

# OPERATION MANUAL

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**JK5530/JK5530+**  
**Battery Comprehensive Tester**



**User Manual**

## Safety notice

warning! It is strictly forbidden to reverse the battery polarity!



remind! Ensure that the fixture cannot be connected to the load before starting up!

Do not terminate the test during the test, it will cause inaccurate measurement data

 Warning  Danger: When you find the following abnormal situations occur, please immediately terminate the operation and disconnect the power cord. Contact Jinko Instrument Sales Department immediately for repair. Otherwise it will cause a fire or a potential electric shock hazard to the operator.

- Abnormal operation of the instrument.
- Unusual noise, peculiar smell, fireworks or flashes are generated during operation.
- During operation, the instrument generates high temperature or electric shock.
- The power cord, power switch or power socket is damaged.
- Impurities or liquid flow into the instrument

## Security Information

 Warning  Danger: To avoid possible electric shock and personal safety, please follow the instructions below.

Disclaimer: Please read the following safety information carefully before starting to use the instrument. For the personal safety and property damage caused by the user's failure to comply with the following terms, Jinailian Technology will not bear any responsibility

Instrument grounding: To prevent the risk of electric shock, please connect the power ground wire.

Don't use the instrument in explosive gas environment: Don't use the instrument in flammable and explosive gas, steam or dusty environment. The use of any electronic equipment in such an environment is a risk to personal safety.

Do not open the instrument shell: non-professional maintenance personnel may not open the instrument shell to try to repair the instrument. The undischarged charge still exists for a period of time after the instrument is turned off, which may cause electric shock hazard to the person.

Do not use a damaged instrument: if the instrument has been damaged, the danger will be unpredictable. Please disconnect the power cord, do not use it again, and do not try to repair it yourself.

Do not use an instrument that works abnormally: If the instrument does not work properly, the danger is unpredictable, please disconnect the power cord, do not use it, and do not try to repair it yourself.

Do not use the instrument beyond the way specified in this manual: beyond the scope, the protective measures provided by the instrument will become invalid.

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# Preface

Common rechargeable batteries include lithium batteries, nickel-cadmium batteries, nickel-metal hydride batteries, and sealed lead-acid batteries. Among them, the lithium battery has the characteristics of large capacity, light weight and high cycle times. It is widely used in mobile phones, PDAs, digital cameras, camcorders, notebook computers and other fields. It is currently the most advanced rechargeable battery. The lithium battery referred to here is a finished product. The lithium battery pack is composed of lithium batteries (lithium ion batteries or inner polymer batteries) plus a lithium battery protection board. Nickel-cadmium batteries are rechargeable batteries that have been used earlier. They have the characteristics of low cost, low internal resistance, and large current discharge. So far, they have been widely used in some electric tools and electric vehicles.

Ni-MH batteries are similar to Ni-Cd batteries, but because they do not contain heavy metals, they have less pollution to the environment. Currently, they are widely used in some common consumer electronic products and have basically replaced the previous applications of Ni-Cd batteries. Small sealed lead-acid batteries, also known as maintenance-free lead-acid batteries, are currently mature in technology and are currently mainly used in fixed backup power applications, such as uninterruptible power supplies, emergency lighting, and so on.

In response to the production and testing needs of these rechargeable batteries, a special comprehensive tester for rechargeable batteries has been specially developed. This tester can make a quantitative and accurate measurement of some basic parameters of the battery, and can measure the open circuit voltage, internal resistance, and Charging, discharging performance, and battery capacity are especially for lithium batteries. There are also overcharge protection, overdischarge protection, overcurrent protection, short circuit protection and other functions, and the corresponding values have been measured, which greatly facilitates the production and sale of batteries. Before and after-sales service work, you can intuitively judge the performance and quality of the battery in a few simple steps, and it also has a quick screening

function. You can set the upper and lower limits of the measurement parameters, and you can easily obtain a batch of finished battery products. Fast detection of defective batteries in the medium and high production efficiency. In addition, some special functions are added to make it have the characteristics of some general-purpose instruments and equipment, expand the flexibility of the equipment, and have the characteristics of a wide range of applications.

In addition, the tester can provide software upgrade services according to customer needs. On the basis of the basic model, it can be upgraded to a computer-connectable model through software. The test data can be set and saved through the computer, and the test results can be automatically recorded. The battery bar code is used to record the test data of each battery, which is conducive to the analysis and control of production quality, product traceability, etc. In addition, the test accuracy of voltage and internal resistance can be increased by an order of magnitude by installing a hardware upgrade module to meet more Strict quality requirements.

The battery performance comprehensive tester can test multiple types of lithium-ion batteries, nickel-hydrogen batteries, polymer batteries (groups) within 10V20A, such as walkie-talkie batteries, mobile phone batteries, etc., such as: MP3/4 batteries, digital batteries, double-string battery packs, mobile phones Batteries, etc.; this testing equipment is widely used in battery manufacturers of walkie-talkie batteries, mobile phone batteries, digital batteries, etc.; it can meet the production testing of high, medium and low-end batteries by various manufacturers. The time to test a battery is no more than 1 second; it is fast, fully functional, and high-precision; it is the most accurate type of instrument currently on the market.

It is widely applicable to battery manufacturers of walkie-talkie batteries, mobile phone batteries, digital batteries, etc.; it can meet the production testing of high, medium and low-grade batteries by various manufacturers. The fastest test time for a battery is no more than 1 second; it is fast, full-featured, and high-precision; it is the most accurate test instrument on the market. For the production and testing of rechargeable batteries, JINKO has specially developed a special comprehensive tester for rechargeable batteries, which can make a quantitative and accurate measurement of some basic parameters of the battery, and can measure the open circuit voltage,

internal resistance, charging and discharging performance of the battery. , The battery capacity is especially for lithium batteries. There are also overcharge protection, over discharge protection, over current protection, short circuit protection and other functions, and the corresponding values have been measured, which greatly facilitates battery production and pre-sales and after-sales services. It can intuitively judge the performance and quality of the battery in a few very simple steps, and it also has a quick screening function. The upper and lower limits of the measurement parameters can be set, and it can be easily and quickly detected bad battery from a batch of finished battery products to improve production efficiency

## **One. Function Overview**

The basic functions of JK5530 battery comprehensive tester include:

### **1. Quick detection of battery static parameters.**

1.1 Battery voltage detection (for the lithium battery that is already in the protection state, it can automatically wake up)

1.2 Battery internal resistance detection

1.3 Battery overcurrent detection (only for lithium batteries)

1.4 Battery short-circuit protection function detection (only for lithium batteries)

1.5 Battery NTC resistance detection.

1.6 The upper and lower limits can be set separately for the parts with detectable numerical values above for quick screening.

### **2. Individually selectable battery charging function.**

Select this function, the tester can be used as a multi-functional smart charger, charging various types of rechargeable battery packs in various combinations (Model JK-5530 can charge up to 4 lithium batteries in series, 12 strings Ni-MH batteries, 6 series of maintenance-free batteries for fast charging), which greatly facilitates the convenience of battery use and testing. While charging, the charging time and the amount of electricity that have been charged are displayed in real time (in mAH) display).



### 3. Individually selectable battery discharge function.

By selecting this function, the tester can discharge a battery separately and control the discharge cut-off voltage at the same time, avoiding the disadvantages of easy over-discharge caused by the usual electronic load or resistance discharge, and it is very convenient for the factory to test battery products , The operation is also very convenient, only need to select the battery type, voltage and capacity to start the intelligent discharge program, and safely discharge the battery.

### 4. CNC current and voltage source function.

By selecting this function, the instrument can be used as a precision numerically controlled DC power supply with a maximum output of 20V and a maximum output of 5A. The output voltage and current limit can be directly set. It can be conveniently used for special battery charging, testing, and The function of supplying power to other equipment expands the scope of application of the instrument.

### 5. CNC electronic load function.

Select this function, the instrument can be used as a precision electronic load, can be set to work in constant current mode, and can also set the cut off voltage (cut off) to facilitate battery discharge measurement, which can make the load voltage low When the cut-off voltage is set, the working current is automatically cut off to avoid damage to the battery due to deep battery discharge. In addition, the instrument can also be used in other occasions that require electronic loads, such as charger testing, aging testing of switching power supplies, and so on.

### 6. Voltage and internal resistance meter function

By selecting this function, the instrument can be used as an ordinary 3 1/2-digit digital voltmeter and digital milliohm meter, which can continuously indicate the input voltage and the internal resistance of the battery, and can be used directly instead of a dedicated internal resistance meter for fast batteries Screening and testing.

#### Technical Parameter:

Model		JK5530	JK5530+
Test range	Battery voltage measurement range	0-36V, Minimum resolution 1mV, Accuracy: $\pm 30\text{mV}$	0-60V, minimum resolution 1mV Accuracy: $\pm 30\text{mV}$

	Internal resistance measurement range	0-1999mΩ, minimum resolution 1mΩ	0-1999mΩ, minimum resolution 1mΩ
	Capacity measurement range	0-100000mAH, minimum resolution 1mAH	
Measurement accuracy	Voltage measurement accuracy	$\pm$ (result*0.1%+3mV) (voltage 0~36V) $\pm$ (result*0.1%+30mV) (voltage 37~60V)	
	Current measurement accuracy	$\pm$ (result*0.2%+30mA) (current 0~10A) $\pm$ (result*0.5%+30mA) (current 11~30A)	
	Internal resistance measurement accuracy	$\pm$ (result*1%+1mΩ)	
Test speed	Static test (test all functions)	1.1-2 seconds	
Internal numerical control voltage source index	Maximum output voltage	20V	30V
	Maximum output current	5A	10A
	Output power	80W	100W
	Ripple voltage	<100mV	<100mV
	Load regulation rate	<10%	
	Response time	1S	
Internal numerical control electronic load index	Maximum discharge voltage	36V	60V
	Maximum discharge current	15A	30A
	Ultimate power	80W	100W long time /200W-15S/300W-5S
	Power supply voltage	220V $\pm$ 10%50Hz	
U disk storage		No	No
Communication interface		No	Yes (with upper computer software)
Accessories		Kelvin clip test lead, test probe	

Size and weight	Shelf size (mm) : 215(w)*88(H)*335(D) Dimensions (mm) :235(W)*105(H)*360(D),about 3.6kg
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## Two. Appearance and operation of the instrument

The appearance panel of the instrument is mainly composed of three parts, LCD used to display operation and measurement information as a keyboard, and wiring holes, as shown in the figure.



### Display Interface

The display interface of this instrument is a large 4.3-inch TFT LCD, which can display more information at the same time. See the operating instructions for details.

### Operation interface

The input interface of this instrument is composed of 26 light touch keys, which are: switch key, 5 function keys, up key, down key, left key, right key, confirm key, display key, setting key, numeric keyboard, trigger key. The operation is very simple, the function of each button is single, anyone with a little familiarity can operate this equipment proficiently.

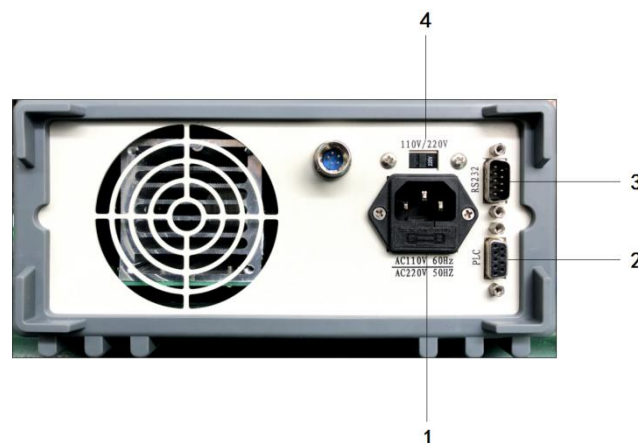
As shown below,



(1. Display screen) (2. Switch key) (3. Function keys) (4. Setting area) (5. Keyboard area) (6. Pass/Fail) (7. USB interface) (8. Battery test line +/- terminal) (9. Battery NTC test terminal)

The operation interface of this instrument adopts the common multi-level, page-turning menu operation interface, which supports many functions and simple operation. The main menu is the 8 main functions mentioned above. Press the up key or the down key to select the corresponding function, press the enter key to select, and enter the setting operation interface. In the operation interface, press the up and down keys to select the corresponding adjustment item. Press left, decrease, right, increase, select the setting value, and press the confirm key to start the test run. In any operation interface, you can switch between functional tests. If it is currently in the setting state, press the trigger key to start the operation. If it is in the running state, press the confirm key to pause the current operation, and press the confirm key again to start again Currently running.

#### Rear panel diagram



(1. Power input) (2. PLC interface) (3. RS232 interface) (4.110V/220V voltage switch)

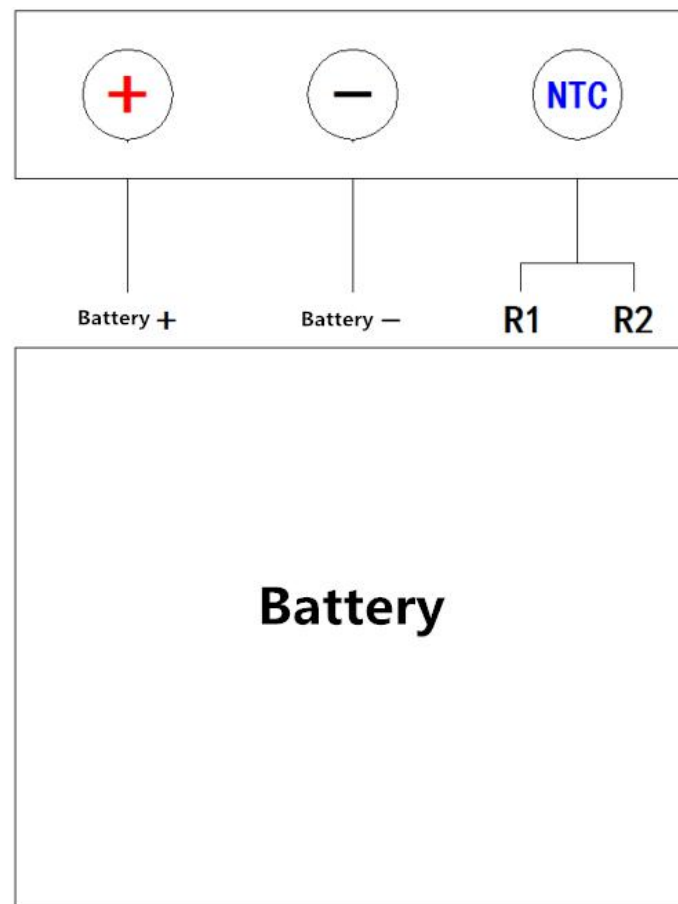
### Three. Wiring Mode

This instrument has 3 connection terminals, of which + and - are respectively connected to the positive and negative terminals of the battery for charging

And discharge connection channel; No. 9 terminal and-terminal are used to detect the two-way NTC resistance of the battery.

The figure below is an example of testing a lithium battery with identification resistor.

The connection method is shown in the figure:

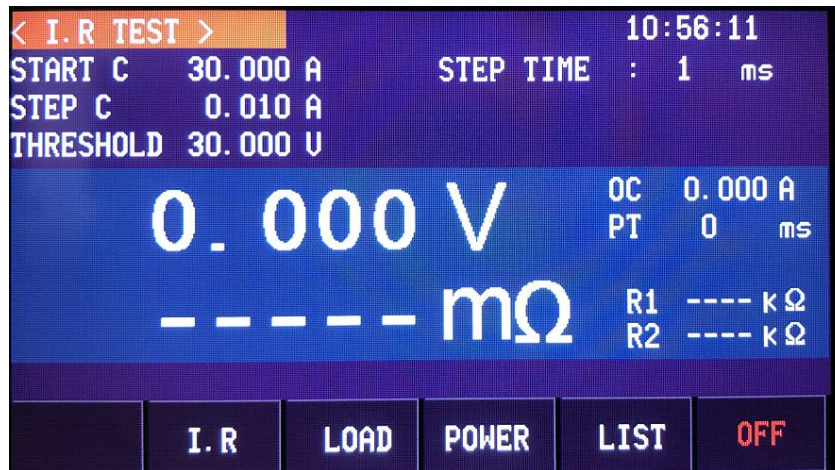


### Four. Function Page

After the boot screen is displayed, enter the main function menu display interface to display voltage and battery internal resistance information,

In the system setting interface, press the "DISP" key to return to the previous test interface.

#### Internal resistance test interface



The internal resistance test interface can test the overcurrent value of the battery according to the set conditions, as well as the battery's voltage before overcurrent, internal resistance, short circuit protection time, NTC resistance R1 and R2.

The overcurrent test is aimed at the battery with a protection board. The battery protection board will start the protection, disconnect the load function, and record the overcurrent current value.

Overcurrent test parameter setting:

1. Initial current: The current will be used as the starting point during the over-current value test to detect the over-current value;
2. Step time: The unit is ms, and the overcurrent value will increase the current at this time interval until it reaches the overcurrent value of the protection board;
3. Step current: the step current of each step time, if you set 0.1A, the step time is 1ms, then step 0.1A every 1ms until the overcurrent value of the protection board is reached;
4. Threshold voltage: If the user sets the threshold voltage, the test can only be started when the device detects that the battery voltage is greater than the threshold voltage.

Test Results

1. Overcurrent: the overcurrent protection value of the battery,
2. Protection: short circuit protection time of the battery,
- 3.-----V: The voltage value of the battery before the overcurrent test,
- 4.-----mΩ : the internal resistance of the battery.

After the over-current test parameters are set, the battery will be connected and the test will start automatically after the internal resistance is stable.

## Program control load test mode display interface



**Set the load mode:** press the up and down keys to move the cursor to this option, and the available options will be displayed in the lower left corner of the screen. Use the function keys to select the desired option to complete the setting;

**Set the load voltage:** press the up and down keys to move the cursor to this option, enter the voltage value you need to set through the numeric keyboard, and then press the corresponding unit in the lower left corner of the screen to complete the setting;

**Set the load current:** press the up and down keys to move the cursor to this option, enter the current value you need to set through the numeric keyboard, and then press the corresponding unit in the lower left corner of the screen to complete the setting;

**Set cut-off voltage:** press the up and down keys to move the cursor to this option, enter the voltage value you need to set through the numeric keyboard, and then press the corresponding unit at the lower left corner of the screen to complete the setting;

### Meaning of each parameter:

**Load mode:** This parameter has CC mode and CV mode optional. In CC mode, the battery is discharged in constant current mode, and the load current parameter is valid; in CV mode, the battery is discharged in constant voltage mode, and the load voltage parameter effective.

**Load voltage:** After this parameter is set, when the load mode is CV mode, the instrument will discharge the battery at a constant voltage with the value set by this



parameter.

**Load current:** After this parameter is set, when the load mode is CC mode, the instrument will discharge the battery with constant current at the value set by this parameter.

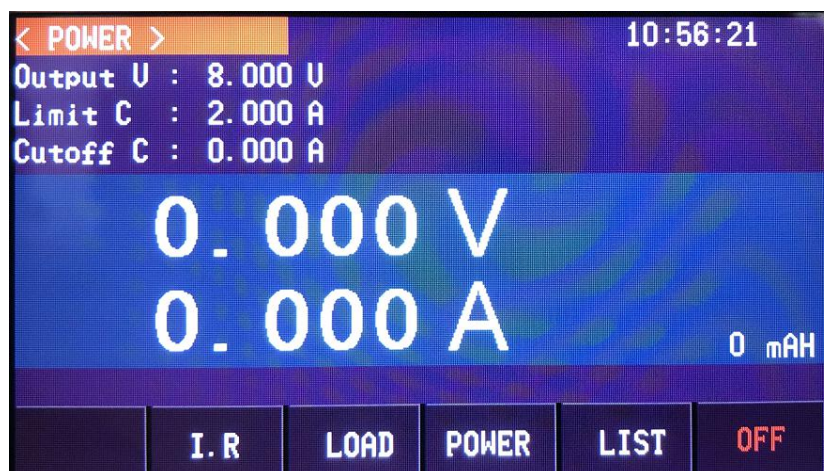
**Cut-off voltage:** After this parameter is set, the instrument will use this parameter to interrupt the battery discharge operation.

After setting all parameters, connect the battery to be tested, press the function key corresponding to the OFF switch at the bottom right corner of the screen, and the switch will turn from OFF to ON to start the battery discharge operation; if you want to interrupt the discharge operation in the middle, press again Press this function key and the switch will turn from ON to OFF, which can interrupt the discharging operation of the battery. The discharge capacity will be recorded in real time during the test.

**CV mode selection:** When the overcurrent value is greater than 2.5 times the actual working current value or the overcurrent value is greater than 10A, select this mode. The test speed in this mode is fast, but some batteries may not support this mode. If the test overcurrent value in this mode is 0, it is recommended to use the CC mode.

**CC mode selection:** Otherwise, select this mode.

## Program control power test mode display interface





**Set the output voltage:** press the up and down keys to move the cursor to this option, enter the voltage value you need to set through the numeric keyboard, and then press the corresponding unit in the lower left corner of the screen to complete the setting;

The setting steps of limiting current and cut-off current are the same as above.

#### Meaning of each parameter:

**Output voltage:** After this parameter is set, the instrument will charge the battery with constant current at the value set by this parameter.

**Limit current:** After this parameter is set, the instrument will charge the battery with constant current at the value set by this parameter.

**Cut-off current:** After this parameter is set, the instrument will use this parameter to interrupt the battery charging operation.

After setting all parameters, connect the battery under test and press the function key corresponding to the OFF switch at the bottom right corner of the screen. The switch turns from OFF to ON to start the battery charging operation; if you want to interrupt the charging operation in the middle, press again Press this function key and the switch will turn from ON to OFF to interrupt the battery charging operation. The charging capacity will be recorded in real time during the test.

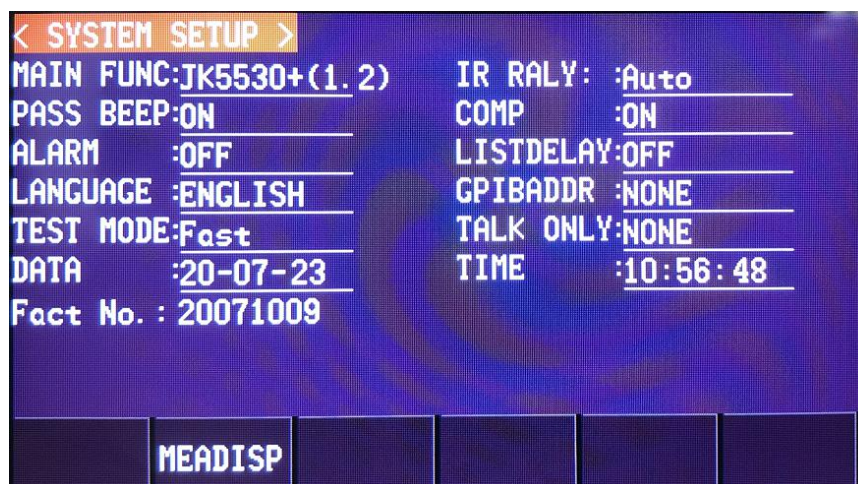
## Measurement setting interface

< COMP >		10:42:04	
LVHIGH	0.000 V	PVHIGH	0.000 V
LVLOW	10.000 V	PVLOW	10.000 V
LCHIGH	0.000 A	PCHIGH	0.000 A
LCLOW	2.000 A	PCLOW	2.000 A
RHIGH	0 m $\Omega$	R1LOW	0.0k $\Omega$
RLOW	200 m $\Omega$	R1HIGH	50.0k $\Omega$
OCHIGH	0.000 A	R2LOW	0.0k $\Omega$
OCLOW	5.000 A	R2HIGH	50.0k $\Omega$
STLOW	0 ms	STHIGH	20 ms
		I. R	LOAD
		POWER	LIST
		SYSSET	

All parameters on this page correspond to the test parameters of the instrument. After setting, cooperate with the sorting switch in the system setting to achieve the function of sorting test data. When the sorting results are all qualified, the instrument parameter display will turn green and light up. The green light prompts, and at the same time, the PLC interface on the back of the instrument will also have qualified contacts; when one or more of the sorting results are unqualified, the instrument parameter display will turn red, and a red light will be lit to indicate that if there is an alarm in the system settings. When the sound is in the open mode, the instrument will emit a buzzer alarm, and at the same time, there will be unqualified contacts on the PLC interface on the back of the instrument.

For all parameters, press the up and down keys to move the cursor to this option, enter the value you need to set through the numeric keyboard, and then press the corresponding unit in the lower left corner of the screen to complete the setting; if any parameter does not need to participate in the sorting, just set the The upper and lower limits of the parameters are all set to 0.

## System settings page



### Meaning of each parameter:

**Internal resistance range:** The range for internal resistance testing can be selected according to the internal resistance of the battery to be tested. There are three options in total: auto, low and high. The low range tests the battery internal resistance below 200mΩ

and the high range tests the battery above 200mΩ. In automatic mode, the instrument will automatically switch the test range according to the internal resistance of the battery under test.

**Button sound:** the operation sound when the button is turned on or off.

**Sorting switch:** turn on or off the parameter sorting function.

**Buzzer alarm:** turn on or off the buzzer alarm function when it fails.

**List delay:** During list test, the delay time between each step is set inside the instrument, and the duration is about 1S, which can be turned on or off by this parameter.

**Display language:** switch between Chinese and English.

**Test mode:** Accurate/Fast. In Accurate mode, the instrument will slow down the test speed to achieve higher test accuracy.

**Date/Time:** Set the system date and time of the instrument.

## List test page



### The meaning of each parameter

**List steps:** Set the number of steps in the list, up to 15 steps.

**Test mode:** automatic/manual. If you select automatic mode, the instrument will determine whether to perform list test based on the threshold voltage. If you select manual, you need to press the OFF function key at the lower right corner of the instrument to perform list test.

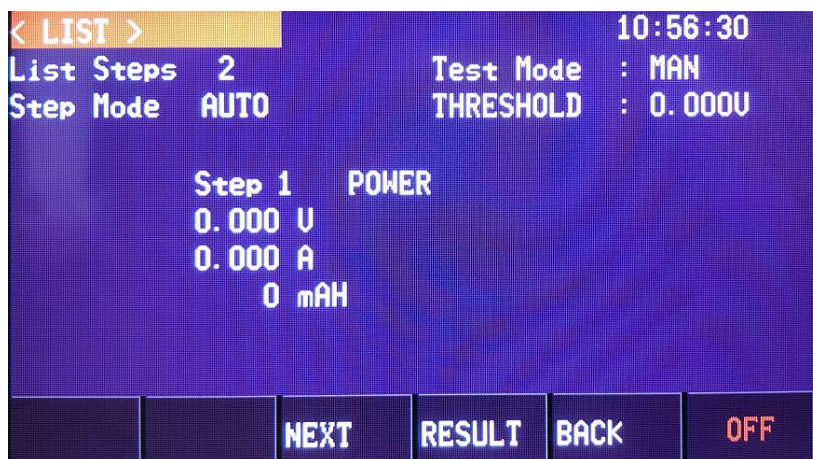
**Step mode:** continuous, each step is tested continuously.

**Threshold voltage:** When the test mode is automatic, this setting is the basis for starting the test. If the connected battery voltage reaches the set voltage, the instrument will automatically perform a list test.

**Step X:** For each step of parameter setting, press the up and down keys to move the cursor to this option, and use the function keys to select the parameter to be set to complete the setting; optional steps are: discharge, charge, overcurrent, overcharge, overdischarge, NTC, static, use the more key to turn pages; use the left and right keys to switch steps. ***When setting the steps, if there are static and overcurrent test steps, the static test needs to be placed in the first step, and the overcurrent test needs to be placed in the second step; if there is no static test but there is an overcurrent test, the overcurrent test needs to be placed in the first step.***

For other parameters, refer to the parameter setting methods on the pages of internal resistance test, programmable load, and programmable power supply.

After all parameter settings are completed, press the enter test function key to enter the list test to be tested interface.



After entering the list test, the instrument will wait for the test or automatic test according to the test mode.



< LIST >					10:56:38
List Steps 2			Test Mode : MAN		
Step Mode AUTO			THRESHOLD : 0.000V		
NO	MODE	PARA1	PARA2	RES1	RES2
1	POW	0.000V	0.000A	0 mA	
2	LOAD	0.000V	0.007A	0 mA	
			PREV	NEXT	BACK
			RETEST		

After the test is completed, the instrument will display the test and sorting results; if the selected test mode is automatic, the instrument will detect the input voltage. When the battery is removed and the input voltage is lower than the threshold voltage, the instrument will enter the list test to be tested interface; When the battery is reconnected and the input voltage is higher than the threshold voltage, the instrument will perform the column test again. In manual test mode, you need to press the OFF function key on the interface to be tested to test.

## Five. Instrument characteristic index

### Applicable environment of the instrument:

1. Temperature, 0~ 40℃
2. Use height, within Altitude 2Km
3. Relative humidity, 40~80% humidity

### Electrical parameters:

Power supply voltage: 220V ±10% 50Hz

Power consumption, maximum 150W

### Appearance and weight:

Instrument weight: 4.1Kg

Instrument size: L (300mm)×W (300mm)×H(100mm)

Outer packing size: L(360mm)×W(360mm )×H(160mm)

Outer packaging weight: 4.4K g

**Warranty regulations**

1. The equipment sold by our company is guaranteed for free for 2 years under the condition of non-human damage.
2. The warranty requires the warranty card, certificate, and original sales certificate.
3. During the warranty period, if it is necessary to return to the company for repair, the user shall bear the shipping cost of returning to the company, and our company will be responsible for the return shipping cost after the repair is completed.
4. For equipment beyond the warranty period, our company is responsible for lifelong free maintenance, but users need to bear the cost of parts.
5. The internal disassembly, modification, or upgrade of the instrument sold by our company is not allowed, otherwise the warranty qualification will be automatically lost.