



BSL NEW ENERGY TECHNOLOGY CO., LTD

User Manual

ESS-GRID C241-X120

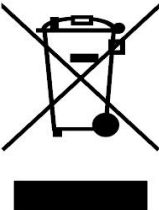
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Identification Instructions

	Please read the endorsed documentation carefully before using the product.
	When the user maintains and repairs, disconnect the power and wait five minutes before working to prevent a stored charge.
	Danger. Risk of electric shock!
	Hazardous Substance Labeling
	Flammability risk
	Keep the battery away from open flame or ignition sources.
	Recycling
	The danger of high voltages. Danger to life due to high voltages in the energy storage system
	This marking indicates that this product should not be disposed with other household wastes

Version History

[illegible]

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01 Safety Instructions

1.1 Safety symbol description

When installing, operating, and maintaining equipment, please read this manual first and follow all safety precautions indicated on the equipment and in the manual. **To ensure that users can better use this product and protect personal and property safety, please read the symbol prompts used below carefully.**



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



Warning: Indicates moderate potential danger if not avoided, which may result in death or serious injury to personnel.



Note: Indicates a low potential danger, and failure to avoid it may result in moderate or mild injury to personnel.



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

1.2 General safety



Illustration:

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

1. The installation and usage environment exceeds the provisions of relevant international, national, and regional standards.
2. Do not operate under the usage conditions described in this manual.
3. Unauthorized disassembly, alteration of products, or modification of software code.
4. Not following the operating instructions and safety warnings in the product and documentation.
5. Equipment damage caused by abnormal natural environments (force majeure such as earthquakes, fires, storms, floods, mudslides, etc.).
6. Damage caused by the customer's failure to comply with transportation and installation requirements.
7. Damage caused by storage conditions not meeting product documentation requirements.
8. Due to customer negligence, incorrect operation, or intentional damage, the hardware or data of the device is damaged.

9. System damage caused by third-party or customer reasons, including relocation and installation of systems that do not comply with the requirements of this manual, as well as damage caused by adjustments, changes, or removal of identification marks that do not comply with the requirements of this manual.

10. 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, internal strife, terrorism, intentional or malicious damage, etc.

**Danger:**

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

1. Please check if the pre-installed cables on the device are securely connected. Check if the equipment is damaged, such as holes, dents, or other signs of possible internal damage. Check that there is no displacement of the internal components of the equipment, and prohibit unauthorized changes to the structure, installation sequence, etc. of the equipment.
2. Do not use water to clean the electrical components inside the equipment. When liquid is found to have entered the interior of the equipment, please immediately press the emergency stop switch and notify the on-site management personnel.
3. Installation, wiring, maintenance, and replacement operations with electricity are prohibited. Before coming into contact with any conductor surface or terminal, the voltage at the contact point should be measured, and it should be confirmed that the protective grounding wire of the equipment or components that require maintenance is reliably grounded, and there is no risk of electric shock.
4. Do not approach the equipment except for personnel operating it. Do not power on the device until it has been installed or confirmed by a professional. At least two personnel must be present on site during the first power on or live operation of the main circuit.

**Illustration:**

1. 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 or region where they are located.
2. During installation, operation, and maintenance, it is necessary to first clean the accumulated water, ice, snow, or other debris on the top of the cabinet before opening the cabinet door to prevent debris from falling into the cabinet.
3. Reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations of device software are prohibited. It is not allowed to study the internal implementation of the device, obtain the source code of the device software, steal intellectual property, or disclose the results of any device software performance testing in any way.

1.3 Electrical safety

1.3.1 Wiring requirements

1. Please select cables that comply with local laws and regulations. Cables of the same type should be tied together, and cables of different types should be laid separately. It is forbidden to wrap or cross lay them with each other.
2. If the wiring is completed or briefly left during the wiring process, the cable port should be immediately sealed, the cabinet door should be closed, and small animals should be avoided from entering.
3. The cables used in energy storage systems must be securely connected, well insulated, and meet the required specifications. The position of cable conduit or wire hole must be protected to prevent the cable from being damaged by sharp edges, burrs, etc.
4. After the cable wiring is completed, it is necessary to use cable brackets and cable clamps for reliable fixation. The cables in the backfilled soil area should be tightly attached to the ground to prevent deformation or damage caused by stress during backfilling.
5. The use of cables in high-temperature environments may cause aging and damage to the insulation layer. The distance between the cable and the periphery of the heating device or heat source area should be at least 30mm.
6. To ensure construction safety, all cables should be laid and installed at temperatures above 0 °C. When handling cables, especially in low-temperature environments, they should be handled with care.

1.3.2 Grounding requirements

1. Do not damage the grounding conductor. The grounding body of the equipment should be permanently connected to the protective grounding grid. Before operating the equipment, the electrical connections of the equipment should be checked to ensure that it is reliably grounded.
2. The grounding impedance of the equipment meets the requirements of the national standard GB 50054 and local electrical standards.
3. It is prohibited to operate the equipment without installing a grounding conductor. When installing equipment that requires grounding, protective grounding wires must be installed first; When dismantling equipment, the protective grounding wire must be removed last.

1.3.3 Maintenance requirements

1. Before connecting or removing cables, the protective switch of the corresponding circuit must be disconnected first.
2. Use a multimeter with the corresponding voltage level to check if the device is live and ensure that it has been completely powered off.
3. If there are live objects nearby, please use insulation boards or tapes to cover or wrap them.
4. After reliably connecting the circuit to be repaired to the grounding circuit using a grounding wire, carry out operation and maintenance.



Illustration:

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

1.4 Mechanical safety



Note:

1. When transporting without wooden crates, the bottom fence must be removed. Take off and land with care to avoid impact or vibration.
2. During transportation, the center of gravity of the box should fall between the two forks on the forklift. Long distance handling, inversion, and tilting are prohibited.
3. When transporting equipment, it may be necessary to arrange auxiliary personnel to assist due to the large size of the equipment blocking the operator's line of sight.
4. To ensure the safety of drilling outside the equipment body, a suitable location should be selected before drilling to ensure that it will not cause short circuits or other impacts. During the drilling process, the equipment should be covered to prevent debris from falling into the interior of the equipment, and debris should be cleaned up promptly after drilling.
5. When handling equipment by hand, preparation should be made for bearing weight, and safety protective equipment such as protective gloves and anti smashing shoes should be worn.
6. Be careful when moving equipment during transportation to avoid impact or falling. Avoid scratching the surface of the equipment, damaging components or cables.

1.5 Battery safety



Illustration:

We are not responsible for any damage caused to the batteries provided by our company due to the following reasons:

1. Due to customer reasons, the battery was not charged and inspected in a timely manner, resulting in expired storage, capacity loss, or irreversible damage.
2. Mechanical damage, leakage, rupture, etc. caused by improper operation or failure to connect the battery as required.
3. Customers or third parties who are not aware of our company may change the battery usage scenario on their own. Including but not limited to: connecting additional loads to the battery by oneself, mixing with other brands of batteries, mixing with batteries of different rated capacities, etc.
4. Direct damage to the battery caused by the inability of on-site equipment operating environment or external power parameters to meet the environmental requirements for normal operation. Including the actual operating temperature of the battery being too high or too low, severe power grid conditions, frequent power outages, etc.
5. The customer has not set the battery operation management parameters correctly or maintained them improperly, resulting in frequent overdischarging of the battery, on-site expansion by the customer, or long-term inability to fully charge.

6. The customer did not perform proper maintenance on the battery according to the operating manual of the supporting equipment, including but not limited to: not regularly checking whether the battery terminal screws are tightened, etc.
7. The battery was stolen and lost.
8. Batteries that have exceeded their warranty period.

**Danger:**

1. Do not expose the battery to high temperature environments or heat generating devices such as sunlight, fire sources, transformers, heaters, etc. Overheating of batteries may cause fires and explosions.
2. Do not disassemble, modify or damage the battery (such as inserting foreign objects, immersing in water or other liquids, etc.) to avoid battery leakage, overheating, fire or explosion.
3. Thermal runaway of batteries can produce flammable gases, as well as harmful gases such as CO and HF. The accumulation of combustible gases generated after thermal runaway of batteries poses a risk of explosion and explosion, which may cause personal injury and property damage.
4. When installing and maintaining the battery, it is necessary to wrap the exposed cable terminals on the battery with insulating tape. At the same time, avoid foreign objects (such as conductive objects, screws, liquids, etc.) from entering the interior of the battery and causing a short circuit.

**Warning:**

1. Batteries must be stored in a separate warehouse and in their outer packaging, avoiding mixing with other materials, storing outdoors, and stacking batteries too high. The site must have fire-fighting facilities that meet the requirements, such as fire sand, fire extinguishers, etc.
2. Batteries should be avoided from impact. When handling batteries, they should be carried in the direction required by the battery, and inversion or tilting are prohibited.
3. Please use the battery within the temperature range specified in this manual. When the ambient temperature of the battery is below the lower limit of the operating temperature, charging is prohibited to avoid crystallization caused by low-temperature charging and internal short circuit of the battery.
4. Please dispose of used batteries in accordance with local laws and regulations, and do not dispose of batteries as household waste.
5. If the battery has been charged for more than 8 months, it needs to be recharged. If not recharged as required, it may affect the performance and service life of the battery.

Measures for handling battery abnormalities**Danger:**

1. When electrolyte leakage or abnormal odor occurs, contact with the leaked liquid or gas should be avoided. Non professionals are not allowed to approach, please contact professionals immediately for assistance.

2. Electrolyte is corrosive and contact may cause skin irritation and chemical burns. If in contact with battery electrolyte, immediately clean the contact area with plenty of water and soap, and seek medical help immediately.
3. After the battery drops (with or without packaging), it is prohibited to continue using it. If there is no obvious deformation or damage to the appearance and there is no obvious odor, smoke, or fire, transfer the battery to an open and safe place for 1 hour before processing, and contact our service engineer, while ensuring safety.
4. When there is a noticeable odor, damage, smoking, or fire after the battery drops, personnel should be evacuated immediately and the alarm should be reported in a timely manner. Professional personnel use fire-fighting equipment to extinguish fires while ensuring safety.

1.6 Maintenance and replacement



Warning:

1. If the device malfunctions, please contact your dealer promptly for assistance.
2. Before carrying out maintenance work, please power off the equipment first, and then follow the instructions on the delayed discharge label to wait for the corresponding time to ensure that the equipment has been powered off before operating it.
3. During the maintenance process, please try to avoid unrelated personnel entering the maintenance site, and temporary warning signs or fences must be erected for isolation.
4. Unauthorized personnel are not allowed to open the cabinet door, otherwise there is a risk of electric shock, and the resulting malfunction is not covered by the warranty.
5. It is prohibited to open the cabinet door in weather conditions such as rain, snow, lightning, dust, and heavy fog.
6. Before removing the components from the cabinet, please confirm that other components on the cabinet are not loose.
7. Operation and maintenance personnel as well as professional technicians should receive sufficient training on safe use and equipment maintenance, and should operate with sufficient preventive measures and personal protective equipment.
8. During equipment maintenance, insulation materials should be used to cover nearby live parts.
9. Before the fan is powered off or stopped rotating, it is forbidden for any object to come into contact with the running fan (such as fingers, components, bolts, etc.).
10. The equipment can only be powered on again after the fault has been resolved, otherwise it may cause the fault to expand or damage the equipment.
11. When conducting live inspection of the system, Note should be paid to the danger warning signs on the equipment to avoid standing at the cabinet door.
12. After the replacement of power components or wiring changes in the energy storage system, manual wiring inspection is required to avoid abnormal system operation.
13. When replacing the battery, please replace it with the same type of battery module.
14. After the maintenance operation is completed, it should be checked immediately to ensure that no tools or other components are missing in the equipment.
15. After completing maintenance and replacement operations, the cabinet door should be locked in a timely manner and the key should be properly kept.

02 Product Introduction

2.1 Overview of Energy Storage System

The ESS-GRID C241-X120 is a solar-powered charging unit designed for electric vehicle (EV) charging. It primarily utilizes solar panels to capture solar energy and convert it into electricity. This energy is then stored in an integrated energy storage system, ready to provide charging services for EVs when needed. Its main components include a solar power generation system, an energy storage system, charging facilities, as well as system integration and monitoring systems. This type of solar charging station can be deployed in various scenarios, such as urban parking lots, highway service areas, and industrial parks.

2.2 Product Description

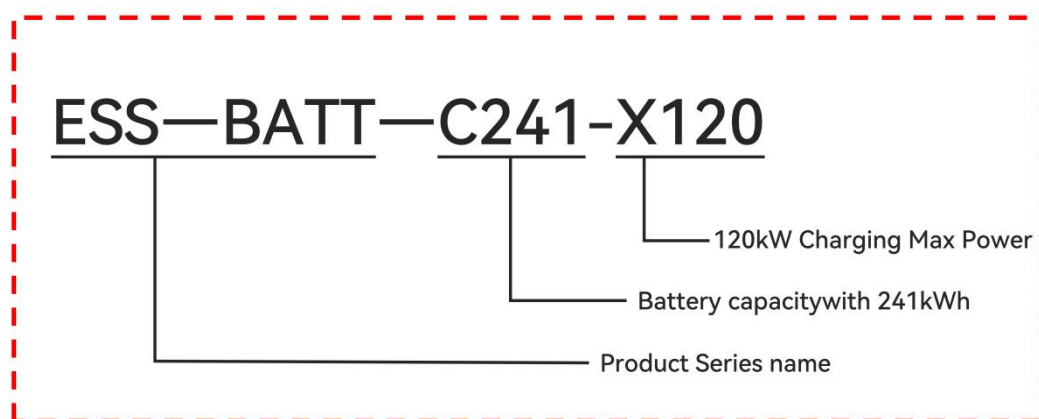


Figure 2.2



Illustration:

Isolation transformers, STS-based grid connection/disconnection switching, and DC power modules are offered as configurable options. Both the rated output power and battery capacity are tailored to the demands of the project.

2.3 Product Application

The integrated photovoltaic energy storage and charging unit comes pre-integrated with energy storage batteries, modular STS, modular PCS, modular DC/DC converters, an energy management and monitoring system, power distribution system, environmental control system, and fire control system. It utilizes a modular PCS design for easy maintenance and capacity expansion. The commercial and industrial storage integrated cabinet features front-access maintenance, which reduces the required footprint and service space. The system is characterized by safety and reliability, rapid deployment, low cost, high energy efficiency, and intelligent management.

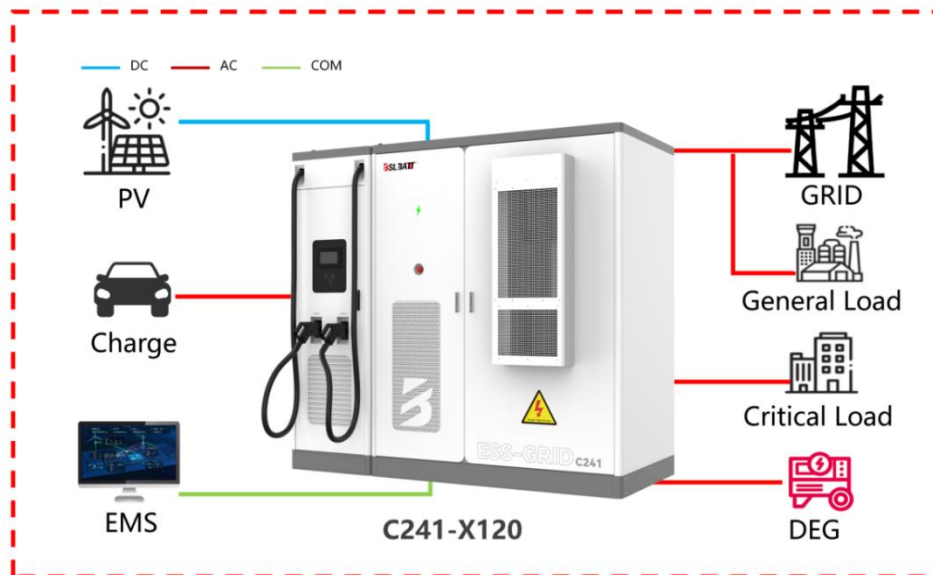


Figure 2.3-1

Under typical application scenarios, the operational strategies of the energy storage system are as follows:

Peak Shaving and Valley Filling (Time-of-Use Arbitrage): During off-peak hours when electricity rates are low, the energy storage cabinet automatically charges. Once fully charged, it remains in standby mode. During peak hours when electricity rates are high, the energy storage cabinet automatically discharges. This leverages the electricity price differential to generate cost savings, thereby enhancing the economic benefits of the solar-storage-charging system.

Integrated Solar and Storage Operation: The system continuously monitors the local load power. Solar PV generation prioritizes supplying the local load directly, with any excess power being stored in the batteries. When the PV generation is insufficient to meet the local load demand, the system prioritizes using the energy stored in the batteries to cover the shortfall.

2.4 Product appearance

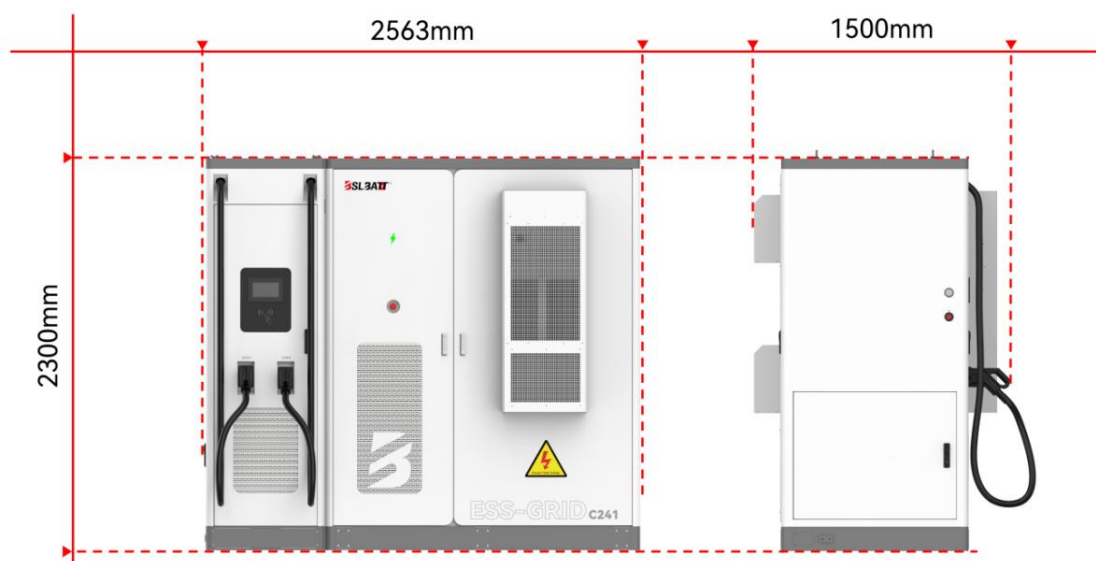


Figure 2.4

2.5 Communication Topology Diagram

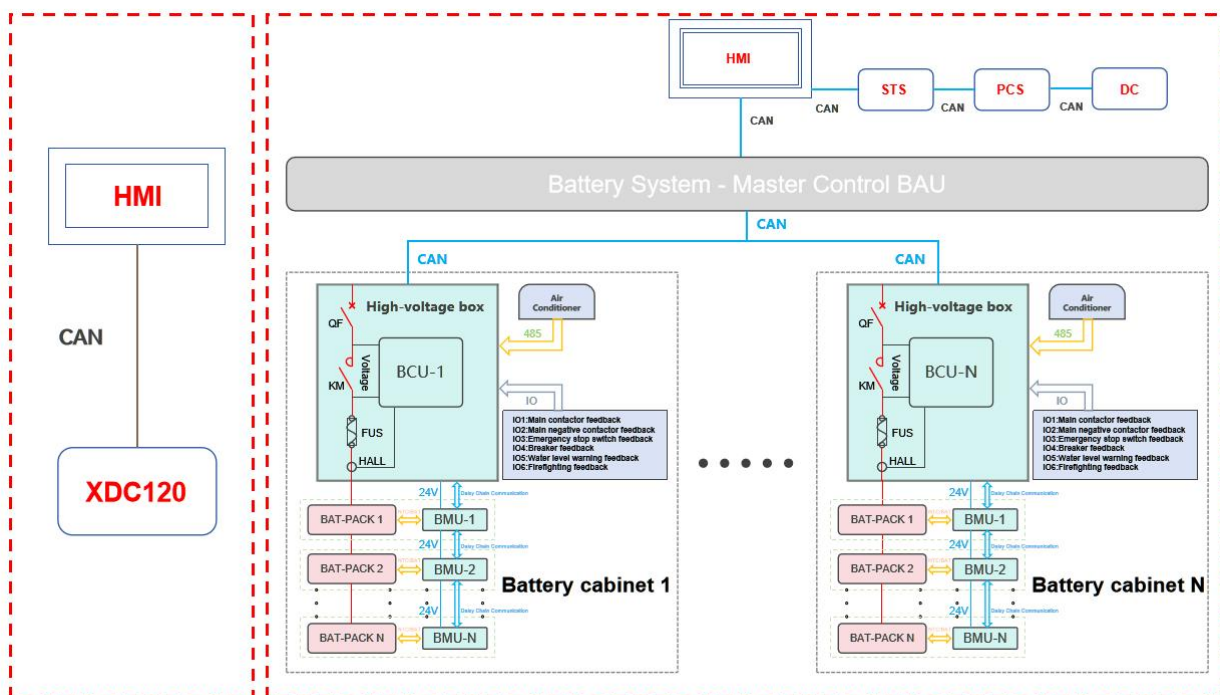


Figure 2.5



Illustration: Different projects have different configurations and communication methods. The actual situation will depend on the delivery.

2.6 Electrical Circuit Diagram

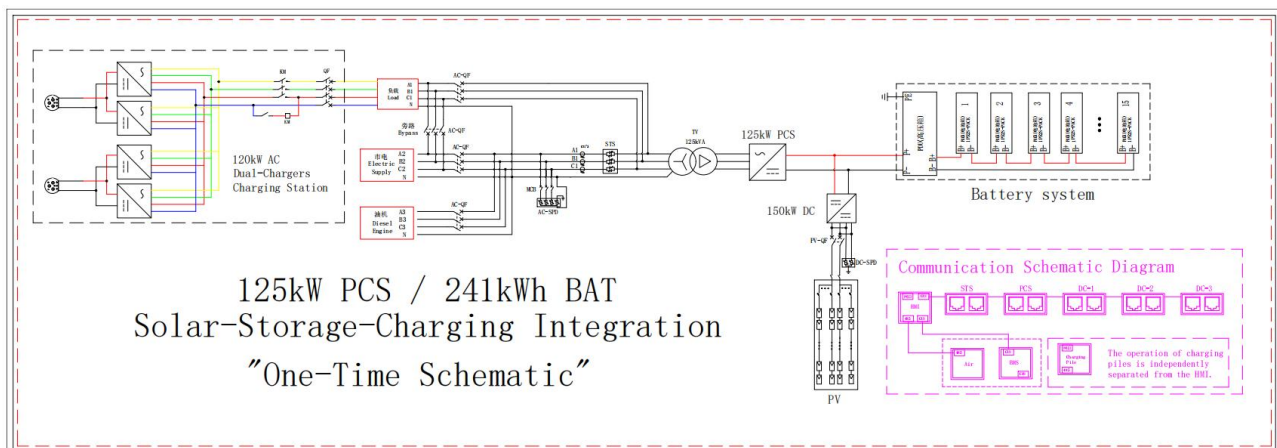


Figure2.6



Illustration: Figure 2.6 depicts the C241-X120 system configuration with grid-tie/off-grid capability, an isolation transformer, and PV input. The actual configuration and wiring may vary from project to project and are subject to the final delivery specifications.

2.7 Product Parameters

ESS-GRID Cabinet series Parameter

Model	ESS-Grid C241-X120	
Battery Parameters		
Battery Type	Lithium Iron Phosphate Battery (LFP)	
Cell Capacity	3.2V/314Ah	
Combination Method	224S1P	240S1P
Rated Energy	225kWh	241kWh
Rated Charge/Discharge Power	0.5P(25±2℃)	
Maximum Charge/Discharge Current	200A(25℃, SOC50%, 1min)	
Rated Charge/Discharge Power	716.8V	768V
Operating voltage range	627.2V~806.4V	672V ~ 864V
Photovoltaic Parameters (optional)		
Rated Power	50kW / 100kW / 150kW	
Starting Voltage	200V	
Operating Voltage Range	250V~620V	
MPPT Full Load Voltage Range	345V~620V	
Maximum Input Current	(80+80)A*1 / (80+80)A*2 / (80+80)A*3	
Maximum Output Current	110A*1 / 110A*2 / 110A*3	
MPPT Roads	1 / 2 / 3	
PCS Parameters		
Power Rating	125kW	
Maximum DC Current	200A	
DC Side Operating Voltage Range	580~1000V (3W+PE)/ 680~1000V (3W+N+PE)	

DC Side Full Load	625~950V (3W+PE)/ 680~950V (3W+N+PE)	
Operating Voltage Range		
Rated AC Voltage	AC400V, 3W+PE/3W+N+PE	
Rated AC Current	180A	
Rated AC Frequency	50Hz/60Hz(±5Hz)	
Power Factor	-1 ahead ~ +1 lagging	
Overload Capability	110%, normal operation; 120%, 1 minute	
Charging Post (optional)		
AC Charging Post	120kW	
General Parameters		
Operating Humidity	0~95%RH (no condensation)	
Operating Temperature	-20℃~55℃ (>45℃ derating)	
Storage Temperature	0℃~35℃	
Altitude	2000m (>2000m derating)	
Cooling Method	Intelligent air-cooled	
Noise	<75dB	
Fire Protection	Thermal aerosol fire extinguisher	
Communication	RS485 / CAN / Ethernet / DRY	
Isolation Method	Isolation transformer	
Protection Level	IP55	
Dimensions (W*D*H)	2563*1500*2350(+10mm)	
Weight	3150kg ±3%	3250kg ±3%

Table 2.7-1



Note:

The actual parameters have been set according to customer requirements before the products were manufactured.

2.8 Component Introduction

This product is composed of two parts for component introduction: the XDC120 charging station and the C241 integrated cabinet.

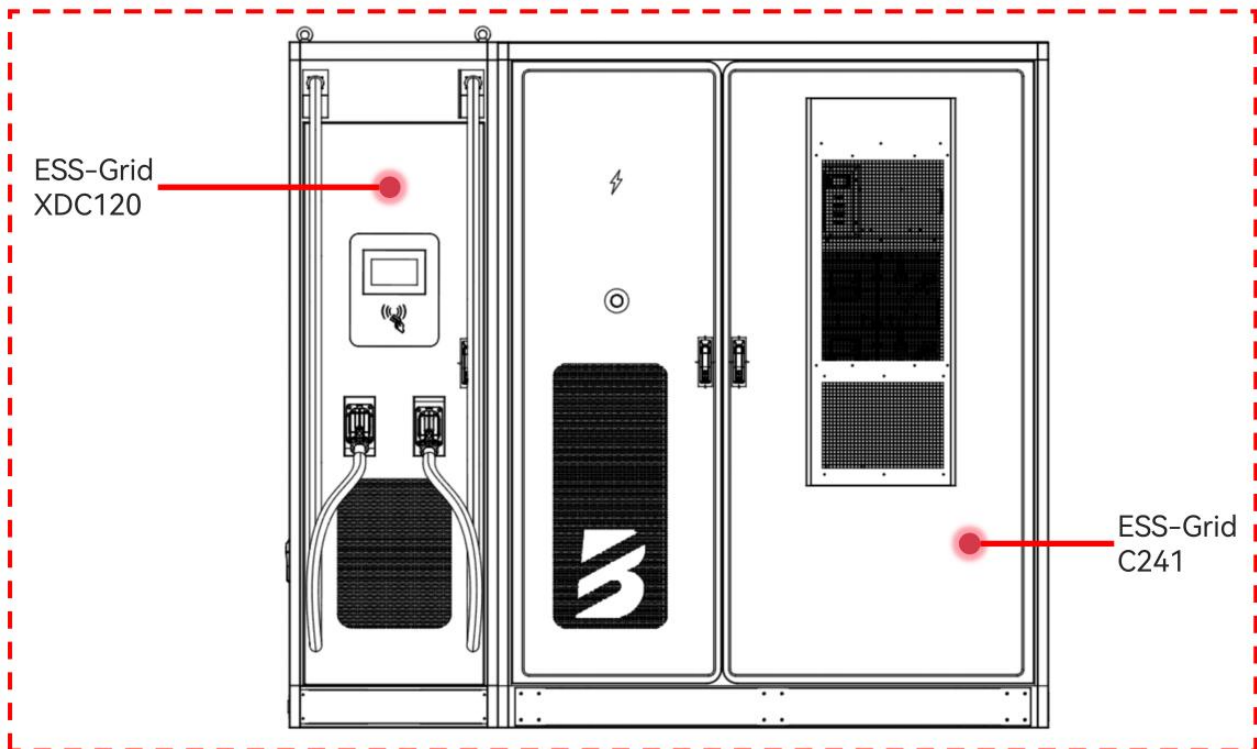


Figure 2.8-1

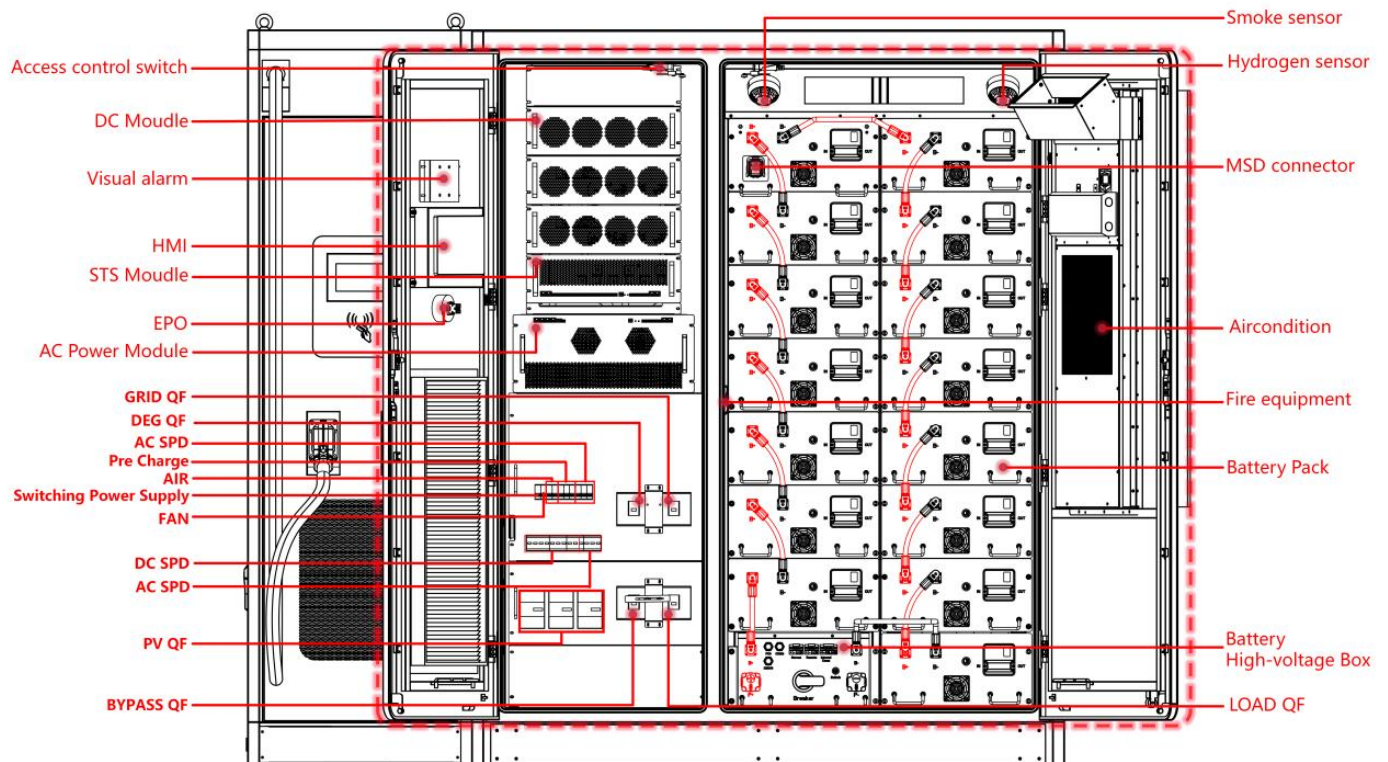


Figure 2.8-2

2.8.1 Battery pack

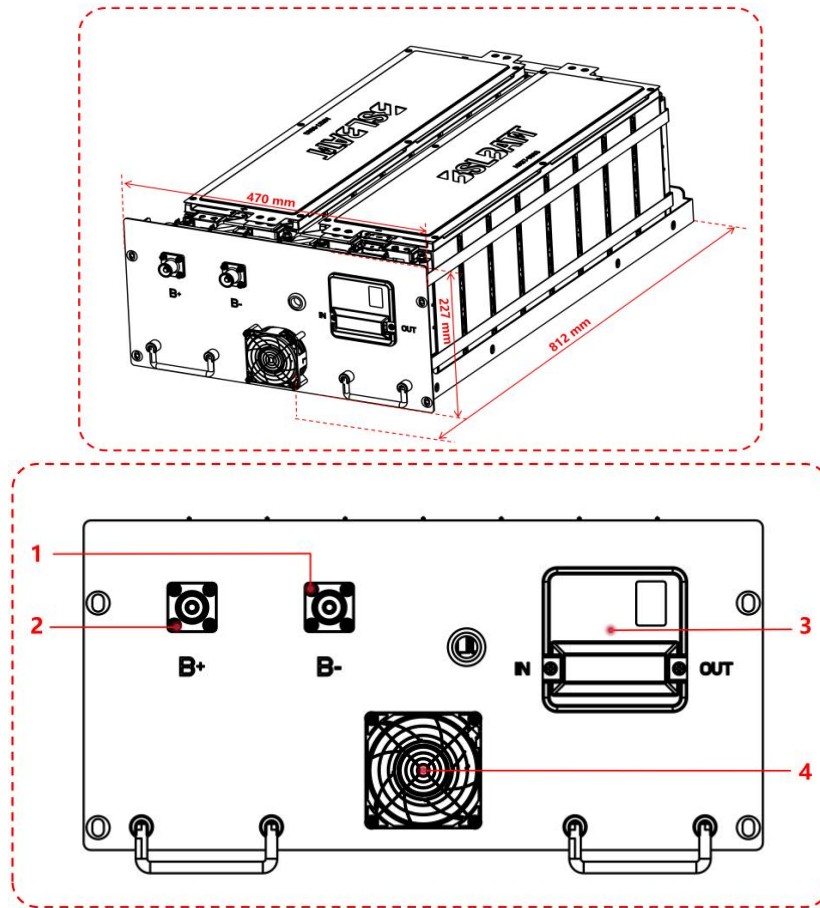
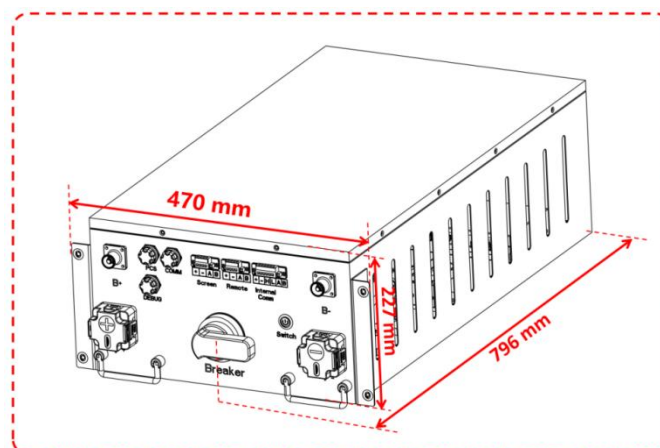


Figure 2.8.1

NO.	Model name	Descriptions
1	Negative output	Connect the negative terminal
2	Positive output	Connect the positive terminal
3	BMU	Battery Management Unit
4	Cooling fan	Cool the battery to reduce the chance of thermal runaway.

Table 2.9.1

2.8.2 High voltage control box



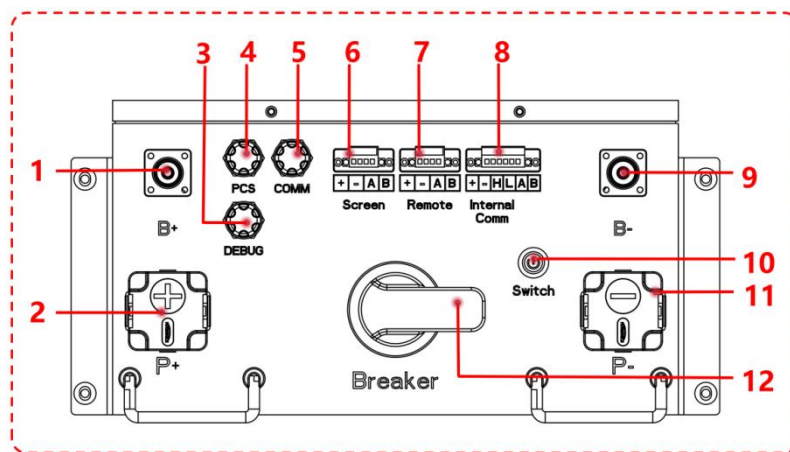


Figure 2.9.2

NO.	Model name	Descriptions
1	Battery positive connection port	Connect the positive terminal
2	System positive output port	Connect the external positive DC cable, which can be connected to the positive terminal of the inverter.
3	Debugging	Communicating with the computer, monitoring and upgrading the battery.
4	PCS	PCS communication connection
5	COMM	Address confirmation for parallel connection with another battery system
6	24V power output	External power supply or communication interface for the display screen
7	BMU connection port	Communication between BCU and BMU
8	Air conditioning	RS485 communication
9	Battery negative connection port	Connect the negative terminal
10	Switch	Control the "on/off" of the low-voltage circuit in the battery system
11	System negative output port	Connect the external negative DC cable, which can be connected to the negative terminal of the inverter.
12	Isolating circuit breaker	Control the on and off of the high-voltage circuit of the battery.

Table 2.9.2

2.8.3 Battery Management System

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

The BMU is located inside the battery box and completes the data collection of individual cell information inside the battery box. It uploads the data to the BCU and balances the individual cells inside the battery box according to the instructions issued by the BCU. BCU is located in the main control box and is responsible for the management of the battery cabinet. It receives detailed data uploaded by the BMU inside the battery, samples the voltage and current of the battery cabinet, performs SOC calculation and correction, is responsible for pre charging and waiting for charging and discharging management of the battery cabinet, and uploads relevant data to EMS.

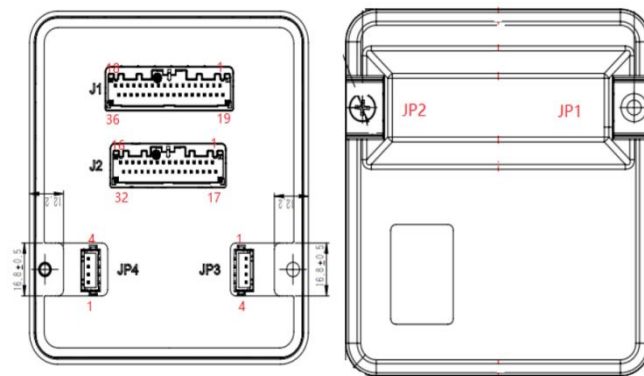


Figure 2.9.3-1 BMU

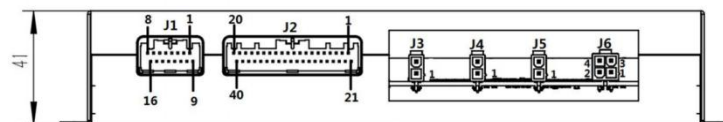


Figure 2.9.3-2 BCU

2.8.4 Energy Storage Converter Power (PCS) Module

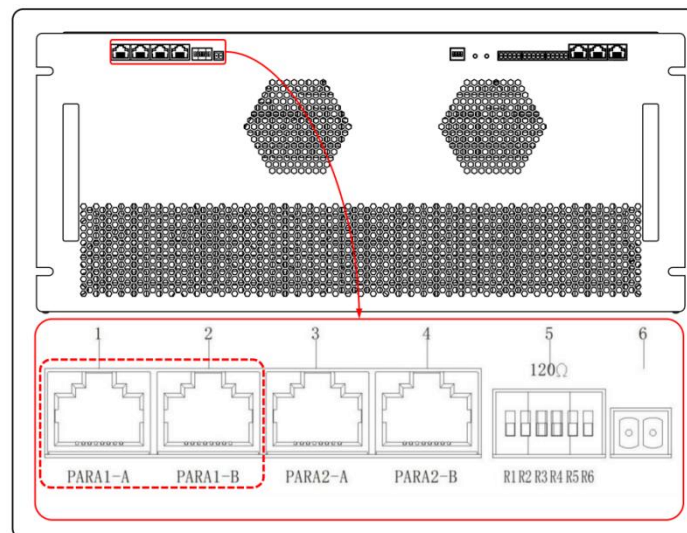


Figure 2.9.4



Illustration : In the parallel connection ports, the "A" and "B" interfaces of PARA1 (module parallel interface) are connected in parallel with no priority difference between them. All internal PCS modules must ensure proper connection of the parallel interface; otherwise, system abnormalities may occur during operation.

Serial number	Name
1	PARA1-A
2	PARA1-B
3	PARA2-A
4	PARA2-B
5	R1, R2, R3, R4, R5, R6
6	Internal debugging port

Table 2.9.4-1 Parallel Connection Port Table

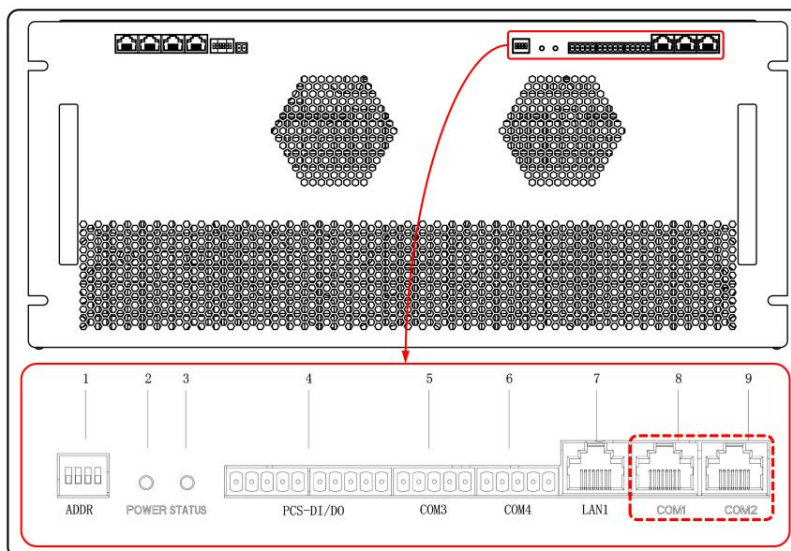


Figure 2.9.4 Signal Port Interface Diagram



Illustration:

1. The COM1 and COM2 signal ports are parallel-connected and serve as the PCS module's external communication interfaces.;
2. For parallel operation of multiple modules, each must be assigned a unique hardware address. If two modules share the same address, address conflicts will occur, preventing correct identification of parallel-connected units and compromising normal system operation.

Serial number	Name	Description
1	ADDR	DIP switch address
2	POWER	Power indicator (Red)
3	STATUS	Status indicator (Green)
4	PCS-DI/DO	PCS digital input/output dry contact port
5	COM3	PCS CAN & RS485 communication port
6	COM4	PCS CAN & RS485 communication port
7	LAN1	PCS Ethernet port
8	COM1	PCS CAN & RS485 communication port
9	COM2	PCS CAN & RS485 communication port

Table 2.9.4-2 Signal Port Interface Table

2.8.5 DC/DC converter power module

For islands, mountainous areas, border outposts, and other remote regions or areas with unstable power supply, or for the construction of zero carbon technology parks with photovoltaic storage systems. Users can configure the DC converter power module according to project requirements, and charge the battery through DC coupling to achieve an integrated power supply system of photovoltaic and energy storage.

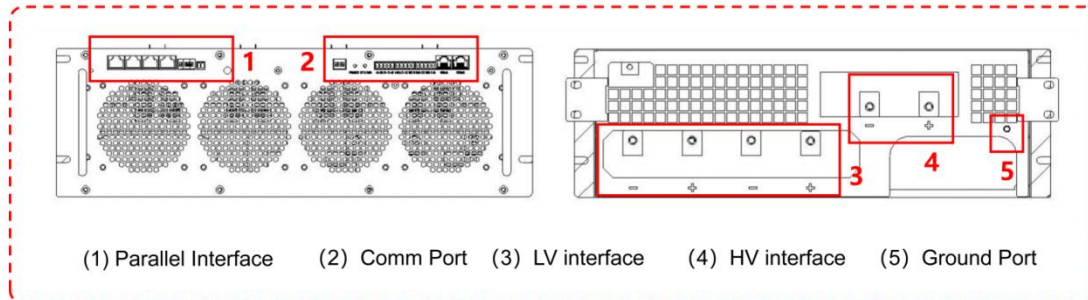


Figure2.8.5-1

NO.	Name
1	PARA1-A
2	PARA1-B
3	PARA2-A
4	PARA2-B
5	R1、R2、R3、R4、R5、R6

Table2.8.5-1

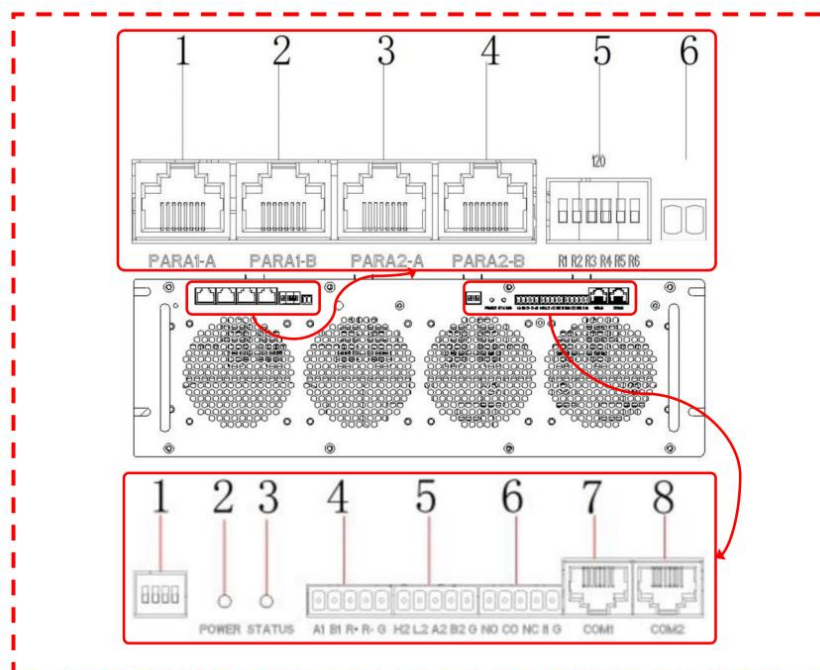


Figure2.8.5-2

NO.	Name
1	Dial address
2	Power Indicator (Red)
3	Status Indicator (Green)
4	485 communication interface 1
5	485 communication interface 2
6	I/O interface
7	RJ45 Port 1 (CAN Communication port)
8	RJ45 Port 2 (CAN Communication port)

Table2.8.5-2

2.8.6 ON/Off grid switching module STS

For areas with unstable power grids and frequent power outages, users can configure STS modules according to project requirements to achieve seamless switching and automatic control of on/off grid operations through STS.

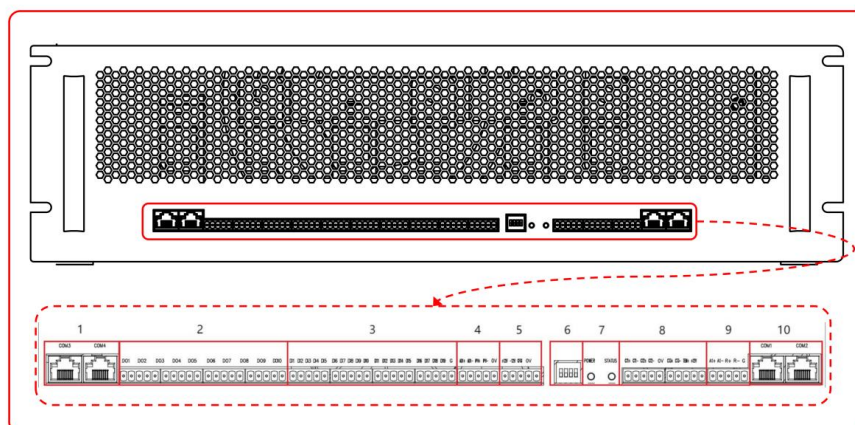


Figure 2.8.6 STS

STS Module Table

NO	Name
1	Parallel Port
2	Output Digital Signals (DO1-DO10)
3	Input Digital Signals (DI1-DI19)
4	Empty
5	Empty
6	DIP Switch
7	Indicator Light
8	Current Sampling Interface
9	Empty
10	RJ45 Interface (CAN Communication Interface)

Table 2.9.6

2.8.7 Three-phase Isolation Transformer

For off-grid application scenarios, a three-phase isolation transformer is configured. The output and input terminals are completely isolated from each other, achieving harmonic filtering and preventing surge currents, etc. The parameters of the isolation transformer module are as follows:

Model	MTFI-3125A
Rated Power	125kVA
Dimensions (W*D * H)	600*410*670mm
Insulation grade	H
Connection group	Dyn11
Primary side input voltage	400V
Primary side input current	180A
Rated frequency	50Hz
Secondary Side Output Voltage	400V
Secondary Side Output Current	180A
Overload Capacity	110%
Cooling Method	Dry self-cooling
Efficiency	> 97.5%
Noise	≤65dB

Table 2.9.7

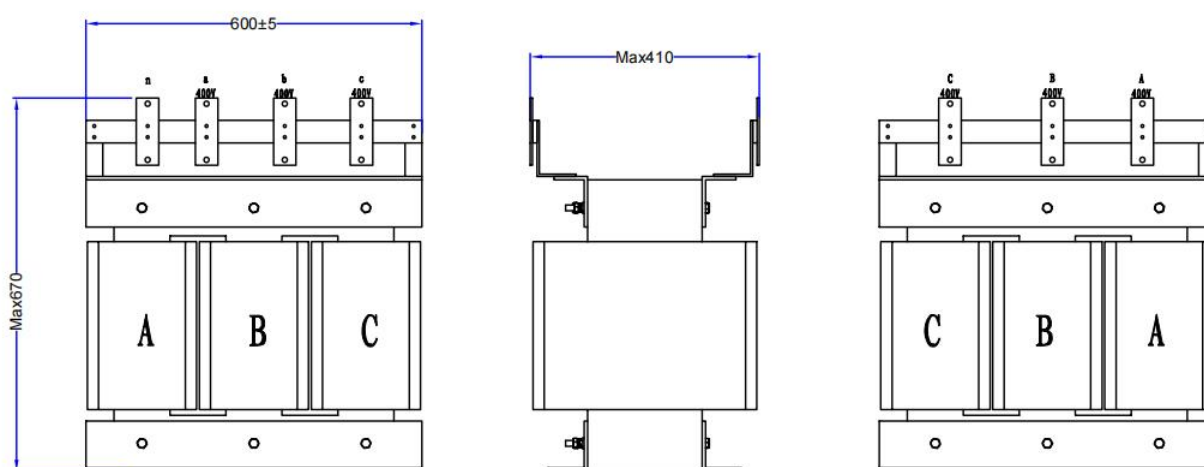


Figure 2.9.7 - Transformer

2.8.8 Temperature Control System

Industrial grade air conditioning

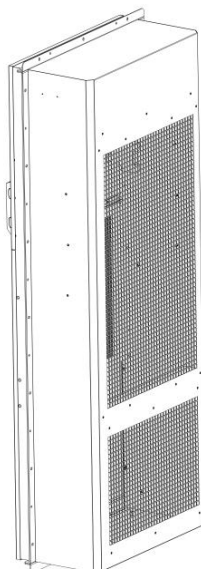


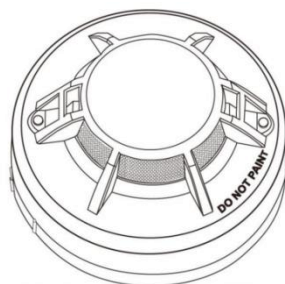
Figure 2.8.8

Product Name	Industrial air conditioners
Fixed way	Semi-embedded
Power supply	220±15%VAC~50Hz
Refrigeration capacity	3000W@L35/L35
Power consumption	1070W@L35/L35
Internal circulation air volume	850 m3/h
Operating temperature range	-40°C~+55°C
Protection level	IP55
Refrigerant	R134a
Dimensions	1300*500*250(mm,HxWxD)
Heat input	2000W

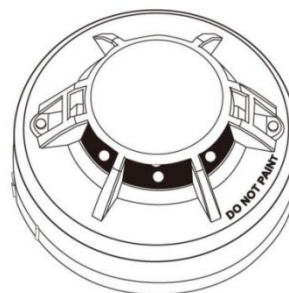
Table 2.9.8

2.8.9 Thermal runaway suppression system

Temperature and smoke detector



Smoke Detector



Thermal Sensor Detector

Figure 2.8.9-1

Technical Specifications of Temperature&Smoke Detector	
Operation voltage	9~28V DC
Operation current	Static current<60uA
Alarm current	10mA≤I≤50mA
indicator	Flashes during monitoring and stays on constantly when alarming.
Operating temperature	-10°C~+55°C
Relative humidity	<95%RH(Without condensation)
Smoke sensitivity	0.2~0.3dB/m
Alarm temperature level	A2R

Table 2.9.9-1

Fire protection system

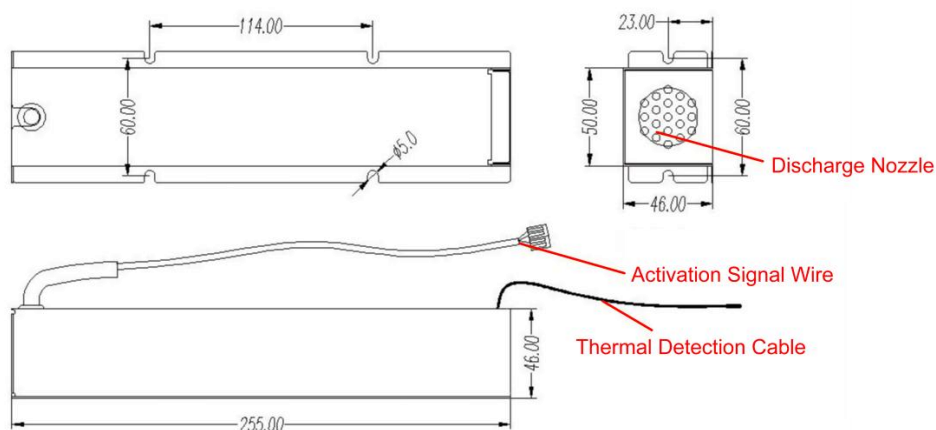


Figure2.9.9-2

Fire equipment parameter table	
Service life	10 years
Startup method	hot start and electric start
Cold Cranking Temperature	160°C→180°C
Ambient Operating Temperature	-50°C→+90°C
Mandatory Safety Clearance	≤ 3 m3
Total Aerosol Emission Mass	300g±2%
Spray delay time	≤5s
Nozzle temperature	5mm away from the nozzle≤200°C
Passive switch feedback signal	normally open in standby mode, normally closed after

startup (starts after exceeding 80°C)	
Equipment weight	860g

Table 2.9.9-2

Pressure Relief Valve

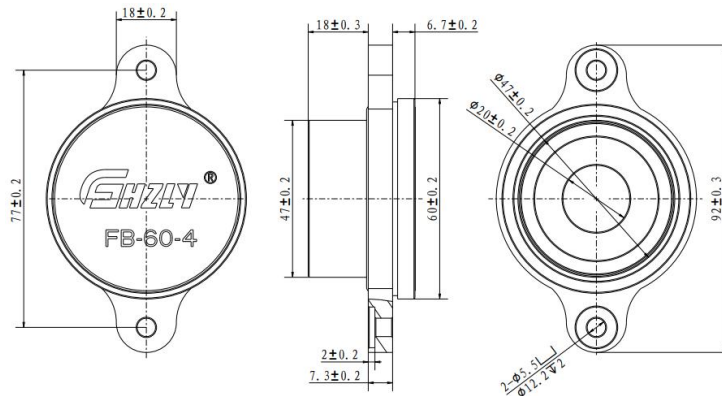


Figure 2.9.9-3

Pressure Relief System Technical Parameter	
IP Protection Rating	IP68
Air Permeability Rate	>900ml/min(air pressure 1.5kPa)
Burst Pressure	4 ± 1kPa
Environmental Compliance	Rohs2.0
Flame Retardant Class	UL94-VO
Temperature Resistance	300g ± 2%
Discharge Lag Time	-40~125°C

Table 2.9.9-3



Illustration:

1. Balance the pressure difference inside and outside the battery cabinet. Under normal operation, the product will not experience seal failure due to the pressure difference exceeding its tolerance when the external environment changes (temperature and altitude changes).
2. When the battery pack experiences abnormal conditions, the product can quickly release pressure.

2.8.10 Access control switch

Door opening status of access control switch detection equipment.

Model	MTFI-3125A
Rated Load	5A/250VAC
Operating Speed	5mm-50cm/s
Operating Frequency	Mechanical: 120 times/min Electrical: 30 times/min
Insulation Resistance	Above 100mΩ
Contact Resistance	Initial value 25mΩ
Dielectric Withstand Voltage	Non-connected: 1000VAC Between terminals: 1500VAC
Vibration	Malfunction: 10-55Hz double amplitude
Shock	Durability: 1000m/s ² Malfunction: 300m/s ³
Service Life	Electrical: 100,000 times and above Mechanical: 1,000,000 times and above
Protection Class	IP65
Operating Temperature	-20~+60°C
Operating Humidity	<85%

Table 2.8.10


Note:

1. Do not disassemble the access control switch by yourself to avoid more serious damage or safety risks.
2. Do not forcefully close or open doors abnormally.

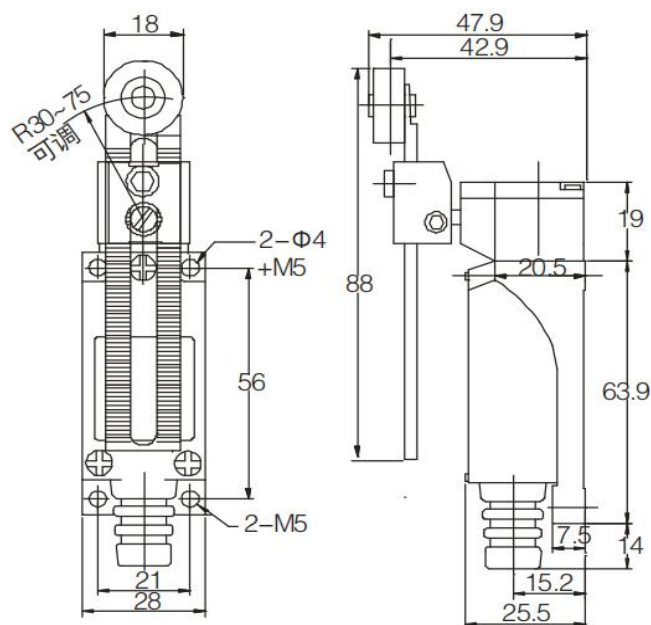


Figure2.8.10

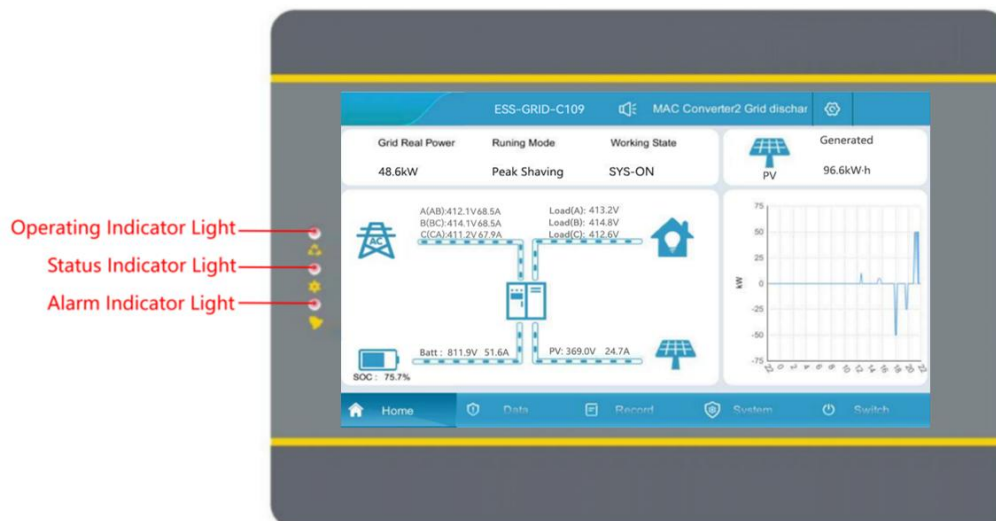
2.8.11 Local management system

Lotus ESS is an intelligent energy management system developed by our company for micro-grid systems, mainly used in various capacity energy storage power stations and integrated photovoltaic storage and charging power stations.

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

Product Model	Lotus - ESS
Power Input	DC 12V
Output Control	3 isolated output switching signals
Input Control	6 isolated input switching signals
Serial Communication	2 isolated RS232 ports, 4 isolated RS485 ports
Fieldbus	2 CAN bus interfaces
Ethernet Port	1 10/100M Ethernet port (RJ45)
Expanded Storage	1 USB port, 1 SD card slot
Audio Alarm	1 controllable buzzer
Program Characterization	1 running indicator light, 1 status indicator light, 1 alarm indicator light
Abnormality Characterization	1 hardware watchdog timer
Real-Time Clock	1 set of RTC real-time clock

Table2.8.11



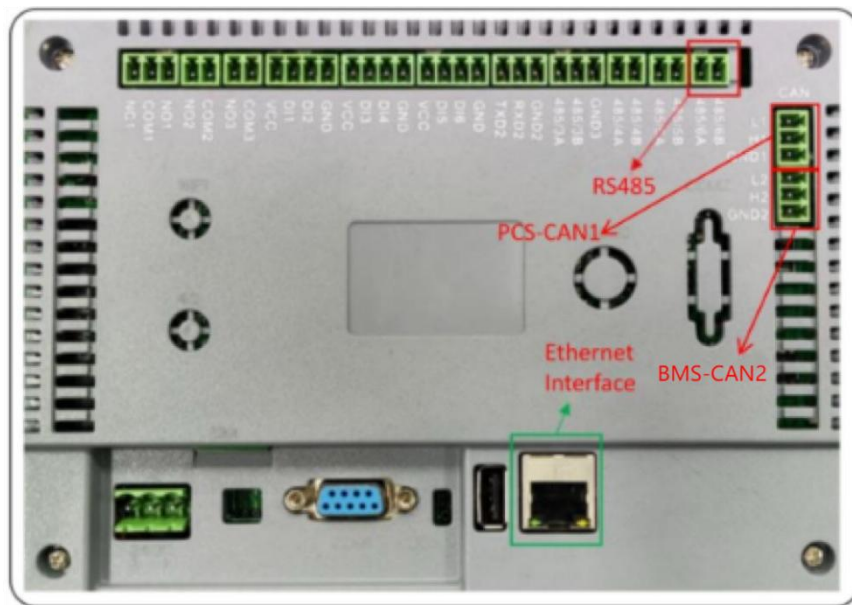


Figure2.8.11-HMI

2.9 Dual-gun charging station

XDC120 is a DC fast charger that complies with international standards and is specifically designed for electric vehicles. It supports dual charger output (CCS2 interface) with a maximum power of 120 kilowatts, enabling a significant portion of the vehicle's charging to be completed within just 30 minutes. This device is equipped with a 10.1-inch touch screen interface, supports cloud management via the OCPP1.6 protocol, and is compatible with various authentication methods (NFC, QR code scanning, and anonymous charging). With its IP55 rating and IK10 shock resistance capability, it is suitable for various harsh environments ranging from 20°C to 55°C, making it an ideal choice for commercial charging stations and public facilities. The product's hardware resources and parameters are as follows:

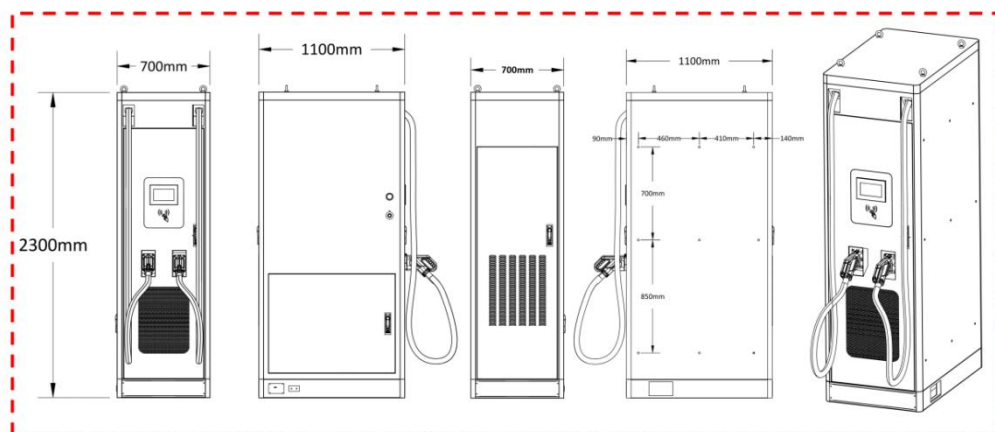


Figure 2.9-1 - Product Appearance

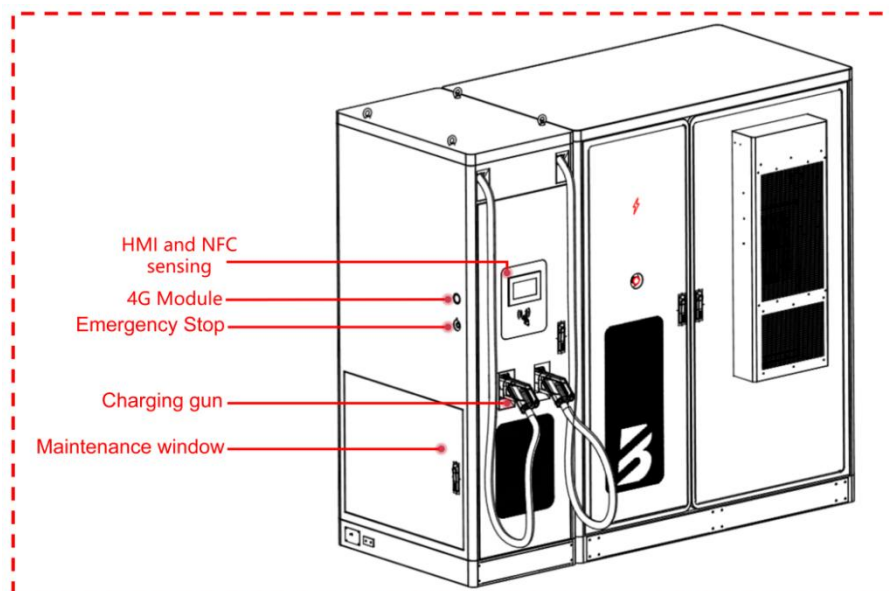


Figure 2.9-2

Model	XDC120
Power Input	
Input Ratings	400V 3-phase Max 200A
Number of Phases /Lines	3P /L1, L2,L3, PE
Power Factor	>0.98
Current Total Harmonic Distortion (THD)	<5%
Efficiency	>95%
Power Output	
Output Power	DC 120kW
Output Ratings	DC:200V-1000V AC: 3-phase 400V
Protective Functions	
Conservation	Over-current,under-voltage,over-voltage,leakage current. surge protection, short-circuit, over-temperature, and ground faults
User interface and Control	
Display	10.1-inch touchscreen
Supported Languages	English (other languages available on request)
Charging Options	The following options are available on request: hourly billing, power billing,and dollar billing
Charging Port	CCS2

User Authentication	PayPal or NFC card
Communication	
Network Interface	Ethernet (standard):Wi-Fi, 4G (optional)
Open Charge Point Protocol	OCPP1.6
Environment	
Operating temperature	-20'C to 55°C(derated for >55°C)
Humidity	<95% relative humidity, non-condensing

Table 2.9

2.10 Configuration List

ESS-GRID C241-X120 Configuration List

Part Name	Modle	Qty.	Remark
Battery System	314Ah, 241kWh	1	With control box
Energy storage converter	BSL-125AC	1	Modularization
DC converter power module	BSL-50DC	2	Modularization
STS Off-Grid Switching Module	BSL-150STS	1	Modularization
Air conditioning system	AC3000P 220±15%VAC~50Hz	1	Intelligent air cooling
fire extinguishing system	QRR0.3G/S	1	Thermosensitive line activation type
Three-phase isolation transformer	MTFI-3100A	1	Dyn11
Auxiliary system	Access control, power distribution, smoke and heat detectors, cables, etc.	1	Product accessories
Management system	Lotus-ESS	1	Product accessories
Dual-gun charging station	ESS-Grid XDC120	1	Product accessories



Note: The actual supply configuration shall prevail.

03 Transportation and storage

3.1 Packaging and Storage

3.1.1 Product packaging

To ensure that the product is well protected during transportation, specific wooden boxes are used for packaging. The equipment packaging includes the following basic parameters (and may include others), which need to be carefully verified according to the project requirements:

Parameter	illustrate
Model	Product model
Dimensions	Size after product packaging
Weight	Total weight after product packaging
Identification	Face up, handle with care, center of gravity position, etc.

Table 3.1.1

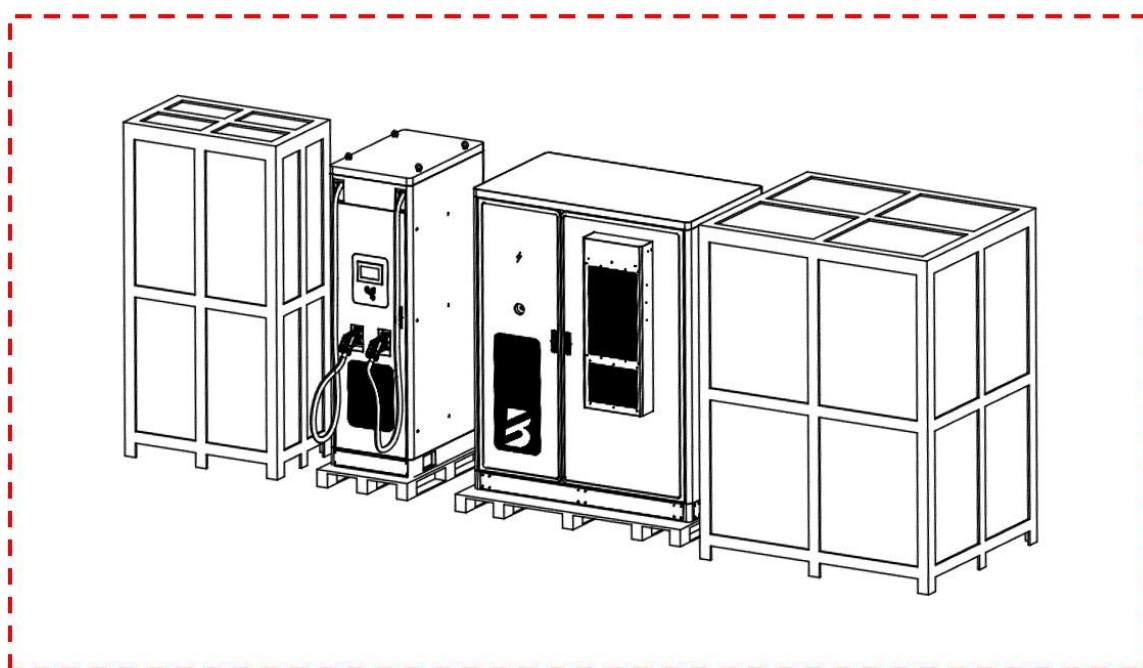


Figure 3.1.1-Packaging illustration



Note:

During the actual packaging and shipment process, this product will be packed separately with ESS-Grid C241 and XDC120.

3.1.2 Product storage

If the product is not immediately transported or installed for use, it must be stored indoors in a storage location that meets the following conditions:

Parameter	Requirements
Storage temperature (excluding battery)	-25°C~+60°C
Battery	20°C ~ 30°C
Storage relative humidity	< 95% (no condensation)
Altitude	< 2000m

Table3.1.2

When storing low battery, it is necessary to recharge according to the maximum time interval allowed by the SOC when the battery is fully discharged. Failure to recharge beyond the maximum time interval may result in battery damage due to over discharging.

SOC at the time of power-off prior to storage	Maximum recharging interval
SOC=50%	8 months
30%≤SOC<50%	4 months
5%≤SOC<30%	20 days
SOC<5%	48 hours

Table 3.1.3



Note: The operation of replenishing electricity must be carried out by professionals who have received skill training, and insulated gloves and specialized insulated tools must be worn during the operation.

During the process of replenishing electricity, someone must be present on site to observe and promptly handle any abnormalities.

During the process of recharging, if the battery experiences abnormalities such as swelling or smoking, it should be immediately stopped from charging and scrapped.

3.2 Transportation and Handling

3.2.1 Product Transportation

1. To ensure that the equipment is in good protective condition, it is recommended to use packaged transportation;
2. Equipment transportation should be carried out according to the labeling requirements on the packaging to prevent personal injury and equipment damage;
3. Energy storage batteries are not recommended for railway or air transportation. Land transportation speed limit requirements: flat roads have a speed limit of 80km/h, and rugged roads have a speed limit of 60km/h. In case of any conflict, please refer to local traffic regulations.

3.2.2 Product handling

1. Ensure that the forklift has sufficient load capacity when moving, and note that the center of gravity of the equipment should be placed between the forklift feet to prevent personal injury and equipment damage;

2. When transporting with batteries, the forklift's load-bearing capacity needs to be $\geq 3t$; when transporting without batteries, the forklift's load-bearing capacity needs to be $\geq 1.5t$;
3. Recommended fork length $\geq 1.5m$, width $80cm \sim 160cm$, thickness $25mm \sim 70mm$.

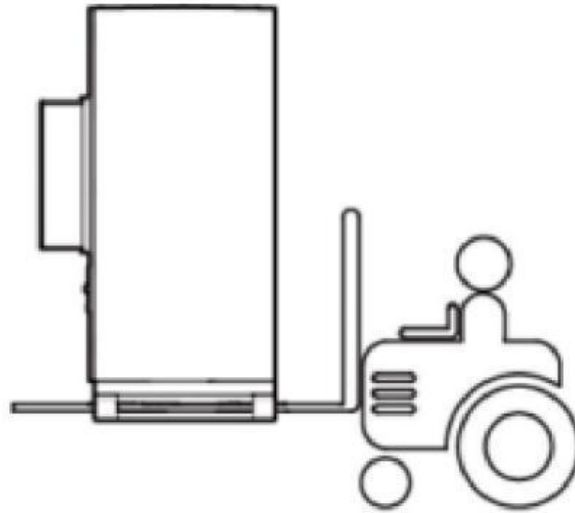


Figure3.2.2-Transportation diagram

04 Product Setup

4.1 Installation environment

The installation layout of energy storage systems must meet the fire distance or firewall requirements specified by local standards, including but not limited to the "*GB 51048-2014 Design Code 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 requires outdoor layout. It does not support indoor layout. The general requirements for site selection are as follows:

1. The installation location should be above the historical highest water level in the area. The distance from the airport, landfill, riverbank or dam should be $\geq 2\text{km}$.
2. Choose a place with good ventilation. When the device is running, do not cover the ventilation openings and cooling system to prevent high temperature fires. Adequate installation space to ensure that surrounding equipment is not affected by the heat generated by the product; Ensure sufficient external wiring space in the installation location. Having convenient transportation conditions and reliable fire suppression system equipment.
3. The installation location should be away from fire sources, and flammable and explosive materials should not be placed around the equipment. If the equipment is installed in a place with lush vegetation, in addition to routine weeding, the ground below the equipment needs to be hardened to prevent overgrown weeds.
4. Do not install energy storage systems outdoors in salt affected areas to prevent equipment from corroding and causing fires. Salt damaged areas refer to areas within 2km of the coast or affected by sea winds.
5. 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 damage.
6. The equipment should be installed in an area far away from liquids and should not be installed below water pipes, air outlets, or other locations that are prone to condensation; It should not be installed below air conditioning vents, ventilation openings, computer room outlet windows, and other locations that are prone to water leakage, to prevent liquids from entering the interior and causing equipment short circuits.



Illustration

When the safety distance of the site selection cannot meet the requirements of relevant national standards, it is recommended to reselect the site. Site selection should avoid scenarios that are not recommended by industry standards and regulations, including but not limited to the following locations, regions, and places:

1. Strong vibration, strong noise sources, and strong electromagnetic field interference areas.
2. Places that generate or have dust, oil fumes, harmful gases, corrosive gases, etc.

3. Places where corrosive, flammable, and explosive materials are produced or stored. Within the hazardous range of blasting.
4. Places with existing underground facilities. Densely populated areas, high-rise buildings, and underground structures.
5. There are unfavorable geological conditions such as rubber soil and weak soil layers, which are prone to water accumulation and sinking on the ground.
6. Within the boundary of the mining subsidence (displacement) zone. The area that may be submerged after a dam or embankment collapses.
7. Earthquake faults and seismic areas with a fortification intensity higher than nine degrees. Areas with direct hazards such as mudslides, landslides, quicksand, and caves.
8. Important water source hygiene protection zone.
9. Historical relics and historic sites protection area.

If there is no more suitable location, it is recommended to install a firewall with a fire resistance of no less than 3 hours for security protection, while considering the requirements for equipment transportation, installation, maintenance, and other space. Suggest referring to T/CEC 373-2020: The length and height of the firewall should exceed the outer contour of the energy storage cabinet by 1m each.

4.2 Space Preparation

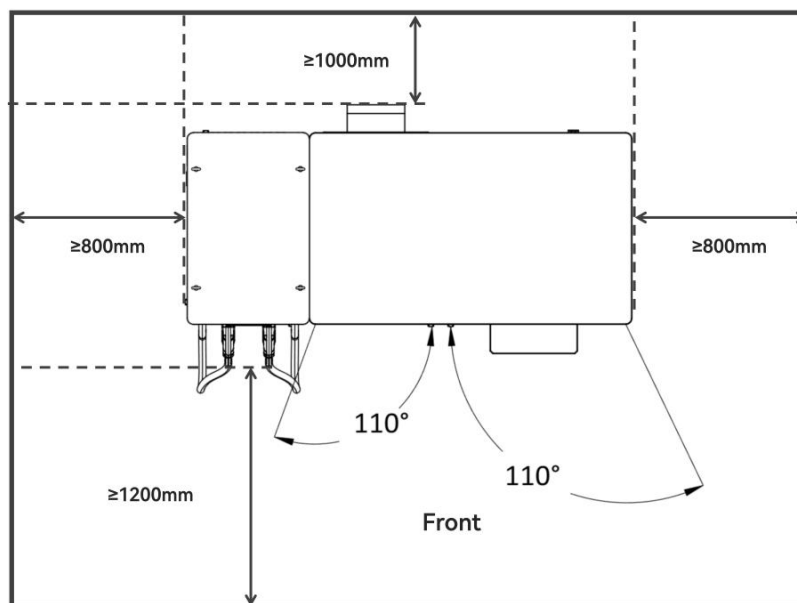


Figure 4.2-1



Illustration: The recommended "Spatial Layout Diagram" in the above figure refers to the "GB 51048-2014 Design Code for Electrochemical Energy Storage Power Stations", and the safety distance setting should be based on the actual local implementation standards.

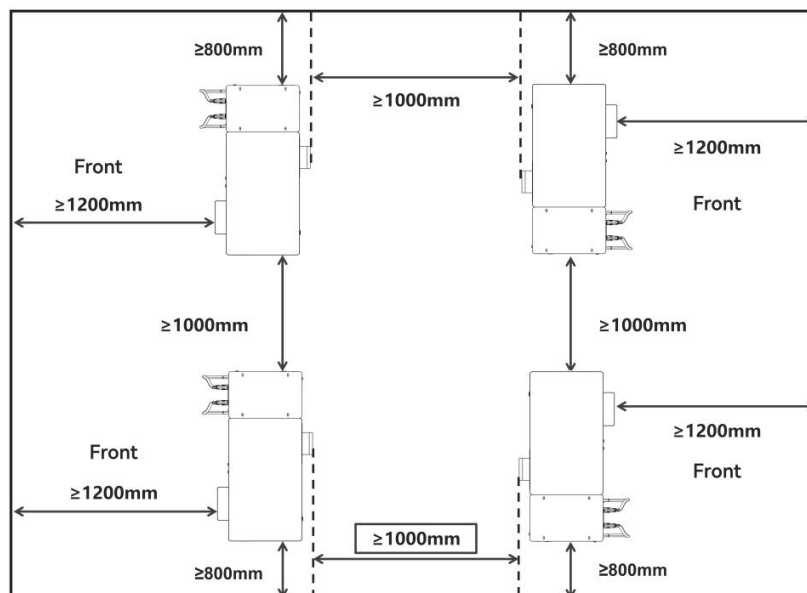


Figure 4.2-2



Illustration: The above figure shows the minimum space requirement.

4.3 Foundation preparation

Foundation reference diagram

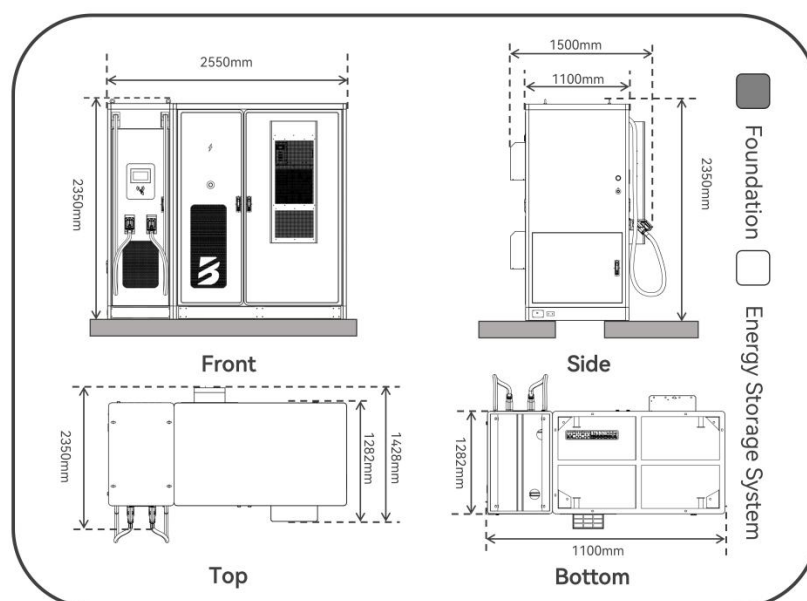


Figure 4.3



Illustration: The above diagram cannot be used as the final construction drawing and is for reference only.

Foundation design requirements:

1. The foundation must be higher than the local historical highest water level and at least 300mm above the horizontal ground level;
2. Construct drainage facilities in accordance with local geological and municipal drainage requirements to ensure that there is no accumulation of water at the equipment

foundation; The foundation construction should meet the local historical maximum rainfall drainage requirements, and the discharged water needs to be treated in accordance with local laws and regulations;

3. The energy storage system must be installed on concrete or other non combustible surfaces; The installation plane must be horizontal, firm, and flat, with sufficient load-bearing capacity, and no dents or tilts are allowed;

4. The foundation is configured based on the total weight of the equipment. When the bearing capacity of the foundation is not met, it needs to be reviewed; The bottom of the foundation pit must be compacted and filled; It is strictly prohibited to disturb the foundation by soaking in water after excavation. If it is disturbed by soaking in water, excavation should continue and replacement should be carried out;

5. When constructing the foundation, it is necessary to consider the issue of cable outgoing lines for the energy storage system and reserve trenches or entry holes; The reserved holes in the foundation and the bottom inlet holes should be sealed;



Illustration : The survey, design, and construction plan for the on-site foundation must be led by a qualified design institute or professional technical personnel, and strictly follow local regulations, industry standards, and the actual situation of the project for review and confirmation.

4.4 Pre-installation preparation

1. Before installing the product, it is necessary to check whether the product is intact and undamaged. If any signs of damage are found, please keep evidence and contact the equipment manufacturer.

2. If the product is confirmed to be normal, please check according to the delivery list to see if the accessories are complete.

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

NO.	Inspection Item	Handling Measure
1	Whether the fasteners are tightened	If loose, retighten the screws
2	Whether the space environment meets the installation dimension requirements	If the space is insufficient, it is recommended to redesign before installation
3	Whether the air duct is unobstructed and free of foreign objects	If there are foreign objects, please clean them; if it is not unobstructed, eliminate the cause

Table 4.4-1 Pre-installation checklist

NO.	Name	QTY	Remarks
1	C241-X120	1SET	Including cabinet door key
2	User Manual	1BOOK	
3	Certificate of Conformity	1PCS	
4	Delivery Inspection Report	1PCS	
5	Packing List	1PCS	

Table3.6-2 Delivery List

Assistance Tool Table

NO.	Tool Name	Legend
1	Insulating gloves	
2	Safety goggles	
3	Insulating shoes	
4	Work clothes	
5	Safety helmet	
6	Screwdriver	
7	Wire stripper	
8	Hydraulic clamp	
9	Heat gun	
10	Multimeter	
11	Torque wrench	
12	Marker pen	

Table 4.4-2

4.5 Basic installation

The first step is to refer to the following suggestions for mechanical installation after confirming that the product is normal and all accessories are complete:

1. Select the installation position of the equipment in advance according to the product size, and ensure proper positioning and fixation; The suggested foundation is shown in Figure 4.5-1.
2. Referring to the weight of the product, the selected installation location needs to have sufficient load-bearing strength;
3. The grounding point is reliable, ensuring that the grounding resistance is less than $4\ \Omega$.

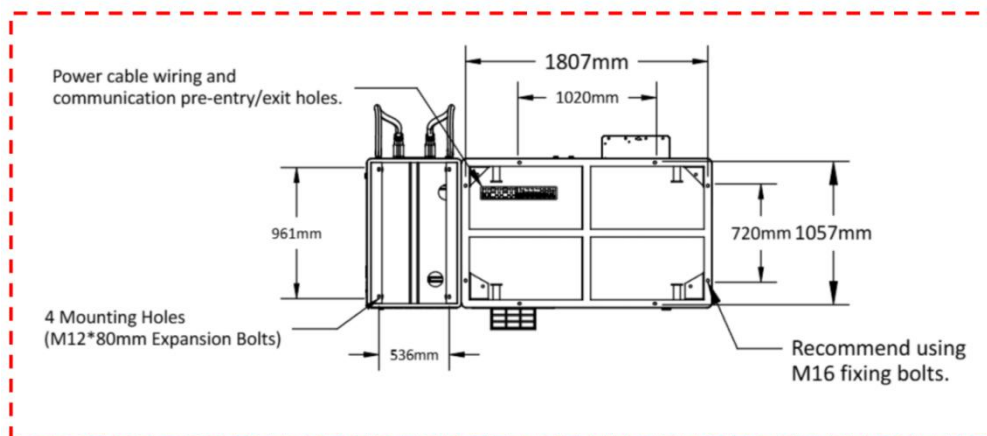


Figure 4.5-1



Note: The actual external dimensions of the equipment shall be subject to shipment. Step two, remove the wooden packaging box and first remove the bottom enclosure of the equipment. Put away the removed fence and screws, and reinstall them after the equipment is in place.

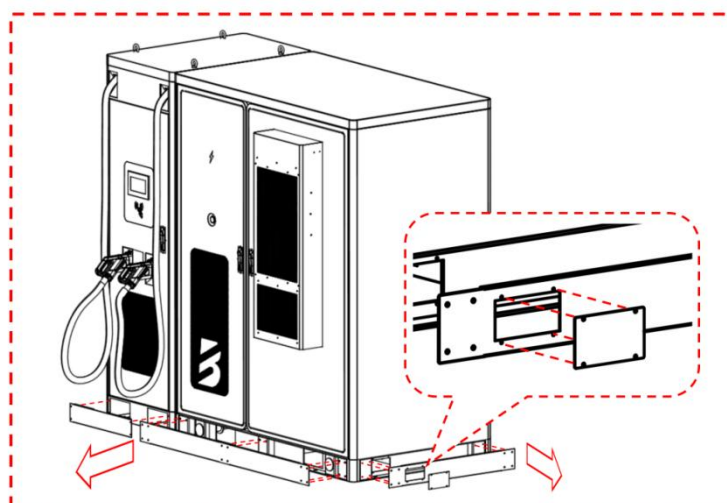


Figure 4.5-2

Step Three: Use a forklift to position the unit onto the foundation. Align the equipment's mounting holes with the embedded nuts in the foundation, and secure them with M12 bolts.

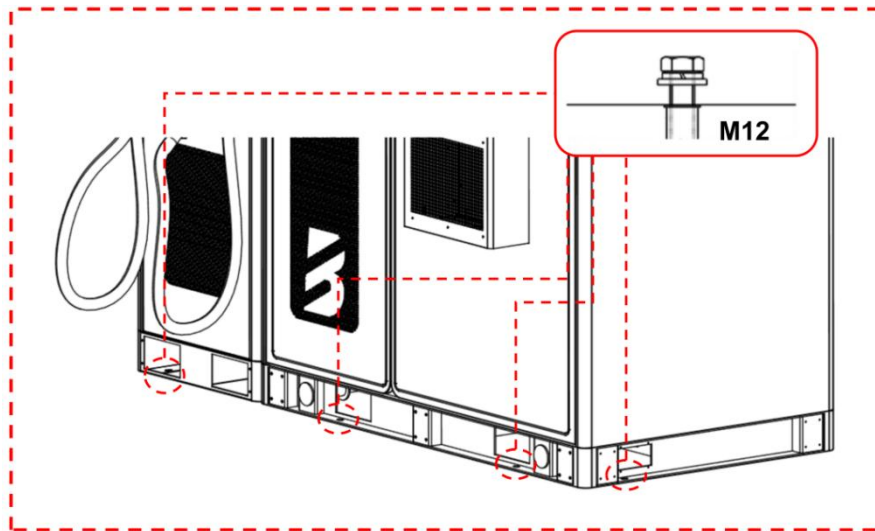


Figure 4.5-3

4.6 Mechanical Installation



Note:

When installing battery packs, it is recommended to use forklifts or other auxiliary installation tools. Transporting battery packs requires the cooperation of 4 or more people. During the process, handle with care and avoid any collisions. Personal safety should be taken seriously, and protective components on battery terminals should not be removed during transportation.

The installation of the battery pack should be fixed in a bottom-up order. Forklifts should also be installed in the order of the battery pack to prevent the risk of tipping due to a high center of gravity. The battery pack installation operation can only be carried out after the forklift has completely stopped running, and personnel are strictly prohibited from standing or reaching into any part of their body below the installation area.

Step 1: Battery Pack Installation

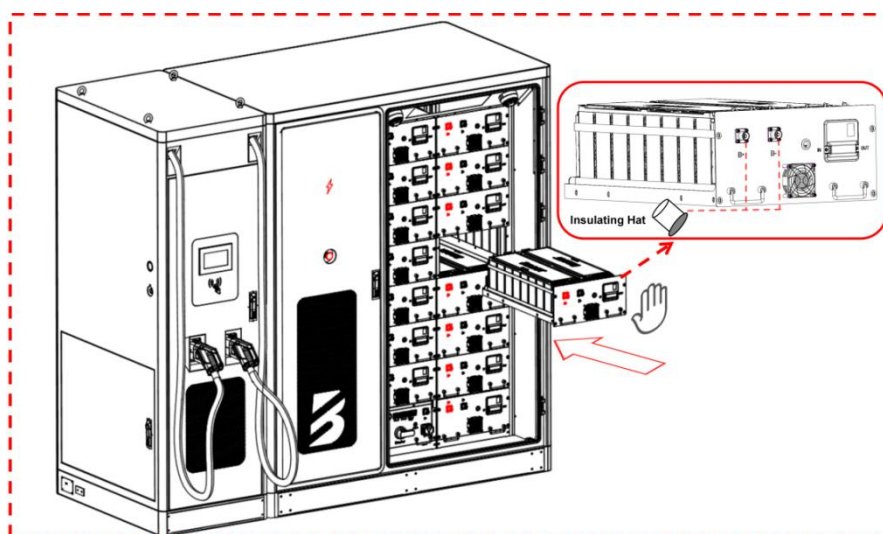


Figure 4.6-1

Step 2: Battery Pack Mounting

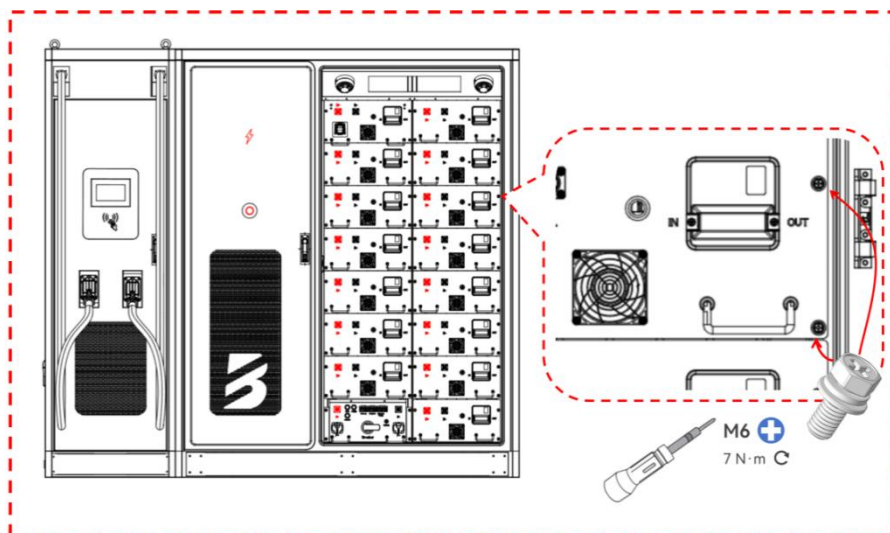


Figure 4.6-2



Illustration: Unless there are special requirements for the project, the installation and fixation of the battery pack inside the cabinet have been completed before leaving the factory;

4.7 Electrical Installation



Danger:

1. Note the positive and negative poles during the connection process. It is strictly prohibited to short-circuit the positive and negative poles of the battery pack;
2. Smoking or using open flames near batteries is prohibited;
3. There must be fire-fighting facilities on site that meet the requirements, such as fire sand, fire extinguishers, etc;
4. Please use specialized protective equipment and insulation tools to avoid electric shock injuries or short circuit faults;



Note: When connecting the battery pack securely, ensure that the cables are not damaged;

Step 1: Remove the MSD

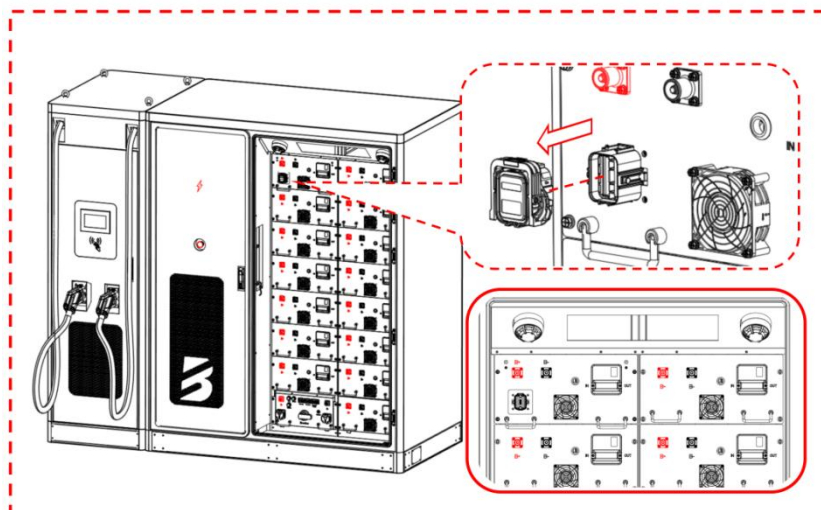


Figure 4.7-1

Step 2: Connection of power lines for battery clusters (between Battery Packs)

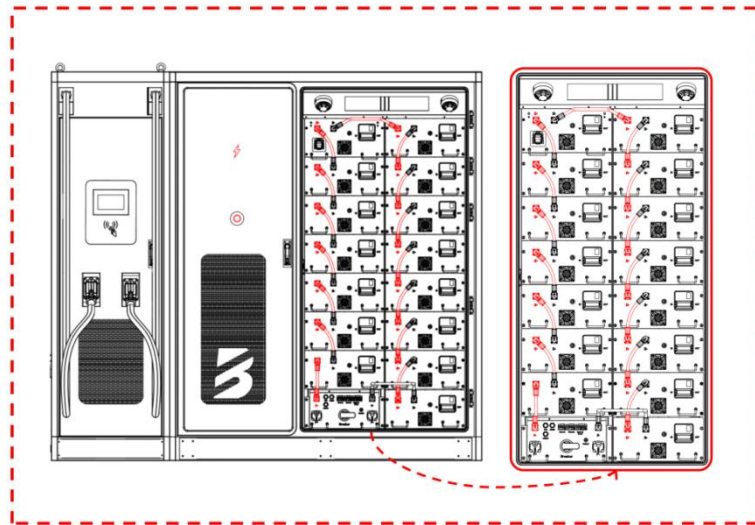


Figure 4.7-2

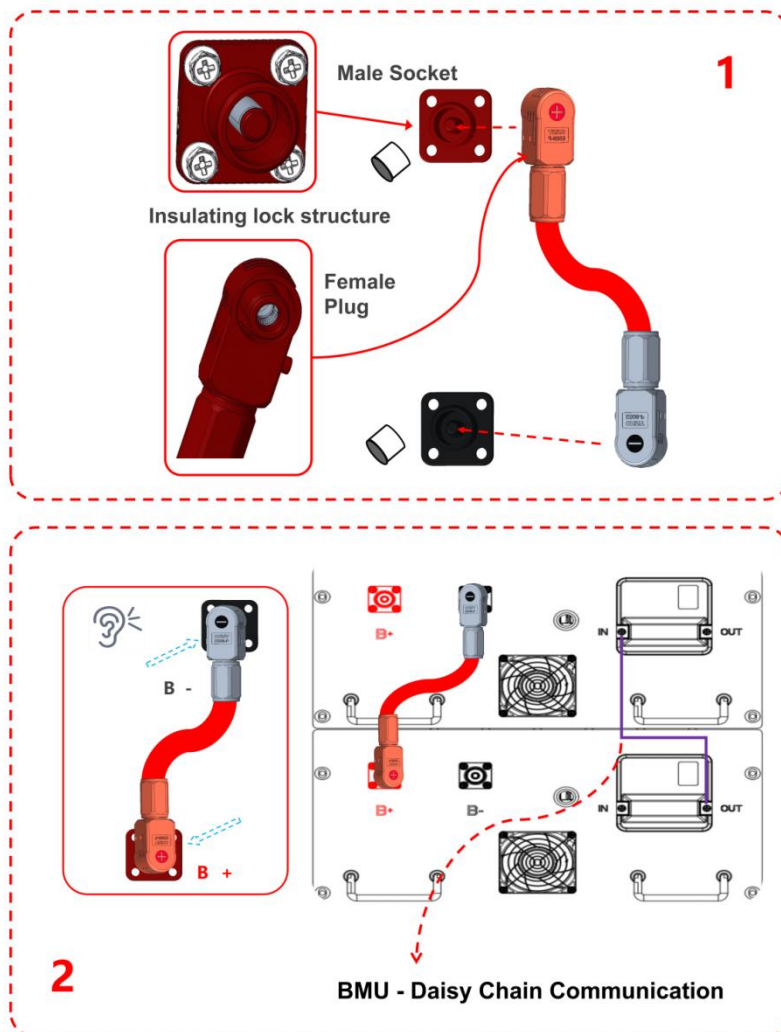


Figure 4.7-3



Illustration: Unless there are special requirements for the project, the connections inside the battery cluster in the cabinet have been completed before leaving the factory;

Step 3: Connect the PCS to the High-Voltage Control Box.



Note:

The PCS module has been pre installed in the electrical compartment of the cabinet, and the DC side cable connection of PCS has been completed before leaving the factory, with the other end connected to the high-voltage control box in the battery compartment;

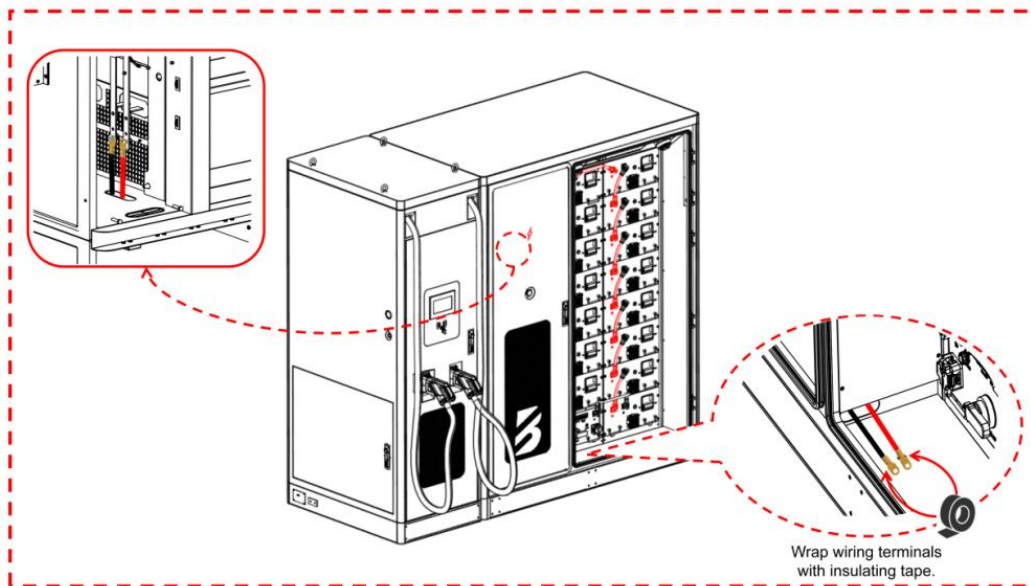


Figure 4.7-4



Illustration:

When the PCS DC side cable in the electrical compartment is not connected to the high-voltage control box in the battery compartment, insulation tape must be used to double wrap the exposed terminals for protection, ensuring air isolation and avoiding contact with the metal parts of the cabinet, while the system is completely powered off;



Note: Please ensure that cables can only be connected in the event of a power outage.



Illustration: Unless there are special requirements for the project, the connections on the control box inside the cabinet have been completed before leaving the factory;

Step 4: Close the protective cover and the MSD switch

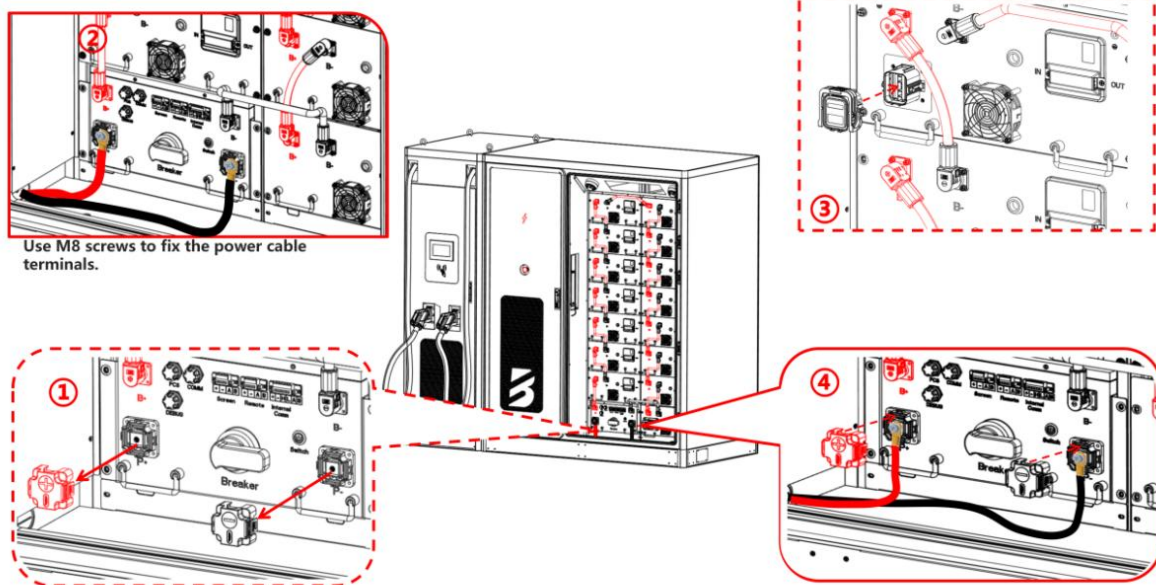


Illustration: Except for cases where the project has specific requirements, otherwise the electrical connection steps have already been completed before the product was manufactured.

Install the communication cabling.

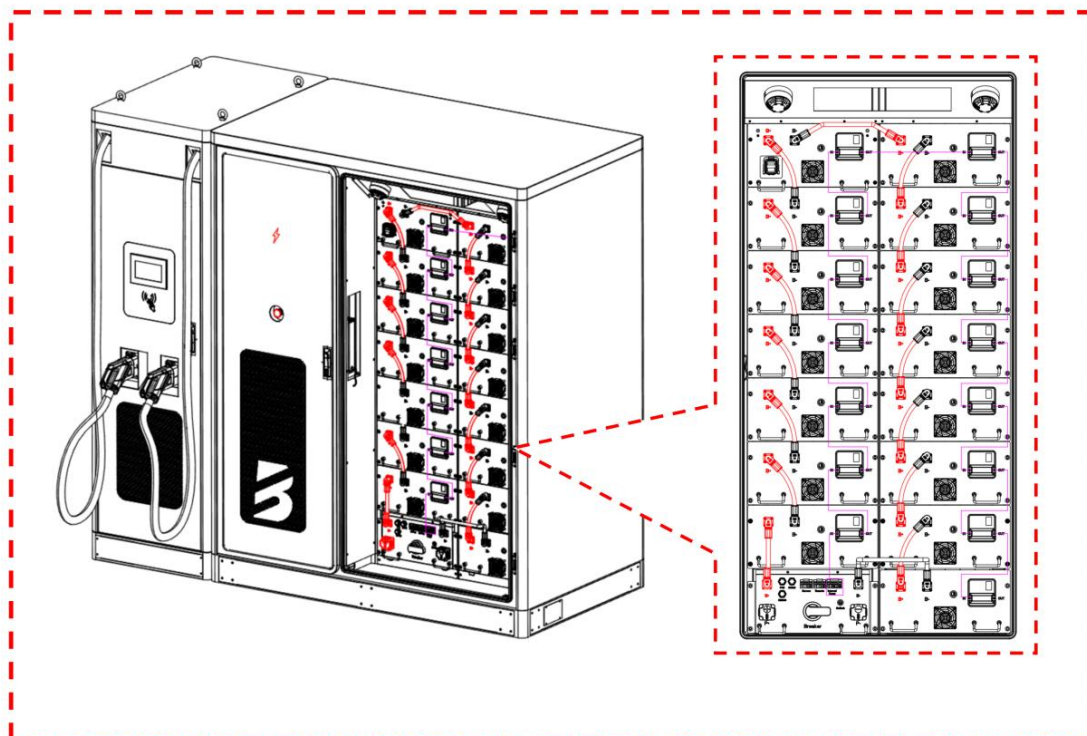


Figure 4.7-6

3. To ensure the correct phase sequence of the cable, different colored insulation sheaths or labels such as yellow, green, red, and black can be added to distinguish and prevent phase sequence errors;
4. The connection between the cable terminal and the copper busbar needs to be tightened, and the length of the screws should be selected appropriately to avoid affecting insulation and fastening;
5. Communication cables and power cables should be laid separately as much as possible, ensuring that the insulation layer of the cables is not damaged during the laying process;
6. The grounding cable must be reliably connected to the grounding copper bar, and the cross-sectional area of the cable must meet the design requirements;
7. All communication cables must enter the equipment through the bottom inlet and outlet holes and be connected to the corresponding phase sequence;
8. After the wiring is completed, use fireproof mud to seal the gaps in the wiring to prevent external insects and rodents from entering and damaging the equipment or cables.

In order to prevent the loosening of the terminal block under stress, which may cause poor contact and increase contact resistance and heat generation, it is necessary to ensure that the bolts used to tighten the terminal block meet the torque requirements listed in Table 4.8.1-2:

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

Table 4.8.1-2

The inlet and outlet lines of the energy storage system are arranged in the "down-in-down-out" manner. After removing the switch cover, it is as shown in Figure 4.8.1. The copper bars at the lower end A/B/C/N of the switch are reserved with $\phi 8.5\text{mm}$ holes for customers to connect the wires, or holes can be made according to the customer's requirements; the protective ground wire is connected to the PE copper bar. The grounding impedance of the equipment meets the requirements of national standard GB 50054 and local electrical standards.

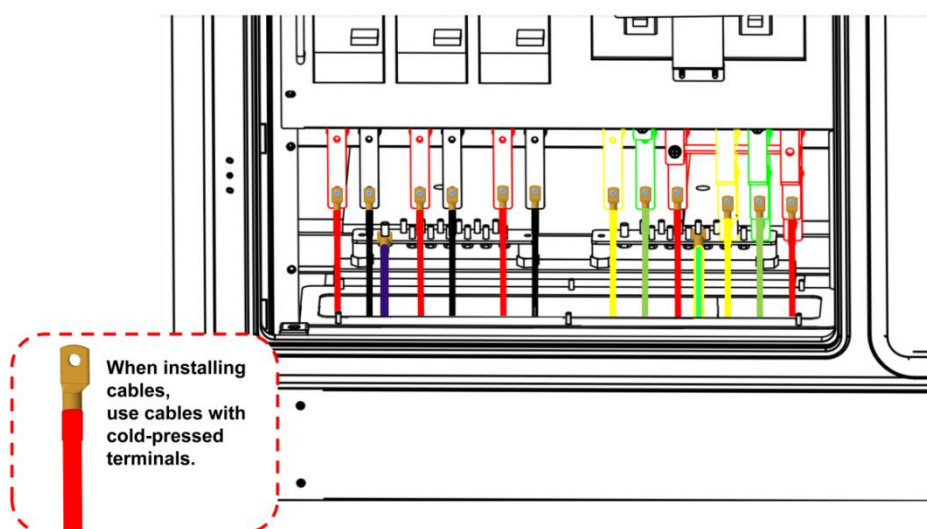


Figure 4.8.1-1

The following is a schematic diagram illustrating the installation of components such as terminals and fixing screws during the wiring of system power cables:

The connection specifications between cables and copper bars are shown in the following figure

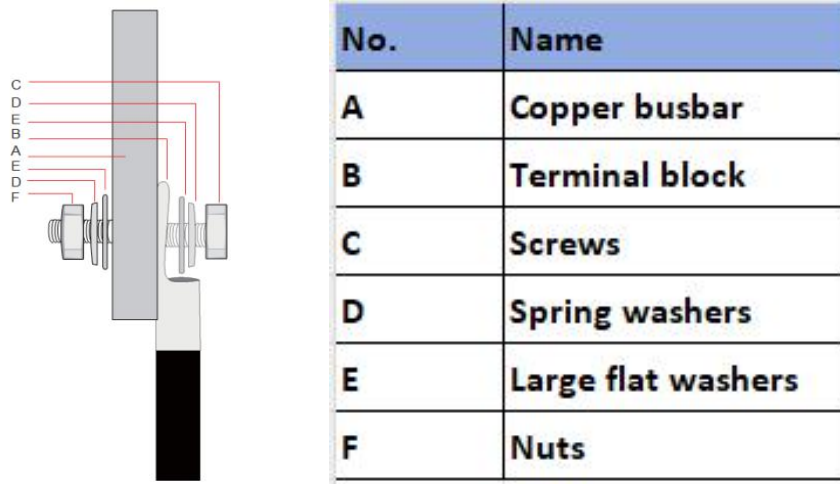


Figure 4.8.1-2



Note:

1. When using copper core cables or copper-clad aluminum cables, please use copper terminal blocks.
2. When using aluminum alloy cables, please use copper aluminum transition terminal blocks or aluminum terminal blocks with copper aluminum transition washers.

4.8.2 Check the equipment after wiring

After installation, in order to avoid equipment damage and property loss, the following items must be rechecked and measured.

NO.	Inspection Items
1	Before measurement, disconnect the switches on the battery side and electrical side to ensure the energy storage equipment is not energized.
2	The positive and negative connections between the battery and the energy storage equipment, as well as the AC phase sequence, are correct and properly tightened. Measure the resistance between the three phases, which should be at the megaohm level. If it is at the k level or lower, the line must be inspected.
3	The external control cables, grounding wires, and communication cables are properly tightened.
4	The grounding wire resistance is less than 4Ω , and the cables are in good condition with no damage or cracks.
5	Clean the installation area to ensure no tools or foreign objects are left in the area.
6	Seal the cable gaps with fire clay to prevent small animals from entering.

Table4.8.2

05 Startup and Debugging

5.1 Pre-power Check

1. Check if the circuit breaker inside the energy storage converter cabinet is in the disconnected state;
2. Check whether the connection terminals of all communication and power cables are reliably connected;
3. Check whether the communication, power supply harness, and power cables of the energy storage converter cabinet are connected correctly;
4. Check if there are any communication connections between the modules inside the energy storage converter cabinet and the integrated display and control machine.

5.2 Check before Startup

Before running the product, please ensure that it has been installed according to the specifications and conduct a comprehensive and detailed inspection of the machine to ensure that all indicators meet the requirements before starting up.

1) Appearance inspection:

- a. The appearance of the equipment is intact, without damage, rust, or paint peeling. If there is paint peeling, please perform touch up operation;
- b. The equipment labels are clear and visible, and damaged labels should be replaced in a timely manner.

2) Grounding inspection:

The box is equipped with a grounding point and is securely grounded; The grounding conductor inside the box is reliably connected to the grounding copper bar of the box.

3) Cable inspection:

- a. The cable protection layer is wrapped intact without obvious damage;
- b. The terminal production meets the specifications and the connection is firm and reliable;
- c. The labels at both ends of each cable are clear and distinct, and the routing follows the principle of separating strong and weak electricity. Leave a margin at the turning point and do not tighten it;
- d. The cable installation bolts have been tightened and there is no looseness when pulling the cable; The sealing of cable conduit holes has been completed.

4) Copper bar inspection:

The copper bar has no obvious cracks or deformations, the screws at the overlap are tightened, the markings are not misplaced, and there are no debris on the copper bar.

5) Component inspection:

The circuit breakers are all in the open position; The lightning arrester indicator is marked in green.



Note:

1. Insulated gloves are required for operation.

For transportation safety, we disconnect one section of the battery module's DC cable, leaving the entire cluster of batteries in an open circuit state. Before powering on, we need to connect the DC cable and insert it into the connector. If you hear a "card" sound, it means it has been inserted into place.

5.3 Power-on Procedure

The product startup operation process is as follows:

1. Use a multimeter to confirm that the grid voltage is within the predetermined range ($400V \pm 10\%$);
2. Referring to Figure 5.3, place the transformer soft-start switch, the air conditioning switch, and the auxiliary power switch to the ON position. Then, place the mains power supply switch to the ON position to complete the transformer soft-start process.
3. Turn on the battery auxiliary power switch and the battery high-voltage box load switch (rotate it to the ON position). Then, turn on the load switch and the photovoltaic switch.
4. Set the inverter parameters in the "System" -> "Parameter Settings" interface, and select the desired operating mode (manual mode, peak shaving and valley filling, backup mode) in the "System" -> "Operating Mode" interface;
5. Enable all modules on the "switch" page of the HMI integrated screen, click "inverter on" to complete the startup.

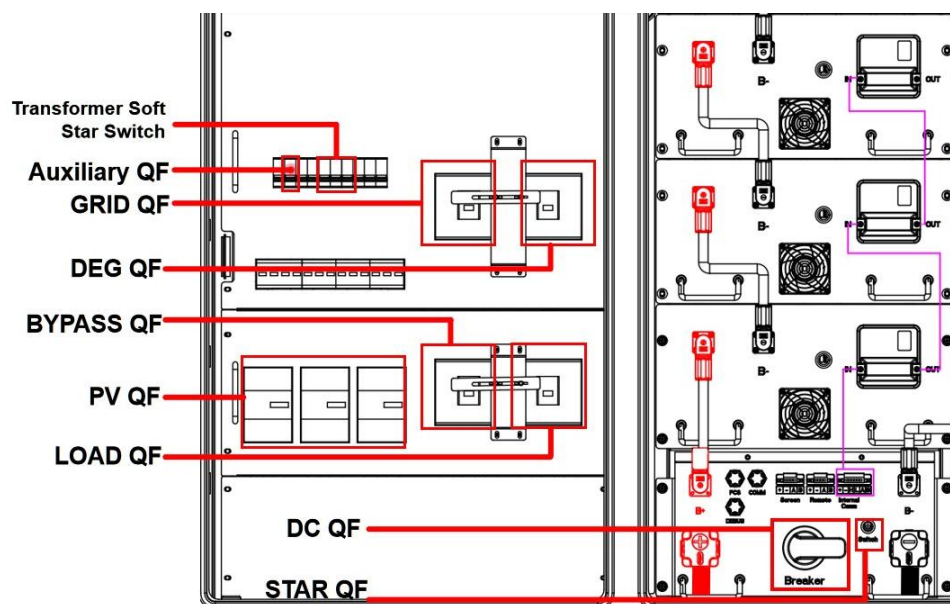


Figure 5.3



Note:

When operating the equipment with the DEG QF, remember to first disconnect the GRID QF; when performing equipment maintenance using the BYPASS QF, remember to first disconnect the LOAD QF.

5.4 Trial Run

After the electrical installation of the equipment is completed, in order to ensure the stable operation of the system, professional electrical technicians need to power on and set the operating mode and parameters for the first start-up:

- Step 1:** Set the device control mode to "manual mode" and set the active power to 5%;
- Step 2:** Turn on the air conditioner in "Data" ->"Environmental Monitoring", enable all modules in the "Switch" interface, and click "System On";
- Step 3:** Observe the parameters of the screen PCS, battery, and air conditioning during operation. If there are any abnormalities, stop the machine for testing in a timely manner;
- Step 4:** Run for 0.5 hours;
- Step 5:** Set the active power to -5%, and charge the battery at 5% of the system's rated power,
- Step 6:** Observe the parameters of the screen PCS, battery, and air conditioning during operation. If there are any abnormalities, stop the machine for testing in a timely manner;
- Step 7:** Run for 0.5 hours;
- Step 8:** After completing a 1-hour trial run without any abnormalities, turn off the system on the "switch" interface;
- Step 9:** You can choose the local manual power control mode based on the project background and requirements The automatic peak shaving and valley filling mode or backup mode has been officially put into operation. Click "System Power On" on the system interface.

5.5 Normal Shutdown

When the product requires daily maintenance and shutdown operation. The normal shutdown operation of the product is as follows:

- Step 1:** Click on the touch screen switch interface and select "System Shutdown";
- Step 2:** Refer to Figure 5.5, disconnect the system air conditioning switch, auxiliary power switch, and battery auxiliary power switch.
- Step 3:** Refer to Figure 5.3 and disconnect the engine switch, mains power switch, bypass switch, load switch, and photovoltaic switch.
- Step 4:** Disconnect the DC load switch of the high-voltage control box of the battery;
- Step 5:** Wait for the busbar discharge to end, the touch screen to turn off, and the device to complete shutdown.

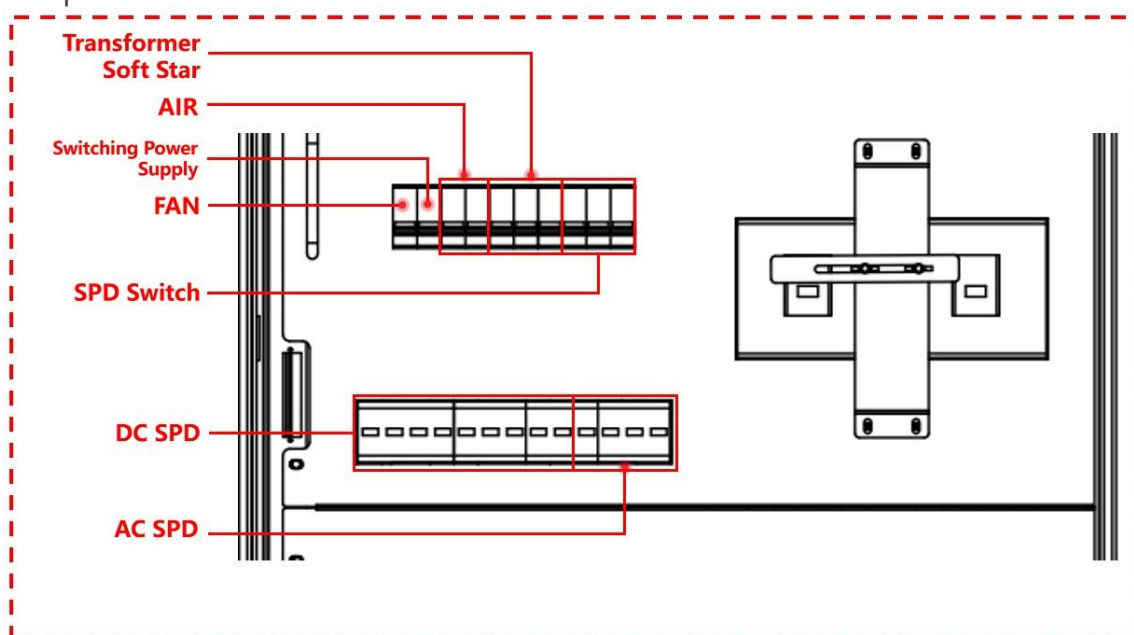


Figure 5.5

5.6 Emergency Stop Shutdown

When the product malfunctions or needs to be shut down urgently in a critical situation, the following emergency shutdown operations can be performed:

Step 1: Press the emergency shutdown button "EPO";

Step 2: Refer to Figure 5.5, disconnect all auxiliary power switches, AC/DC molded-case switches, and battery DC load switches of the system.

Step 3: After confirming that the fault or Danger has been resolved and needs to be run, reset the EPO button.



Illustration:

After pressing the Emergency Power Off (EPO) button, power off the generator switch, mains power switch, photovoltaic switch, auxiliary power switch, and the high-voltage box DC switch. Wait for the HMI touchscreen to completely shut down, and then you must wait for another 10 minutes before turning the system back on!

06 Operation and Handling

6.1 Human-Machine Interface

After the system is powered on, the LCD touch screen enters the startup interface. After 30 seconds, the startup interface disappears and the system enters the "Home" interface. As shown in Figure 6.1, the homepage interface displays the real-time power of the system Voltage. electric current. Electricity generation Operating mode Work status and other related information.

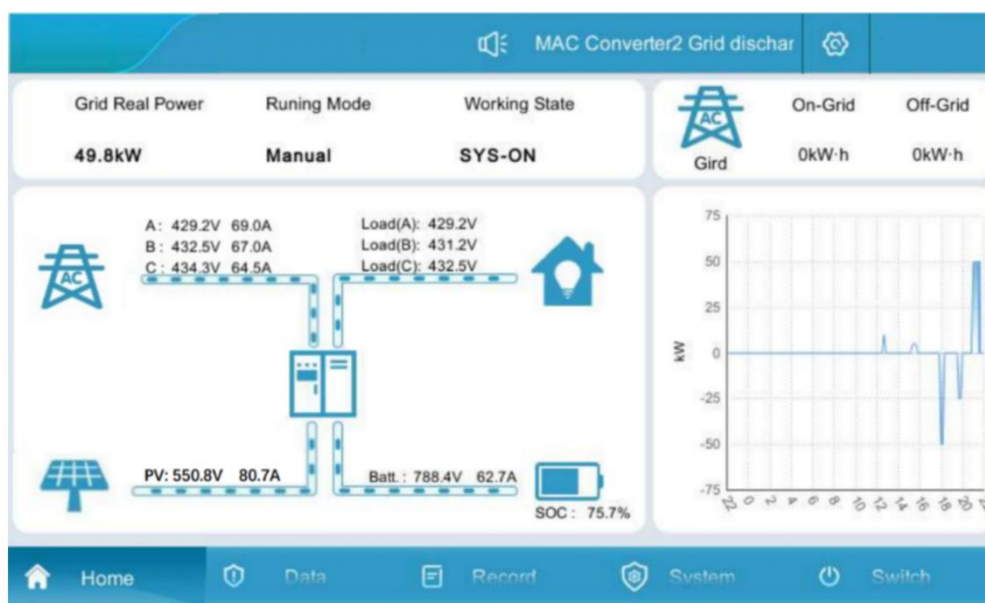


Figure 6.1

Expand each menu item:

HMI display and control integrated screen menu Table

NO.	Name	Content	Function
1	Homepage	None	Display the operating status of the system and the daily charging and discharging curve Figure
2-1	Data	real-time data	Display of all analog data of the inverter
2-2	Data	Real-time status	Inverter working status and switch status display
2-3	Data	Real-time alerts	Current system alarm information
2-4	Data	Battery data	Battery data display and battery on/off settings
2-5	Data	environmental monitoring	Dynamic environmental monitoring display and air conditioning parameter settings
3-1	Record	Historical Alarms	Display historical alarm records

3-2	Record	Operation log	Display operation logs
3-3	Record	Data Report Table	Export History
4-1	System	System Information	Display system information
4-2	System	operation mode	System operation mode setting
4-3	System	Parameter Settings	Converter and battery parameter settings
4-4	System	Factory Settings	Equipment manufacturer settings
4-5	System	System upgrade	System software upgrade
4-6	System	Communication Settings	Set up communication settings
5	Switch	System switch	System startup and shutdown
6-1	HMI	left side HMI	① The first one from top to bottom is the power indicator light: when the HMI touch screen is powered normally, the green light flashes;
6-2	indicator light	indicator light	
7-1	HMI	left side HMI	② The second one from top to bottom is the status indicator light: when the system has a fault, the green indicator light does not light up; When the system has no faults, the green indicator light is always on;
7-2	indicator light	indicator light	
8-1	HMI	left side HMI	③ The third one from top to bottom is the fault indicator light: when the system has a fault, the red indicator light flashes; When the system has no faults, the red indicator light does not light up (flashing frequency once every 1 second)
8-2	indicator light	indicator light	
9	System lights	Status indicator	① When the system is in standby mode and there is a fault, the system light will turn red.
10	System lights	Status indicator	② When the system is running and there are no faults, the system light will turn green
11	System lights	Status indicator	③ When the system is running and there is a fault, the system light will turn yellow
12	System lights	Status indicator	④ When the system is in standby mode and there are no faults, the system light does not turn on.

Table 6.1

6.2 Power on/off Operation

1. System Power-On Sequence: Begin by verifying that the main unit is ready for power-up, As per Figure 5.5, activate the transformer soft-start switch and the auxiliary power switch. Next, activate the mains power switch to finalize the transformer soft-start.
2. Energize the load switch and the photovoltaic switch. (Caution: When the generator switch is to be used, it is imperative to first de-energize the mains power switch. When utilizing the bypass switch for maintenance, the load switch must be de-energized first.)
3. The screen startup takes about 30 seconds.
4. Set the inverter parameters in the "System" -> "Parameter Set" interface, select the desired operating mode in the "System" -> "Run Mode" interface, and choose the grid connection and control mode manually Peak shaving, valley filling, and backup mode.
5. Enable all modules on the "switch" page of the HMI integrated screen (some modules can also be turned on as needed), click "System ON", and the normal startup time is about 30 seconds, as shown in Figure 6.2-12
6. PCS/DC Module shutdown: When your PCS/DC module is in operation, please click the "Module Enable" of the PCS/DC to turn off the module, as shown in Figure 6.2-2.
7. De-energize the converter auxiliary power switch.
8. De-energize the mains power supply switch, the load switch, and the photovoltaic switch.

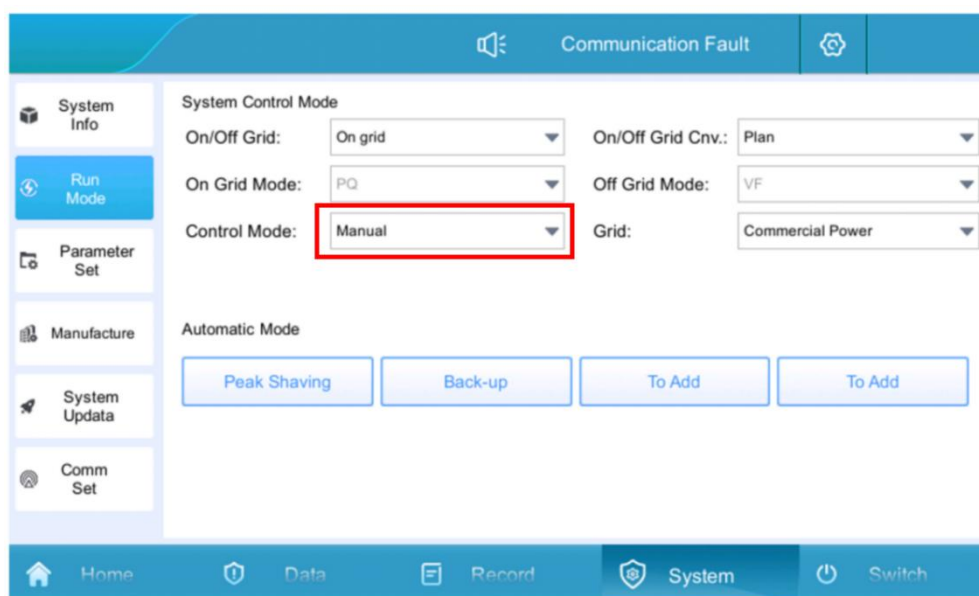


Figure 6.2-1

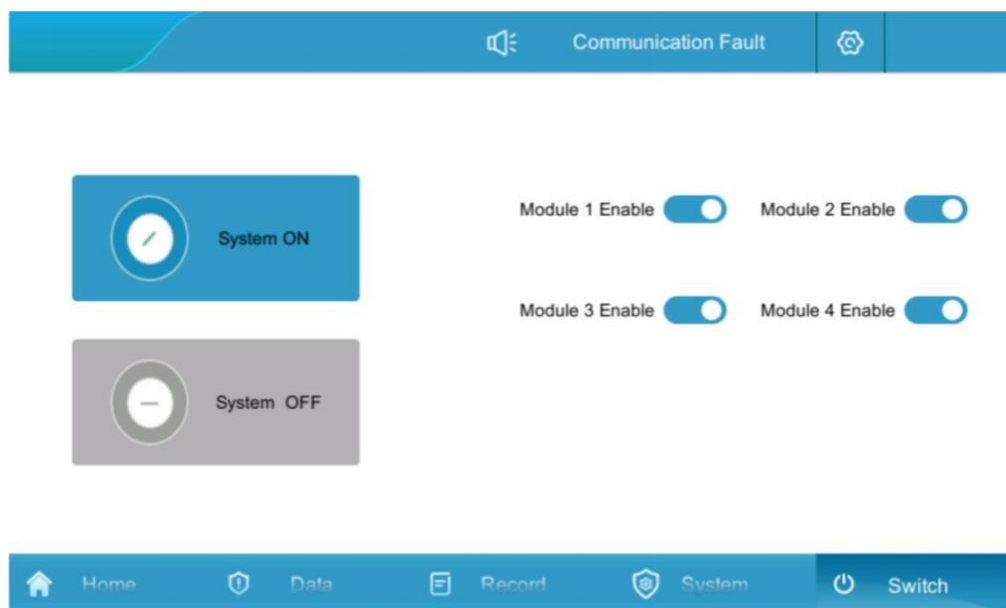


Figure 6.2-2

6.3 Communication Settings

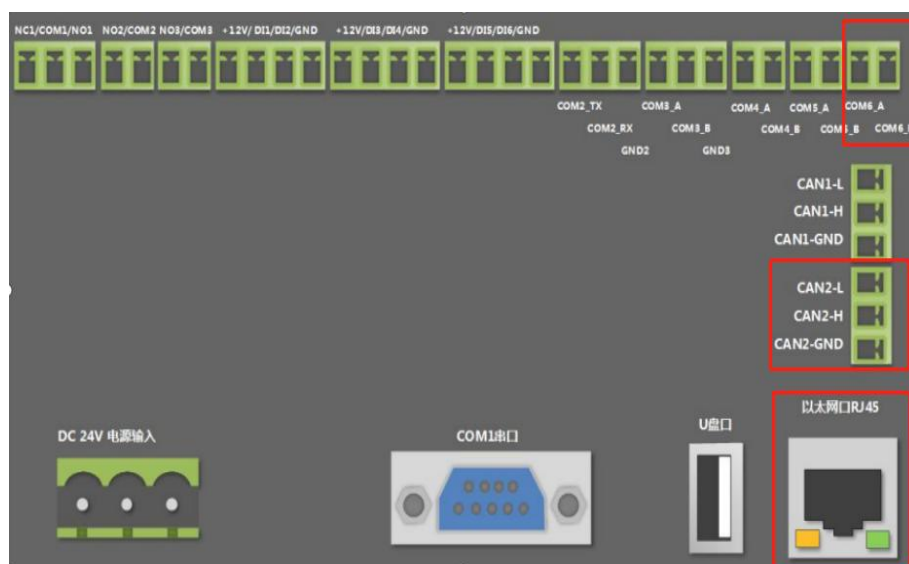


Figure 6.3-1



Illustration: Communication settings refer to the communication protocol settings between the HMI integrated screen and the battery BMS. LCD touch screen and EMS backend.

1. Check that the BMS communication cable of the battery has been connected to the CAN_2H.CAN_2L terminal on the back of the touch screen;
2. Check that the backend EMS communication cable has been connected to the back terminal COM6.A.COM6_S of the touch screen or to the network port position;
3. Click on the HMI integrated screen "System" ->"Communication Settings" to enter the communication settings interface.
4. Battery BMS communication settings: Set the CAN baud rate to 250k bps;

5. Background EMS communication setting 1: If RS485 communication is used, set the local address corresponding to the communication panel to 1. If multiple energy storage systems are connected to the background, the address cannot be duplicated;

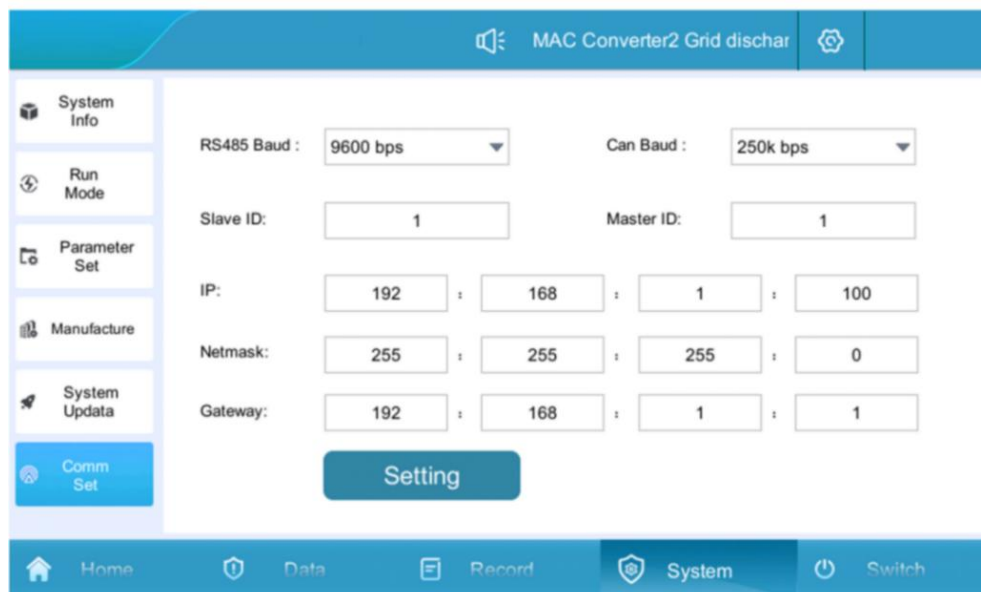


Figure 6.3-2

6. Background EMS Communication Setup 2: For Ethernet communication, the energy storage system unit acts as the server. The host is set to a default address of 192.168.1.100. Set the local address corresponding to the communication panel to 1, and the server port to 502. If multiple energy storage systems are connected to the background, their IP addresses must not be duplicated. After modifying the IP address, click the 'Set' button to configure it.



Figure 6.3-3

6.4 Operation Mode Setting

6.4.1 Introduction to Operation Mode

The operation modes of the energy storage converter are divided into the following

b. Anti-Backfeed Function Setting: The anti-backfeed function can be set to Enabled or Disabled in Grid-Connected Mode.

When setting enable, the energy storage system is prevented from feeding power back to the grid.

When setting disable, power from the energy storage system is allowed to flow into the grid.

This setting can be configured in the system menu at: "System" -> "Parameter Settings" "Advanced Settings (Password: 888888)" -> "MSTS Parameters" -> "Anti-Backfeed Enable".

The interface is shown in the figure below:

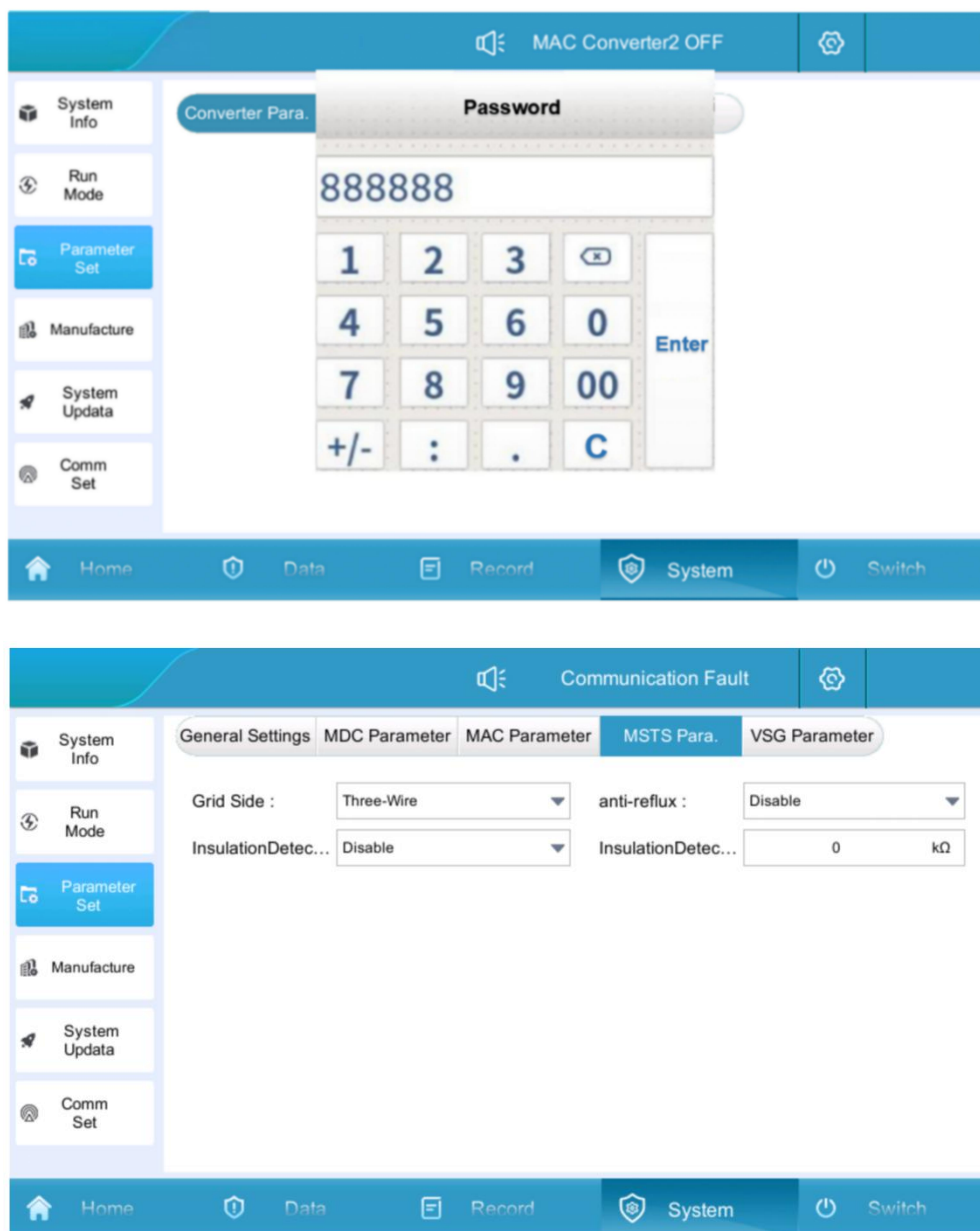


Figure 6.4.1

6.4.2 Grid connection manual mode

1. Click on "System" -> "Operation Mode" to enter the page shown in Figure 6.4.2-1.

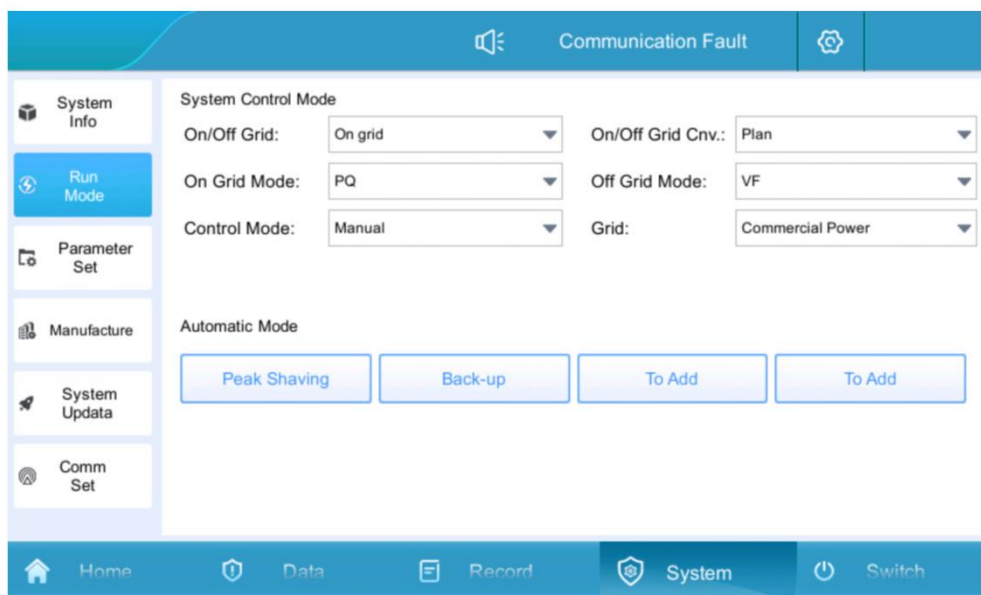


Figure 6.4.2-1

2.Setting the Control Mode to "Manual Mode": On the "Parameter Settings" page, configure the corresponding active power, power factor, and reactive power values. The unit will operate according to the set values (a positive value indicates discharging, a negative value indicates charging). The power setting interface is shown in Figure 6.4.2-2.

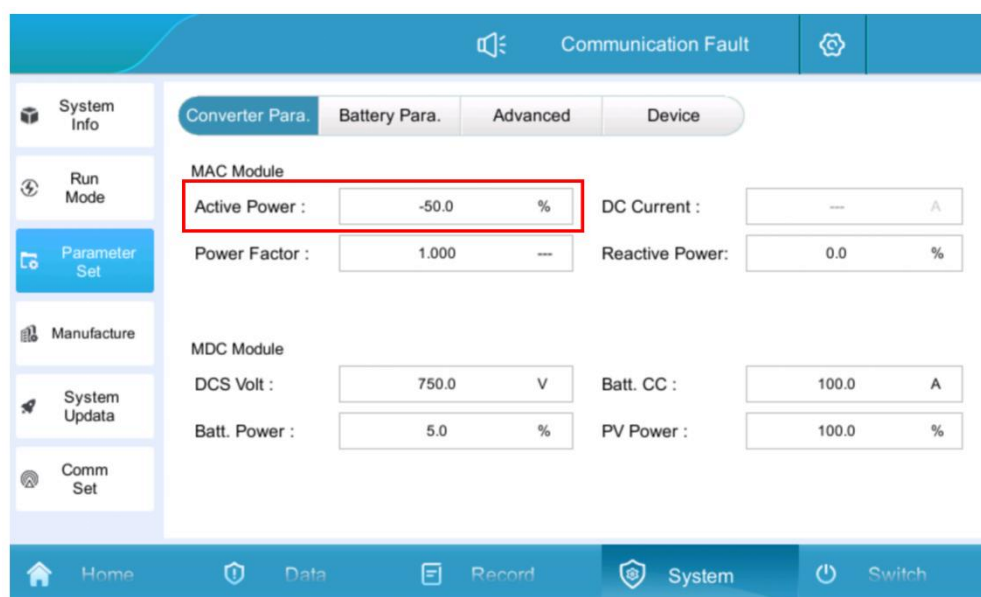


Figure 6.4.2-2

3.Navigate to the "Switch" page and enable the power modules as required (it is recommended to enable all). Finally, click "System ON" to confirm.

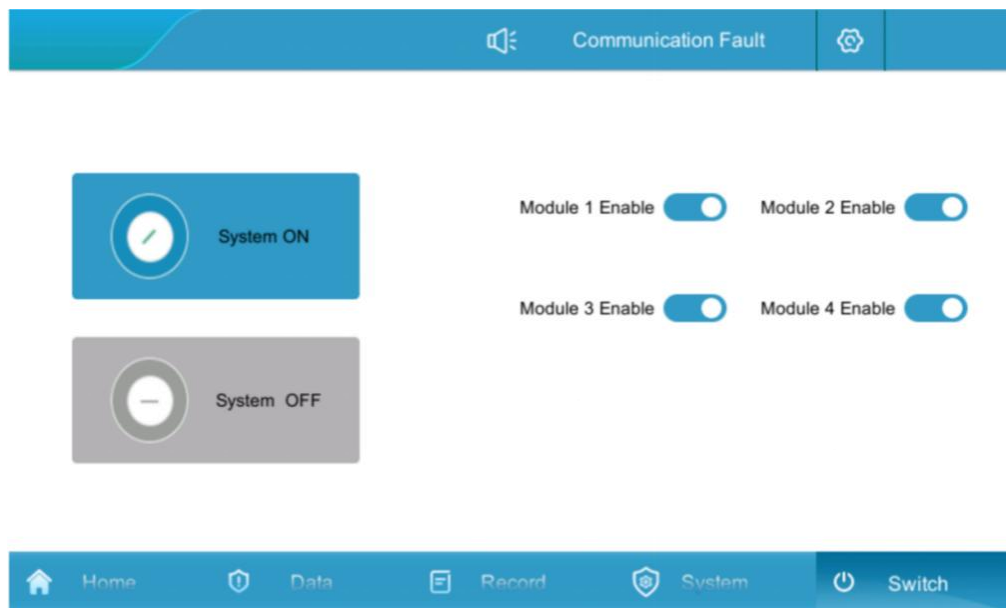


Figure 6.4.2-3

6.4.3 Grid connection automatic mode

Peak Shaving mode:

1. Click on "System" -> "Operation Mode", then select the "Peak Shaving and Valley Filling" button to enter its setup page.

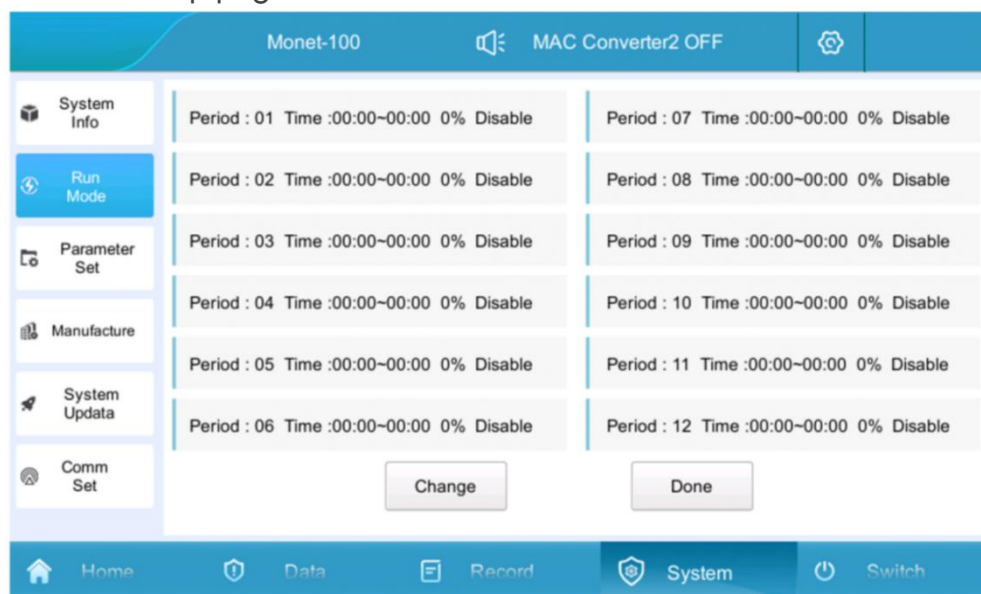


Figure 6.4.3-1

2. Clicking on "Change" allows you to set the peak shaving and valley filling operation periods and power: Set the start and end times for period 1, the charging and discharging power, and whether to enable it; Click "Next" button to enter period 2 settings, complete all period settings, and then save and exit.

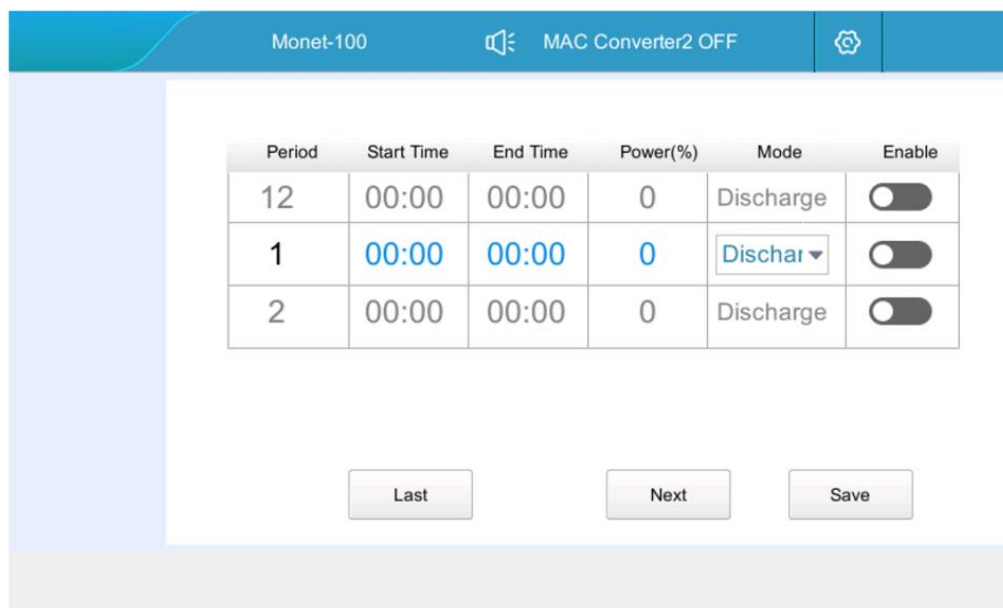


Figure 6.4.3-2

3. Automatically navigate to the following interface and click the "Done" button;

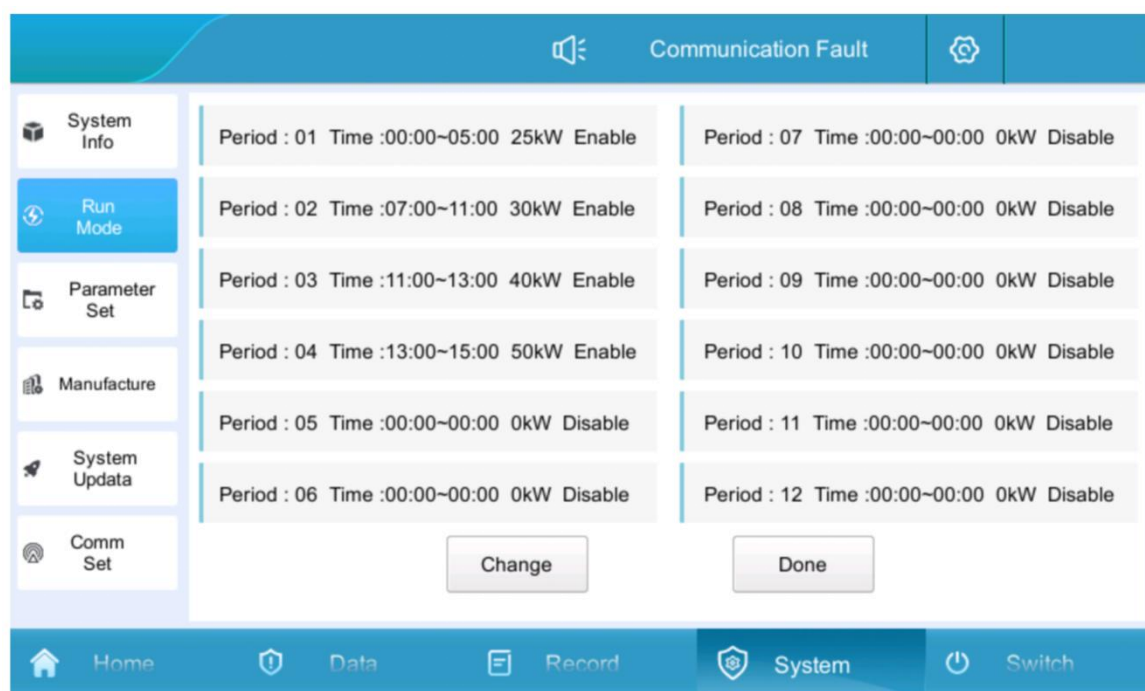


Figure 6.4.3-3

4. Change "Control Mode" to "Peak Shaving".

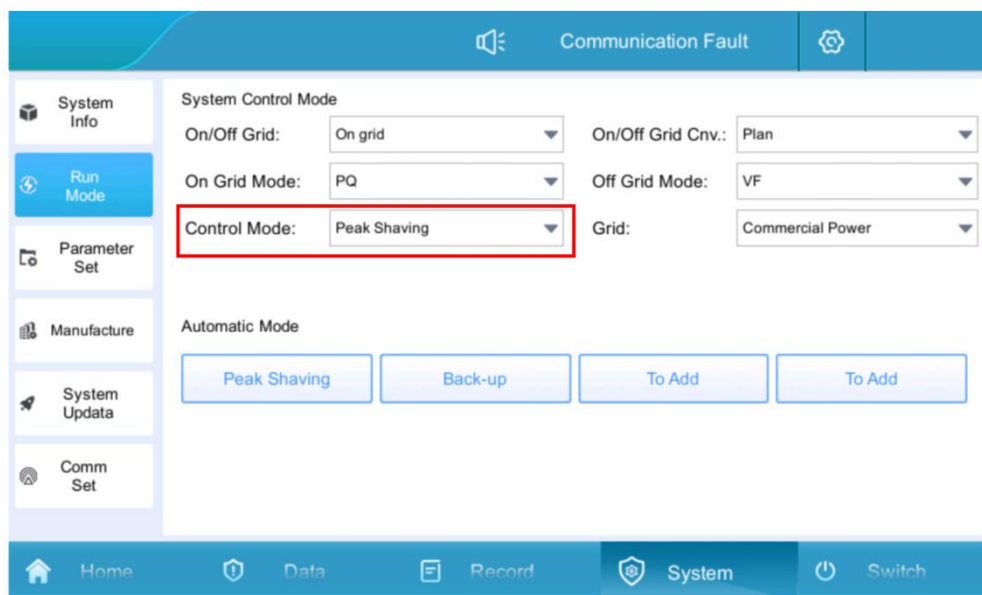


Figure 6.4.3-4

5. At this point, it is in the automatic mode: Pause, click "Switch" -> "System On" to complete the local automatic control mode setting.

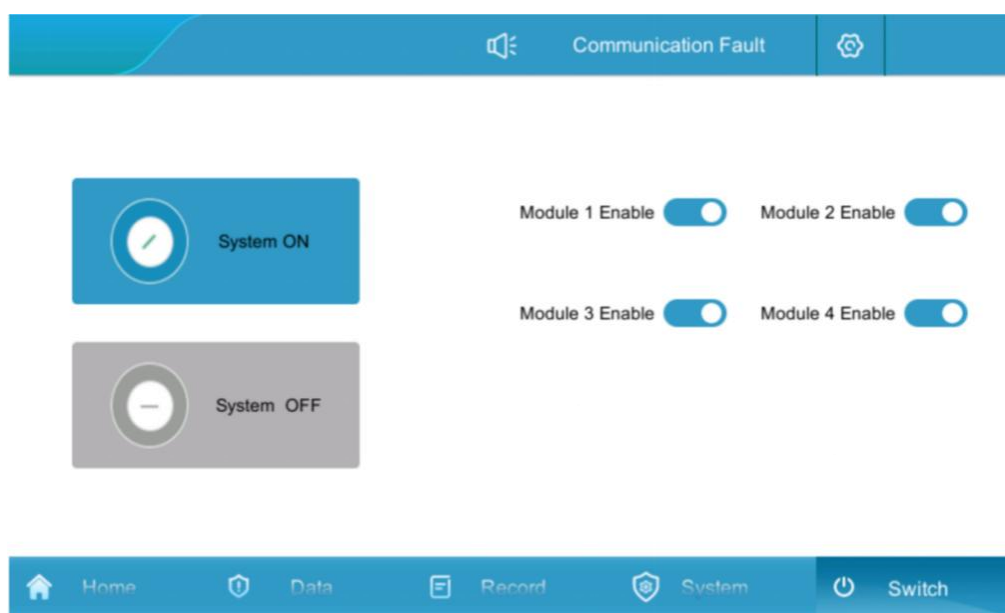


Figure 6.4.3-5

Backup Mode:

1. Click "System" -> "RUN Mode", then click the "Backup Mode" button to enter the setup page.
 - a. **When Mains Charging is set to Enabled:** The mains power is allowed to charge the battery.
 - b. **Battery Charging Power:** Set the desired battery charging power value.
 - c. **When Mains Charging is set to Disabled:** The mains power is not allowed to charge the battery.
 - d. **Generator:** When set to "Enabled", the generator is allowed to supply power to the load. When set to "Disabled", the generator is not allowed to supply power to the load.

e. Generator Charging: When set to “Disabled”, the generator is not allowed to charge the battery. When set to “Enabled”, the generator is allowed to charge the battery (prerequisite: the Generator function must be enabled first).

f. Backup Power Maintained SOC: When the battery SOC discharges to the set value of Backup Power Maintained SOC, the battery stops discharging, and the load is supplied by mains power or the generator.

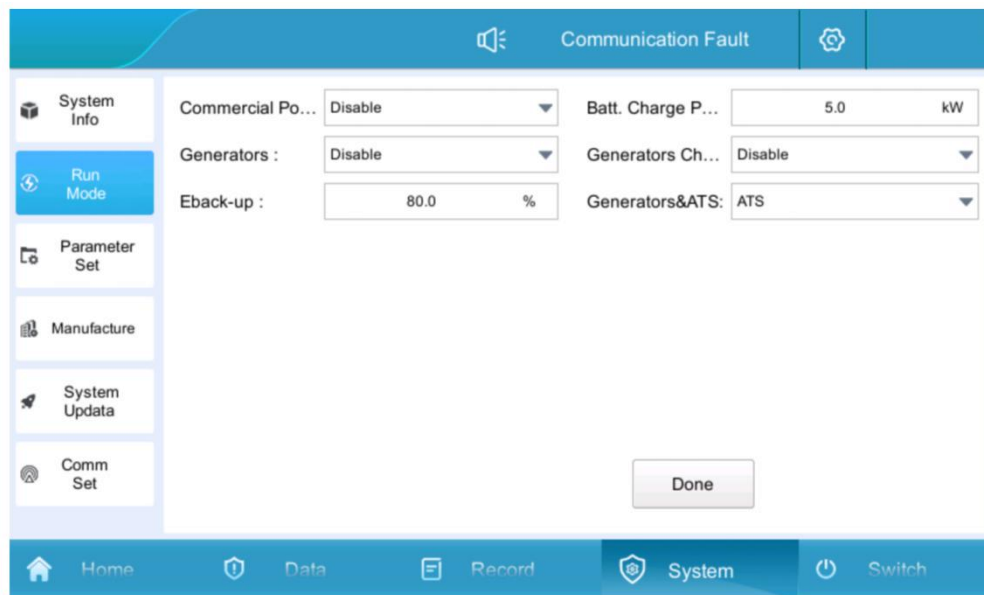


Figure 6.4.3-6

2. When the generator operates in reverse mode, disconnect the grid switch, close the generator switch, and close the load switch.

a. Click "System" -> "RUN Mode" -> "Grid" and set it to Generator;

b. Click the "Back-up" button to enter the settings page, and set "Generator" to Enabled;

c. Set the "Batt. Charge Power" to the required power value for battery charging.



Illustration:

After the generator starts, it will supply power to the load and simultaneously charge the battery until the Backup Power Maintained SOC is reached. The system will then automatically switch to off-grid operation to power the load. When mains power is restored, you must manually turn off the generator switch and turn on the mains power switch. Then, set the "Grid" parameter to Mains Power and run the system in Backup Mode to execute the backup logic. The mains power will charge the battery until the Backup Power Maintained SOC is reached, at which point charging will stop.

2. Change "Control Mode" to "Back-up Mode".

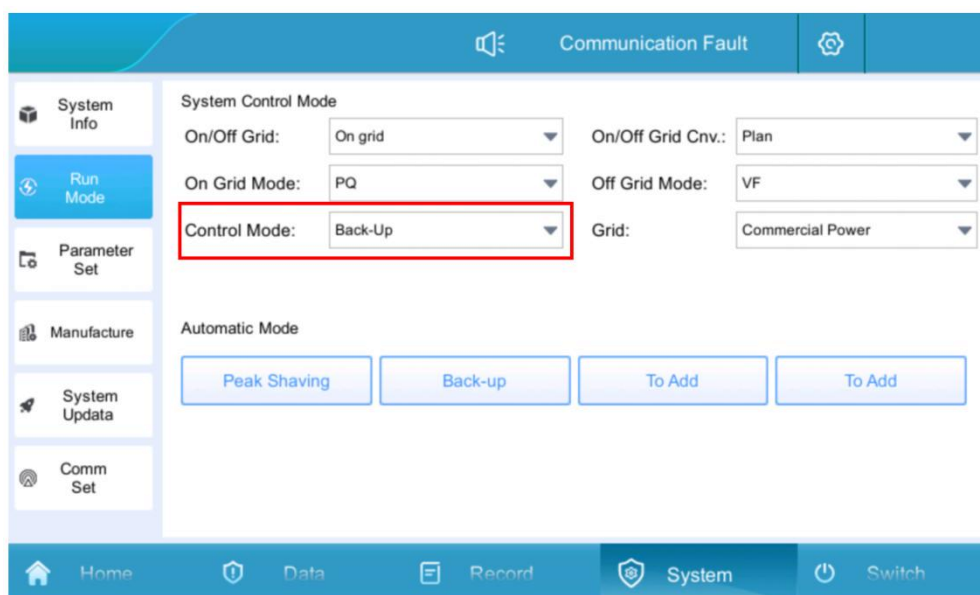


Figure 6.4.3-7

4. At this point, it is in the automatic mode: Pause, click "Switch" -> "System On" to complete the local automatic control mode setting.

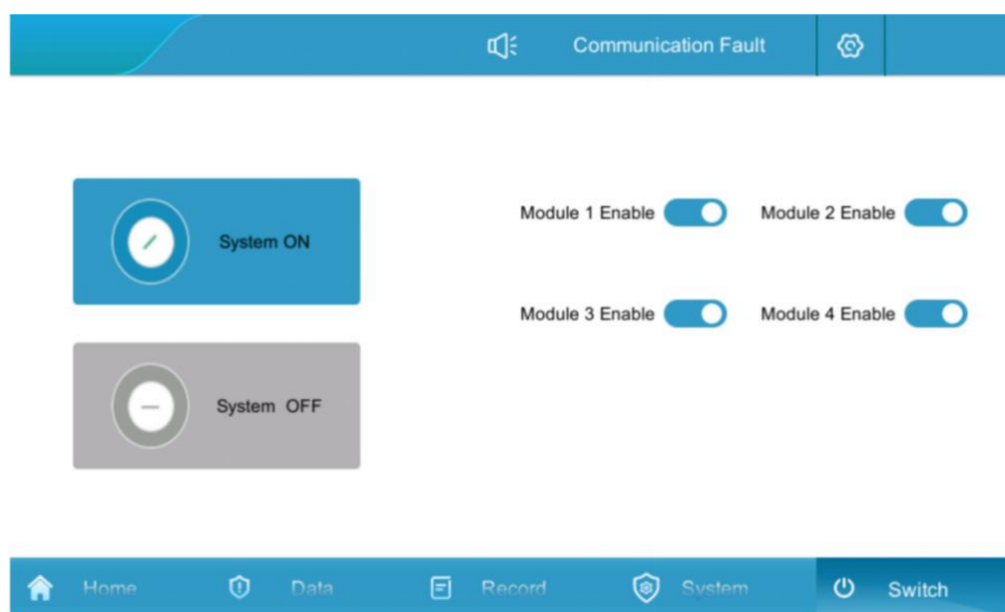


Figure 6.4.3-8

6.4.4 Grid-Connected and Off-Grid Modes Automatic Switching

Grid-Connected to Off-Grid Transition:

When the system is operating in grid-connected mode and a sudden grid power outage occurs, the STS detects the outage. It then sends a grid-fault signal to the PCS and opens its contacts. Upon receiving the signal from the STS, the PCS automatically transitions from grid-connected mode to off-grid mode. The system can then output a stable 400V/50Hz three-phase AC voltage.

Off-Grid to Grid-Connected Transition:

When the system is operating in off-grid mode and grid power is restored, the STS detects the presence of grid power and relays this information to the PCS. The STS then tracks the

grid's phase and magnitude, synchronizing it with the off-grid PCS. Once synchronization is achieved, the PCS instructs the STS to close its contacts. Simultaneously, the PCS automatically switches from off-grid to grid-connected mode, and the system executes the grid-connection strategy.

The specific configuration procedure is as follows:

Manual On-Grid/Off-Grid Switching Mode:

1. Click on "System" -> "Run Mode" to enter the current page;
2. In "On-Off Grid", select "Plan", and set it
3. When running in grid-connected mode, you can manually switch to off-grid mode for operation. Set "On-Off" to "Off-grid";
4. When running in off-grid mode, you can manually switch to grid-connected mode for operation (provided that the mains power is available). Set "On-Off" to "ON-Grid".

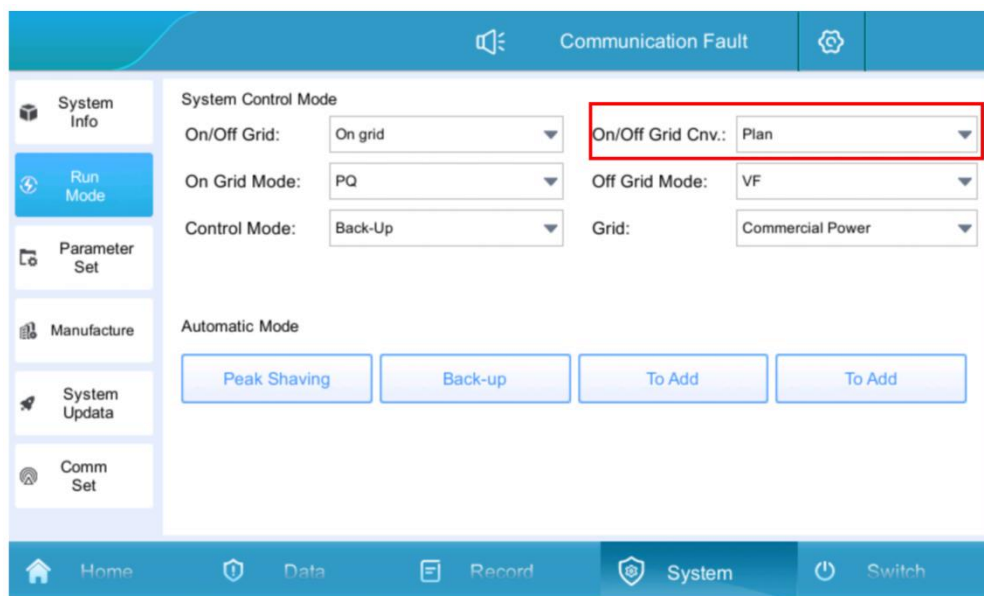


Figure 6.4.4-1

Automatic disconnection network mode:

Click on "System" -> "Run Mode" to enter the current page. Set "On-Off Grid" to "Non-Plan";

2. When the grid suddenly loses power while the system is operating in grid-connected mode, the energy storage converter will automatically switch from grid-connected mode to off-grid mode operation. The system can output a stable 400V/50Hz three-phase AC voltage;
3. When the grid suddenly powers on while the system is in off-grid mode, the energy storage converter will automatically switch from off-grid mode to grid-connected mode operation.

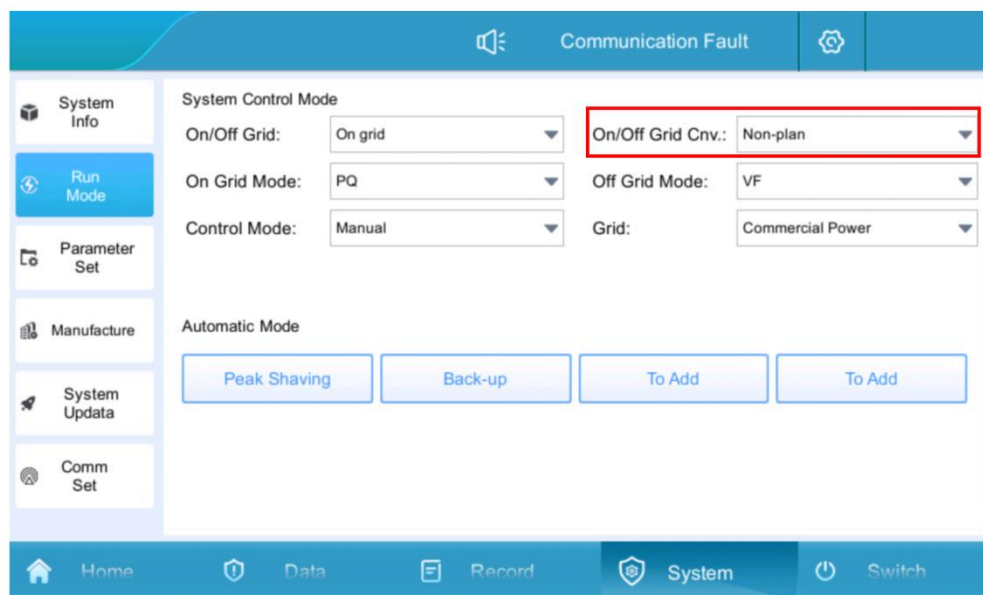


Figure 6.4.4-2

6.4.5 Battery Parameter Settings

1. Click "System" -> "Parameter Set" to enter the current page;
2. The customer can set the upper and lower limits of SOC according to their own needs;
3. It is recommended that the lower limit of SOC be set to no less than 5%.



Note:

The battery parameters have been pre-configured before the system leaves the factory. Modifying them independently is not recommended.

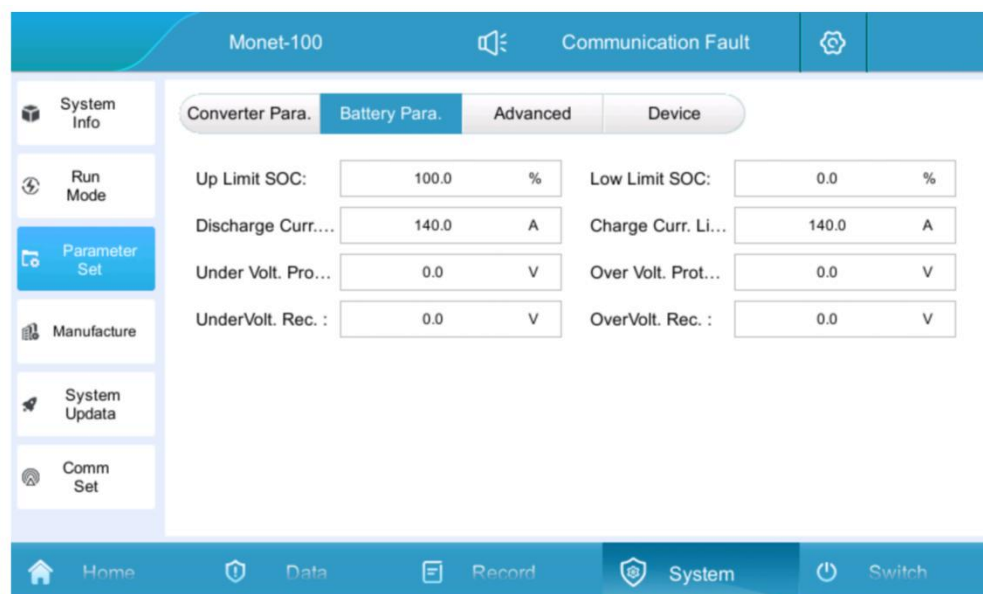


Figure 6.4.5-1

6.4.6 Environmental Monitoring Interface

1. Click on "Data" -> "Environmental Monitoring" to enter the following interface;
2. You can view the real-time environmental status of the system, the setting of air conditioning parameters, and the status of air conditioning being on or off in this interface.

Refrigeration mode:

When the temperature is greater than or equal to the set refrigeration point, the air conditioner starts to cool. When the temperature is lower than the difference from the refrigeration point, the air conditioner stops cooling. The difference value defaults to 5°C (1 - 10°C adjustable).

Heating mode:

When the temperature is lower than the heating threshold, the air conditioner starts heating. When the temperature reaches the heating threshold plus the difference value, the heating stops. The difference value defaults to 5°C (adjustable from 1 to 10°C).

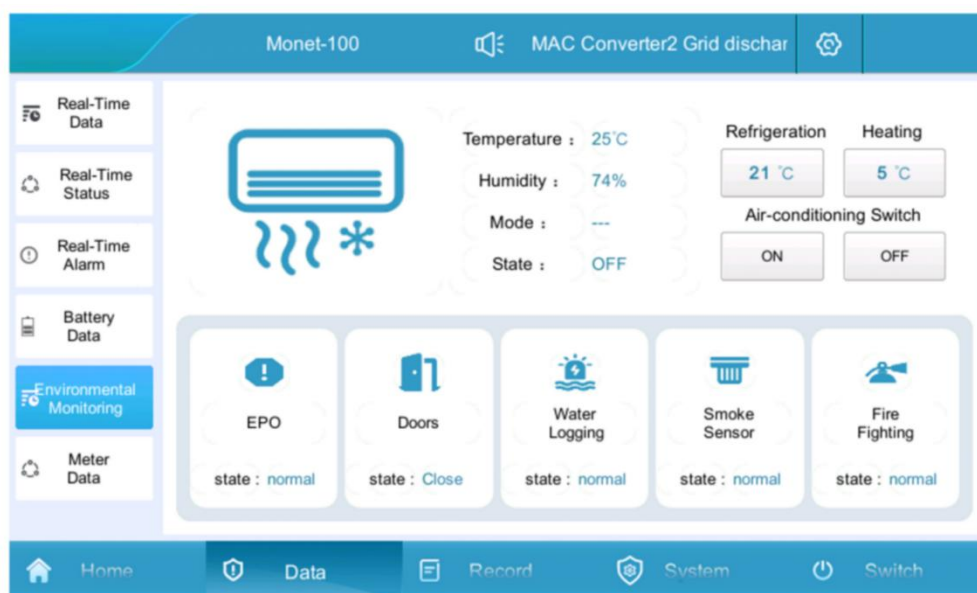


Figure 6.4.6-1

6.4.7 Data Viewing and Export

1. Click "Record" -> "Data Report" to enter the current page.
2. View the current day, month, year, and total charging and discharging power.
3. Insert the USB drive, wait for it to connect, click "Data Export", and wait for the export to complete.

Heating mode:
When the temperature is lower than the heating threshold, the air conditioner starts heating. When the temperature reaches the heating threshold plus the difference value, the heating stops. The difference value defaults to 5°C (1 - 10°C adjustable).

Figure 6.4.7-1

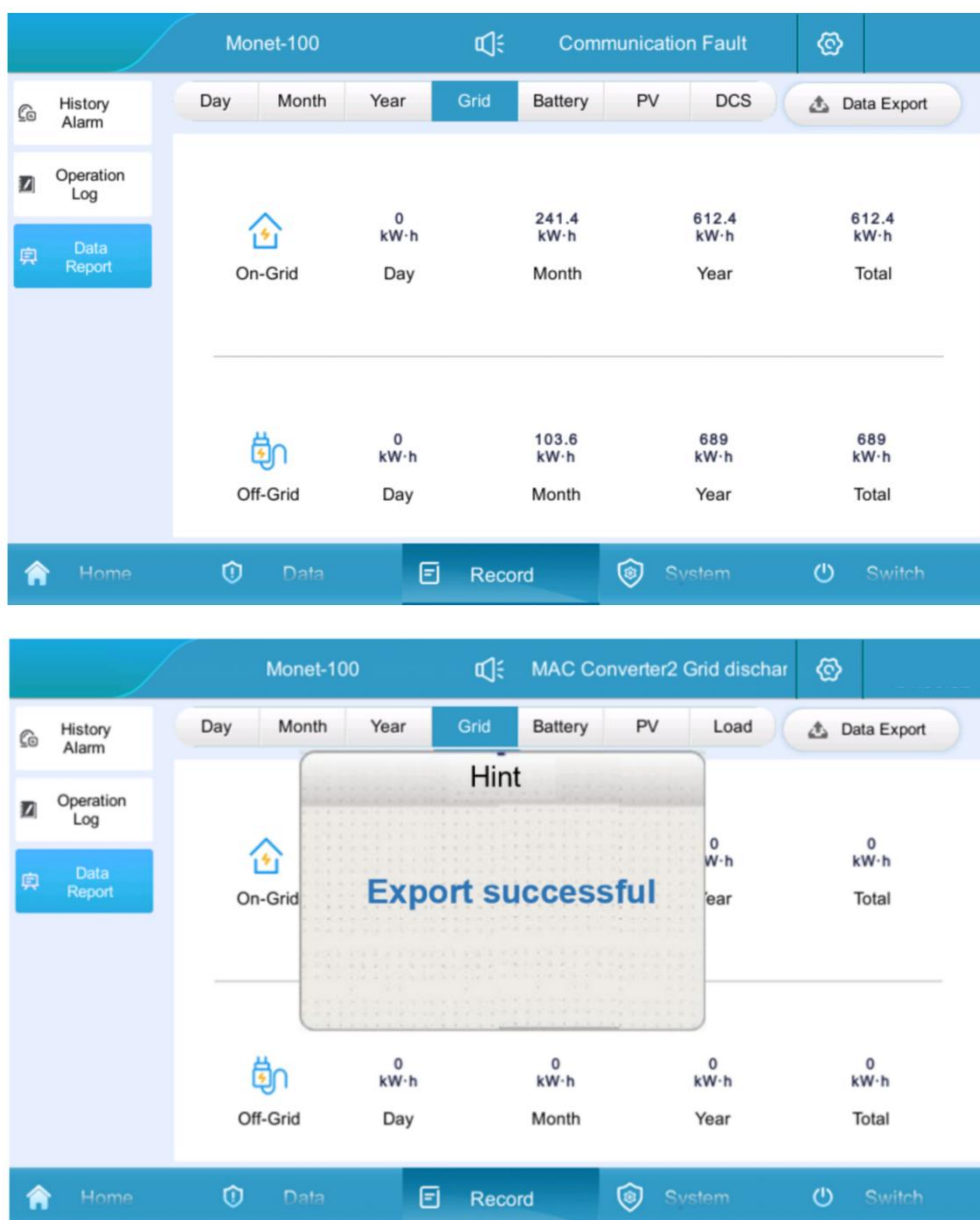


Figure 6.4.7-2

6.4.8 Software Upgrade

The software upgrade includes: the upgrade of the integrated screen software, the power module DSP software, and the power module ARM software. Before the upgrade, the system must be shut down on the "switch" page of the touch screen, which means the upgrade can only be performed during the period when the system is not running.

1.First, prepare a USB flash drive and a computer. Create a new folder on the USB flash drive and name it "UPDATE" to store the programming files.



Figure 6.4.8-1

2.Copy the DSP, LCD and ARM firmware required for system upgrade to the "UPDATE" folder.

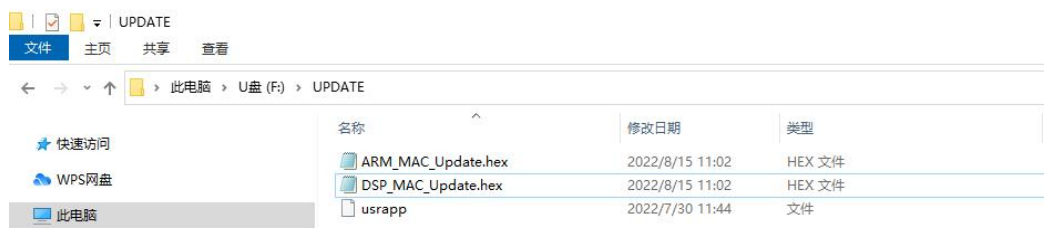


Figure 6.4.8-2

3.Click "System" -> "System Upgrade", enter the password "888888", and proceed to the upgrade page.



Figure 6.4.8-3

4. Insert a USB drive into the back of the LCD integrated screen. The interface will display that the USB drive has been connected and an upgrade file has been detected.

5. Upgrade the integrated screen software. Click "LCD Upgrade" and wait for about 15 seconds. Then, a prompt indicating successful upgrade will appear.

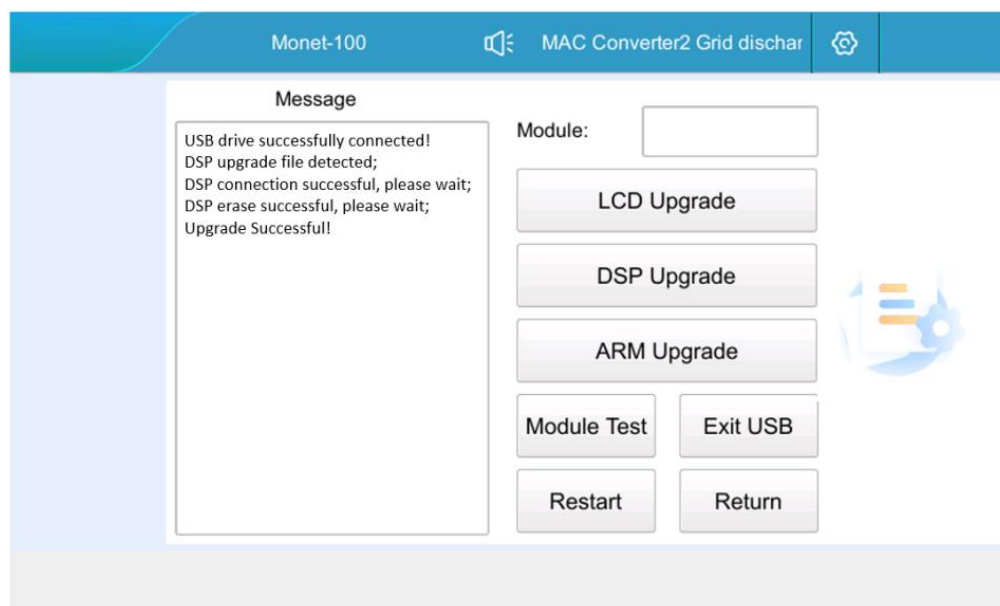


Figure 6.4.8-4

6. After the LCD integrated screen software is upgraded, click the "Restart" button, and the version will be refreshed and take effect. Customers can upgrade the DSP and ARM according to the actual situation and then click "Restart".

7. For the power module DSP/ARM upgrade, select the module to be upgraded in the module box on the "System Upgrade" interface.

8. Click "DSP/ARM Upgrade" and wait for about 5 minutes until a prompt indicates successful upgrade. The system upgrade is completed.



Illustration:

When the system has multiple modules, it is recommended to upgrade Module 1 first. After that, proceed to upgrade Module 2 and continue this process until all modules have been upgraded.



Note:

1. The upgrade process may take some time. Please reserve sufficient time to ensure that the upgrade does not get interrupted.

2. Choose a period when the system usage is relatively low for the upgrade to minimize the disruption to daily operations.

6.5 Charging Station Interface Settings

1. Display debugging :

After the mainboard is powered on, the display screen should light up normally and display the initialization loading interface, and jump to the standby interface after a few seconds.

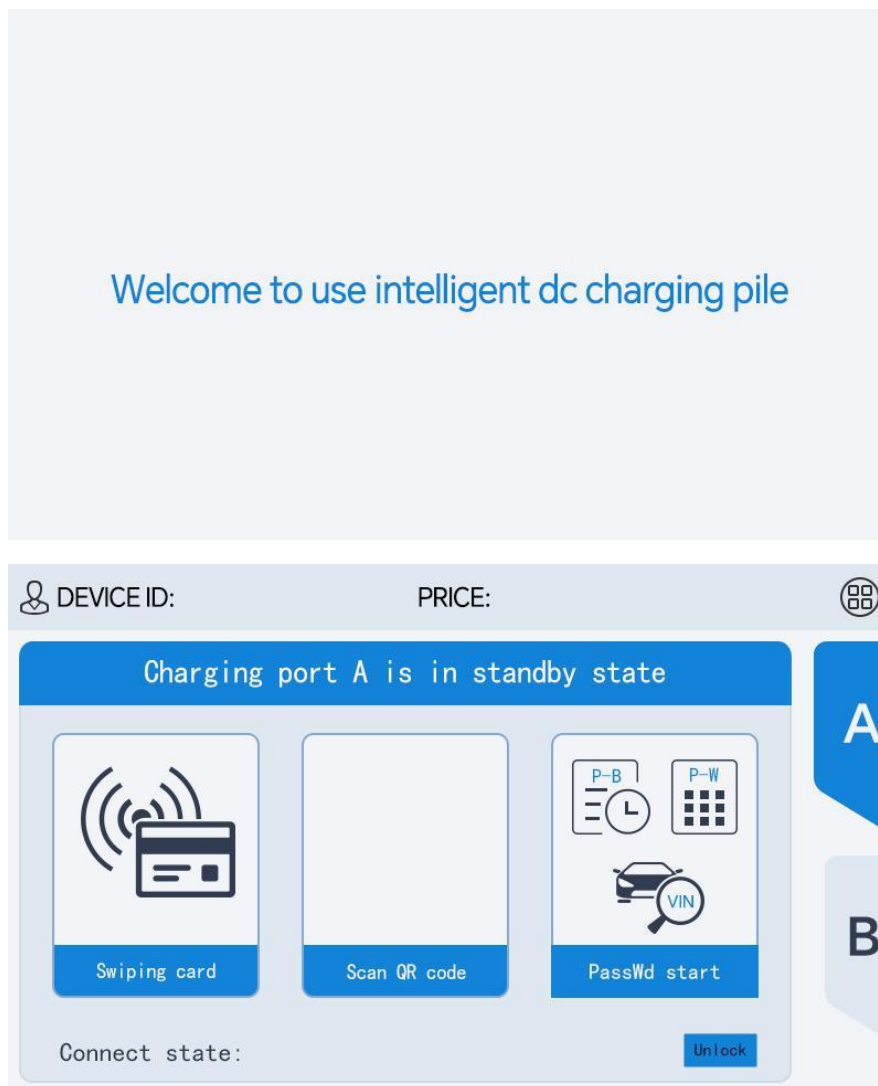
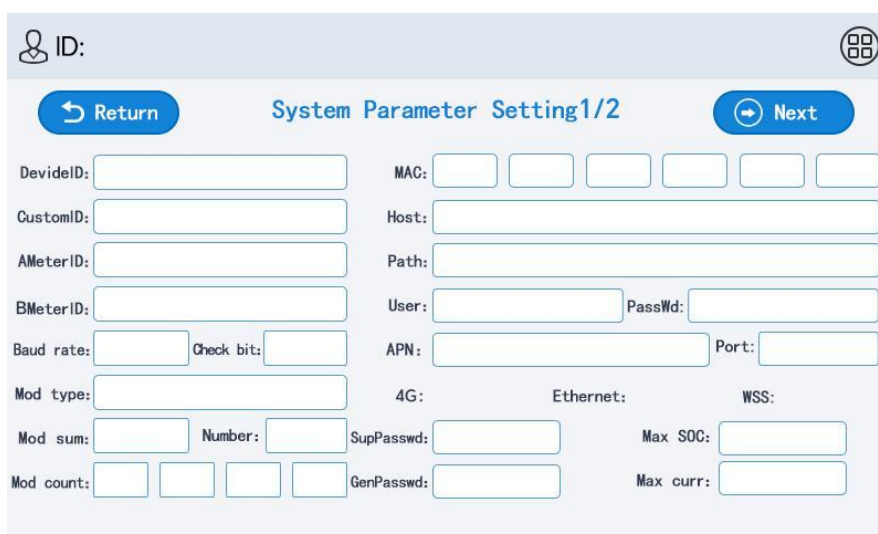


Figure 6.5.-1

2.Parameter settings



ID: ☰
 ↩ Return System Parameter Setting1/2 ➡ Next

DeviceID:	MAC:
CustomID:	Host:
AMeterID:	Path:
BMeterID:	User: PassWd:
Baud rate: Check bit:	APN: Port:
Mod type:	4G: Ethernet: WSS:
Mod sum: Number:	SupPasswd: Max SOC:
Mod count:	GenPasswd: Max curr:

Figure 6.5.-2

Parameter setting 1 definition:

Name	Value Range	Illustrate
Charging pile number	Maximum length of 16 pure digits	If the network platform is a cloud fast charging protocol, you need to enter the standard 14-digit pile number.
Customer Number	1 ~ 65535	The default number is 0. If you need a separate charging card key, please contact our sales colleagues.
Table A address	12-digit pure number	A- gun DC energy meter serial number, standard 12-digit pure digital serial number.
Table B Address	12-digit pure number	B plug DC energy meter serial number, standard 12-digit pure digital serial number.
Table baud rate	2400 or 9600	The baud rate for communicating with the energy meter is 2400 by default.
Check digit	O(ODD)/E(EVEN) N(NONE)	The parity bit for communicating with the energy meter, the default is even parity E.
Module Type	1~9999	Enter according to the model of different power modules, please refer to the "Power Module Type Table".
Total number of modules	1~12	The number of all power modules in the whole pile, including A plug and B plug.
Number of groups	2~4	The number of power module groups is usually 2. If it is a flexible pile, it can be 3 or 4.
Number of group modules	1~6	The minimum number of power modules in each group is 1. The number of modules for A plug and B plug can be set to different.
ServerIP	0~255	IP and port connected to the operation platform.
The IP address of this device	0~255	For example: 192.168.1.10 , if the DHCP switch is ON, or the network mode is not Ethernet, this parameter is invalid.
Subnet Mask	0~255	For example: 255.255.255.0 .If the DHCP switch is ON or the network mode is not Ethernet, this parameter is invalid.
Physical Address	0~0xFF	For example: 00:00:11:22:33:44. If it is not Ethernet networking mode, this parameter is invalid . The MAC address must be unique, otherwise network conflicts will occur and networking instability will occur.

3G/4G	ON/OFF	Open means using 3G or 4G to connect to the operation platform.
Ethernet	ON/OFF	Open means connecting to the operation platform via Ethernet.
Super Password	0~999999	With the highest authority, this authority can set the motherboard parameters and reset the general password. Note: Please modify the factory default password and keep it properly. If the password is leaked, it may be stolen. If the password is forgotten, you can only return it to the factory to flash it.
Common password	0~999999	This password is used to view charging records, alarm records, etc. Note: Please modify the factory default password and keep it properly. If the password is leaked, it may be stolen. If the password is forgotten, you can use the super password to modify it.
Maximum allowed SOC	1 ~ 100	If the SOC value transmitted by the BMS is $\geq$ this parameter value, the mainboard will stop charging.
Maximum single gun current	0~400	The default current is 250A. The maximum current setting of a single gun output can be limited according to needs. For example, if it is a super charging pile, it can be set to 400A.

Table 6.5-1


DEVICE ID:

PRICE:



System Parameter Setting 2/2

Dual gun charge bicycle :		Offline VIN charging :		Online VIN charging :	
Dual gun charge mode :		Swipe feature switch :		Offline card lock control :	
Charg gun lock control :		Charging gun lock detection :		Charg gun temperat detect :	
Electric meter measure :		Meter extension protocol :		Chargeable Local tariff :	
Threshold switch detection :		Meter battery voltage :		Extend battery voltage :	
Insulat monitor switch :		Ac contactor detection :		Dc contactor detection :	
Password charging switch :		Charging Password :			

Figure 6.5.-3

Parameter setting 2 definition:

Name	Value Range	Illustrate
Dual guns and charging bike	ON/OFF	ON means that the A and B plugs can charge the same vehicle at the same time. It is generally used for mud trucks, heavy trucks, buses, etc., and the maximum current of the AB plugs combined can reach 400A.
Offline VIN code charging	ON/OFF	ON means that the charging is supported offline, according to the VIN that has been previously entered. List, when starting charging, determine whether the vehicle VIN matches and continue charging.
Online VIN code charging	ON/OFF	ON means that the VIN obtained from the vehicle when starting charging is supported. The data is sent to the operation platform, and the platform will reply whether it matches and continues charging.
Dual-gun equalizing charging mode	ON/OFF	ON means that the output between gun A and gun B cannot be connected in parallel, that is, the power cannot be called.
Card swiping function switch	ON/OFF	ON means the card swiping function is enabled.
Offline card lock control	ON/OFF	ON means offline card supports locking. After charging with an offline card, the card can only be charged at other charging piles after settlement with the card again. OFF This means that the offline card is not locked and charging can be started by swiping the card. For operating piles, this function is recommended to be set to ON.
charging plug lock control	ON/OFF	ON means that the charging plug electronic lock control is supported, and the charging plug is locked when charging is started. Release when charging stops, it is recommended to set it to ON.
charging plug lock detection	ON/OFF	ON means that the electronic lock status of the charging plug is supported. Check whether the feedback signal is normal. If not, stop charging. It is recommended to set it to ON.
charging plug temperature detection	ON/OFF	ON means that the temperature of the charging plug can be monitored in real time, and charging will be stopped when over-temperature occurs. It is recommended to set it to ON.
External electric meter measurement	ON/OFF	ON Indicates that there is an external energy meter, and the mainboard reads the voltage, current, power and other data of the energy meter in real time.

Electricity meter extension protocol	ON/OFF	ON means that in addition to supporting DL/T645 protocol, it also supports extended protocol. 02100100 , current is read with 02110100.
Billing fee local electricity price	ON/OFF	ON means that it supports local modification of electricity prices and billing, which is mainly used in offline metering piles. It is recommended to set it to OFF.
Threshold switch detection	ON/OFF	ON means that it supports real-time monitoring of the threshold switch status. If the door is open, an alarm will be issued. It is recommended to set it to ON.
The meter uses battery voltage	ON/OFF	ON means using the voltage value collected by the energy meter to make DC overvoltage judgment
Extended battery voltage	ON/OFF	ON means using the voltage value collected by the insulation monitoring module to make a DC overvoltage judgment. It is recommended to set it to ON.
Insulation monitoring switch	ON/OFF	ON Insulation monitoring is performed during charging, and charging is terminated when the insulation value is abnormal. It is recommended to set it to ON. Note: When this switch is set to OFF , the extended battery voltage function will be disabled.
AC contactor detection	ON/OFF	ON represents the feedback signal of monitoring AC contactor.
DC contactor detection	ON/OFF	ON Represents the monitoring of the status of the DC contactor. Refusal means that the contactor is closed but the feedback signal is not closed. Adhesion means that the contactor is disconnected but the feedback signal is It is not disconnected, it is recommended to set it to ON.
Password charging switch	ON/OFF	ON means you can directly enter the password to charge immediately or schedule charging. Deduction, it is recommended to set it to OFF.
Password Charging password	0~9999	When the password charging switch is ON , this parameter is valid. Note: Please change the charging password and keep it properly. If the password is leaked, it may be stolen. If you forget your password, you can change it through the super password.

Table 6.5-2



Illustration: This manual provides only a brief introduction to the charging station.

For detailed operation instructions, please refer to the XDC120 User Manual.

07 Alarm and Maintenance

Term Interpretation:

Serial Number	Term	Explanation
1	Malfunction	The equipment malfunctioned and the system stopped operating.
2	Alarm	The equipment experienced a decrease in output power or partial functional failure due to external factors, but this did not affect the system's charging and discharging functions.
3	Normal operation	Refers to a system that operates daily.
4	Interval operation	Refers to a system whose operating frequency per month is not fixed and cannot be guaranteed to operate every day.
5	Long-term non-use	Battery systems that have not been activated for more than 3 consecutive months.

7.1 Alarm handling

Fault Alarm Handling Method Table

Alarm/Fault	Component	Problem	Method
Water flooding failure	battery holder	Storage cabinet flooded	1. Check if there is any water accumulation inside the cabinet. 2. Confirm whether the distributed energy storage cabinet is leaking and whether the equipment inside is in good condition.
Door magnetic alarm	battery holder	The storage cabinet door is open.	1. Check if the cabinet door is completely closed; 2. Check if the cables on the door magnetic sensor are disconnected; 3. Check if the position of the door magnetic sensor is misaligned.
Fire alarm failure	battery holder	Battery overheating or catching fire	1. Press the EPO button immediately and quickly move away from the energy storage cabinet. 2. Observe from a safe distance for 30 minutes. If there is smoke or fire, please call the fire alarm number; if there are no abnormalities, manually clear the activity alert and contact the manufacturer.

Lightning arrester alarm	battery holder	Lightning arrester failure	1. Check if the signal lines of the lightning protection device are loose. 2. Check if the indicator of the lightning protection device has changed color. 3. Replace the AC lightning protection device.
Compressor alarm	Air	1. Wiring loose 2. Compressor damaged	1. Disconnect the power switch, open the air conditioner wiring box, and check if the wiring is loose; 2. Observe whether there is any obvious damage to the compressor's appearance and whether there is a burnt smell. If so, contact the manufacturer.
Outdoor fan alarm	Air	1. Wiring loose 2. Fan damaged	1. Disconnect the power switch, open the air conditioner wiring box, and check if the wiring is loose; 2. Observe if the fan shows any obvious damage or if there is a burnt smell. If so, please contact the service hotline.
Grid overvoltage /undervoltage fault	Power grid / Generator set	Abnormal voltage at the grid connection point	Check whether the voltage at the grid connection side is abnormal
Grid over-frequency /under-frequency fault	Power grid / Generator set	Grid-connected side frequency anomaly	Check whether the frequency at the grid connection side is abnormal;
Island protection failure	Power grid / Generator set	Abnormal voltage at the grid connection point	Check whether the voltage at the grid connection side is abnormal
High/Low Voltage Crossing Alarm	Power grid / Generator set	Abnormal voltage at the grid connection point	Check whether the voltage at the grid connection side is abnormal
Grid voltage imbalance fault	Power grid / Generator set	Abnormal voltage at the grid connection point	Check whether the voltage at the grid connection side is abnormal
Grid phase disconnection	Power grid / Diesel engine	Incorrect phase sequence at the grid connection side	Swap any two of the three cables in the ABC line set
DC voltage high/low fault	Battery	Abnormal battery voltage	Check whether the DC input voltage is abnormal.
Bus overvoltage	PCS	1. Load imbalance	1. Check if the DC wiring is loose or abnormal; 2. Contact the manufacturer

fault		2. Software anomaly	
Busbar half-voltage imbalance fault	PCS	1. Load imbalance 2. Software anomaly	1. Check if the load is abnormal; 2. Contact the manufacturer
Over-temperature alarm triggered	PCS	Excessive internal temperature	1. Check if the air inlets and outlets of the electrical compartment are blocked; 2. Check if the internal fans are operating normally; 3. Contact the manufacturer
Power transistor over-temperature fault	PCS	Excessive internal temperature	1. Check if the air inlets and outlets of the electrical compartment are blocked; 2. Check if the internal fans are operating normally; 3. Contact the manufacturer
Balance bridge over-temperature fault	PCS	Excessive internal temperature	1. Check if the air inlets and outlets of the electrical compartment are blocked; 2. Check if the internal fans are operating normally; 3. Contact the manufacturer
DC overcurrent fault	PCS	Excessive direct current	1. Check if there is a short circuit or any damage to the DC side; 2. Replace the energy storage inverter module or contact the manufacturer.
Balance bridge overcurrent fault	PCS	Excessive internal current	1. Check if the off-grid load exceeds the limit; 2. Replace the energy storage inverter module or contact the manufacturer.
Output overload /Overcurrent fault	PCS	Excess power/current on the transmission side	1. Check if the grid voltage is normal; 2. Check if there is a short circuit or line damage on the DC side; 3. Check if the off-grid load exceeds the limit; 4. Replace the energy storage converter module or contact the manufacturer.
Wave-by-wave current-limiting failure	PCS	Excessive side current during communication	1. Check if the grid voltage is normal; 2. Check if the off-grid load exceeds the limit; 3. Replace the PCS module or contact the manufacturer.
Communication interruption failure	PCS, Local controller	Communication Outage	1. Check if the communication cables between the modules are loose or malfunctioning; 2. Check if the communication cable of the local controller is loose or malfunctioning;
Parallel operation/synchronization failure	PCS	Intermittence of the parallel/synchronous signal	1. Check if the parallel connection cables are loose or abnormal; 2. Check if the parallel connection settings are abnormal; 3. Hardware circuit damage.

Relay open/closed circuit fault	PCS	Internal relay anomaly / Software anomaly	1. Replace the energy storage converter module 2. Contact the manufacturer to replace the internal components
Fan 1/2/3 alarm	PCS	Internal fan malfunction	1. Replace the energy storage converter module 2. Contact the manufacturer to replace the internal fan
Electrical leakage fault	PCS	1. Excessive leakage current 2. Software anomaly	1. Check if the Hall sensor for leakage current is loose or malfunctioning in its wiring; 2. Check if the grounding wire is disconnected.
Insulation impedance abnormality fault	PCS/Battery	Low insulation to ground and software anomaly	1. Check if the AC and DC cables are damaged or have a ground short circuit; 2. Check if the battery circuits are damaged or have a ground short circuit.
Module loss alarm	PCS	Module communication with the screen has been interrupted.	Check whether the communication cables connecting the modules are loose or malfunctioning.
DC voltage low alarm	PCS	Battery not turned on	Check if the battery is turned on.
Low voltage on the secondary side, one or two circuits have low voltage.	Photovoltaic DC Converter	The open-circuit voltage of the photovoltaic cell is lower than 250V.	Measure the DC voltage between the positive and negative terminals of the photovoltaic switch using a multimeter.

Table 7.1



Warning: The above-mentioned alarms and faults are common ones. If any faults other than those listed in Table 7.1 occur, please contact the manufacturer directly.

7.2 System Maintenance

Before conducting maintenance and repair operations on the energy storage system, the operators must follow the following safety procedures:

1. Disconnect the DC circuit breaker switch on the high-voltage cabinet panel and ensure it is in the OFF position.
2. Check the fire-fighting facilities to ensure they are in normal working condition.

After the maintenance and repair operations are completed, the operators should ensure:

1. The DC circuit breaker switch is in the ON position.
2. The fire-fighting facilities remain in a normal working condition.

This energy storage system product has a high level of protection and is suitable for outdoor environments. However, prolonged operation in harsh conditions may cause the

energy storage equipment to age or internal components to be damaged. To extend the service life and improve the performance of the equipment, it is recommended to conduct the following maintenance checks on the energy storage equipment regularly: replace aging or damaged components. Moreover, due to factors such as environmental temperature, humidity, dust, vibration, and the aging of internal components of the inverter, potential problems may arise during the operation of the system. To ensure the long-term stable operation of the energy storage system, maintenance personnel should conduct regular inspections as per Table 7.2 to promptly identify and address issues. The specific maintenance cycle is as follows:

1. For systems installed in areas with severe dust, high salt spray, or heavy industrial zones, it is recommended to conduct maintenance once a month.
2. In regions with favorable climate conditions, the energy storage system is recommended to be maintained once every three months.

Maintenance Processing Table

Object	Action	Reference standards
Cabinet	1.Check the appearance of the entire machine 2.Check the ventilation openings 3.Check the condition of the door lock	1.No obvious coating peeling off Scratches or rust; 2.No obvious signs of water leakage; 3.The ventilation opening has no dust accumulation; 4.The door lock is not damaged
Air conditioner	1.Check for noise and vibration 2.Clean the filter screen	1.Fan The compressor rotates normally without any lag abnormal noise 2.The surface of the filter is clean and unobstructed
Firefighting	1.Check the appearance 2.Check the wiring harness	1.The wiring is firm and free of pollutants
PCS	1.Check for noise and vibration 2.Check the ventilation openings on the front panel 3.Check the contact surface of the rear copper bar	1.The front panel fan rotates normally without any lag abnormal noise 2.The front panel vent table is clean and unobstructed 3.Copper bars and contact surfaces are free from corrosion, discoloration, and dust accumulation
STS	1.Check for noise and vibration 2.Check the ventilation openings on the front panel 3.Check the contact surface of the rear copper bar	1.The front panel fan rotates normally without any lag abnormal noise 2.The surface of the front panel ventilation opening is clean and unobstructed 3.Copper bars and contact surfaces are free from corrosion, discoloration, and dust accumulation
DC/DC	1.Check for noise and vibration 2.Check the ventilation openings on the front panel 3.Check the contact surface of the rear copper bar	1.The front panel fan rotates normally without any lag abnormal noise 2.The front panel vent table is clean and unobstructed 3.Copper bars and contact surfaces are free from corrosion, discoloration, and dust accumulation

Electrical	1.Check the lightning arrester 2.Check the circuit breaker and contactor 3.Check the contact surface of the copper busbar of the cable	1.Lightning arrester Circuit breaker. The contactor is normal 2.The connecting wire of the screw socket is not loose or detached 3.Copper bars and contact surfaces are free from corrosion, discoloration, and dust accumulation
Battery pack	1.Check for noise and vibration 2.Check the contact surface of the copper busbar of the cable	1.The battery pack fan rotates smoothly without any lag abnormal noise 2.The front panel vent table is clean and unobstructed 3.The connecting wire of the screw socket is not loose or detached 4.Copper bars and contact surfaces are free from corrosion, discoloration, and dust accumulation

Table 7.2

7.3 Cleaning and Dust Removal Process

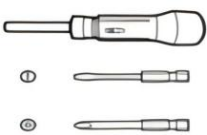
7.3.1 Preparations Before Dust Removal



Note:

Please prepare at least the following tools. If the tools are insufficient, there may be a possibility that the maintenance cannot be completed. The handles of the tools such as the Phillips screwdriver need to be insulated or insulated tools should be used.

Cleaning tools:

 Cross screwdriver	 Multimeter	 Rubber hammer	 Insulated ladder
 Vacuum cleaner	 Water Gun		

Protective equipment:



Figure 6.3.1

7.3.2 Cleaning and Maintenance

Cleaning and Maintenance Schedule

Category	Action	Reference standards	System status
Cabinet	Clean the ventilation opening	1.The ventilation opening has no dust accumulation	Power off
Cabinet	Clean the dust-proof cotton	1.Entry of insects, mice, snakes and other animals	Power off
Cabinet	Rinse appearance	1.The dust-proof cotton has no obvious discoloration or debris	Power off
Air conditioner	Clean the radiator	1.The surface of the radiator table is clean and unobstructed; 2.The fan rotates normally without any lag abnormal noise	Power off
Power Distribution Region	Check for foreign objects in the distribution area	1.The area is clean No foreign matter	Power off
Note: It is recommended to clean up every sandstorm that occurs in dusty areas; It is recommended to clean once before entering summer; In other regions, according to the actual situation, ensure that the filter or condenser is not blocked; The longest service life of dust-proof cotton is 2 years. Recommended tool: High pressure water gun.			

Table 7.3.2

7.3.3 Operating Steps

Step 1: Power off and shut down the system

1. Click on the touchscreen switch interface and select "System Off".
2. Disconnect the auxiliary power switch of the system and the battery auxiliary power switch;

3. Disconnect the oil engine switch, the mains power switch, the load switch, and the photovoltaic switch;
4. Disconnect the DC load switch of the battery high-voltage control box;
5. Shut off the upper-level power switch of the system and hang a "Do Not Close" maintenance sign.

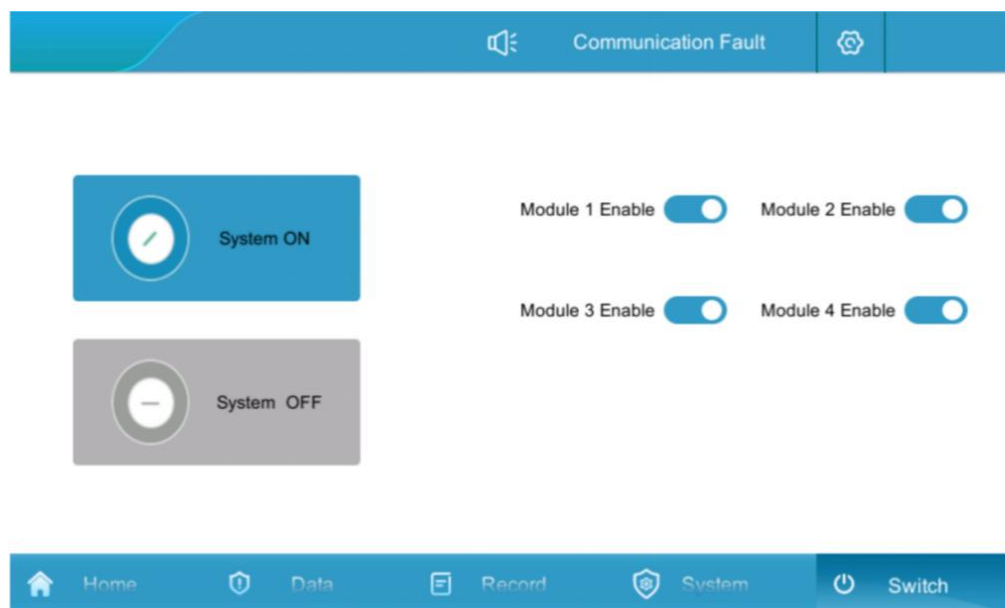


Figure 7.3.3-1

Step 2: Use the special tools and keys to open the system cabinet door.

Step 3: Disconnect the circuit breaker of the upper-level distribution box of the mains power switch, and hang a "Do Not Close" maintenance sign.

Use a multimeter to check if the equipment is still energized inside. Only proceed with the next step after the equipment has been de-energized.



Figure 7.3.3-2

Step 4: Open the cabinet door, release the snap fastener of the dust-proof cotton frame, remove the dust-proof cotton, and place the aluminum frame and the dust-proof cotton flat in the safe storage area.



Figure 7.3.3-3

Step 5: Use a high-pressure water gun to rinse the dust-proof cotton. If it gets too dirty, you can clean it with a cleaning agent.

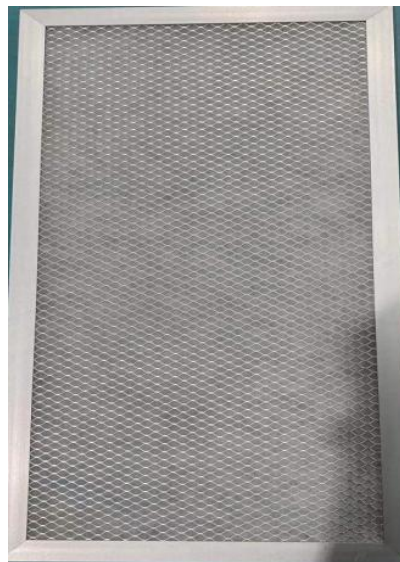


Figure 7.3.3-4

Step 6: After the dust-proof cotton has been cleaned, place it in the aluminum dust-proof cotton frame, let it dry, and then fix it with the clips.

Step 7: Restart the machine

7.4 Warranty Services

7.4.1 Warranty Period

When the product is used correctly, the warranty period as stipulated in the business contract shall apply.

7.4.2 Warranty Scope

If the product is within the warranty period and any malfunction is caused by a quality issue of the product itself, our company will provide free repair or replacement of the product for the customer. The customer should reserve a reasonable response time for our company's maintenance. The replaced product will be handled by our company. The customer is required to present the relevant proof of purchasing the product and ensure that the

product trademark is clearly visible. Otherwise, our company reserves the right not to provide warranty coverage.

7.4.3 Disclaimer Statement

In the following cases, the company reserves the right not to provide quality assurance, but still offer paid repair services.

1. Beyond the warranty period;
2. Unable to provide proof of product purchase;
3. Damage caused during transportation or loading/unloading;
4. Incorrect installation, modification or damage caused by unauthorized personnel's disassembly;
5. Damage caused by abnormal use conditions or environments;
6. Machine failure or damage caused by using non-Natong components or software;
7. Faults caused by irresistible factors such as fire, earthquake, flood, etc. For products within the warranty period, if the failure is caused by quality problems of the product itself, the company will provide free repair or replacement of the product for the customer. The customer should reserve a reasonable response time for the company's repair. The replaced product will be handled by the company. The customer is required to present the relevant proof of product purchase and ensure that the product trademark is clearly visible. Otherwise, the company reserves the right not to provide warranty guarantee.

Appendix

Emergency handling measures

When batteries are dropped or subjected to severe impacts

If there are any obvious odors, damages, smoke emissions or fire incidents:

Immediately evacuate the personnel, call the police and contact professionals.

The professionals will use the fire-fighting equipment to extinguish the fire under the condition of ensuring safety.

If there is no obvious deformation or damage to the appearance, and no unpleasant smell, smoke or fire is emitted:

Warehouse scene: Evacuate the personnel. Professional personnel will use mechanical tools to transfer the batteries to an open and safe area. Contact the service engineer. Let the batteries stand still for 1 hour and monitor the battery temperature (within the range of room temperature $\pm 10^{\circ}\text{C}$) before handling.

On-site of the energy storage system: Evacuate the personnel, close the door of the energy storage system, transfer the batteries to a safe place by professionals, contact the service engineer, and handle them after a 1-hour rest.

When a flood occurs

Under the condition of ensuring personal safety, power down the system.

If any part of the battery is submerged in water, do not touch the battery to avoid electric shock.

Do not use the battery that has been soaked in water. Contact the recycling company to have it disposed of.

When a fire occurs



Warning:

Power down the system in a safe manner.

Use carbon dioxide, FM-200 or ABC dry powder fire extinguishers to put out the fire.

Firefighters should avoid contact with high-voltage components to prevent the risk of electric shock.

High battery temperature may cause deformation, electrolyte leakage and release of toxic gases. They should wear respiratory protection equipment, stay away from the scene and avoid skin irritation and chemical burns.

When the sound and light alarm is activated

Do not approach or open the door. Move away immediately.

Cut off the power supply remotely under the condition of ensuring your own safety.

When the exhaust start occurs

On-site personnel protection: Do not operate directly towards the exhaust outlet.

Post-event maintenance: Please contact the service engineer for assessment.

Emergency handling in case of refrigerant leakage



Warning:

Immediately cut off the power supply, evacuate the personnel, and prohibit any open flame or spark operations (to prevent explosion).

After the fault is resolved, clean the interior of the system, re-power it and check if the system is functioning properly. If any abnormalities occur, please contact the relevant engineers immediately for handling.

Maintenance points:

Locate the leakage points using a leak detector (check the compressor shaft seal and condenser joints);

Minor leakage: Tighten the seals after recovering the refrigerant;

Major leakage: Replace the components.

In the event of a fire extinguishing agent eruption or a fire occurrence

Suggestions for operation and maintenance personnel:

Evacuate the scene and call the police. Provide information such as the type of battery pack, system capacity, and location distribution.

Do not re-enter the burning area or open the storage system door. Isolate the scene and keep watch.

Remote power-down the system (ensure your own safety).

Provide product information and user manual to the firefighters.

After extinguishing the fire, have professionals handle it. Do not open the door privately.

Contact the service engineer for assessment and maintenance.

Suggestions for firefighters:

Refer to the product information provided by the maintenance personnel.

Do not open the storage system door before ensuring safety.

Use control measures to extinguish the fire to prevent it from spreading to the surrounding storage cabinets.



User Manual

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