



Specification Approval Sheet

Name: 10-20S 0.5A Smart Universal Charger for NI-MH/NI-CD

Battery Packs

Model: 01027

SPECS: I/P:AC 100V-240V 50/60Hz

Approved By	Checkup	Make

Customer Confirmation	Signature	Date
	Company Name :	
	Stamp :	

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1 Features

1. This is a standard smart charger with MCU control for NiCH/NiCD Battery Packs, $-\Delta V$ detection ensures no over-charging and the safety
2. The charger is suitable for 10-20S Ni-MH/NiCD battery pack.
3. The charger is suitable for 4300-4500mAh battery to charge fast
4. Constant current charging, $-\Delta V$ detection ensures fast charging speed and the charging saturation $\geq 80\%$
5. 15 hours' safety timer and ensures the safety of charging.
6. Automatic detection helps distinguish good and bad batteries. Charging will be stopped if load other than rechargeable battery is detected.
7. Wake-up function - When battery voltage is lower than normal value, it will charge the battery with 10mA charging current.
8. Connect the output terminals of the charger properly with the anode and cathode of the battery packs and plug in the AC power supply when charging; easy to use.)
9. Reverse polarity protection prevents charger and batteries from being damaged when user inserting batteries with reversed polarity.

NOTE: do not insert batteries reversely for a very long time.

10. Two-color LED indicates charging status.
11. Wide AC input voltage 100-240V 50/60HZ, Designed for worldwide usage
12. Temperature sensor protection - to cling the temperature sensor to the surface of the battery pack to ensures the safety of charging.

Note: Don't charge other types of battery except 10-20 CELLS NiMH/NiCD Battery Pack mentioned in this datasheet

2 Electrical characteristics

2.1 Input Characteristics

2.1.1 input voltage

AC :100V~240V 50HZ/60HZ

2.1.2 input current

AC rated input current: $\leq 0.7A$

2.1.3 inrush current

inrush current:30A MAX



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2.1.4 Leakage Current

Max Leakage Current: $\leq 0.25A$

2.1.5 Start –up Delay time

When plug in AC power supply: $\leq 3S$

2.2 Output Characteristics

2.2.1 Charging Voltage Range

10V-32V (MAX)

2.2.2 Rated Charging Current(Normal charging)

$0.5A \pm 10\%$ @CV=10V-32V

2.2.3 Output No-load Voltage

Output No-load Voltage range: $37 \pm 2V$

2.2.4 Charge Mode

Constant current

2.2.5 Trickle Charge(Normal operating)

Trickle current: 50mA average value (duty cycle = 10%)

2.2.6 Output Short-circuit Current

Short-circuit Current: $10 \pm 5 mA$ Red flash

The charger will automatically enter charging status when short circuit is removed.

2.2.7 Anti irrigation current

Anti irrigation current $\leq 1mA$, (No AC input)

2.2.8 Reverse Protection Current

The charger can protect itself from damages when the battery pack is reversely connected

Note: No long time period reverse connection.

Reverse Protection Current $\leq 100mA$;

2.2.9 Charge Mode & Detection

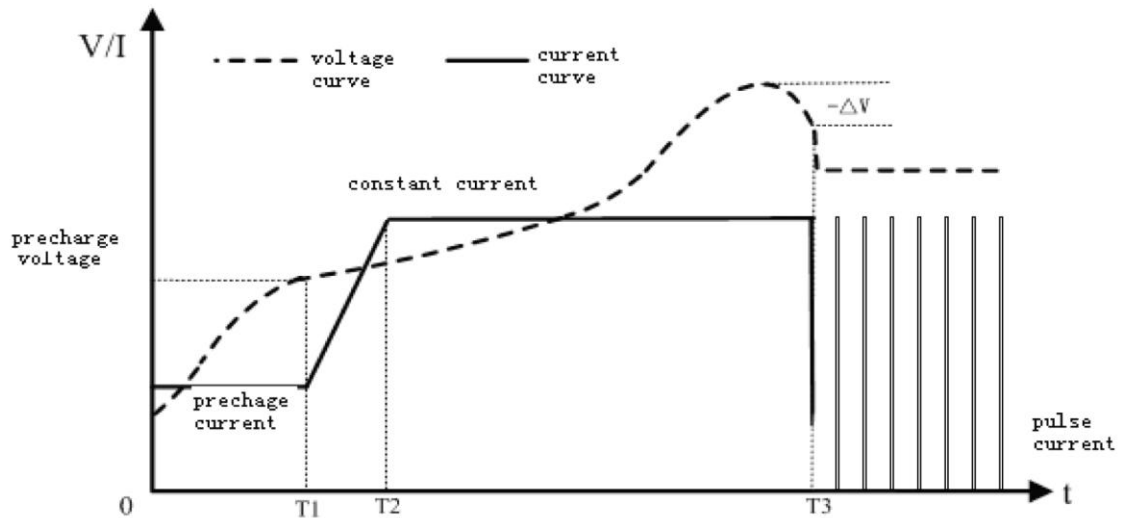
Constant current charging, $-\Delta V$ and temperature detection

$-\Delta V$ occurs when the battery is full charged. When $-\Delta V$ value is between 40-60mV and the temperature of battery pack $\geq 58^{\circ}C$, it turns into trickle charge.

When charging time reaches 15 hours, it turns into trickle charge.

When the battery voltage is higher than 32V, charging stops.

2.2.10 Output Characteristics Curve



T0-T1: Wake up stage. When the voltage of the battery is lower than 10V, the charger will use pre-charge current 10mA to charge the battery.

T1-T2: Current ramp up stage. When the voltage reach 10V, charge current will ramp up from wake up current, and at the end of this stage, the current will ramp up to constant charging current $0.5A \pm 10\%$.

T2-T3: Constant current stage. Charge battery with constant current until the $-\Delta V$ reaches 40-60mV, constant current stage ends and battery is full charged. LED turns from red to green. It enters full charged stage.

T3- : Full charged stage.the red LED is out and the green LED solid on.the charger turn to the trickle current status,the average trickle current value is $50mA \pm 10\%$.

2.2.11 Suitable battery

10-20S NI-MH battery packs

3 Installation and LED Indication

3.1 Installation

Connect a 10-20S NiMH battery pack to the charger and plug in commercial power. The charger will automatically detect battery and start to charge.

3.2 LED Indication

No batteries LED — Green flash



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Charging	LED —— solid Red
Full charged	LED —— solid Green
Short Circuit	LED——Red rapid flash
Battery Reversed	LED——Red flash
irrechargeable battery	LED——Red flash

4 Environmental Requirements

4.1 Operating Temperature

0~+40°C

4.2 Operating Humidity

≤90% (Non-condensing)

4.3 Storage Temperature

-20~+80°C

4.4 Storage Humidity

RH≤85%

4.5 Atmospheric Pressure

70~106KPa

5 Safety Requirements

5.1 Withstand Voltage

Withstand Voltage from primary to secondary $\geq 3000\text{VAC}$ 50HZ/60HZ

Held at the virtual value of sine wave for 1min without breakdown or flashover.

Leakage current $\leq 10\text{ mA}$

5.2 Insulation Resistance

Insulation resistance $\geq 10\text{M}\Omega$ (under DC500V)

6 Mechanical Requirements

6.1 Structural Drawing

Customized



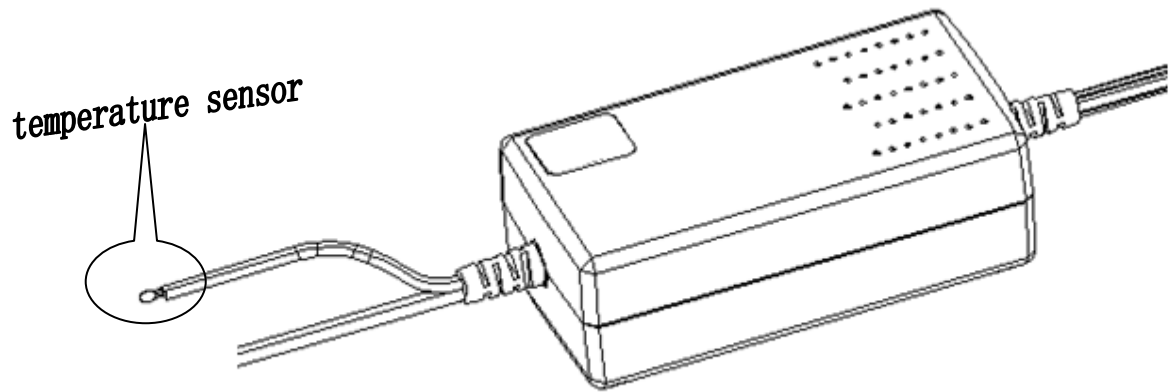
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6.2 Input Wire & AC Plug

Customized

6.3 Output Wire & DC polarity

Customized

6.4 Nameplate & Label

Customized

7 Reliability

- 1.) High Temperature Test:** Place the unpacked product into the test chamber and leave it at the temperature of $65^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 5 hours, then take it out and cool down to room temperature. Then check its appearance, dielectric strength, indication and electrical performances. Any damages or malfunctions are unacceptable.
- 2.) Low Temperature Test:** Place the unpacked product into the test chamber and leave it at the temperature of $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 8 hours, and then take it out and let it recover back to room temperature. Then check its appearance, dielectric strength, indication and electrical performances. Any damages or malfunctions are unacceptable.
- 3.) Constant Temperature and Moisture Test:** Place the unpacked product into the test chamber and leave it at the temperature of $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and humidity of 90%~95% for 48 hours and then take it out. Then check its appearance, dielectric strength, indication and electrical performances. Any damages or malfunctions are unacceptable.



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4.) Vibration Test: Test the charger at the frequency of 10~55Hz and amplitude of 0.35mm for 10 sweep cycles from each direction. Then check its appearance, dielectric strength, indication and electrical performances. Any damages or malfunctions are unaccepted.

5.) Drop Test: Free fall from the height of 1m onto a 20mm thick hard wood surface from 6 different corners of the charger. Check its appearance, dielectric strength, indication and electrical performances. Any damages, malfunctions or abnormal sound inside the charger are unaccepted.

8 Appearance Requirement

Charger surface should be smooth without any scratches, burr or other mechanical damages. Silk print should be clear and intact. No rust should be on the exposed metal parts.

9 Volume & Weight

9.1 Volume

119×61×38mm(W×H×T)

9.2 Weight

236g

10 Sampling Standard

The default QA inspection is based on MIL-STD-105E standard and strictly implemented. Special procedure can be arranged upon customer's request.

11 Package

customized

12 Cautions

1. DO NOT use it to charge inapplicable batteries
2. DO NOT operate the charger when the temperature is higher than 40°C. We recommend you operate when the temperature is lower than 35°C. Batteries may get warm during charging;
3. Cling the temperature sensor to the surface of the battery pack to ensures the



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safety of charging.

4. We suggest using the Tenergy 10-20s NI-CH battery packs for safety .
5. Keep it away from heat and combustion source during charging.
6. DO NOT use charger and batteries in any acidic, alkaline or corrosive environment.
7. DO NOT expose charger to rain, snow, water, gas, oil, etc.
8. DO NOT disassemble charger or battery.
9. DO NOT let children use charger without adult supervision.
10. Please cycle (charge and drain) the battery for several times before use if it's been stored for a long time as the false $-\Delta V$ may cause misdetection of full charge.