FC25 维修手册

FC25 Repair Manual

前　言

Preface

为了确保顾客对产品满意，要求葑全汽车的维修技术人员充分理解本手册的内容，以便为顾客提供快捷准确的维修服务。

To guarantee the customer's satisfaction, all the repair technicians of Fengchuen Auto Co., Ltd. are required to thoroughly understand the contents of this manual, so as to provide repair service for the customers quickly and correctly.

使用本手册时，如发现任何错误或有疑问，请速与本公司联系。我们会努力提高和完善葑全电动汽车的生产和维修技术，愿本手册给您提供帮助。

In case of any errors or doubts upon using this manual, please contact with our company quickly. We will try our best to improve and complete the production and repair techniques of Fengchuen electric autos. Wish this manual helpful to you.

本手册的内容可能会在未通报的情况下，因设计的变更而有所更改。

This manual may change its contents owning to design change without making additional notification.

江苏葑全汽车有限公司
Jiangsu Fengchuen Auto Co., Ltd.

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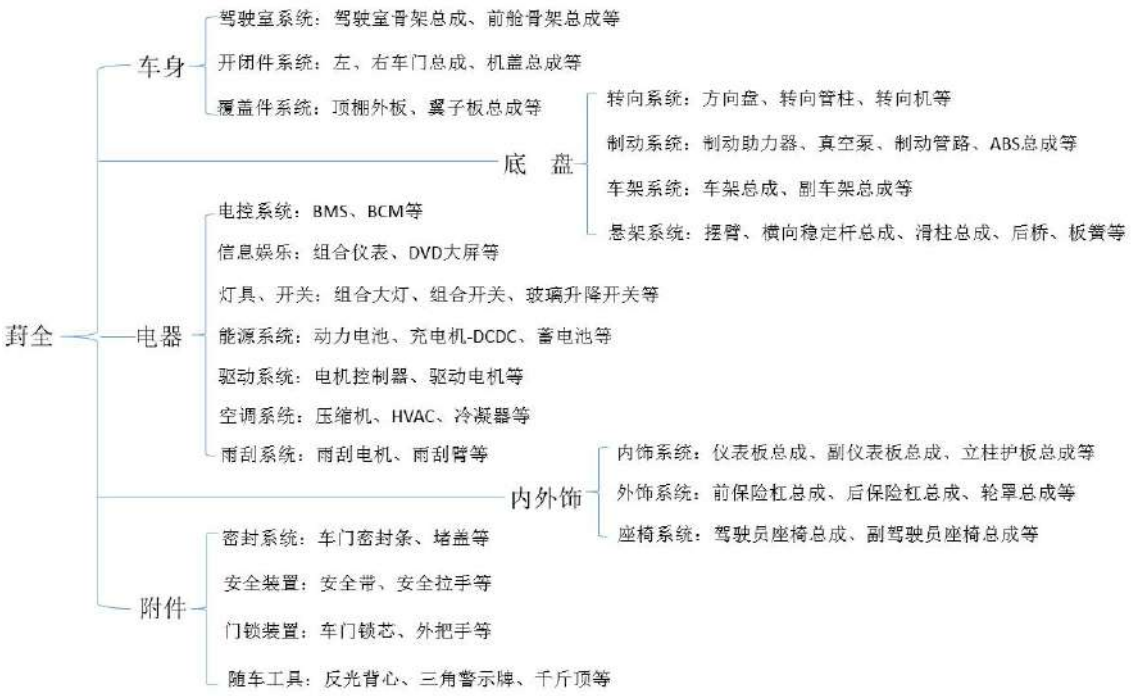
第一章、 基本构造

Chapter I Basic Structure

葑全电动汽车由底盘、电器、内外饰及附件、车身及附件五大部分组成。底盘部分由转向系统、制动系统、车架系统、悬架系统等组成。电器部分由电控系统、信息娱乐系统、灯具、开关、能源系统、驱动系统、空调系统、雨刮系统等组成；内外饰主要由内饰系统、外饰系统、座椅系统等组成；附件主要由密封系统、安全装置、门锁装置、随车工具等组成；车身主要由驾驶室系统、开闭件系统、覆盖件系统等组成。基本构架如下图所示：

Fengchuen electric auto is composed of the chassis, electrical part, interior & exterior decoration and its accessories, vehicle body, and accessories. The chassis part is composed of the steering system, braking system, frame system, suspension system, etc. The electrical part is composed of the electronic control system, information and entertainment system, lamps, switches, energy system, driving system, air conditioning system, windshield wiper system, etc. The interior & exterior decoration mainly includes the interior decoration system, the exterior decoration system, the seating system, etc. The accessories mainly include the sealing system, safety devices, door lock devices, tools attached with the auto, etc. The vehicle body is mainly composed of the cab, the door & closure system, panel system, etc. Its basic structure is as the following figure:



葑全： Fengchuen
车身： Vehicle body: 驾驶室系统：驾驶室骨架总成、前舱骨架总成等 The cab system: the cab frame assembly, the engine compartment assembly, etc. 开闭件系统：左、右车门总成、机盖总成等 The door & closure system: Left and right door assembly, bonnet assembly, etc. 覆盖件系统：顶棚外板、翼子板总成 The panel system: Roof external panel, fender assembly
底盘： Chassis: 转向系统：方向盘、转向管术、转向机等 Steering system: Steering wheel, steering column, steering gear, etc. 制动系统：制动助力器、真空泵、制动管路、ABS 总成等 Braking system: Brake booster, vacuum pump, brake pipeline, ABS assembly, etc. 车架系统：车架总成、副车架总成等 Frame system: Frame assembly, auxiliary frame assembly, etc. 悬架系统：摆臂、横向稳定杆总成、滑柱总成、后桥、板簧等 Suspension system: Swing arm, sway bar assembly, sliding column assembly, rear bridge, leaf spring, etc.
电器： Electrical system: 电控系统：BMS、BCM 等

Electronic control system: BMS, BCM, etc. 信息娱乐：组合仪表、DVD 大屏等 Information and entertainment system: Combined instrument, DVD screen, etc. 灯具、开关：组合大灯、组合开关、玻璃升降开关等 Lights and switches: combined headlight, combined switch, window lifter switch, etc. 能源系统：动力电池、充电机-DCDC、蓄电池等 Power system: power battery, charger-DCDC, storage battery, etc. 驱动系统：电机控制器、驱动电机等 Driving system: Motor controller, driving motor, etc. 空调系统：压缩机、HVAC、冷凝器等 Air conditioning system: Compressor, HVAC, condenser, etc. 雨刮系统：雨刮电机、雨刮臂等 Windshield wiper system: windshield wiper motor, windshield wiper arm, etc.
内外饰： Interior & exterior decoration: 内饰系统：仪表板总成、副仪表板总成、立柱护板总成等 Interior decoration system: Instrument panel assembly, auxiliary instrument panel assembly, column protection plate assembly, etc. 外饰系统：前保险杠总成、后保险杠总成、轮罩总成等 Exterior decoration system: Front bumper assembly, rear bumper assembly, wheel housing assembly, etc. 座椅系统：驾驶员座椅总成、副驾驶员座椅总成等 Seating system: driver’s seat assembly, co-driver’s seat assembly, etc.
附件： Accessories: 密封系统：车门密封条、堵盖等 Sealing system: Door sealing piece, plug, etc. 安全装置：安全带、安全拉手等 Safety device: Safety belt, safety handle, etc. 门锁装置：车门锁芯、外把手等 Door lock devices: Door lock core, external handle, etc. 随车工具：反光背心、三角警示牌、千斤顶等 Tools attached with the vehicle: Reflective vest, triangle warning board, jack, etc.

第二章、电器设备

Chapter II Electrical equipment

2.1、一般事项

2.1 General items

2.1.1、概述

2.1.1 Overview

本章涉及了蓊全电动汽车的电气部分的维修，针对各个系统故障进行了分析，提出了可行的诊断步骤和维修方法。

This chapter involves the repair for the electrical part of Fengchuen autos, analyzes the faults of each system, and puts forward feasible diagnosis steps and repair methods.

蓊全电动汽车电气部分的故障分析与排除应当遵循以下基本操作程序：

The Fault analysis and troubleshooting for the electrical part of Fengchuen autos should follow the following basic operation procedures:

1、 对用户所述故障进行分析。

1. Analyze the faults mentioned by the customers.

在对用户所述故障进行分析时，一定要准确确认症状，为了准确地作出判断，必须排除各种主管臆断，仔细向客户询问故障症状及发生故障时的情况是极其重要的，用户所述故障分析的要点：

Upon analyzing the faults mentioned by the customers, it is a must to confirm the symptoms correctly for correct judgment, and no subjective assumption is permitted. It is critically important to ask the customers about the fault symptoms and the conditions upon fault occurrence carefully, and analyze the following key points of the faults mentioned by the customers:

① 车辆型号、购车日期

① Vehicle model and purchasing date

② 故障发生日期、时间、发生频度

② Fault occurrence date, time and frequency

③ 故障发生时的路面条件

③ Road surface conditions upon fault occurrence

④ 故障发生时的行驶情况、驾驶情况、天气情况

④ Operation and driving conditions as well as weather state upon fault occurrence

⑤ 详细的故障症状

⑤ Detailed fault symptoms

2、 确认故障症状及故障指示灯或报警记录

2. Confirm the fault symptoms and fault indicators or police reporting record.

① 检查常电电池电压

① Inspect the voltage of constant electricity batteries.

② 外观检查线束、连接器和保险丝是否开路和短路等

② Have appearance inspection to confirm whether the harness, connectors, fuses, etc. are broken or have short circuit, etc.

③ 根据故障症状大体确认需要检查的部件或线路

③ As per the fault symptoms, approximately confirm the parts or circuits requiring inspection.

故障排除分析最难处理的情况，就是故障症状不出现。在这种情况下，一定要先对客户所述故障进行详细分析，然后再模拟与客户车辆发生故障时相同或相似的情况和环境。无论技术人员经验如何丰富，技术如何精湛，如果不确认故障症状进行故障排除分析，必然会在修理工作中忽略某些重要因素，在有些地方会错误猜测，造成修理工作无法进行。例如，如果某一充电故障只在用电高峰期电网电压不稳定时发生，或某一故障只在行驶过程中由于路面而产生的振动才发生等，那么在电网电压正常或静止时验证这些症状，就绝对无法确定。由于外接电网或设备、振动、高温或渗水（水气）常常会造成一些难以重现的故障，因此需多方面考虑。

Upon the troubleshooting, the most difficult case is that the fault shows no symptoms. Under such a condition, it is a must to have detailed analysis for the faults mentioned by the customers, and then simulate the same or similar conditions or environments under which the customers' vehicle had faults. No matter how rich experience or excellent skills a technician has, if he didn't confirm the fault symptoms before troubleshooting and analysis, he would certainly ignore some important factors in repair and assume incorrectly at some places, which makes the repair work unable to progress smoothly. For example, a certain charging fault just appears during the electricity consumption peak hours when the power grid voltage is not stable, or a certain fault just appears when the vehicle vibrates owing to the uneven road surface upon driving on the road, etc., then it is absolutely impossible to confirm by verifying these symptoms when the power grid voltage is normal or the vehicle doesn't run. Sometimes, the external power grid or equipment, vibration, high temperature, water penetration (vapor) may usually cause some faults which don't repeat so frequently, so it is necessary to consider from multiple aspects.

蒋全电动汽车多个主要部件具有诊断功能，通过自身或组合仪表或车载影音导航实时显示自身状态，利用这些自我诊断功能，便可迅速缩小故障部位，高效迅速的进行故障分析排除。在蒋全电动汽车中，以下系统均具有诊断功能：①动力电池 ②BMS ③电机控制器 ④驱动电机 ⑤充电机

Multiple main parts of Fengchuen electric autos have diagnosis function, and are able to real time display its own state through the auto itself or the combined instruments, or the auto navigation system. By utilizing these self-diagnosis functions, it enables to narrow the fault scope quickly, and have troubleshooting and analysis with high efficiency. The following systems of Fengchuen autos have the diagnosis function: ① the power battery ② the BMS ③ the motor controller ④ the driving motor ⑤ the charger.

注意：检查故障码或报警记录时，必须先确定故障码或报警记录所示故障是否仍然正在发生，还是过去曾经发生但现在已恢复正常。此外仍需确定故障码或报警记录所示故障是否与目前故障症状有直接关系，以避免在某些情况下对正常运作

的系统进行不必要的故障排除分析，甚至增加故障排除难度，浪费时间与精力。
Remark: Upon inspecting the fault code or alarming record, it is a must to confirm whether the fault indicated by the fault code or alarming record is still going on, or it happened but now it has resumed to normal function. Besides, it is still necessary to confirm whether the fault indicated by the fault code or alarming record has direct relationship with the current fault symptoms, so as to avoid having unnecessary troubleshooting and analysis for the systems which functions normally, increasing the troubleshooting difficulty and wasting time and energy.

3、 电路或部件检查

3. Inspect the circuits or parts

4、 修理或更换

4. Repair or replace

5、 测试试验

5. Test

维修完毕后，应仔细验证故障是否彻底排除，应在与首次发生故障时相同的环境和条件下进行验证试验，测试实验完成后交车。
After repair, it is necessary to verify whether the fault is completely removed, and the verification test should be done under the same environment and conditions under which the first fault occurs, and the vehicle may be delivered after the test is completed.

2.1.2、线束识别标记及名称缩写

2.1.2 Harness recognition identification and name abbreviation

① 根据导线分布的位置不同，把蓊全电动汽车整车线束分为以下几类：
① As per different conductor distribution position, the harnesses of the Fengchuen electric autos are divided into the following categories:

线束名称 Harness name	线束位置 Harness position	备注 Remark
仪表线束 Instrument harness	仪表台下方 Below the dashboard	
地板线束 Floor harness	地板下方 Below the floor	
底盘线束 Chassis harness	车架左侧 Left of the frame	
左前门线束 Left front door harness	左侧车门 Left door	
右前门线束 Right front door harness	右侧车门 Right door	
顶棚线束 Roof harness	顶棚上 On the roof	
蓄电池负极线束 Negative pole harness of the storage battery	蓄电池右侧 Right of the storage battery	

② 原理图及线束图中导线颜色缩写

② Conductor color abbreviation in the principle diagram and harness drawing

缩写字母 Abbreviated letter (s)	表示颜色’ Color indicated	缩写字母 Abbreviated letter (s)	表示颜色 Color indicated
R	红色 Red	Gr	灰色 Grey
G	绿色 Green	O	橙色 Orange
Y	黄色 Yellow	BL	蓝色 Blue
W	白色 White	V	紫色 Purple
B	黑色 Black	P	粉色 Pink
Br	棕色 Brown	T	浅色 Light color

③ 零部件名称缩写

③ Abbreviation of the parts name

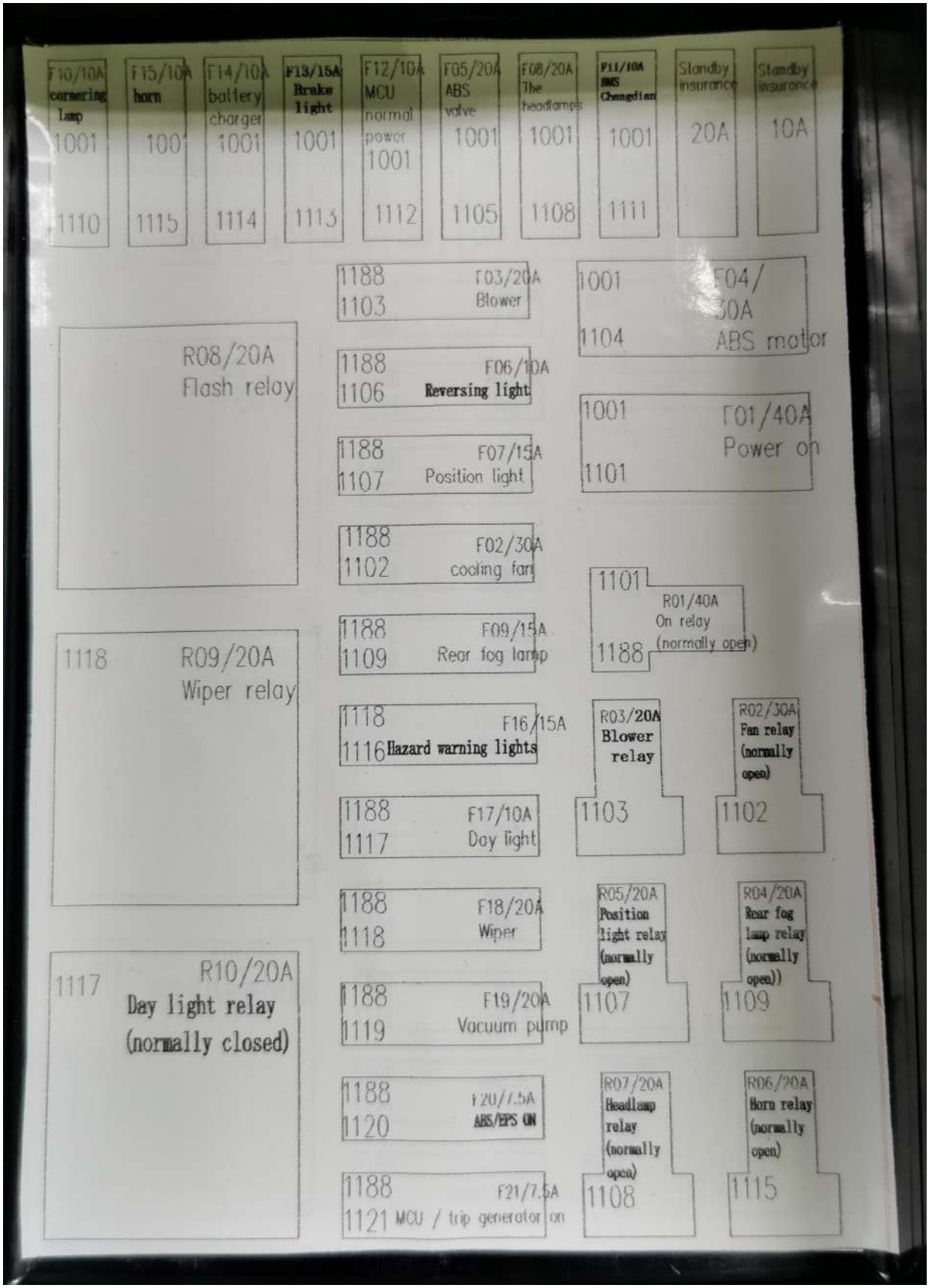
缩写 Abbreviation	代表部件 Parts represented	缩写 Abbreviation	代表部件 Parts represented
MCU	电机控制器 Motor controller	CP	充电控制导引 Charging control pilot
EPS	电子助力转向系统 Electric power steering	PDU	电源分配单元 Power distribution unit
BMS	电池管理系统 Battery management system	ABS	防抱死制动系统 Anti-lock braking system
BCM	车身控制模块 Body control module	IHU	组合仪表 Combined instrument
GPS	车载信息主机 Global position system	OBD	车载诊断系统 On-board diagnostics
OBC+DC-DC	充电机+DC-DC 一体机 Integrated machine of the charger + DC-DC	CC	充电连接确认 Charging connection confirmation

2.1.3、保险丝及继电器

2.1.3 Fuses and relays

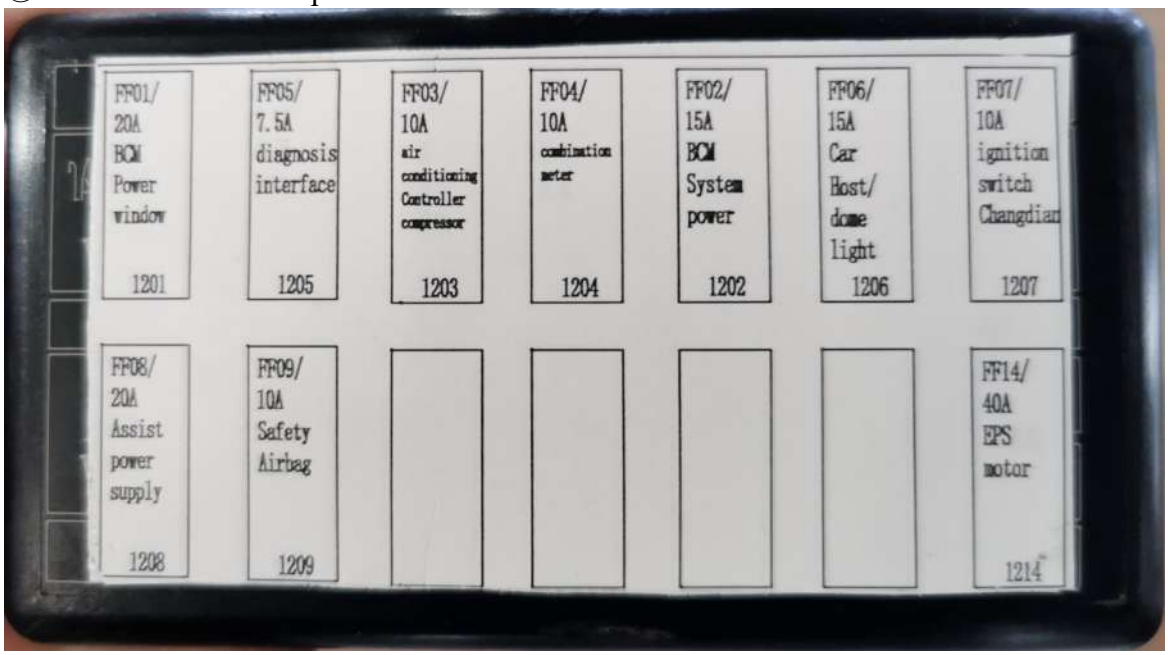
① 前舱保险丝盒

① Fuse box of the engine compartment


F10/10A cornering lamp
1001
1110
F15/10A horn
1001
1115
F14/10A battery charger
1001
1114
F13/15A Brake light
1001
1113
F12/10A MCU normal power
1001
1112
F05/20A ABS valve
1001
1105
F08/20A The headlamps
1001
1108
F11/10A BMS Changdian
1001
1111
Standby insurance
20A
Standby insurance
10A
1188
1103
F03/20A Blower
1001
1104
F04/ 30A ABS motor
R08/20A Flash relay
1188
1106
F06/10A Reversing light
1001
1101
F01/40A Power on
1188
1107
F07/15A Position light
1188
1102
F02/30A cooling fan
1101
R01/40A On relay (normally open)
1188
1188
1109
F09/15A Rear fog lamp
1118
R09/20A Wiper relay
1118
1116
F16/15A Hazard warning lights
R03/20A Blower relay
1103
R02/30A Fan relay (normally open)
1102
1188
1117
F17/10A Day light
1188
1118
F18/20A Wiper
R05/20A Position light relay (normally open)
1107
R04/20A Rear fog lamp relay (normally open))
1109
1117
R10/20A Day light relay (normally closed)
1188
1119
F19/20A Vacuum pump
1188
1120
F20/7.5A ABS/EPS ON
R07/20A Headlamp relay (normally open)
1108
R06/20A Horn relay (normally open)
1115
1188
1121
F21/7.5A MCU / trip generator on

② 座舱保险丝盒

② Fuse box of the cockpit



③ 保险丝览表

③ List of the fuses

位置名称 Name	用途 Function	位置名称 Name	用途 Function
F03	Fan blower	F12	MCU constant power
F04	ABS motor	F13	Brake light
F05	ABS valve	F14	Charger
F06	Reversing light	F15	Horn
F07	Position light	F16	Hazard warning light
F08	Headlight	F17	Daytime running light
F09	Rear fog light	F18	Wiper motor
F10	Turning light	F19	Vacuum Pump
F11	BMS ACC power	F20	ABS/EPS ON
F21	MCU/low speed warning buzzer ON	R01	ON relay（always off）
F01	ON gear power	R02	Condenser fan relay（always off）
F02	Condenser fan	R03	Fan blower relay
R04	Rear fog light relay（always off）	R07	Headlight relay（always off）
R05	Position light relay（always off）	R08	Flash light relay
R06	Horn relay（always off）	R09	Wiper relay
R10	Daytime running light relay （always on）		

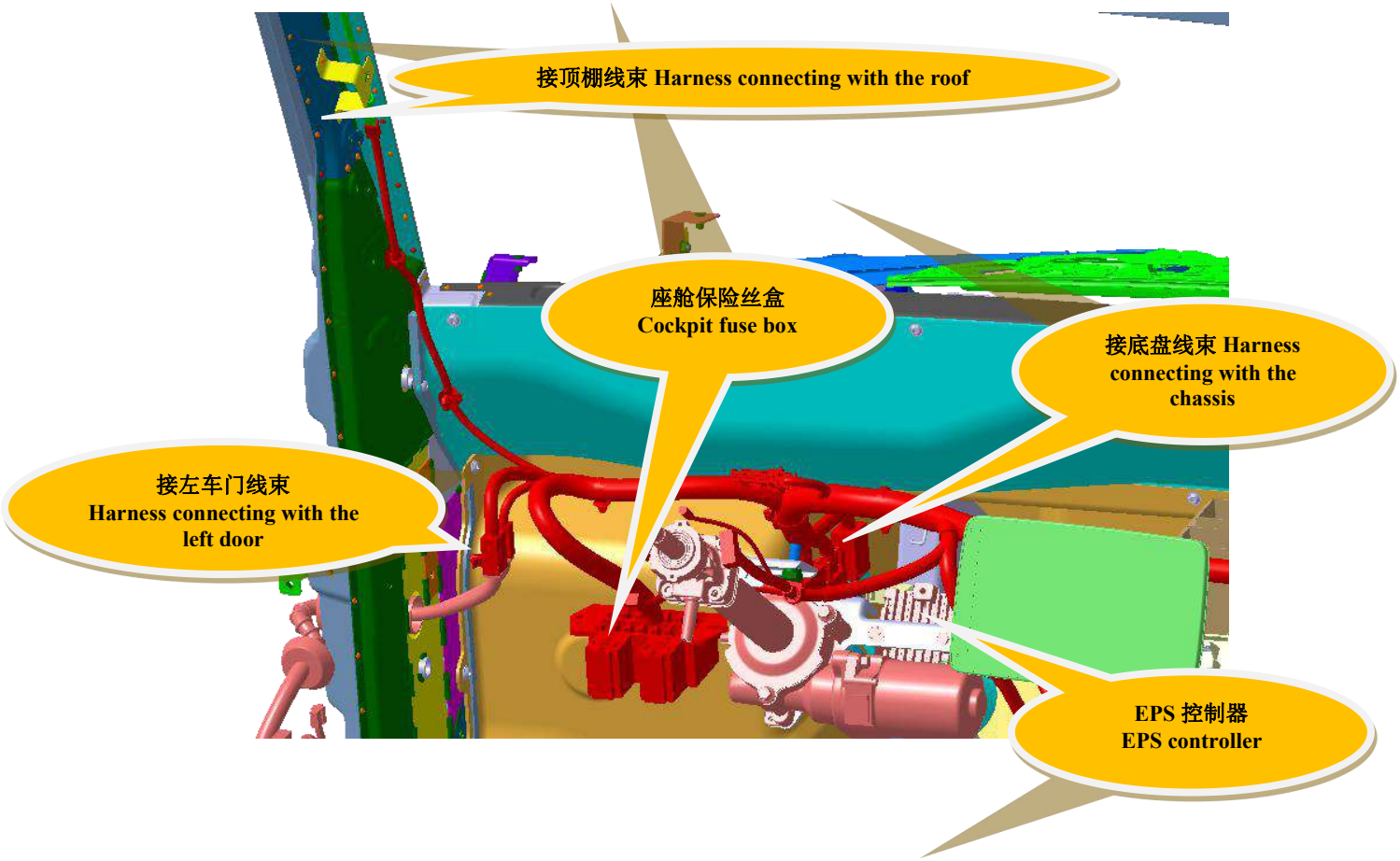
位置名称 Name	用途 Function	位置名称 Name	用途 Function
FF01	BCM electrical window glass lifter	FF05	OBD port
FF02	BCM system power	FF06	Central control panel/ dome light
FF03	Compressor controller	FF07	Combination switch constant power
FF04	Instrument	FF08	Accessory power
FF09	Air bag（reserved）	FF14	EPS motor

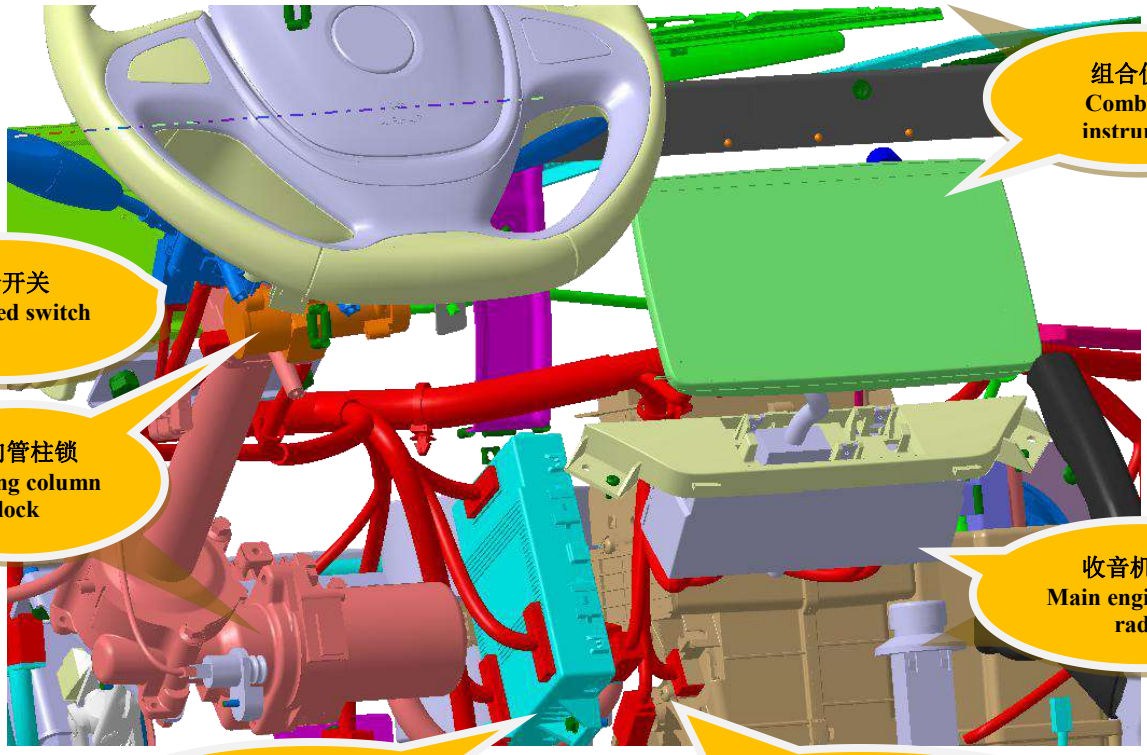
2.2、配件位置图

2.2 Position drawing of spare parts

2.2.1、仪表板线束

2.2.1 Instrument panel harness

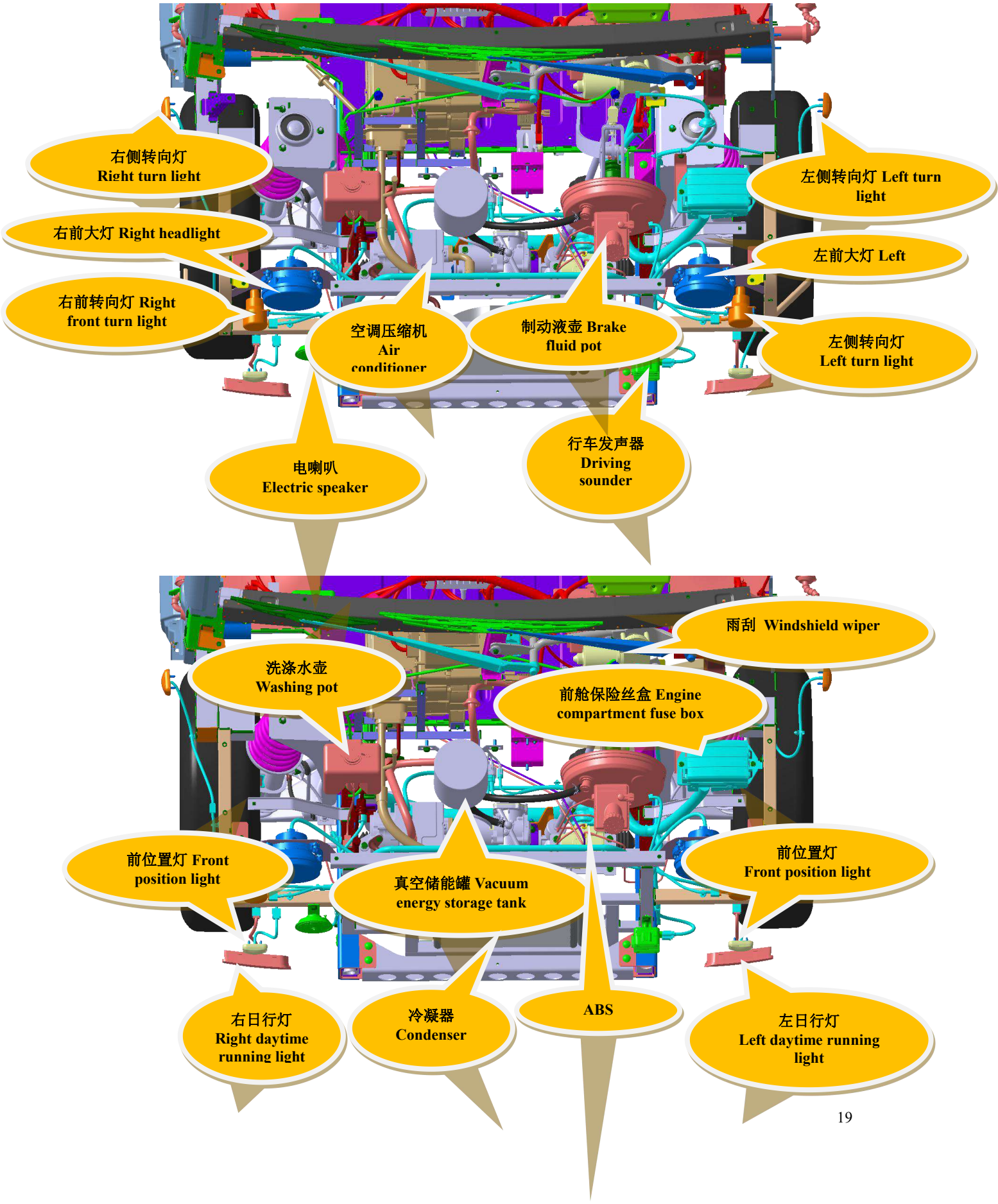


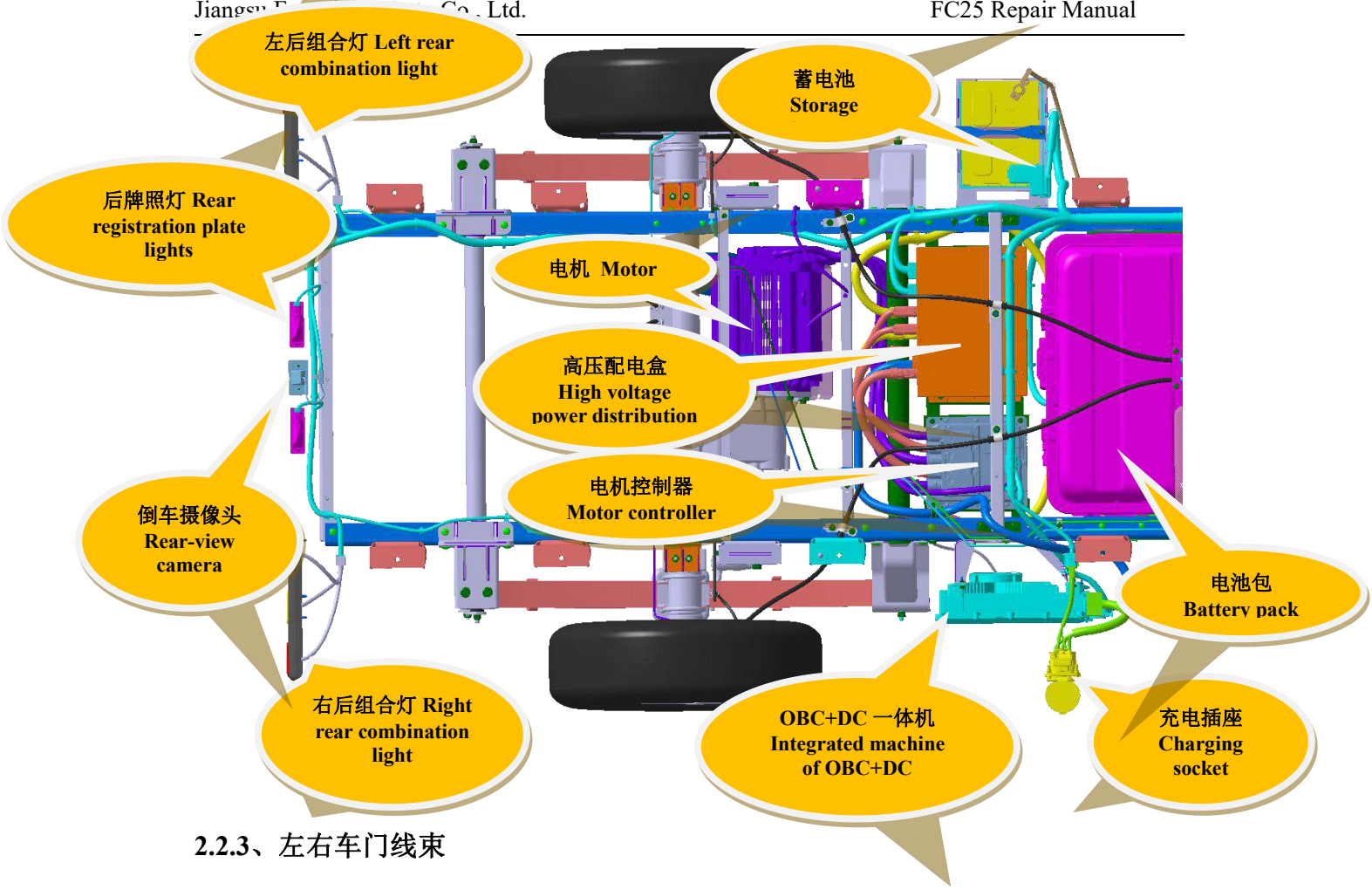

组合仪表
Combined instrument
组合开关
Combined switch
转向管柱锁
Steering column lock
收音机主机
Main engine of the radio
车身控制器
Vehicle body controller
空调主机
Main engine of the air conditioner


自动大灯控制器
Automatic headlight controller
隐藏天线
Hidden antenna
接右车门线束
Harness connecting with the right door
空调控制器
Air conditioner controller

2.2.2、底盘线束

2.2.2 Chassis hardness



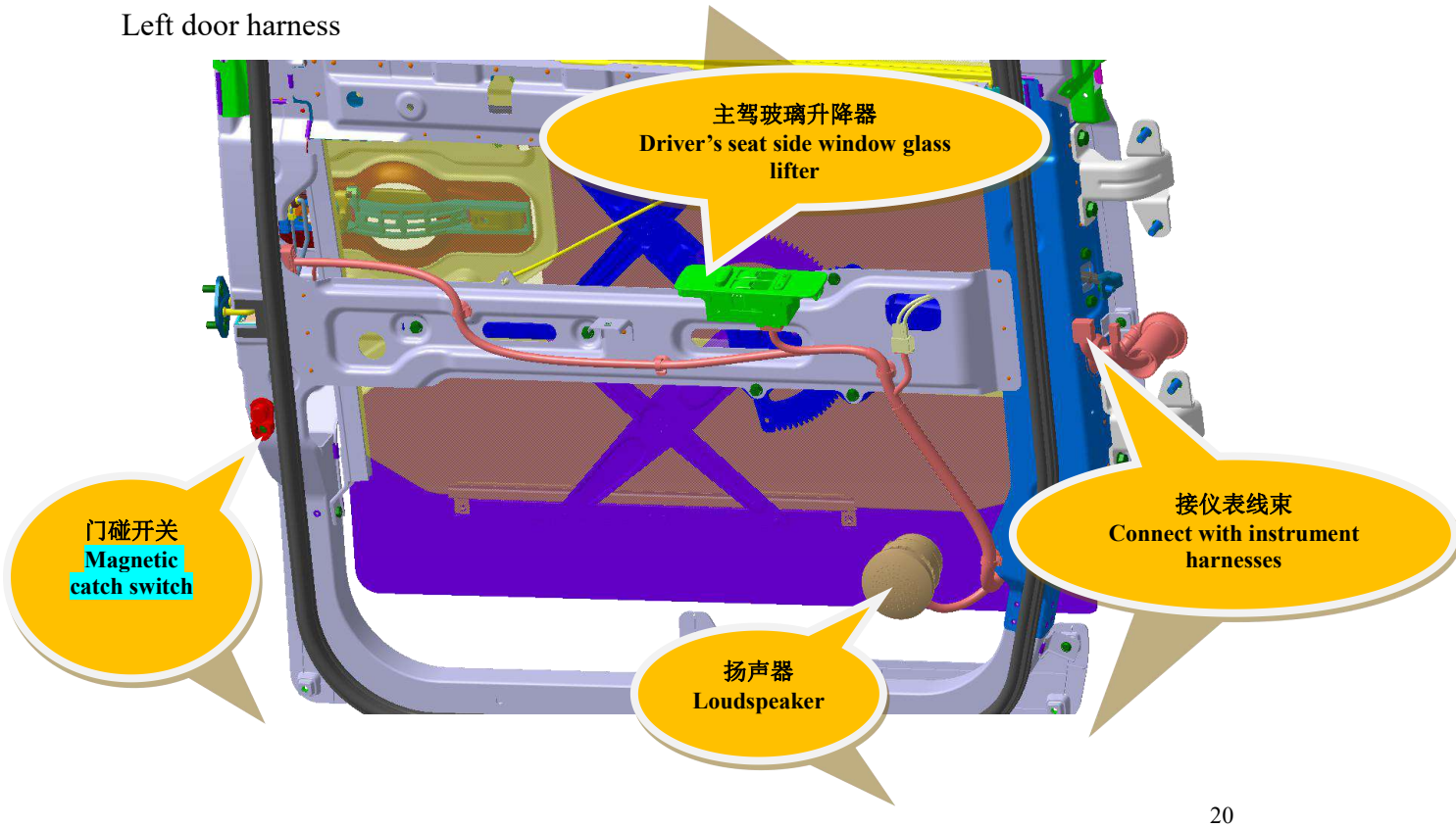


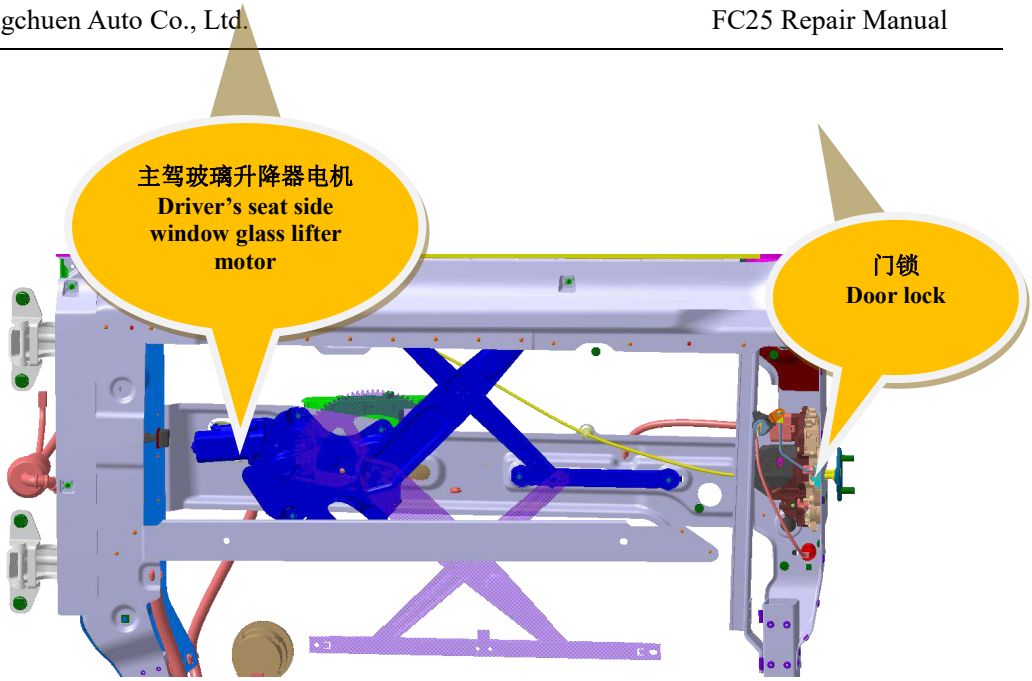
2.2.3、左右车门线束

2.2.3 Left and right door harness

左车门线束

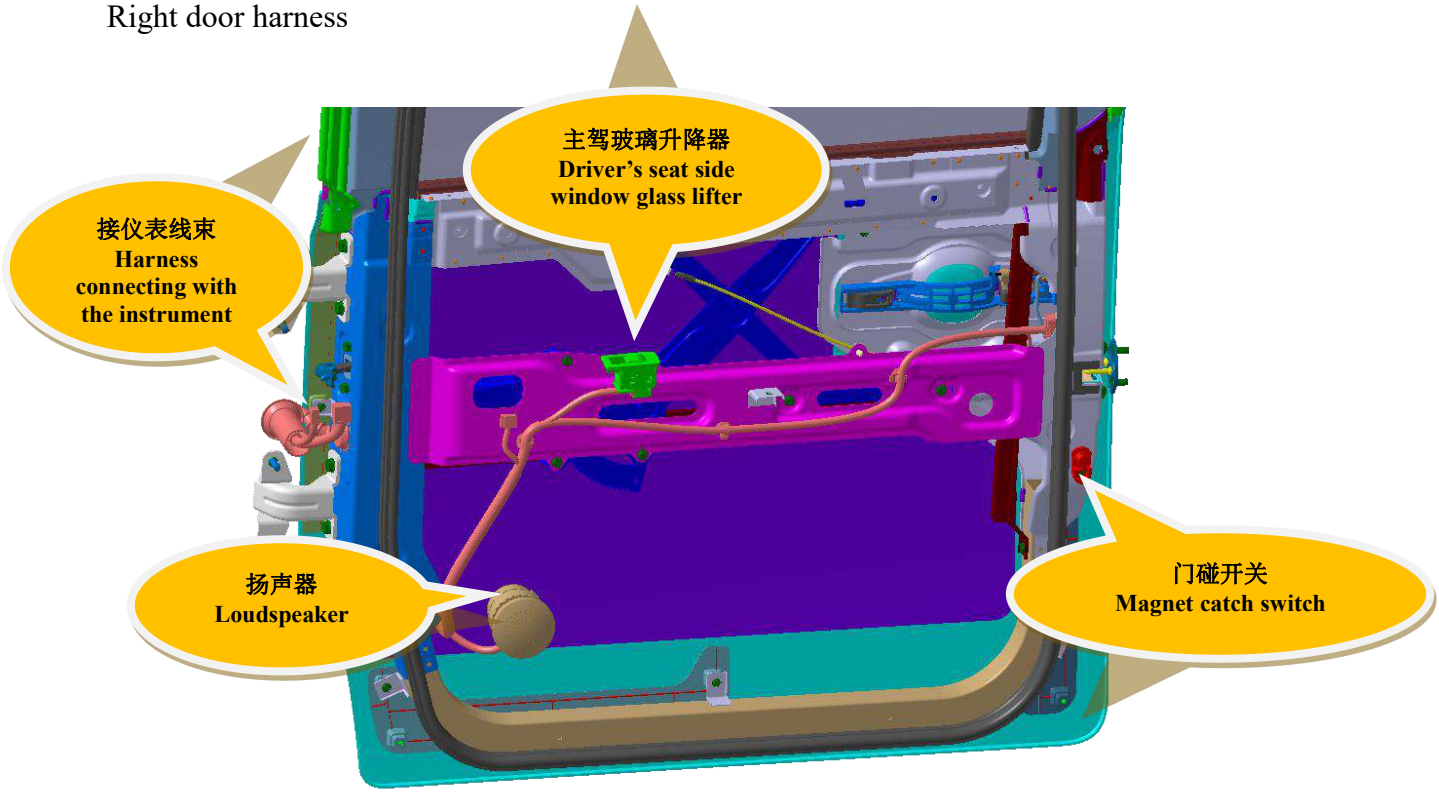
Left door harness

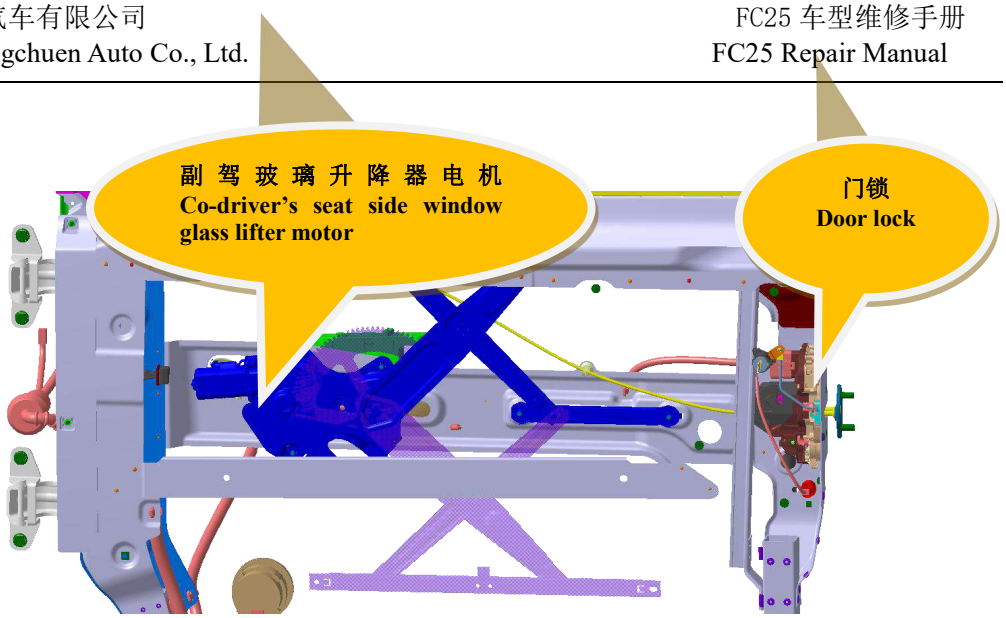




右车门线束

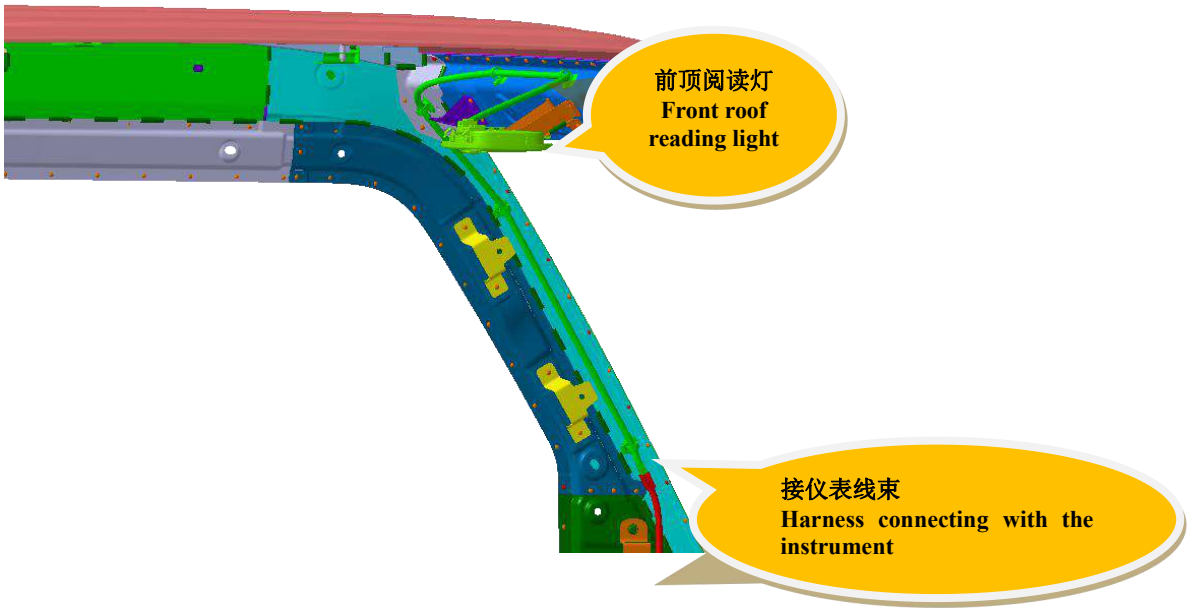
Right door harness





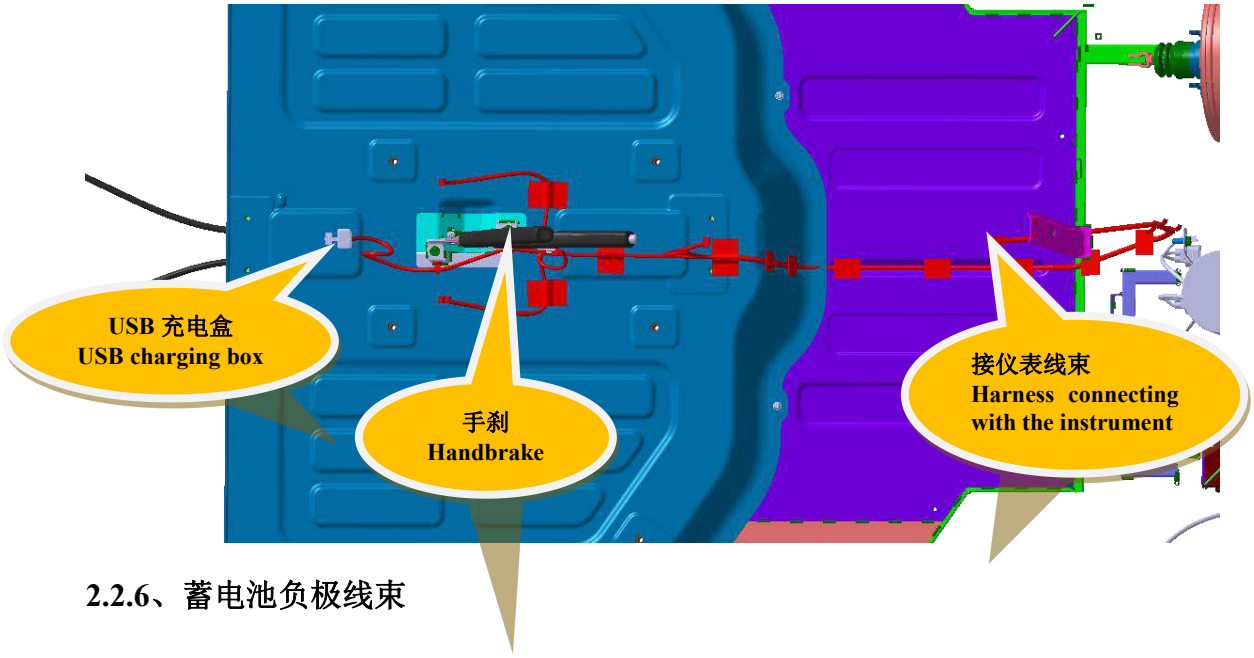
2.2.4、顶棚线束

2.2.4 Roof harness



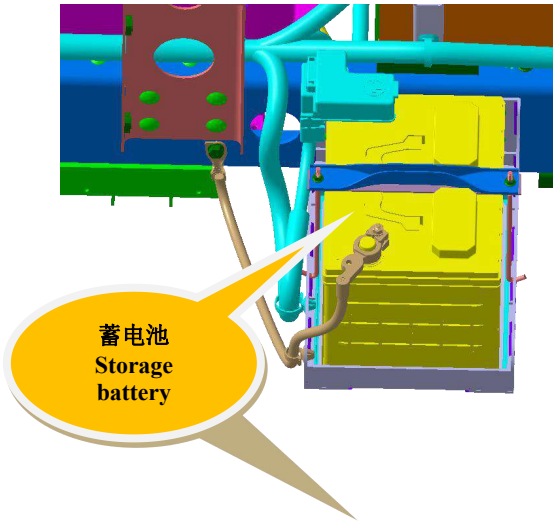
2.2.5、地板线束

2.2.5 Floor harness



2.2.6、蓄电池负极线束

2.2.6 Negative pole harness of the storage battery



2.2.7、搭铁点

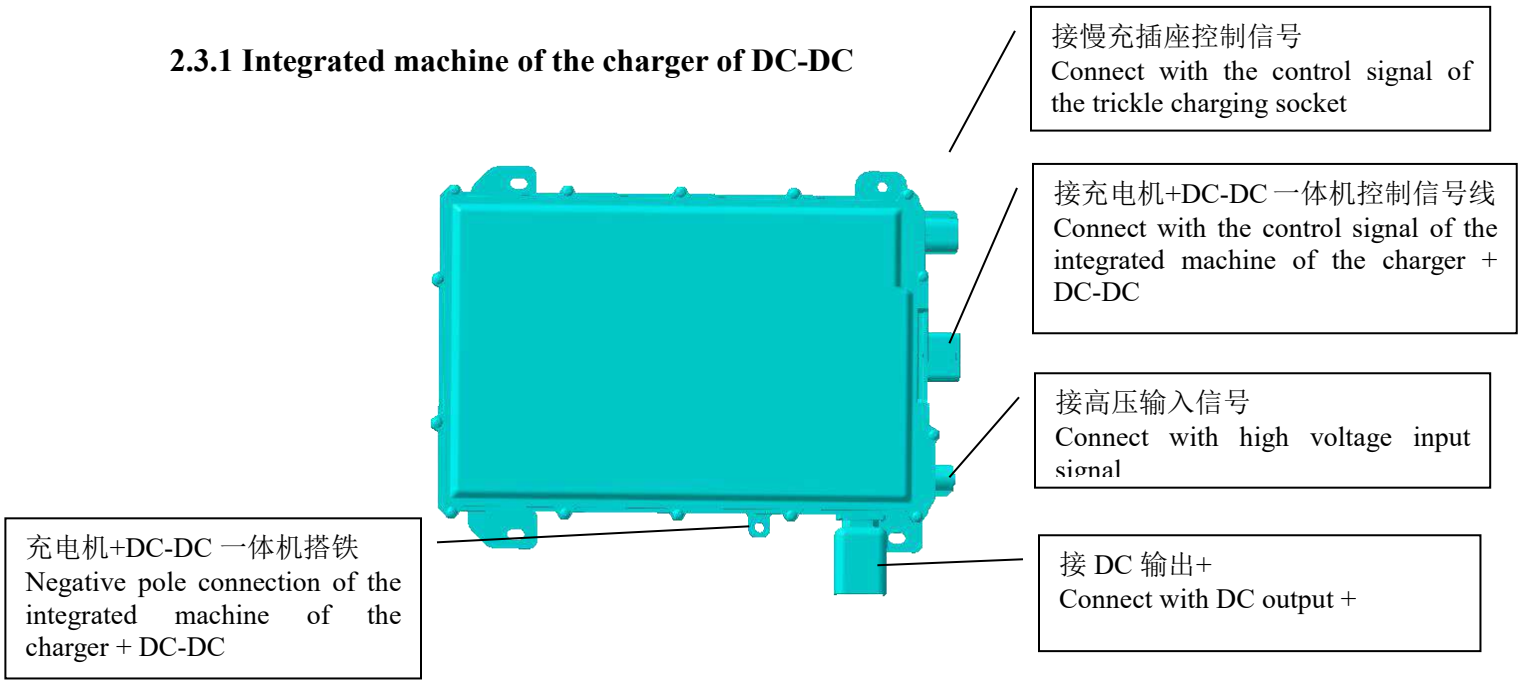
2.2.7 Negative pole connection point

2.3、主要电器设备拆装及常见故障排除

2.3 Main electrical equipment disassembly and common troubleshooting

2.3.1、充电机+DC-DC 一体机

2.3.1 Integrated machine of the charger of DC-DC



A、充电机概述

A. Overview of the charger

葑全电动汽车车载充电机具有重量轻、体积小、充电稳定，效率高、安全可靠等特点。可以进行浮充、均充自动切换，并具有电池反接、输出短路、输出过载等保护功能。

The on-board charger of Fengchuen electric auto has the features of light weight, small volume, stable charging, high efficiency and safety and reliability, etc. It offers automatic switch between floating charging and equalized charging, and protection function against reversed connection of batteries, output short circuit, output overloading, etc.

B、DC-DC 转换器系统概述

B. Overview of the DC-DC converter system

DC-DC 转换器，为车辆提供 12V 低压直流电源给低压设备使用。输出端挂接 12V 常电电池，DC-DC 转换器总成自动对常电电池进行充电管理。壳体为全密封防水防尘结构，汽车级耐温和抗振动。主要参数如下表：

DC-DC converter provides 12V low voltage DC power supply for the low voltage

equipment to use. The output end connects with 12V constant electricity battery, the assembly of the DC-DC converter automatically manages the charging of the constant electricity batteries. The shell adopts complete sealing, waterproof, and dustproof structure, and is auto level high temperature resistant and vibration resistant. The main parameters are as the following:

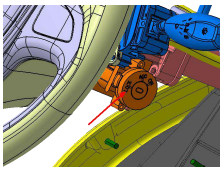
额定功率： Rate power:	1500W
额定输入电压： Rated input voltage:	144VDC
输入电压范围： Input voltage scope:	110-180VDC
输出电压范围： ‘Output voltage scope:	13.8-14.2VDC
使能控制电压： Enable control voltage:	9-12VDC
工作温度： Working temperature:	-40-+65℃

C、16.6KW 充电机+1.5KW DC-DC 一体机拆装步骤

C. Disassembly steps of the integrated machine of 16.6KW charger + 1.5 DC-DC

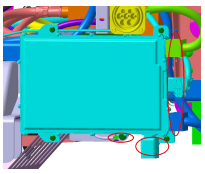
1.整车下电至 OFF 档， 5 分钟后开始作业

1. Power off the vehicle to the OFF gear, and start the operation 5 minutes later.



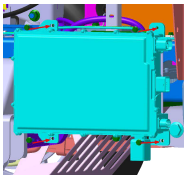
2. 拆除充电机+DC-DC 一体机上的低压线插头、高压线插头和搭铁线

2. Remove the low voltage line plug, high voltage line plug and negative pole connection line on the integrated machine of the charger + DC-DC.



3. 拆除充电机+DC-DC 一体机的四个固定螺栓，将 16.6KW 充电机+1.5KW DC-DC 一体机取下

3. Remove the 4 fixing bolts of the integrated machine of the charger +DC-DC, and remove the integrated machine of 16.6KW charger + 1.5KW DC-DC.



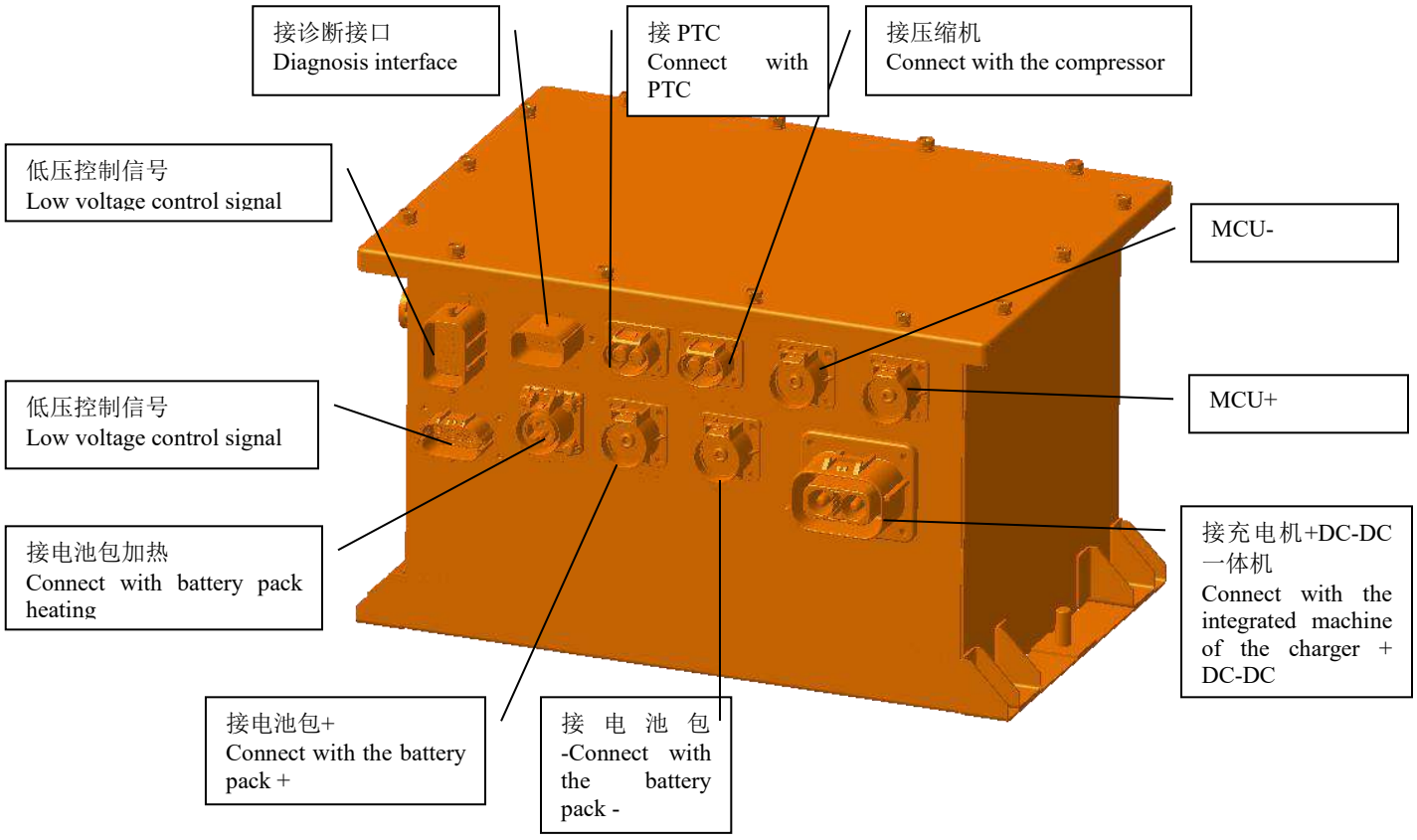
4、安装过程是拆卸步骤的逆过程
4. The assembly process reverses with the disassembly process.

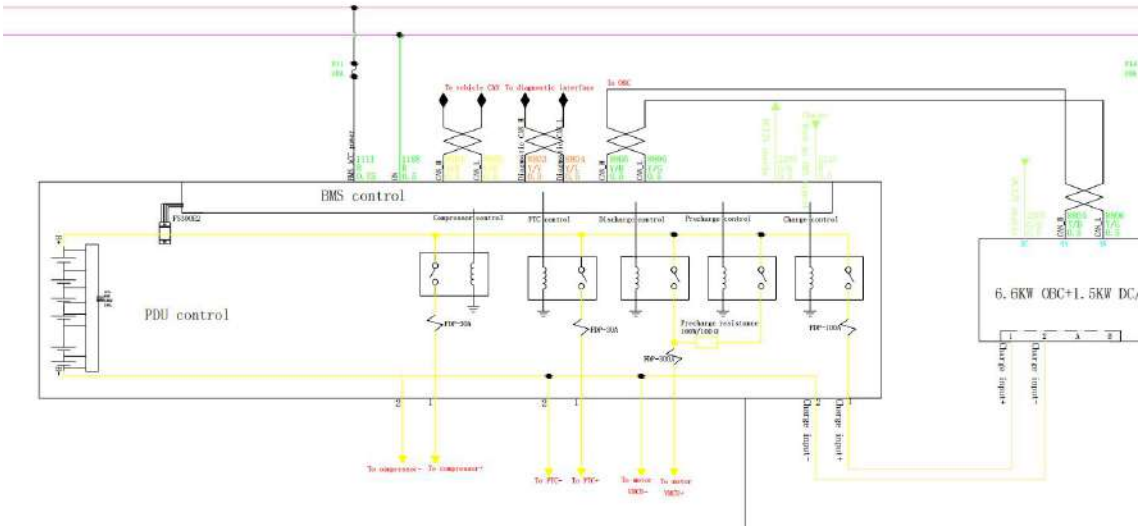
D、DC-DC转换器总成常见故障及解决方法：
D. Common faults and troubleshooting of the DC-DC converter assembly

系统 System	常见故障 Common fault	可能原因 Possible reasons	排除方法 Trouble shooting method
DC-DC转换器总成系统 DC-DC converter assembly system	整车低压电器无电 The whole vehicle low voltage electrical devices have no power	DC-DC控制线故障 DC-DC control wire fault	调整 Adjust
		无输入电压 No input voltage	调整或更换 Adjust or replace
		DC-DC损坏、无输出电压 DC-DC damage, no output voltage	检查、更换 Inspect and replace
		其他线束故障 Other harness faults	更换 Replace
	常电电池亏电 The constant electricity battery has the loss of capacity.	DC-DC输出电压低 DC-DC output voltage is low	更换 Replace
		继电器损坏 Relay damage	更换 Replace
		常电电池故障 Constant electricity battery fault	检查排除 Inspect and exclude
		线束故障 Harness fault	更换 Replace

2.3.2、电池管理系统（BMS）

2.3.2 Battery management system (BMS)





A、产品概述

A. Overview of the product

葑全电动汽车动力电池盒内部配置的电池管理系统（BMS），用来控制、管理和监测动力电池的状态，并提供远端数据下载，故障分析及报警等功能。主要功能详

见下表：

The battery management system configured in the power battery box of Fengchuen electric autos is used for controlling, managing and monitoring the state of the power batteries, providing remote end data download, fault analysis and alarming, etc. The main functions are shown in the following table:

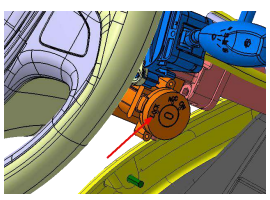
温度检测功能 Temperature test function	选用数字型温度传感器，支持8个温度监测点 Adopt digital temperature sensor, support 8 temperature monitoring points.
电池均衡功能 Battery balance function	提供被动均衡，均衡电流100mA Provide passive balance, with the balance current as 100mA
预充控制功能 Pre-charging control function	控制电池组输出接触器按照一定的顺序接入负载 Control the output contact of the battery group to connect in the load in a certain order.
热管理功能 Thermal management function	根据电池的当前温度工作 Work as per current temperature of the battery
充电管理功能 Charging management function	通过与充电机CAN通讯，实现充电控制工作 Control the charging by communicating with charger CAN.
电池组绝缘电阻检测功能 Battery group insulating resistance test function	检测电池组与车壳的绝缘阻抗 Test the insulating impedance of the battery group and the vehicle shell.
车载设备信息传输功能 Ob-board equipment information transmission function	通过CAN总线实时传输电池组当前数据及工作状态 Transmit the current data and working state of the battery group through the CAN bus.
故障分析及报警功能 Fault analysis and alarming function	根据电池组出现的故障信息分级报警 Have graded alarming as per the fault information of the battery group

B、BMS 总成拆装步骤

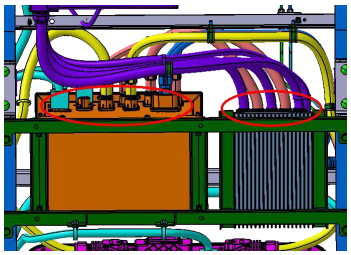
B. Disassembly steps of BMS assembly

1.整车下电至 OFF 档，5 分钟后开始作业

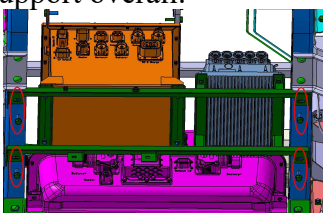
1. Power off the whole vehicle to the OFF gear and start the operation 5 minutes later.



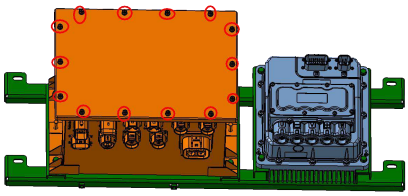
2.拆除高压配电盒的高低压线插头及电机控制器的高压线插头
2. Disassemble the high and low voltage line plug of the high voltage power distribution box and the high voltage line plug of the motor controller



3.拆除高压配电盒支架的四个固定螺栓，将配电盒支架整体取下
3. Disassemble the 4 fixing bolts of the support of the high voltage power distribution box, and remove the power distribution box support overall.



4.拆除高压配电盒上盖板 14 个螺栓，取下上盖板进行维修
4. Disassemble the 14 bolts on the cover of the high voltage power distribution box, and remove the upper cover for repair.



5、安装过程是拆卸步骤的逆过程
5. The assembly process reverses with the disassembly process.

C、常见故障及排除方法

C. Common faults and troubleshooting methods

a:若出现整车无电或无法充电等与 BMS 总成相关故障，请仔细检查 BMS 总成所有外部线路是否正确连接，以及充电机，DC-DC 转换器总成等是否正常工作，再读

取 BMS 相关报文初步判断故障。

a. In case of no power of the whole vehicle, charging failure or other relevant faults concerning the BMS assembly, please carefully inspect whether all the external circuits of the BMS assembly are connected correctly, whether the charger, DC-DC converter assembly, etc. are working normally, and then read relevant reporting data of BMS for preliminary fault judgment.

b: 若组合仪表上没有电池包相关信息显示，如动力电池电压，充放电电流，电池温度等信息，首先检查BMS电源是否正常，再检查电池包内部检测线，若外部线路均正常，可判定BMS自身故障，BMS总成内部没有可供维修的部分，更换总成即可。

b. In case the combined instrument has no information display of the battery pack, including power battery voltage, charging and discharging current, battery temperature, etc., inspect whether the BMS power supply functions well first, then inspect the internal testing lines of the battery pack; in case the external circuits are all normal, it may be judged as BMS fault; there is no repairable part in the BMS assembly, so just replace the assembly.

c: 若组合仪表显示动力电池故障指示灯，应连接USBCAN接口卡至整车信息总线或动力总线，读取相应的故障码以确定故障。

c. In case the combined instrument displays power battery fault indicator, connect the USBCAN interface card to the whole vehicle information bus or the power bus to read corresponding fault code so as to confirm the fault.

2.3.3、动力电池

2.3.3 Power battery

A、产品概述

A. Overview of the product

葑全电动汽车标准配置三元锂电池，以下为葑全电动汽车动力电池主要参数：
Fengchuen electric autos are all configured with ternary lithium batteries. The following is the main parameters of Fengchuen electric auto power batteries:

电池类型 Battery type	锂电池 Lithium battery
额定容量	29.5KWh

Rated capacity	
额定电压 Rate voltage	144V

B、动力电池的检测

B. Power battery testing

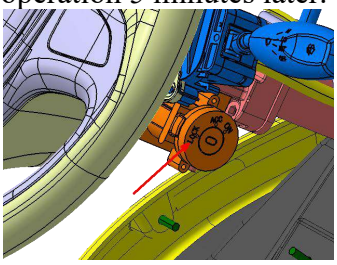
动力电池的检测，需要专用解码仪或 BMS 配置程序以及与之匹配的 USBCAN 接口卡，通过 OBD 通用检测端口可将动力电池充放电日志及故障报警记录导出以分析电池组及单体电池状态。

The power battery test requires special decoder or BMS configuration program as well as corresponding USBCAN interface card. It enables to export the blog and fault alarming record of the charging and discharging of the power batteries through the OBD universal testing ports so as to analyze the state of the battery group and each single cell.

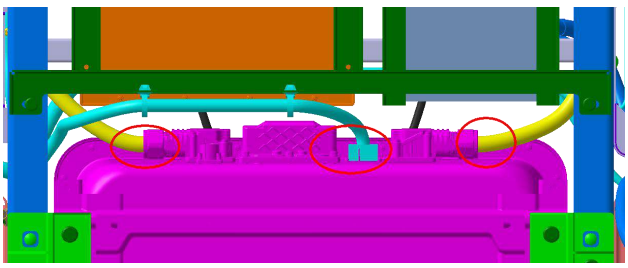
C、动力电池拆装步骤

C. Disassembly steps of the power battery

1.整车下电至 OFF 档，5 分钟后开始作业
1. Power off the whole vehicle to OFF gear and start the operation 5 minutes later.



2. 拆除电池包的高低压线插头及低压线束插头
2. Disassemble the high and low voltage line plug and low voltage harness plug of the battery pack.



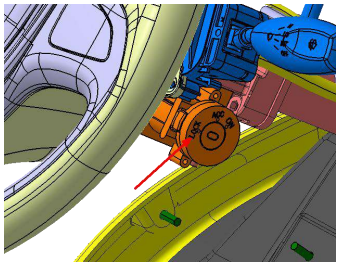
3. 将液压举升小车举升至合适高度，顶住动力电池盒，以防止在拆卸过程中跌落，沿着对角线拆除电池包支架的八个固定螺栓，将电池包支架整体取下
3. Lift the vehicle to an appropriate height along the hydraulic pressure and hold the power battery box in case of fall in disassembly; disassemble the 8 fixing bolts of the battery pack support along the diagonal line, and remove the whole battery pack support.

4. 安装过程是拆卸步骤的逆过程
4. The assembly process reverses with the disassembly process.

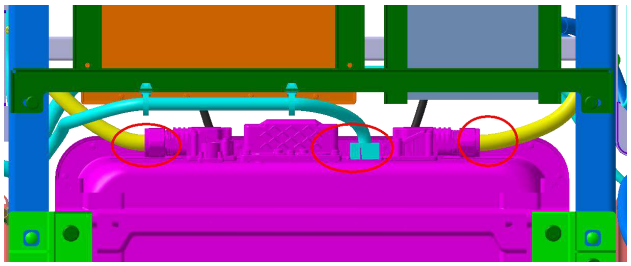
D、电芯拆装步骤

D. The battery cell disassembly steps

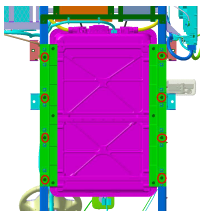
1.整车下电至 OFF 档，5 分钟后开始作业
1. Power off the whole vehicle to the OFF gear and start the operation 5 minutes later.



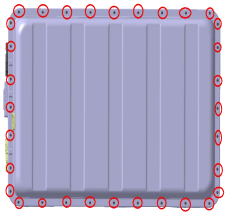
2. 拆除电池包的高低压线插头及低压线束插头
2. Disassemble the high and low voltage line plug and low voltage harness plug of the battery pack.



3. 将液压举升小车举升至合适高度，顶住动力电池盒，以防止在拆卸过程中跌落，沿着对角线拆除电池包支架的八个固定螺栓，将电池包支架整体取下
3. Lift the vehicle to an appropriate height along the hydraulic pressure and hold the power battery box in case of fall in disassembly; disassemble the 8 fixing bolts of the battery pack support along the diagonal line, and remove the whole battery pack support.



4.将电池盒从液压小车上移到到地面上，移动过程应当轻拿轻放，严禁重摔，拆除高压配电盒上盖板 32 个螺钉，取下上盖板进行维修
4. Move the battery box from the hydraulic trolley to the ground, make sure to handle gently upon moving, forbid serious fall, disassemble the 32 screws on the upper cover of the high voltage power distribution box, and remove the upper cover for repair.



5.拆除电芯压板固定螺栓（螺母），按照上位机读取顺序将问题电芯取下更换
5. Disassemble the fixing bolts (nuts) of the battery cell pressing board, and remove the failure battery cells for replacement as per the reading sequence of the host computer.

6. 安装过程是拆卸步骤的逆过程
6. The assembly process reverses with the disassembly process.

E、动力电池常见故障及排除方法

E. Common faults and troubleshooting methods of power batteries

① 当车辆出现无动力电源输出或电池严重欠压无法充电等与动力电池相关的故障，应当首先确认主线路无断路、接触器良好、熔断器良好、保护继电器未损坏，确保 CAN 通讯无故障，动力电池常见故障以及排除方法详见下表：

① In case the vehicle has the problems of no power supply output of the motive power, charging failure owing to serious under-voltage of the battery, or other faults concerning the power battery, it should confirm that the main line has no breakage, the contacts are good, the fuse is good, the protective relay is not damaged, and make sure that the CAN communication has no faults. The common faults and troubleshooting methods of the power battery are shown in the following table:

故障现象 Fault symptom	可能原因 Possible reason	排除方法 Troubleshooting

		method
单体电池零电压 No-voltage of single battery	1、欠充过放造成内部短路 1. Internal short circuit caused by under-charging or over-discharging	更换 Replace
	2、极柱或内部断路 2. Pole post or internal breakage	更换 Replace
电池壳体鼓胀 Battery shell swelling	1、过充电 1. Over-charging	修理或更换 Repair or replace
	2、过放电 2. Over-discharging	修理或更换 Repair or replace
壳体破裂 Shell breakage	1、电池受激烈碰撞或震动 1. The battery suffers sharp impact or vibration	更换 Replace
无法充电 Unable to charge	1、某一单体电池电压过低 1. The voltage of a certain single cell is too low.	均衡或更换 Balance or replace
	2、某一单体电池损坏 2. A certain single cell is damaged.	更换 Replace
行车时断时续 Intermittent driving	1、动力电池总电压过低 1. The total voltage of the power batteries is too low	充电 Charge
	2、动力电池损坏 2. The power battery is damaged	更换 Replace

② 若组合仪表显示动力电池故障指示灯，应连接 USBCAN 接口卡至整车信息总线或动力总线，读取相应的故障码以确定故障，关于动力电池故障码，详细故障码解析

② In case the combined instrument displays power battery fault indicator, connect the USBCAN interface card to the information bus or power bus of the vehicle to read corresponding fault code so as to confirm the fault. The power battery fault code is shown in detailed fault code analysis.

2.3.4、车身控制器（BCM 总成）

2.3.4 Body controller (BCM assembly)

A、产品概述

A. Overview of the product

① 蓊全电动汽车配置自主研发的车身控制器（BCM 总成）

① Fengchuen electric auto is configured with independently researched and developed body controller (BCM assembly).

② 蓊全电动汽车配置车身控制器（BCM总成）的功能
② Functions of the configured body controller (BCM assembly) of Fengchuen electric autos
a. 仪表部分显示信息提供与报警灯驱动
a. Part display information supply of the instrument and alarming light drive
b. 电机控制用信息提供
b. Supply of information for motor control
c. BMS总成控制用信息提供
C. Supply of information for MBS assembly control
d. 车辆部分电器件控制

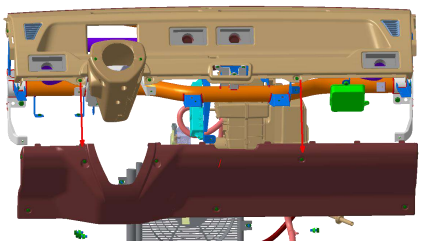
d. Part of the electrical devices control of the vehicle

B、拆卸步骤

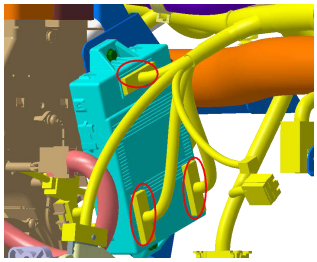
B. Disassembly steps

1.整车下电至 OFF 档，5 分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.

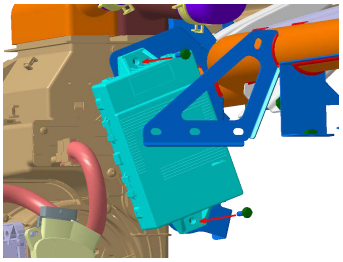
2.拆卸仪表板下本体总成（共8个螺栓），详细步骤请参考仪表板拆卸步骤
2. Disassemble the lower assembly of the instrument panel (totally 8 bolts), and refer to the instrument panel disassembly steps for details.



3.拆除车身控制器的三个接插头，将车身控制器从主电路中断开
3. Disassemble the three connectors of the body controller, and break the body controller from the main circuit.



4.拆除车身控制器的两个固定螺栓，将车身控制器取下
4. Disassemble the 2 fixing bolts of the body controller, and remove the body controller.



5.安装过程是拆卸步骤的逆过程
5. The assembly process reverses with the disassembly process.

C、常见故障及排除方法

C. Common faults and troubleshooting methods

若出现整车 CAN 通讯故障、仪表显示与实际操作不一致、倒车灯、倒车雷达常工作等与 BCM 总成相关的故障时，应首先排除外部线路连接是否正确，以及 BCM 电源及接地是否正常，排除之后则可断定 BCM 总成硬件故障，BCM 总成内部没有可供维修的部分，更换 BCM 总成总成即可。

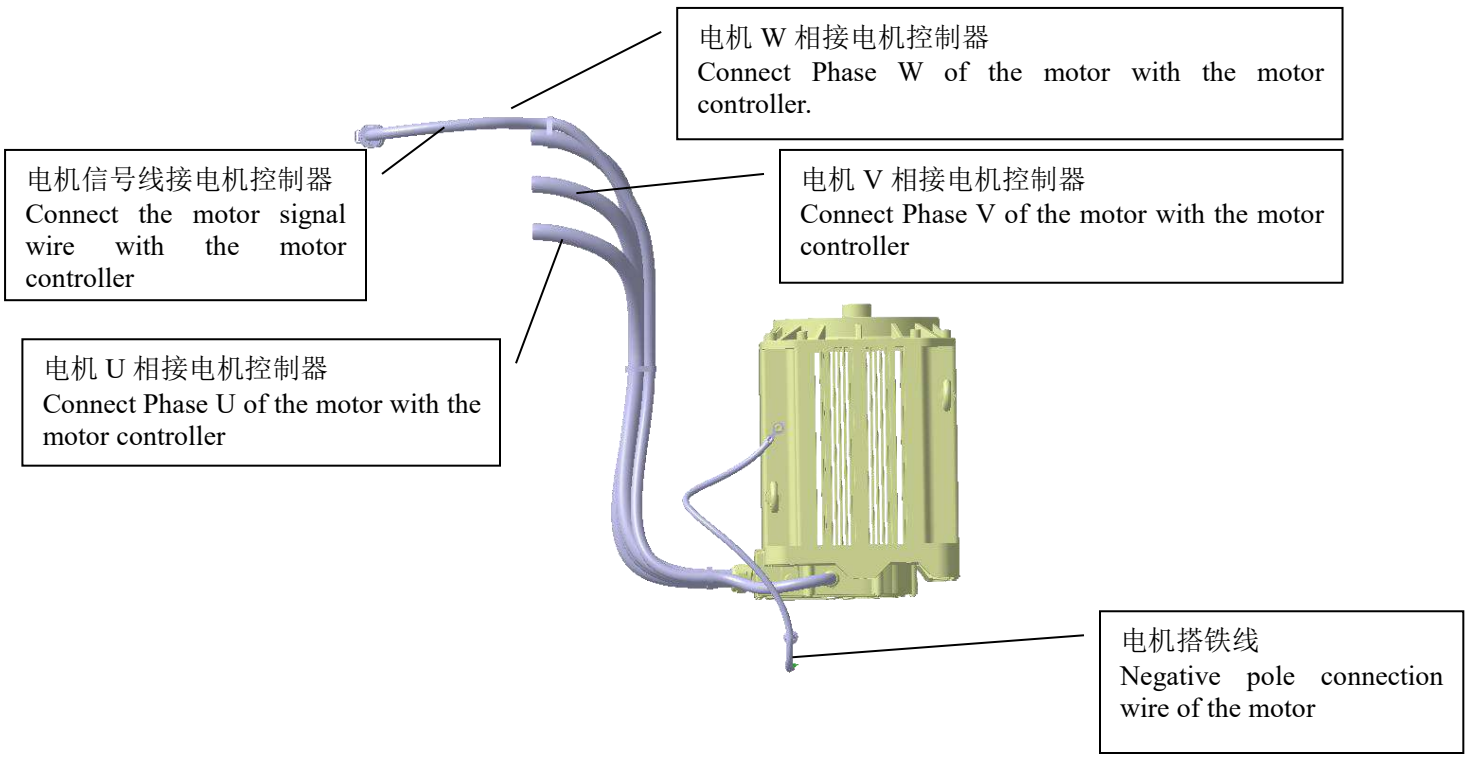
In case of whole vehicle CAN communication fault, inconsistency between the instrument display and actual practice, abnormal working of the reversing light and reversing radar, and other faults relating to the BCM assembly, confirm whether the external circuits are connected correctly, BCM power and grounding are normal; in case of no abnormality, it may be judged as hardware fault of the BCM assembly; there is no repairable part in the BCM assembly, so just replace the BCM assembly.

2.3.5、驱动电机

2.3.5 Driving motor

A、产品概述

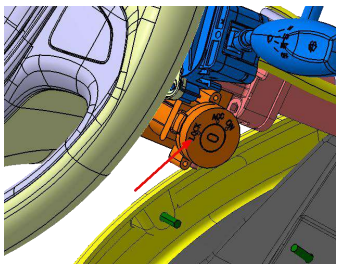
A. Overview of the product



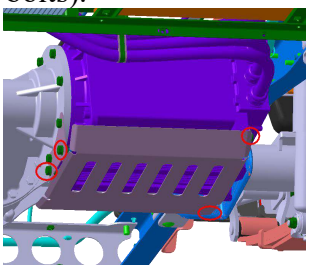
B、驱动电机的拆装步骤

B. Disassembly steps of the driving motor

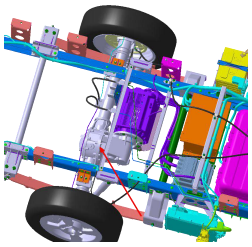
1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.



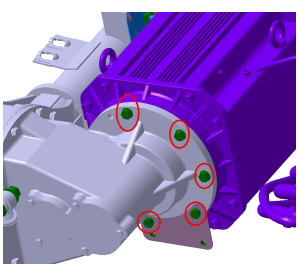
2. 拆除电机防护罩（共4个螺栓）
2. Disassemble the protection shield of the motor (totally 4 bolts).

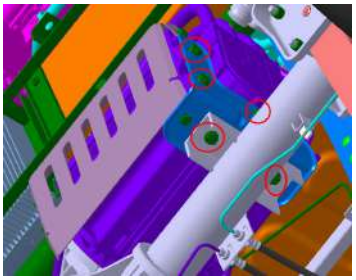


3. 拆除后桥，详细步骤请参考后桥拆卸步骤
3. Disassemble the rear bridge, and refer to the rear bridge disassembly steps for details.



4. 拆除电机总成（共10个螺栓）
4. Disassemble the motor assembly (totally 10 bolts)





5. 安装过程是拆卸步骤的逆过程
5. The assembly process reverses with the disassembly process.

C、常见故障及排除方法

C. Common faults and troubleshooting methods

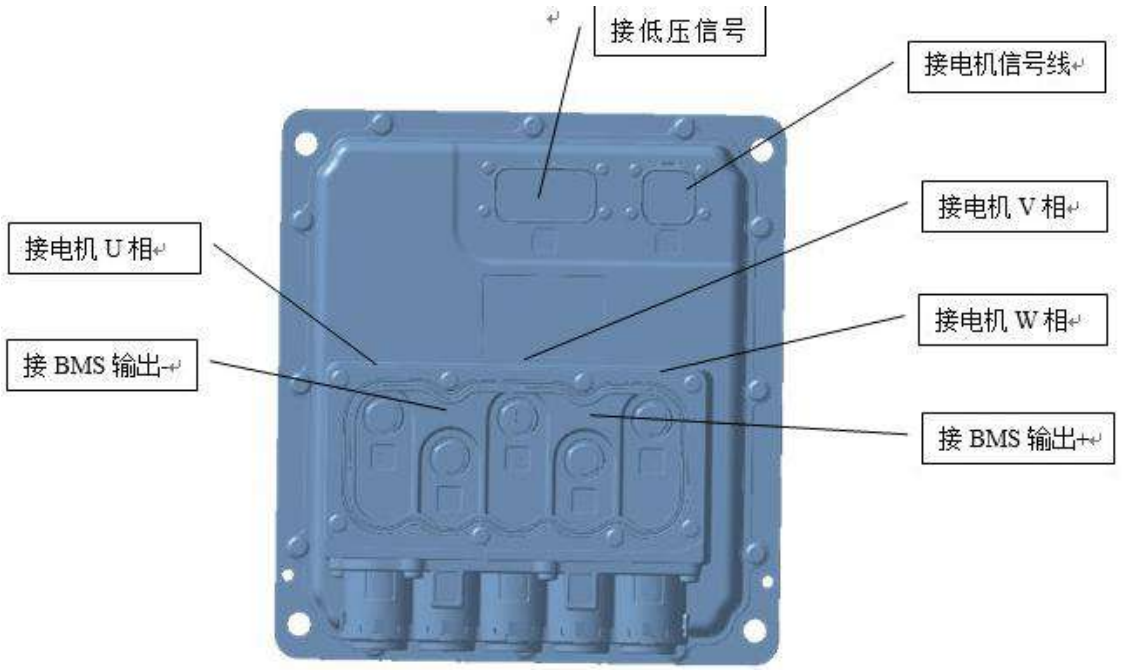
故障现象 Fault symptom	可能原因 Possible reason	排除方法 Troubleshooting method
电动机噪声大 Big motor noise	电机内部轴向窜动 Axial endplay in the motor	更换 Replace
	电机内轴承间隙大 Too big bearing gap in the motor	更换 Replace
	电机转子扫膛 Motor rotor contact fault	更换 Replace
	磁钢松动、脱落 The magnet steel gets loose or falls off	修理、更换 Repair or replace
电动机抖动 Motor vibration	位置传感器线束接触不良 Poor contact of the position sensor harness	修理、更换 Repair or replace
	电机控制器损坏 Motor controller damage	修理、更换 Repair or replace
电机工作失效 Motor failure	电机控制器故障，更换 Motor controller fault, replace	检查、更换 Repair or replace
	电机位置传感器故障 Motor position sensor fault	检查、更换 Repair or replace
	线束故障 Harness fault	检查、更换 Repair or replace

2.3.6、电机控制器

2.3.6 Motor controller

A、电机控制器概述

A. Overview of the motor controller

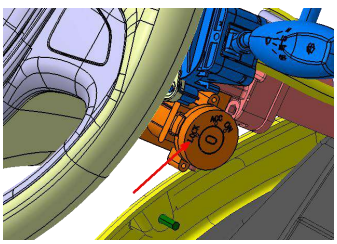


接电机 U 相	Connect with Phase U of the motor
接 BMS 输出	Connect with BMS output
接低压信号	Connect with the low voltage signal
接电机信号线	Connect with the motor signal
接电机 V 相	Connect with Phase V of the motor
接电机 W 相	Connect with Phase W of the motor
接 BMS 输出+	Connect with BMS output +

B、电机控制器拆装步骤

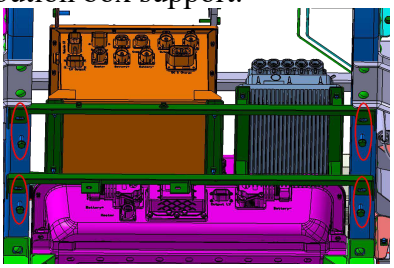
B. Disassembly steps of the motor controller

1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.

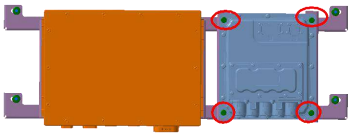


2.拆除电机控制器的高低压线插头及高压配电盒的高低压线插头

3.拆除高压配电盒支架的四个固定螺栓，将配电盒支架整体取下
3. Disassemble the 4 fixing bolts of the support of the high voltage power distribution box, and remove the whole power distribution box support.



4. 拆除电机控制器的4个固定螺栓
4. Disassemble the 4 fixing bolts of the motor controller



5. 安装过程是拆卸步骤的逆过程
5. The assembly process reverses with the disassembly process.

C、常见故障及排除方法

Common faults and troubleshooting methods

电机控制器相关故障会显示在仪表上，可以通过下表解析电机控制器故障代码：
Relevant faults of the motor controller can be displayed in the speedometer monitor, and analyzing the motor controller fault code can be through the following table:

Fault description	Code	Fault result	Treatment measures
Hardware Fault	101	Not running	Contact a professional repair shop to check and repair
DC bus over voltage Fault	102	Not running	Go to a professional repair shop and check whether the battery pack is Normal.
DC bus under voltage Warning	103	Downtime	The power battery loses power, to charge the power battery.
DC bus over current Warning	104	Downtime	Contact a professional repair shop to check and repair
Phase current overcurrent Fault	105	Downtime	Contact a professional repair shop to check and repair
Drive motor overspeed Fault	106	Downtime	Contact a professional repair shop to check and repair
Drive motor overheated	107	Downtime	Stop to cool down, go to a professional repair shop for inspection

Fault（Instrument light up icon）			and maintenance.
MCU overheated Fault（Instrument light up icon）	108	Downtime	Stop to cool down, go to a professional repair shop for inspection and maintenance
Phase current sensor Fault	109	Downtime	Contact a professional repair shop to check and repair
DC voltage sensor Fault	110	Downtime	Contact a professional repair shop to check and repair
Drive motor temperature sensor Fault	111	Limited power operation	The motor runs at 50% power limit, go to a professional repair shop for repair
MCU Temperature Sensor Fault	113		The motor runs at 50% power limit, go to a professional repair shop for repair
CAN communicatio n Fault	114		Contact local distributor
Gear Fault	115	Downtime	Check the gear switch, check whether the brake switch is Normal, if damaged, contact the dealer
Accelerator Fault	116	Not running	Check if the accelerator is Normal, if damaged, contact the dealer
Encoder Fault	117	Not running	Whether the encoder Connected line of the motor and controller is Connected Normally
MCU Precharge circuit Fault	118	Not running	Contact local distributor

2.3.7、组合仪表

2.3.7 Combined instrument

A、产品概述

A. Overview of the product

功能：用于指示车辆各种行车状态，包括车速、剩余电量、行驶里程及各种灯光指示等；

Function: It is used for indicate the driving state of the vehicle, including speed, remaining power volume, mileage, and various light indication, etc.

基本参数：
Basic parameters:
输入电压：12V；
Input voltage: 12V;
工作电压：9-16V；
Working voltage: 9-16V;
静态电流：＜3mA；

Static current: ＜3mA;

最大负载电流：2A

Maximal load current: 2A

仪表的作用就是把信息直观的显示给驾驶员让驾驶员知道了解车子的状况，仪表本身出现故障的可能性很小，大多数问题不是仪表本身的问题，例如，仪表显示的SOC不准、仪表不显示车速、仪表不显示灯光符号、电池单体温度过低、总线通讯故障等

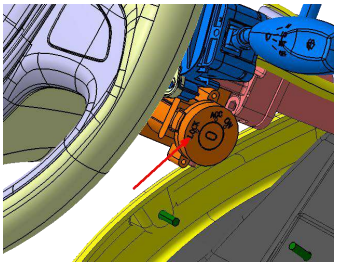
The instrument enables to display the information to the driver intuitively and make it know the state of the vehicle. The chance is very slim for the instrument itself to have fault, most of the problems are not the problems of the instrument, including the inaccurate display of SCO, speed display failure, light symbol display failure, too low temperature of single cell, bus communication fault, etc.

B、组合仪表拆卸步骤

B. Disassembly steps of the combined instruments

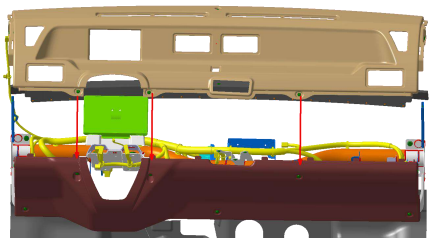
1. 整车下电至OFF档，5分钟后开始作业

1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.



2. 拆除仪表板上本体总成，详细步骤请参考仪表板拆卸步骤

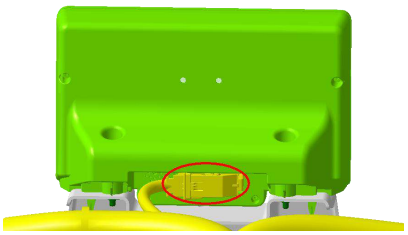
2. Disassemble the assembly on the dashboard, and refer to the disassembly steps of the dashboard for details.



3. 拆除组合仪表的两个固定螺栓及就两个固定卡扣

3. Disassemble the 2 fixing bolts of the combined instrument and two fixing buckles.

4. 拆除组合仪表线束接插件并将组合仪表取出
4. Disassemble the harness connector of the combined instrument and remove the combined instrument.



5. 安装过程是拆卸步骤的逆过程
5. The assembly process reverses with the disassembly process.

C、常见故障及解决方法
C. Common faults and solutions

本仪表总的维修原则是：仪表出现故障时，先检查连接插头是否可靠，即重新安装一次插头，如果故障依然存在，则拔下与仪表连接的插头，检测从汽车输入仪表的信号是否正确，如果对应故障的信号不正确，则说明仪表没有故障，对应故障的信号正确，则说明故障出在仪表内。

The general principle for the instrument repair is: in case of instrument fault, inspect whether the connectors are reliable, i.e. assemble the connector once again; in case the fault still exists, disconnect the connector connecting with the instrument, and inspect whether the signal input into the instrument from the vehicle is correct, in case the signal of the corresponding fault is not correct, it shows that the instrument has no fault, in case the signal of corresponding fault is correct, it indicates that the fault lies in the instrument.

故障现象 Fault symptom	可能原因 Possible reason	排除方法 Troubleshooting method
组合仪表工作失效 The combined instrument failure	1.线束接插件松动 1. The harness connector is loose	检查、修理、更换 Inspect, and repair or replace
	2.无输入信号 2. No signal input	检查、修理、更换 Inspect, and repair or replace
	3.组合仪表内部损坏 3. Internal damage of the combined instrument	检查、更换 Inspect and replace
	4.线束故障	检查、更换

	4. Harness fault	Inspect and replace
	常电电池亏电 Loss of capacity of the constant electricity battery	充电、更换 Charge or replace

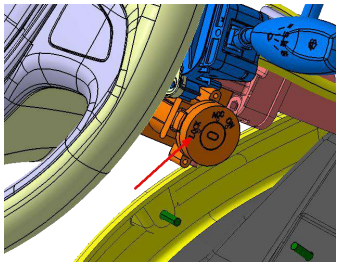
2.3.8、大屏

2.3.8 Big screen

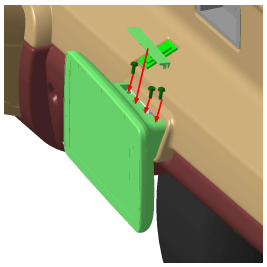
A、大屏拆卸步骤

A. Disassembly steps for the big screen

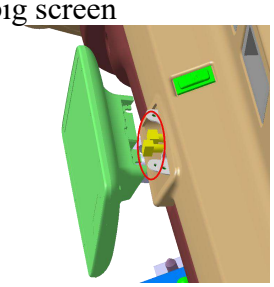
1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.



2.取下大屏的上盖板，并拆除大屏的3个固定螺栓
2. Remove the upper cover of the big screen, and disassemble the 3 fixing bolts of the big screen.



3. 拆除大屏线束接插件并将大屏取下
3. Disassemble the harness of the big screen and remove the big screen



4. 安装过程是拆卸步骤的逆过程
4. The assembly process reverses with the disassembly process.

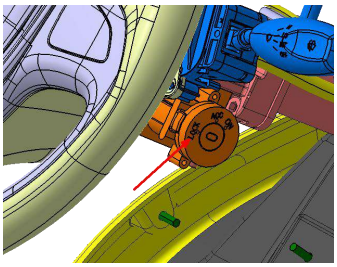
2.3.9、雨刮总成

2.3.9 Windshield wiper assembly

A、雨刮

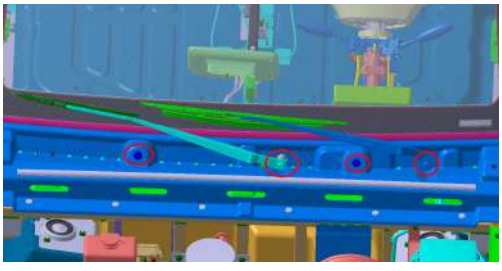
A. Windshield wiper

1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and starts the operation 5 minutes later.

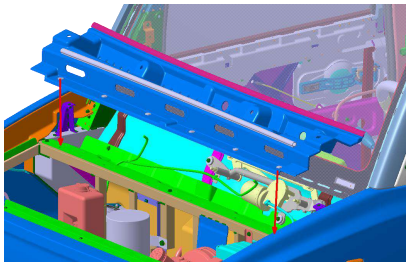


2. 拆除前舱盖总成，详细步骤请参考前舱盖总成拆卸步骤
2. Disassemble the assembly of the bonnet of the engine compartment, and refer to the disassembly steps of the bonnet of the engine compartment for details.

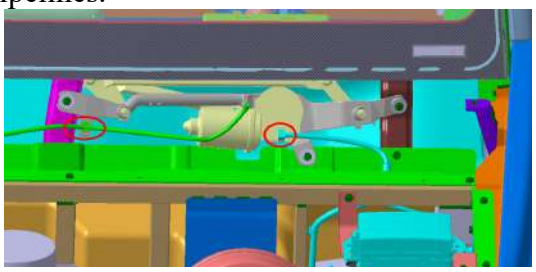
3. 拆除洗涤喷嘴（2个）及主副雨刮刮片和刮臂
3. Disassemble the washing nozzle (2 pcs) and the wiper piece and wiper arm of the main and auxiliary windshield wipers.



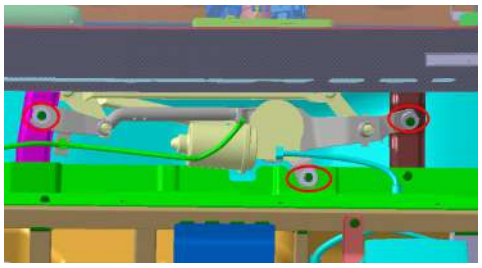
4. 拆除通风盖总成，详细步骤请参考通风盖总成拆卸步骤
4. Disassemble the assembly of ventilation cover, and refer to the disassembly steps of the ventilation cover assembly for details.



5. 拆除雨刮电机连接线束的接插件及洗涤管路的固定卡扣·
5. Disassemble the connectors of the connecting harness of the windshield wiper motor and fixing buckle of the washing pipelines.



6. 拆除雨刮电机的3个固定螺栓并取下雨刮电机
6. Disassemble the 3 fixing bolts of the windshield wiper motor and remove the windshield wiper motor.



7. 安装过程是拆卸步骤的逆过程
7. The assembly process reverses with the disassembly process.

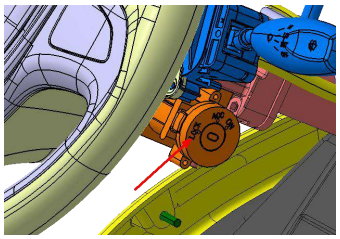
2.3.10、蓄电池

2.3.10 Storage battery

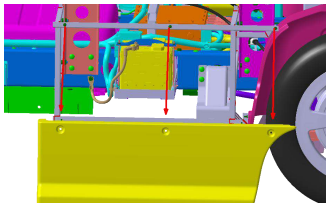
A、蓄电池拆卸步骤

A. Disassembly steps of the storage battery

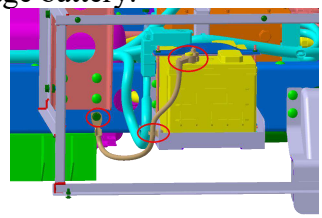
1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.



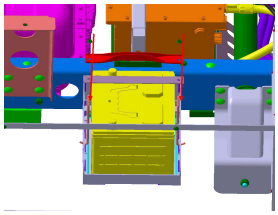
2.拆除左前裙板本体（共5个螺钉）
2. Disassemble left right side skirt (totally 5 screws)



3. 拆除蓄电池负极线搭铁螺栓、正极保险丝盒及蓄电池线束固定卡扣并将蓄电池负极线束取出
3. Disassemble the negative pole connection bolt of the negative wire of the storage battery, positive pole fuse box, the fixing buckle of the storage battery harness, and remove the negative pole harness of the storage battery.



4. 拆除蓄电池固定的螺母，依次取下蓄电池压板、蓄电池压板橡胶条，最后取下蓄电池
4. Disassemble the fixing nuts of the storage battery, and remove the pressing board of the storage battery and rubber piece of the pressing board of the storage battery in order, and finally remove the storage battery.



5. 安装过程是拆卸步骤的逆过程
5. The assembly process reverses with the disassembly process.

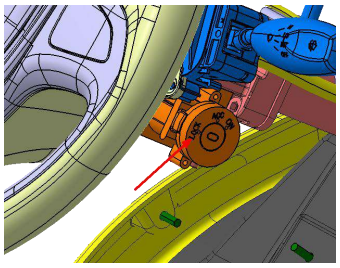
2.3.11、扬声器

2.3.11 Loudspeaker

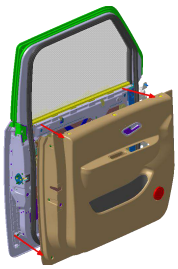
A、扬声器拆卸步骤

A. The disassembly process of the loudspeaker

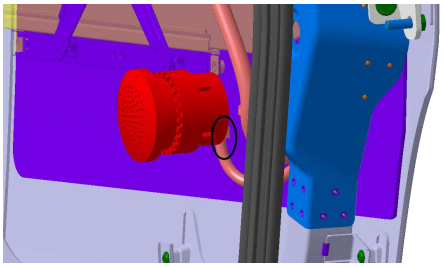
1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.



2.拆除车门内板总成，详细步骤请参考车门内板总成拆卸步骤
2. Disassemble the inner board assembly of the door, and refer to the disassembly steps of the inner board assembly of the door for details.



3. 拆除扬声器连接的接插件并取下扬声器
3. Disassemble the connectors connecting with the loudspeaker, and remove the loudspeaker.



4. 安装过程是拆卸步骤的逆过程
4. The assembly process reverses with the disassembly process.

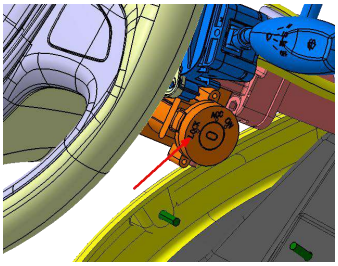
2.3.12、空调系统

2.3.12 Air conditioning system

A、冷凝器拆卸步骤

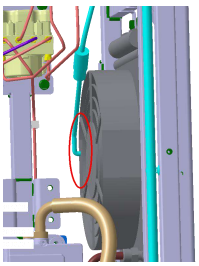
A. Disassembly steps of the condenser

1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.

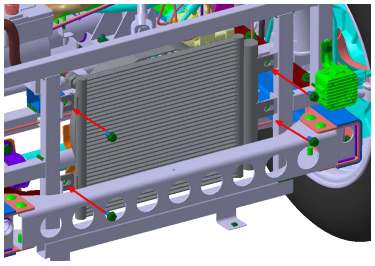


2.拆除前舱盖和前保险杆总成，详细步骤请参考前舱盖和前保险杆总成拆卸步骤
2. Disassemble the bonnet and the assembly of the front bumper, and refer to the disassembly steps of the bonnet and the assembly of the front bumper for details.

3. 拆除冷凝器连接线束的接插件
3. Disassemble the connector of the connecting harness of the condenser.



4.拆除冷凝器的4个固定螺栓并取下冷凝器
4. Disassemble the 4 fixing bolts of the condenser and remove the condenser.

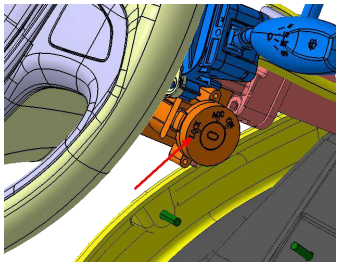


5. 安装过程是拆卸步骤的逆过程
5. The assembly process reverses with the disassembly process.

B、压缩机拆卸步骤

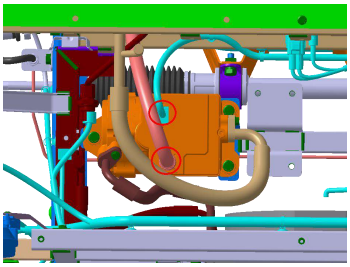
B. Disassembly steps of the compressor

1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.

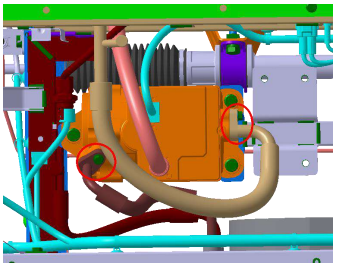


2. 拆除前舱盖总成，详细步骤请参考前舱盖总成拆卸步骤
2. Disassemble the assembly of the bonnet, and refer to the disassembly process of the bonnet for details.

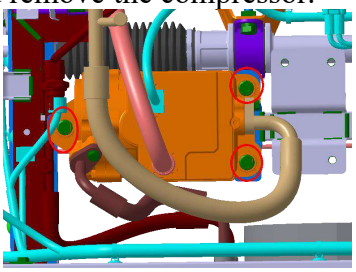
3. 拆除压缩机上连接的高低压线束接插件
3. Disassemble the high and low voltage harness connectors connecting with the compressor.



4. 拆除压缩机上空调管路的固定螺栓（2个）
4. Disassemble the fixing bolts (2 pcs)of the air conditioner pipeline of the compressor.



5. 拆除压缩机的3个固定螺栓并取出压缩机
5. Disassemble the 3 fixing bolts of the compressor and remove the compressor.

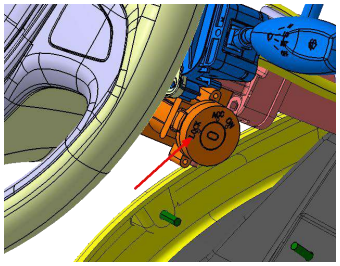


6. 安装过程是拆卸步骤的逆过程
6. The assembly process reverses with the disassembly process.

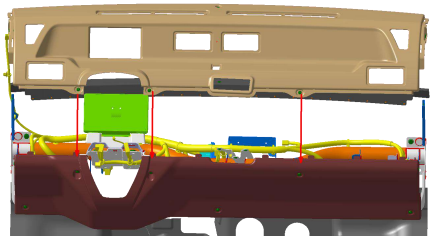
C、空调主机拆卸步骤

C. Disassembly steps of the main engine of the air conditioner

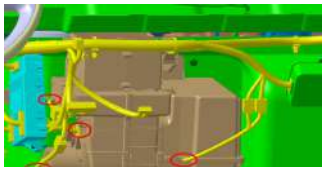
1．整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.



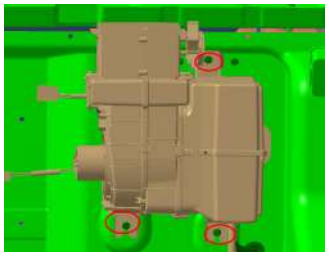
2. 拆除仪表板上本体总成，详细步骤请参考仪表板拆卸步骤
2. Disassemble the assembly of the instrument panel, and refer to the disassembly steps of the instrument panel for details.



3. 拆除空调主机上的高低压线束的接插件
3. Disassemble the connectors of the high and low voltage harness on the main engine of the air conditioner.



4. 拆除空调主机的3个固定螺栓并取下空调主机
4. Disassemble the 3 fixing bolts of the main engine of the air conditioner and remove the main engine of the air conditioner.



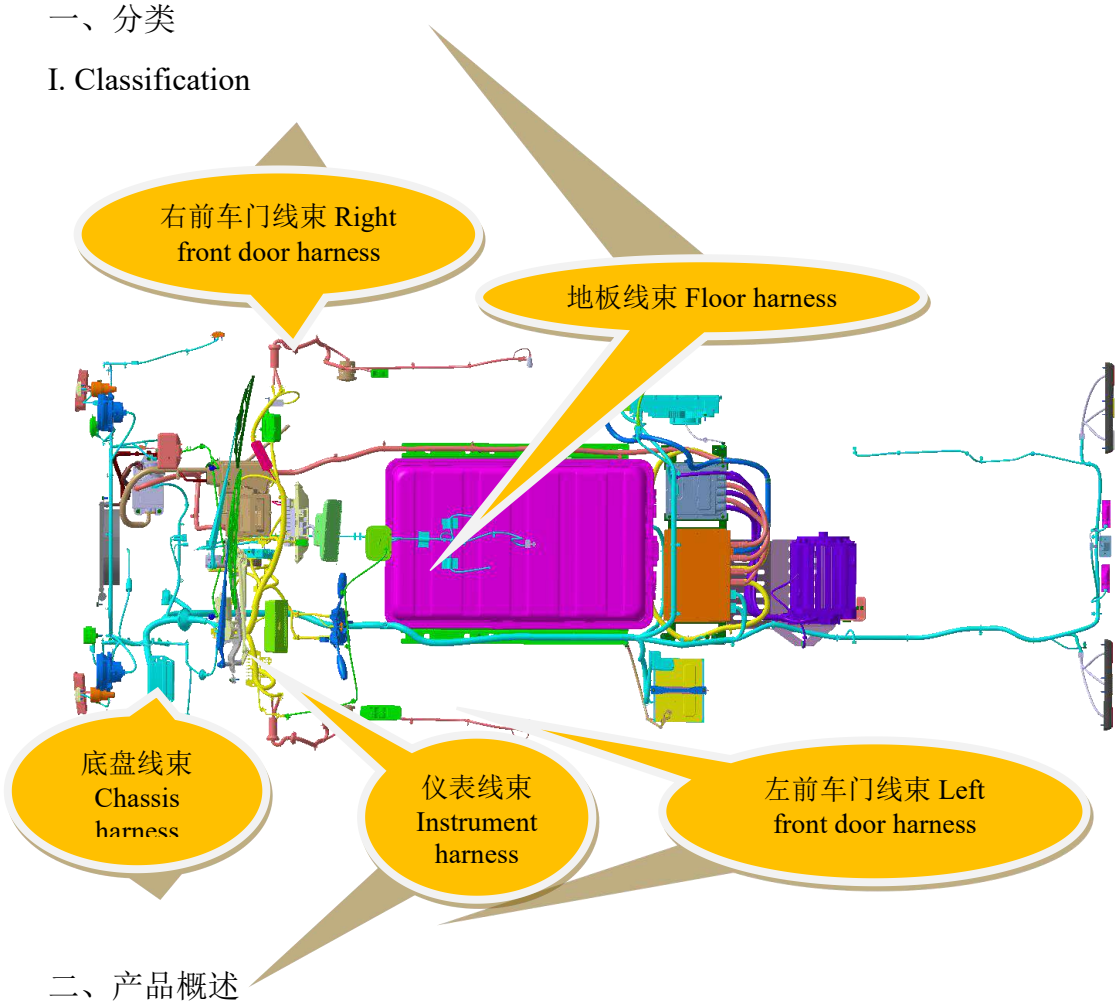
5. 安装过程是拆卸步骤的逆过程
5. The assembly process reverses with the disassembly process.

2.3.13、线束

2.1.13 Harness

一、分类

I. Classification



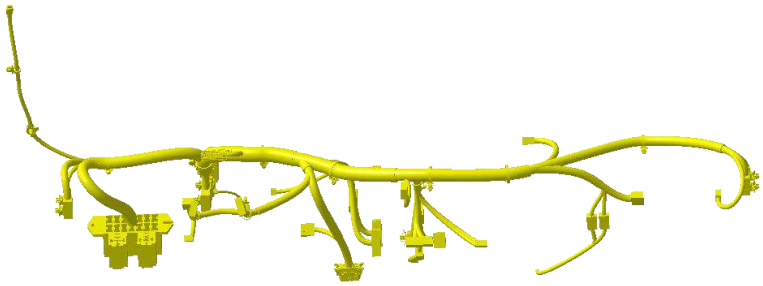
二、产品概述

II. Overview of the product

汽车线束在整车中的作用是将电气系统的电源信号或数据信号进行传递或交换，实现电气系统的功能及要求。
The auto harnesses transmit or exchange the power signal or data signal of the electrical system and achieves the functions and requirements of the electrical system.

A、仪表线束

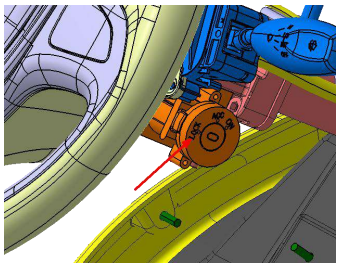
A. Instrument harness



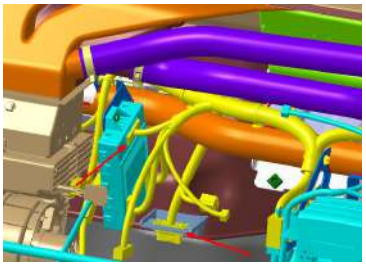
a、拆除仪表线束步骤

a. Disassembly steps of the instrument harnesses

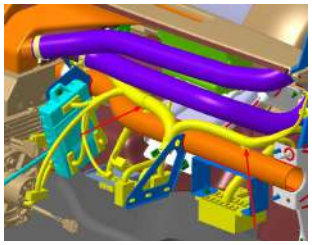
1.整车断电，拆除仪表板总成，详细步骤请参考仪表板拆卸步骤
1. Power off the whole vehicle, disassemble the assembly of the instrument panel, and refer to the disassembly steps of the instrument panel for details.



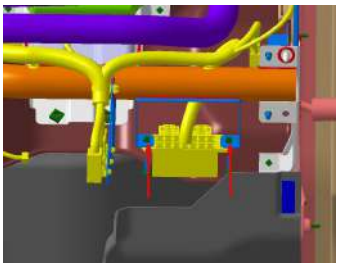
2. 拆卸所有与仪表台线束连接的接插件
2. Disassemble all the connectors connecting with the harnesses of the dashboard.



3. 依次拆除固定仪表线束的各个卡扣，并将仪表线束取出
3. Disassemble all buckles for fixing the instrument harnesses in order, and remove the instrument harnesses.



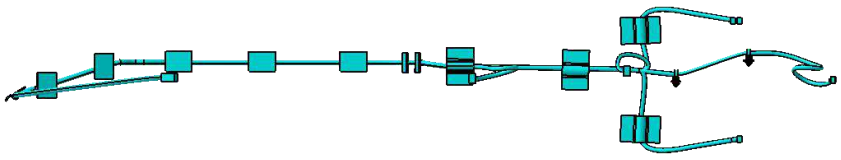
4. 拆卸保险丝盒固定螺栓，并去除仪表台线束
4. Disassemble the fixing bolts of the fuse box, and remove the harnesses of the dashboard.



5. 安装过程是拆卸步骤的逆过程
5. The assembly process reverses with the disassembly process.

B、地板线束

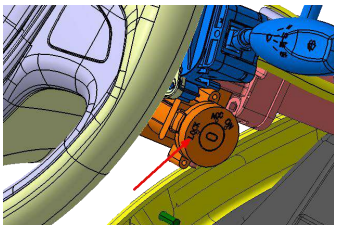
B. Floor harnesses



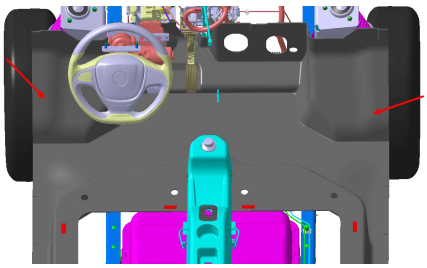
b、拆除地板线束步骤

b. Disassembly steps of the floor harnesses

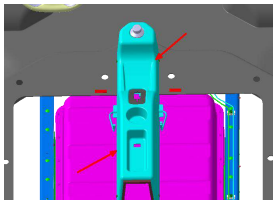
1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.



2. 拆除地毯总成，详细步骤请参考地毯拆卸步骤
2. Disassemble the assembly of the blanket, and refer to the disassembly steps of the blanket for details.



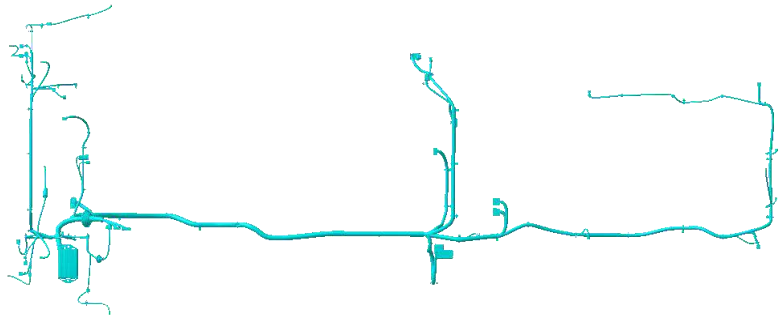
3. 拆除副仪表板，详细步骤请参考副仪表板拆卸步骤并拆除地板线束的固定卡扣和固定胶带
3. Disassemble the auxiliary instrument panel, and refer to the disassembly steps of auxiliary instrument panel for details and disassemble the fixing buckles and fixing tapes of the floor harnesses.



4. 安装过程是拆卸步骤的逆过程
4. The assembly process reverses with the disassembly process.

C、底盘线束

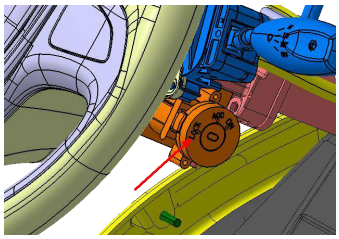
C. Chassis harnesses



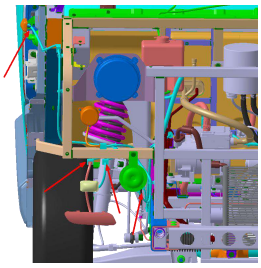
c、拆除底盘线束步骤

c. Steps for disassembling the chassis harnesses

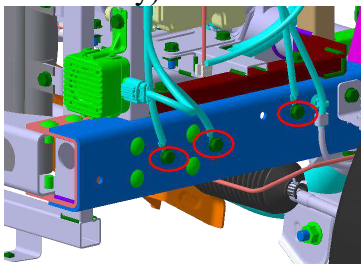
1. 整车下电至OFF档，5分钟后开始作业
1. Power off the whole vehicle to the OFF gear, and start the operation 5 minutes later.



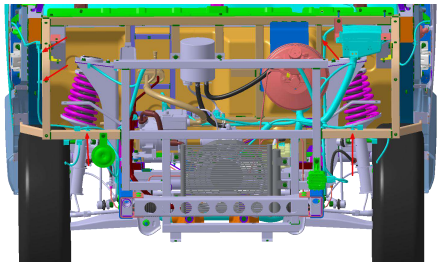
2. 拆卸所有与底盘线束连接的接插件
2. Disassemble all the connectors connecting with the chassis harnesses.



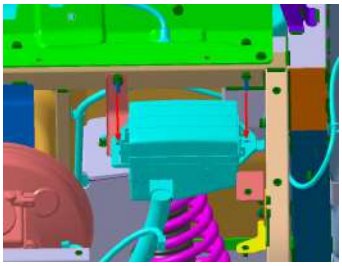
3. 拆卸线束搭铁螺栓（共6处）
3. Disassemble the negative pole connection bolts (6 places totally) of the harness.



4. 拆卸线束固定扎带
4. Disassemble the fixing binding ribbon of the harness.



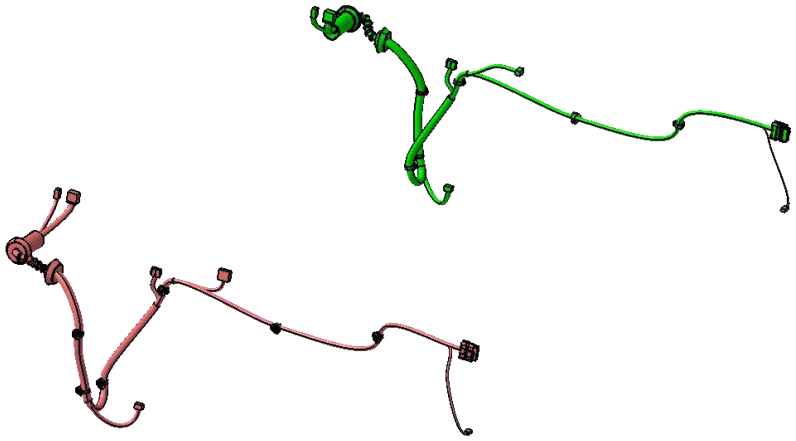
5. 拆卸保险丝盒固定螺栓并将底盘线束取出
5. Disassemble the fixing bolts of the fuse box and remove the harness of the chassis.



6. 安装过程是拆卸步骤的逆过程
6. The assembly process reverses with the disassembly process.

D、左右前门线束

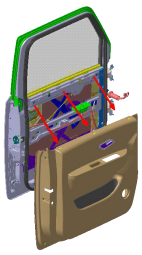
D. Harnesses of the left and right front door



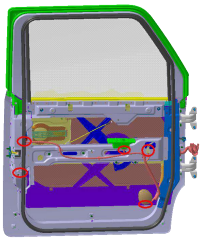
d、拆除左右前门线束步骤

d. Disassembly steps of the left and right door harnesses

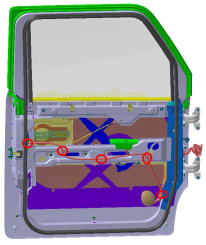
1. 拆卸车门本体总成
1. Disassemble the door assembly.



2. 拆卸所有与车门线束连接的接插件
2. Disassemble all the connectors connecting with the door harnesses.



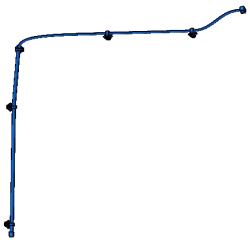
3. 依次按顺序拆卸车门线束的固定卡扣，并取下车门线束
3. Disassemble the fixing buckles of the door harnesses in order and remove the door harnesses.



4. 安装过程是拆卸步骤的逆过程
4. The assembly process reverses with the disassembly process.

E、顶棚线束

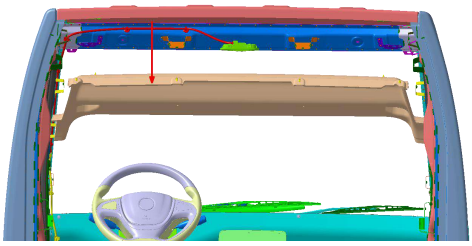
E. Roof harnesses



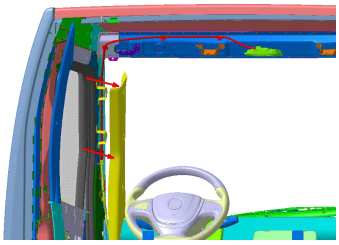
e、拆除顶棚线束步骤

e. Disassembly steps of the roof harnesses

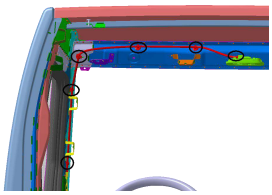
1. 拆除顶棚
1. Disassemble the roof



2. 拆除左侧护板总成
2. Disassemble the right protection plate assembly



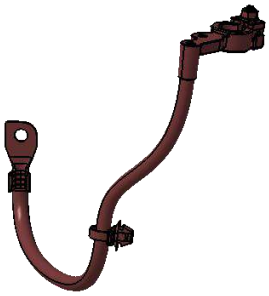
3. 拆除与顶棚线束连接的接插件并依次拆除顶棚线束固定卡扣，取出顶棚线束
3. Disassemble the connectors connecting with the roof harnesses and the fixing buckles of the roof harnesses in order and remove the roof harnesses



4. 安装过程是拆卸步骤的逆过程
4. The assembly process reverses with the disassembly process.

F、蓄电池负极线束

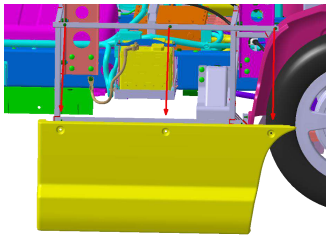
F. Negative pole harnesses of the storage battery



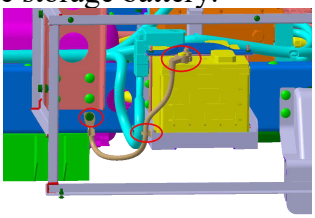
f、拆除蓄电池负极线束步骤

f. Disassembly steps of the negative pole harnesses of the storage battery

1. 拆除左前裙板本体（共5个螺钉）
1. Disassemble the left right side skirt (totally 5 bolts)



2. 拆除蓄电池负极线搭铁螺栓、正极保险丝盒及蓄电池线束固定卡扣并将蓄电池负极线束取出
2. Disassemble the negative pole connection bolts of the negative pole wire of the storage battery, fuse box of the positive pole, and fixing buckle of the storage battery harness and remove the negative pole harness of the storage battery.



3. 安装过程是拆卸步骤的逆过程
3. The assembly process reverses with the disassembly process.

三、线束故障与排除方法

3. Harness faults and troubleshooting methods

① 线路对搭铁短路
① The circuit has short circuit to the negative pole connection
a. 使用数字式万用表测试线路是否对搭铁短路的方法和步骤
a. Methods and steps for using the digital multi-meter to test whether the circuit has short circuit to the negative pole connection.
（1） 断开待测线路上的供电电路（如熔丝、控制模块）。
(1) Break the power supply circuit of the circuit pending for test (such as fuse, control module).
（2） 断开待测线路的负载。
(2) Break the load of the circuit pending for test.
（3） 将数字式万用表旋至Ω挡。
(3) Turn the digital multi-meter to Ω gear.
（4） 将数字式万用表的一个探针连接到待测线路一端。
(4) Connect one of the probes of the digital multi-meter to one end of the circuit pending for test.
（5） 将数字式万用表另一探针连接到可靠搭铁上。此时如果万用表显示电阻很低或没有电阻，则线路对搭铁短路。
(5) Connect the other probe of the digital multi-meter to the negative pole reliably. In case the multi-meter displays very low or no resistance, then the circuit has short circuit to the negative pole connection.
b. 使用测试灯测试线路是否对搭铁短路的方法和步骤
b. Methods and steps for using the testing light to test whether the circuit has short

circuit to the negative pole connection

（1） 断开待测电路上的供电电路（如熔丝、控制模块）。

(1) Break the power supply circuit of the circuit pending for test (such as fuse, control module).

（2） 断开待测线路的负载。

(2) Break the load of the circuit pending for test.

（3） 将测试灯的一个探针连接到蓄电池正极。

(3) Connect one probe of the testing light to the positive pole of the storage battery.

（4） 将测试灯的另一个探针连接到待测电路一端。此时如果测试灯点亮，则待测电路存在对搭铁短路故障。

(4) Connect the other probe of the testing light to one end of the circuit pending for testing. In case the testing light is on, then the circuit pending for testing has short circuit to the negative pole connection.

② 线路线间短路

② Inter-wire short circuit of the circuit

（1） 查阅线路系统示意图并确定开路的熔丝。

(1) Check the diagrammatic sketch of the circuit system and confirm the fuses of the open circuit.

（2） 断开熔丝与各负载之间的第1个连接器或开关。

(2) Break the first connector or switch of the fuse with each load.

（3） 将数字式万用表跨接在熔丝端子之间（确信熔丝上有电）。当数字式万用表显示电压时，表明与第一个连接器或开关连接的线束存在线间短路。如果数字式万用表未显示电压，则进行下一步骤。

(3) Bridge the digital multi-meter between the terminals of the fuses (make sure that the fuse is live). In case the digital multi-meter displays voltage, it indicates that the harness connecting with the 1st connector or switch has inter-wire short circuit. In case the digital multi-meter doesn't display the voltage, keep on the next step.

（4） 依次断开 / 连接（或关 / 闭）各连接器（或开关），直到数字式万用表显示电压，以找出存在短路故障的电路。

(4) Break / connect (or open / close) all the connectors (or switches) until the digital multi-meter displays the voltage, so as to find out the circuit having short circuit faults.

③ 线路对电源短路

③ The circuit has short circuit to the power supply

（1） 将数字式万用表旋至V直流挡。

(1) Turn the digital multi-meter to V AC gear.

（2） 将数字式万用表正极探针连接到待测线路一端。

(2) Connect the probe of the digital multi-meter positive pole to one end of the circuit pending for testing.

（3） 将数字式万用表负极探针连接到可靠的搭铁上。

(3) Connect the probe of the digital multi-meter negative pole to the negative pole connection reliably.

（4） 接通点火开关并操作所有附件。

(4) Connect the ignition switch and operate all accessories.

（5） 如果测量电压高于1V，则电路中存在对电压短路。

(5) In case the tested voltage is higher than 1V, then the circuit has short circuit to the voltage.

④ 线路断路

④ Circuit breakage

使用数字式万用表测试线路断路的方法和步骤

Methods and steps for using digital multi-meter to test circuit breakage

（1） 将数字式万用表旋至Ω挡。

(1) Turn the digital multi-meter to Ω gear.

（2） 断开待测线路的供电电路（如熔丝、控制模块）。

(2) Break the power supply circuit of the circuit pending for testing (such as fuses, control modules)

（3） 断开待测线路的负载。

(3) Break the load of the circuit pending for test.

（4） 按数字式万用表上的MIX/MAX（最小，最大）按钮。

(4) Press the MIX / MAX (minimum, maximum) button on the digital multi-meter.

（5） 将数字式万用表的～个探针连接到待测线路一端。

(5) Connect one probe of digital multi-meter to one end of the circuit pending for testing.

（6） 将数字式万用表的另一个探针连接到待测线路的另一端。此时如果数字式万用表显示电阻很低或没有电阻并能听到～个音调，则电路具有良好的连续性（未断路）。

(6) Connect the other probe of the digital multi-meter to the other end of the circuit pending for testing. In case the digital multi-meter displays very low or no resistance and one tone is heard, then the circuit has good continuity (no breakage).

第三章、底盘

Chapter III Chassis

3.1、转向系统

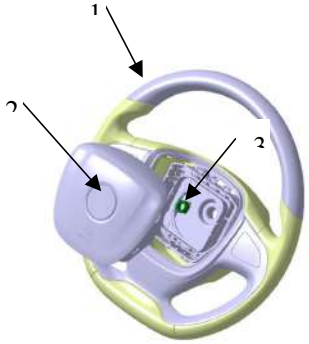
3.1 Steering system

3.1.1、产品概述

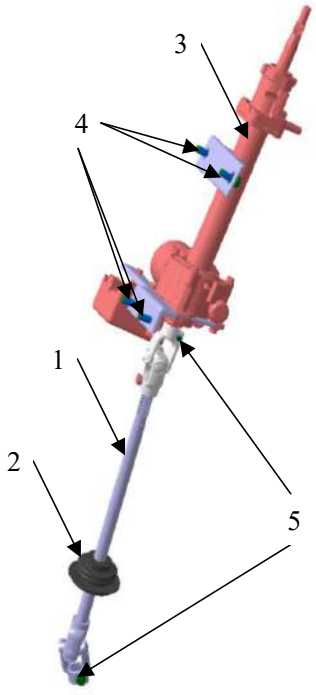
3.1.1 Overview of the product

葑全微卡转向系统由转向盘总成、转向管柱带传动轴总成、转向器总成等组成，转向器结构为齿轮齿条式。

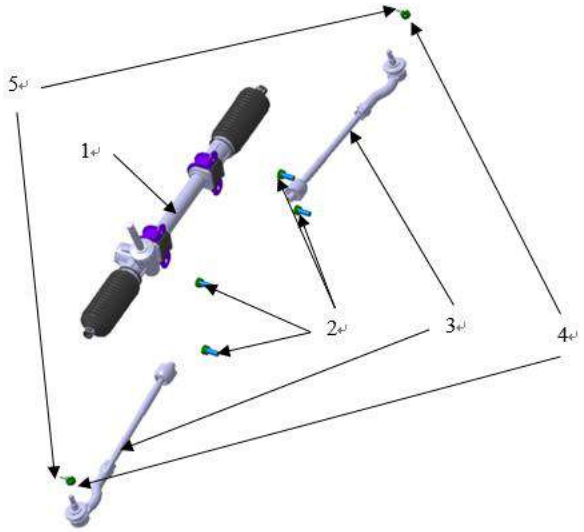
Fengchuen mini truck steering system is composed of the steering wheel assembly, assembly of the steering column with transmission shaft, steering gear assembly, etc., and the steering gear adopts rack and pinion structure.



序号 SN.	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
总成 Assembly	3402100-FC25	转向盘总成 Steering wheel assembly	1	个 Set
1	3402100-FC25	转向盘总成 Steering wheel assembly	1	个 Set
2	——	转向盘上盖带安全气囊总成 Assembly of the steering wheel upper cover with air bag	1	个 Set
3	Q33312	2 型全金属六角锁紧螺母 Type 2 full metal hexagon lock nut	1	个 PC



序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
总成 Assembly	3404110-FC25	转向管柱带传动轴总成 Assembly of the steering column with transmission shaft	1	个 Set
1	3401101-FC25	转向传动轴 Steering transmission shaft	1	个 Set
2	3401102-FC25	转向传动轴护套 Steering transmission shaft bushing	1	个 Set
3	3401103-FC25	转向管柱总成 Assembly of the steering column	1	个 Set
4	Q1421025	六角螺栓和弹簧垫圈组合件 Hexagon bolts and spring washer subassembly	4	个 PC
5	Q1420830	六角螺栓和弹簧垫圈组合件 Hexagon and spring washersub-assembly	2	个 PC



序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
总成 Assembly	3400000-FC25	转向系统装置 Steering system device	1	个Set
1	3401100-FC25	转向器总成 Steering gear assembly	1	个 Set
2	Q1421025	六角螺栓和弹簧垫圈组合件 Hexagon bolt and spring washer sub-assembly	4	个 PC
3	3403100-FC25	转向器拉杆 Steering gear bar	2	个 Set
4	Q387C10	六角开槽薄螺母—细牙 hexagon slotted thin nut – fine thread	2	个 PC
5	Q5002025	开口销 Split pin	2	个 PC

3.1.2、转向系统的检修

3.1.2 Overhaul of the steering system

1、检查方向盘自由行程

1. Inspect the free path of the steering wheel

停车且保持车轮处于直线行驶状态，轻转转向盘，直至前轮开始转动为止，检查在此过程转向盘外圆上的移动距离就是方向盘的自由行程，方向盘最大自由行程为：±15°

Park and keep the wheel at a straight line driving state, rotate the steering wheel gently until the front wheel starts to move. In such a process, the moving distance of the steering wheel on the external circle is the free path of the steering wheel, and the maximal free path of the steering wheel is ±15°.

2、检查中间位置

2. Inspect the middle position

将汽车笔直向前停好，并确认方向盘是否在中间位置，方向盘、转向管柱及方向机装配错误均会造成方向盘不在中间位置。

Park the vehicle forward straightly, and confirm whether the steering wheel is at the middle position, the assembly error of the steering wheel, the steering column and the steering gear will cause the steering wheel deviate from the middle position.

3、检查方向盘自动回位

3. Inspect the automatic return of the steering wheel

将方向盘转动 90°，并以 35km/h 的速度行驶，保持几秒，然后松开方向盘，回位最少在 70°以上。进行缓慢及急速转弯，左右两个方向的回位应无较大差异。

Rotate steering wheel for 90° and drive at a speed of 35km/h, keep for several seconds, then release the steering wheel, the steering wheel should return at least more than 70°. Have slow and sharp turning, the return at both left and right sides should not have relatively big differences.

4、检查球头防尘套

4. Inspect the steering ball dust proof sheath

用手指压，来检查防尘套是否龟裂或损伤，防尘套龟裂或损伤时，有可能连带使球头受损。

Press with fingers to inspect whether the dust proof sheath chaps or is damaged; in case the dust proof sheath chaps or is damaged, it may make the steering ball damage too.

注意：更换零件时一定要小心正确，不正确的更换可能影响转向系统的性能且可能导致驾驶事故。

Remark: Make sure to be careful and correct in parts replacement; incorrect replacement may affect the performance of the steering system and cause driving accidents.

3.1.3、转向系统拆卸步骤

3.1.3 Disassembly steps of the steering system

1、方向盘拆卸步骤：

1. Disassembly steps of the steering wheel

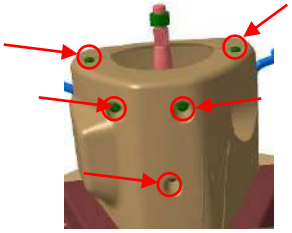
a. 拆卸方向盘上盖，断开喇叭连接线

a. Disassemble the upper cover of the steering wheel, and break the speaker connecting wire.

b. 拆卸方向盘锁紧螺母，取下方向盘
b. Disassemble the locking nut of the steering wheel, and remove the steering wheel.
（螺母规格：M12）
(nut spec: M12)
◎拧紧力矩：50N•m
◎Tightening torque: 50N•m

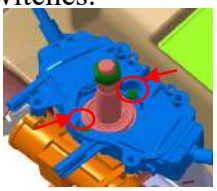
2、转向管柱拆卸步骤：
2. Disassembly steps of the steering column

a. 拆卸转向管柱上下保护罩固定自攻丝，取下转向管柱上下保护罩
a. Disassemble the fixing self tapping screws on the upper and lower protection case of the steering column, and remove the upper and lower protection case of the steering column.

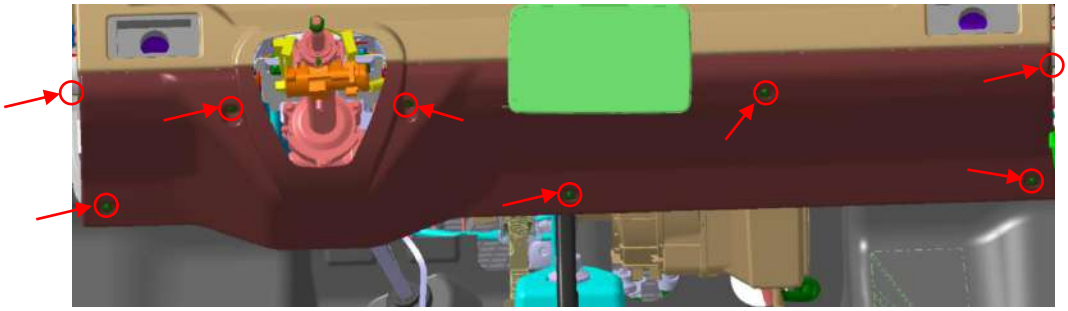


b. 拆卸时钟弹簧
b. Disassemble the clock spring.

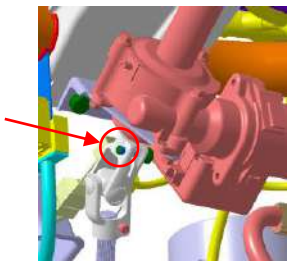
c. 拆卸与组合开关连接的线束，拆卸组合开关连接螺栓，取下组合开关
c. Disassemble the harnesses connecting with the combined switches, as well as the connecting bolts of the combined switches, and remove the combined switches.



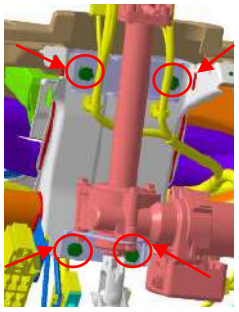
d. 拆卸仪表板下本体总成
d. Disassemble the lower assembly of the instrument panel.



e. 拆卸转向管柱和转向传动轴连接螺栓
e. Disassemble the connecting bolts of the steering column and the steering transmission shaft
（螺栓规格：M8）
(Bolt spec: M8)
◎拧紧力矩：30N•m
◎Tightening torque: 30 N•m

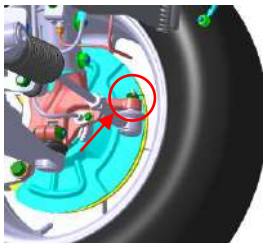


f. 拆卸转向管柱与仪表板管梁固定螺栓,取下转向管柱
（螺栓规格：M10）
f. Disassemble the fixing bolts of the steering column and the tubular beam of the instrument panel, remove the steering column (bolt spec: M10)
◎拧紧力矩：30N•m
◎Tightening torque: 30N•m

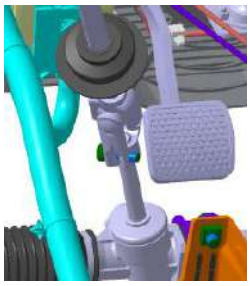


3、转向器拆卸步骤：
3. Disassembly steps of the steering gear

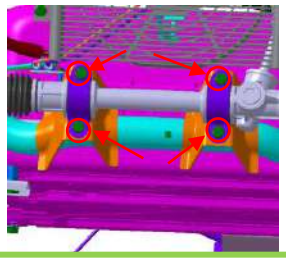
a. 举升车辆至合适位置，拔掉开口销，拆卸转向器球头与转向节固定螺母，将球头螺栓从转向节中分离
(螺母规格：M10)
a. Lift the vehicle to an appropriate position, pull out the split pin, disassemble the fixing bolts of the steering ball and the steering knuckle, and separate the steering ball bolt from the steering knuckle.
（Nut spec: M10）
◎拧紧力矩：75N•m
◎Tightening torque: 75N•m



b. 拆卸转向器与转向传动轴连接螺栓
（螺栓规格：M8）
b. Disassemble the connecting bolts of the steering gear and the steering transmission shaft
◎拧紧力矩：30N•m
◎Tightening torque: 30N•m

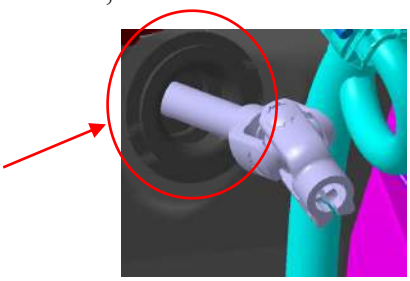


c. 拆卸转向器与副车架连接螺栓，拆除转向器固定支架，取出转向器。
(螺栓规格：M10)
c. Disassemble the connecting bolts of the steering gear the auxiliary frame, disassemble the fixing support of the steering gear, and remove the steering gear
(bolt spec:M10)
◎拧紧力矩：60N•m
◎Tightening torque: 60N•m



4、转向传动轴拆卸步骤
4. Disassembly steps of the steering transmission shaft

a. 拆卸与转向器、转向管柱连接螺栓后，从车下拆除转向传动轴护套，取下转向传动轴
a. Disassemble the connecting bolts of the steering gear and the steering column, remove the steering transmission shaft sheath from the vehicle, and remove the steering transmission shaft.



安装步骤与拆卸步骤相反，转向系主要紧固件连接方式和力矩要求详见下表：
The assembly steps reverse with the disassembly steps, and the connection methods and torque requirements of the main fasteners of the steering system are shown in the below table:

连接内容 Connection contents	连接方式 Connection method	力矩要求 Torque requirement
转向管柱与仪表板管梁总成连接 Connection of the steering column with the assembly of the tubular beam of the instrument panel	六角螺栓和弹簧垫圈组合件 Hexagon bolt and spring washer sub-assembly	30N·m
转向传动轴总成下端与转向器总成连接 Connection of the lower end of the steering transmission shaft and the assembly of the steering gear.	用转向传动轴总成自带的螺栓紧固 Use the bolts of the steering transmission shaft assembly for tightening	30N·m
转向器总成与车架连接 Connection of the steering gear assembly with the vehicle frame	六角螺栓和弹簧垫圈组合件 Hexagon bolt and spring washer sub-assembly	60N·m
转向器总成与转向节连接 Connection of the steering gear assembly and the steering knuckle	转向器球头与转向节锥面配合良好，然后用气动扳手打紧转向器自带槽型螺母 The steering ball has good fit with the steering knuckle conical surface; tighten the attached slot nut of the steering gear with pneumatic wrench.	75N·m
方向盘与转向管柱连接 Connection of the steering wheel with the steering column	2型全金属六角锁紧螺母 Type 2 full metal hexagon locking nut	50 N·m

3.1.4、转向系统常见故障及排除方法

3.1.4 Common faults and troubleshooting of the steering system

系统 System	常见故障 Common fault	可能原因 Possible reason	排除方法 Troubleshooting method
转向系统 Steering system	转向沉重 Heavy steering	1.前轮轮胎气压不足 1.The pressure of the front wheel tyre is insufficient.	检查气压及充气 Inspect the pressure and pressurize
		2.转向器调整螺塞过紧 2.The regulating plug screw of the steering gear is too tight.	调整 Adjust
		3.转向器缺润滑脂 3.The steering gear lacks lubricant grease.	维护，加润滑油 Have maintenance , and add lubricant grease
		4.前束不正常 4.The toe-in is abnormal	调整 Adjust
		5.拉杆球头间隙大 5.The gap between the steering bar and the steering ball is too big	更换 Replace
		6.转向节及主销部位润滑不良 6. The lubrication of the steering knuckle and main pin part is not good.	加润滑油 Add lubricant grease
		7.转向轴或方向机胶套磨损 7. Rubber sheath wearing of the steering shaft or steering gear	更换 Replace
	转向不稳 Unstable steering（车轮摆动） (wheel shake)	1.转向器齿条磨损 1. Steering gear rack wearing	更换转向器 Replace the steering gear
		2.方向机调整螺塞过紧 2. The regulating plug screw of the steering gear is too tight	调整 Adjust
		3.前束调整不正确 3. Incorrect front toe-in adjustment	调整 Adjust
		4.前轮毂轴承过度磨损 4. Front hub shaft is excessively worn.	更换 Replace
		5.横拉杆球头及接头过度磨损 5. Horizontal bar ball and joint are excessively worn.	更换拉杆 Replace the bar
		6.转向器松动 6. The steering gear is loose	紧固 Tighten

1 EPS 自诊断功能：
1. EPS diagnosis function:

在点火开关旋转至 ON 位置时，EPS 控制模块可以诊断下面部件发生的故障，并通过故障指示灯显示故障结果，并可使用解码仪直接读取，或者清除故障码。

When the ignition switch is turned to the ON position, the EPS control module enables to diagnose the faults of the following parts and display the fault result through fault indicators, and use decoder for direct reading or clearing the fault codes.

1.助力电机
1. Boosting motor
2.EPS 控制模块
2. EPS control module

2 故障指示灯按下述操作：
2. The fault indicator is operated as follows:

当点火开关旋转至 ON 位置，在上述部件内如果没有故障存在，组合仪表上的 EPS 故障指示灯亮约 2 秒后关闭，说明上述部件自检通过，当 EPS 控制模块发现在上述部件内产生故障时，指示灯常亮，警告驾驶员发生故障，同时在控制模块的备份存贮器里存贮故障代码，并可使用解码仪直接读取，或者清除故障码。

When the ignition switch is turned to the ON position, in case the above parts have no faults, the EPS fault indicator on the combined instrument will be on for about 2s before off, which indicates that the self-inspection of the above parts is passed; when the EPS control module discovers that the above parts have faults, the indicator is on all time to warn the driver about the fault, the backup memory device of the control module will save the fault codes, and the decoder enables to read directly or clear the fault code.

3 零位标定方法
3. Zero position calibration method

1.通过四轮定位仪将方向盘固定至绝对零位
1. Fix the steering wheel at the absolute zero position through the wheel aligner.
2.连接解码仪，钥匙旋转至 ON 档位
2. Connect the decoder, and turn the key to the ON gear.
3.在解码仪操作界面选择对应车型，并选择电动助力转向系统
3. Select corresponding model at the operation interface of the decoder, and select the electric power steering.
4.电动助力转向系统诊断界面下点击零位标定
4. Click the zero position calibration at the diagnosis interface of the electric power steering.
5.解码仪弹出提示零位标定成功，零位标定完成
5. The decoder will pop up the message of successful zero position calibration, and the zero position calibration is completed.

注意：每次更换 EPS 控制模块或者电动助力转向总成之后必须进行零位标定
Note: It is a must to calibrate the zero position after each replacement of the EPS control module or the electric power steering assembly.

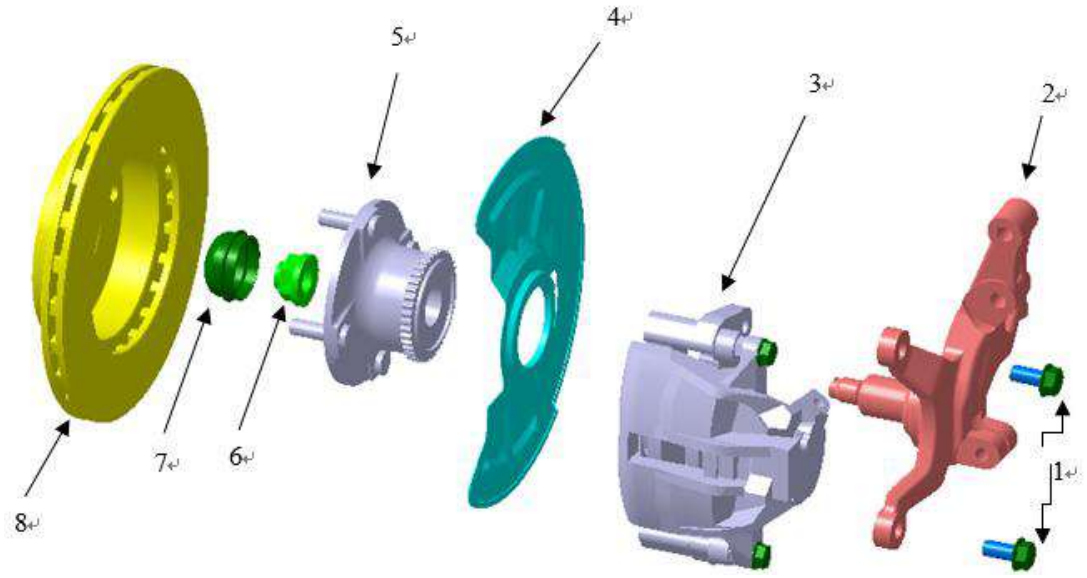
3.2、制动系统

3.2 Brake system

3.2.1、产品概述

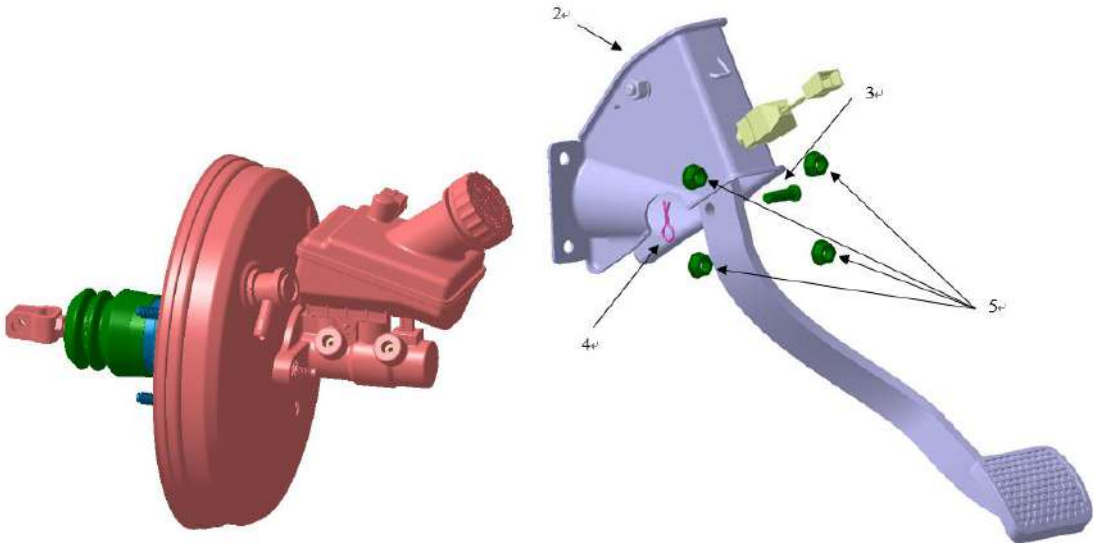
3.2.1 Overview of the product

蓊全微卡制动系统主要由前盘后鼓式制动器，真空助力系统，ABS 及轮速传感器，驻车制动装置组成 Fengchuen mini truck brake system is mainly composed of disc brake disc for front wheels and brake drum for rear wheels, vacuum boosting system, ABS, wheel speed sensor, and parking brake.



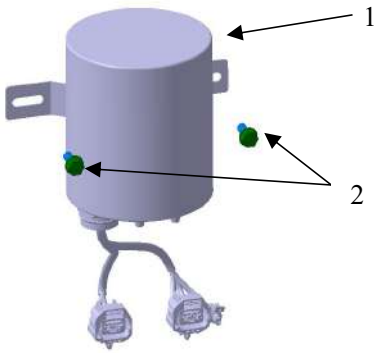
序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
总成 Assembly	3501100-FC25	制动器带左前转向节总成 Assembly of the brake with left front steering knuckle	1	个 Set
1	Q1851225	六角法兰面螺栓 Hexagon flange bolt	2	个 PC
2	3001101-FC25	左前转向节 Left front steering knuckle	1	个 PC
3	3501110-FC25	左前制动钳带支架总成 Assembly of left front caliper disc brake with support	1	个 Set
4	3501101-FC25	左前制动器护板 Left front brake protection plate	1	个 PC
5	3103110-FC25	前轮毂及其轴承总成 Assembly of front hub and its bearing	1	个 PC
6	3001103-FC25	锁紧螺母 Locking nut	1	个 PC
7	3103101-FC25	前轮毂内盖 Inner cap of the front hub	1	个 PC
8	3501103-FC25	制动盘 Brake disc	1	个 Set

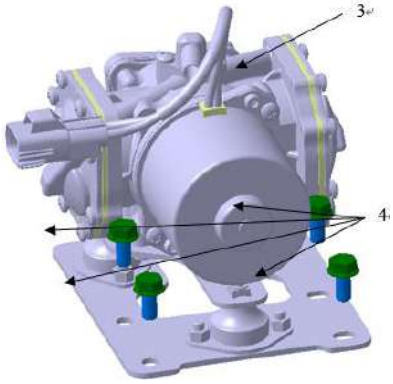
注：图示为左件，右件与之对称。
Remark: The diagram is the left part, and the right part is symmetrical to it.



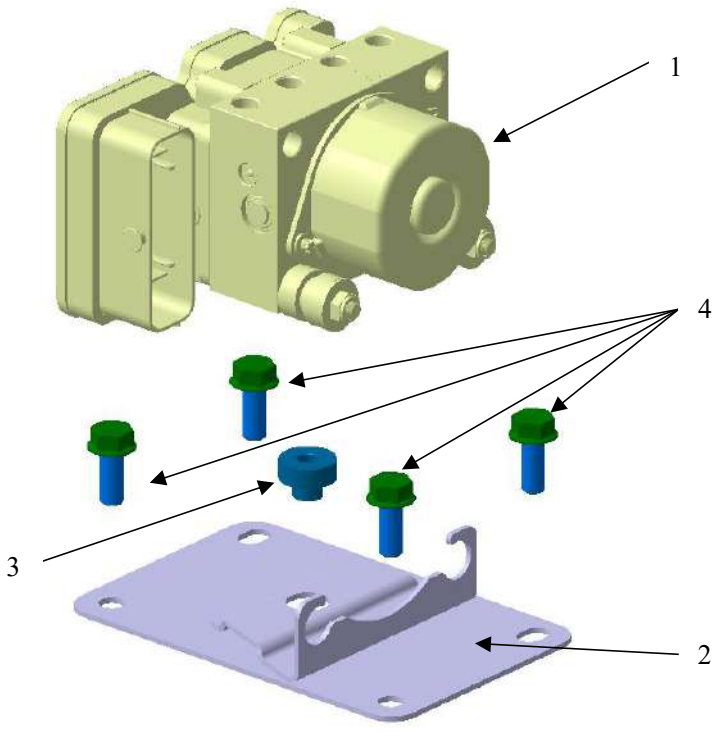
序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	3540114-FC25	真空助力器 Vacuum booster	1	个 Set

2	3504010-FC25	制动踏板焊接总成 Brake pedal welding assembly	1	个 Set
3	Q5100824	销轴 Hinge pin	1	个 Set
4	Q50108	锁销 Lock pin	1	个 PC
5	Q32008	六角法兰面螺母 Hexagon flange nut	4	个 PC

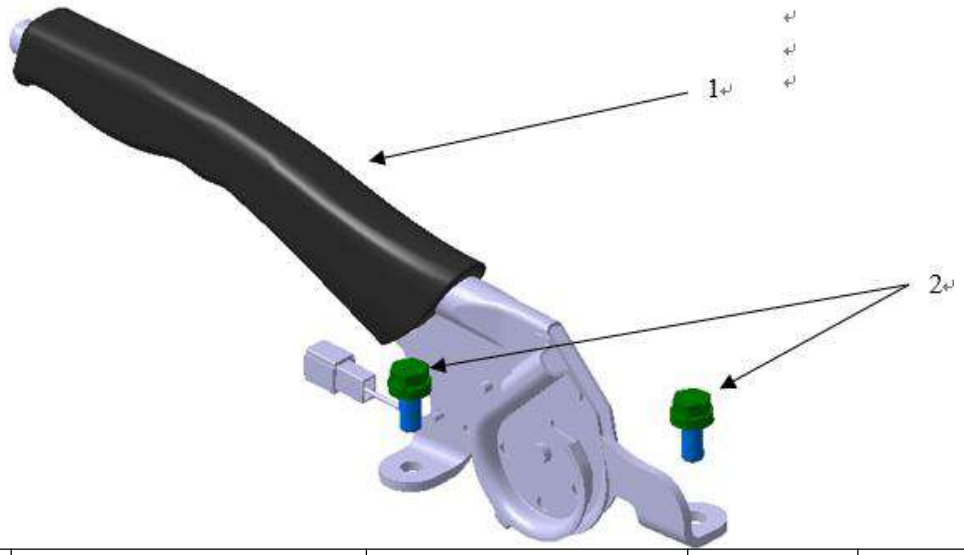




序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	3540111-FC25	电子真空泵总成 Assembly of electronic vacuum pump	1	个 Set
2	Q1840816	六角法兰面螺栓 Hexagon flange bolt	4	个 PC
3	3540112-FC25	真空储能罐 Vacuum energy storage tank	1	个 Set
4	Q1840820	六角法兰面螺栓 Hexagon flange bolt	2	个 PC



序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	3550101-FC25	ABS 总成 ABS assembly	1	个 Set
2	3550102-FC25	ABS 支架 ABS support	1	个 Set
3	3550103-FC25	缓冲块 Buffer block	1	个 PC
4	Q1840820	六角法兰面螺栓 Hexagon flange bolt	4	个 PC



序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	3508100-FC25	驻车制动操纵装置总成 Assembly of the parking brake operating device	1	个 Set
2	Q1460820	六角头螺栓弹簧垫圈和平垫圈组合件 Hexagon head bolt washer and flat washer sub-assembly	2	个 PC

注意：
Remark:
1、 在维修制动系统时，应保证零件和工作区域的清洁。
1. Upon repairing the braking system, make sure to keep the parts and the working area clean.
2、 制动系统维修应仔细，特别是更换零件应小心，否则可能会影响制动系统的功能，引起行车危险。
2. The repair for the braking system should be careful, especially for the part replacement, otherwise it may affect the function of the braking system and cause

driving accident.
3、 在维修任何零部件时，均不要将制动液溅到油漆表面，否则必须立刻清洗干净。
3. Upon repairing any part, do not splash the brake fluid to the paint surface; in case of splashing, clean clearly right away.
4、 对制动系统维修或认为制动管路中存在空气，则需排空气。
4. In case of repair for the braking system or possibility of having air in the brake pipeline, it is necessary to discharge the air.
5、 对制动系统进行维修后，应检查制动系统有无泄漏。
5. After repair for the braking system, it is necessary to inspect whether the braking system has leakage.
6、 必须使用规定牌号的制动液，禁止与其他牌号制动液混用。
6. Make sure to use the brake fluid of stipulated brand, and do not have mixed use with brake fluid of other brands.

3.2.2、制动系统检查与调整

3.2.2 Braking system inspection and adjustment

1、 检查制动总泵储液罐中油液面高度
1. Inspect the oil surface height of the liquid storage tank of the master cylinder.
正常液面高度在MAX和MIN标示之间，如果液面低于规定的最低液面高度，应添加制动液，制动液规格：DOT4
The normal liquid surface height is between the MAX and MIN; in case the liquid surface is lower than the minimum liquid surface, some brake fluid should be added, and the brake fluid spec is: DOT4
2、 制动管路系统排气
2. Air discharge for the brake pipeline system
① 检查制动总泵储液罐中油液面高度
① Inspect the oil surface height of the fluid storage tank of the master cylinder.
③ 反复踩下制动踏板几次后踩住不动，松开制动器上的放气螺塞（制动器制动管路接口附近）
② Press down the brake pedal for several times and then hold it still, and release the air discharge plug screw on the brake (near the joint of brake pipeline of the brake)
③ 在没有制动液流出时拧紧放气螺塞，然后放松制动踏板
③ While there is no brake fluid flowing out, screw the air discharge plug screw tightly, and then release the brake pedal.
④ 重复②和③的操作，直至制动液中的空气全部排出为止
④ Repeat the operation of ② and ③ until all the air in the brake fluid is discharged completely.
⑤ 对各个车轮分泵，重复上述步骤，排出整个制动管路系统的空气
⑤ Repeat the above steps for the slave cylinder of each wheel and discharge the air of the whole brake pipeline system.
注意：排气过程中，要随时向储液罐内添加制动液
Remark: upon air discharge, it is necessary to add brake fluid to the fluid storage tank whenever needed.
3、 检查并调整制动踏板高度
3. Inspect and adjust the height of the brake pedal.

① 检查制动踏板至地板的高度：正常约为 98 mm
① Inspect the height from the brake pedal to the floor: normally 98mm.
② 松开制动灯开关锁紧螺母
② Release locking nut of the brake light switch.
③ 调整制动灯开关至适合的位置 （松开制动踏板制动灯熄灭，轻踩制动踏板制动灯点亮）
③ Adjust the brake light switch to an appropriate position (Release the brake petal, the brake light will be off; press the brake pedal gently, the brake light will be on)
④ 拧紧制动灯开关锁紧螺母
④ Screw the locking nut of the brake light switch tightly.

4、 检查踏板自由行程
4. Inspect the free path of the pedal
将钥匙开关拨至“LOCK”档位，反复踩制动踏板直至助力器中无真空
轻踩踏板直至感到有阻力为止，踏板空程应约为： 5~13mm
Turn the key switch to the “LOCK” gear, repeatedly press the brake pedal until the booster has no vacuum, gently press the pedal until a resistance is felt, and the empty trip of the pedal is about 5~13mm

5、 真空助力系统气密性检查
5. Air tightness inspection of the vacuum boosting system
① 将钥匙开关拨至“ON”档位，反复踩制动踏板直至真空泵开始运作
① Turn the key switch to “ON” gear, press down the brake pedal repeatedly until the vacuum pump starts to operate.
③ 真空泵停止工作后，将钥匙开关拨至“LOCK”档位，慢慢踩制动踏板数次，如果踏板在踩踏时位置逐渐上升，则气密性正常
③ After the vacuum pump stops working, turn the brake pedal to the “LOCK” gear, and slowly press down the brake pedal for several times; in case the pedal rises gradually upon pressing, then the air tightness is normal.
④ 车辆以一定速度行驶，反复踩制动踏板，制动力应无较大差异
④ Drive the at a certain speed and press the brake pedal repeatedly, the braking force should be free from big differences.

6、 制动盘磨损检查
6. Abrasion inspection of the brake disc
用千分尺测量制动盘厚度，标准厚度：18±0.1mm 极限厚度：15mm
Use the microcalliper to measure the thickness of the brake disc, the standard thickness is 18±0.1mm and the limit thickness is 15mm.
若厚度低于磨损极限，请更换制动盘
In case the thickness is lower than the abrasion limit, please replace the brake disc.

7、 摩擦片磨损检查
7. Abrasion inspection for the friction plate
用直尺测量摩擦片衬面厚度，标准厚度：10mm，极限厚度：2mm
Use the ruler to measure the lining thickness of the friction plate, the standard thickness is 10mm and the limit thickness is 2mm.

8、 检查驻车制动手柄行程
8. Inspect the trip of the parking brake handle
驻车制动手柄行程：驻车制动手柄拉起 4～7 齿时，车辆应可靠制动，且制动灯点亮，其最大操纵力应不大于 200N，在完全松开驻车制动手柄时，车轮应能自由

转动。否则，应调整，拆除副仪表台总成（详细拆除步骤请参考副仪表台的拆装），转动调整螺母至合适位置即可

Trip of the parking brake handle: while the parking brake handle is pulled up for 4 to 7 teeth, the vehicle should be able to brake reliably and the brake light should be on, and its maximal operating force should be more than 200N; upon the parking brake handle is released completely, the wheel should be able to rotate freely, otherwise adjustment is needed. Remove the assembly of the auxiliary dashboard (refer to the disassembly steps of the auxiliary dashboard for details), and rotate the adjusting nut to an appropriate position.

9、 修理或更换制动盘、更换摩擦片后或在行驶短距离时出现制动发软的现象，请按照以下步骤磨合制动盘和摩擦片的结合面。

9. In case of brake disc replacement or friction plate replacement, or weak braking after just driving for a short distance, please fit the mounting surface of the brake disc and the friction plate as per the following steps:

① 将维修车辆行驶在平直的道路上

① Drive the repaired vehicle on a flat and straight road.

② 控制好踩制动踏板的力度，使汽车在3～5秒内制动

② Control the force for pressing the brake pedal, and brake the vehicle within 3 to 5 seconds.

③ 驾驶汽车行驶一段距离后停车3分钟以冷却制动系统

③ Park for 3 minutes after driving the vehicle for some distance so as to cool the braking system.

重复步骤①～③直到制动盘和摩擦片完全磨合

Repeat the Steps ①～③ until the brake disc and the friction plate fit well.

3.2.3、制动系统拆卸步骤

3.2.3 Disassembly steps of the braking system

1、前制动软管拆卸步骤：

1. Disassembly steps for front brake hose

a. 按照对角线方向依次拧松车轮螺母（顺序可参考：1→2→3→4）（螺母规格: M12）

a. Unscrew the wheel nuts in order as per the diagonal direction (refer to the order: 1→2→3→4)

◎拧紧力矩：110N•m

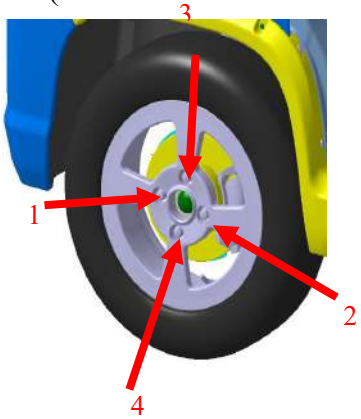
◎Tightening torque: 110N•m

b. 举升车辆至适合拆卸的高度

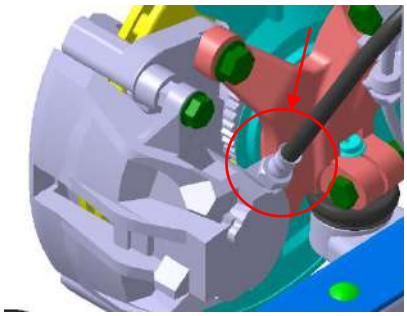
b. Lift the vehicle to a height appropriate for disassembly.

c. 拆卸车轮螺母，取下轮胎

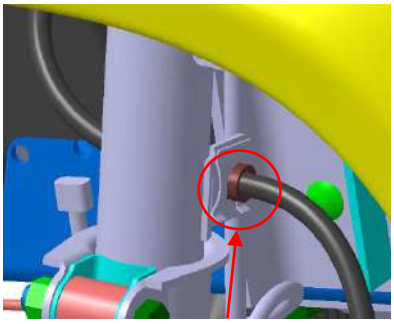
c. Disassemble the wheel nuts, and remove the tyre.



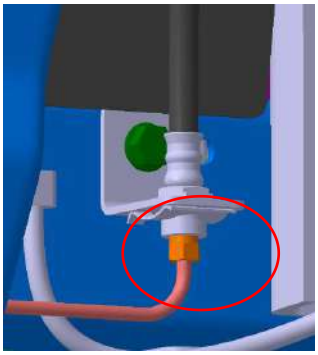
d. 拆除前制动软管与制动钳连接的油孔螺栓，放出管内制动油
（螺栓规格：M10）
d. Disassemble oil-hole bolt connecting the front brake hose and the caliper disc brake and discharge the brake fluid in the hose.
◎拧紧力矩：30N•m
◎Tightening torque: 30N•m



e. 用平口钳将前制动软管与减震器固定处U型卡簧取出，将制动软管和减震器分离
e. Use a flat tongs to remove the U shape circlip at the fixing place of the front brake hose and damper, and separate the brake hose and the damper.

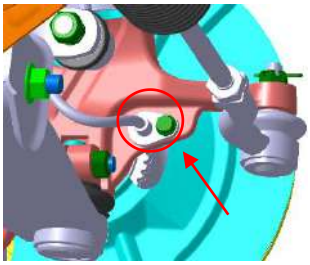


f. 用平口钳将前制动软管与硬管固定处U型卡簧取出，用油管扳手拆卸制动软管和硬管连接螺母，将制动软管和硬管分离，取下前制动软管
（螺母规格：M10）
f. Use a flat tongs to remove the U shape circlip at the fixing place of the front brake hose and the pipe, use a tubing wrench to disassemble the connection nut of the brake hose and pipe, separate the brake hose and the pipe, and remove the front brake hose.
(Nut spec: M10)
◎拧紧力矩：16N•m
◎Tightening torque: 16N•m

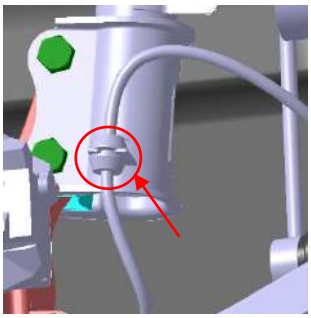


2. 前轮速传感器拆卸步骤：
2. Disassembly steps for the front wheel speed sensor

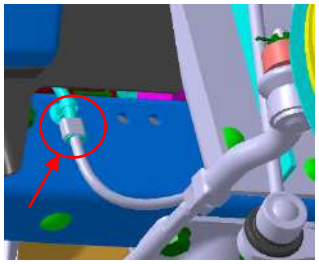
a. 拆卸前轮速传感器与转向节连接螺栓，拔出探头（螺栓规格：M6）
a. Disassemble the connecting bolts of the front wheel speed censor and the steering knuckle, and pull out the probe
(Bolt spec: M6)
◎拧紧力矩：15N•m
◎Tightening torque: 15N•m



b. 将前轮速传感器从前减震器固定支架上拔出
b. Pull out the front wheel speed sensor from the front damper fixing support.

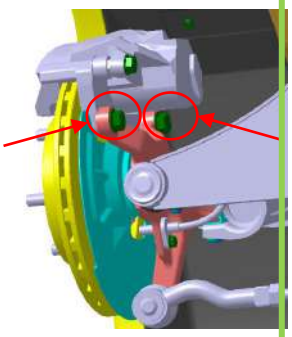


c. 拔出前轮速传感器与线束插接件，取下前轮速传感器
c. Pull out the connectors of the front wheel speed sensor and the harness, and remove the front wheel speed sensor.



3. 前制动钳总成拆卸步骤：
3. Disassembly steps of the front caliper disc brake

a. 拆卸车轮，放出制动油，拆除前制动软管（详见前制动软管拆卸步骤）
a. Disassemble the wheel, discharge the brake fluid, and remove the front brake hose (refer to the disassembly steps of front brake hose)
b. 拆卸制动钳总成与转向节连接螺栓
（螺栓规格：M12）
b. Disassemble the connecting bolts of the caliper disc brake and the steering knuckle
(Bolt spec: M12)

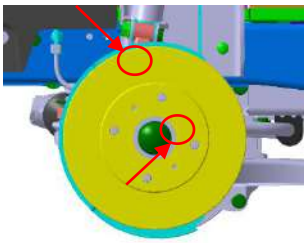


◎拧紧力矩：130N•m
◎Tightening torque: 130N•m
c. 将制动钳从制动盘上取出
c. Remove the caliper disc brake from the brake disc.

提示：可在车辆举升前将车轮转向至易拆卸位置
Attention: It works to rotate the wheel to a position which facilitates the disassembly before lifting the vehicle.

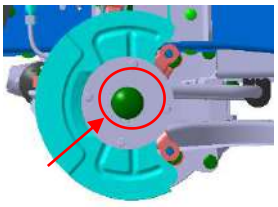
4. 前制动盘拆卸步骤：
4. Disassembly steps of the brake disc

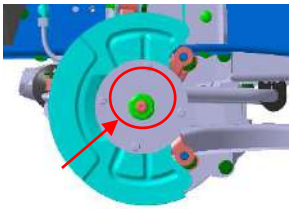
a. 拆卸车轮，前制动软管，制动钳（详见相关零部件拆卸步骤）
a. Disassemble the front wheel, front brake hose, and caliper disc brake (Refer to the disassembly steps of relevant parts for details)
b. 拆卸制动盘锁紧螺钉，取下制动盘
b. Disassemble the locking screws of the brake disc, and remove the brake disc.



5. 前轮毂轴承总成拆卸步骤：
5. Disassembly steps of the assembly of the front hub bearing

a. 拆卸车轮，前制动软管，前轮速传感器，制动钳，制动盘（详见相关零部件拆卸步骤）
a. Disassemble the front wheel, front brake hose, front wheel speed sensor, caliper disc brake, and brake disc (refer to the disassembly steps of relevant parts for details).
b. 拆卸前轮毂内盖，拆卸锁紧螺母
（螺母规格：M18）
b. Disassemble the inner cap of the front hub as well as the locking nuts (nut spec:M18)





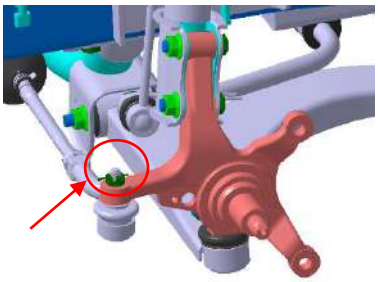
◎拧紧力矩：150N•m
◎Tightening torque: 150N•m
c. 取下前轮毂轴承总成
c. Remove the assembly of the front hub bearing

6. 制动器护板及转向节拆卸步骤：
6. Disassembly steps for the brake protection plate and the steering knuckle:

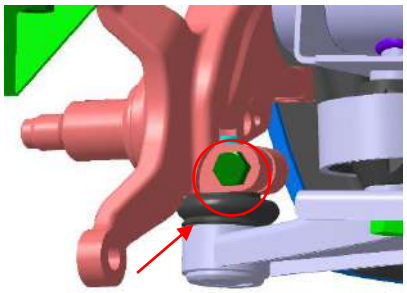
a. 拆卸车轮，前制动软管，前轮速传感器，制动钳，制动盘，前轮毂轴承总成（详见相关零部件拆卸步骤）
a. Disassemble the wheel, front brake hose, front wheel speed sensor, caliper disc brake, brake disc, assembly of the front wheel hub bearing (refer to disassembly steps of relevant parts for details)

b. 拆卸制动器护板（与转向节压装，用力取下即可）
b. Disassemble the brake protection plate (which is pressure mounted with the steering knuckle, just remove it with some power)

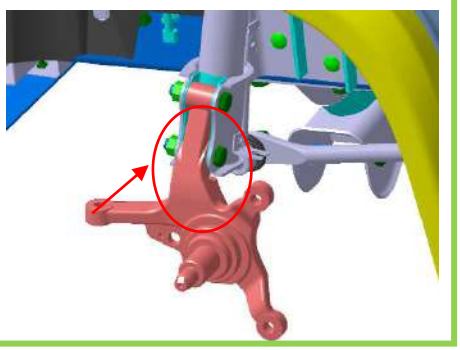
c. 拆卸转向节与转向拉杆连接开口销及开槽螺母，与转向拉杆断开连接
c. Disassemble the connecting split pins and slotted nuts of the steering knuckle and the steering rod, and disconnect the connection with steering rod.
（螺母规格：M10）
(Nut spec: M10)
◎拧紧力矩：75N•m
◎Tightening torque: 75N•m



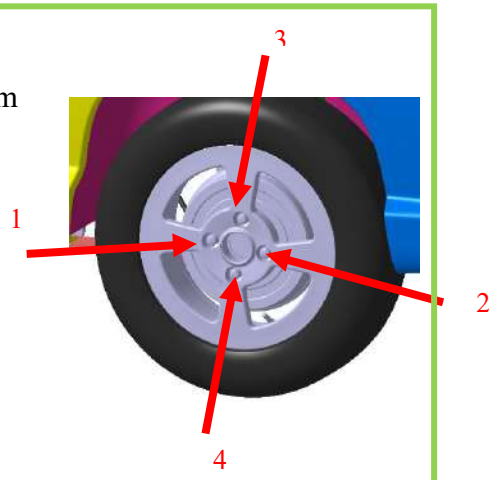
d. 拆卸转向节与下摆臂连接螺栓，与下摆臂断开连接
d. Disassemble the connecting bolts of the steering knuckle and the lower swing arm, and disconnect the connection with the lower swing arm.
（螺栓规格：M10）
(bolt spec:M10)
◎拧紧力矩：130N•m
◎Tightening torque: 130N•m



e. 拆卸转向节与前减震器连接螺栓，取下转向节
（螺栓规格：M12）
e. Disassemble the connecting bolts of the steering knuckle with the front damper, and remove the steering knuckle (bolt spec: M12)
◎拧紧力矩：130N•m
◎Tightening torque: 130N•m

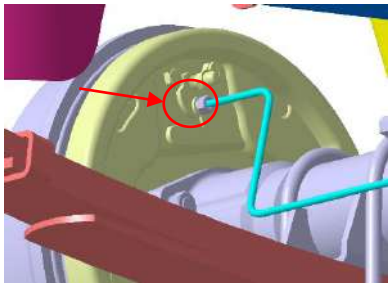


7. 后制动鼓总成拆卸步骤：
7. Disassembly steps of the assembly of rear brake drum
a. 按照对角线方向依次拧松车轮螺母:
（顺序可参考：1→2→3→4）
（螺母规格: M12 ）
a. Unscrew the wheel nuts in order as per the diagonal direction:
(refer to the order: 1→2→3→4)
(Nut spec: M12)
◎拧紧力矩：110N•m
◎Tightening torque: 110N•m

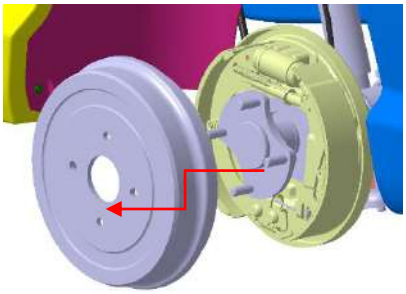


b. 举升车辆至适合拆卸的高度，拆卸车轮螺母，取下轮胎
b. Lift the vehicle to an appropriate height, disassemble the wheel nut, and remove the tyre.

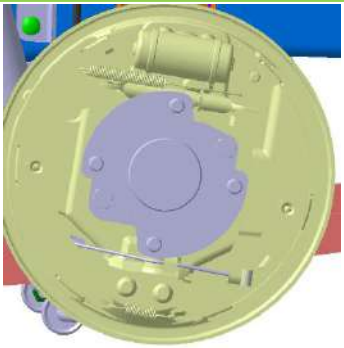
c. 拆卸制动硬管，放出制动油
（螺母规格：M10）
c. Disassemble the brake hose, and discharge the brake fluid.
◎拧紧力矩：16N•m
◎ Tightening torque: 16N•m



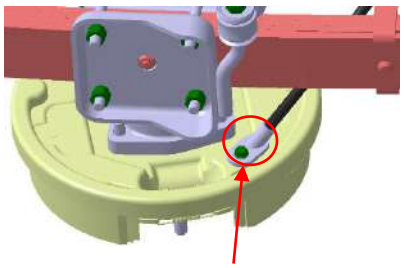
d. 松开驻车制动操纵装置，拆卸制动鼓锁紧螺钉，取下制动鼓壳体
d. Loosen the parking brake operation device, disassemble the locking nuts of the brake drum, and remove the shell of the brake drum.



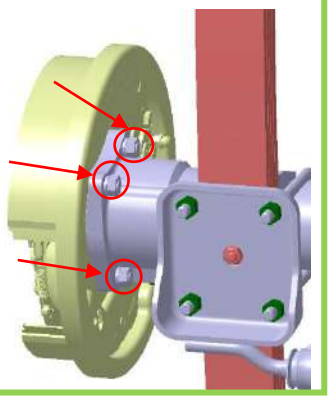
e. 将驻车拉索末端球头从制动鼓中取出
e. Remove the end ball of the parking cable from the brake drum.



f. 拆卸驻车拉索螺栓，将拉索与制动鼓分离
(螺栓规格：M6)
f. Disassemble the parking cable bolts, separate the cable with the brake drum
(Bolt spec: M6)
◎拧紧力矩：15N•m
◎Tightening torque: 15N•m

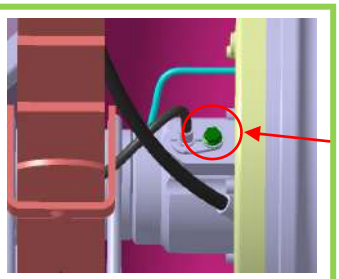


g. 拆卸制动鼓与后桥法兰连接螺母与垫圈，将制动鼓从后桥总成上取出
g. Disassemble the connecting bolts and washer of the brake drum with the rear bridge flange, and remove the brake drum from the rear bridge assembly.
（螺母规格：M10）
(Nut spec: M10)
◎拧紧力矩：100N•m
◎Tightening torque: 100N•m

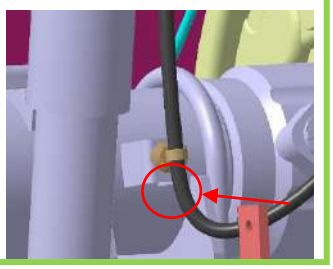


8. 后轮速传感器拆卸步骤：
8. Disassembly steps of rear wheel speed sensor

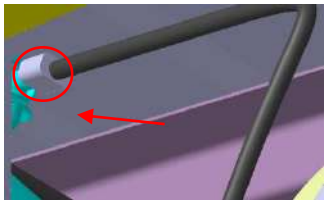
a. 拆卸后轮速传感器与后桥总成连接螺栓，拔出探头
（螺栓规格：M6）
a. Disassemble the connecting bolt of the rear wheel speed sensor and the assembly of the rear bridge, and pull out the detector (bolt spec: M6)
◎拧紧力矩：15N•m
◎Tightening torque: 15N•m



b.拔出后轮速传感器与后桥总成连接卡子
b. Pull out the connecting clip of the rear wheel speed sensor with the rear bridge assembly.

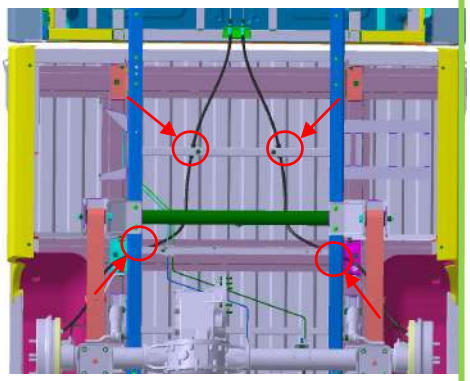


c. 拔出后轮速传感器与线束插件，取下轮速传感器
c. Pull out the connector of the rear wheel speed sensor and the harness, and remove the rear wheel speed sensor.



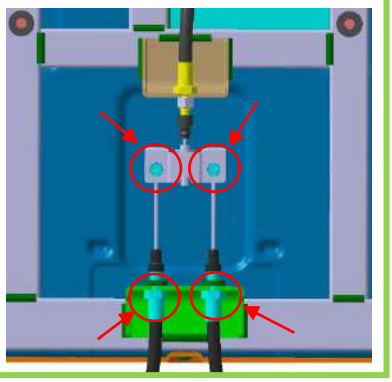
9. 后驻车拉索总成拆卸步骤：
9. Disassembly steps of the rear parking cable assembly

a. 松开驻车制动操纵装置，拆卸车轮与后制动鼓外壳，将后驻车拉索与制动鼓分离（详见后制动鼓总成拆卸步骤）
a. Loosen the parking brake operation device, disassemble the wheel and real brake drum shell, and separate the rear parking cable and the brake drum (refer to the disassembly steps of the rear brake drum assembly for details).



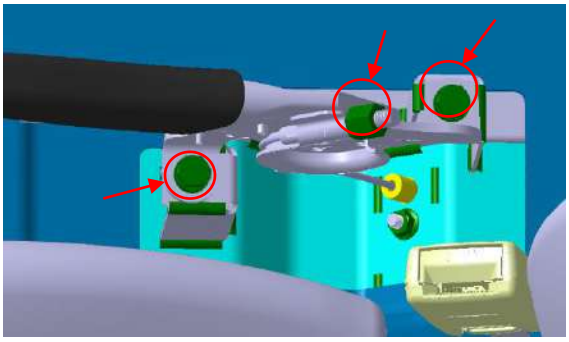
b. 举升车辆至合适高度，拆卸后驻车拉索与车架连接螺栓
b. Lift the vehicle to an appropriate height, and disassemble the connecting bolt of the rear parking cable and the vehicle frame.
(螺栓规格：M8)
(Bolt spec: M8)
◎拧紧力矩：15N•m
◎Tightening torque: 15N•m

c. 松开后驻车拉索前端与车架锁紧螺母，并将端头从平衡块中取出
c. Unscrew the locking nuts of the front end of the rear parking cable and the vehicle frame, and remove the end from the balance block.
（螺母规格：M8）
(Nut spec: M8)



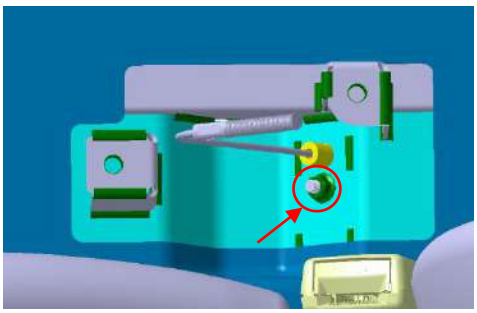
e. 抽出后驻车拉索总成
e. Pull out the assembly of the rear parking cable

10. 驻车制动操纵装置总成及前驻车拉索总成拆卸步骤：
10. Disassembly steps for the assembly of the parking brake operation device and the assembly of the front parking cable.
a. 拆卸副仪表板本体与手刹挡尘板（详见副仪表板及手刹挡尘板拆卸步骤）
a. Disassemble the auxiliary instrument panel and the dust board of the handbrake (refer to the disassembly steps of the auxiliary instrument panel and handbrake)
b. 松开驻车制动操纵装置，拆卸驻车拉索调整螺母，拆卸驻车制动操纵装置与车身连接螺栓
b. Loosen the parking brake operation device, disassemble the parking cable adjustment cable, disassemble the connecting bolts of the parking brake operation device with the vehicle body.
（螺栓规格：M8）
(Bolt spec:M8)
◎拧紧力矩：30N•m
◎Tightening torque

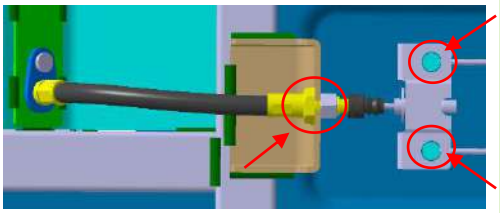


c. 取下驻车制动操纵装置总成
c. Remove the assembly of the parking brake operation device

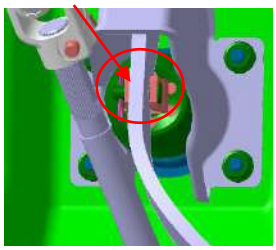
d. 拆卸前驻车拉索与车身连接螺母
（螺母规格：M6）
d. Disassemble the connecting nuts of the front parking cable and the vehicle body (Nut spec: M6)
◎拧紧力矩：15N•m
◎Tightening torque: 15N•m

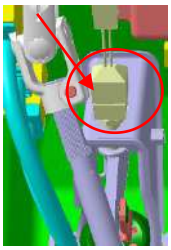


e. 松开前驻车拉索后端与车架锁紧螺母，并将后驻车拉索端头从平衡块中取出
（螺母规格：M8）
e. Unscrew the locking buts of the rear end of the front parking cable and pull out the end of the rear parking cable from the balance block (nut spec: M8)
e. 抽出前驻车拉索总成
e. Pull out the front parking cable assembly.

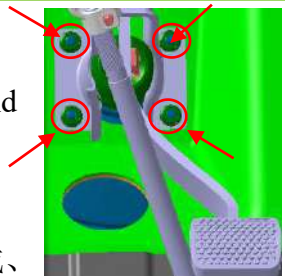


11. 制动踏板总成拆卸步骤：
11. Disassembly steps of the brake pedal assembly
a. 拆卸制动踏板与真空助力器连接销轴
a. Disassemble the connecting hinge pin of the brake pedal with the vacuum booster.
b. 拔出制动灯开关插接件
b. Pull out the brake light switch connectors.

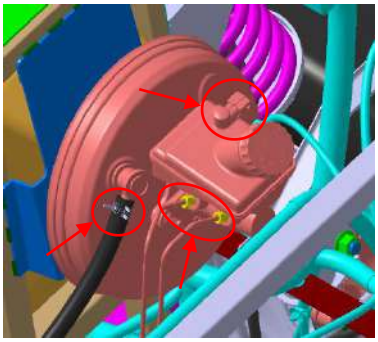




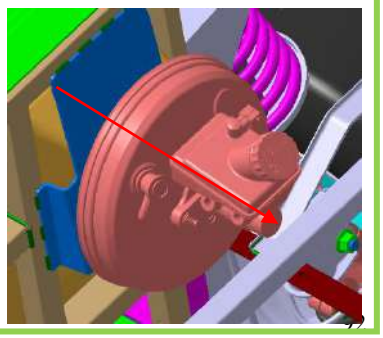
c. 拆卸与车身前围连接螺母，取下制动踏板
（螺母规格：M8）
c. Disassemble the connecting nuts with the vehicle front skirt, and remove the brake petal (Nut spec: M8)
◎拧紧力矩：30N•m
◎ Tightening torque: 30N•m
注：若拆卸制动踏板操作空间不便，可先将仪表板下本体总成、转向管柱拆卸（详见相关零部件拆卸步骤）
Remark: In case of space inconvenience upon disassembling the brake pedal, it works to disassemble the assembly of the instrument panel and the steering column (refer to the disassembly steps of relevant parts for details)



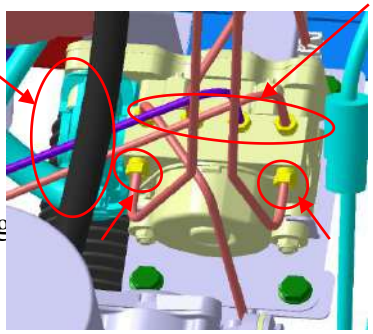
12. 真空助力器拆卸步骤：
12. Disassembly steps of the vacuum booster
a. 拆卸前舱盖总成
a. Disassemble the assembly of the bonnet.
b. 拔下制动液位传感器开关插接件
b. Pull down the connector of the brake fluid level sensor switch.
c. 拆卸真空管连接卡箍，取下真空管
c. Disassemble the connecting collar of the vacuum tube and remove the vacuum tube.
d. 放出制动液，拆卸与主缸连接制动硬管螺母
（螺母规格：M10）
d. Discharge the brake fluid, and disassemble the nuts of the brake hard tube connecting with the master cylinder (nut spec: M10)
◎拧紧力矩：16N•m
◎ Tightening torque: 16N•m



e. 拆卸制动踏板（详见拆卸制动踏板总成步骤）
e. Disassemble the brake pedal (refer to the disassembly steps of the brake pedal for details)
f. 取下真空助力器
f. Remove the vacuum booster.



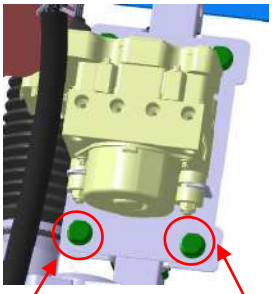
13. ABS总成拆卸步骤：
13. Disassembly steps of the ABS assembly



a. 拆卸前舱盖总成
a. Disassemble the bonnet
b. 放出制动液，拆卸ABS总成与各制动硬管连接螺母（螺母规格：M10）
b. Discharge the brake fluid, and disassemble the connecting with each brake hard tube
◎拧紧力矩：16N•m
◎ Tightening torque: 16N•m

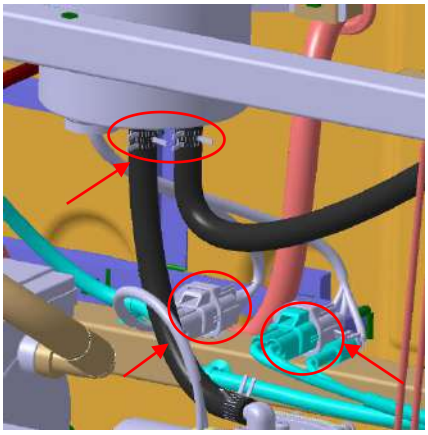
c. 拔下线束插接件
c. Pull out the harness connectors.

d. 松开ABS总成与支架连接螺母，用力取下ABS总成（或拆卸支架与车身连接螺栓，将ABS总成与支架一同取下）
c. Unscrew the connecting nuts of the ABS assembly with the support, and remove the ABS assembly with power (or disassemble the connecting bolts of the support with the vehicle body, and remove the ABS assembly together with the support).



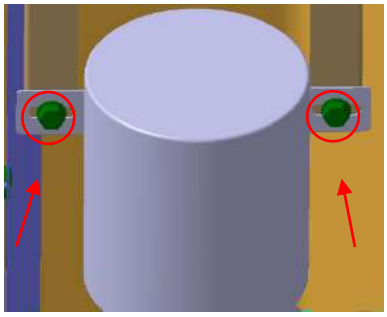
注：若ABS总成拆卸空间不便，可先将真空助力器拆卸（详见拆卸真空助力器步骤）
Note: In case of the ABS disassembly space inconvenience, it works to disassemble the vacuum booster first (refer to the disassembly steps of the vacuum booster for details)

14. 真空储能罐拆卸步骤：
14. Disassembly steps for the vacuum energy storage tank

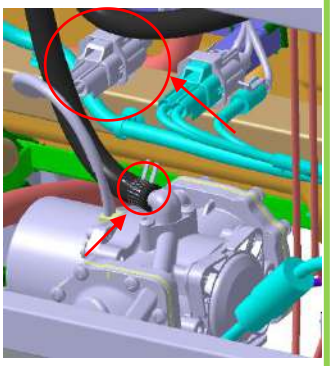


a. 拆卸真空储能罐与真空管连接卡箍，取下真空管
a. Disassemble the connecting collar of the vacuum energy storage tank with the vacuum tubes, and remove the vacuum tubes.
b. 拔出线束插接件
b. Pull out the connectors of the harnesses.

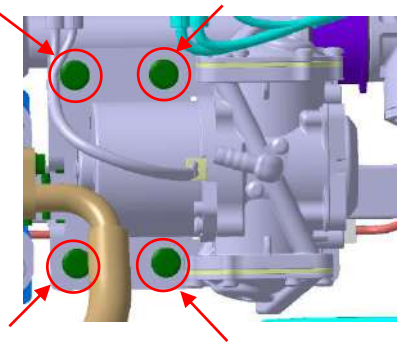
c. 拆卸真空储能罐与车身连接螺栓，取下真空储能罐（螺栓规格：M8）
c. Disassemble the connecting bolts of the vacuum energy storage tank with the vehicle body, and remove the vacuum energy storage tank (bolt spec: M8)
◎拧紧力矩：30N•m
◎ Tightening torque: 30N•m



15. 电子真空泵总成拆卸步骤：
15. Disassembly steps of the electronic vacuum pump assembly:
a. 拆卸电子真空泵总成与真空管连接卡箍，取下真空管
a. Disassemble the connecting collar of the electronic vacuum pump assembly with the vacuum tubes, and remove the vacuum tubes.
b. 拔出线束插接件
b. Pull out the connectors of the harnesses.

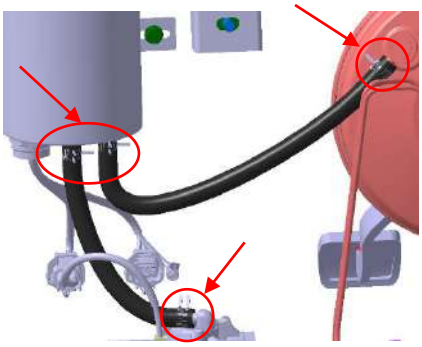


c. 拆卸电子真空泵总成与车身连接螺栓，取下电子真空泵总成
c. Disassemble the connecting bolts of the electronic vacuum pump assembly with the vehicle body, and remove the electronic vacuum pump.
（螺栓规格：M8）
(Bolt spec: M8)
◎拧紧力矩：30N•m
◎ Tightening torque: 30N•m

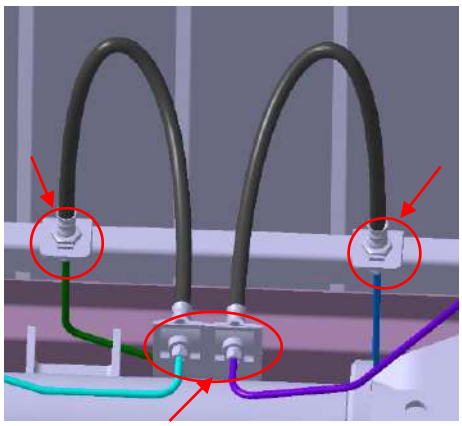


注：若电子真空泵总成拆卸空间不便，可先将真空储能罐拆卸（详见真空储能罐拆卸步骤）
Remark: In case of the electronic vacuum pump assembly space inconvenience, it works to disassemble the vacuum energy storage tank first (refer to the disassembly steps of the vacuum energy storage tank for details)

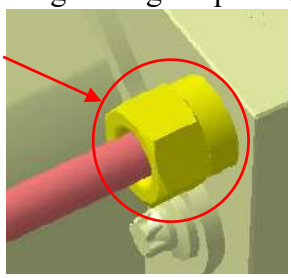
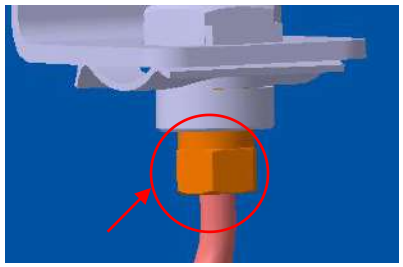
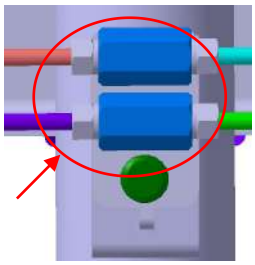
16. 真空管拆卸步骤：
16. Disassembly steps of the vacuum tube
a. 拆卸真空管与真空助力器、真空储能罐、电子真空泵各处卡箍，取下真空管
a. Disassemble the collars of vacuum tubes and the vacuum booster, the vacuum energy storage tank and the electronic vacuum pump, and remove the vacuum tubes.



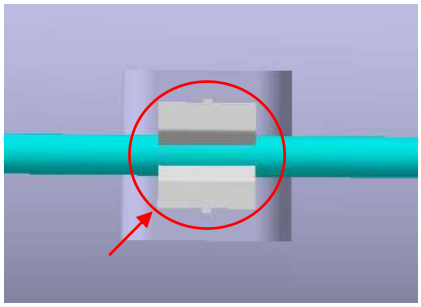
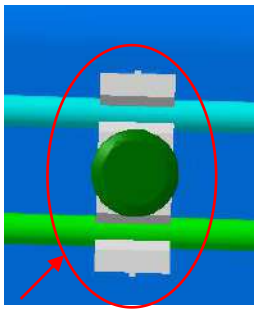
17. 后制动软管拆卸步骤：
17. Disassembly steps of the rear brake hoses
a. 放出制动液，用平口钳将后制动软管与硬管固定处U型卡簧取出，用油管扳手拆卸后制动软管和硬管连接螺母，将后制动软管和硬管分离，取下后制动软管
a. Discharge the brake fluid, remove the U shape jump ring at the fixing place of the rear brake hose and the hard tube with flat tongs, disassemble the connecting bolts of the rear brake hose and the hard tube with the tubing wrench, separate the rear brake hose and the hard tube, and remove the rear brake hose.
（螺母规格：M10）
(Nut spec: M10)
◎拧紧力矩：16N•m
◎Tightening torque: 16N•m



18. 制动硬管拆卸步骤：
18. Disassembly steps of the brake hard tube
a. 放出制动液，拆卸制动硬管各接口处连接螺母
a. Discharge the brake fluid, and disassemble the connecting nuts at each joint of the brake hard tube.
（螺母规格：M10）
(Nut spec: M10)
◎拧紧力矩：16N•m
◎Tightening torque: 16N•m

b．将制动硬管从各处固定管夹中取出，取下制动硬管
b. Remove the brake hard tube from all the fixing tube clips, and remove the brake hard tube.

安装步骤与拆卸步骤相反，制动系主要紧固件连接方式和力矩要求详见下表：
The assembly steps reverse with the disassembly steps. The connecting methods and torque requirements of main fasteners of the braking system are shown in the following table:

连接内容 Connection contents	连接方式 Connection method	力矩要求 Torque requirements
前制动钳与转向节连接 Connection of the front caliper disc brake and steering knuckle	六角法兰面螺栓 Hexagon flange bolt	130N·m
转向节与下摆臂连接 Connection of the steering knuckle and the lower swing arm	六角头螺栓-细牙，2型全金属六角锁紧螺母 Hexagon head bolt-fine threaded, Type 2 full metal hexagon locking but	130N·m

前轮毂轴承与转向节连接 Connection of the front hub bearing and the steering knuckle	锁紧螺母 Locking nut	150N·m
制动踏板与车身连接 Connection of the brake pedal and the vehicle body	六角法兰面螺母 Hexagon flange nut	30N·m
电子真空泵与车身连接 Connection of the electronic vacuum pump and the vehicle body	六角法兰面螺栓 Hexagon flange bolt	30N·m
真空储能罐与车身连接 Connection of the vacuum energy storage tank and the vehicle body	六角法兰面螺栓 Hexagon flange bolt	30N·m
ABS支架与车身连接 Connection of the ABS support and the vehicle body	六角法兰面螺栓 Hexagon flange bolt	30N·m
驻车制动操纵装置与车身连接 Connection of the parking brake operation device and the vehicle body	六角头螺栓弹簧垫圈和平垫圈组合件 Hexagon head bolt spring washer and flat washer sub-assembly	30N·m
制动硬管接口 Brake hard tube joint	制动硬管自带螺母 Nuts attached with the brake hard tube	16N·m
驻车拉索与车架/车身/制动鼓连接 Connection of the parking cable with the vehicle frame / body / brake drum	六角法兰面螺栓 Hexagon flange bolt	15N·m
前制动软管与卡钳连接 Connection of the front brake hose and the caliper	制动软管通心螺栓 Hollow bolt for brake hoses	30N·m
轮速传感器与转向节/后桥连接 Connection of the wheel speed sensor with the steering knuckle / rear bridge	六角法兰面螺栓 Hexagon flange bolt	15N·m

3.2.4、制动系统常见故障及排除方法

3.2.4 Common faults and troubleshooting of the braking system

系统 System	常见故障 Common fault	可能原因 Possible reason	排除方法 Troubleshooting method
制动系统 Braking system	制动失灵 Brake failure	1.制动总泵带液壶总成，分泵坏、油管漏油 1. Failure of the assembly of the master cylinder with fluid pot or the slave cylinder, oil leakage of the oil tubes	检查、排除、更换 Inspect, exclude, and replace
		2.制动液不足或无油 2. Insufficient brake fluid or no oil	补充 Replenish
		3.制动系统有空气 3, There is air in the braking system	排除空气 Air discharge
		4.制动踏板自由行程过大或制动器间隙过大 4. Too big free path of the brake pedal or too big braking gap	调整 Adjust
		5.刹车片过度磨损 5. Over-wearing of the brake block	更换 Replace
		6.制动总泵带液壶总成内漏 6. Internal leakage of the assembly of the master cylinder with the fluid pot	更换 Replace
	制动跑偏 Brake deviation	1.单侧刹车片过度磨损损坏 1. Single side brake block is over-worn or damaged	更换 Replace
		2.轮胎气压不一 2. Different tyre pressure	维修或更换 Repair or replace
		3.单侧制动钳活塞卡死 3. Single side caliper disc brake piston is jammed	调整 Adjust
		4.前轮定位不准 4. Front wheel location is not accurate	调整 Adjust
	制动拖滞 Braking delay	1.制动踏板无自由行程 1. The brake pedal has no free path .	调整 Adjustment
		2.刹车片间隙过小 2. The brake block gap is too small.	调整或更换 Adjust or replace
		3.分泵活塞运动不灵 3. The slave cylinder piston moves inflexibly.	检查、更换 Inspect and replace
		4.制动总泵带液壶总成活塞回位不良 4. Poor return of the piston of the assembly of the master cylinder with the fluid pot	更换 Replace
		5.驻车制动回位不良 5. Poor return of the parking brake	更换回位簧 Replace the return spring
	制动噪音 Braking noise	1.刹车盘弯曲变形 1. The brake disc bends and deforms	更换 Replace
		2.刹车片过度磨损 2. Over-wearing of the brake block	更换 Replace
		3.制动器内有异物 There are foreign bodies in the brake	检查排除 Inspect and exclude

1 制动不良故障 1. Poor braking fault

A: 故障现象

A: Fault symptom

（1） 制动时不能迅速减速或停车

(1) Upon braking, it is unable to decelerate or park quickly.

（2） 第一次踏下制动板时制动不良，连续踩踏制动板，踏板逐渐升高，但脚踏触感减弱，且制动效果不佳

(2) The braking is poor upon pressing down the brake pedal for the first time; after stepping the brake pedal consecutively, the pedal rises gradually, the foot feel is weak and the braking effect is poor.

（3） 汽车行驶中制动时，驾驶员感到减速度小

(3) Upon braking in driving, the driver feels that the deceleration is small.

（4） 汽车紧急制动时，制动距离长

(4) Upon urgent braking of the vehicle, it takes a long time before stop.

B: 故障原因

B: Fault reason

（1） 油路故障。例如：①油液不足；②油液变质；③管路漏油；④管路漏气

(1) Oil-way fault, including: ① Insufficient oil; ② The oil gets bad; ③ Oil leakage of the pipeline; ④ Air leakage of the pipeline.

（2） 制动主缸、分缸故障。例如：①液压制动总泵和液压制动分泵的橡胶圈老化、发胀、磨损变形，活塞与缸壁磨损过大；②出油阀、回油阀密封不严，贮液室内制动液不足

(2) Master cylinder and slave cylinder fault, including: ① The rubber ring aging, swelling, abrasion or deformation of the hydraulic master cylinder and the slave cylinder, too big abrasion of the piston and cylinder wall; ② Poor sealing effect of the oil outlet valve and the oil return valve, insufficient brake fluid in the fluid storage tank.

（3） 制动踏板自由行程故障。例如：①制动踏板自由行程过大；②制动主缸和工作缸推杆调整不当或松动；③踏板传动机构松旷

(3) Free path fault of the brake pedal, including: ① Too big free path of the brake pedal; ② The master cylinder and the slave cylinder rod is not adjusted properly or is

loose; ③ The pedal transmission mechanism is loose.

（4） 真空增压装置故障。例如：①真空管漏气；②控制阀阀门密封不严，气室膜片破损，控制阀活塞和橡胶圈磨损；③增压缸活塞磨损过多，回位弹簧过软

(4) The vacuum pressurizing device fault, including: ① Air leakage of the vacuum tube; ② Poor sealing effect of the control valve, the air chamber film damage, and abrasion of the piston and rubber ring of the control valve; ③ Over-wearing of the piston of the pressurizing cylinder, and too soft return spring.

（5） 制动器故障。例如：①制动摩擦片磨损严重，摩擦片与制动鼓之间间隙过大，制动盘磨损的过薄或制动鼓与制动盘之工作表面有油污；②制动蹄摩擦片与制动鼓接触状态不佳，调整不良；③制动盘翘曲变形，制动鼓圆度圆柱度差制动蹄片表面烧焦蹄片松动脱落铆钉露出鼓式车轮制动器浸水；④制动蹄回位弹簧过硬，制动蹄轴锈蚀卡死

(5) Brake fault, including: ① Serious abrasion of the brake lining, too big gap between the brake lining and the brake drum, too thin brake disc after abrasion or oil stains on the working surface between the brake drum and the brake disc. ② Poor contact or adjustment between the brake shoe friction plate and the brake drum; ③ The brake disc warps or deforms, poor roundness and cylindricity of the brake drum, burnt brake shoe surface, loose or falling brake shoe, exposure of the rivet, water immersion of wheel brake drum; ④ Too hard brake shoe return spring, rust and jamming of the brake shoe.

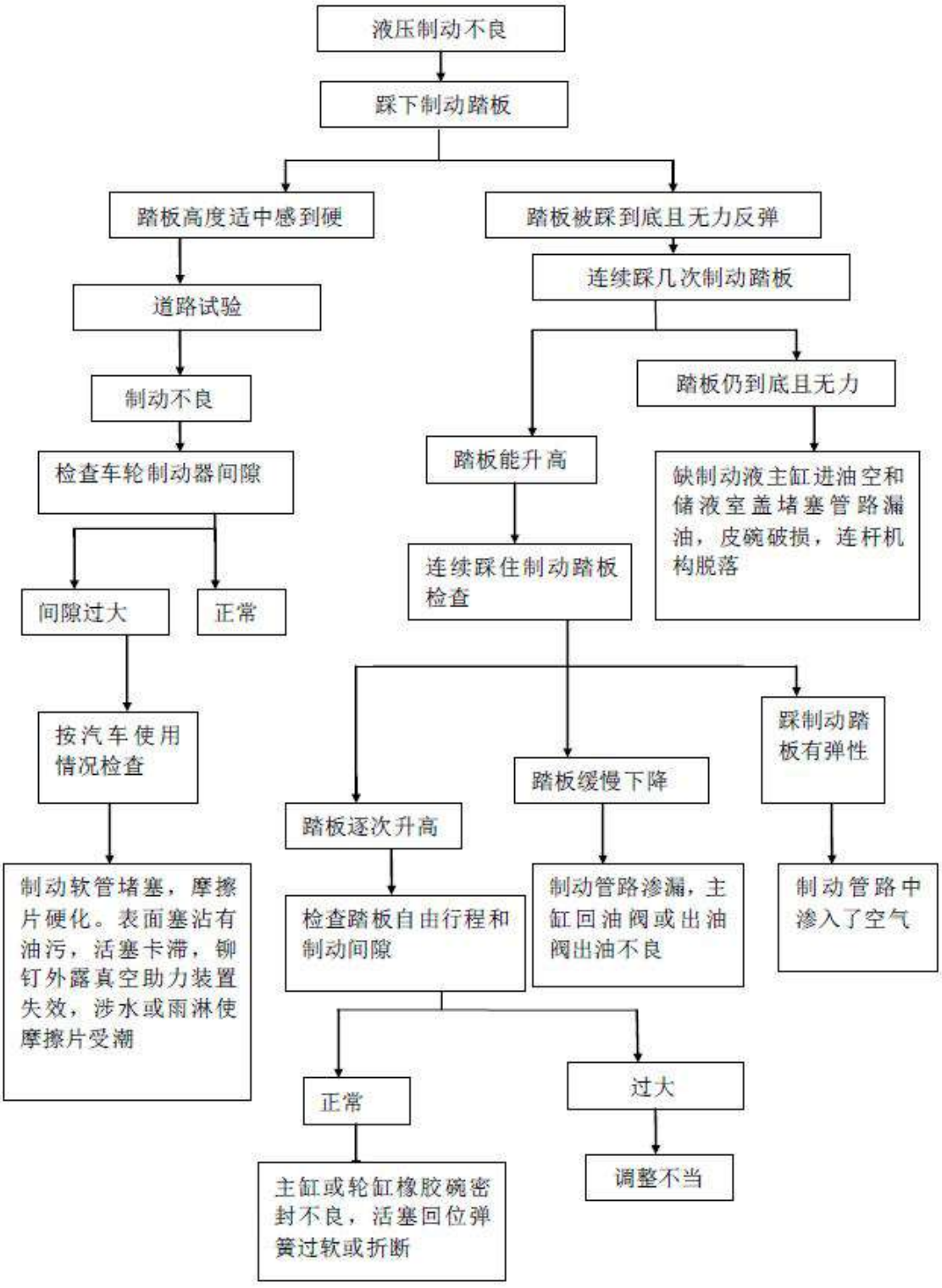
（6） ①制动管路中有空气，或油管凹瘪，软管老化、发胀，内孔不畅通或管路内壁积垢太厚②储液罐制动液不足或变质，③制动主缸、制动轮缸的皮碗、活塞、缸壁磨损过甚④制动主缸、制动轮缸、管路或管接头漏油⑤制动鼓磨损过甚，或制动间隙调整不当⑥制动主缸出油阀、回油阀不密封或活塞回位弹簧预紧力过小，或进油孔、补偿孔、储液罐通气孔、活塞前贯通小孔堵塞⑦制动主缸或制动轮缸皮碗老化、发粘、发胀⑧制动器摩擦片（制动盘）制动鼓（制动钳）的接触面积小，制动蹄摩擦片质量欠佳或使用中表面硬化、烧焦、油污⑨增压器助力器性能不佳或失效⑩制动踏板自由行程太大

(6) ①There is air in the brake pipeline, or the oil tube is concave, the hose gets aging and swelling, the inner hole is not smooth, or the inside wall of the tubes has too thick scale deposit; ② Insufficient or poor brake fluid in the fluid storage tank;

③Over-wearing of the rubber bowl, piston, and cylinder wall of the master cylinder and the slave cylinder; ④ Oil leakage of the master cylinder, slave cylinder, tubes, or tube joints; ⑤ Over-wearing of the brake drum, or improper adjustment of the braking gap; ⑥ Sealing failure of the oil outlet valve and oil return valve of the master cylinder or the too small preload of the return spring of the piston, or obstruction of the oil inlet, compensation hole, air vent of the fluid storage tank, front small through hole of the piston; ⑦ The master cylinder or the slave cylinder gets aging, tacky or swelling; ⑧ The contact area of the brake lining with the (brake disc) brake drum (caliper disc brake) is small, the quality of the brake shoe friction plate is poor or the brake shoe friction plate has surface hardening, burning or oil stain upon using; ⑨ The pressurizing booster has poor performance or fails; ⑩ The free path of the brake pedal is too big.

C:故障诊断流程如下图

C: The fault diagnosis process is as the following diagram.



液压制动不良	Poor hydraulic brake
踩下制动踏板	Press down the brake pedal
道路试验	Road test
连续踩几次制动踏板	Press the brake pedal for several times consecutively

制动不良	Poor brake
检查车轮制动器间隙	Inspect the gap of the wheel brake
间隙过大	Too big gap
正常	Normal
按汽车使用情况检查	Inspect as per the vehicle using condition
制动软管堵塞，摩擦片硬化。表面塞沾有油污，活塞卡滞，铆钉外露真空助力装置失效，涉水或雨淋使摩擦片受潮	Brake hose obstruction, hardening of the friction plate; the surface has oil stains, the piston is stagnant, the rivet is exposed, the vacuum boosting device fails, and the friction plate is moist owing to water or rainfall.
踏板被踩到底且无力反弹	The pedal is pressed down to the bottom and has no power to rebound.
连续踩几次制动踏板	Press the brake pedal several times consecutively.
踏板仍到底且无力	The brake pedal is still at the bottom and has no power.
缺制动液主缸进油空和储液室盖塞管路漏油，皮碗破损，连杆机构脱落	Lack of brake fluid; the master cylinder has oil or air in it; the fluid storage chamber plug and pipeline has oil leakage, the rubber bowl is damaged, and the connecting rod mechanism falls off.
踏板升高	The brake pedal rises
连续踩住制动踏板检查	Press the brake pedal consecutively for inspection
踏板逐次升高	The pedal rises gradually
检查踏板自由行程和制动间隙	Inspect the free path and braking gap of the pedal
正常	Normal
主缸或轮缸橡胶碗密封不良，活塞回位弹簧过软或折断	The sealing of the master cylinder or the slave cylinder is poor, the return spring of the piston is too soft or broken.
踏板缓慢下降	The pedal drops slowly
制动管路渗透，主缸回油阀或出油阀出油不良	The brake pipeline has permeation, the oil return valve or the oil outlet valve of the master cylinder has oil output problem.
过大	Too big
调整不当	Improper adjustment
踩制动踏板有弹性	Feel elastic upon pressing the brake pedal
制动管路中渗入了空气	Air gets into the brake pipeline

2 制动失效故障 2. Brake failure fault

A:故障现象

A: Fault symptoms

汽车行驶中，将制动踏板踩到底，制动装置不起作用，或在使用一次或几次制动后，制动装置突然不起作用，都属于制动失效故障。

In driving, press the brake pedal to the bottom, the brake doesn't function, or the brake suddenly fails after braking one time or several times. All these are brake failure faults.

B: 故障原因

B: Fault reason

液压制动总泵故障。例如：

Hydraulic master cylinder faults, including:

① 制动总泵内制动液严重不足；

① Serious insufficiency of the brake fluid in the master cylinder.

② 制动总泵橡胶皮碗、橡胶圈严重磨损，或橡胶皮碗被踏反；

② Serious wearing of the rubber bowl and rubber ring of the master cylinder, or reversed rubber bowl.

③ 制动总泵和制动分泵之间的管路断裂，或接头松脱，严重漏油；

③ Tube breakage between the master cylinder and the slave cylinder, loose or falling joint, serious oil leakage;

④ 制动踏板传动机构脱落断裂

④ Fall and breakage of the brake pedal transmission mechanism.

液压制动分泵故障。例如：

Hydraulic slave cylinder faults, including:

① 制动分泵橡胶皮碗严重破损，或橡胶皮碗被顶翻；

① Serious damage of the rubber bowl of the slave cylinder, or overturned rubber bowl.

② 制动分泵活塞在缸筒内卡死；

② The piston of the slave cylinder is jammed in the cylinder.

③ 制动分泵进油管被压扁堵死；

③ The inlet tube of the slave cylinder is crushed and blocked.

④ 制动分泵排空气螺钉松动、脱落或丢失

④ Air discharge screw of the slave cylinder is loose, falling off or missing.

车轮制动器故障。例如：

Wheel brake faults, including:

① 制动器摩擦片大面积脱落，摩擦片严重烧蚀；

① The brake lining falls off by large area, and the friction plate is seriously burnt.

② 制动盘开裂、破裂

② The brake disc cracks or breaks.

C: 故障诊断方法

C: Fault diagnosis method

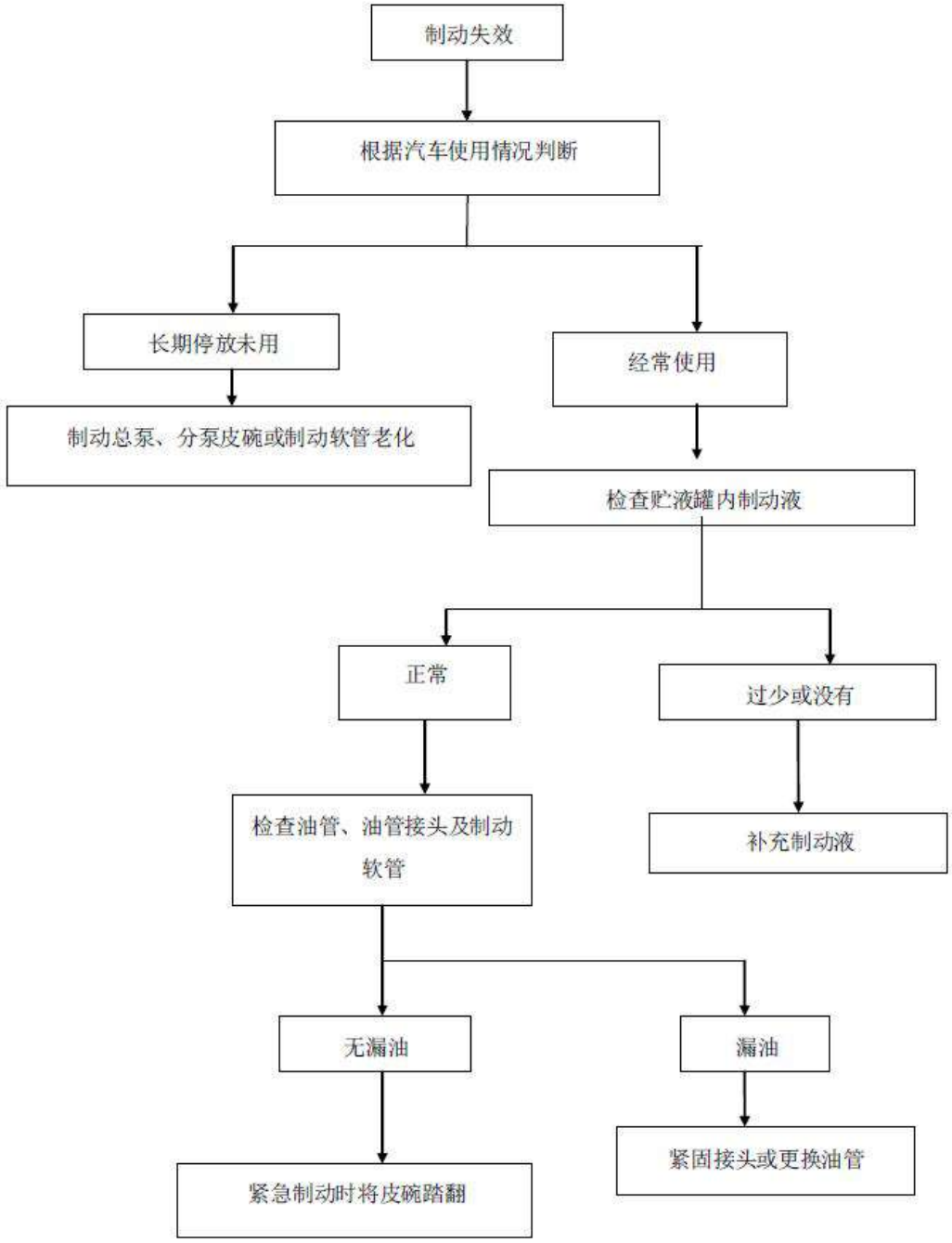
踩下制动踏板，如无连接感，说明是踏板与制动主缸连接脱开；②检查系统管路

有无泄露或破裂（通常根据油迹）。管路的泄露或破裂会是回路中形成不了高压，使制动性能失效。③如上述情况正常，则应检查制动主缸和制动轮缸。

Press down the brake pedal, in case of no connection feeling, it indicates that the pedal is disconnected with the master cylinder; ② Inspect whether the system pipeline has leakage or breakage （usually as per the oil track）. The pipeline leakage or breakage will make high pressure unable to be formed in the loop and make the brake fail. ③ In case the above conditions are normal, then inspect the master cylinder and the slave cylinder.

D: 故障诊断流程如下图

D: The fault diagnosis process is as the following diagram



制动失效	Brake failure
根据汽车使用情况判断	Judge as per the auto using condition
长期停放未用	Without using for a long time
制动总泵、分泵皮碗或制动软管老化	The rubber bowl or brake hose of the master cylinder or the slave cylinder gets aging.
经常使用	Use often
检查贮液罐内制动液	Inspect the brake fluid in the fluid storage tank
正常	Normal
检查油管、油管接头及制动软管	Inspect the oil tube, oil tube joint and the

	brake hose
无漏油	No oil leakage
紧急制动时将皮碗踏翻	The rubber bowl is overturned upon emergency brake
过少或没有	Too little or none
补充制动液	Replenish the brake fluid
漏油	Oil leakage
紧固接头或更换油管	Tighten the joint or replace the oil tube

3 液压制动拖滞故障 3. Hydraulic brake delay fault

A: 故障现象

A: Fault symptoms

使用制动后，当抬起制动踏板后，全部和个别车轮的制动作用不能完全立即解除，在行驶中感到无力，行驶一段距离后，尽管未使用制动器，但仍有某一制动盘或全车制动盘发热。一致影响车辆重新起步，加速行驶或滑行。

After the braking, when the brake pedal rises, the braking of all or individual wheels is unable to be removed immediately and completely; feel sluggish in driving; after driving for some distance, though the brake is not used, a certain brake disc or all brake discs still heats up. All affect the re-start, accelerated driving or slide of the vehicle.

B: 故障原因

B: Fault reasons

a、 液压制动总泵故障。例如：①制动踏板没有自由行程，以及踏板回位弹簧松脱、折断或太软；②制动踏板轴锈蚀或磨损而发卡，回位弹簧不能使其回位；③制动液太脏或粘度太大，使其回油困难；④制动分泵回油孔、旁通空被赃物堵塞；⑤制动总泵活塞发卡或橡胶皮碗发胀使其回位不灵活，堵住总泵回油孔；⑥制动总泵活塞过软或折断；⑦制动总泵回油阀弹簧过硬；

a. Hydraulic master cylinder fault, including ① The brake pedal has no free path, the pedal return spring falls off, breaks or is too soft; ② The brake pedal gets jammed owning to rusting or abrasion, and the return spring fails to make it return; ③ The brake fluid is too dirty or has too big viscosity, making the oil return difficult; ④ The oil return hole and the bypass hole of the slave cylinder is blocked by the filth; ⑤ The piston of the master cylinder gets jammed or the rubber bowl of the master cylinder gets swelling, making it unable to return flexibly and blocking the oil return hole; ⑥ The master cylinder piston is too soft or breaks; ⑦ The oil return valve spring of the master cylinder is too hard.

b、 液压制动分泵故障。例如：①制动分泵橡胶皮碗被粘住或因发胀而被卡住；②制动分泵活塞变形、磨损或卡住；③制动油管被压扁或制动软管老化，内壁脱落堵塞导致回油不畅

b. Hydraulic slave cylinder faults, including ① The rubber bowl of the slave cylinder is

stuck or jammed owing to swelling; ② The slave cylinder piston is deformed, worn or jammed; ③ The brake oil tube is crushed or the brake hose is aging, the inside wall falls off, which make the oil return not smooth.

c、 车轮制动器故障.例如：①制动蹄摩擦片与制动盘之间间隙过小；②制动蹄摩擦片与制动盘烧结、粘住；③制动蹄摩擦片脱落，其碎片夹在制动蹄摩擦片与制动盘之间；④制动蹄回位弹簧脱落、折断或弹力过小；⑤制动蹄轴与衬套配合间隙过小、润滑不良或锈蚀，引起回位弹簧转动困难；⑥制动盘翘曲变形

c. Wheel brake faults, including: ① The gap between the brake shoe lining and the brake disc is too small; ② The brake shoe lining sinters or sticks with the brake disc; ③ The brake shoe lining falls off, and the fragments are stuck between the brake shoe lining and the brake disc; ④ The brake shoe return spring falls off, breaks or has small elastic force; ⑤ The fitting gap of the brake shoe axle and the bushing is too small, the lubrication is poor or there is rust, which cause the return spring hard to rotate; ⑥ The brake disc warps and deforms.

d、 其他原因。例如:①轮毂轴承调整不当，使制动盘歪斜而与制动摩擦片接触。②驻车制动的脚驻车未放松，或驻车制动拉锁调整不当

d. Other reasons， including: ① The hub bearing is not adjusted properly, which makes the brake disc tilt and contact the brake lining. ② The foot parking of the parking brake is not released or the parking brake cable is not adjusted properly.

C: 故障诊断方法

C. Fault diagnosis methods

若个别车轮发热，应检查该轮制动轮缸是否回位不畅，制动器制动间隙是否太小，制动蹄是否回位不畅。

In case of individual wheal heating, inspect whether the wheel salve cylinder has return problems, whether the brake braking gap is too small, and whether the brake shoe has return problem.

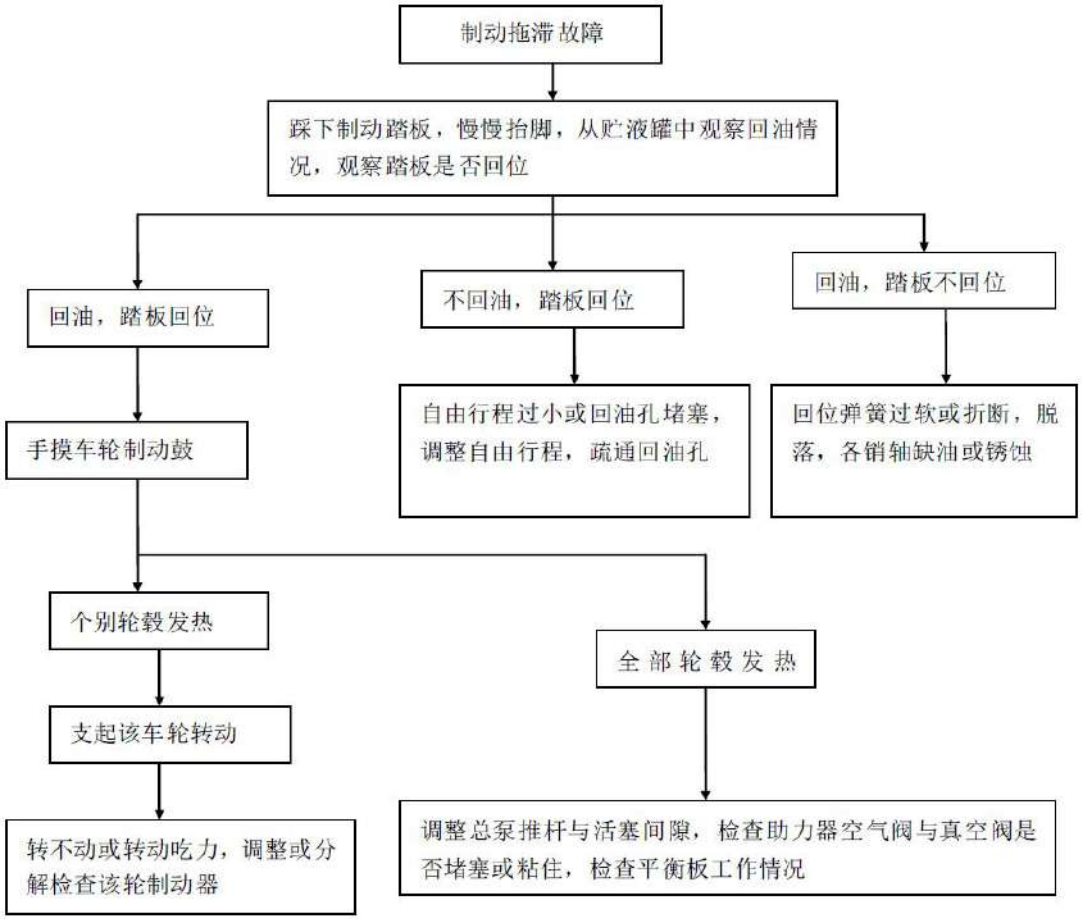
若全部车轮发热，应检查制动踏板自由行程是否太小，制动器制动间隙是否太小，制动主缸是否会回油慢（回油孔不畅，皮碗发胀），真空助力器是否漏气。

In case of all-wheel heating, inspect whether the free path of the brake pedal is too small, whether the brake braking gap is too small, whether the master cylinder returns the oil

slowly (poor oil return, rubber bowl swelling), and whether the vacuum booster has air leakage.

D: 故障诊断流程如图

D: Fault diagnosis process is as the diagram



制动拖滞故障	Brake delay fault
踩下制动踏板，慢慢抬脚，从贮液罐中观察回油情况，观察踏板是否回应	Press down the brake pedal, raise the foot slowly, and observe the oil return condition from the fluid storage tank as well as the reaction of the pedal.
回油，踏板回位	Oil returns, and the pedal returns
手摸车轮制动鼓	Touch the brake drum of the wheel with hands
个别轮毂发热	Individual hubs heat up
支起该车轮转动	Lift the wheel and rotate it
转不动或转动吃力，调整或分解检查该轮制动器	Inc case of failing to rotate or taking big force to rotate, then adjust or break down to inspect the wheel brake.
全部轮毂发热	All the hubs heat up

调整总泵推杆与活塞间隙，检查助力器空气阀与真空阀是否堵塞或粘住，检查平衡板工作情况	Adjust the gap between the master cylinder and piston, inspect the air valve and vacuum valve of the booster is blocked or stuck, and inspect the working state of the balance plate.
不回油，踏板回位	The oil doesn’t return, but the pedal returns
自由行程过小或回油孔堵塞，调整自由行程，疏通回油孔	The free path is too small or the oil return hole is blocked; adjust the free path and dredge the oil return hole
回油，踏板不回位	Oil returns, but the pedal doesn’t return
回位弹簧过软或折断，脱落，各销轴缺油或锈蚀	The return spring is too soft or broken, or falls off,; each hinge pin lacks oil or gets rusty.

4 制动跑偏故障 4. Brake deviation fault

A:故障现象：在汽车在行驶的过程中，汽车制动时自动向一侧偏驶

A: Fault symptoms: In driving, upon braking, the brake deviates toward one side automatically.

B: 故障原因

B: Fault reasons:

某轮缸的进油管被压扁、堵塞，或因进油软管老化、发胀而造成进油不畅或进油管接头松动漏油；某轮缸的缸筒、活塞、橡胶碗磨损漏油，导致压力下降

The oil inlet tube of a certain cylinder is crushed and blocked, or the oil inlet hose is aging and swelling which causes the oil inlet not smooth or the oil inlet tube joint is loose and has oil leakage; the cylinder barrel, piston or rubber bowl of a certain cylinder is worn and has oil leakage, which cause the pressure drop.

制动系统某个支路或轮缸内有空气未排出。各车轮制动器的制动间隙不一致

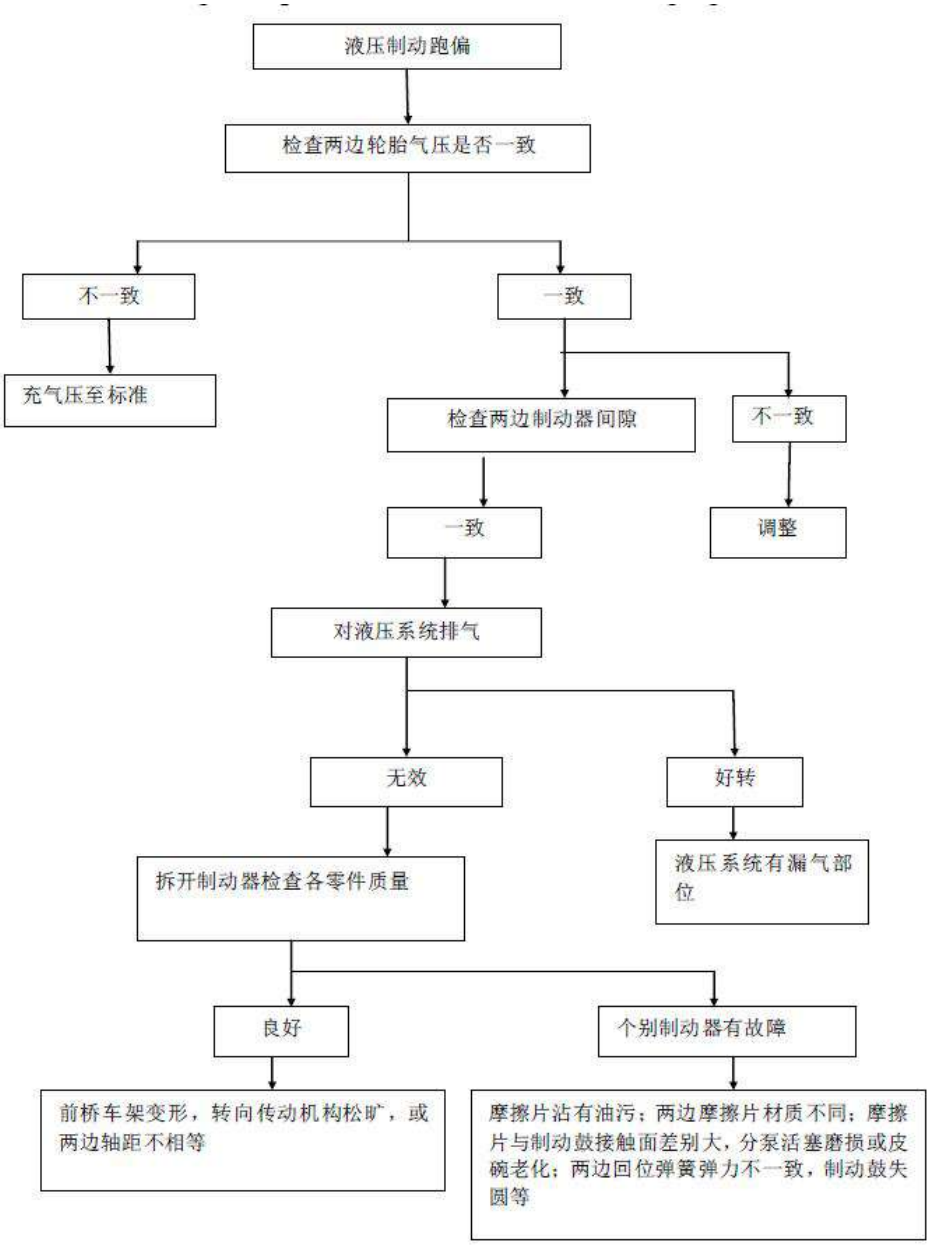
A certain branch of the braking system or the slave cylinder has air in it. The braking gap of each wheel brake is inconsistent.

各车轮制动器的制动盘厚度不符合标准，各车轮制动器的制动蹄回位弹簧弹力相差过大

The brake disc thickness of each wheel brake doesn’t conform to the standard, the elastic force of the brake shoe return spring of each wheel brake has too big difference.

C: 故障诊断流程如下图

C: The fault diagnosis process is as the following diagram



液压制动跑偏	The hydraulic brake deviates
检查两边轮胎气压是否一致	Inspect whether the pressure of the tyres on both sides is consistent.
不一致	Inconsistent
充气压至标准	Pressurize to the standard level
一致	Consistent
检查两边制动器间隙	Inspect the gap of the brakes on both sides
一致	Consistent
对液压系统排气	Discharge the air for the hydraulic system
不一致	Inconsistent
调整	Adjust
无效	Invalid
好转	Get better

液压系统有漏气部位	The hydraulic system has air leakage parts
拆开制动器检查和零件质量	Disassemble the brake to inspect the parts quality
良好	Good
前桥车架变形，转向传动机构松旷，或两边轴距不相等	Front bridge frame deforms, the steering transmission mechanism gets loose, or the axle distance of both sides is different.
个别制动器有故障	Individual brake fault
摩擦片沾有油污：两边摩擦片材质不同：摩擦片与制动鼓接触面差别大，分泵活塞磨损或皮碗老化：两边回位弹簧弹力不一致，制动鼓失圆等	The friction plate has oil stain; the texture of the friction plates on both side is different; the contact surface of the friction plate and the brake drum has big difference; the piston of the slave cylinder is worn or the rubber bowl is aging; the elastic force of the return springs on both sides is inconsistent, the brake drum is not round, etc.

5 制动系的其他故障

5. Other faults of the braking system

（1） 制动踏板发软或有弹性

(1) The brake pedal is sluggish or elastic.

故障原因主要是：①制动系统管路中有空气，应进行放气操作；②制动主缸制动主缸中活塞与缸筒间隙过大，应更换皮碗或总成；③制动液不足，应补充同型号制动液至规定高度等

Main fault reasons: ① In case there is air in the braking system pipeline, discharge the air; ② In case the piston and the cylinder barrel of the master cylinder has too big gap, replace the rubber bowl or the assembly; ③ In case the brake fluid is insufficient, replenish brake fluid of the same model to the stipulated height, etc.

（2） 制动踏板发硬

(2) The brake pedal requires big power to press down

故障原因主要是真空助力器或软管漏气，可对真空助力器真空度和阀门的密封性进行检查，若良好，在对制动系其他部位进行检查。

The main fault reason is the air leakage of the vacuum booster or the hose, inspect the vacuum degree of the vacuum booster and the air tightness of the valve, in case of no

problem, inspect other parts of the braking system.

（3） 制动时车身抖动

(3) Vehicle body shake upon braking

故障主要原因是：①润滑油或制动液污染了制动摩擦片，造成摩擦片打滑，污染摩擦片的润滑油可能源于减速器油封漏油，润滑脂可能源于车轮轴承密封件泄露，应在排除故障后更换制动蹄片；②制动盘划伤或翘曲，应予更换，同轴左右两侧的制动盘应同时更换；③制动钳松动或卡滞，应予紧固或润滑，必要时更换制动摩擦片；④制动轮缸或真空助力器故障，应予检修等；

The main fault reasons are: ① The lubricant grease or the brake fluid contaminates the brake lining, which makes the friction plate slippery; the lubricant grease contaminating the friction plate may result from the oil leakage of the grease seal of the decelerator or the leakage of the sealing pieces of the wheel bearing; replace the brake shoe after troubleshooting; ② In case the brake disc is scratched or warps, replace; the brake discs on both right and left sides of the same shaft should be replaced together; ③ In case the caliper disc brake gets loose or stuck, tighten or lubricate, and replace the brake lining when necessary; ④ In case of the slave cylinder or the vacuum booster fault, overhaul, etc.

（4） 制动器噪声

(4) Brake noise

制动盘和制动钳之间的震颤噪声或尖叫声，多因旋转元件抛光不良，修削加工粗糙，表面刮擦受损或钳体部位毛刺造成，应给予逐一检修清洁，必要时更换零部件。修复旋转元件可采用不定向涡流式抛光发重新抛光其表面，利用特种型号制动盘背后装上垫块和复合材料也可以消除或降低噪声。制动盘过度磨损会导致金属刮削声，制动盘磨损超过规定限度，应给予更换。

The vibration noise or squeal between the brake disc and the caliper disc brake are usually caused by the poor polish of the rotating elements, coarse cutting processing, damage owing to surface scratch or burrs on the caliper disc brake, so overhaul and clean one by one and replace the parts when necessary. The repaired components may adopt non-directional eddy current polishing method to polish its surface, and it also

enables to remove or reduce the noise by installing the cushion block and compound materials on the back of special model brake disc. The over-abrasion of the brake disc will cause the metal scraping noise, so in case the brake disc abrasion exceeds the stipulated limit, it should be replaced.

3.3、悬架系统

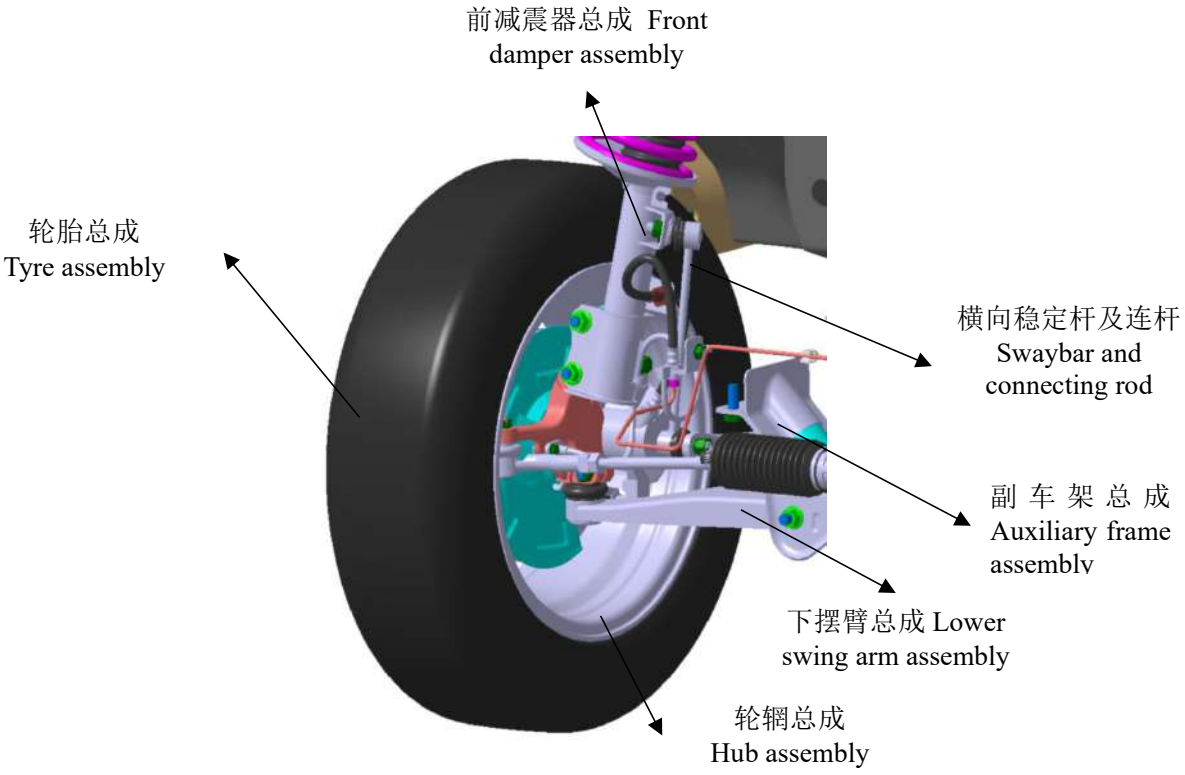
3.3 Suspension system

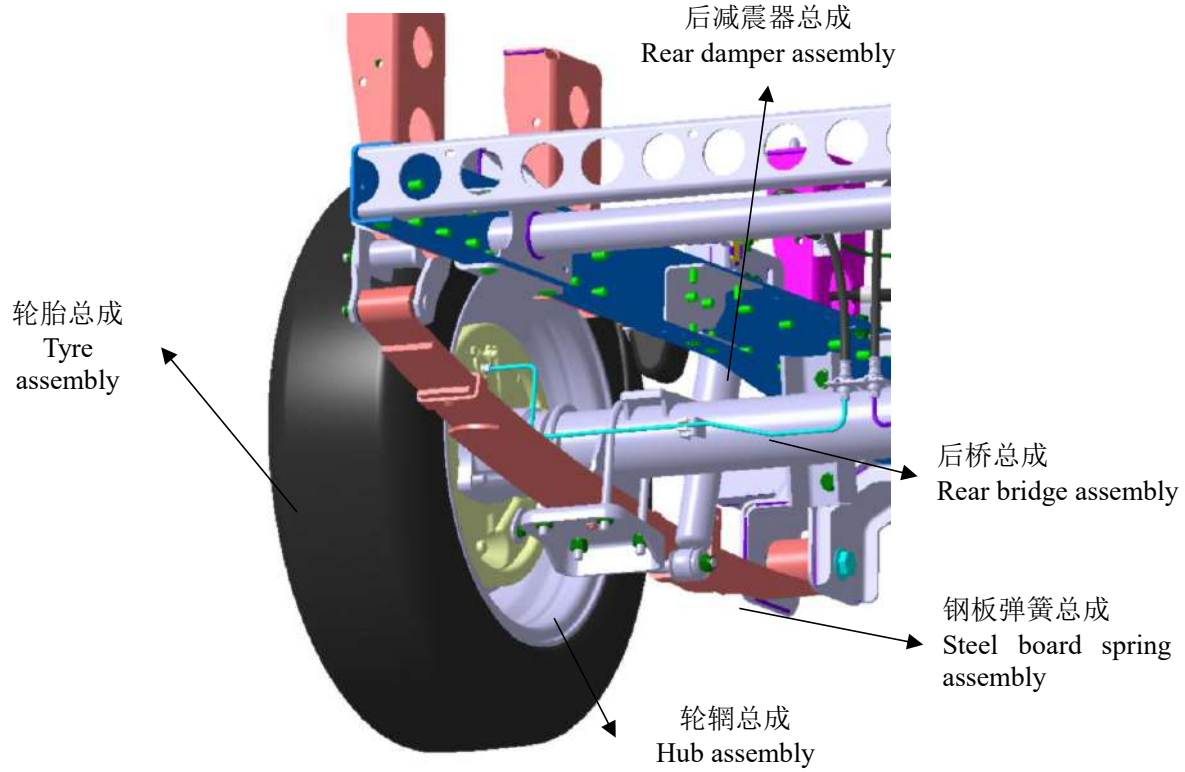
3.3.1、产品概述

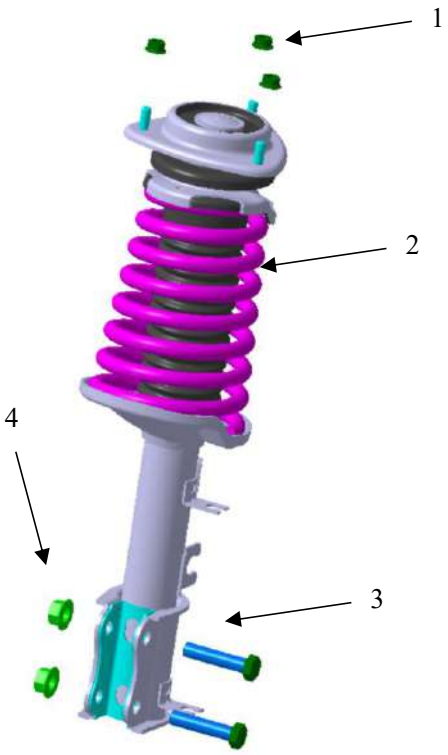
3.3.1 Overview of the product

葑全微卡悬架系统

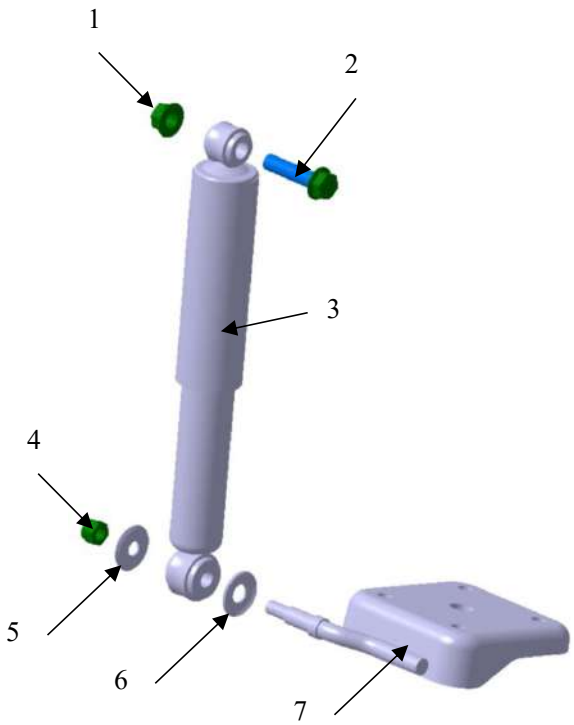
Fengchuen mini truck suspension system


前减震器总成 Front damper assembly
轮胎总成 Tyre assembly
横向稳定杆及连杆 Swaybar and connecting rod
副车架总成 Auxiliary frame assembly
下摆臂总成 Lower swing arm assembly
轮辋总成 Hub assembly

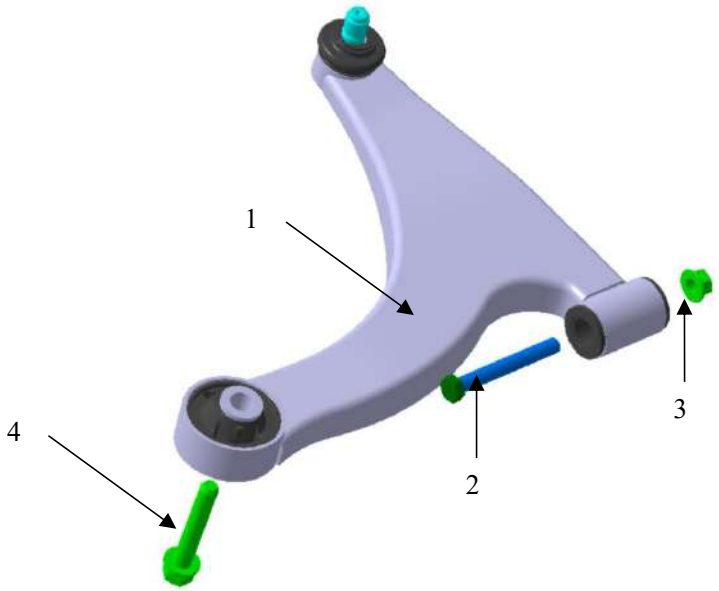

后减震器总成 Rear damper assembly
轮胎总成 Tyre assembly
后桥总成 Rear bridge assembly
钢板弹簧总成 Steel board spring assembly
轮辋总成 Hub assembly



序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	Q32008	六角法兰面螺母 Hexagon flange nut	3	个 pc
2	2905100-FC25	左滑柱总成 Left sliding column assembly	1	个 Set
3	Q151B1255	六角头螺栓-细牙 Hexagon head bolt- fine threaded	2	个 PC
4	Q32312	六角法兰面螺母 Hexagon flange nut	2	个 PC



序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	Q32012	六角法兰面螺母 Hexagon flange nut	1	个 PC
2	Q1841250	六角法兰面螺栓 Hexagon flange bolt	1	个 PC
3	2915100-FC25	后减震器总成 Rear damper assembly	1	个 PC
4	Q32810	1 型非金属嵌件六角锁紧螺母 Type 1 hexagon locking nut with non-metal inserts	1	个 PC
5	2915112-FC25	锥形弹性小孔垫圈 Conical elastic small hole washer	1	个 PC
6	2915111-FC25	锥形弹性大孔垫圈 Conical elastic big hole washer	1	个 PC
7	2911140-FC25	左钢板弹簧座总成 Left steel board spring base assembly	1	个 PC



序号 SN	零部件编号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	2904100-FC25	左摆臂总成 Left swing arm assembly	1	个 Set
2	Q151B1295	六角头螺栓-细牙 Hexagon head bolt – fine threaded	1	个 PC
3	Q32312	六角法兰面螺母 Hexagon flange nut	1	个 PC
4	Q146B1490	六角头螺栓、弹簧垫圈和平垫圈组合件 Hexagon head bolt, spring washer and flat washer sub-assembly	1	个 PC

3.3.2、悬架系统拆卸步骤

3.3.2 Disassembly steps of the suspension system

1、 前悬架系统拆卸步骤：

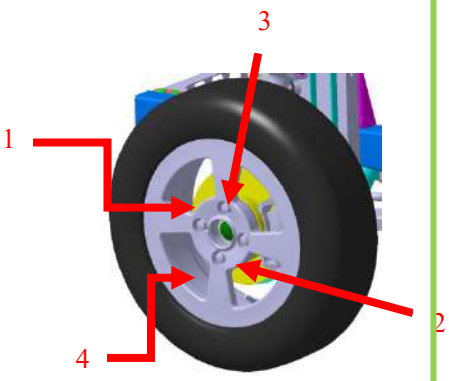
1. Disassembly steps of the front suspension system

a. 按照对角线方向依次拧松车轮螺母:
（顺序可参考：1→2→3→4）
(螺母规格: M12)

a. Unscrew the wheel nut in order as per the diagonal direction
(refer to the order: 1→2→3→4)
(Nut spec: M12)

◎拧紧力矩：110N•m

◎Tightening torque: 110N•m



b. 举升车辆至适合拆卸的高度，拆卸车轮螺母，取下轮胎

b. Lift the vehicle to a height appropriate for disassembly, disassemble the wheel nuts, and remove the tyre

c. 拆卸前制动软管和前轮速传感器接头，放出制动液
（前制动软管螺母规格：M10）

c. Disassemble the joint of the front brake hose and front wheel speed sensor, and discharge the brake fluid.

◎拧紧力矩：30N•m

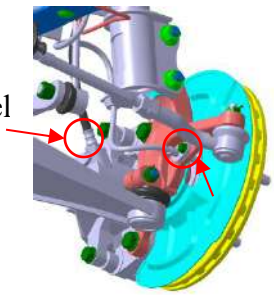
◎Tightening torque: 30N•m

（前轮速传感器螺栓规格：M6）

(Font wheel speed sensor bolt spec: M6)

◎拧紧力矩：15N•m

◎Tightening torque: 15N•m



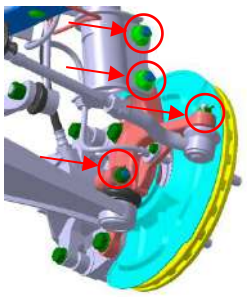
d. 拆卸转向节与转向拉杆连接螺母，转向节与摆臂连接螺栓，转向节与减震器连接螺栓；取下前制动器总成

d. Disassemble the connecting nut of the steering knuckle with the steering bar, the connecting bolts of the steering knuckle with the swing arm, and the connecting bolts of the steering knuckle with the damper, and remove the front brake assembly.

（转向节与转向拉杆连接螺母规格：M10）

(Spec of the connecting nut of the steering knuckle with the steering bar：M10)

◎拧紧力矩：75 N•m



（转向节与摆臂连接螺栓规格：M10）

◎Tightening torque: 75 N•m

(Spec of connecting bolt of the steering knuckle with the swing arm: M10)

◎拧紧力矩：130 N•m

◎Tightening torque: 130 N•m

（转向节与减震器连接螺栓规格：M12）

(Spec of the connecting bolts of the steering knuckle with the damper: M12)

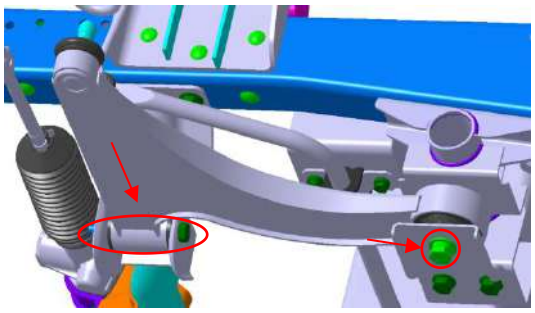
◎拧紧力矩：130 N•m

◎Tightening torque: 130 N•m

e. 拆卸摆臂与安装支架连接螺栓，取下摆臂总成

（摆臂前连接点螺栓规格：M12）

e. Disassemble the connecting bolts of the swing arm with the installation support, and remove the swing arm assembly (spec of the front junction bolt of the swing arm: M12)



◎拧紧力矩：130 N•m

◎Tightening torque: 130 N•m

（摆臂后连接点螺栓规格：M14）

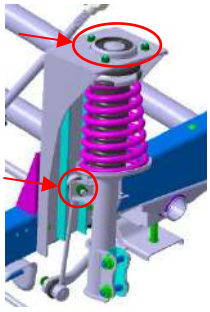
(Spec of the rear junction bolt of the swing arm: M14)

◎拧紧力矩：180 N•m

◎Tightening torque: 180 N•m

f. 拆卸减震器与横向稳定杆连杆连接螺母，拆卸减震器与车身连接螺母，取下减震器总成

f. Disassemble the connecting nut of the damper with the connecting rod of the sway bar, disassemble the connecting nut of the damper with the vehicle body, and remove the damper assembly.



（减震器与横向稳定杆连杆连接螺母规格：M12）

(Spec of the connecting nut of the damper with the connecting rod of the sway bar: M12)

◎拧紧力矩：130 N•m

（减震器与车身连接螺母规格：M8）

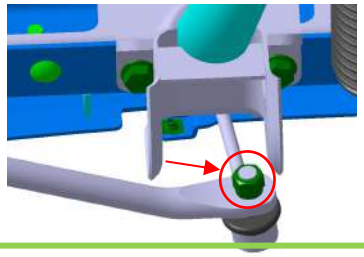
Tightening torque: 130 N•m

(Spec of the connecting nut of the damper with the vehicle body: M8)

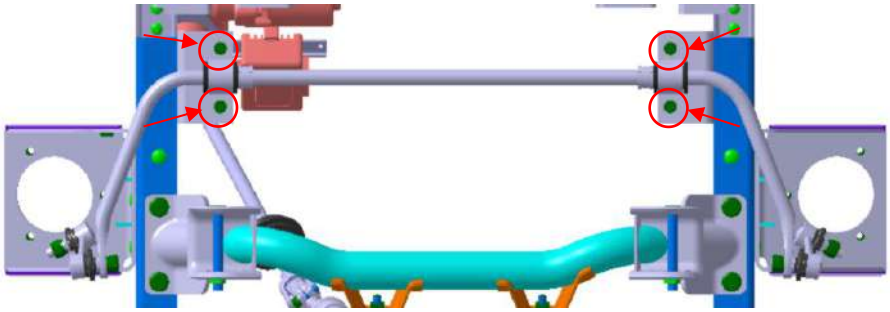
◎拧紧力矩：75 N•m

Tightening torque: 75 N•m

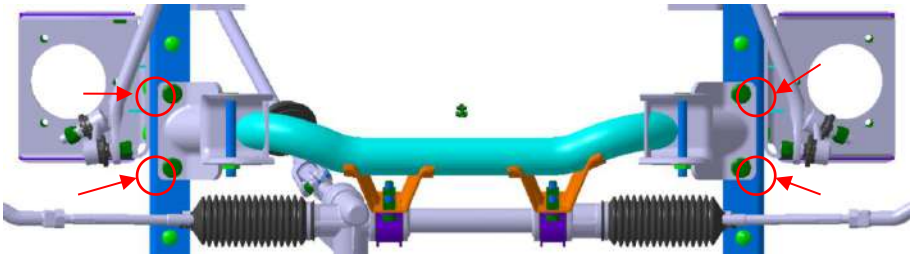
g. 拆卸横向稳定杆连杆与横向稳定杆连接螺母，取下横向稳定杆连杆总成
（螺母规格：M12）
g. Disassemble the connecting nuts of the connecting rod of the sway bar with the sway bar, and remove the assembly of the connecting rod of the sway bar
◎拧紧力矩：130 N•m
◎Tightening torque: 130 N•m



h. 拆卸横向稳定杆总成与稳定杆固定支架总成连接螺栓，取下横向稳定杆总成、卡箍、衬套
h. Disassemble the connecting bolts of the sway bar assembly and the sway bar fixing support assembly, and remove the sway bar assembly, collar, and bushing.
（螺栓规格：M8）
(Bolt spec: M8)
◎拧紧力矩：130 N•m
◎Tightening torque: 130 N•m

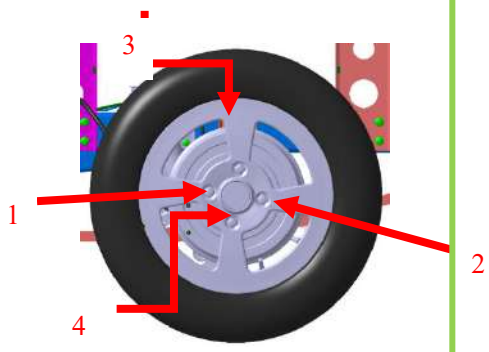


i.拆卸与副车架连接的下摆臂、转向器后(详见相关零部件拆卸步骤)，拆卸副车架与车架连接螺栓，取下副车架总成
i. Disassemble the lower swing arm and the steering gear connecting with the auxiliary frame (refer to the disassembly steps of relevant parts for details), disassemble the connecting bolts of the auxiliary frame with the vehicle frame , and remove the assembly of the auxiliary frame.
（螺栓规格：M12）
(Bolt spec: M12)
◎拧紧力矩：130 N•m
◎Tightening torque: 130 N•m



2. 后悬架系统拆卸步骤：2. Disassembly steps of the rear suspension system

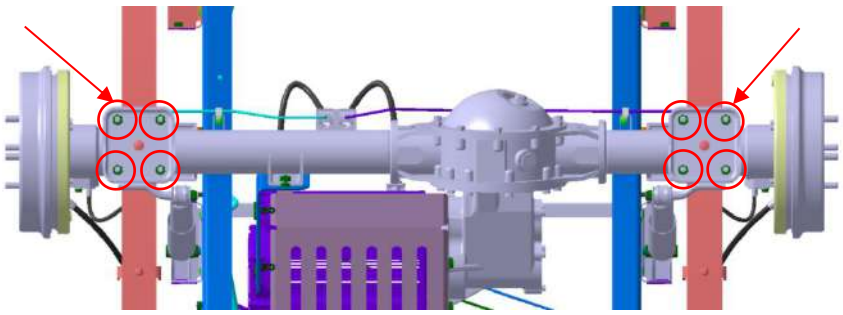
a. 按照对角线方向依次拧松车轮螺母:
（顺序可参考：1→2→3→4）
（螺母规格: M12 ）
a. Unscrew the wheel nut in order as per the diagonal direction
(refer to the order: 1→2→3→4)
(Nut spec: M12)



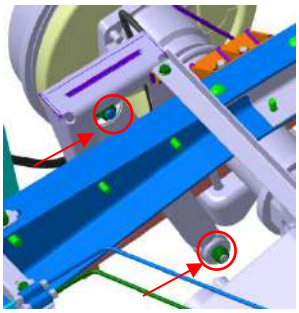
◎拧紧力矩：110N•m
Tightening torque: 110N•m

b. 举升车辆至适合拆卸的高度，拆卸车轮螺母，取下轮胎
b. Lift the vehicle to a height appropriate for the disassembly, disassemble the wheel nut and remove the tyre.

c. 使用工具托举后桥总成，拆卸钢板弹簧座与 U 型螺栓连接螺母
（螺母规格：M10）
c. Use tools to lift the rear bridge assembly, disassemble the connecting nuts of the steel board spring base with the U shape bolt
(Nut spec: M10)
◎拧紧力矩：75 N•m
Tightening torque: 75 N•m



d. 拆卸后减震器总成与钢板弹簧座连接螺母，拆卸后减震器总成与车架连接螺栓，取下后减震器总成与钢板弹簧座
d. Disassemble the connecting nut of the rear damper assembly with the steel board spring base, as well as the connecting bolts of the damper assembly with the frame, and remove the rear damper assembly and the steel board spring base.
（后减震器总成与钢板弹簧座连接螺母规格：M10）



(Spec of the rear damper assembly and the steel board spring base: M10)

◎拧紧力矩：75N•m

◎Tightening torque: 75N•m

（后减震器总成与车架连接螺栓规格：M12）

(Connecting bolt spec of the rear damper assembly and the frame: M12)

◎拧紧力矩：130N•m

◎Tightening torque: 130N•m.

e. 拆卸钢板弹簧后吊耳板与过度支架连接螺母，拆卸钢板弹簧总成与前安装支架连接螺母，取下吊耳和钢板弹簧总成

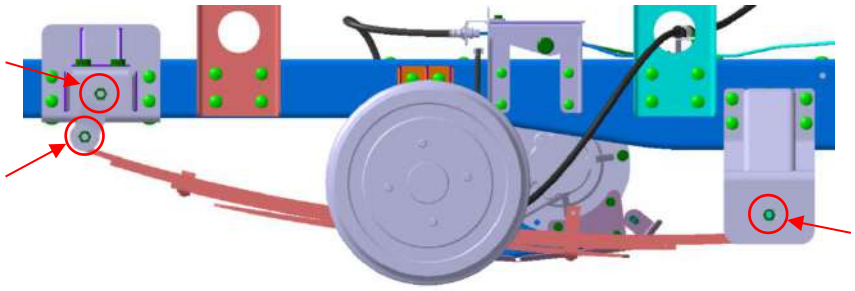
e. Disassemble the connecting nut of the rear shackle plate of the steel board spring with the transition support, disassemble the connecting nuts of the steel board spring assembly and the front installation support, and remove the shackle and the steel board spring assembly.

（螺母规格：M10）

(Nut spec: M10)

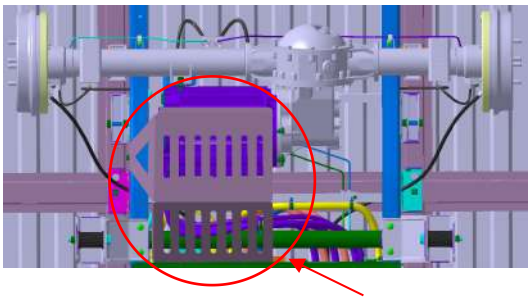
◎拧紧力矩：75N•m

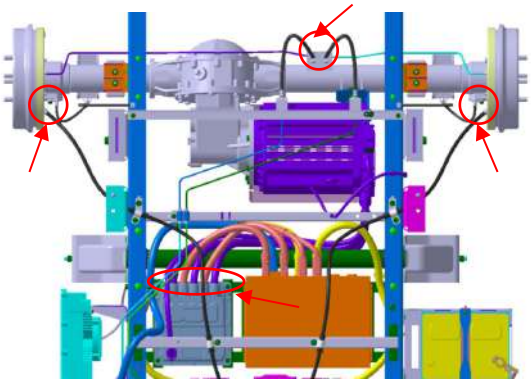
◎Tightening torque: 75N•m



f. 拆卸电机防护罩，拆卸与后桥总成连接的制动管路、后驻车拉索总成、轮速传感器（详见相关零部件拆卸步骤），拆卸与电机连接的线束，将后桥总成与电机一起取下

f. Disassemble the motor protective cover, as well as the brake pipeline, rear parking cable assembly, and wheel speed sensor connecting with the rear bridge (refer to the disassembly steps of relevant parts), disassemble the harnesses connecting with the motor, and finally remove the rear bridge assembly and the motor together.





g. 拆卸后缓冲块与车架连接螺母，取下后缓冲块总成

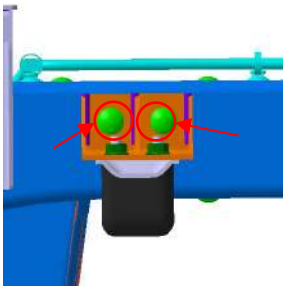
g. Disassemble the connecting nuts of the rear buffer block with the frame, and remove the rear buffer block assembly.

（螺母规格：M8）

(Nut spec: M8)

◎拧紧力矩：30N•m

Tightening torque: 30N•m



安装步骤与拆卸步骤相反，悬架系统主要紧固件连接方式和力矩要求详见下表：

The assembly steps reverse with the disassembly steps. The connection methods and the torque requirements of the main fasteners of the suspension system are shown in the following table:

联接内容 Connection contents	联接方式 Connection method	力矩要求 Torque requirement
车轮与制动器连接 Connection of the wheel with the brake	车轮锥面螺母 Wheel conical nut	110N•m
转向节与前减震器连接	六角头螺栓-细牙/六角法兰面螺母	130N•m

Connection of the steering knuckle and the front damper	Hexagon head bolt-fine threaded/ hexagon flange nut	
转向节与前下摆臂连接 Connection of the steering knuckle and the front swing arm	六角头螺栓-细牙/2 型全金属六角锁紧螺母 Hexagon head bolt-fine threaded / Type 2 full metal hexagon locking nut	130N•m
前下摆臂总成与副车架连接 Connection of the front swing arm assembly and the auxiliary frame	六角头螺栓-细牙/六角法兰面螺母/六角头螺栓、弹簧垫圈和平垫圈组合件 Hexagon head bolt-fine threaded / hexagon flange nut / the subassembly of the hexagon head bolt, spring washer and flat washer	前点：130N•m 后点：180N•m Front point: 130N•m Rear point: 180N•m
前减震器与车身连接 Connection of the front damper and the vehicle body	六角法兰面螺母 Hexagon flange nut	75N•m
前减震器与横向稳定连杆连接 Connection of the front damper and sway bar connecting rod	1 型全金属六角锁紧螺母 Type 1 full metal hexagon locking nut	130N•m
横向稳定杆与车架连接 Connection of the sway bar and the frame	六角头螺栓、弹簧垫圈和平垫圈组合件 Subassembly of the hexagon head bolt, spring washer and flat washer	30N•m
副车架与转向器连接 Connection of the auxiliary frame and the steering gear	六角螺栓和弹簧垫圈组合件 Sub-assembly of the hexagon bolt and the spring washer	60N•m
钢板弹簧与车架连接 Connection of the steel board spring and frame	钢板弹簧安装销 /2 型六角螺母—细牙 Installation pin of the steel board spring / Type 2 hexagon nut –fine threaded	75N•m
钢板弹簧与后桥总成连接 Connection of the steel board ring and the rear	钢板弹簧 U 型螺栓/2 型六角螺母—细牙 U shape bolt of the steel board spring /	75N•m

bridge assembly	Type 2 hexagon nut – fine threaded	
后缓冲块与车架连接 Connection of the rear buffer block and the frame	六角法兰面螺母 Hexagon flange nut	30N•m
板簧后吊耳过度支架与车架连接 Connection of the transition support of the leaf spring rear shackle and the frame	六角法兰面螺栓/焊接方螺母 Hexagon flange bolt / square nut for welding	130N•m
板簧后吊耳与钢板弹簧连接 Connection of the leaf spring rear shackle and the steel board spring	1 型非金属嵌件六角锁紧螺母 Type 1 hexagon locking nuts with non-metal inserts	75N•m
后减震器与车架连接 Connection of the rear damper and frame	六角法兰面螺栓/六角法兰面螺母 Hexagon flange bolt / hexagon flange nut	130N•m
后减震器与钢板弹簧座连接 Connection of the rear damper and steel board spring base	锥形弹性大孔垫圈/锥形弹性小孔垫圈/1 型非金属嵌件六角锁紧螺母 Conical elastic big hole washer / conical elastic small hole washer / Type 1 hexagon locking nut with non-metal insert	75N•m

3.3.3、悬架系统常见故障及排除方法

3.3.3 Common faults and troubleshooting methods of the suspension system

系统 System	**常见故障 Common fault**	**可能原因 Possible reason**	**排除方法 Troubleshooting method**
悬架系统 Suspension system	行驶跑偏 Driving deviation	1.两前轮胎气压不一 1. The pressure of two front tyres is different.	补充 Pressurize
		2.前束过大或过小 2. The toe-in is too big or small.	调整 Adjust
		3.前轮左右轮毂轴承检紧不一 3. The right and left hub bearing tightness of the front wheel is	调整 Adjust

		different.	
		4.有单只车轮制动拖滞现象 4. Single wheel braking delay	调整或更换 Adjust or replace
		5.前悬架部件有松动 5. Some parts of the front suspension are loose.	更换 Replace
	轮胎磨损异常 Tyre abrasion abnormality	1.轮胎气压不正常或长期未换位 1. The tyre pressure is abnormal or there is no tyre rotation for a long time.	补充调换 Pressurize or have tyre rotation.
		2.前束、外倾角数值不正确 2. The value of the toe-in and camber angle is not correct	调整 Adjust
		3.轮毂轴承松动 3. Hub bearing is loose	更换 Replace
		4.后轴管变形 4. Rear axle tube deformation	更换 Replace
		5.轮毂变形 5. Hub deformation	更换 Replace
		6.各车轮制动力大小不一 6. The braking power of each wheel differs	调整 Adjust
		7.经常猛踏加速或猛刹车 7. Often accelerate sharply or brake sharply	改变操作 Change the operation.

第四章、内外饰及附件

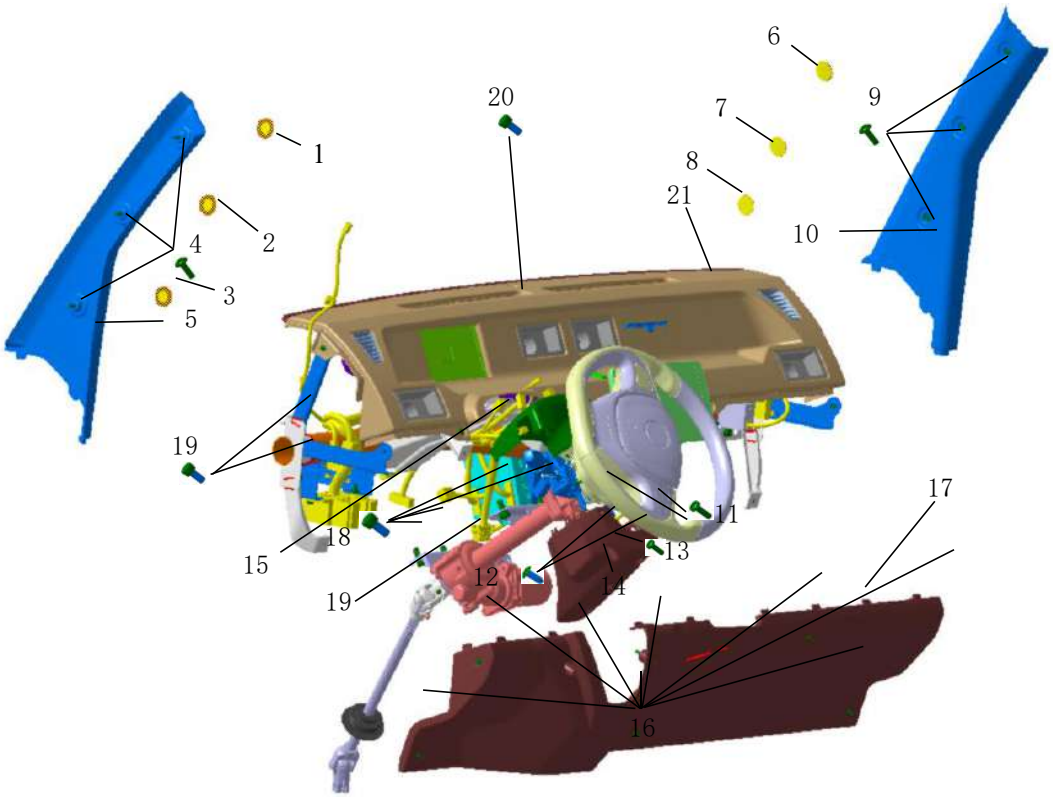
Chapter IV Interior & exterior decoration and accessories

4.1、仪表板总成

4.1 Assembly of the instrument panel

4.1.1、概述

4.1.1 Overview



序号 SN	零件号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	5402115-FC25	左 A 柱上堵盖 Upper plug of left Column A	1	个 PC
2	5402117-FC25	左 A 柱中堵盖 Middle plug of left Column A	1	个 PC

3	5402119-FC25	左 A 柱下堵盖 Lower plug of left Column A	1	个 PC
4	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket bolt	3	个 PC
5	5402111-FC25	左 A 上柱 Left upper Column A	1	个 Set
6	5402126-FC25	右 A 柱上堵盖 Upper plug of right Column A	1	个 PC
7	5402128-FC25	右 A 柱中堵盖 Middle plug of right Column A	1	个 PC
8	5402132-FC25	右 A 柱下堵盖 Lower plug of right Column A	1	个 PC
9	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket bolt	3	个 PC
10	5402122-FC25	右 A 上柱 Right upper Column A	1	个 Set
11	Q2140516	十字槽盘头螺钉 Cross recessed pan head screws	2	个 PC

序号 SN	零件号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
12	Q2734816	十字槽大半圆头自攻螺钉 Cross recessed half-round head self-tapping screw	2	个 PC
13	Q2140412	十字槽盘头螺钉 Cross recessed pan head screws	1	个 PC
14	5306402-FC25	转向管柱下护罩 Lower protection case of the steering column	1	个 PC
15	5306401-FC25	转向管柱上护罩 Upper protection case of the steering column	1	个 PC
16	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket	8	个 PC

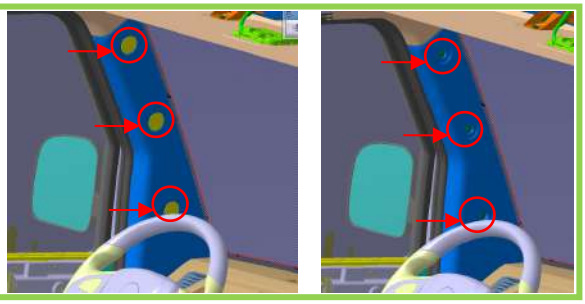
		bolt		
17	5306201-FC25	仪表板下本体 Lower body of the instrument panel	1	个 Set
18	Q1421025	六角螺栓和弹簧垫圈组合件 Sub-assembly of the hexagon bolt and spring washer	4	个 Set
19	3404110-FC25	转向管柱及方向盘总成 Assembly of the steering column and the steering wheel	1	套 Set
20	Q1840816	六角法兰面螺栓 Hexagon flange bolt	5	个 PC
21	5306100-FC25	仪表板总成 Assembly of the instrument panel	1	套 Set

4.1.2、拆装步骤

4.1.2 Disassembly steps

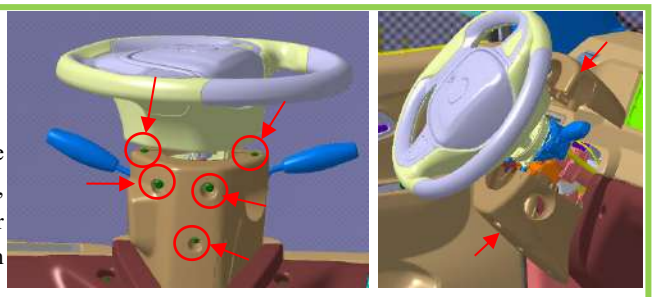
1、拆除 A 柱上、中下、堵盖，再拆除 A 上柱安装螺栓（每侧 A 上柱有 3 个螺栓）

1. Disassemble the upper, middle and lower plugs of the Column A, and then disassemble the mounting bolts of the upper Column A (3 bolts on each upper Column A)



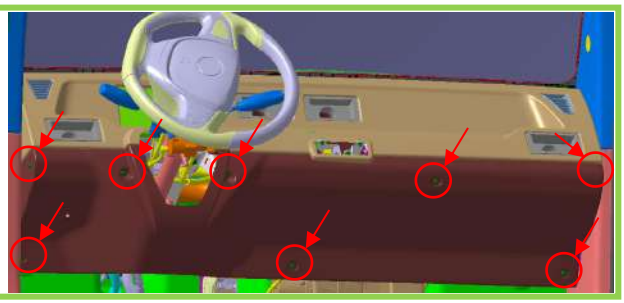
2、旋转方向盘，直到转向管柱护罩螺钉漏出，拆除螺钉后，拆除转向管柱上、下护罩（螺钉有 3 种，共 5 颗）

2. Rotate the steering wheel until the screws of the protection case of the steering wheel is exposed, disassemble the screws, and disassemble the upper and lower protection cases of the steering column (there are three kinds of screws, totally 5 screws)



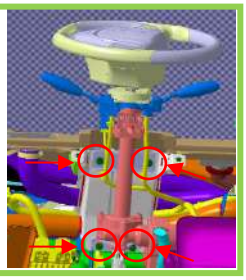
3、拆除仪表板下本体，共 8 颗螺栓

3. Disassemble the lower body of the instrument panel, totally 8 bolts.



4、拆除转向管柱及方向盘总成，共 4 颗螺栓

4. Disassemble the assembly of the steering column and the steering wheel, totally 4 bolts.



5、拆除仪表板，共 5 颗螺栓

5. Disassemble the instrument panel, totally 5 bolts.

6、拆除仪表线束连接端子后将仪表板总成取出

6. Remove the assembly of the instrument panel after disassembling the connecting terminal of the instrument harnesses.

7、 安装过程是拆卸过程的逆过程

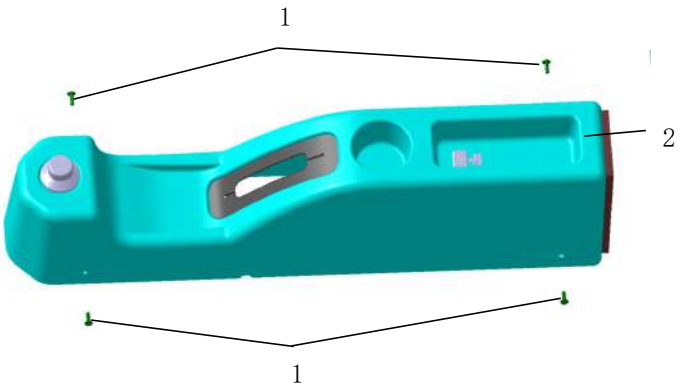
7. The assembly process reverses with the disassembly process.

4.2、副仪表板总成

4.2 Auxiliary instrument panel assembly

4.2.1、概述

4.2.1 Overview



序号 SN	零件号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon	4	个 PC

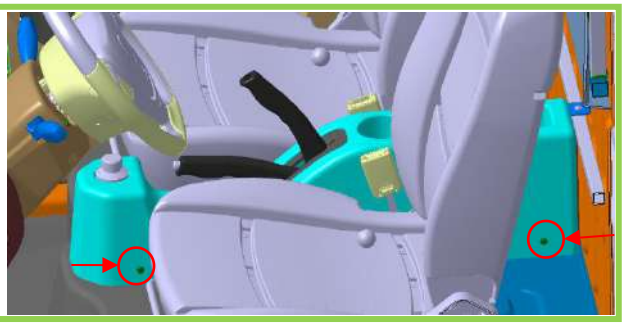
		socket bolt		
2	5305000-FC25	副仪表板总成 Auxiliary instrument panel assembly	1	套 Set

4.2.2、拆装步骤

4.2.2 Disassembly steps

1、拆除副仪表板总成两侧螺栓，共 4 颗螺栓

1. Disassemble the bolts on both sides of the auxiliary instrument panel, totally 4 bolts.



2、将副仪表板总成从上方拔出后，拆开换挡旋钮和 USB 充电盒端子后即可取出副仪表总成

2. Pull out the auxiliary instrument panel assembly from the upper side , disassemble the gear shifting knob and the USB charging box terminals to remove the auxiliary instrument panel assembly.

3、 安装过程是拆卸过程的逆过程

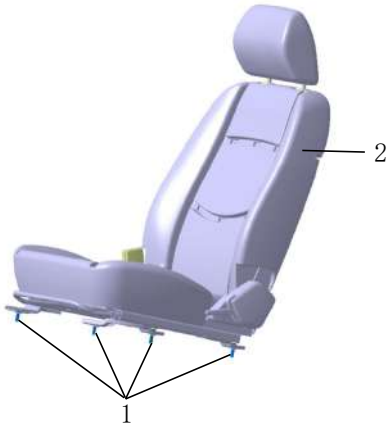
3. The assembly process reverses with the disassembly process.

4.3、驾驶员座椅总成

4.3 The driver’s seat assembly

4.3.1、概述

4.3.1 Overview



序号 SN	零件号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	Q146B0830	六角头螺栓弹簧垫圈和平垫圈组合件 Sub-assembly of the hexagon head bolt spring washer and flat washer	4	个 Set
2	6800000-FC25	座椅总成 Seat assembly	1	套 Set

4.3.2、拆装步骤

4.3.2 Disassembly steps

1、调节驾驶员座椅总成前后位置，座椅底座上的安装螺栓露出工具可操作空间后，拆卸座椅总成安装螺栓（螺栓共 4 颗）1. Adjust the front and rear position of the driver's seat assembly until the mounting bolt on the seat exposes the operation space for the tools, and disassemble the mounting bolts of the seat assembly (totally 4 bolts).

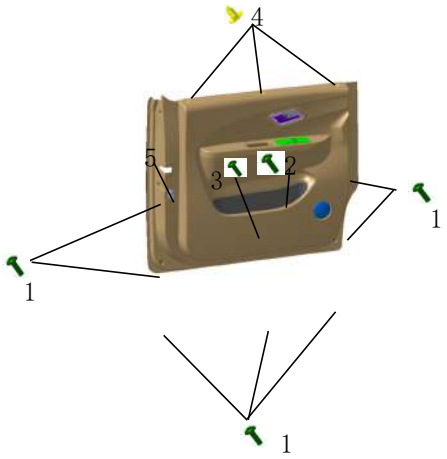
2、螺栓拆除后将座椅取出（驾驶员座椅总成与副驾驶员座椅总成拆卸方法相同）
2. Remove the seat after the bolts are disassembled (the disassembly method for the driver's seat assembly and the co-driver's seat assembly is the same).
3、 安装过程是拆卸过程的逆过程
3. The assembly process reverses with the disassembly process.

4.4、左车门内装饰板总成

4.4 Left door interior decoration plate assembly

4.4.1、概述

4.4.1 Overview



序号	零件号	零部件名称	数量	单位

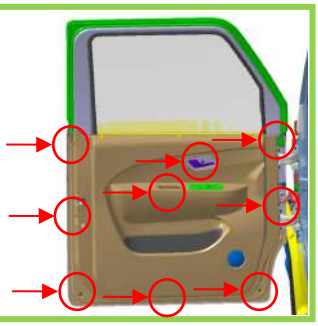
SN	Part NO.	Part name	Qty	Unit
1	6102111-FC25	法兰盘头内六角螺钉 Flange head hexagon socket bolt	7	个 PC
2	Q2140612	十字槽盘头螺钉 Cross recessed pan head screw	1	个 PC
3	Q2140412	十字槽盘头螺钉 Cross recessed pan head screw	1	个 PC
4	5702021-FC25	顶棚卡扣 Roof buckle	3	个 PC
5	6102100-FC25	左车门内装饰板总成 Left door interior decoration plate assembly	1	套 Set

4.4.2、拆装步骤

4.4.2 Disassembly steps

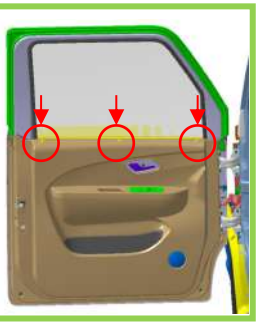
1、拆除车门内装饰板总成安装螺钉，螺钉有 3 种，共 9 颗

1. Disassemble the mounting screws of the door interior decoration plate assembly, including 3 types of screws, totally 9 pcs.



2、拆除车门内装饰板总成上部顶棚卡扣，卡扣共 3 颗

2. Disassemble the roof buckle at the top of the door interior decoration plate assembly, totally 3 buckles.



3、移动车门内装饰板总成，拆卸门碰开关、扬声器、玻璃升降器开关端子后，取出车门内装饰板总成（左车门内装饰板总成和右车门内装饰板总成拆卸方法相同）

3. Move the door interior decoration plate assembly, disassemble the magnetic catch switch, loudspeaker, glass lifter switch terminal, and then remove the door interior decoration plate assembly (the disassembly method of the left door interior decoration plate and the right door interior decoration plate is the same).

4、安装过程是拆卸过程的逆过程

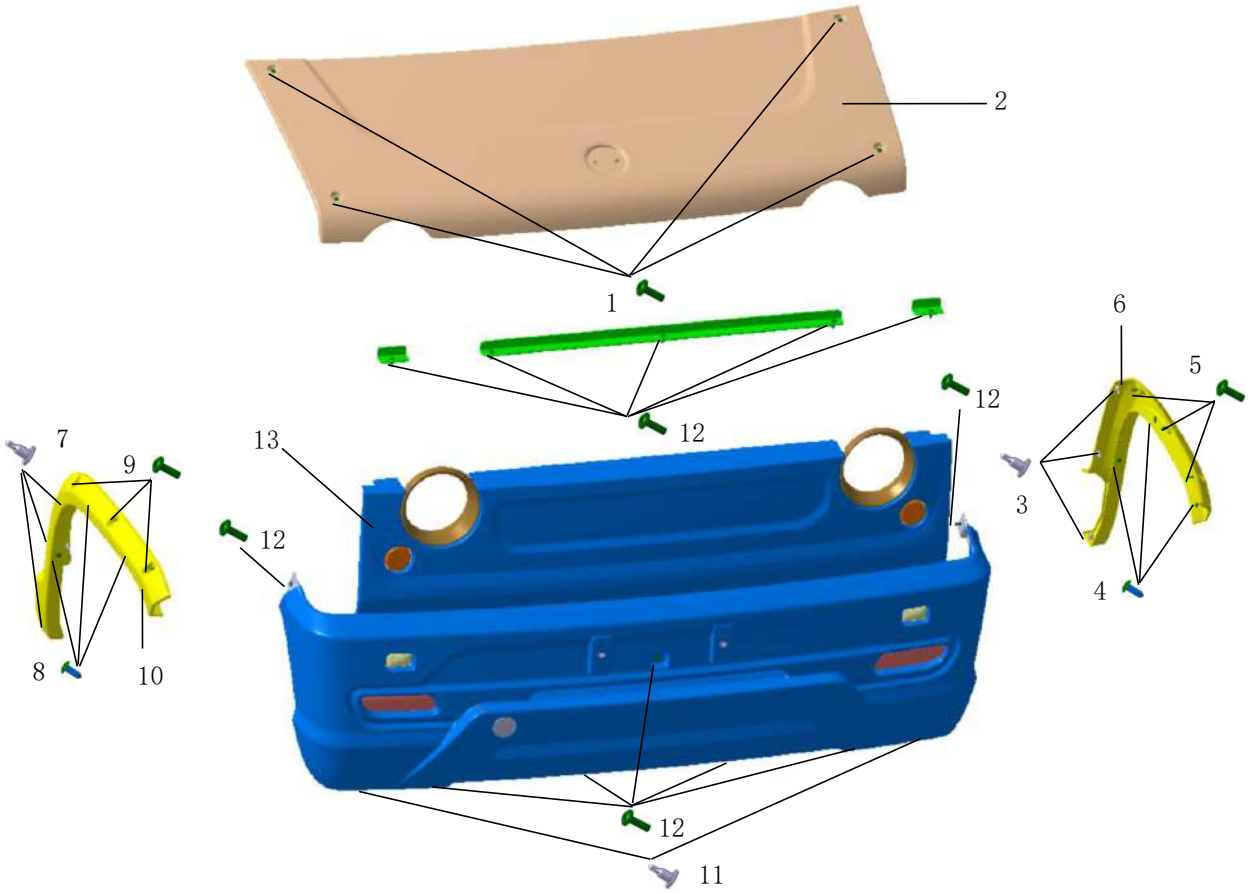
4. The assembly process reverses with the disassembly process.

4.5、前保险杠总成

4.5 Front bumper assembly

4.5.1、概述

4.5.1 Overview



序号 SN	零件号 Part NO	零部件名称 Part name	数量 Qty	单位 Unit
1	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket bolt	4	个 PC
2	8402000-FC25	前舱盖总成 Bonnet assembly	1	套 Set
3	5304119-FC25	子母扣 Snap fasteners	3	个 PC
4	Q2734816	十字槽大半圆头自攻螺钉 Cross recessed large half-round head self-tapping screw	3	个 PC

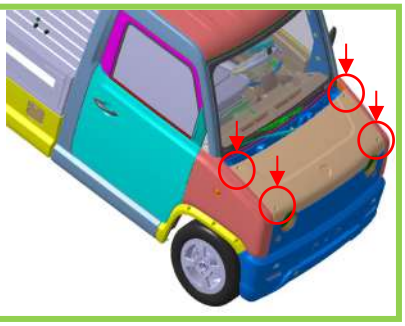
5	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket bolt	3	个 PC
6	5512101-FC25	左前轮眉本体 Left front wheel trim	1	个 PC
7	5304119-FC25	子母扣 Snap fastener	3	个 PC
8	Q2734816	十字槽大半圆头自攻螺钉 Cross recessed large half round head self-tapping screw	3	个 PC
9	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket bolt	3	个 PC
10	5512102-FC25	右前轮眉本体 Right front wheel trim	1	个 PC
11	5304119-FC25	子母扣 Snap fastener	2	个 PC
12	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket bolt	12	个 PC
13	2803100-FC25	前保险杠总成 Front bumper assembly	1	套 Set

4.5.2、拆装步骤

4.5.2 Disassembly steps

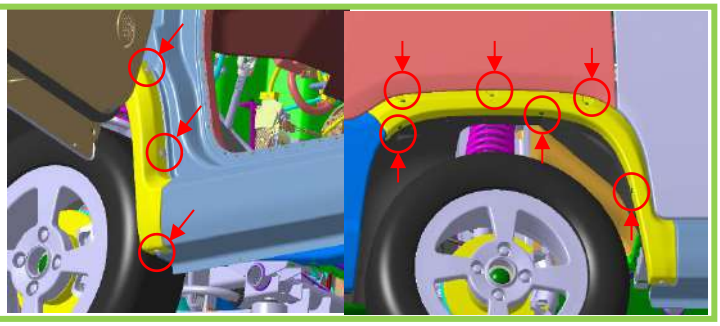
1、拆除前舱盖总成安装螺栓，螺栓共 4 颗，螺栓拆除完成后取出前舱盖板总成

1. Disassemble the mounting bolts of the bonnet assembly, totally 4 bolts, and remove the bonnet assembly after the bolt disassembly.



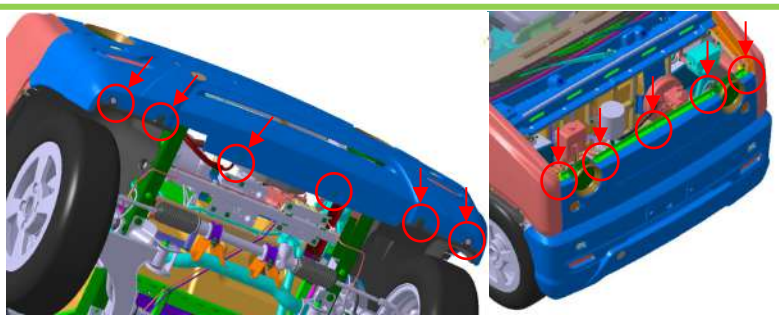
2、打开左侧车门，拆除左前轮眉本体安装的子母扣，子母扣共 3 颗，拆除安装的螺钉，螺钉共 3 颗，拆除安装的螺栓，螺栓共 3 颗，取出左前轮眉本体，按相同方法取出右前轮眉本体

2. Open the left door, disassemble the 3 snap buckles for the installation of the left front wheel trim, disassemble the 3 mounted screws, disassemble the 3 mounted bolts, and remove the left front wheel trim. Remove the right front wheel trim in the same way



3、拆除前保险杠总成子母扣，子母扣共 2 颗；拆除前保险杠总成安装螺栓，螺栓共 12 颗，取出前保险杠左、中、右挡水板

3. Disassemble the 2 snap buckles of the front bumper assembly; disassemble the 12 mounting bolts of the front bumper assembly, as well as the left, middle and right water retaining plate of the front bumper.



4、 拆除左/右前转向灯、左/右前位置灯、左/右日行灯的端子后即可取出前保险杠总成

4. Disassemble the terminals of the left / right front turn lights, left / right front position lights, and left / right daytime running lights, and remove the front bumper assembly.

5、安装过程是拆卸过程的逆过程

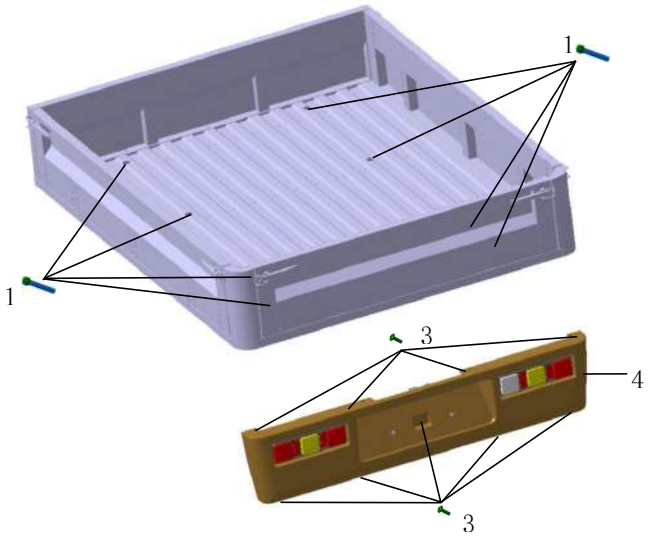
5. The assembly process reverses with the disassembly process.

4.6、后保险杠总成

4.6 Rear bumper assembly

4.6.1、概述

4.6.1 Overview



序号 SN	零件号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	Q218B1060	内六角圆柱头螺钉 Hexagon socket head cap screws	8	个 PC
2	5010300-FC25	货箱货斗总成	1	套

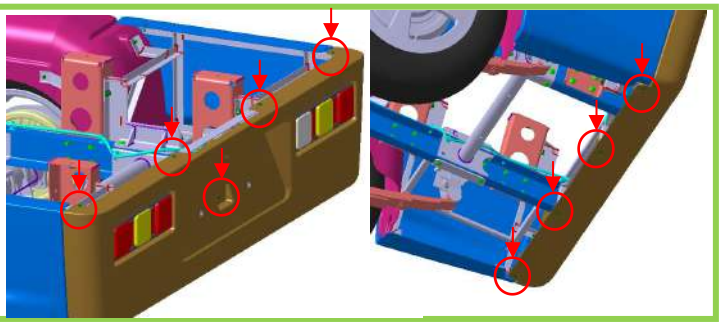
		Cargo container and hopper assembly		Set
3	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket bolt	9	个 PC
4	2804101-FC25	后保险杠总成 Rear bumper assembly	1	套 Set

4.6.2、拆装步骤

4.6.2 Disassembly steps

1、拆除货箱货斗总成安装螺栓，螺栓共 8 个，拆下货箱货斗总成
1. Disassemble the 8 mounting bolts of the cargo container and hopper assembly, and remove the assembly of the cargo container and hopper assembly

2、拆除后保险杠总成安装螺栓，螺栓共 9 颗
2. Disassemble the 9 mounting bolts of the rear bumper assembly.



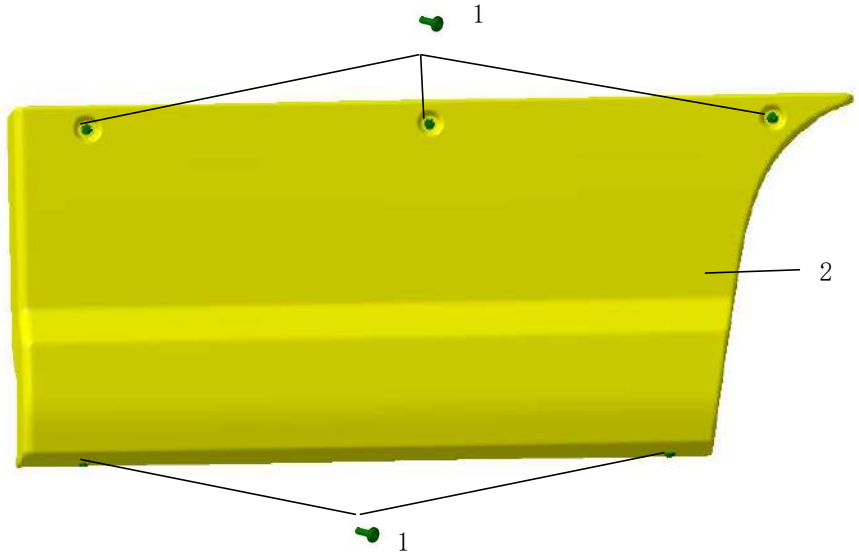
3、拆除左/右后组合灯、左/右后牌照灯、倒车摄像头端子后，取出后保险杠总成
3. Disassemble the terminals of the left/right rear combination lights, left / right rear license plate light and reversing camera, and remove the assembly of the rear bumper.
4、安装过程是拆卸步骤的逆过程
4. The assembly process reverses with the disassembly process

4.7、左前裙板本体

4.7 The left front skirt

4.7.1、概述

4.7.1 Overview

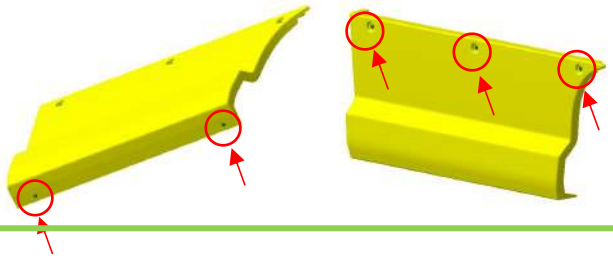


序号 SN	零件号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket bolt	5	个 PC
2	5512301-FC25	左前裙板本体 Left front skirt	1	个 PC

4.7.2、拆装步骤

4.7.2 Disassembly steps

1、拆除左前裙板本体安装螺栓，螺栓共 5 颗
1. Disassemble the 5 mounting bolts of the left front skirt.



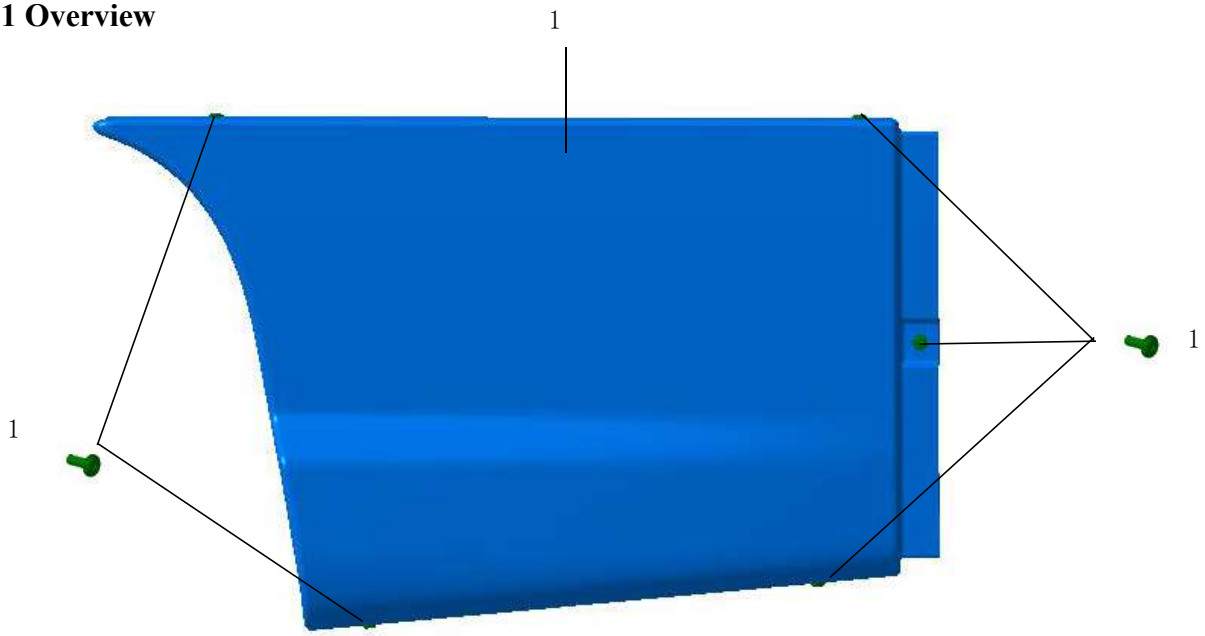
2、螺栓拆除后，将左前裙板本体从安装支架上取出（左前裙板本体与右前裙板本体拆卸方法相同）
2. After the bolts disassembly, remove the left front skirt from the mounting stand (the disassembly method of the left front skirt and the right front skirt is the same)
3、 安装过程是拆卸步骤的逆过程
3. The assembly process reverses with the disassembly process.

4.8、左后裙板本体

4.8 Left rear skirt

4.8.1、概述

4.8.1 Overview



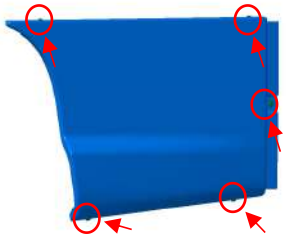
序号 SN	零件号 Part NO.	零部件名称 Part name	数量 Qty	单位 Unit
1	5512104-FC25	法兰盘头内六角螺栓 Flange head hexagon socket bolt	5	个 PC
2	5512303-FC25	左后裙板本体 Left rear skirt	1	个 PC

4.8.2、拆装步骤

4.8.2 Disassembly steps

1、拆卸后保险杠总成，拆卸方法详见后保险总成拆卸
1. Disassemble the rear bumper assembly, and refer to the disassembly steps for the rear bumper assembly for details.

2、拆除左后裙板本体安装螺栓，螺栓共 5 颗
2. Disassemble the 5 mounting bolts of the left rear skirt



3、螺栓拆除后，将左后裙板本体从安装支架上取出（左后裙板本体与右后裙板本体拆卸方法相同）
3. After the bolt disassembly, remove the left rear skirt from the mounting stand (the disassembly method of the left rear skirt and the right rear skirt is the same).
4、安装过程是拆卸步骤的逆过程
4. The assembly process reverses with the disassembly process.

第五章、车身及附件

Chapter V Body and accessories

5.1、玻璃升降器总成

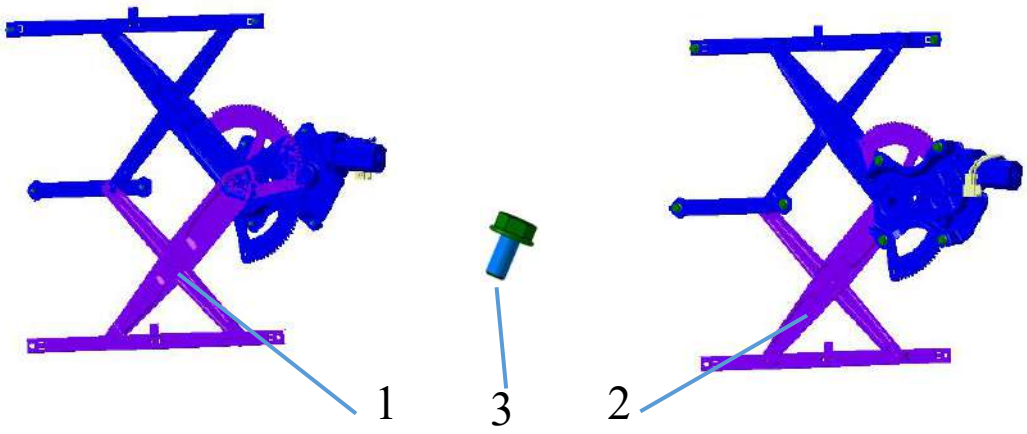
5.1 Glass lifter assembly

5.1.1、玻璃升降器总成概述

5.1.1 Overview of the glass lifter assembly

玻璃升降器是指按一定的驱动方式将汽车窗玻璃沿玻璃导槽升起或下降，并能停留在任意位置的装置。

The glass lifter refers to a device which lifts or lowers the auto window glass along the glass guiding slot by a certain driving method, and is able to stop the glass at any position.



序号 SN	零件号 Part NO.	零件名称 Part name	数量 Qty	单位 Unit
1	6104001-FC25	左车门玻璃升降器 Left door glass lifter	1	套 Set
2	6104002-FC25	右车门玻璃升降器 Right door glass lifter	1	套 Set

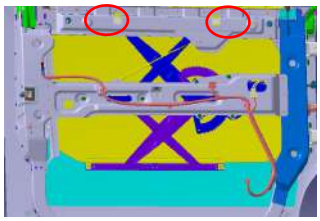
3	Q1840612	六角法兰面螺栓 Hexagon flange bolt	12	件

5.1.2、拆卸玻璃升降器总成步骤

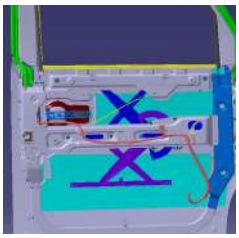
5.1.2 Disassembly steps for the glass lifter assembly

1.拆除侧围护板车门内板总成。
1. Disassemble the assembly of the side frame protective plate and door inner plate.

2.拆除车门玻璃与玻璃升降器固定螺栓，取下车门玻璃。
2. Disassemble the fixing bolt of the door glass and glass lifter, and remove the door glass.



3.拆除玻璃升降器固定螺栓，拔下玻璃升降器接插件插头，取出玻璃升器。
3. Disassemble the fixing bolt of the glass lifter, pull out the plug of the connectors of the glass lifter, and remove the glass lifter.



5.1.3、玻璃升降器总成故障排除及方法

5.1.3 Faults and troubleshooting methods for the glass lifter assembly

故障现象 Fault symptom	可能原因 Possible reason	排除方法 Troubleshooting method
玻璃升降器工作失效 The glass lifter failure	保险丝烧坏 The fuse is burnt	更换 Replace
	线束故障 Harness fault	修理、更换 Repair or replace
	玻璃升降器损坏 The glass lifter is damaged	更换 Replace
玻璃升降器工作不良 The glass lifter works poor	插接件松动 The connector is loose	检查、更换 Inspect and replace
	线束搭铁不良 The negative pole connection of the harness is poor	修理、更换 Repair or replace
	玻璃升降器损坏 The glass lifter is damaged	修理、更换 Repair or replace
	玻璃升降器固定螺栓松动 The fixing bolt of the glass lifter is loose.	修理、更换 Repair or replace
玻璃升降方向相反 The glass lifting direction reverses.	线束接插件插针位置错误 The contact pin position of the connector of the harness is wrong	检查、更换 Repair or replace
	玻璃升降器故障 Glass lifter fault	修理、更换 Repair or replace

5.2、车门锁体总成

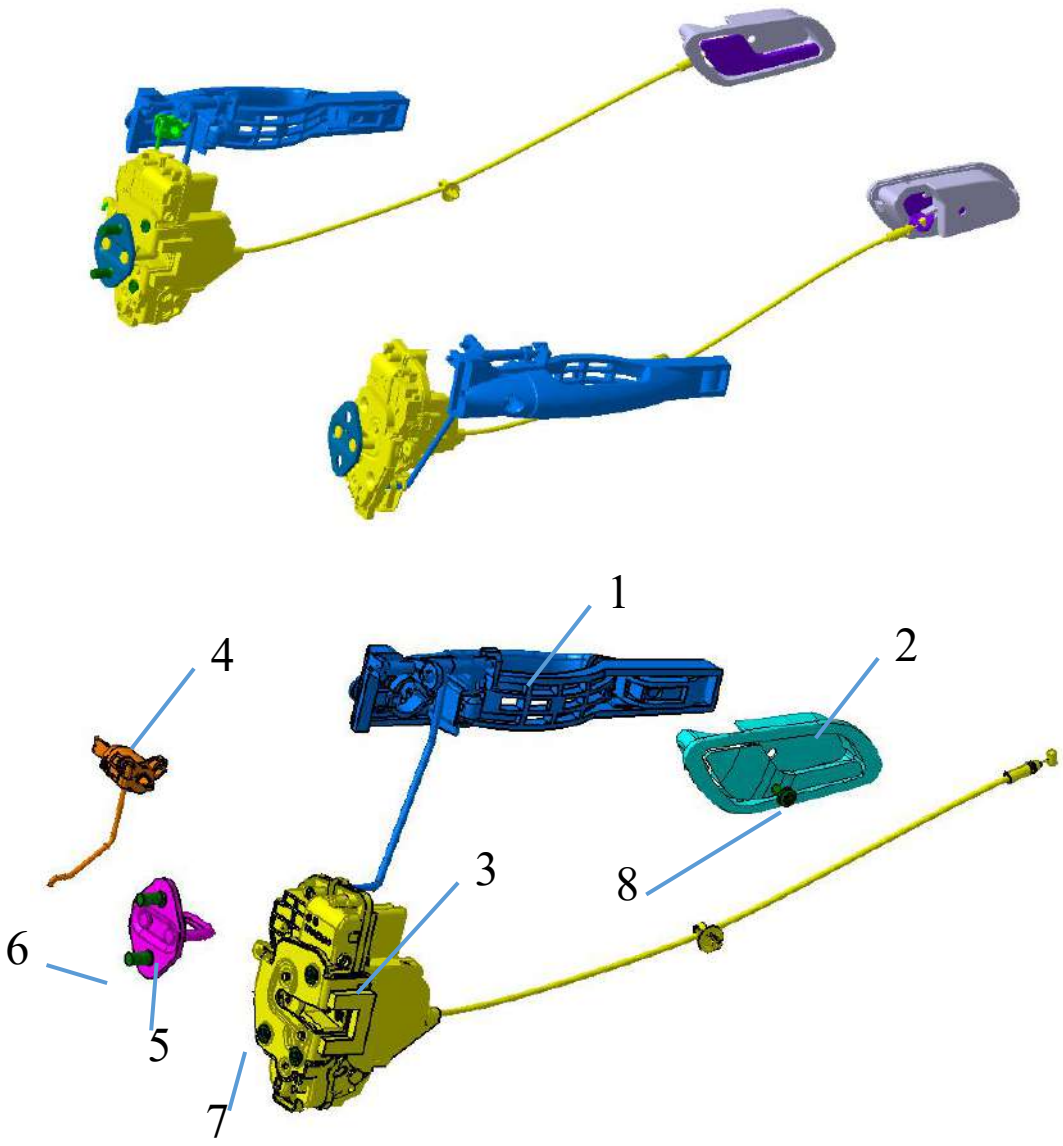
5.2. Door lock assembly

5.2.1、车门锁体总成概述

5.2.1 Overview of the door lock assembly

车门锁主要是为了使汽车的使用方便和安全，主要控制车门的启闭。一般有车门外开拉手、车门内扣手、门锁锁体和锁芯、锁扣等组成。

The door lock intends to guarantee the using convenience and safety of the auto, and is used for controlling the opening and closing of the door. It is usually composed of the exterior door opening handle, interior door opening handle, door lock body and lock core, lock catch, etc.



序号 SN	零件号 Part NO.	零件名称 Part name	数量 Qty	单位 Unit
1	6105003-FC25	左车门外开拉手 Exterior opening handle of the left door	1	套 Set
2	6102109-FC25	左车门扣手 Interior opening handle of the left door	1	套 Set
3	6105001-FC25	左车门门锁 Left door lock	1	套 Set
4	6105007-FC25	左车门锁芯 Left door lock core	1	套 Set

5	6105005-FC25	左车门锁扣 Left door lock catch	1	套 Set
6	Q2540820	十字槽沉头螺钉 Cross recessed countersunk head screw	2	个 PC
7	Q2540612	十字槽沉头螺钉 Cross recessed countersunk head screw	3	个 PC
8	Q2140612	十字槽盘头螺钉 Cross recessed pan head screw	1	个 PC

5.2.2、拆卸车门锁总成步骤

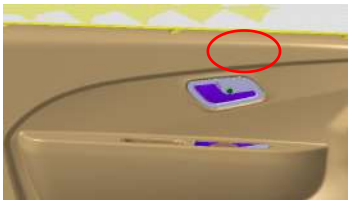
5.2.2 Disassembly steps for door lock assembly

1.拆除侧围护板及车门内板，详细步骤请参考侧围护板和车门内板拆卸步骤。

1. Disassemble the side frame protective plate and door internal plate, and refer to the disassembly steps for the side frame protective plate and door internal plate for details.

2.拆除车门扣手安装螺钉。

2. Disassemble the mounting screws of the door handle.

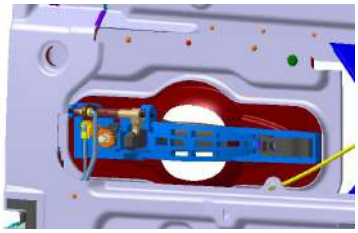


3.拆除车门门锁 3 个安装螺钉。

3. Disassemble the 3 mounting screws of the door lock.

4.拆除车锁拉索与车门骨架的固定，松开车门拉手、锁芯与车门的卡接。

4. Disassemble the fixation of the door lock cable with the door framework, loosen the snapped connection of the door handle and lock core with the door.



5. 安装过程是拆卸步骤的逆过程

5. The assembly process reverses with the disassembly process.

5.2.3、车门锁体总成故障排除及方法

5.2.3 Door lock assembly faults and troubleshooting methods

故障现象 Fault symptom	可能原因 Possible reason	排除方法 Troubleshooting method
车门锁体总成工作失效 Door lock assembly failure	相关拉杆脱落 Relevant pull rod falls off	修理、更换 Repair or replace
	车门锁体损坏 The door lock damage	修理、更换 Repair or replace
	中央门锁控制模块损坏 The central door lock control module damage	修理、更换 Repair or replace
	线束搭铁不良 Poor negative pole connection of the harness	修理、更换 Repair or replace
	保险丝熔断 Broken fuse	检查、更换 Repair or replace
	遥控钥匙工作失效 Remote control key failure	检查、更换 Repair or replace

5.3、翼子板总成

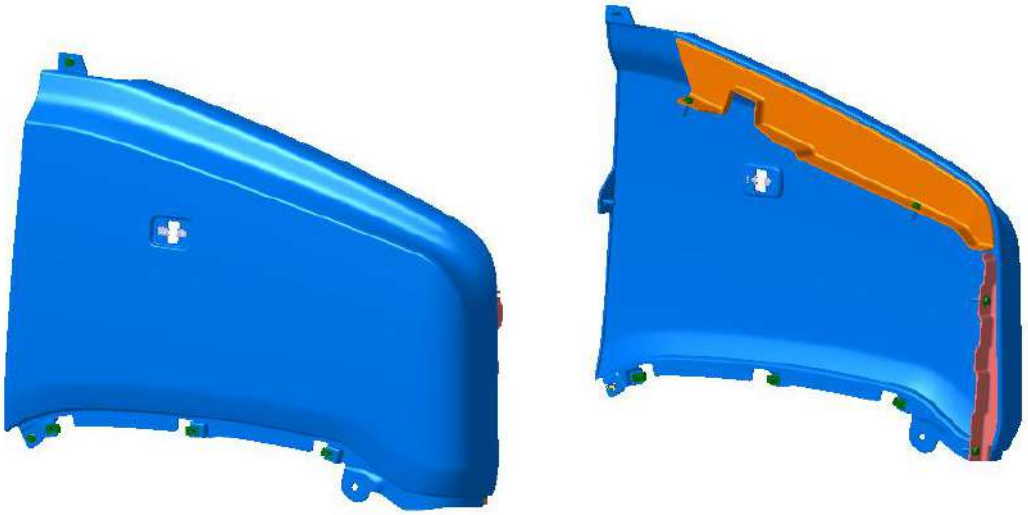
5.3 Fender assembly

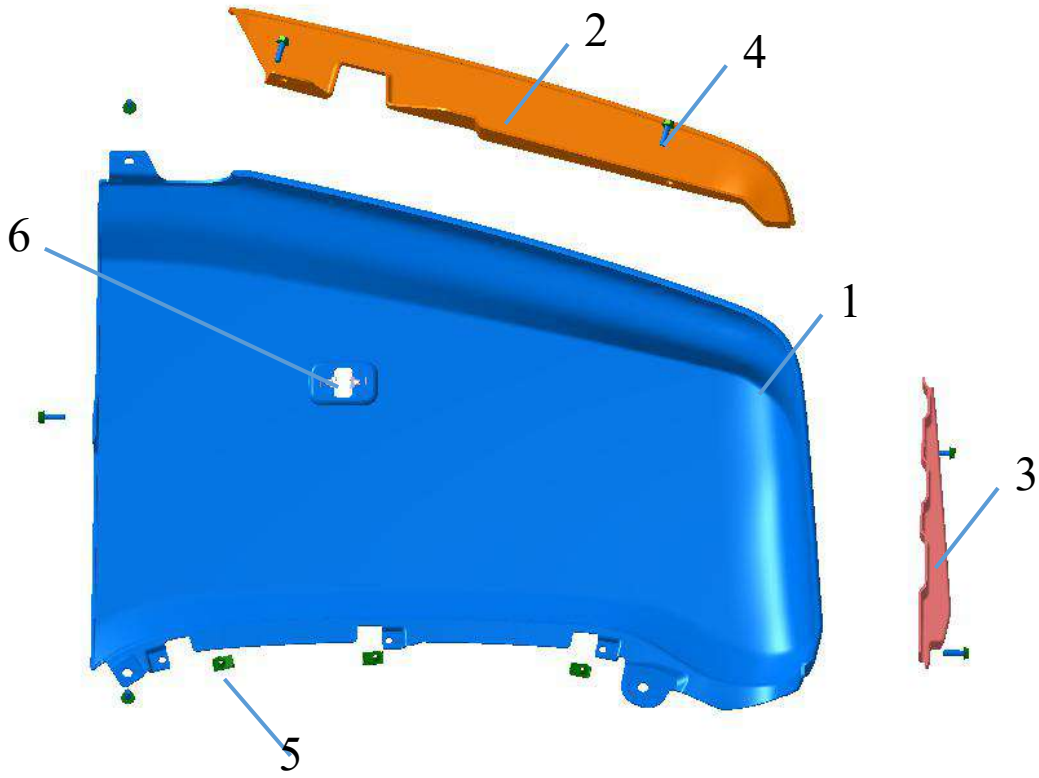
5.3.1、翼子板总成概述

5.3.1 Overview of the fender

车身翼子板是遮盖住车轮的车身外板，安装在车辆车轮的上方，作为车辆侧面两侧的外板。

The body fender is a body external plate for covering the wheel, and installed above the wheels as the external plate on both sides of the vehicle.





序号 SN	零件号 Part NO.	零件名称 Part name	数量 Qty	单位 Unit
总成 Assembly	8403000-FC25	翼子板总成 Fender assembly	1	套 Set
总成 Assembly	8403010-FC25	左翼子板总成 Left fender assembly	1	套 Set
1	8403011-FC25	左翼子板	1	个

		Left fender		PC
2	8403013-FC25	左翼子板支架 1 Left fender support 1	1	个 PC
3	8403015-FC25	左翼子板支架 2 Left fender support 2	1	个 PC
4	Q1840620	六角法兰面螺栓 Hexagon flange bolt	7	个 PC
5	Q31205	B 型板簧螺母 Type B leaf spring nut	3	个 PC
6	5512313	簧片螺母 Leaf spring nut	2	个 PC

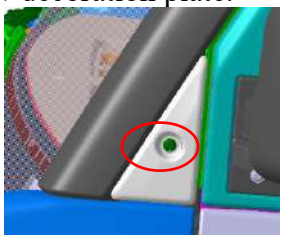
5.3.2、拆卸翼子板总成步骤

5.3.2 Disassembly steps for the fender assembly

1.拆除前轮眉总成及前保险杠总成，前保险杠拆解详细步骤请参考前保险杠拆解。

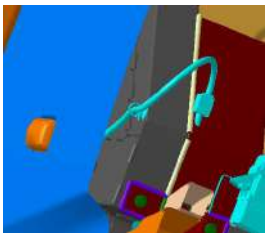
1. Disassemble the front wheel trim assembly and front bumper assembly, and refer to the disassembly steps for front pumper for the details.

2.拆除车门三角窗饰板安装螺栓。
2. Disassemble the mounting bolt of the door triangle window decoration plate.

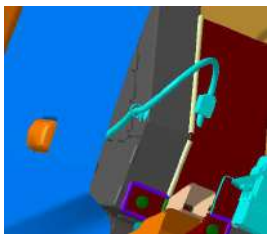


3.打开车门，从门缝中将翼子板与侧围安装支架的固定螺栓拆除。
3. Open the door, and disassemble the fixing bolts of the fender and the side frame protective plate mounting stand through the door gap.

4.拆除侧转向灯线束卡接头和线束安装卡扣。
4. Disassemble card connector of side turn light harnesses and installation buckle of harnesses



5.拆除侧转向灯与翼子板的安装固定，完成翼子板拆解。
5. Disassemble the mounting fixation of the side turn light with the fender, and complete the disassembly of the fender.



6. 翼子板的安装过程是拆卸步骤的逆过程。

6. The assembly process of the fender reverses with its disassembly process.

5.4、前机舱盖总成更换

5.4 Replacement of the bonnet assembly

5.4.1、维修概述

5.4.1 Overview of the repair

1.当发现前机舱盖需要更换的时候，需要使用 3mm 平头内六角扳手将前机舱总成 4 个安装螺栓拆除；

1. In case the bonnet needs to be replaced, it requires using 3mm flat heat hexagon wrench to disassemble the 4 mounting bolts of the engine compartment.

2.取掉螺栓后将前机舱盖总成取下；

2. After removing the bolts, remove the bonnet.

3.将需要更换的前机舱盖总成装上，并用同型号同规格的螺栓打紧。

3. Assemble the new bonnet assembly, and tighten it with the bolt of the same model and same spec.

5.4.2、返修过程

5.4.2 Repair process

1. 使用 3mm 平头内六角扳手将前机舱盖总成 4 个安装螺栓拧松取下。
1. Use 3mm flat head hexagon wrench to scew off the 4 mounting screws of the bonnet assembly and remove them.

2.将前机舱盖总成取下。
2. Remove the bonnet assembly.

3.更换前机舱盖总成，并用同型号同规格的安装螺栓将前机舱盖总成预紧。
3. Replace the bonnet assembly, and pre-tighten the bonnet assembly with mounting bolt of the same model and spec.

4.调整好前机舱盖总成与周边件的间隙，然后拧紧安装螺栓。
4. Adjust the gap between the bonnet assembly and the parts around it, and then tighten the mounting bolt.

5.5、左/右车门更换

5.5 Left / right door replacement

5.5.1、维修概述

5.5.1 Overview of the repair

1.当发现左/右车门需要更换的时候，使用 13 的套筒拆掉 4 个车门铰链在侧围上的安装螺栓；使用 10 的套筒拆除限位器在侧围上的安装螺栓；

1. In case the left / right door needs to be replaced, use socket spanner of 13 to disassemble the mounting screws of the 4 door hinges on the side frame; use the socket spanner of 10 to disassemble the mounting bolt of the stopper on the side frame.

2.断开车门处线束接插件，将车门取下；

2. Disconnect the connector of the door harness, and remove the door.

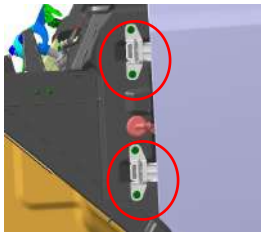
3.将需要更换的车门装上，将车门线束接插件接好，并用同型号同规格的螺栓打紧车门安装铰链。

3. Install the new door, connect the connector of the door harness, and tighten the mounting hinge of the door with bolts of the same model and spec.

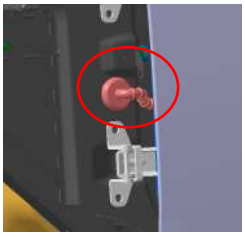
5.5.2、返修过程

5.5.2 Repair process

1. 分别使用 13 和 10 的套筒拆除 4 个铰链安装螺栓和 1 个限位器安装螺栓。
1. Use socket spanner of 13 and 10 to disassemble the 4 hinge mounting bolts and 1 stopper mounting bolt respectively.



2.断开车门处线束接插件，将车门取下。
2. Disconnect the connector of the harness at the door, and remove the door.



3.更换车门并将线束接插件接好，使用螺栓将铰链和限位器与侧围固定
3. Replace the door and connect the connector of the harness well, and use bolt to fix the hinge and stopper with the side frame.

4.按照 DTS 要求，调整车门间隙。
4. As per DTS requirements, adjust the door gap.

附件：整车基本参数表

Attachment: Basic parameters table of the vehicle

Basic Parameter	Length（mm）			3954
	Width（mm）			1600
	Height（mm）			1902
	Box Dimension（mm）			1975*1575*1210
	Wheelbase（mm）			2495
	Payload（kg）			1000 (850 with box)
	Net Weight（kg）			1245
	Maximum Speed（km/h）			85
	Range （km）			200
	Battery Type			LFP
	System Voltage （V）			144
	Battery Capacity （kw/h）			29.52
	Motor Type			Permanent Magnet
	Motor Power（nominal/paek）			15KW/30KW
	Peak Torque（N.m）			＞150
	Maximum Gradeability（%）			25
	Charging Time			5h
Chassis	Drive Mode			2WD Rear
	Suspension System	Front：MacPherson Independent Suspension		●
		Rear：Leaf Spring With Damping		●
	Brake System	Front	Disc Brake	●
		Rear	Drum Brake	●
		Handbrake		●
		Vacuum Brake Booster		●
		ABS Moudle		●
	Steering System	Electric Power Steering		●
	Wheel	Tyre		175/75R14
		Steel Wheel Rim		●
Other Configuration	Seat Belt	Three-point Safety Belt		●
	Seat Belt Reminder	Sound & Indicator		●
	Door Window Glass Lifter	Electric Power		●
	Automatic Lock			●
	Steering Column Lock			●
	LCD Dashborad			●
	MP5（radio,dispaly）			●
	USB port	1		●
	Speaker	2		●
	Air Condition (heating/cooling)			●
	Reversing Camera			●
Note: ●：Standard				

附件：故障码表

Attachment: Fault Code Table

Fault Code Table（ORCA）

Annex：BMS Fault
Fault code：0XX-BMS，1XX-Motor Controller。

Fault level	Fault code	Code meaning	Treatment measures	Note
No Fault	0	Normal mode		
Level 1	1-20	Severe Fault	Stop immediately and evacuate passengers	
Level 2	21-60	General Fault	Limit power to 50% After the vehicle reaches the appropriate position within 20 minutes, it stops and reports to a professional for handling	
Level 3	61-99	Warning Fault	Warning，instrument displays	

Description:
1. When multiple levels of fault occur at the same time, only the code of the highest level fault is reported (for example, if a level 1 and level 2 fault occurs at the same time, then only the fault code of the level 1 fault is reported).
2. If there are multiple faults in the same fault level at the same time, then the fault codes are issued in turn, and the cycle is 1 second.

1.Level 1 fault

Fault level	Fault name	Code	Fault description	Treatment measures	Part
一级（1-20）	temperature Severely too high	01	The highest battery temperature reaches the first level threshold	BMS reports that the motor power limit is 0, and the discharge contactor is disconnected after 3S	BMS
	temperature Severely too low	02	The lowest battery temperature reaches the first level threshold	BMS reports that the motor power limit is 0, and the discharge contactor is disconnected after 3S	
	Total voltage Severely too high	03	The total voltage is up to the first level threshold	BMS reports that the motor power limit is 0, and the discharge contactor is disconnected after 3S	
	Total voltage Severely too low	04	The total voltage is too low to reach the first level threshold	BMS reports that the motor power limit is 0, and the discharge contactor is disconnected after 3S	
	Discharge Severe overcurrent	05	Severe overcurrent, reaching the first level threshold.	BMS reports that the motor power limit is 0, and the discharge contactor is disconnected after 3S	
	Cell voltage Severely too high	06	The highest cell voltage reaches the first level threshold	BMS reports that the motor power limit is 0, and the discharge contactor is disconnected after 3S	
	Cell voltage Severely too low	07	The lowest cell voltage reaches the first level threshold	BMS reports that the motor power limit is 0, and the discharge contactor is disconnected after 3S	
	Insulation resistance Severely low	08	Insulation resistance value <100Ω/V	BMS reports that the motor power limit reaches 0, and the discharge contactor is disconnected after 10S	
	BMS internal communication Fault	09	BMS master control module and slave control module communication Abnormal	BMS reports that the motor power limit reaches 0, and the discharge contactor is disconnected after 10S	

	BMS external communication Fault	10	BMS master control module and vehicle communication Abnormal	BMS reports that the motor power limit reaches 0, and the discharge contactor is disconnected after 10S	

2.Level 2 fault

Fault level	Fault name	Code	Fault description	Treatment measures	Part
二级（21-60）	temperature generally too high	21	The highest battery temperature reaches the secondary threshold	BMS report, the motor power is limited to 50%	BMS
	temperature generally too low	22	The lowest battery temperature reaches the secondary threshold	BMS report, the motor power is limited to 50%	
	Total voltage generally too high	23	The total pressure is as high as the secondary threshold	BMS report, the motor power is limited to 50%	
	Total voltage generally too low	24	The total pressure is too low to reach the secondary threshold	BMS report, the motor power is limited to 50%	
	Cell voltage generally too high	25	The highest voltage of the single cell reaches the secondary threshold	BMS report, the motor power is limited to 50%	
	Cell voltage generally too low	26	The lowest voltage of the cell reaches the secondary threshold	BMS report, the motor power is limited to 50%	
	Discharge generally overcurrent	27	Generally, the overcurrent reaches the secondary threshold.	BMS report, the motor power is limited to 50%	
	Battery voltage difference is too large	28	The pressure difference between the battery packs reaches the Level 2 fault threshold	BMS report, the motor power is limited to 50%	
	Battery temperature difference is too large	29	The temperature difference between the battery packs reaches the Level 2 fault threshold	BMS report, the motor power is limited to 50%	
	SOC too low	30	SOC <10%	BMS report, motor power limit (specifically based on actual test)	
	Insulation resistance generally low	31	Insulation resistance value <500Ω/V	BMS report, the motor power is limited to 50%	

Limiting 50% power is equivalent to limiting the output current to a maximum of 0.5C

3.Level 3 fault

Fault level	Fault name	Code	Fault description	Treatment measures	Part
三级（61-99）		61			BMS
	Temperature high	62	The highest battery temperature reaches the three-level threshold	Instrument display Fault code	
	temperature low	63	The lowest battery temperature reaches the three-level threshold	Instrument display Fault code	
	Total voltage high	64	The total pressure is as high as the three-level threshold	Instrument display Fault code	
	Total voltage low	65	The total pressure is too low to reach the three-level threshold	Instrument display Fault code	
	Cell voltage high	66	The maximum voltage of the single cell reaches the three-level threshold	Instrument display Fault code	
	Cell voltage low	67	The lowest voltage of the cell reaches the three-level threshold	Instrument display Fault code	
	Discharge overcurrent	68	Overcurrent, reaching the three-level threshold.	Instrument display Fault code	
	Battery voltage difference is large	69	The pressure difference between the battery packs reaches the Level 3 fault threshold	Instrument display Fault code	

	Battery temperature difference is large	70	The temperature difference between the battery packs reaches the Level 3 fault threshold	Instrument display Fault code	
		71			
	Charger hardware Fault	72	BMS accepts the feedback from the charger and reports the corresponding fault	BMS requests the charger to stop charging, and the instrument displays the Fault code	
	Charger temperature Fault	73	BMS accepts the feedback from the charger and reports the corresponding fault	BMS requests the charger to stop charging, and the instrument displays the Fault code	
	Charger input voltage Fault	74	BMS accepts the feedback from the charger and reports the corresponding fault	BMS requests the charger to stop charging, and the instrument displays the Fault code	
	Charger starts Fault	75	BMS accepts the feedback from the charger and reports the corresponding fault	BMS requests the charger to stop charging, and the instrument displays the Fault code	
	Charger communication Fault	76	BMS accepts the feedback from the charger and reports the corresponding fault	BMS requests the charger to stop charging, and the instrument displays the Fault code	

Description:
1. When multiple levels of fault occur at the same time, only the code of the highest level fault is reported (for example, if a level 1 and level 2 fault occurs at the same time, then only the fault code of the level 1 fault is reported).
2. If there are multiple faults in the same fault level at the same time, then the fault codes are issued in turn, and the cycle is 1 second.

Motor controller fault code table

Fault level	Fault description	Code	Fault result	Treatment measures
	Hardware Fault	101	Not running	Contact a professional repair shop to check and repair
	DC bus over voltage Fault	102	Not running	Go to a professional repair shop and check whether the battery pack is Normal.
	DC bus under voltage Warning	103	Downtime	The power battery loses power, to charge the power battery.
	DC bus over current Warning	104	Downtime	Contact a professional repair shop to check and repair
	Phase current overcurrent Fault	105	Downtime	Contact a professional repair shop to check and repair
	Drive motor overspeed Fault	106	Downtime	Contact a professional repair shop to check and repair
	Drive motor overheated Fault （ Instrument light up icon）	107	Downtime	Stop to cool down, go to a professional repair shop for inspection and maintenance. 
	MCU overheated Fault （ Instrument light up icon）	108	Downtime	Stop to cool down, go to a professional repair shop for inspection and maintenance
	Phase current sensor Fault	109	Downtime	Contact a professional repair shop to check and repair
	DC voltage sensor Fault	110	Downtime	Contact a professional repair shop to check and repair

	Drive motor temperature sensor Fault	111	Limited power operation	The motor runs at 50% power limit, go to a professional repair shop for repair
	MCU Temperature Sensor Fault	113		The motor runs at 50% power limit, go to a professional repair shop for repair
	CAN communicatio n Fault	114		Contact local distributor
	Gear Fault	115	Downtime	Check the gear switch, check whether the brake switch is Normal, if damaged, contact the dealer
	Accelerator Fault	116	Not running	Check if the accelerator is Normal, if damaged, contact the dealer
	Encoder Fault	117	Not running	Whether the encoder Connected line of the motor and controller is Connected Normally
	MCU Precharge circuit Fault	118	Not running	Contact local distributor

附件：电器原理图

Attachment: electrical schematic diagram

整车原理图.pdf

Vehicle schematic diagram