

12V100AH电池组产品规格书

Product Specification for 12V 100AH Battery Pack

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1. 产品概述 Product Overview

本产品由4串电芯组成的磷酸铁锂电池组（含BMS），本产品适用于工作电流在100A范围内的负载设备。

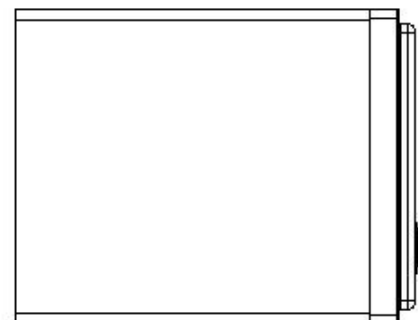
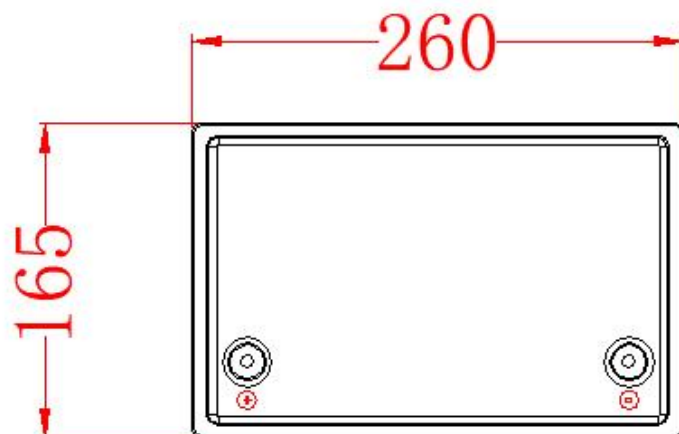
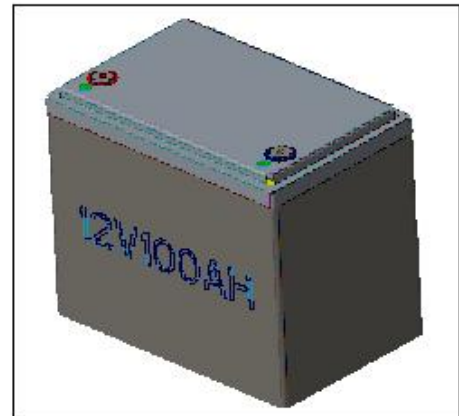
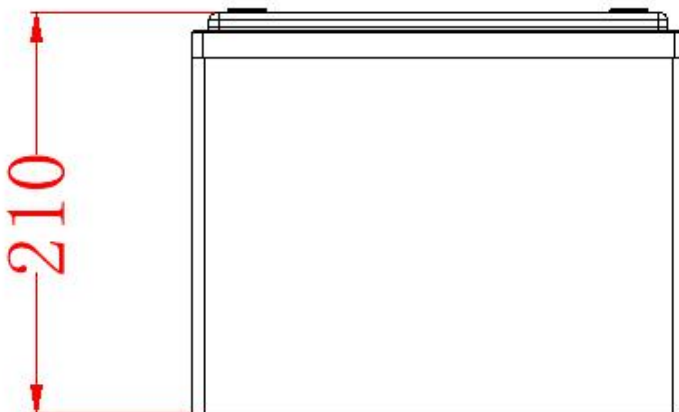
This product is composed of 4pcs of LiFePO4 battery (including BMS), it is applicable to load equipment that works within the working current range of 100A.

2. 产品技术规格 Product Technical Specifications

本产品型号为12V 100Ah电池组，由4S1P电芯组成，最大持续充放电电流100A，外壳采用塑胶壳，壳体颜色为黑色。

This product is 12V 100AH LiFePO4 battery pack. Each battery is composed of 4S1P cells, with a maximum continuous charge and discharge current of 100A, with ABS case, the color of the case is black.

2.1 电池组产品结构图 Battery Pack Product Structure



2.2 电池系统技术参数 Technical Parameters for Battery Pack System

序号 NO.	项目名称 Project Name	基本参数 Basic Parameter	备注 Notes
1	产品型号 Product Model	12V100Ah	
2	额定电压 Rated Voltage	12.8V	
3	额定容量 Rated Capacity	128Ah	
4	额定能量 Rated Energy	5120Wh	
5	冷却方式 Cooling Mode	自然冷却 Natural Cooling	
6	组合方式 Combination Mode	4串1并 4S1P	
7	充放电端口（共口或分口） Charge/Discharge Port	共口 Common Port	
8	通讯方式 Communication	蓝牙 Bluetooth	
9	显示屏 Screen	默认无 Default No	可先配 Optional
10	加热功能 Heating Function	默认无 Default No	可先配 Optional
11	电池组串并联 Series and parallel	支持串联 Support Series	最大支持4组串联 Max. Support 4 Series
12	电池组充电截止电压 Battery Pack Charging Cut-off Voltage	14.6V	充电保护电压 Charge Protection Voltage
13	电池组放电截止电压 Battery Pack Discharge Cut-off Voltage	10.8V	放电保护电压 Discharge Protection Voltage
14	单体充电截止电压 Cell Charging Cut-off Voltage	3.65	
15	单体放电截止电压 Cell Discharging Cut-off Voltage	2.5	
16	充电工作温度范围 Charging Operating Temperature range	0 ~ 55°C	
17	放电工作温度范围 Discharge Operating Temperature range	-20 ~ 60°C	
18	标准充电 Standard Charging	0.2C电流持续充电至14.6V截止 Charging Current 0.2C Until 14.6V	
19	标准放电 Standard Discharge	1C电流持续放电至10.8V截止 Discharging Current 1C Until 10.8V	
20	最大允许持续充电电流 Max.Continuous Charging Current	100A	
21	最大允许持续放电电流 Max. Continuous Discharge Current	100A	

	22	放电保护电流 Discharge Protection Current	110A	
	23	电池箱尺寸(长*宽*高mm) Battery Case Size (L * W * H mm)	260x165x210mm	尺寸公差±2mm Dimensional Tolerance ±2mm
	24	电池箱重量公差(KG) Weight Tolerance of Battery	10	重量公差±1KG Weight Tolerance±1KG

3. 电池管理（BMS）系统 Battery Management System

3.1 BMS系统参数设置 BMS Parameter Setup

项目名称 Project Name	指标项目 Reference	标准数值 Standard value
单体过充保护 Cell Over Charge Protection	过充保护值Overcharge Protection Value	3.65±0.05V
	过充告警值Overcharge Warning Value	3.55±0.05V
	过充恢复值Overcharge Recovery Value	3.5±0.05V
单体过放保护 Cell Over Discharge Protection	过放保护值 Over Discharge Protection Value	2.7±0.05V
	过放告警值Over Discharge Alarm Value	2.8±0.05V
	过放恢复值Over Charge Recovery Value	2.9±0.05V
电池组过充保护 Battery Pack Over Charge Protection	过充保护值Overcharge Protection Value	14.6±0.05V
	过充告警值Overcharge Warning Value	14.4±0.05V
	过充恢复值Overcharge Recovery Value	14±0.05V
电池组过放保护 Battery Pack Over Discharge Protection	过放保护值Over Discharge Protection Value	10.8±0.05V
	过放告警值Over Discharge Alarm Value	11.2±0.05V
	过放恢复值Over Discharge Recovery Value	12±0.05V
充电过流保护 Charge Over-current Protection	充电过流保护 Charge Over Current Protection	110A
放电过流保护 Discharge Over-current	放电过流1保护 Discharge Over Current 1 Protection	110A
	放电过流2保护 Discharge Over Current 2 Protection	340A

Protection		
短路保护 Short Circuit Protection	短路保护电流 Short Circuit Protection Current	1560A
温度保护 Temperature Protection	充电高温保护 Charging High Temperature Protection	55±2 °C
	充电高温恢复 Charging High Temperature Recovery	50±2 °C
	充电低温保护 Charging Low Temperature Protection	-5±2 °C
	充电低温保护恢复 Charging Low Temperature Protection Recovery	0±2 °C
	放电高温保护 Discharge High Temperature Protection	60±2 °C
	放电高温恢复 Discharge High Temperature Recovery	50±2 °C
	放电低温保护 Discharge Low Temperature Protection	-20±2 °C
	放电低温保护恢复 Discharge Low Temperature Protection Recovery	0±2 °C
	均衡功能 Equalization Function	均衡开启电压 Equalization Turn-on Voltage
均衡开启压差 Equalize Opening Voltage Difference		20mA

3.2 BMS系统功能概述 Overview of BMS System Functions

3.2.1 单体过充保护及恢复 Cell Over-charge Protection & Recovery

当任意一节电芯电压高于单体过充电压设定值，并且持续时间达到单体过充延时，系统进入过充保护状态，关闭充电 MOS，不能对电池充电。

When the voltage of any cell is higher than the set value of the monomer overcharge voltage and the duration reaches the monomer overcharge delay, the system enters the overcharge protection state and shuts down the charging MOS to prevent the battery from being charged.

单体过充保护后，当所有单体电压降到单体过充恢复值以下时，解除过充保护状态。也可放电解除。

After the single overcharge is protected, when the voltage of all the single overcharge is lower than the recovery value, the overcharge protection is disabled. The overcharge protection can also be removed by discharge.

3.2.2 总体过充保护及恢复 Battery Pack Over-charge Protection & Recovery

当总体电压高于总体过压设定值，并且持续时间达到总体过充延时，系统进入过充保护状态，关闭充电 MOS，不能对电池充电。

When the pack voltage is higher than the pack over voltage set value and the duration reaches the pack overcharge delay, the system enters the overcharge protection state and shuts down the charging MOS to prevent the battery from being charged.

当总体电压降到总电压过压保护恢复值以下时，解除过充保护状态，也可放电解除。

When the pack voltage drops below the recovery value of the total voltage over voltage protection, the overcharge protection state can be disabled. The overcharge protection can also be removed by discharge.

3.2.3 单体过充保护及恢复 Cell Over-discharge Protection & Recovery

当最低电压低于单体过放电压设定值，并且持续时间达到单体过放延时，系统进入过放保护状态，关闭放电 MOS，不能对电池放电。

When the minimum voltage is lower than the set value of the monomer over discharge voltage and the duration reaches the monomer over discharge delay, the system enters the over discharge protection state, and the discharge MOS is turned off and the battery cannot be discharged.

发生单体过放保护后，对电池组充电可以解除过放保护状态。

After the single over discharge protection occurs, charging the battery pack can release the over discharge protection state.

3.2.4 总体过放保护及恢复 Battery Pack Over-discharge Protection & Recovery

当总体电压低于总体过放电压设定值，并且持续时间达到总体过放延时，系统进入过放保护状态，关闭放电 MOS，不能对电池放电。

When the overall voltage is lower than the set value of the overall over discharge voltage, and the duration reaches the overall over discharge delay, the system enters the over discharge protection state, and the discharge MOS is turned off and the battery cannot be discharged.

发生总体过放保护后，对电池组充电可以解除过放保护状态。

After the overall over discharge protection occurs, charging the battery pack can release the over discharge protection state.

3.2.5 充电过流保护及恢复 Charge Over-current Protection & Recovery

当充电电流超过充电过流保护电流且持续的时间达到过流检测延迟时间，系统进入到充电过流保护状态，不能对电池进行充电。发生充电过流保护后延时自动恢复，如需不要自动恢复可将对应的释放时间设长；放电也可以解除充电过流状态。

When the charging current exceeds the charging over-current protection current and the duration reaches the over-

current detection delay time, the system enters the charging over-current protection state and cannot charge the battery. After the occurrence of over-current protection, the delay will recover automatically. If necessary, the release time can be set longer. Discharge can also remove the charge over-current state.

3.2.6 放电过流保护及恢复 Discharge Over-current Protection & Recovery

当放电电流超过放电过流保护电流且持续的时间达到过流检测延迟时间，系统进入到放电过流保护状态，关闭放电 MOS。发生放电过流后延时自动恢复，如需不要自动恢复可将对应的释放时间设长。充电也可以解除放电过流状态。

When the discharge current exceeds the discharge over-current protection current and the duration reaches the over-current detection delay time, the system enters the discharge over-current protection state and shuts down the discharge MOS. When the discharge over-current occurs, the delay will recover automatically. If it is not necessary to recover automatically, you can set the corresponding release time to be long. Charging can also remove the discharge over-current state.

放电有两级过流保护功能，对不同的电流值具有不同的响应速度，更加可靠地保护电池。

Discharge has two levels of over-current protection function, with different response speed to different current values, more reliable protection for the battery.

3.2.7 充放电高温保护及恢复 Charge & Discharge High Temperature Protection & Recovery

当充放电时 NTC 检测电芯表面的温度高于设定的高温保护温度时，管理系统进入高温保护状态，充电或放电 MOSFET 关闭，在该状态不能对电池包充电或放电。

When the NTC detects that the temperature of the cell surface is higher than the set high temperature protection temperature during charging and discharging, the management system enters the high temperature protection state, and the charging or discharging MOSFET is closed. In this state, the battery pack cannot be charged or discharged.

当电芯表面的温度下降到高温恢复设定值时，管理系统从高温状态恢复，重新导通充放电 MOS。

When the temperature of the cell surface drops to the high temperature recovery set point, the management system recovers from the high temperature state and re-conducts the charging and discharging MOS.

3.2.8 充放电低温保护及恢复 Charge & Discharge Low Temperature Protection & Recovery

当充放电时 NTC 检测电芯表面的温度低于设定的低温保护温度时，管理系统进入低温保护状态，充电或放电 MOSFET 关闭，在该状态不能对电池包充电或放电。

When the temperature of the NTC detection cell surface is lower than the set low temperature protection temperature during charging and discharging, the management system enters the low temperature protection state, and the charging or discharging MOSFET is closed. In this state, the battery pack cannot be charged or discharged.

当电芯表面的温度上升到低温恢复设定值时，管理系统从低温状态恢复，重新导通充放电 MOS。

When the temperature of the cell surface rises to the low temperature recovery set point, the management system recovers from the low temperature state and re-conducts the charging and discharging MOS.

3.2.9 均衡功能 Equalization Function

管理系统采用电阻旁路的方式进行电芯均衡,充电过程中电池组最高节单体电芯电压达到设定的均衡启动电压值,电芯均衡功能开启。

The management system uses resistance bypass mode to balance batteries. During the charging process, the voltage of the highest cell of the battery string reaches the set equilibrium starting voltage, and the battery cell balancing function is enabled.

当电芯压差小于设定值或者电芯电压小于均衡开启电压时均衡停止。可设置充电均衡模式和静态均衡模式。

When the cell pressure difference is less than the set value or the cell voltage is less than the equalization opening voltage, the equalization stops. You can set the charging balancing mode and static balancing mode.

3.2.10 休眠功能 Sleep Function

保护板处于静态时（无电流，无均衡及过压保护。）延时 1 分钟后，进入休眠状态，进入此状态后，保护板仅降低检测电压电流的频率和自身功耗。充放电可以自动退出休眠模式。

When the BMS is static (no current, no equalization and overvoltage protection), after a delay of one minute, enters the sleep state. After entering this state, the BMS reduces only the frequency of detecting voltage and current and its own power consumption. Charge and discharge can automatically exit the sleep mode.

3.2.11 通讯功能 Communication Function

保护板有三种通讯方式，UART和485需通过通讯盒与电脑连接，通讯格式 9600,8,N,1 上位机方式才能查看电池数据。蓝牙模块通过手机蓝牙功能即可连接查看电池数据。

The BMS has three communication modes. UART and 485 need to be connected to the computer through the communication box. The communication format is 9600,8,N,1, and the upper computer can view battery data. The Bluetooth module can be connected to view battery data through the Bluetooth function of the mobile phone.



UART 通讯盒



RS485 通讯盒



蓝牙模块

4. 测试条件 Test Conditions

特殊情况除外，所有测试条件都以标准测试条件为准：

Except for special cases, all test conditions are based on standard test conditions:

环境温度：25±5℃；环境湿度40%-80%RH

Ambient temperature: 25±5℃; Ambient humidity 40%-80%RH

“标准充电”即在环境温度为 $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ 的条件下，先以恒定电流 0.2C 充电至 14.6V ，再以 14.6V 的恒压充电至电流小于 0.02C 。

"Standard charging" means that under the condition of an ambient temperature of $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$, first charge the battery with a constant current of 0.2C to 14.6V , and then charge it with a constant voltage of 14.6V until the current is less than 0.02C .

“标准放电”即在环境温度为 $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$ 的条件下，以恒定电流 0.2C 放电到 10.8V 。

"Standard discharge" means discharge to 10.8V at a constant current of 0.2C at an ambient temperature of $25^{\circ}\text{C}\pm 5^{\circ}\text{C}$.

5. 电气性能、安全性能测试 Electrical Performance & Safety Performance Test

5.1 电气性能测试 Electrical Performance Test

测试项目 Test Items	测试标准 Test Standard	技术要求 Technical Requirement
25°C常温放电容量 Discharge Capacity Under 25°C Normal Temperature	<p>电池组在标准测试条件下先以 0.2C 电流进行充满电后，再以 0.2C 电流进行放电，记录电池组的放电容量。</p> <p>The battery pack is fully charged with 0.2C current under standard test conditions, and then discharged with 0.2C current, and the discharge capacity of the battery pack is recorded.</p>	<p>$\geq 100\%$ 标称容量 $\geq 100\%$ nominal capacity</p>
-10°C低温放电容量 Discharge Capacity Under -10°C Low Temperature	<p>电池组在标准测试条件下先以 0.2C 电流进行充满电后，在 -10°C 低温环境温度存储 10H，以 0.2C 电流进行放电至终止电压，记录电池组的放电容量。</p> <p>The battery pack is fully charged with 0.2C current under standard test conditions, stored for 10H at -10°C low temperature ambient temperature, discharged with 0.2C current to the termination voltage, and the discharge capacity of the battery pack is recorded.</p>	<p>$\geq 75\%$ 标称容量 $\geq 75\%$ nominal capacity</p>
55°C高温放电容量 Discharge Capacity Under 55°C High Temperature	<p>电池组在标准测试条件下先以 0.2C 电流进行充满电后，在 55°C 高温环境温度存储 5H，以 0.2C 电流进行放电至终止电压，记录电池组的放电容量。</p> <p>The battery pack was fully charged with 0.2C current under standard test conditions, stored at 55°C high temperature ambient temperature for 5H, discharged</p>	<p>$\geq 95\%$ 标称容量 $\geq 95\%$ nominal capacity</p>

	with 0.2C current to the termination voltage, and the discharge capacity of the battery pack was recorded.	
<p>荷电保持能力和容量恢复能力</p> <p>Charge Retention and Capacity Recovery</p>	<p>电池组在标准测试条件下先以0.2C电流进行充放电后，记录初始容量，在标准测试条件下充满电，在25°±5C环境温度下搁置30d，以0.2C电流进行放电至终止电压测试保持容量，以0.2C进行充电，再以0.2C进行放电，循环3次，第三次为恢复容量</p> <p>The battery pack is first charged and discharged with 0.2C current under standard test conditions. The initial capacity is recorded. Fully charge it under standard test conditions, left for 30d at 25°±5C ambient temperature, and discharged with 0.2C current to the termination voltage. Test the maintain capacity. Charge at 0.2C, discharge at 0.2C, cycle 3 times, the third time is recovery capacity.</p>	<p>荷电保持率≥95%</p> <p>容量恢复率≥95%</p> <p>Charge retention rate ≥ 95%</p> <p>Capacity recovery rate≥95%</p>
<p>25°C常温循环寿命</p> <p>Cycle Life Under 25°C Normal Temperature</p>	<p>电池组在标准测试条件下先以0.2C电流进行充满电后，以0.2C电流进行放电，25°C±5°C环境温度持续充放电测试，当放电容量≤初始容量的80%时终止循环寿命测试</p> <p>The battery pack is fully charged with 0.2C current under standard test conditions, and then discharged with 0.2C current. Continuous charge-discharge test at 25°C±5°C ambient temperature, the cycle test is terminated when the discharge capacity is ≤80% of the initial capacity.</p>	<p>≥3000次</p> <p>≥3000 cycles</p>
<p>55°C高温循环寿命</p> <p>Cycle Life Under 55°C High Temperature</p>	<p>电池组在标准测试条件下先以0.2C电流进行充满电后，以0.2C电流进行放电，55°C±5°C环境温度持续充放电测试，当放电容量≤初始容量的80%时终止循环寿命测试</p> <p>The battery pack is fully charged with 0.2C current under standard test conditions, and then discharged with 0.2C current. Continuous charge and discharge test at 55°C±5°C ambient temperature. The cycle test is terminated when the discharge capacity is less than or equal to 80% of the initial capacity.</p>	<p>≥1500次</p> <p>≥1500 cycles</p>

5.2 安全性能测试 Safety Performance Test

测试项目 Test Items	测试标准 Test Standard	技术要求 Technical Requirement
外部短路测试 External Short Circuit Test	<p>电池组在标准测试条件下进行充电，将充满电的电池组放置在防爆箱中，用内阻小于 100mΩ的导线短路于电池组外部的正负极，试验过程中记录电池表面温度，短路持续时间 10min，即完成测试。</p> <p>The battery pack is charged under standard test conditions. The fully charged battery pack is placed in an explosion-proof box, and the positive and negative electrodes outside the battery pack are short-circuited with wires with an internal resistance of less than 100mΩ. During the test, record the battery surface temperature and short-circuit duration. 10min to complete the test.</p>	<p>不起火、不爆炸 No fire, no explosion</p>
过充电测试 Overcharge Test	<p>电池组在标准测试条件下进行充电后，用恒流恒压源对电池组某一单节进行 0.2C 充电，恒流充电至 5V 后转为恒压充电，直到截止电流到 0A，结束试验。</p> <p>After the battery pack is charged under the standard test conditions, use a constant current and constant voltage source to charge a single cell of the battery pack at 0.2C, and then switch to constant voltage charging until the cut-off current reaches 0A, and the test is ended.</p>	<p>不起火、不爆炸 No fire, no explosion</p>
过放电测试 Over Discharge Test	<p>电池组在标准测试条件下进行充电后，用负载设备对电池组进行 0.5C 持续放电，直到某一单节电池电压到达 0~0.5V 时，结束试验。</p> <p>After the battery pack is charged under the standard test conditions, the battery pack is continuously discharged at 0.5C with the load device, and the test ends when the voltage of a single cell reaches 0~0.5V.</p>	<p>不起火、不爆炸 No fire, no explosion</p>

6. 产品包装要求 Product Packaging Requirements

6.1 电池箱外观良好，不能有掉漆、划伤、变形、破损等不良现象。

The appearance of the battery is good, and there should be no bad phenomena such as paint peeling, scratches, deformation, damage, etc.

6.2 包装前，电池要处于关机休眠状态。

Before packaging, the battery should be in a power-off hibernation state.

6.3 电池外观要检验合格后，才能进行装箱。

The appearance of the battery must be inspected and qualified before packing.

6.4 外包装采用纸箱包装，纸箱上信息要清晰，纸箱内部要增加防护包材，以确保电池箱在运输中不被划伤。

The outer package is packed in cartons. The information on the cartons must be clear. Protective packing materials must be added inside the cartons to ensure that the battery boxes are not scratched during transportation.

7. 产品贮存与运输 Product Storage and Transportation

7.1 产品贮存 Product Storage

产品长期存放不使用时，应贮存在10°C~35°C干燥、清洁及通风良好的仓库内，避开易燃易爆物品；每三个月定期对电池组进行充点电维护，确保电池处于最佳性能状态。

When the product is not in use for a long time, it should be stored in a dry, clean and well-ventilated warehouse at 10°C~35°C, avoiding inflammable and explosive materials; the battery pack should be charged and maintained regularly every three months to ensure that the battery best performance state.

7.2 产品运输 Product Transportation

电池组应经过外部包装后才能运输，在运输过程中应防止剧烈震荡、冲击或挤压，防止日晒雨淋。

The battery pack can only be transported after external packaging. During transportation, it should be prevented from violent shock, impact or extrusion, and protected from the sun and rain.

8. 电池使用时警告及注意事项 Warnings and Precautions When Using Batteries

为防止电池可能发生泄漏、发热、爆炸，请注意以下预防措施

To prevent possible battery leakage, heat generation, and explosion, please observe the following precautions

警告！

- ① 严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;
- ② 严禁颠倒正负极使用电池;
- ③ 禁止用金属直接连接电池正负极短路;

- ④ 禁止将电池与金属,如发夹、项链等一起运输或贮存;
- ⑤ 禁止敲击或抛掷、踩踏电池等;
- ⑥ 禁止直接焊接电池和用钉子或其它利器刺穿电池。

Warning !

- ① It is strictly forbidden to immerse the battery in seawater or water. When not in use, it should be placed in a cool and dry environment;
- ② It is strictly forbidden to reverse the positive and negative poles to use the battery;
- ③ It is forbidden to use metal to directly connect the positive and negative electrodes of the battery to short circuit;
- ④ It is forbidden to transport or store batteries together with metals, such as hairpins, necklaces, etc.;
- ⑤ It is forbidden to knock or throw, step on the battery, etc.;
- ⑥ It is forbidden to directly weld the battery and pierce the battery with nails or other sharp objects.

注意!

- ① 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；电池长期储存建议最佳温度为10-45°C。
- ② 禁止将电池丢于火或加热器中以防起火、爆炸及污染环境；报废电池应退回供应商或电池回收点处理。
- ③ 禁止在强静电和强磁场的地方使用，否则易破坏电池安全保护装置，带来不安全的隐患。
- ④ 若电池发生泄露，电解液进入眼睛，千万不可揉擦，应立即用清水冲洗眼睛，并立即送医院治疗，否则会伤害眼睛。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，应立即将电池从装置或充电器中移离并停用。
- ⑤ 禁止将电池正负极直接插入电源插座中，必须选用锂离子电池专用充电器。
- ⑥ 安装前需检查电池电压和连接件，一切正常后方可使用。
- ⑦ 电池半电存贮，若电池三个月没有用过，需进行补充电一次。
- ⑧ 若电极弄脏，使用前应用干布抹净，否则可能会导致接触不良、功能失效。

Notice !

- ① It is forbidden to use or place the battery under high temperature (in the hot sun or in a very hot car), otherwise it may cause the battery to overheat, catch fire or fail to function, and shorten its life; the recommended temperature for long-term battery storage is 10-45°C.
- ② It is forbidden to throw batteries into fire or heaters to prevent fire, explosion and environmental pollution; scrapped batteries should be returned to the supplier or battery recycling point for disposal.
- ③ Do not use it in places with strong static electricity and strong magnetic fields, otherwise it will easily damage the battery safety protection device and bring unsafe hidden dangers.
- ④ If the battery leaks and the electrolyte enters the eyes, do not rub it. Immediately rinse the eyes with clean water and send them to the hospital for treatment, otherwise the eyes will be hurt. If the battery emits odor, heats up, discolors, deforms, or has any abnormality during use, storage, or charging, immediately remove the battery from the

device or charger and stop using it.

- ⑤ It is forbidden to insert the positive and negative poles of the battery directly into the power socket, and a special charger for lithium-ion batteries must be used.
- ⑥ Before installation, check the battery voltage and connectors, and use it only after everything is normal.
- ⑦ The battery is stored in half power. If the battery has not been used for three months, it needs to be recharged once.
- ⑧ If the electrode is dirty, it should be wiped with a dry cloth before use, otherwise it may cause poor contact and function failure.