



东风乘用车

动力电池充电系统



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Traction Battery Charging System



- 1、熟悉E70动力电池充电系统的功用
- 2、熟悉E70动力电池充电系统的工作原理
- 3、能对E70动力电池充电系统进行故障诊断与排除
- 4、掌握E70动力电池充电系统相关部件的拆装更换方法及维修注意事项





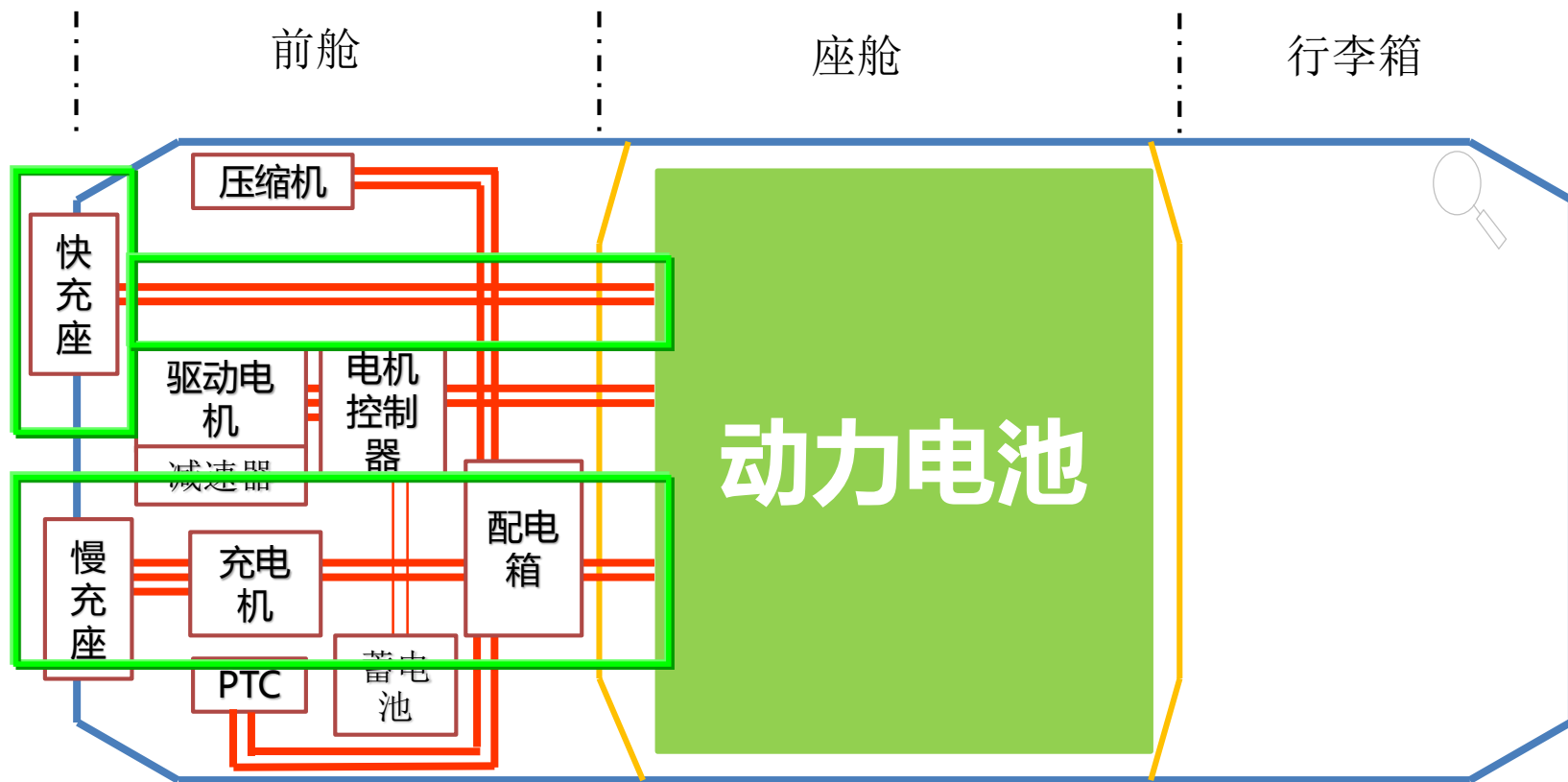
1. Familiar with the functions of the E70 traction battery charging system
2. Familiar with the working principle of the E70 traction battery charging system
3. Troubleshoot the E70 traction battery charging system
4. Master the removal and refitting and replacement methods and service precautions of the E70 traction battery charging system

一、E70动力电池充电系统概述



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E70动力电池充电系统作用是给动力电池提供电能补给，分为交流慢充和直流快充两种充电模式

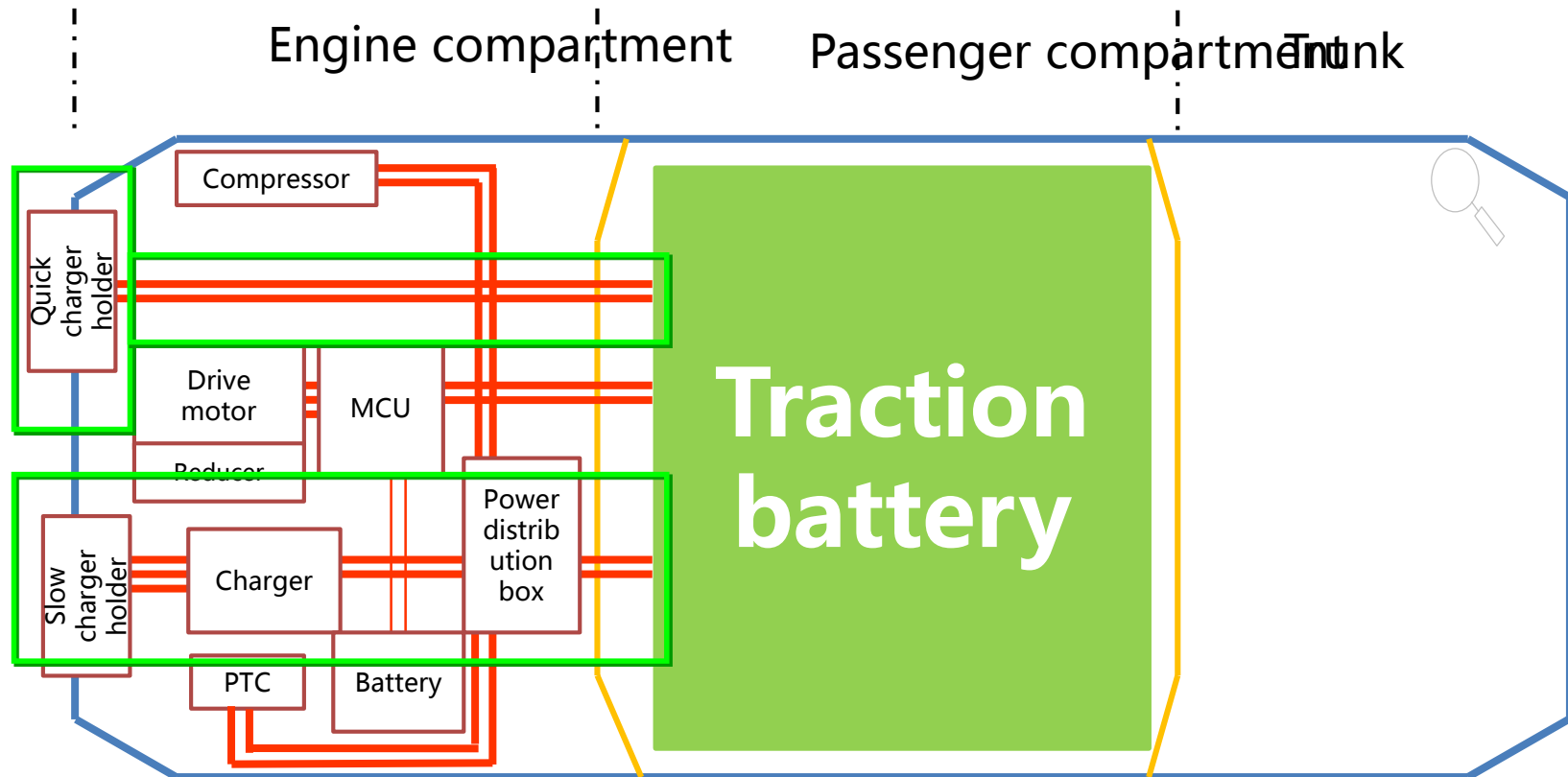


I. Overview of E70 traction battery charging system



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E70 traction battery charging system aims to provide power to the traction battery, and works in **AC charging** mode and **DC fast charging** mode.



一、E70动力电池充电系统概述



E70两种充电模式的特点

项目	慢充	快充
充电电源	交流220V	直流268.8~408V
充电时间	6-8h （ 0-100% ）	0.5h （ 0%-80% ）
充电温度范围	-20-55℃	


0℃以下充电时，充电电流较小，会导致充电时间延长

I. Overview of E70 traction battery charging system



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Features of two charging modes of E70

Items	Slow charging	Quick charging
Charging power	AC 220V	DC 268.8~408V 
Charging time	6-8h (0-100%)	0.5H (0%-80%)
Charging temperature range	-20-55°C	

The current for charging below 0°C is small, which will lead to longer charging time.

一、E70动力电池充电系统概述



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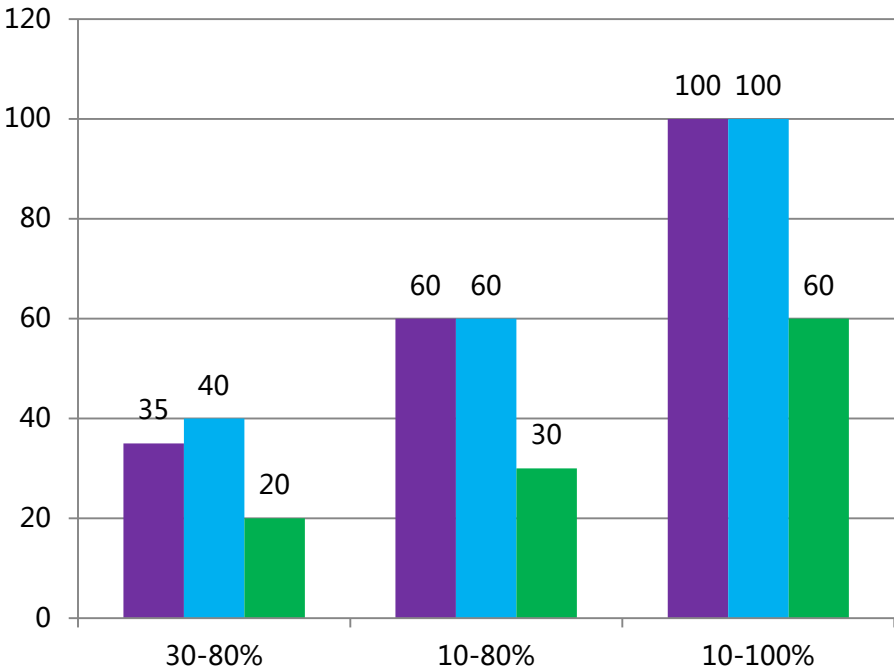
30%→80%SOC快充时间**20min**，领先同级别所有竞品

环境温度37℃，完成两台ET样车快充能力验证

10%→80%SOC快充时间30min，10%→100%快充时间

60min，处于行业领先水平

时间 (min)



充电进度

ET-7# @37℃	时间 (min)	SOC (%)	功率 (kw)	电池温度 (℃)
	0	9	67.5	36
	5	21	69.8	38
	9	30	70.4	38
	14	41	71.2	39
	18	50	72	41
	23	61	73.7	42
	28	71	75.6	43
	32	80	77.6	44
	47	90	19.3	38
ET-12# @37℃	63	99	18.4	35
	时间 (min)	SOC (%)	功率 (kw)	电池温度 (℃)
	0	14	68.5	34
	3	21	69.7	37
	7	30	70.4	38
	12	41	71.2	39
	17	51	72.2	41
	21	60	73.5	42
	26	71	75.5	43
	31	81	18.6	43
ET-12# @37℃	46	90	19.3	37
	61	99	19.4	35

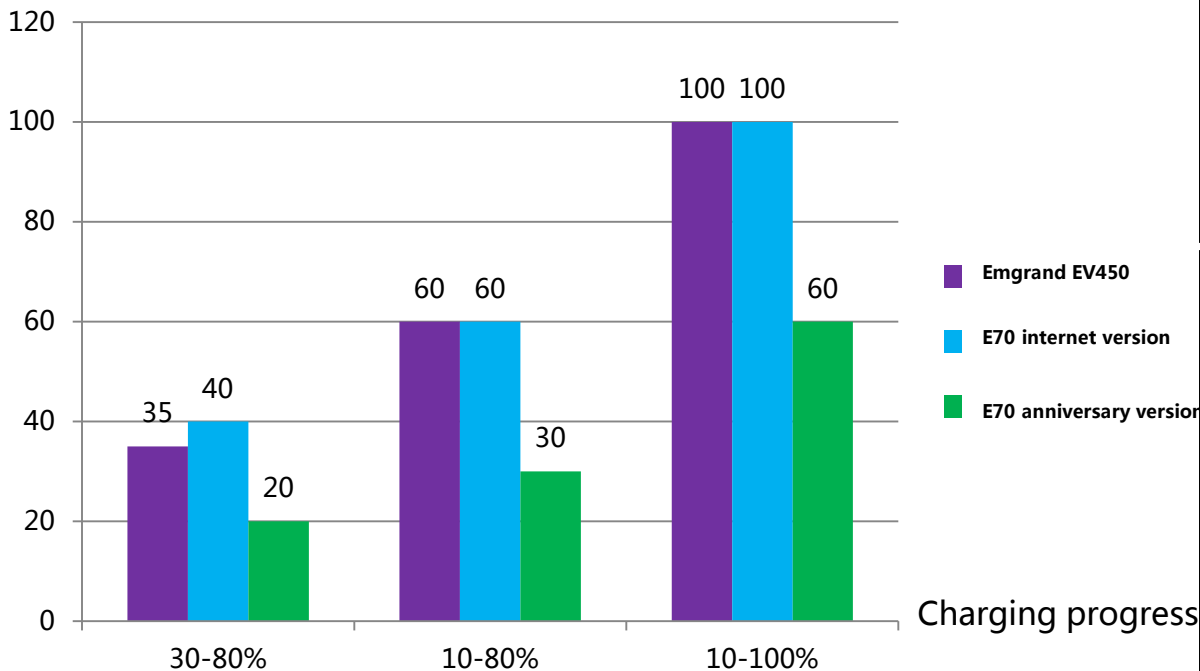
I. Overview of E70 traction battery charging system



30%→80% SOC quick charging time of 20 min leads all competitors in the same level.

The ambient temperature is 37 ° C, and the quick charging verification of two ET prototype vehicles is completed.
10%→80% SOC quick charging time of 30 min, 10%→100% quick charging time of 60 min, in the industry leading level

Time (min)



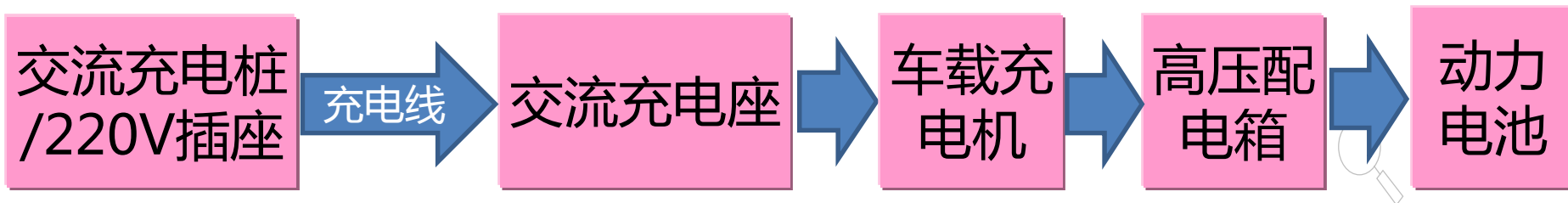
ET-7# @37°C	Time (min)	SOC (%)	Power (kw)	Battery temperature (°C)
	0	9	67.5	36
	5	21	69.8	38
	9	30	70.4	38
	14	41	71.2	39
	18	50	72	41
	23	61	73.7	42
	28	71	75.6	43
	32	80	77.6	44
	47	90	19.3	38
ET-12# @37°C	63	99	18.4	35
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	31	81	18.6	43
Charging progress	46	90	19.3	37
	61	99	19.4	35



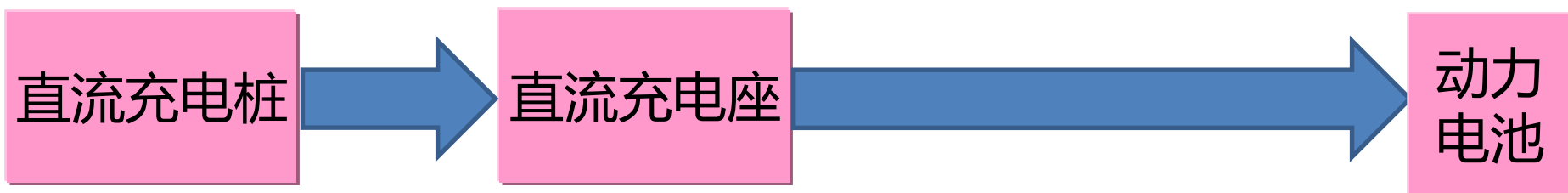
一、E70动力电池充电系统概述

E70两种充电模式的电能传递路线

慢充



快充



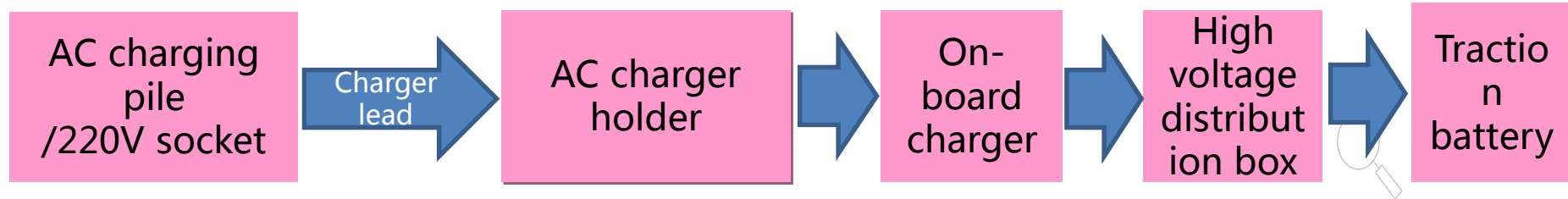
I. Overview of E70 traction battery charging system



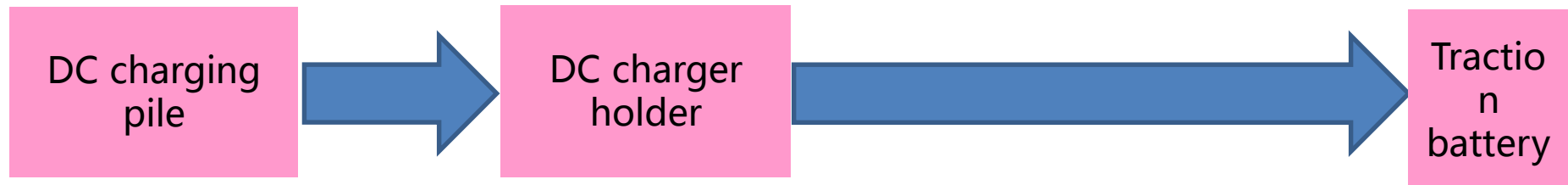
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Power transmission route in two charging modes of E70

Slow charging



Quick charging



一、E70动力电池充电系统概述



充电电源

充电桩是取得电力能量的来源，目前有交流充电桩和直流充电桩两种，另外E70可使用便携慢充线（缆上控制盒）来进行慢充，直接连接220V交流电源即可进行充电。



外连接线

交流充电桩



缆上控制盒

便携慢充线



自带连接线

直流充电桩

I. Overview of E70 traction battery charging system



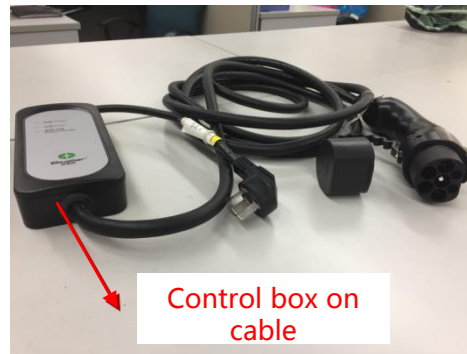
Charging power

The charging pile is the source of electric energy. Currently, AC charging piles and DC charging piles are designed. In addition, the E70 can use the slow charger lead (in-cable control box) for slow charging, and can be directly connected to the 220V AC power supply for charging.



External
connecting cable

AC charging pile



Control box on
cable

Portable slow charger lead



Attached
connecting cable

DC charging pile

一、E70动力电池充电系统概述



充电座

充电座与车载充电机或动力电池连接，起到连接媒介的作用，车上有慢充和快充两个充电座。



慢充座



快充座

I. Overview of E70 traction battery charging system



Charger holder

The charger holder is connected with the on-board charger or the traction battery, and functions as a connection medium. The vehicle has two charger holders: a slow charger holder and a quick charger holder.



Slow charger holder



Quick charger holder

一、E70动力电池充电系统概述



慢充座锁止功能

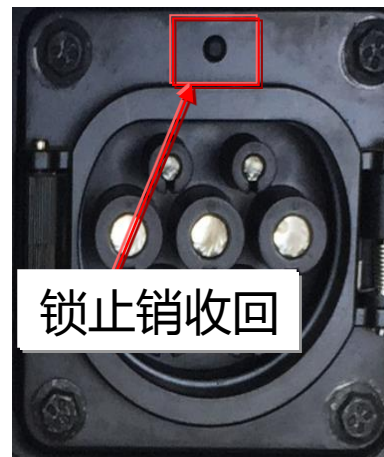
为防止随车的交流充电线被盗走，E70的慢充座具备充电线锁止功能，该功能在充电线被插入时自动启用（通过一个锁止电机带动锁止销实现），通过仪表台主驾驶电子按钮或前舱机械解锁拉环可解除锁止，**当锁止电机损坏时，可能会导致慢充无法进行。**



锁止状态



锁止电机



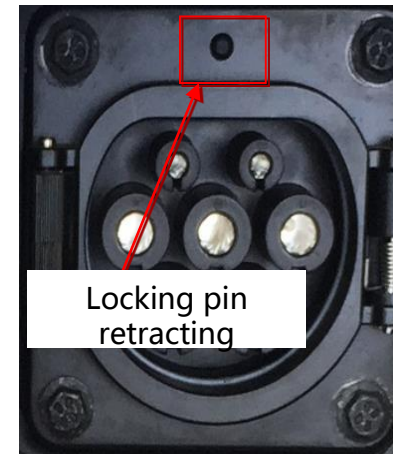
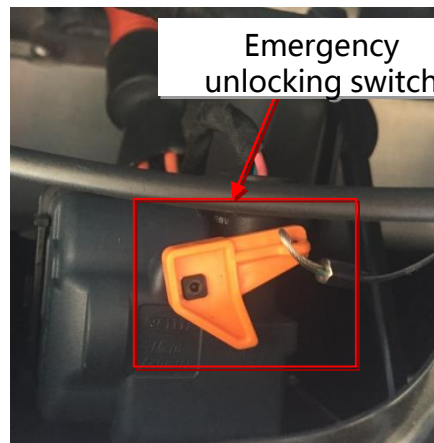
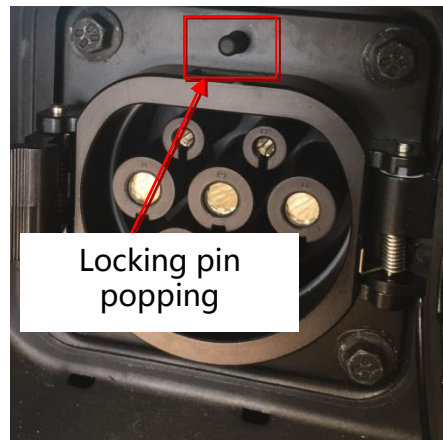
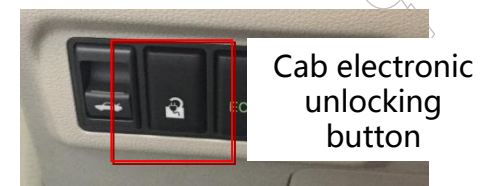
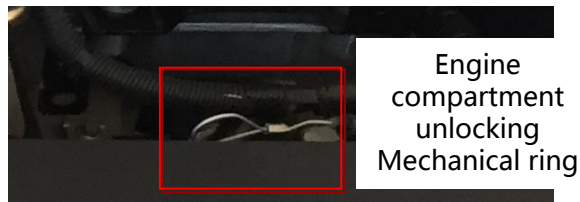
解除状态

I. Overview of E70 traction battery charging system



Locking function of slow charger holder

In order to prevent the AC charger lead of the vehicle from being stolen, the slow charger holder of E70 has a charger lead locking function, which is automatically activated (by a locking motor to drive the locking pin) when the charger lead is inserted, and can be released through the driver's electronic button on the instrument panel or the engine compartment mechanical unlocking ring. **When the locking motor is damaged, slow charging may not be performed.**



Locking status

Locking motor

Released status

一、E70动力电池充电系统概述



充电线路温度监控功能

在高低压充电座端子上布置有温度传感器，快充的正负极端子上各一个，慢充的火线和零线端子上各一个，当快充充电线温度达到80度时，充电电流减半。充电口温度达到100度时，充电自动停止。

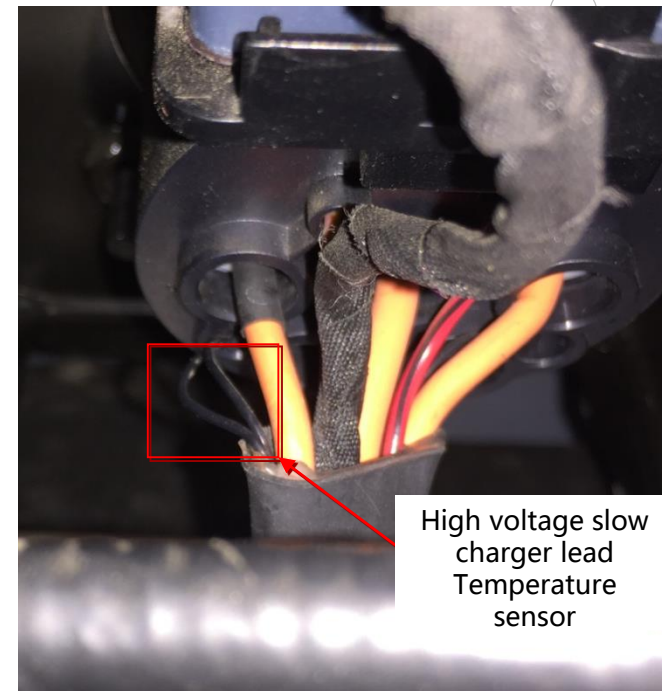
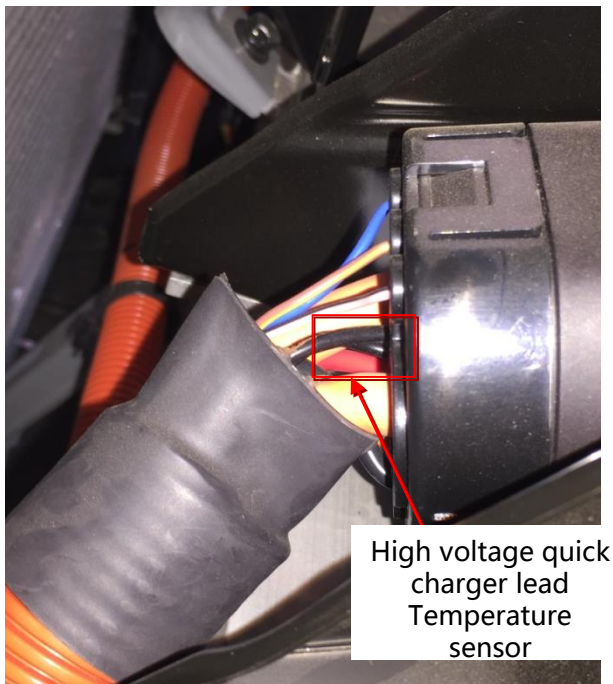


I. Overview of E70 traction battery charging system



Temperature monitoring function of charger lead

Temperature sensors are arranged on the high and low voltage charger holder terminals, with one temperature sensor on each of the positive and negative terminals of the quick charger holder, one on the live line terminal and neutral line terminal respectively of slow charger holder, and the charging current will be halved when the temperature of the quick charger lead reaches 80°C. When the charging port temperature reaches 100°C, the charging will stop automatically.

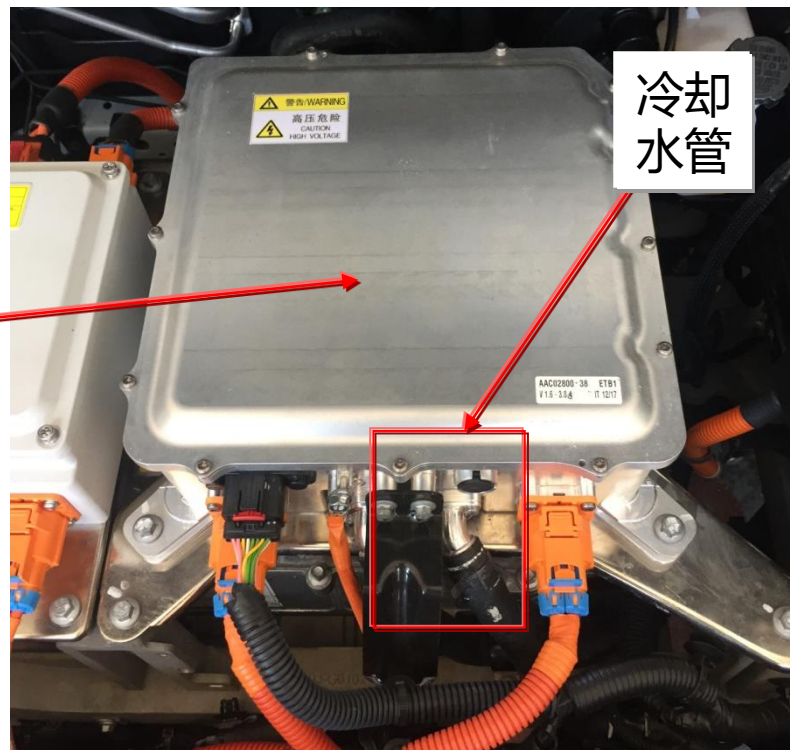


一、E70动力电池充电系统概述



车载充电机（慢充）

车载充电机主要起到整流变压的作用，将220V交流变为直流，并改变成合适的电压值供给电池组充电，E70的车载充电机采用水冷的方式进行冷却。

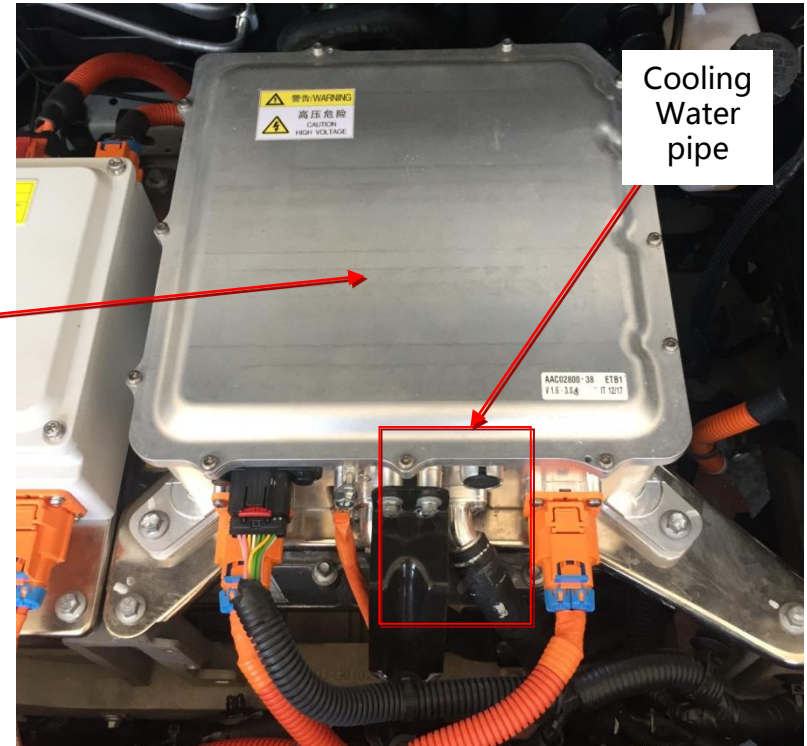


I. Overview of E70 traction battery charging system



OBC (slow charger)

The OBC mainly plays the role of rectification and transformation, converting 220V AC into DC, and changing the voltage to an appropriate value for battery pack charging. The E70's OBC is cooled by water cooling.





E70充电的通信原理

- 1、充电桩、车载充电机或缆上控制盒通过一根唤醒线唤醒电池管理系统（BMS）
 - 2、充电桩、车载充电机或缆上控制盒与电池管理系统（BMS）进行连接确认
 - 3、充电桩或车载充电机通过CAN线与电池管理系统（BMS）进行最终确认，称为握手协议
- 之后充电桩才能进行对动力电池组的充电

II. Working principle and circuit diagram of E70 traction battery charging system



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Communication principle of E70 charging

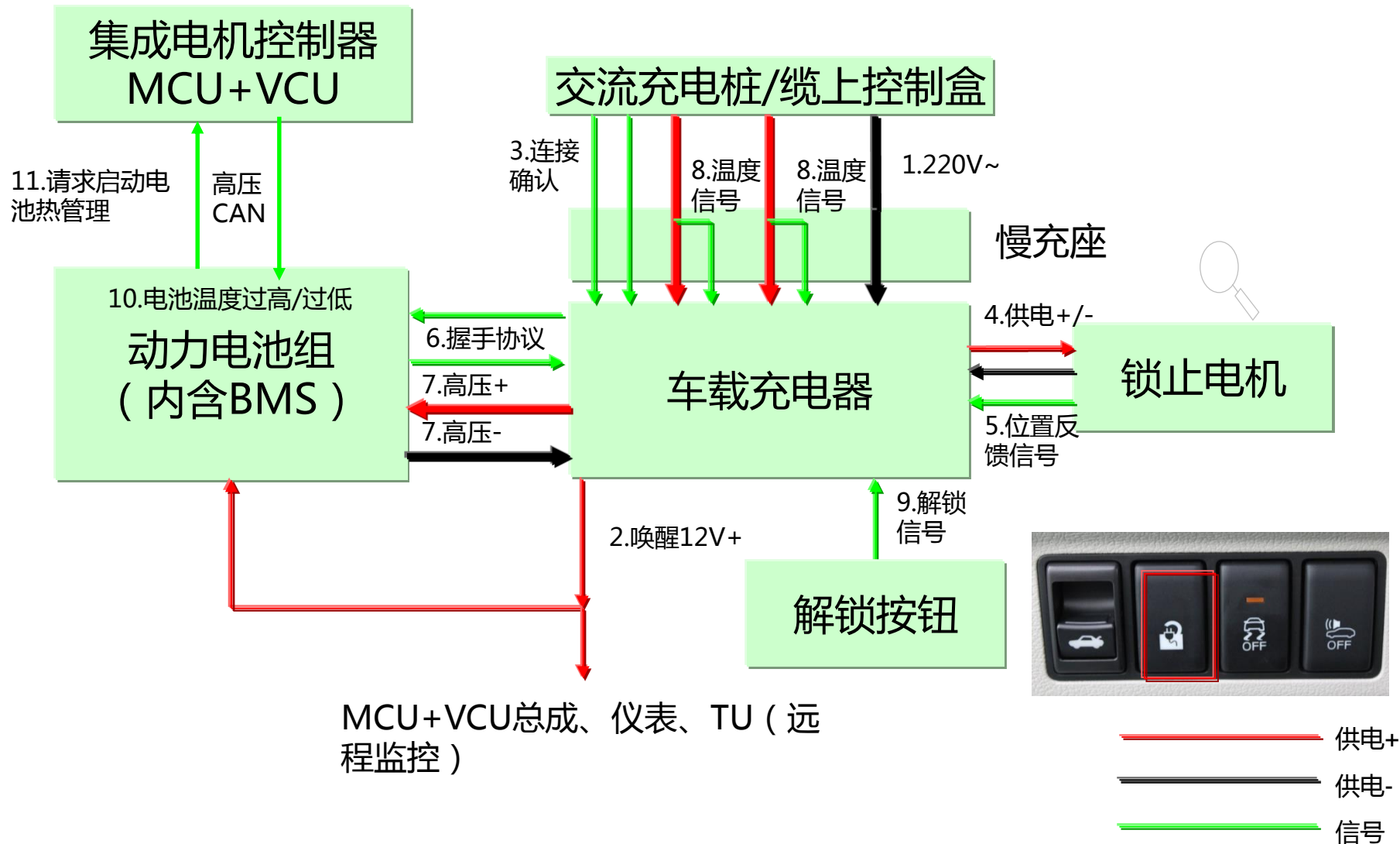
1. The charging pile, the OBC or the in-cable control box wake up the battery management system (BMS) via a wake-up line.
 2. The charging pile, the OBC or the in-cable control box is connected to the BMS for confirmation.
 3. The charging pile or the OBC confirms with the BMS via the CAN line, which is called the handshake protocol.
- Then the traction battery pack can be charged through the charging pile.

二、E70动力电池充电系统工作原理及电路图



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充电基本原理及电路图分析（慢充）

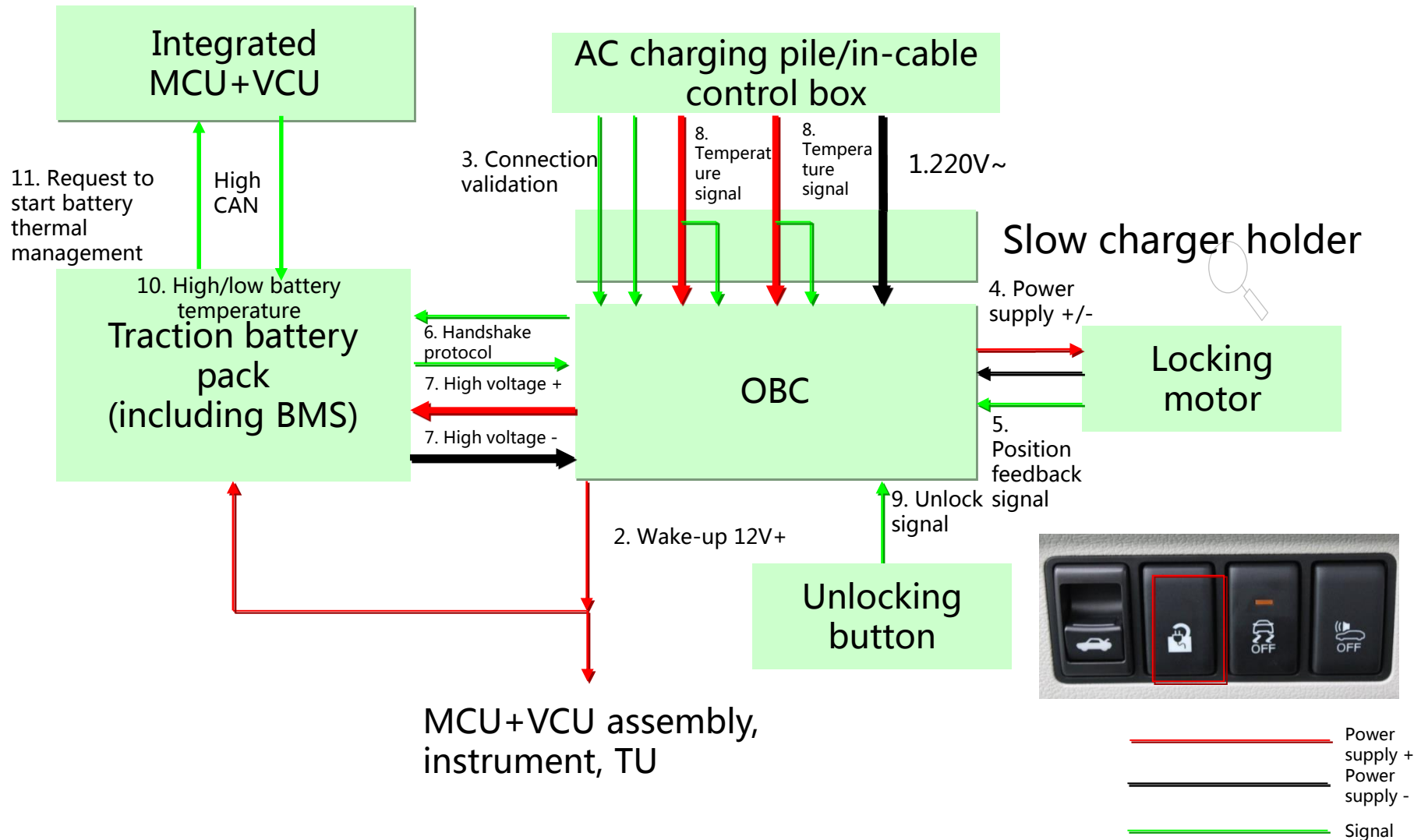


II. Working principle and circuit diagram of E70 traction battery charging system



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Analysis of working principle and circuit diagram of charging (slow charging)

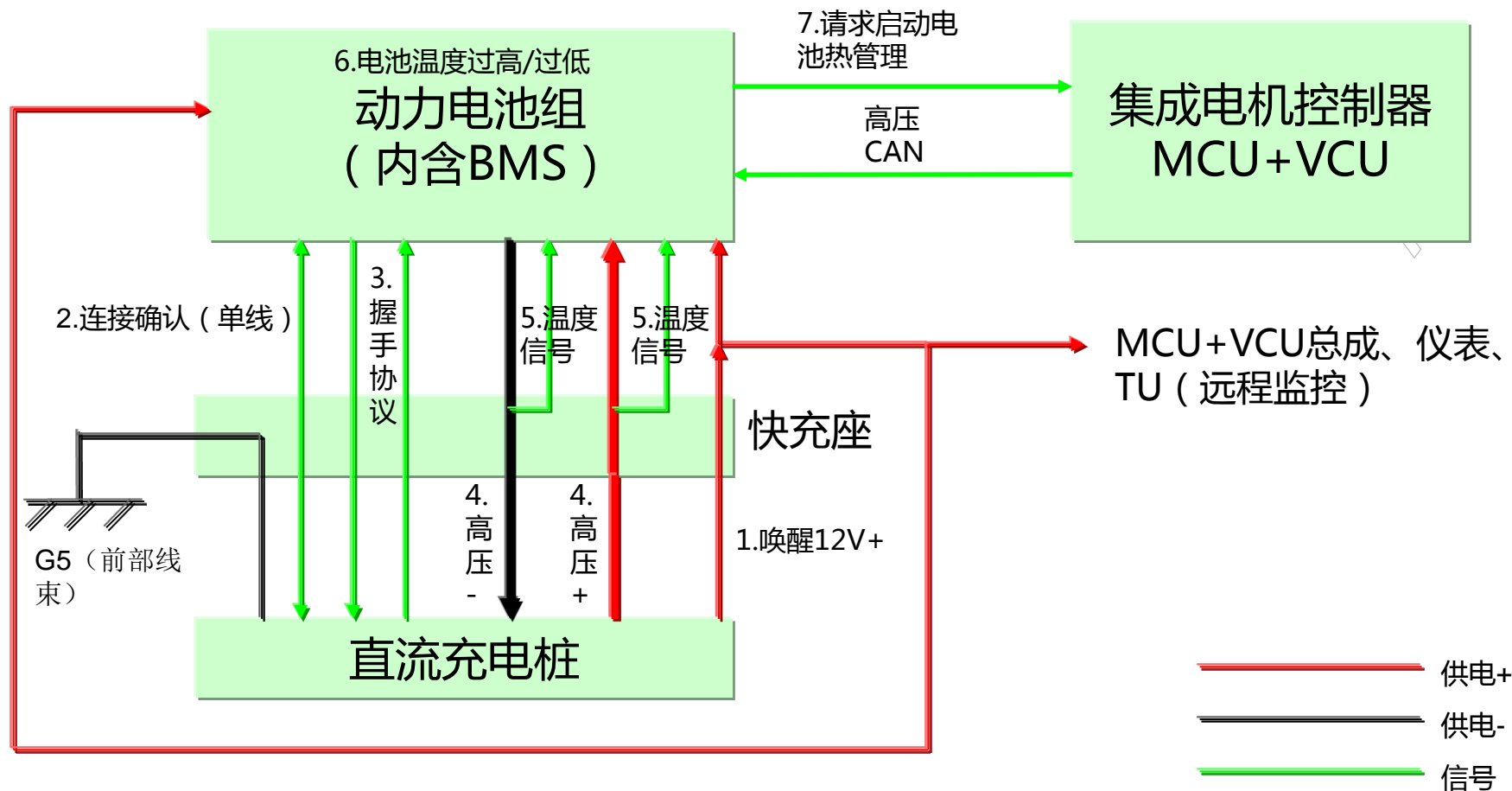


二、E70动力电池充电系统工作原理及电路图



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充电基本原理及电路图分析（快充）

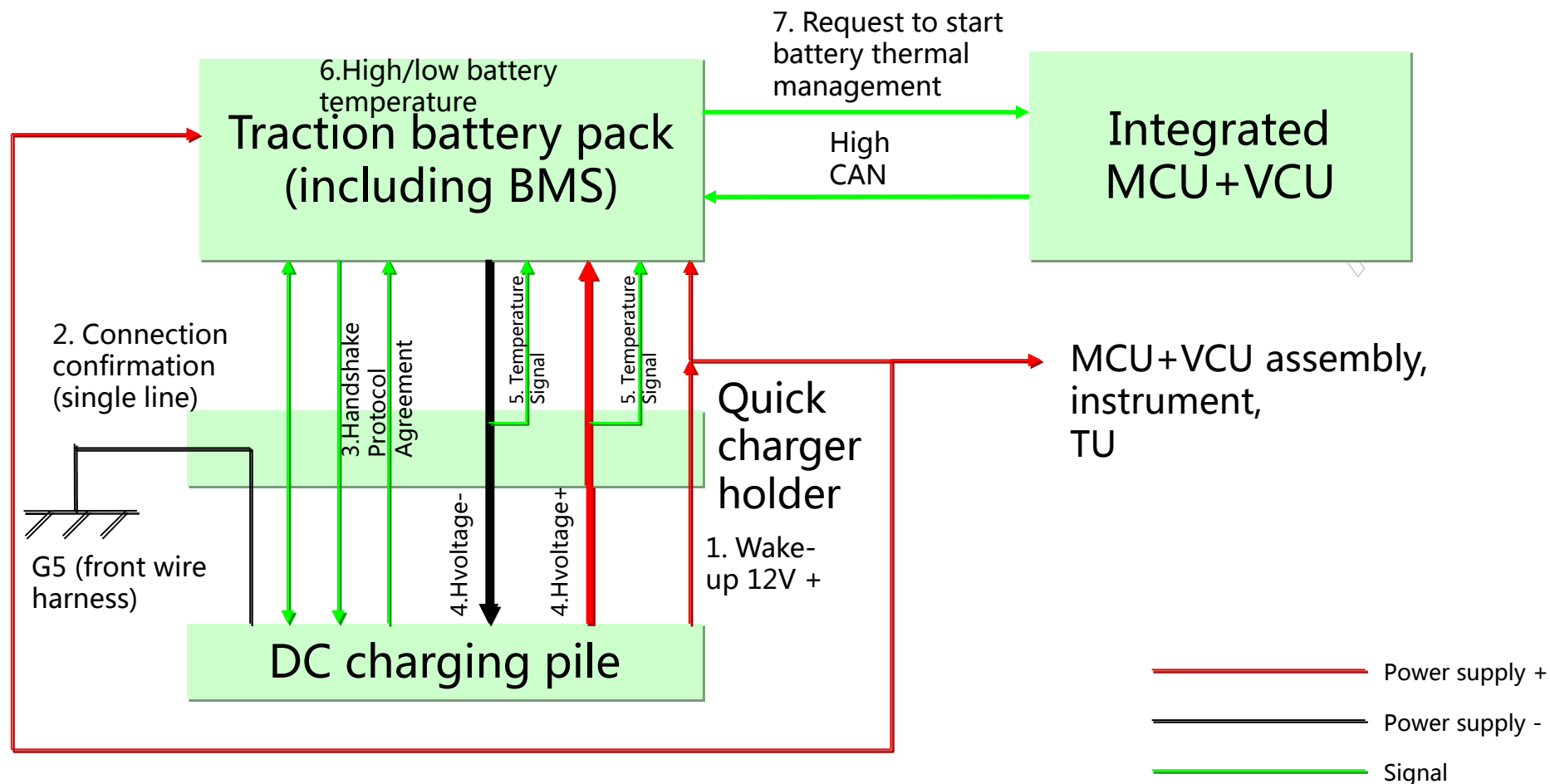


II. Working principle and circuit diagram of E70 traction battery charging system



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Analysis of working principle and circuit diagram of charging (quick charging)




三、E70动力电池充电系统概述故障诊断



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车载充电器有故障自诊断的功能（注意**只有在慢充时才能用诊断仪进入**），且有独立的诊断地址，利用专用故障诊断仪可对系统进行诊断，结合电路图的原理对故障进行排查。

常见故障现象及原因如下

常见故障现象	维修建议
电池无法正常充电	 <ul style="list-style-type: none">1、检查钥匙是否拔出2、检查锁止电机是否能够正常锁止3、检查充电桩是否正常4、检查充电连接线是否正常5、检查充电座温度传感器是否正常6、检查所有的高低压线路连接是否正常7、检查唤醒线是否正常8、检查连接确认线是否正常9、检查握手通信线是否正常10、检查车载充电机及动力电池系统

III. Troubleshooting of E70 traction battery charging system



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The OBC has the function of fault self-diagnosis (note **that the scan tool can only be used in the case of slow charging**), and has an independent diagnosis address. The special scan tool can be used to diagnose the system to troubleshoot according to the principle of the circuit diagram.

Common fault phenomena and causes are as follows:

Fault phenomenon	Recommended countermeasures
Failure to be charged normally	<ol style="list-style-type: none">1. Check if the key is removed.2. Check if the locking motor can lock normally.3. Check if the charging pile is normal.4. Check if the charger lead is normal.5. Check if the charger holder temperature sensor is normal.6. Check if all high and low voltage lines are connected properly.7. Check if the wake-up line is normal.8. Check if the connection confirmation line is normal.9. Check if the handshake communication line is normal.10. Check the OBC and the traction battery system.

四、E70动力电池充电系统维修注意事项



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- 严禁未经培训的人员进行高压部分检修，避免发生安全事故；
- 在开始换件维修工作之前，**请先拔出开启钥匙，再断开蓄电池，断开维修开关,装好相应的专用堵盖**
- 维修人员必须佩戴必要可靠的安全防护用品（绝缘手套，绝缘鞋）
- **在维修作业前请采用安全隔离措施（使用警戒栏隔离），并树立高压警示牌，以警示相关人员，避免发生安全事故；**
- 工作环境要求保持干燥，照明充足，透风；
- 工作环境中要求没有杂物，散乱的工具和部件，燃烧源和危险物品；
- **注意断开维修开关后，在维修动力电池时仍然有触电风险，不要触碰电池的任何正负级端子以及维修开关座上的端子，以免触电**

IV. Precautions for service of E70 traction battery charging system



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- It is strictly forbidden for untrained personnel to carry out high voltage maintenance to avoid safety accidents;
- Before starting the replacement, **please pull out the opening key, disconnect the battery, disconnect the service switch, and install the corresponding special plug;**
- Service personnel must wear necessary and **reliable PPE (insulated gloves, insulated shoes);**
- **Take safety isolation measures (isolating by the warning bar) before service, and set up high voltage warning signs to alert relevant personnel to avoid safety accidents;**
- The working environment is required to remain dry, with sufficient lighting and ventilation;
- No debris, scattered tools and components, sources of ignition and dangerous goods exist in the working environment;
- **Pay attention to the risk of electric shock when servicing the traction battery after disconnecting the service switch. Do not touch any positive and negative terminals of the battery and the terminals of the service switch base to avoid electric shock.**



1.对E70的动力电池充电系统进行认知和拆装

2.完成E70高压实践任务单





1. Cognize and remove and refit the E70 traction battery charging system.
2. Complete the tasks list of the E70 high voltage systems.

