

Off Grid Solar Inverter

User Manual

OG-1P5K-DT-24

About This Manual

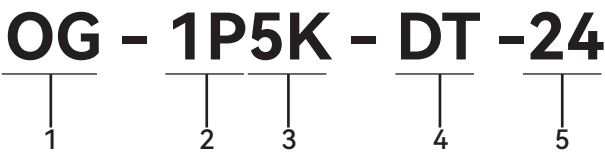
Scope of Validity

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

This manual is valid for the following inverter models:

- PHOTON PRO PV9000-24

Model Description



1	Product Name	"OG" refers to Off Grid Hybrid Solar Inverter.
2	Grid Type	"1P" refers to maximum input power is 9000 W.
3	Rated Power	"5K" refers to the rated output power of 5 kW.
4	Battery Type	"D" is a Dual Output, "T" has a Built-in Power Booster.
5	Rated Voltage	"24" refers that user can choose proper capacity lead acid battery with a nominal voltage at 24 V.

Target Group

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

Symbol Description

Different levels of warning messages in this manual are defined as follows:



DANGER!

Indicates a high-level hazard that, if not avoided, will result in death or serious injury.



WARNING!

Indicates a medium-level hazard that, if not avoided, could result in death or serious injury.



CAUTION!

Indicates a low-level hazard that, if not avoided, could result in minor or moderate injury.



NOTICE

Provide important operation information and techniques for high efficient, proper using and maintenance.

Change History

Version 1.0 (07/03/2025)

Initial release

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Acceptable Loads Are as Below:

This product (OG-1P5K-DT) features strong overload handling capability, enabling it to maintain stable operation for short durations under varying overload conditions. Once the load exceeds the permissible threshold, the system will automatically activate protective measures to ensure equipment safety. The specific overload tolerances are as follows:

- Capable of withstanding a load between 102% and 110% for up to 1 minute;
- Capable of withstanding a load between 110% and 130% for up to 10 seconds;
- Capable of withstanding a load between 130% and 150% for up to 3 seconds;
- Capable of withstanding a load exceeding 150% for up to 200 milliseconds.

The system protection mechanism will engage immediately when the time or load limits are surpassed, effectively safeguarding the equipment.

*** Inductive loads and capacitive loads** can referred to as **shock loads**.

*** Shock loads** may experience shock currents or surges during startup, which can cause voltage fluctuations, current inrushes, motor vibrations, and voltage surges. These anomalies may exceed the load-bearing capacity of the inverter, resulting in damage or even failure. Therefore, it is necessary to control the total amount of inductive and capacitive loads connected to the inverter to ensure safe and stable operation.

- When selecting an inverter, the loading capacity should be taken into consideration to ensure that the total amount of connected inductive and capacitive loads fall within its rated capacity.
- When connecting **Shock loads** to the off-grid inverter, it is necessary to limit the total load capacity according to the following table to ensure safe and reliable operation of the inverter. Please refer to the table for the allowed load capacities for each load type.

Model	Continuous Output	Max. Output (< 10 s)	Maximum individual Shock load power, Maximum total load power
5K 24V	5000 W	11000 VA	≤ 1.1 KVA (Individual Shock load) (1Hp AC x1 or 1.5Hp x1)
			≤ 2.2 KVA (Total Loads include Shock load) (1Hp AC x1)
			≤ 2.5 KVA (Total Load without Shock load)



WARNING!

- Earth connection essential before connecting supply.
- Be sure that AC power source is disconnected before attempting to hardwire it to the unit.
- 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.



NOTICE

- It is important to make sure that the combined power required for all devices connected to this EPS output does not exceed the power rating of the inverter.
- 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 manufacturer of air conditioner if it is equipped with time-delay function before installation. Otherwise, this inverter will trig overload fault and cutoff output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

1 Safety

1.1 Symbols on the Label and Inverter

Table 1-1 Symbols

Symbol	Description
	CAUTION Do not disconnect under load!
	Danger: High Voltage! Danger: Electrical Hazard!
	Delayed discharge. Wait 5 minutes after power is completely discharged.
	Read instructions carefully before performing any operation on the INVERTER.
	Grounding: The system must be firmly grounded for operator safety.

1.2 Safety Instructions

This chapter contains important safety and operating instructions. Read and keep this manual for future reference.



DANGER!

- To reduce risk of injury, charge only deep-cycle lead-acid type rechargeable batteries and lithium batteries. Other types of batteries may burst, causing personal injury and damage.
- To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
- 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.



WARNING!

- Do not disassemble the upper cover. 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.
- Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
- NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
- Make sure the inverter is completely assembled, before the operation.



CAUTION!

- NEVER charge a frozen battery.
- For optimum operation of this inverter, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter.
- 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.



NOTICE

- Provide important operation information and techniques for high efficient, proper using and maintenance.
- Please be clear which kind of battery system you want, lithium battery system or lead-acid battery system, if you choose the wrong system, energy storage system can not work normally.
- Before using the device, read all instructions and cautionary making on the devices 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.
- All the operation and connection please professional electrical or mechanical engineer.
- All the electrical installation must comply with the local electrical safety standards.
- 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.

2 Introduction

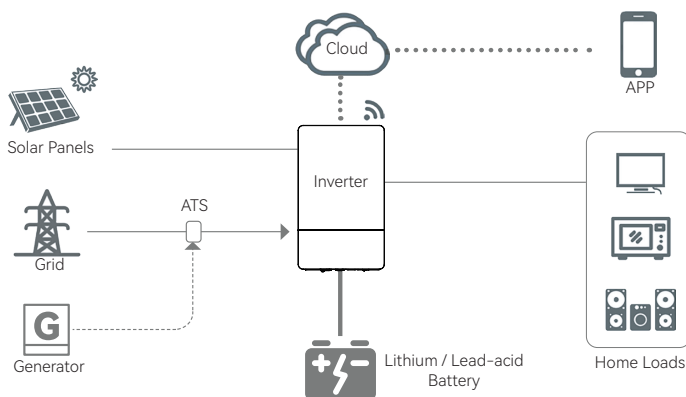


Figure 2-1 Hybrid Solar Energy Storage System

This is a multifunctional solar inverter, integrated with a MPPT solar charge controller, a high frequency pure sine wave inverter and a UPS function module in one machine, which is perfect for off grid backup power and self-consumption applications. This inverter can work with or without batteries.

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 / GPRS module is a plug-and-play 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.

2.1 Features

- Pure sine wave AC output
- High frequency inverter with small size and light weight.
- Solar and utility grid can power loads at the same time
- With CAN/RS485 for BMS communication
- With the ability to work without battery
- Dual AC output
- Feed-in to grid
- (Optional) WiFi/GPRS remote monitoring

2.2 Product Overview

2.2.1 Panel

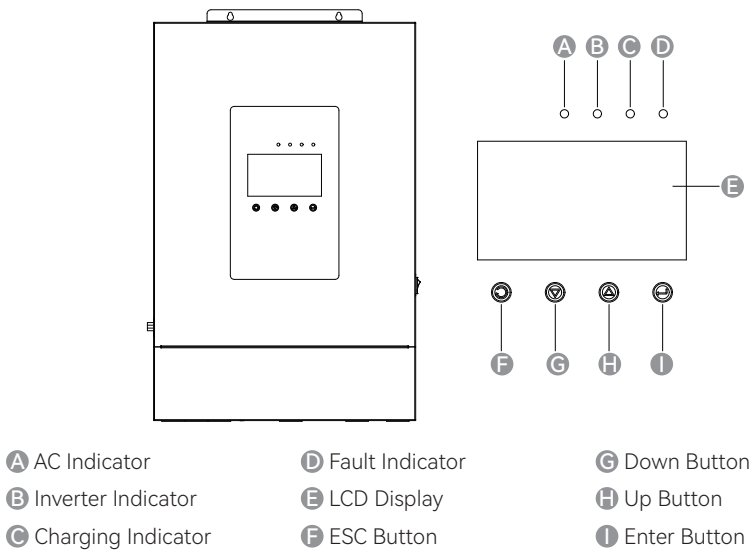
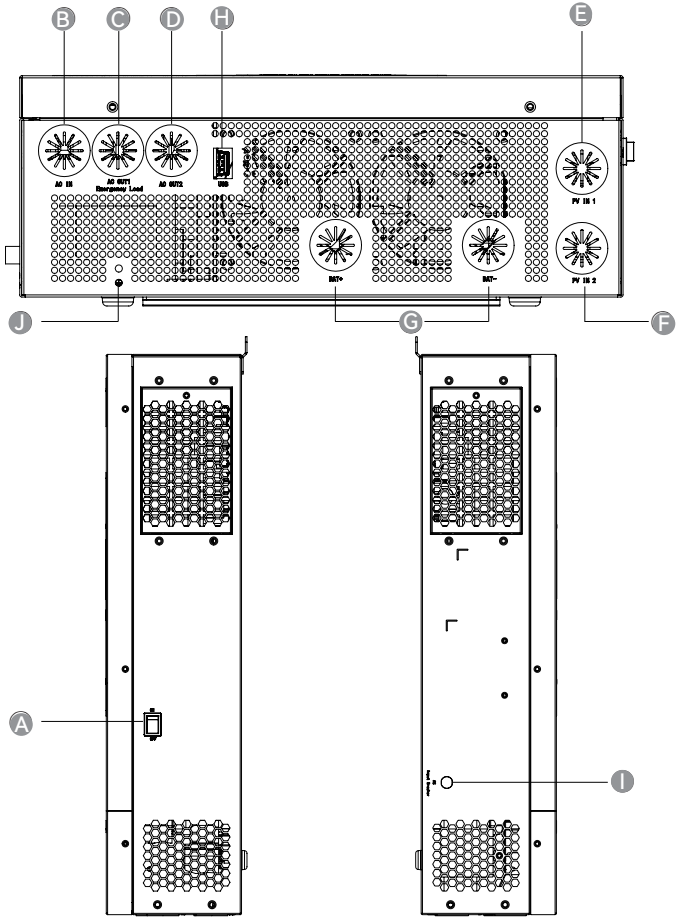


Figure 2-2 LED Panel

2.2.2 Terminal Description



- | | | |
|------------------------------|------------------------|---------------------------|
| A Power On/Off Switch | E PV Input 1 | I AC Input Breaker |
| B AC Input | F PV Input 2 | J PE |
| C AC Output 1 | G Battery Input | |
| D AC Output 2 | H WiFi | |

Figure 2-3 Terminal

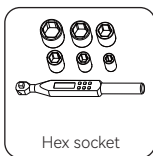
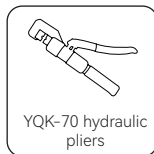
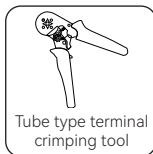
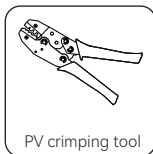
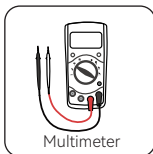
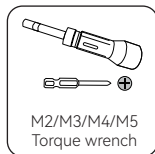
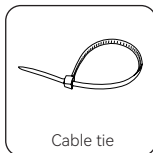
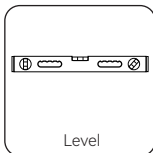
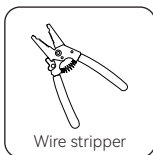
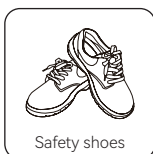
3 Installation

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



3.1.3 Packing List

Description	Quantity
Inverter	1 pc
User Manual	1 pc
M6*50, SUS304 Expansion Screw	2 pcs
E6010 Tubular Terminal, for AC input/output, PV, Generator Input	10 pcs

3.2 Mounting Unit

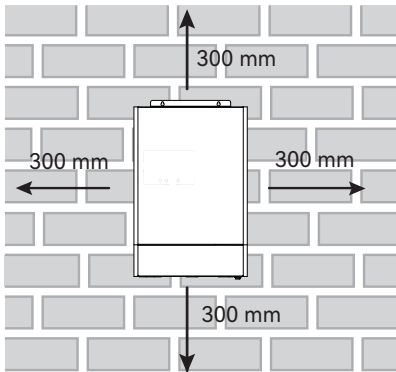


Figure 3-1 Installation distance recommendation

Consider the following points before selecting where to install:

- Do not mount the inverter construction materials.
- Mount on a solid surface.
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between -15°C and 50°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the diagram above to guarantee sufficient and to have enough space for removing wires.



WARNING!

- Inverter is suitable for mounting on concrete or other non-combustible surface only.

Follow the installation steps:

Step 1 Use $\varnothing 8$ drilling bit drill holes on the mounting surface. The distance between 2 holes

is 140 mm. Then insert the expansion screw (M6). The expansion screw*2 are in packing.

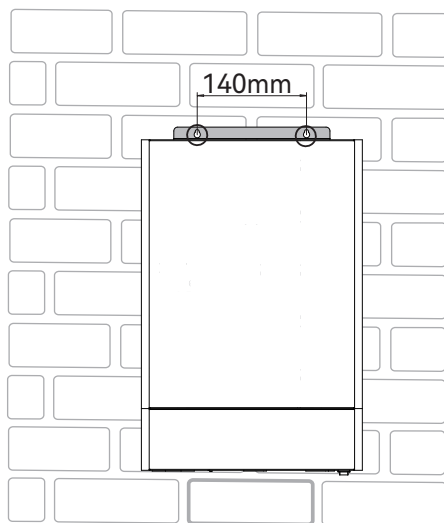


Figure 3-2 Drilling holes

Step 2 Lock bracket on the mounting surface by screw nut.

Step 3 Lift the inverter vertically and place it on the rack through the hook on the back.

Step 4 Lock the M4 screws on the side of the inverter and rack. The screws are in pack.

Before connecting all wiring, please take off bottom cover by removing four screws as shown below:

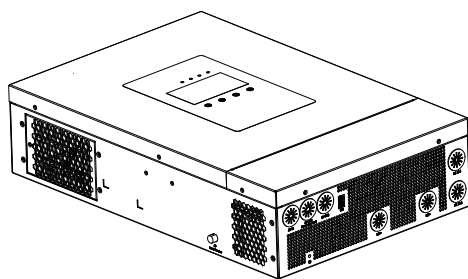


Figure 3-3 Removing screws

4 Electrical Connection



WARNING!

- Make sure AC power is disconnected before attempting to connect AC power 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.
- All wiring must be performed by a qualified personnel.



WARNING!

- To ensure safe and efficient operation of the system and reduce the risk of injury, please use the recommended cable specifications.

4.1 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 40 A for 6.5 kW inverter.
- There are three terminal blocks with 'AC IN', 'GEN /AC OUT 2', 'AC OUT 1' markings. Please do not mis-connect input and output connectors.
- Be sure to connect AC cables 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.

Table 4-1 Suggestion for AC input wires

Model	Gauge	Cross Section
5 kW Inverter	12 AWG	4 mm ²

Table 4-1 Suggestion for AC output wires

Model	Gauge	Cross Section
5 kW Inverter	12 AWG	4 mm ²

Procedures:

Step 1 Before connecting to AC power, make sure that the AC circuit breaker is disconnected.

Step 2 Remove insulation sleeve 12 mm from the head of cables, shorten the conductor part

to 10 mm. Insert the cable into the tubular terminal. Then use terminal crimping tool make the terminal and cable connected tightly.

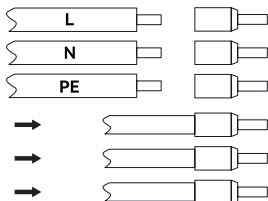


Figure 4-4 AC cable connection

Step 3 Insert AC input cables according to polarities indicated on terminal blocks and tighten the terminal screws. Be sure to connect PE protective cable on the inverter side first.

PE -> Protective Earth (yellow-green)

L-> LINE(brown or black)

N-> Neutral (blue)

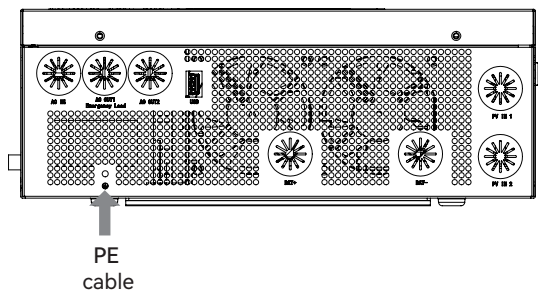


Figure 4-5 PE Connection

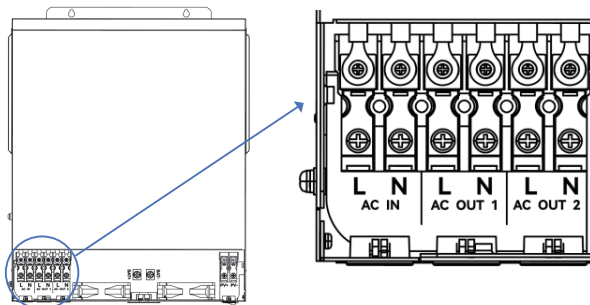
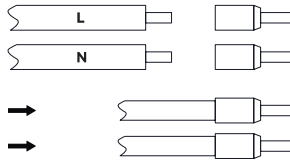


Figure 4-6 AC side connection

Step 4 Make sure the cables are securely connected.

To implement AC output (OUT1/OU2) connection:

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



4.2 PV Connection



DANGER

- Direct sunlight can cause dangerous high voltages in solar panels. Therefore, be sure to follow the safety guidance in the solar panel manual plus related documents.



WARNING!

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



CAUTION!

- Before connecting to PV modules, please install a separate DC circuit breaker between inverter and PV modules. Do not connect any DC switches or AC/DC circuit breakers before completing the electrical connections.

Table 4-2 Suggestion for PV wires

Model	Gauge	Cross Section
5 kW Inverter	12 AWG	4 mm ²

PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters, Parameters can be referenced in “[9 Specifications](#)”.

- 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 start-up voltage.

Procedures:

Step 1 Before connecting the PV module, make sure that the DC circuit breaker is disconnected.

Step 2 Remove insulation sleeve 12 mm from the head of cables, shorten the conductor part to 10 mm. Insert the cable into the tubular terminal. Then use terminal crimping tool make the terminal and cable connected tightly.

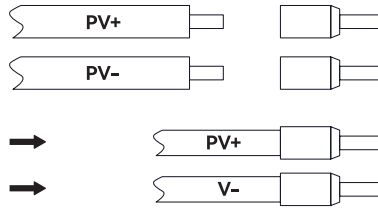


Figure 4-7 PV cable connection

Step 3 Use multi-meter check to ensure the polarities are correct.

Step 4 Insert PV cables according to polarities indicated on terminal block and tighten the terminal screws.

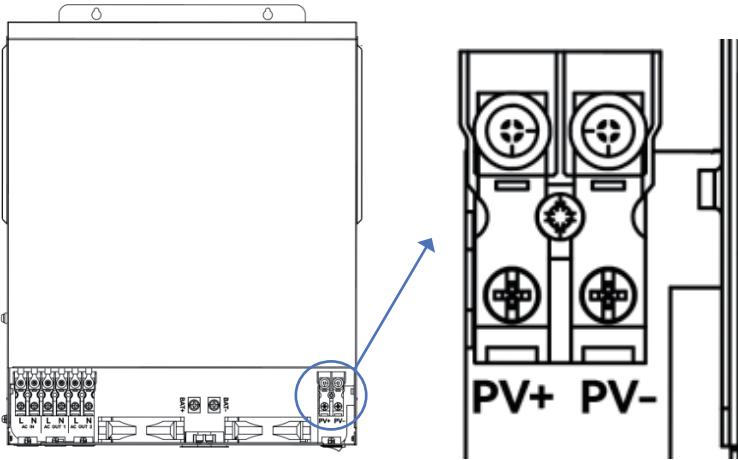


Figure 4-8 PV side connection

Step 5 Make sure the cables are securely connected.

4.3 Battery Connection

4.3.1 Lead-acid Battery Connection

User can choose proper capacity lead acid battery with a nominal voltage at 48V. Also, you need to choose battery type as ‘AGM or FLD(flooded)’, for specific settings, please refer to “5.2.2 LCD Setting”.



CAUTION!

- Do not place anything between the flat part of the inverter terminal and the DT terminal. Otherwise, overheating may occur.



CAUTION!

- For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it's still requested to have over-current protection installed. The recommended size of protector or disconnect is 150 A.

Table 4-3 Suggestion for battery cable and terminal

Model	Gauge	Cross Section
5 kW Inverter	12 AWG	4 mm ²



NOTICE

- For lead acid battery, the recommended charge current is 0.3C (C>battery capacity).

Procedures:

- Step 1** Unscrew the pre-fixed screws on battery poles. Prepare 2 DT terminals (It should fit for AWG2 cables).
- Step 2** Remove insulation sleeve 12 mm from the head of cables, shorten the conductor part to 10 mm. Insert the cable into the DT terminal. Then use terminal crimping tool make the terminal and cable connected tightly.

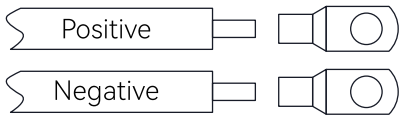


Figure 4-9 Battery cable connection

- Step 3** Pass the battery cable through the battery installation hole on bottom shell, and tighten the terminal screws. Make sure polarity at both the battery inverter/ charge is correctly connected and DT terminals are tightly screwed to the battery terminals.

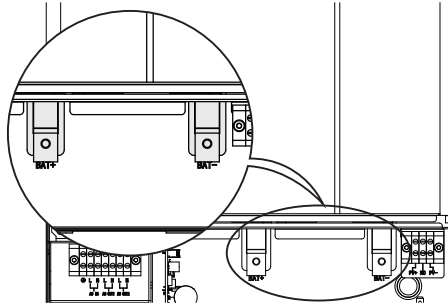


Figure 4-10 Battery side connection

Step 4 Connect all battery packs as units requires. It's suggested to connect at least 200 Ah capacity battery.



DANGER!

- Installation must be performed with care due to high battery voltage in series.



CAUTION!

- Do not apply anti-oxidant substance on the terminals before terminals are connected tightly.
- Before making the final DC connection or closing DC breaker / disconnecter, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).
- Do not place anything between the flat part of the inverter terminal and the DT terminal. Otherwise, overheating may occur.

4.3.2 Lithium Battery Connection

If choosing lithium battery for inverter, please check the compatibility of the protocol first.

There are two connectors on the lithium battery, RJ45 port of BMS and power cable.

Procedures:

Step 1 Follow section 4.3.1 to implement the power cable connection.

Step 2 Connect RJ45 terminal of battery communication cable to BMS communication port of inverter. The communication protocol should be RS485 or CAN.

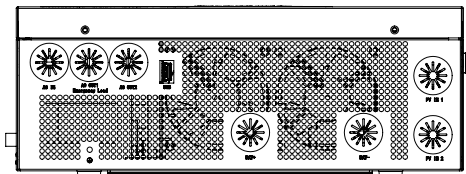


Figure 4-11 Lithium battery connection

Step 3 Insert the other end of RJ45 (battery communication cable) to battery communication port of lithium battery.



NOTICE

- If choosing lithium battery, make sure to correct the BMS communication cable between the battery and the inverter. You need to choose battery type as "lithium battery" during inverter setting.

Lithium battery communication and setting:

In order to communicate with battery BMS, you should set the battery type to "Lib" in ["5.2.2 LCD Setting"](#) Program 17.

Make sure the lithium battery BMS port connects to the inverter is Pin to Pin, the inverter BMS port Pin assignment shown as below:

Pin	BMS Port
1	RS485B
2	RS485A
3	-
4	CANH
5	CANL
6	-
7	-
8	-

Communicating with battery BMS in parallel system

If need to use communicate with BMS in a parallel system, you should make sure to connect the BMS communication cable between the battery and one inverter of the parallel system.

4.4 Final Assembly

After connecting all wiring, please put bottom cover back by screwing four screws mentioned in Section 3.2.

4.5 Smart Communication Stick Connection (Optional)

The smart communication stick is used to connect to cloud platform. Please insert the stick into COM port directly.

4.6 Meter/CT connection (Optional)

Insert the RJ45 connector (communication cable) from meter or mains CT.

Make sure that the meter/mains CT port connected to the inverter is Pin to Pin, and the inverter meter/CT port pin assignment is as shown below:

Pin	Meter/CT Port
1	Meter RS485B
2	Meter RS485A
3	Grid.Isense+
4	-
5	-
6	Grid.Isense-
7	-
8	-

5 Operation

5.1 Power ON/OFF

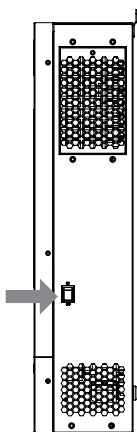


Figure 5-1 Power On&Off button

5.1.1 Power ON

Step 1 Turn on the battery breaker to connect the battery to the inverter.

Step 2 Turn on the switch on the inverter to start the inverter.

Step 3 Turn on the PV breaker.

Step 4 Turn on the AC breaker between the inverter and the power grid.

Step 5 Turn on the load breaker to supply power to the connected loads.

5.1.2 Power OFF

Step 1 Turn off the load switch to ensure that all connected loads are disconnected.

Step 2 Turn off the PV breaker to disconnect the PV from the inverter.

Step 3 Turn off the AC switch between the inverter and the power grid.

Step 4 Turn off the switch on the inverter.

Step 5 Turn off the battery switch to disconnect the battery from the inverter.



CAUTION!

- After the inverter system is powered down, there is still residual electricity and heat, which may cause electric shock or burns. Therefore, wear protective gloves to operate the inverter after the inverter system has been powered down for 5 minutes.

5.2 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.

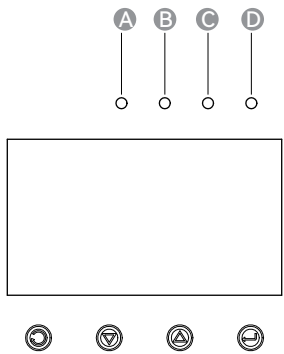


Table 5-1 LED indicator

LED Indicator		Description	
A 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.
B Inverter	Invert indicator (Yellow)	Solid On	Output is powered by battery or PV in battery mode.
		Off	Other states.
C Charging	Charging indicator (Yellow)	Solid On	The battery is in float charging,
		Flashing	The battery is in constant voltage charging.
		Off	Other states.
D Fault	Fault indicator (Red)	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.
		Off	The inverter is working properly.

Table 5-2 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.

5.2.1 LCD Display Icons

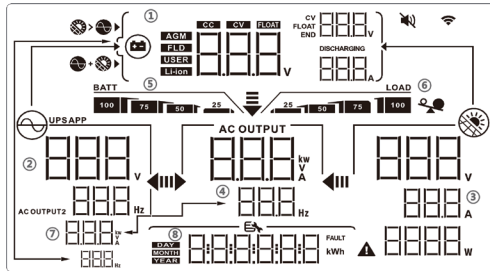


Table 5-3 LCD Icons

Display area	Icon	Description
① Battery Information		Battery icon
		Battery type
		Three charging period. The CC icon is illuminated during the constant current charging stage, the CV icon is illuminated during the constant voltage charging stage, and the FLD icon is illuminated during the float charging stage.
		Indicate battery voltage
		During the constant voltage charging stage, the CV voltage is displayed and the CV icon is illuminated. During the float charging stage, the float voltage is displayed and the END icon is illuminated.
		Battery charging/discharging current

Display area	Icon	Description
② AC Input Information		AC input icon
	UPSAPP	UPS or APP input mode
		When set to GEN input, it display as APP AC input voltage and frequency
③ PV Input Information		PV input icon
		Indicate PV power, PV voltage, PV current, etc.
④ Output Information		Indicate output voltage (V), apparent power (VA or kVA), output active power (W or kW) alternately, switching every five seconds indicate output frequency.
⑤ Battery Capacity		Indicate battery capacity
⑥ Load Capacity		Indicate load capacity
		Over load icon
⑦ AC OUTPUT2 Information	AC OUTPUT2	Second AC output icon
		Indicate AC output 2 voltage (V)
⑧ Parameter Query, Function Setting or Fault/Alarm Information		Indicate system information; Function setting indicate Fault/Alarm
Other Information		Mute
		WiFi connected
		If PV+Grid, the left and right icon light at same time; if only PV, the right icon is light
		If PV first, the left and right icon light at same time

Table 5-4 Battery icon description (Lead-acid battery)

In battery mode, battery icon will present Battery Capacity		
Load Percentage	Battery Voltage	Display
Load > 50 %	< 22.292 V	
	22.292 ~ 23.37 V	
	23.37 ~ 24.448 V	
	> 24.448 V	

Load Percentage	Battery Voltage	Display
50% > Load > 20%	< 23.59 V	
	23.59 ~ 24.668 V	
	24.668 ~ 25.746 V	
	> 25.746 V	
Load < 20%	< 24.24 V	
	24.24 ~ 25.318 V	
	25.318 ~ 26.396 V	
	> 26.396 V	

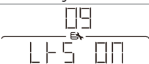
5.2.2 LCD Setting

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.

Table 5-5 Battery icon description (Lead-acid battery)

Program	Description	Setting Option
01	Output voltage	 230 V (default) Adjustable/settable value: 208 V, 220 V, 230 V, 240 V
02	Output frequency	 50 Hz (default) Adjustable/settable frequency: 50 Hz, 60 Hz
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 the same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.

Program	Description	Setting Option
03	Output source priority	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 the same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.
		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.
		MKS  Generator provides power to loads as first priority. When generator, PV, battery all exist, the work mode is as PBG. When generator and battery exist (no PV), the work mode is as GPB. When generator and PV exist (no battery), the work mode is as GPB.
04	Input mode	APP: Appliance (default)  Applied to household appliance Typical switching time is 10 ms.
		UPS  Applied to computer and other devices. Typical switching time is 10 ms.
		GEN  Applied to connect generator from AC IN port. Typically switching time is 20 ms.

Program	Description	Setting Option
05	Charge source priority	PNG: PV and Grid (default) 
		OPV: Only PV 
		PVF: PV first 
		There are three 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 PVF (PV first). IF both PV and grid are available, PV charge. If only PV is available, PV charge. If only grid is available, grid charge.
06	Grid charging current	 60 A (default) Available options: 2/10/20...100/110/120...140/150/160A
07	Maximum charging current	 Set total charging current for solar and grid chargers. The default is 100 A. Available options: 2/10/20...100/110/120...140/150/160A
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 Grid or PV loss alarm. The default setting in ON. If the grid input detected lost, the buzzer will sound for 5 seconds, when set to OFF, after the grid 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 25 W, the system will stop output for a period then resume. If the load is still lower than 25 W, the system will do the loop stop then resume. If the load is higher than 35 W, the system will resume continuous normal output.

Program	Description	Setting Option
13	Overload transfer to bypass	13 OLC OFF The default setting is OFF. When set to ON, in the case of PBG(PV priority) or MKS(generator priority) mode, if there is an overload, the system will immediately transfer to bypass mode (grid power output, also known as bypass mode)
14	Silent mode setting	14 nUE OFF 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. Button sound is not effected.
15	Battery return to grid voltage point	15 bEt 23.0 When the battery is set to CUS (Customer Setting Type) mode. The adjustable range is [22, 26V]. The default is 23V, and it can be adjustable within a range of [22,26V] When the battery is set to 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 LIB(Ternary lithium battery). The default value is 23.8V. It can be adjustable within a range[20,25V]. When the battery is set to FEL(Lithium iron battery), the default value is 24.8V. It can be adjusted within a range of [20, 25V].
16	Switching back to battery mode voltage points	16 bEt 26.0 When the battery is set to CUS (Customer Set Type) mode, the default setting is 27.2V, the voltage range is [23,29V]. 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 iron battery), the default value is 26.6V. It can be adjusted within a range of [23, 29V].
17	Battery type	AGM (default)
		17 bAt AGn
		Flooded
		17 bAt FLD
		Lithium (Ternary Lithium Battery)
		17 bAt LI b
		FEL (Lithium iron)
		17 bAt FEL
		User-Defined
		17 bAt CUS

Program	Description	Setting Option
18	Battery low voltage point	18 BAL 22.0 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]. Initial settings for CUS are the same as for LIB. When the battery type is set to FEL, the default setting is 24V. The adjustable range for the voltage is [20.6, 25V]. It is not possible to set the battery definition mode to AGM or FLD mode. The initial default setting is 22V.
19	Battery shutdown voltage point	19 BAD 21.0 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 LIB, the battery shutdown point can be modified. The default setting is 23V, and the adjustable range is [20,24V]. Initial settings for CUS are the same as for LIB. When the battery type is set to FEL, the battery shutdown point can be modified. The default setting is 21V, and the adjustable range is [20,24V].
20	Constant voltage mode voltage point setting	20 BCV 28.2 When the battery is defined in AGM or FLD mode, the voltage set point can not 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, 30V] for the constant voltage charging set point. The default setting is 28.2V. 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 [24, 30V]. When the battery type is set to FEL, the default constant voltage charging set point is 27.6V, and it can be adjusted within the range of [24,30V]. 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	21 BFL 27.6 When battery is defined as AGM or FLD mode, the voltage set point can not 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 [25, 29V] for the floating charging voltage set point. The default is 27.6 V. If the battery type is LIB, the default setting for the floating charging point is 27.6V. The setting range is [25,29V]. If the battery type is FEL, the default setting for the floating charging point is 27.2V. The setting range is [25,29V]. It is important to note that the constant voltage point voltage should always be set higher than the floating charge point voltage.

Program	Description	Setting Option
22	Grid low voltage point setting	22 EN LL 5 77 If input mode is APP/GEN, Grid low voltage point can be set within a range of 45V to 77V. The default setting is 77V. If input mode is UPS, Grid low voltage point can be set within a range of 85 V to 100 V. The default setting is 92.5 V.
23	Grid high voltage point setting	23 EN LH 132 If input mode is APP/GEN, Grid high voltage point can be set within a range of 132V to 140V. The default setting is 132V. If input mode is UPS, Grid high voltage point is set as 132V.
24	Automatic turn off backlight	24 EN AEb ON The default setting is ON. If ON, the backlight will turn off after 1 minutes of no button operation.
25	Inverter soft start setting	25 EN 5tEOFF 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	26 EN 5tdOFF 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 can not be set in battery mode.
29	Battery Disconnection Alarm	29 EN 5bAOFF Enable/Disable battery disconnection alarm. Default setting is OFF. When set to OFF, there will be no battery disconnection alarm when the battery is disconnected.
31	Equalization Voltage Point Setting	31 EN EQ 29.2 The default setting for FEL battery type is 28 V, setting range is [24, 30V]. The default setting for AGM/FLD/LIB/CUS battery type is 29.9V, with a configurable range of [24, 30V]

Program	Description	Setting Option
32	Equalization Charging Time Setting	32 EN E9E 30 The function can be set as 'OFF' or active. 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 setting range is [5,900] with 5 minutes for every step. The default setting is OFF.
33	Equalization Delay Time Setting	33 EN E90 120 The function can be set as 'OFF' or active. 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.
34	Equalization Interval Time Setting	34 EN E9I 30 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 periods) is reached. The default setting is 30 days, the settable range is [1,90], and the increment of each setting is 1day.
35	Enable Equalization Immediately	35 EN E9NOFF 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.
38	Battery dual output low voltage shutdown point	38 EN dBV 24.0 When enabled, 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 [22.30]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.

Program	Description	Setting Option
39	Battery dual output duration	39 dbt 60 When enabled, 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 [5,900] in minutes. When set to FUL, the secondary output has unlimited output time.
40	Dual output battery mode cut-off SOC	40 db5 20 When enabled, the secondary output of the inverter is enabled by default. In battery mode, when the battery SOC is lower than the set value, the secondary output is turned off. After the battery voltage is 5% higher than set value, the secondary output will turn off. Default value is 20. The setting range is [5, 90] and OFF.
44	BMS Communication Function	44 bns 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. CVT: CVTE protocol (485) PYL: PYLON protocol (485 and CAN) GRO: GROWATT protocol (485 and CAN) VOL: VOLTRONIC protocol (485) IRO: China Tower protocol (485) PAR: PACE RTU protocol (485)
45	BMS ID	45 bni Ato Setting BMS ID number to communication with. The setting value is AtO or numerical value [0,15]. Among them, A-F represents 10-15 respectively. The default value is auto(AtO). When set to auto (AtO), system will automatically poll the BMS ID from small to large. When system poll for the first ID with a correct response, it locks the ID and only asks the BMS with that ID.

Program	Description	Setting Option
46	Low SOC Shutdown	 Set the inverter to shut down when the State of Charge (SOC) of the battery is low. Default setting is 10, 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.
47	High SOC to Battery	 Set the SOC value for the inverter to switch to battery mode. Default setting is 90, 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.
48	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.

Program	Description	Setting Option
61	Battery Max. Discharge Current	61  The default setting is OFF. The inverter will not limit the battery discharging current when setting to OFF. When set to a numerical value, it indicates the limitation current value. The setting range is [10, 140A] with a setting step of 5A. If the discharging current is over the limitation, alarm 60 will occur. If the continuous over-current time reaches 5 seconds, fault 14 will occur and inverter goes into fault mode.

5.3 Display Information

The LCD display information will be switched in turns by pressing "Up" or "DOWN" key. If there is no operation for a long time, the daily PV power generation will be displayed at the bottom of the screen. For example the following screen displays 2.5 kWh.

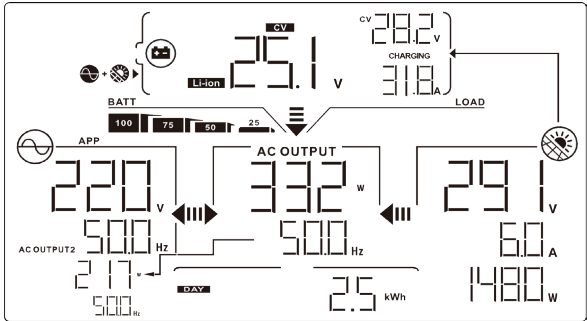
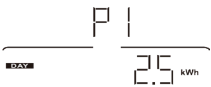
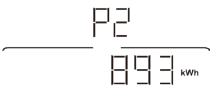
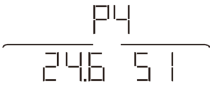


Figure 5-2 LCD display

The selectable information is switched as below

Table 5-6 LCD display information

LCD display	Information
P1 	Display the daily power generation from solar.
P2 	Display total power generation from solar.
P3 	Display lithium battery voltage and current. Display ERR when BMS communication fails. If BMS function is disabled, the page will not display.

LCD display	Information
	Display lithium battery temperature and SOC. Display ERR when BMS communication fails. If BMS function is disabled , the page will not display.
	Display lithium battery rated capacity and remaining capacity. Display ERR when BMS communication fails. If BMS function is disabled , the page will not display.
	Display lithium battery maximum charging voltage and minimum discharging voltage. Display ERR when BMS communication fails. If BMS function is disabled , the page will not display.
	Display lithium battery maximum charging current and minimum discharging current. Display ERR when BMS communication fails. If BMS function is disabled , the page will not display.
	Display lithium battery alarm and fault information. Display ERR when BMS communication fails. If BMS function is disabled , the page will not display.
	Display inverter firmware version.

6 Fault Reference Code

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.

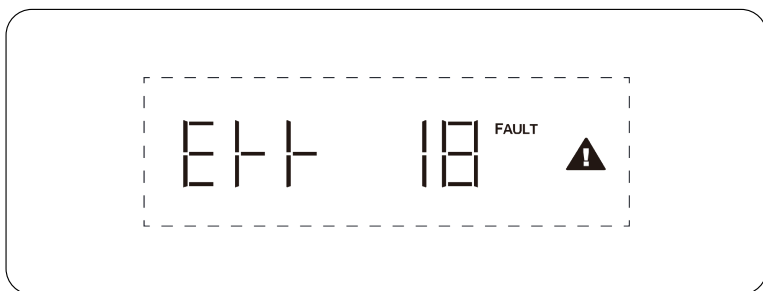


Figure 6-1 Fault display

Table 6-7 Fault code sheet

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions
1	Grid soft start failed	Turn fault mode	Grid soft start process starts but bus voltage does not reach set value.	Restore after reaching the set voltage for 15 minutes.
2	Bus over voltage	Turn fault mode	Bus voltage is higher than set value	Restore after reaching the set voltage for 15 minutes.
3	Bus below voltage	Turn fault mode	Bus voltage is lower than set value	Cannot restore
4	Battery over current	Turn fault mode	Battery current is higher than set value	Cannot restore
5	System over temperature	Turn fault mode	PFC temperature is higher than set value or fan is not connected	Restore after temperature lower than set value and fan connected for 15 minutes
6	Battery over voltage	Turn fault mode	Battery voltage is higher than set value	Restore after reaching the set voltage for 15 minutes

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions
7	Bus soft start failed	Turn fault mode	Battery soft start process starts but the bus voltage has not reached set value	Restore after reaching the set voltage for 15 minutes
8	Bus short circuit	Turn fault mode	Bus voltage is lower than set value	Cannot restore
9	Inverter soft start failed	Turn fault mode	Inverter soft start process starts but the inverter voltage has not reached set value	Restore after reaching the set voltage for 15 seconds
11	Inverter under voltage	Turn fault mode	The inverter voltage is lower than the set value in battery mode	Restore after reaching the set voltage for 15 seconds
12	Inverter short circuit	Turn fault mode	Inverter voltage is less than set value and current is higher than the set value	Restore after reaching the set value for 15 seconds
13	Inverter negative power	Turn fault mode	The inverter power is negative and exceeds the set value for a period of time	Restore after reaching the set value for 15 seconds
14	Over load	Turn fault mode	The load current is higher than the set value	Restore after reaching the set value for 15 seconds
17	Program updating	Turn fault mode	Inverter updating or OTA	Restore after updating
18	Program updating	Turn fault mode	PV reverse connection	Restore after connecting correctly for 15 seconds
26	BMS fault	Turn fault mode	Error code in BMS	Restore after BMS fault resolved
29	Inverter load abnormal	Turn fault mode	Abnormal inverter load leads to abnormal voltage	Restore after voltage returning normal for 15 seconds

7 Alarm Reference Code

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

Table 7-1 Alarm code sheet

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions
50	Battery open	Alarm	Battery disconnected for no more than 10 minutes	Restore after battery connected and charging for 2 minutes
51	Battery under voltage	Alarm, battery low voltage shutdown or cannot power on	Battery voltage is lower than BAU set value	Restore after the battery voltage exceeding the BAU set value by 2 V
52	Battery low voltage	Alarm	Battery voltage is lower than BAL set value	Restore after the battery voltage exceeding the BAL set value by 2 V.
53	Battery charge short circuit	Alarm, battery does not charge	The battery voltage is less than 20 V and the charging current is higher than 4 A.	Cannot restore
56	BMS loss	Alarm	Communication failure after BMS communication function is enable	Restore after communication function disabled or communication success
58	Fan error	Alarm, fan operation in full speed	No fan speed signal detected	Restore after fan speed signal detected
59	EEPROM	Alarm	EEPROM read/write exception	Can restore
60	Overload	Alarm	Output load is higher than 6kW or battery current is higher than MDC value (Item 61 Battery Max. Discharge Current)	Restore after load is lower than 6kW and battery current is lower than MDC

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions
62	PV energy weak	Alarm, Turn off the PV output to the load, but keep the PV charging the battery	When the battery is not connected, the bus voltage is lower than the set value	Restore after battery connected or grid connected or bus voltage higher than set value for 10minutes
68	Battery under SOC	Alarm, turn to stand by mode	BMS reports SOC lower than BSU set value	Restore after meeting one of the following three conditions: 1. Disable low SOC shutdown function 2. Disable BMS communication function 3.SOC is higher than the set value by 5%
69	Battery below	Alarm, if it is in standby mode, it will remain in standby mode.	Lithium battery SOC is lower than set value +5% (grid mode or battery mode), lower than set value +10% (standby mode)	Restore after meeting one of the following three conditions: 1. Disable low SOC shutdown function 2. Disable BMS communication function 3.SOC is higher than the set value by 10%"
72	Battery can not startup	Alarm	During standby, battery voltage is lower than the allowed startup voltage	Restore after the battery voltage is higher than the allowed startup voltage

8 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.



NOTICE

Do not activate this mode when using lithium batteries.

How to Apply Equalization Function

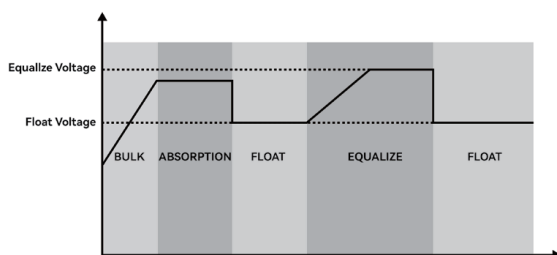
You must enable battery equalization function in monitoring LCD setting Program 29 first.

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

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

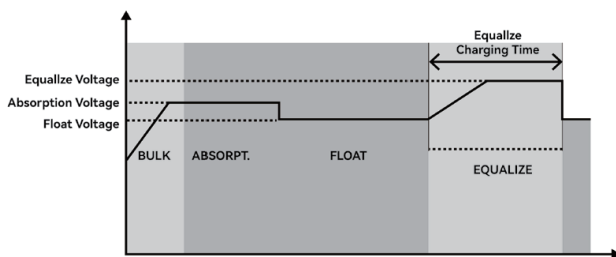
When to Equalize

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.

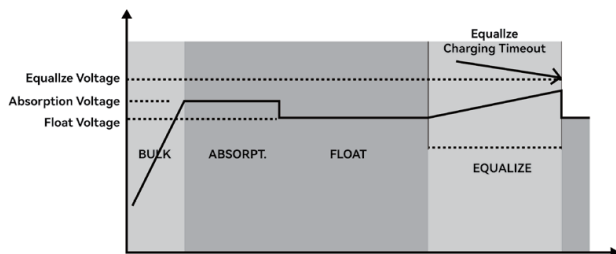


Equalize charging time and timeout

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 remain in the Equalize stage until setting battery zed time is arrived.



However, in Equalize stage, when battery equalized time is expired and battery voltage does not 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 timeout setting is over, the charge controller will stop equalization and return to float stage.



9 Specifications

9.1 Line Specifications

- Input Voltage

Model	OG-1P5K-24
Main topology	L + N + PE
Nominal voltage [Vac]	208 / 220 / 230 240
Input Voltage Range [Vac]	90 ~ 280
Input Low Loss [Vac]	154 (default) Settable: 90 ~ 154 (APP mode)
	185 (default) Settable: 170 ~ 200 (UPS mode)
Input Low Comeback [V]	Low Loss voltage + 9
Input High Loss [Vac]	264 (default) Settable: 264 ~ 280
	264
Input High Comeback [V]	Low Loss voltage - 9

- Input Frequency

Model	OG-1P5K-24
Nominal Frequency [Hz]	50 / 60
Frequency Range [Hz]	40 / 70
Freq. Low loss / Comeback [Hz]	40 / 43.5 @ 50 Hz (UPS mode)
	40 / 40.5 @ 50 Hz (APP mode)
	50 / 53.5 @ 60 Hz (UPS mode)
	50 / 50.5 @ 60 Hz (APP mode)
Freq. High loss / Comeback [Hz]	60 / 56.5 @ 50 Hz (UPS mode)
	70 / 69.5 @ 50 Hz (APP mode)
	70 / 66.5 @ 60 Hz (UPS mode)
	70 / 69.5 @ 60 Hz (APP mode)

- Input Current

Model	OG-1P5K-24
Max. Current (RMS) [A]	40

9.2 Battery Specifications

- Battery Information

Model	OG-1P5K-24
Battery Pieces [pcs]	2
Auto Restart Function	Yes
Battery test function	No
Battery type	VRLA / LI
Nominal Battery voltage [V]	N * 12
Battery management	Yes

- Battery Protection

Model	OG-1P5K-24
Battery over Voltage [V]	30.5
Battery under voltage [V]	10.5 * N
Battery low voltage alarm [V]	10.8 * N
Over current protection	Fuse

9.3 Charger Specifications

- Charger (line mode)

Model	OG-1P5K-24
Charging voltage [V]	FV MODE: 27
	Settable: 26.6 ~ 27.8
	CV MODE: 28.2
	Settable: 28 ~ 29
	N * 12
Temperature Compensation	Yes
Charging Current [A]	2 ~ 160
Default Charging Current	80
Charging mode	Two / Three / Auto Settable
Charge Voltage Accuracy	± 5%

- Charger (PV)

Model	OG-1P5K-24
PV Charging method	MPPT
PV Maximum Input Power [W]	9000
PV Maximum Input Current [A]	27
Efficiency	99.5% max
Battery Voltage Accuracy	± 0.3%
PV Voltage Accuracy [V]	± 2
MPPT [Vdc]	60 ~ 450
Max. PV voltage [Vdc]	500
Max. PV charge current [A]	160A
Max. Charging Current [A]	160A

9.4 Output Specifications

- Output Power Rating

Model	OG-1P5K-24
Output topology	L1 + N1 + L2 + N2 + PE
Output power [W]	5000

- Output Voltage

Model	OG-1P5K-24
Nominal Voltage [Vac]	208 / 220 / 230 / 240
Waveform	Pure Sine Wave
Voltage Regulation	± 5%
DC offset [mV]	± 200

- Output Frequency

Model	OG-1P5K-24
Nominal Frequency [Hz]	50 / 60
Line Mode	50 Hz: (43.5 ~ 56.5) Hz (UPS mode) (40 ~ 70) Hz (APP mode)
	60 Hz: (53.5 ~ 66.5) Hz (UPS mode) (40 ~ 70) Hz (APP mode)
Battery Mode	50 / 60
Frequency regulation	0.1%

- Charge (PV)

Model	OG-1P5K-24
Overload Protection	51min@102%< Load ≤110%
	10s@110%< Load ≤130%
	3s@130%< Load ≤150%
	200ms@Load >150%

- Output Short Circuit Protection

Model	OG-1P5K-24
Battery Mode	Current limitation
Line mode	Breaker (40 A)

9.5 Switch Time Specifications

- Switch Time

Model	OG-1P5K-24
Line Mode To Battery Mode [ms]	10

9.6 Efficiency Specifications

- Efficiency

Model	OG-1P5K-24
Line Mode	> 99.5% @6 Kva
Battery Mode	> 93.5%(Max)
Standby power [W]	< 35

10 Troubleshooting

Problem	Fault Event	Trigger conditions	What to do
LED screen display fault code 5	Overtemperature	1. PFC temperature exceeds the protection threshold for more than 20 seconds. 2. Alarm 58 lasts for 5 seconds	Please check if the fan is not connected or if there are loose wiring issues. If the fan is not connected for more than 5 minutes, the machine will report fault code 5.
LED screen display fault code 12	Inverter short circuit	In battery mode or standby mode, if the inverter voltage is lower than 80V and the inverter current is greater than 30A, it should respond within 100–120 ms	1. Check if there is a short circuit at the output terminals (such as a screw piercing through the locking terminal causing a L/N short circuit). 2. Verify if the inverter voltage and inverter current meet the triggering conditions.
LED screen display fault code 58	Fan malfunction	Any of the fans rotating less than 8 times within 2 seconds.	1. Check if the fan is not connected properly or if there are any loose connections. 2. If the fan is properly connected: a) Check if there is any issue with the fan detection circuit, usually caused by excessive soldering underneath the control board socket. b) Check if the fan itself is damaged.

Problem	Fault Event	Trigger conditions	What to do
Unable to start	Battery	Due to the need for a voltage of $\geq 11.5V/N$ to start the machine in battery mode, common reasons for failure to start include improper calibration or insufficient battery voltage.	1. Check if the battery voltage sampling is functioning properly and if the battery voltage has been calibrated. 2. Use a multimeter to measure the voltage at the battery terminals (using a DC power supply or a real battery) to see if it reaches the minimum voltage of 11.5V per cell for startup. Note: It is crucial to configure the battery voltage according to the machine model. Connecting the wrong battery voltage can cause capacitor explosion.
	Utility power	-	1. Check for any short circuits at the mains terminal (such as a screw piercing through and causing a short circuit between the live and neutral terminals). 2. Check if there are any wiring errors, such as mistakenly connecting the mains input to the output terminals.
Unable to start	PV		1. Check if the PV input voltage is too close to the critical threshold. 2. For low voltage versions of the machine, check if the software version numbers of the main control is compatible. If the software versions differ significantly the machine may not be activated.

Problem	Fault Event	Trigger conditions	What to do
PV not charging			Connecting the wrong battery voltage can result in damage to the auxiliary power supply on the PV side, causing a loss of power and inability to communicate with the main control.