User Manual

CE-6000n Series power battery testing equipment

Notice

- Please fully read the user manual before proceeding.
- Please keep this user manual for reference at any time.
- The safety precautions must be fully read and understood before using the product.

Neware Technology Limited

Content

Preface 3

Installation 6

No.1 Chapter Inspection of Accessories and Apare Parts 7

No.2 Chapter Installation 8

2.1 Box Appearance Structure 8

2.2 Cabinet Installation 9

2.3 Electrical Connection 12

2.4 Installation Tool 20

Operation 21

No.3 Chapter Safety Instructions 22

3.1 Safety Precautions 22

3.2 Personal Safety Requirements 23

3.3 Airframe Identification Requirements 23

3.4 Safety Alert Requirements 23

3.5 Fire Exit Requirements 24

3.6 Battery Protection Requirements 24

3.7 Equipment Installation Requirements 24

3.8 Electrical Connection Requirements 25

3.9 Power-off operation requirements 26

3.10 Product end-of- life requirements 26

3.11 Other protection requirements 26

No.4 Chapter Equipment Introduction 27

4.1 System Composition 27

4.2 System Topology 28

4.3 System Performance Parameters 29

No.5 Chapter Touch Screen Instructions 35

5.1 Home 35

5.2 Overview 37

5.3 Set up 39

5.4 Switch Machine 40

5.5 Running Data 41

5.6 Fault Record 43
5.7 Auto Calibration 44
No.6 Chapter Runing 46
6.1 Boot 46
6.2 Shutdown 47
No.7 Chapter Maintenance and Maintenance 48
7.1 Note 48
7.2 Inspection and Maintenance 49
7.3 Cleaning and Maintenance 50
7.4 Torque Requirements 50
No.8 Chapter Maintenance 51
8.1 Failure Recovery Operation 51
8.2 Common Faults 52
No.9 Chapter Equipment Warranty 53

Foreword

Thank you for choosing the products of Neware Technology. Our company will not only provide you with high-quality products , but also provide reliable after-sales service.

In order to ensure the personal safety of the user and the integrity of the instrument, please fully read this manual before using the equipment.

This user manual introduces in detail the principle of the equipment, standards, structure, operation specifications, maintenance, possible faults and troubleshooting methods, electrical diagrams, etc. All references to "test regulations" and "standards" in this user manual are for reference only. If your company has any objections, please review the relevant standards or materials by yourself.

This manual is mainly used to guide users how to use the equipment correctly. Only by thoroughly reading and correctly understanding this manual can the equipment be used correctly and its functions fully utilized.

Limitation of Liability:

Neware Technology is not responsible for compensation for accidents caused by improper use of equipment and man-made damage to equipment. Users are requested to use the equipment reasonably according to the provisions of the "User Manual" to avoid unnecessary equipment damage and other losses.

Precautions:

After reading this manual, please keep it in a safe place.

If there are missing or wrong pages, our company will be responsible for replacing them.

Composition of the manual:

It consists of 4 parts and can be used separately as needed.

Name	Content
Foreword	Explains the composition, purpose, and types of symbols used in this manual.
Installation	Outline the work involved in installing the equipment. You can refer to this manual for any problems encountered in the process of installing or moving the equipment .
Operation	Introduce the basic principle of the equipment, explain the operation method of the equipment, and explain how to deal with problems encountered.
References	Related reference materials of the equipment, such as controller instruction manual, etc.

Explanation of Safety Symbols:

The following symbols are used in this manual.

Dangerous	Dangers may occur due to wrong operation, resulting in death or serious injury. In this state, the device is not allowed to be used. Do not attempt to use the device in this state.
Warning	Dangers may occur due to wrong operation, which may cause moderate injury or minor injury to the operator, and may also cause damage to equipment or samples.
Pay Attention	Indicates information necessary for the full functioning of the device or information to prevent damage to the device due to malfunction.

keywords :

The keywords in this manual are as follows.

Step: Indicates the operation method.

Reference: Indicates information that is available for reference.

Description of testing equipment model:

The testing equipment is named according to its series, number of channels, voltage and current levels, total DC output power, etc. Please check the product model you are using on the testing equipment nameplate.

The preparation of this manual covers all models of this series. You only need to read the section relevant to your chosen model.

Model		BTS-600Xn	-	133KW	600V	200A	-IG
Logo		①		②	③	④	⑤
Meaning	①	Power battery testing equipment, X is the number of channels, such as BTS-6001n means 1 channel					
	②	Total DC output power					
	③	Single channel output voltage					
	④	Single channel output current					
	⑤	Indicates IGBT device					

Installation

CE-6000n Series Power Battery Testing Equipment

- This chapter describes how to install the testing equipment.
- Please refer to this chapter when you need to relocate the installation.
- Even if the detection equipment is installed by our company or an agent, please read the installation content of this part.

Notice

Chapter 1. Inspection of accessories and spare parts

When unpacking the equipment, check all accessories and spare parts provided according to the Packing List.

If you have specifically stated in the contract that you have purchased a certain part, please check it carefully according to the "Packing List". If any parts are missing or damaged, please contact your supplier immediately.

Note: "Packing List" has been sent with the equipment.

Chapter 2. Installation

This chapter introduces the appearance and structure of the testing equipment and describes the environment and power conditions required for installing the equipment. The user guarantees the following conditions.

2.1 Cabinet Appearance Structure

Cabinet Appearance Diagram (Corresponding Model Reference)

Serial Number	Name	Function/Use
1	Emergency Button	Emergency Protection
2	Start and Stop Button	Battery Test Channel Start and Stop
3	Indicator Light	Fault Light
4	Display Screen	Interactive Interface
5	Warning Light	Indicates Working Status
6	Network Port	Network Port
7	Network Port	Auxiliary Channel Interface
8	Battery Voltage Sampling Port	Battery Voltage Sampling
9	Terminal Port	BMS Communication Interface

2.2 Cabinet installation

Installation Site Confirmation

In order to ensure that the detection equipment can work normally and safely, this section describes the installation site and space requirements.

■ **Installation site requirements**

- The equipment should be installed on the surface of flame-retardant material or channel steel support structure, the foundation needs to be flat and solid, and have the bearing capacity to bear the installed equipment.
- No direct sunlight and good ventilation;
- Temperature: -10 ℃ ~ 40 ℃, no drastic temperature change;
- Relative humidity: 5%~95%RH;
- Altitude: less than 2000m;
- No high concentration of dust, flammable gas and corrosive gas;

Spatial location

The battery testing equipment is designed for indoor installation.

The degree of protection is IP20, when installing, it must be placed on a horizontal cement floor or block, and the design of the cement floor or block must be able to bear the weight of the cabinet. In order to reduce the impact of dust on equipment reliability, appropriate engineering measures should be taken to filter the air so that the air quality meets the design requirements.

The air inlet of the equipment should be kept at a proper distance from fixed objects and adjacent objects to obtain sufficient ventilation conditions. In order to ensure the reliable operation of the equipment, the operating environment temperature of the equipment can be within the allowable temperature range by providing appropriate ventilation devices.

During installation, care must be taken to maintain an appropriate gap with fixed objects (such as walls) and adjacent cabinets to ensure ventilation and safe escape in case of danger. There should be at least one person passing through the space around the equipment ≥ 600 mm.

There must be a certain space on the top of the equipment for ventilation, operation and maintenance, usually not less than 500mm .

Trunking Requirements

In order to facilitate installation and maintenance and reduce the interference of the power circuit to the communication and control signal lines, the communication control cables and power cables should be laid separately, and the DC circuit and AC circuit should be laid separately.

Mobile Installation

This equipment can be transported by forklift or pallet truck. When transporting, pay attention to the weight of the equipment, ensure that the transport equipment has sufficient carrying capacity, and reasonably determine the support point.

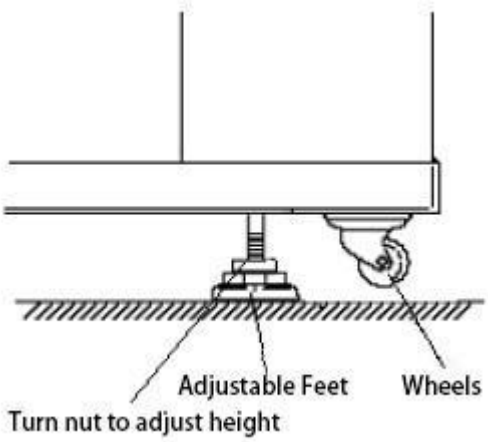
The most suitable method of transportation is the use of a forklift to transport this equipment. During transportation, the center of gravity of the box body should fall between the two fork arms of the forklift, and the fork should be tested. When using a forklift to fork up, put down and move the equipment, it must be slow and stable. Also

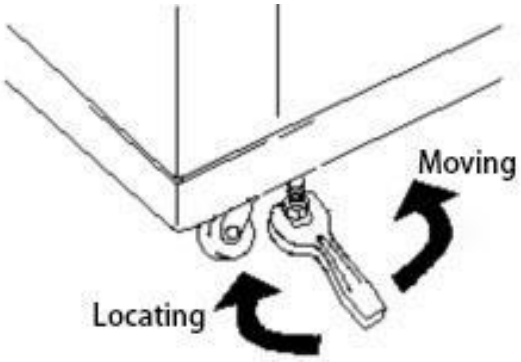
place the device only on firm, level surfaces. During the whole process of using a forklift for transportation, forklift safety operating procedures must be strictly followed.

Notice

When moving the equipment, use a forklift with the rated lifting capacity and the proper fork span. The cabinet must be forked from the bottom.

The cabinet must be supported from all four sides when forked and precautions must be taken to prevent the cabinet from tilting during transport.





The adjustment feet (when the equipment is equipped with adjustment feet) are installed at the four corners of the bottom of the detection equipment. The height of the adjustment feet can be adjusted by tightening or loosening the nut with a wrench. Rotating the nut in a fixed direction can make the casters leave the ground so that the testing equipment can be fixed on the ground. is removable.

2.3 Electrical Connection

The cables to be connected include the following cables:

- Protective Earth Cable Connection
- DC side cable connection
- AC side cable connection
- Communication cable connection

Cable Requirements

- The selected cable must have sufficient current-carrying capacity. The current-carrying capacity of a conductor is related to factors such as environmental conditions, conductor insulation material type, laying method, wire material and cross-sectional area.
- The wire diameters of all cables must be selected according to the maximum current of the AC and DC side of the equipment, with a margin.
- The connecting wires on the same side should be wires of the same specification and type.
- Please use flame-retardant cables.

CE-6002n-250KW-1000V300A-IG Model Recommended Connection Specifications

Connection Type	Recommended Cable Size	Fixed Hole Size	Torque
Battery Side Wiring	120mm ^{2} (300A)	M8	30Nm
AC Side Wiring	18 mm ^{2} (420A)	M12	60Nm
Ground Cable	100 mm ^{2}	M8	30Nm

For other models, please contact our technical staff to recommend suitable cable specifications.

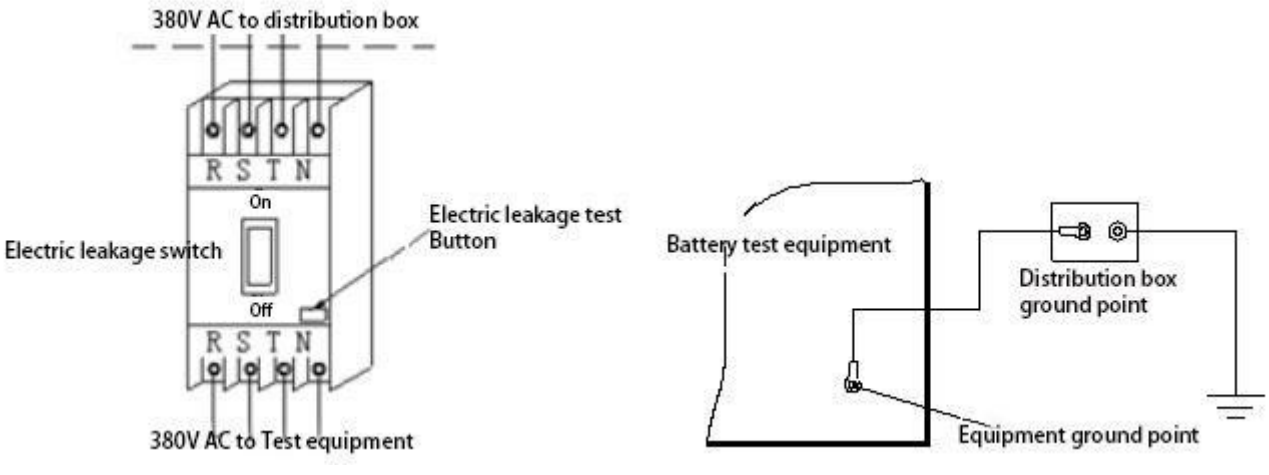
Power Requirements

The power supply must meet the following conditions:

- AC voltage: 380 V±10% three-phase three-wire + protection ground wire.
- Frequency: 50/60Hz±5Hz ;
- The grounding resistance of the protective ground wire is less than 4Ω; TN-S mode powered or TT power supply;
- The user is required to configure an air or power switch of corresponding capacity for the equipment at the installation site, and this switch must be independent and dedicated to the use of this equipment.

Grid Cable Connection

Connect the power supply cable of the device to the mains power supply as shown in the figure below.



↓

Operation Steps

Once the device is fully positioned, connect the input cable as follows:

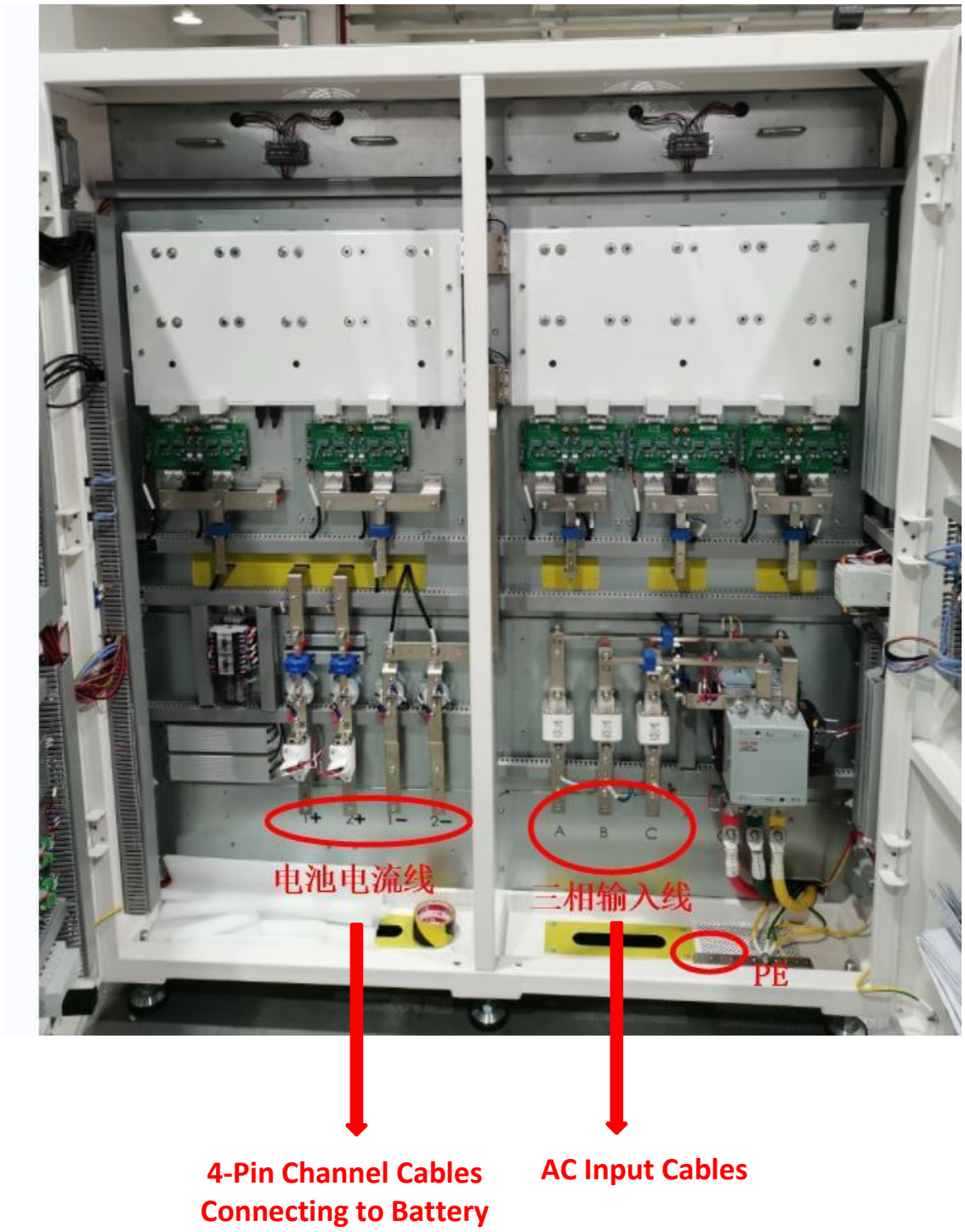
1. Make sure that all input power distribution switches of the equipment are completely turned off, and all power switches inside the cabinet are turned off. Put warning signs on these switches to prevent others from operating the switches;
2. Open the front door of the equipment, and you can see the connecting copper bars;
3. Connect the protective grounding cable to the corresponding grounding screw, as shown in the figure below with the " PE " mark;
4. Connect three-phase AC (A,B,C phase line) cable to the copper bar corresponding to the device, as shown in the figure on next page [A] [B] [C] ;
5. Connect the current wire of the battery channel to the corresponding copper strip, as shown in the figure on next page;
6. After confirming that all cables are connected, close the front door again.

Ground wire

Grounding the equipment prevents electric shock and noise due to poor operation. The equipment provides a ground wire, please prepare the ground terminal in advance. The equipment protective ground wire terminal is located near the circuit breaker at the rear of the cabinet, and reliably connects the prepared ground cable to the protective ground of the system.
The diameter of the grounding cable is not less than 35 mm2, the contact resistance shall not be higher than 4 ohm.

Operation Steps:

Refer to 3rd step of the above "cable connection" operation steps .


1+ 2+ 1− 2−
A B C
电池电流线
三相输入线
PE
4-Pin Channel Cables
Connecting to Battery
AC Input Cables

Danger

- Explosion! Do not connect wires to gas pipes.。
- Be sure to ground! Otherwise, the leakage circuit breaker will not operate when there is an electric leakage, resulting in electric shock. The detection device loses protection against power disturbances

Warning

- It is forbidden to share a grounding terminal with equipment without earth leakage circuit breaker! Otherwise, the leakage circuit breaks in case of leakage ÿ During the whole process of electrical connection to the battery testing equipment, pay attention to follow the following safety rules: The device will not operate, resulting in electric shock.
- Do not cross-ground with other equipment! Otherwise, the leakage circuit breaker will not operate when there is an electric leakage, resulting in electric shock.
- It is forbidden to use a knife switch or a power socket for the external power supply of the equipment!
- The power cable must be fastened with screws! If the connection is not tight enough, the contact resistance will increase, resulting in excessive. If there is too much heat, sparks will be generated in severe cases, and even fire will cause a fire.
- Do not turn ON the main power switch in the following situations. When opening the cover of the power distribution cabinet; when checking some components of the circuit or performing maintenance on the equipment.
- When the equipment is running, the power supply voltage of the equipment cannot exceed ±10% of the rated voltage. If it exceeds this range, it may cause the device to alarm.

Attention

- During the whole process of electrical connection to the battery testing equipment, pay attention to follow the following safety rules:
- Disconnect all internal and external strong power and control power connections of the equipment;
- Hang warning signs and install safety locks to ensure that the system will not be powered on again accidentally;
- For the possible live parts adjacent to the operating part, use insulating cloth or partitions for insulation shielding;
- Arranging and installing safety grounding and short-circuit protection connections;
- Use a multimeter to measure to ensure that the DC bus, AC bus, and high-voltage capacitors of the device are not charged.

2.4 Installation Iool

The following tools need to be prepared before installation:

Serial number	Name	Describe
1	Diagonal Pliers	Cut the cable ties.
2	Wire Strippers	Peel off the cable sheath.
3	Trimming	Cut the cable.
4	Crimping Tool	Pressure line.
5	Multimeter	Test for proper ground connections, etc.
6	Steel Tape	Measure distance.
7	Level Ruler	Ensure that the cabinet is installed horizontally.
8	Protective Gloves	Protect the operator's hands when the equipment is installed.
9	Insulating Gloves	Protect the operator from electric shock.

Remarks: The installation tools are not limited to the tools listed in the table, and the installation tools are prepared according to the actual needs of the site.

Operation

CE-6000n Series power battery testing equipment

Notice

If you are using it for the first time, it is recommended to read this manual sequentially from Chapter 3. Even if the operator of the existing equipment Please also read Chapter 3 "Safety Precautions" carefully.

Chapter 3. Safety Instructions

This chapter introduces the safety precautions that must be observed when using the equipment. Please read this chapter carefully before using the equipment and follow it carefully to ensure the personal safety of equipment operators and prevent damage to test samples or equipment.

3.1 safety precautions

- Have a certified electrician check that the equipment is properly installed and grounded.
- Only qualified and trained personnel should maintain or overhaul battery testing equipment.
- Use proper safety guards, procedures, and test battery testing equipment.
- Do not perform battery testing equipment repair and maintenance operations in wet areas.
- If a humid environment is unavoidable, please stand on a dry rubber mat or dry wood and use insulating gloves to work, do not work alone.
- Equipment installation and maintenance must comply with applicable laws and regulations of the country and region where it is used.
- Regularly inspect the insulation and connections for damage, and replace cracked or worn cables in good time.
- Never overload cables.

The safety warnings listed in the manual only represent what the company knows , and the company does not assume any responsibility for losses caused by violations of general safety operation requirements or violations of safety standards for design, production and use of equipment.

3.2 Personal Safety Requirements

Only professional electricians or personnel with professional qualifications can carry out operations such as transportation and installation of this product.

- Before operating the device, remove conductive objects such as jewelry and watches to avoid electric shock or burns.
- When operating the equipment, please wear insulating gloves and protective insulating shoes.
- Before using the tool, please master the correct use of the tool to avoid hurting people or damaging equipment.
- When operating in a humid environment, avoid the equipment from getting wet. If there is water or humidity in the cabinet, turn off the power immediately.

3.3 Body Identification Requirements

- The warning marks inside the equipment and the cabinet contain important information on the operation of the equipment, and artificial tearing or damage is strictly prohibited.
- There are nameplates installed on the rear cover and the inside of the front door of the battery testing equipment. The nameplate contains important parameter information related to the product, and it is strictly forbidden to tear or damage it artificially.

3.4 Safety Alert Requirements

When performing installation, daily maintenance, overhaul and other operations on battery testing equipment, in order to prevent unrelated personnel from approaching and misuse or accidents, please observe the following:

- Set up obvious signs at the front and rear switches of the equipment to prevent accidents caused by false closing.
- Set up warning signs or safety warning tapes near the installation area.

- After the installation project is finished, be sure to lock the cabinet door and pull out the key for safekeeping.

3.5 fire escape requirements

In order to ensure that the staff can quickly evacuate the scene in the event of an accident, please observe the following:

- Two escape doors should be reserved in the installation position of the cabinet, so that they can be evacuated in time in case of fire.
- During the whole process of equipment installation and other operations, it is necessary to ensure that the escape route is completely unblocked.
- It is strictly forbidden to pile up sundries in the escape passage, or occupy the escape passage in any form.

3.6 Battery Protection Requirements

The voltage between the positive and negative terminals of the battery pack is very high, and there is a risk of electric shock if accidentally touched.

3.7 Equipment Installation Requirements

In order to avoid the noise generated during the operation of the equipment and other possible emergencies affecting the normal life of residents or causing safety accidents, the equipment must be installed in the electrical control room.

- The control room should be as far away as possible from the living area of residents, and appropriate sound insulation measures should be taken.

- It is strictly forbidden to pile up any flammable and combustible materials in and around the control room to prevent fires.
- The design of the control room should meet the requirements of ventilation and heat dissipation of equipment and safe escape of personnel.
- The control room shall comply with relevant EMC design standards.

3.8 Electrical Connection Requirements

The electrical connection must be carried out in strict accordance with the description in this manual and the principle of electrical wiring. The configuration of the battery pack, relevant current, voltage, power and other parameters must meet the technical parameters of the battery testing equipment.

Grounding requirements:

- For electrical connection, the protective ground wire must be installed first; when dismantling the equipment, the protective ground wire must be removed last.
- Before operating the equipment, make sure that the equipment is properly grounded. Poor grounding of the equipment may cause personal injury.
- Do not operate battery testing equipment without a grounding conductor installed!

AC and DC operating requirements:

- The supply voltage of the device is a dangerous voltage, which may be dangerous by direct contact or contact with moisture.
- Irregular and incorrect operation may cause accidents such as fire or electric shock.
- Before the equipment is electrically connected, the front protection switch of the equipment must be disconnected.
- Before turning on the power, it must be ensured that the electrical connection anti-static requirements of the equipment have been completed.
- Before touching the circuit board, you must wear antistatic gloves or an antistatic wrist strap, and ground the other end of the antistatic wrist strap well.
- When holding the board, the edge of the board must be free of components, and it is forbidden to touch the chip with your hands.

- The disassembled boards must be packaged, stored or transported in antistatic packaging materials.

3.9 Power-off operation requirements

Only when it is ensured that the device is completely de-energized can any operation be performed on it.

- Make sure that the device cannot be accidentally powered back on.
- Use a multimeter to make sure the device is completely dead inside.
- Use cloth of insulating material to insulate and cover the possible live parts adjacent to the operating part.
- Make the necessary grounding and short-circuit connections.
- During the entire operation, it is necessary to ensure the smooth flow of escape routes.
- After the device is completely out of service, it is important to wait at least 5 Minutes to ensure that the internal capacitors are fully discharged before operating the machine.

3.10 Product end-of-life requirements

When the device needs to be discarded, it cannot be disposed of as normal waste. Please contact the local authorized professional recycling agency to prevent pollution to the environment.

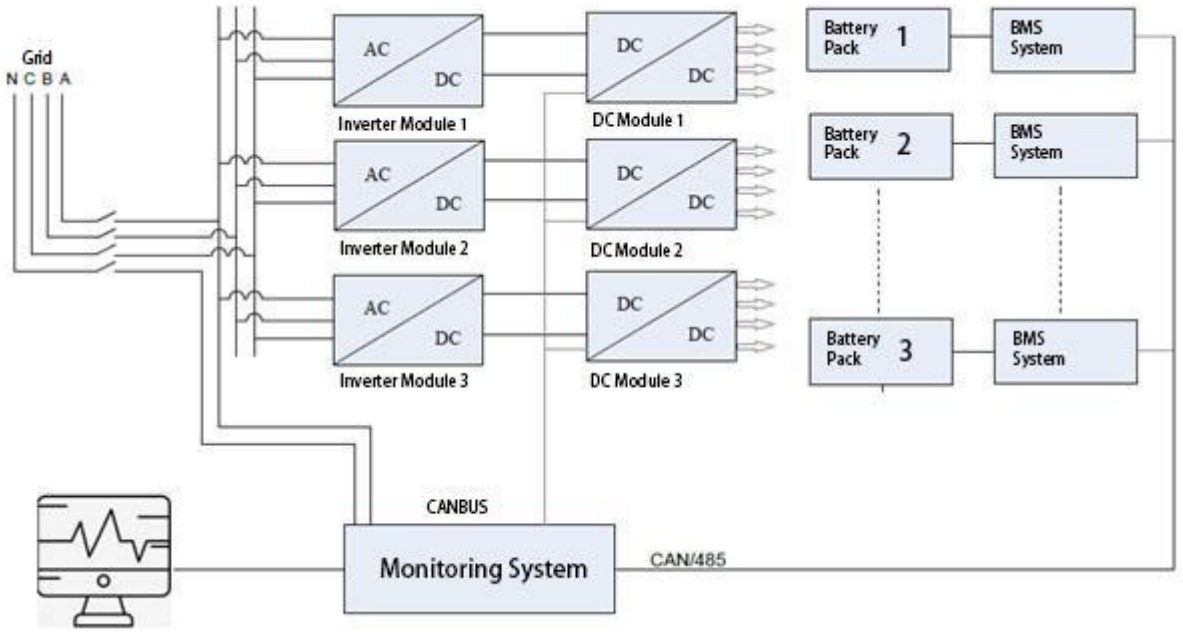
3.11 Other protective requirements

When carrying out various operations such as transportation and installation of the equipment, relevant personnel should take appropriate protective measures as required, such as wearing anti-noise earplugs, wearing insulating shoes, and wearing anti-scald gloves.
When people are injured, first aid procedures should be deployed in accordance with the actual local medical and safety procedures. If abnormal symptoms appear, the victims of electric shock should be examined by a doctor and sent to the hospital for treatment immediately.

Chapter 4. Equipment Introduction

This chapter introduces the system composition, topology, technical indicators, working principle and other related content of the device.

4.1 System composition



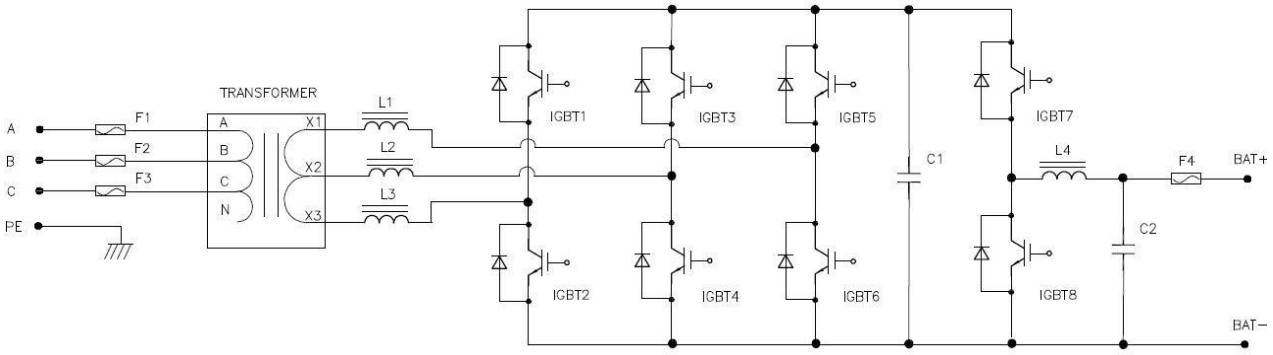
As shown in the figure, the battery detection system is mainly composed of AC power distribution, power module, monitoring system, etc. The power module includes an AC/DC bidirectional inverter module to realize AC/DC or DC/AC conversion.

The DC/DC module can realize the charge and discharge control of batteries with different voltage levels, and realize the bidirectional conversion of the DC part . When charging, the AC/DC The DC bus voltage output by the module is converted into the charging voltage that needs to be set; when discharging, the battery voltage is converted into the bus voltage, provided to the AC/DC module, and fed back to the grid through it.

The monitoring system can realize the remote control of the upper computer through Ethernet, including: constant voltage charge and discharge, constant current charge and discharge, constant power charge and discharge, pulse and working condition simulation and other tests. Operations such as parallel connection of channels can also

be realized according to requirements.

4.2 System Topology



CE-6000n series power battery testing equipment is shown in the figure. The system consists of a three-phase isolation transformer, an AC-to-DC bidirectional inverter module, and a DC-to-DC bidirectional DC inverter module. Composed of modules, a single cabinet can be provided 2 Multiple batteries work at the same time, and multiple cabinets are connected in parallel to expand the demand for multiple batteries. Among them, the AC-to-DC bidirectional inverter module adopts the advanced three-phase zero-neutral design, through the mature and reliable three-phase bridge PFC The circuit and bus voltage are stable to meet the needs of quick response; the DC-to-DC bidirectional DC module is composed of input insurance, BUCK-BOOST DC converter, output filter, and output relay.

4.3 System Performance Parameters

BTS-6000 SPECIFICATIONS		
Model		
Material Code	**BTS-6001n-600V200A-IG-U**	
Channels Information		
Channels Quantity	Quantity per Unit	1
Main Channel	Channel Feature	Constant current source and constant voltage source dual closed loop control
	Channel Control	Independent control
AC Input Power Functions and Performances		
Input Power		AC480V±10% 50/60±5Hz
Power Factor		≥99%(Full load)
THDi		≤5%(Full load)
Input Resistance		≥1MΩ
Input Power		133.3 KW
Input Current		169.8 A/single
Overall System Efficiency	Max	94%
Voltage & Current Sampling		Four-wire connection (Same port for charging and discharging)
Noise		≤75dB
Power Control Module Type		IGBT
Energy Management	Intelligent Energy Regeneration	Full power energy feedback Priority energy recycle between channels Intelligent regenerative
AC Power Connection		Three-phase five-wire (3W+N+PE)
Power Input Protection		Anti-surge, anti-silos, anti over or under frequency, anti over or under voltage, anti phase absence, etc.

DC Input Power Functions and Performances

Voltage	Output Range	Charge: 0V~600V Discharge: 10V~600V
	Min Discharge Voltage	10V
	Accuracy	±0.02% of FS
	Resolution	24 bit
Current	Measurement Range	1A ~ 200A
	Accuracy (Independent Range)	±0.05% of FS
	CV Cut-off Current	200mA
	Resolution	24bit
Power	Single Channel Output	120KW
	Entire Machine Output	120KW
Response Time	Current Response Time	≤5ms
	Current Switch Time (From -300A to 300A)	≤10ms
	Min. Step Time	0.1s
Charge/Discharge Modes	Charge Modes	CCC, CVC, CC-CVC, CPC
	Discharge Mode	CCD, CVD, CPD, CRD
	Cut-off Condition	Voltage, Current, ΔTime, Capacity, -ΔV
Simulation	Charge Mode	Current, Power
	Discharge Mode	Current, Power
	Switch	Support continuous switching between charge and discharge
	Cut-off Condition	Time, step line
	Max File Step Lines	1,000,000
Pulse Mode	Charge	Current ,power
	Discharge	Current, Power
	Min pulse	100ms
	Pulse counts	Up to 32
	Swithing Between Charge and Discharge	Supported
	Cut-off Condition	Voltage, ΔTime
DCIR		Supported by calculation

Auxiliary Peripheral Support	(Optional)	Capable to connection with: - Voltage & temperature AUX - Pressure Sensor - High-low temperature testing chamber - Chiller - The insulation on-line monitoring device - Adjustable power supply - Balancing equipment
Safety Protection	Software Protection	Power-off data protection
		Offline mode function
		Limiting conditions can be set: voltage lower limit ,voltage upper limit, current lower limit, current upper limit, delayed time, etc.
	Hardware Protection	- Anti-reverse connection, over-voltage, over-current, over-temperature, etc. - Peripheral auxiliary variable protection (redundant voltage, auxiliary monitoring temperature, pressure, high-low temperature environment testing chamber

Data Management and Analysis		
Step Setting Method		Form editing
Data Report	Recording Conditions	Minimum time interval: 10ms (connected with AUX channel: 100ms)
		Minimum voltage interval: 1.2V
		Minimum current interval: 0.4A
	Recording Frequency	100Hz (connected with AUX channel: 10Hz)
Database		MySQL database
Data Output		Excel, Txt
Curve Type		Templates available, Customizable plot
Bar Code Scanning		Function supported
		Management and traceability of historical data
Communication		
Host Computer Communication		TCP/IP protocol
Communication Port		Ethernet
Communication Baud Rate of the Testers		1M broadband
Host Computer Communication Baud Rate		10M~100M adaptive
Communication Setup		Set up a LAN (local area network) through switches and routers
BMS Communication Expansion	(Optional)	Supported: - CAN, CANFD (optional), RS485, & BMS communication - DBC configuration function

Environmental Requirements, Dimension and Weight		
Operational Temperature		-10°C~40°C (When the temperature is 25±10°C, the accuracy error caused by temperature change is less than 0.005% of FS /°C)
Storage Ambient Temperature		-20°C~50°C
Operational Humidity		≤70% RH (no moisture condensation)
Storage Ambient Humidity		≤80% RH (no moisture condensation)
Dimension W*D*H		/
Weight		/
Illustration (for reference)		

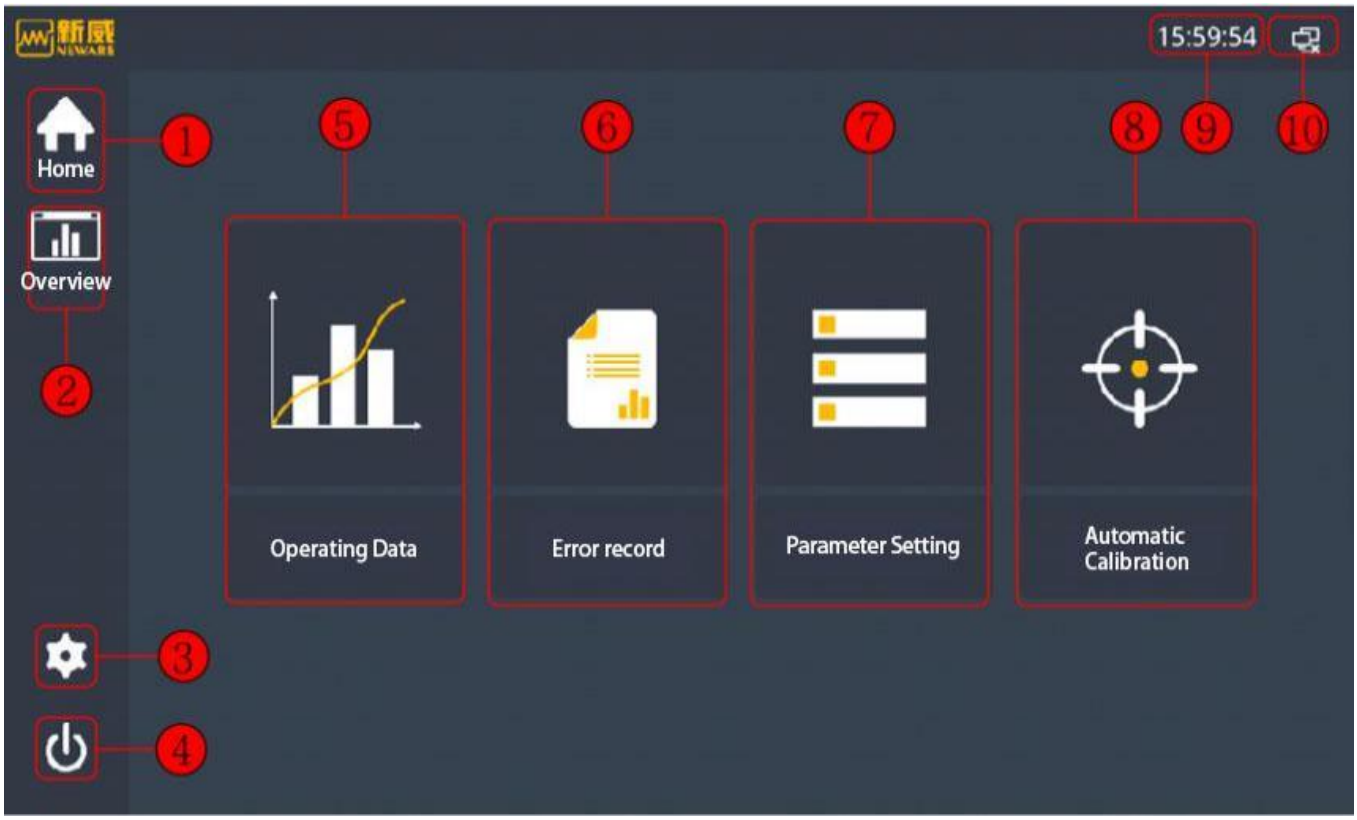
Auxiliary Test System (optional)		
Temperature AUX Channels	Temperature Range	Thermistor: -30℃~120℃
		Thermocouple：-200℃~260℃
	Temperature Accuracy	±1℃（Length within 3m）
	Temperature Resolution	0.1℃
Voltage AUX Channels	Voltage Range	0V~5V
	Voltage Accuracy	±0.1% of FS
	Voltage Resolution	0.1mV
AUX Introduction	Auxiliary channels are mainly used for monitoring the temperature of battery surfaces and tabs during tests. Collected data can be bound with original date from main current and voltage. At the same time, the measured temperature can be used as the control condition and safety condition in working profiles.	

Chapter 5. Touch Screen Description

This chapter will describe the interface information and operation methods of the touch screen in detail. The CE6000n series products are equipped with a 7 " true-color capacitive touch screen, which is easy to use and operate. Users can quickly view the running information of the device, and can also perform related settings as required. The following chapters will describe the interface content of the touch screen in detail. introduce.

5.1 Home

This interface is a menu selection function. In this interface, you can choose to enter the operation data, fault record, parameter setting, automatic calibration, overview, setting, power on and off and other interfaces. The upper left of the interface displays information such as the current time and communication connection status.

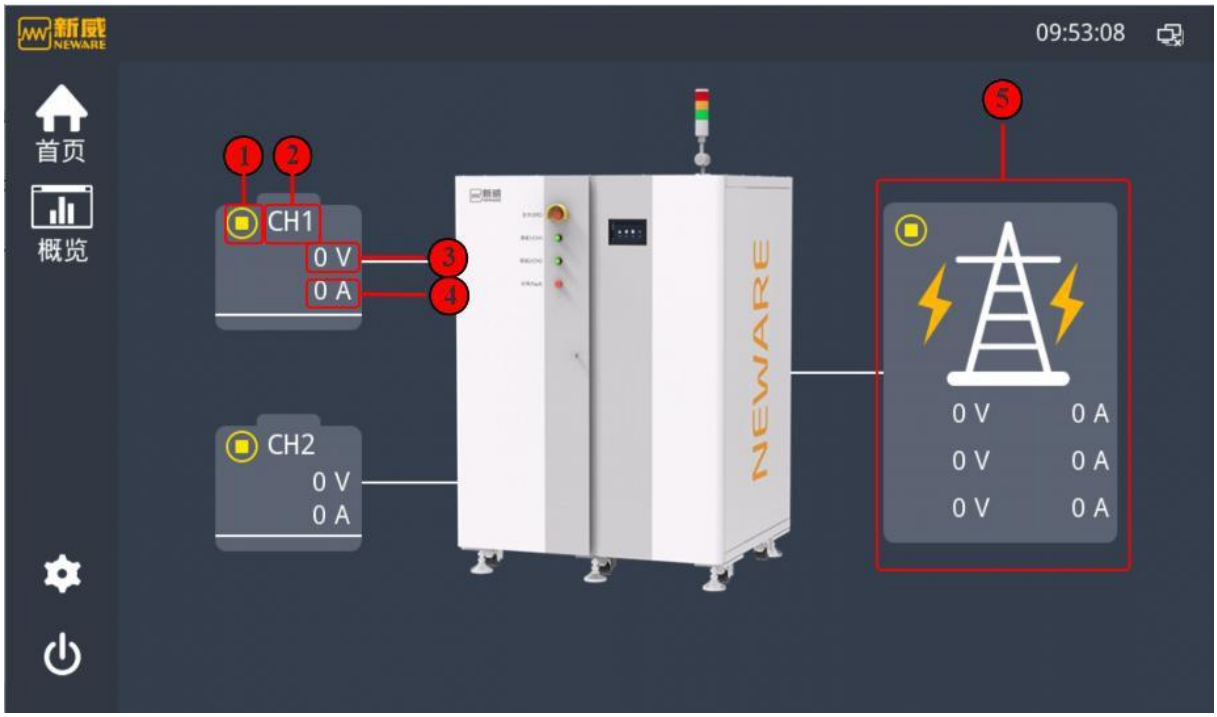


For details on the homepage interface, see the table below:

Serial Number	Name	describe
1	Front Page	Enter the homepage interface button, which is available in all interfaces.
2	Overview	Enter the overview interface button, which is available in all interfaces.
3	Set up	Enter the setting interface button, which is available in all interfaces.
4	Switch Machine	Enter the switch interface button, which is available in all interfaces.
5	Operating Data	Enter the running data interface button.
6	Broken Record	Enter the fault record interface button.
7	Parameter Settings	Enter the parameter setting interface button, professional after-sales personnel enter the password to enter.
8	Automatic Calibration	Enter the automatic calibration interface button.
9	Current Time	Display the current time of the system, and all interfaces will be displayed.
10	Communication Status	Display the current communication status,  : normal communication,  : abnormal communication.

5.2 overview

After the system is initialized, enter the overview interface, where you can view the operating status, voltage value and current value of all physical channels, and you can also choose to enter the home page, settings, power on and off and other interfaces. The upper left of the interface displays information such as the current time and communication connection status.



Note: The information displayed here is the physical channel information, please check the client software for the actual channel information

For details on the overview interface, see the table below:

Serial Number	Name	Describe
1	Operating Status	Display the running status of the current channel.  : shutdown,  : on hold,  : charging,  : discharging,  : failure
2	Physical Channel Number	Conventional equipment has 2 physical channels
3	Voltage value	Display the voltage value of the current channel.
4	current value	Display the current value of the current channel.
5	AC grid	Displays the current three-phase grid voltage and current values.

5.3 set up

This interface is for setting related functions of the touch screen. In this interface, you can choose to enter the home page, overview, power on and off and other interfaces. The upper left of the interface displays information such as the current time and communication connection status. You can also set the date and time, calibration cycle, display and brightness, language, etc.

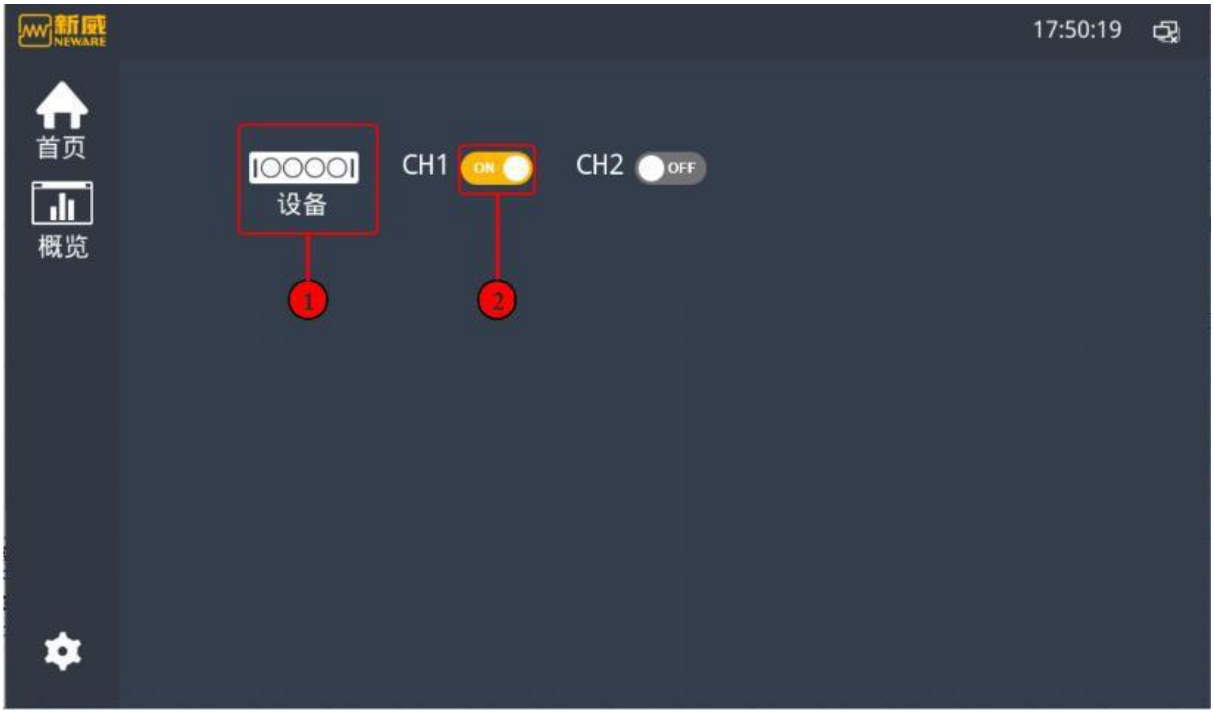
The detailed description of the setting interface is shown in the table below:

Serial Number	Name	Describe
1	Date and Time	Set the system real-time clock.
2	Calibration Cycle	This function is a calibration reminder function, when the time reaches the set time, the calibration reminder interface will pop up.
3	Display and Brightness	The brightness of the touch screen can be adjusted according to the needs.
4	Language	Both Chinese and English interfaces are supported.

5.4 switch machine

This interface is the switch function interface, where you can choose to enter the home page, overview, settings and other interfaces.

The upper left of the display shows the current time and communication connection status and other information. It can also perform operations such as module switch and channel switch.



See the following table for detailed description of the power on/off interface:

Serial Number	Name	Describe
1	Module Switch	Click this button (gray: power off, yellow: power on) to realize the power on/off operation of the current module. When this button is in the open state, the channel switch button will be kicked in.
2	Channel Switch	Click this button (gray: off, yellow: on) to realize the current channel switch operation.

5.5 running data

This interface displays the detailed operating data information of the module. In this interface, you can choose to enter the home page, overview, settings, power on and off, fault record and other interfaces. The upper left of the interface displays information such as the current time and communication connection status.

DC The detailed description of the running data interface is shown in the table below:

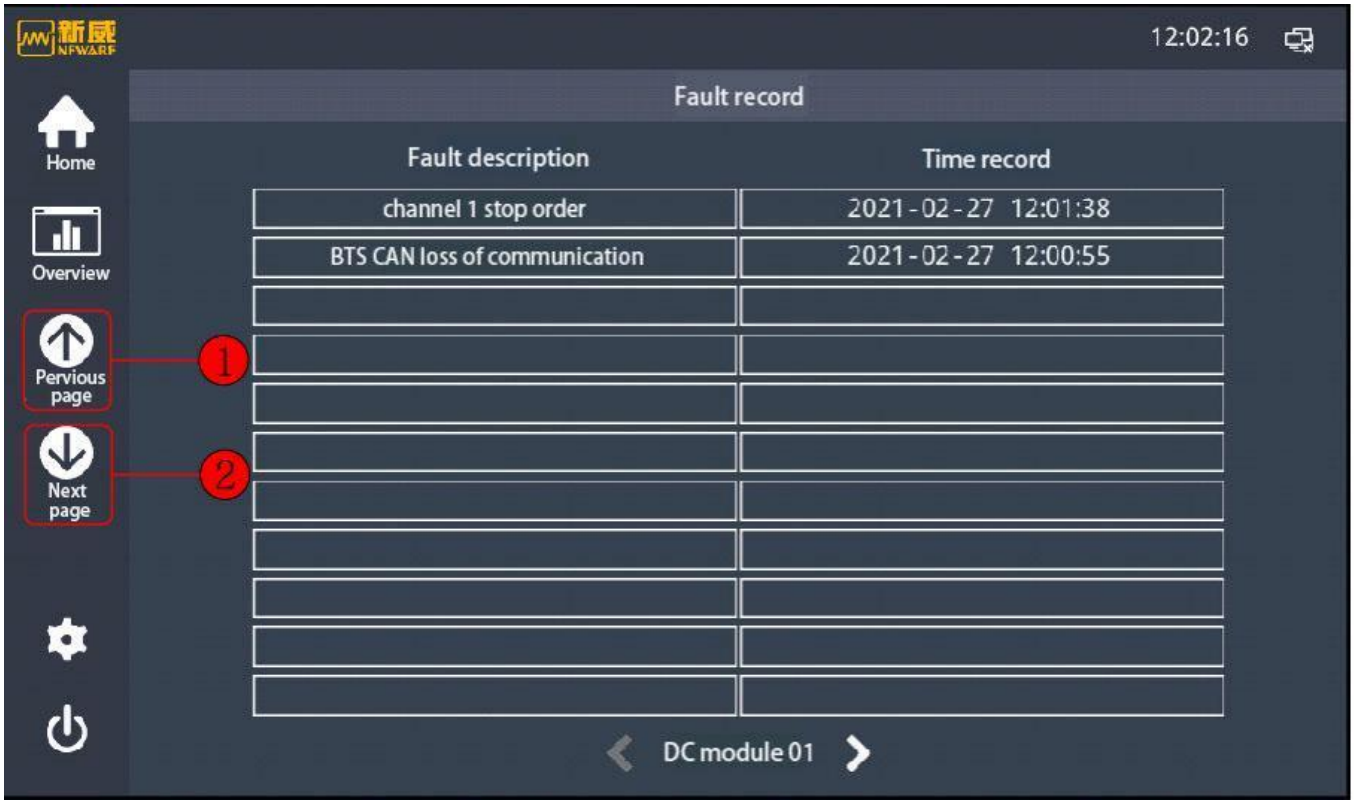
Serial Number	Name	Describe
1	Next Page	Click this button to enter the fault record interface
2	Switch to the Previous Module	Click this button to enter the running data interface of the previous module.
3	Switch to Next Module	Click this button to enter the running data interface of the next module.

AC The detailed description of the running data interface is shown in the table below:

Serial Number	Name	Describe
1	Next Page	Click this button to enter the fault record interface
2	Switch to The Previous module	Click this button to enter the running data interface of the previous module.
3	Switch to Next Module	Click this button to enter the running data interface of the next module.

5.6 Fault record

This interface is the fault information recording interface. In this interface, you can choose to enter the home page, overview, settings, power on and off, operating data, parameter settings and other interfaces. The upper left of the interface displays information such as the current time and communication connection status. This interface will count the fault information of all modules, including fault description and fault sending time, and store these informations.

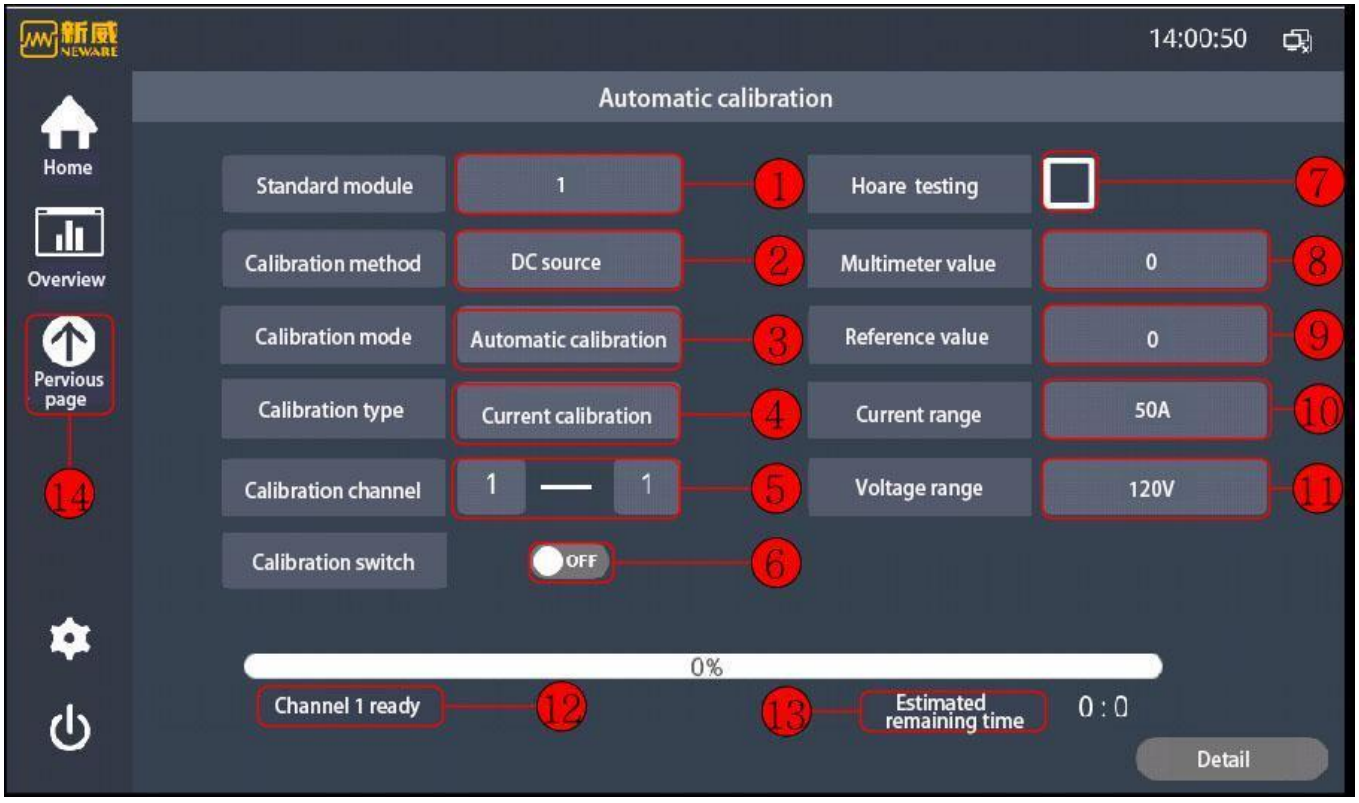


The detailed description of the fault record interface is shown in the table below:

Serial Number	Name	Describe
1	previous page	Click this button to enter the running data interface.
2	next page	Click this button to enter the parameter setting interface (password is required) .

5.7 Automatic Calibration

This interface is the automatic calibration function interface, and this function can only be used with the automatic calibration tooling. In this interface, you can choose to enter the home page, overview, settings, power on and off, parameter settings and other interfaces. The upper left of the interface displays information such as the current time and communication connection status.



The detailed description of the automatic calibration interface is shown in the table below:

Serial Number	Name	Describe
1	Calibration Module ID	the ID of the current module to be calibrated, the default is 1.
2	Calibration Method	DC source / battery, auto-calibration tooling selects " DC source".

3	Calibration Mode	Automatic calibration / manual calibration / accuracy test, automatic calibration tooling selection "automatic calibration". After the calibration is completed, you can select "Accuracy Test" to check the accuracy of the calibrated module.
4	Calibration Type	Current calibration / current voltage calibration / voltage calibration, select the one to be calibrated according to the needs type, when the calibration mode is "Accuracy Test", only "Current Calibration" or "Voltage Calibration".
5	Calibration Channel	Start channel - end channel, start channel value < end channel value
6	Calibration Enable	Used to start or stop a calibration operation.
7	Hall Detection	After checking, if the current accuracy of the calibration channel exceeds 0.5 ‰ FS, it will prompt "accurate degree out of range" and terminate the calibration.
8	multimeter value	Display the current external multimeter number during "Manual Calibration" or "Accuracy Test".
9	Reference	In "Accuracy Test" mode, it is used to enter the reference setpoint.
10	Current range	Select the corresponding current range according to the voltage level of the current model.
11	voltage range	Select the corresponding voltage range according to the current level of the model.
12	prompt information	In the "automatic calibration" mode, it is used to display the status and error information of the current stage.
13	Estimated remaining time	Display the remaining time of calibration in countdown mode
14	previous page	Click this button to enter the parameter setting interface (password is required) .

Chapter 6. Running

This chapter describes the preparation and inspection before the test, the start of the test, the end of the test and other operations. Please operate as described in this chapter before each test.

6.1 Start Up

- All installation and connection are carried out according to the user manual and circuit diagram, and the connection is firm.
- EMERGENCY STOP The emergency stop button has been released, and the start-stop button is in the released position.
- Use instruments to detect whether the AC and DC side voltages meet the equipment start-up conditions, and whether there is any danger of overvoltage
- If restarting after a fault, please make sure that the fault has been completely eliminated.
- Put the start button in the locked position, the device will perform a self-test at power-on, and after passing the self-test, it will run automatically.

6.2 shutdown

This type of device has the following two shutdown methods:

- Quick shutdown (using EMERGENCY STOP emergency stop button) , but only in emergency or malfunction situations.
- Controlled shutdown, using the touch screen to control the shutdown, generally used.

Warning

- If you want to open the cabinet door and perform operations inside the cabinet, be sure to wait at least 5 minutes after turning off the power, and use a multimeter, etc. Instrument testing to ensure safety! After shutdown, the DC input terminal and AC output terminal are still charged, do not touch them.
- Only qualified and trained operators can operate the converter.

Chapter 7. Maintenance and Maintenance

This chapter describes the inspection and maintenance of testing equipment.

In order to keep the testing equipment in good working condition, periodic inspection and maintenance are necessary. Regular inspections and repairs not only nip problems in the bud and keep inspection equipment in top (and therefore safest) working order.

7.1 Precautions

During all maintenance on the equipment, the following safety rules should be followed:

- Disconnect all internal and external strong power and control power connections of the equipment.
- Hang warning signs and lock safety locks to ensure that the equipment will not be powered on again accidentally.
- For the possible live parts near the operating part, use insulating cloth or partitions to insulate and isolate them.
- Arrange for installation of safety ground and short-circuit protected connections.
- Use a multimeter to ensure that the equipment DC bus, AC bus, high-voltage capacitors, etc. are not charged.

7.2 Inspection and Maintenance

If the following inspection results are abnormal, please contact the after-sales service department of our company.

Check content	Inspection Method	Maintenance Cycle
Cabinet Inspection	● Check whether the appearance of the device is damaged, deformed or dusty. ● Check that the door hinges are not too tight and difficult to operate, if so, sprayed with a high-quality silicone lubricating spray.	Once a year
Ground Reliability	Check whether the protective grounding and power input grounding are reliable.	Once a year
Distribution Reliability	Action test of main power switch (leakage circuit breaker).	Once a month
Equipment Running Status	● Check that all devices within the device are functioning properly. ● Check that the surge protector is functioning properly.	Semi-annual
Electrical Connections	● Check whether the cable connection is disconnected or loose. ● Check whether the cable is damaged, and check whether the skin of the cable in contact with the metal surface has cut marks.	Once a year
Fan Check	Regularly check and clean the fan, repair or replace it in time if any failure occurs, and ensure the normal ventilation and heat dissipation of the cabinet.	Semi-annual

7.3 Cleaning and Maintenance

When cleaning the dust inside the equipment, first blow the low-pressure compressed air into the equipment from the bottom of the equipment, and then blow the low-pressure compressed air from the top of the equipment.

7.4 Torque Requirement

Specification	Torque (Nm)
M3	0.7-1 _
M4	1.8-2.4 _
M5	4-4.8 _
M6	7-8 _
M8	17-20 _
M10	34-40 _
M12	60-70 _
M16	119-140 _

Chapter 8. maintenance

This chapter explains equipment malfunctions and shows how to solve them.

8.1 Failback Operation

Danger

Caution Electricity! Before repairing the circuit, cut off the power supply.

Cut off the external power supply switch before removing the cover of the power distribution cabinet (if the cover is accidentally dropped, the power cord may be broken).

When a fault is detected, the corresponding alarm screen will appear on the control panel or display screen. Equipment maintenance personnel can find the possible cause of the failure according to the corresponding failure information.

When failure occurs:

The operation of the equipment can only be resumed after the fault is eliminated through the following steps. If the fault cannot be eliminated, please contact the relevant equipment maintenance personnel for equipment maintenance in time.

1. If the detection equipment is running, first turn off the equipment and confirm that the equipment stops running.
2. Cut off the main power switch (leakage circuit breaker) .
3. Eliminate the fault according to the alarm prompt.
4. Turn on the main power switch (leakage circuit breaker) .

8.2 Common Failure

Minor oversights in preparation, rather than faults in the device itself, may render the device inoperable, so careful review of the table below is recommended as it summarizes information to help resolve the most common problems.

Problem	Possible Cause	Solution
The power light is off	The main input line is not connected	Check whether the input cable is connected correctly.
	The protection of the upper leakage protection switch is triggered	Reset protection switch. Note: Confirm whether there are other branch devices that cause the switch to overload.
	Enter breaker not opened	Open the device's input breaker.
Poor communication	The communication line is too long	Connect the normal communication line to the abnormal device, Use the software to go online to see if the device is connected normally (pay attention to the serial port settings).
	Communication line aging	
	The performance of the computer serial port card is unstable	
	software setting error	Check software settings.
The power indicator light is on, but the device has no charging and discharging current	Device is on hold	Check the software settings to confirm whether the working steps are set correctly.
	The voltage sampling line is not connected	Confirm that the voltage sampling line is connected correctly.
	The output cable is disconnected	Confirm whether the battery cable is connected reliably.
	Output connection reversed	Check whether the positive and negative poles of the battery cable are connected correctly.

Chapter 9. Equipment Warranty

The warranty period of this product is subject to the contract. For products that fail during the warranty period, our company will repair or replace new products free of charge.

If you want to repair or replace the product during the warranty period, the company requires the customer to show the invoice for the purchase of the product. At the same time, the trademark on the product should be clearly identifiable, otherwise the company has the right not to guarantee the quality.

In the following situations, the company has the right not to provide quality assurance:

1. Transport damage.
2. Improper installation, modification or use.
3. Operate under very harsh environment.
4. Damage caused by irresistible natural disasters.
5. Machine failure or damage caused by installation, repair, modification or disassembly not caused by the company's service agencies or personnel.
6. Machine failure or damage caused by using non-standard or non-company components or software.
7. Any installation and use beyond the provisions of relevant international standards.

For product failures caused by the above situations, if the customer requires maintenance services, paid maintenance services can be provided after being judged by the company's service agency.

Product Warranty Records

Product Name		Product Number		Product Number	
Date	Content		Maintainance Staff	Customer Representative	Presentative Note