磷酸铁锂电池组规格书
LiFePO4 Battery Specification

Model：
型 号: **25.6V100Ah**

Nominal Voltage:
标称电压: **25.6 V**

Capacity:
容量: **100Ah**

Draft 拟定	Checking 审核	Approved 批准
日期：	日期：	日期：

Revision History 版本记录

Revision 版本	Date 日期	Editor 编著	Contents 内容
A0	2024-06-05		首次拟定 For the first time

目录

1. 应用 Application

25.6V 系例壁挂式储能磷酸铁锂电池

25.6V series wall-mounted household energy storage lithium iron phosphate battery

备注：本规格书为东莞市锤子新能源科技有限公司描述其自主产品用。任何升级更改都不会主动通知。如需要最新的规格书，请跟我公司业务员联系。

Remark: This spec is for the Independent Products from DongGuan Chuizi New Energy Technology Co., LTD Any upgrade without notification. Please contact with our sales to get the updated spec.

2. 概述 General Information

本规格书适合于 **25.6V100AH 电池**组，描述了其外型尺寸、特性、技术要求及使用注意事项.

This specification is suitable for the 25.6v100ah battery pack, and describes its dimensions, characteristics, technical requirements and precautions for use

3. 基本信息 Basic Information

Description 描述:	Rechargeable LiFePO4 battery pack 可充磷酸铁锂电池包
Cell Type 电芯:	LiFePo4 cell/3.2V100Ah
PCM 保护板：	8S100A 软件版
Chemistry 化学成份:	LiFePO4 磷酸铁锂
Cell configuration 电芯配置:	8S1P
Voltage Nominal 标称电压:	25.6V
Capacity Nominal 标称容量：	100Ah
Energy 能量：	2560Wh
Additional Function 其它功能：	均衡功能
Protection 保护:	
	A. Over Charge Protection 过充保护
	B. Over Discharge Protection 过放保护
	C. Over Current Protection 过流保护
	D. Short Protection 短路保护

4. 电池技术规格 / Battery Specification（@ 25±5℃）

序号 NO	项目 Items		特性/ Characteristics
系统规格 System specification			
2.1	额定容量 Normal capacity		100AH
2.2	额定能量 Nominal energy		2.56KWh
2.3	电池输出额定电压 DC discharge nominal voltage		25.6Vdc (8S)
2.4	电池输出电压范围 rang of DC discharge voltage		20V-29.2Vdc
2.5	内阻 Internal resistance		≤30mΩ @1kHz AC
2.6	直流标准充电电压 DC normal charge voltage		29.2±1Vdc
2.7	直流浮充充电电压 DC float charge voltage		27.2±0.2Vdc
2.8	组合方式compose method		8S1P
2.9	最大持续充电电流 Allowed MAX charge current		100Adc
2.10	推荐充电电流 Recommended charge current		≤50Adc
2.11	最大持续放电电流 Allowed MAX discharge current		100Adc
2.12	放电终止电压 End of discharge voltage		20Vdc
2.13	显示方式与语言Display method and language		英文 English
2.14	通讯方式communication method		RS485
2.15	冷却方式cooling method		自然冷却/Natural cooling
2.16	电池箱尺寸Dimension		长 510+5mm
			宽 310+5 mm
			高 166+5 mm
2.17	防护等级 IP rating		/
2.18	重量 Weight		About 28Kg
2.19	循环寿命 Number of cycles		3000 times
2.20	工作温度 Operation temperature	充电 Charge	0～50℃
		放电 Discharge	-20～60℃
2.21	自放电率 Self-discharge rate	剩余容量 Residual capacity	≤3%/Month(月); ≤15%/ year (年)
		可恢复容量 Recover capacity	≤1.5%/Month(月); ≤8%/ year (年)
2.22	储存环境 Storage environment	≤1month(月)	小于1个月：-20～+60℃、5～75%RH
		≥3month(月)	大于3个月：-10～+45℃、5～75%RH
		推荐环境 Recommend environment	15～35℃、5～75%RH

5. 保护电路规格参数 Circuit Protection

本电池内部包含锂电保护板，能实时监控电池运行状态，必要时提供过充、过放、过流、过温等保护，必要时切断动力电池的输入输出进行保护。

The batteries are supplied with a LiFePO4 Battery Management System (BMS)that can monitor and optimized each single prismatic cell during charge & discharge, to protect the battery pack overcharge, over discharge, short circuit. Overall, the BMS helps to ensure safe and accurate running.

序号 No	项目 Item	内容 Content	检验标准 Criterion
5.1	过充 Over charge	单串过充告警电压 Over-charge protection Alarm for each cell	3.55±0.05V
		单串过充保护电压 Over-charge protection for each cell	3.65±0.05V
		单串过充保护延迟时间 Over-charge protection delay time	0.5~1.5s
		单串过充恢复电压 Over-charge release for each cell	3.5±0.05V
		总体过充告警电压 Over-charge protection Alarm for system	28.4±1V
		总体过充保护电压 Over-charge protection for system	29.2±1V
		总体过充保护延迟时间 Over-charge protection delay time	0.5~1.5s
		总体过充恢复电压 Over-charge release for each cell	28±1V
		过充保护恢复方法 Over-charge release method	低于恢复电压后 60s Under the release voltage than 60s
5.2	过放 Over discharge	单串过放告警电压 Over-discharge alarm for each cell	2.80±0.05V
		单串过放保护电压 Over-discharge protection each cell	2.50±0.05V
		单串过放保护延迟时间 Over-discharge protection delay time	0.5~1.5s
		单串过放恢复电压 Over-discharge release for each cell	3.00±0.05V
		总体过放告警电压 Over-discharge alarm for system	22.4±1V
		总体过放保护电压 Over-discharge protection system	20±1V
		总体过放保护延迟时间 Over-discharge protection delay time	0.5~1.5s
		总体过放恢复电压 Over-discharge release for each cell	24±1V
		过放保护恢复方法 Over-discharge release method	高于恢复电压后 60s Higher the release voltage than 60s

5.3	过流 Over current	充电过流保护告警值 Charge over current protection alarm	110±10A
		充电过流保护值 Charge over current protection	120±10A
		充电过流保护延迟时间 Charge over current protection delay time	2~6s
		充电过流解除 Charge over current release method	1 分钟后自动解除 Auto release after 1min
		放电过流保护告警值 Discharge over current protection alarm	110±10A
		放电过流保护值 1 Discharge over current protection	130±10A
		放电过流保护延迟时间 1 Discharge over current protection delay time	5s
		放电过流保护解除方法 Discharge over current release	1min 后自动解除 Auto release after 1min
		短路保护 Short circuit protection	有
		短路保护恢复 Short circuit protection release	断开负载或更换熔断器 cut-off download or exchange fuse
5.4	温度 Temperature	电池充电高温保护 Charge over temperature protection	55±3℃保护，50±3℃恢复 Protect@55±3℃; Release@50±3℃;
		电池充电低温保护 Charge under temperature protection	0±3℃保护，5±3℃恢复 Protect@0±3℃; Release@5±3℃
		电池放电高温保护 Discharge over temperature protection	65±3℃保护，60±3℃恢复 Protect@65±3℃; Release@60±3℃;
		电池放电低温保护 Discharge under temperature protection	-10±3℃保护，-5±3℃恢复 Protect@-10±3℃; Release@-5±3℃;

6. 结构信息 Mechanical Information

6.1 样品照 Sample Picture

L（长度） mm	510±5	W（宽度） mm	310±5 350(含提手)	H（高度） mm	166±5 200(含支架)

6.2 包装信息 Packing

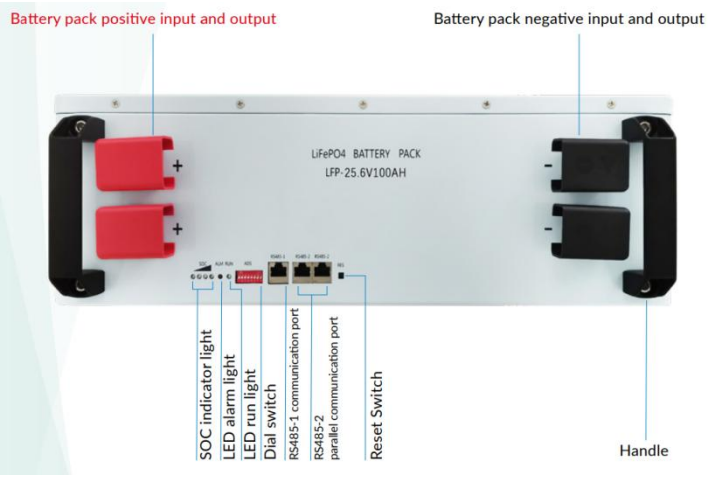
Inventory of items 物料包装清单

Thoroughly inspect the packaging upon receipt of goods. If there is any item that is missing or if there is any damage to the external packaging or to the unit itself upon unpacking, Please contact with DongGuan Chuizi New Energy Technology Co., LTD. Sales Department.

在收到货物后彻底检查包装。如果有任何物品丢失或如果有任何损坏的外部包装或产品本身质量问题，请联系东莞市锤子新能源科技有限公司销售部。

NO.	Item	Quantity	Specification
A	Battery Pack 电池组	1	25.6V100Ah
B	Mounting frame 安装架	/	SPCC
C	Communication cable 通信电缆	/	Length:1.0m cat 5;1.5m USB type A to RJ11
D	Power connector 电源连接器	/	125A/1000V
E	Instruction manual/Warranty Card 使用说明书/保修卡	1	This document

7. 界面介绍和系统通讯说明 Interface Introduction And System communication instructions



7.1 RS485 通信 RS485Communication

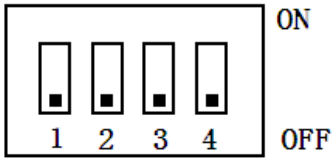
With RS485 interface, when the batteries are used in parallel, the master Pack communicates with the slave Pack through the RS485 interface, so that all the information of Pack can be viewed through the RS232 of the master Pack. The RS485 interface can not be used for parameter setting and corresponding controllable operation.

具有 RS485 接口，在电池组作并联使用时，主 Pack 通过 RS485 接口与从 Pack 进行通讯，从而可以通过主 Pack 的 RS232 查看所有 Pack 的信息，RS485 接口无法进行参数设置及相应可控制操作。

7.2 拨码开关设置 Dial switch setting

When the batteries are used in parallel, different packs can be distinguished by the hardware address, and the hardware address of each PACK in the whole battery stack is unique, the hardware address can be set in turn by the dial switch on the board, switch definitions refer to the following table

在电池组作并联使用时，可通过硬件地址区分不同 PACK，且整个电池堆中每个 PACK 的硬件地址是唯一的，硬件地址可通过板上的拨码开关进行依次设置，开关的定义参照下表。



地址位(二进制) Binary Address	开关位置 1	2	3	4	说明 Explain
0000(0)	OFF	OFF	OFF	OFF	单独用 485 通讯时选"MASTER(0000)"，并机通讯时做主机。
0001(1)	OFF	OFF	OFF	ON	单路 485 通讯时选"SLAVE1(0001)"
0010(2)	OFF	OFF	ON	OFF	单路 485 通讯时选"SLAVE2(0010)"
0011(3)	OFF	OFF	ON	ON	单路 485 通讯时选"SLAVE3(0011)"
0100(4)	OFF	ON	OFF	OFF	单路 485 通讯时选"SLAVE4(0100)"
0101(5)	OFF	ON	OFF	ON	单路 485 通讯时选"SLAVE4(0101)"
0110(6)	OFF	ON	ON	OFF	单路 485 通讯时选"SLAVE4(0110)"
0111(7)	OFF	ON	ON	ON	单路 485 通讯时选"SLAVE4(0111)"
1000(8)	ON	OFF	OFF	OFF	单路 485 通讯时选"SLAVE4(1000)"
1001(9)	ON	OFF	OFF	ON	单路 485 通讯时选"SLAVE4(1001)"
1010(10)	ON	OFF	ON	OFF	单路 485 通讯时选"SLAVE4(1010)"
1011(11)	ON	OFF	ON	ON	单路 485 通讯时选"SLAVE4(1011)"
1100(12)	ON	ON	OFF	OFF	单路 485 通讯时选"SLAVE4(1100)"
1101(13)	ON	ON	OFF	ON	单路 485 通讯时选"SLAVE4(1101)"
1110(14)	ON	ON	ON	OFF	单路 485 通讯时选"SLAVE4(1110)"
1111(15)	ON	ON	ON	ON	单路 485 通讯时选"SLAVE15(1111)"

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7.3 接口定义 Interface definition

通信接口图示 Communication interface diagram

RS485--采用 8P8C 立式 RJ45 插座	
RJ45 引脚	定义说明
1、8	RS485-B1
2、7	RS485-A1
3、6	GND
4、5	NC

CAN和 RS485接口

RS485--采用 8P8C 立式 RJ45 插座		RS485--采用 8P8C 立式 RJ45 插座	
RJ45 引脚	定义说明	RJ45 引脚	定义说明
1、8	RS485-B	9、16	RS485-B
2、7	RS485-A	10、15	RS485-A
3、6	GND	11、14	GND
4、5	NC	12、13	NC

Parallel operation method 并联使用方法

Each battery needs to be monitored in parallel, So we need to name the battery, Through the dial switch to achieve. According to the coding requirements, Number each battery according to the definition in 7.2, Select the host and working mode.

并联使用时需要监控每台电池，所以需要将电池命名，通过拨码开关来实现。根据编码需要，按照 7.2 定义将每台电池进行编号，选定主机及工作模式。

After setting the address, please reset the BMS, After reset, the address will be recognized automatically, It also needs to be reset when changing the address in the future.

设置地址后请将 BMS 进行复位，复位后会自动识别地址，以后进行变更地址时也需要复位。

7.4 Power on the system 系统上电

After the system equipment is installed, Generally it is shut down for use, When necessary, as long as the simple power on operation can make the equipment put into normal operation.

系统设备安装完毕后，一般处于停机待用状态，在需要的时候只要做简单的上电操作就能使设备投入正常运行。

7.5 System activation wake up 系统激活唤醒

In the process of storage and transportation, Or after 24 hours of no external power and no load, The battery system has been dormant. After the voltage of 25.6V is applied The battery system is activated, Enter the normal operation state, It can charge, discharge or enter standby mode. It should be noted that when the battery system is in sleep state, The DC switching power supply used with the battery system must cancel its anti reverse connection protection function, In this way, 25.6V voltage can be used to activate the power supply system after AC recovery.

在仓储、运输过程中，或在无外部电源和无负载 24 小时后，电池系统一直处于休眠状态。在加 上 25.6V 的电压后，电池系统被激活，进入正常运行状态，可以进行充电、放电或进入待机状态。需要特别说明的是当电池系统处于休眠状态时，与电池系统配套使用的直流开关电源必须是取消了其防反接保护功能的，这样才能在交流恢复后又 25.6V 的电压来激活电源系统。

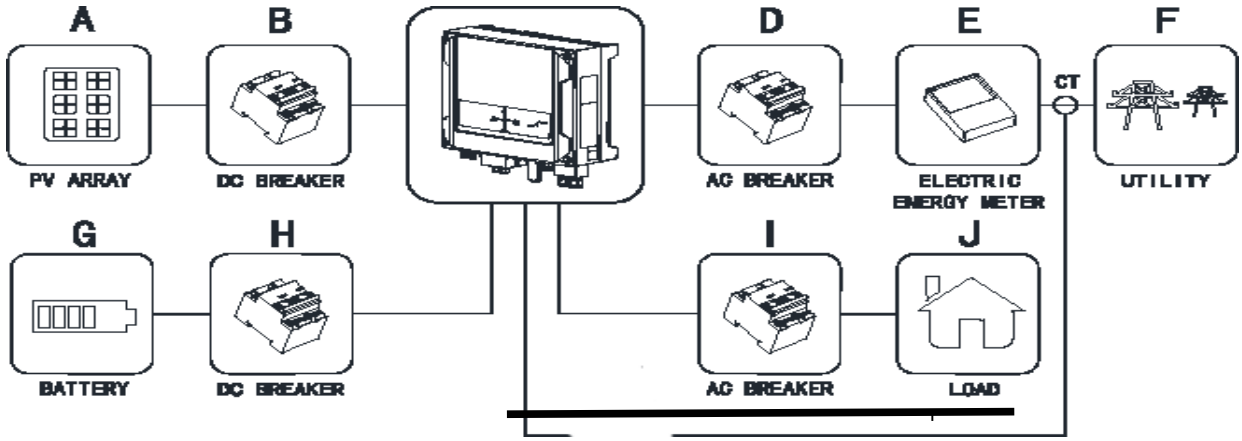
7.6 System standby and sleep 系统待机、休眠

When the system is activated, If the external power supply and load are removed, The battery system will actively enter the standby mode. The run light on the panel flashes to indicate that the battery system is in standby mode. After 24 hours, the battery system will automatically enter the sleep state. In this state, the power loss will be lower, and the indicator light on the panel is all off, indicating

that the battery system is in the sleep state.

系统激活后，若去除外部电源和负载后，电池系统会主动进入待机状态。在此状态下功率损耗极低，面板上 RUN 灯闪烁表示电池系统正处于待机状态。24 小时后电池系统会自动进入休眠状态。在此状态下功率损耗会更低，面板上指示灯全灭表示电池系统正处于休眠状态。

7.7 系统图 System Diagram



8. 安装工具 Installation tool

The following tools are required to install the battery pack安装电池组需要以下工具：

- Wire cutter 剥线钳
- Crimping Modular Plier 压线钳
- Screw Driver 螺丝刀

注意 NOTE

- Use properly insulated tools to prevent accidental electric shock or short circuits.
  使用适当的工具绝缘措施，防止意外触电或短路
- If insulated tools are not available, cover the entire exposed metal surfaces of the available tools, except their tips, with electrical tape.
  如果没有绝缘工具，则用电工胶带覆盖可用工具的整个外露金属表面，但其尖端除外。

安全装置 Safety Gear

It is recommended to wear the following safety gear when dealing with the battery pack:
处理电池组时，建议佩戴以下安全装备：

- Insulated gloves 绝缘手套
- Safety goggles 防护目镜
- Safety shoes 劳保鞋

8.1 安装位置 Installation Location

Make sure that the installation location meets the following conditions 确保安装位置符合以下条件：

- The installation site must be suitable for the size and weight of the battery
  安装地点必须符合电池的尺寸和重量要求.
- Must be installed on a firm surface to sustain the weight of battery.
  必须安装在坚固的墙面上，以承受电池的重量
- The area is water proof 该区域是防水的.
- There are no flammable or explosive materials in proximity 附近没有易燃易爆物品
- The ambient temperature is within the range from 0° C to 45° C 环境温度在 0° C 至 45° C 范围内.

- The temperature and humidity is maintained at a constant level.保持恒定的温度和湿度。
- There is minimal dust and dirt in the area 该区域的只能有少量的灰尘和污垢.
- Installation must be vertical or tilted backwards by maximum 15° - avoid forward or sideway stilt.
  安装必须垂直或向后倾斜最大 15°——避免向前或侧向支撑

9. 注意事项 Caution and prohibition

Before using and handling the pack, see carefully attached "Handling Instruction for Rechargeable Lithium ion battery Pack".

在使用和处理包装之前，请参阅"可充电锂离子电池包的处理说明书"。 不当的使用电池可能会引起电池过热损坏，对于未按规格书操作造成的任何意外事故，为了使电池安全的使用及处理请在使用前认真的阅读操作说明：

For safety reasons rechargeable batteries are not shipped in a low remaining capacity state. Charge before using.

为了安全起见，可充电电池禁止在低剩余容量状态下运输。 使用前请充电。

The battery need to be charged every 6 months if out of use.

长期储存时，按规格书规定的方式每 6 个月需充放电循环一次。

No fall down, no pile up over 4 layers, and keep face up.

运输过程装卸电池时请注意不要摔落，请勿超过 4 层堆积、翻转放置，保证正面朝上。

Please keep the battery away from heat source, high voltage place, and long time sun exposure

电池请远离热源、高压场所、并避免长时间的日光暴晒。

Do not immerse the battery in water .

不能将电池浸入水中。

Do not connect the positive and negative poles of the reverse battery

不要接反电池的正负极。

Do not use metal to short the positive and negative electrodes of the battery

不要用金属短接电池正负极

Avoid excessive physical vibration and impact on the battery. Do not impact, fall or step on the battery

避免过分的物理震动和冲击电池，不要撞击、摔落、踩踏电池

It is forbidden to disassemble or assemble the battery without the permission and guidance of the manufacturer.

未经厂家许可和指导，严禁私自拆卸或组装电池。

It is not allowed to mix batteries of different manufacturers, types and models

不能将其它不同厂家，类型，型号的电池混合使用

Please do not use or store in high temperature environment, otherwise it will cause battery heating, fire or reduce service life.

请不要高温环境下使用或储存，否则会引起电池发热、起火或使用寿命降低。

After the battery is used up, please charge it in time (within 15 days).

电池用完电后，请及时(15 天内)充电。

Please use the matching or recommended professional lithium battery charger.

请使用配套或者推荐的专业锂电池充电器。

Please stop using the battery in case of peculiar smell, discoloration, noise, leakage, serious deformation and other abnormal conditions.

电池有异味、变色、噪音、漏液、严重变形等异常情形时，请停止使用。

When the electrolyte leaks and splashes into the skin and eyes, please rinse with clean water and see a doctor immediately.

电解液泄露溅入皮肤、眼睛时，请用清水冲洗并立即找医生诊治。

Please keep the battery out of the reach of children. Children are not allowed to touch the battery.

请将电池放置在儿童接触不到的位置，禁止小孩接触电池。

Do not put the waste battery into water or fire.报废电池请不要投入水或火中。

This battery pack is not allowed to be used in series or in parallel. If you need series or parallel application, please contact the manufacturer for consultation.

本电池组禁止多组串联或者并联使用，如有串联或者并联应用需求请联系厂家咨询。

10. 保修 Warranty

Manufacturer will be responsible for replacing the battery pack against defects or poor workmanship for 36months from the date of shipping. Any other problem caused by malfunction of the equipment or misuse of the battery is battery is not covered under this warranty.

电池包从发货之日起 36 个月内出现缺陷或做工不佳等问题由厂商负责更换。 任何由于设备故障或使用不当造成的问题，不在本保修范围之内。

11. 锂离子电池包使用说明书 Handling Instruction Guide for Li-ion Battery Pack

11.1、总括 General

Battery packs supplied by Tuolico have to be handle carefully according to the specification. Here are some more to be followed.

拓力提供的电池包必须根据规格书正确使用。 如下：

11.2、电池组的储存 Storage of pack

The packs are requested to be stored under the following conditions: 电池包请按以下条件下储存：

a. Indoor storage in a cool circumstances without direct sun light on the packs or cartons.

存放在室内阴凉的处，禁止阳光暴晒。

b. Store batteries in a dry location with low humidity, and a temperature range of - 20°C to +30°C. In case of the long term storage.

长期存放的情况下，需将电池放在干燥（湿度低）的地方，温度范围为-20° C 至+ 30°

c. As long-term storage can accelerate battery self-discharge and lead to the deactivation of the batteries. To minimize the deactivation effect, store battery packs in a temperature range of +10°C to +30°C.

由于长期存储会加速电池自放电并导致电池的停用。 为了最大限度地减少电池消耗，请将电池包放在+ 10° C 至+ 30° C 的温度范围内。

d. When charging for the first time after long-term storage, deactivation of the packs may have led to decreased capacity. Recover such packs to original performance through repeating several cycles of full charging and discharging.

长时间储存后首次充电时，电池包的停用可能导致容量降低。 通过重复几次完全充电和放电循环，将这些电池包恢复到原始性能。

e. When store packs for more than 6 month, charge at least once charring require per 6 months to prevent leakage and deterioration in performance due to self-discharging.

当电池包长期储存时，每 6 个月至少需要补电一次，以防止由于自放电而造成的泄漏和性能下降。

11.3、电池包充电 Charging pack

a. Use suitable charger with the specified voltage and current. We strongly recommend smart battery charger. We can recommend the usage or specification of the charger manufacturing. If you want to get the information about it, please contact us.

使用指定电压和电流的合适充电器。 我们强烈推荐使用智能电池充电器。 我们可以推荐充电器制造的规格和使用。 如果您想获取有关信息，请与我们联系。

b. Never attempt reverse charging. Charring with polarity reversed can cause a reversal in battery polarity, causing gas pressure inside of the battery to rise, which can be lead to leakage of the batteries in the pack.

切勿尝试反向充电。 极性反转的充电可能导致电池极性反转，导致电池内部的气压升高，这可能导致电池中的电解液泄漏。

c. Avoid overcharging. Repeated overcharging can be lead to deterioration in pack performance. And Over-heat occurred.

避免过度充电。 重复过充可能导致包装性能下降。 导致电池过热。

d. Charging efficiency drops at temperatures above 40°C.

充电温度在 40° C 以上会导致充电效率下降。

11.4、防止电池包意外损坏 Protection from unexpected damaged to pack

a. (+) and/or (-) terminals must not be connected in metal wire, necklace, chains.

（+）正极和/或负极（ - ）端子不得连接在金属线，项链，链条中。

b. Do not drop packs from height in order to prevent them from possible malfunction or damage.

不要从高处抛掷电池包，以防止它们发生故障或损坏。

c. Do not twist or bend packs in order to prevent possible damage.

不要扭曲或弯曲电池包，以防止可能的损坏。

11.5、安全条款 For Safety

a. Do not disassemble packs.

不要拆卸电池包。

b. Do not use pack when something abnormal found such as smells, deformation, discoloration, and so on.

出现异常现象时，如气味，变形，变色等，请勿使用电池包。

d. Do not re-use Li-ion cells or other parts after removing from the packs.

从电池包中取出后，请勿重新使用锂离子电池或其他部件。

e. When the electrolyte leakage occurs, do not touch the liquid.

当发生电解液泄漏时，请勿接触液体。

f. Once watered, packs may have potential malfunctions. Do not use those packs.

一旦碰水，电池包可能有潜在的故障。 不要使用这些电池包。

g. Do not have packs in the hot-temperature (60°C or more).

禁止在高温（60° C 或更高）下使用电池包。

h. Do not put packs into fire.

电池包禁止接触火源。

i. Do not crush/nail pack.

禁止碾压或钉子刺穿电池包

j. Do not apply solder directly to packs.

禁止将焊料直接焊在电池包上。

12. Product maintenance 产品维护

12.1 Routine maintenance 日常维护

11.1.1、 The charging operation should be supervised by professional personnel. During the charging process, the plug and socket should be in good contact, the charging equipment should work normally, and the connection points of the battery pack should be in good contact. If it is abnormal, it needs to be repaired before charging;

充电操作时要有专业人员进行看护，充电过程中确保插头与插座接触良好，确保充电设备工作正常，确保电池组各连接点接触良好。如果出现异常，需要修复后才能充电；

12.1.2 、If there are a lot of dust, metal scraps or other sundries on the upper cover and pole of the battery pack, use compressed air to clean it in time, and avoid using water or water soaked objects to clean it;

若电池组上盖与极柱上存在大量灰尘、金属屑或其他杂物，及时使用压缩空气进行清理，避免使用水或水浸湿的物体进行清洁；

12.1.3 When charging and discharging, try to avoid water or other conductive objects splashing on

the battery cover and pole, such as exposure to heavy rain;

充电和放电时尽量避免有水或其他导电物体溅到电池上盖与极柱处，例如暴露在大雨中使用；

12.1.4 The charging time and discharging time of the battery are estimated according to the actual use state of the battery or battery pack. At the end of charging and discharging, pay attention to observe whether the battery or battery pack is abnormal, such as the voltage difference of the battery.

根据电池或电池组实际使用状态估计电池的充电时间和放电时间，在充电末期和放电末期注意观察电池或电池组是否存在异常，如电池的电压差问题。

12.2 Regular maintenance 定期保养

11.2.1、Check whether the conductive belt, voltage acquisition terminal and other nodes are loose, falling off, rusty or deformed to ensure that the series parallel wiring harness used by the battery pack is firm and reliable (once a month);

检查导电带、电压采集端子等节点是否存在松动、脱落、生锈或者变形等情况，确保电池组使用的串并联线束牢固可靠（1 次/月）；

11.2.2 、Check the battery shell for cracks, deformation, pole looseness, bulge and other abnormalities (once a month);

检查电池外壳是否存在裂缝、变形、极柱松动、鼓胀等异常情况(1 次/月）；

11.2.3 Check the reliability of charging equipment to ensure that the battery will not be overcharged (once a month);

检查充电设备的可靠性，确保电池不会被过充电(1 次/月）；

11.2.4、In case of inconsistency of charged quantity of battery pack, after consulting the manufacturer and under the permission and guidance of the manufacturer, the following solutions can be adopted:

若出现电池组带电量不一致的情况时，在咨询厂家以后，在厂家许可与指导下，可以按以下方法解决：

A、It is better to use a management system with equalization function and good equalization effect, preferably a management system with equalization charging function.

使用带有均衡功能且均衡功能效果非常好的管理系统，最好是具有均衡充电功能的管理系统。

B、Charge all single batteries to 3.65v with a charging current less than 0.3C.

将所有单体电池用小于 0.3C 的充电电流将单体电池的电压充到 3.65V。

Method 1: first, the whole battery is charged by series charger until the upper limit voltage protection of single battery appears, and then all single batteries are charged by constant current charger (equalizing charging equipment) with limited voltage of 3.65v until the voltage of all single batteries reaches 3.65v. The performance index of the equalization charging equipment is that the input voltage can be set according to the local AC voltage, such as AC220 V, the output voltage is dc3.65 V, and the output current is 0.01 C, such as 10 A or 20 a. (once / 3 months or when the charged quantity is inconsistent)

方法一：首先使用串联充电器将整组电池充电，直到出现单体电池上限电压保护， 再使用限定电压为 3.65V 的恒流充电器（均衡充电设备）对所有单体电池进行充电，直到所有单体电池电压都达到 3.65V。该均衡充电设备的性能指标为输入电压可根据当地使用交流电压定，如 AC220V，输出电压为 DC3.65V，输出电流为 0.01C，如 10A 或 20A 等。（1 次/3 个月或出现带电量不一致时）

Method 2: remove all the batteries in the battery pack, and use the charging and discharging test cabinet to fully charge all the batteries, so that their charge is consistent. (once / 3 months or when the charged quantity is inconsistent)

方法二：把电池组中的所有电池拆下，用充放电测试柜把所有电池都充满，让其带电量一致。（1 次/3 个月或出现带电量不一致时）

C、 The voltage of all single cells was put to 2.3V with a discharge current less than 0.3C.

将所有单体电池用小于 0.3C 的放电电流将单体电池的电压放到 2.3V。

Method 1: remove all the batteries in the battery pack, and put all the batteries into 2.3V with the charge and discharge test cabinet, so that their charge is consistent. (once / 3 months or when

the charged quantity is inconsistent)

方法一、把电池组中的所有电池拆下，用充放电测试柜把所有电池都放到 2.3V，让其带电量一致。（1 次/3 个月或出现带电量不一致时）

Method 2: first, discharge the whole set of batteries until under voltage protection of single battery appears. Then, the battery is discharged by the discharge equipment with limited voltage of 2.8V until the voltage of all cells is equal to 2.8V. For the discharge equipment with limited voltage of 2.8V, the discharge resistance can be controlled by voltage comparator and discharge relay. The discharge power device is a resistance wire with a diameter of 5mm and a length of 50cm, and the current is about 20 amperes (suitable for the battery pack which can be easily disassembled). Or use 1 ohm 15W resistor, the discharge current is about 3 amperes, it is suitable for the battery pack that is not convenient to disassemble, it can be discharged for a long time with small current through the voltage acquisition line of the management system). (once / 3 months or when the charged quantity is inconsistent)

方法二：首先将整组电池放电，直到出现单体电池欠压保护。再采用限定电压 2.8V 的放电设备对单体电池进行放电，直到所有单体电池电压都等于 2.8V。限定电压 2.8V 的放电设备可以采用电压比较器加放电继电器控制放电电阻放电的方法。放电的功率器件为直径为 5mm 长度 50CM 的电阻丝，电流约 20 安培（适用于电池组可以方便拆卸的）。或者采用 1 欧姆 15W 的电阻，放电电流约 3 安培左右适用于电池组不方便拆卸的，可以通过管理系统电压采集线进行小电流长时间放电）。（1 次/3 个月或出现带电量不一致时）

13. Other chemical reactions 其它化学反应

Because the battery is based on the principle of chemical reaction, the performance of the battery will decrease with the increase of time, even if it is stored for a long time without use. If the use conditions such as charging, discharging and ambient temperature are not within the specified range, the service life of the battery will be shortened, or the leakage will cause equipment damage. If there is a big difference between the normal discharge time and the fully charged battery, even if the charging method is correct, it means that the battery needs to be replaced.

由于电池是利用化学反应的原理，所以随时间的增加电池的性能会降低，即使是存放很长一段时间而不使用。如果使用条件如充电、放电及周围环境温度等情形不在指定的使用范围内，也会缩短电池的使用寿命，或者产生漏液导致设备损坏。如果电池充饱电后与正常的放电时间相差很多，即使充电方法正确，这样也表示需要更换电池了。

14. Executive standard 执行标准

14.1、 Notice on printing and distributing the administrative measures for network access detection of operating substances (Trial) (China Tower (2015) No. 83);

《关于印发<运营物质入网检测管理办法（试行）的通知》（中国铁塔（2015）83 号）；

14.2、 Lithium iron phosphate battery pack for communication Part 1: integrated battery pack (YD / T 2344.1-2011);

《通讯用磷酸铁锂电池组 第 1 部分：集成式电池组》（YD/T 2344.1-2011）

14.3、Lithium iron phosphate battery pack for communication Part 1: separate battery pack (YD / T 2344.2-2015);

《通讯用磷酸铁锂电池组 第 1 部分：分立式电池组》（YD/T 2344.2-2015）；

14.4、 Summary of standards for new auxiliary equipment (Trial) (Q / ZTT 1005-2014);

《新建配套设备标准汇总册（试行）》 （Q/ZTT 1005-2014）；

14.5、 "battery testing specification Part 3: lithium iron phosphate battery pack (integrated)" QZTT 2218.3-2016;

《蓄电池检测规范 第 3 部分：磷酸铁锂电池组（集成式）》 QZTT 2218.3-2016;