

User Manual

Energy Storage System



About This Manual

The manual primarily encompasses product information, along with installation, operation, and maintenance guidelines.

It will refer to the device as the "ESS" unless otherwise specified.

- **Target Group**

This manual is intended for professional technicians who have responsibilities for the installation, operation, and maintenance of inverters, as well as users who need to check inverter parameters.

Installation Requirements:

The installation of the ESS should only be carried out by professional technicians who meet the following requirements

- Possess knowledge of electronics, electrical wiring, and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Have received professional training related to the installation and commissioning of electrical equipment.
- Capable of promptly responding to hazards or emergencies that may arise during the installation and commissioning process.
- Familiar with local standards and relevant safety regulations pertaining to electrical systems.
- Thoroughly read this manual and understand the safety instructions associated with the operations.

- **Symbols**

This manual incorporates crucial safety instructions that are emphasized using specific symbols. These symbols are employed to ensure the safety of individuals and property during product usage or to assist in maximizing product performance efficiently.

It is essential to thoroughly comprehend the significance of the warning symbols to enhance your utilization of the manual.

Change History

Changes between document issues are cumulative, meaning that each subsequent document issue includes all the changes made in earlier issues.

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This version is the first official release

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1. Safety instructions

1.1. Safety symbol description

When installing, operating, and maintaining equipment, please read this manual first and follow all safety precautions marked on the equipment and in the manual. To ensure better user use of this product and ensure personal and property safety, please carefully read the symbol prompts used below.



Danger: indicates a highly potential danger that, if not avoided, could result in death or serious injury.



Warning: Indicates a moderate potential danger, which could result in death or serious injury if not avoided.



Attention: indicates a low potential danger, which, if not avoided, may result in moderate or mild injury to personnel.



Explanation: Emphasizing and supplementing content may also provide tips for optimizing product usage.

1.2. General safety



Explanation:

This equipment should be used in an environment that meets the design specifications, otherwise it may cause equipment failure, resulting in equipment functional abnormalities or component damage, personal safety accidents, property damage, etc., which are not within the scope of equipment quality assurance. Local laws, regulations, and norms should be followed when installing, operating, and maintaining equipment. The safety precautions in the manual are only supplementary to local laws, regulations, and norms. Our company shall not be liable for any of the following situations.

- The installation and use environment exceeds the provisions of relevant international, national, and regional standards.
- Do not operate within the usage conditions specified in this manual.
- Unauthorized disassembly, modification of products, or modification of software

codes.

- Not following the operating instructions and safety warnings in the product and documentation.
- Equipment damage caused by abnormal natural environments (such as earthquakes, fires, storms, floods, mudslides, etc.).
- Damage caused by the customer's failure to comply with transportation and installation requirements.
- Damage caused by storage conditions that do not meet the requirements of the product documentation.
- Due to customer negligence, incorrect operation, or intentional damage, the hardware or data of the equipment may be damaged.
- System damage caused by third-party or customer reasons, including relocation and installation of systems that do not meet the requirements of this manual, as well as damage caused by adjustments, changes, or removal of identification signs that do not meet the requirements of this manual.
- Defects, malfunctions, or damages caused by actions, events, negligence, or accidents beyond the reasonable control of the seller, including power outages or electrical failures, theft, war, riots, civil unrest, terrorism, intentional or malicious damages, etc.



Danger:

The equipment has high voltage, and improper operation may cause electric shock or fire, resulting in death, serious personal injury, or serious property damage. Please follow the operating sequence and safety precautions provided in this manual and other relevant documents, and operate in a standardized manner:

- Please check the pre installed cable connections of the equipment for tightness.
Check if the equipment is damaged, such as holes, dents, or other signs of possible internal damage. Check that the internal components of the equipment are not displaced, and unauthorized changes to the structure and installation sequence of the equipment are prohibited.
- It is prohibited to use water to clean the electrical components inside the equipment.

When liquid is found entering the equipment, please immediately press the emergency stop switch and notify the on-site management personnel.

- It is prohibited to carry out installation, wiring, maintenance, and replacement operations with electricity. Before touching any conductor surface or terminal, the voltage at the contact point should be measured, and it should be confirmed that the protective ground wire of the equipment or components that require maintenance is reliably grounded to ensure that there is no risk of electric shock.
- Except for personnel operating the equipment, please do not approach the equipment. Do not power on the device until it has been installed or confirmed by a professional. At least two personnel must be present on site during the first power on or main circuit live operation.

 explain

- The user's operational behavior and tools during transportation, handling, installation, wiring, and maintenance must comply with the laws, regulations, and relevant standards of the country and region where they are located.
- During installation, operation, and maintenance, it is necessary to first clean the top of the cabinet of accumulated water, ice, snow, or other debris, and then open the cabinet door to prevent debris from falling into the cabinet.
- It is prohibited to conduct reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations on device software. It is not allowed to study the internal implementation of the device, obtain the source code of the device software, steal intellectual property rights, etc. in any way, and the results of any device software performance testing shall not be disclosed.

1.3.Electrical Safety

1.3.1. Wiring requirements

- Please select cables that comply with local laws and regulations. Similar cables should be tied together, and different types of cables should be laid separately. It is prohibited to entangle or cross lay each other..
- If the wiring is completed or left for a short time during the wiring process, the cable outlet should be immediately sealed, the cabinet door should be closed, and small animals

should be avoided from entering.

- The cables used in the energy storage system must be firmly connected, have good insulation, and meet the specifications. The position where cables pass through pipes or wire holes must be protected to avoid damage from sharp edges, burrs, etc.
- After the cable wiring is completed, it is necessary to use cable brackets and cable clamps for reliable fixation. The cables in the backfilled soil area should be tightly attached to the ground to prevent deformation or damage caused by force on the cables during backfilling.
- The use of cables in high-temperature environments may cause aging and damage to the insulation layer. The distance between the cable and the periphery of the heating device or heat source area should be at least 30mm.
- To ensure construction safety, all cables should be laid and installed above 0 °C. When handling cables, especially in low-temperature environments, they should be handled with care

1.3.2. Grounding requirements

- It is prohibited to damage the grounding conductor. The grounding body of the equipment should be permanently connected to the protective grounding grid. Before operating the equipment, the electrical connections should be checked to ensure that the equipment is reliably grounded..
- The grounding impedance of the equipment meets the requirements of national standard GB 50054 and local electrical standards.
- It is prohibited to operate equipment without installing grounding conductors. When installing equipment that needs to be grounded, the protective ground wire must be installed first; When dismantling equipment, the protective ground wire must be removed last.

1.3.3. Maintenance requirements

- Before connecting or removing cables, the corresponding circuit protection switch must be disconnected first.
- Use a multimeter with the corresponding voltage level to check if it is live and ensure that the equipment has been completely powered off.
- If there are charged objects nearby, please use insulation boards or tapes to cover or

wrap them.

- After using a grounding wire to reliably connect the circuit to be repaired with the grounding circuit, carry out operation and maintenance maintenance



explain:

- Before connecting the cable, it is necessary to confirm that the cable label identification is correct before proceeding with the connection.
- If the device has multiple inputs, all inputs should be disconnected and the device can only be operated after it is completely powered off.
- After the maintenance is completed, dismantle the grounding wire between the maintenance circuit and the grounding circuit.

1.4. Mechanical safety



pay attention to:

- The bottom enclosure must be removed without a wooden box fork. Take-off and landing should be handled lightly to avoid impact or vibration.
- In the process of transportation, the center of gravity of the box should fall in the middle of the two cargo forks on the forklift. Long-distance handling or inversion or tilt is prohibited.
- When transporting the equipment, the large volume of the equipment may cover the view of the operator, so auxiliary personnel should be arranged to help complete the equipment.
- To ensure the safety of drilling in the outer body of the equipment, the appropriate position should be selected before drilling to ensure that there is no short circuit and other effects. The equipment should be blocked during drilling to prevent debris from falling into the equipment and clean the debris after drilling.
- When carrying the equipment by hand, you should be prepared for load-bearing, and you should wear protective gloves, wear anti-smashing shoes and other safety protective appliances.
- Move the equipment carefully during equipment handling to avoid hitting or falling. Avoid scratching equipment surfaces, damaged parts, or cables.

1.5. Battery safety



explain

The Company shall not be liable for damage to the battery provided by the Company by:

- Failure to timely charging, acceptance, resulting in overdue battery storage, capacity loss or irreversible damage.

- Drop mechanical damage, leakage, rupture, etc. due to improper operation or failure to connect the battery as required.
- The customer or the third party will not know the company to change the battery use scenario. Including but not limited to: to connect the additional load to the battery, mixed with other brands of batteries, mixed with different rated capacity of batteries, etc.
- Direct damage to the battery caused by the operating environment of field equipment or external power parameters cannot meet the environmental requirements of normal operation. Including the actual operating temperature of the battery is too high or too low, and the power grid situation is bad and frequent power failure.
- The customer does not set the battery operation management parameters correctly or improper maintenance, resulting in frequent battery discharge, the customer expands the capacity or fails to fully charge for a long time.
- The customer did not maintain the battery correctly according to the supporting equipment operation manual, including but not limited to: did not regularly check whether the battery terminal screws are tightened, etc.
- The battery was stolen and lost.
- Batteries exceeding the warranty period.



danger:

- Do not expose the battery to a high temperature environment or around the heating equipment, such as sunlight, fire source, transformer, heater, etc. Overheated battery may cause a fire and explosion.
- Do not disassemble, modify or destroy the battery (such as insertion of foreign body, immersion in water or other liquid medium) to avoid battery leakage, overheating, fire or explosion.
- Battery thermal runaway produces combustible gas, as well as CO, HF Hazardous gases such as. The accumulation of combustible gas caused by the thermal runaway of the battery has the risk of deflagration and explosion, which may cause personal injury and property loss.

- When installing and maintaining the battery, the exposed cable terminals on the battery should be wrapped with insulation tape. At the same time, avoid foreign bodies (such as conductive objects, screws, liquids, etc.) entering the battery and cause short circuit.



- The battery must be stored in a separate warehouse and in the outer packaging, avoid mixing with other materials, avoid open storage, avoid battery stacking. The site must be equipped with qualified fire-fighting facilities, such as fire-fighting sand, fire extinguishers, etc.
- The battery should avoid impact. When handling the battery, it should be carried in accordance with the direction required by the battery, without inversion and tilt.
- Use the battery within the temperature range specified in this manual. Charge the battery when the ambient temperature is below the lower limit of operating temperature,
Avoid the internal short circuit of the battery caused by crystallization at low temperature charging.
- Please dispose of the waste batteries according to the local laws and regulations. Do not treat the batteries as household waste.
- If the battery is longer than from the last charging time 8Month, the battery needs to be charged with power operation. If the battery is not replenished as required, it may affect the performance and service life of the battery.

Battery abnormal handling measures



- In case of electrolyte leakage or abnormal smell, avoid contact with the leaking liquid or gas. Non-professionals do not rely on them
Close up, please contact the professional staff to handle it immediately.
- Electrolytes are corrosive, and contact can lead to skin irritation and chemical burns. With the battery electrolyte, wash the contact area with a lot of water and soap and seek medical help.
- No battery drops (with packing material or not). If the appearance has no obvious deformation or damage and there is no obvious odor, smoke or fire, the battery should be transferred to an open and safe place under the premise of ensuring

safety1hPost-processing, and contact our company service engineer.

- When the battery falls, there is obvious odor, damage, smoke or fire, people should be evacuated immediately and alarm in time. Professional personnel shall use fire fighting facilities while ensuring safety.

1.6. Maintenance and replacement



- No rain, snow, thunder, dust, fog and other weather to open the cabinet door.
- Before the parts are removed from the cabinet, please confirm that the other parts on the cabinet are not loose.
- During maintenance of equipment, live parts shall be covered with insulating materials.
- Avoid touching the running fan (such as fingers, parts, bolts, etc.).
- Do not power on the device before troubleshooting.
- During the system live inspection, attention should be paid to the danger sign on the equipment to avoid standing at the cabinet door.
- Devices other than the battery pack must wait after power15Minutes to ensure that the equipment is out of power before operating the equipment.
- After the replacement of power components of the energy storage system or wiring change, manual wiring detection is required to avoid abnormal system operation.
- After completing the maintenance and replacement operations, lock the cabinet door in time and keep the key properly.

2.product presentation

2.1.demonstration of the type

/

2.2.product function

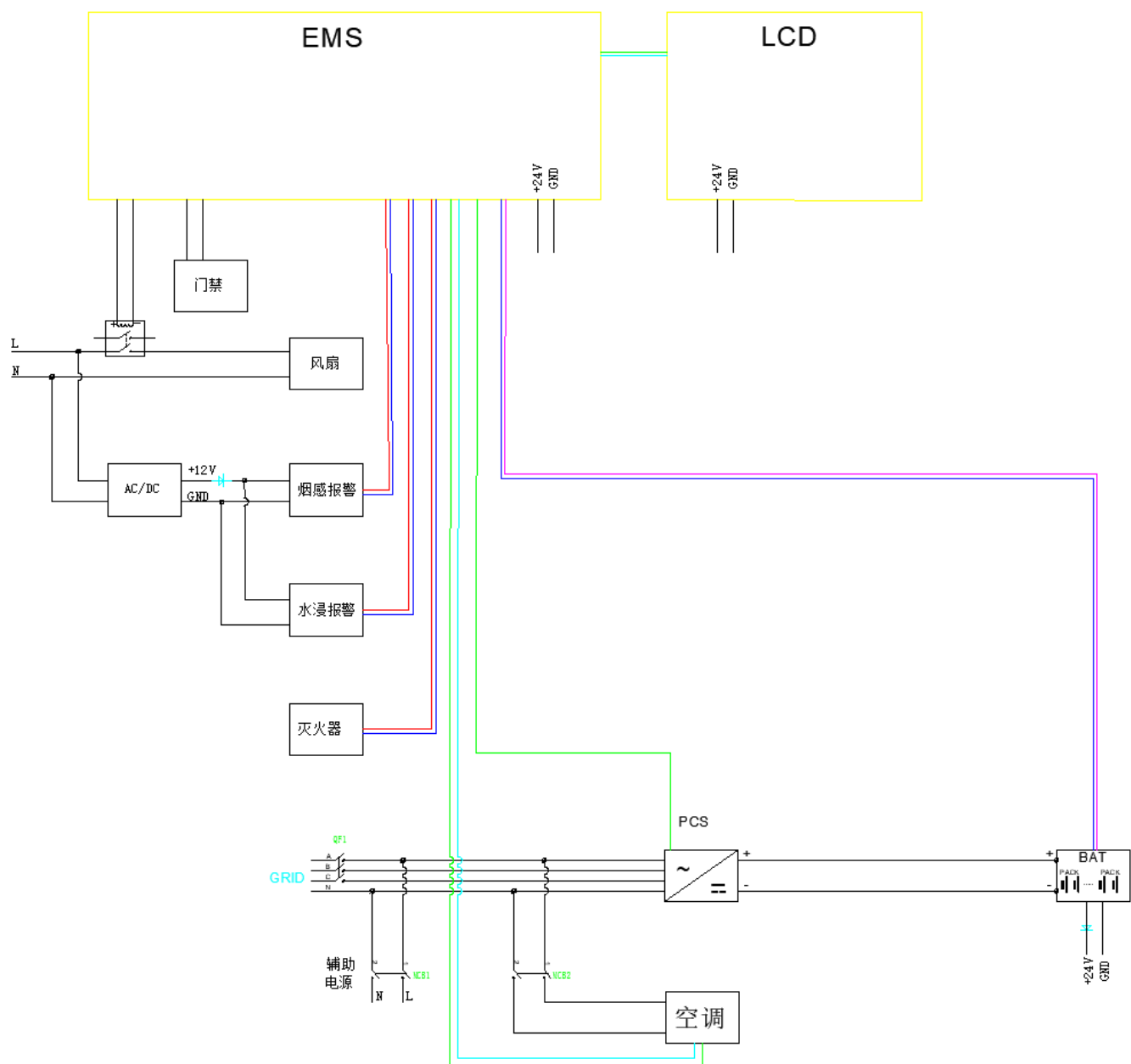
MonetSeries of outdoor energy storage cabinets integrated energy storage battery, modularPCS, Energy management and monitoring system, power distribution system, environmental control system and fire control system, etc. Modularity is usedPCS, Easy to maintain and expand capacity, outdoor cabinet maintenance before maintenance, can reduce the footprint and maintenance channel, with the characteristics of safe, reliable, fast deployment, low cost, high energy efficiency and intelligent management.

In common application scenarios, the operation strategies of energy storage systems are as follows:

Peak shifting and valley filling: when the electricity price is in the valley section: the energy storage cabinet is automatically charged and standby after full; when the electricity price is at the peak section: the energy storage cabinet is automatically discharged to realize the electricity price arbitrage and improve the economic benefits of the optical storage and charging system.

Optical storage combination: real-time acquisition of local load power, photovoltaic power generation is given priority to self-use and surplus power storage; if photovoltaic power is less than the local load, battery storage power is preferred.

2.3. Electrical line diagram



graph2.1 Electrical topology diagram



Note: figure 2.1 In order to have the system scheme of off-grid, isolation transformer and photovoltaic input, different projects have different configurations and the lines are slightly different, and the actual attached drawings of the shipment shall prevail

2.4. Product characteristics

- System productization, integrated energy storage battery, PCS, energy management and monitoring system, power distribution system, environmental control system and

fire control system, etc., to fully control the operation status and risk of the system;

- The ack modular PCS with multi-machine parallel operation and good scalability; PC S modules and total battery power can be selected according to the system capacity requirements of micro-grid and other scenarios. The typical configuration is 100kW / 200kWh.
- Protection level IP54, can perfectly deal with all types of outdoor weather;
- Using the door-mounted embedded integrated air conditioning, does not occupy the cabinet space, improve the available space of the outdoor cabinet, the top structural integrity is better, the waterproof effect is good;
- The local control screen can realize diversified functions such as system operation monitoring, energy management strategy formulation, and remote equipment upgrade.

2.5. Product Parameter

The following are typical configuration parameters for outdoor cabinet energy storage systems

2.1 The Parameter Table of the Energy Storage System

Model	215KWh
Battery rated energy storage	215KWh
System rated voltage	768V
System voltage range	672V~864V
Battery type	Lithium-iron phosphate battery (LFP)
Battery pack series and parallel	1P*20S*12S
Maximum charge and discharge	140A
Rated AC power	100kW
Rated AC current	144A
Rated AC voltage	400V , 3W+N+PE/3W+PE
Rated AC frequency	50/60Hz
Total current harmonic distortion	<5% (rated power)
power factor	-1speed-up~+1lag
The voltage total harmonic	<3% (linear load)
levels of protection	IP54
Protection level	I
isolation method	Transformer isolation
Stop self-consumption	<100W (excluding transformer)
show	touchLCDtouch screen
relative humidity	0~95% (no condensation)
noise	less-than70dB
ambient temperature	-25℃~60℃ (45More than °C reduction)
cooling-down method	Intelligent air cooling
above sea level	2000m(Over 2000m drop)
BMS communication	CAN
EMS communication	Ethernet / 485
size (W*D*H)	1800*1250*2000mm
Weight (approx)	2800kg

2.6. Part introduction

2.6.1. Battery system

Outside 2.2 Battery system parameters

Cell parameters	
Battery type	Lithium-iron phosphate battery
nominal voltage	3.2V
voltage range	2.8V~3.6V
nominal capacity	280Ah
Maximum operating temperature	0~50℃
Maximum operating temperature	-10~50℃
Cell series and parallel connection	1P20S
rated energy	17.92kWh
nominal voltage	64V
voltage range	56V~72V
Weight (approx)	135kg
outline dimension (W*D*H)	460*940*230mm
Rated energy storage	215kWh
System rated voltage	768V
System voltage range	672V~864V
Serial and parallel mode	1P*20S*12S
The number of electric boxes	12
Weight (approx)	1620kg

2.6.2. Battery management system

The energy storage management system consists of the battery management system (BMS) and the energy management system (EMS). The battery comes with BMS system, which is divided into two levels: BMU and BCU.

The BMU is located in the battery box, completing the data collection of the single cell information inside the battery box, and uploads the data to the BCU, and completes the balance between the single cells in the battery box according to the instructions issued by the BCU.

The BCU is located in the main control box, which is responsible for the management of the battery cabinet, accepts the detailed data uploaded by the BMU inside the battery, and samples the battery

The voltage and current of the cabinet, make SOC calculation and correction, be responsible for the pre-charge and charge and discharge management of the battery cabinet, and upload the relevant data to EMS.

2.6.3.electrical system

The outdoor cabinet energy storage system adopts a modular scheme, and users can configure different numbers of power modules according to the project requirements. Power module parameters of the energy storage converter are as follows:

Table 2.3 Converter module parameters

This scheme uses 2 pcs, and the parameters of each pcs are as follows

Model		MA1000K060
DC side parameters	Maximum voltage [V]	1000
	Voltage range [V]	670~1000
	Maximum charging/discharging current [A]	106
AC grid connection parameters	Rated power [kW]	60
	Maximum input active power [kW]	72
	Maximum input apparent power [kVA]	72
	Rated current [A]	86
	Rated grid voltage [V]	230/400
	Rated input frequency [Hz]	50/60
	power factor	0.8cap~0.8ind
Communication off grid parameters	Rated power [kW]	60
	Rated current [A]	86
	Maximum output active power [kW]	72
	Maximum output apparent power [kVA]	72
	Rated output voltage [V]	230/400
	Rated output frequency [Hz]	50/60
	Unbalanced load capacity	100%
	Overload capacity	110%10min 120% 1min
General parameters	Working temperature range [°C]	-30~+60 (>45 °C derating)
	Cooling method	Forced air cooling
	Isolation method	Non isolated
	AC wiring method	3P+N+PE
	Noise [dB]	65
	Insulation resistance [MΩ]	≥1
	Overvoltage category	II(DC)/III(AC)
	Protection level	TP20
	Working altitude [m]	3000
	Maximum efficiency	98.5%
	AC/DC start function	have
	Dimensions (width * depth * height) 【mm】	490*600*130
	Weight [Kg]	28
signal communication	BMS communication interface	CAN、RS485、Dry junction
	Superior monitoring communication interface	Ethernet/RS485/CAN/dry contact
	Superior monitoring communication protocol	Modbus TCP/Modbus RTU/CAN2.0

Light storage for islands, mountainous areas, border posts and other remote areas or areas with unstable power supply, or new zero-carbon technology parks system. Users can configure the DC converter power module according to the project requirements to realize the power supply system integrating photovoltaic and energy storage. The DC converter power module parameters are as follows:

Table 2.4 The module parameters of the DC converter

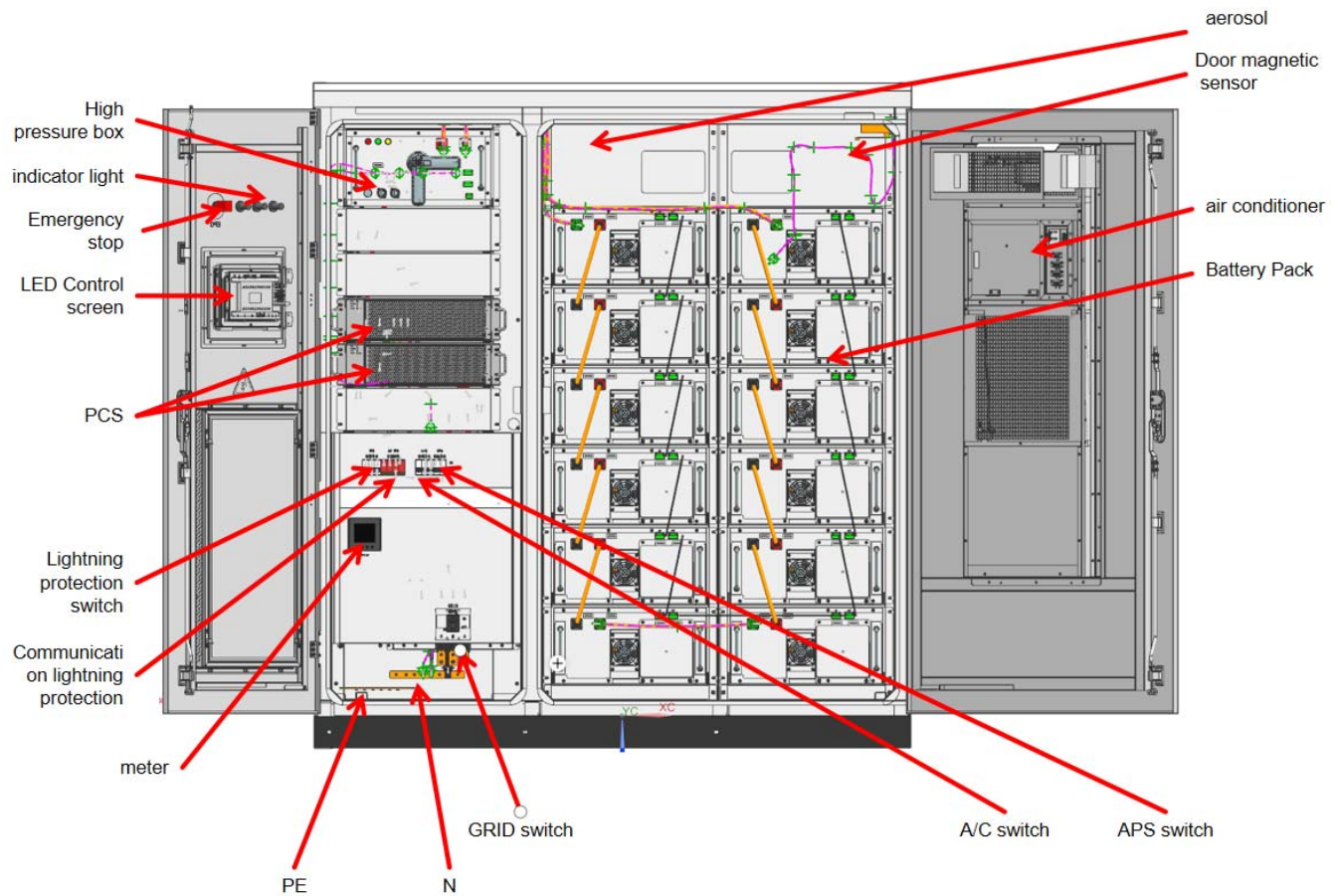
This plan does not have MPPT

Table 2.5 STS Module Parameters

This plan does not have STS

2.6.4.Environmental control system

The energy storage system is equipped with smoke detectors, water immersion sensors, door magnetic sensors, and fire protection environmental control units, which can comprehensively control the system's operating status. Schematic diagram of environmental control system:



Graph 2.2 Internal structure diagram of the cabinet

2.6.4.1 Precision air conditioning parameters

Table 2.6 Precision air-conditioning parameters

Model	AC3000
Electrical parameters	
Rated working voltage	220Vac
Rated cooling current	6.4A
Maximum operating current	10A
Rated operating frequency	50Hz
size (H*W*D)	1350×550×250mm
weight	40kg
Protection level	IP54
Cooling capacity	3000W
Heating capacity	2000W
Air volume	850m ³ /h

refrigeration	
Cooling on point	22°C ~44°C (Setable)
Retracement	give tacit consent to 6°C (Setup)
heating	
Heating on point	-5°C~16°C (Setup)
Retracement	Default 10°C (Settable)
dehumidification	
Dehumidification opening point	50%~99% (Setable)
Dehumidification stop point	45%~95% (Setable)
caution function	
High temperature alarm inside the cabinet	30°C ~60°C (Setable)
Low temperature alarm inside the cabinet	-45°C~10°C (Setup)
High humidity alarm inside the cabinet	0%~100% (Setable)
Attention: The actual parameters are set according to customer requirements before leaving the factory.	

2.6.4.2 Access control switch

Access control switch detects the door opening status of the equipment.

Outside 2.6 Access control switch parameters

Name	Parameter
rated voltage	AC-15: 380V DC-13: 220V
rated current	AC-15: 0.79A DC-13: 0.14A
nominal insulation voltage	415V
Rated impact withstand	2.5kV
operation frequency	machinery/electrical: 20Times/component
service environment	Temperature: -5°C ~ + 40°C relative humidity <90% RH (no

2.6.4.3 Water immersion detection device

The water immersion detection device detects whether there is any water leakage in the energy storage system.

outside 2.7 Immersion sensor parameters

Name	Parameter
rated voltage	DC12V(Allow range 10V~15V)
rated current	≤0.1A
Detection channel	1road, 2Core leakage cable
response time	< 2s
relay output	Often open, the contact capacity 1A 30VDC
Usage environment	Temperature: -10°C ~ + 65°C Relative humidity <95% RH (no condensation)

2.6.4.4 smoke detector

The smoke detector is used to detect the smoke concentrations in the current environment.

Outside 2.8 Smoke detector parameters

Name	Parameter
rated voltage	DC12/24V(Allow range9V~30V)
rated current	Monitoring status: <1 mA @ DC 12 V fire alarm: <30mA@DC12V
relay output	Open normally, with a contact capacity of 1A 30VDC
Work instructions	Monitor status red light about per6stwinkle1Times The red light is always on, and the red light in the fault state flashes about 2 times every 6s
Service	Temperature: -10°C ~ + 65°C Relative humidity <95% RH

2.6.4.5 Dual power automatic switcher

When the main power supply fails due to power outage, it quickly switches to the backup power supply and returns to the main power supply when there is an incoming call.

Outside 2.9 Dual power automatic switcher parameters

Name	Parameter
rated voltage (V)	400
rated current (A)	160
Rated operating frequency (Hz)	50
Rated short-term withstand current I _{cw} (kA)	10
Rated short-circuit making capacity I _{cm} (kA)	17
Mechanical lifespan (number of cycles)	12000
Electrical lifespan (number of cycles)	3000
Contact transfer time	0.1~1S

2.6.5.fire extinguisher system

Fire protection system adopts aerosol fire extinguishing device is a new type of environmental protection fire protection product with the world's advanced level.

Working principle: When the ambient temperature reaches the start temperature of the thermal line or contacts the open flame, the thermal line spontaneously burns and transmits it to the aerosol series

fire unit. After the aerosol fire extinguishing device receives the start signal, the internal fire extinguishing agent is activated, quickly producing the nanotype aerosol fire extinguishing agent and ejected, realizing rapid fire extinguishing.

outside2.10Fire-fighting aerosol parameters

Model	QRR0.3GS
technical parameter	
Drug weight	300g
weight of equipment	860g
size	255*65*46mm
Starting method	Hot start (optional electric start, or hot start and electric start)
Starting temperature	160 °C → 180 °C
Operating environment temperature	-50 °C → +90 °C
Protected space	≤ 3 m ³
Spray lag time	≤ 5s
Spray nozzle temperature	≤ 200 °C at a distance of 5mm from the spray nozzle
Passive switch feedback signal	Passive switch signal (normally open in standby mode, normally closed after startup (greater than 80 °C)Normally open and normally closed (can be customized according to customer needs)

2.6.6. EMS system

An intelligent energy management system developed by EMS system, mainly used in various capacity energy storage power stations and integrated solar energy storage and charging power stations.

The product set includes human-machine configuration screen (HMI), port control and communication, system parameter and operation strategy settings, to achieve monitoring and management of the energy storage system. The hardware resources and parameters of the product are as follows:

Product model	EMS
power input	DC 12V
outgoing control	The 3-way isolation output switch quantity
input control	6Route isolation input switch quantity
Serial communication	2 isolated RS232, 4 isolated RS485
field bus	2roadCANBI
Ethernet port	1 Road 10 / 100M Ethernet port (RJ 45)
Extended storage	1individualUhandicap, 1individualSDBayonet
Sound alarm	1 controllable buzzer
Program characterization	1Operating indicator lights, 1Status indicators, 1An alarm indicator light
abnormal attribute	1 hardware watchdog timer
real-time clock	1groupRTCreal-time clock

2.7. Configuration list

In conclusion, the overall configuration list of the energy storage system under the typical configuration is as follows:

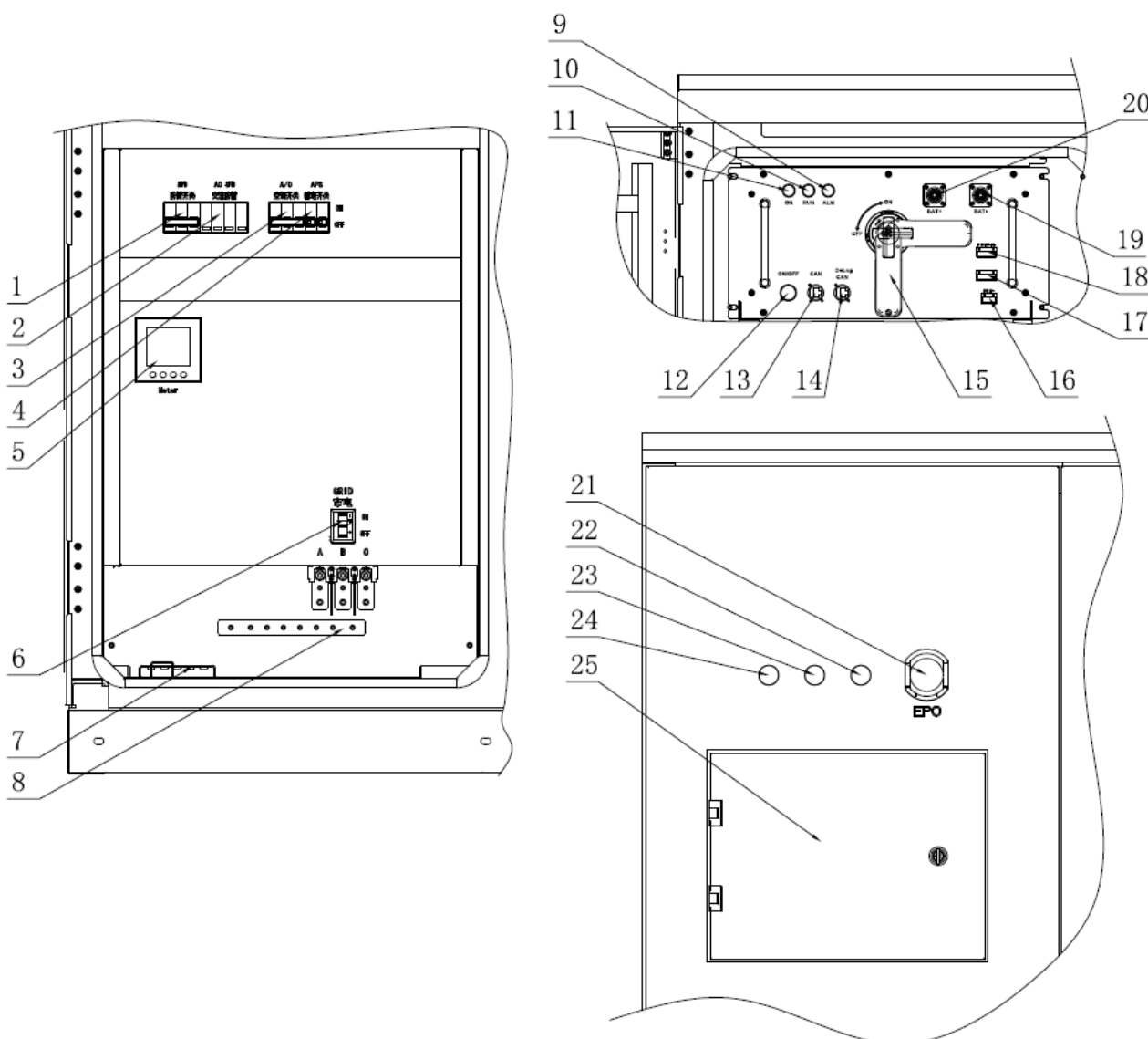
Overall configuration list of outdoor cabinet energy storage system

Table 2.12.1 100KW215KWh-Pure Grid Connection

Name	Model	Unit	Quantity	Remarks
Battery system	280Ah, 215kWh	Set	1	With control box
Energy storage	MA1000K060	PCS	2	modularity
air conditioning	AC3000	PCS	1	Precision air conditioning
Fire protection	QRR0.3GS	PCS	1	Heat-sensitive line starting type
Auxiliary system	Access control, etc	PCS	1	Auxiliary supporting equipment
management	EMS	PCS	1	LCD screen

The actual supply configuration shall prevail.

2.8. Function interface description



No.	Description	Silk-screen	Remark
1	Lightning arrester switch	SPD	Lightning arrester switch
2	Lightning arrester	AC SPD	AC lightning arrester
3	Air conditioning switch	MCB2	
4	Auxiliary switch	MCB1	
5	AC meter	meter	View grid connected output values
6	GRID Switch	Grid	Connected to mains power
7	PE busbar	PE	All PE-line connection ports
8	N busbar	N	All N-line connection ports
9	red light	ALM	DC side fault
10	green light	RUN	DC side normal operation
11	Yellow light	ON	DC side System power on
12	E-switch	ON/OFF	
13	CAN bus Port	CAN	CAN bus and inverter connection port
14	Debug CAN	Debug CAN	Battery testing port

15	disconnecter	ON/OFF	Cut off the battery power switch
16	24V power supply	24+ 24-	Provide 24V power supply
17	not have	/	standby
18	Communication and power supply	IP MP 24+ 24-	Link battery pack communication and heat dissipation
19	BAT-	BAT-	Link battery pack total weight
20	BAT+	BAT+	Link battery pack total positive
21	emergency button	EPO	AC side emergency switch
22	red light		AC side fault
23	green light		AC side normal operation
24	Yellow light	ON	AC side System power on
25	LCD Key/EMS		EMS integrated screen

3. Installation and wiring

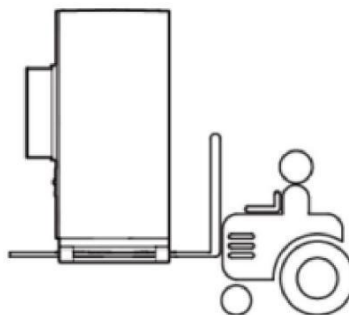
3.1. Transportation and handling

3.1.1. Product transportation

- In order to keep the equipment in a better protective state, it is recommended to use the transportation with packaging;
- Equipment transportation shall be transported according to the identification requirements on the package to prevent personal injury and equipment damage;
- Energy storage batteries are not recommended by rail transportation, air transportation. Speed limit requirement: speed limit of 80 km/h on flat road and 60 km/h on rugged road. If there is any conflict, please refer to the local traffic regulations.

3.1.2. Product handling

- When using the forklift to move, ensure that the forklift has enough weight, and pay attention to the center of gravity of the equipment should fall between the feet of the forklift to prevent personal injury and equipment damage;
- With battery transfer, the forklift bearing capacity needs 3t; without battery transfer, the forklift bearing capacity needs 1.5t;
- With a recommended length of 1.5m, width of 80cm~160cm and thickness of 25cm~70cm.



graph3.1Schematic diagram of handling

3.2. Packaging and storage

3.2.1.product packaging

In order to make the product in a better protective state during transportation, use a specific wooden box packaging. The following basic parameters are listed on the equipment package (including but not limited to), which shall be carefully checked according to the project requirements:

Table 3.1 Packaging parameters table

parameter	explain
model	product model
size	Post-packaging product dimensions
weight	Total product weight after packaging
characteristic	Front up, carefully placed, center of gravity position, etc

3.2.2. Product storage

If the product is not transported or installed immediately, it must be stored indoors and meet the following conditions:

Table 3.2 Requirements for Product Storage Conditions

parameter	ask
Storage temperature (without cell	-25℃~+60℃
	20℃ ~ 30℃
Store relative humidity	<95% (no condensation)
height	< 3000m



Note: Long-term storage of batteries is not recommended. For long-term storage, lithium is stored at the recommended storage temperature

After 12 months, the general irreversible capacity loss is from 3% to 10%. The total storage and transportation time of the battery packs is no more than 8 months (from shipment start the clock). Over 8 months requires replacement and SOC calibration, with a minimum of 50% SOC. If the battery is not replenished as required, it may affect the performance and service life of the battery.

3.3. Installation environment requirements

The installation layout of the energy storage system must meet the fire distance or firewall requirements specified in the local standards, including but not limited to GB 51048-2014 Design code for electrochemical energy storage power station », 《NFPA 855 Standard for the Installation of Stationary Energy Storage Systems》. Energy storage system is only suitable for outdoor scenes, so it needs outdoor arrangement, and does not support indoor arrangement. General requirements are as follows:

- The horizontal surface of the installation position shall be above the highest water level in the area. The distance from the airport, landfill disposal site, riverbank or dam shall be $\geq 2\text{km}$.
- Choose a well-ventilated place. Do not block the vents and heat dissipation system to prevent high temperature fire. Enough installation space to ensure that the surrounding equipment is not affected by the heat generated by the product; the installation position ensures adequate external wiring space. With convenient transportation conditions, reliable fire suppression system equipment.
- The installation position is far away from the fire source. Do not place inflammable and explosive items around the equipment. If the equipment is installed in a lush vegetation, in addition to routine weeding, the ground below the equipment needs to be hardened to prevent weeds.
- Do not install energy storage system outdoors in salt damage areas to prevent corrosion and fire. Salt-hit areas are defined as off the coast 2km Within, or in areas affected by the sea breeze.
- The energy storage system must be equipped with fences, walls and other protective measures, and safety warning signs must be erected to avoid unauthorized entry during the operation of the equipment, resulting in personal injury or property loss.
- The equipment is installed in the area far away from the liquid, and should not be installed under the water pipe and air outlet; it should not be installed under the air conditioning outlet, vent and equipment room outlet window to prevent the liquid from causing short circuit.



When the safe spacing of the site selection cannot meet the requirements of the relevant national standards, it is recommended to relocate the site. Site selection should avoid industry standards and regulations

Unrecommended scenarios, including but not limited to the following lots, areas and premises:

- Strong vibration, strong noise source, and strong electromagnetic field interference areas.
- Places that produce or have dust, lampblack, harmful gases, corrosive gases, etc.
- Places that produce or store corrosive, flammable and explosive articles. Within the blasting hazard range.
- Places where underground facilities already exist. Dense populated places, high-rise buildings, underground buildings.
- There are rubber soil, soft soil layer and other bad geological conditions, easy to water and easy to sink the ground.
- Within the limits of the mining subsidence (dislocation) area. Areas that may be submerged after a dam or embankment breaks up.
- Seismic fault and fortification intensity higher than nine degrees. There are debris flow, landslide, quicksand, karst cave and other direct harm of the area.
- Important water supply source sanitation protection area.
- Historical relics and historic sites reserve.

If there is no more suitable site selection, it is recommended to install a firewall no less than 3h for safety protection, and consider the requirements of space for equipment transportation, installation and maintenance. It is recommended to refer to T / C E C 373-2020: the length and height of the firewall should be 1m beyond the outer outline of the energy storage cabinet.

3.4. Preparation before installation

- 1) Check whether the product is intact before installing the product. If any damage trace is found, please retain the evidence and contact us.
- 2) If the product is abnormal, please check the delivery list to see whether the accessories are complete.

Table 3.3 Delivery list

order	name	quantity	remarks
1	Outdoor cabinet energy storage	A set	Include cabinet door key
2	user's manual	1stem or root	
3	certificate	A	
4	Factory inspection report	1portion	

- 3) Users need to prepare relevant installation tools before installation.

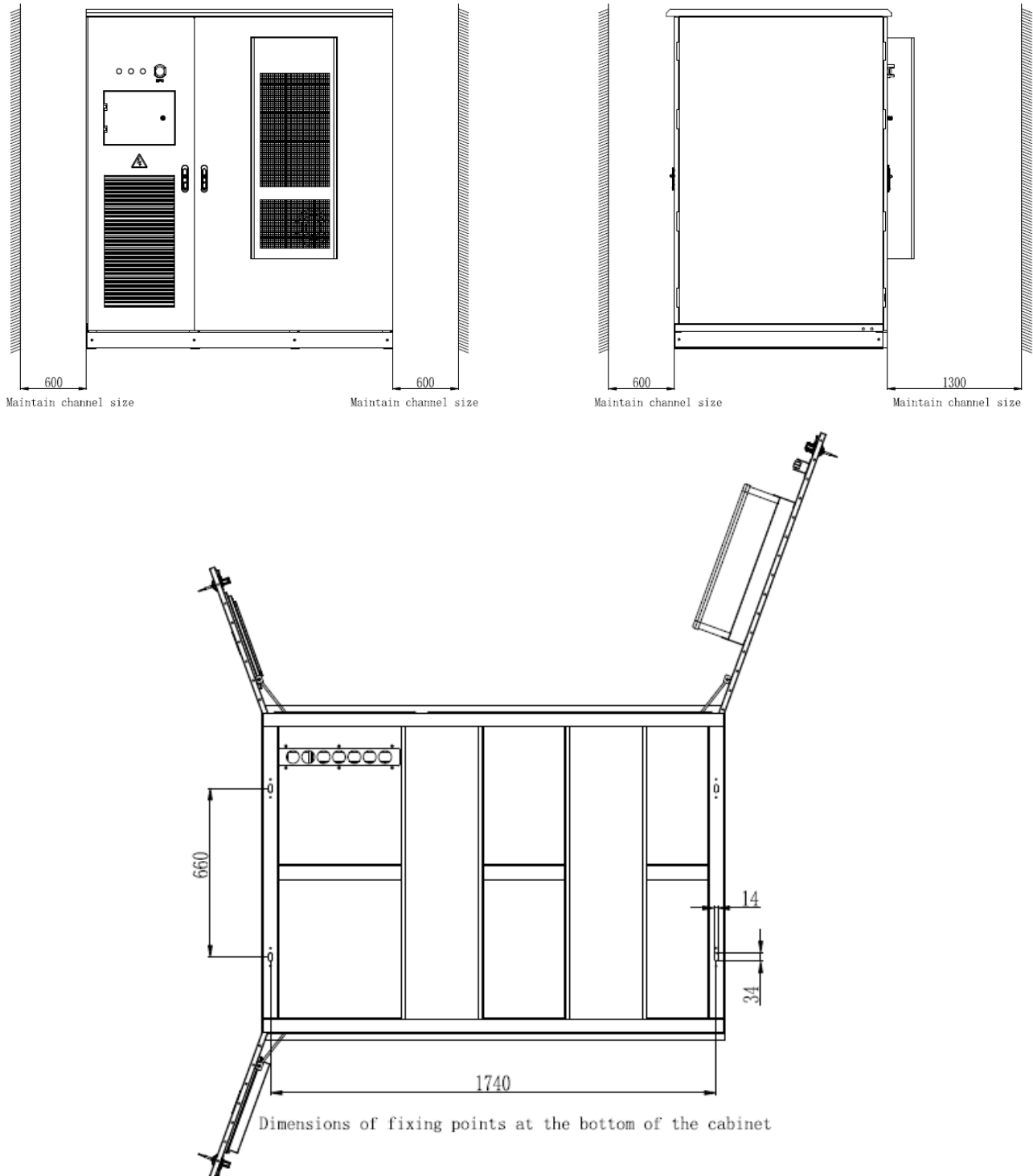
Table 3.4 List of installation tools

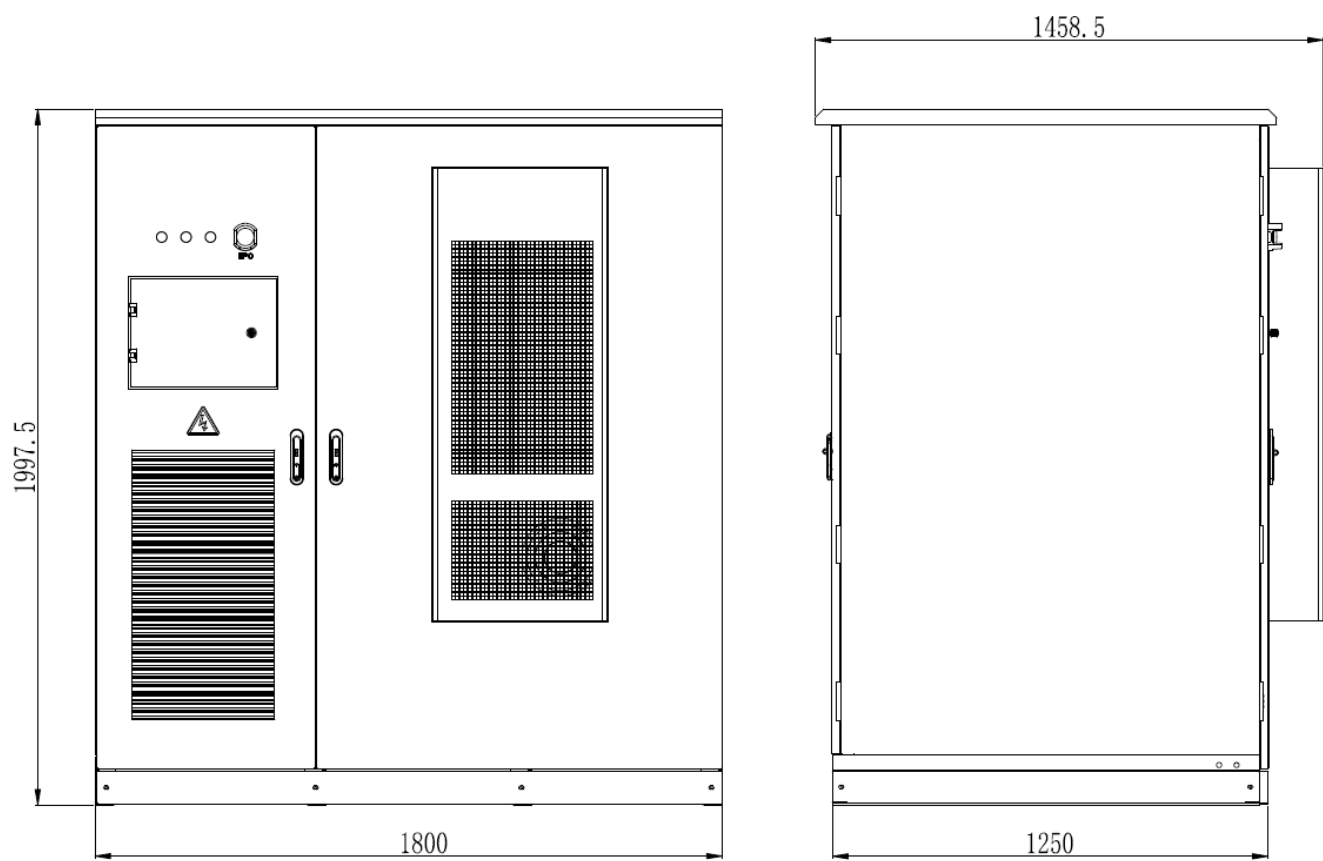
order	name	quantity	remarks
1	Screw Knife Set	A set	
2	jacket	1cover	
3	multimeter	A	
4	forklift	1A car	
5	Screws, nuts, gasers	a surname	

3.5. Mechanical installation

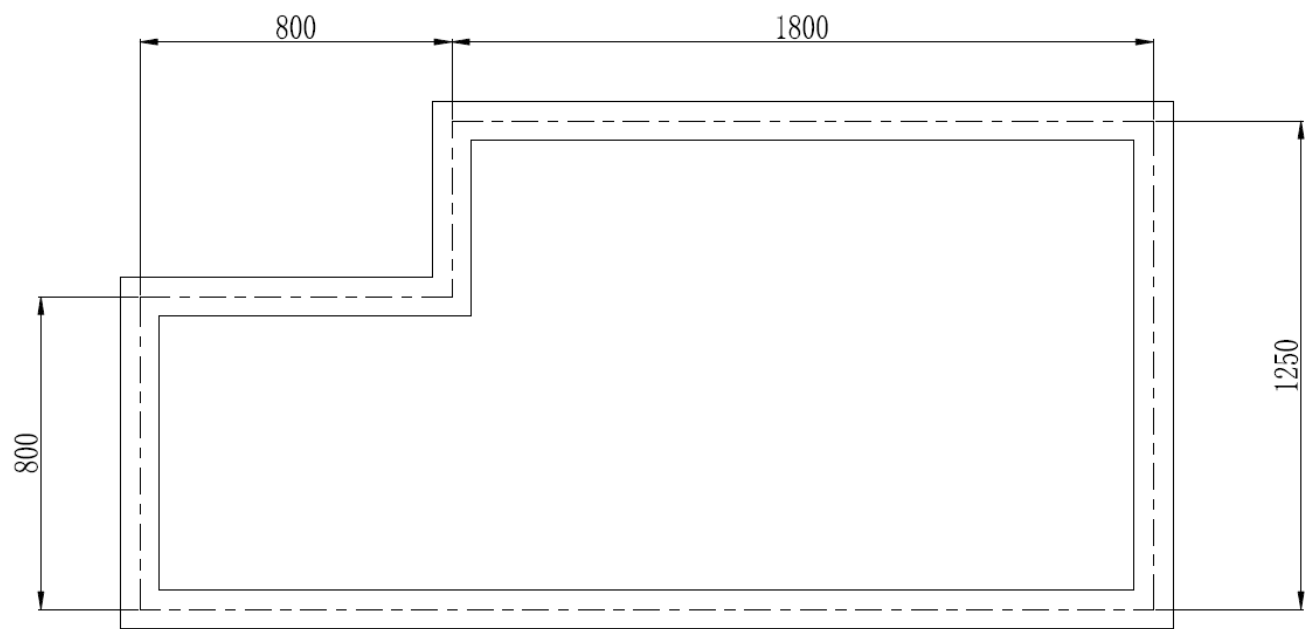
- 1) After confirming that the product is free and all accessories are complete, refer to the following suggestions:
 - Select the installation position of equipment in advance according to the product size, make positioning and fixing; the recommended foundation is shown in Figure 3.2.

- Referring to the product weight, the selected installation position should have sufficient load-bearing strength;
- The ground resistance is less than 4 Ω .





Cabinet size



Suggested infrastructure dimensions

Figure 3.2 Basic Reference Drawing (actual dimension of equipment subject to shipment)

- 2) After removing the packing box, remove the bottom panel of the equipment first. The removed panels and screws shall be collected, and they shall be installed after the equipment is installed.



Figure 3.3 Schematic drawing of the bottom enclosure panel of the equipment

- 3) Use the forklift to place the equipment to the foundation, and align the equipment fixing hole with the foundation embedded nutM 16X 40Of the bolt for fastening.

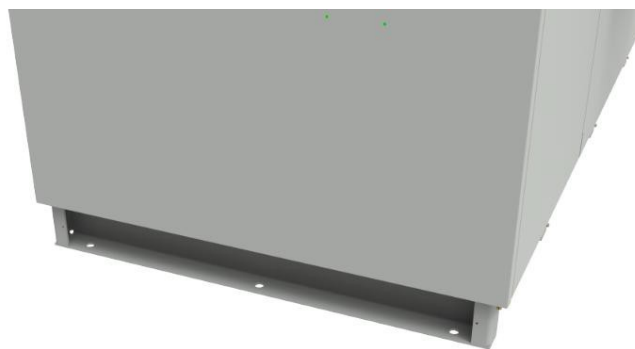


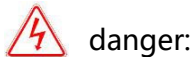
Figure 3.4 Bolt tightening at the bottom of the equipment

3.6. Electrical cable installation

This product adopts an all-in-one machine structure, and the internal wiring on the DC side has been completed. On site, only electrical cables need to be installed on the AC side and external communication. Nantong provides wiring references as shown in Table 3.5 based on product power and cable specifications. The selection of cable diameter should comply with local cable standards. The factors that affect cable selection include rated current, cable type, laying method, ambient temperature, and maximum acceptable line loss.

Table 3.5 Cable diameter comparison table

Model	AC cable	null line	earth wire	Positive and negative
50kW	$\geq 3 \times 35\text{mm}^2$	$\geq 35\text{mm}^2$	$\geq 25\text{mm}^2$	Single-module of 70mm^2
100kW	$\geq 3 \times 70\text{mm}^2$	$\geq 70\text{mm}^2$	$\geq 50\text{mm}^2$	unimodule $\geq 70\text{mm}^2$
150kW	$\geq 3 \times 150\text{mm}^2$	$\geq 150\text{mm}^2$	$\geq 95\text{mm}^2$	Single-module of 70mm^2



danger:

For conducting electrical installation, refer to the following recommendations:

- (1) Before wiring, check that all switches in the equipment are disconnected to ensure that the equipment is not charged;
- (2) Disconnect the power grid switch before wiring to ensure that the cable is not charged;
- (3) To determine that the phase order of the cable is correct, you can add yellow, green, red and black different color insulation sheath or logo to distinguish, to prevent the wrong phase order;
- (4) The connection of the cable terminal and the copper row should be pressed, and the screw selection length should be moderate, so as not to affect the insulation and fastening;
- (5) Communication lines and power cables should be laid separately as far as possible to ensure that the insulation layer of the cable is not damaged during the laying process;
- (6) The grounding cable must be reliably connected with the grounding copper row, and the cross-sectional area of the cable shall meet the design requirements;
- (7) All AC cables shall enter the equipment through the inlet hole of the bottom of the equipment and then connect to the corresponding phase sequence;
- (8) After the wiring is completed, use fire mud to seal the wiring leakage joint to prevent external insects and rats from entering and damaging the equipment or cable.

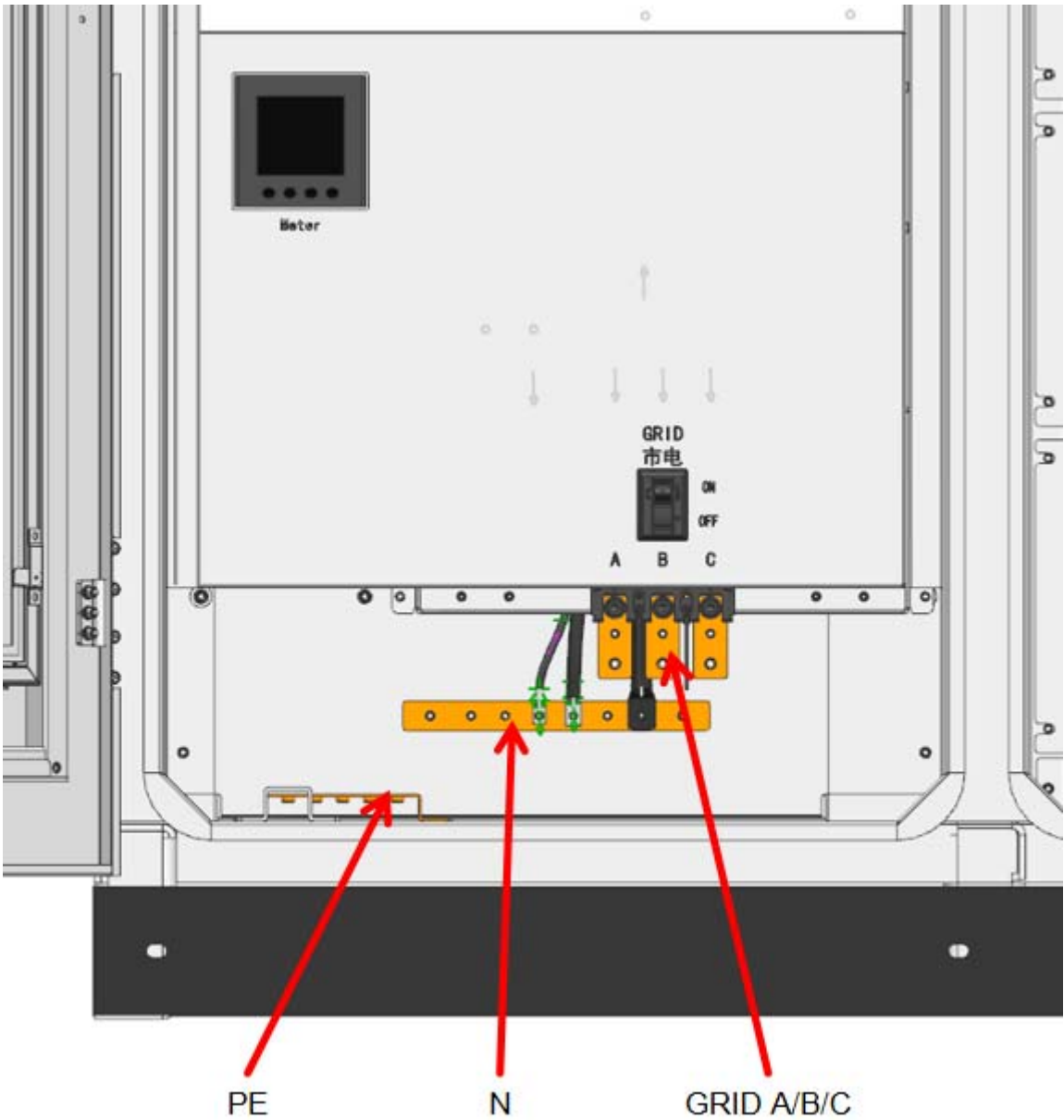
In order to prevent the terminal from being loose and increasing contact resistance and heating, the terminal should be tightened

The bolts meet the torque requirements listed in Table 3.6:

Table 3.6 Wiring moment requirements

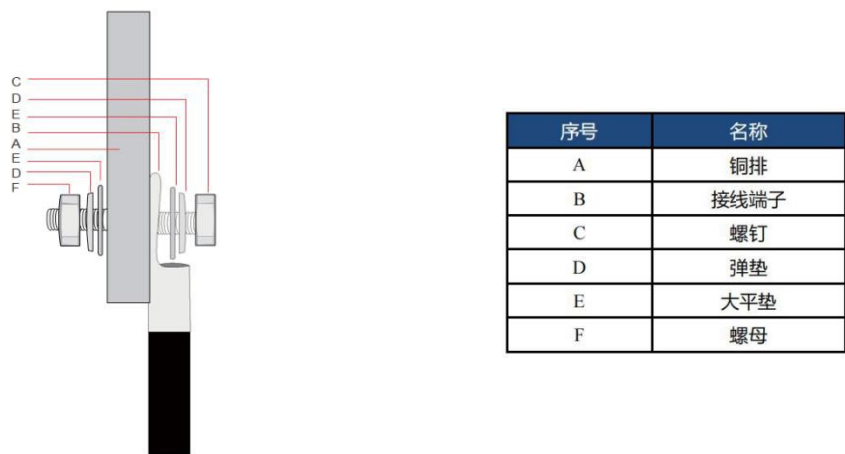
Screw size	M4	M5	M6	M8	M10	M12	M14	M16
torsion (N*m)	1.8~2.4	4~4.8	7~8	22~29	44~58	76~102	121~162	189~252

The inlet and outlet method of the energy storage system is bottom in and bottom out. After removing the switch baffle, as shown in Figure 3.5, the A/B/C/N copper bar at the lower end of the switch Reserve holes with diameters of 11mm and 13mm for customer wiring, or make holes according to customer requirements in size; The protective grounding wire is connected to the PE copper busbar, and the equipment grounding impedance meets the requirements of national standard GB 50054 and local electrical standards.



graph3.5switch

The installation of terminals and fixed screws used for system power cable wiring is as follows:



Terminal installation Name of each component of the wiring terminal
graph3.6Installation sign of the fixing screws

pay attention to:

- When using copper wire or copper clad aluminum wire, use copper terminals.
- When using aluminum alloy cable, please use copper aluminum transition terminal, or aluminum terminal with copper aluminum transition gasket.

4. Boot and debugging

4.1. Check before boot

Before the product operation, please ensure that the product has been installed in accordance with the specifications, and the machine should be comprehensively and carefully checked to ensure that all indicators meet the requirements before starting up.

1)appearance inspection:

- a, The appearance of the equipment is intact, without damage, without rust and paint loss. If the paint is dropped, please replace the paint;
- b, The equipment label is clearly visible, and the damaged label should be replaced in time.

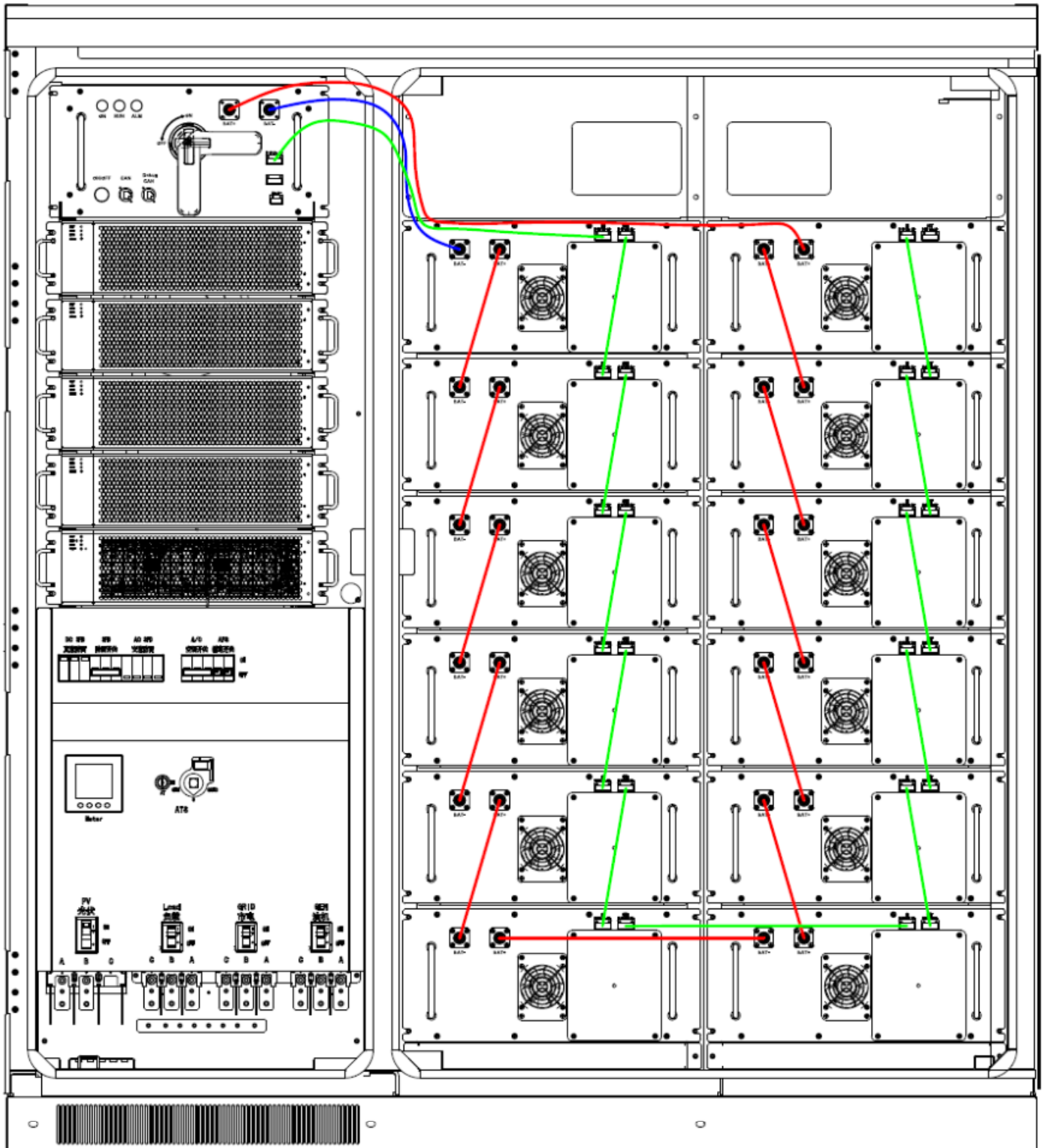
2) Grounding check: the box has a ground point and a solid grounding; the grounding conductor in the box is reliably connected to the box grounding copper row.

3)Cable inspection:

- a, The cable protective layer package is intact without obvious damage;
- b, Terminal production is in line with the specification, and the connection is firm and reliable;
- c,The labels at both ends of the cable are clear and clear, the line meets the principle of separation of strong and weak electricity, and the margin at the corner should not be tightened;
- d,The cable installation bolt has been fastened and the cable pulling is not loose; the plugging of the cable crossing hole has been completed.

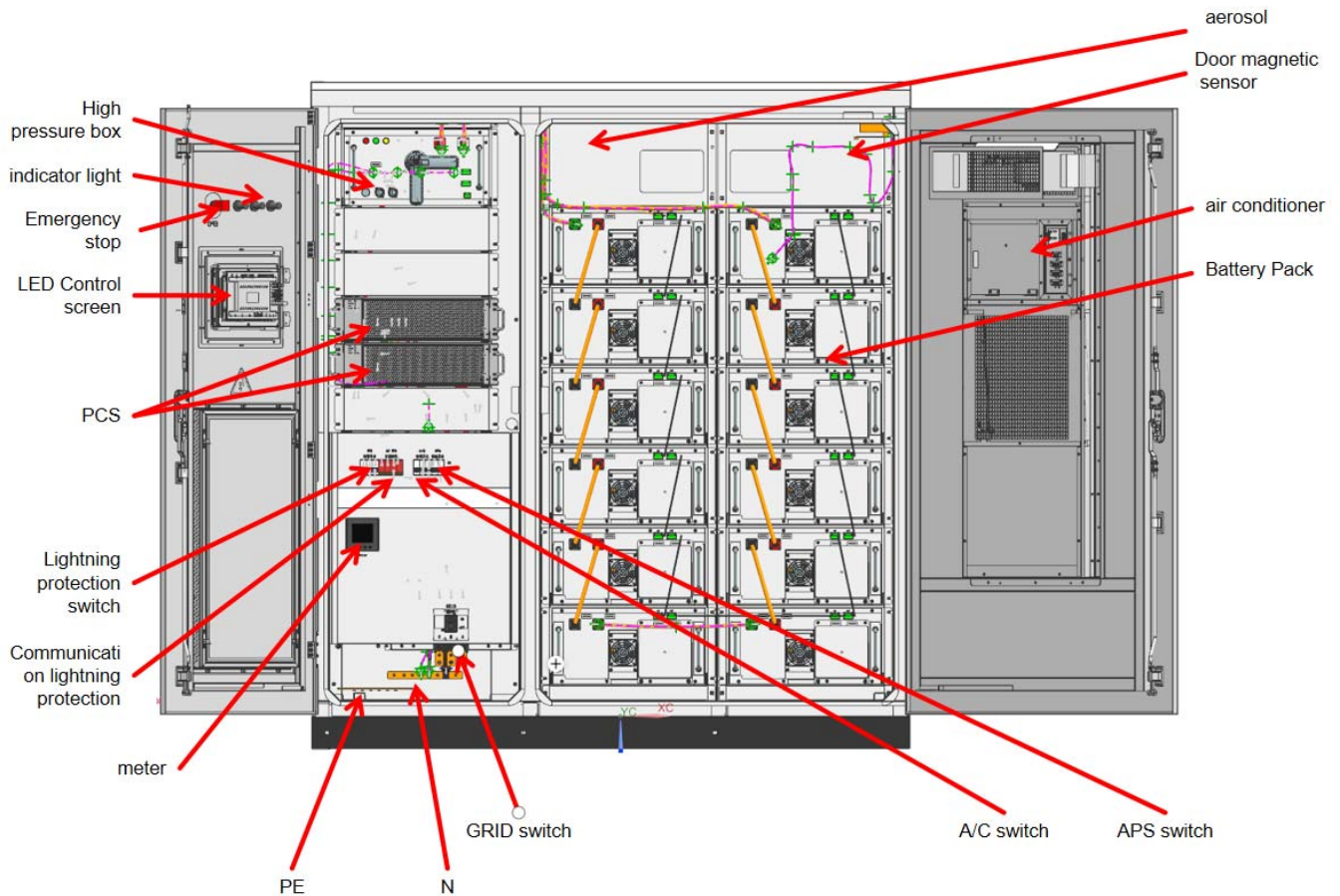
e,The battery terminal wiring method is shown in the following figure

(Red and blue represent power lines, green represents communication lines)



4) Copper strip inspection: no obvious cracks or deformation in the copper strip, tighten the lap screws, no dislocation of the marking mark, and no debris on the copper strip.

5) Components inspection: refer to Fig4.1 The circuit breaker is in the switch position; the lightning protection indicator is green.



graph4.1 Position diagram of the power distribution switch

4.2. Boot operation

The operation process for starting up and running the product is as follows:

- 1) Confirm with a multimeter that the grid voltage is within the predetermined range (400V $\pm$ 10%);
- 2) Referring to Figure 4.1, close the soft start switch APS and auxiliary switch SPD of the transformer, and close the GRID AC plastic shell switch to complete the soft start of the transformer.
- 3) Wait for the touch screen to start (about 30 seconds), confirm that the display is normal and there are no fault alarms;
- 4) Close the auxiliary power switch of the battery and the load switch of the high-voltage box battery (rotate to the ON position), and turn on the battery in "Data" -> "Battery Data". Close GEN oil engine switch, close load switch, close PV photovoltaic switch;
- 5) Set the inverter parameters in the "System" -> "Parameter Settings" interface, and select the desired operating mode in the "System" -> "Operation Mode" interface;
- 6) Enable all modules on the "Switch" page of the touch screen, click "Converter On" to complete the startup.

4.3.pilot run

After the installation of all electrical structures of the equipment meets the startup conditions, in order to ensure the reliable and stable operation of the energy storage system, the initial operation must be powered up, and the operation mode and related parameters must be set according to the project requirements:

- 1) Set the device control mode to Manual mode, and set the active power to 5%;
- 2) In the "data" -> "Environment monitoring" turn on the air conditioning, in the "switch" interface enables all the modules, click "System open";
- 3) Observe the screen during the run PCS, Battery and air conditioning parameters, if there is abnormal timely stop detection;
- 4) move 0.5 hour;

- 5) Set the active power to 5%The battery presses the system5%The rated power charge,
- 6) Observe the screen during the runPCS, Battery and air conditioning parameters, if there is abnormal timely stop detection;
- 7) move0.5hour;
- 8) accomplish1After no operation, close the system in the "switch" interface;
- 9) According to the project background and requirements, you can select the local manual power control mode, automatic peak load filling mode or backup mode mode to officially put into operation, and click "System boot" on the system interface.

4.4. Shutdown operation When the product needs daily maintenance, the shutdown operation is required. The normal product shutdown operation is as follows:

- 1) Click the touch screen switch interface and click "System shutdown";
- 2) reference picture 4.1, Break the system air conditioning A/C switch, Auxiliary electric switch APS And battery auxiliary power switch;
- 3) Break off the main AC circuit breaker;
- 4) Break off the battery load switch and auxiliary power switch;
- 5) Wait for the bus discharge to end, the touch screen goes off, and the device turns off.

- 4.5. Emergency stop shutdown** When the product failure or critical situation requires emergency shutdown, the emergency shutdown operation can be performed as follows:
- 1) Press the emergency shutdown button "EPO" ;
 - 2) reference picture 4.1 , Break the system auxiliary power switch APS And the battery auxiliary power supply, break off the high-voltage box battery load switch;
 - 3) Reset after the fault or danger is removed and operation is required EPO push-button.



After pressing "EPO" for emergency shutdown, it is necessary to turn off the AC/DC plastic shell switch, auxiliary power switch, and high-voltage box battery load switch. Wait for 10 minutes before starting up!

5. Operation and operation

I Introduction

With the continuous adjustment of the global energy structure and the rapid development of clean energy, the demand for efficient and intelligent energy storage systems in the energy

storage field is increasing. In order to meet this demand, we have made great efforts to create a smart energy storage Cloud Computing Platform that integrates collection, monitoring, and

management. This user manual aims to introduce the functions and operation methods of the

platform, help you better utilize the platform advantages, and improve the operational efficiency and management level of the energy storage system.

Energy storage system is not only a key facility for balancing power supply and demand and optimizing energy allocation, but also an important support for achieving energy conservation, emission reduction, and green development. By introducing advanced technologies such as Cloud Service, Big Data Analysis, and artificial intelligence, our Energy Storage Cloud Computing Platform can achieve real-time monitoring, intelligent control, and optimized management of the energy storage system, ensuring efficient and stable operation of the system, reducing operating costs, and improving the economic and social benefits of the enterprise.

II Platform Overview

5.2.1. Industrial and commercial energy storage full lifecycle management platform.

5.2.2. Power station level, system level, equipment level data lake visualization;

5.2.3. Centralized management of multi-station operation indicators.

5.2.4. Support unified control for various equipment such as energy storage and photovoltaics.

5.2.5. Flexibly configure energy control strategies based on time period, date, month, battery status, and load type.

5.2.6. Support different operators to access, and the data of each operator is completely isolated.

5.2.7. Flexibly generate daily, monthly, and annual operating data reports and revenue data reports.

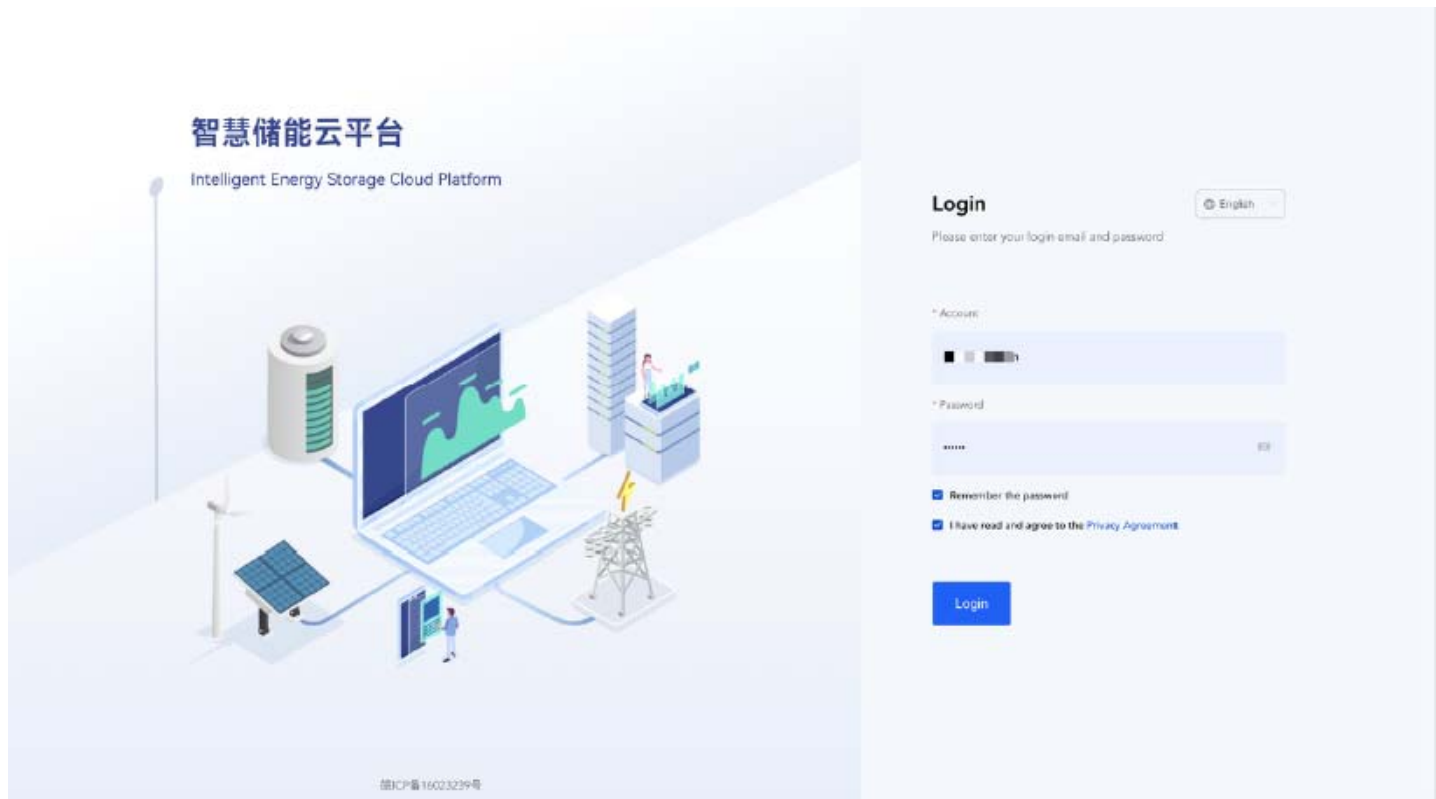
5.2.8. Value mining, AI prediction and decision analysis based on Big data.

III Function introduction

Category	Functional modules	Description
Data Dashboard	Data big screen	Display the real-time data resource status of all sites on a large screen.
	Multi-site Overview	Display data statistics, data trends, fault alerts, site lists, and other information for all sites within the Cloud Computing Platform.
	Site card	Display information such as installed capacity, installed power, site name, commissioning time, and location of each site within the Cloud Computing Platform.
Single station data	Power plant overview	Display data statistics, data trends, site information, comprehensive efficiency, discharge achievement rate, system list and other information of individual sites within the Cloud Computing Platform.
	Site system	Display real-time data, energy flow chart, power trend, alarm status, real-time equipment operation trend, real-time electricity revenue and other information of the systems within the Cloud Computing Platform.
	Device monitoring	Display real-time data of the devices bound to the system, including real-time status, data analysis, data export, and command issuance.
	Site alarm	Summary of power station-level alarms, displaying relevant fault information when equipment malfunctions or malfunctions occur.
	Energy management	Issue control operations to the energy management module of the system.
	Electricity price management	The function of electricity price management is mainly to configure and manage the electricity price strategy of the power station.
Statistical reports	Electricity report	Support power data summary/export, support single/multi-station, time period/day/month/year, custom time period and other forms.
	Income statement	Support revenue data summary/export, support multiple forms such as single/multi-site, daily/monthly/annual, custom time periods, etc.
Operations management	Ticket management	According to the needs of different customers, the power station ticket is targeted to manage, maintain and track a series of problems and requests.
Alarm center	Alarm monitoring	Support platform-level multi-site alarm information summary and display.
System management	Power station management	Tools for managing and maintaining power plants in energy storage systems.
	Common template	A common template for managing all company sites under the Cloud Computing Platform.
	Account management	User accounts used to create, manage, and maintain the platform.
	System management	It can be used to add, allocate, and manage EMS systems.
Intelligent algorithms	Battery algorithm	Through the battery big data algorithm, fault prediction and warning are realized, battery performance is optimized, and battery life is extended.
	Energy algorithm	Implement functions such as dynamic electricity pricing and intelligent energy management through energy management algorithms.

5.1 Log in

Enter the platform address in the browser: <https://www.iesscloud.com/#/> to enter the login page (it is recommended to use chrome browser), enter the corresponding username and password to log in. (Create a new account requires the administrator to add it in [System Management] - > [Account Settings])



5.2 Data Dashboard

5.2.1 Data big screen

EMS Cloud Computing Platform supports data center large screen monitoring function. During

account login, the large screen will continue to display and data will be refreshed in real time.

- In the Cloud Computing Platform system, click the "Data Big Screen" button to open the big

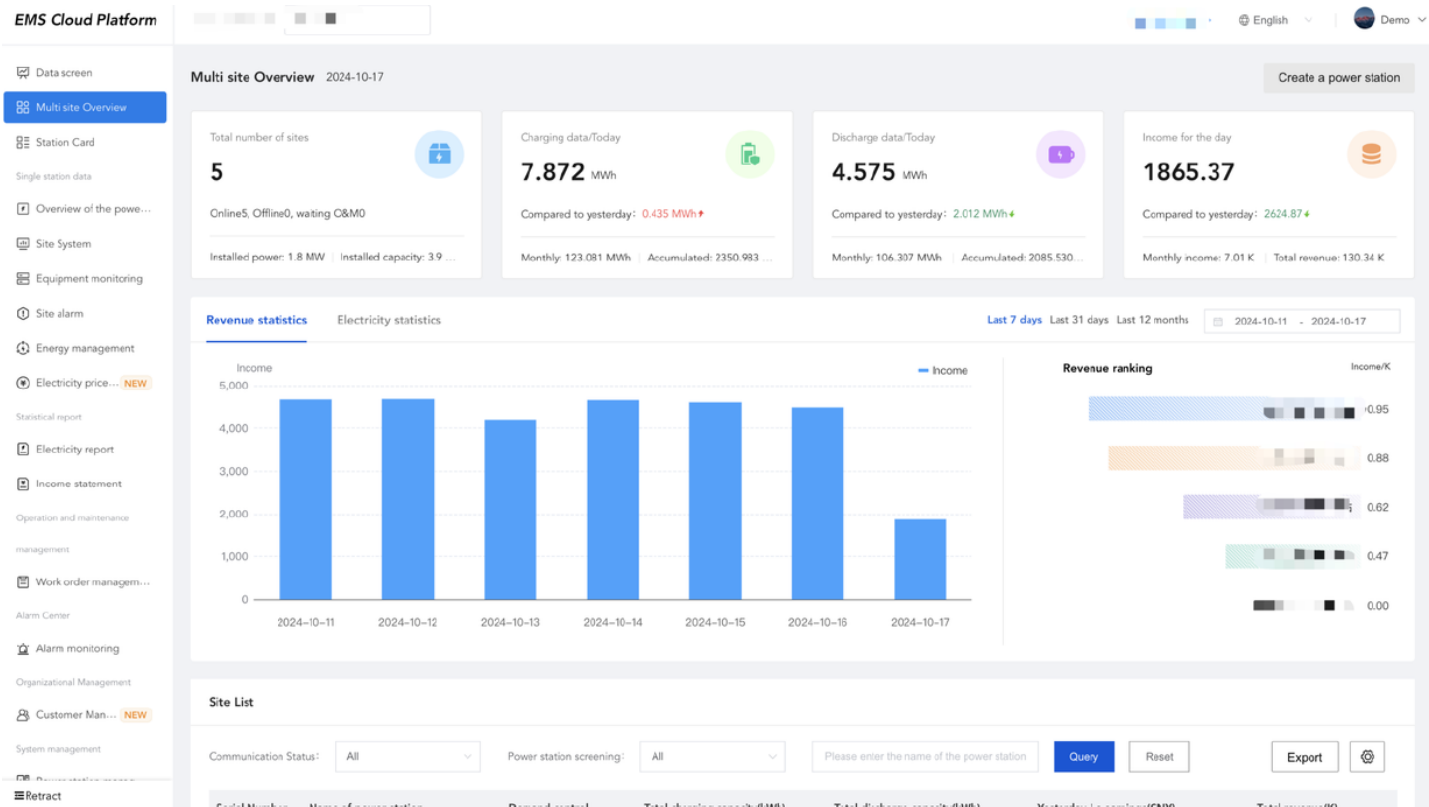
screen monitoring in a new page, which displays the real-time data resource status of all sites

uniformly. As shown in the figure below:



5.2.2 Overview of multiple sites

After logging in to Cloud Computing Platform, you can enter the homepage interface. By default, the "Multi-site Overview" page is displayed. The Multi-site Overview displays information such as data statistics, data curve charts, alarm information, and site lists in the Cloud Computing Platform in the form of cards. As shown in the figure below:



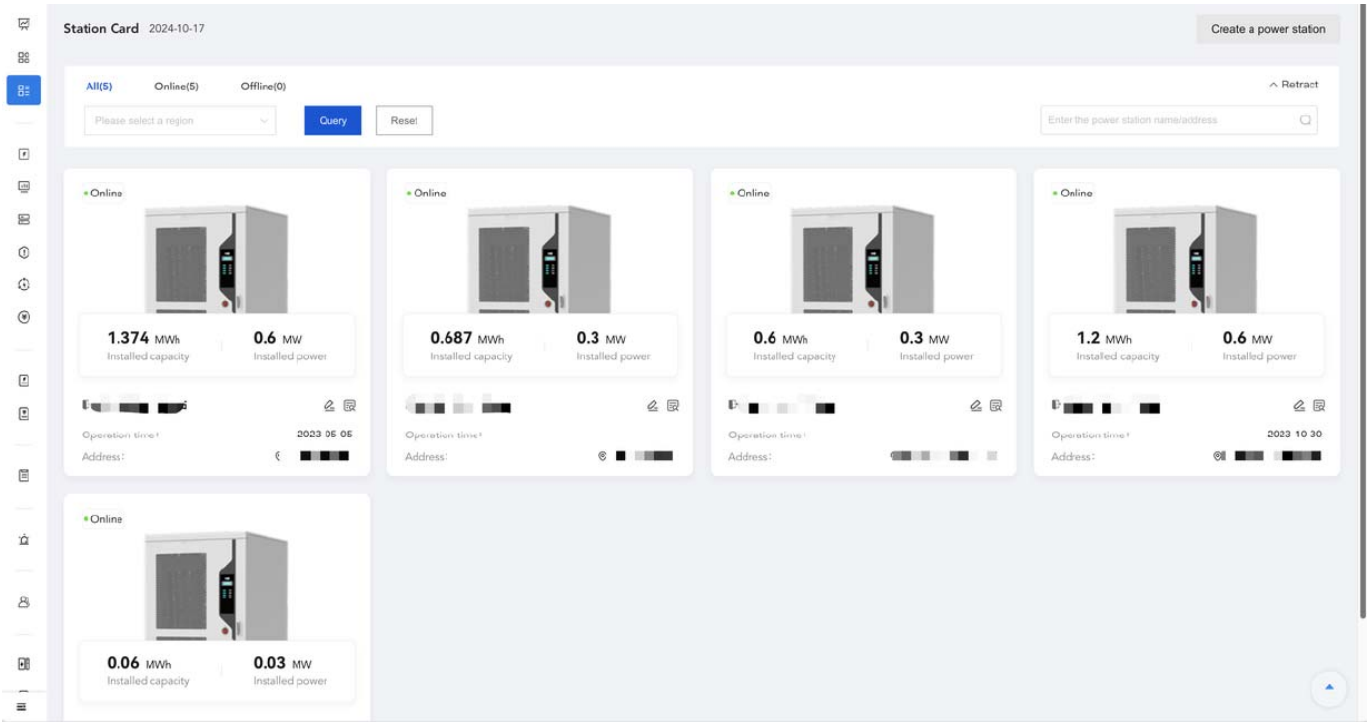
Note: Every time you enter or refresh the homepage, you can get the latest data, and the default statistics of the power station data managed under the current account.

5.2.3 Site cards

The site managed by this account is displayed in card form by default.

5.5.3.1. Display basic information of the power station, support operations such as entering the power station, viewing details, and editing.

5.5.3.2. Support filtering by "online status" and "country", or search directly by power plant name or address.

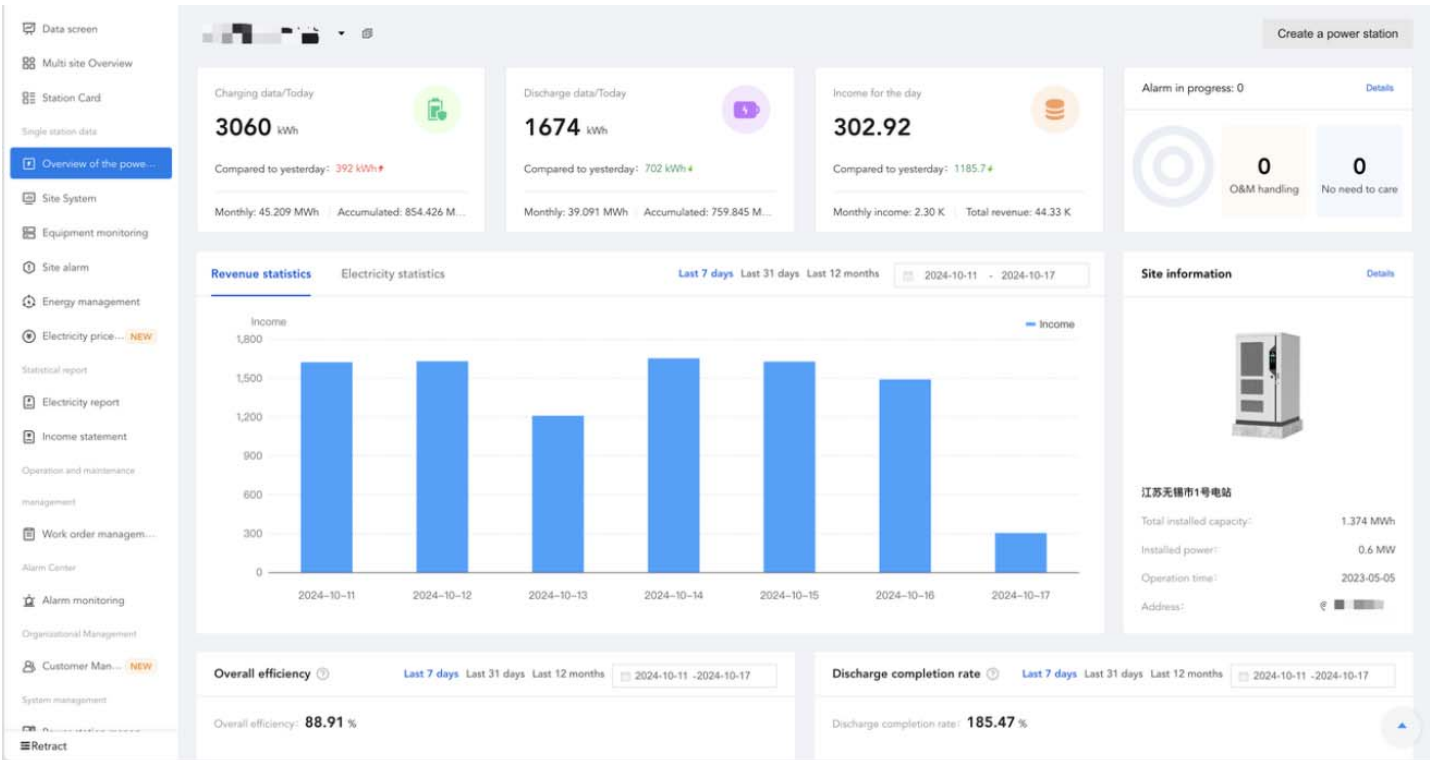


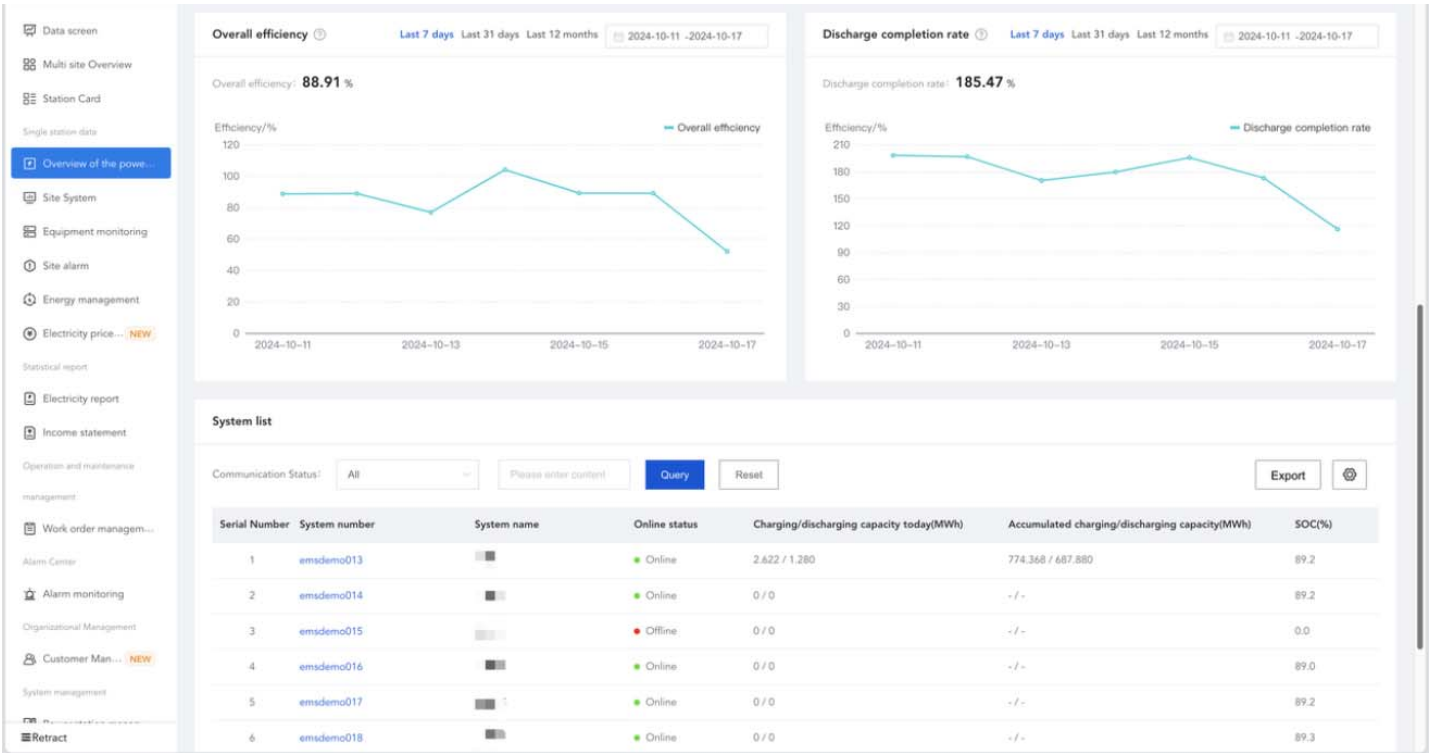
5.3 Single-site data

Overview: Single Station Data Shows the data, information, and configuration capabilities of a single station.

5.3.1 Overview of power plants

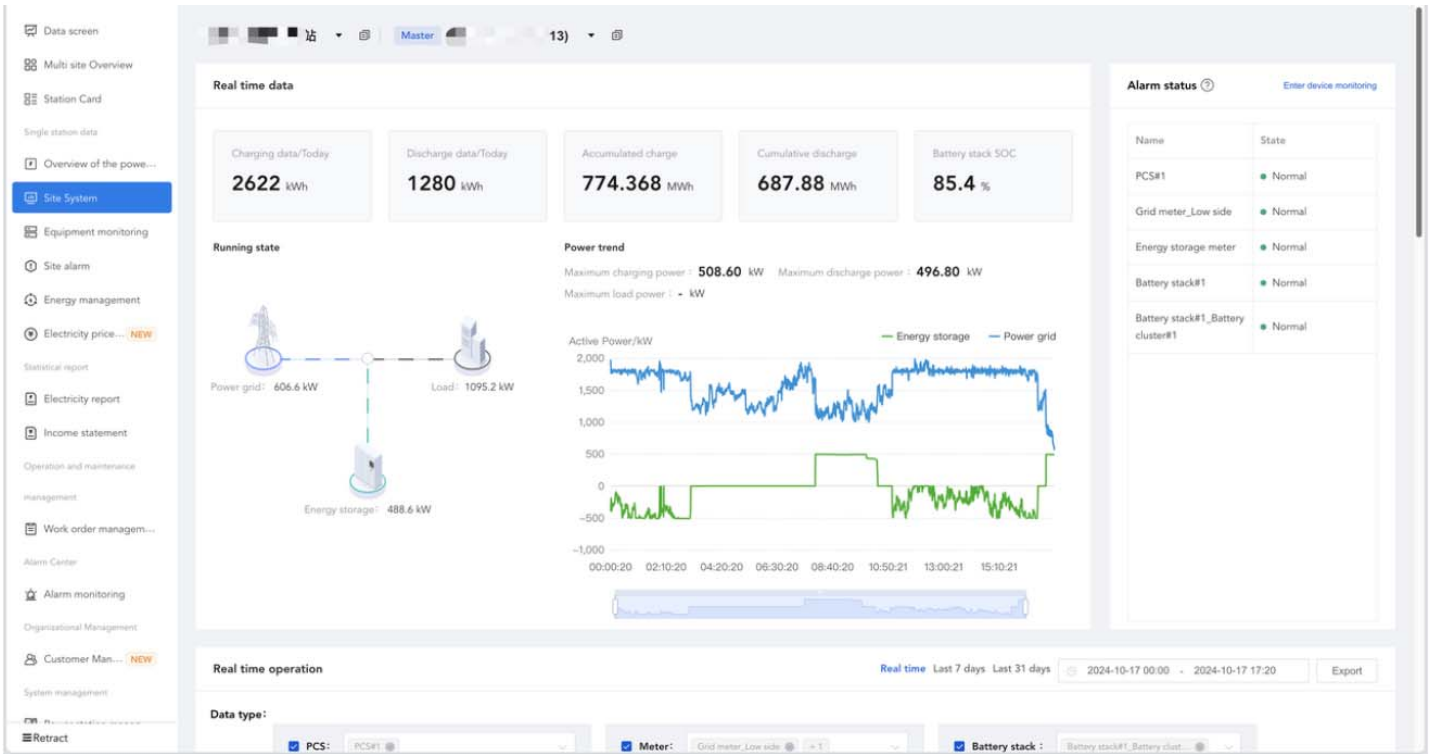
The overview of the power station displays the information of a single site in the Cloud Computing Platform in the form of a card, such as " data statistics, data curves, site information, comprehensive efficiency, discharge achievement rate, system list ".

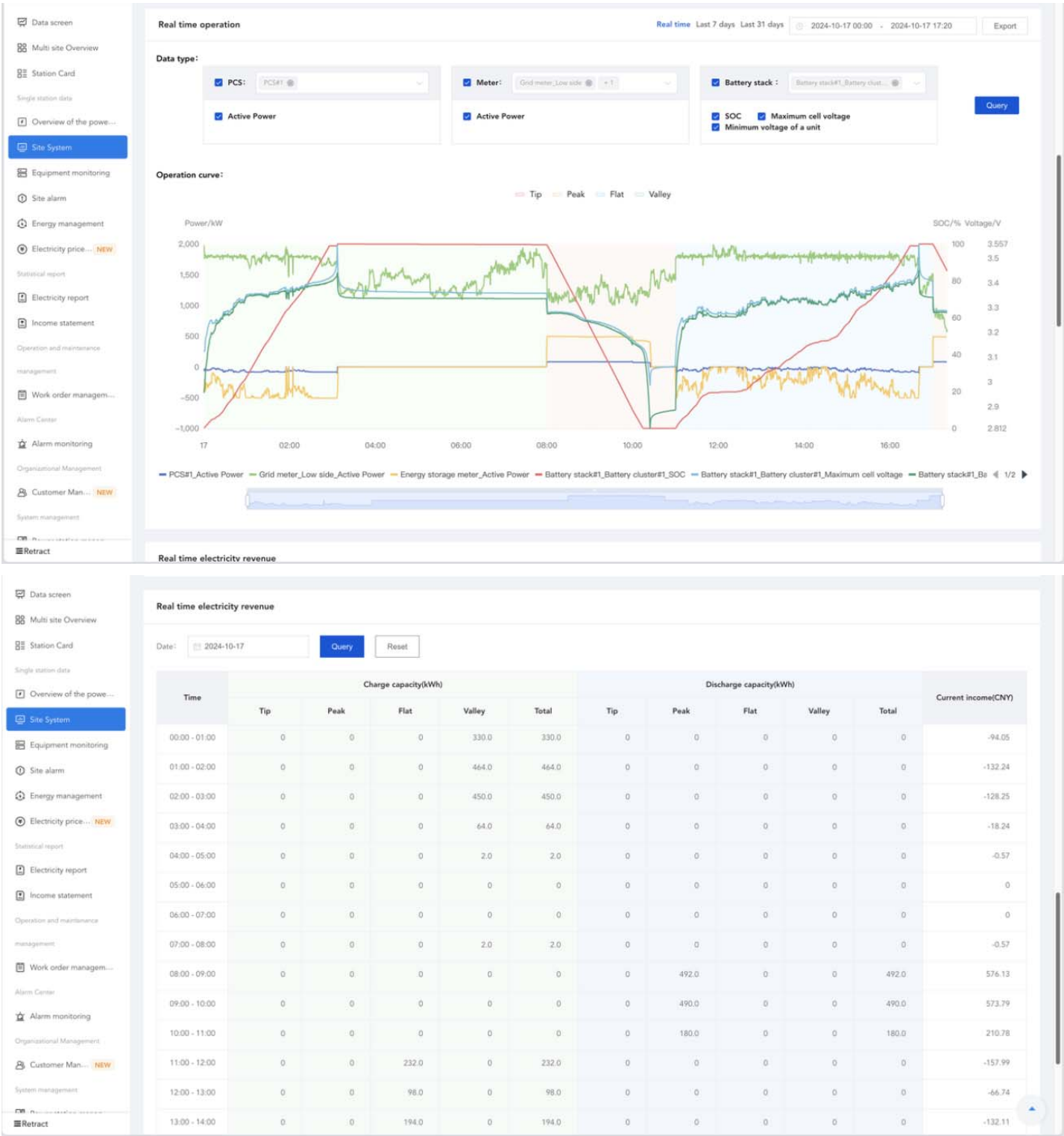


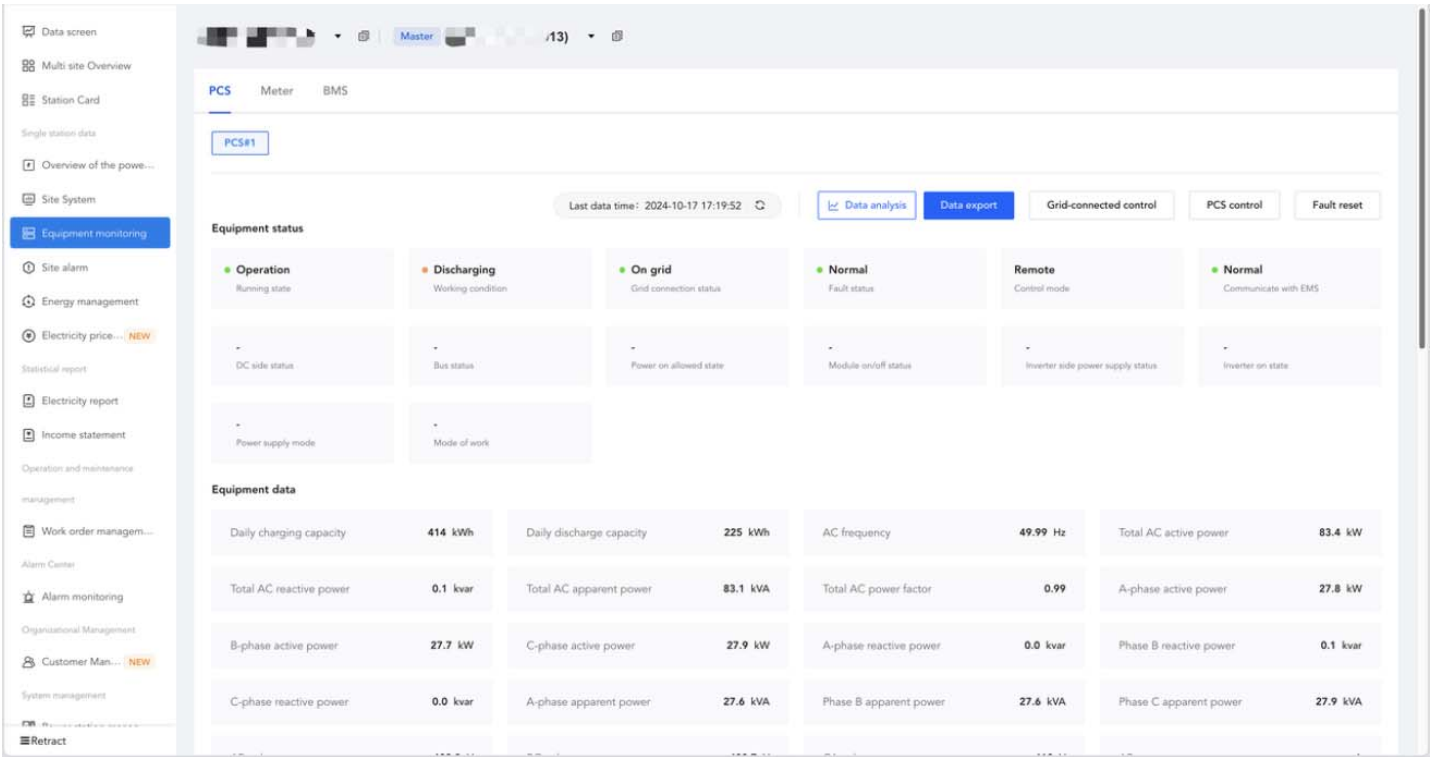


5.3.2 Site system

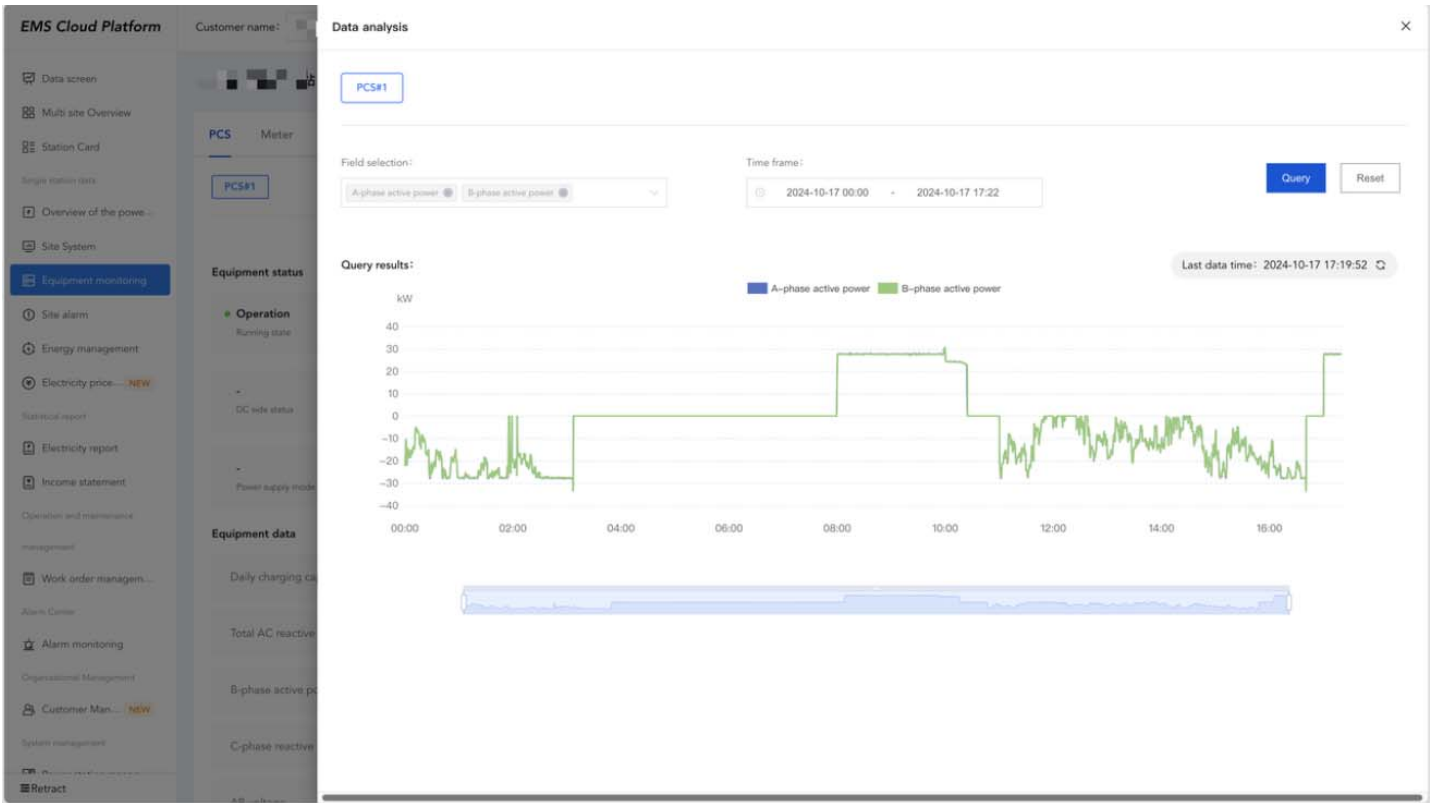
Display the system inside the power station " data overview, energy flow chart, data curve, alarm status, electricity revenue " and other information.



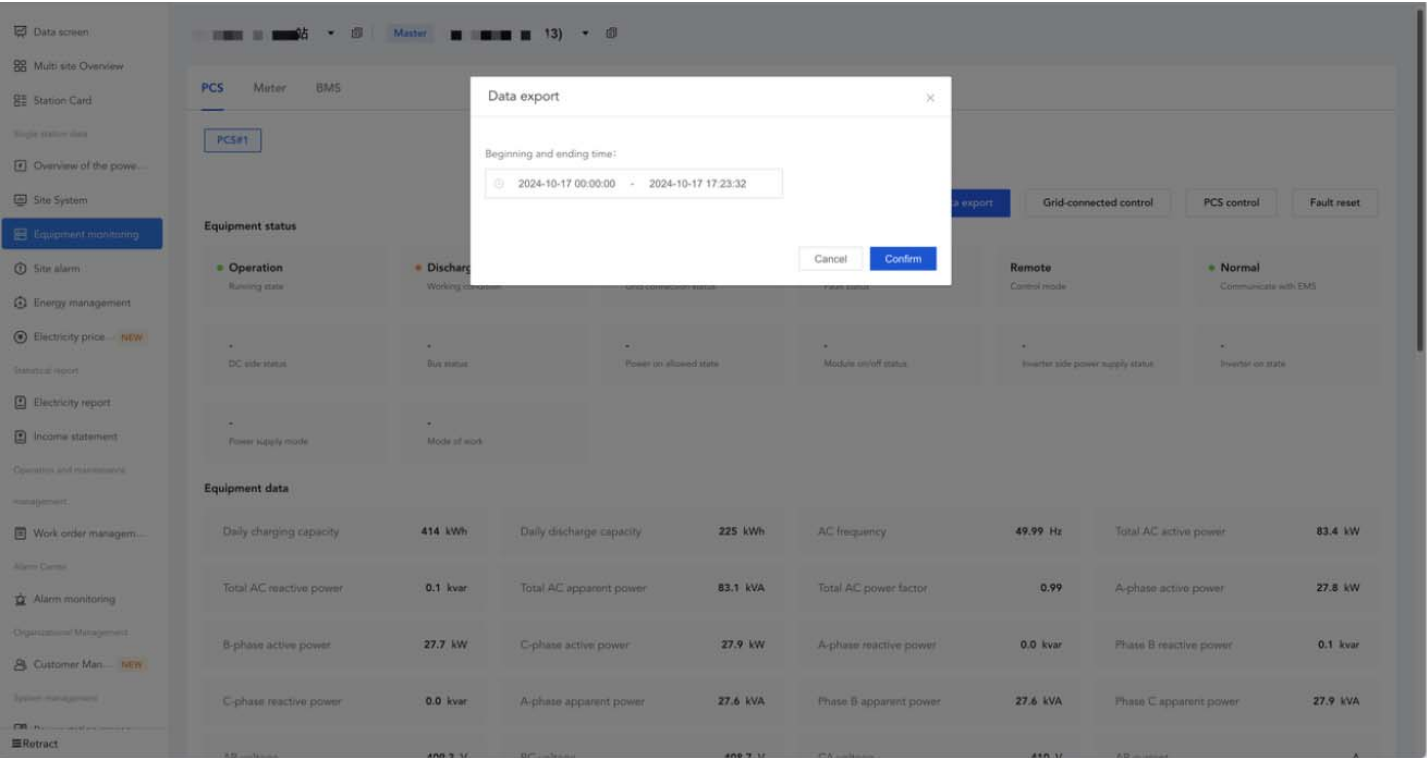




Data Analysis: Support the analysis of equipment data, and display the data within the time range in the form of a curve.

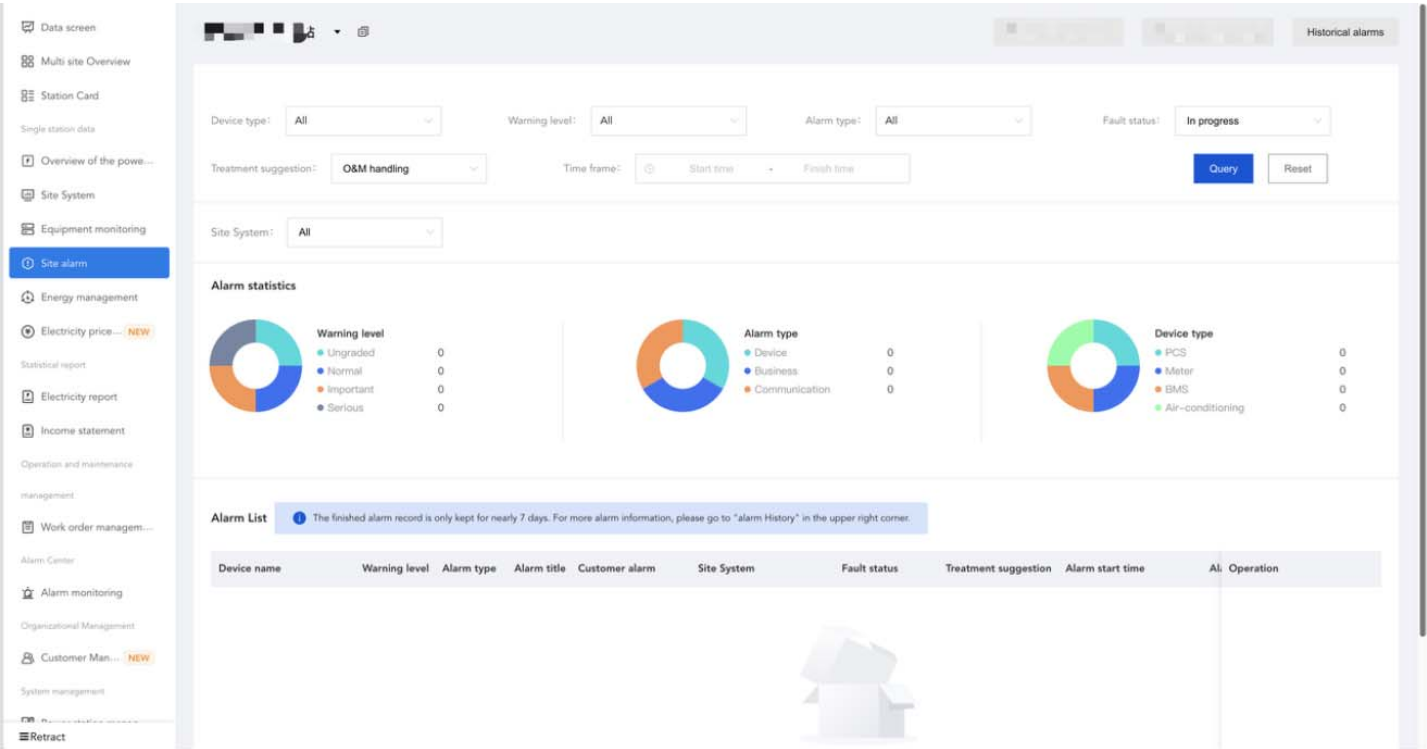


Data Export: Support exporting device data and exporting data within the time range to Excel files.



5.3.4 Site Alerts

Display relevant alarm information when equipment malfunctions or malfunctions occur.



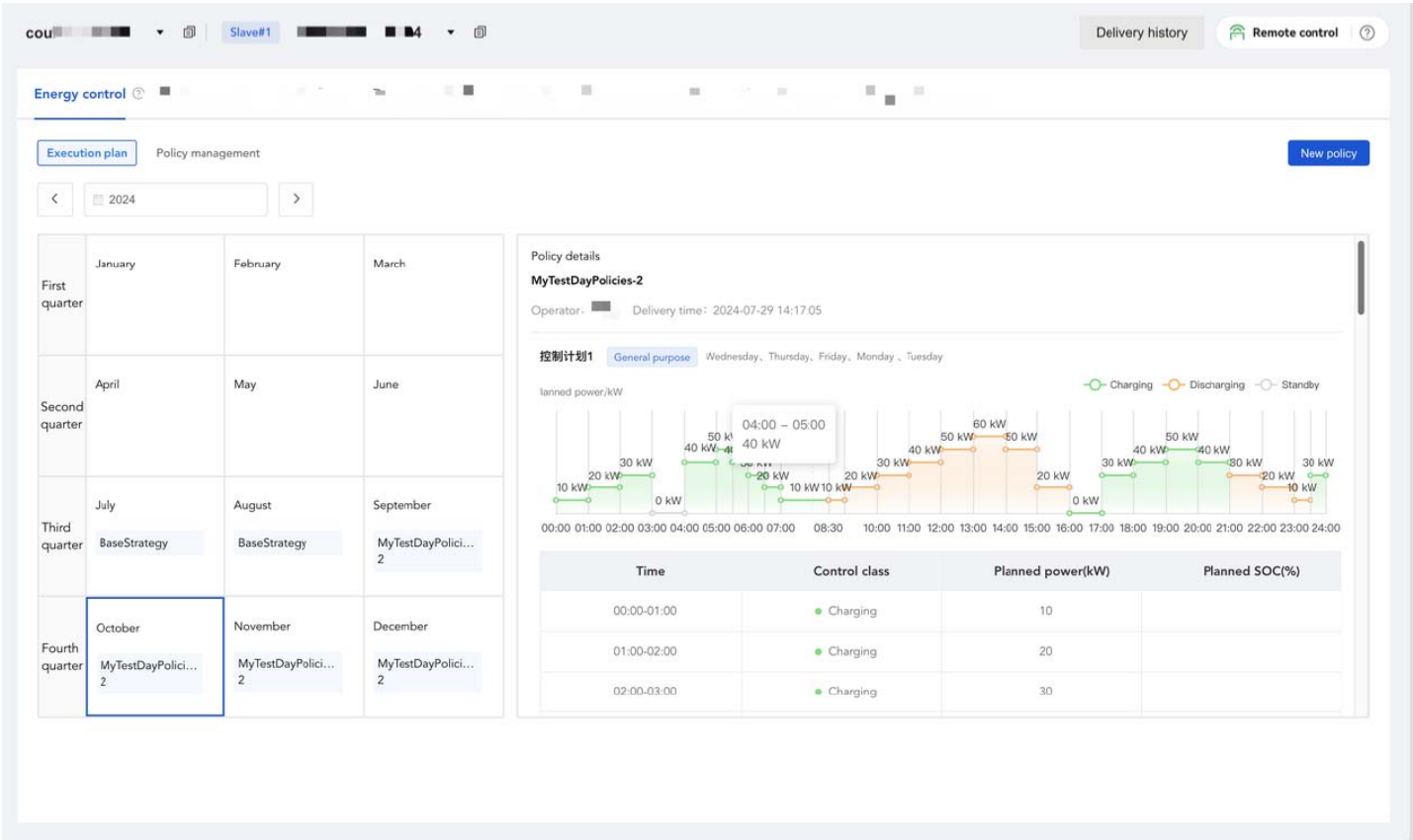
5.3.5 Energy management

Energy management can achieve energy scheduling functions, formulate reasonable scheduling strategies according to changes in energy demand, achieve reasonable allocation and utilization of energy, and avoid long-term overload or overdischarge of energy storage equipment.

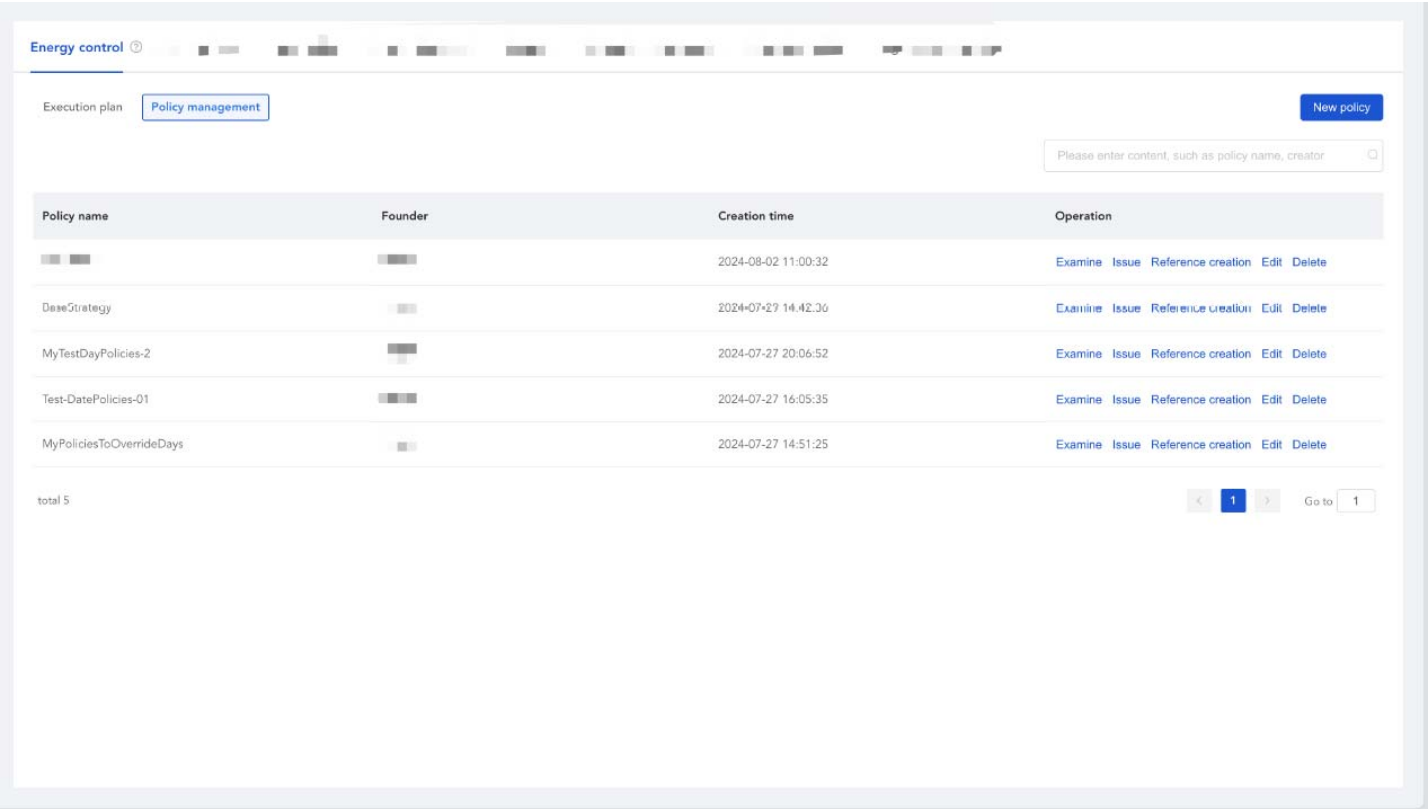
5.3.5.1 energy control

The system runs automatically according to the configured energy control strategy. (Supports two modes, "long-term control" and "flexible control", long-term control: single charge and discharge plan, long-term operation; flexible control: policy supports multiple plans, set on a daily basis, issued on a monthly basis)

- Execution plan: Display the charging and discharging plan information that the equipment is executing

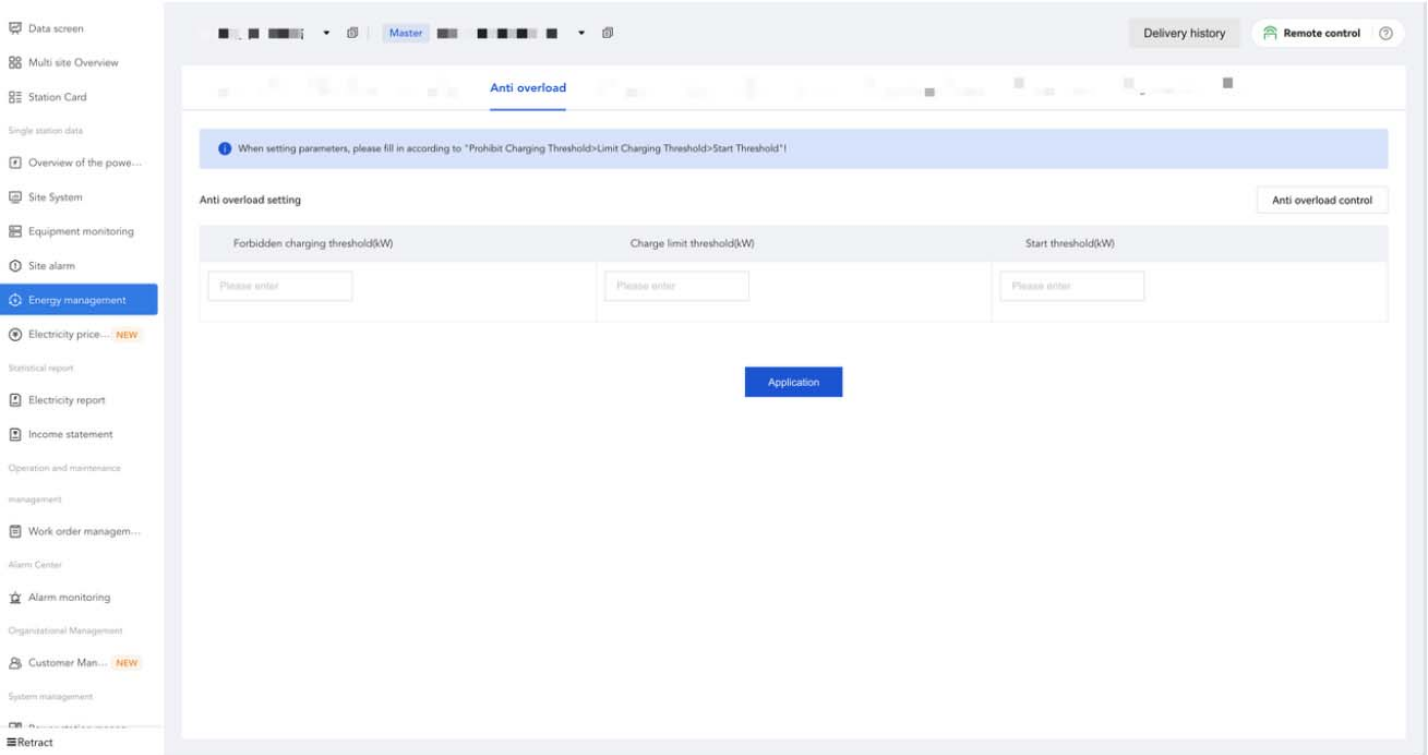


- Strategy management: creation and operation of energy control strategies;



5.3.5.2 Anti overload

It refers to the real-time monitoring of the power of the grid connection point during the charging process, and the real-time adjustment of the energy storage charging power according to the set parameters to avoid overload at the grid connection point.



5.3.5.3 Anti-reflux

During the discharge process, the power of the grid connection point is monitored in real time, and the energy storage discharge power is adjusted in real time according to the set parameters, so that the system does not send electricity to the grid.

Data screen

Multi site Overview

Station Card

Single station data

Overview of the power...

Site System

Equipment monitoring

Site alarm

Energy management

Electricity price...NEW

Statistical report

Electricity report

Income statement

Operation and maintenance management

Work order management...

Alarm Center

Alarm monitoring

Organizational Management

Customer Man...NEW

System management

Retract

Master13

Delivery historyRemote control

Anti-reflux

When setting parameters, please fill in according to "Start threshold>Limit threshold>Prohibit threshold"

Anti backflow setting

Anti backflow control

Start threshold(\$/W)Please enter

Limiting discharge threshold(\$/W)Please enter

Prohibit discharge threshold(\$/W)Please enter

Disable time period settingsUsed to set the disabling period of the anti backflow function, which is controlled by a switch to enable the function. After each adjustment, the "Apply" button needs to be clicked to take effect

Control switch:OFF

Prohibition period:

Start timeSelect time

Finish timeSelect time

Newly increased

Application

5.3.5.4 demand control

Support dynamic demand control function, set function start and stop

Master

Delivery historyRemote control

Demand control

Demand controlThe switch is used to control whether the function is enabled or not. After each adjustment, click the "Apply" button to take effect

Control switch:OFF

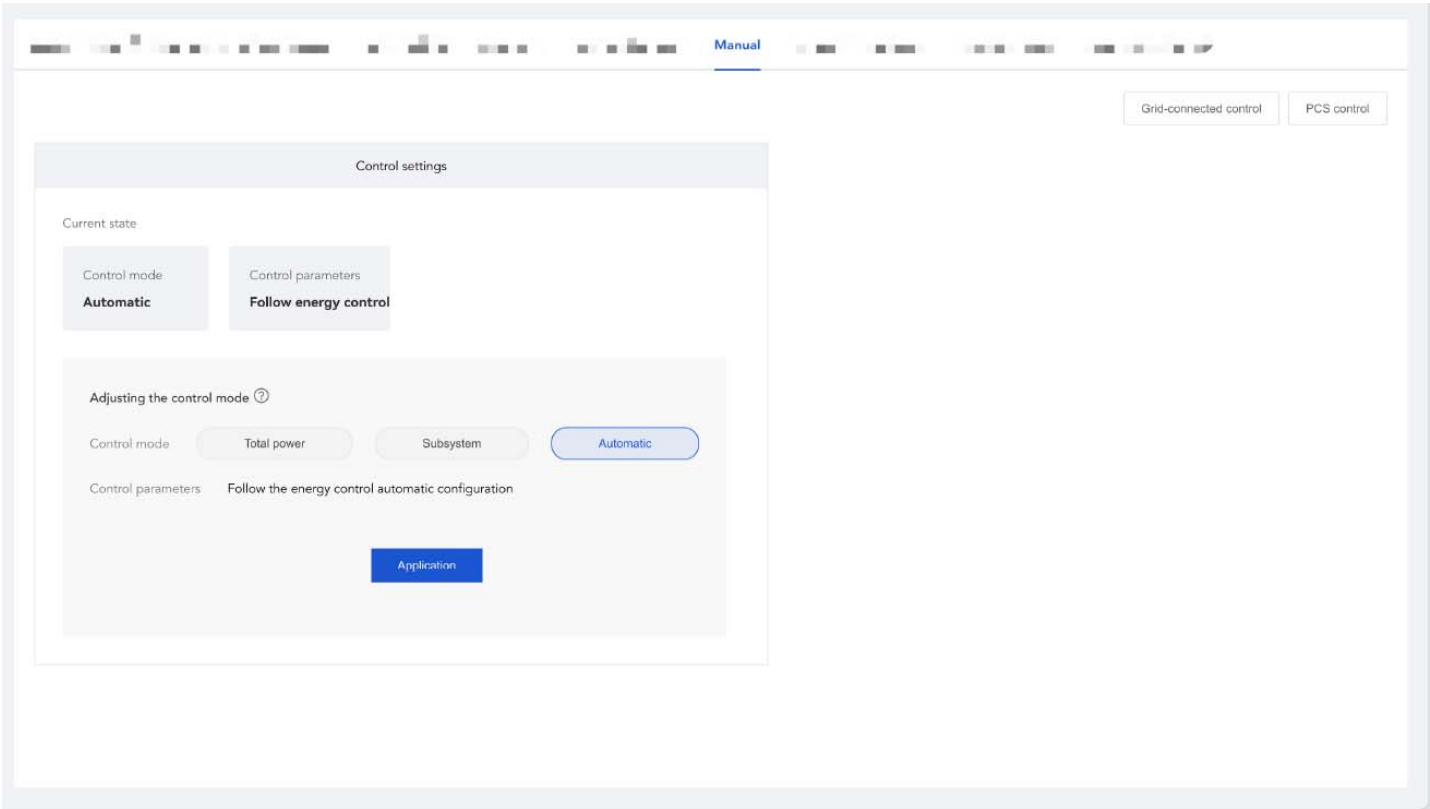
Control mode:Automatic control

Demand value:- kW

Application

5.3.5.6 manual

Support users to manually charge and discharge energy storage devices



5.3.5.7 secondary protection

The secondary protection parameter function is mainly to further protect and control the battery to ensure the safe, reliable, and efficient operation of the entire battery energy storage unit.

Secondary protection

Secondary protection settings

Current parameters

SOC charging upper limit

95 %

SOC discharge Lower limit

5 %

Discharge Cut-off Voltage

- V

Charging cutoff voltage

- V

Overdischarge release voltage

- V

Overcharge release voltage

- V

Secondary protection parameter settings

SOC charging upper limit

Please enter

%

SOC discharge Lower limit

Please enter

%

Discharge Cut-off Voltage

Please enter

V

Charging cutoff voltage

Please enter

V

Overdischarge release voltage

Please enter

V

Overcharge release voltage

Please enter

V

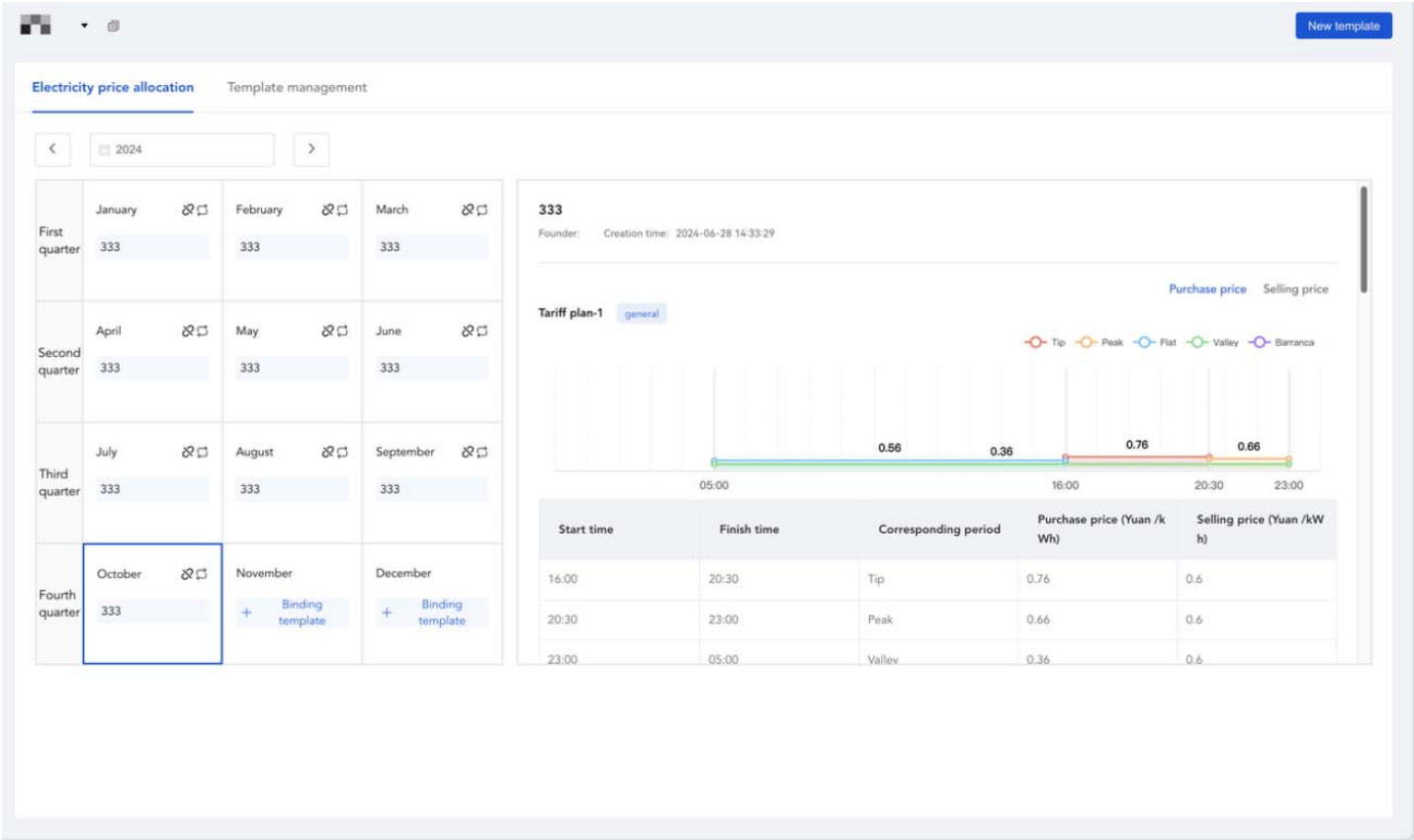
Application

5.3.6 Electricity Price Management

The function of electricity price management is mainly to configure and manage the electricity price strategy of the power station.

5.3.6.1 price allocation

Support power station-level and monthly electricity price allocation.

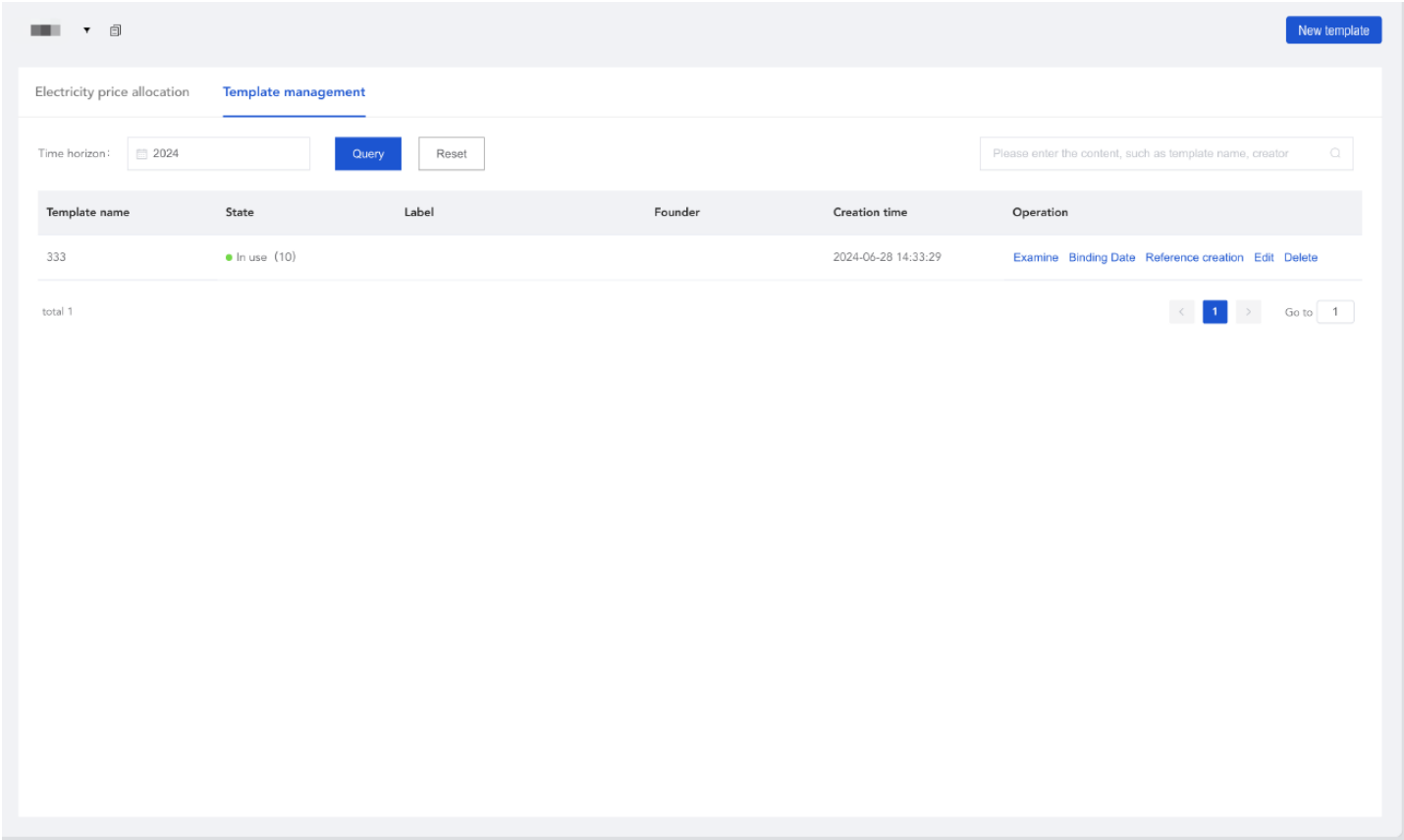


If the user modifies the electricity price template price that has been used , the platform data will not change immediately.

The current calculation will be recalculated around 1am the next day after the modification.

5.3.6.2 template management

Template management page can manage the electricity price template under the current site,support new electricity price template, reference electricity price template , display template list and corresponding operations.



- Create template: Create a new electricity price template under this site. Click the "Create template" button on the page to enter the creation page.
- After filling in the basic information, time period, and electricity price in order, click "Confirm Add" to create a template.

Time period and electricity price: The set start and end times must be 24 hours.

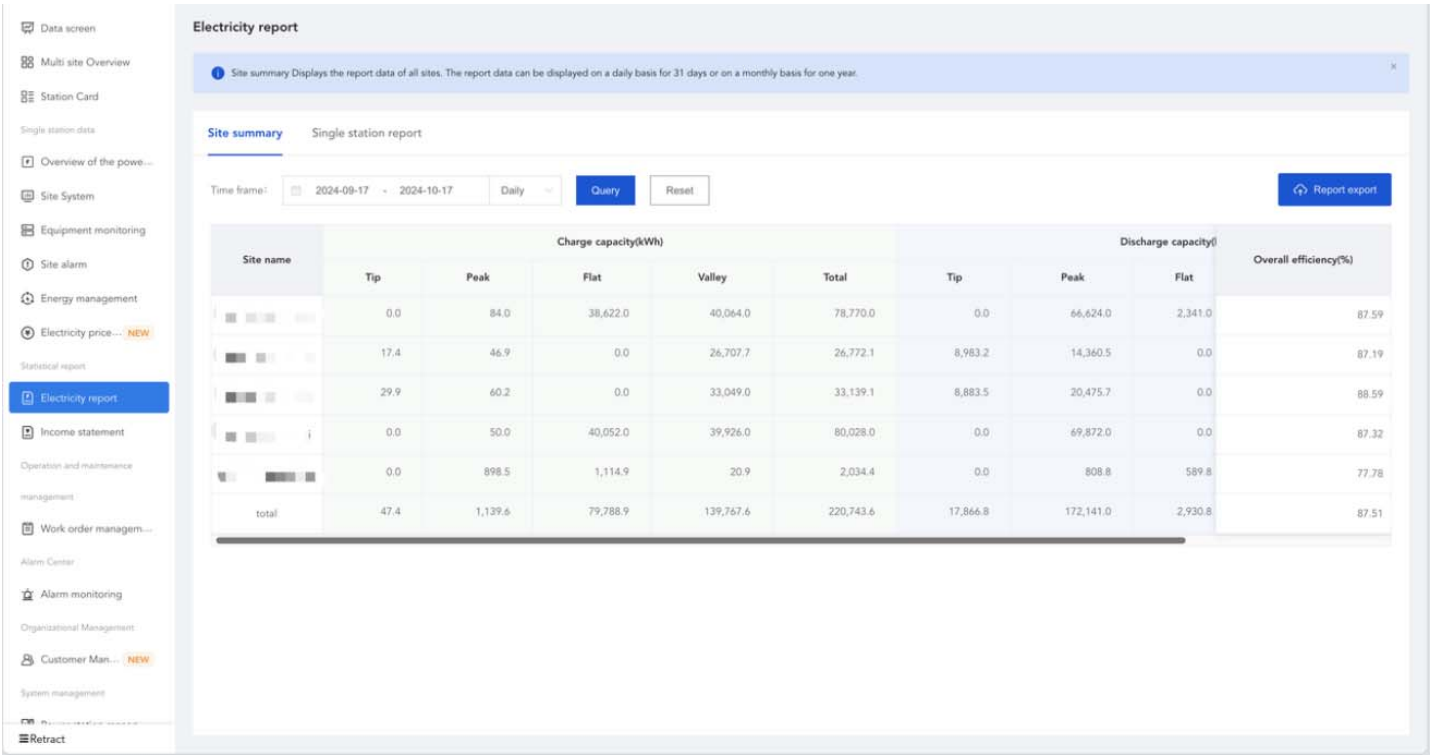
5.4 Statistical reports

The statistical report function is a display of the operating data of the Cloud Computing Platform system, which can centrally reflect key information such as power consumption and revenue, providing comprehensive data support for storage management and operation. Users can more intuitively understand the operation of the system, formulate reasonable charging and discharging strategies, and improve the efficiency and economy of energy storage systems.

5.4.1 Electricity report

- The default display is "Site Summary", which includes the charging, discharging, and comprehensive efficiency data of all power stations managed under the current account.
- Support filtering and report export functions by time range (day, month, year).

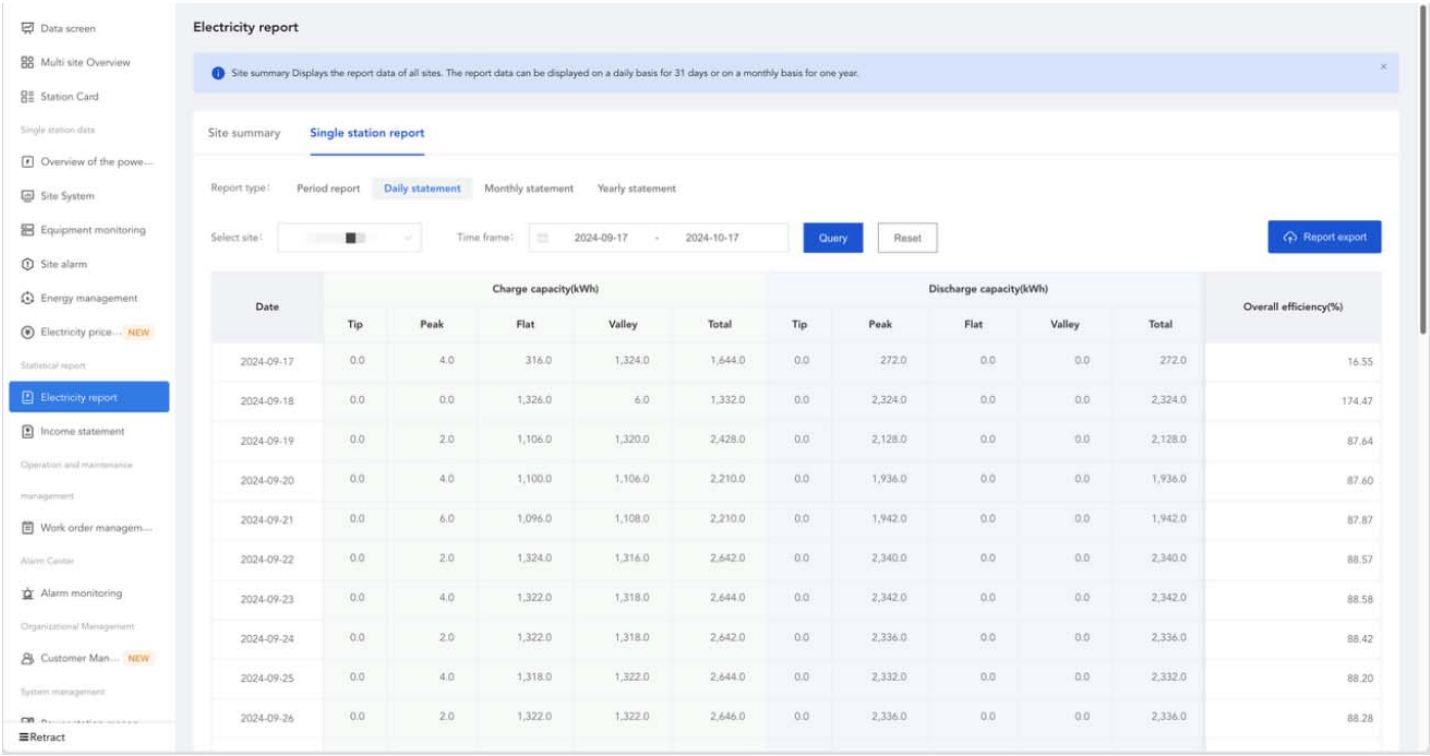
Single



Single station report

View the charging amount, discharge amount, and comprehensive efficiency data corresponding to a single power station managed under the current account.

- Support switching report types (period, daily, monthly, annual reports), selecting sites, filtering queries by time range, and exporting reports.



5.4.2 Income statement

- The default display is "Site Summary", which includes the charging price, discharge price, and time

5.5. Operations management

5.5.1 Manage tickets

Ticket management is a function that manages, maintains, and tracks a series of issues and requests for power station tickets according to the needs of different customers.

- Overview of ticket management features

Functional sub-item	Function description
Create a new ticket	Support users with new permission to create tickets, and enter the display to be assigned after creation.
Ticket status	Display corresponding ticket data according to different ticket statuses
Ticket list	Display the fields and operations of different status tickets in list form
Ticket Filter	Query the ticket list by filtering conditions and display the corresponding results.
Ticket operation	Perform corresponding operations on each ticket

Data screen

Multi site Overview

Station Card

Single station data

Overview of the powe...

Site System

Equipment monitoring

Site alarm

Energy management

Electricity price...

NEW

Statistical report

Electricity report

Income statement

Operation and maintenance management

Work order managem...

Alarm Center

Alarm monitoring

Organizational Management

Customer Man...

NEW

System management

Retract

Work order management

+ New construction work order

To be distributed(2)

Pending order(3)

In process(1)

Processed

Completed(3)

Closed(7)

Select site: All

Order type: All

Time frame:

Start date

 -

Finish date

work order number / title / content...

Query

Reset

Serial Number	Work order number	Order type	Name of power station	Degree of urgency	Creation time	Work order heading	Founder	Operation
1	GD2024092600002	Maintenance work order		-	2024-9-26 17:24:18	2	Demo	Examine Edit Distribution Close
2	GD2024092600001	Installation work order		-	2024-9-26 17:23:29	1	测试	Examine Edit Distribution Close
total 2								< 1 > Go to 1

Function Description

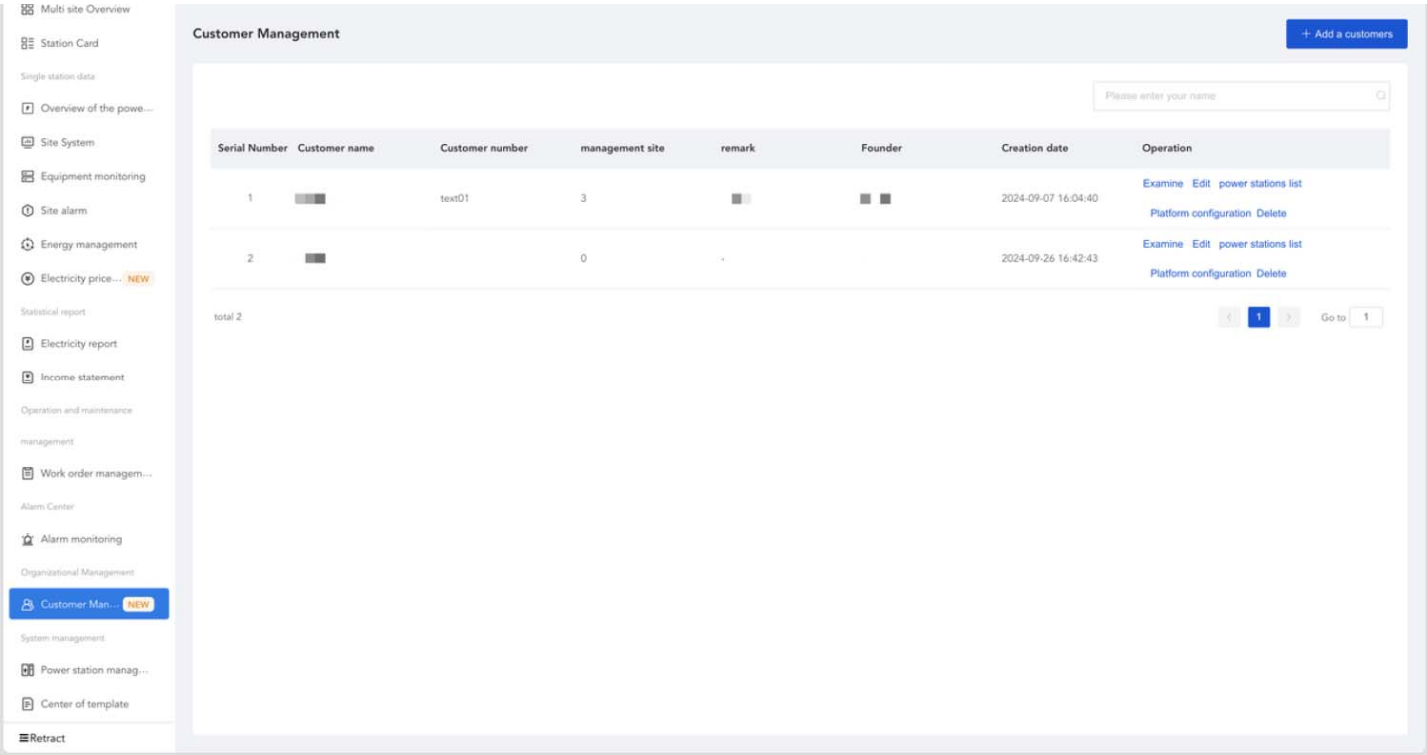
- New ticket: The ticket is created by the administrator and displayed on the "To be assigned"page after creation, and the administrator can assign it.
- Ticket status: Ticket management is divided into "pending allocation", "pending order","processing", "processed", "completed", and "closed" status.

- Pending allocation: refers to the status of the newly created ticket waiting to be assigned to other personnel.
- Pending order: refers to the state where the ticket has been allocated and is waiting for the processor to receive it.
- Processing: Refers to the status where the handler has received the ticket and is currently processing it.
- Processed: refers to the status of operation and maintenance processing completed and awaiting confirmation by the administrator.
- Completed: Refers to the status of the ticket after confirming the processing flow.
- Closed: refers to the ticket that was directly closed by the creator. (Tickets before the processed state support closing)
- Ticket filtering: refers to the filtering and query corresponding to the ticket status (fuzzy search supports ticket number, title, content).
- Ticket list: Display the corresponding fields of each ticket status in the form of a list (displayed according to permissions).
- Ticket operation: refers to the process of handling and solving ticket tasks (operations are defined based on ticket status and role permissions).

5.6. Organizational

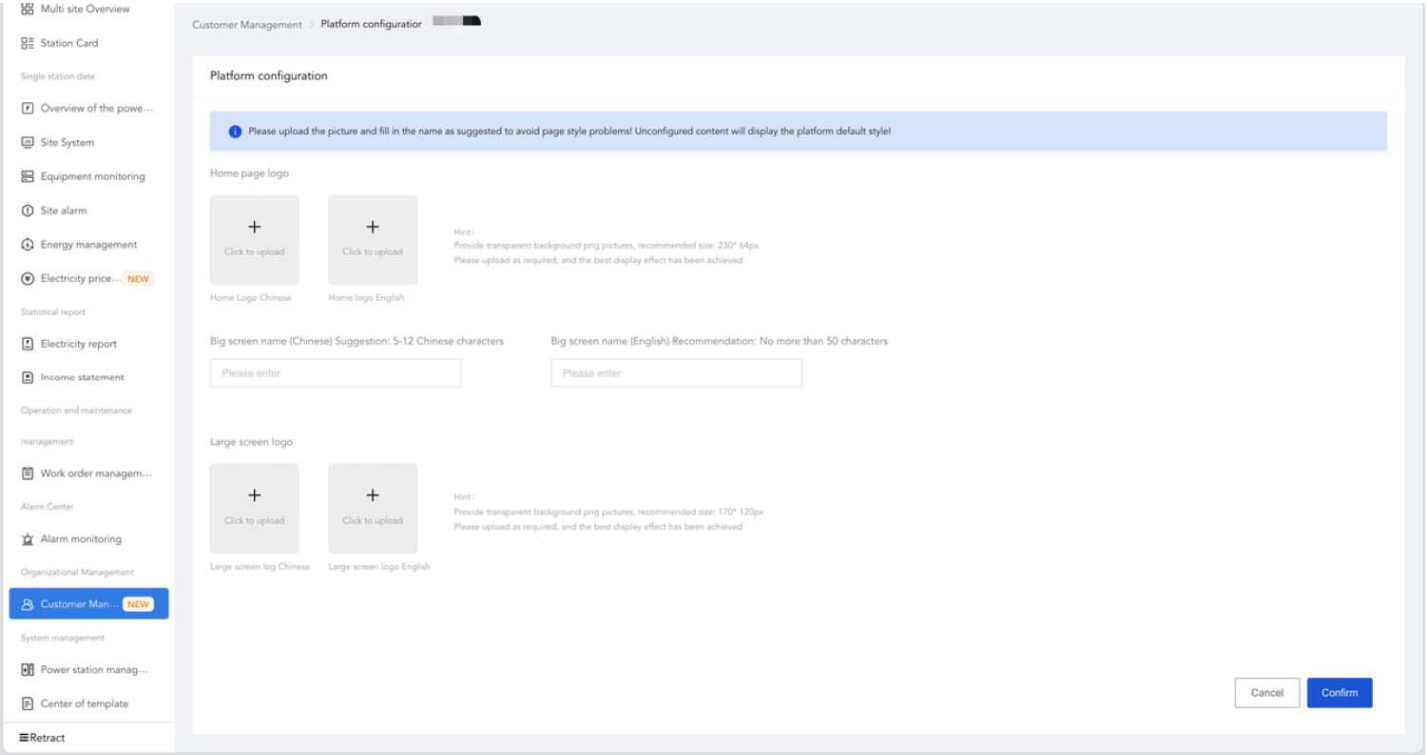
5.6.1 Customer management

Support enterprises to classify and manage customers, including customer creation, customer power station management, customer account management, and customer platform display configuration.



Support in the customer list, customers " view, edit, power station list, platform configuration, delete " operation. Customer Power Station Management: Click " Operation-Power Station List " to enter the customer's power station list management page, which displays the power station content and related operations managed by the customer.

Customer platform configuration: Click " Operation-Platform Configuration " to enter the platform configuration page under the customer, and operate according to the page content and prompts.

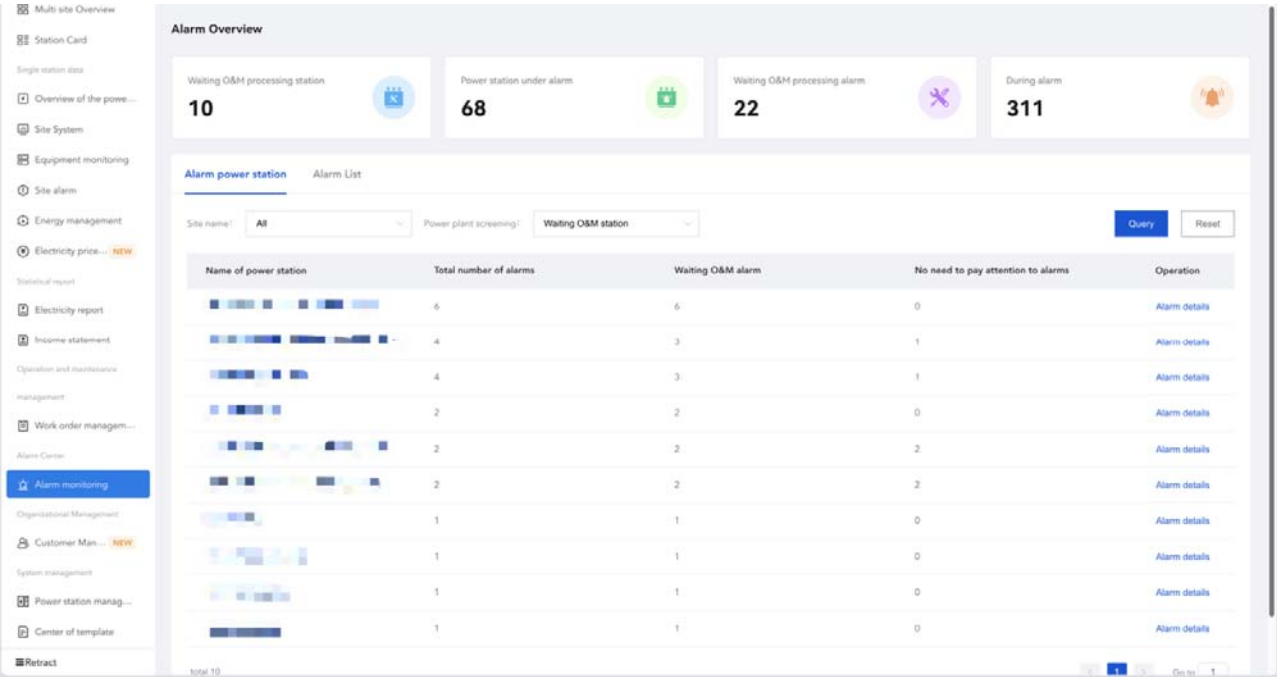


5.7. Alarm center

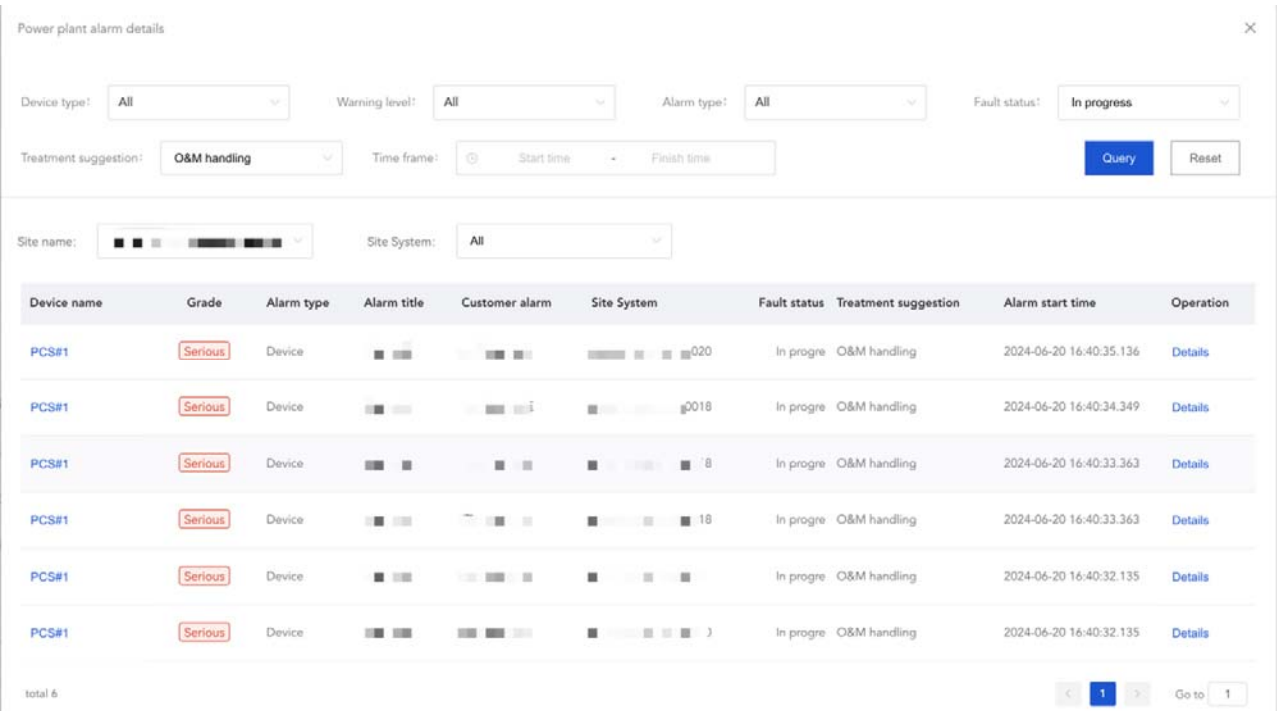
Platform-level alarm information summary display, convenient access to some historical alarm information of all power plants and systems, helping operation and maintenance personnel quickly locate problems and improve the efficiency of fault handling.

5.7.1 Alarm power station

From the perspective of the power station, display the alarm information of each power station in the management authority of the account.



- The occurrence alarm information corresponding to the power station can be viewed, and the alarm information can be filtered



5.7.2 Alarm list

- From the perspective of alarms, display the alarm information of all power stations in the management authority of the account, and filter the alarm information.

Waiting O&M processing station

10

Power station under alarm

68

Waiting O&M processing alarm

22

During alarm

311

Alarm power station

Alarm List

Device type: All

Warning level: All

Alarm type: All

Treatment suggestion: All

Time frame: UTC+08

Start time

Finish time

Query

Reset

Site name: All

Site System: Select

Device name	Grade	Alarm type	Alarm title	Customer alarm	Name of power station	Site System	Treatment suggestion	Alarm start time	Operation
PCS#1	Serious	Device					O&M handling	2024-10-17 09:27:18.71	Details
PCS#1	Serious	Device					O&M handling	2024-10-17 09:27:16.70	Details
PCS#1	Serious	Device					O&M handling	2024-10-17 09:27:15.85	Details
PCS#1	Serious	Device					O&M handling	2024-10-17 09:27:15.85	Details
PCS#1	Serious	Device					O&M handling	2024-10-17 09:27:15.85	Details
PCS#1	Serious	Device					O&M handling	2024-10-17 09:27:15.70	Details
PCS#1	Serious	Device					O&M handling	2024-10-17 09:27:15.70	Details

5.8. System management

5.8.1 Power plant management

Support the management of power stations in Cloud Computing Platform, such as creating power stations, binding systems, and other operations.

Multi site Overview

Station Card

Single station data

Overview of the power...

Site System

Equipment monitoring

Site alarm

Energy management

Electricity price... NEW

Statistical report

Electricity report

Income statement

Operation and maintenance management

Work order managem...

Alarm Center

Alarm monitoring

Organizational Management

Customer Man... NEW

System management

Power station manag...

Center of template

Retract

Power station management

+ Create a power station

Station status: All

customer:

Please enter the name of the power s

Query

Reset

Serial Number	Name of power station	Number of systems	Installed power(MW)	Installed capacity(MWh)	customer	Address	Operation t	Operation
1		7	0.6	1.374			2023-05-05	Examine Modification Delete
2		3	0.3	0.687			-	Examine Modification Delete
3		3	0.3	0.6			-	Examine Modification Delete
4		6	0.6	1.2	-		2023-10-30	Examine Modification Delete
5		1	0.03	0.06	-		2024-04-12	Examine Modification Delete

total 5

<

1

>

Go to 1

5.8.3 Account management

Cloud Computing Platform has account management function, which can be used to create,manage and maintain user accounts on the platform.

Role name	Explanation	Module permissions	Operation permissions
Platform administrators	The highest management role within the enterprise platform (user type: administrator and ordinary user).	All modules	All permissions
Operations And maintenance	Used for production, operation and maintenance of internal personnel in enterprises	Data big screen	View
		Multi-site Overview	View, export
		Site card	View
		Single Site Overview	View, export
		Site system	View, export
		Device monitoring	View, device control issue, export
		Site alarm	View
		Energy management	Energy distribution history – query, details Manual Control – View, Edit Level 2 Protection – View, Edit Energy Control – View, Edit Anti-backflow – View, Edit Overload Prevention – View, Edit Balance Power – View, Edit Demand Control – View, Edit Capacity Increase Control – View, Edit Backup Control – View, Edit
		Electricity price management	View, add, modify, delete
		Electricity report	View, export
		Income statement	View, export
		Ticket management	View, process follow-up, process completed
		Alarm monitoring	View
		Power station management	View, add, edit, delete
		Template Center	View, add, modify, delete
Energy management	Used by daily energy management personnel responsible for the site in the enterprise	Data big screen	View
		Multi-site Overview	View
		Site card	View
		Single Site Overview	View
		Site system	View
		Energy management	Manual Control – View, Edit

			Level 2 Protection – View, Edit Energy Control – View, Edit Anti-backflow – View, Edit Overload Prevention – View, Edit Balance Power – View, Edit Demand Control – View, Edit Capacity Increase Control – View, Edit Backup Control – View, Edit
		Electricity price management	View, add, modify, delete
		Electricity report	View, export
		Income statement	View, export
		Ticket management	View
Experience	External customer experience platform usage for enterprises	Data big screen	View
		Multi-site Overview	View
		Site card	View
		Single Site Overview	View
		Site system	View
		Device monitoring	View
		Site alarm	View
		Electricity price management	View
		Electricity report	View
		Income statement	View
		Alarm monitoring	View
		Power station management	View
Browse	For enterprise power plant owners to view platform data usage	Data big screen	View
		Multi-site Overview	View
		Site card	View
		Single Site Overview	View
		Site system	View
		Electricity report	View, export
		Ticket management	View
Browse (Power Station & Electricity Report)	Used for enterprise power plant owners to view platform data usage and support viewing revenue reports	Data big screen	View
		Multi-site Overview	View
		Site card	View
		Single Site Overview	View
		Site system	View
		Electricity report	View, export
		Income statement	View, export
		Ticket management	
Demo	Used for internal personnel of the enterprise to demonstrate the platform to customers	Data big screen	View
		Multi-site Overview	View
		Site card	View
		Single Site Overview	View
		Site system	View
		Device monitoring	View
		Site alarm	View
		Energy management	Manual Control – View Secondary Protection – View

			Energy Control - View Anti-backflow - View Overload Prevention - View Balance Power - View Demand Control - View Capacity Increase Control - View Backup Control - View
		Electricity price management	View
		Electricity report	View, export
		Income statement	View
		Ticket management	View, process follow-up, process completed
		Alarm monitoring	View
		Power station management	View

Generate a separate role for some permissions and configure flexibly.

Role	Explanation	Module permissions	Operation permissions
Customer management	Used for creating and managing customer organizations and customer accounts in enterprises	Customer management	Add, view, edit, delete, power station assignment, power station unbinding, platform configuration view, platform configuration editing, power station view
		Account Management - Customer Accounts	View, edit, delete, add, sub-customer station view, all sub-customer view
Customer account management	Used for creating and managing customer accounts in enterprises	Account Management - Customer Accounts	View, edit, delete, add, sub-customer station view, all sub-customer view

5.8.3.1 internal account

Refers to the account used by internal employees of the enterprise, which supports administrators to create new accounts, assign sites, and configure alarms for accounts under their company.

Equipment monitoring

Site alarm

Energy management

Electricity price-NEW

Statistical report

Electricity report

Income statement

Operation and maintenance management

Work order management

Alarm Center

Alarm monitoring

Organizational Management

Customer Man-NEW

System management

Power station management

Center of template

Account management

Inner count

customer count

System management

Retract

Account management

State: All

User type: All

Please enter the content, such as name, mobile phone, email

Query

Reset

Serial Number	Name	Email	Mobile phone	State	Role	Creation date	Maturity time	U	Operation
1			135	Normal	Experience	2024-10-17 16:08:56	2024-10-23 16:08:56	D	Examine Edit Forbidden More
2				Normal	Experience	2024-10-16 16:04:09	2024-10-22 16:04:09	D	Examine Edit Forbidden More
3			1	Normal	Experience	2024-10-15 15:59:31	2024-10-21 15:59:31	D	Examine Edit Forbidden More
4				Normal	Platform administrator	2024-10-14 16:40:47	Forever	D	Examine Edit Forbidden More
5				Normal	Experience	2024-10-10 17:10:03	2024-10-16 17:10:03	D	Examine Edit Forbidden More
6				Normal	Experience, Demo	2024-10-10 14:57:07	2024-11-09 14:58:07	D	Examine Edit Forbidden More
7				Normal	Subcustomer user ...	2024-10-08 17:58:07	Forever	D	Examine Edit Forbidden More
8				Normal	Experience	2024-10-08 16:32:25	2024-10-14 16:32:25	D	Examine Edit Forbidden More
9				Normal	Experience	2024-10-07 10:02:32	2024-10-13 10:02:32	D	Examine Edit Forbidden More
10				Normal	Experience	2024-09-30 10:46:50	2024-10-06 10:46:50	D	Examine Edit Forbidden More

total 327

1

2

3

4

5

6

...

33

Go to 1

- Description:**
1. The role of the customer's main account is the same as that of the enterprise account, but the scope of authority will be limited to its "customer" organization and isolated from other data under the original enterprise.

2. Account roles created by customers can only inherit roles within the scope of the customer's main account .

Data screen

Multi site Overview

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Site alarm

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Electricity price-NEW

Statistical report

Electricity report

Income statement

Operation and maintenance management

Work order management

Alarm Center

Alarm monitoring

Organizational Management

Customer Man-NEW

System management

Retract

customer count

Client: All

State: All

Customer user type: All

Please enter the name, company, email

Query

Reset

Serial Number	Name	Email	Mobile phone	Attribution	State	Role	Creation date	Maturity tin	Operation
1				测试客户	Normal	Browse, Experienc...	2024-10-16 14:28:10	Forever	Examine Edit Forbidden More
2				测试客户	Normal	Demo	2024-10-11 17:17:59	Forever	Examine Edit Forbidden More
3				测试客户	Normal	Browse, Experienc...	2024-10-11 11:34:42	2024-11-10	Examine Edit Forbidden More
4				测试客户	Normal	Demo	2024-10-10 18:09:05	Forever	Examine Edit Forbidden More
5				测试客户	Normal	Browse, Experienc...	2024-09-24 14:42:15	Forever	Examine Edit Forbidden More
6				测试客户	Normal	Browse, Experienc...	2024-09-23 09:47:33	2024-10-23	Examine Edit Forbidden More
7				测试客户	Normal	Experience	2024-09-18 11:40:26	2024-10-31	Examine Edit Forbidden More
8				测试客户	Normal	Browse, Experienc...	2024-09-07 16:05:37	Forever	Examine Edit Forbidden More

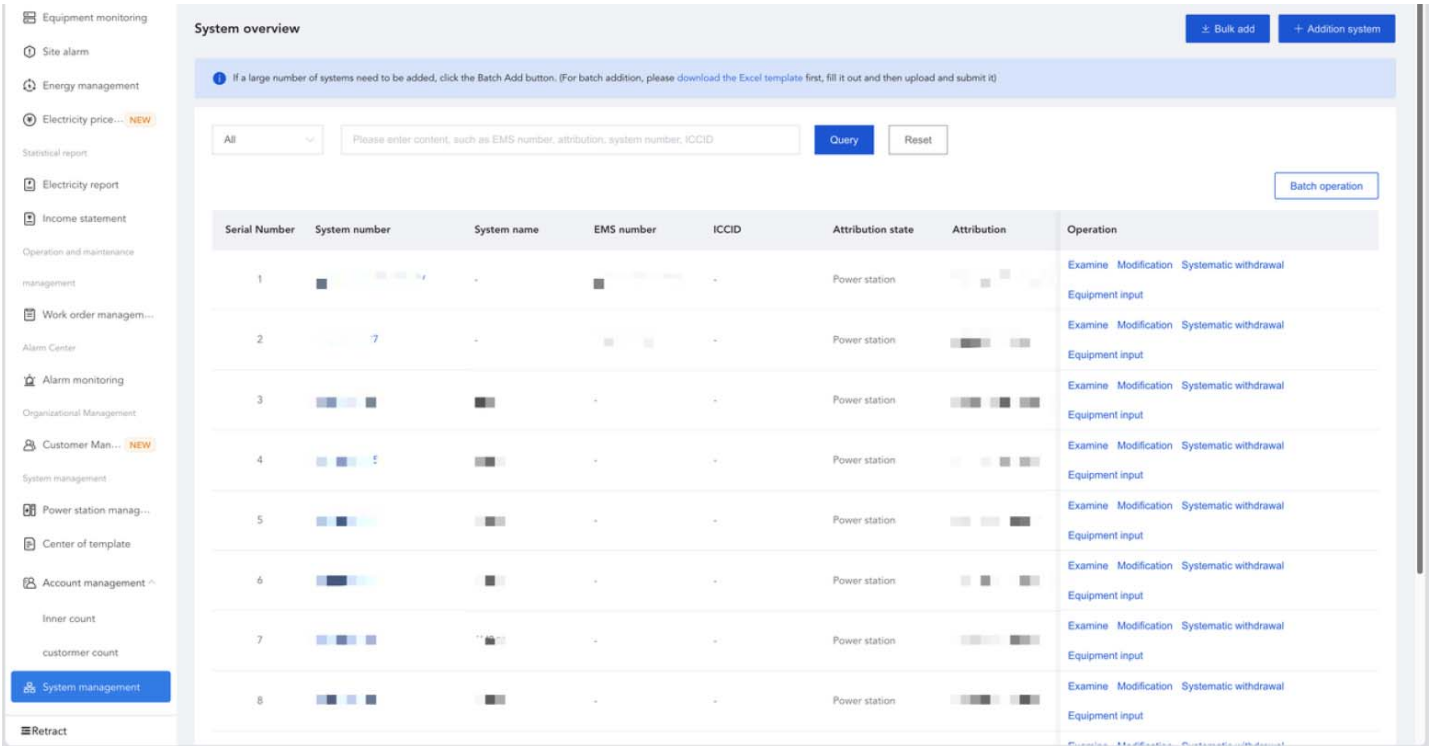
total 8

1

Go to 1

5.8.4 System Management

Cloud Computing Platform has system management capabilities that can be used to add, allocate, and manage EMS systems.



- Click "Add System", pull up the corresponding pop-up window, you can enter the basic information (system number and EMS provided by our company) and specification parameters , after completion, click "OK" to add the system.

Basic information

System number *

Please enter the system number

System name

Custom system number name0/50

EMS number *

Please enter the EMS number

Specification parameter

Rated power(kW) *

Please enter the rated power

Rated capacity(kWh) *

Please enter the rated capacity

Type of cooling

Please select a type of cooling

Nominal voltage(V)

Please enter the nominal voltage

Weight(kg)

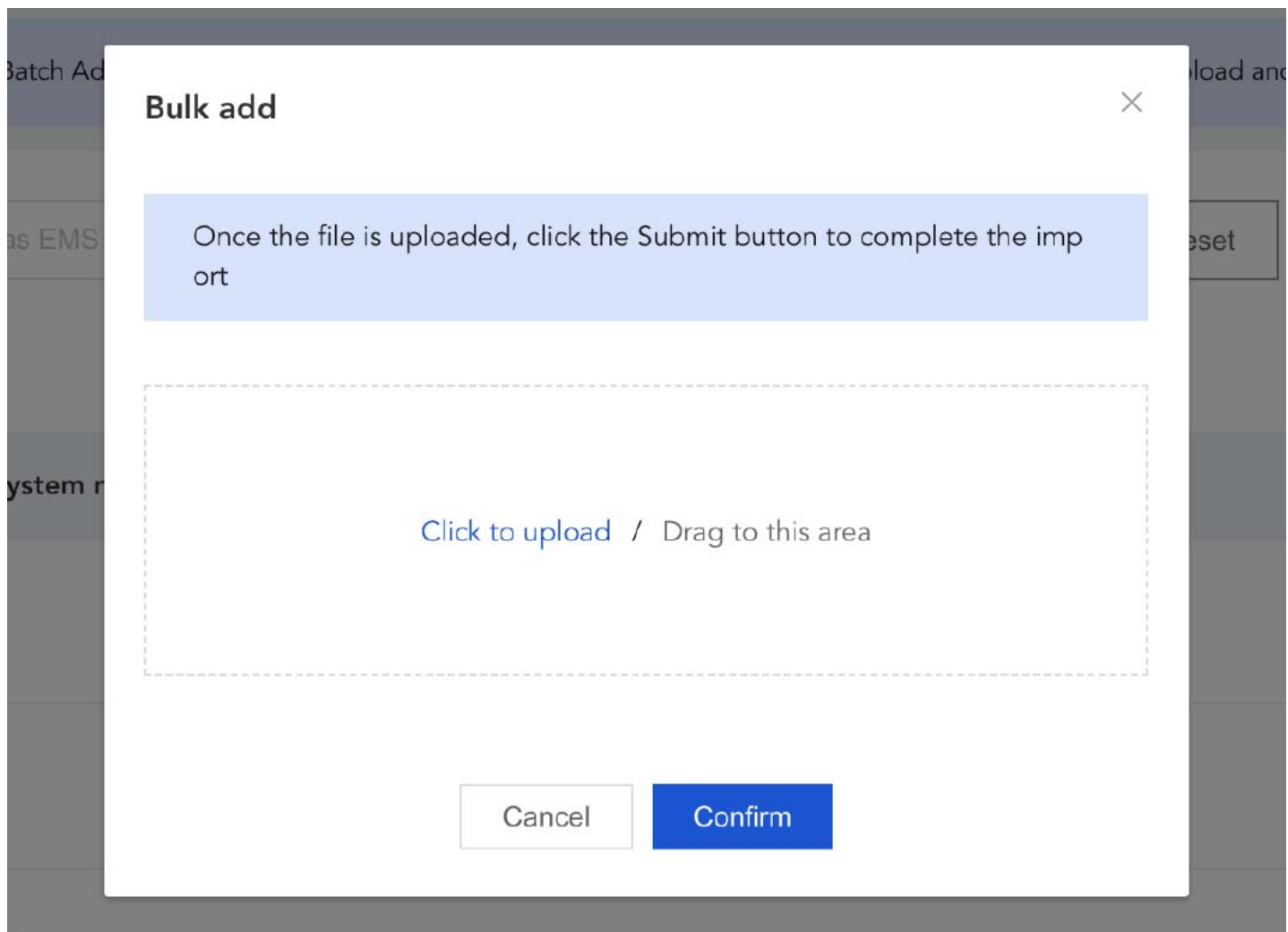
Please enter weight

Size(mm)

Please enter dimensions (L * W * H)

CancelConfirm

- Support users to download Excel, fill in and perform batch addition operations.



- Click "System Assignment" in the system list operation to support assigning the system to the created power station.

FAQs

If you have any questions or suggestions, please feel free to contact us. We will serve you wholeheartedly. Let us work together to promote the innovation and development of industrial and commercial energy storage technology, and contribute to the construction of a green, lowcarbon,and efficient energy system.

Other notes

1. The supplier has the right to modify the manual without notifying the buyer.
2. The supplier is not responsible for any losses caused by failure to follow the manual.

6. Warning and maintenance

The alarm level is defined as follows:

- Fault: The equipment fails, and the system stops operation (charging/discharge).
- Alarm: the output power drops or partial function fails due to external factors, but it does not affect the charge and discharge function of the system.

6.1. Warning processing

outside6.1Fault alarm handling method

Alarm / fault	Involving parts	The cause of the problem	method of disposition
Water flooding fault	Battery warehouse	Water immersion in energy storage cabinet	1. Check for water inside the cabinet; 2. Confirm whether the outdoor cabinet is leaking, and whether the equipment in the cabinet is in good condition.
Door magnetic alarm	Battery warehouse	The energy storage cabinet door is opened	1. Check whether the cabinet door is completely closed; 2. Check whether the cable on the door magnetic sensor is disconnected; 3. Check whether the position of the door magnetic sensor is offset.
Fire fault	Battery warehouse	The battery is overheated or in fire	1. Press immediatelyEPOButton, and the message speed is far away from the energy storage cabinet; 2. Continuous observation outside of the safe distance30minute. If there is smoke or fire, call the fire alarm; if not, manually remove the alarm and contact the manufacturer.
Lightning protection alarm	Electrical warehouse	Lightning protection device failure	1. Check whether the signal line connection of the lightning protector is loose; 2. Check whether the lightning protection device indicator changes color; 3. Replace the AC lightning protection device.
Compressor alarm	air-conditioning	1. The wiring loose 2. Compressor is damaged	1. Disconnect the distribution switch, open the air conditioning junction box, and check whether the wiring is loose; 2. Observe whether the appearance of the compressor is obviously damaged, whether there is a burnt flavor, and if so, contact the manufacturer.

Outdoor fan alarm	air-conditioning	1. Free of the wiring 2. The fan is damaged	1. Disconnect the distribution switch, open the air conditioning junction box, and check whether the wiring is loose; 2. Observe whether the fan is obviously damaged and whether there is a burning smell. If so, please contact the service hotline.
Indoor fan alarm	air-conditioning	1. Free of the wiring 2. The fan damage	1. Disconnect the distribution switch, open the air conditioning junction box, and check whether the wiring is loose; 2. Observe whether the fan is obviously damaged and whether there is a burning smell. If so, please contact the service hotline.
Power grid overpressure/Underpressure failure	Grid / oil machine	Abnormal voltage on the grid-connected	Check whether the grid-connection side voltage is abnormal;
Power grid overfrequency/Overfrequency failure	Grid / oil machine	Abnormal frequency of the grid connection side	Check whether the frequency of the grid connection side is abnormal;
Island protection failure	Grid / oil machine	Abnormal voltage on the grid-connected	Check whether the grid-connection side voltage is abnormal;
High / low voltage crossing alarm	electrified wire netting/oil engine	Abnormal voltage on the grid-connected side	Check whether the grid-connection side voltage is abnormal;
Power grid voltage imbalance fault	electrified wire netting/oil engine	Abnormal voltage on the grid-connected side	Check whether the grid-connection side voltage is abnormal;
Grid wrong phase failure	electrified wire netting/Chai machine	Wrong grid connection side phase sequence	Exchange ABC Any two cables in the third line
High DC voltage/Low fault	cell	The battery voltage is abnormal	Check whether the DC input voltage is abnormal;

Overvoltage fault of bus	Energy storage converter	1. Load imbalance 2. Software exception	1. Check whether the DC wiring is loose or abnormal; 2. Contact the manufacturer
Bus half-pressure unbalanced fault	Energy storage converter	1. Load imbalance 2. Software anomaly	1. Check whether the load is abnormal; 2. Contact the manufacturer
Over temperature drop alarm	Energy storage converter	The internal temperature is too high	1. Check whether the inlet and outlet of the electrical warehouse are blocked; 2. Check whether the internal fan is running properly; 3. Contact the manufacturer
Power tube over temperature fault	Energy storage converter	The internal temperature is too high	1. Check whether the inlet and outlet of the electrical compartment are blocked; 2. Check whether the internal fan is running properly; 3. Contact the manufacturer
Balanced bridge over temperature fault	Energy storage converter	The internal temperature is too high	1. Check whether the inlet and outlet of the electrical compartment are blocked; 2. Check whether the internal fan is running normally; 3. Contact the manufacturer
DC current fault	Energy storage converter	Direct current excess	1. Check the DC side for short circuit or line damage; 2. Replace the energy storage converter module or contact the manufacturer.
Over current fault	Energy storage converter	Internal current excess	1. Check whether the off-grid load is in excess; 2. Replace the energy storage converter module or contact the manufacturer.
Output overload/Overf low failure	Energy storage converter	AC side power/Current excess	1. Check whether the power grid voltage is normal; 2. Check the DC side for short circuit or line damage; 3. Check whether the off-grid load is in excess; 4. Replace the energy storage converter module or contact the manufacturer
Wave-by-wave flow limit failure	Energy storage converter	AC side current is excess	1. Check whether the power grid voltage is normal; 2. Check whether the off-grid load is excessive; 3. Replace the energy storage converter module or contact the manufacturer.

Communication interruption failure	Energy storage converter local controller	Communication interruption	1. Check whether the communication network cable between the modules is loose and abnormal; 2. Check whether the local controller communication network cable is loose and abnormal;
parallel operation/Synchronous failure	Energy storage converter	parallel operation/Synchronization signal is interrupted	1. Check whether the parallel cable is loose or abnormal; 2. Check whether the parallel machine Settings are abnormal; 3. Hardware circuit is damaged.
Relay open/short trouble	Energy storage converter	1. Internal relay differences ordinary 2. Software anomaly	1. Replace the energy storage converter module 2. Contact the manufacturer to replace the internal plate
Fan 1 / 2 / 3 alarm	Energy storage converter	The internal fan is abnormal	1. Replace the energy storage converter module 2. Contact the manufacturer to replace the internal fan
Fault of leakage current	Energy storage converter	1. Excess of the leakage current 2. Software anomaly	1. Check whether the leakage current of Hall wiring is loose or abnormal; 2. Check whether the grounding wire is disconnected;
Abnormal fault of the insulation impedance	Energy storage converter / battery	1.Low insulation to the ground 2.Software anomaly	1. Check whether the AC / DC cable is damaged or short-circuit to the ground; 2. Check whether the battery circuit is damaged or has a short-circuit to the ground.
Module loss alarm	Energy storage converter	Module to-screen communication is interrupted	Check whether the communication network cable between the modules is loose and abnormal;
Direct current low pressure alarm	Energy storage converter	The battery is not on	Check that the battery is turned on



Warning: The above alarms and faults are common alarms or faults, if there is a table **6.1** **If any fault occurs, please contact the manufacturer directly.**

6.2.routine maintenance

Due to the ambient temperature, humidity, dust, vibration, and the aging of the inverter internal components, some potential problems may occur during the operation of the system. In order to enable the energy storage system to run stably for a long time, maintenance personnel need to arrange to inspect regularly according to Table 6.2 to find and deal with problems in time. Systems installed in severe dust, high salt fog or heavy industrial parks are recommended to be maintained quarterly, gas

It is recommended that energy storage systems in favorable waiting areas be maintained every six months.

outside6.2Routine maintenance work

Maintain to like	movement	reference standard
box	- Check the appearance of the whole machine - Check the air vents - Check the door lock condition	- No obvious coating peeling, scratches or rust - No obvious trace of water leakage - No dust accumulation in the vents - The door lock is not damaged
Air conditioning	- Check for the noise and vibration - cleaning filter	- The fan and compressor rotate normally, without lag and abnormal sound - The surface of the filter screen is clean without blockage
Energy storage converter	- Check for the noise and vibration - Check the front panel vents - Check the contact surface of the rear-end copper row	- The front panel fan rotates normally, without any lag and abnormal sound - The surface of the front panel vent is clean without blockage - The copper row and contact surface are without corrosion and discoloration, and no dust accumulation
electrical	- Check the lightning protection - Check the contact surface of the cable	- The lightning protector is normal - The screw socket cable is not loose and falls off - The copper row and contact surface are without corrosion and discoloration, and no dust accumulation
battery pack	- Check for the noise and vibration - Check the contact surface of the cable	- Battery pack fan rotation without lag, abnormal sound - The surface of the front panel vent is clean without blockage - The screw socket cable is not loose and falls off - The copper row and contact surface are without corrosion and discoloration, and no dust accumulation

6.3.conformally connected space

6.3.1.defects liability period

In the case of the correct use of the product, the warranty period agreed in the commercial contract shall prevail.

6.3.2. Warranty scope

During the warranty period, if the product belongs to the quality problems of the product itself, Jiangsu Natong Energy Technology Co., Ltd. will provide customers with free repair or replace the product. The customer shall reserve a reasonable response time for the company's maintenance, and the replaced products shall be handled by the Company. The customer should present the relevant certificate of the product and ensure that the product trademark is clearly visible, otherwise the company has the right not to guarantee the warranty.

6.3.3. Disclaimer

In the following cases, the company has the right not to guarantee the quality, but can still provide paid maintenance services.

The warranty period has expired;

- Unable to provide the relevant proof of product purchase;
- Damage caused during transportation, loading and unloading;
- Damage caused by incorrect installation, modification or repair by unauthorized personnel;
- Damage caused by operation under abnormal use conditions or environment;
- Machine failure or damage caused by the use of non-nano parts or software;
- Fault caused by fire, earthquake, flood and other irresistible factors.