

**Lithium Battery Charge/Discharge &
Equalization Repair Instrument
User Manual V2.0
(HT-ED10AC20)**

Heltec Energy

Precautions for Use

- To protect the legitimate rights and interests of users, please be sure to carefully read the instructions, disclaimers and safety instructions we provide with this product before using this product. Heltec Energy reserves the right to update the above documents. Please be sure to operate this product in accordance with the instructions and safety instructions.
- This product is not suitable to be used by people other than those with battery manufacturing engineer qualifications. Please avoid contact with this product by people other than the above-mentioned people. Please pay special attention when operating in places where the above-mentioned people are present.
- Once you start using this product, you are deemed to have read, understood, recognized and accepted all the terms and contents of this product's instructions, disclaimers and safety instructions. Users promise to be responsible for their own actions and all consequences arising therefrom. Users promise to use this product only for legitimate purposes and agree to these terms and any relevant policies or guidelines that Heltec Energy may formulate.
- When using this product, please be sure to strictly abide by and implement the requirements including but not limited to the instructions and safety instructions. For all personal injuries, accidents, property losses, legal disputes, and all other adverse events that cause conflicts of interest caused by violations of the safety instructions or irresistible factors, the user shall bear the relevant responsibilities and losses. Heltec Energy disclaims all liability.
- Heltec Energy will not be held responsible for any direct or indirect violation of legal provisions by users using this product.
- This product is prohibited from being used unattended.
- Maintain the ambient temperature and humidity when the equipment is in use.
- The air inlet at the rear of the equipment cannot be blocked and needs to ensure more than 5cm of ventilation space.
- The air outlets on the left and right sides of the equipment need to be kept open to

ensure more than 5cm of ventilation space; the top of the equipment has an air inlet, the need to ensure that the bottom air inlet is open and not blocked by debris.

- When using this product, please stay away from dangerous environments such as residences, shops, accumulation of flammable materials, crowded places, confined spaces, wires, etc.
- When using this product, please stay away from mobile phone base stations and high-power transmitting equipment in environments with high electromagnetic interference.
- Please use this product in a factory with lithium battery production qualifications, and always keep the device within the visual range of the operator.
- Do not place this product around combustible materials or near batteries to avoid irreversible production safety hazards.
- When starting to test the battery, please confirm the parameters of the battery. Incorrect parameter settings may cause the battery to catch fire. Please avoid accidents.
- Do not use this product near residences, shops, or crowded places.
- Do not use this product to test second-hand batteries or conduct destructive experiments.
- Unless extremely necessary, do not turn off the power of this product during testing.
- This product cannot be used when drinking alcohol, being tired, taking drugs, feeling unwell, etc.
- Please check this product before each use, including but not limited to the firmness and normal contact of the wiring harness, the normal current and voltage of the equipment, the effectiveness of the indicator lights, etc. When any abnormality is found, please stop using it immediately and replace the corresponding accessories.
- A detector that is in abnormal working condition may cause accidents, so do not start it.

- Do not try to prevent the product from being connected by manually loading or unloading the battery.
- Do not cover the heat dissipation vents.
- Please do not modify this product or use it for purposes other than those for which it was originally designed.
- Please operate according to the product instructions.
- Please use original parts for maintenance and replacement.

1. Introduction

The current production process of 18650 and other similar batteries as below:

Coating → Winding → Assembling cells → Spot welding and packaging → Injecting electrolyte → First charged and discharged to full capacity → Internal resistance screening → Consistency screening → Qualified.

First charged and discharged to full capacity: Conduct 5 cycles of charge and discharge tests on the cells that have just been filled with liquid to ensure that the capacity is within the design standard range.

Internal resistance screening: Conduct internal resistance testing on batteries that meet the standard capacity to ensure that they are within the design standard range.

Consistency screening: Batteries that meet the standard in terms of capacity and internal resistance will be selected for voltage consistency after standing for a certain period of time, so that they can be used in groups.

Our new product -- **Lithium Battery Charge/Discharge & Equalization Repair Instrument** (hereinafter refer to as Battery Repair Instrument) -- can optimize this production process, so that the first full charged and discharged to full capacity and consistency screening process can be combined into one process and completed automatically. After completing the test, the test results are judged and displayed for classification.

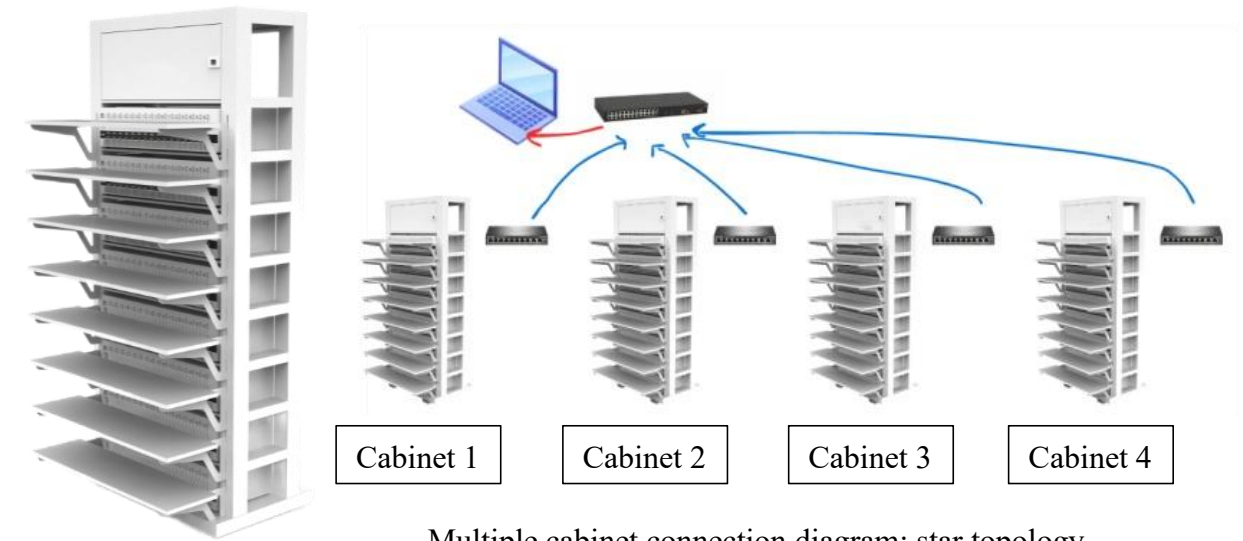
For example: The test process is set to 5 charge and discharge cycles, and the last one is the shelving step. After all process tests are completed, it can be determined according to the matching plan whether the discharge capacity of the currently

completed battery reaches the standard. The final voltage of the shelving process is whether it is within the standard range, the analysis can check the battery consistency. The optimized battery cell production process is as follows, reducing the manpower and material resources of a testing process:

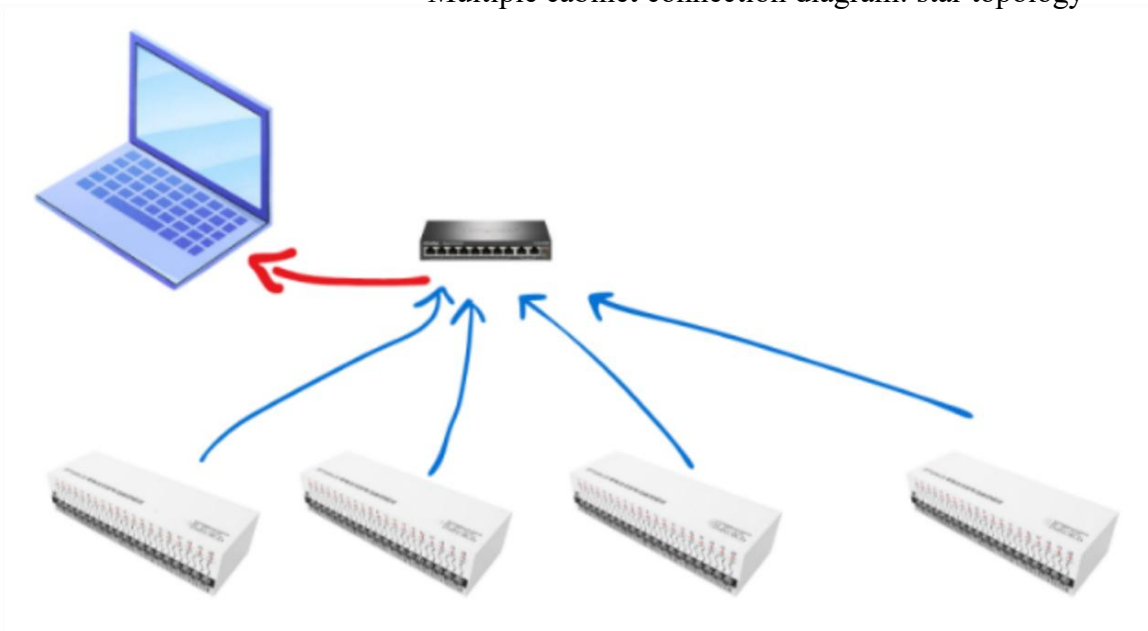
Coating → Winding → Assembling cells → Spot welding and packaging → Injecting electrolyte → First charged and discharged to full capacity & consistency screening → Internal resistance screening → Qualified.

1.1 System Application Scenarios

Materials: Several Battery Repair Instruments, several cabinets, network cables, network switches, and computers. A single device forms a tower test cabinet, and several cabinets form a test cluster.



Multiple cabinet connection diagram: star topology

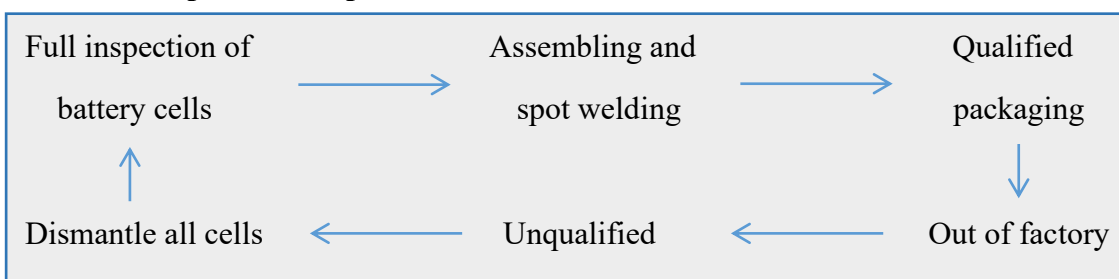


1.2 For Battery Assembly Manufacturer

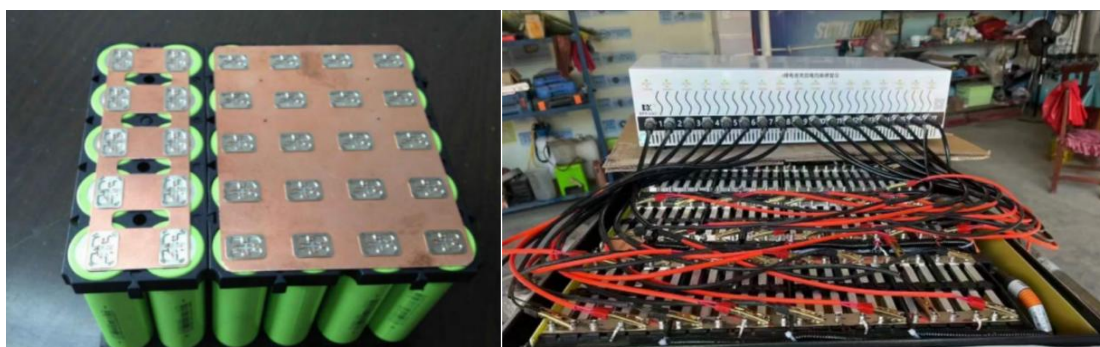
Materials: Several Battery Repair Instruments, several cabinets, network cables, network switches, computers.

In the traditional production process, when the whole set of batteries is tested poorly, it is impossible to accurately determine that a certain unit is defective. The entire set of batteries needs to be disassembled and the production process restarted. However, this is time-consuming and will also cause some damage to the re-spot welding of the good cells.

Traditional production process:

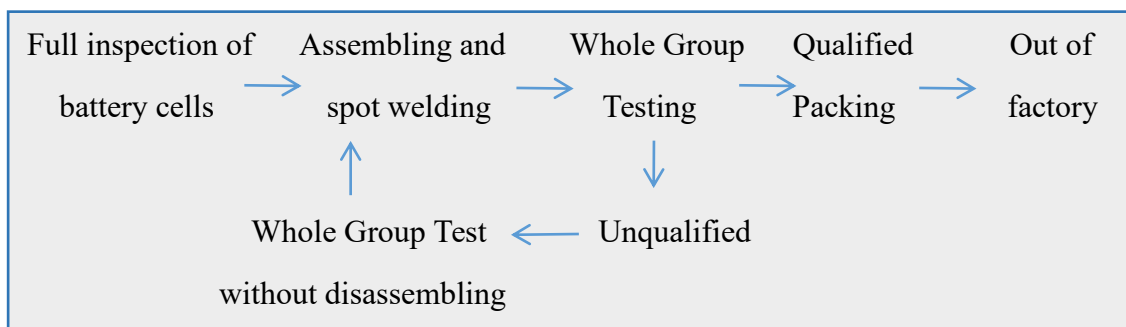


The isolation detection technology of the Battery Repair Instrument can directly conduct charge and discharge tests on the cells of the entire battery pack without disassembling the battery pack, find out the bad cells, and replace them accurately to improve maintenance efficiency without disassembly. Test the entire battery pack as shown below:





Improved production process:



In the full battery inspection process, this equipment can perform customized inspections according to any manufacturer's standards. For example, constant power discharge, constant resistance discharge, constant current discharge. Single constant current charging, single constant voltage charging, constant current and constant voltage charging. The charge and discharge voltage can be customized, the charge and discharge time can be limited, the charge and discharge capacity can be limited, and the conversion conditions can be defined. After the customized process test is completed, the test results can also be automatically filtered, and the road that meets the filtering requirements can be marked with an indicator light reminder on the device.

1.3 For Battery Pack Wholesaler

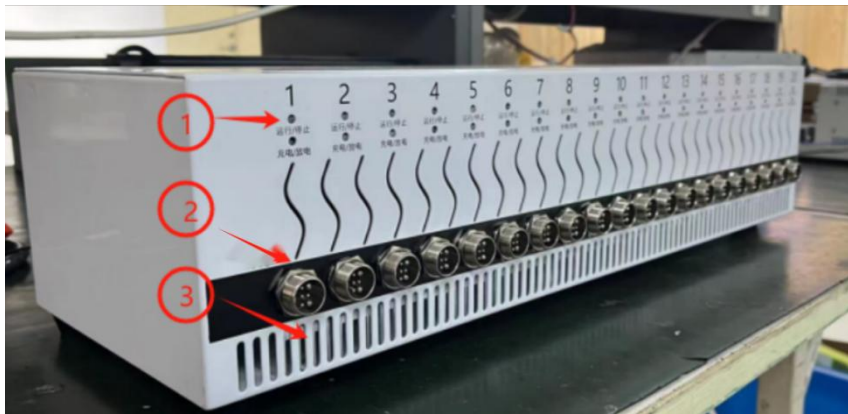
Materials: Battery Repair Instrument, computer.

Battery dealers will also encounter defective batteries for repair during the battery sales process. If they encounter defective batteries, they usually have to return

them to the manufacturer for analysis and judgment. Using the isolation detection technology of our Battery Repair Instrument, you can determine the location of the defective battery cells before replacing them without disassembling the battery cells; you can even perform several charge and discharge cycles on the unbalanced battery pack to balance the power and have the battery pack returned to its normal equilibrium state.

2. Equipment Diagram and Start Steps

2.1 Front



①Status indicator light ②Output line aviation seat ③Radiator air inlet

2.2 Back



④Air outlet ⑤Power input socket ⑥Main power switch

2.3 Computer Connection Setting Area



- ⑦ Device serial number setting ⑧ Communication indicator light
 ⑨ Network indicator light ⑩ Network cable port ⑪ TF card

Table 1. Relationship between Setting Gear and Device Number

Setting Gear	0	1	2	3	4	5	6	7	8	9
Device Number	1	2	3	4	5	6	7	8	9	10

Table 2. Signal light status and meaning

Signal light	Status	Meaning
Channel indicator light	Continuous flash	Internal sampling is normal
Channel indicator light	Intermittent flash	Bad data bus contact
Internet indicator light	Flashes once every second	Sampling data upload
Internet indicator light	Off	No data upload or setup errors

2.4 Preparation for Device Connection and Use

Step 1: Connect the AC 220V socket to the power input socket of the device, turn on the power switch, and observe that the indicator light on the front of the machine initializes and displays, and finally displays the stop state.

Step 2: Set the device number 1~20 on the rear panel of the device (in the stand-alone version of the device connection, one computer is allowed to connect 8 devices). When using multiple devices at the same time, the device numbers must be set to be different from each other.

3. Software Installation and Connection

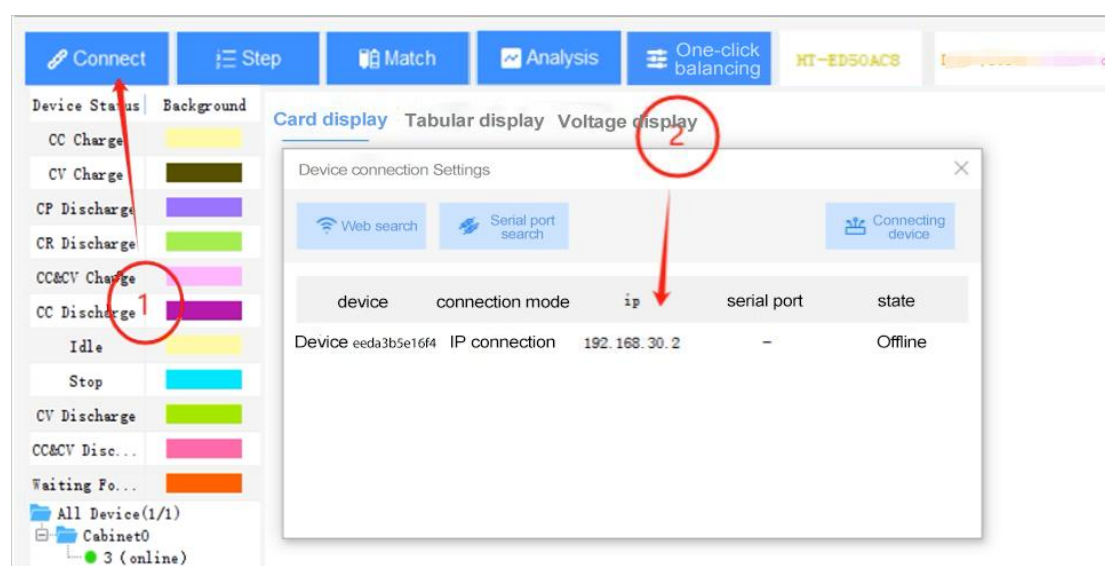
3.1 System Requirement

Item	Requirement
Computer System	Windows XP and above systems have network port configuration
Hardware Configuration	CPU intel i3 or above or AMD R3 or above, memory 4G

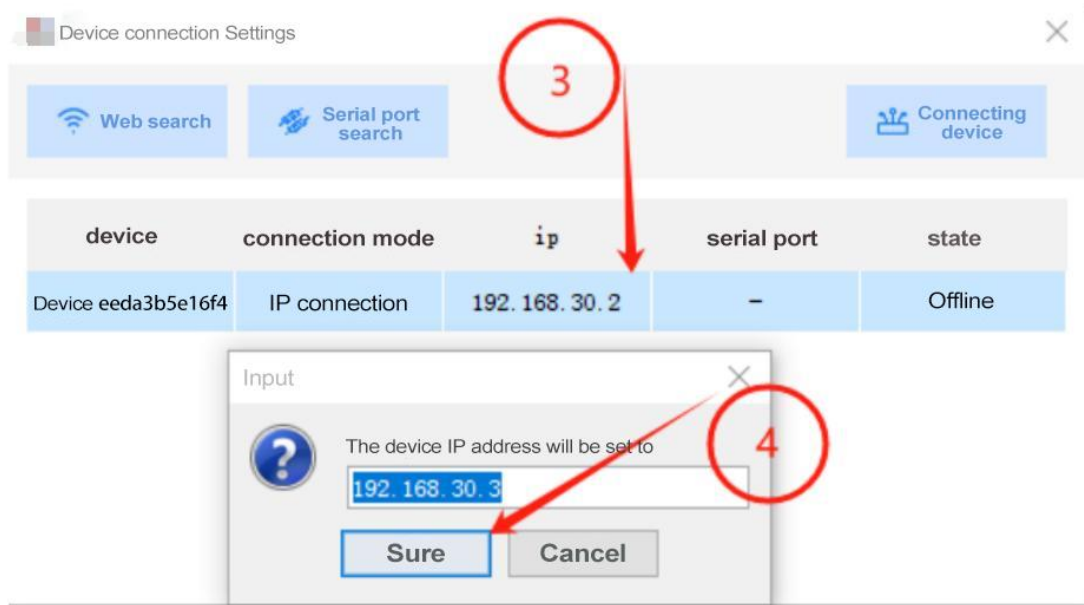
3.2 Installation

Find the installation software and open it. The installation location can be selected. Please do not install the C disk. Some systems have no installation location and the default is D disk.

Click Connect. A window for device connection settings will pop up. Select the device you want to connect to.



Click to connect the device after it changes to a blue background. The IP has been set window will appear. Simply click OK by default.



Note:

- When adding a work step plan when opening the software, an error is reported or cannot be set. The software is running in administrator mode and cannot be opened by double-clicking with the left button.
- If the public network is not checked when running for the first time, it may cause the connecting status to be displayed all the time when connecting to the device. Solution: ① Turn off the public network firewall; ② Modify the network connection method when the software is run. If it cannot be modified, you can reset the firewall default value and restart Start the software to check the network connection again.

4. Battery Connection

- Supported Battery: The device supports batteries with a voltage within 5V and a capacity within 100AH. Physical specifications support: 18650, 26650 LiFePO4, No.5 Ni-MH batteries, pouch batteries, prismatic batteries, single large batteries and other battery connections.
- The minimum height of the probe can be adjusted to 22mm, and the maximum height can be adjusted to 75mm.

Appendix I. Product Warranty Terms

Product Name: **Lithium Battery Charge/Discharge & Equalization Repair Instrument**

Warranty Period: One Year

First of all, thank you for purchasing the **Lithium Battery Charge/Discharge & Equalization Repair Instrument** launched by Chengdu Heltec Energy Technology Co., Ltd.

Chengdu Heltec Energy Technology Co., Ltd. provides quality warranty for the hardware products and accessories sold by the company. The warranty period is as shown above. If a malfunction occurs due to quality reasons during the warranty period, the company has the right to choose to repair or replace the entire product after receiving notification of the product malfunction and verification. The entire set of replacement products may be new or nearly new.

1. Chengdu Heltec Energy Technology Co., Ltd. guarantees that the products have been fully tested.

2. Chengdu Heltec Energy Technology Co., Ltd. does not guarantee that the product can be used without interruption during the product repair process. However, the company shall ensure that malfunctioning products are repaired within a reasonable period of time.

3. The product warranty period starts from the date of shipment of the product or the date of installation by Chengdu Heltec Energy Technology Co., Ltd. If the installation of the Company's product does not begin within 30 days after the date of shipment due to user schedules or delays, the product warranty period begins on the 31st day after the date of shipment.

4. Chengdu Heltec Energy Technology Co., Ltd. does not provide free warranty for product failure and damage caused by any of the following conditions:

(a) Incorrect use or improper maintenance;

(b) Software, accessories, components or other items not provided by Chengdu Heltec Energy Technology Co., Ltd.;

- (c) Unauthorized disassembly, modification and misuse;
- (d) Use beyond the scope specified in the product technical specifications;
- (e) Improper transportation, handling and storage;
- (f) Failure or damage caused by other non-quality reasons (such as earthquakes, wars, traffic accidents, etc.).

To the extent permitted by law, the above warranty terms are express and exclusive and there are no other warranties of any kind, whether written or oral. Any implied warranties and commercial terms are expressly disclaimed.