

Product Specification

产品规格书

Name/产品名称: MH-Ni Battery 镍氢动力电池

Model/产品型号: WL4312S

Doc NO./文件编号:

Author/拟制:

Review /审核:

Approval /批准:

Date/日期:

一、 SCOPE/范围

This specification is applicable to Ni MH battery for hybrid of WL4312S.

本规格书适用于 WL 4 3 1 2 S 动力型镍氢电池。

Model/型号: Ni-MH WL4312S

二、 RATINGS/规格

| No./ 序号 | Description/类型 | Unit/单位 | Specification/说明 | Condition/环境 |
|------------|--|---------|------------------|--|
| 1 | Nominal Voltage 标称电压 | V | 14.4 | |
| 2 | Operating Voltage 工作电压 | V | 12.0~19.2 | |
| 3 | Nominal capacity 标称容量 | mAh | 6000 | Standard charge / discharge 标准充电/放电 |
| 4 | Minimum capacity 最小容量 | mAh | 5800 | Standard charge / discharge 标准充电/放电 |
| 5 | Nominal Energy 额定能量 | Wh | 90 | 1小时倍率 1 hour rate |
| 6 | Weight 重量 | g | 2000±50 | Standard environment、 Accuracy±0.05g Electronic scale 标准环境、精度±0.05g 以内电子秤 |
| 7 | Power Density 功率密度 | W/kg | >850 | |
| 8 | Energy Density 能量密度 | Wh/kg | >43 | |
| 9 | Max. continuous discharge current 最大恒流放电倍率 | C | 20 | 20℃~45℃ |
| 10 | Max. continuous charge current 最大恒流充电倍率 | C | 15 | |
| 11 | Storage Temperature 储存温度范围 | ℃ | -20~35 | |
| 12 | Operating Temperature 使用温度范围 | ℃ | -30~55 | |

三、 PERFORMANCE/性能

Tests should be done within one month of receiving the goods under the following conditions.

测试电池的状态应为用户收到后不超过一个月的产品

Test condition/测试条件

Temperature/适用温度：20±5℃

Relative Humidity/相对湿度：65±20%

Atmospheric Pressure/大气压力：86～106kPa

Standard charge discharge specification/标准充放电规格

Discharge/放电： 6000mA (1C) to 12.0V

Charge/充电： 6000mA (1C)×1hrs, 1200mA (0.2C)×1hrs

Discharge/放电： 6000mA (1C) to 12.0V

| No. 序号 | Test 测试 | Unit 单位 | Description 说明 | Condition 环境 | Note 备注 |
|-----------|-------------------------------------|------------|-------------------|---|---|
| 1 | Open circuit voltage 开路电压 (OCV) | V | ≥15 | Within 1h after charging /充电后一小时内 | |
| 2 | Internal resistance 直流内阻 (DC-IR) | mΩ | ≤32 | 50%SOC | |
| 3 | Internal Impedance 交流内阻 (AC-IR) | mΩ | ≤13.8 | 1kHz | |
| 4 | Self -discharge rate 自放电率 | % | <18 | | 55±2℃ rest 3days, 20±2℃ rest 7days /55±2℃搁置3天、20± 2℃搁置7天 |
| 5 | Energy Efficiency 能 量效率 | % | ≥85 | 25℃ | |
| 6 | Volumetric Efficiency 容量效率 | % | >95 | 25℃ | |
| 7 | Cycle Life 循环寿命 | 周 | >3000 | 80%DOD | Charge to 90%, discharge to 10% /充电至90%，放电至10% |

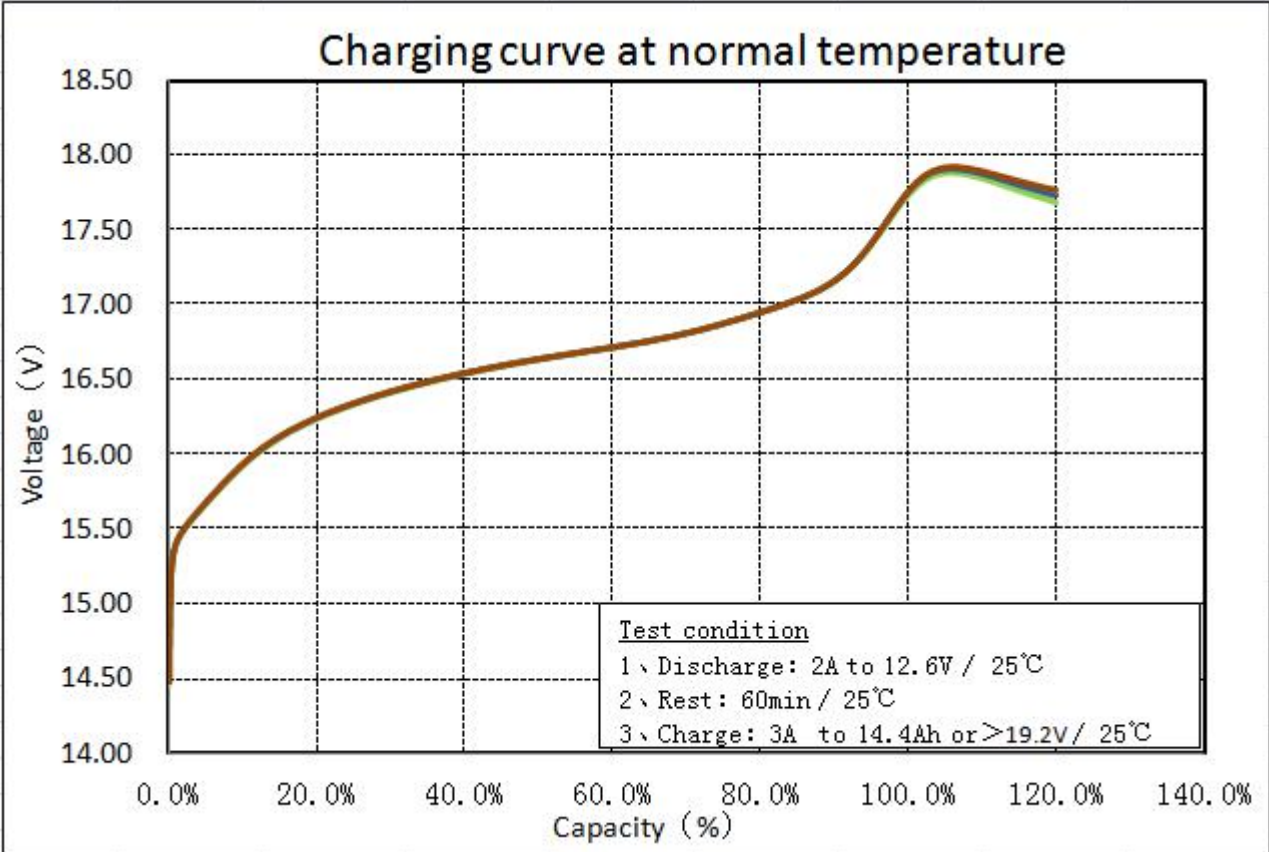
四、 MANDATORY PERFORMANCE INDEX/强制性能指标

| No. / 序号 | Battery parameters /电池参数 | Test Method /测试方法 | Standard 指标 |
|-------------|------------------------------------|--|--|
| 1 | Appearance 外观 | Visually check the appearance of the battery under good light conditions. 在良好的光线条件下，用目测法检查蓄电池的外观。 | Neatly arranged, reliable and clearly marked. Free from cracks, scars. 无变形裂纹，外伤，排列整齐，连接可靠且标识清晰 |
| 2 | Vibration Resistance 耐振动性 | Fixed the battery module to the vibration test stand, Perform a linear scan vibration test according to the following conditions: 将蓄电池模块固定到振动试验台上，按下述条件进行线性扫描振动试验： ——Direction of vibration: single vibration ups and down; 振动方向：上下单振动； ——Vibration frequency; 振动频率：10Hz~55 Hz; ——Max Acceleration 最大加速度：30m/s ² ; ——Vibration Time 振动时间：3h。 | No deformation and no leakage 无变形、无漏液 |
| 3 | Over discharge Test 过放电试验 | 1、 Charge according to standard charging method;按标准充电方法充电; 2、 Discharge with 6A current (If there is an electronic protective line, the discharge electronic protection line shall be removed temporarily)discharge 90min;以6A电流放电如果有电子保护线路，应暂时除去放电电子保护线路)，放电90min; 3、 Observe 1h. 观察1h。 | No explosion, no catching fire, or no leakage. 不爆炸，不起火，无漏液 |
| 4 | Overcharge Test 过充电试验 | 1、 Charge by standard charging method; 按标准充电方法充电; 2、 Charge 1H with 6A current; 以6A电流充电1h; 3、 Observe 1h. 观察1h。 | No explosion or no catching fire. 不爆炸，不起火 |
| 5 | Short-circuit Test 短路试验 | 1、 Charge by standard charging method; 按标准充电方法充电; 2、 External Short-circuit the battery 10min, and the external line resistance should be less than 5mΩ ;将电池经外部短路 10min，外部线路电阻应小于 5mΩ ; 3、 Observe 1h. 观察 1h。 | No explosion or no catching fire. 不爆炸，不起火 |

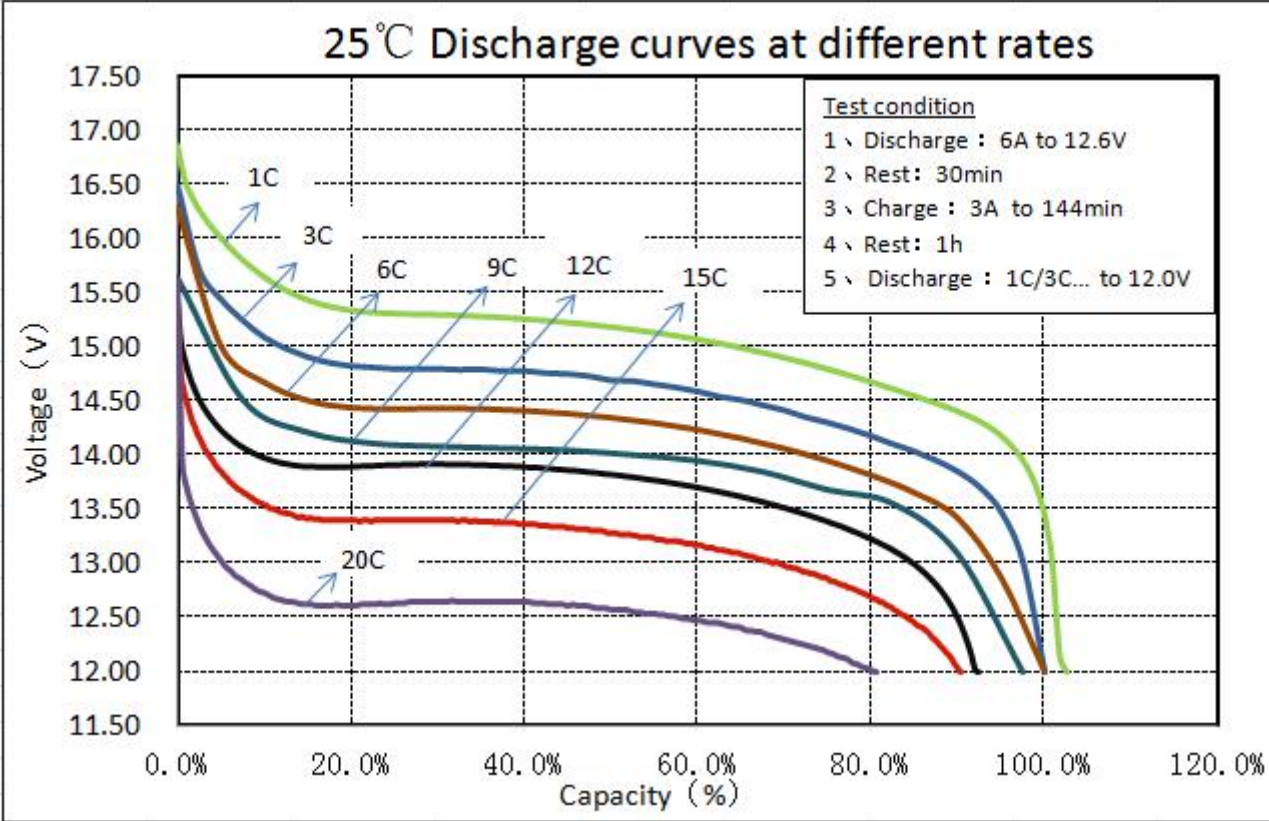
| | | | |
|---|--------------------------|---|--|
| 6 | Heating Test 加热试验 | 1、Charge by standard charging method; 按标准充电方法充电; 2、The temperature chamber is heated from room temperature to 85 ± 2 DEG C at a rate of 5/min, and the heating is stopped after 2h;温度箱按照 $5^{\circ}\text{C}/\text{min}$ 的速率由室温升至 $85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ，并保持此温度 2h 后停止加热; 3、Observe 1h. 观察 1h。 | No explosion or no catching fire. 不爆炸，不起火 |
| 7 | Extrusion Test 挤压试验 | 1、Charge by standard charging method; 按标准充电方法充电; 2、Extrusion direction: perpendicularly pressure to the battery monomer arrangement direction 挤压方向:垂直于蓄电池单体排列方向施压; 3、Extrusion plate form: The radius of the 75mm half cylinder, the length of the semi cylinder (L) is greater than the size of the extruded battery;挤压板形式: 半径 75mm 的半圆柱体,半圆柱体长度(L)大于被挤压电池的尺寸; 4、Extrusion speed;挤压速度: (5 ± 1) mm/s; 5、Extrusion degree: the voltage reaches 0V or the deformation amount reaches 30%, or the extrusion pressure reaches 200KN, then stop extruding;挤压程度: 电压达到 0V 或变形量达到 30%或挤压力达到 200KN 后停止挤压; 6、Observe 1h. 观察 1h。 | No explosion or no catching fire. 不爆炸，不起火 |
| 8 | Acupuncture Test 针刺试验 | 1、Charge by standard charging method; 按标准充电方法充电; 2、With high temperature resistant steel than 6mm ~ 10mm in diameter (tip cone angle of 45 degrees to 60 degrees, smooth surface, needle without rust, oxide layer and oil), with 25 ± 5 mm/s speed, from the vertical to the battery plate direction, turn through at least 3 monomer;用 $\Phi 6\text{mm} \sim \Phi 10\text{mm}$ 的耐高温钢针(针尖的圆锥角度为 $45^{\circ} \sim 60^{\circ}$ ，针的表面光洁，无锈蚀、氧化层及油污)，以 25 ± 5 mm/s 的速度，从垂直于蓄电池极板的方向，依次贯穿至少 3 个单体; 3、Observe 1h. 观察 1h。 | No explosion or no catching fire. 不爆炸，不起火 |

五、 PERFORMANCE CHART/性能图表

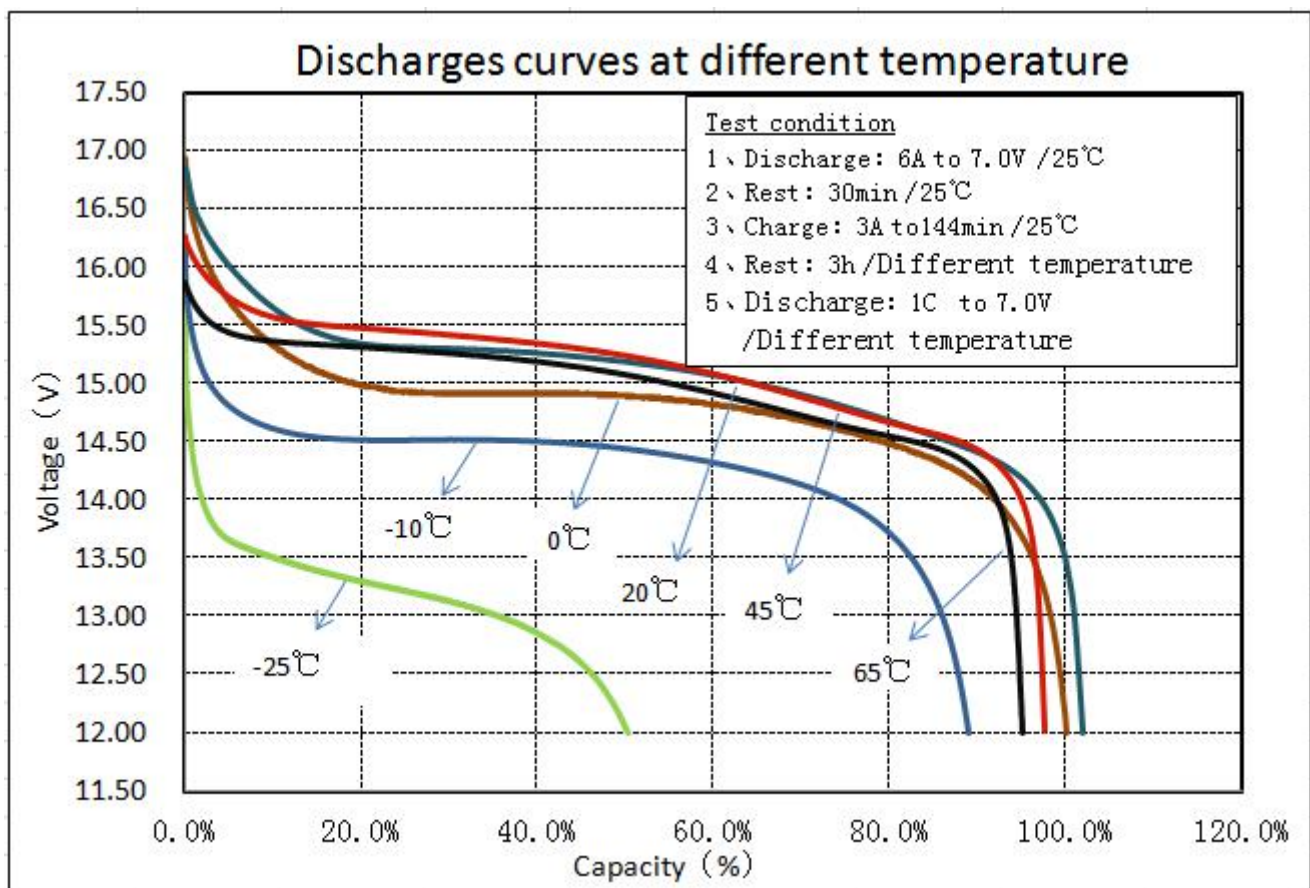
5.1、 Charging curve at normal temperature/常温充电曲线图



5.2、 Discharge curves at different rates/不同倍率下放电曲线图



5.3、 Discharge curves at different temperature/不同温度下放电曲线图



六、 **CONFIGURATION AND DIMENSIONS** /结构、尺寸（单位：mm）

See attached sheet /见附页

七、 **EXTERNAL APPEARANCE** /外观

No scars, rust, discoloration, leakage and deformation.

无破裂、划痕、生锈、变色、漏液及变形等现象。

八、 **GUARANTEE** /保证

Product fabrication and material defects are guaranteed within 2 years.

在两年内存在产品做工和材料缺陷问题给予保证。

Recommendations: the company's products have been filled 30-90% power in the factory, depending on the shipping distance and packing conditions. When capacity measurement, discharge with 1C to 12.6V/ pcs; Then charge/discharge with the specified current to test capacity. If the stock reach or exceed 2 months, discharge with 1C to 14.4V/ pcs; Then charge with 1C for 54min, 0.2C charge for 1hrs, rest 20min, discharge

with 1C to 12.6V/ pcs, after 3 cycles; Then charge/discharge with the specified current to test capacity.建议：本公司产品在出厂时根据运输距离和包装条件已充30-90%的电量，贵公司在检测容量时，先用1C放电至12.6V/根；再用规定电流充放，进行容量检测。如果库存时间有2个月或以上的，先用1C放电至14.4V/根，然后用1C充电54min，0.2C充电1hrs，搁置20min，以1C放电至12.6V/根，循环3次后；再用规定电流充放，进行容量检测。

For the first use, the standard charge method is recommended to avoid damage to the battery.

首次使用时建议采用标准充电法充电，以免对电池造成伤害。

九、 CAUTION/注意事项

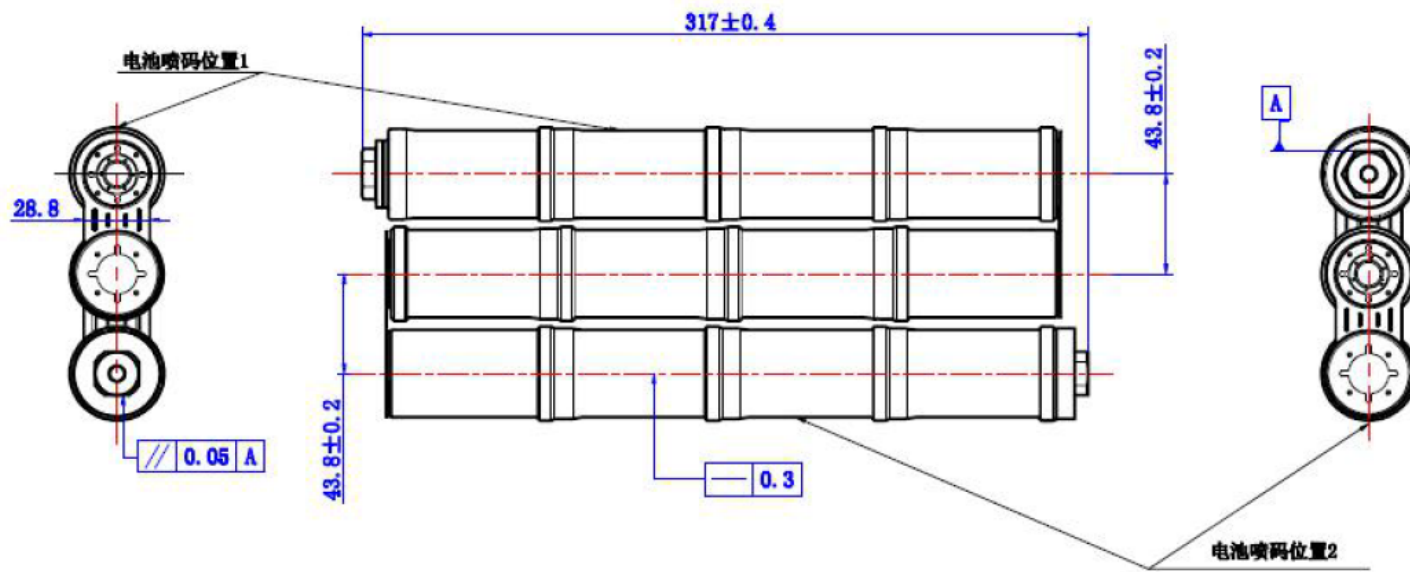
1. When charging the battery, please charge in accordance with the charging method in the technical manual. use the specified charger in the specified temperature range. Do not reverse charge, do not exceed the required charging current, and do not exceed the required charging time. 电池在充电使用时，请按照技术手册中的充电方法充电。要在指定的温度范围内，采用指定的充电器充电，不要正负极颠倒充电、不要超过规定的充电电流、不要超过规定的充电时间。
2. Do not charge only with limited voltage and limited current. 严禁只采用限压限流方式充电。
3. Do not put the battery into the fire or heating it. 禁止将电池投入火中或对其进行加热。
4. Do not connect the positive and negative pole with conductive substances such as metals. 禁止使用金属等导电物质将电池正负极直接相连。
5. Do not dissect the battery. 禁止解剖电池。
6. Do not refit or damage batteries. 禁止改装或损坏电池。
7. Do not solder battery. 禁止锡焊电池。
8. Do not contacting the battery with water, sea water, or other oxidants. 避免将电池与水、海水或其它氧化剂接触。

9. Do not hit, puncture or shock battery.禁止撞击、硬物刺或震荡电池。
10. Do not use batteries inconsistent with the equipment.禁止使用与设备不符的电池。
11. The inside strong alkali with high corrosiveness may burn people. If alkali is hitting eyes, skin or clothing, please drastically clean it with tap water or other clean water and get medical treatment straight away.电池内部的强碱液，有很强的腐蚀性，会灼伤人体。若碱液接触眼睛、皮肤或衣服，请立即使用大量的自来水或其它干净的水源彻底地清洗，并及时就医。
12. If the battery does not work properly in the equipment, please refer to the equipment warning and use manual.若电池在设备中不能正常工作，请查阅设备警告事项及使用手册。
13. When the battery is out of use, please make sure the switch is off, otherwise, it may cause leakage. When the battery is not used for a long time, make sure the battery is open circuit that the positive and negative poles are completely disconnected from other devices. When the battery with the charging device is in storage, ensure that the static current of the charging device is very small (recommended less than 5 μ A) , prevent the loop of the battery and the charging device. The battery be over discharged for a long time shall result in liquid leakage, disable to charge, and it is difficult to restore the performance.设备停止使用电池时，请确保开关关闭，否则可能会造成漏液。当电池长期不使用，必须将电池正负极两端与其它设备完全断开，保证电池开路搁置。带有充电装置的电池在储存时，必须保证充电装置的静态电流很小（推荐小于 5 μ A），防止电池与充电装置形成回路，电池长期过放电，造成漏液、充不进电、性能难以恢复。
14. Battery mixing is strictly prohibited neither with different charged states for the similar batteries nor for a dry cell, other battery of different sizes, or brands.严禁新旧不同或荷电态不同的同类电池混用。严禁与干电池或其他不同容量、型号或品牌的电池混用。
15. When two or more similar batteries are used together, the state must be the same.两组或以上的同类电池一起使用时，必须保证它们状态相同。

16. Stop using the new battery immediately if it is found to be alkaline, fever or other abnormalities occur. Please wipe it with a soft dry cloth if there is dirt in the battery. Prevent battery from contact with equipment, leakage or useless. 若发现新电池爬碱、发热或其他异常发生，立即停止使用。若电池两极有脏物，请用柔软的干布擦拭干净，防止电池与设备接触不良、漏电或不能使用。
17. Batteries must be stored or used in a specified, dry, heat dissipating environment.(According to the specification, the long-term storage temperature of the battery is $-20^{\circ}\text{C}\sim 35^{\circ}\text{C}$). Storage or use of batteries should be placed in an special area. No other articles around, especially flammable or explosive articles. 必须在指定的、干燥的散热环境下储存或使用电池（按照规格书说明，电池长期储存的温度是 $-20^{\circ}\text{C}\sim 35^{\circ}\text{C}$ ）。储存或使用电池要有专区摆放，周围不得存放其他物品，尤其是易燃或易爆物品。
18. No baby or child is allowed to remove the battery from the charger or equipment. during charging or use. 在电池充电或使用过程中，严禁让婴儿或儿童将电池从充电器或设备中移走。
19. Batteries do not use for a long time, need to activate 1 times every 3 months; activation methods need to communicate with manufacturers. 电池长期不使用时，每隔 3 个月需激活 1 次；激活方法需与厂商进行沟通

*** Note: If the above regulations are violated, battery leakage, fever, explosion, fire, battery performance degradation or shortened life may occur.**

*** 注：若违反以上规定，可能造成电池漏液、发热、爆炸、起火、电池性能下降或寿命缩短。**



说明:

- 1、每组模块喷两个相同的码。
- 2、喷码位置：每组模块朝上及朝下靠正、负极端子第二节电池。