

SPECIFICATION FOR APPROVAL

承 认 书

客户 / CUSTOMER	:	_____
客户型号 / CUSTOMER P/N	:	_____
产品名称 / ITEM	:	DC 12槽0.5A镍氢LCD充电器/ DC 12-slot 0.5A NI-MH LCD Charger
产品种类 / DESCRIPTION	:	槽 充 slot charger
本公司产品型号 / OUR MODEL NO.	:	CH-RMH280-02
标准 / STANDARD	:	_____
额定 / RATING	:	I/P:DC 12V 1.5A
		O/P AA :DC1.2V 2000mA×0.25×4CHs×3groups
	:	O/P AAA :DC1.2V 1000mA×0.25×4CHs×3groups
备注 / REMARKS		_____

注意:在贵司出单前,请确认签回以下项目/ Attention: Before placing orders, please confirm to sign back the followings:

- ☐ 产品规格(首页) /Production Spec(Front Page)
☐ 铭牌规格(如有) /Nameplate Spec(if any)
☐ 包装规格(如有)/Packing Spec(if any)

版本 REV	描述/DESCRIPTION	日期 DATE
1	初版/FIRST RELEASE	2014-05-16
2	增加低温保护/ADD LOW TEMPERATURE PROTECTION	2017-02-27

瑞鼎电子/ Ryder Electronics	
	批准/ Approved by
签名 Signature	谭溪安
日期/DATE	2017-02-27

客户/ CUSTOMER	
确认	
Approved by	
(签字或公司盖章)	
日期/DATE	

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CH-RMH280-02	JE-KF-GGS-121	A1	刘君斌	彭荣忠	PAGE 1/10

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1 产品特点Product characteristics

1. 本充电器是一款 12 通道 PWM 开关型快速充电器，采用单片机智能控制。能精确的判断电池状态，控制充电质量，确保不欠充和过充。It is a 12-slot PWM switching model quick charger with intelligent single chip microcomputer control. With accurate detection of battery's status, each channel can control charging quality to prevent insufficient charge and overcharge.
2. 12 槽独立充电，AA 与 AAA 电池可混充。12 slots charging separately. AA/AAA battery can be mixed to charge.
3. 本充电器适用于 1.2V AA/AAA 镍氢/镍镉电池。This charger is suitable for 1.2V AA/AAA NI-MH battery and NI-CD battery.
4. 恒电流充电模式， $-\Delta V$ 检测，确保对电池快速充电。Constant current charging model, $-\Delta V$ detection, quick charge.
5. 8 小时充电安全时间限制，确保使用安全。Limitation of 8 hours charging time for safety
6. 接入 DC 电源，正确放入电池即可充电，使用非常方便。Convenience with DC connection and correct battery placing.
7. 具有电池(外壳结构)反接保护功能，确保充电器及电池在误操作（接反）的情况下不会损坏充电器及电池。Battery reverse protection function (shell mechanism), to make sure that battery or charger will not be damaged under the condition of reverse.
8. 大屏幕 LCD 指示充电状态，显示高档直观。LCD display.
9. 配宽电压输入电源适配器，适应全球电压，使用非常方便。Input voltage: 100-240V AC 50/60Hz
10. 温度保护功能，低于 0 度不充电，高于 55 度不充电。Temperature protection. Normal charge in temperature range: $0^{\circ} - 55^{\circ} \text{C}$
11. AA/AAA 电池可以混充，镍氢和镍镉电池也可以混充，可以任意放置。AA/AAA battery can be mixed to charge, NI-MH battery and NI-CD battery also can be mixed to charge.

注意：请不要拿 1.2V AA/AAA 镍氢/镍镉以外的电池及电池包和本充电器连接充电，本规格书所提及的所有电池均指 1.2V AA/AAA 镍氢/镍镉电池。

Caution: this spec and charger are only suitable for 1.2V AA/AAA NI-MH battery and NI-CD battery.

2 电气性能Electrical Specification

2.1 输入特性Input characteristics

2.1.1 适配器输入电压 Input voltage of adapter

输入电压 Input voltage:

AC 100V~240V 50Hz/60Hz

2.1.2 充电器输入电压 Input voltage of charger

额定输入电压及频率 Rated Input Voltage And Frequency:

DC 12V

额定输入电流 Rated Input Current:

在额定输入电压及正常充电的情况下，输入电流小于 2.0A。

In the condition of normal charging with rated input voltage, the input current is lower than 2.0A.

2.1.3 可充电电池电压范围 The range of charging voltage

电池超出此电压范围将不能充电 Normal range of charging voltage:

0.4-1.6V。

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电池电压低于 0.8V 用涓流充电（额定充电电流的 1/10），超过 0.8V 用额定充电电流充电。

Charging with trickle current (about 1/10 of rated current) when battery's voltage is lower than 0.8V; Charging with rated current when battery's voltage is higher than 0.8V.

2.2 输出特性 Output characteristics

2.2.1 空载电压 No-load Voltage

空载电压 No-load Voltage: 0v

2.2.2 额定充电电流: (正常充电条件下) Rated charging current : (under normal charging condition)

额定充电电流 Rated charging current:

2.0A $\times 0.25 \pm 15\%$ (0.25 duty cycle) & AA channel $\times 4$ CHs $\times 3$ groups

额定充电电流 Rated charging current:

1.0A $\times 0.25 \pm 15\%$ (0.25 duty cycle) & AAA channel $\times 4$ CHs $\times 3$ groups

2.2.3 涓流充电电流 Trickle charging current

涓流充电电流 Trickle charging current:

2.0A $\times 0.025 \pm 15\%$ (0.025 duty cycle) & AA channel $\times 4$ CHs $\times 3$ groups

涓流充电电流 Trickle charging current:

1.0A $\times 0.025 \pm 15\%$ (0.025 duty cycle) & AAA channel $\times 4$ CHs $\times 3$ groups

2.2.4 充电方式 Charging method

采用恒流充电方式 Constant current charging

2.2.5 - ΔV 检测精度- ΔV Detection accuracy

- ΔV 检测精度- ΔV Detection accuracy: $\leq 9\text{mV}$

2.2.6 放电特性 Discharge Characteristics

放电电流 Discharge current:

根据电池电压和电池个数的不同，放电电流会在 0 到 800mA 之间。

Due to the battery's voltage and difference of battery's number, the discharge current will be range from 0mA to 800mA.

放电停止条件 The stop condition of discharge:

充电器上全部电池电压放至低于 1.0V 后,转入充电状态。

If all batteries discharge to 1.0V, charger will turn to charging status.

2.2.7 电池反接保护 Battery reverse protection

充电器反接保护电流 Reverse protect current: 0 (结构防反接)

(Reverse protection by shell mechanism)

2.2.8 输出反向漏电流 Output reverse leakage current

当无 DC12V 输入时，充电器输出反向漏电流: $\leq 10\text{mA}$,以保持已充入电池的电量。Without DC12V input, charger's output reverse leakage current: $\leq 10\text{mA}$, to maintain power which had input to the battery

2.2.9 最长充电时间限制 The maximum charging time limitation

在放入电池开始充电起计时，8 小时后无论是否充电完成，充电器将停止充电，保证电池安全，即最长充电时间限制 8 小时。The charger will stop charging since the battery was placed in charger for 8 hours no matter whether battery was fully charged or not.

2.2.10 温度保护功能，低于 0 度不充电，高于 55 度不充电。

Temperature protection. Charger will not charge battery beyond the range: $0^{\circ} \sim 55^{\circ} \text{C}$

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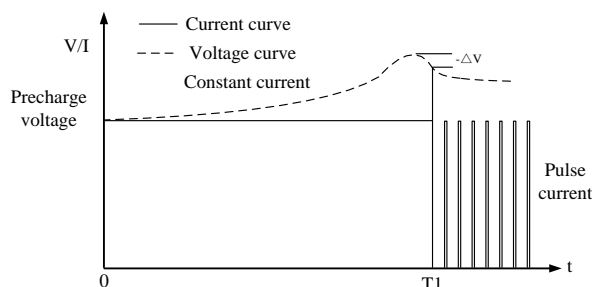
2.2.11 适用电池 Suitable Battery

本充电器适合 1.2V NI-MH/NI-CD AA/AAA 电池

This charger is suitable for 1.2V NI-MH/NI-CD AA/AAA battery.

3 充电方式及LCD 指示状态 Charge method and LCD Indication

3.1 充电器输出特性曲线 Output Characteristics Curve



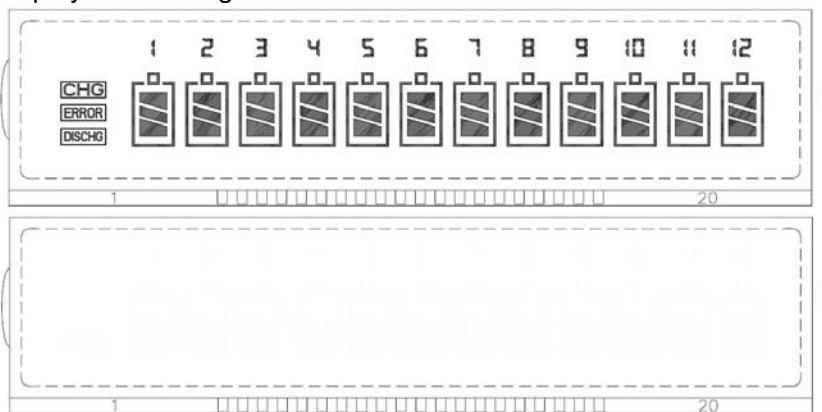
T0-T1: 恒流充电阶段,在此阶段,检测电池的 $-\Delta V$,当检测到 $-\Delta V$ 时,就会转入充饱阶段,指示灯满格,指示充饱状态。Constant current charge period. In this period, charger detects battery's $-\Delta V$. when $-\Delta V$ was detected, it turns into fully charged period that LCD indicate the battery is fully charged.

T1- : 充饱阶段,充电器转入脉冲涓流状态(占空比约: 10%)。Fully charged period. Charger turns into pulsed trickle current charging(duty cycle : aprx 10%).

3.2 LCD指示 LCD Indication

3.2.1 开机启动 LCD 显示状态 LCD indication during start-up.:

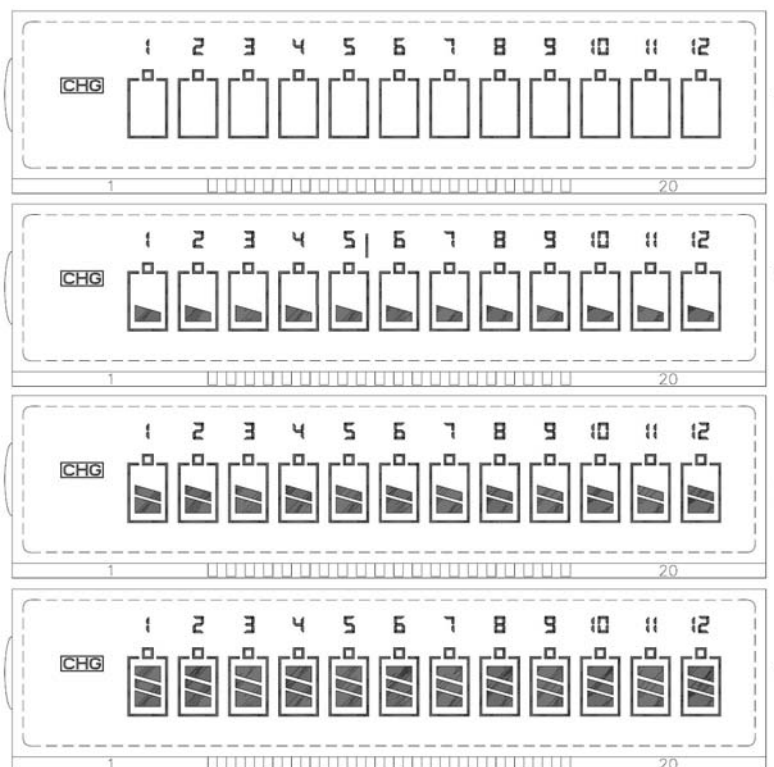
充电器连接通电,背光 LED 灯亮 6 秒,空载状态 LCD 屏和背光 LED 熄灭。When charger was connect to power supply, the backlight LED will light for 6 seconds. The LCD display and backlight LED will turn off in no-load status.



3.2.2 电池充电状态 Charge :

放入电池时,其 LCD 显示对应电池槽位电池容量格数,同时 CHG 充电指示亮起,电池容量格上下跳动显示指示充电状态 When the battery was put into the charger, the LCD displays the power capacity of battery corresponding to the battery slot, while the CHG charging indicator light up, and the battery capacity is dynamically displayed to indicate the

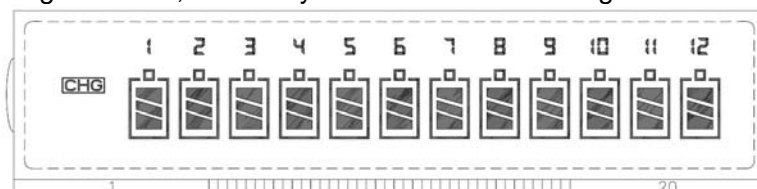
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charging state.

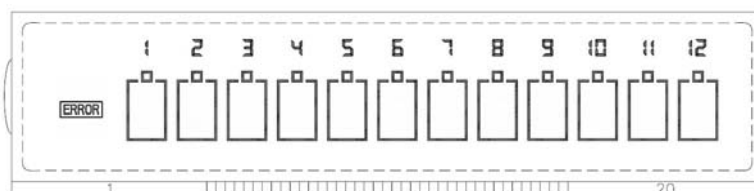
3.2.3 电池饱和状态 Fully charged:

当对应槽位电池容量充电饱和时，其 LCD 屏电池容量指示格满屏指示并不再上下闪烁充电，CHG 仅指示涓流充电。When battery is fully charged, the corresponding LCD indicator no longer in flash, CHG only indicates a trickle charge.



3.2.4 电池出错状态 Error:

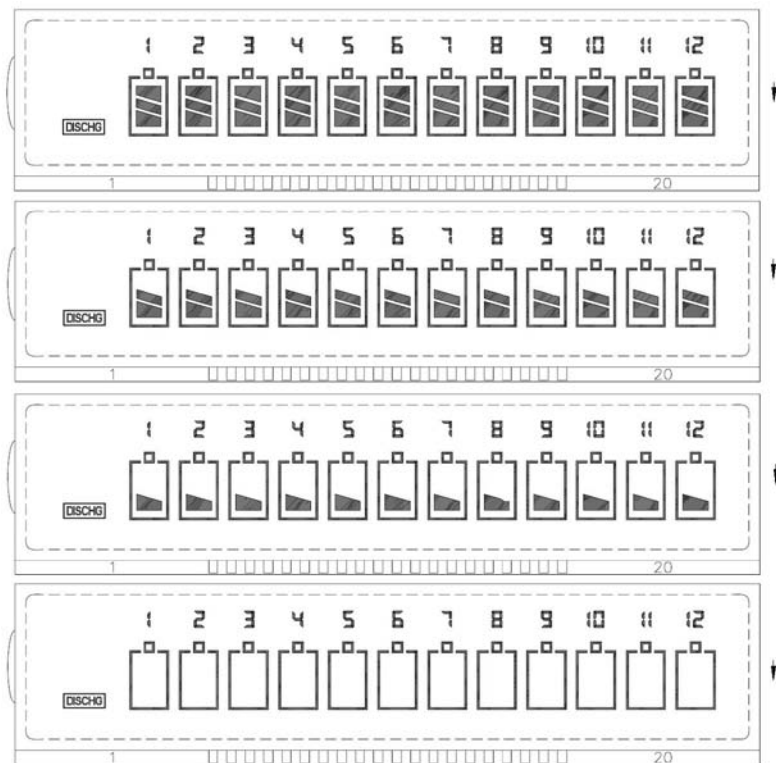
对应电池槽放入电池短路或为碱性电池时，约 5 秒钟后 LCD 屏 ERROR 错误指示显示。If the placed battery occur short circuit or battery is alkaline battery, the corresponding LCD indicates ERROR about 5 seconds later.



3.2.5 电池放电状态 Discharge:

放入电池时，按 DISCHG 键 1 秒钟，进入放电状态，其 LCD 显示对应电池槽位电池容量格数，同时 DISCHG 充电指示亮起，电池容量格上下跳动显示指示放电状态。Place the battery in charger, press the DISCHG button for 1 second, the corresponding LCD indicator and DISCHG will light up at the same time. The battery capacity is dynamically displayed to indicate the discharging state

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4 适用环境Applicable Environments

4.1 工作温度Working temperature

Working temperature: 0~+40℃

4.2 工作湿度Working humidity

Working humidity ≤90% （不结露 No condensation）

4.3 贮存温度Storage temperature

Storage temperature: -20~+80℃

4.4 存储湿度Storage humidity

Relative humidity ≤85%

4.5 大气压力Atmospheric pressure

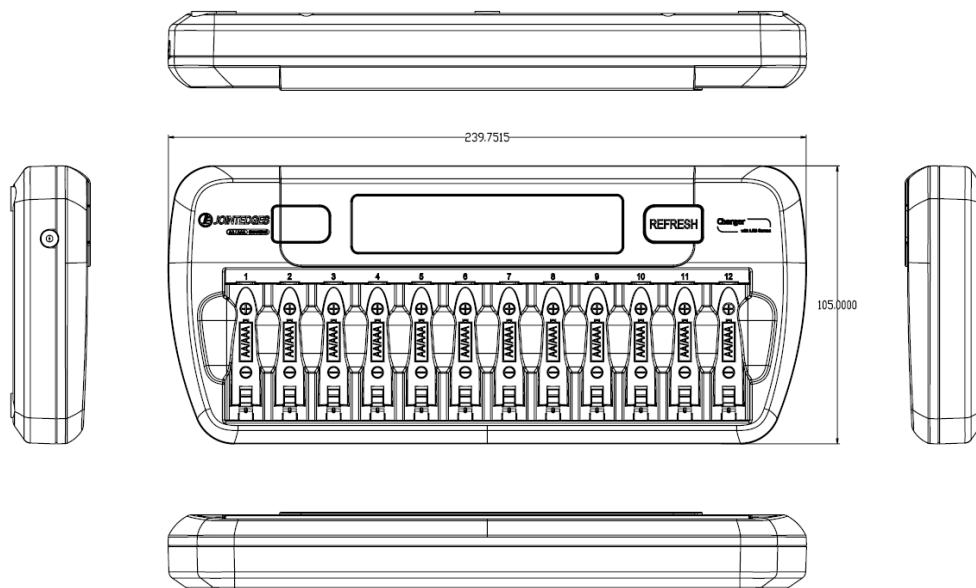
70~106KPa

5 机械Mechanics

5.1 外观图 Appearance

具体外观颜色及印字可按客户要求定制 The appearance and print can be customized

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5.2 输入AC插头Input AC Plug

美规墙插式 US standard, wall insert

5.3 铭牌标贴Charger Label

按客户要求订制 Charger label can be customized

6 可靠性能Reliable Performance

1. 高温试验：实验温度为 $65^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ，产品不包装，持续时间为 5 小时。在常温下放置待恢复后对其外观、绝缘强度、指示功能及电气性能进行重新测试，外观应平整无划痕、毛刺以及其它机械损伤，外露金属部分不应有锈蚀，绝缘测试无击穿、飞弧现象，LCD 指示功能及电气性能正常。

High temperature test: under $65^{\circ}\text{C} \pm 2^{\circ}\text{C}$, the charger without packing, last for 5 hours. Then take it into the room temperature, test its appearance, LCD and electrical specification. The appearance should have no scratches, burrs and other mechanical damage, metal parts rust should have no corrosion. Insulation test has no breakdown or arcing phenomenon. LCD indication function and electrical performance work normally

2. 低温试验：实验温度为 $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ，产品不包装，持续时间为 8 小时。在常温下放置待恢复后对其外观、绝缘强度、指示功能及电性能进行重新测试，外观应平整无划痕、毛刺以及其它机械损伤，外露金属部分不应有锈蚀，绝缘测试无击穿、飞弧现象，LCD 指示功能及电气性能正常。

Low temperature test: under $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$, the charger without packing, last for 8 hours. Then take it into the room temperature, test its appearance, LCD and electrical specification. The appearance should have no scratches, burrs and other mechanical damage, metal parts rust should have no corrosion. Insulation test has no breakdown or arcing phenomenon. LCD indication function and electrical performance work normally

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3. 恒定湿热试验: 实验温度为 $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$, 湿度为 90%~95%, 产品不包装, 持续时间为 48 小时。测试后对其外观、绝缘强度、指示功能及电性能进行重新测试。外观应平整无划痕、毛刺以及其它机械损伤, 外露金属部分不应有锈蚀, 绝缘测试无击穿、飞弧现象, LCD 指示功能及电气性能正常。
The constant humidity and heat test: under $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$, humidity 90%~95%, the charger without packing, last for 48 hour. Then test its appearance, LCD and electrical specification. The appearance should have no scratches, burrs and other mechanical damage, metal parts rust should have no corrosion. Insulation test has no breakdown or arcing phenomenon. LCD indication function and electrical performance work normally
4. 振动试验: 频率为 10~55HZ, 振幅为 0.35mm, 每个方向上扫频循环次数为 10 次。实验后对其外观、绝缘强度、指示功能及电性能进行重新测试。外观应平整无划痕、毛刺以及其它机械损伤, 外露金属部分不应有锈蚀, 绝缘测试无击穿、飞弧现象, LCD 指示功能及电气性能正常。
Vibration test: 10~55HZ, amplitude 0.35mm, Sweep cycles in each direction 10 times. Then test its appearance, LCD and electrical specification. The appearance should have no scratches, burrs and other mechanical damage, metal parts rust should have no corrosion. Insulation test has no breakdown or arcing phenomenon. LCD indication function and electrical performance work normally
5. 跌落试验: 高度为 1 米, 实验台厚度为 20mm 的硬木板, 6 个表面, 每个方向 1 次。实验后对其外观、绝缘强度、指示功能及电性能进行重新测试。产品内部无异响, 外观无机械破损, 外露金属部分不应有锈蚀, 绝缘测试无击穿、飞弧现象, LCD 指示功能及电气性能正常。
Drop test: from 1M, the test platform is the hardboard with 20mm thickness. 6 surface, once in each direction. Then test its appearance, Dielectric strength, LCD and electrical specification. The appearance should have no damage, no abnormal noise inside; metal parts rust should have no corrosion. Insulation test has no breakdown or arcing phenomenon. LCD indication function and electrical performance work normally

7 外观要求 Appearance Requirement

充电器外壳表面平整无划痕, 毛刺及其它机械损伤, 丝印完整清晰, 外露金属部份无锈蚀。

Charger case should be smooth and have no scratches, burrs and other mechanical damage, complete and clear screen, the exposed metal parts has no rust

8 体积与重量 Volume And Weight

8.1 体积 Volume

L 239.7* W 105* H 30 mm³

8.2 重量 Weight

Net : 120g

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9 抽样标准Sampling Standard

产品抽样检验参照 MIL-STD-105E 标准制定满足本公司产品品质检验之抽样计划，并严格督导实施。
当客户或合同有特殊要求时。可按客户和合同要求执行。

Product sampling reference MIL-STD-105E standards to meet the company's products quality inspection of the sampling plan, and implement strict supervision. Standard also can be based on the customer's requirement.

10 包装Packing

产品可配套吸塑包装，具体包装方式可按客户要求订制。

Product can be packed with blister. Packing can be customized

11 使用注意事项Caution

1. 不可以拿本充电器适配 1.2V AA/AAA NI-MH 以外的电池。

Only suitable for 1.2V AA/AAA NI-MH battery.

2. 不可在超过 40℃环境使用本充电器对电池充电；建议在 35℃以下的环境下充电，电池在充足的时候有轻微的发热，属正常现象，请放心使用。

Do not use the charger to charge when temperature is over 40℃, temperature below 35℃ is recommended. It is normal that there is some heat when battery was fully charged.

3. 为了安全，建议使用 TENERGY 公司的 1.2V AA/AAA NI-MH 电池。

For safety, 1.2V AA/AAA NI-MH battery made by TENERGY Co.,Ltd is recommended to use.

4. 充电时远离热源和火源。

Far away from heat and fire

5. 不得在酸、碱、和有腐蚀的环境中使用本充电器及电池。

Do not use the charger under the environment of acids, alkalis, and corrosion

6. 不得让充电器进水或淋雨，以免引起安全问题。

Do not place the charger into rain or water, or may cause problems

7. 不得拆解充电器和电池，以免引起危险。

Do not disassemble charger and battery, to avoid danger

8. 不得让小孩单独使用本充电器。

Do not let children use the charger alone

9. 当电池长时间放置不用后再次使用时，可能会出现假象- ΔV 现象，导致充电器误判而停止充电，出现此情况后，请对电池反复充电、放电几次后即可修复或部分修复。

When the battery is not in use for a long time, there may be false $-\Delta V$ phenomenon, resulting in wrong detection and stop charging. In this case, please repeatedly charge and discharge the battery for a few times.

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