User Manual

eBank-241L

eBank-261L

About This Manual

This manual contains mainly product information as well as installation, operation and maintenance instructions.

It will refer to the device as the "eBank" 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 the parameters of the inverters.

Installation Requirements:

Installation of eBank should only be performed by specialized technicians who meet the following requirements.

- Knowledge of electronics, electrical wiring and mechanical expertise and familiarity with electrical and mechanical schematics.
- Received professional training.
- Capable of promptly responding to hazards or emergencies that may arise during the installation and commissioning process.
- Be familiar with local standards and relevant safety regulations regarding electrical systems.
- Thoroughly read this manual carefully and understand the safety instructions related to the operation.

- **Symbols**

This manual contains important safety instructions, which are emphasized using specific symbols. These symbols are used to ensure the safety of people and property during product use, or to help effectively maximize product performance.

It is essential to thoroughly understood the significance of the warning symbols to us the manual better.

Change History

All the changed issues in the file are recorded and accumulated, which means that all subsequent files will contain the previously changed issues.

V1.0 (2025-09-28)

This version is the first official release

Contents

1. Safety instructions

1.1. Safety symbol description

please read this manual first and follow all the safety precautions marked on the equipment and in the manual when installing, operating and maintaining the equipment, To ensure better user use of this product and to protect personal and property safety, please read the following symbols used to prompt carefully.

 Danger: Indicates a highly potentially hazardous situation which, if not avoided, will result in death or serious injury.

 Warning: Indicates a situation of moderate potential hazard which, if not avoided, could result in death or serious injury to persons.

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

 Explanation: Emphasis and additions to the content may also provide tips for optimizing the use of the product.

1.2. Regular security

 Explanation:

This equipment should be used in an environment that meets the design specifications. Otherwise, it may cause equipment failure. The resulting equipment malfunction or component damage, personal safety accidents, property losses, etc. are not within the scope of equipment quality assurance. When installing, operating, and maintaining the equipment, local laws, regulations, and specifications should be followed. The safety precautions in the manual are only used as a supplement to local laws, regulations, and specifications. The company does not assume any responsibility in the event of 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 that the device's pre-installed cable connections are tight. Check the device for damage, such as holes, dents or other signs of possible internal damage. Check that the internal parts of the equipment have not been displaced, and do not tamper with the structure, mounting order, etc. of the equipment.
- 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.
- Do not approach the equipment except for the person who will operate it. Do not energize the equipment without completing the installation or confirming by a qualified person. At least two persons must be present when the equipment is first powered up or when the main circuit is energized.

Explanation

- 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, decompile, 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.

When wiring is completed or when you leave for a short period of time during the wiring process, you need to immediately block the cable opening and close the cabinet door to avoid the entry of small animals.

- The cables used in the energy storage system shall be firmly connected, well insulated and of the required specifications. The cables must be protected from sharp edges, burrs and other damage at the location

where the cables are threaded through the pipes or holes, etc.

- After the cables are wired, they need to be securely fixed using cable brackets and cable clamps. The cables in the backfill area must fit tightly against the ground to prevent deformation or damage caused by stress during back filling.
- Using cables in high temperature environments may cause aging and damage to the insulation layer. The distance between the cable and the heating device or the periphery of the heat source area should be at least 30mm.
- In order 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 gently held and placed.

1.3.2. Grounding requirements

- Tampering with the grounding conductor is prohibited. The equipment grounding body should be permanently connected to the protective grounding grid. Before operating the equipment, check the electrical connections of the equipment to ensure that it is securely earthed.
- The equipment grounding impedance meets the requirements of 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 of the corresponding voltage level to check whether there is power and ensure that the device is completely powered off.
- If there are charged objects nearby, please use insulation boards or tapes to cover or wrap them.
- Use a grounding wire to reliably connect the circuit to be serviced to the grounding circuit before performing O&M.

Explanation:

- 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 when transporting with a forklift. 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 equipment, the large size of the equipment may block the operator's view, so need to arrange the assistance of auxiliary personnel.
- 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 equipment by hand, you should be prepared to bear the weight and should wear protective gloves, anti-smash shoes and other safety gear.

- Move the equipment carefully during handling to avoid bumping or dropping. Avoid scratching the surface of the equipment, damaging parts or cables.

1.5. Battery safety

Explanation

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

Our company will not be responsible for any damage to the batteries caused by the following reasons.

- 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 a third party changes the usage scenario of the battery without informing us. This includes, but is not limited to, connecting additional loads to the battery, mixing it with other brands of batteries, or mixing it with batteries of different rated capacities, etc.
- Direct damage to the battery caused by the operating environment of the field equipment or external power parameters that do not meet the environmental requirements for normal operation. Including the actual operating temperature of the battery is too high or too low, the power grid situation is poor and frequent power outages.
- Frequent over-discharge of the battery caused by the customer's failure to correctly set the battery operation and management parameters or improper maintenance, the customer's on-site expansion or long-term failure to fully charge the battery, etc.
- 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 customer has failed to properly maintain the battery in accordance with the equipment's operating manual, including, but not limited to.
- 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 will produce flammable gases, and CO, HF and other harmful gases. The volume of flammable gases generated by the thermal runaway of the battery is a risk of deflagration and explosion, which may cause personal injury and property damage.
- When installing and maintaining the battery, the exposed cable terminals should be wrapped with insulating tape. At the same time, avoid other objects (e.g., conductive objects, screws, liquids, etc.) from entering the battery and causing a short circuit.

Warn:

- Batteries must be stored in a separate warehouse, and stored in the outer packaging, avoiding mixed storage with other materials, avoiding open storage, and avoiding high stacking of batteries. The site must be equipped with fire-fighting facilities that meet the requirements, such as fire sand and fire extinguishers.
- Batteries should be protected from impact. When handling the battery, it should be carried in the direction required by the battery requirements, and inverted or tilted is prohibited.

- Use the battery within the temperature range specified in this manual. When the ambient temperature of the battery is lower than the lower limit of the operating temperature, charging is prohibited to avoid internal short-circuiting of the battery due to crystallization that occurs with low temperature charging.
- Please dispose of the used batteries in accordance with local laws and regulations. Do not dispose the batteries as household waste.
- If it has been more than 8 months since the battery was last charged, the battery needs to be recharged. Otherwise, it may affect the performance and life of the battery.

Battery abnormal handling measures

 **Danger:**

- When an electrolyte leak occurs or there is an unusual odor, do not contact with the leaking liquid or gas. Non-professionals should stay away and contact a professional immediately to handle the situation.
- The electrolyte is corrosive and contact may cause skin irritation and chemical burns. If you come into contact with the battery electrolyte, wash the contact area immediately with plenty of water and soap and seek medical personal help immediately.
- After dropping the battery (no matter with or without package), it is forbidden to use it further. If there is no obvious deformation or damage in appearance and there is no obvious odor, smoke or fire, transfer the battery to an open and safe place for 1h under the premise of ensuring safety, and contact our service engineer.
- If the battery drops and there is an obvious odor, damage, smoke, or fire, people should be evacuated immediately and the police should be called in time. Professionals should use fire-fighting facilities to extinguish the fire while ensuring safety.

1.6. Maintenance and replacement

 **Warn**

- It is prohibited to open the cabinet door in rain, snow, lightning, dust, fog, etc.
- Before parts are removed from the cabinet, please make sure that other parts on the cabinet are not loose.
- During equipment maintenance, nearby energized parts should be covered with insulating material.
- Avoid touching the running fan (such as fingers, parts, bolts, etc.).
- Do not power on the device before troubleshooting.
- Inspect the system when it is in working status, pay attention to the hazard warning signs on the equipment and avoid standing at the cabinet door.
- Wait 15 minutes after powering down equipment other than battery packs to ensure that the equipment is stopped before operating the equipment.
- Manual wiring inspection is required to avoid abnormal system operation after power components of the energy storage system are replaced or wiring is changed.
- After completing maintenance and replacement operations, the cabinet door should be locked in time and the key should be properly kept.

2.Product Presentation

2.1.Type of the demonstration

2.2. Product function

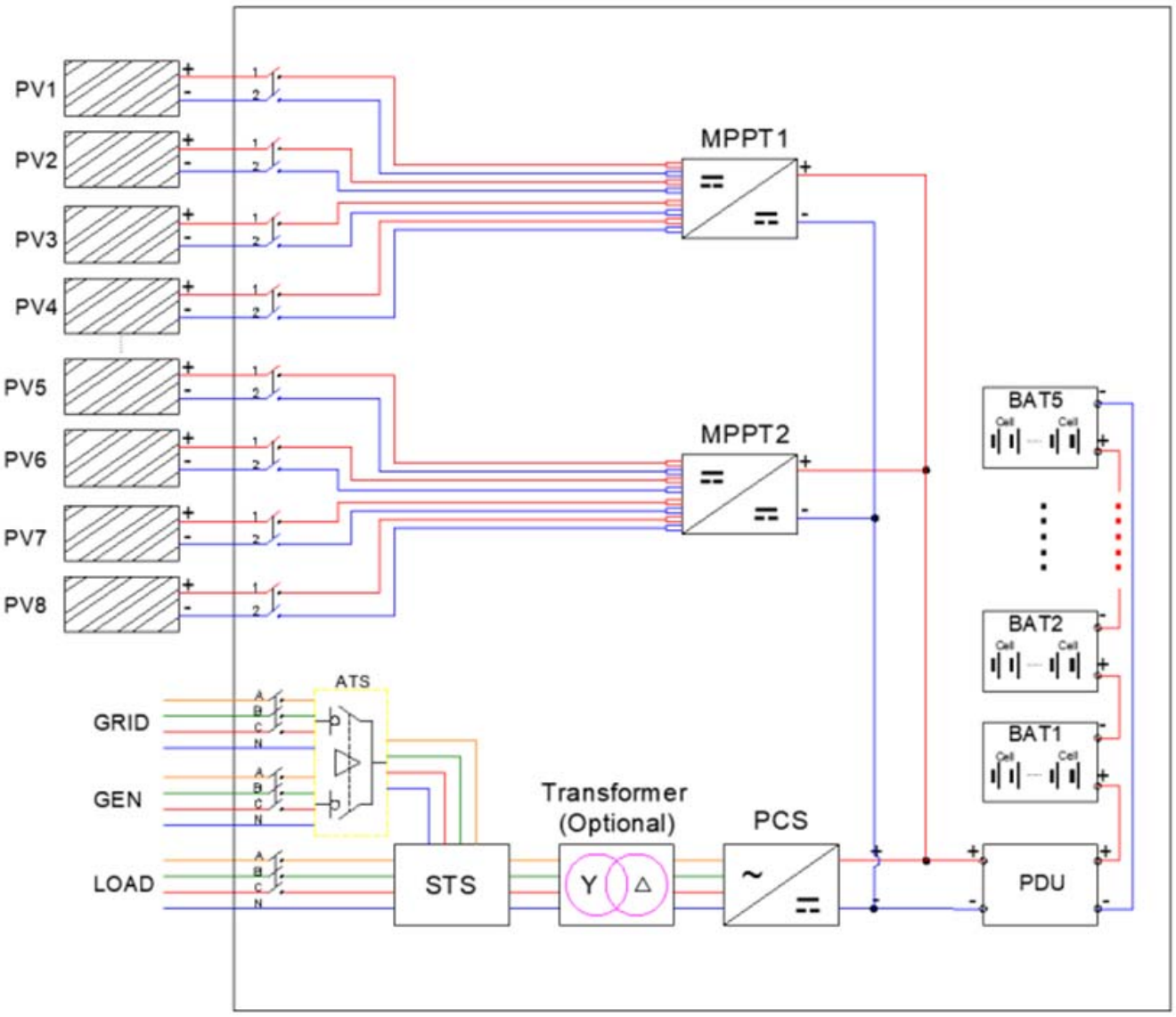
Monet series outdoor energy storage cabinets integrate energy storage batteries, modular PCS, energy management monitoring system, power distribution system, environmental control system and fire control system, etc. The modular PCS is used to facilitate maintenance and expansion. The outdoor cabinet adopts front maintenance to reduce the floor space and maintenance channels. It is safe and reliable, quickly deployed, low-cost, high energy efficiency and intelligent management.

In common application scenarios, the operation strategy of the eBank is as follows:

Peak load shifting: when the electricity price is in the valley: the energy storage cabinet is automatically charged and standby after being filled; when the electricity price is in the peak: the energy storage cabinet is automatically discharged, realizing the arbitrage of the price difference, and improving the economic efficiency of the optical storage and charging system.

Solar and eBank combination: The local load power is obtained in real time, and photovoltaic power generation is prioritized for self-use, with the surplus power stored. If the photovoltaic power generation power is insufficient to provide power for the local load, then power supply from battery storage is prioritized.

2.3. Electrical Schematics Diagram



Graph 2.1Full functional electrical topology diagram (corresponding functions have been customized and deleted)

Note: Figure 2.1 In order to system solution with on-grid and off-grid functions, isolation transformers, and photovoltaic input. Different projects have different configurations and slightly different in layout. The actual configuration shall be subject to the attached delivery drawing.

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 rack-mounted modular, PCS, supports multi-machine parallel connection and has good scalability. The number of PCS modules and total battery power can be selected according to the system capacity requirements of micro grid and other scenarios.

The system suitable for outdoor used with protection level of IP54.

The door-mounted embedded integrated air conditioner does not take up cabinet space, increasing the available space in the outdoor cabinet, with better structural integrity at the top and good waterproofing;

The local control panel can realize various functions such as system operation monitoring, energy management strategy formulation, and remote equipment upgrade.

2.5. Product Parameter

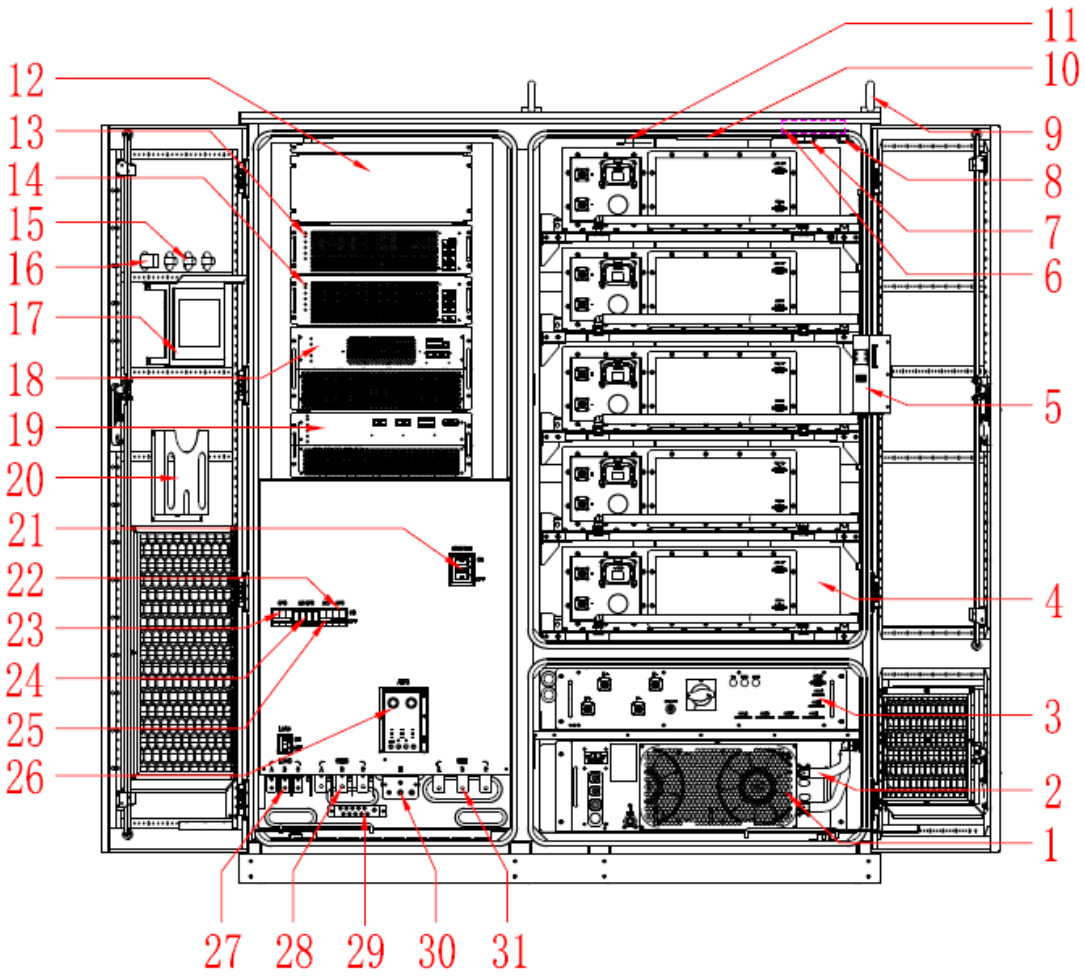
The following are typical configuration parameters for outdoor cabinet energy storage systems

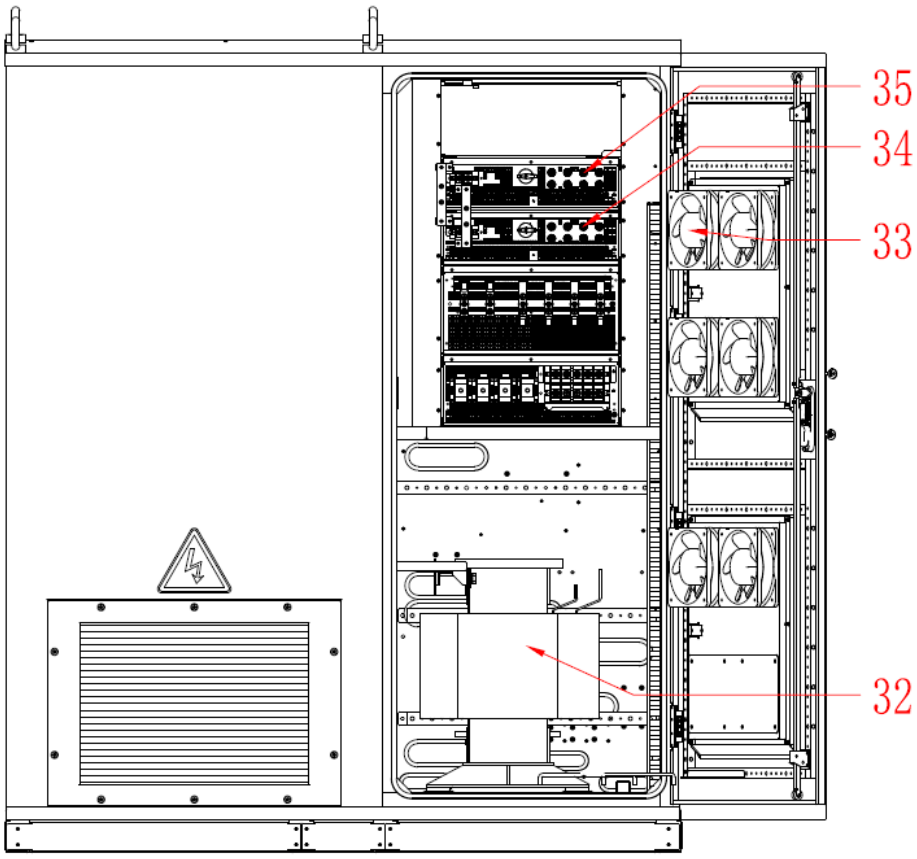
2.1 The Parameter Table of the Energy Storage System

Model	eBank-241L	eBank-261L
Battery rated energy storage capacity	241.152KWh	261.248KWh
Rated capacity	314Ah	
System rated voltage	768V	832V
System voltage range	672V~864V	672V~936V
Battery type	Lithium-iron phosphate battery (LFP)	
Battery pack series and parallel mode	1P240S(1P*48S 5pcs）	1P260S(1P*52S 5pcs）
MPPT power	120KW	120KW
PCS power	100KW	125KW
STS power	200KW	250KW
Diesel generator interface power	Max 200KW	Max 250KW
Transformer power	100KW	125KW
Noise	< 70dB	
Ambient temperature	Charging: 0℃~55℃ Discharging： -20℃~50℃	
Cooling type	Liquid cooling	
Fire Protection System	Have (Suggest a cool and ventilated place)	
Placement environment	Outdoor	
Altitude	3000m(Over 3000m drop)	
Size (W*D*H)	1700*1350*2050mm	
Weight (approx)	3250kg	3350kg
IP Class	IP54	

2.6. Unit Introduction

2.6.1. System configuration

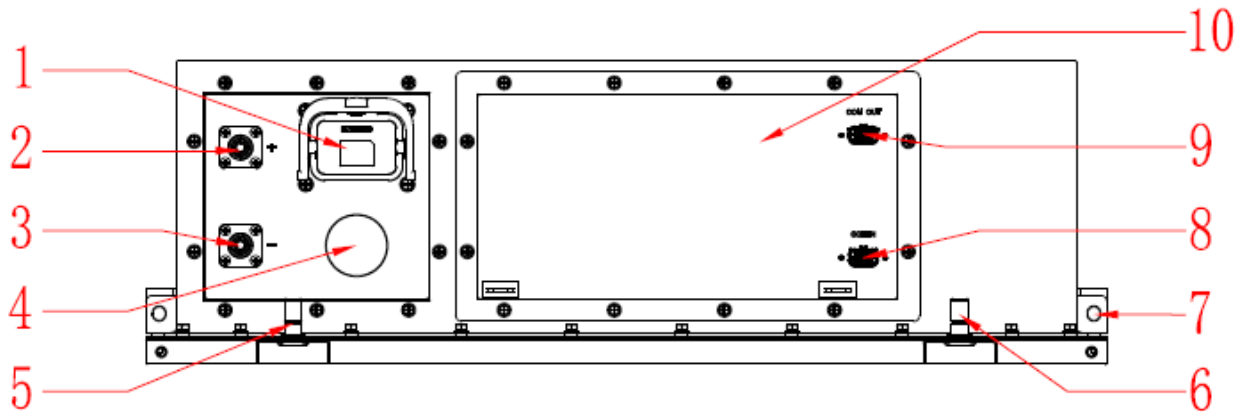




No.	Name	eBank-241L	eBank-261L
1	liquid cooling machine	5KW	
2	Liquid cooling pipe		
3	PDU		
4	Battery Pack	1P48S x 5pcs	1P52S x 5pcs
5	Dehumidifier		
6	Aerosol		
7	Smoke detection		
8	Temperature sensing		
9	Lifting lug		
10	Lighting lamp		
11	Access control switch		
12	Backup space		
13	MPPT1	60KW	
14	MPPT2	60KW	
15	Rack indicator light	Green: normal operation Yellow: Prompt Red: Fault	
16	Emergency button		
17	EMS		
18	PCS	100KW	125KW
19	STS	200KW	250KW
20	Emergency button		
21	Grid/Gen Switch		
22	APS Switch		
23	SPD Switch		

24	AC SPD		
25	A/C Switch		
26	ATS		
27	Load	Three-phase electrical interface	
28	Grid	Three-phase electrical interface (Max power 200KW)	Three-phase electrical interface (Max power 250KW)
29	Pe		
30	N		
31	Gen	Three-phase electrical interface (Max power 200KW)	Three-phase electrical interface (Max power 250KW)
32	Transformer	Optional 100KW	Optional 125KW
33	AC cooling fan		
34	PV1 Interface	8*15KW(45A)	
35	PV2 Interface		

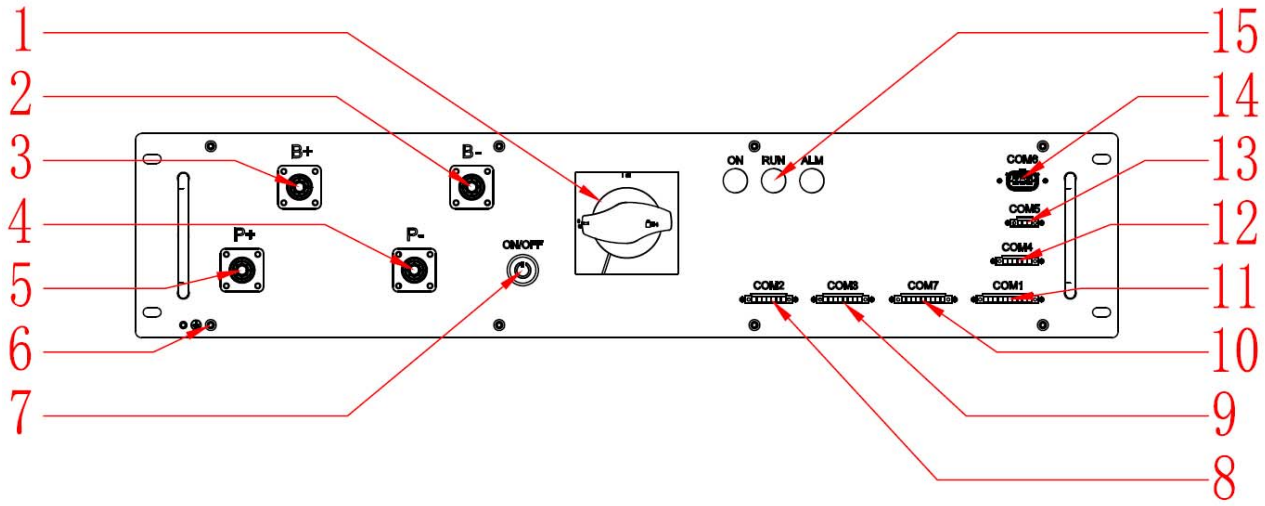
2.6.2. Battery box composition



No.	Name	Instructions
1	MSD	Including fuses
2	Positive electrode of the battery pack	
3	Battery pack negative electrode	
4	Explosion-proof valve	

5	Water inlet	
6	Water outlet	
7	Lifting lug	
8	COM IN	
9	COM OUT	
10	BMU maintenance port	

2.6.3. PDU composition



No.	Name	Instructions
1	Disconnecting switch	
2	PDU B-	
3	PDU B+	
4	PDU P-	
5	PDU P+	
6	Pe	
7	low-voltage switch	
8	COM2	1. 24V-OUT 2. 24V+OUT 3. LSS2 4. SW2_IN- 5. SW2_IN+ 6. SW1_IN- 7. SW1_IN+

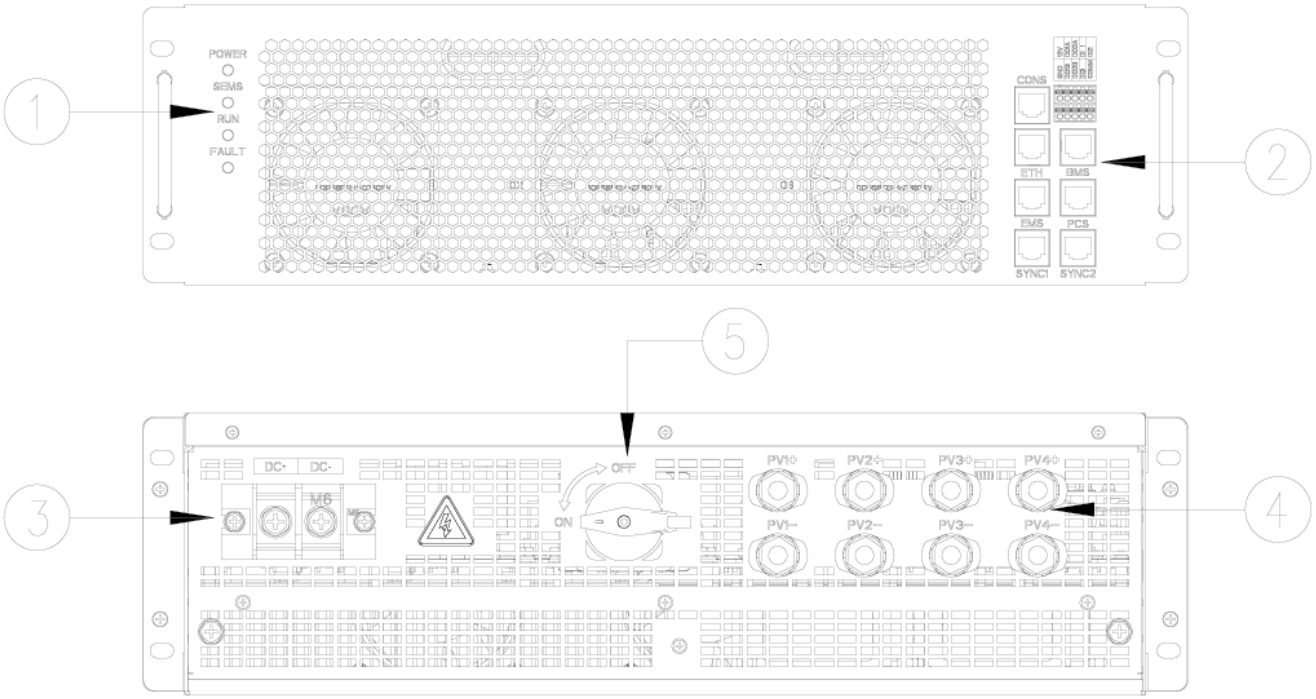
9	COM3	2. 24V-OUT 3. 24V+OUT 4. DIH_IN3 5. DIH_IN2 6. SW3-OUT B 7. SW3-OUT A
10	COM7	1. LED Yellow + 2. LED Yellow - 3. LED Red + 4. LED Red - 5. LED Green + 6. LED Green -
11	COM1	1. RS485-G0 2. RS485-B0 3. RS485-A0 4. RS485-G1 5. RS485-B1 6. RS485-A1 7. CAN2G 8. CAN2L 9. CAN2H 10. CAN2R
12	COM4	2. 24V-IN 3. 24V+IN 4. BEBUG_CAN1L 5. BEBUG_CAN1H 6. BEBUG_CAN1R
13	COM5	1. PE 2. N 3. L
14	COM6	Battery communication
15	PDU indicator light	

PDU indicator light

	RUN	ALM
Power-off state	0	0
Power on and operate, no fault	1	0
There is a non-prohibited charging or non-prohibited discharging fault	1	flash1
Only charging prohibition fault is present, but no relay disconnection fault is present	1	flash2
Only a fault in the prohibition setting, but no fault in the relay disconnection	1	flash3
There are both faults of forbidden charging and forbidden discharging, but no fault of relay disconnection	1	1

Only charging prohibition fault, and relay disconnection fault	0	Flash2
Only the fault of forbidden discharge and the fault of relay disconnection exist	0	Flash3
There are both charging and discharging faults, as well as a relay disconnection fault	0	1

2.6.4. MPPT module component description



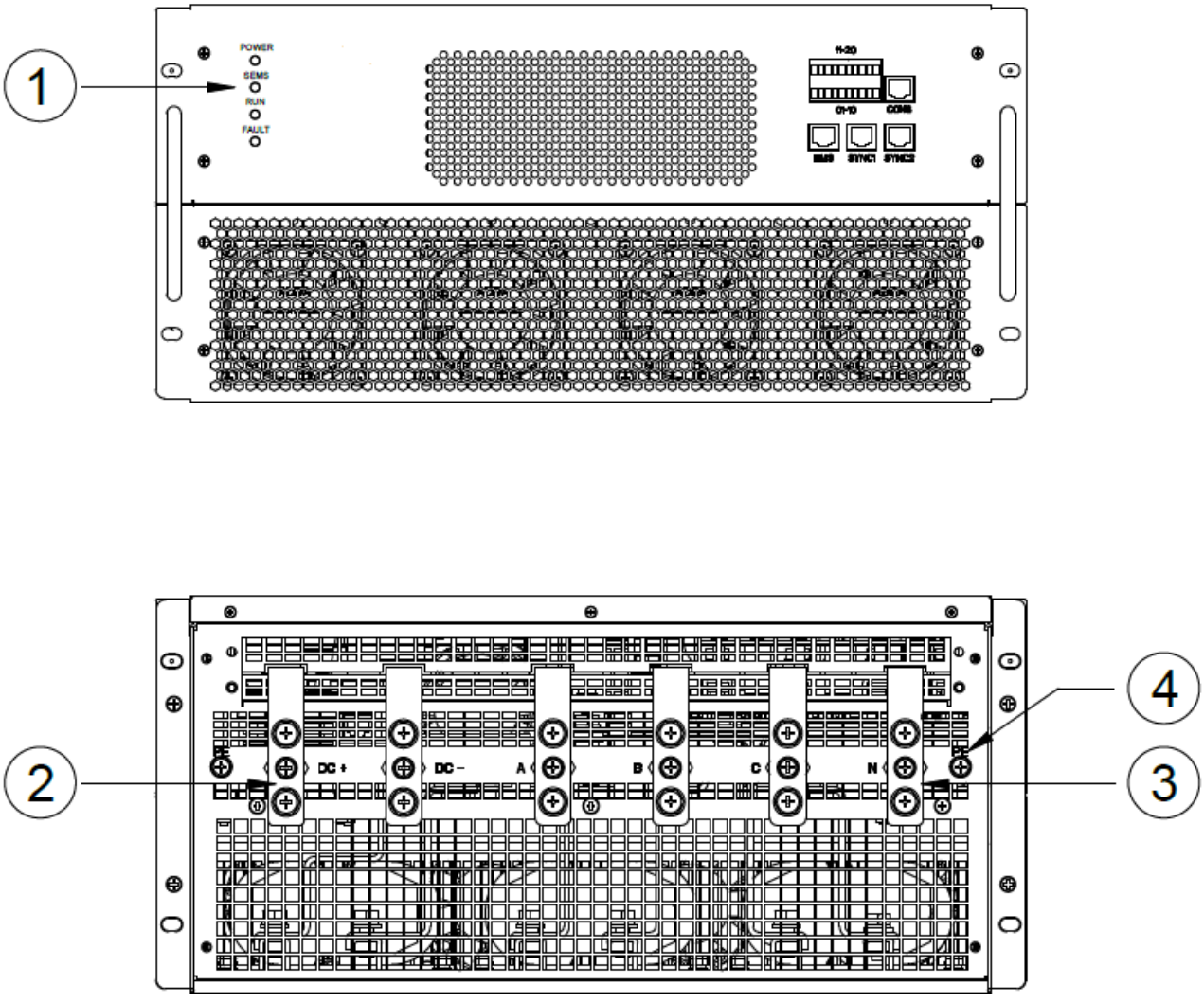
No.	Name	Instructions
1	Indicator light	
2	Communication interface	
3	DC wiring terminal on high-voltage side	
4	Low-voltage side DC wiring terminal	
5	Isolating switch	

MPPT Indicator light description

Indicator light	Status:	Instructions
POWER (green)	Chang Liang	The converter has low-voltage side battery, or PV, or high-voltage side power supply access
	often extinguish	The converter system is not powered on
SEMS (green)	Chang Liang	Communication is normal

	often extinguish	Communication anomaly
RUN (green)	Chang Liang	The converter is in operation
	often extinguish	The converter is in a non-operational state
FAULT (red light)	Chang Liang	The converter has an alarm, but it can continue to operate
	flicker	Inverter fault, shutdown state
	often extinguish	The converter has no fault or alarm

2.6.5. PCS module component description



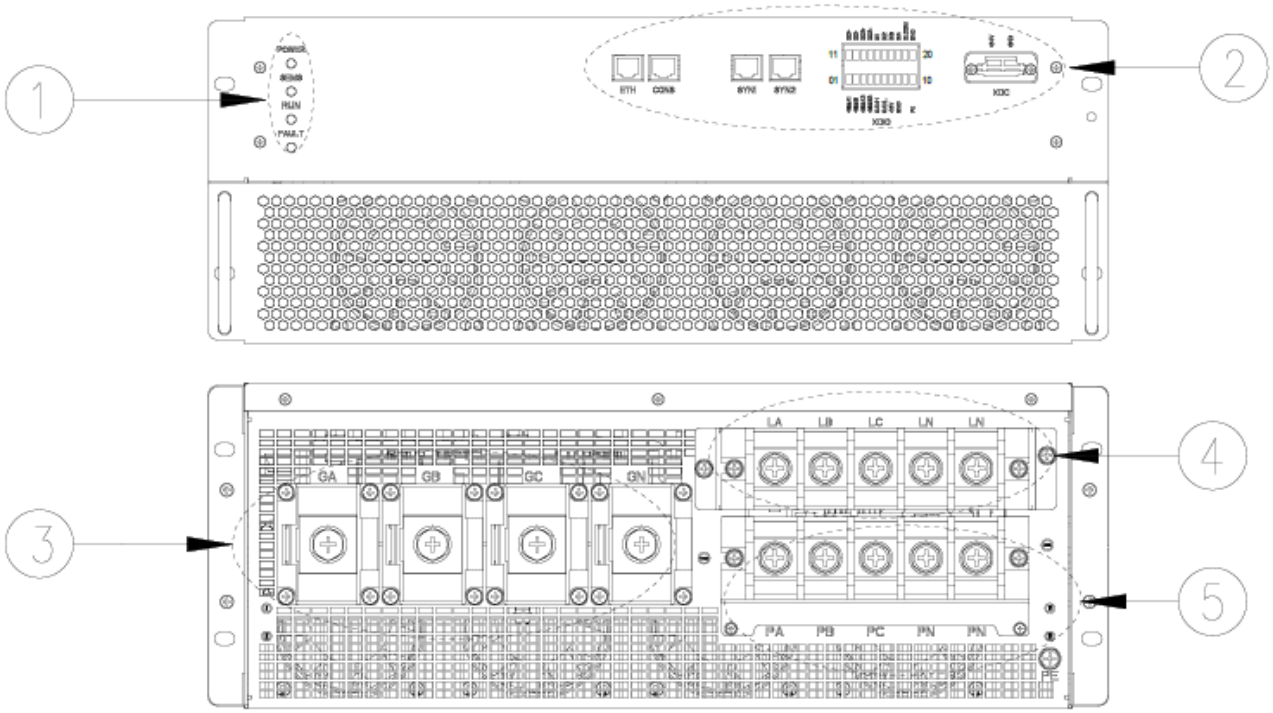
No.	Name	Instructions
1	Indicator light	
2	DC wiring terminal (M8)	

3	AC terminal block (M8)	
4	Grounding terminal (M6)	

PCS Indicator light description

Indicator light	Status:	Explanation
POWER (green)	Chang Liang	Both batteries and power grids are connected
	Quick flash	Battery not connected
	Slow flash	The power grid is not connected
	often extinguish	Neither the battery nor the power grid is connected.
SEMS (green)	flash.	Communication is normal
	often extinguish	Communication anomaly
RUN (green)	often extinguish	PCS is in a halted state
	Chang Liang	PCS is in standby mode
	Quick flash	PCS is in operation
FAILT (red light)	Slow flash	Alarm (in computer science)
	Chang Liang	fault, shutdown state

2.6.6. STS module component description



No.	Name	Instructions
1	LED indicator light	Operation status indicator
2	24V input power supply and signal terminal	Connect 24V power supply, parallel interface, and dry contact
3	Power grid wiring terminal	Connect to the power grid
4	BACKUP power terminal block	Connecting load
5	PCS power wiring terminal	Connect PCS

STS Indicator light description

Indicator light	Status:	Explanation
POWER (green)	Chang Liang	PCS port, grid port and external 24V are all powered on
	flashing	Software Upgrade
	Slow flash	External 24V or PCS port or grid port is powered on
	often extinguish	PCS port, grid port and external 24V are not powered on
SEMS (green)	Quick flash	Communication is normal
	often extinguish	Communication anomaly

RUN (green)	often extinguish	STS is in a halted state
	Chang Liang	STS is in grid-connected state
	flash, pop up	STS is in offline state
	Slow flash	Grid-connected switch closing state
FAILT (red light)	Slow flash	Alarm system
	Chang Liang	fault, shutdown state

2.6.7. 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 inside of battery box, completes the data acquisition of the information of the single cell inside the battery box and uploads the data to the BCU, and at the same time completes the equalization between the single cells in the battery box according to the instructions issued by the BCU.

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

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

Battery system parameters

	eBank-241L	**eBank-261L**
Cell parameters		
Battery type	Lithium-iron phosphate battery (LFP)	
Nominal voltage	3.2V	
Voltage range	2.5V~3.65V	
Nominal capacity	314Ah	
Maximum operating temperature range recharge	0~55℃	
Maximum operating temperature range discharge	-30~50℃	
Pack parameters		
Cell configuration	1P48S	1P52S
Rated energy	48.2304kWh	52.2496kWh
Nominal voltage	153.6V	166.4V
Voltage range	120V~172.8V	130V~187.2V
Weight (approx)	336±5kg	346±5kg
Dimension (W*D*H)	L785*W1100*H480mm	
Battery system parameters		
Rated energy storage	241.152kWh	261.248kWh
System rated voltage	768V	832V
System voltage range	672V~864V	650V~936V

Standard charging / discharging current	157A	157A
Maximum charging / discharging current	157A	157A
Serial and parallel mode	1P*48S	1P*52S
The number of electric boxes contained	5	5

2.6.8. Electrical system

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

Table 2.3 Converter module parameters

	Model	PCS 100KW	PCS 125KW
DC side parameters	Maximum DC voltage	1000V	
	Minimum DC voltage	580V	
	DC voltage operating range	580V~1000V	
	Maximum current on the DC side	173A	216A
Communication side (grid connected)	Rated charging and discharging power	100kW	125kW
	Maximum charging and discharging power	120kW	150kW
	Rated charging and discharging current	145A	182A
	Maximum charging and discharging current	174A	217A
	Rated grid voltage	400V	
	Permissible grid voltage range	300~460V	
	Grid Frequency	50Hz/60Hz	
	Total harmonic distortion rate of current	<3% (at rated power)	
	Power factor	>0.99	
	Power factor range	-1~1	
	Overload capacity	1.2P, lasting for 1 minute	
Communication side parameters	Rated output voltage	400V	
	Voltage deviation	±2%	
	Voltage total harmonic distortion rate	<3% (linear load)	
System Parameter	Maximum efficiency	98.9%	
	Protection modes	DC reverse protection, AC short circuit protection, AC output over-current protection, insulation impedance monitoring, temperature protection	

	Surge protection	level 2
	Dimensions	H220*W444**D720mm
	Weight	≤58kg
	Topology	Transformerless
	Working environment temperature	-40~+60℃
	Protection level	IP20
	Work environment	Sinusoidal steady state oscillation: 2Hz≤f < 9Hz, Displacement 1.5mm; 9Hz≤f < 200Hz, Acceleration 5m/s2. GB/T 4798.3-2007 3M2
	Cooling type	Smart air cooling
	Maximum working altitude	4000m (over 3000m, reduced operation)
	Standby power	<12W
	Display	LED
	Communication method	Ethernet、RS485、CAN

Photovoltaic energy storage is suitable for remote areas, such as islands, mountainous areas, border guard posts or areas with unstable power supply, or new zero-carbon science and technology park systems. Users can configure DC converter power modules according to project requirements to realize the integrated power supply system of PV and energy storage. The parameters of DC converter power module are as follows:

Table 2.4 The module parameters of the DC converter

	Model	MPPT 120KW
DC low voltage side	Rated power	120KW
	Rated current	90A+90A+90A+90A
	Rated voltage	350V
	Maximum voltage	1000V
	Voltage range	150~1000V
	Minimum voltage at full power	340V
	Buck Mode Low Side Voltage Requirements	150V ≤ low voltage terminal voltage ≤ high voltage terminal voltage, up to 1000V
	Low voltage side starting voltage	150V
DC high voltage side	Rated power	100kW (Maximum 120KW)
	Rated current	200A
	Rated voltage	600V
	Maximum voltage	1000V
	Voltage range	350~1000V
	Full power voltage range	600~950V
	Voltage requirements for high voltage side in boost mode	1000V ≥ high voltage terminal voltage ≥ low voltage terminal voltage, minimum 350V
	High voltage side starting voltage	350V
System parameter	Protection and functionality	Reverse connection protection, fuse protection, over-current protection, over-voltage/under-voltage protection, overheating protection, low voltage side short circuit protection, insulation impedance detection
	Over-voltage level	Type II
	Basic working mode	Bidirectional constant power, bidirectional constant current, bidirectional constant voltage

	Circuit operation mode	4-channel parallel operation, 4-channel 90 ° staggered parallel connection
	Bidirectional bypass working mode	Comply bidirectional direct energy flow between low and high
	Forward and reverse switching time	Full load switching time 30ms
	Topological structure	Non isolated
	IP protection level	IP20
	Working temperature range	-30~+60 ℃ (>45 ℃ run at a reduced rate)
	Relative humidity	< 95%
	Maximum working altitude	4000m (>3000m run at a reduced rate)
	Maximum efficiency	> 99%
	Cooling method	Smart forced air cooling
	Communication method	RS485/CAN/Ethernet
	Display	LED
	Maximum parallel operation quantity	8 *2pcs
	Weight	25kg *2pcs
	Dimensions	W444mm * H130mm * D550mm *2pcs

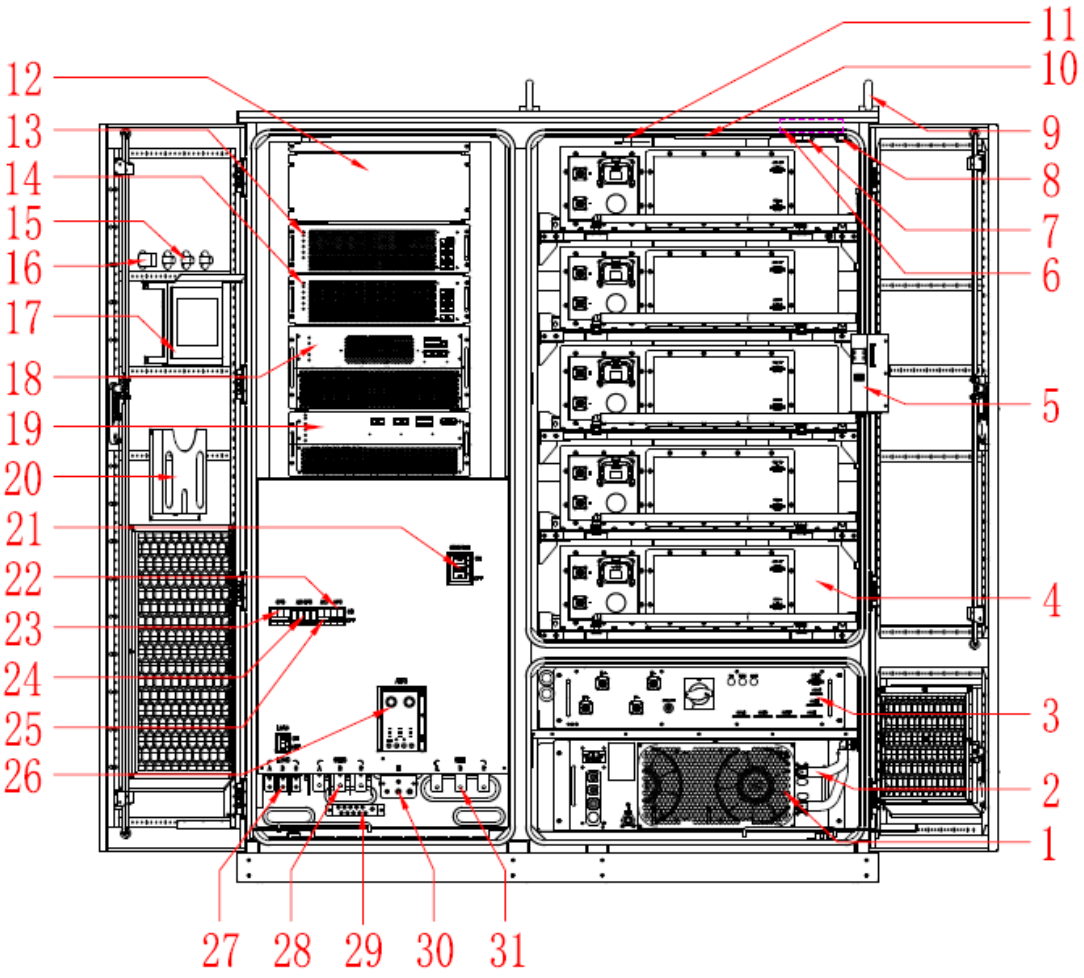
Table 2.5 STS Module Parameters

	Model	STS 200KW	STS 250KW
Electrical specifications	Rated grid side power	200kW	250kW
	Rated grid side current	304A	380A
	PCS side power	100kW	125kW
	Load power	100kW	125kW
	Rated grid voltage	380V/400V	
	Voltage range of power grid	±15%	
	Rated grid frequency	50Hz/60Hz	
	Grid frequency range	±5Hz	
	Long term overload capacity	110% (ambient temperature below 40 ℃)	
	Time of grid connection to off grid	<10ms	
	Wiring method	Three phase five wire	
	Maximum efficiency	99.5%	
system parameter	topological structure	Non isolated	
	Protection level	IP20	
	Working temperature range	-40-60 ℃ (>45 ℃ derating operation)	
	Storage temperature range	-40~70℃	

	relative humidity	0~95%, no condensation
	Maximum working altitude	4000m (>3000m derating operation)
	Cooling method	Intelligent air cooling
	Noise (typical value)	<70dB
	human-computer interaction	LED
	Communication method	RS485/CAN/EtherNet/DIO
	Weight	27kg
	Size	440mm*175mm*550mm
	Installation method	Modular rack installation

2.6.9. Environmental control system

The energy storage system is equipped with smoke detectors, water logging sensors, door magnetic sensors, and fire protection environmental control units to fully control the system's operating status. Schematic diagram of environmental control.



System:

Graph 2.2 Internal structure diagram of the cabinet

2.6.9.1. Precision air conditioning parameters

Table 2.6 Precision air-conditioning parameters

No	project	Unit	Data
1	Power supply system	1/PE AC 220V±10% 50Hz；1/PE AC 220V±10% 60Hz	
2	Maximum power/current	kW/A	2.8/13.4
3	standby power	W	≤20
4	Self circulating power	kW	0.2
5	Communication protocol	/	RS485
6	Refrigeration capacity	kW	5 (L35℃/W20℃)
7	Cooling power/current	kW/A	2.0/9.3 (L35℃/W20℃)

8	Heating capacity	kW	2
9	Heating power/current	kW/A	2.2/10.3
10	Working mode	Automatic control mode, cooling mode, heating mode, standby mode, self cycling mode	
11	Liquid temperature setting range	℃	15-35 (liquid temperature factory set at 20 ℃)
12	Refrigerant	R410A	
13	Condensed air volume	m3/h	1800
14	Noise	dB(A)	≤72
15	Rated flow rate	L/min	30
16	Rated pressure difference	kPa	100
17	protection grade	IP55 (electrical control cabinet)	
18	Medium	Concentration ≤ 60% ethylene glycol aqueous solution;	

2.6.9.2. 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 impulse withstand voltage	2.5kV
Operation frequency	Machinery/Electrical:20 Times/Component
Service environment	Temperature: -5℃ ~ + 40℃ relative humidity <90% RH (no condensation)

2.6.9.3. Water immersion detection device

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

Outside2.7 Immersion sensor parameters

Name	Parameter
Rated voltage	DC12V (Permitted range10V~15V)
Rated current	≤0.1A

Detection channel	1 Road,2 Core Leakage Cable
Response time	< 2s
Relay output	Normal Open, the contact capacity 1A 30VDC
Environment	Temperature: -10℃ ~ + 65℃ Relative humidity <95% RH (no condensation)

2.6.9.4. 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	Monitoring status red light flashes about 1 time every 6 seconds Red light is always on, fault status red light flashes about 2 times every 6 seconds
Service	Temperature: -10℃ ~ + 65℃ Relative humidity <95% RH

2.6.9.5. Dual power supply 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 LCW（kA）	10
Rated short-circuit making capacity LCM（kA）	17
Mechanical lifespan (times)	12000
Electrical lifespan (times)	3000
Contact transfer time	0.1~1S

2.6.9.6. Fire extinguisher system

The fire fighting system adopts aerosol fire extinguishing device, which is a new type of environmentally friendly fire fighting product with advanced level in the world. Working principle: When the ambient temperature reaches the starting temperature of the heat-sensitive line or contact with open flame, the heat-sensitive line will ignite spontaneously and pass to the aerosol series.

Aerosol fire extinguishing device. When the aerosol fire extinguishing device receives the activation signal, the internal fire extinguishing agent is activated, and the aerosol fire extinguishing agent is rapidly generated and sprayed out to realize rapid fire extinguishing.

Outside2.10 Fire-fighting aerosol parameters

Model	**QRR0.3GS**
Technical parameter	
Dimension	95mm×61mm×25mm
Working environment temperature range	-40℃~+90℃
Starting mode	Electrical start or thermal start
Relative humidity of the working environment	≤95％RH
Thermal start temperature	≥170℃
Fire extinguishing time	≤20s
Fire fighting density	60g/m³
Spit fall lag time	≤5s
Return signal	Passive switching signals
Nozzle temperature	Distance 5mm ≤200℃
Maximum protection space	0.5m³
Spitow heat spacing	≤200℃
Warranty	10 years
Name and content of oxidizing	Strontium nitrate 50%, potassium nitrate 10%

3. Installation and Wiring

3.1. Transportation and Handling

3.1.1. Product transportation

In order to keep the equipment in a better state of protection, it is recommended to use transportation with packaging.

Transportation of equipment should be carried out in accordance with the marking requirements on the packaging to prevent personal injury and equipment damage;

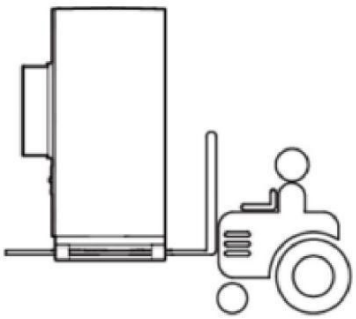
Energy storage batteries are not recommended for railroad transportation and air transportation. Speed limit for land transportation: 80km/h for flat road, 60km/h for rugged road, if there is any conflict, please refer to local traffic regulations.

3.1.2. Product handling

When using a forklift, make sure it has sufficient capacity and that the center of gravity of the equipment falls between the legs of the forklift to prevent personal injury and equipment damage;

For transit with battery, the forklift loading capacity needs to be ≥3t; for transit without battery, the forklift loading capacity needs to be ≥1.5t;

Recommended fork knife length ≥1.5m, width 80cm~160cm, thickness 25cm~70cm.



graph3.1Schematic diagram of handling

3.2. Packaging and storage

3.2.1. Product packaging

In order to keep the product in a better state of protection during transportation, it is packed in a specific wooden case. The following basic parameters (including but not limited to) are included on the equipment packaging and need to be checked carefully according to the project requirements:

Table 3.1 Packaging parameters table

Parameter	Explanation
Model	Product Model
Size	Post-packaging product dimensions
Weight	Total product weight after packaging
Characteristic	Face 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	Requirements
Storage temperature (without battery)battery)	-25℃~+60℃
Cell	20℃ ~ 30℃
Storage relative humidity	<95% (no condensation)
Altitude	< 3000m

Note: Long-term storage of batteries is not recommended. Long-term storage of lithium batteries will cause capacity loss. After 12 months of storage at the recommended storage temperature, the

Rrreversible capacity loss is generally 3%~10%. The total storage and transportation time of the battery pack shall not exceed 8 months (calculated from the time of shipment). If it exceeds 8 months, it is necessary to recharge and calibrate the SOC, and the minimum SOC needs to be replenished to 50%. If the recharge is not performed as required, the performance and service life of the battery may be affected.

3.3. Installation environment requirements

The installation layout of the energy storage system must meet the fire protection distance or firewall requirements specified by local standards, including but not limited to "GB 51048-2014 Design Specifications for Electrochemical Energy Storage Power Stations" 《NFPA 855 Standard for the Installation of Stationary Energy Storage Systems》。The energy storage system is only suitable for outdoor scenarios and needs to be deployed outdoors. It does not support indoor deployment. The general requirements for site selection are as follows:

- The installation location should be above the highest historical water level in the area. The distance to the airport, landfill, river bank or dam should be ≥2km
- Choose a well-ventilated place. When the equipment is running, do not block the vents and cooling system to prevent high temperature fire. There is enough installation space to ensure that surrounding equipment will not be affected by the heat generated by the product; the installation location ensures that there is enough space for external wiring. It has convenient transportation conditions and reliable fire suppression system equipment.
- The installation location should be far away from fire sources, and flammable and explosive items should not be placed around the device. If the device is installed in a place with lush vegetation, in addition to routine weeding, the ground under the device needs to be hardened to prevent weeds from growing.
- Do not install energy storage systems outdoors in salt-damaged areas to prevent corrosion of the equipment

and fire. Salt-damaged areas refer to areas within 2 km from the coast or affected by sea breezes.

- The energy storage system must be equipped with protective measures such as fences and walls, and safety warning signs must be erected for isolation to prevent unauthorized personnel from entering during equipment operation, which may cause personal injury or property loss.
- The equipment should be installed in an area away from liquids. It should not be installed under water pipes, air outlets, or other locations where condensation is likely to occur. It should not be installed under air conditioning outlets, vents, or computer room outlet windows, or other locations where water is likely to leak, to prevent liquid from entering the interior and causing a short circuit in the equipment.

Explanation

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, scenarios that are not recommended, including but not limited to the following lots, areas, and venues:

- Strong vibrations, strong noise sources and strong electromagnetic field interference areas.
- Places that produce or have dust, lampblack, harmful gases, corrosive gases, etc.
- Places where dust, fumes, harmful gases, corrosive gases, etc. are generated or present.
- Places where corrosive, flammable or explosive substances are produced or stored. Within the blasting hazard.
- Places where underground facilities are already in place. Densely populated places, high-rise buildings, underground buildings.
- Undesirable geologic conditions such as rubbery and weak soils, ground prone to waterlogging and subsidence.
- Earthquake faults and seismic zones with a defense intensity higher than nine degrees. Sections with direct hazards such as mudslides, landslides, quicksand and caves.
- Important sanitary protection areas for water supply sources.
- Historical Monuments and Sites Conservation Area.

If there is no more suitable site, it is recommended to install a firewall with a fire resistance of not less than 3h for safety protection, and also consider the space requirements for transportation, installation and maintenance of the equipment. It is recommended to refer to T/CEC 373-2020: the length and height of fireproof wall should exceed the outline of energy storage cabinet by 1m each.

3.4. Pre-installation preparation

1)Before installing the product, you need to check whether the product is intact or not. If you find any signs of damage, please keep the evidence and contact us.

2) If there is no abnormality in the product, please check according to the delivery list to see if the accessories are complete.

Table 3.3 Delivery list

No.	Name	Quantity	Remarks
1	Outdoor cabinet energy storage system	1 set	Include cabinet door key
2	User manual	1 pcs	

3)Before installation, users need to prepare the relevant installation tools

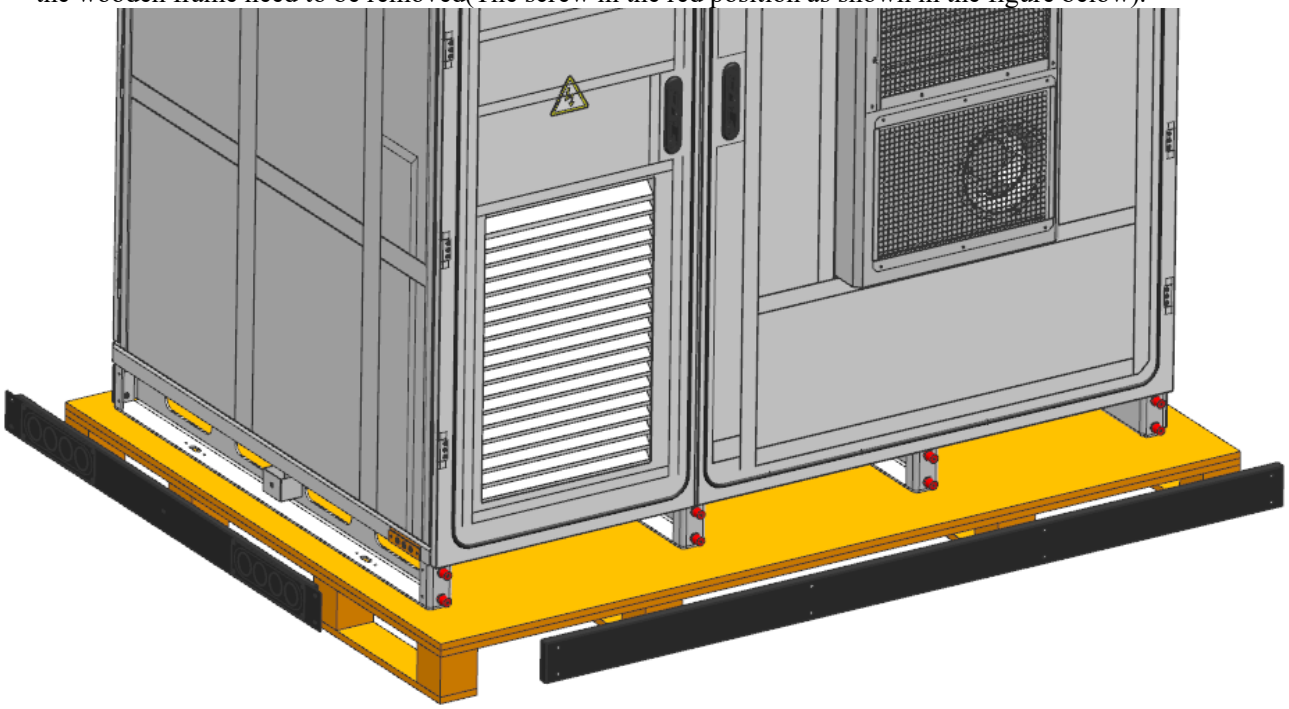
Table 3.4 Chestlist of installation tools

No.	Name	Quantity	Remarks
1	Screw Knife Set	1 set	
2	Jacket	1 pcs	
3	Multimeter	1 pcs	
4	forklift	1 pcs	
5	Screws, Nuts, Spacers	Several	

3.5. Mechanical installation

3.5.1.Handling matters

All kinds of equipment inside the energy storage integrated cabinet have been installed and fixed inside the cabinet before leaving the factory. When transporting, the energy storage integrated cabinet can be lifted and transported as a whole. Before installation, the screws fixing the energy storage integrated cabinet to the wooden frame need to be removed(The screw in the red position as shown in the figure below).



- Ensure that the cabinet doors and side panels are securely locked.
- Choose the appropriate forklift, crane, or lifting tool based on the site conditions. The selected tool must have sufficient load-bearing capacity, arm length, and rotation radius.
- If you need to move on a slope, additional traction devices may be required.
- Clear all obstacles that exist or may exist during the movement process, such as trees, cables, etc.
- Liquid cooled energy storage integrated cabinets should be transported and moved as much as possible during good weather conditions.
- Be sure to set up warning signs or tapes to prevent non staff from entering the handling work area, in order to avoid accidents.

3.5.2.Prepare the foundation

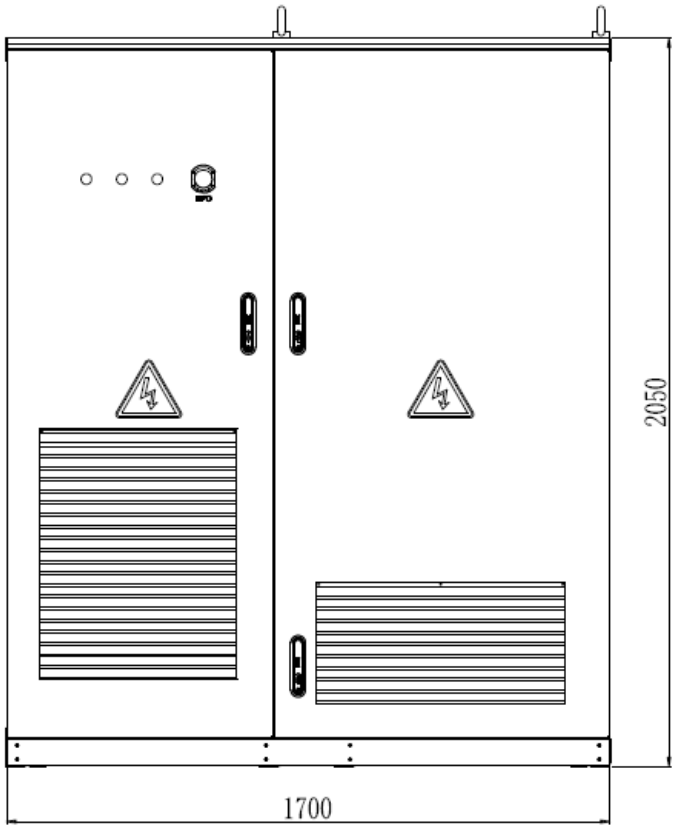
3.5.2.1.Site selection requirements

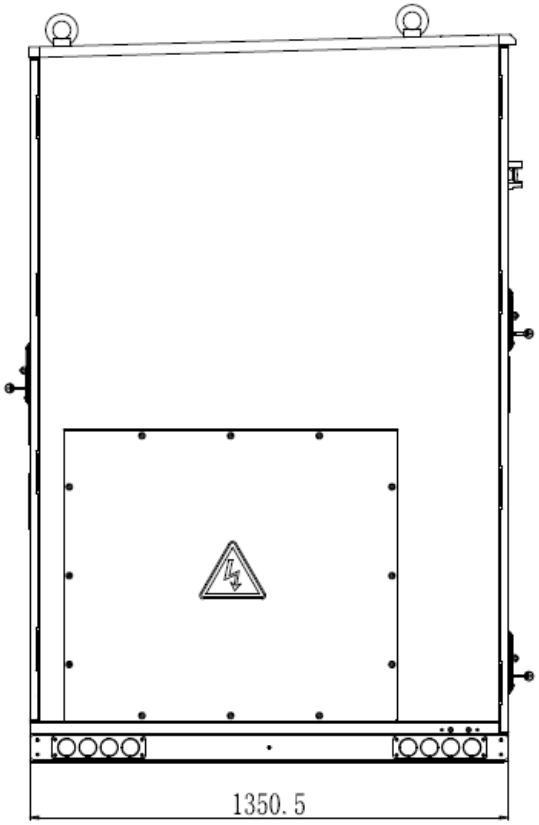
When choosing an installation site, please follow at least the following principles:

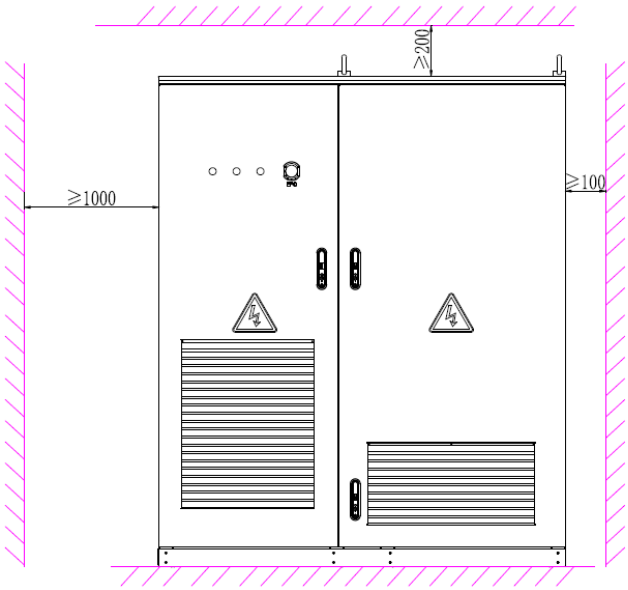
- Do not plant trees in close proximity to the installation site. To prevent strong winds from knocking down tree branches or leaves from blocking the doors or air inlets and outlets of the liquid cooled energy storage integrated cabinet.
- The installation site should be equipped with a drainage system to prevent the bottom of the cabinet or equipment inside the cabinet from being soaked in water during rainy seasons or heavy rainfall.
- The climatic environment and geological conditions (such as stress wave emission and groundwater level) of the installation site of the liquid cooled energy storage integrated cabinet should be fully considered.
- The surrounding environment is dry, well ventilated, and away from flammable and explosive areas.
- The soil at the installation site needs to have a certain degree of compaction. If the soil is loose, please take measures to ensure the stability of the foundation.

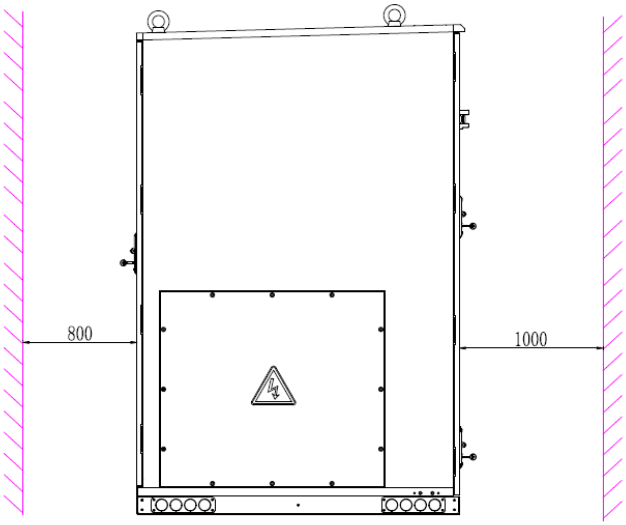
3.5.2.2.Space requirements

The following figure shows the minimum space requirements for installation and operation, and the equipment space requirements also need to meet the site selection requirements. Please refer to the site selection requirements.









3.5.2.3.Foundation requirements

Before constructing the foundation, a detailed investigation of the site's various conditions (mainly referring to geological and environmental climate conditions, etc.) should be conducted. Only on this basis can the design and construction of the foundation begin.

Unreasonable foundation construction plans will bring significant difficulties to the placement, opening and closing, and later operation of liquid cooled energy storage integrated cabinets. Therefore, the installation foundation of the liquid cooled energy storage integrated cabinet must be designed and constructed according to certain standards in advance to meet the requirements of mechanical support, cable routing, and later maintenance and repair.

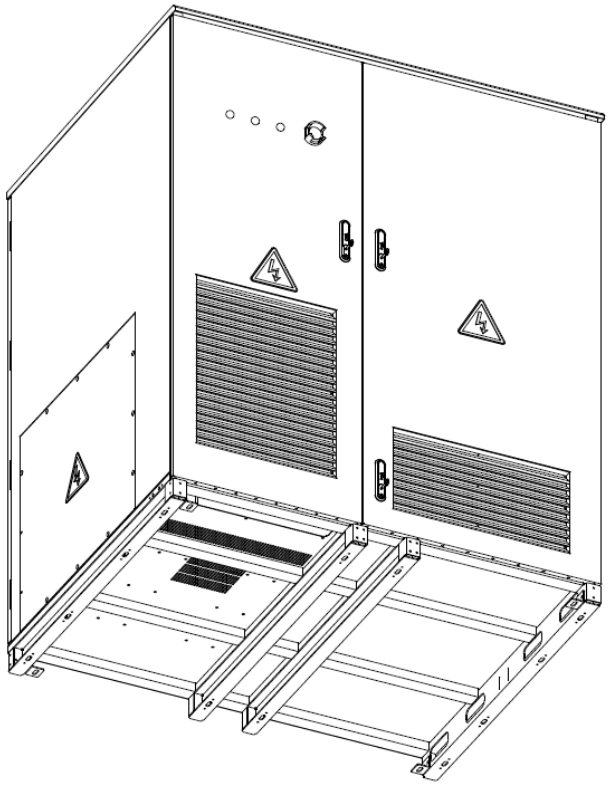
At least the following requirements should be met when constructing the foundation:

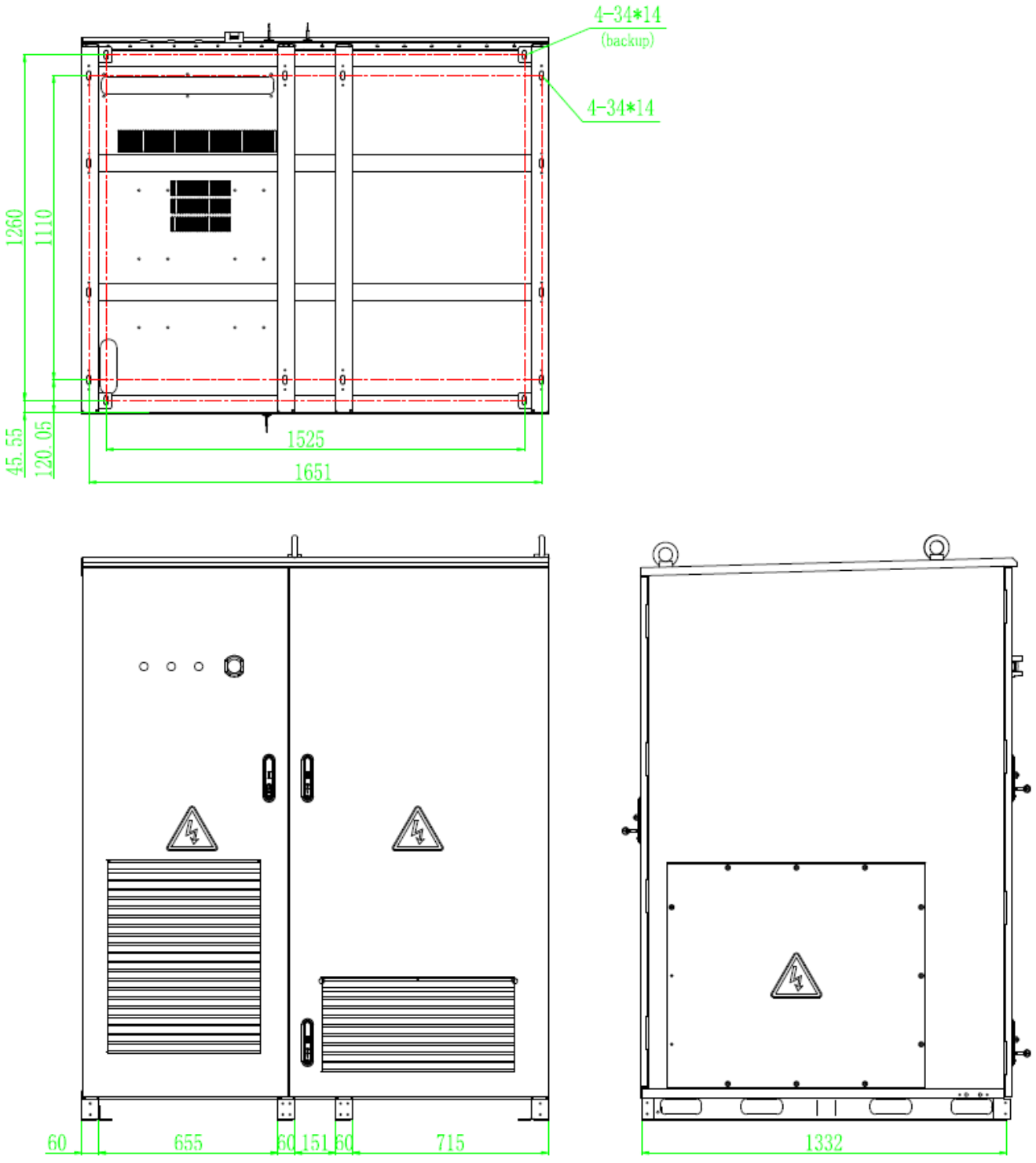
- The bottom of the foundation pit for building the foundation must be filled and compacted.
- The foundation should be sufficient to provide effective load-bearing support for the integrated energy storage cabinet.
- The foundation should have a certain height to raise the liquid cooled energy storage integrated cabinet and prevent rainwater from eroding the base, cabinet, and internal equipment of the energy storage integrated cabinet. It is recommended that the foundation be raised at least 300mm above the horizontal ground level after construction at the installation site.
- Corresponding drainage measures should be constructed based on local geological conditions.
- Build a foundation with sufficient cross-sectional area and depth. The depth of the foundation is determined by the construction party based on the site geology. When constructing the foundation, consideration should be given to the wiring of incoming and outgoing cables for the energy storage integrated cabinet, and reserved trenches or entry holes.

3.5.2.4.Install integrated cabinet

After confirming that the foundation construction meets the requirements and is sufficiently dry, sturdy, and flat, transport the liquid cooled energy storage integrated cabinet to the designated location. Use expansion bolts to fix the liquid cooled energy storage integrated cabinet to the foundation at the installation hole position on the base. The position and size of the installation hole on the base are shown in the following figure.

We recommend using M12×100 screw expansion bolts. Expansion bolt torque standard: 70N · m.



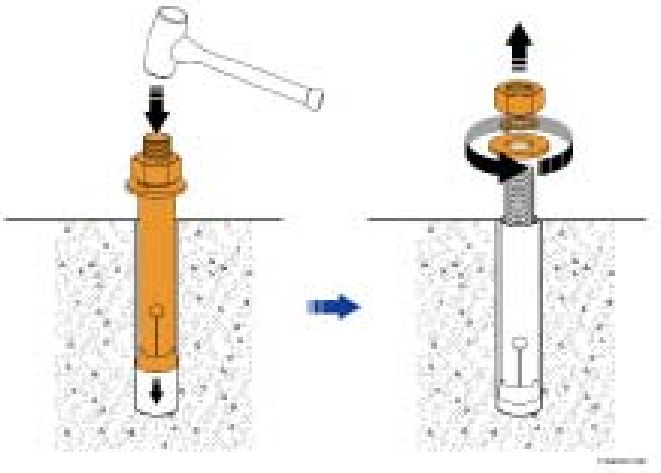


3.5.2.4.1. Drill holes on the foundation according to the installation hole position and size.

To prevent dust from entering the human respiratory tract or falling into the eyes during drilling, operators should wear protective goggles and dust masks.

Use a vacuum cleaner to clean all the dust inside and outside the holes, then measure the hole spacing. For holes with large errors, they need to be repositioned and drilled.

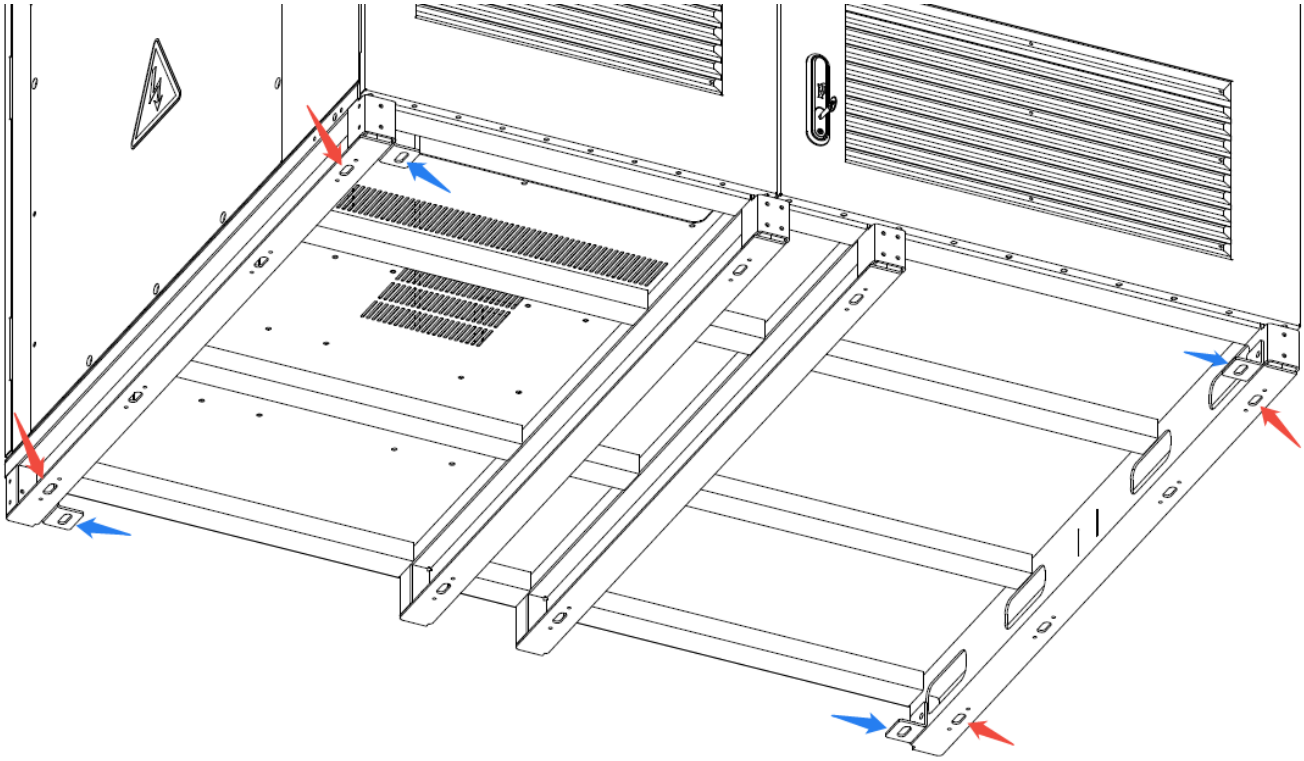
3.5.2.4.2. Implant expansion bolts.



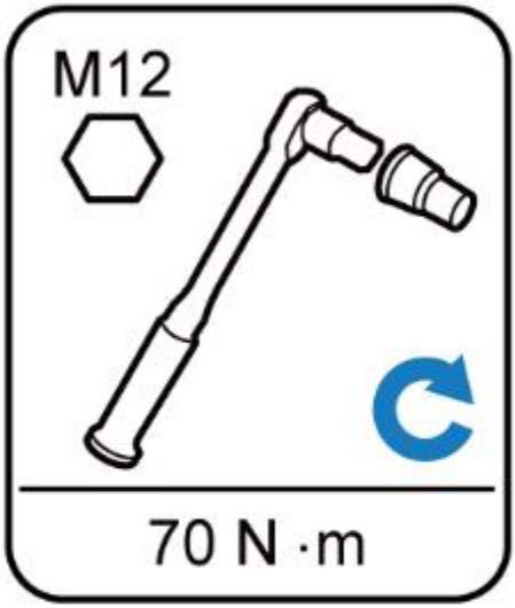
When inserting expansion bolts, the upper end face of the expansion tube must be level with the ground and not protrude from the ground, otherwise it will cause the power cabinet legs to be placed unevenly on the ground.

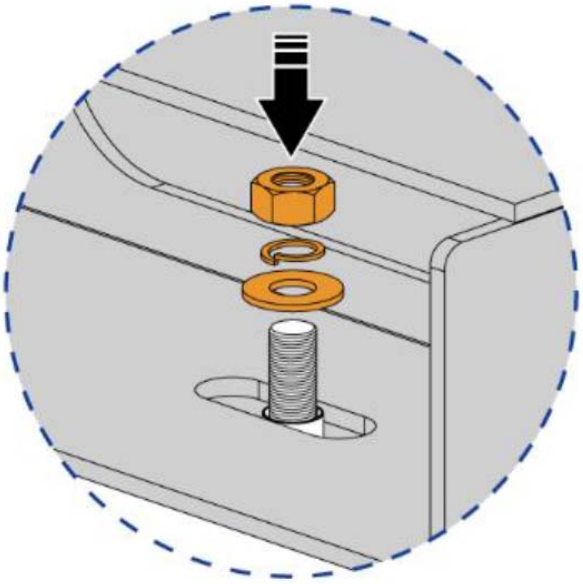
3.5.2.4.3. Place and fix the liquid cooled energy storage integrated cabinet.

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.



Installation method: choose one of the two
External installation on both sides (red arrow)
Installation on both sides of the interior (blue arrow)

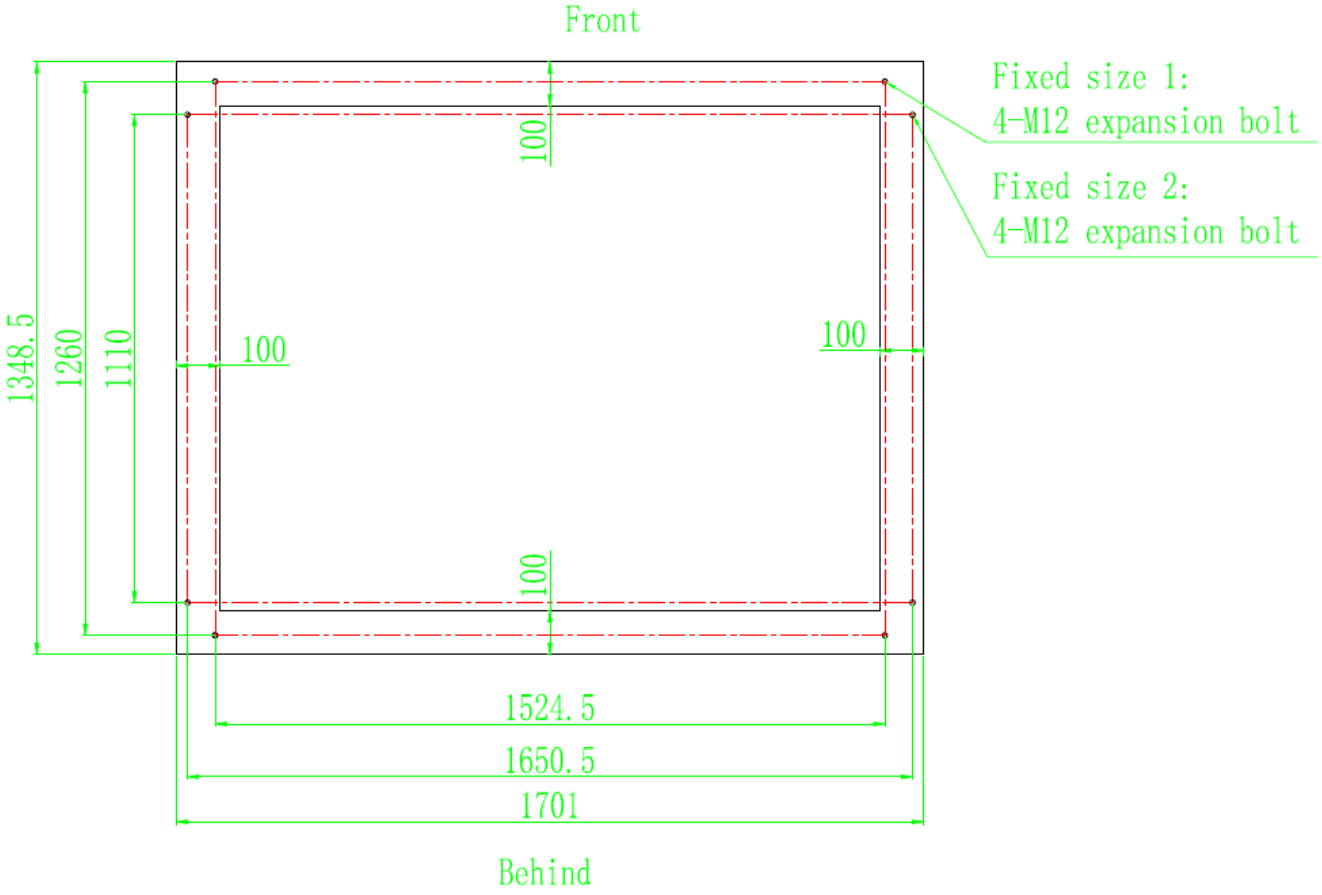

M12
70 N·m

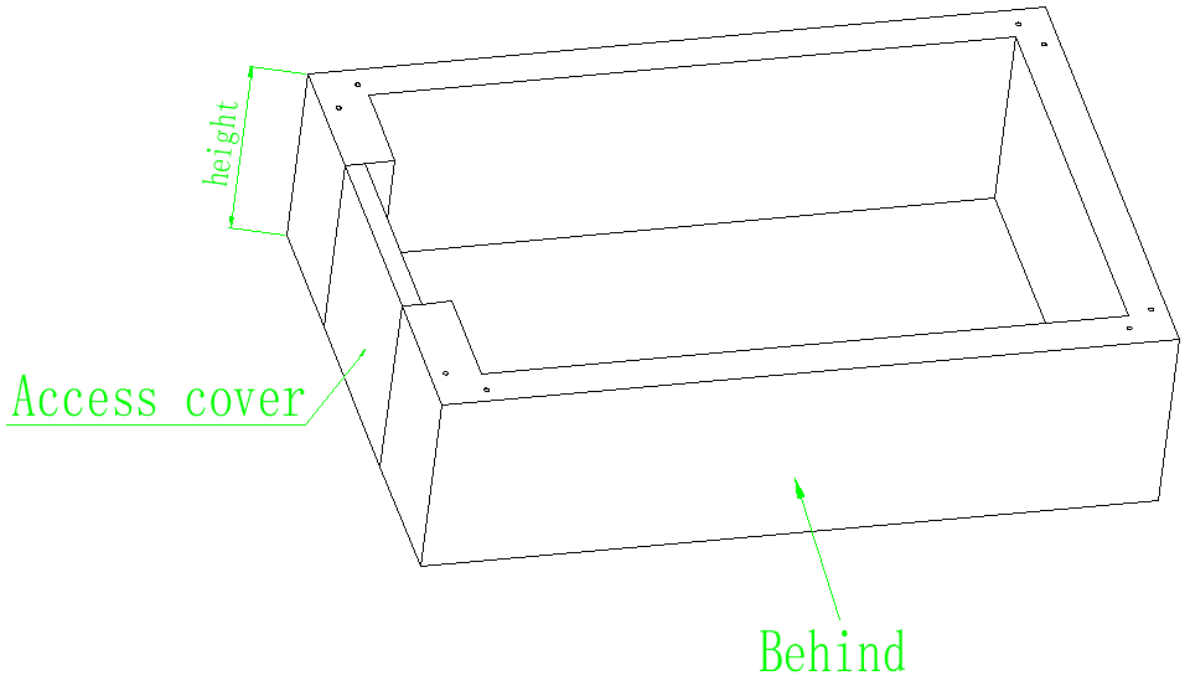


3.6. Infrastructure Promotion

3.6.1 Infrastructure

It is recommended that the infrastructure be arranged as shown in the following diagram,The height and size of the infrastructure should be determined based on the local terrain elevation and constructed accordingly.





3.7. Electrical cable installation

This product adopts the structure of integrated machine, the internal wiring of DC side has been completed, only the installation of AC side and external communication cable is required on site. Our company provides wiring reference as shown in Table 3.5 according to the product power and cable specifications. Cable diameter selection should be in accordance with local cable standards. Factors affecting cable selection include rated current, cable type, laying method, ambient temperature, and maximum acceptable line loss.

Table 3.5 Comparison of Cable Diameter and Bolts

Model capacity	eBank-241L Cable size	eBank-261L Cable size	Bolts size
Load cable	≥70mm²	≥70mm²	M8
Grid cable	≥120mm²	≥150mm²	M10
Gen cable	≥120mm²	≥150mm²	M10
Null cable	≥120mm²	≥150mm²	M8
Earth cable	≥70mm²	≥70mm²	M8
PV cable	≥6mm²	≥6mm²	MC4

Danger:

Refer to the following recommendations when performing electrical installations:

(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 make sure 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 torque 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

eBank inlet and outlet wiring mode is bottom-up, after removing the switch baffle, as shown in Fig. 3.5, the diameter of A/B/C/N/PE copper row at the bottom of the switch is reserved for reference in Table 3.5 for customers' wiring or drilling according to the customer's required dimensions; the protection grounding wire is connected to PE copper row, and the equipment grounding impedance meets the requirements of GB 50054 and the local electrical standards.

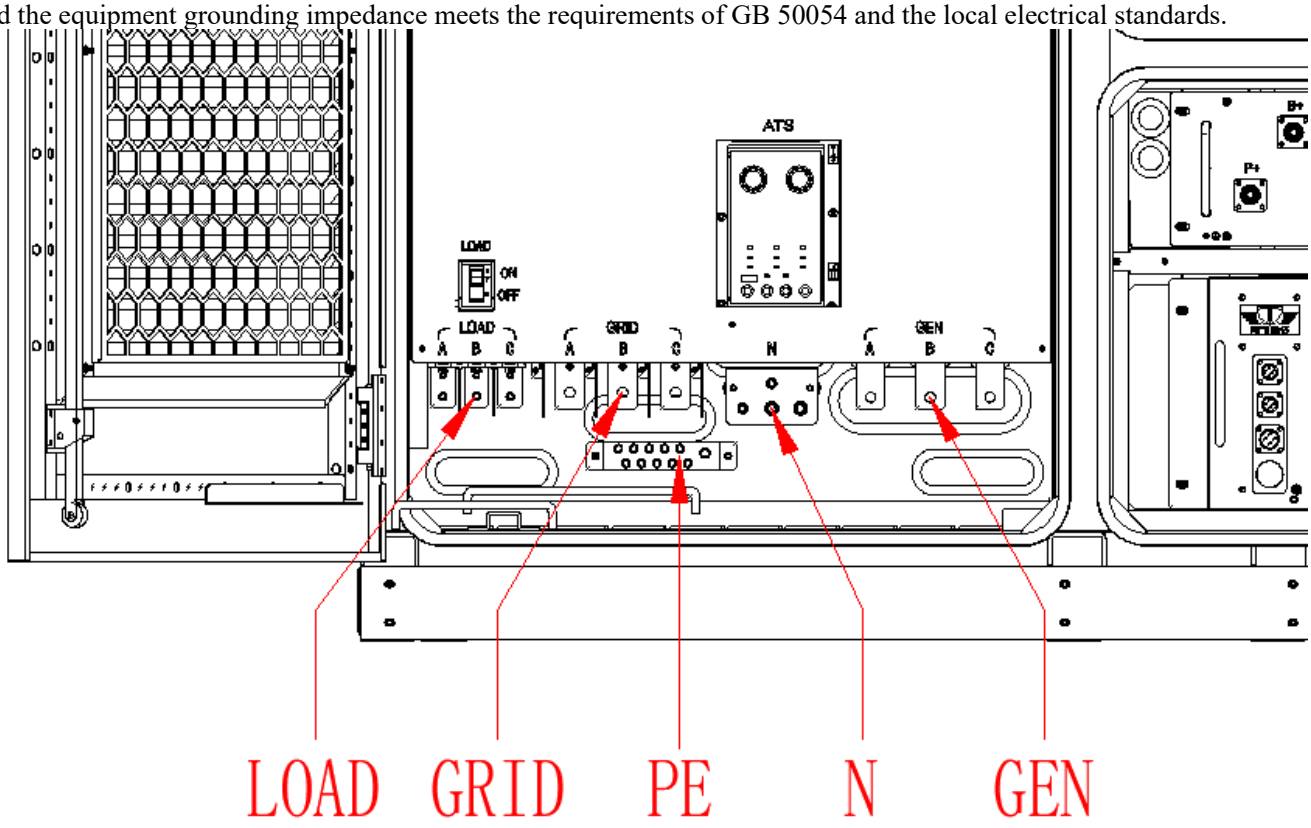
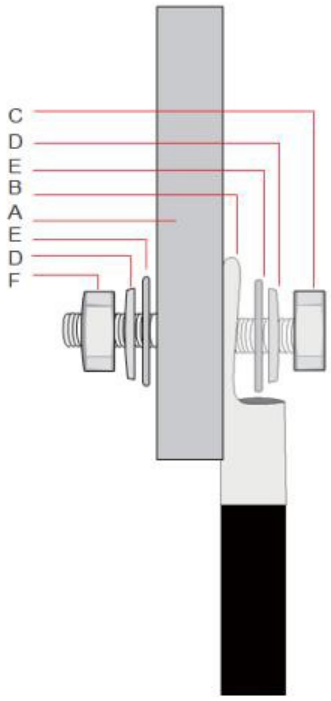


Figure3.5 A/B/C/N/PE switch

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



序号	名称
A	铜排
B	接线端子
C	螺钉
D	弹垫
E	大平垫
F	螺母

Terminal installation　　Name of each component of the wiring terminal

Figure3.6 Installation sign of the fixing screws

Please note:

- 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. Front line cable connection during startup

To avoid accidents during product transportation, the power cord harness of the battery pack will be disconnected. Please first check that the cable protective layer packaging is intact and free from obvious damage, and then connect the battery power cord as shown in Figure 4.1.

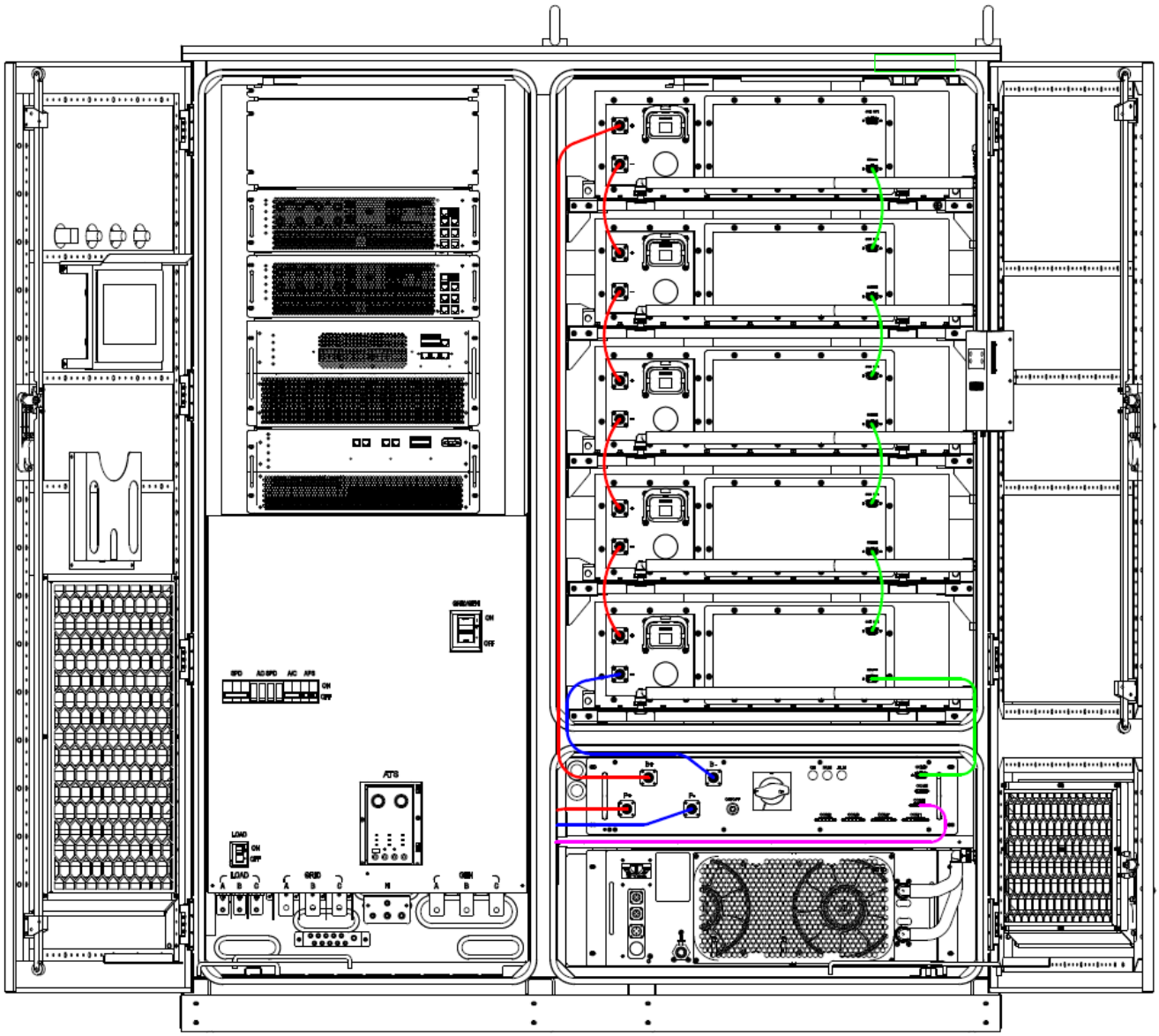


Figure4.1 Wiring diagram of battery pack power harness

4.2. Pre-startup inspection

Before running the product, please make sure that the product has been installed in accordance with the specification requirements, and comprehensively and carefully check the machine to ensure that the indicators meet the requirements before starting the machine.

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.

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.

4.2. Boot operation

The operation process for starting up and running the product is as follows(If this feature is not available in this version, please ignore this step):

1) Use a multimeter to check that the grid voltage is within the predetermined range (400V±10%);

2) Close the APS switch and auxiliary switch SPD, and close the GRID AC plastic shell switch to complete the soft start of the transformer.

3) Wait for the touch panel to start up (about 30 seconds) and confirm that the display is normal and there are no fault alarms;

4) Turn off the battery auxiliary power switch, high voltage box battery load switch (turn to ON position), and turn on the battery in “Data”->“Battery Data”. Turn off the diesel generator switch, turn off the load switch, and turn off the PV PV 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 all electrical structures of the equipment are installed to meet the starting conditions, the initial operation must be energized in order to ensure the reliable and stable operation of the energy storage system, 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 PCS, battery and air-conditioning parameters during operation, and stop the machine immediately if detect any fault.

4)Run 0.5 hour;

5)Set the active power to -5% The battery presses the system 5% The rated power charge.

6)Observe the screen during the run PCS, Battery and air conditioning parameters, if there is abnormal timely stop detection;

7)Run 0.5 hour;

8)After completing the 1-hour test run without any abnormality, turn off the system in the “Switch” screen;

9)According to the project background and demand, you can choose the local manual power control mode, automatic peak shaving mode or backup mode for formal operation, and click “System On” in the system interface.

4.4. Shutdown operation

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

1)Click the touch screen switch interface and click "System shutdown";

2)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 bar to finish discharging, the touch screen goes out, and the unit completes shutdown.

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 4.3 , 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.

☞Explanation

After pressing “EPO” emergency shutdown, you need to turn off the AC/DC molded case switch, auxiliary power switch, high-voltage box battery load switch, and wait for 10 minutes before turning on the machine!

5. EMS Operation and operation

5.1. Wiring Instructions

EMS is equipped with Android 10 mainstream operating system, featuring a higher system version, lower memory occupation, higher operating efficiency, etc. Equipped with 10.1-inch full-view LCD screen, 3-point anti-interference capacitive touch, the whole machine has ESD class 3, EFT class 3, surge class 3. The whole machine is fully enclosed design, touch surface IP65 dust-proof and waterproof. Structure occupies little space, easy to install, suitable for flush mounting, can meet the indoor, semi-outdoor environment.

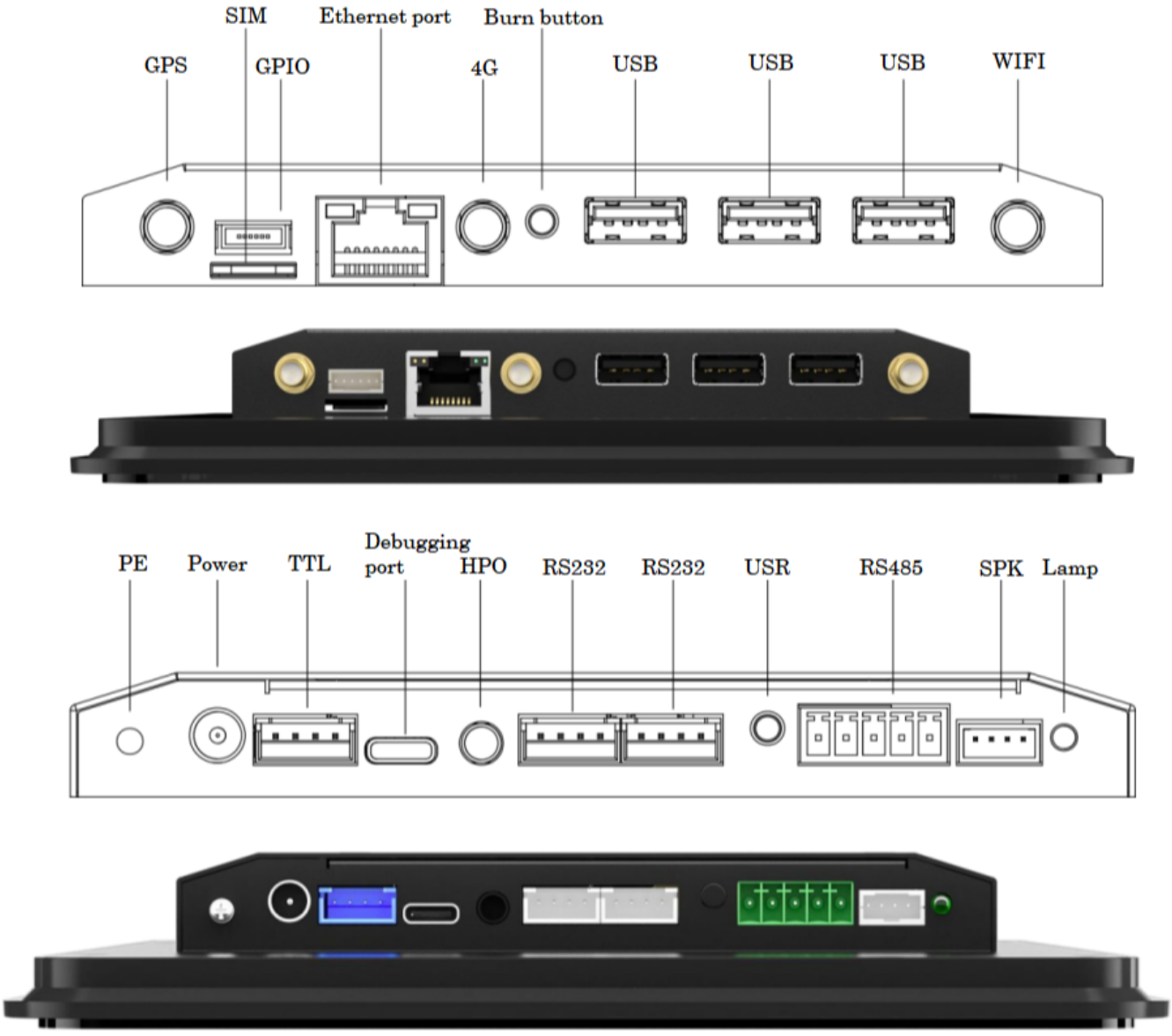


Figure 5.1 EMS display wiring diagram

5.2 Description of the data page

5.2.1. Home

Click the "Home" icon in the red box in the menu below to display the power plant topology, or click the enlargement icon in the upper right corner to display it in full screen.

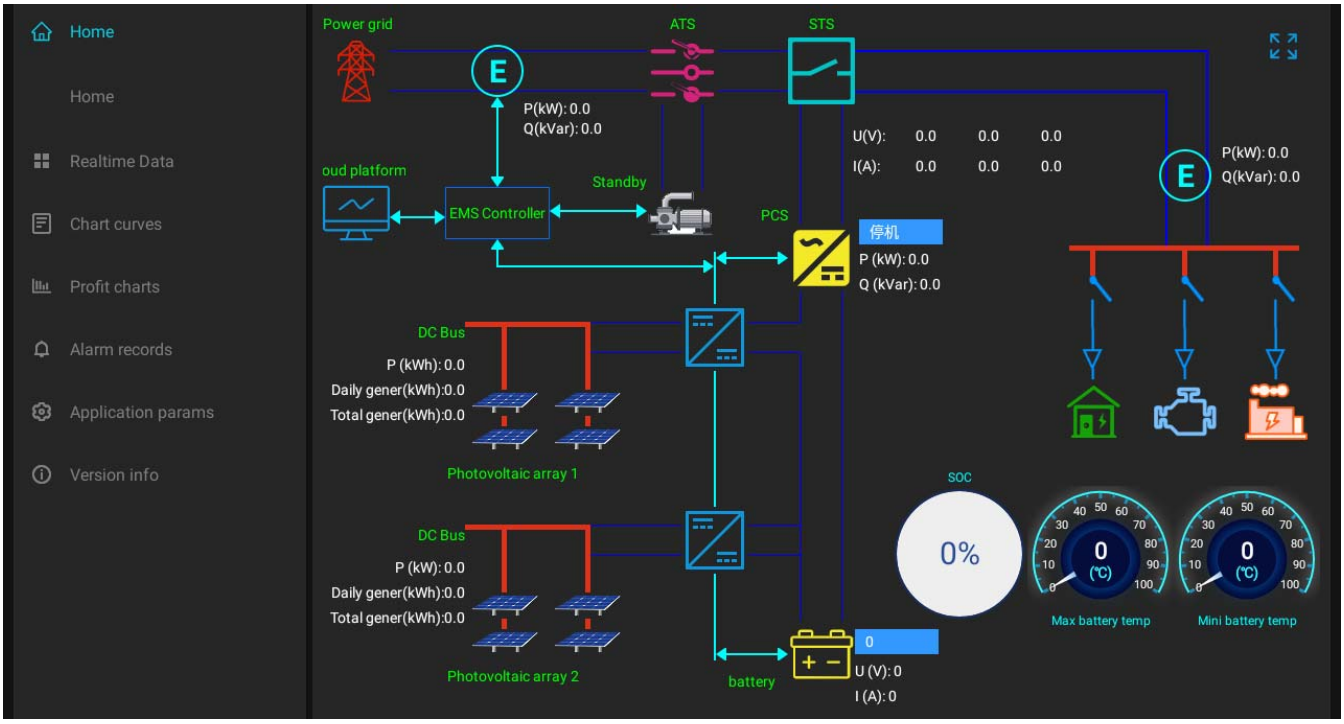


Figure 5.2 Home

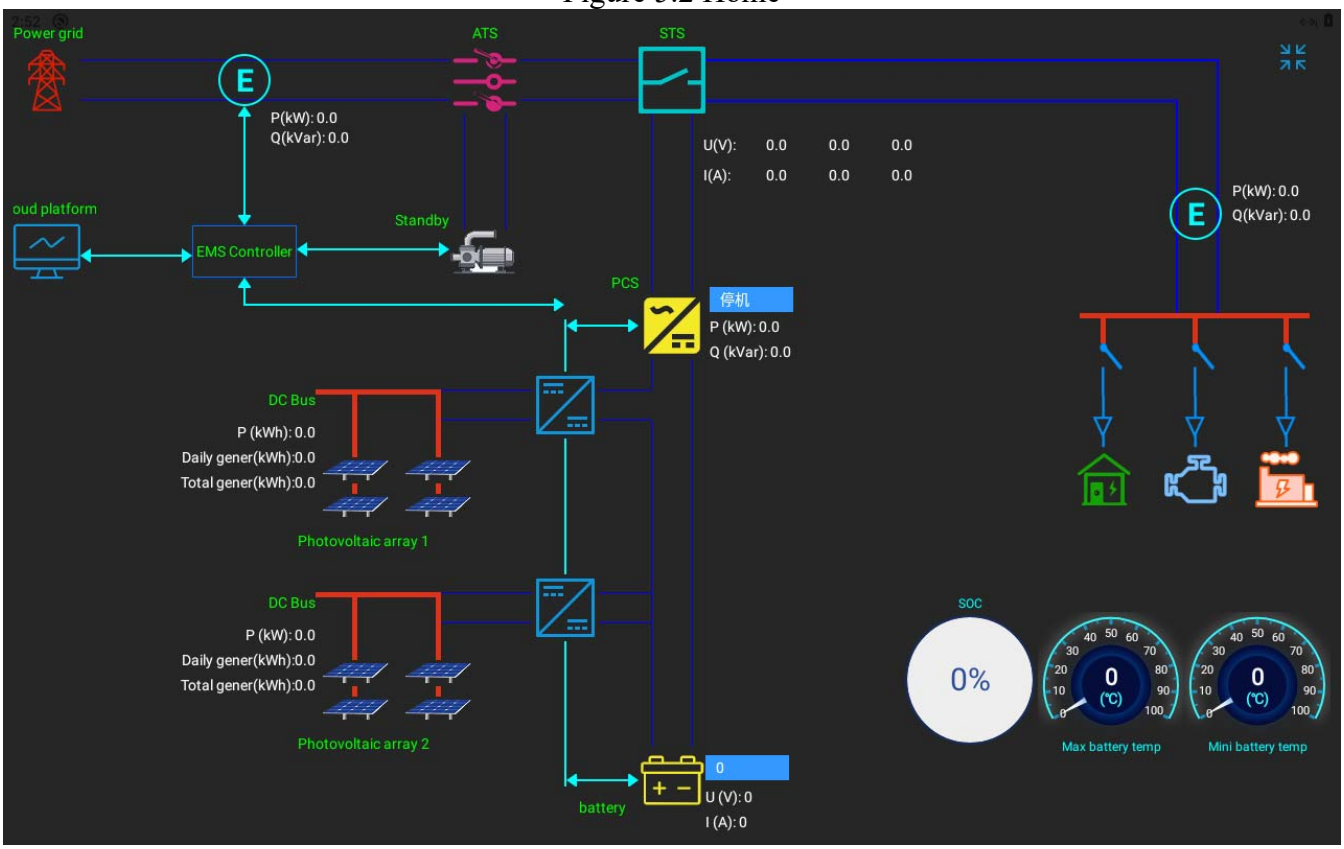


Figure 5.3 Full screen display

The data is refreshed every 3 seconds, and the screen drives the energy animation according to the on-site working conditions. There are a total of 7 segments of energy flow display as follows.

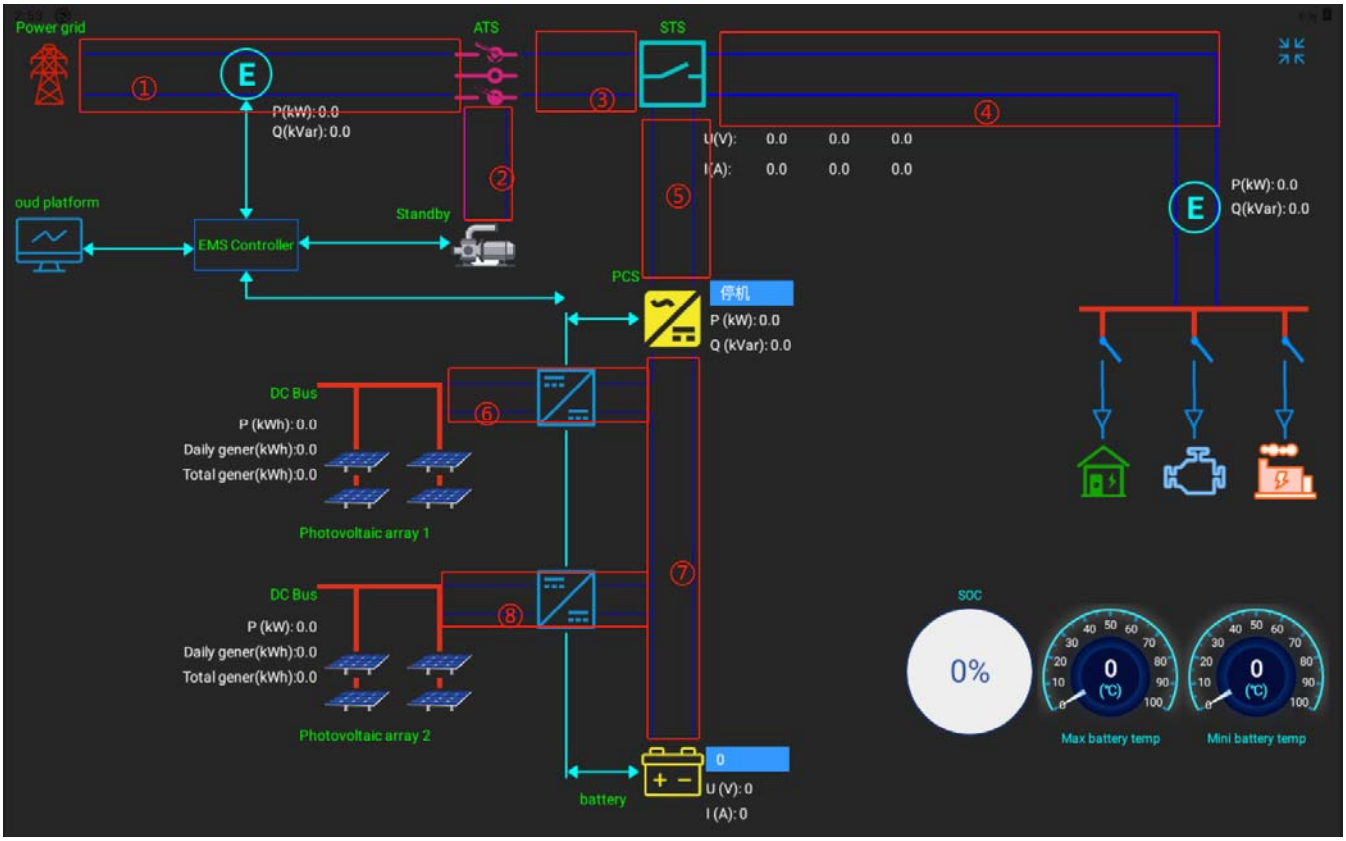


Figure 5.4 Energy flow section

All energy flow segments follow the same rules and have three states, namely: 0: still 1: forward flow 2: reverse flow, where the horizontal flow from left to right is forward and the vertical flow from top to bottom is forward, otherwise it is reverse.

Energy flow segment number	Status Description	State variable value range
1	0: No current on the grid side 1: Current flows from the grid to the micro grid 2: Current flows from the micro grid to the grid	【0/1/2】
2	0: The engine is not generating electricity 2: The diesel engine is generating electricity	【0/2】
3	0: The grid or the diesel generator has no power to supply the load 1: The power grid or the diesel generator has power to supply the load 2: The battery or photovoltaic power is output to the grid	【0/1/2】
4	0: No load 1: There is load power consumption	【0/1】
5	0: PCS no output 1: Charging 2: Discharge	【0/1/2】
6	0: No photovoltaic output 1: Photovoltaic power generation	【0/1】
7	0: Battery idle 1: Charging 2: Discharge	【0/1/2】

5.2.2. Real-time data

Click on the "Real-time Data" indicated by the red box in the menu below to display the "PCS Data" in the real-time data. Click on the secondary menu on the left to switch sub-items one by one.

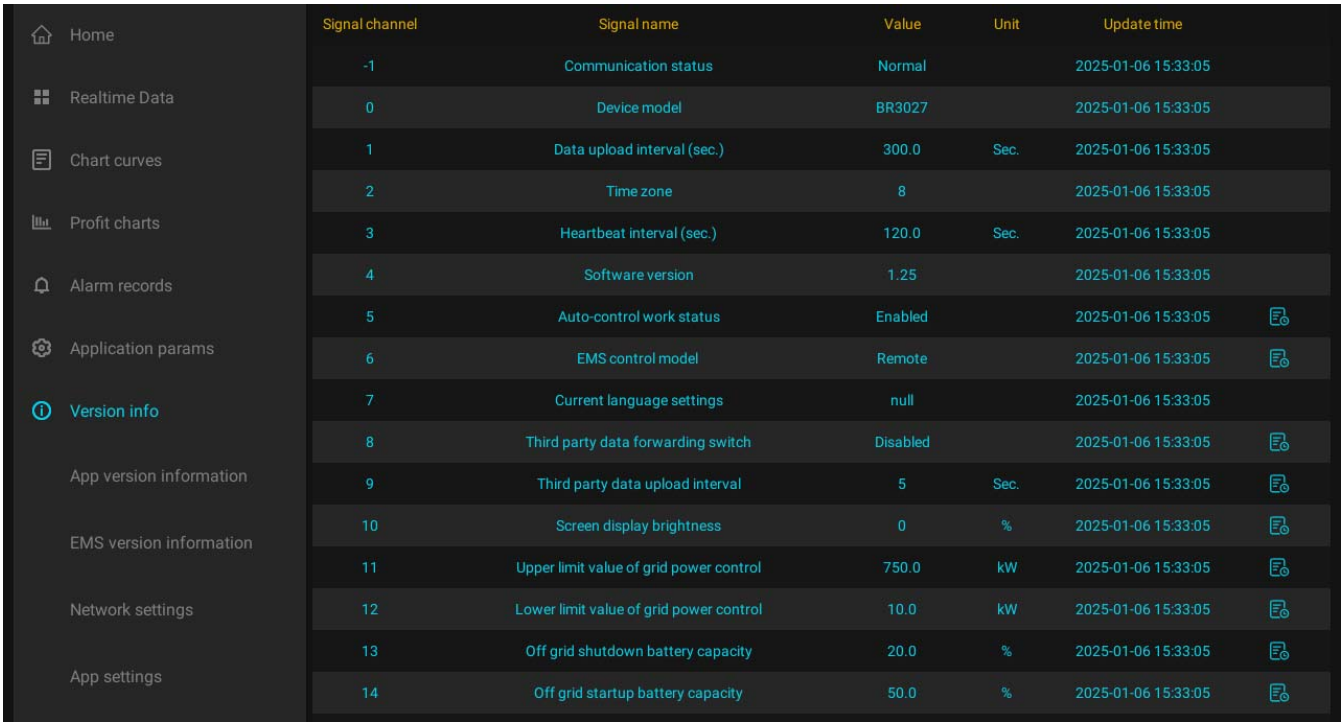


Figure 5.5 Real-time data-PCS data

The real-time data of all connected devices can be queried here. The content displayed by a single device can be configured, and the data refresh cycle is 1 second.

Click the text button on the right to view the historical data of a single data, which can be displayed in the form of a curve or a table: as shown below:

Figure 5.6 Real-time data-data curve

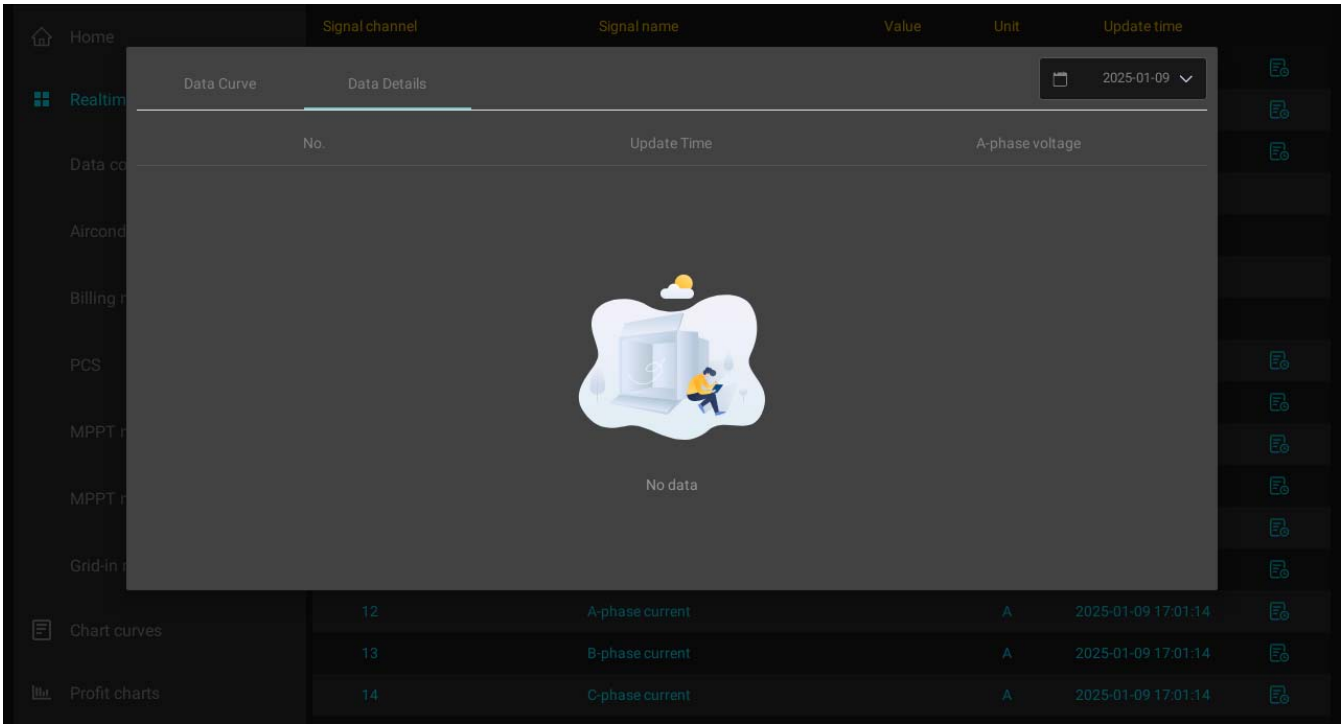


Figure 5.7 Real-time data-historical data

5.2.3. Chart curve

(1) Historical data: Click "Historical data" indicated by the red box in the menu below to display the real-time data of all devices. Click ① to select a device, and click ② to select the value of a single type of data.

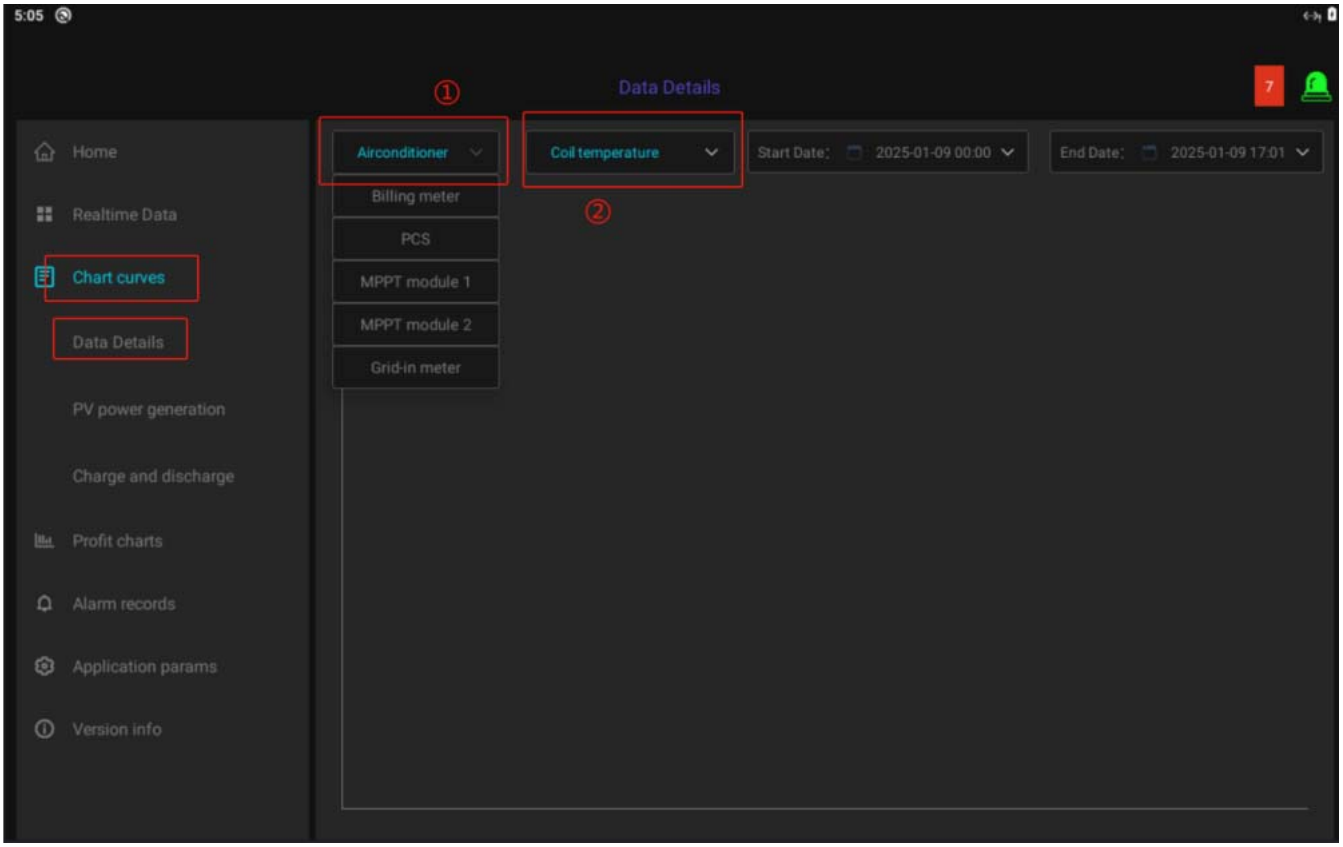


Figure 5.8 Chart curve - historical data

Support time selection, click the button in the red box in the figure below, and the time selection box will pop up. When selecting time, the end time must be greater than the start time.

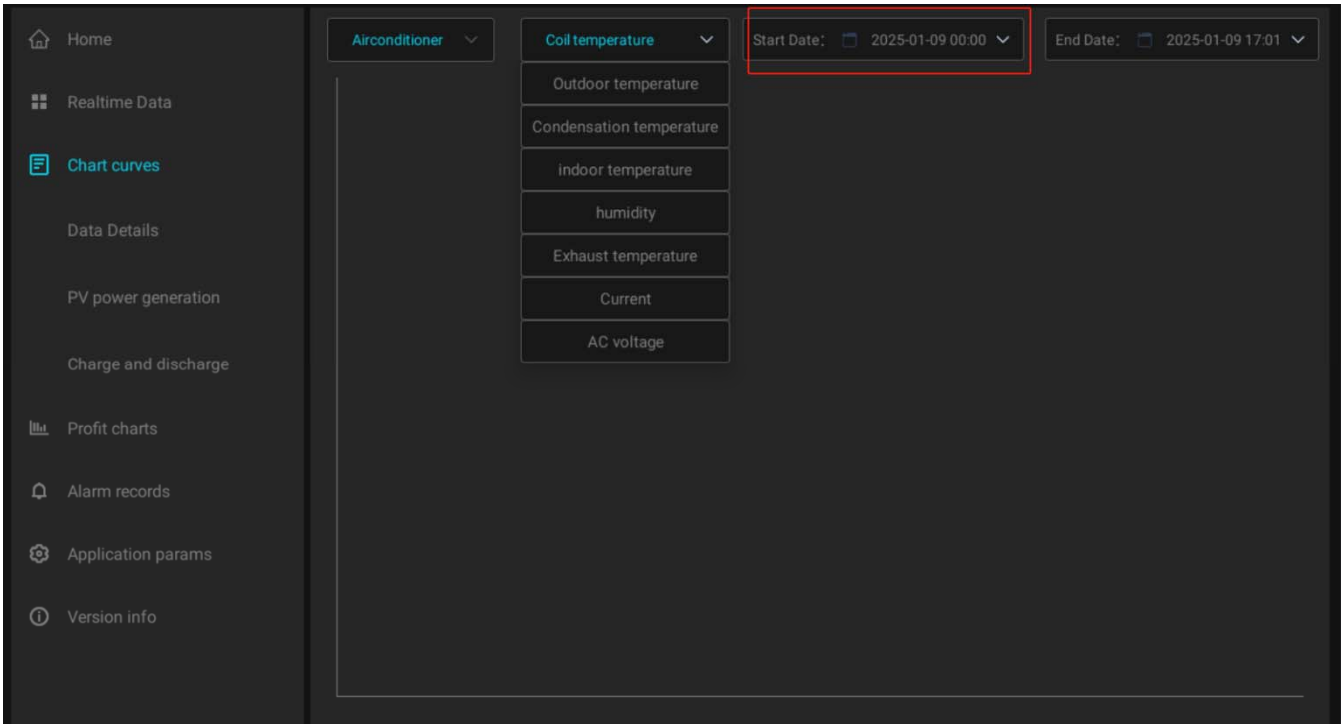


Figure 5.9 Chart curve - historical data - time selection

(2) Photovoltaic power generation: Displays the photovoltaic power generation. Click to select the time you want to view. Supports daily, monthly, and annual data. Daily data indicates the historical data of the day, monthly data indicates the historical data of the month, and annual data indicates the historical data of the year.

Figure 5.10 Graph curve - photovoltaic power generation

(3) Charge and discharge capacity: Displays the battery charge and discharge capacity. Click the red box to select the time you want to view. Supports daily, monthly, and annual data. Daily data indicates the historical data of the day, monthly data indicates the historical data of the month, and annual data indicates the historical data of the year.

Figure 5.11 Graph curve - photovoltaic power generation

5.2.4. Revenue Statistics

（1）Cycle Charge/Discharge Capacity: Click “Cycle Charge/Discharge Capacity” shown in the red box on the left side of the figure below to display the interface of cycle charge/discharge capacity, when there are more than one PCS, click ① drop-down box to switch PCS.

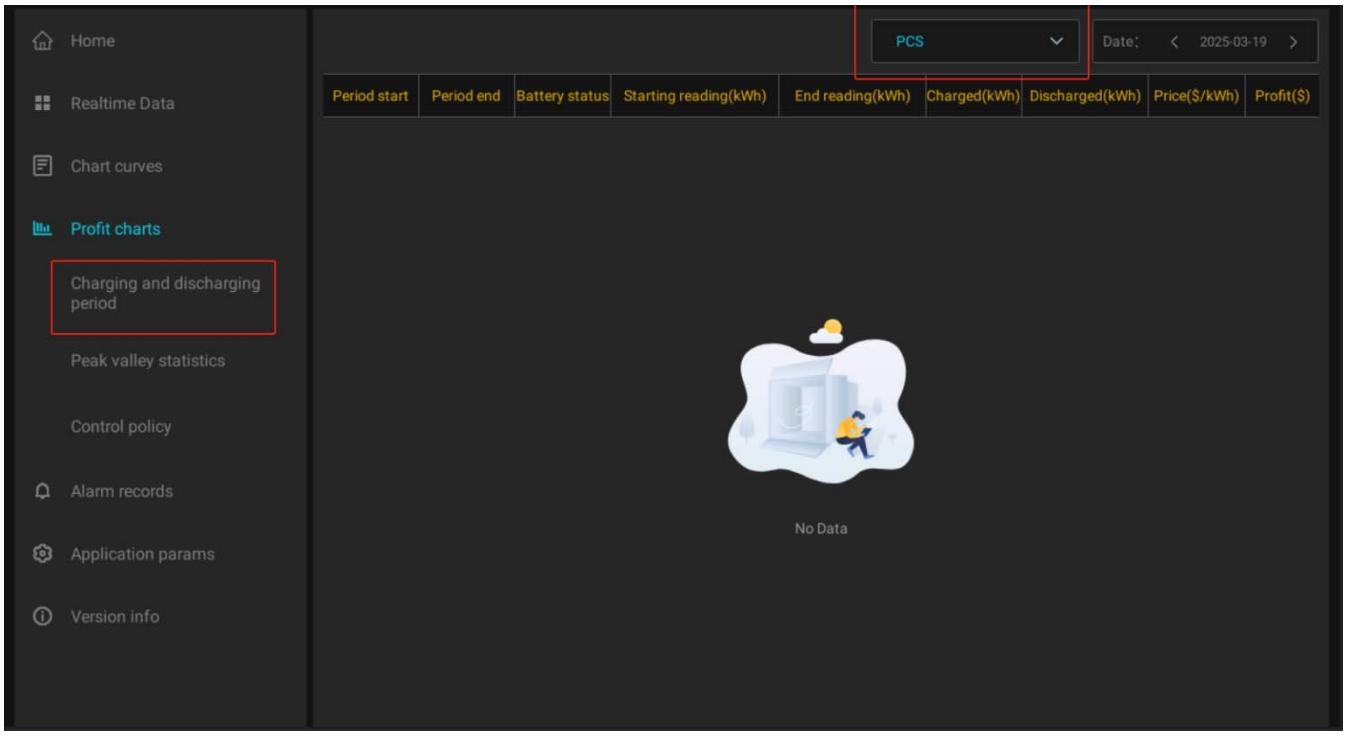


Figure 5.12 Revenue statistics - charging and discharging amount during the period

(1) Peak and valley statistics: Click the "Peak and valley statistics" shown in the red box on the left side of the figure below to display the peak and valley statistics interface. Click ① and select the time.

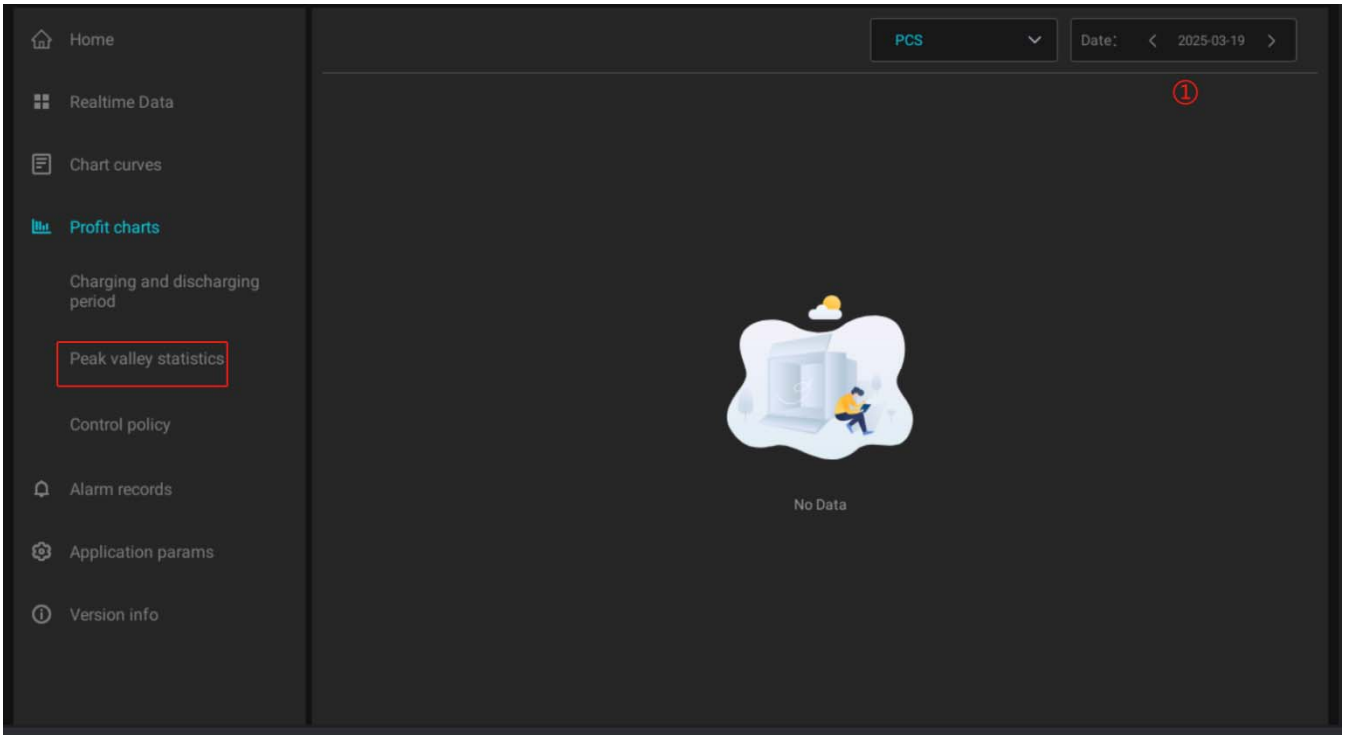
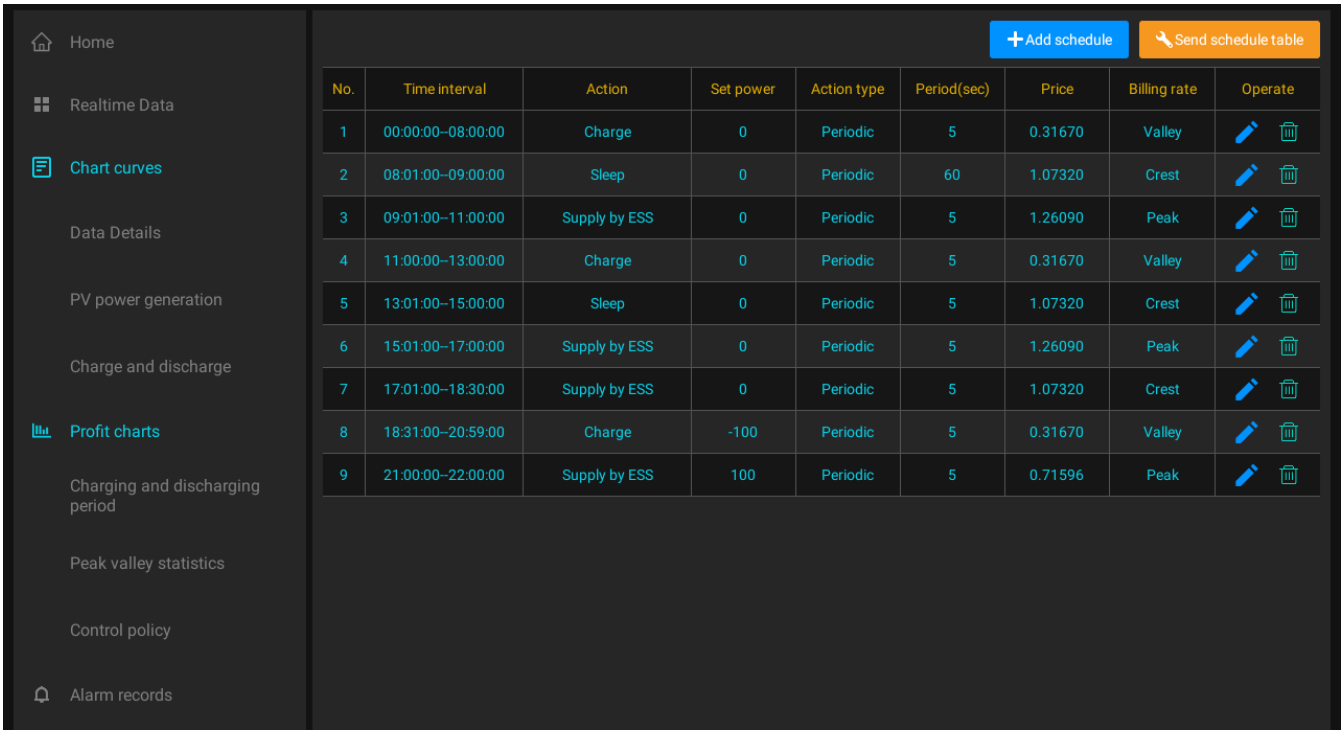


Figure 5.13 Revenue Statistics - Peak and Valley Statistics

(2) Control Strategy: Click on the “Control Strategy” shown in the red box on the left side of the figure below to display the control strategy interface.



No.	Time interval	Action	Set power	Action type	Period(sec)	Price	Billing rate	Operate
1	00:00:00--08:00:00	Charge	0	Periodic	5	0.31670	Valley	
2	08:01:00--09:00:00	Sleep	0	Periodic	60	1.07320	Crest	
3	09:01:00--11:00:00	Supply by ESS	0	Periodic	5	1.26090	Peak	
4	11:00:00--13:00:00	Charge	0	Periodic	5	0.31670	Valley	
5	13:01:00--15:00:00	Sleep	0	Periodic	5	1.07320	Crest	
6	15:01:00--17:00:00	Supply by ESS	0	Periodic	5	1.26090	Peak	
7	17:01:00--18:30:00	Supply by ESS	0	Periodic	5	1.07320	Crest	
8	18:31:00--20:59:00	Charge	-100	Periodic	5	0.31670	Valley	
9	21:00:00--22:00:00	Supply by ESS	100	Periodic	5	0.71596	Peak	

Figure 5.14 Revenue Statistics-Control Strategy

5.2.5. Alarm records

Click the "Alarm Record" in the red box in the menu below to display historical and real-time alarm and fault records. After inserting the USB flash drive, click "Export Record" to export the alarm record table corresponding to the selected time. Click the date selection box to filter the alarm time.

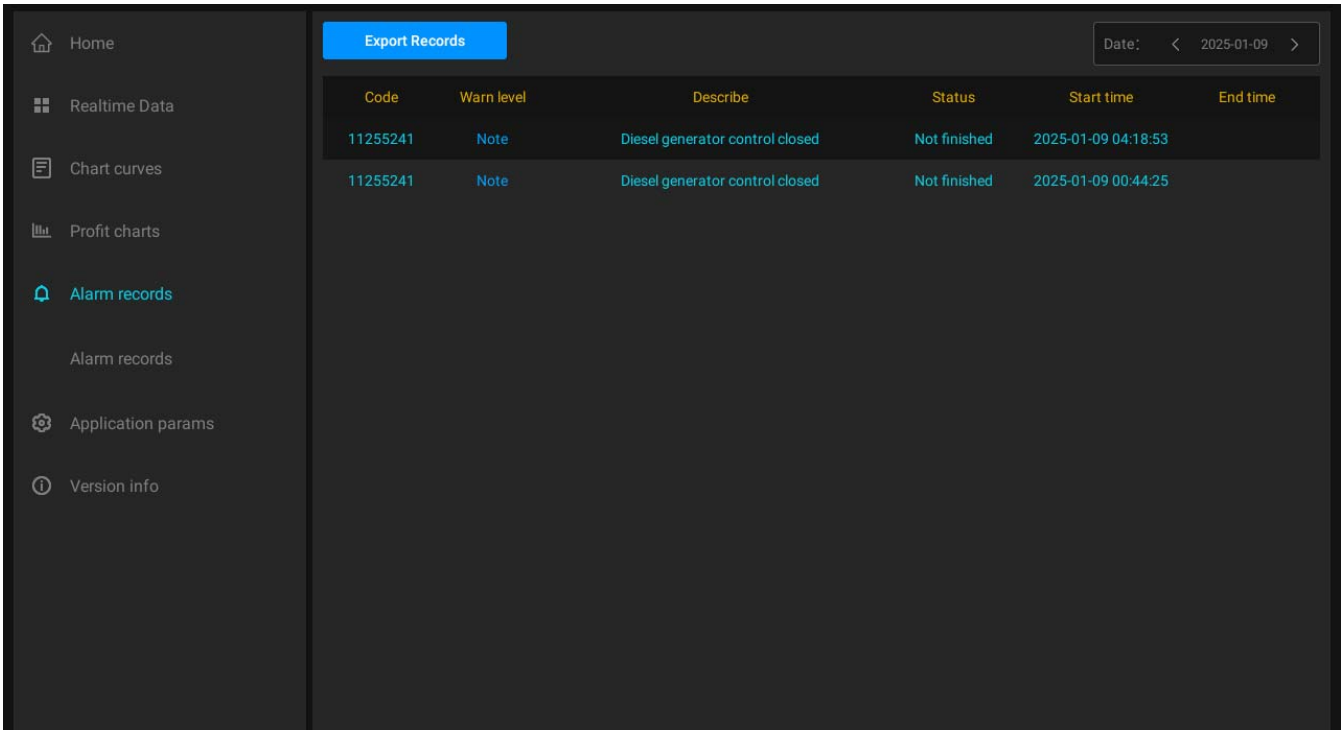


Figure 5.15 Alarm record

5.2.6. Parameter settings

Click "Application Parameters" as indicated by the red box in the menu below to enter the parameter setting page for the device. Click the secondary list on the left to switch sub-items one by one.

Figure 5.16 Application parameters-EMS parameters

Setting steps: Click ① text box, the numeric keypad will pop up at the bottom, after inputting, click the blue button on the right side to send the setting instruction, wait for 1 second, the bottom will pop up to indicate whether the setting is successful or not.

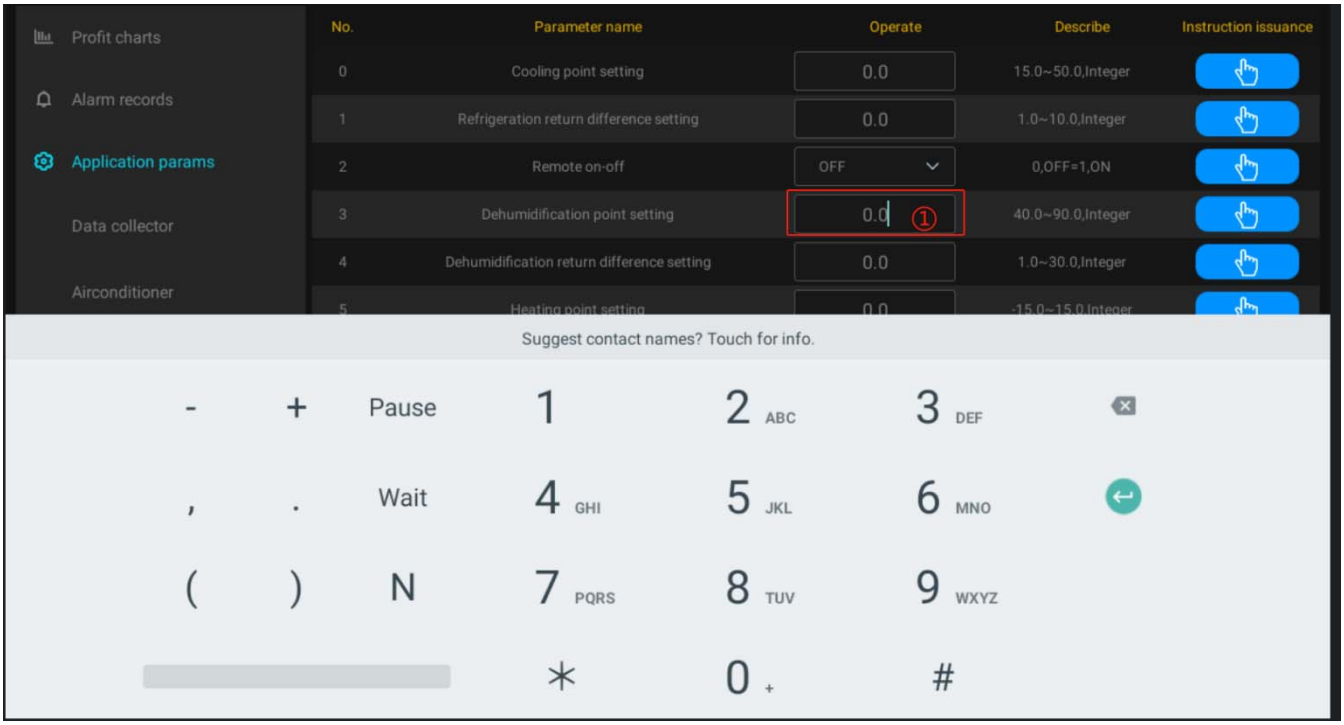


Figure 5.17 Application parameters-Setting parameters

5.2.7. Version Information

(1) App version information: Click “Version Information”-“App Version Information” in the menu bar, as shown in the red box in the figure below, the page will display the manufacturer's logo, app version, system version, IP address, MAC address, system running time, CPU temperature, CPU utilization rate and other information.

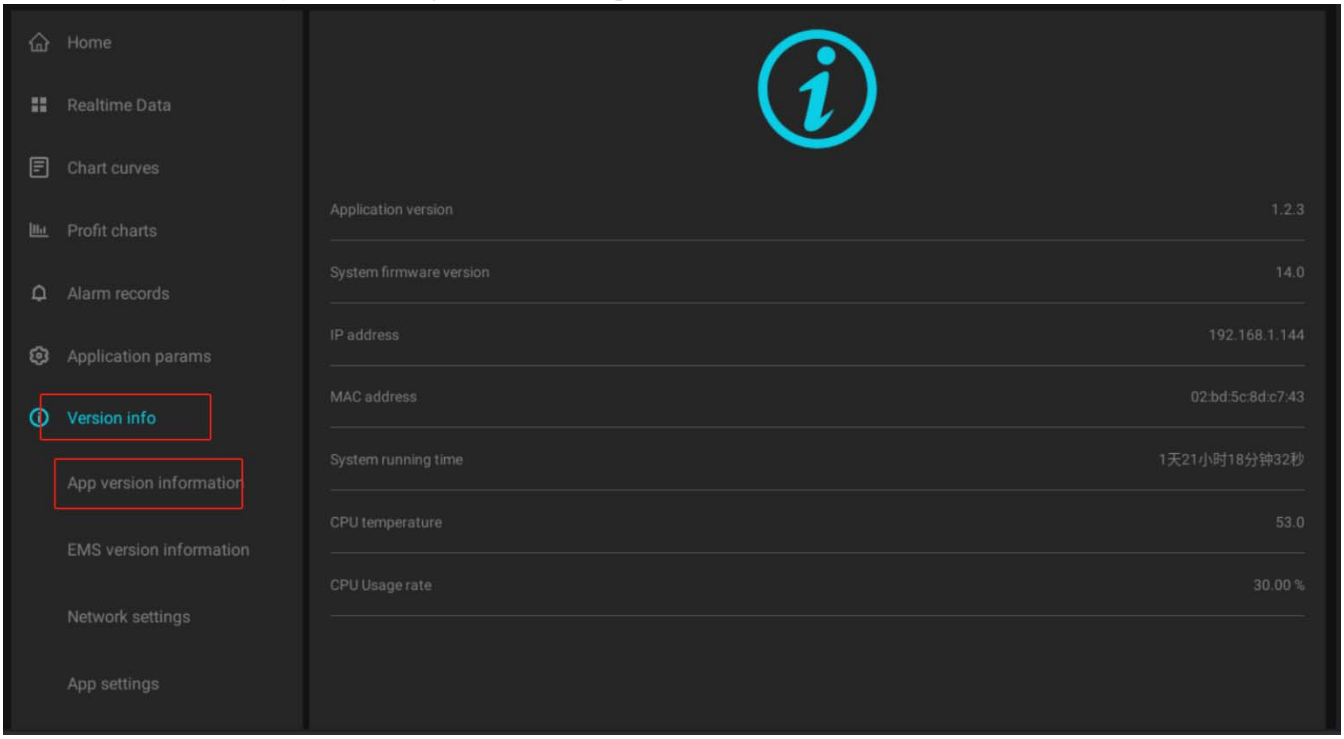


Figure 5.18 Version information-App version information

(2) EMS version information: Click the "EMS version information" in the red box in the menu below, and the page will display the manufacturer's EMS device type, device barcode, hardware version, HMI version, and EMS software version.

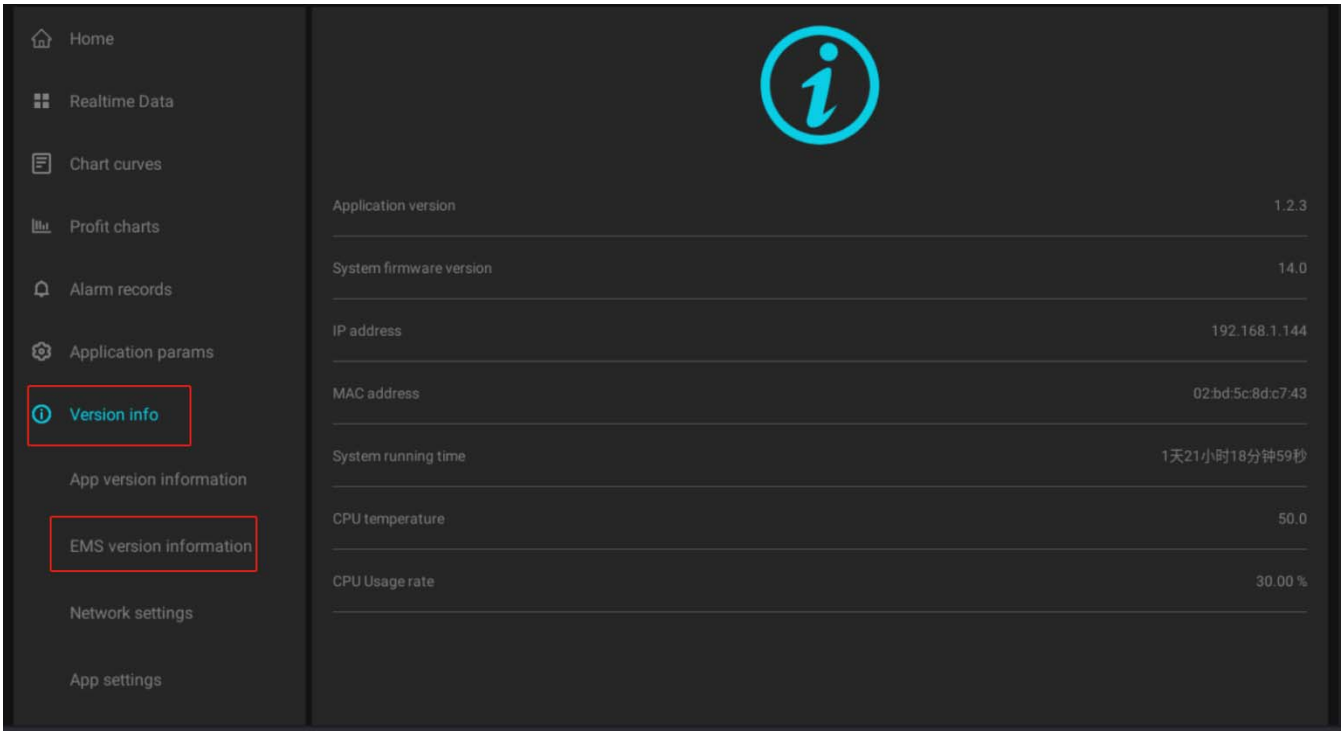


Figure 5.19 EMS version information

(3) Network Settings: Click “Network Settings” in the red box in the menu below, the page will show the IP address and port number of EMS. The page will show the IP address, port number of EMS, Ethernet mode, gateway, local IP address, etc. of Android screen. You can also set these parameters as follows:

1、Click in the text box.

2、Enter content in the pop-up soft keyboard.

3、Click the orange Save Settings button.

4、Set up for success

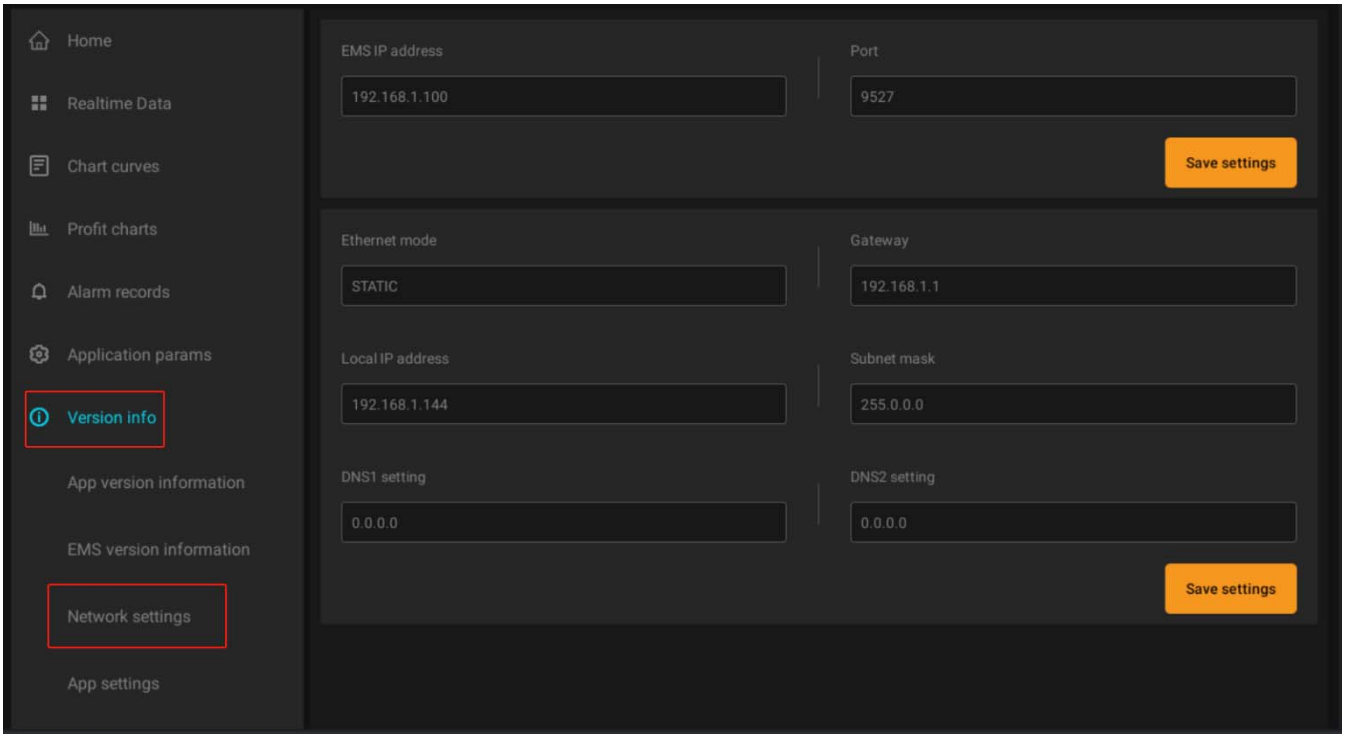
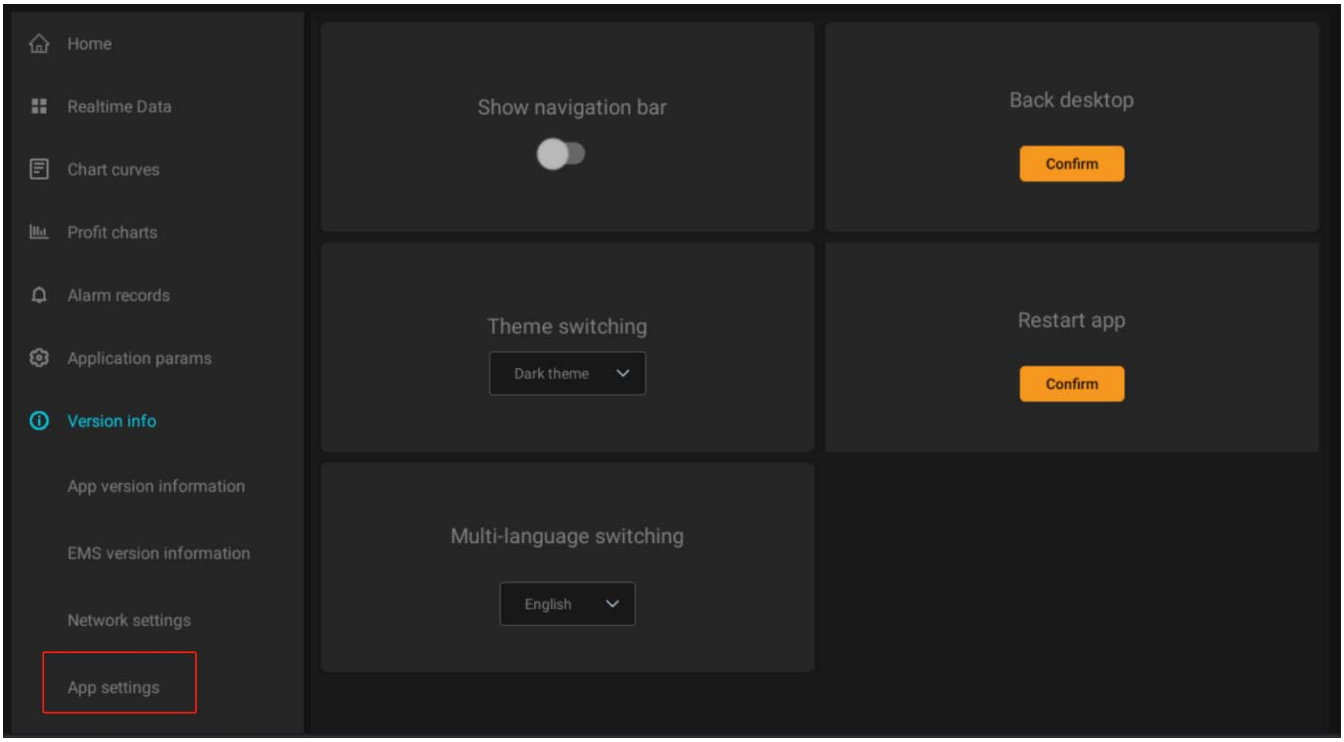


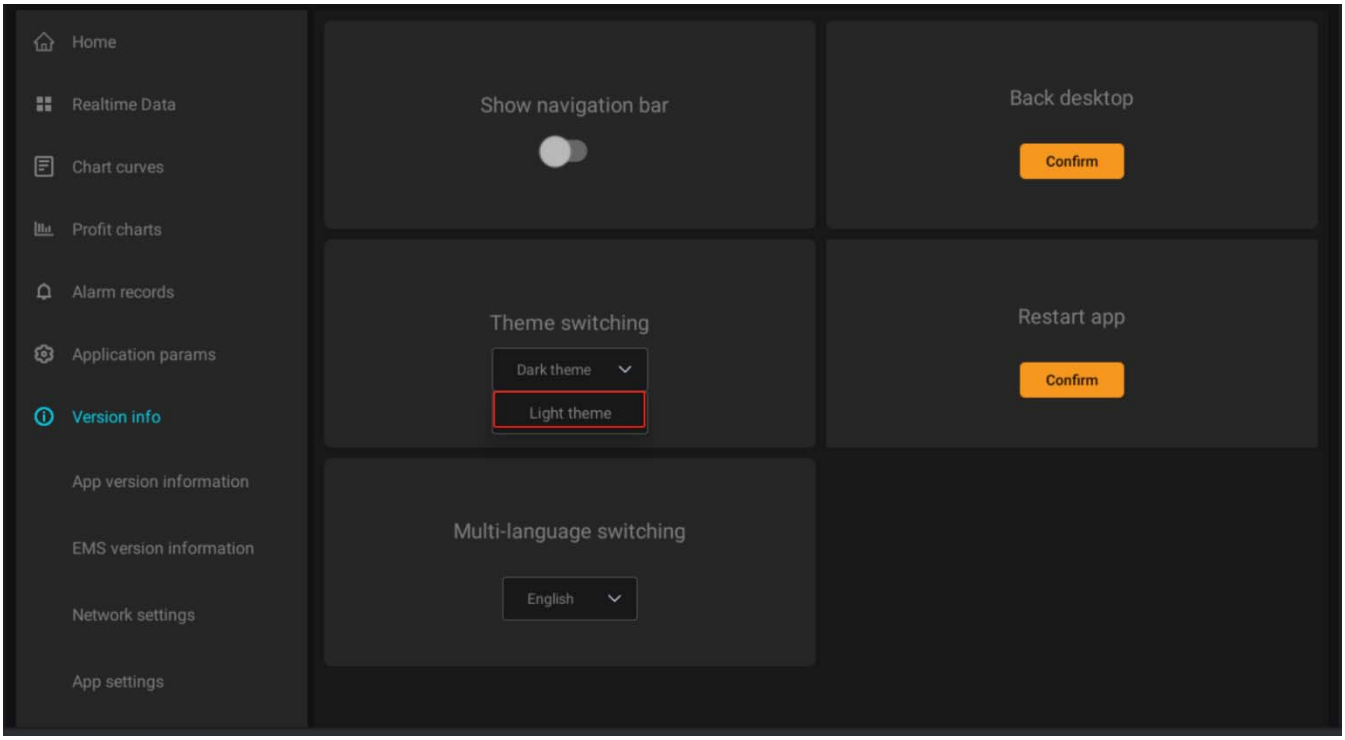
Figure 5.20 Network settings

(4)Application settings: Click "Application settings" in the red box in the menu below. The page displays

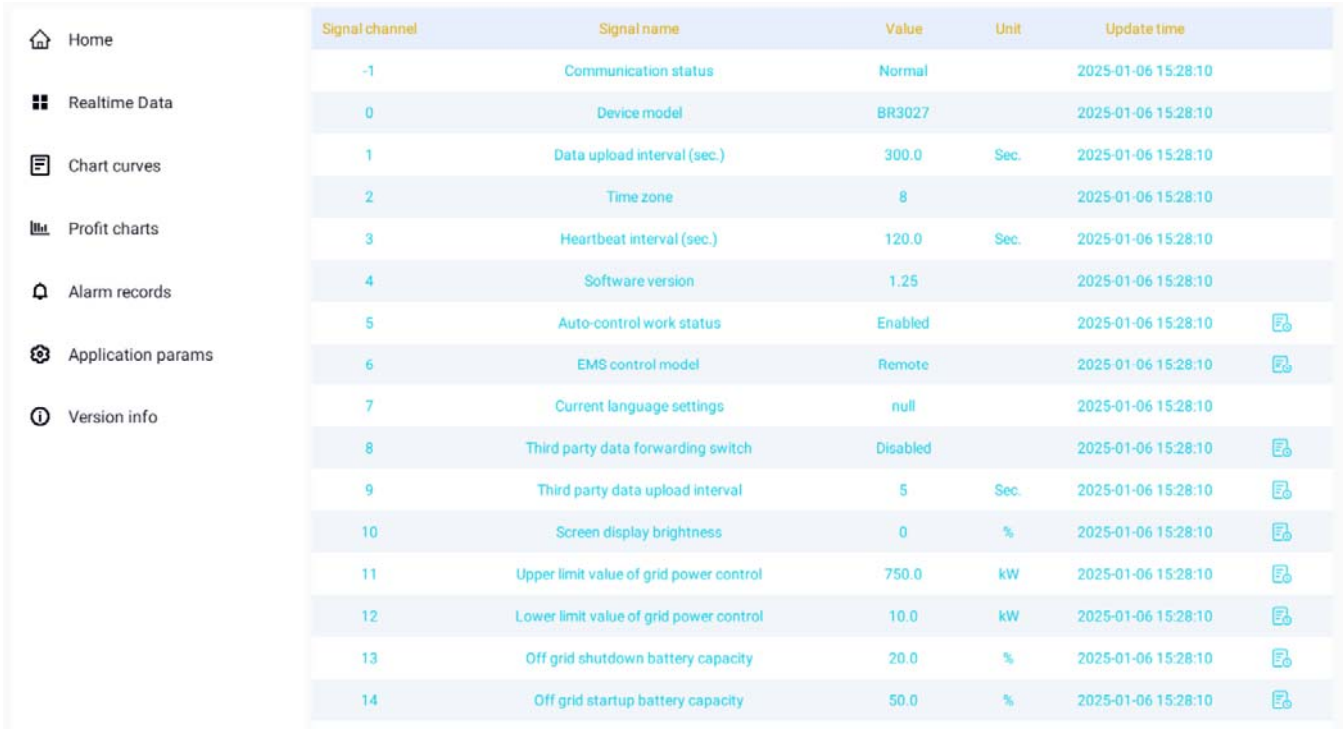
application parameter settings, and you can show and hide the navigation bar, return to the system desktop, switch themes (black theme, light theme), restart the app, and switch multiple languages.

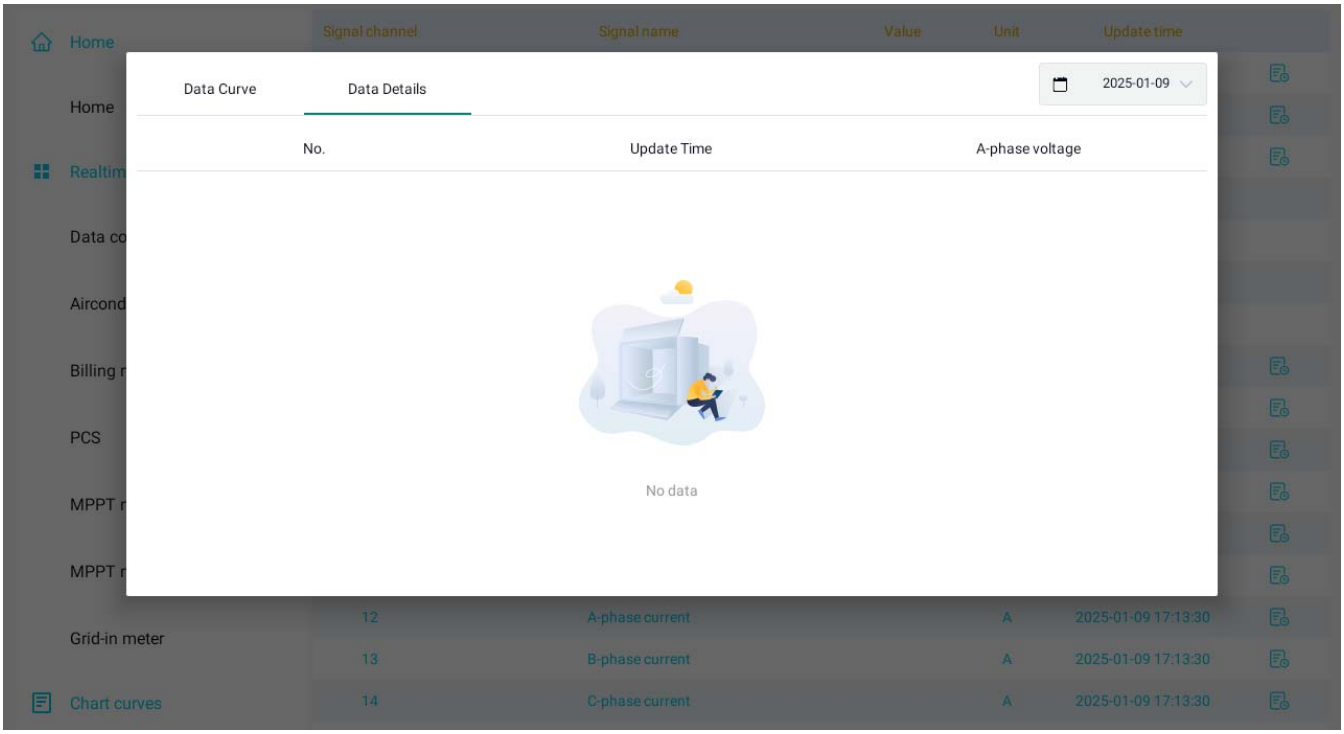


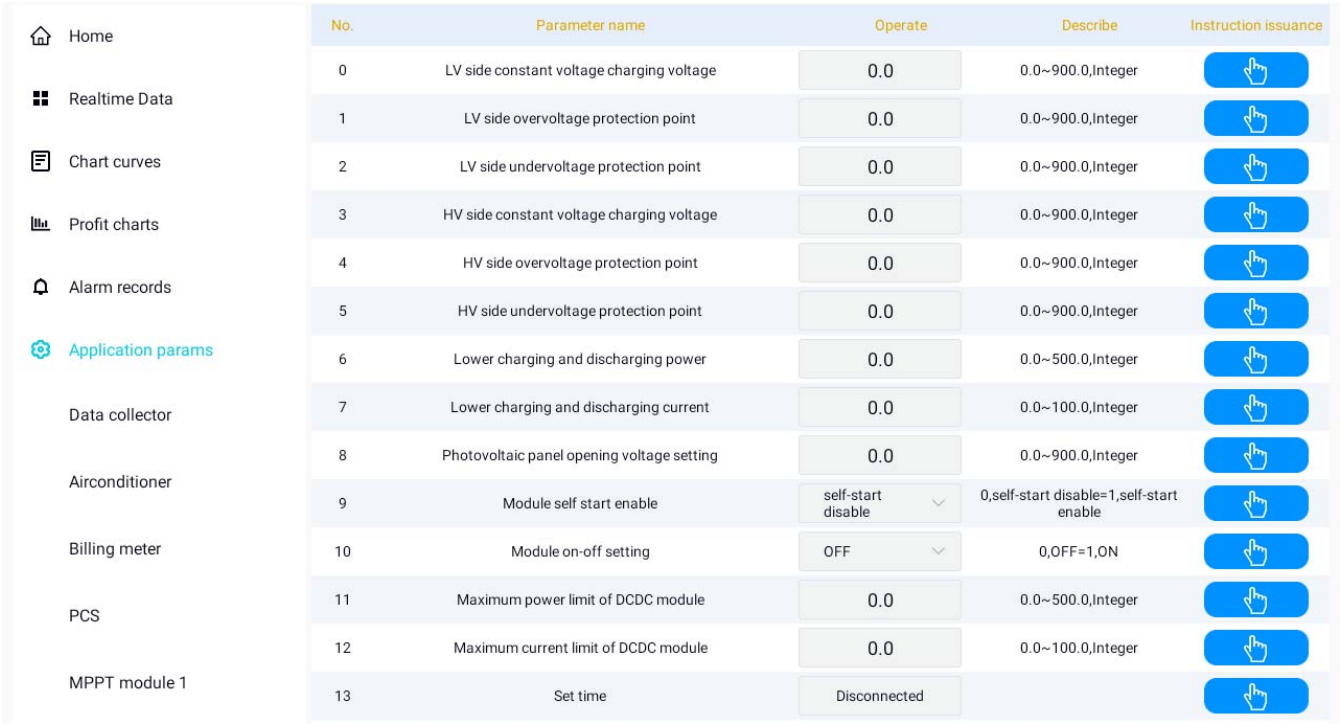
Theme switch: There are dark themes and light themes. The default theme is dark. Click the red box in the picture below to switch to light theme.

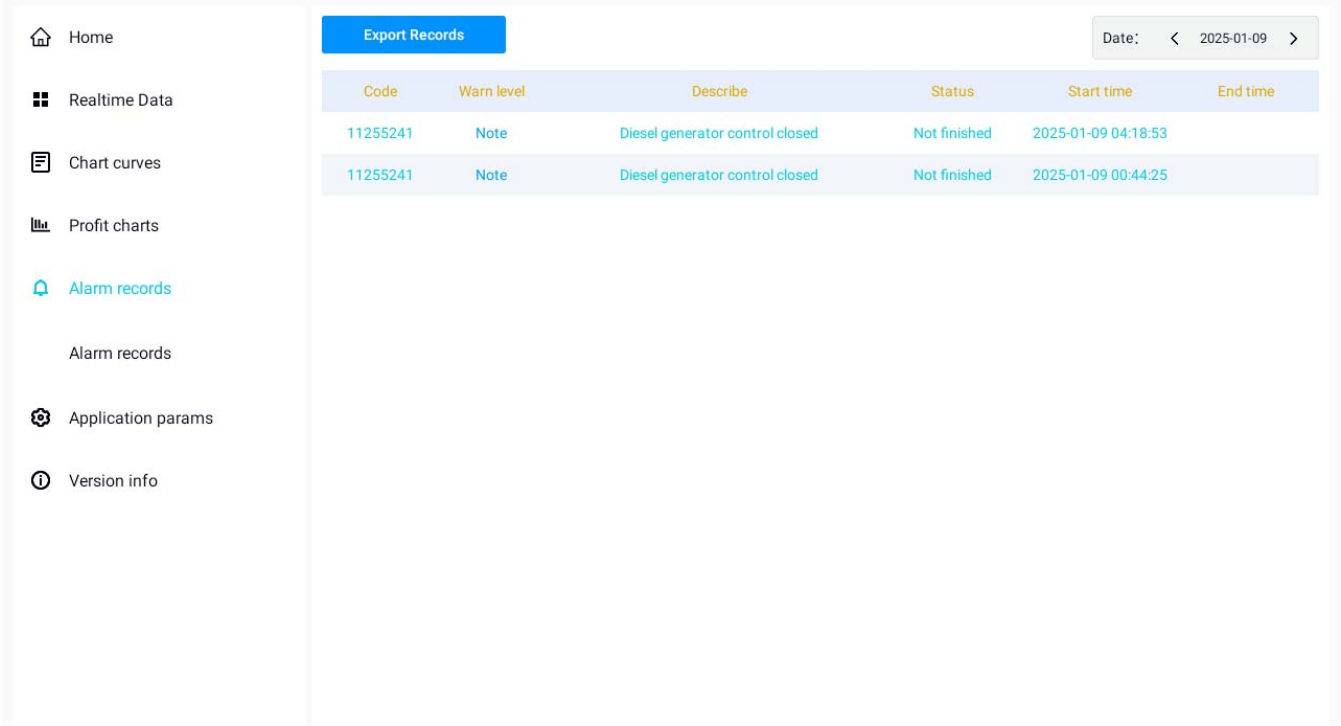


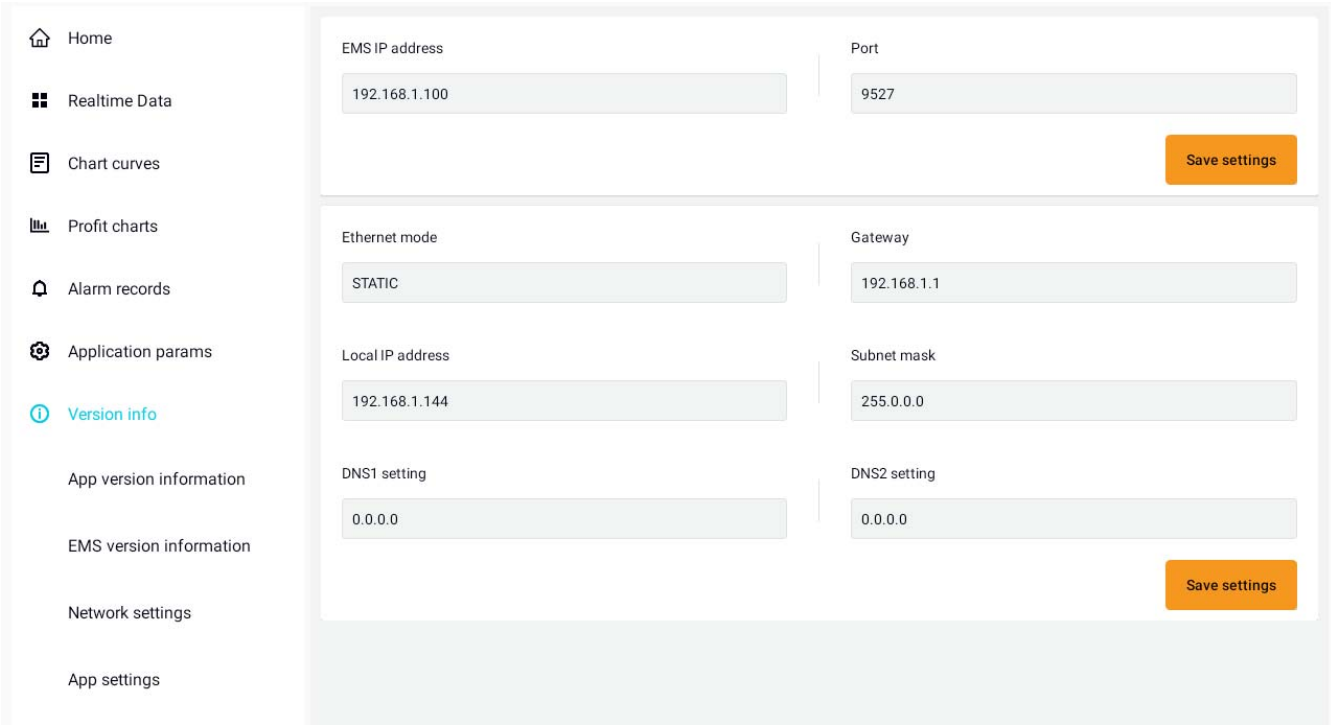
After clicking the light theme, the app will automatically restart and the color will turn white. Some of the interface displays are as follows:


Home
Realtime Data
Chart curves
Profit charts
Alarm records
Application params
Version info
Signal channel
Signal name
Value
Unit
Update time
-1 Communication status Normal 2025-01-06 15:28:10
0 Device model BR3027 2025-01-06 15:28:10
1 Data upload interval (sec.) 300.0 Sec. 2025-01-06 15:28:10
2 Time zone 8 2025-01-06 15:28:10
3 Heartbeat interval (sec.) 120.0 Sec. 2025-01-06 15:28:10
4 Software version 1.25 2025-01-06 15:28:10
5 Auto-control work status Enabled 2025-01-06 15:28:10
6 EMS control model Remote 2025-01-06 15:28:10
7 Current language settings null 2025-01-06 15:28:10
8 Third party data forwarding switch Disabled 2025-01-06 15:28:10
9 Third party data upload interval 5 Sec. 2025-01-06 15:28:10
10 Screen display brightness 0 % 2025-01-06 15:28:10
11 Upper limit value of grid power control 750.0 kW 2025-01-06 15:28:10
12 Lower limit value of grid power control 10.0 kW 2025-01-06 15:28:10
13 Off grid shutdown battery capacity 20.0 % 2025-01-06 15:28:10
14 Off grid startup battery capacity 50.0 % 2025-01-06 15:28:10


Home
Home
Realtim
Data co
Aircond
Billing r
PCS
MPPT r
MPPT r
Grid-in meter
Chart curves
Signal channel
Signal name
Value
Unit
Update time
Data Curve
Data Details
2025-01-09
No.
Update Time
A-phase voltage
No data
12 A-phase current A 2025-01-09 17:13:30
13 B-phase current A 2025-01-09 17:13:30
14 C-phase current A 2025-01-09 17:13:30


Home
Realtime Data
Chart curves
Profit charts
Alarm records
Application params
Data collector
Airconditioner
Billing meter
PCS
MPPT module 1
No.
Parameter name
Operate
Describe
Instruction issuance
0 LV side constant voltage charging voltage 0.0 0.0~900.0,Integer
1 LV side overvoltage protection point 0.0 0.0~900.0,Integer
2 LV side undervoltage protection point 0.0 0.0~900.0,Integer
3 HV side constant voltage charging voltage 0.0 0.0~900.0,Integer
4 HV side overvoltage protection point 0.0 0.0~900.0,Integer
5 HV side undervoltage protection point 0.0 0.0~900.0,Integer
6 Lower charging and discharging power 0.0 0.0~500.0,Integer
7 Lower charging and discharging current 0.0 0.0~100.0,Integer
8 Photovoltaic panel opening voltage setting 0.0 0.0~900.0,Integer
9 Module self start enable self-start disable 0,self-start disable=1,self-start enable
10 Module on-off setting OFF 0,OFF=1,ON
11 Maximum power limit of DCDC module 0.0 0.0~500.0,Integer
12 Maximum current limit of DCDC module 0.0 0.0~100.0,Integer
13 Set time Disconnected

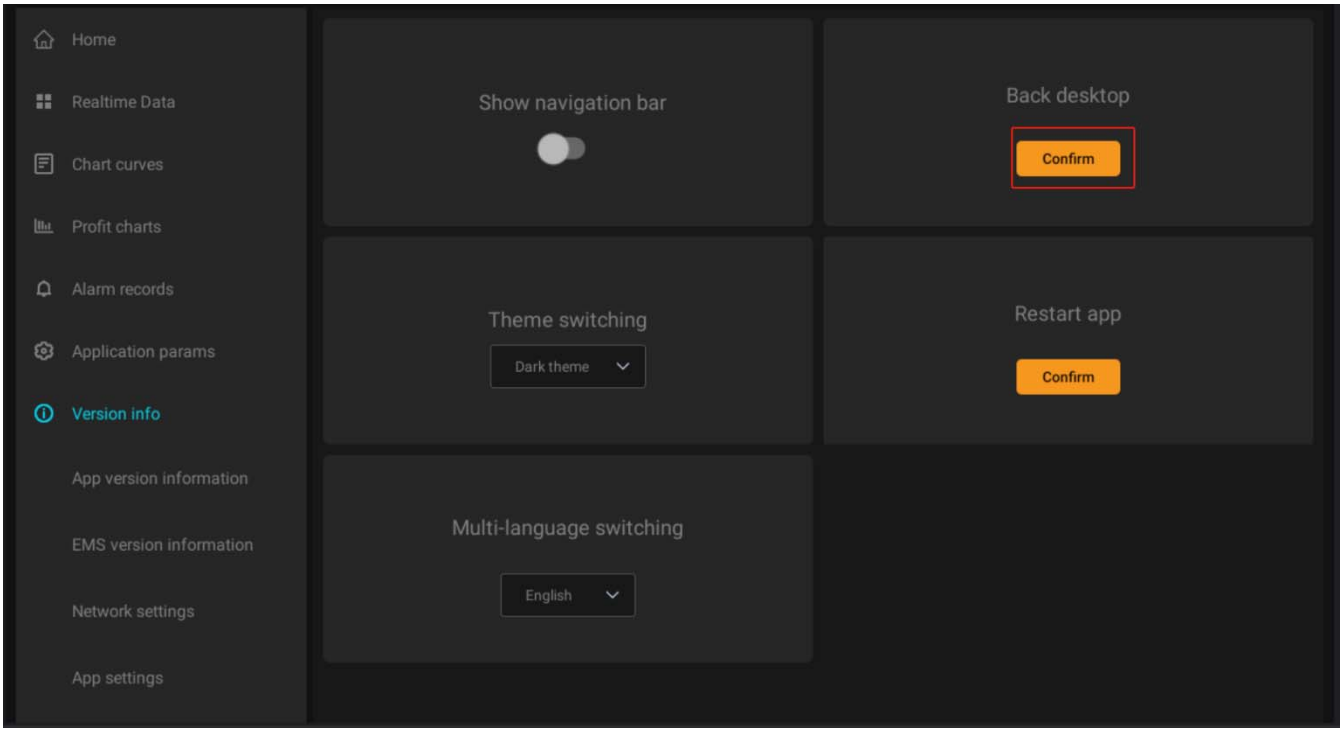

Home
Realtime Data
Chart curves
Profit charts
Alarm records
Alarm records
Application params
Version info
Export Records
Date: 2025-01-09
Code
Warn level
Describe
Status
Start time
End time
11255241 Note Diesel generator control closed Not finished 2025-01-09 04:18:53
11255241 Note Diesel generator control closed Not finished 2025-01-09 00:44:25



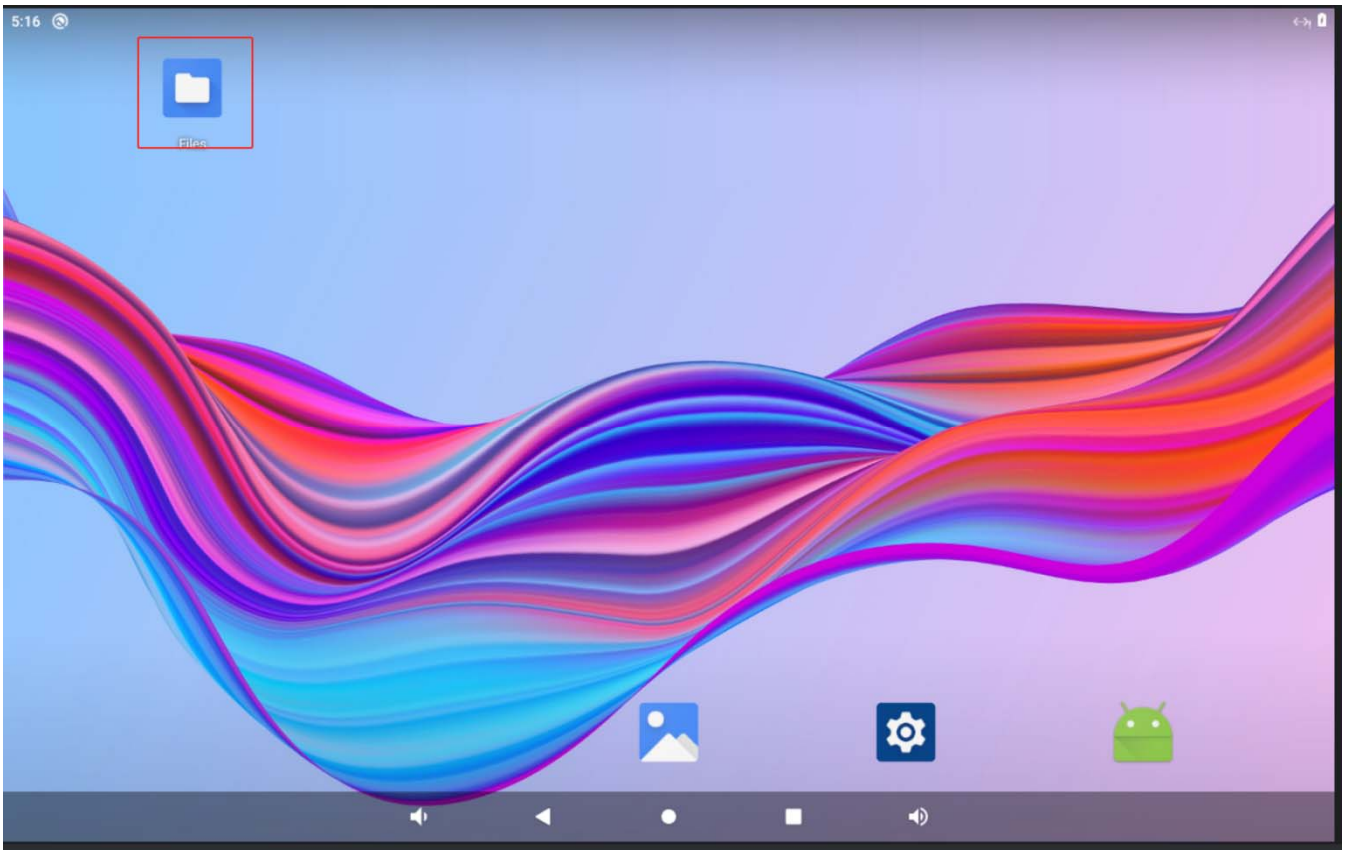
5.2.8. APP software upgrade

(1) Copy the APK to a USB flash drive and insert it into the USB port of the screen. The location of the USB flash drive is as shown in the red box below.

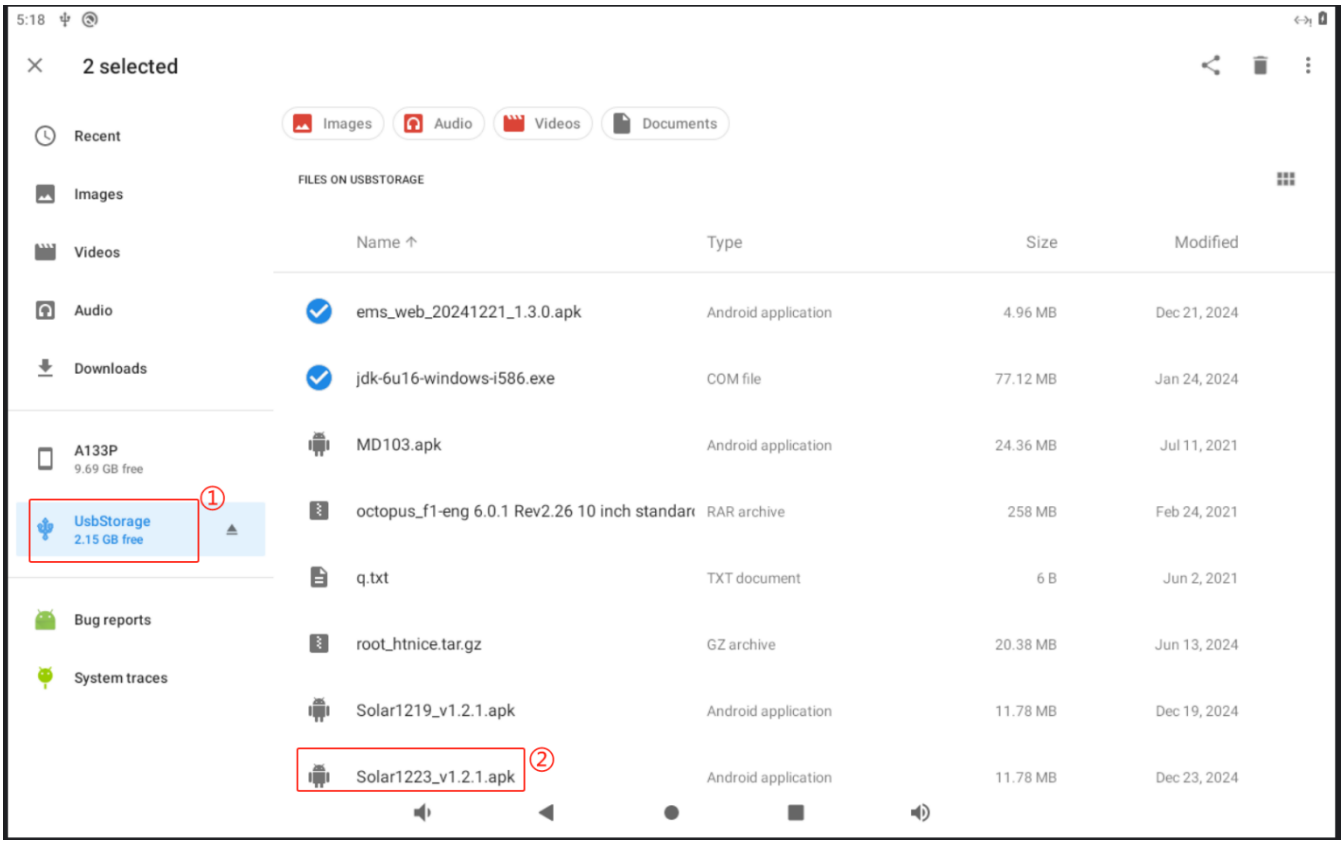
(2) In the App settings interface, click the red box to return to the desktop and exit the App, as shown below:



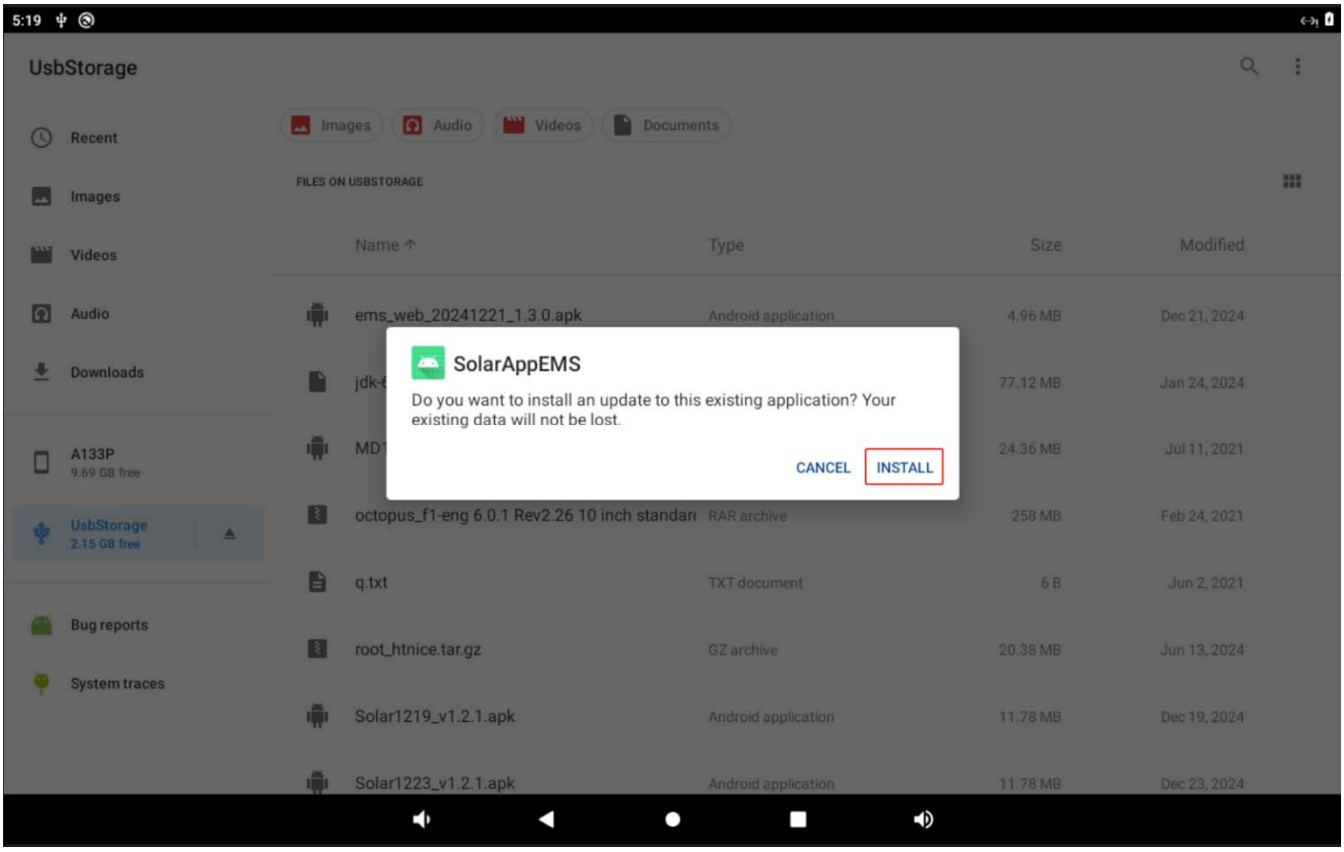
(3) Find the file app on the system desktop and click to open the file app



(4) Click the USB drive, find the Solar App, click and install it

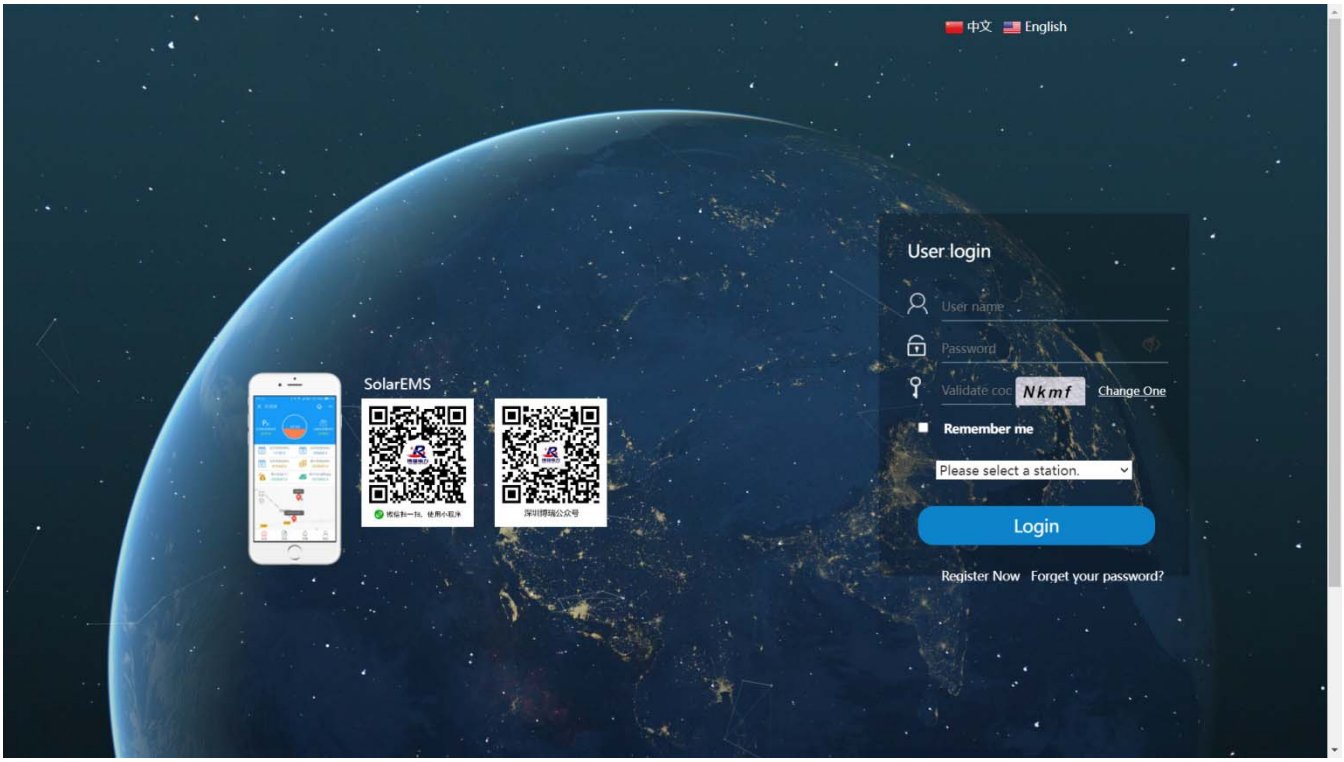


(5) Click the red box in the picture below and click the install button to install it.



5.3. Cloud platform data access

Local touch screen via 4GOr send data to the cloud platform via Ethernet. If you need to remotely browse or control the local machine, you can use WEB Browser remote access data,WBB Browse address:https://solaremsglobal.com.



It opens as shown.

For specific operations, please refer to the platform's online help documentation

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 in the cabinet; 2. Verify that the outdoor cabinet is not leaking water and that the equipment inside the cabinet is intact.
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 the EPO button immediately and quickly move away from the energy storage cabinet; 2、Observe continuously for 30 minutes from a safe distance. If there is smoke or fire, call the fire department; if not, manually release 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.
Compresso r alarm	air-condition ing	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 with supplier.
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 with supplier.
Grid over-voltage/under-voltage faults	Grid / oil machine	Abnormal voltage on the grid-connected side	Check whether the voltage on the grid side is abnormal
Power grid over-frequency/Over-frequency 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 side	Check whether the voltage on grid-connection side 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;
Grid voltage unbalance faults	Electrified wire netting/oil engine	Abnormal voltage on the grid-connected side	Check whether the voltage on grid-connection side is abnormal;
Grid wrong phase failure	Electrified wire netting/Chai machine	Phase sequence error on grid connection side	Switch any two cables in the third row of ABC
High DC voltage/Low fault	Cell	The battery voltage is abnormal	Check whether the DC input voltage is abnormal;
Over-voltage 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-bar half-voltage unbalance 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
Balance Bridge Overheat 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 too large; 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-wa ve 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	Communication Interruption Failure Energy Storage Converter Local controller Communication interruption 1. check for loose and abnormal communication network cables between modules; 2. check for loose and abnormal local controller communication network cables;

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 the AC/DC connecting wires for breakage and short circuit to ground; 2. Check the battery circuit for breakage and short to 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 signs of water leakage ● No dust accumulation in the vents ● No damage to the door lock
Air conditioning	● Check for the noise and vibration ● Cleaning filter	● Fan, compressor rotation is normal, no lag, abnormal noise ● Filter surface is clean and not clogged
Energy storage converter	● Check for the noise and vibration ● Check the front panel vents ● Check the contact surface of the rear-end copper row	● Front panel fan rotates normally, without stagnation or abnormal noise. ● The surface of the front panel vents is clean and not blocked. ● Copper rows and contact surfaces are free of corrosion and discoloration, and 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 rotates without lagging or rattling. ● The surface of the front panel vents is clean and not blocked. ● Screws and socket wires are not loose or detached. ● Copper rows and contact surfaces are free of corrosion, discoloration, and dust accumulation.

6.3.Conformally Connected Space

6.3.1.Warranty Period

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

6.3.2. Warranty scope

During the warranty period, if the product is caused by quality problems, Our company will repair or replace the product for free. Customers should reserve a reasonable response time for our company's repairs, and the replaced products will be handled by our company. Customers need to show relevant proof of purchase of the product and ensure that the product trademark is clearly visible, otherwise our company has the right not to provide warranty guarantee.

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 malfunction or damage caused by the use of non-Our company parts or software;
- ●Fault caused by fire, earthquake, flood and other irresistible factors.