



HYBRID SOLAR INVERTER

— USER MANUAL —



3.6KW | 5kWh

LD-LHFES-3.6KW-B5

INSTALLATION | OPERATION | SAFETY

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1、Information on this Manual

1.1、Validity

This manual is valid for the following devices:

- Hybrid Solar Energy Storage Inverter

1.2、Scope

This manual describes the assembly, installation, operation and troubleshooting of this unit. please read this manual carefully before installations and operations.

1.3、Target Group

This document is intended for qualified persons and end users. Tasks that do not require any particular qualification can also be performed by end users.

Qualified persons must have the following skills:

-  Knowledge of how an inverter works and is operated
-  Training in how to deal with the dangers and risks associated with installing and using electrical devices and installations
-  Training in the installation and commissioning of electrical devices and installations
-  Knowledge of the applicable standards and directives
-  Knowledge of the compliance with this document and all safety information

1.4、Label Description

In order to ensure the user's personal safety when using this product, the inverter and manual provides relevant identification information and uses appropriate symbols to alert the user, who should carefully read the following

list of symbols used in this manual.

Labels on Solar Energy Storage Inverter

	CAUTION Do not disconnect under load!
	Danger: High Voltage Danger: Electrical Hazard
	Start maintaining the INVERTER at least 5 minutes after the INVERTER disconnected from all external power supplies.
	Read instructions carefully before performing any operation on the INVERTER.
	Grounding: The system must be firmly grounded for operator safety.

Labels in the documentation

 WARNING!	A high level of potential danger, which, if not avoided, could result in death or serious injury to personnel.
 CAUTION!	A moderate or low level of potential danger, which, if not avoided, could result in moderate or minor injuries to personnel. In some bad situation, it could result in death or serious injury to personnel.

1.5、 Safety Instructions

	WARNING! This chapter contains important safety and operating instructions. Read and keep this manual for future reference.
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01. Before using the unit, read all instructions and cautionary marking on the unit, the batteries and all appropriate sections of this manual. The company has the right not to quality assurance, if not according to the instructions of this manual for installation and cause equipment damage.
02. All the operation and connection please professional electrical or mechanical engineer.

03. All the electrical installation must comply with the local electrical safety standards.
04. When install PV modules in the daytime, installer should cover the PV modules by opaque materials, otherwise it will be dangerous as high terminal voltage of modules in the sunshine.
05. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
06. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
07. Charging the battery is strictly prohibited when the solar energy storage inverter battery is in a fault, protection, or locked state.
08. For optimum operation of this inverter, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter.
09. Exercise caution when using metal tools in the equipment connection area. Accidental dropping of tools may cause short circuits, sparks, or equipment damage, and in severe cases, could lead to fire or explosion.
10. please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.
11. GROUNDING INSTRUCTIONS-This inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
12. NEVER cause AC output and DC input short circuited. DO NOT connect to the mains when DC input short circuits.
13. Make sure the inverter is completely assembled, before the operation.

2、Introduction

This hybrid solar energy storage inverter system is primarily designed for



locations beyond the reach of the utility grid, such as remote mountainous areas, off-grid regions, islands, field operations, specialized aquaculture sites, and telecommunication base stations. When sunlight is available, the photovoltaic (PV) array converts solar energy into electricity, which the hybrid inverter uses to power the load while simultaneously charging the battery bank. In the absence of sunlight, the hybrid inverter converts the DC energy stored in the batteries into AC power to supply the AC load. Representing a new generation of energy-efficient PV power equipment, this system features an integrated design that is easy to install and operate, making it an ideal small-scale power solution for households.

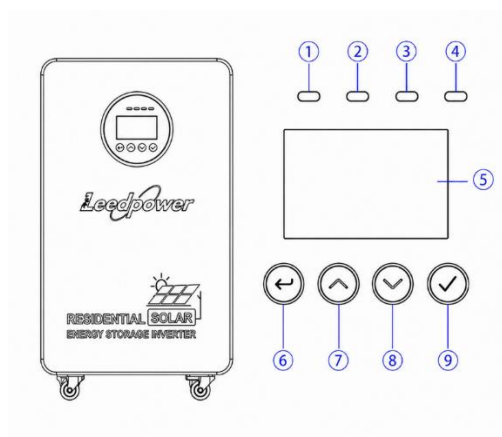
This device is a hybrid solar energy storage inverter featuring a high-frequency, bidirectional energy storage design, allowing it to easily charge the battery using either PV energy or utility grid power. When there is a surplus of PV energy, the system can store the power or feed it back into the grid; when PV generation is insufficient, the system supplements the load with power from the grid or the battery, thereby maximizing the utilization of solar energy. An intuitive LCD interface allows users to easily monitor the device's operating status. Simple controls, such as inverter and battery switches, accommodate various usage scenarios. The product employs an advanced MPPT control algorithm to rapidly track the PV array's maximum power point under any environmental conditions, ensuring maximum energy extraction from the solar panels and significantly improving the system's energy efficiency. Utilizing high-frequency power conversion technology, this series replaces bulky, traditional silicon steel transformers with lightweight ferrite transformers. In inverter mode, the unit outputs a pure sine wave. Resistive loads can be powered normally provided their power consumption does not exceed the inverter's rated output. For capacitive loads (e.g., LED lights), the instantaneous startup power—typically three times the rated power—must be considered. Similarly, for inductive loads (e.g., motors, water pumps, air conditioners), the instantaneous startup

power—typically three to five times the rated power or higher—must be taken into account; actual requirements depend on the specific load type. Therefore, when configuring capacitive and inductive loads, it is essential to ensure that the inverter possesses sufficient peak output capability to guarantee reliable equipment startup and stable system operation.

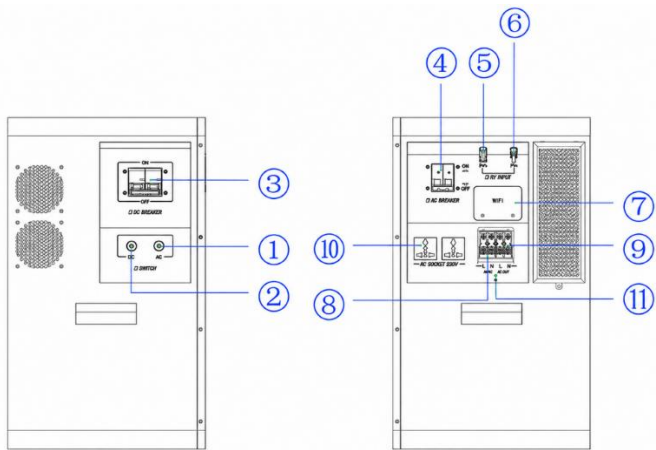
2.1、Features

- ✚ Rated power 3.6KW, power factor 1
- ✚ MPPT ranges 40V~450V, 500Voc
- ✚ High frequency with small size and light weight
- ✚ Pure sine wave AC output
- ✚ Solar and grid power loads at the same time
- ✚ Built-in 5 kWh lithium iron phosphate battery
- ✚ WIFI remote monitoring
- ✚ Feed-in to grid

2.2、Product Overview



- ①AC Indicator ② Invert Indicator ③Charging Indicator
 ④Fault Indicator ⑤ LCD Display ⑥ESC Button
 ⑦Up Button ⑧ Down Button ⑨Enter Button



- ①AC Inverter Switch ②DC Battery Switch ③DC Battery Breaker
- ④AC Output Breaker ⑤PV+ Input ⑥PV- Input ⑦Wifi port
- ⑧AC Input ⑨AC Output ⑩AC Socket ⑪PE

2.3、 Packing List

No.	Item	Quantity	Description	Remarks
1	Hybrid Solar Energy Storage Inverter	1		
2	User manual	1	English	
3	Warranty and After-Sales Service Information	1	English	
4	OT terminal RV3.5-5S	12		For AC input, AC output, PE
5	Photovoltaic connectors	4		For PV

2.4、 Specifications

Model	LD-LHFES-3.6KW-B5
AC Input	
Rated Input Voltage (VAC)	208/220/230/240; L + N + PE
Voltage Range (VAC)	90~280 (APP/GEN mode); 170~264 (UPS

	mode)
Frequency (Hz)	50/ 60 (Auto Adaptive)
AC Output	
Rated Capacity (kVA/kW)	3.6
Surge Power (kVA)	7.2
Voltage (VAC)	208/220/230/240
Power Factor (PF)	1
Frequency (Hz)	50/60
Switch Time (ms)	10 (APP/UPS mode)/20 (GEN mode)
Wave Form	Pure Sine Wave
Overload Capacity (Battery Mode)	1min@102%-110% load, 10s@110%-200% load
Max. Efficiency (Battery Mode)	92.7%@24VDC
Parallel Quantity	NA
battery pack	
Battery rated input voltage	25.6VDC
Float charge voltage	27V
Charging cut-off voltage	29.2V
Battery Type	Lithium iron phosphate battery
Built-in battery specifications	25.6V 200Ah (lithium iron phosphate battery)
Charger (PV /AC)	
Solar Charger Type	MPPT
Max. PV input Current (A) / Input Power(W)	18/5000
MPPT Range @Operating Voltage (VDC)	40~450
Max. PV Open Circuit Voltage (VDC)	500
Max. PV Charge Current (A)	100
Max. AC Charge Current	100

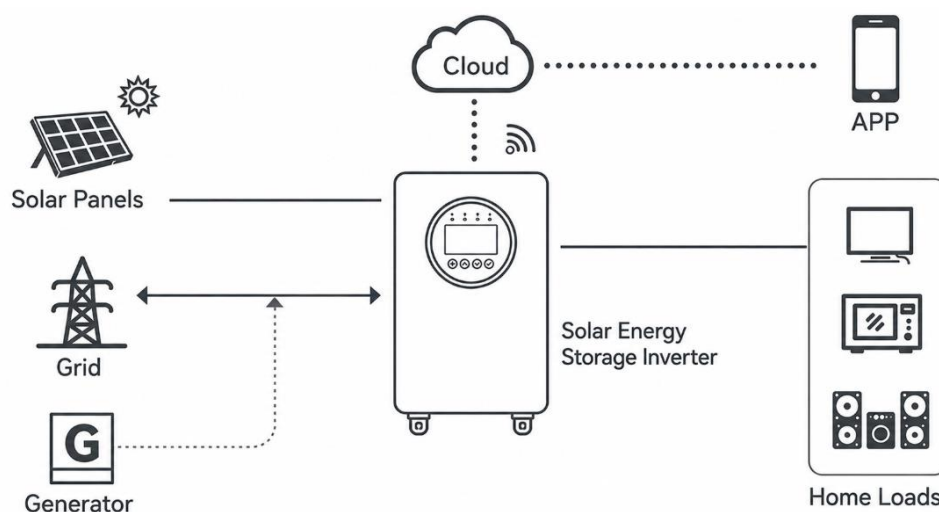
(A)	
Max. Charge Current (PV + AC) (A)	100
Interface	
HMI	LCD
Monitoring	WiFi (built-in)
General Data	
Ingress Protection	IP21
Operating Temperature (°C)	-10~60
Relative Humidity	5% ~ 95% (Non-condensing)
Storage Temperature (°C)	-15~60
Net Weight (kg)	55kg
Gross Weight (kg)	60kg
Dimensions (H*W*D) (mm)	610×419×323mm

Output Power rating will be reduced due to various conditions.

Battery	PV	AC Input	Max Output Power
L	N	N	Follow the Battery Voltage Derating Curve as shown below
N	L	N	Depends on the PV input power and Maximum is 3.6kw
N	N	L	Input Voltage * Input Max current 20A
L	L	N	Two ways to achieve 3.6kW are as follows: 1. Battery Voltage $\geq 26V$; 2. Battery Voltage $\geq 21V$ and PV Input Power $\geq 900W$; If none of the above conditions are met, then follow the Battery Voltage Derating Curve as shown below.
N	L	L	Input Voltage * Input Max Current 20A
L	N	L	Input Voltage * Input Max Current 20A

L	L	L	Input Voltage * Input Max Current 20A
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2.5、System Diagram



Solar Energy Storage System

Note: The diagram shows a typical off-grid scenario.

This is a multifunctional solar energy storage inverter, integrated with a MPPT solar charge controller a high frequency pure sine wave inverter and Lithium iron phosphate battery in one machine, which is perfect for off grid backup power and self-consumption applications. This hybrid solar energy storage inverter features a built-in battery, eliminating the need for an external battery.

The whole system also need other devices to achieve complete running such as PV modules, generator, or utility grid. Please consult with your system integrator for other possible system architectures depending on your requirements.

The WiFi module is built-in monitoring device to be installed on the inverter. With this device, users can monitor the status of the PV system from the mobile phone or from the website anytime anywhere.

3、Installation

3.1、Unpacking and Inspection

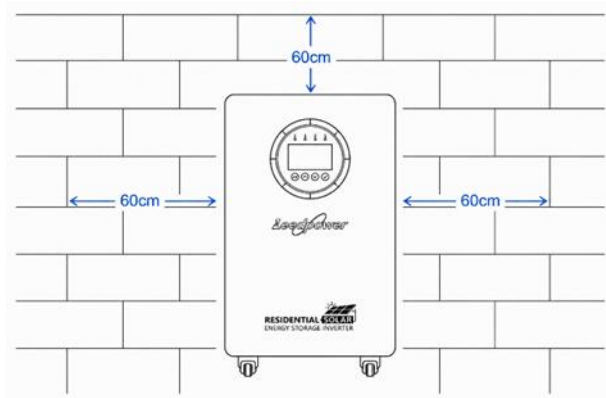
3.1.1.Open-box Inspection

Products have been strictly tested before leaving the factory. Please sign for them after inspection. If the product is damaged, please contact the local distributor. Please open the box to check whether the outer packaging is intact or damaged, whether the internal equipment is damaged.

3.1.2.Installation Tools

Installation Tools	Multi-meter 	Protective gloves 	Insulated anti-smashing shoes 
	Safety glasses 	ESD wrist strap 	Hammer drill 
	Electric screwdriver 	Cross screwdriver 	Rubber mallet 
	Spirit level 	Wire cutter/stripper 	Terminal crimping tool 

3.2、Mounting Unit



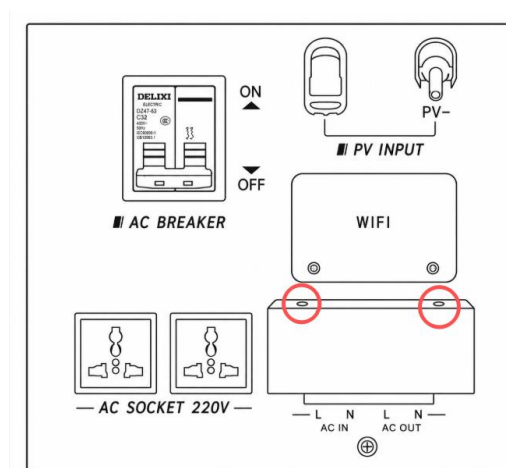
When installing the solar inverter, ensure a clearance of at least 600 mm around the unit and keep it away from heat sources to maintain proper airflow. The installation site must comply with electrical equipment installation standards and provide sufficient space for access and fire safety, facilitating inspection and maintenance in the event of a malfunction.

The installation area must be well-ventilated to ensure adequate cooling airflow for the equipment. To guarantee safe and stable operation, the relative humidity should be below 90%, and the ambient temperature should be maintained between -10°C and 60°C.

-  Avoid direct sunlight
-  Avoid moisture and liquid ingress
-  Avoid the accumulation of dust and particulates
-  Avoid high temperatures and proximity to heat sources

	WARNING! The equipment should be installed on a solid, stable, and non-combustible surface with sufficient load-bearing capacity.
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Before connecting all the lines, please remove the two securing screws and take off the protective cover, as shown in the figure below:



3.3、Installation Sequence

Equipment installation and wiring must be performed by qualified professionals. Before installation and wiring, ensure that the utility input, PV input, and device power supply are all disconnected.

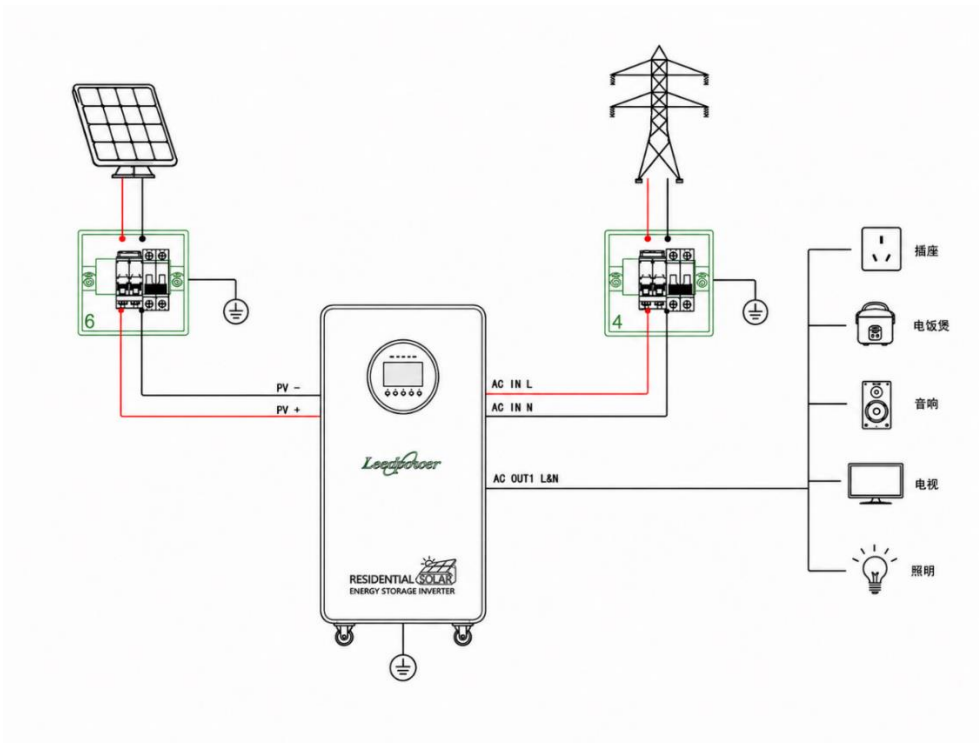
It is recommended to proceed with installation and wiring in the following order:

- ✚ Install the device and ensure reliable grounding;
- ✚ Connect the load output (AC OUTPUT) cables;
- ✚ Connect the utility input (AC INPUT) cables;
- ✚ Connect the PV array (PV INPUT) cables;
- ✚ Check the polarity, terminals, and connection status of all cables to ensure connections are correct and secure;
- ✚ Start the device according to the prescribed startup procedure.

Before shutting down the system or performing maintenance, turn off the device according to the prescribed shutdown procedure and sequentially disconnect the PV input, utility input, and associated load circuits.

Maintenance or wiring operations may only be performed after confirming that the device is completely de-energized.

3.4、System Wiring Diagram



System Wiring Diagram

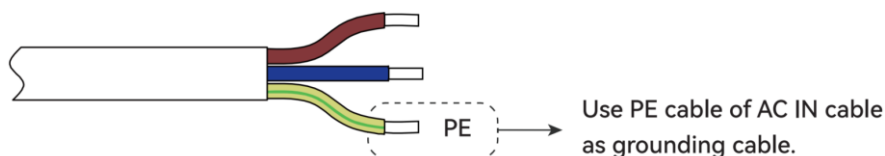
3.5、External Protective Grounding Connection

	DANGER Ensure a reliable connection of the grounding wire to prevent electrical shock hazards.
	WARNING! - The external grounding protection point provides a reliable grounding - Do not use inappropriate grounding conductors as it may result in product damage or personal injury. - If unsure about the grounding connection, please consult a professional for proper guidance.

The external grounding cable is to be prepared by customer. The grounding

cable must be yellow-green color. OT terminals with insulating jacket is in the packing.

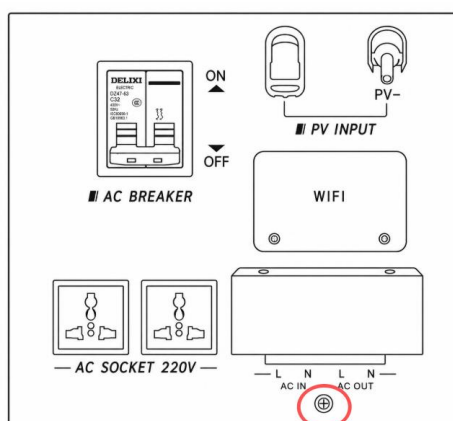
1. Remove insulation sleeve a proper length from the head of cables.



2. Use OT terminal crimping tool make cable and terminal crimped tightly



3. Connect the ground cable with M5 screw



3.6、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.
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	CAUTION! There are two terminal blocks with "AC IN", "AC OUT" markings. Please do NOT mis-connect input and output connectors.
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	CAUTION! Be sure to connect AC cables with correct polarity. If L and N wires are connected reversely, it may cause damage to the inverter The N wires of input and output must not be connected together, as this may cause damage to the inverter in some condition.
---	--

	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.
---	--

Suggestion for AC input wires

Gauge	Cable (mm ²)
14AWG	2.075

	WARNING! It's very important for system safety and efficient operation to use appropriate cable for AC dual output connection. To
---	--

	reduce risk of injury, please use the proper recommended cable size as below.
--	---

Suggestion for AC output wires

Gauge	cable (mm ²)
14AWG	2.075

	WARNING! Make sure AC power is disconnected before attempting to connect AC cable to the unit. All operations during the electrical connection process, as well as the specifications of cables and components used, must comply with local laws and regulations. The cable color mentioned below is for typical reference.
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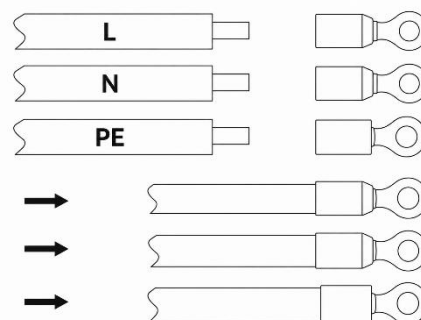
Please follow below steps to implement AC input/output connection:

Before making AC connection, be sure to open AC circuit breaker first.

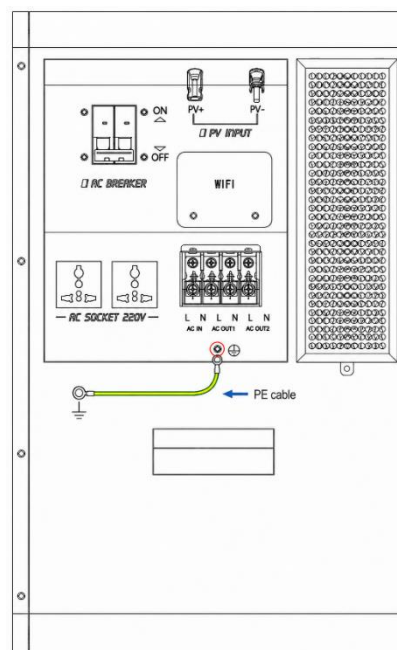
1. Strip approximately 12 mm of

insulation from the cable end and trim the exposed conductor to the appropriate length based on the crimp

barrel of the ring terminal. Fully insert the cable conductor into the crimp barrel, ensuring it is seated correctly. Use a dedicated crimping tool matched to the terminal specifications to perform the crimp, ensuring a secure and reliable connection between the terminal and the cable. After crimping, inspect the terminal for any looseness, exposed conductors, or damage.



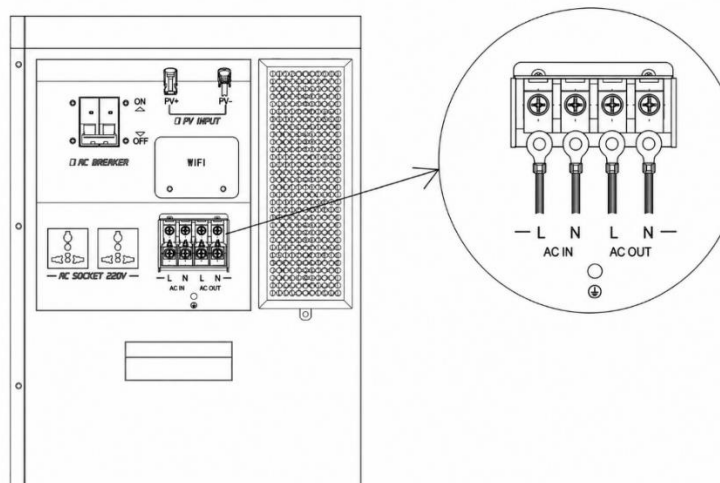
2. Connect the AC input cable correctly according to the L, N, and PE markings on the AC input terminals. Attach the pre-crimped ring terminals to the corresponding connection points and secure them firmly using nuts or fastening bolts. When wiring, connect the PE protective earth wire first, followed by the N (neutral) and L (live) wires. Ensure all connections are secure and tight, with no looseness.



PE → Protecting Earth (yellow-green)

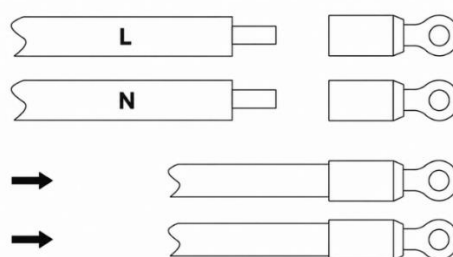
L → LINE (brown or black)

N → Neutral (blue)



To implement AC output connection:

Follow the steps as AC input connection of L (LINE) and N (Neutral) cables.



3. Make sure the cables are securely connected.

	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 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.
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3.7、PV Connection

	CAUTION! Before connecting to PV modules, please install a separate DC circuit breaker between inverter and PV modules. The recommended spec of DC breaker is 25A with a maximum operating voltage greater than 500VDC.
---	---

	WARNING! Do not ground the positive or negative terminals of the PV modules, as this can severely damage the inverter.
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	WARNING! Exposure to sunlight can generate lethal high voltages in photovoltaic strings, so strictly adhere to the safety precautions listed in the photovoltaic string and related documents.
---	--

	WARNING! Make sure to connect the PV terminals to the corresponding ports on the inverter, as reversing the polarity can damage the inverter.
---	---

	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 PV module connection. To reduce risk of injury, please use the proper recommended cable size as below. The cable color mentioned below is for typical reference.
---	--

Gauge	cable (mm ²)
14AWG	2.075

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.

- Open circuit Voltage (Voc) of PV modules should be higher than start-up voltage.

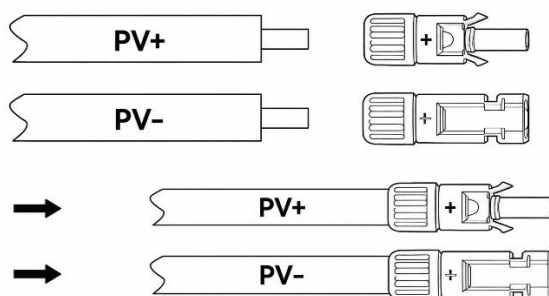
Max. PV Array Open Circuit Voltage	500Vdc
Start-up Voltage	60Vdc
PV Array MPPT Voltage Range	40Vdc~450Vdc

	WARNING! Please do not connect any DC switches or AC/DC circuit breakers before completing the electrical connections.
---	---

Please follow below steps to implement PV module connection:

- Before making PV connection, be sure to open DC circuit breaker first.
- Strip approximately 10 mm of insulation from the end of the PV cable, taking care not to damage the inner conductor. Fully insert the exposed conductor into the metal crimp terminal of the PV connector and perform a secure crimp using a specialized crimping tool compatible with the terminal specifications.

After crimping, insert the metal terminal into the corresponding PV+ or PV– connector housing until it is fully seated and locked in place. Gently pull on the cable to verify that the terminal is not loose or detached.

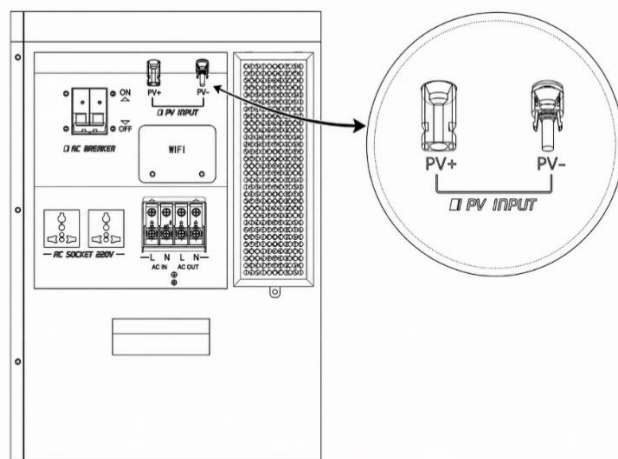


- Use multi-meter check to ensure the polarities are correct.
- Connect the PV+ and PV– connectors to the corresponding ports on the device's PV input side, observing the marked polarity. Ensure correct polarity for the positive and negative terminals, and fully insert the

connectors to guarantee a secure and reliable connection.

+ →PV+ (red)

- →PV-(black)



5. Make sure the cables are securely connected.

3.8、Final Assembly

After completing all wiring and verifying that the connections are correct and secure, reinstall the protective cover and fasten it securely using the two original mounting screws provided.

4、Operation

4.1、Power ON/OFF

After confirming that all electrical connections are correct and secure, and ensuring the system is ready for a safe startup, start the equipment in the following order:

-  Turn on the DC circuit breaker;
-  Turn on the DC battery switch;
-  Turn on the PV input switch (customer-supplied);
-  Turn on the grid input circuit breaker (customer-supplied);

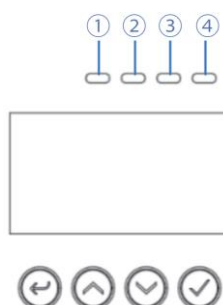
-  Turn on the AC inverter switch;
-  Turn on the AC output circuit breaker.

After the equipment starts up, verify that the display shows no fault or alarm messages and check that the system is operating normally.

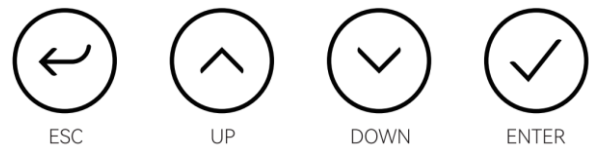
4.2、 Operation and Display Panel

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes four indicators, four function keys and a LCD display,

indicating the operating status and input/output power information.



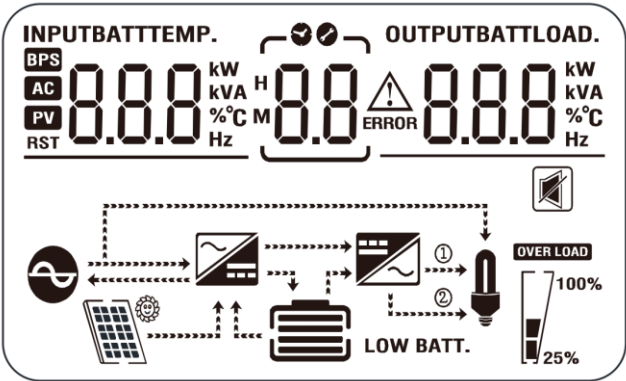
LED Indicator			Messages
① AC	Status indicator (Green)	Solid On	The mains power is normal and enters the mains power operation.
		Flashing	The mains power is normal, but it has not entered mains power operation.
		Off	The mains power is abnormal.
② Inverter	Inverter indicator (yellow)	Solid on	Output is powered by battery or PV in battery mode.
		Off	Other states.
③ charging	charging indicator (yellow)	Solid on	The battery is in float charging
		Flashing	The battery is in constant voltage charging
		Off	Other states
④ 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

4.2.1.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.

4.2.2.LCD setting

After pressing and holding ENTER button for 2 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. Then press "ENTER" button to confirm the selection or Esc button to exit.

Program	Description	Setting Option
01	Output voltage	OPU 01 230 ^v

		230V (default) Adjustable/settable value:208v,220v,230v,240v	
02	Output frequency	OPF 02 50 ^{Hz}	
		50Hz(default) Adjustable/settable frequency: 50HZ, 60HZ	
03	output source priority	Solar first	OPP 03 PV
		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)	OPP 03 Grid
		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.	
		PBG priority	0PP 03 PBG
		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)	n0d 04 APP
		Applied to household appliances	
		UPS	n0d 04 UPS
		Applied to computer and other devices. Typical switching time is 10ms.	
		GEN	n0d 04 GEN
		Applied to connect generator by using grid input port	

05	charger source priority	PNG: PV and Grid (default)	CHP 05 PNG
		OPV: Only PV	CHP 05 OPV
		GRD: Grid first	CHP 05 GRD
		PV: PV first	CHP 05 PV
		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		ACC 06 40 ^A
		40A(default) Setting range is [2, 100A]	
07	Maximum charging current		nCC 07 60 ^A
		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		nDF 08 00
		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 1minute, 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
15	Battery return to mains voltage point	
		When the battery is set to the CUS (Customer Setting Type) mode. The adjustable range is [22, 26V].
		When the battery is set to the AGM (Lead Acid Battery Type) or FLD (Flooded Battery Type) mode. The default setting is 23V, and the adjustable range is [22,26V].
		When the battery is set to the LIB (Ternary Lithium Battery Type) mode. The default is 23.8V, and the adjustable range is [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 adjustable range is [24,29V].
		When the battery is set to AGM (Absorbent

		Glass Mat) or FLD (Flooded) mode. The default is 26V. The adjustable range is [24, 29V].	
		When the battery is set to LIB (Ternary Lithium Battery Type) mode, The default setting is 27.2V. The adjustable range is [23, 29V].	
		When the battery is set to FEL(Lithium Iron Battery Type) mode, The default setting is 26.6V. The adjustable range is [23, 29V].	
17	Battery type	AGM (default)	bAt 17 AGn
		Flooded	bAt 17 FLD
		Ternary Lithium	bAt 17 LIB
		Lithium Iron	bAt 17 FEL
		User- Defined	bAt 17 CUS
18	Battery low voltage point	bAt 18 21.6V	
		It is not possible to set the battery definition mode to AGM or FLD mode. The initial default setting is 21.6V. When the battery type is set to CUS, the adjustable range for the battery voltage is [21, 27V].	
		When the battery type is set to LIB, the default setting is 23.8V. The adjustable range is [20.6, 25V]. When the battery type is set to FEL, the default setting is 24V. The adjustable range	

		is [20.6,25V]
19	Battery shutdown voltage point	
		It 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 default setting is 23V, and the adjustable range is [20, 24V]. When the battery type is set to FEL, the default setting is 23.2V, and the adjustable range is [20,24v]
20	Constant voltage mode voltage point setting	
		When the battery is defined in AGM or FLD mode, it 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]. 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 is 28.2V, and the adjustable range is [25, 29V]. When the battery type is set to FEL, the default is 27.6V, and the adjustable range is [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]. If the battery type is LIB or FEL, the default setting is 27.6V. The setting range is [24,28V]. 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 shut down 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	Std 26 OFF
		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	PAR 27 SIG
		Not Applicable for this model.
28	Battery Disconnection Alarm	SbA 28 OFF
		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	EQn 29 OFF
		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	EQv 30 29.2 ^v

	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 5minutes 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 5minutes 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 equalization charging is activated immediately, and the controller will start to enter the equalization stage.
35	Grid-tie inverter function	
		Set whether the inverter should feed power to the grid in PV priority grid mode or PBG grid mode. The default setting is OFF, and the function is not enabled. When set to ON, the inverter tracks the maximum power point, and the excess energy is fed into the mains. After the function is turned on, if a communication abnormality occurs, an alarm 56 is generated, and the inverter no longer determines the operation logic according to the BMS information.

36	Battery dual output low voltage shutdown point	db ^u 36 24.0 ^v
		The secondary output of the inverter is enabled by default. In battery mode, when the battery voltage drops below the set point, the secondary output is turned off. When the battery voltage rises above the set value plus 1V per additional battery cell, the secondary output is turned on. The default setting of 24V, with a configurable range of [22, 32] V. When the set point is higher than the constant voltage charging (CV) point- 1V per cell, the recovery voltage is set to the constant voltage charging point.
37	Battery dual output duration	dbt 37 OFF
		The secondary output of the inverter is enabled by default. In battery mode, when the battery discharge time reaches the set point, the secondary output is turned off. Default setting is OFF, the function is not enabled. The configurable range is [5,890] in minutes. When set to FUL, the secondary output has unlimited output time.
38	BMS communication Function	bns 38 OFF
		The default setting is OFF, and the function is not enabled. When set to a specific BMS protocol, the inverter communicates with the lithium battery BMS through the centralized control board and obtains battery information.

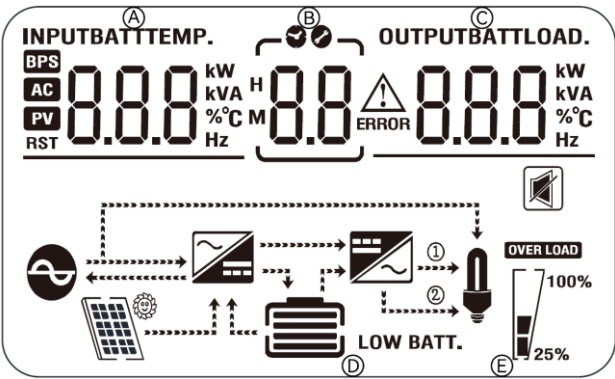
		If the communication is abnormal after the function is enabled, alarm 56 is generated. And the inverter does not determine the running logic based on the BMS information. PYL: PYLON protocol(485/CAN) GRO: GRO WATT protocol (485) VOL: VOL TRONIC protocol (485) IRO: China Tower protocol (485)
39	LOW SOC 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 switch back 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

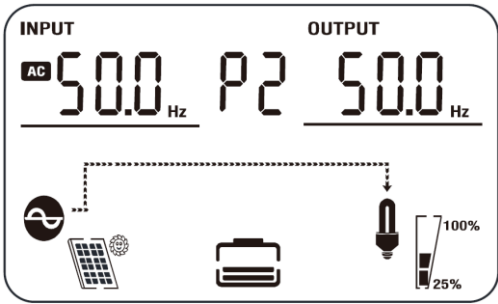
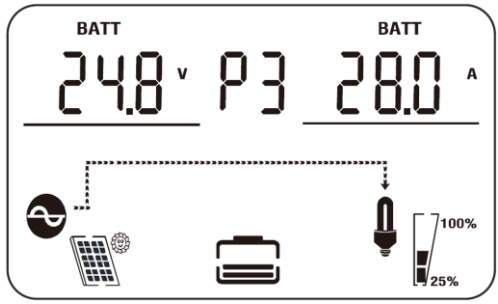
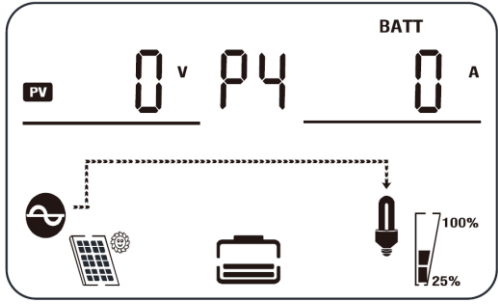
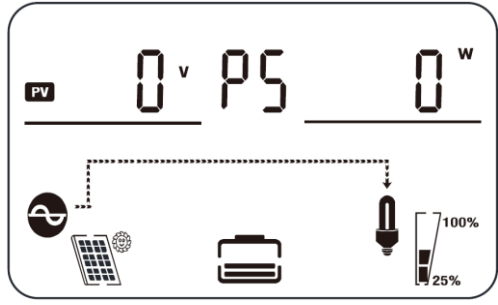
		when the SOC is below the set point or the battery voltage is lower than the voltage point to switch back to grid mode It can be set to OFF, in which case the inverter no longer switches from battery mode to grid mode based on the SOC condition. Once the function is enabled, if a communication abnormality 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.
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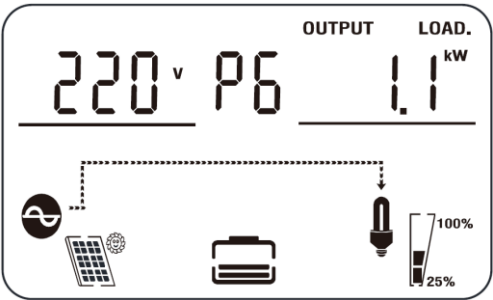
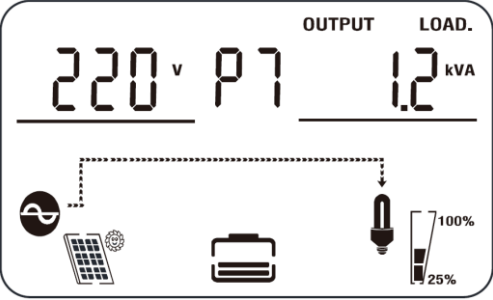
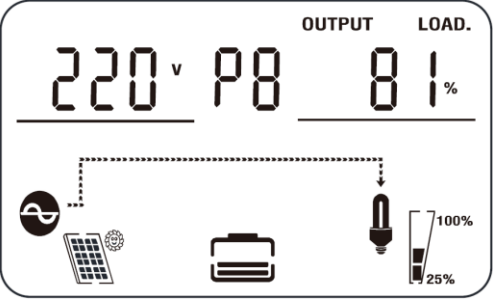
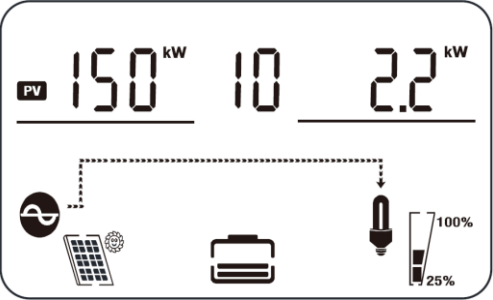
4.3、Display Information

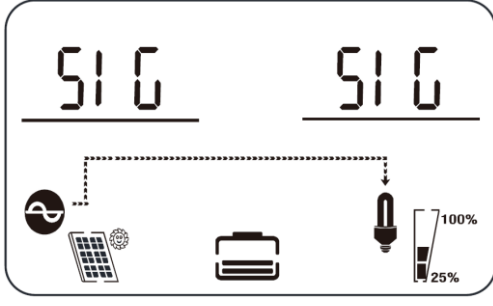
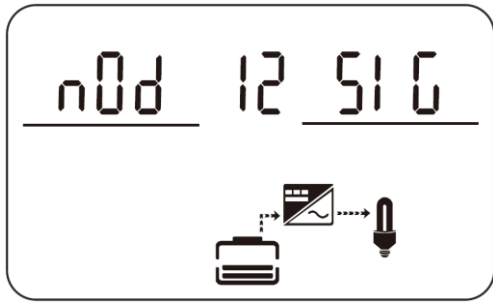
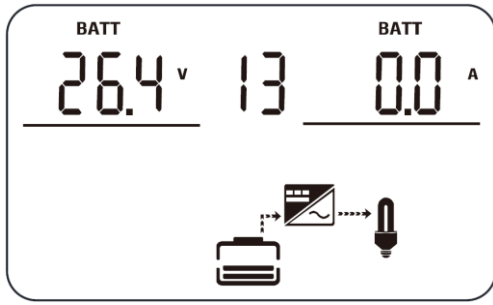
The LCD display information will be switched in turns by pressing "UP" or "DOWN" key. The selectable information is switched as below order: voltage, frequency, current, power, firmware version.

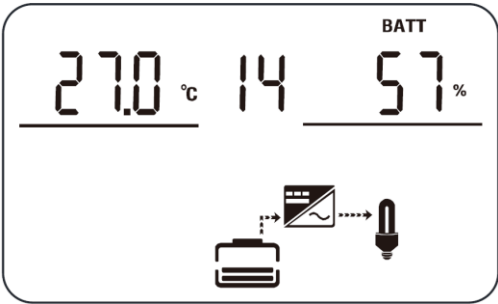
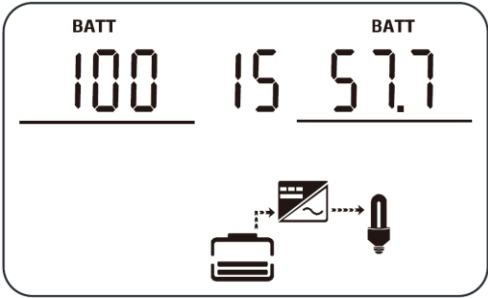
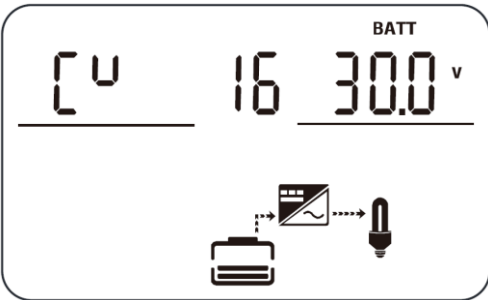


Information	LCD display
Ⓐ AC Input voltage	The LCD display shows the following information: INPUT 219V, OUTPUT 219V, and a battery level indicator at 100%.
Ⓑ Display page number	
Ⓒ Output voltage	
Ⓓ Battery capacity	

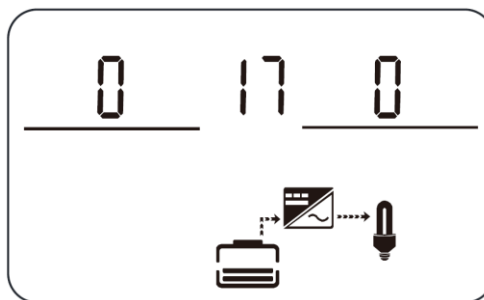
⑤ Load percentage	
④ AC Input frequency ③ Display page number ② Output frequency ① Battery capacity ⑤ Load percentage	
④ Battery voltage ③ Display page number ② Output current ① Battery capacity ⑤ Load percentage	
④ PV voltage ③ Display page number ② PV charging current ① Battery capacity ⑤ Load percentage	
④ PV voltage ③ Display page number ② PV power ① Battery capacity ⑤ Load percentage	

Ⓐ Output voltage Ⓑ Display page number Ⓒ Active power output Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ Output voltage Ⓑ Display page number Ⓒ Apparent power output Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ Output voltage Ⓑ Display page number Ⓒ Load percentage Ⓓ Battery capacity Ⓔ Load percentage	
Display software version	
Ⓐ Total power generation Ⓑ Display page number Ⓒ Daily power generation Ⓓ Battery capacity Ⓔ Load percentage	

Parallel operation status	 The display shows 'SIG' on both the upper left and upper right. Below the displays, there is a diagram showing a battery pack connected to a light bulb. A dashed line connects the battery pack to the light bulb, indicating a parallel connection. A small icon of a battery pack is also shown.
After enabling BMS, the following pages are available	
Network status of lithium battery. When the upper right display shows SIG constant, the battery pack is operating as a single group; When it shows PAR constant, the battery pack is operating in multiple groups in series and parallel; When it flashes PAR, the battery pack is establishing a state of multiple groups in series and parallel.	 The display shows 'n0d' on the upper left, '12' in the center, and 'SIG' on the upper right. Below the displays, there is a diagram showing a battery pack connected to a light bulb. A dashed line connects the battery pack to the light bulb, indicating a parallel connection. A small icon of a battery pack is also shown.
Lithium battery voltage and current information; The upper left displays BMS battery voltage information; The upper right displays BMS battery current information. When BMS communication fails, both the upper left and upper right displays will flash	 The display shows 'BATT' above '26.4 V' on the upper left, '13' in the center, and 'BATT' above '0.0 A' on the upper right. Below the displays, there is a diagram showing a battery pack connected to a light bulb. A dashed line connects the battery pack to the light bulb, indicating a parallel connection. A small icon of a battery pack is also shown.

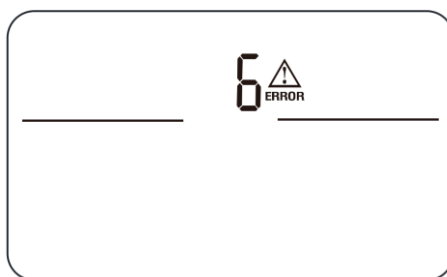
ERR.	
Lithium battery temperature and SOC; The upper left displays BMS temperature information; The upper right displays BMS SOC information. When BMS communication fails, both the upper left and upper right displays will flash ERR	
Lithium battery capacity; The upper left displays rated capacity; The upper right displays current capacity. When BMS communication fails, both the upper left and upper right displays will flash ERR.	
Lithium battery constant voltage point; The upper left displays the fixed letter CV; The upper right displays the BMS constant voltage charging point. When BMS communication fails, the upper right display will flash ERR.	

Lithium battery fault alarm information; The upper left displays BMS alarm information; The upper right displays BMS fault information. When BMS communication fails, both the upper left and upper right displays will flash ERR.



5、Fault Reference code

Fault display



Function description: If alarm occurs, Fault indicator flashes and buzzer sounds every 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 try restart automatically. 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 off (off 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

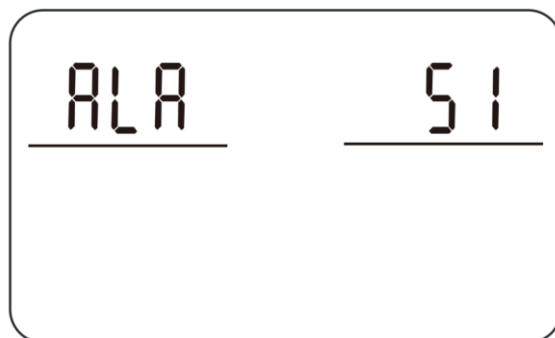
Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions
1	Bus soft boost start failed	Turn fault mode	Bus voltage does not reach set value during soft start.	Cannot restore.
2	Bus voltage high	Turn fault mode	The bus voltage is higher than protection point.	Cannot restore.
3	Bus voltage low	Turn fault mode	Bus voltage is below the under voltage protection point.	Cannot restore.
4	Battery over current	Turn fault mode	Battery current exceeds set point instantly, triggering protection.	Cannot restore.
5	Over temperature	Turn fault mode	The PFC temperature exceeds the protection threshold. Fan stuck for more than 5 minutes.	Tried to re start six times, if failed, cannot restore.
6	Battery high voltage	Turn fault mode	Battery voltage is higher than set value.	Restore after voltage is lower set value.
7	Bus soft start fault	Turn fault mode	Soft start process has exceeded but	Cannot restore.

			the bus voltage has not reached set value.	
8	Bus short circuit	Turn fault mode	Inverter on or PFC on, bus voltage below threshold.	Cannot restore.
9	INV soft start fault	Turn fault mode	INV soft start for a while, it cannot reach the rated output voltage.	Cannot restore.
10	INV over voltage	Turn fault mode	In battery mode, inverter voltage exceeds set value.	Cannot restore.
11	INV under voltage	Turn fault mode	In battery mode, inverter voltage is under set value.	Cannot restore.
12	INV short circuit	Turn fault mode	Inverter voltage drops below the set value, or current is above the set value.	Tried to restart six times, if failed, cannot restore.
13	Negative power protection	Turn fault mode	Inverter power remains below the set value for a certain period of time.	Cannot restore.
14	Over load	Turn fault mode	Overload exceeds limit (list in specification).	Tried to restart six times, if failed, cannot restore.
15	Model fault	Turn fault	Cannot match any	Cannot

		mode	model in model number detection.	restore.
16	No boot loader	Turn fault mode	No boot loader.	Cannot restore.
17	Flash burning fault	Turn fault mode	Burning the program	Restore after burning is completed.
26	BMs fault	Turn fault mode	Error code in BMS message.	Turn off BMS communication function or BMS fault recovery
28	NTC fault	Turn fault mode	NTC open circuit	Cannot restore
29	Inverter over current	Turn fault mode	Instantaneous current of inverter is higher than set value.	Tried to re start six times, if failed, cannot restore.

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
50	Battery open	Alarm, battery does not charge	Battery voltage is below set point	Restore after battery voltage recover
51	Battery low voltage shutdown	Alarm, battery low voltage shutdown or cannot power	Battery voltage is below set point.	Restore after battery voltage recover
52	Battery low voltage	Alarm	Battery voltage is lower than BAL set value	Restore after battery voltage recover
55	Battery over charge	Alarm, battery does not charge	Battery voltage is higher than the set value	Can restore.
56	BMS loss	Alarm, lock standby mode	BMS communication failed (BMS function is open)	Restore after communication recover
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
58	Fan error	Alarm, if one fan fails and the other fan is running at full speed	No fan speed signal detected	Can restore
59	EEPROM error	Alarm	Read/Write failure on EEPROM	Cannot restore

60	Overload	Alarm, battery does not charge.	Load exceeds 102%	Restore after load back to normal.
61	Abnormal generator waveform	Alarm, continuously operating in battery mode.	Generator waveform detection result is abnormal.	Can restore.
62	PV Energy Weak	Alarm, turn off PV output and charging.	When the battery is not connected, the bus voltage is lower than the set value.	Restore after 10 mins.
68	SOC Under	Alarm, turn standby mode	Lithium battery SOC is 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%.
69	SOC Low	Alarm, if it is in standby mode, it will remain in standby mode and not power	Lithium battery SOC is lower than the set value + 5% (mains mode or battery mode), lower than the set value + 10%	Restore after turning off the low SOC shutdown function, or turning off the BMS communication

			(standby mode).	function, or when the SOC returns to the set value + 10%.
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 is detected or detected that the battery terminal voltage exceeds the set value for one consecutive minute.

7、Battery Equalization

Equalization function is added into charge controller. It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top.

Equalization also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize battery periodically

Note:*Don't activate this mode when using lithium batteries

How to Apply Equalization Function

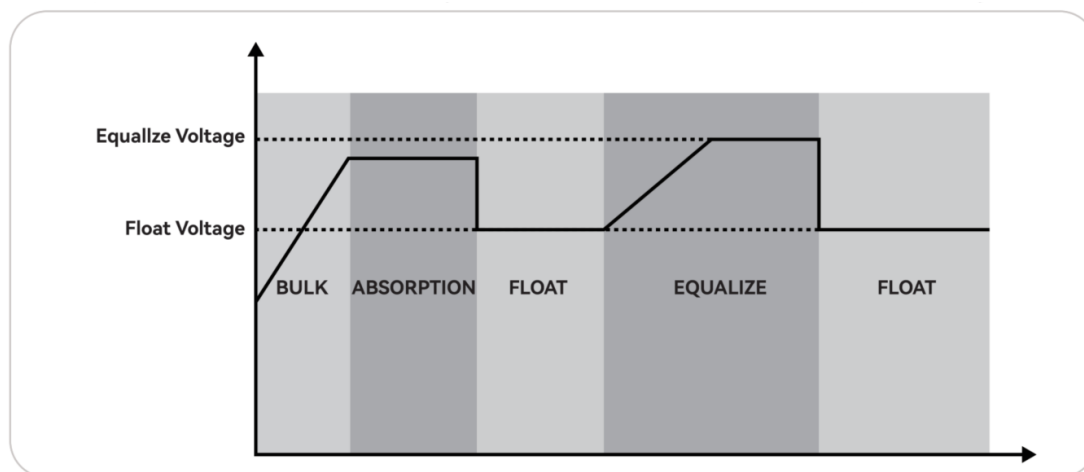
You must enable battery equalization function in monitoring LCD setting

Program 29 first. Then, you may apply this function in device by either one of following methods:

1. Set equalization mode on program 29.
2. Set equalization voltage point on program 30.
3. Set equalization charging time on program 31.
4. Set equalization delay time on program 32.
5. Set equalization interval time on program 33.
6. Set immediate equalization mode activation on program 34.

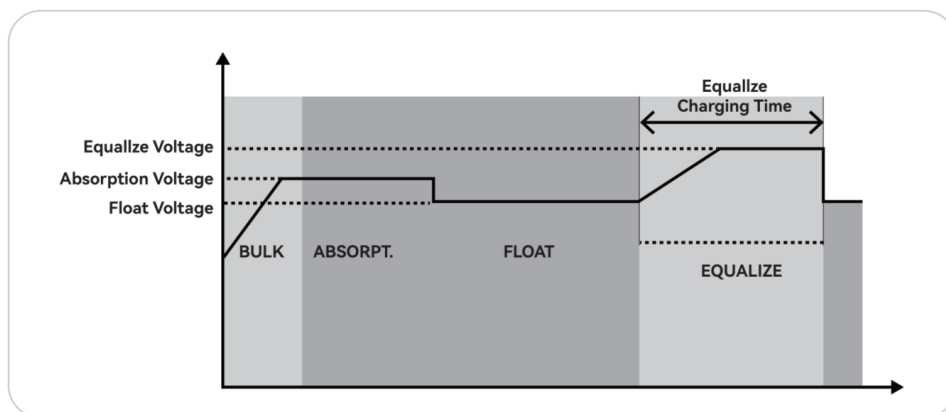
When to Equalize

In float stage, when the setting equalization interval (battery equalization cycle) is arrived, or equalization is active immediately, the controller will start to enter Equalize stage.

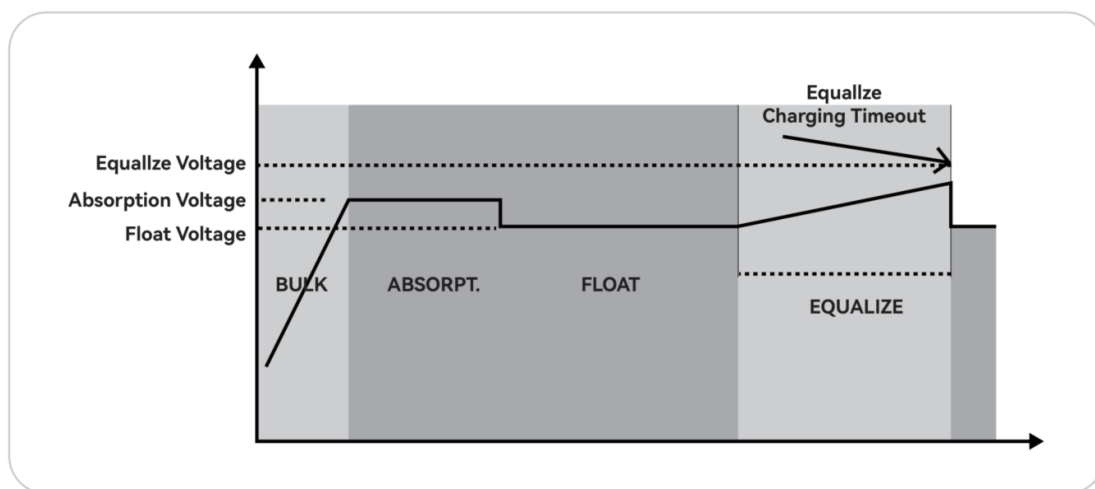


Equalize charging time and timeout

In Equalize stage, the controller will supply power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage. The battery will remain in the Equalize stage until setting battery equalized time is arrived.



However, in Equalize stage, when battery equalized time is expired and battery voltage doesn't rise to battery equalization voltage point, the charge controller will extend the battery equalized time until battery voltage achieves battery equalization voltage. If battery voltage is still lower than battery equalization voltage when battery equalized time out setting is over, the charge controller will stop equalization and return to float stage.



8、Trouble Shooting

problem	Fault Event	Inspection steps	solution
Fault code2	Bus voltage high	1.Check whether the total rated voltage of PV string exceeds the Max. PV open circuit voltage of inverter.	If it exceeds, reduce the PV module number.

		2. In case of parallel operation, check whether the output voltage settings of the two inverters are consistent.	If inconsistent, reset.
Fault code3	Bus voltage low	1.Disconnect the load from inverter and restart again to observe if it recovers.	If it recovers, it indicates that there are too many impact loads and part of them should be removed from inverter.
Fault code5	Over temperature	1. After the temperature is low, start the inverter output and check whether the fan rotates.	If the fan is not rotating, there may be a fault with the fan or its wiring.
		2. Check if the dust filter is too dirty.	If there is excessive dust accumulation, it needs to be cleaned.
		3. Check if there is a clearance space of more than 30cm around the machine.	If there is insufficient space,please refer to the user manual for reinstalling.
		4. Check if the ambient temperature is too high(above 45°C)	For example, avoid direct sunlight.
		5. Check if the air duct paper is loose.	Install the plastic nail provided by the manufacturer at the loose position
Fault code 8	Bus short circuit	1. Disconnect the load from inverter and restart again to observe if it recovers.	If it recovers, it indicates that there are too many impact loads and part of them should be removed from inverter.
Fault code	BMS fault	1. Check the BMS fault	Handle battery

26		information through the battery background controller.	problems according to fault information.
Alarm code 56	BMS loss	1. Check whether the communication cable is plugged into the correct port of the lithium battery.	The lithium battery may have multiple communication interfaces, which need to be plugged into the correct position.
Alarm code 56	BMS loss	2. Check whether the battery dial switch setting is consistent with the protocol used.	The battery supports a variety of BMS protocols, and different protocols can be selected through the dial switch on the battery.
		3. Confirm whether the definition of battery port pin of BMS communication cable is consistent with that of inverter.	If not, replace the correct cable.
		4. Confirm whether the BMS protocol matches the inverter.	If it is not within the matching range of inverter, the Protocol shall be replaced.
		5. Replace the battery or inverter for test.	If it is normal after replacement, the communication hardware fails.

Notes: Updates to the content and version of this manual will not be notified separately.



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