All-In-One

Off-grid

Energy Storage System

ESS-ST2K5A-3KF1-A1/C1

User Manual

Table of Contents

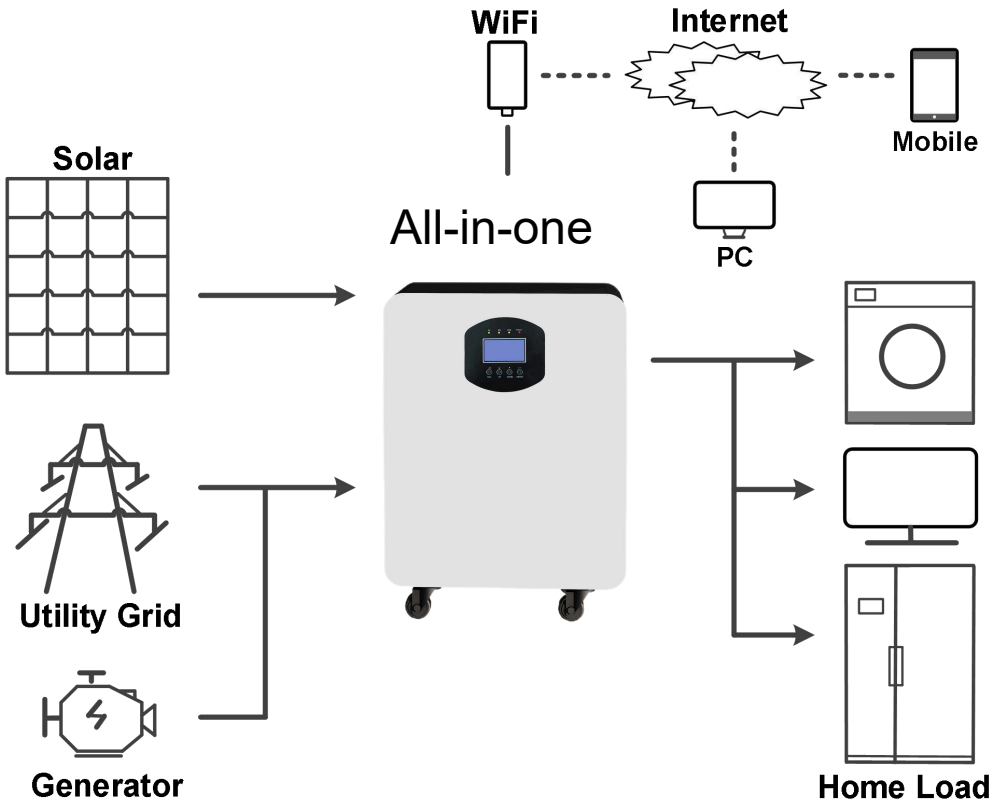
1.Information

1.1 System Introduction

ESS-ST2K5A-3KF1-A1/C1(including 2.56KWh battery and 3KW inverter) can be used in DC coupled systems (mainly newly installed), AC coupling system (mainly transformation) and off-grid system (mainly transformation, photovoltaic capacity increase). And the scheme is as follows:

Solution	Configuration	
	Inverter	Battery
ESS-ST2K5A-3KF1-A1/C1	3KW	2.56KWh

1.2 Application



ESS-ST2K5A-3KF1-A1/C1

Figure1 Working Diagram

1.3 Safety Instructions

1.3.1 This sign indicates a hazardous situation which, if not avoided, could result in death or serious injury.

1.3.2 The All-In-One must not be touched or put into service until 5 minutes after it has been

switched off or disconnected to prevent an electric shock or injury.

1.3.3 This sign shows danger of hot surface.

1.3.4 Refer to the operating instructions.

1.3.4.Setting of Warning Sign for Safety

During instruction, maintenance and repair, follow the instructions below to prevent non-specialist personnel from causing misuse or accident:

♦ Obvious signs should be placed at front switch and rear-level switch to prevent accidents caused by false switching.

♦ Warning signs or tapes should be set near operating areas.

♦ The system must be reinstalled after maintenance or operation.

1.3.5 Measuring Equipment

To ensure the electrical parameters to match requirements, related measuring equipment are required when the system is being connected or tested.

Ensure that the connection and use matched specification to prevent electric arcs or shocks.

1.3.6 Moisture Protection

It is very likely that moisture may cause damages to the system. Repair or maintaining activities in wet weather should be avoided or limited.

1.3.7 Operation After Power Failure

The battery system is part of the energy storage system which stores life-threatening high voltage even when the DC side is switched off. Touching the battery outlets is strictly prohibited. The inverter can keep a life-threatening voltage even after disconnecting it from the DC and / or AC side. Therefore, for safety reasons, it must be tested with a properly calibrated voltage tester before an installer works on the equipment.

1.4 Battery Safety Datasheet

1.4.1 Hazard Information

Classification of the hazardous chemical:

Exempt from classification according to Australian WHS regulations.

Other hazards:

This product is a Lithium Iron Phosphate Battery with certified compliance under the UN Recommendations on Transport of Dangerous Goods, Manual of Tests and Criteria, Part III, subsection 38.3. For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage.

However, if the product is exposed to a fire, added mechanical shocks, decomposed,added electric stress by misuse, the gas release vent will be operated. The battery cell case will be breached at the extreme. Hazardous materials may be released.
Moreover, if heated strongly by the surrounding fire, acrid or harmful fume may be emitted.

1.4.2 Safety Datasheet

For detailed information please refer to the provided battery safety datasheet.

1.5 General Precautions

 DANGER

Danger to life due to high voltages of the PV array, battery and electric shock. When exposed to sunlight, the PV array generates dangerous DC voltage which will be present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks. If you disconnect the DC connectors from the system under load, an electric arc may occur leading to electric shock and burns.

♦ Do not touch uninsulated cable ends.
♦ Do not touch the DC conductors.
♦ Do not open the inverter and battery.
♦ Do not wipe the system with damp cloth.
♦ Have the system installed and commissioned by qualified people with the appropriate skills only.
♦ Prior to performing any work on the inverter or the battery pack, disconnect the inverter from all voltage sources as described in this document.

 WARNING

Risk of chemical burns from electrolyte or toxic gases. During standard operation, no electrolyte shall leak from the battery pack and no toxic gases shall form. Despite careful construction, if the Battery Pack is damaged or a fault occurs, it is possible that electrolyte may be leaked or toxic gases formed.

♦ Do not install the system in any environment of temperature below -10°C or over 50°C and in which humidity is over 90%.
♦ Do not touch the system with wet hands.
♦ Do not put any heavy objects on top of the system. Do not damage the system with sharp objects.
♦ Do not install or operate the system in potentially explosive atmospheres or areas of high humidity.
♦ Do not mount the inverter and the battery pack in areas containing highly flammable materials or gases.
♦ If moisture has penetrated the system (e.g. due to a damaged enclosure), do not install or operate the system.
♦ Do not move the system when it is already connected with battery modules.Secure the system to prevent tipping with restraining straps in your vehicle.
♦ The transportation of product must be made by the manufacturer or an instructed personal. These instructions shall be recorded and repeated.

♦ A certified ABC fire extinguisher with minimum capacity of 2kg must be carried along when transporting.
♦ It is totally prohibited to smoke in the vehicle as well as close to the vehicle when loading and unloading.
♦ For the exchange of a battery module, please request for new hazardous goods packaging if needed, pack it and let it be picked up by the suppliers.
♦ In case of contact with electrolyte, rinse the affected areas immediately with water and consult a doctor without delay.

CAUTION:

Risk of injury through lifting or dropping the system. The inverter and battery are heavy. There is risk of injury if the inverter or battery is lifted incorrectly or dropped during transport or when attaching to or removing from the wall.

♦ Lifting and transporting the inverter and battery must be carried out by more than 2 people.

1.6 Parts List

Check the following parts list to ensure it is complete.

factory delivers a total system separately on site to client, this consists of:

 All-In-One OFF-GRID Energy Storage System	 USBA
 APP Operation Guide	 User manual

1.7 Specifications

Item	Model	ESS-ST2K5A-3KF1-A1/C1
Battery Module	Voltage	25.6V
	Battery capacity	100Ah
	Charge voltage	29.2V

	Discharge cut-off voltage	20V
	Charge current	50A
	Max charge current	100A
	Standard discharge current	50A
	Max. discharge current	100A
	Max peak current	150A
Inverter	Power	3KW
	Output Voltage	230VAC
	Frequency	50Hz/60Hz
	Max. PV Power	3KW
	Max. PV Voltage	500VDC
	MPPT Voltage Range	40-450VDC
Parameter	Protection Degree	IP21
	Material/Colour	Metal/White+Black
	Size	370*225*510mm
	Weight	32Kg
	Temperature range	-10℃-50℃

1.8 Liability Limitation

Any product damage or property loss caused by the following conditions, factory does not assume any direct or indirect liability.

Product modified, design changed or parts replaced without factory authorization;

Changes, repair attempts and erasing of series number or seals by non factory technician;

System design and installation are not in compliance with standards and regulations;

Fail to comply with the local safety regulations (VDE for DE, SAA for AU);

Transport damage (including painting scratch caused by rubbing inside packaging during shipping). A claim should be made directly to shipping or insurance company in this case as soon as the container/packaging is unloaded and such damage is identified;

Fail to follow any/all of the user manual, the installation guide and the maintenance regulations;

Improper use or misuse of the device;

Insufficient ventilation of the device;

The maintenance procedures relating to the product have not been followed to an acceptable standard;

Force majeure (violent or stormy weather, lightning, overvoltage, fire etc.);Damages caused by any external factors.

1.9 Installation

This Manual introduces the basic steps to install and set up product

	NOTE: Please be cautious unpacking the battery, otherwise components could be damaged.

1.10 Installation Site and Environment

General

This energy storage system is indoor version and can be installed in an indoor location.

When product systems are installed in a room, product must not be hampered by the structure of the building, the furnishings and equipment of the room.

The product is naturally ventilated. The location should therefore be clean, dry and adequately ventilated.

The mounting location must allow free access to the unit for installation and maintenance purposes, and the system panels must not be blocked.

The following locations are not allowed for installation:

habitable rooms;

ceiling cavities or wall cavities;

on roofs that are not specifically considered suitable;

access / exit areas or under stairs / access walkways;

where the freezing point can be reached, such as garages, carports or other places as well as wet rooms (environmental category 2);

locations with humidity and condensation over 90%;

places where salty and humid air can penetrate;

seismic areas - additional security measures are required;

Sites with altitude below 2000m;

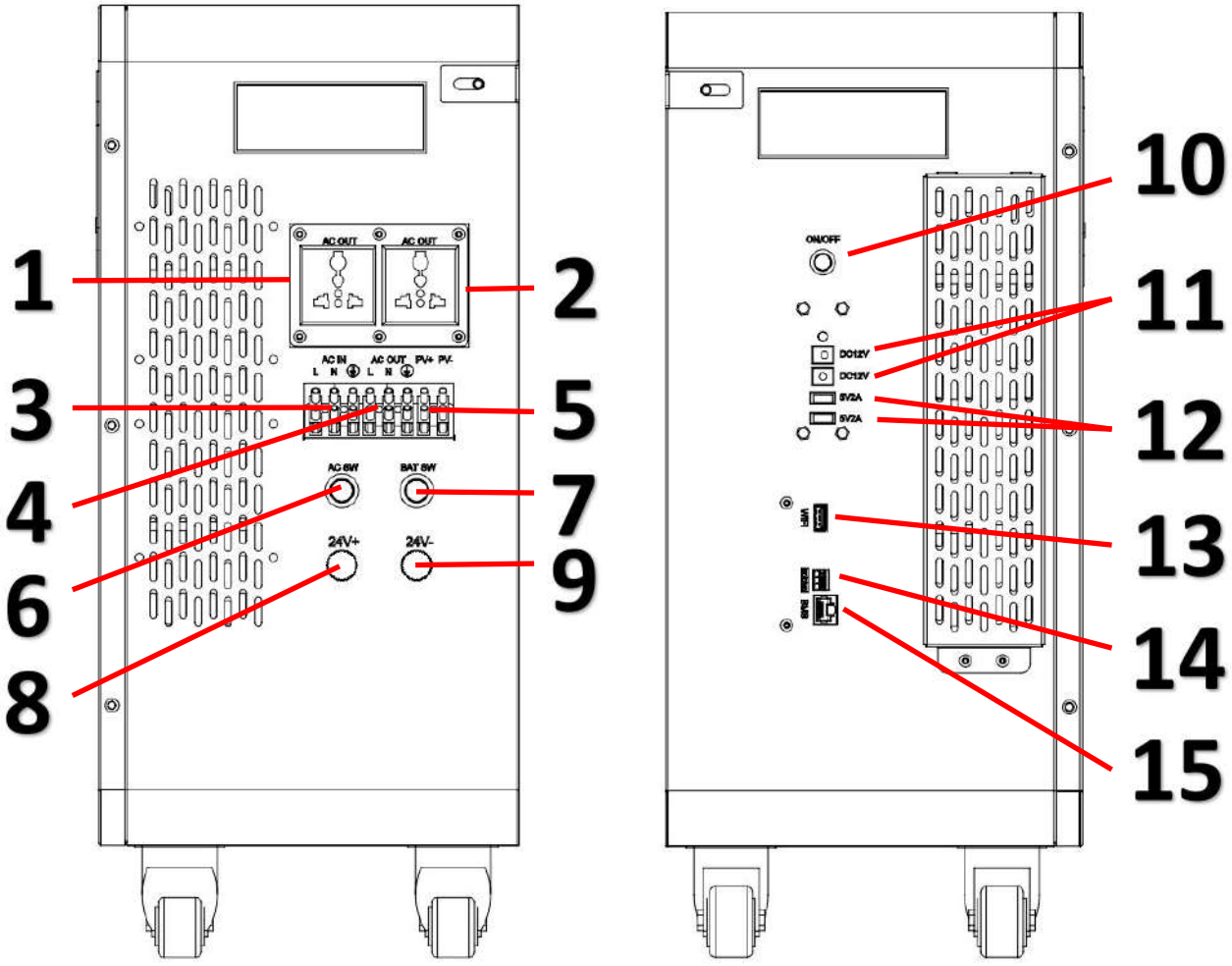
places with an explosive atmosphere;

locations with direct sunlight or a large change in the ambient temperature;

places with flammable materials or gases or an explosive atmosphere.

2.Product Introduction

2.1 Installation



NO	NAME	Silk-SCREEN	REMARK
1、2、4	AC OUT	AC OUT	AC OUTPUT
3	AC IN	AC IN	AC input
5	PV-/PV+	PV-/PV+	PV in
6	AC SW	AC SW	AC switch
7	BAT SW	BAT SW	Battery switch
8	24V+	24V+	Battery 24V+
9	24V-	24V-	Battery 24V-
10	ON/OFF	ON/OFF	power outlet switch
11	DC12V	DC12V	DC12V power
12	5V2A	5V2A	USB charging outlet
13	WIFI	WIFI	
14	NO/C/NC	NO/C/NC	Dry contact

15	BMS	BMS	

Household off-grid application

⚠	NOTE: First turn on the battery switch, then turn on the inverter switch.

⚠	NOTE: Recommended AC circuit breaker rating is 25A.

⚠	STATEMENT: The method of anti-islanding protection is Method(c)

3.System Operation

3.1 Switch On

When turning on the system, it is very important to follow the steps below to prevent damage to the system .

WARNING: Please check the installation again before turning on the system .

Step 1: Press the DC switch button, then press the AC switch button, and the display will light up

Step 2: Turn on the external PV switch.（If there is a PV external switch）

Step 3: Turn on the external grid switch.（If there is a external grid switch）

Step 4: If backup load is applied, turn on the external Backup switch.

⚠	NOTE: the Backup switch is only used when a backup load is applied.

3.2 Switch Off

Step 1: Press the AC switch button, then press the DC switch button until the display is off.

Step 2: Turn off the external grid switch.

Step 3: If backup load is applied, turn off the external backup switch.

Step 4: Turn off the external PV switch on the cable box.

3.3 AC Input/Output Connection

CAUTION: Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 25A for 3KF1.

CAUTION: There are two terminal blocks with ‘IN’ and ‘OUT’ markings. Please do NOT mis-connect input and output connectors.

WARNING: All wiring must be performed by a qualified personnel.

WARNING: It’s very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.

Suggested cable requirement for AC wires

Model	Gauge	Cable
3KF1	1*14AWG	2.075mm^2

Please follow below steps to implement AC input/output connection:

Before making AC input/output connection, be sure to open DC protector or disconnector first.

Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.

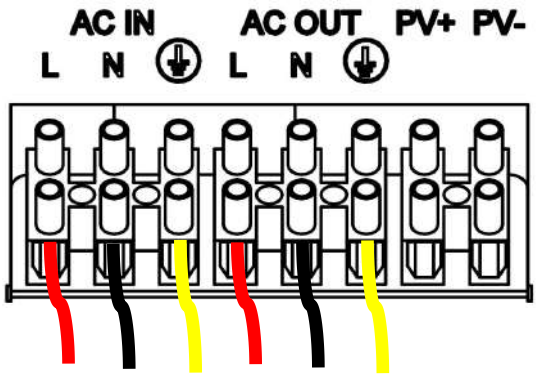
Insert AC input/output wires according to polarities indicated on terminal and tighten the terminal screws.

Be sure to connect PE protective conductor ⏚ first.

⏚ → Ground (yellow)

L → LINE (red)

N → Neutral (black)



Connect the corresponding cable to the port according to the identifier , Make sure the wires are securely connected.

⚠	**WARNING:** Be sure that AC power source is disconnected before attempting to hardwire it to the unit.

CAUTION: Important

Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check with manufacturer of air conditioner that if it's equipped with time-delay function before installation. Otherwise, this off grid solar inverter will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

3.4 PV Connection

CAUTION: Before connecting to PV modules, please install separately a DC circuit breaker between inverter and PV modules.

WARNING: All wiring must be performed by a qualified personnel.

WARNING: It'very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Model	Gauge	Cable
3KW	1*14AWG	2.075mm^2

PV Module Selection:

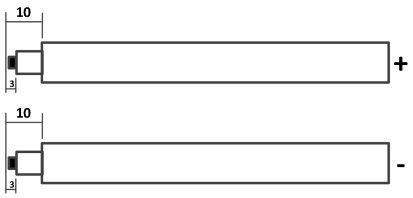
When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

Inverter Model	3KW
Max. PV Array Open Circuit Voltage	500Vdc
Start-up Voltage	40Vdc
PV Array MPPT Voltage Range	40Vdc~450Vdc

Please follow below steps to implement PV module connection:

Remove insulation sleeve 10 mm for positive and negative conductors.

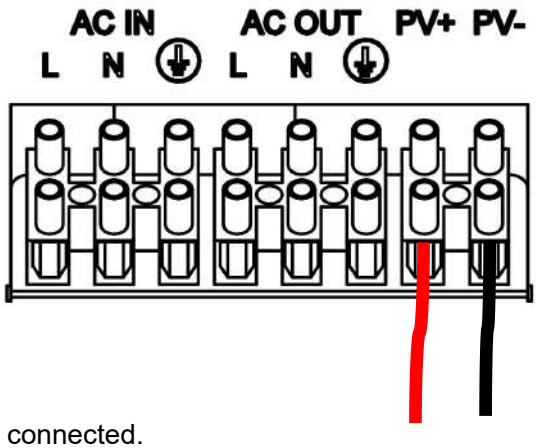


Step 1: Check the input voltage of PV array modules. This system is applied with One strings of PV array. Please make sure that the maximum current load of each PV input connector is 18A.

CAUTION: Exceeding the maximum input voltage can destroy the unit!! Check the system before wire

connection.

Step 2: Disconnect the circuit breaker and switch off the DC switch.
Step 3: Insert PV+/PV- according to the polarity indicated on the terminal, and tighten the terminal screw.



Make sure the wires are securely connected.

3.5 Emergency Procedure

When the energy storage system appears to be running abnormally, you can turn off the grid-connected main switch that directly feeding the BESS , and turn off all load switches within the BESS ,turn off the battery switch at the same time. To prevent a potentially fatal personal injury, if you want to repair or open the machine after the power is switched off,please measure the voltage at the input terminals with a suitably calibrated voltage tester.Before working on this equipment, please confirm that there is no grid electric supply to the BESS! The upper cover plate cannot be opened until the DC-link capacitance inside the battery modules discharges completely about 15 minutes later.

3.5.1 Emergency Handling Plan

1. Disconnect the AC breaker.
2.Check the control power supply. If it is OK, return the power supply to find out the reason.
3. Please record every detail related to the fault, so Factory can analyse and solve the fault. Any operation of equipment during a fault is strictly forbidden, please contact Factory as soon as possible.
4.As battery cells contain a little Oxygen inside and all cells have got explosion-proof valves,explosion hardly happens.
5.When the indicator light on the battery shows a red fault, check the fault type through the communication protocol, and contact our after-sales service personnel for advice.

3.5.2 Hazards

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas.
If one is exposed to the leaked substance, immediately perform the actions
described below:
Inhalation: Evacuate the contaminated area, and seek medical attention.
Eye contact: Rinse eyes with running water for 5 minutes, and seek medical attention.
Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention.
Ingestion: Induce vomiting and seek medical attention.

3.5.3 Fire

If a fire breaks out in the place where the battery pack is installed, perform the following countermeasures:

Fire extinguishing media

During normal operation, no respirator is required. Burning batteries can not be extinguished with a regular fire extinguisher, this requires special fire extinguishers such as the Novec 1230, the FM-200 or a dioxin extinguisher. If the fire is not from a battery, normal ABC fire extinguishers can be used for extinguishing.

Fire -fighting instructions

1.If fire occurs when charging batteries, if it is safe to do so, disconnect the battery pack circuit breaker to shut off the power to charge.

2.If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.

3. If the battery pack is on fire, do not try to extinguish but evacuate people immediately.

	NOTE:There may be a possible explosion when batteries are heated above 150℃.When the battery pack is burning, it leaks poisonous gases . Do not approach.

Effective ways to deal with accidents

Battery in dry environment: Place damaged battery into a segregated place and call local fire department or service engineer.

Battery in wet environment: Stay out of the water and don’t touch anything if any part of the battery, inverter, or wiring is submerged.

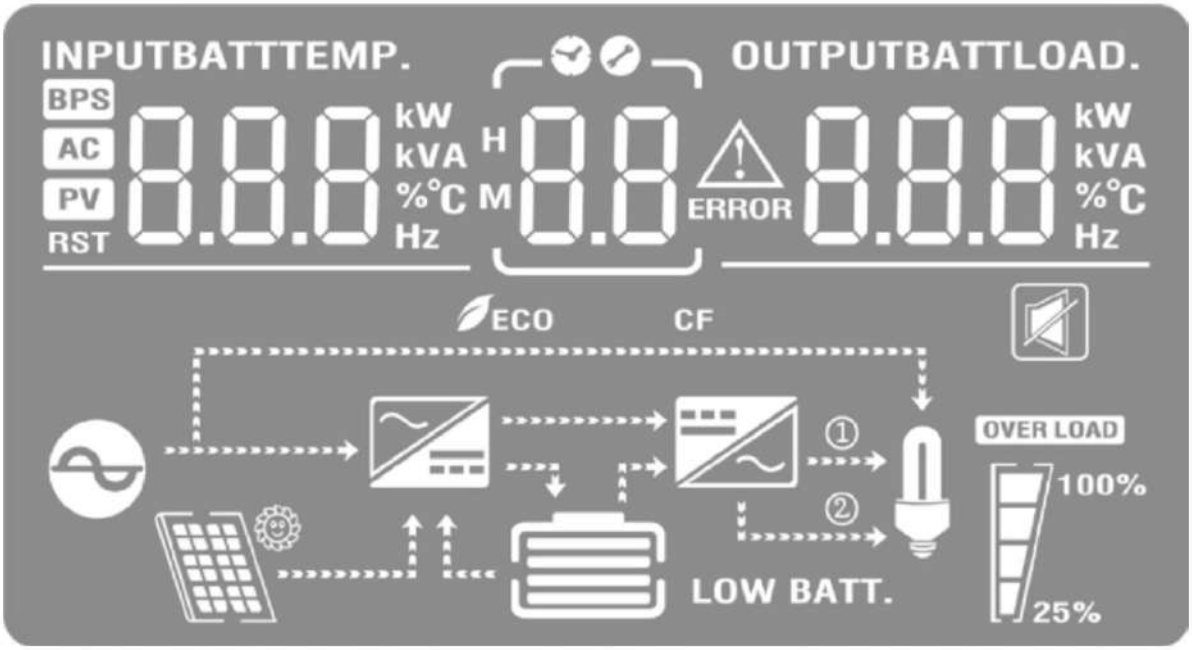
Do not use a submerged battery again and contact the service engineer.

3.6 4G/Wi-Fi Connection

This unit is equipped with a 4G/Wi-Fi transmitter. 4G/Wi-Fi transmitter can enable wireless communication between off-grid inverters and monitoring platform.Users can access and control the monitored inverter with downloaded APP. You may find “SmartESS” app from the Apple® Store or SmartESS 4G/Wi-Fi” in Google® Play Store. All data loggers and parameters are saved in iCloud. For quick installation and operation, please refer to Appendix III - The 4G/Wi-Fi Operation Guide for details.

4.EMS Introduction And Set Up

4.1 LCD Display Icons



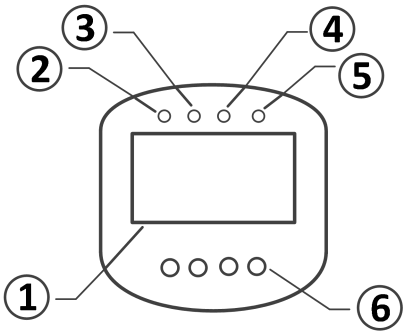
Icon	Description
AC Input Information	
	AC input icon.

	Indicate AC input power, AC input voltage, AC input frequency, AC input current.
PV Input Information	
	PV input icon.
	Indicate PV power, PV voltage, PV current, etc.
Output Information	
	Inverter icon.
	Indicate output voltage, output current, output frequency, inverter temperature.
Load Information	
	Load icon.
	Indicate power of load, power percentage of load.
	Indicate overload happened.
Battery Information	
	Indicate battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.
	Indicate battery voltage, battery percentage, battery current.
Other Information	
	Indicate alarm code or fault code.
	Indicate a fault is happening.
	Indicate the alarm is disabled.
	Indicate power saving mode.

4.2 LCD Operating Figure

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes three indicators, four function keys and a LCD display, indicating the operating status and input/output power information.

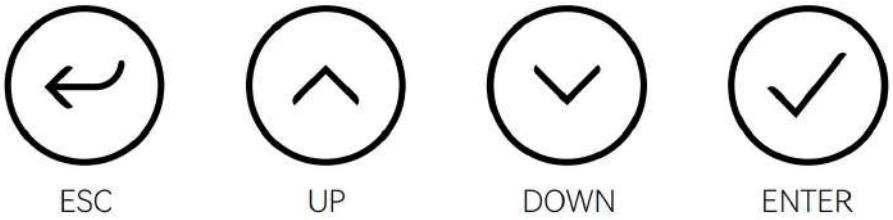
1. LCD display
2. AC indicator
3. Inverter indicator
4. Charging indicator
5. Fault indicator
6. Function buttons



LED Indicator

LED indicator			Messages
AC	Status	Solid on	The mains power is normal and enters the mains power operation

	indicator (Green)	Flashing	The mains power is normal, but it has not entered mains power operation
		Off	The mains power is abnormal.
INV	Invert indicator (Yellow)	Solid on	Output is powered by battery or PV in battery mode.
		Off	Other states
CHG	Charging indicator (Yellow)	Solid on	The battery is in float charging
		Flashing	The battery is in constant voltage charging.
		Off	Other states.
FAULT	Fault indicator (Red)	Solid on	Fault occurs in the inverter
		Flashing	Warning condition occurs in the inverter.
		Off	The inverter is working properly

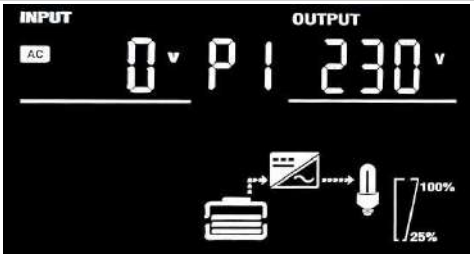


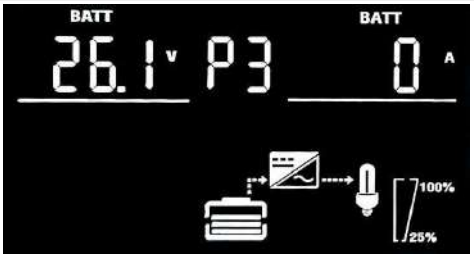
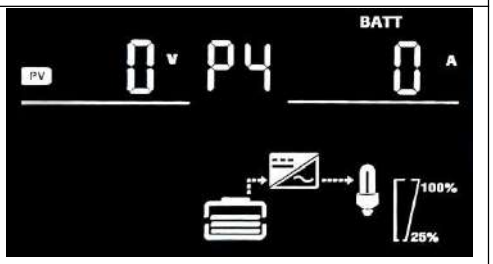
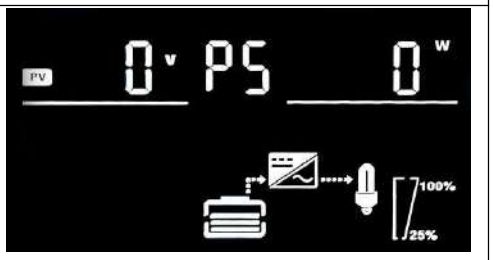
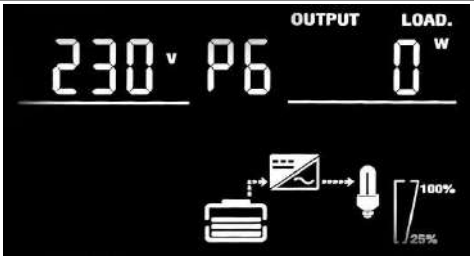
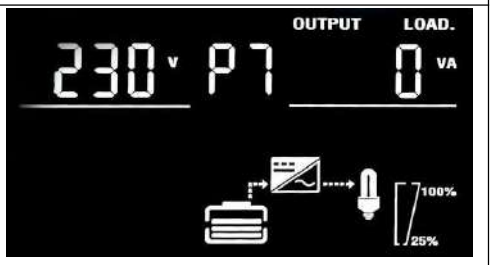
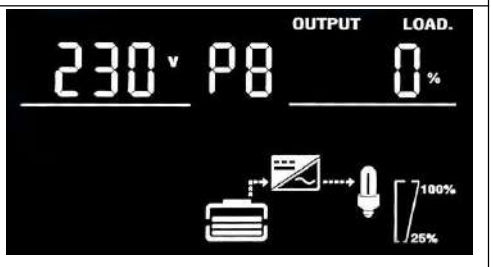
Function Buttons

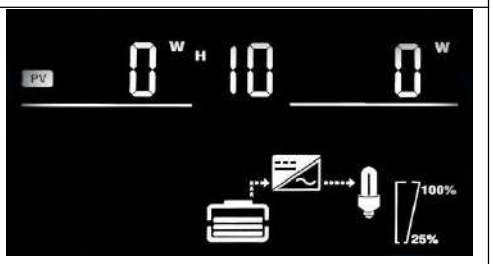
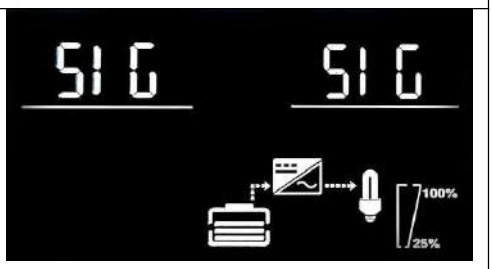
Button	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

4.3 Operation Instructions for Query

In normal display mode, if there are 10 pages of information displayed, you can use the UP or DOWN button to flip through the pages by pressing and holding for around 0.2-1 second. The corresponding query contents for each page are shown below:

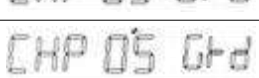
Index	Function Code	Functionality	Function Display
1	P1	Inverter Input/Output Voltage	

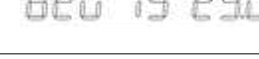
2	P2	Inverter Input/Output Frequency	
3	P3	Battery Voltage and Charging Current	
4	P4	PV Voltage and PV Charging Current	
5	P5	PV Voltage and PV Power	
6	P6	AC Output Voltage and Active Power	
7	P7	AC output voltage and complex power.	
8	P8	AC output voltage and load power percentage.	

9	P9	Software version.	
10	10	PV generation.	
11	11	"SIG" displayed on the right indicates that the inverter is not parallel-connected. "PAR" displayed on the right indicates that multiple inverters are parallel-connected.	

4.4 Other feature descriptions.

Program	Description	Setting Option	
01	Output voltage		
		230V (default) Adjustable/settable value: 208V, 220V, 230V, 240V	
02	Output frequency		
		50Hz(default) Adjustable/settable frequency: 50Hz, 60Hz	
03	Output source priority	Solar first	
		Solar energy provides power to the loads as first priority. If solar energy is sufficient, battery will be charged with solar energy. If solar energy is not sufficient to power all connected loads, Grid will supply power to the loads at the same time. The extra power will charge the battery. If solar energy and grid are not sufficient, battery will supply power to the loads at same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	
		Grid first (default)	

		Grid provides power to the loads as first priority. Solar power will charge the battery. If solar is not sufficient to charge battery, grid will charge the battery at the same time. If grid is not sufficient to power all connected loads, solar energy will supply power to the loads at the same time. If solar energy and grid are not sufficient, battery will supply power to the loads at same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	
03	Output source priority	PBG priority	
		Solar energy provides power to the loads as first priority. If solar energy is sufficient, battery will be charged with solar energy. If solar energy is not sufficient to power all connected loads, battery will supply power to the loads at the same time. If solar energy and battery are not sufficient, grid will supply power to the loads at same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	
04	Output mode	APP: Appliance (default)	
		Applied to household appliances	
		UPS	
		Applied to computer and other devices. Typical switching time is 10ms.	
		GEN	
		Applied to connect generator by using grid input port	
05	Charger source priority	PNG: PV and Grid (default)	
		OPV: Only PV	
		GRD: Grid first	
		PV: PV first	
		There are four options for charging priority. The default is PNG (PV and Grid). PV and Grid are charged at the same time;. The second is OPV (Only PV). Only PV charge. The third is GRD (Grid). Grid charging takes priority. The fourth is PV. PV gives priority to charging.	
06	Grid charging current		
		40A(default) Setting range is [2, 100A]	

07	Maximum charging current		
		Set total charging current for solar and grid chargers. The default is 60A. Available options: 2/10/20/30/40/50/60/70/80/90/100A	
08	Menu Default		
		During setting: Set to ON. If the current page is not on the first page and no operation with 1 minute, the system will return to display the first page. Set to OFF. If the current page is not on the first page and no operation with 1 minute, the system will stay on the current page.	
09	Auto restart when overload occurs	The default is ON.	
10	Auto restart when over temperature occurs	The default is ON.	
11	Main input cut warning		
		Enable/Disable Mains or PV loss alarm. The default setting is ON. If the main input detected lost, the buzzer will sound for 3 seconds. when set to OFF, after the main input is lost, the buzzer will not sound.	
12	Energy-saving mode		
		The default setting is OFF. When set to ON, in battery mode, if the load is lower than 25W, the system will stop output for a period then resume. If the load is still lower than 25W, the system will do the loop stop then resume. If the load is higher than 35W, the system will resume continuous normal output.	
13	Overload transfer to bypass		
		The default setting is OFF. When set to ON, in the case of PBG priority output, if there is an overload, the system will immediately transfer to bypass mode (utility power output, also known as bypass mode).	
14	Silent mode setting		
		Enable/disable buzzer sound. The default setting is OFF. When set to ON, in any situation such as alarms or faults, the buzzer will not sound. This setting can be applied to all modes .	
			
		When the battery is set to the CUS (Customer Setting Type) mode. The adjustable range is [22, 26V]. .	

15	Battery return to mains voltage point	When the battery is set to the AGM (Lead Acid Battery Type) or FLD (Flooded Battery Type) mode. The default setting is 23V, and it can be adjusted within a range of [22, 26V].	
		When the battery is set to the LIB (Lithium Battery Type) mode. The default is 23.8V, and it can be adjusted within a range of [20, 25V].	
16	Switching back to battery mode voltage points		
		When the battery is set to CUS (Customer Set Type) mode, The default setting is 26V, The voltage range is [24, 29V].	
		When the battery is set to AGM (Absorbent Glass Mat) or FLD (Flooded) mode,The default is 26V. It can be adjusted within a range of [24, 29V].	
		When the battery is set to LIB (Lithium Battery) mode, The default setting is 27V. It can be adjusted within a range of [23, 28.5V].	
17	Battery type	AGM	
		Flooded	
		Lithium (default)	
		User-Defined	
18	Battery low voltage point		
		It is not possible to set the battery definition mode to AGM or FLD mode. The initial default setting is 22V. When the battery type is set to CUS, the adjustable range for the battery voltage is [21, 27V].	
		Battery low voltage alarm setting. When the battery type is set to LIB, the default setting is 23.8V. The adjustable range for the voltage is [20.6, 25V].	
19	Battery shutdown voltage point		
		The battery low voltage shutdown point setting function cannot be adjusted when the battery is defined as AGM or FLD mode. The default setting is 21V. When the battery type is set to CUS, the default setting is 21V. The adjustable range for the voltage is [20, 24V].	
		When the battery type is set to LIB , the battery shutdown point can be modified. The default setting is 23V, and the adjustable range is [20, 24V].	
20	Constant voltage mode voltage point setting		
		When the battery is defined in AGM or FLD mode, the voltage set point cannot be configured. The default setting for AGM mode is 28.2V, for FLD mode is 29V. When the battery type is CUS, It can be set within the range of [24, 29V] for the constant voltage charging set point. It is important to note that the constant voltage set point voltage needs to be higher than the float charge set point voltage.	

		When the battery type is set to LIB, the default constant voltage charging set point is 28.2V, and it can be adjusted within the range of [25, 29V]. It is important to ensure that the constant voltage set point voltage is higher than the float charge set point voltage.
21	Floating charge mode voltage point setting	
		When the battery is defined in AGM or FLD mode, the voltage set point cannot be configured. The default setting for AGM/FLD mode is 27V When the battery type is CUS, It can be set within the range of [26.6, 27.8V] for the floating charging voltage set point. If the battery type is LIB, the default setting for the floating charging point is 27.6V The setting range is between 24V and 28V. It is important to note that the constant voltage point voltage should always be set higher than the floating charge point voltage.
22	Grid low voltage point setting	
		If output mode is APP/GEN, Grid low voltage point can be set within a range of 90V to 154V. The default setting is 154V.
		If output mode is UPS, Grid low voltage point can be set within a range of 170V to 200V. The default setting is 185V.
23	Grid high voltage point setting	
		If output mode is APP/GEN, Grid high voltage point can be set within a range of 264V to 280V. The default setting is 264V.
		If output mode is UPS, Grid high voltage point is set as 264V.
24	Low power discharge time setting	
		When in battery mode and operating under a low load, unrestricted discharge for an extended period can deplete the battery, affecting its lifespan. When the inverter reaches the set low power discharge time, the low voltage shutdown point will be raised to 22V. The default low power discharge time is 8 (8 hours), adjustable range [1, 8]. In inverter mode,the low power discharge time setting,the default is 8(8 hours),the setting range is [1, 8].
		In battery mode, after the continuous discharge time exceeds 8 hours and the battery shutdown point has not been reached, the battery voltage shutdown point will be modified to 22V, and the system will alarm for 1 minute when the battery continues to discharge to 22V. Then shutdown again.When the battery voltage exceeds 26.4V exceeds 30s, the battery discharge time will be reset..
		

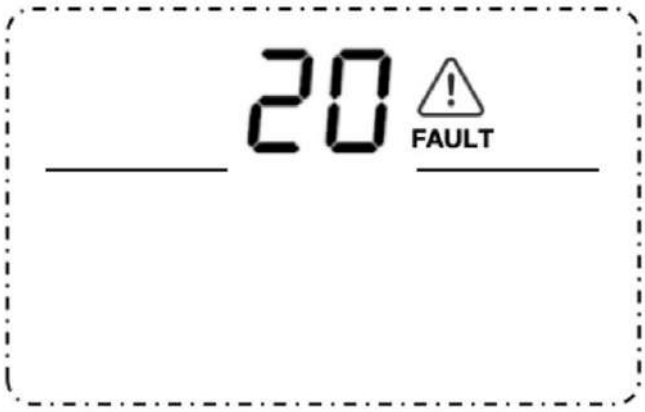
25	Inverter soft start setting	Default setting is OFF. If it set to ON, the inverter output gradually increases from 0 to the target voltage value. If OFF, the inverter output directly increases from 0 to the target voltage value. Setting Condition: It can be set in single-machine operation mode.
26	Reset factory setting	 Restore all settings to factory default values. Before the setting, this interface is displayed as OFF. When set to ON, the system will restore to default settings. After the setting is completed, this interface will display OFF again. The setting can be applied immediately in mains and standby modes, but cannot be set in battery mode.
27	Parallel operation mode	 Not Applicable for this model.
28	Battery Disconnection Alarm	 Enable/Disable battery disconnection alarm. Default setting is OFF.When set to OFF, there will be no battery disconnection, low battery voltage, or battery under voltage alarms when the battery is disconnected.
29	Battery Equalization Mode	 Enable/Disable Battery equalization. Default setting is OFF. If it is set to ON, the controller will start to enter the equalization phase when the set equalization interval (battery equalization period) is reached during the float charging stage, or the equalization is activated immediately.
30	Equalization Voltage Point Setting	 The default setting is 29.2V, with a configurable range of [25, 31.5V].
31	Equalization Charging Time Setting	 During the equalization stage, the controller will charge the battery as much as possible until the battery voltage rises to the battery equalization voltage. Then, it will adopt constant voltage regulation to maintain the battery voltage. The battery will remain in the equalization stage until the set battery equalization time is reached. The default

		setting is 60 minutes, with a configurable range of [5, 900], and an increment of 5 minutes for each setting.
32	Equalization Delay Time Setting	 During the equalization stage, if the battery equalization time expires and the battery voltage has not risen to the battery equalization voltage point, the charging controller will extend the battery equalization time until the battery voltage reaches the battery equalization voltage. When the battery equalization delay setting is completed and the battery voltage is still below the battery equalization voltage, the charging controller will stop equalization and return to the floating stage. The default setting is 120 minutes, with a configurable range of [5, 900], and an increment of 5 minutes for each setting.
33	Equalization Interval Time Setting	 When the battery connection is detected during the float phase with the equalization mode turned on, the controller will start to enter the equalization phase when the set equalization interval (cell equalization period)is reached.The default setting is 30 days, the settable range is[1,90], and the increment of each setting is 1 day.
34	Enable Equalization Immediately	 The default setting is OFF, the function is not turned on; when it is set to ON, in the float charging stage when the equalization mode is turned on and the battery connection is detected. The balance charging is activated immediately, and the controller will start to enter the equalization stage.
35	Grid tie inverter	 Not Applicable for this model.
36	Battery dual output low voltage shutdown point	 Not Applicable for this model.
37	Battery dual output duration	 Not Applicable for this model.
38	BMS Communication Function	 Enable/Disable lithium battery communicates with inverter. Default setting is OFF.Choose the corresponding option based on the battery pack type.if a communication abnormality occurs, alarm 56 is generated .
		

39	Low SOC Shutdown	Set the inverter to shutdown when the State of Charge (SOC) of the battery is low. Default setting is 20, with a configurable range of [5, 50]. When the lithium battery SOC reaches the set value in battery mode, the inverter shuts down and generates alarm 68.The alarm 68 is cleared when the SOC returns to the set value + 5%. In standby mode, the inverter can switch to battery mode only when the SOC reaches the set value + 10%. If it does not reach this threshold, alarm 69 is generated. Once the function is enabled, alarm 69 is triggered when the lithium battery SOC reaches the set value + 5%, and it is cleared when it returns to the set value + 10%. It can be set to OFF, in which case the inverter no longer performs shutdown, startup, or alarm operations based on the SOC condition. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms.
40	High SOC to Battery	 Set the SOC value for the inverter to switch to battery mode. Default setting is 95, with a configurable range of [10, 100]. In PBG priority mode, when the lithium battery SOC reaches the set value in normal grid mode, the inverter switches to battery mode. Once enabled, the inverter will only switch to battery mode when the SOC is above the set point and the battery voltage is higher than the voltage point to switchback to battery mode It can be set to OFF, in which case the inverter no longer switches from grid mode to battery mode based on the SOC condition. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms.
41	Low SOC to Grid	 Set the SOC value for the inverter to switch to grid mode. The default setting is 50, with a configurable range of [10, 90]. In PBG priority mode, when the lithium battery SOC reaches the set value in battery mode, the inverter switches to grid mode. Once enabled, the inverter will switch to grid mode when the SOC is below the set point or the battery voltage is lower than the voltage point to switchback to grid mode It can be set to OFF, in which case the inverter no longer switches from battery mode to grid mode based on the SOC condition. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms. When this setting is higher than the STB point, STB and STG will no longer take effect after the next activation.

4.5 Fault Reference Code

Fault display:



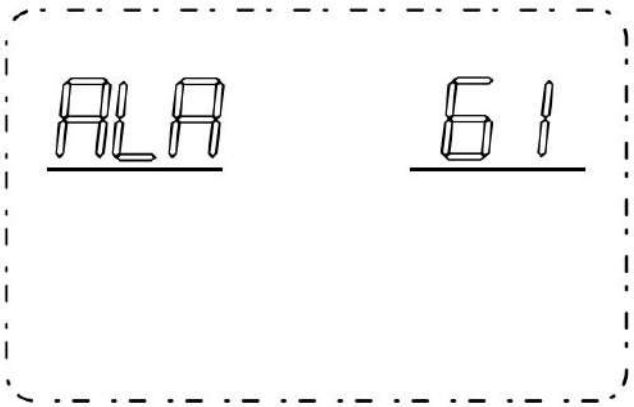
Function description: If alarm occurs, Fault indicator flashes and buzzer sounds ever one second for 1 minute, then stop. If fault occurs, the fault indicator is always on, the buzzer sounds 10 seconds then stops. System will tr restart aromatically. If the machine does not work after six times' restart, the machine and LCD display will always in the fault status. You need to completely power of (of the screen) or wait for 30 minutes to restart the machine.
The fault LCD display is shown in the figure above. In fault mode fault icon is bright, in alarm state alarm icon is flashing, and contact the manufacturer to troubleshoot the abnormal situation according to the fault information.
Fault: The inverter enters fault mode, with a constant red LED light and LCD displaying a fault code.
Fault code sheet

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault/ Alarm
1	Bus soft boost start failed	Tum fault mode	Bus voltage does not reach set value for more than 30 seconds	Cannot restore.	Fault
2	Bus voltage high	Turn fault mode	The bus voltage is higher than protection point.	Cannot restore	Fault
3	Bus voltage low	Turn fault mode	Bus voltage is below the under voltage protection point.	Cannot restore	Fault
4	Battery over current	Turn fault mode	TZ interrupt triggered more than 2 times within 2ms.	Cannot restore	Fault
5	Over temperature	Turn fault mode	The PFC temperature exceeds the protection threshold Fan stuck for more than 5 minutes.	Tried to restart six times,if failed,cannot restore	Fault
6	Battery high voltage	Turn fault mode	Battery voltage is higher than set value.	Restore after voltage is lower set value	Fault

7	Bus soft start fault	Turn fault mode	Turn fault mode.The soft start process has exceeded but the bus voltage has not reached set value.	Cannot restore	Fault
8	Bus short circuit	Tum fault mode	Inverter on or PEO on,bus voltage below threshold.	Cannot restore	Fault
9	Inverter soft start fault	Tum fault mode	The bus voltage s higher than protection point,or the DC Component is greater than 20y or the inverter is not completed within5 minutes	Cannot restore	fault
10	INN over voltage	Tum fault mode	The inverter voltage s higher than the set value [276V]	Cannot restore	Fault
11	INV under voltage	Turn fault mode	Battery mode and there is no short circuit in the inverter, the inverter voltage s lower than 160V	Cannot restore	Fault
12	INV short circuit	Tum fault mode	n battery mode or Standby mode,if the inverter voltage slower,current is greater than set value	Tried to restart sx times,if failed,cannot restore	Fault
13	Negative power protection	Tum fault mode	n battery mode the load power s lower than set value(negative power,such as -1200W)	Cannot restore	Fault
14	Over load	Tum fault mode	Overload exceeds limit (list in specification	Tried to restart six times,if failed,cannot restore	Fault
15	Model fault	Tum fault mode	Cannot match any mode in model number detection.	Cannot restore.Check whether the control board is assembled incorrectly or whether the program is burned incorrectly	Fault
16	No boot loader	Tum fault mode	No boot loader	Cannot restore.Try to send command TIDA1911000000000000	Fault
26	BMS fault	Tum fault mode	Error code in BMS message	Tum off BMS communication function or BMS fault recovery	Fault
28	NTC fault	Tum fault mode	NTC open circuit	Cannot restore	Fault
29	inverter over current	Tum fault mode	instantaneous current of inverter s higher than set value	Tried to restart six times,if failed,cannot restore	Fault

4.6 Alarm Reference Code

Alarm: the inverter does not enter the fault mode, LED red light flashing, LCD displays the Alarm code.



Alarm code sheet

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
50	Battery open	Alarm, battery does not charge.	Battery voltage is below set point	Restore after battery voltage recover.	Alarm
51	Battery low voltage shutdown	Alarm, battery low voltage shutdown or cannot power on.	Battery voltage is below set point.	Restore after battery voltage recover	Alarm
52	Battery low voltage	Alarm	Battery voltage is below set point	Restore after battery voltage recover	Alarm
53	Charger short circuit	Warning battery does not charge	The battery voltage is less than5Vand the charging current is greater than 4A	Cannot restore	Alarm
54	Low power discharge	Alarm	The battery voltage is greater than 26.4V and the discharge time exceeds the set low-power discharge time.	Restore after battery voltage recover	Alarm
55	Battery over charge	Alarm battery does not charge.	Battery voltage is higher than the set value	Can restore	Alarm
56	BMS disconnect	Alarm,lock standby mode.	No correct BMS communication response within 10 seconds	Restore after communication recover	Alarm
57	Over temperature	Alarm battery does not charge	The temperature of PFC or INV is above the set value	Restore after temperature is under set value.	Alarm

58	Fan error	Alarm,if one fan fails and the other fan s running at full speed	Fan speed is less than the set value	Restore after fan re00ver	Alarm
59	EEPROM error	Alarm	Numerical calibration error	Restore after calibration right	Alarm
60	Overload	Alarm battery does not charge	When not in mains mode or the PV s normal and the output priority is not mains priority,the load exceeds 102% and the duration is 200-220 ms	Restore after load back to normal	Alarm
61	Abnormal generator waveform	Alarm, continuously operating n battery mode	Generator waveform detection result is abnormal	Can restore	Alarm
62	PV Energy Weak	Alarm turnoff PV output and charging	When the battery is not connected,the bus voltage is lower than the set value	Restore after 10mins	Alarm
63	Synchronization signal fa	Alarm,turn fault mode	Host or slave with host present,no synchronization signal restored within set value	Restore after signal re00ver.	Alarm
68	SOC Under	Alarm,turn standby mode	Lithium battery SOC s lower than the set value	Restore after turning off the low SOC shutdown function, or turning off the BMS communication function,or when the SOC returns to the set value+5%	Alarm
69	S0C Low	Alarm,if it is in standby mode,it will remain in standby mode and not power on	Lithium battery SOC s lover than the set value +5%(mains mode or battery mode),lower than the set value+10% (standby mode).	Restore after turning off the low S00 shutdown function, or turning off the BMS communication function,or when the SOC returns to the set value+10%	Alarm
70	Battery terminal source fail	Alarm,turn standby mode	Battery is not connected and the voltage of battery terminal is lower than set value	Restore after battery s detected or detected that the battery terminal voltage exceeds the set value for one consecutive minute	Alarm

5.Routine Maintenance

5.1 Maintenance Plan

♦ Check if wire connections are loose.

♦ Check if cables are aged/damaged.

♦ Check if cable insulating ribbon drops.

♦ Check if cable terminal is loose, any overheat sign.

♦ Check if ground connection is good.

5.1.1 Operating Environment

(Every six months)

Carefully observe whether the battery system equipment is ineffective or damaged;

When the system is running, listen to any part of the system for abnormal noise;

Check whether the voltage, temperature and other parameters of the battery and other equipment parameters are normal during system operation;

5.1.2 Equipment Cleaning

(Every six months to one year, depending on the site environment and dust content, etc.)Ensure that the ground is clean and tidy, keep the maintenance access route unblocked,and ensure that the warning and guiding signs are clear and intact.

Monitor the temperature of the battery module and clean the battery module if necessary.

5.1.3 Cable, Terminal and Equipment Inspection

(Every six months to one year)

♦ Check if the cable connections are loose.

♦ Check whether the cables are aged / damaged.

♦ Check whether the cable tie of the cable has fallen off.

♦ Check if the cable terminal screws are loose and the terminal position has any signs ofoverheating.

♦ Check whether the management system of the system equipment, monitoring system and other related equipment are invalid or damaged.

♦ Check that the grounding of the equipment is good and the grounding resistance is less than 10 ohms.

5.2 Notes

After the equipment is out of operation, please pay attention to following notes while maintaining :

♦ Related safety standards and specifications should be followed in operation and maintenance.

♦ Disconnect all the electrical connections so that the equipment would not be powered on.

♦ Wait at least 5 minutes after disconnection, so that the residual voltage of the capacitors drops to a safe voltage. Use a multimeter to make sure that the equipment is completely discharged.

♦ The equipment should be repaired by professional staff only and it is strictly forbidden for maintenance staff to open equipment modules on their own.

♦ Appropriate protective measures should be taken while maintaining, such as insulated gloves, shoes, and anti-noise ear plugs.

♦ Life is priceless. Make sure no one would get hurt first.

♦ In case of a deep discharge, the battery must be charged to a SOC rate of 30% to 50% if the entire system is static (ie the battery has not been charged for two weeks or more).

Please contact us in time if there are any conditions that could not be explained in the manual.

6.Quality Assurance

When product faults occur during the warranty period, factory or his partner will provide free service or replace the product with a new one.

Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, factory has the right to refuse to honor the quality guarantee.

Conditions

♦ After replacement, unqualifified products shall be processed by factory.

♦ The customer shall give manufacturer or his partner a reasonable period to repair the faulty device.

Exclusion of Liability

In the following circumstances, manufacturer has the right to refuse to honor the quality guarantee:

♦ The free warranty period for the whole machine/components has expired.

♦ The device is damaged during transport.

♦ The device is incorrectly installed, refifitted, or used.

♦ The device operates in harsh environment, as described in this manual.

♦ The fault or damage is caused by installation, repairs, modifification, or disassembly performed by a service provider or personnel not from manufacturer or his authorized partner .

♦ The fault or damage is caused by the use of non-standard or non-manufacturer.

components or software.

♦ The installation and use range are beyond stipulations of relevant international standards.

♦ The damage is caused by unexpected natural factors.

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of manufacturer.

Warranty Card

User Information

Company/User Name:

Address:

Telephone:

Email:

Project installation location:

Product Information

Battery Model:

Serial No:

Invoice Number:

Purchase Date:

Dealer:

Commission date:

Fault/Error Description: