

## SPECIFICATION FOR APPROVAL

### 承 认 书


客户 / CUSTOMER	:	_____
客户型号 / CUSTOMER P/N	:	_____
产品名称 / ITEM	:	7-8串镍氢电池美规充电器/7-8 series nickel-hydrogen battery US standard charger
产品种类 / DESCRIPTION	:	线充
本公司产品型号 / OUR MODEL NO.	:	CH-RMH071-01
标准 / STANDARD	:	_____
额定 / RATING	:	I/P:AC 100V~240V 50HZ/60HZ O/P:DC 16V0.6A
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)

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日期/DATE	2019-01-28

客户/ CUSTOMER
确认
APPROVED BY

(签字或公司盖章)
日期/DATE

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## 1 产品特点 Features:

- 1.1. 本充电器是一款智能型镍氢电池包专用充电器，使用微电脑芯片控制，- $\Delta V$  检测功能，确保充电的质量及安全。This charger is a special charger for intelligent Ni-MH battery pack. It uses microcomputer chip control and  $-\Delta V$  detection function to ensure the quality and safety of charging.
- 1.2. 适应 7 至 8 串镍氢电池包充电；适合 600-2500mAh 的电池快速充电。Adapt to 7 to 8 string Ni-MH battery pack charging; suitable for 600-2500mAh battery fast charging.
- 1.3. 恒电流充电，- $\Delta V$  检测，确保电池快速充电及电池充电的饱和度 $\geq 80\%$ 。Constant current charging,  $-\Delta V$  detection, to ensure fast battery charging and battery charging saturation  $\geq 80\%$ .
- 1.4. 5 小时充电安全时间限制，确保使用安全。5-hour charging safety time limit to ensure safe use
- 1.5. 电池自动识别功能，能识别电池及好坏，对电池以外的其它负载将自动停止充电。The battery automatic identification function can identify the battery and its quality, and will automatically stop charging other loads than the battery.
- 1.6. 具有唤醒功能，当电池电压低于正常电压值时，用 0-300mA 的斜坡电流去唤醒电池。With wake-up function, when the battery voltage is lower than the normal voltage value, use 0-300mA ramp current to wake up the battery.
- 1.7. 充电时只需将充电器的两个输出端和电池包正、负极正确连接，接入 AC 电源即可；使用非常方便。When charging, just connect the two output terminals of the charger and the positive and negative terminals of the battery pack correctly, and connect to the AC power supply; it is very convenient to use.
- 1.8. 具有电池反接保护功能，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；注意请不要长时间反接电池充电。With reverse battery protection, it ensures that the charger and battery will not damage the charger and battery under the Incorrect operation(reverse); please do not reverse the battery for a long time.
- 1.9. 双色发光二极管指示充电状态，显示直观。The two-color LED indicates the state of charge and the display is intuitive.
- 1.10. 宽电压 AC 输入,100-240VAC 50/60Hz,适应全球。Voltage AC input,100-240VAC 50/60Hz,Global use

注意：请不要拿本充电器充适应范围以外的其它电池及电池包，本规格书所提及的所有电池及电池包均指 7-8 串的镍氢电池组。

**Note: Please do not use this charger to charge other batteries and battery packs outside the scope. All batteries and battery packs mentioned in this specification refer to 7-8 series Ni-MH battery packs.**

## 2 电气性能 Electrical Characteristics

### 2.1 输入特性 Input characteristics

#### 2.1.1 输入电压 Input voltage

输入电压范围 Input voltage range: 100-240VAC 50/60Hz

#### 2.1.2 输入电流 Input Current

额定工作电流 Rated operating current:  $\leq 200\text{mA}$

#### 2.1.3 浪涌电流 Inrush current:

浪涌电流 Inrush current: 30A MAX

#### 2.1.4 最大漏电流 Maximum leakage current

最大漏电流 Maximum leakage current:  $\leq 0.25\text{mA}$

#### 2.1.5 启动延迟时间 Start delay time

接入市电时，启动延迟时间 When accessing the mains, Start delay time:  $\leq 3\text{S}$

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## 2.2 输出特性 Output characteristics

### 2.2.1 充电电压范围 Charging voltage range

充电电压范围 Charging voltage range: 8.4V-12V (最大可充电电压范围 Maximum chargeable voltage range)

### 2.2.2 额定充电电流 Rated charging current: (正常充电条件下 Under normal charging conditions)

额定充电电流 Rated charging current: 600 ±60mA

### 2.2.3 输出空载电压 Output no-load voltage:

输出电压 output voltage: 16±1V

### 2.2.4 调整率 Adjustment rate:

输出调整率 Output adjustment rate: ≤5%

### 2.2.5 充电方式 charging method

采用恒流充电方式 Constant current charging

### 2.2.6 涓流电流 Turbulent current(正常充电条件下 Under normal charging conditions)

涓流电流 Turbulent current: 200mA ±20%

### 2.2.7 输出短路电流 Output short circuit current

当输出端短路时，充电器会出现无充电电流输出，红色指示灯闪烁；When the output is short-circuited, the charger will have no charging current output and the red indicator light will flash;

短路排除，充电器自动进入充电状态。The short circuit is removed and the charger automatically enters the charging state.

### 2.2.8 反灌电流 Reverse current

充电器反灌电流 Reverse current: ≤2mA (当无市电输入时 When there is no mains input)

### 2.2.9 反向保护电流 Reverse protection current

充电器具有反接保护功能：当电池接反时，充电器自动保护，不会损坏充电器。The charger has a reverse connection protection function: when the battery is reversed, the charger automatically protects the charger from damage.

注意：不要将充电器长时间反接充电。Note: Do not recharge the charger for a long time.

充电器反向保护电流 Reverse protection current: ≤100mA。

### 2.2.10 停止充电的条件

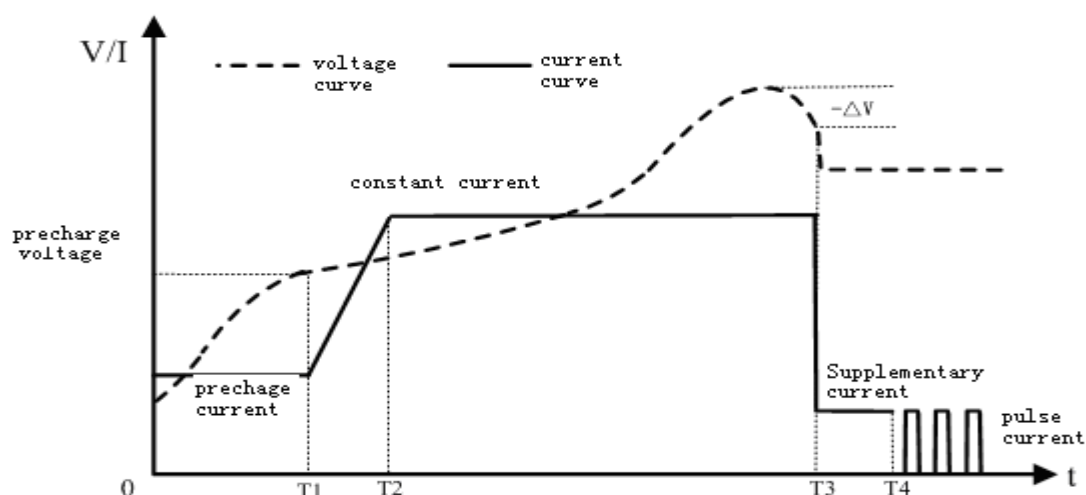
当电池充满时出现-△，当-△V 为 20-40mV 时，停止充电；When the battery is full, -△ occurs, when -△V is 20-40mV, the charging is stopped;

当安全充电时间≥5 小时，停止充电。When the safe charging time is ≥ 5 hours, stop charging.

当电池电压大于 13.5V 时，停止充电。When the battery voltage is greater than 13.5V, the charging is stopped.

### 2.2.11 充电输出特性图 Charging output characteristic diagram

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T0-T1: 唤醒阶段, 当电池包的电压 $\leq 7V$ 时, 充电器将会用 0-300mA 的斜坡电流去唤醒电池。During the wake-up phase, when the voltage of the battery pack is  $\leq 7V$ , the charger will wake up the battery with a ramp current of 0-300mA.

T1-T2: 电流上升阶段, 当电池包的电压 $\geq 8V$ 时, 充电器将会从唤醒状态转换为电流上升状态。在此阶段, 电流上升到恒流充电电流; 600mA  $\pm 10\%$  电流给电池充电。During the current rise phase, when the voltage of the battery pack is  $\geq 8V$ , the charger will change from the awake state to the current rising state. At this stage, the current rises to a constant current charging current; 600 mA  $\pm 10\%$  current charges the battery.

T2-T3: 恒流充电阶段, 在此阶段, 检测电池的 $-\Delta V$ , 当检测到 $-\Delta V$ 为 20-40mV 时, 就会转入充饱阶段。就会转入充饱阶段; 在由红灯转为绿灯, 指示充饱状态。In the constant current charging phase, at this stage, the  $-\Delta V$  of the battery is detected, and when the  $-\Delta V$  is detected to be 20-40 mV, it is transferred to the filling phase. It will be transferred to the fullness phase; it will turn to a green light from the red light to indicate the full state.

T3-T4: 充饱阶段, 红色充电指示灯就会熄灭, 绿灯亮起。充电器转入 300 mA 将进一步补充电池容量, 充电时间大约 2 分钟, 在转为脉冲涓流电流。During the full charge phase, the red charge indicator will go out and the green light will illuminate. Transferring the charger to 300 mA will further supplement the battery capacity, charging time is about 2 minutes, and it is converted to pulse turbulent current.

T4-: 涓流阶段, 平均电流 200mA $\pm 20\%$  Turbulent phase, average current 200mA  $\pm 20\%$

#### 2.2.12 适用电池 Applicable battery

本充电器适用于 7 至 8 串联镍氢电池组充电。This charger is suitable for charging 7 to 8 series Ni-MH battery packs.

## 3 电池放置及 LED 指示状态 Battery placement and LED indication status

### 3.1 电池放置 Battery placement

将 7 至 8 串联镍氢电池正负极与充电器对接, 充电器自动识别有电池接入后, 并开始充电; The positive and negative poles of the 7 to 8 series nickel-hydrogen battery are docked with the charger, and the charger automatically recognizes that the battery is connected and starts to charge;

### 3.2 LED 指示 LED indication

不接电池 Not connected battery 充电指示灯—红灯闪烁 Charging indicator—Red light flash

充电状态 Charging status 充电指示灯—红灯常亮 Charging indicator—Red light is always on

充饱状态 Full state 充电指示灯—绿灯常亮 Charging indicator—Green light is always on

输出短路 Output short circuit 充电指示灯—红灯闪烁 Charging indicator—Red light flash

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## 4 符合安规标准 Compliance with safety standards

EN603035

UL1310

## 5 适用环境 Applicable environment

5.1 工作温度 Working temperature:

在 0~+40℃

5.2 工作湿度 Working humidity

工作湿度 Working humidity: ≤90% (不结露 no condensation)

5.3 贮存温度 Storage temperature

贮存温度 Storage temperature: -20~+80℃

5.4 存储湿度 Storage humidity

相对湿度 relative humidity: ≤85%

5.5 大气压力 Atmospheric pressure

大气压力 Atmospheric pressure: 70~106KPa

## 6 安全要求 Safety requirements

6.1 抗电强度 Dielectric strength

初次级抗电强度≥3000VAC 50HZ/60HZ 正弦波有效值一分钟无击穿、飞弧现象, 漏电流≤10 mA

Primary and secondary electric strength ≥3000VAC 50HZ/60HZ, Sine wave without breakdown for one minute, arcing phenomenon, leakage current ≤10 mA

6.2 绝缘电阻 Insulation resistance

绝缘电阻 Insulation resistance ≥10MΩ(在 DC500V 条件下)

## 7 机械 mechanical

7.1 外观图 Appearance:

外壳颜色: 实际外观颜色或印字内容按客户订制

Shell color: actual appearance color or printed content customized by customer

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## 7.2 输入线材与 AC 头标准 Input wire and AC head standard

具体 AC 头标准及线材规格可按客户要求订制 Specific AC head standards and wire specifications can be customized according to customer requirements

## 7.3 输出线材 DC 极性要求 Output wire DC polarity requirements

具体 DC 插头标准及线材标准按客户要求订制 Specific DC plug standard and wire standard are customized according to customer requirements

## 7.4 铭牌标贴 Nameplate label

具体内容按客户要求订制 The specific content is customized according to customer requirements.

# 8 可靠性能

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；成品电性能正常；LED 指示功能正常。

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, LED 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 .LED indication function and electrical performance works 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；成品电性能正常；LED 指示功能正常。

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, LED 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. LED indication function and electrical performance works 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；成品电性能正常；LED 指示功能正常。  
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, LED 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. LED indication function and electrical performance works 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；成品电性能正常；LED 指示功能正常。  
Vibration test: 10~55HZ, amplitude 0.35mm, Sweep cycles in each direction 10 times. Then test its appearance, LED 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. LED indication function and electrical performance works 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，外观应无机械破损，外露金属部分不应有锈蚀；绝缘测试无击穿、飞弧现象；成品电性能正常；LED 指示功能正常；成品内部应无异响。  
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, LED 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. LED indication function and electrical performance works normally

## 9 外观要求 Appearance requirements

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 no rust

## 10 体积与重量 Volume And Weight

### 10.1 体积 Volume

Volume L 86 \* W 48\* H 53.5 mm<sup>3</sup>

### 10.2 重量 Weight

net: 120g

## 11 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。

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

## 12 包装 Packing

产品配套白盒/彩盒包装，具体包装方式可按客户要求订制. The product is packaged in white box/color box, and the specific packaging method can be customized according to customer requirements.

## 13 使用注意事项 Caution

1. 不可以拿本充电器充适应范围以外的电池。

Do not use this charger to charge the battery outside the range.

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 this charger to charge the battery in the environment above 40 °C; it is recommended to charge in the environment below 35 °C, the battery is slightly hot when there is sufficient, it is normal, please feel free to use.

3. 为了安全，建议使用 TENERGY 公司的 34 串镍氢电池包。

For safety, it is recommended to use TENERGY's 34-string Ni-MH battery pack.

4. 需保证温控探头与充电电池包正确接触。

It is necessary to ensure that the temperature control probe is in proper contact with the rechargeable battery pack.

5. 充电时请远离热源和火源。

Keep away from heat and fire when charging.

6. 请勿在酸、碱、和有腐蚀的环境中使用本充电器及电池。

Do not use the charger and battery in acid, alkali, or corrosive environments.

7. 请勿将充电器进水或淋雨，以免引起安全问题。

Do not put the charger into the water or rain to avoid safety problems.

8. 请勿自行拆开充电器和电池，以免发生危险。

Do not disassemble the charger and battery yourself to avoid danger.

9. 不得让小孩单独使用本充电器。

Do not allow the child to use the charger alone.

10. 当电池长时间放置不用后再次使用时，可能会出现假象- $\Delta V$  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 used again after being left unused for a long time, an artifact  $\Delta V$  phenomenon may occur, causing the charger to misjudge and stop charging. After this condition occurs, please recharge the battery repeatedly and discharge it several times to repair or partially repair it.

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