OPERATING INSTRUCTIONS

Battery Charger BT-C3100 V2.2 CE

1. Intended Use

The product is intended to charge and discharge NiCd, NiMH or 3.7v Li-ion rechargeable batteries in size type of 16340, 10440, 14500, 16340, 18500, 18650, 26650, 26500. It provides four independent charging slots for rechargeable batteries. The charger can also optimize and test the maximum capacity of rechargeable batteries. Each charging slot has its own display showing various information: charging current, battery voltage, charged capacity, battery internal resistance and elapsed charging time.

Charging current can be selected for 200mA, 300mA, 500mA , 700mA, and 1000mA (if only bay 1 and/or 4 are used to charging batteries, current 1500mA and 2000mA can be further selected).

Default charging current is 500mA. For Ni-MH or Ni-Cd batteries, the maximum discharging current is 700mA(when 1000mA charging current is selected with TEST or REFRESH mode, the discharging current is still 700mA).

Discharging current can be selected between 200mA, 300mA, 500mA, 700mA and 1000mA for Li-ion batteries.

Default charging or discharging current is 500mA

The charger can charge batteries of different type and size and with different capacity at the same time. It also integrates the minus delta voltage (-ΔV) for NiCd or NiMh battery charging termination, and for Li-ion batteries charging to 4.2V with pre-selected CC/CV standard lithium charging algorithm.

When battery is fully charged, the charger will switch to trickle charging automatically for NiCd, NiMH rechargeable batteries, therefore battery will be kept at its optimum capacity. With Lithium battery, there is no trickle charge current when charging is completed due to maintain battery safety reason. However when li-ion batteries voltage is dropped below 4.12v, charger will start charging batteries to full automatically.

Charger also includes overheat detection to protect rechargeable batteries and charger itself from overheating. When temperature sensor detects PCB or battery voltage is over 40 degrees Celsius, then ventilation fan will be turned on automatically. Only when all 6 temperature sensors temperature is measured less than 40 degrees Celsius, then the fan will be switched off.

The charger can only be powered by power supply rated 12v/3.0A. Operate and store it in dry indoor environment only.

This product fulfills European and national requirements related to electromagnetic compatibility (EMC). CE conformity has been verified and the relevant statements are available upon request.

Unauthorized conversion and/or modification of the device are inadmissible because of safety and approval reasons (CE). Any usage other than described above is not permitted and can damage the product and lead to associated risks such as short-circuit, fire, electric shock, etc. Please read the operating instructions thoroughly and keep them for future reference.

The charger has its backlight turned on after each key press. Back light will be switched off after 30 seconds when no key is pressed.

The maximum charging capacity can be up to 20,000mAH.

2. Delivery Content

Battery Charger BT-C3100	1pcs
Power Adapter	1pcs
Operation Instructions	1pcs

3. Safety Instructions ⚠

We do not assume liability for resulting damages to property or personal injury if the product has been abused in any way or damaged by improper use or failure to observe these operating instructions. The warranty will then expire!

3.1 Product Safety

- The product must not be exposed to substantial mechanical strain or strong vibrations.
- The product must be protected against electromagnetic fields, static electrical fields, extreme temperatures, direct sunlight and moisture
- The manufacturer's instruction for the respective batteries must be observed, before they are charged.
- The product should not be connected immediately after it has been brought from an area of cold temperature to an area of warm temperature. Condensed water might destroy the product. Wait until the product adapts to the new ambient temperature before use.

Sufficient ventilation is essential when operating the charger. Never cover the ventilating slots of the charger, especially area in front of the cooling fan need to be at least 8cm free open area for enough ventilation purpose. Please take cautions especially when ambient temperature is over 35 degrees Celsius and charging current rate is over 0.5C. If higher charging current applied, it is more easy to build up temperature on batteries.

3.2 Battery Safety

- Correct polarity must be observed while inserting the batteries.
- Non-rechargeable batteries, rechargeable alkaline batteries (RAM),

lead acid batteries must not be charged with this product. There is danger of explosion!

- Batteries should be removed from the device if it is not used for a long period of time to avoid damage through leaking. Leaking or damaged batteries might cause acid burns when in contact with skin, therefore use suitable protective gloves to handle corrupted batteries.
- Batteries must be kept out of reach of children. Do not leave the battery lying around, as there is risk, that children or pets swallow it.
- Batteries must not be dismantled, short-circuited or thrown into fire.
- Never recharge non-rechargeable batteries. There is a risk of explosion!
- Repair works must only be carried out by a specialist/specialist workshop.
- If you have queries about handling the device, which are not answered in this operating instruction, please check with the distributor for further help.

4. Operating Elements







5. Power Supply

The shipped power adapter is the power supply for this charger. In case you need to use other power adapter, please be aware that power supply has the correct polarity plug. Also please be noted that power supply need be able to supply minimum 3.0A current. Low output power adapter could lead to working improperly. After powering up, all LCD segments will light up and then showing firmware version 2.1 momentary. “null” will be shown when no battery is loaded inside charger.

6. Operation

Once a rechargeable battery is inserted, its present voltage(for example, “1.12v”) will be displayed for 3 seconds, then 500mA default charging current will be shown on display for another 3 seconds. If **MODE** or **CURRENT** button is not pressed during this 6 seconds, charging process will start. During the first 6 second time, If any button is pressed, the unit will wait for another 10s before finishing current slot setting. Press “SLOT” button will confirm the setting right way without the needs of waiting the 10s auto time-out time elapsed. All other battery can be handled the same. So each battery can have its own setting independently.

While the previous battery slot setting mode is in effective (telling by the flashing display of that battery slot LCD), and the next battery is inserted, then both battery slot display will be flashing, which means that any setting change will be applied for all batteries in setting mode at the same time.

Once start normal working mode, charging current can no longer be changed unless its working mode is changed or batteries are taken out from charger and insert into charger again.

During normal working mode, if no particular slot is selected by pressing the SLOT button, MODE, CURRENT and DISPLAY button are always referring to 4 slots simultaneously. If a different working or display mode is desired for particular slot, press the SLOT button to select the slot and then press “Mode” or “Display” to select your wanted working or display mode..

6.1 Mode Selection

- Press and hold the “MODE” button for 2 seconds to start working mode selection for all four battery slot.
- Press the “MODE” button subsequently to toggle among the “Charge”, ”Discharge”, ”Test” , “Quick Test” and “Refresh” mode
- When particular slot working mode need to be changed, press SLOT button to select the desired slot and then press MODE button to choose wanted working mode.

- When working mode is changed, working current adjustment is possible.

6.2 Current Selection

Within the first 6 seconds after inserting battery or right after power up, press the “CURRENT” button to select desired charge current for slots loaded with battery at the same time. Current setting can not be altered once setting has been confirmed in the initial stage. If different working current is needed afterwards, either changing working mode or rechargeable battery must be taken out and inserted again. Discharge current is set to the selected charge current selected.

6.3 Display Selection

“DISPLAY” button is for toggling display information for voltage, current, capacity, work time etc. Press “Display” button for 3s, it will turn on back light permanently. Press this button for another 5s to de-activate this function.

6.4 SLOT Selection.

This button is used to select desired slots for different working mode, charge current or display mode. Press SLOT button will start the slots selection processing in the sequence cycle of 1->2->3->4->4 slots->exit.

7. Overheat Protection

When charger works at high current, there will be massive heat generated inside the charger. To achieve a good charging result as well as keeping batteries at the top condition, lowest temperature rise is very important for both charger and battery. BT-C3000 charger is equipped with a temperature controlled cooling system. When internal temperature is lower than 40C, fan will be stopped. When internal temperature or battery temperature is over 40C, fan will be switched on.

With our improved charging circuit design, for normal good quality battery with low impedance, heating built up on battery during charging process is almost unnoticeable. However during the last charging stage for Ni-Cd or Ni-Mh batteries, when battery is almost full, batteries can become hot. This is normal: the larger charging current applied, the more heat will build up. When battery temperature is sensed to be over 60C, then over heat protection will be kicked in for safety reason. When overheating occurs, current working mode for all 4 slots will be automatically halted. To tell if it is in the state of overheating protection mode, charging current will be reduced to 0mA.

Charging/discharging process will only resume after battery temperature drops below 40 degrees Celsius.

8. Operation Modes and Display

8.1 Operation Modes:

- Charge Mode: The rechargeable battery is charged up to its maximum capacity. Accumulated charging capacity is displayed at mAH display mode. For Ni-MH or Ni-Cd batteries, after charging mode is completed, a trickle charge current (around 10mA) will be applied. For Li-ion battery, once charge mode is completed, no trickle charge current will be applied. When Li-ion battery voltage is dropped less than 4.0v, then charging will be activated until battery voltage reaches 4.20v.
- Discharge Mode: It is used to reduce the memory effect. The rechargeable battery is discharged to a preset battery voltage (0.9v for Ni-Cd & Ni-Mh, 2.8v for Li-ion batteries). Once discharge is finished, total accumulated discharging capacity is displayed at mAH display mode, showing how much energy is discharged from the battery, which is always referring to the accumulated discharging capacity. Trickle charge current will be applied after discharge cycle is finished, preventing the batteries from discharging any further for NiMh and NiCd battery.
- Refresh Mode: Rechargeable battery is charged and discharged repeatedly to optimize to its maximum capacity. Old rechargeable batteries or those that have not been used for a long period of time can be restored to their rated capacity. Depends on selected charge current, battery capacity and battery impedance (healthy state), it can take tens hours or even days time before complete. Refresh mode will make 3 complete discharge-charge working cycles before complete. After discharge cycle is completed, total discharged capacity will be kept displayed in mAH display state even next charging cycle is in progress.
- Test mode: Checks the present capacity of a rechargeable battery. The maximum capacity is determined by discharging the rechargeable battery after it was fully charged. If the maximum capacity is much lower than the rated capacity then it may reach the end of its lifetime.
- Quick Test mode: The charger will analyze the dynamic internal battery resistance by applying a load and the current reading is referred to the voltage drop detected on the battery. Within 10s, the tested battery resistance will be displayed in the unit of milliohm. For good quality batteries,

the internal resistance is very low: in the range of 20 ~ 80 milliohms. If battery internal resistance is over 500milliohms, then these batteries are not good for supplying power to high current loads, such as digital camera etc. But they can still be used for low energy loads, such as clock, remote controllers etc. Always use batteries with close internal resistance range when they are used in serial to achieve maximum battery life. Alkaline and any other 1.5v batteries can be tested on this charger as well. If a completely empty battery is to be tested, it is not possible to give any correct reading. Please be noted that since the internal battery resistance can be very small, and contact resistance can be a major influence factor, thus same battery tested in different slot or even at the same slot with different contact condition, the reading can be varied for 10% to 20%. This is normal. Test twice if needed to assure a correct measurement result. Due to the construction reason, there is around 30milliohm contact resistance from the charger itself, and this resistance is calculated together with battery internal resistance. It should be deducted from the reading to get a more accurate battery resistance reading.

When a high impedance battery(eg. Over 2500milli ohm) is loaded onto the charger, due to its high internal impedance, real displayed charging current can be much less than your pre-selected charging current. When this happened, it doesn't means the charger is defective. Eventually it needs longer charging time until fully charged.

8.2 Display

- Charge/Discharge Current: instantaneous current is displayed.
- Time Elapsed: The charging/discharging time of the last cycle is displayed.
- Accumulated Capacity: The accumulated battery capacity is displayed in mAh. For discharge mode, it is referring to the accumulated energy discharged from that battery. For refresh mode, previous charging capacity is displayed even when current working stage is at discharge cycle.
- Battery Voltage: The instantaneous battery voltage is displayed.
- At QUICK TEST mode, it shows the internal battery resistance in mili- ohm(0.001R).
- Full: After the rechargeable battery is fully charged in any of the operation modes, trickle charging will be started automatically. Trickle charging prevents the rechargeable batteries from being overcharged and compensates for self-discharging of the batteries

9. Maintenance

The device is maintenance-free but should be cleaned occasionally. When cleaning, the device must be removed from any power source. Only use dry and soft cloth to clear the housing of the charger. Do not use abrasive or solvents.

10. Disposal

10.1 Disposal of waste electrical and electronic equipment

In order to preserve, protect and improve the quality of environment, protect human health and utilize natural resources prudently and rationally, the user should return unserviceable product to relevant facilities in accordance with statutory regulations.

The crossed-out wheeled bin indicates the product needs to be disposed separately and not as municipal waste.



10.2 Used batteries/rechargeable batteries disposal

The user is legally obliged (battery regulation) to return used batteries and rechargeable batteries. Disposing used batteries in the household waste is prohibited! Batteries/rechargeable batteries containing hazardous substances are marked with the crossed-out wheeled bin. The symbol indicates that the product is forbidden to be disposed via the domestic refuse. The chemical symbols for the respective hazardous substances are Cd= Cadmium, Hg = Mercury, Pb = Lead.

You can return used batteries/rechargeable batteries free of charge to any collecting point of your local authority.





11. Technical Data

Operating Voltage	12V DC	
Power Adapter	Input:	100~240V～, 50/60Hz
	Output:	12V DC, 3.0A
Charging Current range	200,300,500,700,1000,1500,2000	
Discharging Current range	200,300,500,700mA 1000mA (li-ion cell only)	
Max. Charging Capacity	20000mAh	
Operating Temperature	0 to 40 ℃	
Voltage Deviation	<0.03v @4.2v	
Current Deviation	<5%	