锂电池主动均衡保护板

Lithium battery active balance BMS

JK-BD6AxxS-6P/ JK-BD6AxxS-8P

JK-BD6AxxS-10P / JK-BD6AxxS-15P

JK-BD6AxxS-20P/ JK-B1AxxS-15P

JK-B2AxxS-15P/ JK-B2AxxS-20P

使用维护说明书

Operation and maintenance instructions

成都极空科技有限公司

Chengdu Jikong Technology Co., Ltd

产品保修条款

产品名称：锂电池智能护板

保修期限：壹年

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版权声明

Product warranty terms

Product Name: lithium battery intelligent protection board
Warranty period: one year

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1. Chengdu Jikong Technology Co., Ltd. guarantees that the products have been fully tested.

2. Chengdu Jikong Technology Co., Ltd. does not guarantee that the products can be used without interruption during the process of product repair. However, the company shall guarantee to repair the faulty products within a reasonable period.

3. The warranty period of the product shall be calculated from the date of shipment of the product or the date of installation by Chengdu Jikong Technology Co., Ltd. If the company's products are not installed within 30 days after the date of shipment due to the user's schedule or delay, the product warranty period shall be calculated from the 31st day after the date of shipment.

4. Chengdu Jikong Technology Co., Ltd. does not provide free warranty for product failure and damage caused by any of the following circumstances: (a) wrong use or improper maintenance; (b) Software, accessories, parts or other items not provided by Chengdu Jikong Technology Co., Ltd; (c) Unauthorized disassembly, modification and wrong use; (d) Use beyond the scope specified in the product technical specifications; (e) Improper transportation, handling and storage; (f) Failure or damage caused by other non quality reasons (such as earthquake, war, traffic accident, etc.).

To the extent permitted by law, the above warranty terms are only clear, and there are no other warranty terms, whether written or oral. Expressly disclaims any implied warranty and commercial terms.

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1. 概述Overview

锂电池智能保护板是为大容量串联锂电池组量身打造的管理系统，具备电压采集、大电流主动均衡、过充过放过流过温保护、库仑计、蓝牙通信、GPS 远程等功能。可适用于磷酸铁锂、三元锂等电池种类。

Lithium battery intelligent BMS is a management system tailored for high-capacity series lithium battery packs. It has the functions of voltage collection, large current active equalization, overcharge and discharge overcurrent temperature protection, coulometer, Bluetooth communication, GPS remote, etc. It can be applied to lithium iron phosphate, ternary lithium and other battery types.

保护板依托具备自主知识产权的能量转移式主动均衡技术，可以实现最大持续 2A 的均衡电流。大电流主动均衡技术可以最大程度的保证电池一致性、提高电池续航里程、延缓电池衰老。

Relying on the energy transfer active balancing technology with independent intellectual property rights, BMS can achieve a maximum continuous 2A balance current. High current active balancing technology can ensure battery consistency, improve battery life and delay battery aging to the maximum extent.

保护板有配套的手机APP，支持 Android 和IOS 操作系统。APP 可以通过手机蓝牙连接到保护板以查看电池工作状态、修改保护板的各项工作参数、控制充放电开关等等。保护板体积小、操作简单、功能全，可广泛应用于小型观光车、代步车、共享汽车、大功率储能、基站备用电源、太阳能电站等产品的电池 PACK。

BMS has a supporting mobile app that supports Android and IOS operating systems. The app can be connected to the protection board through the Bluetooth of the mobile phone to view the working status of the battery, modify various working parameters of the BMS, control the charging and discharging switch, and so on. BMS is small in size, simple in operation and full in functions. It can be widely used in battery packs of small sightseeing cars, scooters, shared cars, high-power energy storage, backup power supply of base stations, solar power stations and other products.

2.主要技术参数 Main technical parameters

2.1. 主要技术指标 Main technical indicators

6P/8P/10P/15P/20P系列保护板的主要技术指标如表1、表2 所示。

The main technical indexes of 6P/8P/10P/15P /20P series BMS are shown in Table 1 and table 2.

表1 6P/8P系列保护板主要技术指标

Table 1 main technical indexes of 6P / 8P series BMS

技术指标 Technical indicators	产品型号 Product model:					
	BD6A17S6P	BD6A20S6P	BD6A24S6P	BD6A17S8P	BD6A20S8P	BD6A24S8P
三元串数 Number of NCM strings	7～17	7～20	7～24	7～17	7～20	7～24
铁锂串数 Number of LFP strings	8～17	8～20	8～24	8～17	8～20	8～24
钛酸串数 Number of LTO strings	14～17	14～20	14～24	14～17	14～20	14～24
均衡方式 Balance mode	主动均衡 Active balancing					
均衡电流 Balance current	0.6A					
主回路内阻 Internal resistance of main circuit	1.53 mΩ			1.2 mΩ		
持续放电电流 Continuous discharge current	60A	60A	60A	80A	80A	80A
最大放电电流 Maximum discharge current	100A	100A	100A	150A	150A	150A
过流保护(可调) Overcurrent protection (adjustable)	10～60 A	10～60 A	10～60 A	10～80 A	10～80 A	10～80 A
RS485通信接口 RS485 communication interface	支持，需选配（CAN/RS485只能二选一） Support, optional (can / RS485 can only be one of two)					
CAN通信接口 Can communication interface	支持，需选配（CAN/RS485只能二选一） Support, optional (can / RS485 can only be one of two)					
显示屏接口 Display interface	有 have					
出线方式 Entry cable	同口 Tongkou					
单体电压范围 Single voltage range	1~5V					
电压采集精度 Voltage acquisition accuracy	±3mV					
过充保护电压 Overcharge protection voltage	1.2～4.35V 可调 (adjustable)					
过充解除电压 Overcharge release voltage	1.2～4.35V 可调(adjustable)					
过流解除时间 Overcurrent release time	2～120S可调(adjustable)					
过放保护电压 Over discharge protection voltage	1.2～4.35V 可调(adjustable)					

过放恢复电压 Over discharge recovery voltage	1.2～4.35V 可调(adjustable)
温度检测数量 Temperature detection quantity	3 个
温度保护 Temperature protection	有 have
短路保护 Short circuit protection	有 have
库仑计SOC	有 have
蓝牙功能 Bluetooth function	支持安卓、苹果 Support Android and IOS
GPS(选配) GPS (optional)	支持（RS485 和GPS 二选一） Support (one of RS485 and GPS)

表2　　10P/15P/20P系列保护板主要技术指标 Table 2 main technical indexes of 10P / 15P/20P series BMS

技术指标 Technical indicators	产品型号					
	BD6A20S10P	BD6A24S10P	B1A20S15P	B1A24S15P	B2A24S15P	B2A24S20P
三元串数 Number of NCM strings	7～20	7～24	7～20	7～24	7～24	7～24
铁锂串数 Number of LFP strings	8～20	8～24	8～20	8～24	8～24	8～24
钛酸串数 Number of LTO strings	14	14～20	14～20	14～24	14～24	14～24
均衡方式 Balance mode	主动均衡 Active balancing					
均衡电流 Balance current	0.6A		1A		2A	
主回路内阻 Internal resistance of main circuit	1 mΩ		0.65 mΩ		0.47 mΩ	
持续放电电流 Continuous discharge current	100A		150A		200A	
最大放电电流 Maximum discharge current	200A		300A		350A	
过流保护(可调) Overcurrent protection (adjustable)	10～100A		10～150A		10～200A	
RS485通信接口 RS485 communication interface	支持，需选配（CAN/RS485只能二选一） Support, optional (can / RS485 can only be one of two)					
CAN通信接口 Can communication interface	支持，需选配（CAN/RS485只能二选一） Support, optional (can / RS485 can only be one of two)					
显示屏接口 Display interface	有 have					
出线方式 Entry cable	同口 Tongkou					
单体电压范围 Single voltage range	1~5V					
电压采集精度 Voltage acquisition accuracy	±3mV					

过充保护电压 Overcharge protection voltage	1.2～4.35V 可调 (adjustable)
过充解除电压 Overcharge release voltage	1.2～4.35V 可调(adjustable)
过流解除时间 Overcurrent release time	2～120S可调(adjustable)
过放保护电压 Over discharge protection voltage	1.2～4.35V 可调(adjustable)
过放恢复电压 Over discharge recovery voltage	1.2～4.35V 可调(adjustable)
温度检测数量 Temperature detection quantity	3 个
温度保护 Temperature protection	有 have
短路保护 Short circuit protection	有 have
库仑计SOC	有 have
蓝牙功能 Bluetooth function	支持安卓、苹果 Support Android and IOS
GPS(选配) GPS (optional)	支持（RS485 和GPS 二选一） Support (one of RS485 and GPS)

2.2. 使用环境条件 Service environment conditions

- ➢ 工作温度范围：-40℃～70℃；

- ➢ Operating temperature range: - 40 ℃ ~ 70 ℃;

- ➢ 电源要求：20~100V。

- ➢ Power requirement: 20 ~ 100V.

- ➢ 功耗：均衡状态 10mA@100V，非均衡状态 6mA@100V。

- ➢ Power consumption: balanced state 10mA@100V , unbalanced state 6mA@100V 。

3. 连接器及接口描述 Connector and interface description

3.1. 连接器、LED 灯位置标识 Connector and LED lamp position identification

两款保护板连接器、LED 灯位置如图 1 和图 2 所示所示。

The positions of the two BMS connectors and LED lights are shown in Figure 1 and Figure 2.
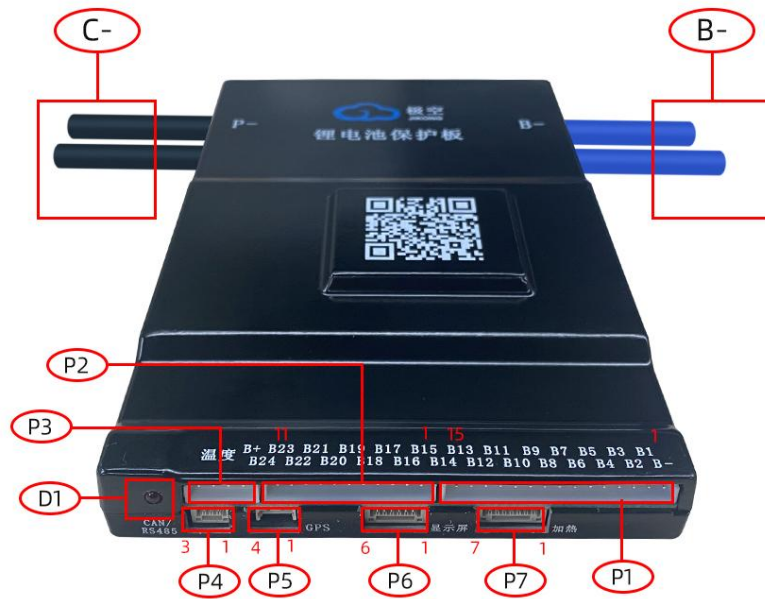
图 1 BD6AxxS-10P/ B1AxxS-15P/B2AxxS-15P/B2AxxS20P 连接器示意图
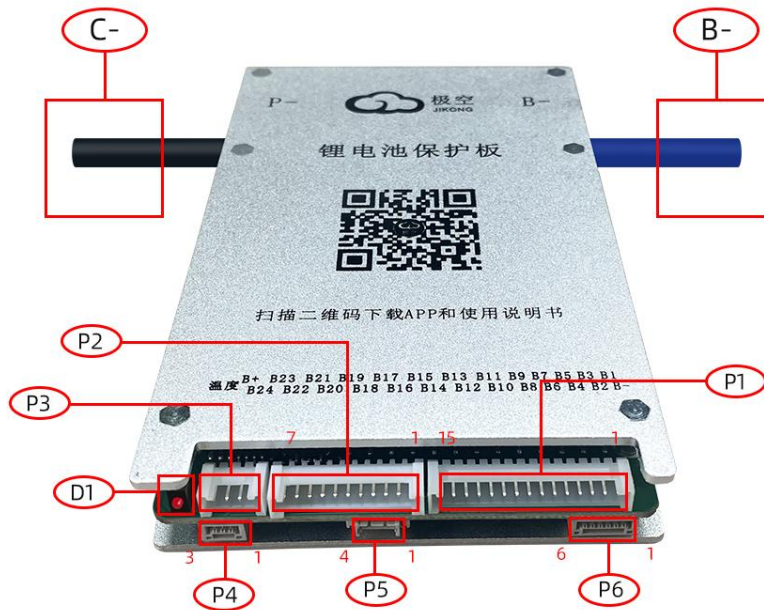Fig. 1 Schematic diagram of BD6AxxS-10P/ B1AxxS-15P/B2AxxS-15P/B2AxxS20P connector

图 2 BD6AxxS-6P/BD6AxxS8P 连接器示意图

Fig. 2 Schematic diagram of BD6AxxS-6P/ BD6AxxS8P connector

3.2. 连接器、LED 定义 Definition of connector and led

BD6AxxS-6P/BD6AxxS-8P/BD6AxxS-10P/B1AxxS-15P/B2AxxS-15P/B2AxxS20P
保护板连接器定义、LED 灯定义见表 3 表4。

See Table 3 and table 4 for definitions of BD6AxxS-6P/BD6AxxS-8P/BD6AxxS-

10P/B1AxxS-15P/B2AxxS-15P/B2AxxS20P protection board connector and LED lamp.

表3　　P1~P4接口定义 Table 3 P1-P4 interface definition

连接器 Connector	接口名称 Interface name:	管脚号 Pin number	BD6AxxS-6P/BD6AxxS-8P/BD6AxxS-10P B1AxxS-15P/B2AxxS-15P/B2AxxS20P	
			名称 name	定义 Definition
P1	均衡与采集接口 Balance and acquisition interface	1	B-	电池总负极 Total negative electrode of battery
		2	B1	第 1 串电池正极 Positive electrode of the 1st string battery
		3	B2	第 2 串电池正极 Positive electrode of the 2st string battery
		4	B3	第 3 串电池正极 Positive electrode of the 3st string battery
		5	B4	第 4 串电池正极 Positive electrode of the 4st string battery
		6	B5	第 5 串电池正极 Positive electrode of the 5st string battery
		7	B6	第 6 串电池正极 Positive electrode of the 6st string battery
		8	B7	第 7 串电池正极 Positive electrode of the 7st string battery
		9	B8	第 8 串电池正极 Positive electrode of the 8st string battery
		10	B9	第 9 串电池正极 Positive electrode of the 9st string battery
		11	B10	第 10 串电池正极 Positive electrode of the 10st string battery
		12	B11	第 11 串电池正极 Positive electrode of the 11st string battery
		13	B12	第 12 串电池正极 Positive electrode of the 12st string battery
		14	B13	第 13 串电池正极 Positive electrode of the 13st string battery
		15	B14	第 14 串电池正极 Positive electrode of the 14st string battery
P2		1	B15	第 15 串电池正极 Positive electrode of the 15st string battery
		2	B16	第 16 串电池正极 Positive electrode of the 16st string battery
		3	B17	第 17串电池正极 Positive electrode of the 17st string battery
		4	B18	第 18 串电池正极 Positive electrode of the 18st string battery
		5	B19	第 19 串电池正极 Positive electrode of the 19st string battery
		6	B20	第 20 串电池正极

				Positive electrode of the 20st string battery
		7	B21	第 21 串电池正极 Positive electrode of the 21st string battery
		8	B22	第 22 串电池正极 Positive electrode of the 22st string battery
		9	B23	第 23 串电池正极 Positive electrode of the 23st string battery
		10	B24	第 24 串电池正极 (电池总正） Positive electrode of the 24st string battery
		11	B+	保护板电源,接电池总正 Power supply of protection board, connected to battery positive
P3	温度接口Temperature interface	1	T1A	第 1 个温度传感器 A 管脚 Pin A of the first temperature sensor
		2	T1B	第 1 个温度传感器B 管脚 Pin B of the first temperature sensor
		3	T2A	第 2 个温度传感器 A 管脚 Pin A of the second temperature sensor
		4	T2B	第 2 个温度传感器B 管脚 Pin B of the second temperature sensor
P4	通讯接口 **communication interface**	1	D_N	CAN_L/RS485-N信号正极（选配功能，可选择CAN或RS485） CAN_ L / rs485-n signal positive (optional function, CAN or RS485 can be selected)
		2	D_P	CAN_L/RS485-N信号正极（选配功能，可选择CAN或RS485） CAN_ L / rs485-n signal positive (optional function, CAN or RS485 can be selected)
		3	GND	信号地

表4   P5~P7接口定义 Table 4 P5 ~ P7 interface definition

连接器 Connector	接口名称 Interface name:	管脚号 Pin number	BD6AxxS-6P/BD6AxxS-8P/BD6AxxS-10P B1AxxS-15P/B2AxxS-15P/B2AxxS20P	
			名称 name	定义 Definition
P5	GPS接口 GPS interface	1	VGPS	电源输出，电压与B+接近 Power output, voltage close to B +
		2	TX	UART_TX,3.3V
		3	RX	UART_RX,3.3V
		4	GND	电源/信号地 Power / signal ground
P6	显示屏接口 LCD interface	1	VCC	显示屏电源输出 LCD power output
		2	A	显示屏RS485信号正极 LCD RS485 signal positive pole
		3	B	显示屏RS485信号负极 LCD RS485 signal negative pole

5		4	GND	电源负极 Negative pole of power supply
		5	K+	激活信号正极 Active signal positive
		6	K-	激活信号负极 Activation signal negative
P7	加热接口(选配功能) Heating interface (optional function)	1	HT-	加热负极——(BD6AxxS-6P/BD6AxxS-8P无此功能) Heating negative electrode - (BD6AxxS-6P/BD6AxxS-8P do not have this function)
		2	HT-	加热负极——(BD6AxxS-6P/BD6AxxS-8P无此功能) Heating negative electrode - (BD6AxxS-6P/BD6AxxS-8P do not have this function)
		3	HT-	加热负极——(BD6AxxS-6P/BD6AxxS-8P无此功能) Heating negative electrode - (BD6AxxS-6P/BD6AxxS-8P do not have this function)
		4	HT-	加热负极——(BD6AxxS-6P/BD6AxxS-8P无此功能) Heating negative electrode - (BD6AxxS-6P/BD6AxxS-8P do not have this function)
		5	HT-	加热负极——(BD6AxxS-6P/BD6AxxS-8P无此功能) Heating negative electrode - (BD6AxxS-6P/BD6AxxS-8P do not have this function)
		6	CD+	充电指示输入正极——(BD6AxxS-6P/BD6AxxS-8P无此功能) Charging indication input positive - (BD6AxxS-6P/BD6AxxS-8P do not have this function)
		7	CD-	充电指示输入负极——(BD6AxxS-6P/BD6AxxS-8P无此功能) Charging indication input negative electrode - (BD6AxxS-6P/BD6AxxS-8P does not have this function)
D1	蓝牙连接指示灯，当蓝牙连接上保护板时指示灯常亮，断开连接时指示灯闪烁。 Bluetooth connection indicator: the indicator is always on when the Bluetooth is connected to the protection board, and flashes when the Bluetooth is disconnected.			
C-	接外部负载或者充电器负极 Connected to external load or charger negative pole			
B-	接电池负极 Connected to battery negative electrode			

3.3. 产品外型 Product appearance

JK-BD6AxxS-10P、JK-B1AxxS-15P、JK-B2AxxS-15P、JK-B2AxxS-20P保护板外型如图3所示。

The outline of JK-BD6AxxS-10P/JK-B1AxxS-15P/JK-B2AxxS-15P、 and JK-B2AxxS-20P protection boards is shown in Figure 3.

图 3 JK-BD6AxxS-10P、JK-B1AxxS-15P、JK-B2AxxS-15P、JK-B2AxxS-20P 效果图

Fig. 3 effect diagram ofJK-BD6AxxS-10P、JK-B1AxxS-15P、JK-B2AxxS-15P and JK-B2AxxS-20P

JK-BD6AxxS-6P、JK-BD6AxxS-8P保护板外型如图 4 所示。

The appearance of JK-BD6AxxS-6P and JK-BD6AxxS-8P protection plates is shown in Fig. 4.

图 4 JK-BD6AxxS-6P、JK-BD6AxxS-8P 效果图
Figure 4 effect diagram ofJK-BD6AxxS-6P and JK-BD6AxxS-8P

3.4. 尺寸 Size

JK-BD6AXXS-10P/JK-B1AXXS-15P/JK-B2AXXS-15P/JK-B2AXXS-20P系列 保护板尺寸为 162mm×102mm×20.4mm，外形尺寸如图 5 所示。

JK-BD6AXXS-10P/JK-B1AXXS-15P/JK-B2AXXS-15P and JK-B2AXXS-20P series BMS size is 162mm × 102mm × 20.4mm, and the overall dimensions are shown in Fig. 5.
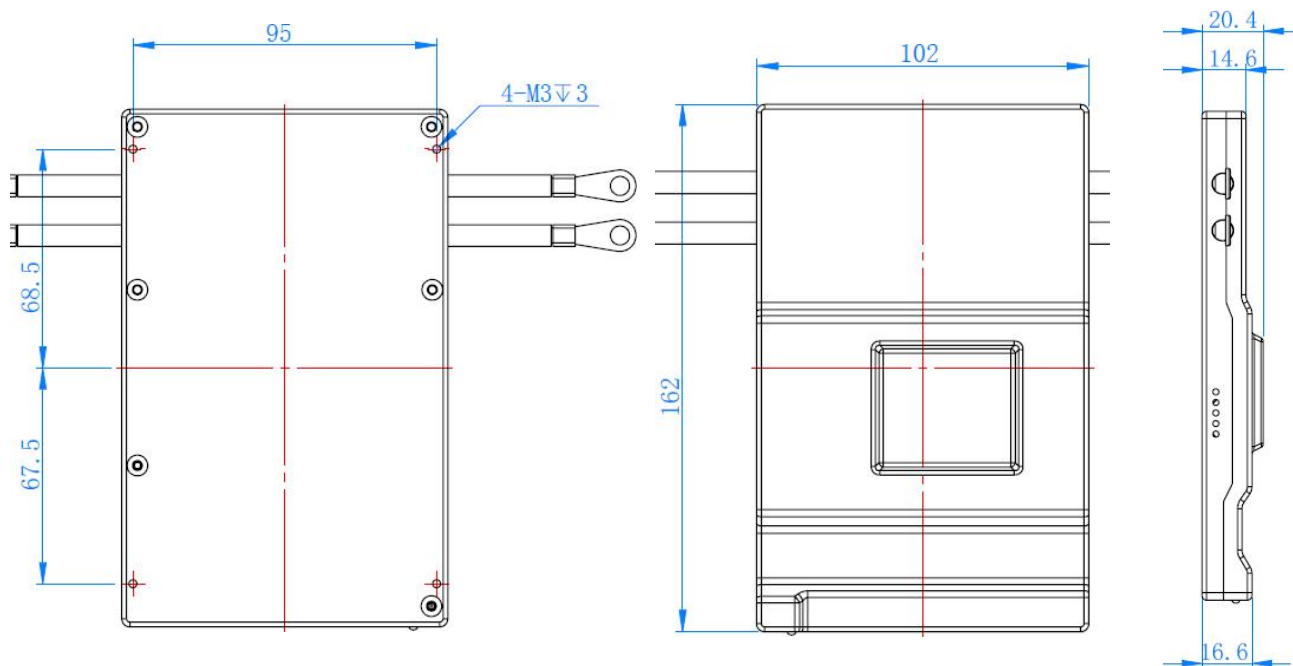
图 5 BD6A20S10P/B2A24S10P/ B1A24S15P/B2A24S15P/B2A24S20P 外形尺寸图
Figure 5 outline dimension drawing of BD6A20S10P/B2A24S10P/ B1A24S15P/B2A24S15P and B2A24S20P

BD6AXXS-6P、BD6AXXS-8P系列保护板尺寸为 136mm×83mm× 17.6mm，外形尺寸如图6 所示。

BD6AXXS-6P and BD6AXXS-8P series BMS are 136mm in size × 83mm × 17.6mm, and the overall dimensions are shown in Fig. 6.
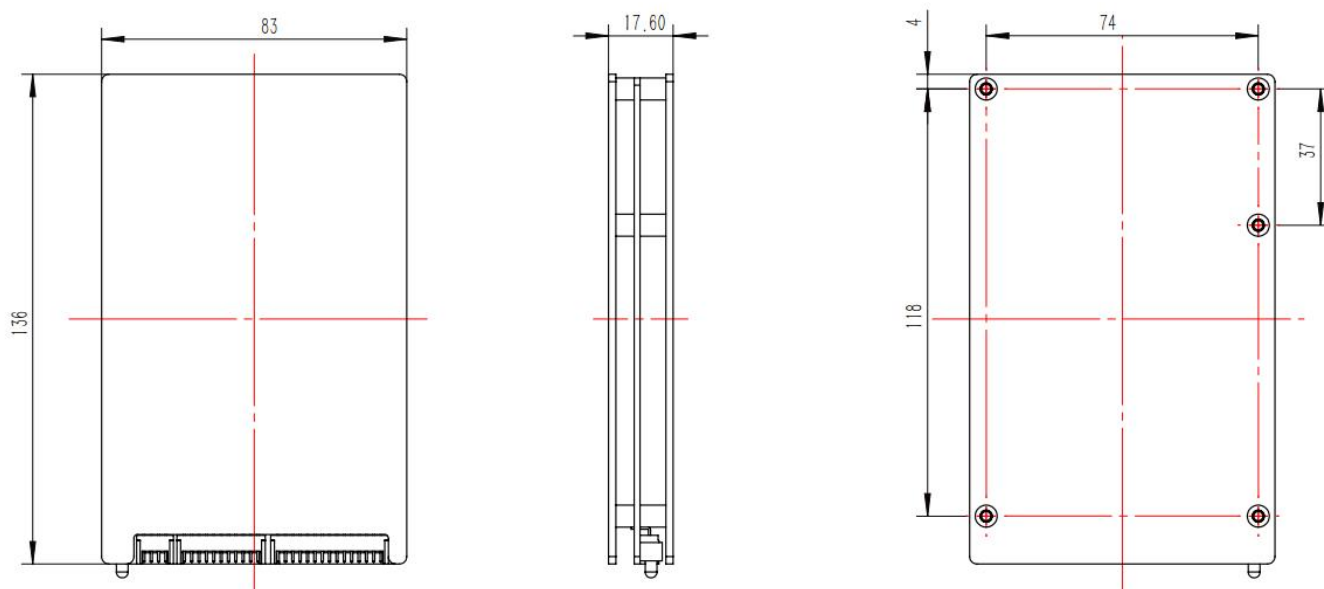

图 6 BD6AXXS-6P、BD6AXXS-8P系列保护板外形尺寸图
Figure 6 outline dimension drawing of BD6AXXS-6P and BD6AXXS-8P series BMS

3.5. 重量 Weight

➢ BD6AXXS-6P、BD6AXXS-8P系列 保护板重量约为 257g 。

➢ The weight of BD6AxS-6P and BD6AxS-8P series BMS is about 257g.

➢ BD6AXXS-10P系列 保护板重量约为 360g 。

➢ The weight of BD6AXXS-10P series BMS is about 360g.

➢ B1AXXS-15P/B2AXXS-15P/B2AXXS-20P系列 保护板重量约为 430g 。

➢ The weight ofB1AXXS-15P/B2AXXS-15P and B2AXXS-20P series BMS is about 360g.

4.安装方法及注意事项 Installation method and precautions

4.1. 开箱检查及注意事项 Unpacking inspection and precautions

开箱检查及注意事项如下：

Unpacking inspection and precautions are as follows:

A) 对包装箱、保护板等需要轻拿轻放、尽量不要倒置；

a）The packaging box and protective plate shall be handled with care and shall not be inverted as far as possible;

B) 开箱前注意包装是否完好，如有无撞击痕迹、有无破损等；

b) Before unpacking, pay attention to whether the package is in good condition, such as whether there are impact marks and damages;

4.2. 线路连接 Line connection

BD6AxxS-10P 、BD6AxxS-15P、BD6AxxS-20P 、 B1AxxS-15P、B2AxxS-15P、B2AxxS-20P 保护板适用于 7-24 串电芯的锂电池组，不同电芯数量的电池组接线方法不同，具体接线方式如下图所示。

BD6AxxS-10P ／ BD6AxxS-15P ／ BD6AxxS-20P ／ B1AxxS-15P ／ B2AxxS-15P and B2AxxS-20P BMS protection board is applicable to lithium battery pack with 7-24 strings of cells. The wiring method of battery pack with different number of cells is different. The specific wiring method is shown in the following figure.
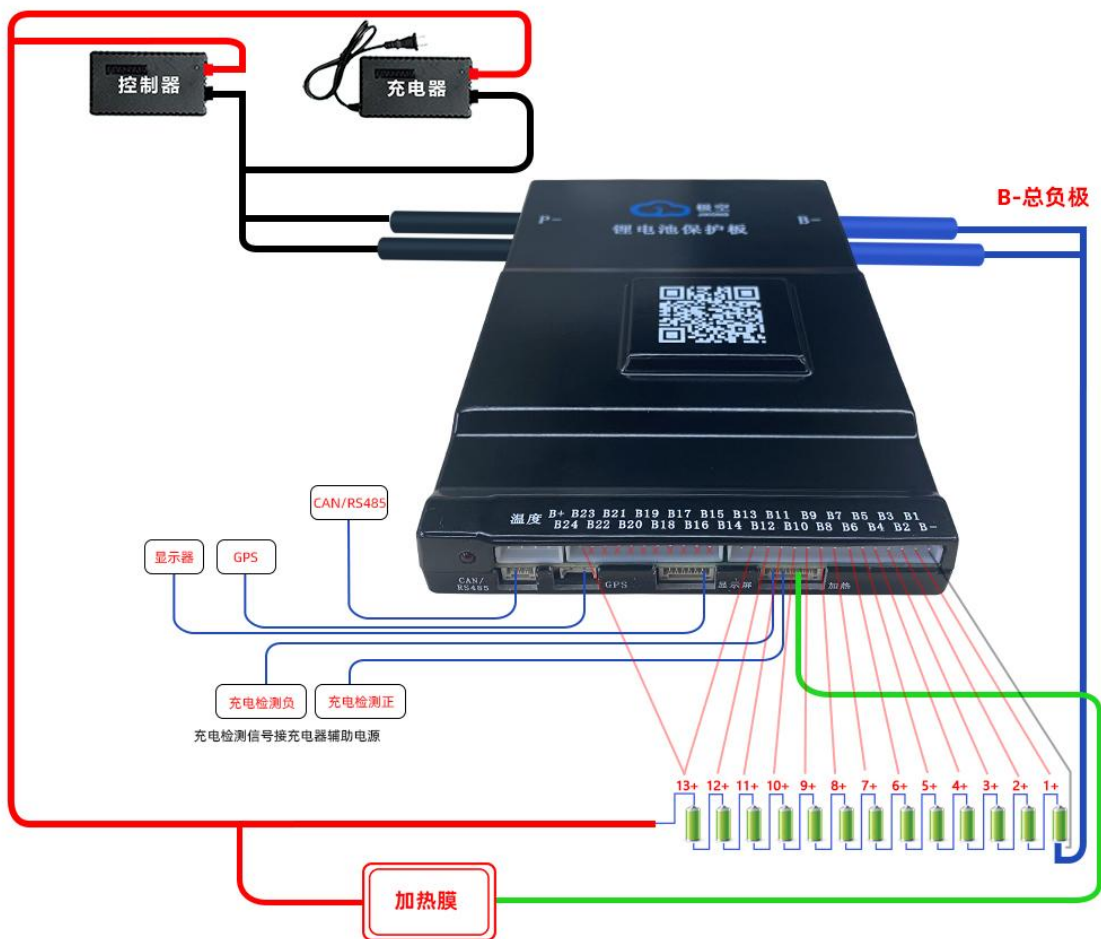

图 7 加热功能接线图示 Fig. 7 wiring diagram of heating function

图 8 24 串电池接线图示 Figure 8 wiring diagram of 24 string batteries

20串连接图

图 9　20 串电池接线图示 Figure 9 wiring diagram of 20 string batteries

17串连接图

图 10 17 串电池接线图示 Figure 10 wiring diagram of 17 string batteries

图 11　13 串电池接线图示 Figure 11 wiring diagram of 13 string batteries

BD6AxxS-6P 、 BD6AxxS-8P 保护板适用于 7-24 串电芯的锂电池组，不同电芯数量的电池组接线方法不同，具体接线方式如下图所示。

BD6AxxS-6P and BD6AxxS-8P protection boards are applicable to lithium battery packs with 7-24 strings of cells. The wiring methods of battery packs with different cell numbers are different. The specific wiring methods are shown in the following figure.
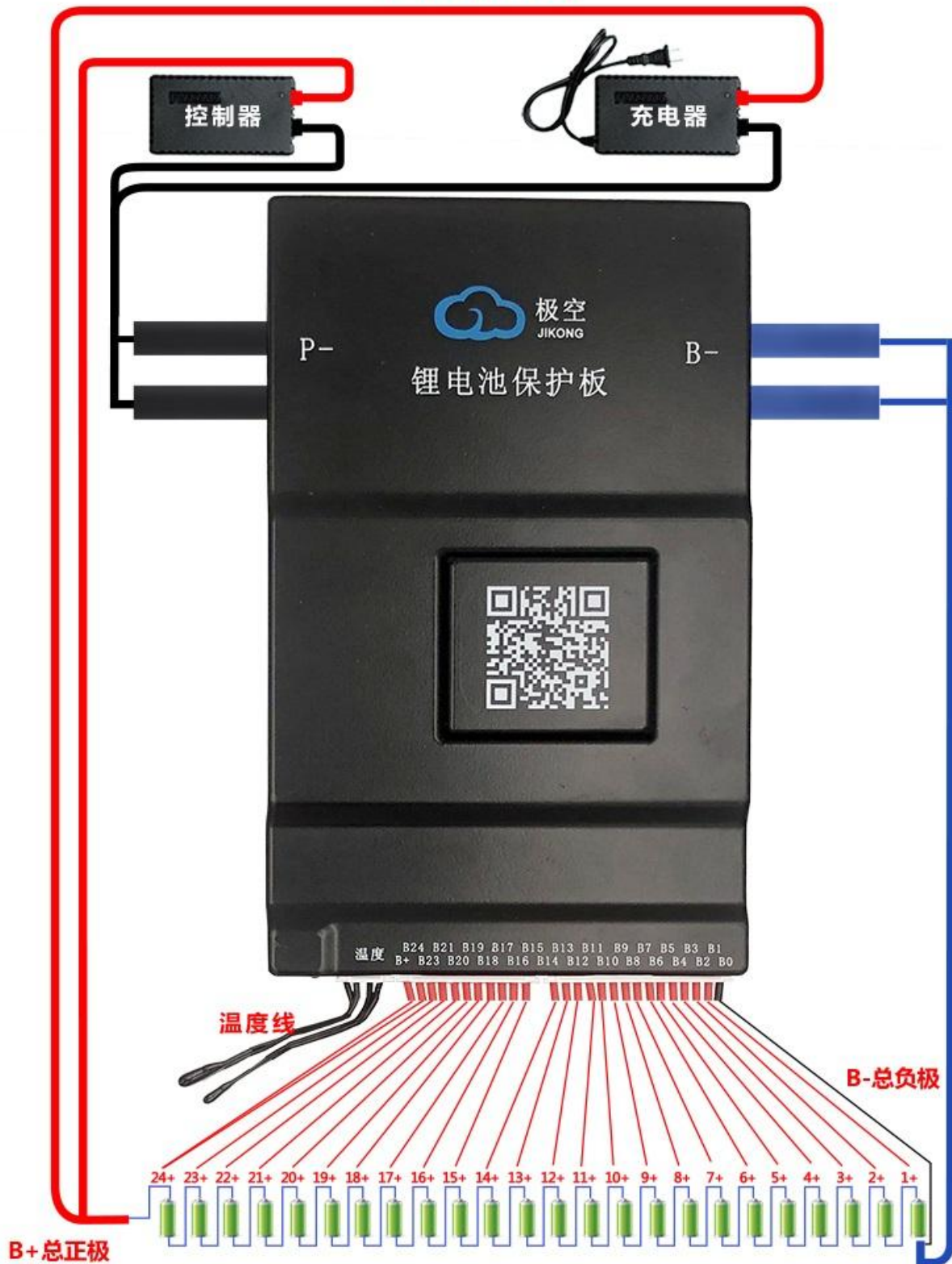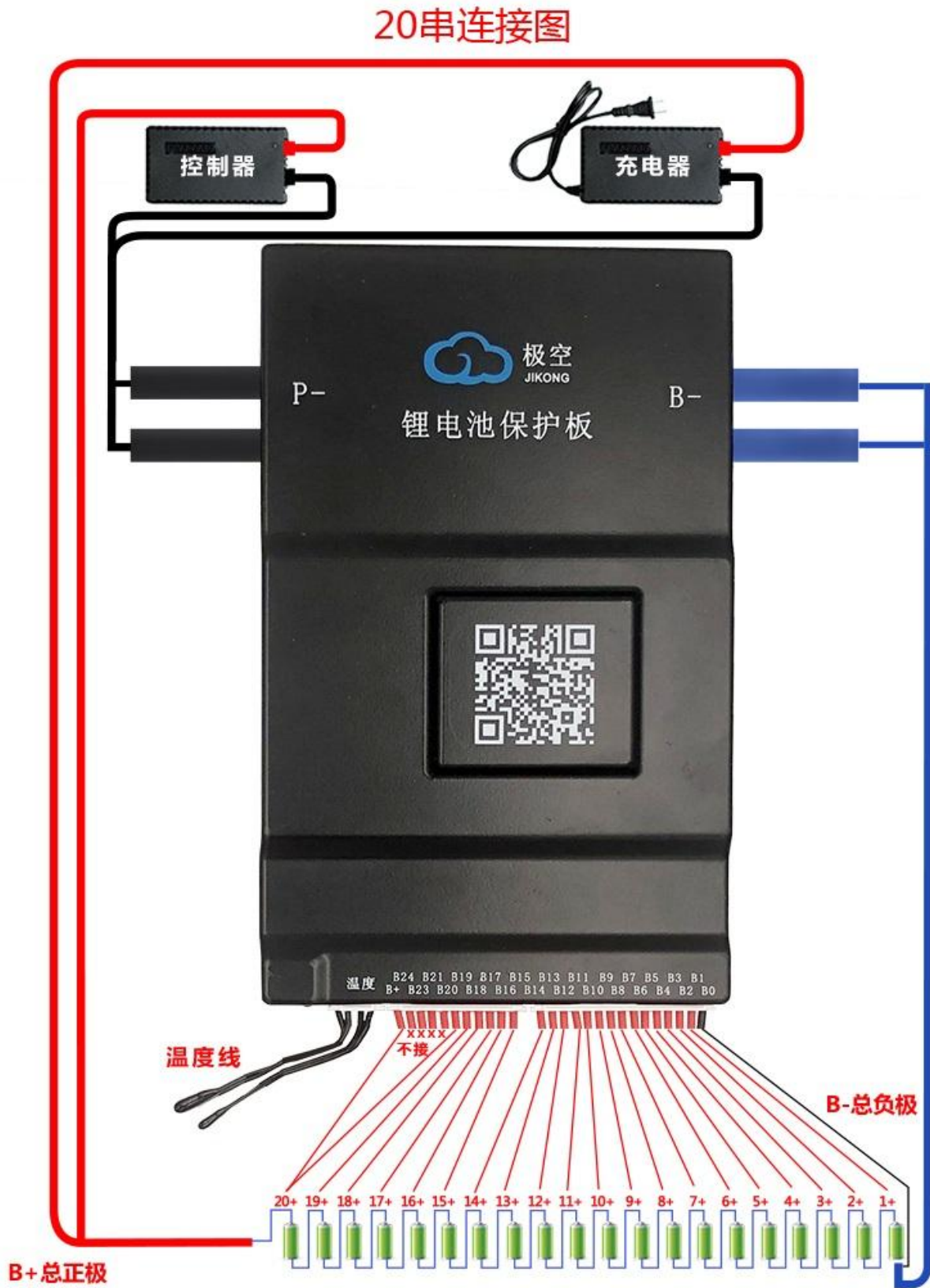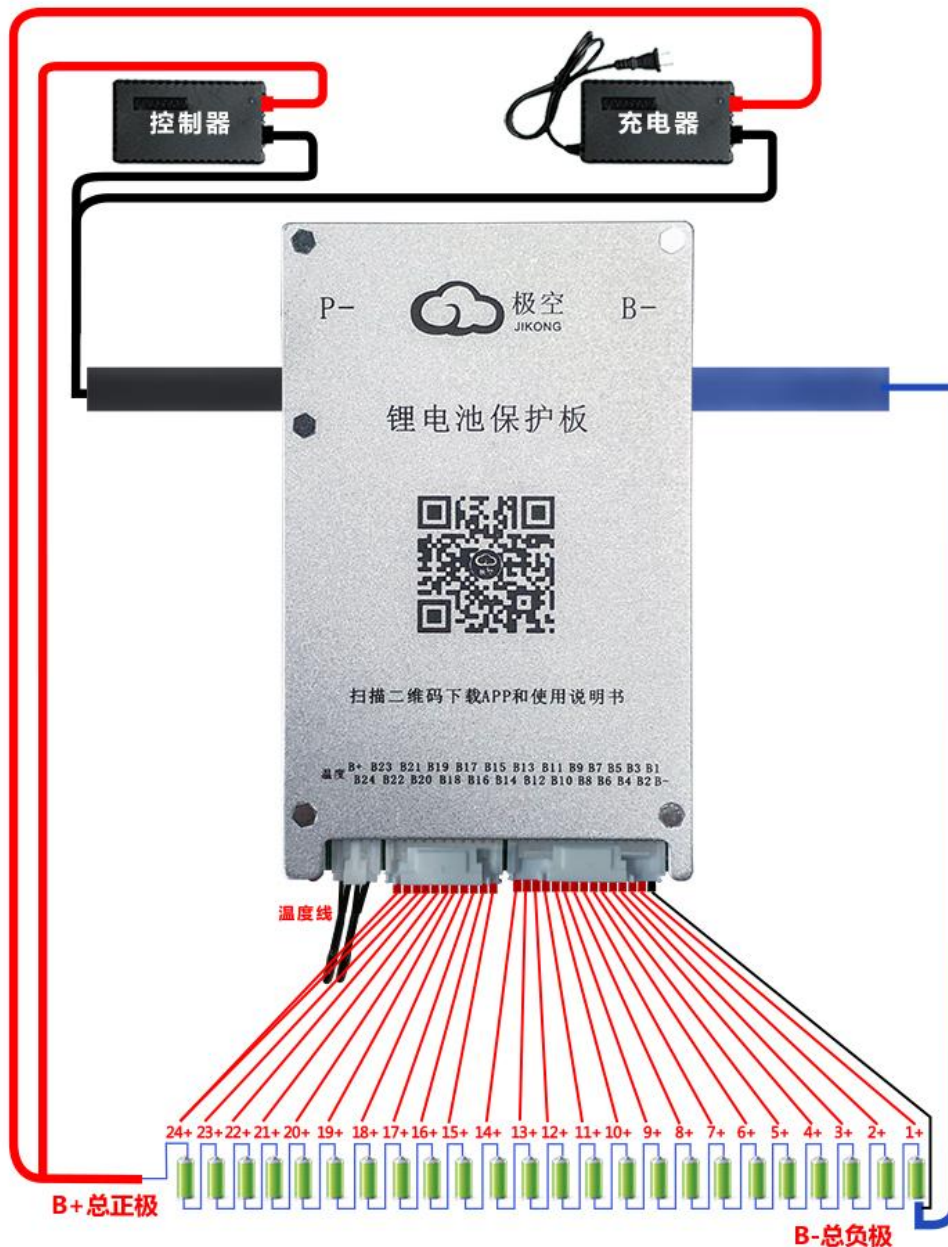

图 12 24 串电池接线图示 Figure 12 wiring diagram of 24 string batteries
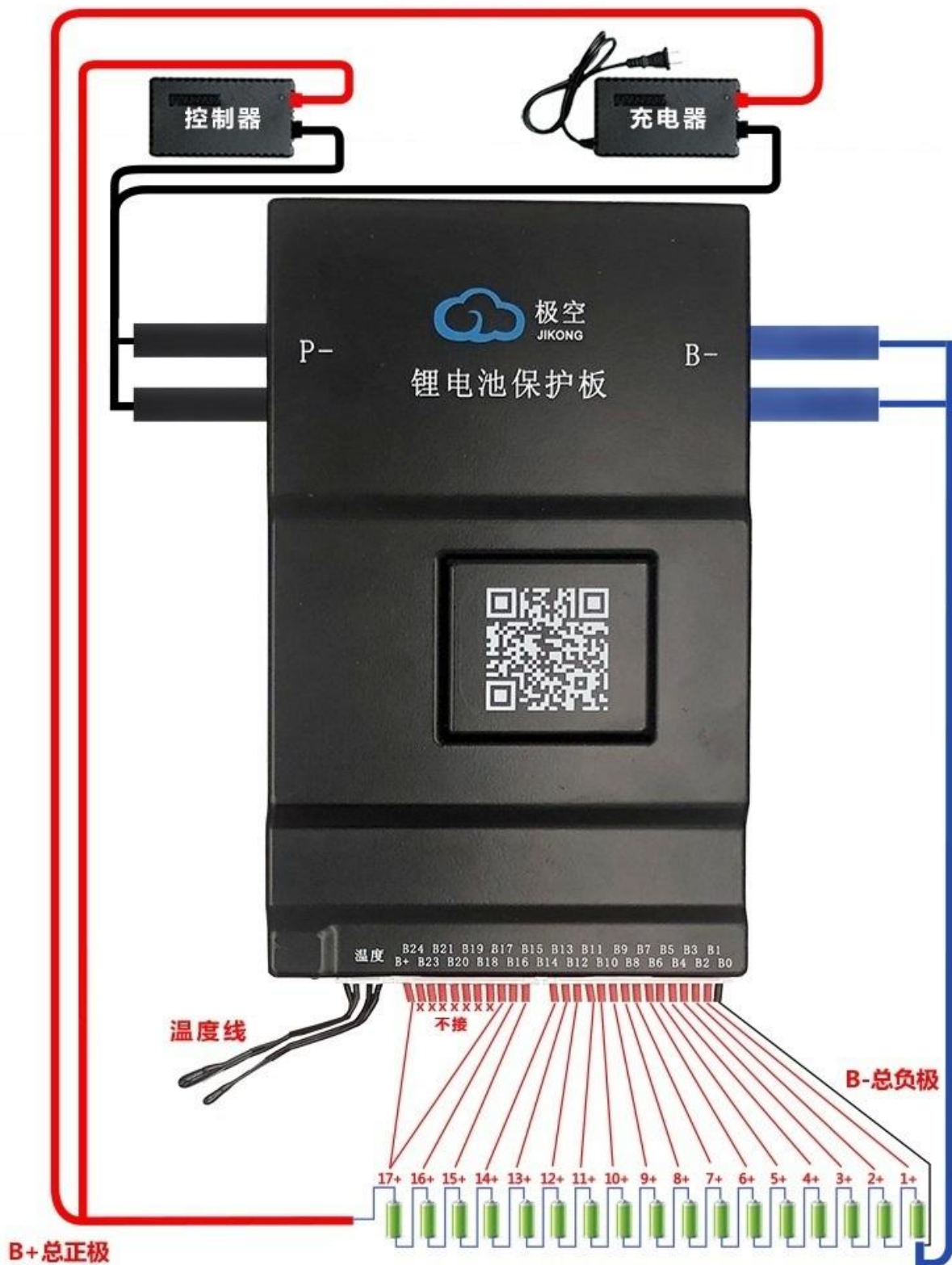
图 13　20 串电池接线图示 Figure 13 wiring diagram of 20 string batteries

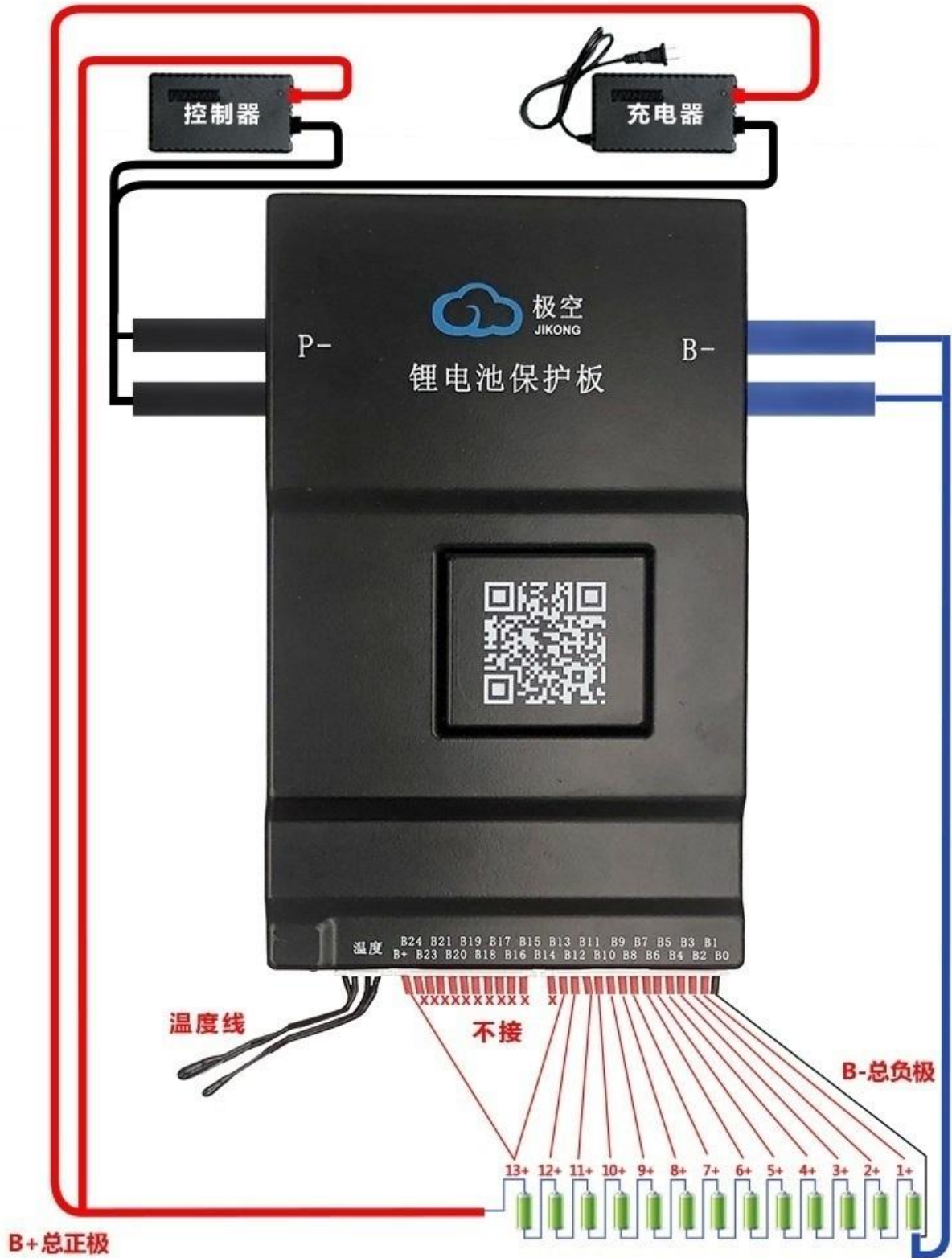图 14 17 串电池接线图示 Figure 14 wiring diagram of 17 string batteries

13串连接图
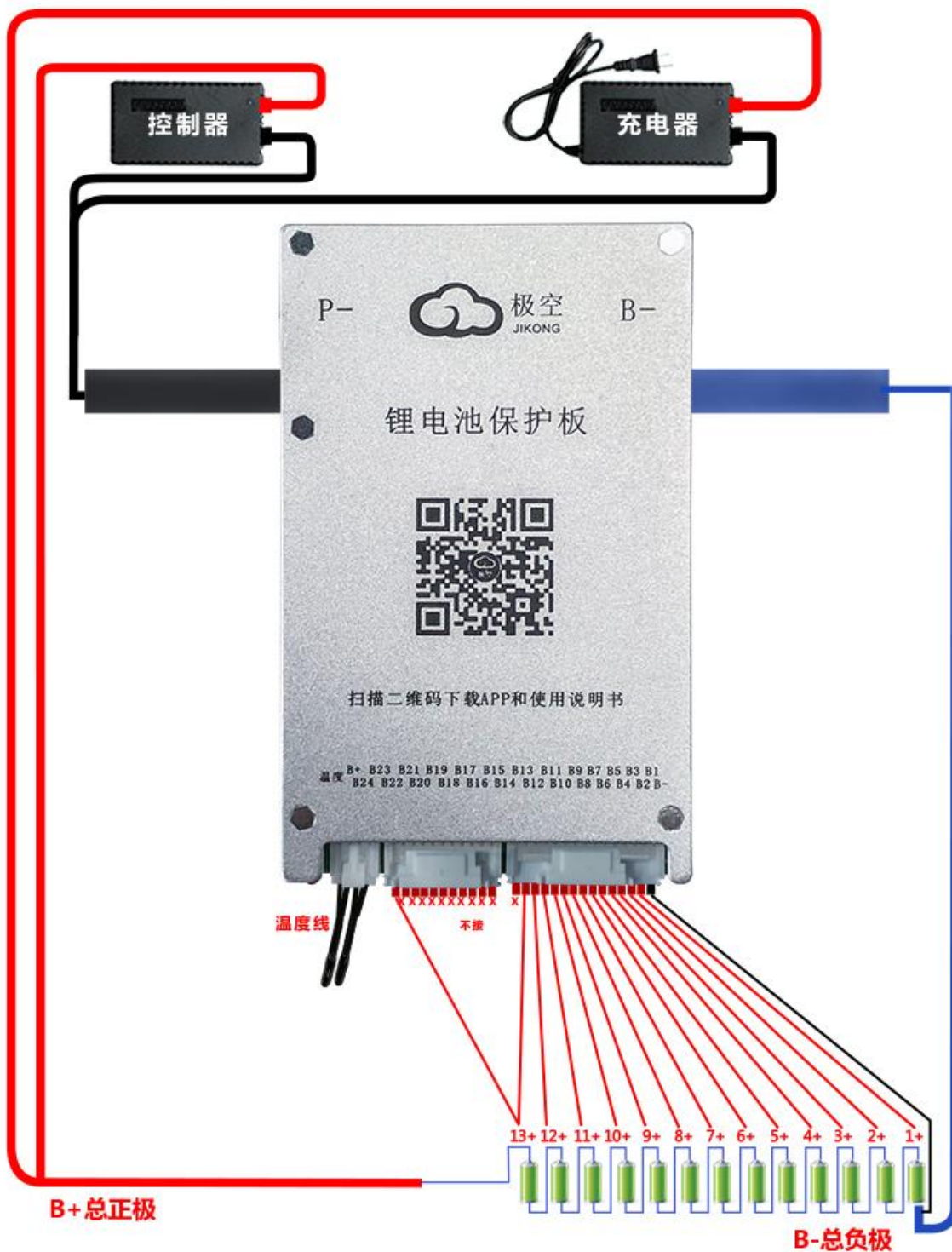
图 15 13串电池接线图示 Figure 15 wiring diagram of 13 string batteries

4.3．APP 安装 APP installation

通过扫描图 31 所示的二维码可以获取与产品配套的手机APP。

By scanning the two-dimensional code shown in Figure 31, you can obtain the mobile phone app matching the product.

图 16 手机APP 链接二维码 Figure 16 mobile app link QR code

5.使用与操作 Use and operation

5.1. 使用前的准备和检查 Preparation and inspection before use

在保护板开机之前，请再次确认均衡线连接是否正常，" C-"与"B-"是否连接正确。检查保护板是否已经稳妥的与电芯固定，确认无误后才可以接通给保护板上电，否则可能造成工作异常、甚至烧毁等严重后果。

Before starting the protection board, please confirm whether the equalizing line is connected

normally again and whether "C -" and "B -" are connected correctly. Check whether the protection board has been firmly fixed with the electric core. Only after confirmation can the protection board be powered on. Otherwise, it may cause serious consequences such as abnormal operation or even burning.

5.2. 保护板上电工作 Power on protection board

确认上述操作无误以后，可以给保护板上电。保护板没有上电控制开关，设计为**充电激活模式(充电器电压比电池电压高 2V)**，即电池组装完成以后需要接上充电器让保护板开机工作。

After confirming that the above operation is correct, power on the protection board. The protection board has no power on control switch and is designed to be in the **charging activation mode (the charger voltage is 2V higher than the battery voltage)**, that is, after the battery is assembled, the charger needs to be connected to start the protection board.

5.3. APP 操作说明 APP operating instructions

5.3.1. 设备操作 Equipment operation

5.3.1.1. 设备连接 Device connection

首先开启手机蓝牙，然后打开APP 后，如图 17 所示。

First, turn on the Bluetooth of the mobile phone, and then turn on the app, as shown in Figure 17.

点击左上角图标扫描设备，等待扫描完成以后，**点击需要连接的设备名称**，如"JK- B1A24S"。第一次连接时 APP 会提示输入密码，设备的默认密码为"1234"，设备连接

后 APP 会自动记录密码，下次连接无需输入密码，开启 APP 后点击设备列表中的设备自动连接，密码输入界面如图 18所示。

Click the icon in the upper left corner to scan the equipment. After the scanning is completed, **click the name of the equipment to be connected**, such as "JK - B1A24S". During the first connection, the app will prompt for the password. The default password of the device is "1234". After the device is connected, the app will automatically record the password. The next connection does not require the password. After the app is opened, the password will be automatically connected. The password input interface is shown in Figure 18.
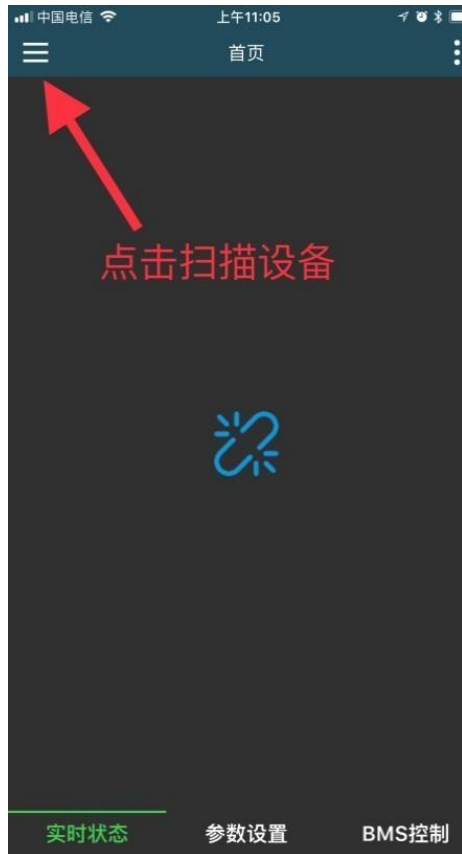
图17 设备扫描 Figure 17 device scanning　　　　　　图18 密码输入 Figure 18 password input

5.3.1.2. 修改密码和名称 Change password and name

设备连接上后点击设备列表右侧的"**笔型**"图标可修改设备名称和密码。

After the device is connected, click the "**pen type**" icon on the right side of the device list to modify the device name and password.

修改设备名称界面如图19 所示，注意，设备名称仅支持英文或者数字，不支持中文名称和汉字。

The interface for modifying the equipment name is shown in Figure 19. Note that the equipment name only supports English or numbers, and does not support Chinese names and Chinese characters.

修改密码界面如图 20 所示。要修改设备密码必须先输入设备的旧密码，只有在当前密码正确的前提下，才能进入到新密码输入的选项。输入两次新密码后，点击'确定'可以完成设备密码修改。

The password modification interface is shown in Figure 20. To modify the device password, you must first enter the old password of the device. Only when the current password is correct can you enter the new password. After entering the new password twice, click "OK" to complete the modification of the device password.

图19 名称修改 Figure 19 name modification   图 20 密码修改 Figure 20 password modification

5.3.2. 状态查看 Status viewing

实时状态界面如21 所示。

The real-time status interface is shown in Figure 21.

图 21 实时状态显示 Figure 21 real time status display

在实时状态页面分为 3 个区域。

The real-time status page is divided into three areas.

图中 1 区为电池综合信息栏。各参数参数释义如下：

Area 1 in the figure is the battery comprehensive information column. The definition of each parameter is as follows:

a) 运行时间 Run time

运行时间表示从保护板第一次开机至今的运行总时间。

The running time indicates the total running time since the first startup of the protection board.

b) 充电 **Charge**

表示当前保护板充电MOS 的开关状态。显示"开启"时，表示当前保护板充电MOS 打开，电池允许充电；显示"关闭"时，表示当前保护板充电 MOS 关闭，电池不允许充电。

Indicates the current switching state of the protection board charging MOS. When "on" is displayed, it indicates that the charging MOS of the current protection board is on and the battery is allowed to be charged; When "off" is displayed, it means that the current protection board charging MOS is off and the battery is not allowed to be charged.

c) 放电 Discharge

表示当前保护板放电MOS 的开关状态。显示"开启"时，表示当前保护板放电MOS 打开，电池允许放电；显示"关闭"时，表示当前保护板放电 MOS 关闭，电池不允许放电。

Indicates the current switching state of the protection board discharge MOS. When "on" is displayed, it indicates that the current protection board discharge MOS is on and the battery is allowed to discharge; When "off" is displayed, it means that the current protection board discharge MOS is off and the battery is not allowed to discharge.

d) 均衡 balanced

表示当前保护板均衡开关的开关态。显示"开启"时，当达到均衡触发条件以后，保护板自动均衡；显示"关闭"时，表示均衡关闭，保护板不会对电池进行均衡。

Indicates the switching state of the current equalizing switch of the protection board. When "on" is displayed, the protection board will automatically equalize when the equalization trigger condition is reached; When "off" is displayed, it means that equalization is off and the protection board will not equalize the battery.

e) 电压 Voltage

电压区域实时显示当前电池的总电压，总电压是所有单体电压之和。

The voltage area displays the total voltage of the current battery in real time. The total voltage is the sum of all cell voltages.

f) 电流 Current

电流区域实时显示当前电池的总电流。当电池充电时，电流为正，当电池放电时，电流为负。

The current area displays the total current of the current battery in real time. When the battery is charged, the current is positive, and when the battery is discharged, the current is negative.

g) 电池功率 Battery power

表示当前电池输出或者输入的总功率，其值是当前电池电压和电池电流绝对值之积。

Represents the total power output or input of the current battery, and its value is the product of the current battery voltage and the absolute value of the battery current.

h) 剩余电量 Remaining power

表示当前电池所剩电量的百分比。

Represents the percentage of power left in the current battery.

i) 电池容量 Battery capacity

表示当前保护板通过高精度 SOC 所计算得到的电池实际容量，单位为：AH。**（该值需要电池做一个完整的放电和充电循环后才更新）。**

Indicates the actual capacity of the battery calculated by the current protection board through the high-precision SOC, unit: AH. **(this value needs to be updated after a complete discharge and charge cycle of the battery).**

j) 剩余容量 Remaining capacity

剩余容量表示当前电池的剩余容量，单位：AH。

Remaining capacity refers to the remaining capacity of the current battery, unit: AH.

k) 循环容量 Circulation capacity

循环容量表示电池的累计放电容量，单位：AH。

Cycle capacity refers to the cumulative discharge capacity of the battery, unit: AH.

l) 循环次数 Number of cycles

循环次数表示当前电池的充电饱和次数，单位为：次。

The number of cycles indicates the number of times of current battery charging saturation, and the unit is: times.

m) 单体平均 Monomer average

表示当前电池的单体平均电压，单位：V。

Represents the average cell voltage of the current battery, unit: v.

n) 最大压差 Maximum differential pressure

最大压差表示当前整组电池，最高电芯电压和最低电芯电压的差值，单位：V。

The maximum voltage difference indicates the difference between the highest cell voltage and the lowest cell voltage of the whole battery, unit: V.

o) 均衡电流 Equalizing current

当保护板开启均衡功能，且达到均衡条件时，均衡电流显示区域实时显示均衡电流，单位：A。

When the protection board turns on the equalization function and reaches the equalization condition, the equalization current display area displays the equalization current in real time, unit: a.

当均衡进行时，实时状态的单体电压显示区域，蓝色代表放电的电池，红色代表被充电的电池。均衡电流负电流表示电池在放电，此时蓝色闪烁，均衡电流正电流表示在电池在充电，此时红色闪烁。

When the equalization is performed, the cell voltage display area in the real-time state, blue represents the discharged battery, and red represents the charged battery. The negative current of equalizing current indicates that the battery is discharging, and the blue blinks at this time. The positive current of equalizing current indicates that the battery is charging, and the red blinks at this time.

保护板采用主动均衡技术，均衡的原理是从高电压的电芯取电，存放到保护板，然后再放给低电压的电芯。

The protection board adopts active equalization technology. The principle of equalization is to take power from high-voltage cells, store it in the protection board, and then put it into low-voltage cells.

p) MOS

实时显示当前保护板功率MOS 的温度，单位：℃。

Real time display of current protection board power MOS temperature, unit: ℃.

q) 电池温度 1 Battery temperature 1

在温度传感器1 没有安装的情况下显示"NA"，在温度传感器安装的情况下，实时显示温度传感器 1 的温度，单位：℃。

"Na" is displayed when the temperature sensor 1 is not installed. When the temperature sensor 1 is installed, the temperature of the temperature sensor 1 is displayed in real time, unit: ℃.

r) 电池温度 2 Battery temperature 2

在温度传感器2 没有安装的情况下显示"NA"，在温度传感器安装的情况下，实时显示温度传感器 2 的温度，单位：℃。

"Na" is displayed when the temperature sensor 2 is not installed. When the temperature

sensor 2 is installed, the temperature of the temperature sensor 2 is displayed in real time, unit: °C.

s) 加热状态(如果支持) Heating status (if supported)

在保护板支持加热的条件下，实时显示当前保护板加热开关状态，显示内容为"开启"或"关闭"。

Under the condition that the protection board supports heating, the current heating switch status of the protection board is displayed in real time, and the display content is "ON" or "OFF".

t) 加热电流(如果支持) Heating current (if supported)

在保护板支持加热的条件下，当保护板加热打开的时候，实时显示当前的加热电流，单位：A；

Under the condition that the protection plate supports heating, when the protection plate heating is turned on, the current heating current will be displayed in real time, unit: A;

u) ACC(如果支持) ACC (if supported)

如果保护板支持ACC识别功能，该处显示ACC当前的状态，显示内容为"开启"或"关闭"。保护板支持ACC识别时，需要ACC状态为"开启"的条件下，保护板才能打开放电输出。

If the protection board supports ACC recognition function, the current status of ACC will be displayed here, and the display content is "ON" or "OFF". When the protection board supports ACC recognition, the protection board can turn on the discharge output only when the acc status is "ON".

v) 充电器(如果支持) Charger (if supported)

如果保护板支持充电器识别功能，该处显示当前充电器的状态，显示内容为"插入"或"未插入"，此时需要充电器状态为"插入"的情况下，才能打开充电。

If the protection board supports the charger identification function, the status of the current charger will be displayed here, and the display content is "plugged in" or "not plugged in". At this time, the charger can be turned on only when the charger status is "plugged in".

w) 预充状态（如果支持） Precharge status (if supported)

表示当前放电预充开关的状态。当显示内容为"开启"时，此时放电预充开关打开，电池通过预充电开关，流经预充电阻，给控制器进行预充电。预充电的时间为参数设置中"放电预充时间"所设置的值。预充结束，保护板会自动打开放电开关。

Indicates the current state of the discharge precharge switch. When the display is "ON", the discharge precharge switch is on, and the battery flows through the precharge resistor through the precharge switch to precharge the controller. The precharge time is the value set

by "discharge precharge time" in parameter settings. After precharge, the protection board will automatically turn on the discharge switch.

x)　　　　SOH估值（如果支持）　SOH valuation (if supported)

表示当前保护板所估算的电池健康状态。

Indicates the battery health state estimated by the current protection board.

y)　　　　应急时间（如果支持）　Emergency time (if supported)

在打开应急开关的条件下，这里显示当前还剩下的应急时间。单位：秒(S)。

When the emergency switch is turned on, the remaining emergency time is displayed here. Unit: seconds (s).

图中 2 区为单体电压区域。实时显示电池包中每个单体的电压数据，其中红色表示最低电压的单体，蓝色表示最高电压的单体。

Zone 2 in the figure is the single voltage region. The voltage data of each cell in the battery pack is displayed in real time, where red indicates the cell with the lowest voltage and blue indicates the cell with the highest voltage.

图中3 区为均衡线电阻区域。该均衡线电阻为保护板自检得到的均衡线电阻，该值只是初略的计算，目的是为了防止接错线，或者接触不良，当均衡线电阻超过一定值以后，显示为黄色，此时不能开启均衡。

Zone 3 in the figure is the area of equalizing line resistance. This equalization line resistance is the equalization line resistance obtained by BMS self-test. This value is only a preliminary calculation. The purpose is to prevent wrong connection or poor contact. When the equalization line resistance exceeds a certain value, it will be displayed in yellow. At this time, equalization cannot be started.

5.3.3. 参数设置 Parameter setting

图 22 参数设置页面显示 Figure 22 display of parameter setting page

如果需要修改保护板的工作参数，必须先点击**"授权设置"**按钮，输入参数设置密码，以验证参数设置权限。参数设置密码出厂默认为"123456"。只有正确输入参数设置密码以后才能修改保护板的参数。参数设置密码和设备蓝牙连接密码是相互独立的。

If you need to modify the working parameters of the protection board, you must first click the **"authorization setting"** button and enter the parameter setting password to verify the parameter setting authority. The parameter setting password is "123456" by default. Only after the parameter setting password is correctly entered can the parameters of the protection board be modified. The parameter setting password and the device Bluetooth connection password are independent of each other.

在参数设置页面可对保护板的各项工作参数进行修改，各个参数的释义如下。

The working parameters of the protection board can be modified on the parameter setting page. The definitions of the parameters are as follows.

A) 一键铁锂 One key LFP

点击该按钮可以将保护板的所有工作参数修改为铁锂电池参数，铁锂参数默认值见附录。

Click this button to modify all working parameters of the protection board to LFP battery parameters. See the appendix for the default values of LFP parameters.

B) 一键三元 One key NCM

点击该按钮可以将保护板的所有工作参数修改为三元电池参数，三元锂参数默认值

见附录。

Click this button to modify all working parameters of the protection board to NCM battery parameters. See the appendix for the default values of NCM parameters.

C) 一键钛酸锂 One key LTO

功能该按钮可以将保护板的所有工作参数修改为钛酸锂电池参数，钛酸锂参数默认值见附录。

Function this button can modify all working parameters of the protection board to LTO battery parameters. See the appendix for the default values of LTO parameters.

D) 单体数量 Monomer quantity

单体数量表示当前电池的电芯数量，在使用之前，请准确的设定该值，否则保护板不能正常工作。

E) The number of cells indicates the number of cells of the current battery. Please set this value accurately before use, otherwise the protection board will not work properly. 电池容量 Battery capacity

该值为电池的设计容量。

This value is the design capacity of the battery.

F) 触发均衡压差 Trigger equalizing differential pressure

在均衡开关打开的情况下，当电池组最大压差超过该值，且当前单体电压超过**均衡起始电压**，均衡开始，直到压差低于该值或单体电压低于均衡起始电压时均衡结束。比如设定均衡触发压差为 0.01V，当电池组压差大于 0.01V 时开始均衡，低于 0.01V 时结束均衡。

When the equalization switch is turned on, when the maximum voltage difference of the battery pack exceeds this value and the current cell voltage exceeds **equalization start voltage** , equalization starts until the voltage difference is lower than this value or the cell voltage is lower than the equalization start voltage. For example, set the equalizing trigger voltage difference to 0.01V, start equalizing when the voltage difference of the battery pack is greater than 0.01V, and end equalizing when it is lower than 0.01V.

（建议 50AH 以上的电池设定均衡触发压差为 0.005V，50AH 以下的电池设定触发均衡压差为 0.01V）。

G) (it is recommended to set the equalizing trigger pressure difference to 0.005v for batteries above 50ah and 0.01V for batteries below 50ah).电压校准 **Voltage calibration**

电压校准功能可以用来校准保护板电压采集的精度。

The voltage calibration function can be used to calibrate the accuracy of the protection board voltage acquisition.

当发现保护板采集的总电压和电池的总电压有误差的时候，可以使用电压校准功能来校准保护板。校准的方法是填入当前测量到的电池总电压，然后点击电压校准后面的'设置'按钮，完成校准。

When it is found that there is an error between the total voltage collected by the protection board and the total voltage of the battery, the voltage calibration function can be used to calibrate the protection board. The calibration method is to fill in the current measured total battery voltage, and then click the "set" button behind the voltage calibration to complete the calibration.

H) 电流校准 Current calibration

电流校准功能可以用来校准保护板电流采集的精度。The current calibration function can be used to calibrate the accuracy of the current collection of the protection board.

当发现保护板采集的总电流和电池的实际电流有误差的时候，可以使用电流校准功能来校准保护板。**校准的方法是填入当前测量到的电池总电流**，然后点击电流校准后面的'设置'按钮，完成校准。

When it is found that there is an error between the total current collected by the protection board and the actual current of the battery, the current calibration function can be used to calibrate the protection board. **the calibration method is to fill in the current measured total battery current**, and then click the "set" button behind the current calibration to complete the calibration.

I) "单体欠压保护"、"单体欠压恢复" "Single undervoltage protection", "single undervoltage recovery"

"单体欠压保护"是指电芯的截止电压，只要电池组中任一单体电压低于该值时，产生'单体欠压报警'，同时保护板关闭放电MOS，此时电池不能放电，只能充电。当报警产生以后，只有全部单体电压值超过"单体电压恢复"的值以后，保护板解除'单体欠压报警'，同时开启放电MOS。

"Cell undervoltage protection" refers to the cut-off voltage of the battery cell. As long as the voltage of any cell in the battery pack is lower than this value, a "cell undervoltage alarm" will be generated. At the same time, the protection board will turn off the discharge MOS. At this time, the battery cannot be discharged and can only be charged. After the alarm is generated, only when all the individual voltage values exceed the value of "individual voltage recovery", the protection board releases the "individual undervoltage alarm" and turns on the discharge MOS.

J) "单体过充电压"、"单体过充恢复" "Single overcharge voltage", "single overcharge recovery"

"单体过充电压"是指电芯的饱和电压，只要电池组中任一单体电压超过该值时，产生'单体过充报警'，同时保护板关闭充电MOS，此时电池不能充电，只能放电。当报警产生以后，只有全部单体电压值低于"单体过充恢复"的值以后，保护板解除'单体过充报

警'，同时开启充电MOS。

"Single overcharge voltage" refers to the saturation voltage of the battery cell. As long as the voltage of any single cell in the battery pack exceeds this value, a "single overcharge alarm" will be generated. At the same time, the protection board closes the charging MOS. At this time, the battery cannot be charged and can only be discharged. After the alarm is generated, only when the voltage value of all the cells is lower than the value of "cell overcharge recovery", the protection board releases the "cell overcharge alarm" and turns on the charging MOS.

K) 自动关机电压 Automatic shutdown voltage

自动关机电压表示保护板工作的最低电压，当电池组中最高单体的电压低于该值时， 保护板关闭。该值必须低于"单体欠压保护"。

The automatic shutdown voltage indicates the lowest voltage of the protection board. When the voltage of the highest cell in the battery pack is lower than this value, the protection board is closed. This value must be lower than "single undervoltage protection".

L) 均衡起始电压 Balanced starting voltage

均衡起始电压用来控制均衡的电压阶段，只有当单体电压超过该值，且电池组最大压差超过**均衡触发压差**，均衡才会被触发。

The equalization start voltage is used to control the voltage stage of equalization. Only when the cell voltage exceeds this value and the maximum voltage difference of the battery pack exceeds **balance trigger voltage difference** , equalization will be triggered.

M) 最均衡电流 **Maximum balance current**

均衡电流表示在能量转移的过程中高电压电池放电和低电压电池充电的持续电流。最大均衡电流表示能量转移过程中的最大电流，最大均衡电流以不超过 0.1C 为宜。

The equalizing current represents the continuous current of the high-voltage battery discharging and the low-voltage battery charging in the process of energy transfer. The maximum equalizing current refers to the maximum current in the energy transfer process, and the maximum equalizing current should not exceed 0.1C.

如：20AH 电池不超过 20*0.1=2A。

For example, 20AH battery shall not exceed 20 * 0.1 = 2A.

N）"持续充电电流"、"充电过流延时"、"充电过流解除" "Continuous charging current", "Charging overcurrent delay", "Charging overcurrent release"

当给电池包充电时，电流超过"最大充电电流"且持续时间超过"充电过流延时"的时间，保护板产生'充电过流报警'，同时关闭充电开关。报警产生以后，经过"充电过流解除"的时间后，保护板解除充电过流报警，重新开启充电开关。

When charging the battery pack, if the current exceeds the "maximum charging current" and the duration exceeds the "charging overcurrent delay", BMS will generate a "charging overcurrent alarm" and turn off the charging switch. After the alarm is generated, after the time of "charging overcurrent release", BMS releases the charging overcurrent alarm and turns on the charging switch again.

举例：设定"最大充电电流"为10A、"充电过流延时"为10 秒、"充电过流解除"为50秒。在充电过程中充电电流连续10 秒超过10A，保护板将产生'充电过流报警'，同时关闭充电开关，报警产生后50 秒，解除'充电过流报警'，同时保护板重新开启充电开关。

For example, set "maximum charging current" as 10a, "charging overcurrent delay" as 10s, "charging overcurrent release" as 50s. During charging, if the charging current exceeds 10A for 10 consecutive seconds, BMS will generate a 'charging overcurrent alarm' and turn off the charging switch. 50 seconds after the alarm is generated, BMS will release the 'charging overcurrent alarm' and turn on the charging switch again.

O）"持续放电电流"、"放电过流延时"、"放电过流解除" "Continuous discharge current", "discharge overcurrent delay", "discharge overcurrent release"

当给电池包放电时，电流超过"最大放电电流"且持续时间超过"放电过流延时"的时间，保护板产生'放电过流报警'，同时关闭放电MOS。报警产生以后，经过"放电过流解除"的时间后，保护板解除'放电过流报警'，重新开启放电开关。

When discharging the battery pack, if the current exceeds the "maximum discharge current" and the duration exceeds the "discharge overcurrent delay", the BMS will generate a "discharge overcurrent alarm" and turn off the discharge MOS. After the alarm is generated, after the "discharge overcurrent release" time, BMS releases the "discharge overcurrent alarm" and turns on the discharge switch again.

举例：设定"最大放电电流"为100A、"放电过流延时"为10 秒、"放电过流解除" 为50秒。在放电过程中放电电流连续10 秒超过100A，保护板将产生'放电过流报警'，同时关闭放电MOS，报警产生后50 秒，解除'放电过流报警'，同时保护板重新开启放电MOS。

For example, set "maximum discharge current" as 100A, "discharge overcurrent delay" as 10s, "discharge overcurrent release" as 50s. During the discharge process, if the discharge current exceeds 100A for 10 consecutive seconds, BMS will generate a "discharge overcurrent alarm" and turn off the discharge MOS. 50 seconds after the alarm is generated, the "discharge overcurrent alarm" will be released, and BMS will turn on the discharge MOS again.

P）短路保护延时 Short circuit protection delay

当保护板检测到电流超过600A且持续时间超过"短路保护延时"的时间，保护板产生'短路报警'，同时相应充放电开关。报警产生以后，经过"短路保护解除"的时间后，保护板解除'短路保护报警'，重新开启充放电开关。

When BMS detects that the current exceeds 600A and the duration exceeds the time of "short circuit protection delay", BMS will generate "short circuit alarm" and corresponding charge / discharge switch. After the alarm is generated, after the "short circuit protection is released" time, BMS will release the "short circuit protection alarm" and turn on the charge and

discharge switch again.

举例：设定"短路保护延时"为 1000 微秒、"短路保护解除"为 50 秒。在充放电过程中电流连续 1000 微秒600A，保护板将产生'短路保护报警'，同时相应充放电开关，报警产生后 50 秒，解除'短路保护报警'，同时保护板重新开启充放电开关。（**建议非必要使用出厂默认设置；短路保护设置为'0'，表示关闭短路保护**）。

For example, set "short circuit protection delay" to 1000 microseconds and "short circuit protection release" to 50 seconds. During the charging and discharging process, if the current is 600A for 1000 microseconds continuously, BMS will generate "short circuit protection alarm", and the corresponding charging and discharging switch will be set. 50 seconds after the alarm is generated, the "short circuit protection alarm" will be released, and BMS will turn on the charging and discharging switch again. (**It is recommended to use the factory default setting unnecessarily; if the short-circuit protection is set to '0', it means that the short-circuit protection is turned off.**).

Q) 短路保护解除 Release of short circuit protection

当短路保护发生以后，经过'短路保护解除'所设定的时间以后，解除短路保护。

After the short-circuit protection occurs, the short-circuit protection is released after the time set by "short-circuit protection release".

R) "充电过温保护"、"充电过温恢复" "Charging over temperature protection", "charging over temperature recovery"

在充电过程中，电池温度超过"充电过温保护"的值时，保护板产生'充电过温保护'警告，同时保护板关闭充电MOS。报警产生以后，当温度低于"充电过温恢复"时，保护板解除'充电过温保护'警告，同时重新开启充电MOS。

During charging, when the battery temperature exceeds the value of "charging over temperature protection", the BMS will generate a warning of "charging over temperature protection" and turn off the charging MOS. After the alarm is generated, when the temperature is lower than "charging over temperature recovery", BMS will release the warning of "charging over temperature protection" and restart the charging MOS.

S) "放电过温保护"、"放电过温恢复" z) "Discharge over temperature protection", "Discharge over temperature recovery"

在放电过程中，电池温度超过"放电过温保护"的值时，保护板产生'放电过温保护'警告，同时保护板关闭放电开关。报警产生以后，当温度低于"放电过温恢复"时，保护板解除'放电过温保护'警告，同时重新开启放电开关。

During discharge, when the battery temperature exceeds the value of "discharge over temperature protection", BMS will generate a warning of "discharge over temperature protection" and BMS will close the discharge switch. After the alarm is generated, when the temperature is lower than "discharge over temperature recovery", the protection board will release the warning of "discharge over temperature protection" and restart the discharge switch.

T) "充电低温保护"、"充电低温恢复" "Low temperature charging protection", "Low temperature charging recovery"

在充电过程中，电池温度低于"充电低温保护"的值时，保护板产生'充电低温保护'警告，同时保护板关闭充电MOS。报警产生以后，当温度高于"充电低温恢复"时，保护板解除'充电低温保护'警告，同时重新开启充电MOS。

During charging, when the battery temperature is lower than the value of "charging low temperature protection", the BMS will generate a warning of "charging low temperature protection" and turn off the charging MOS. After the alarm is generated, when the temperature is higher than "charging low temperature recovery", the protection board will release the warning of "charging low temperature protection" and restart the charging MOS.

在保护板支持加热的条件下，进入"充电低温保护"以后，保护板打开加热功能给电池加热，'充电低温保护'解除以后，加热关闭。

Under the condition that BMS supports heating, after entering "charging low temperature protection", BMS turns on the heating function to heat the battery. After "charging low temperature protection" is released, the heating is turned off.

U) "MOS 过温保护"、"MOS 过温恢复" "MOS over temperature protection", "MOS over temperature recovery"

当 MOS 温度超过"MOS 过温保护"的值以后，保护板产生'MOS 过温报警'同时关闭充放电MOS，电池不能充电也不能放电。报警产生以后，MOS 温度低于"MOS 过温恢复"的值以后，保护板解除'MOS 过温报警'，同时重新开启充放电MOS（**MOS 过温保护值为 75℃，MOS 过温恢复值为 65℃，这两个值为出厂默认值，不能修改**）。

When the MOS temperature exceeds the value of "MOS overtemperature protection", the BMS will generate "MOS overtemperature alarm" and turn off the charge and discharge MOS at the same time. The battery cannot be charged or discharged. After the alarm is generated, after the MOS temperature is lower than the value of "MOS over temperature recovery", the BMS will release the "MOS over temperature alarm" and restart the charging and discharging MOS (**The MOS over temperature protection value is 75 ℃, and the MOS over temperature recovery value is 65 ℃. These two values are factory default values and cannot be modified**).

V) 设备地址（如果支持） Device address (if supported)

用来配置保护板的设备从地址。

The device slave address used to configure the protection board.

W) 放电预充时间（如果支持） Discharge precharge time (if supported)

当保护板支持放电预充功能，该值用来控制放电预充开关的闭合时间，单位：秒。放电预充结束以后，自动打开放电开关，开始放电。

When the protection board supports the discharge precharge function, this value is used to

control the closing time of the discharge precharge switch, unit: s. After the discharge precharge is completed, the discharge switch is automatically turned on to start the discharge.

X) 用户私有数据(用户数据) User private data (user data)

在铁搭换电的应用中，该处填入BT码的前12位。铁搭换电协议中BT码共计24位，后12位是蓝牙名称。

In the application of grounding and power exchange, the first 12 bits of BT code are filled in here. The BT code in the grounding power exchange protocol has 24 bits in total, and the last 12 bits are the Bluetooth name.

举例，电池BT码为BT207204012YMLD220815001；则前12位BT207204012Y填入用户私有数据，后12位MLD220815001填入蓝牙名称。

For example, the battery BT code is BT207204012YMLD220815001; The first 12 bits BT207204012Y fill in the user's private data and the last 12 bits MLD220815001 fill in the Bluetooth name.

Y) 连接线电阻 Connecting wire resistance

连接线电阻用于多箱体电池，单箱体电池不使用，具体使用方法请咨询供货商**(注意连接线电阻与实时数据页面的均衡线电阻没有实质性的关联)**。

The connection line resistance is used for multi box batteries, and single box batteries are not used. Please consult the supplier for the specific use method **(Note that the connection line resistance has no substantive relationship with the balance line resistance on the real-time data page).**

注意：Be careful:

任何参数的修改，请参考说明书，不恰当的参数可能会使保护板不能正常工作，甚至烧毁保护板。任何一项参数修改以后，均需要点击参数后面的"设置"按钮完成参数下发，保护板成功接收到参数以后，会发出"滴"的响声。

For any parameter modification, please refer to the manual. Improper parameters may make the BMS unable to work normally or even burn the BMS. After any parameter is modified, you need to click the "Set" button behind the parameter to complete the parameter distribution. After the BMS successfully receives the parameter, it will make a "Drip" sound.

5.3.4. BMS 控制 BMS control

BMS 控制页面如图 23所示。通过BMS 控制可以对保护板进行充电功能、放电功能、均衡功能进行开关和应急开关等。

The BMS control page is shown in Figure 23. Through BMS control, the protection board can be charged, discharged, balanced, switched and emergency switched.

图 23 BMS控制页 Figure 23 BMS control page

Z) 充电开关 **Charging switch**

用来控制保护板充电开关打开或者关闭。

It is used to control the opening or closing of the charging switch of the protection board.

AA) 放电开关 **Discharge switch**

用来控制保护板放电开关打开或者关闭。

It is used to control the opening or closing of the discharge switch of the protection board.

AB) 均衡开关 Balance switch

用来控制保护板均衡功能打开或者关闭。

It is used to control the opening or closing of BMS balance function.

AC) 应急开关 Emergency switch

无论电池出现任何故障，打开应急开关都可以打开充放电，允许用户应急使用电池。应急开关打开后，30分钟自动关闭，无需用户自行关闭(**打开应急开关以后，电池失去任何保护功能，非必要请勿打开此开关**)。

Regardless of any failure of the battery, opening the emergency switch can turn on charging and discharging, allowing users to use the battery in emergency. After the emergency switch is turned on, it will automatically turn off within 30 minutes without the user turning it off by himself (after the emergency switch is turned on, the battery will lose any protection function, and do not turn on the switch unless necessary).

AD) 加热开关 Heating switch

保护板支持加热的条件下，在满足加热的条件时，只有**检测到充电器**或者**打开**此加热开关加热才能打开。

Under the condition that BMS supports heating, when the heating conditions are met, this heating switch can be turned on only when **the charger is detected or turned on**.

AE) 温度传感器屏蔽 Temperature sensor shield

打开温度传感器屏蔽开关，此时保护板忽略跟温度相关的报警(此功能常用与温度传感器由于某种原因损坏的情况)。

Turn on the temperature sensor shield switch. At this time, BMS ignores the temperature related alarm (this function is often used when the temperature sensor is damaged for some reason).

AF) GPS心跳检测 GPS heartbeat detection

打开GPS心跳检测功能以后，保护板会检测GPS的连接状态，当GPS断开与保护板连接超过24小时以后，保护板关闭充放电开关，同时产生"GPS断开连接"的报警(该功能通常用于GPS防拆检测)。

After the GPS heartbeat detection function is turned on, the BMS will detect the connection status of the GPS. When the GPS is disconnected from the BMS for more than 24 hours, the BMS will turn off the charge / discharge switch and generate an alarm of "GPS disconnected" (this function is usually used for GPS anti disassembly detection).

AG) 复用端口切换 Multiplexing port switching

该功能可以切换保护板复用端口的输出功能，切换选项为"RS485"或者"CAN"(需要保护板硬件支持相应的功能)。

This function can switch the output function of the BMS multiplex port. The switching options are "RS485" or "CAN" (the BMS hardware is required to support the corresponding

functions).

6. 安全保护措施及注意事项 Safety protection measures and precautions

使用之前请仔细阅读使用说明书，按照对应串数的接线图接线，从负极向正极接，均衡线接好以后要再次用万用表确认，确认无误才能插入保护板。

Before use, please read the instruction carefully and connect according to the wiring diagram corresponding to the number of strings, from the negative electrode to the positive electrode. After the equalizing wire is connected, use a multimeter to confirm again. After confirmation, it can be inserted into the BMS.

保护板默认密码为"1234"，默认授权密码为"123456"，手机APP连接保护板后，请及时修改连接密码，防止被他人连接。

The default password of BMS is "1234" and the default authorization password is "123456". After the mobile app connects to BMS, please modify the connection password in time to prevent it from being connected by others.

不允许私自改装保护板的功率线，私自改装功率线会造成保护板过流不均匀而烧毁保护板。

It is not allowed to modify the power line of BMS without permission. Modifying the power line without permission will cause uneven overcurrent of BMS and burn the BMS.

7. 运输与贮存 Transportation and storage

7.1. 运输 Transport

装箱后的产品不受雨雪直接影响和剧烈碰撞颠簸下，可用通常的运输工具运输。在运输过程中不允许与酸碱等腐蚀物放在一起。

The packed products are not directly affected by rain and snow, and can be transported by normal means of transportation. It is not allowed to put it together with acid, alkali and other corrosive substances during transportation.

7.2. 贮存 Keep in storage

包装好的产品应放置在永久性的库房内贮存，库房温度为 0℃～35℃，相对湿度不超过 80%，库房内应无酸碱及腐蚀性气体、无强烈机构振动和冲击、无强磁场的作用。

The packaged products shall be stored in a permanent warehouse with a temperature of 0 ℃ ~ 35 ℃ and a relative humidity of no more than 80%. The warehouse shall be free of acid, alkali and corrosive gases, strong mechanism vibration and impact, and strong magnetic field.

附录 "一键铁锂"、"一键三元"、"一键钛酸锂"默认参数

Appendix "one bond iron lithium", "one bond ternary", "one bond lithium titanate" default parameters

序号 No.	参数 Parameter	三元 NCM	铁锂 LFP	钛酸锂 LTO	单位 Company
1	单体欠压保护 Single undervoltage protection	2.9	2.6	1.8	V
2	单体截欠压保护恢复 Recovery of single block undervoltage protection	3.2	3.0	2.0	V
3	单体过充电压 Single overcharge voltage	4.2	3.6	2.7	V
4	单体过充保护恢复 Recovery of single overcharge protection	4.1	3.4	2.4	V
5	触发均衡压差 Trigger balance differential pressure	0.01	0.01	0.01	V
6	自动关机电压 Automatic shutdown voltage	2.8	2.5	1.7	V
7	充电过流保护延时 Charging overcurrent protection delay	30	30	30	秒(S)
8	充电过流保护解除时间 Release time of charging overcurrent protection	60	60	60	秒(S)
9	放电过流保护延时 Discharge overcurrent protection delay	30	30	30	秒(S)
10	放电过流保护解除时间 Discharge overcurrent protection release time	60	60	60	秒(S)
11	短路保护解除时间 Release time of short circuit protection	60	60	60	秒(S)
12	充电过温保护温度 Charging over temperature protection temperature	60	60	60	℃
13	充电过温恢复温度 Charging over temperature recovery temperature	55	55	55	℃
14	放电过温保护温度 Discharge over temperature protection temperature	60	60	60	℃
15	放电过温恢复温度 Discharge over temperature recovery temperature	55	55	55	℃
16	充电低温保护温度 Charging low temperature protection temperature	-20	-20	-20	℃
17	充电低温恢复温度 Charging low temperature recovery temperature	-10	-10	-10	℃
18	MOS 过温保护温度 MOS over temperature protection temperature	75	75	75	℃
19	MOS 过温保护恢复温度 Recovery temperature of MOS over temperature protection	70	70	70	℃