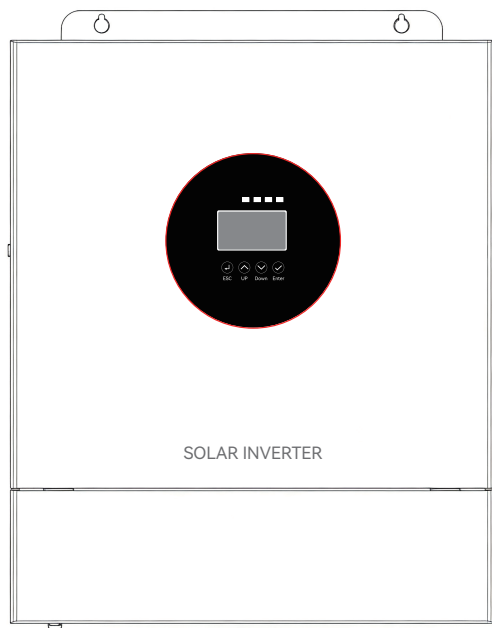




SUNWAYS UMX III 2.2 KVA PRO Solar inverter

User Manual

● Please read this user manual carefully before installation and use.

State

● Unauthorized reproduction and plagiarism are prohibited. ● This information is subject to change without notice.

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1.Information on this Manua

1.1 Validity

This manual is valid for the following devices:
2.2KVA 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 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.
 CAUTION !	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.

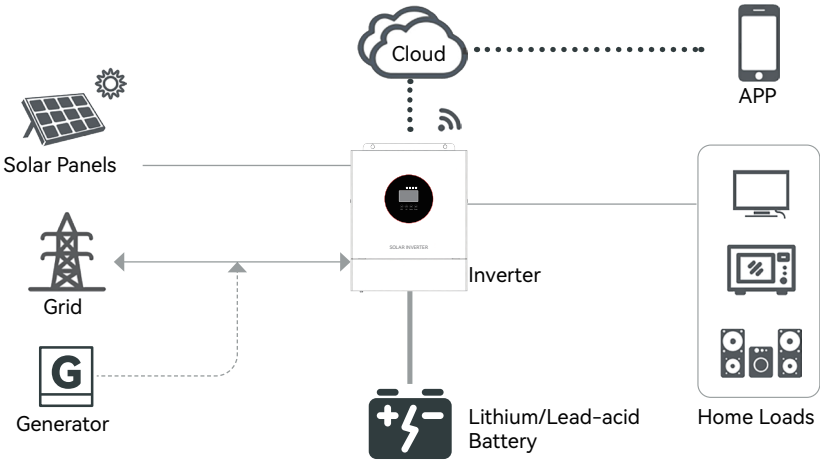
1.5 Safety Instructions



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

- 01.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't work normally.
- 02.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.
- 03.All the operation and connection please professional electrical or mechanical engineer.
- 04.All the electrical installation must comply with the local electrical safety standards.
- 05.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.
- 06.CAUTION - 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.
- 07.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.
- 08.To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning.Turning off the unit will not reduce this risk.
- 09.NEVER charge a frozen battery.
- 10.For optimum operation of this inverter, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter.
- 11.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.
- 12.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.
- 13.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.
- 14.NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
- 15.Make sure the inverter is completely assembled, before the operation.

2.Introduction



Hybrid Solar Energy Storage System

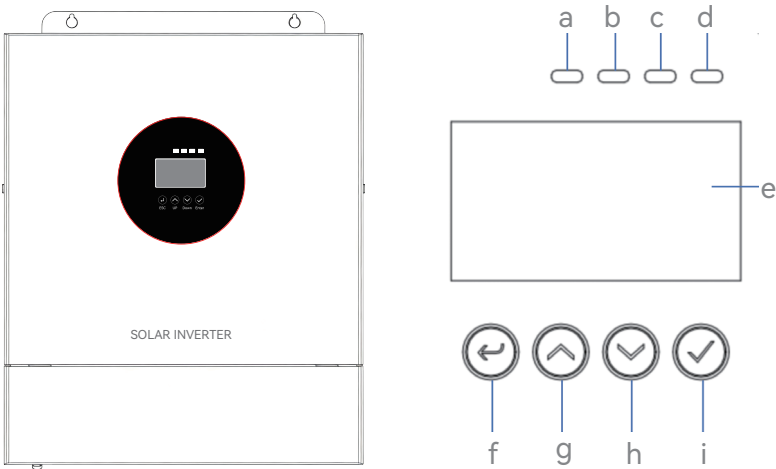
This is a multifunctional solar inverter, integrated with a MPPT solar charge controller, a high frequency pure sine wave inverter and a UPS function module in one machine, which is perfect for off grid backup power and self-consumption applications. This inverter can work with or without batteries.

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.

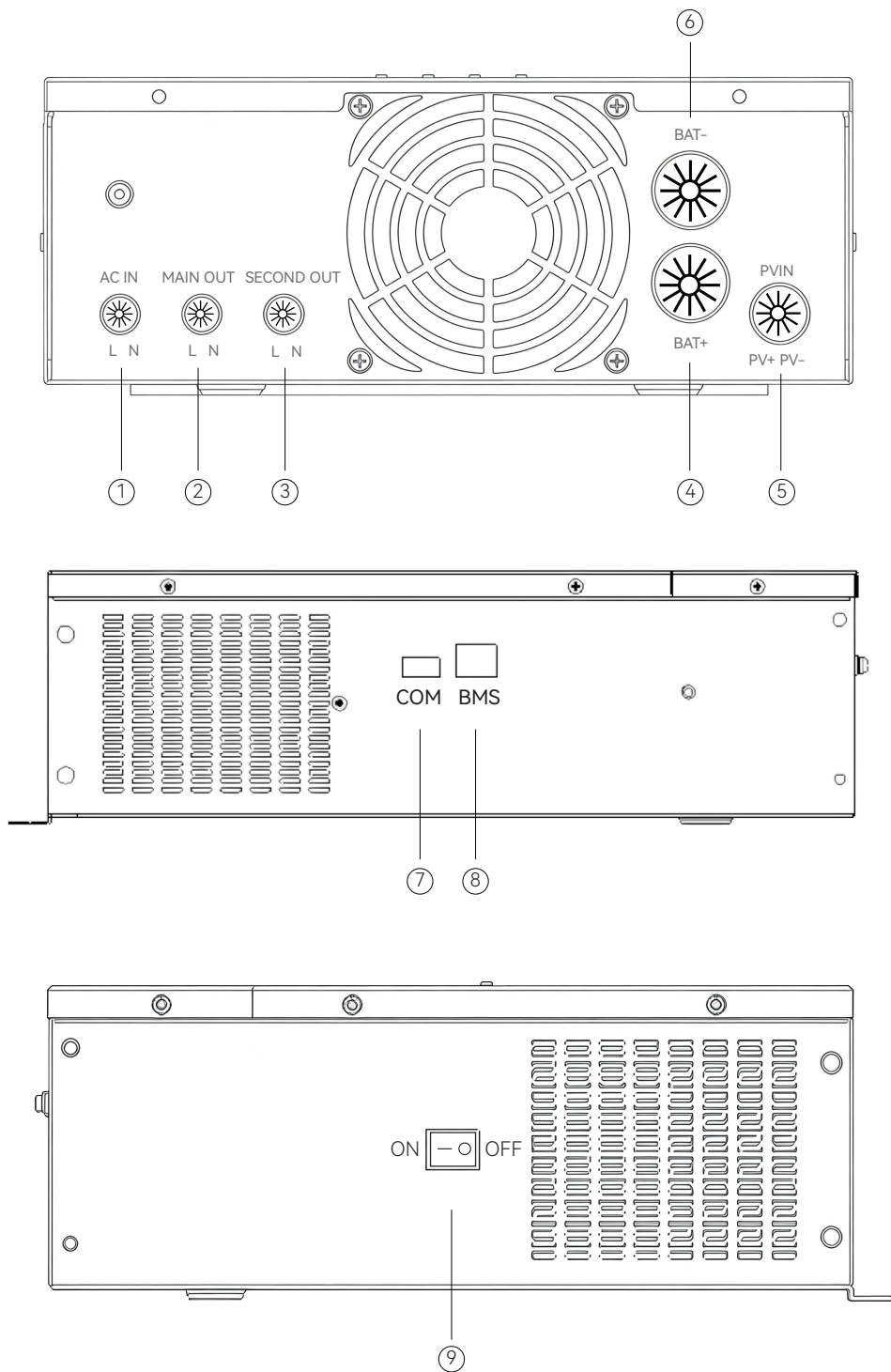
2.1 Features

- Rated power 2.2KVA, power factor 1
- MPPT ranges 30V~400V, 450Vdc
- High frequency inverter with small size and light weight
- Pure sine wave AC output
- Solar and utility grid can power loads at the same time
- With CAN/RS485 for BMS communication
- With the ability to work without battery
- WIFI/ GPRS remote monitoring (optional)

2.2 Product Overview



- | | | |
|----------------------|-------------------|----------------|
| a AC Indicator | d Fault Indicator | g Up Button |
| b Invert indicator | e LCD Display | h Down Button |
| c Charging Indicator | f ESC Button | i Enter Button |



- | | |
|---------------------------------------|--|
| 1 AC Input | 7 WiFi/GPRS Communication Port |
| 2 MAIN OUT | 8 BMS Communication Port
(Support CAN/RS485 Protocol) |
| 3 SECOND OUT | 9 Power On/Off Switch |
| 4 Positive terminal for battery input | |
| 5 PV Input | |
| 6 Negative terminal for battery input | |

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.

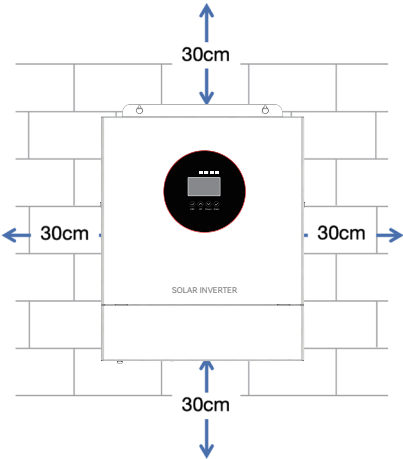
3.1.2 Installation Tools

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
			

3.1.3 Packing List

No.	Item	Quantity	Description	
1	Inverter	1		
2	User manual	1	English	
3	Expansion Screw	2	M6*50	

3.2 Mounting Unit



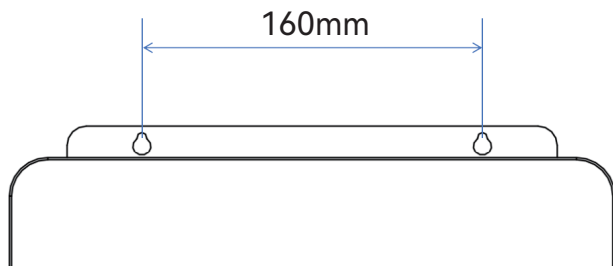
- Consider the following points before selecting where to install:
- Do not mount the inverter on flammable construction materials.
 - Mount on a solid surface.
 - Install this inverter at eye level in order to allow the LCD display to be read at all times.
 - The ambient temperature should be between -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 heat dissipation and to have enough space for removing wires.



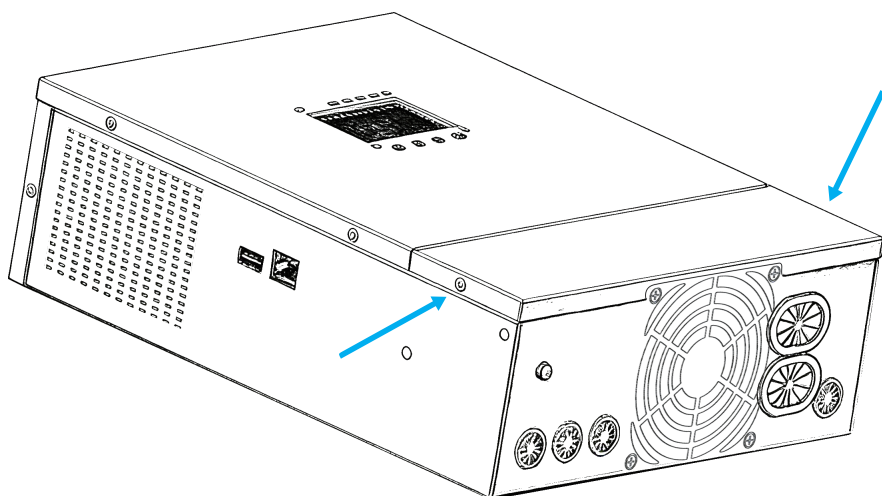
WARNING!
Inverter is suitable for mounting on concrete or other non-combustible surface only.

Follow the installation steps:

1. Use $\phi 8$ drilling bit drill holes on the mounting surface. The distance between 2 holes is 200mm. Then insert the expansion screw(M6). The expansion screw*2 are in packing.



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



3.3 AC Input / Output Connection

	CAUTION! Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 20A for 2000VA inverter.
	CAUTION! There are three terminals marked with "AC IN" and "MAIN OUT" and "SECOND OUT".Please do NOT mis-connect input and output connectors
	CAUTION! 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.
	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

Model	Gauge	Cable (mm²)
2.2KVA-EU PRO Inverter	14 AWG	2.075

	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 output wires

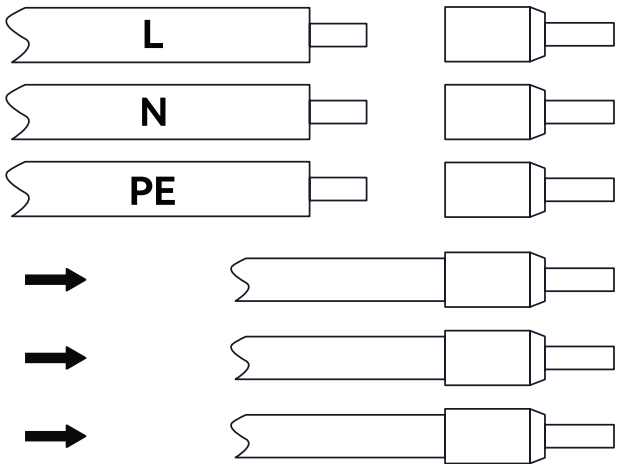
Model	Gauge	Cable (mm²)
2.2KVA-EU PRO Inverter	14 AWG	2.075



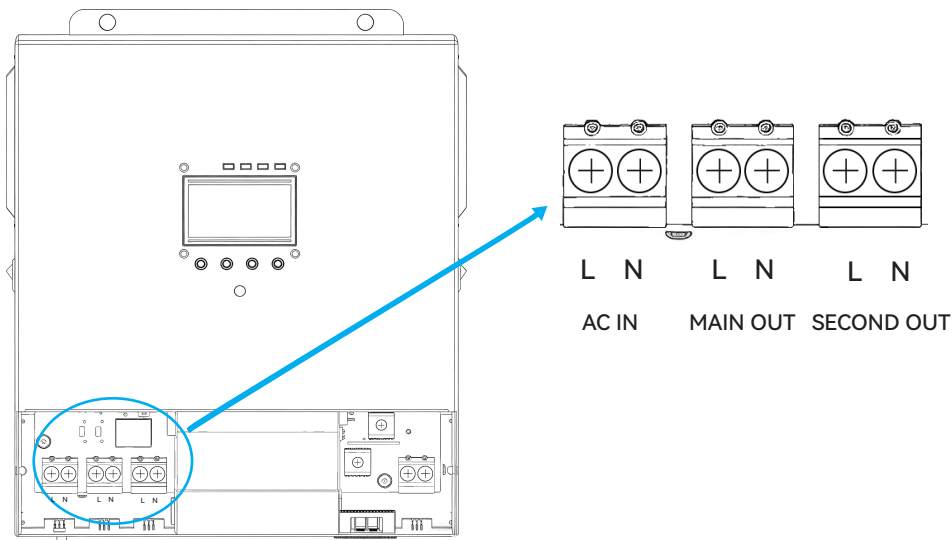
WARNING!
Make sure AC power is disconnected before attempting to connect AC power to the unit.
All operations during the electrical connection process, as well as the specifications of cables and components used, must comply with local laws and regulations. The cable color mentioned below is for typical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

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

1. Before making AC connection, be sure to open AC circuit breaker first.
2. Remove insulation sleeve 12mm 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



3. Insert AC input/output cables according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective cable first.
PE→ Protecting Earth (yellow-green)
L → LINE (brown or black)
N → Neutral (blue)



4. 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 off grid solar inverter will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air condition.

3.4 PV Connection

	CAUTION! Before connecting to PV modules, please install a separate DC circuit breaker between inverter and PV modules.
	WARNING! Do not ground the positive or negative terminals of the PV modules, as this can severely damage the inverter.
	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.

Model	Gauge	Cable (mm ²)
2.2KVA-EU PRO Inverter	12 AWG	4

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

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

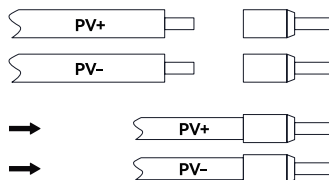
Inverter Model	2.2KVA-EU PRO Inverter
Max. PV Array Open Circuit Voltage	450Vdc
Start-up Voltage	60Vdc
PV Array MPPT Voltage Range	30Vdc~400Vdc

**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:

1. Before making PV connection, be sure to open DC circuit breaker first.
2. Remove insulation sleeve 12mm 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

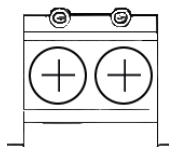
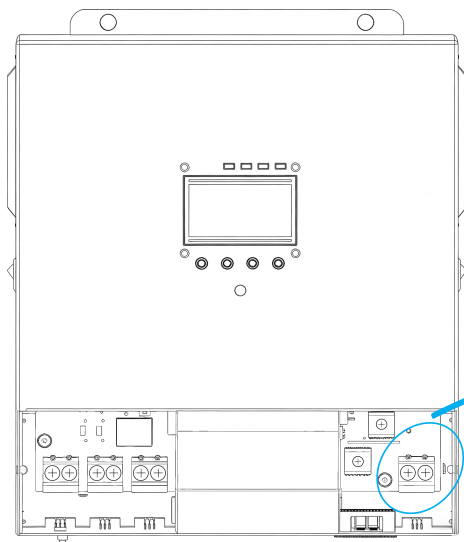


3. Use multi-meter check to ensure the polarities are correct.

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

+ → PV+ (red)

- → PV- (black)



PV+ PV-
PV INPUT

5. Make sure the cables are securely connected.

3.5 Battery Connection

3.5.1 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)'

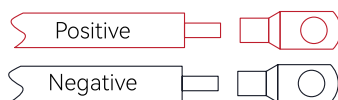
	CAUTION! For safety operation and regulation compliance, it' s requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it' s still requested to have over-current protection installed. The recommended size of protector or disconnect is 200A.
	WARNING! All wiring must be performed by a qualified person.
	WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below. The cable color mentioned below is for typical reference.
	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.

Recommended battery cable and terminal size:

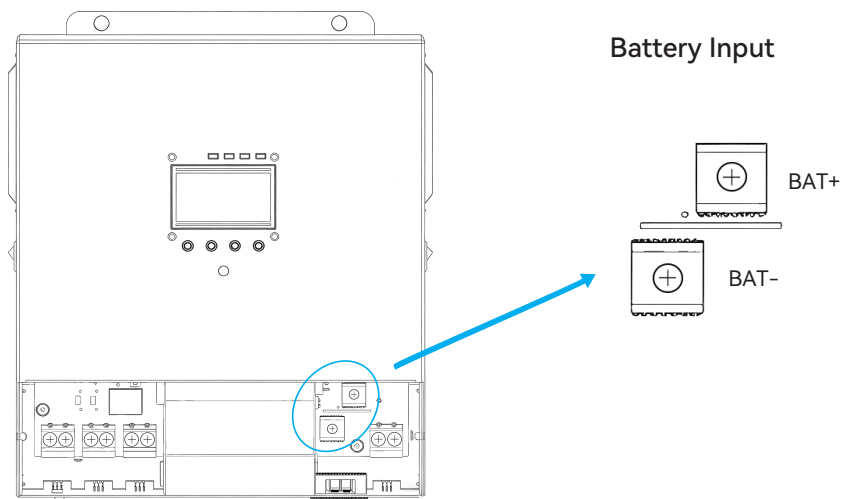
Model	Gauge	Cable (mm ²)
2.2KVA-EU PRO Inverter	4 AWG	25

Note: For lead acid battery, the recommended charge current is 0.3C (C=battery capacity)
Please follow below steps to implement battery connection:

1. Unscrew the pre-fixed screws on battery poles. Prepare 2 DT terminals(It should fit for AWG2 cables).
2. Remove insulation sleeve 12mm 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



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 and the inverter/charge is correctly connected and DT terminals are tightly screwed to the battery terminals.



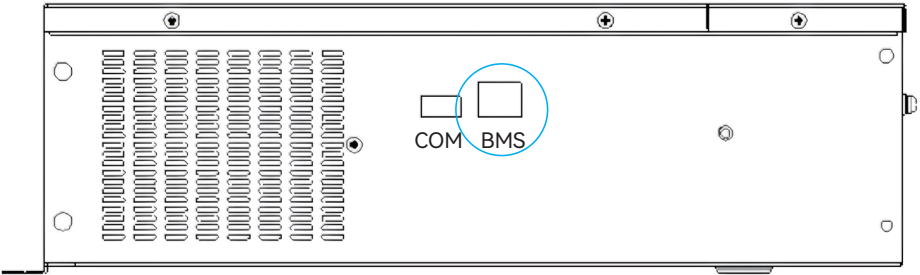
4. Connect all battery packs as units requires. It' s suggested to connect at least 200Ah capacity batter

	WARNING! Shock Hazard Installation must be performed with care due to high battery voltage in series.
	CAUTION! Do not place anything between the flat part of the inverter terminal and the DT terminal. Otherwise, overheating may occur.
	CAUTION! Do not apply anti-oxidant substance on the terminals before terminals are connected tightly.
	CAUTION! Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

3.5.2 Lithium Battery Connection

If choosing lithium battery for inverter, Please check the compatibility of the protocol first. There're two connectors on the lithium battery, RJ45 port of BMS and power cable. Please follow below steps to implement lithium battery connection:

1. Follow section 3.5.1 to implement the power cable connection.
2. Connect RJ45 terminal of battery communication cable to BMS communication port of inverter. The communication protocol should be RS485 or CAN.



3. Insert the other end of RJ45 (battery communication cable) to battery communication port of lithium battery. Note: If choosing lithium battery, make sure to connect 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 Section

4.2.2 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:

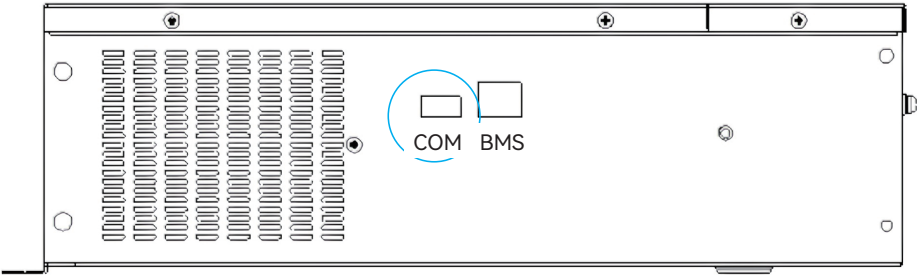
Pin number	BMS port
1	RS485B
2	RS485A
3	-
4	CANH
5	CANL
6	-
7	-
8	-

3.6 Final Assembly

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

3.7 Smart Communication Stick Connection(Optional)

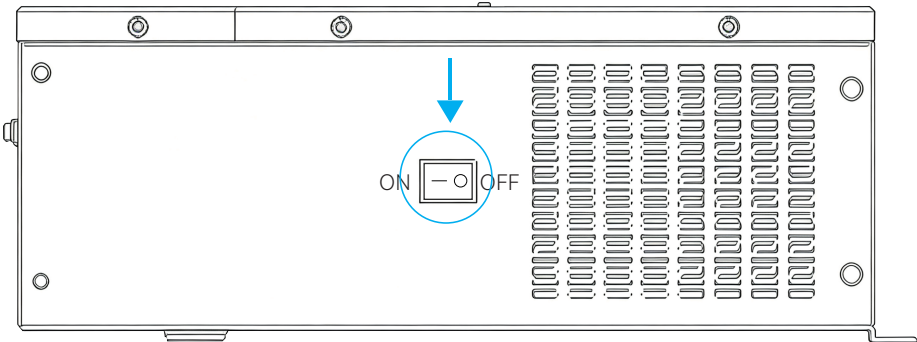
The smart communication stick is used to connect to the cloud platform. Please insert the stick into COM port directly.



4. Operation

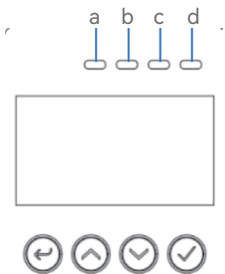
4.1 Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press ON/OFF switch (located on the button of the case) to turn on the unit.



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.



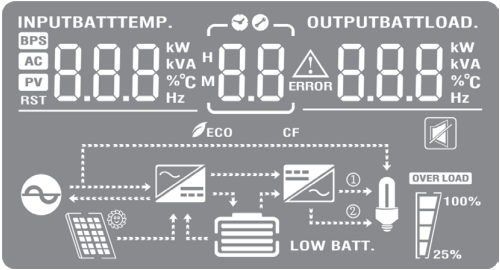
LED Indicator			Messages
a AC	Status indicator (Green)	Solid On	The mains power is normal and enters the mains power operation.
		Flashing	The mains power is normal, but it has not entered mains power operation.
		Off	The mains power is abnormal.
b Inverter	Invert indicator (Yellow)	Solid On	Output is 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.



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.
	Indicate power saving mode.

For Lead-acid battery, detailed description of battery icon as following:

In battery mode, battery icon will present Battery Capacity		
SOC Percentage	Battery Cell Voltage	Display
SOC >50%	< 11.146V	
	11.146V ~ 11.685V	
	11.685V ~ 12.224V	
	> 12.224V	
50%> SOC > 20%	< 11.795V	
	11.795V ~ 12.334V	
	12.334 ~ 12.873V	
	> 12.873V	
SOC < 20%	< 12.12V	
	12.12V ~ 12.659V	
	12.659V ~ 13.198V	
	> 13.198V	

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	OPV 01 230.	
		230V (default) Adjustable/settable value: 208V, 220V, 230V, 240V	
02	Output frequency	OPF 02 50.	
		50Hz(default) Adjustable/settable frequency 50Hz, 60Hz	
03	Output source priority	Solar first	OPP 03 PCB
		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 CPB
		Grid provides power to the loads as first priority. Solar power will charge the battery. If solar is not sufficient to charge battery, grid will charge the battery at the same time. If grid is not sufficient to power all connected loads, solar energy will supply power to the loads at the same time. If solar energy and grid are not sufficient, battery will supply power to the loads at same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	

03	Output source priority	PBG priority	OPP 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.	
		MKS Priority	OPP 03 nLS
04	Output mode	APP: Appliance (default)	nOd 04 APP
		Applied to household appliances	
		UPS	nOd 04 UPS
		Applied to computer and other devices. Typical switching time is 10ms.	
		GEN	nOd 04 GEN
05	Charger source priority	which is used for the situation where the generator is connected to the mains port. The typical switching time is 20ms.	
		PNG: PV and Grid (default)	CHP 05 PNG
		OPV: Only PV	CHP 05 OPV
		PV: PV first	CHP 05 PVF

05	Charger source priority	There are three charging priorities, the default is PNG (PV and Grid): PV and Grid charging at the same time; the second is OPV (Only PV): only photovoltaic charging; the third is PVF (PV First), PV charging when PV and Grid are present at the same time, PV charging when PV is present only, and Grid charging when Grid is present only.	
06	Grid charging current		
		RCC: Grid Charge Current, the maximum charging current of mains power is set to 20A by default. 2/10/20/30/40/50/60/70/80/90/100A optional;	
07	Maximum charging current		
		MCC: Maximum Charge Current, the maximum charging current refers to the maximum value of PV and mains charging current, and is set to 60A by default. 2/10/20/30/40/50/60/70/80/100A optional;	
08	Menu Default		
		The default setting is ON. When the function setting operation is set to ON, the page is not in the first interface (P1) and returns to the first interface after 1min; if the setting is OFF, if the page is not in the first interface (P1), the LCD will remain in this interface.	
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	PWS 12 ON
		PWS: Power Saving The default setting is OFF, and the function is not enabled; when the setting is ON, in battery mode, if the load is less than 25W, the system will stop output briefly and then continue output. If the load is higher than 35W, the system will resume continuous normal output.
13	Overload transfer to bypass	OLC 13 OFF
		The default setting is OFF. When set to ON, in the case of PV 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	MBE 14 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 .
15	Battery return to mains voltage point (BTG)	BTC 15 11.5
		When the battery definition mode is AGM (lead-acid battery type) or FLD (water-registered battery type) mode: The default setting is 11.5V, and the range can be set to [11,13]
		When the battery definition mode is LIB (lithium battery type) or CUS (customer setting type) mode: The default setting is 11.9V, and the range can be set to [10,12.5]
		When the battery definition mode is FEL (lithium iron battery type) mode: The default setting is 12.4V, and the range can be set to [10,12.5]
		BTC 16 13.0
		When set to FUL, the battery will be charged until full power is reached before the battery mode is turned on again.

16	Switching back to battery mode voltage points	When the battery definition mode is AGM (lead-acid battery type) or FLD (water-activated battery type): The default setting is 13V and the range can be set to [12,14.5] (the same logic)	
		When the battery definition mode is LIB (lithium battery type) and CUS (customer setting type) mode: The default setting is 13.6V, and the range can be set to [11.5,14.5] (the same logic as above)	
		When the battery definition mode is FEL (lithium iron battery type) mode: The default setting is 13.6V, and the range can be set to [11.5,14.5] (the same logic as above)	
17	Battery type	AGM	BAT 17 AGM
		Flooded	BAT 17 FLD
		Lithium (default)	BAT 17 LIB
		User-Defined	BAT 17 CUS
		FEL	BAT 17 FEL
18	Battery low voltage point	BAL 18 11.0	
		The battery definition mode cannot be set when the mode is AGM (lead-acid battery type) or FLD (water-adding battery type). The default setting is 11V	
		When the battery type is set to LIB (lithium battery type), the low voltage point of the battery can be modified, The default setting is 11.9V and the range can be set to [10.3,12.5]	
		When the battery type is set to FEL (iron lithium battery type), the low voltage point of the battery can be modified, The default setting is 12V and the range can be set to [10.3,12.5]	

		When the battery type is set to CUS (customer setting type), the battery low point can be modified, The default setting is 11.9V, and the range can be set to [10.3,12.5]
19	Battery shutdown voltage point	BAU 19 10.5 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 10.5V. When the battery type is set to LIB/CUS , the battery shutdown point can be modified.The default setting is 11.5V, and the adjustable range is [10,12V]. When the battery type is set to FEL (iron lithium battery type), you can modify the battery shutdown point. The default setting is 10.5V and the setting range is [10,12]
20	Constant voltage mode voltage point setting	BCV 20 14.1 bCV:battery Constant Voltage The battery definition mode cannot be set when it is defined as AGM (lead-acid battery type) or FLD (water injection battery type). The default is set to 14.1V (AGM) and 14.5V (FLD) When the battery type is set to LIB (lithium battery type) or CUS (customer setting type), the constant voltage charging point can be modified. The default setting is 14.1, and the range can be set to [12,15]. The constant voltage point voltage needs to be greater than the float charge point voltage. When the battery type is set to FEL (iron lithium battery type), the constant voltage charging point can be modified. The default setting is 13.8, and the range can be set to [12,15]. The constant voltage point voltage needs to be greater than the float charge point voltage.

21	Floating charge mode voltage point setting	bFL 2* 13.5
		The battery definition mode cannot be set when the mode is AGM (lead-acid battery type) or FLD (water-adding battery type) The initial default is 13.5V When the battery type is set to LIB (lithium battery type), the constant voltage charging point can be modified. The default setting of 2k-VMH-12V is 13.8V, and the setting range is [12.5,14.5]. The constant voltage point voltage should be greater than the float charge point voltage. When the battery type is set to FEL (iron lithium battery type), the constant voltage charging point can be modified. The default setting of 2k-VMH-12V is 13.6V, and the range of setting is [12.5,14.5]. The constant voltage point voltage should be greater than the float charge point voltage. When the battery type is set to CUS (customer setting type), the constant voltage charging point can be modified. The default setting of 2k-VMH-12V is 13.8V, and the range can be set to [12,15]. The constant voltage point voltage should be greater than the float charge point voltage.
22	Grid low voltage point setting	LLV 22 154.
		LLV:Line Low Voltage In the inverter mode (output mode: MOD needs to be set to APP/GEN), the low voltage point of the mains power is set by default to 154V, and the setting range is [90,154]. (Output mode: MOD needs to be set to UPS), the low voltage point of the mains power is set by default to 185V, and the setting range is [170,200].
23	Grid high voltage point setting	LHV 23 264.
		LHV:Line High Voltage In the inverter mode (output mode: MOD needs to be set as APP/GEN), the high voltage point of the mains is set by default to 264V, and the range can be set to [264,280].

24	Automatic screen off Settings	ALB 24 OFF
		Function description: Automatic screen off is the automatic backlight off setting. Setting conditions: All states of the inverter can be set in APP mode. Note: After opening, the backlight will automatically turn off after 10 minutes without button operation, and the default is OFF.
25	Inverter soft start setting	STE 25 OFF
		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 mode setting	n00 27 S16
		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	Equalized voltage point setting	E90 31 14.0
		All modes can be set. When the battery type is set to FEL (iron lithium battery type), The default setting is 14V, and the setting range is [12,15]; When the battery type is AGM (lead-acid battery type), FLD (water injection battery type), LIB (lithium battery type), CUS (customer setting type), The default setting is 14.6V, and the range can be set as [12,15];
30	Equalization Charging Time Setting	E90 32 60
		During the equalization stage, the controller will charge the battery as much as possible until the battery voltage rises to the battery equalization voltage. Then, it will adopt constant voltage regulation to maintain the battery voltage. The battery will remain in the equalization stage until the set battery equalization time is reached. The default setting is 60 minutes, with a configurable range of [5, 900], and an increment of 5 minutes for each setting. When the setting is OFF, the balanced charging will not be entered
31	Equalization Delay Time setting	E90 33 120
		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. When the setting is OFF, no equalization delay is performed.

32	Equalization Interval Time Setting	E9I 34 30
		When the float charging stage is detected when the battery is connected under the balanced mode, the controller will enter the balanced stage when the set balanced interval (battery balanced cycle) is reached. The default setting is 30 days, the range of setting is [1,90], and the increment of each setting is 1 day.
33	Enable Equalization Immediately	E9n 35 OFF
		The default setting is OFF, the function is not turned on; when it is set tooN, 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.
34	Grid-tie inverter function	GEI 36 OFF
35	Maximum grid-connected power	GEp 37 20
36	Battery dual output low voltage shutdown point	dbV 38 12
		The default setting is 48V, and the range can be set to [11,15] Set the point higher than the constant voltage charging (CV) point-1V/ section, and use the constant voltage charging point as the recovery voltage. * This function needs to be used with the dual-output auxiliary board.
37	Battery dual output duration	dbt 39 OFF
		The default setting is OFF, and the function is not enabled. The range of setting can be [5,900], and the unit is minutes. When set to FUL, the output time of the secondary path is not limited. * This function needs to be used with the dual-output auxiliary board.

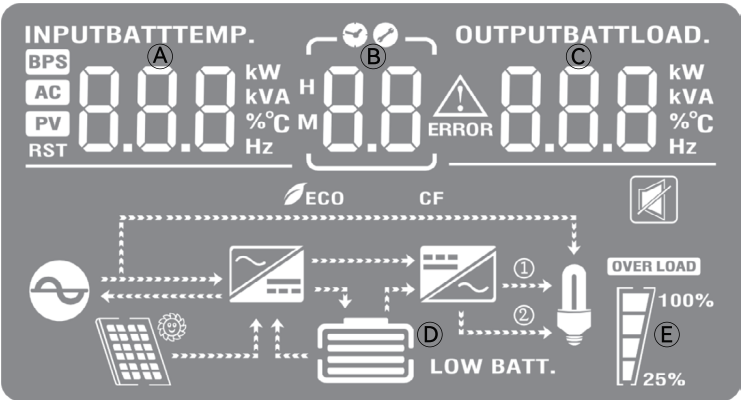
38	Battery dual output low SOC shutdown point	db5 40 20
		Function description: When turned on, the inverter sub-output is turned on by default. After entering battery mode, when the battery SOC is lower than the set point, the sub-output is turned off. When the battery voltage is higher than the set value + 5%, the sub-output is turned on. setting conditions. All states can be set. The default setting is 20, and the range can be set to OFF and [5,90] When set to OFF, this product will not trigger this function. * This function needs to be used with the dual-output auxiliary board.
39	BMS communication Function	bn5 44 OFF
		The default setting is OFF, and the function is not enabled; when the setting is ON, the inverter communicates with the lithium battery BMS through the central control board and obtains the battery information. After the function is enabled, if communication exception occurs, alarm 56 will be generated, and the inverter will no longer determine the operation logic according to BMS information. This function needs to be used with the central control board. The default setting is OFF, and the function is not enabled. When the setting is a specific BMS protocol, the inverter communicates with the lithium battery BMS through the centralized control board and obtains the battery information. After the function is enabled, if a communication exception occurs, alarm 56 is generated, and the inverter no longer determines the operation logic according to BMS information. CVT: CVTE protocol PYL: PYLON protocol GRO: GROWATT protocol VOL: VOLTRONIC protocol IRF: Tower Agreement PAC: Peicheng Agreement
		bn1 45 AFD

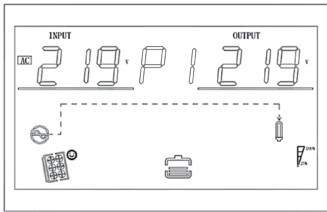
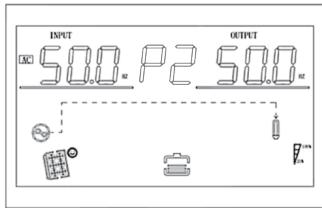
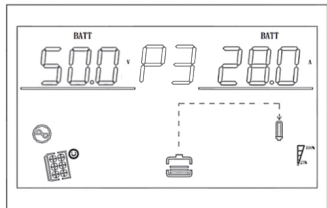
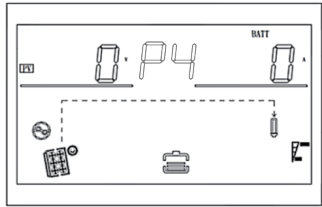
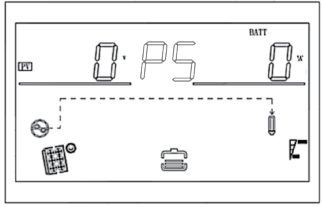
40	High SOC to Battery	The default setting is ATO (Auto), and the range can be set to [0,15]. When set to Auto, the system will automatically poll the BMS ID from small to large, When the system polls the first ID with a correct response, it locks the ID and asks only about the BMS of that ID. If the BMS is lost, the BMS ID will unlock and repoll the BMS ID
41	Low SOC shutdown	65U 46 20 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 + 1 0%. It can be set to oFF, in which case the inverter no longer performs shutdown, startup, oral arm 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.
42	High SOC to battery function	56b 47 90 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 these t value in normal grid mode, the inverter switches to battery mode. once enabled, the inverter wil l only switc ht o batter y 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.

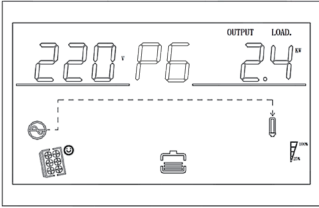
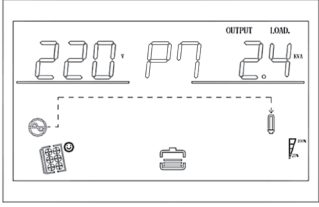
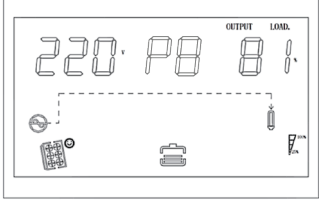
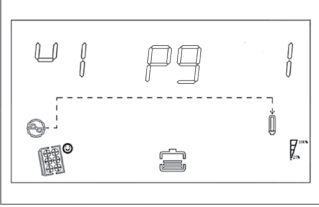
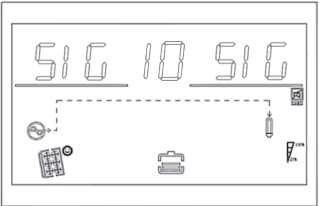
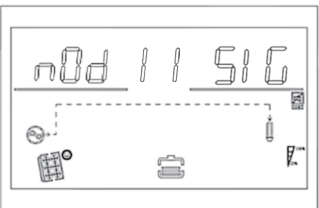
43	Low soc to Grid	STC 48 50
		The default setting is 50, with a range of [10,90]. When the lithium battery's SOC reaches the set value in normal battery mode, the PBG priority mode switches to the mains power mode. After activation, if the SOC falls below the set point or the battery voltage drops below the threshold for switching back to mains power, the inverter will switch to mains power 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 nformation 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.
44	Maximum discharge current function	ndC 6! OFF
		The default setting is OFF, the range can be set to [10,150] or OFF, and the step length is 5A. When the setting is OFF, the inverter does not limit the discharge current. When the setting is ON, when the discharge current exceeds the limit current, overload alarm 60 is reported. After continuous overcurrent reaches 5s, inverter reports overload fault 14 and enters the fault mode.

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.

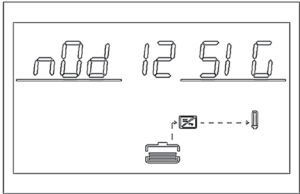


Information	LCD display
(A) AC Input voltage (B) Alarm or Fault code (Default Display Screen) (C) Output voltage (D) Battery capacity (E) Load percentage	
(A) AC Input frequency (B) Alarm or Fault code (C) Output frequency (D) Battery capacity (E) Load percentage	
(A) Battery voltage (B) Alarm or Fault code (C) Output current (D) Battery capacity (E) Load percentage	
(A) PV voltage (B) Alarm or Fault code (C) PV charging current (D) Battery capacity (E) Load percentage	
(A) PV voltage (B) Alarm or Fault code (C) PV power (D) Battery capacity (E) Load percentage	

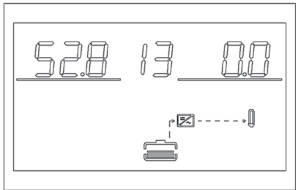
Ⓐ Output voltage Ⓑ Alarm or Fault code Ⓒ active power output Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ Output voltage Ⓑ Alarm or Fault code Ⓒ complex power output Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ Output voltage Ⓑ Alarm or Fault code Ⓒ load percentage Ⓓ Battery capacity Ⓔ Load percentage	
Display software version	
Display photovoltaic power generation	
parallel operation status display photovoltaic power generation	

After enabling BMS, the following pages are available

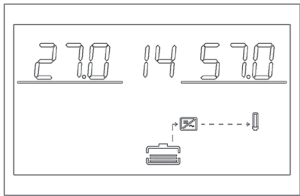
Network status of lithium battery
When the upper right display shows SIG constant, the battery pack is operating as a single group; When it shows PAR constant, the battery pack is operating in multiple groups in series and parallel; When it flashes PAR, the battery pack is establishing a state of multiple groups in series and parallel



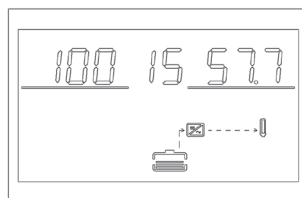
Lithium battery voltage and current information; The upper left displays BMS battery voltage information; The upper right displays BMS battery current information. When BMS communication fails, both the upper left and upper right displays will flash ERR



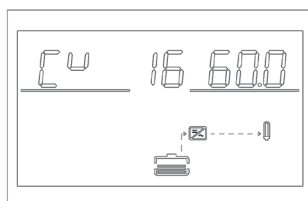
Lithium battery temperature and SOC; The upper left displays BMS temperature information; The upper right displays BMS SOC information. When BMS communication fails, both the upper left and upper right displays will flash ERR



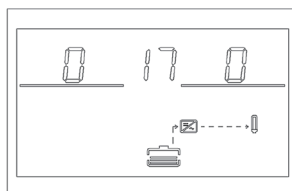
Lithium battery capacity;
The upper left displays rated capacity; The upper right displays current capacity. When BMS communication fails, both the upper left and upper right displays will flash ERR



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

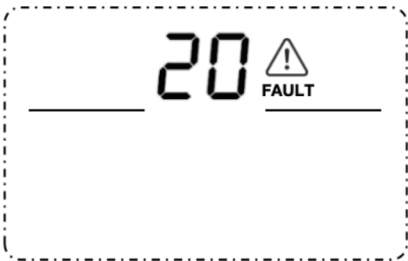


Lithium battery fault alarm information;
The upper left displays BMS alarm information; The upper right displays BMS fault information. When BMS communication fails, both the upper left and upper right displays will flash ERR



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 aromatically. If the machine does not work after six times’ restart, the machine and LCD display will always in the fault status. You need to completely power 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	Fault / Alarm
1	Bus soft boost start failed	Turn fault mode	Bus voltage does not reach set value for more than 30 seconds.	Cannot restore.	Fault
2	Bus voltage high	Turn fault mode	The bus voltage is higher than protection point.	Cannot restore.	Fault
3	Bus voltage low	Turn fault mode	Bus voltage is below the under voltage protection point.	Cannot restore.	Fault

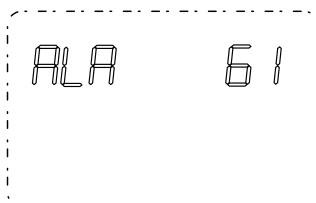
Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
4	Battery over current	Turn fault mode	TZ interrupt triggered more than 2 times within 2ms.	Cannot restore.	Fault
5	Over temperature	Turn fault mode	The PFC temperature exceeds the protection threshold. Fan stuck for more than 5 minutes.	Tried to restart six times, if failed, cannot restore.	Fault
7	Bus soft start fault	Turn fault mode	Turn fault mode. The soft start process has exceeded but the bus voltage has not reached set value.	Cannot restore.	Fault
8	Bus short circuit	Turn fault mode	Inverter on or PFC on, bus voltage below threshold.	Cannot restore.	Fault
9	Inverter soft start fault	Turn fault mode	The bus voltage is higher than protection point, or the DC component is greater than 20V. or the inverter is not completed within 5 minutes.	Cannot restore.	Fault
10	INV over voltage	Turn fault mode	The inverter voltage is higher than the set value [276V].	Cannot restore.	Fault
11	INV under voltage	Turn fault mode	Battery mode and there is no short circuit in the inverter, the inverter voltage is lower than 160V.	Cannot restore.	Fault

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
12	INV short circuit	Turn fault mode	In battery mode or Standby mode, if the inverter voltage is lower, current is greater than set value.	Tried to restart six times, if failed, cannot restore.	Fault
13	Negative power protection	Turn fault mode	In battery mode, the load power is lower than set value(negative power, such as -1200W).	Cannot restore.	Fault
14	Over load	Turn fault mode	Overload exceeds limit (list in specification).	Tried to restart six times, if failed, cannot restore.	Fault
15	Model fault	Turn fault mode	Cannot match any model in model number detection.	Cannot restore. Check whether the control board is assembled incorrectly or whether the program is burned incorrectly.	Fault
16	No boot loader	Turn fault mode	No boot loader.	Cannot restore. Try to send command TIDA1911000000000000.	Fault
17	Program updating	Turn fault mode	Inverter receive updating task.	Restore after updating.	Fault
18	18 PV reverse connection	turn to failure mode	Photovoltaic panels are reversed	15s recovery	Fault
19	Same SN	Turn fault mode	Same series number in parallel.	Cannot restore.	Fault
20	CAN communication fault	Turn fault mode	Wrong number of slave machine.	Cannot restore.	Fault
21	Large voltage difference of the parallel battery	Turn fault mode	The voltage difference of the parallel battery is too large.	Cannot restore.	Fault

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
22	Voltage difference of the parallel inverter	Turn fault mode	The difference in mains voltage exceeds set value between parallel inverter.	Cannot restore.	Fault
23	Frequency difference of the parallel inverter	Turn fault mode	The difference in mains frequency exceeds set value between parallel inverter.	Cannot restore.	Fault
24	Parallel configuration difference	Turn fault mode	The local inverter is single mode, but there is a parallel machine on the bus.	Restore after set to single machine operation and disconnect parallel communication, or parallel operation condition recover.	Fault
25	Parallel disconnection	Turn fault mode	Synchronization signal lost.	Cannot restore	Fault
26	BMS fault	Turn fault mode	Error code in BMS message.	Turn off BMS communication function or BMS fault recovery.	Fault
29	Inverter over current	Turn fault mode	Instantaneous current of inverter is higher than set value.	Tried to restart six times, if failed, cannot restore.	Fault

6. Alarm Reference Code

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



Alarm code sheet

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
50	Battery open	Alarm, battery does not charge.	Battery voltage is below set point.	Restore after battery voltage recover.	Alarm
51	Battery low voltage shutdown	Alarm, battery low voltage shutdown or cannot power on.	Battery voltage is below set point.	Restore after battery voltage recover.	Alarm
52	Battery low voltage	Alarm	Battery voltage is below set point.	Restore after battery voltage recover.	Alarm
53	Charger short circuit	Warning, battery does not charge.	The battery voltage is less than 5V and the charging current is greater than 4A.	Cannot restore.	Alarm
54	Low power discharge	Alarm	The battery voltage is greater than 52.8V and the discharge time exceeds the set low-power discharge time.	Restore after battery voltage recover.	Alarm
55	Battery over charge	Alarm, battery does not charge.	Battery voltage is higher than the set value.	Can restore.	Alarm
56	BMS disconnect	Alarm, lock standby mode.	No correct BMS communication response within 10 seconds.	Restore after communication recover.	Alarm
57	Over temperature	Alarm, battery does not charge.	The temperature of PFC or INV is above the set value.	Restore after temperature is under set value.	Alarm

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
58	Fan error	Alarm, if one fan fails and the other fan is running at full speed.	Fan speed is less than the set value.	Restore after fan recover.	Alarm
59	EEPROM error	Alarm	Numerical calibration error.	Restore after calibration right.	Alarm
60	Overload	Alarm, battery does not charge.	When not in mains mode or the PV is normal and the output priority is not mains priority, the load exceeds 102% and the duration is 200-220 ms.	Restore after load back to normal	Alarm
61	Abnormal generator waveform	Alarm, continuously operating in battery mode.	Generator waveform detection result is abnormal.	Can restore.	Alarm
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 10mins.	Alarm
63	Synchronization signal fail	Alarm, turn fault mode.	Host or slave with host present, no synchronization signal restored within set value	Restore after signal recover.	Alarm
64	Parallel configuration incompatible	Alarm, turn standby mode.	When parallels with 3 phases, there is one phase loss setting.	Restore when three-phase setting is correct.	Alarm
65	Parallel version incompatible	Alarm, turn standby mode.	There is an incompatible version number in the parallel system.	Restore when all machine versions in the parallel system are compatible with each other.	Alarm

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
66	Parallel Communication Fault	Alarm, turn standby mode.	The slave machine cannot be detected in a parallel system.	Restore after detecting slave machine access or set to stand-alone mode to restore.	Alarm
67	Line difference of the parallel inverter	Alarm	The host determines that the difference between the local mains voltage and any slave mains voltage exceeds set value.	Cannot restore.	Alarm
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%.	Alarm
69	SOC Low	Alarm, if it is in standby mode, it will remain in standby mode and not power on.	Lithium battery SOC is lower than the set value + 5% (mains mode or battery mode), lower than the set value + 10% (standby mode).	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 + 10%.	Alarm

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.

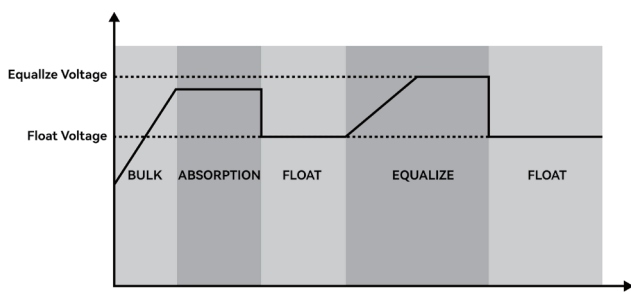
• How to Apply Equalization Function

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 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.

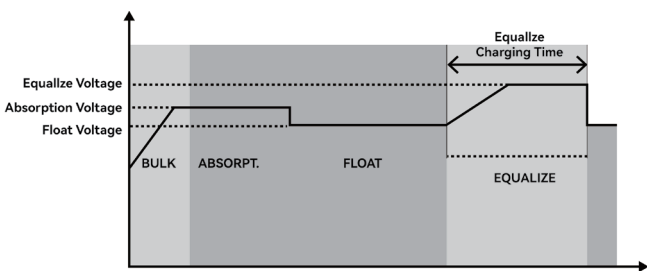
• When to Equalize

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.

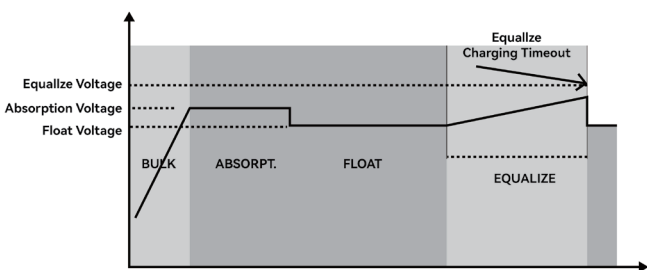


Equalize charging time and timeout

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 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 timeout setting is over, the charge controller will stop equalization and return to float stage.



8.Specifications

8.1 Line Specifications

Model	Item	Value	Comments
Input Voltage	Main topology	L + N + PE	
	Nominal voltage	230Vac	Settable: 208/220/230/240 Vac
	Input Voltage Range	90~280Vac	Settable
	Input Low Loss	154Vac (default) Settable: 90-154	Appliance mode
		185Vac (default) Settable: 170-200	UPS mode
	Input Low Comeback	Low Loss voltage +9V	
	Input High Loss	264Vac(default) Settable:264-280	Appliance mode
		264Vac	UPS mode
	Input High Comeback	High Loss voltage -9V	
Input Frequency	Nominal Frequency	50 / 60Hz	
	Frequency Range	40 / 70Hz	
	Freq. Low loss / Comeback	40/43.5Hz@50Hz(UPS mode)	
		40/40.5HZ@50HZ(APP mode)	
		50/53.5Hz@60Hz(UPS mode)	
	Freq. High loss / Comeback	50/50.5HZ@60HZ(APP mode)	
		60/56.5Hz@50Hz(UPS mode)	
		70/69.5Hz@50Hz(APP mode)	
		70/66.5Hz@60Hz(UPS mode)	
		70/69.5Hz@60Hz(APP mode)	
Input current	Max Current (RMS)	20A	20A

Note: When the specification of the external circuit breaker is greater than 20A, the maximum input current is 20A.

When the external circuit breaker specification is less than 20A, the maximum input current depends on the external circuit breaker specification.

8.2 Battery Specifications

* N= battery pieces

	Item	Value	Comments
Battery information	Battery Pieces	1pcs	12V/PCS
	Auto Restart Function	Yes	
	Battery test function	No	
	Battery type	VRLA/LI	
	Nominal Battery voltage	N*12V	@25°C
	Battery management	Yes	
Battery protection	Battery over Voltage	15.5V	
	Battery under voltage	10.5V*N	Settable:10*N~11*N
	Battery low voltage alarm	10.8V*N	Settable:10.3*N~11.3*N
	Over current protection	Fuse	Fast acting

8.3 Charger Specifications

	Item	Value	Comments
Charger(line mode)	Charging voltage	FV MODE: 13.5V Settable: 13.3~13.9V CV MODE: 14.1V Settable: 14~14.5V	
	Temperature Compensation	No	
	Charging Current	2~100A	Settable
	Default Charging Current	30A	
	Charging mode	Two/Three/Auto Settable	Three states: CC/CV/Float Two states: CC/Float
	Charge Voltage Accuracy	±5%	Calibrated by RS232
Charger(PV)	PV Charging method	MPPT	
	PV Maximum Input Power	3000W	
	Efficiency	99.5% max	
	Battery Voltage Accuracy	±0.3%	
	PV Voltage Accuracy	±2V	
	MPPT	30~400Vdc	
	Max PV voltage	450Vdc	
	Max PV charge current	100A	
Max charging current	/	100A (Maximum allowable) Default: 60A	Settable

8.4 Output Specifications

	Item	Value	Comments
Output power rating	Output topology	PE+L+N	
	Output power	2000W	When setting the Output voltage to 208V, the Output Power rating will be reduced to 90%.
Output voltage	Nominal Voltage	208/220/230/240 Vac	Default 230V, manual set by RS232 or LCD
	Waveform	Sinusoidal	
	Voltage Regulation	±5%	
	DC offset	±100mV (Bat mode)	Empty load and linear load mode
Output frequency	Nominal Frequency	50 / 60Hz	50/60Hz auto selection (default on)
	Line Mode	50Hz: (43.5 – 56.5)Hz (UPS mode) (40 – 70)Hz (APP mode) 60Hz: (53.5 – 66.5)Hz (UPS mode) (40 – 70)Hz (APP mode)	
	Battery Mode	50 / 60Hz	
	Frequency regulation	0.1%	
Load	102%<Load ≤110%	1 minute minimum, then alarm and turn off output (operation environment temperature -10 – 40°C)	
	110%< Load ≤130%	10 seconds minimum, then alarm and turn off output	
	130%<Load ≤150%	3 seconds minimum, then alarm and turn off output	
	Load>150%	200 ms minimum, then alarm and turn off output	
Output short circuit protection	Battery mode	Current limitation	
	Line mode	Breaker (20A)	

8.5 Switch Time Specifications

	Item	Value	Comments
Switch time	Line Mode To Battery Mode	10ms(typical)	UPS mode
		10ms(typical)	Appliance mode

8.6 Efficiency Specifications

	Item	Value	Comments
Efficiency	Line Mode	>99.5%@2Kva	Full R load, without battery connect.
	Battery Mode	>91.5%@2Kva	Full R load.
	Standby power	<50W	Empty load mode, battery disconnected.

9.Trouble Shooting

Problem	Fault Event	Trigger conditions	What to do
LED screen display fault code 5	Overtemperature	1.PFC temperature exceeds the protection threshold [85°C when not locked rotor, 65°C when locked rotor] for more than 20 seconds. 2.Fan lock exceeds 5 minutes.	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 100V and the inverter current is greater than 40A, it should respond within 80-100ms.	1.Check if there is a short circuit at the output terminals (such as a screw piercing through the locking terminal causing a LN short circuit). 2.Verify if the inverter voltage and inverter current meet the triggering conditions.
LED screen display fault code 15	Model malfunction	The model number detection does not match any model number.	Check if the control board is assembled incorrectly or if the program is burned incorrectly.
LED screen display fault code 16	No boot program	The third digit of the communication is not 1.	Send command: TIDA1911000000000000

Problem	Fault Event	Trigger conditions	What to do
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.
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.

Problem	Fault Event	Trigger conditions	What to do
	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.
	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.
PV not charging			1.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. 2.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.