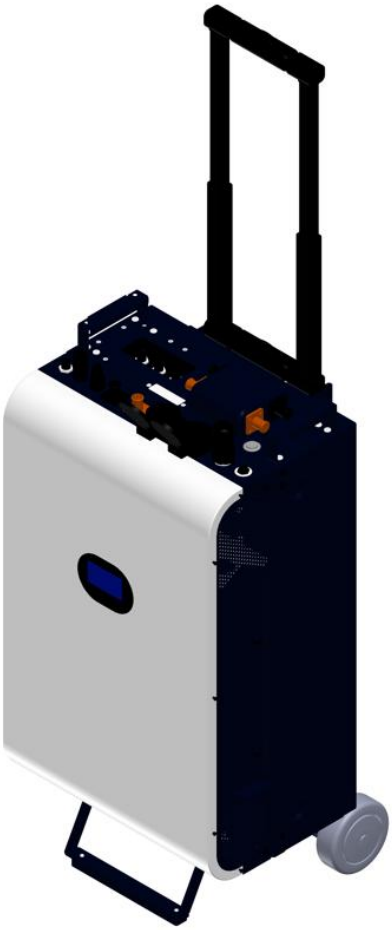
RahVolt
RUIHE ENERGY STORAGE



DOVA5 User Manual

REV 1.0

Production base: Ruihe (Chongqing) New Energy Technology Co. , Ltd.

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Announcement

Disclaimer

Please read this User Manual and ensure you understand it fully before using the product. Please keep this User Manual properly for future reference. In this manual and other related documents, Failure to properly operate this product could cause serious injury to yourself or others, or cause damage to this product and other property by using this product, you are deemed to have understood, acknowledged, and accepted all terms and contents of this document. Individual users are responsible for their actions and the consequences of those actions. Rahvolt hereby disclaims any liability for any losses due to the user's failure to use the product in accordance with the User Manual.

In compliance with laws and regulations, Rahvolt reserves the right to final interpretation of this document and all documents related to the product. This document is subject to changes(updates, revisions, or termination) without prior notice. Please visit Rahvolt's official website to obtain the latest product information.

EU Declaration of Conformity

within the scope of the EU directives

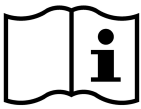
1. Directive 2014/30/EU relating to electromagnetic compatibility(EN IEC61000-6-1,IEC 61000-6-2,EN 61000-6-4.
2. Restriction of the use of certain hazardous substances 2011/65/EU (L 174/88,June 8,2011) and 2015/863/EU(L 137/10, March 31,2015) (ROHS).

Ruihe (Chongqing) New Energy Technology Co. , Ltd. confirms herewith that the products described in this document are in compliance with the fundamental requirements and other relevant provisions of the above mentioned directives. The entire EU Declaration of Conformity can be found at https://rahvolt.com.

Safety Instructions

Safety Alert Symbols Guide

These are safety warning symbols. Such safety information alerts you to hazards that can be lethal to you and others, and that can cause damage to the equipment. All safety information is preceded by safety warning symbols and hazard words, including: "DANGER", "WARNING","CAUTION", and "NOTICE". The "DANGER", "WARNING", "CAUTION", and "NOTICE" statements in this manual do not cover all the safety instructions. They are only supplements to safety instructions.

WARNING	Moderate risk. If not avoided, it could lead to severe injury or even death.
CAUTION	Lower risk. If not avoided, it may result in minor or moderate injury.
NOTICE	Potentially hazardous. If not avoided, it could result in equipment damage,data loss, performance deterioration, or unanticipated results.
	Protective conductor terminal
	Refer to the operating instructions

	Caution, risk of electric shock
	Caution, risk of electric shock, Energy storage timed discharge (time to be indicated adjacent to the symbol)
	Caution, hot surface
	Caution, risk of danger

WARNING

Save these instructions - This manual contains important instructions for model DOVA-5BY and DOVA-5I that shall be followed during installation and maintenance.

1. Before installing, using and maintaining the product, please read carefully the safety instructions in this manual. Rahvolt is not responsible for any problems caused by improper handling of the product in installation and maintenance procedures.

2. Do not use parts or accessories that are not officially supplied. Use of third-party accessories may result in risks such as fire and electric shock, If parts or accessories are necessary, please visit Rahvolt's official sales channel for purchase information. Rahvolt is not responsible for product problems

caused by the use of cables and other accessories produced by third-party manufacturers.

3. Keep this product out of the reach of children and pets and close attention is required to prevent potential hazards when children or pets are close to the device.

4. Strictly comply with the ambient temperature in this User Manual when using this product. If the temperature is too high, the battery may catch fire or explode. If the temperature is too low, the product may not work normally.

5. Do not disassemble, modify or replace this device (including internal and external parts), if necessary, please contact qualified professionals or contact Rahvolt after-sales service for handling.

6. Do not place other heavy objects (except the inverter and batteries) on the device during use or storage.

7. Avoid impacts, falling, dropping or strong vibrations. In the case of severe external impact,please turn off the power immediately and stop using the product. Ensure the product is well fastened during transportation to avoid vibrations and impacts.

8. If the product falls into water accidentally during use, place it in a safe open area and stay away from it until it is completely dry. The dried product should not be reused and should be disposed of properly as described in the "Disposal" section below. If the product catches fire,please use a fire extinguisher or fire-fighting equipment in the following recommended order: water or mist, sand, fire blanket, dry powder, and carbon dioxide fire extinguisher.

9. Handle this product with care to prevent it from being damaged due to overturning. If the product is badly damaged after overturning, please turn off the power immediately, place the battery in an open area away from combustible materials or people, and properly dispose of it according to the requirements of local laws and regulations.

10. Electromagnetic fields created by this product may affect the normal functioning of medical implants or personal medical devices, such as pacemakers, cochlear implants, hearing aids defibrillators and so on. If you are using these medical devices, please consult the manufacturers about the

restrictions on the use of relevant devices to ensure that a safe distance is maintained between this product and the implanted medical devices (such as pacemakers, cochlear implants, hearing aids, defibrillators and so on) during operation.

11. After the installation is completed, clean up the items in time, such as cartons, foam, plastic cable ties, etc.

12.The photovoltaic array is exposed to light, it supplies a d.c. voltage to the PCS.

13.Servicing of batteries should be performed or supervised by personnel knowledgeable.

14.When replacing batteries, replace with the same type and number of batteries or battery packs.

CAUTION

1. Do not dispose of batteries in a fire. The batteries may explode.

2. Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

3.A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries.

a) Remove watches, rings, or other metal objects.

b) Use tools with insulated handles.

c) Wear rubber gloves and boots.

d) Do not lay tools or metal parts on top of batteries.

e) Disconnect charging source prior to connecting or disconnecting battery terminals.

f) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

Environmental Requirements

1. This product is suitable for use in industrial environments.
2. Ensure that the device is installed in a ventilated environment, and do not block the vents when the device is in operation.Inadequate ventilation may damage the device.
3. Do not use this product near heat sources or high temperatures (e.g. fire sources or hot stoves). To prolong the battery life, it is recommended to use or store this product at 20°C to30°C.
4. When installing or using the product in an environment near fumes, smoke, heat, steam or dust, it is necessary to use a protective cover to prevent the risk of fire.
5. The installation environment should be hard flat ground. Due to the large mass of the device.it is necessary to ensure that the installation environment of the device is stable and that the equipment does not tilt to avoid personal injury or product damage.
6. Keep the product away from humid environments, do not immerse it in water or get it wet. If water is found inside the product, please turn off the product and stop using it again. Take anti-electric shock measures before touching the product, and put it immediately in a safe, waterproof and open area. Contact qualified personnel or Rahvolt after-sales service if necessary.

Safety Requirements

1. Do not stand, lean or sit on the device.
2. If the product will not be used for a long period of time, make sure that it is unplugged from the outlet and turned off.
3. Do not connect this device with damaged cables. Use of damaged cables may affect the normal operation of the device or lead to potential risks.
4. Do not put your hands or foreign objects into the device ports or vents.

Specifications

DOVA5 Series Battery

General Parameters	
Name	5kWH Energy Storage Battery
Model	DOVA-5BY
Battery capacity	5kWH
Product size	585*360*150 mm
Package size	790*405*465 mm
Net weight	49 kg
Gross weights	58 kg
Ambient temperature and humidity	
Charging temperature	0℃～65℃
Discharge temperature	-15～65℃
Storage temperature	-20℃～65℃
Working humidity	10%RH～85%RH
Storage humidity	10%RH～85%RH
Other information	
Altitude	≤2,000 m
IP rating	IP65

DOVA5 Series Inverter

General parameters	
Name	Power Conversion System
Model	DOVA-5I
Product size	585*360*110 mm
Package size	695*455*235 mm
Net weight	13.5 kg
Gross weights	16.5 kg
Output Information	

Output voltage	208/220/230/240 Vac
Output power	5000 W (2500W * 2)
Output frequency	50/60 Hz
Power factor	0.9
Input Information	
PV input (charging)	120-430Vdc
PV efficiency	99.5% max
Max charging current	80A
AC input(charging)	208/220/230/240 Vac
AC nominal current	22.7A
Input voltage range	90~280Vac
Ambient temperature and humidity	
Operation temperature	-20℃～55℃
Storage temperature	-25℃～60℃
Working humidity	10%RH～85%RH
Storage humidity	10%RH～85%RH
Working altitude	≤2000M
IP rating	IP20

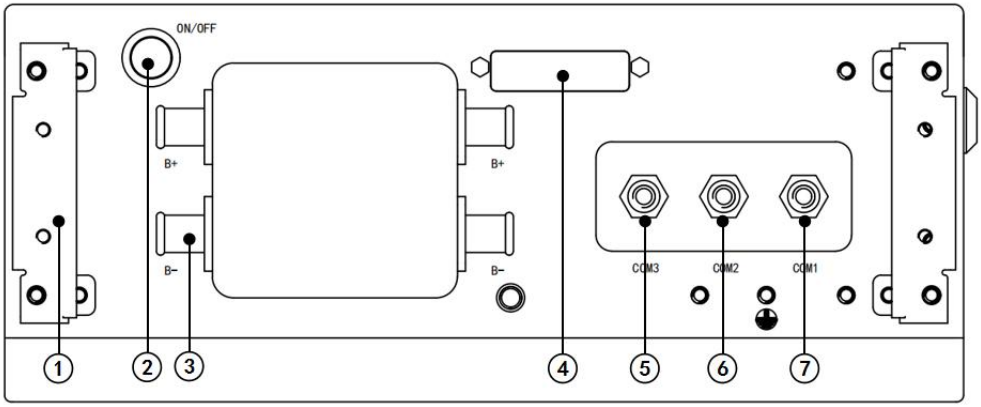
NOTICE

- Whether the product can be charged or discharged depends on the actual temperature of the battery.
- The battery will automatically start self-heating if the temperature is lower than 0 ℃ .
- Ambient temperature greater than 40℃, battery SOC greater than 94%, PV input voltage greater than 380V battery charging current will produce a derating level.

Product Exterior

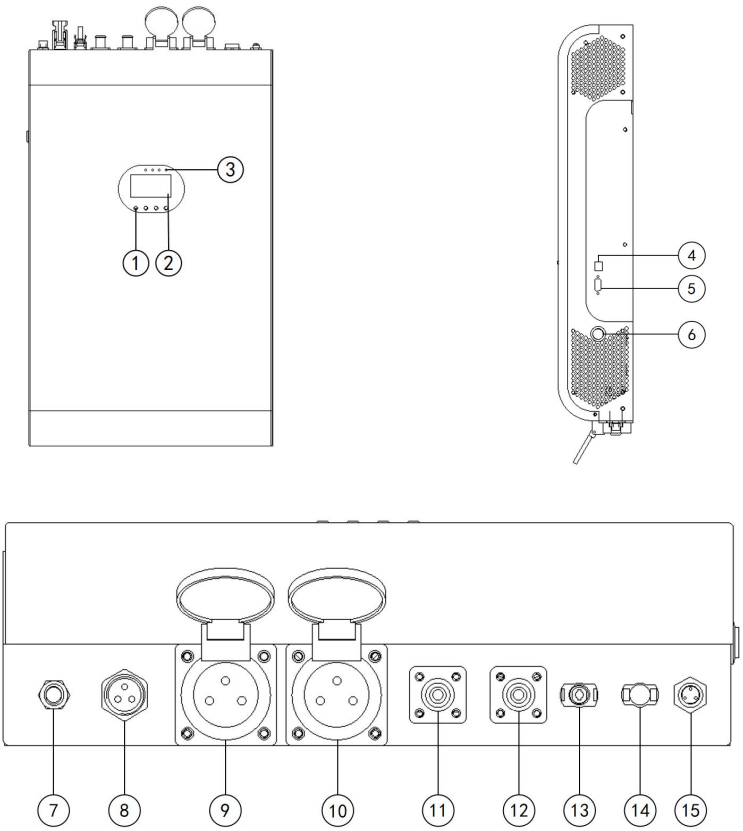
DOVA-5BY

The energy storage system includes an inverter module, an energy storage battery module and a tie rod module. The inverter power module is 5kW and the battery module standard capacity is: 5kWh.



Number	Instruction	Number	Instruction
1	Grips	2	Battery power switch
3	Power port	4	Indicator light
5	Parallel port 1	6	Parallel port 2
7	PCS com port		

DOVA-5I



N0.	Illustrate	No.	Illustrate
1	Panel button	2	LCD display
3	Indicator light	4	Type-B serial wire debug
5	RS232 port	6	Inverter Power switch
7	Breaker	8	AC input port
9	AC output port1	10	AC output port2
11	Battery(+) power port	12	Battery(-) power port
13	PV+ power input port	14	PV- power input port
15	Battery com port		

NOTICE

- AC OUT The maximum output of single output position only supports 3500W, and the maximum output power supports 5000W.
- AC input supports slow charging and fast charging, the load power should be less than the permitted range of the access line.

Product Installation

NOTICE

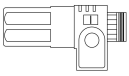
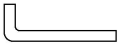
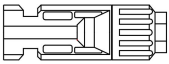
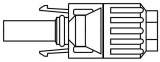
- After unpacking, confirm that the product appearance is not damaged, dirty, deformed or otherwise defective;
- Confirm whether the product accessories are consistent with the product packing list. If there are missing accessories, please contact the manufacturer in time.
- Please ensure that the product is powered off before installation (the power switch is in the released position.

CAUTION

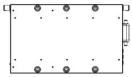
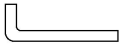
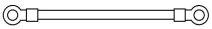
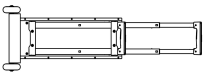
- The portable stand needs to be installed on a hard, flat surface instead of soft surfaces(for example, dirt or sand).
- Do not place the portable stand on a tilted surface as it may cause the product to topple over, potentially resulting in personal injury or product damage.
- The weight of the energy storage module is 49 kilograms. It requires two people to lift it together, and please handle with care during transportation.
- Please keep the product away from water sources when installing it, and you need to avoid direct contact with water sources, or it may cause short circuit and other risks.

Packing list

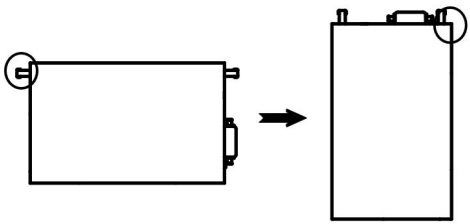
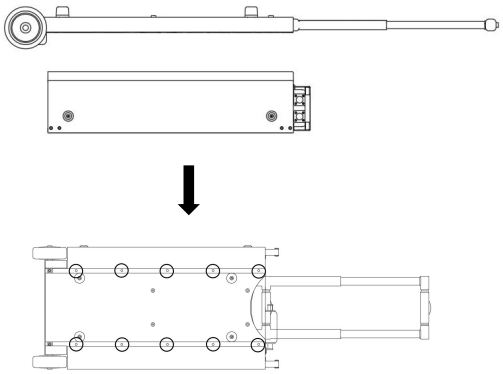
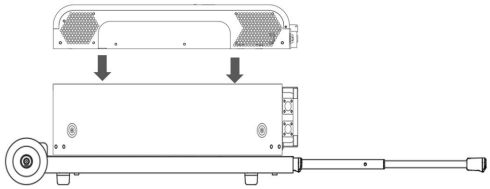
DOVA-5I

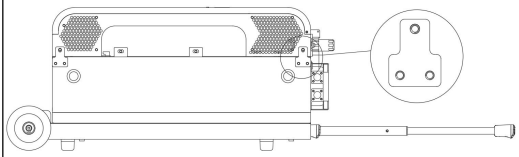
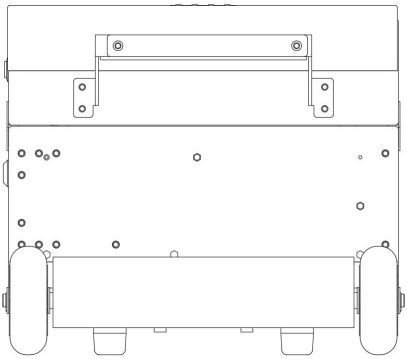
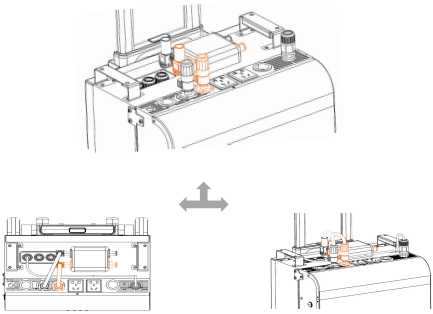
No.	Name	Picture	QTY.
1	Inverter Modules		1
2	Power Terminal Male		2
3	User's manual		1
4	Warranty Card		1
5	Mounting Backplate		1
6	Expansion bolt		4
7	Fastener（M5*8）		4
8	AC Power Cord(16A)		1
9	Hexagon Socket Spanner		1
10	Grounding Wire		1
11	PV terminal positive		1
12	PV terminal negative		1

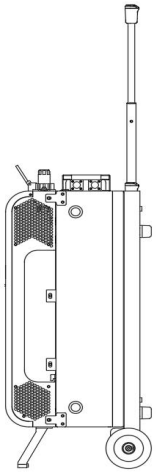
DOVA-5BY

No.	Name	Picture	Quantity
1	Energy Storage Battery Modules		1
2	Power Transfer Line (Positive)		2
3	Communication Line		1
4	Cascade Metal Sheets		4
5	Warranty Card		1
6	User's Manual		1
7	Fastener（M5*8）		26
8	Hexagon Socket Spanner		1
9	Grounding Wire		1
10	Tension bar		1
11	Footrest		1

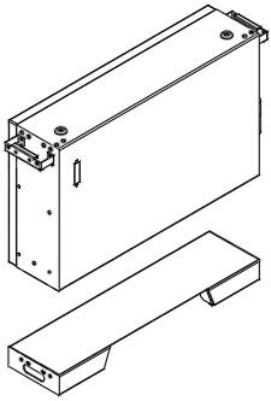
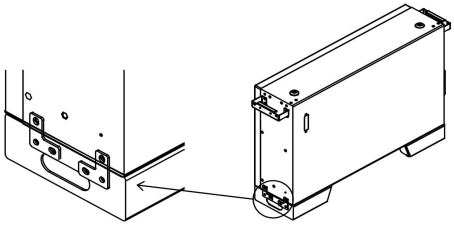
DOVA5 Portable Installation

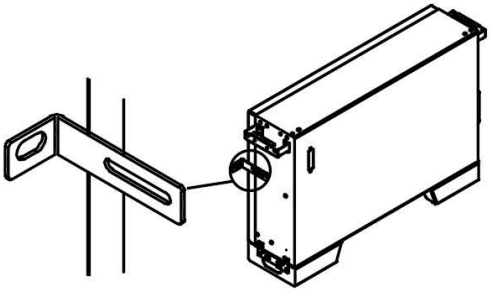
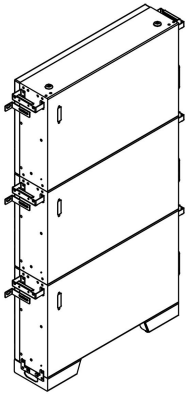
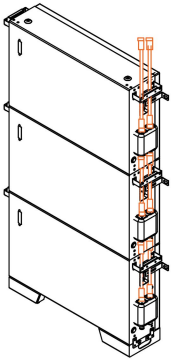
Step1	Carrying handle position replacement, when the front hand position is easy to pick up, the installation needs a carrying handle position to swap	
Step2	The tie rod is installed on the energy storage module. Align the screw hole position of the tie rod with the screw hole position on the back of the battery module and tighten 10 screws to complete the tie rod installation.	
Step3	Turn the battery module 180° and install the inverter module. Align the inverter with the edge of the battery module.	

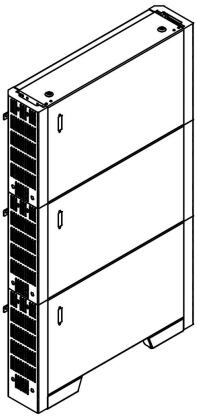
Step4	Align the mounting holes of the connecting piece with the screw holes on the battery module and tighten the 12 screws to complete the inverter installation.	
Step5	Align the support legs with the screw holes on the bottom of the inverter and tighten the screws to complete the installation of the support legs.	
Step6	Power transmission line connection	

Step7	Assembly completed	

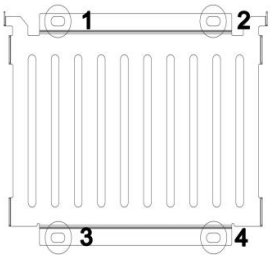
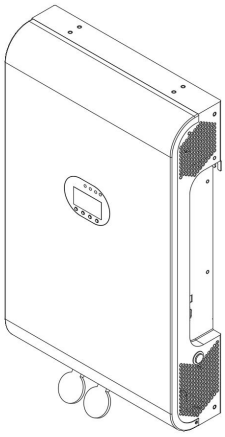
DOVA5 Extra Battery installation

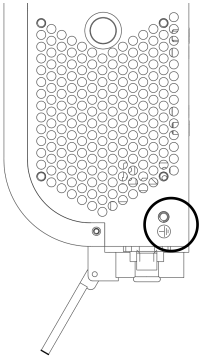
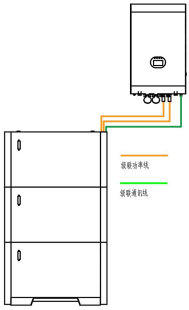
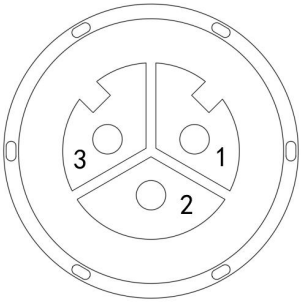
Step 1	Align the first battery module on the floor stand and attach 12 screws (M5*12).	
Step 2	Complete the 12 screws on both sides as shown in the picture	

Step 3	Attach the lugs to the screws as shown in the picture.	
Step 4	Install the battery packs one by one in order as shown in Step2 It is recommended to stack up to 6 of them.	
Step 5	Parallel connection of battery modules via cascade power cables and cascade communication cables	

Step 6	After completing the electrical connections and checking that the cables are connected correctly and reliably, install the external decorative hood cover (in order from the bottom to the top of the shield) and fasten it with screws.	

DOVA5 Fixed installation

Step 1	Take out the mounting back plate, and fix the mounting plate to the wall by 4 M6*20 expansion bolts respectively.	
Step 2	Install the inverter on top of the backplane through the inverter bayonet and mounting plate bayonet, and tighten the 4 screws to complete the inverter installation.	

Step 3	Connect the earth wire on the side of the product where it is marked with a grounding symbol.	
Step 4	Take out the power cable and RJ45 communication cable to connect the battery pack to the inverter.	
Step 5	AC Input Terminal Wiring Instructions 1#：L(Fire Wire）、2#：PE（Earth Wire）、3#：N（Neutral Line）	

Installation completion check items

Number	Checklist
1	The module is installed correctly and firmly and reliably
2	Reasonable cable layout
3	The power transmission line connection is correct, firm and reliable
4	Cover unused ports with waterproof covers
5	The installation space is reasonable, the environment is clean and tidy, and no tools and debris are left behind.

Instructions for use

On/off operation

After the installation reaches the acceptance standard and a battery or mains power that meets the requirements is connected (the mains power needs to confirm the reasonable input range according to the output mode), the power-on operation can be performed.

- Mains power on

Connect to normal mains power, press the inverter switch button to the ON state, and the system will turn on. If it is set to give priority to mains output, wait for a period of time and the panel will display mains mode to indicate that the startup is completed and enter the mains mode.

- Battery on

Connect the normal mains power, press the inverter power button to the ON state,and the system will start up. If set to prioritize mains power output, wait for a period of time until the panel displays mains power mode, indicating that the startup is complete, and enter mains power mode.

- Shutdown steps

When the system is in battery mode or mains mode output, press the Inverter Power switchagain to the OFF state, and the system will shut down.

Instructions for using energy storage batteries

Energy storage battery LED indicator light description

Table 1: LED working status indication

State	Normal/Alarm/ Protection	OFF/ON	RUN	ALM	Battery indicator LED
Shutdown	Hibernate	○	○	○	○
Standby	Normal	●	◐	○	According to the power indicator
	Alarm	●	◐	◐	
Charge	Normal	●	●	○	According to the power indicator
	Alarm	●	●	◐	
	Overcharge protection	●	●	○	●
	Temperature, over current, and failure protection	●	○	●	○
Discharge	Normal	●	◐	○	According to the power indicator
	Alarm	●	◐	◐	
	Under voltage protection	●	○	○	○
	Temperature, over current, short circuit,	●	○	●	○

	reverse connection, failure protection				
Lose efficacy		○	○	●	○

Table 2: Description of Capacity Indications

State		Charge						Discharge					
Capacity indicator light		L6	L5	L4	L3	L2	L1	L6	L5	L4	L3	L2	L1
SOC (%)	0%～17%	○	○	○	○	○	◐	○	○	○	○	○	●
	18%～33%	○	○	○	○	◐	●	○	○	○	○	●	●
	34%～50%	○	○	○	◐	●	●	○	○	○	●	●	●
	51%～66%	○	○	◐	●	●	●	○	○	●	●	●	●
	67%～83%	○	◐	●	●	●	●	○	●	●	●	●	●
	84% ～ 100%	◐	●	●	●	●	●	●	●	●	●	●	●

Table 3: LED flashing instructions

Flashing	Instruction
●	Green light always on
○	Lights out
●	Red light always on
◐	Green light flashing
◐	Red light flashing

Buzzer description

During malfunction, beep every 1 second for 0.25 seconds

During protection, beep every 2 seconds for 0.25 seconds (excluding over voltage protection);

When an alarm occurs, it will beep for 0.25 seconds every 3 seconds (excluding over voltage alarms)

Sleep and wake-up

- Sleep

When any of the following conditions are met, the system enters low-power mode:

1. Individual or overall over discharge protection has not been released for 30 seconds.

2. Press the button (3-6S) and release it.

3. The minimum individual voltage is lower than the sleep voltage and the duration reaches the sleep delay time (while meeting the requirements of no communication, no protection, no balance, and no current).

4. The standby time exceeds 24 hours (no communication, no charging or discharging, no mains power).

5. Force shutdown through upper computer software.

Before entering sleep mode, it is necessary to ensure that the input terminal is not connected to external voltage, otherwise it will not be able to enter low-power mode.

- Wake Up

When the system is in low-power mode and meets any of the following conditions, the system will exit low-power mode and enter normal operating mode:

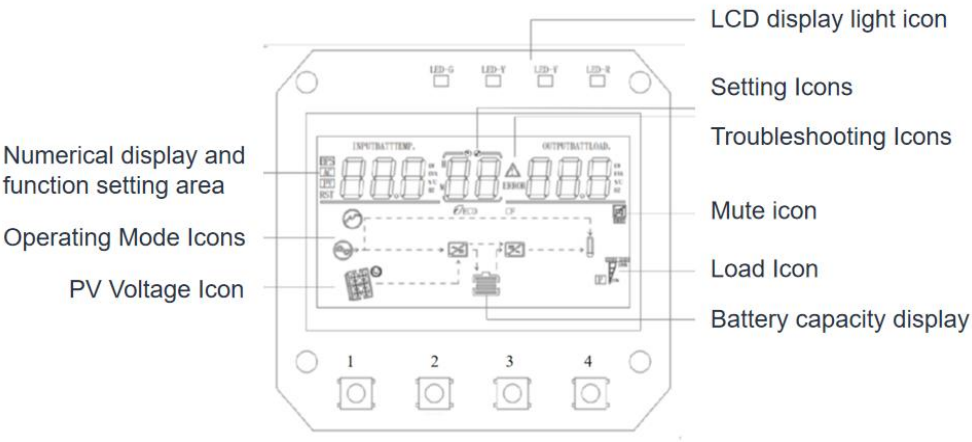
1. Connect the charger, and the output voltage of the charger should be greater

than 48V.

2. Press the button (3-6S) and release it.

3. Activate RS232.

LCD function display instructions



LCD display interface: numerical display and function setting area, working mode display area Icon display area:

- The load and battery graphics represent the load and battery capacity. Each square represents 25% of the capacity. The load icon will flash when the inverter is overloaded. The battery icon will flash when the battery capacity is too low or the battery is not connected.
- The buzzer icon shows whether the buzzer is muted. Under normal circumstances, the icon is not displayed; if the background software sets MUTE ON in any mode, the inverter enters the mute state, and the buzzer prohibition icon will be displayed.

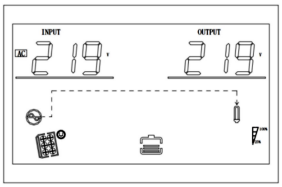
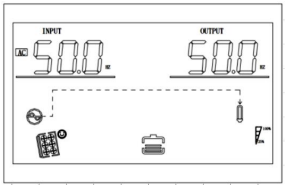
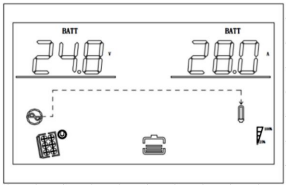
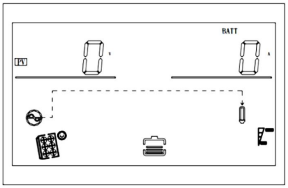
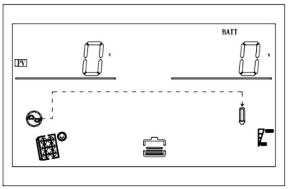
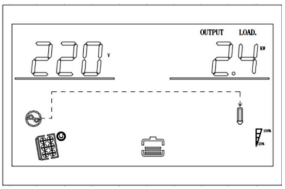
- When entering the settings menu, the settings icon will light up. Otherwise, the icon will not be displayed.
- The fault icon is only displayed in fault mode and is not displayed in other situations.

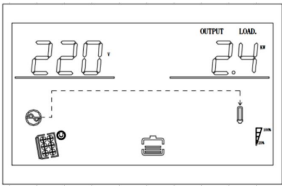
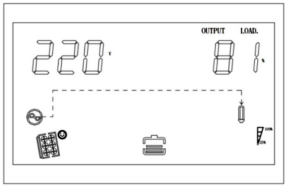
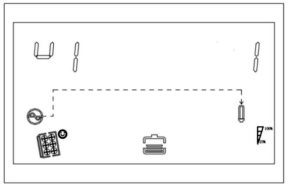
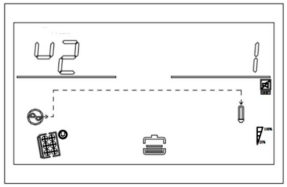
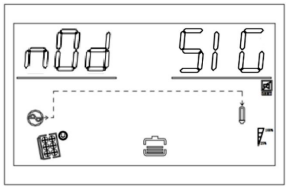
Numerical display and function setting area:

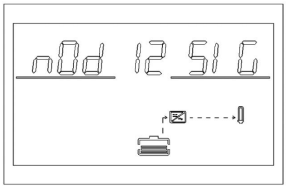
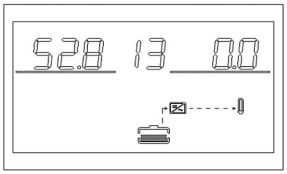
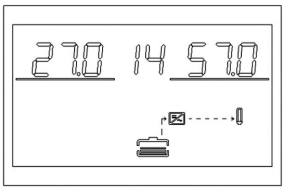
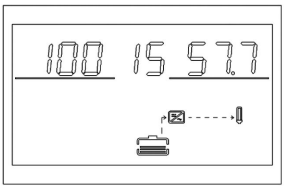
- In the non-functional setting mode, this area displays relevant information about the inverter. In normal mode, it shows output information, and using the up and down arrow keys, you can display input voltage and output voltage, input frequency and output frequency, battery voltage and current, PV voltage and PV current, PV voltage and power, output power and output voltage, output apparent power and output voltage, load percentage and output voltage, software version, and other relevant information. In fault mode, it displays fault codes.
- During the functional setting page, you can perform functional settings by operating the function setting key and using the up and down arrow keys. After 4 seconds of powering on, this display area mainly shows the mode in which the inverter is operating. For example: Standby mode, Utility mode, Battery mode, Fault mode.

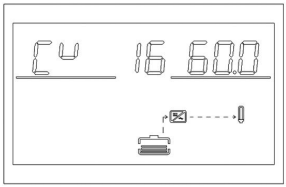
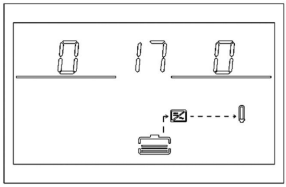
Parameter query operation

Under normal circumstances, there are a total of seventeen pages on the display. Pressing the DOWN or UP key for 0.2 to 1 second can flip through the display pages, showing information such as input and output voltage, input and output frequency, battery, PV voltage and current, load, software version, etc. In case of an alarm, an additional page for alarm information will be displayed, and if the inverter has a fault, the fault code page will be shown by default. The main page defaults to displaying fault or alarm information, and when the inverter has no faults or alarms, the main page defaults to showing output voltage and frequency information.

	Display page 1: display the inverter input and output voltage
	Display page 2: Display the inverter input and output frequency
	Display page 3: battery information, showing battery voltage and charging current
	Display page 4: PV information, showing PV voltage and PV charging current.
	Display page 5: PV information, showing PV voltage and PV power
	Display page 6: Output information, display output voltage and output active power.

	Display page 7: Output information, display output voltage and output complex power
	Display page 8: Output information, display output voltage and load percentage.
	Display page 9: Software version, displays the inverter system software version.
	Display page 10: software version.
	Display page 11: Parallel status, display of photovoltaic power generation.

	Display page 12: Lithium battery pack networking status; When SIG is constantly displayed in the upper right corner, the battery pack is running as a single group; When PAR is constantly displayed, the battery pack is running in multiple groups in series and parallel; When PAR is blinking, the battery pack is in the process of establishing a multiple groups series and parallel state.
	Display page 13: Lithium battery voltage and current information; The upper left corner displays BMS battery voltage information; The upper right corner displays BMS battery current information. In case of BMS communication failure, both upper left and upper right corners will display blinking ERR.
	Display page 14: lithium battery temperature and SOC; the upper left displays BMS temperature information; the upper right displays BMS SOC information. When BMS communication fails, flashing ERR is displayed on the upper left and upper right.
	Display page 15: Lithium battery capacity; the upper left shows the rated capacity; the upper right shows the current capacity. When BMS communication fails, flashing ERR is displayed on the upper left and upper right.

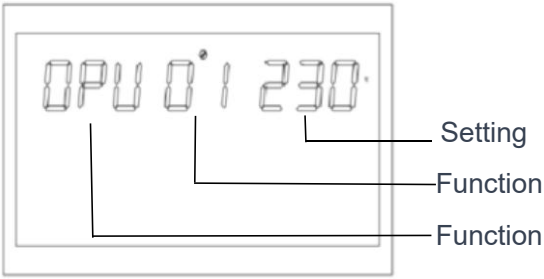
	Display page 16: Lithium battery constant voltage point; the fixed letter CV is displayed on the upper left; the BMS constant voltage charging point is displayed on the upper right. When BMS communication fails, flashing ERR is displayed on the upper right.
	Display page 17: lithium battery failure alarm information; the upper left displays BMS alarm information; the upper right displays BMS fault information. When BMS communication fails, flashing ERR is displayed on the upper left and upper right.

Function setting instructions

When setting the function, please strictly follow the user manual. If the setting is incorrect, it is very likely that the system will not work properly.

Setup Steps

Press the ENTER key for 2-5 seconds to enter the function setting interface. Use the DOWN and UP keys to navigate and select functions. At this point, the function name will blink. Flip to the desired function, then press the ENTER key for 0.1-2 seconds to enter the setting. The setting value will blink, and you can adjust it using the DOWN and UP keys. After confirming, press the ENTER key to complete the setting. Press the ESC key to return to the main interface.



code	Function name	Function Description
01	Output voltage (OPU)	Function description: The default value of output voltage is 230V, 208V, 220V, 230V, 240V which can be set.
02	Output frequency (OPF)	Function Description: Set inverter output frequency, 50Hz and 60Hz can be set, default 50Hz;
03	Output priority setting (OPP)	Function Description: GRD: Utility output priority; PU(PV): PV output priority; PBG: PV cell utility output;
04	Output mode (MOD)	Function Description: APP: Appliance, for home appliances; UPS mode, for computers and other devices; typical value of switching time is 10ms.
05	Charging Priority (CHP)	Function description: PNG (PV and Grid): PV and Grid charging at the same time; OPV (Only PV): Only PV charging; GRD (Grid): Utility charging priority; PV: PV priority charging
06	Grid Charge Current(RCC)	Function Setting: Set the maximum value of the inverter's mains rechargeable current. The default setting of the maximum mains charging current is 50A, and the setting range is [2,60A].

07	Maximum Charge Current (MCC)	Function Description: Setting the maximum charging current value of the inverter. maximum value of PV and mains charging current,maximum can be set to 80A
08	Menu Default (MDF)	Function: Return to the main interface setting. Default setting is ON, if ON is set during function setting operation, the page is not in the first interface (P1), and it will return to the first interface after 1min; if OFF is set, if the page is not in the first interface (P1) at this time, the LCD will keep in this interface all the time.
09	Overload restart setting(LRS)	Function：Overload restart function setting.
10	Over-temperature restart setting (TRS)	Function Description: Over-temperature restart function setting.
11	Main input power failure alarm (MIP)	Function Description: Setting of alarm long beep function for loss of mains power or PV.
12	Power saving mode (PWS)	Function description: low power mode(energy saving mode) setting When powered by battery, if the load is less than 25W, the inverter will enter energy saving mode and continue to output, If the load is greater than 35W, the system will return to normal mode.

13	Overload to Bypass(OLG)	Function Description: When battery mode is overloaded, set whether to turn to mains mode immediately. If the PV priority output with load is overloaded, the system will immediately turn to bypass (mains output, also known as bypass mode).
14	Mute setting (MUE)	Function Set whether the buzzer beeps or not.
15	Back To Grid(BTG)	Function Description: When the battery utility exists at the same time, the battery discharged to a certain voltage will be transferred to the utility to ensure that the battery will not be empty. Output priority can be set in PV and PBG modes.
16	Back To Battery (BTB)	Function Description: After the battery is switched off with low voltage, it is necessary to reach a certain battery voltage value in order to switch on again in battery mode.
17	Battery Type (BAT)	Functional description: Battery type setting function; Lead-acid batteries; FLD: water-filled batteries; LIB: lithium batteries; CUS: customer setting type; Fe: lithium iron batteries
18	Battery Low(BAL)	Function Description: Low voltage warning point setting. When the battery type is set to LIB (lithium battery type), the battery low voltage point can be modified. The setting range is [41.2,50.0].

19	Battery Under (BAU)	Function: Battery low voltage shutdown point setting function. The battery shutdown point can be modified when the battery type is set to LIB (lithium battery type). The setting range is [40,48];
20	Battery Constant Voltage (BCV)	Function: Constant voltage point setting function. The constant voltage charging point can be modified when the battery type is set to LIB (lithium battery type). The setting range is [48,60]. The constant voltage point voltage needs to be greater than the float charge point voltage.
21	Battery Float(BF)	Function: Float charge voltage point setting function. The constant voltage charging point can be modified when the battery type is set to LIB (lithium battery type), and the setting range is [50,58]. The voltage of constant voltage point should be greater than the voltage of float charging point.
22	Line Low Voltage (LLV)	Function description: Setting the low voltage protection point of the utility power supply
23	Line High Voltage (LHV)	Function description: Setting of the utility high voltage protection point.

24	Low Watt Discharge (LWD)	Function Description: Low power discharge protection function, when the inverter is in low power discharge setting time, the battery low voltage shutdown point will be raised to 44V. Description：Inverter mode, low power discharge time setting, default is 8 hours, can set range [1, 8].
25	Soft Relay Enable (SRE)	Function Setting: The default setting is OFF, the inverter output is directly increased from 0 to the target voltage value, when this interface is ON, the inverter output is gradually increased from 0 to the target voltage value.
26	Set Default (STD)	Function Description: This interface shows OFF before setting, when setting ON, the system will restore the default setting. When the setting is done, this interface will show OFF again.The setting can be set in mains and standby mode and take effect immediately, but cannot be set in battery mode.
27	Parallel operation mode(PAM)	Function Description: Set the parallel operation mode, which can be set in mains mode and standby (Stand By: no output but bright screen state), but not in battery mode.
28	Set battery alarm (SBA)	Function Description: The default setting is OFF, when the battery is not connected, there will be no battery not connected, battery low voltage, battery under voltage alarm.

29	Equalization Mode (EQM)	Function Description: The default setting is OFF, the function is not turned on; set to ON, the controller will start to enter the equalisation phase when the float charging phase reaches the set equalisation interval (battery equalisation cycle), or when equalisation is activated immediately.
30	Equalization Voltage (EQV)	Function Description: All modes can be set. The default setting is 58.4 and the settable range is [48,60].
31	Equalization Time (EQT)	Function Description: The battery will remain in the equalisation phase until the battery voltage increases to the battery equalisation voltage. The default setting is 60 minutes and the settable range is [5,900].
32	Equalization Timeout (EQO)	Function Description: When the battery voltage does not rise to the battery equalisation voltage point during the equalisation phase, extend the battery equalisation time until the battery voltage reaches the battery equalisation voltage. The default setting is 120 minutes and the settable range is [5,900].

33	Equalization interval (EQI)	Function Description: When battery access is detected during the float charging phase with equalisation mode on, the controller will start to enter the equalisation phase when the set equalisation interval (battery equalisation cycle) is reached. The default setting is 30 days and the settable range is [1,90].
34	Turn on the equalization Equalization Now (EQN)	Function Description: The default setting is OFF, the function is not turned on; when it is set to ON, the equalisation charging will be activated immediately in the float charging stage under the equalisation mode on and when the battery access is detected, the controller will start to enter the equalisation stage.
35	Grid Tie Invert (GTI)	Function Description: The default setting is OFF, the function is not turned on; when it is set to ON, the inverter feeds excess energy into the mains by performing maximum power point tracking.
36	Dual output battery mode cut-off voltage (DBV)	Function Description: When turned on, the inverter secondary output is turned on by default. After entering the battery mode, when the battery voltage is lower than the set point, the secondary output is turned off. When the battery voltage is again above the set point + 1V/cell, the secondary output turns on.

37	Dual output battery mode cut-off time (DBT)	Function description: The default setting is OFF, the function is not turned on, when it is turned on, the inverter secondary output is turned on by default. After entering the battery mode, when the battery discharge time reaches the set point, the secondary output will be turned off, and when set to FUL, the secondary output is not limited to the output time.
38	Battery Manage System(BMS)	Function Description: The default setting is ON, the function is on; when set to OFF, the function is off.
39	Battery SOC under lock (SBU)	Function Description: The default setting is 10, and the settable range is [5,50]. Set to OFF, at this time, the inverter no longer performs shutdown, startup, and alarm operations according to the SOC condition.
40	Battery SOC turn to battery mode. (STB)	Function Set the inverter to battery mode SOC value, the default setting is 90, and the settable range is [10,100].
41	Battery SOC turn to grid mode (STG)	Function Description: Set the inverter to mains mode SOC value, the default setting is 50, and the settable range is [10,90]. Battery mode lithium battery SOC reaches the set value when switching to mains mode. When this setting is higher than the STB point, STB and STG will not be effective after the next effective time.

Fault and alarm description

Explanation of inverter faults and alarms

Function description: The alarm code ALA flashes and the buzzer sounds for 1 second and stops for 1 minute. The fault indicator code is always on, and the buzzer beeps for 10 seconds and then stops. After the stop, the fault is eliminated. Try to restart the machine. After six failed restarts, the machine continues to be in the fault state. You need to completely power off (stop the screen) or wait for 30 minutes before restarting the machine. The LCD display of faults and alarms is as shown in the figure above. The fault icon in the fault mode is always on, and the alarm icon in the alarm status flashes. Contact the manufacturer according to the fault information to eliminate the abnormal situation.

Fault description: The inverter enters fault mode, the LED red light is always on, and the LCD displays a fault code.

code	Fault description	Fault details	Disposal measures

1	Bus bar Voltage Boost Soft Start Failure	Unable to Reach Set Voltage During Bus bar Soft Start	Contact the manufacturer
2	Bus bar over voltage	The bus bar is higher than the set value	Contact the manufacturer
3	Bus bar under voltage	The bus bar is lower than the set value	Contact the manufacturer
4	Battery over current	If the instantaneous battery current exceeds 580A, protect immediately	Contact the manufacturer
5	Over temperature	The temperature sensor of PFC or INV is higher than the over-temperature set value	After restart is enabled, the fault cannot be recovered after six failed restarts.
6	Battery over voltage	The battery voltage is higher than the set value	Recoverable
7	Bus bar soft start fault	The bus bar DC soft starting voltage does not reach the set value.	Contact the manufacturer

8	Bus bar short circuit	During normal operation, the bus bar is momentarily lower than the set value.	Contact the manufacturer
9	Inverter soft start fault	After the inverter soft-starts for a period of time, it still cannot reach the rated output voltage.	Contact the manufacturer
10	Inverter output over voltage	In battery mode, the inverter voltage is higher than the set value	Contact the manufacturer
11	Inverter output under voltage	In battery mode, the inverter voltage is lower than the set value	Contact the manufacturer
12	Inverter short circuit	The inverter voltage is momentarily less than the set value, and the current is momentarily greater than the set value.	After six failed restarts, recovery is not possible,Contact the manufacturer
13	Negative work protection	The inverter power is less than the set value for a period of time	Contact the manufacturer

14	Overload fault	Load capacity exceeds specification	After restart is enabled, the fault cannot be recovered after six failed restarts.
15	Model failure	Software recognition machine model does not match hardware detection	Contact the manufacturer
16	No boot loader	no boot loader	Contact the manufacturer
17	PV program is burning	VML model is burning PV control program	Contact the manufacturer
19	Same serial number	In parallel mode, multiple machines with the same serial number were detected.	Contact the manufacturer
20	CAN communication error	In parallel mode, CAN bus communication is abnormal.	Contact the manufacturer

21	Battery voltage difference is too large	In parallel mode, the battery voltage difference between different machines is too large	Contact the manufacturer
22	Input voltage difference is too large	In parallel mode, the input voltage difference between different machines is too large	Contact the manufacturer
23	Input voltage frequency difference	In parallel mode, the input voltage frequency of different machines is too different.	Contact the manufacturer
25	Output out of sync	In parallel mode, the output voltage detection loses synchronization.	Not recoverable
26	BMS failure	Battery BMS has fault information	Turn off the BMS communication function, or eliminate the BMS fault and restore it
code	Fault description	Fault details	Disposal measures
50	Battery open	Battery voltage not detected	Battery on or reconnecting the battery

51	Battery Under	Battery shuts down or won't turn on with low voltage	Battery charging
52	Battery low	Low battery voltage	Battery charging, SOC >5% Alarm cleared
53	Battery charge short	Battery voltage less than 5V and charging current more than 4A	Unrecoverable
54	Low watt discharge	Battery discharged beyond the set low power discharge time	Recoverable
55	Over charge	Battery voltage higher than set value	Recoverable
56	BMS Loss	Communication failure when BMS communication function is turned on	Battery pack and inverter restart or reconnect cascade communication lines
57	Over Temperature	Temperature sensor of PFC or INV is higher than the set value	Temperature sensor of PFC or INV is below the set value
58	Fan lock	Fan speed signal not detected	Inverter restart
59	EEPROM fail	EEPROM read/write failure	Unrecoverable
60	Overload warning	Load >102%	Recoverable (load <97%)

61	Abnormal generator waveform	Abnormal generator waveform detection	Recoverable
62	PV Energy Weak	Bus voltage below set value when battery is not connected	Recover after 10mins
63	Synchronization signal fail	Parallel board disconnection fault	Switching to Standalone Mode Recovery Disconnected Troubleshooting Recovery
64	Parallel configuration incompatible	Parallel setup error	When the parallel setting is correct
65	Parallel version incompatible	Incompatible version numbers exist for parallel systems	Recovery when all machine versions in a parallel system are compatible with each other
66	Parallel Communication Fault	Slave not detected in parallel system	Recovery after slave access is detected under parallel system, set to standalone mode recovery

67	Parallel Line Differ	Excessive error in mains voltage or frequency of parallel machines	Recover when the mains voltage and frequency error of each machine are detected to be reasonable.
68	SOC Under	Li-ion battery SOC below set value	Turn off the low SOC shutdown function, or turn off the BMS communication function, or recover when SOC returns to set value + 5%.
69	SOC Low	Li-ion battery SOC below set value + 5% (mains mode or battery mode), below set value + 10% (standby mode)	Turn off the low SOC shutdown function, or turn off the BMS communication function, or recover when SOC returns to set value + 10%.

Explanation of energy storage battery faults and alarms

code	Fault description	Fault details	Disposal measures
1	Individual overcharge protection	Individual voltage greater than 3.65V	SOC<96% or discharge current>1A
2	Individual over discharge protection	Single cell voltage less than 2.7V	Single cell voltage>2.95V or connected to charger

3	Overall overcharge protection	The overall overcharge voltage is greater than 58.4V	SOC<96% or discharge current>1A
4	Overall over discharge protection	The overall voltage is less than 43.2V	Overall voltage>47.2V or connected to charger
5	Charging over current protection	Charging current greater than 110A	Automatic contact or discharge current>1A after 1 minute (10 consecutive occurrences will lock the state and will no longer automatically release it)
6	Discharge over current protection	Discharge current greater than 110A	Automatic contact or charging current>1A after 1 minute (10 consecutive occurrences will lock the state and will no longer automatically release it)
7	Short circuit protection	/	When charging, the short circuit protection will be automatically released or the load will be removed
8	MOS high-temperature protection	MOS temperature above 115 ℃	MOS temperature drops to 85 ℃ to release
9	Cell temperature protection	Charging temperature below -5 ℃ or above 65 ℃	Release when the battery cell temperature is greater than 0 ℃ but less than 55 ℃

		Discharge temperature below -20 ℃ or above 70 ℃	Release when the cell temperature is greater than -15 ℃ but less than 60 ℃
10	Environmental temperature alarm	The ambient temperature is below -20 ℃ or above 75 ℃	Release whean the cell temperature is greater than -15 ℃ but less than 65 ℃
11	Low battery alarm	SOC < 5%	SOC greater than 5% or connected to charger
12	Cell failure protection	Single cell voltage difference>1V	Charging and discharging are not allowed. Contact the manufacturer

Disposal

When a product is scrapped or its parts are replaced, please do not dispose of the product with household waste. Instead, dispose of the packaging and replaced parts in accordance with the applicable regulations of the region where the product is used, adhering to the following principles for proper disposal.

- Collect waste lithium batteries and store them in a closed container. The recycling and treatment of waste batteries should be separated from other garbage to prevent secondary pollution.
- Classify according to material composition for convenient subsequent processing.
- Sell it to a legitimate recycling unit for disposal, do not dispose of it casually.