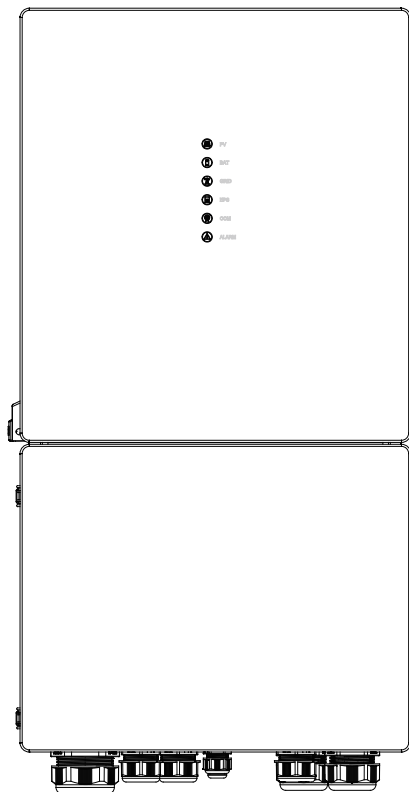


Version: US -UM-1.0



USER MANUAL

ESS Inverter

HISTORY

VERSION	ISSUED	COMMENTS
1.0	03-Feb.-23	First release

Preface

About This Manual

This manual describes the installation, connection, the use of APP, commissioning and maintenance etc. of ESS inverter. Please first read the manual and related documents carefully before using the product and store it in a place where installation, operation and maintenance personnel can access it at any time. The illustration in this user manual is for reference only. This user manual is subject to change without prior notice. (Specific please in kind prevail.)

Target Group

ESS inverters must be installed by professional electrical engineers who have obtained relevant qualifications.






Scope

This manual is applicable to following inverters:

- 5K US
- 6K US
- 8K US
- 10K US

Conventions

The following safety instructions and general information are used within this user manual.

 DANGER	Indicates an imminently hazardous situation which, if not correctly followed, will result in serious injury or death.
 WARNING	Indicates a potentially hazardous situation which, if not correctly followed, will result in serious injury or death.
 CAUTION	Indicates a potentially hazardous situation which, if not correctly followed, could result in moderate or minor injury.
 NOTICE	Indicates a potentially hazardous situation which, if not correctly followed, could result in equipment failure to run, or property damage.
 NOTE	Call attention to important information, best practices and tips: supplement additional safety instructions for your better use of the Three phase hybrid inverter to reduce the waste of you resource.

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9. Technical Specifications

1. Safety

Before using the inverter, please read all instructions and cautionary markings on the unit and manual. Put the instructions where you can take them easily.

The ESS inverter of ours strictly conforms to related safety rules in design and test. Local safety regulations shall be followed during installation, operation and maintenance. Incorrect operation work may cause injury or death to the operator or a third party and damage to the inverter and other properties belonging to the operator or a third party.

1.1 Symbols Used

Safety Symbol	Description
	Danger of high voltage and electric shock! Only qualified personnel may perform work on the inverter.
	Danger of high voltage. Residual voltage in the inverter need 5 mins to discharge, wait 5 mins before operation.
	Danger of hot surface
	Environmental Protection Use Period
	Refer to the operating instructions
	Product should not be disposed as household waste.
	Grounding terminal

1.2 Safety Precaution

- Installation, maintenance and connection of inverters must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and requirements of local power authorities and/or companies (for example: AS 4777 and AS/NZS 3000 IN Australia).
- To avoid electric shock, DC input and AC output of the inverter must be terminated at least 5 minutes before performing any installation or maintenance.
- The temperature of some parts of the inverter may exceed 60°C during operation. Do not touch the inverter during operation to avoid being burnt.
- Ensure children are kept away from inverters.
- Don't open the front cover of the inverter. A part from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.
- Static electricity may damage electronic components. Appropriate method must be adopted to prevent such damage to the inverter; otherwise the inverter may be damaged and the warranty annulled.
- Ensure the output voltage of the proposed PV array is lower than the maximum rated input voltage of the inverter; otherwise the inverter may be damaged and the warranty annulled.
- When exposed to sunlight, the PV array generates dangerous high DC voltage. Please operate according to our instructions, or it will result in danger to life.
- PV modules should have an IEC61730 class A rating.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Completely isolate the inverter before maintaining. Completely isolate the inverter should: Switch off the PV switch, disconnect the PV terminal, disconnect the battery terminal, and disconnect the AC terminal.
- Prohibit inserting or pulling the AC and DC terminals when the inverter is running.
- In Australia, the inverter internal switching does not maintain the neutral integrity, neutral integrity must be addressed by external connection arrangements.
- In Australia, the output of backup side in switchbox should be labeled main switch UPS supply, the output of normal load side in switchbox should be labeled mains switch inverter supply.
- Don't connect Three phase hybrid inverter in the following ways:
BACKUP Port should not be connected to grid;
The single PV panel string should not be connected to two or more inverters.

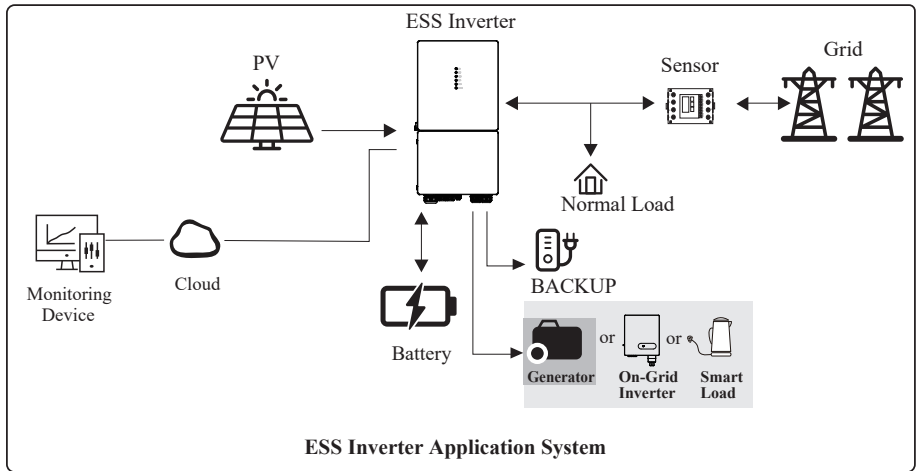
2. Product Introduction

2.1 Overview

ESS Inverter

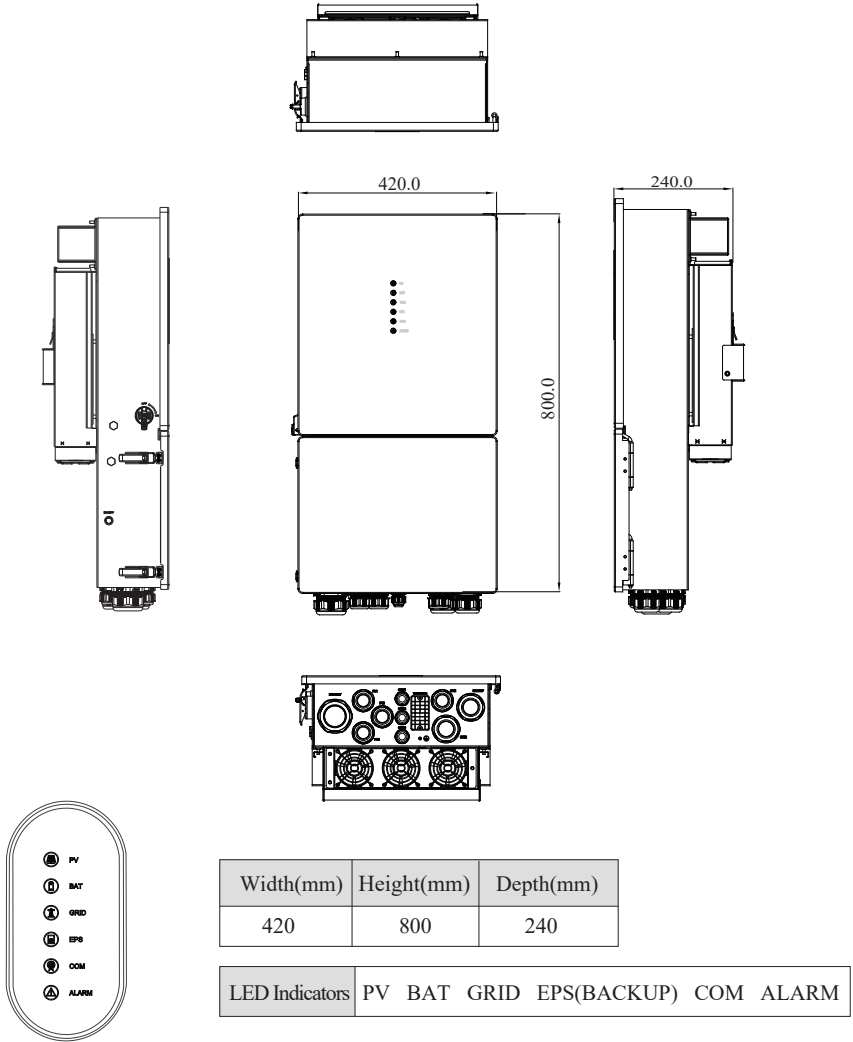
The hybrid inverters are high-quality inverter which can convert solar energy to AC energy and store energy into battery.

The inverter can be used to optimize self consumption, store in the battery for future use or feed into public grid. Work mode depends on PV energy and user's preference. It can provide power for emergency use during the grid lost by using the energy from battery and inverter (generated from PV).



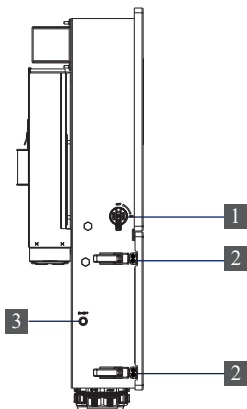
2.2 Product Appearance

2.2.1 ESS Inverter



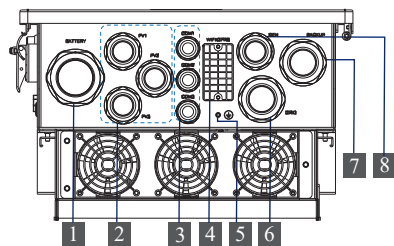
LED Details

The External View of ESS Inverter



1. PV Switch
2. Toggle Latch (for opening/closing the junction box cover)
3. ON/OFF Button

The Left View of ESS Inverter



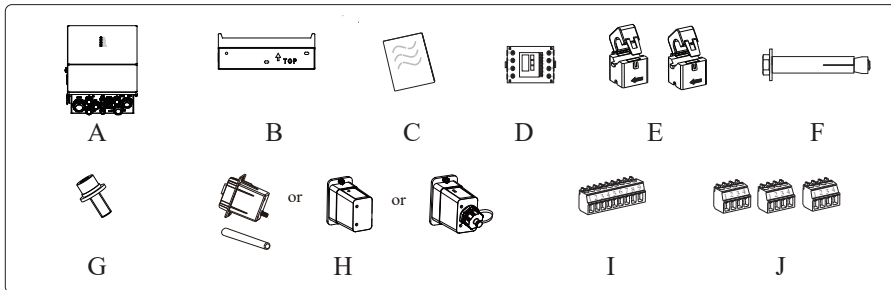
1. Battery Connect Terminals
2. PV Input Terminals
3. COM1/2/3 Ports (RS485, BMS, DRM, CT, DRY, RSD, PARA)
4. COM Port (WIFI/GPRS)
5. Grounding Terminal
6. GRID Output Terminal
7. BACKUP Terminal
8. GEN Terminal

The Bottom View of ESS inverter

3. Installation

3.1 Packing List

After unpacking, please check the following packing list carefully for any damage or missing parts. If any damage or missing parts occurs, contact the supplier for help.

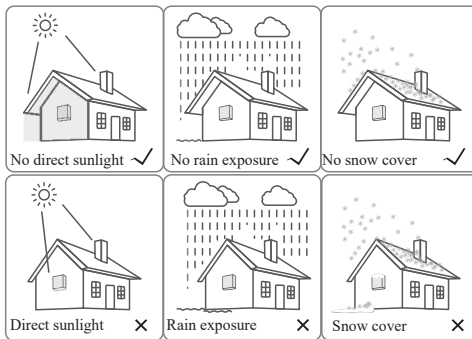


Number	Quantity	Description
A	1	Inverter
B	1	Mounting bracket
C	1	File package
D	1	Meter (Optional)
E	2	CT
F	3	M6 Expansion screws
G	1	M6 Security screw
H	1	GPRS/WIFI/LAN module (Optional)
I	1	9-Pins terminal
J	3	4-Pins terminal

3.2 Selecting the Mounting Location

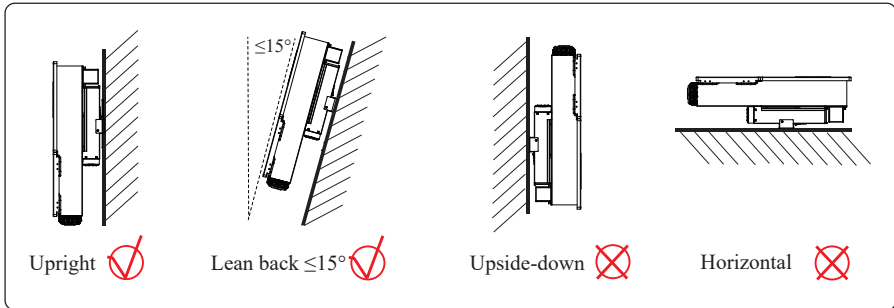
3.2.1 Installation Environment Requirements

- a. The storage inverter protection class is IP65 and can be mounted indoors or outdoors.
- b. The mounting location must be inaccessible to unrelated personnel since the enclosure and heat sinks are extremely hot during operation.
- c. Do not install the storage inverter in areas containing highly flammable materials or gases.
- d. To ensure optimum operation and long service life, the ambient temperature must be below 50°C.
- e. The storage inverter must be mounted in a well ventilated environment to ensure good heat dissipation.
- f. To ensure long service life, the storage inverter must not be exposed to direct solar irradiation, rain, or snow. It is recommended that the inverter be mounted in a sheltered place.
- g. The carrier where the inverter is mounted must be fire-proof. Do not mount the inverter on flammable building materials.
- h. Do not install the inverter in a rest area since it will cause noise during operation.
- i. The installation height should be reasonable and make sure it is easy to operate and view the display.
- j. Product label and warning symbols shall be clear to read after installation.
- k. Please avoid direct sunlight, rain exposure, snow cover.



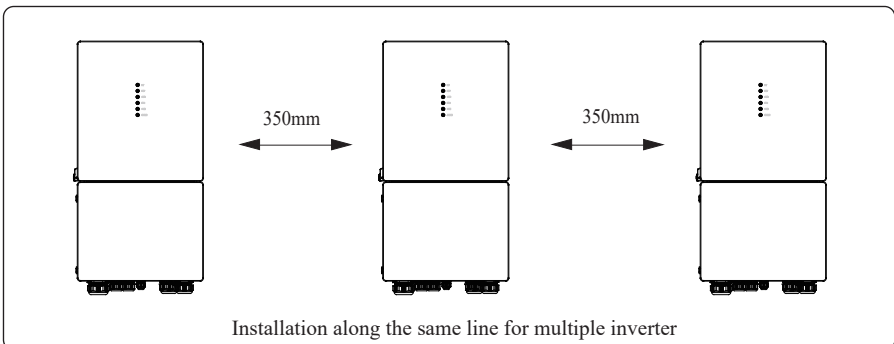
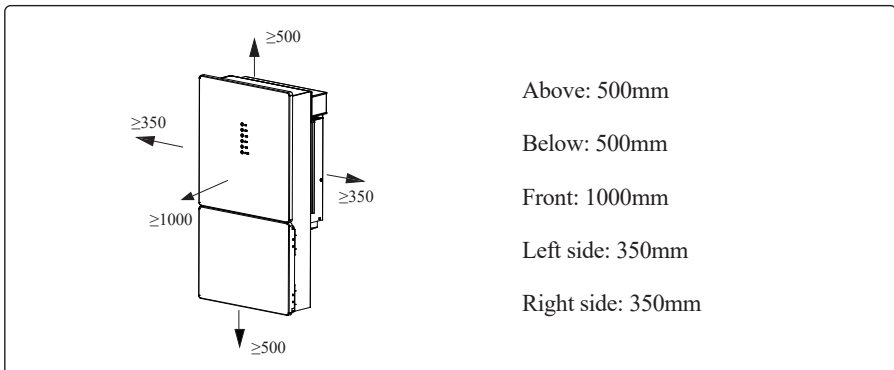
3.2.2 Mounting Requirements

Mount the inverter vertically or tilted backward by max 15°. The device can not be installed with a wrong mode and the connection area must point downward.



3.2.3 Installation Space Requirements

To ensure the inverter normally and easy to operate, there are requirements on available spaces of the inverter, e.g. to keep enough clearance. Refer to the following figures.

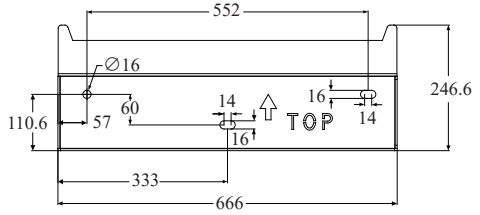


3.3 Mounting

Before mounting the inverter, you have to prepare expansion screws and a security screw.

Step 1. Install the mounting bracket

1. Use a level ruler to mark the position of the 3 holes on the wall. Refer to Figure a. And drill 3 holes, 16mm in diameter and 55mm in deep. Refer to Figure b.
2. Knock the expansion screw kit into the hole together with a hammer. Refer to Figure c.
Note: Do not remove the nut unit in this step.
3. After tightening 2-3 buckles, the expansion bolts are tight and not loose, and then unscrew the bolts, spring washer, gasket. Refer to Figure c.
4. Install and fix the mounting bracket on the wall. Refer to Figure d.



Unit: mm

Step 2. Install the inverter on the mounting bracket. Then lock the inverter using the security screw. Refer to Figure e, Figure f.

<p>a Hold the wall bracket horizontally. Mark the holes position on the wall.</p>	<p>b Drill the holes. Ø: 16mm; Depth: 55mm</p>	<p>c Install the expansion tubes. Expansion screw group (M6; 3 suites)</p>
<p>d</p>	<p>e Install the inverter.</p>	<p>f M6 Security screw; 2.5N·m</p>

<p>DANGER</p>	<p>Before drilling the hole on the wall, ensure no damage on the electric wire and/or water pipe inside the wall.</p>
<p>CAUTION</p>	<p>To prevent potential damages and injuries from inverter falling down, please hang the inverter on the bracket, do not loosen grip unless confirm that the inverter is well mounted.</p>

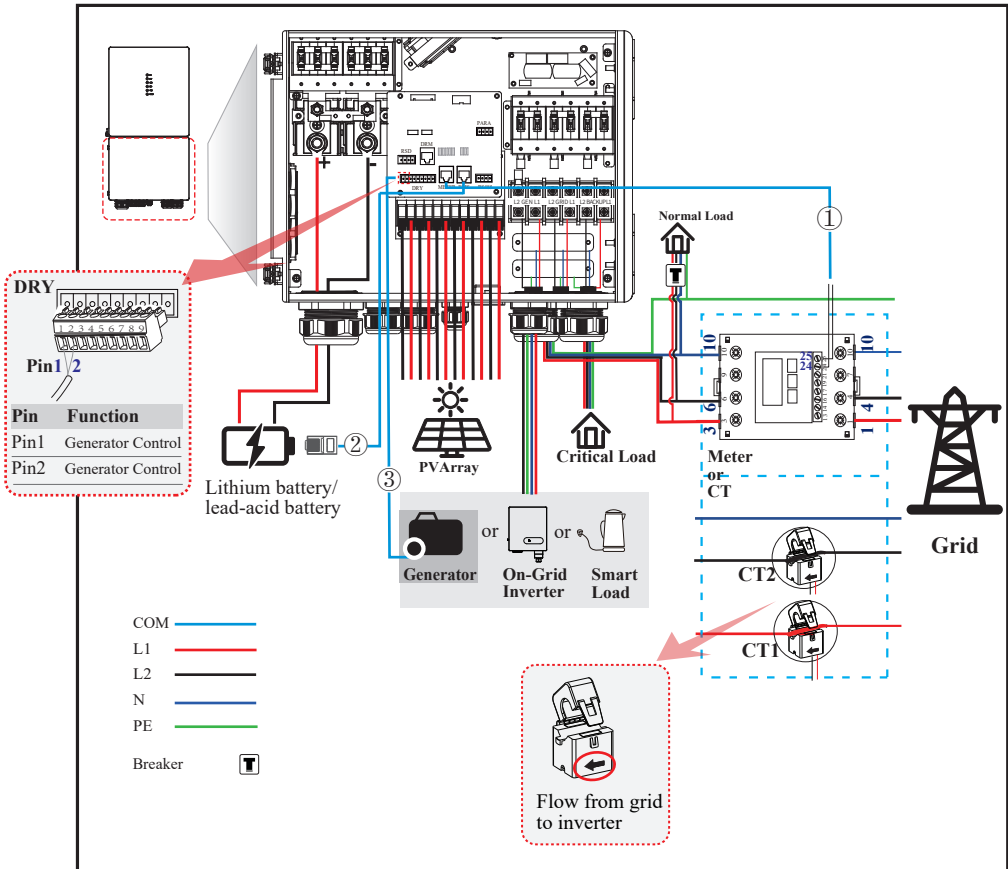
4. Electrical Connection

This chapter shows the detailed connections of ESS inverter. The following illustration only uses the hybrid inverter as an example.

ESS inverter system connection diagram:

Non-parallel connection mode

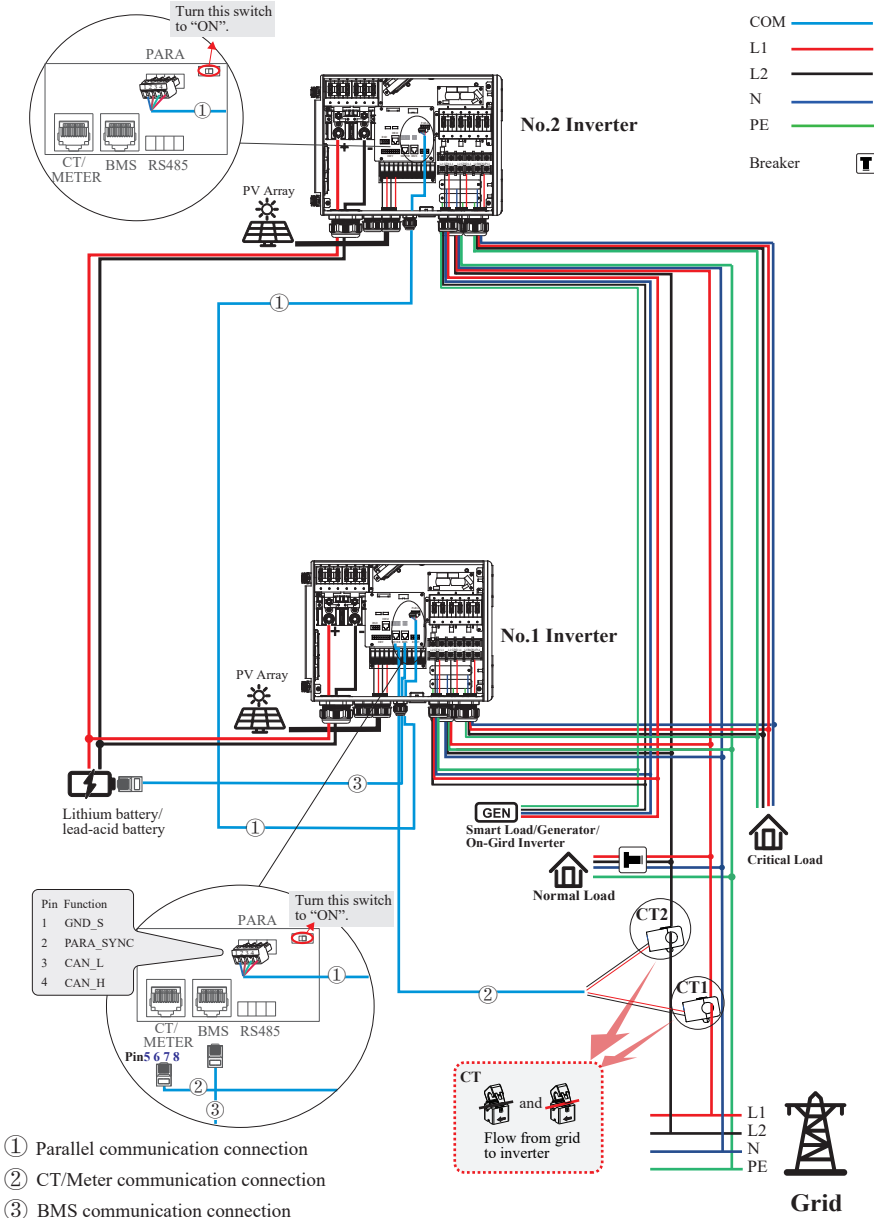
Split phase (120/240Vac) connection diagram (US)



DANGER

Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, fatal injury can occur due to the high voltage.

Split Phase parallel connection mode-Scheme A (N=2)



Note:

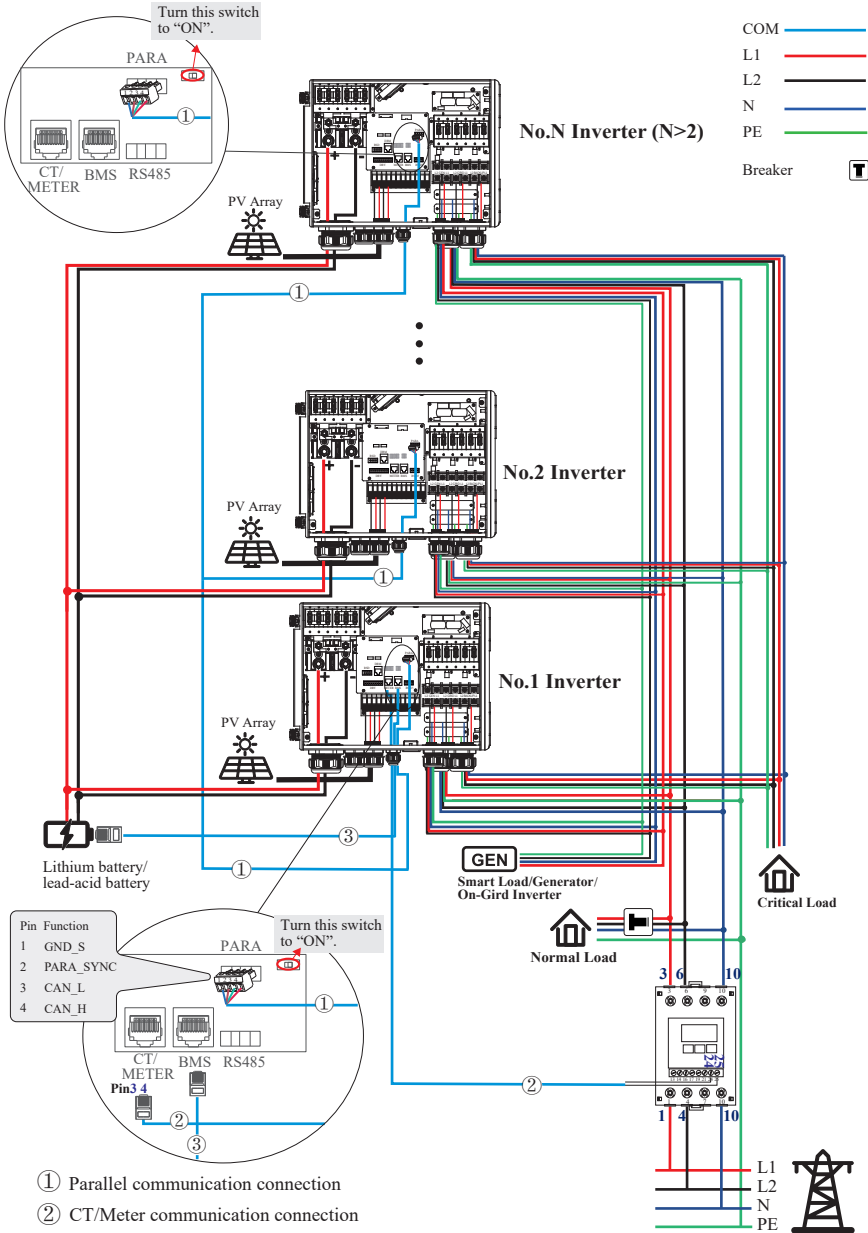
1. PV related contents are N/A for AC Couple inverter.
2. BMS communication connection is only for lithium battery.
3. It is necessary to turn the matched resistance switch of No. 1 inverter and No. 2 inverter to “ON” in parallel connection mode.
4. With parallel connection mode, it is necessary to connect APP to one of inverters and then go to [Console > Other Setting](#) page to enable [Parallel mode](#) on APP.
5. About breakers:
DC breaker on BATTERY side: 300A
AC breaker on GEN side $\geq 60A$
AC breaker on Grid side $\geq 70A$
AC breaker on Backup side $\geq 70A$



DANGER

Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, fatal injury can occur due to the high voltage.

Split Phase parallel connection mode-Scheme B (N>2)



* These communication cables can be connected to any inverter, but they must be inserted into the same inverter and we call this inverter No. 1 inverter.

Note:

1. PV related contents are N/A for AC Couple inverter.
2. BMS communication connection is only for lithium battery.
3. It is necessary to additionally purchase suitable CT and meter according to the specific requirements in parallel connection mode-Scheme B.
4. It is necessary to turn the matched resistance switch of No. 1 inverter and No. N inverter to "ON" in parallel connection mode.
5. With parallel connection mode, it is necessary to connect APP to one of inverters and then go to [Console > Other Setting](#) page to enable [Parallel mode](#) on APP.

6. About breakers:

DC breaker on BATTERY side: 300A

AC breaker on GEN side $\geq 60A$

AC breaker on Grid side $\geq 70A$

AC breaker on Backup side $\geq 70A$

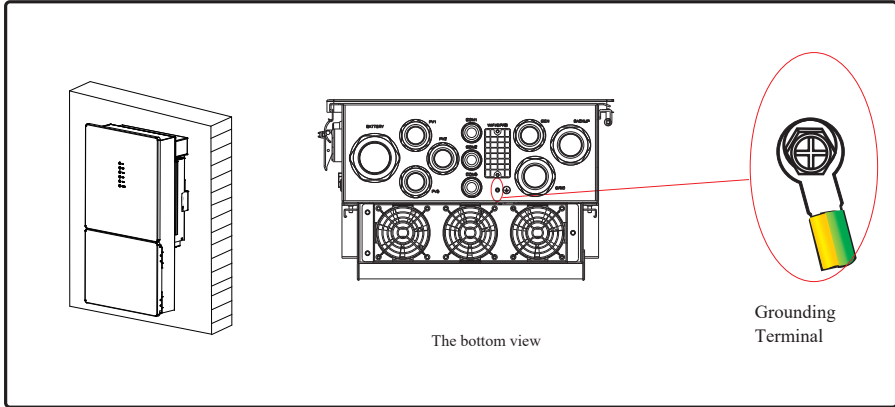




DANGER

Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, fatal injury can occur due to the high voltage.

4.1 Grounding

A protective earth (PE) terminal is equipped at the side of the inverter. Please be sure to connect this PE terminal to the PE bar for reliable grounding. AWG 2 or 4 yellow green lines are recommended.



 WARNING	The inverter must be grounded; otherwise, there may be an electric shock risk.
 CAUTION	If the positive pole or negative pole of the PV array is required to be grounded, then the inverter output (to AC grid) must be isolated by transformer in accordance with IEC62109-1, -2 standards.

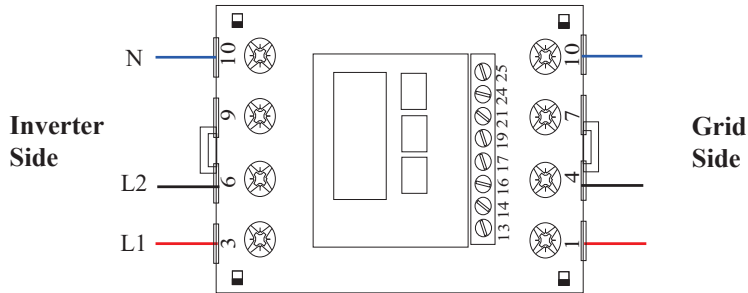
4.2 Meter/CT Connection

You can monitor usage with a meter or a CT.

4.2.1 Meter Connection

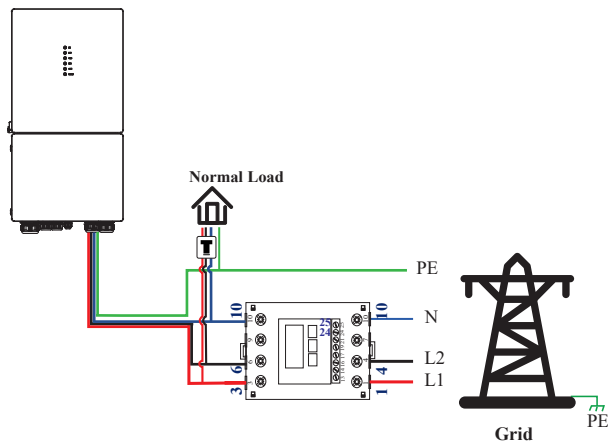
This section is applicable to non-parallel connection mode only.

ESS inverter supports the meter CHINT-DTSU666 meter by default. The meter is optional.



Before connecting to Grid, please install a separate AC breaker ($\geq 70\text{A}$; not equipped) between meter and Grid. This will ensure the inverter can be safely disconnected during maintenance.

The connection diagram of power cable of meter is shown in the figure below:

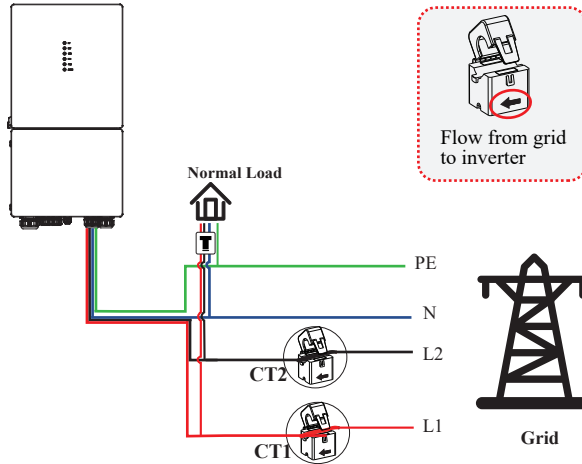


Please refer to the meter instruction manual for details.


4.2.2 CT Connection

Before connecting to Grid, please install a separate AC breaker ($\geq 70A$; not equipped) between CT and Grid. This will ensure the inverter can be safely disconnected during maintenance.

The connection diagram of power cable of CT is shown in the figure below:

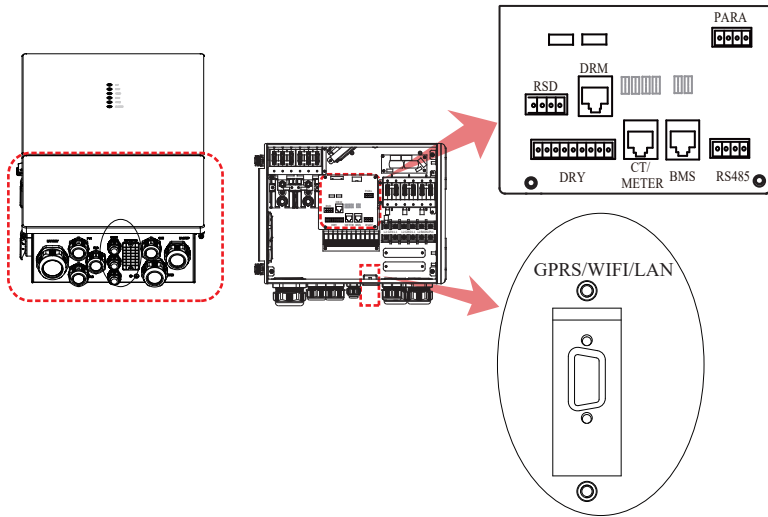


Please attention to the Current interchanger (CT) connection. The arrow on the CT indicates the current flow from grid to inverter. And lead the live line through the detection hole of CT.

 NOTE	The current direction from grid to inverter is defined as positive and current direction from inverter to grid is defined as negative.
---	--

4.3 Communication Connection

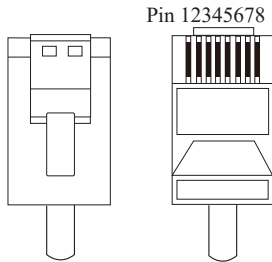
There are communication interfaces in the communication port on the bottom of the inverter as show below :



Interface		Descriptions
PARA		4-Pins interface for parallel communication
		A matched resistance switch for parallel communication
RS485		4-Pins interface for RS485 communication
DRM		Demand response mode for Australia application
METER		For Meter communication or Grid current sense
BMS		Lithium battery communication interface
9-Pins	GEN	Generator control
	NTC	Temperature sensor terminal of lead-acid battery
	RMO	Remote off control
	DRY	DI/DO control
RSD		RSD control interface
GPRS/WIFI/LAN		For GPRS/WIFI/LAN communication

4.3.1 BMS Connection (Only for Lithium Battery)

RJ45 Terminal Configuration of Battery Communication (BMS)

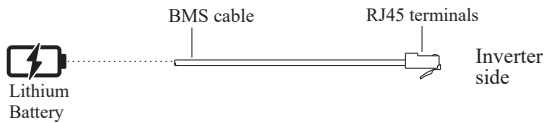


PIN	1	2	3	4
Function Description	RS485_A	RS485_B	/	CAN_H
PIN	5	6	7	8
Function Description	CAN_L	/	/	/

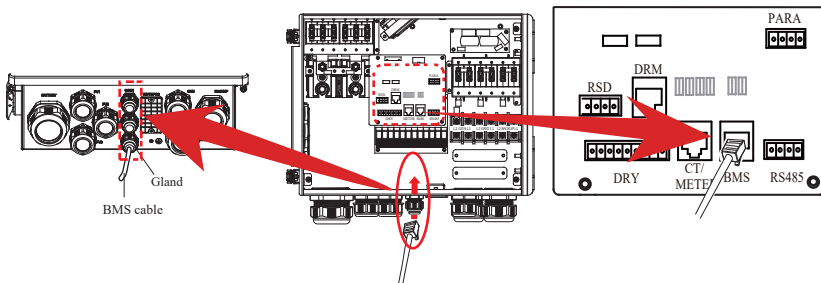
This manual describes the cable sequence of the inverter. For details about the cable sequence of the battery, see the manual of the battery you used.

Refer to the following steps:

- a. Make the RJ45 terminal according to above function description of each Pin definition.

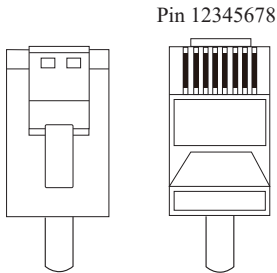


- b. Lead the BMS cable through the gland. And insert the RJ45 terminals into corresponding ports.



4.3.2 Meter Connection

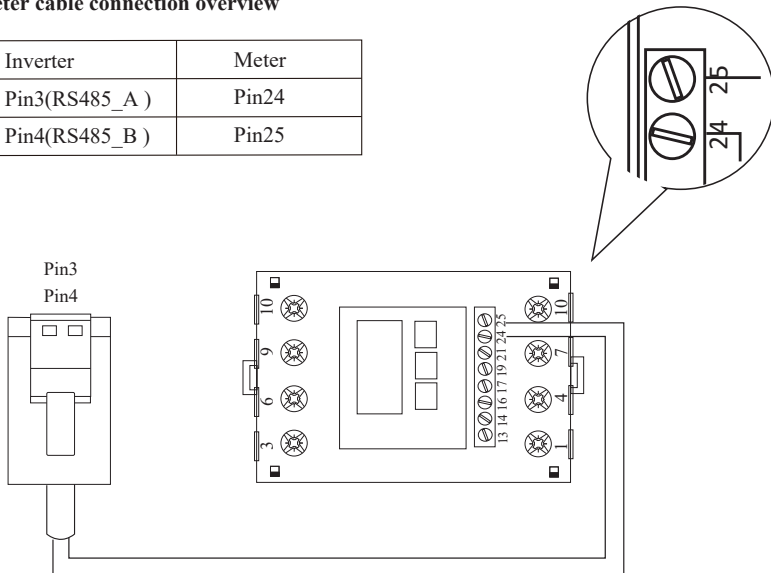
RJ45 Terminal Configuration of Meter Communication



PIN	1	2	3	4	5	6	7	8
Function Description	/	/	RS485_A	RS485_B	/	/	CT1+	CT1-

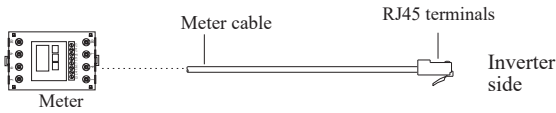
Meter cable connection overview

Inverter	Meter
Pin3(RS485_A)	Pin24
Pin4(RS485_B)	Pin25

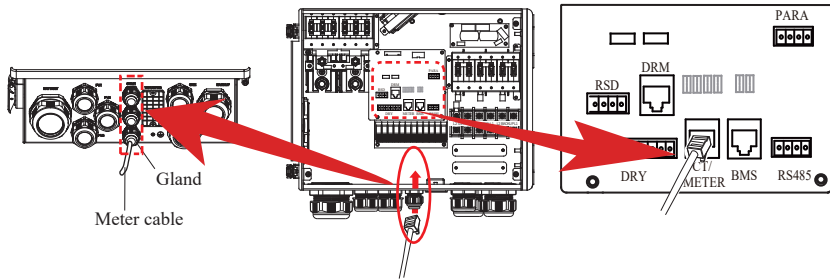


Connect meter. Refer to the following steps:

a. Make the RJ45 terminal according to above function description of each Pin definition.



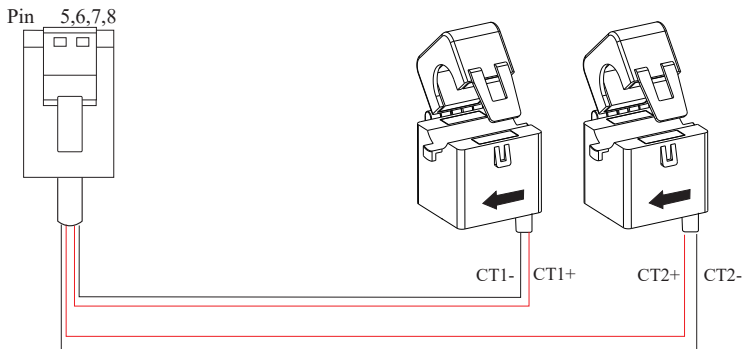
b. Lead the meter communication cable through the gland. And insert the RJ45 terminals into corresponding ports.



4.3.3 CT Connection

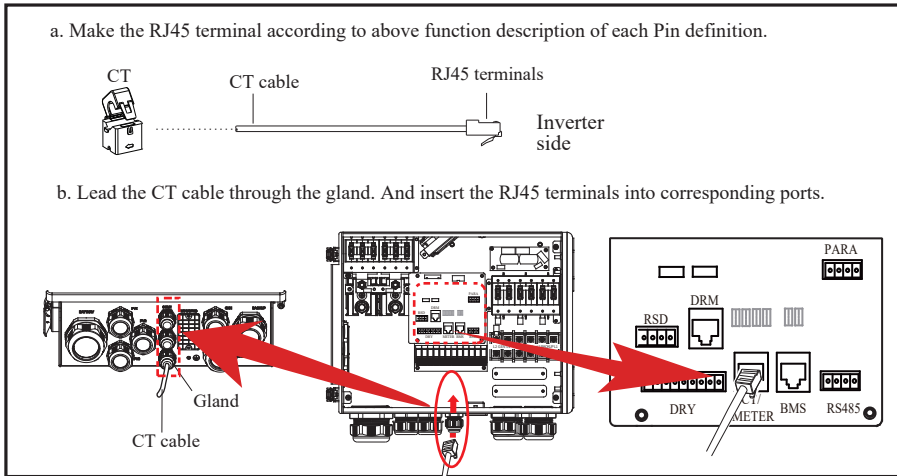
This section is applicable to non-parallel connection mode and parallel connection-scheme A only.

CT cable connection overview



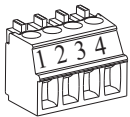
Inverter	CT
Pin5(CT2-)	Black
Pin6(CT2+)	Red
Pin7(CT1+)	Red
Pin8(CT1-)	Black

Connect CT. Refer to the following steps:



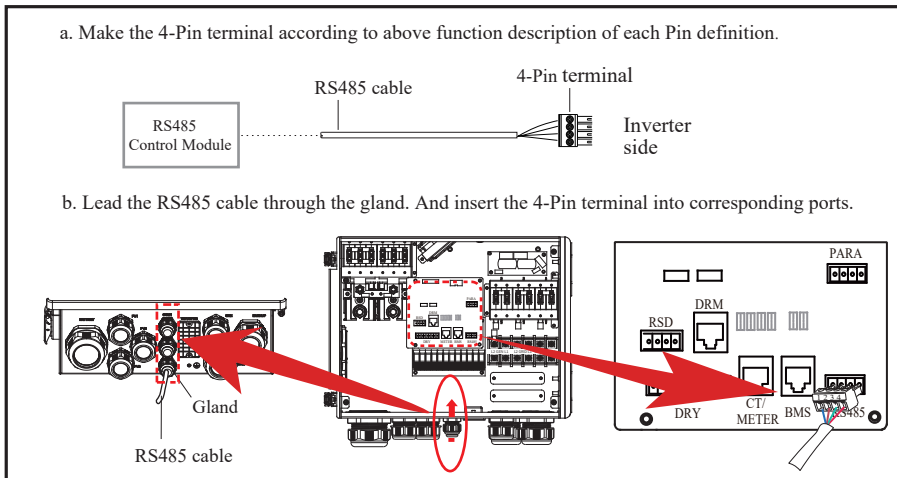
4.3.4 RS485 Connection

4-Pin Terminal Configuration of RS485 Communication



PIN	1	2	3	4
Function Description	RS485_A	RS485_B	PE	PE

Connect RS485. Refer to the following steps:



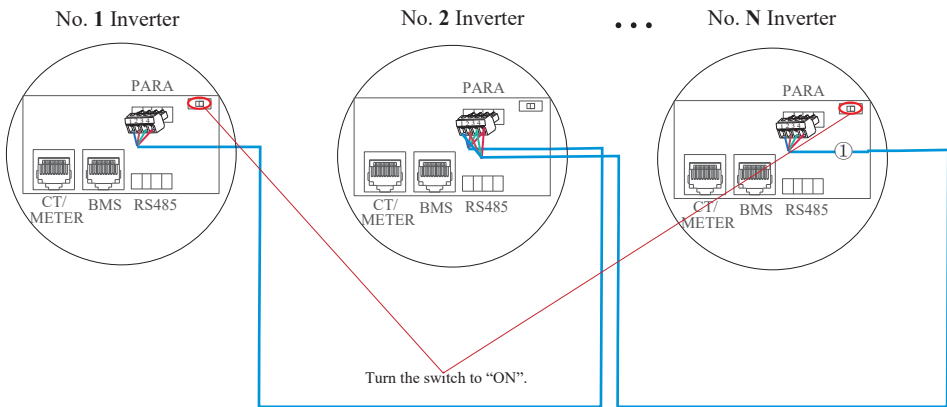
4.3.5 Parallel Communication Connection

4-Pin Terminal Configuration of parallel Communication



PIN	1	2	3	4
Function Description	GND_S	PARA_SYNC	CAN_L	CAN_H

Parallel communication cable connection overview

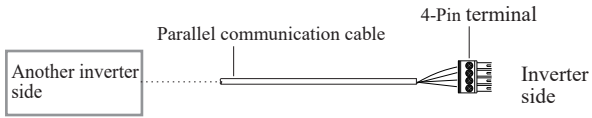


It is necessary to turn the matched resistance switch of No. 1 inverter and No. N inverter to “ON” in parallel connection mode.

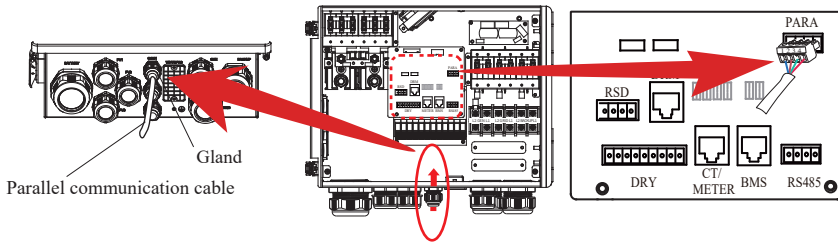
No. 1 Inverter	No. 2 Inverter	...	No. N Inverter
Pin4(CAN_H)	Pin4(CAN_H)		Pin4(CAN_H)
Pin3(CAN_L)	Pin3(CAN_L)		Pin3(CAN_L)
Pin2(PARA_SYNC)	Pin2(PARA_SYNC)		Pin2(PARA_SYNC)
Pin1(GND_S)	Pin1(GND_S)		Pin1(GND_S)

Refer to the following steps:

- a. Make the 4-Pin terminal according to above function description of each Pin definition.



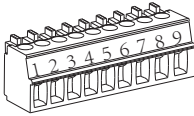
- b. Lead the Parallel communication cable through the gland. And insert the 4-Pin terminal into corresponding ports.



4.3.6 NTC/RMO/DRY Connection(s)

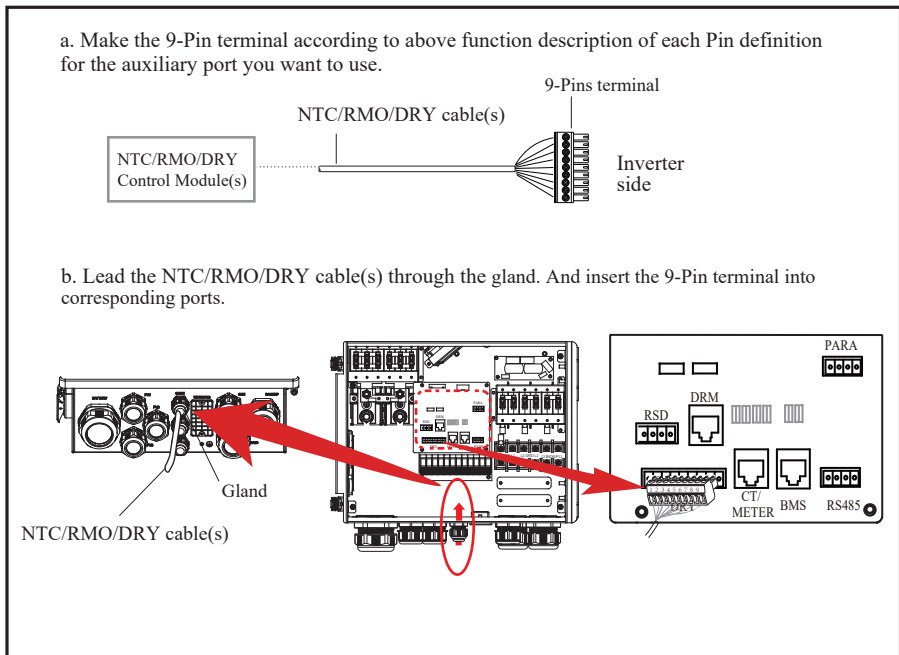
9-Pin Terminal Configuration of Auxiliary Communication

Pin 123456789



PIN	Function Description
1	GEN Control
2	GEN Control
3	NC1 (Normal Close)
4	NC2 (Normal Close)
5	N2
6	NC2 (Normal Close)
7	REMO OFF
8	GND S(NTC BAT)
9	NTC BAT+

Refer to the following steps:



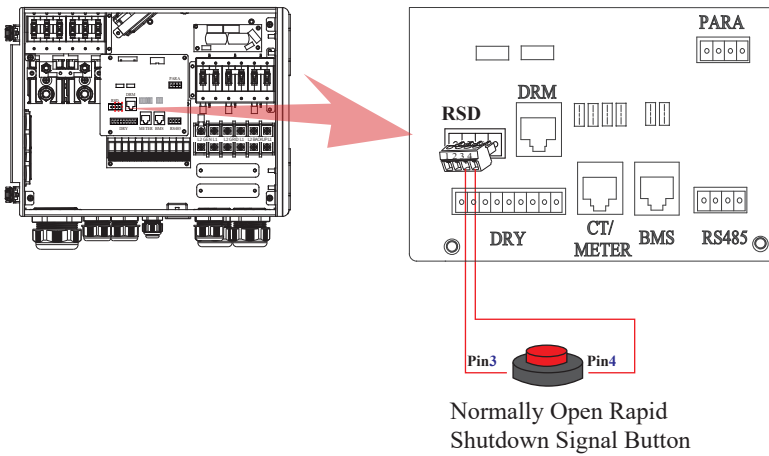
4.3.7 RSD Connection(s)

4-Pins Terminal Configuration of RSD Communication



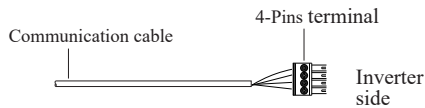
PIN	1	2	3	4
Function Description	+12V	GND	Emergency Stop Signal Button	

Emergency Stop Signal:

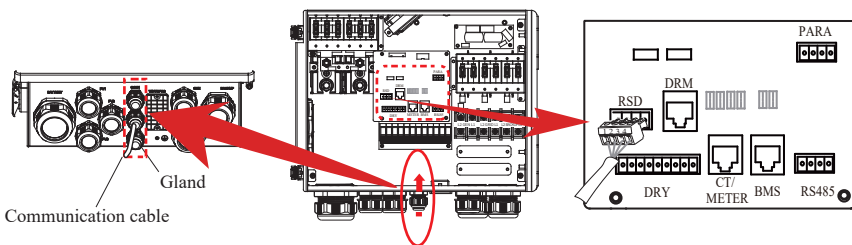


Refer to the following steps:

- Make the 4-Pins terminal according to above function description of each Pin definition.



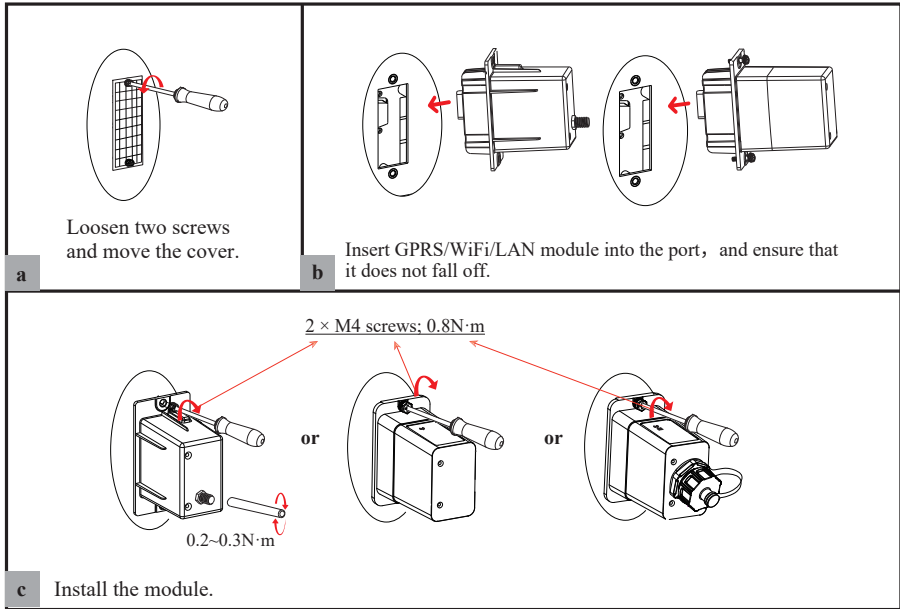
- Lead the communication cable through the gland. And insert the 4-Pins terminal into corresponding ports.



4.3.8 GPRS/WIFI/LAN Module Connection (Optional)

For details, please refer to the corresponding Module Installation Guide in the packing.

The appearance of modules may be slightly different. The figure shown here is only for illustration.



5. System Operation

5.1 Inverter Working Mode

The inverter supports several different working modes.

5.1.1 Self Used Mode

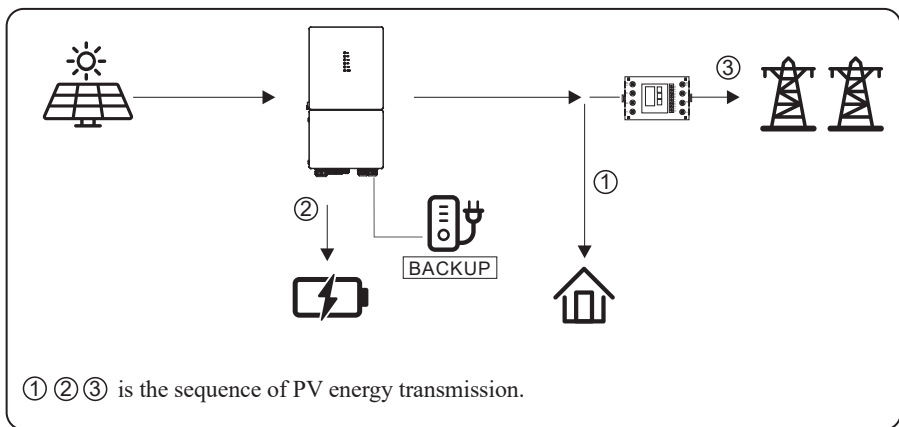
Go to the "Hybrid work mode" menu, and select the "Self used mode" working mode.

Under Self Used mode, the priority of PV energy will be Load > Battery > Grid, that means the energy produced by PV gives priority to local loads, excess energy is used for charging the battery, and the remaining energy is fed into the grid.

This is the default mode to increase self-consumption rate. There are several situations of Self used working mode based on PV energy.

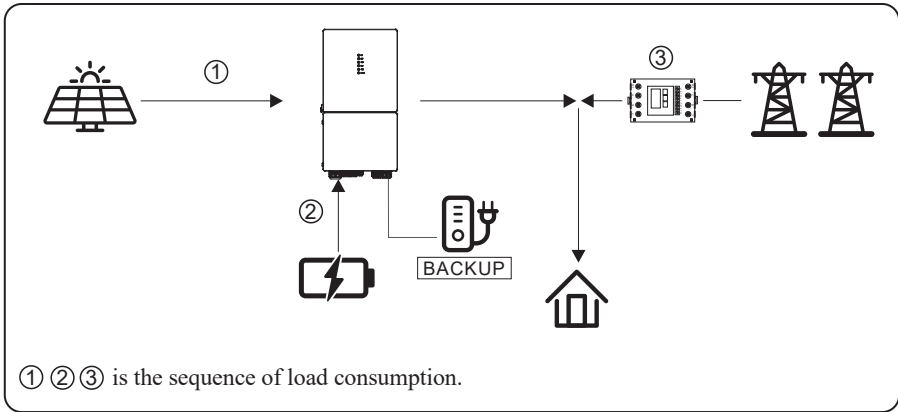
a) Wealthy PV Energy

When PV energy is wealthy, the PV energy will first consumed by loads, the excess energy will be used to charge the battery. then the remaining energy will be fed into the grid.



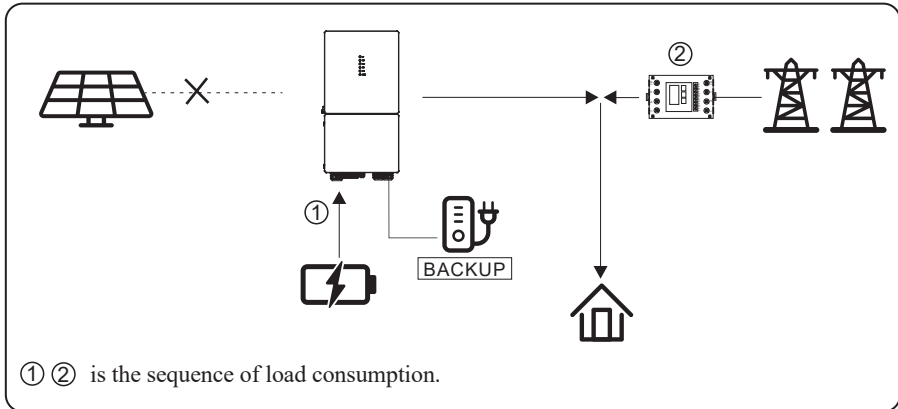
b) Limited PV power

When the PV energy is not enough to cover all the loads, all the PV energy will be used for load, and the insufficient part will be supported by battery. Then still insufficient parts will be supported by grid.



c) No PV Input

The inverter will first discharge the battery energy for home load consuming when no PV input(such as in the evening or some cloudy or rainy days). If the demand is not met then will consume the grid energy.

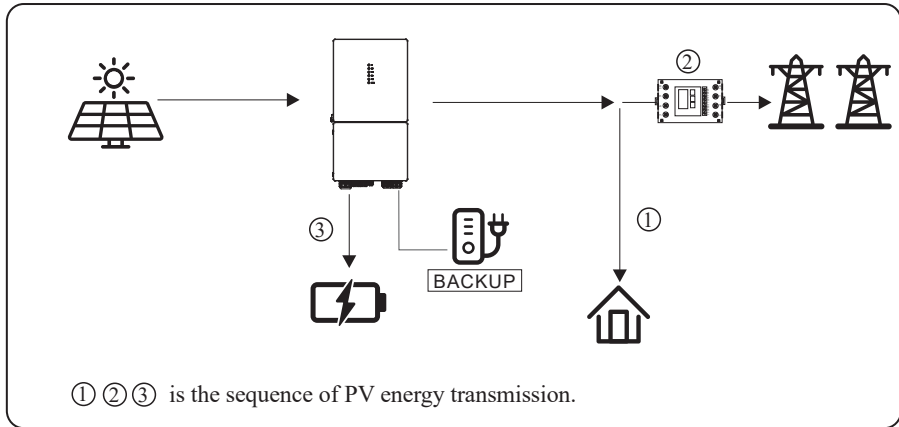


5.1.2 Feed-in Priority Mode

Go to the "Hybrid work mode" menu, and select the "Feed-in priority mode" working mode. Under this mode, the priority of PV energy will be Load > Grid > Battery, that means the energy produced by PV gives priority to local loads, excess energy is fed into the grid, and the remaining energy is used for charging the battery.

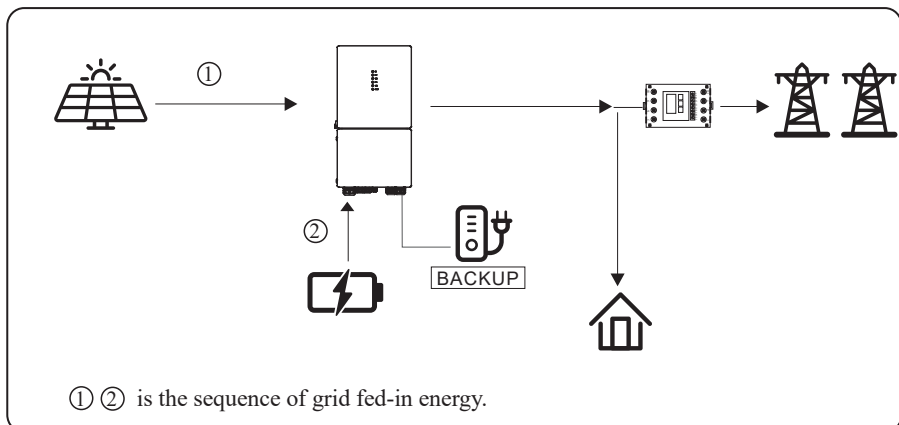
a) Wealthy PV Energy

When PV energy is wealthy, the PV energy will be first consumed by loads, if there is excess PV power, then the excessive power will be fed into grid. If there is still PV energy rested after load consuming and grid feeding, then the rested PV power will be used to charge the battery.



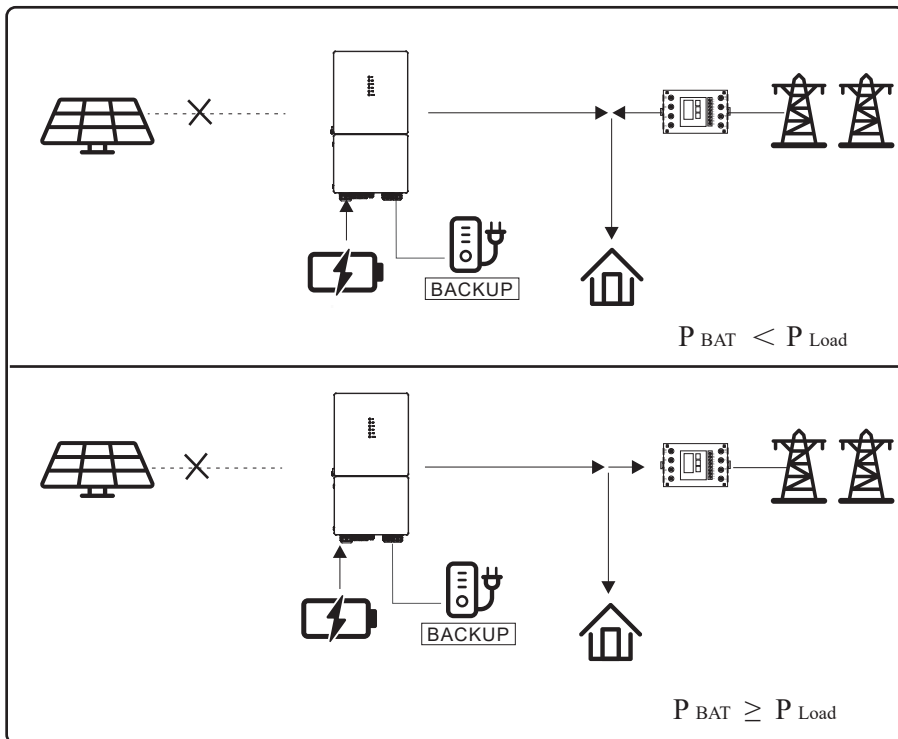
b) Limited PV Energy

When PV energy is limited and can not meet the feed-in grid power, the battery will discharge to meet it.



c) No PV Input

The inverter will first discharge the battery energy for home load consuming when no PV input (such as in the evening or some cloudy or rainy days). If the demand is not met then will consume the grid energy.



5.1.3 Time-Based Control Mode

Go to the "Hybrid work mode" menu, and select the "Time-based Control" working mode. Under this mode, you can control the charging and discharging of the inverter. You can set the following parameters based on your requirements:

- Charge and discharge frequency: one time or daily
- Charging start time: 0 to 24 hours
- Charging end time: 0 to 24 hours
- Discharge start time: 0 to 24 hours
- Discharge end time: 0 to 24 hours

You can also choose whether to allow the grid to charge the battery, which is prohibited by default. If the user enable the "Grid charge function" , the "Maximum grid charger power" and "Capacity of grid charger end" can be set. When the battery capacity reaches the set value of "Capacity of grid charger end", the grid will stop charging the battery.

5.1.4 Back-up Mode

Go to the "Hybrid work mode" menu, and select the "Back-up Mode" working mode.

Under this mode, the priority of PV energy will be Battery > Load > Grid.

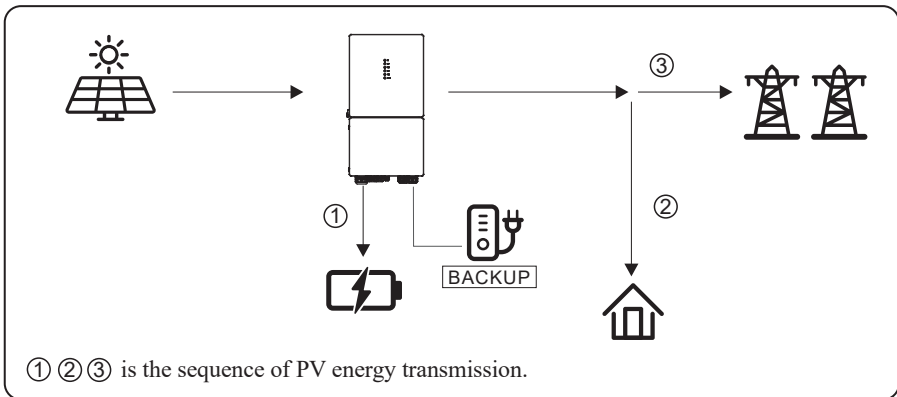
This mode aims at charging the battery quickly, and at the same time, you can choose whether to allow AC to charge the battery.

Forbid AC charging

In this mode, the battery can be charged only with PV power, and the charging power varies with PV power.

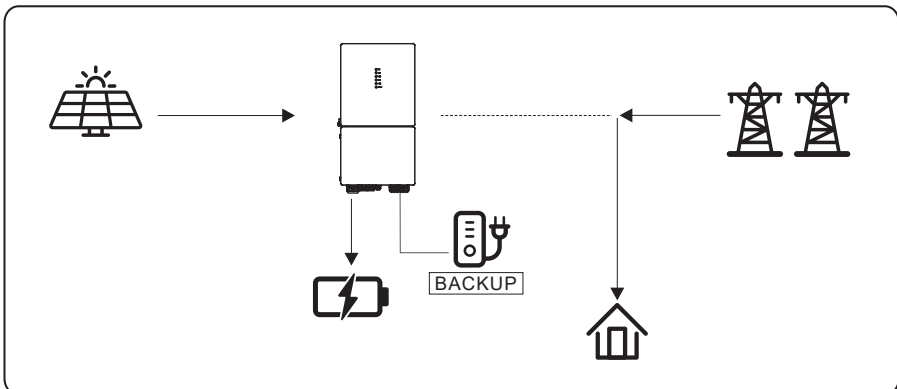
a) Wealthy PV power

When PV energy is wealthy, PV charges the battery first, then meets the load, and the rest is fed into the grid.



b) Limited PV power

When PV energy is limited, PV gives priority to charging the battery, and the grid directly meets the load demand.

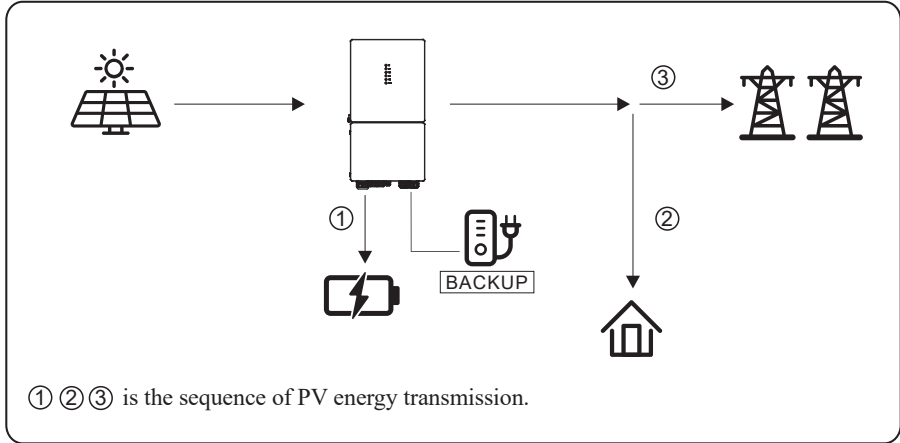


Allow AC charging

In this situation, the battery can be charged both with PV and AC.

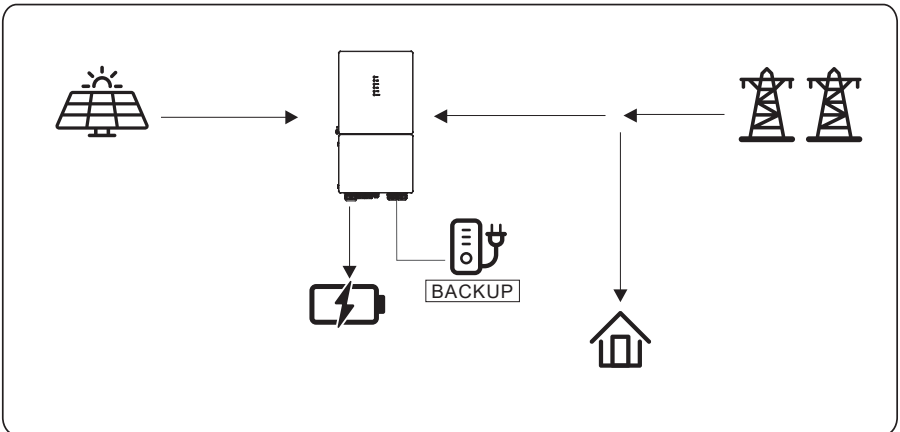
a) Wealthy PV power

When PV energy is wealthy, PV charges the battery first, then meets the load, and the rest is fed into the grid.



b) Limited PV power

When the PV energy is not enough to charge the battery, the grid energy will charge the battery as supplement. Meanwhile, the grid energy is consumed by loads.



5.1.5 Off Grid Mode

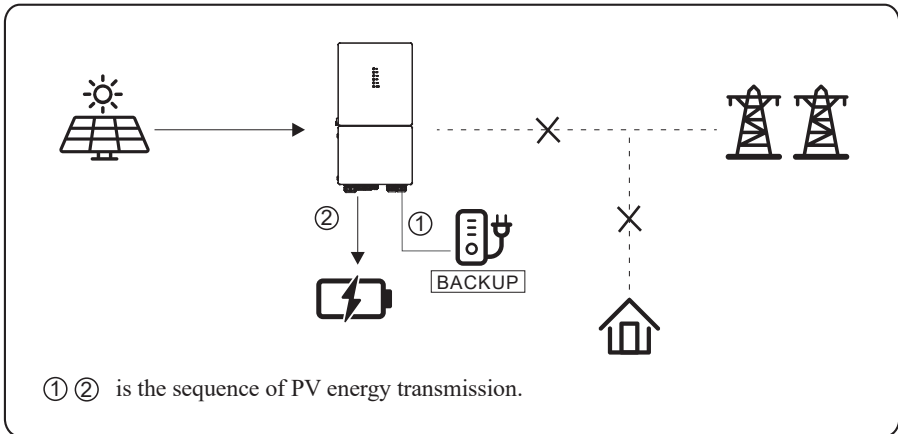
When the power grid is cut off, the system automatically switches to Off Grid mode.

Under off-grid mode, only critical loads are supplied to ensure that important loads continue to work without power failure.

Under this mode, the inverter can't work without the battery.

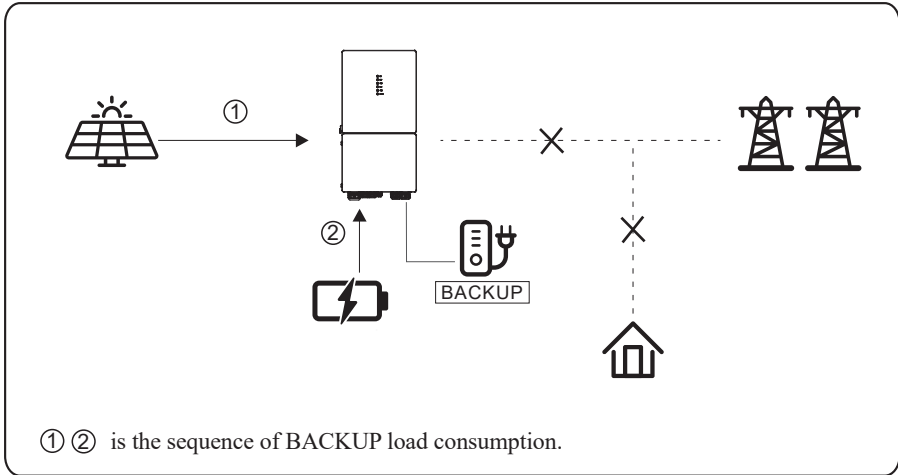
a) Wealthy PV power

When PV energy is wealthy, the PV power will be first consumed by critical load, charges battery then smart load.



b) Limited PV power

When PV energy is limited, BACKUP loads are first powered by PV and then supplemented by battery.



NOTICE

- Under this mode, please complete the output voltage and frequency settings.
- It is better to choose the battery capacity larger than 100Ah to ensure BACKUP function work normally.
- If BACKUP output loads are inductive or capacitive loads, to make sure the stability and reliability of system, it is recommended to configure the power of these loads to be within 50% of BACKUP output power range.

5.2 Startup/Shutdown Procedure

5.2.1 Startup Procedure

Check and confirm that the installation is secure and strong enough and that the system grounding is OK. Then confirm the connections of AC, battery, PV etc. are correct. Confirm the parameters and configurations conform to relevant requirements.

AC Frequency	50/60Hz	PV Voltage	70~540V
Battery Voltage	40~64V	Grid AC Voltage	120/240V(Split phase) /208V(2/3 phase)

Make sure all the above aspects are right, then follow the procedure to start up the inverter:

- 1) Power on the PV.
- 2) Power on the battery.
- 3) Power on the AC.
- 4) Power on the EPS(BACKUP).
- 5) Connect the cell phone App via blue-tooth. Please refer to Section 7.2 for details.
- 6) Click the Power ON on the App for the first time. Please refer to Section 7.2 for details.

And you can press the button on the side of the inverter for 1 seconds in this step when performing subsequent startup.

5.2.2 Shutdown Procedure

According to actual situation, if have to shut-down the running system, please follow below procedure:

- 1) Connect the cell phone App via blue-tooth. Please refer to Section 7.2 for details.
- 2) Click the Power OFF on the App. Please refer to Section 7.2 for details. Or you can press the button on the side of the inverter for 5 second in this step when performing subsequent startup.
- 3) Power off the EPS(BACKUP).
- 4) Power off the AC.
- 5) Power off the Battery.
- 6) Power off the PV.
- 7) If need to disconnect the inverter cables, please wait at least 5 minutes before touching these parts of inverter.

6. Commissioning

It is necessary to make a complete commissioning of the inverter system. This will essentially protect the system from fire, electric shock or other damages or injuries.

6.1 Inspection

Before commissioning, the operator or installer (qualified personnel) must inspect the system carefully and make sure:

- 1) The system is firmly and correctly installed by following the contents and notifications of this manual, and there are enough spaces for operation, maintenance and ventilation.
- 2) All the terminals and cables are in good status without any damages.
- 3) No items are left on the inverter or within the required clearance section.
- 4) The PV, battery pack is working normally, and grid is normal.

6.2 Commissioning Procedure

After inspection and making sure status is right, then start the commissioning of the system.

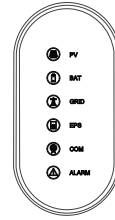
- 1) Power on the system by referring to the Startup section 5.2.1.
- 2) Setting the parameters on the App according to user's requirement.
- 3) Finish commissioning.

7. User Interface

7.1 LED

This section describes the LED panel. LED indicator includes PV, BAT, GRID, EPS(BACKUP), COM, ALARM indicators.

It includes the explanation of indicator states and summary of indicator states under the running state of the machine.



LED Indicator	Status	Description
PV	On	PV input is normal.
	Blink	PV input is abnormal.
	Off	PV is unavailable.
BAT	On	Battery is charging.
	Blink	Battery is discharging. Battery is abnormal.
	Off	Battery is unavailable.
GRID	On	GRID is available and normal.
	Blink	GRID is available and abnormal.
	Off	GRID is unavailable.
COM	On	Communication is ok.
	Off	Power supply is unavailable.
EPS (BACKUP)	On	EPS(BACKUP) power is available.
	Blink	EPS(BACKUP) output is abnormal.
	Off	EPS(BACKUP) power is unavailable.
ALARM	On	Fault has occurred and inverter shuts down.
	Blink	Alarms has occurred but inverter doesn't shut down.
	Off	No fault.

Details	Code	PV LED	Grid LED	BAT LED	EPS LED	COM LED	ALARM LED
PV normal		●	○	○	○	○	○
No PV		○	○	○	○	○	○
PV over voltage	B0						
PV under voltage	B4						
PV irradiation weak	B5	★	○	○	○	○	○
PV string reverse	B7						
PV string abnormal	B3						
On grid		○	●	○	○	○	○
Grid over voltage	A0						
Grid under voltage	A1						
Grid absent	A2						
Grid over frequency	A3	○	★	○	○	○	○
Grid under frequency	A4						
Grid abnormal	A6						
Grid over mean voltage	A7						
Neutral live wire reversed	A8						
Battery in charger		○	○	●	○	○	○
Battery absent	D1	○	○	○	○	○	○
Battery in discharge		○	○	★★	○	○	○
Battery under voltage	D3						
Battery over voltage	D2						
Battery discharge over current	D4	○	○	★	○	○	○
Battery over temperature	D5						
Battery under temperature	D6						
Communication loss (Inverter - BMS)	D8						
EPS(BACKUP) output active		○	○	○	●	○	○
EPS(BACKUP) output inactive		○	○	○	○	○	○
EPS(BACKUP) short circuit	DB						
EPS(BACKUP) over load	DC	○	○	○	★	○	○
EPS(BACKUP) output voltage abnormal	D7						
EPS(BACKUP) over dc-bias voltage	CP						

Details	Code	PV LED	Grid LED	BAT LED	EPS LED	COM LED	ALARM LED
RS485/DB9/BLE/USB		○	○	○	○	●	○
Inverter over temperature	C5						
Fan abnormal	C8						
Inverter in power limit state	CL						
Data logger lost	CH	○	○	○	○	○	★
Meter lost	CJ						
Remote off	CN						
PV insulation abnormal	B1						
Leakage current abnormal	B2						
Internal power supply abnormal	C0						
Inverter over dc-bias current	C2						
Inverter relay abnormal	C3						
GFCI abnormal	C6						
System type error	C7						
Unbalance Dc-link voltage	C9						
Dc-link over voltage	CA	○	○	○	○	○	●
Internal communication error	CB						
Internal communication loss(E-M)	D9						
Internal communication loss(M-D)	DA						
Software incompatibility	CC						
Internal storage error	CD						
Boost abnormal	CG						
Dc-dc abnormal	CU						

Remark: ● Light on ○ Light off ◎ Keep original status
 ★ Blink 1s and off 1s ★★ Blink 2s and off 1s

7.2 App Setting Guide

7.2.1 Download App

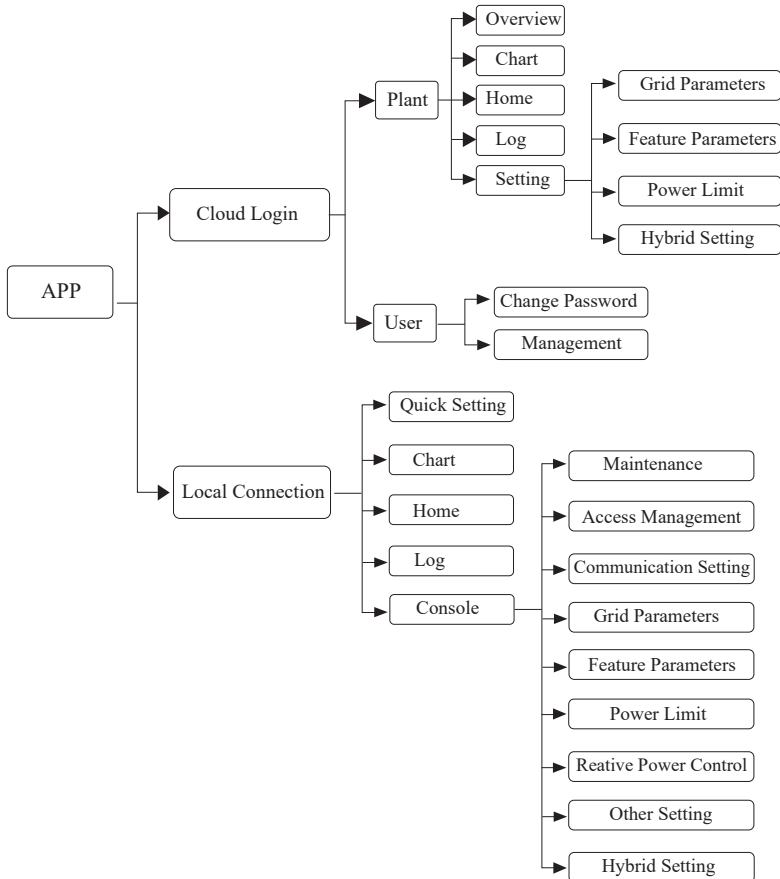
- Scan the QR code on the inverter to download the APP.
- Download the APP from the App Store or Google Play.

The APP should access some permissions such as the device’s location. You need to grant all access rights in all pop-up windows when installing the APP or setting your phone.

7.2.2 App Architecture

It contains “Cloud Login” and “Local Connection”.

- Cloud login: APP read data from cloud server through API and display inverter parameter
- Local connection: APP read data from inverter through Bluetooth connection with Modbus protocol to display and configure inverter parameter.



7.2.3 Local Setting

■ Access Permission

Before using the local setting, the APP should access some permissions. (You can allow them when you install the APP or grant permissions in your own phone setting.) When the APP asks for permission, please click Allow.

■ Connect Inverter

Firstly, open the Bluetooth on your own phone, then open the APP.

Press Local Setting to go to the connect page. This page shows the inverters which you can connect or you have connected. (As shown below) Press the inverter’s name to connect it.

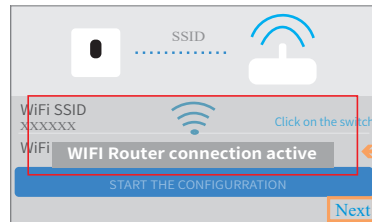
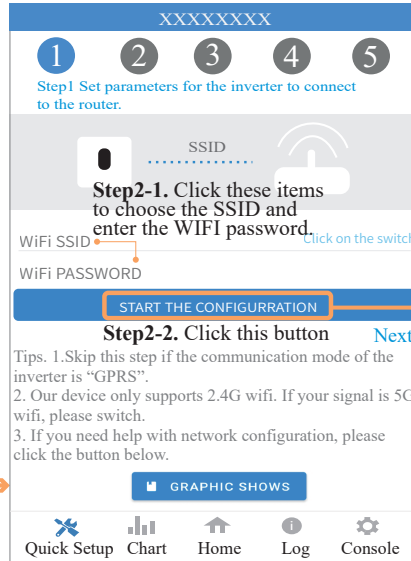
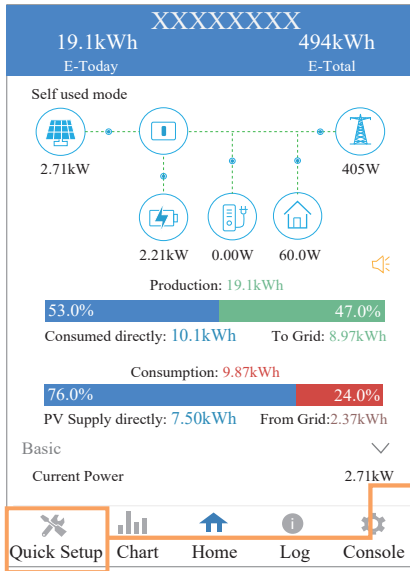


■ Quick Setting

1. Connect to the router.

Step 1 Go to Quick Setting page.

Step 2 Click each item to enter the information, then click [Next](#).

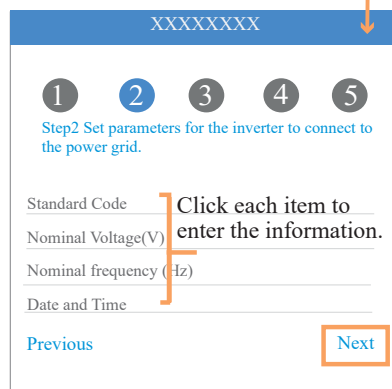


2. Set parameters of power grid

Step 1 Click each item to enter the parameters of power grid.

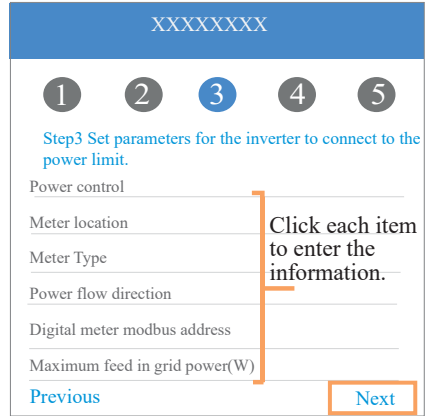
Step 2 Click [Next](#).

Step 3 Click [Previous](#) back to the previous page.



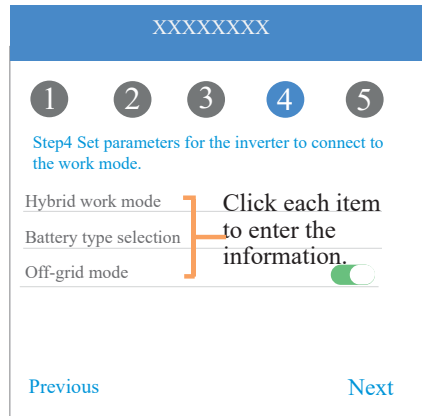
3. Set parameters of power limit

- Step 1 Click each item to enter the parameters of power limit.
- Step 2 Click [Next](#).
- Step 3 Click [Previous](#) back to the previous page.




4. Set parameters of work mode

- Step 1 Click each item to enter the information of work mode.
- Step 2 Click [Next](#).
- Step 3 Click [Previous](#) back to the previous page.



5. Start Inverter

- Step 1 Click .
- Step 2 Click [Previous](#) back to the previous page.

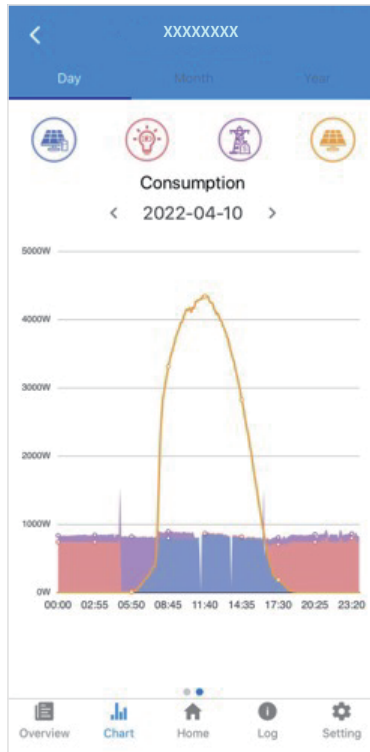
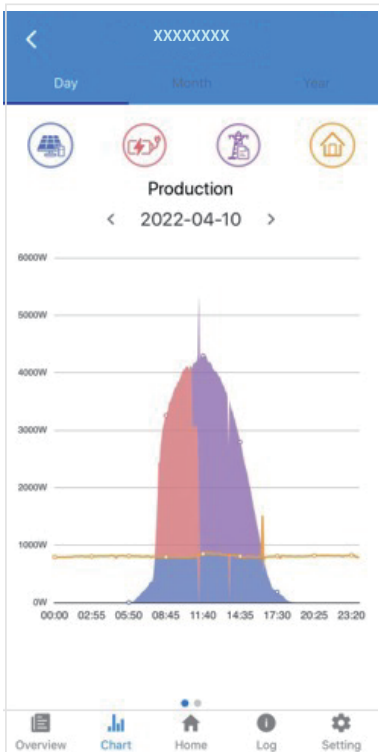


■ Chart

Under this menu, you can check the relevant data curve of energy (including Daily, Monthly and Annually).

1. Query(Daily) Data

Go to [Chart](#) > [Day](#) page. It will show the Daily Production or Consumption Curve in this page. You can swipe the screen left and right to switch the graph.

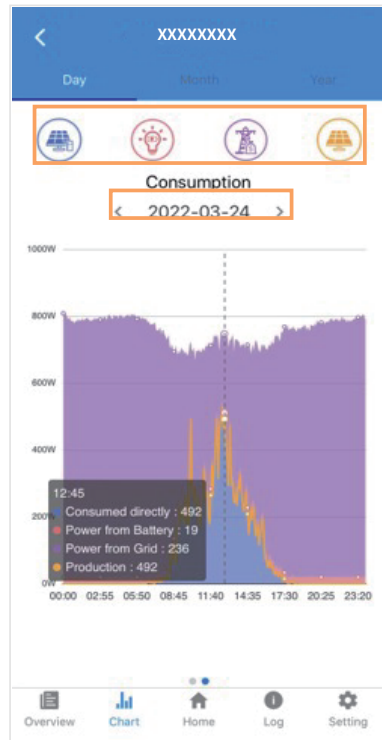


Different color curves represent energy data of different icons.

Click the icon to show and hide the corresponding curve of the corresponding content.

Click the curves to display the specific data.

You can also press the date such as “2022-03-24” in the figure to choose the day which you want to check. Or click the left and right arrows to switch the data of the day before yesterday and tomorrow (as shown in the Figure)



2. Query(Monthly or Yearly) Data

Go to [Chart](#) > [Month](#) or [Year](#) page. It will show the Daily Production or Consumption bars in this page. You can swipe the screen left and right to switch the graph. And the specific operation of checking data is the same as Daily.

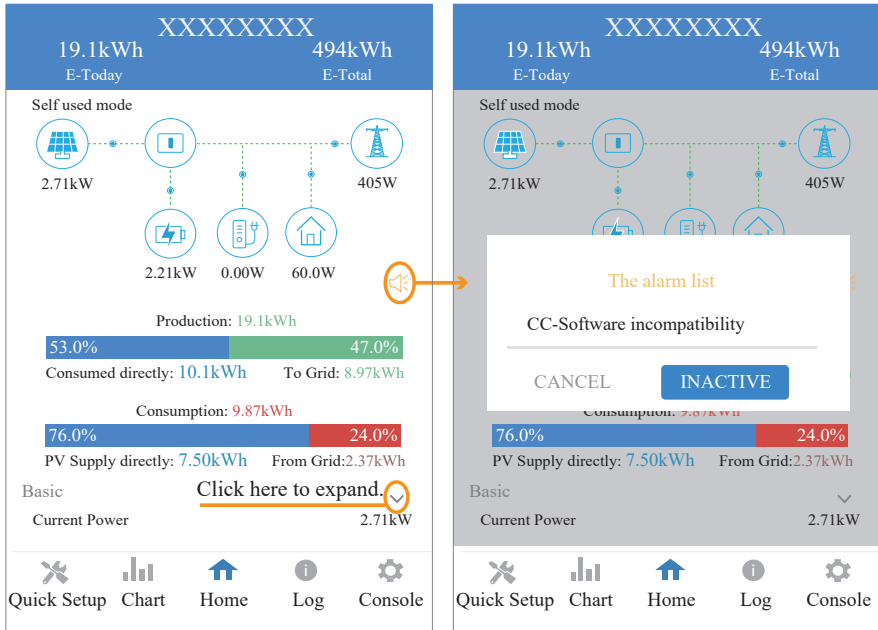
Daily data retention: 7 days

Monthly data retention: 36 months

yearly data retention: 10 years

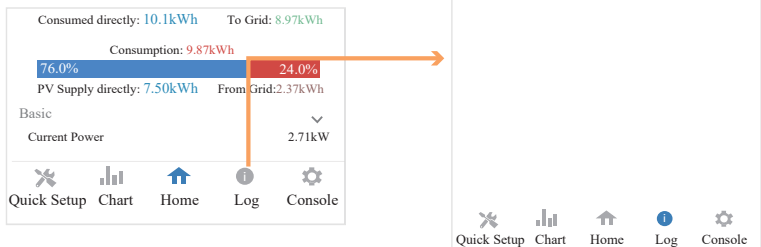
Local Setting Homepage

This page shows the basic information of inverter. Click  to display the warning message.



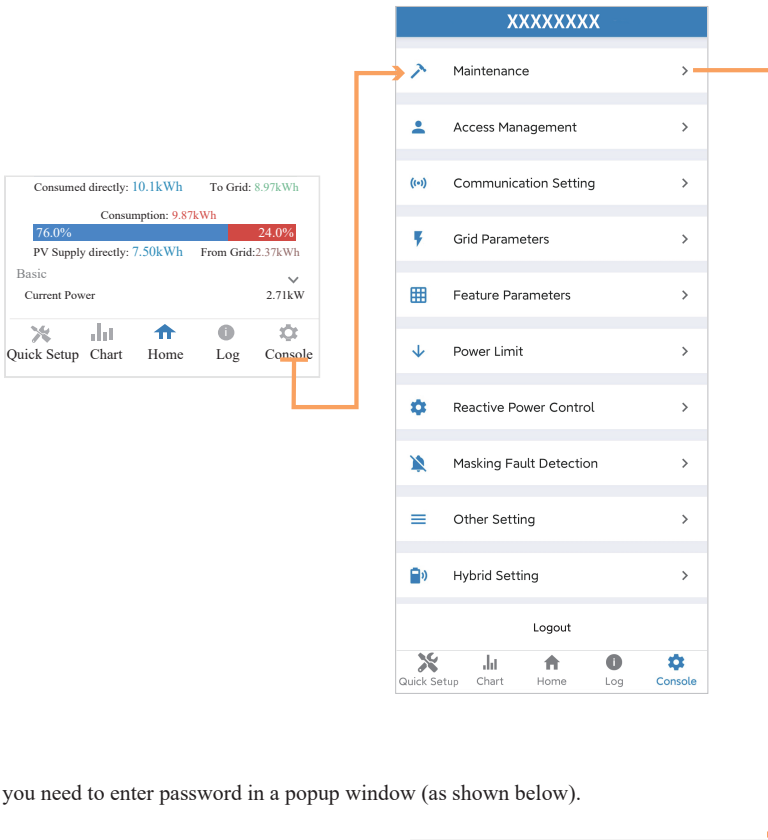
History Log

Press **Log** at the bottom and then go to the history log page (as shown below). It contains all the logs for the inverter.



■ Maintenance

Go to [Console](#) page. And click [Maintenance](#)



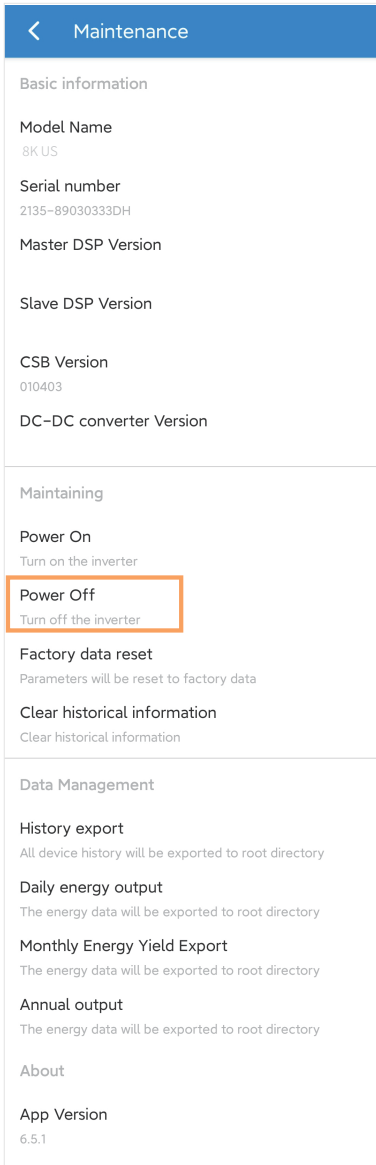
Then you need to enter password in a popup window (as shown below).

Login As Administrator

Enter administrator password

CANCEL OK

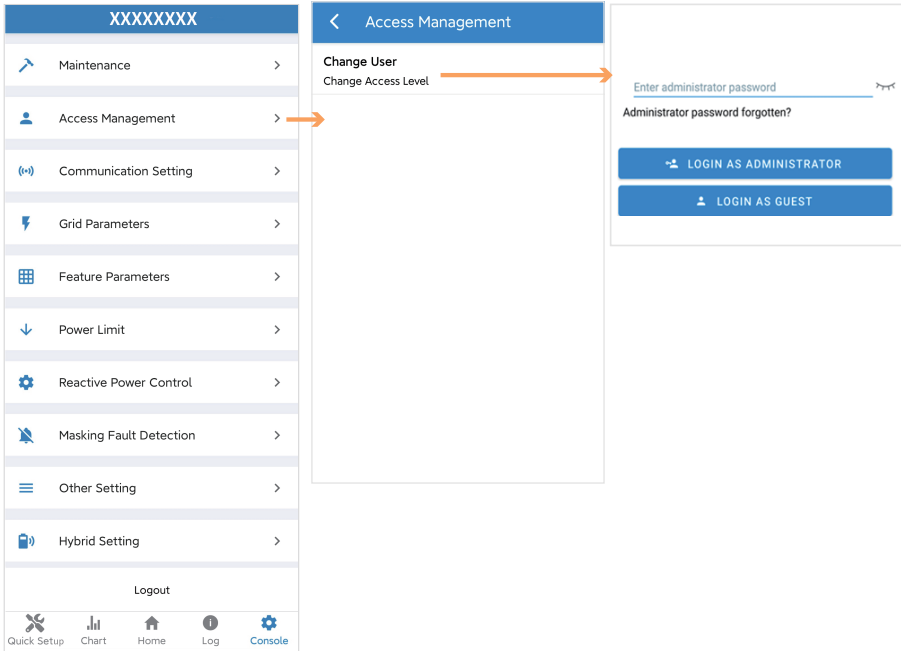
In this page, you can view the basic information like some version information, do some maintaining operations like turn off/on the inverter and manage data.



■ Console

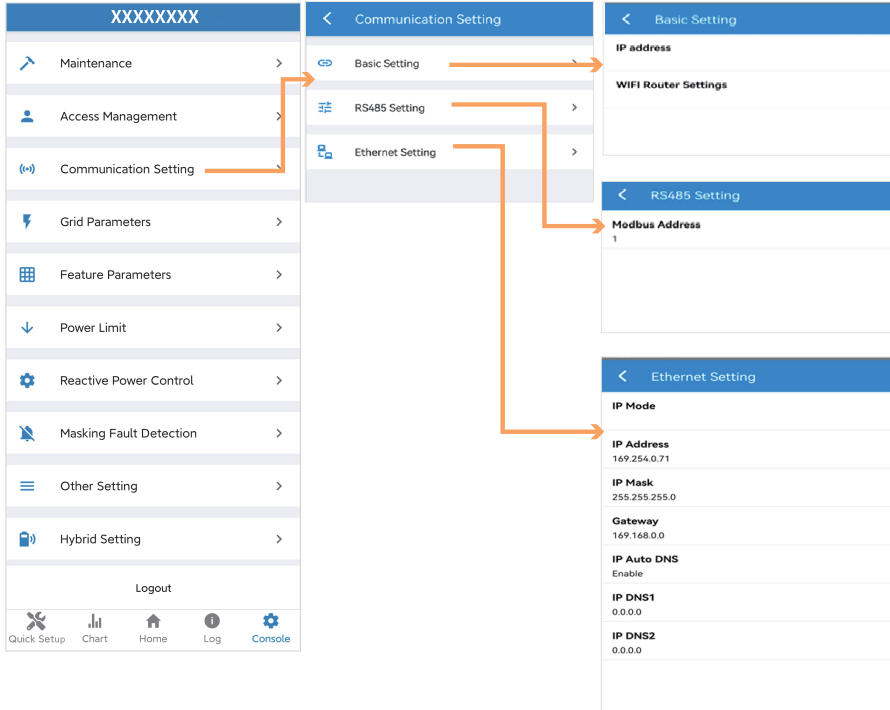
Access Management

Go to [Console](#) > [Access Management](#) page. In this page, you can switch the login permission.



Communication Setting

Go to [Console > Communication Setting](#) page. In this page, you can set or change the parameters of communication settings: Basic Setting, RS485 Setting and Ethernet Setting.



Grid Parameters

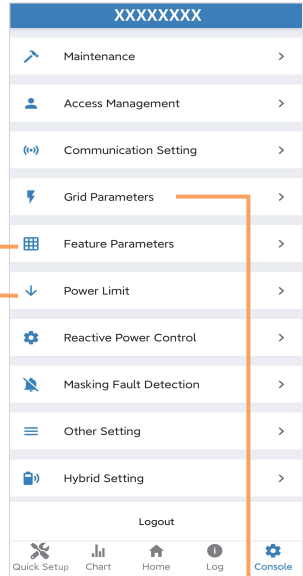
Go to [Console](#) > [Grid Parameters](#) page. In this page, you can set or change the parameters of Grid side, as shown in the figure.

Feature Parameters

Go to [Console](#) > [Feature Parameters](#) page. In this page, you can set or change the feature parameters, as shown in the figure.

Power Limit

Go to [Console](#) > [Power Limit](#) page. In this page, you can set or change the parameters of power limit, as shown in the figure.



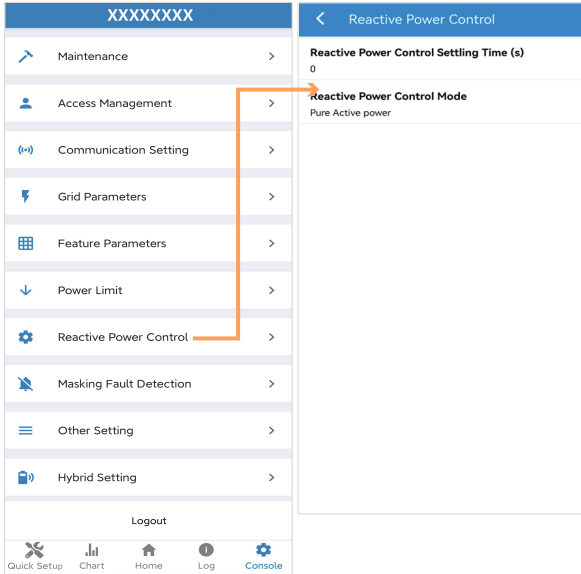
Power Limit
Power control Digital Power Meter
Meter location On Grid
Meter Type CHINT/DTSU666
Power flow direction From grid to inverter
Digital meter modbus address 200
Maximum feed in grid power(W) 70000

Feature Parameters
Low Voltage Through <input type="checkbox"/>
Island Detection <input type="checkbox"/>
Isolation Detection <input type="checkbox"/>
Leakage Current Detection(GFCI) <input type="checkbox"/>
Terminal Resistor <input type="checkbox"/>
Derated Power(%) 0
Power Factor 0.00
Insulation Impedance(kΩ)
Leakage Current Point(mA)
Unbalanced Voltage Point(%)
Moving Average Voltage Limit(V) 0

Grid Parameters
Standard Code Unknown
First Connect Delay Time(s)
Reconnect Delay Time (s)
Frequency High Loss Level_1(Hz) 0
Frequency Low loss Level_1(Hz) 0
Voltage High Loss Level_1(V) 0
Voltage Low Loss Level_1(V) 0
Frequency High Loss Time Level_1(ms) 0
Frequency Low loss Time Level_1(ms) 0
Voltage High Loss Time Level_1(ms) 0
Voltage Low Loss Time Level_1(ms) 0
Frequency High Loss Level_2(Hz) 0
Voltage High Loss Level_2(V) 0
Frequency High Loss Time Level_2(ms) 0
Voltage High Loss Time Level_2(ms) 0

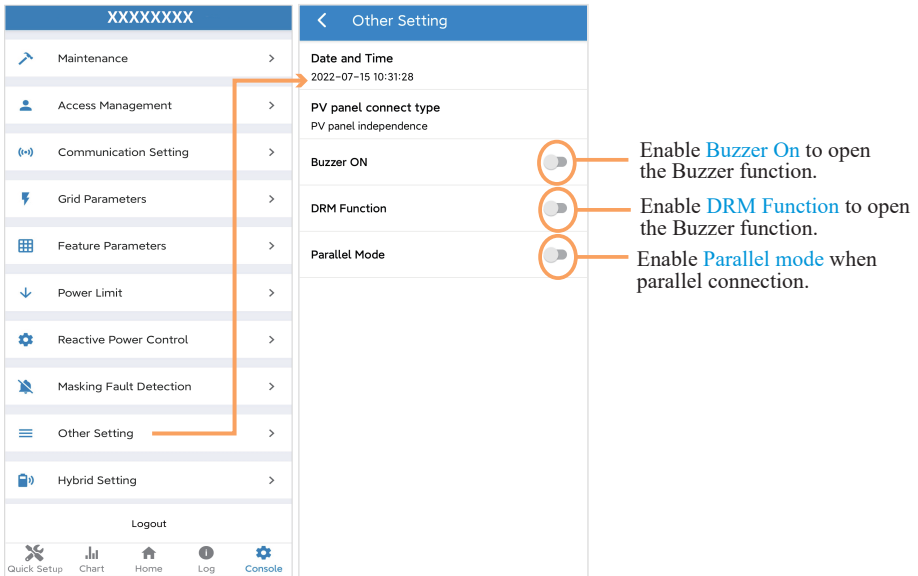
Reactive Power Control

Go to [Console > Reactive Power Control](#) page. In this page, you can set or change the Reactive Power Control parameters.



Other Setting

Go to [Console > Other Setting](#) page. In this page, you can set other setting parameters.




Hybrid Setting

Go to [Console > Hybrid Setting](#) page. In this page, you can set Hybrid Setting parameters.

XXXXXXX	< Hybrid Setting
Maintenance >	Hybrid work mode Self used mode
Access Management >	Battery type selection Unavailable
Communication Setting >	Maximum charger power(W) 0
Grid Parameters >	Capacity of charger end(%) 0
Feature Parameters >	Maximum discharger power(W) 555
Power Limit >	Capacity of discharger end(%) 0
Reactive Power Control >	EPS Output <input checked="" type="checkbox"/>
Masking Fault Detection >	Rated output voltage(V) 220V
Other Setting >	Off-grid start-up battery capacity(%) 0
Hybrid Setting >	Support Normal Load <input checked="" type="checkbox"/>
Logout	Force Charge Start Capacity of charger Start(SOC %) 10
Quick Set... Chart Home Log Console	Force Charge End Capacity of charger End(SOC %) 15

8. Maintenance

 CAUTION	<p>Before maintaining and commissioning inverter and its peripheral distribution unit, switch off all the charged terminals of the inverter and wait at least 10 minutes after the inverter is powered off.</p>
--	---

8.1 Routine Maintenance

Items	Check Content	Maintain Content	Maintenance Interval
Inverter output status	Statistically maintain the status of electrical yield, and remotely monitor its abnormal status.	N/A	Weekly
Inverter cleaning	Check periodically that the heat sink is free from dust and blockage.	Clean periodically the heat sink.	Yearly
Inverter running status	Check that the inverter is not damaged or deformed. Check for normal sound emitted during inverter operation. Check and ensure that all inverter communications is running well.	If there is any abnormal phenomenon, replace the relevant parts.	Monthly
Inverter electrical connections	Check that all AC, DC and communication cables are securely connected; Check that PGND cables are securely connected; Check that all cables are intact and free from aging.	If there is any abnormal phenomenon, replace the cable or re-connect it.	Semiannually

8.2 Inverter Troubleshooting

When the inverter has an exception, its basic common warning and exception handling methods are shown below.

Code	Alarm Information	Suggestions
A0	Grid over voltage	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal for a short time, and no action is required. 2. If the alarm occurs repeatedly, contact the local power station. After receiving approval of the local power bureau, revise the electrical protection parameters settings on the inverter through the App. 3. If the alarm persists for along time, check whether the AC circuit breaker /AC terminals is disconnected or not, or if the grid has a power outage.
A1	Grid under voltage	
A3	Grid over frequency	
A4	Grid under frequency	
A2	Grid absent	Wait till power is restored.
B0	PV over voltage	Check whether the maximum voltage of a single string of input PV modules is greater than the allowable voltage. If the maximum voltage is higher than the standard voltage, modify the number of pv module connection strings.
B1	PV insulation abnormal	<ol style="list-style-type: none"> 1. Check the insulation resistance against the ground for the PV strings. If a short circuit has occurred, rectify the fault. 2. If the insulation resistance against the ground is less than the default value in a rainy environment, set insulation resistance protection on the App.
B2	Leakage current abnormal	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically recovered to the normal operating status after the fault is rectified. 2. If the alarm occurs repeatedly, contact your dealer for technical support.
B4	PV under voltage	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, possibly the external circuits are abnormal accidentally. The inverter automatically recovers to the normal operating status after the fault is rectified. 2. If the alarm occurs repeatedly or last a long time, check whether the insulation resistance against the ground of PV strings is too low.
C0	Internal power supply abnormal	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically restored, no action required. 2. If the alarm occurs repeatedly, pls. contact the customer service center.

C2	Inverter over dc-bias current	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal for a short time, and no action is required. 2. If the alarm occurs repeatedly, and the inverter fails to generate power, contact the customer service center.
C3	Inverter relay abnormal	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal for a short time, and no action is required. 2. If the alarm occurs repeatedly, pls. refer to the suggestions or measures of Grid over voltage. and the inverter fails to generate power, contact the customer service center. If there is no abnormality on the grid side, the machine fault can be determined. (If you open the cover and find traces of damage to the relay, it can be concluded that the machine is faulty.) And pls. contact the customer service center.
CN	Remote off	<ol style="list-style-type: none"> 1. Local manual shutdown is performed in APP. 2. The monitor executed the remote shutdown instruction. 3. Remove the communication module and confirm whether the alarm disappears. If it does, replace the communication module. Otherwise, please contact the customer service center.
C5	Inverter over temperature	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically restored, no action required. 2. If the alarm occurs repeatedly, pls. check the installation site for direct sunlight, good ventilation, and high ambient temperature (Such as installed on the parapet). If the ambient temperature is lower than 45 ° C and the heat dissipation is good, contact the customer service center.
C6	GFCI abnormal	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, it could have been an occasional exception to the external wiring, the inverter can be automatically recovered, no action required. 2. If it occurs repeatedly or cannot be recovered for a long time, pls. contact customer service to report repair.
B7	PV string reverse	Check and modify the positive and negative polarity of the input of the circuit string.
C8	Fan abnormal	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, pls. restart the inverter. 2. If it occurs repeatedly or cannot be recovered for a long time, check whether the external fan is blocked by foreign objects. Otherwise, contact customer service.
C9	Unbalance Dc-link voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required.
CA	Dc-link over voltage	2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.

CB	Internal communication error	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CC	Software incompatibility	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CD	Internal storage error	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CE	Data inconsistency	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CF	Inverter abnormal	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CG	Boost abnormal	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CJ	Meter lost	<ol style="list-style-type: none"> 1. Check the meter parameter Settings 2. Local APP checks that the communication address of the inverter is consistent with that of the electricity meter 3. The communication line is connected incorrectly or in bad contact 4. electricity meter failure. 5. Exclude the above, if the alarm continues to occur, please contact the customer service center.

D2	Battery over voltage	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. Check that the battery overvoltage protection value is improperly set. 3. The battery is abnormal. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
D3	Battery under voltage	<ol style="list-style-type: none"> 1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. Check the communication line connection between BMS and inverter (lithium battery). 3. The battery is empty or the battery voltage is lower than the SOC cut-off voltage. 4. The battery undervoltage protection value is improperly set. 5. The battery is abnormal. 6. If exclude the above, the alarm continues to occur, please contact the customer service center.
D4	Battery discharger over current	<ol style="list-style-type: none"> 1. Check whether the battery parameters are correctly set. 2. Battery undervoltage. 3. Check whether a separate battery is loaded and the discharge current exceeds the battery specifications. 4. The battery is abnormal. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.
D5	Battery over temperature	<ol style="list-style-type: none"> 1. If the alarm occurs repeatedly, please check whether the installation site is in direct sunlight and whether the ambient temperature is too high (such as in a closed room).
D6	Battery under temperature	<ol style="list-style-type: none"> 2. If the battery is abnormal, replace it with a new one. 3. If exclude the above, the alarm continues to occur, please contact the customer service center.
D7	BACKUP output voltage abnormal	<ol style="list-style-type: none"> 1. Check whether the BACKUP voltage and frequency Settings are within the specified range. 2. Check whether the BACKUP port is overloaded. 3. When not connected to the power grid, check whether BACKUP output is normal. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
D8	Communication error (Inverter-BMS)	<ol style="list-style-type: none"> 1. Check whether the battery is disconnected. 2. Check whether the battery is well connected with the inverter. 3. Confirm that the battery is compatible with the inverter. It is recommended to use CAN communication. 4. Check whether the communication cable or port between the battery and the inverter is faulty. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.

D9	Internal communication loss(E-M)	1. Check whether the communication cables between BACKUP, electricity meter and inverter are well connected and whether the wiring is correct 2. Check whether the communication distance is within the specification range
DA	Internal communication loss(M-D)	3. Disconnect the external communication and restart the electricity meter and inverter. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
CU	Dcdc abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, please check: 1) Check whether the MC4 terminal on the PV side is securely connected. 2) Check whether the voltage at the PV side is open circuit, ground to ground, etc. If exclude the above, the alarm continues to occur, please contact the customer service center.
CP	BACKUP over dc-bias voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
DB	BACKUP short circuit	1. Check whether the live line and null line of BACKUP output are short-circuited. 2. If it is confirmed that the output is not short-circuited or an alarm, please contact customer service to report for repair. (After the troubleshooting of alarm problems, BACKUP switch needs to be manually turned on during normal use.)
DC	BACKUP over load	1. Disconnect the BACKUP load and check whether the alarm is cleared 2. If the load is disconnected and the alarm is generated, please contact the customer service. (After the alarm is cleared, the BACKUP switch needs to be manually turned on for normal use.)

9. Technical Specification

Item	5K US	6K US	8K US	10K US
Input (PV)				
Max. Input Power	7500W	9000W	12000W	15000W
MPPT Range(Full load)	200V~480V	200V~480V	200V~480V	200V~480V
MPPT Range	70V-540V			
Max. DC Voltage	600V			
Max. Input Current	30A/22A		30A/22A/22A	
Max. Short Current	40A/30A		40A/30A/30A	
MPP Tracker No.	2	2	3	3
Input (Battery)				
Compatible battery type	Lithium-ion/Lead-acid			
Nominal battery voltage(Full load)	48V			
Battery voltage range	40V-64V			
Max charge/discharge current	210A/130A	210A/130A	210A/180A	210A/210A
Max charge/discharge power	10000W/5000W	10000W/6000W	8000W/8000W	10000W/10000W
Lithium battery charge curve	Self-adaption to BMS			
Output (On Grid)				
AC Input Max.Power	7500W	9000W	12000W	15000W
AC Output Rated Power	5000W	6000W	8000W	10000W
AC Output Maximum Power	5500W	6600W	8800W	11000W
AC Output Maximum Apparent Power	5500VA	6600VA	8800VA	11000VA
Nominal Voltage	120/240V(Split phase) / 208V(2/3 phase)			
Maximum Current(Output)	25A	30A	40A	50A
Maximum Current(Input)	38A	38A	70A	70A
Power Factor Range	-0.8(lagging)~0.8(leading)			
Rated Frequency	50/60 Hz			

Model	5K US	6K US	8K US	10K US
Output (BackUp)				
Nom. Power	5000VA	6000VA	8000VA	10000VA
Maximum Power (60s)	8000VA	9000VA	12000VA	15000VA
Apparent Power (10s)	10000VA	12000VA	16000VA	20000VA
Nominal Voltage	120/240V(Split phase) / 208V(2/3 phase)			
THD	3% (R) , 5% (RCD)			
Parallel	9 pcs (they can form the three-phase model)			
Efficiency				
Max. Efficiency(PV to Grid)	97.80%	97.80%	97.80%	97.80%
CEC. Efficiency(PV to Grid)	97.20%	97.20%	97.20%	97.20%
Max.Charge Efficiency (PV to Battery)	95%	95%	95%	95%
Max.Charge/Discharge Efficiency (Grid to Battery)	95%	95%	95%	95%
General				
Temp. Range	-25 ~60°C(>45°C derating)			
Max. operation altitude	2000m			
Topology	Transformerless(PV to Grid)/Transformer (Bat to Grid)			
Protection	IP65/Type 4X			
Noise emission	45dB			
Humidity	0 ~100%, non-condensing			
Cooling	Fan Cooling			
HMI & COM				
Display	LED+APP (Bluetooth) ,LCD(optional)			
Communication interface	BMS(CAN/RS485)			
	RS485(standard configuration)/WiFi/GPRS/4G/Ethernet(optional)			
	DI			
	Meter(RS485)			
	1*DO			

Model	5K US	6K US	8K US	10K US
Protection				
Anti-islanding protection	YES			
AC over-current protection	YES			
AC short-circuit protection	YES			
AC over-voltage protection	YES			
SPD	DC Type2 , AC Type2			
Insulation detection	YES			
GFCI	YES			
AFCI	YES			
RSD	Tigo/APS			
GEN	YES			
Mechanical				
W x H x D	420*800*240mm			
Weight	32kg	32kg	37kg	
DC switch	Internal			
AC Connection	AC Breaker Optional			
PV Connection	Terminals			
Battery Connection	DC Breaker Optional			
Compliance				
Grid	UL1741SB, IEEE1547: 2018, HECO SRD 2.0			
Safety	UL 1741/CSA C22.2/UL 1699B			
Overvoltage Cat.	DC input : OVC II , AC output : OVC IV			
EMC Emission	FCC Part 15 ClassB			
EMI EMC Immunity	FCC Part 15 ClassB			

Remarks :

- *Not yet test ;
- **The range of output voltage and frequency may vary depending upon different grid codes.
- Specifications are subject to change without advance notice.