# 4 Channels Battery Cell Capacity Tester

# Product Manual

# HT-BCT50A4C

## Heltec Energy

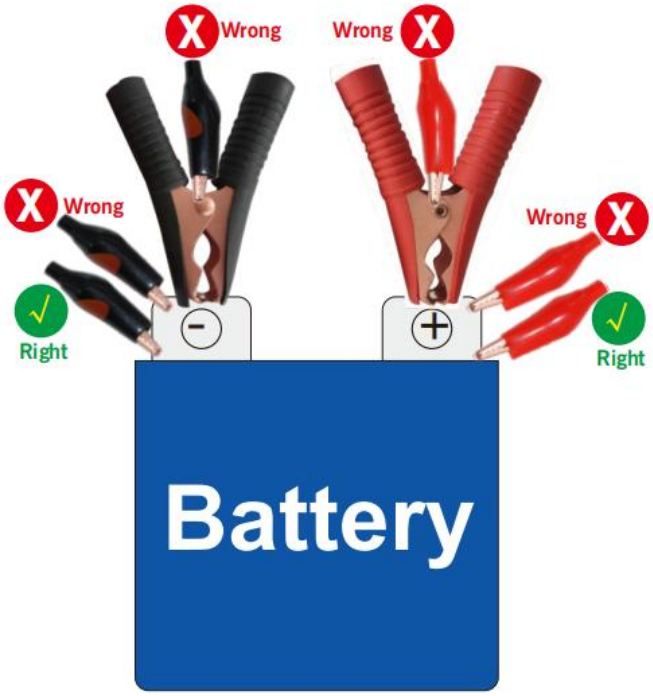
## Dear customer

Thank you very much for purchasing this product. The contents of this manual have fulfilled the obligation of reminding and warning according to the safety production law! Before using this product, you must read and understand the contents of the manual carefully! This product is only for professional use, you must know Any operation on the lithium battery is extremely dangerous! Therefore, you must set the machine correctly and reasonably according to the specifications provided by the battery manufacturer. All direct or indirect consequences caused by the use of this product have nothing to do with our company! This product and accessories will be upgraded from time to time without notice.

## Reminder:

99% of the failures are caused by too small contact area between the battery clamp and the battery pole ear/bad contact/too large charge and discharge current/cell damage. Although the battery clamp has clamped the battery, but if the contact area is not large enough, it will lead to various failures, it is recommended that you make your own battery clamp!

1. Both the large and small crocodile clamps must be clamped on the battery pole lugs!
2. The contact area between the large crocodile clip and the pole ear should be large enough, and it is prohibited to clip it onto screws/nickel plates/wires, otherwise it will cause abnormal interruption of the testing process !
3. The small crocodile clip must be clamped at the bottom of the battery ear, otherwise it may cause inaccurate capacity testing!



## Product parameters:

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| **Model** | HT-BCT50A4C, 4 Channels are isolated from each other and work independently |
| **Charging range** | 0.3-5V/0.5-50AAdj |
| **Discharge range** | 0.3-5V/0.5-50AAdj |
| **Work step** | Charge/Discharge/Rest/Cycle |
| **Communication** | USB,WIN XP or above systems,Chinese or English |
| **Extended function** | 4 channels can work in parallel,achieving 200A charging and discharging (with consistent parameter settings), channel is olation,and no need to disassemble the connecting pieces between battery cells |
| **Auxiliary functions** | Voltage balancing(CV Discharge) |
| **Protective function** | Battery overvoltage/Battery reverse connection/ Battery disconnection/Fan not running |
| **Calibration equipment** | Standard source(V:Fluke 8845A,A:Gwinstek PCS-10001) |
| **Accuracy** | V±0.1%,A±0.1%,The accuracy is valid for one year from the date of purchase |
| **Cooling** | Cooling fans open at 40°C,protected at 83°°C (please check and maintain the fans regularly) |
| **Working environment** | 0-40°°C,air circulation,do not allow heat to accumulate around the machine |
| **Warning** | During battery testing,someone must be present to supervise |
| **Power** | AC200-240V 50/60HZ (If you need 110V,please inform us in advance) |
| **Size and weight** | Product Size 620*105*230mm,Weight 7Kg |

## Appearance introduction:

① Power switch:If the power is suddenly cut off during the test,the test data will not be saved

② Display screens:Display charging and discharging parameters and discharge curve

③ Coding switches:Rotate to adjust working mode, press to set parameters

④ Start/Stop button: any operation in running state must be paused first

⑤ Battery positive input:1-2-3 pin through current, 4 pin voltage detection

⑥ Battery negative input:1-2-3 pin through current, 4 pin voltage detection

## Use method:

1. Start up first, and then clip the battery. Press the setting knob to enter the setting page, rotate left and right to adjust the parameters, press to determine, Set the parameters correctly and save theexit.


### Parameters to be set in charging mode:

Charging End voltage: lithium titanate 2.7-2.8V, 18650/ternary/polymer 4.1-4.2V, lithium iron phosphate 3.6-3.65V (You must set this parameter correctly and reasonably).

Charging current: set to 10-20% of the cell capacity (Please set it correctly and reasonably). It is recommended to set a current that makes the cell heat less as much as possible.

Judging full current: When constant current charging is switched to constant voltage charging, and the charging current decreases to this value, it is judged as fully charged and set to 0.2-1A by default.

## Parameters to be set in discharge mode:

Discharge End voltage: lithium titanate 1.6-1.7V, 18650/ternary/polymer 2.75-2.8V, lithium iron phosphate 2.4-2.5V (You must set this parameter correctly and reasonably).
Discharge current: set to 10-50% of the cell capacity (Please set it correctly and reasonably). It is recommended to set a current that makes the cell heat less as much as possible.

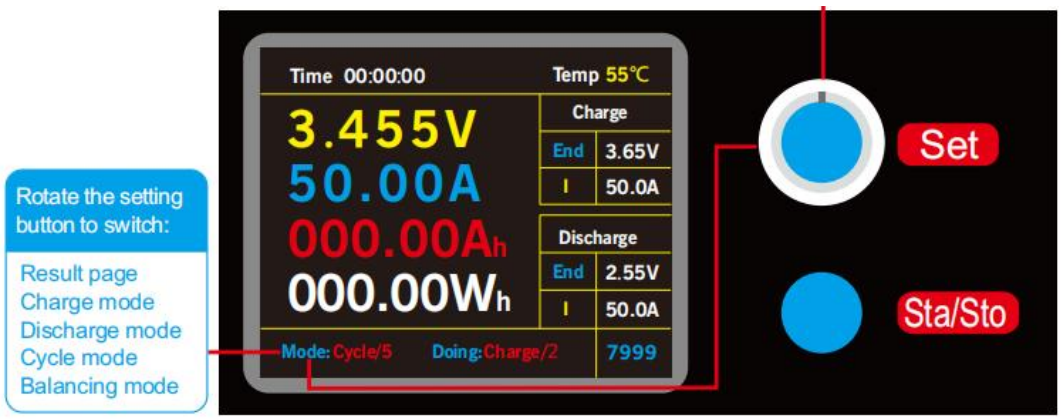
## Parameters to be set in cycle mode:

Charge and discharge mode parameters need to be set simultaneously
Keep voltage: The cut-off voltage of the last charge in cyclic mode ,can be the same as the cut-off voltage of the charge or discharge.
Resting time: In cycle mode, after the battery is fully filled or discharged (let the battery cool down for a period of time), usually set for 5 minutes.
Cycle: Max 5 times, 1 time (charge-discharge-charge), 2 times ( charge - discharge - charge - discharge - charge ) , 3 times (charge - discharge - charge -discharge - charge - discharge - charge )

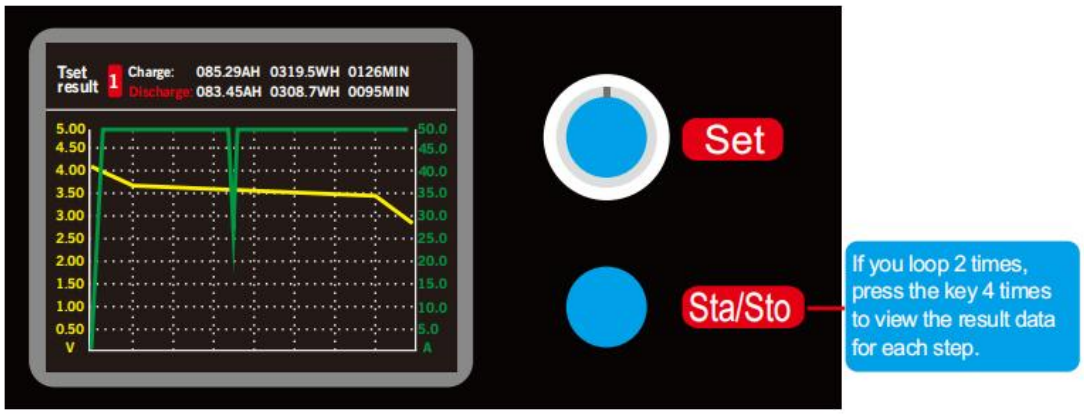
## Parameters to be set in Voltage balancing mode:

Discharge End voltage: How many volts do you plan to balance the cell voltage to? This value must be higher than 10mv than the battery voltage.
Discharge current setting reference: It is recommended to set it to 0.5-10A, the smaller the cell capacity or voltage difference, the smaller the current setting.
End current: It is recommended to set it to 0.01A

2. Return to the home page, rotate the setting button to the left or right to switch to the working mode you need, press the start / stop button to enter the working state, and press again to pause..



3. After waiting for the test to end, the result page will automatically pop up (press any button to stop the alarm sound) and record it manually. Test the results, and then test the next battery.




Test results: 1 indicates the first cycle, the AH/WH/min of charge and discharge respectively.

Press the start / stop button further to show the results and curve of each step in turn.

The yellow numbers represent the voltage axis, and the yellow curve represents the voltage curve.

Green numbers represent the current axis, green numbers represent the current curve.

When the battery performance is good, the voltage and current should be a relatively smooth curve. When the voltage and current curve rises and falls sharply, it may be that there is a pause during the test or the charging and discharging current is too large. Or the internal resistance of the battery is too large and it is close to being scrapped.

If the test result is empty, the working step is less than 2 minutes, so the data will not be recorded.

## Matters need attention

- Data must not be generated until the native machine ends the operation automatically.
- Do not power off or switch over the working mode during the machine operation, otherwise the data will not be saved.
- The machine runs for 2 minutes before starting recording the data (while overwriting the previous data).
- Any operation on the running machine must first press the pause key.
- Do not test batteries that are not rechargeable or zero voltage or have damaged bulges.
- The radiator surface has high temperature and is connected to the positive electrode of the battery, so prohibit short circuit and touch.
- Do not test batteries over 5V, otherwise no warranty.
- Charging cut-off voltage / current and discharge off voltage / current must be set correctly and reasonably according to the cell specifications.
- Testing must be conducted in a supervised open environment, without high temperature flammable and explosive valuables around.
- The product shall not be leased / transferred / donated to a third party, otherwise the consequences shall be borne and the after-sales service shall be terminated.
- Use a well-grounded socket (otherwise there may be leakage or minor induction).
- This product is only a tool, and is entirely used by you, and our company refuses to accept any responsibility.

## The warranty policy

Warranty service period is 1 year.

The warranty service is limited to normal use: man-made damage, self-disassembly, modification and repair, use not in accordance with the instructions, and damage caused by external force majeure factors are not within the scope of free warranty.

Accessories such as test fixtures are consumables without warranty.

When you need warranty service, please contact your dealer for processing. If you cannot contact the dealer, you can contact our company by email or phone.

There are no after-sales service stations in other countries except China. If you need warranty service, please send the product to us for free repair, but you need to pay the freight for the round trip.

## Common troubleshooting methods:

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| 1: Why does the voltage and current displayed on this device not match your multimeter?<br>Reason 1: The machine is calibrated with a Fluke 8845A six and a half multimeter for voltage and a Goodwin PCS-1000I six and a half ammeter for current at the factory. Additionally, a national third-party authoritative organization is commissioned annually to sample and test the accuracy of the machine, which may not be achievable with your multimeter.<br>Method: Measure and compare with instruments of the same level or higher than our factory.<br>Reason 2: Inconsistent voltage measurement points.<br>Method: If measuring voltage with current, you must measure the voltage sampling point of the fixture (position of the small clamp), otherwise the voltage may be inconsistent due to voltage drop. |
| 2: Why does the machine sound an alarm?<br>Reason: Positive and negative pole clamp reversal/overheating/overvoltage.<br>Method: Check if the fixture is clamped backwards, if the heat dissipation of the machine is normal, and if the battery exceeds 5V. |
| 3: Why do fixtures or battery terminals burn out?<br>Reason: The contact area between the fixture and the battery terminal ear is too small or severely poor.<br>Method: Increase the contact area to ensure good contact. |
| 4: Why is there no result data after testing?<br>Reason: A certain work step did not work for more than 2 minutes.<br>Method: First charge/discharge for 5 minutes before proceeding with the normal testing process. |
| 5: Why does charging/discharging exceed the cut-off voltage/current?<br>Reason 1: The contact area between the fixture and the battery terminal ear is too small or severely poor.<br>Method: Increase the contact area and ensure good contact.<br>Reason 2: The set charging/discharging current exceeds the range that the battery cell can withstand.<br>Method: Set the parameters correctly and reasonably according to the battery cell specification book. |
| 6: Why is the test result data highly biased?<br>Reason 1: Decrease in battery cell capacity.<br>Method: It is recommended to eliminate the battery cell.<br>Reason 2: Incorrect setting of charging and discharging parameters.<br>Method: Set the parameters correctly and reasonably according to the battery cell specification book.<br>Reason 3: The local error exceeds the nominal value.<br>Method: Return to the factory for calibration. |
| 7: Why is the battery cell overheating severely during the testing process? |

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| Reason 1: The charging/discharging current exceeds the range that the battery cell can withstand.<br>Method: Set the parameters correctly and reasonably according to the battery cell specification book.<br>Reason 2: The internal resistance of the battery cell is too high or the battery cell is damaged.<br>Method: It is recommended to eliminate the battery cell. |
| 8: Why is there a significant fluctuation in current during the testing process?<br>Reason 1: The contact area between the fixture and the battery terminal ear is too small or loose due to poor contact.<br>Method: Increase the contact area to ensure good contact.<br>Reason 2: Poor battery cell (increased internal resistance or unstable internal resistance fluctuations).<br>Method: It is recommended to eliminate the battery cell. |
| 9: Why is the testing process automatically interrupted?<br>Reason 1: The contact area between the fixture and the pole ear is too small, resulting in excessive pressure drop or poor contact. This machine provides protection.<br>Method: Increase the contact area between the fixture and the pole ear, and ensure good contact.<br>Reason 2: The set charging/discharging current exceeds the range that the battery cell can withstand, resulting in local protection.<br>Method: Reduce the charging/discharging current and set it correctly and reasonably.<br>Reason 3: The increase or instability of the internal resistance of the battery cell leads to the protection of this device.<br>Method: It is recommended to eliminate the battery cell.<br>Reason 4: The fixture and battery terminal ear are not suitable.<br>Method: Replace the appropriate fixture. |
| 10: Why can't the set discharge cut-off voltage be reached?<br>Reason 1: The discharge current is too high, causing the voltage to quickly reach the cut-off voltage. After the machine stops discharging, the voltage slowly rises.<br>Method: Reduce the discharge current.<br>Reason 2: The contact area between the fixture and the pole ear is too small or the contact is poor.<br>Method: Increase the contact area and ensure good contact. |
| 11: Why can't the set charging cut-off voltage be reached?<br>Reason 1: The set saturation current is too high to fully charge.<br>Method: Reduce the saturation current.<br>Reason 2: The charging current is too high, causing the voltage to quickly reach the cut-off voltage. After the machine stops charging, the voltage slowly drops.<br>Method: Reduce the charging current.<br>Reason 3: Poor battery cell (excessive self discharge)<br>Method: It is recommended to eliminate the battery cell.<br>Reason 4: Poor contact between the fixture and the pole ear.<br>Method: Increase the contact area to ensure good contact. |

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| 12: Why is it quickly filled/emptied?<br>Reason 1: Excessive charging/discharging current caused the machine to quickly stop working after reaching the set cut-off voltage.<br>Method: Set parameters correctly and reasonably.<br>Reason 2: The internal resistance of the battery cell has increased and is approaching scrap.<br>Method: It is recommended to eliminate the battery cell.<br>Reason 3: The contact area between the fixture and the battery cell ear is too small or the contact is poor.<br>Method: Increase the contact area to ensure good contact. |
| 13: Why does the voltage rise/fall after a few hours of battery cell testing/balancing?<br>Reason 1: Due to the physical characteristics of the battery cell, the voltage will naturally decrease after being fully charged and left to stand for a period of time.<br>Method: Physical properties cannot be changed.<br>Reason 2: Due to the physical characteristics of the battery cell, the voltage will naturally rise after being discharged and left to stand for a period of time.<br>Method: Physical properties cannot be changed. |
| 14: Why is the charging time too long?<br>Reason: The contact area between the fixture and the battery cell ear is too small, resulting in excessive voltage drop and causing the machine to switch to constant voltage charging state in advance.<br>Method: Increase the contact area or clip the voltage detection small clip onto the battery cell terminal ear (do not clip it together with the large clip). |