

# Lithium Energy Battery Capacity Testing Equipment

## **Technical Specification**

Product model: 100V100A-4CH

Product Specifications: Energy Feedback

Effective Date: 2024.11.20 Version Number: 2.0



## 1. Feedback series Equipment features

- Energy feedback energy-saving type , in the test process, it has the effect of charging energy saving (80 %) and discharging feedback (93%) , and the heat generation is small, so as to achieve the purpose of energy saving and cost reduction for users;
- The constant current to constant voltage charging is safe and smooth, the voltage and current of the device are connected in a four-wire system, and the voltage and current loops are independently designed to make a safe and smooth transition during the constant current to constant voltage charging process to avoid damage to the battery due to spikes;
- High-precision calibration method , charging current, discharging current, charging voltage and discharging voltage are all calibrated by Agilent with high precision to ensure that the accuracy of current and voltage is within 0.5‰;
- Excellent heat dissipation performance, unique air duct design, through forced air cooling to reduce the impact of high temperature on equipment performance. Dual-fan mode is used to cool down the power cooling module by forced ventilation, and a thermal imager is used to conduct thermal simulation tests to ensure that the cooling device works within a reasonable temperature range;
- The built-in temperature of the device, each channel can be customized according to the needs. It comes with one main temperature without external auxiliary temperature ( with multiple channels, the temperature needs external auxiliary temperature ), real-time monitoring of battery temperature, so as to monitor and protect the normal safety test of the battery according to temperature changes;
- Single box power supply , independent power supply for each box of the whole cabinet, to ensure the stability and safety of the whole cabinet power supply;
- The power supply is independent, ensuring that the circuit output is uniform during the power supply operation, and there is no protection problem;
- The clamp is flexible and adjustable, and can be compatible with batteries of various sizes, so that it is truly multi-purpose and maximizes its use value.

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## 2. The scope of application and functions of the equipment

**2.1. Scope of application of the equipment:** mainly used in life aging tests in the production or experiment of lithium-ion batteries, lead-acid batteries, nickel-cadmium batteries, nickel-metal hydride batteries and other batteries (Circle life Testing) and quality control.

**2.2. Supported test content:** battery cycle life test, battery capacity test, battery charging characteristics test, battery discharge Characteristic test, battery charge retention test, battery charge and discharge efficiency test, battery overcharge and overdischarge rate tolerance test, etc.

## 3. Equipment Working requirements and technical parameters

#### 3.1. Single power supply:

AC voltage 220V ±10%,

Frequency: 50 Hz ±5%,

Whole cabinet power supply:

AC voltage 380V ±10%,

Frequency: 50 Hz ±5%

#### 3.2. Ambient temperature:

0 ∽ 45°C

#### 3.3. Ambient humidity:

no more than 85%RH ( no water vapor condensation )

3.4. The environment has

no strong vibration,

no corrosive gas and

no flammable or explosive gas.

#### 3.5. Resolution:

Analog Digital Conversion: 16bit accuracy



## 4. Specifications :

| Device model                                 | 100V100A-4ch 1 Channel/ rack, the whole table has 4 channels  |  |  |  |  |
|--|---|--|--|--|--|
| communication method                         | TCP/IP (network port)   |  |  |  |  |
| channel control mode                         | single point independent control  |  |  |  |  |
| Charging Energy<br>Saving Efficiency         | 80%   |  |  |  |  |
| Charging voltage                             | 10~100V   |  |  |  |  |
| Port discharge voltage                       | 10~100V   |  |  |  |  |
| recharging current                           | 0.1A~100A   |  |  |  |  |
| Discharge feedback<br>efficiency             | 93%   |  |  |  |  |
| Discharge current                            | 0.1A~100A   |  |  |  |  |
| Voltage accuracy                             | 0.05%   |  |  |  |  |
| Current accuracy                             | 0.05%   |  |  |  |  |
| main temperature                             | According to the specific equipment, it can be customized and equipped with 1 channel for each channel  |  |  |  |  |
| Voltage resolution                           | 1mV   |  |  |  |  |
| current resolution                           | 1mA   |  |  |  |  |
| temperature resolution                       | 0.1°C   |  |  |  |  |
| input power                                  | AC 220V±10%/50Hz (cabinet power supply mode: three-phase five-wire)   |  |  |  |  |
| sampling time                                | Single box sampling frequency 10mS  |  |  |  |  |
| record time                                  | 100mS~65535S  |  |  |  |  |
| charging mode                                | Constant current limiting voltage , constant current constant voltage , constant power charging , constant current overcharge test (for batteries with protection boards) |  |  |  |  |
| Charge cut-off condition                     | Voltage, current, time, capacity , temperature  |  |  |  |  |
| discharge mode                               | Constant current discharge, constant power discharge , constant current over-<br>discharge test (for batteries with protection boards)                                    |  |  |  |  |
| Discharge cut-off condition                  | Voltage, current, time, capacity, temperature   |  |  |  |  |
| Number of working<br>steps in a single cycle | 100 steps, with nested loop function (10 layers )   |  |  |  |  |
| Circuit configuration                        | Modular structure design, easy to replace and repair  |  |  |  |  |
| Software and hardware protection             | Reverse polarity protection, overvoltage protection, overcurrent protection, overtemperature protection, undervoltage protection, short circuit protection                |  |  |  |  |



|                                 | 1. The software supports various connections, such as manual pause connection, software shutdown connection, power interruption interruption connection, device communication interruption connection connection, and abnormal stop connection connection;   |  |  |  |  |
|---------------------------------|--|--|--|--|--|
| Main functions of the<br>system | 2. Support barcode scanning, which can scan one-dimensional codes and two-<br>dimensional codes, and there are scanning methods such as sequential code<br>scanning, channel jump scanning code, and plate scanning code scanning;   |  |  |  |  |
|                                 | <ol> <li>Local test detailed data storage, you can view the current test data and historical data of each channel at any time, there are two ways of corresponding presentation of data and curves, and support exporting EXCE reports in single or batch form, and you can also set the end of the test according to your needs Automatically import data.</li> <li>Support capacity sorting, which can classify batteries and turn on LED lights;</li> </ol>   |  |  |  |  |
|                                 | 5. Support the qualified judgment at the end of the test, and judge the Pass/NG result according to the specified cycle capacity, voltage, time and other information;   |  |  |  |  |
|                                 | 6. Support various working step protection and global voltage, current, temperature abnormal protection, and abnormal alarm, support battery pack overcharge and overdischarge protection test;  |  |  |  |  |
|                                 | 7. Support unit conversion;  |  |  |  |  |
|                                 | 8. Support database server background MES storage or other MES docking;  |  |  |  |  |
|                                 | 9. Software and hardware offline protection;   |  |  |  |  |
|                                 | 10. Support channel parallel function;   |  |  |  |  |
|                                 | 11. Real-time screening of voltage acquisition, check for poor battery crimping before the test, and screening of the formed voltage after the test.   |  |  |  |  |
|                                 | 12. The BMS communication protocol is connected, and the battery charging and discharging steps are monitored through the BMS data items.  |  |  |  |  |
| system protection               | Global protection parameters (including battery reverse connection protection, voltage lower limit protection, voltage upper limit protection, current upper limit protection, over-<br>temperature protection), CC charging protection parameters (voltage trend abnormal protection, charging current fluctuation abnormal protection, voltage fluctuation abnormal protection, charging Voltage time setting, abnormal charging voltage rising speed protection), CV charging protection parameters (including current trend abnormal protection, charging current fluctuation abnormal protection, voltage fluctuation abnormal protection, charging current fluctuation parameters (including current trend abnormal protection), CC discharge protection parameters (including voltage trend abnormal protection, discharge current fluctuation protection Abnormal protection, abnormal voltage fluctuation protection, abnormal discharge voltage drop speed protection), Idle protection parameters (including abnormal voltage iump protection) five items, when |  |  |  |  |
|                                 | each protection reaches the user-set parameters, set<br>The equipment will automatically stop the operation of the channel, and an alarm will<br>be issued, and the event will be recorded for easy tracking.  |  |  |  |  |



| Data monitoring view                                  | During the operation of the system, the main window of the software will display<br>information such as the current current, voltage, charge and discharge capacity of<br>each channel, the process of operating steps, and the name of the currently operating<br>steps in real time. The software can also view the current operating data or historical<br>record data at any time through the window, and can be manually or automatically<br>exported in EXCEL format. |
|---|---|
| communication method                                  | The interface between the equipment and the central computer adopts the CAN interface,<br>and the communication between the central computer and the upper computer adopts the LAN<br>network, which can ensure the stability and real-time performance of long-distance data<br>collection. All communication ports of the device are isolated,  |
|   | With lightning protection design.   |
| Software system                                       | Provide free software upgrades for life   |
| Voltage and current<br>detection sampling<br>terminal | Special four-wire connection  |
| Security Level  | Comply with EN60950, GB4943 requirements  |
| noise   | Follow the method of IEC62040-3 to test the noise. The sound level meter used when the noise is less than 70dBA should meet the requirements of Type I in IEC804, and the accuracy should be better than $\pm 0.5$ dB.  |
| degree of protection                                  | IP20  |
| Chassis color   | ice gray  |
| lightning protection                                  | Meet the 2-pole lightning protection requirements of GB17626  |
| cool down   | ventilate   |



## 5. The physical picture of the equipment:

Single box Equipment diagram (length \* width \* height: 753\*686\*210mm) Single box can be max 1CH 100V100A so for 4CH there will be 4 boxes



Larger Equipment Picture: (length \* width \* height: 750\*700\*1850mm) Single rack mount can handle 4CH 100V100A in one cabinet



Customer will arrange additional tables/racks to place the battery packs to be TESTED



## 6. Accessory list

| No |                           | <b>-</b>                              |                           |          | _                                      |
|----|---------------------------|---------------------------------------|---------------------------|----------|--|
|    | Category                  | Product Name                          | PN                        | Quantity | Remark                                 |
| 1  | Test<br>Equipment         | Charge and discharge test equipment   | 100V100A<br>4CH           | 1 PCS    | Total 4 channel                        |
| 2  | cabinet                   | equipment cabinet                     | /                         | 1 PCS    | Default with 4mt power input line      |
| 3  | Accessories               | Charge and discharge<br>test line     | Four-<br>wire<br>system   | 1 PCS    | One set of test per<br>channel         |
|    |                           |                                       |                           |          | Cord, length 2 meter                   |
| 4  | Accessories               | O-shaped cupper nose                  | 22-8                      | 1 set    |  |
| 5  | Accessories               | battery rack                          | 1600                      | 1 set    | Extra Paid option                      |
|    |                           |                                       | 435                       |          |  |
|    |                           |                                       | 1425mm                    |          |  |
| 6  | Accessories               | computer                              | WIN7                      | 1 set    | Including mouse<br>keyboard, monitor   |
|    |                           |                                       |                           |          | Extra paid option                      |
| 7  | Accessories               | switch                                | /                         | 1 PCS    | Compatible with on-<br>site online use |
| 8  | Accessories               | Communication accessories             | Commu<br>nication<br>line | some     | Compatible with on-<br>site online use |
| 9  | Accessories               | battery detection<br>system pieces    |                           | 1 set    | After-sales<br>installation provided   |
| 10 | Accessories               | Software instruction manual and video |                           | 1 set    | After-sales<br>installation provided   |
|    |                           | tutorial                              |                           |          |  |
| 11 | accompanying<br>documents | document                              | /                         | 1 set    | delivery note, etc.                    |



## 7. Introduction to the software and interface of the Host computer

Customer will arrange a Host PC with W10 operating system.

The upper computer test software is an inseparable part of the charge and discharge test system, which can be installed on the computer with the operating system win98/ win2000/ WinXP/ win7/ or win10 with above professional version to realize the integration of process procedures, test processes, data collection and result analysis; The integrated design concept is easy for users to operate, and the mature software design architecture is adopted, which has good scalability and is easy to upgrade and maintain.

#### 7.1. START Software:

After the hardware configuration is completed, open the test software, and it will automatically enter the search mode. The interface is as follows:





#### 7.2. Process Editing

Click the "Login" button, the "StepEdit" interface will pop up, click "New Process" to create a new process, click the program name to change the process name.

For example, select a constant current and constant voltage charging step: 20000mA constant current charging, voltage setting 4200mV, current limit setting 50mA.

(Constant current and constant voltage charging is a combination of constant current charging and constant voltage charging, first constant current charging to the limiting voltage, and then constant voltage charging to the limiting current).

Note: The parameters set by different batteries are not the same, and they need to be set according to the actual parameters provided by the battery manufacturer. After the settings are completed, click the "Save" button to prompt "OK" and exit the process editing interface. If it is not saved normally, fill in and modify the corresponding parameter settings according to the prompts, and it will automatically locate the corresponding location that is not filled in normally.

Parameters that need to be set for common types of charging and discharging:

Constant current and constant voltage charging: constant current value, constant voltage value, current limit value. Capacity, time limit optional

Resting: Time limit

Jump: cloth number, number of jumps.

Constant current charging: constant current value, time, other options.

Constant voltage charging: constant voltage value, time, other options.

Constant power charge and discharge: constant power value, time, other options.

Constant current discharge: constant current value, time, other options.





#### 7.3. Viewing Data

We can view the data when the channel is running, or we can view it after the test is over, and double-click on the channel to pop up to see the number of samples for the corresponding channel according to the window.

In the future, you can also refresh directly in this window and click [Refresh Content] to display the latest test data in real time.

