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): **BM571KO智能软件板-集成北斗GPS定位**

BM571KO 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	**13~24S**	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 (三元锂最高支持20串) NMC, LFP (NMC supports up to 20 strings)**	**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	**120A、150A**	采样排线 Sampling cable	14+12P，带卡扣1000mm 14+12P, have snap fit 1000mm
芯片方案 Chip solution	中颖集成方案 Zhongying solution	蓝牙通信 BT communication	支持 Support
北斗GPS定位 Beidou GPS positioning	支持，可选配 Support, optional	放电开关 Discharge switch	支持 Support
均衡 Equalization	自动均衡，电阻放电方式 Automatic equalization, resistive discharge mode	预加热功能 Preheating function	外挂，最大支持30A充电加热 Add-on, maximum support to 30A charging heating
电流积分 Coulometer	支持2500A以内检测 Supports detection within 2500A	预放电功能 Pre-discharge function	支持，防打火，**可选配【带显示仪表不支持此功能】** Support, anti-spark, **optional (Instrument with a display does not support this function)**
显示屏 Display	支持，RS485协议显示屏 Support , RS485 display	电池并联功能 Battery Parallel Function	支持2个并联，无感切换 Supports parallel connection of 2 batteries with seamless switching.

后续描述与配置表有矛盾的以上面配置表为准

If there is any conflict between the following description and the configuration table, refer to the preceding configuration table.

编　　制 PREPARED BY	审　　核 CHECKED BY	批　　准 APPROVED BY
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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同口锂电池保护板，本产品严格满足ROHS标准 。

This specification applies to the same-port 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 charging and discharging over-current 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 and 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 mode.
- **电流积分功能【库仑计】。**
  Coulometer 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 Coulometer 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.
- 具有预放电功能，防打火**【可选配】**
  Pre-discharge function, anti-spark. **(optional)**
- 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			单位 Units	其它说明 Other Description
		最小值 Minimum	典型值 Typical	最大值 Maximum		
充电电流 Charging current		-	/	-	A	120、150A可选 120、150A optional
放电电流 Discharging current		-	/	-	A	120、150A可选 120、150A optional
工作电流【模块工作】 Working current [module operation]		-	15	30	mA	保护板工作状态 Protection board in working status
待机电流【模块休眠】 Standby current [module sleep]		-	10	20	mA	保护板待机状态 Protection board in standby status
低功耗模式电流【关机】 Low power mode current [shutdown]		-	5	10	μA	保护板关机状态 Protection board in shutdown state
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 Current integration	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 Support 1 channel				
CAN接口 CAN interface		支持1路 Support 1 channel				保护板带匹配电阻120Ω Protection board: no 120Ω matching resistor by default

蓝牙/GPRS/GPS定位 BT/GPRS/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 BT can quickly detect and analyze battery health status; GPS real-time positioning; remote real-time query of battery-related information	三合一 Three in one
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~4.5V	
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	**13-24串 13-24 strings**	**电池串数可选择 optional battery strings 三元锂最高支持20串 NMC supports up to 20 strings 铁锂最低可支持14串 LFP supports a minimum of 14 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℃环温下测试)

(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	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 Strings number of NMC * 4.225V 铁锂电池组串数 * 3.6V Strings 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 Strings number of NMC *4.1V 铁锂电池组串数 * 3.5V Strings number of LFP *3.5V	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 The overall voltage drops to the recovery point		/
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 Strings number of NMC *2.8V 铁锂电池组串数 * 2.5V Strings number of LFP * 2.5V	可设 Settable	±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 Strings number of NMC *3.1V 铁锂电池组串数 * 2.9V Strings number of LFP *2.9V	可设 Settable	±1V
	总体过充保护解除 Overall overcharge 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 pressure	> 20mV	不可设 Fixed	/
	均衡电流 Equalizing current	30~80 mA	不可设 Fixed	/
电芯压差保护 Cell voltage difference protection	单节电芯压差保护电压 Single cell voltage difference 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 If SOC < 10%, no alarm is generated during charging	可设 Settable	/
	标称容量 Nominal capacity	100AH，需要设置 100AH, need to be set	可设 Settable	/

功能指标项目 Functional Index Item		设置参数 Setting Parameter				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	**120A：** 1800A±15% **150A：** 2250A±15%				不可设 Fixed	/
	短路保护延时时间 Short circuit protection delay time	200μS				不可设 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; Because the short circuit current is particularly large, it is not recommended that customers do 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**	/	/
		120A	**150A**				
	充电过流3 Charging over-current 3	**60A**±2A	**75A**±2A	**120S**±2s	**30S**±2s	可设 Settable	/
	充电过流2 Charging over-current 2	**84A**±2A	**105A**±2A	**30S**±2s	**30S**±2s	可设 Settable	/
	充电过流1 Charging over-current 1	**108A**±2A	**135A**±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**	/	/
		120A	**150A**				
	放电过流3 Discharging over-current 3	**132A**±2A	**165A**±2A	**60S**±2s	**30S**±2s	可设 Settable	/
	放电过流2 Discharging over-current 2	**150A**±2A	**187A**±2A	**10S**±2s	**30S**±2s	可设 Settable	/
	放电过流1 Discharging over-current 1	**180A**±2A	**225A**±2A	**5S**±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	85°C	可设 Settable	±3℃
	MOS高温保护解除温度 Release temperature of MOS high temperature protection	70°C	可设 Settable	±3℃
	MOS低温保护温度 MOS low temperature protection	-20°C	可设 Settable	±3℃
	MOS低温保护解除温度 Release temperature of MOS low temperature protection	-15°C	可设 Settable	±3℃
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℃
	充电高温保护解除温度 Charging high temperature protection release temperature	50°C	可设 Settable	±4℃
	充电低温保护温度 Charging low temperature protection temperature	-15°C	可设 Settable	±4℃
	充电低温保护解除温度 Charging low temperature protection release temperature	-10°C	可设 Settable	±4℃
	放电高温保护温度 Discharge high temperature protection temperature	65°C	可设 Settable	±4℃
	放电高温保护解除温度 Discharge high temperature protection release temperature	55°C	可设 Settable	±4℃
	放电低温保护温度 Discharge low temperature protection temperature	-20°C	可设 Settable	±4℃
	放电低温保护解除温度 Discharge low temperature protection release temperature	-15°C	可设 Settable	±4℃

说明：以上数据均为25℃环境下测试，若不在25℃测试，测试数据可能会引起偏差。
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 an intelligent, low-cost GPS positioning function. It integrates GSM wireless communication technology and GPS positioning technology (note: "system" is omitted to avoid redundancy). The terminal adopts an industrial-grade high-integration design, allowing users to control battery charging and discharging via a computer-based backend or mobile APP. Cooperating with the BMS protection board to intelligently control battery charging and discharging, it enables real-time monitoring of the battery's operating status, ensuring battery safety, optimizing the battery's service life, and facilitating the maintenance and management of batteries and vehicles.

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 Low Power and Wake-up

3.4.1 休眠模式及唤醒 Sleep Mode and Wake-up

保护板检测到电池静止（不充不放）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 stationary (neither charging nor discharging) for 5 minutes, it enters standby sleep mode to reduce power consumption. The protection board automatically wakes up and operates when the battery discharges.

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 (single cell voltage, LFP < 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，也可以手动下发关机指令，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 the RS485 communication interface function, which connects to the controller or instrument to enable accurate power display. 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 the upper computer through the RS485 interface, so as to view various information of the battery on the upper computer, including battery voltage, current, temperature, charging and discharging status, State of Charge (SOC), battery information and so on.

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 9600bps. By connecting to the upper computer, it can support program upgrades, support the modification of protection parameters and the shutdown settings of the protection board, etc.

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 function of CAN communication interface. It can report the State of Charge (SOC) data through CAN communication and interface with controllers or instruments, enabling accurate display of the power level and so on. The communication protocol can be customized according to customer requirements.

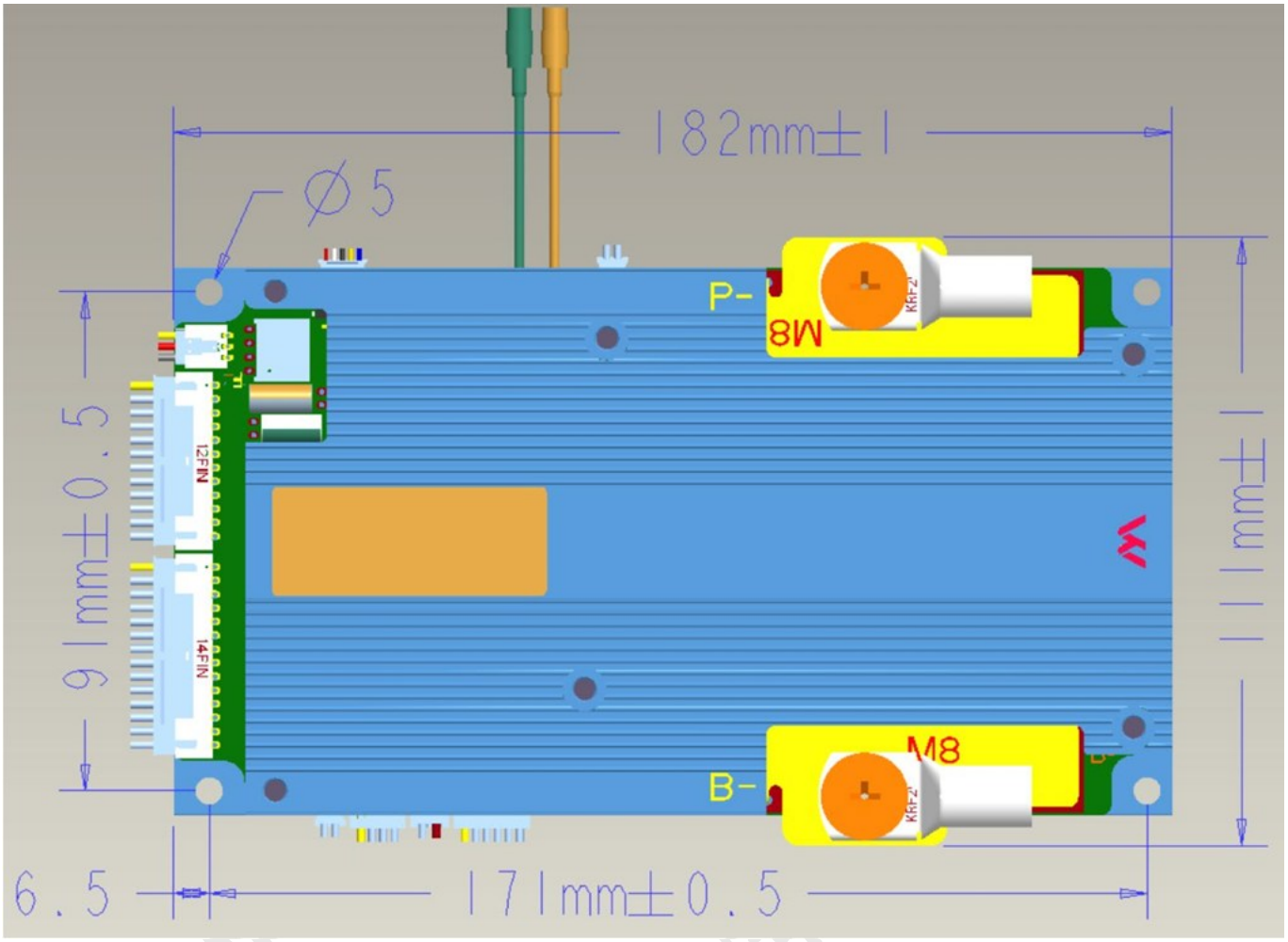
可以通过CAN 接口与充电机、车载显示系统等进行通讯。

It can communicate with chargers, vehicle-mounted display systems and so on through the CAN interface.

◆此为可选配功能。

This is optional.

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



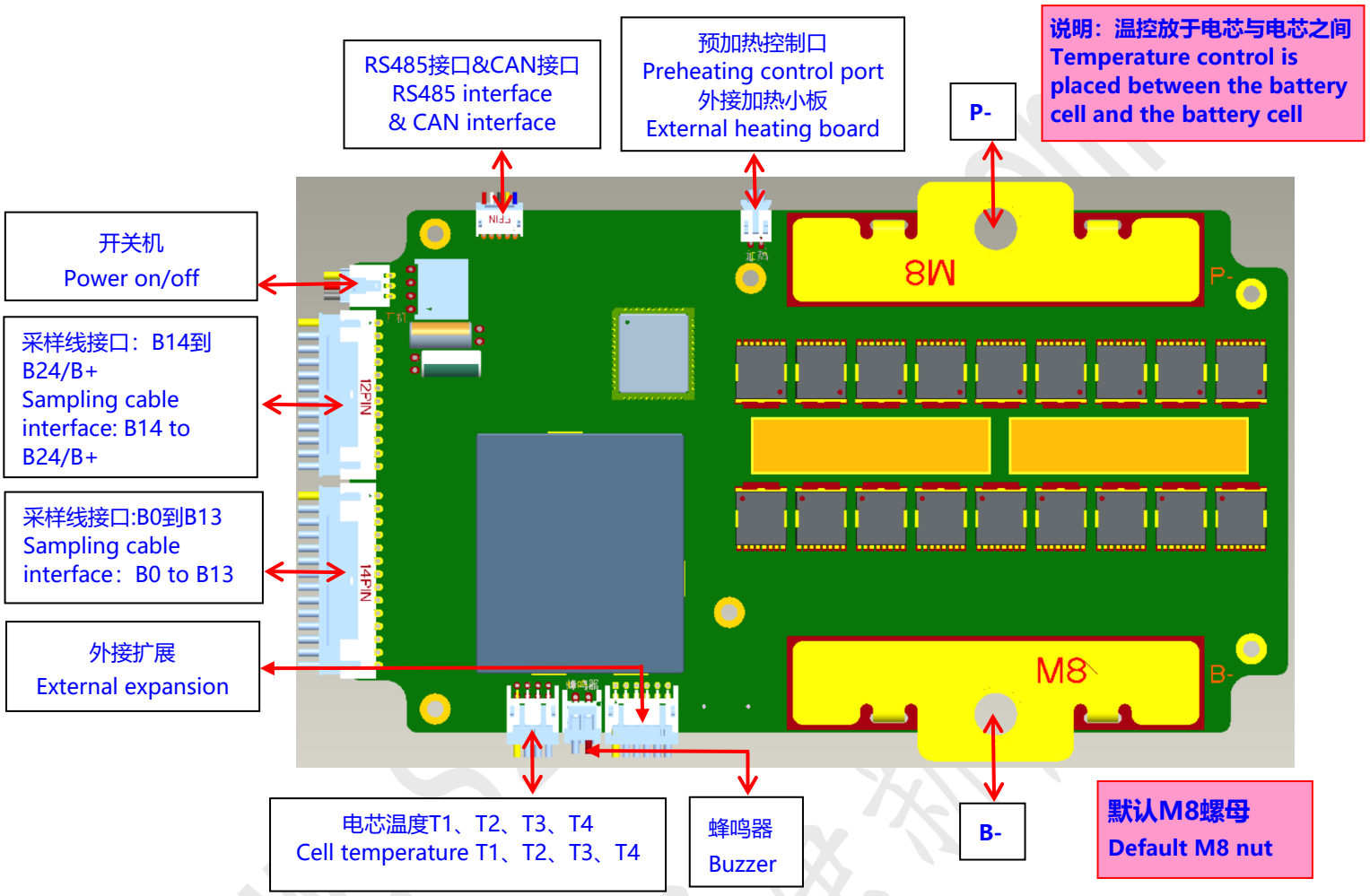
保护板尺寸：182*111*22.5【固定孔位中心尺寸171*91,固定孔位螺丝M4】（mm）
Size of protection board: 182*111*22.5 [fixed hole center size 171*91, fixed hole position screw M4] (mm)

■ 说明：保护板散热片可以通过上图所示的定位孔固定在电池铁箱外壳或者增加的铝板上来辅助散热，接触面要增加导热硅脂或导热硅胶片来导热。

■ Notice: The heat sink of the protection board can be fixed on the battery iron box shell or the additional aluminum board through the positioning hole shown in the above figure to assist heat dissipation. The contact surface should be equipped with thermal conductive silicone grease or thermal conductive silicone sheet to conduct heat.

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



BM571KO接插件详细型号说明 Detailed Description of BM571KO Interface			
接口功能 Interface function	接口型号 Interface model	接口功能 Interface function	接口型号 Interface model
开关机 Power on/off	HY2.0-3P	RS485&CAN	ZH1.5-5P
蜂鸣器 Buzzer	EH2.5-2P(5V有源) EH2.5-2P (5V active)	温度线(4路) Temperature cable (4 channels)	PHD2.0 双排-2x4P PHD2.0 dual row-2x4P
加热控制 Heating control	PH2.0-2P	电压采样线 Voltage sampling cable	XHB2.5带扣-14+12P XHB2.5 with buckle-14+12P
扩展接口 Expansion interface	PHD2.0双排-2x6p PHD2.0 dual row-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: The battery sampling wires, temperature wires, RS485 communication wires, etc., should be glued and fixed after installation to prevent them from loosening or detaching due to vibrations during battery 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 Solutions

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】

Solution 1: Connect a self-resetting switch

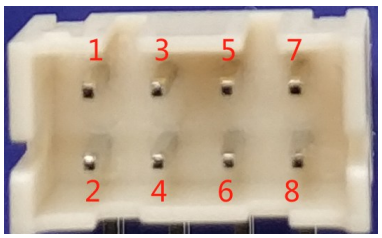
Press the switch for 2 seconds to power on when the protection board is off. Long-press the switch for 2-3 seconds when the protection board is on, and it will power off after a delay of about 5 seconds. [Software matching and support are required if this function is to be used.]

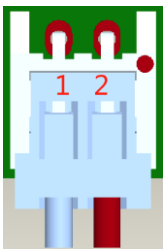
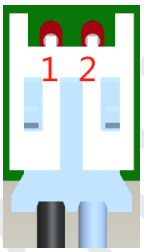
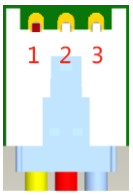
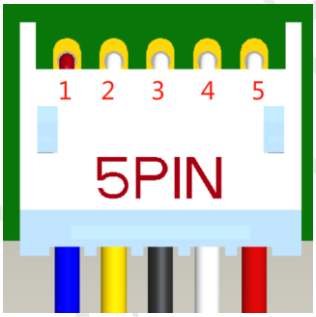
方案二、接自锁开关，控制放电。保护板关机状态下，闭合开关可以开机；保护板开机状态下，闭合开关可以放电，断开不能放电。——【如果需要使用此功能，软件需要匹配支持】

Solution 2: Connect a latching switch to control discharge

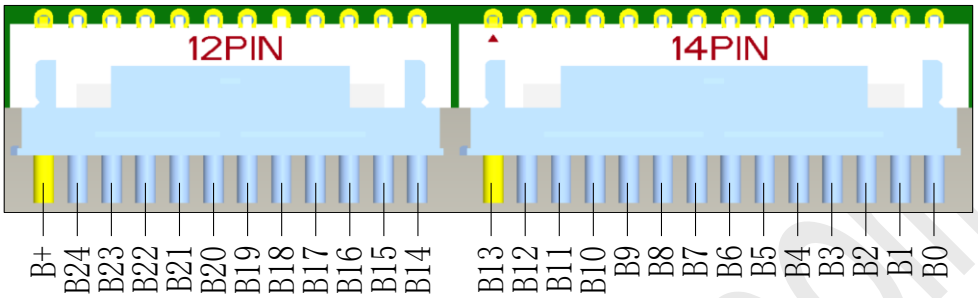
Close the switch to power on when the protection board is off. When the protection board is on, closing the switch allows discharge, while opening it stops discharge. [Software matching and support are required if this function is to be used.]

6.2、 保护板接口定义 Definition of protection board interface

NO.	接插件示意图及功能说明 Schematic diagram and functional description of connectors	引脚 PIN	定义说明 Definition	备注 Remark
1	电芯采样插座1： XHB2.5-14P带扣 Battery sampling socket 1: XHB2.5-14P with buckle 	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+	
		PIN12	B11+	
		PIN13	B12+	
		PIN14	B13+	
2	电芯采样插座2： XHB2.5-12P带扣 Battery sampling socket 2: XHB2.5-12P with buckle 	PIN 1	B14+	
		PIN 2	B15+	
		PIN 3	B16+	
		PIN 4	B17+	
		PIN 5	B18+	
		PIN 6	B19+	
		PIN 7	B20+	
		PIN 8	B21+	
		PIN 9	B22+	
		PIN10	B23+	
		PIN11	B24+	
		PIN12	B+	
3	温度采集 4路： PHD2.0双排-2x4P Temperature collection 4 channels: PHD2.0 dual row-2x4P  NTC规格：R25=10KΩ±1%，B25/85=3435K±1% NTC specifications: R25=10KΩ±1%，B25/85=3435K±1%	PIN 1	NTC1-	
		PIN 2	NTC1+	
		PIN 3	NTC2-	
		PIN 4	NTC2+	
		PIN 5	NTC3-	
		PIN 6	NTC3+	
		PIN 7	NTC4-	
		PIN 8	NTC4+	

NO.	接插件示意图及功能说明 Schematic diagram and functional description of connectors	引脚 PIN	定义说明 Definition	备注 Remark
4	蜂鸣器接口：EH2.5-2P Buzzer interface: EH2.5-2P 蜂鸣器规格：5V有源 Buzzer specification: 5V active 	PIN 1	BZ-	
		PIN 2	BZ+	
5	加热控制口： PH2.0-2P Heating control port: PH2.0-2P  注：软件需要匹配支持 Note: The software requires matching support.	PIN 1	Heat-	
		PIN 2	Heat+	
6	开关机接口：HY2.0带扣-3P Power on/off interface: PH2.0 with snap-fit-3P  开关类型：自复位开关 Switch type: self resetting switch 注：软件需要匹配支持 Note: The software requires matching support.	PIN 1	检测口 Detection Port	
		PIN2	SW-	
		PIN 3	SW+	
7	RS485接口： ZH1.5-5P RS485 interface: ZH1.5-5P 	PIN 1	CAN _ H	
		PIN 2	CAN _ L	
		PIN 3	/	
		PIN 4	RS485—A（正+）	
		PIN 5	RS485—B（负-）	

6.3、电池采样线接线定义 Battery Sampling Cable 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 Explanation of Wire-Splicing Method List

BMS端	电　池　端 Battery Terminal											
定义 Definition	24S	23S	22S	21S	20S	19S	18S	17S	16S	15S	14S	13S
B0-	B0-	B0-	B0-	B0-	B0-	B0-	B0-	B0-	B0-	B0-	B0-	B0-
B1+	B1+	B1+	B1+	B1+	B1+	B1+	B1+	B1+	B1+	B1+	B1+	B1+
B2+	B2+	B2+	B2+	B2+	B2+	B2+	B2+	B2+	B2+	B2+	B2+	B2+
B3+	B3+	B3+	B3+	B3+	B3+	B3+	B3+	B3+	B3+	B3+	B3+	B3+
B4+	B4+	B4+	B4+	B4+	B4+	B4+	B4+	B4+	B4+	B4+	B4+	B4+
B5+	B5+	B5+	B5+	B5+	B5+	B5+	B5+	B5+	B5+	B5+	B5+	B5+
B6+	B6+	B6+	B6+	B6+	B6+	B6+	B6+	B6+	B6+	B6+	B6+	B6+
B7+	B7+	B7+	B7+	B7+	B7+	B7+	B7+	B7+	B7+	B7+	B7+	B6+
B8+	B8+	B8+	B8+	B8+	B8+	B8+	B8+	B8+	B8+	B7+	B7+	B6+
B9+	B9+	B9+	B9+	B9+	B9+	B9+	B9+	B8+	B8+	B7+	B7+	B6+
B10+	B10+	B10+	B10+	B10+	B10+	B9+	B9+	B8+	B8+	B7+	B7+	B6+
B11+	B11+	B11+	B11+	B10+	B10+	B9+	B9+	B8+	B8+	B7+	B7+	B6+
B12+	B12+	B11+	B11+	B10+	B10+	B9+	B9+	B8+	B8+	B7+	B7+	B6+
B13+	B13+	B12+	B12+	B11+	B11+	B10+	B10+	B9+	B9+	B8+	B8+	B7+
B14+	B14+	B13+	B13+	B12+	B12+	B11+	B11+	B10+	B10+	B9+	B9+	B8+
B15+	B15+	B14+	B14+	B13+	B13+	B12+	B12+	B11+	B11+	B10+	B10+	B9+
B16+	B16+	B15+	B15+	B14+	B14+	B13+	B13+	B12+	B12+	B11+	B11+	B10+
B17+	B17+	B16+	B16+	B15+	B15+	B14+	B14+	B13+	B13+	B12+	B12+	B11+
B18+	B18+	B17+	B17+	B16+	B16+	B15+	B15+	B14+	B14+	B13+	B13+	B12+
B19+	B19+	B18+	B18+	B17+	B17+	B16+	B16+	B15+	B15+	B14+	B14+	B13+
B20+	B20+	B19+	B19+	B18+	B18+	B17+	B17+	B16+	B16+	B15+	B14+	B13+
B21+	B21+	B20+	B20+	B19+	B19+	B18+	B18+	B17+	B16+	B15+	B14+	B13+
B22+	B22+	B21+	B21+	B20+	B20+	B19+	B18+	B17+	B16+	B15+	B14+	B13+
B23+	B23+	B22+	B22+	B21+	B20+	B19+	B18+	B17+	B16+	B15+	B14+	B13+
B24+	B24+	B23+	B22+	B21+	B20+	B19+	B18+	B17+	B16+	B15+	B14+	B13+
B+	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+

注：颜色区域表示多个电压采集排线并接在一起

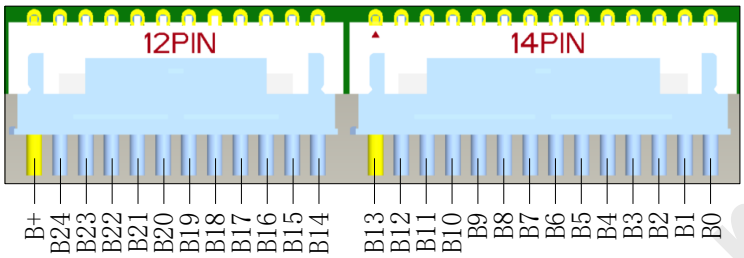
Note: The color area represents multiple voltage acquisition cables connected together.

说明：BMS端B0～B13为14P插座，B14～B+为12P插座；**保护板端的B+这根线要独立接线。**

Explanation: BMS terminals B0-B13 are 14P sockets, B14-B+are 12P sockets;

The B+wire at the end of the protective board needs to be wired independently.

★并线方式接线说明 Wiring Instructions for Wire-Splicing Method



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。【注意焊排线时排线切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】

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.

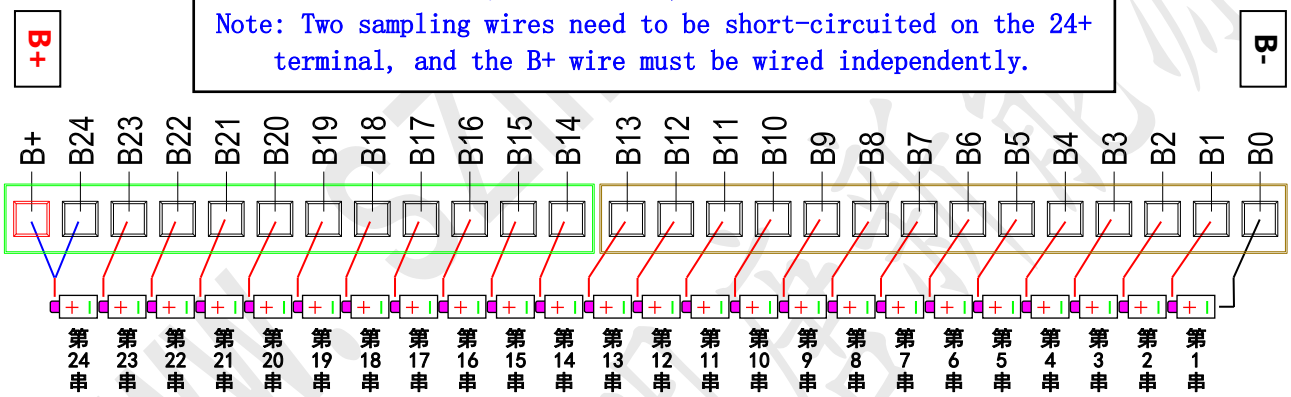
Notice: When soldering the wiring harness, do not solder it while it is plugged into the protection board. After connecting the wiring harness, do not directly plug it into the balancing instrument for equalizing.

24串电池采样线接线说明

24-String Battery Sampling Cable Connection Instructions

注意24+上需要短接2根采样线、B+这根要独立接线

Note: Two sampling wires need to be short-circuited on the 24+ terminal, and the B+ wire must be wired independently.

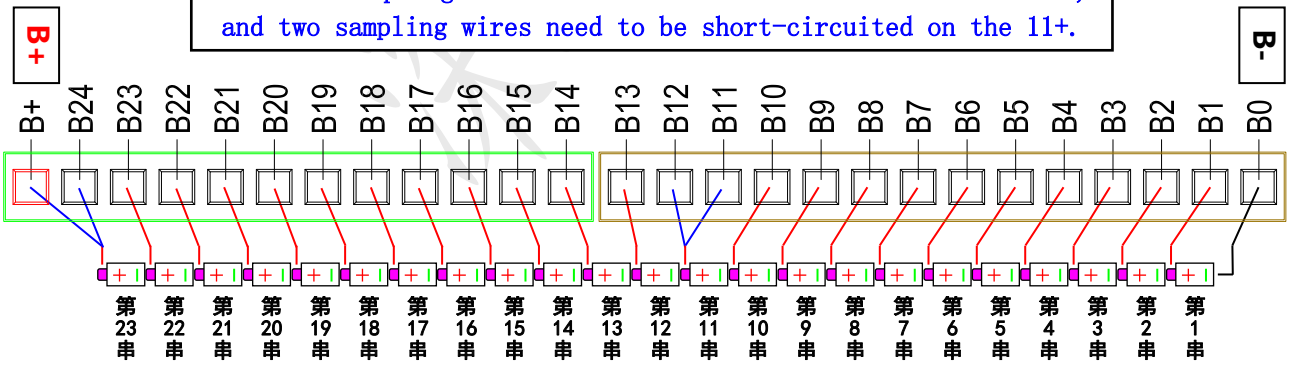


23串电池采样线接线说明

23-String Battery Sampling Cable Connection Instructions

注意23+上需要短接2根采样线、11+上需要短接2根采样线

Note:Two sampling wires need to be short-circuited on the 23+, and two sampling wires need to be short-circuited on the 11+.

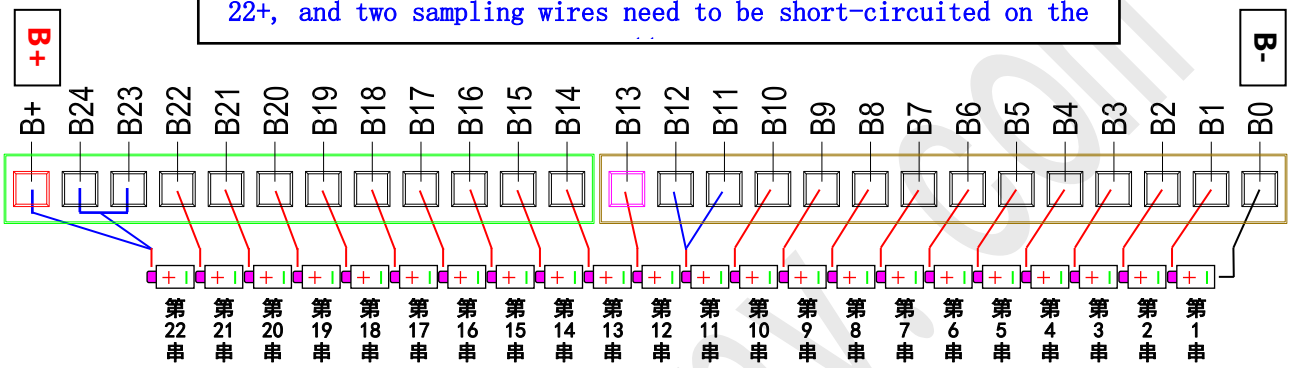


22串电池采样线接线说明

22-String Battery Sampling Cable Connection Instructions

注意22+上需要短接3根采样线、11+上需要短接2根采样线

Note:Three sampling wires need to be short-circuited on the 22+, and two sampling wires need to be short-circuited on the

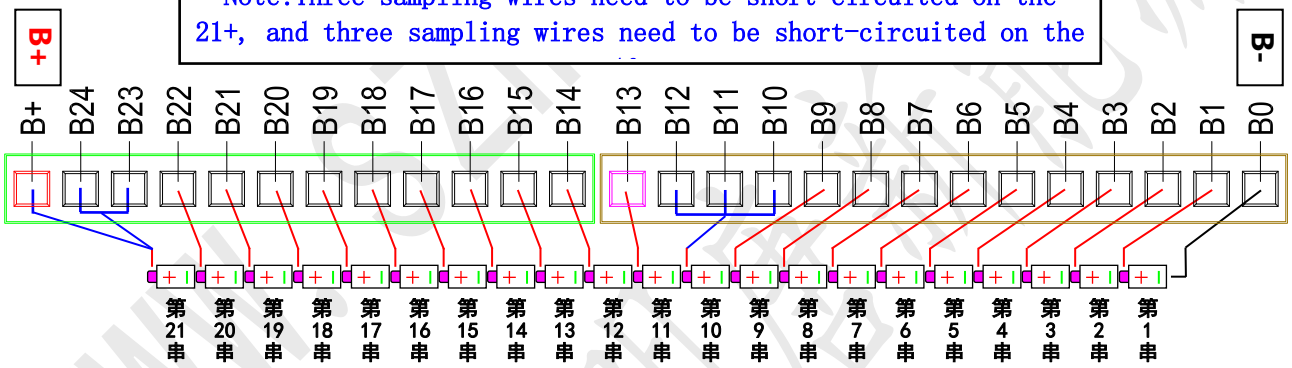


21串电池采样线接线说明

21-String Battery Sampling Cable Connection Instructions

注意21+上需要短接3根采样线、10+上需要短接3根采样线

Note:Three sampling wires need to be short-circuited on the 21+, and three sampling wires need to be short-circuited on the

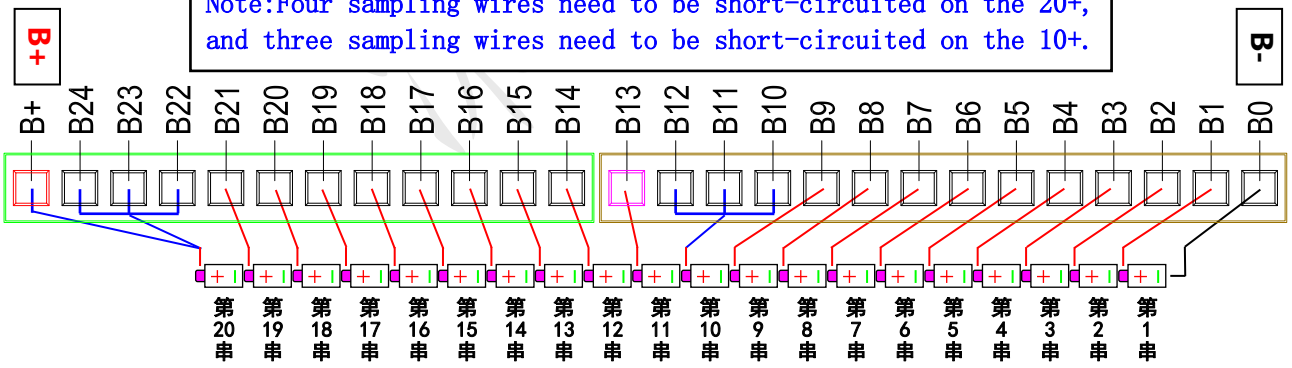


20串电池采样线接线说明

20-String Battery Sampling Cable Connection Instructions

注意20+上需要短接4根采样线、10+上需要短接3根采样线

Note:Four sampling wires need to be short-circuited on the 20+, and three sampling wires need to be short-circuited on the 10+.

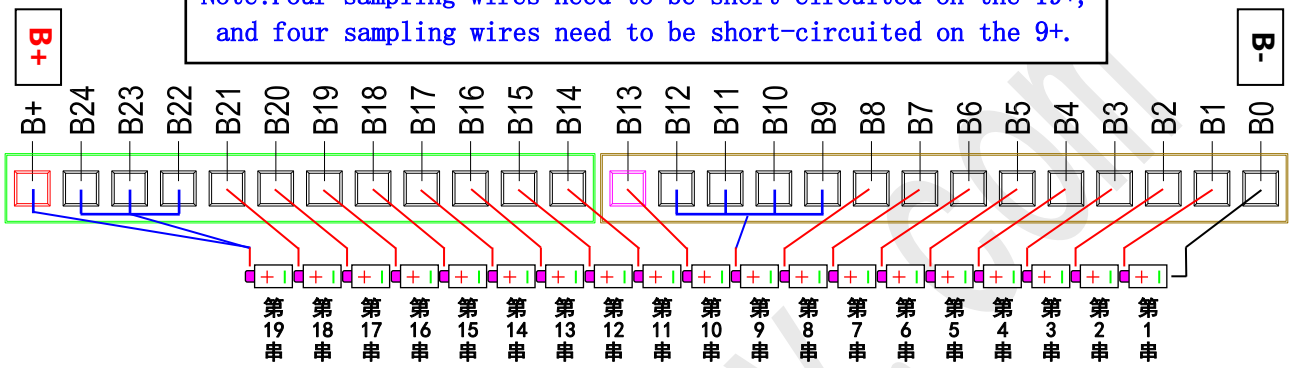


19串电池采样线接线说明

19-String Battery Sampling Cable Connection Instructions

注意19+上需要短接4根采样线、9+上需要短接4根采样线

Note:Four sampling wires need to be short-circuited on the 19+, and four sampling wires need to be short-circuited on the 9+.

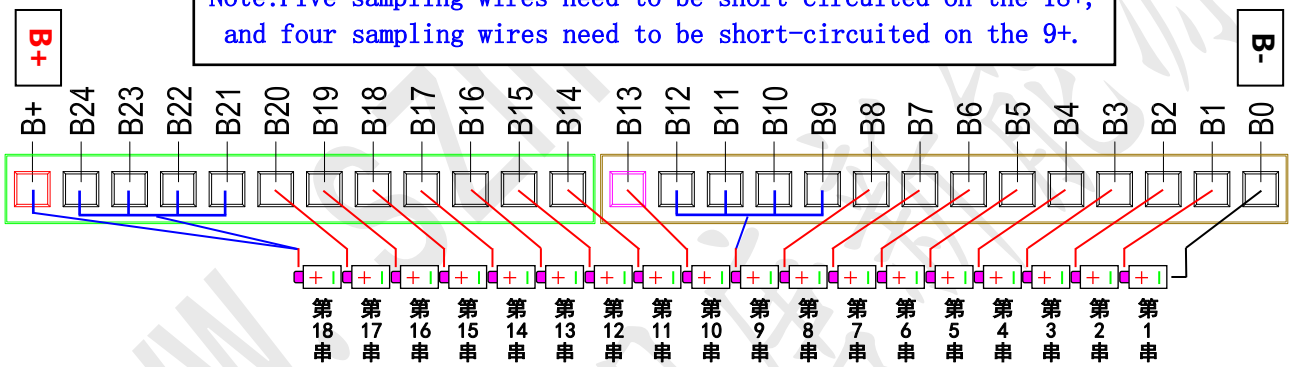


18串电池采样线接线说明

18-String Battery Sampling Cable Connection Instructions

注意18+上需要短接5根采样线、9+上需要短接4根采样线

Note:Five sampling wires need to be short-circuited on the 18+, and four sampling wires need to be short-circuited on the 9+.

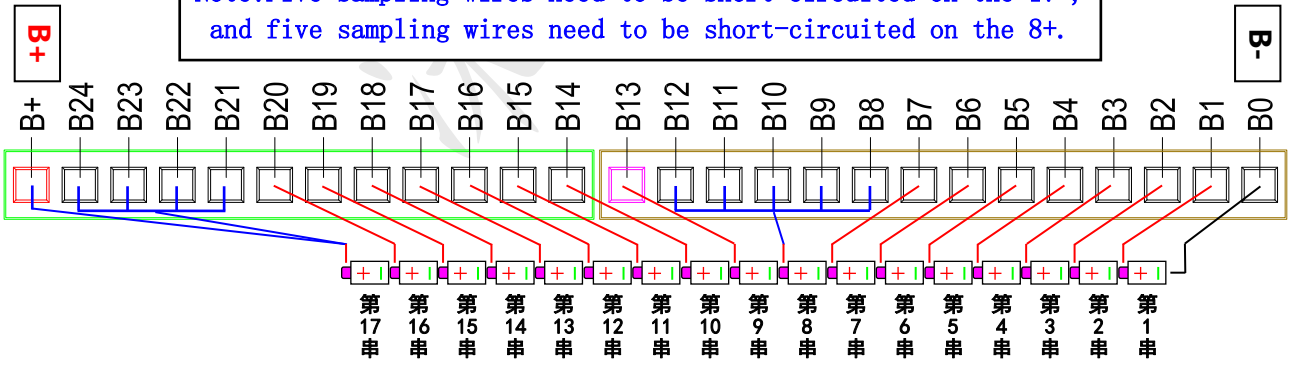


17串电池采样线接线说明

17-String Battery Sampling Cable Connection Instructions

注意17+上需要短接5根采样线、8+上需要短接5根采样线

Note:Five sampling wires need to be short-circuited on the 17+, and five sampling wires need to be short-circuited on the 8+.

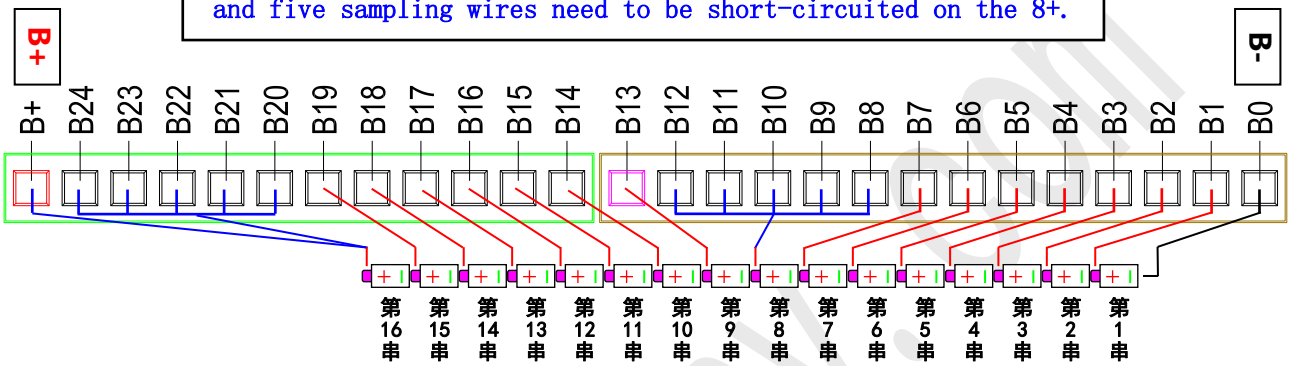


16串电池采样线接线说明

16-String Battery Sampling Cable Connection Instructions

注意16+上需要短接6根采样线、8+上需要短接5根采样线

Note:Six sampling wires need to be short-circuited on the 16+, and five sampling wires need to be short-circuited on the 8+.

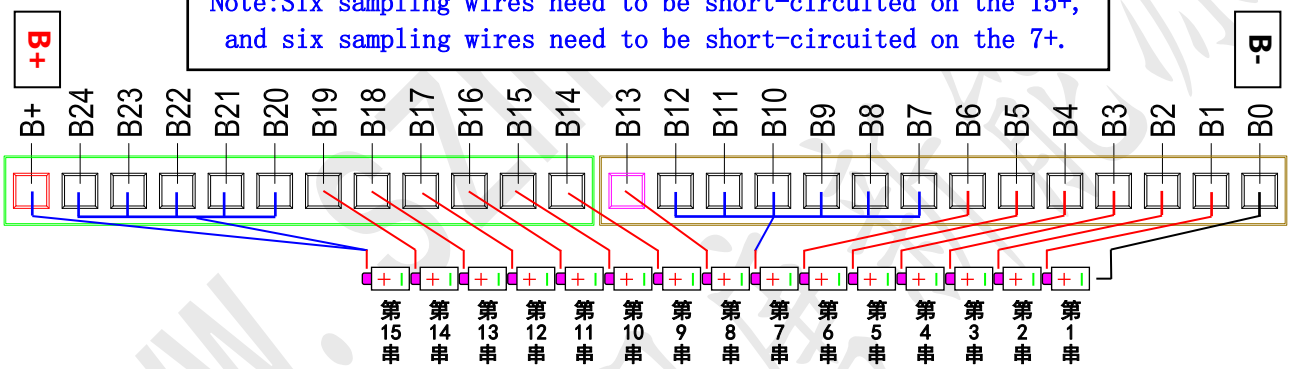


15串电池采样线接线说明

15-String Battery Sampling Cable Connection Instructions

注意15+上需要短接6根采样线、7+上需要短接6根采样线

Note:Six sampling wires need to be short-circuited on the 15+, and six sampling wires need to be short-circuited on the 7+.

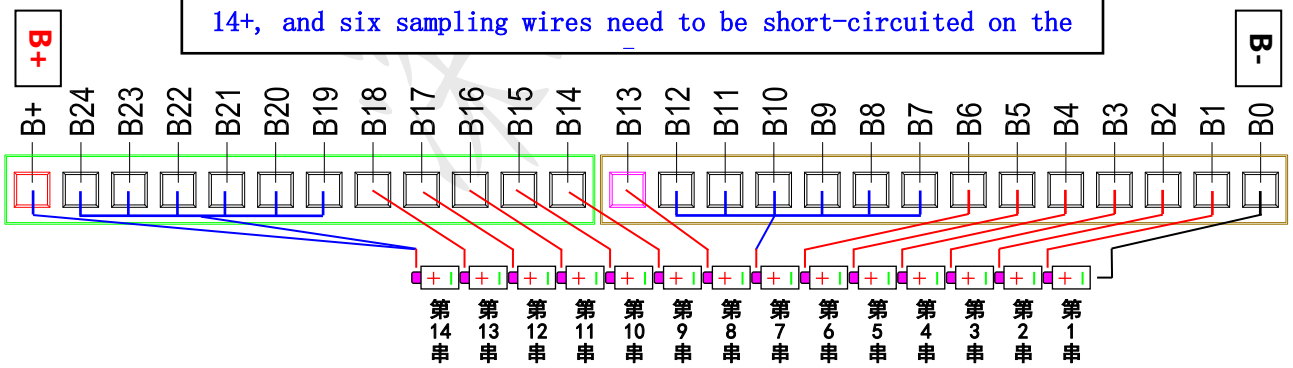


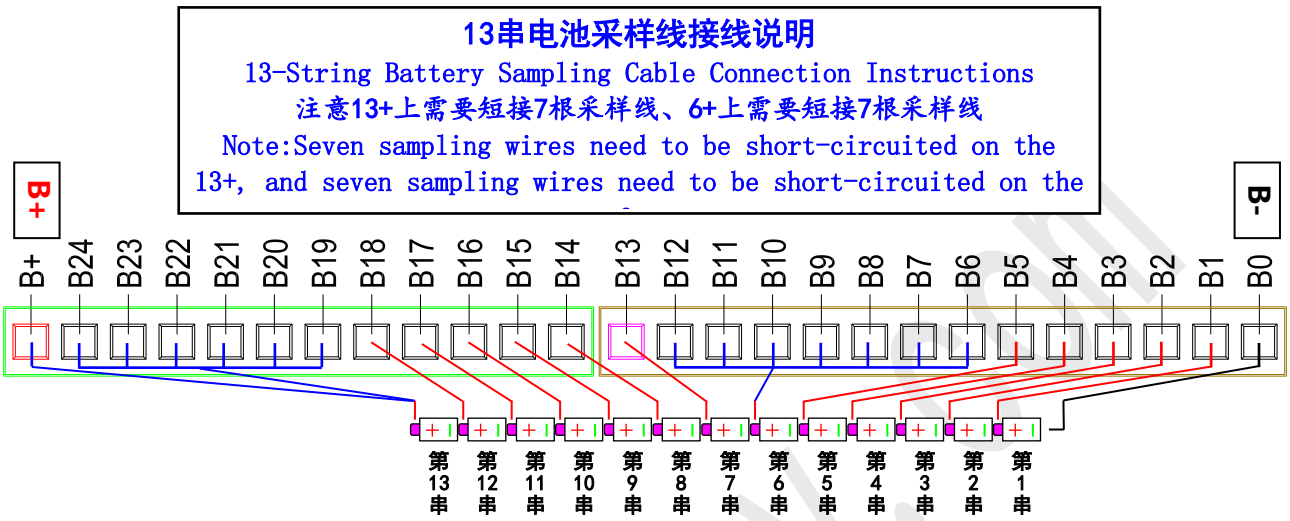
14串电池采样线接线说明

14-String Battery Sampling Cable Connection Instructions

注意14+上需要短接7根采样线、7+上需要短接6根采样线

Note:Seven sampling wires need to be short-circuited on the 14+, and six sampling wires need to be short-circuited on the





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 cable to the battery 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 cable of the battery pack; **(First insert the low voltage sampling cable [with black wire], then insert the high voltage sampling 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 cable 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 wire 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.

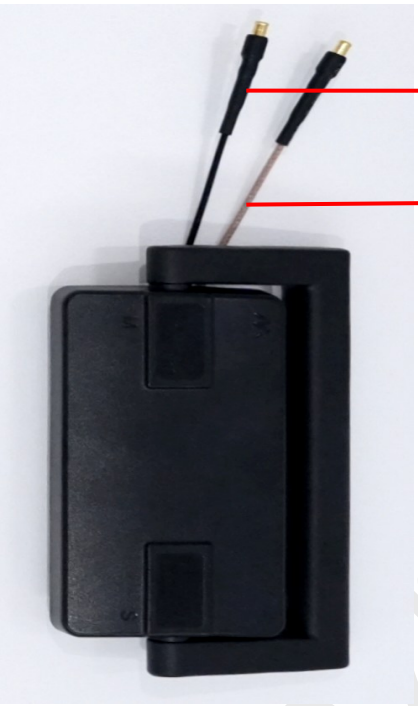
【说明：需要较长时间运输或者存储时，可以下发关机指令，让保护板关机进入低功耗模式，投入使用前需充电激活保护板开机才能正常使用】
[Notice: When it takes a long time for transportation or storage, the shutdown command can be issued to shut down the protection board and enter the low power consumption mode. Before putting into use, the protection board needs to be charged and activated to start up.]

七、天线把手安装说明 Antenna Handle Installation Instructions

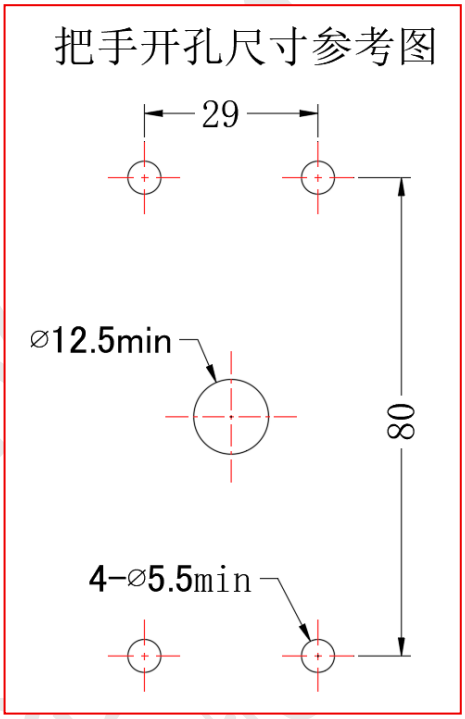
7.1、 天线把手实物及尺寸图：Antenna Handle and Its Dimension Drawing

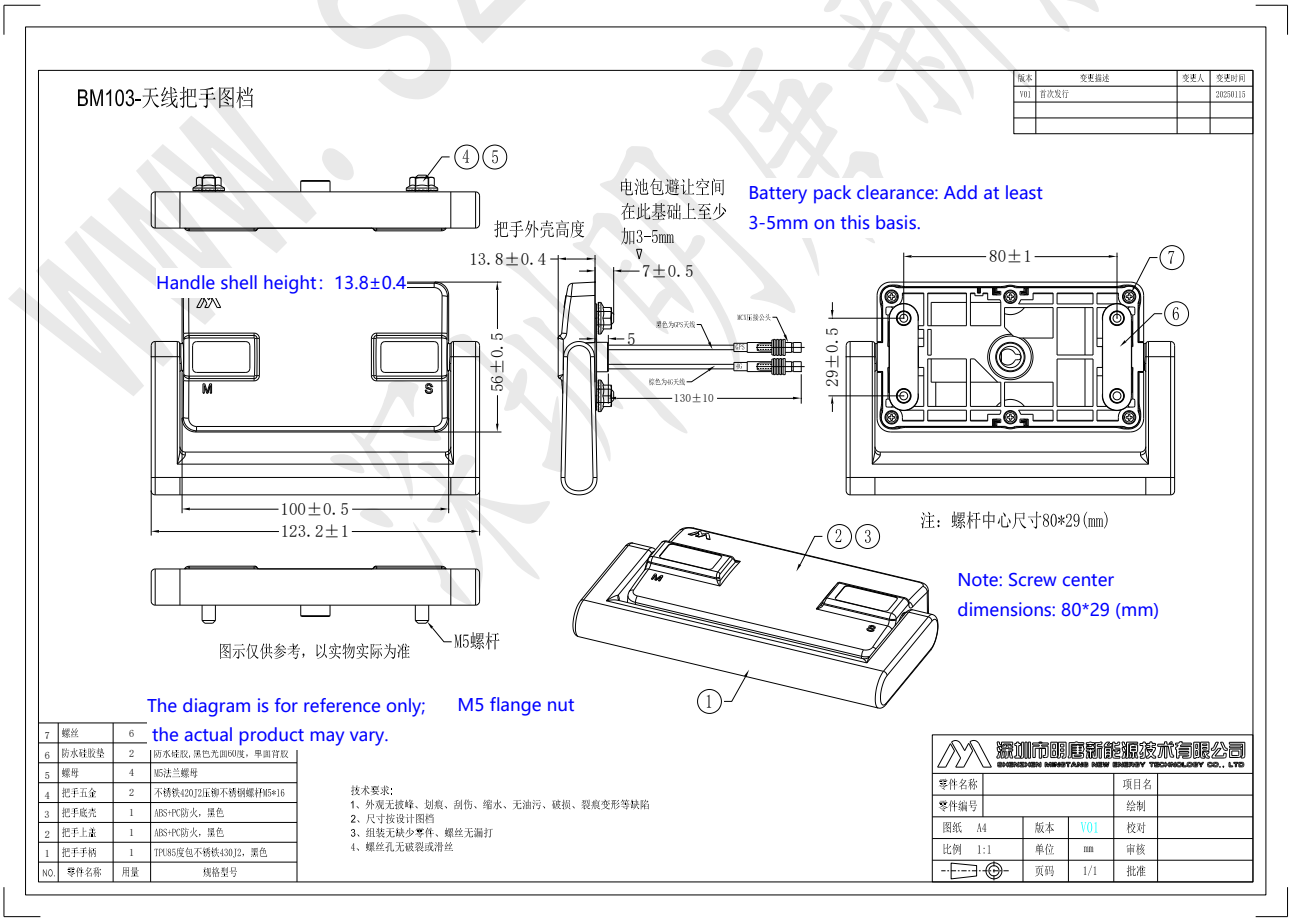
说明：把手可承重75Kg。

Description: Handle can bear 75Kg.



Reference diagram for handle opening size





7.2、 天线把手安装要求 Antenna Handle Installation Requirements:

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.

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

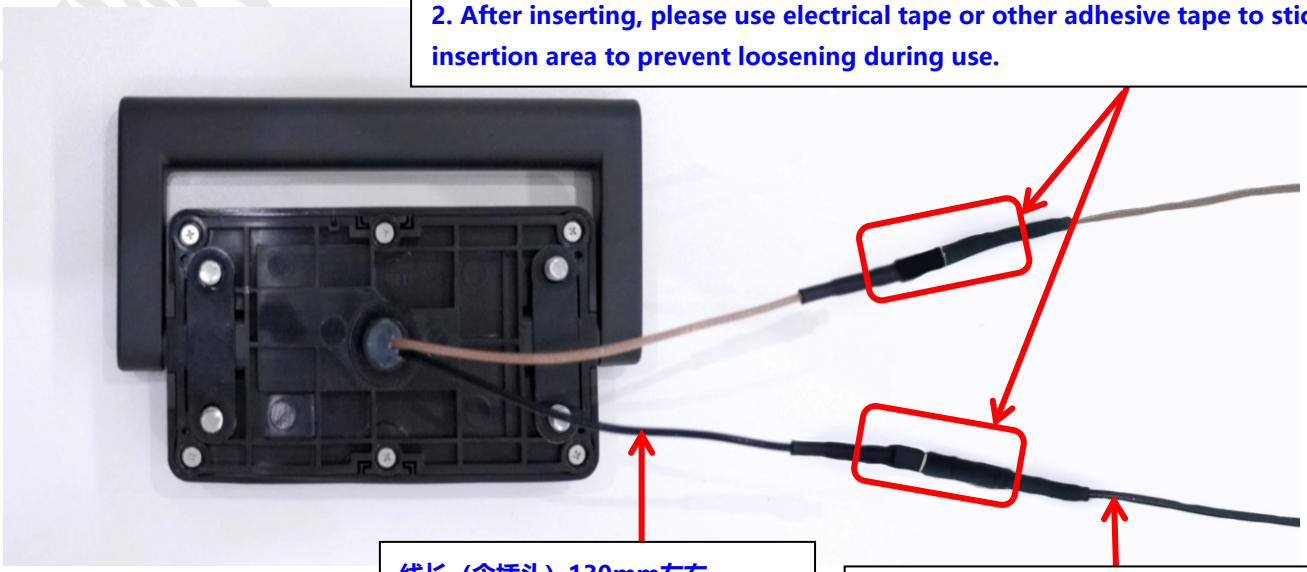
说明 Note:

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.



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：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

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

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 cable.
3, the layout of the temperature control wire 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。**
  Pay attention to the lead, soldering iron, tin slag, etc. do not touch the components on the circuit board, otherwise it is easy to 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 welding battery leads, do not connect wrong or reverse connect them. If it is confirmed that it has been connected incorrectly, the circuit board may be damaged and needs to be re-tested before it can be used.

- 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, the protection board should not directly contact the surface of the battery cell to avoid damage to the battery cell. The assembly should be strong 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 heat-dissipating aluminum board near the surface of the battery cell; otherwise, heat will be transferred to the battery cell, which will affect 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 string and protection board, if no voltage is generated or no power is supplied during the first power-on, check whether cables are correctly connected.

- 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 you test, install, use, or touch the protection board, take appropriate ESD measures.

- 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 have 0V charging function, once the battery appears 0V, the battery will be seriously degraded until damaged, in order not to damage the battery, users in the long-term do not use, please charge regularly and replenish the power, in the use of discharge protection, must be timely charged within 12 hours. Prevent the battery from discharging to 0V due to self-consumption.

- 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。
  The protection board is not equipped with the anti-charge protection function. Do not reverse connect the charging input when in use; otherwise, the protection board and battery may be damaged.

- 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 the charger that meets the requirements of this specification. If the charger is higher than the maximum DC voltage of the charging port, it may cause damage to the protection board. The charger with the trickling off function at the end of the charging current should be preferred (double safety). Note that the charger that does not have the trickle off function is designed for lead-acid batteries and is not suitable for lithium batteries .**For chargers that require detection of battery voltage to charge the battery, this product will not**

be able to charge after under-voltage protection. Chargers with charging activation function or default output charging voltage are 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 the use of the product must follow the design parameters and conditions of use, shall not exceed the values in this specification; If this specification is violated, it is easy to damage the protection board, and then damage 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 there is any abnormal situation during use, please stop using immediately and return to the original factory or ask professional maintenance personnel for repair.

- 使用过程要注意防静电、防潮、防水等。
  Note: Static electricity, moisture, and water resistance must be observed during use.

- 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 long-term transportation or storage, use the upper computer to control the BMS and shut down the protection board, which will then enter low-power mode to prevent battery depletion from prolonged 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, all parameters in the specification sheet are measured at room temperature (25℃). Contact our technical department for confirmation if using beyond the specified parameters.

- 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。
  A large number of reliability tests have been done on this protection board, which is much higher than the general protection board on the market, but in order to minimize the occurrence of accidents, please use qualified batteries.

- **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）
  The relationship between the battery pack capacity and the continuous discharge current of the protection board:
  It is recommended that the battery pack capacity is many amps, and the protection board with continuous discharge current is many amps is selected. (For example: 50AH battery pack to choose a continuous discharge current of at least 50A protection board)

  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.

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

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	中颖SH367309 ZhongyingSH367309
2	充电MOS管 Charging MOS tube	MDT10N023RH、CRSZ028N12N3Z、WMLL020N11HGS
3	放电MOS管 Discharging MOS tube	MDT10N023RH、CRSZ028N12N3Z、WMLL020N11HGS

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 shall not exceed the MOSFET's voltage rating of 100V.

十、产品修订记录表 Product Revision Record

版本 Revision	变更内容 Modified Content	责任人 Principl	日期 Date	标记 Mark	备注 Note
A0	首版发行 Initial Release	FJB	20250513		
A1	修正使用注意事项并联的说明 Revised the explanation of parallel connection in the usage precautions	FJB	20250610		
A2	修正23串的采样接线说明及更新主要元器件清单 Revised the sampling wiring instructions for 23-strring batteries and updated the main component list	FJB	20250826		
A3	项目更新，更新文字描述 Project update: Updated textual descriptions	FJB	20251106		