Maintenance Manual
for
ZHIDOU D2S

Zhidou Automobile Vehicle Sales Co., Ltd.

October 20, 2017

Preface

The manual is used for only the maintenance technicians of the service center franchised by Zhidou Electric Vehicle Co., Ltd.

In order to ensure that customers are satisfied with products, the maintenance technicians of Zhidou Electric Vehicle Co., Ltd. are required to fully understand the contents of the manual and thus to provide customers with quick and accurate maintenance services.

In case of finding any errors or questions during use of the manual, please contact the Company. We will try hard to improve and prefect Zhidou electric vehicle manufacturing and maintenance technologies. Hope that the manual helps you.

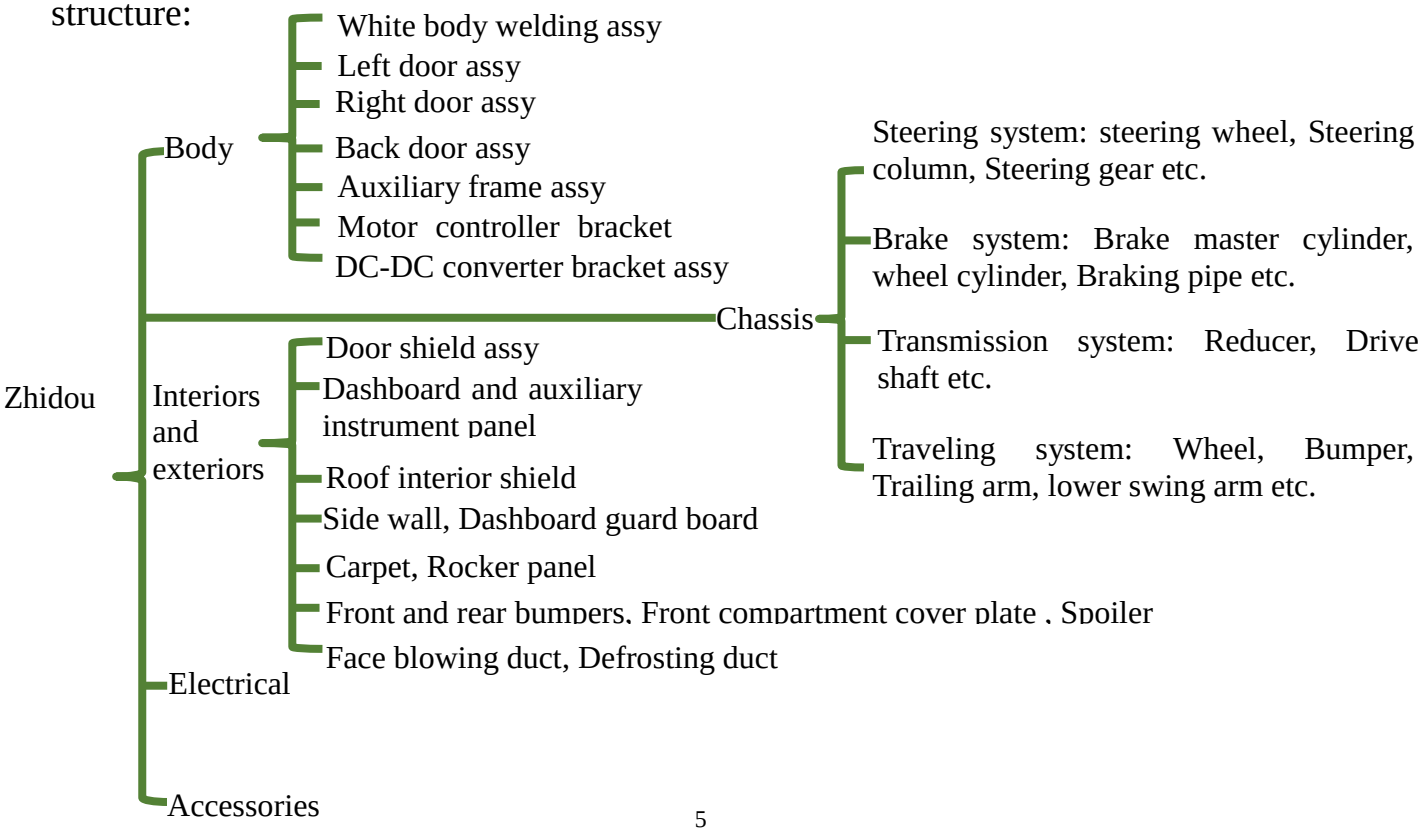
The contents of the manual may be subject to change due to design modification without notice.

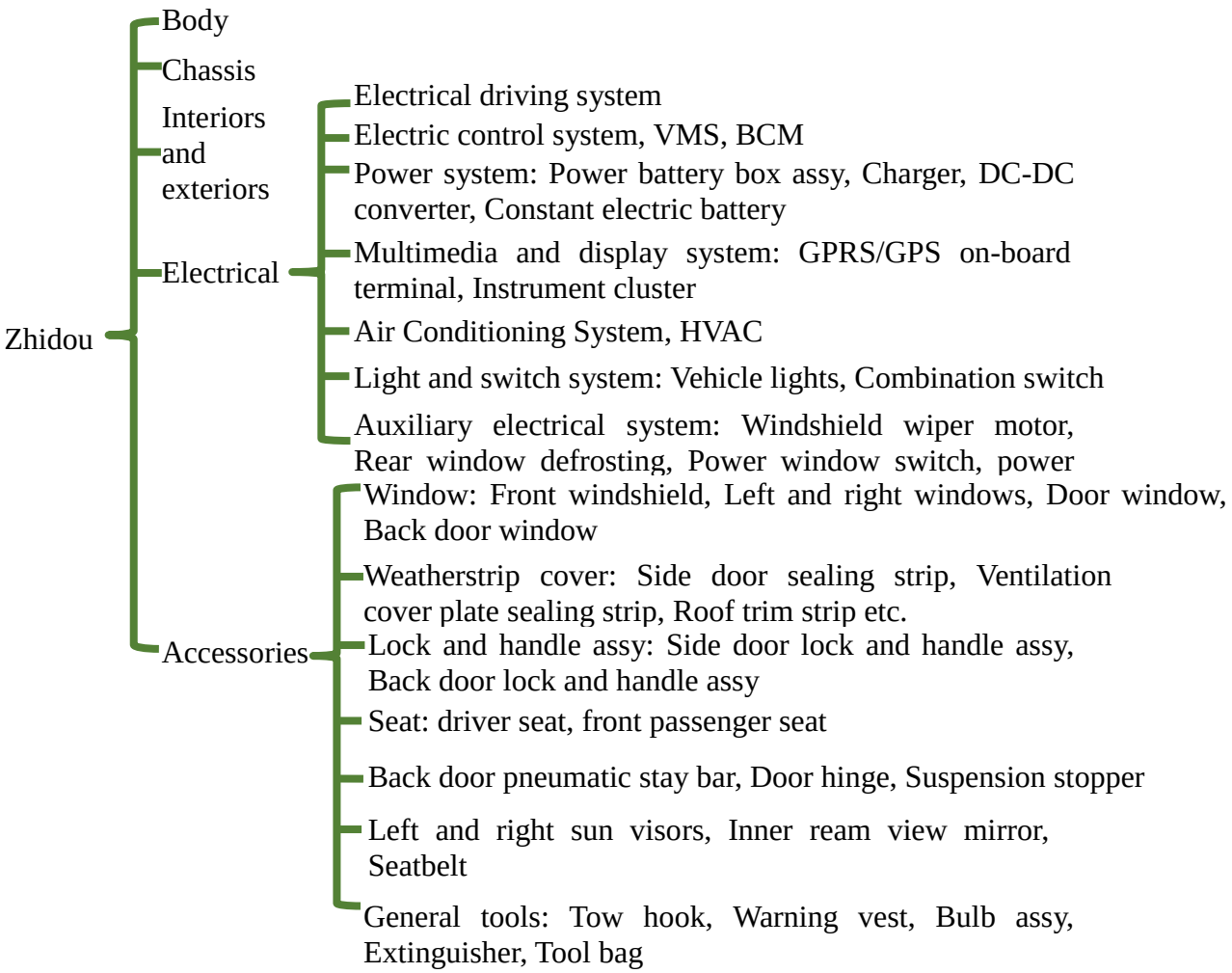
Zhidou Automobile Sales Co., Ltd.

Table of Contents

Chapter I Basic Structure

Zhidou electric vehicle consists of five major parts such as chassis, electrical system, interiors and exteriors, accessories and body. The chassis part consists of transmission system, steering system, brake system and traveling system. The electrical part consists of power lithium battery, battery management system (BMS), vehicle management system (VMS assy), motor controller, on-board charger, DC-DC converter assy, etc. The interiors and exteriors consist mainly of front and rear bumpers, side wall, side wall shield, dashboard, fender, auxiliary instrument panel, etc. The accessories consist mainly of door lock body, windshield wiper, seat, window, seal strip, cover, covering part, etc. The body consists mainly of whole body, hinge, left and right doors, back door, mounting bracket, auxiliary frame, converter bracket, motor controller mounting bracket, etc. See the following figure for the basic structure:




Zhidou
Body
Chassis
Interiors and exteriors
Electrical
Accessories
Electrical driving system
Electric control system, VMS, BCM
Power system: Power battery box assy, Charger, DC-DC converter, Constant electric battery
Multimedia and display system: GPRS/GPS on-board terminal, Instrument cluster
Air Conditioning System, HVAC
Light and switch system: Vehicle lights, Combination switch
Auxiliary electrical system: Windshield wiper motor, Rear window defrosting, Power window switch, power
Window: Front windshield, Left and right windows, Door window, Back door window
Weatherstrip cover: Side door sealing strip, Ventilation cover plate sealing strip, Roof trim strip etc.
Lock and handle assy: Side door lock and handle assy, Back door lock and handle assy
Seat: driver seat, front passenger seat
Back door pneumatic stay bar, Door hinge, Suspension stopper
Left and right sun visors, Inner ream view mirror, Seatbelt
General tools: Tow hook, Warning vest, Bulb assy, Extinguisher, Tool bag

Chapter II Electrical Equipment

Section 1 General

I. Overview

The chapter involves the repair of the electrical part of Zhidou electric vehicle, analyzes the faults of each system, and presents feasible diagnosis steps and repair methods.

Analysis and removal of the faults of the electrical part of Zhidou electric vehicle shall be in accordance with the following basic operation procedure:

1. Analyze the fault described by the user.

When analyzing the fault described by the user, be sure to accurately confirm the fault symptom. In order to make accurate judgment, be sure to eliminate various subjective assumptions. It is extremely important to carefully ask the user for the fault symptom and the fault occurrence situation. The analysis key points of the fault described by the user are below:

① Vehicle model and vehicle purchasing date

② Fault occurrence date, time and frequency

③ Road surface conditions during fault occurrence

④ Driving conditions and weather conditions during fault occurrence

⑤ Detailed fault symptom

2. Confirm the fault symptom, and fault indictor light or alarm record.

① Check the voltage of the constant electric battery.

② Visually check for open circuit and short circuit of the harness, connector and fuse.

③ Roughly confirm the parts or lines to be checked according to the fault symptom.

The largest difficulty in fault removal and analysis is non-occurrence of fault symptom. In this case, be sure to firstly analyze the fault described by the customer in detail, and then simulate the situation and environment similar to those where the customer's vehicle is out of order. No matter how technicians are experienced and skilled, in case of removing and analyzing the fault without confirming the fault symptom, some important factors will be certainly neglected in the repair work, and technicians will wrongly guess some aspects so as to result in failure to do the repair work. For instance, if a charging fault occurs only in case of unstable network voltage in the electricity consumption peak period or a fault occurs only due to vibration caused by road surface conditions during driving, these symptoms cannot be absolutely verified and determined in case of normal network voltage or vehicle stilling. The factors such as external power grid or equipment, vibration, high temperature or water seepage (moisture), etc. will often result in some faults difficult to reoccur, so it is needed to consider many aspects.

Multiple main components of Zhidou electric vehicle have diagnosis functions and show their own state in real time via themselves or instrument cluster or on-board multimedia navigation system. By means of these self-diagnosis functions, the scope

of the faulty part can be reduced rapidly and the fault can be analyzed and eliminated highly effectively and quickly. The following systems of Zhidou electric vehicle have diagnosis functions: ① power battery, ② BMS, ③ motor controller, ④ driving motor and ⑤ charger.

Note: when checking the fault code or the alarm record, be sure to firstly make sure whether the fault indicated by the fault code or the alarm record is still occurring or once occurred but has now been removed. In addition, it is still needed to determine whether the fault indicated by the fault code or the alarm record is directly related to the current fault symptom, so as to avoid unnecessary fault removal and analysis of ongoing systems in some cases and even increasing fault removal difficulty and wasting time and energy.

3. Inspection of circuits or components

4. Repair or replace

5. Testing

After repair completion, carefully verify whether the fault is thoroughly eliminated under the environment and conditions where the fault occurred for the first time. After testing completion, the vehicle is delivered.

II. Harness identification marks and name abbreviations

① According to different distribution positions of conductors, the harness of Zhidou

electric vehicle is divided into the following several types:

Harness name	Harness position	Remark
Compartment harness assy	Front compartment	
Dashboard harness assy	Below the dashboard	
Floor harness assy	Left rocker panel	
Left door harness	Left door	
Right door harness	Right door	
Back door harness left section assy	Rear back door left	
Back door harness right section assy	Rear back door right	

② Abbreviations of conductor colors in the schematic diagram and harness diagram:

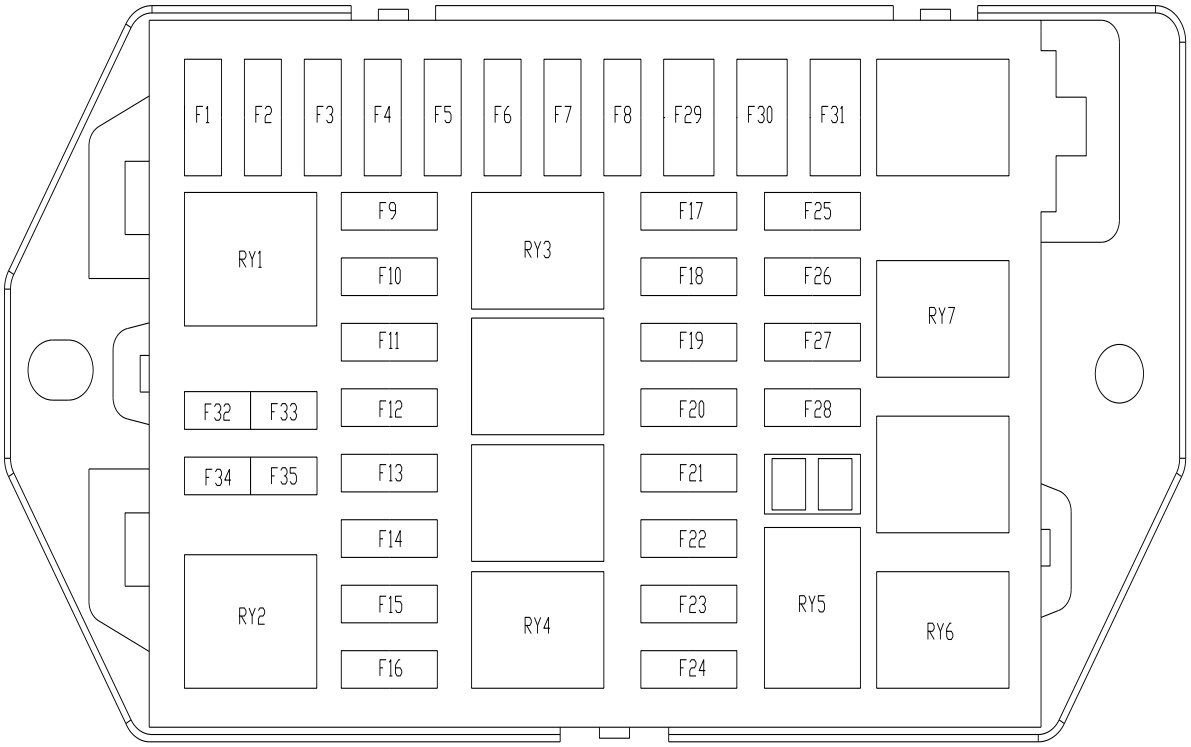
Abbreviation letters	Color	Abbreviation letters	Color
R	Red	G	Green
O	Orange	L	Blue
W	White	Br	Brown
B	Black	Gr	Gray
Y	Yellow	P	Pink
V	Purple	Lg	Light Green

③ Part name abbreviations

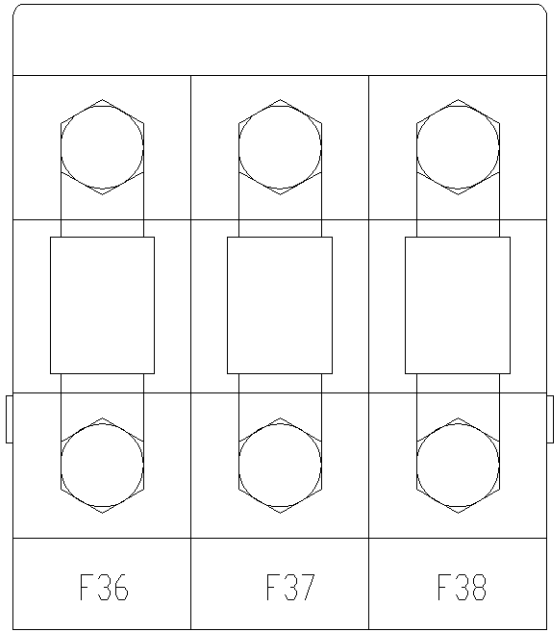
Abbreviation	Part	Abbreviation	Part
MC	Motor controller	DSU	Driver switch unit
VMS	Vehicle management system	LSU	Light combination switch
BMS	Battery management system	BCM	Body control module
GPRS	On-board terminal	ADAS	Advanced driver assistance system
GPS	On-board information host	PEPS	Keyless access and starting system
ESCL	Electronic steering column lock	IMMO	Electronic theft protection device
EPS	Electronic power steering system	RFID	RFID
OBC	Charger	OBD	On-board diagnosis system
ICU	Instrument cluster	KS	Total negative relay
KM	Total positive relay	KP	Precharging relay
CC	Charging connection confirmation	CP	Charging control guidance
PE	Protective grounding		

III. Fuse and relay

① Interior fuse box:



② Front compartment fuse box:



③ List of fuses:

Fuse and relay	capacity	Connecting circuit
F1	10A	GPRS
F2	10A	Horn
F3	15A	Multimedia system
F4	15A	Low and high beams
F5	5A	Instrument cluster
F6	10A	Turn signal lamp
F7	20A	Rear defrosting
F8	10A	Central locking system
F9	20A	ACC position
F10	20A	ON position
F11	15A	Windshield wiper
F12	5A	DSU/windscreen wiper switch
F13	10A	Side mirror/charger B
F14	5A	Motor controller/air conditioning panel
F15	15A	Vacuum booster system
F16	10A	ACC signal
F17	5A	Reading lamp
F18	5A	Charger A
F19	10A	ESCL/anti-theft
F20	10A	PEPS controller A
F21	10A	PEPS controller B
F22	10A	BCM/diagnosis interface
F23	10A	Corner lamp
F24	15A	Small lamp
F25		Null
F26	5A	Inner ream view mirror

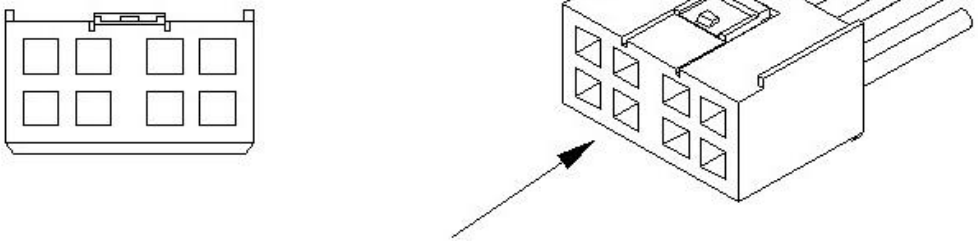
F27	10A	ON position signal/BCM
F28	15A	Backup power
F29	20A	Condenser fan
F30	20A	Window
F31	20A	Blower
F32	5A	Backup fuse
F33	10A	Backup fuse
F34	15A	Backup fuse
F35	20A	Backup fuse
F36	60A	DC/DC fuse
F37	50A	Interior electrical box
F38	30A	EPS electronic power steering

④ List of relays:

No.	Name	Specification	Connecting circuit
1	RY1		Null
2	RY2	JD1914	Charging relay
3	RY3	JD1927Y	Condenser fan relay
4	RY4	JD1927Y	ACC position relay
5	RY5	JD1927Y	Blower relay
6	RY6	JD1927Y	ON position relay
7	RY7	JD1927Y	Compressor relay

Section 2 Harness connector shape and pin definitions

Harness connector view direction: from the façade view of the connector



I. Dashboard harness:

接右后组合灯RIGHT REAR LIGHT

DJ7061Y-2-20(YY)

接门灯开关ROOF DOOR SW

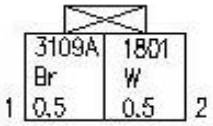
DJ7013-6.3-20(YY)

接倒车雷达右侧探头

Reversing radar right probe

6180-2451(SUM)

接后雾灯REAR FOG LIGHT



DJ7021-2-21

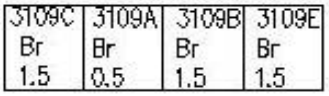
接倒车雷达左侧探头

Reversing radar left probe

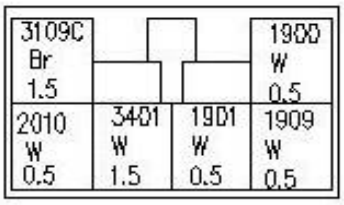
6180-2451(SUM)

G9接地点

G9 GND point



接后背门线束BACK DOOR



DJ7064Y-2.2-11

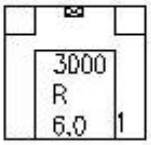
接左后组合灯LEFT REAR LIGHT

DJ7061Y-2-20(YY)

门灯开关ROOF DOOR SW

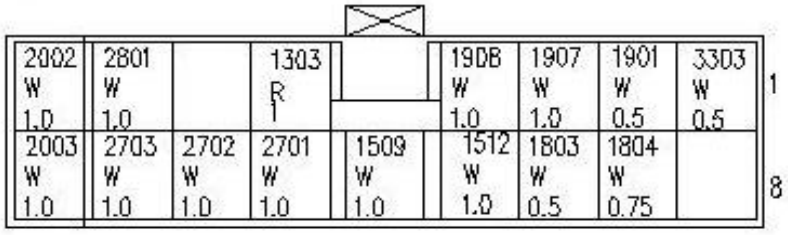
DJ7013-6.3-20(YY)

接前舱线束2
CABIN HARNESS CONNECTOR 2



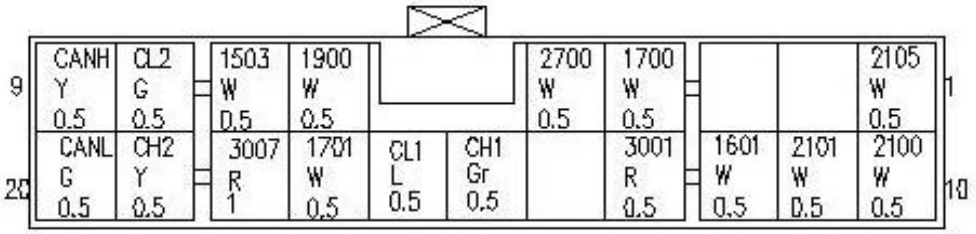
DJ7011-9.5-10

接前舱线束3
CABIN HARNESS CONNECTOR 3



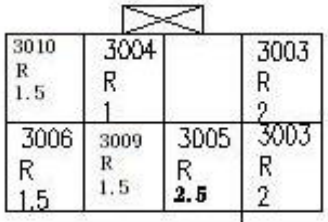
DJ7171-3-10(YY)

接前舱线束1
CABIN HARNESS CONNECTOR 1



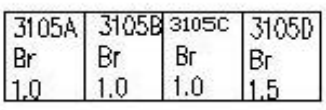
DJ7204Y-2.2-10(YY)

接前舱线束4
CABIN HARNESS CONNECTOR 4



DJ7081-6.3-21

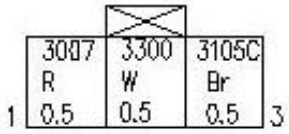
G5 GND point



DJ431-6D

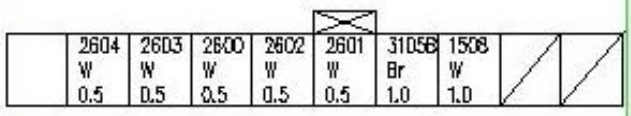
接阅读灯

Reading lamp



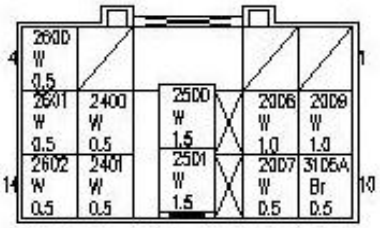
0465101 (THB)

电动后视镜开关MIRROR SW



7283-7602

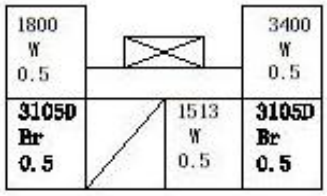
接左前门线束LEFT FRONT DOOR



DJ7141Y-2.2/4.8-10(YY)

接后除霜开关

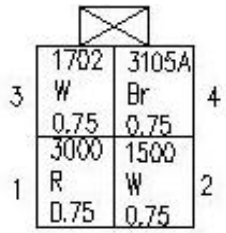
Rear defrost switch



DJ7061-2.3-20

充电保压接插件

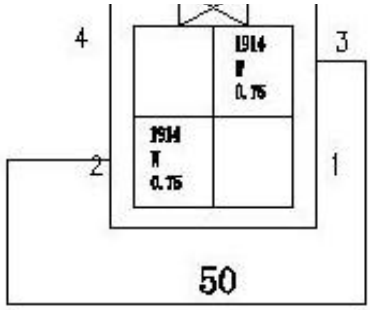
Charging voltage-maintaining connector



39-01-3042(molex)

充电保压接插件

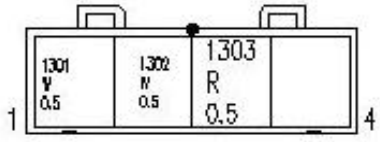
Charging voltage-maintaining connector



39-01-2041(molex)

接点火开关KEY

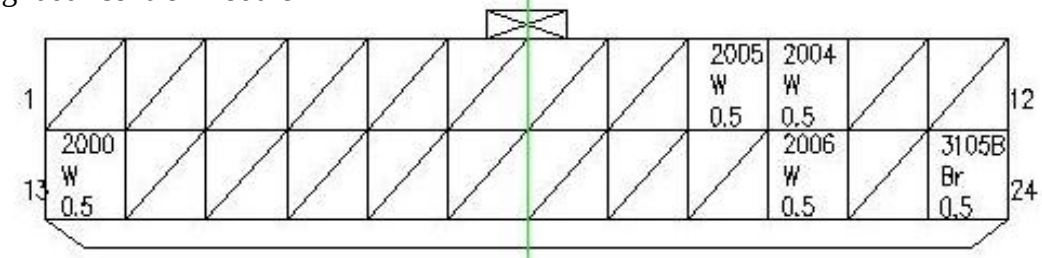
Ignition switch



936238-1 (AMP)

接倒车雷达控制模块RADAR REVERSING

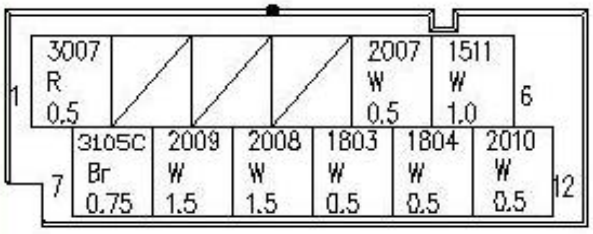
Reversing radar control module



DF-TKA24MW02WH

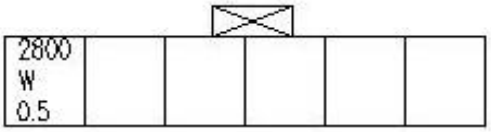
中央门锁控制模块(BCM)

Control module of the central locking system (BCM)



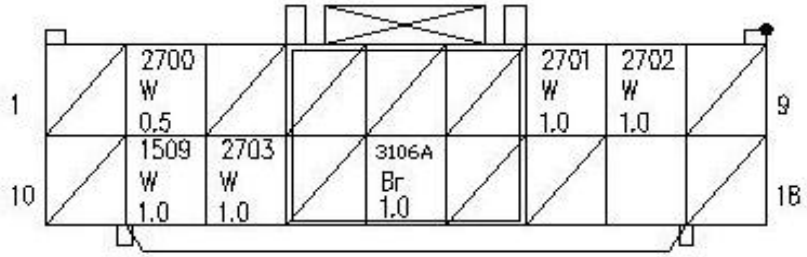
827603-1

电喇叭HORN



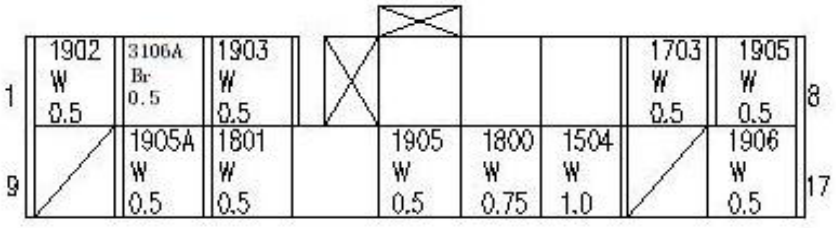
174923-1

接雨刮开关WIPER SW



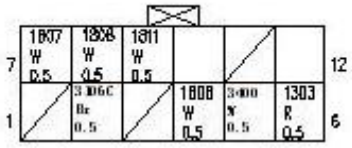
6098-1164(SUM)

接灯光开关LIGHT SW



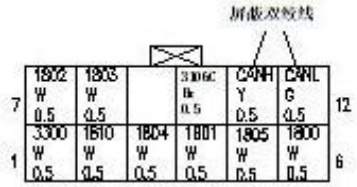
6098-1998(SUM)

组合仪表 A CLUSTER A



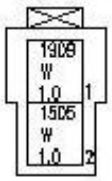
MG610376

组合仪表 B CLUSTER B



MG610376

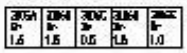
接制动踏板BRAKE PEDAL SW



7022-6.3-20（YY）

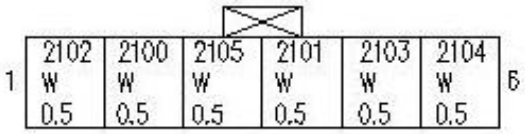
G6接地点

G6 GND point



DJ431-6E

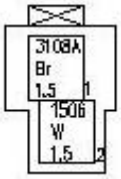
接加速踏板 **ACCELERATOR PEDAL**



AMP 936394-2

12V电源接口

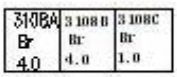
12V power interface



DJ7023-6.3-20

G8接地点

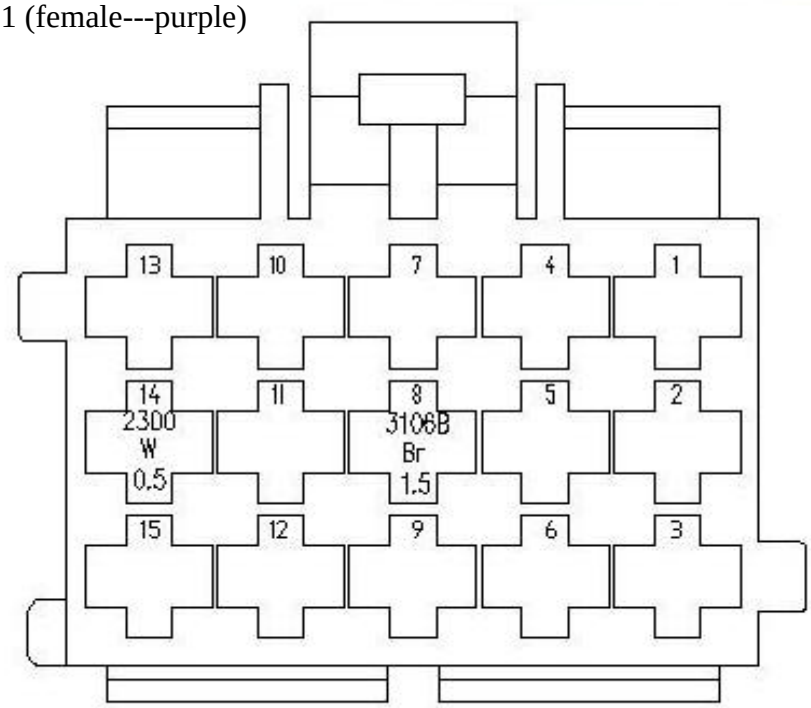
G8 GND point



DJ431-6E

对接附件线束1 (母---紫) ACCESSORY CONNECTOR 1

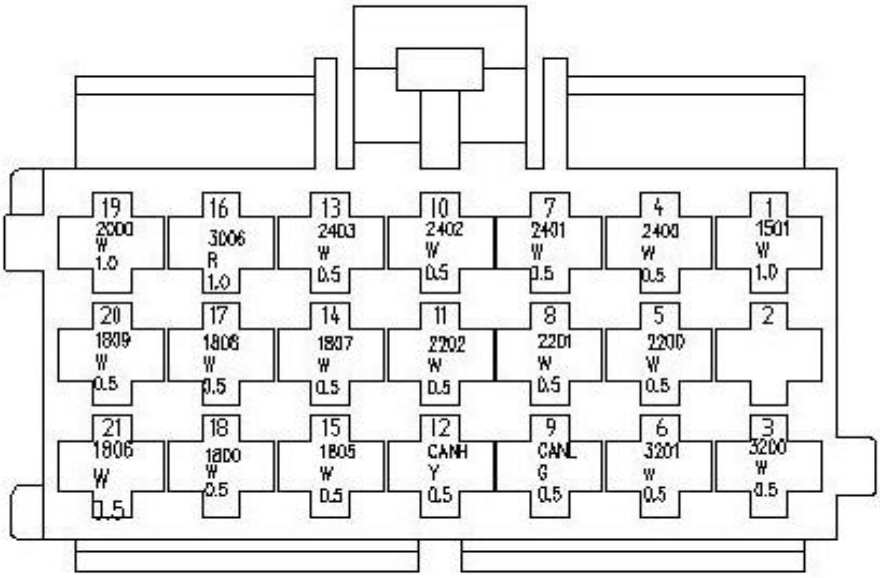
Accessory harness 1 (female---purple)



AMP 1-967623-3

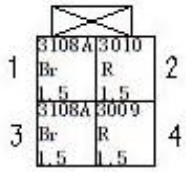
对接附件线束2(母--棕)ACCESSORY CONNECTOR 2

Accessory harness 2 (female--- brown)



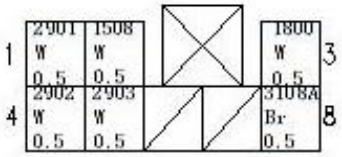
AMP 1-967625-1

接空调系统
Air conditioning system



DJ7041-6.3-21(YY)

接空调系统
Air conditioning system

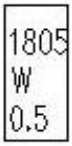


DJ7081Y-2-21(YY)

接充电口CP和PP插件CHAGER PP AND CP

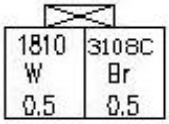
DJ70227Y-2.2-21

接手刹开关HAND BREAK SW



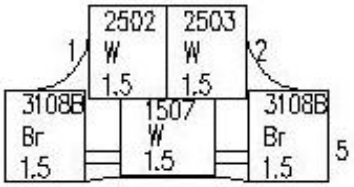
DJ7011-6.3-20(YY)

接应急开关测试端口EMERGENCY SW



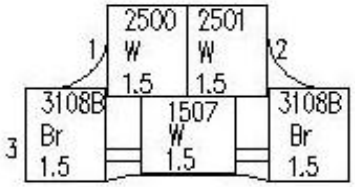
DJ70214Y-2-21

接右玻璃升降器开关RIGHT WINDOW SW



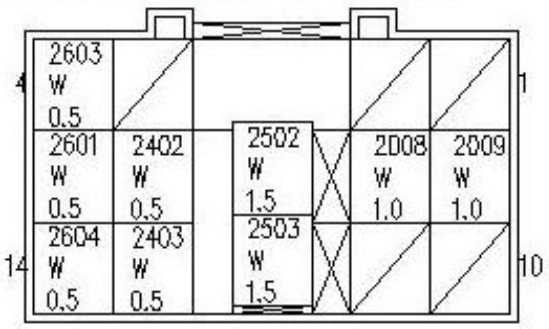
DJ7052-6.3-20

接左玻璃升降器开关LEFT WINDOW SW



DJ7052-6.3-20

接右前门线束RIGHT DOOR

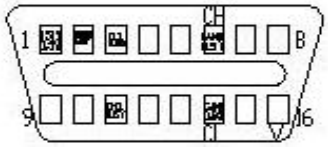


DJ7141Y-2.2/4.8-10(YY)

接RS485诊断接口 RS485 DIAGNOSTIC INTERFACE

282087-1

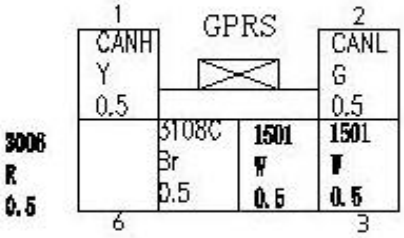
通用诊断接口CAN-BUS DIAGNOSTIC INTERFACE



179631-1(AMP)

接GPRS

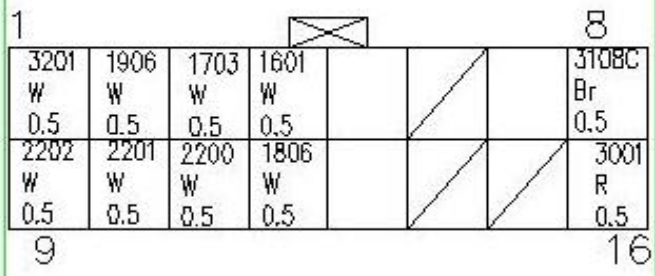
GPRS



DJ7061-2.3-21

对接VMS插件C（黑色）VMS CONNECTOR C

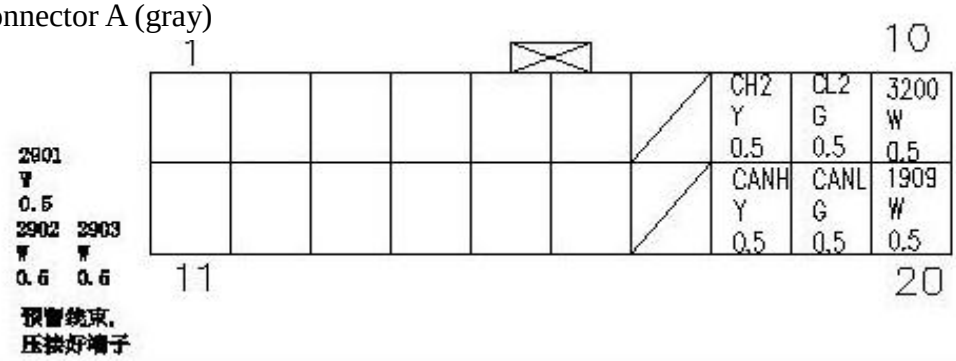
VMS connector C (black)



174046-2

对接VMS插件A(灰色)VMS CONNECTOR A

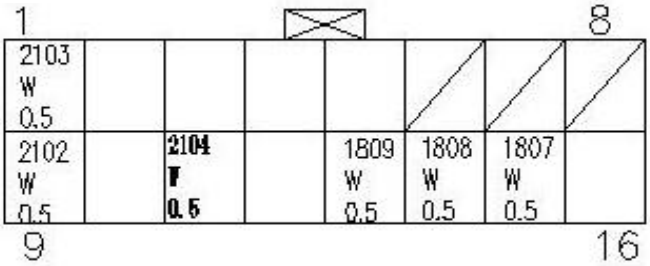
VMS connector A (gray)



179057-6

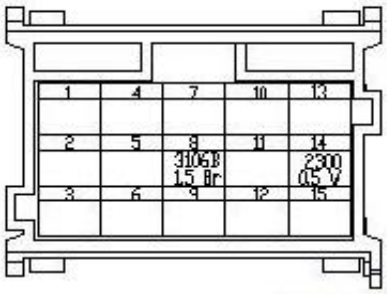
对接VMS插件B（灰色）VMS CONNECTOR B

VMS connector B (gray)



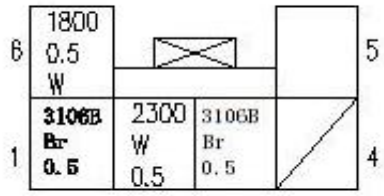
179054-6

对接附件线束1(公---紫)
Accessory harness 1 (male---purple)



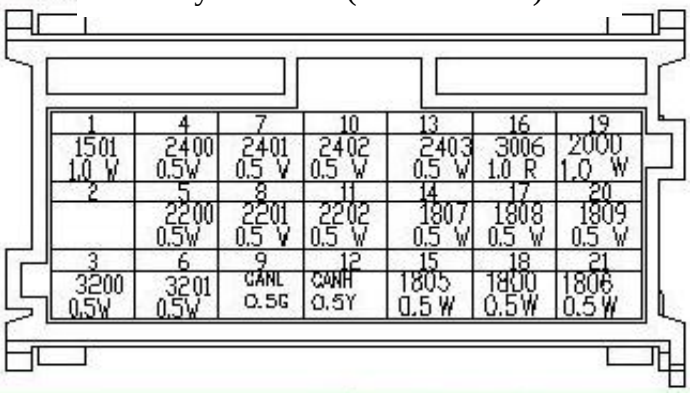
AMP:1-967628-3

接警示灯开关HAZARD SW



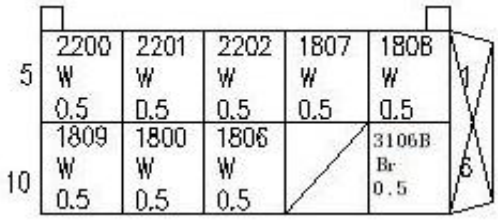
DJ7061-2.3-20(YY)

对接附件线束2 (公---棕 Accessory harness 2 (male---brown)



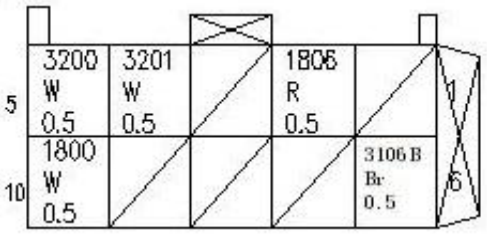
AMP：1-967630-1

档位开关DRIVER SWITCH UNIT (DSU)
(黄色)(Yellow)



1534170-1

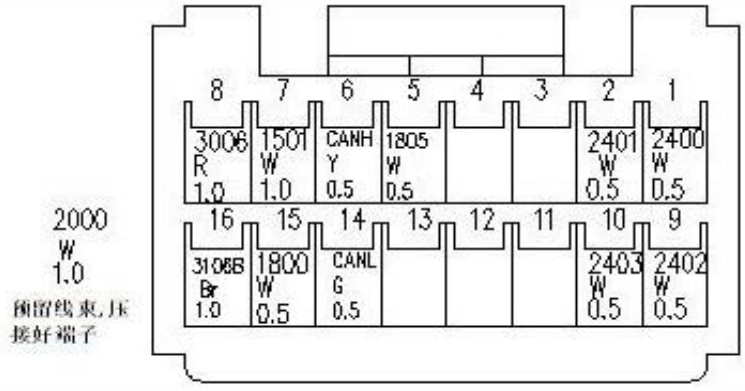
接模式切换开关(捆绑在仪表分支上)
(黑色)



Mode switch (on the instrument branch)
(Black)

1534170-1

接GPS主机
GPS host

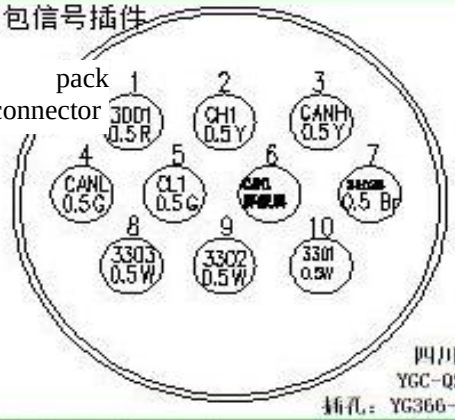


DJ7161-1.2-21

II. Compartment harness

接电池包信号插件

Battery pack signal connector



四川永贵电器
YGC-QS14K10TK1
插孔：YG366-01-01-00

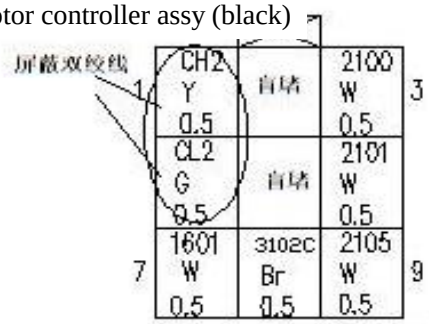
接接触器控制线圈

Contactor control switch

282087-1(AMP)

接电机控制器总成(黑色)

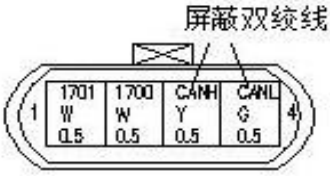
Motor controller assy (black)



DJ7091-2.3-20 (YY)

接充电机

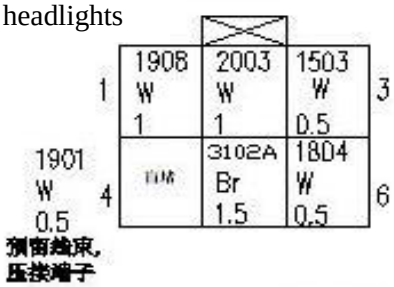
Charger



282088-1 (AMP)

接右前组合灯

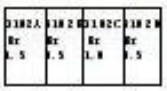
Right headlights



DJ70610Y-2.2-20

G2 接地点

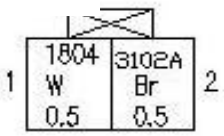
G2 GND Point



DJ431-6D

接右侧转向灯

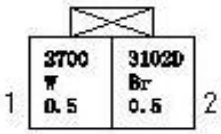
Right turn light



0439103

接洗涤壶总成

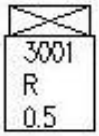
Washer assy



282080-1(AMP)

接DC-DC转换器12V控制线

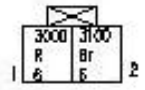
DC-DC converter 12V control line



282079-1

接DC-DC转换器

DC-DC converter



DJ7021-8-21

常电电池接插件

Constant electric battery connector

公端：DJ7021-9.5-11

Male terminal

母端：DJ7021-9.5-21

Female termina

接40A大保险(ATM)

40A big fuse (ATM)

接常电电池负极

Negative terminal of constant electric battery

DJ431-6E

接常电电池正极

Positive terminal of constant electric battery

DJ431-6E

接电喇叭

Electric horn

DJ7013-6.3-20(YY)

接电喇叭

Electric horn

DJ7013-6.3-20(YY)

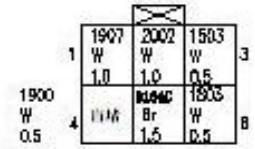
G1接地点

G1 GND Point

DJ431-6E

接左前组合灯

Left headlights



预留线束，压接端子

Reserved harness, crimp terminal

DJ7061GY-2.2-2D

接左侧转向灯

Left turn light

D439103

G4接地点

G4 GND Point

DJ431-6D

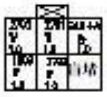
接真空助力系统

Vacuum booster system

282080-1(M/P)

接雨刮电机

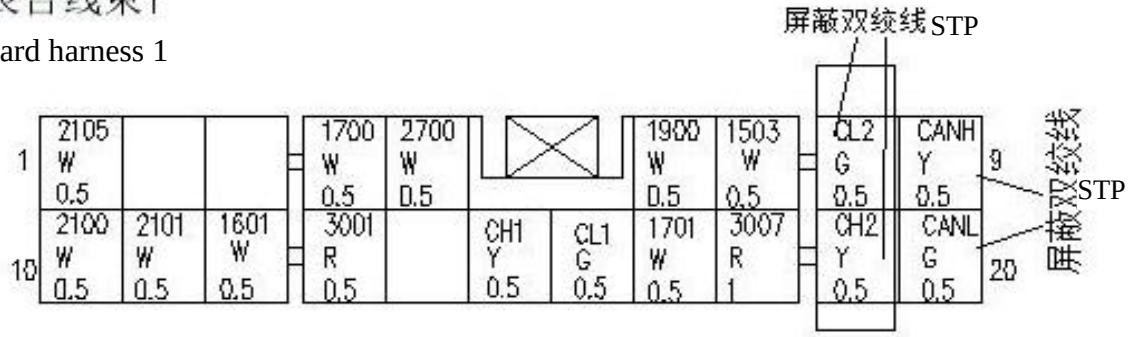
Windshield wiper motor



DJ7051Y-2.2-21

接仪表台线束1

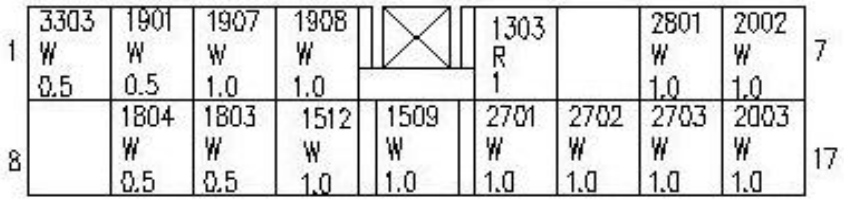
Dashboard harness 1



FC21: DJ7204Y-2.2-20(YY)

接仪表台线束3

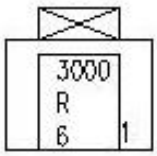
Dashboard harness 3



FC20: DJ7171-3-20(YY)

接仪表台线束2

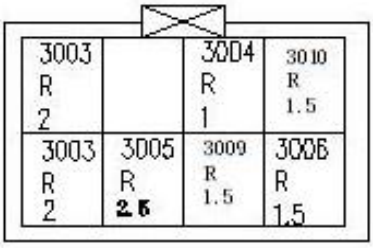
Dashboard harness 2



FC19:DJ7011-9.5-21

接仪表台线束4

Dashboard harness 4

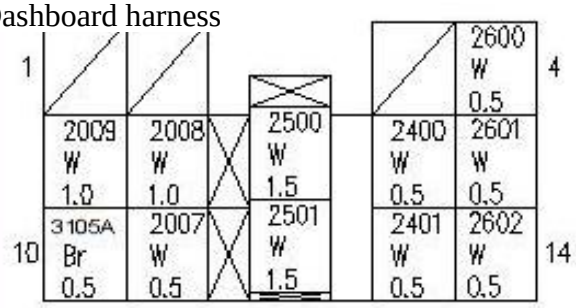


DJ7081-6.3-11

III. Left door harness

接仪表台线束

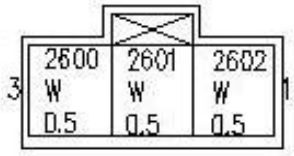
Dashboard harness



DJ7141Y-2.2/4.8-20(YY)

接左侧后视镜

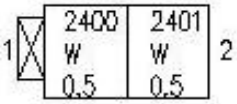
Left side mirror



DJ7031A-2.8-21

接左前扬声器

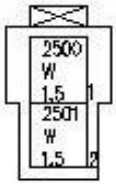
Left front loudspeaker



DJ7021D-3.5-21

接左前玻璃升降电机

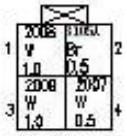
Left front power window switch



DJ7027Y-6.3-21/26(YY)

接左门锁

Left door lock

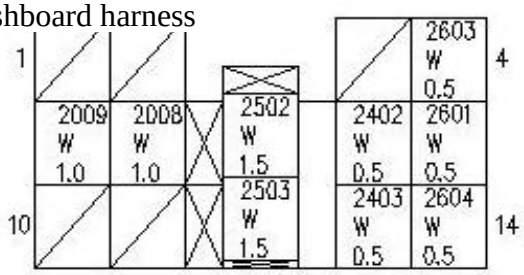


DJ7042-6.3-20(YY)

IV. Right door harness

接仪表台线束

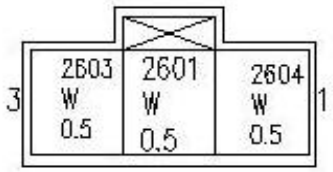
Dashboard harness



DJ7141Y-2.2/4.8-20(YY)

接右侧后视镜

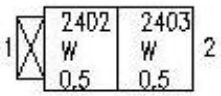
Right side mirror



DJ7031A-2.8-21

接右前扬声器

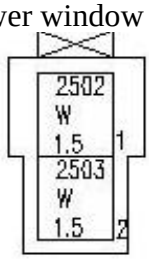
Right front loudspeaker



DJ70210-3.5-21

接右前玻璃升降电机

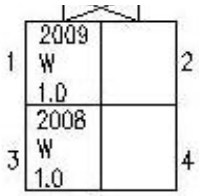
Right front power window switch



DJ7027Y-6.3-21/26(YY)

接右门锁

Right door lock

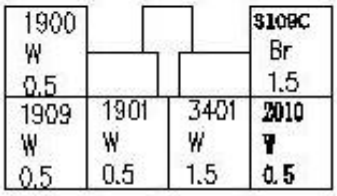


DJ7042-6.3-20(YY)

V. Back door harness

接仪表台线束

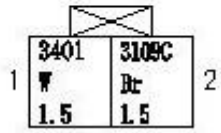
Dashboard harness



DJ7064Y-2.2-21

接后除霜器

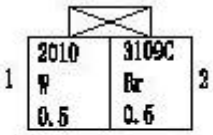
Rear defrost switch



DJ7021-2-21

接背门锁

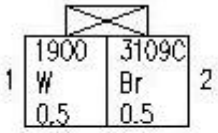
Back door lock



DJ7021-1.8-21(黑色)

接左牌照灯

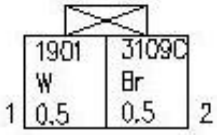
Left license plate light



DJY7021-2-21

接右牌照灯

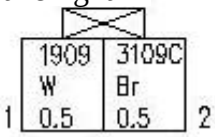
Right license plate light



DJY7021-2-21

接高位制动灯

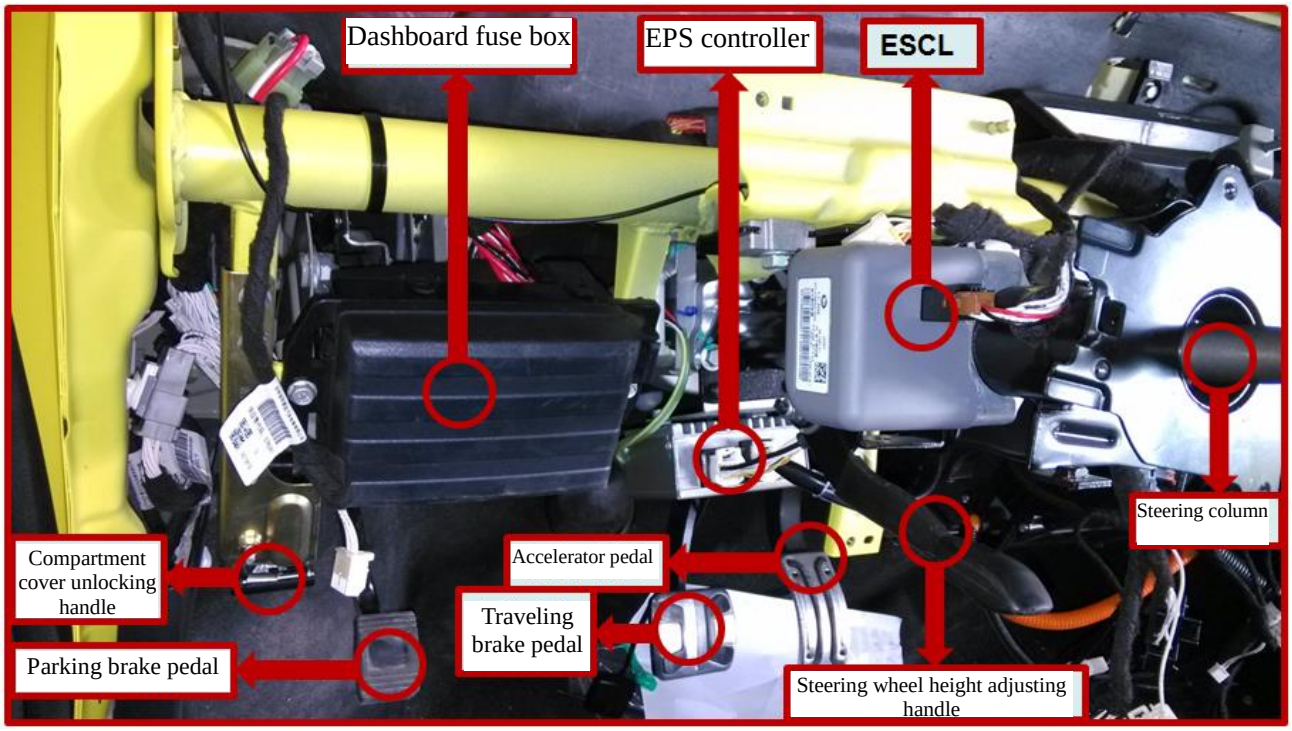
High position brake light

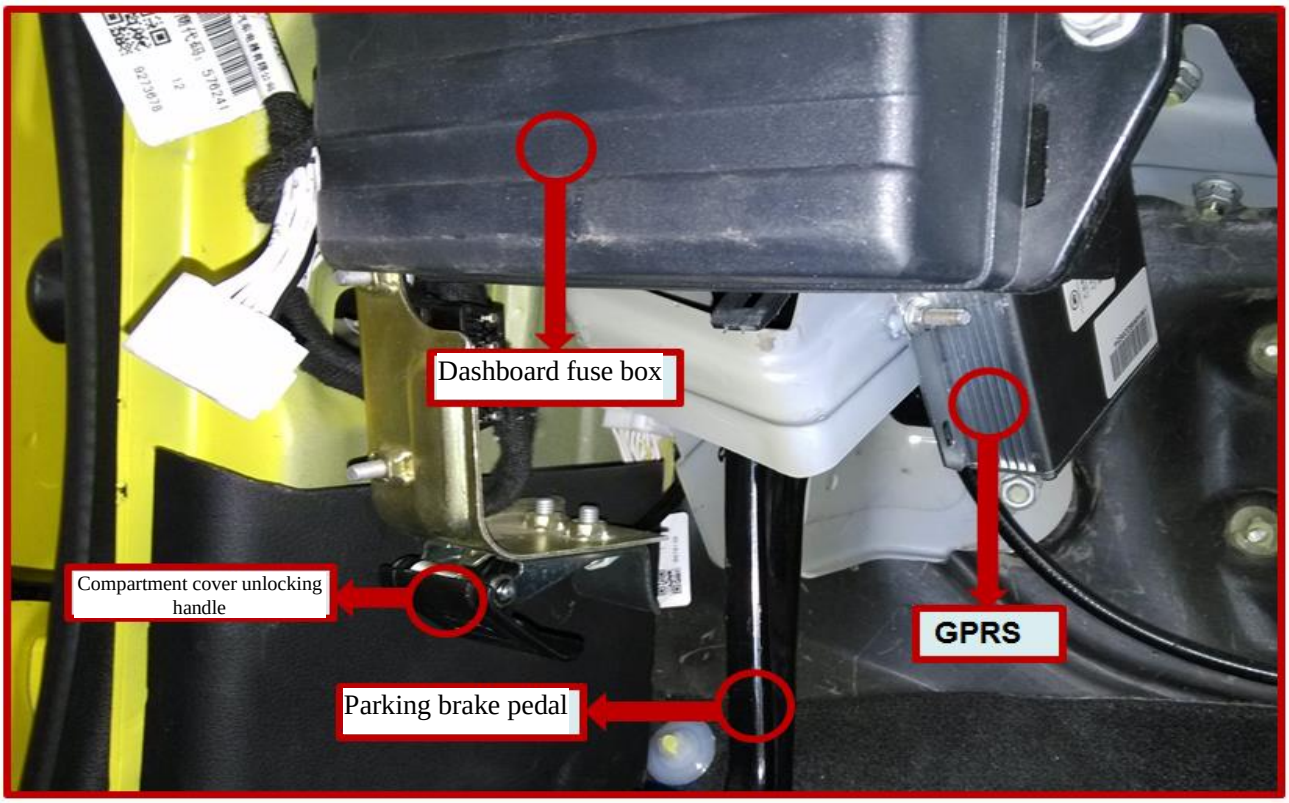


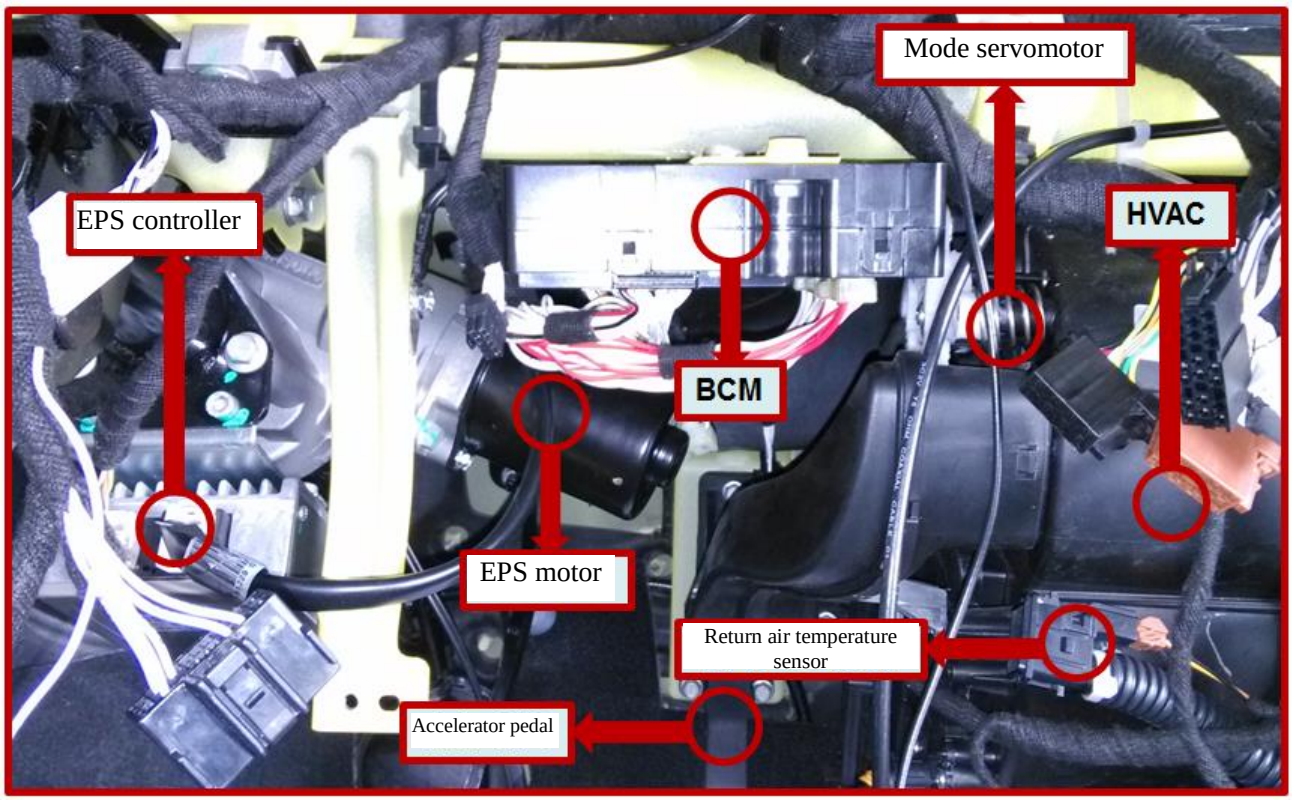
DJY7021-2-21

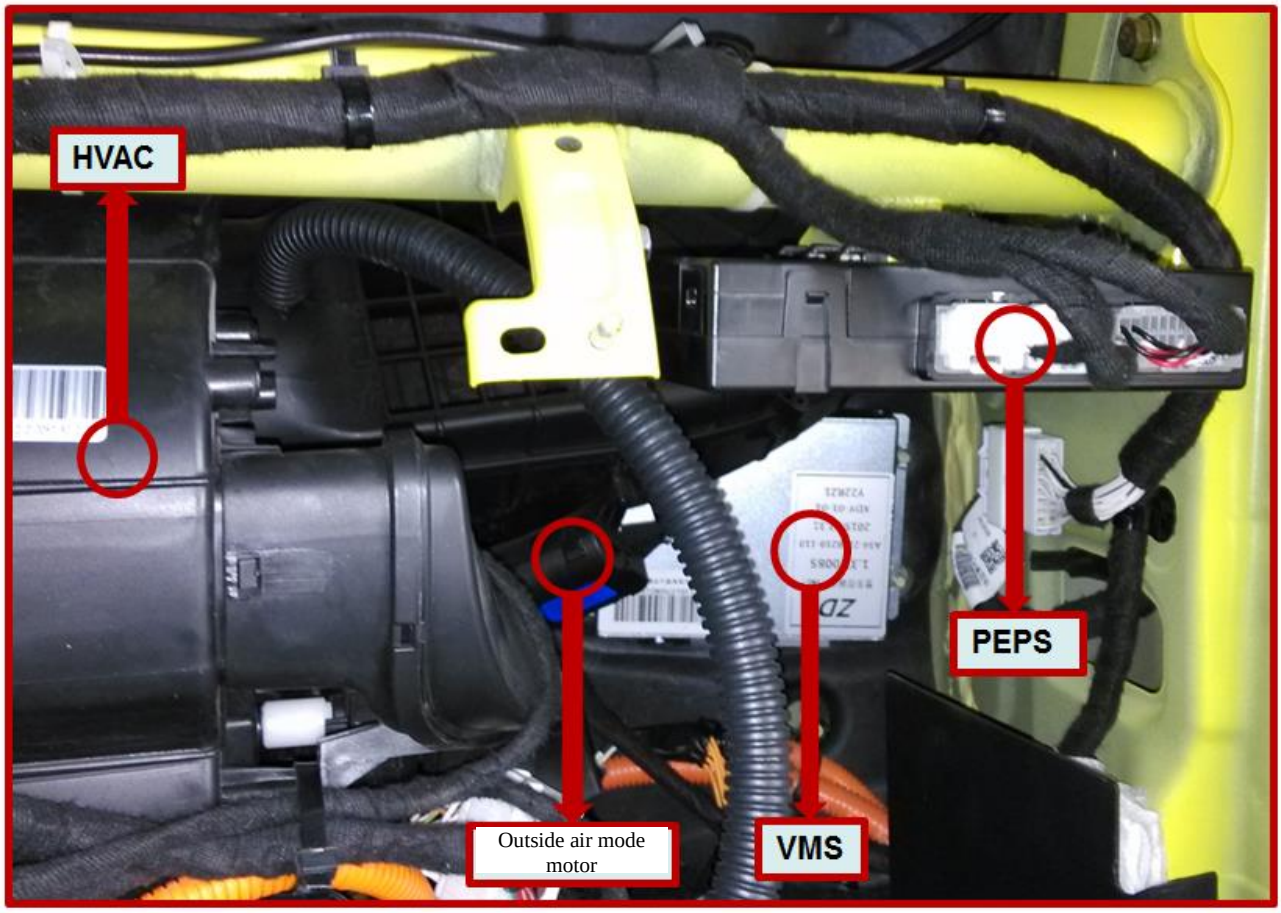
Section 3 Position Diagram of Accessories

I. Dashboard harness

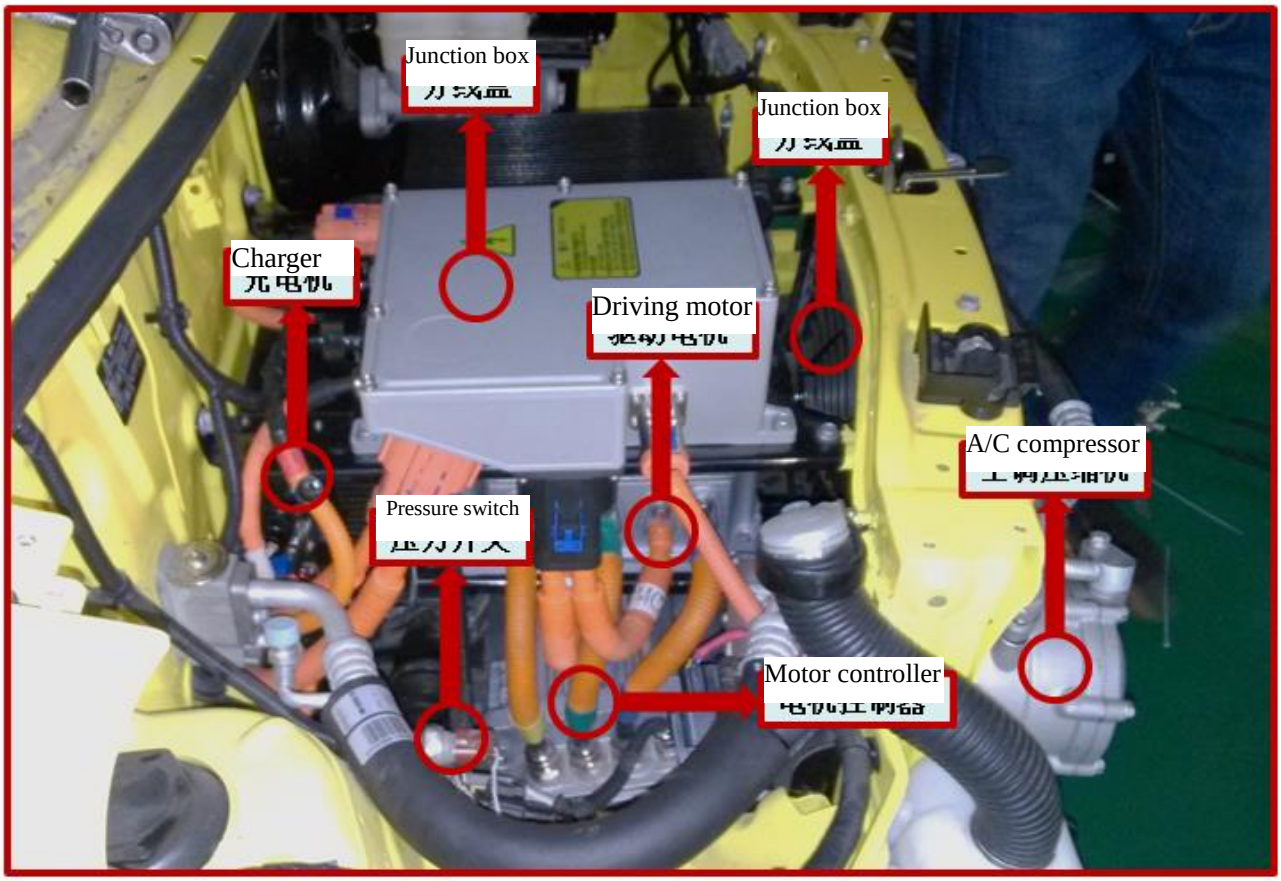


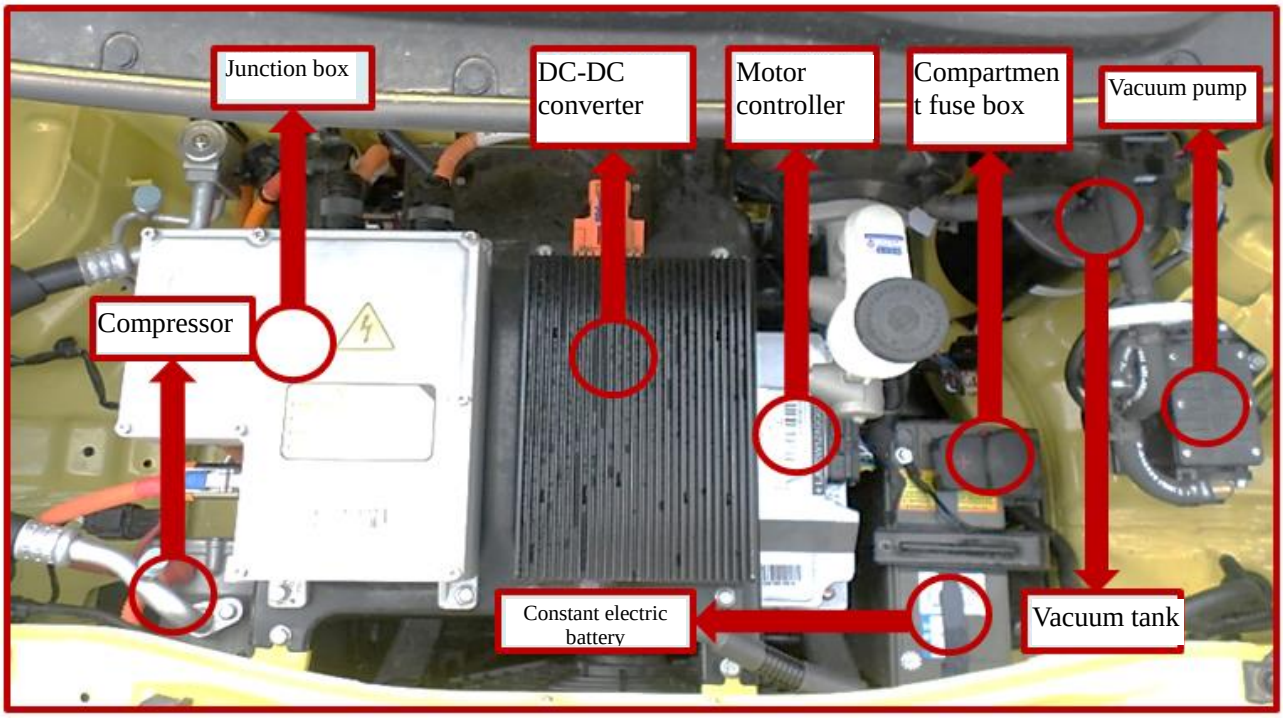


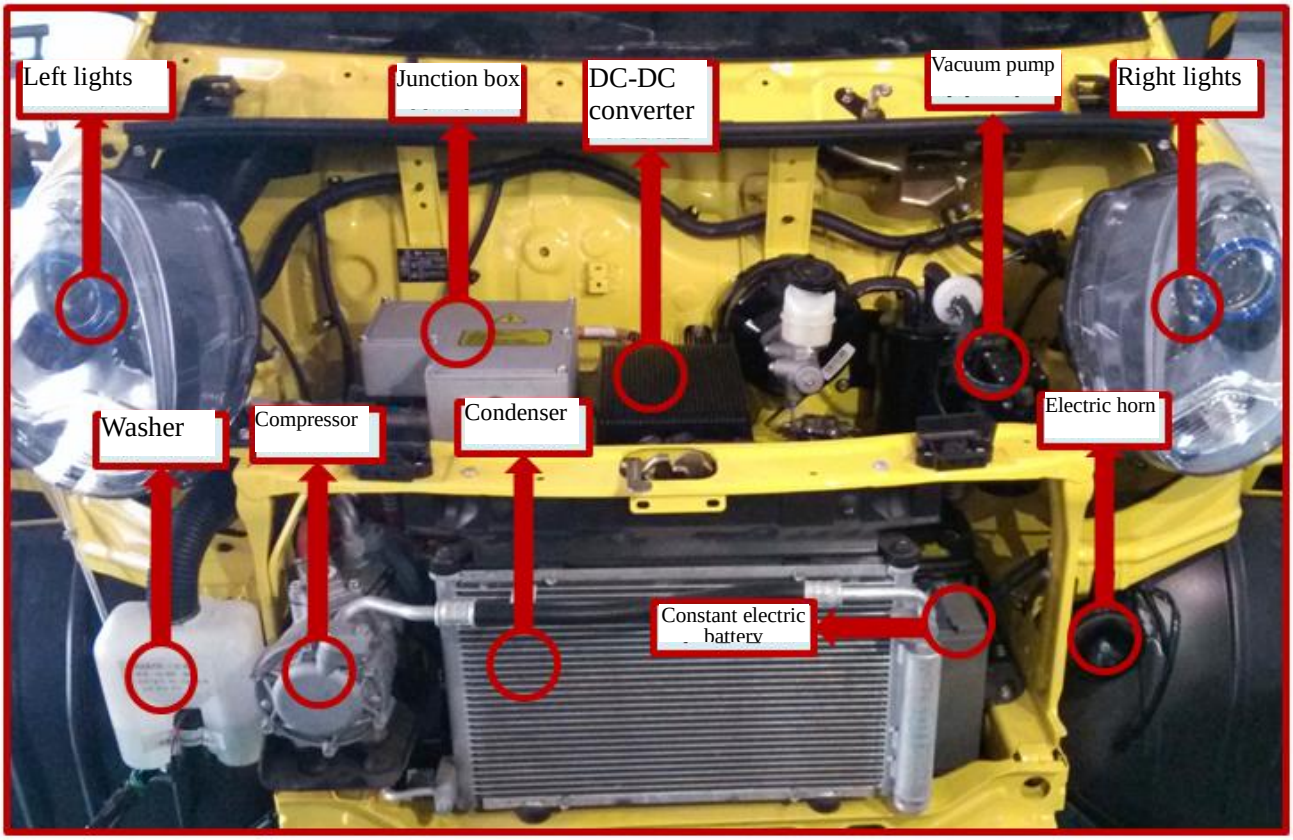

Mode servomotor
EPS controller
HVAC
BCM
EPS motor
Return air temperature sensor
Accelerator pedal


HVAC
PEPS
Outside air mode motor
VMS

II. Compartment harness

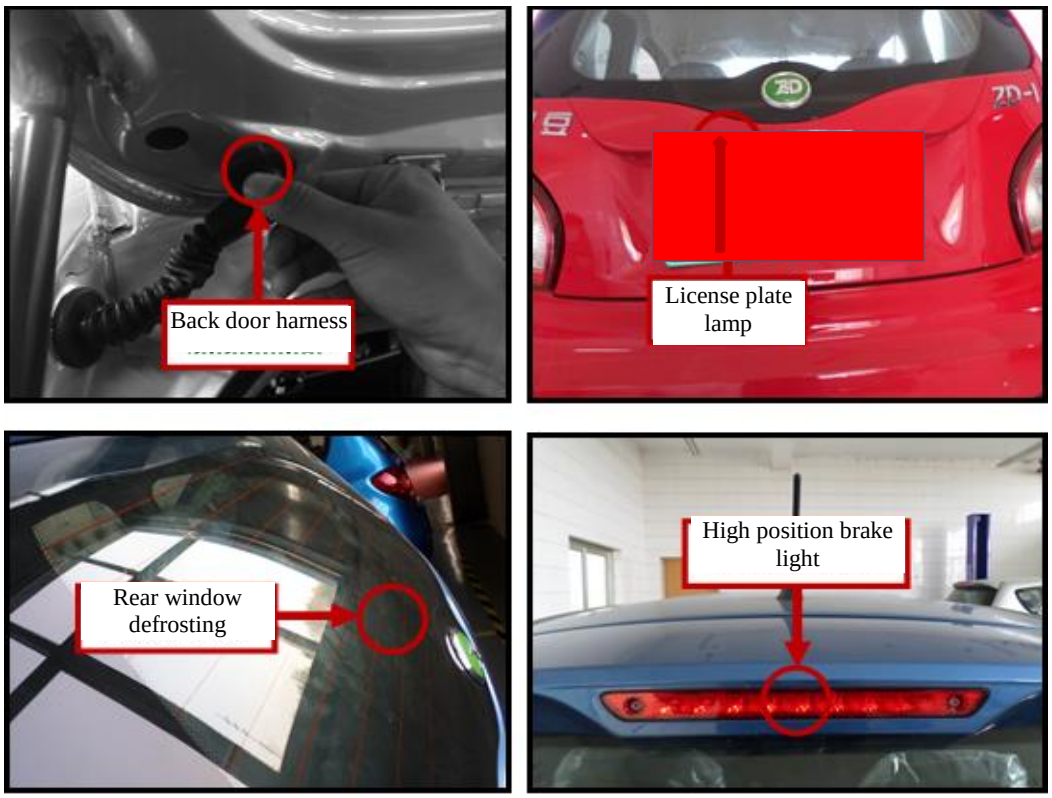






III. Left and right door harness

IV. Back door harness



V. GND point

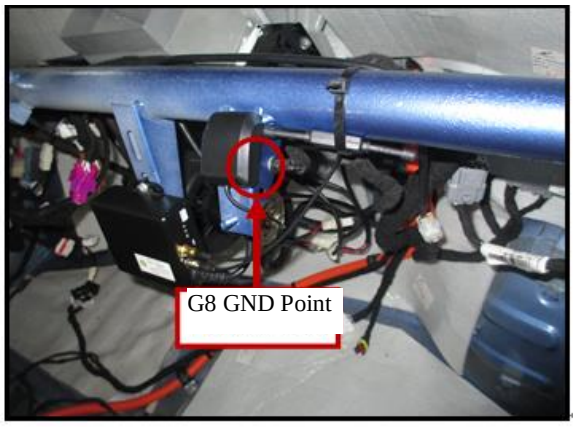

G1 GND Point

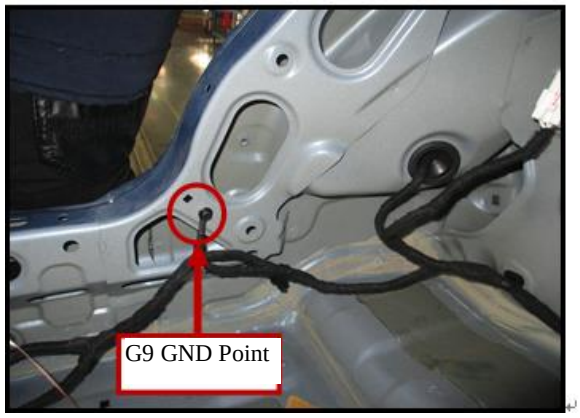

G2 GND Point


G4 GND Point


G5 GND Point


G6 GND Point


G8 GND Point

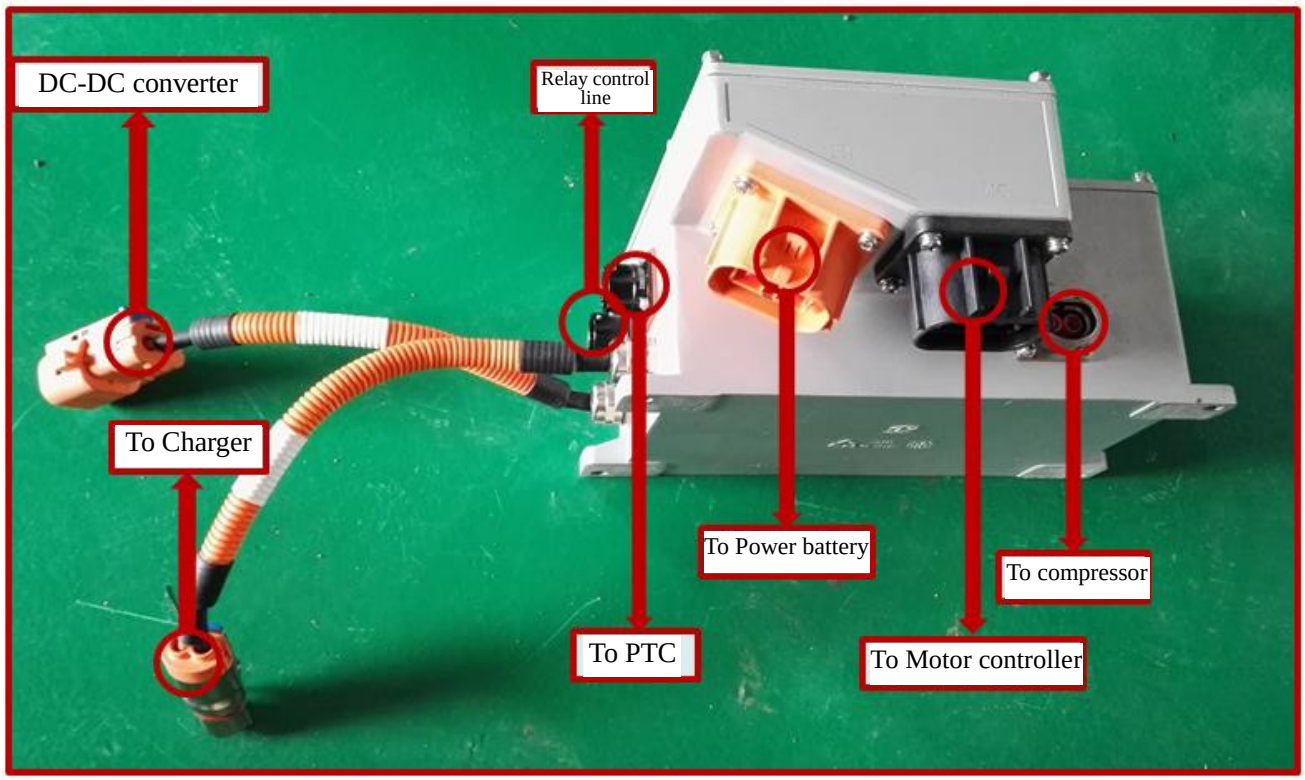

G9 GND Point

Section 4 Dismantling and Installation of Main Electrical Equipment and Removal of Common Faults

I. Junction box

1. Overview

The junction box assy, a key component of Zhidou electric vehicle, is used in electric energy distribution and overcurrent and short circuit protection and plays an important role in safety operation of the complete vehicle. The junction box provides power input to the high voltage electrical apparatus such as motor controller and motor, DC-DC converter, air conditioning system, etc. and charging input from the charger to the power battery.



2. Repair of the junction box assy

Note: repair or maintenance of any high voltage electrical apparatus must be

performed after power failure for five minutes.

1. Dismantle the 8 fixing bolts of the junction box cover pla

◎ Tightening torque: 5N•m

2. Dismantle the upper cover of the junction box.

3. Repair method and requirements

No.	Repair item	Repair	Requirements
1	Visual appearance	Visual	Good appearance, free of missing parts,
2	Cable	Visual	Cables are not damaged and loosened and
3	Fastener	Visual	Good fastening of all fasteners, no dislocation
4	Rubber seal	Visual	No oxidative denaturation
5	Cable terminal	Visual	Good appearance, free of damage, falling, breakage,

4. Cleaning

Remove the dust inside the junction box assy with a hair brush (if necessary, absolute ethyl alcohol can be used to wipe and clean the junction box); then remove the dust on the outer cable of the junction box assy with a hair brush.

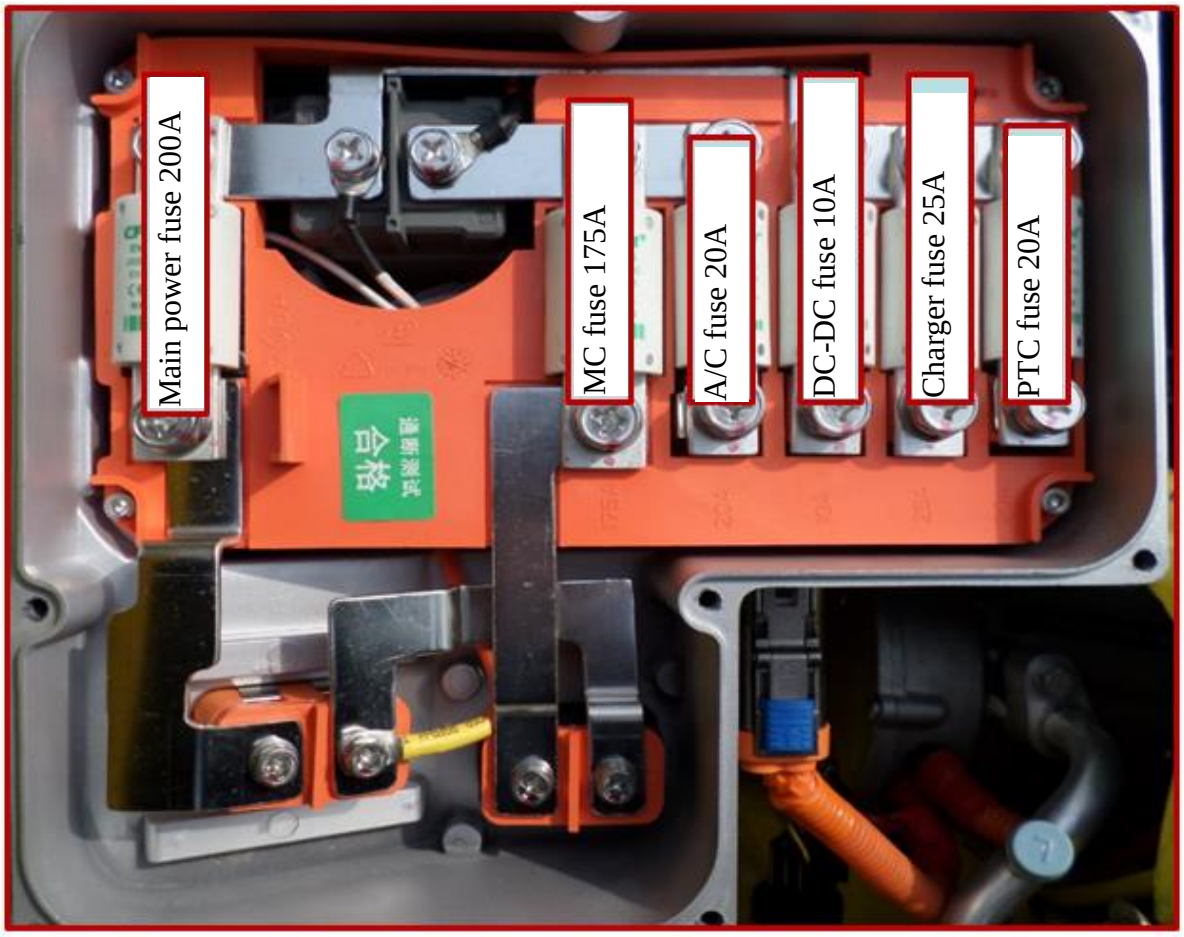
5. Seal ring replacement

After dismantling the upper cover of the junction box assy, dismantle and scrap the housing cover end face seal ring, and install a new seal ring to the corresponding

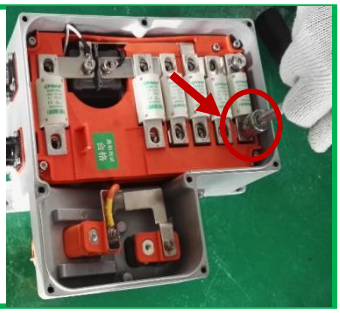
position of the housing end face (during installation, the seal ring can be fixed using an appropriate quantity of room temperature vulcanized silicone rubber).

6. Fuse replacement

Note: after the fuse is blown, be sure to eliminate the corresponding high voltage circuit shorting fault or overcurrent fault and then replace the fuse.

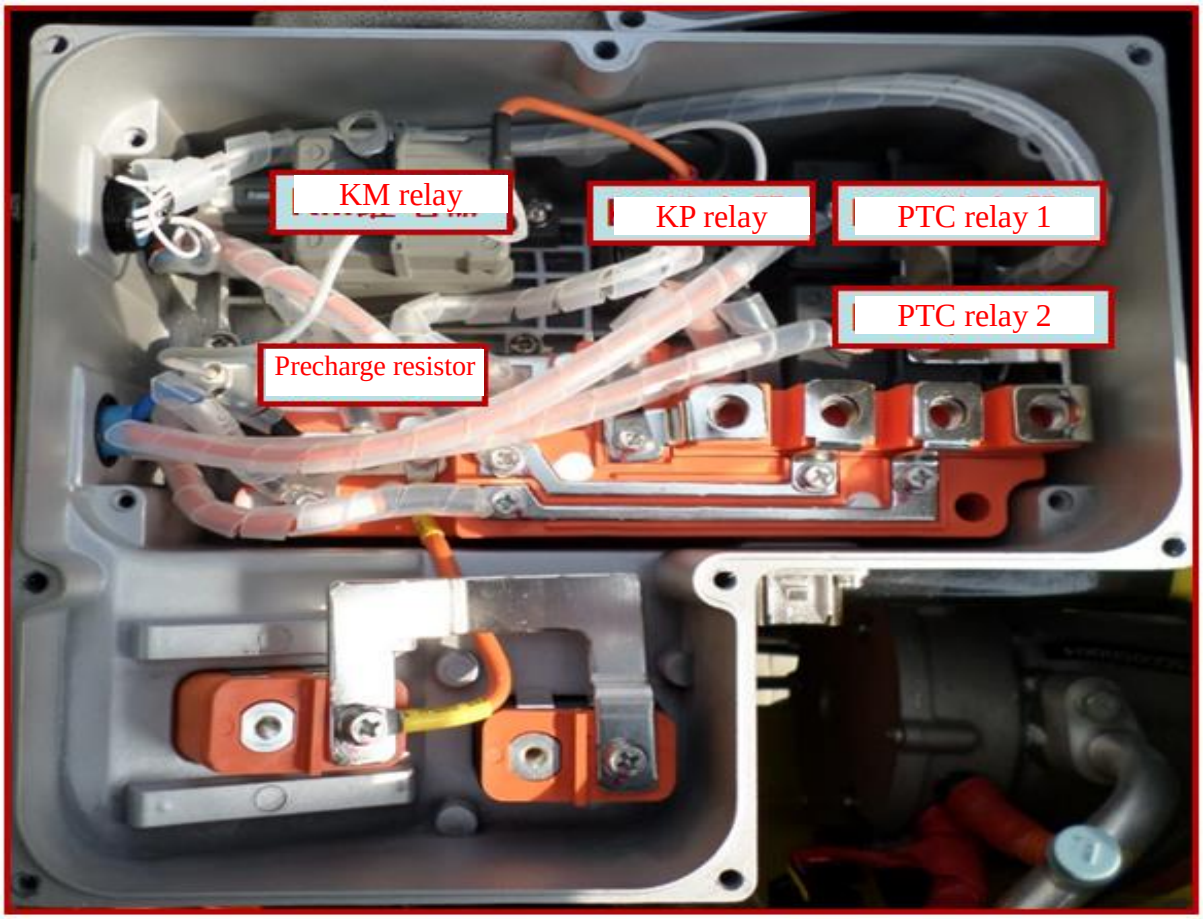


Dismantle the fastening bolt for fixing the fuse with an insulating tool and then replace the fuse with a new fuse of the corresponding specification. ◎ Tightening torque: 5N•m

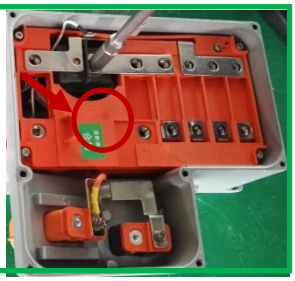


Before replacement, a continuity test shall be performed on the fuse with a multimeter so as to determine whether the substituted fuse is acceptable; in addition, fasten the fuse strictly according to the specified torque requirements, and make an anti-loosening marking.

7. Relay replacement



1. Successively dismantle the fuse and high voltage components with an insulating tool.



2. Dismantle the middle isolation plate. And then the KM, KP and PTC relays can be repaired or replaced.

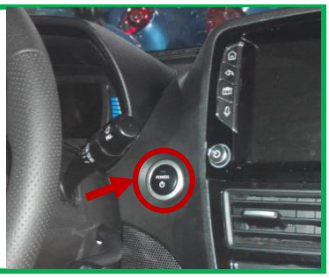
8. Restoration

After closing the upper cover, fix the 8 M5 combination screws of the upper cover with a M5 Phillips screwdriver according to the tightening torque of 5 N•m, and make an anti-loosening marking as required.

Dismantling and installation steps for the junction box assy

1. The whole vehicle is powered off to the OFF position.

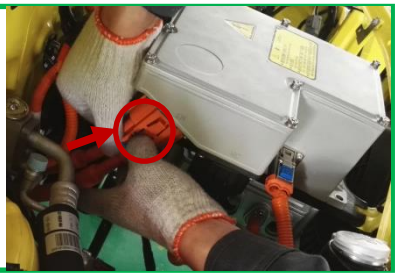
After 5min, begin operation.



2. Disconnect the aviation connector of the relay control harness.

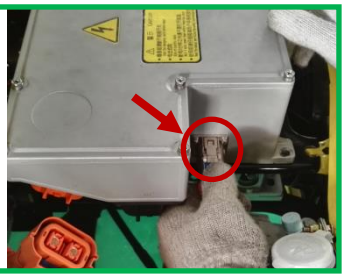
3. Disconnect the aviation connector of the PTC heating harness.

4. Disconnect the positive and negative harness connector of the power battery.



5. Disconnect the positive and negative harness connector of the motor controller.

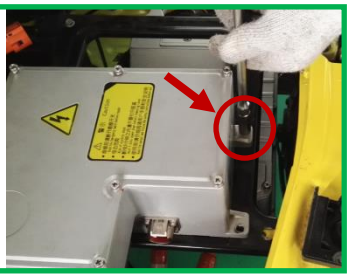
6. Disconnect the positive and negative harness connector of the air conditioning compressor.



7. Disconnect the positive and negative harness connector of the DC-DC converter.

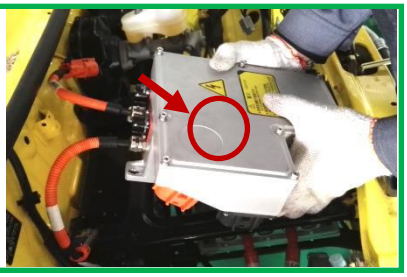
8. Disconnect the positive and negative connector of charger DC output.

9. Dismantle the four fixing bolts of the junction box.



10. Take out the junction box assy from the front compartment.

Take care to handle it lightly and never throw it heavily.

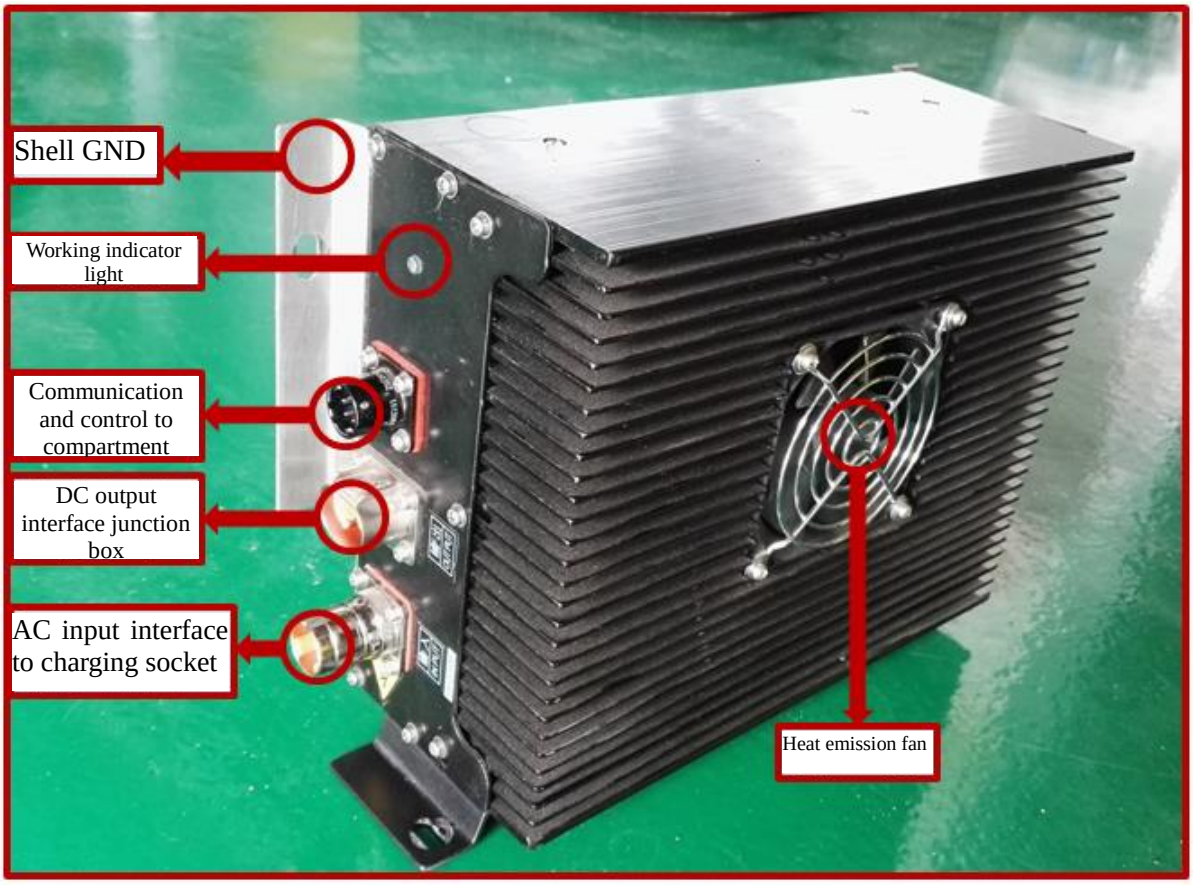


11. The installation process is the contrary of the dismantling process.

II. Charger

1. Overview

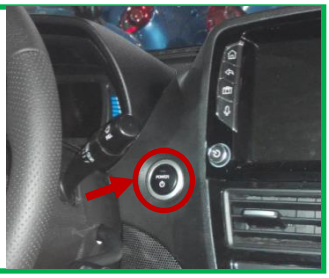
The on-board charger of Zhidou electric vehicle is applicable to LFP and LMO lithium batteries. The charger is characterized by small weight, small volume, stable charging, high efficiency, high safety and reliability, etc. The charger can achieve automatic switching between float charging and equalized charging and has protection functions such as output short circuit protection, output overload protection, etc.



2 Charger dismantling and installation steps

1. The whole vehicle is powered off to the OFF position.

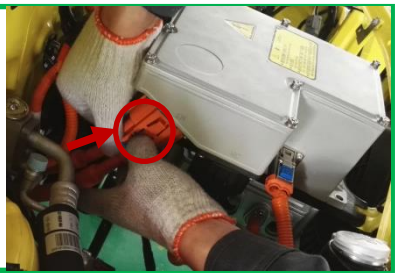
After 5min, begin operation.



2. Disconnect the aviation connector of the relay control harness.

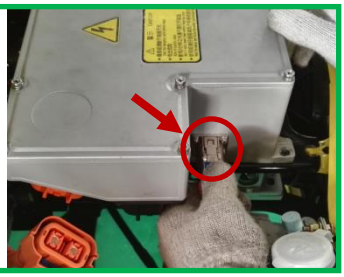
3. Disconnect the aviation connector of the PTC heating harness.

4. Disconnect the positive and negative harness connector of the power battery.

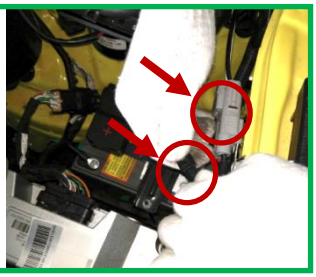


5. Disconnect the positive and negative harness connector of the motor controller.

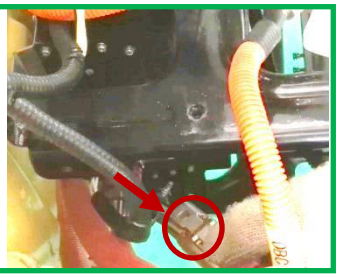
6. Disconnect the positive and negative harness connector of the air conditioning compressor.



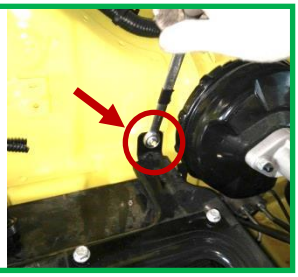
7. Disconnect the DC output connector and enable line plug-in connector of the DC-DC converter.



8. Disconnect the positive and negative connector of charger DC output.



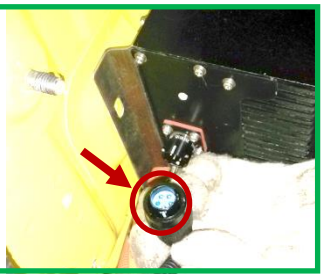
9. Dismantle the fixing bolts between the junction box and the DC-DC converter bracket.



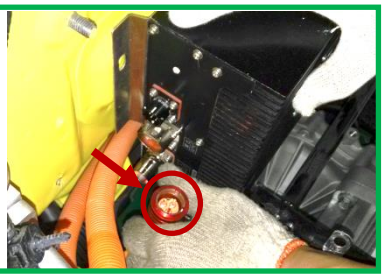
10. Take out the junction box assy, DC-DC converter and bracket together from the front compartment.

Take care to handle them lightly and never throw them heavily.

11. Disconnect the aviation plug of the communication and control harness of the charger.



12. Disconnect the AC input aviation plug of the charger.



13. Dismantle the 4 fixing bolts of the charger.

14. Take out the charger from the front compartment.

15. The installation process is the contrary of the dismantling process.

4. Common faults and their removal methods

① LED indicator light label:

The LED indicator light is an important mark for judging whether the charger works normally. After the charger is powered on, the following tips will appear:

Charger status	Indicator light status
Standby	Red light always on
Being charged	Green light flashing
Fully charged	Green light always on
Communication fault	Red light flashing

① Common faults and Solutions

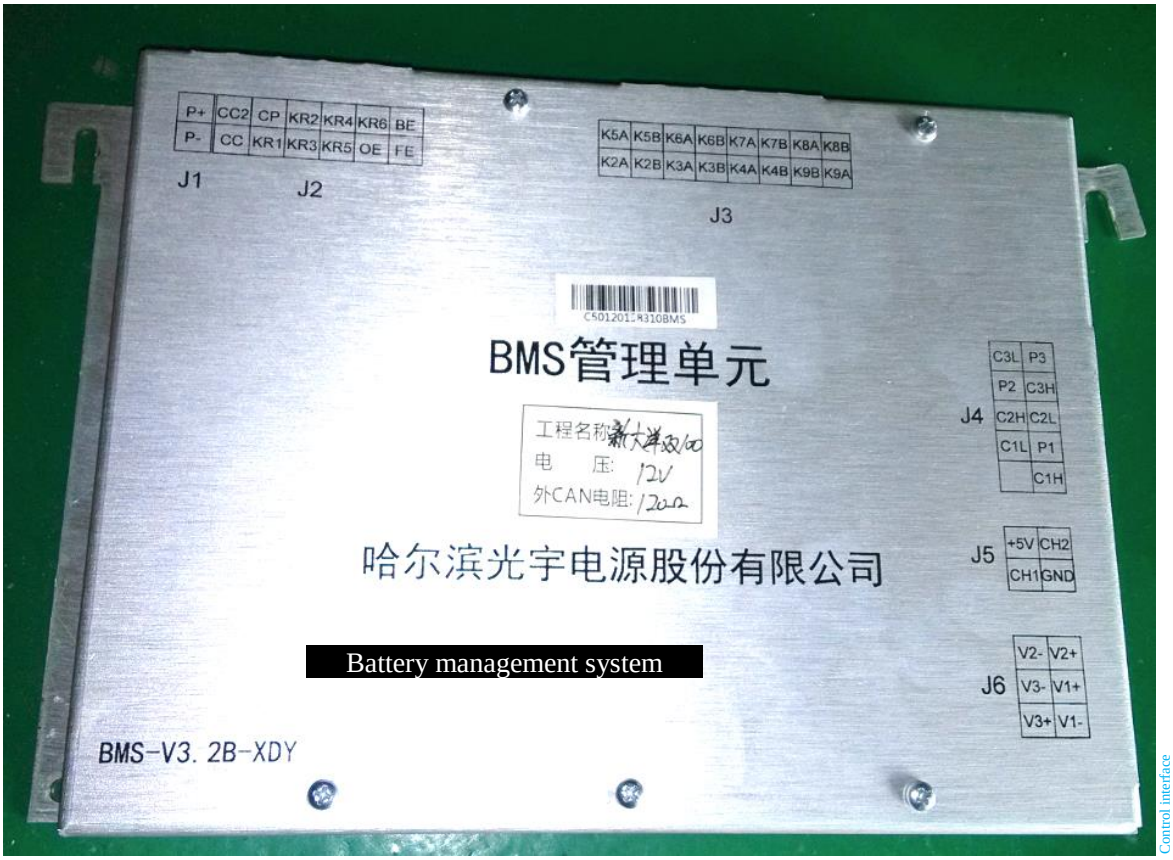
Fault	Fault symptom	Possible causes	Troubleshooting method
Failure to charge	Red-green flashing alternately, with the interval time of 1s	1. The main power switch is not turned on.	Turn on the main power switch.
		2. Power line shorting	Check, repair, connect
		3. Battery box fuse damage	Replace
		4. Battery box contactor damage	Replace
		Undervoltage or insufficient voltage of the 5.12V small battery	Check, replace
	Red, green - red, green flashing circularly, with the interval time of 6s	1. Battery error, battery damage	Check, repair, replace
		2. The voltage class of the battery doesn't match with the charger.	Replace or repair
	Red, green, red - red, green, red flashing circularly, with the interval time of 5s	Charging timeout error caused by battery fault	Check, repair, replace
	Red, green, red, green - red, green, red, green flashing circularly, with the interval time of 4s	Too high or too low AC input voltage	Check, repair, replace
	Green, red –	1. Too high charger temperature	Check, adjust,

	green, red flashing circularly, with the interval time of 6s		replace
		2. Too high charging environment temperature or unsmooth ventilation	Replace the charging place.
	Red, green - red, green flashing circularly, with the interval time of 4s	Charger fault	Check, repair, replace
	Red, green, red, green, red, green, red flashing circularly, with the interval time of 1s	1. BMS assy damage	Check, repair, replace
		2. CAN communication line non-connection or damage	Check, repair, replace

III. Battery management system (BMS)

1. Product overview

The battery management system (BMS) in the power battery box of Zhidou electric vehicle is used to control, manage and monitor the status of the power battery and to provide functions such as remote data downloading, fault analysis and alarm, etc. The main functions are shown in the following table:



Temperature detection function	A digital temperature sensor is used, which supports 6 temperature monitoring points.
Battery equalization function	Provision of passive equalization, equalizing current 100mA
Precharging control function	Control the battery pack output contactor to be connected with loads as per a certain sequence.
Thermal management function	Control fan working according to the current temperature and status of the battery.
Charging management function	Achieve charging control through communication with the CAN of the charger.
Battery pack insulation resistance measuring function	Measure the insulation resistance between the battery pack and eth vehicle shell.
On-board equipment information transmission function	Transmit the current data and working state of the battery pack in real time via the CAN bus.
Remote data download function	The system program is upgraded and the system history data is downloaded through CAN bus

Fault analysis and alarm function	Grading alarm according to the battery pack fault information

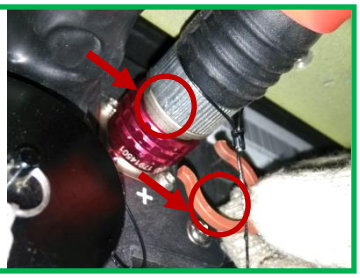
2. BMS assy dismantling and installation steps

1. The whole vehicle is powered off to the OFF position.

After 5min, begin operation.

2. Lift the vehicle to the height suitable for dismantling and then dismantle the outgoing line bottom guard plate. Fix bolts and dismantle the outgoing line bottom guard plate.

3. Pull out the positive and negative high voltage lines and signal line aviation plugs.
(Take out the locking buckle and then anticlockwise rotate to unlock.)

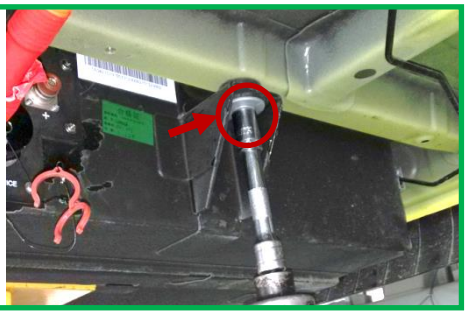


4. Separate the high voltage line and signal line from the battery box, lift the hydraulic lift trolley to an appropriate height and hold out against the power battery box to prevent it from falling during dismantling.

5. Dismantle the fixing bolts of the battery shell grounding harness.

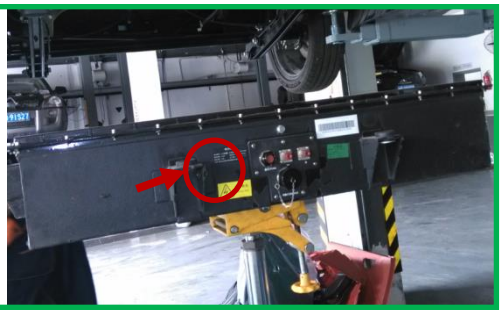
6. Dismantle the 7 fixing bolts of the power battery box along the diagonal direction.

◎ Tightening torque: 45±5N•m



7. Slowly lower the hydraulic lift trolley to the appropriate height.

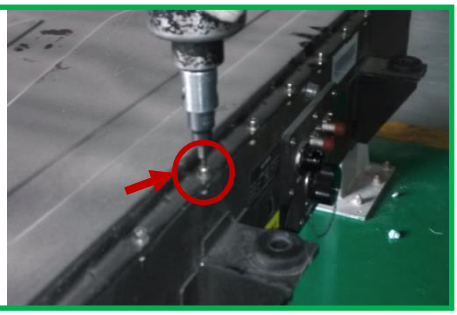
Keep the battery box stably during lowering.



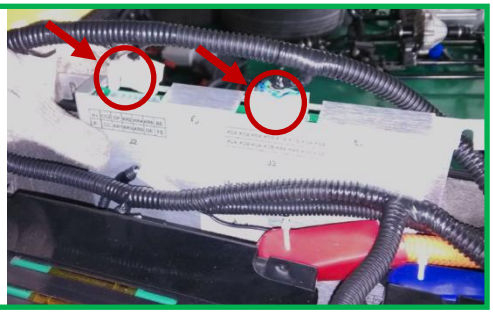
8. Move the battery box from the hydraulic trolley onto ground. Take care to handle the battery box lightly and never throw it heavily during moving.

9. Dismantle the battery box cover fixing bolts (20 pieces).

Dismantle the battery box cover.



10. Dismantle the BMS assy connection plug and disconnect the BMS assy from the detection line.



11. Dismantle the fixing bolts of the BMS assy with the battery box and take out the BMS assy from the battery box.

12. The installation process is the contrary of the dismantling process.

3. Common faults and their removal methods

① If the faults related to the BMS assy occur, including power-off of the whole vehicle or failure to charge, etc., please carefully check for correct connection of all external lines of the BMS assy and for normal working of the charger, DC-DC converter assy, etc., then read the BMS related messages, and preliminarily judge faults.

② If the instrument cluster has no indication of information on the battery pack, e.g. information on power battery voltage, charging and discharging current, battery temperature, etc., check for BMS power supply anomaly and then for the internal detection line of the battery pack. If all external lines are normal, the fault can be deemed to be the BMS fault. There is no part available for repair inside the BMS assy,

so it is replaced.

③ If the the power battery fault indicator is displayed on the combination instrument, connect the USBCAN interface card to the information bus or the power bus of the vehicle to read the relevant fault code and thus to determine the fault. As for the fault code of the power battery, the information bus reads 0x17ff00f4, and the power bus reads 0x18ff00f4. The detailed fault codes are interpreted as follows:

0x17ff00f4

Byte	Bit	Fault Code	Fault Detail
BYTE1	BIT1	0-1 (0: normal; 1: abnormal)	Battery cell is overvoltage (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery cell is under ultra-high voltage (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery cell is undervoltage (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery cell is under ultra-low voltage (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery pack is overall overvoltage (pre-alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery pack is overall under ultra-high voltage (alarm)
	BIT7	0-1 (0: normal; 1: abnormal)	Battery pack is overall undervoltage (pre-alarm)
	BIT8	0-1 (0: normal; 1: abnormal)	Battery pack is overall under ultra-low voltage (alarm)
BYTE2	BIT1	0-1 (0: normal; 1: abnormal)	Battery cell has overlarge voltage difference (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery cell has super-large voltage difference (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack has scant remaining capacity (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack has scant remaining capacity (alarm)
	BIT5-BIT8	Reserved	Reserved
BYTE3	BIT1	0-1 (0: normal; 1: abnormal)	Battery pack has overlarge discharge current (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery pack has super-large discharge current (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack has overlarge charging current (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack has super-large charging current (alarm)
	BIT5-BIT8	Reserved	Reserved
BYTE4	BIT1	0-1 (0: normal; 1: abnormal)	Battery pack is overtemperature

			(pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery pack is under ultra-high temperature (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack is undertemperature (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack is under ultra-low temperature (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery pack has overlarge temperature difference (pre-alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery pack has super-large temperature difference (alarm)
	BIT7-BIT8	Reserved	Reserved
BYTE5	BIT1	0-1 (0: normal; 1: abnormal)	Insulation is excessively low (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Insulation is ultra-low (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack takes a overlong time to heat (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack takes a super-long time to heat (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery pack takes a overlong time to charge (pre-alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery pack takes a super-long time to charge (alarm)
	BIT7-BIT8	Reserved	Reserved
BYTE6	BIT1	0-1 (0: normal; 1: abnormal)	BMS system fault, etc. (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Communication fault with charger (pre-alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Communication fault with the vehicle control unit (pre-alarm)
	BIT4-BIT8	Reserved	Reserved
BYTE7	BIT1	0-1 (0: normal; 1: abnormal)	Pre-charging fault (alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Heating abnormality (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Negative contactor fault: close failure (alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Negative contactor fault: adhesion (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery external short circuit (alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery internal short circuit (alarm)
	BIT7-BIT8	Reserved	Reserved
BYTE8	BIT1-BIT8	Reserved	Reserved

0x18ff00f4:

Byte	Bit	fault code	Fault Detail
BYTE1	BIT1	0-1 (0: normal; 1: abnormal)	Battery cell is overvoltage (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery cell is under ultra-high voltage (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery cell is undervoltage (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery cell is under ultra-low voltage (alarm)

	BIT5	0-1 (0: normal; 1: abnormal)	Battery pack is overall overvoltage (pre-alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery pack is overall under ultra-high voltage (alarm)
	BIT7	0-1 (0: normal; 1: abnormal)	Battery pack is overall undervoltage (pre-alarm)
	BIT8	0-1 (0: normal; 1: abnormal)	Battery pack is overall under ultra-low voltage (alarm)
BYTE2	BIT1	0-1 (0: normal; 1: abnormal)	Battery cell has overlarge voltage difference (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery cell has super-large voltage difference (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack has scant remaining capacity (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack has scant remaining capacity (alarm)
	BIT5-BIT8	Reserved	Reserved
BYTE3	BIT1	0-1 (0: normal; 1: abnormal)	Battery pack has overlarge discharge current (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery pack has super-large discharge current (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack has overlarge charging current (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack has super-large charging current (alarm)
	BIT5-BIT8	Reserved	Reserved
BYTE4	BIT1	0-1 (0: normal; 1: abnormal)	Battery pack is overtemperature (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery pack is under ultra-high temperature (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack is undertemperature (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack is under ultra-low temperature (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery pack has overlarge temperature difference (pre-alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery pack has super-large temperature difference (alarm)
	BIT7-BIT8	Reserved	Reserved
BYTE5	BIT1	0-1 (0: normal; 1: abnormal)	Insulation is excessively low (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Insulation is ultra-low (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack takes a overlong time to heat (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack takes a super-long time to heat (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery pack takes a overlong time to charge (pre-alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery pack takes a super-long time to charge (alarm)
	BIT7-BIT8	Reserved	Reserved
BYTE6	BIT1	0-1 (0: normal; 1: abnormal)	BMS system fault, etc. (pre-alarm)

	BIT2	0-1 (0: normal; 1: abnormal)	Communication fault with charger (pre-alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Communication fault with the vehicle control unit (pre-alarm)
	BIT4-BIT8	Reserved	Reserved
BYTE7	BIT1	0-1 (0: normal; 1: abnormal)	Pre-charging fault (alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Heating abnormality (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Negative contactor fault: close failure (alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Negative contactor fault: adhesion (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery external short circuit (alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery internal short circuit (alarm)
	BIT7-BIT8	Reserved	Reserved
BYTE8	BIT1-BIT8	Reserved	Reserved

IV. Vehicle Management System (VMS Assy)

1. Product overview

① Zhidou electric vehicle is fitted with the independently developed vehicle management system (VMS assy).

② Functions of the vehicle management system (VMS assy) of Zhidou electric vehicle:

a. Provision of the instrument part display information and alarm light driving

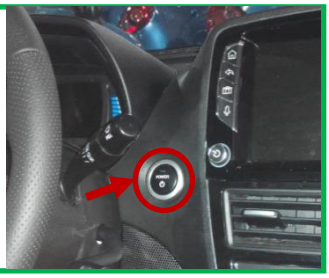
b. Provision of motor control information

b. Provision of BMS assy control information

d. Provision of GPRS transmission information

e. Control of the electrical components of the vehicle part

2. Dismantling steps

1. The whole vehicle is powered off to the OFF position.	
2. Dismantle the three plugs in the upper part of the VMS assy, and disconnect it from the main circuit.	
3. Dismantle the four fixing screws of te VMS assy and take out it from the body.	

4. The installation process is the contrary of the dismantling process.

3. Common faults and their removal methods

If the faults related to the VMS assy occur, e.g. vehicle CAN communication fault, forward and reverse gear position failure, inconsistency between instrument display

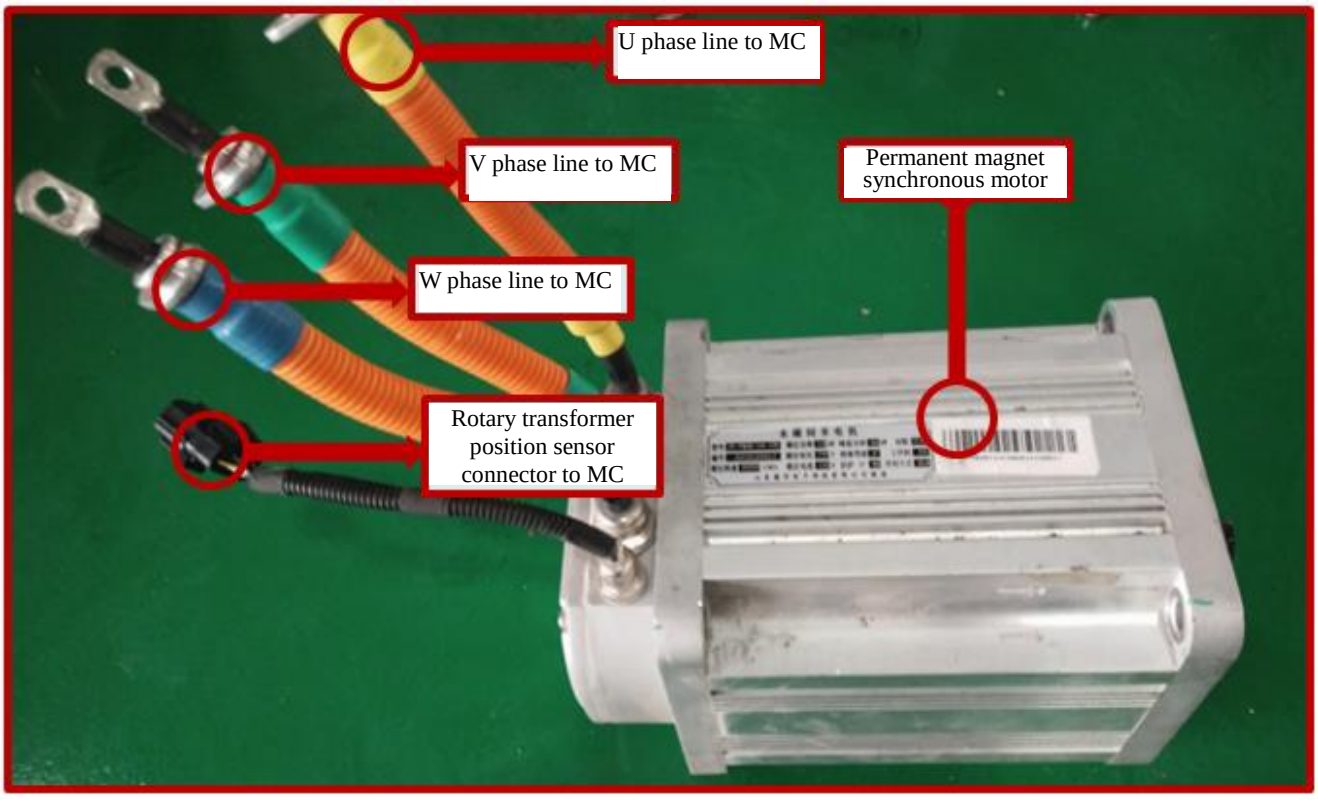
and actual operation, reversing radar malfunction, etc., firstly check for correct connection of external lines and for normal VMP power supply and grounding; after confirming all of them are normal, a VMS assy hardware fault can be concluded. There is no part available for repair inside the VMS assy, so it is replaced.

V. Drive Motor

1. Product overview

The drive motor of Zhidou electric vehicle is a permanent magnet synchronous motor. The specifications of the motor: rated voltage 144V, rated power 15kW, peak power 30kw, rated speed 5200rpm, and max. speed 7300rpm.

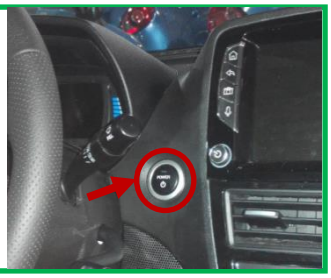
With the advanced electromagnetic design simulation technology, the slot shape of the stator and rotor of the motor, the size of the yoke and gear part, etc. are re-designed, and the magnetic flux density of the motor yoke, gear part and air gap is reasonably determined, so that in comparison to the motor of the same power, this product has features such as electromagnetic material saving, small volume, small weight, low noise, high efficiency platform, high power density, etc. on the basis of using common electromagnetic materials.



2. Drive motor dismantling and installation steps

1. The whole vehicle is powered off to the OFF position.

After 5min, begin operation.

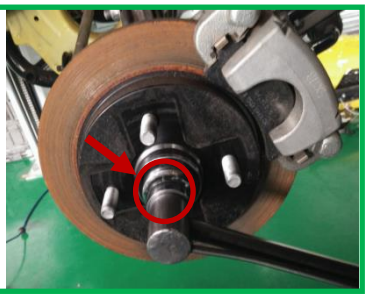


2. Loosen the wheel nuts successively as per the diagonal direction. (Model: XQ306A12-M12×1.25-8.8)

◎ Tightening torque: 90±10N•m

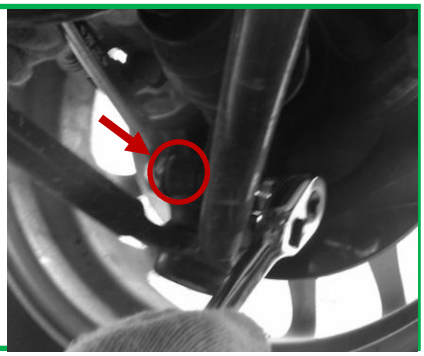
3. Dismantle the locking nuts of the drive shaft.

◎ Tightening torque: 180±10N•m

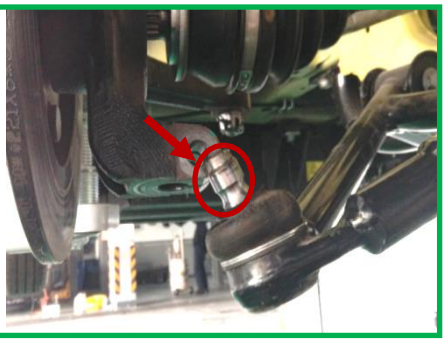


4. Dismantle the fastening bolts of the lower swing arm ball head with the steering knuckle.

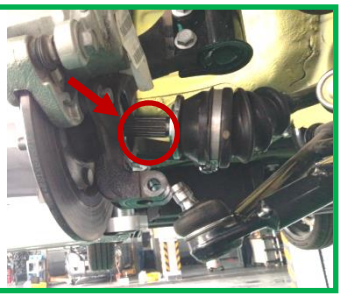
(1*M10×45-10.9) ◎ Tightening torque: 70±5N•m



5. If it is difficult to separate the lower swing arm ball head from the steering knuckle, knock out the lower swing arm ball head from the steering knuckle with a wooden hammer and separate the lower swing arm from the auxiliary frame.



6. Pull out the steering knuckle and front damper assy slightly outside to separate the drive shaft from the hub bearing.



7. Lift the hydraulic lift trolley to the appropriate height and hold out against the auxiliary frame and motor reducer assy to prevent them from falling during dismantling.

8. Dismantle the fixing bolts and fixing nuts of the auxiliary frame. (12 fixing bolts DIN 6921-M10X20-8.8)

◎ Tightening torque: 59±10N•m

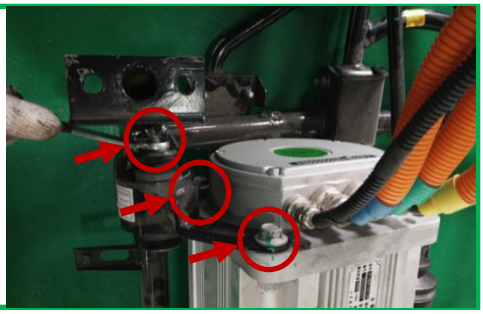
9. Slowly lower the hydraulic lift trolley to the appropriate height, and keep it stable during lowering.

10. Dismantle the motor front suspension assy.

(1 nut DIN6927-M10×1.25-8,

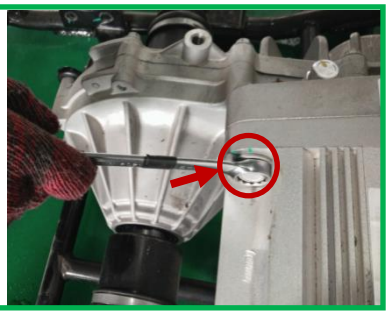
1 bolt DIN931-M10×1.25×80-10.9)

◎ tightening torque: 70±5N•m

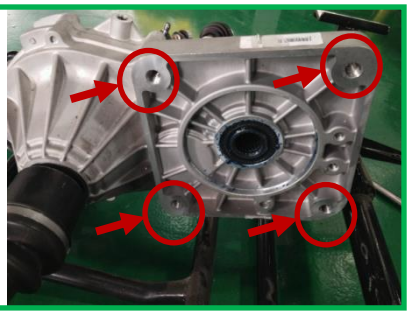


11. Dismantle the connecting bolts of the motor and reducer. (4 bolts DIN 6921-M12X40-8.8)

◎tightening torque: 78±5N•m



12. Separate the motor from the reducer.



13. The installation process is the contrary of the dismantling process.

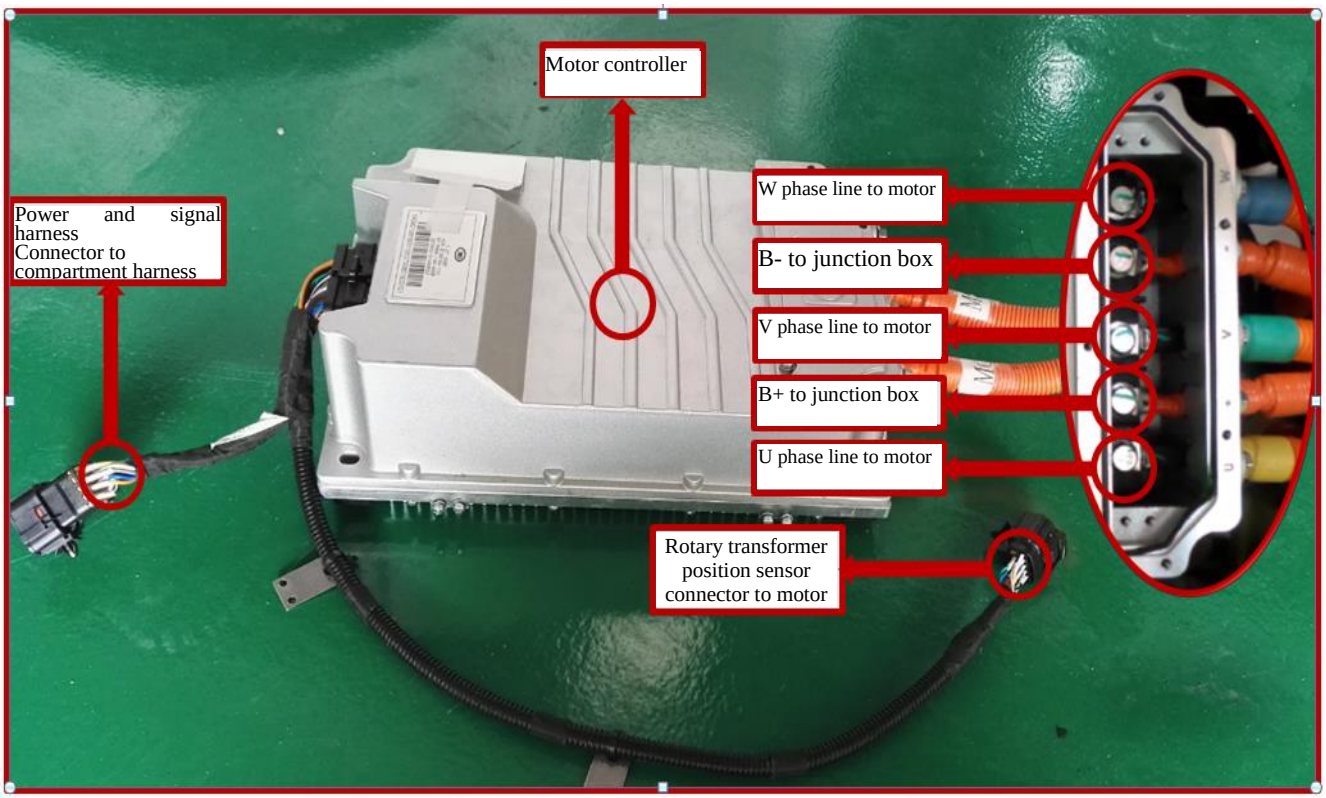
3. Common faults and their removal methods

Fault symptom	Possible cause	Troubleshooting method
High motor noise level	Axial play in the motor	Replace
	Large bearing clearance in the motor	Replace
	Motor rotor sweeping	Replace
	Loosening and falling of magnetic steel	Repair, replace

Motor joggling	Poor contact of position sensor harness	Repair, replace
	Motor controller damage	Repair, replace
Working failure of the motor	Motor controller failure, replacement	Check, replace
	Motor position sensor failure	Check, replace
	Harness fault	Check, replace

VI. Motor Controller

1. Overview of the motor controller

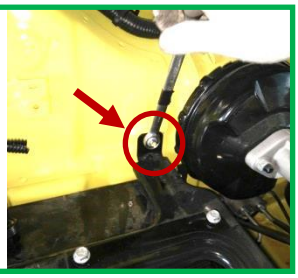


2. Motor Controller dismantling and installation steps

1. The whole vehicle is powered off to the OFF position. After 5min, begin operation.

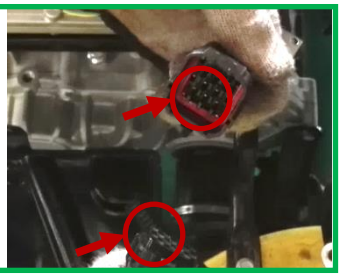
2. Disconnect the HV harness connector of the junction box and the DC-DC LV harness connector.

3. Dismantle the fixing bolts between the junction box and the DC-DC converter bracket.

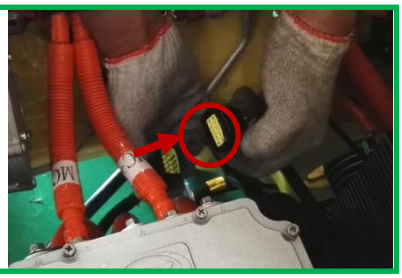


4. Take out the junction box assy, DC-DC converter and bracket together from the front compartment.
Take care to handle them lightly and never throw them heavily.

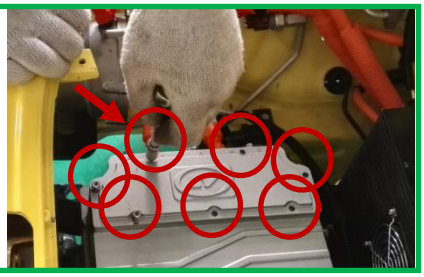
5. Disconnect the motor controller power and signal line connectors.



6. Disconnect the signal line connector of the position sensor of the motor controller.

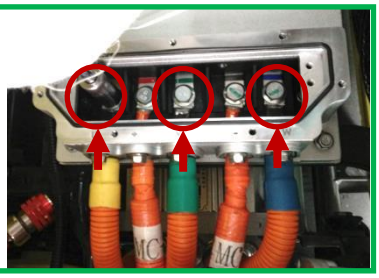


7. Dismantle the 7 fixing bolts of the guard cover of the HV harness of the motor controller.



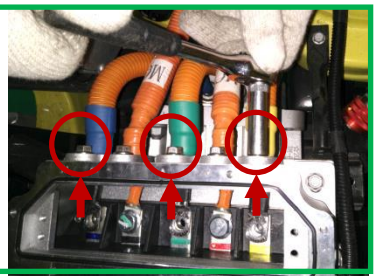
8. Dismantle the fixing bolts of the U, V and W three-phase lines.

◎tightening torque: 23±2N•m



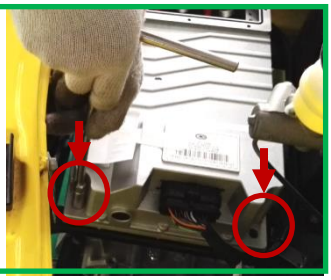
9. Dismantle the 3 fixing bolts of the phase line of the motor controller.

◎tightening torque: 9±2N•m



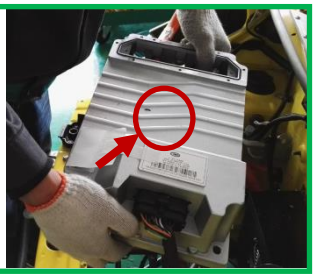
10. Dismantle the 4 fixing bolts on the heat sink of the motor controller.

◎tightening torque: 9±2N•m



11. Take out the controller from the controller bracket.

Take care to lightly handle it.



12. The installation process is the contrary of the dismantling process.

3. Common faults and their removal methods

The faults related to the motor controller and drive motor can be solved by connecting the USBCAN interface card with the vehicle power bus to obtain the motor controller fault code message 0x0cf13f05 and analyzing the motor controller fault code, alarm code and status code in the following table:

Fault code is the first byte of 0x0cf13f05:

Fault code	Fault cause	Protection action	Troubleshooting method
0x75(117)	Precharging fault	No action	Check the precharging relay.
0x76(118)	Broken circuit of the motor angle sensor	No action	Check the motor sensor circuit.
0x77(119)	12V undervoltage	No action	Check the 12V supply.
0x78(120)	Hardware protection	No action	Restart and try
0x79(121)	Main battery loss	No action	Restart and try
0x81(129)	Contractor and fuse fault	No action	Replace the contactor and fuse.
0x82(130)	Too high battery voltage	No action	Check the battery voltage.
0x83(131)	Controller over-temperature	No action	Restarting after cooling
0x84(132)	Current sensor failure	No action	Depot repair
0x85(133)	Abnormal motor phase overcurrent	No action	Depot repair
0x86(134)	Motor position sensor failure	No action	Depot repair
0x87(135)	Motor overspeed	No action	Parking, restarting
0x88(136)	Motor over-temperature	No action	Restarting after cooling
0x89(137)	Motor angle sensor failure	No action	Depot repair
0x91(145)	Current sensor initialization failure	No action	Depot repair
0x92(146)	Motor position sensor initialization failure	No action	Depot repair
0x93(147)	Parameter configuration error	No action	Re-configure the parameters.
0x94(148)	The motor angle sensor doesn’t’ match.	No action	Match with the motor and refer to the matching method.

The motor controller alarm code is the second byte of 0x0cf13f05:

Alarm code	Fault cause	Protection action	Troubleshooting method
0x12(18)	Wrong depressing of the accelerator pedal	No action	Check whether the accelerator pedal is raised normally; after resetting normally, the alarm is

			cleared.
0x13(19)	High controller temperature	Service in derated capacity	Check for smooth air duct and for long-time working at large current.
0x14(20)	The gear position and accelerator pedal are not reset.	No action	After putting the gear position to the neutral position, the alarm disappears. Check whether the accelerator pedal is raised and whether the output voltage is too high.
0x15(21)	Low main battery voltage	Service in derated capacity	Check the main battery.
0x16(22)	High motor temperature	Service in derated capacity	Check for smooth air duct and for long-time working at large current.
0x17(23)	Broken circuit of the motor temperature sensor	Running	Depot repair ASAP
0x18(24)	Broken circuit of the controller temperature sensor	Running	Depot repair ASAP; check the motor sensor circuit.

The motor controller status code is the third byte of 0x0cf13f05:

Status code	Status	Description
0x01(1)	Initialization	
0x02(2)	Buffer circuit starting	
0x03(3)	Waiting for buffering	
0x04(4)	Buffering completed	
0x05(5)	Standby	
0x06(6)	Neutral position	
0x07(6)	Forward acceleration	Forward gear, with accelerator
0x08(8)	Reverse acceleration	Reverse gear, with accelerator
0x09(9)	Forward gear	Forward gear, without accelerator
0x0A(10)	Reverse gear	Reverse gear, without accelerator
0x20(32)	Initialization check and alarm	View the alarm code and determine the specific cause.
0x21(33)	Neutral position alarm	View the alarm code and determine the specific cause.
0x22(34)	Forward locked-rotor protection	View the alarm code and determine the specific cause.
0x23(35)	Reverse locked-rotor protection	View the alarm code and determine the specific cause.
0xFE(254)	Fault status	View the fault code and determine the specific cause.

VII. Power Battery

1. Product overview

Zhidou electric vehicle is standard-equipped with a ternary lithium manganese battery.

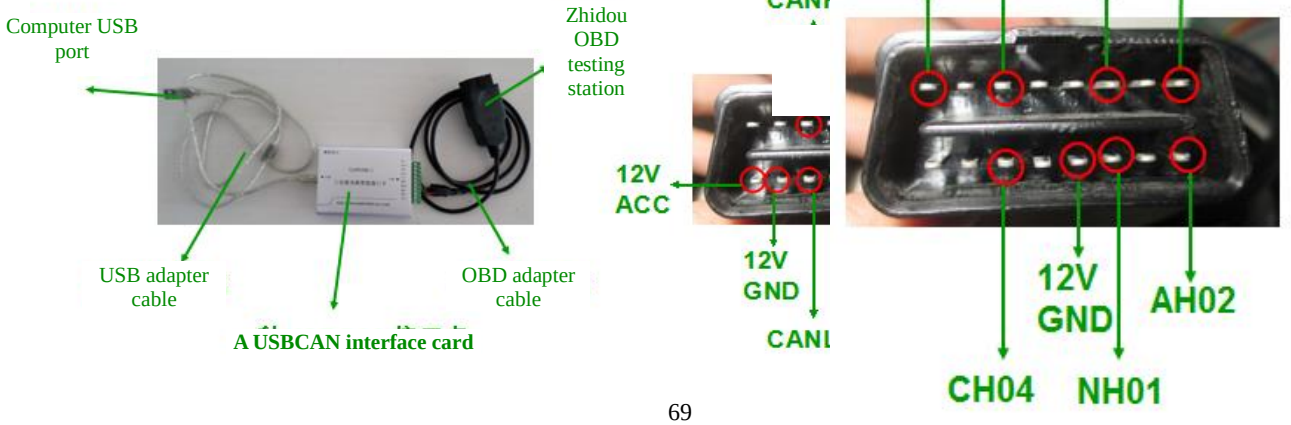
Below are the main parameters of the power battery of Zhidou electric vehicle:

Battery type:	Ternary lithium manganese battery
Assy model:	GYNCMP12040313801
Rated capacity:	120AH
Single battery model:	NCMP 1690200A
Rated voltage:	148V

2. Power battery testing

The testing of the power battery requires use of the special decoder or BMS configuration program and matching USBCAN interface card. The charge-discharge log of the power battery together with its fault alarm record can be exported through the OBD general testing port to analyze the state of both the battery pack and the battery cells.

① Use the special USBCAN interface card and BMS configuration program for battery testing. Pins of the OBD connector are define



Introduction to Use of BMS Configuration Program

The driver USBXpressInstaller.exe and the master program BMS V2.05 need to be installed on the PC before use. The driver clicks the installation file USBXpressInstaller in the directory H:\CANUSB\Drivers of the CD built on the CAN card. The master program is installation-free. The driver can be used once it is installed. The following is the main interface of BMS V2.05.

The testing software can provide the following information for reference of the maintenance personnel:

Version information: to display the hardware and software version codes of the BMS device.

Real-time data: to display real-time data such as voltage, current and temperature of the battery pack and battery cells.

Parameter configuration: BMS system parameters, OEM parameters, system time and other configuration options can be configured under the parameter configuration option. Besides, the alarm records stored in the BMS can be read.

Alarm record: If the actual value of the battery exceeds or falls below the normal value configured in the system parameters during charging and discharging, BMS will record and store it. The maintenance personnel can select one or several alarm items to be exported to Excel format as the data reference.

System time: Time of the BMS device can be adjusted to be the same as the actual time to confirm the alarm time and the time of charging and discharging, so as to estimate the exact time when the fault occurs.

Others: In this interface, you can reset the remaining battery capacity. After setting, the instrument will display the set value regardless of the actual remaining battery capacity. It is recommended to recharge and recalibrate the SOC immediately after its reset.

Historical data dump: As long as it starts to work, BMS acquires and records the data of the power battery pack every 2s, covering the acquisition time (accurate to the second), the current %SOC, the current total voltage and total current, and voltage of all the battery cells. The maintenance personnel can export the charge-discharge log of a certain day under this interface as the data basis for troubleshooting.

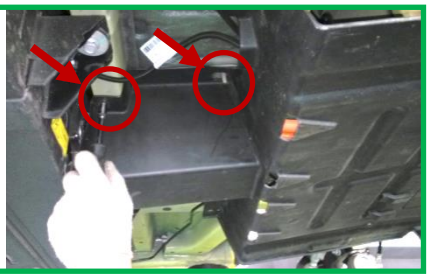
② Use the ZD special decoder to test the power battery and read the data flow. For the use of the special decoder, refer to the *Decoder Use Video*.


读取数据流
总电压 132 V
总电流 0.0 A
外接充电线连接状态 接充电线没有连接
CP信号 无
总负接触器KS状态 KS闭合
开关S2状态 S2打开
与充电机通讯状态 与充电机通讯断开
电池包均衡状态 电池包没有均衡
冷却风扇状态 断开
电池组当前的SOC 50 %
电池组当前状态 放电
故障等级 级故障（降功率）
能量回馈使能 允许
动力电池报警指示 正常
文本
波形
合并波形
表盘
关于
打印
保存
比较
返回

3. Power battery dismantling and installation steps

1. The whole vehicle is powered off to the OFF position. After 5min, begin operation.

2. Lift the vehicle to the height suitable for dismantling; dismantle the bottom guard plate fixing bolts and the bottom guard plate.



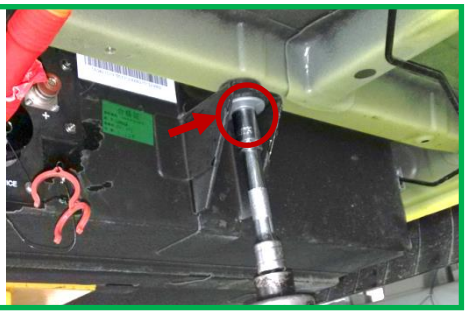
3. Pull out the positive and negative high voltage lines and signal line aviation plugs. (Take out the locking buckle and then anticlockwise rotate to unlock.)

4. Separate the high voltage line and signal line from the battery box, lift the hydraulic lift trolley to an appropriate height and hold out against the power battery box to prevent it from falling during dismantling.

5. Dismantle the fixing bolts of the batery shell grounding harness.

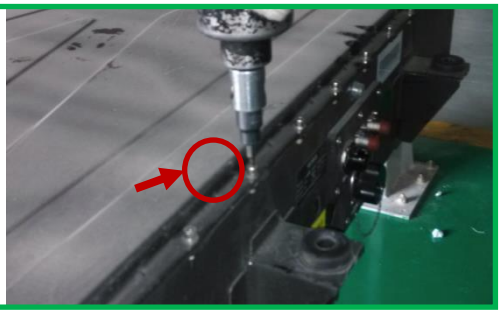
6. Dismantle the 7 fixing bolts of the power battery box along the diagonal direction.

◎tightening torque: 45±5N•m



7. Slowly lower the hydraulic lift trolley to the appropriate height.

Keep the battery box stably during lowering.



8. Move the battery box from the hydraulic trolley onto ground. Handle the battery box lightly and never throw it heavily during moving.

9. The installation process is the contrary of the dismantling process.

4. Common power battery faults and their removal methods

①When the faults related to the power battery occur, e.g. no power output, serious battery undervoltage, failure to charge, etc., firstly check for no broken circuit of the main line, no contactor anomaly, no fuse anomaly, and non-damage of the protection relay, and ensure no CAN communication fault. The common power battery faults and their removal methods are shown in the following table:

Fault symptom	Possible cause	Troubleshooting method
Zero voltage of single battery	1. Internal short circuit caused by undercharging and overdischarging	Replace
	2. Post terminal shorting or internal shorting	Replace
Battery shell expansion	1. Overcharging	Repair or replace
	2. Overdischarging	Repair or replace
Shell breakage	1. Severe collision or vibration of the battery	Replace
Failure to charge	1. Too low voltage of a single battery	Equalize or replace
	2. Damage of a single battery	Replace
Intermittent driving	1. Too low total voltage of the power battery	Charge
	2. Power battery damage	Replace

② If the instrument cluster shows the power battery fault indicator light, the USBCAN interface card shall be connected to the vehicle information bus or power bus to read the corresponding fault code and determine the fault. Power battery fault codes, the vehicle information bus reading 0x17ff00f4 and power bus reading 0x18ff05f4 are shown in the fault table mentioned below.

Byte	Bit	fault code	Fault Detail
BYTE1	BIT1	0-1 (0: normal; 1: abnormal)	Battery cell is overvoltage (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery cell is under ultra-high voltage (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery cell is undervoltage (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery cell is under ultra-low voltage (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery pack is overall overvoltage (pre-alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery pack is overall under ultra-high voltage (alarm)
	BIT7	0-1 (0: normal; 1: abnormal)	Battery pack is overall undervoltage (pre-alarm)
	BIT8	0-1 (0: normal; 1: abnormal)	Battery pack is overall under ultra-low voltage (alarm)
BYTE2	BIT1	0-1 (0: normal; 1: abnormal)	Battery cell has overlarge voltage difference (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery cell has super-large voltage difference (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack has scant remaining capacity (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack has scant remaining capacity (alarm)
	BIT5-BIT8	Reserved	Reserved
BYTE3	BIT1	0-1 (0: normal; 1: abnormal)	Battery pack has overlarge discharge current (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery pack has super-large discharge current (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack has overlarge charging current (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack has super-large charging current (alarm)
	BIT5-BIT8	Reserved	Reserved
BYTE4	BIT1	0-1 (0: normal; 1: abnormal)	Battery pack is overtemperature (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Battery pack is under ultra-high temperature (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack is undertemperature (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack is under ultra-low temperature (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery pack has overlarge temperature difference (pre-alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery pack has super-large temperature difference (alarm)
	BIT7-BIT8	Reserved	Reserved
BYTE5	BIT1	0-1 (0: normal; 1: abnormal)	Insulation is excessively low (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Insulation is ultra-low (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Battery pack takes a overlong time to heat (pre-alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Battery pack takes a super-long time to heat (alarm)

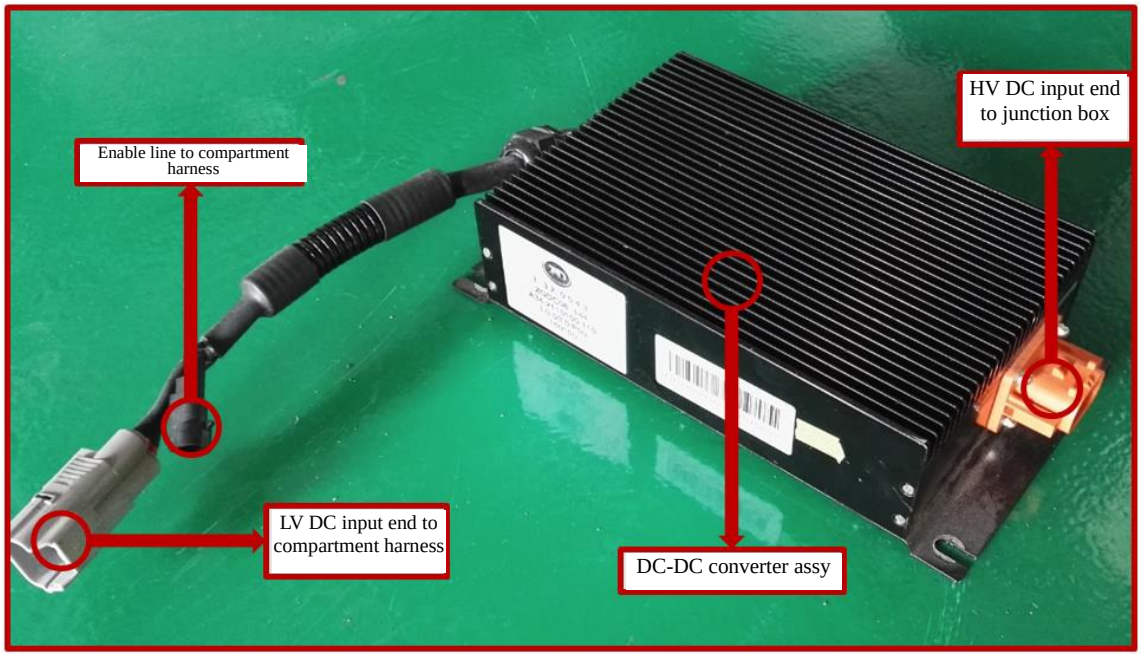
	BIT5	0-1 (0: normal; 1: abnormal)	Battery pack takes a overlong time to charge (pre-alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery pack takes a super-long time to charge (alarm)
	BIT7-BIT8	Reserved	Reserved
BYTE6	BIT1	0-1 (0: normal; 1: abnormal)	BMS system fault, etc. (pre-alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Communication fault with charger (pre-alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Communication fault with the vehicle control unit (pre-alarm)
	BIT4-BIT8	Reserved	Reserved
BYTE7	BIT1	0-1 (0: normal; 1: abnormal)	Pre-charging fault (alarm)
	BIT2	0-1 (0: normal; 1: abnormal)	Heating abnormality (alarm)
	BIT3	0-1 (0: normal; 1: abnormal)	Negative contactor fault: close failure (alarm)
	BIT4	0-1 (0: normal; 1: abnormal)	Negative contactor fault: adhesion (alarm)
	BIT5	0-1 (0: normal; 1: abnormal)	Battery external short circuit (alarm)
	BIT6	0-1 (0: normal; 1: abnormal)	Battery internal short circuit (alarm)
	BIT7-BIT8	Reserved	Reserved
BYTE8	BIT1-BIT8	Reserved	Reserved

VIII. DC-DC Converter System

1. Product overview

The DC-DC converter supplies 12V LV DC power to low voltage equipment. The output end is connected with a 12V constant electric battery, and the DC-DC converter assy automatically achieves charging management of the constant electric battery. The shell is a fully sealed waterproof and dustproof structure has automobile grade temperature resistance and vibration resistance. The main parameters are shown in the following table:

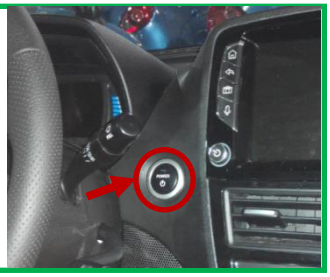
Rated power:	800W
Rated input voltage:	144VDC
Input voltage range:	110-180VDC
Output voltage range:	13.8-14.2VDC
Enable control voltage:	9-12VDC
Working temperature:	-40-+65℃



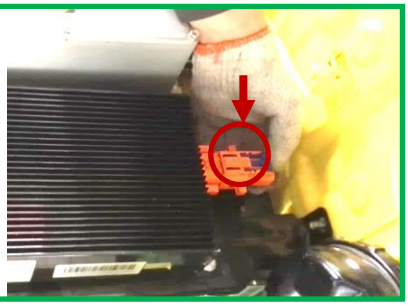
2. DC-DC converter assy dismantling steps:

1. The whole vehicle is powered off to the OFF position.

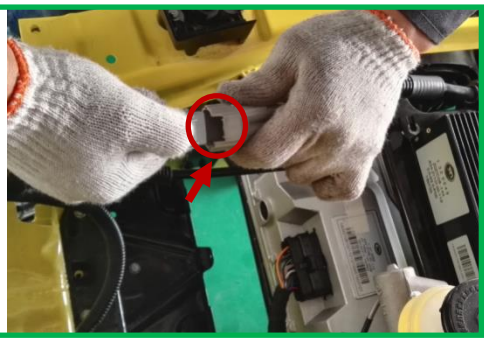
After 5min, begin operation.



2. Disconnect the input end harness connector of the DC-DC converter assy.



3. Disconnect the output end harness connector of the DC-DC converter assy.

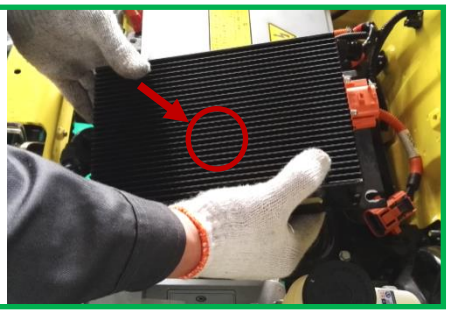


4. Disconnect the control line connector of the DC-DC converter assy.

5. Dismantle the four fixing bolts of the DC-DC converter.

◎tightening torque: 9±2N•m

6. Take out the DC-DC converter from the front compartment.



7. The installation process is the contrary of the dismantling process.

3. Common DC-DC converter assy faults and their removal methods:

Troubleshooting steps for DC/DC converter working anomalies: firstly measure for voltage input, then for 12V enable voltage signal input and finally for voltage output.

System	Common fault	Possible cause	Troubleshooting method
DC-DC converter assy system	No power to the low voltage electrical equipment of the whole vehicle	DC-DC control line fault	Adjust
		No 72V input voltage	Adjust or replace
		DC-DC damage, no output voltage	Check, replace
		Other harness faults	Replace
	Insufficient voltage of the constant electric battery	Low DC-DC output voltage	Replace
		Relay damage	Replace
		Constant electric battery fault	Check and eliminate
		Harness fault	Replace

IX. Instrument Cluster

1. Product overview

Functions: it is used to indicate various running states of the vehicle, including vehicle speed, remaining battery capacity, driving mileage, various light indications, etc.

The basic parameters:

Input voltage: 12V;

Working voltage: 9-16V;

Static current: <3mA;

Max load current: 2A.

The function of instrumentation is to visually show information to the driver, so that the driver understands various states of the vehicle. The occurrence possibility of instrumentation failure is very small. Most problems are not caused by instrumentation itself, e.g. inaccurate SOC indication on instrumentation, no vehicle speed indication on instrumentation, no light symbol indication on instrumentation, too low temperature of single battery, bus communication fault, etc.

2. Instrument cluster dismantling steps:

1. Dismantle the guard shield of the instrument cluster.	

2. Dismantle the instrument cluster fixing tapping screws (3 pieces in total).

3. Dismantle the harness connectors (1 left and 1 right) of the instrument cluster.

4. Take out the instrument cluster.

The installation process is the contrary of the dismantling process.

3. Common faults and troubleshooting methods

The general maintenance principle for the instrumentation: when the instrumentation is at fault, firstly check for connecting plug reliability; i.e. re-install the plug; if the fault still exists, unplug the plug connecting the instrumentation, and check for correctness of the signal transmitted from the vehicle to the instrumentation; if the corresponding fault signal is incorrect, this means that the instrumentation is not at fault; if the corresponding fault signal is correct, this means that the fault occurs in the instrumentation.

Fault symptom	Possible cause	Troubleshooting method

Instrument cluster working failure	1. Harness connector loosening	Check, repair, replace
	2. No input signal	Check, repair, replace
	3. Instrument cluster inside damage	Check, replace
	4. Harness fault	Check, replace
	Insufficient voltage of the constant electric battery	Charge, replace

X. Airbag System

1. Warnings and Notices

• Non-standard or incorrect operation of the airbag during repair or replacement may cause unexpected explosion of the airbag and thus result in personal injury or damage to the vehicle. Improper repair may also give rise to airbag failure. Therefore, the airbag system can be overhauled and replaced by the professionally trained technicians only.

• Circuits of the airbag system can never be operated with electrical equipment except as described in this manual. Circuits of the airbag system can be identified by yellow harnesses or connectors.

• Faults of the airbag system are hard to confirm. The fault codes stored in the memory by the self-diagnostic system are an important source of information for troubleshooting. Therefore, the fault code must be read before removing the negative battery cable prior to checking and troubleshooting the airbag.

• The checking should not be performed unless the power source is in the state of "OFF" and the battery negative terminal is disconnected for 90s or longer. Because there is a backup power source in the airbag ECU, checking within 90s after removing the battery terminal may cause the airbag to be unexpectedly exploded.

• There are requirements for components of the airbag system. All the components must be one-off. Damaged components related to the airbag must not be used after repair. Airbag related components include driver airbag, occupant airbag, airbag ECU,

clock spring, and the like.

• The airbag must be replaced immediately when the front of the vehicle is bumped and the airbag is exploded, scratched or happened to other damages.

• Unauthorized modification of the following equipment may impact the airbag system, e.g. install devices like mobile two-way radio devices, cassette players or compact disc players; modify the suspension system and the front end structure; install grid protector (push rods, kangaroo rods, etc.) or attach other devices to the front end.

• The airbag is a precision component. Therefore, connectors to the airbag must be connected or removed when the airbag is fixed, otherwise the airbag function may be disabled.

• Do not change, remove, knock or open any assemblies during repair, such as steering wheel, driver airbag cover, airbag ECU, and sensor assembly, as they will cause the airbag to suddenly inflate or the system to lose its function.

• When removing or handling the airbag assemblies, the airbag trim covers should face up and the airbag assemblies must not be stacked for fear that the airbag accidently explodes and causes serious accidents.

2. System Overview

Warning:

This vehicle is equipped with an airbag restraint system. Failure to follow correct operating procedures can result in the following:

a. The airbag is unexpectedly deployed;

b. The airbag restraint system does not work when needed.

Warning: The following rules must be strictly observed to avoid the above situations:

a. Prior to any operation, determine if you are performing repair operations around any component of the airbag restraint system or on its line.

b. If you are performing repair operations around any component of the airbag restraint system or on its line, the airbag restraint system should be released.

The airbag restraint system (SRS AIRBAG) is a safety device that works together with the seat belt. The airbag cannot replace the seat belt. The driver and the occupant must always fasten their seat belts and adjust to the most appropriate condition according to their body.

Attention:

The airbag restraint system is not a substitute for the seat belt. Failure to wear a seat belt may cause serious personal injury when the airbag is exploded. Only when the seat belt is fastened during driving or riding can the airbag restraint system provide better protection to the driver or the occupant in the event of a collision.

The airbag restraint system is designed to protect the driver when the vehicle is happened to a severe frontal collision. The airbag will deploy if the direction and impact of such collision effect meet the design requirements of the airbag restraint system. The airbag restraint system consists of the following components:

• Airbag indicator lamp

• Airbag control module

• Combination instrument assembly

• Driver airbag

• Reminding system for driver and front occupant seat belt unfastened

• Side collision sensor

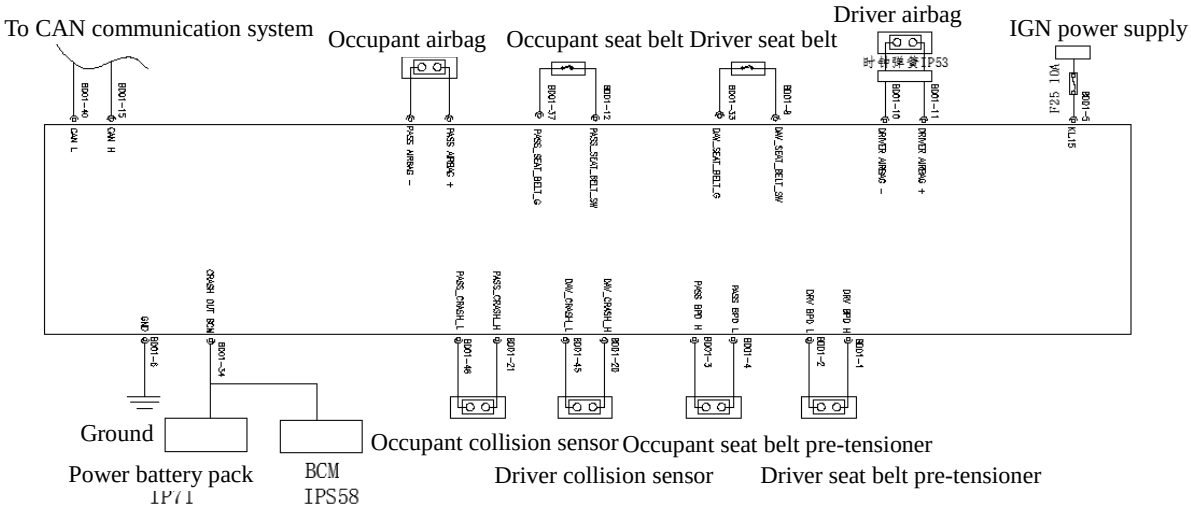
• Airbag harness

The airbag restraint system provides the occupant with auxiliary protection in addition to the seat belt, which is a passive safety system. The airbag control module continuously diagnoses and monitors the electrical components of the airbag restraint system. When a system fault is detected, the airbag control module sets a fault diagnosis code and lights up the airbag indicator lamp to inform the driver. Also, the airbag control module determines the severity of the collision. When the signal value is greater than the value set in the memory, the airbag control module issues an ignition command to deploy the inflation module of the airbag restraint system. After confirming the collision signal, the airbag control module sends a “collision” signal to the BCM and the power battery pack. Once BCM receives the signal, it executes the unlocking function; once the power battery pack receives the signal, it executes the

forced power cut.

3. Operating Principle

System Schematic Diagram



Airbag Indicator Lamp

• The airbag indicator lamp that is located inside the combination instrument assembly is to notify the driver that the airbag restraint system is at fault and verify whether the airbag control module is communicating with the instrument panel. When the ignition switch is turned to "ON", the indicator lamp should be lit up and then goes out. If the indicator lamp is constantly lit, it is a must to check the entire line of the airbag restraint system for a possible fault. If the line of the airbag restraint system is errorless, the indicator lamp should go out after being lit up.

Warning: The airbag restraint system at fault may cause the airbag hardly to be exploded or deployed when the collision does not reach the set severity. When the airbag indicator lamp is lit up, please go to a ZD authorized service station for maintenance as soon as possible; the airbag indicator lamp will not go out until the fault is eliminated.

Airbag Control Module

Warning: The airbag control module contains a spare power source so that the airbag can deploy smoothly even if the battery voltage is lost during the collision.
Warning: The negative battery harness should be disconnected for more than 60s before any repair to the airbag restraint system for the sake of safety.
Warning: In order to prevent unexpected deployment of the airbag and consequent personal injury, the airbag module not deployed cannot be disposed as regular shop wastes, but should be safely scrapped according to the deployment procedure. If the sealed container is damaged in the process of scrapping, some of the substances contained in the non-deployed module may cause serious illness or personal injury.
• The airbag control module is a microprocessor and the control center of the airbag system.

When the vehicle happens to a collision, the airbag control module compares the collision signal it detected with the value stored in the memory. When the generated signal value exceeds the stored value, the airbag control module issues an ignition command (current signal) to the ignition circuit to deploy the airbag.

• When the airbag is deployed, the airbag control module records the state of the airbag system and lights up the airbag indicator lamp on the combination instrument.

• Once the vehicle is started, the airbag control module makes periodic diagnosis of the electrical components and harnesses of the airbag restraint system. When the airbag control module detects a fault, it stores a fault diagnosis code and lights up the airbag indicator lamp to inform the driver of the fault.

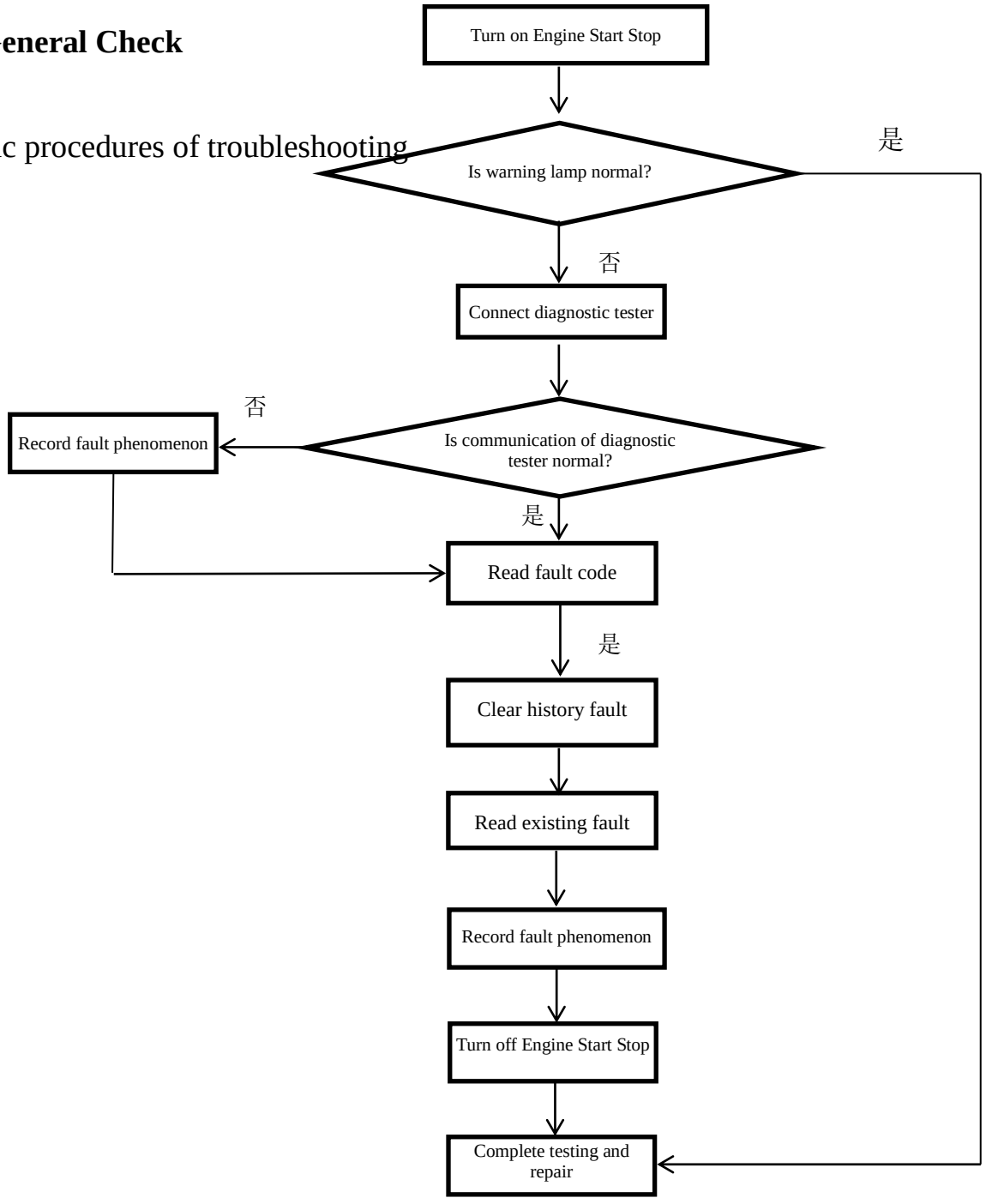
Airbag

• The airbag module consists of a shell, an inflatable airbag, an igniter and a gas generator. When the vehicle happens to a frontal collision with sufficient impact, the airbag control module will issue an ignition command to the ignition circuit to deploy the airbag. The gas generated from the reaction causes the airbag to inflate rapidly.

After the airbag is inflated with gas, it quickly deflates through the airbag vent. There is a short-circuit plate on the terminal of the harness connector of the airbag control module that will short connect the deployment circuit of the airbag inflation module when the connector is disconnected, thus to prevent the airbag from unexpected deployment during repair.

4. General Check

Basic procedures of troubleshooting



Read and Clear Fault Code

• When the power source is in the state of “ON”, the self-diagnosis circuit inside the airbag ECU constantly detects voltage or current of each system component circuit and gets the operation state of each circuit through the operation and comparison of its internal processor.

• When the data detected by the airbag ECU does not match the pre-stored data, the fault information is stored in the memory module inside the ECU in the form of a fault code.

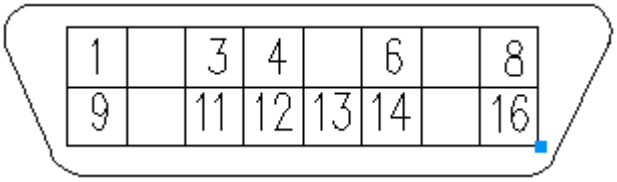
• Faults can be divided into “recoverable faults” and “unrecoverable faults”. Unrecoverable faults are determined as permanent faults once they occur. The recoverable faults can disappear after the self-diagnosis circuit detects that the faulty circuits are back to normal; the recoverable faults are mostly caused by short harness break or poor connector contact.

• Once there is a fault, the airbag ECU transmits the fault information to the combination instrument or the diagnostic tester connected to the vehicle via CAN.

• The fault information is displayed on the combination instrument in a way that the fault indicator lamp is constantly lit and showed on the diagnostic tester as a fault code.

Check Diagnosis Interface

• The diagnosis interface is located at the bottom left of the instrument panel.



4. Fault Diagnosis

Table of Fault Phenomena

Using the table below will help you find the cause of the problem. Check parts one by one, and repair or replace when needed.

Phenomenon	Fault Cause	Measure Recommended
Airbag indicator lamp is not lit	1. Fuse damage	Refer to the diagnosis flow when the airbag indicator lamp is not lit
	2. Combination instrument fault	
	3. Lien fault	
Airbag indicator lamp is constantly lit	1. Fuse and line	Refer to the diagnosis flow when the airbag indicator lamp is constantly lit
	2. Clock spring damage	
	3. Driver airbag fault	
	4. Combination instrument fault	
	5. Control module fault	
	6. Battery fault	

Diagnosis flow when the airbag indicator lamp is not lit

Warning: The airbag control module contains a spare power source so that the airbag can deploy smoothly even if the battery voltage is lost during the collision.

Warning: The negative battery harness should be disconnected for more than 60s before any repair to the airbag restraint system for the sake of safety.

No.	Operation Step	Check Result	Subsequent Step
1	Check harness connector of the combination instrument for damage, poor contact, aging and looseness.	Yes	Repair the faulty part
		No	Turn to Step 2
2	Check fuse of the combination instrument Set the Engine Start Stop Switch to “OFF” Check the fuse F13 The capacity of the fuse F13 is 10A	Yes	Turn to Step 3
		No	Replace the fuse
3	Check power circuit of the combination instrument Set the Engine Start Stop Switch to “OFF” Disconnect harness connector IP09 of the combination instrument. Set the Engine Start Stop Switch to “ON”. Check if the voltage between the terminal	Yes	Turn to Step 4
		No	Overhaul power circuit of the combination instrument

	6 in the harness connector IP09 of the combination instrument and the ground is normal. The voltage value: battery voltage		
4	Check ground circuit of the combination instrument Set the Engine Start Stop Switch to “OFF” Disconnect harness connector IP09 of the combination instrument. Check if the terminal 2 in the harness connector IP09 of the combination instrument is conductive to the ground.	Yes	Turn to Step 5
		No	Overhaul ground circuit of the combination instrument
5	Check the state of airbag indicator lamp on the combination instrument Set the Engine Start Stop Switch to “ON” Check if the airbag indicator lamp on the combination instrument is not lit	Yes	Turn to Step 6
		No	If the lamp is constantly lit, refer to the diagnosis flow when the airbag indicator lamp is constantly lit; if the lamp is constantly lit after flashing, refer to the diagnosis flow when the airbag indicator lamp flashes and is then constantly lit.
6	Check if CAN communication harness of the combination instrument is normal	Yes	Turn to Step7
		No	Overhaul CAN communication system
7	Replace the combination instrument Double check if the airbag indicator lamp is normal	Yes	The end of check
		No	Replace the airbag control module

Diagnosis flow when the airbag indicator lamp is not lit

Warning: The airbag control module contains a spare power source so that the airbag can deploy smoothly even if the battery voltage is lost during the collision.

Warning: The negative battery harness should be disconnected for more than 60s before any repair to the airbag restraint system for the sake of safety.

No.	Operation Step	Check Result	Subsequent Step
1	Check clock spring, airbag, airbag control module, and harness connector of combination instrument for damage, poor contact, aging and looseness.	Yes	Repair the faulty part
		No	Turn to Step 2
2	Check the state of airbag indicator lamp on the combination instrument a. Set the Engine Start Stop Switch to “ON”. b. Check if the airbag indicator lamp on the combination instrument is constantly lit	Yes	Turn to Step 3
		No	If the lamp is not lit, refer to the diagnosis flow when the airbag indicator lamp is not lit; if the lamp is constantly lit after flashing, refer to the diagnosis flow when the airbag indicator lamp flashes and is then constantly lit.
3	Check the fault code Set the Engine Start Stop Switch to “OFF”. b. Connect the special diagnostic tester to	Yes	Refer to diagnosis steps of relevant fault codes.
		No	Turn to Step 4.

	read the fault code. c. Is there any fault code related to the airbag?		
4	Check fuse of the combination instrument a. Set the Engine Start Stop Switch to "OFF". b. Check the fuse F13 Fuse capacity: capacity of F13 is 10A.	Yes	Turn to Step 5.
		No	Replace the fuse
5	Check power circuit of the combination instrument a. Set ignition switch to "LOCK". b. Disconnect harness connector IP09 of the combination instrument. c. Set the Engine Start Stop Switch to "ON". d. Check if the voltage between the terminal 6 in the harness connector IP09 of the combination instrument and the ground is normal Voltage value: battery voltage	Yes	Turn to Step 6
		No	Overhaul power circuit of the combination instrument
6	Check ground circuit of the combination instrument a. Set ignition switch to "LOCK". b. Disconnect harness connector IP09 of the combination instrument c. Check if the terminal 2 in the harness connector IP09 of the combination instrument is conductive to the ground.	Yes	Turn to Step 7.
		No	Overhaul ground circuit of the combination instrument.
7	a. Replace the combination instrument. b. Double check if the airbag indicator lamp is normal.	Yes	Turn to Step 8
		No	Replace the airbag control module
8	Check fuse of the airbag control module Set the Engine Start Stop Switch to "OFF". Check the fuse F25 Capacity of the fuse F25 is 10A	Yes	Turn to Step 9
		No	Replace the fuse
9	Check power circuit of the airbag control module Set the Engine Start Stop Switch to "OFF". Disconnect harness connector BD01 of the airbag control module c. Check if the voltage between the terminal 5 in the harness connector BD01 of the airbag control module and the ground is normal Voltage value: battery voltage	Yes	Turn to Step 10
		No	Overhaul power circuit of the airbag control module
10	Check ground circuit of the airbag control module a. Set the Engine Start Stop Switch to	Yes	Turn to Step11
		No	Overhaul ground circuit of the

	"OFF". b. Disconnect harness connector BD01 of the airbag control module c. Check if the terminal 6 in the harness connector BD01 of the airbag control module is conductive to the ground.		combination instrument
11	Replace the airbag control module b. Double check if the airbag indicator lamp is normal.	Yes	The end of check
		No	Find out the cause and diagnose from other fault phenomena

5. Instructions for Repair

Replacement and disassembly of airbag control module

Warning: The negative battery harness should be disconnected for more than 60s before any repair to the airbag restraint system for the sake of safety.

1. Disconnect the battery cable.

2. Remove the auxiliary instrument. Please refer to the instructions for repair-replacement of auxiliary instrument

3. Remove the airbag control module

(a). Disconnect the harness connector of the airbag control module.

(b). Remove fixing bolts of the airbag control module.

(c). Remove the airbag control module from the vehicle.

Installation

Installation is carried out in the order reverse to that of disassembly.

Replacement of Driver Airbag

Disassembly

Warning: The negative battery harness should be disconnected for more than 60s before any repair to the airbag restraint system for the sake of safety.

Warning: The product barcode on each part of the airbag system is the only permanent identification of the part. It is not allowed to be torn or contaminated in the process of disassembly for the sake of quality traceability and performance check of the part by the manufacturer.

1. Keep the steering wheel at the horizontal position.

Attention: Make sure the steering wheel is locked.

Attention: Make sure the wheels are located right ahead.

2. Disconnect the battery negative cable.

3. Remove the driver airbag and the horn hood assembly.

(a). Use an Allen wrench to remove two hexagon socket screws from both sides underneath the steering wheel and loose the horn hood assembly.

(b). Disconnect the horn connector.

(c). Disconnect the driver airbag harness connector.

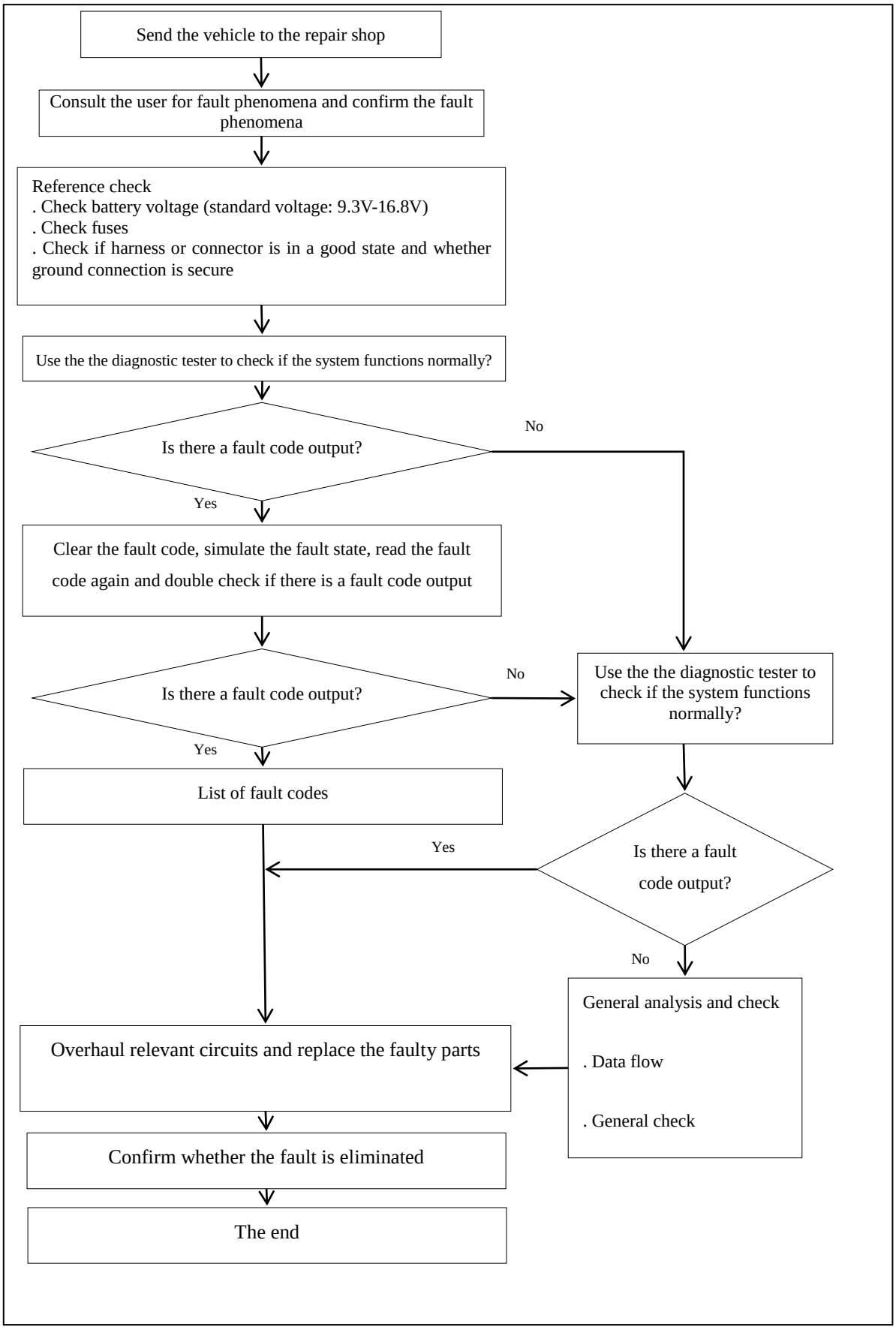
(d). Remove the horn hood and the driver airbag assembly

Installation

Installation is carried out in the order reverse to that of disassembly.

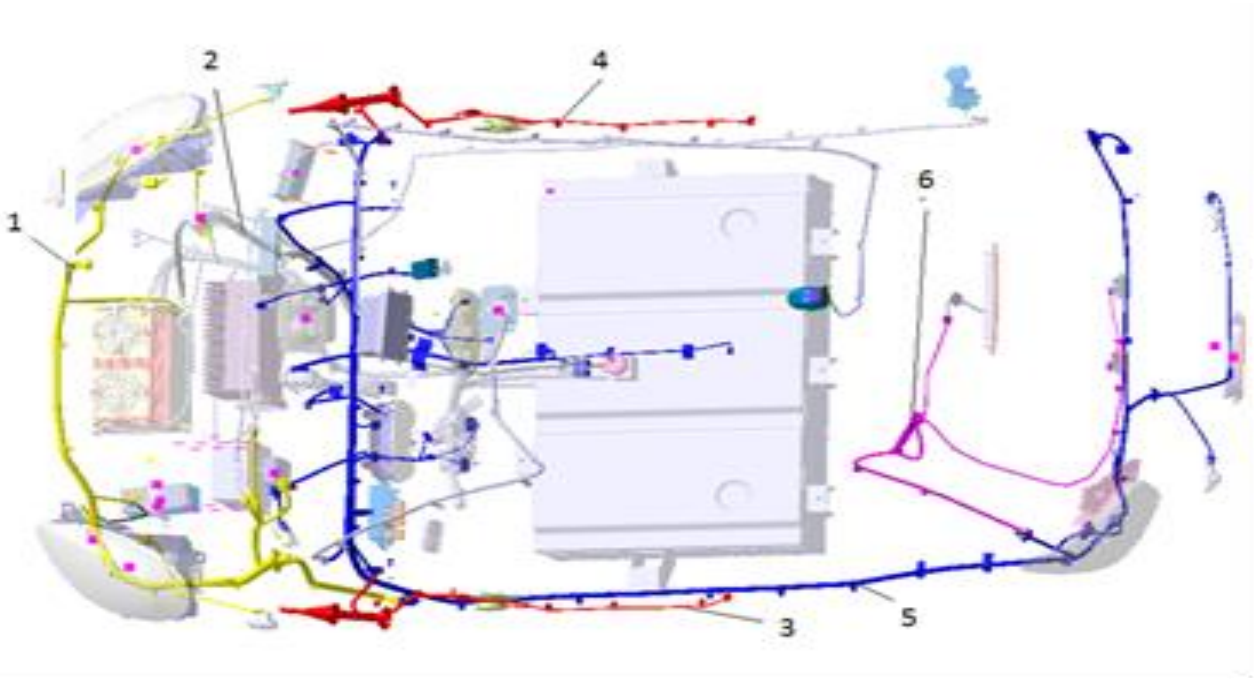
6. General Check

Basic procedures of troubleshooting


Send the vehicle to the repair shop
Consult the user for fault phenomena and confirm the fault phenomena
Reference check
. Check battery voltage (standard voltage: 9.3V-16.8V)
. Check fuses
. Check if harness or connector is in a good state and whether ground connection is secure
Use the the diagnostic tester to check if the system functions normally?
Is there a fault code output?
No
Yes
Clear the fault code, simulate the fault state, read the fault code again and double check if there is a fault code output
Is there a fault code output?
No
Use the the diagnostic tester to check if the system functions normally?
Yes
List of fault codes
Yes
Is there a fault code output?
No
General analysis and check
. Data flow
. General check
Overhaul relevant circuits and replace the faulty parts
Confirm whether the fault is eliminated
The end

XI. Harness

1. Classification

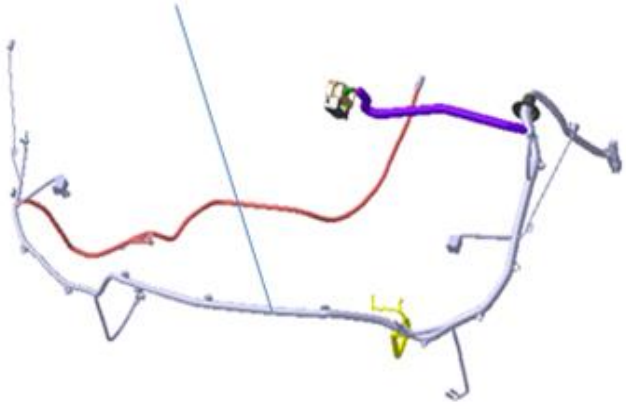


1. Compartment harness 3. Left door harness 4. Right door harness 5. Dashboard harness 6. Back door harness

2. Product overview

The function of vehicle harness is to transmit or exchange the power signals or data signals in the electrical system and thus to achieve its functions and requirements.

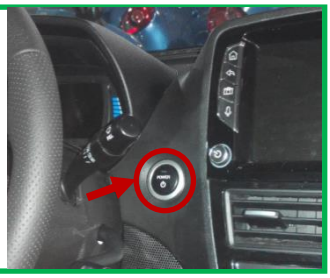
3. Compartment harness



3.1 Compartment harness dismantling steps:

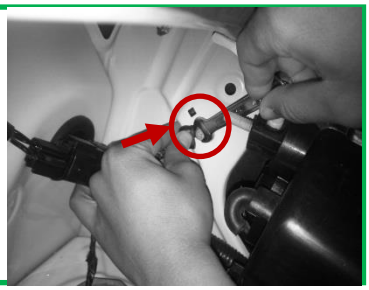
1. The whole vehicle is powered off to the OFF position.

After 5min, begin operation.

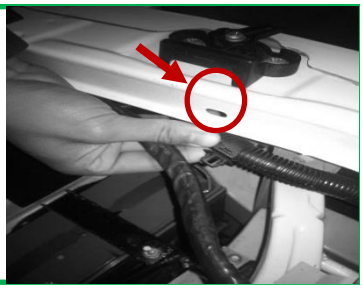


2. Disconnect all the connectors connecting the compartment harness.

3. Dismantle the grounding bolts (totally 3 pieces: G1, G2 and G4).



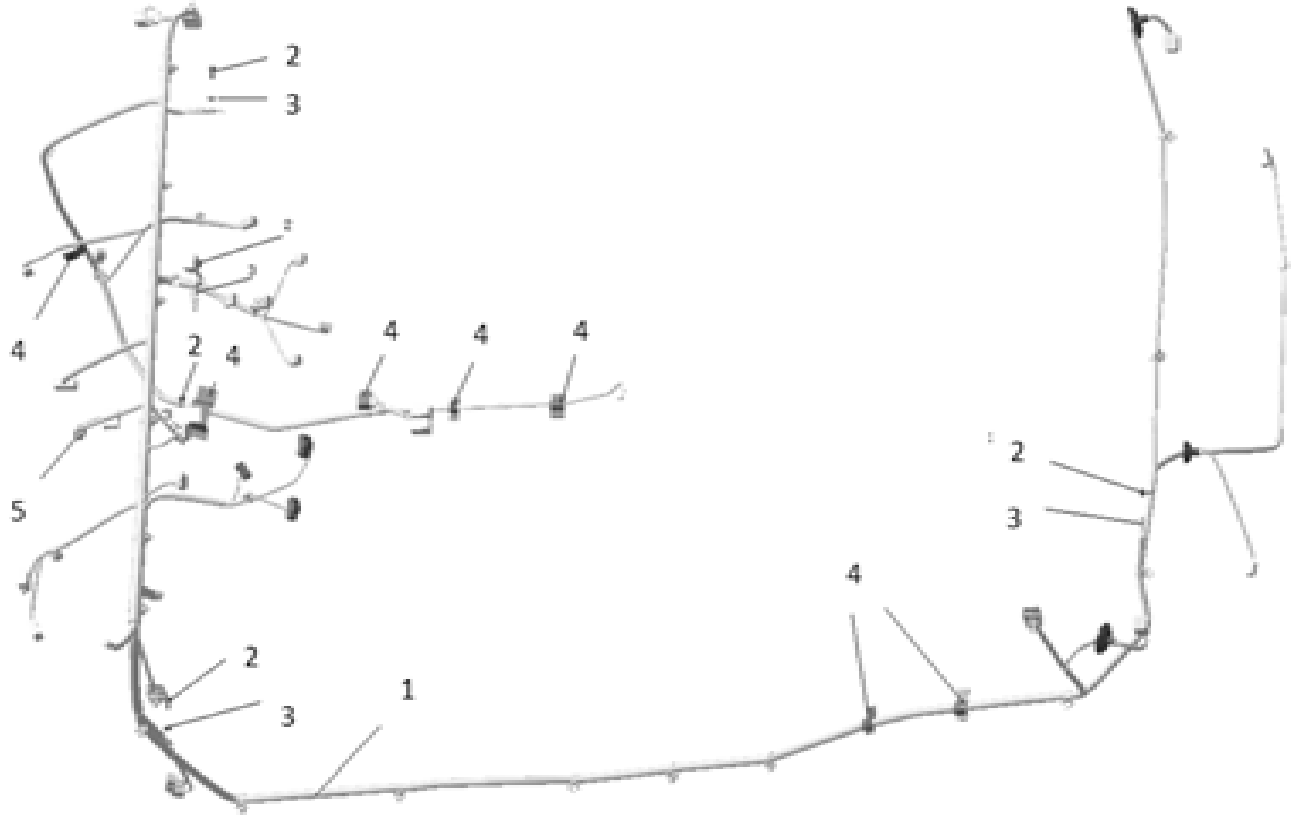
4. Dismantle each buckle of the harness successively.



5. Remove the compartment harness.

6. The installation process is the contrary of the dismantling process.

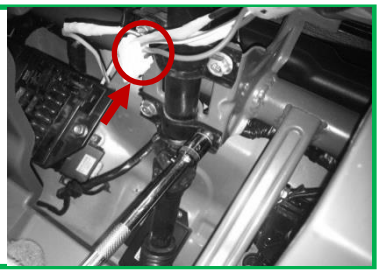
4. Dashboard harness



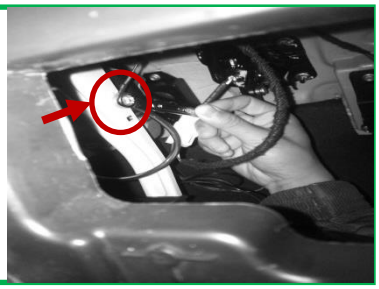
1. Dashboard harness assy 2. Self-chip removal screw 3 Inner serrated lock washer 4. Insulation tape (for fixing the harness) 5. Harness strap II

1. Dashboard harness dismantling steps:

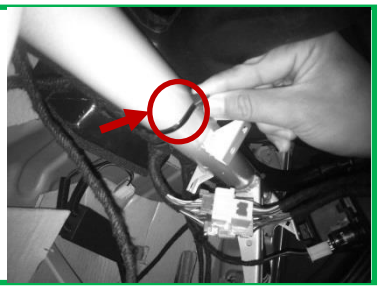
1. The whole vehicle is powered off. Dismantle the dashboard assy. For the detailed steps, see the dashboard dismantling steps.

2. Dismantle all the connectors connecting the dashboard harness.	

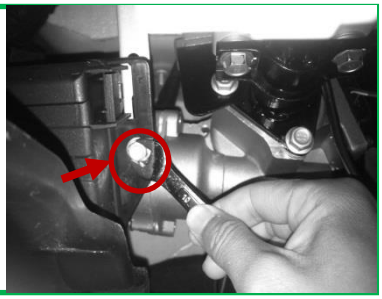
3. Dismantle the harness grounding bolts (totally 4 pieces: G5, G6, G8 and G9).



4. Dismantle the harness fixing strap.



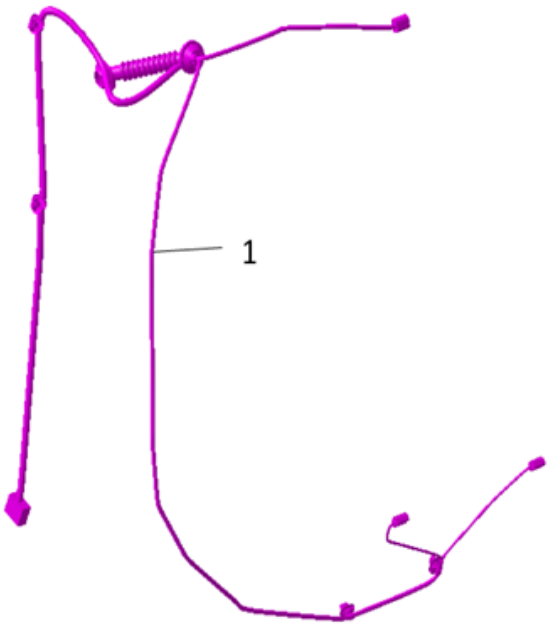
5. Dismantle the fuse box fixing bolt.



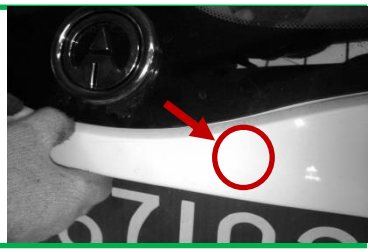
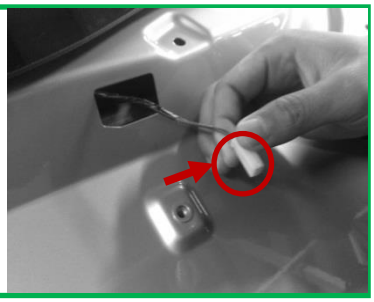
6. Dismantle the harness fixing buckles sequentially.

7. Remove the dashboard harness.

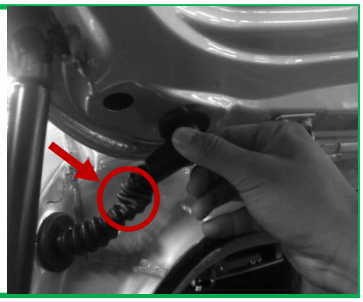
5. Back door harness



1. Back door harness dismantling steps:

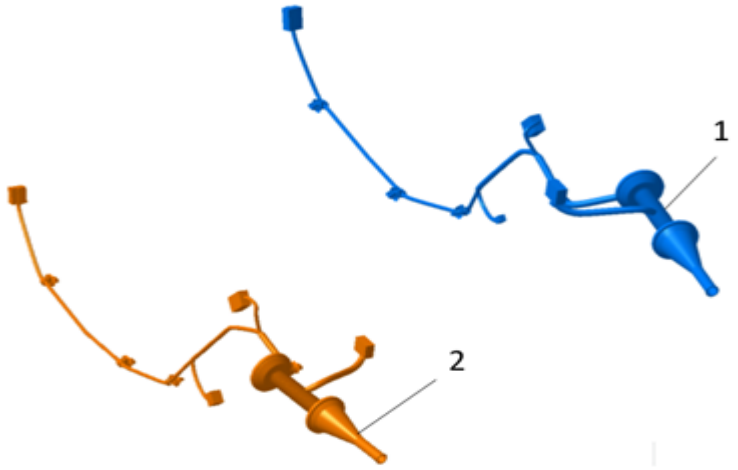
1. Dismantle the rear license plate light trim.	
2. Dismantle the spoiler.	
3. Dismantle all the connectors connecting the back door harness.	

4. Dismantle the back door harness jacket.



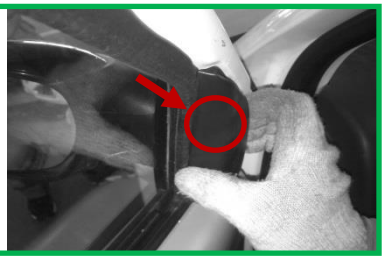
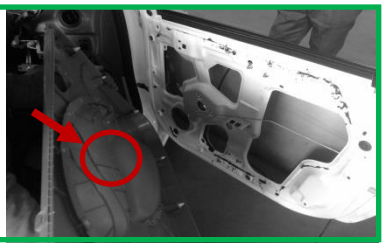
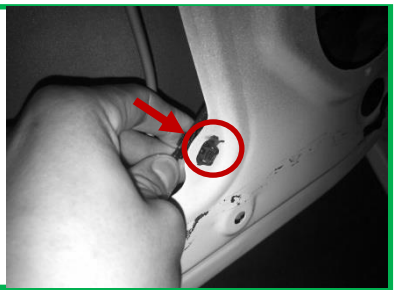
5. Remove the back door harness.

6. Door harness



1. Left door harness 2. Right door harness

1. Door harness dismantling steps:

1. Dismantle the door triangular guard plate.	
2. Dismantle the door body assy.	
3. Dismantle all the connectors connecting the door harness.	
4. Dismantle the door harness fixing buckles sequentially. 5. Remove the door harness.	

2. Harness faults and troubleshooting methods

① Line shorting to GND

a. Methods and steps for testing for line shorting to GND using a digital multimeter

(1) Disconnect the supply circuit (e.g. fuse, control module) on the line to be tested.

(2) Disconnect the load on the line to be tested.

(3) Turn the digital multimeter to the Ω range.

(4) Connect one probe of the digital multimeter to one end of the line to be tested.

(5) Connect the other probe of the digital multimeter onto the reliable GND. Here if the multimeter shows very low resistance or no resistance, the line is shorted to GND.

b. Methods and steps for testing for line shorting to GND using a test light

(1) Disconnect the supply circuit (e.g. fuse, control module) on the line to be tested.

(2) Disconnect the load on the line to be tested.

(3) Connect one probe of the test light to the positive terminal of the battery.

(4) Connect the other probe of the test light to one end of the line to be tested. Here if the test light is on, the line to be tested is shorted to GND.

② Inter-line shorting

(1) Refer to the line system schematic and determine the open-circuited fuse.

(2) Disconnect the first connector or switch between the fuse and each load.

(3) Carry out bridge connection of the digital multimeter between the terminals of the fuse (make sure there is electricity on the fuse). When the digital multimeter shows voltage, this reflects inter-line shorting of the harness connected with the first connector or switch. If the digital multimeter shows no voltage, perform the next step.

(4) Successively disconnect/connect (or close/open) each connector (or switch) till the digital multimeter shows voltage, thus finding out the circuit with shorting fault.

③ Line shorting to power supply

(1) Turn the digital multimeter to the V DC range.

(2) Connect the positive probe of the digital multimeter to one end of the line to be tested.

(3) Connect the negative probe of the digital multimeter onto the reliable GND.

(4) Turn on the ignition switch and operate all accessories.

(5) If the measuring voltage is higher than 1V, the line is shorted to voltage.

④ Line circuit breaking

Methods and steps for testing for line circuit breaking with a digital multimeter

(1) Turn the digital multimeter to the Ω range.

(2) Disconnect the supply circuit (e.g. fuse, control module) on the line to be tested.

(3) Disconnect the load on the line to be tested.

(4) Press the MIX/MAX button on the digital multimeter.

(5) Connect one probe of the digital multimeter to one end of the line to be tested.

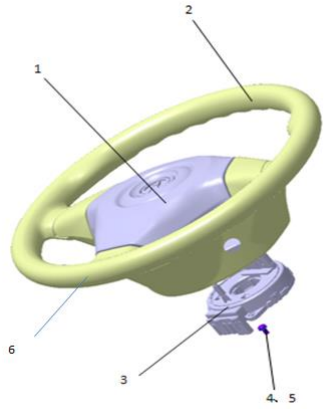
(6) Connect the other probe of the digital multimeter to the other end of the line to be tested. Here if the digital multimeter shows very low resistance or no resistance and one tone can be heard, the line has good continuity (without circuit breaking).

Chapter III Chassis

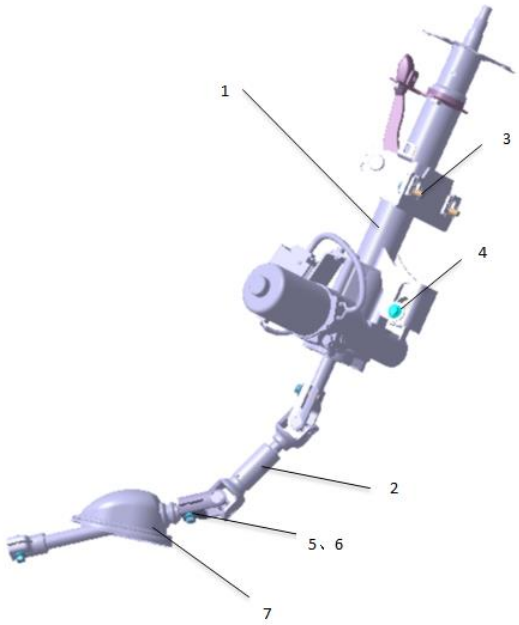
Section 1 Steering System

I. Product Overview

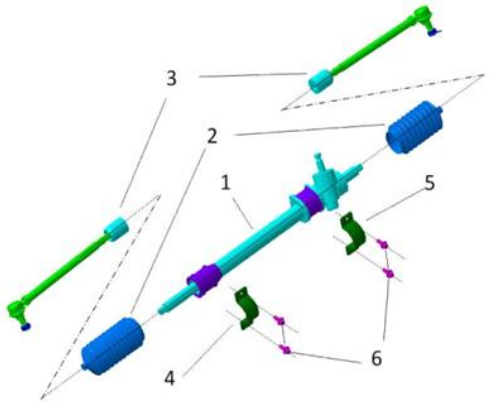
The steering system of Zhidou electric vehicle consists of steering wheel assy, steering column, steering drive shaft, steering gear assy, etc. The steering gear structure is a gear rack structure



No.	Part No.	Part name	Qty.
Assy	W11-3402100-00	Steering wheel assy	1
1	W11-3402101-00	Steering wheel upper cover	1
2	W11-3402110-00	Steering wheel body	1
3	W11-3402200-00	Clock spring assy	1
4	DIN7981-ST4.8×9.5-F	Cross recessed pan head self-tapping screw	3
5	DIN 125-5.3-300HV	plate washer	1



No.	Part No.	Part name	Qty.
Assy	A31-3404010-00A0	Electric power steering column and drive shaft assy	1
1	A31-3404100-00A0	Electric power steering column assy	1
2	W41-3404200-00	Electric power steering drive shaft assy	1
3	DIN 6921-M8×25-8.8	Hexagon head bolt with flange strength shank and half thread	2
4	DIN 6921-M8×70-8.8	Hexagon head bolt with flange strength shank and half thread	1
5	GB/T 5785-M8×30-8.8	Hexagon bolt with fine pitch thread	3
6	GB 93-87-8	spring washer	3
7	W41-3404301-01A0	Dust cover	1



No.	Part No.	Part name	Qty.
Assy	W11-3401100-01A1	Steering gear assy	1
1	W11-3401110-00	Steering gear shell	1
2	W11-3401101-00	Dust boot	2
3	W11-3401120-00	Tie rod assy	1
4	W11-3403012-00	Steering gear right mounting bracket	1
5	W11-3403011-00	Steering gear left mounting bracket	1
6	DIN 6921-M8X20-8.8	Hexagon head bolt with flange strength shank and half thread	4

II. Steering system repair

1. Check the steering wheel free play.

Park the vehicle and keep the wheels in the straight driving state; lightly turn the steering wheel till the front wheels begin to rotate. The moving distance on the outer circle of the steering wheel is its free play in the check process. The max free play of the steering wheel of Zhidou electric vehicle is 30mm.

2. Check the intermediate position of the steering wheel.

Park the vehicle straightly and confirm whether the steering wheel is at the intermediate position. Assembling errors of the steering wheel, steering column and steering gear will cause the steering wheel not to be at the intermediate position.

3. Check for automatic resetting of the steering wheel.

Turn the steering wheel by 90°, drive the vehicle at the speed of 35km/h, keep for several seconds and then release the steering wheel. It shall be reset by at least more

than 70°. During slow and sharp turning, there shall be no large difference between left resetting and right resetting.

4. Check the ball head boot.

Press the boot with fingers to check for cracking or damage of the boot. Cracking or damage of the boot may damage the ball head.

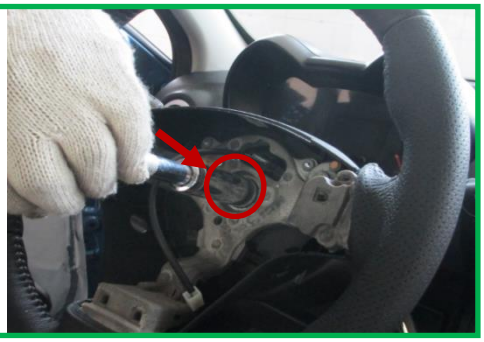
Note: be sure to replace parts correctly with care. Incorrect replacement of parts may affect the performance of the steering system and lead to a driving accident.

III. Steering System Dismantling Steps:

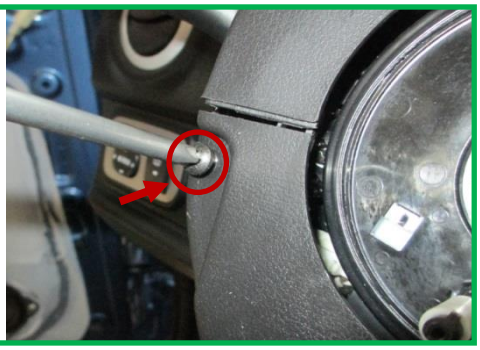
1. Separate the upper cover of the steering wheel from it; dismantle the upper cover of the steering wheel and disconnect the horn connecting line.

2. Dismount the steering wheel locking nut (1*M12-8) and remove the steering wheel.

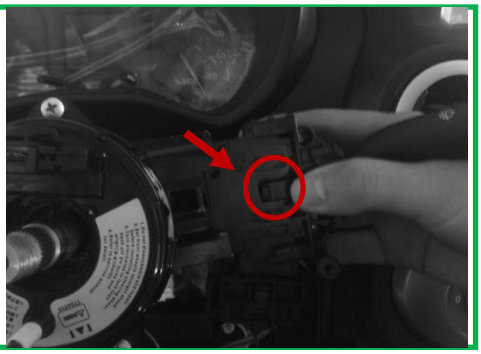
◎tightening torque: 75±5N•m



3. Dismantle the four tapping screws of the upper and lower protection covers of the steering column and take down the upper and lower protection covers of the steering column.



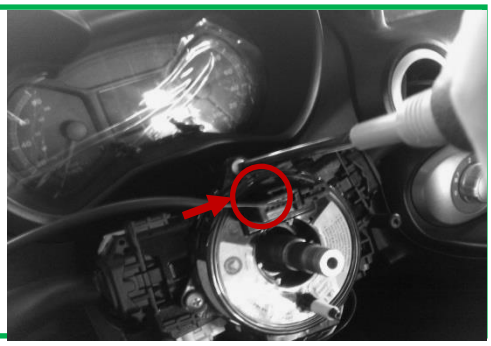
4. Dismantle the combination switch.



5. Dismantle the ESCL assy.

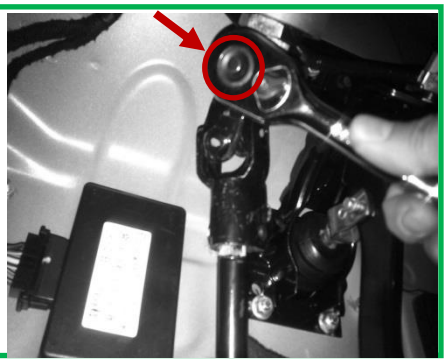
6. Dismantle the clock spring assy.

◎tightening torque: 5±1N•m



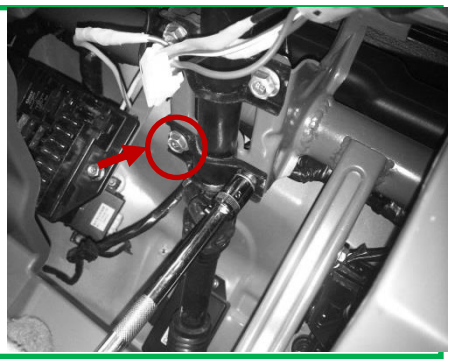
7. Dismantle the connecting bolt of the steering column with the steering drive shaft (1*M8 × 25-8.8).

◎tightening torque: 25±2N•m



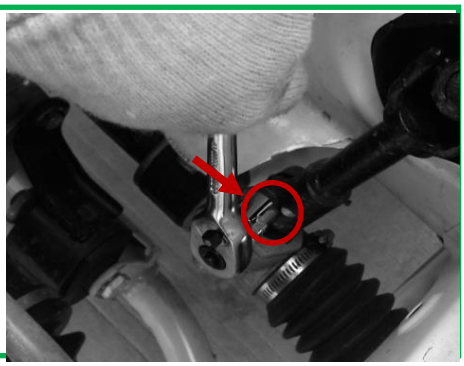
8. Dismantle the fixing bolts of the steering column (4*M8 ×20-8.8).

◎tightening torque: 23±2N•m



9. Dismantle the connecting bolt of the steering drive shaft with the steering gear (1*M8 × 25-8.8). Then disconnect the steering drive shaft from the steering gear. Dismantle the steering drive shaft assy.

◎tightening torque: 23±2N•m

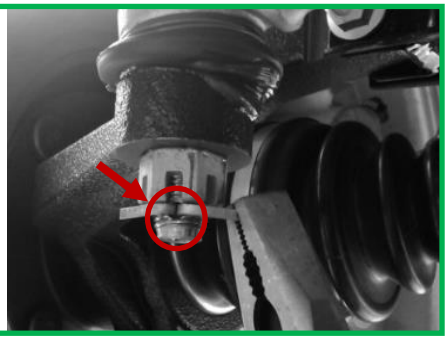


10. Dismantle the steering gear assy.

Note: if it is difficult to separate the steering tie rod ball from the steering knuckle, the nut shall be reversely screwed onto the ball stud; then knock out the steering tie rod ball from the steering knuckle with a wooden hammer to avoid damaging the threads of the tie rod ball stud and leading to installation difficulty.

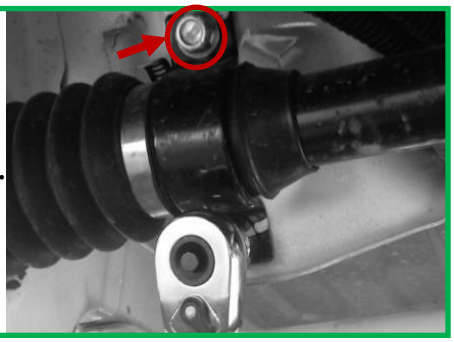
11. Dismantle the circlip for hole “DIN 472-60X2” and the fixing nut of the steering gear ball with the steering knuckle.

◎tightening torque: 55±5N•m



12. Dismantle the fixing bolts of the steering gear (4*M8 ×20-8.8). Dismantle the fixing bracket of the steering gear.

◎tightening torque: 23±2N•m



13. Take out the steering gear from one side of the body.

The installation steps are contrary to the dismantling steps. See the following table for the connection modes and torque requirements of the main fasteners of the steering system:

Connection contents	Connection mode	Torque requirement
The steering column is fixed at the corresponding position of the dashboard tubular beam assy.	4 hexagon head bolts with flange strength shank and half thread “DIN6921-M8×20-8.8”	23±2N·m
The lower end of the steering drive shaft assy is connected with the steering gear assy.	Tighten them with the bolts of the steering drive shaft assy.	25±2N·m
The steering gear assy is fixed at the corresponding part of the body.	4 hexagon head bolts with flange strength shank and half thread “DIN6921-M8×20-8.8”, and steering gear left and right mounting brackets	23±2N·m
The steering gear assy is connected with the wheel rim assy.	The steering gear ball is well fitted with the conical surface of the wheel rim assy. Then tighten the slot nuts of the steering gear with a pneumatic wrench.	75±5N·m

IV.Common Faults of the Steering System and Troubleshooting Methods

System	Common fault	Possible cause	Troubleshooting method
Steering system	Laborious steering	1. Insufficient front tire pressure	Check the tire pressure and pump up the tire.
		2. Too tight adjusting screw of the steering gear	Adjust

		3. Insufficient grease of the steering gear	Maintain and add lube oil.
		4. Abnormal toe-in	Adjust
		5. Large tie rod ball clearance	Replace
		6. Poor lubrication of the steering knuckle and main pin	Add lube oil.
		7. Wear or damage of the steering shaft and steering gear rubber jacket	Replace
	Unstable steering (wheel swing)	1. Wear of the rack of the steering gear	Replace the steering gear.
		2. Too tight adjusting screw of the steering gear	Adjust
		3. Incorrect adjustment of toe-in	Adjust
		4. Excessive wear of the front hub bearing	Replace
		5. Excessive wear of the tie rod ball and joint	Replace the tie rod.
		6. Loosening of the steering gear	Fasten

1. Self-diagnosis function of EPS

When the ignition switch is turned to the ON position, the EPS control module can diagnose the faults of the following parts, and show the fault result via the fault indictor light. The fault result can be read directly by the decoding instrument or the fault code is cleared.

1. Torque sensor
2. Angle sensor
3. Assisted motor
4. EPS control module

2. Operate the fault indictor light as follows:

When the ignition switch is turned to the ON position, if there is no fault in the above parts, the EPS fault indicator light on the instrument cluster is on for about 2s and then

off. This reflects that the above parts pass self-check. When the EPS control module finds a fault in the above parts, the indicator light is always on to warn the driver of fault occurrence. Meanwhile, the fault code is stored in the backup memory of the control module and can be read directly by the decoding instrument or is cleared.

3. Zero calibration method

1. Fix the steering wheel to the absolute zero position with a four-wheel aligner.

2. Connect the decoding instrument and turn the key to the ON position.

2. Select the corresponding vehicle model on the operation interface of the decoding instrument; then select the EPS.

4. Click “Zero Calibration” under the diagnosis interface of the EPS.

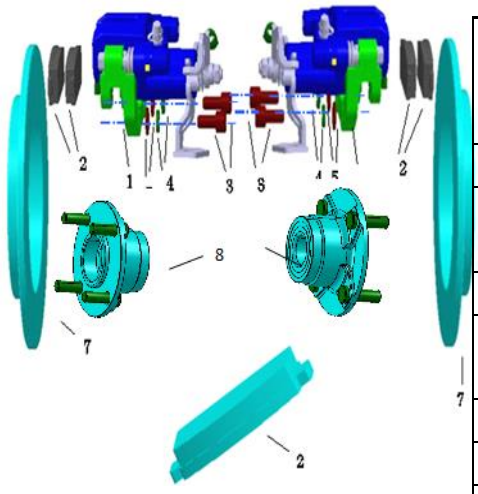
5. The decoding instrument pops up the dialog box “Zero Calibration Completed Successfully”.

Note: be sure to perform zero calibration after replacing the EPC control module, angle sensor or electric power steering assy each time.

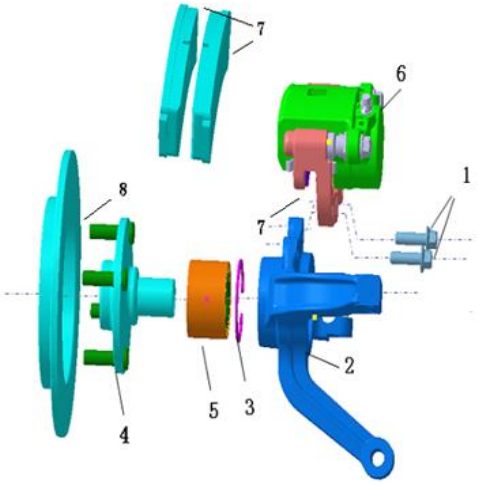
Section 2 Brake System

I. Product Overview

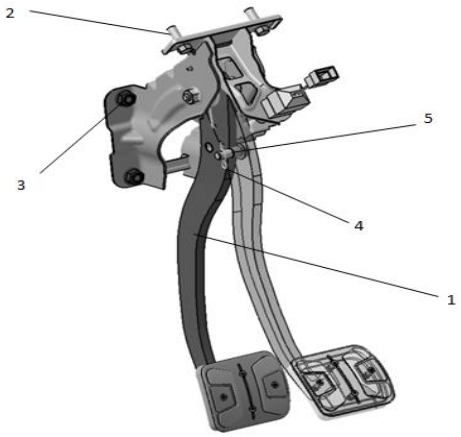
Brake system of Zhidou electric vehicle



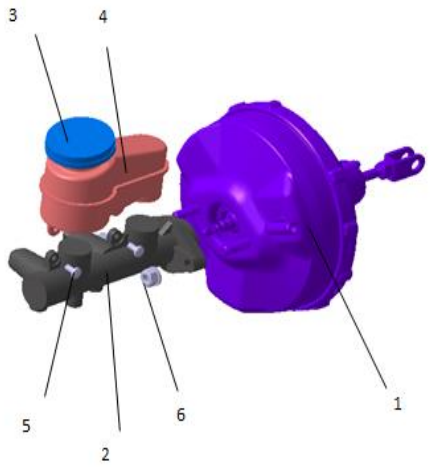
No.	Part No.	Part name	Qty.
Assy	W11-3502010-00	Rear brake	1
1	W11-3502110-00	Left rear brake caliper assy	1
2	W11-3502111-00	Rear friction lining	4
3	DIN 912-M10×1.25×25-10.9	Inner hexagonal fillister head screw	4
4	DIN7980-10-FSt	spring washer	4
5	DIN125-10.5-300HV	plate washer	1
6	W11-3502210-00	Right rear brake caliper assy	1
7	W11-3501301-00	brake disc	2
8	W11-3104100-00	Rear hub & bearing assy	2



No.	Part No.	Part name	Qty.
Assy	W11-3001100-00	Left front wheel rim assy	1
1	DIN 6921-M10X30-10.9	Hexagon head bolt with flange strength shank and half thread	2
2	W11-2901101-00	Left front steering knuckle	1
3	DIN 472-60X2	Circlip for hole	1
4	W11-3103100-00	Front hub flange assy	1
5	W11-3103200-00	Front Hub Bearing	1
6	W11-3501100-00	Left front brake caliper assy	1
7	W11-3501101-00	Front friction lining	1
8	W11-3501301-00	brake disc	1



No.	Part No.	Part name	Qty.
Assy	W11-3504010-01	Braking pedal and drive	1
1	W11-3504100-01	Brake pedal assy	1
2	DIN 6921-M8×20-8.8	Hexagon head bolt with flange strength shank and half thread	2
3	DIN 6923-M8-8	Metallic locking hexagon flange nut	4
4	Q50108	Locking pin	1
5	Q5100824	Pin	1



No.	Part No.	Part name	Qty.
Assy	W11-3540010-01B0	Brake master cylinder with vacuum booster assy	1
1	W11-3540100-01B0	Vacuum booster assy	1
2	W11-3505100-01B0	Brake cylinder assy	1
Assy	W11-3505200-01A0	Oil can assy	1
3	W11-3505201-01A0	Oil can cover	1
4	W11-3505202-01A0	Oil can	1
5	GB/823-88/M5x8/DZnC	Cross recessed small pan head screw	2
6	W11-3540011-01A0	Anti-slip nut assy	2

Note: 1. Ensure that parts and working area are clean during repair of the brake system.

2. The brake system shall be repaired with care. Be sure to replace parts carefully, which may otherwise affect the function of the brake system and cause driving hazards.

3. When repairing any part, never splash brake fluid onto paint surface; otherwise, be sure to clean immediately.

4. It is needed to exhaust air if the brake system is repaired or it is deemed that there is air in the brake line.

5. Check the brake system for leakage after repairing it.

6. Be sure to use the brake fluid of the specified designation. It is forbidden to mix the brake fluid of the specified designation with that of other designations for use.

II. Check and Adjustment of the Brake System

1. Check the oil liquid level height in the brake master cylinder reservoir.

The normal liquid level height shall be between MAX and MIN marks. If the liquid level is lower than the specified lowest liquid level height, add brake fluid. The specification of brake fluid is DOT4.

2. Exhausting of the brake line system

① Check the oil liquid level height in the brake master cylinder reservoir.

① Repeatedly depress the brake pedal several times and then hold it; loosen the bleeder plug.

② When no brake fluid flows out, tighten the bleeder plug and then release the brake pedal.

③ Repeat ② and ③ until the air in brake fluid is completely exhausted.

④ For each wheel cylinder, repeat the above steps to exhaust the air in the whole brake line system.

Note: add brake fluid in the reservoir at any time during exhausting.

3. Check and adjust the brake pedal height.

① Check the brake pedal height to floor, which shall be 171~178 mm normally

② Loosen the locking nut of the brake light switch.

③ Adjust the brake light switch to the appropriate position.

④ Tighten the locking nut of the brake light switch.

4. Check the free play of the pedal.

① Turn the key switch to the “LOCK” position and repeatedly depress the brake pedal till no vacuum in the booster.

② Lightly depress the pedal till there is resistance. Press down the clutch pedal and move the shift bar till feeling certain resistance. The back play of the pedal shall be 5~15mm.

5. Check the air tightness of the vacuum booster system.

① Turn the key switch to the “ON” position and repeatedly depress the brake pedal till the vacuum pump begins to run.

② It takes about 18s to carry out complete vacuum pumping of the vacuum tank with the vacuum pump; after 18s, the vacuum pump stops working.

③ Turn the key switch to the “LOCK” position and slowly depress the brake pedal several times. If the position of the pedal rises gradually when depressed, this indicates that the air tightness is normal.

④ When the brake pedal is depressed repeatedly during vehicle driving at a certain speed, there shall be no large difference in the braking force.

6. Brake disc wear check

Measure the brake disc thickness with a micrometer. The standard thickness is 8±0.1mm and the extreme thickness 5.5mm.

If the thickness is lower than the wear limit, please replace the brake disc.

7. Friction lining wear check

Measure the thickness of the friction lining surface with a ruler. The standard thickness (front/rear) is 7.5mm/6mm and the extreme thickness (front/rear) 2mm/1mm.

8. Check the travel of the parking brake handle.

The travel of the parking brake handle: when the parking brake handle is pulled up by 4~7 teeth, the vehicle shall be braked reliably, the brake light is on, and the max operating force shall be no more than 196N. When the parking brake handle is released completely, the wheels shall be able to rotate freely. Otherwise, make adjustment and dismantle the auxiliary instrument panel assy (for the detailed dismantling steps, please refer to the dismantling and installation steps for the auxiliary instrument panel); then turn the adjusting nut to the appropriate position.

9. After repairing or replacing the brake disc and replacing the friction lining or in the event of insufficient braking force after short-distance driving, please carry out running-in of the joint surface of the brake disc and friction lining.

① Drive the vehicle to be repaired on an even and straight road.

② Control the intensity of depressing the brake pedal, so that the vehicle is braked within 3~5s.

③ After driving the vehicle for a certain distance, park it for 3min to cool the brake system.

④ Repeat steps ①~③ until complete running-in of the brake disc and friction lining.

III. Brake System Dismantling Steps:

1. Brake hose assy dismantling steps:

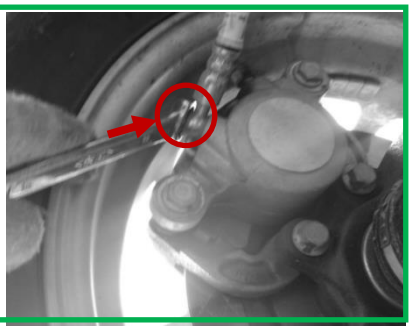
a. Loosen the wheel nuts successively as per the diagonal direction. (model: XQ306A12-M12×1.25-8.8)

◎tightening torque: 90±10N•m

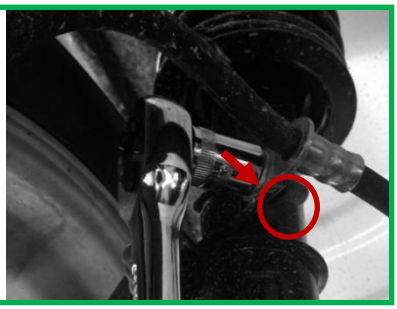
b. Lift the vehicle to the height suitable for dismantling.

c. Dismantle the wheel nuts and take down the tire.

d. Dismantle the oil hole bolt connecting the brake hose with the brake caliper and discharge the brake oil in the hose.



e. Dismantle the fixing bolt of the brake hose with the damper and separate them.



f. Take out the U-shaped circlip of the fuel pipe with flat-nose pliers; Dismantle the connecting nut of the brake hose with the hard pipe with a fuel pipe wrench;
Separate the brake hose from the hard pipe and take down

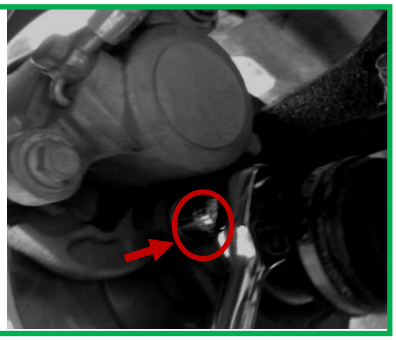
the brake hose.

2. Front brake caliper assy dismantling steps:

a. Discharge the brake oil and dismantle the brake hose assy (for detailed steps, see the brake hose dismantling steps).

b. Dismantle the connecting bolts of the brake caliper assy with the steering knuckle. (two inner hexagon bolts, specification: DIN 6921-M10X30-10.9)

◎tightening torque: 70±5N•m



c. Take out the brake caliper from the brake disc.

3. Dismantling steps for the rear brake caliper and brake disc assy:

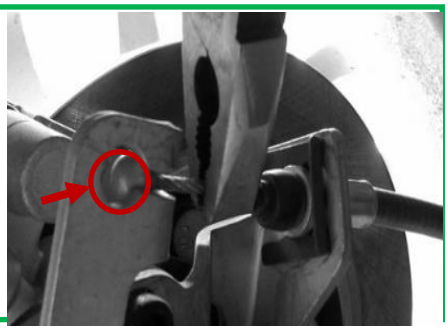
a. Loosen the wheel nuts successively as per the diagonal direction. (Model: XQ306A12-M12×1.25-8.8)

◎tightening torque: 90±10N•m

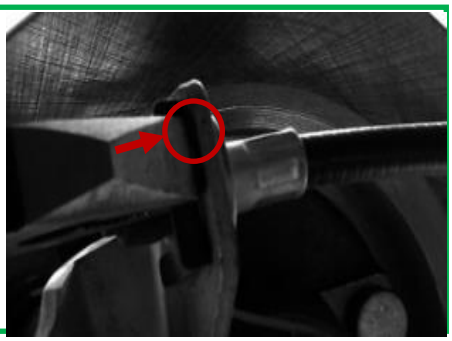
b. Lift the vehicle to the height suitable for dismantling; dismantle the wheel nuts and take down the tire.

c. Discharge the brake oil and dismantle the brake hose assy (for detailed steps, see the brake hose dismantling steps).

d. Release the hand brake, dismantle the hand brake cable, and take out the tail end ball of the hand brake cable from the brake caliper.

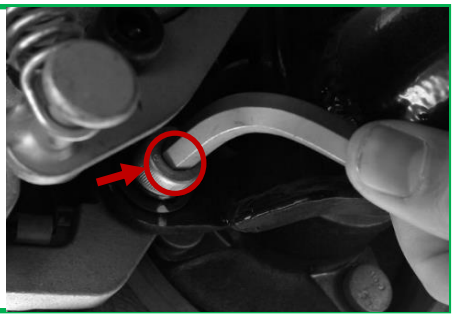


e. Dismantle the U-shaped circlip of the hand brake and separate the hand brake cable from the brake caliper.



f. Dismantle the connecting bolts of the brake caliper with the rear axle tube. (DIN 912-M10X20-10.9)

◎tightening torque: 70±5N•m



g. Take out the brake caliper from the rear axle tube assy.

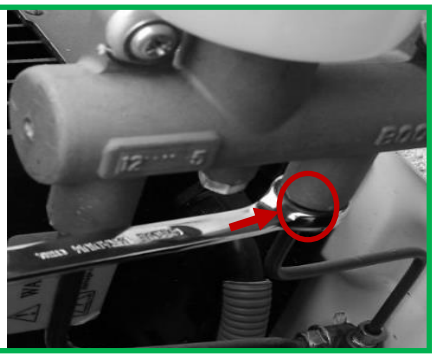
h. Take out the brake disc from the rear hub.

4. Dismantling steps for the brake master cylinder with washer assy:

a. Loosen the oil drain plug of the brake master cylinder with washer assy to discharge the brake oil.

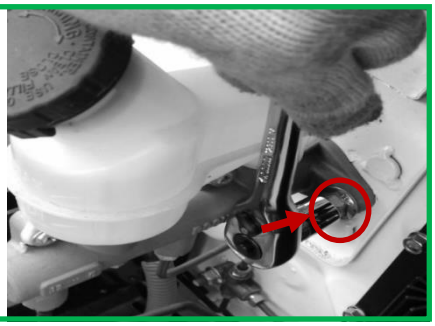
b. Dismantle the connecting nut of the brake hard pipe with the brake master cylinder with washer assy using a fuel pipe wrench; Separate the brake hard pipe from the brake master cylinder with washer assy.

◎tightening torque: 5±1N•m

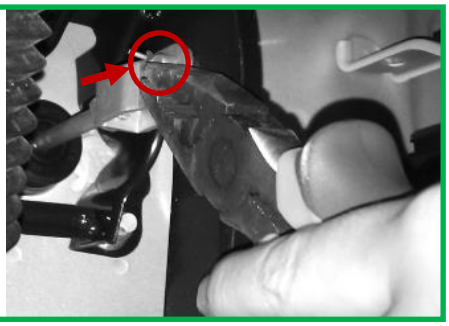


c. Dismantle the fixing nuts of the brake master cylinder with washer assy (2 all-metal hexagon locking nuts “DIN 980-M10-10”).

◎tightening torque: 70±5N•m



d. Dismantle the connecting pin of the brake pedal with the brake master cylinder with washer assy.



e. Dismantle the brake master cylinder with washer assy.

The installation steps are contrary to the dismantling steps. See the following table for the connection modes and torque requirements of the main fasteners of the brake system:

Connection contents	Connection mode	Torque requirement
The brake master cylinder with washer assy installed at the corresponding position of the body.	2 all-metal hexagon locking nuts “DIN 980-M10-10”	70±5N·m
The tee with bracket assy is installed on the front wall mounting stud.	1 metal hexagon flange locking nut “DIN 6927-M8-8”	23±2N.m
Fuel pipe interface	M10 nut	19±1N·m
The left and right front brake hard pipe assy is installed on the corresponding bracket of the front damper assy.	2 hexagon head bolts with flange strength shank and half thread “ DIN 6921 -M8X20-8.8”	23±2N.m
The brake pedal assy is fixed at the corresponding position of the body.	4 metal hexagon flange locking nuts “DIN 6927-M8-8” and 2 hexagon head bolts with flange strength shank and half thread “ DIN 6921 -M8X20-8.8”	23±2N.m
Fixing of the left and right rear brake caliper assy	4 hexagonal fillister head bolts DIN912-M10X1.25X20-10.9	70±5 N•m
The rear brake hose assy 2 and the rear brake hose assy 3 are fixed on the rear brake caliper.	2 oil hole bolts and 4 seal rings	32±1N·m
Fixing of the tee with bracket assy	1 hexagon head bolt with flange strength shank and half thread “ DIN 6921 -M8X30-8.8”	23±2 N•m
The left and right front brake hoses are connected with the front brake caliper.	2 oil hole bolts and 4 seal rings	32±1N·m
The rear section of the parking brake cable is fixed on the projection-welded bolt.	4 metal hexagon flange locking nuts “DIN 6927-M8-8”	23±2 N•m
The tail end of the rear section of the parking brake cable is connected with the brake caliper assy.	2 hexagon head bolts with flange strength shank and half thread “ DIN 6921-M6×16-8.8”	10±2 N•m
The parking brake handle assy is fixed on the hand brake mounting brake on the floor.	2 hexagon head bolts with flange strength shank and half thread “ DIN 6921 -M8X20-8.8”	23±2N·m

IV. Common Faults of the Brake System and Troubleshooting Methods

System	Common fault	Possible cause	Troubleshooting method
Brake system	Brake failure	1. Damage of the brake master cylinder with washer assy and wheel cylinder, oil leakage of the oil pipe	Check, remove, replace
		2. Insufficient brake fluid or no oil	Supplement
		3. Existence of air in the brake system	Air exhaust
		4. Too large free path of the brake pedal or too large brake clearance	Adjust
		5. Excessive wear of the brake lining	Replace
		6. Internal leakage of the brake master cylinder with washer assy	Replace
	Braking deviation	1. Excessive wear and damage of the single-side brake lining	Replace
		2. Inconsistent tire pressure	Repair or replace
		3. Seizure of the single-side brake caliper piston	Adjust
		4. Inaccurate front wheel positioning	Adjust
	Braking drag	1. No free play of the brake pedal	Adjust
		2. Too small brake lining clearance	Adjust or replace
		3. Wheel cylinder piston motion failure	Check, replace
		4. Poor return of the piston of the brake master cylinder with washer assy	Replace
		5. Poor return of parking brake	Replace the return spring.
	Braking noise	1. Bending deformation of the brake disc	Replace
		2. Excessive wear of the brake lining	Replace
		3. Existence of foreign objects in the brake	Check and eliminate

1. Poor braking

1. Fault symptom

(1) Failure to decelerate or stop the vehicle rapidly during braking

(2) Braking is poor in case of depressing the brake pedal for the first time; after continuously depressing the brake pedal, the pedal is raised gradually but the sense of touching the pedal is weakened and the braking effect is not good.

(3) The driver feels small deceleration in case of braking during vehicle driving.

(4) Long braking distance in case of emergency braking of the vehicle

2. Fault causes

(1) Oil way faults. For example: ① Insufficient oil liquid; ② Oil liquid deterioration; ③ Oil leakage of the pipeline; ④ Gas leakage of the pipeline;

(2) Fault of the brake master cylinder and wheel cylinder; For example: ①Aging, expansion, wear and deformation of the rubber rings of the hydraulic brake master cylinder and wheel cylinder, too large wear of the piston and cylinder wall; ② Non-airtight sealing of the outlet valve and oil return valve, insufficient brake fluid in the reservoir;

(3) Faults of the free path of brake pedal; For example: ① Too large free path of the brake pedal; ② Improper adjustment or loosening of the push rod of the brake master cylinder and working cylinder; ③ Loosening of the pedal drive mechanism;

(4) Faults of the vacuum booster; For example: ① Air leakage of the vacuum tube; ② Non-airtight sealing of the control valve, air chamber diaphragm damage, wear of the control valve piston and rubber ring; ③ Excessive wear of the pressure cylinder piston,

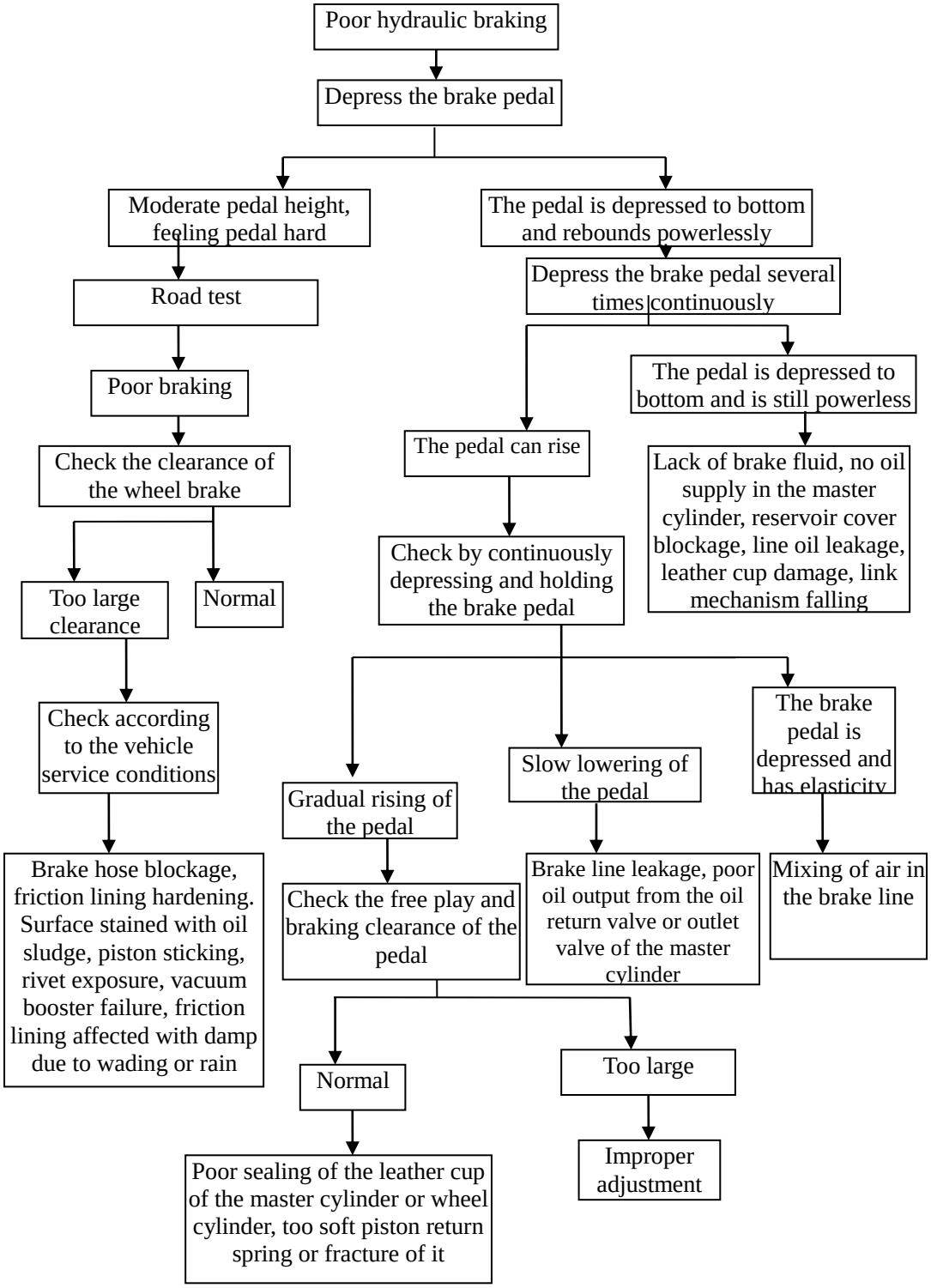
and too soft return spring;

(5) Brake faults; For example: ①Serous of the brake friction lining, too large clearance between the friction lining and the brake drum, excessive wear of the brake disc, existence of oil sludge between the brake drum and the brake disc; ②Poor contract between the brake shoe friction lining and the brake drum, poor adjustment; ③ Warping deformation of the brake disc, poor circularity and cylindricity of the brake drum, charring, loosening and falling of the brake shoe surface, exposure of rivets, water immersion of the drum wheel brake; ④ Too hard return spring of the brake shoe, rustiness and seizure of the brake shoe shaft;

(6) ① Existence of air in the brake line, or denting of the oil pipe, hose aging and expansion, unsmooth inner hole, or too thick scale deposits on the inner wall of the line; ② Insufficient brake fluid or deterioration of brake fluid in the reservoir; ③ Excessive wear of the leather cup, piston and wall of the brake master cylinder and wheel cylinder; ④ Oil leakage of the brake master cylinder, wheel cylinder, line or pipe joint; ⑤ Excessive wear of the brake drum, or improper adjustment of brake clearance; ⑥ Non-sealing of the outlet valve and oil return valve of the brake master cylinder or too small pre-tightening force of the piston return spring, or blockage of the oil supply hole, compensating hole, reservoir vent hole, and small through-hole before the piston; ⑦ Aging, pastiness and expansion of the leather cup of the brake master cylinder or wheel cylinder; ⑧Small contract area of the brake friction lining (brake disc) and brake drum (brake caliper), poor quality of the brake shoe friction lining, or hardening, charring and oil contamination of the surface during use; ⑨ Poor

performance or failure of the booster; ⑩ Too large free path of the brake pedal.

3. The fault diagnosis process is shown in the following figure:



2. Brake failure

1. Fault symptom

When the brake pedal is depressed to bottom during vehicle driving, the brake doesn't work, or after braking once or several times, the brake doesn't work suddenly. All these belong to brake failure.

2. Fault causes

The hydraulic brake master cylinder is out of order. For example:

① Seriously insufficient brake fluid in the brake master cylinder;

② Serious wear of the leather cup and rubber ring of the brake master cylinder, or leather cup reversal caused by treading;

③ Breakage of the pipeline between the brake master cylinder and the wheel cylinder, or joint loosening, serious oil leakage;

④ Falling and breakage of the brake pedal drive mechanism;

The hydraulic brake wheel cylinder is out of order. For example:

① Serious damage of the leather cup of the wheel cylinder, or leather cup overturning;

② Seizure of the piston of the wheel cylinder;

③ Flattening and complete blockage of the oil supply pipe of the wheel cylinder;

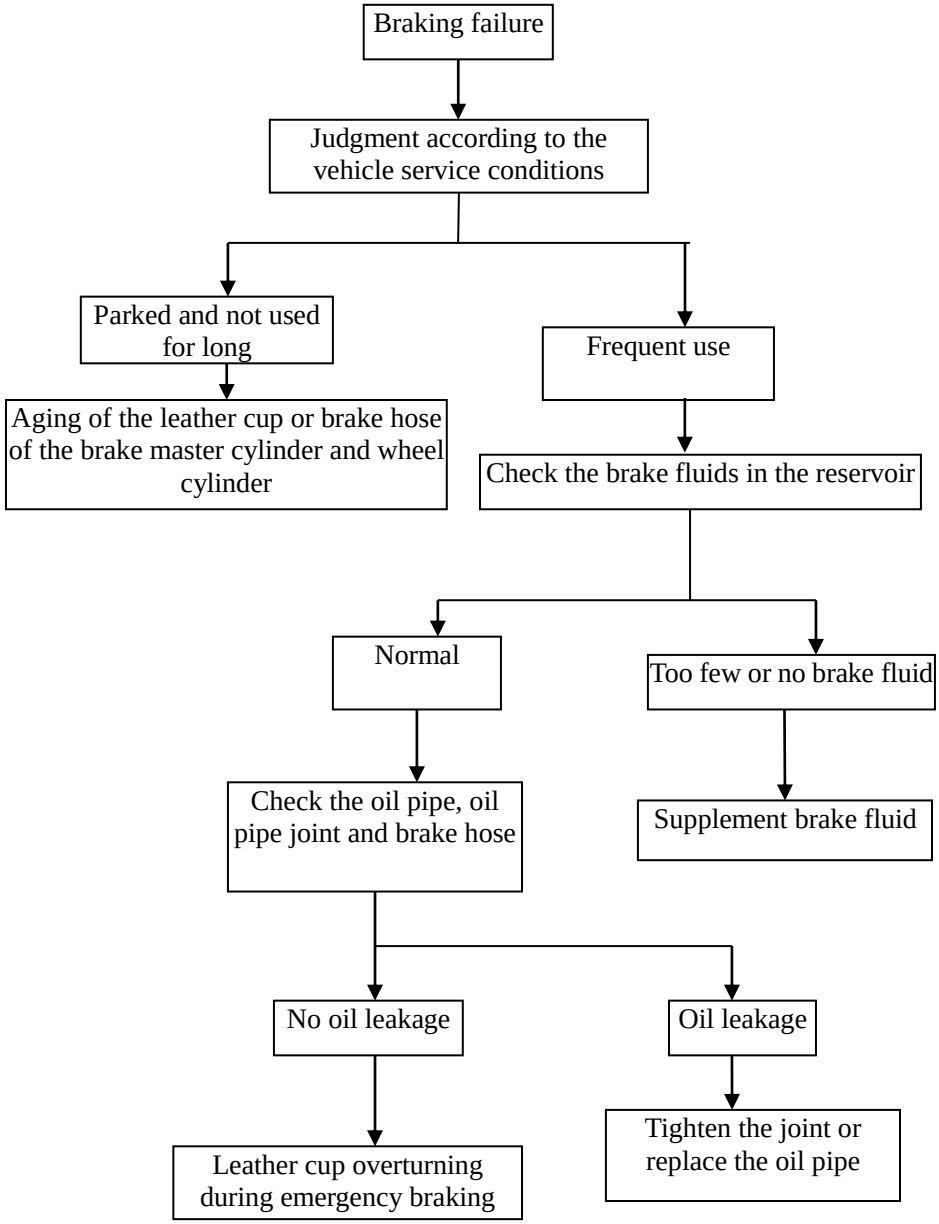
④ Loosening, falling or loss of the air exhaust screw of the wheel cylinder;

Wheel brake faults. For example:

① Large-area falling of the brake friction lining, serious ablation of the friction lining;

② Cracking and breakage of the brake disc

3. The fault diagnosis process is shown in the following figure:



4. Fault diagnosis method

If there is no sense of connection in case of depressing the brake pedal, this indicates that the pedal is disconnected from the brake master cylinder. ② Check for leakage or breakage of the system pipeline (according to oil stains in general). Leakage or breakage of the pipeline will cause failure to form high pressure in the loop and loss of

braking performance. ③ If the above is normal, check the brake master cylinder and wheel cylinder.

3. Hydraulic braking drag

1. Fault symptom

After depressing the brake pedal and then raising it, the braking action on all or several wheels cannot be completely eliminated, and there is a sense of powerlessness during driving; after driving for a certain distance, a brake disc or all brake discs still have high temperature in spite of not using the brake, so as to affect restarting, accelerated driving or gliding of the vehicle.

2. Fault causes

A The hydraulic brake master cylinder is out of order. For example: ①No free play of the brake pedal, loosening and fracture of the pedal return spring, or too soft return spring; ②Sticking of the brake pedal shaft due to rustiness or wear, failure to return it by the return spring; ③ Too dirty brake fluid or too high viscosity of brake fluid so as to make oil return difficult; ④ Blockage of the oil return hole and bypass hole of the wheel cylinder by dirt; ⑤ Sticking of the brake master cylinder piston or leather cup expansion so as to result in non-flexible return and block the oil return hole of the master cylinder; ⑥ Too soft piston of the brake master cylinder or fracture of the piston; ⑦ Too hard oil return valve spring of the brake master cylinder;

B The hydraulic brake wheel cylinder is out of order. For example: ① Sticking of

the leather cup of the wheel cylinder, or seizure of the leather cup due to expansion; ② Deformation, wear or seizure of the piston of the wheel cylinder; ③ Flattening of the brake oil pipe or aging of the brake hose, unsmooth oil return due to inner wall falling and blockage;

C Wheel brake faults. For example: ① Too small clearance between the brake shoe friction lining and the brake disc; ② Sintering and sticking of the brake shoe friction lining with the brake disc; ③ Falling of the brake shoe friction lining, fragments clamped between the brake shoe friction lining and the brake disc; ④ Falling, fracture or too elastic force of the return spring of the brake shoe; ⑤Too small fit clearance between the brake shoe shaft and the bushing, poor lubrication or rustiness so as to result in difficult rotation of the return spring; ⑥ Warping deformation of the brake disc

D Other causes; For example: ① Improper adjustment of the hub bearing so as to result in deflection of the brake disc and its contact with the brake friction lining; ② Non-relaxing of the hand brake for parking braking, or improper adjustment of the parking brake cable

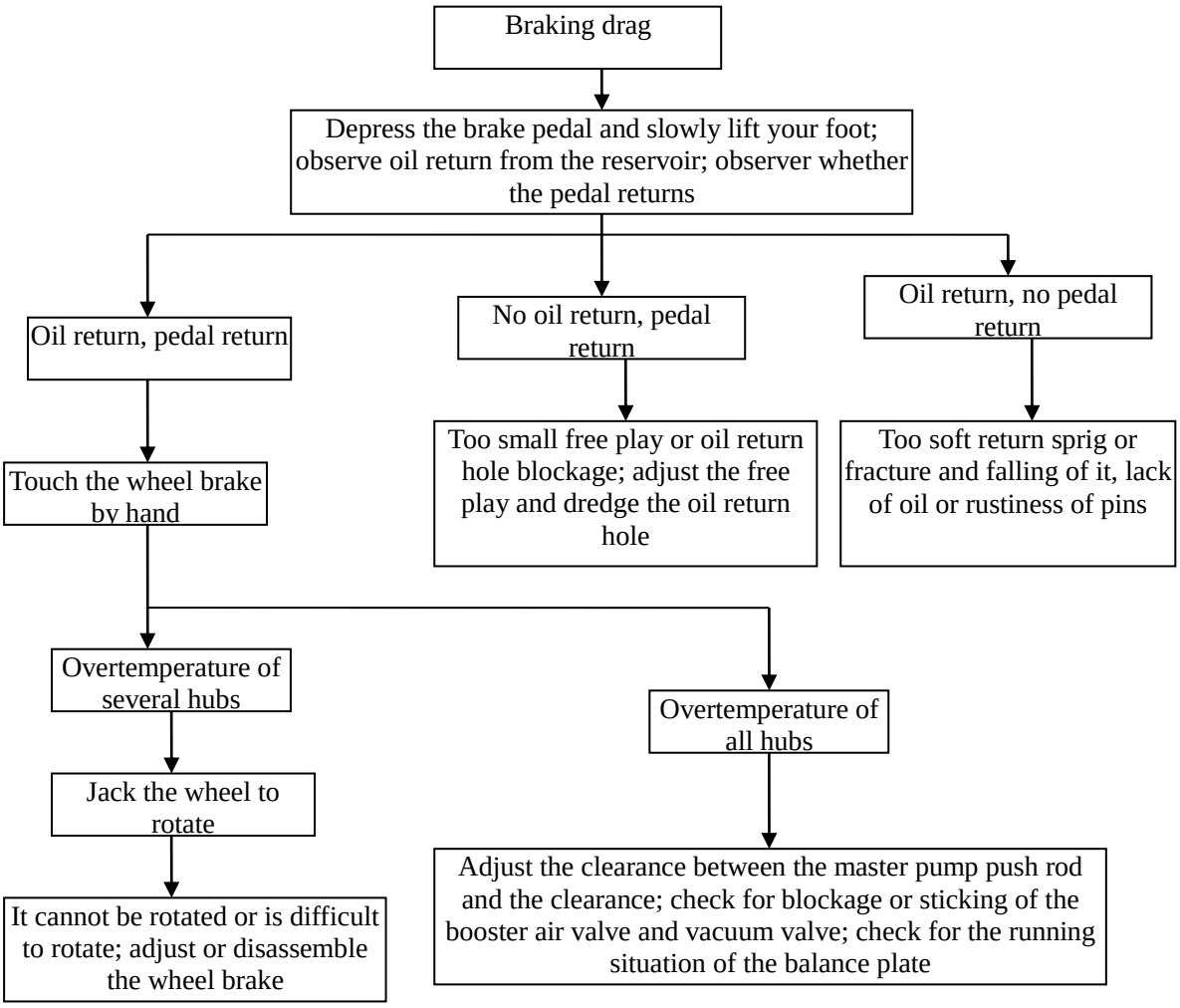
3. Fault diagnosis method

If a wheel has high temperature, check for unsmooth return of the brake cylinder of the wheel, for too small braking clearance of the brake and for unsmooth return of the brake shoe.

If all wheels have high temperature, check for too small free play of the brake pedal, for too small braking clearance of the brake, for slow oil return in the brake master

cylinder (unsmooth oil return hole, leather cup expansion), and for air leakage of the vacuum booster.

4. The fault diagnosis process is shown in the following figure:



5. Other faults of the brake system

(1) Spongy or elastic brake pedal

The main fault causes: ① There is air in the pipeline of the brake system, and the air shall be exhausted; ② There is a too large clearance between the piston and the cylinder tube in the brake master cylinder, and the leather cup or assy shall be replaced; ③ Brake fluid is insufficient, and the brake fluid of the same model shall be supplemented to the specified height.

(2) Hard brake pedal

The main fault cause is air leakage of the vacuum booster or hose, and the vacuum degree of the vacuum booster or the sealing property of the valve can be checked; if they are good, other parts of the brake system shall be checked.

(3) Body shaking during braking

The main fault causes: ① Lube oil or brake fluid contaminates the brake friction lining so as to result in friction lining gliding. The lube oil contaminating the friction lining may come from leakage of the oil seal of the reducer, and the grease may come from leakage of the wheel bearing seal. The brake shoe shall be replaced after fault removal; ② The brake disc shall be replaced due to scuffing or warping; the brake discs on the left and right of the same shaft shall be replaced simultaneously; ③ The brake caliper is loosened or seized and shall be fastened or lubricated; if necessary, replace the brake friction lining. ④ The brake wheel cylinder or the vacuum booster is out of order and shall be repaired.

(4) Brake noise

The vibration noise or scream between the brake disc and the brake caliper is caused mostly by poor polishing of rotary components, rough trimming, surface scraping and damage or caliper burrs, etc. All of them shall be repaired and cleaned one by one. In necessary, replace components. When rotary components are repaired, their surface can be re-polished using the non-directional eddy current type polishing method. The noise can also be eliminated or reduced by installing cushion blocks or composite materials on the brake disc back. Excessive wear of the brake disc will result in metal

scraping noise. When the wear of the brake disc exceeds the specified limit, it shall be replaced.

4. Braking deviation

1. Fault symptom: The vehicle is automatically deviated towards one side in case of braking during driving.

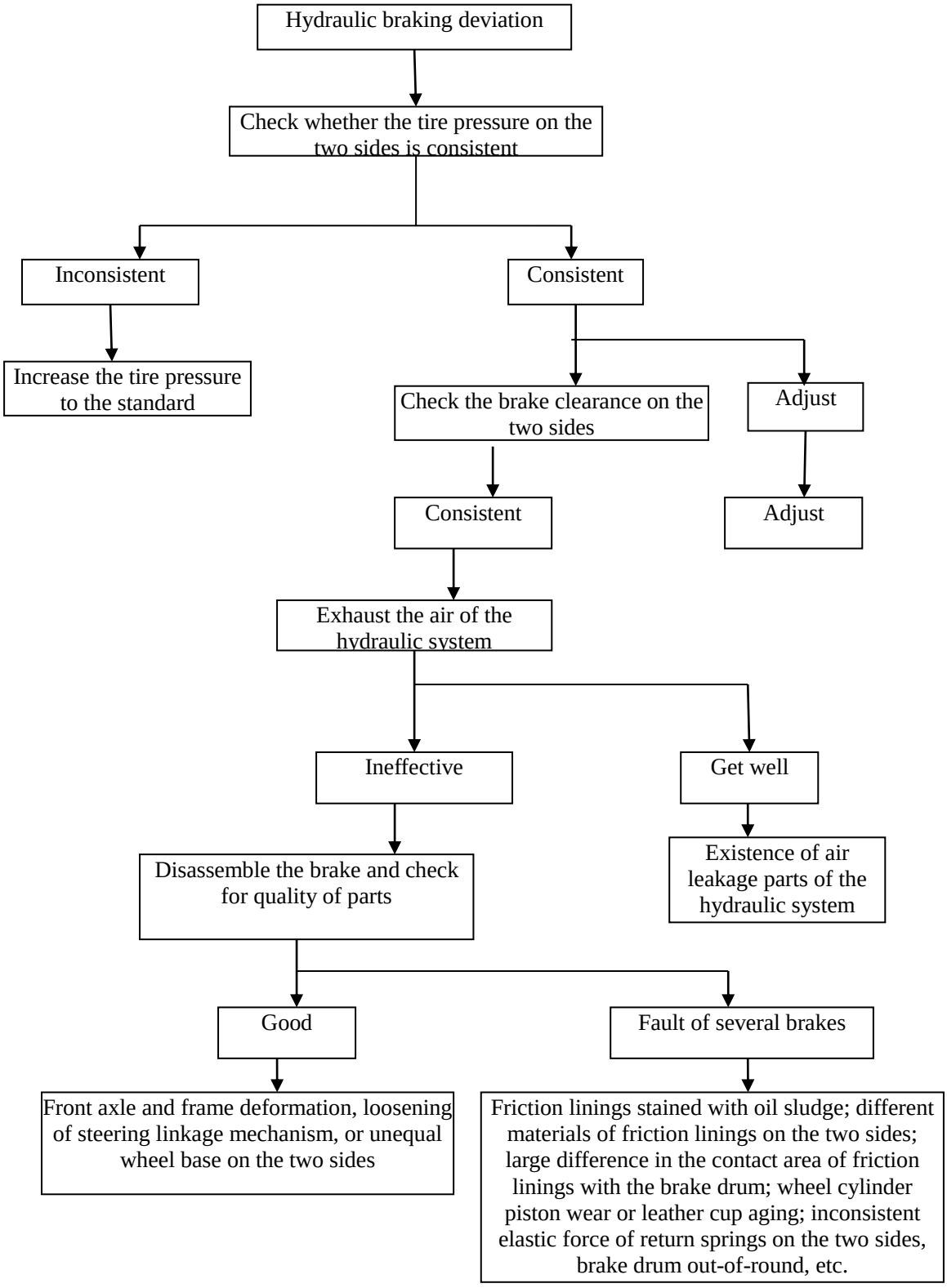
2. Fault causes

Flattening and blockage of the oil supply pipe of a wheel cylinder, or oil supply hose aging and expansion so as to result in unsmooth oil supply or oil supply pipe joint loosening and oil leakage; Wear and oil leakage of the cylinder tube, piston and leather cup of a wheel cylinder so as to result in pressure drop;

The air in a branch line or wheel cylinder of the brake system is not exhausted. Inconsistent braking distance of wheel brakes

The brake disc thickness of wheel brakes doesn’t reach the standard. There is a too large difference in the elastic force of the return spring of the brake shoe of wheel brakes.

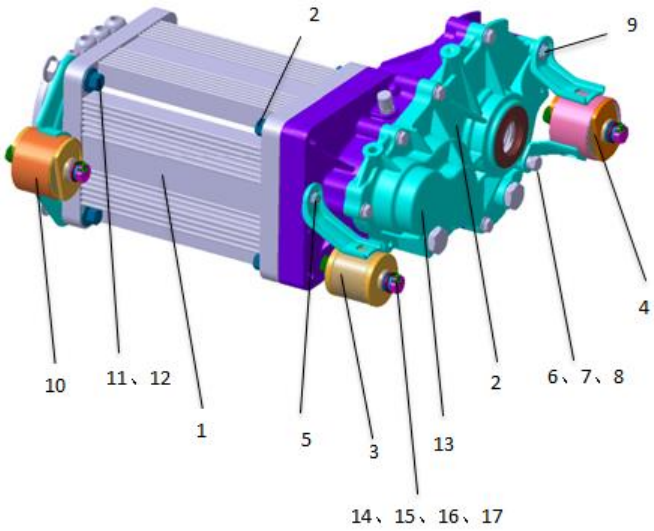
3. The fault diagnosis process is shown in the following figure:



Section 3 Transmission System

I. Product Overview

Transmission system of Zhidou electric vehicle



No.	Part No.	Part name	Qty.
Assy	A31-2100010-00A0	Electric vehicle drive system	1
1	A31-2100100-410	Driving motor	1
2	DIN 6921-M12X40-8.8	Hexagon head bolt with flange strength shank and half thread	4
3	W11-2100230-00	Front suspension assy	1
4	W11-2100240-00	Rear suspension assy	1
5	DIN 6921-M8X25-8.8	Hexagon head bolt with flange strength shank and half thread	2
6	DIN 6921-M8X16-8.8	Hexagon head bolt with flange strength shank and half thread	1
7	DIN 7980-8-FSt	spring washer	1
8	DIN 125-8.4-300HV	plate washer	1
9	DIN 6921-M8X45-8.8	Hexagon head bolt with flange strength shank and half thread	1
10	W11-2100250-00	Motor suspension assy	1
11	DIN 6921-M12X40-8.8	Hexagon head bolt with flange strength shank and half thread	2
12	DIN 6927-M12-8	Metallic locking hexagon	2

		flange nut	
13	W11-1700010-220	Reducer assy	1
14	DIN 931-M10×85-10.9	Hexagon head bolt with strength shank and half thread	3
15	DIN 7980-10-FSt	spring washer	3
16	DIN 125-10.5-300HV	plate washer	3
17	DIN 6927-M10-8	Metallic locking hexagon flange nut	3

II. Dismantling Steps for the Motor and Reducer

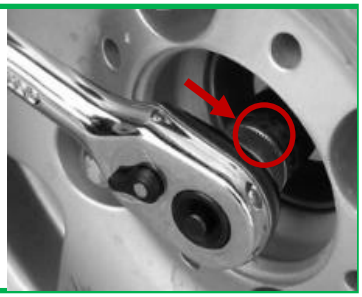
1. The whole vehicle is powered off. Dismantle the lines connecting the motor, including U, V and W three-phase lines and signal lines.

2. Loosen the wheel nuts successively as per the diagonal direction. (Model: XQ306A12-M12×1.25-8.8)

◎tightening torque: 90±10N•m

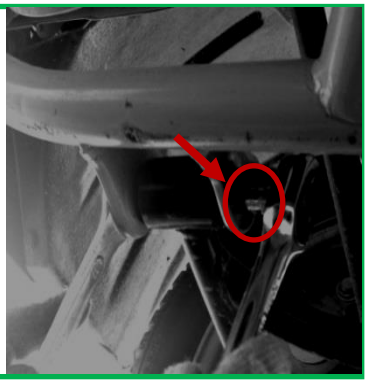
11. Dismantle the locking nuts of the drive shaft.

◎tightening torque: 180±10N•m



12. Dismantle the connecting bolts of the lower swing arm with the auxiliary frame (2*M10X70-10.9); Separate the lower swing arm from the auxiliary frame; Pull out the steering knuckle and front damper assy slightly outside to separate the drive shaft from the hub bearing.

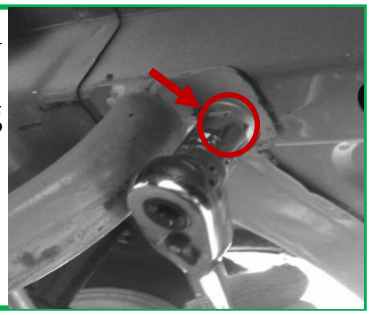
◎tightening torque: 70±5N•m



5. Lift the hydraulic lift trolley to the appropriate height and hold out against the auxiliary frame and motor reducer assy to prevent them from falling during dismantling.

6. Dismantle the fixing bolts and fixing nuts of the auxiliary frame. (4 fixing bolts DIN 6921-M10X20-8.8 and 2 fixing nuts DIN 6927-M10-8)

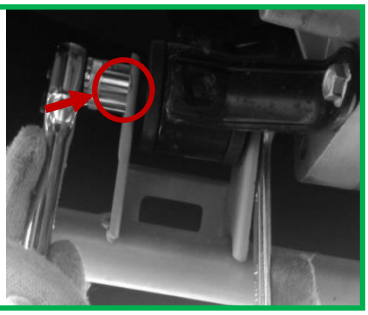
◎tightening torque: 59±10N•m



7. Slowly lower the hydraulic lift trolley to the appropriate height, and keep it stable during lowering.

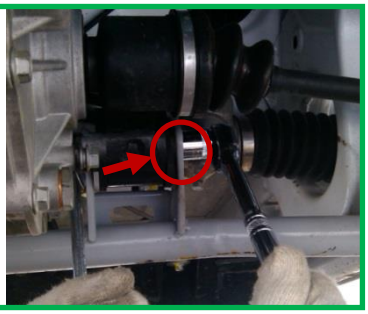
8. Dismantle the motor front suspension assy.
(1 nut DIN6927-M10×1.25-8, 1 bolt DIN931-M10×1.25×80-10.9)

◎tightening torque: 70±5N•m



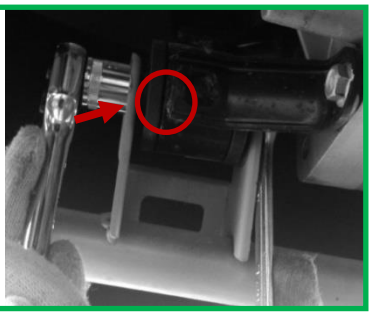
9. Dismantle the motor rear suspension assy.
(1 nut DIN6927-M10×1.25-8, 1 bolt DIN931-M10×1.25×80-10.9)

◎tightening torque: 70±5N•m



10. Dismantle the motor suspension assy.
(1 nut DIN6927-M10×1.25-8, 1 bolt DIN931-M10×1.25×80-10.9)

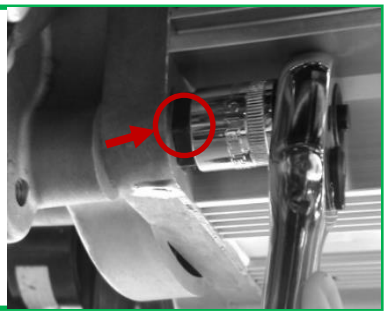
◎tightening torque: 70±5N•m



11. Separate the drive shaft from the reducer.

12. Dismantle the connecting bolts of the motor with the reducer, and separate the motor from the reducer. (4 bolts DIN 6921-M12X40-8.8)

◎tightening torque: 78±5N•m



III. Drive Shaft Dismantling Steps:

The drift shaft is a constant angular velocity drive shaft. The drive shaft consists of tri-forked axle type constant velocity universal joint and fixed ball-cage type constant velocity universal joint. The reducer connection end is the tri-forked axle type constant velocity universal joint, and the wheel end is the fixed ball-cage type constant velocity universal joint.

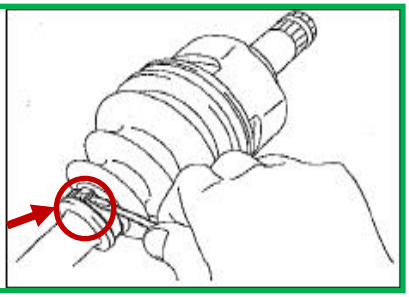
1. Check the drive shaft assy.

- Check for obvious loosening of the tri-forked axle type constant velocity universal joint.
- Check for smooth sliding of the slide shaft.
- Check for obvious loosening of the fixed ball-cage type constant velocity universal joint.
- Check whether the dust cover is damaged.

2. For the detailed drive shaft dismantling steps, please see the dismantling steps for the motor and reducer.

3. Drive shaft disassembling

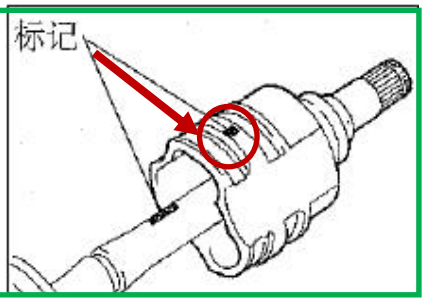
a. Disassembling of the dust cover of the tri-forked axle type constant velocity universal joint

Loosen the clamp of the dust cover of the tri-forked axle type constant velocity universal joint; Dismantle the dust cover.	

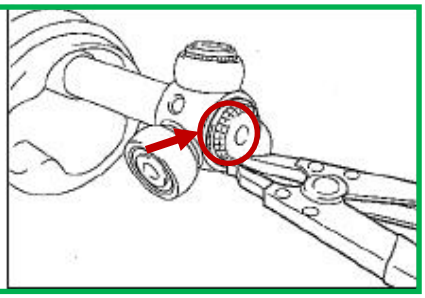
Note: if the clamp is deformed, it shall be replaced.

b. Disassembling of the tri-forked axle type constant velocity universal joint

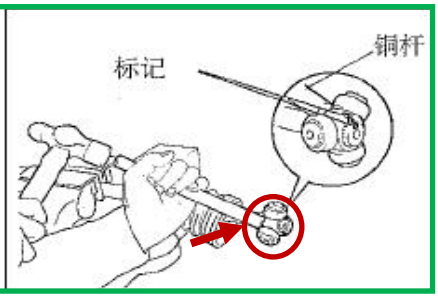
1. Remove the old grease.

2. Make assembling marks on the inner and outer sections using a marking pen. **Note**: do not mark marks with a punch.	

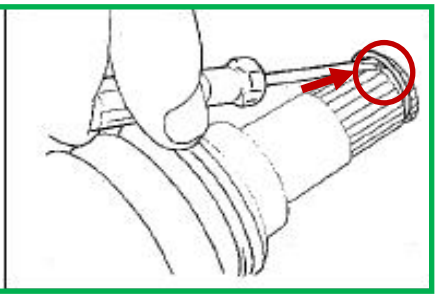
3. Take down the outer section.

4. Dismantle the snap ring with clip forceps.	

5. Make assembling marks on the tripod ball section and outer section using a marking pen.

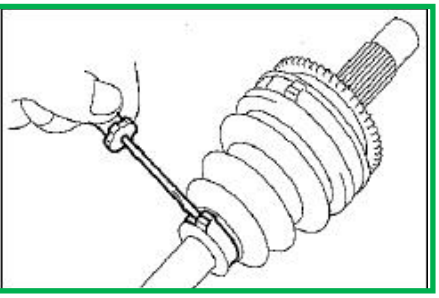
6. Dismantle the tripod ball section with a cooper bar and hammer. Note: do not knock the roller.	

c. Disassembling of the snap ring at the spline shaft end of the outer section of the tri-forked axle type constant velocity universal joint

Dismantle the snap ring at the spline shaft end of the outer section of the tri-forked axle type constant velocity universal joint using a screwdriver.	

Note: do not damage the snap ring; otherwise, it shall be replaced.

b. Disassembling of the dust cover of the fixed ball-cage type constant velocity universal joint

Loosen the clamp of the dust cover of the fixed ball-cage type constant velocity universal joint; Dismantle the dust cover.	

Note: if the clamp is deformed, it shall be replaced.

c. Disassembling of the fixed ball-cage type constant velocity universal joint

1) Remove the old grease.

2) Make assembling marks on the inner and outer sections using a marking pen.

Note: do not mark marks with a punch.

The installation process is the contrary of the dismantling process.

Pay attention to the following in the installation process:

- When assembling the tri-forked axle type constant velocity universal joint and the fixed ball-cage type constant velocity universal joint, apply an appropriate quantity of long life grease conforming to requirements, and assemble them as per marks.
- Keep the spline shafts at the two ends clean. The dust cover shall be undamaged and the clamp shall be installed flatly.
- The tri-forked axle type constant velocity universal joint and the differential shall be assembled in place, and the ring opening side shall face downwards; if necessary, use a rubber hammer to knock properly.

See the following table for the connection modes and torque requirements of the main fasteners of the transmission system:

Connection contents	Connection mode	Torque requirement
Locking nuts of the front wheel drive shaft	2 metallic locking hexagon flange nuts XQ330A18-M18X1.5-8	180±10 N•m
The motor, transmission and auxiliary frame sub-assy are fixed on the body.	4 hexagon head bolts with flange strength shank and half thread “DIN 6921- M10X20-8.8” and 2 metal hexagon flange locking nuts “ DIN 6927- M10”	45±5 N•m
Transmission assy and driving motor	4 hexagon head bolts with flange strength shank and half thread “ DIN 6921- M12×40-8.8”	70±5 N•m

IV. Common faults of the transmission system and troubleshooting methods

System	Common fault	Possible cause	Troubleshooting method
Transmission system	Abnormal running noise	1. Insufficient grease or no grease in the ball cage of the drive shaft	Add grease.
		2. Reducer gear wear or bearing damage	Replace
		3. Hub bearing damage	Replace
		4. Motor bearing damage	Replace
		5. Insufficient gear oil or no gear oil	Supplement gear oil.
	Judder during starting	1. The motor controller program is out of order and needs to be refreshed.	Adjust
		2. Motor Hall sensor fault	Replace
		3. Breakage of the rubber sleeve of the motor suspension	Fasten

V. ABS

I. Notices

1. Notices

(a). The harness connector should be disconnected from the ABS control module before welding the vehicle.

(b). Pay special attention to the installation of each part of ABS, for instance the location of cables, the location of bolts, as well as harnesses, connectors, fasteners and brackets. Incorrect cabling can cause the system to suffer from electromagnetic interference and thus become unable to function properly.

(c). It is not allowed to use the quick charger to charge the battery while the battery cable is not disconnected, as it will cause damage to the battery or ABS parts.

(d) The harness connector of the ABS control module can be disconnected only when the Engine Start Stop Switch is set to the "OFF" state.

(e). The ABS control module with pump assembly can only be replaced as a whole and cannot be disassembled for repair.

(f). It is not allowed to hang any object related to the suspension on the wheel speed sensor harness, otherwise it may damage the wheel speed sensor.

(g). It is not allowed to place the ABS control module in an environment above 105 °C.

(h). It is not allowed to use petroleum liquids in the brake master cylinder, as petroleum will cause the rubber-like components in the brake system to expand and deform.

II. System Overview

The vehicle is equipped with an anti-lock brake system (ABS) and is added with an ABS control module on the basis of the original brake system.

Attention: The mounting bolts between the ABS control module and the ABS bracket have rubber damping pads that function to protect the ABS control module from vehicle vibration. The ABS control module cannot be disassembled but must be replaced as an assembly.

ABS control module:

When Engine Start Stop Switch is switched on and there is no fault diagnosis code of the anti-lock brake system, the system energizes the relay to provide the battery positive voltage to the solenoid valve and the pump. The ABS control module continuously detects the state of wheels and controls the slip rate of the wheels to keep within a certain range so as to maintain the stability of the vehicle.

ABS control module (also known as ABS or electronic-hydraulic control unit) mainly consists of the following parts:

- One ABS ECU (also known as ABS controller)
- One ABS pump motor (also known as ABS motor)
- Four pressure retaining valves
- Four pressure release valves
- Eight solenoid coils and relays
- Two low-pressure fluid reservoirs
- One hydraulic unit body

Wheel speed sensor:

The wheel speed sensor is a Hall type sensor. As wheels rotate, the ABS control module calculates the wheel speed based on the wheel speed signals. The wheel speed sensors can be replaced separately. However, the front wheel signal disc (gear ring) is mounted on the drive shaft and has to be replaced together with the drive shaft. The rear wheel signal disc is mounted on the bearing and has to be replaced together with the bearing.

Brake switch:

The brake switch lights up the brake lamp and sends brake signals to the ABS control module when the brake pedal is trod.

ABS warning lamp:

The ABS warning lamp that is located on the combination instrument informs the driver of an ABS fault in a way of being lit. The combination instrument on the instrument panel will light up the ABS warning lamp in case of following events:

- The ABS control module detects that the ABS system is at fault. The combination instrument receives a request of lighting up the lamp from the ABS control module via the CAN bus.
- The combination instrument detects the loss of communication with the ABS control module.

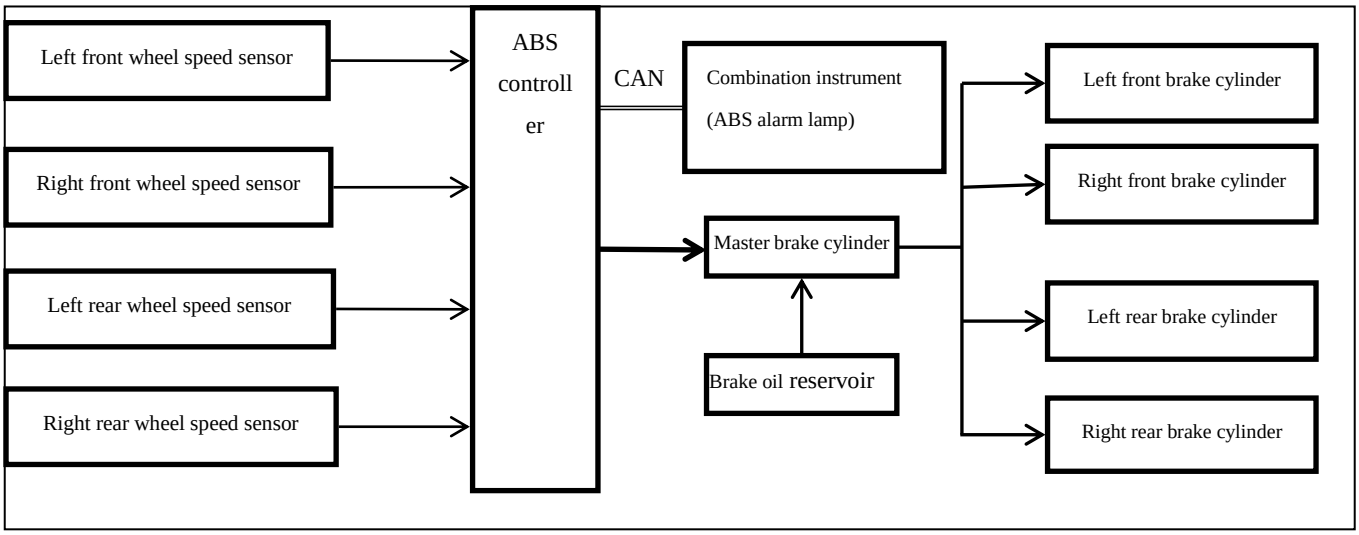
Self-diagnosis Test:

The ABS control module will perform a self-diagnosis test after Engine Start Stop

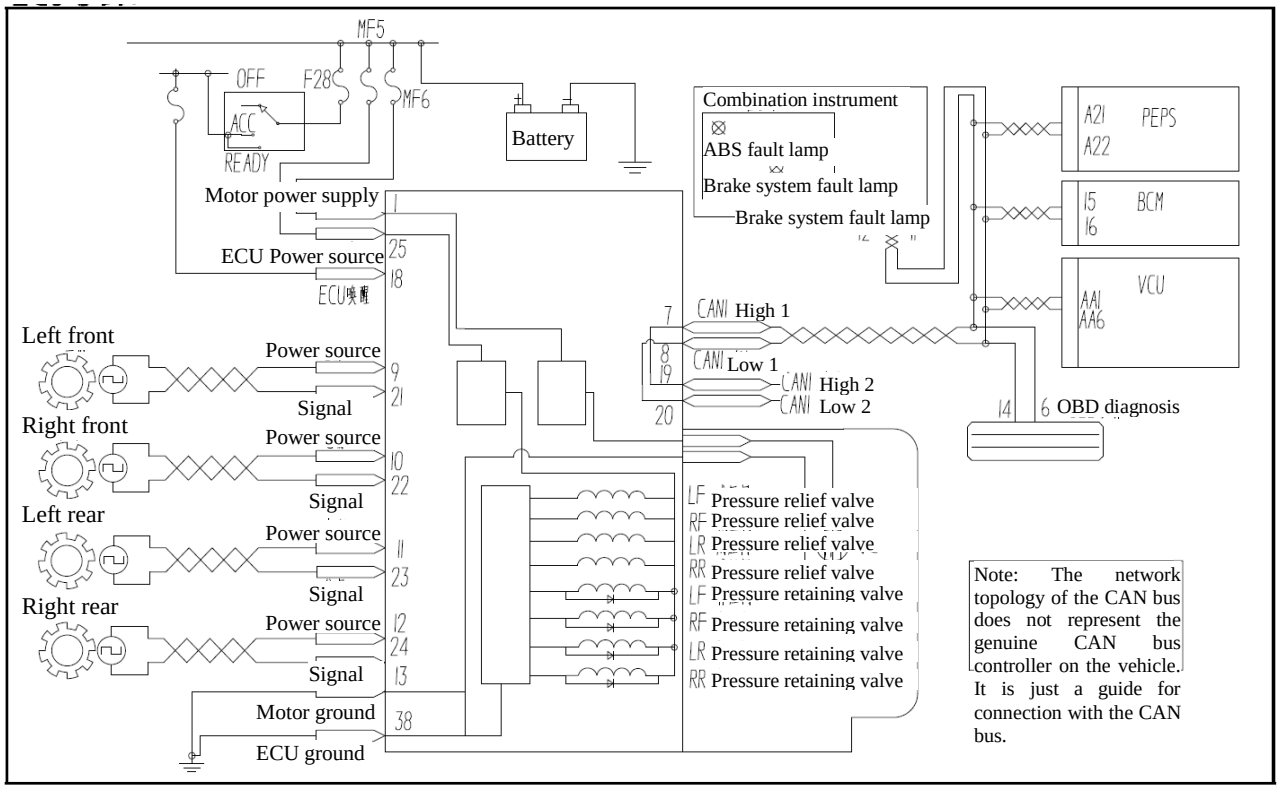
Switch is switched on. ABS will monitor the performance as long as it is energized and in a normal state. Once an error is detected, an alarm will be made immediately until the error disappears. But the error code will remain in the ABS memory until it is manually cleared.

III. Operating Principle

System block diagram

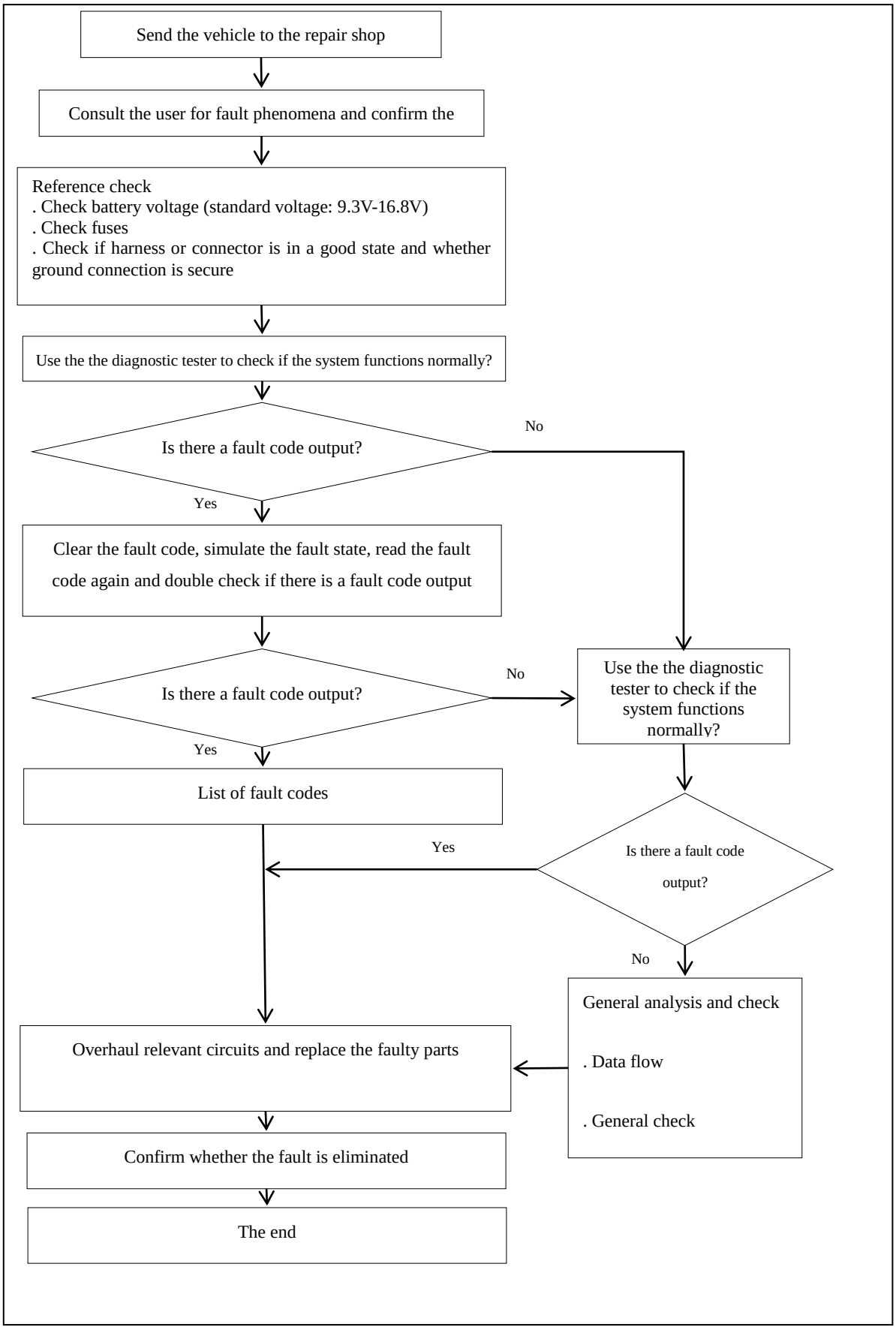


System schematic diagram



IV. General Check

1. Basic Procedures of Troubleshooting


Send the vehicle to the repair shop
Consult the user for fault phenomena and confirm the
Reference check
. Check battery voltage (standard voltage: 9.3V-16.8V)
. Check fuses
. Check if harness or connector is in a good state and whether ground connection is secure
Use the the diagnostic tester to check if the system functions normally?
Is there a fault code output?
No
Yes
Clear the fault code, simulate the fault state, read the fault code again and double check if there is a fault code output
Is there a fault code output?
No
Use the the diagnostic tester to check if the system functions normally?
Yes
List of fault codes
Yes
Is there a fault code output?
No
General analysis and check
. Data flow
. General check
Overhaul relevant circuits and replace the faulty parts
Confirm whether the fault is eliminated
The end

2. Preliminary Check:

When repairing the ABS system, please follow the steps below.

1. Check ABS control module and brake line

• Check ABS control module, brake line and connections for possible leakage.

• Check if the fixing bolts of the ABS control module and the ABS bracket are loose.

• Check for missing or damaged plastic gaskets of the ABS control module and ABS bracket.

2. Visually check appearance of the following electrical components

• Whether the harnesses and connectors of the components related to the ABS system are properly connected, pinched or cut.

• Whether harnesses are placed too close to high-voltage or high-current devices such as high-voltage electricity or components, generators and motors, and stereo amplifiers installed after sale.

Attention: High-voltage or high-current devices may cause circuits to produce inductive noises, and thus interfere with the normal operation of the circuits.

• ABS components are highly sensitive to electromagnetic interference (EMI). If an intermittent fault is suspected, check if the theft-deterrent device, lamp or mobile phone installed after sale is incorrectly installed.

3. Check Fuses

• Check if the power fuse MF6 (30A) of ABS ECU is blown and if blown, replace with a fuse of the same specification.

• Check if the wake-up fuse F28 (5A) of ABS ECU is blown and if blown, replace

with a fuse of the same specification.

• Check if the fuse MF5 (40A) of ABS pump motor is blown and if blown, replace with a fuse of the same specification.

4. Check ABS Ground Wire

• Check if the grounding point of the ABS ground wire is loose and the position of grounding is changed.

Note: ABS ground wire must have good sealing to prevent water and moisture from infiltrating into the ABS ECU connector through the hole in the harness under the effect of capillary (siphon) and thus cause function failure.

5. Check Working States of Harnesses Related to ABS System

(a). Check if the harnesses and connectors related to the ABS system are properly connected, pinched or cut.

(b). Check if the harnesses related to the ABS system are placed too close to high-voltage or high-current devices such as high-voltage electricity or components, generators and motors, and stereo amplifiers installed after sale.

(c). Check if the fuse MF6 of ABS pump motor is blown and if blown, replace with a fuse of the same specification.

Attention:

• High-voltage or high-current devices may cause circuits to produce inductive noises, and thus interfere with the normal operation of the circuits.

• ABS components are highly sensitive to electromagnetic interference. If an intermittent fault is suspected, check if the theft-deterrent device, lamp or mobile phone installed after sale is incorrectly installed.

6. Check ABS ECU Connector

Note: According to the operation stated in the test conditions, check the terminal voltage or resistance of the control unit from the rear of the harness connector to determine whether the line is working properly.

7. Read ABS Data Flow

By reading the "value analysis" on the fault diagnostic tester, you may check the working states of switches, sensors and actuators without removing any components. Observation and analysis of the data before fault diagnosis of the ABS system are the first step of troubleshooting, which can shorten the time of troubleshooting.

V. Fault Diagnosis

Table of Fault Phenomena

Tip: Using the table below will help you find the cause of the problem. Check parts one by one, and repair or replace when needed.

Phenomenon	Fault Cause	Measure Recommended
ABS control module is in the absence of diagnosis communication	1. Line fault	Refer to 3.3.3.8 Fault diagnosis – the diagnosis flow when ABS control module is in the absence of diagnosis communication.
	2. ABS control module fault	
	3. Diagnostic tester fault	
	4. Diagnostic tester communication fault	
ABS warning lamp is not lit	1. Line fault	Refer to 3.3.3.8 Fault diagnosis –the diagnosis flow when ABS warning lamp
	2. Combination instrument fault	
	3. ABS control module fault	

		is not lit.
ABS warning lamp is constantly lit	1. Line fault	Refer to 3.3.3.8 Fault diagnosis – the diagnosis flow when ABS warning lamp is constantly lit.
	2. Combination instrument fault	
	3. ABS control module fault	

Diagnosis flow when ABS control module is in the absence of communication:

No.	Check Item	Check Result	Subsequent Step
1	Check battery voltage of the ABS control module a. Set the Engine Start Stop Switch to "OFF". b. Disconnect harness connector of the ABS control module. c. Check the voltage between the terminal 25 (ECU power source) and the terminal 38 (ground) in the harness connector of the ABS control module. Voltage value: battery voltage	Yes	Overhaul the harness or replace the battery or replace DC/DC
		No	Turn to Step 2
2	Check control power source of Engine Start Stop Switch of ABS control module a. Set the Engine Start Stop Switch to "OFF". b. Disconnect harness connector of the ABS control module. c. Check the voltage between the terminal 18 (ECU wake-up) and the terminal 38 (ground) in the harness connector of the ABS control module. Voltage value: battery voltage	Yes	Overhaul the harness or Engine Start Stop system
		No	Turn to Step 3
3	Check CAN line a. Set the Engine Start Stop Switch to "OFF". b. Disconnect harness connector of the ABS control module. c. Check if the terminal 7 (CAN high) in the harness connector of ABS control module is conductive to the terminal 6 (body CAN high) of the OBD interface connector? c. Check if the terminal 8 (CAN low) in the harness connector of ABS control module is conductive to the terminal 14 (body CAN low) of the OBD interface connector?	Yes	Turn to Step 4
		No	Overhaul the harness
4	Replace the ABS control module a. Replace the ABS control module and connect all connectors of the control unit. b. Check if the fault is eliminated.	Yes	Exhaust the ABS oil circuit
		No	Find out the cause from other fault phenomena

Diagnosis flow when the ABS warning alarm is not lit:

Step	Check Item	Check Result	Subsequent Step
1	Check fault code a. Connect the diagnostic tester and check if there is any fault code related to the ABS system.	Yes	Refer to fault code diagnosis
		No	Turn to Step 2
2	Check ABS warning lamp a. Set the Engine Start Stop Switch to "OFF". b. Connect the diagnostic tester.	Yes	Turn to Step 3
		No	Replace the combination instrument

	c. Set the Engine Start Stop Switch to “ON”and observe whether ABS warning lamp on the combination instrument is lit up after ABS self-check.		
3	Check power circuit of ABS control module a. Set the Engine Start Stop Switch to “OFF”. b. Disconnect harness connector of the ABS control module. c. Check if voltages of the terminal 1 (power source of pump motor), the terminal 18 (ECU wake-up) and the terminal 25 (ECU power source) in the harness connector of the ABS control module with the ground terminal 13 (pump motor ground) and the terminal 38 (ECU ground) are normal? Voltage value: battery voltage	Yes	Turn to Step 4
		No	Overhaul the line

Step	Check Item	Check Result	Subsequent Step
4	Check ground circuit of ABS control module a. Set the Engine Start Stop Switch to “OFF”. b. Disconnect harness connector of the ABS control module. c. Check if the ground terminal 13 (pump motor ground) and the terminal 38 (ECU ground) in the harness connector of the ABS control module are conductive to the ground bolt.	Yes	Turn to Step 5
		No	Overhaul the line
5	Check CAN communication line a. Set the Engine Start Stop Switch to “OFF” and disconnect harness connector of ABS control module. b. Check the resistance between the terminal 7 (CAN high) and the terminal 8 (CAN low) in the harness connector of the ABS control module. Resistance: 55Ω~63Ω	Yes	Turn to Step 6
		No	Overhaul the line
6	Check the circuit between combination instrument and ABS control module a. Set the Engine Start Stop Switch to “OFF” and disconnect connectors of all the control units. b. Connect connector of the combination instrument and check the resistance between the terminal 7 (CAN high) and the terminal 8 (CAN low) in the harness connector of the ABS control module. Resistance: 110Ω~125Ω	Yes	Turn to Step 7
		No	Overhaul the line
7	Replace the ABS control module a. Replace the ABS control module and check if the system is normal	Yes	Exhaust the ABS oil circuit
		No	Find out the cause from other fault phenomena

Diagnosis flow when ABS warning lamp is constantly lit

Step	Check Item	Check Result	Subsequent Step
1	Check fault code a. Connect the diagnostic tester and check if there is any fault code related to the ABS system.	Yes	Refer to fault code diagnosis
		No	Turn to Step 2
2	Check the CAN communication line a. Set the Engine Start Stop Switch to “OFF” and disconnect the ABS controller harness connector.	Yes	Turn to Step 3
		No	Overhaul the line

	b. Check the resistance between the terminal 7 (CAN high) and the terminal 8 (CAN low) in the harness connector of the ABS control module. Resistance: 55Ω~63Ω		
3	Check the circuit between combination instrument and ABS control module a. Set the Engine Start Stop Switch to “OFF” and disconnect connectors of all the control units. b. Connect connector of the combination instrument and check the resistance between the terminal 7 (CAN high) and the terminal 8 (CAN low) in the harness connector of the ABS control module. Resistance: 110Ω~125Ω	Yes	Turn to Step 4
		No	Overhaul the line

Step	Check Item	Check Result	Subsequent Step
4	Check A power circuit of the BS control module a. Set the Engine Start Stop Switch to “OFF”. b. Disconnect harness connector of the ABS control module. c. Check if voltages of the terminal 1 (power source of pump motor), the terminal 18 (ECU wake-up) and the terminal 25 (ECU power source) in the harness connector of the ABS control module with the ground terminal 13 (pump motor ground) and the terminal 38 (ECU ground) are normal? Standard value: battery voltage	Yes	Turn to Step 5
		No	Overhaul the line
5	Check ground circuit of the ABS control module a. Set the Engine Start Stop Switch to “OFF”. b. Disconnect harness connector of the ABS control module. c. Check if the terminal 13 (pump motor ground) and the terminal 38 (ECU ground) in the harness connector of the ABS control module are conductive to the ground bolt.	Yes	Turn to Step 6
		No	Overhaul the line
6	Replace the combination instrument a. Replace the combination instrument and check if the system is back to normal?	Yes	The end of check
		No	Find out the cause from other fault phenomena

VI. Instructions for Repair

Replacement of ABS Actuator Assembly

Disassembly

1. Disconnect the battery negative cable with reference to the procedures to disconnect and connect the battery cables.

2. Remove the battery.

3. Remove the ABS brake rigid tube

(a). Remove the union nuts of the six brake hoses from the brake regulator and immediately wipe off the brake fluid spilled.

Attention: Refer to "Important Notices regarding Effect of Brake Fluid on Paint and Brake Parts" in "Warnings and Notices".

(b). Use a label or take a record to identify the position for reconnection.

4. Lift up the vehicle.

5. Remove the ABS assembly.

(a). Disconnect connector of ABS control unit.

(b). Remove fixing bolts and nuts of ABS assembly.

(c). Take out the ABS assembly.

Installation

Installation is carried out in the order reverse to that of disassembly.

Attention:

It is necessary to exhaust the brake system after its installation.

Replacement and disassembly of front wheel speed sensor and harness assembly

1. Remove the battery negative cable and disconnect the front wheel speed sensor connector in the engine compartment.

2. Lift up the vehicle.

3. Remove the front wheel with reference to Replacement of Wheels.

4. Remove the front wheel speed sensor.

(a). Remove the harness buckle of the front wheel speed sensor.

(b). Remove the fixing bolts of the front wheel speed sensor.

(c). Pull out the front wheel speed sensor.

Installation

Installation is carried out in the order reverse to that of disassembly.

Replacement of rear wheel speed sensor and harness assembly

Disassembly

1. Remove the rear wheel speed sensor.

(a). Disconnect the rear wheel speed sensor connector.

(b). Remove the harness buckle of the rear wheel speed sensor.

(c). Remove the fixing bolts of the rear wheel speed sensor.

(c). Pull out the rear wheel speed sensor.

Installation

Installation is carried out in the order reverse to that of disassembly.

Replacement of wheel gear ring

Disassembly

1. Remove the rear wheel bearing.

2. Remove the gear ring of the rear wheel speed sensor.

Installation

1. Install the new gear ring of the wheel speed sensor with a proper hydraulic machine.

Attention:

• Make sure that the gear ring is not knocked, damaged, and attached with metal chips in the process of operation.

• Place a protective plate containing no iron material on the gear ring to avoid damage.

• Make sure the brake drum is fully supported and is not allowed to get stuck on the wheel bolts.

• Exert force slowly and evenly in the process of installation until the gear ring is fully seated.

2. Install the rear wheel bearing. Reference: Installation Methods for Rear Wheel Bearing.

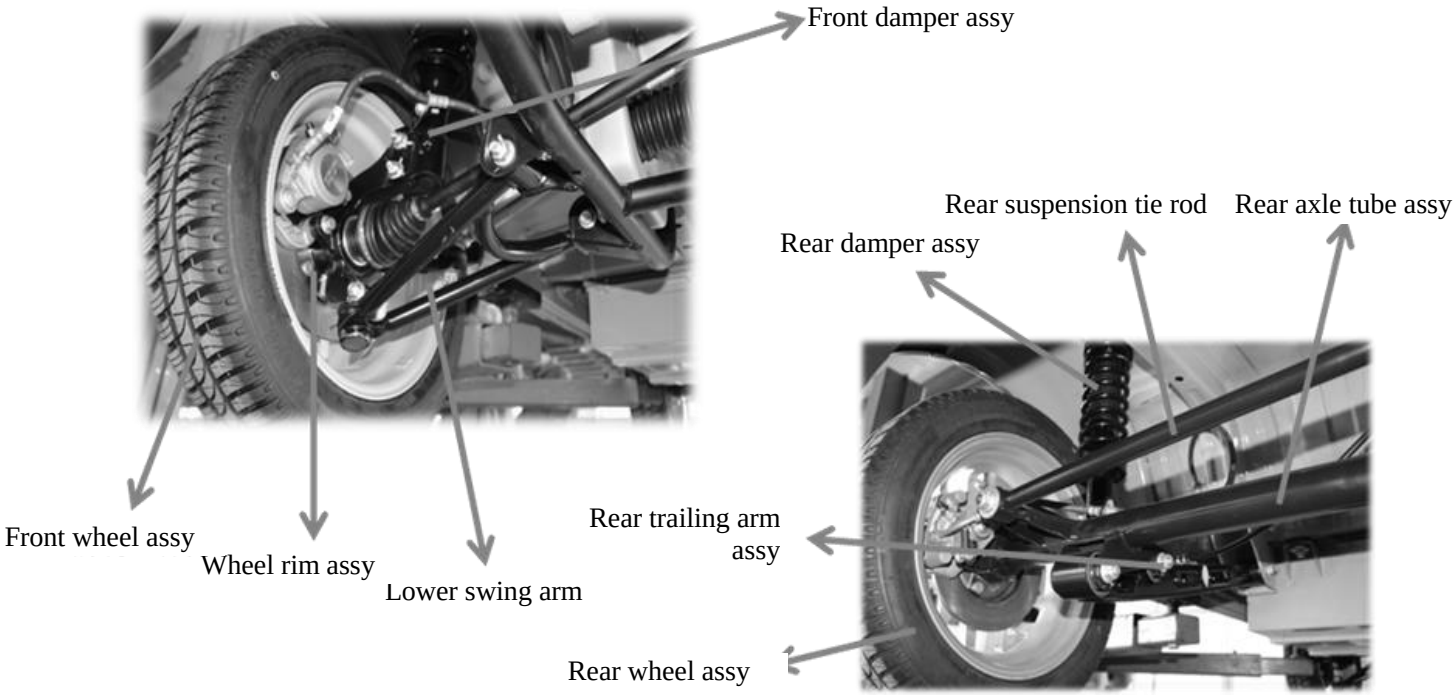
Replacement of front wheel gear ring

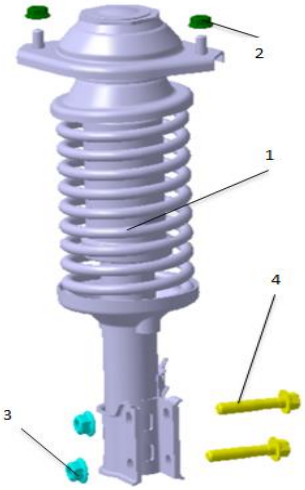
Refer to the replacement of the rear wheel gear ring

Section 4 Suspension System

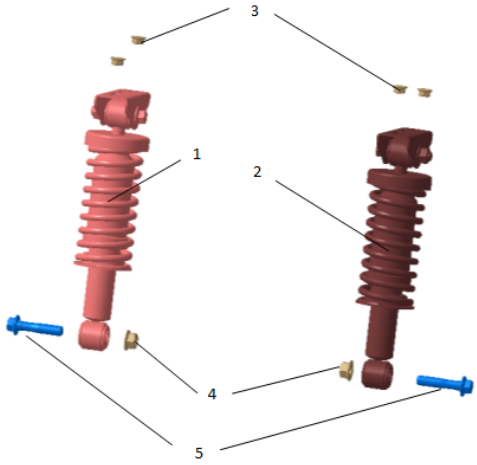
I. Product Overview

Suspension system of Zhidou electric vehicle

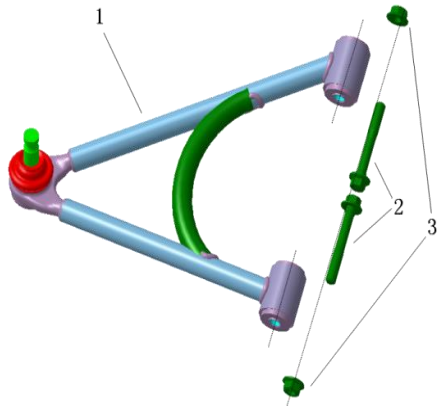




No.	Part No.	Part name	Qty.	Unit
1	W11-2905100-00	Left front shock absorber with spiral spring assy	1	Piece
2	DIN 6927-M8-8	Metallic locking hexagon flange nut	2	Piece
3	DIN 6927-M10-10	Metallic locking hexagon flange nut	2	Piece
4	DIN 6921-M10X50-10.9	Hexagon head bolt with flange strength shank and half thread	2	Piece



No.	Part No.	Part name	Qty.	Unit
1	W11-2915100-121	Left rear shock absorber with spiral spring assy	1	Piece
2	W11-2915200-121	Right rear shock absorber with spiral spring assy	1	Piece
3	DIN 6927-M10-8	Metallic locking hexagon flange nut	4	Piece
4	DIN 6927-M14-10	Metallic locking hexagon flange nut	2	Piece
5	DIN 6921-M14X65-10.9	Hexagon head bolt with flange strength shank and half thread	2	Piece



No.	Part No.	Part name	Qty.	Unit
1	W11-2901300-00	Left front lower swing arm assy	1	Piece
2	DIN 6921-M10X70-10.9	Hexagon head bolt with flange strength shank and half thread	2	Piece
3	DIN 6927-M10-10	Metallic locking hexagon flange nut	2	Piece
4	DIN 6921-M10×45-10.9	Hexagon head bolt with flange strength shank and half thread	2	Piece
5	DIN 6927-M10-10	Metallic locking hexagon flange nut	2	Piece

II. Suspension System Dismantling and Installation Steps:

① Front damper dismantling steps:

1. Loosen the wheel nuts successively as per the diagonal direction. (Model XQ306A12-M12-8)

◎tightening torque: 90±10N•m

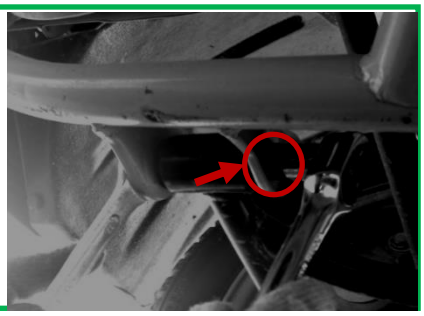
2. Dismantle the wheel nuts and take down the tire. Dismantle the hub nuts. (model: XQ330A18-M18×1.5-8)

◎tightening torque: 180±10N•m

3. Dismantle the connecting bolts of the lower swing arm with the auxiliary frame (2*M10X70-10.9);

Separate the lower swing arm from the auxiliary frame;

◎tightening torque: 70±5N•m

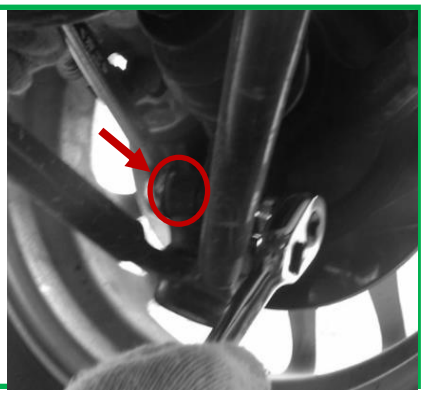


4. Dismantle the fastening bolt of the lower swing arm ball head with the steering knuckle (1*M10×45-10.9).

If it is difficult to separate the lower swing arm ball head from the steering knuckle, knock out the lower swing arm ball head from the steering knuckle with a wooden hammer;

Separate the lower swing arm from the auxiliary frame;

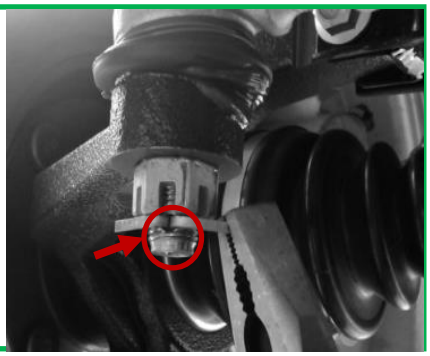
◎tightening torque: 70±5N•m



5. Dismantle the circlip for hole “DIN 472-60X2”;

Dismantle the fixing nuts of the steering gear ball head with the steering knuckle.

◎tightening torque: 55±5N•m

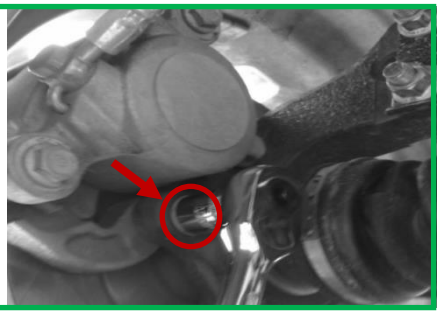


Note: if it is difficult to separate the steering tie rod ball from the steering knuckle, the nut shall be reversely screwed onto the ball stud; then knock out the steering tie rod

ball from the steering knuckle with a wooden hammer to avoid damaging the threads of the tie rod ball stud and leading to installation difficulty.

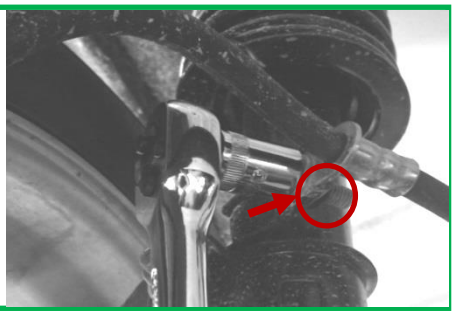
6. Dismantle the fixing screws of the wheel cylinder with the steering knuckle (2*M10X30-10.9);

Separate the wheel cylinder from the steering knuckle;



7. Separate the brake hose from the front damper assy;

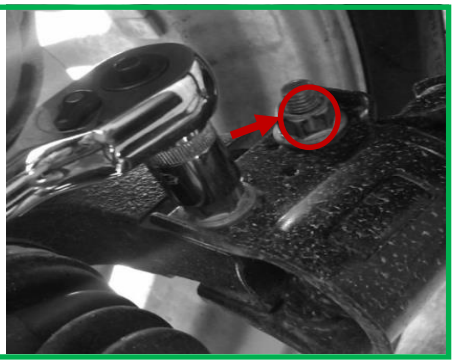
Fix the wheel cylinder onto the auxiliary frame with iron wires to prevent the wheel cylinder from falling.



8. Pull out the steering knuckle and front damper assy slightly outside to separate the drive shaft from the hub bearing.

9. Dismantle the connecting screws of the steering knuckle with the front damper assy; (2* M10X50-10.9)

◎tightening torque: 70±5N•m

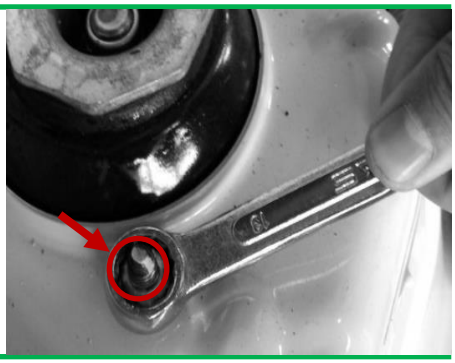


10. Separate the wheel rim assy from the front damper assy and take down the wheel rim assy;

11. Lower the vehicle to the height suitable for dismantling.

12. Take down the front compartment cover and dismantle the locking nuts of the front damper with the body (2*M8-8).

◎tightening torque: 23±2N•m



13. Take out the front damper assy.

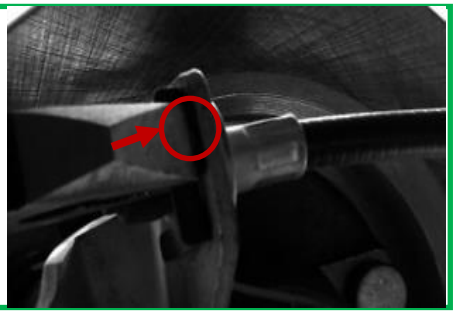
② Rear damper dismantling steps:

1. Loosen the wheel fixing nuts successively as per the diagonal direction.

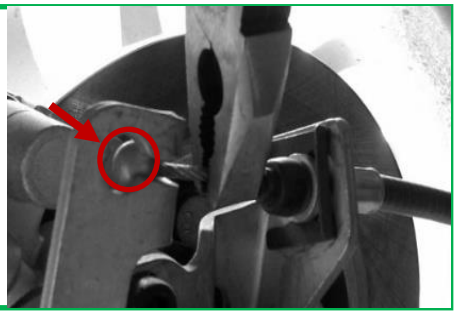
(Model XQ306A12-M12-8)

2. Lift the vehicle to the height suitable for dismantling; dismantle the wheel nuts and take down the tire.

3. Release the hand brake, dismantle the hand brake cable, and take out the tail end ball of the hand brake cable from the brake caliper.

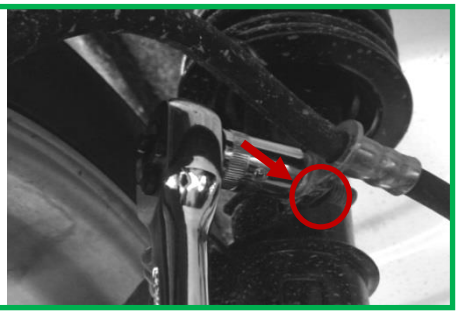


4. Dismantle the U-shaped circlip of the hand brake and separate the tail end ball head of the hand brake cable from the brake caliper.

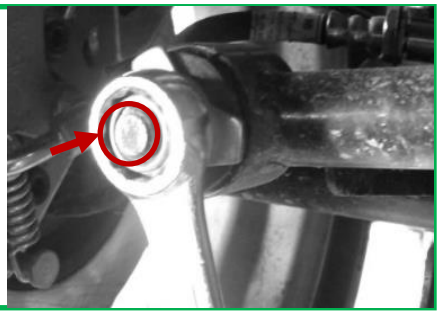


5. Dismantle the fixing screws of the wheel cylinder with the rear axle tube (4*M10X20-10.9);
Separate the wheel cylinder from the rear axle tube;
◎tightening torque: 70±5N•m

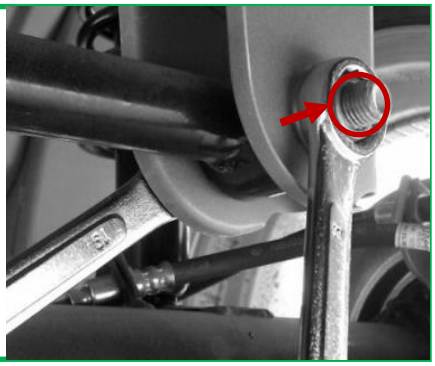
6. Separate the brake hose from the rear damper fixing bracket; Fix the wheel cylinder onto the body with iron wires to prevent the wheel cylinder from falling.



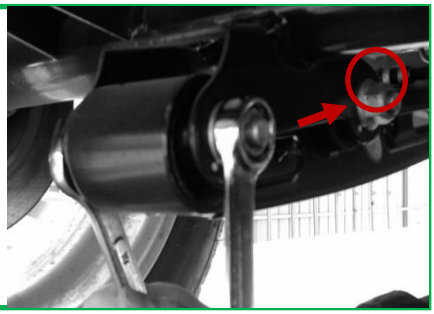
7. Dismantle the connecting locking nut of the rear suspension tie rod with the rear axle tube. (model: 1* M12-8)
◎tightening torque: 80±5N•m



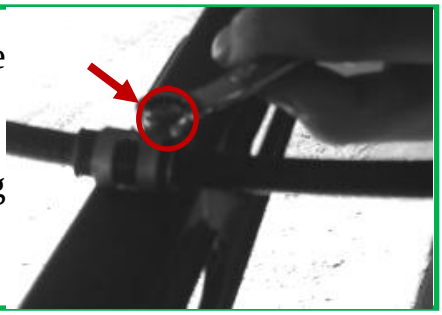
8. Dismantle the connecting screws and nuts of the rear suspension tie rod with the body.
(bolt model: DIN 6921-M12X60-10.9, nut model: DIN 6927-M12-10)Take down the rear suspension tie rod.
◎tightening torque: 80±5N•m



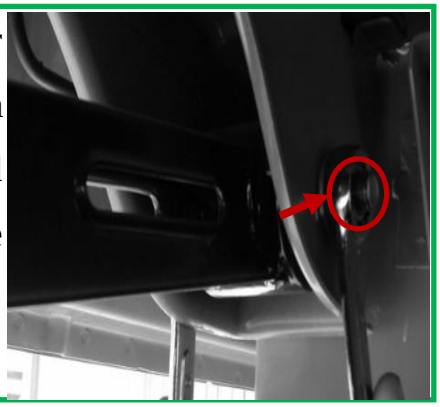
9. Dismantle the connecting screws of the rear trailing arm with the rear axle tube (4*M12X90-10.9);
Separate the rear trailing arm from the rear axle tube;
◎tightening torque: 80±5N•m



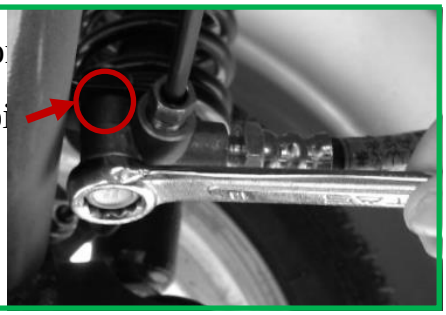
10. Dismantle the fixing bolts of the hand brake cable on the rear trailing arm;
Separate the hand brake cable from the rear trailing arm;



11. Dismantle the connecting bolts and nuts of the rear trailing arm with the body (hexagon head bolt with flange strength shank and half thread M12×1.5×90-10.9; metallic locking hexagon flange nuts DIN6927-M12×1.5-10)
◎tightening torque: 80±5N•m



12. Dismantle the fixing bolts of the oil distributio valve on the rear axle tube; Disconnect the oi distribution valve from the rear axle tube.

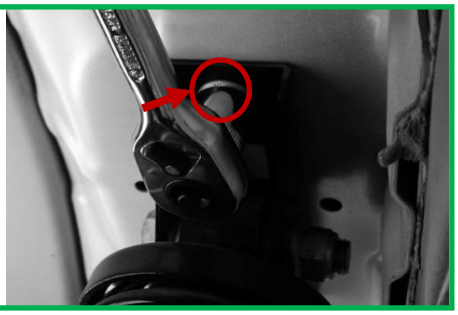


13. Dismantle the connecting screws of the rear damper assy with the rear axle tube (2*M14X65-10.9); Take down the rear axle tube and rear hub assy.
◎tightening torque: 90±10N•m

14. Dismantle the connecting nuts of the rear damper assy with the body (4*M10-10);

Separate the rear damper assy from the body;

Take down the rear damper assy. ◎ tightening torque: 70±5N•m



The installation steps are contrary to the dismantling steps. See the following table for the connection modes and torque requirements as well as common faults and troubleshooting methods of the main fasteners of the suspension system:

Connection contents	Connection mode	Torque requirement
Wheel conical nut	4 wheel conical nuts XQ306A12-M12X1.25-8.8	90±10 N•m
Connecting fixing bolts of the wheel rim with the front damper	2 hexagon head bolts with flange strength shank and half thread DIN6921-M10X50-10.9/ metallic locking hexagon flange nuts DIN6927-M10-10	70±5N•m
Connecting bolts and nuts of the motor and reducer assy with the body	4 hexagon head bolts with flange strength shank and half thread DIN6921-M10X1.25X20-8.8 and 2 metallic locking hexagon flange nuts DIN6927-M10	45±5N•m
Connecting fixing bolts of the wheel rim with the lower swing arm	2 hexagon head bolts with flange strength shank and half thread DIN6921-M10X1.25X45/50-10.9 and metallic locking hexagon flange nuts DIN6927-M10X1.25-10.	70±5N•m
Connecting bolts of the front lower swing arm with the auxiliary frame	4 hexagon head bolts with flange strength shank and half thread DIN6921-M10X1.25X70-10.9 and 4 metallic locking hexagon flange nuts DIN6927-M10X1.25-10	70±5N•m

III. Common faults of the traveling system and troubleshooting methods

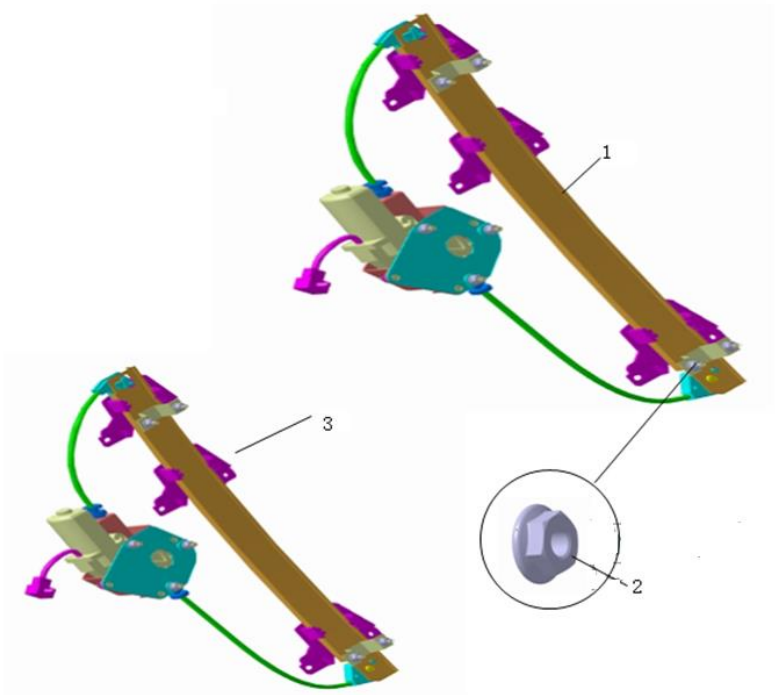
System	Common fault	Possible cause	Troubleshooting method
Traveling system	Driving deviation	1. Inconsistent pressure of the two front tires	Supplement
		2. Too large or too small toe-in	Adjust
		3. Inconsistent tightening degree of the left and right hub bearings of the front wheel	Adjust
		4. Braking drag of a single wheel	Adjust or replace
		5. Loosening of the front suspension	Replace
	Abnormal wear of tire	1. Abnormal tire pressure or long-term non-rotation of tires	Supplement and replace
		2. Incorrect toe-in and outer dip angle	Adjust
		3. Hub bearing loosening	Replace
		4. Rear axle tube deformation	Replace
		5. Hub deformation	Replace
		6. Different braking force of rear wheels	Adjust
		7. Suddenly depress the accelerator pedal or the brake pedal frequently.	Change operation.

Chapter IV Interiors and Accessories

Section 1 Power Window Assy

I. Overview of the power window assy

The power window switch refers to a device which raises or lowers the vehicle window along the window guide groove in a certain driving mode and can stop the window at any position.

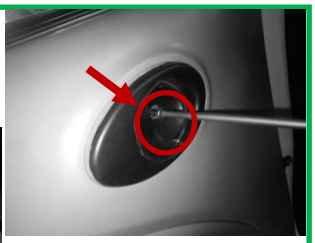


No.	Part No.	Part name	Qty.	Unit
Assy	W11-6104010-00	Side door power window assy	1	Set
1	W11-6104100-00	Left side door power window assy	1	Piece
2	DIN 6927-M6-8	Metallic locking hexagon flange nut	14	Piece
3	W11-6104200-00	Right side door power window assy	1	Piece

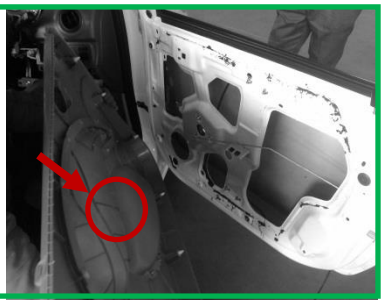
II. Power window assy dismantling steps:

1. Dismantle the door shield triangle body.

2. Dismantle the door inside handle and the door shield handle box.

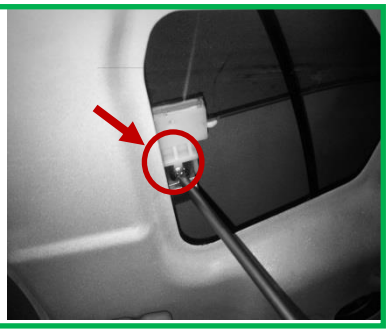


3. Dismantle the door body assy.



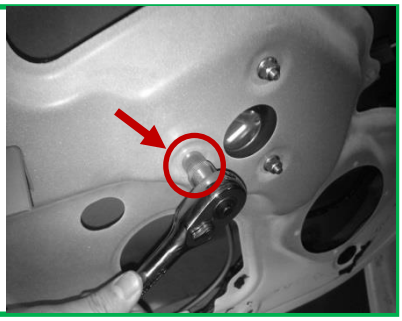
4. Dismantle the door waterproof membrane.

5. Dismantle the fixing bolts of the door window and take down the door window.



6. Unplug the power plug of the power window switch.

7. Dismantle the fixing bolts of the power window assy and take down the power window switch.



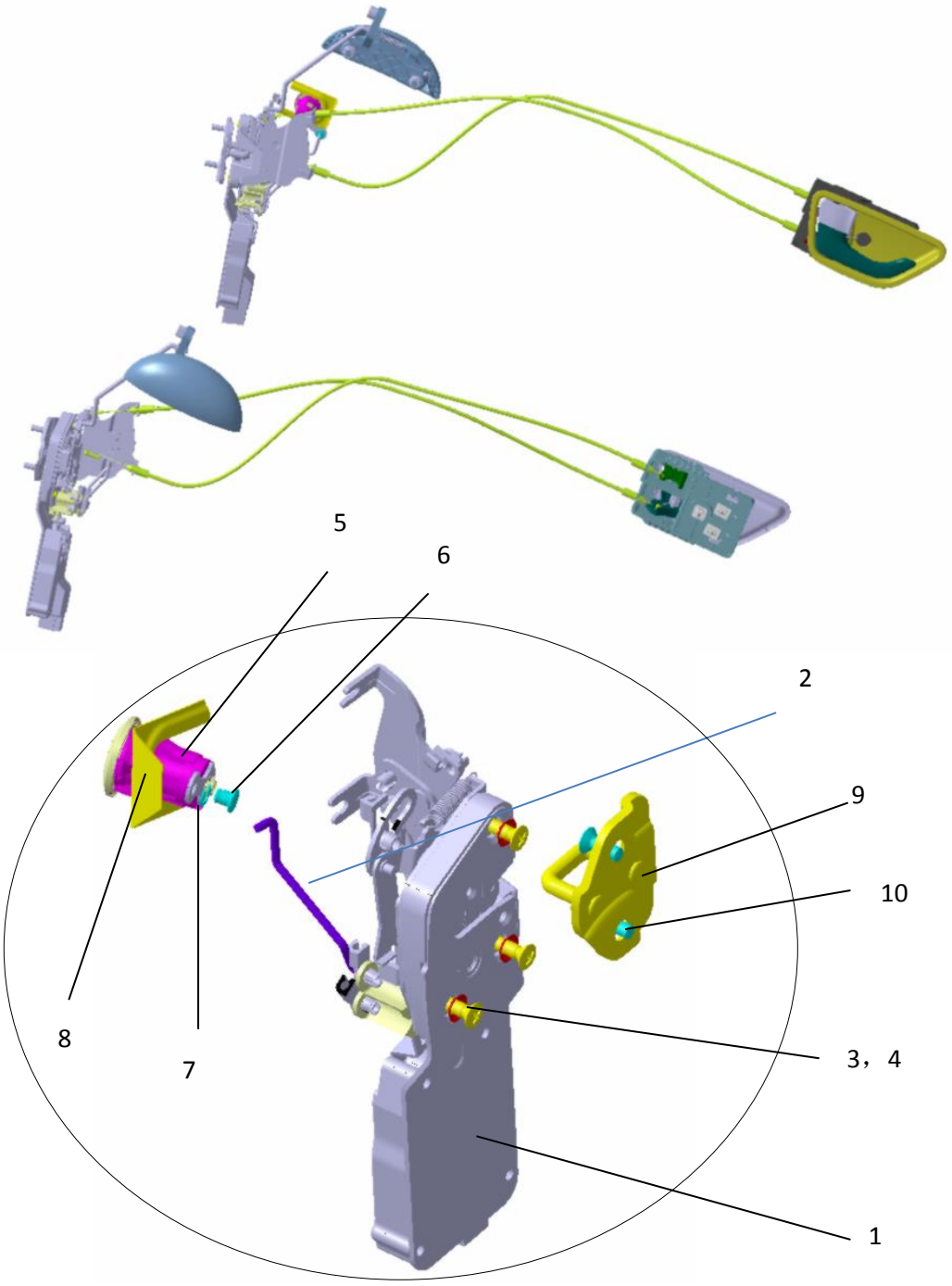
III. Faults the power window assy and troubleshooting methods

Fault symptom	Possible cause	Troubleshooting method
Power window switch working failure	The fuse is broken.	Replace
	Harness fault	Repair, replace
	Power window switch damage	Replace
Poor working of the power window switch	Looseness of connectors	Repair, replace
	Poor harness grounding	Repair, replace
	Power window switch damage	Repair, replace
	Loosening of power window switch fixing bolts	Repair, replace
Reversal of power window lifting/lowering directions	Wrong position of the contact pin of the harness connector.	Check, replace
	Power window switch fault	Check, replace

Section 2 Door Lock Body Assy

I. Door lock body assy overview

The interior central locking system is a switch beside the driver seat and a control device which can control closing and opening of all doors of the vehicle.



No.	Part No.	Part name	Qty.	Unit
Assy	A31-6105010-00A0	Side door lock and handle assy	1	Set
Assy	W41-6105100-00	Left door lock body assy	1	Set
1	W41-6105110-00	Left door lock body sub-assy	1	Piece
2	W11-6105017-01	Left door lock cylinder lever	1	Piece
3	DIN 966-M6×16-8.8-H	Cross recessed raised countersunk head screw	3	Piece
4	Q41406	Conical serrated lock washer	3	Piece
5	W11-6105700-00	Left door lock cylinder assy	1	Piece
6	W11-6105702-00	Left door lock cylinder pin	1	Piece
7	W11-6105703-00	Left door lock cylinder snap spring leaf	1	Piece
8	W11-6105701-00	Spring leaf	1	Piece
9	W11-6105800-01	Side door lock buckle assy	1	Piece
10	DIN 965-M8×20-8.8-H	Cross recessed countersunk head screw	2	Piece

II. Door lock cylinder dismantling steps:

1. Dismantle the door trim board and waterproof film. For the detailed steps, see the door lock body dismantling steps.

2. Dismantle the lock cylinder lever buckle and take out the lever.

3. Dismantle the lock cylinder snap spring leaf.

4. Take out the lock cylinder from the door lock cylinder hole.

5. The installation process is the contrary of the dismantling process.

III. Faults of the door lock body and troubleshooting methods

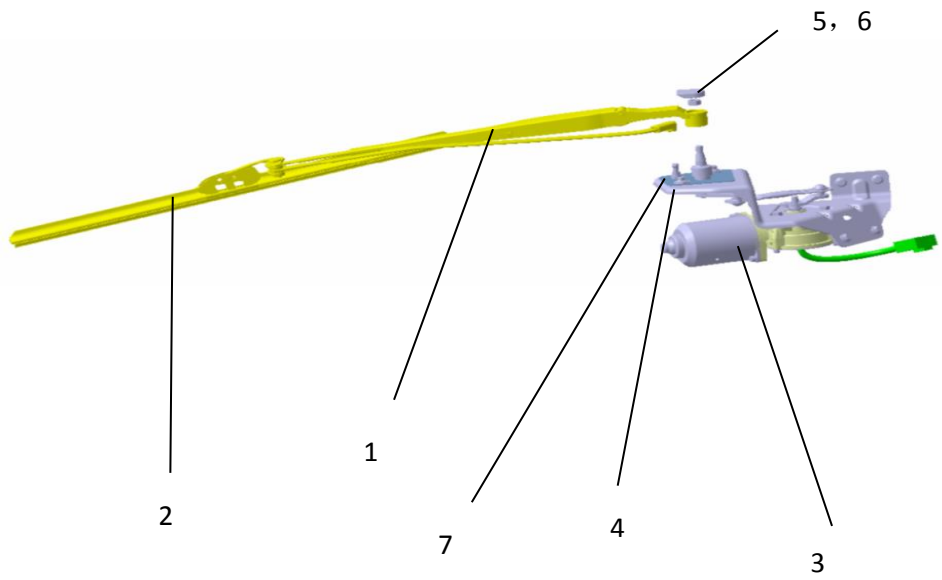
Fault symptom	Possible cause	Troubleshooting method
Working failure of the door lock body assy	Falling of the relevant lever	Repair, replace
	Door lock body damage	Repair, replace
	Damage of the control module of the central locking system	Repair, replace
	Poor harness grounding	Repair, replace
	fuse blow	Check, replace
	Working failure of the remote key	Check, replace

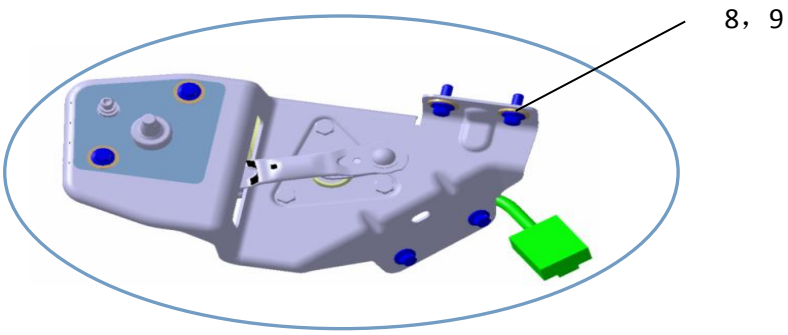
Section 3 Windshield Wiper Motor with Bracket Assy

I. Overview of the windshield wiper motor with bracket assy

The rotation motion of the windshield motor is converted into the reciprocating motion of the wiper arm via the link mechanism, thus achieving the action of the windshield wiper. In general, when the motor is turned on, the windshield wiper can work. By choosing high and low speed gears, the current of the motor can be changed, thereby controlling the motor speed and then the speed of the wiper arm.

There is a small gear transmission enclosed in the same shell at the rear end of the windshield wiper motor to reduce the output speed to the needed speed. This device is commonly known as wiper driving assy. The output shaft of the assy connects the mechanical device at the terminal of the wiper, and achieves the reciprocating swinging of the wiper via fork driving and spring resetting.

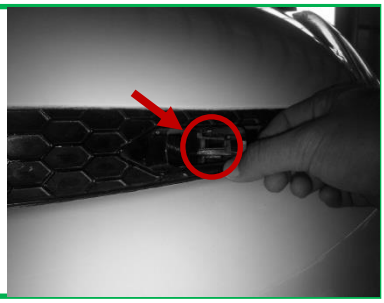




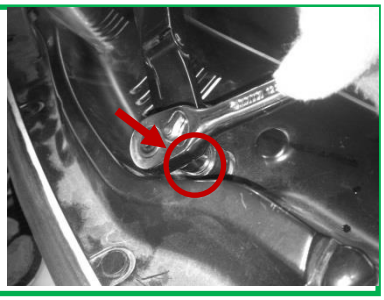
No.	Part No.	Part name	Qty.	Unit
Assy	A31-5205010-00A0	Windshield wiper assy	1	Set
Assy	A31-5205100-00A0	Wiper blade and arm assy	1	Set
1	A31-5205110-00A0	Wiper arm sub-assy	1	Piece
2	A31-5205120-00A0	Wiper blade sub-assy	1	Piece
Assy	A31-5205200-00A0	Windshield wiper motor with four-link mechanism assy	1	Set
3	A31-5205210-00A0	Windshield wiper motor	1	Piece
4	A31-5205220-00A0	Four-link mechanism	1	Piece
5	A31-5205011-00A0	Wiper arm mounting nut	1	Piece
6	A31-5205012-00A0	Screw fastener cap	1	Piece
7	A31-5205015-00A0	Windshield wiper motor gasket	1	Piece
8	DIN 6921-M6X16-8.8	Hexagon head bolt with flange strength shank and half thread	6	Piece
9	DIN 9021-6.4-140HV	Big washer	4	Piece

II. Dismantling steps for the windshield wiper motor with bracket assy:

1. Open the compartment cover plate.



2. Dismantle the wiper arm with wiper blade assy.



3. Dismantle the trim board of the fender.

4. Dismantle the front wall vent cover plate.

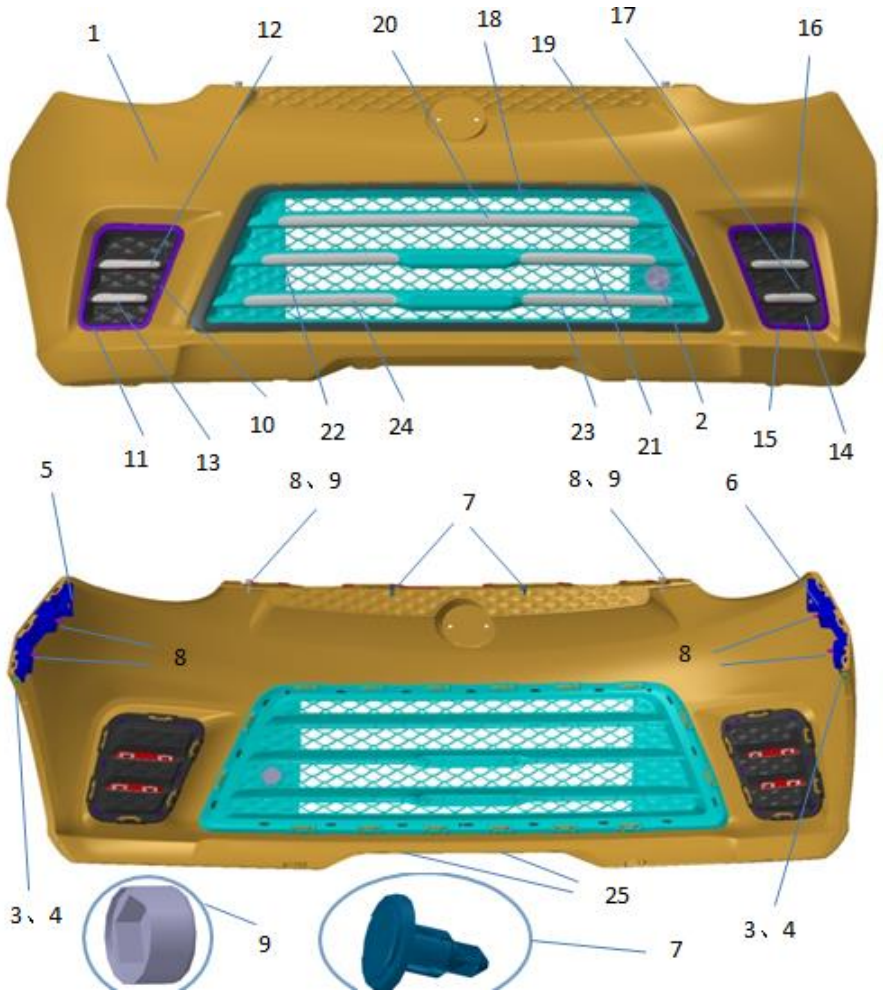
5. Dismantle the windshield wiper motor with bracket assy.

III. Faults the windshield wiper motor with bracket assy and troubleshooting methods

Fault symptom	Possible cause	Troubleshooting method
Working failure of the windshield wiper motor	Windshield wiper motor damage	Replace
	fuse blow	Check, replace
	Idling of the linkage sliding wire	Repair, replace
	Relay burnout	Repair, replace
	Harness problem	Repair, replace

Section 4 Front Bumper Assy

I. Overview

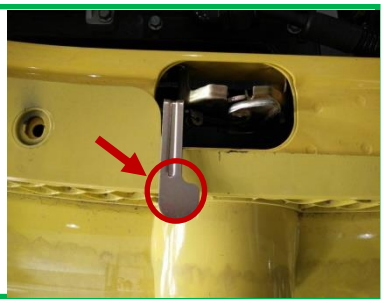


No.	Part No.	Part name	Qty.	Unit
Assy	A31-2803010-00A0	Front bumper	1	Set
Assy	A31-2803100-00A0	Front bumper assy	1	Set
1	A31-2803101-00A0	Front bumper body	1	Piece
2	A31-2803105-00A0	Tow hook cover	1	Piece
3	DIN 7981-ST4.8X13-C-H	Cross recessed pan head self-tapping screw	2	Piece
4	DIN 9021-5.3-140HV	Big flat washer	2	Piece
5	A31-2803107-00A0	Front bumper left mounting bracket	1	Piece
6	A31-2803108-00A0	Front bumper right mounting bracket	1	Piece
7	W11-5512303-00A0	Snap fastener	2	Piece

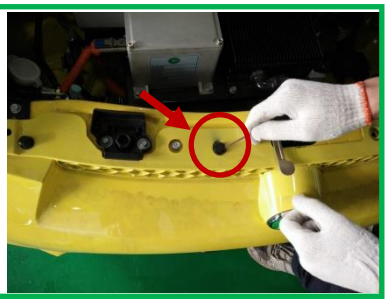
8	DIN 6921-M6X16-8.8	Hexagon head bolt with flange strength shank and half thread	6	Piece
9	W11-2803109-00	Screw fastener cap	2	Piece
Assy	A31-2803200-00A0	Front bumper right grille assy	1	Piece
10	A31-2803202-00A0	Front bumper right grille body	1	Piece
11	A31-2803204-00A0	Front bumper right grille bright trim ring	1	Piece
12	A31-2803206-00A0	Front bumper right grille bright strip I	1	Piece
13	A31-2803208-00A0	Front bumper right grille bright strip II	1	Piece
Assy	A31-2803300-00A0	Front bumper left grille assy	1	Piece
14	A31-2803201-00A0	Front bumper left grille body	1	Piece
15	A31-2803203-00A0	Front bumper left grille bright trim ring	1	Piece
16	A31-2803205-00A0	Front bumper left grille bright strip I	1	Piece
17	A31-2803207-00A0	Front bumper left grille bright strip II	1	Piece
Assy	A31-2803400-00A0	Front bumper middle grille assy	1	Piece
18	A31-2803401-00A0	Front bumper middle grille body	1	Piece
19	A31-2803403-00A0	Front bumper middle grille bright trim ring	1	Piece
Assy	A31-2803400-00B0	Front bumper middle grille assy	1	Piece
20	A31-2803405-00B0	Front bumper middle grille bright strip I	1	Piece
21	A31-2803407-00B0	Front bumper middle grille bright strip II	1	Piece
22	A31-2803408-00B0	Front bumper middle grille bright strip III	1	Piece
23	A31-2803409-00B0	Front bumper middle grille bright strip IV	1	Piece
24	A31-2803410-00B0	Front bumper middle grille bright strip V	1	Piece
25	W11-8200616-00	Cross recessed pan head expansion buckle	2	Piece

II. Dismantling and installation steps

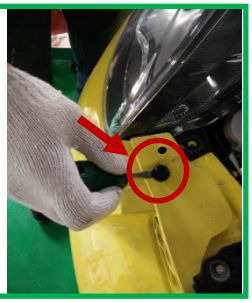
1. After unlocking, dismantle the front compartment cover.



2. Dismantle the front bumper fixing bolts (1 left and 1 right).



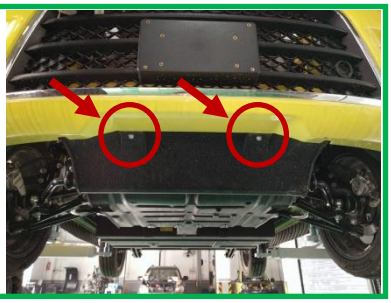
3. Dismantle the fixing buckles (totally 2 pieces).



4. Dismantle the bumper fixing tapping screws (1 left and 1 right).

5. Dismantle the cross recessed pan head screws (1 left and 1 right) of the front fender with the front bumper.

6. Dismantle the fixing screws (totally 2 pieces) of the front compartment bottom fender with the bumper.



7. Dismantle the dual-clamp spring leaves for fixing the front bumper with the fender.

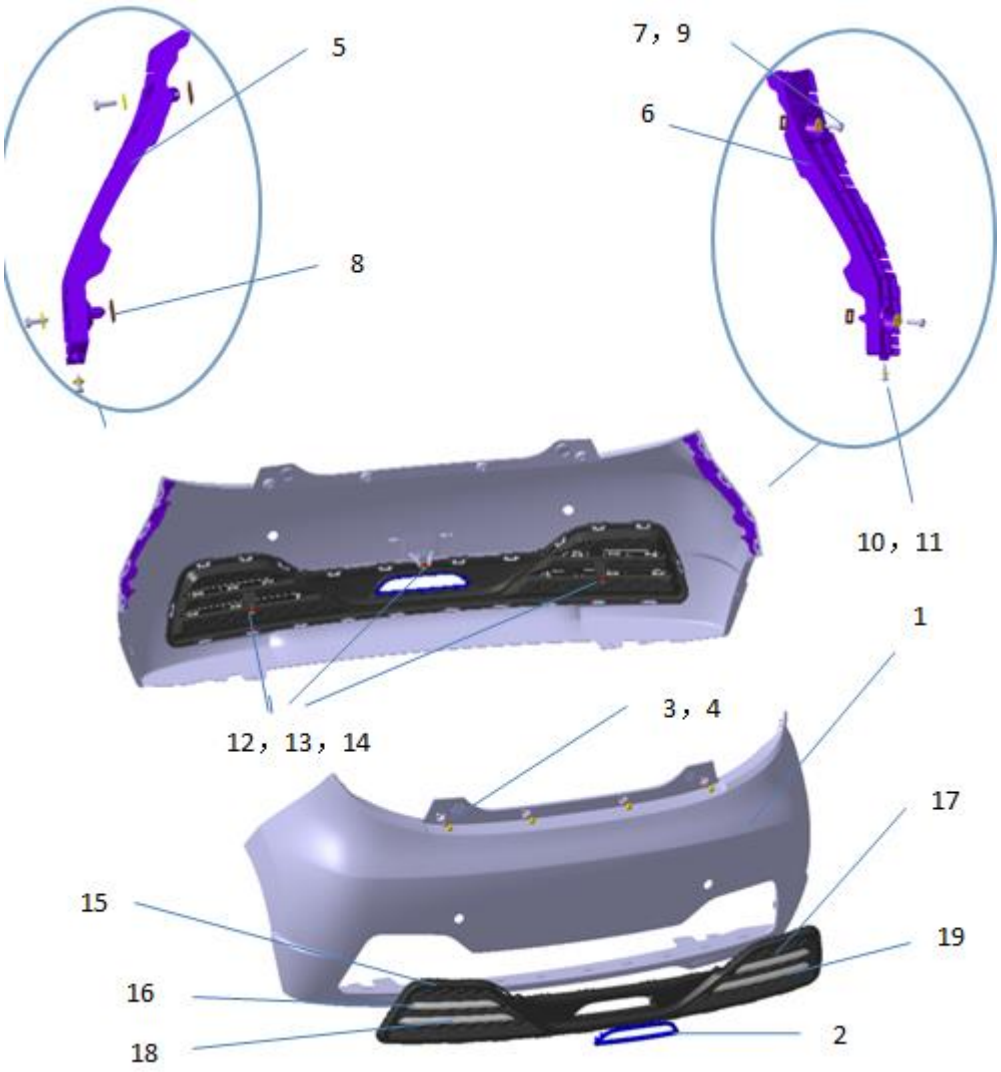
8. Remove the bumper from the mounting bracket.

9. Take out the bumper from the mounting bracket.

10. The installation process is the contrary of the dismantling process.

Section 5 Rear Bumper Assy

I. Overview

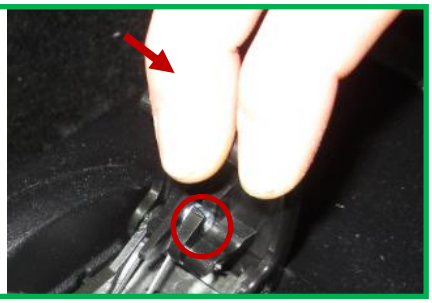


No.	Part No.	Part name	Qty.	Unit
Assy	A31-2804010-00A0	Rear bumper	1	Set
Assy	A31-2804100-00A0	Rear bumper assy	1	Set
1	W11-2804101-00	Rear bumper body	1	Piece
2	W11-2804102-00	Rear fog light bright trim ring	1	Piece
3	DIN 6921-M6X12-8.8	Hexagon head bolt with flange strength shank and half thread	4	Piece
4	W11-2803109-00	Screw fastener cap	4	Piece
5	A31-2804103-00A0	Rear bumper left mounting bracket	1	Piece
6	A31-2804104-00A0	Rear bumper right mounting bracket	1	Piece
7	Q2754816A	Cross recessed hexagon self-tapping screw with indentation	4	Piece
8	A31-2804107-00A0	Sponge cushion	4	Piece

9	DIN 9021-5.3-140HV	Big washer	4	Piece
10	DIN 7981-ST4.2X16-C-H	Cross recessed pan head self-tapping screw	2	Piece
11	DIN 125-5.3-300HV	Big flat washer	2	Piece
12	Q31206	Style B leaf spring nut	3	Piece
13	DIN 125-7.4-300HV	plate washer	3	Piece
14	DIN 7985-M6X16-4.8-H	Cross recessed pan head screw	3	Piece
总成	A31-2804200-00A0	Rear bumper grille assy	1	Set
15	A31-2804201-00A0	Rear bumper grille	1	Piece
16	A31-2804203-00A0	Rear bumper grille bright strip I	1	Piece
17	A31-2804204-00A0	Rear bumper grille bright strip II	1	Piece
18	A31-2804205-00A0	Rear bumper grille bright strip III	1	Piece
19	A31-2804206-00A0	Rear bumper grille bright strip IV	1	Piece

II. Dismantling and installation steps

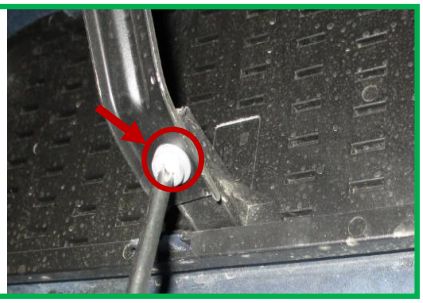
1. Pull up the back door unlocking switch to open the back door.



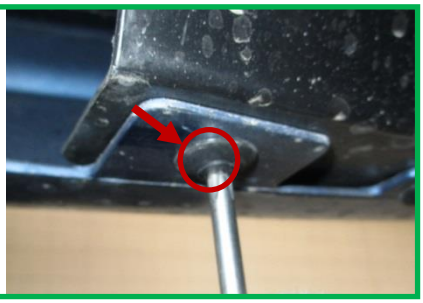
2. Dismantle the rear bumper fixing bolts (totally 3 pieces).

3. Dismantle the tapping screws (totally 6 pieces) for fixing the rear bumper with the rear fender.

4. Dismantle the fixing screws (totally 3 pieces) for fixing the rear bumper mounting bracket.



5. Dismantle the cross recessed pan head tapping screws (totally 4 pieces) for fixing the rear bumper with the rear fender.



6. Dismantle the reversing radar probe.

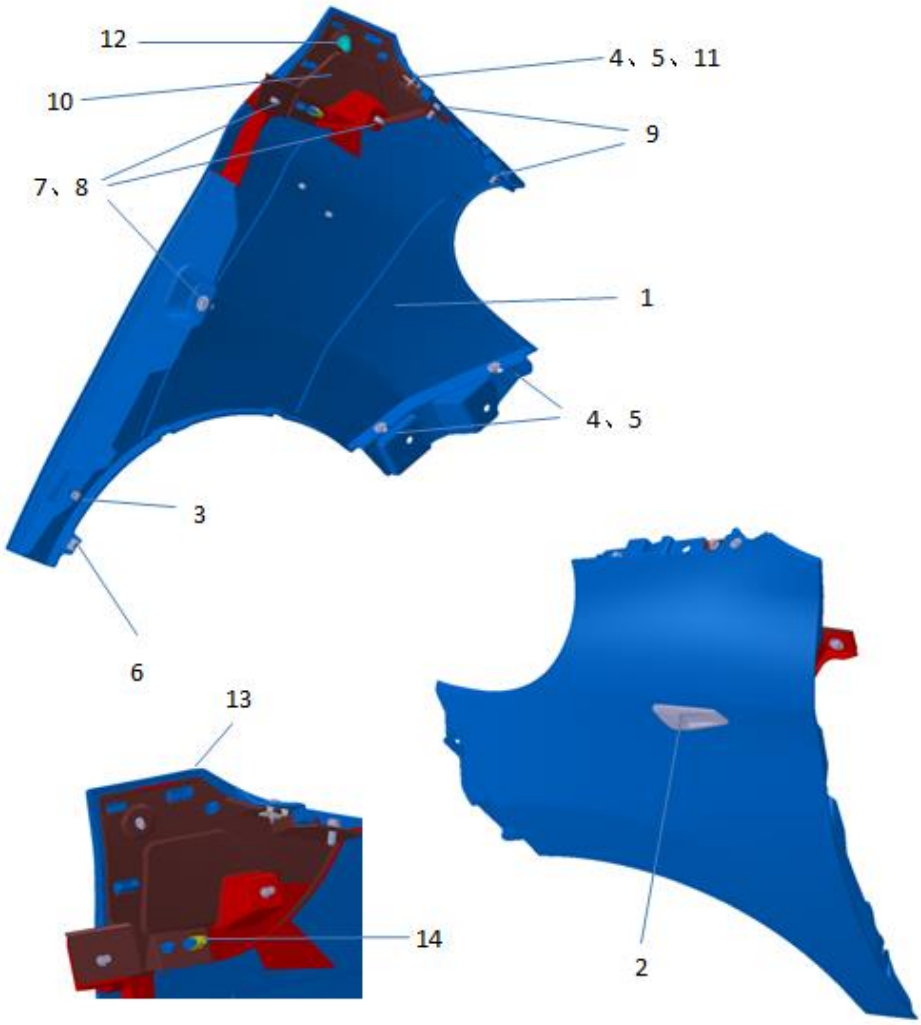
Dismantle the rear fog light connector.

7. Take down the rear bumper from the mounting bracket.

8. The installation process is the contrary of the dismantling process.

Section 6 Fender Assy

I. Overview



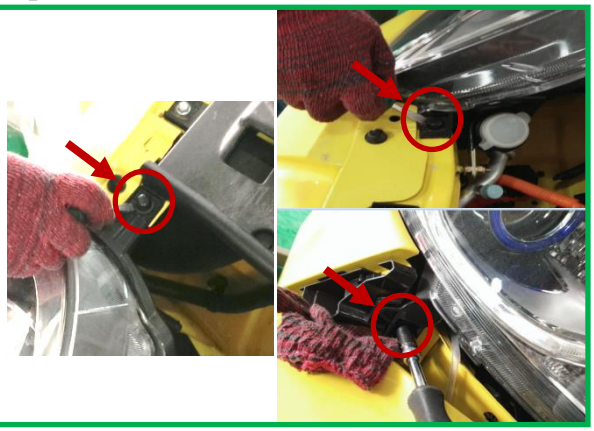
No.	Part No.	Part name	Qty.	Unit
Assy	A31-8403010-00A0	fender	1	Set
Assy	A31-8403100-00A0	Left fender assy	1	Set
1	A31-8403101-00A0	Left fender body	1	Piece
2	A31-8403105-00A0	Left fender trip strip	1	Piece
3	DIN 6923-M6-10	Hexagon flange nut	1	Piece
4	DIN 7981-ST4.8X16-C-H	Cross recessed pan head self-tapping screw	3	Piece
5	DIN 9021-5.3-140HV	Big flat washer	3	Piece
6	Q39748202	Style A reed nut	1	Piece
7	DIN 7985-M6X16-4.8-H	Cross recessed pan head screw	3	Piece

8	DIN 9021-6.4-140HV	Big gasket	4	Piece
9	DIN 6921-M6X12-8.8	Hexagon head bolt with flange strength shank and half thread	2	Piece
10	A31-8403103-00A0	Left fender skeleton	1	Piece
11	Q39748151	Reed nut	1	Piece
12	Q399B04	End seal type inserted plastic nut	1	Piece
13	DIN 7981-ST5.5X19-C-H	Cross recessed pan head self-tapping screw	1	Piece
14	W11-5306112-00A0	Plastic buckle	1	Piece

II. Dismantling and installation steps

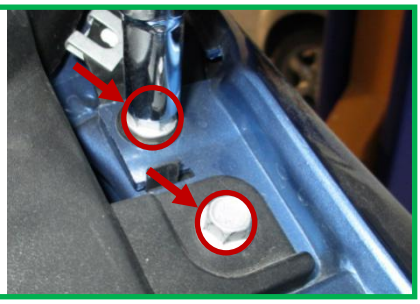
1. Dismantle the front bumper assy. For the detailed dismantling steps, please see the dismantling steps for the front bumper.

2. Dismantle the fixing bolts (totally 3 pieces) of the headlights.

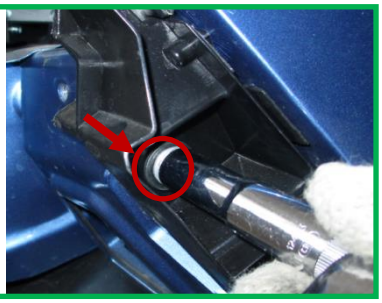


3. Disconnect the two harness connectors of the headlights. Take out the headlights.

4. Dismantle the 2 fixing bolts of the fender.

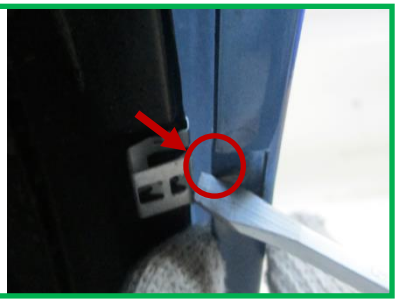


5. Dismantle the fixing screws (totally 2 pieces) of the fender with the bumper mounting bracket.



6. Dismantle the tapping screws for fixing the fender with the front fender.

7. Dismantle the dual-clamp spring leaves for fixing the fender with the front fender.



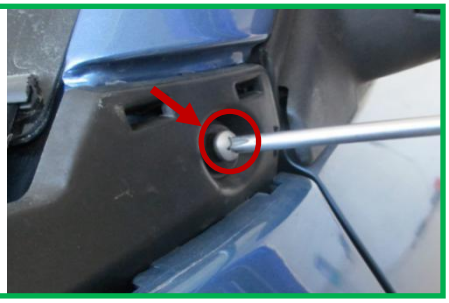
8. Open the door, and dismantle the fender fixing tapping screws via the gap between the fender and

the door.

9. Dismantle the fender fixing tapping screws via the gap between the fender and the door.

10. Dismantle the fixing bolts at the lower end of the fender.

11. Dismantle the tapping screws for fixing the fender skeleton.

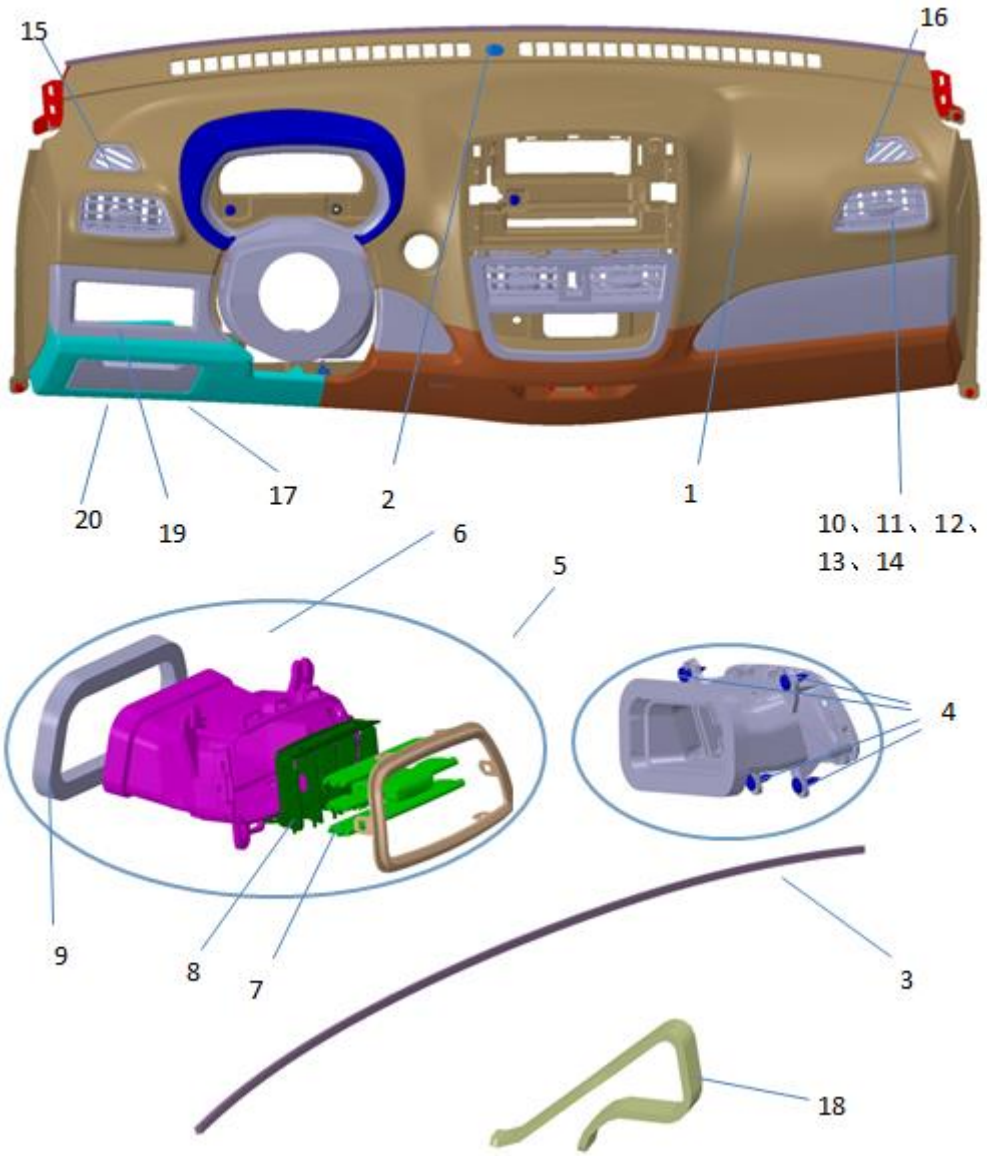


13. Take out the fender.

14. The installation process is the contrary of the dismantling process.

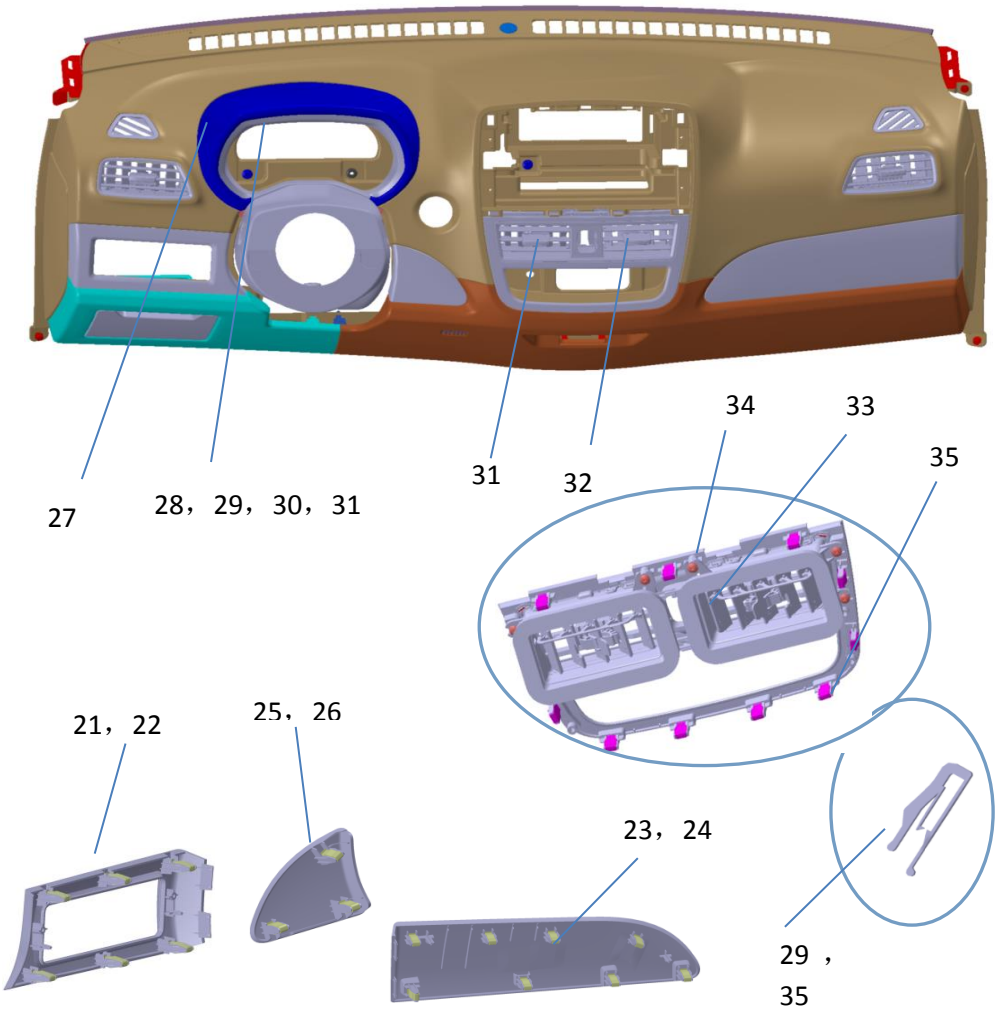
Section 7 Dashboard Assy

I. Overview



No.	Part No.	Part name	Qty.	Unit
Assy	A31-5306010-00A0	Instrument panel	1	Set
Assy	A31-5306100-00A0	Dashboard body assy	1	Set
1	A31-5306101-00A0	Dashboard body	1	Piece
2	A31-5306102-00A0	Dashboard solar sensor cover	1	Piece
3	A31-5306103-00A0	Dashboard sealing sponge	1	Piece
4	DIN 7981-ST4.8X16-C-H	Cross recessed pan head self-tapping screw	8	Piece
Assy	A31-5306230-00A0	Left face blowing vent assy	1	Set

5	A31-5306231-00A0	Left vent bright strip	1	Piece
6	A31-5306233-00A0	Left vent body	1	Piece
7	A31-5306237-00A0	Left front and rear vane combination	1	Piece
8	A31-5306241-00A0	Left gear regulating vane combination	1	Piece
9	A31-5306243-00A0	Left duct sealing sponge	1	Piece
Assy	A31-5306240-00A0	Right face blowing vent assy	1	Set
10	A31-5306232-00A0	Right vent bright strip	1	Piece
11	A31-5306234-00A0	Right vent body	1	Piece
12	A31-5306238-00A0	Right front and rear vane combination	1	Piece
13	A31-5306242-00A0	Right gear regulating vane combination	1	Piece
14	A31-5306244-00A0	Right duct sealing sponge	1	Piece
15	A31-5306113-00A0	Left defogging vent	1	Piece
16	A31-5306114-00A0	Right defogging vent	1	Piece
Assy	A31-5306120-00A0	Dashboard left lower fender assy	1	Set
17	A31-5306121-00A0	Dashboard left lower fender	1	Piece
17	A31-5306121-00A0	Dashboard left lower fender	1	Piece
18	A31-5306122-00A0	Opening metal card	2	Piece
19	A31-5306123-00A0	Upper cover plate	1	Piece
20	A31-5306170-00A0	Access port storage box assy	1	Piece



No.	Part No.	Part name	Qty.	Unit
Assy	A31-5306250-00A0	Dashboard left finish panel assy	1	Set
21	A31-5306251-00A0	Dashboard left finish panel	1	Piece
22	W11-5306112-00A0	Plastic buckle	6	Piece
Assy	A31-5306260-00A0	Dashboard right finish panel assy	1	Set
23	A31-5306261-00A0	Dashboard right finish panel	1	Piece
24	W11-5306112-00A0	Plastic buckle	8	Piece
Assy	A31-5306270-00A0	Dashboard middle finish panel assy	1	Set
25	A31-5306271-00A0	Dashboard middle finish panel	1	Piece
26	W11-5306112-00A0	Plastic buckle	3	Piece
Assy	A31-5306130-00A0	Instrument cluster trim cover assy	1	Set
27	A31-5306131-00A0	Instrument cluster upper trim cover	1	Piece
28	A31-5306132-00A0	Instrument cluster lower trim cover	1	Piece
29	A31-5306133-00A0	Single-side buckle	4	Piece
30	W11-5306112-00A0	Plastic buckle	3	Piece
31	DIN 7981-ST3.5X9.5-C-H	Cross recessed pan head self-tapping screw	4	Piece

Assy	A31-5306160-00A0	Center console assy	1	Set
32	A31-5306161-00A0	Center console	1	Piece
33	A31-5306280-00A0	Central face blowing vent assy	1	Piece
34	DIN 7981-ST4.2X13-C-H	Cross recessed pan head self-tapping screw	6	Piece
35	A31-5306133-00A0	Single-side buckle	11	Piece

II. Dismantling steps

1. Dismantle the steering wheel and clock spring. For the detailed steps, please see the dismantling and installation steps for the steering wheel of the steering system.

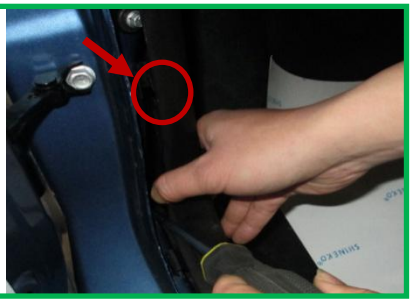
2. Dismantle the instrument cluster assy.

For the detailed steps please see the instrument cluster dismantling and installation steps.

3. Dismantle the rocker panel assy fixing screws (totally 2 pieces).

4. Dismantle the rocker panel assy.

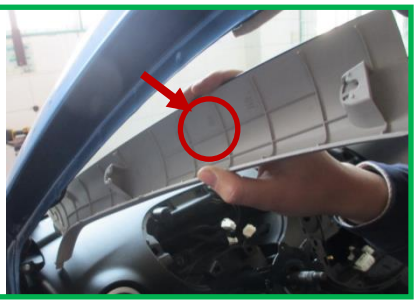
5. Dismantle two style A buckles with a straight screwdriver. Dismantle the A column lower fender.



6. Dismantle the door weatherstrip.

7. Dismantle two style A buckles of the upper fender of the A fixing column with a straight screwdriver.

8. Dismantle the A column upper fender.

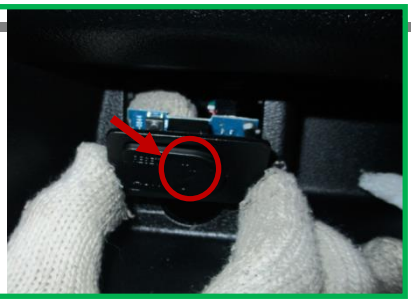


9. Remove the lower fender of the dashboard.

Note: the buckles can be firstly damaged if dismantling is difficult.

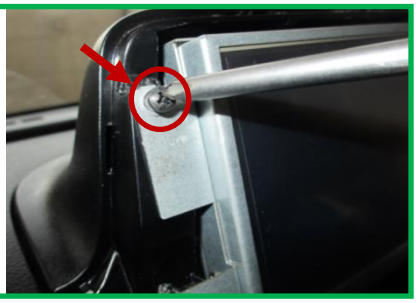
10. Dismantle the A/C control panel assy.

11. Dismantle the fixing screws (totally 3 pieces) of the central control panel.



12. Dismantle the central control panel.

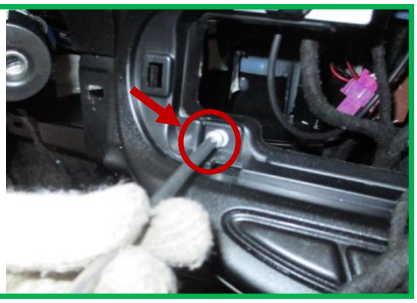
13. Dismantle the fixing screws (totally 4 pieces) of the multimedia terminal.



14. Dismantle the connector, antenna, etc. of the multimedia terminal. Take out the multimedia terminal.

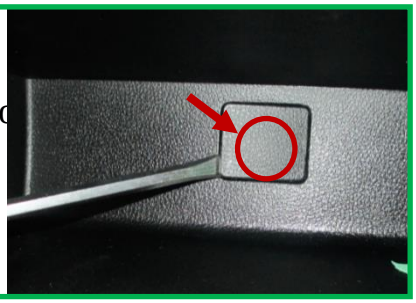
15. Dismantle the 12V power interface connector. Take out the 12V power interface.

16. Dismantle the USB and AUX interface connectors. Take the USB/AUX interface.

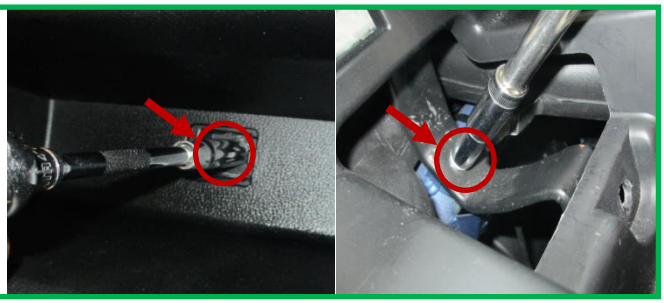


17. Dismantle the side mirrors and rear window defrosting switch connector. Take out the side mirrors and rear window defrosting switch.

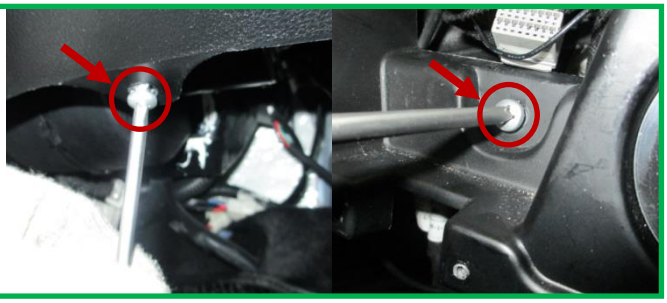
18. Dismantle the fixing bolt and cover plate of the dashbo screwdriver.



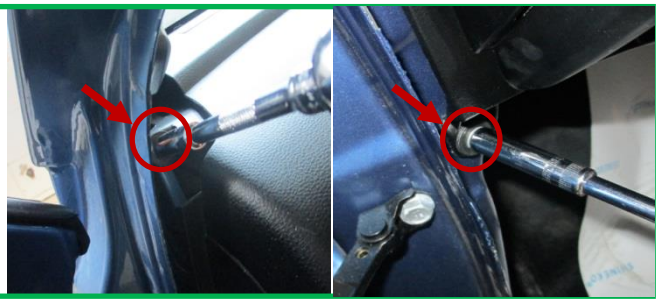
19. Dismantle the 2 fixing nuts of the dashboard.



20. Dismantle the 3 cross recessed head screws for fixing the dashboard.



21. Dismantle the 7 fixing bolts of the dashboard.

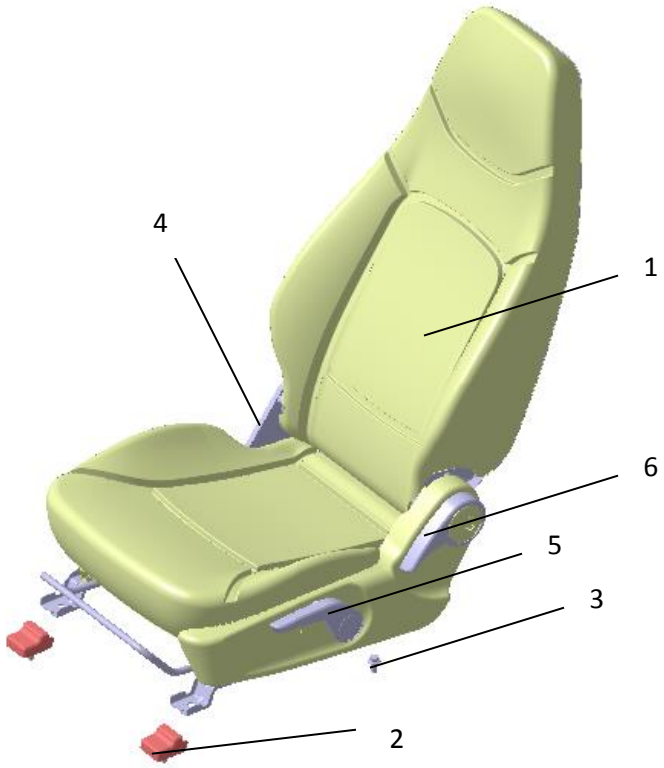


22. Take out the dashboard.

23. The installation process is the contrary of the dismantling process.

Section 8 Seats

I. Overview



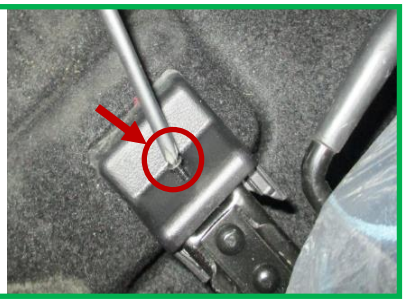
No.	Part No.	Part name	Qty.	Unit
Assy	A31-6800010-00A0	Driver seat assy	1	Set
1	A31-6800100-00A0	Driver Seat	1	Piece
2	A31-6800105-00A0	Seat front mounting point shield	2	Piece
3	DIN 6921-M10×20-8.8	Hexagon head bolt with flange strength shank and half thread	4	Piece
4	A31-6800106-110	Driver seat side shield	1	Piece
5	A31-6800107-110	Driver seat raising handle	1	Piece
6	A31-6800108-110	Driver seat side backrest adjuster handle	1	Piece

II. Dismantling and installation steps

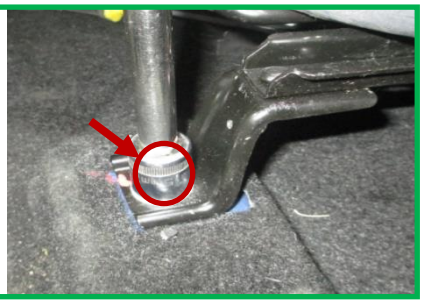
1. Dismantle the fixing screws (totally 2 pieces) of the seat backrest adjuster shield.
2. Dismantle the two seat shield covers with a straight screwdriver.
3. Dismantle the fixing screws (totally 3 pieces) of the seat shield.
4. Dismantle the seat shield.

5. Dismantle the fixing screws (totally 2 pieces) of the seat front mounting point shield.

Dismantle the seat front mounting point shield.



6. Dismantle the 2 front fixing bolts of the seat.



7. Push the seat to the foremost position and dismantle the two seat rear mounting point shields.

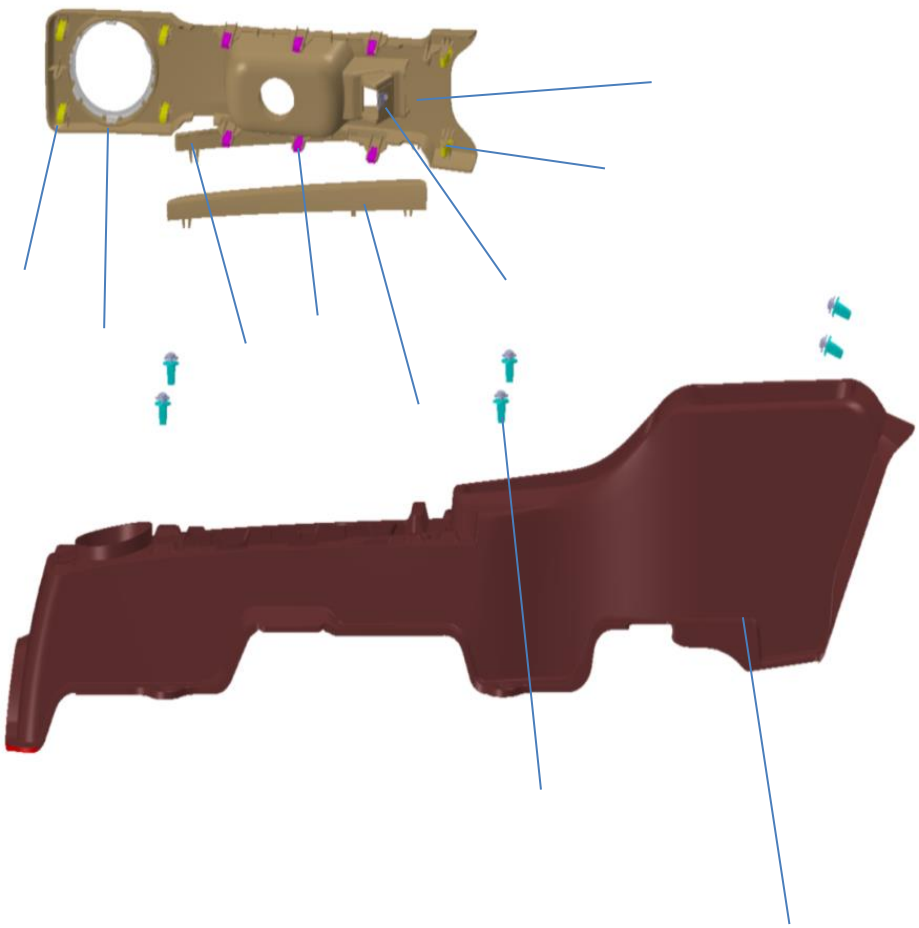
8. Dismantle the 2 rear fixing bolts.

9. Take out the seat form the vehicle.

10. The installation process is the contrary of the dismantling process.

Section 9 Auxiliary Instrument Panel

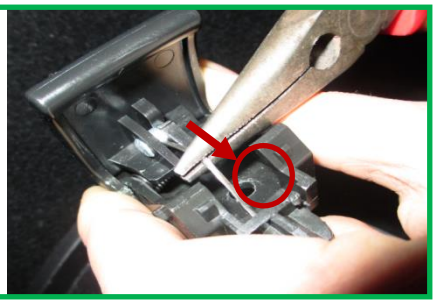
I. Overview



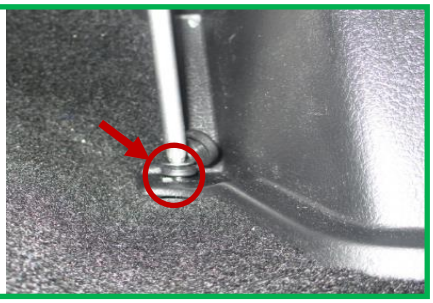
II. Dismantling and installation steps

1. Dismantle the fixing screw of the back door unlocking switch. Take out the back door unlocking switch.	

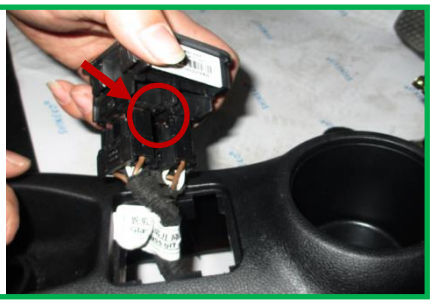
2. Take out the back door cable from the back door unlocking switch with needle nose pliers.



3. Dismantle the 7 fixing screws of the auxiliary instrument panel.



4. Disconnect the power window switch connector.



6. Dismantle the auxiliary instrument panel assy.

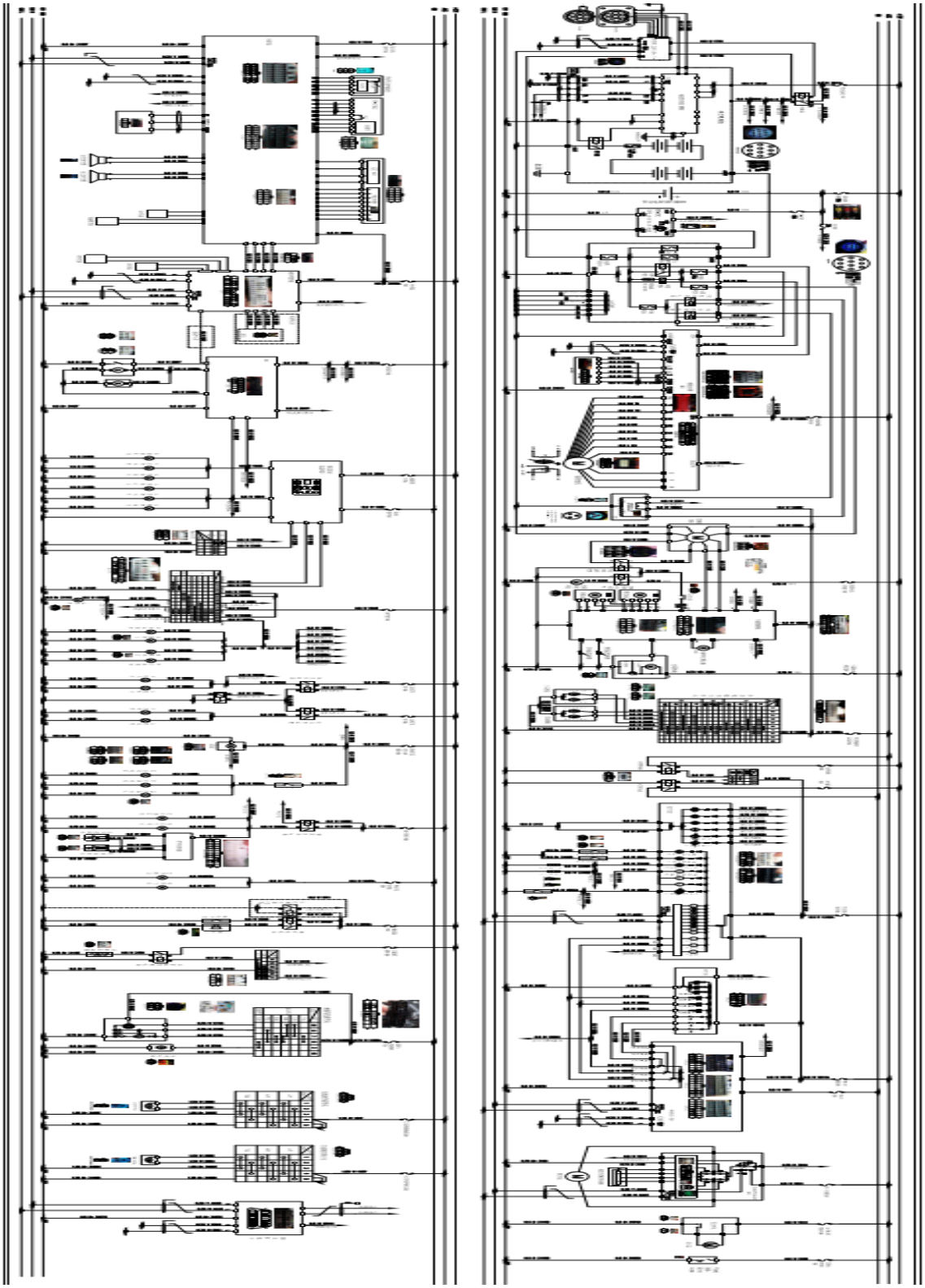
Take out the auxiliary instrument panel form the vehicle.

7. The installation process is the contrary of the dismantling process.

Attachment: Table of Basic Parameters of Complete Vehicle

Vehicle Model			D2S Model	
		Unit		
Main Dimension Parameters				
Overall dimension (no-load)	Total length	mm	2806±10	
	Total width		1540±10	Excluding rearview mirror
	Total height		1555±10	No-load
Wheelbase			1765±10	
Front suspension			554±5	
Rear suspension			492±5	
Tread	Front tread		1325±10	
	Rear tread		1301±10	
Mass Parameters				
Curb mass		kg	775±20, 850±25	
Maximum total mass		kg	955±20, 1030±25	
Front and rear axle load corresponding to curb mass		kg	460/315, 500/350	
Front and rear axle load corresponding to maximum total mass		kg	520/435, 555/475	
Vehicle Model			**D2S Model**	
		Unit		
Motor Parameters				
Rated power		kw	15	
Peak power		kw	30	
Performance Parameters				
Maximum speed		km/h	≥100	
Maximum gradability		%	≥20%	
Maximum endurance mileage under NEDC condition		km	≥150, ≥255	
Minimum ground clearance		mm	130	
Minimum turning diameter		m	8	
Wheel alignment	Maximum turning angle of front wheels (inside/outside)	°	36°12′±2°/29°6′±2°	
	Camber angle of front wheels	°	0°±45′	
	Camber angle of rear wheels	°	0°±45′	
	Kingpin inclination angle	°	11°15′±1°	
	Kingpin caster angle	°	6°24′±1°	
	Toe-in of front wheels	°	0°±30′	
Other Parameters				
Operating stroke of brake pedal		°	13	
Application range of brake friction pair		-	Replacement is required when one-side abrasion loss of the brake disc is over 1mm and the remaining thickness of the friction plate is less than 3mm	
Dynamic balance of wheels		-	45g for one side and 90g for both sides	

Attachment: Electrical Schematic Diagram of Complete Vehicle



Update Record

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