深圳市明唐新能源技术有限公司
SHENZHEN MINGTANG NEW ENERGY TECHNOLOGY CO., LTD

产 品 承 认 书

PRODUCT SPECIFICATION

产品型号 (Product Number)：**BM563MO智能软件板-集成北斗GPS定位**

BM563MO Intelligent Software Board - Integrated Beidou-GPS

客户名称 (Customer Name)：

客户型号(Customer Model)：

配置 Configuration	参数 Parameter	配置 Configuration	参数 Parameter
串数 Number of battery strings	**13~20S**	RS485接口 RS485 interface	5PIN，450mm排线 5PIN, 450mm cable
适用电池 Applicable battery	**三元锂、磷酸铁锂** **NMC, LFP**	**CAN接口** **CAN interface**	**选配，与RS485同接口** **Optional, same as RS485 interface**
持续放电电流 Continuous discharge current	**55A**	采样排线 Sampling cable	11P+12P带扣，600mm 11P+12P with buckle, 600mm
芯片方案 Chip solution	中颖集成方案 Zhongying solution	蓝牙通信 BT connectivity	支持 Support
北斗GPS定位 Beidou GPS positioning	**支持，可选配** Support, **optional**	电池温度检测 Battery temperature detection	2路NTC 2-channel NTC
均衡方式 Equalization	自动均衡，电阻放电方式 Automatic equalizing, resistive discharge mode	预加热功能 Preheating function	外挂，最大支持15A充电加热 External cheat, maximum support to 15A charging heating
电流积分 Coulometer	支持500A以内检测 Support detection within 500A	预放电功能 Pre-discharge function	支持，防打火，**可选配** **【电池带显示屏不支持此功能】** Support, anti-spark, **optional (Instrument with a display does not support this function)**
显示屏 Display screen	支持，RS485屏 Support, RS485 screen	电池并联功能 Parallel battery function	**选配，支持2个并联，无感切换** **Optional, supports two in parallel with seamless switching.**

后续描述与配置表有矛盾的以上面配置表为准

In case of discrepancies, the configuration table shall prevail.

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修订记录表
Revision Record Form

版本 Revision	变更内容 Modified Content	责任人 Principle	日期 Date	标记 Mark	备注 Note
A0	首次发布 First Release	FJB	20250801		
A1	项目更新，调整放电过流及短路保护参数 Project Updated: Adjusted discharge over-current and short-circuit protection parameters	FJB	20250917		
A2	更新文字描述 Update text description	FJB	20251101		
A3	更新过流值及文字描述 Update overcurrent values and textual descriptions	FJB	20251127		

目 录Content

一、综述 Overview

本规格书适用于深圳市明唐新能源技术有限公司的锂电池保护板，本产品严格满足ROHS标准 。

This specification applies to the lithium battery protection board of Shenzhen Mingtang New Energy Technology Co., Ltd.. This product strictly meets the ROHS standards.

随着锂电池的广泛应用，对电池管理系统提出了高性能、高可靠性及高性价比等要求。BMS电池系统俗称为电池管家，BMS实时采集、处理、存储电池组运行过程中的重要信息，与外部设备如整车控制器交换信息，解决锂电池系统中安全性、可用性、易用性、使用寿命等关键问题。主要作用是为了能够提高电池的利用率，防止电池出现过充电和过放电，延长电池的使用寿命，监控电池的实时状态。

With the widespread application of lithium batteries, high performance, high reliability, and high cost-effectiveness are required for battery management systems. The BMS battery system is commonly known as the battery steward. The BMS collects, processes, and stores important information during the operation of the battery pack in real-time, exchanges information with external devices such as vehicle controllers, and solves key issues of safety, availability, ease of use, and service life in lithium battery systems. Its main purpose is to improve battery utilization, prevent overcharging and over-discharging, extend battery life, and monitor the battery's real-time status.

本BMS保护板，采用集成化的设计，将采集、管理、通信等功能集成于一体，可进行高精度的GPS定位【兼容北斗和GPS】，保证动力电池安全可靠、高效及长寿命的运行。

This BMS protection board adopts an integrated design, integrating functions such as collection, management, and communication, supporting high-precision GPS positioning (compatible with Beidou and GPS), ensuring safe, reliable, efficient, and long-lasting operation of power batteries.

二、产品功能特性 Product Functional Characteristics

- 具有单体电压、总体电压检测，过充、过放报警及保护功能。
  Equipped with monomer voltage, total voltage detection, overcharge, over-discharge alarm, and protection function.
- 具有充电、放电过流报警及保护功能。
  Equipped with monomer voltage, total voltage detection, overcharge, over-discharge alarm, and protection function.
- 具有电芯、MOS 温度实时检测功能；电芯高、低温报警及保护功能；MOS 高温报警及保护功能。
  Equipped with real-time detection of cell and MOS temperature; high and low temperature alarm and protection function for cells; high temperature alarm protection function for MOS.
- 具有对输出短路的检测及保护功能。
  Equipped with output short circuit detection and protection function.
- 具有自动均衡功能，可以在充电时对不均衡的电芯进行均衡。
  Equipped with automatic balancing function can balance unbalanced cells during charging.
- 软件远程控制功能，可通过平台软件方便地对电池的相关参数进行设置。
  Software remote control function, convenient setting of relevant battery parameters through platform software.
- **RS485 通信，采用隔离通信方式。**
  RS485 communication，using an isolated communication method.

- **电流积分功能【库仑计】。**
  Current integration function (coulomb meter).
- **SOC 计量：采用电流积分与开路电压算法相结合。**
  SOC measurement: using a combination of current integration and open circuit voltage algorithm.
- **支持单体电压掉线检测、单体电压检测、总电压检测。**
  Support monomer voltage disconnection detection, monomer voltage detection, and total voltage detection.
- 实时定位；电池异常提醒；低电提醒；震动防盗报警；电子围栏；轨迹回放；里程统计；空中升级；远程控制充电、放电功能；实时监测电池电压、电池电量SOC、充放电循环次数；实时监测电池温度、BMS保护板温度，实现双重保护功能。
  Real-time positioning; battery abnormal reminder; low power reminder; vibration anti-theft alarm; electronic fence; track playback; mileage statistics; over-the-air upgrade; remote control charging and discharging function; real-time monitoring of battery voltage, battery capacity SOC, charging and discharging cycles; real-time monitoring of battery temperature, BMS protection board temperature, realizing dual protection function.
- 具有多种休眠及唤醒方式。
  Multiple sleep and wake-up methods.
- 支持固件OTA远程升级
  Support firmware OTA remote upgrade.

三、电气参数 Electrical Parameters(Ta = 25 ℃.)

3.1、 额定规格参数 Rated Specifications

详细项目 Detailed items		规格 Specification 最小值 Minimum	典型值 Typical	最大值 Maximum	单位 Units	其它说明 Other Notes
充电电流 Charging current		-	**55**	-	A	
放电电流 Discharge current		-	**55**	-	A	
工作电流【模块工作】 Working current [module operation]		10	-	28	mA	保护板工作状态 Protective board in working status
待机电流【模块休眠】 Working current [module operation]		6	-	18	mA	保护板待机状态 Protection board in standby mode
低功耗模式电流【关机】 Low power mode current [shutdown]		10	-	15	μA	保护板关机状态 Protection board in shutdown status
工作环境 Working environment	工作温度 Working temperature	-20	-	+70	℃	正常工作温度范围 Normal working temperature range
	工作湿度 Working humidity	0%	-	90%	RH	湿度低于90%，无凝结 Humidity below 90%, no condensation
存储环境 Storage environment	存储温度 Storage temperature	-40	-	+85	℃	正常存储温度范围 Normal storage temperature range
	存储湿度 Storage humidity	0%	-	90%	RH	湿度低于90%，无凝结 Humidity below 90%, no condensation
电流积分 Coulometer	SOC估算精度 SOC accuracy	<5%				
	电流检测 Current detection	采样频率<250mS，精度5% Sampling frequency <250mS, accuracy 5%				
RS485接口 RS485 interface		支持1路 Supports 1 channel				
CAN接口 CAN interface		支持1路 Supports 1 channel				

蓝牙/LTE/GPS定位 BT/LTE/GPS positioning	蓝牙可快速检测分析电池健康状况；GPS实时定位；远程实时查询电池相关信息 Bluetooth can quickly detect and analyze battery health status; GPS real-time positioning; remote real-time query of battery-related information.	
单体电压掉线检测 Monomer voltage disconnection detection	支持 Support	
单体电压检测 Monomer voltage detection	支持，1.5V-4.5V Support, 1.5V~5.0V	
总体电压检测 Total voltage detection	42V-90V	
电池类型 Battery type	**3.7V三元锂** **3.7V NMC** **3.2V磷酸铁锂** **3.2V LFP**	**参数可设置** **Settable parameter**
电池组组合方式 Battery pack combination mode	**13-20串** **13-20 strings**	**电池串数可选择** **optional battery strings**

注：长期超载工作，会损坏保护板，减少其使用寿命。
Note: Long-term overload will damage the protection board and reduce its service life.

3.2、 基本功能参数 Basic Functional Parameters

（注：以下参数除特殊注明以外，25℃环境温度下测试）

(Note: The following parameters are tested at 25℃ ring temperature unless otherwise specified)

功能指标项目 Functional Index Item		建议设置参数 Recommended Setting Parameters	设置说明 Setting Instructions	备注 Remark
过充保护（单串电池）Overcharge protection (Single string battery)	单体过充保护电压 Single cell overcharge protection voltage	三元4.25V / 铁锂3.65V NMC 4.25V / LFP 3.65V	可设 Settable	±20mV
	单体过充保护延时时间 Single cell overcharge protection delay time	1000mS	不可设 Fixed	±500mS
	单体过充保护解除电压 Single cell overcharge protection release voltage	三元4.15V / 铁锂3.5V NMC 4.15V / LFP 3.5V	可设 Settable	±20mV
	单体过充保护解除 Single cell overcharge protection release	单体电压下降到恢复点 The single voltage drops to the recovery point		/
过放保护（单串电池）Over-discharge protection (Single string battery)	单体过放保护电压 Single cell over-discharge protection voltage	三元2.75V / 铁锂2.5V NMC 2.75V / LFP 2.5V	可设 Settable	±20mV
	单体过放保护延时时间 Single cell over-discharge protection delay time	1500mS	不可设 Fixed	±500mS
	单体过放保护解除电压 Single cell over-discharge protection release voltage	三元3.0V / 铁锂2.9V NMC 3.0V / LFP 2.9V	可设 Settable	±20mV
	单体过放保护恢复 Single cell over-discharge protection recovery mode	单体电压上升到恢复点 The single voltage rises to the recovery point		/
总体过充保护 Overall overcharge protection	总体过充保护电压 Overall overcharge protection voltage	三元电池组串数 * 4.225V String number of NMC * 4.225V 铁锂电池组串数 * 3.6V String number of LFP * 3.6V	可设 Settable	±1V
	总体过充保护延时时间 Overall overcharge protection delay time	1000mS	不可设 Fixed	±500mS

	总体过充保护解除电压 Overall overcharge protection release voltage	三元电池组串数 * 4.1V String number of NMC *4.1V 铁锂电池组串数 * 3.5V String number of LFP *3.5 V	可设 Settable	±1V
	总体过充保护解除 Overall overcharge protection release	总体电压下降到恢复点 When the individual voltage drops to the recovery point , it automatically recovers.		/
总体过放保护 Overall over-discharge protection	总体过放保护电压 Overall over-discharge protection voltage	三元电池组串数 * 2.8V String number of NMC *2.8V 铁锂电池组串数 * 2.5V String number of LFP *2.95V	可设	±1V
	总体过放保护延时时间 Overall over-discharge protection delay time	1500mS	不可设 Fixed	±500mS
	总体过放保护解除电压 Overall over-discharge protection release voltage	三元电池组串数 * 3.1V String number of NMC *3.1V 铁锂电池组串数 * 2.9V String number of LFP *2.9 V	可设 Settable	±1V
	总体过放保护恢复 Overall over-discharge protection release	总体电压上升到恢复点 the overall voltage rises to the recovery point		/
均衡功能 Equalization function	均衡开启电压 Equalization turn-on voltage	三元3.9V / 铁锂3.3V NMC 3.9V / LFP 3.3V	可设 Settable	±20mV
	均衡开启压差 Equalize opening differential	>20mV	不可设 Fixed	/
	均衡电流 Equalizing curren	30~80 mA	不可设 Fixed	/
电芯压差保护 Cell voltage differential protection	单节电芯压差保护电压 Single cell voltage differential protection voltage	>1000mV	可设 Settable	±20mV
内阻 Internal resistance	放电回路内阻 Internal resistance of discharge loop	<40 mΩ	/	/
容量默认设置 Capacity default Settings	低电量告警 Low power alarm	SOC < 10%，充电时不告警 SOC < 10%， no alarm during charging	可设 Settable	/
	标称容量 Nominal capacity	需要手动设置 Manual configuration required	可设 Settable	/

	低电模式 Low Power Mode	选择设置，建议采用隐藏电量方式 Optional settings, the hidden battery mode is recommended 详细说明参考低电模式说明 For details, please refer to the low power mode description	可设 Settable	/

功能指标项目 Functional Index Item		建议设置参数 Recommended Setting Parameters			设置说明 Setting Instructions	备注 Remark
短路保护 Short circuit protection	短路保护电流 Short circuit protection current	600A			不可自设 Fixed	可申请修改 Modification can be requested.
	短路保护延时时间 Short circuit protection delay	200μS			不可自设 Fixed	
	短路保护解除方式 Short circuit protection released mode	**断开负载；鉴于短路电流特别大，避免危险不建议客户做短路测试 Disconnect the load; Due to the high short-circuit current, it is not recommended for customers to conduct short-circuit testing to avoid danger.**				/
充电过流保护 Charging over-current protection	**充电过流保护 Charging over-current protection**	**电流值 Current value**	**持续时间 Duration**	**恢复延时 Delay recovery**	/	/
	充电过流3 Charging over-current 3	**27A**±2A	**120S**±2S	**30S**±2S	可设 Settable	/
	充电过流2 Charging over-current 2	**38A**±2A	**30S**±2S	**30S**±2S	可设 Settable	/
	充电过流1 Charging over-current 1	**49A**±2A	**10S**±2S	**30S**±2S	可设 Settable	/
	充电过流保护解除 Charging over-current protection release	延时后自动恢复 Automatic recovery after delay				/
放电过流保护 Discharging over-current protection	**放电过流保护 Discharging over current protection**	**电流值 Current value**	**持续时间 Duration**	**恢复延时 Delay recovery**	/	/
	放电过流3 Discharging over-current 3	**57A**±2A	**60S**±2S	**30S**±2S	可设 Settable	/
	放电过流2 Discharging over-current 2	**63A**±2A	**10S**±2S	**30S**±2S	可设 Settable	/
	放电过流1 Discharging over-current 1	**74A**±2A	**2S**±2S	**30S**±2S	可设 Settable	/
	放电过流保护解除 Discharging over-current protection release	延时后自动恢复 Automatic recovery after delay				/

MOS温度保护 MOS temperature protection	MOS高温保护温度 MOS high temperature protection	75°C	可设 Settable	±3°C
	MOS高温保护解除温度 Release temperature of MOS high temperature protection	60°C	可设 Settable	±3°C
	MOS低温保护温度 MOS low temperature protection	-20°C	可设 Settable	±3°C
	MOS低温保护解除温度 Release temperature of MOS low temperature protection	-15°C	可设 Settable	±3°C
电芯温度保护 Cell temperature protection	充电高温保护温度 Charging high temperature protection temperature	60°C	可设 Settable	±4°C
	充电高温保护解除温度 Charging high temperature protection release temperature	50°C	可设 Settable	±4°C
	充电低温保护温度 Charging low temperature protection temperature	-15°C	可设 Settable	±4°C
	充电低温保护解除温度 Charging low temperature protection release temperature	-10°C	可设 Settable	±4°C
	放电高温保护温度 Discharge high temperature protection temperature	65°C	可设 Settable	±4°C
	放电高温保护解除温度 Discharge high temperature protection release temperature	55°C	可设 Settable	±4°C
	放电低温保护温度 Discharge low temperature protection temperature	-20°C	可设 Settable	±4°C
	放电低温保护解除温度 Discharge low temperature protection release temperature	-15°C	可设 Settable	±4°C

说明：以上数据均为25℃环境下测试。建议客户按实际温度测试更改相关数值。
BMS保护参数都具有上述功能，参数可能会有所变动更新，改动不做另行通知，请以实际为准。所有保护参数如需修改，需向保护板厂家提出申请。

Note: The above data are tested at 25 ° C. If not tested at 25 ° C, the test data may cause deviation.
The BMS protection parameters all have the above functions. The parameters may be changed without prior notice. If all protection parameters need to be modified, apply to the manufacturer of the protection board.

3.3、 GPS规格参数GPS Specifications

此型号自带智能型低成本的GPS定位功能，它融合了GSM无线通信技术及GPS系统定位技术，终端采用工业级高集成度设计，可使用电脑端后台或者手机APP控制电池的充放电，配合BMS保护板对电池充放电智能控制，实时掌握电池的使用情况，保证电池的安全性，优化电池使用寿命，方便电池和车辆的维护管理。

This model comes with intelligent low-cost GPS positioning function. It integrates GSM wireless communication technology and GPS system positioning technology. The terminal adopts industrial high integration design and can use the computer end background or mobile phone APP to control the battery charging and discharging, with BMS protection board intelligent control of battery charging and discharging, real-time grasp the use of the battery, which can ensure the safety of the battery, optimize the battery life, and facilitate the maintenance and management of the battery and vehicle.

1、实时定位：通过GPS卫星定位，可远程掌握电池运行状态

Real-time positioning: Through GPS satellite positioning, you can remotely grasp battery operating status

2、轨迹回放：平台上可保存行车记录，方便回放，同时回放过程中可可以查看车辆的轨迹、停留及停留时间、当时的速度和里程等。

Track playback: Driving records can be saved on the platform for easy playback, and the track, stay and stay time, speed and mileage of the vehicle can be viewed during the playback process.

3、里程统计：可以查看车辆每日、周、月的里程统计报表及总里程，在手机上轻松管控每一辆车。与电池充放电循环次数一起作为售后维护的依据。

Mileage statistics: Daily, weekly, monthly mileage reports and total mileage can be viewed on the mobile phone for easy management of each vehicle. Together with the number of battery charging and discharging cycles, it is used as the basis for after-sales maintenance.

4、盲区补传功能：终端定位盲区自动储存数据，有信号正常上线时上传。

Blind area supplement function: The terminal automatically stores data in areas with poor signal coverage and uploads it when a signal is available.

3.4、 低功耗及唤醒

3.4.1 休眠模式及唤醒

保护板检测到电池静止（不充不放不运动）5分钟后，保护板进入待机休眠状态，降低功耗；电池放电运动时保护板自动唤醒工作。

When the protection board detects that the battery is idle (not charging, discharging, or in motion) for 5 minutes, it enters standby sleep mode to reduce power consumption. The protection board automatically wakes up and resumes operation when the battery is discharging or in motion.

3.4.2 深度睡眠模式及唤醒Deep Sleep Mode and Wake-up

方式一： 电池电压偏低时【电池单串电压铁锂<2.1V、三元<2.5V】，保护板会关机进入深度睡眠模式，防止将电量耗尽损坏电池。

Method 1: When the battery voltage is low (LiFePO4 < 2.1V, NMC < 2.5V), the protection board shuts down and enters deep sleep mode to prevent battery damage from over-discharge.

方式二： 需要较长时间运输或存储时，也可以通过连接明唐上位机下发保护板关机指令，让保护板关机进入深度睡眠模式，保留电量。

Method 2: For long-term transportation or storage, a manual shutdown command can be issued to put the protection board into deep sleep mode, preserving battery power.

唤醒方式：电池投入使用前需采用充电或者使用开机唤醒键让保护板开机才能正常使用

Wake-up Methods: Before using the battery, it must be activated by either charging or using the wake-up button to turn on the protection board for normal operation.

3.5、 显示屏功能Display Function

本智能软件板使用RS485接口来支持屏幕显示电池组状态，电池电压、电流、单体电压、温度等相关电池信息。

The intelligent software board uses RS485 interface to support the screen display of battery pack status, battery voltage, current, cell voltage, temperature and other related battery information.

四、通信说明 Communication Description

4.1、 LTE通信 LTE Communication

BMS 可以通过LTE进行通讯，从而在平台查看电池的各种信息。

BMS can communicate over LTE to view various information about the battery on the platform.

4.2、 RS485通信 RS485 Communication

本产品支持RS485通信接口功能，与控制器或仪表进行对接，可实现精准的电量显示。通讯协议可根据客户要求进行定制。

This product supports an RS485 communication interface function, which can be connected to a controller or display to enable accurate power level indication. The communication protocol can be customized according to customer requirements.

BMS 可以通过RS485 接口与上位机进行通讯，从而在上位机端查看电池的各种信息，包括电池电压、电流、温度、充电放电状态、SOC、电池信息等。

The BMS can communicate with an upper computer via the RS485 interface, allowing the user to view various battery information on the upper computer, including battery voltage, current, temperature, charge/discharge status, SOC, and battery details.

默认波特率为9600bps。通过连接上位机，支持保护参数更改及保护板关机设置等。

The default baud rate is 9600 bps. By connecting to an upper computer, it supports protection parameter modifications and protection board shutdown settings.

4.3、 CAN通信 CAN Communication

本产品支持CAN通信接口功能，通过CAN通讯进行SOC数据上报，与控制器或仪表进行对接，可实现精准的电量显示等。通讯协议可根据客户要求进行定制。

This product supports the CAN communication interface function, enabling SOC data reporting via CAN communication. When connected to a controller or display, it allows for accurate power level indication and other functions. The communication protocol can be customized according to customer requirements.

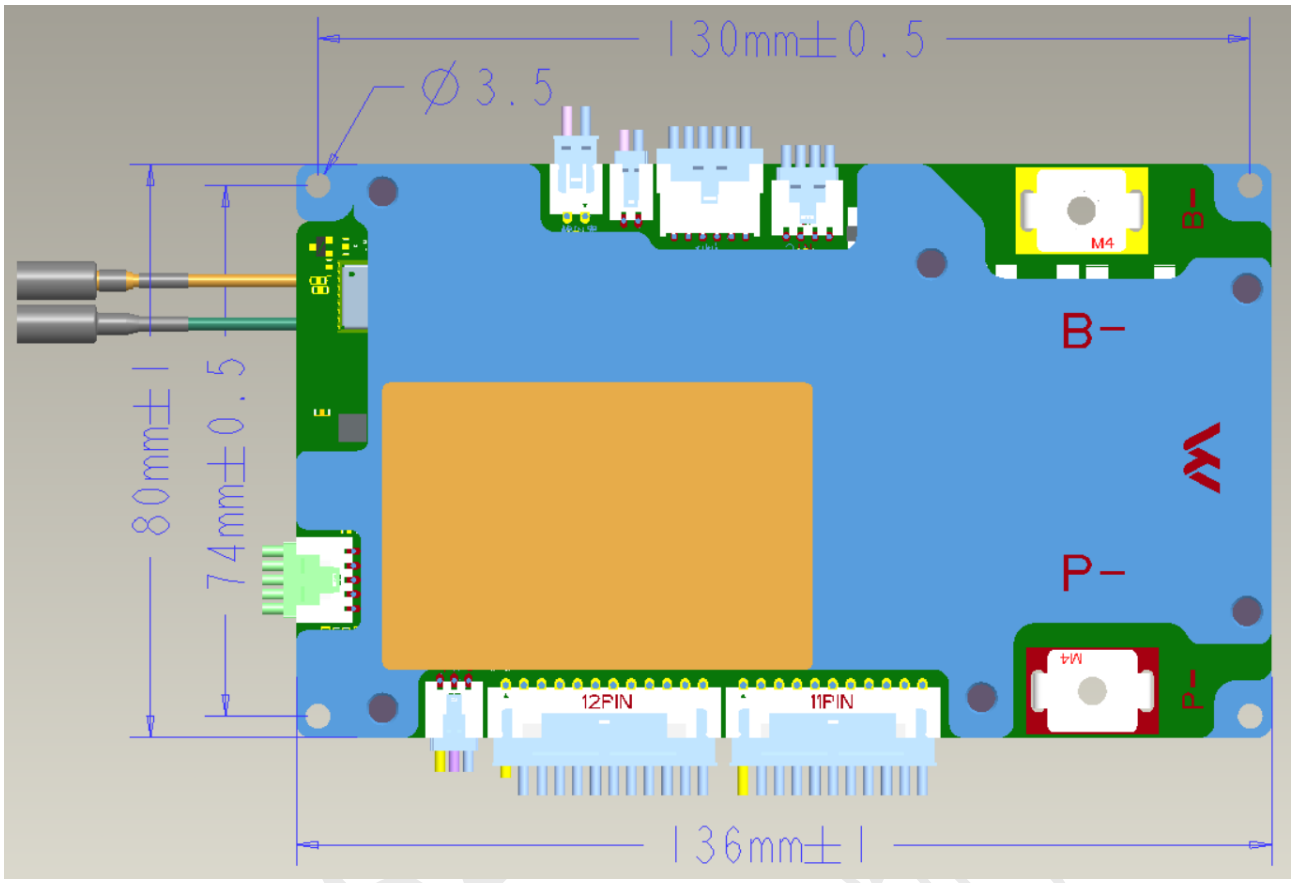
可以通过CAN 接口与充电机、车载显示系统等进行通讯。

It can communicate with charging equipment and vehicle display systems through the CAN interface.

◆此为可选配功能。

This function is optional.

五、BMS保护板尺寸图 BMS Protection Board Dimensions

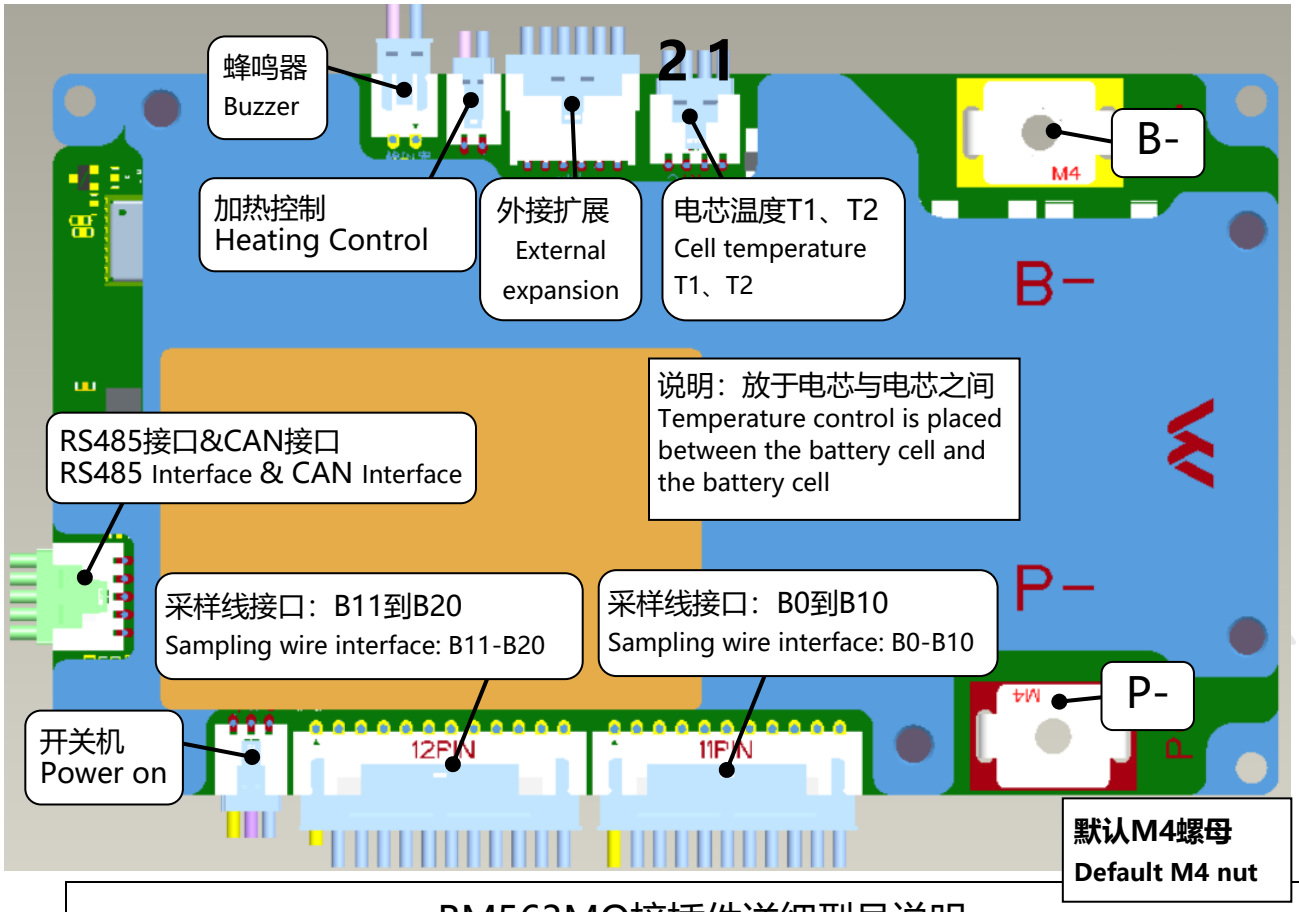


保护板尺寸： 136*80*17.5【固定孔位中心尺寸130*74，固定孔位螺丝M3】（mm）

Size of protection board : 136 * 80 * 17.5 [fixed hole center size 130 * 74, fixed hole screw M3](mm)

六、参考图及安装说明 Reference Diagram and Installation Instructions

6.1、 保护板元件视图 Protection Board Component View



BM563MO接插件详细型号说明 Detailed Model Description of BM563MO Connector			
接口功能 Interface function	接口详细型号 Detailed interface model	接口功能 Interface function	接口详细型号 Detailed interface model
开关机 Power on & off	HY2.0带扣-3P HY2.0 with buckle-3P	RS485&CAN	HY2.0带扣-5P HY2.0 with buckle-5P
加热控制 Heating control	HY2.0带扣-2P HY2.0 with buckle-2P	温度线(2路) Temperature line (2 line)	HY2.0带扣-4P HY2.0 with buckle-4P
蜂鸣器 Buzzer	XHB2.5带扣-2P(5V有源) XHB2.5 with buckle-2P (5V active)	电压采样线 Sampling wire	XHB2.5带扣-11P+12P XHB2.5 with buckle-11P+12P
扩展接口 Expansion interface	PHB2.0双排带扣-2x6p PHB2.0 double-row buckle - 2x6p		

重要说明：电池采样线材、温度线、RS485通讯线等插接的线材，装好后要打胶固定，防止电池使用过程中震动脱落。

Important note: Wires for battery sampling, temperature, RS485 communication, etc. should be glued and fixed after installation to prevent vibration and detachment of the battery during use.

以上图片仅供参考，实物以配置表或封样为准。

The images above are for reference only. The actual product will be determined by the specification sheet or the sealed sample.

相关接口功能说明【电池箱外壳需要开孔增加相应的按钮及接线处理】：

Description of relevant interface functions [The battery box casing requires drilling to add corresponding buttons and wiring processing].

■ 开关机接口：方案可选 Power on/off interface: optional solution

方案一、接自复位开关。保护板关机状态下，按下2秒可以开机；保护板开机状态下，长按开关2-3秒，延时5秒左右关机。——【如果需要使用此功能，软件需要匹配支持】

Mode 1: Connect a self reset switch.

When the protection board is turned off, press it for 2 seconds to turn it on;

When the protection board is turned on, press and hold the switch for 2-3 seconds, and then turn off after a delay of about 5 seconds.

(If you need to use this feature, the software needs to match support)

方案二、接自锁开关，控制放电。保护板关机状态下，闭合开关可以开机；保护板开机状态下，闭合开关可以放电，断开不能放电。——【如果需要使用此功能，软件需要匹配支持】

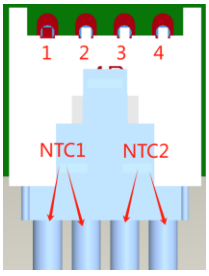
Mode 2: Connect a self-locking switch to control the discharge.

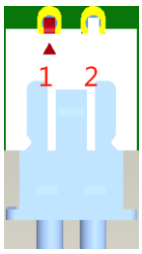
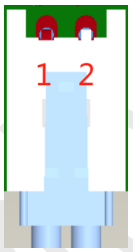
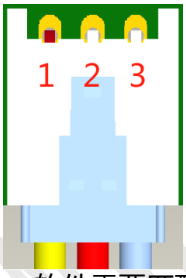
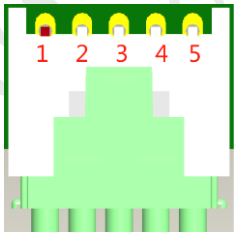
When the protection board is turned off, closing the switch can turn it on;

When the protection board is turned on, closing the switch can discharge, but opening it cannot discharge.

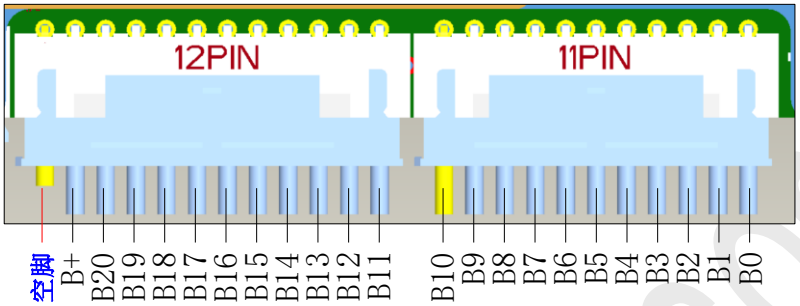
(If you need to use this feature, the software needs to match support)

6.2、 保护板相关接口定义 Protection Board Interface Definitions

NO.	接插件示意图及功能说明 Connector Diagram and Functional Description	引脚 Pin	定义说明 Description	备注 Remark
1	电芯采样插座1： XHB2.5带扣-11P Cell Sampling Socket 1: XHB2.5 with buckle - 11P 	PIN 1	B0-	
		PIN 2	B1+	
		PIN 3	B2+	
		PIN 4	B3+	
		PIN 5	B4+	
		PIN 6	B5+	
		PIN 7	B6+	
		PIN 8	B7+	
		PIN9	B8+	
		PIN10	B9+	
		PIN11	B10+	
2	电芯采样插座2： XHB2.5带扣-12P Cell Sampling Socket 2: XHB2.5 with buckle - 12P 	PIN 1	B11+	
		PIN 2	B12+	
		PIN 3	B13+	
		PIN 4	B14+	
		PIN 5	B15+	
		PIN 6	B16+	
		PIN 7	B17+	
		PIN 8	B18+	
		PIN9	B19+	
		PIN10	B20+	
		PIN11	B+	
		PIN12	空 Null	
3	温度采集2路： HY2.0带扣-4P Temperature Acquisition 2-Channel: HY2.0 with buckle - 4P NTC规格：R25=10KΩ±1%， B25/85=3435K±1% NTC Specification: R25 = 10KΩ ±1%, B25/85 = 3435K ±1% 	PIN 1	NTC1-	
		PIN 2	NTC1+	
		PIN 3	NTC2-	
		PIN 4	NTC2+	

NO.	接插件示意图及功能说明 Connector Diagram and Functional Description	引脚 Pin	定义说明 Description	备注 Remark
4	蜂鸣器接口：XHB2.5带扣-2P Buzzer Interface: XHB2.5 with buckle - 2P 蜂鸣器规格：5V有源 Buzzer Specification: 5V Active 	PIN 1	BZ-	
		PIN 2	BZ+	
5	加热控制口： HY2.0带扣-2P Heating Control Port: HY2.0 with buckle - 2P 	PIN1	Heat-	
		PIN 2	Heat+	
6	开关机接口： HY2.0带扣-3P Power Switch Interface: HY2.0 with buckle - 3P  开关类型：自复位开关 Switch Type: Self-resetting Switch 注：软件需要匹配支持 Software compatibility support	PIN 1	检测口 Test Port	
		PIN 2	SW-	
		PIN 3	SW+	
7	RS485&CAN接口： HY2.0带扣-5P RS485 & CAN Interface: HY2.0 with buckle - 5P 	PIN 1	CAN _ H	
		PIN 2	CAN _ L	
		PIN 3	空脚 Null	
		PIN 4	RS485 _ A（正+）	
		PIN 5	RS485 _ B（负-）	

6.3、 采样线接线定义Sampling Line Wiring Definition



相关说明：采样排线的走线排布不要扯太紧，以免使用过程中拉扯松脱；主板插座和排线结合处要打胶固定。
Instructions: The routing of the sampling wiring harness should not be too tight to avoid being pulled loose during use; the junction between the motherboard socket and the wiring harness should be secured with adhesive.

【注意焊排线时排线切记不可插在保护板上面去焊接，排线接好后不能直接插均衡仪进行均衡】
Notice: When soldering the wiring harness, do not solder it while it is plugged into the protection board. After connecting the wiring harness, do not directly plug it into the balancing instrument for equalizing.

★并线方式列表说明 List of BMS Parallel

BMS端 BMS Terminal	电池端 Battery Terminal							
定义	20S	19S	18S	17S	16S	15S	14S	13S
B0-	B0-	B0-	B0-	B0-	B0-	B0-	B0-	B0-
B1+	B1+	B1+	B1+	B1+	B1+	B1+	B1+	B1+
B2+	B2+	B2+	B2+	B2+	B2+	B2+	B2+	B2+
B3+	B3+	B3+	B3+	B3+	B3+	B3+	B3+	B3+
B4+	B4+	B4+	B4+	B4+	B4+	B4+	B4+	B4+
B5+	B5+	B5+	B5+	B5+	B5+	B5+	B5+	B5+
B6+	B6+	B6+	B6+	B6+	B6+	B6+	B6+	B6+
B7+	B7+	B7+	B7+	B7+	B7+	B7+	B7+	B7+
B8+	B8+	B8+	B8+	B8+	B8+	B8+	B8+	B8+
B9+	B9+	B9+	B9+	B9+	B9+	B9+	B9+	B9+
B10+	B10+	B10+	B10+	B10+	B10+	B10+	B10+	B10+
B11+	B11+	B11+	B11+	B11+	B11+	B11+	B11+	B11+
B12+	B12+	B12+	B12+	B12+	B12+	B12+	B12+	B12+
B13+	B13+	B13+	B13+	B13+	B13+	B13+	B13+	B13+
B14+	B14+	B14+	B14+	B14+	B14+	B14+	B14+	B13+
B15+	B15+	B15+	B15+	B15+	B15+	B15+	B14+	B13+
B16+	B16+	B16+	B16+	B16+	B16+	B15+	B14+	B13+
B17+	B17+	B17+	B17+	B17+	B16+	B15+	B14+	B13+
B18+	B18+	B18+	B18+	B17+	B16+	B15+	B14+	B13+
B19+	B19+	B19+	B18+	B17+	B16+	B15+	B14+	B13+
B20+	B20+	B19+	B18+	B17+	B16+	B15+	B14+	B13+
B+	B总+	B总+	B总+	B总+	B总+	B总+	B总+	B总+

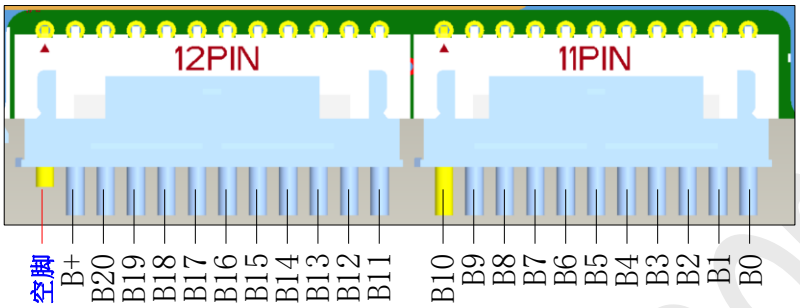
注：颜色区域表示多个电压采集排线并接在一起

Note: The colored areas indicate that multiple voltage sensing wires are connected together.

说明：BMS端B0～B10为11P插座，B11～B+为12P插座；**保护板端的B+这根线要独立接线。**

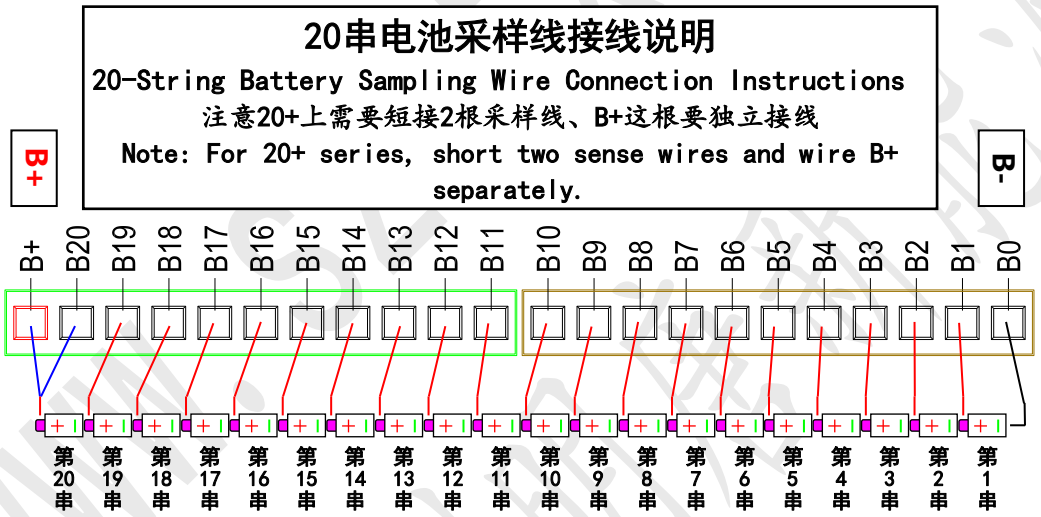
Explanation: On the BMS side, B0 to B10 correspond to an 11-pin socket, while B11 to B+ correspond to a 12-pin socket. **The B+ wire on the protection board side must be wired independently.**

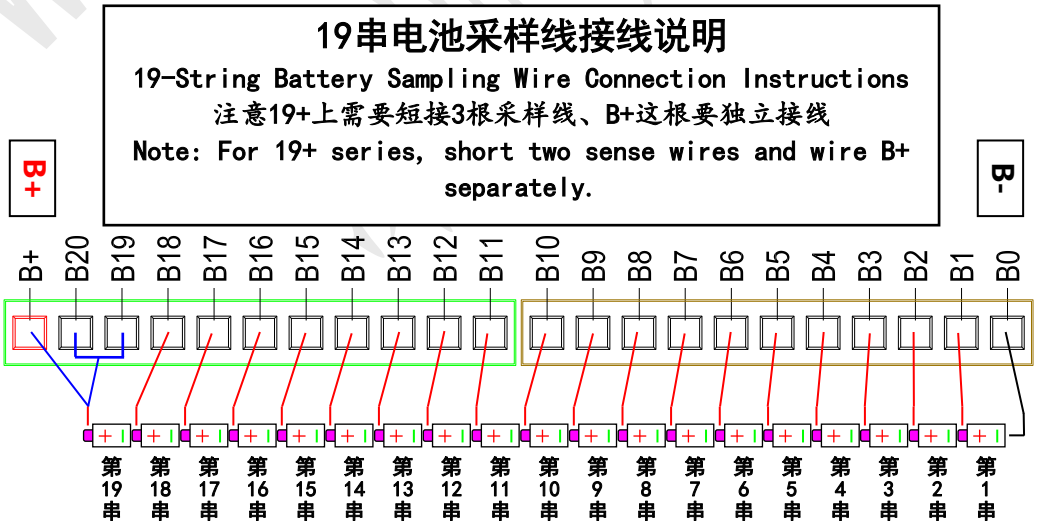
★并线方式接线说明Parallel Wiring Method Explanation



相关说明：采样排线的走线排布不要扯太紧，以免使用过程中拉扯松脱；主板插座和排线结合处要打胶固定。
Instructions: The routing of the sampling wiring harness should not be too tight to avoid being pulled loose during use; the junction between the motherboard socket and the wiring harness should be secured with adhesive.

【注意焊排线时排线切记不可插在保护板上面去焊接，排线接好后不能直接插均衡仪进行均衡】
Notice: When soldering the wiring harness, do not solder it while it is plugged into the protection board. After connecting the wiring harness, do not directly plug it into the balancing instrument for equalizing.



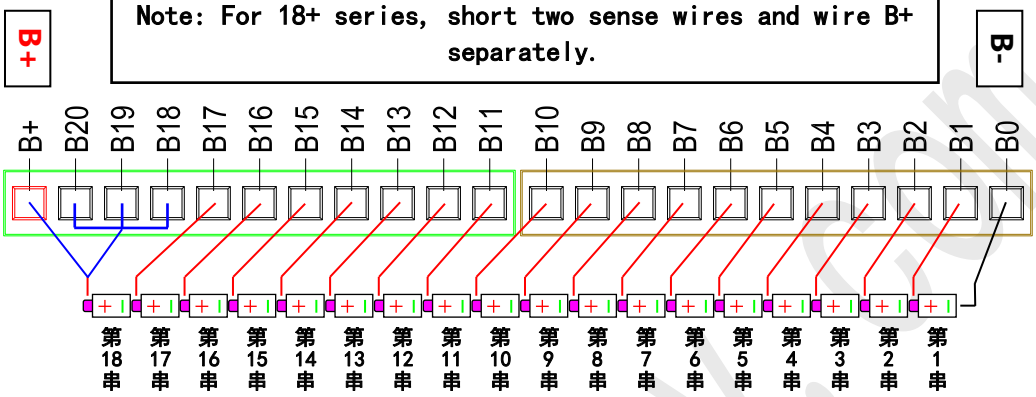


18串电池采样线接线说明

18-String Battery Sampling Wire Connection Instructions

注意18+上需要短接4根采样线、B+这根要独立接线

Note: For 18+ series, short two sense wires and wire B+ separately.

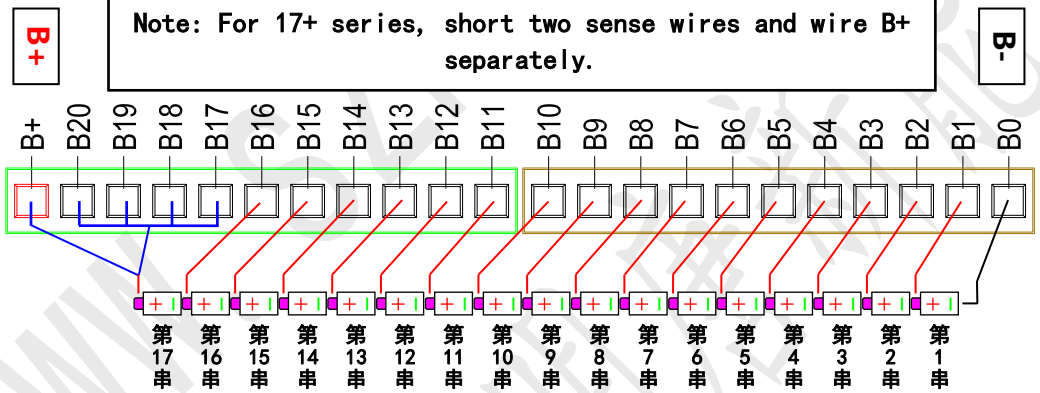


17串电池采样线接线说明

17-String Battery Sampling Wire Connection Instructions

注意17+上需要短接4根采样线、B+这根要独立接线

Note: For 17+ series, short two sense wires and wire B+ separately.

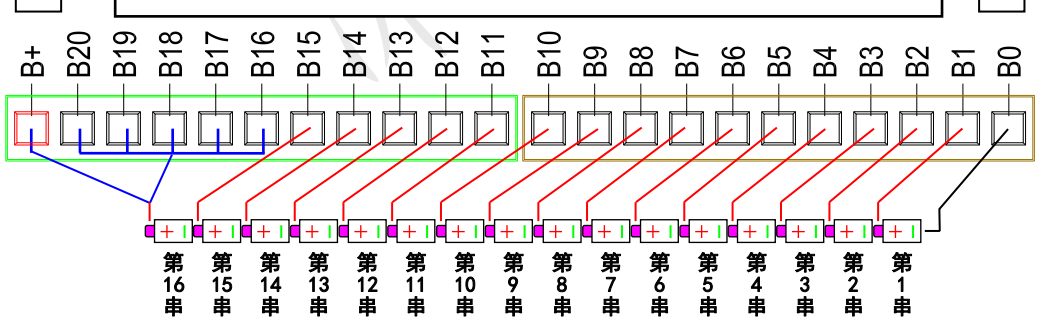


16串电池采样线接线说明

16-String Battery Sampling Wire Connection Instructions

注意16+上需要短接4根采样线、B+这根要独立接线

Note: For 16+ series, short two sense wires and wire B+ separately.

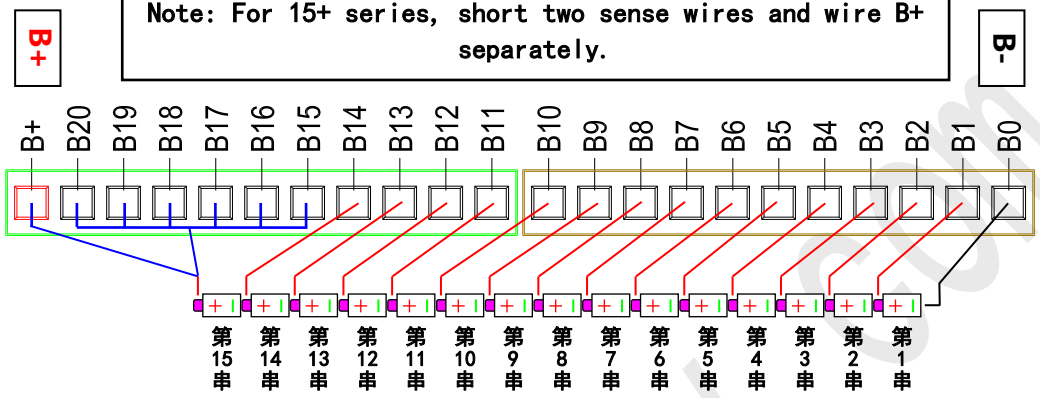


15串电池采样线接线说明

15-String Battery Sampling Wire Connection Instructions

注意15+上需要短接4根采样线、B+这根要独立接线

Note: For 15+ series, short two sense wires and wire B+ separately.

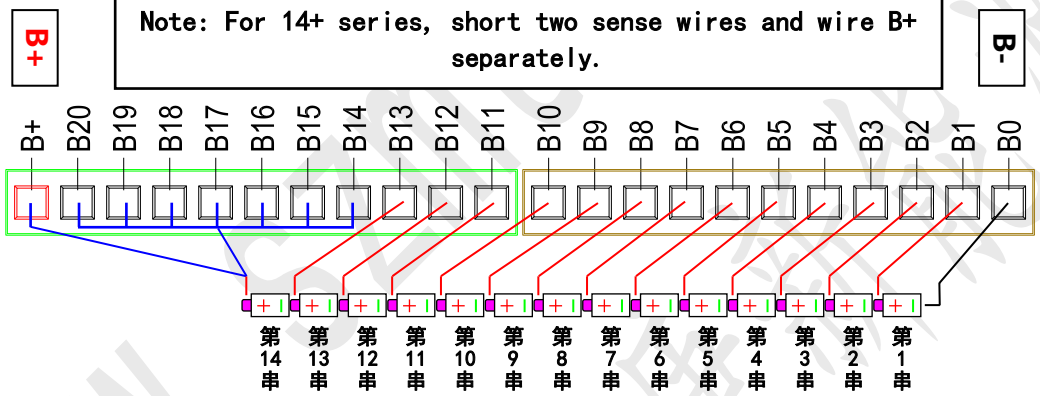


14串电池采样线接线说明

14-String Battery Sampling Wire Connection Instructions

注意14+上需要短接4根采样线、B+这根要独立接线

Note: For 14+ series, short two sense wires and wire B+ separately.

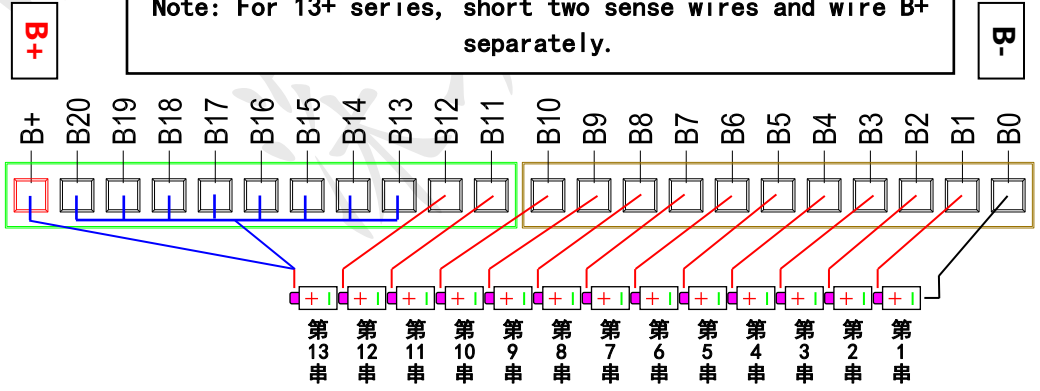


13串电池采样线接线说明

13-String Battery Sampling Wire Connection Instructions

注意13+上需要短接4根采样线、B+这根要独立接线

Note: For 13+ series, short two sense wires and wire B+ separately.



6.4、 安装连接说明 Installation and Connection Instructions

警告：把保护板连接至电芯，或从电池组拆下保护板时，必须遵守以下连接顺序与规定；如果不按要求的顺序作业，会损坏保护板的元器件，从而导致保护板不能保护电芯，造成严重的后果。

Warning: When connecting the protection board to the battery cell, or when removing the protection board from the battery pack, the following connection sequence and regulations must be adhered to. If the work is not performed in the required sequence, the components of the protection board will be damaged, resulting in the protection board failing to protect the cell and causing serious consequences.

A、连接保护板的步骤 Steps for connecting a protection board

准备工作：先把采样排线连接在电池组电芯上，检查排线连接正确【切记：不能把排线插在保护板上再一根一根连接在电池组电芯上】

Preparation: First connect the sampling line to the battery e pack cell and check that the cable is connected correctly. [Remember: do not plug the cable into the protection board and then connect it to the battery pack cell one by one]

1) 连接电池组的负极B-；
   Connect the negative electrode B- of the battery pack;
2) 连接输出负载的负极P-；
   Connect the negative terminal P- of the output load;
3) 连接电池组的采样排线；（**先插低压排线【带黑色线材的】，再插高压排线【带红色线材的】**）
   Connect the sampling line of the battery pack; **(First insert the low voltage bar cable [with black wire], then insert the high voltage bar cable [with red wire])**
4) 所有连接线安装好，再插入充电器激活保护板开机，
   Install all the cables, and then insert the charger to activate the protection board to start.

B、断开保护板的步骤 Steps for disconnecting the protection board

1) 断开负载或者充电器；
   Disconnect the load or charger;
2) 拔下电池组的采样排线；（**先拔高压排线【带红色线材的】，再拔低压排线【带黑色线材的】**）
   Unplug the sampling line of the battery pack; **(First pull out the high pressure wire [with red wire], and then pull out the low pressure wire [with black wire])**
3) 断开输出负载负极的P-连接线；
   Disconnect the P-connection line of the output load negative terminal;
4) 断开电池组负极的B-连接线；
   Disconnect the B-connection wire of the negative battery pack;

特别说明：在此环节中要注意静电的防护。特别要注意生产的烙铁漏电问题。

Special note: Pay attention to the protection of static electricity in this link. Pay special attention to the production of soldering iron leakage problem.

6.5、 保护板激活开机说明Protection Board Activation and Power-on Instructions

1、新装电池包 New battery pack

首先保护板需要按照上面的对应串数接线图，正确接好所有线，确认OK，新装的电池包保护板接口外露的，可以使用开机唤醒方式激活保护板开机，板上红色指示灯闪亮，说明保护板开机OK。

First of all, the protection board needs to be correctly connected according to the corresponding string number wiring diagram above, and confirm OK. If the interface of the newly installed battery pack protection board is exposed, you can activate the protection board to start up by using the wake-up mode. The red indicator on the board is shining, indicating that the protection board is OK to start up.

2、组装完成封箱的电池组 Assembled and sealed battery pack

BMS保护板在电芯电压低于保护值或者下发关机指令，进入关机状态后，需要采用充电的方式【充电电流>1A】激活保护板开机才能正常使用。**【注：对于需检测到电池电压才能给电池充电的充电器，本产品关机后将无法充电激活，需带充电激活功能的或者默认输出充电电压的充电器。】**

When the battery voltage of the BMS protection board is lower than the protection value or the shutdown command is issued, and it enters the shutdown state, it is necessary to activate the protection board by charging [charging current >1A] to start up. **[Note: For chargers that require detection of battery voltage to charge the battery, this product will not be able to charge and activate after shutdown. Chargers with charging activation function or default output charging voltage are required.]**

保护板开机成功后，可以使用上位机程 序、手机APP、电脑端平台等确认保护板运行情况。

After the protection board is successfully started, you can use the upper computer program, mobile phone APP, computer terminal platform, etc., to confirm the operation of the protection board.

【说明：需要较长时间运输或者存储时，可以下发关机指令，让保护板关机进入低功耗模式，投入使用前需充电激活保护板开机才能正常使用】

[Notice: When it takes a long time for transportation or storage, the shutdown command can be issued to shut down the protection board and enter the low power consumption mode. Before putting into use, the protection board needs to be charged and activated to start up.]

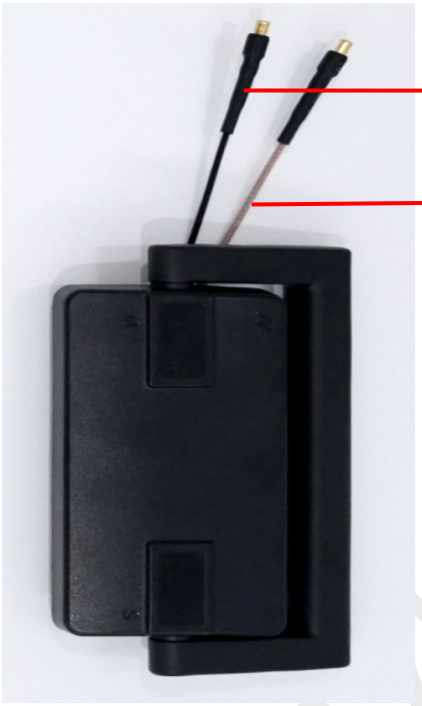
七、安装注意事项说明Antenna Handle Installation Instructions

7.1、 天线把手实物及尺寸图：Antenna Handle and Its Dimension Drawing

说明：把手可承重75Kg。

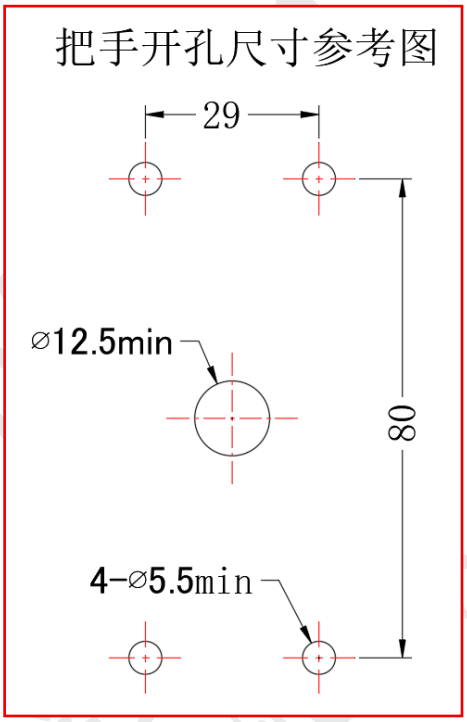
Description: Handle can bear 75Kg.

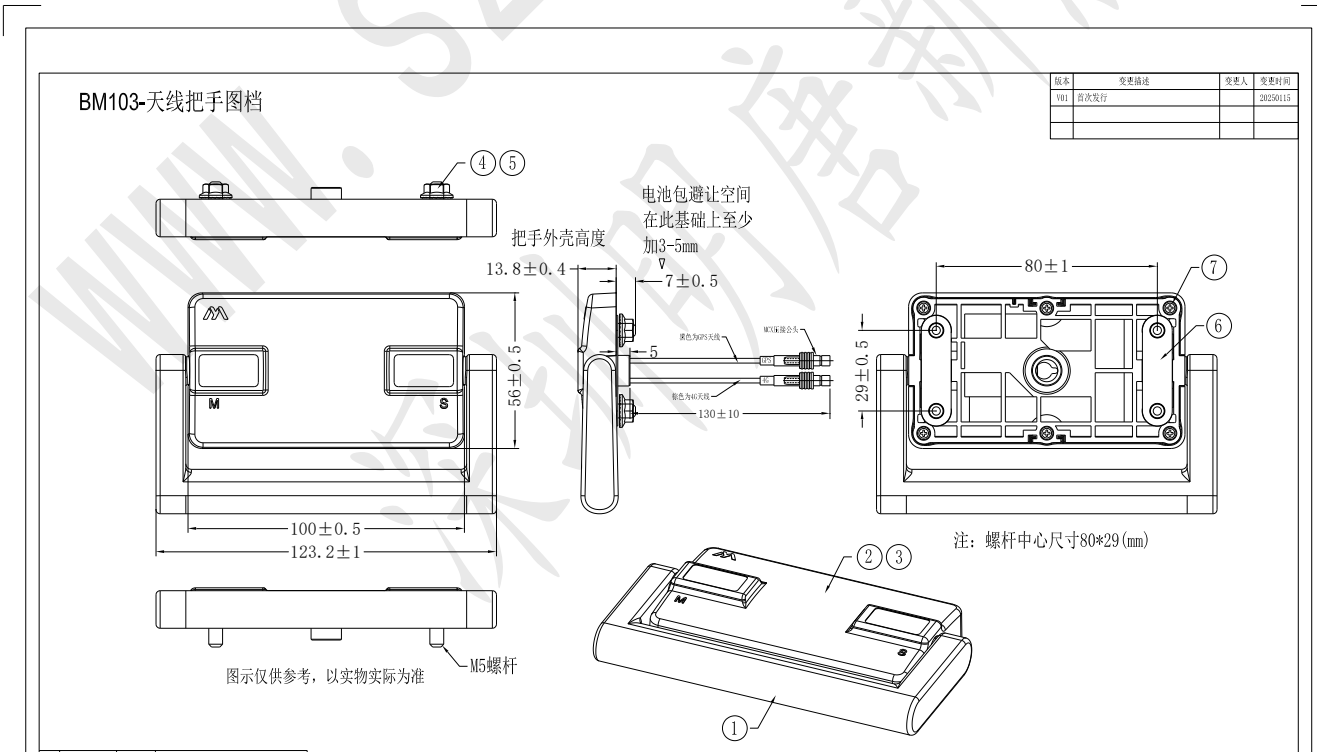
Reference diagram for handle opening size



黑线为GPS线
The black line is the GPS antenna

棕线为GSM线
The brown line is the 4G antenna





NO.	零件名称	用量	规格型号
7	螺丝	6	不锈钢SUS304，CA2x8，薄头自攻
6	防水硅胶垫	2	防水硅胶，黑色光面60度，单面背胶
5	螺母	4	M5法兰螺母
4	把手五金	2	不锈铁420J2压铆不锈钢螺杆M5*16
3	把手底壳	1	ABS+PC防火，黑色
2	把手上盖	1	ABS+PC防火，黑色
1	把手手柄	1	TPUS5度包不锈铁430J2，黑色

零件名称		项目名	
零件编号		绘制	
图纸 A4	版本 V01	校对	
比例 1:1	单位 mm	审核	
	页码 1/1	批准	

7.2、 天线把手安装要求：

A、 电池外箱钻孔尺寸及注意事项：

Battery outer box drilling size and precautions:

◆ 建议在外箱居中位置放置钻孔尺寸

Place the drill hole dimensions in the middle position of the outer box.

电池外箱上壳
Battery outer box upper shell

注意如图放置孔位，这样天线的信号才能达到最佳。
Pay attention to the position of the hole as shown in the figure, so that the antenna signal can reach the best.

保护板设备号粘贴位置，上下位置可选择
The position for attaching the device number of the protection board is optional.

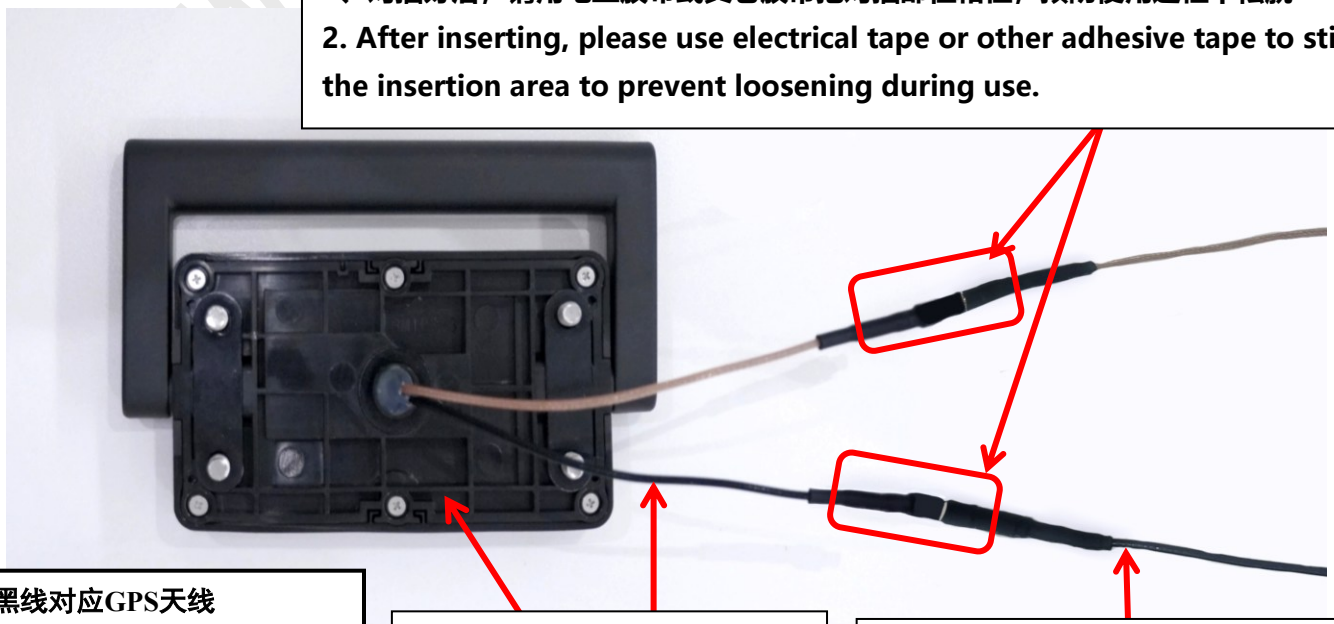
说明 Note:

1、对插时黑对黑，棕对棕，不要搞混

1. When inserting, black to black and brown to brown, don't confuse them.

2、对插好后，请用电工胶布或其它胶带把对插部位粘住，预防使用过程中松脱

2. After inserting, please use electrical tape or other adhesive tape to stick the insertion area to prevent loosening during use.



黑线对应GPS天线
Black line --- GPS antenna
棕线对应GSM天线
Brown line --- GSM antenna

线长（含插头）130mm左右
The wire length (including plug) is about 130mm

BMS保护板端：
线长（含插头）295mm左右
BMS protection board end: wire length (including plug) around 295mm

7.3、 温度传感器安装注意事项 Temperature Sensor Installation Precautions

温度传感器安装示意说明
Temperature sensor installation schematic description

温度传感器：放置于电芯与电芯之间的沟槽里固定住，任何时候都不能挤压，防止损坏。

Temperature sensor: fixed in the groove between the battery cell and the battery cell, can not be squeezed at any time to prevent damage.

作用：实时监测电池的温度

Function: Real-time monitoring of battery temperature

注意一定要加导热硅脂传热
Be sure to add thermal grease to heat transfer

特别注意：
1、温度传感器感应头部不能挤压。
2、所有线材过线都不能压线。
3、温控线的走线排布不要扯太紧，以免使用过程中拉扯松脱；主板插头结合处要打胶固定。

Pay special attention to:
1, the temperature sensor sensor head can not be squeezed.
2, all wires can not be pressed over the line.
3, the layout of the temperature control line should not be pulled too tight, so as not to pull loose during use; The connector of the motherboard should be fixed with glue.

■ 下表为软硅胶线导线线径选择参考：

The following table is a reference for selecting the diameter of the soft silicone wire conductor：

电流 Current	线号 Wire Gauge	截面积 Section Surface
15A及以下	14AWG	2.0mm²
20-25A	12AWG	3.4mm²
30-45A	10AWG	5.3mm²
50-70A	8AWG	8.3mm²
80A	7AWG	12mm²
100-120A	6AWG	16mm²
200A	4AWG	25mm²
250A	3AWG	35mm²
300-400A	2AWG	50mm²

※ 注意：一定要根据实际放电电流选择相对应的线材，线径不能偏小，否则放电过程中易造成保护板温度过高，从而影响保护板的使用性能。

※ Notice: Be sure to select the corresponding wire according to the actual discharge current, the wire diameter can not be small, otherwise the discharge process is easy to cause the temperature of the protection board is too high, thus affecting the performance of the protection board.

八、使用注意事项 Usage Precautions

- **使用中注意引线头、电烙铁、锡渣等不要碰到电路板上的元器件，否则易损坏本保护板。**
  During use, ensure that wire ends, soldering iron tips, and solder splashes do not come into contact with components on the circuit board, as this may easily damage the protection board.
- 焊接电池引线时，一定不可有错接或反接。如果确认已接错，这块电路板可能已损坏，需要重新测试合格后才可使用。
  When soldering battery leads, ensure there are no miswired or reverse connections. If incorrect wiring is confirmed, the circuit board may be damaged and must be retested for compliance before reuse.
- 装配时保护板不要直接接触到电芯表面，以免损坏电芯。装配要牢固可靠。
  During assembly, avoid direct contact between the protection board and the battery cell surface to prevent damage to the cell. Ensure the assembly is secure and reliable.
- 保护板和电池组组装作业时，勿将散热铝板靠近电芯表面，否则热量会传递给电芯，影响电池组安全。
  When assembling the protection board and battery pack, do not place the aluminum cooling plate in direct contact with the cell surface, as heat transfer may occur and compromise the safety of the battery pack.
- 将电池组和保护板组合好以后，首次上电如发现无电压输出或充不进电，请检查接线是否正确。
  After assembling the battery pack and protection board, if no voltage output or charging failure is observed during the initial power-on, please check whether the wiring is correct.
- 在测试、安装、使用、接触该保护板时，需做好相应的防静电措施。
  When testing, installing, using, or handling this protection board, appropriate anti-static measures must be implemented.
- 本保护板没有0V充电功能，电池一旦出现0V的情况下，电池将严重退化直至损坏，为了不损坏电池，用户在长期不使用时请定期充电补充电量，在使用过程中放电保护后，须在12小时内及时充电，防止电池因自耗电而放电至0V。
  This protection board does not support 0V charging functionality. Once the battery voltage drops to 0V, the battery will severely degrade or become damaged. To prevent battery damage, users should periodically recharge the battery during prolonged storage. After discharge protection is triggered during use, the battery must be recharged within 12 hours to prevent self-discharge from depleting the voltage to 0V.
- 本保护板未配置反充电保护功能，使用时不可将充电输入反接，否则可能损坏保护板和电池。
  This protection board is not equipped with reverse-charge protection. Do not reverse the charging input during use, as this may damage the protection board and the battery.
- 请使用符合本规格书规定的充电器，如使用高于充电口最高可承受的直流电压的充电器，易造成保护板损坏，充电器应优先选择具备充电电流末端涓流关闭功能的产品（双保险）。注意不具备涓流关闭功能的充电器是为铅酸电池设计的，不适合锂电池使用。**对于需检测到电池电压才能给电池充电的充电器，本产品欠压保护后将无法进行充电，需带充电激活功能的或者默认输出充电电压的充电器。**

Please use a charger that complies with the specifications outlined in this document. Using a charger with a DC voltage higher than the maximum tolerable voltage of the charging port may easily damage the protection board. Priority should be given to chargers equipped with a trickle charge termination function (dual protection). Note that chargers without trickle charge termination are designed for lead-acid batteries and are not suitable for lithium batteries. **For chargers that require detection of battery voltage to initiate charging, this product will not support charging after undervoltage protection is triggered. A charger with activation function or one that defaults to outputting charging voltage is required.**

- 产品使用过程中一定要遵循设计参数及使用条件，不得超过本规格书中的值；如违反本规格书，易损坏保护板，进而损坏电池组。
  During product use, the design parameters and operating conditions must be strictly followed, and the values specified in this document must not be exceeded. Violation of these specifications may easily damage the protection board and subsequently compromise the battery pack.
- 使用过程中如出现异常情况，请立即停止使用，送回原厂或请专业维修人员进行维修。
  If any abnormal conditions occur during use, immediately stop using the product and return it to the manufacturer or seek assistance from a professional technician for repair.
- 使用过程要注意防静电、防潮、防水等。
  During use, precautions must be taken against static electricity, moisture, water, and other potential hazards.
- 不得拆解、撞击、穿刺或其它方式破坏产品原有结构。
  Do not disassemble, impact, puncture, or otherwise damage the original structure of the product.
- 需要较长时间运输或者存储时，可以使用上位机来控制BMS，让保护板关机进入低功耗模式，避免长期存储电池亏电。
  For extended transportation or storage, the upper computer software can be used to control the BMS and shut down the protection board into low-power mode, preventing battery depletion during long-term storage.
- 除特殊说明外，规格书标注的参数均为常温25℃时测定。如需超规格使用，请与我司技术沟通确认。
  Unless otherwise specified, the parameters indicated in the specification sheet are measured at room temperature (25°C). For applications beyond the specified range, please consult our technical team for confirmation.
- 本保护板已经做了大量的可靠性试验，可靠性远远高于市面上的一般保护板，但为尽可能的减少事故的发生，请使用合格的电芯。
  This protection board has undergone extensive reliability testing, with performance significantly surpassing that of standard protection boards on the market. However, to minimize the risk of accidents, please use qualified battery cells.
- **电池组容量和保护板持续放电电流之间的关系：**
  建议电池组容量多少安时，就选用持续放电电流为多少安的保护板。（例如：50AH的电池组要选择持续放电电流至少为50A的保护板）
  注：长期超载工作，会损坏保护板，减少其使用寿命。

Relationship between battery pack capacity and the protection board's continuous discharge current:

It is recommended to select a protection board with a continuous discharge current (in amperes) equal to the battery pack's capacity in ampere-hours.

(Example: A 50Ah battery pack should be paired with a protection board rated for at least 50A continuous discharge current.)

Note: Prolonged operation under overload conditions may damage the protection board and shorten its service life.

- 测试和使用时，电压不得超过MOS管的耐压值。
  During testing and use, the voltage must not exceed the withstand voltage rating of the MOSFETs.

九、主要元器件清单Main Component List

序号 NO.	类型 Type	名称 Name
1	保护IC IC Protection	SH3673520
2	充电MOS管 Charging MOS Tube	CRSS037N10N、BLP04N11
3	放电MOS管 Discharging MOS	CRSS037N10N、BLP04N11

请客户注意：我司各型号保护板在批量出货过程中，不同批次的订单我司有可能更换不同品牌不同型号的 MOS 管，但是前提是在能满足上述性能指标的情况下而做出的更改。

Notice: In the batch shipment process of each model of our protection board, we may replace different brands of different models of MOS tubes for different batches of orders, but the premise is to make changes under the condition that the above performance indicators can be met.

说明：测试和使用时，电压不得超过MOS管的耐压值100V

Note: During testing and use, the voltage must not exceed the MOSFETs' withstand voltage rating of 100V.