

磷酸铁锂电池产品说明书

Lifep04 Battery Product Manual



Model: RSPS-15KWh

Battery Specification

电池规格书

Battery type 电池型号	RSPS 15KWh		
Nominal voltage 标称电压	51.2V		
Nominal capacity 标称容量	15.36 KWh		
Page count 文件页数	25		
File number 文件编号			
Customer 客户			
Business code 业务代码			
Date 日期	2024.8.23		
Registered 编制	Checked 审核	Approved 批准	Customer Approve 客户承认

Safety instructions 安全说明：

Read the safety instructions before you operate the device. The safety precautions mentioned in this manual do not represent all the safety precautions to be followed, but only as a supplement to all the safety precautions. When installing, operating, and maintaining devices, comply with local safety laws and regulations. Only trained professionals can install, operate and maintain the equipment, SMARTKEY will not be liable for any loss caused by violation of general safe operation requirements or violation of safety standards for design, production and use of the equipment. The installation and maintenance personnel must be skilled in operating high-voltage and AC power supplies. When installing, operating, and maintaining the device, do not wear any conductive objects, such as watches, bracelets, bracelets, and rings, and prevent moisture from entering the device.

对设备进行任何操作前请阅读安全须知。本手册中所提及的安全预防措施并不代表所应遵守的所有安全事项，只作为所有安全注意事项的补充。在安装、操作、维护设备时，应遵守当地安全法规和规范。只有经过培训的专业人员才能安装、操作和维护设备，本公司不承担任何因违反通用安全操作要求或违反设计、生产和使用设备安全标准而造成损失的责任。安装维护人员必须具备高压和交流电源操作技术能力。在安装、操作、维护设备时，不得穿戴任何导电物体，如手表、手链、手镯和戒指等，并防止水分进入设备。



High voltage hazard 高压危险：

The high-voltage power supply provides power for the device operation. Direct or indirect contact with the high-voltage power supply through damp objects may result in fatal danger.

高压电源为设备的运行提供电力，直接接触或通过潮湿物体间接接触高压电源，会带来致命危险。



Use special tools 使用专用工具：

Always use special tools instead of personal tools when working with high voltage and AC power.

工作在高电压和交流电源时，一定要使用专用工具代替个人工具。



Anti-static 防静电:

The static electricity generated by the human body may damage the electrostatic sensitive components on the circuit board. Therefore, take proper ESD preventive measures before touching plug-ins, circuit board, or chip.

人体所产生的静电会损坏保护板上的静电敏感元器件，在触摸插件、电路板或芯片之前，要确保正确的防静电措施。



Disconnect the power supply during operation 操作时断开电源:

When operating the power supply, cut off the power supply first. Do not operate with the power on.

在操作电源时，必须先切断电源，禁止带电操作。



DC short circuit hazard 直流短路危险:

The power system provides DC regulated power supply. A DC short circuit may damage the device and cause fatal hazards.

电力系统提供直流稳压电源，直流短路会损坏设备并引起致命的危险。

Directory 目录

Directory 目录.....	4
1. Product introduction 产品介绍	5
2. Technical specifications 技术规格	8
2.1 Battery string specifications 电池组规格参数	8
2.2 Product picture 产品图片.....	14
2.3 Communication interface 通讯接口	15
2.4 Capacity indicator 指示灯说明.....	18
3. Precautions for installation and maintenance 安装、维护注意事项.....	20
3.1 Installation Precautions 安装注意事项	20
3.2 Maintenance Precautions 维护注意事项.....	20
3.3 Analysis of common problems and solutions 常见问题分析及解决方法	22
3.3.1 Under-voltage alarm 欠压告警.....	22
3.3.2 Discharge overcurrent protection 放电过流保护	23
3.3.3 Temperature protection 温度保护	23
3.3.4 The battery has no voltage output 电池无电压输出	23
4. Packaging, transportation, storage 包装、运输、存储	24
4.1 packaging 包装	24
4.2 transport 运输	24
4.3 storage 储存	24

1. Product introduction 产品介绍

This product is the lithium iron phosphate battery pack (including BMS) designed and manufactured by our company. It is composed of 16 battery cells, the battery group using intelligent sorting, accurate and reliable; BMS uses a professional protection panel test system to conduct a comprehensive test before going online to ensure that BMS can achieve comprehensive and effective protection of the battery pack during use. This product has high energy density, long life, safe and reliable, light weight, wide temperature range and other characteristics, is your reliable green environmental protection products.

本产品为本公司设计、制造的磷酸铁锂电池组（含BMS）。它由16串电芯组成，电芯的配组采用智能分选，准确可靠；BMS用专业的保护板测试系统在上线前进行全面的检测，确保在使用过程中BMS对电池组实现全面有效的保护。本产品具有能量密度高，长寿命，安全可靠，重量轻，使用温度范围宽等特性，是您值得信赖的绿色环保产品。

(1) When the battery is charged 电池充电时：

- ◆ The six capacity indicators are displayed based on the current battery capacity;
6 个容量指示灯（CAPACITY）会根据当前电池容量显示；
- ◆ The RUN indicator blinks every 1 second;
运行指示灯（RUN）每隔大约 1S 时间闪烁一次；
- ◆ The six capacity indicators of the battery are steady on. When the RUN indicator is off, the battery is fully charged。
当电池 6 个容量指示灯状态为常亮。RUN 灯灭时，电池充满。

(2) Battery discharge 电池放电时：

- ◆ The RUN normally on lamp RUN;
灯常亮；
- ◆ The six capacity indicators display the remaining capacity of battery discharge;
6 个容量指示灯（CAPACITY）会根据电池放电剩余容量显示；
- ◆ When the battery is discharged to the protection voltage, it enters the protection state. All indicators of the battery are off。
当电池放电至保护电压时，进入保护状态。电池所有指示灯将全部灭。

(3) The battery warning 电池告警：

When a battery fault occurs, the ALM indicator is red, indicating a battery fault alarm。

当电池出现问题故障时，ALM 灯为红色显示，电池故障告警提示。

(4) ADS Dial the code ADS 拨码：

The DIP switch is on the left of the protection board jack. The shape is shown in the following figure：

拨码开关位置在保护板插口的左边，形状如下图：



The DIP switch is used to control the address of the protection board. Dip control is used to control the address in binary mode. In the figure above, 1 represents the lowest bit and 4 the highest bit. Each dial above means 1, and each dial below means 0. The four-bit binary can represent 0, 1, 2-----, 14, 15, a total of 16 addresses。

拨码开关在作用是用来控制保护板的地址。拨码控制是用二进制方式控制地址，上图中 1 表示最低位，4 表示最高位。每位拨到上面表示 1，拨到下面表示 0。四位二进制可以表示 0、1、2-----、14、15，一共 16 个地址。

- ◆ As shown in the figure above, digits 1-4 are 0, indicating that the address is 0;
如上图所示，表示 1—4 位都是 0，表示地址是 0；
- ◆ If I dial 3 up, the address is $2^2=4$;
如果把 3 拨到上面，地址是 $2^2=4$ ；
- ◆ If you put both 3 and 4 up here, the binary is $2^2+2^3=4+8=12$;
如果把 3 和 4 都拨到上面，二进制是 $2^2+2^3=4+8=12$ ；
- ◆ If you want to set the IP address of the protection board to 3, you need to dial 1 and 2 instead of 3。
如果要把保护板地址设置成 3，需要将 1 和 2 拨到上面，而不是将 3 拨到上面。

(5) RS232 monitoring port RS232 监控端口：

The battery system uses RS232 serial port communication mode when uploading data. Through RS232 serial port, the battery system can be monitored in the background in a centralized manner, and the working status and alarm information of the battery system can be transmitted to

the remote monitoring center to achieve remote monitoring.

电池系统上传数据时采用 RS232 串口通讯方式，通过 RS232 串口可以对电池系统进行后台集中监控，将电池系统工作状态和告警信息等信息传到远端监控中心，实现远程监控。

(6) RS485 communication port **RS485 通讯端口：**

RS485 level communication interface. During system cascading, data is transmitted through the RS485 serial port. The cascaded Pack system uses RS485 for internal communication. The host system obtains Slave Pack data through the Master Pack.

RS485 级联通讯接口。系统级联时，数据传输采用 RS485 串口通讯方式。级联后的 Pack 系统内部使用 RS485 通讯方式，上位机系统对各个 Slave Pack 数据的获取都是通过 Master Pack 来实现的。

(7) **FUSE**

Output and input insurance: When the battery is short-circuited or is impacted by a large current, FUSE insurance is used to effectively protect the battery pack. FUSE can be directly inserted and removed for replacement.

输出、输入保险，当电池发生短路或受到大电流冲击时，FUSE 保险熔断，有效保护电池组安全。FUSE 可直接插拔进行更换。

(8) RST reset button **RST 复位键：**

RST: Reset indicates the reset key. If the system is abnormal, you can use this key to reset the system.

RST: 表示复位，在系统出现异常时，可以使用此键对系统进行复位，恢复系统的正常运行。

RST 复位键手动操作说明 RSTresetkey manual operationinstructions	开机 boot	BMS In the shutdown state, press the button for 1S to power on. BMS 在关机状态，按键 1S 开机
	关机 OFF	BMS No backup power, press 3S to shut down. BMS 非备电状态，按键 3S 关机
	复位 reset	BMS In the standby state, press the button for 10S until all led light up and reset. BMS 非备电状态，按键 10S 直至所有 LED 点亮复位

2. Technical specifications 技术规格:

2.1 Battery string specifications 电池组规格参数

Pile Index 成品参数	Nominal voltage 标称电压	51.2V
	Nominal capacity 标称容量	15.36 KWh
	Minimum capacity 最小容量	14.74 KWh
	Combination 组合方式	16S 1 P
	Charging Voltage 充电电压	57.6V
	Voltage at end of Discharge 放电终止电压	44.8V
	Standard charge current 标准充电电流	Sustained current 持续电流: 150 A Cut-off current 截止电流: 0.01CA
	Maximum charge current 最大充电电流	200A
	Standard discharge current 标准放电电流	150A
	Max continuous discharge current 最大持续放电电流	200A
	The factory voltage 出厂电压	50.4V – 52V
	Self-discharge 自放电率	≤2%/月 month
	Monitoring and control communications 监控通信	RS232、RS485 Port: Serial port communication RS232、RS485 接口: 串口通讯
	work environment	temperature: -20°C ~ + 60°C; humidity: ≤95%;

工作环境	At an altitude of: $\leq 4000\text{m}$ 温度: $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$; 湿度: $\leq 95\%$; 海拔: $\leq 4000\text{m}$
Product Dimensions 电池组结构尺寸 WxDxH(mm)	890*416*237mm
Net Weight 电池重量	115.5 \pm 1KG
installation 安装方式	wall mounted、outdoor hanging wall type 壁挂式、室外挂墙式
Minimum battery capacity standard 电池最小容量标准	$\geq 95\%$
Differential pressure between battery charging and discharging ends 电池充放电末端压差	$\leq 300\text{mV}$

Management system 管理系统	Cell overcharge protection 单体过充保护	Cell Over Charging alarm voltage 单体过充告警电压	3600mV	Can be set 可设	
		Cell Over Charge protection voltage 单体过充保护电压	3650mV	Can be set 可设	
		Cell Over Charging protection delay 单体过充保护延时	1.0S	Can be set 可设	
	Cell over voltage protection is removed 单体过压保护解除	Cell overcharge protection and restoration 单体过充保护解除电压	3380mV	Can be set 可设	
	Cell over discharge protection voltage 单体过放保护	Cell Over discharging alarm voltage 单体过放告警电压	2800mV	Can be set 可设	
		Cell over discharge protection voltage 单体过放保护电压	2700mV	Can be set 可设	
		Cell over release protection delay 单体过放保护延时	1.0S	Can be set 可设	

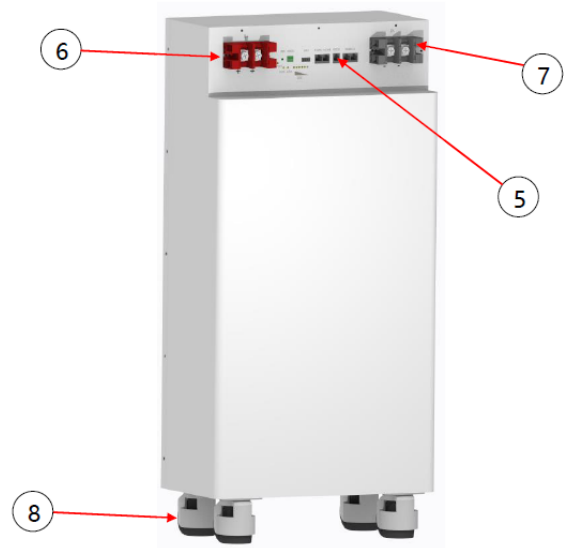
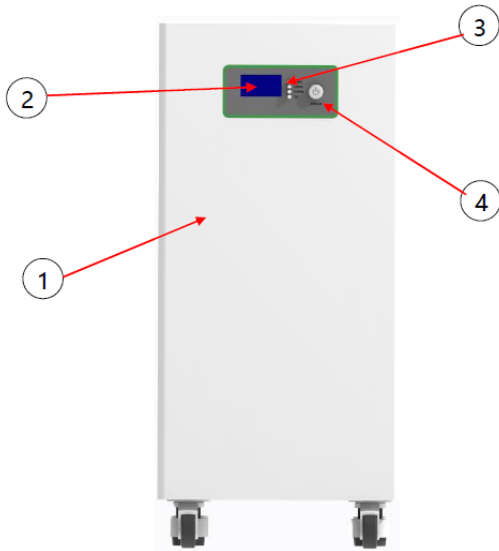
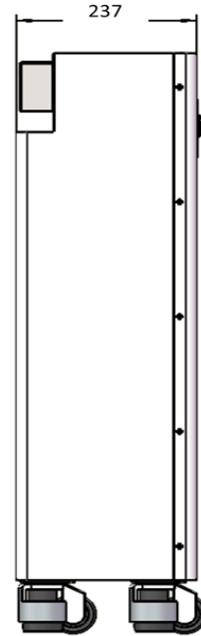
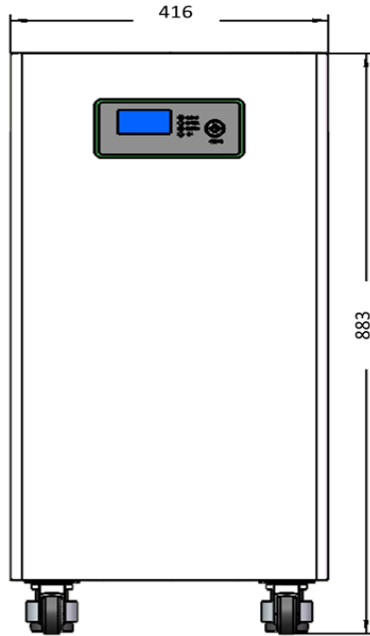
	Cell over release protection is disabled 单体过放保护解除	Over discharge renew voltage 单体过放保护解除电压	2850mV	Can be set 可设	
	Overall overcharge protection 总体过充保护	Overall overcharge alarm voltage 总体过充告警电压	57.6V	Can be set 可设	
		Overall overcharge protection voltage 总体过充保护电压	58.40V	Can be set 可设	
		Overall overcharge protection delay 总体过充保护延时	1.0S	Can be set 可设	
	Overall over release protection is removed 总体过放保护解除	Overall over discharge protection discharge voltage 总体过放保护解除电压	45.60V	Can be set 可设	
	Charge over current protection 充电过流保护	Charge over current alarm current 充电过流告警电流	205A	Can be set 可设	
		Charge over current protection current 充电过流保护电流	210A	Can be set 可设	
		Charging over current protection delay 充电过流保护延时	1.0S	Can be set 可设	
		Charging over current recovery condition 充电过流恢复条件	The lock will be automatically unlocked 1 minute later. If the lock is unlocked for 10 consecutive times, the lock will not be automatically unlocked. 1min 后自动解除, 连续出现 10 次将锁定该状态, 不再自动解除。		
	Discharge over current 1	Indicates the alarm current	205A	Can be set 可设	

Protection 放电过流1保护	放电过流1告警电流			
	Discharge over current 1 Protects the current 放电过流1保护电流	205A	Can be set 可设	
	Discharge over current 1 Protection delay 放电过流1保护延时	1.0S	Can be set 可设	
	Over current recovery conditions 过流恢复条件	The lock will be automatically unlocked 1 minute later. If the lock is unlocked for 10 consecutive times, the lock will not be automatically unlocked. 1min 后自动解除, 连续出现10次将锁定该状态, 不再自动解除。		
Discharge over current 2 protection 放电过流2保护	Discharge over current 2 Protects current 放电过流2保护电流	≥250A	Can be set 可设	
	Discharge over current 2 Protection delay 放电过流2保护延时	100mS	Can be set 可设	
	Secondary over current recovery condition 二级过流恢复条件	The lock will be automatically unlocked 1 minute later. If the lock is unlocked for 10 consecutive times, the lock will not be automatically unlocked. 1min 后自动解除, 连续出现 10 次将锁定该状态, 不再自动解除。		
Short circuit protection 短路保护	Short circuit protection 短路保护	有		
	Short circuit protection removed 短路保护解除	After the load is removed, it is automatically removed 负载移除后, 将自动解除		
MOS high temperature protection MOS 高温保护	MOS Over temperature protection temperature MOS 过温保护温度	115℃	Can be set 可设	
	MOS protection release temperature MOS 保护解除温度	85℃	Can be set 可设	

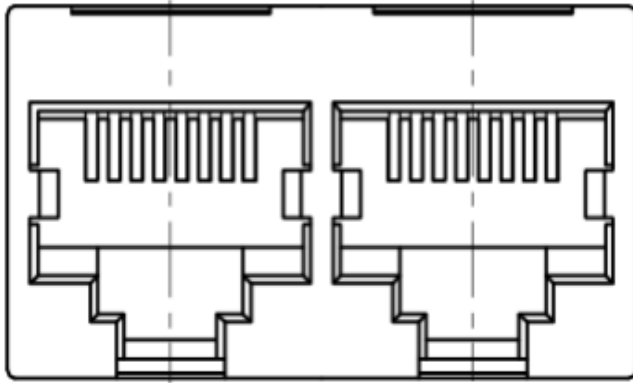
	Cell temperature protection 电芯温度保护	Low charge temperature Alarm temperature 充电低温告警温度	0℃	Can be set 可设	
		Charging low temperature protection temperature 充电低温保护温度	-5℃	Can be set 可设	
Management system 管理系统	Cell temperature protection 电芯温度保护	The low temperature protection of charging is removed 充电低温保护解除温度	0℃	Can be set 可设	
		Charge High temperature Indicates the alarm temperature 充电高温告警温度	60℃	Can be set 可设	
		Charging high temperature Protection temperature 充电高温保护温度	65℃	Can be set 可设	
		The charging high temperature protection removes the temperature 充电高温保护解除温度	55℃	Can be set 可设	
		Discharge low temperature Indicates the alarm temperature 放电低温告警温度	-15℃	Can be set 可设	
		Discharge low temperature protection temperature 放电低温保护温度	-20℃	Can be set 可设	
		Discharge low temperature protection releases the temperature 放电低温保护解除温度	-15℃	Can be set 可设	
		Discharge High temperature Indicates the alarm temperature 放电高温告警温度	65℃	Can be set 可设	
		Discharge high	70℃	Can be set	

		temperature protection temperature 放电高温保护温度		可设	
		Discharge high temperature protection releases the temperature 放电高温保护解除温度	60°C	Can be set 可设	
	Ambient temperature protection 环境温度保护	Ambient low temperature Indicates the alarm temperature 环境低温告警温度	-15°C	Can be set 可设	
		Ambient low temperature protection temperature 环境低温保护温度	-20°C	Can be set 可设	
		Ambient low temperature The ambient low temperature is removed 环境低温保护解除温度	-15°C	Can be set 可设	
		Ambient Temp Indicates the alarm temperature 环境高温告警温度	65°C	Can be set 可设	
		Ambient high Protective temperature 环境高温保护温度	70°C	Can be set 可设	
		Ambient high temperature The ambient temperature is removed 环境高温保护解除温度	65°C	Can be set 可设	
		balancing 均衡功能	Equalizing on voltage 均衡开启电压	3500mV	Can be set 可设
	Open the voltage differential 开启压差		30mV	Can be set 可设	

2.2 product picture 产品图片



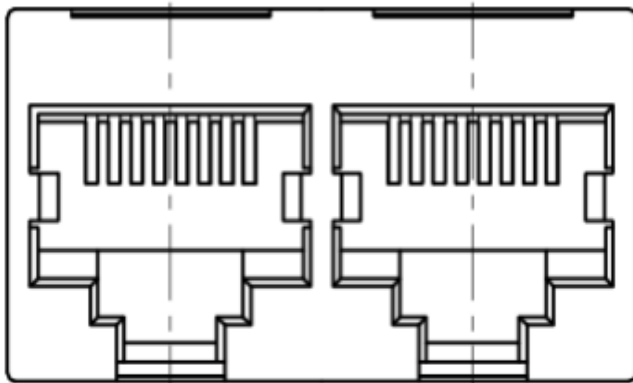
①	白色机盖	⑤	RS485/232/CAN
②	LCD 显示屏	⑥	正极防呆接插端子
③	功能按键	⑦	负极防呆接插端子
④	开关	⑧	福马脚轮



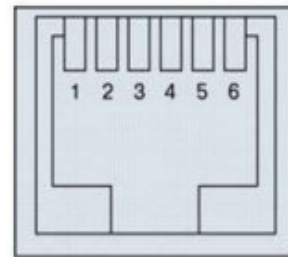
CAN 和 R485 接口



干接点



并联通讯端口



RS232 通讯接口

2.3.2 Electrical interface definition 电气接口定义

RS232-- Use 6P6C vertical RJ11 socket RS232--采用 6P6C 立式 RJ11 插座	
RJ11 pin RJ11 引脚	Defined declaration 定义说明
2	NC
3	TX (Board) TX (单板)
4	RX (Board) RX (单板)
5	GND

S485-- Use 8P8C vertical RJ45 socket RS485--采用 8P8C 立式 RJ45 插座		RS485-- Use 8P8C vertical RJ45 socket RS485--采用 8P8C 立式 RJ45 插座	
RJ45 pin RJ45 引脚	Defined declaration 定义说明	RJ45 pin RJ45 引脚	Defined declaration 定义说明
1、8	RS485-B1	9、10、11、14、16	NC
2、7	RS485-A1	12	CANL
3、6	GND	13	CANH
4、5	NC	15	GND

CAN and RS485 ports CAN 和 RS485 接口

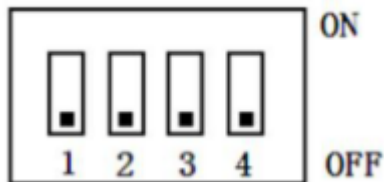
Parallel communication port 并联通讯口

RS485--Use 8P8C vertical RJ45 socket RS485--采用 8P8C 立式 RJ45 插座		RS485--Use 8P8C vertical RJ45 socket RS485--采用 8P8C 立式 RJ45 插座	
RJ45 pin RJ45 引脚	Defined declaration 定义说明	RJ45 pin RJ45 引脚	Defined eclaration 定义说明
1、8	RS485-B1	9、16	RS485-B
2、7	RS485-A1	10、15	RS485-A
3、6	GND	11、14	GND
4、5	NC	12、13	NC

2.3.3 Address setting 拨码开关设置

When packs are used in parallel, you can set the addresses of different packs by using the dip switch on the BMS. Avoid setting the addresses to be the same. For the definition of the DIP switch, see the following table.

当 PACK 作并联使用时,可通过 BMS 上的拨码开关设置地址区分不同的 PACK, 需避免地址设为相同, BMS 拨码开关的定义参照下表。



add 地址	Dip switch position 拨码开关位置			
	1#	2#	3#	4#
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

2.4 Indicator Light Description 指示灯说明

Table 1 LED working status indicator 表 1 LED 工作状态指示

state 状态	Normal/Alarm/Protection 正常/告警/保护	ON/OFF	RUN	ALM	Power indicator LED 电量指示 LED						explain 说明	
		●	●	●	●	●	●	●	●	●		
OFF 关机	dormancy 休眠	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	All OFF 全灭
standby 待机	normal 正常	ON 常亮	Flashes 闪 1	OFF 灭	According to electric quantity indicator 依据电量指示						standby 待机状态	
	Alarm 告警	ON 常亮	Flashes 闪 1	Flashes 闪 3							module of low pressure 模块低压	
Charge 充电	normal 正常	ON 常亮	ON 常亮	OFF 灭	According to electric quantity indicator (Maximum power indicator LED flash 2) 依据电量指示 (电量指示最高 LED 闪 2)						Maximum battery LED blinks (blinking 2). ALM does not blink when an overcharge alarm is generated 最高电量 LED 闪动 (闪 2)，过充告警时 ALM 不闪烁	
	Alarm 告警	ON 常亮	ON 常亮	ON 常亮								
	Overcharge Protection 过充保护	ON 常亮	ON 常亮	OFF 灭	ON 常亮	ON 常亮	ON 常亮	ON 常亮	ON 常亮	ON 常亮	If there is no mains power, the indicator switches to standby state 若无市电，指示灯转为 待机状态	
Temperature 、over current、 invalidation protection 温度、过流、 失效 保护	ON 常亮	OFF 灭	ON 常亮	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	Stop charge 停止充电	
discharge 放电	ON 正常	ON 常亮	Flashes 闪 3	OFF 灭	According to electric quantity indicator 依据电量指示						Stop discharge	

放电	Alarm 告警	ON 常亮	Flashes 闪 3	Flashes 闪 3								停止放电
	under voltage protection 欠压保护	ON 常亮	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	OFF 灭	Stop discharge 停止放电
	Temperature、over current、Short circuit, reverse connection, invalidation protection 温度、过流、短路、反接、失效保护	ON 常亮	OFF 灭	ON 常亮	ON 灭	ON 灭	ON 灭	ON 灭	ON 灭	ON 灭	ON 灭	
failure 失效		OFF 灭	OFF 灭	ON 常亮	ON 灭	ON 灭	ON 灭	ON 灭	ON 灭	ON 灭	ON 灭	Stop charging and discharging 停止充、放电

Table 2 Capacity indicator description 表2 容量指示说明

state 状态		charge 充电						discharge 放电					
Capacity indicator light 容量指示灯		L6	L5	L4	L3	L2	L1	L6	L5	L4	L3	L2	L1
Electric quantity (%) 电量 (%)	0~16.6%	OFF	OFF	OFF	OFF	OFF	Flash2	OFF	OFF	OFF	OFF	OFF	ON
	16.6~33.2%	OFF	OFF	OFF	OFF	Flash2	ON	OFF	OFF	OFF	OFF	ON	ON
	33.2~49.8%	OFF	OFF	OFF	Flash2	ON	ON	OFF	OFF	OFF	ON	ON	ON
	49.8~66.4%	OFF	OFF	Flash2	ON	ON	ON	OFF	OFF	ON	ON	ON	ON
	66.4~83.0%	OFF	Flash 2	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON

	83.0~100%	Flash 2	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
running indicator light 运行指示灯 ●		ON							Flashe (闪3)				

Table 3 LED flashing description 表3 LED 闪动说明

Flashing way 闪动方式	ON 亮	OFF 灭
Flash闪1	0.25S	3.75S
Flash闪2	0.5S	0.5S
Flash闪3	0.5S	1.5S

2. Precautions for installation and maintenance 安装、维护注意事项

3.1 Installation Precautions 安装注意事项

(1) Unpack and test the number of accessories and battery appearance before installation;

安装前拆箱、检测配件数量和电池外观；

(2) Install mounting ears and handles, and use a multimeter to measure the battery voltage. Generally, the battery voltage is between 51.5V and 53.5V;

安装挂耳和把手，用万用表测量电池电压，一般电池出厂电压在 51.5V - 53.5V 之间；

(3) Check the positive and negative electrodes of the battery before wiring. It is forbidden to connect the positive and negative extremes in the installation of the battery.

接线前查看好电池正负极，严禁在安装电池时正负极端子接反；

(4) When connecting batteries, wear protective gloves. When using metal tools such as a torque wrench, insulate the tools. Do not contact the positive and negative battery terminals at the same time, which may cause short circuit.

在电池连接过程中，请戴好防护手套，使用扭矩扳手等金属工具时，请将金属工具进行绝缘包装，绝对避免扭矩扳手等金属工具两端同时接触到电池正、负端子，造成电池短路；

(5) Before connecting with the external device, make the device in the disconnected state, and check again whether the polarity of the battery connection and the total voltage are correct, and then connect the positive electrode of the battery to the positive electrode of the device, the negative electrode of the battery to the negative extreme of the device, and tighten the connection wire;

跟外接设备连接之前，使设备处于断开状态，并再次检查电池的连接极性和总电压是否正确，然后再将电池的正极连接设备的正极，电池的负极连接设备的负极端，并紧固好连接线；

(6) The battery must be handled gently in the process of handling and placing, do not fall, impact, do not throw, beating the battery, so as to avoid damage to the battery or lead to safety hazards;

电池在搬运和摆放过程中必须轻拿轻放，严禁坠落、冲击，禁止抛掷、敲打电池，以免损坏电池或导致安全隐患；

(7) The sharp parts of the tool should not touch the surface of the battery box, so as to scratch or damage the battery box;

禁止使用工具的尖锐部件接触到电池箱表面，划伤或损坏电池箱；

(8) Do not disassemble the battery box without permission;

禁止私自拆解电池箱；

(9) Do not place any metal or conductive material objects with the battery or assemble them into the battery box. Installation method:

禁止将任何金属、导电材质物件与电池放置一起或者一起组装进电池箱；安装方式：

(10) Install according to the selected installation method:根据所选安装方式安装：

◆Standard cabinet (rack) Installation: Install the battery string with mounting ears and secure the battery string to the standard cabinet. The battery box is protected by a tray.

◆ 标准机柜（机架）安装：将电池组安装配套挂耳并固定在标准机柜内，电池箱增加托盘保护。

◆Wall hanging box installation: ensure that the wall meets the requirements of wall hanging before installation; According to the location of the design scheme, install the special wall mounting box for lithium battery; The battery pack is fixed in the wall mounting box by means of mounting ears;

◆ 壁挂箱安装：安装前确保墙体符合壁挂要求；根据设计方案位置，安装锂电池专用壁挂箱；电池组以挂耳方式固定于壁挂箱内；

◆Integrated indoor and outdoor cabinet (box) installation: Install the cabinet (box) according to the customized installation specifications.

◆**错误!未找到引用源。**一体化室内外机柜（箱）安装：根据所定制一体化机柜（箱）安装规范安装。

3.2 Maintenance Precautions 维护注意事项：

◆My company lithium iron phosphate batteries because of its low self-discharge rate, floating resistance, long service life, such as performance, maintenance-free characteristics, intelligent BMS battery management system, completely replaced the artificial detection link, can automatically monitor each monomer batteries in the battery voltage and the voltage of battery pack, general electric current, in the process of charging and discharging, of monomer battery equalization, Prevent the

occurrence of overcharge and over discharge. The automatic detection and protection function of the battery management system greatly reduces the failure rate of the battery pack, and the ultra-long service life greatly reduces the use cost of the communication industry.

我公司磷酸铁锂电池组因其自放电率低、耐浮充、超长使用寿命等性能，具有免维护的特性，完全智能化 BMS 电池管理系统，替代了人工检测环节，可以自动监控电池组内各单体电池的电压及电池组的总电压、总电流，在充电和放电过程中，对单体电池进行均衡，防止过充过放情况发生。电池管理系统的自动检测和保护功能，极大地降低了电池组的故障率，超长的使用寿命，大大降低了通讯行业的使用成本。

◆After installation and use, simple maintenance inspection can be carried out on lithium iron battery. Due to its maintenance-free feature, the maintenance cycle can be extended, such as once every 3 months.

安装使用后期可以对铁锂电池进行简单的维护检验，因其免维护特点，可以延长维护的周期，如 3 个月进行一次。

◆Check whether the pole and connecting wire of the lithium iron phosphate battery are loose, damaged, deformed or corroded, and whether the battery shell is damaged or deformed;

检查磷酸铁锂电池的极柱、连接线是否出现松动、损伤、变形或腐蚀等现象，电池壳体有无损伤、变形；

◆Check the status of the running indicator of the battery string. Normally, it is green on. When the last capacity indicator of the battery string blinks, it indicates that the battery power is low and the battery is about to drain and turn off output.

观察电池组运行指示灯的状态，正常状态下是绿灯亮，电池组 CAPCITY 灯仅剩最后一盏闪烁时，表明电池电量低，电池即将放干电关断输出；

◆If a fault occurs and the battery string ALM red light blinks, check whether the battery connection is correct or whether there is over current. Then press the RST reset button to restart the battery and check whether the fault is rectified. If the fault cannot be rectified, please contact the manufacturer. Do not open the battery box without permission.

如果出现故障，电池组 ALM 红灯出现闪烁，发出告警，请检查电池连接是否正确或是否存在过流情况；之后按 RST 复位键，电池重启后看故障是否消除，如无法消除请联系厂家处理，请勿擅自打开电池组箱体；

◆for multiple sets of batteries in parallel application scenario, if need to replace a set of batteries is in failure, please ensure that the new replacement battery voltage and other battery packs to parallel voltage differential pressure within the 2 v, if the differential is bigger, high voltage of battery pack will happen for low voltage large current charging the battery pack, low voltage of battery charging over-current protection, lead to can't charge;

针对多组电池并联的应用场景，如果当中的一组电池出现故障需要替换，请确保新替换的电池组电压和要并联的其他电池组的电压压差在 2V 以内，如果压差较大，会发生电压高的电池组给电压低的电池组大电流充电，电压低的电池组发生充电过流保护，导致无法充电；

◆Record the time and frequency of power outage, and make detailed statistics on the battery power supply time;

记录停电的时间和次数，对电池的供电时间做详细的统计；

3.3 Analysis of common problems and solutions 常见问题分析及解决方法：

3.3.1 Under-voltage alarm 欠压告警

Symptom: The ALM alarm indicator is steady on, and the RUN indicator is off.

现象：ALM 告警指示灯常亮，RUN 运行指示灯灭。

Reason analysis:原因分析：

(1) The load current exceeds the battery discharge protection value.

负载电流过大，超出电池放电保护值。

(2) The battery protection board is faulty. 电池保护板故障。

Solution: After the protection board enters the over current state, it will lock the state until the charging input terminal can be activated by adding a charger.

解决办法：保护板进入过流状态后会锁定该状态，直到在充电输入端加充电器可以激活。

3.3.2 Discharge over current protection 放电过流保护：

Symptom: The ALM alarm indicator is steady on, and the RUN indicator is off.

现象：ALM告警指示灯常亮，RUN运行指示灯灭。

Reason analysis:原因分析：

(1) The load current exceeds the battery discharge protection value.

负载电流过大，超出电池放电保护值。

(2) The battery protection board is faulty.

电池保护板故障。

Solution: After the protection board enters the over current state, it will lock the state until the charging input terminal can be activated by adding a charger.

解决办法：保护板进入过流状态后会锁定该状态，直到在充电输入端加充电器可以激活。

3.3.3 temperature protection 温度保护

Symptom: The ALM alarm indicator is steady on, and the RUN indicator is off.

现象：ALM 告警指示灯常亮，RUN 运行指示灯灭。

Cause: The ambient temperature may be too high or too low.

原因分析：环境温度可能过高或过低。

Solution: When the temperature of the NTC returns to normal, the protection board recovers from the temperature protection state, and the red ALM indicator is off.

解决办法：当 NTC 端的温度恢复到正常值时，保护板从温度保护状态恢复，红色 ALM 灯熄灭。

3.3.4 battery has no voltage output 电池无电压输出

Symptom: the battery indicator is off, and the measured voltage at both ends of the battery is 0V。

现象：电量指示灯灭，测得电池两端的电压为 0V。

Cause: The battery is not activated or the battery management system is abnormal。

原因分析：电池没有被激活或电池管理系统异常。

Solution: Activate the battery or reset the battery by pressing the reset button "RST" on the battery panel when the battery is activated. If there is still no voltage output, contact the professional personnel of the manufacturer。

解决办法：激活电池或在激活状态下通过电池面板上的复位键“RST”对电池进行复位，若无电压输出，联系厂家专业人员进行处理。

3. Packaging, transportation, storage 包装、运输、存储

4.1 Packaging 包装

The lithium iron phosphate battery pack is packaged as a whole to ensure that the products are protected from any harmful gas, chemical pollution, static electricity, moisture and mechanical damage during handling, transportation and storage。

磷酸铁锂电池组进行整体包装，以确保产品在搬运、运输、贮存中不受任何有害气体、化学污染、静电、潮湿和机械损伤。

4.2 transportation 运输

Pay attention to the following aspects during battery handling:

电池搬运过程应注意以下方面：

- (1) should be handled with care to avoid severe vibration of the equipment;
应轻拿轻放，避免设备受剧烈震动；
- (2) Do not invert, roll, drop or bump the battery to avoid damaging the appearance of the battery;
禁止倒置、翻滚、摔、撞电池，避免破坏电池的外观；
- (3) The battery should avoid exposure to the sun and rain, and it is forbidden to directly submerge the battery into the water;
电池应避免暴晒、雨淋，禁止直接将电池整体浸入水中；
- (4) Do not short-circuit the positive and negative terminals.
禁止正负极短路。

4.3 storage 储存

- (1) The outer terminals of the battery string are insulated;

电池组的外接端子处于绝缘防护状态；

(3) The battery pack with a storage period of more than 3 months shall be replenished accordingly. Turn on the BMS power indicator light, and when the power indicator light is two or more times, charge the battery at 0.2C for 1 hour; When the power indicator lights on 1: charge at 0.2C for 3 hours.

储存期超过 3 个月的电池组要相应进行补充电，打开 BMS 电量指示灯亮，当电量指示灯亮两个及以上时：以 0.2C 充电 1 小时；当电量指示灯亮 1 个时：以 0.2C 充电 3 小时。

(4) The battery should be stored in a dry, clean, ventilated, non-corrosive gas environment, away from fire, avoid exposure to the sun;

电池应存放在干燥、清洁、通风，无腐蚀气体的环境中，要远离火源，避免暴晒；

(5) Do not store or place at a high temperature of more than 60 degrees for a long time, otherwise it will cause functional decline and reduced life.

不要在超过 60 度的高温下长期储存或放置，否则会引起功能衰退、寿命减小。

版本修订记录 Revision History

序号 NO.	发行日期 Release Date	修订 Revision	发行原因 Reason	备注 Memo
A0	2024.8.23		New 新版发行	