

# STACKABLE ENERGY STORAGE

## ALL-IN-ONE MACHINE

### USER MANUAL



Version: V1.0

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## 1. Overview

### 1.1 Scope of Application

This product manual provides a detailed introduction to the DZ Stackable Energy Storage Unit (hereinafter referred to as the "Energy Storage Unit"), including product information, installation wiring, operation, maintenance, and troubleshooting. Please follow the instructions for installation and use. Before using the product, please read this manual carefully to understand the product safety information and familiarize yourself with its functions and features.

This product manual applies to the following models of stacked energy storage all-in-one machines.

<b>LFP-48100-DD</b>	<b>DZ-SMK6.2K-48100-DD</b>
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Please properly store this product manual and ensure that relevant personnel can easily access and review it.


### 1.2 Target Audience


This manual is intended for professional electrical technicians responsible for installing and commissioning energy storage integrated machines.


### 1.3 Symbol Description

To ensure the personal and property safety of users when using this product, as well as the efficient use of this product, the manual provides relevant safety operation information and highlights it with appropriate symbols. The following lists the symbols used in this manual. Please read it carefully.

	<b>Danger!</b> "Danger" indicates a highly potential hazardous situation where failure to avoid it could result in death or serious injury.
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	<b>Warning!</b> "Warning" indicates a moderate potential hazard that, if not avoided, could result in death or serious injury.
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	<b>Attention!</b> "Attention" indicates a low level of potential danger, where failure to avoid it could result in moderate or minor injuries to personnel.
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	<b>Instruction</b> "Instructions" are additional information in the manual that emphasize and supplement the content, and may also provide tips or tricks for optimizing the use of the product, helping you solve a problem or save time.
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## 2 Safety Precautions


### 2.1 Electrical Safety Precautions


	<p><b>Danger!</b></p> <p>Exposure to sunlight will cause the photovoltaic array to produce dangerous voltages. Before making electrical connections, ensure that the photovoltaic panels are covered with light-blocking material or the DC circuit breaker is disconnected.</p>
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	<p><b>Danger!</b></p> <p>The energy storage battery has a deadly high voltage between the positive and negative terminals!</p> <ul style="list-style-type: none"><li>● When installing the battery, please confirm the positive and negative terminals of the battery and turn off the power.</li><li>● Do not use the battery or controller box that is obviously defective, damaged or missed.</li></ul>
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	<p><b>Danger!</b></p> <p>Touching the terminals of the grid or equipment may lead to fatal electric shock!</p> <ul style="list-style-type: none"><li>● Do not touch the terminals or conductors connected to the grid circuit.</li><li>● Pay attention to all instructions or safety documentation regarding connection to the grid.</li></ul>
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	<p><b>Danger!</b></p> <p>Damaged equipment or system malfunctions may cause electric shock or fire!</p> <ul style="list-style-type: none"><li>● Perform an initial visual inspection of the equipment for damage or other hazards before operating.</li><li>● Check whether other external equipment or circuit connections are safe.</li><li>● Ensure that the equipment is in a safe state before operation.</li></ul>
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	<p><b>Danger!</b></p> <ul style="list-style-type: none"><li>● Maintenance or repair operations are strictly prohibited while the equipment is powered on!</li><li>● When performing maintenance or repair on the equipment, at least two personnel must be present on-site.</li></ul>
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	<p><b>Attention!</b></p> <ul style="list-style-type: none"><li>● Any fault that affects the safety performance of the energy storage all-in-one machine must be eliminated before the unit can be turned on again.</li><li>● Do not dismantle or install internal components of the energy storage all-in-one machine without authorization. The company does not bear warranty and joint liability for losses caused by this.</li></ul>
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DZ stackable energy storage all-in-one machine is designed and tested strictly in accordance with relevant safety regulations, but as a storage and gas electronic equipment, when installing and maintaining, it requires adherence to the following safety instructions. Improper operations will endanger the operator and others or cause property loss.

- Energy storage all-in-one machines must be installed and maintained by professionals in accordance with local standards and regulations.
- It is strictly prohibited to install, use, and operate outdoor equipment and cables in severe weather conditions such as thunderstorms, rain, snow, and winds stronger than Force 6 (including but not limited to moving equipment, operating equipment and cables, plugging and unplugging outdoor signal interfaces, high-altitude operation, outdoor installation, etc.)
- If a fire occurs, evacuate the building or equipment area, press the fire alarm button, or dial the fire department. Under no circumstances should one re-enter a burning building.
- All electrical installations must comply with local electrical standards and obtain permission from the local power supply department before being carried out by professionals to connect the energy storage all-in-one machine to the grid.
- Do not disassemble the device casing or touch/replace components without authorization, as this may pose a risk to human safety and equipment.
- The energy storage all-in-one machine may experience local temperatures exceeding 60°C during operation. Please do not touch to avoid burns.
- Ensure that the open-circuit voltage of the photovoltaic input is less than the maximum allowable input voltage of the device, or else the device will be damaged.
- When the device is in operation, it is prohibited to plug or unplug the DC and AC connectors.

## 2.2 Icon Description

Always pay attention to the safety-related markings on the machine, read them carefully, and fully understand their meanings.

Icon	Icon Description
	The interior of the body contains high voltage, touching may cause electric shock hazards.
	The temperature here is above the human acceptable range; do not touch arbitrarily to avoid personal injury.
	After a power outage, the internal capacitors are still charged and need to be left for 5 minutes to ensure complete discharge.
	This is the protective earthing (PE) terminal, which needs to be securely grounded to ensure the safety of the operator.
	Positive and negative pole identification, reminding users to pay attention to the polarity of electrical connections.
	This side must not be tilted or placed upside down.
	Recyclable and reusable.
	Must not be discarded as ordinary trash; must be recycled through special channels.
	Please refer to this user manual for operation.
	Compliant with CE certification standards.

### 3 Product Description

#### 3.1 Basic Features

The DZ series stacked energy storage all-in-one machine integrates stacked energy storage battery modules and photovoltaic energy storage inverters, and is a solution applied to energy management equipment between photovoltaic modules, loads, and the grid. It can convert solar energy into AC power. Energy can also be stored in batteries.

Photovoltaic-generated electricity can power the load, be stored in batteries for future use, and be connected to the AC grid. The working mode depends on the user's usage scenario. When the power grid is down, the energy storage unit can utilize the battery and solar energy, providing power for emergency loads.

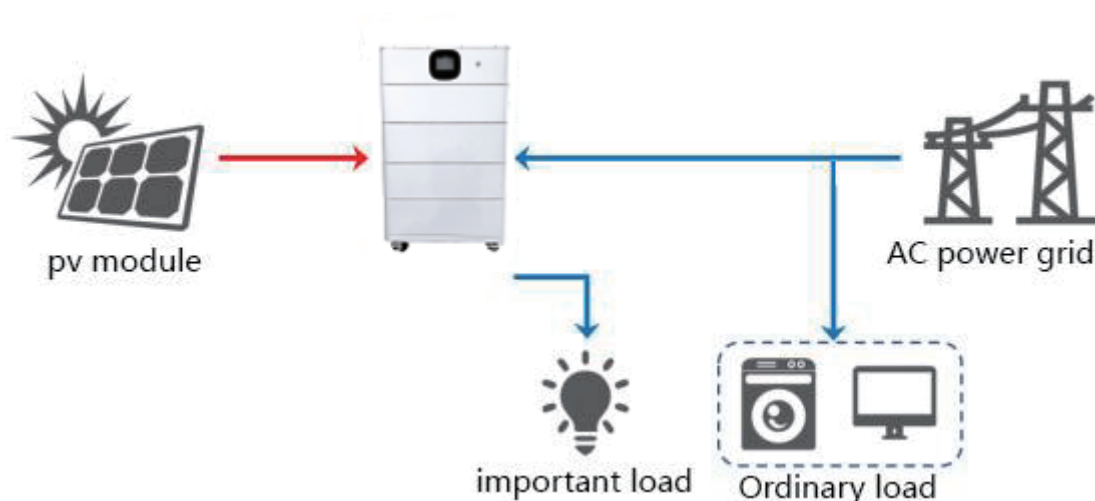


Figure 3-1 Typical Application System Diagram

#### 3.2 Mechanical Dimensions

For 10 kWh Two Module Batteries

Product Model	Dimensions (W×D×H)	Net Weight
LFP-48100-DD	600×450×527mm	115kg

### 3.3 Introduction of Component

#### 3.3.1 System Introduction

This document uses an example of stacking four batteries to introduce the product installation and wiring steps.

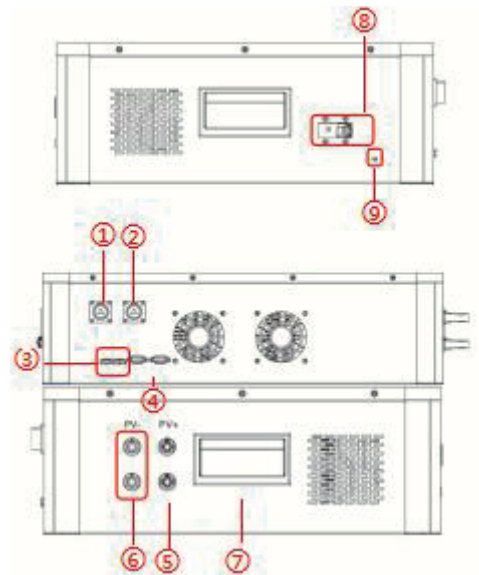


NO.	Items
①	Inverter
②③④⑤	Battery Module
⑥	Pedestal

#### 3.3.2 Introduction of Inverter



Top View



Back View

No.	Items	No.	Items
①	AC IN	⑤	PV+
②	AC OUT	⑥	PV-
③	Current-sharing port (applicable only to parallel modules)	⑦	Handle
		⑧	Inverter circuit breaker
④	Parallel Communication Port (Applicable only to Parallel Module)	⑨	Grounding hole

### 3.4 Functional Features

The LEB series stacked energy storage all-in-one machine adopts a modular design, integrating energy storage batteries and photovoltaic energy storage inverters for households, capable of meeting a wide range of home energy storage needs.

- Support for multiple scenarios and working modes.
- Modular design, stacked installation, easy to operate and maintain.
- High efficiency, high power density, and space-saving installation.
- The stackable all-in-one machine simultaneously supports power expansion and battery capacity expansion.

## 4 Installation Preparations

### 4.1 Check the Integrity of Transportation

Although the product has been fully tested and rigorously inspected before leaving the factory, there is still a possibility of damage during transportation, so please conduct a thorough inspection before signing for the product.

- Check if the package box is damaged upon receipt.
- Check the completeness of the items according to the packing list and ensure they match the order.
- After disassembly, check whether all internal components are complete and undamaged.

If any damage is detected, please contact the shipping company or our company directly. Please provide photos of the damaged area on time. Our company's after-sales department will provide the fastest and best service.


Do not dispose of the original packaging of the device; it is best to store the device in its original packaging box when it is not in operation.

### 4.2 Check the packing list

After unpacking, check the contents of the box against the packing list to ensure the following items are included:

No.	Items	Qty.	Description
1	Photovoltaic Inverter	1	
2	Battery Module	3/4/5	Refer to configuration
3	Base	1	
4	Photovoltaic Connectors	1	PV+ Input Terminals
		1	PV- Input Terminals
5	AC Female Terminal	2	Grid Connection Terminals
6	Document	1	Includes product manual
7	M5*10 Three Combined Screws	1	

### 4.3 Storage

	<b>Note:</b>
	<ul style="list-style-type: none"><li>● During storage, records should be kept in accordance with the product storage requirements of this manual, such as temperature, humidity, and storage environment.</li><li>● It is not recommended to store batteries for an extended period. Prolonged storage of lithium batteries can result in capacity loss; after 12 months of storage at the recommended temperature, the irreversible capacity loss is generally 3%-10%.</li></ul>

It is not recommended to store batteries for an extended period. Prolonged storage of lithium batteries can result in capacity loss; after 12 months of storage at the recommended temperature, the irreversible capacity loss is generally 3%-10%.

If the energy storage all-in-one machine is not to be put into operation immediately, it needs to be stored under specific environmental conditions.

- Repack in the original packaging and keep the desiccant.
- The packaging box needs to be sealed with tape.
- Store in a clean and dry place, protected from dust and moisture.
- Storage environment temperature:  $-40^{\circ}\text{C}\sim+50^{\circ}\text{C}$ ; Storage environment relative humidity: 0~65%, no condensation.
- Avoid chemical corrosive substances, as they may corrode the all-in-one machine.
- During storage, regular inspections (biannually) are required. If any signs of insect infestation or rodent damage are found, timely replacement is necessary.
- The packaging box must not be tilted or inverted.
- When stacking the packaging boxes, they should comply with the stacking requirements on the outer packaging.
- When storing beyond the due date, it requires comprehensive inspection and testing by professionals before it can be put into operation.

#### 4.4 Installation Tools

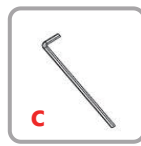
The following tools need to be prepared before installation:



Insulating gloves



Safety shoes



Hex key



Level



Flat-head screwdriver



Phillips-head screwdriver



Disassembly tool



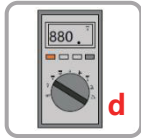
Crimping tool



Wire cutter



Wire stripper



Multi-meter



Rubber hammer

No.	Description
a	M4
b	M5
c	5mm hex key
d	Maximum range $\geq 1500\text{Vdc}$

## 5 Mechanical Installation

### 5.1 Installation Precautions Danger!



#### **Danger !**

Before installing the energy storage unit, ensure that the energy storage unit has no electrical connections.



#### **Attention!**

Poor ventilation in the installation environment will affect system performance!  
During the operation of the device, it is necessary to ensure the cooling requirements of the device to maintain adequate internal cooling.


### 5.2 Site Selection for Installation


To choose the best installation site for the energy storage unit is crucial for ensuring its safe operation, longevity, and performance. The energy storage all-in-one machine has an IP30 protection level, suitable for both indoor and outdoor installation. Installation position should be convenient for electrical connection, operation, and maintenance.


- Ensure installation in a dry, well-ventilated environment and secure the device on a solid, flat support surface.
- Garage installation should be kept away from the direction of vehicle movement to avoid accidental collisions.
- Install the device away from fire and heat sources, and avoid placing flammable or explosive materials around the equipment.
- The installation location is clean with no significant infrared radiation, organic solvents, or corrosive gases.
- The installation needs to adopt corresponding preventive measures in areas frequently affected by natural disaster such as flood, debris flow, earthquakes, and typhoons.
- Ensuring smooth ventilation and heat dissipation is crucial for the energy storage unit. Please install the energy storage unit in a well-ventilated environment.
- When the device is in operation, the chassis and heatsink will become quite hot, so please do not install them in easily accessible locations.
- During operation, do not block the air vents or cooling system to prevent overheating and fire.
- Not to be installed in locations accessible to children.
- Environmental Temperature:  $-20^{\circ}\text{C}\sim+50^{\circ}\text{C}$ ; Maximum Relative Humidity: 0%~65%, non-condensing.
- Salt damage areas refer to coastal areas within 500 meters of the coastline. Installation in outdoor areas affected by salt damage is not allowed. The sedimentation amount is related to the characteristics of the seawater in the adjacent sea area, sea wind, precipitation, air humidity, topography, and forest coverage, and have significant differences.
- Avoid direct sunlight, rain, and snow accumulation on the energy storage all-in-one machine to extend its service life. Installation under a shelter is recommended.

## 6 Electrical Connections

Electrical connections must comply with local regulations and relevant electrical standards.

	<p><b>Warning!</b></p> <p>The cables used in photovoltaic energy storage systems must be securely connected, in good condition, well insulated, and of appropriate specifications.</p>
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	<p><b>Warning!</b></p> <ul style="list-style-type: none"><li>● Incorrect wiring operations may result in personal injury to operators or permanent damage to equipment.</li><li>● Only qualified professionals are allowed to perform wiring work.</li><li>● Electrical operators must wear protective equipment, such as insulated shoes and protective gloves, before making electrical connections.</li></ul>
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	<p><b>Attention!</b></p> <p>Photovoltaic input, AC grid, and load side are recommended to be equipped with external circuit breakers for isolation during maintenance and to provide short-circuit over-current protection.</p>
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### 6.1 Cable Requirements

The recommended cable specifications for connection are shown in the table below.

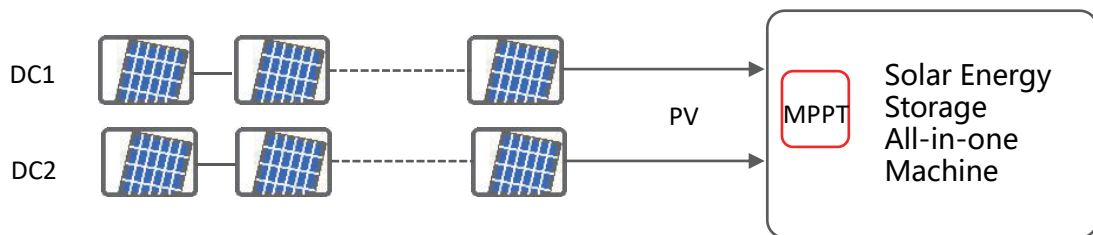
Port	Definition	Cable Type	Cable Specification
Photovoltaic port	PV1+	Outdoor multi-core copper wire	4~6mm <sup>2</sup>
	PV1-		
Load Interface	AC OUT	Outdoor multi-core copper wire	4~6mm <sup>2</sup>
Grounding	PE	Yellow-green outdoor copper core cable	≥6mm <sup>2</sup>

## 6.2 Connecting Photovoltaic Cables:

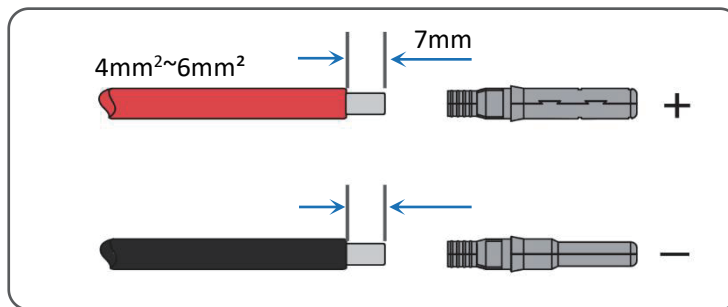
Follow these requirements for connecting PV strings.

- Ensure that the DC switch is in the off position before connecting the PV string.
- Ensure that the polarity of the photovoltaic string matches the photovoltaic connector.
- The short-circuit current of each photovoltaic string must not exceed the maximum input current for photovoltaic of the inverter.
- Each string of photovoltaic components must not exceed the maximum input voltage of the inverter.
- Positive and negative terminals of photovoltaic strings must not be grounded.
- It is imperative to use the photovoltaic connectors provided by our company.

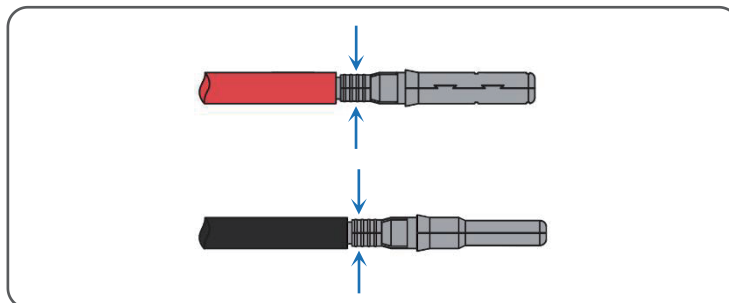
The inverter has multiple PV string inputs, with each two inputs having independent MPPT. To fully utilize the input power of photovoltaic panels, the photovoltaic modules in the same string should have the same structure, including same modules, number of battery panels, same inclination angle, same azimuth angle.



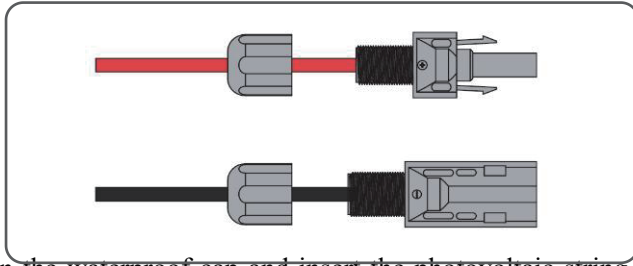
**Step 1:** Select the appropriate photovoltaic cable and strip the conductor by 7mm.



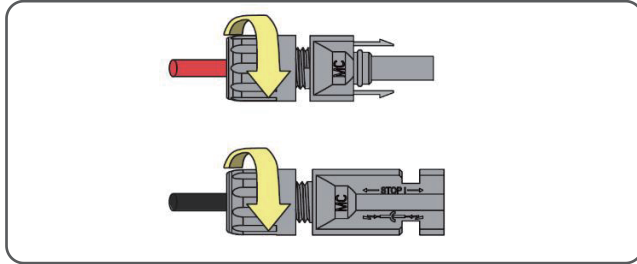
**Step 2:** Connect the conductor part of the photovoltaic cable to the metal terminal and tighten it with a specialized terminal crimping tool.



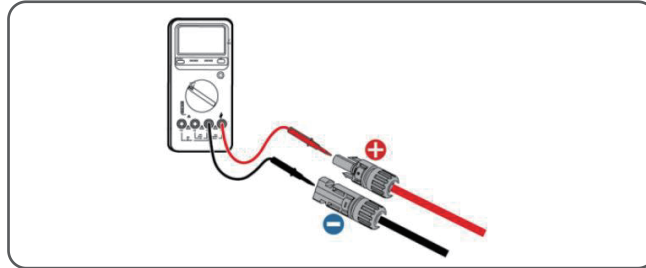
**Step 3:** Insert the crimped photovoltaic cable into the photovoltaic connector. A correct insertion will produce a "click" sound.



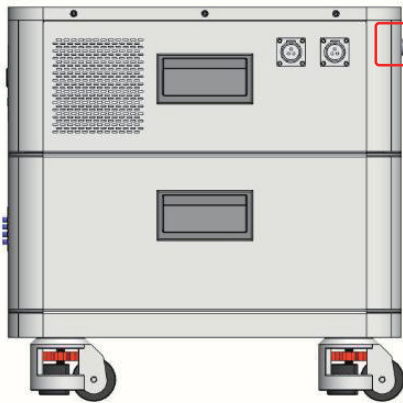
**Step 4:** Tighten the waterproof cap and insert the photovoltaic string input terminal of the solar storage all-in-one machine.



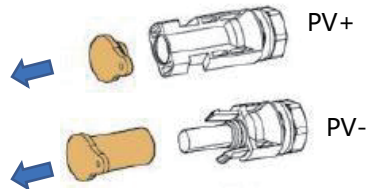
**Step 5:** Use a multi-meter to check if the polarity is correct.



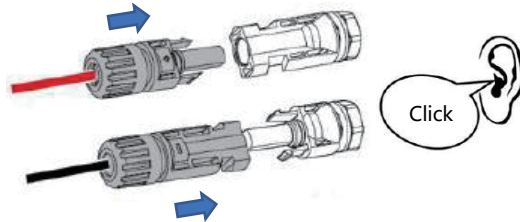
**Step 6:** Insert the inverter PV input end.



Please keep the waterproof cap properly



Pull back PV cable and no drop means it is in good place

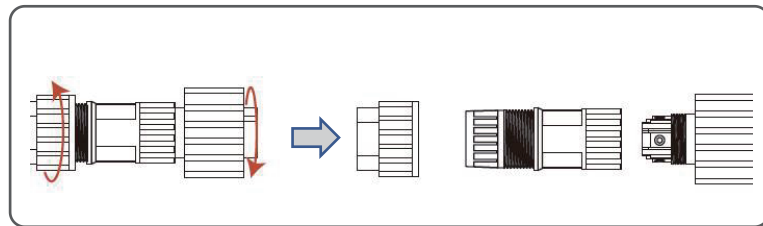


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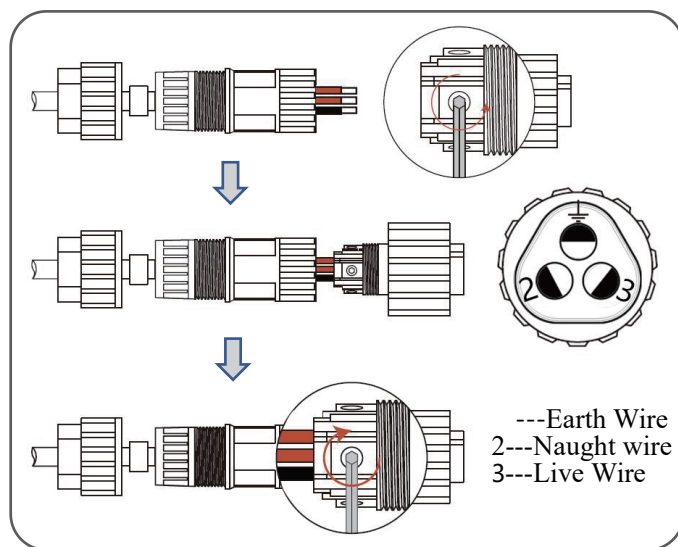
### 6.3 Connect the AC grid terminals

**Step 1** The recommended input cable for the AC grid is 8AWG cable. The cable is manually peeled to expose 4mm copper wire for subsequent crimping.

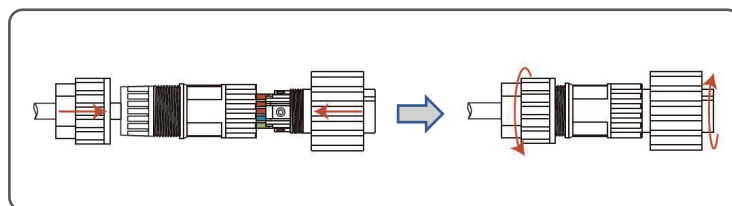
**Step 2** Remove the AC connector.



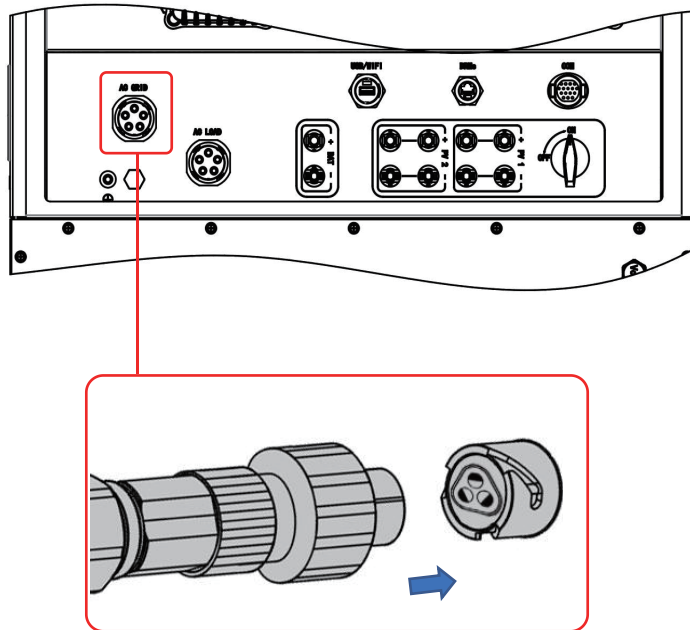
**Step 3** Connect the communication cable to the connector.



**Step 4** Assemble the AC connector.



**Step 5** Connect the AC connector to the inverter AC grid terminal.

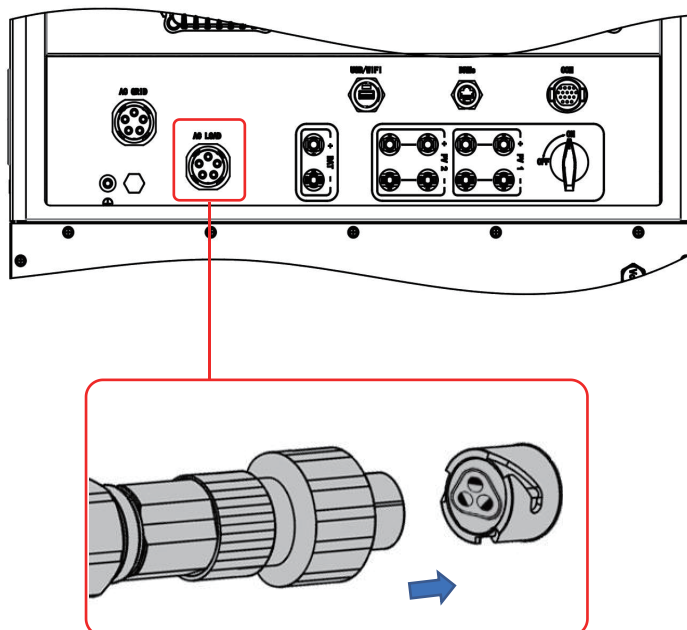


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#### 6.4 Connect the AC load cable

**Step 1~4** Refer to steps 1-4 of "6.3 Connecting the power grid cable".

**Step 5** Connect the load connector to the inverter AC load terminal.



--End

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## 7 Running

### 7.1 Double-Check

Please double-check the following items before running.

- The energy storage all-in-one machine has been securely and firmly installed and fixed.
- The cable connection is secure, the polarity/phase sequence is correct, and the voltage is within the acceptable range.
- The battery switch is in the off position.
- Ensure that an AC circuit breaker is correctly connected between the all-in-one machine's grid port and the grid, with the circuit breaker in the open position.
- The all-in-one machine load port is correctly connected to the emergency load with an AC circuit breaker, and the breaker is in the off position.

### 7.2 Initial Power-On

Step 1: Close the battery switch.

#### Power On/Off



Once the unit is properly installed and the battery is securely connected, simply press the ON/OFF switch (located on the unit's casing) to turn it on.



Step 2 Press the "ON/OFF" button on the control box, with the button in the "ON" position, the battery powers on.

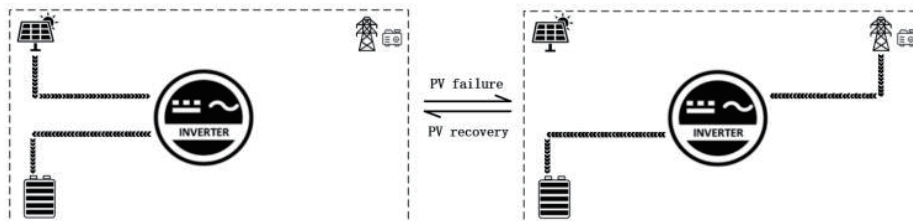
The energy storage all-in-one machine has started running. If this is the initial power-up, the following parameters need to be set.

No.	Parameter	Description
1	System Time	Time calibration to local time
2	Safety Regulations Parameters	Set the corresponding safety regulations parameters. The user needs to check the parameters from corresponding countries or regions.
3	Energy Storage Mode	Set the operating mode. For an introduction to the energy storage mode, refer to the "8 Parameter Setting Instructions" section of this manual.

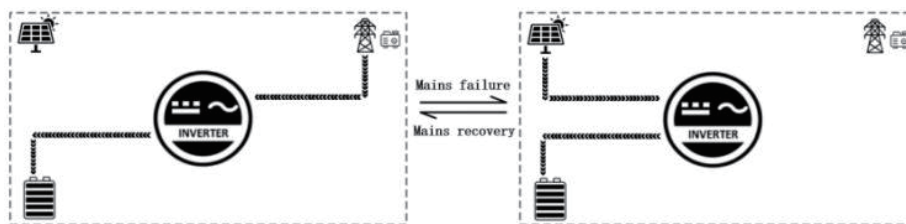
# 8. Operating modes

## 8.1 Charging mode

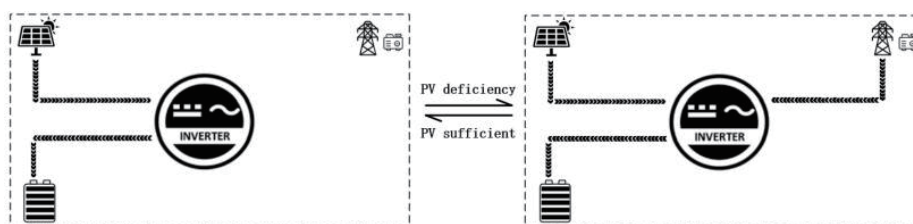
1、 **Solar First:** priority shall be given to charging by PV, and mains charging will be started only when the PV has failed. It can fully utilize solar energy to generate power in the daytime and then switch to mains charging to keep the battery level, and can be used in regions where the grid is relatively stable and the feed-in tariff is relatively expensive.



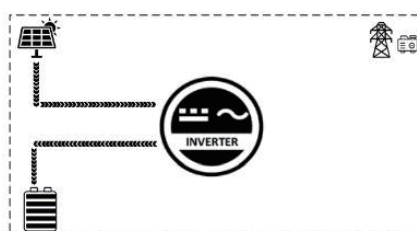
2、 **Mains First:** priority shall be given to charging by Mains Power, and charging with PV power will be started only when the Mains has failed.



3、 **Hybrid Charging:** hybrid charging of PV and Mains Power, give priority to PV MPPT charging, and supplement Mains Power when PV energy is insufficient. When the PV energy is sufficient, the Mains Power will stop charging. This is the mode of fast charging and suitable for unstable areas of power grid, and can provide sufficient backup power at any time.

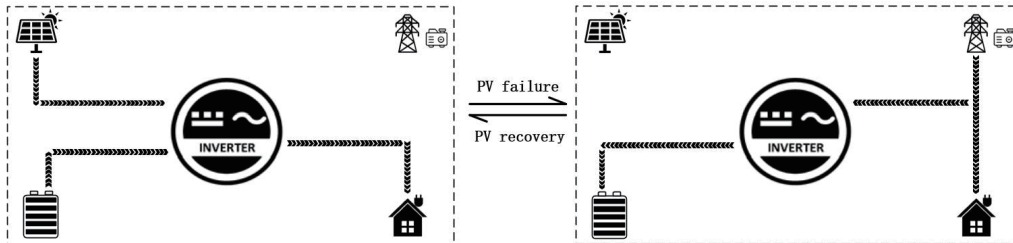


4、 **Only Solar:** Only PV charging, no mains charging is initiated. This is the most energy-efficient mode and the battery power comes from solar energy, which is usually used in regions with good daylighting conditions.

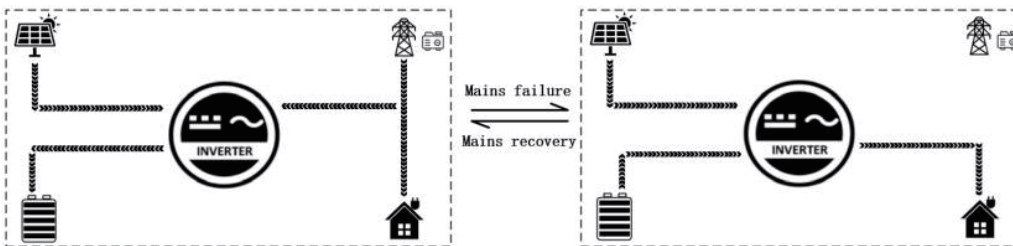


## 8.2 Output mode

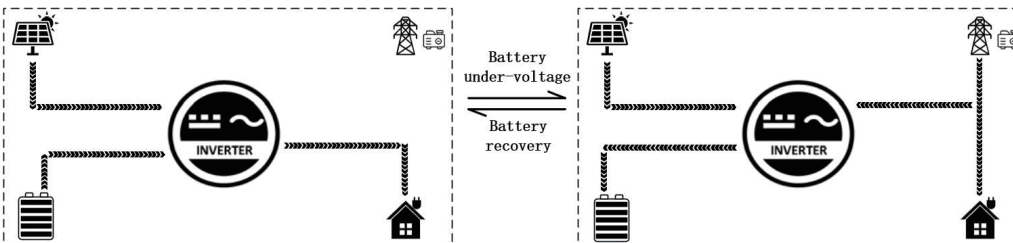
1、 **Solar First:** PV and battery will power the load, with diversified charging modes available and output mode optional, when the Solar First Mode is selected, the use of green solar energy can be maximized for energy efficiency and emission reduction. Switch to Mains Power when PV has failed. This mode can maximize the use of solar energy while maintaining the battery power, which is suitable for regions with relatively stable power grid.



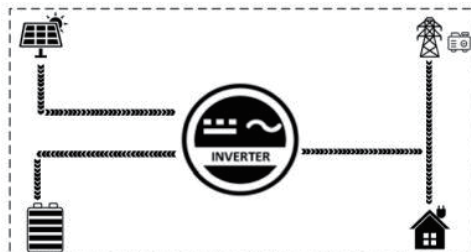
2、 **Mains First:** switch to inverter power supply only when Mains Power has failed, which is equivalent to backup UPS and is used in regions with unstable power grid.



3、 **Inverter First:** switch to Mains Power supply only when the battery is under-voltage. This mode uses DC energy to the maximum extent and is used in regions with stable power grid.



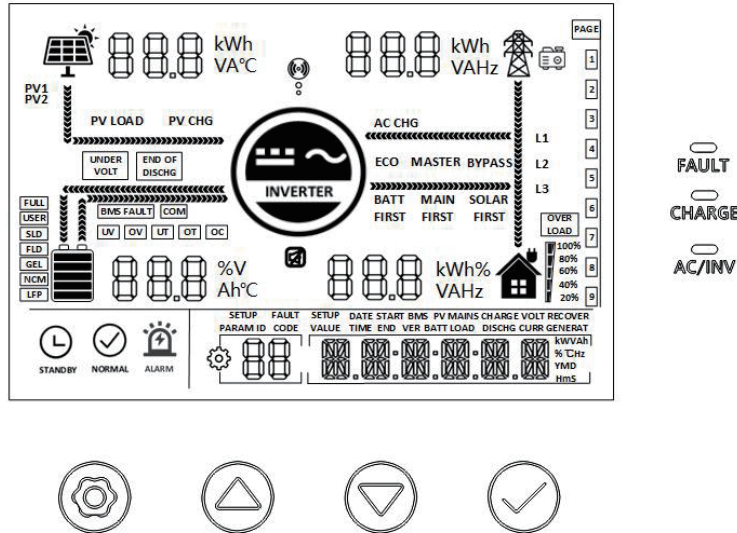
4、 **Hybrid output and grid connection ( need to be abled)** In the utility bypass state, when no battery is connected or when the battery is full, the load power is supplied by the PV and the utility together if the hybrid function is enabled, and the surplus PV energy is fed back to the grid if the grid connection function is enabled.



# 9. LCD screen operating instructions

## 9.1 Operation and display panel

The operation and display panel is shown below, including one LCD screen, 3 indicator lights and 4 operation buttons.



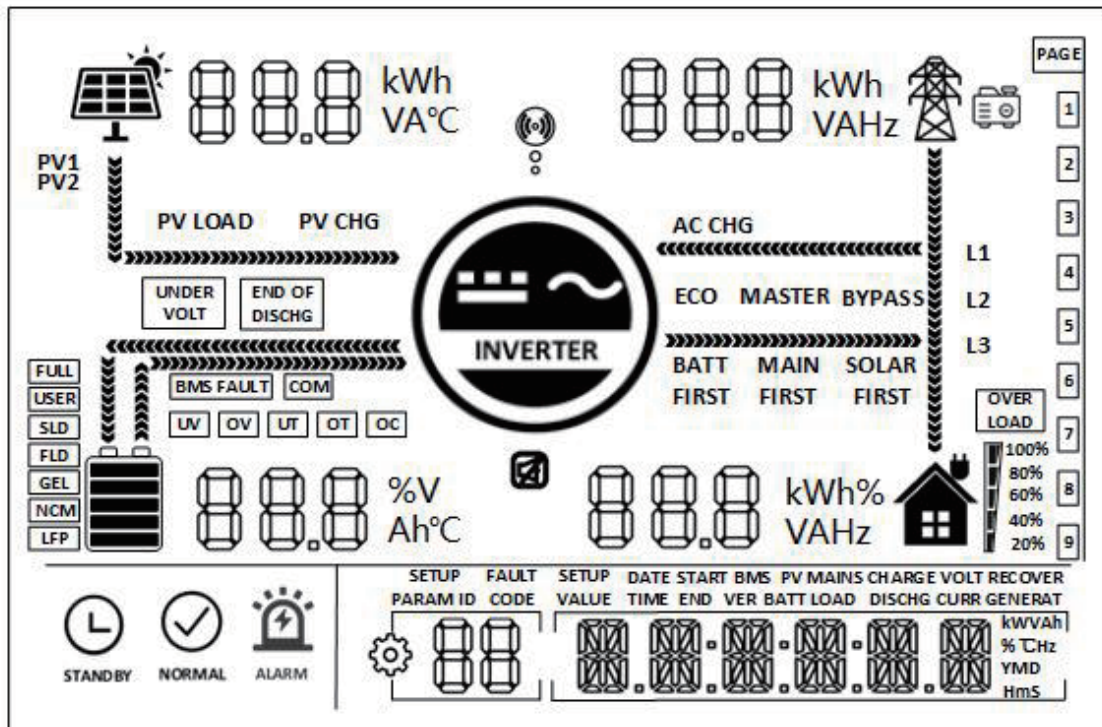
### Operation buttons introduction

Function Key	Description
	Menu of Enter/Exit Settings
	Page Number/Option Increase
	Page Number/Option Decrease
	Under the menu of Settings, OK/Enter Options










### Indicators introduction


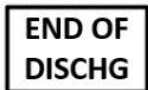








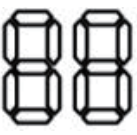
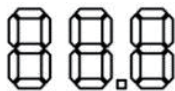
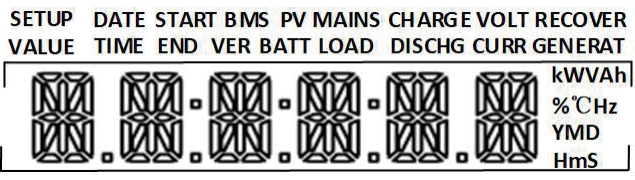
Indicator light	Color	Description
AC/INV	Yellow	Normally On: Mains Power output
		Flicker: Inverter output
CHARGE	Green	Flicker: The battery is being charged.
		Normally On: The charging is completed.
FAULT	Red	Normally On: Fault status

LCD screen introduction





Icon	function	Icon	function
	Indicates mains power		Indicates the inverter is working
	Indicates generator		Indicates home appliances
	Indicates solar power		Indicates AC output is overload
	<ul style="list-style-type: none"> <li> Battery remaining capacity is below 5%</li> <li> Battery remaining capacity is 5%~19%</li> <li> Battery remaining capacity is 20%~39%</li> <li> Battery remaining capacity is 40%~59%</li> </ul>		<ul style="list-style-type: none"> <li> Load percentage is below 5%</li> <li> Load percentage is 5%~19%</li> <li> Load percentage is 20%~39%</li> <li> Load percentage is 40%~59%</li> </ul>

	<p>Battery remaining capacity is 60%~79%</p> <p> Battery remaining capacity is 80%~100%</p>		<p>40%~59%</p> <p> Load percentage is 60%~79%</p> <p> Load percentage is 80% ~ 100%</p>
	Indicates that the machine is communicating with the Surveillance Equipment		Indicates that the buzzer is not enabled
<b>FULL</b>	Indicates that the battery is fully charged	<b>USER</b>	Indicates that the current battery type of the machine is user-defined
<b>SLD</b>	Indicates that the current battery type of the machine is sealed lead-acid battery	<b>FLD</b>	Indicates that the current battery type of the machine is flooded lead-acid battery
<b>GEL</b>	Indicates that the current battery type of the machine is gel battery	<b>NCM</b>	Indicates that the current battery type of the machine is NCM battery
<b>LFP</b>	Indicates that the current battery type of the machine is LFP battery	<b>PAGE</b>	Display the page number prompt of the main interface
<b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b> <b>6</b> <b>7</b> <b>8</b> <b>9</b>			Indicates the data page of the main display interface
 STANDBY	Indicates that the machine is currently idle	 NORMAL	Indicates that the machine is currently in normal operation
 ALARM	Indicates that the machine is currently in an alarm or fault state		Indicates that the machine is currently in the parameter setting state
<b>PV LOAD</b>	Indicates that the PV is in a direct load state	<b>PV CHG</b>	Indicates that the PV is in a state of charge








<b>AC CHG</b>	Indicates that the AC is in a state of charge	<b>BYPASS</b>	Indicate that the Mains Power is in the bypass state
<b>ECO</b>	Indicates that the system is enabled in the ECO mode	<b>BATT FIRST</b>	Indicates that the output mode is Battery First
<b>MAIN FIRST</b>	Indicates that the output mode is Mains Power first	<b>SOLAR FIRST</b>	The indicated output mode is Solar First.
	Indicates battery under voltage		Battery over-discharge
	Indicates internal communication failure		Indicates system under voltage
	Indicates system over voltage		Indicates system low temperature
	Indicates system over temperature		Indicates system over current
	Indicates BMS communication failure		Indicates the direction of energy flow
	When the system is in alarm or fault state, the main interface displays fault code; display setting options when setting		Display parameters of PV, battery, mains power and load
		Main Interface: display real-time time, date, total PV power generation, total load power consumption, RS485 address, version number Setting Interface: display setting contents	

## Real-time data viewing method

On the LCD main screen, press   the button for page turning to view the real-time data of the machine.

Page	PV side parameters	Battery side parameters	Mains side parameters	Load side parameters	Comprehensive parameters
1	PV Voltage	Battery Voltage	AC Voltage	Load Voltage	Current Time
2	PV Current	Battery Current	AC Current	Load Current	Current Date
3	PV Power	BMS Batt SOC	AC Power	Load Power	PV Total kWh
4	PV Today kWh	BMS Batt Voltage	Reserved	Load Today kWh	Load Total kWh
5	PV Temperature	INV Temperature	AC Frequency	Load Frequency	RS485 Address
6	Maintenance Parm	Battery Rated Voltage	Reserved	Load kVA	Soft Version
7	PV Rated Voltage	Battery Rated Current	Reserved	Load Rated Power	Parallel Mode

## 9.2 Setup parameters description

Key Operation Instructions: Enter the setting menu and exit the setting menu, please press  , After entering the setting menu, the parameter number [00] will flash. At this time, you can press the  and  key to select the parameter code to be set. Then press to  enter the parameter editing state, at this time, the value of the parameter flashes, adjust the value of the parameter through the  and  , and finally press  to complete the editing of the parameter and return to the parameter selection state.

Parameter Number	Parameter Name	Setting options	Description
00	Exit	[00]ESC	Menu of Exit Settings

01	Supply Priority Mode	[01] AC1ST <b>Default</b>	Mains Power First Mode, switch to the Inverter only when the Mains Power has failed
		[01] BT1ST	Inverter First Mode: switch to Mains Power only when the battery is under-voltage or lower than Parameter [04] Set Value.
		[01] PV1ST	Solar First Mode: switch to Mains Power when PV has failed or battery is lower than Parameter [04] Set Value.
02	Output Frequency	[02] 50.0 <b>Default</b>	Bypass self-adaptation; when the mains is connected, it automatically adapts to the mains frequency; when the mains is disconnected, the output frequency can be set through this menu. The default output frequency of the 230V machine is 50HZ, and the 120V machine is 60HZ.
		[02] 60.0	
03	AC Input Voltage	[03] UPS <b>Default</b>	The input mains voltage range of 230V machine is 170~280V Mains input voltage range of 120V machine: 90~140V
		[03] APL	The input mains voltage range of 230V machine is 90~280V Mains input voltage range of 120V machine: 90~140V
04	Battery to Mains	[04] 43.6V <b>Default</b>	When the Parameter [01] = BT1ST/PV1ST, the battery voltage is lower than the set value, and the output is switched from inverter to Mains Power, and the set range is 40V~52V.
05	Mains to Battery	[05] 56.8V <b>Default</b>	When the Parameter [01] = BT1ST/PV1ST, the battery voltage is higher than the set value or the battery is fully charged, and the output is switched from mains to inverter, and the set range is 48V~60V.
06	Charging mode	[06] Hybrid <b>Default</b>	Hybrid charging by PV and under utility grid give priority to PV, and use utility grid for supplementary if PV energy is insufficient. When the PV energy is sufficient, the utility grid will stop charging. Note: PV and utility grid are available for charging at the same time only when the bypass output is loaded, and only PV charging can be activated when the inverter is working.
		[06] AC1ST	The Mains Power is charged first, and PV charging is started only when the Mains Power has failed
		[06] PV1ST	Priority shall be given to charging by PV and mains charging will be initiated only when the PV has failed.

		[06] ONLYPV	Only PV charging, no mains charging is enabled.
07	Maximum Charging Current	[07] 60A Default	Set Range of 0~100A
08	Battery type	[08] USER	User-defined, all battery parameters can be set.
		[08] SLd	Sealed lead-acid battery with constant charge voltage of 57.6V and floating charge voltage of 55.2V
		[08] FLd	Flooded lead-acid battery with constant charge voltage of 58.4V and floating charge voltage of 55.2V
		[08] GEL Default	GEL lead-acid battery with constant charge voltage of 56.8V and floating charge voltage of 55.2V
		[08 ]LFP14/LFP15/LFP16	LFP14/LFP15/LFP16 are corresponding to Battery Series of 14, 15 and 16, and their default constant charge voltages are 49.6V, 53.2V and 56.8V respectively, which can be adjusted.
		[08] NCM13/NCM14	NCM lithium battery, adjustable
09	Boost Voltage	[09] 57.6V Default	Setting of Boost Voltage: Set Range of 48V~58.4V, Step 0.4V, available when the battery type is user-defined and lithium battery.
10	Maximum Boost Duration	[10] 120 Default	Setting of Maximum Boost Duration, which is the maximum charging time when the voltage reaches the Parameter [09] when charging at constant voltage, with the Set Range of 5min~900min, and Step of 5min.
11	Float charge voltage	[11] 55.2V Default	Floating Charge Voltage, with the Set Range of 48V~58.4 V, Step of 0.4 V.
12	Over-discharge voltage	[12] 42V Default	Over-discharge Voltage: the battery voltage is lower than such criterion, and the Inverter output is turned off after the time delay parameter is set to [13], with the Set Range of 40V~48V and Step of 0.4V.
13	Over discharge Delay Time	[13] 5S Default	Over-discharge Delay Time: when the battery voltage is lower than the Parameter [12], the inverter output is turned off upon delay of time set by this Parameter, with the Set Range of 5S~50S, Step of 5S.
14	Battery under voltage alarm point	[14] 44V Default	Battery under-voltage alarm point: when the battery voltage is lower than such criterion, under-voltage alarm

			will be given, the output will not be shut down, with the Set Range of 40V~52V, Step of 0.4V.
15	Battery Discharge Limit Voltage	[15] 40V Default	Battery Discharge Limit Voltage: the battery voltage is lower than such criterion, output and shut down immediately. Set Range of 40V~52V, Step of 0.4V, available when the battery type is user-defined and lithium battery.
16	Equalization charge	[16] DIS	No equalization charging
		[16] ENA Default	Enable equalization charging, only Flooded lead-acid batteries, sealed lead-acid batteries and user-defined are effective
17	Equalization Voltage	[17] 58V Default	Equalization Charging Voltage, with the Set Range of 48V~58V, Step of 0.4V, available for Flooded lead-acid battery, sealed lead-acid battery and user-defined
18	Equalization Charging Time	[18] 120 Default	Equalization Charging Time, with the Set Range of min~900min, Step of 5min, available for Flooded lead-acid battery, sealed lead-acid battery and user-defined
19	Equalized Charging Delay	[19] 120 Default	Equalization Charging Delay, with the Set Range of min~900min, Step of 5min, available for Flooded lead-acid battery, sealed lead-acid battery and user-defined
20	Equalization Charge Interval Time	[20] 30 Default	Equalization Charge Interval Time, 0~30d, Step of 1d, available for Flooded lead-acid battery, sealed lead-acid battery and user-defined
21	Equalization Charging Start-Stop	[21] ENA	Start equalization charging immediately
		[21] DIS Default	Stop equalization charging immediately
22	ECO mode	[22] DIS Default	NO ECO mode
		[22] ENA	When the ECO mode is enabled, if the load is below 50W, the inverter output is delayed for 5 minutes and then the output is turned off. When the hull switch is pressed to the "OFF" State, and then pressed to the "ON" State, the inverter will resume the output

23	Overload Automatic Restart	[23] DIS	Overload automatic restart is disabled. If overload occurs, the output will be shut down, and the machine will not be restarted.
		[23] ENA Default	Enable overload auto restart. If overload occurs, shut down output, delay the machine for 3 min and then restart the output. After 5 times in total, no startup will be resumed.
24	Auto restart upon over-temperature	[24] DIS	Over-temperature automatic restart is disabled. If over-temperature occurs, the output will be shut down, and the machine will not be restarted for output.
		[24] ENA Default	Enable automatic restart upon over-temperature. If over-temperature occurs, shut down output, and restart output after the temperature has dropped.
25	Buzzer Alarm	[25] DIS	No Alarm
		[25] ENA Default	Enable alarm
26	Mode Change Reminder	[26] DIS	Alarm is disabled when the status of the main input source has change.
		[26] ENA Default	Alarm is disabled when the status of the main input source has change.
27	Inverter Overload to Bypass	[27] DIS	Automatic switch to Mains Power is disabled when the Inverter is overloaded.
		[27] ENA Default	Automatic switch to Mains Power when the inverter is overloaded.
28	Current of charging under grid electricity	[28] 60A Default	AC output 230Vac, with the Set Range of 0~60A
		28] 40A Default	AC output 120Vac, with the Set Range of 0~40A
30	RS485 Address Setting	[30] 1 Default	RS485 communication address can be set within the range of 1~254 for stand-alone mode and 1 to 6 for parallel mode.
31	AC output mode (can be set in the standby mode only)	[31] SIG Default	Single machine setting (for S & U model)
		[31] PAL	Single-phase parallel connection setting (for S & U model)

		[31] 2P0/2P1/2P2	Split-phase parallel connection setting ( for U model)
		<p>When the parameter [38] setting item=120 for U series model.  All connected P1-phase inverters are set to "2P0":</p> <p>1) If all connected P2-phase inverters are set to "2P1", AC output line voltage difference is 120 degrees (L1-L2), line voltage is <math>120 \times 1.732 = 208\text{Vac}</math>; Phase voltage is 120Vac (L1-N; L2-N).</p> <p>2) If all connected P2-phase inverters are set to "2P2", AC output line voltage difference is 180 degrees (L1-L2), line voltage is <math>120 \times 2 = 240\text{Vac}</math>; Phase voltage is 120Vac (L1-N; L2-N).</p>	
		[31] 3P1/3P2/3P3	Three-phase parallel connection setting ( for S & U model)
		<p><b>All machines in phase 1 must be set as [3P1]</b>  <b>All machines in phase 2 must be set as [3P2]</b>  <b>All machines in phase 3 must be set as [3P3]</b></p> <p><b>1.When the output voltage set in the setting [38] is 120 Vac (U model)</b>  At present the line voltage between L1 in phase 1 and L2 in phase 2 is <math>120 \times 1.732 = 208\text{ Vac}</math>, similarly the line voltage between L1-L3, L2-L3 is 208 Vac; the single phase voltage between L1-N, L2-N, L3-N is 120 Vac.</p> <p><b>2.When the output voltage set in the setting [38] is 230Vac (S model)</b>  At present the line voltage between the live wire L1 in phase 1 and the live wire L2 in phase 2 is <math>230 \times 1.732 = 398\text{Vac}</math>, and similarly the line voltage between L1-L3, L2-L3 is 398Vac; the single phase voltage between L1-N, L2-N, L3-N is 230Vac.</p>	
32	Communication function	[32]SLA Default	RS485-2 port for PC or telecommunication control.
		[32] 485	RS485-2 port for 485-BMS communication.
33	BMS communication protocol	When [32] enables BMS communication, the corresponding lithium battery manufacturer brand should be selected for communication	
		PAC=PACE, RDA=Ritar, AOG=ALLGRAND BATTERY, OLT=OLITER, HWD=SUNWODA, DAQ=DAKING, WOW=SRNE, PYL=PYLONTECH, UOL=WEILAN	
34	PV grid-connected power generation function	[34] DIS Default	Disable this Function
		[34] TOGRID	In the utility bypass state, when no battery is connected, the surplus PV energy is fed back to the grid.
		[34] TOLOAD	In the utility bypass state, when no battery is connected, the load power is supplied by the hybrid of PV and the

			utility.
35	Battery Under-voltage Recovery Point	[35] 52V Default	When the battery is under-voltage, the battery voltage should be greater than this set value to restore the inverter AC output of the battery, and the set range is 44V~54.4V.
36	Max PV charger current	[36] 80A Default	Max PV charger current. Setting range: 0~100A
37	Battery Recharge Recovery Point	[37] 52V Default	After the battery is fully charged, the inverter will stop charging, and when the battery voltage is lower than this Value, the Inverter will resume charging again. And the set range is 44V~54V.
38	AC Output Rated Voltage	[38] 230Vac Default	You can set: 200/208/220/240Vac
		[38] 120Vac	You can set: 100/105/110/120Vac
39	Charge current limiting method (when BMS is enabled)	[38] LC SET	Max. battery charging current not greater than the value of setting <b>【07】</b>
		[38] LC BMS Default	Max. battery charging current not greater than the limit value of BMS
		[38] LC INV	Max. battery charging current not greater than the logic judgements value of the inverter.
40	1-section start charging time	[40] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
41	1-section end charging time	[41] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
42	2-section start charging time	[42] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
43	2-section end charging time	[43] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
44	3-section start charging time	[44] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
45	3-section end charging time	[45] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
46	Sectional charging function	[46] DIS Default	Disable this Function
		[46] ENA	After the sectioned charging function is enabled, the power supply mode will change to BT1ST, and system

			will enable the mains power charging only in the set charging period or battery over discharge; If the sectioned discharge function is enabled at the same time, the power supply mode of the system will change to AC1ST, which only enable the mains charging in the set charging period, and switch to the battery inverter power supply mode in the set discharge period or when the mains power is off
47	1-section start discharging time	[47] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
48	1-section end discharging time	[48] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
49	2-section start discharging time	[49] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
50	2-section end discharging time	[50] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
51	3-section start discharging time	[51] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
52	3-section end discharging time	[52] 00:00:00 Default	Set Range: 00: 00-23: 59: 00
53	Sectional discharge function	[53] DIS Default	Disable this Function
		[53] ENA	After the sectioned discharge function is enabled, the power supply mode will change to AC1ST and the system will switch to battery inverter power supply only during the set discharge period or when the mains power is off
54	Current date setting	[54] 00:00:00 Default	Set Range: 00:01: 01-99:12:31
55	Current time setting	[55] 00:00:00 Default	Set Range: 00:00: 00-23:59: 59
56	Leakage protection function	[56] DIS Default	Disable this Function
		[56] ENA	Enable leakage protection function
57	Stop charging current	[57] 2A Default	Charging stops when the default charging current is less than this setting

<b>58</b>	Discharge alarm SOC setting	[58] 15% <b>Default</b>	SOC alarm when capacity is less than this set value (valid when BMS communication is normal)
<b>59</b>	Cut-off discharge SOC Settings	[59] 5% <b>Default</b>	Stops discharging when the capacity is less than this setting (valid when BMS communication is normal)
<b>60</b>	Cut-off charge SOC Settings	[60]100% <b>Default</b>	Stops charging when capacity is greater than or equal to this setting (valid when BMS communication is normal)
<b>61</b>	Switch to mains SOC Settings	[61] 10% <b>Default</b>	Switch to mains when capacity is less than this setting (valid when BMS communication is normal)
<b>62</b>	Switch to inverter output SOC Settings	[62] 100% <b>Default</b>	Switches to inverter output mode when capacity is greater than or equal to this setting (valid when BMS communication is normal)

## 9.3 Battery type parameters

### For Lead-acid Battery :

Battery type Parameters	Sealed lead acid battery (SLD)	Colloidal lead acid battery (GEL)	Vented lead acid battery (FLD)	User-defined (User)
Overvoltage disconnection voltage	60V	60V	60V	36 ~ 60V (Adjustable)
Battery fully charged recovery point(setup item 37)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)
Equalizing charge voltage	58V	56.8V	58V	36 ~ 60V (Adjustable)
Boost charge voltage	57.6V	56.8V	58.4V	36 ~ 60V (Adjustable)
Floating charge voltage	55.2V	55.2V	55.2V	36 ~ 60V (Adjustable)
Undervoltage alarm voltage(01 fault)	44V	44V	44V	36 ~ 60V (Adjustable)
Undervoltage alarm voltage recovery point(01 fault)	Undervoltage alarm voltage+0.8V			
Low voltage disconnection voltage(04 fault)	42V	42V	42V	36 ~ 60V (Adjustable)
Low voltage disconnection voltage recovery point (04 fault)(setup item 35)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)	52V (Adjustable)
Discharge limit voltage	40V	40V	40V	36 ~ 60V (Adjustable)
Over-discharge delay time	5s	5s	5s	1 ~ 30s (Adjustable)
Equalizing charge duration	120 minutes	-	120 minutes	0 ~ 600 minutes (Adjustable)
Equalizing charge interval	30 days	-	30 days	0 ~ 250 days (Adjustable)
Boost charge duration	120 minutes	120 minutes	120 minutes	10 ~ 600 minutes (Adjustable)

## For Lithium Battery :

Battery type Parameters	(NCM13)	(NCM14)	(LFP16)	(LFP15)	(LFP14)
Overvoltage disconnection voltage	60V	60V	60V	60V	60V
Battery fully charged recovery point(setup item 37)	50.4V (Adjustable)	54.8V (Adjustable)	53.6V (Adjustable)	50.4V (Adjustable)	47.6V (Adjustable)
Equalizing charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)
Boost charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)
Floating charge voltage	53.2V (Adjustable)	57.6V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2 (Adjustable)
Undervoltage alarm voltage(01 fault)	43.6V (Adjustable)	46.8V (Adjustable)	49.6V (Adjustable)	46.4V (Adjustable)	43.2V (Adjustable)
Undervoltage alarm voltage recovery point(01 fault)	Undervoltage alarm voltage+0.8V				
Low voltage disconnection voltage(04 fault)	38.8V (Adjustable)	42V (Adjustable)	48.8V (Adjustable)	45.6V (Adjustable)	42V (Adjustable)
Low voltage disconnection voltage recovery point (04 fault)(setup item 35)	46V (Adjustable)	49.6V (Adjustable)	52.8V (Adjustable)	49.6V (Adjustable)	46V (Adjustable)
Discharge limit voltage	36.4V	39.2V	46.4V	43.6V	40.8V
Over-discharge delay time	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)	30s (Adjustable)
Boost charge duration	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)	120 minutes (Adjustable)

# 10 Protection

## 10.1 Protections provided

No.	Protections	Description
1	PV current/power limiting protection	When charging current or power of the PV array configured exceeds the PV rated, it will charge at the rated.
2	PV night reverse-current protection	At night, the battery is prevented from discharging through the PV module because the battery voltage is greater than the voltage of PV module.
3	Mains input over voltage protection	When the mains voltage exceeds 280V (230V model) or 140V (120V model), the mains charging will be stopped and switched to the inverter mode.
4	Mains input under voltage protection	When the mains voltage is lower than 170V (230V model /UPS mode) or 90V (120V model or APL mode) the mains charging will be stopped and switched to the inverter mode.
5	Battery over voltage protection	When the battery voltage reaches the overvoltage disconnection point, the PV and the mains will be automatically stopped to charge the battery to prevent the battery from being overcharged and damaged.
6	Battery low voltage protection	When the battery voltage reaches the low voltage disconnection point, the battery discharging will be automatically stopped to prevent the battery from being over-discharged and damaged.
7	Load output short circuit protection	When a short-circuit fault occurs at the load output terminal, the AC output is immediately turned off.
8	Heat sink over temperature protection	When the internal temperature is too high, the machine will stop charging and discharging; when the temperature returns to normal, charging and discharging will resume.
9	Overload protection	Output again 3 minutes after an overload protection, and turn the output off after 5 consecutive times of overload protection until the machine is re-powered. For the specific overload level and duration, refer to the technical parameters table in the manual.
10	PV reverse polarity protection	When the PV polarity is reversed, the machine will not be damaged.

## 10.2 Fault code

Fault code	Fault name	Whether it affects the output or not	Description
【01】	BatVoltLow	NO	Battery undervoltage alarm
【02】	BatOverCurrSw	Yes	Battery discharge average current overcurrent software protection
【03】	BatOpen	Yes	Battery not-connected alarm
【04】	BatLowEod	Yes	Battery undervoltage stop discharge alarm
【05】	BatOverCurrHw	Yes	Battery overcurrent hardware protection
【06】	BatOverVolt	Yes	Charging overvoltage protection
【07】	BusOverVoltHw	Yes	Bus overvoltage hardware protection
【08】	BusOverVoltSw	Yes	Bus overvoltage software protection
【09】	PvVoltHigh	NO	PV overvoltage protection
【10】	PvOCSw	NO	Boost overcurrent software protection
【11】	PvOCHw	NO	Boost overcurrent hardware protection
【13】	OverloadBypass	Yes	Bypass overload protection
【14】	OverloadInverter	Yes	Inverter overload protection
【15】	AcOverCurrHw	Yes	Inverter overcurrent hardware protection
【17】	InvShort	Yes	Inverter short circuit protection
【19】	OverTemperMppt	NO	Buck heat sink over temperature protection
【20】	OverTemperInv	Yes	Inverter heat sink over temperature protection
【21】	FanFail	Yes	Fan failure

<b>【22】</b>	EEPROM	Yes	Memory failure
<b>【23】</b>	ModelNumErr	Yes	Model setting error
<b>【26】</b>	RlyShort	Yes	Inverted AC Output Backfills to Bypass AC Input
<b>【29】</b>	BusVoltLow	Yes	Internal battery boost circuit failure
<b>【30】</b>	BatCapacityLow1	NO	Alarm given when battery capacity rate is lower than 10% (setting BMS to enable validity)
<b>【31】</b>	BatCapacityLow2	NO	Alarm given when battery capacity rate is lower than 5% (setting BMS to enable validity)
<b>【32】</b>	BatCapacityLowStop	Yes	Inverter stops when battery capacity is low (setting BMS to enable validity)
<b>【34】</b>	CanCommFault	Yes	CAN communication fault in parallel operation
<b>【35】</b>	ParaAddrErr	Yes	Parallel ID (mailing address) setting error
<b>【37】</b>	ParaShareCurrErr	Yes	Parallel current sharing fault
<b>【38】</b>	ParaBattVoltDiff	Yes	Large battery voltage difference in parallel mode
<b>【39】</b>	ParaAcSrcDiff	Yes	Inconsistent AC input source in parallel mode
<b>【40】</b>	ParaHwSynErr	Yes	Hardware synchronization signal error in parallel mode
<b>【41】</b>	InvDcVoltErr	Yes	Inverter DC voltage error
<b>【42】</b>	SysFwVersionDiff	Yes	Inconsistent system firmware version in parallel mode
<b>【43】</b>	ParaLineContErr	Yes	Parallel line connection error in parallel mode

<b>【44】</b>	Serial number error	Yes	If the serial number is not set by omission in production, please contact the manufacturer to set it
<b>【45】</b>	Error setting of splitphase mode	Yes	[31]Settings item setting error
<b>【58】</b>	BMS communication error	NO	Check whether the communication line is connected correctly and whether [33] is set to the corresponding lithium battery communication protocol
<b>【59】</b>	BMS alarm	NO	Check the BMS fault type and troubleshoot battery problems
<b>【60】</b>	BMS battery low temperature alarm	NO	BMS alarm battery low temperature
<b>【61】</b>	BMS battery over temperature alarm	NO	BMS alarm battery over temperature
<b>【62】</b>	BMS battery over current alarm	NO	BMS alarm battery over current
<b>【63】</b>	BMS battery undervoltage alarm	NO	BMS alarm low battery
<b>【64】</b>	BMS battery over voltage alarm	NO	BMS alarm battery over voltage

## 10.3 Handling measures for part of faults

Fault code	Faults	Remedy
Display	No display on the screen	Check if the battery the PV circuit breaker has been turned off; if the switch is in the "ON" state; press any button on the screen to exit the screen sleep mode.
【06】	Battery overvoltage protection	Measure if the battery voltage exceeds rated, and turn off the PV array circuit breaker and Mains circuit breaker.
【01】 【04】	Battery undervoltage protection	Charge the battery until it returns to the low voltage disconnection recovery voltage.
【21】	Fan failure	Check if the fan is not turning or blocked by foreign object.
【19】 【20】	Heat sink over temperature protection	When the temperature of the device is cooled below the recovery temperature, normal charge and discharge control is resumed.
【13】 【14】	Bypass overload protection, inverter overload protection	① Reduce the use of power equipment; ② Restart the unit to resume load output.
【17】	Inverter short circuit protection	① Check the load connection carefully and clear the short-circuit fault points; ② Re-power up to resume load output.
【09】	PV overvoltage	Use a multimeter to check if the PV input voltage exceeds the maximum allowable input voltage rated.
【03】	Battery disconnected alarm	Check if the battery is not connected or if the battery circuit breaker is not closed.
【40】 【43】	Parallel connection fault	Check whether the parallel line is not connected well, such as loose or wrong connection.
【35】	Parallel ID setting error	Check whether the setting of parallel ID number is repeated.
【37】	Parallel current sharing fault	Check whether the parallel current sharing line is not connected well, such as loose or wrong connection.
【39】	Inconsistent AC input source in parallel mode	Check whether the parallel AC inputs are from the same input interface.
【42】	Inconsistent system firmware version in parallel mode	Check whether the software version of each inverter is consistent.

11	AC reverse protection	Prevent battery inverter AC current from being reversely input to Bypass. ( In off-grid mode )
12	Bypass over current protection	Built-in AC input overcurrent protection circuit breaker.
13	Battery input over current protection	When the discharge output current of the battery is greater than the maximum value and lasts for 1 minute, the AC input would switched to load.
14	Battery input protection	When the battery is reversely connected or the inverter is short-circuited, the battery input fuse in the inverter will blow out to prevent the battery from being damaged or causing a fire.
15	Charge short protection	When the external battery port is short-circuited in the PV or AC charging state, the inverter will protect and stop the output current.
16	CAN communication loss protection	In parallel operation, an alarm will be given when CAN communication is lost.
17	Parallel connection error protection	In parallel operation, the equipment will be protected when the parallel line is lost.
18	Parallel battery voltage difference protection	In parallel operation, the equipment will be protected when the battery connection is inconsistent and the battery voltage is greatly different from that detected by the host.
19	Parallel AC voltage difference protection	In parallel operation, the equipment will be protected when the AC IN input connection is inconsistent.
20	Parallel current sharing fault protection	In parallel operation, the running equipment will be protected when the load difference of each inverter is large due to improper connection of current sharing line or device damage.
21	Synchronization signal fault protection	The equipment will be protected when there is a fault in the guidance signal between parallel buses, causing inconsistent behavior of each inverter.

## 11. Troubleshooting

- **In order to maintain the best long-term performance, it is recommended to conduct following checks twice a year.**
  1. Make sure that the airflow around the unit is not blocked and remove any dirt or debris from the heat sink.
  2. Check that all exposed wires are damaged by exposure to sunlight, friction with other objects around them, dryness, bite by insects or rodents, etc., and the wires shall be repaired or replaced if necessary.
  3. Verify for the consistency of indication and display with the operation of the device. Please pay attention to the display of any faults or errors, and take corrective actions if necessary.
  4. Check all wiring terminals for corrosion, insulation damage, signs of high temperature or burning/discoloration, and tighten the screws.
  5. Check for dirt, nesting insects and corrosion, and clean up as required.
  6. If the arrester has failed, replace in time to prevent lightning damage to the unit or even other equipment of the user.

**Warning: Danger of electric shock! When doing the above operations, make sure that all power supplies of the machine have been disconnected, and all capacitors have been discharged, and then check or operate accordingly!**

- **The company does not assume any liability for damage caused by:**
  1. Improper use or use in improper site.
  2. Open circuit voltage of the PV module exceeds the maximum allowable voltage rated.
  3. Temperature in the operating environment exceeds the limited operating temperature range.
  4. Disassemble and repair the solar storage inverter without permission.
  5. Force majeure: Damage that occurs in transportation or handling of the solar storage inverter.

## 12. Technical parameters

Models	SYP 5K-S	SYP 5K-U
<b>Parallel mode</b>		
Permitted parallel number	1~6	
<b>AC mode</b>		
Rated input voltage	220/230Vac	110/120Vac
Input voltage range	(170Vac~280Vac) $\pm 2\%$ (90Vac~280Vac) $\pm 2\%$	(90Vac~140Vac) $\pm 2\%$
Frequency	50Hz/ 60Hz (Auto detection)	
Frequency Range	47 $\pm 0.3$ Hz ~ 55 $\pm 0.3$ Hz (50Hz); 57 $\pm 0.3$ Hz ~ 65 $\pm 0.3$ Hz (60Hz);	
Overload/short circuit protection	Circuit breaker	
Max. Efficiency	92%	
Conversion time (bypass and inverter)	10ms (typical)	
AC reverse protection	Available	
Maximum bypass overload current	40A	63A
<b>Inverter mode</b>		
Output voltage waveform	Pure sine wave	
Rated output power (VA)	5000	
Rated output power (W)	5000	
Power factor	1	
Rated output voltage (Vac)	230Vac (200/208/220/240Vac Settable)	120Vac (100/105/110Vac Settable)
Output voltage error	$\pm 5\%$	
Output frequency range (Hz)	50Hz $\pm 0.3$ Hz 60Hz $\pm 0.3$ Hz	
Maximum Efficiency	92%	
Overload protection	(102% < load < 125%) $\pm 10\%$ : report error and turn off the output after 5 minutes; (125% < load < 150%) $\pm 10\%$ : report error and turn off the output after 10 seconds; Load > 150% $\pm 10\%$ : report error and	(102% < load < 110%) $\pm 10\%$ : report error and turn off the output after 5 minutes; (110% < load < 125%) $\pm 10\%$ : report error and turn off the output after 10 seconds; (Load > 125% $\pm 10\%$ ): report error and

	turn off the output after 5 seconds	turn off the output after 5 seconds;
Peak power	10000VA	
Loaded motor capability	4HP	
Rated battery input voltage	48V (Minimum starting voltage 44V)	
Battery voltage range	Undervoltage alarm/shutdown voltage/overvoltage alarm /overvoltage recovery... settable on LCD screen)	
Power saving mode self-consumption	Load≤50W	
<b>AC Output ( Grid)</b>		
Rated Output Power (W)	5000W	
Max. apparent power (VA)	5000VA	
Max. output current (A)	21.7A	41.7A
THDI	< 3%	
Rated voltage(V)	230Vac	120Vac
Frequency	50Hz/60Hz	
<b>AC charging</b>		
Battery type	Lead acid or lithium battery	
Maximum charge current(can be set)	0-60A	0-40A
Charge current error	± 3Adc	
Charge voltage range	40 - 58Vdc	
Short circuit protection	Circuit breaker and blown fuse	
Circuit breaker specifications	40A	63A
Overcharge protection	Alarm and turn off charging after 1 minute	
<b>PV charging</b>		
Maximum PV open circuit voltage	500Vdc	
PV operating voltage range	120-500Vdc	
MPPT voltage range	120-450Vdc	
Battery voltage range	40-60Vdc	
Maximum PV input power	5500W	

Maximum PV input current	22A	
PV charging current range (can be set)	100A	
Charging short circuit protection	Blown fuse	
Wiring protection	Reverse polarity protection	
<b>Hybrid charging Max charger current specifications (AC charger+PV charger)</b>		
Max charger current(can be set)	100A	
<b>Certified specifications</b>		
Certification	CE(IEC62109-1)/FCC/UKCA	
EMC certification level	EN61000	
Operating temperature range	-10°C to 55°C (14°F ~131°F)	
Storage temperature range	-25°C ~ 60°C (-13°F ~140°F )	
Humidity range	5% to 95% (Conformal coating protection)	
Noise	≤60dB	
Heat dissipation	Forced air cooling, variable speed of fan	
Communication interface	USB / RS485 (WiFi/GPRS) / Dry contact control	
Dimension (L*W*D)	446.9*350*133mm (1.47*1.15*0.44ft)	
Weight	12kg (26.46lb)	13kg (28.66lb)