

Nantong Ningyuan Automation Technology Co., Ltd.

***96V200AH LiFePO4 battery
pack***

(Users should read the instructions carefully before using them.)

**LiFePO4
battery pack
specification**

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1. Battery pack

This product is composed of single core NY32138 lithium liFePO4 battery which is assembled in series and parallel. The battery is insulated by epoxy board.

This battery pack has two parts, four battery boxes connected in series, and a high-voltage BMS control box.

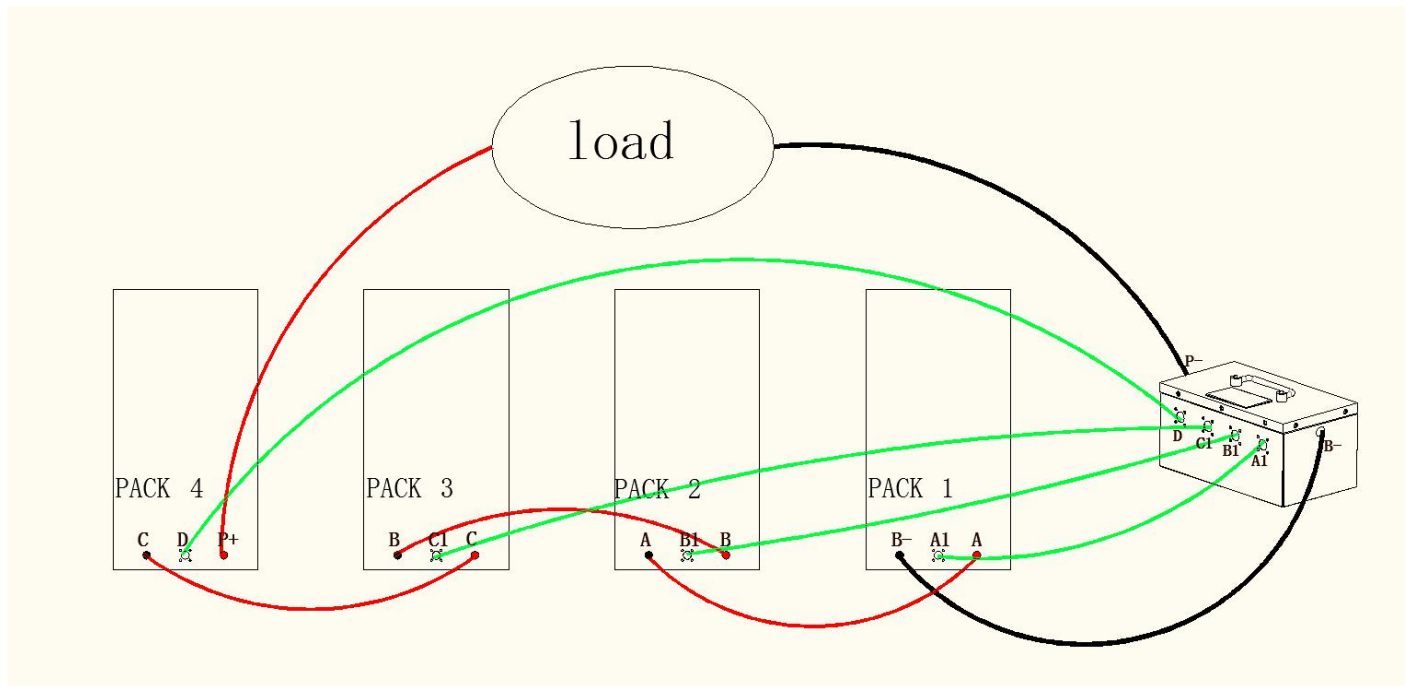
The battery characteristics are shown in the table below.:

Pile Index 参数	Rated Capacity 标称容量	200Ah
	Nominal Voltage 额定电压	96V
	Max. Charge Voltage 最大充电电压	109.5V
	Discharge cut-off voltage 放电截止电压	75±0.2V
	Charge Current 充电电流	≤50A
	Max Charge Current 最大充电电流	50A
	Charge method 充电方法	CC/CV
	Continuous Working Current 持续工作电流	300A
	Maximum Surge Current 最大脉冲电流	400A(1s)
	Dimension 外形尺寸 (L×W×H)	Customized
	Weight 重量	180KG±1500g
	Cycle life 循环寿命(DOD80%)	≥3000 times
	Operating Temperature 适用温度	Charge 充电
Discharge 放电		-20°C~65°C;
Storage 储存		-10°C~45°C;



The product design drawings are as follows:

Be sure to connect in order! ! !

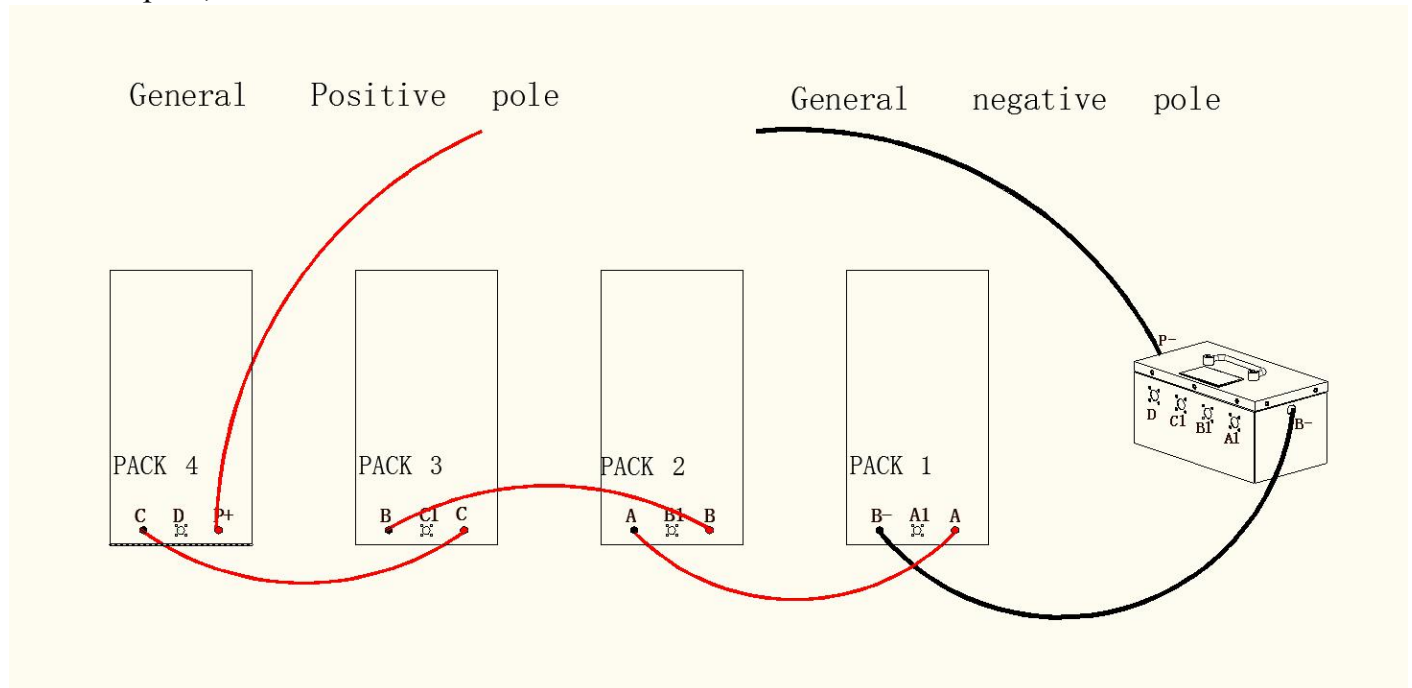


Battery pack connection method (using method): **When connecting with high voltage, wear insulated gloves and necessary protective facilities.**

First: connect the battery pack in series through the discharge line.

Connection sequence:

BMS B- → Pack1 B-, Pack1 A → Pack2 A, Pack2 B → Pack3 B, Pack3 C → Pack4 C, Pack4 P+ → Load +pole;

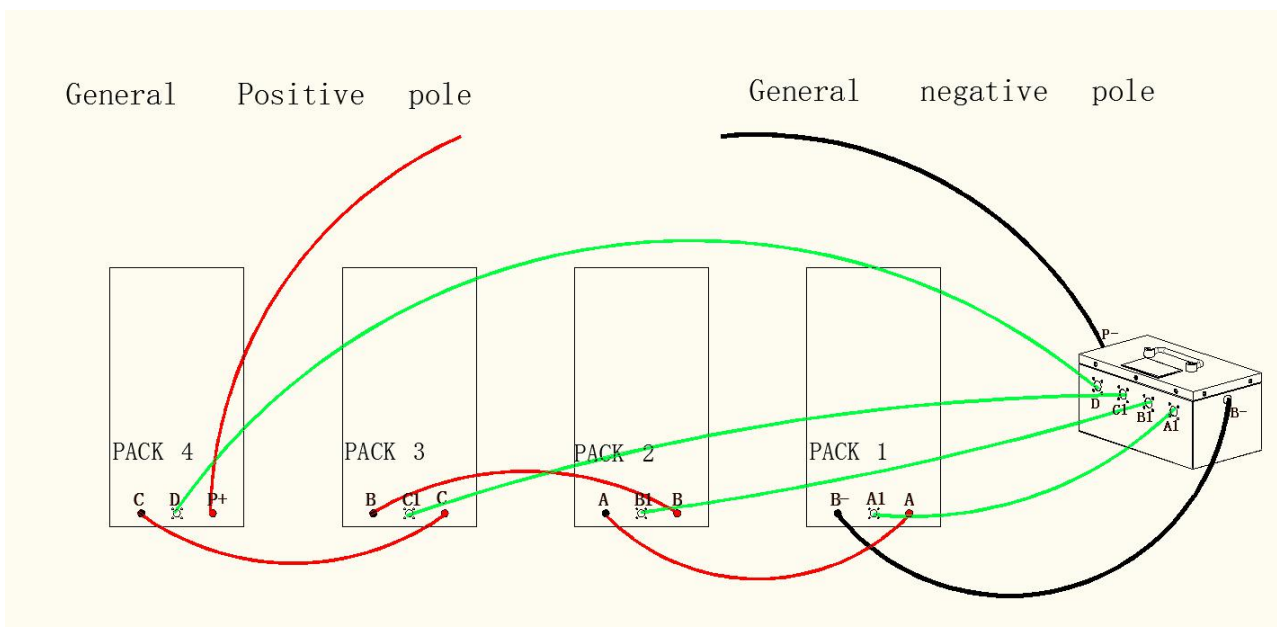


Second: connect the BMS signal line from low voltage (A1) to high voltage (D) .
 The signal lines are connected to the BMS box port in turn. Cannot change the order of the join. The principle of successive voltage increases must be observed.. An example diagram is as follows:



A1→B1→ C1→ D.

1. Pack1 A1→BMS A1;
2. Pack2 B1→BMS B1;
3. Pack3 C1→BMS C1;
4. Pack4 D→BMS D;

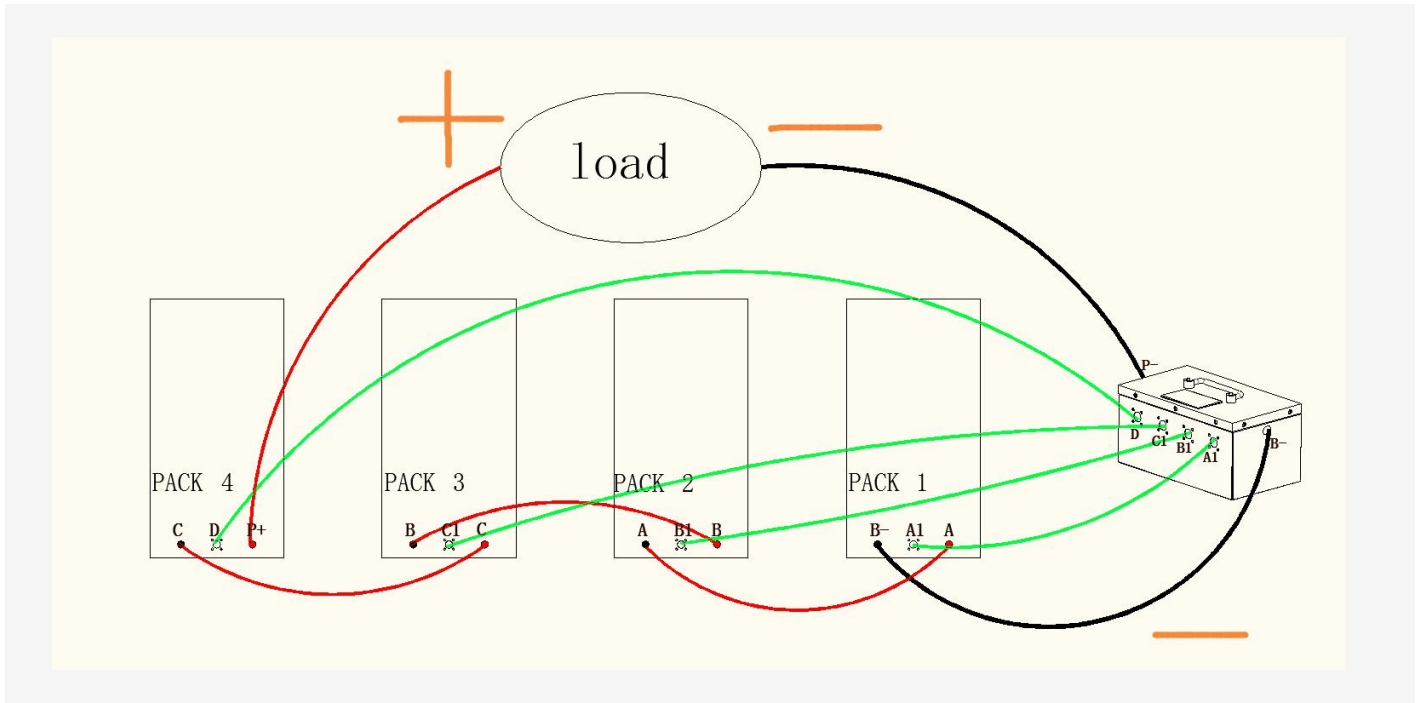


Third: Connect to load

Pack4 P+ → Load +pole;

BMS P- → Load -pole.

Pay attention to the sparks generated by the high voltage when the battery pack is connected to the load.



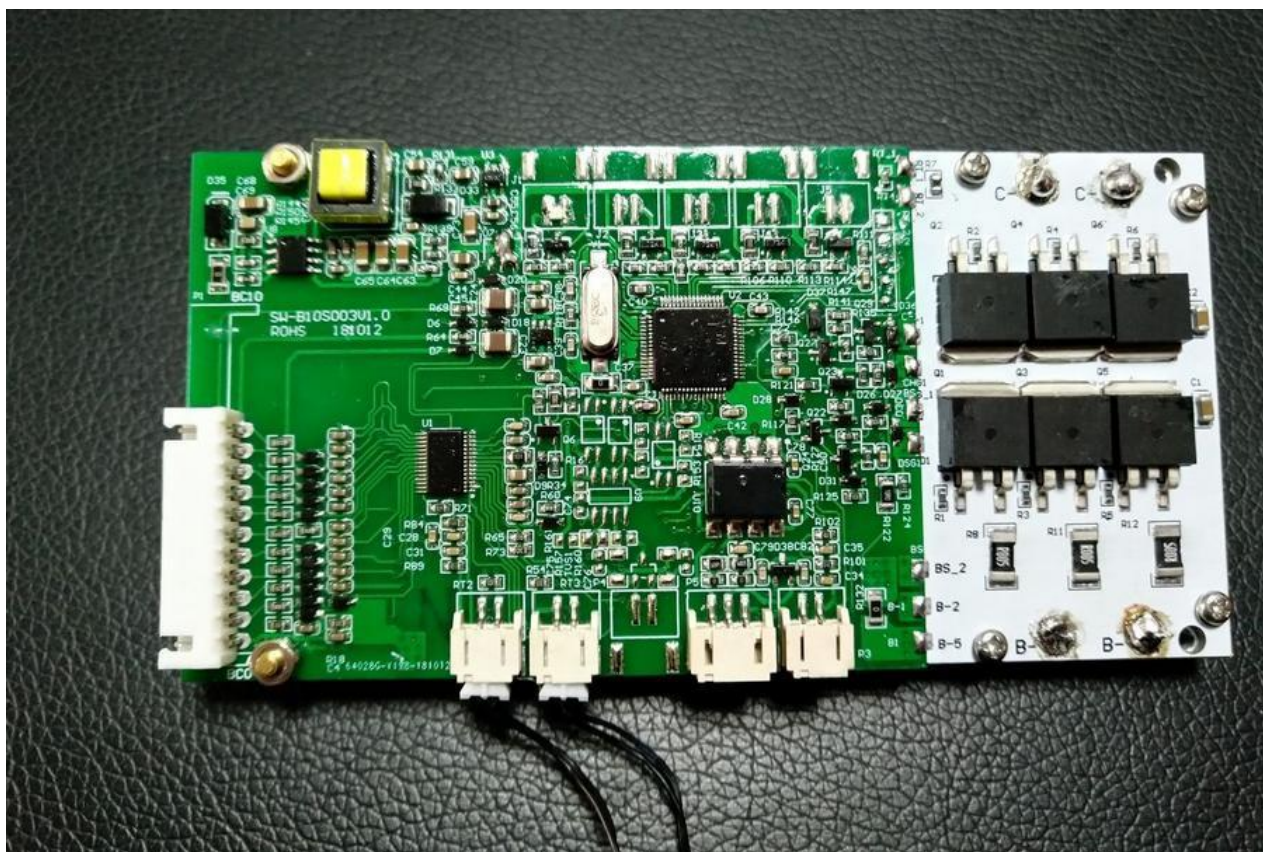
Charging: Just replace the load with a charger.

When separating: first disconnect the load, then disconnect the BMS signal line (note that the signal line on the BMS box must be separated first, then you need to go from high voltage (D) to low voltage (A) : BMS' D→C1→B1→A1), and finally disconnect the discharge line.

2. Protective plate

2.1 Shape and dimension of protective plate

The appearance of the protective panel is shown in the figure.:



DATA SHEET

序号 No.	项目 Item	最小值 Min.	典型值 Typical	最大值 Max	单位 Unit	备注 Note
1	支持串数	32	~	28	series	
2	充电电流 Charging current	—	50		A	可持续 continuous
3	放电电流 Discharging current	—	300		A	可持续 continuous
4	单体过压 monomer Overvoltage	3650	3700	3750	mV	第一级(参数可调整)
	响应时间 Reaction time	1	2	3	S	The first level (adjustable parameters)
	恢 复 Recovery	3500	3550	3600	mV	
	单体过压 2 monomer Overvoltage2	—	3750	3800	mV	第二级(参数可调整)
	响应时间 Reaction time		1000	1250	mS	The second level (adjustable parameters)
恢 复 Recovery	软件清除 Software delete					

5	单体欠压 Monomer undervoltage	2300	2400	2500	mV	第一级(参数可调整)
	响应时间 Reaction time	1	2	3	S	The first level (adjustable parameters)
	恢 复 Recovery	3350	3400	3450	mV	
	单体电压 Cell voltage	2000	2000	2100	mV	第二级(参数可调整)
	响应时间 Reaction time	100	—	1000	mS	The second level (adjustable parameters)
恢 复 Recovery	软件清除 Software delete					
6	短路保护 Short circuit protection	正负极阻抗小于 50mΩ 时, 认为短路 When positive and negative resistance is less than 50mΩ, It is short-circuit				
	恢 复 Recovery	移除负载 6~10S remove load 6-10S				
7	充电过流保护 Over charging current protection	50	60	100	A	(参数可调整)
	响应时间 Reaction time	3	4	—	S	Adjustable parameters
	恢 复 Recovery	8S 后自动恢复 Automatic recovery after 8S				
8	放电过流保护 1 Over discharging current protection 1	300	400	500	A	第一级(参数可调整)
	响应时间 Reaction time	—	5	—	S	The first level (Adjust parameters)
	恢 复 Recovery	恢复:4S 后自动恢复 Recovery: Automatic recovery after 4S				
	放电过流保护 2 Over discharging current protection	/	/	/	A	第二级(参数可调整)
	响应时间 Reaction time	/	—	/	mS	The second level (Adjustable parameters)
恢 复 Recovery	软件清除 software delete					
9	充电过温保护 Charging over-temperature protection	53	55	80	℃	(参数可调整) Adjustable parameters

	恢复温度 Recovery temperature	37	40	43	°C	
10	放电过温保护 Discharging over-temperature protection	57	60	63	°C	(参数可调整) Adjustable parameters
	恢复温度 Recovery temperature	37	40	43	°C	
11	储存温度的和湿度范围 Storage temperature and humidity range	一年内: -20°C to 35°C, (45-85%RH) within one year				储存期间, 电池必须每三个月补充电一次, 充电容 60%~70%。 During storage, battery should charge every three weeks, charge capacity is 60%~70%
		半年内: -20°C to 40°C, (45-85%RH) within 6 months				
		三个月内 Within 3 months:-20°C to 45°C, (45-85%RH)				
		一周内 Within one week:20°C to 50°C, (45-85%RH)				
12	静态消耗电流 Quiescently current consumption	---	---	30	mA	保护板损耗电流 PCM current consumption
	休眠电流 sleep current		0.10		mA	
13	重量 Weight		450		g	不带线 No wires
14	工作环境温度 Working environment temperature	0	25	85	°C	湿度: 最大 85%RH Humidity: Max: 85%RH

3. 技术要求(Technical Requirements)

3.1 测试条件(除特别规定)Testing Conditions (unless otherwise specified)

温度 Temperature: 15~35°C
相对湿度 Relative Humidity: 45%~75%
大气压 Atmospheric pressure: 86~106Kpa

3.2 充放电性能 (Electrical Characteristics)

NO	项目 (ITEM)	测试方法 (Testing Instruction)	要求 (Requirements)
1	Standard Charge 标准充电	Charging the cell initially with constant current at 0.2C and then with constant voltage at 109.5V till charge current declines to 0.05C 先用0.2C恒流充电至14.6V，再恒压109.5V充电直至充电电流	
		≤0.05C	
2	Rated Capacity 初始容量	Measure discharge capacity with discharge current 0.2C to 75V cut-off within 1 hour after standard charge. 标准充电方式充电后，以0.2C电流放电至75V的容量	≥200Ah
3	Cycle Life 循环寿命	Measure the capacity after 2000 cycles of standard charge and discharge at 0.2C current to 75V cut-off 标准充电方式充电后，0.2C放电至75V，如此循环3000次后电池的剩余容量	≥80% of Rated Capacity 初始容量的80%
4	Storage Characteristics 储存性能	Capacity after 30days storage at 25°C from standard charge 标准充电方式充电后，25°C下储存30天后的容量	Retention capacity ≥96% 剩余容量≥96%
		Capacity after 7days storage at 40°C from standard charge 标准充电方式充电后，40°C下储存7天后的容量	Recovery capacity ≥96% 剩余容量≥96%

3.3 环境性能 (Environmental Characteristic)

NO	项目 (ITEM)	测试方法 (Testing Instruction)	要求 (Requirements)
1	Temperature testing 高低温测试	Measure capacity with constant discharge current 0.5C to 75V cut-off at each temperature after standard charge at 25°C, Percentage as an index of the capacity compared with 100% at 25°C 25°C下标准充电方式充电后，在指定温度下0.5C放电至75V的容量，并以25°C时放电容量为基准计算百分率	80% at 0°C 100% at 25°C 99% at 60°C
2	Constant temperature/humidity 恒定湿热性能	Keep the battery at 60°C and 90%RH for 12hrs 将电池放入温度为60°C，相对湿度为90%的条件下搁置12小时	Recovery capacity ≥90% 恢复容量≥90%

3.4安全性能(Safe Characteristic)

NO	项目 (ITEM)	测试方法 (Testing Instruction)	要求 (Requirements)
1	Short Circuit 短路	<p>After standard charge, the battery located in a fume hood is to be short-circuited by connecting the positive and negative terminals with an external load of less than 50 mΩ till the battery case temperature has returned to near ambient temperature.</p> <p>将标准充电后的电池置于通风橱中，短路其正负极（线路总电阻不大于50mV），实验过程中监视电池温度变化，当电池温度下降到接近初始室温时，结束实验</p>	
2	Abnormal Charging Test 过充	<p>After discharge to 2.5V cut-off with discharge current 1C, the battery is to be subjected to a charging current 3C. The specified charging current is to be obtained by connecting a resistor of the specified size and rating in series with the battery. The test time is to be calculated using the formula: $t_c = 40c / 3(I_c)$</p> <p>将电池1C放电至2.5V后，调节电流3C充电，充电时间按以下公式计算：$t_c = 2.5 * \text{电池额定容量} / (3 * \text{制造商给定1C电流})$</p>	<p>The battery shall not rupture, smoke, catch fire, vent or leak.</p> <p>电池应无破裂、冒烟、着火、泄漏或漏液</p>
3	Over discharge testing 过放	<p>After standard charge, the battery will be connected with external with a maximum resistance load of 0.1Ω for 24hrs until it is completely discharged and the battery case temperature has returned to near ambient temperature.</p> <p>以标准方式充电后，将电池正负端以内阻小于0.1欧姆的铜导线连接24小时，直至电池完全放电，温度下降到环境温度</p>	
4	Puncture 穿刺	<p>After standard charge, the battery located in a fume hood is to be punctured with a nail (diameter $\geq 1\text{mm}$) until it is</p>	

		<p>completely discharged and the battery case temperature has returned to near ambient temperature</p> <p>将标准充电后的电池置于通风橱中，用直径不小于1mm的针将电池从正面刺穿，直至电池完全放电，温度下降到环境温度</p>	
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4. 保质期限及产品责任 WARRANTY PERIOD & PRODUCT LIABILITY

Warranty period of this product is 24 months from manufacturing code.

保质期是从出厂日期开始起24个月

.Our company is not responsible for the troubles caused by mishandling of the battery which is clearly against the instructions in this specification.

我司对因没有按本规格书规定操作而导致的意外不负责任

When Our company finds any new facts which require modification of this document, we will inform you again.

一旦我司发现本规格书有新的修改细节，我们将再告知。

5. 电池使用时警告事项及注意事项

WARNINGS AND CAUTIONS IN HANDLING THE Lithium-ion BATTERY

To prevent a possibility of the battery from leaking, heating or explosion please observe the following precautions:

为防止电池可能发生泄漏, 发热、爆炸, 请注意以下预防措施:

WARNINGS!

- Do not immerse the battery in water or seawater, and keep the battery in a cool dry surrounding if it stands by.

禁将电池浸入海水或水中, 保存不用时, 应放置于阴凉干燥的环境中

Do not use or leave the battery near a heat source as fire or heater

禁止将电池在热高温源旁, 如火、加热器等使用和留置

- When recharging, use the battery charger specifically for that purpose

充电选用锂离子电池专用充电器

- Do not reverse the positive (+) and negative (-) terminals

严禁颠倒正负极使用电池

- Do not connect the battery to an electrical outlet

严禁将电池直接接入电源插座

- Do not discard the battery in fire or heat it

禁止将电池丢于火或加热器中

- Do not short-circuit the battery by directly connecting the positive (+) and negative (-) terminal with metal objects such as wire.

禁止用金属直接连接电池正负极短路

- Do not transport or store the battery together with metal objects such as necklaces, hairpins etc.

禁止将电池与金属,如发夹、项链等一起运输或贮存

- Do not strike or throw the battery

禁止敲击或抛掷、踩踏电池等

- Do not directly solder the battery and pierce the battery with a nail or other sharp object.

禁止直接焊接电池和用钉子或其它利器刺穿电池

CAUTIONS!

- Do not use or leave the battery at very high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat or fire or its performance will be degenerated and its service life will be decreased.

禁止在高温下（炙热的阳光下或很热的汽车中）使用或放置电池,否则可能会引起电池过热、起火或功能失效、寿命减短

- If the battery leaks, and the electrolyte get into the eyes. Do not rub eyes, instead, rinse the eyes with clean running water, and immediately seek medical attention. Otherwise, it may injure eyes or cause a loss of sight.

如果电池发生泄露,电解液进入眼睛,请不要揉擦,应用清水冲洗眼睛,并立即送医院治疗,否则会伤害眼睛

- If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charger and stop using it.

如果电池发出异味,发热、变色、变形或使用、贮存,充电过程中出现任何异常,立即将电池从装置或充电器中移离并停用

- In case the battery terminals are dirty, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.

如果电极弄脏,使用前应用干布抹净,否则可能会导致接触不良功能失效

- Be aware discarded batteries may cause fire, tape the battery terminals to insulate them
废弃之电池应用绝缘纸包住电极,以防起火、爆炸。