P1BA101)

P1BB401 Voltage Sample Open of 20# Cell (repair is the same as P1BA101)

P1BB501 Voltage Sample Open of 21# Cell (repair is the same as P1BA101)

P1BB601 Voltage Sample Open of 22# Cell (repair is the same as P1BA101)

P1BB701 Voltage Sample Open of 23# Cell (repair is the same as P1BA101)

P1BB801 Voltage Sample Open of 24# Cell (repair is the same as P1BA101)

P1BB901 Voltage Sample Open of 25# Cell (repair is the same as P1BA101)

P1BBA01 Voltage Sample Open of 26# Cell (repair is the same as P1BA101)

P1BBB01 Voltage Sample Open of 27# Cell (repair is the same as P1BA101)

P1BBC01 Voltage Sample Open of 28# Cell (repair is the same as P1BA101)

P1BBD01 Voltage Sample Open of 29# Cell (repair is the same as P1BA101)

P1BBE01 Voltage Sample Open of 30# Cell (repair is the same as P1BA101)

P1BBF01 Voltage Sample Open of 31# Cell (repair is the same as P1BA101)

P1BC001 Voltage Sample Open of 32# Cell (repair is the same as P1BA101)

P1BC101 Voltage Sample Open of 33# Cell (repair is the same as P1BA101)

P1BC201 Voltage Sample Open of 34# Cell (repair is the same as P1BA101)

P1BC301 Voltage Sample Open of 35# Cell (repair is the same as P1BA101)

P1BC401 Voltage Sample Open of 36# Cell (repair is the same as P1BA101)

P1BC501 Voltage Sample Open of 37# Cell (repair is the same as P1BA101)

P1BC601 Voltage Sample Open of 38# Cell (repair is the same as P1BA101)

P1BC701 Voltage Sample Open of 39# Cell (repair is the same as P1BA101)

P1BC801 Voltage Sample Open of 40# Cell (repair is the same as P1BA101)

P1BC901 Voltage Sample Open of 41# Cell (repair is the same as P1BA101)

P1BCA01 Voltage Sample Open of 42# Cell (repair is the same as P1BA101)

P1BCB01 Voltage Sample Open of 43# Cell (repair is the same as P1BA101)

P1BCC01 Voltage Sample Open of 44# Cell (repair is the same as P1BA101)
P1BCD01 Voltage Sample Open of 45# Cell (repair is the same as P1BA101)

P1BCE01 Voltage Sample Open of 46# Cell (repair is the same as P1BA101)

P1BCF01 Voltage Sample Open of 47# Cell (repair is the same as P1BA101)

P1BD001 Voltage Sample Open of 48# Cell (repair is the same as P1BA101)

P1BD101 Voltage Sample Open of 49# Cell (repair is the same as P1BA101)

P1BD201 Voltage Sample Open of 50# Cell (repair is the same as P1BA101)

P1BD301 Voltage Sample Open of 51# Cell (repair is the same as P1BA101)

P1BD401 Voltage Sample Open of 52# Cell (repair is the same as P1BA101)

P1BD501 Voltage Sample Open of 53# Cell (repair is the same as P1BA101)

P1BD601 Voltage Sample Open of 54# Cell (repair is the same as P1BA101)

P1BD701 Voltage Sample Open of 55# Cell (repair is the same as P1BA101)

P1BD801 Voltage Sample Open of 56# Cell (repair is the same as P1BA101)

P1BD901 Voltage Sample Open of 57# Cell (repair is the same as P1BA101)

P1BDA01 Voltage Sample Open of 58# Cell (repair is the same as P1BA101)

P1BDB01 Voltage Sample Open of 59# Cell (repair is the same as P1BA101)

P1BDC01 Voltage Sample Open of 60# Cell (repair is the same as P1BA101)

P1BDD01 Voltage Sample Open of 61# Cell (repair is the same as P1BA101)

P1BDE01 Voltage Sample Open of 62# Cell (repair is the same as P1BA101)

P1BDF01 Voltage Sample Open of 63# Cell (repair is the same as P1BA101)

P1BE001 Voltage Sample Open of 64# Cell (repair is the same as P1BA101)

P1BE101 Voltage Sample Open of 65# Cell (repair is the same as P1BA101)

P1BE201 Voltage Sample Open of 66# Cell (repair is the same as P1BA101)

P1BE301 Voltage Sample Open of 67# Cell (repair is the same as P1BA101)

P1BE401 Voltage Sample Open of 68# Cell (repair is the same as P1BA101)

P1BE501 Voltage Sample Open of 69# Cell (repair is the same as P1BA101)

P1BE601 Voltage Sample Open of 70# Cell (repair is the same as P1BA101)

P1BE701 Voltage Sample Open of 71# Cell (repair is the same as P1BA101)

P1BE801 Voltage Sample Open of 72# Cell (repair is the same as P1BA101)

P1BE901 Voltage Sample Open of 73# Cell (repair is the same as P1BA101)

P1BEA01 Voltage Sample Open of 74# Cell (repair is the same as P1BA101)

P1BEB01 Voltage Sample Open of 75# Cell (repair is the same as P1BA101)

P1BEC01 Voltage Sample Open of 76# Cell (repair is the same as P1BA101)

P1BED01 Voltage Sample Open of 77# Cell (repair is the same as P1BA101)

P1BEE01 Voltage Sample Open of 78# Cell (repair is the same as P1BA101)

P1BEF01 Voltage Sample Open of 79# Cell (repair is the same as P1BA101)

P1BF001 Voltage Sample Open of 80# Cell (repair is the same as P1BA101)

P1BF101 Voltage Sample Open of 81# Cell (repair is the same as P1BA101)

P1BF201 Voltage Sample Open of 82# Cell (repair is the same as P1BA101)

P1BF301 Voltage Sample Open of 83# Cell (repair is the same as P1BA101)

P1BF401 Voltage Sample Open of 84# Cell (repair is the same as P1BA101)

P1BF501 Voltage Sample Open of 85# Cell (repair is the same as P1BA101)

P1BF601 Voltage Sample Open of 86# Cell (repair is the same as P1BA101)

P1BF701 Voltage Sample Open of 87# Cell (repair is the same as P1BA101)

P1BF801 Voltage Sample Open of 88# Cell (repair is the same as P1BA101)

P1BF901 Voltage Sample Open of 89# Cell (repair is the same as P1BA101)

P1BFA01 Voltage Sample Open of 90# Cell (repair is the same as P1BA101)

P1BFB01 Voltage Sample Open of 91# Cell (repair is the same as P1BA101)

P1BFC01 Voltage Sample Open of 92# Cell (repair is the same as P1BA101)

P1BFD01 Voltage Sample Open of 93# Cell (repair is the same as P1BA101)

P1BFE01 Voltage Sample Open of 94# Cell (repair is the same as P1BA101)

P1BFF01 Voltage Sample Open of 95# Cell (repair is the same as P1BA101)

P1C0001 Voltage Sample Open of 96# Cell (repair is the same as P1BA101)

P1C0101 Voltage Sample Open of 97# Cell (repair is the same as P1BA101)

P1C0201 Voltage Sample Open of 98# Cell (repair is the same as P1BA101)

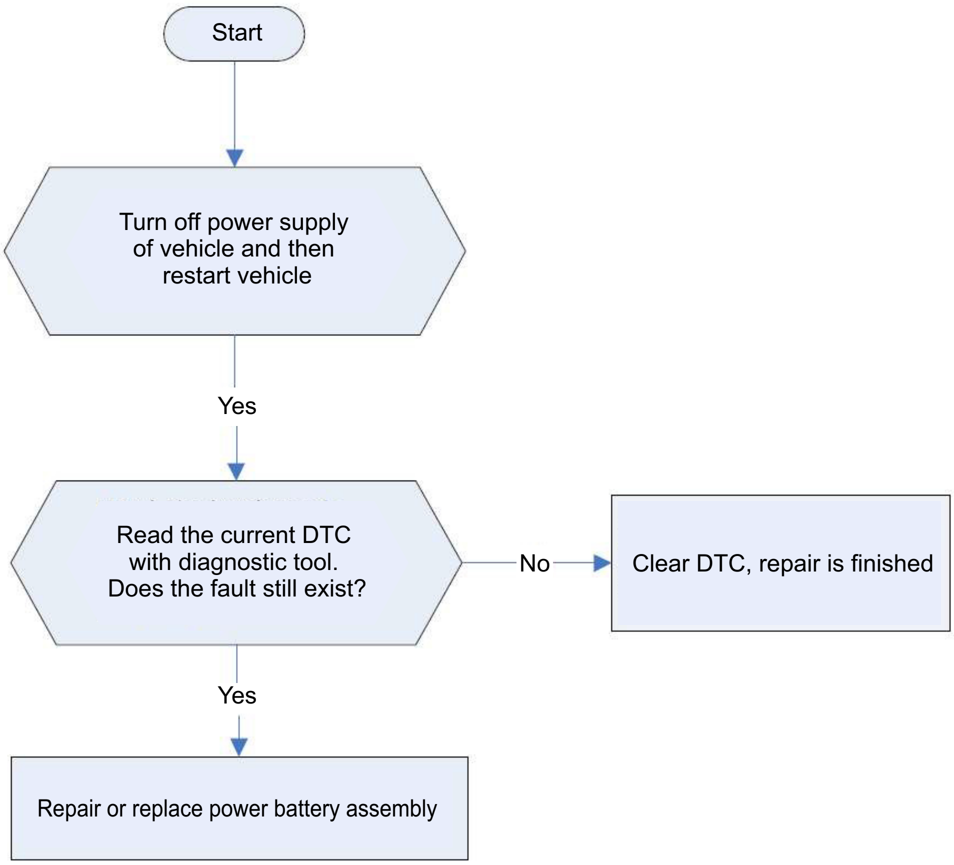
P1C0301 Voltage Sample Open of 99# Cell (repair is the same as P1BA101)

P1C0401 Voltage Sample Open of 100# Cell (repair is the same as P1BA101)

P1C0501 Voltage Sample Open of 101# Cell (repair is the same as P1BA101)

P1C0601 Voltage Sample Open of 102# Cell (repair is the same as P1BA101)

P1CA101 Sampling Open Circuit of 1# Temperature Sensor



P1CA401 Sampling Open Circuit of 2# Temperature Sensor (repair is the same as P1CA101)

P1CA701 Sampling Open Circuit of 3# Temperature Sensor (repair is the same as P1CA101)

P1CAA01 Sampling Open Circuit of 4# Temperature Sensor (repair is the same as P1CA101)

P1CAD01 Sampling Open Circuit of 5# Temperature Sensor (repair is the same as P1CA101)

P1CB001 Sampling Open Circuit of 6# Temperature Sensor (repair is the same as P1CA101)

P1CB301 Sampling Open Circuit of 7# Temperature Sensor (repair is the same as P1CA101)

P1CB601 Sampling Open Circuit of 8# Temperature Sensor (repair is the same as P1CA101)

P1CB901 Sampling Open Circuit of 9# Temperature Sensor (repair is the same as P1CA101)

P1CBC01 Sampling Open Circuit of 10# Temperature Sensor (repair is the same as P1CA101)

P1CBF01 Sampling Open Circuit of 11# Temperature Sensor (repair is the same as P1CA101)

P1CC201 Sampling Open Circuit of 12# Temperature Sensor (repair is the same as P1CA101)

P1CC501 Sampling Open Circuit of 13# Temperature Sensor (repair is the same as P1CA101)

P1CC801 Sampling Open Circuit of 14# Temperature Sensor (repair is the same as P1CA101)

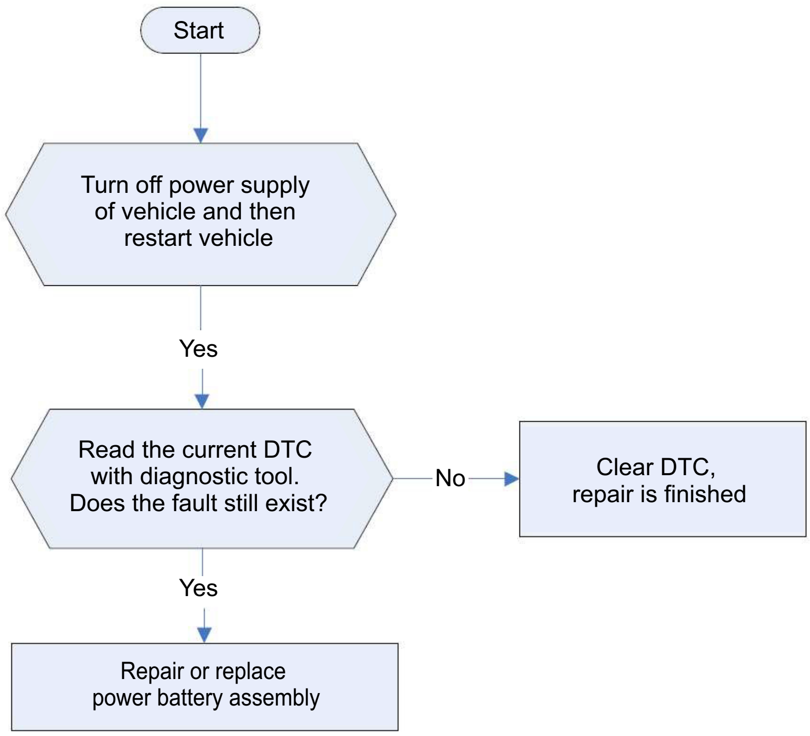
P1CCB01 Sampling Open Circuit of 15# Temperature Sensor (repair is the same as P1CA101)

P1CCE01 Sampling Open Circuit of 16# Temperature Sensor (repair is the same as P1CA101)

P1CD101 Sampling Open Circuit of 17# Temperature Sensor (repair is the same as P1CA101)

P1CD401 Sampling Open Circuit of 18# Temperature Sensor (repair is the same as P1CA101)

P1D6001 1# Cell Equalization circuit Error



P1D6101 2# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6201 3# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6301 4# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6401 5# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6501 6# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6601 7# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6701 8# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6801 9# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6901 10# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6A01 11# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6B01 12# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6C01 13# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6D01 14# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6E01 15# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D6F01 16# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7001 17# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7101 18# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7201 19# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7301 20# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7401 21# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7501 22# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7601 23# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7701 24# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7801 25# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7901 26# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7A01 27# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7B01 28# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7C01 29# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7D01 30# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7E01 31# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D7F01 32# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8001 33# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8101 34# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8201 35# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8301 36# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8401 37# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8501 38# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8601 39# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8701 40# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8801 41# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8901 42# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8A01 43# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8B01 44# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8C01 45# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8D01 46# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8E01 47# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D8F01 48# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9001 49# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9101 50# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9201 51# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9301 52# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9401 53# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9501 54# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9601 55# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9701 56# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9801 57# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9901 58# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9A01 59# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9B01 60# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9C01 61# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9D01 62# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9E01 63# Cell Equalization circuit Error (repair is the same as P1D6001)

P1D9F01 64# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA001 65# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA101 66# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA201 67# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA301 68# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA401 69# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA501 70# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA601 71# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA701 72# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA801 73# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DA901 74# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DAA01 75# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DAB01 76# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DAC01 77# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DAD01 78# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DAE01 79# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DAF01 80# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB001 81# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB101 82# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB201 83# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB301 84# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB401 85# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB501 86# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB601 87# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB701 88# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB801 89# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DB901 90# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DBA01 91# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DBB01 92# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DBC01 93# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DBD01 94# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DBE01 95# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DBF01 96# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DC001 97# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DC101 98# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DC201 99# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DC301 100# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DC401 101# Cell Equalization circuit Error (repair is the same as P1D6001)

P1DC501 102# Cell Equalization circuit Error (repair is the same as P1D6001)

Removal and Installation

Repair Safety Precautions

1) Operators must receive the safe removal and installation training and be qualified for the test;

2) The repair environment must be dry and clean;

3) Safety tools such as dry powder fire extinguisher, fire sand etc. must be prepared for repair environment; Insulation treatment must be performed for removing operating table;

4) The equipment such as lifter or lift platform truck are free of failure and operated by professionals;

5) Power battery assembly high voltage must be cut off before removing.

Battery Assembly Location

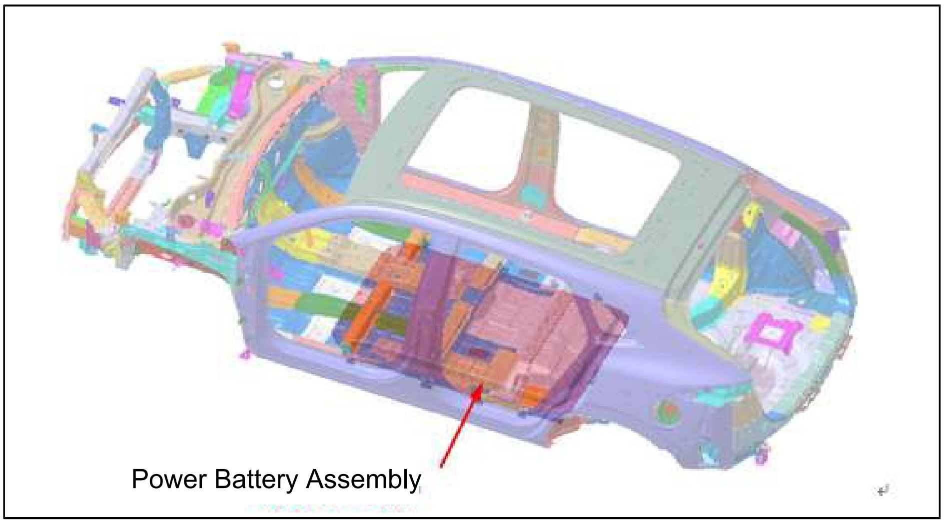


Figure 8 Position of Battery Assembly on Vehicle

Removal Procedures

Removal Procedures of Battery Assembly

1. Preparations for removal

Requirements:

Lift the vehicle to a certain height with the lifter, lift the lift platform truck and support the bottom of battery assembly. During removal, support the lower surface of battery with trolley, note that the battery should be symmetrical left and right on the trolley.

2. Remove battery assembly

Requirements:

Disconnect battery pack connector and loosen all bolts before removing battery retaining bolts, remove front and rear bolts, and then left and right bolts.

Note:

Pneumatic wrench, sleeve

Installation Procedures

Follow the reverse order of “Removal Procedures”.

3.3.5 High Voltage Wiring Harness

Torque Specifications

Description	Nm
Outer hexagon flange bolt M8 in three-phase power wiring harness assembly I, in total of 3 (cooper bar high voltage wiring harness retaining bolt); Outer hexagon flange bolt M6, in total of 3 (high voltage connector retaining bolt)	(11 ± 1) (9 ± 1)
Hexagon flange bolt M6 in high voltage power supply wiring harness assembly, in total of 1 (with connector); Cross recessed hexagon head screw and plate washer set M6, in total of 1; Hexagon flange nut M6, in total of 1	(8 ± 1) (8 ± 1) (8 ± 1)
Inner hexagon countersunk head screw M6 in AC charging socket wiring harness assembly, in total of 4; Hexagon flange bolt, in total of 4; Ground bolt M6, in total of 2	6 (8 ± 1) (8 ± 1)

Description and Malfunction Analysis

General Introduction of High Voltage Wiring Harness System

1. High voltage wiring harness layout and interlock introduction

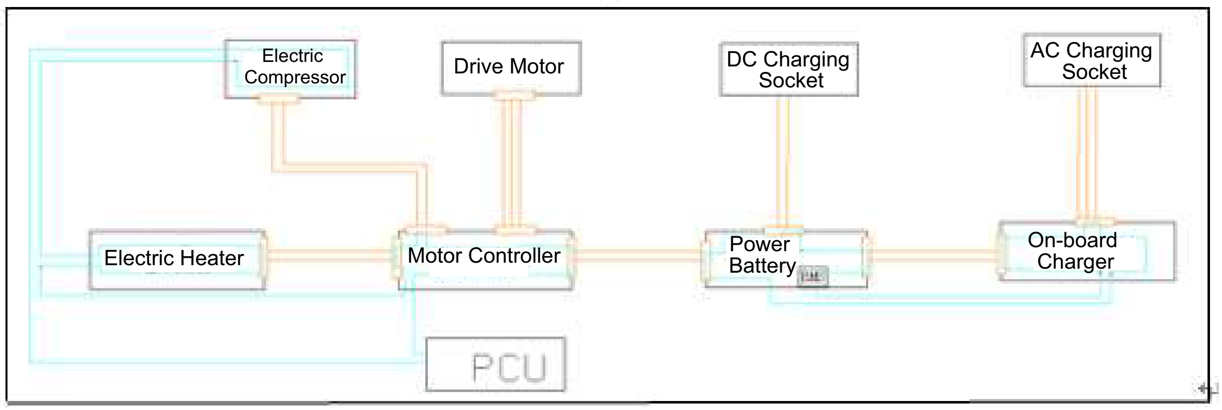


Figure 1 High Voltage Wiring Harness System Layout

Item	Description
1	High voltage power supply wiring harness assembly Ⅰ
2	Three-phase power wiring harness Ⅰ
3	Electric compressor high voltage wiring harness assembly
4	AC charging socket wiring harness assembly
5	PTC input wiring harness assembly

Malfunction Analysis

Item	DTC Description	Inspection and Solutions
1	Wiring harness burnt	Check wiring harness for burnt. If so, replace corresponding wiring harness.
2	Wiring harness worn	Inspect if wiring harness is worn. If the wear is not bad, continue to use it after exterior banding and fixing; If interior shield layer or copper core is almost exposed due to wear, replace the corresponding wiring harness.
3	Connector damage	Replace corresponding wiring harness
4	Insulation reduction	a. Use insulation resistance tester to measure that insulation resistance between either of high voltage +, -, ground, interlock is no more than 100 MΩ, replace corresponding component; b. When vehicle reports an insulation fault and insulation resistance is detected, the maximum voltage of insulation detection device cannot be more than 1000 V.
5	Interlock failure	a. Check if any connector in circuit is not inserted in place according to interlock view. If so, connect the connector in place; b. If connectors have been inserted in place, check if interlock terminals are dislocated, poorly contacted, dropped, etc. If so, replace the corresponding component.
6	Interlock short circuit	Find the component where short circuit is located according to interlock view, replace the corresponding component.

High Voltage System Sub Wiring Harness Introduction

1. Motor controller input wiring harness assembly

Layout

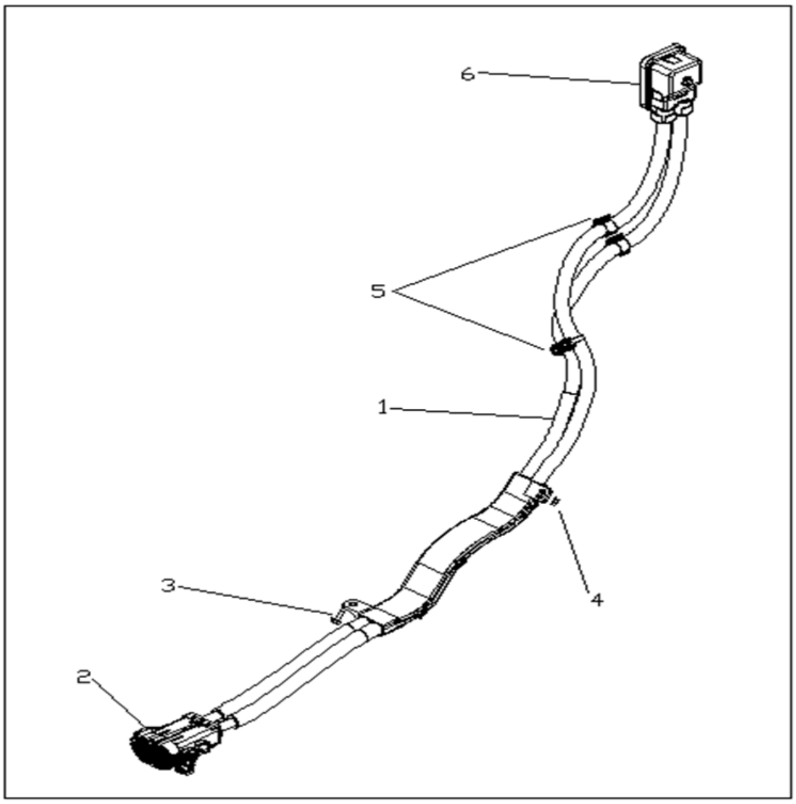


Figure 2 Motor Controller Input Wiring Harness Assembly

1	High voltage power supply wiring harness
2	To battery
3	M6×16 bolt
4	M6 nut
5	Fixed wiring harness clip
6	To motor controller

Interface Definition

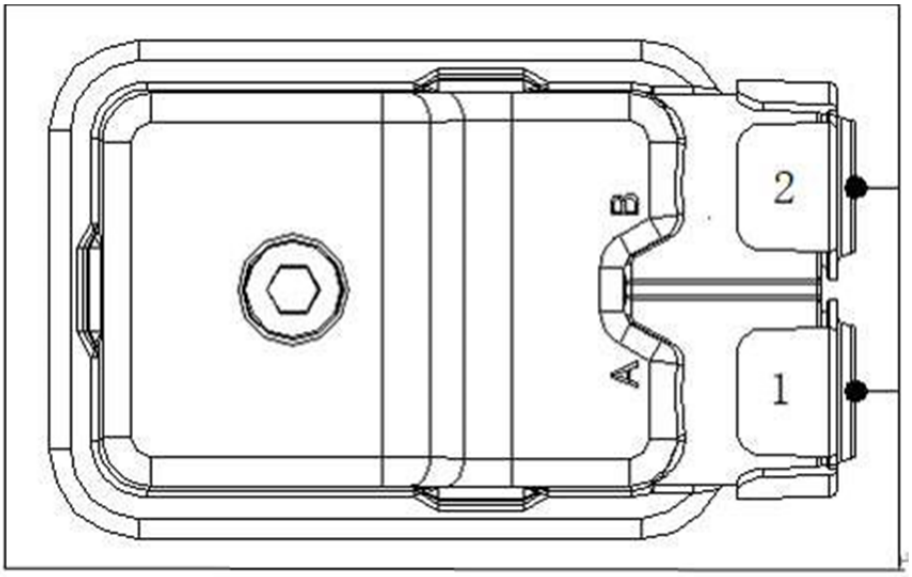


Figure 3 To Front IPU Interface Definition

1	Positive	2	Negative

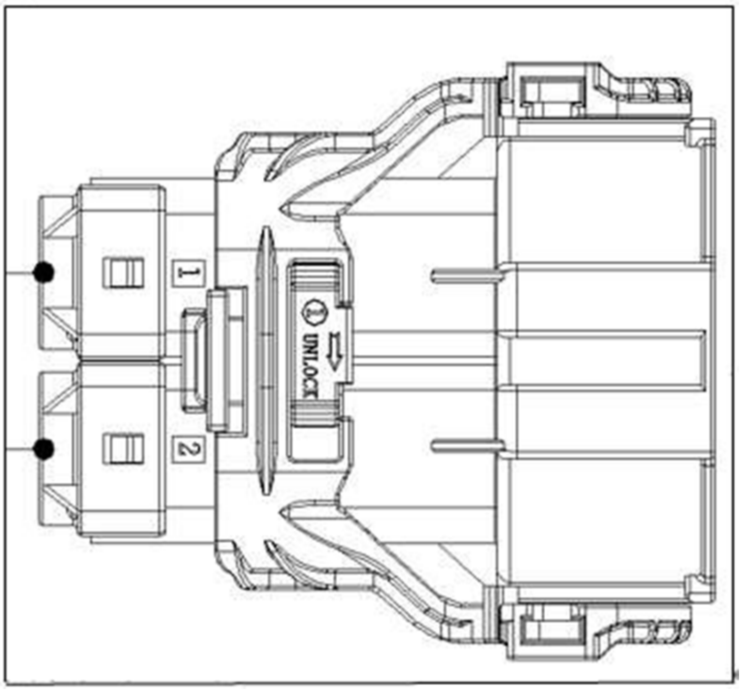


Figure 4 To Battery Output Connector Interface Definition

1	Negative	2	Positive

2. Three-phase power wiring harness assembly

Layout

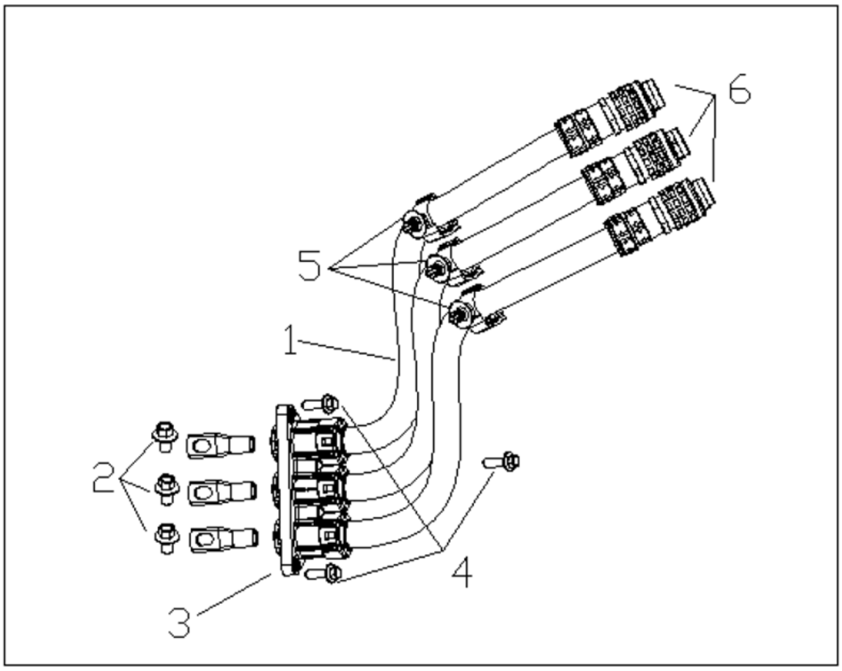


Figure 5 Three-phase Power
Wiring Harness Ⅰ

1	Three-phase power wiring harness Ⅰ
2	M8×12 hexagon flange bolt
3	To front motor
4	M6×20 bolt
5	Fixed wiring harness clip
6	To front motor controller

Interface Definition

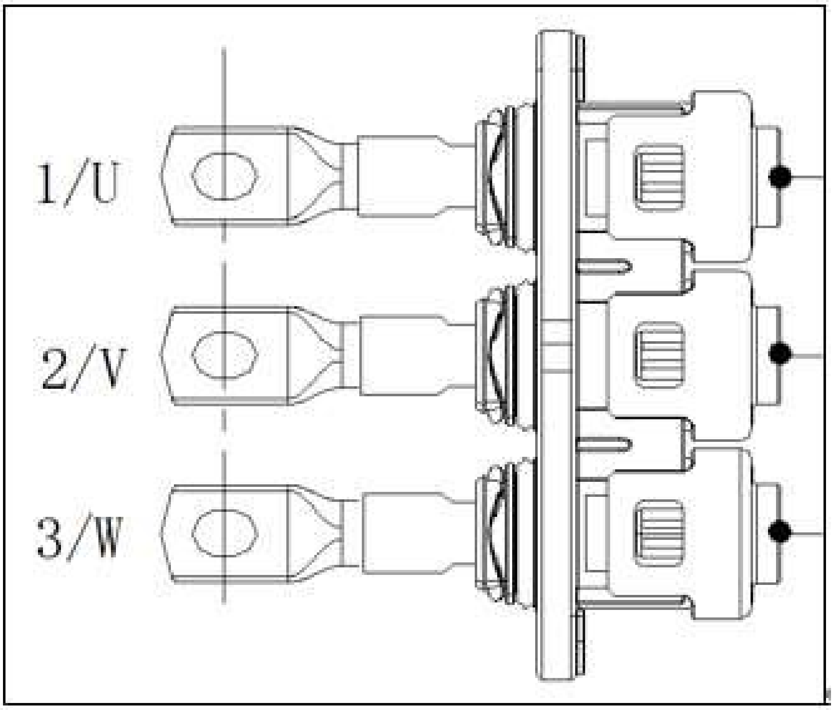


Figure 6 To Front Motor Interface Definition

1	U	2	V	3	W

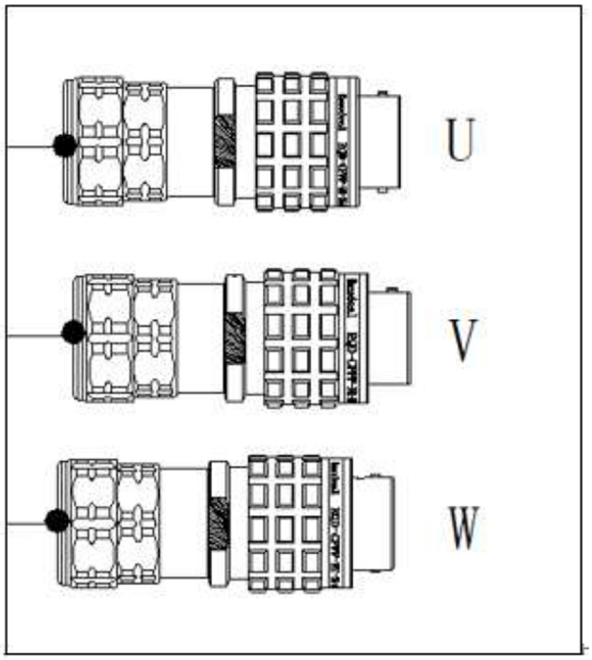


Figure 7 To Front Motor Controller Interface Definition

1	U red	2	V black	3	W yellow

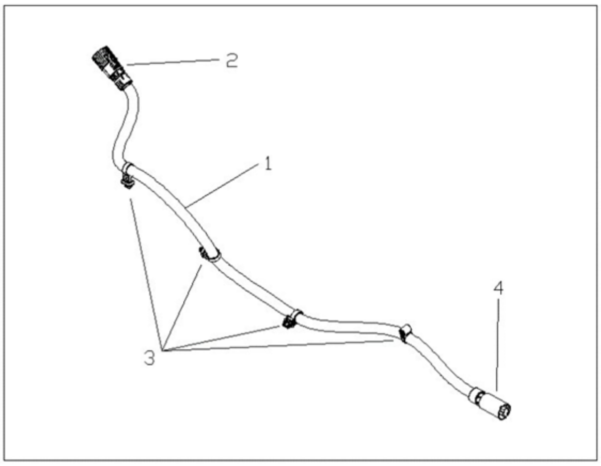


Figure 8 Electric Compressor High Voltage Wiring Harness Assembly

1	Electric compressor high voltage wiring harness assembly
2	To front IPU
3	Fixed wiring harness clip
4	To Compressor

Interface Definition

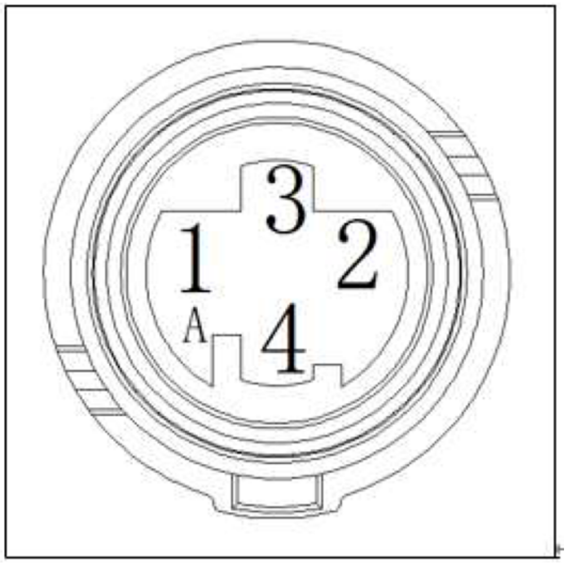


Figure 9 To Front IPU Interface Definition

1	Positive	2	Negative
3	Interlock	4	Interlock

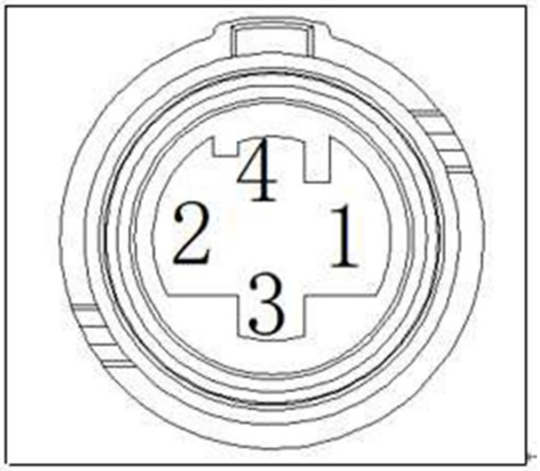


Figure 10 To Front IPU Interface Definition

1	Positive	2	Negative
3	Interlock	4	Interlock

4. AC charging socket wiring harness assembly
Layout

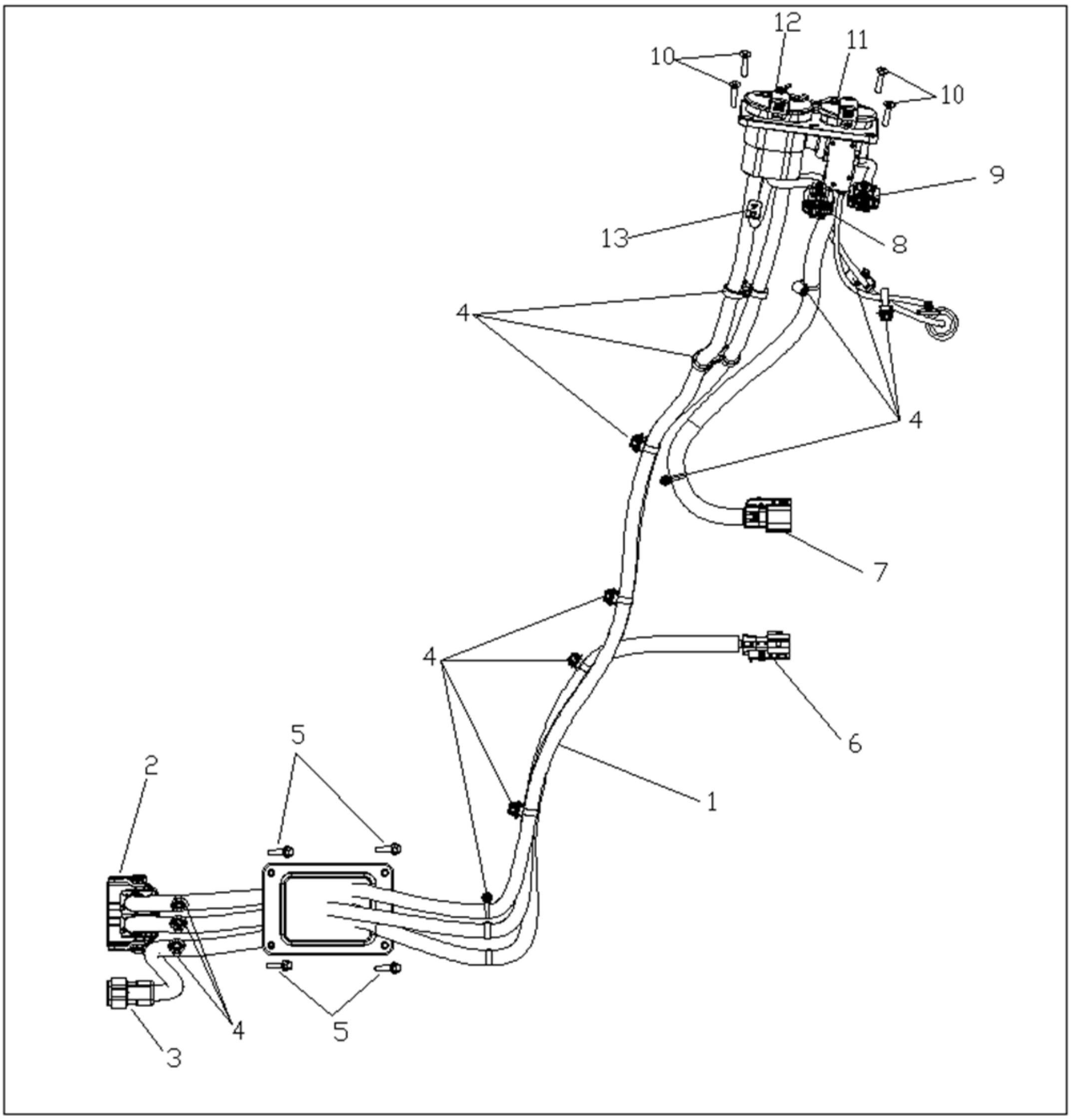


Figure 11 AC Charging Socket Wiring Harness Assembly

1	AC charging socket wiring harness assembly
2	To battery
3	To battery
4	Fixed wiring harness clip
5	M6×24 hexagon flange bolt
6	To charger assembly
7	To charger assembly
8	DC socket low voltage wiring harness
9	AC socket low voltage wiring harness
10	Cross recessed pan sunk screw M6×26
11	AC charging socket
12	DC charging socket
13	Ground

Interface Definition

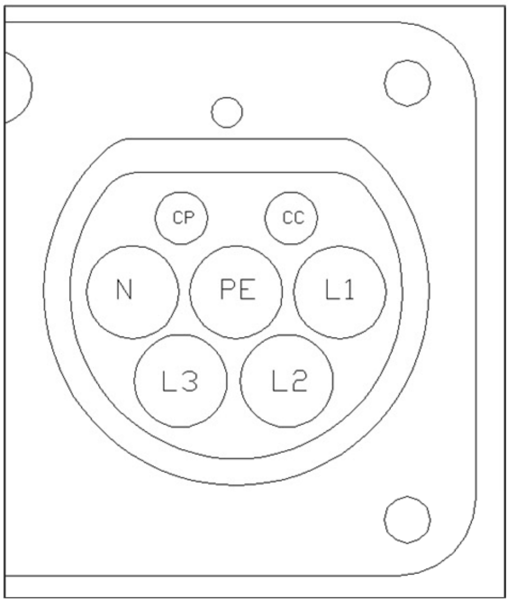


Figure 12 AC Charging Socket Interface Definition

L1	AC power supply	N	Central line
CC	Connection	CP	Control confirmation
PE	Vehicle body	L2	\
L3	\		

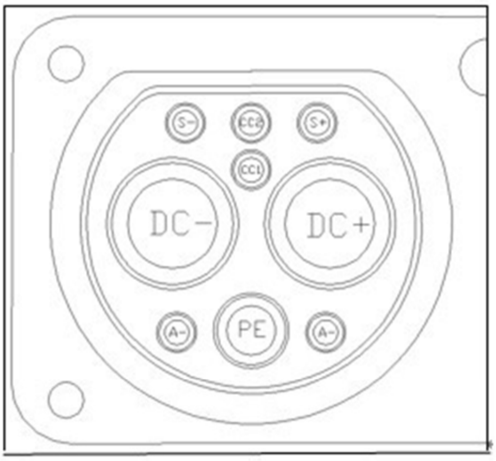


Figure 13 DC Charging Socket Interface Definition

DC+	DC charging positive	DC-	DC charging negative
PE	Ground	CC1	To resistance connection PE
A+	Low voltage auxiliary power supply positive	A-	Low voltage auxiliary power supply negative
CC2	Charging connection confirmation	S+	Charging communication CAN_H
S-	Charging communication CAN_L		

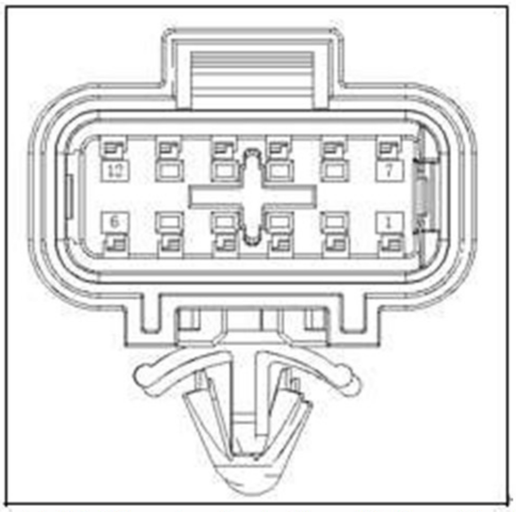


Figure 14 AC Charging Socket Low Voltage Boot Interface Definition

1	CC	2	CP
3	Temperature sensor 1+ (hole L)	4	Temperature sensors 1, 2 collinear
5	Temperature sensor 2+ (hole N)	6	Electronic lock power supply 1
7	Electronic lock power supply 2/electronic lock feedback 1	8	Electronic lock feedback 2
9	Pin 1 GND	10	LED lamp: RED
11	LED lamp: GREEN	12	LED lamp: BLUE

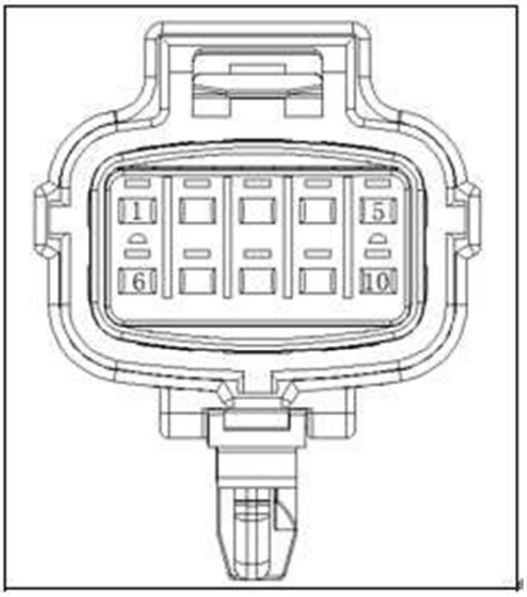


Figure 15 DC Socket Low Voltage Boot Interface Definition

1	Low voltage auxiliary power supply positive (A+)	2	Low voltage auxiliary power supply negative (A-)
3	Charging connection confirmation	4	Charging communication CAN_H
5	Charging communication CAN_L	6	Temperature sensor 1+ (hole DC+)
7	Temperature sensor 1- (hole DC+)	8	Temperature sensor 2+ (hole DC-)
9	Temperature sensor 2- (hole DC-)	10	\

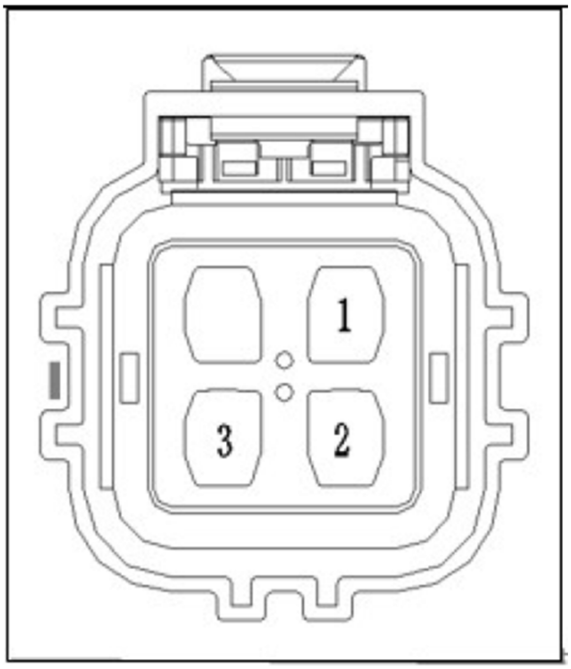


Figure 16 To Charger Assembly Interface Definition

1	L	2	N
3	PE		

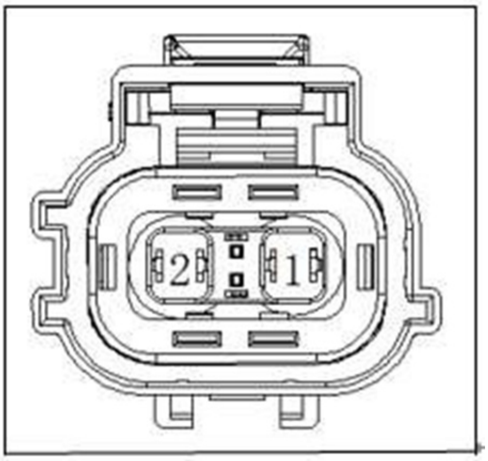


Figure 17 To On-board Charger Interface Definition

1	Positive	2	Negative

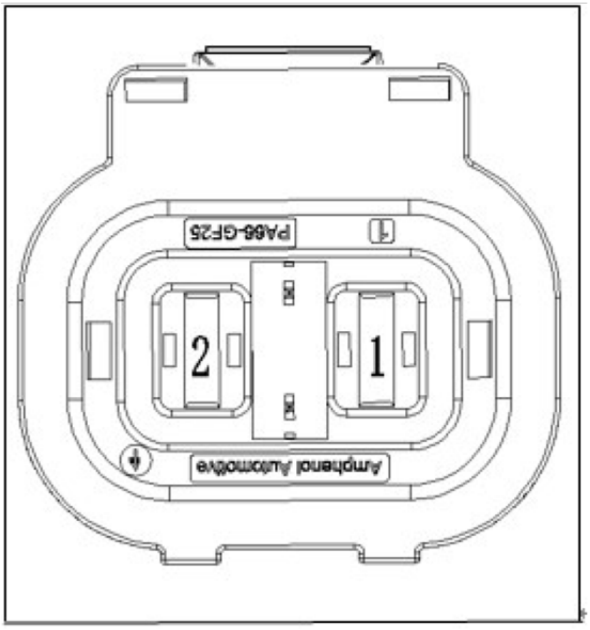


Figure 18 To Battery Interface Definition

1	Positive	2	Negative

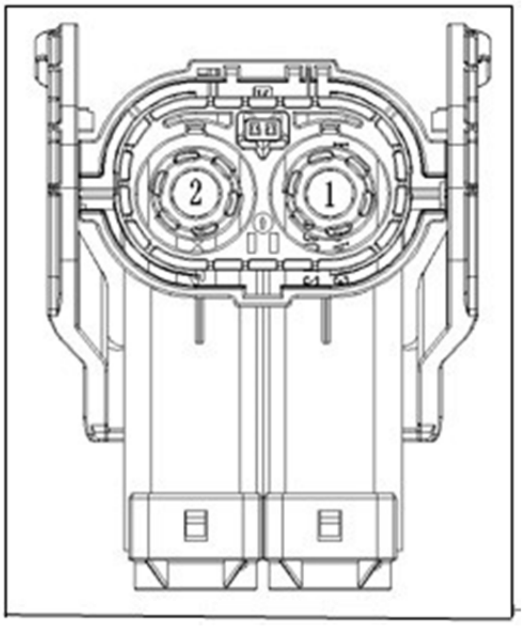


Figure 19 To Battery Interface Definition

1	Positive	2	Negative

5. PTC input wiring harness assembly Layout

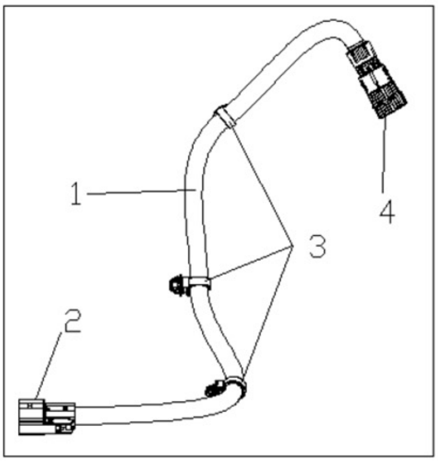


Figure 20 PTC Input Wiring Harness Assembly

1	PTC input wiring harness assembly
2	To PTC
3	Fixed wiring harness clip
4	To front IPU

Interface Definition

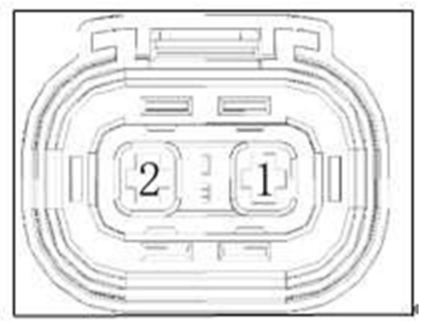


Figure 21 To PTC Connector Interface Definition

1	Positive	2	Negative

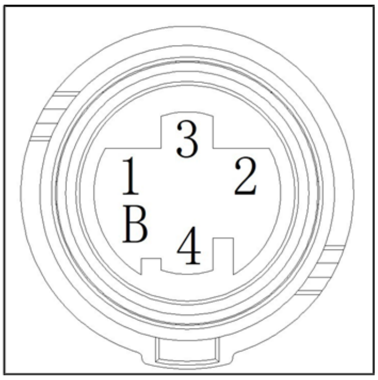


Figure 22 To Power Battery Connector Interface Definition

1	Positive	2	Negative
3	Interlock	4	Interlock

Removal and Installation

Precautions

High voltage hazard, pay attention to safety!

1. Turn power switch to OFF before removing and installing high voltage wiring harness, disconnect negative battery cable to avoid operating with electricity; Wear insulation gloves, goggles and insulation shoes. Note that secondary lock mechanism of connector should be opened, and then disconnect connector; For the plug type connector, it is necessary to remove the retaining bolt and then remove the plug, properly operate the connector.

2. During removal and installation, the bolts must be operated according to the specified torque to ensure the reliability of assembly.

3. Do not touch high voltage live parts with your hands.

Removal

1. Turn power switch to OFF before removing and installing high voltage wiring harness, disconnect negative battery cable to avoid operating with electricity;

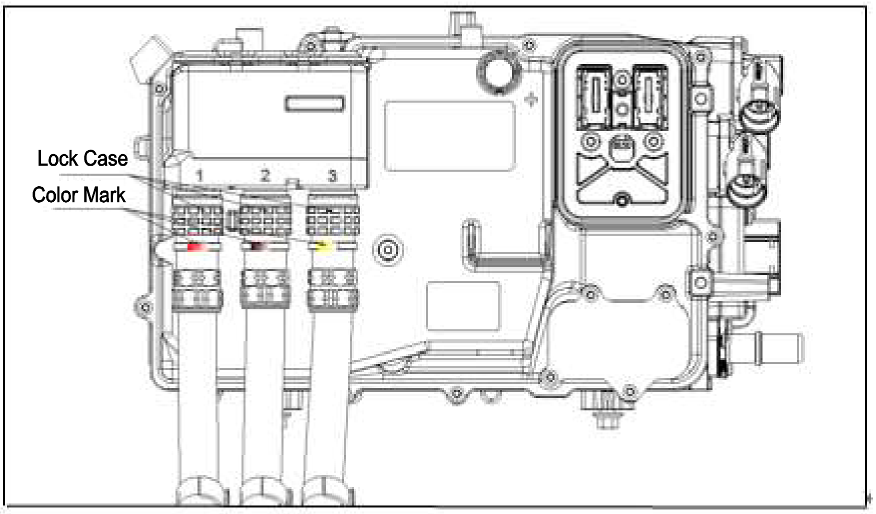
2. Wear insulation gloves;

3. Remove connector in the direction of current flow;

4. Remove connector at the other end of wiring harness;

5. Remove retaining bracket and clip of wiring harness from retaining points such as body;

6. During removing, pinch lock case of three-phase power wiring harness connector with thumb and index finger and pull it down, and remove connector; When assembling, keep flat and painted position of connector case (marked by color) level, push the end cable to quickly connect in place and a crisp sound is heard. If there is no crisp sound, indicating that the connection is not in place, remove connector and reassemble it.



Installation

Wear insulation gloves when assembling, installation is in the reverse order of removal.

⚠ Caution: The secondary lock of connector should be locked in place during assembly.

Tools

Tool Name	Usage
Digital multimeter	Inspect characteristic parameters such as voltage, resistance and current in pure electric power system
Insulation gloves	Insulate and protect human body
Insulation resistance tester	Megohm ohmmeter for measuring insulation resistance of various electrical device

3.3.6 Vehicle High Voltage Power-on/Power-off

Operation

For UNI-K iDD model, operation principle of high voltage power-on/power-off is the same as pure electric vehicles, due to high voltage electricity, high voltage wiring harness and parts related to high voltage needs to be operated by professionals. High voltage power-on/power-off includes pre-charging, high voltage activation, and high voltage power-off. Pre-charging is to reduce the pressure difference between inside and outside of main relay using small current by closing pre-charging relay. When pressure difference between inside and outside of main relay is lower than a certain value, main relay is closed to achieve high voltage power-on (power battery and external high voltage components are in high voltage activation state).

High voltage components include power battery, drive motor, motor controller, OBC (charger), electric compressor, PTC.

Symptom Mode and Diagnosis

Troubleshooting steps:

Step 1: Problem confirmation.
1. Does Ready come on? If Ready comes on, it means that high voltage power-on is successful.
2. Does lead-acid battery lamp come on? If lead-acid battery lamp does not come on, it means that high voltage power-on is successful.
Note: If Ready does not come on and lead-acid battery fault lamp comes on, troubleshoot from the aspect of failed high voltage powered-on

↓

Step 2: Troubleshooting direction
Direction 1: Whether high voltage power-on fails due to a fault
Direction 2: Whether high voltage interlock occurs due to replacement of wiring harnesses or components, resulting in fail to high voltage power-on
Note: High voltage wiring harness or low voltage wiring harness may lead to high voltage interlock failure

↓

Step 3: High voltage power-on related parts
1. BMS battery controller
2. PEU motor controller
3. PCU power system controller

↓

Step 4: Data acquisition
1. Read data with diagnostic tool
2. Read data by other methods

↓

Step 5: Elements of feedback information
1. VIN number
2. Production date
3. BMS version
4. PEU version
5. OBC version
6. PCU version
7. Whether to replace before failure occurs?
8. Pre-failure, failure, failure recovery data (PCAN data)
9. Occasionally or definitely (occasionally: please explain in detail the scene, operation steps, and probability of reoccurrence)
9. Scenario elements: when charging, powering-on, powering-off
10. Whether to power off, lock vehicle, wait for 5 minutes and retry
11. Whether to pull negative cable of lead-acid battery, wait for 5 minutes and retry

Common Fault Examples

Item	Fault Cause	Troubleshooting Suggestion
1	Connected external inspection device causes that PCAN communication error reports, unable to operate high voltage power-on	Try again after vehicle sleeps
2	Poorly inserted OBC high voltage connector causes that high voltage interlock error reports, unable to operate high voltage power-on	Perform assembly to correct
3	OBC low voltage connector wiring harness error causes that high voltage interlock reports, unable to operate high voltage power-on	Replace wiring harness to correct
4	Motor high voltage interlock fault causes that high voltage power-on cannot be performed	Replace PEU
4	Lost BMS and PEU signals causes that diagnosis malfunction trigger is powered-off, unable to operate high voltage power-on	CAN signal is lost
5	Poor wiring harness connector connection causes high voltage interlock fault, unable to operate high voltage power-on	Repair wiring harness
7	Unequipped key with vehicle assembly causes that PCU cannot detect smart key position status signal, unable to operate high voltage power-on	Equipped with key
8	Connect small battery and apply high voltage directly	Trigger fault to power off when repairing, remove small battery and install small battery again, BCM can memory Keyon status
9	Unconnected lead-acid battery causes that high voltage power-on cannot be performed, reporting error	Connect positive and negative lead-acid battery cabless correctly when performing power-on
10	IG1 and IG2 wiring harnesses report error, causing Crank power-off	Distinguish IG1 and IG2
11	Fault causes high voltage power-off	Check diagnostic tool and related data
12	Collision causes high voltage power-off	Try again after vehicle sleeps