

SPECIFICATION FOR APPROVAL

承认书

客户 / CUSTOMER : _____

客户型号 / CUSTOMER P/N : _____

产品名称 / ITEM : 10-20节镍氢电池500mA充电器 10-20 Ni-MH Batteries 500 mA Charger

产品种类 / DESCRIPTION : 线 充/ Wire type charger

本公司产品型号 / OUR MODEL NO. : CH-RMH190-01

标准 / STANDARD : _____

额定 / RATING : I/P:AC 100V~240V 50Hz/60Hz


备注 / REMARKS : _____
(非认证普通版指定带温控线)

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 |
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| | 审核/Checked by |
| 签名 Signature | 衣绍鹏 |
| 日期/DATE | 2019-01-28 |

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| <p>客户/ CUSTOMER</p> <p>确认</p> <p>Approved by</p> <p></p> <p>(签字或公司盖章)</p> <p>日期/DATE</p> |
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1 产品特点 Product Characteristics

- 本产品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，- ΔV 检测功能，确保充电的质量及安全。This product is an intelligent nickel-hydrogen battery pack charger, which is controlled by a microchip, -V detection function to ensure the quality and safety of charging
- 适应 10 至 20 串镍氢电池包充电。Suitable for charging 10 to 20 series of Ni-MH battery packs
- 适合 4300-4500mAh 的电池快速充电。Fast Charging of Batteries Suitable for 4300-4500mAh
- 恒电流充电，- ΔV 检测，确保电池快速充电及电池充电的饱和度 $\geq 80\%$ 。Constant current charging, -V detection, to ensure rapid battery charging and battery charging saturation of more than 80%.
- 15 小时充电安全时间限制，确保使用安全。15-hour charging safety time limit to ensure safe use
- 具有电池自动识别功能，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。It has the function of automatic battery identification, which can identify the battery and its quality. It will automatically stop charging other loads besides the battery.
- 具有唤醒功能，当电池电压低于正常电压值时，用 10mA 电流去唤醒电池。With wake-up function, when the battery voltage is lower than the normal voltage value, use 10 mA current to wake up the battery.
- 充电时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, the two output terminals of the charger and the positive and negative poles of the battery pack are connected correctly and connected to AC power supply, which is very convenient to use.
- 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。It has the function of battery reverse connection protection to ensure that chargers and batteries will not damage chargers and batteries in the case of misoperation (reverse connection); be careful not to recharge batteries for a long time.
- 双色发光二极管指示充电状态，显示直观。Double-color light emitting diodes indicate charging status and display intuitively
- 宽电压 AC 输入，100-240V AC 50/60Hz 适应全球。Wide voltage AC input, 100-240V AC 50/60Hz adapted to the world
- 外置电池温度感应器，充电时请将温控传感器紧贴电池包，确保电池充电时的安全。External Battery Temperature Sensor. When charging, please attach the temperature sensor to the battery pack to ensure the safety of the battery when charging.

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 10-20 串的镍氢电池组。Note: Please do not use this charger to charge other batteries and battery packs beyond the scope of application. All batteries and battery packs mentioned in this specification refer to 10-20 series of Ni-MH batteries.

2 电气性能 Electrical Specification

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 working current: $\leq 0.7A$

2.1.3 浪涌电流：Surge current:

浪涌电流：Surge current 30A MAX

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2.1.4最大漏电流 Maximum Leakage Current

最大漏电流: Maximum Leakage Current ≤ 0.25 mA

2.1.5启动延迟时间 Startup Delay Time

接入市电时, 启动延迟时间: Start Delay Time When Accessing Market Power ≤ 3 S

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 10V-32V (最大可充电电压范围) (Maximum rechargeable voltage range)

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

充电电流: Charging current $0.5A \pm 10\%$ @CV=10V-32V

2.2.3输出空载电压: Output no-load voltage

输出电压: Output no-load voltage 37 ± 2 V

2.2.4充电方式 Charging Method

采用恒流充电方式 Constant current charging method

2.2.5涓流电流(正常充电条件下) Trickle Current (Normal Charging Conditions)

涓流电流: 50 mA 平均值(占空比=10%) Trickle current: 50 mA average (duty cycle = 10%)

2.2.6输出短路电流 Output Short Circuit Current

充电器短路电流: Charger Short Circuit Current 10 ± 5 mA 红色快闪 Red flash

短路排除, 充电器自动进入充电状态。 Short circuit elimination, the charger automatically enters the charging state.

2.2.7反灌电流 Reverse Irrigation Current

充电器反灌电流: Recharge Current of Charger ≤ 1 mA, (当无市电输入时) (When there is no market electricity input)

2.2.8 反向保护电流 Reverse Protection Current

充电器具有反接保护功能: Charger has reverse connection protection function 当电池接反时, 充电器自动保护, 不会损坏充电器, 注意: 不要将充电器长时间反接充电。 When the battery is connected back, the charger will be automatically protected and the charger will not be damaged. Note: Do not charge the charger back for a long time.

充电器反向保护电流: Charger reverse protection current ≤ 100 mA

2.2.9 充电方式及检测 Charging Mode and Detection

恒电压恒电流充电方式, $-\Delta V$ 及温度检测。 Constant Voltage and Constant Current Charging, $-\Delta V$ Temperature detection

当电池充足时出现 $-\Delta V$, 当 $-\Delta V$ 为 40-60mV 时; 及充电的电池包温度传感器 $\geq 58^\circ\text{C}$ 时,

将转为涓流充电。 Appear when the battery is $-\Delta V$, When $-\Delta V$ is 40-60 mV and the temperature sensor of the charged battery pack is above 58 C, It will be converted to trickle charging. Appear when the battery is $-\Delta V$

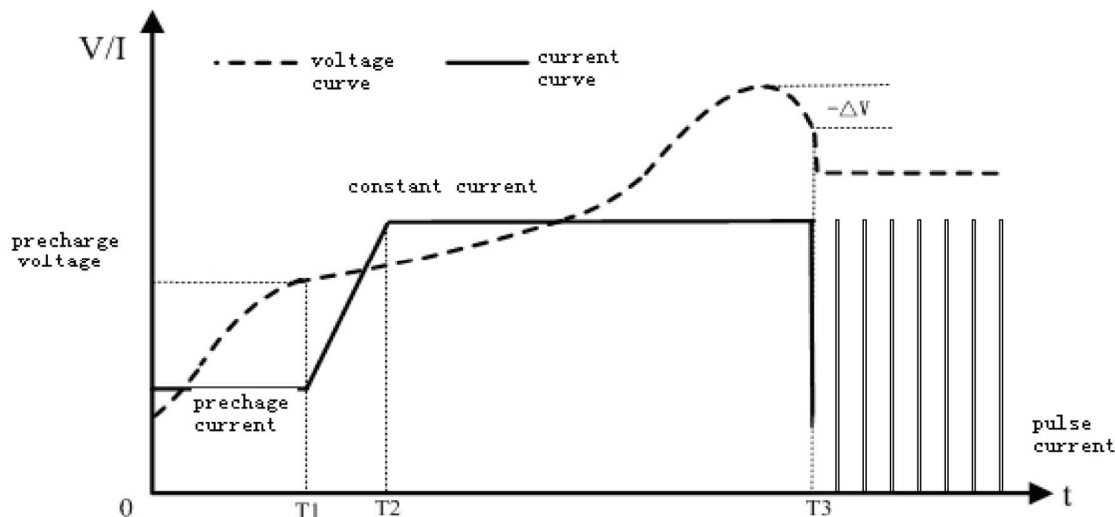
当充电时间大约 15 小时, 将转为涓流充电。 When the charging time is about 15 hours, it will be converted to trickle charging.

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当电池电压大于 32V 时, 停止充电。When the battery voltage is greater than 32V, stop charging.

当电池温度感应器检测温度 $> 60^{\circ}\text{C}$ 时停止充电。When the detection temperature of the battery temperature sensor is higher than 60°C , the charging is stopped.

2.2.10 充电输出特性图 Charging Output Chart



T0-T1: 唤醒阶段, 当电池包的电压 $\leq 10\text{V}$ 时, 充电器将会用 10mA 电流去唤醒电池。In the wake-up stage, when the voltage of the battery pack is less than 10V , the charger will use 10mA current to wake up the battery.

T1-T2: 电流上升阶段, 当电池包的电压 $\geq 10\text{V}$ 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 $500\text{mA} \pm 10\%$ 。In the current rising stage, when the voltage of the battery pack is more than 10V , the charger will change from the wake-up state to the current rising state. At this stage, the current rises to $500\text{mA} \pm 10\%$ of the constant current charging current

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 $40\text{--}60\text{mV}$ 时, 就会转入充电饱阶段; 在由红灯转为绿灯, 指示充电饱状态。Constant current charging stage; at this stage, the battery $-\Delta V$ is detected, when $-\Delta V$ is detected to be $40\text{--}60\text{mV}$, it will be transferred to full stage; at the red light to green light, indicating full state.

T3-; 充电饱阶段, 红色充电指示灯就会熄灭, 绿灯亮起。充电器转入涓流充电, 涓流电流平均值 $50\text{mA} \pm 10\%$ 。During the filling stage, the red charging indicator will be turned off and the green light will be on. The charger is charged by trickle current, and the average slip current is $50\text{mA} \pm 10\%$

2.2.11 适用电池 Applicable to batteries.

本充电器适用于 10 至 20 串 镍氢电池组充电。The charger is suitable for charging 10 to 20 series of Ni-MH batteries.

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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 10 至 20 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。
 Connect the positive and negative electrodes of 10-20 series Ni-MH batteries with the charger. The charger automatically identifies the batteries connected and starts charging.

3.2 LED 指示 LED Indicators

| | |
|--|--|
| 不接电池 No battery | 充电指示灯——绿灯闪烁 Charging Indicator - Green Light Flashing |
| 充电状态 Charging state | 充电指示灯——红灯常亮 Charging Indicator Lamp - Red Lamp always on |
| 充电指示灯——绿灯常亮 Charging Indicator Light - Green Light always on | |
| 输出短路 Output short circuit | 充电指示灯——红灯快闪 Charging Indicator-Red Flash |
| 电池反接 Battery reverse connection | 充电指示灯——红灯闪烁 Charging Indicator - Red Light Flashing |
| 非充电电池 Non-rechargeable battery | 充电指示灯——红灯闪烁 Charging Indicator - Red Light Flashing |

4 适用环境 Applicable environment

4.1 工作温度: Working temperature

在 0~+40℃

4.2 工作湿度 Working humidity

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

4.3 贮存温度 Storage temperature

贮存温度 **Storage temperature:** -20~+80℃

4.4 存储湿度 Storage humidity

相对湿度: relative humidity ≤85%

4.5 大气压力 Atmospheric pressure

大气压力 **Atmospheric pressure:** 70~106KPa

5 安全要求 Safety requirements

5.1 抗电强度 Electrical Resistance

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
 No breakdown and arc phenomena occur in one minute when the primary and secondary resistances are greater than 3000VAC 50HZ/60HZ, and the leakage current is less than 10 mA.

5.2 缘绝电阻 Insulation resistance

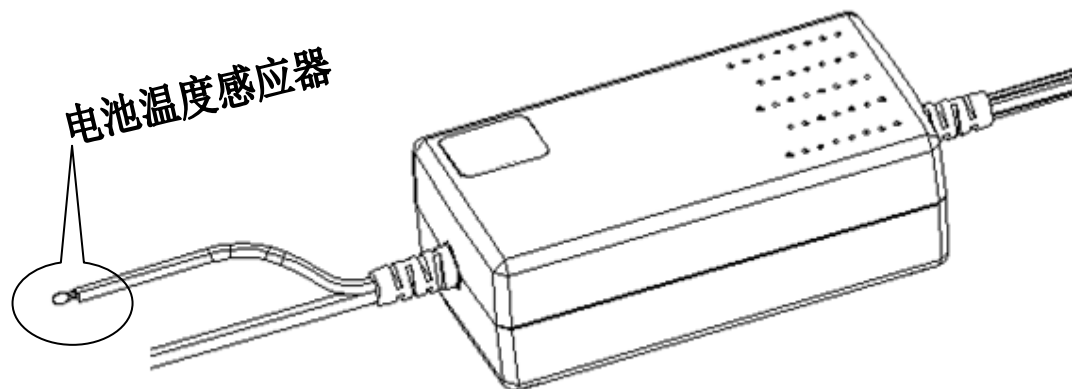
绝缘电阻≥10MΩ(在 DC500V 条件下) Insulation Resistance (> 10M) (under DC500V condition)

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6 机械 **Mechanics**

6.1 外观图 **Appearance**

具体外形及印字按实际样品而定 Specific shape and printing depend on the actual sample.



6.2 输入插头及 AC 线材要求 **Input cable and AC plug standard**

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

6.3 输出线材及 DC 插头要求 **Output cable and DC plug requirements**

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

6.4 铭牌标贴 **Label**

具体规格及标准按客户要求订制 Specific specifications and standards according to customer requirements

7 可靠性能 **Reliable Characteristics**

- 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；LED 指示功能及电气性能正常。High temperature test: the temperature of the experiment is 65 ± 2 . The product is not packaged and lasts for 5 hours. After restoring at room temperature, the appearance, insulation strength, indicating function and electrical performance of the device should be re-tested; the appearance should be flat without scratches, burrs and other mechanical damage; the exposed metal part should not be corroded; no breakdown and flying arc phenomena in insulation testing; and the LED indicating function and electrical performance should be normal.

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- 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；LED 指示功能及电气性能正常。Low temperature test: the test temperature is $-20 (+3 (?)^{\circ}\text{C}$, the product is not packaged and lasts for 8 hours. After restoring at room temperature, the appearance, insulation strength, indicating function and electrical performance of the device should be re-tested; the appearance should be flat without scratches, burrs and other mechanical damage, and the exposed metal part should not be corroded; there should be no breakdown and flying arc phenomenon in insulation testing; and the LED indicating function and electrical performance are normal.
- 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；LED 指示功能及电气性能正常。Constant humidity and heat test: the experimental temperature is 40 ± 2 and the humidity is 90%-95%. The product is not packaged and lasts for 48 hours. After testing, its appearance, insulation strength, indicating function and electrical performance were re-tested. Appearance should be flat without scratches, burrs and other mechanical damage, exposed metal parts should not be rusted; insulation testing without breakdown, arc phenomenon; LED indicator function and electrical performance are normal.
- 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；LED 指示功能及电气性能正常。vibration test: the frequency of 10 ~ 55HZ, amplitude is 0.35mm, each direction sweep cycle is 10 times the number of. After the experiment, its appearance, insulation strength, indicating function and electrical performance were re-tested. Appearance should be flat without scratches, burrs and other mechanical damage, exposed metal parts should not be rusted; insulation testing without breakdown, arc phenomenon; LED indicator function and electrical performance are normal.

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- 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；LED 指示功能及电气性能正常。Drop test: Hardwood board with height of 1 meter and thickness of 20 mm, 6 surfaces, once in each direction. After the experiment, its appearance, insulation strength, indicating function and electrical performance were re-tested. There is no abnormal sound inside the product, no mechanical damage in the appearance, no rust in the exposed metal part, no breakdown and arc phenomenon in insulation test, and the LED indicator function and electrical performance are normal.

8 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。The surface of charger shell is flat without scratches, burrs and other mechanical damage. The screen printing is complete and clear, and the exposed metal part is free from rust.

9 体积与重量 **Volume and Weight**

9.1 体积 Volume

体积 **Volume** L 119* W* 61 H38: 275842 mm³

9.2 重量 Weight

净重: Net weight 236g

10 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。Sampling inspection of products refers to the MIL-STD-105E standard to formulate a sampling plan to meet the company's product quality inspection, and strictly supervise the implementation. When customers or contracts have special requirements. It can be executed according to customer and contract requirements.

11 包装: **Packing**

具体包装方式可按客户要求订制。Specific packing methods can be customized according to customer requirements.

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12 使用注意事项 Caution

- 不可以拿本充电器充适应范围以外的电池及电池包。This charger should not be used to charge batteries and battery packs beyond the scope of application.
- 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。This charger should not be used to charge batteries in the environment of over 40 C. It is recommended to charge batteries under 35 C. It is normal for batteries to have slight fever in sufficient time. Please feel free to use it
- 充电时请将电池温度感应器紧贴电池包，确保电池充电时的安全。When charging, please attach the battery temperature sensor to the battery pack to ensure the safety of the battery when charging.
- 为了安全，建议使用 TENERGY 公司的 10-20 节串联的镍氢电池包。For safety, it is recommended to use TENERGY's 10-20 NiMH battery packs in series.
- 充电时远离热源和火源。Keep away from heat source and fire source when charging
- 不得在酸、碱、和有腐蚀的环境中使本充电器及电池。This charger and battery shall not be used in acid, alkali or corrosive environment.
- 不得让充电器进水或淋雨，以免引起安全问题。Do not let the charger into the water or rain, so as not to cause safety problems
- 不得拆解充电器和电池，以免引起危险。Chargers and batteries must not be dismantled to avoid danger.
- 不得让小孩单独使用本充电器；请勿将充电器放置于小孩可接触到的地方，以免发生危险。Children should be allowed to use the charger alone. Do not place the charger in a place accessible to children in order to avoid danger.
- 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 put away for a long time and used again, there may be a false phenomenon - ΔV , which leads to the misjudgement of the charger and stops charging. When this happens, please recharge and discharge the battery several times before repairing or partially repairing.

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