Hybrid Solar Inverter

PV9000-48 Pro

User Manual

V1.5

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1.Information on this Manual

1.1 Validity

This manual is valid for the following devices:

- 6500W 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.

Labels in the documentation

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

1.5 Safety Instructions

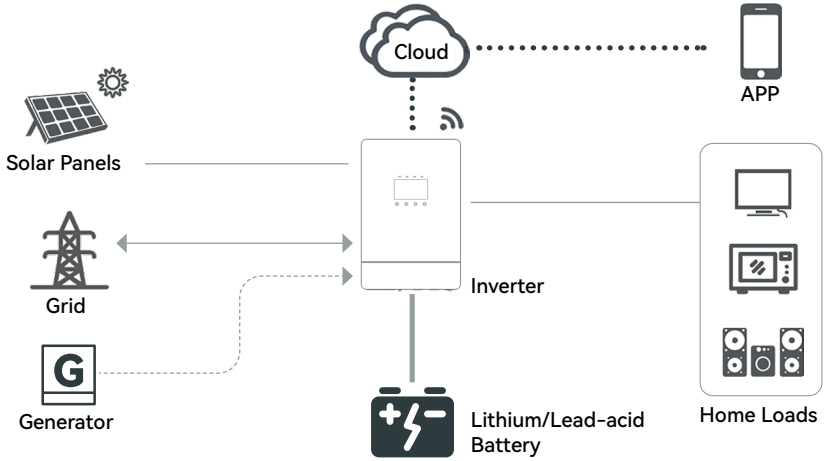
WARNING!

This chapter contains important safety and operating instructions.

Read and keep this manual for future reference.

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.

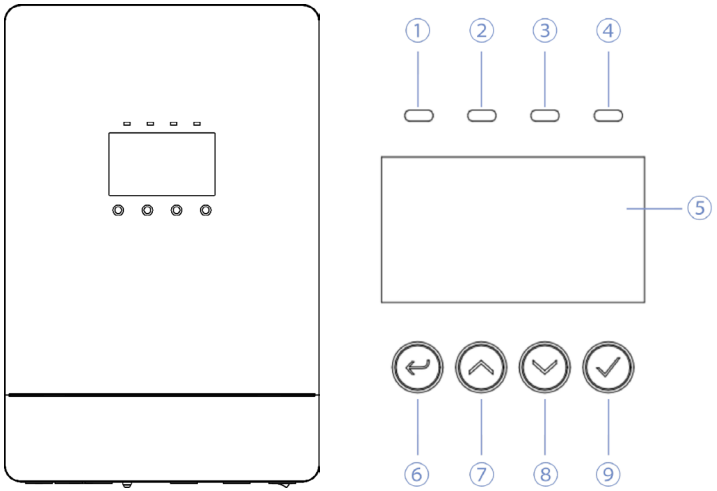
The whole system also need other devices to achieve complete running such as PV modules, generator, or utility grid. Please consult with your system integrator for other possible system architectures depending on your requirements. The WiFi / GPRS module is a plug-and-play monitoring device to be installed 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.

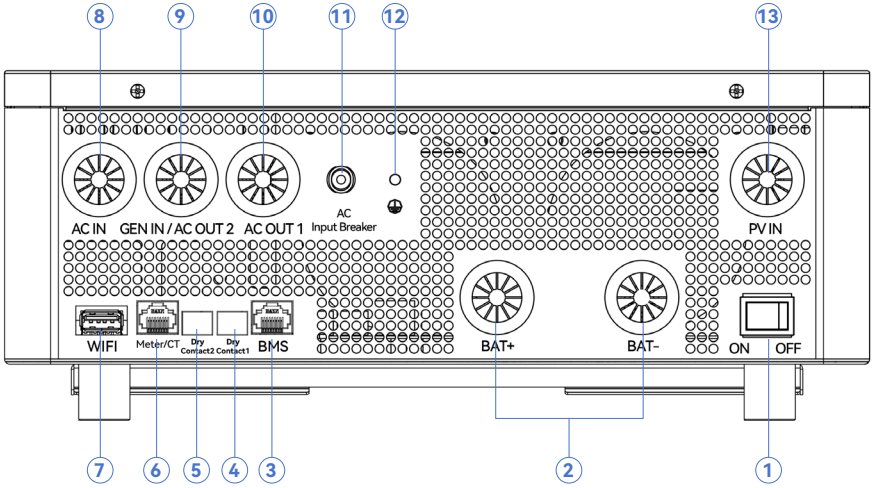
2.1 Features

- Rated power 6.5KW, power factor 1
- MPPT ranges 60V~450V, 520Voc
- 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 remote monitoring (optional)
- Dual AC input or output
- Feed-in to grid

2.2 Product Overview



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



① Power On/Off Switch
② Battery Input
③ BMS Communication Port
④ Dry Contact 1
⑤ Dry Contact 2
⑥ Meter/Grid CT
⑦ WiFi Communication Port
⑧ AC Input
⑨ Generator Input/AC Output 2
⑩ AC Output 1
⑪ AC Input Breaker
⑫ PE
⑬ PV 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.

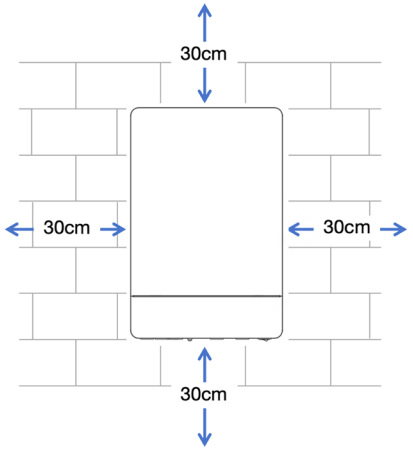
3.1.2 Installation Tools

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	Remarks
1	Inverter	1		
2	Bracket	1		
3	User manual	1	English	
4	Expansion Screw	2	M6*50, SUS304	
5	Cross Head Screw	2	M4*18mm	
7	Tubular Terminal	9	E6010	For AC input/ output, PV, Generator Input
8	CT	1	2m cable	

3.2 Mounting Unit



Consider the following points before selecting where to install:

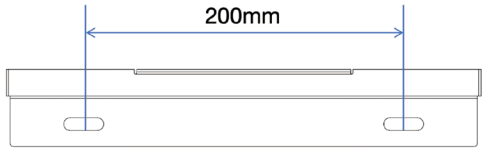
- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface.
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between -15°C and 50°C to ensure optimal operation.
- The recommended installation 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!

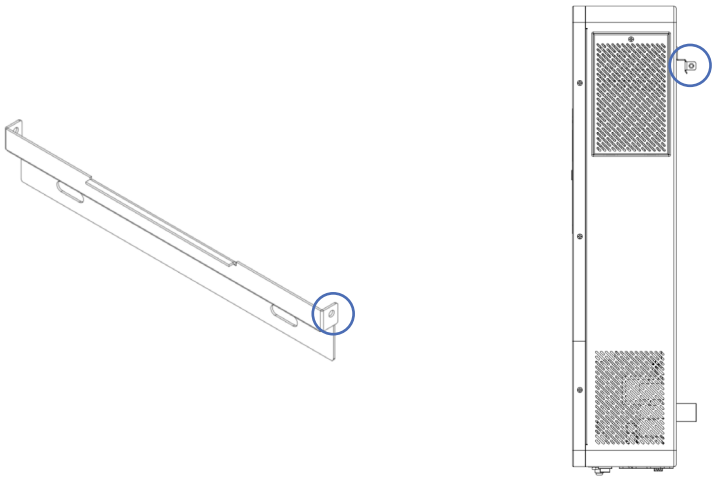
Inverter is suitable for mounting on concrete or other non-combustible surface only.

Follow the installation steps:

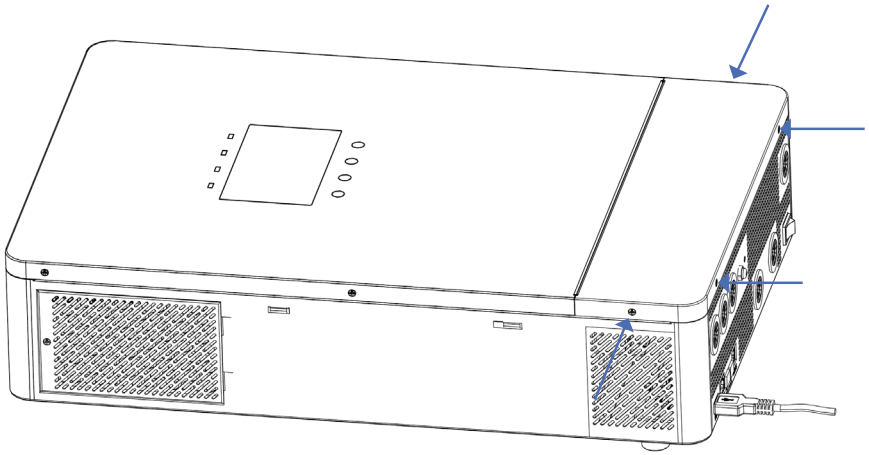
1. Use ϕ8 drilling bit drill holes on the mounting surface. The distance between 2 holes is 200mm. Then insert the expansion screw(M6). The expansion screw*2 are in packing.



2. Lock bracket on the mounting surface by screw nut.
3. Lift the inverter vertically and place it on the rack through the hook on the back.
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:



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 40A for 6.5KW inverter.

CAUTION!
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.

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)
6.5KW Inverter	10 AWG	5.26

WARNING!
It's very important for system safety and efficient operation to use appropriate cable for AC output 1 connection. To reduce risk of injury, please use the proper recommended cable size as below.

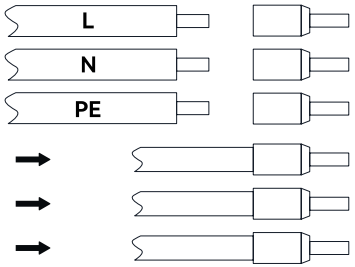
Suggestion for AC output wires

Model	Gauge	Cable (mm^2)
6.5KW Inverter	12 AWG	4

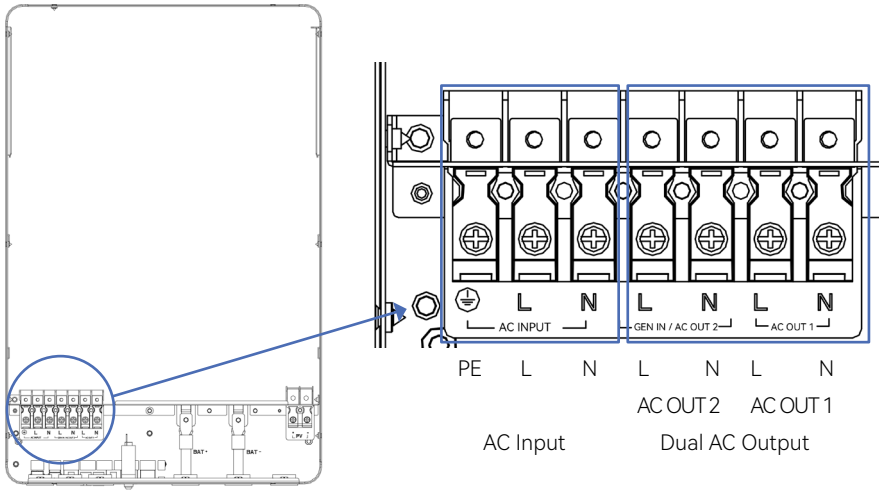
WARNING!
Make sure AC power is disconnected before attempting to connect AC power to the unit.
All operations during the electrical connection process, as well as the specifications of cables and components used, must comply with local laws and regulations. The cable color mentioned below is for typical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

CAUTION!
Install a separate AC circuit breaker between the inverter and the generator before connecting the generator.

CAUTION!
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.

CAUTION!
Be sure to connect 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 GEN input connection. To reduce risk of injury, please use the proper recommended cable size as below.

Suggestion for Generator Input wires

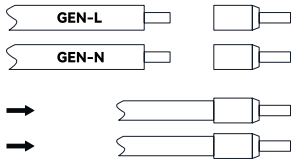
Model	Gauge	Cable (mm²)
6.5KW Inverter	10 AWG	5.26

WARNING!
Make sure GEN power is disconnected before attempting to connect GEN 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 generator connection:

1. Before making GEN 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.

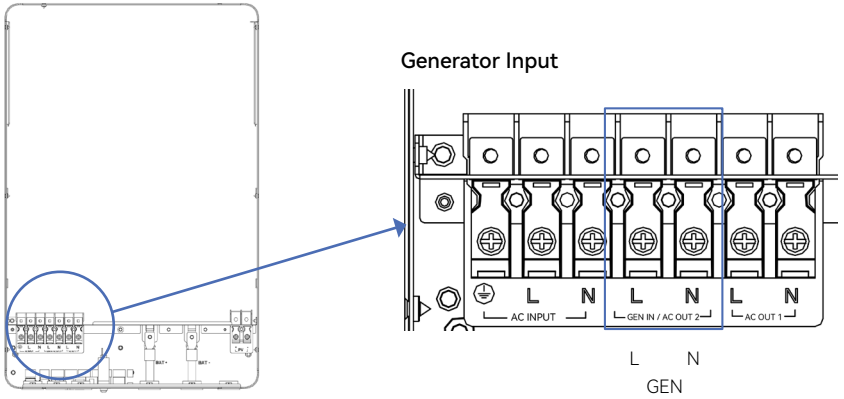


3. Insert GEN cables according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective cable first.

PE→ Protecting Earth (yellow-green)

L → LINE (brown or black)

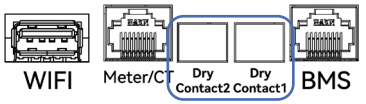
N → Neutral (blue)



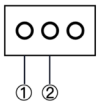
4. Make sure the cables are securely connected.

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.

Dry contact connection:
In communication port area of inverter bottom, there are 2 dry contact ports for generator control.

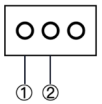


Dry Contact 1 is for generator start/stop signal.



Terminal ① : Start/stop control terminal
Terminal ② : Start/stop public terminal

Dry Contact 2 is for fuel-way start/stop signal.



Terminal ① : Fuel-way start/stop control terminal
Terminal ② : Fuel-way start/stop public terminal

3.5 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' 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)
6.5KW Inverter	10AWG	5.26

PV Module Selection:

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

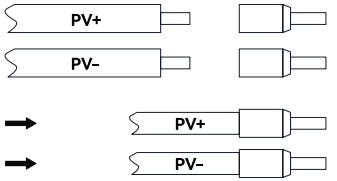
1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than start-up voltage.

INVERTER MODEL	6.5KW Inverter
Max. PV Array Open Circuit Voltage	520Vdc
Start-up Voltage	60Vdc
PV Array MPPT Voltage Range	60Vdc~450Vdc

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

Please follow below steps to implement PV module connection:

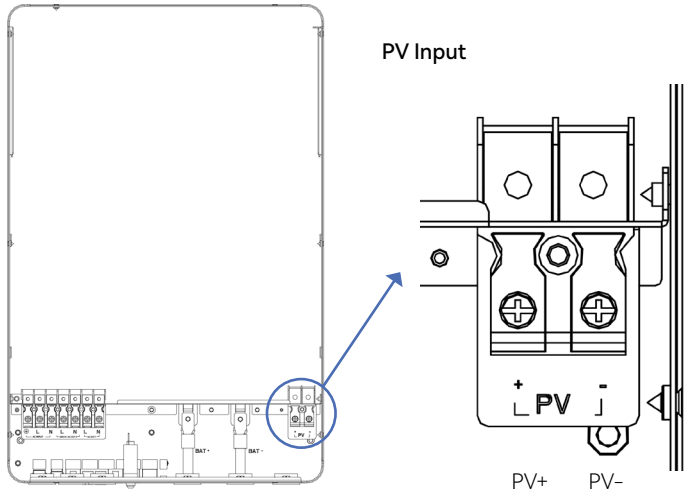
1. Before making PV connection, be sure to open DC circuit breaker first.
2. Remove insulation sleeve 12mm from the head of cables, shorten the conductor part to 10 mm. Insert the cable into the tubular terminal. Then use terminal crimping tool make the terminal and cable connected tightly



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)



5. Make sure the cables are securely connected.

3.6 Battery Connection

3.6.1 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 150A.

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.

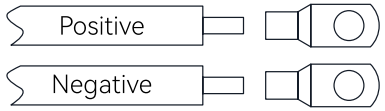
Recommended battery cable and terminal size:

Model	Gauge	Cable (mm²)
6.5KW Inverter	2 AWG	25

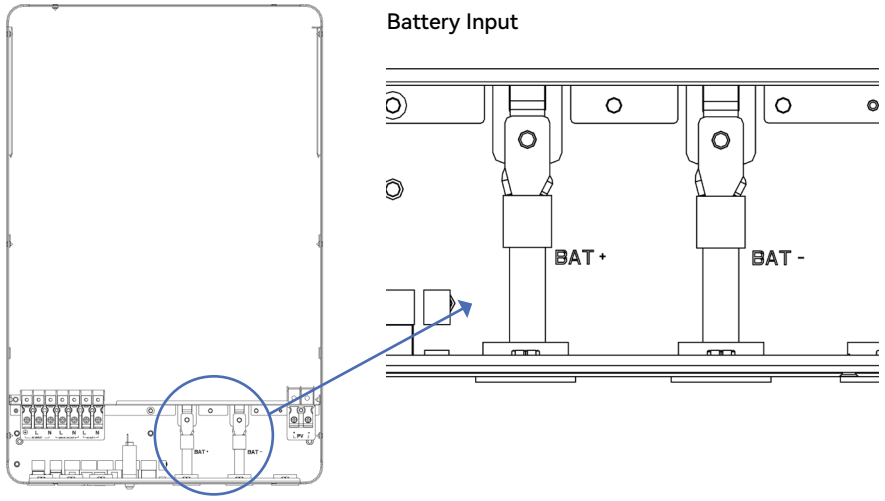
Note: For lead acid battery, the recommended charge current is 0.3C (C>battery capacity)

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 battery.

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.

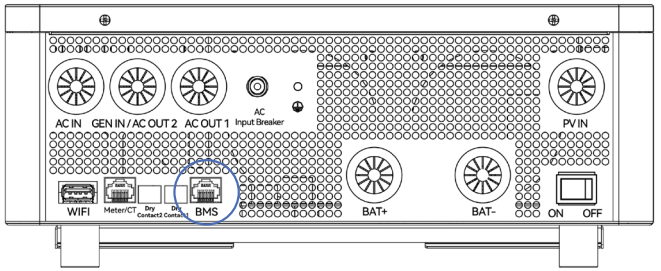
CAUTION!
Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

3.6.2 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 3.6.1 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 “Llb” 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	-

Communicating with battery BMS in parallel system

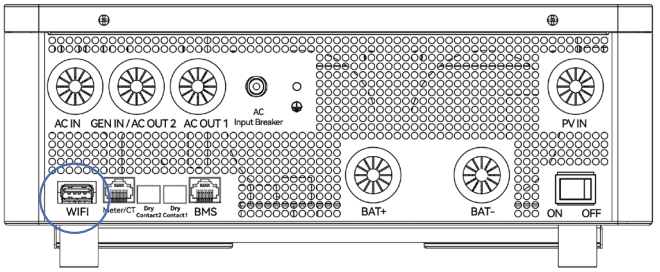
If need to use communicate with BMS in a parallel system, you should make sure to connect the BMS communication cable between the battery and one inverter of the parallel system.

3.7 Final Assembly

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

3.8 Smart Communication Stick Connection (Optional)

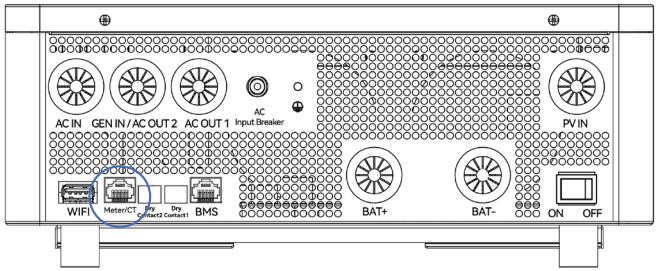
The smart communication stick (WIFI) is used to connect to the cloud platform. Please insert the stick into WIFI port directly.



3.9 CT Connection / Electricity Meter Connection (Optional)

The inverter support CT/Electricity meter to measure the power feed to grid and have anti-reverse current function.

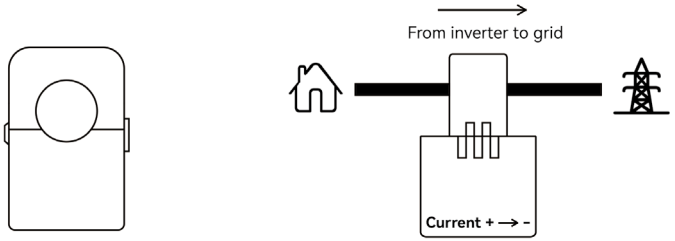
Insert CT cable or meter communication cable to Meter/CT port on inverter. Make sure that the meter/CT cable connected to the inverter is Pin to Pin, and the inverter meter /CT port pin assignment is shown as below:



Pin number	BMS port
1	MeterRS485B
2	MeterRS485A
3	Grid.Isense+
4	-
5	-
6	Grid.Isense-
7	-
8	-

3.9.1 CT Connection

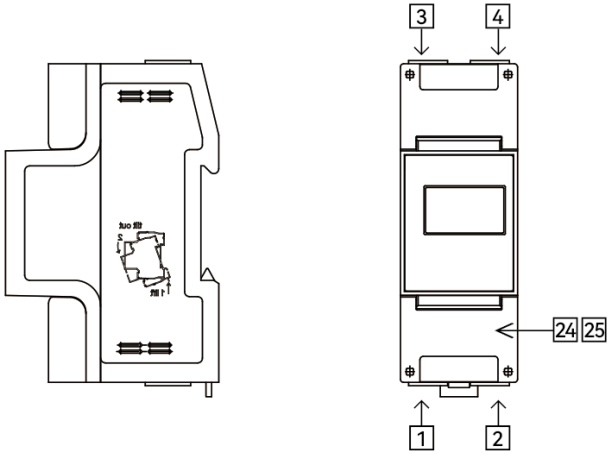
Disassemble the CT and insert the L line (live wire) of the inverter and grid connection into it. It is important to pay attention to the direction of the CT and ensure that the arrow points from the inverter towards the grid. Plug RJ45 connector of CT into Meter/CT port.

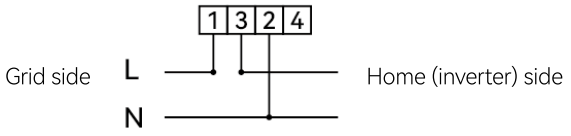


3.9.2 Electricity Meter Connection

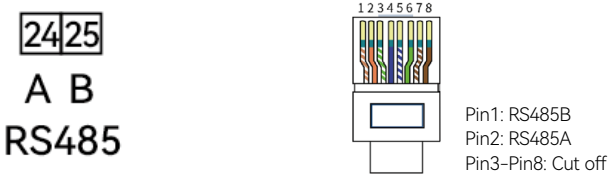
The electric meter is 35mm DIN type. It should be fixed on a rail

The electric meter has 6 connecting terminals. Terminal 1 is for L line input, terminal 3 is for L line output. Terminal 2 is for N line connect.





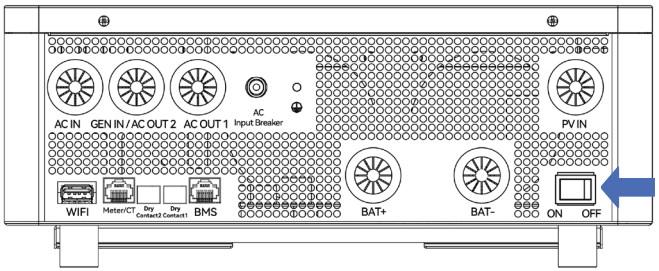
Terminal 24 and 25 is for RS485 communication.
After connecting L and N line, plug RJ45 connector (cable from terminal 24 and 25) of electric meter into Meter/CT port.



4. Operation

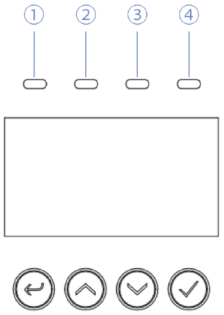
4.1 Power ON/OFF

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.

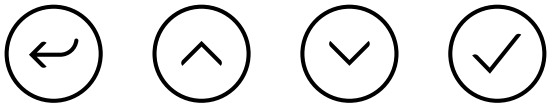


4.2 Operation and Display Panel

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.



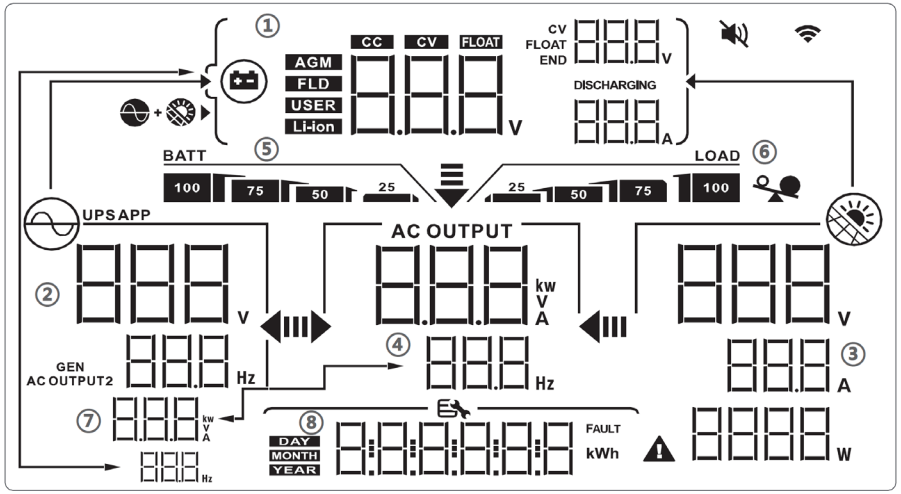
LED Indicator			Messages
① AC	Status indicator (Green)	Solid On	The mains power is normal and enters the mains power operation.
		Flashing	The mains power is normal, but it has not entered mains power operation.
		Off	The mains power is abnormal.
② Inverter	Invert indicator (Yellow)	Solid On	Output is powered by battery or PV in battery mode.
		Off	Other states.
③ Charging	Charging indicator (Yellow)	Solid On	The battery is in float charging.
		Flashing	The battery is in constant voltage charging.
		Off	Other states.
④ Fault	Fault indicator (Red)	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.
		Off	The inverter is working properly.



Function Buttons

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

4.2.1 LCD Display Icons



Display area	Icon	Description
①Battery Information		Battery icon
	AGM FLD USER Li-ion	Battery type
	CC CV FLOAT	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 FLOAT icon is illuminated during the float charging stage.
	V	Indicate battery voltage
	CV FLOAT END V	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 FLOAT icon is illuminated. During the discharge state, the end discharge voltage is displayed and the END icon is illuminated.
	DISCHARGING A	Battery charging/discharging current
②AC Input Information		AC input icon
	UPS APP	UPS or APP output mode
	V Hz	AC input voltage and frequency
③PV Input Information		PV input icon
	V A	Indicate PV power, PV voltage, PV current, etc.
④Output Information	AC OUTPUT kW V A Hz	Indicate output voltage(V), apparent power (VA or kVA), output active power (W or kW) alternately, switching every five seconds Indicate output frequency
⑤Battery Capacity	BATT 100 75 50 25	Indicate battery capacity
⑥Load Capacity	LOAD 25 50 75 100	Indicate load capacity
		Over load icon
⑦Generator Information or AC OUTPUT2	GEN AC OUTPUT2	Generator or second AC output icon
	kW V A Hz	Indicate generator input voltage(V), apparent power (VA or kVA), output active power (W or kW) alternately, switching every five seconds. Or indicate AC output 2 voltage(V), apparent power (VA or kVA), output active power (W or kW) alternately, switching every five seconds. Indicate generaotr input or AC output 2 frequency. When the user sets generator enable at setting item page40, 'GEN' icon is displayed here; when the generator is off, 'AC OUTPUT2' icon is displayed.

⑧Parameter Query, Function Setting or Fault/Alarm Information		Indicate system infomation; 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 only light

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

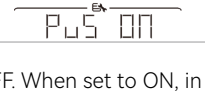
In battery mode, battery icon will present Battery Capacity		
Load Percentage	Battery Voltage	Display
Load >50%	< 44.584V	
	44.584 ~ 46.74V	
	46.74 ~ 48.896V	
	> 48.896V	
50%> Load > 20%	< 47.18V	
	47.18 ~ 49.336V	
	49.336 ~ 51.492V	
	> 51.492V	
Load < 20%	< 48.48V	
	48.48 ~ 50.636V	
	50.636 ~ 52.792V	
	> 52.792V	

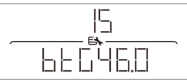
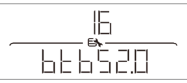
4.2.2 LCD Setting

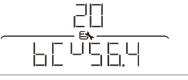
After pressing and holding ENTER button for 2 seconds, the unit will enter setting mode. Press “UP” or “DOWN” button to select setting programs. Then press “ENTER” button to confirm the selection or ESC button to exit.

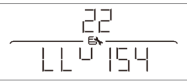
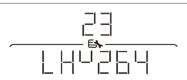
Program	Description	Setting Option	
01	Output voltage		
		230V (default) Adjustable/settable value: 208V, 220V, 230V, 240V	
02	Output frequency		
		50Hz(default) Adjustable/settable frequency: 50Hz, 60Hz	
03	Output source priority	Solar first	
		Solar energy provides power to the loads as first priority.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

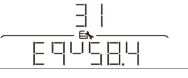
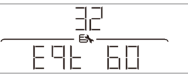
03	Output source priority	PBG priority	
		Solar energy provides power to the loads as first priority. If solar energy is sufficient, battery will be charged with solar energy. If solar energy is not sufficient to power all connected loads, battery will supply power to the loads at the same time. If solar energy and battery are not sufficient, grid will supply power to the loads at same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	
04	Output mode	APP: Appliance (default)	
		Applied to household appliances	
		UPS	
		Applied to computer and other devices. Typical switching time is 10ms.	
05	Charger source priority	PNG: PV and Grid (default)	
		OPV: Only PV	
		There are two 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.	
06	Grid charging current		
		40A(default) Setting range is [2, 120A]	

07	Maximum charging current		
		Set total charging current for solar and grid chargers. The default is 60A. Available options: 2/10/20/30/40/50/60/70/80/90/100/110/120A	
08	Menu Default		
		During setting: Set to ON. If the current page is not on the first page and no operation with 1 minute, the system will return to display the first page. Set to OFF. If the current page is not on the first page and no operation with 1 minute, the system will stay on the current page.	
09	Auto restart when overload occurs	The default is ON.	
10	Auto restart when over temperature occurs	The default is ON.	
11	Main input cut warning		
		Enable/Disable Mains or PV loss alarm. The default setting is ON. If the main input detected lost, the buzzer will sound for 3 seconds. when set to OFF, after the main input is lost, the buzzer will not sound.	
12	Energy-saving mode		
		The default setting is OFF. When set to ON, in battery mode, if the load is lower than 25W, the system will stop output for a period then resume. If the load is still lower than 25W, the system will do the loop stop then resume. If the load is higher than 35W, the system will resume continuous normal output.	
13	Overload transfer to bypass		
		The default setting is OFF. When set to ON, in the case of 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		
		Enable/disable buzzer sound. The default setting is OFF. When set to ON, in any situation such as alarms or faults, the buzzer will not sound. This setting can be applied to all modes.	
15	Battery return to mains voltage point		
		When the battery is set to the CUS (Customer Setting Type) mode. The adjustable range is [40, 50V]. The default is 47.6V, and it can be adjusted within a range of [40, 50V].	
		When the battery is set to the AGM (Lead Acid Battery Type) or FLD (Flooded Battery Type) mode. The default setting is 46V, and it can be adjusted within a range of [44, 52V].	
		When the battery is set to the LIB (Lithium Battery Type) mode. The default is 47.6V, and it can be adjusted within a range of [40, 50V].	
16	Switching back to battery mode voltage points		
		When the battery is set to CUS (Customer Set Type) mode, The default setting is 54.4V, the voltage range is [46, 58V].	
		When the battery is set to AGM (Absorbent Glass Mat) or FLD (Flooded) mode, the default is 52V. It can be adjusted within a range of [48, 58V].	
		When the battery is set to LIB (Lithium Battery) mode, The default setting is 54.4V. It can be adjusted within a range of [46, 58V].	
17	Battery type	AGM	
		Flooded	
		Lithium (default)	
		User-Defined	

18	Battery low voltage point	
		Battery low voltage alarm setting. When the battery type is set to LIB, the default setting is 47.6V. The adjustable range for the voltage is [41.2, 50V]. Initial settings for CUS are the same as for LIB.
		It is not possible to set the battery definition mode to AGM or FLD mode. The initial default setting is 44V.
19	Battery shutdown voltage point	
		The battery low voltage shutdown point setting function cannot be adjusted when the battery is defined as AGM or FLD mode. The default setting is 42V.
		When the battery type is set to LIB , the battery shutdown point can be modified. The default setting is 46V, and the adjustable range is [40, 48V]. Initial settings for CUS are the same as for LIB.
20	Constant voltage mode voltage point setting	
		When the battery is defined in AGM or FLD mode, the voltage set point cannot be configured. The default setting for AGM mode is 56.4V, for FLD mode is 58V. When the battery type is CUS, It can be set within the range of [48, 60V] for the constant voltage charging set point. The default setting is 56.4V. 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 56.4V, and it can be adjusted within the range of [48, 60V]. It is important to ensure that the constant voltage set point voltage is higher than the float charge set point voltage.

21	Floating charge mode voltage point setting	 When battery is defined as AGM or FLD mode, the voltage set point cannot be configured. The default setting for AGM/FLD mode is 54V. When the battery type is CUS, It can be set within the range of [50, 58V] for the floating charging voltage set point. The default is 55.2V. If the battery type is LIB, the default setting for the floating charging point is 55.2V. The setting range is [50, 58V] . It is important to note that the constant voltage point voltage should always be set higher than the floating charge point voltage.
22	Grid low voltage point setting	 If output mode is APP, Grid low voltage point can be set within a range of 90V to 154V. The default setting is 154V. If output mode is UPS, Grid low voltage point can be set within a range of 170V to 200V. The default setting is 185V.
23	Grid high voltage point setting	 If output mode is APP, Grid high voltage point can be set within a range of 264V to 280V. The default setting is 264V. If output mode is UPS, Grid high voltage point is set as 264V.
24	Automatic screen quenching Settings	 Automatically turn off backlight. The default is off. If set on, the backlight will turn off without button operation for 10 minutes after turning on
25	Inverter soft start setting	 Default setting is OFF. If it set to ON, the inverter output gradually increases from 0 to the target voltage value. If OFF, the inverter output directly increases from 0 to the target voltage value. Setting Condition: It can be set in single-machine operation mode.

26	Reset factory setting	 Restore all settings to factory default values. Before the setting, this interface is displayed as OFF. When set to ON, the system will restore to default settings. After the setting is completed, this interface will display OFF again. The setting can be applied immediately in mains and standby modes, but cannot be set in battery mode.
29	Battery Disconnection Alarm	 Enable/Disable battery disconnection alarm. Default setting is OFF.When set to OFF, there will be no battery disconnection, low battery voltage, or battery under voltage alarms when the battery is disconnected.
30	Battery Equalization Mode	 Enable/Disable Battery equalization. Default setting is OFF. If it is set to ON, the controller will start to enter the equalization phase when the set equalization interval (battery equalization period) is reached during the float charging stage, or the equalization is activated immediately.
31	Equalization Voltage Point Setting	 The default setting is 58.4, with a configurable range of [48, 60V].
32	Equalization Charging Time Setting	 During the equalization stage, the controller will charge the battery as much as possible until the battery voltage rises to the battery equalization voltage. Then, it will adopt constant voltage regulation to maintain the battery voltage. The battery will remain in the equalization stage until the set battery equalization time is reached. The default setting is 60 minutes, with a configurable range of [5, 900], and an increment of 5 minutes for each setting.

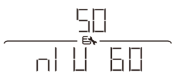
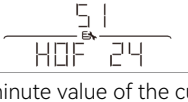
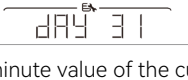
33	Equalization Delay Time Setting	 During the equalization stage, if the battery equalization time expires and the battery voltage has not risen to the battery equalization voltage point, the charging controller will extend the battery equalization time until the battery voltage reaches the battery equalization voltage. When the battery equalization delay setting is completed and the battery voltage is still below the battery equalization voltage, the charging controller will stop equalization and return to the floating stage. The default setting is 120 minutes, with a configurable range of [5, 900], and an increment of 5 minutes for each setting.
34	Equalization Interval Time Setting	 When the battery connection is detected during the float phase with the equalization mode turned on, the controller will start to enter the equalization phase when the set equalization interval (cell equalization period) is reached. The default setting is 30 days, the settable range is[1,90], and the increment of each setting is 1 day.
35	Enable Equalization Immediately	 The default setting is OFF, the function is not turned on; when it is set to ON, in the float charging stage when the equalization mode is turned on and the battery connection is detected. The balance charging is activated immediately, and the controller will start to enter the equalization stage.

36	Grid-tie inverter function	 Set whether the inverter is grid fed or not. In PGB mode, as long as the grid is connected, the PV can feed energy to the grid as much as possible, and the surplus energy of the PV charges the battery. In GPB mode and PBG mode, as long as the grid is connected, the PV can charge the battery with as much power as possible, and the surplus energy of the PV feeds grid. The default setting is OFF. The function is not turned on. When set to INT, it means the inverter uses internal measurement data to provide feeder support. When set to CT, it means the inverter uses external CT data to provide feeder support. When set to MET, it means the feeder support is provided by meter data.
37	Max Grid Tie Power	 Setting the output power value to grid. The default is 6.5kW. The setting range is [0, 6.5]kW. Every setting step is 0.1kW.
38	Battery dual output low voltage shutdown point	 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 48V, with a configurable range of [44, 60]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.
39	Battery dual output duration	 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 ON, the function is not enabled. The configurable range is [5,890] in minutes. When set to FUL, the secondary output has unlimited output time.

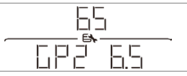
40	Generator function	 Enable/Disable generator function. The default is OFF. The generator port is reused with dual oupout. If generator function is enabled, the dual output function will be closed.
41	Genarator Rated Power	 Setting the generator rated output power. The default is 0. The setting range is [0, 6.5]kW. Every setting step is 0.1kW.
42	Generator Max Power	 Setting the generator max output power. To protect generator, if the output power of generator is higher than setting value, system will shutdown the generator and switch to battery output. The default value is 0. The setting range is [0, 6.5]kW. The setting step is 0.1kW.
43	Generator Error Reset	 The default value is OFF. When it set to ON, system will clear the generator error immediately. After error clear up, the item value will back to OFF automatically. The function is to pretect generator. If error occurs, user should check the status and clear the error, then start to use generator again.

44	BMS Communication Function	 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: CVT 485 protocol VOL: indicates the VOL 485 protocol GRO: indicates the GRO 485 protocol PYL: PYL 485 + PYL CAN IRO: IRO 485 protocol
45	BMS ID	 Setting BMS ID number to communicate with. The default value is auto (AtO). The setting range is [1, 15]. When the item is set to auto (AtO), system will automatically poll the BMS ID from small to large. When system polls for the first ID with a correct response, it locks the ID and only asks the BMS with that ID.

46	Low SOC Shutdown	
		Set the inverter to shut down when the State of Charge (SOC) of the battery is low. Default setting is 20, with a configurable range of [5, 50]. When the lithium battery SOC reaches the set value in battery mode, the inverter shuts down and generates alarm 68. The alarm 68 is cleared when the SOC returns to the set value + 5%. In standby mode, the inverter can switch to battery mode only when the SOC reaches the set value + 10%. If it does not reach this threshold, alarm 69 is generated. Once the function is enabled, alarm 69 is triggered when the lithium battery SOC reaches the set value + 5%, and it is cleared when it returns to the set value + 10%. It can be set to OFF, in which case the inverter no longer performs shutdown, startup, or alarm operations based on the SOC condition. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms.
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.

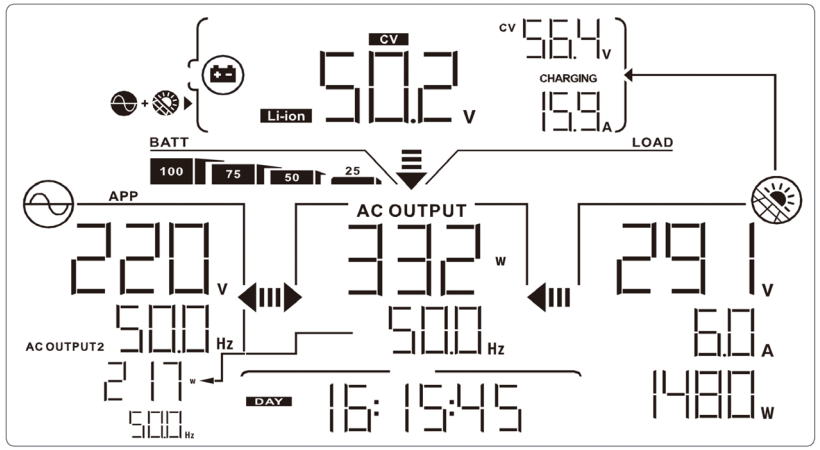
48	Low SOC to Grid	
		Set the SOC value for the inverter to switch to grid mode. The default setting is 50, with a configurable range of [10, 90]. In PBG priority mode, when the lithium battery SOC reaches the set value in battery mode, the inverter switches to grid mode. Once enabled, the inverter will 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.
49	The seconds of RTC time	
		The default value is the current time in seconds. The value configuration range is [0,60] seconds. During first setup, it should be set according to real time.to real time.
50	The minutes of RTC time	
		The default value is the minute value of the current time. The value configuration range is [0,60] minutes. During first setup, it should be set according to real time.
51	The hours of RTC time	
		The default value is the minute value of the current time. The value configuration range is [0,24] hours. During first setup, it should be set according to real time.
52	The days of RTC time	
		The default value is the minute value of the current time. The value configuration range is [1,31] days. During first setup, it should be set according to real time.

53	The months of RTC time	 The default value is the minute value of the current time. The value configuration range is [1,12] months. During first setup, it should be set according to real time.
54	The years of RTC time	 The default value is the minute value of the current time. The value configuration range is [0,99] years. During first setup, it should be set according to real time.
55	PV power sell mode time 1	 Set PV power sell mode time point 1. System will switch from PV priority charging state to PV priority sell power state. Default value is OFF. The function is not turned on. If the time is set, when the time reaches PV sell power mode time 1 system will switch to PV priority sell power state. The setting range is [0,23]. For example 10 stands for 10AM.
56	PV power keep mode time 1	 Set PV power preservation time 1. System will switch from PV priority sell power state to PV priority charging state. Default value is OFF. The function is not turned on. If the time is set, when the time reaches the PV power preservation time point 1 system will switch to PV priority charging state. The setting range is [0,23].
57	PV power sell mode time 2	 Set PV power sell mode time point 2. System will switch from PV priority charging state to PV priority sell power state. Default value is OFF. The function is not turned on. If the time is set, when the time reaches PV sell power mode time 2 system will switch to PV priority sell power state. The setting range is [0,23].
58	PV power keep mode time 2	 Set PV power preservation time 2. System will switch from PV priority sell power state to PV priority charging state. Default value is OFF. The function is not turned on. If the time is set, when the time reaches the PV power preservation time point 2 system will switch to PV priority charging state. The setting range is [0,23].

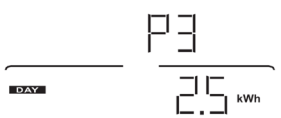
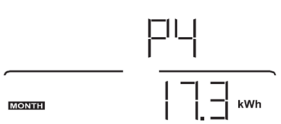
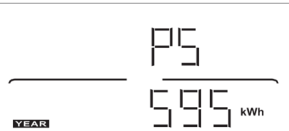
59	Power ON Event Trigger Time	 Setting the time point to start to output power automatically. The default value is OFF and the function is not open. If setting the time, system will output power when reach the setting time point. The time range is [0, 23]
60	Power OFF Event Trigger Time	 Setting the time point to stop output power automatically. The default value is OFF and the function is not open. If setting the time, system will stop output power when reach the setting time point. The time range is [0, 23]
62	Grid Tie Time 1	 Setting the grid tie power switching time point 1. The default is OFF. If setting the time, system grid tie power capacity will switch to Grid Tie Power1(GT1) when reach the setting time point. The time range is [0, 23]. For example 10 stands for 10AM.
63	Grid Tie Time 2	 Setting the grid tie power switching time point2. The default is OFF. If setting the time, system grid tie power capacity will switch to Grid Tie Power2(GT2) when reach the setting time point. The time range is [0, 23].
64	Grid Tie Power1	 Setting the grid tie power capacity 1. It works with Grid Tie Time1(GT1).
65	Grid Tie Power2	 Setting the grid tie power capacity 2. It works with Grid Tie Time2(GT2).

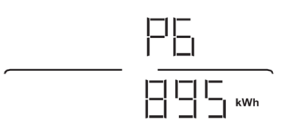
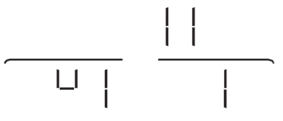
4.3 Display Information

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 current time will be displayed at the bottom of the screen generally. For example the following screen displays time 10:20.



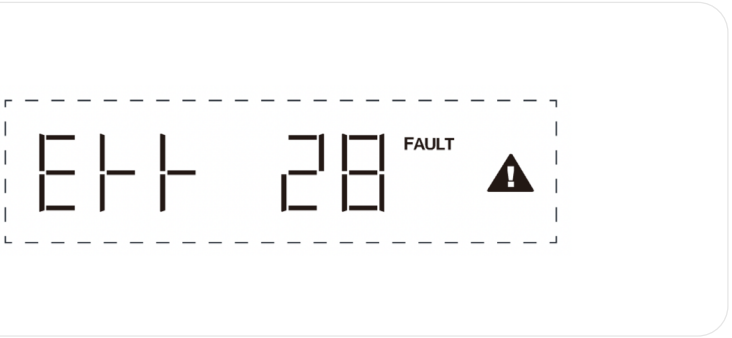
The selectable information is switched as below.

LCD display	Informatiopn
	Display the real time as Hour/Minute/Second.
	Display the date as Year/Month/Day.
	Display the daily power generation from solar.
	Display the monthly power generation from solar.
	Display the annual power generation from solar.

LCD display	Informatiopn
	Display total power generation from solar.
	Display battery SOC. If BMS communication error, ERR will show. If BMS function is turned off, the page is not displayed.
	Display battery capacity (as AH). If BMS communication error, ERR will show. If BMS function is turned off, the page is not displayed.
	Display BMS alarm information. If BMS communication error, ERR will show. If BMS function is turned off, the page is not displayed.
	Display BMS fault information. If BMS communication error, ERR will show. If BMS function is turned off, the page is not displayed.
	Display inverter firmware version.

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
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
26	BMS fault	Turn fault mode	Error code in BMS message.	Turn off BMS communication function or BMS fault recovery.	Fault
27	PV Reverse	Turn fault mode	PV reserve connection.	Cannot restore.	Fault
28	MCU fault	Turn fault mode	Internal MCU malfunction.	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

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
56	BMS disconnect	Alarm, lock standby mode.	No correct BMS communication response within 10 seconds.	Restore after communication recover.	Alarm
57	Over temperature	Alarm, battery does not charge.	The temperature of PFC or INV is above the set value.	Restore after temperature is under set value.	Alarm
58	Fan error	Alarm, if one fan fails and the other fan 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
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
70	Large voltage difference of the parallel battery	Alarm	The voltage difference of the parallel battery is too large.	Can restore.	Alarm
71	BAT short	Alarm	Battery short circuit.	Cannot restore.	Alarm
72	BAT cannot start up	Alarm	After power on, the battery voltage is lower than the allowable startup voltage.	Cannot restore.	Alarm
73	Overpower of generator	Alarm, shutdown the generator	The generator output power is higher than set value of generator max output power.	Restore after error clear up.	Alarm
74	Generator undervoltage	Alarm, shutdown the generator	The generator voltage is lower than set value.	Restore after error clear up.	Alarm
75	Generator overvoltage	Alarm, shutdown the generator	The generator voltage is higher than set value.	Restore after error clear up.	Alarm
76	Grid tie abnormal	Alarm, no power tie to grid	GTI setting page selects CT but CT is not connected, selects MET but the meter is not connected.	Cannot restore.	Alarm

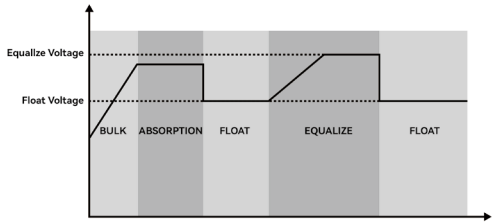
7. Battery Equalization

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.

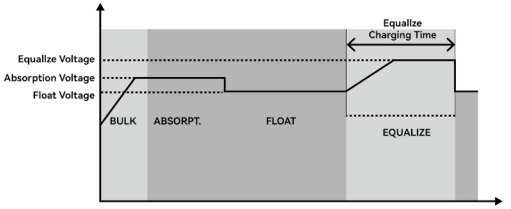
Note:*Don't activate this mode when using lithium batteries.

- 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.

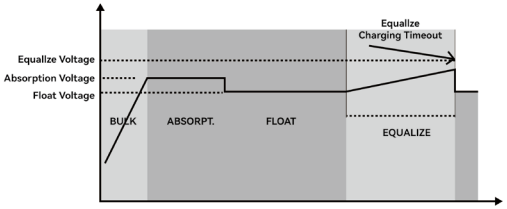
- When to Equalize
  In float stage, when the setting equalization interval (battery equalization cycle) is arrived, or equalization is active immediately, the controller will start to enter Equalize stage.



- 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	220VAC	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) 50/50.5HZ@60HZ(APP mode)	
	Freq. High loss / Comeback	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)	40A	40A

Note: When the specification of the external circuit breaker is greater than 40A, the maximum input current is 40A.

When the external circuit breaker specification is less than 40A, the maximum input current depends on the external circuit breaker specification.

8.2 Generator Specifications

Model	Item	Value	Comments
Input Voltage	Main topology	L + N + PE	
	Nominal voltage	220VAC	Settable: 208/220/230/240 Vac
	208/220/230/240 Vac	No	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) 40/70Hz@60Hz (APP mode)	
	Freq. High loss / Comeback	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)	40A	40A

8.3 Battery Specifications

* N= battery pieces

	Item	Value	Comments
Battery information	Battery Pieces	4pcs	12V/PCS
	Auto Restart Function	Yes	
	Battery test function	No	
	Battery type	VRLA/LI	
	Nominal Battery voltage	N*12V	@25℃
	Battery management	Yes	
Battery protection	Battery over Voltage	61V	
	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

8.4 Charger Specifications

	Item	Value	Comments
Charger (line mode)	Charging voltage	FV MODE: 54V Settable: 53.2~55.6V CV MODE: 56.4V Settable: 56~58V	
	Temperature Compensation	No	
	Charging Current	2~120A	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	9000W	
	Efficiency	99.5% max	
	Battery Voltage Accuracy	±0.3%	
	PV Voltage Accuracy	±2V	
	MPPT	60~450Vdc	
	Max PV voltage	520Vdc	
	Max PV charge current	120A	
Max charging current	/	120A (Maximum allowable) Default: 60A	Settable

8.5 Output Specifications

	Item	Value	Comments
Output power rating	Output topology	L1+N1+L2+N2+PE	
	Output power	6.5KW	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 220V, 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%	
Charger(PV)	102%<Load ≤120%	10 minutes minimum, then alarm and turn off output (operation environment temperature -10 - 50℃)	
	120%< Load ≤150%	1 minute minimum, then alarm and turn off output	
	150%<Load ≤200%	10 seconds minimum, then alarm and turn off output	
	Load>200%	5 seconds minimum, then alarm and turn off output	
Output short circuit protection	Battery mode	Current limitation	
	Line mode	Breaker (40A)	

8.6 Switch Time Specifications

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

8.7 Efficiency Specifications

	Item	Value	Comments
Efficiency	Line Mode	>99.5%@3Kva >99.5%@6Kva	Full R load, without battery connect.
	Battery Mode	>94.5%@1Kva >93.5%@3Kva >91.0%@6Kva	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℃ when not locked rotor, 65℃ 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.

Problem	Fault Event	Trigger conditions	What to do
LED screen display fault code 16	No boot program	The third digit of the communication is not 1.	Send command: TIDA1911000000000000
LED screen display fault code 20	CAN communication error	In battery mode, if the battery mode is set to mains power mode and the parallel mode is set to mains power mode, the number of responses from the slave devices does not match the previously defined number of slave devices. Receiving communication from two or more devices with a slave number of 0 consecutively.	1.Check if the parallel mode is set but the machine is turned on in single machine mode. 2.Check if the parallel connection cable and the parallel board are connected according to the parallel SOP (Standard Operating Procedure).
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 ≥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.