Photovoltaic+Storage Hybrid Inverter

USER'S MANUAL

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1. Security Precaution

1.1. Security Symbols Explanation

When installing, operating, and maintaining the equipment, please read this manual first and follow the safety precautions indicated on the equipment and in this manual. To ensure proper use of this product and to protect personal and property safety, please carefully read the following symbols used in this manual.

Symbol	*Description*
Danger	*Indicates a high potential for danger, such as a situation that will result in death or serious injury if not avoided.*
Warning	*Indicates a moderate potential for danger, such as a situation that could result in death or serious injury if not avoided.*
Caution	*Indicates a low potential for danger, such as a situation that could result in moderate or minor injury if not avoided.*
Note	*Emphasizing and adding content may also provide techniques for optimizing the use of the product.*

1.2. General Safety

This equipment shall be used under the environment meeting the design specification requirements. Otherwise, equipment failure may be caused, and the resulting equipment function abnormalities or component damage, personal safety accidents, property losses and other events are not within the scope of equipment quality guarantee. When installing, operating and maintaining the equipment, local laws and regulations and norms shall be observed. The safety precautions in this manual are only supplementary to local laws, regulations and norms. The company shall not be responsible for the following situations.

Note

- Installing and using the equipment in an environment that exceeds the regulations in relevant international, national, and regional standards.
- Not operating within the conditions specified in this manual.
- Unauthorized disassembly, modification of the product or modification of software code.

- Not following the operating instructions and safety warnings in the product and documentation.
- The equipment damage caused by abnormal natural environment (force majeure, such as earthquake, fire, storm, flood, mudslide, etc.) shall not be borne by the company.
- Damage caused by customers not following the transportation and installation requirements.
- Damage caused by storage conditions not meeting the requirements specified in the product documentation.
- Damage to the equipment's hardware or data caused by customer negligence, improper operation, or intentional damage.
- System damage caused by third parties or customer reasons, including relocation and installation of the system not in accordance with the requirements of this manual, as well as damage caused by adjustments, modifications or removal of identification marks not in accordance with the requirements of this manual.
- Defects, failures, or damage caused by acts, events, negligence, or accidents beyond the reasonable control of the seller, including power shutdown or electrical failures, theft, war, riots, civil unrest, terrorism, intentional or malicious damage, etc.

The equipment contains high voltage, and improper operation may result in electric shock or fire, leading to death, severe personal injury, or significant property damage. Please follow the operation sequences and safety precautions provided in this manual and other relevant documents, and operate the equipment in a standard manner.

Danger

- Check if the equipment is damaged, such as holes, dents, or other internal signs of possible damage. Check that the internal components of the equipment are not shifted, and do not alter the structure or installation sequence of the equipment.
- It is prohibited to use water to clean electrical components inside the equipment. If any liquid enters the equipment, do not power it on and notify the site manager.

- It is prohibited to perform installation, wiring, maintenance, and replacement operations while the equipment is powered on. Before contacting any conductor surface or terminal, measure the voltage at the contact point and confirm that the protective ground wire of the equipment or the component to be repaired is reliably grounded to eliminate the risk of electric shock.
- Other than the personnel performing operations on the equipment, please do not approach the equipment. Do not power on the equipment until it is fully installed or confirmed by a professional. When initially powering on or performing main circuit operations with electricity, at least two personnel must be present on site.

Note

- The user's operating behavior and tools during transportation, handling, installation, wiring, and maintenance must comply with the laws and regulations and relevant standards of the country or region where the equipment is used.
- When installing, operating and maintaining, it is necessary to clean the water, snow and other debris on the top of the cabinet first, and then open the cabinet door to avoid debris falling into the cabinet.
- It is prohibited to perform reverse engineering, decompile, disassemble, modify, implant, or other derivative operations on the equipment software. It is not allowed to study the internal implementation of the equipment, obtain the equipment software source code, steal intellectual property rights, or disclose any results of equipment software performance testing.

1.3. Electrical Safety

1.3.1. Wiring requirements

- Please select cables that comply with local laws and regulations. Cables of the same type should be bundled together, while cables of different types should be separated and laid out without intertwining or crossing each other.
- If the wiring is completed or temporarily left during the wiring process, the cable opening should be blocked immediately, and the cabinet door should be closed to avoid animals entering.

- The cables used in the energy storage system must be connected solidly, have good insulation, and meet the specifications. The cables passing through pipes or holes must be protected to avoid being damaged by sharp edges, burrs, etc.
- After the completion of wire connections, reliable fixing should be done with cable supports and clamps. The cables in the back-filled soil area should be closely attached to the ground to prevent deformation or damage caused by wire stress during back-filling.
- The use of cables in high-temperature environments may cause aging and damage to the insulation layer. The distance between the cables and the heat-generating devices or heat source areas should be at least 30mm.
- To ensure construction safety, all cables should be installed at temperatures above 0℃. When handling cables, especially when working in low-temperature environments, they should be handled gently.

1.3.2. Grounding requirements

- It is prohibited to damage the grounding conductor. The grounding body of the equipment shall be connected to the protective grounding grid permanently. Before operating the equipment, the electrical connection of the equipment shall be checked to ensure that the equipment has been reliably grounded.
- .The equipment grounding impedance meets the national standard GB 50054 and local electrical standards.
- It is prohibited to operate the equipment without installing a grounding conductor. For equipment that needs to be grounded, when installing, the protective ground wire shall be installed first; when removing the equipment, the protective ground wire shall be removed last.

1.3.3. Maintenance requirements

- Before connecting or disconnecting cables, the protective switch corresponding to the circuit must be disconnected.
- Use a multimeter with the corresponding voltage rating to check if the equipment is charged, to ensure that the equipment is completely shut down.

- If there are nearby live bodies, use insulating boards or insulating wraps to cover or wrap them.
- After using an earthing wire to connect the maintenance circuit with the earthing circuit, proceed with the maintenance operation.

Note

- Before connecting the cables, it is necessary to confirm that the wire labels are correctly identified before connecting them.
- If the equipment has multiple input channels, all inputs should be disconnected and the equipment should be completely powered off before it can be operated.
- After completing the maintenance, disconnect the earthing wire between the maintenance circuit and the earthing circuit.

1.4. Mechanical Safety

Caution

- When lifting and transporting the equipment without wooden boxes, the bottom boards must be removed. The equipment should be handled gently to avoid impact or vibration during lifting and lowering.
- During transportation, the center of gravity of the equipment should be placed in the middle position between the two forks of the forklift. Long-distance handling, inversion, or tilting are prohibited.
- When transporting equipment, it may be necessary to cover the operator's line of sight due to the large size of the equipment. It is recommended to arrange auxiliary personnel to assist in completing the operation.
- To ensure the safety of drilling outside the equipment body, suitable positions should be selected before drilling to avoid short circuits or other impacts. The equipment should be blocked during the drilling process to prevent debris from falling into the equipment. After drilling, clean up the debris promptly.

- When handling equipment by hand, it is necessary to prepare for the weight and wear protective gloves, anti-crash shoes and other safety equipment.
- During the transportation of the equipment, it should be carefully moved to avoid collisions or falls. Avoid scratching the equipment surface, damaging components or cables.

1.5. Maintenance and Replacement

Warning

- It is prohibited to open the cabinet door in rain, snow, lightning, sand, dust, fog, or other weather.
- Before parts are removed from the cabinet, make sure that other parts on the cabinet are not loose.
- During equipment maintenance, cover nearby energized parts with insulating material.
- Prohibit any objects from touching the running fan (e.g., fingers, parts, screws, etc.) until the fan is de-energized and stops rotating.
- Do not energize the unit before troubleshooting.
- When the converter is energized for inspection, pay attention to the hazard warning signs on the equipment and avoid standing at the cabinet door.
- Wait 15 minutes after powering down the equipment to ensure that the equipment is free of power before operating the equipment.
- Manual wiring inspection is required after the replacement of power components or wiring change of the equipment to avoid abnormal operation of the converter.
- After completing the maintenance and replacement related operations, the cabinet door should be locked in time and the key should be kept properly.

2. Product Introduction

2.1. Model Description

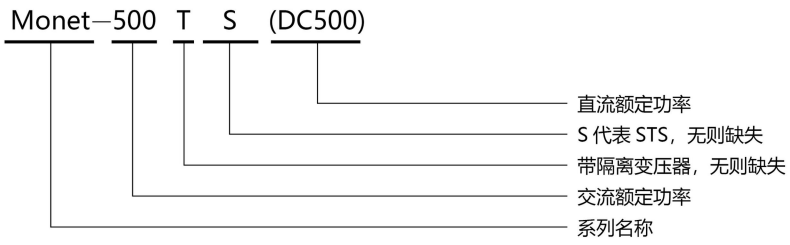


Figure 2-1Model identification

Note **Isolation transformer, DC power modules are optional parts, rated output power can be flexibly configured according to project requirements.**

2.2. Product Features

Monet series PV+storage Hybrid Inverter integrates modularized PCS, local energy management monitoring system, power distribution system and environmental control system. It adopts modularized PCS, which is easy for maintenance and capacity expansion; adopts front maintenance, which can reduce the floor space and maintenance access; and is characterized by safety and reliability, rapid deployment, low cost, high energy efficiency and intelligent management.

The common application scenarios run with the following strategies:

On-Grid mode: The PV+storage Hybrid Inverter is connected to the battery and converted to AC power through the AC/DC power module to be connected to the grid, which can be realized: the storage battery is connected to realize peak shaving and valley filling, and the tariff difference is arbitrage.

Off-grid mode: The optical storage integrated machine is connected to batteries, PV or other DC sources, disconnected from the utility, connected to the load, and converted to AC power through AC/DC power module to supply power to local loads with a default three-phase voltage of 400Vac, 50Hz.

2.3. Electrical wiring diagram

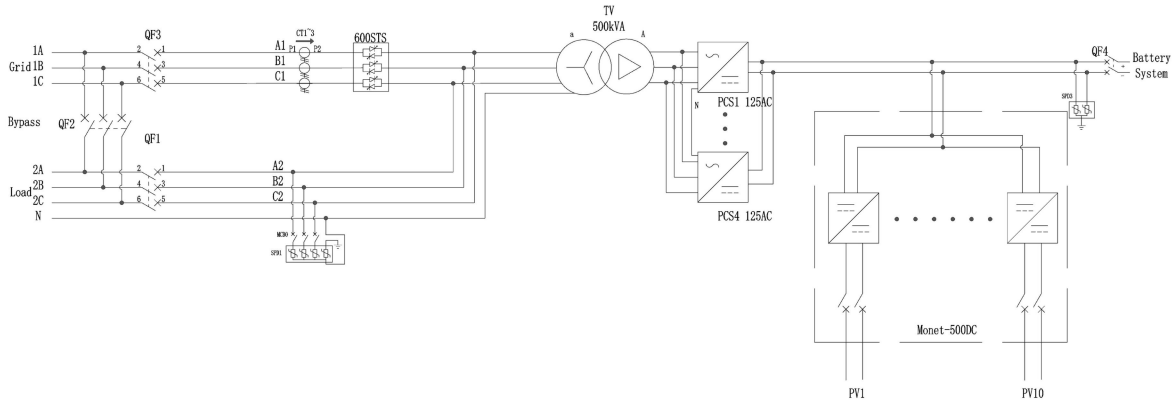


Figure 2-2Electrical primary diagram

Note **Figure 2.2 shows the system plan for grid-tied plus manual off-grid with PV input. Different projects have different configurations and slightly different lines, the actual shipping attached drawings shall prevail.**

2.4. Product Features

Monet series PV+storage Hybrid Inverter adopts advanced digital control technology, equipped with self-developed Lotus-Pcs microgrid management system to optimize the control performance and improve the reliability of the system to meet the needs of multi-application scenarios, its performance characteristics are as follows:

- It can accept grid scheduling, with primary frequency/voltage regulation and other functions.
- There are two types of cabinets for Outdoor and outdoor to meet the needs of a variety of installation sites.

- Modular rack-mounted design, flexible configuration, convenient expansion and maintenance.
- Power module three-level circuit design, high conversion efficiency, improve power utilization.
- The local control panel can realize diversified functions such as converter operation monitoring, energy management strategy formulation, and equipment remote upgrade.

2.5. Product parameters

The following are typical configuration parameters of Monet series PV+storage Hybrid Inverter, the actual supply is subject to the technical agreement.

Table 2-1Parameters of PV+storage Hybrid Inverter

Model	***Monet-500TS***
Operate voltage range	*580~950V*
Maximum DC current	*200A*4*
Adaptive battery	*Lithium/lead-acid/Solar panel(MPPT)*
Charging mode	*According to BMS instructions/three-stage/MPPT*
Operating mode	*Constant current, constant power, MPPT, AC voltage source, DC voltage source*
Rated Max.AC power	*500/550kW*
Rated AC current	*180A*4*
Rated AC voltage	*400V,3W+N+PE*
Rated AC frequency	*50/60Hz±5Hz*
THDi	*<3% (Rated power)*
Power Factor	*-1leading to+1 lagging*
Rated AC voltage	*400V*
Rated AC frequency	*50/60Hz*
THDv	*<3% (Linear Load)*
Overload capacity	*110%, normal operation; 120%, 1 minute*
Degree of protection	*IP55(Outdoor)*
Protective Class	*I*
Isolation method	*Transformer isolation*
Shutdown self-discharge	*<0.1% of rated power(without transformer)*
Display	*LCD*

Relative humidity	*0 ~ 95% (no condensation)*
Noise	*< 78dB*
Ambient temperature	*-25℃ to +60℃(derating above 45℃)*
Cooling mode	*Intelligent air-cooled*
Altitude	*3000m (> 3000m reduction)*
Communication interface	*RS485/CAN/Ethernet*
*Dimensions (W * D * H)*	*1350*1000*2100mm(Outdoor)*
Weight (approx.)	*2240kg(Outdoor)*

Model	***Monet-(DC500)***
Photovoltaic(PV) port	
PV voltage range	*250-500V (MPPT)*
Max.PV input current	*10*160A*
MPPT quantity	*1/5/10*
Battery port	
Battery voltage range	*600~950V*
DC side bus power	*500kW*
Number of DC side inputs	*1*
General Parameters	
Degree of protection	*IP55 (Outdoor)*
Protective Class	*I*
Isolation mode	*Non-Isolation*
Shutdown self-discharge	*< 0.1%Rated Power (Without transformer)*
Display	*LCD*
Relative humidity	*0 ~ 95% (No condensation)*
Noise	*< 78dB*
Ambient temperature	*-25℃ to +60℃(Derating above 45℃)*
Cooling mode	*Intelligent air-cooled*
Altitude	*3000m (> 3000m reduction)*
Communication interface	*RS485 / CAN/Ethernet*
*Dimensions (W*D*H)*	*1350*1000*2100mm (Outdoor)*
Weight (approx.)	*900kg (Outdoor)*

Note **Actual parameters are set according to customer needs and have been configured before delivery.**

2.6. Component Introduction

2.6.1. Electrical system

The PV+ storage Hybrid Inverter adopts modularization scheme, users can configure different number of power modules according to the project requirements. The parameters of the power modules of the PV+ storage Hybrid Inverter are as follows:

Table 2-2 Power Module Parameters

Model	***Monet-125AC***
Rated power	*125kW*
Maximum power	*137.5kW*
DC operating voltage range	*580V~1000V*
DC side full load voltage range	*625V~950V*
Maximum current on low voltage side	*200A*
Rated AC Voltage	*400Vac，3W+PE，50/60Hz，（±5Hz)*
Rated AC current	*180A*
Overload capability	*110%, normal operation; 120%, 1 minute*
Current distortion	*<5%（Rated power)*
Power factor adjustment range	*-1 leading ~+1 lagging*
Maximum efficiency	*98.2%*
*Dimensions (W * D * H)*	*566(without mounting lug 520)*680*245mm*
Weight (approx.)	*68kg*
Isolation Mode	*Non Isolation*
Protection level	*IP20*
Operating temperature	*-35℃ to +60℃(derating above 45℃)*
Relative humidity	*0 ~ 95% (no condensation)*
Cooling mode	*Forced air cooling*
Altitude	*3000m (> 3000m reduction)*
Communication interface	*RS485/CAN/Dry contact*

Table 2-3 DC Converter Module Parameters

Model	***Monet -50DC***
Rated DC power	*50kW*
Maximum DC power	*55kW*
DC working voltage range	*200V~1000V*
Low voltage side full load voltage range	*312V~850V*
Maximum current at low voltage side	*80A*2*
Low voltage side input channels	*2 (2 channels can be independent, can be paralleled as 1 channel)*
High voltage side full load voltage range	*500V~950V*
Maximum DC current on high voltage side	*110A*
High voltage side input channels	*1*
Compatible battery	*Lithium battery/lead acid/photovoltaic module*
Operating mode	*Constant voltage, constant current, constant power, MPPT*
Maximum conversion efficiency	*98.8%*
*Dimensions (W*D*H)*	*566 (not including mounting lug 520)*600*150mm*
Weight (approx.)	*35kg*
isolation method	*non-isolated*
degree of protection	*IP20*
Operating temperature	*-25℃~+60℃ (>45℃ derating)*
Relative humidity	*0~95% (no condensation)*
cooling method	*Forced air cooling*
noise	*<70dB*
Altitude	*3000m (>3000m derating)*
Communication Interface	*RS485 (optional)/CAN*

Table 2-4 STS Power Module Parameters

Model	***Monet-600STS***
Rated power	*600kW*
Maximum power	*660kW*
Rated AC Voltage	*400Vac，3W+PE*
Rated frequency	*50/60Hz*
Rated AC current	*866A*
Switching time	*< 10ms*
Synchronous control and protection interfaces	*CAN/10 inputs/relay outputs, load current CT*
*Dimension (W*D*H)*	*566 (not including mounting lug 520)*600*150mm*
Weight (approx.)	*37kg*
Operating temperature	*-25℃~+45℃*
Communication Interface	*RS485(optional)/CAN*

2.6.2. Electrical distribution system

Schematic diagram of the power distribution system:

Figure 2-3 Monet-500TS Cabinet internal structure diagram

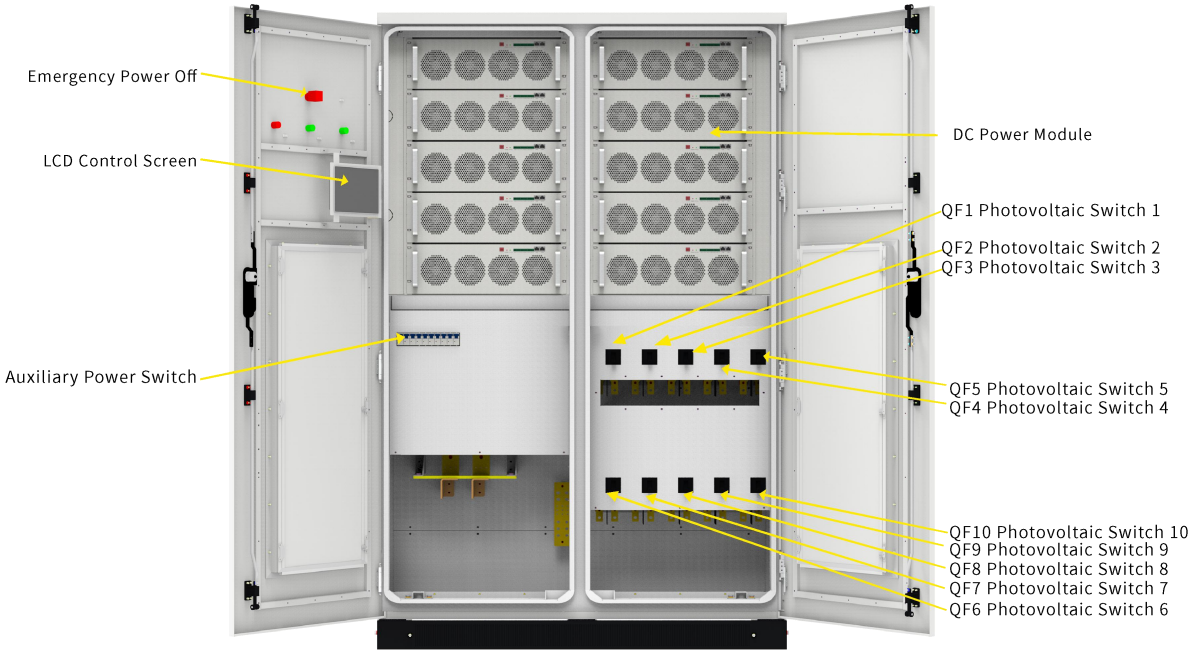


Figure 2-4 Monet-（DC500）Cabinet internal structure diagram

2.6.3. Local management system

The microgrid management system Lotus-Pcs is an intelligent management system independently developed by our company, which can realize the energy control system of power storage and conversion. On the power generation side, it can effectively connect renewable

energy systems such as photovoltaic power generation and wind power generation to the grid; on the input side, it can respond to the grid and realize peak shaving, peak load shifting, and valley filling to cooperate with grid dispatching and stabilize grid frequency; on the power distribution side, it can achieve peak shaving, valley filling, and flexible DC interconnection, alleviating power shortages during peak periods and smoothing out power surpluses during low-demand periods; on the power consumption side, it can be used as an uninterruptible power supply and DC source. The product integrates the human-machine interface (HMI), port control and communication, system parameter and operation strategy setting functions to realize the monitoring and management of PV+ storage Hybrid Inverters. The hardware resources and parameters of the product are as follows:

Table 2-5Local controller parameters

Module	***Lotus - Pcs***
Power input	*DC 12V*
Output control	*3 isolated output switching values*
Input control	*6 isolated input switching values*
Serial communication	*2 isolated RS232, 4 isolated RS485*
Fieldbus	*2 CAN bus interfaces*
Ethernet port	*1 10/100M Ethernet port (RJ45)*
Expanded storage	*1 USB port, 1 SD card port*
Audible alarm	*1 controllable buzzer*
Program indication	*1 operation indicator light, 1 status indicator light, 1 alarm indicator light*
Abnormal indication	*1 hardware watchdog timer*
Real-time clock	*1 set of RTC real-time clock*

2.7. Interface instructions

In summary, the overall configuration list of PV+storage Hybrid Inverter in a typical configuration is as follows:

Table 2-6 PV+storage Hybrid Inverter Overall configuration list

Name	***Module***	***Unit***	***Quantity***	***Note***
PCS cabinet	*1350*1000*2100mm*	*set*	*1*	
DC cabinet	*1350*1000*2100mm*	*set*	*1*	
AC Power Modules	*Monet-125AC*	*set*	*4*	*Modular*
DC Power Modules	*Monet-50DC*	*set*	*10*	*Modular*
On/off switching Power Modules	*Monet-600STS*	*set*	*1*	*Modular*
Lightning protection	*20/40kA*	*set*	*1*	

Distribution system	*Micro breaks, etc.*	*set*	*1*	*Auxiliary equipments*
Management system	*Lotus-Pcs*	*set*	*1*	
Isolation transformer	*500kVA*	*set*	*1*	

3. Installation and Wiring

3.1. Transportation and Handling

3.1.1. Product Transportation

- To ensure better protection of the equipment, it is recommended to use packaging for transportation.
- The equipment should be transported according to the requirements indicated on the packaging to prevent personal injury and equipment damage.
- It is not recommended to transport energy storage batteries by rail or air. Land transportation speed limit requirements: the speed limit on flat roads is 80km/h, and on rough roads is 60km/h. In case of any conflict, please comply with local traffic regulations.

3.1.2. Product handling

- When moving with a forklift, ensure that the forklift has sufficient load capacity and pay attention to the center of gravity of the equipment falling between the forks of the forklift to prevent personal injury and equipment damage.
- When transporting with batteries, the load capacity of the forklift should be ≥3t.
- It is recommended that the fork length should be ≥ 1.5m, the width should be 80cm~160cm, and the thickness should be 25cm~70cm.

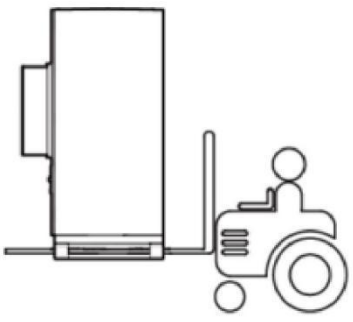


Figure 3-1 Schematic diagram of handling

3.2. Packaging and Storage

3.2.1. Product packaging

To ensure better protection of the product during transportation, specific paper boxes are used for packaging. The equipment packaging includes the following basic parameters (including but not limited to), which need to be carefully checked against project requirements:

Table 3-1 Table of packaging parameters

Parameter	***Description***
model	*Product model*
size	*Product packaging size*
weight	*Total weight of product after packaging*
Identification	*Face up, handle with care, center of gravity position, etc.*

3.2.2. Product storage

If the product is not to be transported or installed for use immediately, it must be stored Outdoors in a place that meets the following conditions:

Table 3-2 Requirements for product storage conditions Parameter Requirement

Parameter	***Description***
Storage temperature(without battery)	*-25℃~+60℃*
Storage relative humidity	*＜95%(no condensation)*
weight	*＜3000m*

Note

Long-term storage of PV+ storage Hybrid Inverter unit is not recommended. If the storage more than 6 months before installation need to carry out aging test, no problem before installation and use.

3.3. Installation environment requirements

The installation layout of PV+ storage Hybrid Inverter must meet the fire protection distance or firewall requirements specified by local standards, including but not limited to the "GB 51048-2014 Electrochemical Energy Storage Power Station Design Code" and "NFPA 855

Standard for the Installation of Stationary Energy Storage Systems". The siting requirements are generally as follows:

- The installation location should be at a level higher than the historical highest water level of the area. The distance from airports, landfills, river banks, or dams should be ≥2km.
- Choose a well-ventilated place. Do not block the vents and cooling system during operation to prevent high temperature and fire. Ensure sufficient installation space to prevent surrounding equipment from being affected by the heat generated by the product; and ensure sufficient external wiring space. Have convenient transportation conditions and reliable fire suppression system equipment.
- The installation location should be far 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, hardening treatment should be carried out on the ground below the equipment to prevent weeds from growing.
- Do not install the energy storage system outdoors in salt-affected areas to prevent equipment corrosion and subsequent fires.
- PV+ storage Hybrid Inverter must be equipped with fences, walls, and other protective measures, and safety warning signs should be erected for isolation to prevent unauthorized personnel from entering during operation, which may lead to personal injury or property damage.
- The equipment should be installed in an area away from liquids, and should not be installed below water pipes, air outlets, or other locations prone to condensation; it should also not be installed below air conditioning vents, exhaust vents, or machine room outlet windows, to prevent liquid from entering and causing equipment short circuits.

Note

When the safety clearance required by relevant national standards cannot be met during the site selection, it is recommended to relocate the site. The site selection should avoid scenarios

that are not recommended by industry standards and regulations, including but not limited to the following locations, areas, and sites:

- Strong vibration, strong noise sources, and strong electromagnetic field interference areas.
- Places that generate or have dust, smoke, harmful gases, corrosive gases, etc.
- Places that produce or store corrosive, flammable, and explosive substances. Within the danger zone of blasting.
- Places with existing underground facilities. Dense populated areas, high-rise buildings, and underground structures.
- Places with adverse geological conditions such as rubber soil, weak soil layers, and other ground that is prone to water accumulation and sinking.
- Within the boundaries of collapsed (defective) mining areas. In areas that may be flooded after dam or levee collapse.
- In earthquake fault zones and earthquake-prone areas with a seismic fortification intensity higher than level 9. In areas directly threatened by landslides, mudflows, quicksand, and caves.
- Important water supply source health protection zones.
- Historic and cultural heritage protection zones.

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

3.4. Before installation

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

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

Table 3-3 Delivery list

Serial number	*Name*	*Quantity*	*Note*
1	*PCS cabinet*	*1*	*key for cabinet door*
2	*DC cabinet*	*1*	*key for cabinet door*
3	*User manual*	*1*	*electronic version*
4	*Certificate of conformity*	*1*	
	Factory inspection report	*1*	

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

Table 3-4 List of installation tools

Serial number	*Name*	*Quantity*	*Note*
1	*Screwdriver set*	*1*	
2	*Socket*	*1*	
3	*Multimeter*	*1*	
4	*Forklift*	*1*	
5	*crews, nuts, washers*	*Some*	

3.5. Mechanical installation

（1）After confirming that the product is free from any abnormalities and all accessories are complete, you can refer to the following suggestions for mechanical installation:

- Select the equipment installation location in advance according to the product dimensions, and ensure proper positioning and fixation. It is recommended to use the foundation as shown in the figure.
- Refer to the product weight, and choose an installation location with sufficient bearing strength.
- Reliable grounding, ensure that the grounding resistance is less than 4Ω.

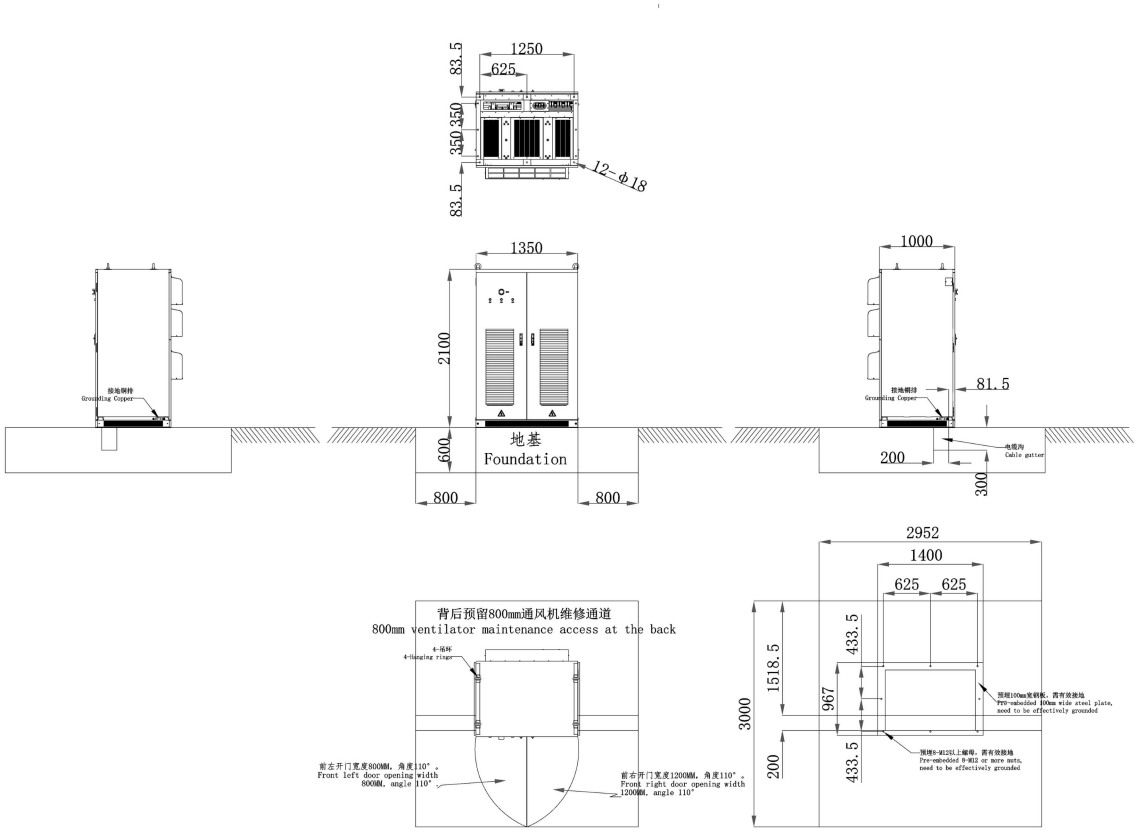


Figure 3-2 Monet-500TS Basic reference drawing (the actual external dimensions of the equipment are subject to shipment)

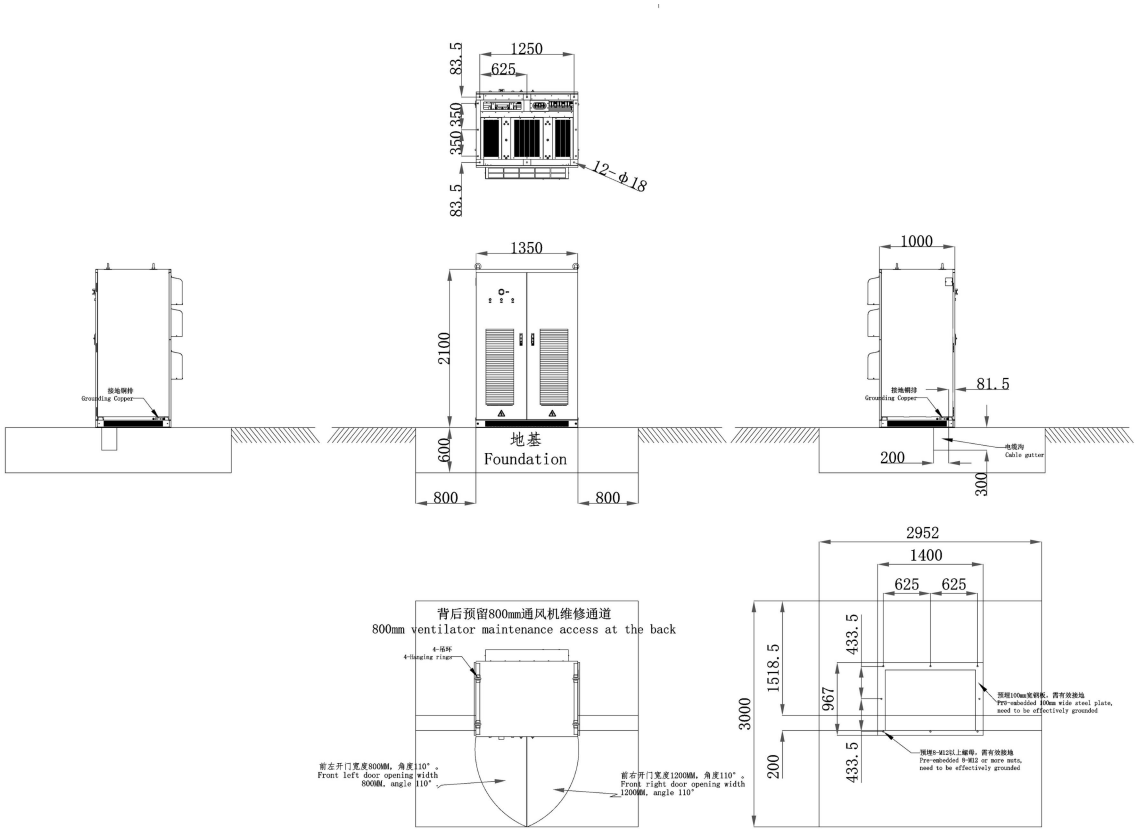


Figure 3-3 Monet-（DC500）Basic reference drawing (the actual external dimensions of the equipment are subject to shipment)

(2) After removing the wooden packaging box, disassemble the side panels at the bottom of the equipment first. Keep the disassembled side panels and screws properly, and reinstall them after the equipment is in place.

(3) Position the equipment on the foundation with a forklift, align the equipment fixing holes with the pre-embedded nuts of the foundation, and fasten with M12X40 bolts.

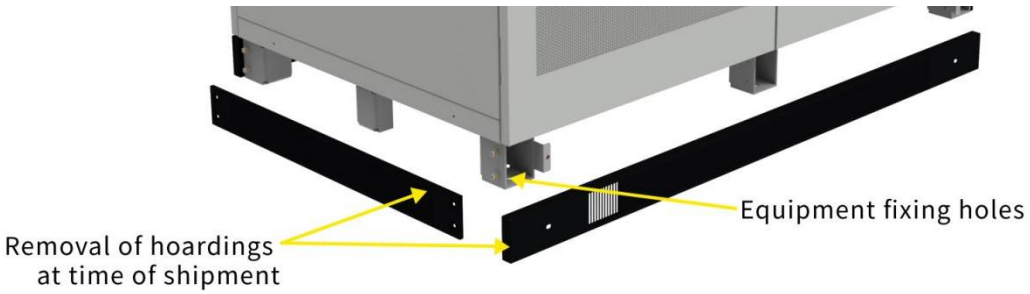


Figure 3-4 Equipment bottom enclosure preparation and bolt fastening diagram

3.6. Electrical Cable Installation

This product adopts an all-in-one structure, and the wiring on the DC side has been completed internally. Only electrical cable installation for the AC side and external communication is required on site. Our company provides wiring references as shown in Table 3.5 based on product power and cable specifications. The selection of cable diameters should comply with local cable standards. Factors that affect the selection of cables include rated current, cable type, installation method, ambient temperature, and maximum acceptable line loss.

Table 3-5 Cable Diameter Comparison Table

Model capacity	*AC Cable (Single Phase)*	*Zero wire*	*Ground Wire*	*DC Cable (Single Phase)*	*PV*
250kW	≥2*95mm²	≥95mm²	≥95mm²	≥2*70mm²	*≥50mm² (each way)*
500kW	≥4*95mm²	≥2*95mm²	≥2*95mm²	≥4*95mm²	*≥50mm² (each way)*

Danger

When performing electrical installation, you can refer to the following suggestions for electrical installation:

(1) Before wiring, check that all switches inside the equipment are in the off position to ensure that the equipment is not energized.

(2) Disconnect the power grid switch before wiring to ensure that the cables are not energized.

(3) Determine the correct phase sequence of the cables, and use different colored insulating sleeves or markings (yellow, green, red, and black) to distinguish them, to prevent phase sequence errors.

(4) The connection between the cable terminals and the copper busbars needs to be securely tightened. The length of the screws should be moderate to avoid affecting insulation and tightening.

(5) Communication cables and power cables should be laid separately as much as possible, and care should be taken to ensure that the insulation layers of the cables are not damaged during installation.

(6) The grounding cables must be reliably connected to the grounding copper busbars, and the cross-sectional area of the cables should meet the design requirements.

(7) All AC cables should enter the equipment through the bottom access holes and be connected to the corresponding phase sequence.

(8) After wiring is completed, use fireproof mud to seal the wiring gaps to prevent external pests such as insects and rodents from entering and damaging the equipment or cables.

In order to prevent the terminals from loosening under force and causing poor contact resulting in increased contact resistance and heat generation, etc., make sure that the bolts used to fasten the terminals meet the torque requirements listed in Table 3.6:

Table 3-6 Wiring torque requirements

Screw dimensions	*M3*	*M4*	*M5*	*M6*	*M8*	*M10*	*M12*	*M16*
*Torque (*kgf* cm)*	*8*	*14*	*30*	*60*	*150*	*390*	*650*	*2000*

The inlet and outlet mode of the PV+ storage Hybrid Inverter is lower inlet and outlet, after removing the switch baffle, as shown in Fig. 3.2, the A/B/C/N and DC positive and negative copper rows at the lower end of the switch are reserved with φ11mm and φ13mm holes for the customer to wire, or according to the customer's requirements for the size of the holes; the protective ground wire is connected to the PE copper row, and the equipment grounding impedance meets the requirements of national standard GB 50054 and the local electrical standards.

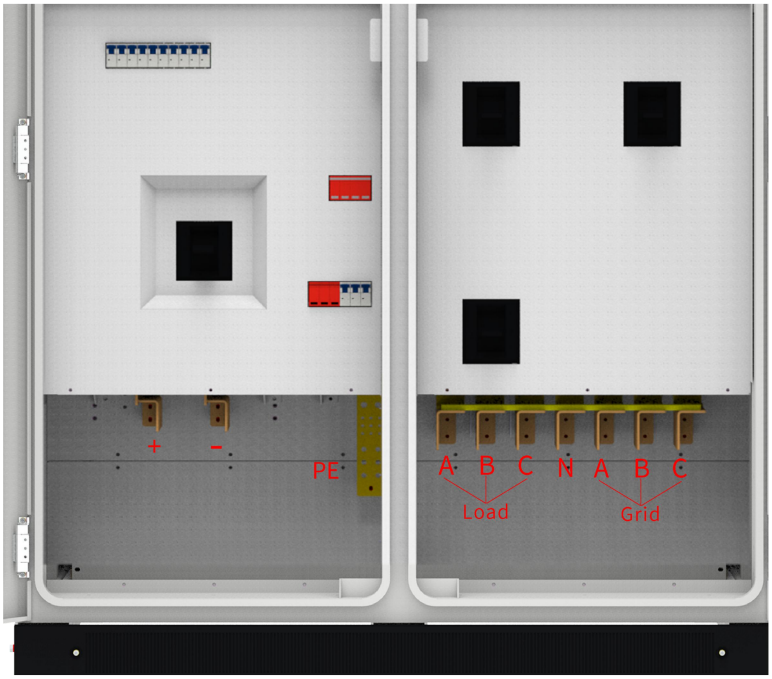


Figure 3-5 Monet-500TS Switch block and terminal block

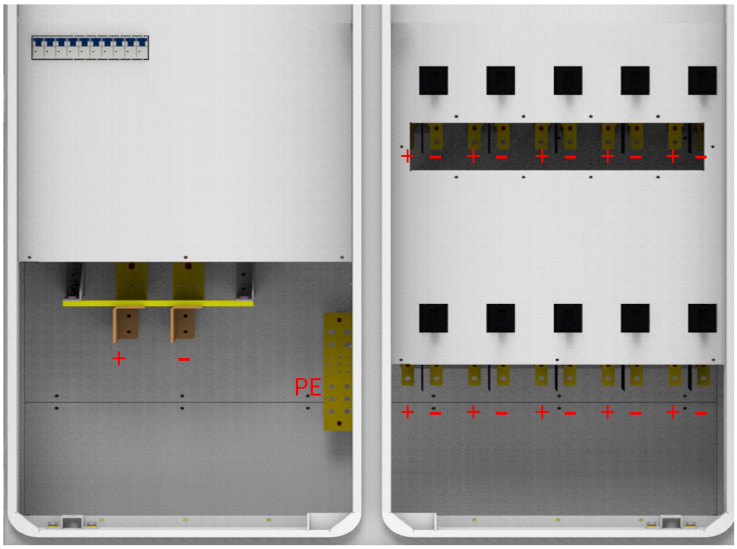
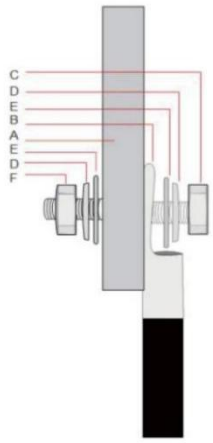


Figure 3-6 Monet-(DC500) Switch block and terminal block

The installation of the terminals, set screws and other parts used for power cable wiring is shown below:



Serial Number	Name
A	Copper Busbar
B	Wiring Terminal
C	Screw
D	Spring Washer
E	Big Flat Gasket
F	Nut

Installation of Wiring Terminals

Names of Departments for Wiring Terminal Installation

Illustration of Fixed Screw Installation

Figure 3-7 Set Screw Installation Schematic

Caution

- When using copper-cored cables or copper-clad aluminum cables, please use copper wiring terminals.
- When using aluminum alloy cables, please use copper-aluminum transition wiring terminals, or aluminum wiring terminals in combination with copper-aluminum transition gaskets.

3.7. Communication Cable Installation

When installing external communication cables, it is important to separate them from power cables. When laying communication cables and power cables in parallel, the recommended distance should be no less than 300mm. When the communication cable must pass through the power cable, it is recommended to ensure that the angle between the two cables is 90° to reduce electromagnetic interference from the power cable to the communication cable. Communication cables should be routed as close to the surface support as possible, such as wire ducts, metal rails, etc. If there is no support, they can be basically fixed with ties.

The PV+Storage Hybrid Inverter can use RS485 or Ethernet communication methods for backend communication, and the system communication protocol uses Modbus RTU or TCP. Twisted shielded cables or network cables are used to access the position shown in the figure below.

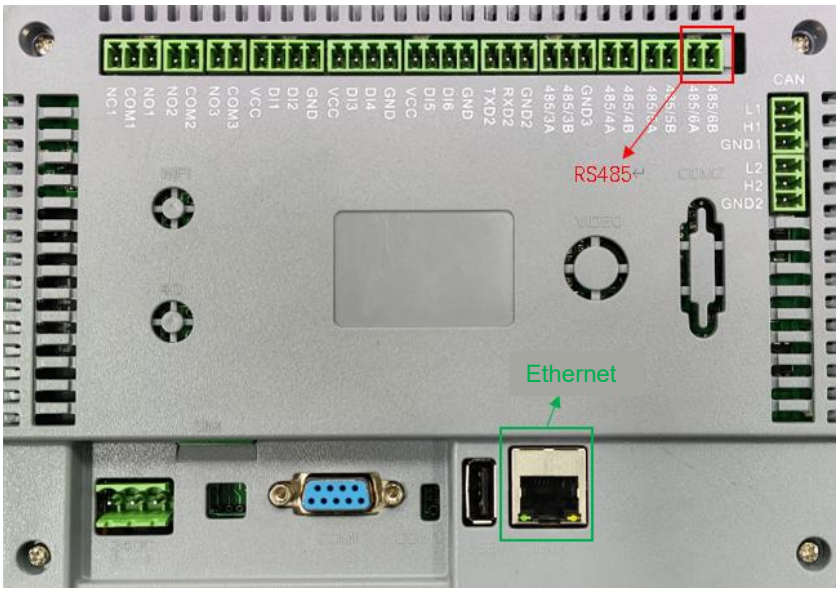


Figure 3-8 Communication cable wiring location diagram

4. Startup and Debugging

4.1. Pre-startup Inspection

Before operating the product, please ensure that the product has been installed according to specifications, and conduct a thorough and detailed inspection of the machine. The product can only be turned on after ensuring that all indicators meet the requirements.

（1）Visual Inspection:

a、The exterior of the equipment is intact, with no damage, rust, or paint peeling. If there is paint peeling, please conduct paint repair operations.

b、The equipment labels are clearly visible, and damaged labels should be replaced promptly.

（2）Grounding Inspection: The cabinet has a grounding point, and the grounding is secure; the grounding conductor inside the cabinet is reliably connected to the cabinet's grounding copper bar.

（3）Cable Inspection:

a、The protective layer of the cables is intact and there is no obvious damage.

b、The terminals are made in accordance with specifications, and the connections are solid and reliable.

c、The labels at both ends of each cable are clear and unambiguous. The wiring meets the principle of strong and weak power separation, with sufficient slack at the turns and no tightening.

d、The cable installation bolts are tightened, and there is no loosening when pulling the cables; the cable pass-through holes have been sealed.

e、Check that the AC phase sequence and DC positive and negative polarity of the AC and DC access cables are correct.

(4) Copper row inspection: no obvious cracks or deformation of copper rows, fastening of screws at the lap joints, no misalignment of scribed markings, and no debris on the copper rows.

(5) Component inspection: Referring to Figure 4.1, the circuit breakers are all in the open position.

Figure 4-1 Monet-500TS Distribution switch location map

Figure 4-1 Monet-(DC500) Distribution switch location map

4.2. Startup Operation

The operation flow for starting up the product is as follows:

(1) Use a multimeter to confirm that the grid voltage is within the predetermined range 400V（-15%~10%）.

(2) Referring to Figure 4.1 Monet-500TS cabinet, close transformer soft start switch MCB1 and auxiliary power switch MCB2~5, close QF3 utility switch, and close QF1 load switch (Note: When using QF2 bypass switch for equipment maintenance, remember to disconnect QF1 load switch first).

(3) Referring to Figure 4.2 Monet-(DC500) cabinet, close QF1~10 PV switch, close auxiliary power switch MCB1~2.

(4) Wait for the touch screen to start (about 30 seconds), make sure that the display is normal and there is no fault alarm.

(5) Click "System" -> "Parameter Setting" interface to set converter parameters in Monet-500TS cabinet touch screen, and select the desired operation mode in "System" -> "Run Mode" interface. In "System" -> "Run Mode" interface, select the desired operation mode.

(6) Enable all the modules in the "Switch" page of the touch screen, and click"System ON" to complete the power on.

4.3. Trial operation

After the equipment has been installed to meet the start-up conditions, in order to ensure that the energy storage system runs reliably and stably, the initial operation must be powered up

by professional electrical engineers and technicians and set up the operation mode and related parameters according to the project requirements:

(1) Set the device control mode to "Manual Mode" and set the active power to 5%.

(2) Observe the parameters of PCS on the screen during operation, and stop the machine in time for inspection if there is any abnormality.

(3) Operate for 0.5 hours.

(4) Set the active power to -5%, at which point the battery will charge at 5% of the system's rated power.

(5) Observe the parameters of PCS, battery and air conditioner on the screen during operation, and stop the machine in time for testing if there is any abnormality.

(6) Operate for another 0.5 hours.

(7) After completing the 1-hour commissioning without any abnormalities, shut down the system on the "Switch" interface.

(8) Based on the project background and requirements, you can choose the local manual power control mode, automatic peak shaving and valley filling mode, or backup mode for official operation. Simply click "System ON" on the system interface to proceed.

4.4. Shutdown Operation

When the product requires routine maintenance, a shutdown operation is necessary. The normal shutdown procedure for the product is as follows:

(1) Click on "System Shutdown" on the "Switch" screen of the touch panel and wait for the converter to stop running.

(2) Referring to Fig. 4.1 Monet-500TS cabinet, tap main AC/DC circuit breaker and tap auxiliary power switch MCB2~5.

(3) Referring to Fig. 4.3 Monet-(DC500) cabinet, breaking QF1~10 PV switches, breaking auxiliary power switches MCB1~2

(4) Switching main AC and DC circuit breakers.

(5) Waiting for the busbar discharge to end, the touch screen goes out and the device completes shutdown.

4.5. Emergency Shutdown

In the event of a product malfunction or emergency situation requiring immediate shutdown, the following emergency shutdown procedure can be performed:

(1) Press the emergency shutdown button "EPO".

(2) Referring to Figure 4.1~2, break all auxiliary power switches of the system, AC and DC molded case switches.

(3) Reset the EPO button after determining that the fault or hazard is cleared and operation is required.

Note

After pressing "EPO" emergency shutdown, it is necessary to turn off the auxiliary power switch and DC molded case switch, and wait for 10min before powering on!

4.6. Equipment overhaul

When the product needs to be powered off for maintenance, click the touch screen "Switch" interface to click "System OFF" and wait for the converter to stop running; if you need the utility to continue to supply power to the loads, first turn off the user loads; disconnect the load switch and close the bypass switch. When the maintenance is completed and the equipment is back in

use, turn off the user load first, disconnect the bypass switch and close the load switch; press 4.2 to start up the equipment.

5. Running and Operation

This chapter mainly introduces the LCD touch screen display interface and the corresponding operational control through the human-machine interface. Users can execute various operational commands through the LCD display interface, conveniently browse DC, AC, and system operation-related parameters and data, promptly obtain current equipment status and real-time alarm information, providing a reliable basis for fault diagnosis. Additionally, the LCD touch screen can also display system software version information and upgrade various component software via a USB flash drive.

5.1. Introduction to Human Machine Interface

After the system is powered on, the LCD touch screen enters the startup interface, and after 30s, the startup interface disappears and the system enters the "Home" interface. As shown in Figure 5.1, the homepage interface displays the real-time power, voltage, current, power generation, operation mode, working status and other information of the system.

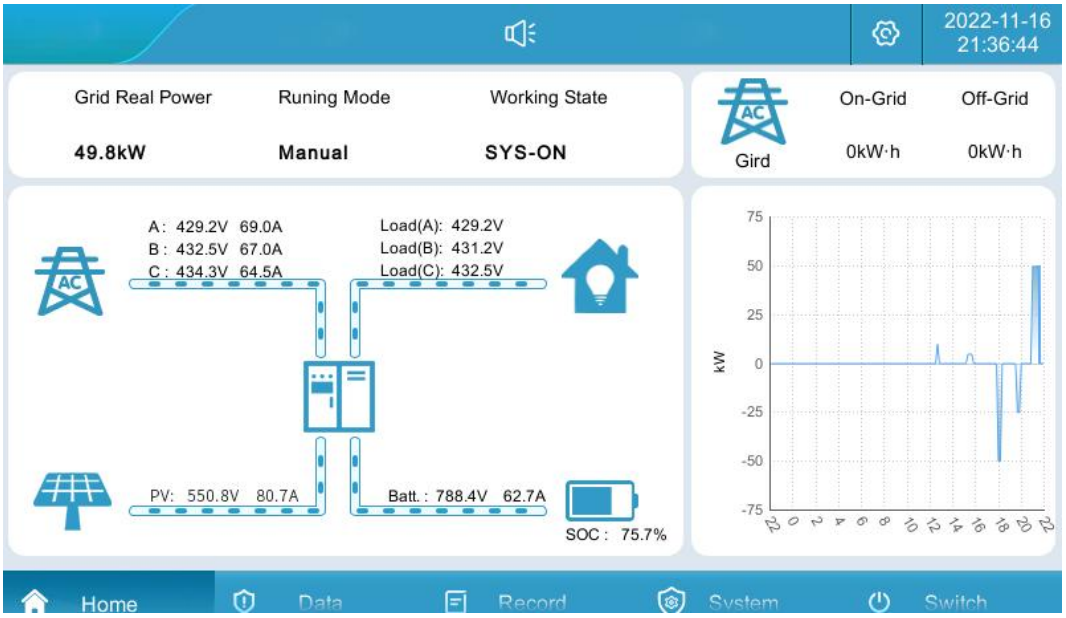


Figure 5-1Main Page

Each menu expands items:

No.	Menu name	Menu Items	Parameter Function
1	Home	N/A	Display the operation status of the system and the charging/discharging curve of the day.
2	Data	Real-Time Data	Display all analog data of the converter
		Real-Time Status	Converter operating status and switching status display
		Real-Time Alarm	Current system alarm information
3	Record	History Alarm	Displaying historical alarm records
		Operation Log	Displaying the operation log
		Data Report	Exporting history records
4	System	System information	Displaying system information
		Run Mode	System operation mode setting
		Paramater Set	Converter and battery parameterization
		Mlanuiacture	Equipment manufacturer settings
		System Update	System software upgrade
		Comm Set	Perform communication settings
5	Switch	Converter on/off	Converter power on and off

5.2. Switching operation

1、Confirm with a multimeter that the grid voltage is within the predetermined range (400V fluctuates within -15%~+10%).

2、Refer to Fig. 4.1 Monet-500TS cabinet, close transformer soft start switch MCB1 and auxiliary power switch MCB2~5, close QF3 utility switch, and close QF1 load switch (Note: When using QF2 bypass switch for equipment maintenance, remember to disconnect QF1 load switch first).

3、Referring to Fig. 4.3 Monet-(DC500) cabinet, close QF1~10 photovoltaic switch, close auxiliary power switch MCB1~2.

4、Set the converter parameters in "System" -> "Parameter Set" interface, and select the required operation mode in "System" -> "Run Mode" interface. In "System" -> "Run Mode" interface, select the required operation mode, select grid connection and control mode manual or peak shaving and valley filling.

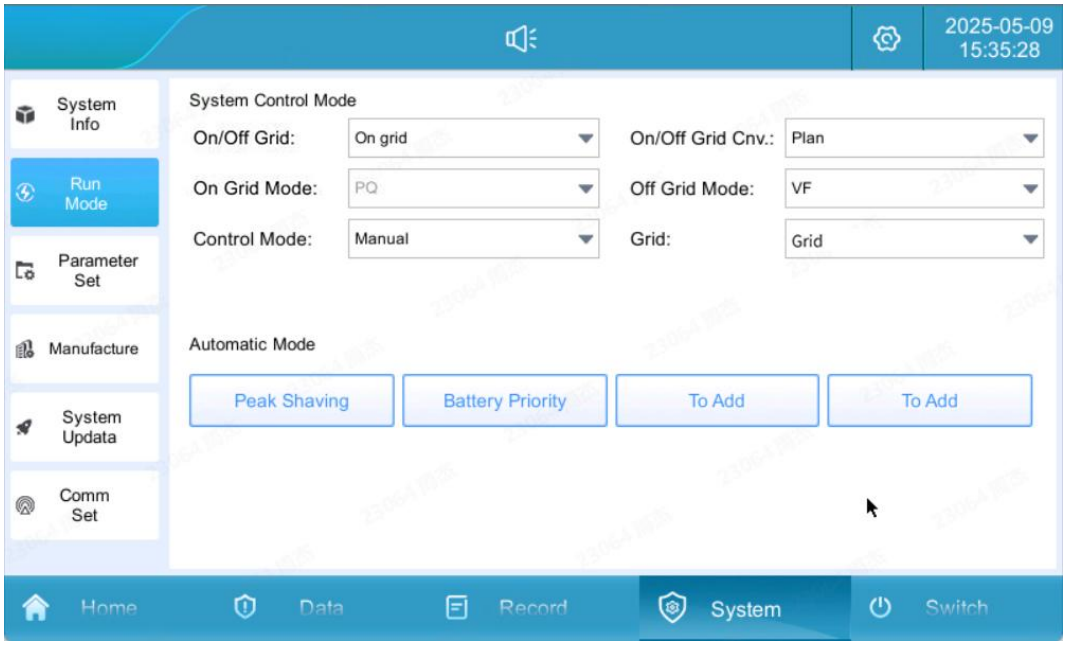


Figure 5-2 Run Mode Interface

5、In the touch screen “Switch” page to enable all the modules (you can also turn on some of the modules according to the actual need, the number of modules to the actual delivery shall prevail, in order to two modules as an example), click on the "System ON", the normal opening time of about 30 seconds, as Figure 5.3

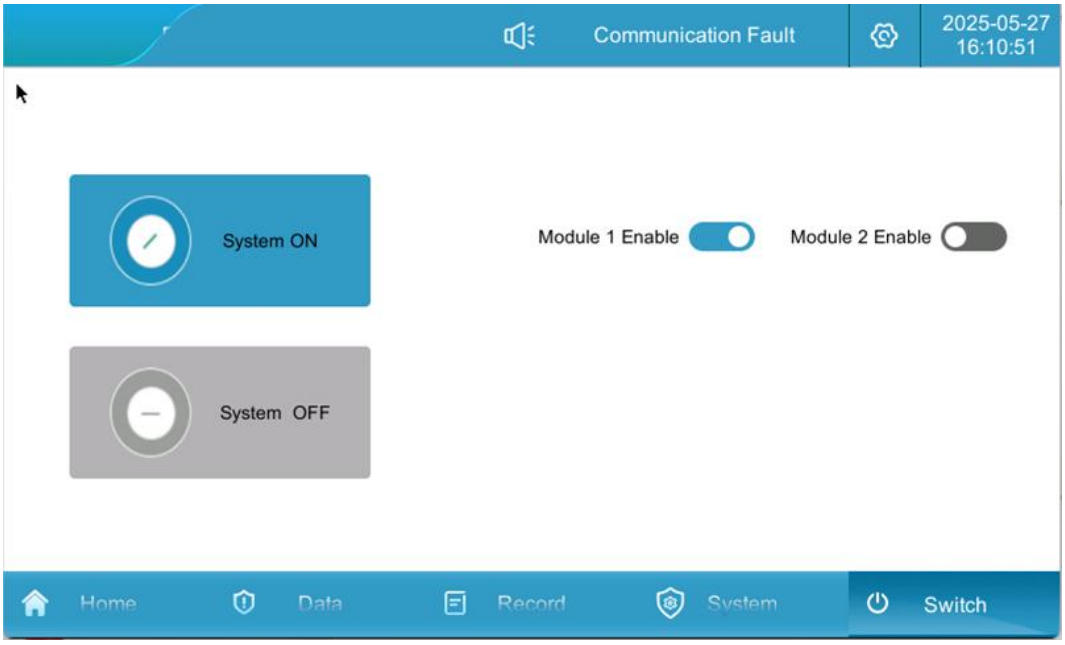


Figure 5-3 Switching Interface

6、Converter shutdown: When the converter is running, click on “System OFF”, as in Figure 5.3.

7、Interrupts all AC and DC switches, auxiliary power switches

5.3. Communication Settings

Note Communication setting refers to the communication protocol setting between LCD touch screen and EMS background.

1、Check that the backstage EMS communication line has been connected to the back terminal COM6_A, COM6_B of the touch panel or to the network port position.

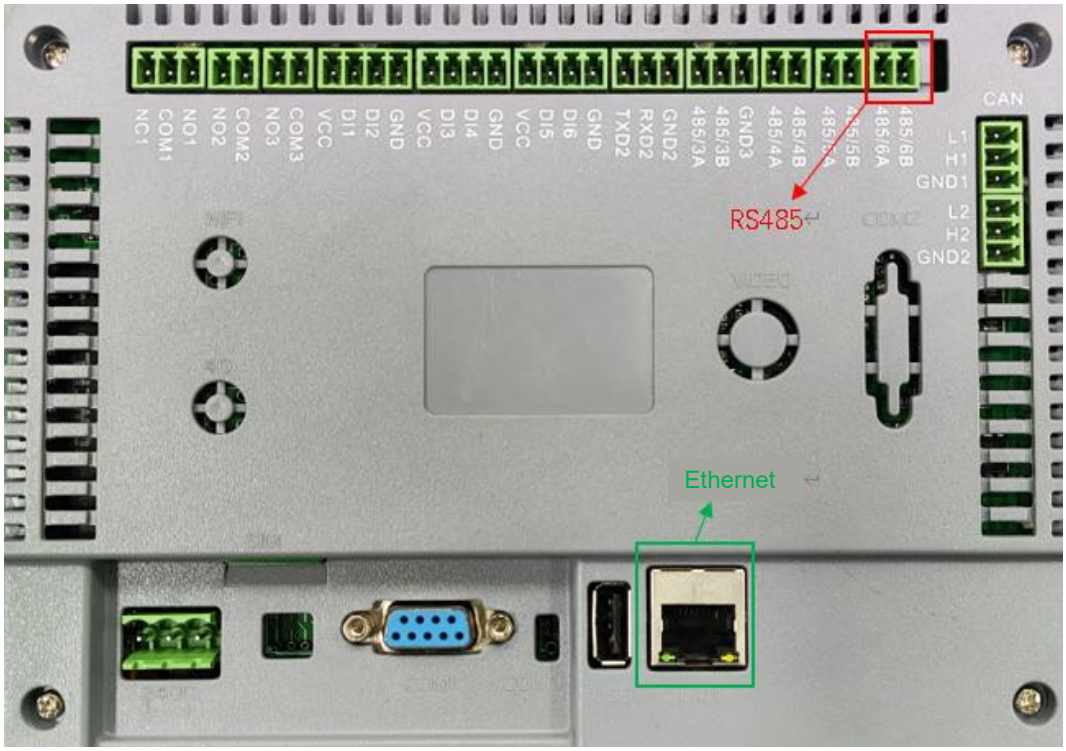


Figure 5-4 Communication wiring check

2、Click on "System" -> "Comm Set" on the LCD touch screen to enter the communication settings interface.

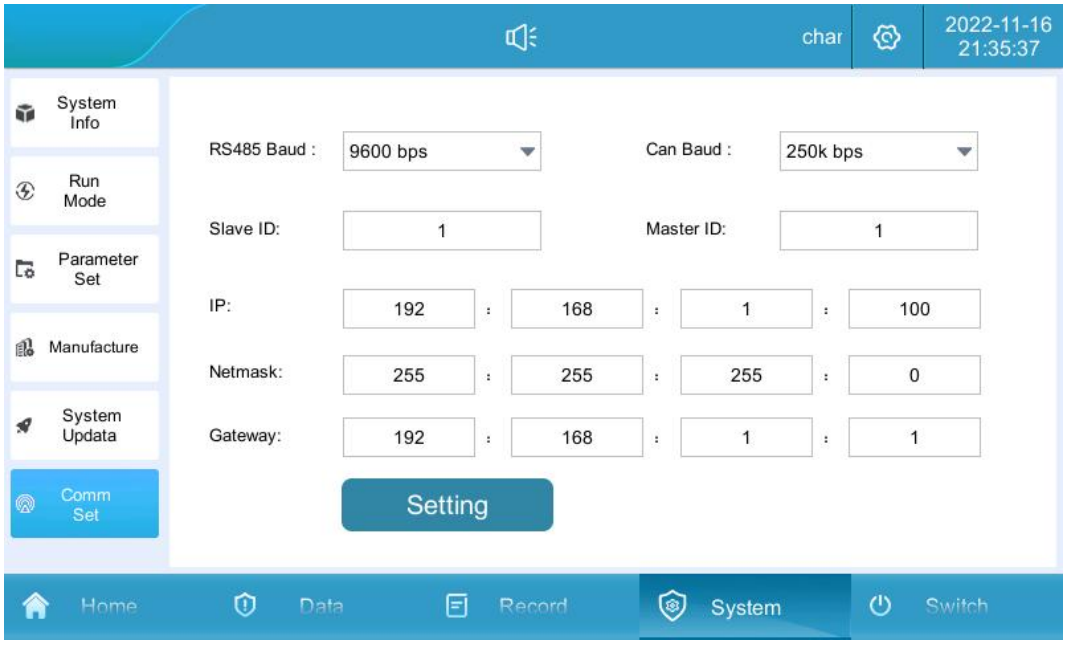


Figure 5-5 Communication Setting Screen

3、Background EMS communication setting 1: If RS485 communication is used, set the local address corresponding to the communication panel to 1, if more than one PV+ storage Hybrid Inverter is connected to the background from the address cannot be repeated.

4、Background EMS communication setting 2: If Ethernet communication is used, the local machine of the PV+ storage Hybrid Inverter is used as the server, the default address of the host is set to 192.168.1.100, and the corresponding local address of the communication panel is set to 1, and the server port is 502, if more than one PV+ storage Hybrid Inverter is accessed to the background IP address can not be duplicated, and the IP address is modified by clicking on the Setup button to configure the IP address.

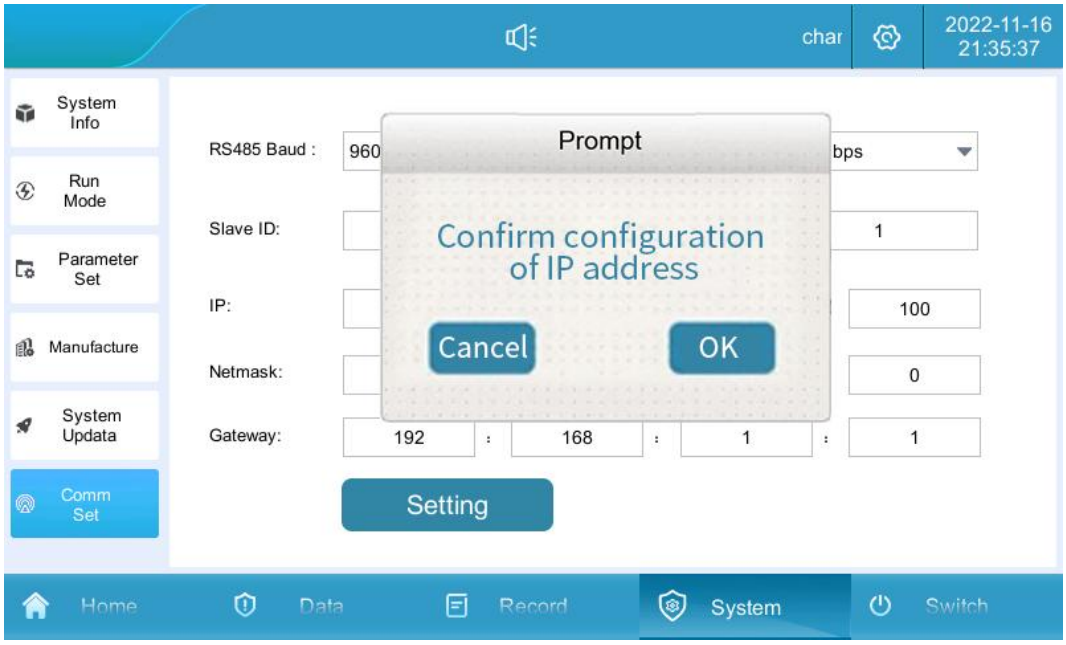


Figure 5-6 IP Address Configuration Screen

5.4. Operating Mode Settings

5.4.1. Introduction of Modes

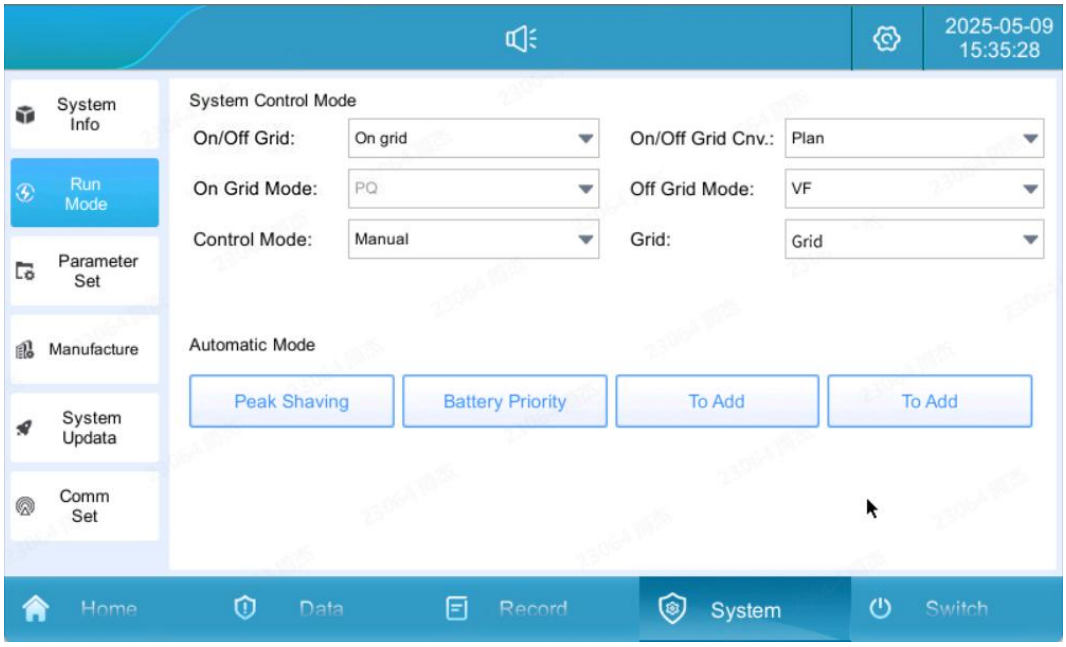
The operation modes of the energy storage system are categorized into: On Grid Manual Mode, On Grid Automatic Mode and Automatic Switching between On/Off Grid.

1、**On Grid Manual Mode:** The energy storage system operates in grid-connected mode, but system startup or shutdown must be manually operated by the user on the LCD touch screen. The charging and discharging active power, reactive power and power factor of the energy storage system can be set in the "Parameter Set".

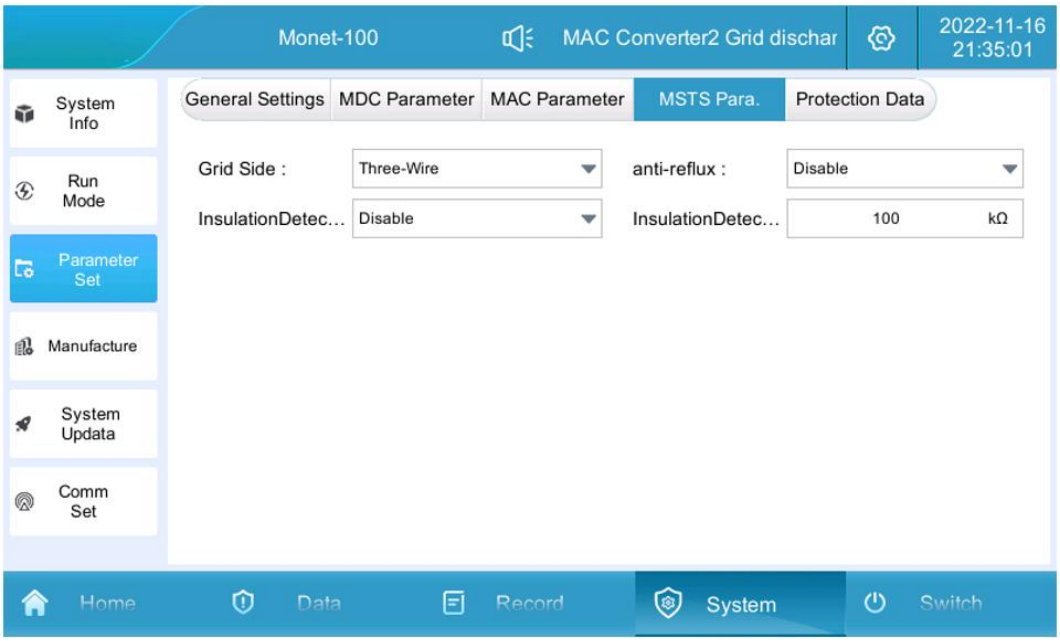
2、**On Grid Automatic Mode:** For peak shaving and valley filling application scenarios, the energy storage system automatically connects to the grid according to the pre-set time-sharing charging and discharging power.

3、**Automatic Switching between On/Off Grid:**When running in the On Grid state when the power grid suddenly cuts off, the energy storage converter automatically switches from On Grid to Off Grid mode operation, the system can output a stable 400V/50Hz three-phase AC voltage; when running in the Off Grid state when the power grid suddenly comes back to the grid, the energy storage converter automatically switches from Off Grid to On Grid Mode operation.

Explanation: a. Switching On/Off Grid can be set as planned or Non-plan trigger. Setting it as Non-plan trigger: when the grid power is cut off, the system automatically switches to Off Grid operation and outputs stable 400V/50Hz three-phase AC voltage; when the grid power comes back to the power supply, the system automatically switches to On Grid Mode operation. Setting as Plan trigger: running in On Grid Mode can be manually switched to Off Grid mode, set the On/Off Grid to "Off Grid", running in Off Grid mode can be manually switched to On Grid Mode (provided that grid exists), Set "On/Off Grid" to "On-grid". The setting interface is shown below:



b. In On Grid Mode, the anti-reverse current function can be set to disable or enable, set to enable: the power of the energy storage system will not be supplied back to the grid. Setting to disable: the power from the energy storage system can flow into the grid. In the system "System" -> "Parameter Set" -> "Advanced (Password 888888)" ->"MSTS Parameter "Setting interface of "anti-reflux" is shown as below:



5.4.2. Grid-connected manual mode

1、Click "System" -> "Run Mode" mode to enter Figure 5.6.

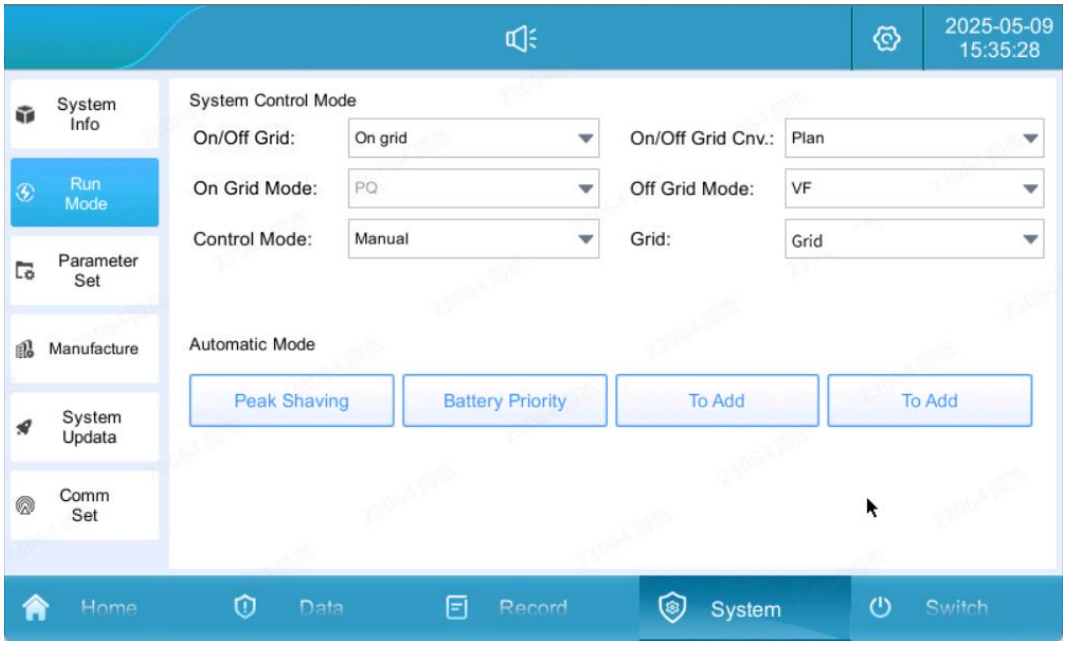


Figure 5-7 Grid-connected manual mode setting

2、Set the control mode to "Manual Mode", set the corresponding active power, power factor, reactive power size in the "Parameter Set" page, and the machine will run according to the set value (positive value for discharging, negative value for charging). The power setting interface is shown in Figure 5.7.

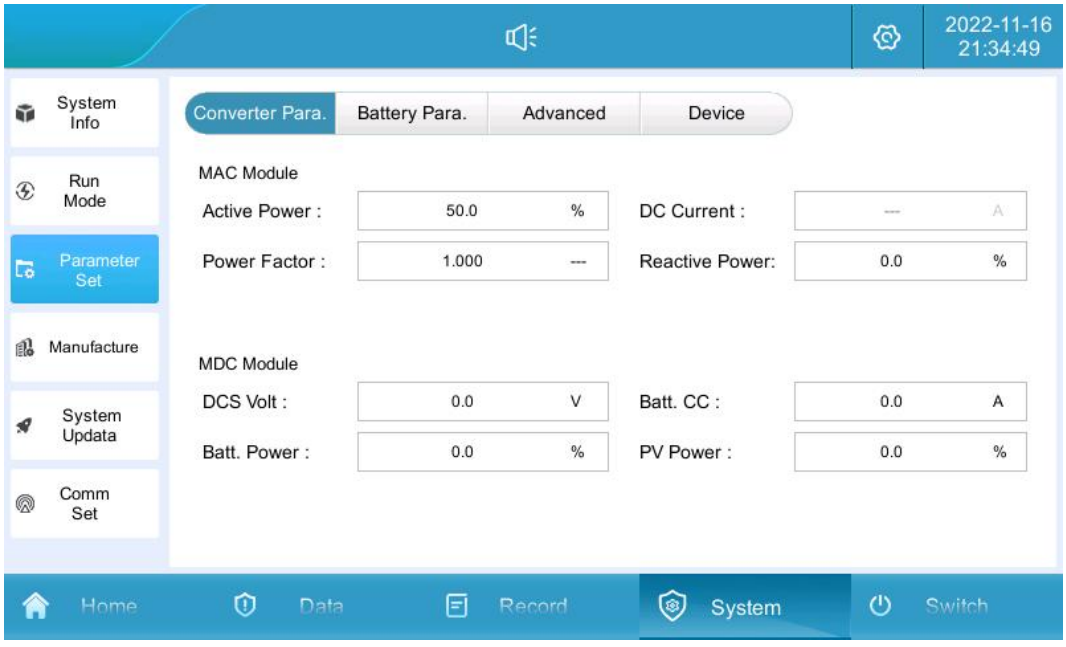


Figure 5-8 Power limit settings

5.4.3. Grid-connected automatic mode

Peak-shaving and valley-filling mode:

1、Click “System” -> “Run Mode”, and then click “Peak Shaving” button to enter the setting page.

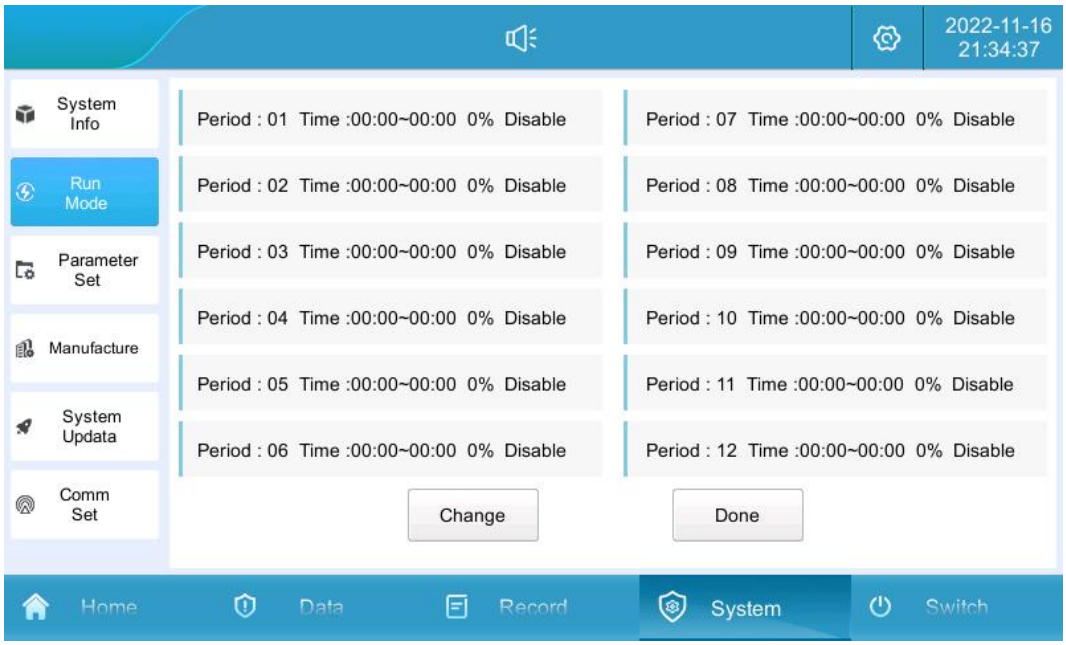


Figure 5-9 Peak Shaving Operation Setup Screen

2、Click “Change” to set the peak shaving and valley filling operation time and power: set the start and end time, charging and discharging power and whether to enable or not in time period 1; click the next entry to enter the time period 2 setting, save and exit after completing all the time period settings.

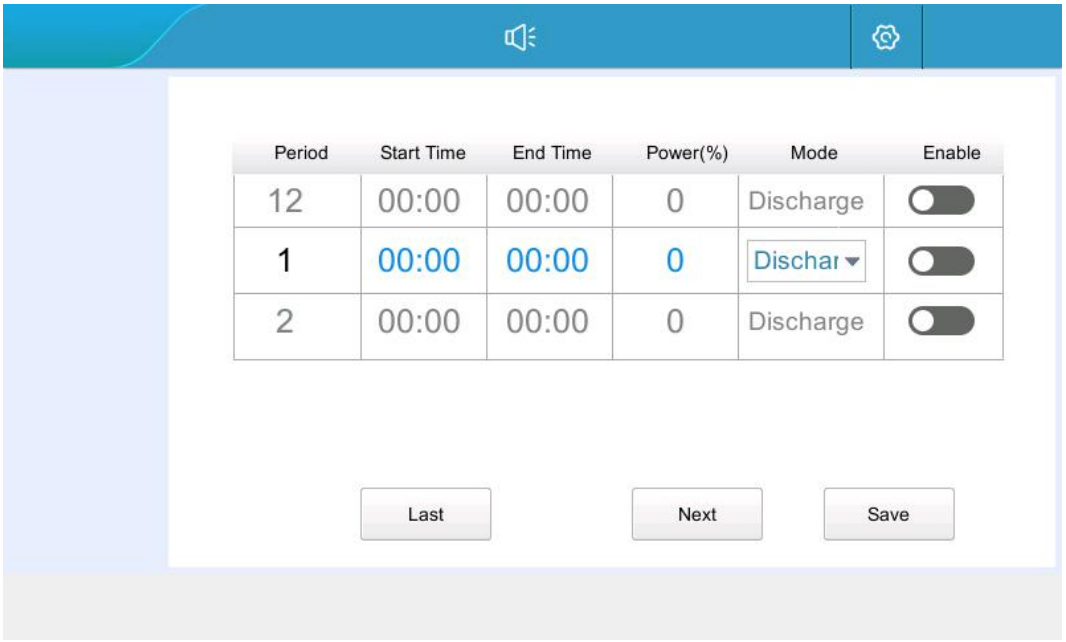


Figure 5-10 Charge and Discharge Time Setting Interface for Peak Shaving

3、Automatically jump to the following screen, click the Finish button.

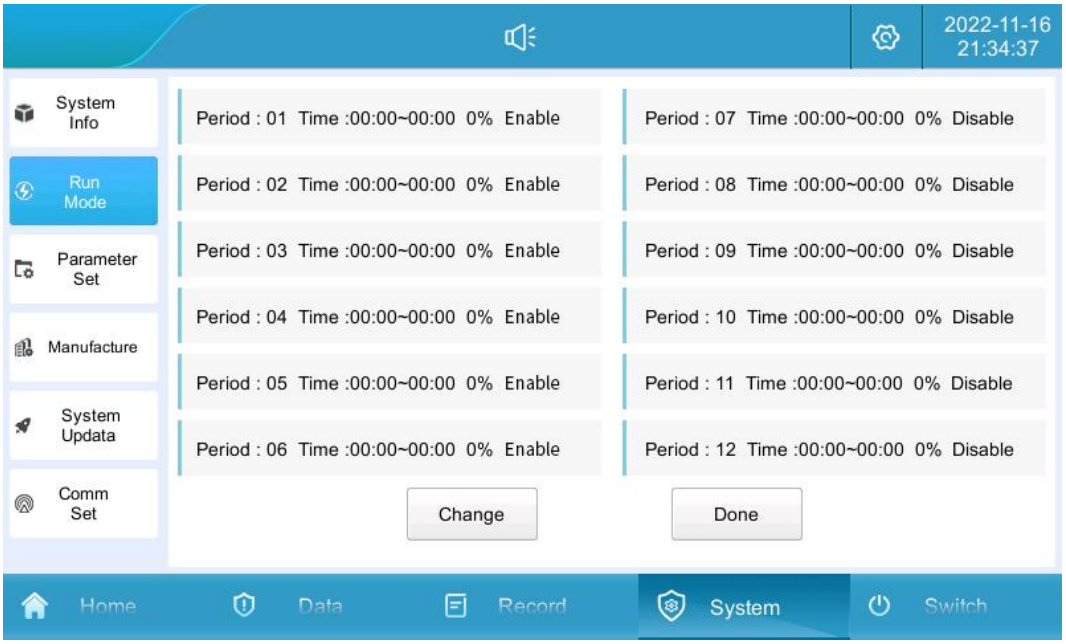


Figure 5-11 Charge and Discharge Time Setting Interface for Peak Shaving

4、 “Control mode” changed to ” Peak Shaving”.

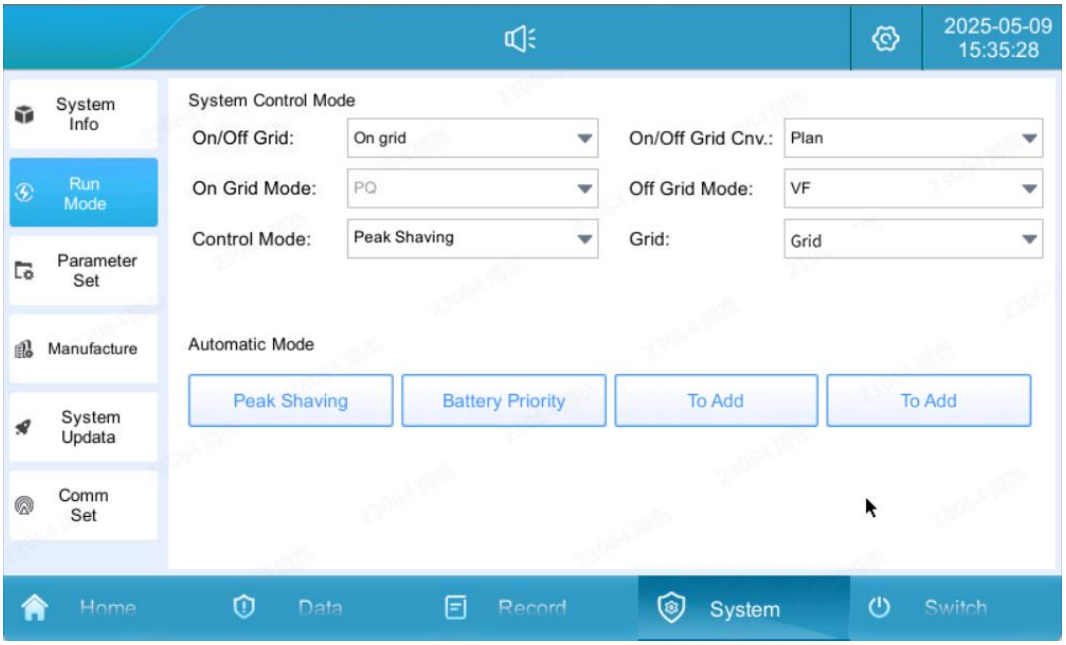


Figure 5-12 Peak Shaving control mode

5、This is the automatic mode: pause, click “Switch” >"System ON" to complete the local automatic control mode setting.

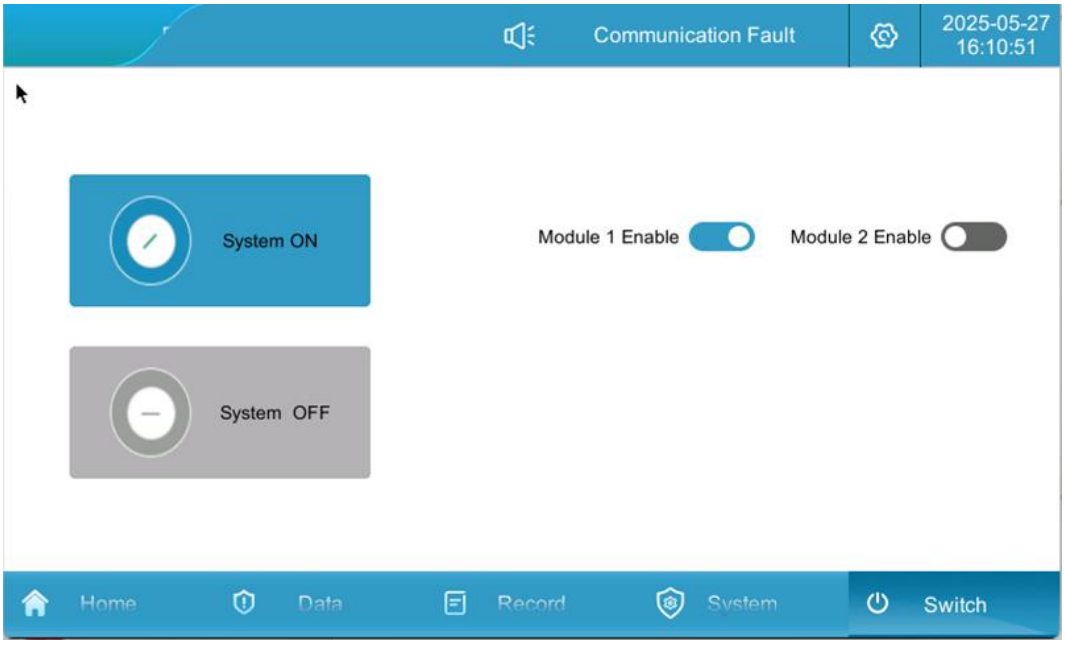


Figure 5-13 Automatic control operation mode on

5.4.4. Automatic Switching between On/Off Grid

When running in On Grid state when the power grid suddenly cuts off, the energy storage converter is automatically switched from On Grid to Off Grid mode, and the system can output a stable 400V/50Hz three-phase AC voltage; when running in Off Grid state when the power grid suddenly calls in, the energy storage converter is automatically switched from Off Grid to On Grid Mode. The specific settings are as follows:

1、**Manual Switching between On/Off Grid:** Click "System" -> "Run Mode" to enter the current page. Select "Plan Trigger" in "Switching On/Off Grid" and set it as "Plan Trigger": the operation in On Grid Mode can be switched to Off Grid mode manually, and set "Switching On/Off Grid" to "Off Grid". "Off Grid", running in Off Grid mode can be manually switched to On Grid Mode (provided that grid power exists), set 'On/Off Grid' to 'On Grid'.

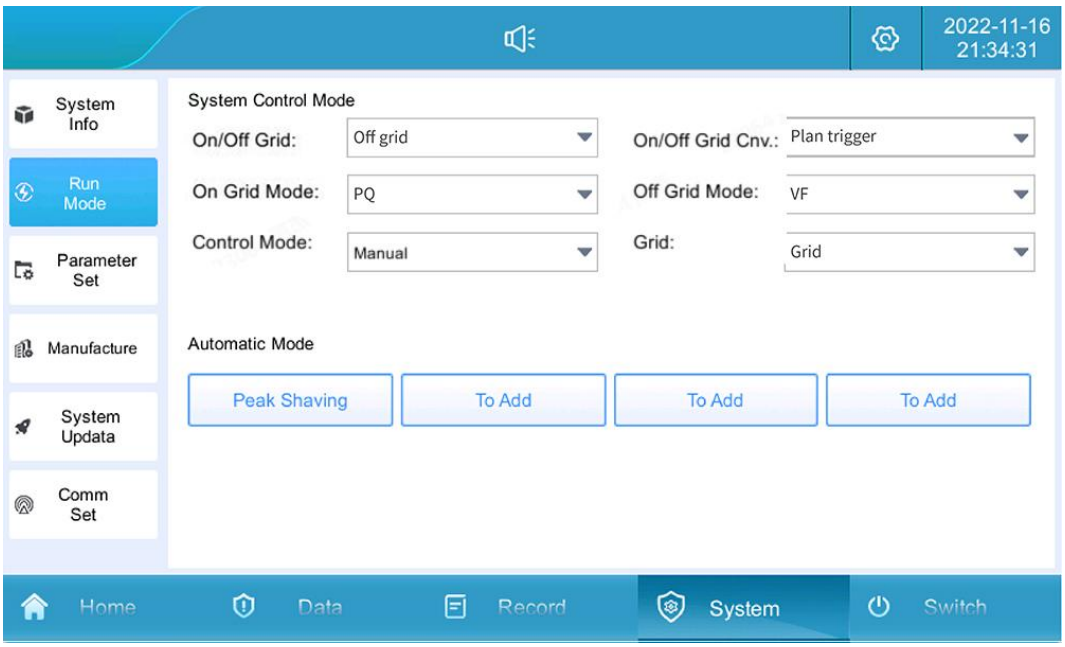


Figure 5-14 Manual switching mode

2、**Automatically cut Off Grid mode:** Click "System" -> "Run Mode" to enter the current page, and set "On/Off Grid Cnv." to "Non-plan Trigger", and set it to "Non-plan Trigger". set to 'Non-plan triggering': when the power grid suddenly cuts off under the On Grid state, the ESC automatically switches from the On Grid Mode to the Off Grid mode, and the system outputs a stable three-phase AC voltage of 400V/50Hz; when the

grid suddenly calls in the Off Grid mode, the ESC automatically switches from the Off Grid to the On Grid Mode.

3、**Manual cut Off Grid mode:** When running in the On Grid state, the power grid loses power, the PCS islanding protection stops, at this time, the utility switch is manually switched, and the energy storage system needs to be set to off-grid mode, click on the "System" -> "Run Mode" to enter the current page. Then select "On/Off Grid" in "On Grid" and "VF" in "Off Grid mode". (The settings related to grid connection will not take effect in off-grid mode)

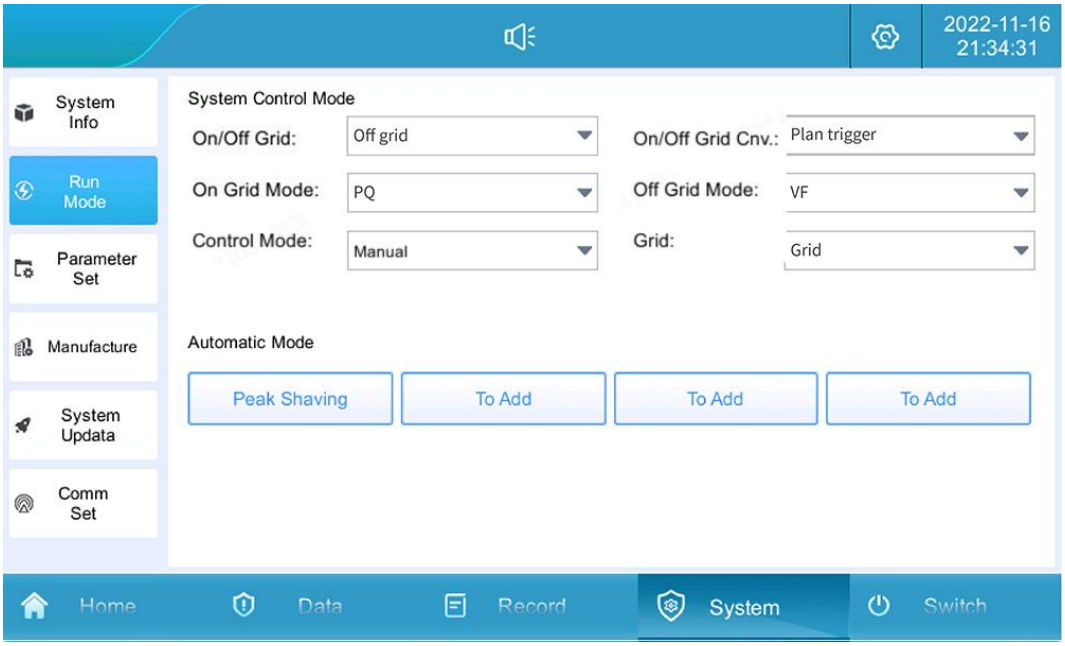


Figure 5-15 Off-grid mode Setting Interface

4、Enter the "Switch" page to "enable" the power modules as needed (all are recommended to be enabled), and finally, click "System ON" to confirm, then the converter will run off-grid and output a stable 400V/50Hz AC voltage.

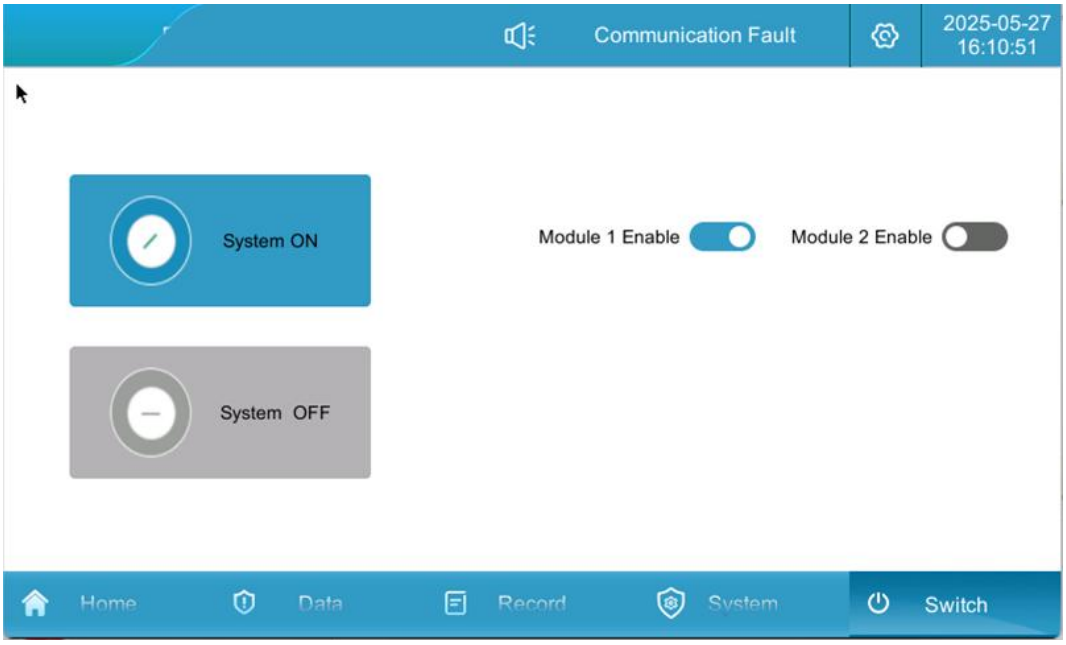


Figure 5-16 On interface

5.5. Data Viewing and Exporting

1、Click on "Record" -> "Data Report" to enter the current page.

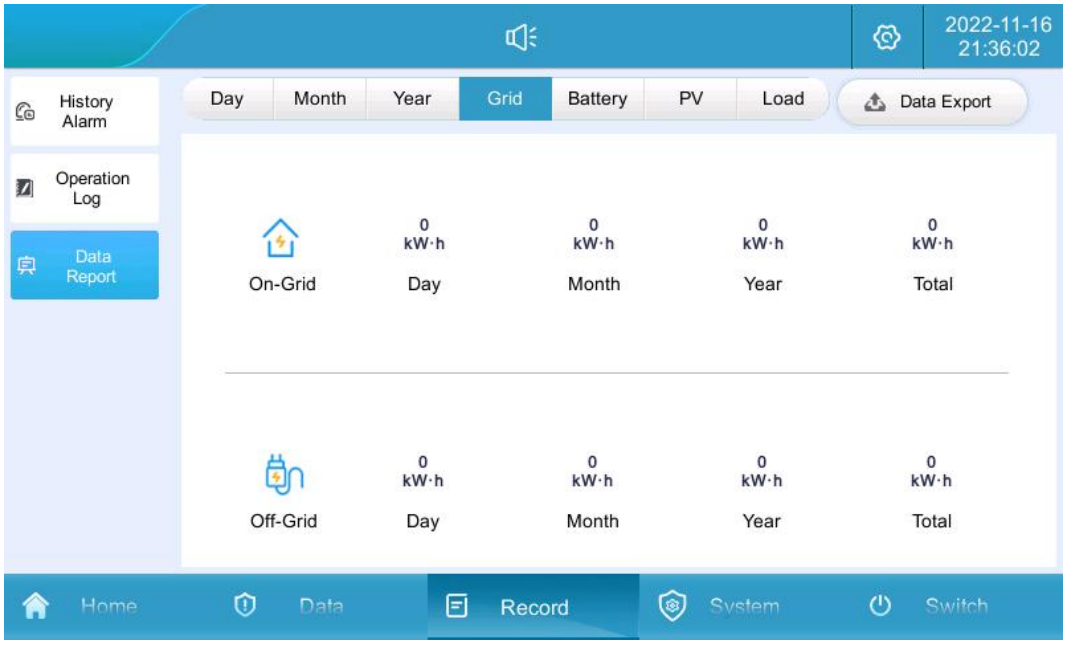


Figure 5-17 Data report screen

2、View the total amount of charge and discharge for the day, month, year, and overall.

3、Insert a USB flash drive, wait for the USB flash drive to connect, click on "Data Export", and wait for the export to complete.

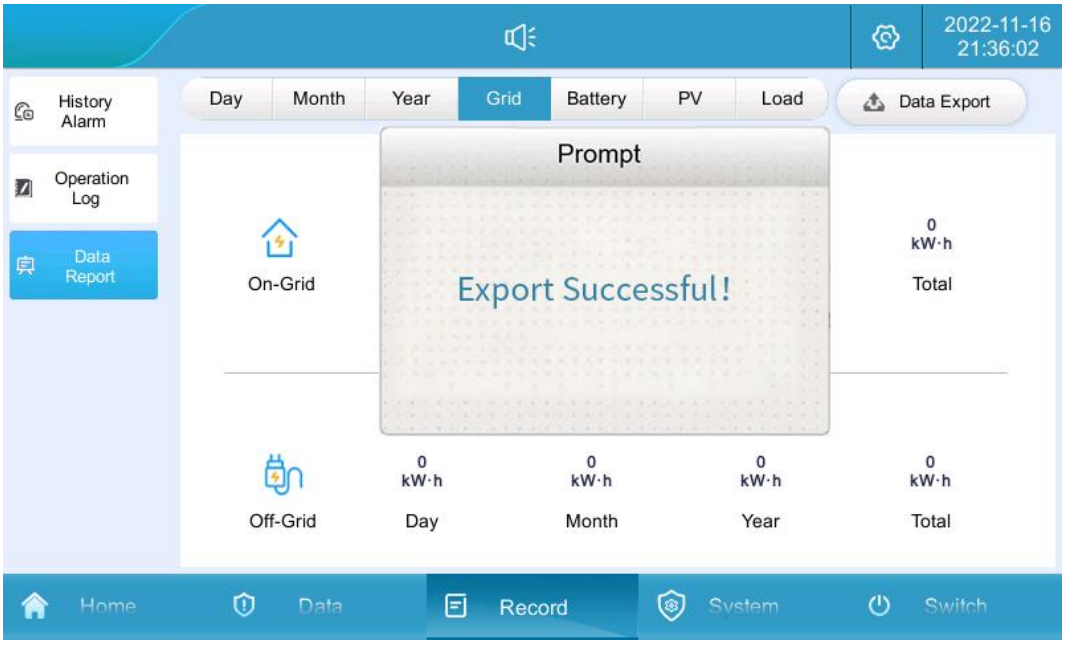


Figure 5-18 Data Export Interface

5.6. Software Upgrade

Software upgrades include the upgrading of three types of software: LCD touch screen software, power module DSP software, and power module ARM software. Before upgrading, turn off the system on the "Switch" page of the touch screen, meaning that the software must be upgraded while the system is not running.

1、First, prepare a USB flash drive and a computer. Create a new folder named "UPDATE" on the USB flash drive to store the burning files.

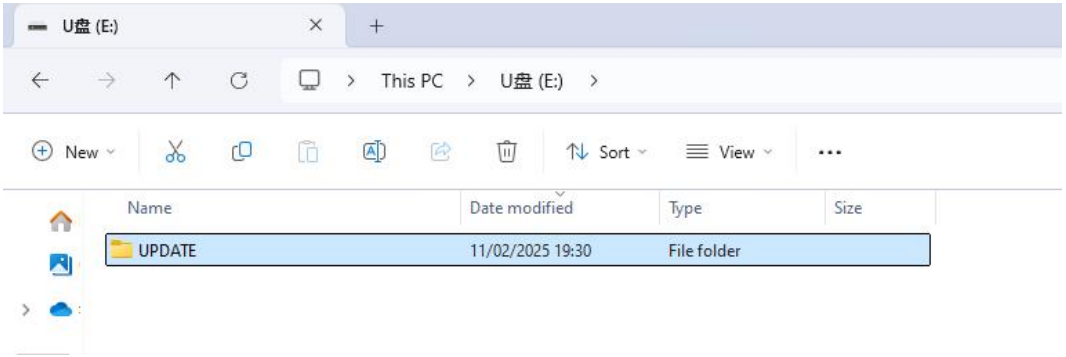


Figure 5-19 Creating an upgrade software folder

2、Copy the required DSP, LCD, and ARM firmware for system upgrading into the "UPDATE" folder.

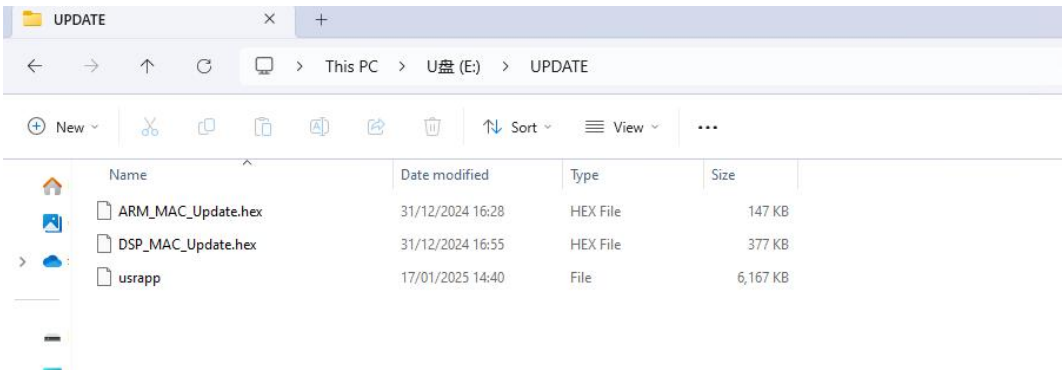


Figure 5-20 Storing the upgrade software

3、Click on "System" -> "System Updata", enter the password "888888" to access the upgrade page.

Figure 5-21 Upgrade Software Password Verification

4、Insert the USB flash drive into the back of the touch screen, and the interface will display that the USB flash drive is connected and the upgrade file is detected.

5、To upgrade the LCD touch screen software, click on "LCD Upgrade" and wait for approximately 15 seconds until a prompt appears indicating that the upgrade was successful.

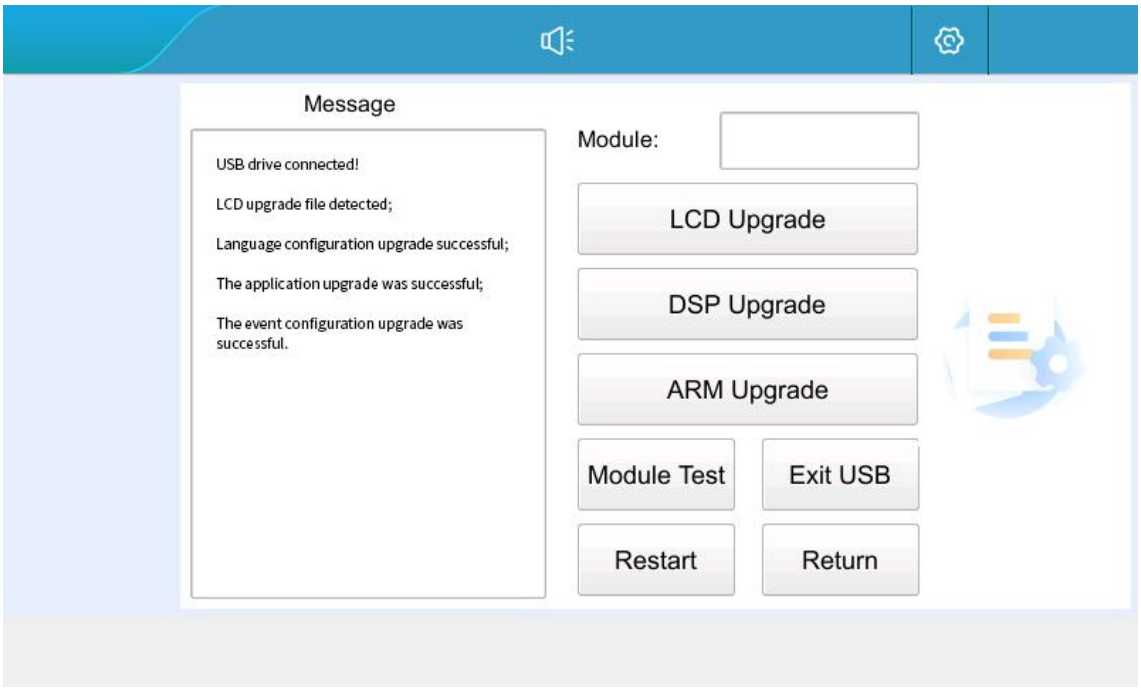


Figure 5-22 LCD Upgrade Software and Reboot Interface

6、After upgrading the LCD touch screen software, click on the "Restart" button to make the version refresh effective, as shown in Figure 5.24. Customers can choose to upgrade the DSP and ARM software after completing the upgrade of the LCD touch screen software, and then click on "Restart" when ready.

7、To upgrade the power module DSP/ARM, select the module to be upgraded in the module box on the "System Upgrade" interface (when there are multiple modules in the system, it is recommended to start with upgrading Module 1, then set and upgrade Module 2, and continue until all modules are upgraded).

8、Click on "DSP/ARM Upgrade" and wait for approximately 5 minutes until a prompt appears indicating that the upgrade was successful. The system upgrade is now complete.

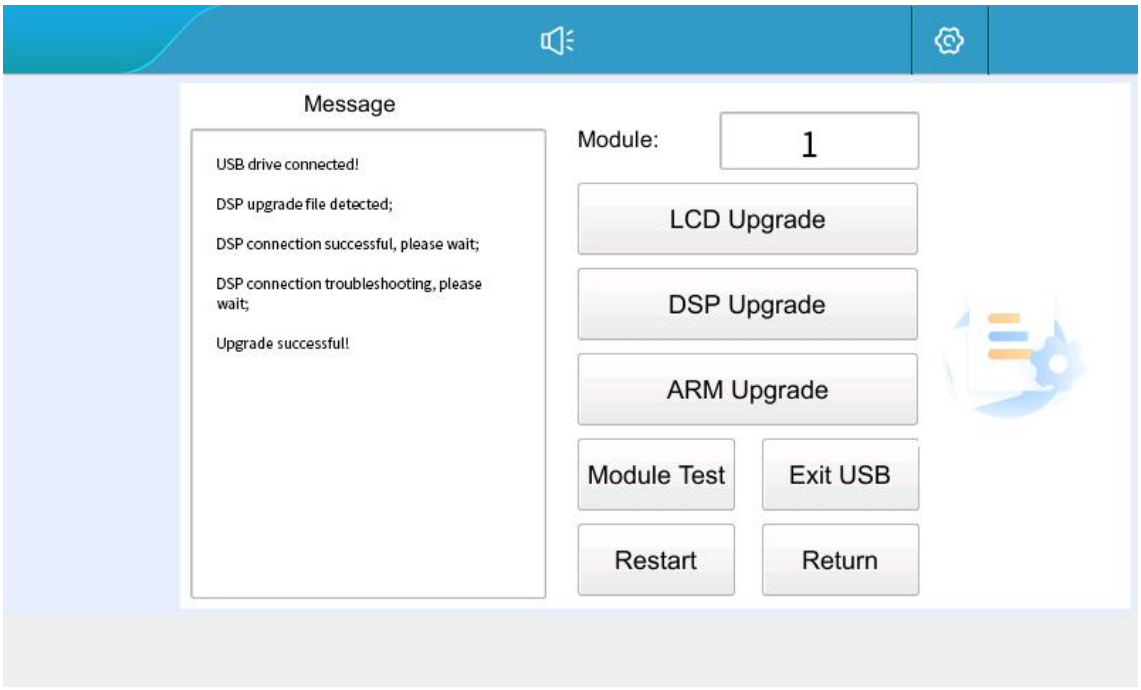


Figure 5-23 DSP/ARM Upgrade Interface

6. Warning and Maintenance

Warning levels are defined as follows:

- The equipment has failed, and the system has stopped operating (charging/discharging).
- Warning: The equipment's output power has decreased or some functions have failed due to external factors, but this does not affect the system's charging and discharging functions.

6.1. Handling of warnings

Table 6-1Fault Alarm Handling Methods

Warning/Failure	***Problem Cause***	***Handling***
Lightning Protector Alarms	*lightning arrester failure*	*1. Check whether the lightning arrester signal line connection is loose;* *2. Check whether the lightning protector indicator is discolored;* *3. Replace the AC lightning protector.*
Grid over-voltage/under-voltage Fault	*Abnormal voltage on the grid-connected side*	*Check whether the voltage at the grid side is abnormal*
Grid over-frequency/under-frequency Fault	*Abnormal frequency at grid side*	*Check whether the frequency at the grid side is abnormal*
Islanding protection Faults	*Abnormal voltage on the grid-connected side*	*Check whether the voltage at the grid side is abnormal*
High/Low Voltage Ride Through Alarms	*Abnormal voltage on the grid-connected side*	*Check whether the voltage at the grid side is abnormal*
Grid voltage unbalance Fault	*abnormal voltage on the grid side*	*Check whether the voltage at the grid side is abnormal*
Grid wrong phase Fault	*Phase sequence at grid side is connected wrongly*	*Exchange any two cables among the three lines of ABC*
Low DC voltage Alarm	*Insufficient voltage on DC side*	*1.Check if DC wiring is loose or abnormal;* *2. Check whether the battery is turned on.*
DC voltage reverse fault	*DC external wiring error*	*Adjust DC positive and negative cables*
DC Voltage High/Low Fault	*Battery voltage abnormal*	*Check the DC input voltage is abnormal*
Bus over-voltage Fault	*1.Load imbalance* *2.Software exception*	*1.Check whether the DC wiring is loose or abnormal* *2. Contact the manufacturer*
Half-voltage unbalance on bus Fault	*1.Load imbalance* *2.Software exception*	*1.Check whether the load is abnormal* *2. Contact the manufacturer*

Over Temperature Derating Alarm	*Internal temperature is too high*	*1.Check whether the air inlet and outlet of the electrical compartment are blocked* *2. Check whether the internal fan is working properly* *3.Contact the manufacturer*
Transformer high temperature Fault	*Failure Transformer heat dissipation abnormality*	*1. Check whether the ambient fan is operating normally;* *2. Check whether the temperature switch wiring is loose;* *3. Check whether the air inlet and outlet of the electrical warehouse are blocked.*
Power tube over temperature Fault	*Internal temperature is too high*	*1.Check whether the air inlet and outlet of the electrical compartment are blocked* *2. Check whether the internal fan is working properly* *3.Contact the manufacturer*
Balance bridge over temperature Fault	*Internal temperature is too high*	*1.Check whether the air inlet and outlet of the electrical compartment are blocked* *2. Check whether the internal fan is working properly* *3.Contact the manufacturer*
DC over-current Fault	*DC current overrun*	*1. Check for short circuits or broken wiring on the DC side;* *2. Replace the storage converter module or contact the manufacturer.*
Balanced bridge over-current Fault	*Internal current overrun*	*1. Check whether the inlet and outlet of the electrical compartment are blocked;* *2. Check whether the internal fan operates normally;* *3. Contact the manufacturer.*
Output overload/over-current Fault	*AC side power/current overrun*	*1.Check whether the grid voltage is normal* *2.Check whether there is a short circuit or line damage on the DC side* *3.Check whether the off-grid load exceeds the limit* *4.Replace the PV+ storage Hybrid Inverter module or contact the manufacturer*
Wave-by-wave current limiting Fault	*AC side current overrun* *DC side voltage oscillation*	*1.Check whether the grid voltage is normal;* *2. Check whether the off-grid load is overrun;* *3. Check whether DC side voltage is normal;* *4. Replace the PV+ storage Hybrid Inverter module or contact the manufacturer.*
Communication interruption Fault	*Communication interruption*	*1. Check whether the communication network cable between the modules is loose and abnormal;*

		2. Check whether the communication network cable of the local controller is loose and abnormal.
Parallel/Synchronization Fault	*Parallel/synchronization signal interruption*	*1.Check whether the parallel cable is loose or abnormal* *2. Check whether the parallel setting is abnormal* *3.Hardware circuit damage*
Relay open/short circuit Fault	*1.Internal relay is abnormal* *2.Software exception*	*1.Replace the PV+ storage Hybrid Inverter module* *2.Contact the manufacturer to replace the internal parts*
Pre-charge Fault	*Internal soft start circuit abnormal*	*1.Replace the PV+ storage Hybrid Inverter module* *2. Contact manufacturer to replace internal board*
Battery Type Configuration Error	*External DC wiring error*	*Check whether the corresponding PV, battery or DC source is connected to the correct DC switch*
Fan 1/2/3 Alarm	*Internal fan abnormality*	*1.Replace the PV+ storage Hybrid Inverter module* *2.Contact the manufacturer to replace the internal fan*
Leakage current Fault	*1.Excessive leakage current* *2.Software exception*	*1.Check whether the leakage current Hall is loose or abnormal* *2.Check whether the ground wire is disconnected*
Abnormal insulation impedance Fault	*1.Low insulation to ground* *2.Software exception*	*1.Check whether the AC and DC cables are damaged or short-circuited to the ground* *2.Check whether the battery line is damaged or short-circuited to the ground*
Loss of module Alarm	*Module-to-screen communication is interrupted*	*Check whether the communication network cable between modules is loose and abnormal*

Warning

The above alarms and faults are comm on alarms or faults. If any faults other than those listed in Table 6.1 occur, please contact the manufacturer directly.

6.2. Routine Maintenance

Due to the influence of ambient temperature, humidity, dust, vibration, and aging of internal components of the inverter, the system may encounter some potential issues during operation.

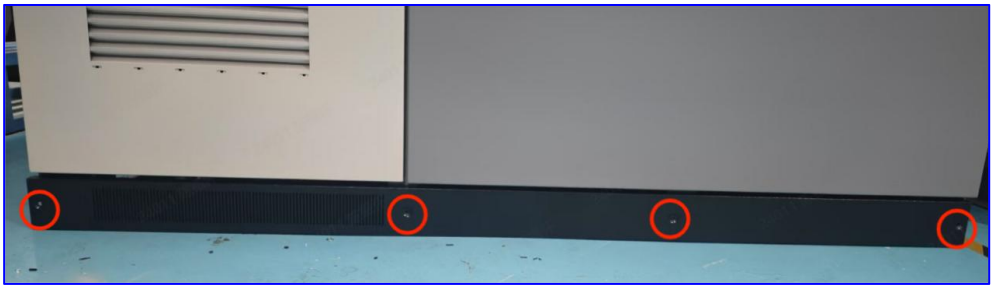
To ensure the long-term and stable operation of the energy storage system, it is necessary to arrange maintenance personnel to conduct regular inspections according to Table 6.2, and promptly discover and address any issues. Systems installed in areas with severe dust and sand, high salt fog, or heavy industrial parks are recommended to be maintained once every quarter, while energy storage systems in areas with good climatic conditions are recommended to be maintained once every six months.

Table 6-2Routine maintenance tasks

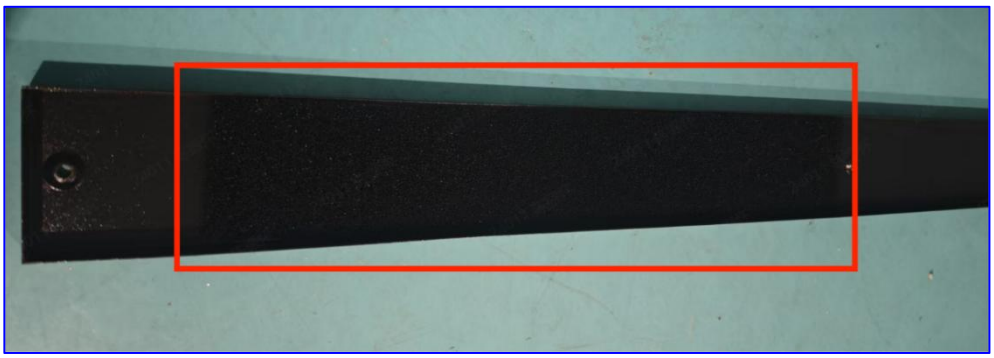
Maintenance objects	***Movements***	***Reference standard***
cabinet	• *Check the appearance of the whole machine* • *Checking the vents* • *Check door lock condition*	• *No obvious coating peeling, scratches or rusting* • *No obvious signs of water leakage* • *No accumulation of dust in vents* • *No damage to door locks*
PV+ storage Hybrid Inverter	• *Check for noise and vibration* • *Check front panel vents* • *Check the rear copper contact surface*	• *The front panel fan rotates normally, without stuttering or rattling* • *The surface of the front panel vent is clean and not blocked.* • *No corrosion and discoloration of copper rows and contact surfaces, and no accumulation of dust.*
Electricity	• *Check the lightning protector* • *Check cable copper contact surface*	• *Lightning protector is normal* • *No loose screws and sockets connecting wires.* • *No corrosion and discoloration of copper rows and contact surfaces, no dust accumulation*

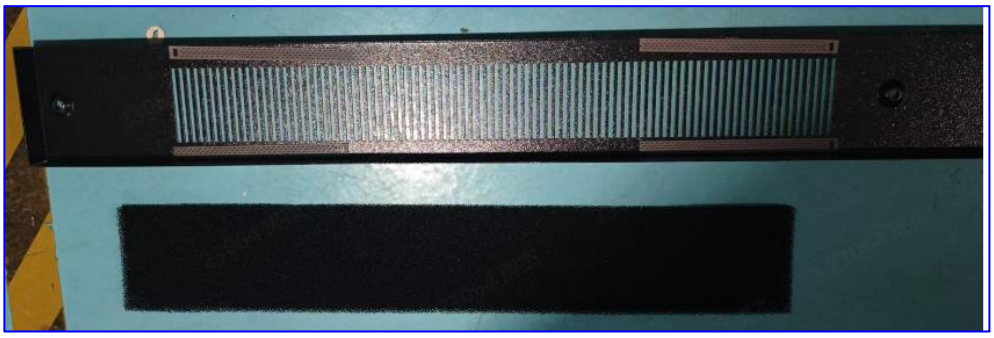
6.2.1. Transformer compartment dust removal maintenance (if applicable)

1. Shut down the system and disconnect the power supply.
2. Remove the surrounding panels.



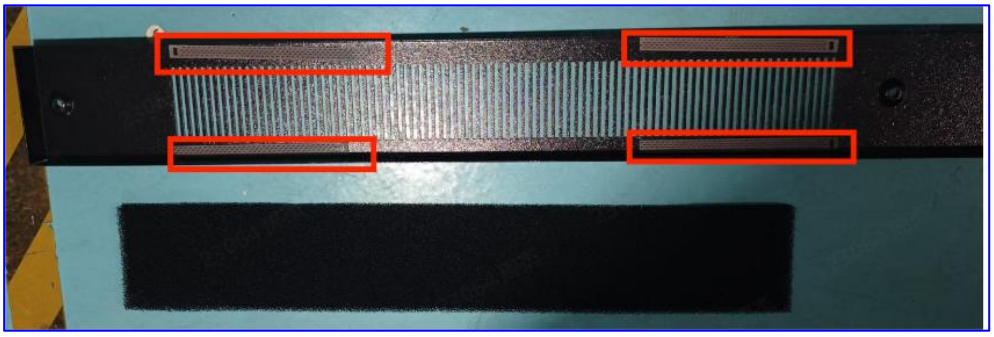
3. Remove the dust filter and clean it.



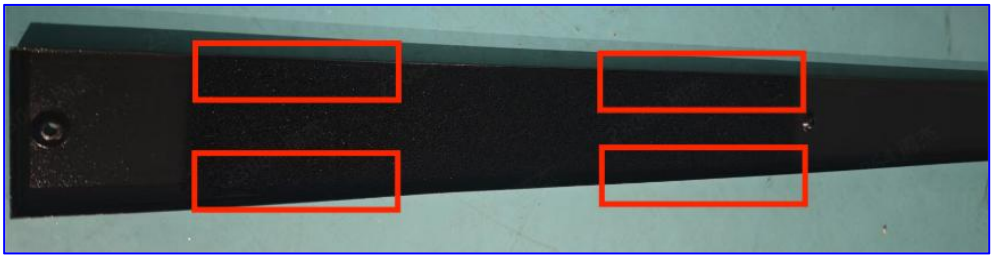


4. Remove the dust filter and clean it.

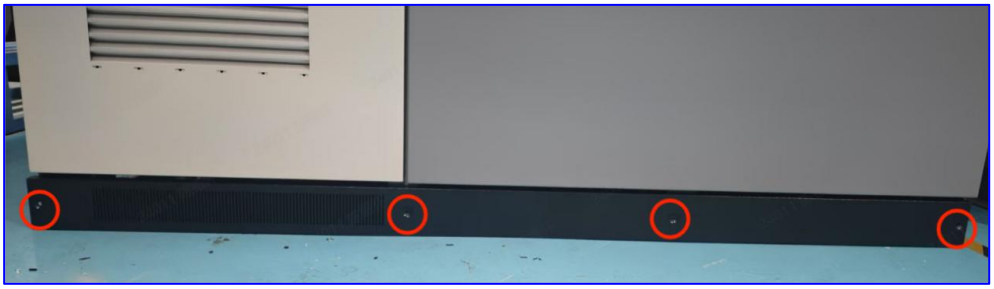
①The dust-proof cotton is secured by barbs as shown in the figure below.



②Press the location shown in the figure below to secure the dust-proof cotton.

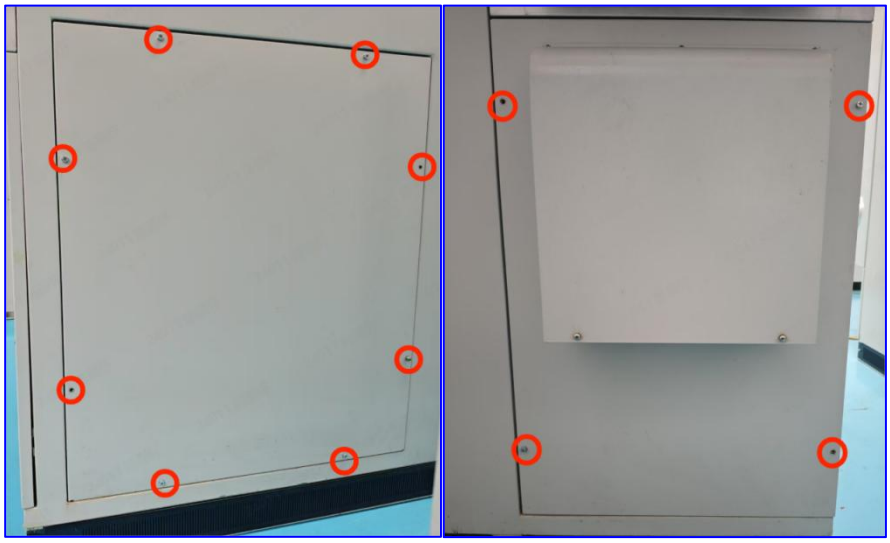


③Install the enclosure;



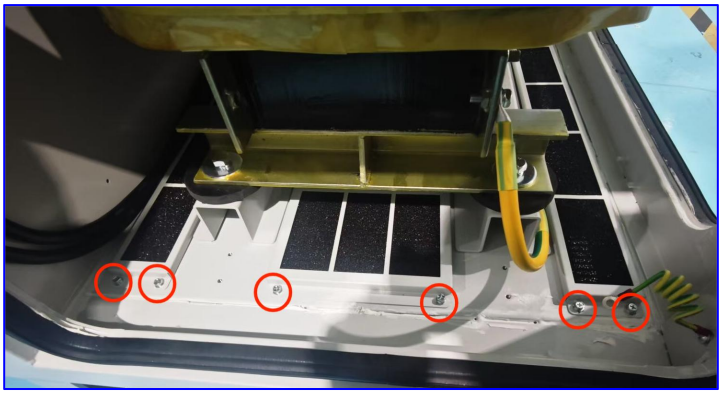
5. Side panel dust-proof cotton treated in sequence.

6. Remove the rear cover plate and side cover plates of the transformer compartment (take care to ensure the ground wire connection remains intact during removal).

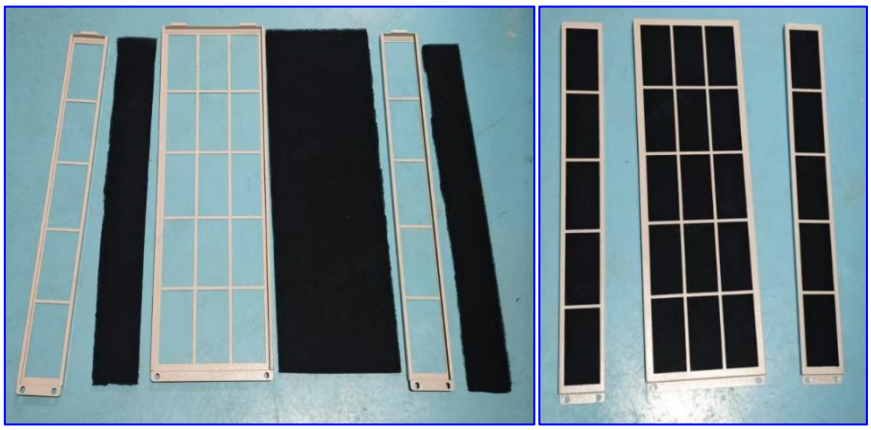


7. Clean the dust-proof cotton at the bottom.

①Remove the screws as shown in the figure.



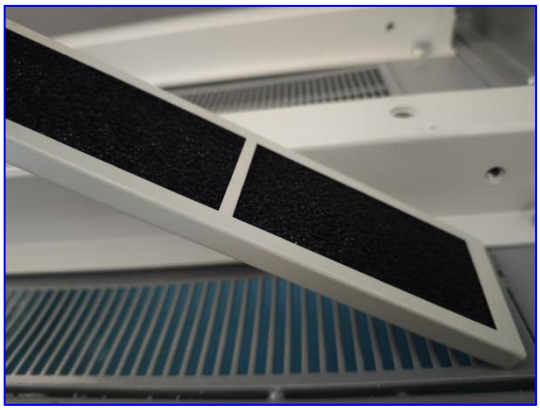
②Pull out the dust-proof cotton, remove it from the fixed frame, and clean it.



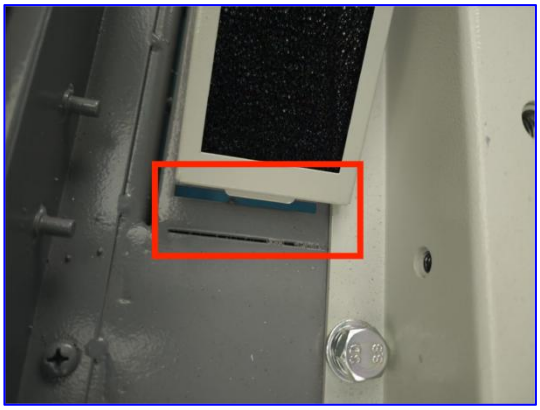
8. Cleaning the dust filter: Rinse with clean water, then dry thoroughly to ensure no water stains remain.

9. Installing the dust filter.

①Lift one end of the dust cover slightly.



②Insert this end into the base plate.



③Lay the dust-proof cotton flat, then proceed with the remaining dust-proof cotton in the same manner. Once installed, tighten the screws.

10. The rest of the dust in the warehouse can be cleaned with a vacuum cleaner.

6.3. Warranty Service

6.3.1. Warranty Period

Under the condition of correct product usage, the warranty period shall be subject to the commercial contract.

6.3.2. Warranty Scope

During the warranty period, if any fault occurs due to the product's inherent quality issues, Our company will provide free maintenance or product replacement to the customer. Customers should reserve a reasonable response time for our company's maintenance, and the replaced product will be disposed of by our company. Customers are required to present relevant proof of product purchase and ensure that the product trademark is clearly visible. Otherwise, our company reserves the right to refuse warranty coverage.

6.3.3. Disclaimer

Our company is not obligated to provide warranty coverage in the following situations, but we can still offer paid maintenance services:

- The warranty period has expired.

- Relevant proof of product purchase cannot be provided.
- Damages caused during transportation, loading, or unloading.
- Damages caused by incorrect installation, modification, or dismantling by unauthorized personnel.
- Damages caused by operation under abnormal usage conditions or environments.
- Malfunction or damage to the machine caused by the use of non-Company parts or software.
- Faults caused by irresistible factors such as fire, earthquake, flood, etc.