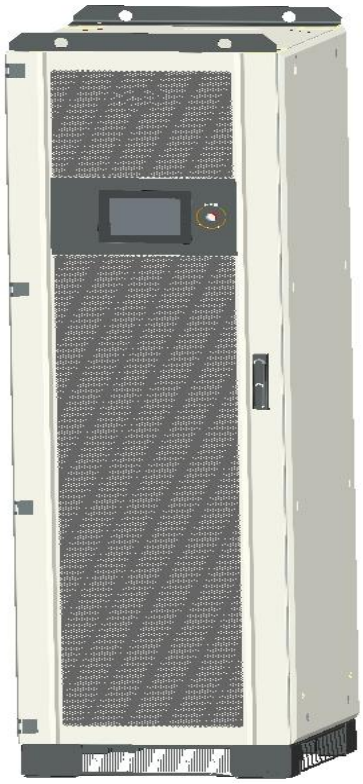
User Manual

MPS Series Inverter



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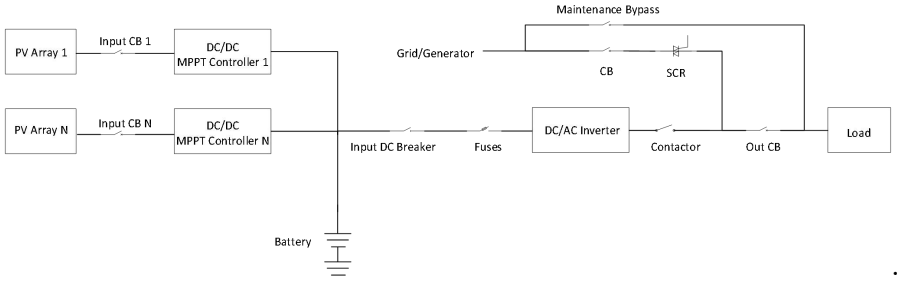


1 About This Manual

1.1Preface

Dear Customer:

Thank you for using the MPS Series Inverter. We sincerely hope that our product can meet your needs. We also invite you to put forward more valuable suggestions on the product performance and function.

1.2Applicable products

This manual is applicable to the product types as follows:

Type	AC Rated Power	PV Rated Power	Max AC Power
MPS0030	30KVA	30/60Kwp	33KVA
MPS0050	50KVA	60/120Kwp	55KVA
MPS0100	100KVA	120/180/240Kwp	110KVA
MPS0150	150KVA	120/180/240Kwp	165KVA

※Unless specified otherwise, any "inverter" and "energy storage inverter" mentioned in this manual refers to this series of products.

1.3 Content abstract

- For users, the manual details the product information, installation instructions, operation, maintenance and troubleshooting. Before installing and debugging or running any equipment, the user must read and understand all the instructions contained in this manual and be familiar with the relevant safety symbols.
- Readers need to have a certain degree of electrical theory, electrical wiring and professional mechanical knowledge. Before installing this product, please read this manual carefully and ensure that the relevant personnel can easily access and use it.

1.4 Symbols

In order to ensure the safety of the user's personal and property when using the product, and to better use the product, the manual provides relevant information and highlights it with appropriate symbols.

The following list of symbolic hints may be used in this manual, please read them carefully.

DANGER

"Danger" indicates that there is a high potential hazard which, if not avoided, will result in death or serious injury.

WARNING

"Warning" indicates that there is a moderate potential hazard which, if not avoided, may result in death or serious injury.

CAUTION

"Caution" indicates that there is a low potential hazard which, if not avoided, may result in moderate or minor injury.

NOTE

"Note" indicates that there is a potential risk which, if not avoided, may result in abnormal operation of the equipment or property damage.

"Instruction" is the additional information in the manual to emphasize or supplement the content. It may also provide tips or tricks for optimized use of the product, which can help you solve one problem or save your time.

Please pay attention to the warning labels on the product, which include:

Label	Meaning
	This label indicates there is high voltage within the product, and touch may cause an electric shock.
	This symbol indicates that the temperature here is higher than the acceptable range of the human body, and do not contact in order to avoid personal injury.
	This symbol indicates here is the protective grounding (PE) terminal, and solid grounding is needed to ensure operators' safety.

2 Safety Instructions

2.1 Personnel Requirements

- Only professional electricians or qualified personnel can operate the product.
- Operators should be fully familiar with the structure and working principle of the whole energy storage system.
- Operators should be fully familiar with this manual "MPS Series Energy Storage Inverter User Manual"
- Operators should be fully familiar with the relevant standards in the country/area where the project is located.

- It is strictly forbidden to maintain or overhaul the equipment when it is live!
- At least two persons must be ensured to be present during maintenance or overhaul of the equipment. The equipment has been disconnected safely and waited for 15 minutes until the inverter discharge is completed before the maintenance or maintenance operation can be carried out.

2.2 Safety Warning Operation

When installing, routine maintenance and overhaul of energy storage inverter, it is necessary to avoid incorrect operation or accidents when personnel are close to each other. Please observe the following:

- In order to prevent mis-closing of the switch, a clear mark should be set up at the front and rear switches of the energy storage inverter.
- Set up warning signs or safety cordons near the operation area.
- After the completion of maintenance or overhaul, be sure to pull out the key of the cabinet door and keep it stored safely.

2.3 Device Identification Protection

- The warning signs on the device and cabinet of the energy storage inverter contain important information for safe operation of the energy storage inverter. Removal or damage is strictly prohibited!
- A nameplate is installed inside the front door of the energy storage inverter. The nameplate contains important parameter information related to the product. Removal or damage is strictly prohibited!

- Make sure the device logo is clear and readable at all times.
- Once the device logo is damaged or blurred, it must be replaced immediately.

2.4 Electricity Safety Matters

2.4.1 Electrical safety

DANGER

There is a lethal high voltage inside the product!!

- Do not touch terminals or conductors connected to power network circuits.
- Attention should be paid to all instructions or safety instructions for connection to the power grid and to the warning signs on the products.
- Observe the safety precautions listed in this manual and other relevant documents of the equipment.

DANGER

Damaged equipment or system failure may cause electric shock or fire!!

- Preliminary visual inspection before operation to check whether the equipment is damaged or there are other dangers.
- Check the safety of other external equipment or circuit connections.
- Confirm that the equipment is in a safe state before it can be operated.

2.4.2 Electrostatic Protection

CAUTION

Electrostatic sensors on PCB or elsewhere can be damaged by improper operation or contact of operators.

- Operators are advised to avoid unnecessary circuit board contact.
- Operators should abide by the electrostatic protection rules, such as wearing anti-static hand rings.

2.4.3 Notes for Energy Storage Batteries

DANGER

- There is a fatal high voltage between the positive and negative electrodes of the energy storage battery pack connected with the energy storage inverter.
- When maintaining the equipment, ensure that the connection between the energy storage inverter and the energy storage battery pack is completely disconnected.

2.5 Environmental Space Requirements

2.5.1 Escape Channel Requirements

In order to ensure that staff members can evacuate the scene promptly in case of accidents, please observe the following items:

- Do not place flammable and explosive materials around the inverter.
- It is strictly forbidden to pile up debris in the escape route or occupy the escape route in any form.

2.5.2 Moisture Protection

Do not use the inverter in excess of the specified humid environments listed!

CAUTION

Damage to the energy storage inverter is very likely in humid environment!!

In order to ensure the normal use of various functions of energy storage inverter, please observe the following items:

- Do not open the cabinet door when the air humidity is over 90%.
- Avoid opening the cabinet door in rainy or wet weather to maintain or repair the energy storage inverter.

2.6 On-line test specification

2.6.1 On-line Test

There is a high voltage in the equipment. Accidental contact may lead to fatal shock hazard.

Therefore, in live measurement, it should:

- Ensure adequate levels of protection (such as wearing insulating gloves, insulating shoes, etc.).
- At least two persons must be ensured to be on site to ensure personal safety.

2.6.2 Use of Measuring Equipment

In order to ensure that the electrical parameters meet the requirements, it is necessary to use relevant electrical measuring equipment when conducting electrical connection and trial operation of energy storage inverter.

- Selection of measuring range, usable conditions and other high-quality measuring equipment that meet the requirements of the site.
- Ensure that the connection and use of measuring equipment are correct and standardized so as to avoid the danger of arcing.

2.7 Touch Screen Parameter Setting

The parameters of touch screen are closely related to the operation of energy storage inverter. These parameters can only be modified after reliable analysis and evaluation of the operation status of the system and energy storage inverter.

- Using inappropriate parameter settings may affect the normal function and capabilities of energy the storage inverter.
- Only authorized professionals can set the parameters of energy storage inverters.

2.8 Maintenance Or Overhaul Specifications

The following points should be noted when performing maintenance or maintenance operations on equipment:

- Securely mark and ensure that the energy storage inverter will not be accidentally re-energized.
- Use a multimeter to ensure that the internal discharge of the energy storage inverter is completed.
- Ensure that the equipment is well grounded.
- Any live parts must be covered with insulating materials.
- After the energy storage inverter is switched off and the AC/DC power supply is disconnected, the front door can be opened after at least 15 minutes to maintain or repair the energy storage inverter.
- During the whole process of maintenance and overhaul, it is necessary to ensure adequate escape route or space.

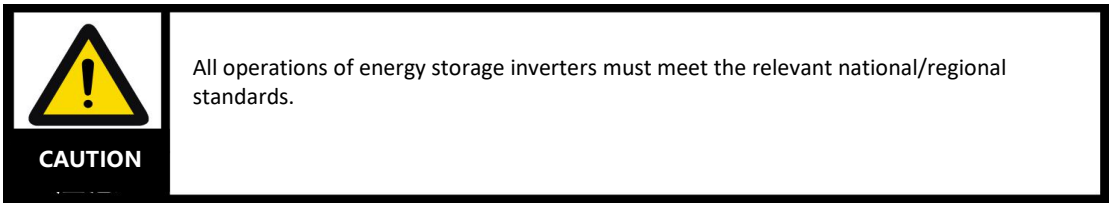
2.9 Product Scrapping

- When the energy storage inverter needs to be discarded, it can not be treated as conventional waste, we will accept this product as per W and there may be a handling fee.
- Alternatively contact the local authorized professional recycling agency.

2.10 Other Considerations

The following protective or emergency measures shall be taken according to the actual operation summary:

- When maintaining and repairing the equipment, relevant personnel should take appropriate protective measures according to their needs, such as wearing noise-proof earplugs, insulating shoes and scald-proof gloves.
- If installation site of energy storage inverter is remote, emergency rescue facilities should be considered in the event of an accident.
- Use all necessary supplementary measures to ensure the safety of personnel and equipment.



All descriptions in this manual are for energy storage inverters with standard configurations. If you have special needs, please give instructions to us. When ordering. Specifically, please refer to the actual products you receive.
This manual does not cover all possible situations during operation, maintenance and overhaul. If you encounter situations that are not explained in the manual ,Please contact us

3 Product introduction

3.1 Product Appearance

The appearance and external components of the energy storage inverter are described as follows

MPS0030
MPS0050

MPS0100
MPS0150

WARNING

High Voltage Electricity Danger**!**

- When pressing the emergency shutdown button, the AC/DC connection terminal of the energy storage inverter is still live!
- There is still a fatal high voltage inside the energy storage inverter!

WARNING

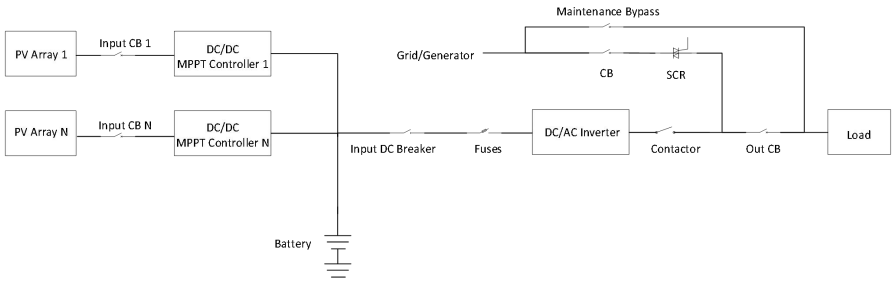
The emergency shutdown button can be used to turn off the energy storage inverter only in a fault scenario!
If the emergency shutdown button is not properly used, it can cause damage to the energy storage inverter.
If the emergency shutdown button is pressed in the case of load, the related parts of the energy storage inverter will encounter greater stresses and may fail.

3.2Main Power Topology

The inverter achieves the rectification and inversion through a three-phase full-bridge

inverter, and the rectified output is injected into the energy storage battery. The inverter output is turned into sine wave voltage via the LC filter, then goes through the isolated boost of three-phase transformer and then is incorporated into the grid power generation or becomes off-grid power supply to the load.

Main circuit schematic inside the energy storage inverter is as shown in the figure below.



3.3 Communication Solutions

3.3.1Communication Scheme of Upper Computer

The energy storage inverter communicates with the host computer through RS485/RS232 inverter. Several energy storage inverters are connected through 485 bus, and finally

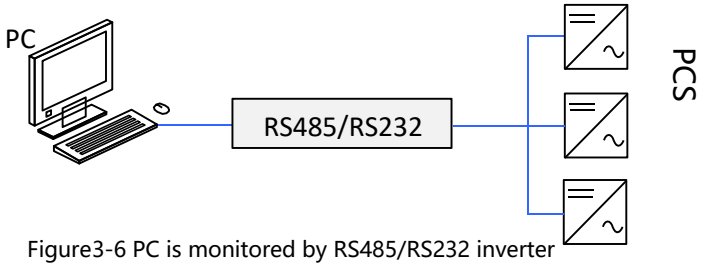


Figure3-6 PC is monitored by RS485/RS232 inverter

connected to the upper terminal.

3.3.2 EMS Communication scheme

Through CAN/RS485 communication line, the energy storage inverter can communicate with EMS, and monitor the energy storage system independently designed. The software can monitor the energy storage inverter in real time. .

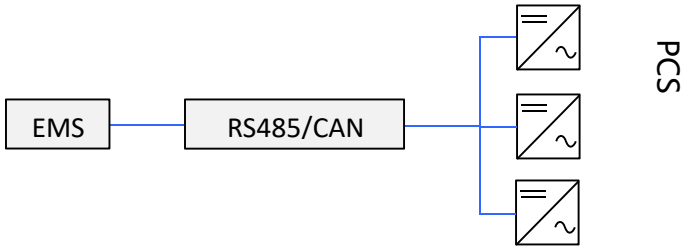


Figure3-7 EMS is monitored by RS485/CAN

3.3.3 BMS Communication scheme

Through CAN/RS485 communication line, energy storage inverter can communicate with BMS to realize data transmission.

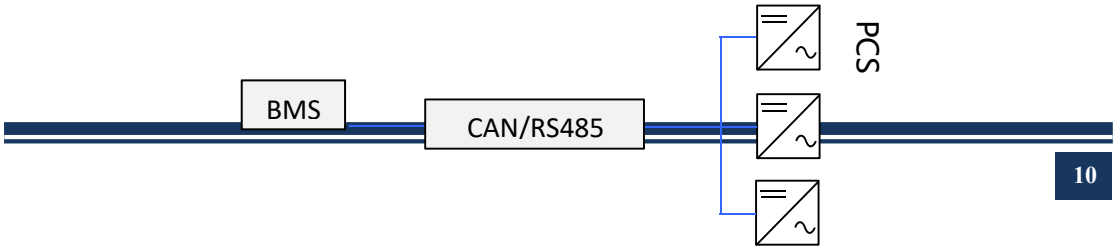


Figure3-8 BMS transmits data through CAN

4 Inverter Mode and Function

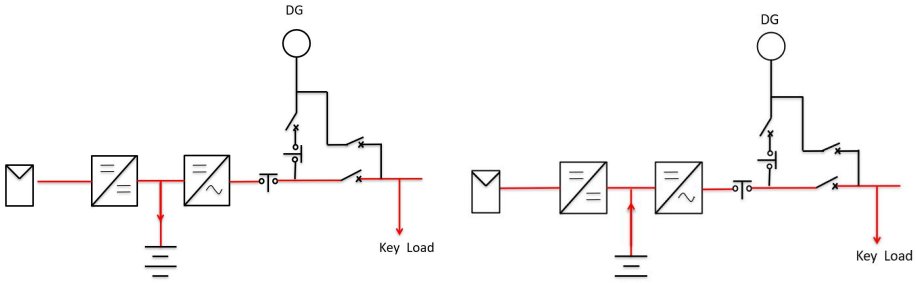
4.1 Model Introduction

4.1.1 Self-use with grid

The power generated from PV will be used to supply the local loads firstly, then to charge the battery , the redundant power will export to the public grid.

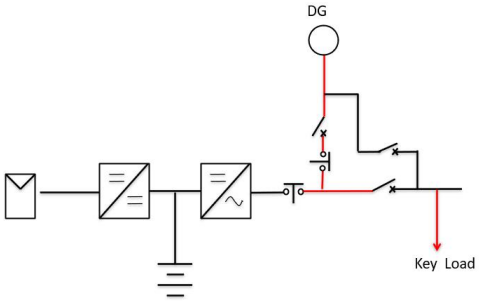
4.1.2 Self-use with generator

① when the SOC of battery is normal , Battery and PV supply the load together, the generator is off

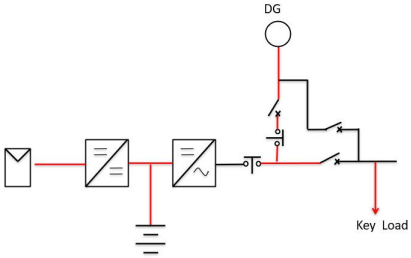


PV power > load　　PV power < load

② when SOC of battery is low， MPS turn on the generator using dry contactor Automatically. The generator supply the loads.

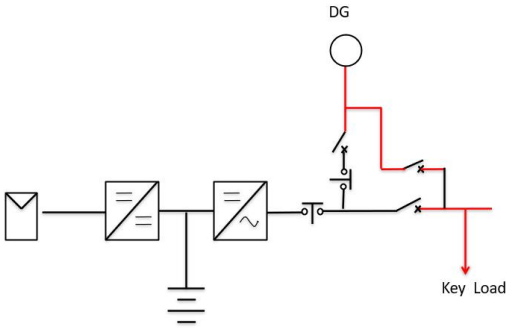


③ when the PV has energy will charge the battery, generator supply the load.



④ when the battery is full, turn off the generator automatically, mps transfer to ① mode

4.1.3 Maintenance mode



4.2 Energy Storage Inverter Function

4.2.1 Overheating And Cooling Operation

- The inverter operates at set power when IGBT junction temperature is less than 105 C.
- When the junction temperature of IGBT is higher than 105 C, the IGBT will be operated at a set power percentage.

4.2.2 Cooling System Start-Up

- The air-cooled system will start automatically when the energy storage inverter reaches the rated power or temperature threshold.

4.2.3 Cold Start System

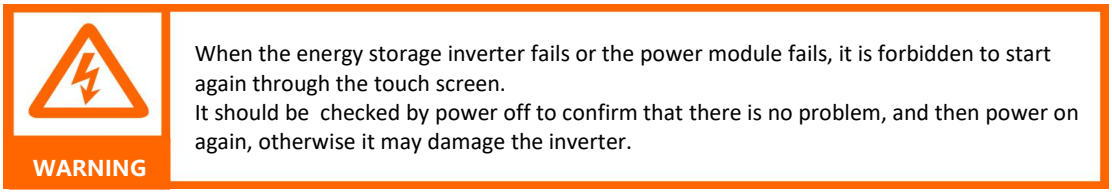
- For off-line operating models, it is necessary to start directly through the battery to supply power to the load, which can be operated manually.

4.3Introduction of Inverter Status

There are six states of energy storage inverter, as shown in Table 4-1 below.

Table 4-1 Status and Description

Status	Description
operation	Normal operation of energy storage inverter。
Standby	When the inverter receives standby instructions from the LCD screen or the host computer, it turns to standby state in shutdown or operation mode. When the AC and DC contactors of the inverter are closed in standby state, the system is in hot standby state. When the LCD screen or the host computer carries out relevant control, the inverter can respond quickly.
fault	When the energy storage system fails, the inverter will stop working, automatically disconnect the contactor on the AC and DC side, and the main circuit will be disconnected from the battery, power grid or load. In the fault state, the system always monitors whether the fault is eliminated or not. If the fault is not eliminated, the system maintains the fault state. If the fault is eliminated, it will enter standby state after the default of 30 seconds.
Shutdown	If the energy storage inverter is in the normal "running" state, the user can stop the energy storage inverter by issuing the stop instruction from the host computer, or Turn off the key through the LCD screen switch page.
Emergency shutdown	In case of failure or emergency, press the emergency shutdown button (EPO) to stop the inverter.
Shutdown	Energy Storage Inverter All Circuit Breakers Disconnect and Switch Reset



When the energy storage inverter fails or the power module fails, it is forbidden to start again through the touch screen.
It should be checked by power off to confirm that there is no problem, and then power on again, otherwise it may damage the inverter.

5 Mechanical Installation Guidance

5.1 Precautions Before Installation

- Installation of this series of energy storage inverters requires simultaneous operation of at least two qualified personnel, and all electrical installations must conform to local electrical installation standards.
- When installing, do not touch other parts of the cabinet except the terminal.
- Safety signs must be set up at all upstream isolators to prevent closing during construction.

5.2 Installation Process

The installation process of MPS series energy storage inverters is as follows:

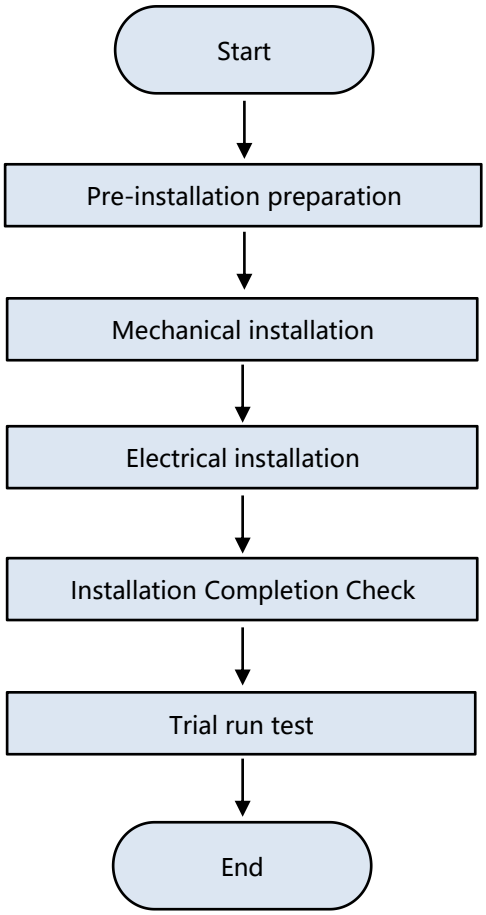


Fig. 5-1 Installation flow chart

5.3 Installation Preparation

5.3.1 Packaging Inspection

Before installation, it is necessary to check whether the equipment is damaged. If any transportation damage is found, please contact the transportation company. and provide photos of the damage.

5.3.2Delivery Checklist

According to the packing list in the packing box, check whether all the parts delivered are complete or not: transportation

Table 5-1 Delivery list

project	Number
Inverter	1PCS
Key	2PCS
Certificate	1 PCS
Warranty card	1 PCS
Product User Manual	1 PCS
Exit Inspection Report	1 PCS

5.3.3 Installation Tools And Parts

The tools and parts needed to install the inverter are as follows:

Table 5-2 Tool List

Tool	Remarks
Forklift or crane	1 vehicle
Wire stripper	1 pcs
Crimping pliers	1 pcs
Bolt driver	1 pcs
Sleeve	1 pcs
multimeter	1 pcs
Screws, nuts, gaskets	Some

5.3.4 Installation Environment Requirements

Before installing the inverter, please confirm the following requirements:

Table 5-3 Environmental requirements

Project	Requirement
Temperature	-30℃~55℃
Humidity	< 95% （No condensation）
Altitude	<3000m

5.4 Machine Transportation

5.4.1 Transport Instructions

- In order to keep the inverter in a better protective state, packaged transportation should be adopted as far as possible.
- When using forklift or crane for transportation, attention should be paid to the weight of inverter to ensure that transport equipment has sufficient carrying capacity, and reasonable arrangement of support or lifting points.
- Inverter packaging is marked with detailed product parameters and transport requirements. Please transport according to the indication of various labels on the packaging. The graphic

description of inverter packaging labels is shown in tables 5-4 and 5-5.

Table 5-4 Description of Packing Parameters

Name	Explain
MODEL	Inverter Model
SIZE	Outer packing dimensions
NW	Net weight of inverter
GW	Gross Weight, Inverter Containing Outer Packaging Box

Table 5-5 Graphical description of packing marks

Sign	Describe
	Front-up, no transverse, tilt or inversion of inverter
	Care should be taken to avoid damage to inverter caused by excessive collision and friction in transportation environment.
	Pay attention to damp-proof, avoid the inverter being rained or damped

5.4.2 Forklift Transportation

The following is a sketch of using forklift trucks to transport with or without packaging.

- When transporting without packing, be sure to unload the fender for transporting.
- In the course of transportation, the center of gravity of the box device should fall between the two forks of the forklift truck.
- Forklift trucks are forbidden to carry long distances or take sloping roads.
- Take-off and landing should be handled lightly to avoid impact or vibration.
- When transporting, the larger size of the inverter may block the operator's sight. Please arrange the assistant personnel.

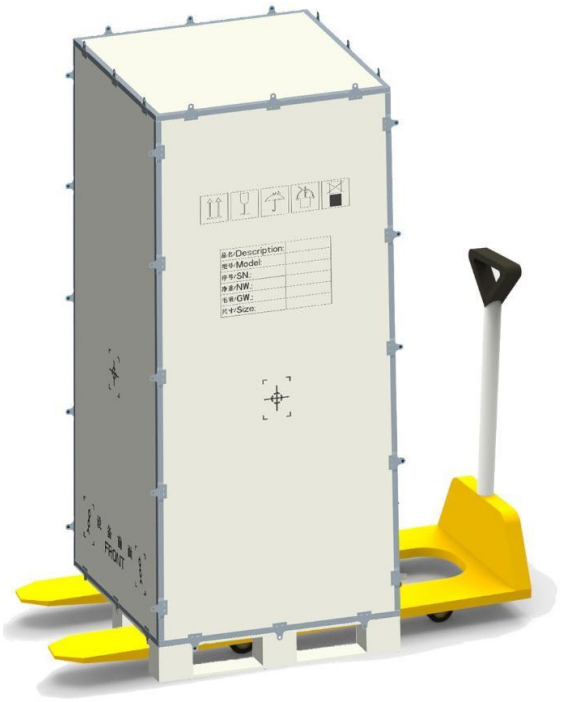


Figure 5-2 Packaged Handling

Figure 5-3 Unpackaged Handling

5.5 Location and Fixation

5.5.1 Space Requirement

- Installed indoors with good ventilation. Not in high humidity and high ambient temperature, no corrosive gasse.
- Avoid direct sunlight or rain.
- Ensure that the grounding resistance of the grounding wire in the distribution room is less than 4 in dry environment.
- Inverter can only be installed on concrete base or other non-flammable mounting surface, and sufficient load bearing should be guaranteed.
- Avoid placing together with inflammable and explosive materials, meeting fire protection requirements.

The volumetric space reserved size is shown in the following figure:

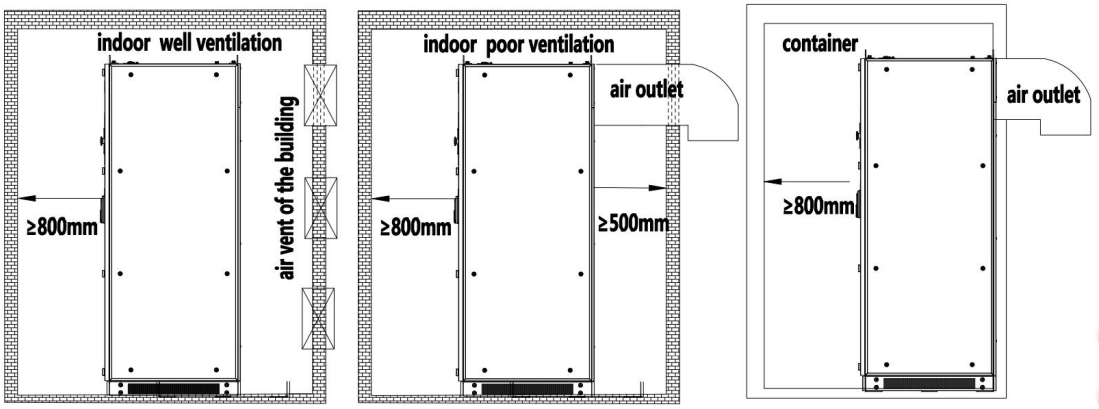


Fig. 5-4 Installation space requirements

5.5.2 Dimensions of Various Models

The mechanical dimensions of each type of MPS series inverter are shown in Table 5-6 below. For more parameters, please refer to Appendix 1. Users can design and install according to this data.

Table 5-6 Dimensions of MPS Series

Model	Size (W×D×H)
MPS0030	800×800×1900(mm)
MPS0050	800×800×1900(mm)
MPS0100	1200×800×2050(mm)
MPS0150	1200×800×2050(mm)

5.5.3 Base Mounting

The bottom of this series inverters should be connected with the base reliably. The bottom of the inverter has a fixed hole for fixing the inverter on the bottom support channel steel or on the ground. As shown in the following figure:

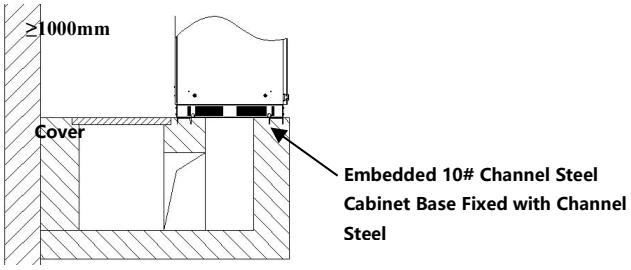


Fig. 5-5 Base mounting and fixing

In the manufacture of channel anchors, it is necessary to design the positioning hole with the base at the bottom of the inverter. The bottom section of each model is shown in the following figures (mm). Cooling air can enter from the front and bottom, and cables from the bottom. In front of the inverter, there are DC and AC inlet and outlet holes.

5.6 Design And Installation Of Air Ducts

5.5.1 Forced Air Cooling System

This series energy storage inverters use forced air cooling for heat dissipation, and need to maintain adequate air intake.

5.5.2 Ventilation Environment

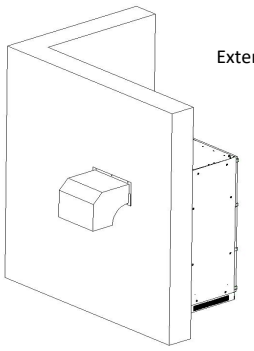
In order to meet the ventilation requirements of this series inverters, the installation environment should meet the following requirements:

- Inverter should avoid installing in the situation of poor ventilation condition and low air flow. It can get more ventilation by increasing construction measures such as air supply grille or fan.
- Sufficient air intake should be provided at the intake port.
- Air quality must be guaranteed. If the content of suspended solids such as sand and dust in the air is too high, the air quality can meet the requirements through construction measures (such as installing filters at the air supply grille of the building).

5.5.3 Air Duct Setting

In order to ensure pressure balance, an additional fan can be added at the outlet of the outlet pipe to exhaust the air. The size of ventilation duct should be designed by professionals according to the size of air output. When designing and installing, it is nece

ssary to prevent the phenomenon of backfilling air in the inverter cabinets.



External duct rain

Internal Ventilation

Figure 5-9 Schematic diagram of inverter external duct

Specific requirements for adding air ducts to inverters are as follows:

- Requirements do not reduce cabinet ventilation by adding ducts
- The interface between air duct and inverter cabinet is well sealed.
- The outlet of the duct should be inclined downward (rainproof)
- Protection should be added to the outlet of the air duct (rodent and bird control, etc.)

The air required by the inverter is inhaled through the bottom vent and the dust net of the front door. Hot air is discharged through the top vent of the inverter, and there is an outlet at the top. The sketch maps of the top section outlets of each type of this inverter are shown in the following figures (mm).

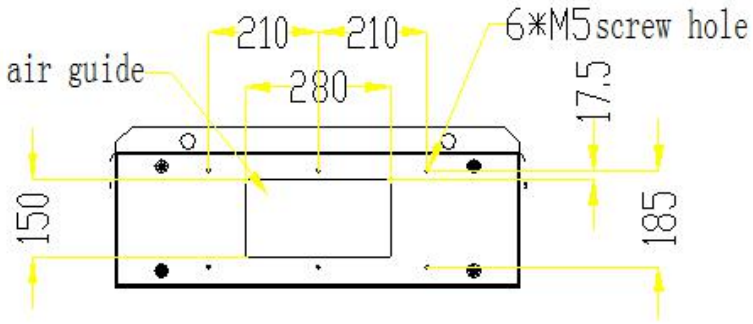


Figure 5-1030kW/50Kw/100KW Vent Size

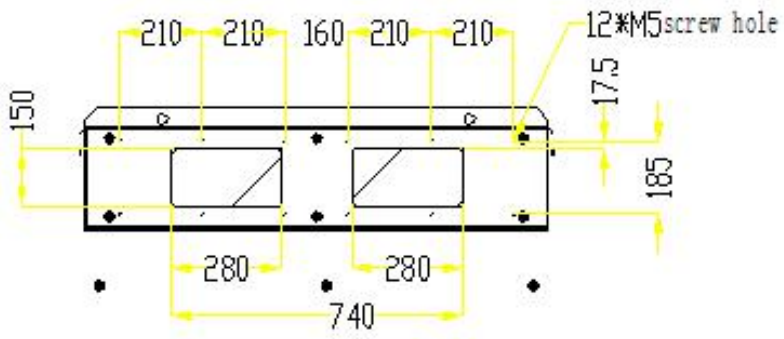


Fig. 5-11 250kW Vent Size

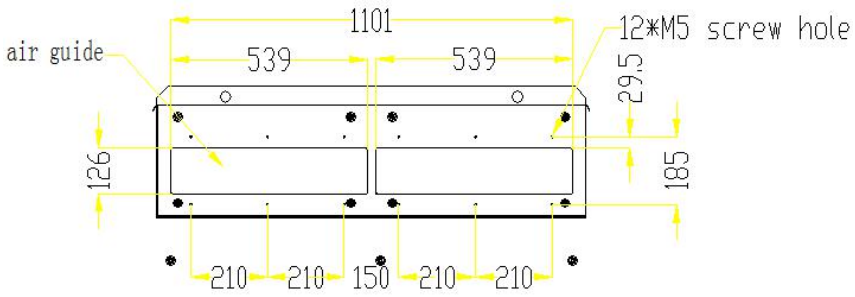


Figure 5-12 500 kW/630 KW Vent Size

6 Electrical Installation Guidance

6.1 Cable Requirements

According to the capacity allocation requirement of single MPS series inverter, it is suggested that the current passing through 1mm^ 2 conductor should be no more than 3A, and the same size and type of conductor should be selected for the connection on the same side. The reference requirements for various types of interface cables are given by us . Users can design relevant cables according to the table below. Cables shall be designed in accordance with the instructions in this section and local wiring regulations, taking into account environmental conditions.

Table 6-1 Specifications of power cables for the inverters

Type capacity	Type capacity	Zero line	Ground wire	Positive and negative DC input (per pole)
30KW	≥25mm^2×3	≥25mm^2	≥16mm^2	input 50mm^2
50KW	≥35mm^2×3	≥35mm^2	≥16mm^2	input 70mm^2
100KW	≥50mm^2×3	≥50mm^2	≥25mm^2	input 95mm^2
250KW	≥120mm^2×3	≥120mm^2	≥50mm^2	2-way input 120mm^2
500KW	≥185mm^2×3	≥185mm^2	≥95mm^2	4-way input 120mm^2
630KW	≥240mm^2×3	≥120mm^2	≥120mm^2	4-way input 120mm^2

WARNING

Before wiring operation, confirm that both the municipal power input and BAT input switches are disconnected, and affix warning signs to prevent others from operating the switches.

WARNING

Power cables need trenches or metal trenches to avoid mechanical damage.

Or cause radio frequency interference to peripheral equipment.

The cable dimensions provided in this table are for reference only. The actual selection should be based on the working environment temperature, laying method, heat dissipation conditions and so on.

CAUTION

The equipment does not have external cables. The above cable recommendation table is not provided by inverters. Users are requested to provide their own cables according to relevant needs.

CAUTION

All external cables are connected to the corresponding position after entering the equipment through the bottom entry and exit holes.

The terminals and fixing screw used in power cable wiring of this series inverters have been installed at the corresponding wiring terminals when the equipment is delivered.

6.2 Connection Terminal

Installation indication of terminal and fixed screw used in power cable wiring of inverter:

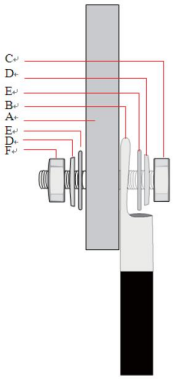


Figure 6-1 Terminal

Table 6-2 Names of wiring terminals

Serial number	Name
A	Copper bar
B	Connection terminal
C	screw
D	Spring washer
E	Large pad
F	Nut

6.3 Wiring Specification

When laying cables, communication lines and power lines should be laid separately. DC and AC circuits need to be laid separately, and the distance between different cables should be more than 300 mm. When the control cable must pass through the power cable, the angle between the two cables should be kept as high as 90 degrees.

The recommended minimum space distance between parallel shielded data lines and power cables corresponds to the field.

Table 6-3 Distance between signal lines and power cables

Parallel Line Length (m)	Minimum Spatial Distance (m)
200	0.3
300	0.5
500	1.2

※The data line should be as close as possible to the supporting line of the surface ring, such as supporting beams, steel troughs, metal guideways, etc.

6.4 Fixation and Protection of Connecting Cables

6.4.1 Cable Fixation

In order to prevent loosening of the copper nose, causing poor contact, or increasing contact resistance leading to fever or even fire, it is necessary to ensure that the screw fastening the terminal meets the torque requirements listed in Table 6-4:

Table 6-4 Screw dimensions and required torques

Screw size	M4	M5	M6	M8	M10	M12	M14	M16
Torque (N. m)	2	3.2	7	16	34	46	58	68

6.4.2 Cable Protection

The protection of cables includes communication cables and power cables. The protective methods are as follows:

Protection of communication cable: Because communication cable is thin, it is easy to break or fall off from the terminal during construction. Therefore, it is suggested that the power circuit should be connected first, and then the connection should be made. When connecting, the cable should be grooved as far as possible. Where there is no groove, the cable should be fastened with tie-in belt. When traveling, the development of thermal elements and strong electric field circuit cables should be avoided.

Protection of power cables: Therefore, the scratch and breakage of cable insulation skin should be avoided when installing connection, because this may lead to short circuit. Power cables must also be properly fixed.

6.5 Remove Switch Baffle And Lower Panel

6.5.1 Remove Baffle

With a screwdriver, loosen the four screws of the lower baffle of the switch, remove the screw and the lower baffle of the switch, and the wiring operation can be carried out. Open the front door as shown in Figure 6-2.

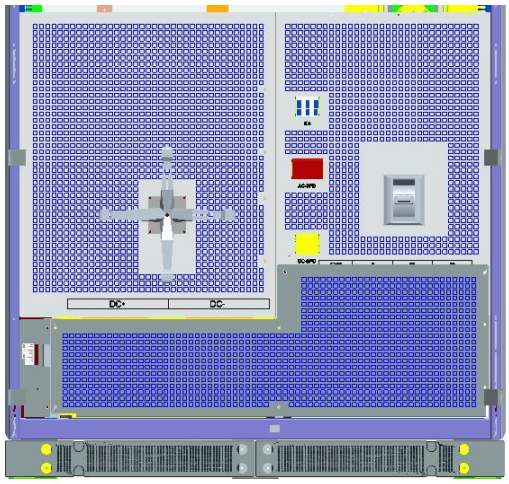


Figure 6-2 Switch baffle

6.5.2 Installation Of Lower Fender

MPS series inverters have lower fencing boards at the bottom of front, back, left and right. They are packaged and placed at the bottom of the packaging box. Before installation, all lower fencing boards of the inverter must be removed and put out. After the inverter is positioned and the screw is locked, the lower fencing boards shall be installed. Dust-proof cotton is installed in the lower fencing board, which can not be lost during installation.

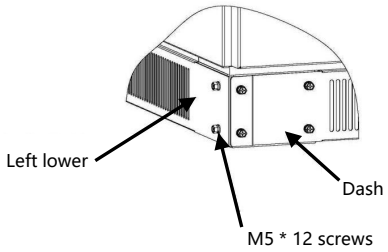


Figure 6-3 Installation of lower fender

6.6 Internal Terminal

The inlet and outlet modes of this series inverters are down-going and down-going. When the switch baffle is removed, the power terminal can be seen. Three kinds of screw sizes, M8, M10 and M12, can be selected. The schematic diagram of the internal wiring terminal is shown in the figure.

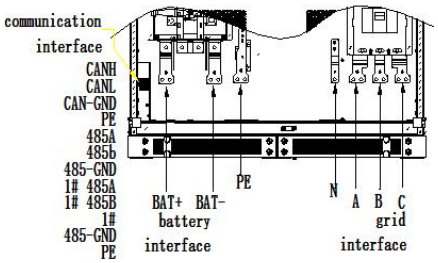


Figure 6-4
MPS 30T/MPS 50T/ MPS 100T/MPS 250T
Connection terminal schematic diagram

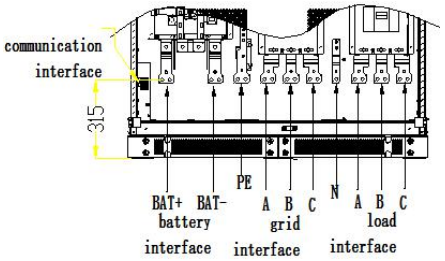


Figure 6-5
MPS30T/MPS50T-S/ MPS100T-S/MPS250T-S/MPS500T-S
Connection terminal schematic diagram

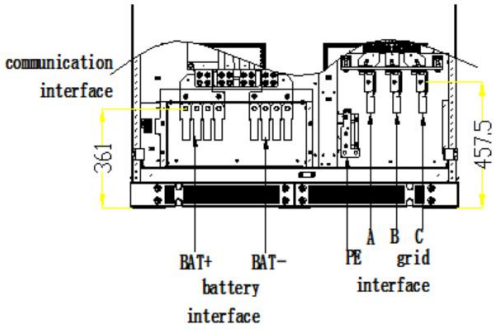


Figure 6-6
MPS 500T/MPS 630 T
Connection terminal schematic diagram

6.7DC Side Wiring

6.7.1 Battery Connection

The DC-side connection of batteries connected to this series inverters is shown in Table 6-5 below.

Battery voltage access range is 400V ~ 850V. For a single MPS series inverter, the power should not exceed 1.05 times the rated power. When connecting, users need to access at least 50mm² input lines per channel. The energy storage inverter has left many terminals for users. Refer to Section 6.5 for the access location of copper bars.

Table 6-5 DC-side wiring correspondence

BAT+	Connect to positive battery pack
BAT-	Connect to battery pack negative pole
GND	Earthing

6.7.2 The DC Side Wiring Steps Are As Follows:

Step 1: Verify that all terminals of the inverter have been powered off with a multimeter.

Step 2: Identify the positive and negative poles of the cable and mark them well.

Step 3: Connect the positive and negative poles of the battery pack to the "BAT+" and "BAT-" terminals.

In order to avoid personal and equipment injury, wiring must be carried out without electricity.

- DC switch is off.
- Multimeter is used to measure that the DC side wiring row is not live.

DC input voltage limit. Confirm that the DC input voltage should not exceed 850VDC!

- Any DC input voltage exceeding this limit may cause damage to the inverter.
- Damage and loss of equipment caused in this case do not fall within the scope of quality assurance.

Fixed screw and other parts used for wiring have been installed at the corresponding wiring terminals when the equipment is delivered.
Need to check the material of the external terminal connection point. If copper and aluminium materials are interconnected, special copper and aluminium connectors should be used. Do not connect directly!

6.8 AC Side Wiring

6.8.1AC Connection

All models of this series energy storage inverters have grid connection. Only those with bypass need to consider bypass connection. Their corresponding relations are shown in the table below. Refer to Section 6.5 for the access location of copper bars.

Table 6-6 Corresponding

A	Phase A or U connected to power grid
B	Phase B or V connected to power grid
C	Connecting to C or W phase of power grid
N	N Phase Connecting to Power Grid

Table 6-7 Load connection

A	Phase A or U connected to load
B	Phase B or V connected to load
C	Phase C or W connected to load

6.8.2 AC Side Line Steps：

Step 1: Measure with a multimeter to confirm that all terminals have been powered off.

Step 2: Confirm the phase sequence of the cables and mark them well. Three-phase AC output cable L1, L2, L3, N should be added yellow, green, red and black insulating bushing respectively in order to distinguish the phase sequence.

Step 3: Correctly connect the ABC (UVW) three-phase of the power grid to the inverter according to Table 6-6.

Step 4: If it is an off-grid integrated model, connect the cables according to Table 6-6 and Table 6-7.

6.9 System Grounding

The grounding copper bars in this series energy storage inverters need to be connected reliably by grounding cables. Grounding copper bars have been reliably connected with the outer shell of the inverter in the cabinet. When connecting, it is necessary to connect the grounding copper bars with equipotential connection devices of the installation site or the electrical control room. The resistance shall not be higher than 4Ω, the diameter of grounding cable shall not be less than 16 mm ², and the position of the copper bars shall refer to the internal terminal of 6.5 sections.

6.10 Installation Is Complete

After all mechanical and electrical installations have been completed, the removed switch baffles and lower fences need to be reinstalled on the inverter. After installation, power-on operation is allowed only after confirmation is correct.

7 Test Run

7.1 Pre-Boot Check

Before commissioning, a thorough inspection of the installation of the equipment should be carried out, especially to check whether the DC and AC voltages meet the requirements of the inverter, as well as whether the polarity and phase sequence are correct.

Check that all connections have met the requirements of the relevant standards and specifications. And whether the system is well grounded. Grounding resistance is of great importance to the safety of the whole system. It must be determined that the grounding resistance meets the requirements before the first trial operation.

CAUTION

Before commissioning, it is necessary to ensure that all switches on the AC side are open.

Step 1: Check the inverter

The inverter needs to be checked before it is turned on.

- Check the installation and wiring of the inverter according to Chapters 5 and 6.
- Ensure that all AC and DC circuit breakers are disconnected.

Step 2: Check AC side voltage

- Check whether the three phases of the inverter are connected correctly to the three phases of the power grid.
- Check whether the phase voltage and line voltage are within the predetermined range and record the voltage value.
- If possible, measure the total harmonic distortion (THD) and view the curve. If the distortion is serious, the inverter may not work.

Step 3: Check DC side voltage

- The DC side should be connected to the inverter from the battery pack to ensure that the input polarity of each battery pack is correct.

WARNING

The DC side voltage shall not exceed 850V.
If the voltage deviation is greater than 3%, it may be caused by load fluctuation, cable damage or cable loosening on site.

Step 4: Check other content

After completing the above check before starting, the following items need to be carefully checked to ensure that they are correct.

- All links are made in accordance with Chapter 6 of this manual.
- The protective shield inside the equipment has been firmly installed.
- The emergency shutdown button is released.
- The AC side and DC side circuit breakers have been disconnected, i.e. they are in the "OFF" position.
- The multimeter is used to detect whether the AC and DC side voltages meet the starting conditions of the inverter, and there is no danger of overvoltage.
- The door of the cabinet has been closed and the key of the cabinet door has been pulled out and handed over to a special person for safekeeping.

WARNING

For the long downtime energy storage inverter, before starting, the equipment must be thoroughly and meticulously checked to ensure that all indicators meet the requirements before starting.

7.2 Start-Up Operation Flow

After all of the above are satisfied, the energy storage inverter can be turned on. The operation steps are as follows:

Step 1: Make sure that the DC side and AC side are connected correctly and the DC side voltage is lower than 850V.

Step 2: Close AC and DC circuit breaker switches;

Step 3: Close lightning protection switch KB4, auxiliary power switch KB1, contactor power switch KB2, (and off-grid integrated model needs to close KB3);

Step 4: After completing the above steps, through the switch menu on the touch screen, click on the inverter to open. After the machine is booted normally, it can see the running state of the machine through the touch screen.

Step 5: After the machine is running normally, close the cabinet door and hand over the key to a special person for safekeeping.

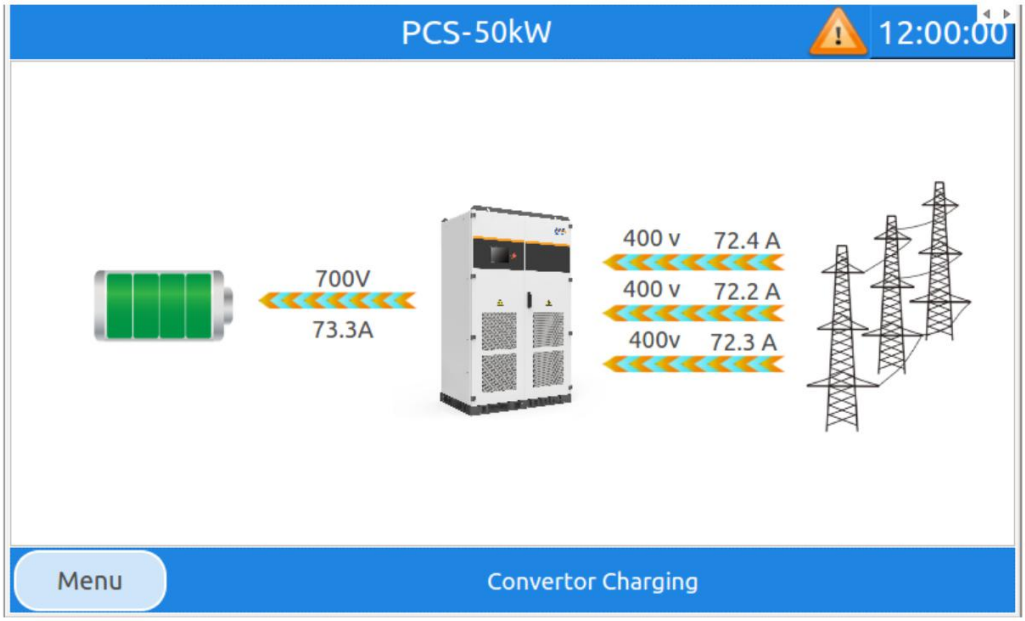


Figure 7-1 Touch Screen Inverter Open Button Interface

When you need to boot through the DC side, you need to press the "cold start" button (red).

Figure 7-2 "Cold Start" Switch

7.3 Shutdown Operation Flow

7.3.1Normal shutdown

During normal maintenance or overhaul, shutdown operation should be carried out according to the following procedures:

Step 1: Through the switch menu on the touch screen, click "Inverter Close";

Step 2: When the AC contactor is disconnected and the touch screen shows that after the "inverter" is turned off, the DC side circuit breaker or load switch of the inverter is manually disconnected so that the switch is in the "OFF" position.

Step 3: Disconnect inverter fan switch, auxiliary power switch and lightning protection switch.

Step 4: Disconnect the AC side circuit breaker of the inverter so that the switch is in the "OFF" position.

Step 5: Wait until the bus capacitor discharge is finished, the touch screen is off, and the energy storage inverter is off.

WARNING

When the machine is working normally, it is strictly forbidden to disconnect the circuit breaker directly, so as to avoid dangerous arc damage to the circuit breaker.
In severe cases, it may also lead to damage of energy storage inverter.

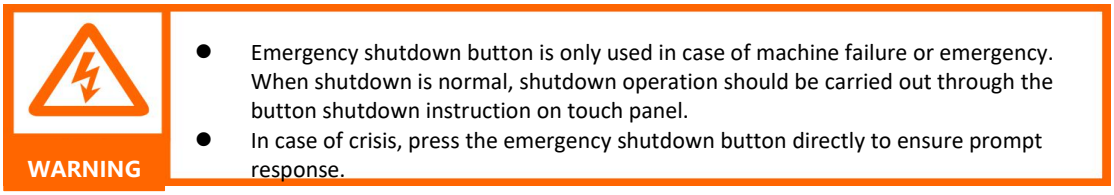
7.3.2 Turn off at a time of failure or emergency

In case of emergency or failure, follow the following procedure:

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

Step 2: Disconnect the machine DC side circuit breaker or load switch, AC side circuit breaker;

Step 3: Reset the EPO button after confirming that the danger or fault has been removed and needs to be operated.



8 Touch Screen Operational Guidelines

8.1 Introduction of Touch Screen

8.1.1 Operation interface

The LCD touch screen is installed on the front of the inverter cabinet door. Users can monitor the inverter through the LCD screen, read the data of the inverter, and set the parameters of the inverter. The touch screen interface is shown in the following figure:

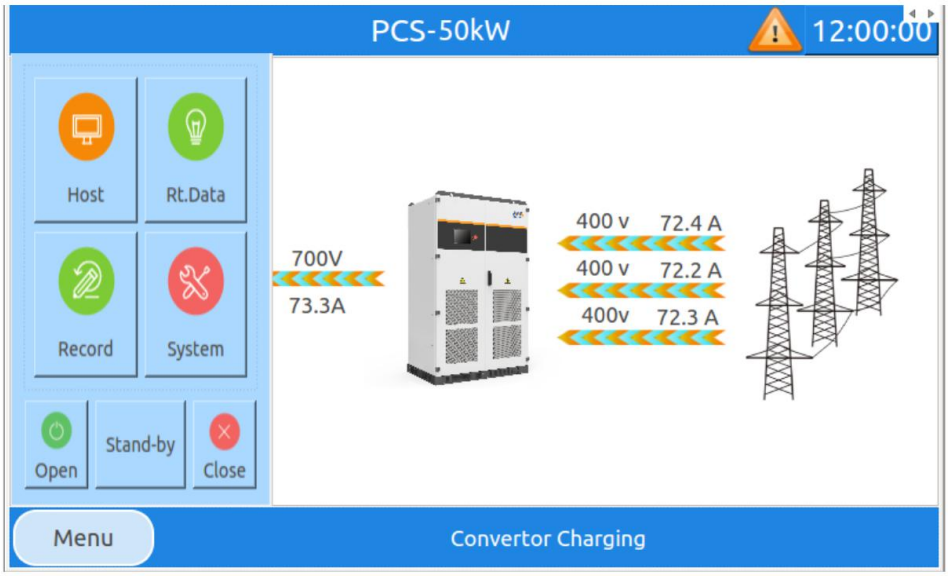


Figure 8-1 LCD Appearance

Table 8-1 Regional Function Description

Functional area	Explain
Basic Information Bar	Display company LOGO, machine model, network address, time
Function bar	Choose the menu of each function
homepage	Display current and voltage of AC and DC sides of inverter
Running status bar	Communication state, current state of inverter, alarm, state quantity

Table 8-2 Indicator status

Indicator light	Function	State	Significance
Indicator 1	System Operating Indicator	Green always shines/fades	Abnormal monitoring system
		Green scintillation	Normal monitoring system
Indicator 2	Inverter indicator	Green is always bright	Inverter Normal work
		Green scintillation	Inverter Soft start
		Indicator turn off	Inverter does not work
Indicator 3	Alarm light	Red flashing	Inverter alarm
		Indicator turn off	Inverter no alarm

※ndicator lamp 1, indicator lamp 2, indicator lamp 3, refers to the working status indicator lamp, the order is from top to bottom.

8.2 Alarm Buzzer

Table 8-3 Buzzer Warning Mode

Short-lived single-beep alert	When pressing any function operation key, issue this alarm sound
Whisper every 1 second	When an alarm occurs in the inverters, the alarm sounds are emitted

8.3 Communication Settings

Communication parameters can set device address (modbus address) and RS485 baud rate to communicate with the host computer. The communication mode between equipment and BMS can be chosen: no communication, CAN, serial port. The communication between the equipment and the host computer supports RS485 serial communication and network communication. The settings are as follows:

RS485 Serial Communication

The Modbus address of the device ranges from 1 to 247, and each device has a unique address.

The default baud rate of serial communication is 9600 bps.

Network communication

IP address default 192.168.1.250

Subnet mask default 255.255.255.0

Gateway default 192.168.1.1

CAN port communication

The default baud rate of CAN port communication is 250 kbps.

8.4 Software Introduction

8.4.1 Homepage introduction

The main interface mainly displays machine model, network address, time, menu bar, battery

information, inverter information, communication information, operation status, alarm information, switch status information. As shown in Figure 8-2 below:

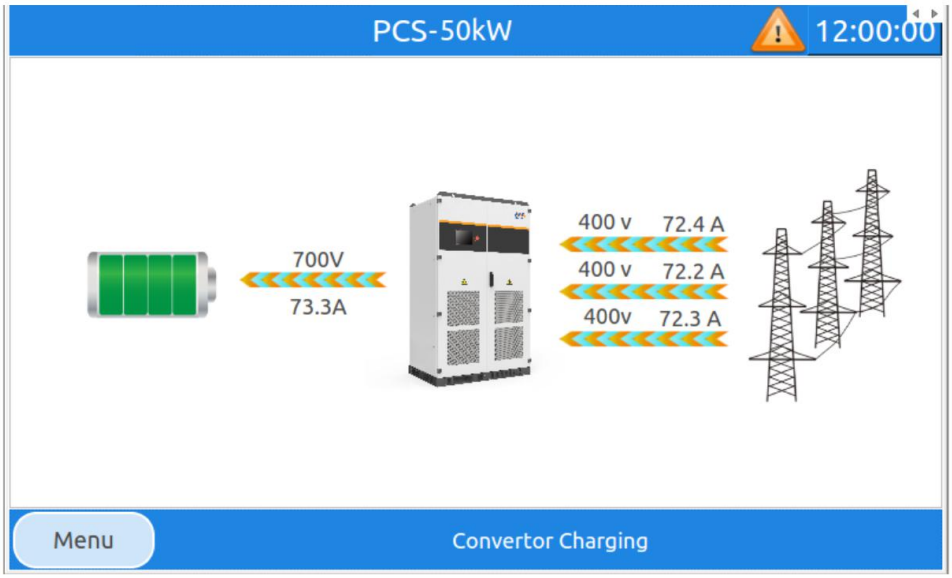


Figure 8-2 Main Interface

1. Click on the "Battery" icon on the main page to view battery properties.

2. Click on the inverter icon to view "real-time data".

3. Click on the triangular "Warning" sign in the lower right corner of the screen to view all alerts.

4. Click on the status button in the lower right corner of the screen to view the status of each switch.

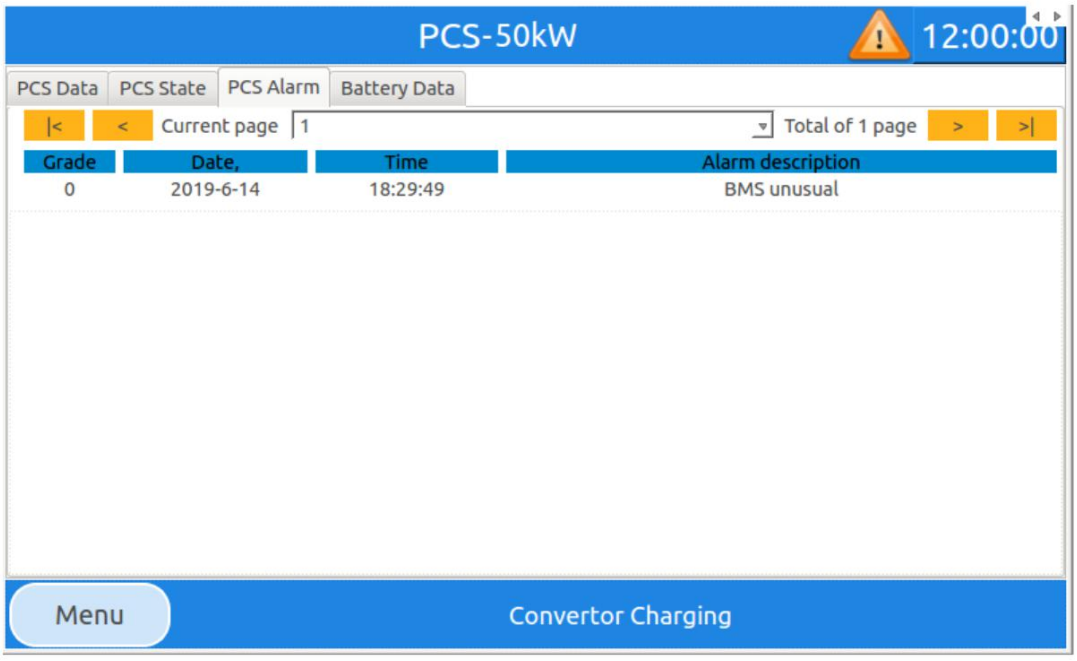


Figure 8-3 Alarm Item List

Table 8-4 Menu expansion items

Serial number	Menu name	Menu item	Parameter function
1	homepage	menu	Main menu
		PCS Data	Display real-time data
		Parameter	Parameter Setting
		PCS State	The state of each switch in the current inverter
2	State	PCS Data	All analog data of the inverter are displayed
		PCS State	Display of Inverter Operation State and Switching State
		PCS Alarm	Current system operation information and alarm
3	Record	Data Report	Charge and discharge statistics
		Export Data	Export history and operation records
		History Record	Display historical alarm records
		Operation Log	Records generated by system settings
4	Parameter Setting	General setup	User-level parameter setting
		Parameter Setting	Factory parameter setting
		Battery Setup	Battery parameter setting
		other	Summary of current main parameter settings Setting up System Language (Chinese/English) System autorun time segment settings Restore system factory settings Display PCS version number
5	switch	Inverter switch	Inverter Start-up and Inverter Shut-down

8.4.2 Introduction to Status Menu

Click on the status button to enter the status menu interface. In this interface, users can click on the three buttons of "real-time data", "real-time status" and "real-time alarm".

Users can monitor the inverter by observing the feedback of these three real-time quantities.

The state interface is shown in Figure 8-4.

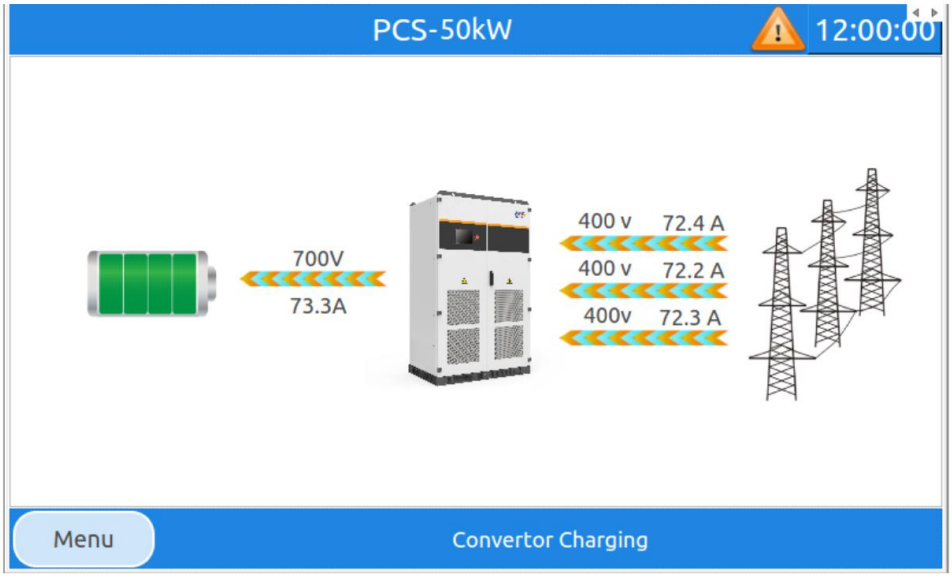


Figure 8-4 Status Menu Interface

8.4.3 Introduction to Record Menu

Click on the status button to enter the record menu interface. In this interface, you can click "Data Report", "Export Data", "History Record" and "Operating Diary".

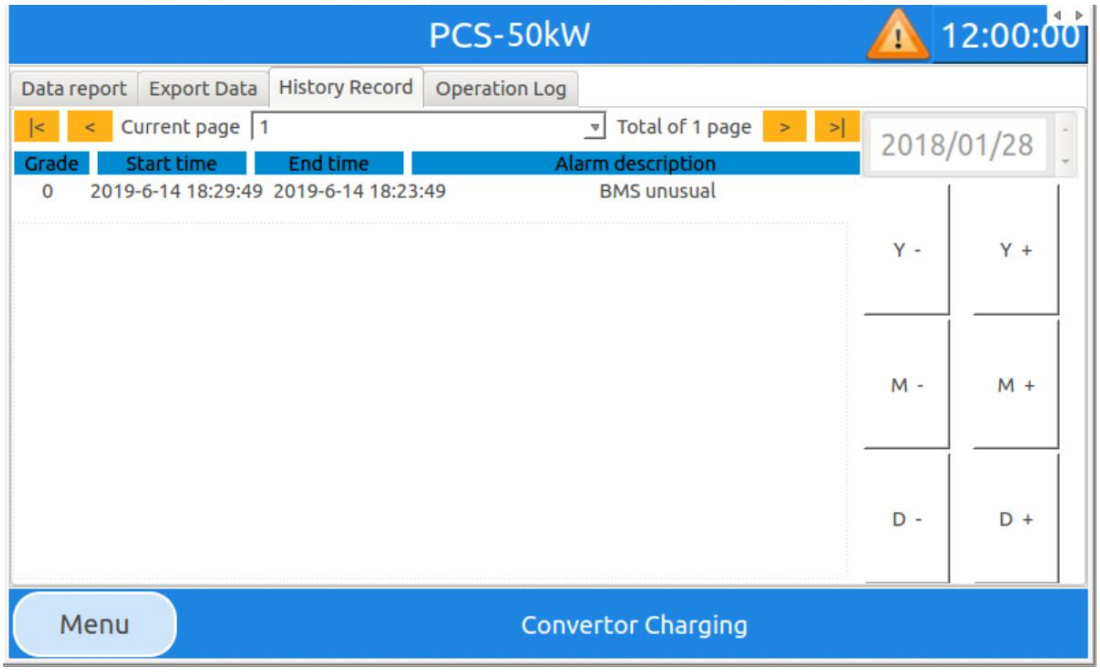


Figure 8-5 Recording menu interface

1. 1. In the record menu, click the "Export Data" button.

   After entering the interface, you need to access the U disk.

   You can select in the interface whether you need to export "History" or "Operation Log".

   After the guide is finished, click "Eject U disk".

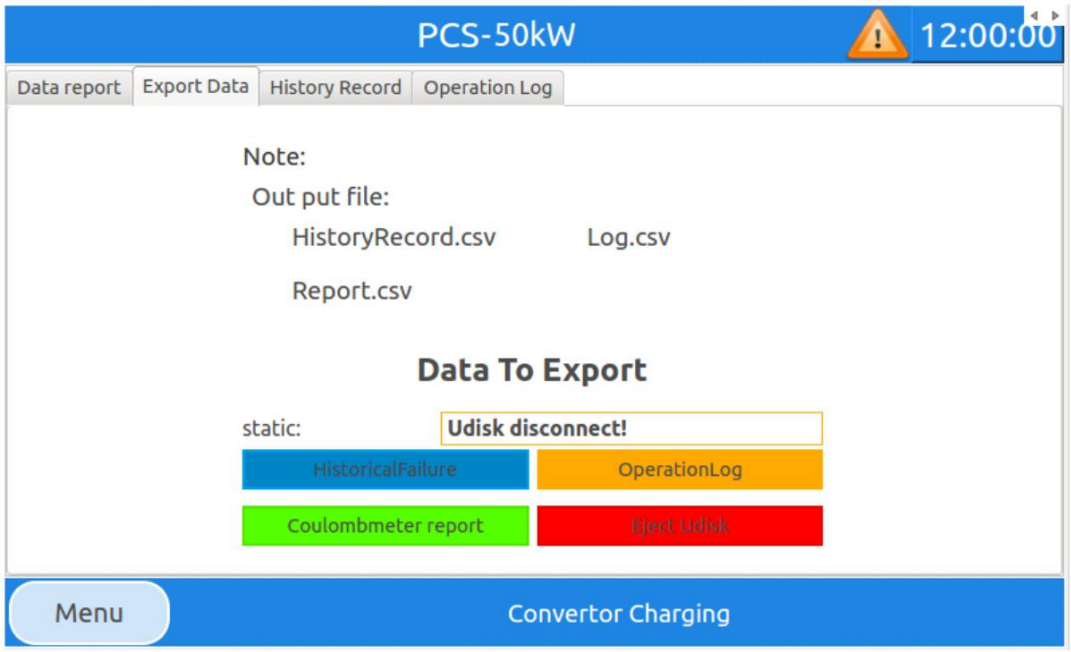


Figure 8-6 Record_Export Data

8.4.4Introduction to System Settings Menu

In this menu interface, you can click "General Settings", "System Settings", "Battery Settings", "Machine Type", "Language", "Time Settings", "Recovery of Factory", "System Information".

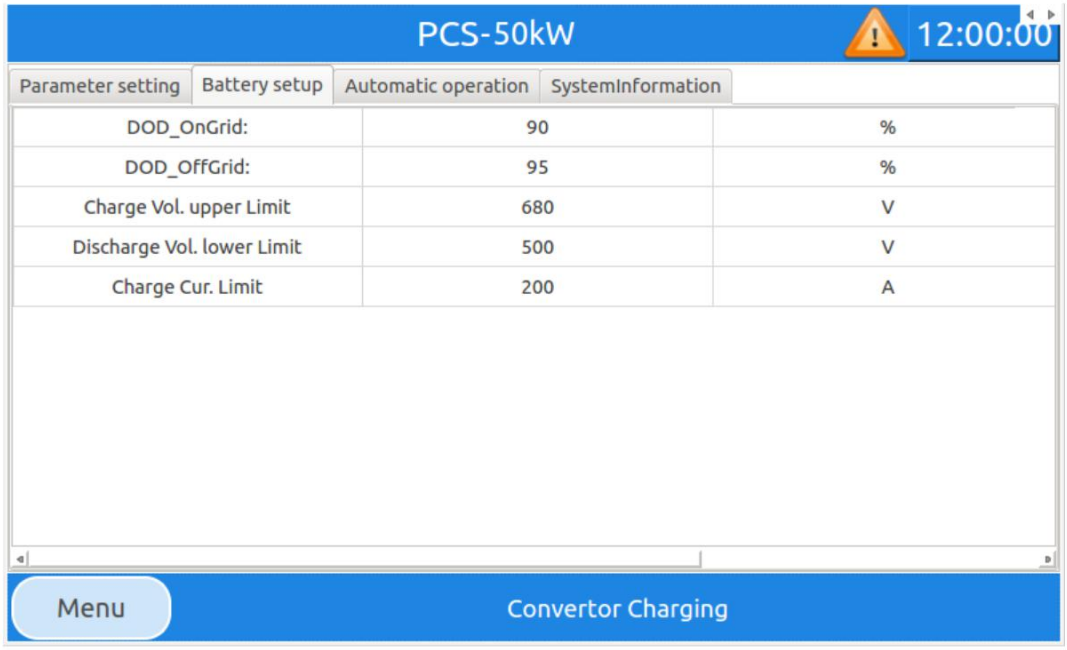


Figure 8-7 Introduction to System Menu

Click "General Settings" in the system menu and enter the password to enter the operation interface.

If the inverter restarts or does not click the touch screen for a long time (10 minutes) and then clicks the general setting or "system parameters" setting button again, the input password interface will pop up.

The password is 123.

The interface can select general settings such as inverter working mode and battery charging and discharging mode.

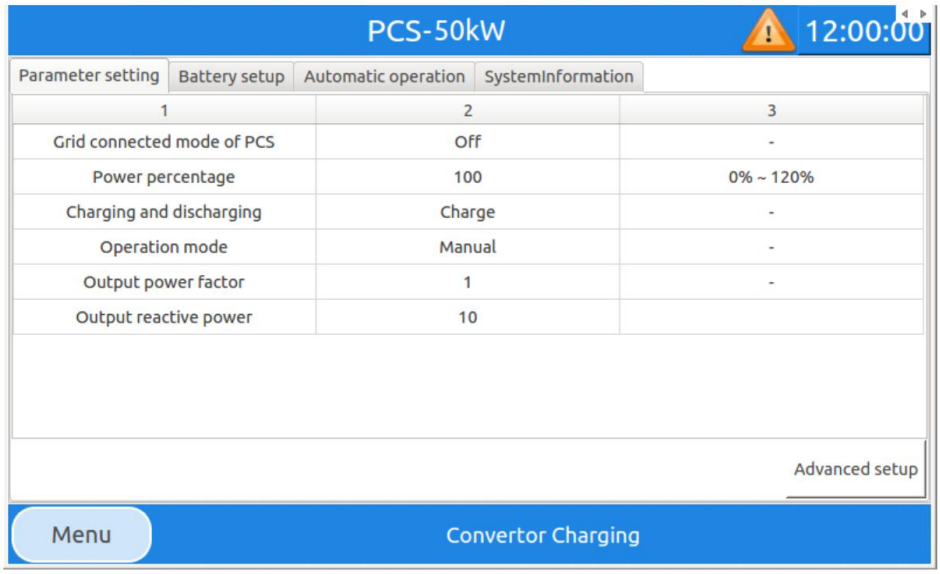


Figure 8-8 System_General Settings

Click System Settings on the System Menu.

The system is set up when it leaves the factory.

Under this menu, fixed settings such as model and power factor can be set.

The interface can select general settings such as inverter working mode and battery charging and discharging mode.

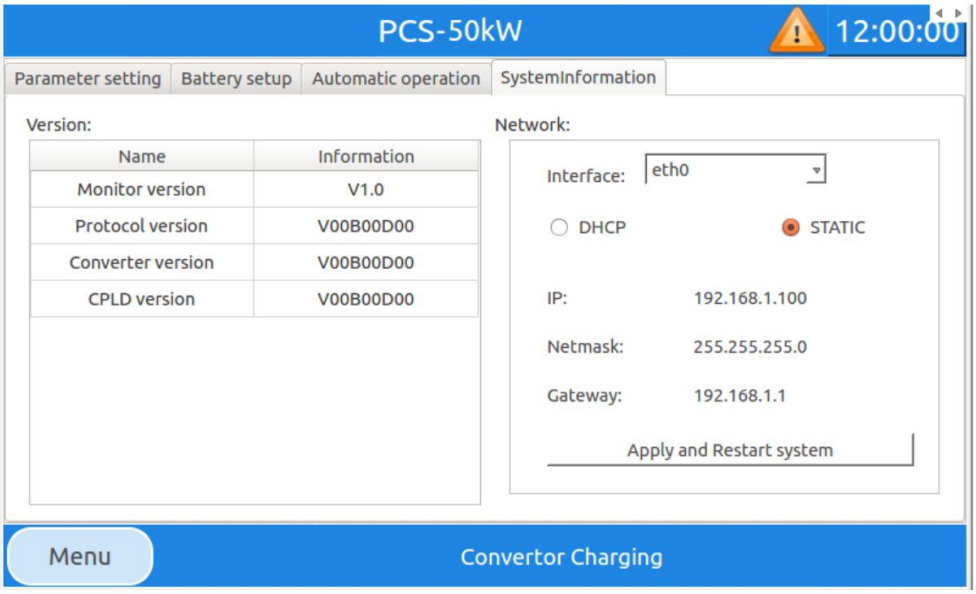


Figure 8-9 System_System Settings

Select "Running Time" from the system menu and enter the setting of charging and discharging time for peak shaving and valley filling.

Users can set it according to the local electricity price difference or the actual peak-valley power consumption time.

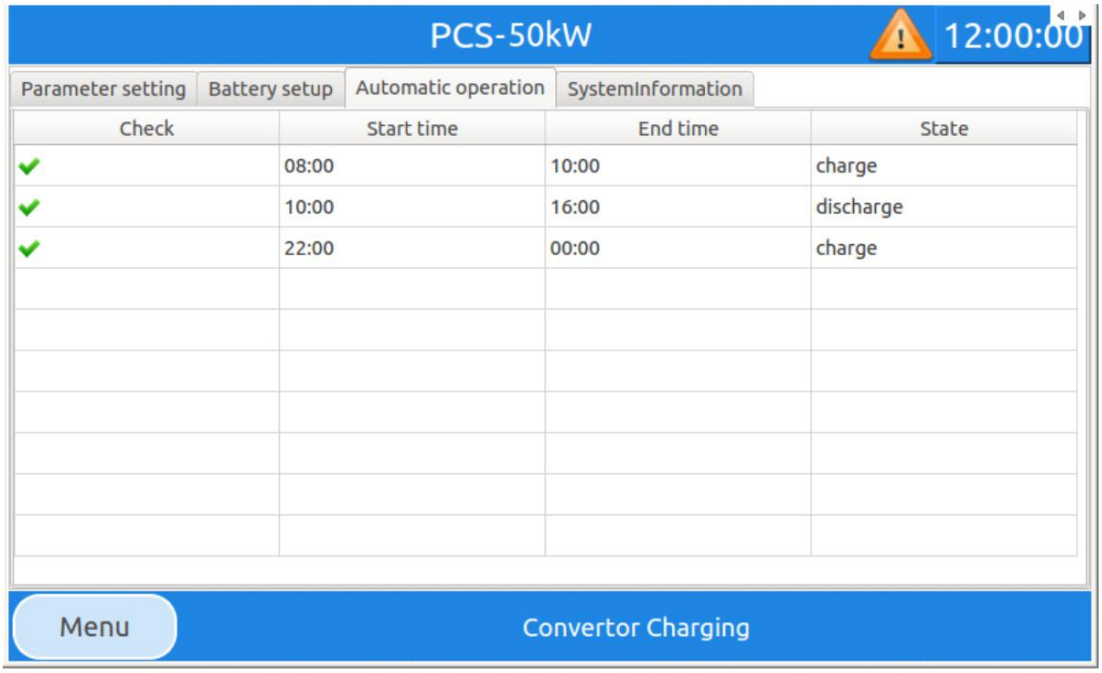


Figure 8-10 System_Time Settings

8.4.5 Switch Menu

Click on the switch button to enter the inverter switch interface.

1. Click on the green "Inverter Open" button and the inverter starts to work.
2. Select the red button "Inverter Close" button, and the inverter will stop working.

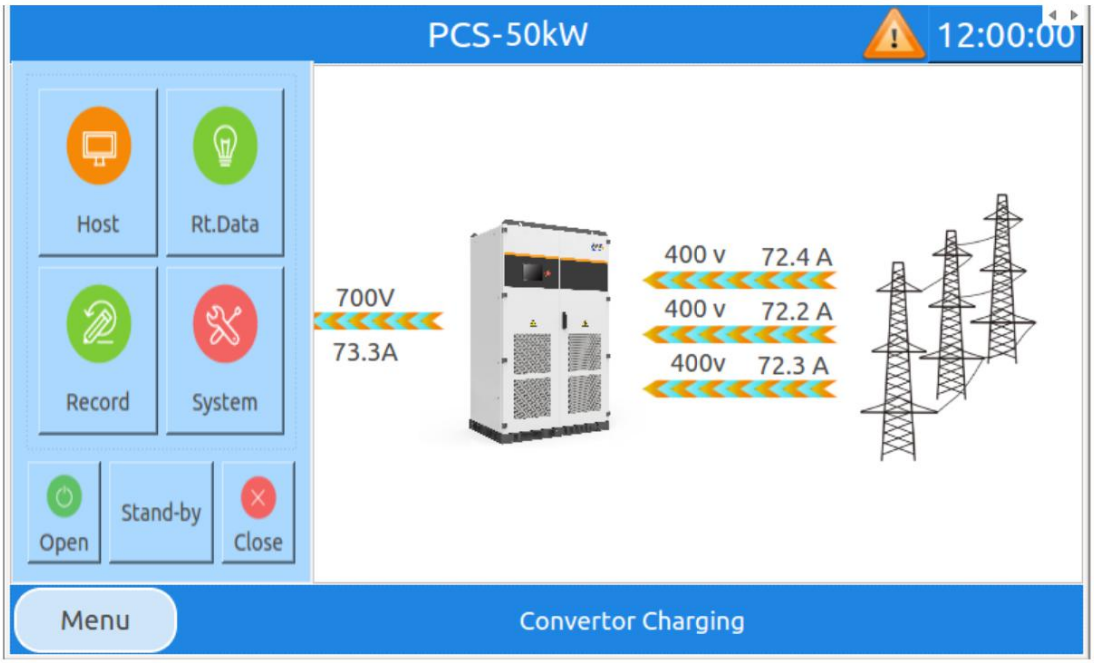


Figure 8-11 Switch menu

9 Maintenance and troubleshooting

9.1 Explain

Due to the influence of ambient temperature, humidity, dust and vibration, the internal devices of energy storage inverter will be aging, which will affect the performance of inverter and can even lead to failure. Therefore, it is necessary to carry out routine and regular maintenance of energy storage inverter to ensure its normal operation and service life. All measures and methods to help the energy storage inverter in good working condition belong to the scope of maintenance work. If there is a malfunction, with the help of this manual, you still can't solve the problem. Please contact us. At the same time, provide some information in order to provide you with better service:

- Photographs of Fault Site
- Type and serial number of energy storage inverter.
- Information on components connected to energy storage inverters, configuration of energy storage batteries and network parameters.
- Communication connection scheme of energy storage inverter.
- Fault information and brief description.

9.2 Matters Needing Attention

9.2.1 General Safety Rules

In order to ensure the safety of the operators, the following five safety rules must be observed when maintaining or overhauling the energy storage inverter:

- Disconnect all external connections of the energy storage inverter and the internal power supply of the equipment.
- Ensure that the energy storage inverter is not accidentally re-energized.
- Use the multimeter to ensure that the internal of the energy storage inverter is completely dead.
- Ensure that the energy storage inverter is well grounded.
- The operating part is close to the parts that may be electrified. It needs to be covered with insulation material.

WARNING

Only qualified and authorized personnel can maintain the energy storage inverter and other operations.
In the maintenance work, do not leave screw, washer and other metal parts in the energy storage inverter to avoid damage to the inverter!

WARNING

If only the circuit breaker is disconnected, the cable connection terminals in the AC/DC cabinet of the energy storage inverter are still live!
Before opening the cabinet door and starting the formal maintenance work, it is necessary to disconnect not only the circuit breaker, but also the front and back stage circuit breakers of the energy storage inverter.

WARNING

After the energy storage inverter is out of operation, please wait at least 15 minutes before operating it.

9.2.3 Maintenance Work And Cycle

Table 9-1 Maintenance Work Item Sheet

Maintenance project	Maintenance content	Recommendation cycle
Save record	◆ Export data with USB and save backup。	1 months
Inverter Inspection	◆ Observe whether the appearance of energy storage inverter is damaged, deformed or rusted. ◆ Listen to the abnormal sound of the energy storage inverter. ◆ LCD was used to observe the running parameters. Use thermal imager and other detection systems to detect the heating status. ◆ Check whether the ventilation, ambient temperature, humidity and dust around the inverter meet the requirements.	Half a year
Duct cleaning	◆ Check duct dust. ◆ Listen to if there is any abnormal vibration when the fan is running. ◆ Use compressed air and turn on the fan for cleaning. ◆ Clean or replace the air filter	Half a year (bad environment needs to be shortened as appropriate)
Security function	◆ Check whether the EPO button is invalid ◆ Check whether the LCD closed inverter function is invalid.	Half a year
Circuit connection	◆ Check all electrical connections for looseness or poor contact. ◆ Check the surface of all cables and metal surfaces for damage or scratch. ◆ Check that the insulation bandage of all terminals is off ◆ Check screw position for signs of overheating. ◆ Check the color change of the copper bars and bolts	1 years
Circuit Breaker Maintenance	◆ Check all circuit breakers for failure. ◆ Check whether the circuit breaker or load switch is damaged.	1 years
Identification check	◆ Check device warning signs and other equipment labels. ◆ If blurred or damaged, please replace it in time	1 years

WARNING

Due to the capacitance of DC bus, it will take at least 15 minutes to wait until the energy storage inverter is completely cut off. Before removing the dust, please use the multimeter measurement to confirm that there is no electricity in the machine, so as to avoid electric

shock.

The overwhelming majority of maintenance work can only be carried out by removing the protective net cover inside the machine. At the end of all maintenance work, it is necessary to restore all dismantled maintenance covers to their original state. Make sure all screws are tightened in place

Only the recommended product routine maintenance cycle is included in the table. The actual maintenance cycle should be determined according to the specific installation environment of the product. The maintenance cycle of the product will be affected by factors such as the scale of the power plant, the location of the plant and the on-site environment. It is necessary to shorten the maintenance cycle and increase the maintenance frequency if the wind and sand in the operation environment are larger or the dust is thicker.。

9.2.4 Check And Replace The Air Filter

- Read the safety instructions carefully.
- Open the cabinet door.
- Check the air filter and remove it with a screwdriver if necessary.
- Check the cleanliness of cabinet. If necessary, use a soft cloth or vacuum cleaner for cleaning.
- Close the cabinet door.

9.2.5 Replacement Of Electronic Components

When replacing the electronic and electrical components in the energy storage inverter, be sure to replace the same type of components from the same manufacturer! The type of components can be obtained by identifying the energy storage inverter or the product itself. If not, please contact us.

If it is necessary to replace the products of other manufacturers or different models of the same manufacturer, it must be confirmed by our engineers. in advance. Otherwise, we will not be liable for casualties or property losses that may result from this.

9.3 Fault Handling

9.3.1 Troubleshooting

Under the condition of failure, there may still be fatal high voltage inside the energy storage inverter! Only technicians who meet the requirements can perform the operations described in this chapter. "Compliance with requirements" means that operators have participated in professional training on equipment troubleshooting operations in the early stage. Please perform only the troubleshooting operations described in this manual. When operating, please observe all safety operation specifications.

When the energy storage inverter can't output as expected or the charge and discharge quantity changes abnormally, please pay attention to the following items:

- Open-circuit voltage of energy storage battery
- Whether the machine is in a state of failure

- Whether the power grid is connected correctly and powered on
- Check whether the communication of measuring equipment is normal

9.3.2 Non-Alarm Inducing Failure

Machine working noise is high

- Check whether the power is in the normal range; Measure whether the grid-connected current and voltage waveforms are normal; Check the replacement of cooling fans.

Network communication mode:

- Please check whether the IP address, subnet mask and gateway are set correctly.
- Check whether the communication line is through and whether it is well connected.
- If all the above tests are normal and correct, try to replace the LCD monitoring board.

Serial communication mode:

- Check the wiring, check all wiring is good, A/B has no connection.
- Communication adapter does not match. Replace communication adapter and try again.
- Check whether the local address and baud rate are consistent with the host computer.

LCD screen cannot be switched on and off

- Check the communication connection between LCD screen and DSP board

9.3.3 Alarm Failure List

LCD can display 32 alarms, and the corresponding solutions are shown in Table 9-2 below.

Table 9-2 Alarm Fault Handling Method

Fault Type	Processing Method
Low battery voltage	Disconnect DC load switch and check DC side voltage and battery configuration
Battery Voltage Low Auxiliary Power Supply	Disconnect DC load switch and check DC side voltage and battery configuration
Low battery power	Disconnect DC circuit breaker load switch and check energy storage battery status
Battery Back Connection Failure	Switch-off DC-side input bus
Busbar Overvoltage Fault	Turn off to check DC side voltage
Bus Short Circuit Fault	Turn off and check DC bus connection
Overvoltage of power	Check the voltage of grid connection point by shutdown

network	
Low grid voltage	Check the voltage of grid connection point by shutdown
Inverse Voltage Sequence of Power Grid	Disconnect the power supply switch and Turn off to check the three-phase wiring
Abnormal Frequency of Power Grid	Turn off and check grid voltage
DC Contactor Fault	Turn off and check whether the DC contactor is damaged.
Fault Type	**Processing Method**
Output contactor open circuit	Turn off and check if AC contactor is damaged
Output Contactor Short Circuit	Turn off and check if AC contactor is damaged
AC Fan Fault	Turn off and check AC fans
AC auxiliary power failure	Turn off and check the AC auxiliary power supply board
DC auxiliary power supply failure	Turn off and check DC auxiliary power supply board
15V power failure	Turn off , check AC and DC auxiliary power supply board
Inverter overcurrent	Turn off , check whether the input and output of the inverter are short circuit or whether the inverter is overloaded.
Wave by Wave Current Limitation of Inverter	Turn off , check whether the input and output of the inverter are short circuit or whether the inverter is overloaded.
Inverter Fault	Check operation before switching off repetitive inverter
Inverter overheating	Turn off , check whether the inverter fan is out of order and whether the air duct is unobstructed.
Inverter Phase Shortage Fault	Turn off and check AC side line
Inverter asynchronization	Turn off and check the inverter settings
Lightning protection failure	Turn off and check the lightning protection of the inverter
BMS Communication Fault	Turn off and check if the communication cable between inverter and battery system is loose
Overload	Turn off and check load size
Isolated island protection	Turn off

Drive Line Fault	Turn off， Check whether the internal drive line is loose
Insulation impedance anomaly	Turn off， Check inverter grounding and cable aging
EPO	Turn off
CT or Hall Opening	Turn off， Check CT wiring

9.3.4 Safety Protection Functions

Energy storage inverter has perfect protection function and warning function. When the input voltage or abnormal situation of power grid occurs, it can operate effectively to protect the safe operation of energy storage inverter and continue to operate the set mode until the abnormal situation disappears.

Table 9-3 Inverter Warning and Protection Functions

Function	Function Description
DC over/under voltage protection	When the DC voltage of the energy storage battery exceeds the allowable voltage range, the energy storage inverter will stop working and send out warning signals, and display the fault type on the LCD screen. Energy storage inverter can detect abnormal voltage quickly and react.
Overvoltage/undervoltage protection of power grid	When the energy storage inverter detects that the grid voltage exceeds the allowable voltage range, the energy storage inverter will stop working and send out warning signals, and display the fault type on the LCD screen. Energy storage inverter can detect abnormal voltage quickly and react.
Over/Under Frequency Protection of Power Grid	When the energy storage inverter detects that the frequency fluctuation of the power grid exceeds the allowable range, the energy storage inverter will stop working and send out warning signals. The fault type is displayed on the LCD screen. Energy storage inverter can detect abnormal frequency quickly and respond to it.
Isolated island protection	When the energy storage inverter detects that the grid voltage is 0, the energy storage inverter will stop working and send out warning signals, and display the fault type on the LCD screen. Energy storage inverter can detect abnormal voltage quickly and react.
AC Overcurrent Protection	When the output power of the energy storage battery exceeds the maximum DC input power allowed by the energy storage inverter, the energy storage inverter will work at the allowable maximum AC output power. When the AC current is detected to be greater than 1.2 times the rated current, the energy storage inverter will stop working. After restoring to normal, the energy storage inverter should be able to work normally.
AC leakage current protection	The energy storage inverter has the function of grounding protection. A leakage current sensor is installed in the grounding cable. When the leakage current exceeds 2A, the machine will stop immediately. When the current is less than 1.5A, the protection can be eliminated. The fault is displayed on the LCD screen.

IGBT Overtemperature Protection	IGBT module of energy storage inverter uses high precision temperature sensor, which can monitor module temperature in real time. When the temperature is too high, the DSP will issue instructions to stop the operation of energy storage inverter to protect the stable operation of equipment.
IGBT Fault Protection	The IGBT module of the energy storage inverter has self-protection function. When the module detects that the module has over-current, it can send fault information to the DSP quickly. The DSP will issue instructions to stop the energy storage inverter running, and send warning signals, and display the fault type on the LCD.
Polarity Reverse Connection Fault Protection	When the energy storage inverter detects that the DC voltage is negative, the energy storage inverter will send a warning signal and display the fault type on the liquid crystal.

Function	Function Description
Environmental Overtemperature Protection	High precision temperature sensor is used in the energy storage inverter, which can monitor the temperature inside the machine in real time. When the temperature is too high, the DSP will issue instructions to stop the operation of the energy storage inverter to protect the stable operation of the equipment.
DC Overcurrent Protection	When the energy storage inverter detects that the DC current is greater than 1.2 times the rated current, the energy storage inverter will stop working and send out warning signals, and display the fault type on the LCD. After restoring to normal, the energy storage inverter should be able to work normally.
Independent Inverter Overvoltage Protection	When the energy storage inverter operates in the independent inverting mode and detects that the three-phase output voltage exceeds the allowable voltage range, the energy storage inverter will stop working and send out warning signals, and display the fault type on the liquid crystal.
Phase Sequence Reverse Connection Protection	When the energy storage inverter self-checks and finds that the three-phase voltage phase of the connected power grid is wrong, the inverter will send out warning signals and display the fault type on the LCD. After returning to normal, the energy storage inverter should be re-energized and self-checked to work normally.
AC voltage unbalance protection	When the energy storage inverter detects that the difference of three-phase AC voltage exceeds the allowable range, the energy storage inverter will stop working and send out warning signals, and display the fault type on the LCD. Energy storage inverter can detect abnormal voltage quickly and react.
AC current unbalance protection	When the energy storage inverter detects that the difference of three-phase AC voltage exceeds the allowable range, the energy storage inverter will stop working and send out warning signals, and display the fault type on the LCD. Energy storage inverter can detect abnormal voltage quickly and react.
Transformer Overtemperature Protection	The transformer of energy storage inverter uses high precision temperature sensor, which can monitor module temperature in real time. When the temperature is too high, the DSP will issue instructions to stop the operation of energy storage inverter to protect the stable operation of equipment.
Fan Fault Protection	The fan of the energy storage inverter has the function of automatic detection. When the fan is not turned, it can send fault information to the DSP quickly. The DSP will issue instructions to stop the energy storage inverter, and send warning signals, and display the fault type on the LCD.

Fault Protection of AC/DC Contactors	When the operating state of the energy storage inverter is standby, grid-connected or off-grid, the AC/DC main contactor is detected to be disconnected, the energy storage inverter will stop working, and send out warning signals, and display the fault type on the LCD.

Appendix 1：Technical Parameter

Table 1 Parallel off-line model (30KW/50kW/100KW)

TYPE	MPS 30T-S MPS 30T	MPS 50T-S MPS 50T	MPS 100T-S MPS 100T
DC(battery)			
Voltage range	500V~850Vdc		
Max current	66A	110A	220A
AC			
Rated power	30KW	50kW	100kW
Max output power	33KW	55kW	110kW
AC connection	3W+N+PE		
Rated voltage	400Vac		
Rated output current	43A	72A	144A
Max output current	48A	80A	160A
grid-connected			
Grid Voltage range	400Vac（-20%~+15%）		
Frequency range	50±5HZ/60±5HZ		
Overload capability	110%-10min/120%-1min		
THDI	< 3%		
PF	> 0.99		
PF range	-1~+1		
Fault traversal capability	ZVRT、HVRT		
Off-grid			
Isolation mode	Built-in transformer		
Voltage regulation	1%		
THDU	< 3%（linear）		
Unbalanced load capacity	100%		
Overload capacity	110%~10min，120%~1min		
System Parameter			
Maximum efficiency	> 96.2%	> 96.5%	> 97.1%
Cooling mode	Forced air		
Charge-discharge switching time	< 40ms		
Environmental Protection Level	IP21		
relative humidity	0-95% non-condensing		
Operation Temperature	-30℃~+55℃		
Maximum altitude	3000m		
Display	7 inch Touch screen		
communication interface	R485 / MODBUS-TCP / Ethernet		
BMS Access	allow		
Mechanical parameters			
Dimension（W*D*Hmm）	800*800*2050	800*800*2050	800*800*2050
Weight（Kg）	350	420	860

Table 3 On and Off line Model（250KW/500KW/630KW）

TYPE	MPS 250T-S MPS 250T	MPS 500T-S MPS 500T	MPS 630T
DC(battery)			
Voltage range	500V~850Vdc		
Max current	550A	1100A	1260A
AC			
Rated power	250kW	500kW	630KW
Max output power	275kW	550kW	693KW
AC connection	3W+N+PE		
Rated voltage	400Vac		
Rated output current	361A	720A	910A
Max output current	400A	800A	1000A
grid-connected			
Grid Voltage range	400Vac（-20%~+15%）		
Frequency range	50±5HZ/60±5HZ		
Overload capability	110%~ normal，120%~1min		
THDI	< 3%（Rated power）		
PF	> 0.99（Rated power）		
PF range	-1~+1		
Fault traversal capability	ZVRT、HVRT		
Off-grid			
Isolation mode	Built-in transformer		
Voltage regulation	1%		
THDU	< 3%（linear）		
Unbalanced load capacity	100%		
Overload capacity	110%~10min，120%~1min		
system parameter			
Maximum efficiency	> 97.3%	> 97.5%	> 97.8%
Cooling mode	Forced air		
Charge-discharge switching time	< 40ms		
Environmental Protection Level	IP21		
relative humidity	0-95% non-condensing		
Operation Temperature	-30℃~+55℃		
Maximum altitude	3000m		
Display	7 inch Touch screen		
communication interface	R485 / MODBUS-TCP / Ethernet		
BMS Access	allow		
Mechanical parameters			
Dimension（W*D*Hmm）	1200*800*2050	1600*935*2050	1600*935*2050
Weight（Kg）	1350	2770	2950

Table 4 On-grid Model（500kW/630kW）

TYPE	MPS 500			MPS 630		
DC(battery)						
Voltage range	500V~850V	550V~850V	600V~850V	550V~850V	600V~850V	600V~850V
Max current	1100A	1000A	916A	1200A	1150A	1150A
AC						
Rated power	500kW			630kW		
Max output power	550kW			693KW		
AC connection	3W+PE					
Rated voltage	315Vac	360Vac	400Vac	315Vac	360Vac	400Vac
Rated output current	916A	800A	722A	1150	1010A	910A
Max output current	1008A	880A	794A	1270	1111A	1000A
grid-connected						
Grid Voltage range	315/360/400Vac（-20%~+15%）			315/360/400Vac（-20%~+15%）		
Frequency range	50±2HZ/60±2HZ					
Overload capability	110%~10min，120%~1min					
THDI	< 3%					
PF	> 0.99					
PF range	-1~+1					
Fault traversal capability	ZVRT、HVRT					
Off-grid						
Isolation mode	External transformer					
Voltage regulation	1%					
THDU	<3%					
Unbalanced load capacity	100%					
Overload capacity	110%~10min，120%~1min					
system parameter						
Maximum efficiency	> 98.7%			> 98.7%		
Cooling mode	Forced air					
Charge-discharge switching time	< 40ms					
Environmental Protection Level	IP21					
Relative humidity	0-95% non-condensing					
Operation Temperature	-30℃~+55℃					
Maximum altitude	3000m					
Display	7 inch Touch screen					
Communication Interface	R485 / MODBUS-TCP / Ethernet					
BMS Access	allow					
Mechanical parameters						
Dimension（W*D*Hmm）	1200*800*2050					
Weight（Kg）	1100			1300		

Appendix II: Quality Assurance

- Products that fail during quality assurance.
- We will repair or replace new products free of charge.

1. Evidence

During the warranty period, the company requires customers to produce invoices and dates for purchasing products. At the same time, the trademark on the product should be clearly visible, otherwise it has the right not to give quality assurance.

2. Conditions

- Unqualified products after replacement shall be handled by our company.
- Customers should reserve reasonable time for the company to repair faulty equipment.

3. Immunity from liability

In the following circumstances, the company has the right not to undertake quality assurance:

- The whole machine and parts have exceeded the free warranty period.
- Transportation damage.
- Improper installation, modification or use.
- Operating in very harsh environments beyond those described in this manual.
- Machine failure or damage caused by installation, repair, alteration or disassembly by non-company service personnel.
- Any installation and use beyond the scope specified in the relevant international standards.
- Machine failure or damage caused by the use of non-standard or non approved components or software.
- Damage caused by abnormal natural environment causes product failure due to the above situation. Customers require maintenance services. After judging by the company's service agencies, it can provide paid maintenance services.

In order to continuously improve customer satisfaction, the company's products and product manuals are in the process of continuous improvement and upgrading. If there is a difference between the manuals and the products in your hand, it may be the reason for the edition, please refer to the specific products. If you still have questions, please contact us.