AlphaESS

V01

USER MANUAL OF ENERGY STORAGE SYSTEM STORION-G2-H30/H50 (for End Users)

Copyright Statement

Please keep this manual safe and strictly follow all safety and operating instructions in this manual. Do not install or operate the system before reading this manual.

Note

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When the entire system needs to be powered off and disconnected, it is necessary to manually shut down the Windows system on the SCADA industrial tablet in advance, wait for the Windows system to shut down normally, and then perform the disconnection and disconnection operation.

The SCADA system and cloud platform monitoring accounts are not compatible.

Preface

Overview

After years of dedicated research and development by AlphaESS, the STORION-G2-H30/H50 lithium-ion battery indoor energy storage system has been successfully applied to many sites. This high-tech product with excellent quality and stable performance, is widely used in electric power supply industry today.

This manual is designed to provide comprehensive guidance on product installation, including safety instructions, product introduction, and installation procedures.

Symbol Convention

The following symbols may appear in this manual, and their meanings are as follows.

Symbol	Description
CAUTION	Indicates a potential risk that could lead to system failure or fault alarm if not avoided.
WARNING	Indicates a medium level of risk that could lead to system damage or injury if not avoided.
DANGER	Indicates a high level of risk that could lead to serious injury or even death if not avoided.
NOTE	Provides supplementary information about the important content in the document. 'Note' does not convey safety alarm information and is not related to information about personal injury, system damage, or environmental harm.

Table of Contents

1. Safety Instructions

Statement

This manual contains important information about the product operation. It is imperative to thoroughly read and comprehend its contents before initiating any operational procedures.

Please keep this manual properly for installation, operation and maintenance.

Please strictly adhere to the instructions outlined in this manual during installation, operation, and maintenance to prevent product damage, personnel injury, and property loss. For incomplete commissioning system, it is mandatory to shut down the entire system (including the battery and energy storage inverter) before installation personnel leave the site.

In the event of a system failure during normal operation, consult the troubleshooting table provided in this manual for resolution. If the issue persists, promptly contact an AlphaESS engineer for assistance. Close down the system (including the battery and energy storage inverter) before the AlphaESS engineer responds.

To ensure optimal reliability and compliance with warranty requirements, energy storage systems must be installed, operated, and maintained in accordance with the instructions detailed in this manual. The company disclaims any liability for violations of general safety operation requirements or safety standards related to the design, production, and use of the products. Any product damage resulting from such violations is not covered by the warranty.

1.1 Operator Requirements

- Operators must hold a professional certification authorized by AlphaESS or AlphaESS-certified qualifications.
- Operators must be familiar with the product, including its composition and working principles.
- Operators must be familiar with the product instructions and carry out installation, operation, and maintenance strictly in accordance with the provided instructions.

- Please ensure that a minimum of two operators is present during any work related to the product. Refrain from undertaking maintenance tasks unless the product is completely shut down.

1.2 Personal Safety

- Clearly mark the PV, battery, energy storage inverter, distribution box, and other circuit breakers to prevent accidents resulting from inadvertent closures.
- Set up warning signs or safety warning belts near the operation area.
- During electrical connection, trial operation, or product maintenance in the system, employ multimeters to measure electrical parameters, ensuring compliance with requirements. Please use and connect the measurement products correctly to ensure personal safety.
- Given the high-voltage in the system, exercise caution during live tests to avert the risk of fatal electric shock.
- Ensure that the system's connection and utilization adhere to relevant regulations to prevent arc or electric shock accidents.

CAUTION

The following installation tools and protective equipment are required during installation, operation and maintenance.

The installation tools are shown in the table below:

No.	Name	Model Specifications (Accuracy)	Unit	Quantity
1	Diagonal Pliers	/	pcs	1
2	Screwdriver	2/4/6/8mm	pcs	1
3	Cable Tie	/	pcs	1
4	Multimeter	DC 1000V	pcs	1
5	Impact Drill	/	pcs	1
6	Socket Wrench	Socket spanner sets	pcs	1
7	Open-end Wrench	Open-end spanner set	pcs	1
8	Socket Torque Wrench	/	pcs	1
9	PV Cable Insertion and Removal Tool	/	pcs	1

The protective equipments are shown in the table below:

No.	Name	No.	Name
1	Safety Shoe	4	Safety Goggles
2	Safety Helmet	5	Dust Mask
3	Safety Gloves		

1.3 Product Safety

- Warning mark contains important information for the safe operation of the product. Ensure that the warning mark is clearly visible, and strictly prohibit any man-made damage. In the event of damage, replace it immediately.
- Remove the key after the system is in formal operation or during maintenance activities.
- Avoid unnecessary contact with circuit boards to prevent damage to circuit boards or other electrostatic-sensitive components due to contact or improper operation.
- Please avoid opening the product for maintenance or overhaul during rainy days or wet weather.

All products must be powered off and maintained in strict accordance with the relevant requirements outlined in this manual.

2. Power On and Power Off Operations

2.1 Pre-Operation Check

If there is no damage, and all circuit breakers are in the "off" position, perform the following equipment checks before operation:

1. Check whether the battery, high-voltage box, energy storage inverter, PV combiner box, etc. are reliably grounded (i.e. check that the protective grounding wire of the system is connected), and use the insulation resistance value of the insulation meter side to ground. An insulation resistance value greater than or equal to 10M Ω is considered reliable grounding).
2. Check whether the polarity of the wiring is correct, whether the wiring is loose, and whether the appearance is complete.
3. Check that the EPO button of the energy storage system is in the reset state.
4. Check if the fixing screws of the battery, high-voltage box, etc. are tightened.
5. Check whether the voltage range of the battery side, PV side, and grid side inside the energy storage inverter is within the specified range, and whether the voltage of the battery cluster is consistent. If there is a voltage difference, a difference of about 5V is a reasonable range.
6. Check if all indicator lights are off.

2.2 Power on/off steps

WARNING

When the system encounters an abnormality, please immediately press the emergency stop button "EPO" on the energy storage system, and then follow the steps in 2.2.2 to turn off the power from A to H.

2.2.1 Power On

CAUTION

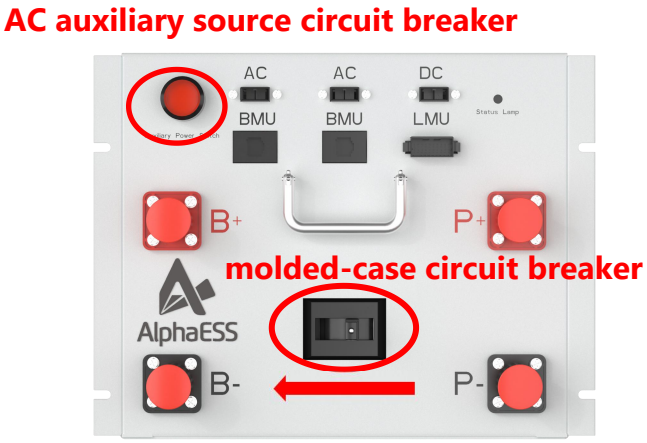
The following steps should be followed in sequence to avoid any damage.

A. Close all molded-case circuit breakers of the high-voltage box.Close the AC auxiliary source circuit breaker inside the cabinet.

CAUTION

When there is a battery expansion cabinet, it is necessary to close all high-voltage box plastic shell circuit breakers within one minute.

The schematic diagram of closing the high-voltage box circuit breaker is shown in the following figure:



B. After closing the molded case circuit breaker, the LED lights on the battery and high-voltage box start flashing.

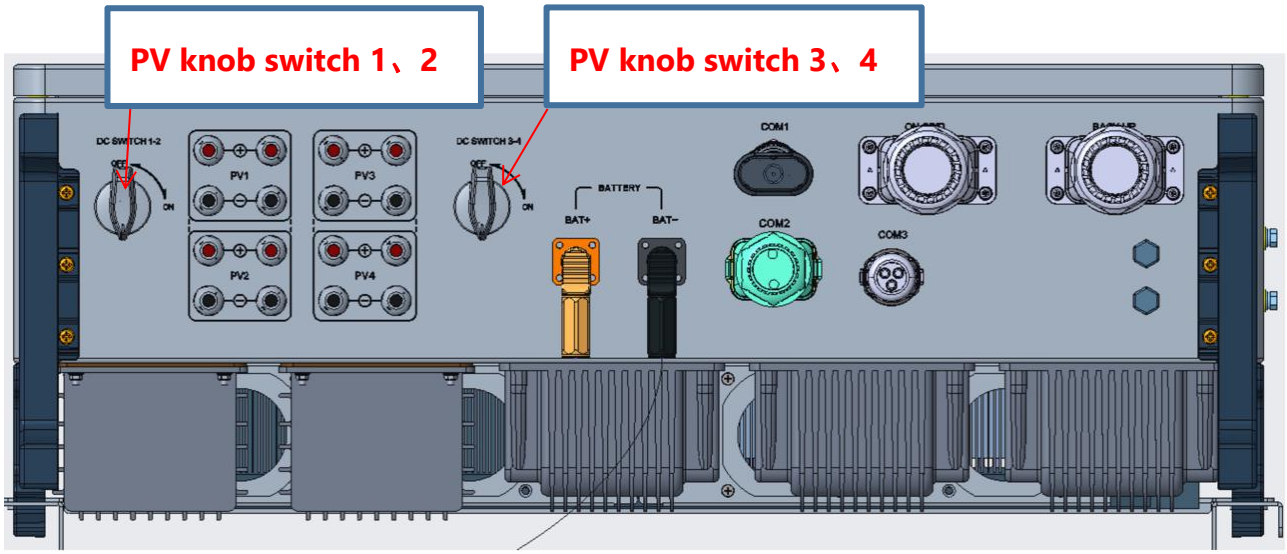
The battery/High-voltage box light indication instructions are shown in the following table:

Serial number	LED Color	Describe
1	green	Running normally
2	red	Hardware malfunction

C. Follow the wizard instructions in SCADA to configure the system.

D. After TOP BMU assigns IDs to the high-voltage box, the battery cluster number can be determined by the number of flashes of the LED lights on the high-voltage box. After the LED light flashes rapidly, start counting and record the number of slow flashes until the next flash. The number of slow flashes is the battery cluster

number. According to the SCADA interface, check whether the relay is closed on the main relay status page in the system information list.



E. Turn on the PV knob switch of the inverter.

F. Turn on the auxiliary source switch of the high-voltage box.

G. If there are no errors, the system will run normally.

2.2.2 Power Off

The system should be shut down according to the following steps:

A. Operate the SCADA interface, close the Windows system on the SCADA industrial tablet, and wait for the Windows system to shut down normally.

B. Disconnect all loads.

C. Disconnect the power grid/diesel generator connection.

D. Turn off the PV knob switch of the inverter.

E. Disconnect the AC auxiliary source circuit breaker inside the cabinet.

F. Disconnect the high-voltage box DC molded case circuit breaker.

G. Turn off the auxiliary source switch of the high-voltage box.

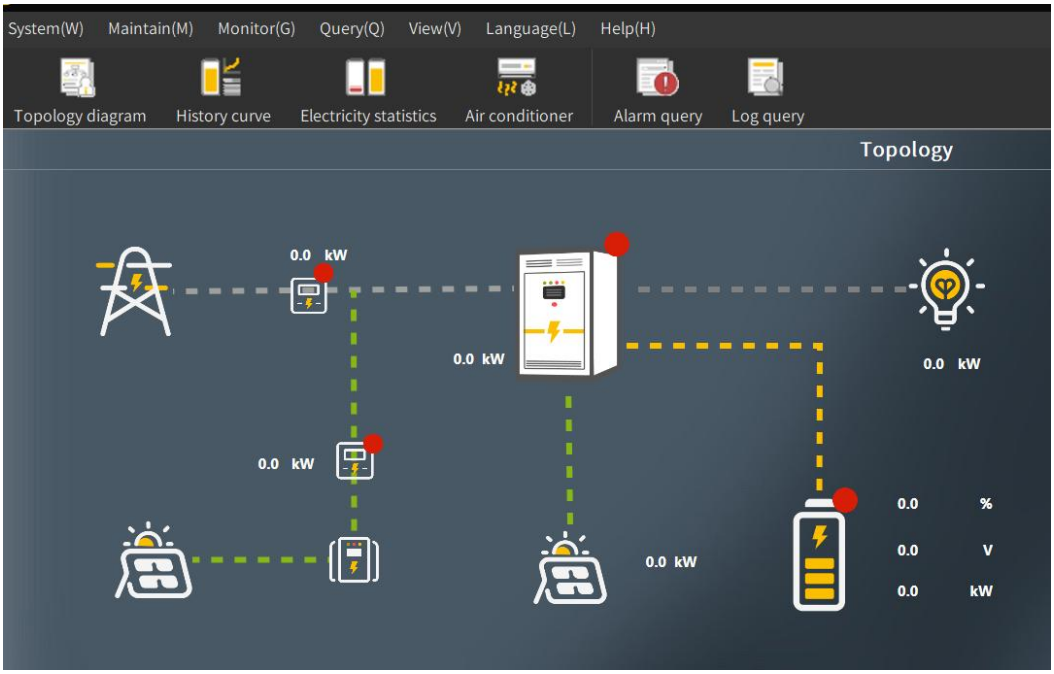
DANGER

After the system is powered off, there is still residual power. Wait for about 15 minutes before performing any electrical related operations. Before operation, a multimeter must be used to measure to ensure that there is no voltage in the system.

3. Introduction to SCADA

3.1 System Login

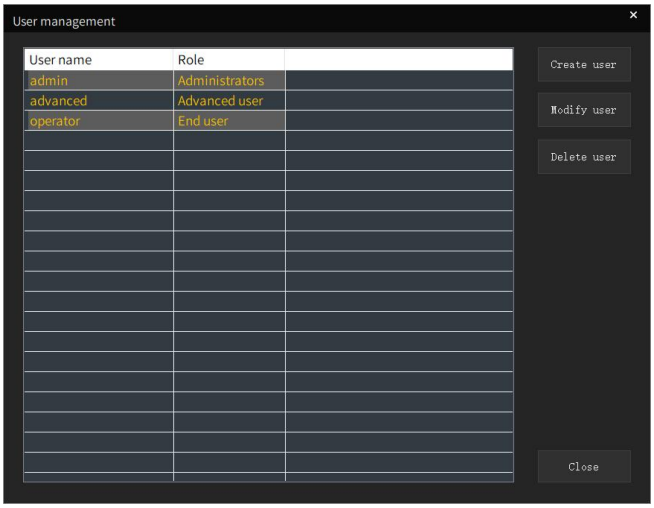
After power on, the AlphaCS-SCADA-FS Monitor will automatically start (first power on, priority will be given to entering the wizard, and settings will be made according to the wizard instructions), and the system login interface as shown in the following figure:



3.2 User Management and Switching

Click on "Maintenance" ->"User Management" to enter the user management interface. In this dialog box, users can be created, modified, and deleted.

The management interface for end users is shown in the following figure:



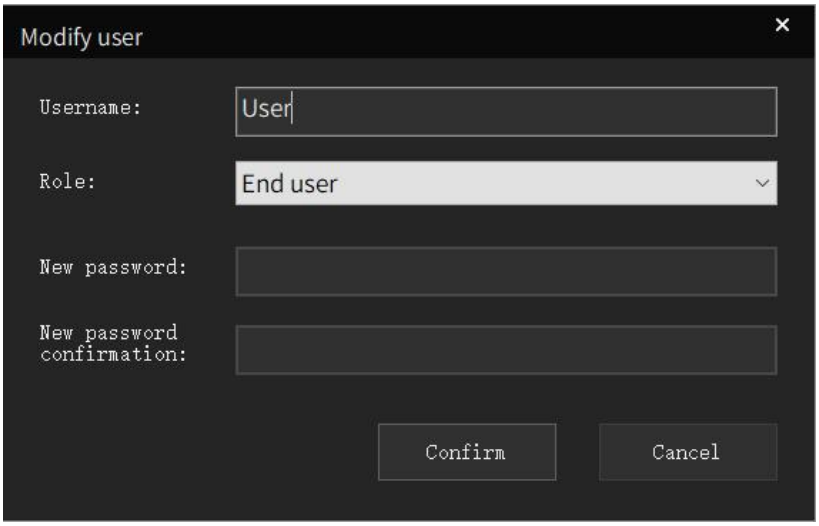
The end user management permission table is shown in the following table.

End Users	Modify User	Modify oneself	√
		Modify end users	√

Note: No user can modify or delete users admin, advanced, or operator.

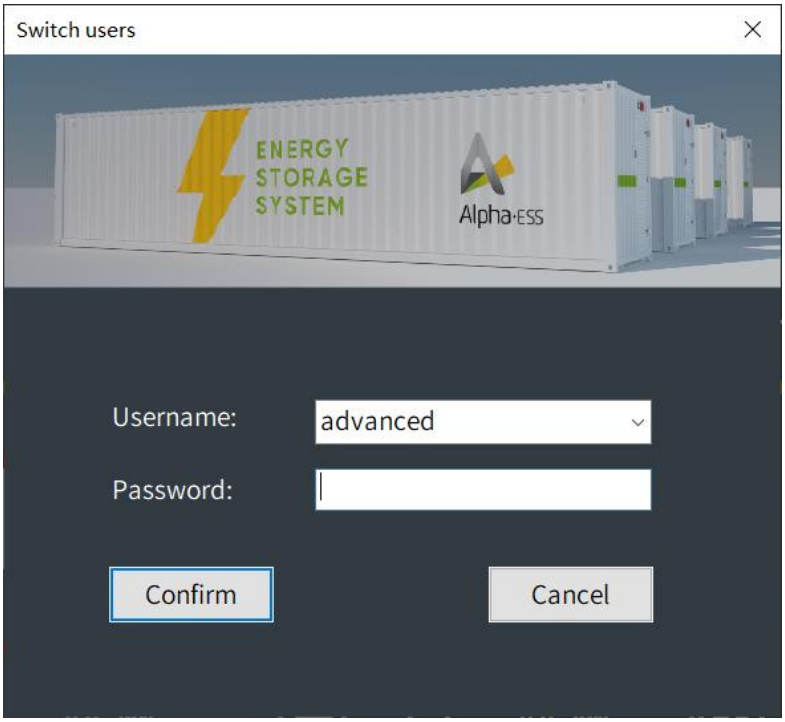
3.2.1 Modify User

Modify user process: Click "Maintenance" ->"User Management" ->select the "Modify User" button, select the user role you want to modify, click the "Modify User" button, select the content you want to modify (including username, role, password) in the modification user interface, and click the "OK" button to complete the modification operation. The modification user interface is shown in the following figure.



3.2.2 Switch Users

Switching User Process: Click on "System" ->"Switch User" in sequence. By entering "username" and "password" in the switching user interface and clicking the "OK" button, different users can switch between each other. Switch the user interface as shown in the following figure:



3.2.3 User Functional Permissions

The functional permissions of end users are shown in the following table:

Menu function	Submenu function	Advanced users
System	Start-up	√
	Real time monitoring of messages	√
	Save message	√
	Switch users	√
	Sign out	√
Maintain	User management	√
	Basic parameter configuration	√
	Control strategy configuration	√
	Historical curve	√
	Electricity statistics	√
	Air conditioner	√
	Alarm Query	√
	Log query	√
View	Toolbar	√
	Status bar	√
Language	Chinese	√
	English	√
	Deutsch	√
Help	About	√
Other Functions	Real-time Alarm	√
	Remote upgrade	√
	Resume from breakpoint	√

3.3 Configuration Option

3.3.1 Basic Parameter Configuration Options

3.3.1.1 Basic Parameter Configuration

The basic parameter configuration mainly includes: device operation settings, system parameter settings, RRCR settings (limited to Germany), air conditioning settings (limited to outdoor products), and system safety settings.

Device operation settings allow for the addition, deletion, and modification of devices. At the same time, protocols, device categories, device subclasses, models, and device IDs can be set.

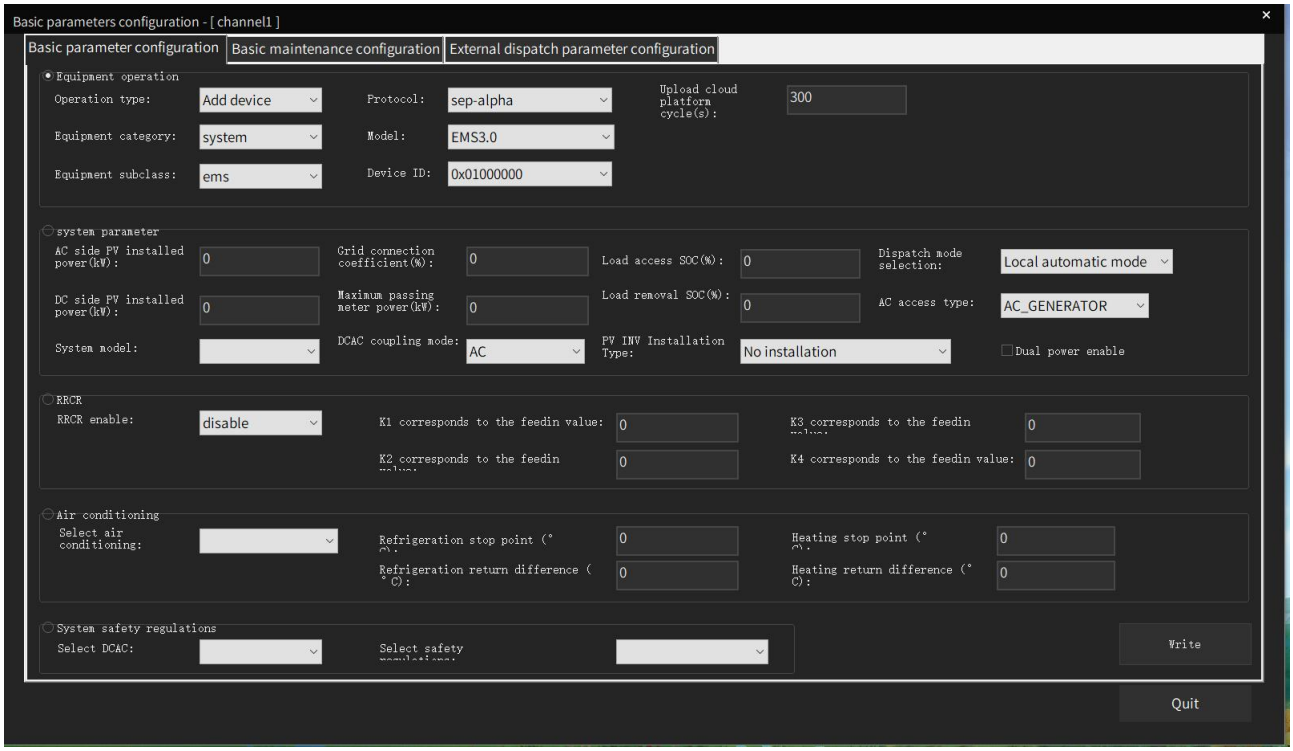
The system parameter settings include the following parameter settings: AC side PV installed power, grid connection coefficient, load access SOC, scheduling mode selection, DC side installed power, maximum through meter power, load shedding SOC, system model, DCAC coupling mode, and PV inverter installation type.

RRCR is only available for use in Germany, please refer to the RRCR settings section for details.

Air conditioning is limited to outdoor products, and indoor cabinet products do not require installation.

System security settings include DCAC selection and security selection settings. Customers can choose the corresponding safety regulations based on their country.

Setting process: Click "Maintenance" ->"Configuration Management" ->"Basic Parameter Configuration" ->"Basic Parameter Configuration" in sequence.

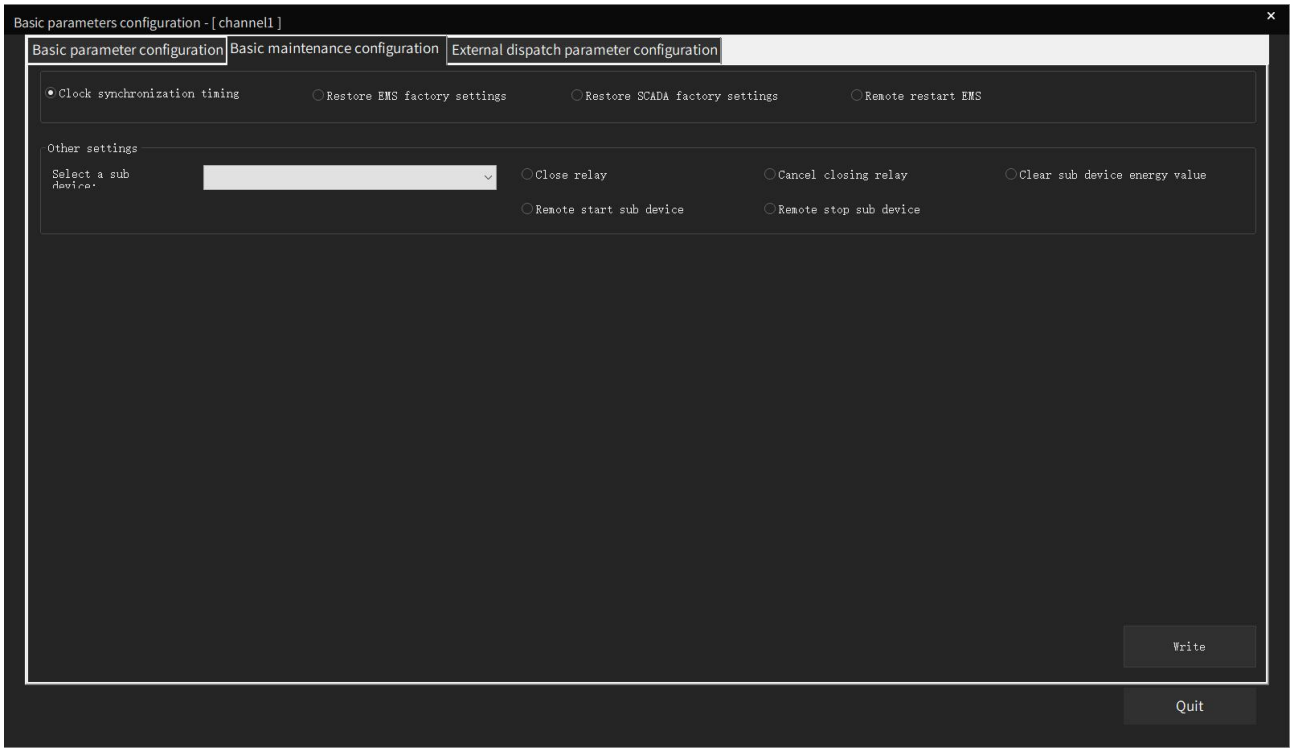


3.3.1.2 Basic Maintenance Configuration

Basic maintenance configuration includes clock synchronization and timing, remote restart of EMS, restoration of SCADA factory settings, and restoration of EMS factory settings.

Other settings include selecting sub devices and setting them up, including closing relays, canceling closing relays, clearing sub device energy values, remotely starting sub devices, and remotely stopping sub devices.

Setting process: Click "Maintenance" ->"Configuration Management" ->"Basic Parameter Configuration" ->"Basic Maintenance Configuration" ->"Check Corresponding Settings" ->Click "Write". The interface diagram is shown below:

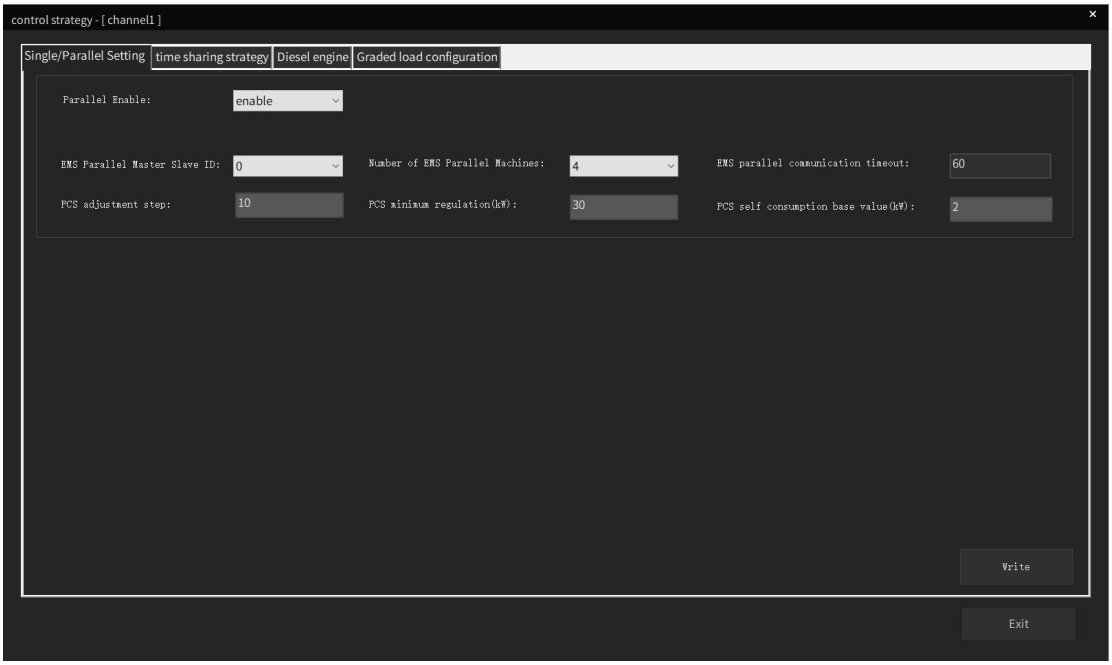


3.4 Function Setting Options

3.4.1 Single/Parallel Machine Setting Interface

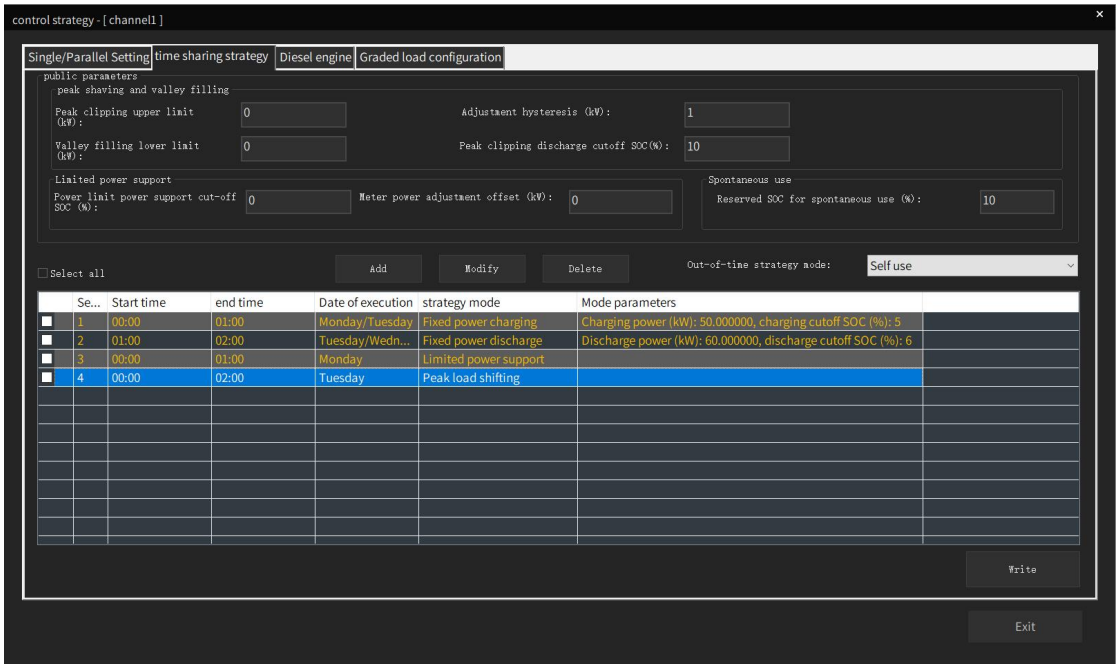
The parameter configuration process for the single/parallel machine setting interface is as follows: click "Maintenance" ->"Control Strategy" ->"Single/Parallel Machine Setting", and this interface will enable the setting of parallel machines.

If parallel operation is enabled, the system will automatically recognize the parallel operation mode and display parameter settings based on the parallel operation mode, including EMS parallel operation ID, EMS parallel operation quantity that needs to be set, and other default parameter settings. The setting interface is shown in the following figure:

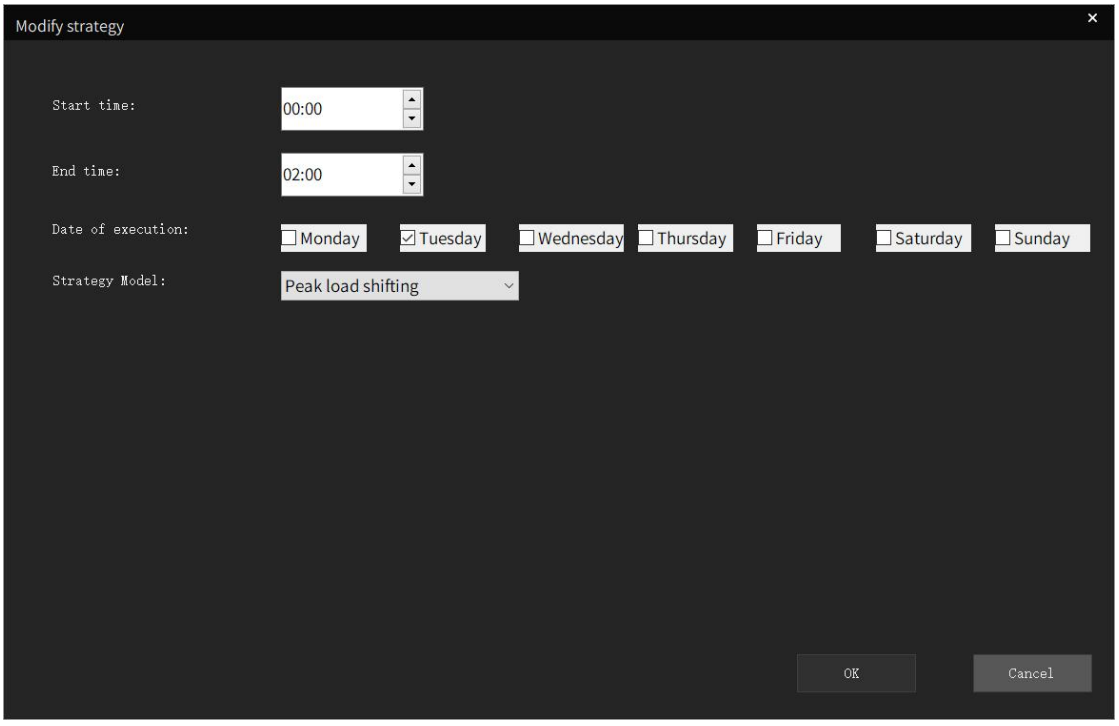


3.4.2 Time Sharing Strategy

In the time sharing strategy interface, relevant parameters for self use, power limit support, and peak shaving and valley filling strategies can be set. In the "time sharing strategy" interface, you can set common parameters for each strategy, and click the "add", "delete", and "modify" buttons to operate on the data in the list. The interface diagram of the "time sharing strategy" is shown below:



In the "Add Policy" and "Modify Policy" interfaces, you can add and modify data in the list, as shown below:

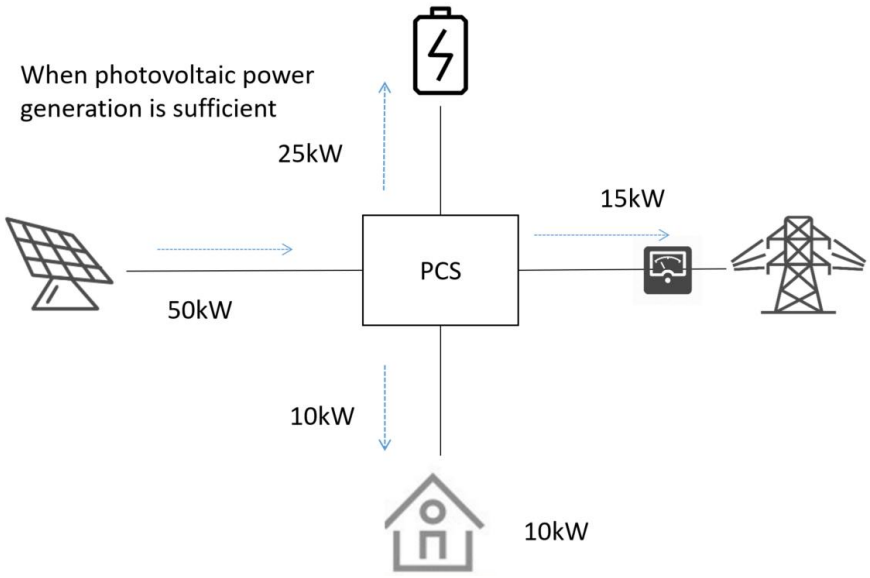


Process of modifying list data: Select a data item in the list ->click the "Modify" button. The original data will be displayed in the modification interface. Then, you can modify the start time, end time, and strategy mode (when the strategy mode is fixed power charging or

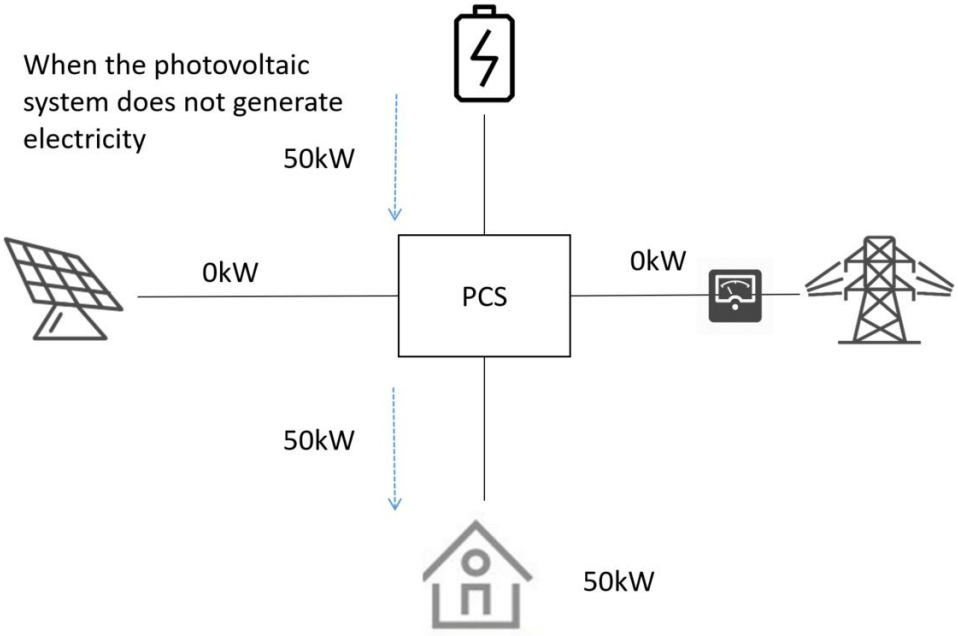
fixed power discharging, you can modify the charging and discharging power and charging and discharging cut-off SOC cut-off SOC) again. Click the "OK" button to successfully modify a data item in the list.

3.4.2.1 Self Use

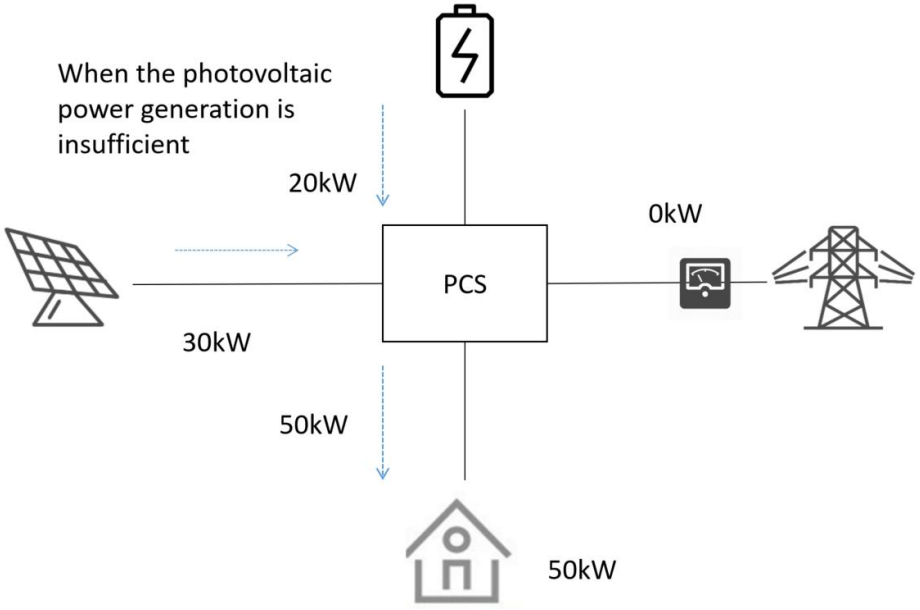
In the presence of mains power, when there is sufficient PV power generation, the system prioritizes supplying power to the load and charging the excess battery. If the battery reaches its maximum charging power, the excess electricity will be fed into the grid without triggering the maximum feed limit. The schematic diagram is as follows:



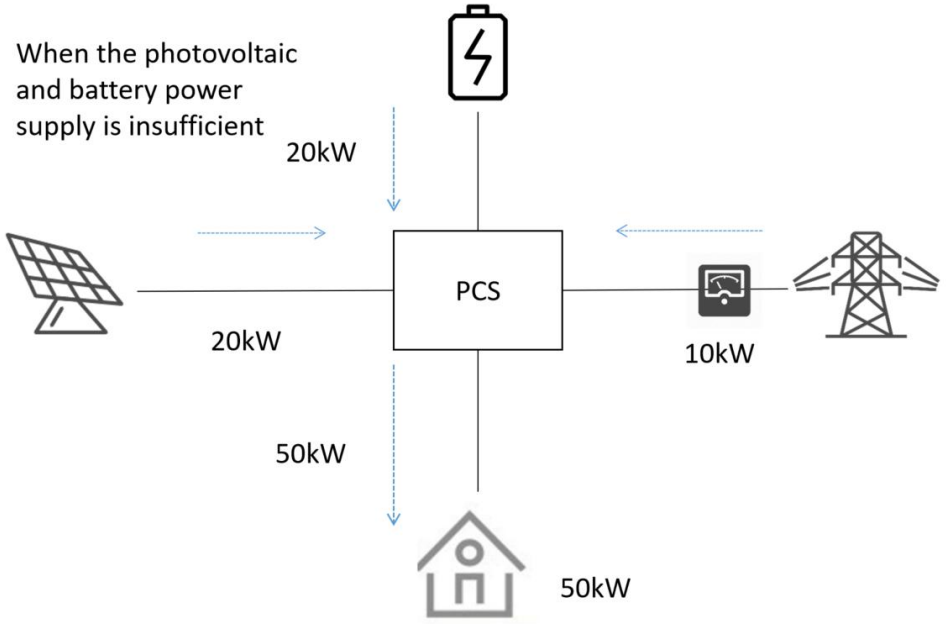
When the PV system does not generate electricity and the stored energy is sufficient, the load is powered by the stored energy, as shown in the schematic diagram below:



When PV power generation is insufficient to support the load, PV and energy storage jointly supply power to the load, as shown in the schematic diagram below:

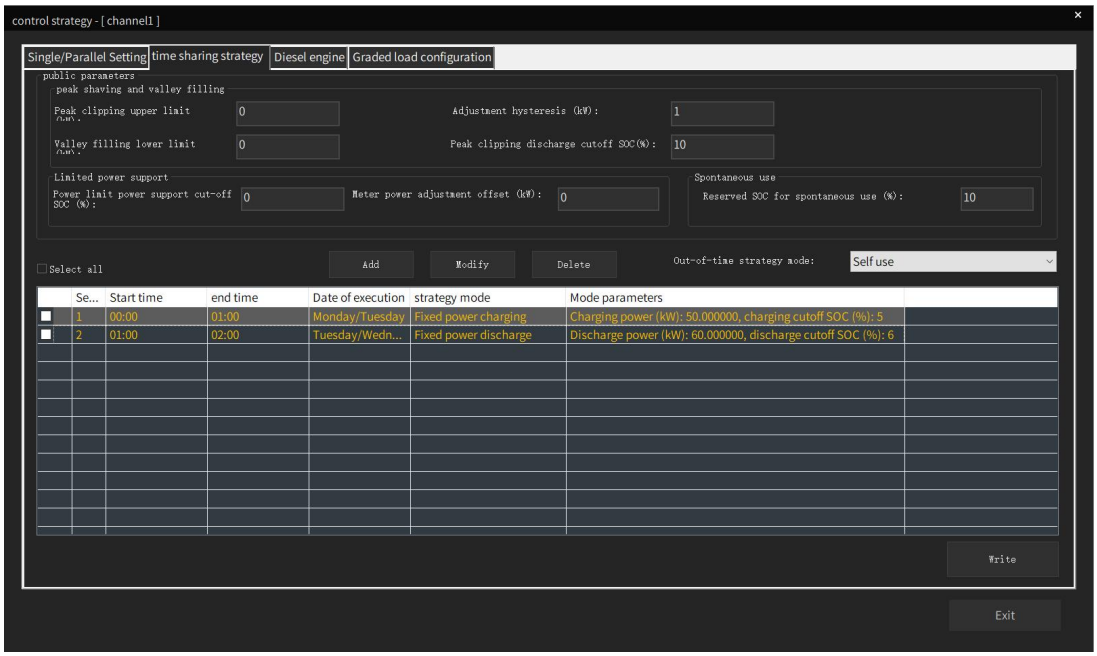


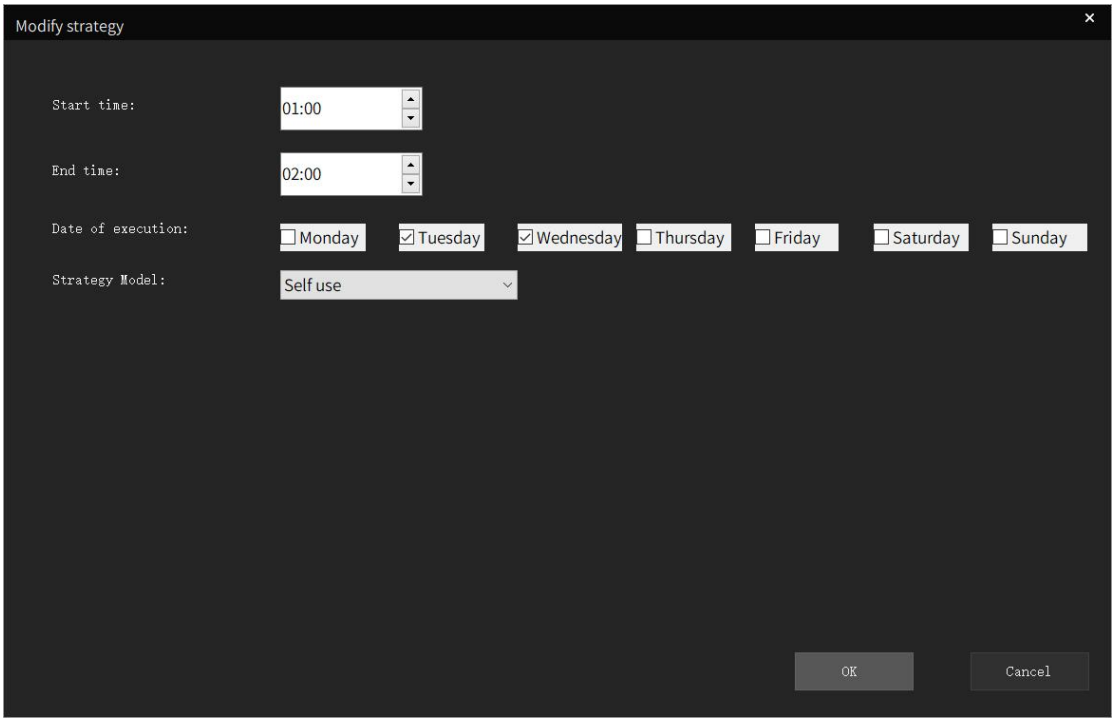
When neither PV nor battery power can support the load, the remaining power is taken from the grid, as shown in the schematic diagram below:



Setting process: Click "Maintenance" ->"Configuration Management" ->"Control Strategy" ->"time sharing Strategy" ->Set "Self use Reserve SOC" ->Click "Add" ->Add Self use Policy.

The interface is shown in the following figure:

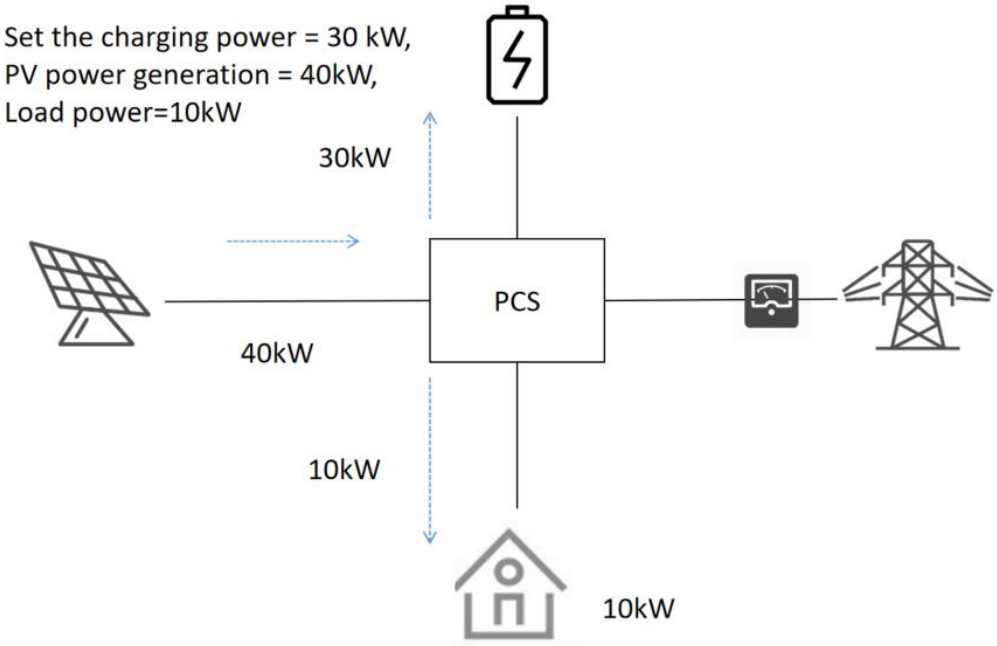


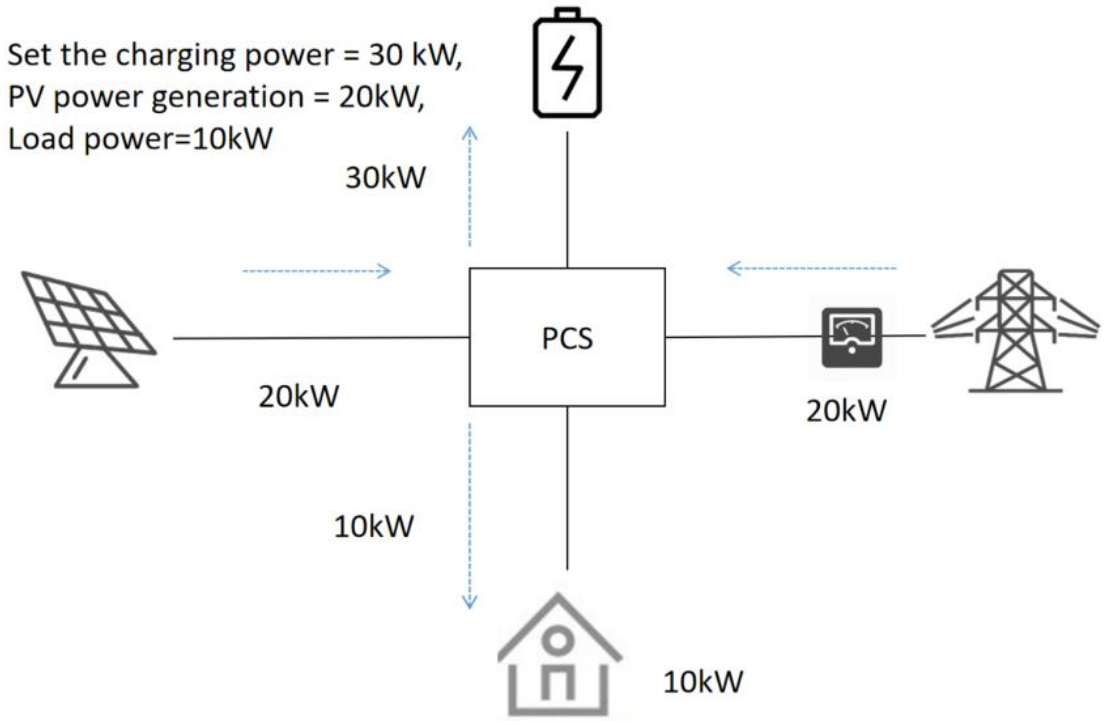


3.4.2.2 Fixed Power Charging and Discharging

This function is only available when connected to the grid. During the charging period, priority is given to charging the battery from the PV system. If the PV power generation cannot meet the battery charging power at this time, power is taken from the grid to charge the battery. When the battery reaches the charging cut-off SOC, the grid charging is stopped. At this point, when the PV is greater than the load, the excess PV can continue

to charge the battery; When the PV is less than the load, the mains power supplements to supply power to the load. The schematic diagram is as follows:

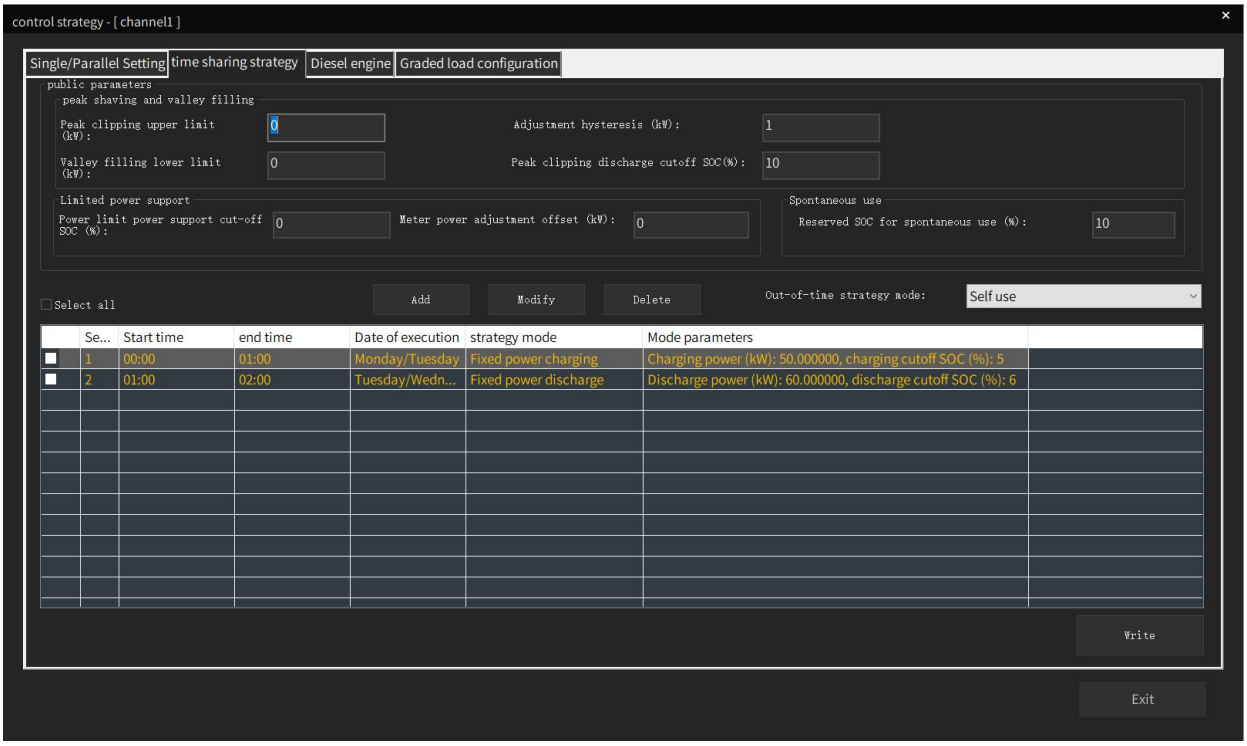




During the discharge period, the system performs fixed power discharge.

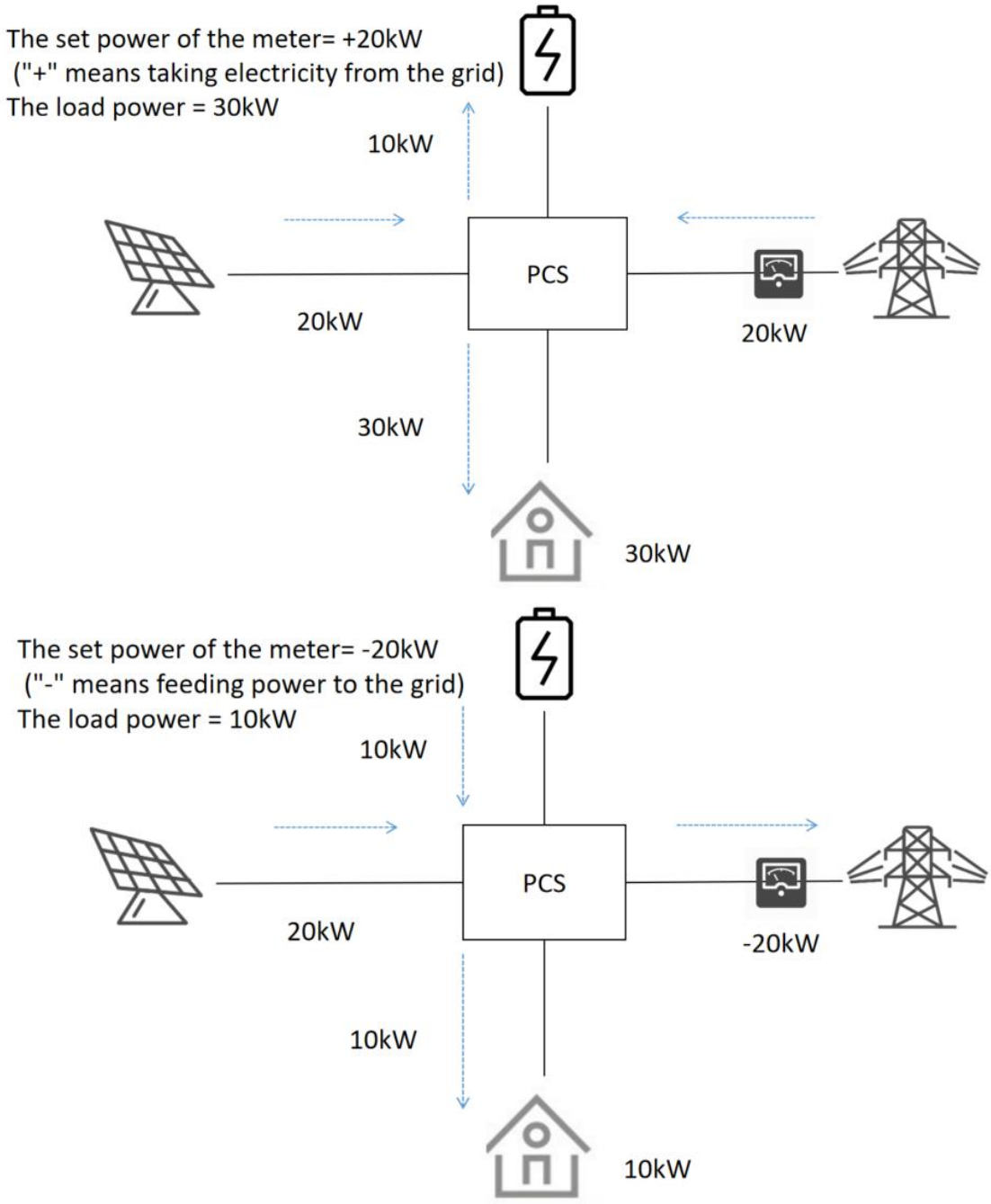
Setting process: Click on "Maintenance" ->"Configuration Management" ->"Control Strategy" ->"time sharing Strategy" ->click on "Add" ->add fixed power charging/discharging.

The interface is shown in the following figure:

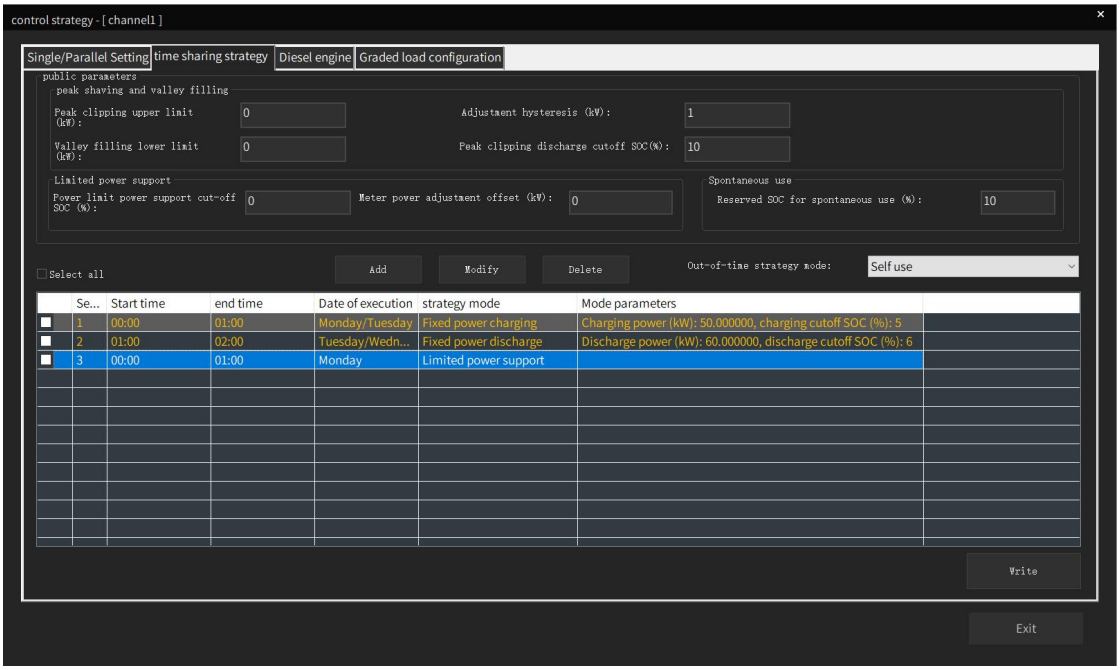


3.4.2.3 Pmeteroffset

This function is only available when connected to the grid. After the power limit support is enabled, the system will take power from or feed power to the grid at a constant power according to the power value set by the customer; Otherwise, the system will perform autonomous self use. The schematic diagram is as follows:

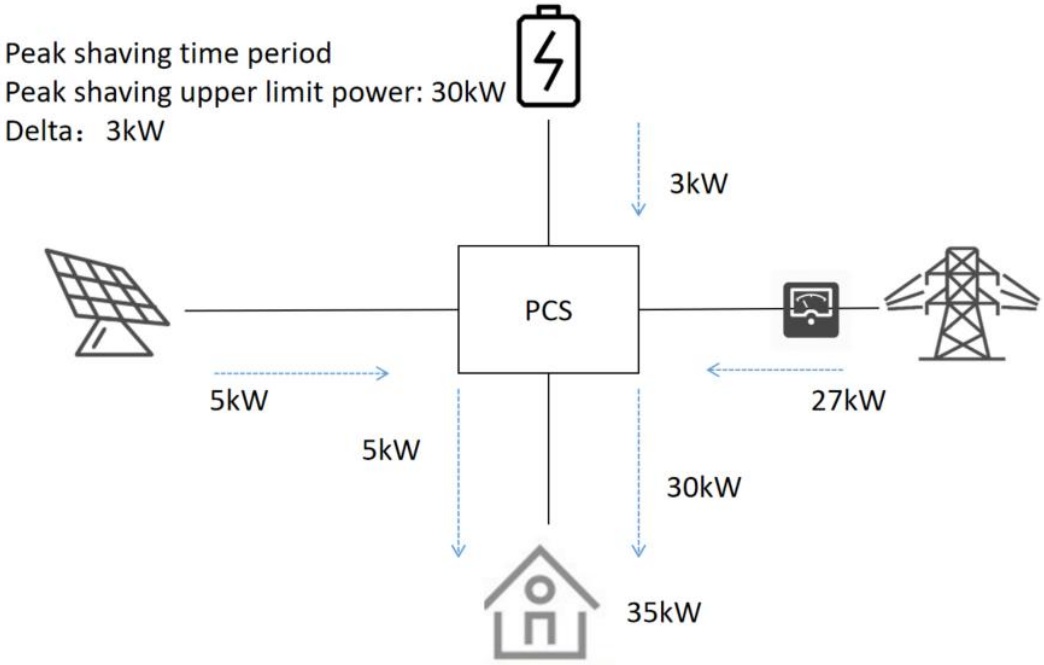


Setting process: Click "Maintenance" ->"Configuration Management" ->"Control Strategy" ->"time sharing Strategy" ->Set "pmeteroffset" parameters ->Click "Add" ->Add pmeteroffset Mode.

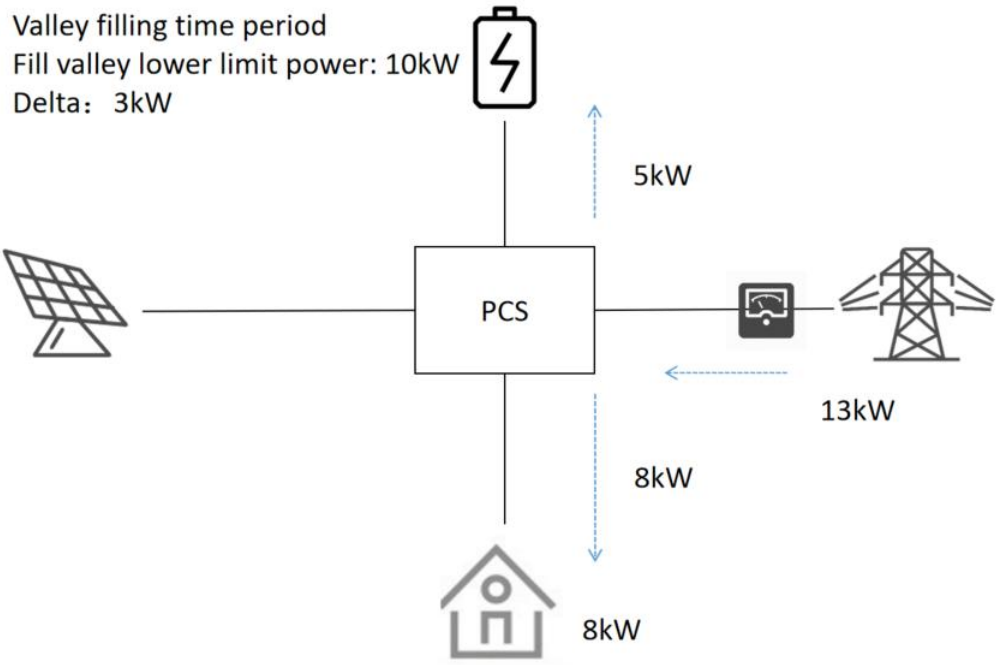


3.4.2.4 Peak Shaving

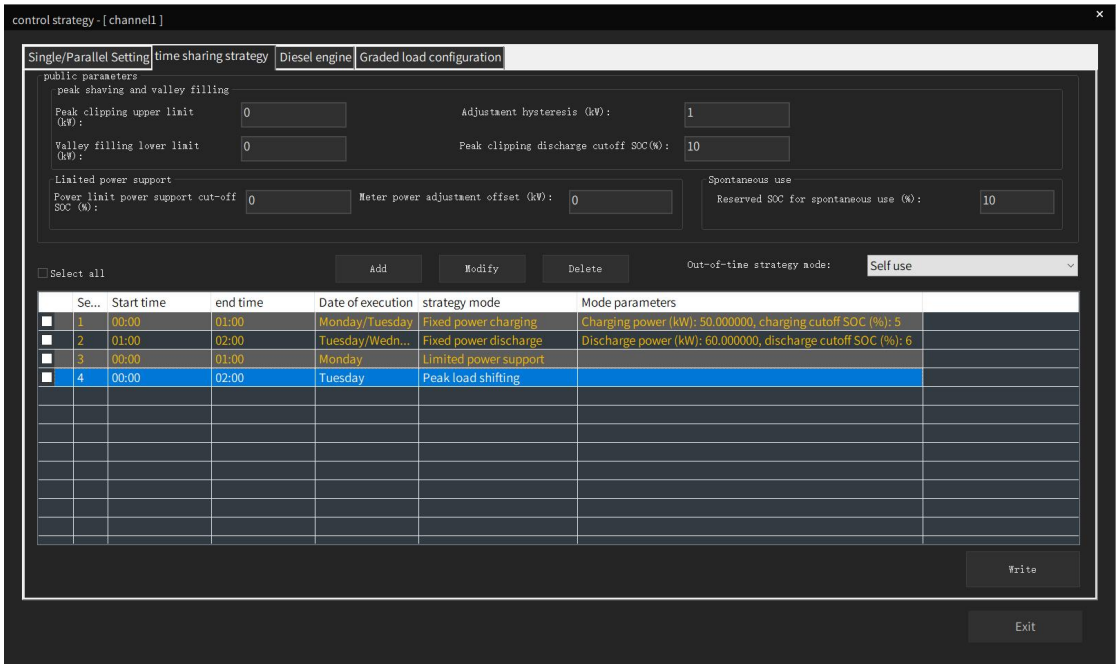
This function is only available in the state of connecting to the grid. During the peak shaving function period, when the system draws power from the grid greater than the set upper limit power, the peak shaving function is executed, that is, the system will increase the discharge or decrease the charging power, so that the power drawn from the grid is less than the set peak power. The schematic diagram is shown below:

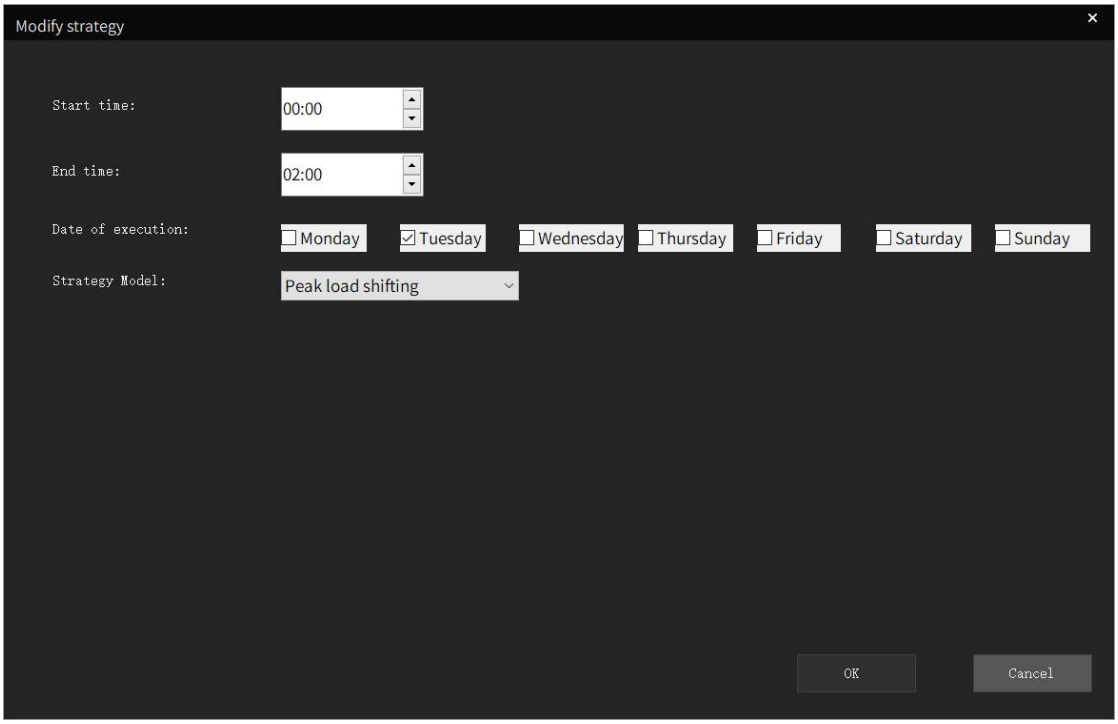


When entering the valley filling function period, if the power taken from the grid by the system is less than the set lower limit power, the valley filling function will be executed, that is, the system will reduce the discharge or increase the charging power, so that the power taken from the grid is greater than the set valley power. The schematic diagram is shown below:



Setting process: Click "Maintenance" ->"Configuration Management" ->"Control Strategy" ->"time sharing Strategy" ->Set Peak shaving and valley filling parameters ->Click "Add" ->Set "Start Time", "End Time", "Execution Date", and select the "Peak shaving and valley filling" strategy mode.





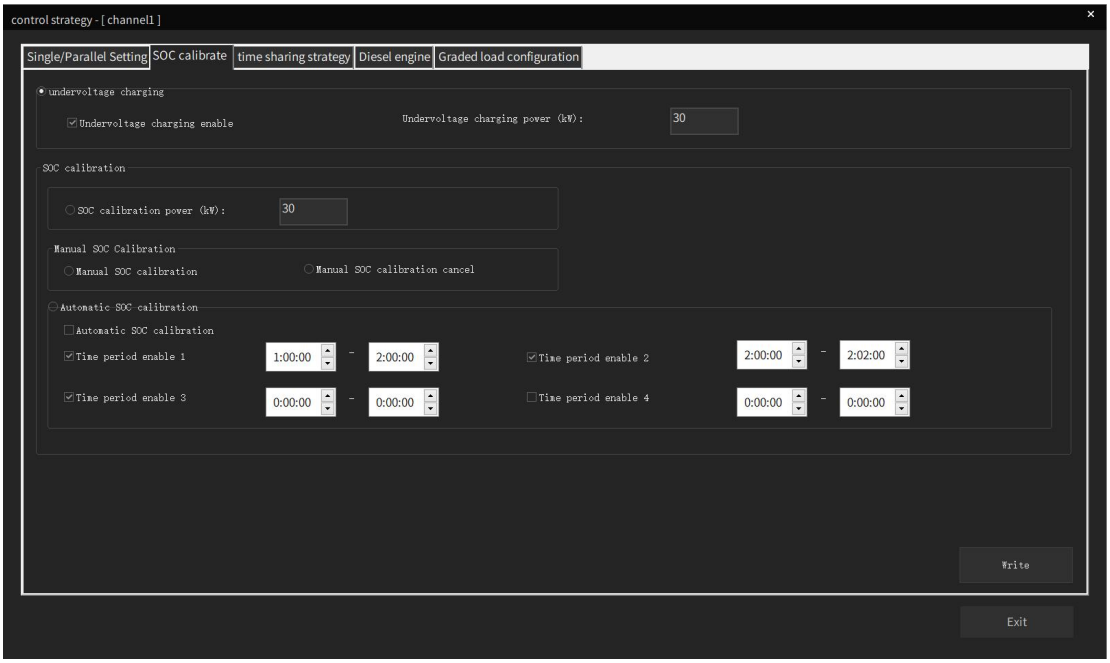
3.4.3 SOC Calibration

After this function is enabled, if it is a grid connected system and the battery is rechargeable, the battery will start strong charging directly. If the PV is not enough, power will be taken from the grid. If it is a diesel generator system, first turn on the diesel generator, then charge the battery according to the corresponding power mode. When the battery charging flag changes to 'no charging', exit SOC calibration.

By setting a time period and selecting the time for SOC calibration, automatic calibration of SOC can be performed. Start charging the battery directly during the time period, and if the PV is insufficient, take power from the grid. If it is a diesel generator system, first turn on the diesel generator, then charge the battery according to the corresponding power mode. When the battery charging flag changes to 'no charging', exit SOC calibration.

SOC calibration configuration process: Click "Maintenance" ->"Control Strategy Configuration" ->"SOC Calibration" in sequence, set the undervoltage charging (including undervoltage charging enable and undervoltage charging power) and SOC calibration (including four time periods of SOC calibration power, manual SOC calibration enable, automatic SOC calibration enable, and automatic SOC calibration enable) (note: time period settings can span across days but cannot overlap), and then click the "Write" button to save the settings.

The interface is shown in the following figure:



3.4.4 Diesel Generator Function

There are three types of on/off modes for diesel generators,

SOC mode: In this mode, a start SOC and a stop SOC are set. When the battery SOC is lower than the start SOC, the diesel generator is turned on; When the battery SOC is higher than the shutdown SOC, turn off the diesel generator.

Time slot mode: In this mode, a start time point and a stop time point are set. When the local time is between these two time points, the diesel generator is turned on; Turn off the diesel generator outside the designated time period.

Manual mode: In this mode, the start stop button of the diesel generator needs to be manually controlled.

In addition, there are two modes for diesel generator power control, using two set values, one is the rated power value of the diesel generator and the other is the battery power supply value.

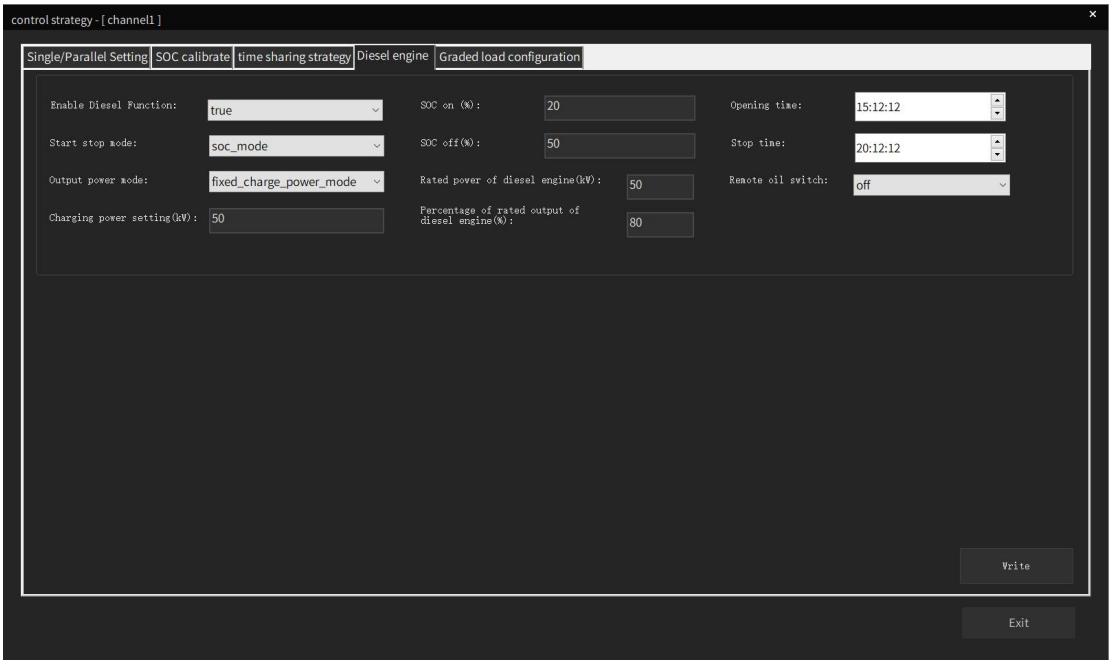
diesel generator rated power mode: When selecting this power mode, set PCS to draw power from the diesel generator=80% of the diesel generator rated power - load power. If the former is less than the difference between the latter two, PCS will not draw power from the diesel generator.

Battery rated power mode: When selecting this power mode, the PCS is set to draw power from the diesel generator=the set battery charging power value. However, if (80% of the diesel generator rated power - load value) is less than the set battery charging power value, the PCS will draw power from the diesel generator according to the former power difference. The setting of this value needs to accurately consider the load peak value, otherwise it may cause overload and shutdown of the diesel generator.

Oil engine interface configuration process: Click "Maintenance" ->"Control Strategy Configuration" ->"Oil Engine" in sequence. In the oil engine configuration interface of the control strategy configuration, configure the diesel generator parameters, and then click the "Write" button to save the settings.

The parameters that need to be configured for a diesel generator include: engine enable, start stop mode, output power mode, charging power setting, remote engine on/off, SOC on/off, rated power of the diesel generator, percentage of rated output of the diesel generator, start time, and stop time.

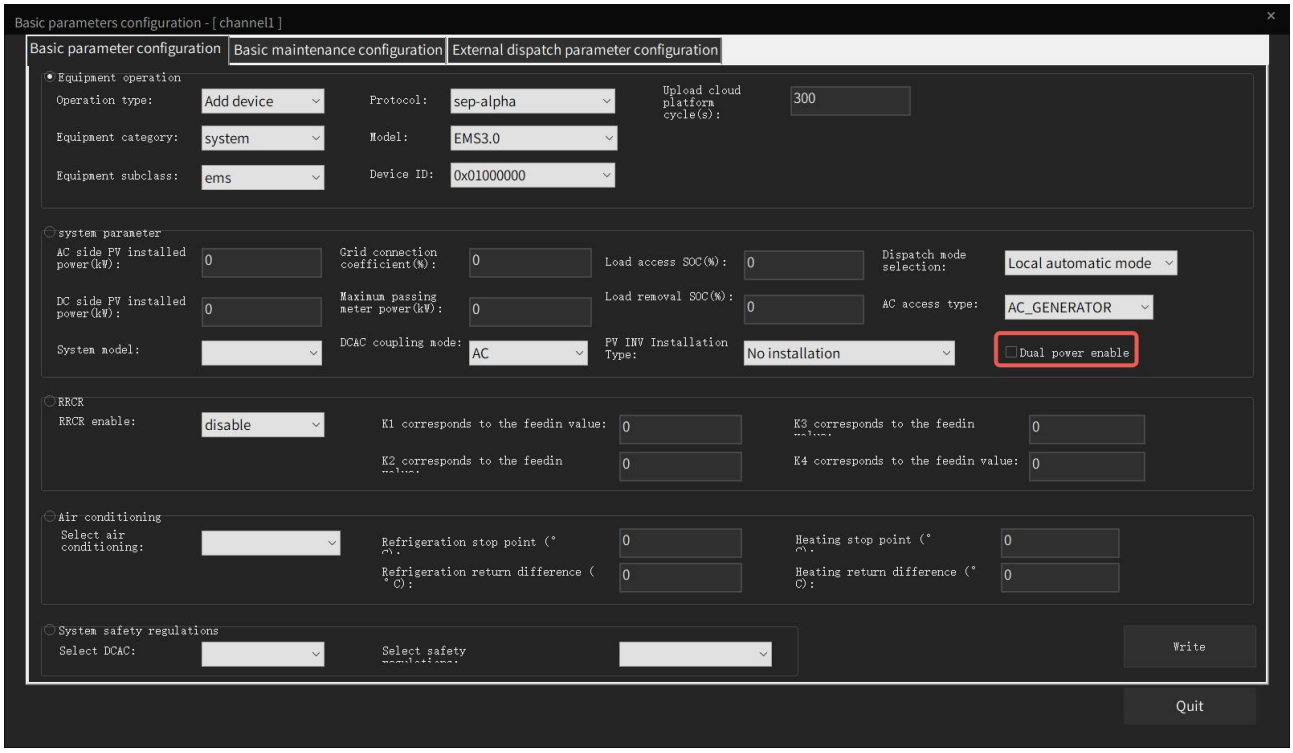
The diesel generator configuration interface is shown in the following figure:



3.4.5 Dual Power Function

If the customer has installed an automatic switching device ATS, dual power switching can be performed. When the mains power exists, ATS will prioritize switching to the mains side and use the power from the grid; When the mains power is lost and the backup power exists, ATS will automatically switch to the backup power side and use the backup power; When both the primary and backup power are lost, the ATS switch will maintain its pre power outage state.

Setting process: Click on "Maintenance" ->"Configuration Management" ->"Basic Parameter Configuration" ->"Basic Parameter Configuration" ->select "System Parameters" ->set "Dual Power Enable" ->"Write". The interface is shown below:



3.4.6 Graded Load Configuration

NOTE

AlphaESS only provides dry contacts, and the use of this function requires the customer's switch to support dry contact control. The installation manual will reflect the connection capability of these dry contacts (including voltage, current, etc.).

Under off grid conditions, when the SOC of the battery is ⩽ the SOC of the general load, the power supply to the general load is disconnected. The battery continues to discharge, and when SOC ⩽ the critical load SOC is disconnected, all loads are disconnected, and the inverter maintains off grid no-load operation.

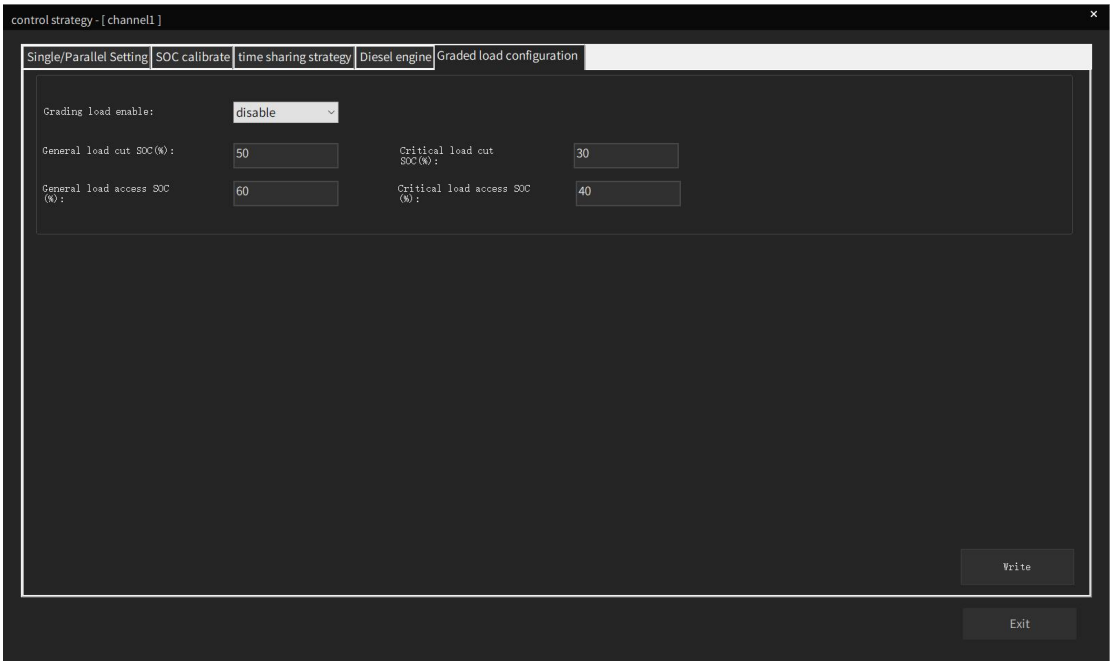
As the PCS runs without load, the battery continues to discharge. If there is PV power, it will replenish the battery until the corresponding load SOC is restored, and then control the corresponding load connection;

It should be noted that when the oil engine is connected or the mains power is connected, all loads will be directly restored to power supply.

Setting process: Click "Maintenance" ->"Control Strategy Configuration" ->"Control Strategy" ->"Graded load configuration" in sequence, configure parameters on the hierarchical load interface, and then click the "Write" button to save the settings.

The parameters that need to be configured include setting: graded load enable, general load cutoff SOC, general load access SOC, important load cutoff SOC, and important load access SOC.

The configuration interface is shown in the following figure:

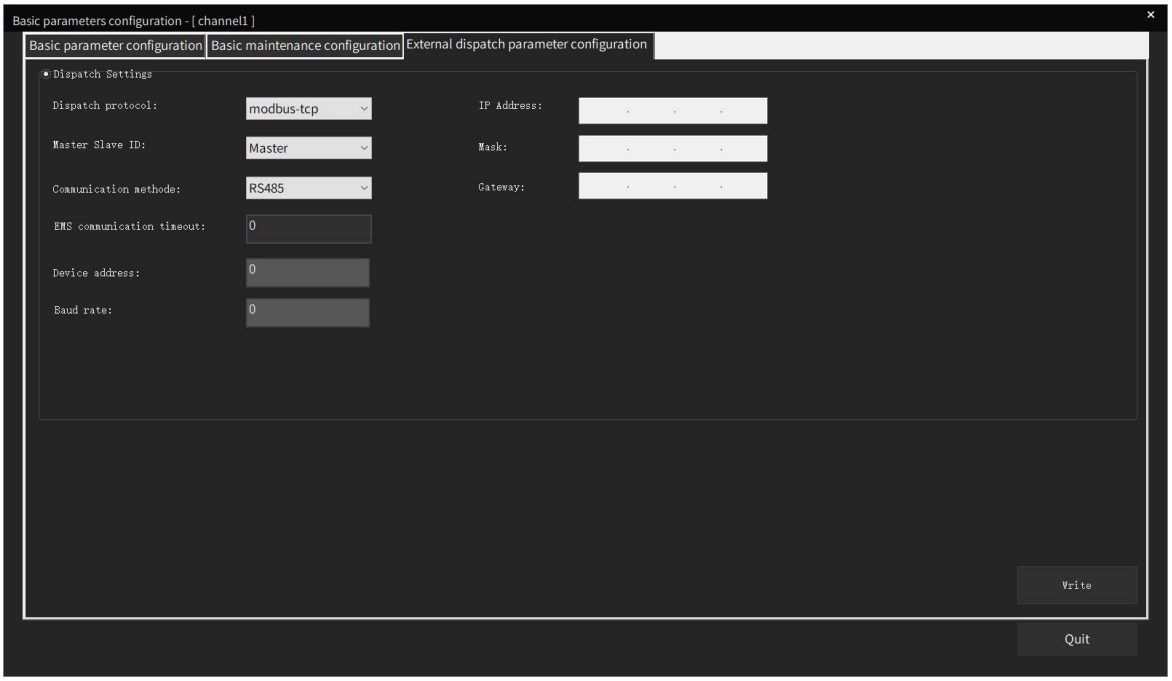


3.4.7 External Dispatch

3.4.7.1 Modbus TCP Scheduling (Single Machine)

This scheduling function supports customers to communicate with our EMS through TCP communication and MODBUS TCP protocol. It supports PCS AC active power setting, PCS AC reactive power setting, PCS power on/off setting, PCS fault clearing, control mode (local mode and remote mode, remote mode supports external control) setting, and data query.

Setting process: Click "Maintenance" ->"Configuration Management" ->"Basic Parameter Configuration" ->"External Scheduling Parameter Configuration" in sequence. The interface diagram is shown below:

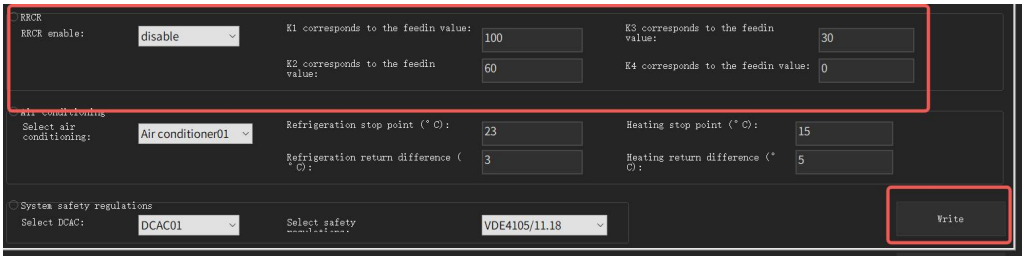


3.4.8 RRCR Setting (Germany Specific)

The RRCR function is used to dynamically adjust the grid connection coefficient. When the RRCR function is enabled, the default grid connection coefficient of the system no longer takes effect, and the system grid connection coefficient will be updated to the corresponding set value with the triggering of K1~K4.

Setting process: Click "Maintenance" ->"Configuration Management" ->"Basic Parameter Configuration" ->Set "RRCR Interface" ->Click the "Write" button to save.

The interface diagram is shown below:

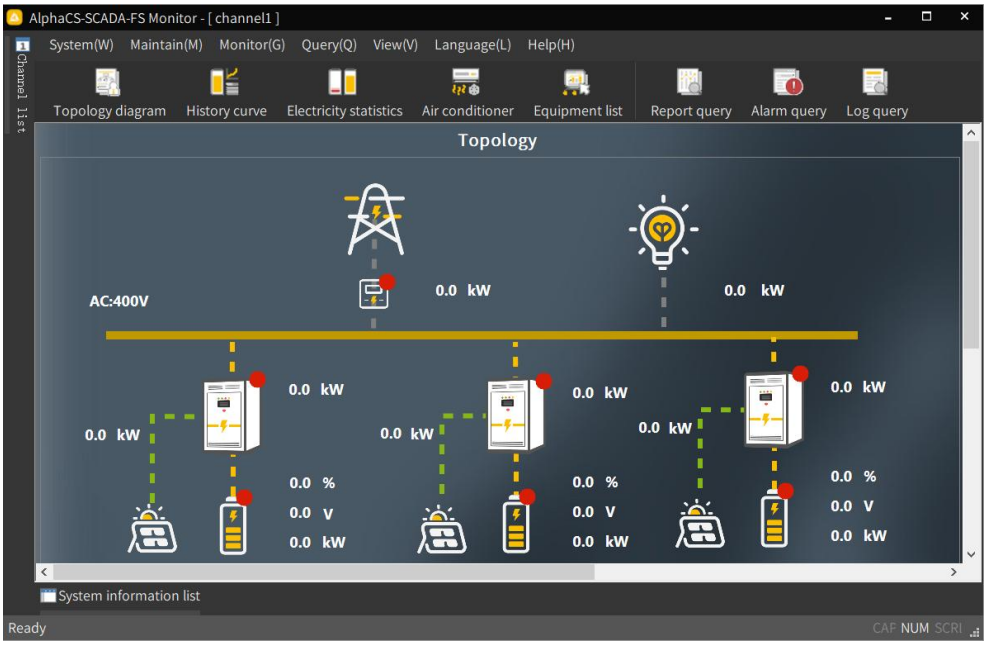


3.5 Introduction to Data Reading Interface

3.5.1 Topology Diagram

The topology page allows for a clearer view of the operational status of each device and the overall topology structure of the system.

The topology page is shown in the following figure:



Method for replacing topology diagram file: Copy and replace the new topology diagram file "diagram. xml" to the SCADA program installation path C: \ AlphaESS \ AlphaCS-SCADA-FS Monitor \ project folder, and click the topology diagram button again to display the new topology diagram.

3.5.2 Historical Curve

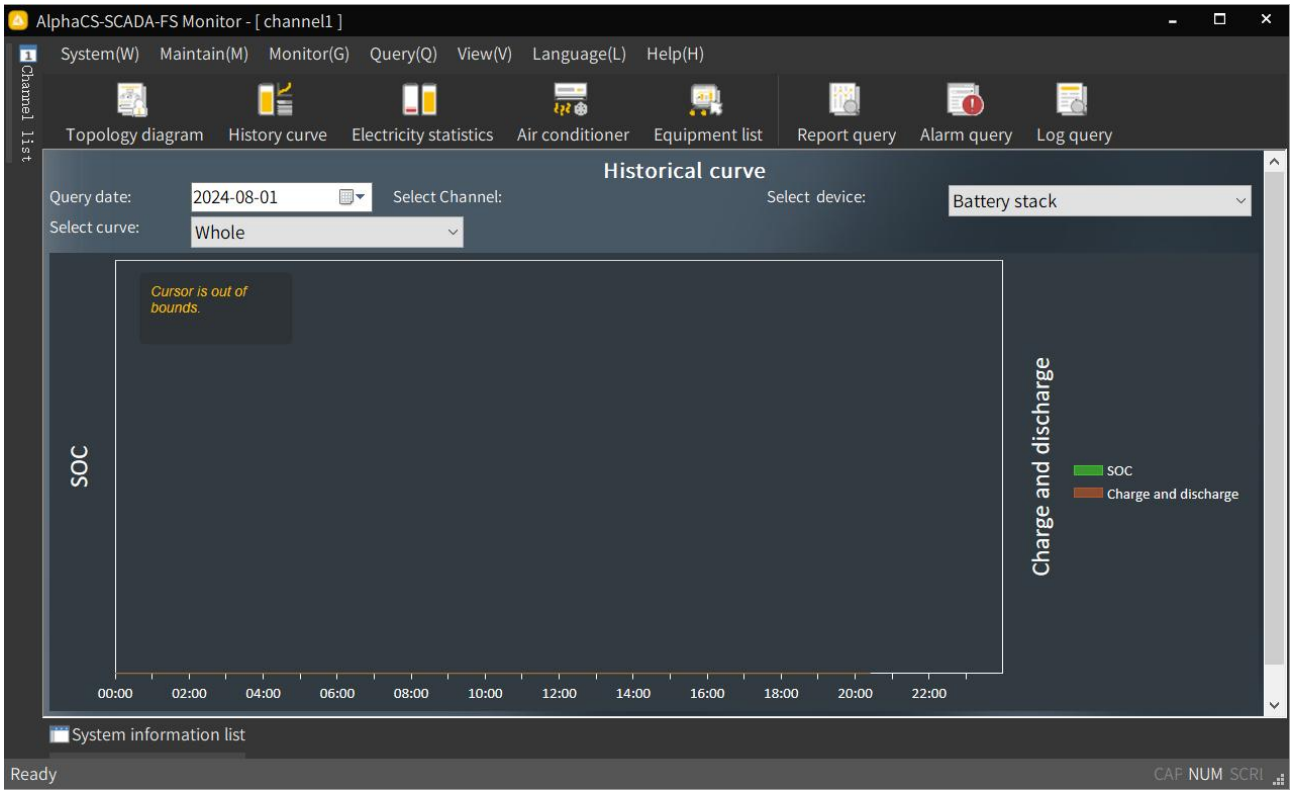
The historical curve page allows users to view historical data such as device power, presented in the form of curves.

Click the "Monitor" button in the menu bar, select "Historical Curve" from the drop-down menu, or click the "Historical Curve" icon from the toolbar, and then the Historical Curve interface will appear in the customer area below.Select channel: Select the channel to view;

Select device: Select the device to view;

Select Curve: Select the curve to view.

Select the corresponding date, channel, equipment, and curve to query the corresponding historical curve.



3.5.3 Electricity Statistics

The power statistics page can query the power statistics data of the device within a certain period of time, presented in the form of a bar chart.

Click the "Monitor" button in the menu bar, then click on the power statistics in the drop-down menu, or click on the "Power Statistics" icon from the toolbar, and the power statistics page will appear in the customer area below. The power statistics interface is shown in the following figure.

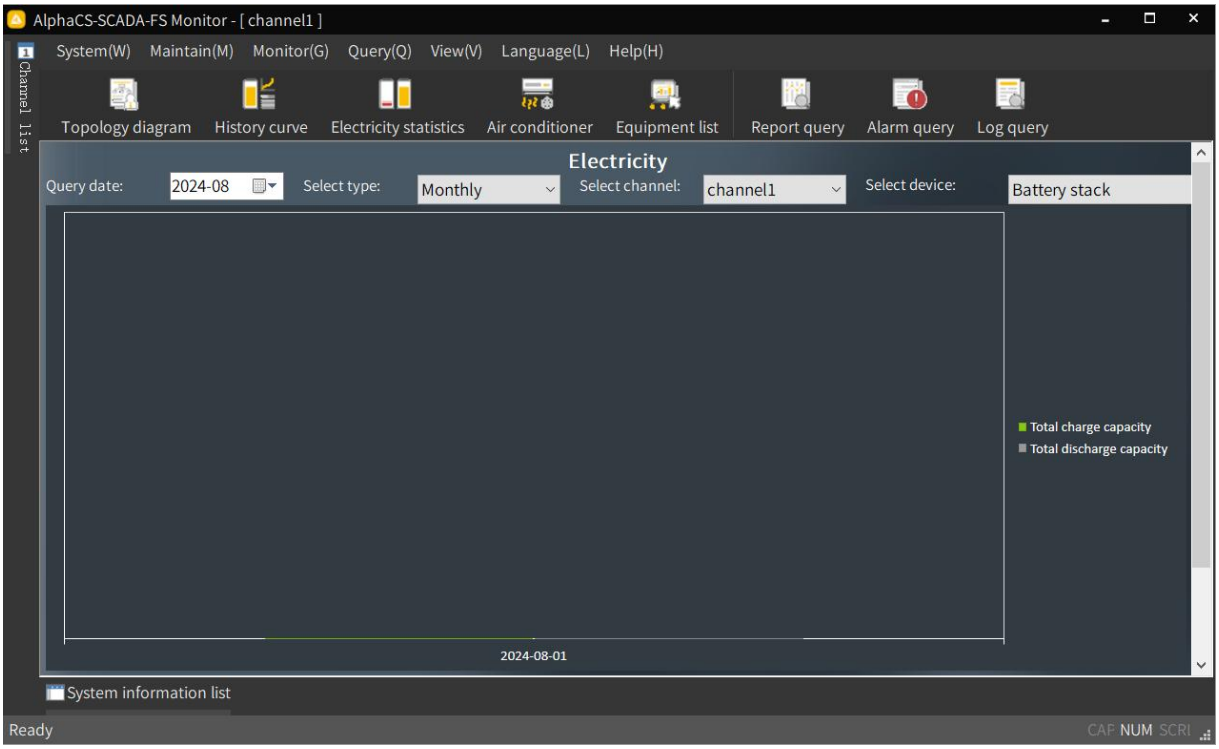
Query Date: Select the date to view;

Selection type: There are three types to choose from: annual, monthly, and self installation;

Select channel: Select the channel to view;

Select device: Select the device to view.

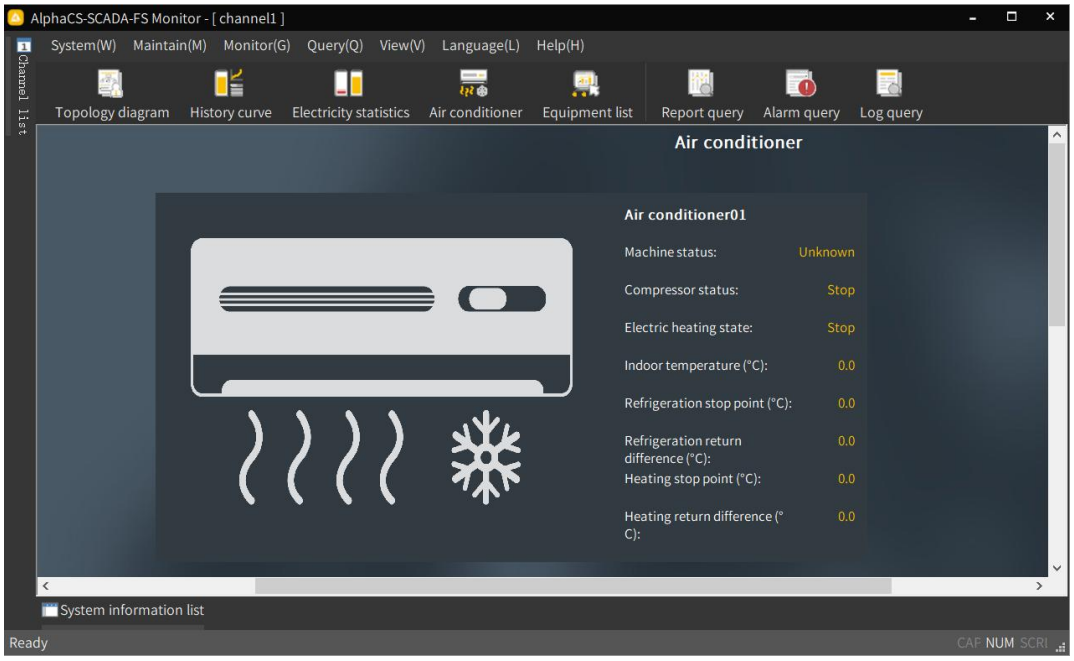
Select the date, type, channel, and device to query the corresponding electricity statistics data.



3.5.4 Air Conditioning (Outdoor Products Only)

The air conditioning page allows you to view relevant information about the air conditioner, including the overall status, compressor status, electric heating status, indoor temperature, indoor humidity, cooling stop point, cooling hysteresis, heating stop point, and heating hysteresis parameters.

Click the "Monitor" button in the menu bar, select the air conditioner from the drop-down menu, or click the "Air Conditioner" icon from the toolbar. Then, the air conditioner page will appear in the customer area below, displaying the data parameters of each air conditioner. The air conditioning interface is shown in the following figure.



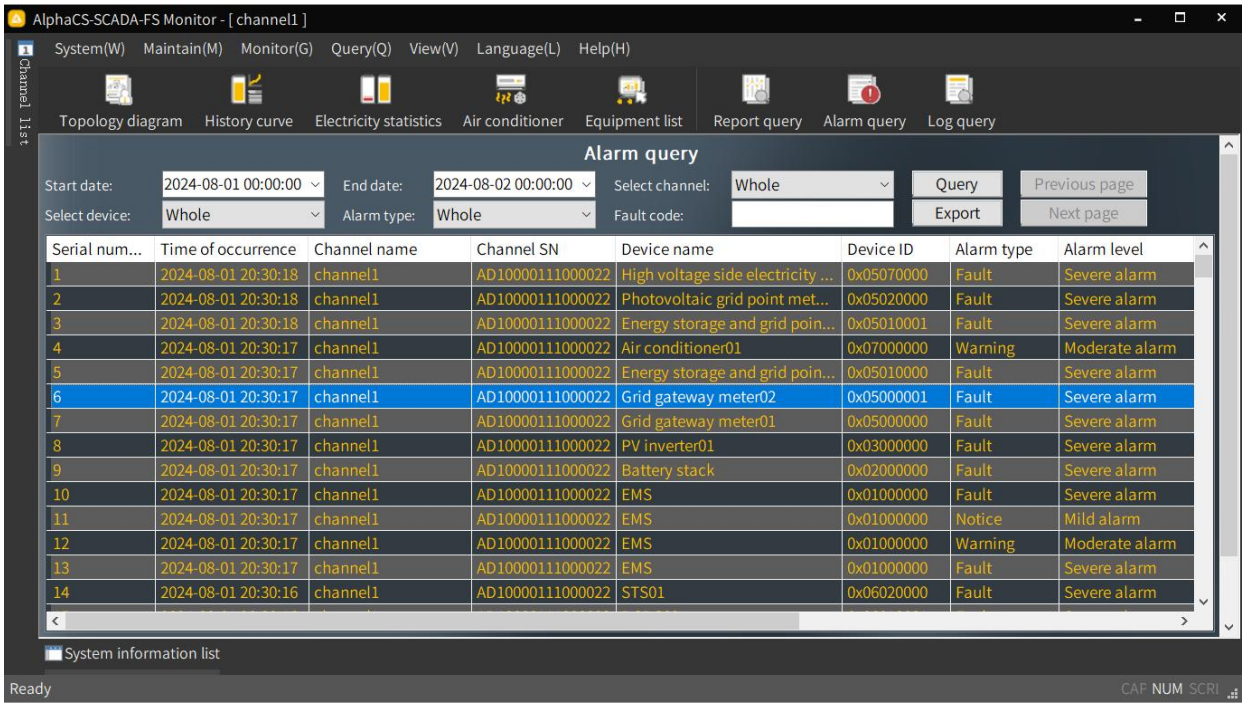
3.5.5 Alarm Query

By using the alarm query function, it is possible to query the alarm information of various devices in the system over a period of time.

Click on "Query" in the menu bar, click on "Alarm Query" in the drop-down menu, or click on the "Alarm Query" icon from the toolbar, and then the alarm query interface will appear in the customer area below. The alarm query page is shown in the following figure.

Query alarms based on selection criteria such as start date, end date, channel, device, alarm type (event, warning, fault), fault code, etc.

The method for exporting alarm queries: Click the "Export" button on the alarm query interface, then select the path in the pop-up dialog box, and click the "OK" button to successfully export.

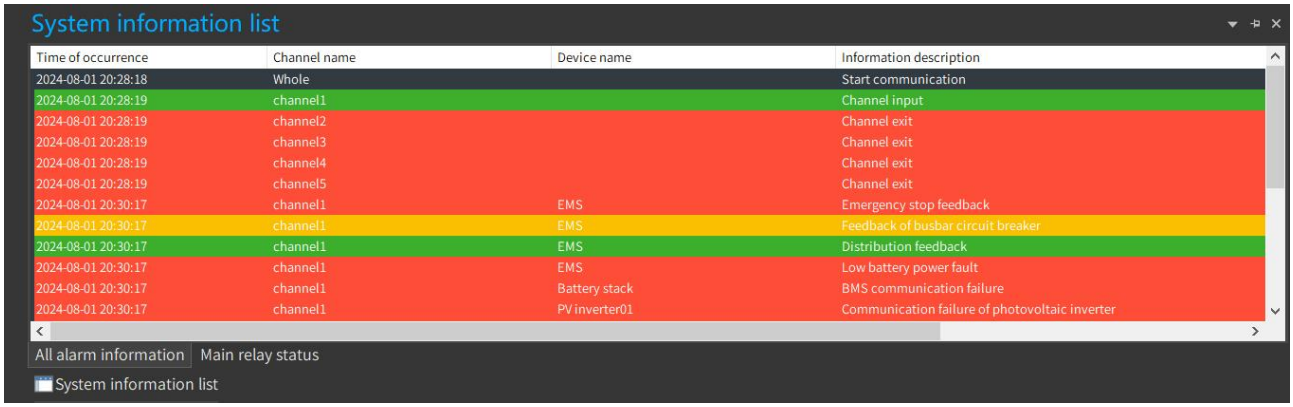


In the system information list at the bottom of the interface, up to 400 pieces of information can be displayed. The list displays all the information content in the current system, including three types of alarms: event information, warning information, and fault information. Different background colors in the list represent different alarm levels, and the normal black background color in the list is general information; The green background color indicates that the information is important; The yellow background color indicates an emergency message, and the real-time alarm interface is shown in the following figure.

Event information: including starting/stopping communication, channel input, fault recovery, reading and writing device parameters, etc;

Alarm information: refers to the warning information of the device;

Fault information: including equipment fault information, channel exit, etc.



3.5.6 Log Query

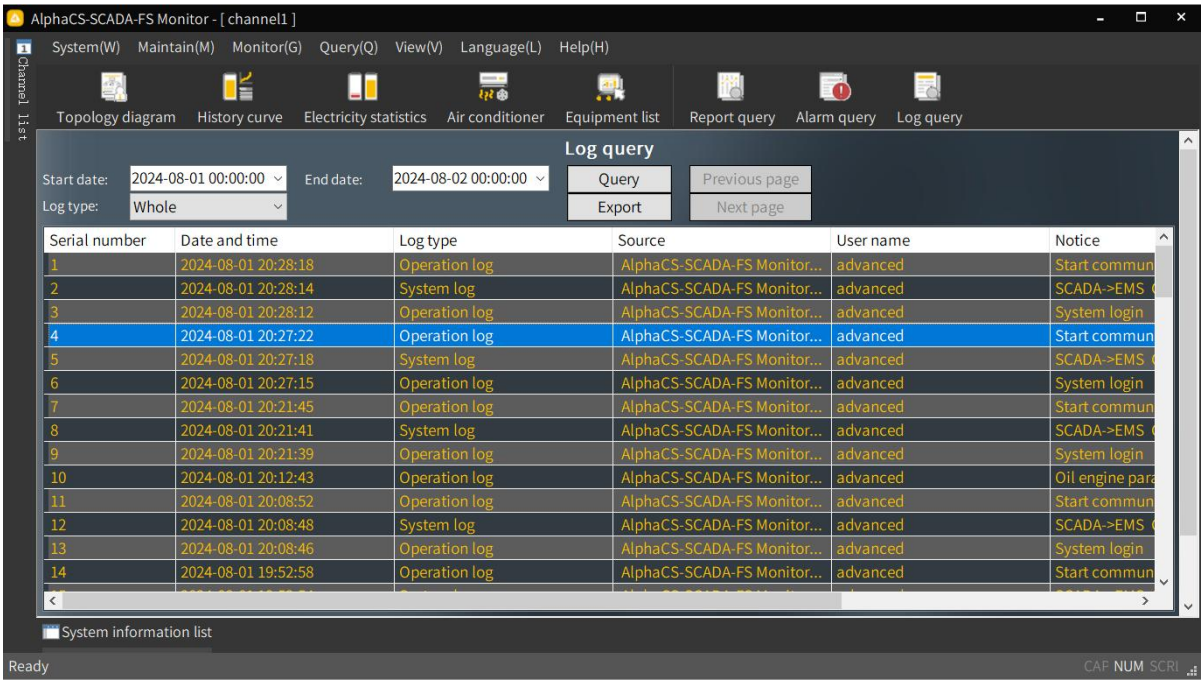
By using the log query function, various operation and system log information in SCADA can be queried.

Click the "Query" button in the menu bar, click on "Log Query" in the drop-down box, or click on the "Log Query" icon from the toolbar, and then the log query page will appear in the customer area below.

Select the start date, end date, and log type (operation log, system log), and click the "query button" to display the queried log.

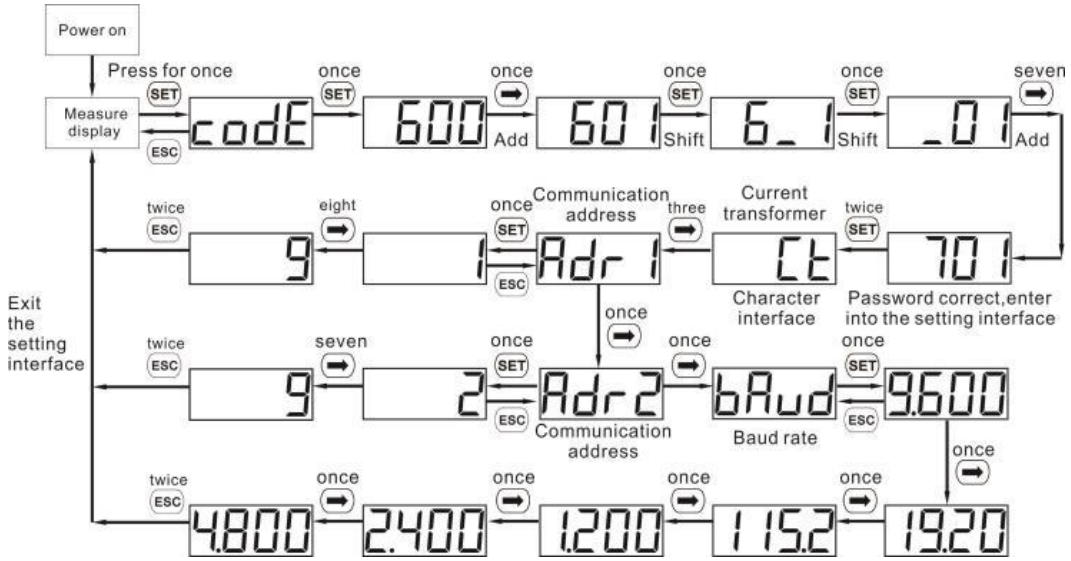
Method for exporting logs: Click the "Export" button on the log query interface, select the path to save in the opened dialog box, and click the "OK" button to successfully export.

The interface is shown below:


AlphaCS-SCADA-FS Monitor - [channel1]
System(W) Maintain(M) Monitor(G) Query(Q) View(V) Language(L) Help(H)
Channel list
Topology diagram
History curve
Electricity statistics
Air conditioner
Equipment list
Report query
Alarm query
Log query
Log query
Start date: 2024-08-01 00:00:00
End date: 2024-08-02 00:00:00
Query
Previous page
Log type: Whole
Export
Next page
Serial number | Date and time | Log type | Source | User name | Notice
1 | 2024-08-01 20:28:18 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | Start commun
2 | 2024-08-01 20:28:14 | System log | AlphaCS-SCADA-FS Monitor... | advanced | SCADA->EMS
3 | 2024-08-01 20:28:12 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | System login
4 | 2024-08-01 20:27:22 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | Start commun
5 | 2024-08-01 20:27:18 | System log | AlphaCS-SCADA-FS Monitor... | advanced | SCADA->EMS
6 | 2024-08-01 20:27:15 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | System login
7 | 2024-08-01 20:21:45 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | Start commun
8 | 2024-08-01 20:21:41 | System log | AlphaCS-SCADA-FS Monitor... | advanced | SCADA->EMS
9 | 2024-08-01 20:21:39 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | System login
10 | 2024-08-01 20:12:43 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | Oil engine para
11 | 2024-08-01 20:08:52 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | Start commun
12 | 2024-08-01 20:08:48 | System log | AlphaCS-SCADA-FS Monitor... | advanced | SCADA->EMS
13 | 2024-08-01 20:08:46 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | System login
14 | 2024-08-01 19:52:58 | Operation log | AlphaCS-SCADA-FS Monitor... | advanced | Start commun
System information list
Ready
CAP NUM SCRI

4. Meter Settings

The steps to set the communication address or baud rate of the electricity meter are as follows:



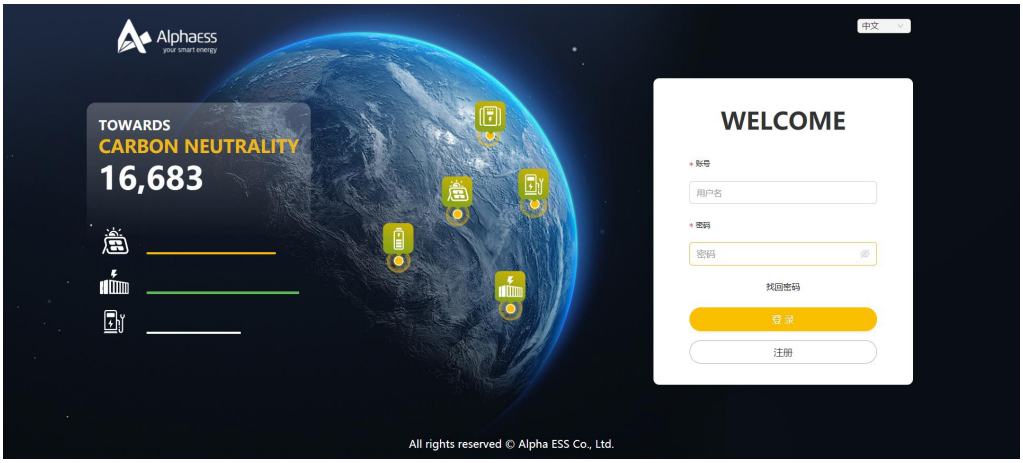
According to this step, the baud rate can be checked and the communication address can be set. The corresponding communication addresses and baud rates for each meter are as follows:

Address of municipal electricity meter	101
PV meter address	121
Oil engine and electricity meter address	182
Meter communication baud rate	9600

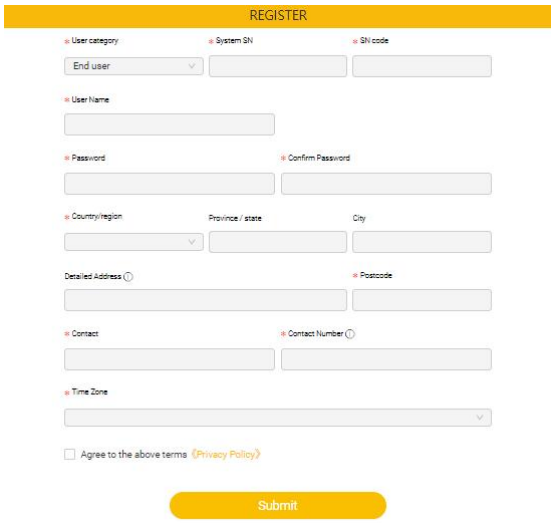
5. Industrial and Commercial Cloud Platform

You must create a new account on our web server for system monitoring. Therefore, please follow the following steps: URL: http://cni.alphaess.com

Enter your username and password, then click "Login" to jump to the homepage. After login failure, a prompt will appear.



Unregistered users need to click "Register" to access the registration page: (as shown below)



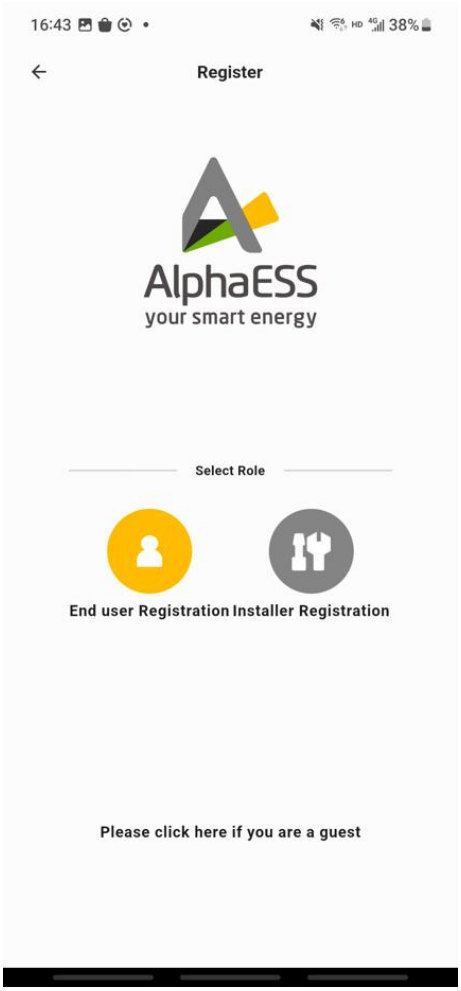
You must fill in the box marked with an "*" and the information you provide must match the facts. There are two types of registered users: end users and installers. Please choose according to the actual situation. Enter SN, check SN verification code, date, name, and contact phone number to complete the registration process (check the verification code on the device label).

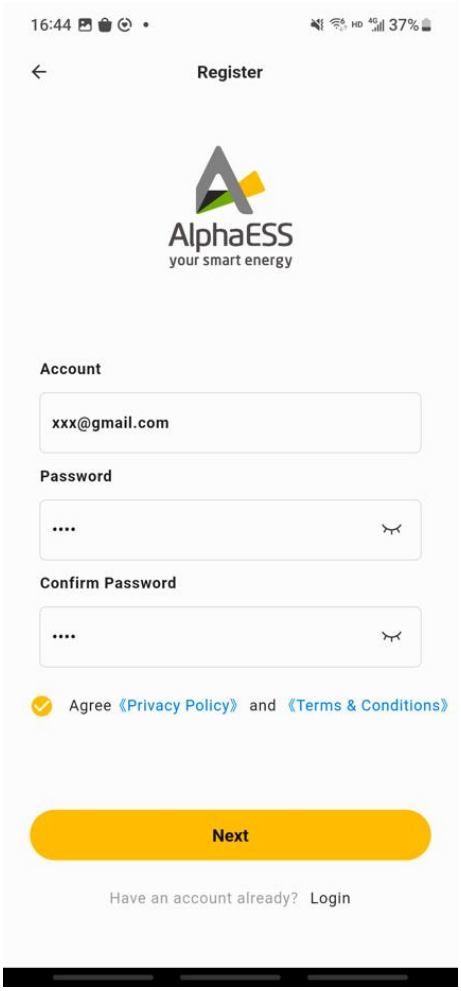
Please refer to the cloud platform user manual for detailed usage steps.

6. APP

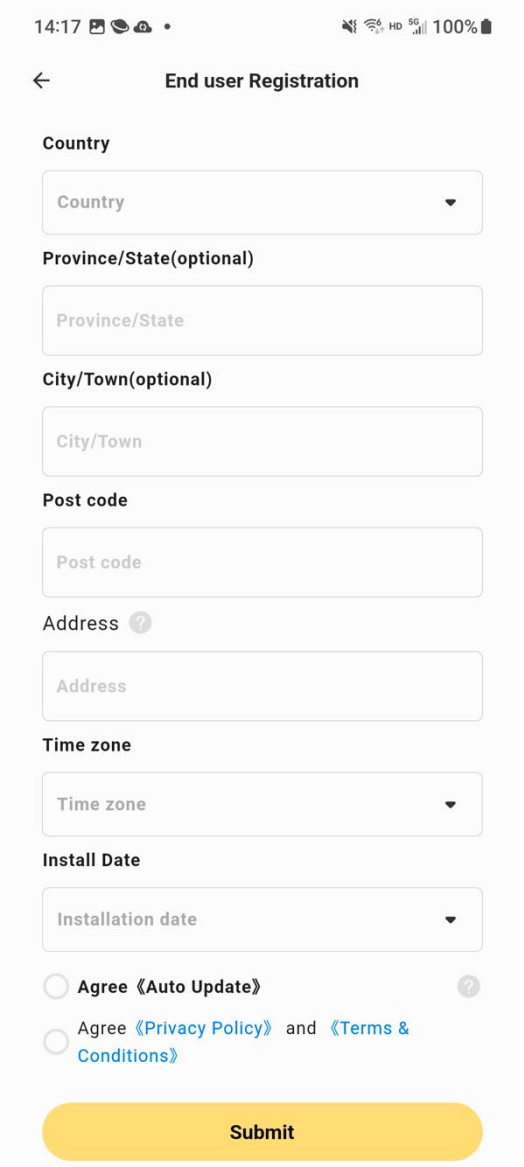
Select the option 'Installation Program Registration' as the desired type. To complete the registration process, please provide a valid email address and set a password. Please note that if the email address is unavailable, you will not be able to continue registering.

Before continuing, please review our 'Privacy Policy' and 'Terms and Conditions'. If you agree to these terms, please click the "Next" button to enter the registration screen.

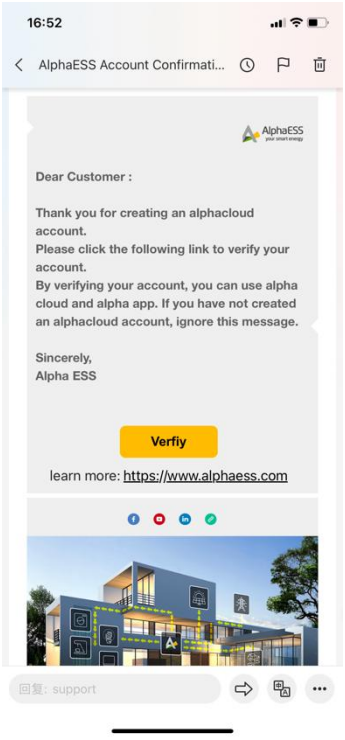


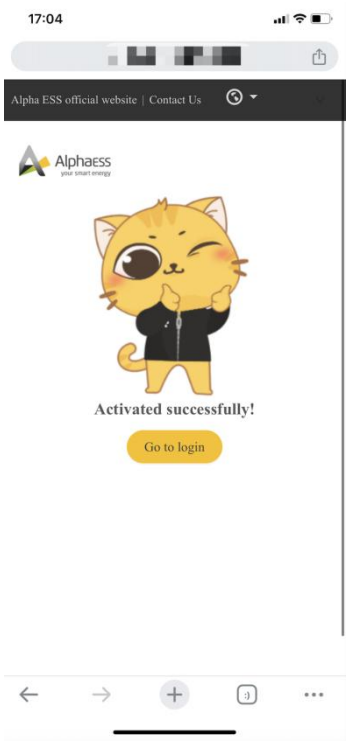


After filling in the required fields, click "OK" to continue. Subsequently, an activation email will be sent to the email address provided to you.

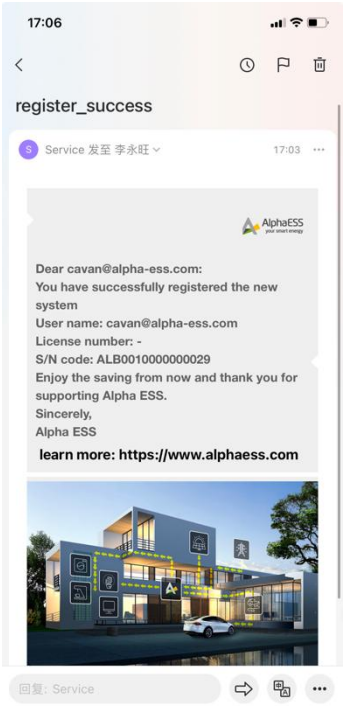


Afterwards, you will receive an email to activate your account, as shown below. Click the 'Verify' button to confirm account activation and automatically redirect to the login page.

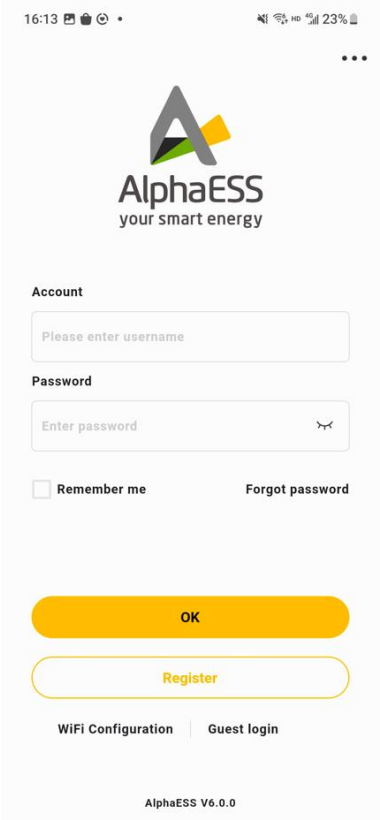




Finally, after completing the registration process, a successful registration email will be sent to your email address.



After successful registration, you can log in with your account and password. The login interface is shown below:



Please refer to the APP user manual for detailed usage steps.

7. System Maintenance

7.1 List of Requirements for Tools and Consumables

7.1.1 Requirements for Tools and Equipment

Serial number	Name	Model Specifications (Accuracy)	Company	Quantity	Remarks
1	A screwdriver	2. 4, 6, 8 "	pcs	1	
2	Cross screwdriver	2. 4, 6, 8 "	pcs	1	
3	Wrench		pcs	1	
4	A multimeter		pcs	1	
5	Clamp type flowmeter		pcs	1	
6	Insulation tester		pcs	1	
7	Ethernet cable	CAT5E	pcs	1	
8	USB-485 data cable		pcs	1	
9	Digital storage oscilloscope	(No requirement)	pcs	1	
10	Power Quality Analyzer	(No requirement)	pcs	1	

7.1.2 List of Consumables

Serial number	Name	Model Specifications	Company	Quantity	Remarks
1	Electrical tape	……	pcs	1	……
2	Plastic cable ties		pcs	1	

7.2 Check and Maintain

7.2.1 Routine Inspection

7.2.1.1 Power on Inspection

Perform daily checks on the system, observe the status of device indicator lights and software monitoring information.

Inspection items	Inspection content	Time	
1. SCADA screen			
SCADA screen display	Check whether the SCADA screen can light up normally and whether the screen touch is normal when the system is running normally.	Once every six months	
2. Battery			
Indicator light	Check if all battery and High-voltage box indicator lights are lit properly when the system is running normally.	Once every six months	
Abnormal noise	Check for any abnormal noise during system operation	Once every six months	
3. Energy storage inverter			
Display	Check if all voltage, power, and current data on the energy storage inverter screen are normal	Once every six months	
Energy storage inverter communication	Check if communication is normal	Once every six months	
Working status of energy storage inverter	Check if there are any fault records in the historical records	Once every six months	
Fault record of energy storage inverter	Read error messages and warnings, export fault records	Once every six months	
Circuit breaker	Check if all circuit breakers are functioning properly through fault records	Once every six months	
Fan	Check for fan malfunction through fault records	Once every six months	
Functional testing	Check if the start stop and circuit breaker on/off functions of the energy storage inverter are normal	Once every two years	

7.2.1.2 Power Outage Inspection

After the device has been running for a period of time, it is necessary to perform a power outage inspection on the device.

Inspection items	Inspection content	Time	Remarks
1. Battery			
Appearance	Check the appearance of all batteries and high-voltage boxes in the system for damage or rust marks	Once every six months	
Battery fixation	Check if all battery fixing bolts are tightened	Once every six months	
Battery grounding	Check if the battery is well grounded; The electrical connection between the front and rear surfaces of the battery case cover and the battery rack surface, as well as the grounding point, should be good (tested with a multimeter to ensure conductivity)	Once every six months	
High-voltage box fixation	Check if the high-voltage box is securely fixed; Is the front panel tightly attached to the battery rack; Is the screw securely fastened	Once every six months	
Plastic shell circuit breaker for high-voltage box	Check if the molded case circuit breaker of the high-voltage box is in a normal closed state	Once every six months	
Battery connection	Check if the wiring harness between the battery and the battery is securely locked; Is there any damage, deformation, or signs of overheating on the connection terminals of the battery power line; Does the battery terminal have insulation protection	Once every six months	
Connection between battery and high-voltage box	Is the connection terminal of the high-voltage box power line damaged or deformed	Once every six months	
Connection between high-voltage box and combiner box	Check if the wiring harness between the high-voltage box and the junction box is securely locked; Check whether the bundle connection terminals between the high-voltage box and	Once every six months	

	the combiner box are damaged or deformed;		
Connection between combiner box and energy storage inverter	Check if the wiring harness between the high-voltage box and the junction box is securely locked; Check whether the wiring harness connection terminals between the combiner box and the energy storage inverter are damaged or deformed;	Once every six months	
Wire harness fixation	Check if the connecting harness is secure	Once every six months	
	Check if the cables are aging or damaged	Once every six months	
2. Energy storage inverter			
Grounding of energy storage inverter	Check if the grounding wire connection of the energy storage inverter is securely fastened	Once every six months	
Fixed energy storage inverter	Check if all bolts at the fixing point of the energy storage inverter are tightened	Once every six months	
Energy storage inverter cable	Check for aging or damage to the cable terminals of the energy storage inverter	Once every six months	

7.2.2 Daily Maintenance

7.2.2.1 Startup Maintenance

Maintain the project	Maintain content	Time
1. Battery		
Battery capacity calibration	Complete the charge and discharge cycle	Once every three months
Battery data analysis	Analyze BMS data (completed by AlphaESS engineers)	Once every six months
Check the switch function of the high-voltage box circuit breaker	Assisted by AlphaESS engineers for local inspection	Once every six months
Is the insulation resistance on the DC side within a	When the BMS does not report insulation faults during normal system operation, the insulation resistance is within a reasonable range	Once every six months

reasonable range		

7.2.2.2 Power Outage Maintenance

Maintain the project	Maintain content	Time
1. Battery system		
Battery grounding	Use a multimeter for grounding testing	Once every three months
Battery fixation	Check if the battery is securely fixed to the battery rack	Once every six months
High-voltage box grounding	Use a multimeter for grounding testing	Once every three months
Battery label	Check for damage, if damaged, replace with the same label	Once every three months
2. Energy storage inverter		
Appearance	Check whether the appearance of the inverter is damaged or deformed	Once every six months
Inspection of live parts screws, power wiring harness, and communication wiring harness of energy storage inverter	The screws, power harness, and communication harness of the energy storage inverter are connected normally without any jamming or loosening, and the connectors are not loose	Once every six months
Cleaning and rust prevention inspection of energy storage inverters	Clean the energy storage inverter and check if the wiring harness connectors are rusted	Once every six months
Power circuit connection	Check if the power cord is loose or tight; Check if the power and control cables are damaged; Pay special attention to the contact surface between the insulation layer of the cable and the metal; Check if the insulation cable tie is detached from the cable terminal	Once every six months
Clean the ventilation baffle or duct	After the power is cut off, use a brush or vacuum cleaner to remove the attached dust	Once every six months
Security	Check warning labels and replace them if necessary	Once every six months

CAUTION

After all devices have stopped running, the following precautions should be taken during maintenance:

- Relevant safety standards and regulations should be followed during operation and maintenance.
- Disconnect all electrical connections to prevent the device from powering on.
- During maintenance, the number of maintenance personnel shall not be less than two.
- The equipment should be maintained by professional personnel, and maintenance personnel are strictly prohibited from opening the equipment on their own.
- Appropriate protective measures should be taken during maintenance, such as insulated gloves, shoes, and noise cancelling earplugs.
- Usually, storage systems are located far away from urban areas. Relevant emergency rescue measures should be developed for implementation when necessary.
- When the entire system is in a static state for a long time (i.e. the battery has not been charged for two weeks or more), the battery SOC needs to be charged to 30%~50% to prevent excessive discharge.
- If there are any situations that cannot be explained in this manual, please contact us promptly.

7.2.3 Product Storage

<table>
<tr><th colspan="3">System Storage Environment</th></tr>
<tr><th>Category</th><th>Name</th><th>Storage Environment</th></tr>
<tr><td rowspan="2">Finished product</td><td>Battery</td><td rowspan="2">1. The battery is stored indoors in a cardboard box, and the indoor humidity is controlled below 65%. When there is high external humidity, the doors and windows are tightly closed to prevent external moisture from entering the room
2. Stacking method and storage environment of cardboard boxes:
① The cardboard box should be elevated with a wooden frame, at least 25cm above the ground and 10cm above the wall
② Leave a certain gap between cardboard boxes to facilitate the circulation and diffusion of moisture
③ Install a fan to facilitate the circulation and diffusion of moisture</td></tr>
<tr><td>High-voltage box</td></tr>
<tr><td rowspan="2">Wire harness</td><td>Power line</td><td rowspan="2">Seal with a PE bag and place it in a cardboard box for indoor storage</td></tr>
<tr><td>Communication line</td></tr>
<tr><td>Inverter</td><td>PCS</td><td>1. Temperature requirement: The storage temperature should not be</td></tr>
</table>

		lower than -20 ℃ or higher than 40 ℃ for a long time, and it is recommended to maintain it at around 25 ℃. Please add heat dissipation and heating measures to the storage area 2. Humidity requirements: The humidity range should be between 0-95%, with no condensation or obvious water vapor. For long-term storage, it is recommended to maintain the humidity below 85%. In places with excessive humidity, it is necessary to add dehumidification equipment such as air conditioning 3. Dust prevention requirements: The storage environment of the module should not have a large amount of dust and sandstorms. The equipment should be sealed with wrapping film. In areas with high sandstorms and dust, preventive measures should be taken externally to ensure that there will be no large areas of dust and sand after long-term storage. It is recommended to regularly check and maintain it every week 4. Fire prevention requirements: The place where the equipment is placed should have the function of extinguishing fires in case of fire, with a fire protection system or fire extinguisher. At the same time, the fire source should be eliminated, and smoking is strictly prohibited. Fireproof mud should be added to the bottom of the equipment 5. Rodent prevention requirements: The storage area should be carefully inspected in advance to ensure that there are no loopholes in the space that allow rodents to enter. It is recommended to add measures such as rodent prevention boards, seal and package the equipment properly, and conduct regular inspections 6. Seaside: The seaside has high salt spray and humid air, and the environment for storing equipment needs to be strictly isolated and protected. Design and select corrosion-resistant materials using sealed structures, apply coatings and surface treatments to prevent salt corrosion of base metals, and use corrosion inhibitors and passivators to suppress salt spray corrosion; Ensure a dry storage environment, add fog exhaust pipes, and ensure that the pipes are unobstructed without any folds or protrusions
System		1. For devices stored for more than 6 months, every 6 months, after inspecting the appearance and internal wiring, the system needs to be re powered on for charging and discharging tests to ensure that the product is problem free. Before powering off the system, ensure that the battery's storage SOC is between 30% and 50% 2. After on-site installation of the system, pay attention to sealing the bottom inlet with fireproof materials

8. Troubleshooting

EMS troubleshooting				
Code	Error	Description	Status	Solution
5008	ATS_switch_fault	ATS switching abnormality	warning	1. Check the dry contact wiring of ATS feedback signal. 2. Check the on/off status and control line status of the diesel generator, and investigate whether the oil engine operation meets the working conditions. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
5009	RRCR_fault	RRCR device abnormality	warning	1. If the RRCR function is enabled, check the RRCR signal dry contact wiring, and at least one dry contact should be triggered. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
56	EMS_parallel_comm_lost	EMS parallel communication lost	fault	1. Check if the EMS parallel communication cable is disconnected. 2. Check if the parallel IP configuration is correct. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
57	EMS_parallel_id_fault	EMS parallel machine ID error	fault	If the problem cannot be ruled out, please contact the installer or Alpha engineer.
58	Duplicate_MAC_address	MAC address duplication	fault	1. Check network parameter configuration and modify incorrect network parameters. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
28	PcsModeFault	PCS working mode error	fault	1. Check if PCS is set to remote mode. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
29	BatEnergyLow	Low battery energy fault	fault	1. When the system is disconnected, if the actual SOC is lower than the set disconnected SOC or lower than the connected SOC in the disconnected state, the battery will recover after energy replenishment. If the system is connected to the grid and the PV system is sufficient, and the system still charges the battery to eliminate the

				fault, please contact the installer or AlphaESS engineer.
52	YX_system_epo_signal	Emergency stop signal	fault	1. Check if the emergency stop button has been pressed. If it has been pressed, release the emergency stop button in the direction indicated by the arrow; If not pressed, repeat the steps of pressing and releasing, activate the emergency stop button. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
5010	YX_fire_system_fault	Fire protection system malfunction	warning	1. Check the alarm status of the fire control box. If the fire control box alarms, investigate the cause of the fire alarm. If the hardware is damaged, replace it; If there is no alarm in the fire control box, check if the EMS fire dry contact is in an abnormal state. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
53	YX_fire_warning	Fire alarm (temperature/smoke/combustible gas alarm)	fault	
54	YX_fire_action	Firefighting action	fault	
5011	YX_spd_signal	SPD signal (lightning strike)	warning	1. Check the lightning signal input dry contact, which should not be conductive under normal circumstances. Check if the lightning arrester has been triggered incorrectly. If it has been triggered incorrectly, reset the lightning arrester. If the lightning arrester is damaged, replace it. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
55	YX_water_signal	Water immersion signal	fault	1. Check if the water immersion sensor is submerged in water. 2. Check if the water immersed dry contact is conductive. Under normal circumstances, the water immersed dry contact should not be conductive. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
5013	YX_temp_over_signal	Environmental overheating	warning	1. If the system is equipped with an environmental temperature detection module: check whether the external temperature sensor wiring is normal, whether the installation position of the external temperature sensor meets the

				specifications, whether there are abnormal heat sources around, and whether the air conditioning is running normally. 2. If the system does not have an environmental temperature detection module installed: check if the dry contact of the environmental over temperature input is erroneously enabled. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
25	GC_Fault	Oil engine malfunction	fault	1. Check whether the diesel generator starts or stops abnormally, confirm the cause of the abnormality, such as fuel depletion of the diesel generator, abnormal dry contact communication, etc. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
21	PV_INV_Fault	PV inverter malfunction	fault	1. Check the communication wiring of the PV grid connected machine (wiring position, wiring sequence). 2. Check if the PV inverter model in the setting list is consistent with the actual one. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
22	AirConFault	Air conditioning malfunction	fault	Check the communication wiring of the air conditioner; Check if the air conditioning configuration type in the equipment list is consistent with the actual one. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
5	meter_lost	Electricity meter communication lost	fault	1. Check the communication wiring of the electricity meter (wiring position, wiring sequence). 2. Check if the meter model configured on SCADA matches the actual installed meter model. 3. Check if the communication address on the meter end is the corresponding address. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
7	battery_lost	Battery communication lost	fault	1. Check if the battery communication line wiring is normal (wiring position, wiring sequence). 2. Check if the battery model configured

				on SCADA matches the actual installed battery model. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
4	pcs_lost/sts_lost	PCS/STS communication lost	fault	1. Check if the communication wiring of the PCS switch EMS board is normal. 2. Check if the devices on the communication wiring path are powered on. 3. Check if the PCS communication address is correct (standalone version 192.168.200.203). 4. Check if the IP configured in SCADA configuration parameters - advanced parameters - interface with sub devices - socket2 is consistent with the PCS device. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.

PCS troubleshooting				
Code	Error	Description	Status	Solution
100117	Mains Lost	Power grid loss	fault	1. Check if the mains power is lost. 2. Check if the communication wiring is correct. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100136	Grid Voltage Fault	Abnormal voltage in the power grid	fault	1. Confirm if the safety regulations are set correctly. 2. Check if the wiring on the communication side is correct. 3. Check if the AC cable has been severely compressed due to high impedance, and replace it with a thicker cable. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100137	Grid Frequency Fault	Abnormal power grid frequency	fault	1. Confirm whether the grid connection safety regulations are set correctly. 2. Occasional fluctuations in the power grid can cause frequency abnormalities, and the inverter will automatically return to normal once the power grid is restored. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.

100038	DCI Fault	DC component exceeds the limit	fault	1. Restart the inverter. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100007	ISO Over Limitation	Insulation impedance exceeds the limit	fault	1. Check for water ingress or damage to components, cables, and connectors. 2. Use a shaking table to measure whether the DC impedance to ground is normal, and the measured value should not be less than 500K Ω. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100008	GFCI Fault	Leakage current exceeds the limit	fault	1. Restart the inverter. 2. Check for water ingress or damage to components, cables, and connectors. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100468	PV Over Voltage	Input voltage exceeds the limit	fault	Reduce the number of PV modules to ensure that the open circuit voltage of each string is less than the maximum allowable input voltage of the inverter.
100469	Bus Voltage Fault	Bus voltage exceeds the limit	fault	1. Check if the input voltage exceeds the limit. 2. Restart the inverter. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100470	Inverter Over Temperature	Equipment temperature exceeds the limit	fault	1. Check if the ventilation at the installation location of the inverter is good. 2. Try turning off the machine for a period of time and then turning it back on after the temperature drops. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100183	SPI Fault	SPI communication failure	fault	Please contact the installer or AlphaESS engineer.
100122	E2 Fault	E2 malfunction	fault	
100471	GFCI Device Fault	GFCI sensor malfunction	fault	
100472	AC Transducer Fault	AC current sensor malfunction	fault	

100473	Relay Check Fail	Relay malfunction	fault	1. Measure the zero ground voltage with a multimeter. If the voltage exceeds 10V, the neutral or ground wire connection on the grid side is abnormal. 2. Restart the inverter. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100128	Internal Fan Fault	Internal fan malfunction	fault	1. Restart the inverter. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100138	External Fan Fault	External fan malfunction	fault	1. Check if there are any foreign objects blocking the fan, and clean it if there are any. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100474	Bus Hardware Fault	Bus hardware malfunction	fault	Please contact the installer or AlphaESS engineer.
100475	PV Power Low	Insufficient DC energy	fault	
100476	Batt.VoltageFault	Battery voltage malfunction	fault	1. Check if the high-voltage box is outputting normally. 2. Check if the number of batteries configured in SCADA matches the actual number, and modify any incorrect parameters. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100477	BAK Voltage Fault	Abnormal backup voltage	fault	1. Turn off the inverter and unplug the spare connector. Use a multimeter to measure if there is voltage present at the spare connector. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100101	Bus Voltage Lower	Low bus voltage	fault	1. Check if the battery and PV side voltage are normal. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100478	Sys Hardware Fault	Hardware malfunction	fault	1. Restart the inverter. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100043	BAK Over	Load power exceeds	fault	1. Check if the load power on the backup side exceeds the maximum output power

	Power	the limit		of the inverter, and reduce the load connected to the backup side. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100479	Inverter Over Voltage	Inverter voltage exceeds the limit	fault	1. Check if there is any impact load on the backup end and if the load power is too high. 2. Check if there is a short circuit on the backup end. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100480	Inverter Over Freq	Inverter frequency exceeds the limit	fault	
100481	Inverter Over Current	Inverter current exceeds the limit	fault	
100066	Phase Order Err	Abnormal phase sequence of power grid	fault	1. Check the phase sequence of the GRID side wiring and correct any incorrect phase sequence. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
100177	SCI Fault	SCI communication malfunction	fault	Please contact the installer or AlphaESS engineer.
100178	FLASH Fault	Flash malfunction	fault	

BMS troubleshooting				
Code	Error	Description	Status	Solution
20006	BMU_parallel_failure	Parallel failure detection	warning	If the fault persists, check the cluster single switch fault code and identify the corresponding fault. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
30000	LMU_soft_ver_diff	LMU software version inconsistency	warning	1. Upgrade LMU software version again. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40002	Pole_over_temp	Pole overheating	fault	1. Confirm whether the on-site ambient temperature is too high or too low. 2. Check if the LMU board and battery box sampling harness are functioning properly. 3. If the temperature of the pole is too high, check if there is any looseness at the power line connection. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40003	Cell_over_temp	Individual overheating	fault	
40004	Chag_low_temp	Charging at low temperature	fault	
40005	Dchg_low_tem	Low temperature	fault	

	p	discharge		
40008	Cell_temp_diff	Temperature difference	fault	
40006	Cell_over_volt	Single unit overvoltage	fault	1. If the relay is not disconnected during normal operation, it is considered normal and will automatically recover. 2. Check if the LMU board and battery box sampling harness are functioning properly. 3. If the actual voltage of the battery cell is abnormal, it should be recharged or the battery should be replaced. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40007	Cell_low_volt	Individual undervoltage	fault	
40000	Chag_over_current	Charging overcurrent	fault	1. Check if the PCS output meets the requirements for battery charging and discharging power. 2. Check if the Hall sensor and connecting harness of the high-voltage box are normal. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40001	Dchg_over_current	Discharge overcurrent	fault	
40009	Insulation_err	Insulation failure	fault	1. Check the insulation resistance between the positive pole and the shell, and between the negative pole and the shell of each battery module. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40010	LMU_com_err	BLMU communication failure	fault	1. Check if the communication line between BMU and LMU has poor contact. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40011	Temp_sen_err	Temperature sensor damaged	fault	1. Check for poor connections in the battery box sampling harness. 2. Check if the LMU board is functioning properly and try replacing it to restore normal operation. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40015	Relay_err	Relay malfunction	fault	1. Check whether the relay itself or the relay harness inside the high-voltage box is normal. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.

40063	Shutdown under voltage	Undervoltage shutdown fault	fault	1. Battery undervoltage, charge the battery after restarting the system. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40014	Total_volt_err	Abnormal total pressure detection	fault	1. Check the total voltage of the cluster and the wiring of the power line. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40018	LMU_SN_repea t	BLMU SN repetition	fault	1. Check if the SN reported by LMU is correct. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40019	LMU_id_repeat	Duplicate BLMU ID	fault	1. Check if the ID reported by LMU is duplicate, and modify LMUID if there is any duplicate. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40020	LMU_id_discon tinue	BLMU ID is discontinuous	fault	1. Check if the communication line between LMU and UMU has poor contact. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40021	Current_sensor _err	Current sensor damaged	fault	1. Check if there is a broken wire or damaged Hall module in the high-voltage box. If the hardware is damaged, the module needs to be replaced. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
55005	no blmu fault	No BLMU malfunction	info	1. Check if the communication connection between BMU and LMU is normal. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40062	Overvoltage shutdown	Overvoltage shutdown fault	fault	1. After restarting the system, discharge the battery and recalibrate the battery. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40023	MCCB_fault	Plastic case circuit breaker malfunction	fault	1. Check if the communication harness between the BMU board and the molded case circuit breaker inside the high-voltage box is normal. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.

50000	Cell_volt_diff	Differential pressure fault	fault	1. After SOC calibration, perform charging and discharging to confirm the voltage condition of the battery cells during the charging and discharging process, and check the data of abnormal cell voltage. Recharge the abnormal battery cells. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
50003	Cluster_over_volt	Cluster voltage overvoltage	fault	1. If the relay is not disconnected and the system is at the end of charging or discharging, it is normal and can automatically recover after discharging or charging. 2. Check if all battery communication is normal. 3. Check if there is any abnormal voltage in the battery data. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
50004	Cluster_low_volt	Cluster voltage undervoltage	fault	
50008	HV_box_over_temp	BCMU High-voltage box overheating	fault	1. Check if there are any loose connections in the high-voltage box and tighten the connections again. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40060	BLMU ID allocation exception	BLMU ID allocation exception	fault	1. Check if the ID reported by LMU is correct. 2. Check if the communication harness between LMUs has poor contact. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40065	Abnormal voltage difference between front and rear ends	Inconsistent voltage at the front and rear ends of the high-voltage box	fault	1. Check if the wiring harness inside the high-voltage box is normal. If the hardware is abnormal, replace the module. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
40074	BCMU High-voltage box wiring harness disconnection	BCMU high-voltage box wiring harness broken	fault	
40067	ISO link exception	ISO module link abnormality	fault	
40068	precharge failure	System pre charging abnormality	fault	

30005	Module_chag_over_current	Module charging overcurrent	warning	2. Check if the Hall sensor and connecting harness of the high-voltage box are normal. If the problem cannot be ruled out, please contact the installer or AlphaESS engineer.
30006	Module_dchg_over_current	Module discharge overcurrent	warning	
30007	SOC low	SOC low	warning	1. Prompt for low battery level, automatic clearing of alarm after battery charging. If the problem cannot be resolved, please contact the installer or AlphaESS engineer.

9. Technical Contact

If you have any technical issues with our products, please contact us. The contact information can be found on the homepage of this manual. Please provide the following information to quickly help you solve the problem.

A. System configuration

B. Product serial number

C. Software version number

D. Fault information

E. PV module information

@AlphaEnergyStorageSystem @AlphaESS @alpha_ess @AlphaESS www.alphaess.com

Alpha ESS Co., Ltd.

+86 513 8060 6891
info@alpha-ess.com
www.alphaess.com
No. 1086 Bihua Road, Tongzhou District, Nantong City, Jiangsu Province, China

Alpha ESS International Pte. Ltd.

+65 6513 1125 / +65 6513 1126
Singapore@alpha-ess.com
2 Corporation Road #01-06A Corporation Place 618494 Singapore

Alpha ESS Europe GmbH

+49 610 3459 1601
europe@alpha-ess.de
www.alphaess.de
Paul-Ehrlich-Straße 1a, Langen, Hessen D-63225 Germany

Alpha ESS Australia Pty. Ltd.

+61 02 9000 7676
techsupport@alphaess.au
www.alphaess.au
8/15-21 Gibbes Street, Chatswood, NSW 2067 Australia

Alpha ESS UK Co., Ltd

+44 330 043 2610
info@alpha-ess.com
Drake house, Long street, Dursley, gl11 4hh UK

Alpha ESS Italy S.r.l.

+39 339 462 4288
info@alphaess.it
www.alphaess.it
Via Del Molinuzzo 83, 59100 Prato (PO), Italy

Alpha ESS NZ Ltd.

+64 0800 769 377
info@alpha-ess.com
www.alpha-ess.co.nz
19 Arrenway Drive, Albany, 0630, New Zealand

Alpha ESS USA, Inc.

+1 800 220 0725 (Service Inquiries)
service@alphaess.us
www.alphaess.us
2180 S Ivanhoe St. Unit 5 Denver.CO 80222 USA

Alpha ESS South Africa (Pty.) Ltd.

+27 010 745 5653
measervice@alpha-ess.com
Johannesburg, South Africa

Alpha ESS Korea Co., Ltd

info@alpha-ess.com
2F, 19-4, Nohyeong 11-gil, Jeju-si, Jeju-do, Republic of Korea

Alpha ESS Japan, Inc.

info@alpha-ess.com
www.alphaess.jp