

JS6120GHBEV（纯电）

JS6120GHBEV(Pure Electricity)

服务保修手册

Service Warranty Manual

YANGZHOU YAXING MOTOR COACH CO.,LTD

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一.产品保修规定

Product Warranty Regulation

1.1 总则 General

1.1 为了保障客户利益，维护扬州亚星客车股份有限公司(以下简称“亚星公司”)产品信誉，根据《中华人民共和国产品质量法》及本公司的质量方针制定本规定。

(Hereinafter referred to as “Yangzhou Yaxing Motor Coach, Ltd.”) in order to protect the interests of customers and maintain the credibility of the products, according to the “Product Quality Law of the People's Republic of China” and the company's quality policy to formulate this provision.

1.2 本规定是亚星系列客车产品保修服务的原则性规定，规定了亚星系列客车产品售后服务保修范围、保修期限、保修项目及保修办法等。

This regulation is the principle regulation of the warranty service of Yaxing series bus products, which stipulates the scope of after-sales service warranty, warranty period, warranty items and warranty methods of Yaxing series bus products.

1.3 本规定适用于亚星公司生产并在国内销售的客车产品。特殊保修条件及出口销 售的亚星客车应根据客户或市场的需要,考虑本公司的能力作相应的修改、补充或另行规定。

This provision applies to the bus products produced by Yaxing and sold in China. Special warranty conditions and export sales of Yaxing buses shall be modified, supplemented or otherwise stipulated according to the needs of customers or markets, taking into account the ability of the Company.

1.4 在保修有效期内出现产品质量问题，客户与特约服务站或亚星公司服务人员按照本规定的要求进行解决。

Product quality problems within the warranty validity period, the customer and the authorized service station or Yaxing service personnel in accordance with the requirements of this provision to resolve.

1.2 保修条件 Warranty Conditions

1.2.1 车辆保修的前提条件 Prerequisites for Vehicle Warranty

2.1.1 必须在规定的保修有效期内。

Must be within the specified warranty validity period.

2.1.2 客户必须按规定在指定服务站进行新车强制走合保养及定期维护保养，否则视为自动放弃保修权利。

Customers must carry out new car mandatory walk-in maintenance and regular maintenance at designated service stations as required, otherwise it is regarded as an automatic waiver of

warranty rights.

2.1.3 客户申请保修时，出示的《亚星客车服务手册》上登记的的车型、发动机号、底盘号与实际车辆相符。

When the customer applies for warranty, the model, engine number, and chassis number registered in the YAXING Bus Service Manual presented by the customer matches the actual vehicle.

2.1.4 保修受理期限为自故障发生之日起 30 天内，超出 30 天的，亚星公司不再受理保修申请。

Warranty acceptance period is 30 days from the date of failure, beyond 30 days, ASEC no longer accept warranty applications.

2.1.5 属于保修有效期内的零部件质量缺陷，以修复为主，确实无法修复的给予更换零部件，修复或更换必须遵循：零件→部件→总成的次序。

Belong to the warranty period of the quality of defective parts, to repair the main, really can not be repaired to give the replacement parts, repair or replacement must follow: parts → parts → assembly of the order.

2.1.6 需要更换或补充的维修辅料及正常消耗件不予保修。如润滑油、冷却液、制动液、各类滤清器、制动摩擦片等。

Maintenance accessories and normal consumable parts that need to be replaced or replenished are not warranted. Such as lubricating oil, coolant, brake fluid, various types of filters, brake friction pads and so on.

1.2.2 保修限制 Warranty Limitation

发生下列情况之一的，亚星公司有权不予保修并不承担免费修、换等责任，但可以根据情况提供相应的收费修理服务：

In the event of one of the following circumstances, YAXING has the right not to warranty and does not assume the responsibility of free repair, replacement, etc., but can provide the appropriate charges for repair services according to the situation:

2.2.1 超过保修有效期的车辆或零部件。

Vehicles or parts that have exceeded the warranty expiration date.

2.2.2 由于使用或维护、调整不当造成的损坏。

Damage caused by improper use or maintenance or adjustment.

2.2.3 客户无《亚星客车服务手册》、手册残缺或手册登记的内容与保修车辆不符或涂改，且又不能证明其所购买产品属保修有效期内产品的。

If the customer does not have “Yaxing Bus Service Manual”, the manual is mutilated, or the content registered in the manual does not match with the warranty vehicle or is altered, and cannot prove that the product purchased belongs to the product within the validity period of the warranty.

2.2.4 因客户私自改变原车结构，如加装或改装车顶行李架、增加弹簧钢板、改变轮胎尺寸、私自改动电器

线路、改装或加装电器元件、自行加大保险片或保险丝负荷等造成的有关损坏。

Damage caused by the customer's private changes to the original structure of the car, such as adding or modifying the roof rack, increasing the spring steel plate, changing the size of the tires, private changes to the electrical wiring, modification or addition of electrical components, and increase the load of the fuse or fuse by themselves.

2.2.5 亚星公司不负责客户反配套件的保修，由客户直接与反配套件供应商协商具体保修事宜。

Yaxing is not responsible for the warranty of the customer's anti-matching parts, the customer directly with the anti-matching parts supplier to negotiate the specific warranty matters.

2.2.6 客户指定件的保修，按客户与亚星公司签订的指定件服务协议执行。

Warranty for customer-specified parts shall be executed in accordance with the service agreement for specified parts signed between the customer and Yaxing.

2.2.7 折价出售的车辆如样车、试验车或超期库存车不予保修索赔；特殊情况下，依据客户与亚星公司签订的购车协议中相关约定执行，没有约定的不予保修。

Vehicles sold at a discount, such as sample cars, test cars or overdue stock cars will not be warranty claims; under special circumstances, based on the customer and the company signed the purchase agreement of the vehicle in the implementation of the relevant agreements, there is no agreement on the warranty will not be warranted.

2.2.8 故障发生后，客户需按照“不影响故障责任鉴定”的原则，保持必要的故障原始状态。由于客户自身的原因造成故障状态被破坏，导致故障发生责任难以进行鉴定或确认的，亚星公司对发生故障车辆不承担任何责任。

After the occurrence of the failure, the customer should maintain the necessary original state of the failure in accordance with the principle of “not affecting the identification of the responsibility for the failure”. Due to the customer's own reasons caused by the damage to the fault state, resulting in the responsibility for the occurrence of the fault is difficult to identify or confirm, Yaxing does not bear any responsibility for the occurrence of the fault vehicle.

2.2.9 亚星公司不支付车辆在使用过程中正常检验、维护所发生的费用，如根据《使用说明书》等资料规定进行的正常检查、调整、维护保养等所需的费用。

Yaxing will not pay for expenses incurred in the normal inspection and maintenance of the vehicle in the course of its use, such as expenses required for normal inspection, adjustment, maintenance, etc., in accordance with the provisions of the “Instruction Manual” and other information.

2.2.10 保修期内的间接损失或主观推算的损失亚星公司不予补偿和索赔，此类损失包括但不限于故障汽车的停车费、误工费、租车费、罚款、牵引费、搬运费、出差费、交通费、电话费等，以及停班造成的营业损失、名誉损失费、精神损失费、其它的附带损失费用等，以及对第三方的人或物造成的损害。

Consequential damages or subjective imputed damages during the warranty period will not

be reimbursed or claimed by Yaxing, such damages include, but are not limited to, parking fees, lost wages, rental fees, fines, towing fees, moving costs, travel expenses, transportation costs, telephone charges, etc., for the broken down automobile, as well as loss of business due to stoppage of work, cost of loss of reputation, cost of moral damages, and other incidental damages expenses, etc., as well as damages to third party's persons or things.

2.2.11客户在车辆发生故障时未能及时发现，或发现故障后未及时排除的情况下， 未经亚星公司或特约服务站同意又继续使用车辆，造成损失扩大的，扩大部分损失 不予赔偿。

If the customer fails to find the vehicle breakdown in time, or fails to remove the problem in time after finding the breakdown, and continues to use the vehicle without the consent of Yaxing or the authorized service station, resulting in the expansion of the damage, the expanded part of the damage will not be compensated.

2.2.12客户未经亚星公司同意自行处理或未按商定方案处理、不能提供故障件、故 障信息等相关证据，亚星公司有权不予保修。

The customer without the consent of the company to deal with their own or not in accordance with the agreed program to deal with, can not provide faulty parts, fault information and other relevant evidence, Yaxing reserves the right not to warranty.

2.2.13拒绝、阻止亚星公司服务人员（含特约服务站鉴定人员）对车辆进行正常检 查、分析、鉴定故障。

Refusing or preventing Yaxing's service personnel (including authorized service station appraisers) from conducting normal inspections, analyzing and identifying malfunctions of the vehicle.

2.2.14不可抗力因素如水灾、地震、火灾等造成的损坏或因此而引发的后期故障； 恶劣环境如酸雨、高温、高湿度、低温等引发故障的。

Damage caused by force majeure factors such as floods, earthquakes, fires, etc. or late failures as a result; Harsh environments such as acid rain, high temperatures, high humidity, low temperatures, etc. that cause failures.

2.2.15发生车损事故，客户认为涉及到产品缺陷，未及时通知亚星公司参与现场鉴 定或事故现场已遭破坏导致无法鉴定的。

In the event of a car accident, the customer believes that it involves a product defect and fails to notify Yaxing in time to participate in the on-site appraisal, or the scene of the accident has been destroyed, making it impossible to appraise the accident.

2.2.16 客户接车时参照技术协议和购销合同对车辆进行全面核对检查，确因在生产过程中产生的漏装、错装引起的与合同不符的问题，其索赔期为 90 天或 10000 公里， 两者以先到为准，逾期则视为客户自动放弃索赔权利。

When the customer receives the vehicle, he/she shall carry out a comprehensive verification and inspection of the vehicle with reference to the technical agreement and the purchase and sales contract, and the claim period is 90 days or 10,000 kilometers, whichever is the first, for any non-conformity of the vehicle with the contract due to omission or mis-installation during the

production process, and the customer shall be regarded as waiving the right to claim for damages after the expiration of the claim period.

1.2.3 其他不予保修的条件
Other Non-warranty Conditions

2.3.1 车辆出厂时使用的是防冻液，严禁添加普通冷却水或更换成普通冷却水，并 应定期或在入冬之前对防冻液的冰点做检测，达不到要求时必须整体更换，否则由此而引起的故障不予保修。

Antifreeze is used when the vehicle is shipped from the factory, it is strictly prohibited to add ordinary cooling water or replace it with ordinary cooling water, and the freezing point of the antifreeze should be tested regularly or before winter, and the whole antifreeze must be replaced when it fails to meet the requirements, otherwise, the faults caused by this will not be warranted.

2.3.2 润滑油加注量达不到使用说明书规定要求、未定期更换或更换的润滑油为非规定使用的牌号，后桥轴承齿轮异常磨损等故障不予保修。

Failure to meet the requirements of the instruction manual for lubricating oil filling, failure to replace the lubricating oil on a regular basis or replacement of lubricating oil of a grade other than that specified for use, and abnormal wear of the rear axle bearing gears will not be covered by the warranty.

2.3.3 前束值或轴距不在使用说明书规定范围内，造成轮胎异常磨损不予保修。

Abnormal tire wear caused by front beam values or wheelbase not within the range specified in the instruction manual will not be warranted.

2.3.2 维修或保养不当导致转向节、转向拉杆等部位螺纹乱扣不予保修。

Improper repair or maintenance resulting in messed up threads on steering knuckles, steering tie rods, etc. will not be warranted.

2.3.5 各类轴承、转向节主销及衬套、钢板销及销套因缺润滑脂出现锈蚀、松旷或烧蚀不予保修。

All types of bearings, steering knuckle main pins and bushings, steel plate pins and pin bushings are not warranted due to rust, looseness or ablation due to lack of grease.

2.3.6 行驶 2 万公里以上，出现轴承走外圆或内圆不予保修。

Driving more than 20,000 kilometers, there is a bearing to go out of round or inner circle will not be warranted.

2.3.7 长时间使用脚制动导致制动温度过高后，采取人为措施使制动鼓迅速降温引起制动鼓开裂、蹄片异常磨损或制动失效不予保修。

After using the foot brake for a long period of time resulting in high braking temperatures, taking artificial measures to rapidly cool down the brake drums causes cracking of the drums, abnormal wear of the shoes, or brake failure will not be warranted.

2.3.8 车辆涉水造成的零部件损坏不予保修。

Damage to parts of the vehicle caused by wading in water is not warranted.

2.3.9 车身焊接时未关闭电源及拆除电瓶线导致车用设备电脑板烧毁故障不予保修。

Failure to turn off the power during body welding and removal of battery cables resulting in burned out faults in the computer board of the vehicle equipment are not warranted.

2.3.10 车辆存放一年以上，出现密封件、轮胎等橡胶件老化故障不予保修。

Vehicles stored for more than one year with deteriorated seals, tires, and other rubber parts failures are not warranted.

2.3.11 受外力撞击或人为因素造成的零部件损坏及相关的后期故障等不予保修。

Damage to parts caused by external impact or human factors and related later failures are not warranted.

1.3 保修定义 Warranty Definition

3.1 产品质量保修：在客户按照“使用说明书”及《亚星客车服务手册》的要求， 正确操作、使用、维护保养的前提下，并在规定的保修有效期内，因产品设计、材 料、制造、装配原因而导致的故障或零部件损坏，亚星公司负责为客户进行免费修理或更换（仅限于无法修复的零部件），以恢复产品的正常使用。

Product quality warranty: In accordance with the requirements of “User Manual” and “Yaxing Bus Service Manual”, under the premise of correct operation, use and maintenance, and within the stipulated warranty period, Yaxing is responsible for free repair or replacement (limited to irreparable parts) to restore the normal use of the product. Repair or replacement (limited to parts that can not be repaired) to restore the normal use of the product.

3..2 亚星特约服务站：经亚星公司授权，并在签订协议有效期内，代理亚星客车产品售后服务的维修企业。

Yaxing special service station: authorized by Yaxing, and in the validity of the signed agreement, the agent of Yaxing bus products after-sales service maintenance enterprises.

1.4 保修程序 Warranty Procedures

4.1 保修期内车辆出现故障后，客户应及时与就近的特约服务站、呼叫中心服务热线或亚星公司驻外服务经理联系。

Yaxing special service station: authorized by Yaxing and within the validity period of the signed agreement, the maintenance enterprise that acts as the agent of after-sales service of Yaxing bus products. After the failure of the vehicle during the warranty period, the customer should contact the nearest authorized service station, call center service hotline or Yaxing's overseas service manager in time.

4.2 亚星公司服务人员或特约服务站鉴定员对故障车辆的故障情况进行鉴定；在保修有效期内且是亚星公司产品质量缺陷引起的，由亚星公司负责保修；超出保修有效期或非亚星公司产品质量缺陷引起的，服务站进行有偿服务。

Yaxing service personnel or special service station appraiser on the fault of the vehicle failure to identify; in the warranty period and is caused by product quality defects in Yaxing, Yaxing is responsible for warranty; beyond the warranty period or non-Yaxing product quality defects

caused by the service station for paid services.

4.3 亚星公司驻外服务经理负责监督、管理所辖地区特约服务站的保修索赔业务，负责审核所辖地区特约服务站的《产品故障鉴定单》费用申报和对索赔故障件的核实，协调本地区客户的紧急求援和抛锚车辆的外出抢修，做好辖区内大客户的服务，及时把亚星客车的质量状况和改进意见反馈给亚星客服中心。

Yaxing's overseas service manager is responsible for supervising and managing the warranty claim business of the authorized service station in the area under his jurisdiction, reviewing the cost declaration of the "Product Failure Identification Sheet" of the authorized service station in the area under his jurisdiction and verifying the claimed faulty parts, coordinating the emergency request for assistance from the customers in this area and the outgoing repair of the broken-down vehicles, doing a good job in the area of the service of the major customers, and feeding back the quality status and improvement opinions of the buses of Yaxing to the Yaxing Customer Service Center.

4.4 亚星客服中心应认真监督各地区保修业务的操作质量，及时处理亚星客车客户的各种投诉，并根据各配套厂商不同的要求对故障件作出处理决定。

Yaxing Customer Service Center shall carefully supervise the operation quality of the warranty business in each region, promptly deal with all kinds of complaints from Yaxing Bus customers, and make decisions on the handling of faulty parts according to the different requirements of each supporting manufacturer.

1.5 保修质量裁决 Warranty Quality Award

5.1 双方对故障的责任归属鉴定结论有异议时，应委托双方认可的国家级汽车质量监督检验中心进行鉴定，费用由申请者预付，最后由责任方全部承担。

When both parties disagree on the identification conclusion of the responsibility attributed to the fault, the national automobile quality supervision and inspection center recognized by both parties shall be entrusted to carry out the identification, and the cost shall be prepaid by the applicant and finally borne by the responsible party in its entirety.

5.2 如鉴定结论一时难以得出，在不影响鉴定继续进行的条件下，客户可要求先行更换、修理，但需交付相应款项作为维修押金。

If it is difficult to arrive at an appraisal conclusion for a while, under the condition that the appraisal does not affect the continuation of the appraisal, the customer may request to replace or repair it first, but it is necessary to pay the corresponding amount as a deposit for repair.

5.3 有关产品品质的所有争议由产品生产地的人民法院管辖。

All disputes concerning the quality of the product shall be under the jurisdiction of the people's court of the place where the product is manufactured.

1.6 保修附则 Warranty Attachment

6.1 本规定是明确亚星公司与购车客户之间，有关客车产品的质量保证责任、期限、售后服务等方面权利与义务的产生、变更和终止的约定。

This provision is to clarify the agreement between Yaxing nd the customer who purchased the vehicle, the rights and obligations related to the quality assurance responsibility of the bus product, the period, after-sales service and other aspects of the generation, change and termination of the agreement.

6.2 本规定中任何条款如被司法机关或仲裁机关裁判无效或不予执行，均不影响本规定中其它条款的有效性。

The invalidity or unenforceability of any provision of this provision by a judicial or arbitration authority shall not affect the validity of any other provision of this provision.

6.3 亚星公司拥有对本规定的修改、补充、撤消及最终解释权，并保留进一步改进产品的权利；对于本规定的任何更改，亚星公司有权不予另行通知购车客户。

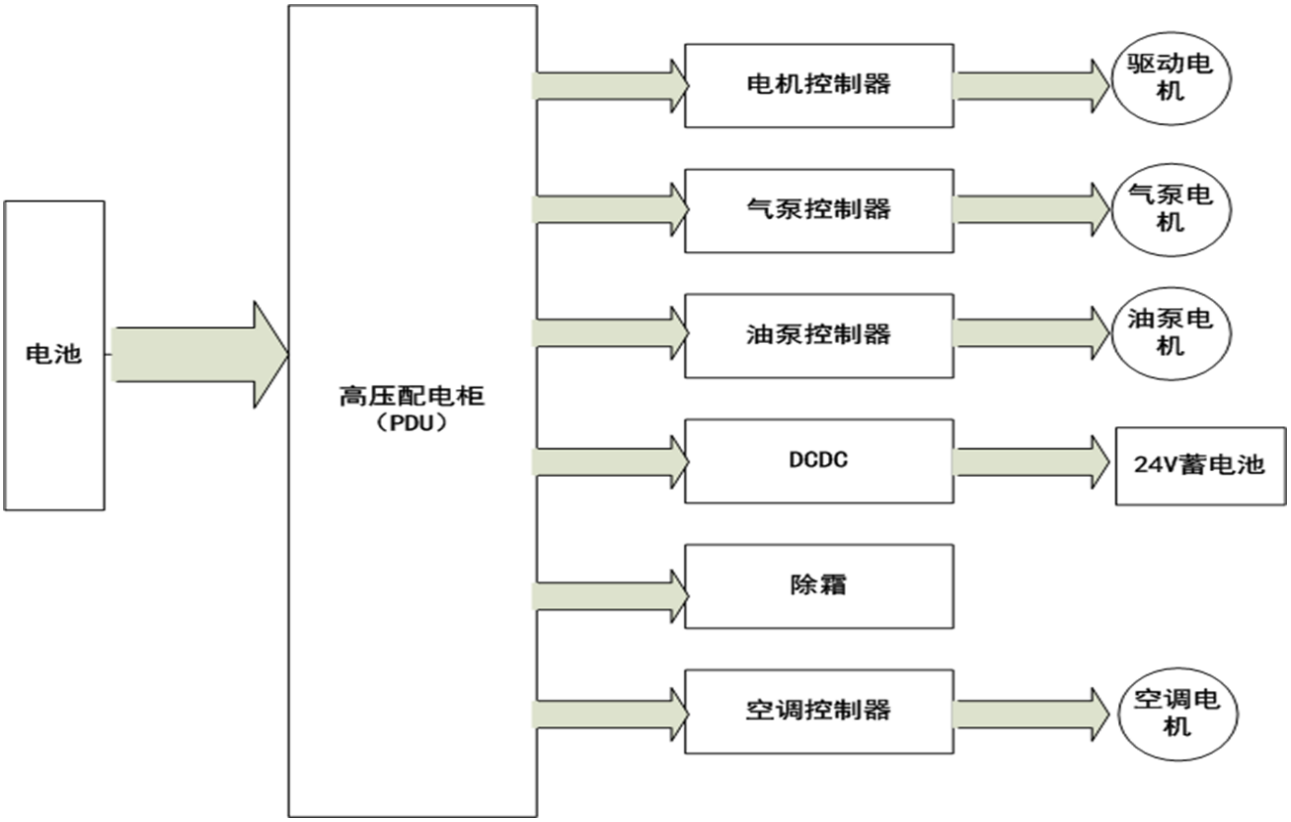
Yaxing has the right to modify, supplement, withdraw and ultimately interpret this provision, and reserves the right to further improve the product; Yaxing has the right not to notify the purchasing customer of any changes to this provision.

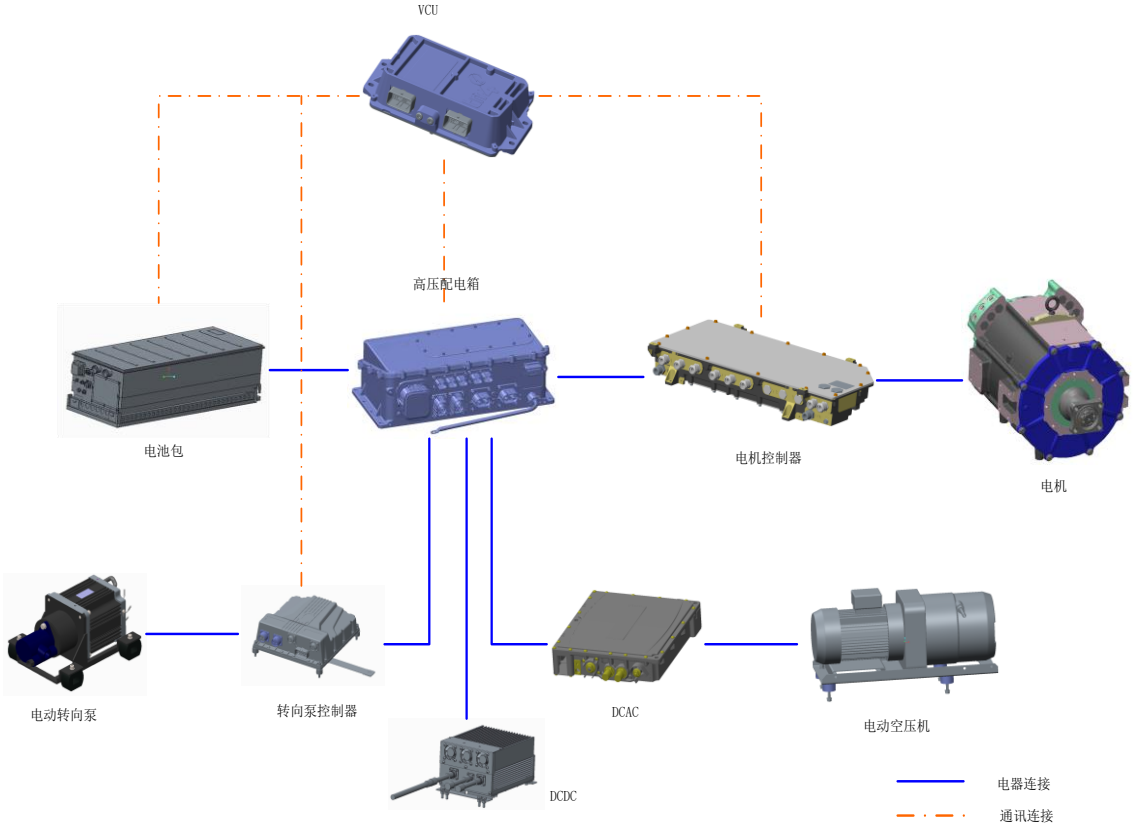
6.4 本规定作为与购车客户的约定，自购车发票开具之日起生效。

This provision shall be effective as an agreement with the purchasing customer from the date of the purchase invoice.

二．纯电客车能量流动示意图

This provision shall be effective as an agreement with the purchasing customer from the date of the purchase invoice.




VCU
高压配电箱
电池包
电机控制器
电机
电动转向泵
转向泵控制器
DCAC
电动空压机
DCDC
电器连接
通讯连接

三．纯电动客车简易故障分析

Simple Failure Analysis of Pure Electric Buse

故障现象	诊　断　方　向				
上不了高压	1. 检查24V电是否馈电	2. 高压急断开关被开启	3. 四合一总保险熔断（维修开关）	4. 预充未完成	5. 四合一主正继电器故障
	6. 控制系统继电器故障	7. 整车控制器未输出控制信号	8. SOC过低（20%以下）	9. 整车CAN通讯故障	10. 绝缘故障（参考故障现象二）
绝缘故障	1. 绝缘模块坏	2. 高压设备绝缘报警	3. 高压设备进水	4. 各高压设备程序之间技术协议有冲突	5. 绝缘通讯不通或超时故障
车辆限扭（限速）	1. 出现“车辆锁定”	2. 乘客门未关好、手控阀未松、车辆气压未到安全值	3. 热效能高（水温高）	4. 冷却水泵坏	5. SOC低（25%以下）
	6. 有绝缘二级报警	7. 个别单体电池压差大	8. 通讯线接触不良		
充不了电	1. 充电协议有问题	2. 充电枪未插好	3. 整车24V无电	4. 充电口进水	5. 电池箱内从版故障
	6. 充电桩故障	7. 四合一内充电继电器故障			
档位器跳档	1. 档位器故障	2. 档位器通讯故障	3. 电池系统程序不完善	4. 四合一内主正继电器接触不好	5. CAN通讯线被干扰
其他	1. 24V线束接触不良	2. 与高压设备连接处有接触不良（如退针脚现象）	3. 司机不正确操控	4. 四合一内爆保险丝	5. 高压线连接不好

四．动力电池的保养

Maintenance of Power Battery

4.1 动力电池 Power Battery

作用：为整车运行提供能量。相当于传统商用车的柴油。

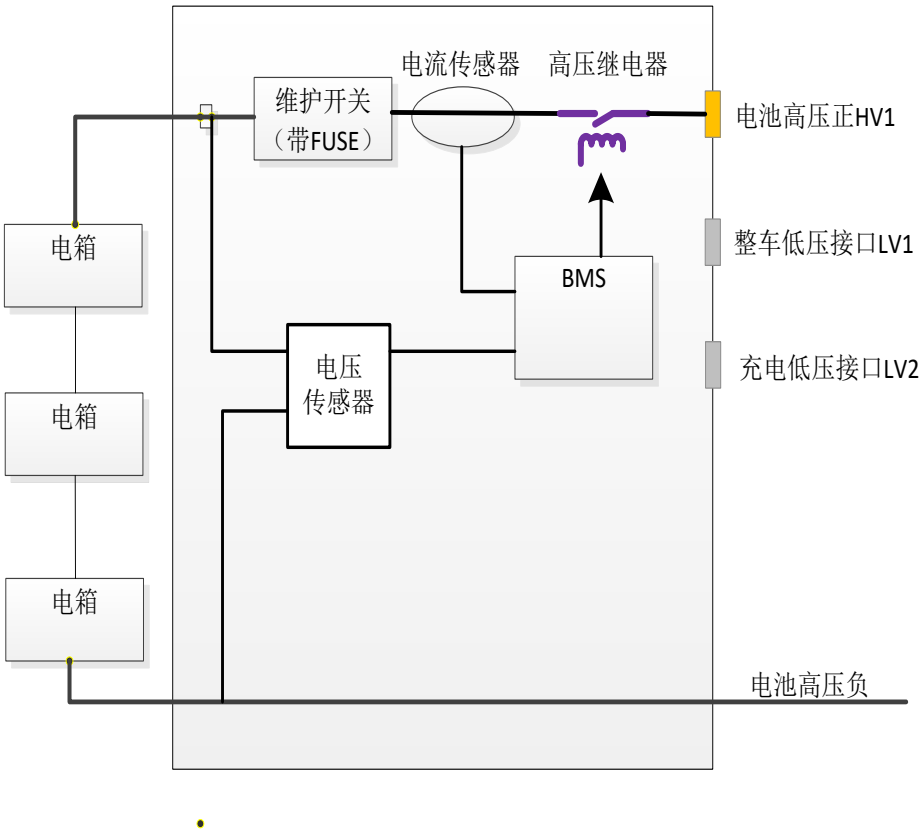
Function: To provide energy for the operation of the entire vehicle. Equivalent to diesel fuel for conventional commercial vehicles.

组成：电池箱和高压盒。高压盒内含：BMS 主机、电压传感器、电流传感器、高压继电器。

Composition: Battery box and high voltage box. High-voltage box contains: BMS host, voltage sensor, current sensor, high-voltage relay.

充电：充电插座与 BMS 通过充电 CAN 线连接，BMS 由充电桩提供 24V 电源，经充电连接确认后，可通过充电插座向动力电池充电。

Charging: The charging socket is connected to the BMS through the charging CAN cable, and the BMS is supplied with 24V power from the charging post, which can be charged to the power battery through the charging socket after the charging connection is confirmed.



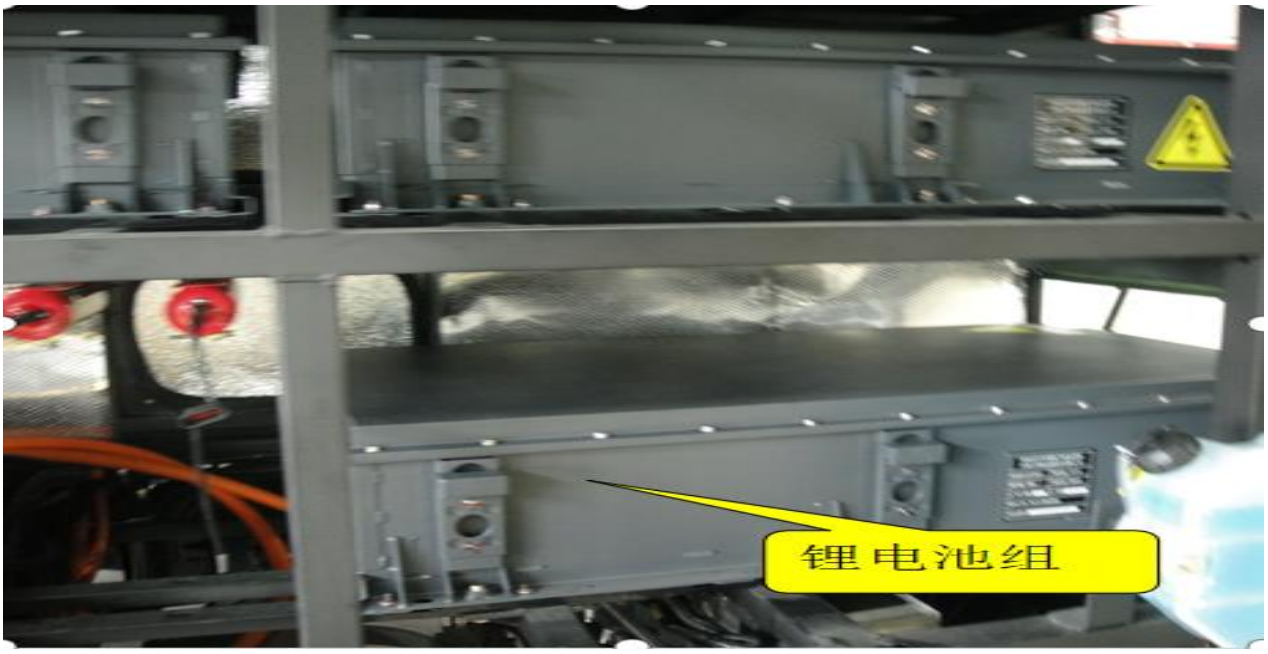
图为动力电池原理示意图

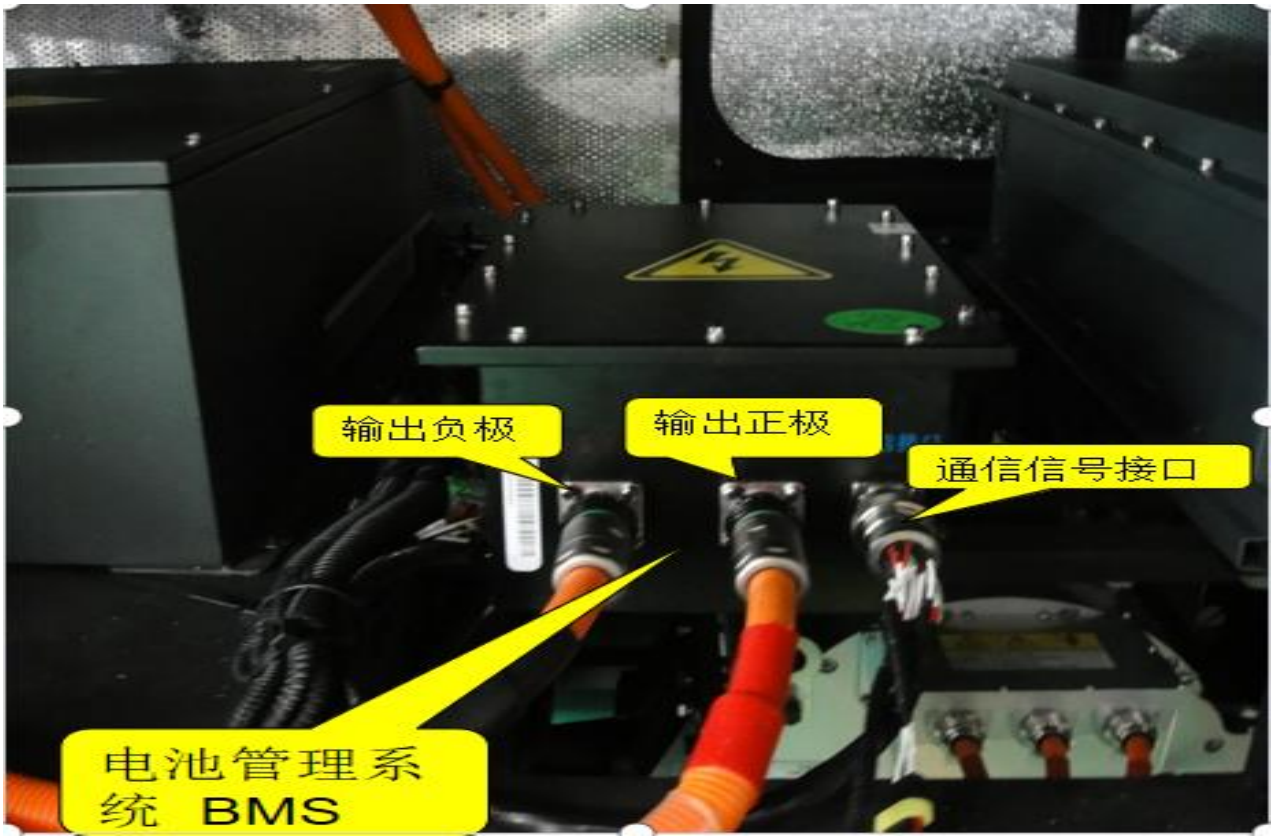
The schematic diagram of the principle of power battery

4.2 电池管理系统 BMS

BMS 主机（CCU）硬件介绍：接受从计算机发送的信息，采样总电流、电压、计算 SOC，向整车控制器发送电池信息，同时根据电池信息对电池进行放电管理；实现外部与 VCU、仪表、充电机等部件的通信。

Hardware introduction of BMS host (CCU): accepts information sent from computer, samples total current, voltage, calculates SOC, sends battery information to vehicle controller, and at the same time, discharges and manages the battery according to the battery information; realizes external communication with VCU, meter, charger and other components.




输出负极
输出正极
通信信号接口
电池管理系统 BMS

4.3 动力电池保养说明 Power Battery Maintenance Instructions

序号	分类	维护项目	维护周期	建议实施单位
1	日常保养	1.车辆使用完毕后及时对车辆进行充电； 2.清理清扫电池舱，确保电池舱清洁、干净； 3.记录车辆运行过程中的异常问题。	每天	终端使用客户
2	一级保养	1.长时间不使用车辆需对电池系统进行充、放电； 2.清理清扫电池舱，确保电池舱清洁、干净； 3.接插件是否存在松动； 4.电池箱固定螺栓是否松动。	1个月	终端使用客户
3	二级保养	1.长时间不使用车辆需对电池系统进行充、放电； 2.清理清扫电池舱，确保电池舱清洁、干净； 3.接插件是否存在松动； 4.电池箱固定螺栓是否松动； 5.动力线束和通讯线束是否存在磨损； 6.使用均衡充电机对电池系统进行均衡充电维护。	3个月	终端使用客户

序号	分类	维护项目	维护周期	建议实施单位
4	三级保养	1.长时间不使用车辆需对电池系统进行充、放电； 2.清理清扫电池舱，确保电池舱清洁、干净； 3.电池箱内排风扇是否正常； 4.接插件是否存在松动； 5.电池箱固定螺栓是否松动； 6.动力线束和通讯线束是否存在磨损； 7.使用均衡充电机对电池系统进行均衡充电维护； 8.接触器吸合情况检查； 9.电池系统绝缘检测； 10.电池系统通讯检测及数据分析。	6个月	电池供应商、终端使用客户

4.3.1 动力电池维护保养项目操作规范

Power Battery Maintenance Program Specifications

（1） 电池舱整理及清洁
Battery compartment organization and cleaning

目的：为了防止杂物将通风道堵塞，不便于电池箱内电池散热，从而引发温度异。

Purpose: To prevent debris from blocking the ventilation channel, which does not facilitate the dissipation of heat from the batteries in the battery box, thus triggering the temperature variance.

工具准备：扫把、干拖把、干毛巾等清洁工具。

Tool: broom, dry mop, dry towel and other cleaning tools.

操作方法：

Operating method:

① 将车辆钥匙拧至 OFF 档，同时拔掉车辆钥匙随身携带；
Turn the vehicle key to OFF while removing the vehicle key with you;
② 关闭低压电瓶电源，打开电池舱舱门；
Turn off the low voltage battery power and open the battery compartment hatch;
③ 清除电池舱内的杂物（严禁将清洁工具放置在电池舱内）；

Remove debris from the battery compartment (it is strictly prohibited to place cleaning tools in the battery compartment);

④ 使用清洁工具依次对每个电池舱进行清扫、清洁和整理，确保电池舱内整洁干净；
Use cleaning tools to sweep, clean and organize each battery compartment in turn to ensure that the battery compartment is neat and clean; remove debris in the battery compartment (it is strictly prohibited to place cleaning tools in the battery compartment);

⑤ 整理、清扫每个电池舱后，依次关闭每个电池舱舱门并上锁，打开低压电瓶开关。

After organizing and cleaning each battery compartment, close and lock each battery compartment hatch in turn, and open the low voltage battery switch.

（2） 电池箱固定螺栓检查
Battery box retaining bolt inspection

目的：为了防止车辆在高速行驶过程中，电池箱紧固螺栓松动导致电池箱被甩掉，从而引发事故。

Purpose: In order to prevent the vehicle in the process of high-speed driving, the battery box fastening bolts loose lead to the battery box was thrown off, thus causing accidents.

工具准备：棘轮扳手、17mm 套筒头、手套。

Tool preparation: ratchet, 17mm socket head, gloves.

操作方法：

Method of operation:

① 将车辆钥匙拧至 OFF 档，同时拔掉车辆钥匙随身携带；
Turn the vehicle key to OFF while removing the vehicle key with you;
② 关闭低压电瓶电源，打开电池舱舱门；
Turn off the low voltage battery power and open the battery compartment hatch;
③ 目测电池箱固定螺栓是否有松动，对于松动螺栓使用棘轮扳手将其固定紧固（紧固螺栓扭矩:27N.M）；
Visually inspect the battery box fixing bolts for looseness, and use a ratchet wrench to fix and tighten the loose bolts (tightening bolt torque: 27N.M);
④ 检查完毕电池箱固定螺栓后，依次关闭每个电池舱舱门并上锁，打开低压电瓶开关。
After checking the battery box retaining bolts, close and lock each battery compartment hatch in turn and turn on the low voltage battery switch.

（3） 线束连接插件检查
Wiring harness connection plug-in inspection

目的：为了防止接插件松动引发通讯异常或接插件烧蚀现象。

Purpose: To prevent communication anomalies or connector erosion caused by loose connectors.

工具准备：手套、退针器。

Tool preparation: gloves, needle retractor.

操作方法：

Method of operation:

① 将车辆钥匙拧至 OFF 档，同时拔掉车辆钥匙随身携带；
Turn the vehicle key to OFF while removing the vehicle key with you;
② 关闭低压电瓶电源，拔下主回路维修开关，打开电池舱舱门；
Turn off the low voltage battery power, unplug the main circuit service switch and open the battery compartment hatch;
③ 目测并检查连接电池箱动力插件和通讯插件是否有异常或松动；
Visually inspect and check for abnormalities or looseness in connecting the battery box power plug and communication plug;
④ 对于松动的接插件及时紧固到位，对于有烧蚀异常的接插件尽快联系服务人员到现场进行维护更换处理；
For loose connectors fastened in place in a timely manner, as soon as possible to contact the service personnel to the scene for maintenance and replacement of connectors with abnormal abrasion;
⑤ 检查完毕线束插件后，依次关闭每个电池舱舱门并上锁，插上主回路维修开关，打开低压电瓶开关。
After checking the harness inserts, close and lock each battery compartment hatch in turn, plug

in the main circuit service switch, and turn on the low voltage battery switch.

（4） 线束表面检查
Wire Harness Surface Inspection

目的：为了防止线束破损引发通讯异常或绝缘异常。

Purpose: To prevent communication abnormality or insulation abnormality caused by a broken wire harness.

工具准备：手套、绝缘胶带。

Tool preparation: gloves, insulating tape.

操作方法：

Method of operation:

① 将车辆钥匙拧至 OFF 档，同时拔掉车辆钥匙随身携带；
Turn the vehicle key to OFF while removing the vehicle key with you;
② 关闭低压电瓶电源，拔下主回路维修开关，打开电池舱舱门；
Turn off the low voltage battery power, unplug the main circuit service switch and open the battery compartment hatch;
③ 目测通讯线束和动力线束折弯处是否有磨损或破皮漏电嫌疑；
Visually inspect the communication harness and power harness bends for suspected wear or broken skin leakage;
④ 对于有磨损或破皮的线束使用绝缘胶带进行绝缘防护处理；
Wiring harnesses that are frayed or torn are treated with insulation tape for protection;
⑤ 检查完毕线束后，依次关闭每个电池舱舱门并上锁，插上主回路维修开关，打开低压电瓶开关。
After checking the wiring harnesses, close and lock each battery compartment hatch in turn, plug in the main circuit service switch, and turn on the low voltage battery switch.

（5） 电池系统通讯检查
Battery system communication check

目的：为了预防电池系统通讯异常导致车辆不能运行。

Purpose: To prevent the vehicle from not operating due to abnormal battery system communication.

工具准备：笔记本电脑、上位机软件、CAN 卡。

Preparation of tools: laptop, host computer software, CAN card.

操作方法：

Method of operation:

① 将车辆钥匙拧至 ON 档；
Turn the vehicle key to ON;
② 检查车辆仪表盘显示电池系统信息是否正常，是否存在电池故障信息；
Check that the vehicle's instrument panel displays normal battery system information and that there is no battery fault message;
③ 对于仪表盘显示的异常信息应及时联系服务人员进行分析排查解决。
Abnormal information displayed on the instrument panel should be analyzed and resolved by contacting service personnel.

（6） 接触器吸合测试
Contactor Suction Test

目的：为了防止接触器黏连引发安全事故发生。

Purpose: To prevent contactors from sticking and causing safety accidents.

工具准备：笔记本电脑、上位机软件、CAN 卡、万用表、手套。

Tools preparation: laptop, host computer software, CAN card, multimeter, gloves.

操作方法：

Method of operation:

① 将车辆钥匙拧至 ON 档；
Turn the vehicle key to ON;
② 使用上位机软件分别发送放电接触器吸合指令和充电接触器吸合指令；
Use the host computer software to send the discharge contactor suction command and the charge contactor suction command respectively;
③ 将万用表调至直流电压检测档，发送充电接触器闭合指令时检测充电插口处是否有电池系统总电压，然后发充电接触器断开指令检测充电插口处是否有电池系统总电压，发送闭合指令时充电插口处有电池系统总电压，发送断开指令时充电插口处未电池系统总电压，两次发出的指令和实测结果相符则充电接触器正常，若不相符则充电接触器异常，需及时更换；
Set the multimeter to DC voltage detection gear, send the charging contactor closed command to detect the charging socket whether there is a total voltage of the battery system, and then send the charging contactor disconnect command to detect the charging socket whether there is a total voltage of the battery system, send the closed command to the charging socket there is a total voltage of the battery system, send the disconnect command to the charging socket is not the total voltage of the battery system, the two commands issued and the actual test results match If the two commands and the measured results match, then the charging contactor is normal, if not, then the charging contactor is abnormal and needs to be replaced in

time;

④ 放电接触器的检测按照充电接触器的方法进行检测，如果检测结果异常应及时更换接触器。
The discharge contactor is tested in accordance with the method for charging the contactor, and the contactor should be replaced in a timely manner if the test results are abnormal.

（7） 电池单体信息
Battery Cell Information

目的：通过检查电池系统内单体电池信息，可避免因电池一致性差异过大引发的行驶里程衰减。

Purpose: By checking the information of individual cells within the battery system, mileage degradation caused by excessive differences in battery consistency can be avoided.

工具准备：笔记本电脑、上位机软件、CAN 卡。

Preparation of tools: laptop, host computer software, CAN card.

操作方法：

Method of operation:

① 将车辆钥匙拧至 ON 档;
Turn the vehicle key to ON;

② 使用上位机软件监控电池系统信息，读取系统最高电池电压、最低电池电压、最高极柱温度和最低记住温度;
Use the upper computer software to monitor the battery system information and read the system's highest cell voltage, lowest cell voltage, highest pole temperature and lowest remembered temperature;

③ 对于检测的静态单体电压压差大于 50mv，温度压差大于 10℃时，应读取历史数据进行分析检查，对压差较大的电池进行维护处理或更换处理；对于温差较大的电池箱进行检查，确保电池箱内风扇正常运行。

For the detection of static single voltage pressure difference greater than 50mv, temperature pressure difference greater than 10 ℃, should read the historical data to analyze and check the larger pressure difference of the battery maintenance treatment or replacement treatment; for the larger temperature difference of the battery box to check to ensure that the fan in the battery box normal operation.

（8） 电池系统绝缘检测
Battery system insulation testing

目的：防止因电池系统漏电引发安全事故。

Purpose: To prevent safety accidents caused by battery system leakage.

工具准备：手套、绝缘测试仪。

Tool preparation: gloves, insulation tester.

操作方法：

Method of operation:

① 将车辆钥匙拧至 OFF 档，同时拔掉车辆钥匙随身携带；
Turn the vehicle key to OFF while removing the vehicle key with you;
② 关闭低压电瓶电源，拔下高压盒电源正极和电源负极；
Turn off the low voltage battery power and unplug the power positive and power negative terminals of the high voltage box;
③ 将绝缘测试仪拨至相应档位（绝缘测试仪档位应选择接近电池系统总电压），使用绝缘测试仪分别测量电源正极与车体和电源负极与车体之间的绝缘阻值，绝缘阻值应大于国标标准 500Ω/V；对于绝缘阻值小于标准值的电池系统应尽快检查处理；
The insulation tester will be dialed to the appropriate gear (insulation tester gear should be selected close to the total voltage of the battery system), the use of insulation testers to measure the power supply positive and the body and the power supply negative and the body of the insulation resistance between the insulation resistance should be greater than the national standard standard 500Ω / V; for the insulation resistance value is less than the standard value of the battery system should be inspected as soon as possible to deal with;
④ 高压盒内电源正极、电源负极、充电正极、充电负极、放电正极和放电负极的绝缘检测按照测量电源正极和电源负极对车体的绝缘检测方法进行检测，对于绝缘阻值异常的高压盒尽快检查处理。
The insulation test of the power positive pole, power negative pole, charging positive pole, charging negative pole, discharging positive pole and discharging negative pole in the high-voltage box is carried out in accordance with the method of measuring the insulation test of the power positive pole and the power negative pole to the vehicle body, and the high-voltage box with an abnormal insulation resistance value is inspected and processed as soon as possible.

（9） 电池保养的操作方法
Battery maintenance operation

（1） 保养场地要求：宽敞平整安全，要有充电设备。
Maintenance site requirements: spacious, flat and safe, to have charging equipment.

（2） 保养操作流程：
Maintenance operation process:

步骤一 调整电池电量（SOC）在 25%-40%区间。

Step 1: Adjust the battery charge (SOC) in the 25%-40% range.

步骤二 车辆停稳，关闭电源（钥匙拧至 OFF 档），然后启动电源（钥匙拧至 ON 档），检查车上所有的用

电设备，确保处于关闭状态。

Step 2: Stop the vehicle, turn off the power (with the key turned to OFF), then start the power (with the key turned to ON), and check all electrical equipment on the vehicle to make sure it is off.

步骤三 保持车辆通电状态 12-15 小时，保养结束后需进行一次满充电。

Step 3: Keep the vehicle energized for 12-15 hours, a full charge is required at the end of maintenance.

注：执行步骤三期间，不允许使用车辆或任何用电设备。

NOTE: Use of the vehicle or any electrical equipment is not permitted during the performance of Step III. Step 3 Keep the vehicle energized for 12-15 hours, a full charge is required at the end of maintenance.

（10）定期检查要求
Periodic inspection requirements

车辆每运行三个月，需进行全面检查，具体检查项目如下：

Vehicles need to be fully inspected every three months of operation, and the specific inspection items are as follows:

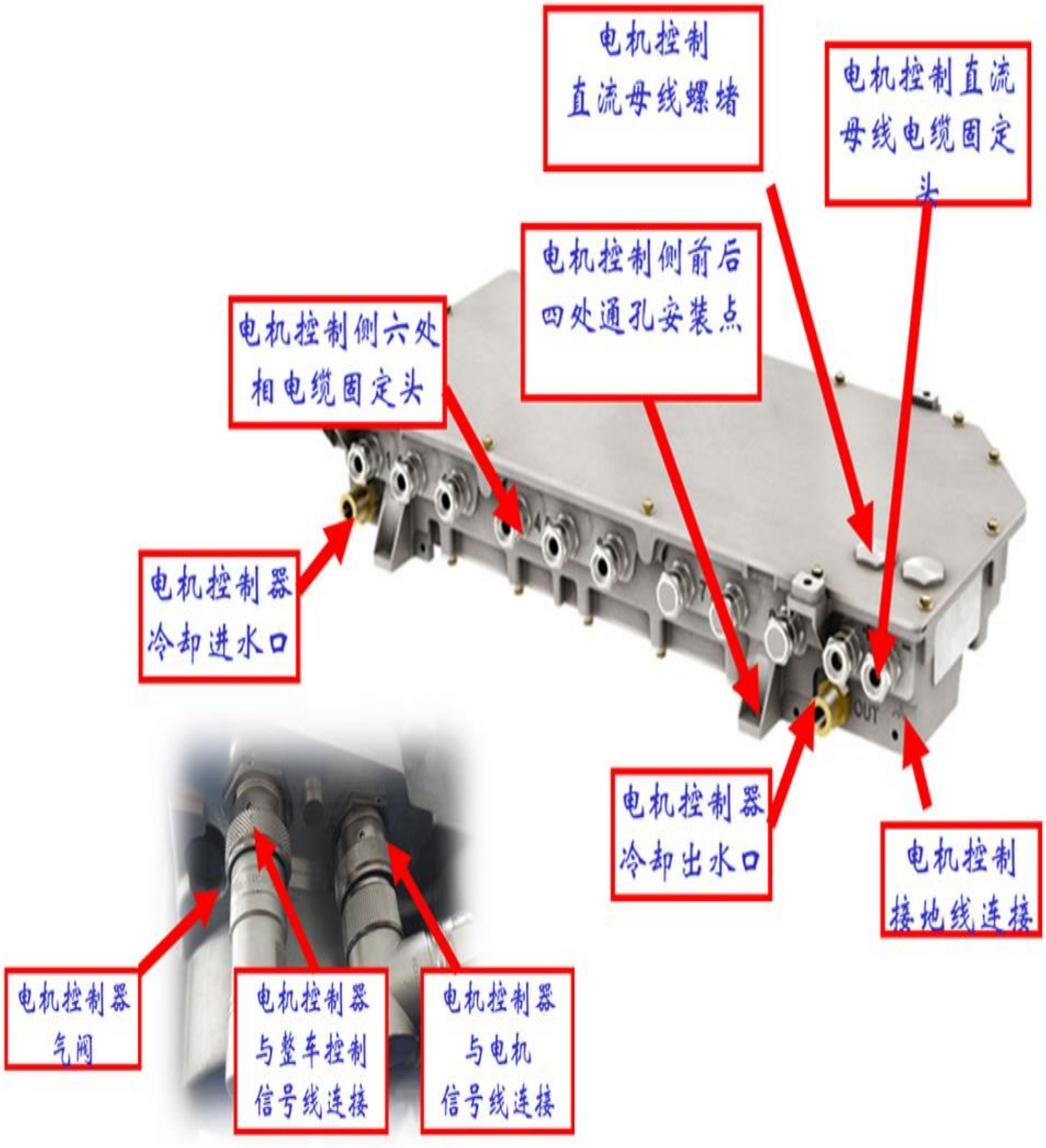
（1） 电池系统的高低压线束及连接器有无擦伤、破损、松动。
The high and low voltage wiring harnesses and connectors of the battery system are not scuffed, broken or loose.
（2） 电池箱或高压箱是否存在污泥、裂缝、变形、异味、鼓胀。
Battery box or high voltage box for sludge, cracks, deformation, odor, bulging.
（3） 电池箱的气压平衡阀或防爆阀外形有无损坏。
There is no damage to the shape of the air pressure balancing valve or explosion-proof valve of the battery box.
（4） 电池箱、高压箱与车架的连接是否牢固。
The battery box and high voltage box are securely attached to the frame.

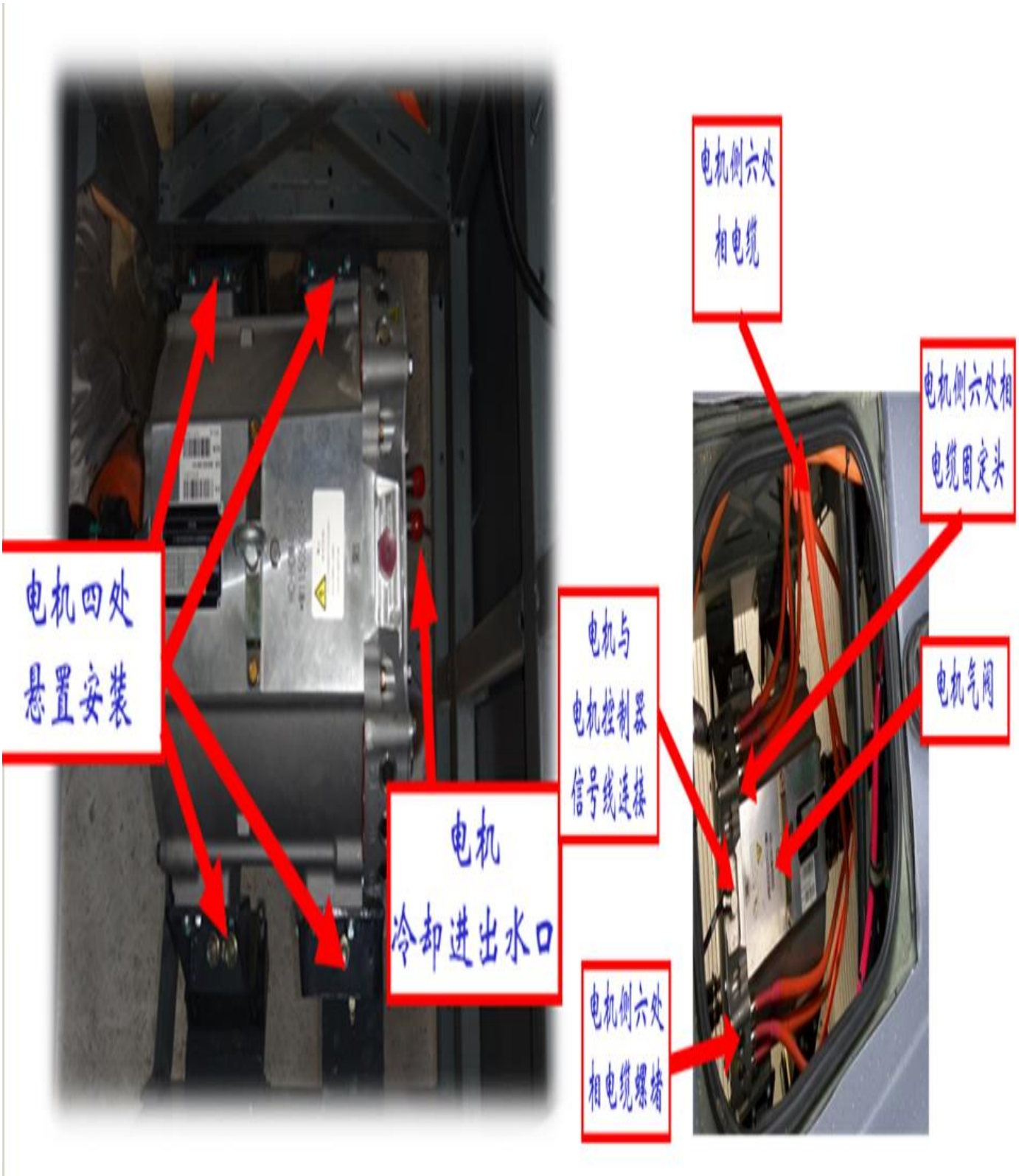
注：执行检查动作前，为确保人身安全，请务必穿戴绝缘鞋、绝缘手套、防护目镜等防护用品。

Note: Before performing the inspection action, to ensure personal safety, please make sure to wear insulated shoes, insulated gloves, protective goggles and other protective equipment.

五．驱动系统保养

Drive system maintenance




电机四处
悬置安装
电机
冷却进出水口
电机与
电机控制器
信号线连接
电机侧六处
相电缆螺堵
电机侧六处
相电缆
电机侧六处相
电缆固定头
电机气阀

5.1 电驱动系统部件保养说明

Instructions for maintenance of electric Drive system components

检查项目	具体说明	措施	检查时间间隔
电机本体	整机的完整性部件是否有磕碰及损坏的迹象	影响性能时，进行更换	每2万公里/每12个月
电机控制器本体	整机的完整性部件是否有磕碰及损坏的迹象	影响性能时。进行更换	每2万公里/每12个月
电机安装	电机悬置的完整性相关紧固件是否有松动迹象	依据规范重新紧固	每2万公里/每12个月
电机控制器安装	相关紧固件是否有松动迹象	依据规范重新紧固	每2万公里/每12个月
电机冷却进/出水口	冷却液是否有泄漏	重新紧固卡箍	每2万公里/每12个月
电机控制器冷却进/出水口	冷却液是否有泄漏	重新紧固卡箍	每2万公里/每12个月
膨胀水箱	冷却液液面高度是否到下限	添补防冻液	每2000公里/每3个月
冷却液	冷却液是否混浊	更换防冻液	每4万公里/每24个月
电机排气阀	排气阀周边是否堆积异物及杂质	刷子清洁	每2万公里/每12个月

电机控制器排气阀	排气阀周边是否堆积异物及杂质	刷子清洁	每2万公里/每12个月
电机侧相电缆固定头	相电缆固定头是否松脱	依据规范重新紧固	每5000公里/每3个月
电机侧相电缆螺堵	相电缆螺堵是否松动	依据规范重新紧固	每5000公里/每3个月
电机与电机控制器间相电缆	相电缆是否磨损、破皮、烧蚀迹象	依严重情况进行更换	每5000公里/每3个月
电机控制器侧相电缆固定头	电缆固定头是否松脱	依据规范重新紧固	每5000公里/每3个月
电机控制器直流母线电缆	直流母线是否松动	依据规范重新紧固	每5000公里/每3个月
电机控制器直流母线电缆	直流母线是否磨损、破皮、烧蚀迹象	依严重情况进行更换	每5000公里/每3个月
电机控制器直流母线固定头	电缆固定头是否松脱	依据规范重新紧固	每5000公里/每3个月
电机控制器直流母线螺堵	相电缆螺堵是否松动	依据规范重新紧固	每5000公里/每3个月

检查项目	具体说明	措施	检查时间间隔
电机与电机控制器间信号线	信号线两端插接件是否松动	依据规范重新紧固	每5000公里/每3个月
电机与电机控制器间信号线	信号线是否有磨损、破皮迹象	依严重情况进行更换	每5000公里/每3个月
电机控制器与整车控制器连接	插接件是否松动	依据规范重新紧固	每5000公里/每3个月
电机接地线	接地线是否松脱	依据规范重新紧固	每5000公里/每3个月
电机与电机控制器间信号线	信号线两端插接件是否松动	依据规范重新紧固	每5000公里/每3个月
电机与电机控制器间信号线	信号线是否有磨损、破皮迹象	依严重情况进行更换	每5000公里/每3个月
电机控制器与整车控制器连接	插接件是否松动	依据规范重新紧固	每5000公里/每3个月
电机控制器接地线	接地线是否松脱	依据规范重新紧固	每5000公里/每3个月
通风清洁	零部件表面是否尘埃堆积	使用风枪清洁表面	每5000公里/每3个月
软件升级	按需对产品软件进行升级	产品升级	按需

注意：电机和电机控制器均为高压驱动设备。

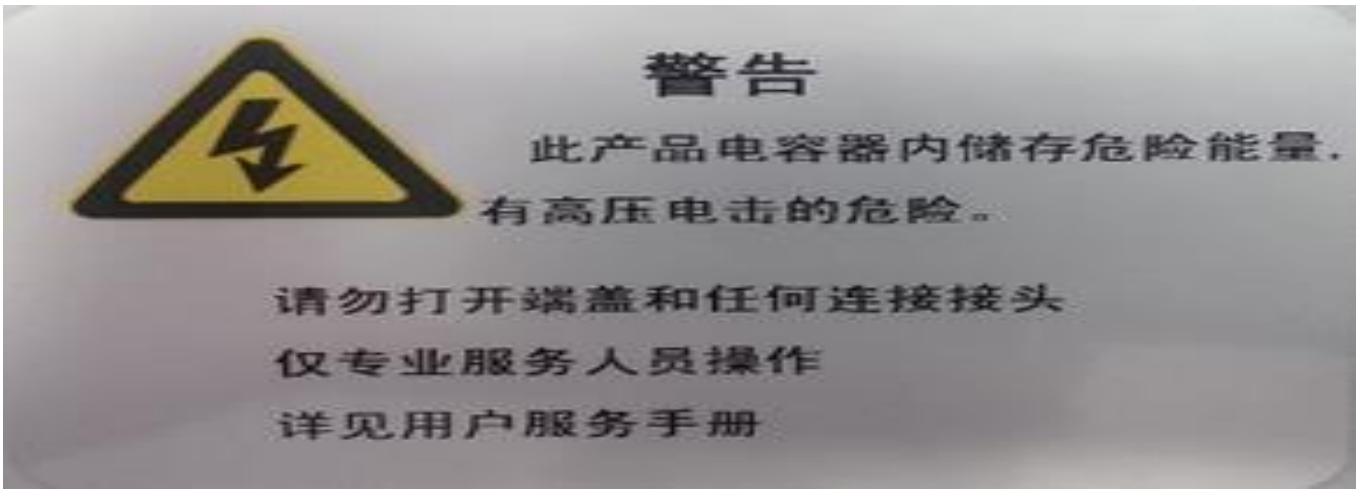
即使断电后，电机控制器内的电容仍可能带有高压，需要等待 2min 后再操作。

所有涉及高压线缆的操作都需要专业人员进行。

Note: Both the motor and the motor controller are high-voltage drive devices.

Even after power-off, the capacitors inside the motor controller may still carry high voltage and need to wait for 2 minutes before operation.

All operations involving high-voltage cables need to be carried out by professionals.


警告
此产品电容器内储存危险能量.
有高压电击的危险。
请勿打开端盖和任何连接接头
仅专业服务人员操作
详见用户服务手册

六．电动转向系统维护保养

Maintenance of the electric steering system

6.1 电动助力转向系统

Electric power steering system

工作原理： 电动液压助力转向油泵是汽车转向系统的动力源，它通过转向电机作为动力源，将机械能转换为液压能，方向机通过油泵输出的液压油把液压能转换成机械能，从而起到减轻驾驶员操舵的强度，同时提高车辆的可操纵性。（**新车行驶 2500 公里须更换一次液压油,对油罐、滤油装置和管路进行仔细清洗，以后每 2 万公里换油一次并清洗。**）

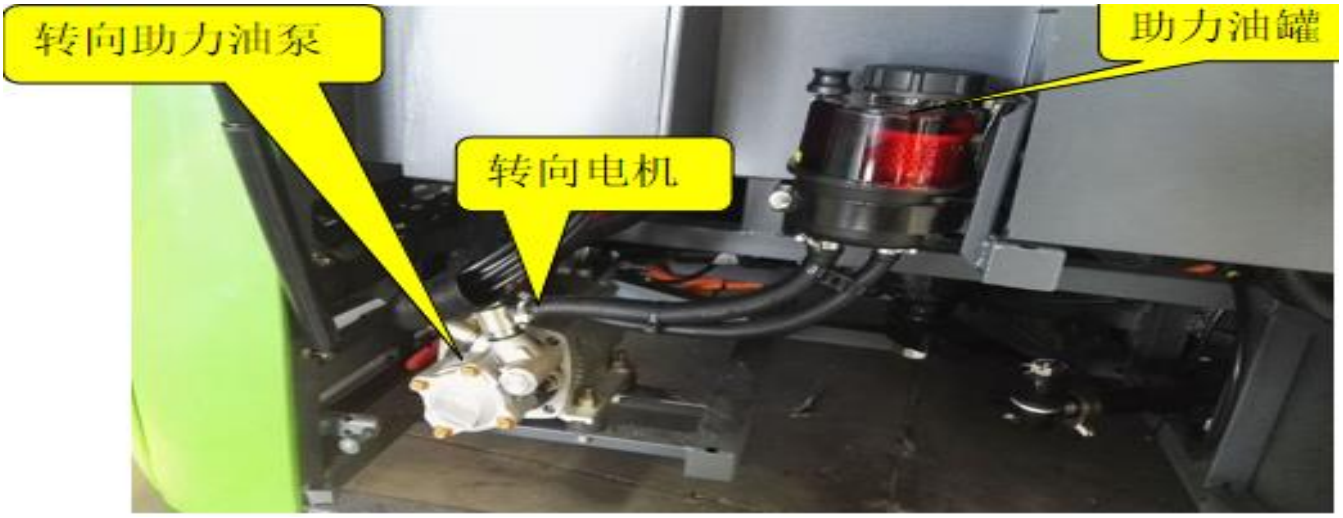
Working principle: The electric hydraulic power steering oil pump is the power source of the vehicle's steering system. It uses the steering motor as the power source to convert mechanical energy into hydraulic energy, and the steering gear converts the hydraulic energy into mechanical energy through the hydraulic oil output by the oil pump, thereby reducing the intensity of the driver's steering while improving the maneuverability of the vehicle. (**For a new vehicle, the hydraulic oil should be changed once every 2,500 kilometers, and the oil tank, oil filter and pipelines should be carefully cleaned, and then changed and cleaned every 20,000 kilometers thereafter.**)

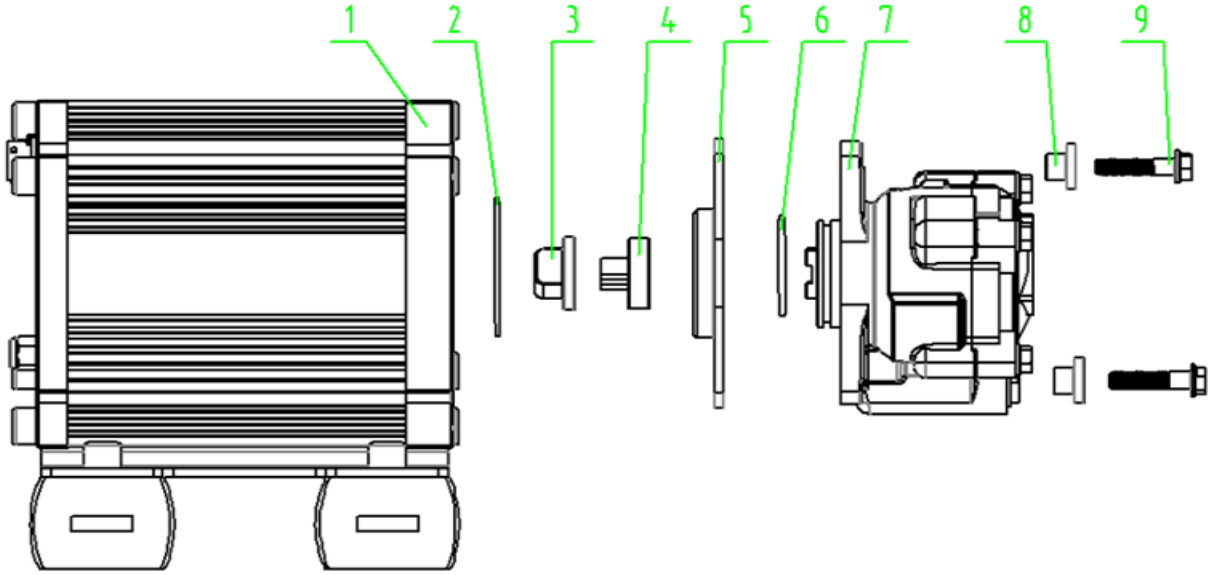
控制方式：整车控制器闭合预充继电器，油泵控制器预充到一定电压后，整车控制器通过 CAN 报文启动油泵控制器，然后油泵控制器向整车控制器发送状态报文。

Control method: The vehicle controller closes the pre-charge relay, the oil pump controller is pre-charged to a certain voltage, the vehicle controller starts the oil pump controller via CAN message,

and then the oil pump controller sends a status message to the vehicle controller.







1、转向电机总成
2、O形圈密封环（66*1.8）
3、连接块绝缘套
4、传动连接块
5、法兰绝缘垫
6、O形圈密封环（46*3）
7、转向泵总成
8、安装孔绝缘套
9、六角法兰面螺栓M8x35（对边10）

图为转向油泵结构图

Figure shows the structure of the steering oil pump

拆卸检测所需工具如下：①数字万用表　　②13mm 套筒扭力扳手　　③10mm 内六角扳手

The tools needed for disassembly and inspection are as follows: ① Digital multimeter ②13mm socket torque wrench ③10mm Allen wrench



6.2 电动转向系统定期检查项目

Regular inspection items for the electric steering system

检查项目	检 查 处 理 步 骤	
助力转向电机油泵	检查外观	总成外部是否有灰尘，处理方法：清除灰尘
	助力转向接插件	端子损坏、松动、变形、存在拉电弧迹象，处理方法：更换接插件
	检查液压油	液压油面是否在规定刻度范围内，新车行驶2500公里更换一次液压油并清洗油路，以后每2万公里更换一次液压油并清洗油路。
	助力转向电机油泵油路检测	高压油管损坏，有渗漏，处理方法：紧固油管接头或更换油管
	助力转向电机油泵支架	支架螺栓松动、损坏、变形、断裂、结构损坏，处理方法：紧固支架螺丝或更换支架
助力转向电机控制器	检查外观	用风枪、毛刷对控制器外表，尤其散热器、电线插头进行清洁（不要拔出电线插头），保证电控装置清洁干燥。
		检查电线插头的固定情况，确保插件无松动、污物等。

电机无法启动	蓄电池故障	检查高压、低压蓄电池是否损坏
	电机是否烧坏	检查电机UVW三相线电阻
		检查电机单相与机壳间的电阻
	温度传感器线折断	检查温控传感器线束
	电机没有高压输入	检查电机与控制器间接插件是否出现脱针现象，高压线是否出现断路现象
转向沉重	电机反转	检查接线或程序，修正转向
	（如一边重一边轻）方向机故障	详见方向机维修手册
	阻尼孔被堵塞	清洗排除脏污脏物
	流量旁通路拐压，压力上不来	检查油路是否被拐，检查压力油是否从执行件旁路流出

故障类型	产生原因	排 除 方 法
转向泵异响	滤芯器堵塞，吸油不畅	检查滤芯器是否堵塞，若堵塞则予以修复或更换滤芯
	油液粘度大	使用推荐粘度的油液
	转向泵进油管有气体进入	检查进油管连接部分是否有漏气或较大弯折处，若有则予以修复
	进油管太细太长，弯折过多	加粗、缩短油管，重新调整进油管走向
	电机与控制器参数不匹配	核实控制器参数

转向系统使用注意事项

一、方向盘不得长时间打死；

二、待电动转向泵正常运行后再打方向；

三、急转弯、原地转向等将方向盘打到极限，应马上把方向盘回退一些（不会影 响转弯角度），避免方向盘极限位置打死；

四、冬季注意更换低温抗磨液压油（ -10 度以下建议使用冬季液压油（昆仑天润 ATFIII 汽车自动传动液；壳牌施倍力 S3 ATFIII 自动变速箱油以及 CastrolDEXRON-III 自动变速箱油）。

五、不得使用机油做为液力传动介质，若汽车原车使用机油建议立即换为液压油。

Steering system usage precautions

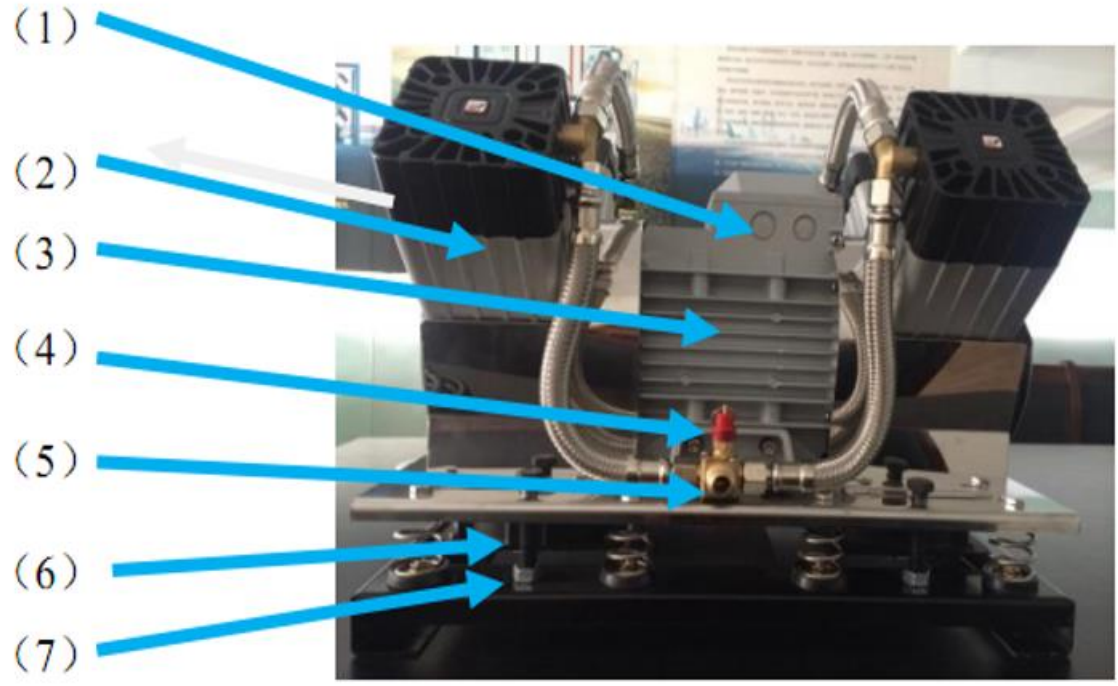
1. Do not turn the steering wheel for a long time;

2. Wait until the electric steering pump is working properly before turning the steering wheel;

3. For sharp turns, in-place turns, etc., when the steering wheel is turned to the limit, immediately pull the steering wheel back a little (it won't affect the turning Angle) to avoid turning the steering wheel to the limit position.

4. In winter, pay attention to replacing the low-temperature anti-wear hydraulic oil. (Below -10 degrees, it is recommended to use winter hydraulic oil (Kunlun Tianrun ATFIII automotive automatic transmission fluid).) Shell SBLi S3 ATFIII automatic transmission fluid and CastrolDEXRON-III automatic transmission fluid).

5. Do not use engine oil as the hydraulic transmission medium. If the vehicle originally uses engine oil, it is recommended to immediately switch to hydraulic oil.



（1）接线盒（2）空气压缩机构（3）电机（IP67）（4）安全阀
（5）排气三通（R1/2）（6）可拆卸风机（IP67）(7)底座

The picture shows a schematic diagram of the structure of the air compressor

七．空气压缩机维护保养

Examples of air compressor inspection and arrangement

图为空气压缩机的结构示意图

7.1 空气压缩机检查及排故事例

1.保持机器的清洁

2 .储气罐的排水阀每日打开一次排除污水。在湿气较重的地方，请每四小时打开一次。

3.空气滤清器约 90 天清洗或更换（滤芯为易损件），可视环境不同酌情增

减保养时间；

4.每 90 天检查主要零部件紧固情况，对重要螺栓、螺母拧紧情况予以确

认，需要时按规定复紧；

5.使用 5000 小时（或两年）后将排气阀拆出来清洗（排气阀拆出来清洗后，阀板密封圈需重新更换）

6.每年应将机器各部清洗一次

1 Keep the machine clean

2 Open the drain valve of the gas storage tank once a day to drain the sewage. In areas with high humidity, open it every four hours.

3 Clean or replace the air filter approximately every 90 days (the filter element is a consumable part), and increase as needed depending on the environment

Reduce maintenance time;

4 Check the fastening of major components every 90 days and ensure that important bolts and nuts are tightened

Check and retighten as prescribed if necessary;

5. Remove the exhaust valve for cleaning after 5000 hours (or 2 years) of use (after removing the exhaust valve for cleaning, the valve plate seal ring needs to be replaced)

6. The machine should be cleaned once a year

故障现象	造成原因	排除方法
电机不能转动、转动缓慢或电机过热	电机转动缓慢	检查线路
	电源线过细过长	更换电源线
	开关故障	修理或更换
	电机故障	修理或更换
	主机咬死	检查并修理
主机咬死	运动部件损坏或被异物卡住	检查曲轴、轴承、连杆、活塞、活塞环等，必要时更换
振动剧烈或有异常响声	连接部件松动	检查并紧固
	异物落入主机内	检查并清除
	活塞顶缸	加纸垫
	运动部件磨损严重	修理或更换
气压不足或排气量减少	电机转动缓慢	检查并排除
	空气滤清器堵塞	清洗或更换滤芯
	安全阀漏气	调整或清除杂质、更换阀片
	排气管路泄漏	检查并修理
	密封圈破损	检查并更换
	阀片损坏或卡住	更换或清除
	活塞环、气缸磨损或损坏	修理或更换
空压机振动激烈	偏心轮轴弯曲	送专业维修部修理
风机故障	叶片损坏	检查并更换
	风机马达故障	检查并更换

八．多合一控制器（PDU）All-in-one controller (PDU)

8.1 多合一控制器 All-in-One Controller

四合一辅助动力控制器是由一路 DCDC、两路 DCAC 和高压配电箱组合而成，其中 DCDC 将动力电池高压变换为低压，为车辆 24V 低压蓄电池供电；

DCAC 将高压蓄电池直流电转换为三相交流电，以控制电动空压机和转向油泵电机，保持整车气压和方向助力功能正常使用；

高压配电箱为新能源车辆动力电源的控制部件，具有电力分配、电流测量、短路保护、充放电控制、预充电、手动急停和绝缘检测端口等功能。

The four-in-one auxiliary power controller is composed of one DCDC, two DCAC and a high voltage distribution box, among which the DCDC converts the high voltage of the power battery to low voltage to supply power to the vehicle's 24V low voltage battery;

The DCAC converts the direct current from the high-voltage battery into three-phase alternating current to control the electric air compressor and the steering oil pump motor, maintaining the normal operation of the vehicle's air pressure and steering assist functions.

The high-voltage distribution box is a control component for the power supply of the new energy vehicle, with functions such as power distribution, current measurement, short-circuit protection, charge and discharge control, pre-charging, manual emergency stop and insulation detection ports.


Tyco Electronics
350A
Bussmann
170M3418
350A 690V~ IEC
700V~ UL
ASSEMBLY IS NOT SERVICEABLE
DISCARD ENTIRE ASSEMBLY WHEN FUSE IS BLOWN



主要输入输出：

Main input/output:

①输入

a)正、负极输入端分别配备直流高压接触器，快速熔断器。

b)车载直流充电口

②4 路输出

a)电机控制器，配备快速熔断器;

b)辅机系统（电动助力转向泵、电动空气压缩机、DCDC、电动空调、高压电除霜）分别配备快速熔断器;

① Input

a) The positive and negative input terminals are respectively equipped with DC high voltage contactors and fast fuses.

b) On-board DC charging port

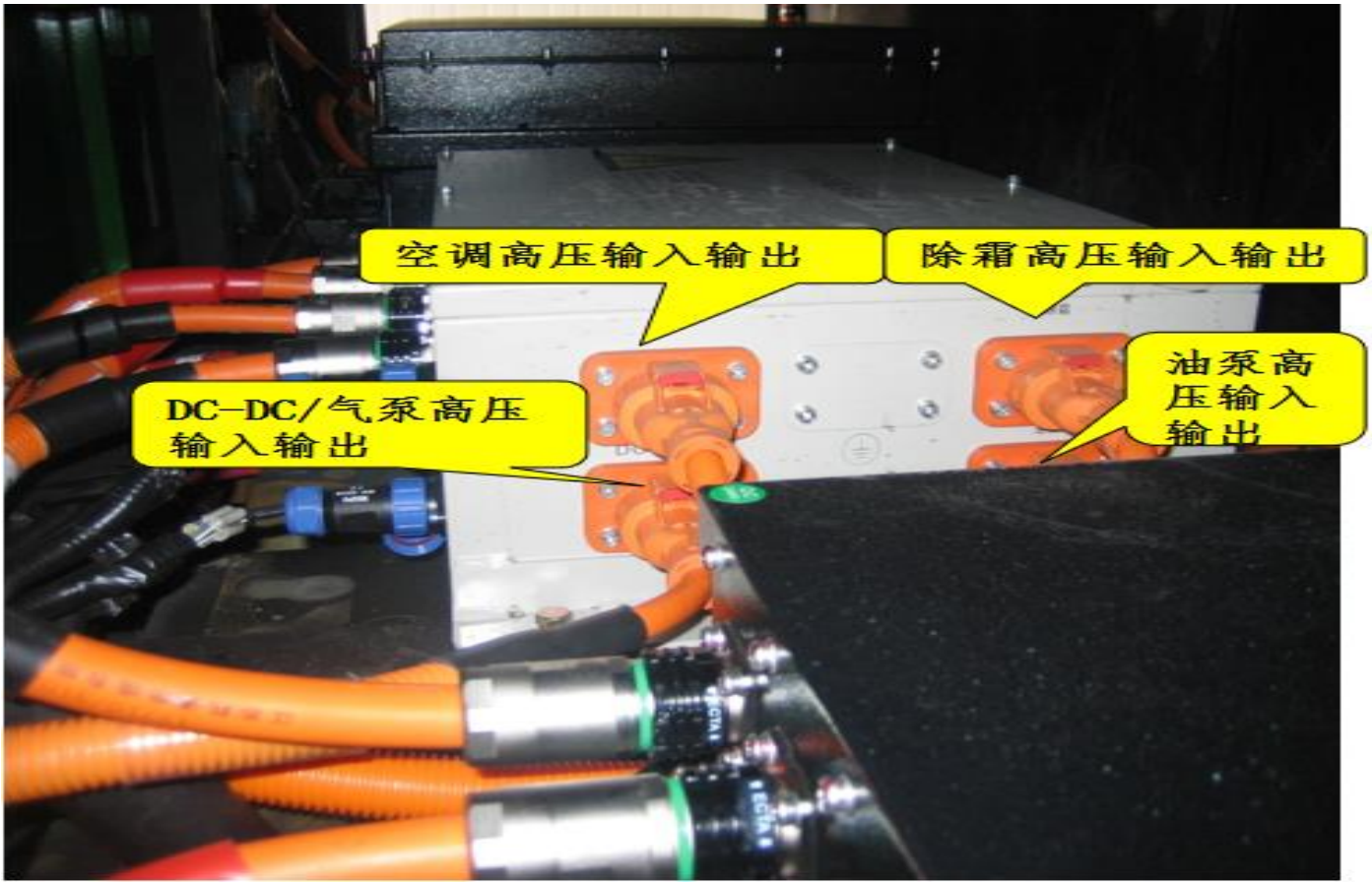
② Four output channels

a) Motor controller with fast fuses;

b) The auxiliary systems (electric power steering pump, electric air compressor, DCDC, electric air conditioning, high voltage defrosting) are respectively equipped with fast fuses;

手动维修开关（MSD）:维修使用，一般配备 350A 熔断器

Manual maintenance switch (MSD) : For maintenance use, generally equipped with 350A fues


空调高压输入输出
除霜高压输入输出
DC-DC/气泵高压输入输出
油泵高压输入输出

绝缘监测模块

作用：监测高压直流母线与车辆电底盘之间的绝缘电阻，并将绝缘阻值发送到整车控制器，整车控制器检测到绝缘阻值低于设定值时，报绝缘故障。

高压互锁检测

作用：如果有接插件没有连接或者连接不紧密，高压继电器无法闭合，整车无法上高压电，以防止由于接插件连接不紧密产生高压电弧损坏接插件甚至威胁整车安全。

Insulation monitoring module

Function: Monitor the insulation resistance between the high-voltage DC bus and the vehicle chassis, and send the insulation resistance value to the vehicle controller. When the vehicle controller detects that the insulation resistance value is lower than the set value, it reports an insulation fault.

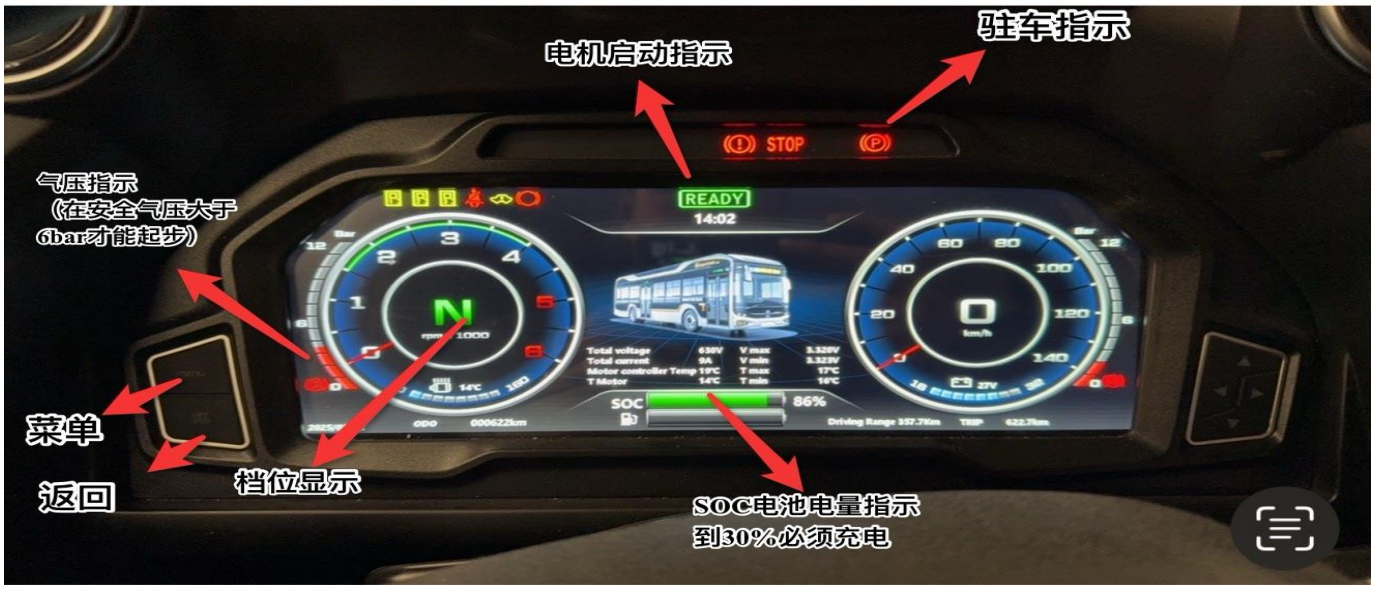
High voltage interlock detection

Function: If a connector is not connected or is not tightly connected, the high voltage relay cannot close, and the whole vehicle cannot receive high voltage electricity, to prevent high voltage arc caused by loose connector connection from damaging the connector or even threatening the safety of the whole vehicle.









图为汽车仪表信息

Picture shows information on the instrument panel of a car

8.2 DCDC 故障报警和对策

类型	故障原因	对策
输入过压	动力电池电压过高，电压检测电路异常	检查电池电压，寻求支援
输入欠压	动力电池电压过低，电压检测电路异常	检查电池电压，寻求支援
输出过压	辅助电池电压过高，输出电压检测电路异常	检查电池电压，寻求支援
输出欠压	电池和转换器输出未连接，输出电压检测电路异常，电池馈电严重	连接电池和转换器，寻求支援，使用外部电池搭接
硬件故障	功率模块损坏，外部干扰	寻求支援
过温故障	温度检测电异常	寻求支援
过载保护	电池馈电严重，充电电流过大，电流检测电路异常	使用外部电池搭接，寻求支援
过流保护	电池馈电严重，充电电流过大，电流检测电路异常，转换器输出端短路	使用外部电池搭接，寻求支援，检查输出线

8.3 DCAC 故障报警异常情况的处理方法

Handling Methods for Abnormal Situations of DCAC Fault alarm

DCAC 在运行中进行自监视。若出现故障，DCAC 会将故障通过 CAN 上报给整车控制器，并关断 DCAC 输出，使停止工作。

在使用过程中可能遇到以下若干异常情况，请按以下步骤做简单的分析：

上电无显示

1.用万用表检查 DCAC 的输入电源是否和 DCAC 的额定电压一致。

2.用万用表检查 DCAC 母线电压，判断三相整流是否完好。

3.检查 CHARGE 灯是否点亮。

如果以上均正常，故障可能在开关电源部分。请寻求服务。

The DCAC conducts self-monitoring while in operation. In the event of a failure, the DCAC will report the failure to the vehicle controller via CAN and shut down the DCAC output to stop working.

The following several anomalies may occur during use, please follow the steps below for a simple analysis:

No display when powered on

1 Use a multimeter to check if the input power of the DCAC matches the rated voltage of the DCAC.

2 Check the DCAC bus voltage with a multimeter to determine if the three-phase rectification is in good condition.

3 Check if the CHARGE light is on.

If all of the above are normal, the problem may be in the switching power supply section. Ask for service.

九．纯电客车维护保养规定

会将纯电客车（日常维护、一级维护、二级维护、重点维护）进行汇总除纯电动系统外的其他维护项目参照常规车辆执行 Maintenance regulations for pure electric passenger vehicles

The pure electric bus (daily maintenance, first-level maintenance, second-level maintenance, key maintenance) will be summarized. Other maintenance items except for the pure electric system will be carried out in accordance with the regular vehicle

9.1 日常维护 Routine Maintenance

每日由驾驶员在出车前、行车中、收车后执行

Daily maintenance shall be carried out by the driver before departure, during driving, and after returning the vehicle

序号	维护项目	作业内容	技术要求
1	清洁	清洁纯电动各部件	驱动电机、电机控制柜、高压控制柜、空调压缩机、电动真空泵、电动液力转向泵等不能有水、有灰尘
2	检查	检查纯电动高压线路	1）高压线端子不露铜、不松脱、不磨蹭 2）电池桩头密封良好
		电机水冷系统检查	1）检查水箱是否充满，不足添加。 2）检查管路无弯曲、折叠、漏水现象
		动力电池	1)箱体固定可靠，箱体表面无明显灰尘、锈蚀、变形；电池通风管无凹瘪、破损、固定不牢现象 2)电池仓内干燥、清洁 3)各箱体高低压线连接正常，固定可靠，无松动现象
		检查驱动电机、电动泵电机、电动液力转向泵电机	1）电机无异响、无故障 2）检查转向泵无漏油
		检查仪表、档位操纵面板	显示正常、无故障显示

9.2 一级维护

Level 1 Maintenance

一级维护每间隔 3000 - 5000km，由经过培训的专业维修人员作业，新车纯电动系统走合维护作业内容与一级维护作业内容相同。

First-level maintenance is carried out by trained professional maintenance personnel at intervals of 3000-5000km. The running-in maintenance of the new vehicle's all-electric system is the same as that of first-level maintenance.

序号	维护项目	作业内容	技术要求
1	日常维护	所有日常维护项目	符合维护作业要求
2	保险、熔断器	检视、紧固	接线牢固、不松动
3	高压柜	检视、紧固	1）高压柜固定牢固、不松动 2）用吸尘器除尘，保持干燥、干净
4	驱动电机控制器	1）检查接线情况 2）检视、清洁 3）电机控制器壳体接地检测 4）检查低压插接口 5）电机冷却水管	1）接线牢固、不松动 2）用吸尘器除尘，保持干燥、干净 3）电机控制器壳体与车体之间的电阻，应小于 0.01Ω 4）低压插接口插接牢固、无端子松动 5）电机冷却水管无老化、变形、渗漏
5	驱动电机	1）检查 U、V、W 端子接线、与屏蔽层接地情况 2）检视电机输入线及接线盒 3）检查清洁驱动电机表面灰尘情况 4）检查低压插接口 5）检查驱动电机工作情况	1）U、V、W 端子接线牢固、无松动，线电阻近似相等；检查屏蔽层接地电阻小于 0.01Ω 2）输入电线的绝缘层无破损，接线盒完好 3）驱动电机表面去尘（用吸尘器吸），保持干燥、干净，散热筋的沟槽内无异物 4）低压插接口无破损，旋变线接线、高温传感

序号	维护项目	作业内容	技术要求
			器线固定可靠，有效 5）试车，电机工作时无异响
6	DC/DC、DC/AC	1）视检各接线桩 2）检视、清洁 3）检查输出电压	1）要求各接线桩头不松动、不允许裸露 2、用吸尘器去尘，保持干燥、干净 3）输出电压符合要求
7	锂电池组	1）视检各接线桩 2）视检保护罩 3）检视、清洁 4）电池支架	1）要求各接线桩头不允许裸露 2）线束自带保护罩应安装到位 3）用吸尘器去尘，保持干燥、干净 4）支架无松动变形
8	电机水冷系统	1）管路 2）水泵 3）冷却水箱	1）管路无老化、变形、渗漏 2）水泵工作正常 3）水箱表面清洁、无损伤、无渗漏，风扇工作正常
9	真空泵电机、液力转向泵电机	检查电动真空泵电机、电动液力转向泵电机	1）电机无异响、无故障 2）检查转向泵无漏油、管路未老化
10	绝缘检查	电池、驱动电机、空调压缩机、DC/DC、、DA/AC、暖风、除霜高压线	高压线与地之间电阻大于 2MΩ
11	减速机构	1）检查油位 2）检查无渗漏油现象	1）检查油位，不足添加（75W-80 齿轮油） 2）检查无渗漏油现象

9.3 二级维护

Secondary Maintenance

二级维护每间隔 8000-12000km，由经过培训的专业维修人员作业。

Secondary maintenance is carried out by trained professional maintenance personnel at intervals of 8,000-12,000 km.

序号	维护项目	作业内容	技术要求
1	一级维护项目	所有一级维护项目	符合维护作业要求
2	高压柜	1）检查、复紧 2）清除接线柱氧化层 3）测量接线柱间电压 4）检测维修开关、熔断器及断路器	1）接线桩铜排的连接链栓紧固无松动 2）检查、清除接线桩表面的氧化 3）测量高压线电压正常 4）维修开关可正常断开、熔断器无高温变色，断路器工作正常；
3	锂电池	1）检查高压插件 2）检查单体电池电压	1）锂电池各高压航空插件插接到位、不松动 2）用专业仪器测单体电池电压压差不超 80mv
4	驱动电机控制器	1）检查、复紧接线端子螺栓 2）清除灰尘 3）测量电压 4）检查低压插件	1）接线桩连接链栓紧固无松动。 2）清除接线桩表面的氧化。用吸尘器去尘，保持干燥、干净 3）测量 U、V、W 三相电压正常；接地完好 4）电机与控制器低压接插件接触良好
5	驱动电机	1）检查、紧固 U、V、W 端子 2）清除接线柱氧化层 3）清洁 4）位置、温度传感器电阻值与绝缘电阻值	1）检查 U、V、W 端子，紧固无松动，输入电线绝缘层无破损，接线盒完好 2）检查、清除接线桩表面的氧化 3）驱动电机表面用干布去尘或用吸尘器吸住，保持干燥、干净，散热筋的沟槽内无异物

序号	维护项目	作业内容	技术要求
			4）各传感器阻值正常，各信号线的绝缘电阻应大于 100kΩ
6	转向泵、打气泵电机	1）检查高低压线绝缘 2）紧固电机接线盒内三相线螺栓	1）兆欧表测量三相线与电机壳体绝缘电阻应大于 20MΩ 2）各信号线的绝缘电阻应大于 100KΩ 3）检查、紧固电机接线盒内三相线螺栓
7	电动打气泵总成	1）更换空滤滤芯 2）清洁、更换回油阀滤芯 3）更换润滑油 4）更换油气分芯	1）根据实际运营情况，更换空气滤芯（一般每 3 个月更换） 2）每 6 个月，清洁回油阀滤芯 3）每 12 个月换油，并更换回油阀滤芯，油品为：Rotoroil 8000F2 合成油 4）每 24 个月，更换油气分芯
8	减速机构	检查润滑油液位，视情况更换润滑油	每6.5万km或2年更换减速箱润滑油，以先到达的期限为准（减速箱推荐采用75W-80齿轮油，油量约2.9L）
9	电机冷却系统	检查电机冷却系统	1）检查、清洁水垢 2）必要时更换冷却液（一般 2 年更换一次）

9.4 重点维护

Key Maintenance

重点维护是纯电动系统特有的一个保养里程，一般每 10~15 万公里需对驱动电机和电池等进行维护检查。

Key maintenance is a maintenance mileage specific to the pure electric system. Generally, every 100,000 to 150,000 kilometers, the drive motor, battery, etc. need to be maintained and inspected.

序号	维护项目	作业内容	技术要求
1	驱动电机	1）拆下电机 2）清洁 3）检查线圈绕组 4）电机轴	1）确保电机无损伤 2）清除电机壳体内、外表面油污、保持线圈干燥 3）定子线圈绝缘电阻大于 20MΩ。输入线绝缘层无破损、接线盒完好 4）电机轴无变形、磨损 （东风电机：每 15 万公里或 2 年更换电机轴承；西门子电机：轴承替换周期为 20000 小时，或 5 年）
2	锂电池	1）检查电池箱 2）检查电池箱绝缘 3）检查单体电池电压 4）检查电池箱内部状况	1）检查电池箱底部是否有电解液、积水等异常情况 2）电池箱绝缘电阻大于 20MΩ 3）单体电池电压压差不超 80mv 4）电池内部无腐蚀、杂物、连接松动、电解液泄漏等现象；各电芯外观，无损坏、漏液、严重变形等现象

十．纯电车操作安全注意事项

Safety precautions for operating pure electric vehicles

1.在使用和维护修理过程中请按照高压直流电源操作规定着装，并做好人身防护。如需直接处理电池，请双手戴绝缘橡胶手套操作。

2. 搬运时不要刺穿或碰撞电源系统产品，也不可将其暴露在明火下或焚烧，发生火灾时禁止用水对其灭火，必须使用干粉灭火器对其灭火。

3.为避免伤害、烧伤或电击，应使儿童远离电源系统。

4.在接触电池或电源系统之前，请取下身上的手表、戒指等易于裸露在外的金属件。

5.为防止静电堆积，维修人员在对电池进行操作之前应当先接触大型接地金属件。

6.维修保养过程中需要登高时应注意安全，防止人员摔倒或电池跌落。

7.在连接高压动力线时，请使用绝缘工具和适当的绝缘材料。

8.切勿将工具或金属部件放置在电池顶端。

9.装配过程中应注意不得用手或其他金属物品同时接触电池组的正负端子，以免发生触电或短路。

10.禁止踩踏、坐卧在电源系统上。

11.不得将电源系统正负极反接，否则会造成反向充电，造成电池漏液、发热、破裂。

12.不要以任何方式打开或改装电池。电池里流出的电解液可能会损害皮肤和眼睛。如发生电解液伤害，请及时使用大量清水反复冲洗，严重时请及时到医院处理。

13. 严禁擅自改装电源系统。在电源系统中，为防止发生危险，装有保护系统，若保护系统遭到损坏，可能导致充电无法控制，或者充放电电流超过设定边界值，从而造成电池漏液、发热、破裂。

14. 充放电时严禁有任何物品覆盖在电源系统产品的进风口和出风口上，否则会使产生的热量积累，电池发生性能下降、漏液等情况

15.避免对电源产品长时间过度充电，否则会造成电池漏液、发热、破裂。

1. Dress according to the operating regulations for high voltage DC power supply during use and maintenance and repair, and take personal protective measures. If you need to handle the battery directly, wear insulating rubber gloves on both hands.

2. When handling, do not Pierce or bump the power system product, nor expose it to open flames or burn it. In case of fire, do not use water to extinguish it; use a dry powder fire extinguisher instead.

3 Keep children away from power systems to avoid injury, burns or electric shock.

4 Remove easily exposed metal items such as watches and rings from your body before touching batteries or power systems.

5. To prevent the accumulation of static electricity, maintenance personnel should touch large grounding metal before operating on the battery.

6. Pay attention to safety when climbing during maintenance to prevent people from falling or the battery from dropping.

7. When connecting high-voltage power lines, use insulating tools and appropriate insulating materials.

8. Do not place tools or metal parts on top of the battery.

9. During assembly, be careful not to touch the positive and negative terminals of the battery pack with your hands or other metal objects at the same time to avoid electric shock or short circuit.

10. Do not step on or sit on the power system.

11. Do not reverse the positive and negative terminals of the power system, otherwise it will cause reverse charging, resulting in leakage, overheating and breakage of the battery.

12. Do not open or modify the battery in any way. Electrolyte flowing out of the battery can damage skin and eyes. If electrolyte damage occurs, rinse repeatedly with plenty of water immediately, and seek medical attention promptly if it is severe.

13. - It is strictly forbidden to modify the power system without authorization. In the power supply system, a protection system is installed to prevent danger. If the protection system is damaged, it may cause the charging to be uncontrollable or the charging and discharging current to exceed the set boundary value, resulting in battery leakage, overheating and breakage.

14. During charging and discharging, it is strictly prohibited for any items to cover the air inlet and outlet of the power system products. Otherwise, the generated heat will accumulate, and the battery may experience performance degradation, leakage, and other issues

15. Avoid overcharging the power supply product for a long time, otherwise it will cause the battery to leak, heat up and break.