产品规格书

Product Specification Book

客户名称 /Customer name	湖南银杏
产品名称 /Product Name	HNYX70-13~24 串软件版系列
产品型号 /Model Name	STxxMxxxTxxx or SFxxMxxxTxxx
功率输出方式 /Output Mode	Power MOSFET
产品工艺 /Product Technology	PCBA 三防漆
发布日期 Date	2025/4/28
有效期 Period of Va1idity	2026/4/28

银杏审核签字 Signature by Ginkgo				**客户签字或盖章 Seal or Signature by Customer**
编制 Prepared	**审核 Checked**	**复核 Reviewed**	**批准 Approved**	

产品变更履历/Product Modification History

序号 /NO.	日期/Date	变更点描述 Change Description	责任人/Principal Responsible Person
1	2025/04/28	初版	谢健宁

目录

1. 产品简介（Product introduction）

1.1 HNYX70 系列是专门针对 13~24 串和控制 B-输出,锂电池包而设计的软件保护板，可适用不同材料的电池，如锂离子、聚合物、磷酸铁锂、钠离子、锰酸锂等；该保护板支持蓝牙通信数据传输，支持上位机读取查看电理修改参数信息，支持主动均衡功能等。

HNYX70 is a software protection board scheme specially designed for 13~24 series battery packs and controls the B- output. It is compatible with batteries of various materials, such as lithium-ion, polymer, lithium iron phosphate, sodium ion, and lithium manganese oxide. The protection board supports BLE data transmission and allows the host computer to read, view, and modify electrical parameter information，supports active balancing function.

1.2 产品型号信息（Ordering Information）：

SAxxMxxxTCU00

00:流水号(Serial number)

C:CAN R:RS485 U:UART D:RS232 B:BLE G:GPS

T:充放电同口(Charge and discharge are both at the same port)
F:充放电分口(Charge and discharge are separate)

xxx:额定放电电流(Rated discharge current)

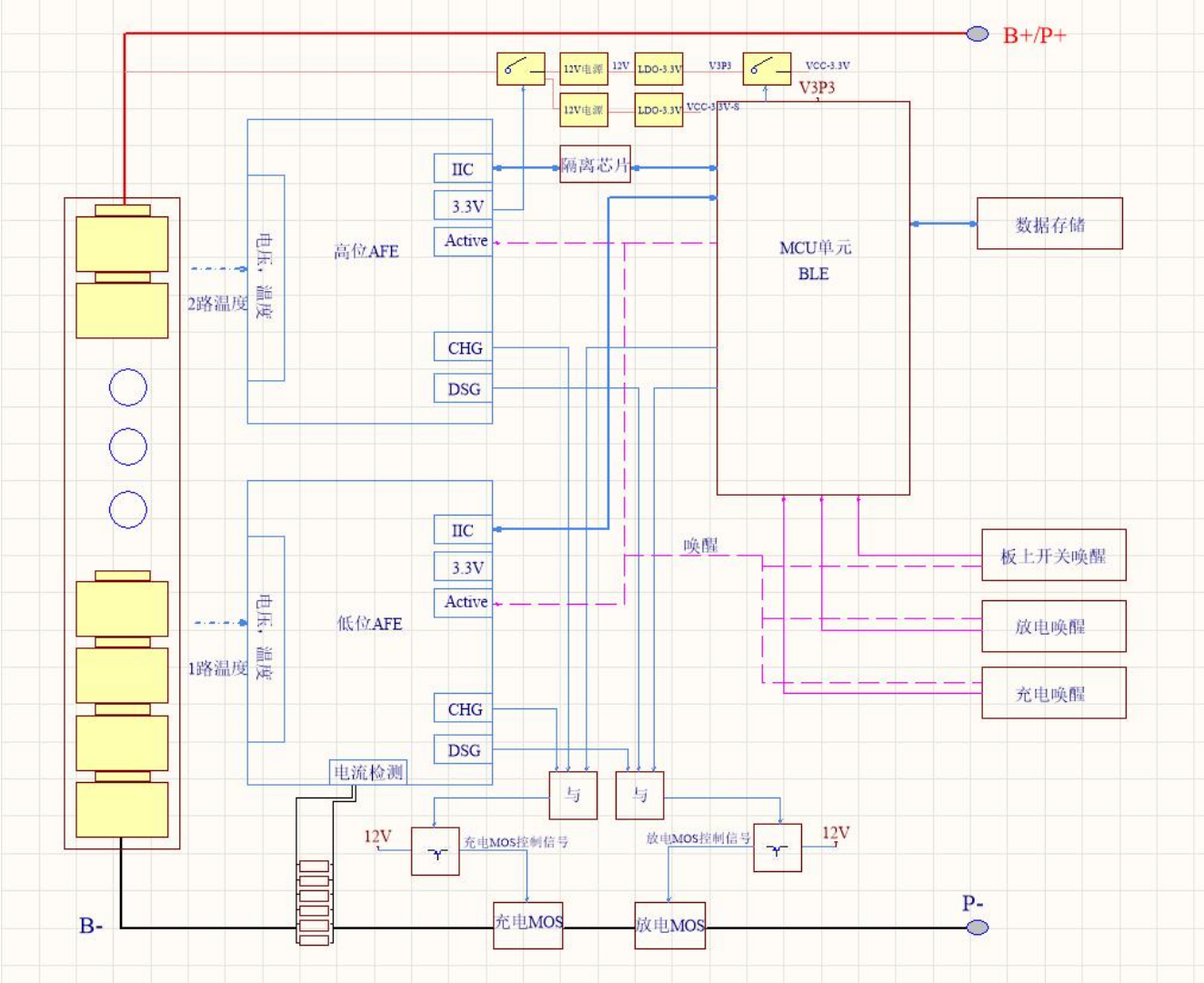
M:开关器件为 MOS 管 (Power MOSFET)
R:开关器件继电器(Number of strings supported)

xx:支持串数 (Number of strings supported)

G:低速车(Low-speed Ternary Lithium Battery)
A:无人物流车 AGV (Automated Guided Vehicle)
M:电摩、电动两轮车(Electric motorcycle, electric two-wheel vehicle)
U:无人机(Drone)
P:便携电源、房车电源、启动电源等(Portable power source, household power supply, startup power supply, etc.)
S:家庭储能、工商业储能(Household energy storage, industrial and commercial energy storage)
E:小动力工具(Small power tool)

S:软件板 (Software board)
H:硬件板(Hardware board)
A:辅助功能板(Auxiliary functional board)

2. 功能示意框图（Function Block Diagram）



3. 功能配置（Configuration）

功能 （Function）	配置 (Configuration)	功能 (Function)	配置 (Configuration)
支持串数 Number of strings supported	13~24(以线束配置为准，可向下兼容)	485(隔离) 485Communication(Isolated)	/
放电持续电流 Discharging Continuous	按功率板配置（20A~250A）	UART(隔离) UART Communication	标配 Standard option

current		(Isolated)	
充电持续电流 Charging continuous current	按功率板配置（20A~250A）	CAN 通讯 CAN Communication (Isolated)	/
NTC 数量 Number of NTCs	2 路电池 (Two temperature probes for battery) 1 路 MOS(One temperature probe for MOS)	加热功能 Heating Function	/
均衡功能 Balance Function	主动均衡，标配（Active balance，Standard option） 被动均衡，选配（Passive balance，Optional）	蓝牙模块 Bluetooth Module	标配（Standard option）
开关功能 Switch Function	选配 （Optional）	电池组串联 Battery packs in series	/
充电限流功能 Charging current limit	不支持 （Not supported）	二次保护功能 Secondary protection	/
电池组并联 Battery packs in parallel	不支持 （Not supported）	LCD 显示屏 LCD Display	不支持（Not supported）
履历 History storage	标配 （Standard option）	LED 指示灯接口 LED indicator interface	不支持（Not supported）
预放电功能 Pre-discharge function	标配 （Standard option）	GPS 接口 GPS interface	不支持（Not supported）

备注：1.非隔离通信不支持与充电器或负载通讯

Note: 1.Non-isolated communication with charger or loads is not supported.

4. 参数设置（Parameter settings）

4.1 基本参数（Basic parameter）

电池包规格(battery pack Specifications)	13~24 串（13~24 Strings）
接口类型(Interface type)	充放电同口（Charge and discharge are both at the same port）
充电电压(Charging voltage)	铁锂 3.65V*串数/三元 4.25V*串数
单体电压范围(Cell voltage range)	铁锂 2.7~3.65V/三元 2.4~4.25V
持续充电电流(Continuous charging current)	20A-250A 可选
持续放电电流(Continuous discharging current)	20A-250A 可选

通信接口（Communication Interface）连接上位机波特率，ID(Connected upper computer Baud Rate and ID)	UART Baud Rate: 115200 ID:1
动行功耗(Consumption of running)	≤200mA
休眠功耗(Consumption of sleep)	≤1mA
休眠条件(Sleep conditions)	无电流、通讯、保护状态下（No current、communication、protection state）
深度休眠功耗(Consumption of deep sleep)	≤100uA
深度休眠条件(Deep sleep conditions)	单体欠压状态下（In cell under voltage state）
工作温度(Operating temperature)	-20℃~60℃
板子结构尺寸(Size)	20-40A:(L*W*H) 145*85*16mm±1mm 60A-80A:(L*W*H) 160*85*16mm±1mm 100A:(L*W*H) 180*85*16mm±1mm 150A:(L*W*H) 214.57*85*16mm±1mm 200A:(L*W*H) 236.8*85*16±1mm 250A:(L*W*H) 275*85*16±1mm (长度*宽度*高度)

4.2 主要参数（Main Parameter Parameters）

项目 Project		规格（Specification） 最小 MIN	典型 TYP 铁锂/三元	最大 MAX	单位 Unit
4.2.1 单串电池参数(Cell Parameter)					
单节过充保护 Single Cell Over-Charge Protection	过充保护 Over-Charge Voltage Protection		3.65/4.25		V
	过充保护延时时间 Over-Charge voltage Protection Delay Time	2000	3000	4000	mS
	过充保护恢复电压 Over-Charge voltage Protection Release		3.35/3.9		V
单节过放保护 Single Cell Over-Discharge Protection	过放保护 Over-Discharge Voltage Protection	2.6	2.65/2.7	2.7	V
	过放保护延时时间 Over-Discharge voltage Protection	2000	3000	4000	mS

	Delay Time				
	过放恢复电压 Over-Discharge voltage Protection Release		2.75/2.8		V
4.2.2 均衡功能（Balance Function）					
均衡电压 Balanced Voltage	均衡开启电压 Balanced Opening Voltage		3.2/3.6		V
	均衡开启压差 Balanced Opening Voltage Different	0.03	0.05	0.07	V
	均衡电流 Balanced Opening Current		1		A
	均衡方式 Balanced Opening Mode	主动均衡			\
4.2.3 电流保护参数(Current Protection Parameter)					
充电过流保护 Over Charge Current Protection	充电过流保护电流 Over-Current Charge Protection		1.5 倍额定充电电流		A
	充电过流保护延时 Over-Current Charge Protection Delay Time	9000	10000	11000	mS
	充电过流保护解除 Over-Current Charge Protection is lifted	延时 30S 自动恢复, 3 次后需要移除充电器 Delay 30S Self-recovery，After 3 times, need to remove the charger to restore			
放电过流保护 Over Discharge Current Protection	一级放电过流保护电流 1th Ove Protection Current		1.5 倍额定放电电流		A
	一级放电过流保护延时 1th Over Protection Delay Time	4500	5000	5500	mS
	二级放电过流保护电流 2nd Level Over Protection Current		2 倍额定放电电流		A
	二级放电过流保护延时 2nd Level Over Protection Current Delay Time	29000	30000	31000	mS
	放电过流保护解除 Over-Current Discharge Protection Release	延时 30S 自动恢复,3 次需要移除负载 Delay 30S Self-recover， After 3 times, need to remove the load			

		to restore			
4.2.4 短路保护参数（Short-Circuit Protection Parameter）					
短路保护 Shor-Circuit Protection	短路保护电流 Short-Circuit Protection Current		8 倍额定放电电流		A
	短路保护延时 Short-Circuit Protection Delay Time	300	400	500	uS
	短路保护解除 Short-Circuit Protection is lifted	延时 30S 自动恢复 Delay 30S Self-recover			
	短路说明：表中的短路电流最小值与最大值是短路保护功能的有效作用范围，电流低于最小值或高于最大值，都会可能导致短路保护功能失效。请充分评估实际的短路电流值，或者串联电阻，再进行短路测试！ Short-Circuit Description: The minimum and maximum values of the short-circuit current listed in the table define the effective range of the short-circuit protection function. If the current is lower than the minimum value or higher than the maximum value, it may cause the short-circuit protection to fail. Please thoroughly assess the actual short-circuit current value or series resistance before conducting short-circuit tests.				
4.2.5 电池温度保护参数（Cell Temperature Protection Parameter）					
充电温度保护 Charging Temperature Protection	充电高温保护 Charging High Temperature Protection	51	55	59	℃
	充电高温恢复 Charging High Temperature Protection Release	46	50	54	℃
	充电低温保护 Charging Low Temperature Protection	-4	0	4	℃
	充电低温恢复 Charging Low Temperature Protection Release	1	5	9	℃
放电温度保护 Discharging Temperature Protection	放电高温保护 Discharging High Temperature Protection	59	60	61	℃
	放电高温恢复 Discharging High Temperature Protection Release	54	55	56	℃

	放电低温保护 Discharging Low Temperature Protection	-21	-20	-19	℃
	放电低温恢复 Discharging Low Temperature Protection Release	-11	-10	-9	℃
4.2.6 MOS 温度保护参数（MOS Temperature Protection Parameter）					
MOS 高温保护 High Temperature Protection of MOS	MOS 温度保护值 Temperature Protection Value	116	120	124	℃
	MOS 温度保护解除值 Temperature Protection Release Value	96	100	104	℃
4.2.7 电池总压保护参数（Total Voltage Protection Parameter）					
总压过充保护 Total Voltage Over charge Protection	总压过充保护电压 Overall Overcharge Protection Voltage		3.65*N/4.25*N		V
	总压过充保护延时 Overall Overcharge Protection Delay	2000	3000	4000	mS
	总压过充保护解除电压 Overall Overcharge Protection Release Voltage		3.35*N/4.1*N		V
总压过放保护 Total Voltage Over discharge Protection	总压过放保护电压 Overall Over discharge Protection Voltage		2.7*N/2.4*N		V
	总压过放保护延时 Overall Over discharge Protection Delay	2000	3000	4000	mS
	总压过放保护解除电压 Overall Over discharge Protection Release Voltage		2.9*N/3*N		V
4.2.8 加热管理（Heating Manage）					
加热管理 Heating Manage	加热开启温度 Heating Opening temperature		/		℃
	加热停止温度 Heating Stop temperature		/		℃
	加热电流 Heating Current	/			A
	加热方式 Type Of Heating	充电加热 Heating By Charge			

5. 关键物料清单（Bill Of Critical Materials）

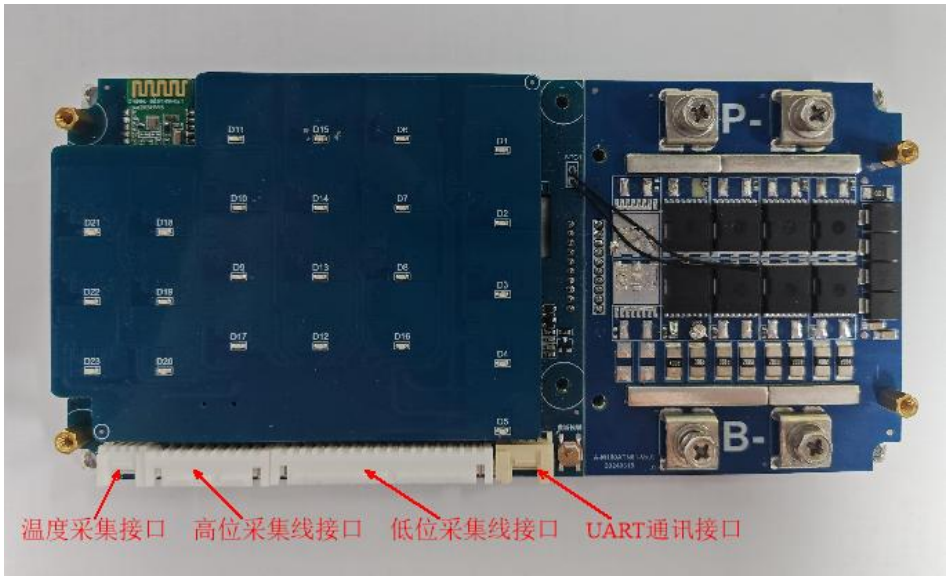
序号（NO）	物料名称（Name of Material）	生产厂家（Manufacturer）	封装（Packaging）	数量（Quantity）
1	BLE-08-Vx.1	HNYX	26.9*13*1.0mm	1
2	PW016N10TS (功率 MOS 根据电流和电压配置，不同型号存在差异)	平伟	TOLL	按功率板配置
3	SH367309	中颖	QFP48	2

重点说明：为保障供应链的安全，所有 BMS 物料，尤其是关键器件我司都会有同品质同规格的替代方案，如有认证需求不允许更换或需经客户端确认才能更换物料，需通知我司业务重新送样方案，并确认规格书。

Note: To ensure the safety of the supply chain, we have alternative materials of the same quality and specifications for all Battery Management System (BMS) materials, particularly the key components. If there are certification requirements where replacement is not allowed, or if a client's approval is required for replacement, please notify our sales representatives to resend sample proposals and confirm the product specification.

6. 产品示意图及尺寸（Product Diagram and Dimensions）

6.1 产品实物图及接口（Product Photos and Interface）



6.2 低位采样接口定义（Low level sampling interface definition）

低位采样接口定义 Low level sampling interface definition					
NO	**PIN**	**PIN 功能定义 （Pin Function）**	**NO**	**PIN**	**PIN 功能定义 （Pin Function）**
1	B0	接 1 串电池负极 Connect to Negative side of cell 1	2	B1	第 1 串电池正极 Connect to Positive side of cell 1
3	B2	第 2 串电池正极 Connect to Positive side of cell 2	4	B3	第 3 串电池正极 Connect to Positive side of cell 3
5	B4	第 4 串电池正极 Connect to Positive side of cell 4	6	B5	第 5 串电池正极 Connect to Positive side of cell 5
7	B6	第 6 串电池正极 Connect to Positive side of cell 6	8	B7	第 7 串电池正极 Connect to Positive side of cell 7
9	B8	第 8 串电池正极 Connect to Positive side of cell 8	10	B9	第 9 串电池正极 Connect to Positive side of cell 9
11	B10	第 10 串电池正极 Connect to Positive side of cell 10	12	B11	第 11 串电池正极 Connect to Positive side of cell 11
13	B12	第 12 串电池正极 Connect to Positive side of cell 12	14	B13	第 13 串电池正极 Connect to Positive side of cell 13
15	B14	第 14 串电池正极 Connect to Positive side of cell 14	16	B15	第 15 串电池正极 Connect to Positive side of cell 15
17	B16	第 16 串电池正极 Connect to Positive side of cell 16	18	B17	第 17 串电池正极 Connect to Positive side of cell 17

6.3 高位采样接口定义（High level sampling interface definition）

高位采样接口定义 High level sampling interface definition					
NO	**PIN**	**PIN 功能定义 （Pin Function）**	**NO**	**PIN**	**PIN 功能定义 （Pin Function）**
1	B18	第 18 串电池正极 Connect to Positive side of cell 18	2	B19	第 19 串电池正极 Connect to Positive side of cell 19
3	B20	第 20 串电池正极 Connect to Positive side of cell 20	4	B21	第 21 串电池正极 Connect to Positive side of cell 21
5	B22	第 22 串电池正极 Connect to Positive side of cell 22	6	B23	第 23 串电池正极 Connect to Positive side of cell 23
7	B24	第 24 串电池正极 Connect to Positive side of cell 24	8	B+	第 24 串电池正极 Connect to Positive side of cell 24

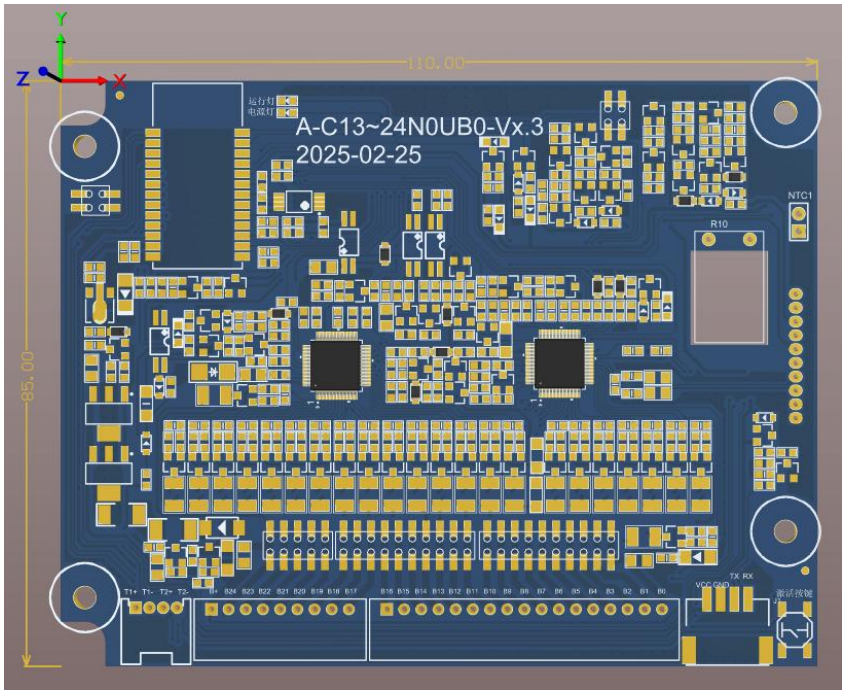
6.4 通讯线接口定义（communication interface definition）

通讯线接口定义 Communication interface definition					
NO	**PIN**	**PIN 功能定义 （Pin Function）**	**NO**	**PIN**	**PIN 功能定义 （Pin Function）**
1	VCC	12V 电源正极	2	GND	12V 电源负极
3	RX	外设串口接收信号	4	TX	外设串口发送信号

6.5 温度线束接口定义（Temperature Sampling Interface）

温度线束接口定义 Temperature Sampling Interface					
NO	**PIN**	**PIN 功能定义 （Pin Function）**	**NO**	**PIN**	**PIN 功能定义 （Pin Function）**
1	T1+	温度传感器 1 正极 Positive side of temperature sensor1	2	T1-	温度传感器 1 负极 Negative side of temperature sensor1
3	T2+	温度传感器 2 正极 Positive side of temperature sensor2	4	T2-	温度传感器 1 负极 Negative side of temperature sensor1

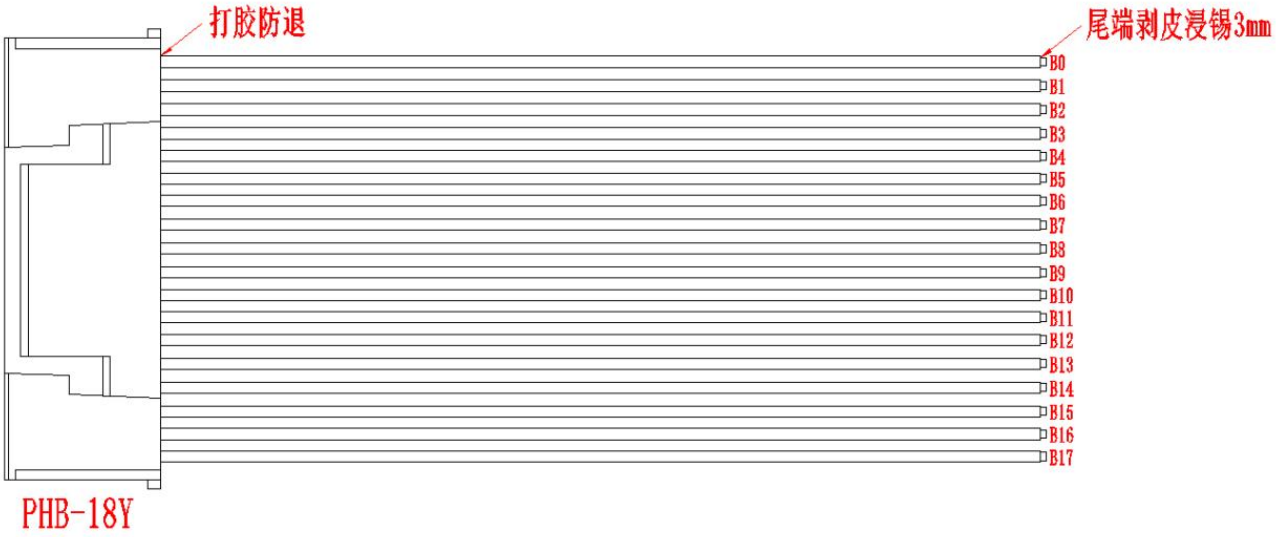
6.6 产品结构尺寸图（Product Dimensions）



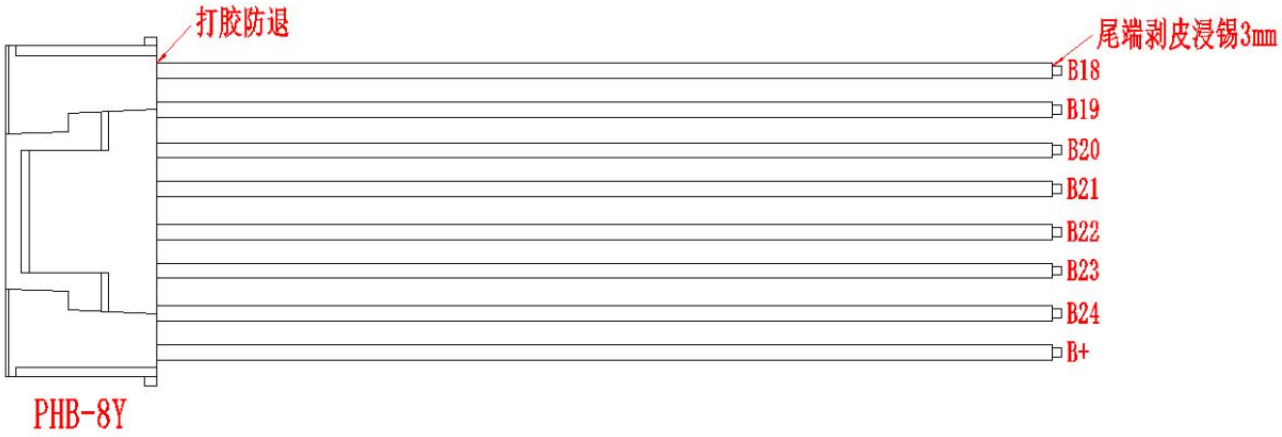
控制板

7. 线束(Wiring Harness）

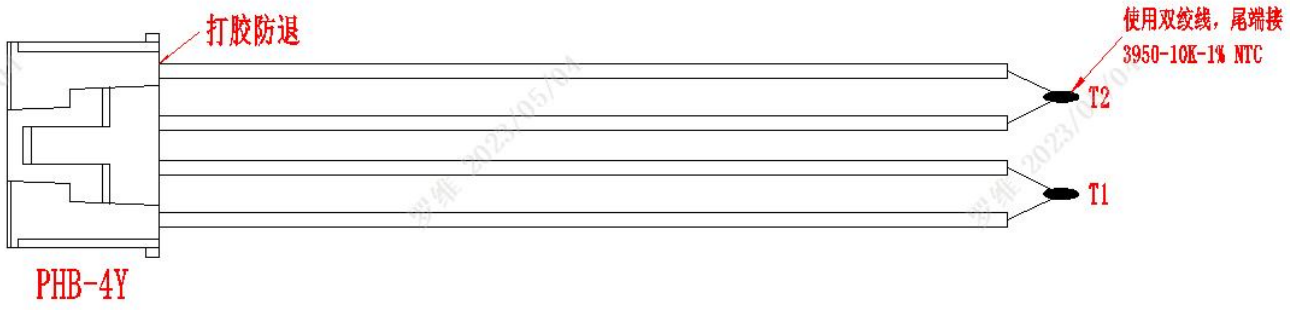
7.1 低位采集线（low acquisition line）



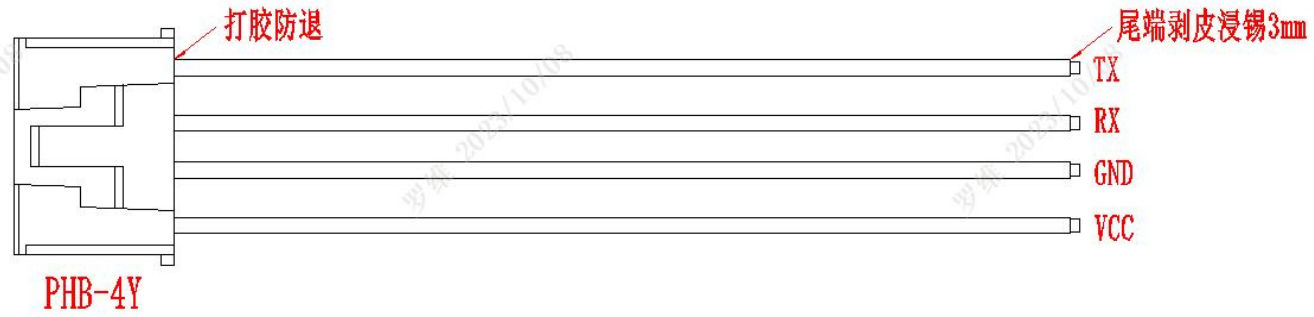
7.2 高位采集线（high-position acquisition line）



7.3 温度控制线（relay and temperature control line）

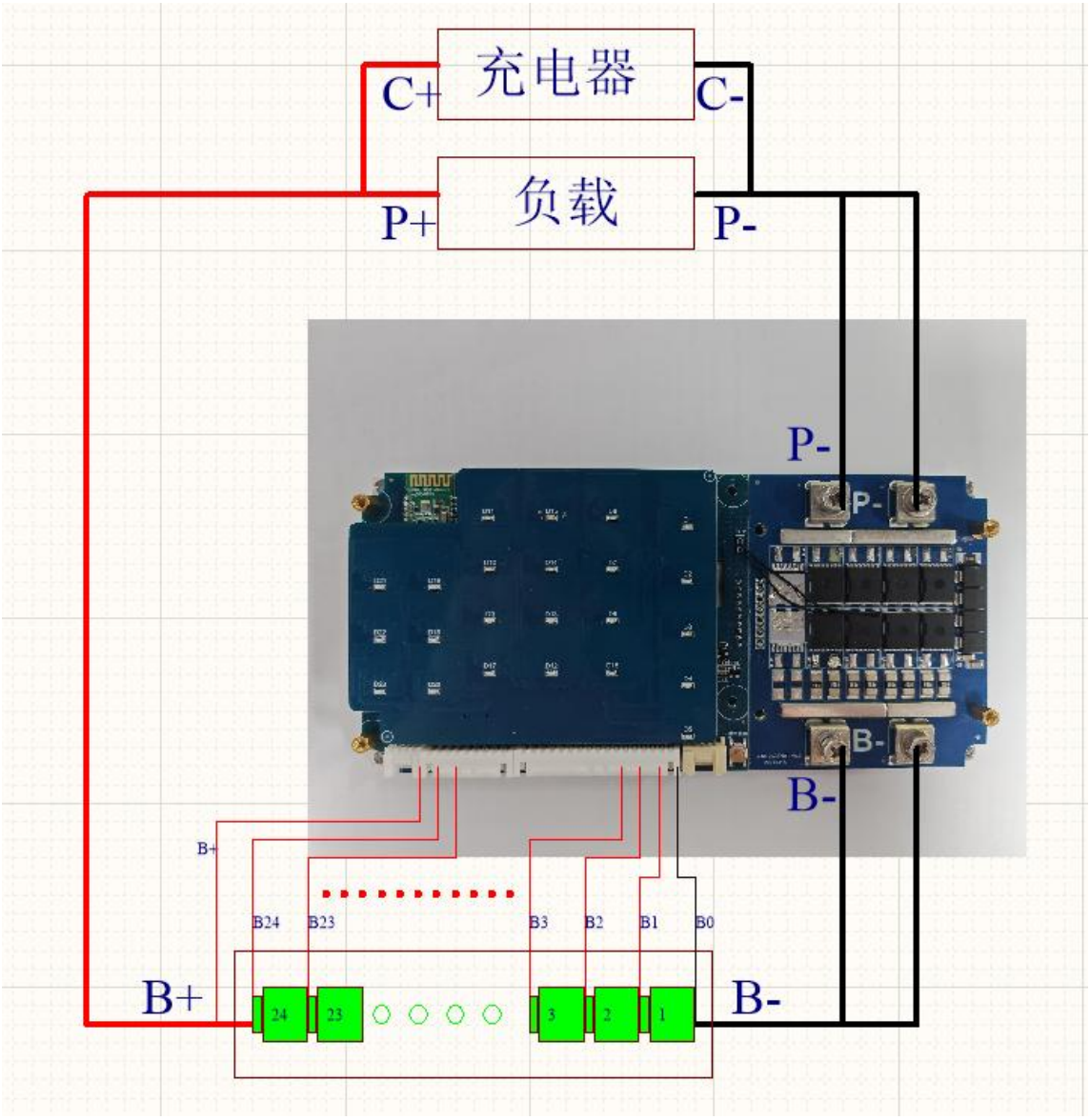


7.4 通讯线（key and communication line）



8. 产品安装说明（Product Setup Instructions）

8.1 充放电接线示意图（Charge and Discharge Wiring Diagram）



8.1.1 上电顺序(Power Up Sequence)：

第一步：连接主板 B-到电池包的负极；

Step 1: Connect the main board "B-" to the negative terminal of the battery pack.

第二步：接入温度传感器线束、通讯线束；

Step 2: Connect the temperature probes cable, 422 communication cable, start signal cable, etc.

第三步：连接电池采集线束；

Step 3: Connect the cell voltage sensing cable.

第四步：连接“P-”动力线到负载负极或充电器负极，或“C-”动力线到充电器负极；

Step 4: Connect the “P-” wire to the negative of the load or the charger, or connect the “C-” wire to the negative of the charger.

第五步：确保以上连接正确后，短接 K+与 K-信号 1 秒钟后断开，此时 BMS 板上电开始自检，系统自检正常时，板上状态指示灯按 1 秒 1 次的频率开始闪烁；自检异常时（如有过压、欠压或过温时），板上状态指示灯按 1 秒 3 次的频率闪烁，提示报警。

Step 5: After ensuring all the above connections are correct, short-circuit the “K+” and “K-” signals for 1 second. The BMS will then power up and undergo a self-test. If the LED on the board blinks once every second, it indicates that the BMS system is operating normally. If the LED blinks three times every second, it indicates an abnormal operation and triggers an alarm.

8.1.2 下电顺序(Power Down Sequence)：

第一步：断开充电器和负载；

Step 1: Disconnect the charger and load.

第二步：断开电压采集线；

Step 2: Disconnect the voltage sensing cable.

第三步：断开所有通讯线；

Step 3: Disconnect all communication cables.

第四步：断开主板 B-。

Step 4: Disconnect the main board B-.

注：如果电压采集线为焊接方式的:

Note: If the voltage sensing line is welded:

A：提前加工：将 BMS 放置在防静电桌面上，操作员手持烙铁在待焊接焊盘上加锡，待

焊接物料如来料时未加锡处理，也需提前进行加锡，以减少带电焊接时的焊接时间。

A: Pre-processing: Place the BMS on an anti-static desktop, with the operator using a soldering iron to tin the solder pad that's to be welded. If the materials to be soldered weren't tinned upon arrival, it is also necessary to tin them in advance to reduce the welding time during live soldering.

B：焊接顺序：电池采集线焊接顺序为 B1→B2・・・・B+，确认焊接无误后，才能上电。

B: Welding sequence: The welding sequence for the battery sensing line is B1 → B2 ... B+. Only after confirming that the welding is correct should you power on.

C:焊接过程中避免碰到周边元件及周边的 PCB 线路。

C: Avoid contacting surrounding components and PCB circuits during the welding process.

8.1.3 串数兼容列表(Strings Number Compatibility List)：

BMS 连接器端 BMS Interface	电池端 PACK Configuration												
	24S	23S	22S	21S	20S	19S	18S	17S	16S	15S	14S	13S	
B24	B24+	B23+	B22+	B21+	B20+	B19+	B18+	B17+	B16+	B15+			
B23	B23+												
B22	B22+	B22+											
B21	B21+	B21+	B21+										
B20	B20+	B20+	B20+	B20+									
B19	B19+	B19+	B19+	B19+	B19+								
B18	B18+	B18+	B18+	B18+	B18+	B18+							
B17	B17+	B17+	B17+	B17+	B17+	B17+	B17+						
B16	B16+	B16+	B16+	B16+	B16+	B16+	B16+	B16+					

B15	B15+	B15+	B15+	B15+	B15+	B15+	B15+	B15+	B15+		B14+		
B14	B14+	B14+	B14+	B14+	B14+	B14+	B14+	B14+	B14+	B14+		B13+	
B13	B13+	B13+	B13+	B13+	B13+	B13+	B13+	B13+	B13+	B13+	B13+		

8.2 温度传感器安装(Temperature Sensor Installation)

主板上温度传感器用于监测电池包温度，安装时，请将探头紧贴在位于电池组中间位置的单体电池上，确保测量到电池组温度最集中的地方。

The temperature sensor on the main board is used to monitor the temperature of the battery pack. During installation, please place the sensor probe closely against a single cell located in the middle of the battery pack, ensuring it measures at the most concentrated heat area of the pack.

8.3 电气接线说明(Electrical Wiring Instructions)

8.3.1 将 BMS 连接到电池组时，首先应将电池组总负极连接到 BMS 的 B-，确保系统可靠接地。同时，电池组总负极到 BMS 板 B-端动力线阻抗应尽量低，控制在 0.1mΩ以内，以确保在大电流充、放电时的电流检测精度；

When connecting the BMS to the battery pack, first connect the overall negative terminal of the battery pack to the B- terminal of the BMS, ensuring a reliable grounding of the system. At the same time, the impedance of the power line from the overall negative terminal of the battery pack to the B- terminal on the BMS board should be kept as low as possible, ideally within 0.1mΩ, to ensure accurate current detection during high-current charging and discharging.

8.3.2 在做充放电大于 50A 电流测试时，主板上的 B-和 P-动力线必须全部接上，以确保过电流能力，并保证功率器件均流。

When conducting tests with charge and discharge currents greater than 50A, both the B- and P- power lines on the main board must be fully connected to ensure overcurrent capability and to guarantee even current distribution across power devices.

8.4 BMS 开箱检查及注意事项(BMS unpacking inspection and precautions)

8.4.1.1 开箱前注意包装是否完好，如有无撞击痕迹、有无破损等；对包装箱、BMS 等 需要轻拿轻放、尽量不要倒置。

Before opening the box, check if the packaging is intact, looking for any signs of impact or damage. Handle the packaging box and the BMS gently, and try to avoid placing them upside down.

8.4.1.2 安装 BMS 之前，电池一定要匹配好，上电电压太高或太低会导致 BMS 告警，而无法正常工作，如果电芯电压是已经过充或过放，请把电芯电压充或放电到正常电压再连接 BMS。

Before installing the BMS, ensure that the battery cells are properly matched. A voltage that is too high or too low will trigger an alarm in the BMS, preventing it from functioning correctly. If the battery cell's voltage is overcharged or over-discharged, adjust the voltage to its normal range before connecting it to the BMS.

8.5 线束整理(Wiring harness organization)

8.5.1. **B-、P-、B+、P+、加热 H+、H-动力线为独立的输出线，禁止与信号线捆扎在一起。**

B-、P-、B+、P+ 、heating power lines are separate output lines, do not bind signal cables。

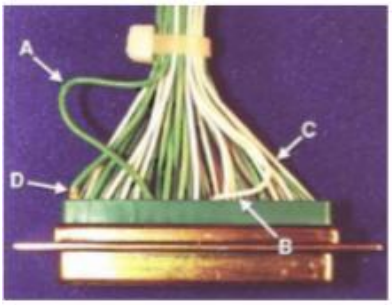
8.5.2. **对外输出的通信线与本线通信线分开捆扎。如对外的 RS485、CAN、外部 12V 激活信号、弱电开关信号线禁止与本地蓝牙、GPS、电压采集、温度采集、显示屏、电量灯板线捆扎在一起。**

The outgoing communication cable must be bound separately from the local communication cable. For example ,the RS485、CAN、12V activation and switching signals are not bound to the local BLE、GPS、voltage collection、temperature collection、display and power indicator board cable.

8.5.3. **直向走线：线束捆扎点在与连接器宽度等长的位置**

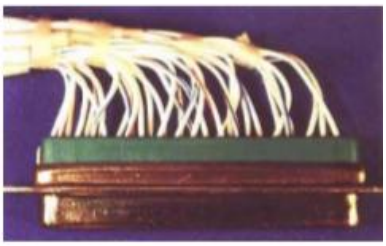
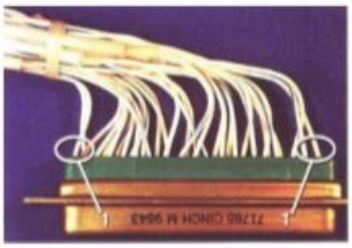
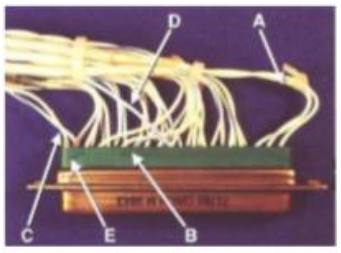
Straight Wiring: The tie point of the wiring harness is positioned at a length equivalent to the width of the connector.

目标（图 A）：线束出线与连接器面垂直；线束捆扎点与连接器之间有足够的距离以防止线束有应力。 Objective (Figure A): The wiring harness exit is perpendicular to the connector's surface; there's enough distance between the tie point of the harness and the connector to prevent any stress on the wires.	合格（图 B）：线束出线与连接器而近垂直；线束没有应力。 Acceptable (Figure B): The wiring harness exit is almost perpendicular to the connector; the harness is free from stress.	不合格（图 C，A）：线束长度过长；线束出线与连接器面形成锐角（图 C，B）；线束有应力（完全没有移动的余地） Not Acceptable (Figure C,A): The length of the wiring harness is too long; The wiring harness exit forms a sharp angle with the connector's surface (Figure C, B); The harness is under stress (with no room for movement whatsoever).

		
图A（1处为高应力区）	图B	图C

8.5.4.**侧向走线：线束弯曲点在连接器 1/3 宽度的位置**

Lateral wiring: The bending point of the wiring harness is located at 1/3 of the width of the connector

目标（图 A）：线束在弯曲前出线方向应垂直于连接器；线束没有应力；线束没有受到扎带的应力作用； Objective (Figure A): The wire harness should be perpendicular to the connector before any bending; The harness should be free from stress; The harness shouldn't experience stress from any ties.	合格（图 B）：线束出线与连接器面接近垂直。 Acceptable (Figure B): The wire harness exit is nearly perpendicular to the face of the connector.	不合格（图 C）：线束长度过长（A）；线束出线与连接器而形成锐角（B）；线束有应力（没有移动的余地）（C、D） Not Acceptable (Figure C): • The wire harness is excessively long (A). • A sharp angle is formed between the wire harness exit and the connector (B). • The wire harness has tension or stress (lacks slack or free movement) (C, D).
		
图A	图B（1处所指为高应力区）	图C

8.5.5．**线束固定：**

线束需要用卡扣或扎带固定在箱体或安装板上，要求布线整齐、固定牢靠、不可有晃动悬垂、不可有干涉受力、不可有摩擦破损；在连接器 30~50mm 处必须有固定点，两固定点之间间距不得大于 200mm，过拐角棱边两端 80mm 之内应有固定点。

C. Wire Harness Fixation:

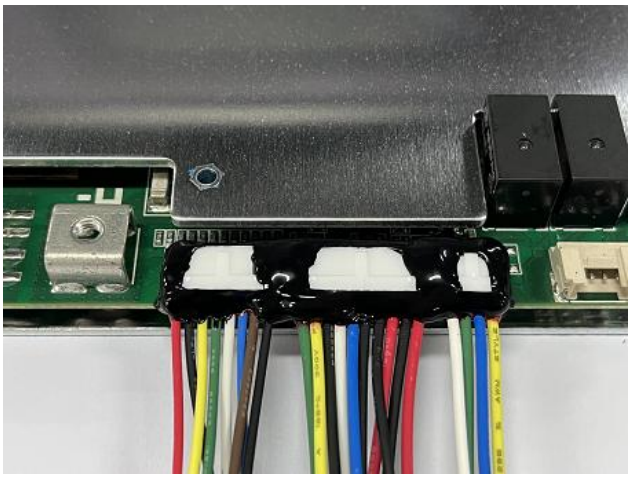
The wire harness should be securely attached to the enclosure or mounting plate using clips or ties. The wiring should be tidy and stable, with no loose hanging, interference, undue stress, or signs of wear from friction. Fixation points must be positioned 30-50mm from the connector, with no more than 200mm between each fixation point. Additionally, fixation points should be placed within 80mm

from both ends when navigating corner edges.

8.6 连接器点胶固定(Securing Connector With Adhesive)

线束安装完成后，确保连接器卡扣安装到位，建议在线束胶壳与 BMS 连接器相交位置及卡扣四周打上阻燃的红胶或黄胶（硬胶）进行固定，正反面都需要打胶。

Once the wiring harness installation is finished, ensure the connector's buckle is properly positioned. It's suggested to apply flame-retardant red or yellow adhesive (hard type) at the junction between the wiring harness's protective casing and the BMS connector, as well as around the buckle. Both front and back sides should have adhesive applied.



重点说明：

因电机的控制器均带有续流保护器件，故 BMS 板上未配置大功率续流管，如果使用大型充放电测试柜对电池组进行放电测试时，为防止放电关断瞬间，测试柜产生电感效应，应在测试柜输出端并接续流保护二极管，推荐规格为 200V/100A 的肖特基二极管。否则，测试柜的感应电压有可能损坏 BMS 板上的功率器件。

Note:

Since motor controllers come with continuous current protection devices, the BMS board doesn't have high-power continuous current tubes. When using a large-scale charging and discharging test cabinet for battery pack discharge tests, to prevent inductive effects during discharge cut-off, a continuous current protection diode should be added to the test cabinet's output. A 200V/100A Schottky diode is recommended. Failing to do so could result in induced voltages from the test cabinet damaging the power components on the BMS board.

8.7 蓝牙/GPS 模块的安装（Installation of Bluetooth/GPS）

蓝牙/GPS 模块是一个独立模块，为保障信号强度，需要保障蓝牙/GPS 天线不被金属壳体屏蔽，遮挡。

The Bluetooth/GPS module is standalone. To ensure robust signal strength, make sure the Bluetooth/GPS antenna isn't shielded or obstructed by any metal casing.

8.8 装配注意事项（Assembly precautions）

8.8.1 装配和使用中应防止静电，不要用手随意去接触电路板导电的部分；焊接使用的烙铁及装配使用的电动工具必须良好接地。

Avoid static electricity during assembly and use. Refrain from touching the conductive areas of the circuit board directly with your hands. Ensure that the soldering iron and electric tools used during assembly are properly grounded.

8.8.2 装配使用中应避免电路板受力，以免损坏电子元器件,导致电路板失效。

During assembly and use, avoid putting stress on the circuit board to prevent damage to electronic components and potential circuit board failure.

9. 免责声明（Disclaimer）

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，造成的后果由用户承担责任。

If procedures are not followed in the specified order, components of the protective board may be damaged, rendering the board unable to safeguard the battery pack. Users will bear responsibility for any resulting consequences.

10. 常见故障诊断（Fault Diagnosis）

NO	故障现象(Fault Phenomenon)	故障排查(Troubleshooting)
1	插上电压采集线束冒烟或有烧焦味 Smoke or burnt smell when plugging in the voltage collection harness	①.立即拔下电压采集线束，排查电芯端的接线是否按照 B0,B1,B2,---到最后一串的顺序焊接的，不允许串序和空焊； ①.Immediately unplug the voltage collection harness and check whether the wiring on the cell end is soldered in the order of B0, B1, B2, ... to the last string, and no sequence errors or cold solder joints are allowed; ②.有多个电压采集接口的 BMS 板，接入时是否先接低位，再接高位采集线束；拔掉时，是否先拔高位，再拔低位； ②. For BMS boards with multiple voltage collection interfaces, check if the low-position collection harness is connected first, then the

		high-position; and if the high-position is unplugged first, then the low-position; ③.是否有裸露的线短接或者有焊接的锡珠掉落在板子上。 ③. Check for any exposed wires short-circuiting or solder beads falling on the board.
2	BMS 板子不上电 BMS board does not power on	①.观察 BMS 板上是否有指示灯亮，若无指示灯亮，请尝试按键开关或充电激活 BMS 板，1 秒钟闪烁表示正常工作状态，说明 BMS 基本功能正常，通讯正常等，200mS 快闪表示有告警或异常保护，此时可连通讯，如上位机或蓝牙查看 BMS 异常状态。10 秒钟亮一下表示 BMS 板进入休眠模式，需要充或放电激活进入正常工作； ①. Check if there is an indicator light on the BMS board. If no light is on, try pressing the switch or charging to activate the BMS board. A 1-second flash indicates normal operation, meaning basic BMS functions and communication are normal. A 200ms fast flash indicates an alarm or abnormal protection; in this case, connect the communication interface or Bluetooth to check the BMS abnormal state. A flash every 10 seconds indicates the BMS board has entered sleep mode and needs charging or discharging to activate into normal operation; ②.灯常亮一般为误操作进入升级界面，重新升级即可。 ②. If the light is constantly on, it generally

		indicates an accidental entry into the upgrade interface. Re-upgrade to solve this issue.
3	电池包不放电 Battery pack does not discharge	①.在正常工作模式下无输出时，排查是否配置了外部弱电开关，尝试按下外部开关。另外可连接蓝牙或上位机查看放电 MOS 状态是否置“1”，1 表示放电 MOS 导通，允许放电，0 表示放电 MOS 断开，不能放电； ①. In normal operation mode, if there is no output, check if an external weak current switch is configured. Try pressing the external switch. You can also connect Bluetooth or the upper computer to check whether the discharge MOS status is set to "1", which means the discharge MOS is on and allows discharge, "0" means the discharge MOS is off and discharge is not allowed; ②.休眠模式下无输出属于正常现象，休眠模式是为了省电会关闭输出，需排查是否带弱电开关功能，可尝试开关唤醒，或充电、放电唤醒 BMS 进入正常工作模式； ②. No output in sleep mode is normal as sleep mode saves power by shutting off output. Check if there is a weak current switch function; try the switch to wake up, or charge/discharge to wake up the BMS into normal operation mode; ③.看指示灯是否是 200mS 快闪，快闪说明有电池有异常，BMS 有保护动作关闭输出，需

		要连接通讯或蓝牙 APP 排查问题，可优先查是否出现电压，电流，温度异常等相关保护； ③. Check if the indicator light is flashing at 200ms. If fast flashing, it indicates a battery abnormality, and the BMS protection action shuts off output. Connect communication or the Bluetooth APP to troubleshoot. Prioritize checking for voltage, current, or temperature abnormalities and related protections; ④.需要排查是否出现过异常保护后，还未达到恢复条件。 ④. Check if abnormal protection has occurred without meeting recovery conditions.
4	电池包不充电 Battery pack does not charge	①.排查充电器是否匹配，通常接市电就有输出电压的为盲充充电器，需确认输出电压大于或等于电池包满充的电压，充电器电压低于电池包电压是无法充电； ②.使用充放电老化柜，部分充电器要求先识别电池电压，充电器为协议充电器存在不匹配的情况，无法充电； ③.充电器输出电压是否大于电池包当前电压 1.2V 左右。当电池包比较满电时，存在不充电不识别充电器的型号，属正常情况; ④.部分 BMS 板带有弱电开关，充电受弱电开关控制，可尝试按下外部开关，进行充电。 ①. Check if the charger matches. Normally, blind charging chargers connected to mains power have output voltage; confirm the output voltage is greater than or equal to the fully charged voltage of the battery pack. The charger

		voltage lower than the battery pack voltage cannot charge; ②. When using charge-discharge aging cabinets, some chargers require first identifying battery voltage. Protocol chargers may not match and fail to charge; ③. Check if the charger output voltage is about 1.2V higher than the current battery pack voltage. When the battery pack is nearly full, it might not charge or recognize the charger model, which is normal; ④. Some BMS boards have weak current switches, with charging controlled by the weak current switch. Try pressing the external switch to charge.
5	电压采集线束发热	①.排查电压采集线束末端与电芯相连顺序是否正确，高低顺序是否接反，连接错误会造成发热，甚至烧坏板内线路和器件; ②. 排查线束串数与 BMS 板出厂串数是否匹配。线束不匹配，线束和 BMS 板短接串数使用错误，会造成线束发热，甚至烧坏板内线路和器件。 ①. Check if the end of the voltage collection harness is correctly connected to the cells, and if the high and low orders are reversed. Incorrect connections cause heating, and may damage the board's internal circuits and components; ②. Check if the number of harness strings matches the BMS board's factory strings. Mismatched harnesses and BMS board

		short-circuited strings cause heating and may damage the board's internal circuits and components.
6	其中一串电压随着充或放电电流越大电压变化越大，导致与相邻串的压差越大	①.排查电压变化大的电芯与相邻电芯的连接片焊接是否牢固； ②.排查电压变化大的电芯电压采集线焊接是否牢固； ③. 排查电压变化大的电芯与相邻电芯的连接片内阻是否比较大，电池组与电池组之间的连接线强烈推荐采用软紫铜排连接，不要使用动力线连接。 ①. Check if the soldering of the connecting pieces between the cell with large voltage changes and adjacent cells is firm; ②. Check if the soldering of the voltage collection wire of the cell with large voltage changes is firm; ③. Check if the internal resistance of the connecting piece between the cell with large voltage changes and adjacent cells is relatively large. Strongly recommend using soft copper bars for connections between battery groups instead of power cables.
7	接负载或逆变器断电	①.排查电池电压是否过低，触发了 BMS 板的过放保护，建议连接上位机或蓝牙 APP 排查问题; ②. 排查负载或逆变器功率是否过大，触发了 BMS 板的过流保护，建议连接上位机或蓝牙 APP 排查问题；

		③. 设备是否有大电容，触发了 BMS 板过流或短路保护，建议连接通讯或蓝牙 APP 排查问题。 ①. Check if the battery voltage is too low, triggering the BMS board's over-discharge protection. Connect the upper computer or Bluetooth APP to troubleshoot; ②. Check if the load or inverter power is too large, triggering the BMS board's overcurrent protection. Connect the upper computer or Bluetooth APP to troubleshoot; ③. Check if the device has large capacitors, triggering the BMS board's overcurrent or short-circuit protection. Connect communication or Bluetooth APP to troubleshoot.
8	加速或者爬坡断电	①.检查是否触发了 BMS 板的过流保护，可连接上位机或蓝牙 APP 读取告警和运行数据排查，修改优化保护参数； ②.检查电量是否充足，是否触发了欠压保护; ③.检查动力线是否焊接牢固。 ①. Check if the BMS board's overcurrent protection is triggered. Connect the upper computer or Bluetooth APP to read alarms and operational data for troubleshooting, and optimize protection parameters; ②. Check if the battery power is sufficient and if under-voltage protection is triggered; ③. Check if the power cables are soldered firmly.
9	蓝牙连接不上	①.蓝牙 APP 搜索界面是否能搜到蓝牙模块的名称，能搜到，说明 BMS 板工作正常。搜索

		不到，可能为 BMS 板进入休眠或欠压保护状态； ②.排查蓝牙模块指示灯是否有绿色指示灯闪烁，有说明蓝牙模块供电正常，否则需要排查接口接线是否正确； ③.当蓝牙模块的指示灯常亮时，说明手机已经与蓝牙模块配对上，界面有数据说明蓝牙连接正常，常亮无数据可能为设置错误，在手机界面尝试修改 ID 号：1 或 20; ④.排查手机蓝牙功能是否打开，蓝牙搜寻界面尝试触摸下滑多刷新几次，安卓手机还需打开定位服务。 ①. Check if the Bluetooth APP search interface can find the Bluetooth module's name. If found, the BMS board is working normally. If not found, the BMS board may be in sleep or under-voltage protection state; ②. Check if the Bluetooth module's indicator light is flashing green, indicating normal power supply to the Bluetooth module. Otherwise, check if the interface wiring is correct; ③. When the Bluetooth module indicator light is constantly on, it indicates the phone has paired with the Bluetooth module. If there is data on the interface, the Bluetooth connection is normal. Constant on with no data might be a setting error. Try modifying the ID number to 1 or 20 in the phone interface; ④. Check if the phone's Bluetooth function is turned on. In the Bluetooth search interface, try swiping down several times to refresh. Android

		phones also need to turn on location services.
10	CAN 通讯连接不上	①.排查 CAN 通讯盒的品牌，建议选用品牌为创芯科技，其它品牌存在通讯连接不上或不畅的情况； ②.排查电脑端是否已安装驱动，可通过插拔 CAN 设备的 USB 接口，观察电脑设备管理器，插上 USB 接口，出现设备说明驱动正常，此时拔掉 USB 接口，设备会消失。设备驱动显示告警叹号说明驱动安装异常; ③.CAN 通讯盒的拨码开关是否打下，一般推荐一上一下; ④.排查 BMS 板接线信号定义 H 和 L 是否与通讯盒对应正确，避免接线槽锁螺丝时只接触到了线皮; ⑤.优先连线到 CAN 盒的 CAN1 接口，CAN2 的上位机设置会有差异; ⑥. 排查电脑端是否打开多个上位机软件，其它 CAN 软件或调试助手需要关闭，避免占用 CAN 设备; ⑦. 排查 CAN 设置界面是否正确：设备选 CANalyst-II,波特率:参考规格书，BMSID：参考规格书，其它为默认值即可。设置正确后点击连接和采集按钮。 波特率和 BMSID 通常为以下 8 种组合之一： 125Kbps，1 或 125Kbps，20 250Kbps，1 或 250Kbps，20 500Kbps，1 或 500Kbps，20 1000Kbps，1 或 1000Kbps，20 ①. Check the brand of the CAN communication

		box. Recommended brand is Chuangxin Technology. Other brands may have connection issues; ②. Check if the driver is installed on the computer. Plug and unplug the CAN device's USB interface and observe the computer's device manager. If the device appears when the USB is plugged in, the driver is normal. If the device disappears when unplugged, the driver installation is abnormal; ③. Check if the dip switch of the CAN communication box is set correctly. Generally, one up and one down is recommended; ④. Check if the BMS board's signal definitions H and L match the communication box to avoid only contacting the wire skin when locking the wiring slot screws; ⑤. Prioritize connecting to the CAN1 interface of the CAN box. The upper computer settings of CAN2 vary; ⑥. Check if multiple upper computer software are open on the computer. Close other CAN software or debugging assistants to avoid occupying the CAN device; ⑦. Check if the CAN setting interface is correct: device selection CANalyst-II, baud rate: refer to the specification, BMSID: refer to the specification, other default values are acceptable. After setting correctly, click the connect and collect buttons. Baud rate and BMSID are usually one of the following 8 combinations: 125Kbps, 1 or 125Kbps, 20; 250Kbps, 1 or

		250Kbps, 20; 500Kbps, 1 or 500Kbps, 20; 1000Kbps, 1 or 1000Kbps, 20.
11	RS485 通讯连不上	①.排查电脑端是否已安装驱动，可通过插拔 RS485 设备的 USB 接口，观察电脑设备管理器，插上 USB 接口，出现串口说明驱动正常，此时拔掉 USB 接口，串口会消失。设备驱动显示告警叹号说明驱动安装异常; ②.排查 BMS 板接线信号定义 A，B 是否与通讯盒对应正确，避免接线槽锁螺丝时只接触到了线皮; ③. 排查电脑端是否打开多个上位机软件，调试助手，避免占用串口号; ④. 排查设置界面是否正确：选 COM 菜单，选对 COM 号,波特率:参考规格书，BMSID：参考规格书，其它为默认值即可。设置正确后点击连接和采集按钮。 波特率和 BMSID 通常为以下 4 种组合之一： 9600，1 或 9600，20 115200，1 或 115200，20 ①. Check if the driver is installed on the computer. Plug and unplug the RS485 device's USB interface and observe the computer's device manager. If the serial port appears when the USB is plugged in, the driver is normal. If the serial port disappears when unplugged, the driver installation is abnormal; ②. Check if the BMS board's signal definitions A and B match the communication box to avoid only contacting the wire skin when locking the wiring slot screws; ③. Check if multiple upper computer software

		are open on the computer. Close other debugging assistants to avoid occupying the serial port number; ④. Check if the setting interface is correct: select the COM menu, select the correct COM number, baud rate: refer to the specification, BMSID: refer to the specification, other default values are acceptable. After setting correctly, click the connect and collect buttons. Baud rate and BMSID are usually one of the following 4 combinations: 9600, 1 or 9600, 20; 115200, 1 or 115200, 20.

12	串口/UART 通讯连接不上	①.排查电脑端是否已安装驱动，可通过插拔串口设备的 USB 接口，观察电脑设备管理器，插上 USB 接口，出现串口说明驱动正常，此时拔掉 USB 接口，串口会消失。设备驱动显示告警叹号说明驱动安装异常; ②. 排查 BMS 板接线信号定义 TXD，RXD,GND 是否与通讯盒对应正确，避免接线槽锁螺丝时只接触到了线皮。通常 BMS 的 TXD 对应通讯盒的 TXD，RXD 对应通讯盒的 RXD，部分机型存在 TXD，RXD 交叉连线的情况; ③. 排查电脑端是否打开多个上位机软件，调试助手，避免占用串口号; ④. 排查设置界面是否正确：选 COM 菜单，选对 COM 号,波特率:参考规格书，BMSID：参考规格书，其它为默认值即可。设置正确后点击连接和采集按钮。 波特率和 BMSID 通常为以下 4 种组合之一： 9600，1 或 9600，20 115200，1 或 115200，20 ①. Check if the driver is installed on the computer. Plug and unplug the serial device's USB interface and observe the computer's device manager. If the serial port appears when the USB is plugged in, the driver is normal. If the serial port disappears when unplugged, the driver installation is abnormal; ②. Check if the BMS board's signal definitions TXD, RXD, and GND match the communication box to avoid only contacting the wire skin when locking the wiring slot screws. Typically, the BMS's TXD corresponds to the communication box's TXD, RXD corresponds to RXD. Some models have TXD, RXD crossed;

		③. Check if multiple upper computer software are open on the computer. Close other debugging assistants to avoid occupying the serial port number; ④. Check if the setting interface is correct: select the COM menu, select the correct COM number, baud rate: refer to the specification, BMSID: refer to the specification, other default values are acceptable. After setting correctly, click the connect and collect buttons. Baud rate and BMSID are usually one of the following 4 combinations: 9600, 1 or 9600, 20; 115200, 1 or 115200, 20. |

11. 联系我们(Contact Us)

公司：湖南银杏电池智能管理技术有限公司

Company: Hunan Ginkgo Battery Intelligent Management Technology Co., Ltd

地址：湖南省长沙经济技术开发区东六路南段 77 号金科亿达科技城 B49-2 栋

Address: Building B49-2, Jinke Yida Science and Technology City, No. 77, South Section of Dongliu Road, Changsha Economic and Technological Development Zone, Hunan Province

邮政编码：410100

Postal Code: 410100

技术支持：0731-88288662

Technical support: 0731-88288662