USER MANUAL

Three-phase ESS Inverter

Version: EN-UM-1.4

HISTORY

VERSION	ISSUED	COMMENTS
1.0	08-May.-24	First release
1.1	23-May.-24	Update the preface; update CT ratio; update Battery Connection table; update 4.6.3 CT connection; update DI/DO connection; add startup note; update 7.1 Indicator States table; update 8.2 Inverter troubleshooting.
1.2	24-Jun.-24	Update packing list; update parallel connection scheme; update silkscreen of communication ports; update App.
1.3	10-Jul.-24	Update apperance of inverter.
1.4	26-Nov.-24	Update models; modify installation hole depth; update M5 screw; update battery connector and related information; add BMS connection details; update technical parameter; update APP information; optimize descriptions.

Preface

About This Manual

This manual describes the installation, electrical connection, commissioning and maintenance, APP operation of the inverter. Please read the manual and related documents carefully before using the product and keep them within the reach of installation, operation and maintenance personnel.
The illustration in this user manual is for reference only. This user manual is subject to change without prior notice. (Specific product please in kind prevail.)

Target Group

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

Scope

This manual is applicable to the following inverters:

- 12K
- 15K
- 20K
- 25K
- 30K

Statement

All information here takes model 30K as reference and guidance only. The appearance may vary in different models, the actual product shall prevail. Contents including illustrations in this manual are subject to change without notice.

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 ESS inverter to reduce the waste of you resource.

CONTENTS

1. Safety

Before using the inverter, please read all instructions and cautionary markings on the console and manual. Always keep this manual within reach. The three phase ESS inverter (hereinafter referred to as the inverter) strictly conforms to related safety rules in design and test. Please follow the local laws and regulations during installation, operation and maintenance. Incorrect operation may result in personal injury or death, inverter damage and properties damage to the operator or a third party.

1.1 Symbols Used

Safety Symbol	Description
	Danger of high voltage! Only qualified personnel may perform work on the inverter.
	Residual voltage exists after the inverter is powered off. It takes 10 minutes for system to discharge to a safe voltage.
	Danger of hot surface
 Do not disconnect under load!	Do not disconnect under load, otherwise there will be a danger of fire.
	Environmental Protection Use Period
	Refer to the operating instructions
	Don’t dispose of the inverter with the household waste.
	Grounding terminal

1.2 Safety Precaution

- Installation, maintenance and connection of inverters must be performed by qualified personnel and in compliance with local electrical standards, wiring rules and requirements of local power authorities and/or companies.
- To avoid electric shock, DC input and AC output of the inverter must be terminated at least 10 minutes before performing any installation or maintenance.
- The temperature of some parts of the inverter may exceed 60℃ during operation. DO NOT touch the inverter during operation to avoid being burnt.

  Ensure children are kept away from inverters.
- DO NOT open the front cover of the inverter. Except performing work at the wiring terminal, touching or changing components without authorization may result in personal injury, inverter damages and annulment of the warranty.
- Static electricity may damage electronic components. Appropriate methods should 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 the inverter according to the user manual. Otherwise, high-voltage may result in fatal injury.
- 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 by turning off the PV switch, disconnecting the PV terminal, battery terminal, and AC terminal.
- After the inverter is powered off, the remaining electricity and heat may still cause electric shock and body burns. DO NOT touch any part of the inverter for at least 10 minutes after disconnection from the power sources.
- DO NOT insert or unplug the AC and DC terminals when the inverter is running.
- In Australia, the inverter internal switching does not maintain the neutral continuity. And neutral integrity must be addressed by external connection arrangements.
- DO NOT connect ESS inverter in the following ways:

  Connect the BACKUP Port to the grid;

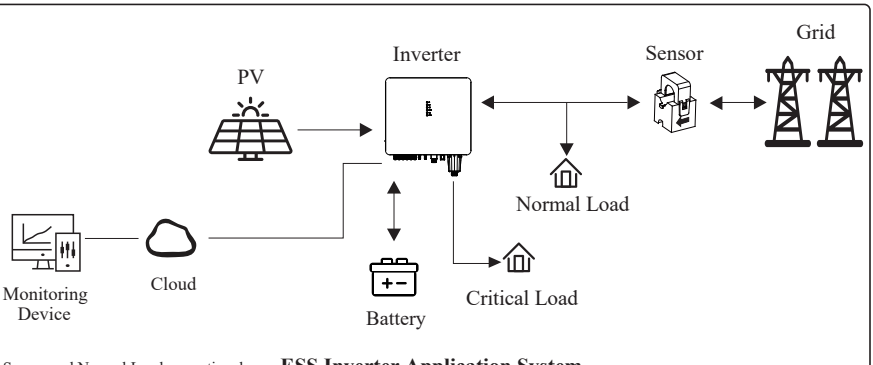
  More than two inverters share a single PV panel string.
- Never touch BACK-UP port when the inverter is powered on since there is AC output. Power off the inverter first if maintenance is required for the loads connected with BACK-UP ports. Otherwise, electric shock may occur.

2. Product Introduction

2.1 Overview

ESS Inverter

The inverter can be used to optimize self-consumption, store electricity in the battery for future use or feed into public grid and can be an alternative for emergency use when the grid is lost. The work mode of the inverter depends on PV energy and user's preference.

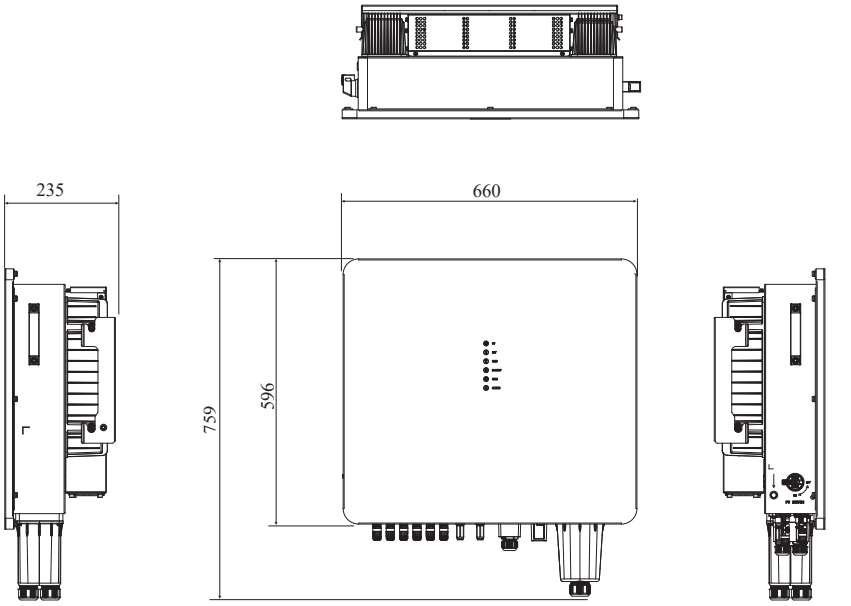


Sensor and Normal Load are optional.

ESS Inverter Application System

2.2 Product Appearance

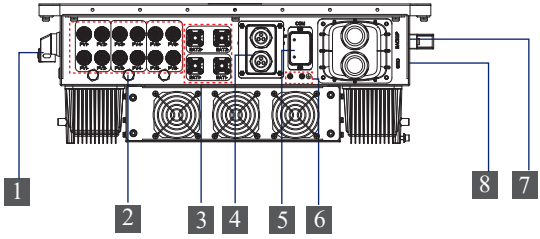
2.2.1 Type 1: Inverter with LED



Unit: mm

LED Icon	Description
PV	PV indicator
BAT	BAT indicator
GRID	GRID indicator
BACKUP	BACKUP indicator
COM	COM indicator
ALARM	ALARM indicator

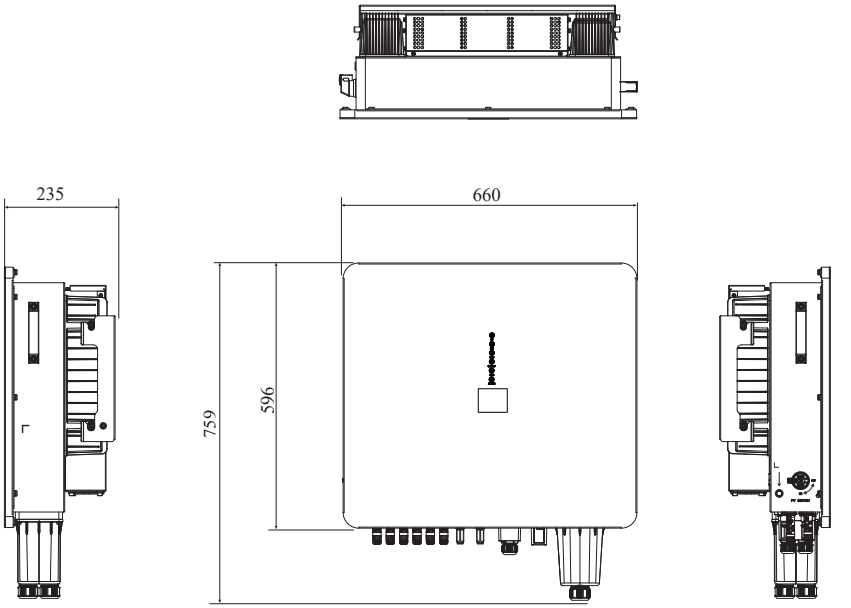
The External View of ESS Inverter



The Bottom View of ESS Inverter

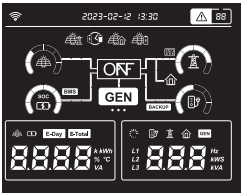
Number	Description
1	PV Switch
2	PV Input Terminals
3	Battery Connect Terminals
4	COM1 Ports (RS485, BMS, DRMs/RCR, CT, NTC/DI/DO, RSD/RMO, PARAL)
5	COM Port (WI-FI/LAN)
6	Grounding Terminal
7	BACKUP Output Terminal
8	GRID Output Terminal

2.2.2 Type 2: Inverter with LED and LCD



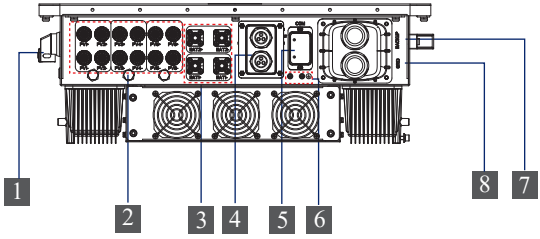
Unit: mm

LED Icon	Description
PV	PV indicator
BAT	BAT indicator
GRID	GRID indicator
BACKUP	BACKUP indicator
COM	COM indicator
ALARM	ALARM indicator



LCD Details

The External View of ESS Inverter



The Bottom View of ESS Inverter

Number	Description
1	PV Switch
2	PV Input Terminals
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4	COM1 Ports (RS485, BMS, DRMs/RCR, CT, NTC/DI/DO, RSD/RMO, PARAL)
5	COM Port (WI-FI/LAN)
6	Grounding Terminal
7	BACKUP Output Terminal
8	GRID Output Terminal

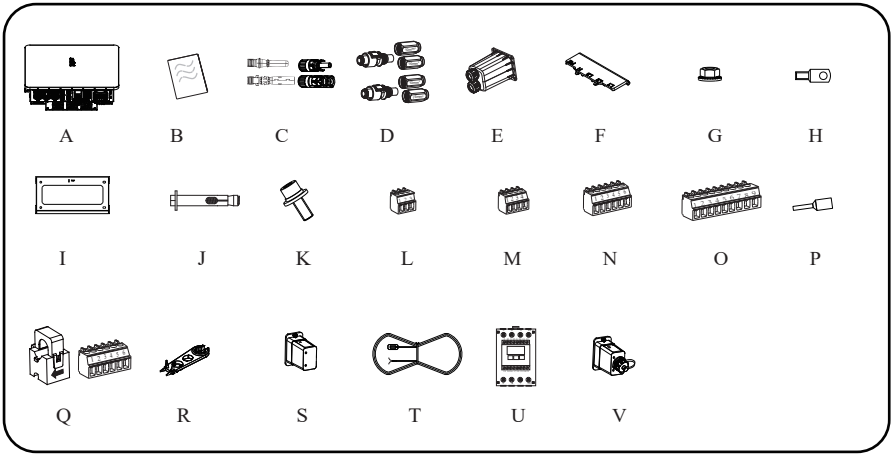
2.3 Model Definition

The letters in the product model indicate the power of the 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 found, please contact the supplier for help.



Number	Quantity	Description	Number	Quantity	Description
A	1	Inverter	J	4	M10 Expansion blot
B	1	File package	K	1	M6 Security screw
C	4 or 6	PV connector group (female + male connector of PV input wire)	L	1	3-Pin terminal
			M	3	4-Pin terminal
			N	1	6-Pin terminal
D	1 or 2	Battery connector group (positive + negative terminal of battery cable)	O	1	9-Pin terminal
			P	25	Pin terminal
			Q	1	CT pack (3 pcs CT + 1 pc 6-pin terminal)
E	1	AC waterproof cover	R	1	Tightening/Removal tool for PV connector
F	1	Insulation board for AC terminal	S	1	Wi-Fi module
G	11	M5 Screw cap (for AC cable locking)	T	1	Battery temperature sensor (NTC optional)
H	11	OT terminal	U	1	Meter (Optional)
I	1	Mounting bracket	V	1	LAN module (optional)

3.2 Selecting the Mounting Location

3.2.1 Installation Environment Requirements

a. The storage inverter protection class is IP66 and can be mounted indoors or outdoors.

b. To ensure optimum operation and long service life, the ambient temperature should be -25℃ to 60℃.

c. DO NOT install the inverter in a rest area since it will introduce noise during operation.

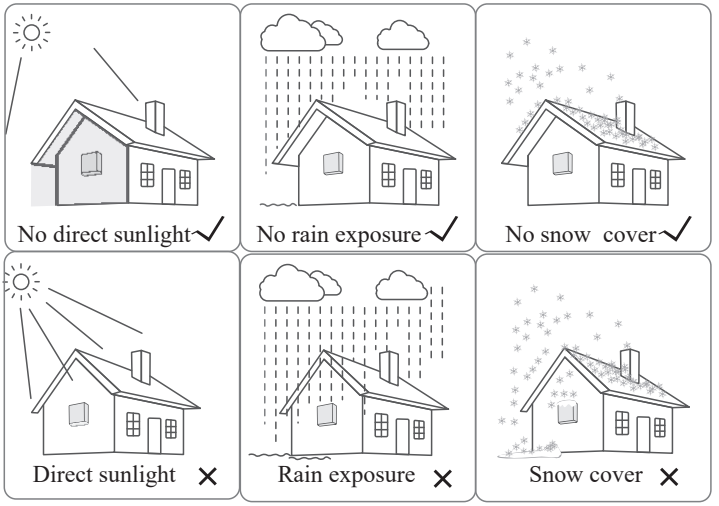
d. The inverter carrier must be fire-proof. DO NOT mount the inverter on flammable building materials.

e. Ensure that the wall meets the requirements of the inverter installation.

f. Product label and warning symbols shall be clear to read after installation.

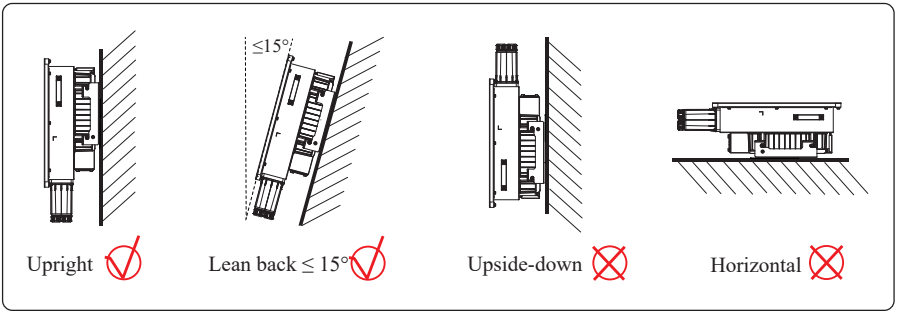
g. The installation height should be reasonable and make sure it is easy to operate and view the display.

h. Please avoid direct sunlight, rain exposure, snow cover.



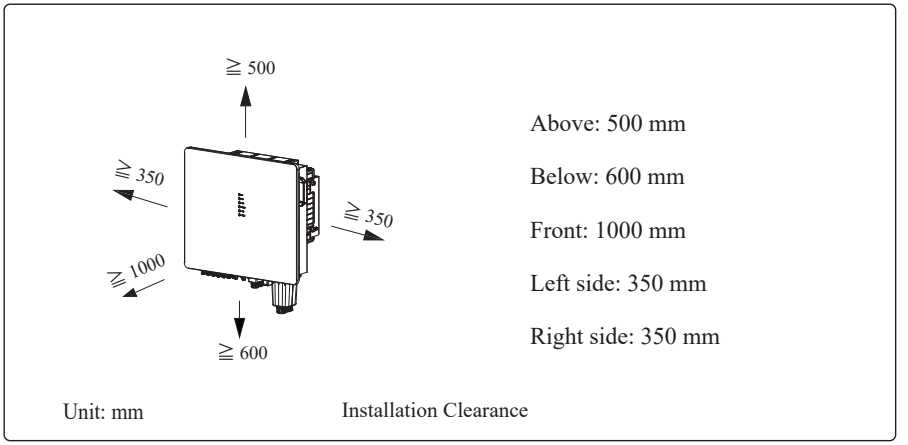
3.2.2 Mounting Requirements

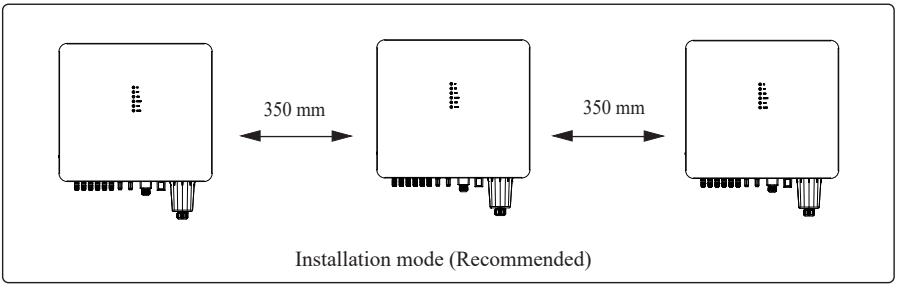
Mount the inverter vertically or at tilted backward by max 15°. Never install the inverter in a wrong way. Always make the connection area downward.



3.2.3 Installation Space Requirements

To ensure the normal and easy operation of inverter, please reserve enough installation clearance around the inverter as the following figure shows.





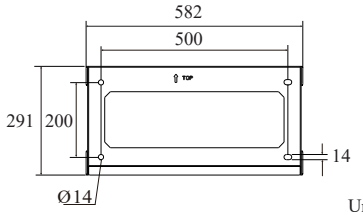
3.3 Mounting

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

DANGER	Before drilling holes, ensure that there is no electrical or other pipes buried in the walls to avoid risks.

CAUTION	To prevent potential damages and injuries from inverter falling down, please well-mounted the inverter on the mounting bracket.

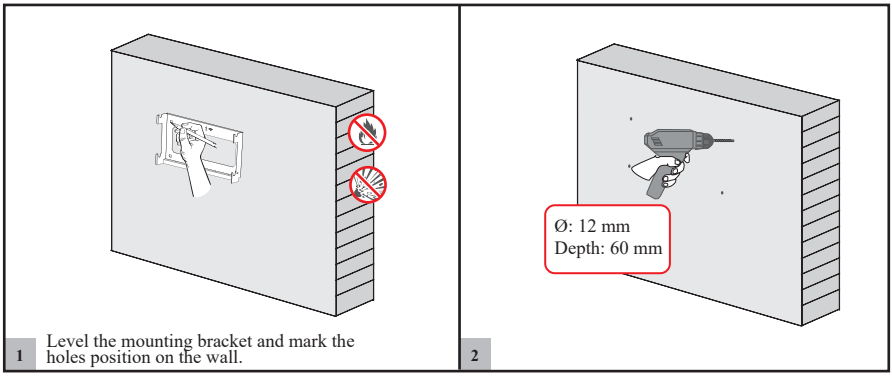
3.3.1 Mounting Bracket



Unit: mm

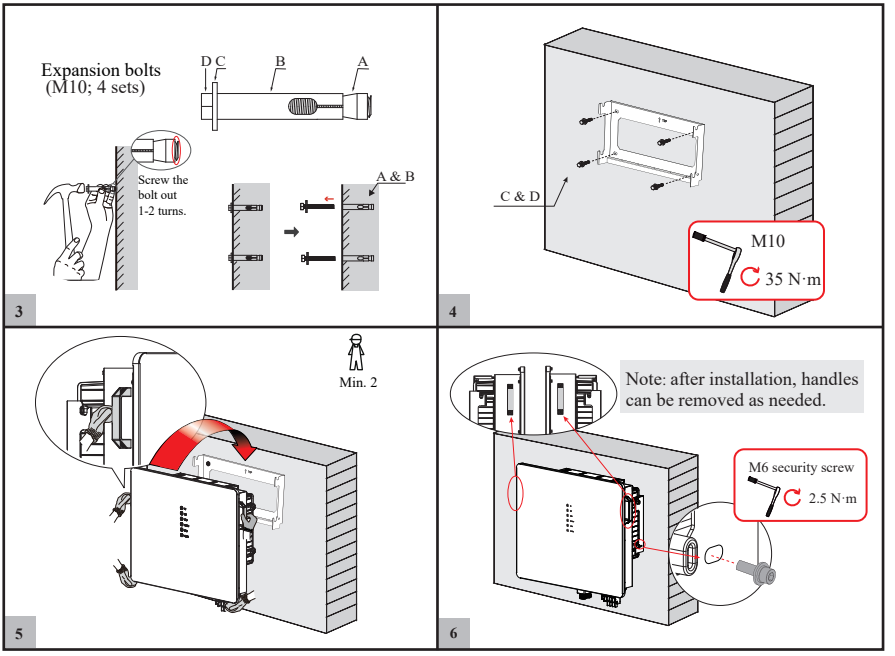
3.3.2 Wall-mounted Installation

CAUTION	The inverter is heavy! To avoid device damage and personnel injury, at least two people are recommended to move the inverter and handle with care.



1 Level the mounting bracket and mark the holes position on the wall.

2


Expansion bolts
(M10; 4 sets)
D C
B
A
Screw the
bolt out
1-2 turns.
A & B
3
C & D
M10
35 N·m
4
Min. 2
5
Note: after installation, handles
can be removed as needed.
M6 security screw
2.5 N·m
6

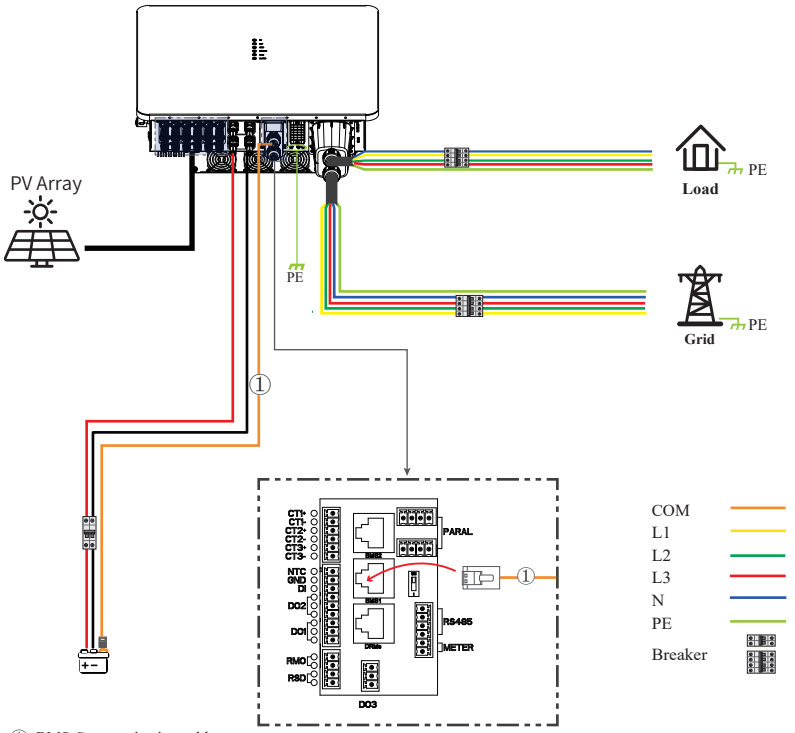
4. Electrical Connection

This chapter shows the connection details of the inverter. The following illustration is for reference only.

DANGER	Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, high voltage may result in fatal injury.

Inverter system connection diagram:

Connection mode for whole-house load:



① BMS Communication cable

Note:

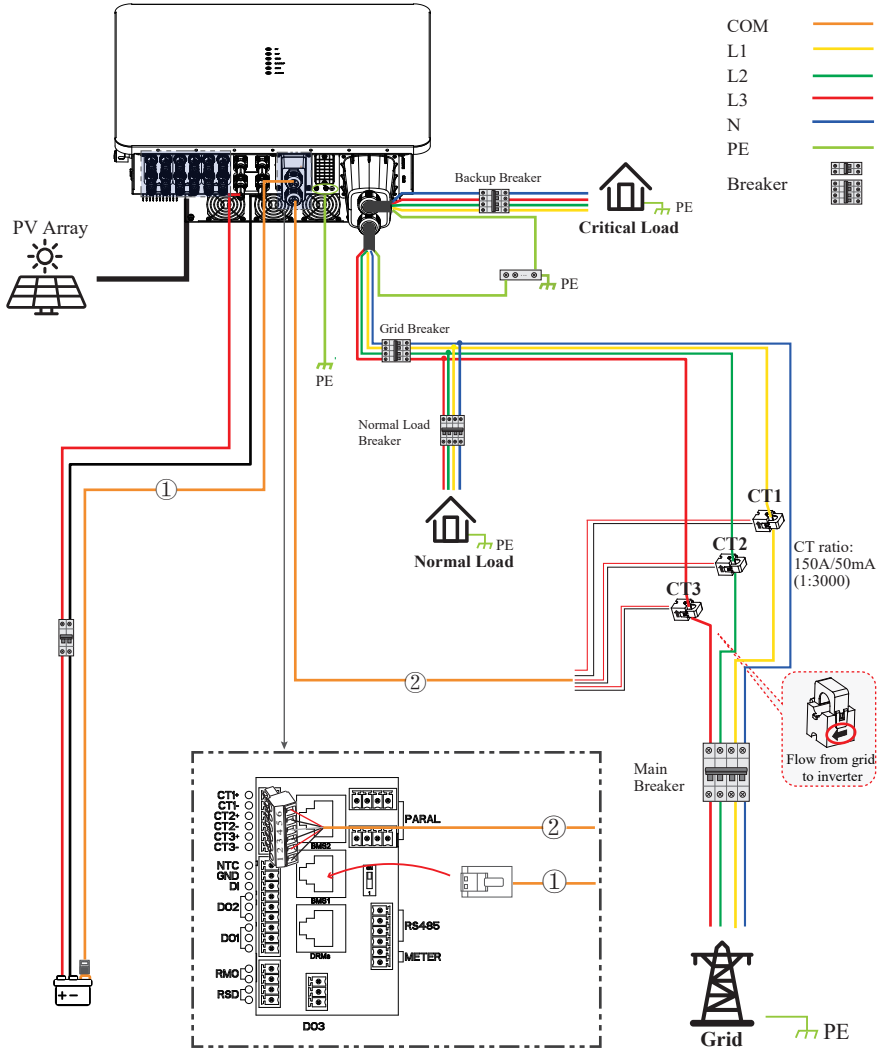
1. BMS communication connection is only for lithium battery.
2. The external DC/AC breakers are not supplied with the inverter and must be purchased separately. For other breakers, please refer to the table below.

Breakers recommendation:

Inverter	Battery Breaker	Battery Breaker	Grid Breaker	Normal Load Breaker	Main Breaker
12K	≥ 80 A	≥ 63 A	≥ 63 A	Depends on household loads	Depends on household loads
15K		≥ 63 A	≥ 63 A		
20K		≥ 63 A	≥ 63 A		
25K	≥ 160 A * 1 (Single battery connected to both BAT1 and BAT2); ≥ 80 A * 2 (Battery systems connected to BAT1 and BAT2 respectively).	≥ 80 A	≥ 80 A		
30K		≥ 80 A	≥ 80 A		

Non-parallel connection mode

DANGER	Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, high voltage may result in fatal injury.



① BMS Communication cable

② CT Communication cable

Note:

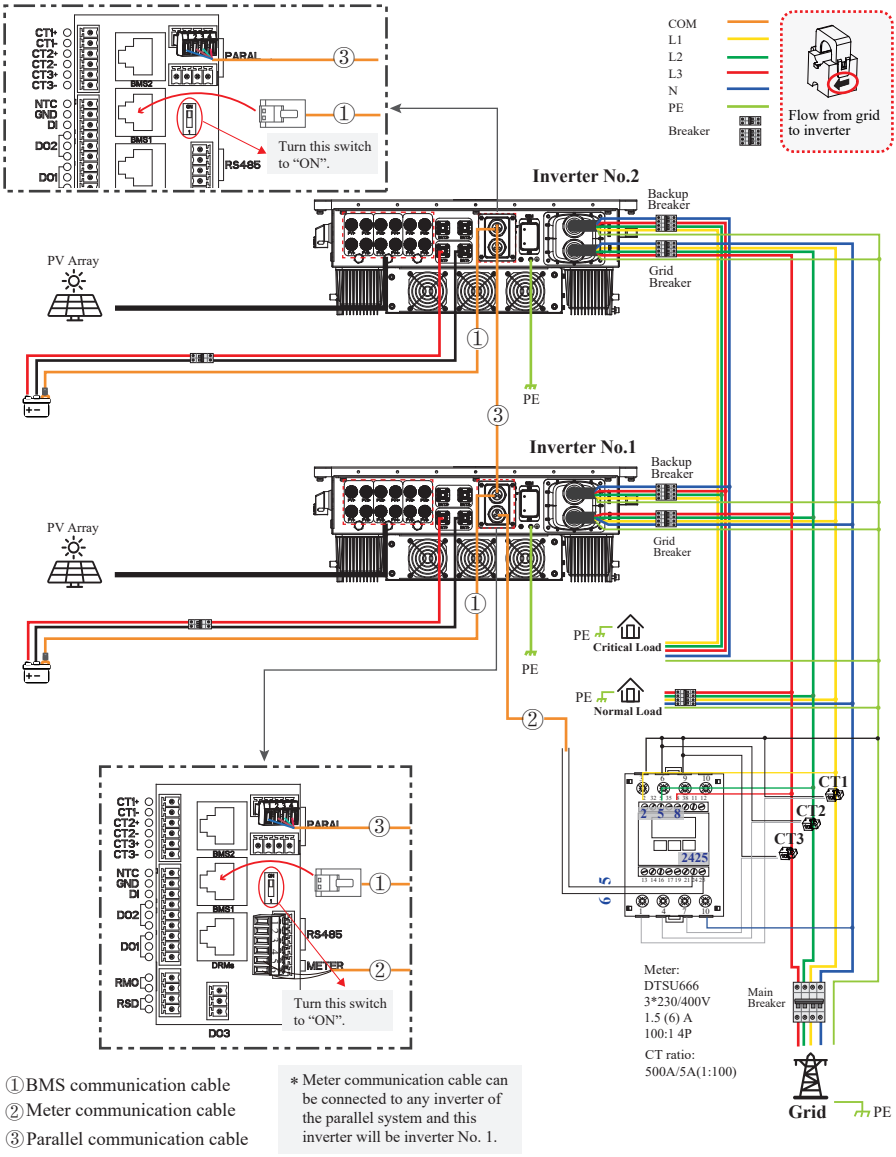
1. BMS communication connection is only for lithium battery.
2. The external DC/AC breakers are not supplied with the inverter and must be purchased separately. The specifications of main breaker and normal load breaker depend on household loads. For other breakers, please refer to the table below.

Breakers recommendation:

<table>
<tr><th>Inverter</th><th>Battery Breaker</th><th>Battery Breaker</th><th>Grid Breaker</th><th>Normal Load Breaker</th><th>Main Breaker</th></tr>
<tr><td>12K</td><td rowspan="3">≥ 80 A</td><td>≥ 63 A</td><td>≥ 63 A</td><td rowspan="5">Depends on household loads</td><td rowspan="5">Depends on household loads</td></tr>
<tr><td>15K</td><td>≥ 63 A</td><td>≥ 63 A</td></tr>
<tr><td>20K</td><td>≥ 63 A</td><td>≥ 63 A</td></tr>
<tr><td>25K</td><td>≥ 160 A * 1 (Single battery connected to both BAT1 and BAT2);
≥ 80 A * 2 (Battery systems connected to BAT1 and BAT2 respectively).</td><td>≥ 80 A</td><td>≥ 80 A</td></tr>
<tr><td>30K</td><td>≥ 80 A</td><td>≥ 80 A</td></tr>
</table>

Parallel connection mode - Scheme A (N=2)

DANGER	Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, high voltage may result in fatal injury.



①BMS communication cable
②Meter communication cable
③Parallel communication cable

* Meter communication cable can be connected to any inverter of the parallel system and this inverter will be inverter No. 1.

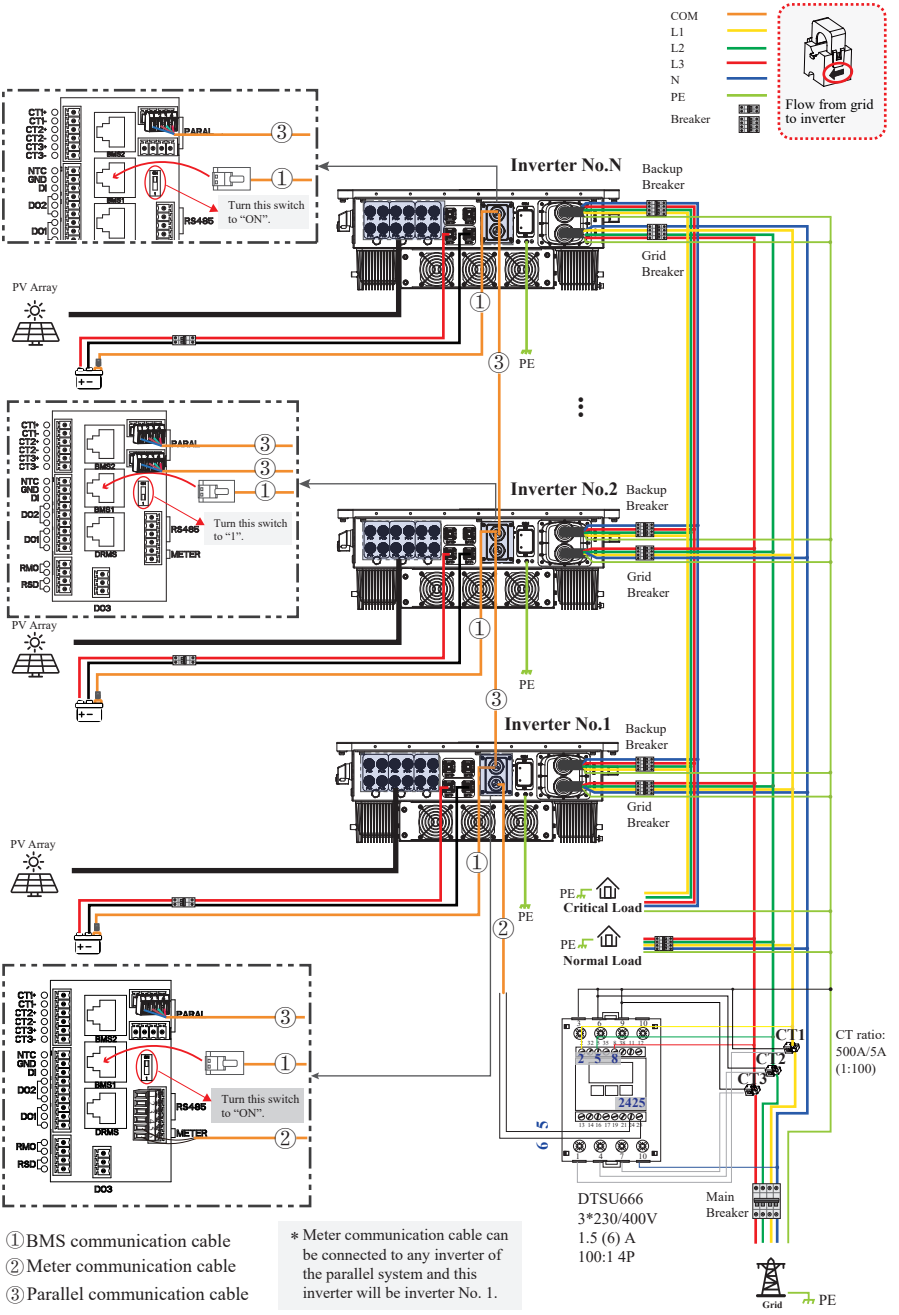
Note:

1. BMS communication connection is only for lithium battery.
2. The external DC/AC breakers are not supplied with the inverter and must be purchased separately. The specifications of main breaker and normal load breaker depend on household loads. For other breakers, please refer to the table below.

Breakers recommendation:

<table>
<tr><th>Inverter</th><th>Battery Breaker</th><th>Battery Breaker</th><th>Grid Breaker</th><th>Normal Load Breaker</th><th>Main Breaker</th></tr>
<tr><td>12K</td><td rowspan="3">≥ 80 A</td><td>≥ 63 A</td><td>≥ 63 A</td><td rowspan="5">Depends on household loads</td><td rowspan="5">Depends on household loads</td></tr>
<tr><td>15K</td><td>≥ 63 A</td><td>≥ 63 A</td></tr>
<tr><td>20K</td><td>≥ 63 A</td><td>≥ 63 A</td></tr>
<tr><td>25K</td><td rowspan="2">≥ 160 A * 1 (Single battery connected to both BAT1 and BAT2);
≥ 80 A * 2 (Battery systems connected to BAT1 and BAT2 respectively).</td><td>≥ 80 A</td><td>≥ 80 A</td></tr>
<tr><td>30K</td><td>≥ 80 A</td><td>≥ 80 A</td></tr>
</table>

Parallel connection mode - Scheme B (3≤N≤10)



①BMS communication cable
②Meter communication cable
③Parallel communication cable

* Meter communication cable can be connected to any inverter of the parallel system and this inverter will be inverter No. 1.

DANGER	Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, high voltage may result in fatal injury.

Note:

1. BMS communication connection is only for lithium battery.
2. It is necessary to turn the matched resistance switch of No. 1 inverter and No. N inverter to "ON" and turn others to "1" in parallel connection mode. **(Only for Scheme B)**
3. With parallel connection mode, it is necessary to connect APP to one of inverters and then go to Console >Hybrid Setting> Other >Parallel mode page to enable Parallel mode on APP. Setting/modifying the parameter requires logging into an administrator account.
4. The external DC/AC breakers are not supplied with the inverter and must be purchased separately. The specifications of main breaker and normal load breaker depend on household loads. For other breakers, please refer to the table below.

Breakers recommendation:

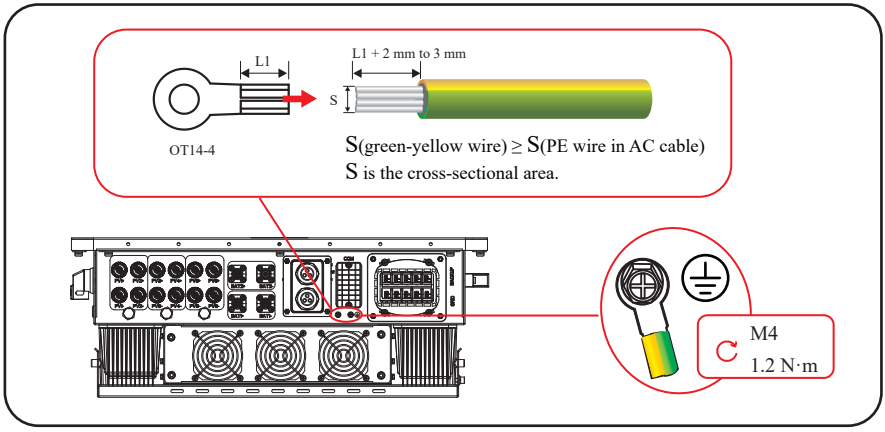
Inverter	Battery Breaker	Battery Breaker	Grid Breaker	Normal Load Breaker	Main Breaker
12K	≥ 80 A	≥ 63 A	≥ 63 A	Depends on household loads	Depends on household loads
15K		≥ 63 A	≥ 63 A		
20K		≥ 63 A	≥ 63 A		
25K	≥ 160 A * 1 (Single battery connected to both BAT1 and BAT2); ≥ 80 A * 2 (Battery systems connected to BAT1 and BAT2 respectively).	≥ 80 A	≥ 80 A		
30K		≥ 80 A	≥ 80 A		

4.1 Grounding

A protective earth (PE) terminal is equipped at the side of the inverter. Please ensure that this PE terminal is connected to the grounding rod for reliable grounding.

WARNING	• The inverter must be well-grounded; otherwise, there may be electric shock risk. • The PE cable connected to the enclosure of the inverter cannot replace the PE cable connected to the AC output port. Please make sure that both of the two PE cables are securely connected.

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.

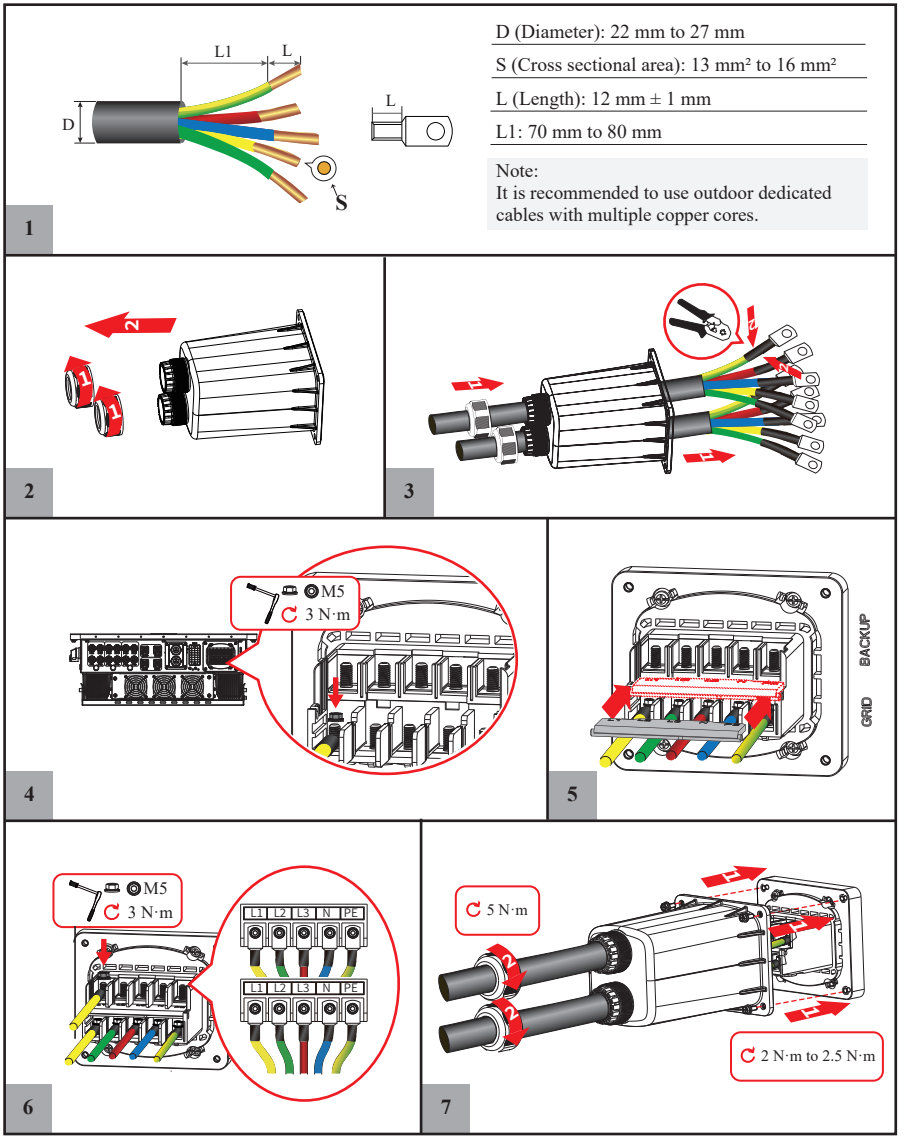


4.2 GRID/BACKUP Connection

Before connecting the GRID/BACKUP terminal, ensure that both the AC terminal and the DC terminal are powered OFF and the PV switch is OFF. Otherwise there is a risk of high voltage shock.

For GRID/BACKUP connection, please perform the following steps:

Step 1 Assemble the AC connector and then insert AC connector into GRID/BACKUP port.



Step 2 Install the AC circuit breaker. An appropriate AC breaker（≥ 63 A or ≥ 80 A）should be installed between inverter and the GRID/BACKUP for safety:

a. Before installing the AC circuit breaker, please confirm the AC breaker is working normally. Turn off the AC breaker and keep the AC breaker in “off” status.

b. Connect the PE conductor to grounding electrode, and connect the N and L conductors to AC breaker.

c. Connect the AC breakers to the utility GRID/BACKUP load.

WARNING	• Connect the AC cables to the corresponding terminals correctly. Otherwise it will damage the inverter. • Install an AC circuit breaker for each inverter. Multiple inverters are not allowed to share a circuit breaker. • Load is not allowed to connect between the grid and the AC breaker. • Never touch backup port when the inverter is powered on since there is AC output. Power off the inverter first if maintenance is required for the loads connected with BACK-UP ports. Otherwise, electric shock may occur.

4.3 Battery Connection

⚠ WARNING	• Reverse polarity will damage the inverter! • Be careful of electric shock and chemical hazards! • To reduce risk of injury, please use appropriate cable size. • Install a DC breaker between the inverter and battery.

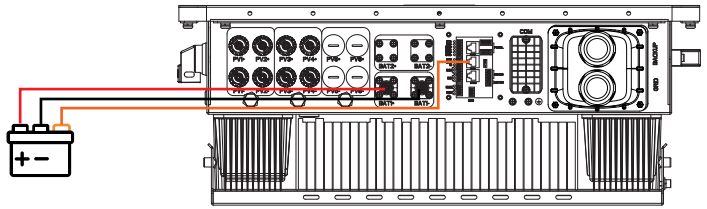
The inverter now only supports lithium / lead-acid battery.

The recommended lithium battery brands are as follows: Weco, Pylon tech, UZ energy series.

This section only describes the battery connection on inverter side. If you need more detailed connection information about the battery side, please refer to the manual of the battery.

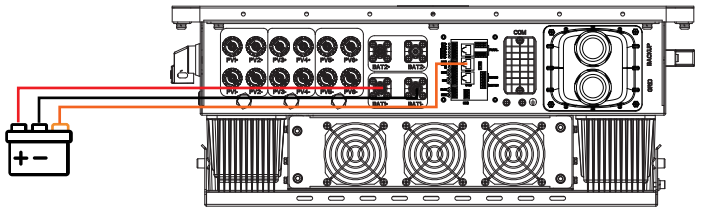
Before connecting battery, please install a separate DC breaker between inverter and battery which ensures that the inverter can be safely disconnected during maintenance.

12K/15K/20K can be connected to only one battery system. The battery cable must be connected to BAT 1, as shown below.

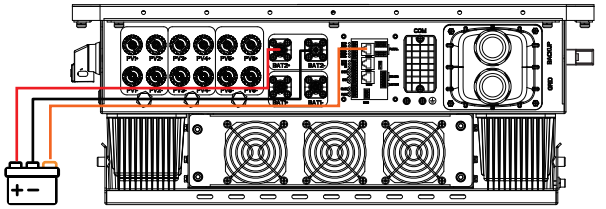


25K/30K can be connected to one or two battery system, as shown below.

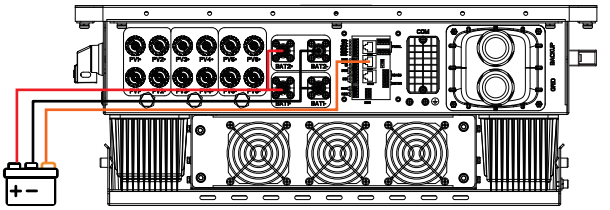
Single battery system connected to BAT1 of the inverter.



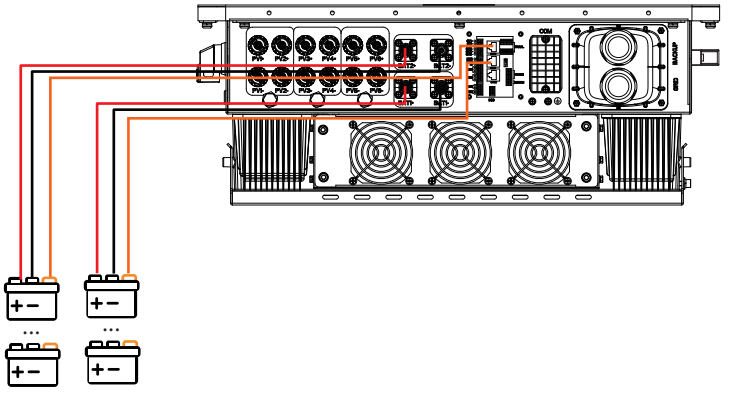
Single battery system connected to BAT2 of the inverter.

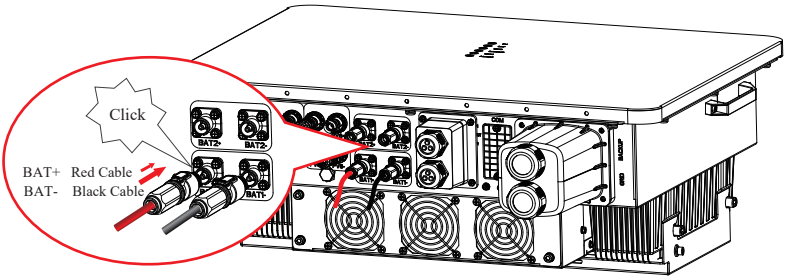


Single battery system connected to both BAT1 and BAT2 of the inverter. (In this mode, the battery communication cable can only be connected to BMS1 port.)



Battery systems connected to BAT1 and BAT2 of the inverter respectively. (In this mode, please connect the BAT1 communication cable to BMS1 and BAT2 communication cable to BMS2 port correspondingly.)

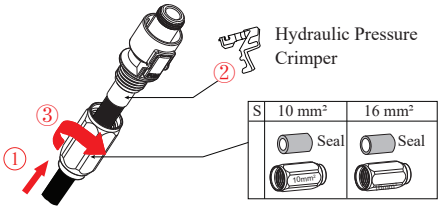




BAT Cable / Item (recommendation)	Spec 1	Spec 2
Diameter (D)	6.5 mm to 7.5 mm	8.0 mm to 9.0 mm
Cross section (S)	10 mm²	16 mm²
Strip length (L)	~10 mm	
Cable total length	≤ 3 m	

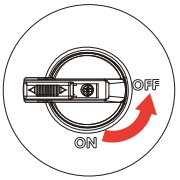
Note: the 10 mm² BAT cable is applicable to model 12K/15K/20K, while the 16 mm² BAT cable is applicable to all inverter models.

1



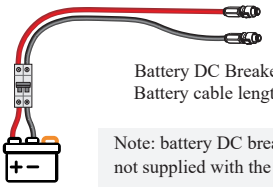
Note: choose the proper connector parts according to the BAT cable cross section (S).

2



Ensure that the PV switch is OFF.

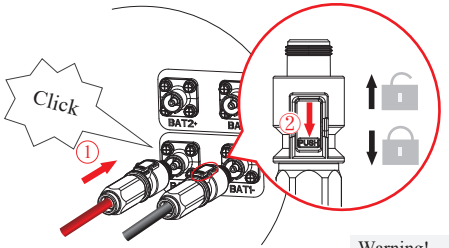
3



Battery DC Breaker ≥ 80 A
Battery cable length ≤ 3 m

Note: battery DC breakers are not supplied with the inverter.

4



BAT+ Red Cable
BAT- Black Cable

Warning!
Reverse polarity will damage the inverter!

5

Battery Communication Connection

If the battery type is lithium battery which needs communication between the inverter and battery management system (BMS), the connection must be installed. Please refer to section 4.6.1 for details.

Since there are two groups of battery connect terminals, for 25K/30K, it is necessary to set battery connection type on APP and make sure that the connection methods of power port and BMS port are correct by following the table below before powering on the inverter.

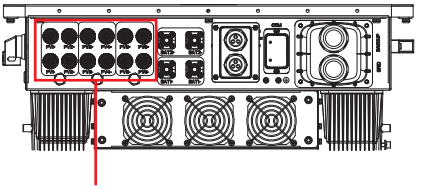
Battery connection type	Description	Power port		BMS port	
		BAT1+/-	BAT2+/-	BMS1	BMS2
Single Battery (BAT1)	Single battery system connected to BAT1 only	✓		✓	
Single Battery (BAT2)	Single battery system connected to BAT2 only		✓		✓
Two Separate Batteries (BAT1, BAT2)	Battery systems connected to BAT1 and BAT2 respectively	✓	✓	✓	✓
Single Battery (BAT1+BAT2)	Single battery system connected to both BAT1 and BAT2	✓	✓	✓	

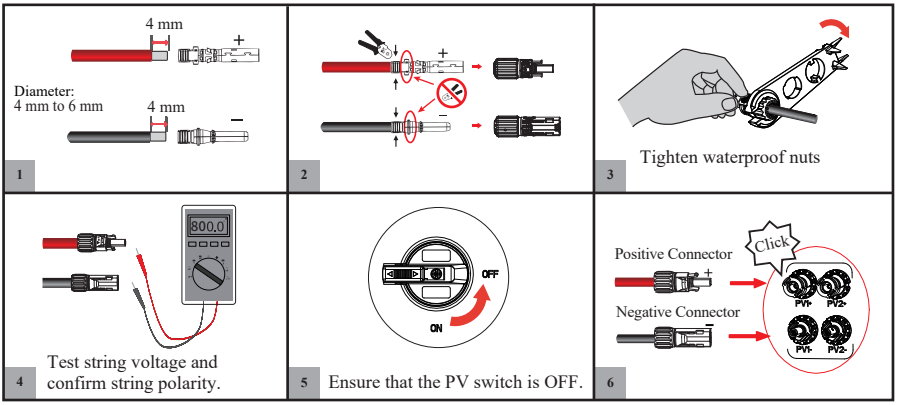
4.4 PV Connection

WARNING	• Please check polarity of PV connectors! • If polarity reversed, do not try to disconnect any PV connector until the irradiance declines and the DC currents fall below 0.5 A! Only then disconnect the PV plugs and correct the polarity before reconnecting.

NOTICE	• Before connecting the PV panel, make sure the polarity is correct. Reverse polarity may permanently damage the inverter. DO NOT connect PV to the grounding conductor. • The minimum insulation resistance to ground of the PV panels • must exceed 33.3 kΩ, there is a risk of shock hazard if the requirement of minimum resistance is not met.

For PV connection, please refer to the following figures:





4.5 CT Connection (Direct connect)

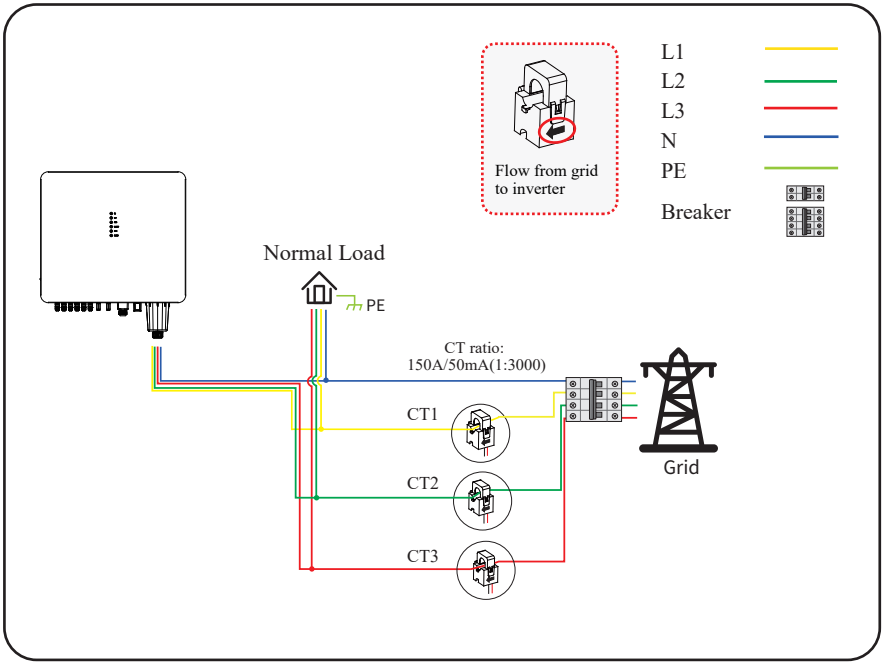
You can monitor usage with a CT (Current transformer).

Before connecting to the Grid, please install a separate AC breaker (≥ 100 A; prepared by user) between the CT and the Grid to ensure that the inverter can be safely disconnected during maintenance.

When performing CT connection, pay attention to the current flow direction and lead the live line through the detection hole of CT.

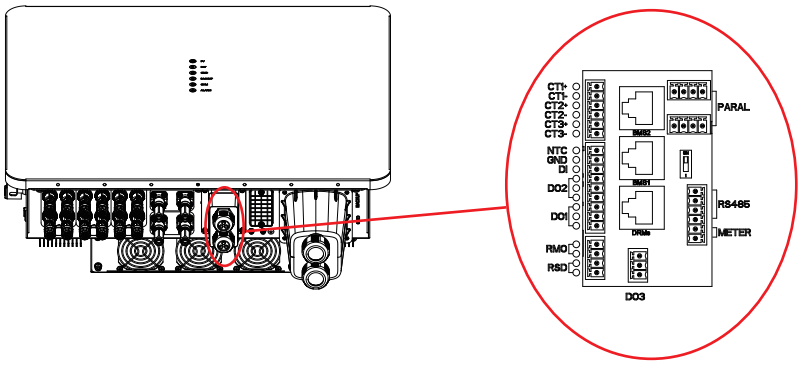
NOTE	• The arrow on the CT indicates the current flow from grid to inverter. The current direction from grid to inverter is defined as positive and current direction from inverter to grid is defined as negative. • L1, L2, and L3 can only pass through the detection hole of CT1, CT2 , and CT3 respectively.

The connection diagram of power cable of CT is shown as below:



4.6 Communication Connection

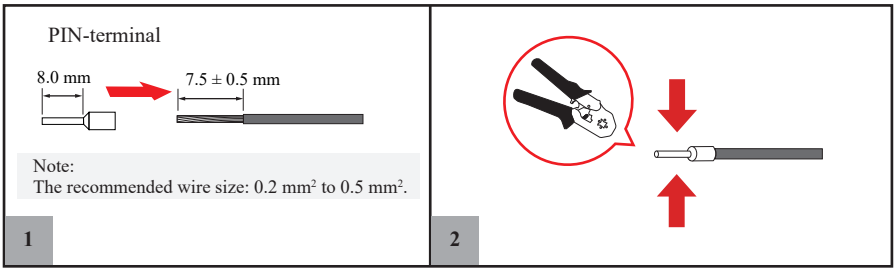
Communication interfaces are located on the bottom of the inverter:



Interface		Descriptions
BMS		Lithium battery communication interface
RS485		RS485 communication (monitor / meter)
CT		6-pin terminal for grid/load current transformer
9-Pin	DRY	DI/DO control
	NTC	Temperature sensor terminal of lead-acid battery
DO3		DO control
DRMs		Demand response mode for Australia application
RSD/RMO		RSD control power and remote off
PARA		4-pin terminal for parallel communication
		A matched resistance switch for parallel communication
COM		For WIFI/LAN communication.

PIN Terminal Crimping

Crimp commuinication cables before threading.



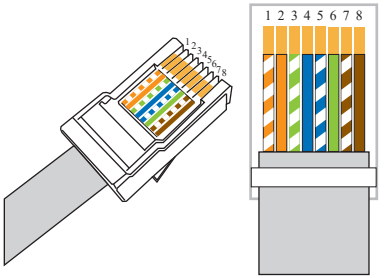
4.6.1 BMS Connection (Only for Lithium Battery)

CAUTION	• For 12K/15K/20K, please connect the cable to BMS1 port. Otherwise, BMS communication may fail. • For 25K/30K, when single battery system is connected to both BAT1 and BAT2, please connect the cable to BMS1 port to realize BMS communication. Otherwise, BMS communication may fail. • For 25K/30K, When battery systems connected to BAT1 and BAT2 of the inverter respectively, please connect the BAT1 communication cable to BMS1 and BAT2 communication cable to BMS2 port correspondingly to realize BMS communication. Otherwise, BMS communication may fail.

NOTE	This manual ONLY illustrates the pinout sequence of BMS at INVERTER SIDE. For details about the pinout sequence at battery side, see the user manual of the battery you use, and the following pinout diagram of battery side is only for illustration.

RJ45 Terminal Configuration of Battery Communication at Inverter Side

Standard RJ45 Pinout



RJ45 Pin Configuration	
Pin	**Color**
1	White-Orange
2	Orange
3	White-Green
4	Blue
5	White-Blue
6	Green
7	White-Brown
8	Brown

Always face the flat side of the terminal, and count the pin slots from left to right from 1 to 8. Read the pin definitions of both the battery and inverter carefully.

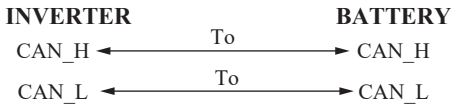
INVERTER:

Inverter	
Pin	**Definition**
1	RS485_A
2	RS485_B
3	GND
4	CAN_H
5	CAN_L
6	NC
7	NC
8	NC

BATTERY:

Battery（example)	
Pin	**Definition**
1	NC
2	NC
3	GND_S
4	CAN_H
5	CAN_L
6	GND_S
7	NC
8	NC

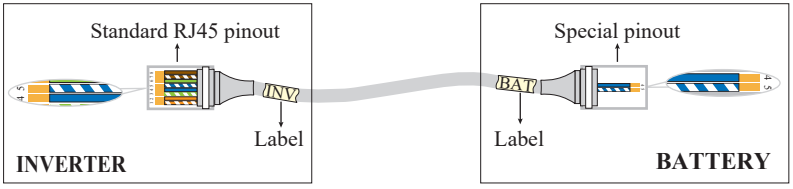
CAN BUS connection principle:



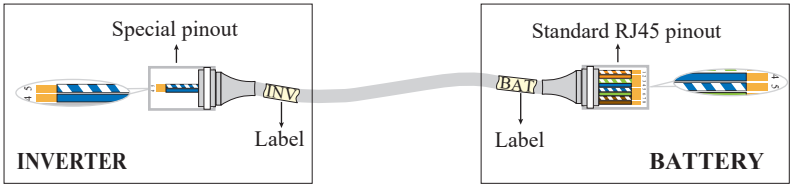
BMS communication cable prepare.

① Prepare RJ45 terminals and strip appropriate length of COM cables.
② According to pin definitions and cable order, assemble the RJ45 terminals and crimp communication wires. There are two methods to assemble the RJ45 terminals.
③ Then label the RJ45 terminals (BAT or INV) to avoid confusion.
④ After finishing wire-making, use a multimeter or other specific tool to determine if your cable is good, bad, or wired incorrectly.

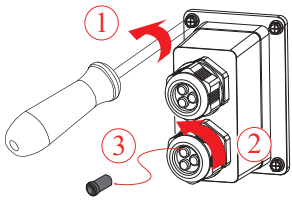
Method 1: Use the INVERTER RJ45 pinout as the standard pinout to crimp wires, then the battery side will be a non-standard one (special pinout). Cut off the other no-used wires (1/2/3/6/7/8) for the battery RJ45 terminal.



Method 2: Use the BATTERY RJ45 pinout as the standard pinout to crimp wires, then the inverter side will be a non-standard one (special pinout). Cut off the other no-used wires (1/2/3/6/7/8) for the inverter RJ45 terminal.

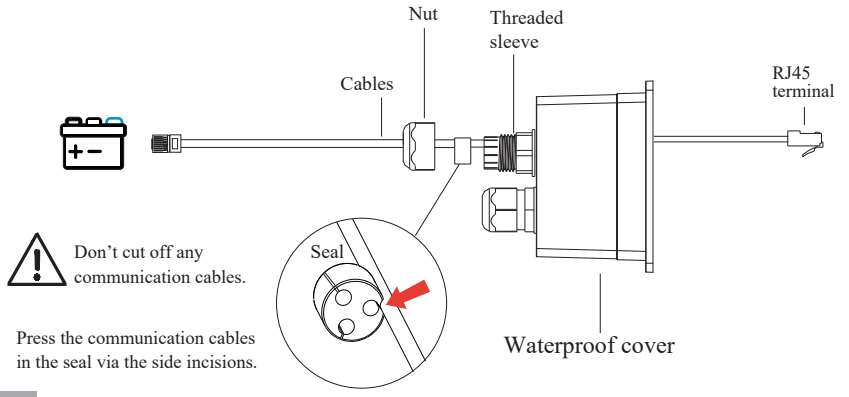


For BMS communication connection, please refer to the following steps:



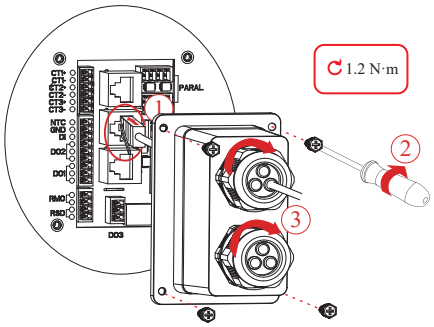
1

① Unscrew the waterproof cover.
② Loosen the nut on waterproof cover.
③ Remove sealing plugs.



2

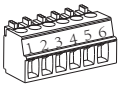
Thread the communication cable(s) through the nut, seal and waterproof cover in turn.



3

4.6.2 RS485 Connection (Monitoring/Meter)

6-Pin Terminal Configuration of Monitoring/Meter Communication

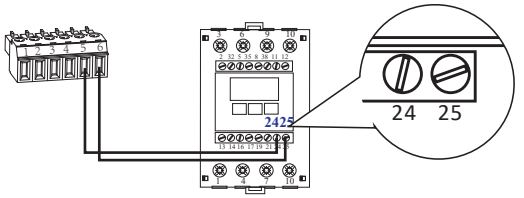


PIN	Function Description
1	RS485 A1 (for Monitoring)
2	RS485 B1 (for Monitoring)
3	RS485 A1 (for Monitoring)
4	RS485 B1 (for Monitoring)
5	RS485 A2 (for Meter)
6	RS485 B2 (for Meter)

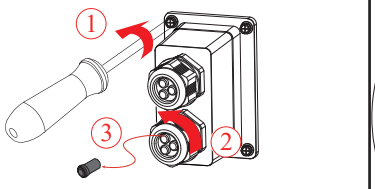
Inverter	Monitoring
Pin1(RS485 A1)	RS485 A
Pin2(RS485 B1)	RS485 B

Inverter	Meter
Pin5(RS485 A2)	Pin24
Pin6(RS485 B2)	Pin25

Meter Cable Connection Overview

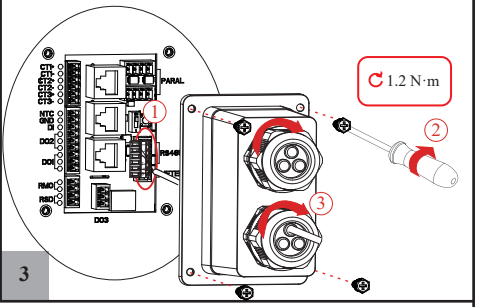


For RS485 connection, please perform the following steps:

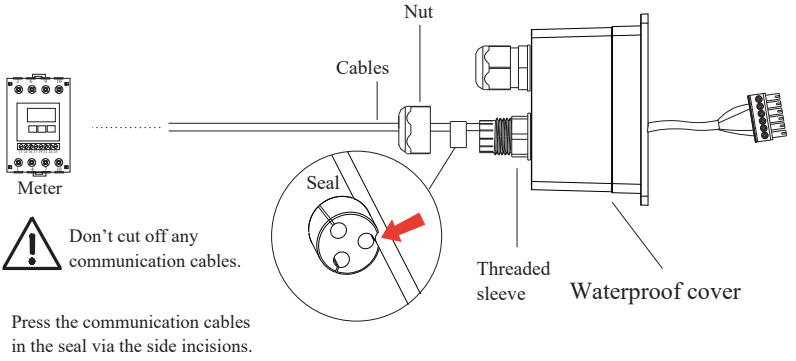


① Unscrew the waterproof cover.
② Loosen the nut on waterproof cover.
③ Remove sealing plugs.

1



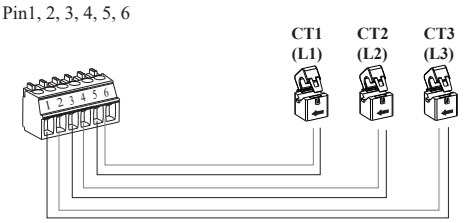
3



2 Thread the communication cable(s) through the nut, seal and waterproof cover in turn.

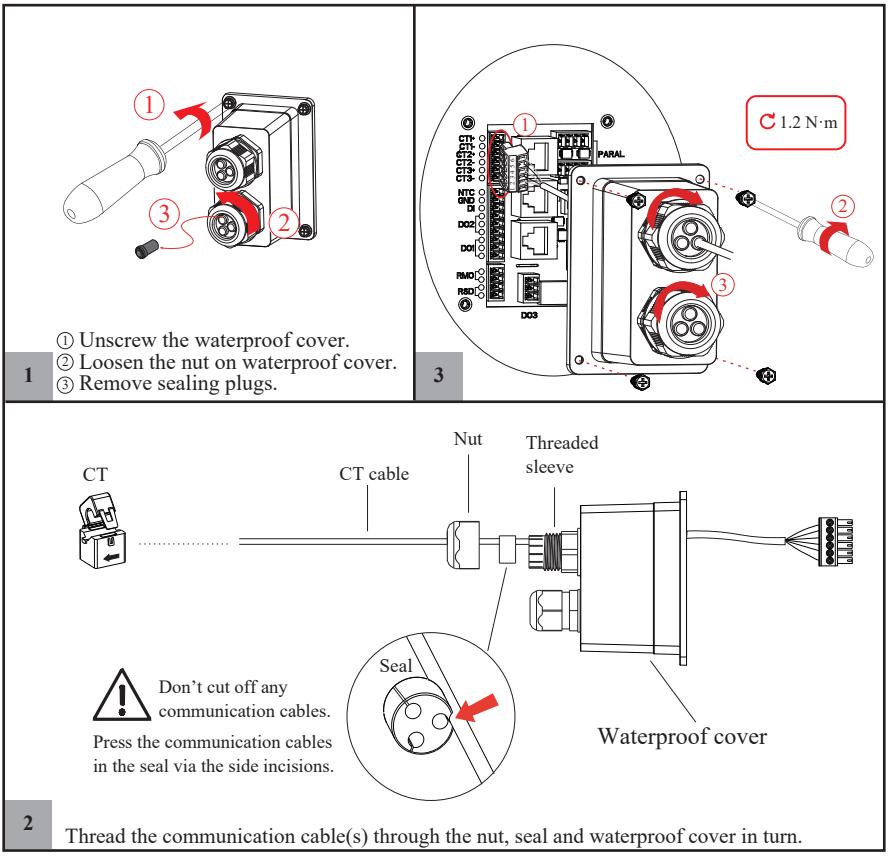
4.6.3 CT Connection

CT cable connection overview



Inverter	CT	Phase Line
Pin1(CT3-)	Black	L3
Pin2(CT3+)	/	
Pin3(CT2-)	Black	L2
Pin4(CT2+)	/	
Pin5(CT1-)	Black	L1
Pin6(CT1+)	/	

For CT connection, please perform the following steps:

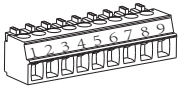


1 ① Unscrew the waterproof cover.
② Loosen the nut on waterproof cover.
③ Remove sealing plugs.

3

2 Thread the communication cable(s) through the nut, seal and waterproof cover in turn.

4.6.4 DI/DO Connection(s)

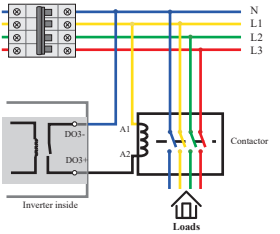


PIN	Function Description
1	NO1 (Normal Open)
2	COM1
3	NC1 (Normal Close)
4	NO2 (Normal Open)
5	COM2
6	NC2 (Normal Close)
7	DI
8	GND
9	NTC BAT+

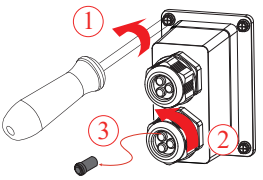
Note:
Pin7&8 can be used for CEI 0-21 SPI external signal testing.

PIN	Function Description
1	DO3+
2	/
3	DO3-

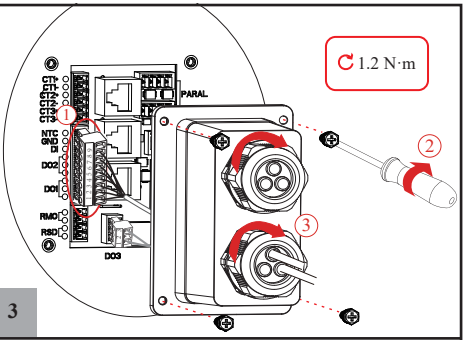
The inverter reserves a DO relay controlling port(DO3), which supports connecting additional contactors to enable/disable the loads, such as household loads etc.
Take following application for example, when the DO relay is ON, the loads will be enabled; when it is OFF, the loads will be disabled.



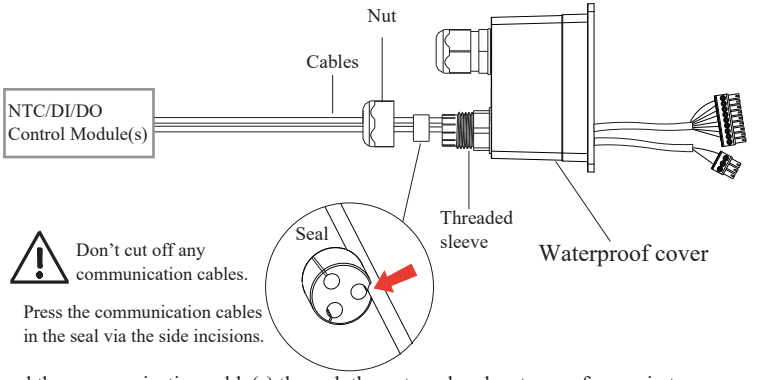
For DI/DO connection, please perform the following steps:



1 ① Unscrew the waterproof cover.
② Loosen the nut on waterproof cover.
③ Remove sealing plugs.

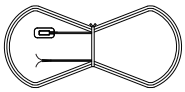


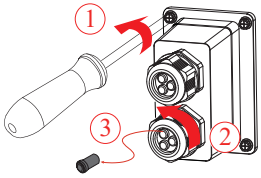
3



2 Thread the communication cable(s) through the nut, seal and waterproof cover in turn.

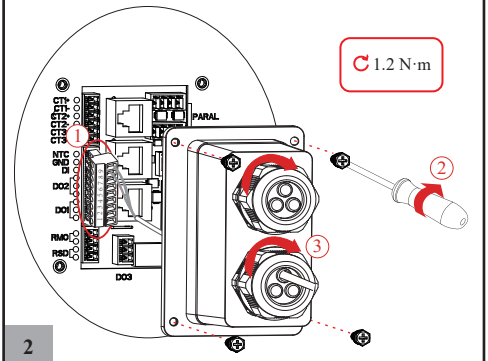
4.6.5 NTC Temperature Sensor Connection for Lead-acid Battery (Optional)



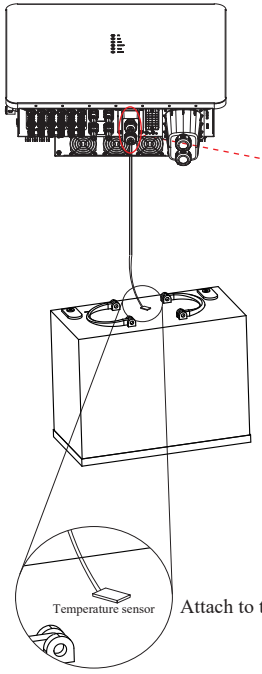


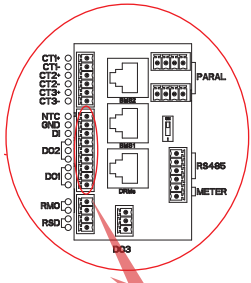
① Unscrew the waterproof cover.
② Loosen the nut on waterproof cover.
③ Remove sealing plugs.

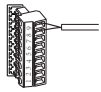
1



2







Pin	Function
Pin8	GND
Pin9	NTC BAT+

Attach to the battery surface

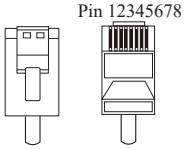
3

4.6.6 DRMs Connection

DRMs is a shortened form for “inverter demand response modes”. It is a compulsory requirement for inverters in Australia.

Note: with DRMs connection, it is necessary to connect APP to inverter and then go to Console > Other Setting page to enable DRM function on APP. For details, please refer to section 7.2.3.

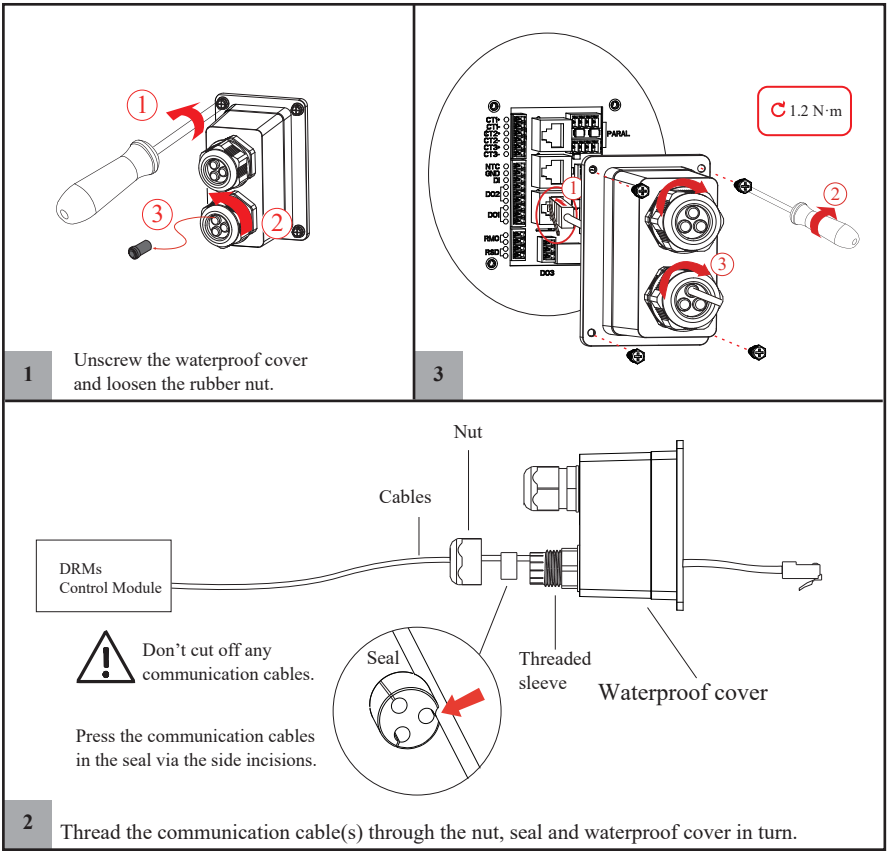
RJ45 Terminal Configuration of DRMs



DRMs

PIN	1	2	3	4	5	6	7	8
Function Description	DRMs1/5	DRMs2/6	DRMs3/7	DRMs4/8	REF	GND	/	/

For DRMs Connection, please perform the following steps:

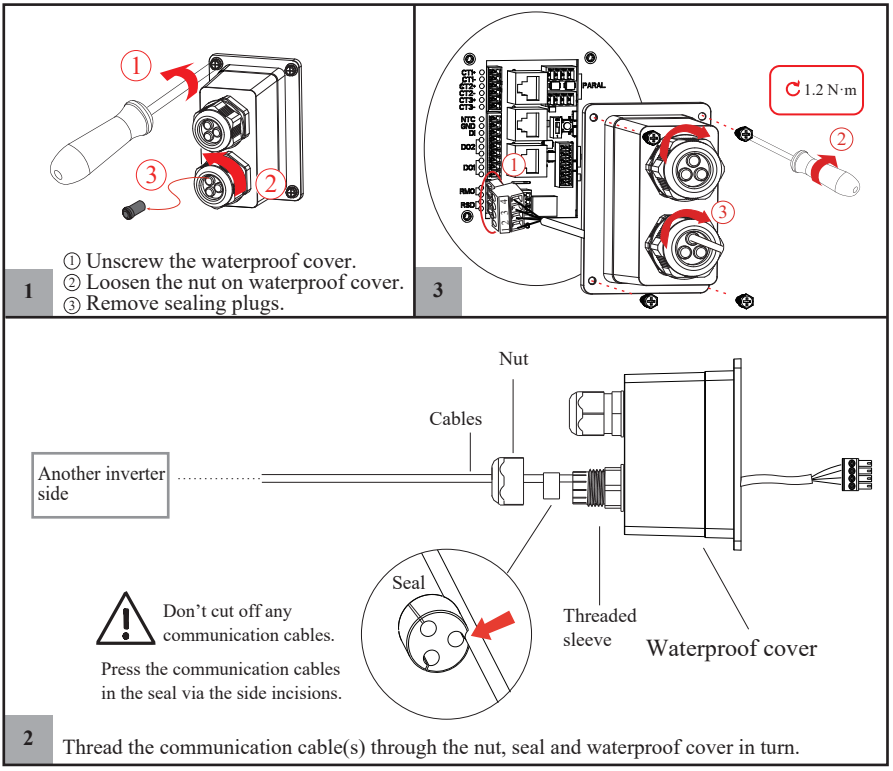


4.6.7 RSD/RMO Connection(s)

4-Pin Terminal Configuration of RSD/RMO Communication

PIN	1	2	3	4
Function Description	+12V	GND	GND	REMO_OFF

For RSD/RMO connection, please perform the following steps:

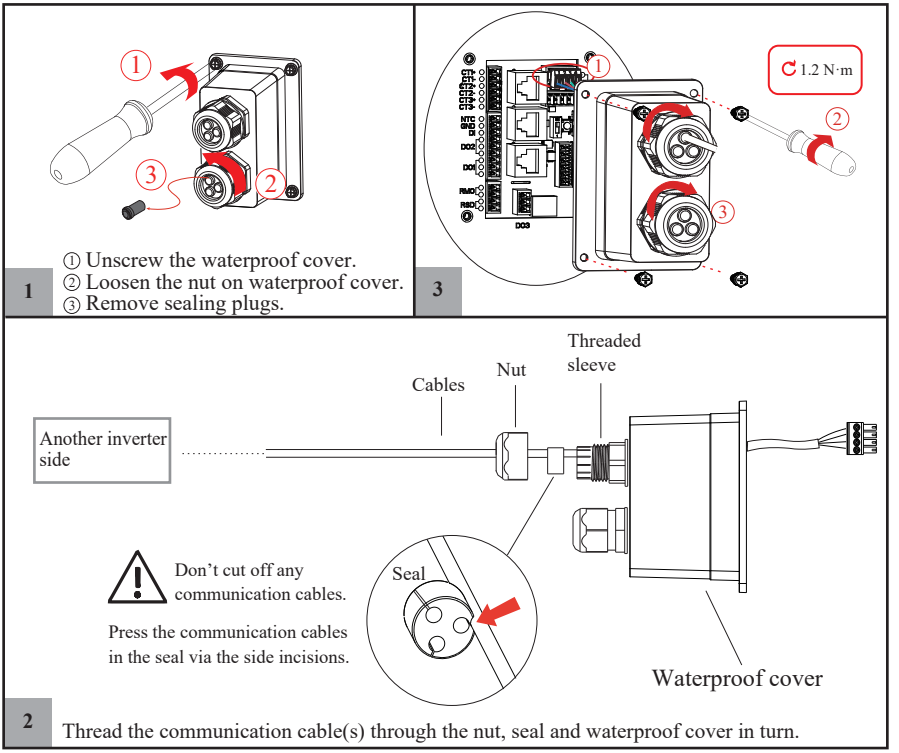


4.6.8 Parallel Communication Connection

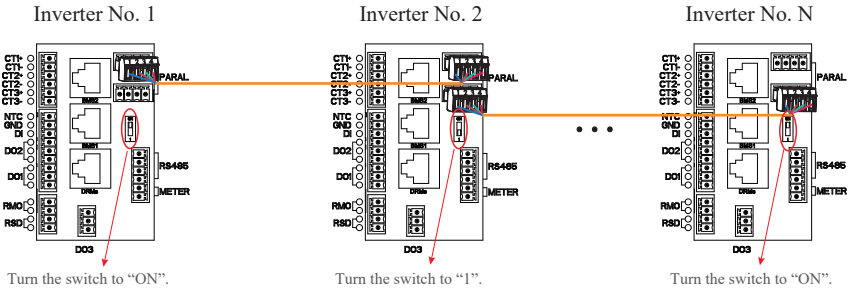
4-Pin Terminal Configuration of parallel Communication

PIN	1	2	3	4
Function Description	GND_S	PARA_SYNC	CAN_L	CAN_H

For parallel communication connection, please perform the following steps:



Parallel communication cable connection overview



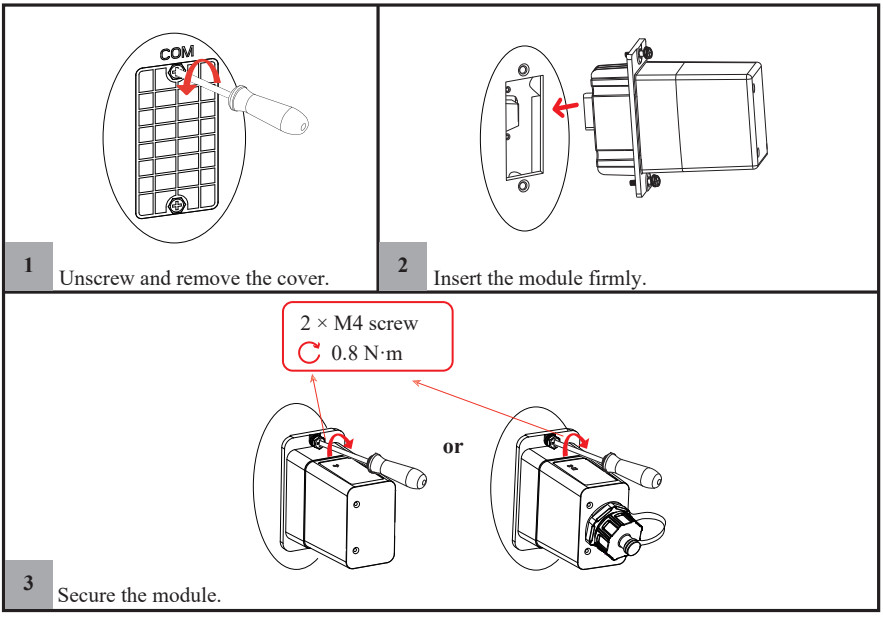
It is necessary to turn the matched resistance switch of inverter No. 1 and inverter No. N to “ON” and turn the matched resistance switch of others to “1” in parallel connection mode.

Inverter No. 1	Inverter No. 2	.....	Inverter No. N
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)

4.6.9 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-consumption Mode

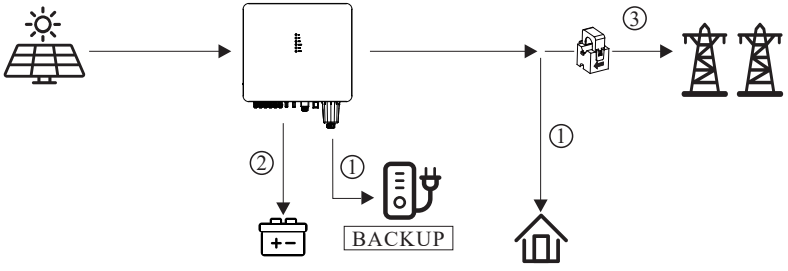
Go to Console > Hybrid Setting > Work mode page, and select Self-consumption mode.

Under Self-consumption mode, the supply priority of PV energy will be Load > Battery > Grid, that means the power generated by PV system gives priority to local loads. The excess energy charges the battery first, then the remaining power will be fed into the grid.

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

a) Wealthy PV Energy

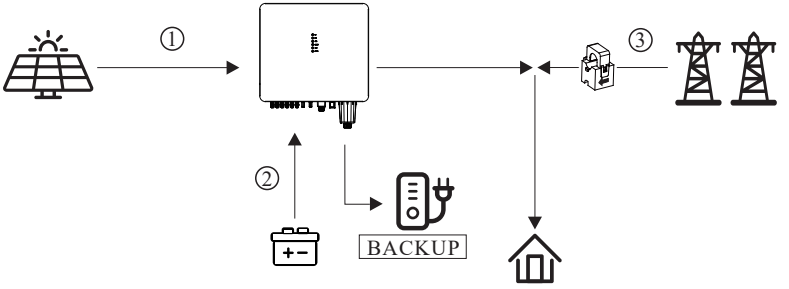
When PV energy is sufficient, it will give priority to local loads, the excess energy charges the battery first, then the remaining power will be fed into the grid.



①②③ is the sequence of PV energy transmission.

b) Limited PV Energy

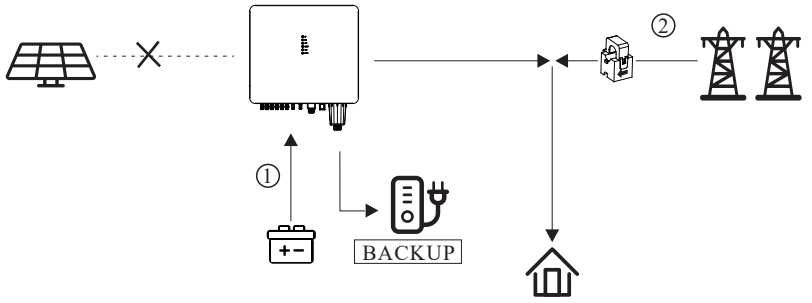
When the PV energy is not enough to cover all consumption, the PV energy will be entirely used by loads, and the insufficient part will be supplied by battery. Then still insufficient parts will be supplied by grid.



① ② ③ is the sequence of load consumption.

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 battery power is not enough, the load will be supplied by the grid.



① ② is the sequence of load consumption.

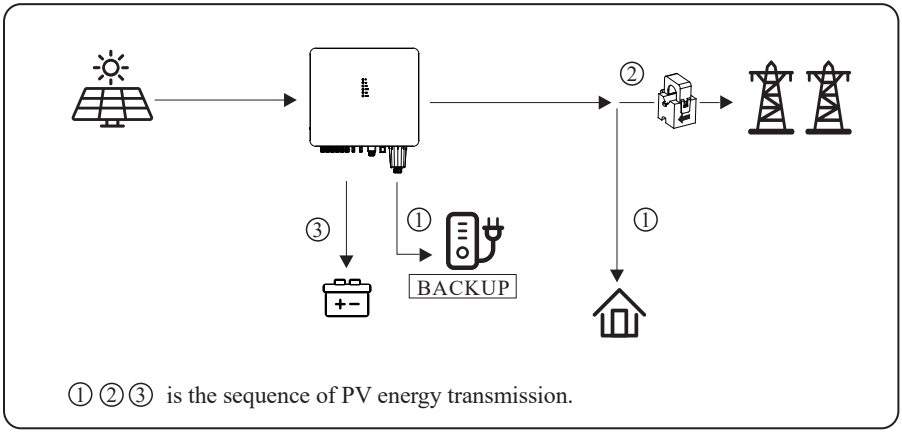
5.1.2 Feed-in Priority Mode

Go to Console > Hybrid Setting > Work mode page, and select Feed-in priority mode.

Under this mode, the supply priority of PV power will be Load > Grid > Battery, that means the power generated by PV system gives priority to local loads, the excess power will be fed into the grid first, then the remaining power charges the battery.

a) Wealthy PV Energy

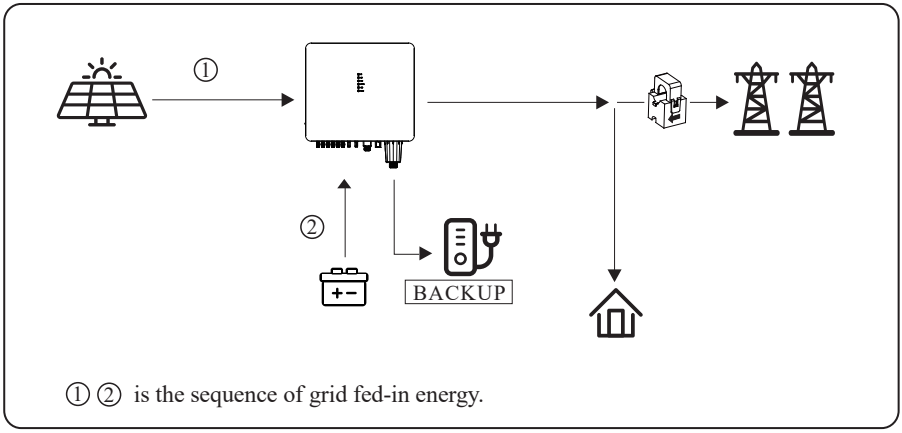
When PV energy is sufficient, it will give priority to local loads, the excess power will be fed into the grid first, then the remaining power charges the battery.



①②③ is the sequence of PV energy transmission.

b) Limited PV Energy

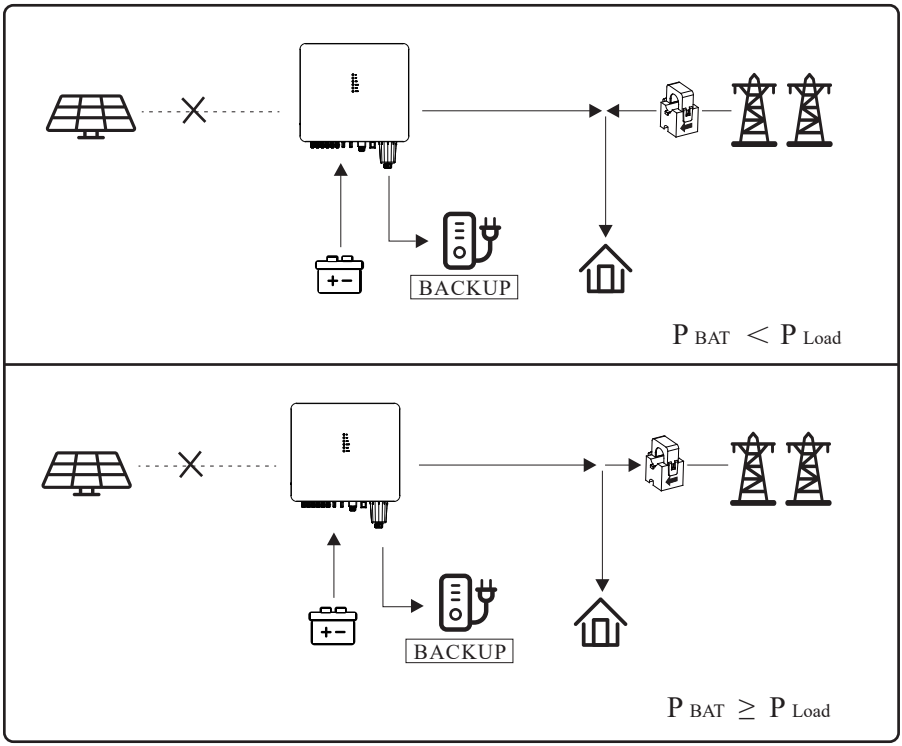
When PV energy is limited and cannot meet the feed-in grid power, the battery will discharge to meet it.



①② is the sequence of grid fed-in energy.

c) No PV Input

The inverter will first discharge the battery power for home load consuming when no PV input (such as in the evening or some cloudy or rainy days). If the battery power is not enough, the load will be supplied by the grid.



5.1.3 Back-up Mode

Go to Console > Hybrid Setting > Work mode page, and select Back-up mode.

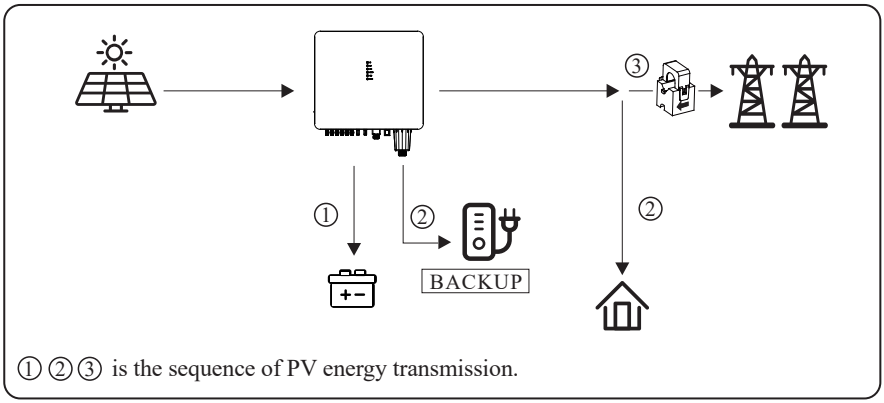
Under this mode, the supply priority of PV energy will be Battery > Load > Grid.
This mode aims at fast battery charging. You can set whether to allow AC charging or not.

Forbid AC Charging

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

a) Wealthy PV Energy

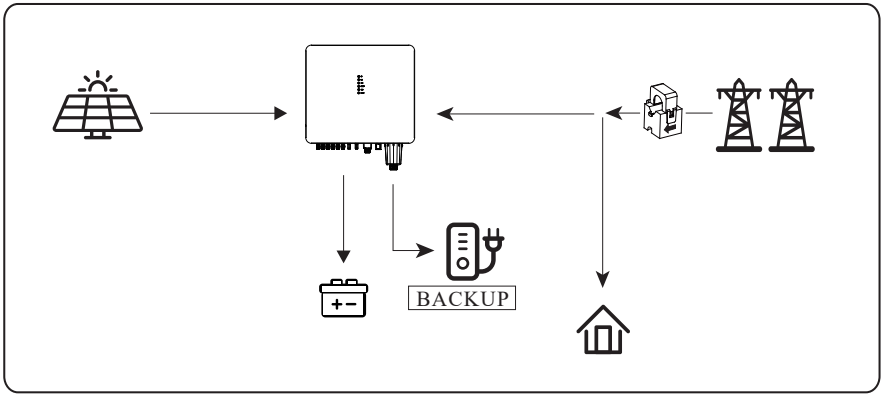
When PV energy is sufficient, it charges the battery first, then meets the load, and the rest is fed into the grid.



① ② ③ is the sequence of PV energy transmission.

b) Limited PV Energy

When PV energy is limited, PV charges the battery, and the grid meet the load demand, including normal load and backup load.

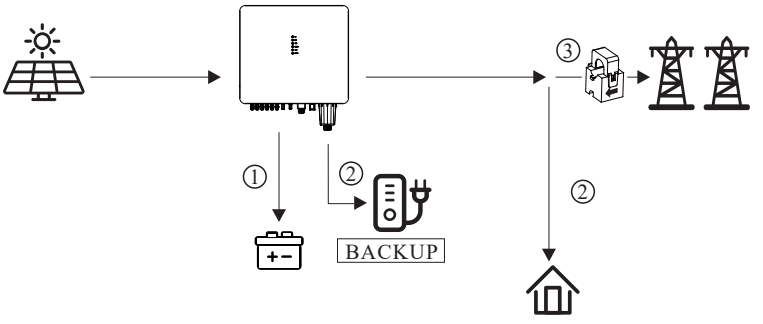


Allow AC Charging

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

a) Wealthy PV Energy

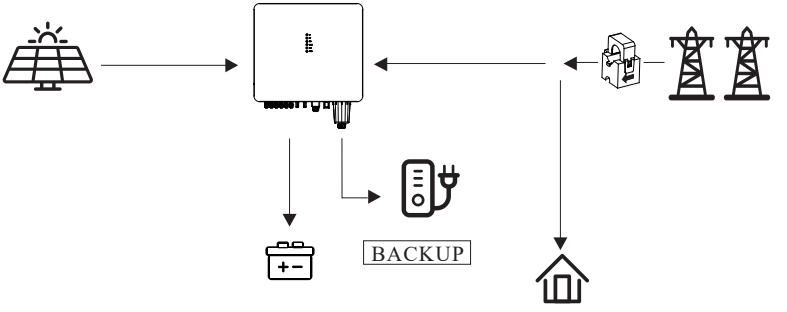
When PV energy is sufficient, PV charges the battery first, then meets the load, and the rest is fed into the grid.



①②③ is the sequence of PV energy transmission.

b) Limited PV Energy

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.



5.1.4 Off Grid Mode

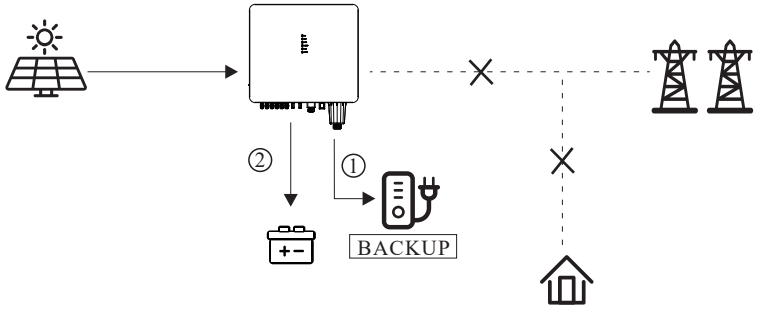
When the power grid is cut off, the system automatically switches to Off Grid mode.

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 cannot work without the battery.

a) Wealthy PV Energy

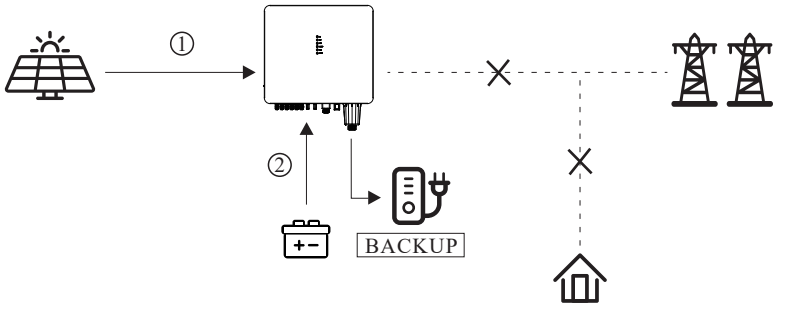
When PV energy is wealthy, the PV energy will be first consumed by critical load, then will be used to charge the battery.



①② is the sequence of PV energy transmission.

b) Limited PV Energy

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



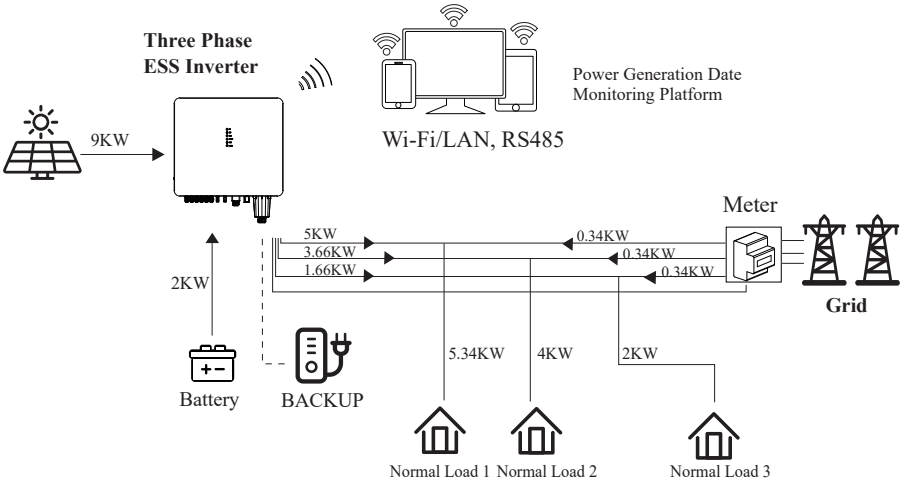
① ② is the sequence of BACKUP load consumption.

NOTICE	• Under this mode, please complete the output voltage and frequency settings. • It is better to choose the battery with sufficient capacity 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% BACKUP output power range.

5.1.5 On-grid Unbalanced Output

1) The normal load is single phase.
2) The three phases of normal load are different or unbalanced.

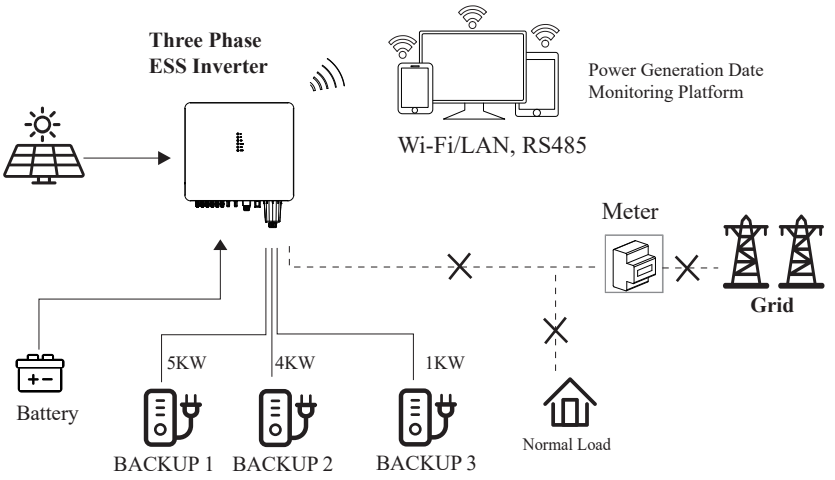
This is the best scheme to meet your needs.



5.1.6 Back-up Unbalanced Output

1) The critical load is single phase.
2) The three phases of critical load are different or unbalanced.

This is the best scheme to meet your needs.



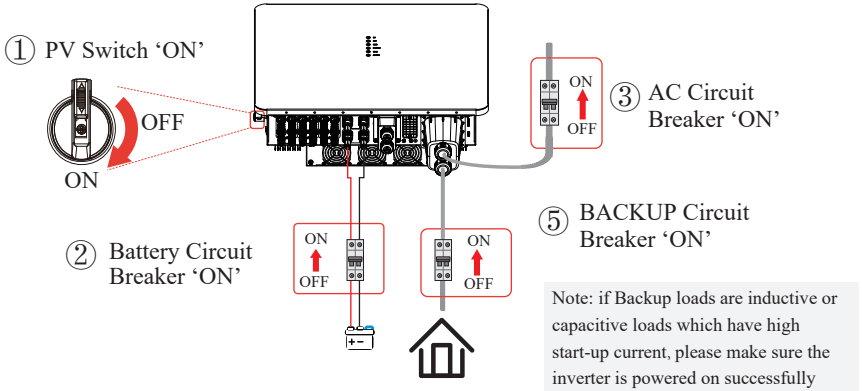
5.2 Startup/Shutdown Procedure

5.2.1 Startup Procedure

Check and confirm the installation is secured and that the system is well-grounded. Ensure that all connections (AC, battery, PV etc.) are correct, parameters and configurations conform to relevant requirements.

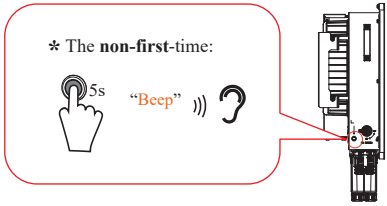
AC Frequency 50/60Hz	PV Voltage 160 V to 950 V
Battery Voltage 120 V to 800 V	Grid AC Voltage 180 V to 270V(311 V to 467 V)

Startup Procedure



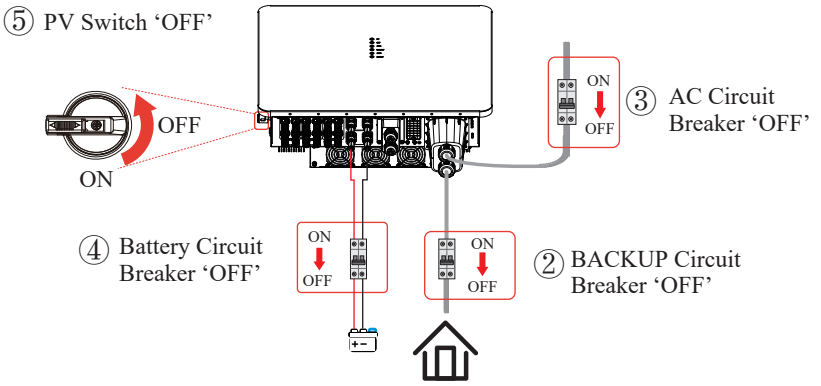
④ Go to APP, finish Quick Setup, and start the inverter.

* To perform the non-first-time startup: press and hold down the button on the left side of the inverter for about 5 seconds, until a "beep" sound heard.



Shutdown Procedure

DANGER	After the inverter is powered off, the remaining electricity and heat may still cause electric shock and body burns. If you need to disconnect the inverter cables, please wait at least 10 minutes before touching the inverter.



6. Commissioning

It is necessary to fully commission the inverter system for it is essential to protect the system from fire, electric shock, other damages, and personal injury.

6.1 Inspection

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

1) The system is properly installed according to the contents and instructions in this manual, and there is sufficient space for operation, maintenance, and ventilation.

2) All terminals and cables are in good conditions.

3) No objects are left in/on the inverter or within the required clearance.

4) The PV and the battery pack are working normally, the grid is normal.

6.2 Commissioning Procedure

When all items have been checked and the system is ready for use, start the commissioning procedure.

1) Power on the system by following the Startup Procedure in section 5.2.1.

2) Set the parameters on the App according to user's needs.

3) Complete commissioning.

7. User Interface

7.1 LED

This section describes the LED panel. LED indicator includes PV, BAT, GRID, 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 (light on 2s and off 2s). Battery is abnormal (light on 1s and off 1s).
	Off	Battery is unavailable.
GRID	On	GRID is available and normal.
	Blink	GRID is abnormal.
	Off	GRID is unavailable.
BACKUP	On	BACKUP power is available.
	Blink	BACKUP output is abnormal.
	Off	BACKUP power is unavailable.
COM	Blink	Data are communicating.
	Off	No data transmission
ALARM	On	Fault has occurred and inverter shut down.
	Blink	Alarms has occurred but inverter doesn’t shut down.
	Off	No fault.

Details	Code	PV LED	Grid LED	BAT LED	BACKUP 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 Bypass output		◎	●	◎	◎	◎	○
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 in discharge		◎	◎	★★	◎	◎	○
Battery1 absent	D1	◎	◎	○	◎	◎	○
Battery2 absent	DE						
Battery1 over voltage	D2	◎	◎	★	◎	◎	○
Battery2 over voltage	DF						
Battery1 under voltage	D3						
Battery2 under voltage	DG						
Battery1 discharge over current	D4						
Battery2 discharge over current	DH						
Battery1 over temperature	D5						
Battery2 over temperature	DJ						
Battery1 under temperature	D6						
Battery2 under temperature	DL						

Details	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
Communication loss (Inverter - BMS1)	D8	◎	◎	★	◎	◎	○
Communication loss (Inverter - BMS2)	DP						
Battery1 reversed	Dn						
Battery2 reversed	Dq						
BACKUP output active		◎	◎	◎	●	◎	◎
BACKUP output inactive		◎	◎	◎	○	◎	◎
BACKUP short circuit	DB	◎	◎	◎	★	◎	○
BACKUP over load	DC						
BACKUP output voltage abormal	D7						
BACKUP over dc-bias voltage	CP						
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 abnorma	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						

Details	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
Software incompatibility	CC	◎	◎	◎	◎	◎	●
Internal storage error	CD						
Data inconsistency	CE						
Inverter abnormal	CF						
Boost abnormal	CG						
Dc-dc abnormal	CU						
Battery communication cable configuration error	DU	◎	◎	★	◎	◎	○
Battery power cable configuration error	DY						

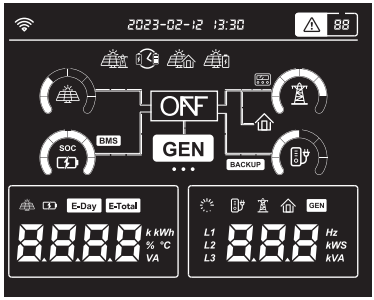
Remark: ● Light on ○ Light off ◎ Keep original status

★ Light on 1s and off 1s ★★ Light on 2s and off 2s

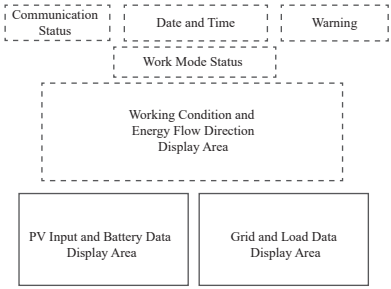
7.2 LCD Description

LCD screen is optional for this series of inverters. If you choose a LCD screen, the following introduction will help you understand the function of each icon displayed.

Menu Structure Overview

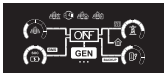


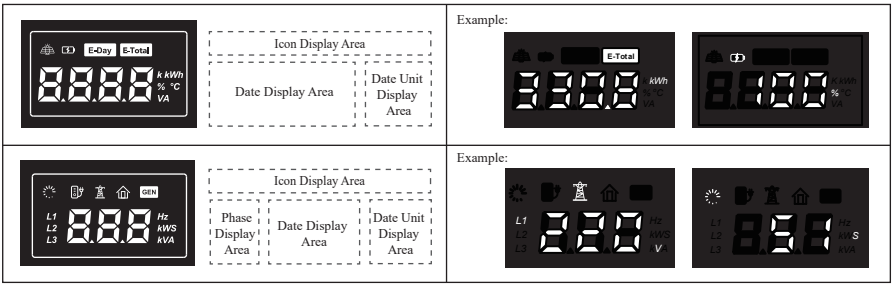
Actual LCD Screen



Function Overview

Icon Introduction-1

	This icon indicates **WIFI** connection status.
	The **date and time** display information of year, month, day, and hour-time. The ':' between hour and minute flashes once a second.
	**Warning icon** only displays when the error occurs. For specific warning code explanation, please refer to the chapter Inverter Troubleshooting.
	These four icons show **different operating status**. Please refer to chapter Inverter Working Mode for detailed introduction.  **Feed-in Priority Mode**  **Self-used Mode**  **Time-based Control Function**  **Back-up Charging Mode**
	This area shows the **working conditions and energy flow directions**. Please refer to Table Icon Status Description for detailed introduction of each icon displayed.
	The **Energy Bars** indicate energy flow direction. Each bar lights up one by one, then turns off when all bars light and repeats this cycle again.
	The **Energy Ring** indicates the battery SOC or the current power percentage. Each Energy Ring definition is as follows.  PV Input Power  ***On-Grid Mode***: Grid Output Power ***Non On-Grid Mode:*** Bypass load consumption power + Backup consumption power  Battery SOC  Backup  Grid under-voltage  Grid over-voltage



Icon Introduction-2

	The **PV icon** represents the power of PV.
	The **Battery icon** represents the current battery charge percentage or the voltage of battery.
E-Day	The **E-Today icon** represents the electricity energy generated today.
E-Total	The **E-Total icon** represents the electricity energy generated in total.
	When the **Loading icon** is on, it represents that the device is starting and the start timer countdown is displayed. The icon lights up a cluster of lights every second, until all lights are on, and then repeat the whole process again.
	The **Back-Up icon** represents the relevant power, frequency or voltage of Back-Up.
	The **Grid icon** represents the relevant power, frequency or voltage of the Grid.
	The **Load icon** represents the power consumption.
GEN	The **GEN icon** represents the voltage or power of generator.
L1 L2 L3	The **L1 icon** represents L1 phase of Grid/Backup/Generator. The **L2 icon** represents L2 phase of Grid/Backup/Generator. The **L3 icon** represents L3 phase of Grid/Backup/Generator.
	These two areas will display corresponding data of each lit icon mentioned above.

Icon Status Description			
Icon	**Name**	**Light**	**Description**
	PV	ON	Any PV voltage exists (it should be higher than the Min. PV Startup Voltage) .
		OFF	PV Voltage is lower than the Min. PV Startup Voltage.
	Grid	ON	Grid Voltage and frequency are normal.
		OFF	Grid over-voltage / under-voltage / over-frequency / under-frequency occurs.
	Battery	ON	Bat. Voltage is higher than the Rated Min. Bat Voltage.
		OFF	Bat. Voltage is lower than the Rated Min. Bat Voltage.
	Back-Up Load	ON	Backup relay is on.
		OFF	Backup relay is off.
	BMS	ON	Battery is set to BMS Type and its communication is normal.
		Blink	BMS communiation is abnormal.(The icon indicator on for one second, off for one second)
		OFF	1. Battery is not set to BMS Type.
			2. Battery voltage is lower than Rated Min. Voltage
	BACKUP	ON/OFF	Lights up/off with Back-Up Load icon simultaneously
	Meter/CT	ON	Power Limit is set to CT or Meter in APP, and the CT/Meter communication is normal, the Grid side is running well.
		Blink	When Meter/CT communication is lost, Meter/CT icon on for one second, off for one second)
		OFF	1. Power Limit is not set to CT or Meter.
			2. The voltage or frequency of grid side is abnormal.
	Load	ON/OFF	Lights up/off with Grid icon simultaneously.
	ON	ON	1. Backup relay is on.
			2. The inverter works under On-Grid mode.
			3. The inverter works under Off-Grid mode.
	OFF	OFF	Non-on working mode.
	Generator / Smart Load / Inverter	From left to right, when the three dots light up, each represents different meanings.	
		When GEN communication is lost, GEN icon will go off.	
	GEN	ON	Generator relay is on.
		OFF	Generator relay is off.
	Generator dot	ON	In APP, the "Gen port" parameters set to "Generator Input" and the generator relay is powered on.
		OFF	APP parameter set to Non 'Generator Input'.
	Smart Load dot	ON	In APP, the "Gen port" parameters set to "Smart Load Output" and the generator relay is powered on.
		OFF	APP parameter set to Non 'Smart Load Output'.
	Inverter dot	ON	In APP, the "Gen port" parameters set to "Inverter Input" and the generator relay is powered on.
		OFF	APP parameter set to Non 'Inverter Input'.

7.3 App Setting Guide

7.3.1 Download App

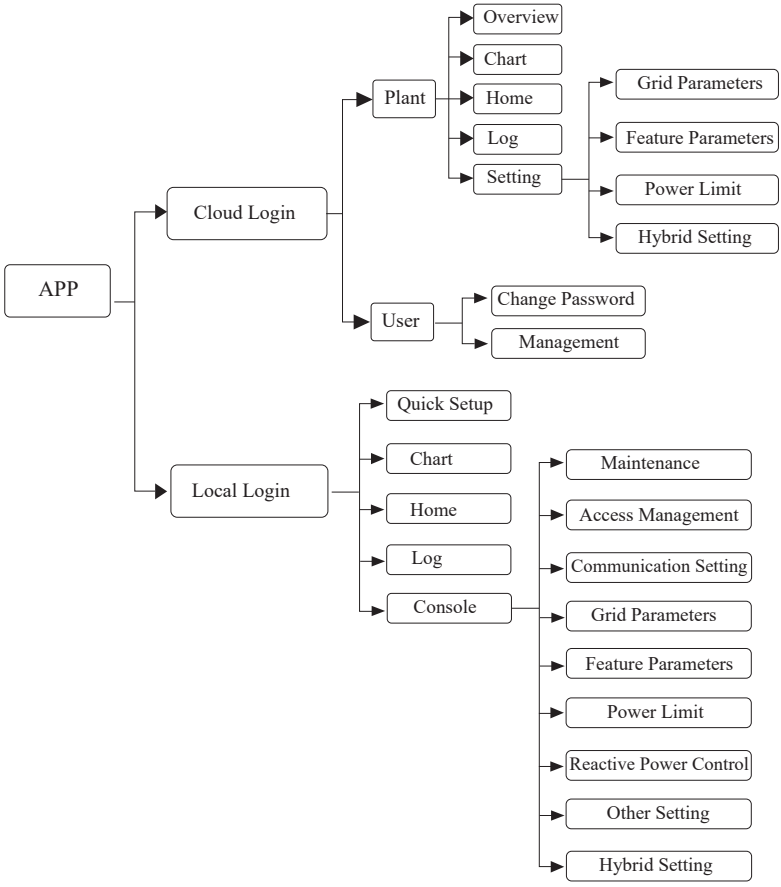
- Scan the QR code on the inverter to download the APP.
- Download APP from the App Store or Google Play.

Note:
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.

7.3.2 App Architecture

It contains "Cloud Login" and "Local Login".

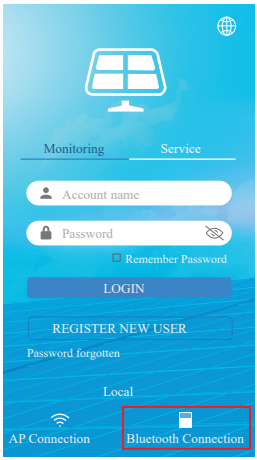
- Cloud login: APP read data from cloud server through API and display inverter parameter
- Local login: APP read data from inverter through Bluetooth connection with Modbus protocol to display and configure inverter parameter.

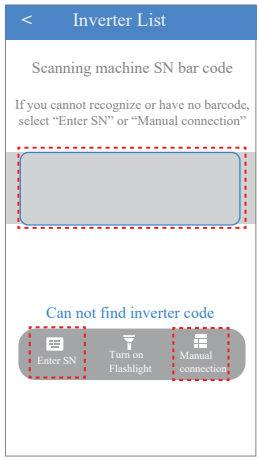


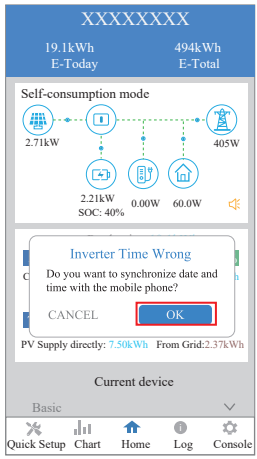
7.3.3 Local Login

To login the APP, please perform the following steps:

1. Enable the Bluetooth on your own phone and open the APP, then click the Bluetooth Connection.
2. To connect the inverter, please choose one of the following three ways:
   - Scan machine SN barcode
   - Enter SN
   - Manual connection
3. Click OK.



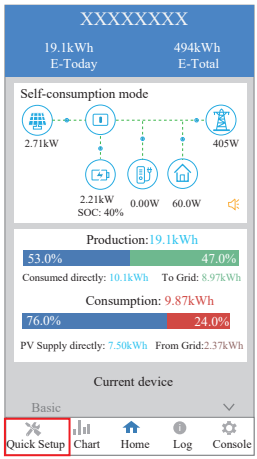




▪ **Quick Setup**

The quick setup is required for the first local login. Please perform the following steps.

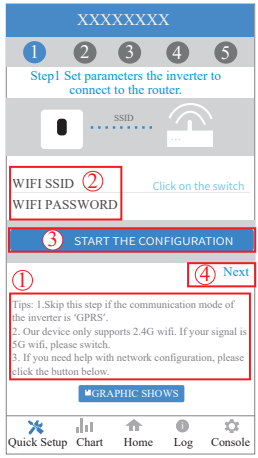
1. Click the Quick Setup.



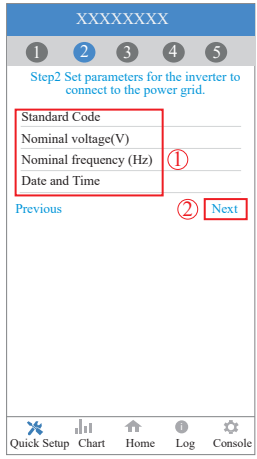
2. Read tips on the screen carefully before choosing the Wi-Fi SSID and entering the Wi-Fi password. Then click START THE CONFIGURATION and wait for Wi-Fi router loading successfully. Then click Next.

Note:

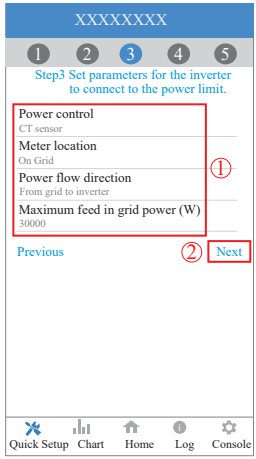
Please use the 2.4G network frequency band for configuration.



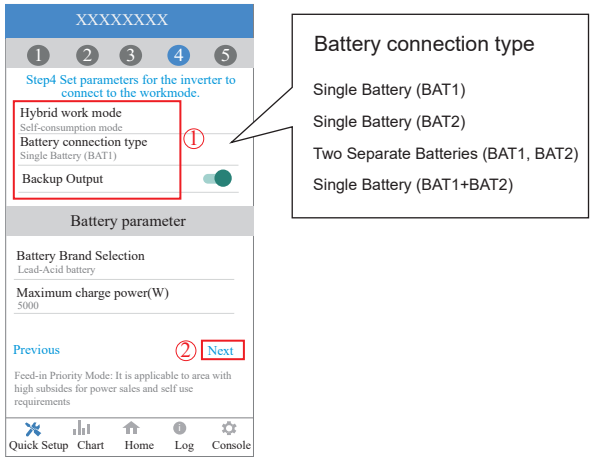
3. Set Standard Code and Date and Time parameters. Then click the Next.



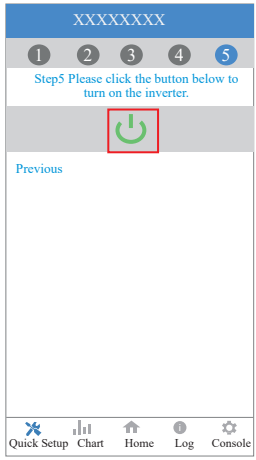
4. Set parameters for the inverter to connect to the power limit. Then click the Next.



5. Set parameters for the inverter to connect to the work mode and battery type. Then click the Next. For 25K/30K, it is necessary to set battery connection type correctly before powering on the inverter.



6. Please click the button to turn on the inverter.



▪ Chart

The power chart is showed by Day, Month and Year in our APP. Data curves in the following figures are only for illustration.

Query Daily Data

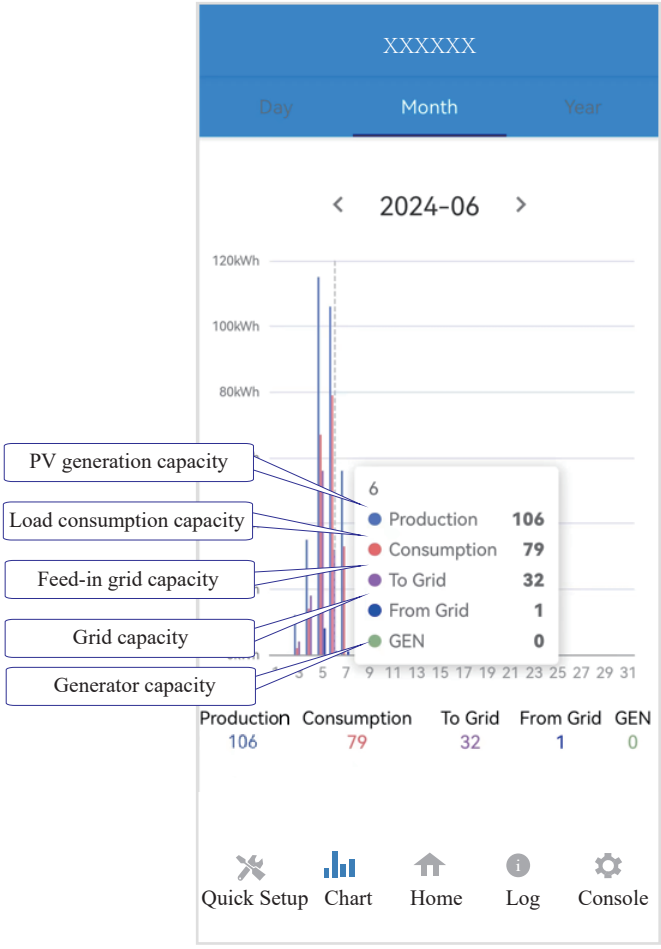
Go to Chart > Day page. It will show the Daily Production or Consumption Curve in this page. You can click anywhere on the graph to see the energy value of any time.

The above combination day chart shows the energy flow:

- PV generation power (Blue)
- Battery discharge and charge power (Red)
- Grid power and feed-in grid power (Purple)
- Load consumption power (Orange)
- Generator power (Green)

Query Monthly Data

Go to Chart > Month page. It will show the Monthly Production or Consumption Curve in this page. You can click anywhere on the graph to see the energy value of any month.

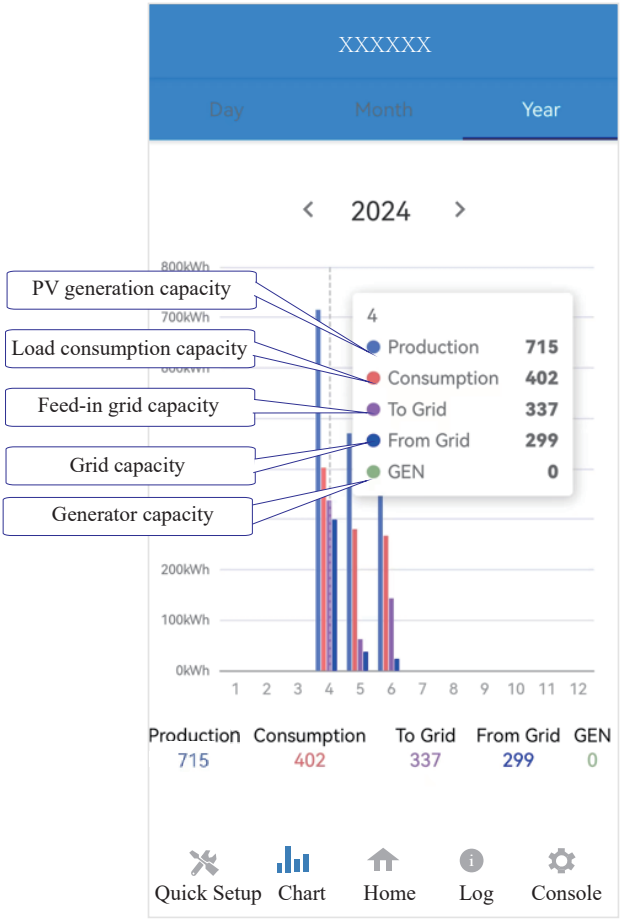


The above combination month chart shows the energy flow:

- PV generation capacity (Blue)
- Load consumption capacity (Red)
- Feed-in grid capacity (Purple)
- Grid capacity (Mazarine)
- Generator capacity (Green)

Query Yearly Data

Go to Chart > Year page. It will show the Annually Production or Consumption Curve in this page. You can click anywhere on the graph to see the energy value of any year.

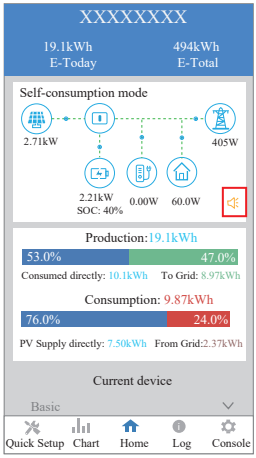


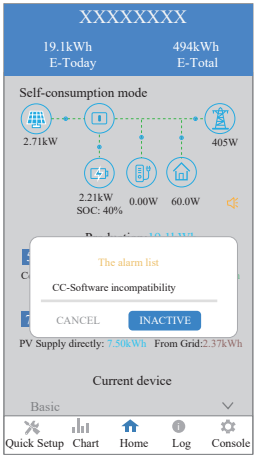
The above combination year chart shows the energy flow:

- PV generation capacity (Blue)
- Load consumption capacity (Red)
- Feed-in grid capacity (Purple)
- Grid capacity (Mazarine)
- Generator capacity (Green)

▪ Home

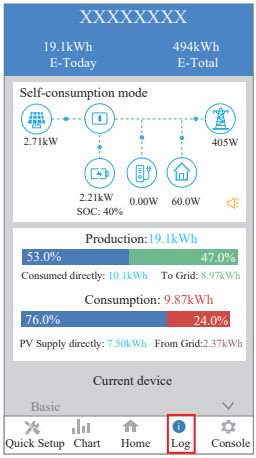
In this page, you can view the basic information of inverter.
Click "🔇" to display the warning message.

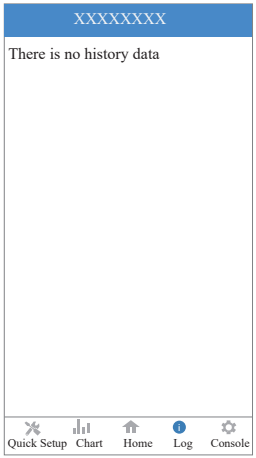




▪ Log

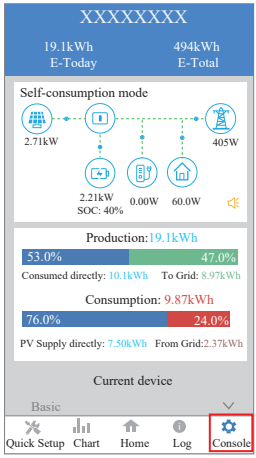
Press Log at the bottom and then go to the history log page (as shown below). It contains all the logs for the inverter.

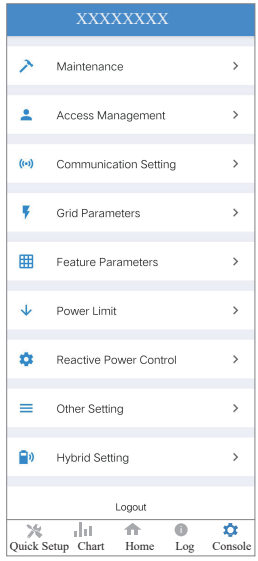




▪ **Console**

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.

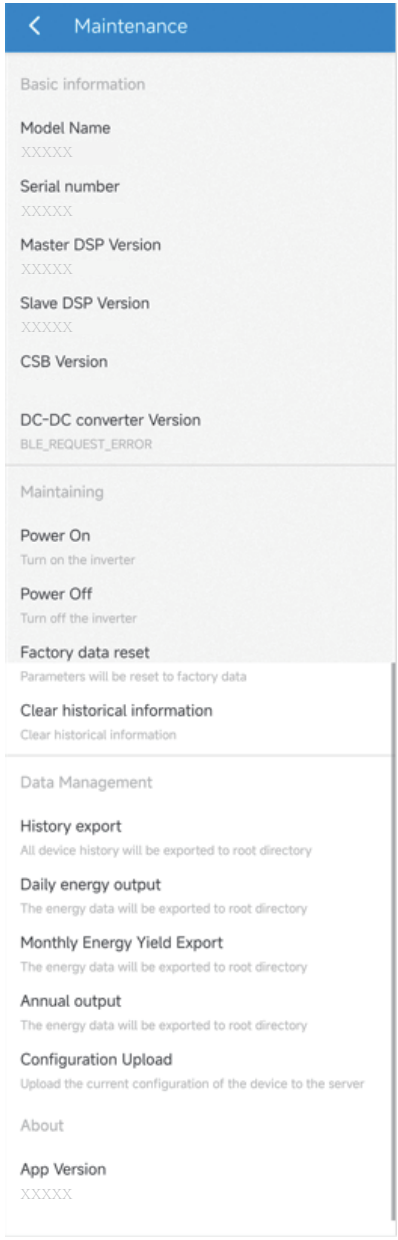




Maintenance

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

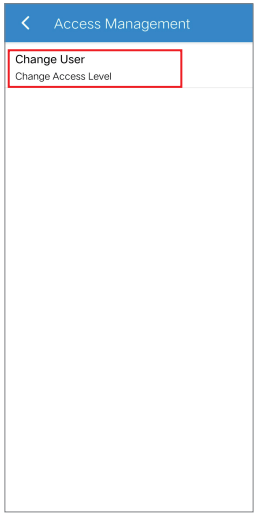
In Console page, click Maintenance.

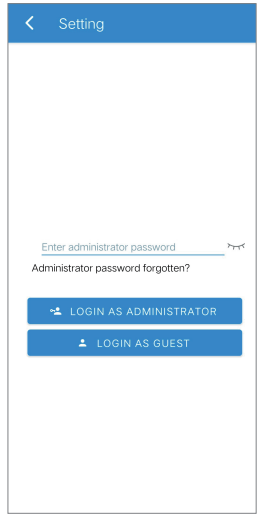


Access Management

In this page, you can switch the login permission.

In Console page, click Access Management > Change User page.





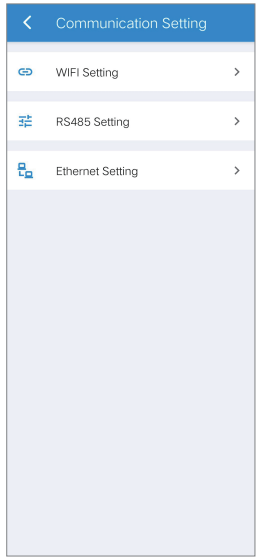
Communication Setting

In this page, you can set or change the parameters of communication settings: WiFi Setting, RS485 Setting and Ethernet Setting.

In Console page, click Communication Setting.

Note:

Setting/modifying these parameters requires logging into an administrator account.



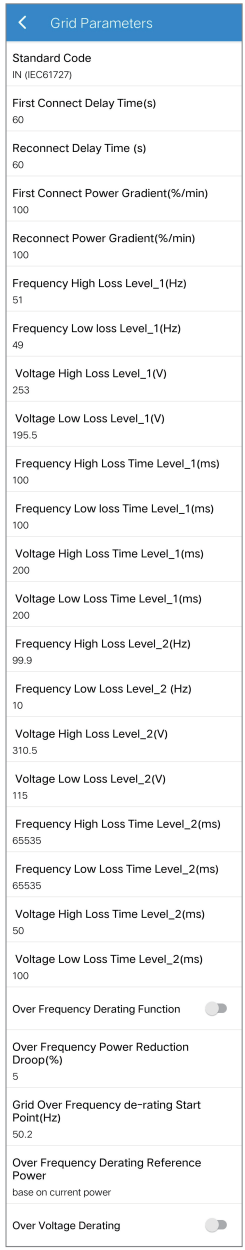
Grid Parameters

In this page, you can set or change the parameters of Grid side.

In Console page, click Grid Parameters.

Note:

Setting/modifying these parameters requires logging into an administrator account.



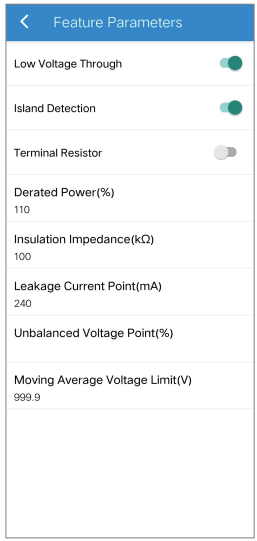
Feature Parameters

In this page, you can set or change the feature parameters, as shown in the figure.

In Console page, click Feature Parameters.

Note:

Setting/modifying these parameters requires logging into an administrator account.



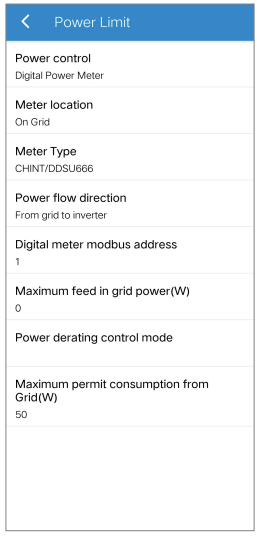
Power Limit

In this page, you can set or change the parameters of power limit.

In Console page, click Power Limit page.

Note:

Setting/modifying these parameters requires logging into an administrator account.



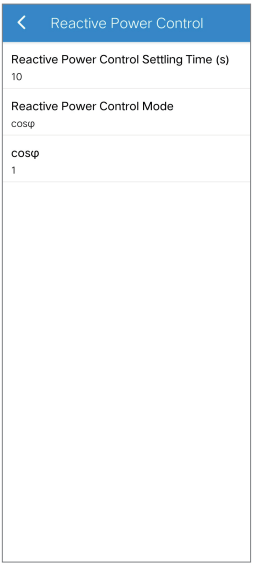
Reactive Power Control

In this page, you can set or change the Reactive Power Control parameters.

In Console page, click Reactive Power Control.

Note:

Setting/modifying these parameters requires logging into an administrator account.

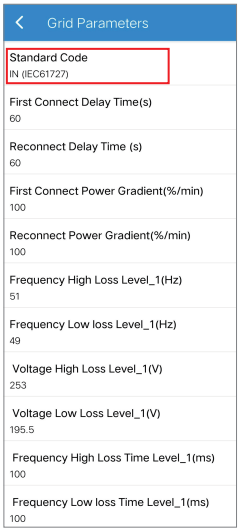


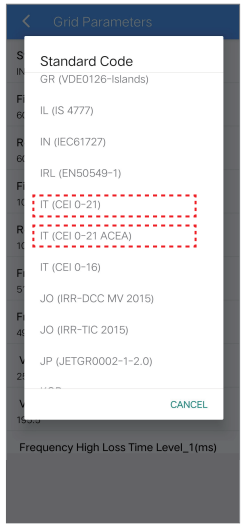
Autotest

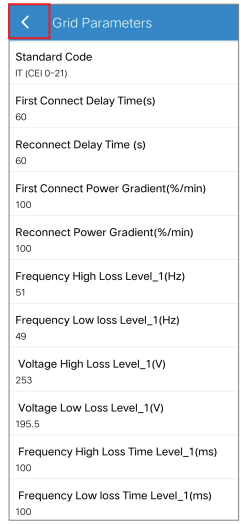
To perform autotest, please perform the following steps:

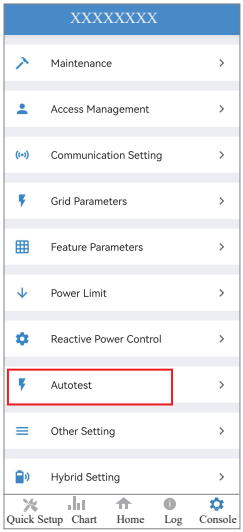
1. In Console page, click Grid Parameters > Standard Code,then select the IT (CEI 0-21) or IT (CEI O-21 ACEA).
2. Back to Console page. Refresh the page and enter the Autotest page to click START.
3. Then the inverter is autotesting. Wait for about 10 minutes, the autotest process will be finished.
4. You can click the DOWNLOAD to save the data file if necessary.

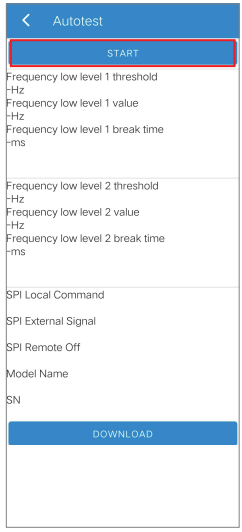
Note: If the Autotest option can't be turned out after the refresh in step 2. Please re-connect after logout. And then go to Console > Autotest page to click START.







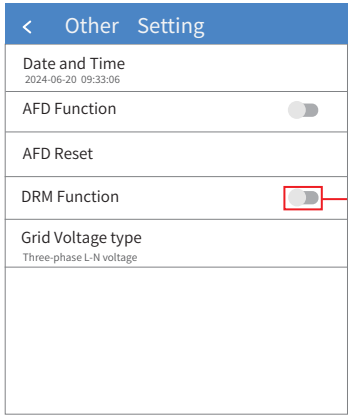




Other Setting

In this page, you can set other setting parameters.

In Console page, click Other Setting.



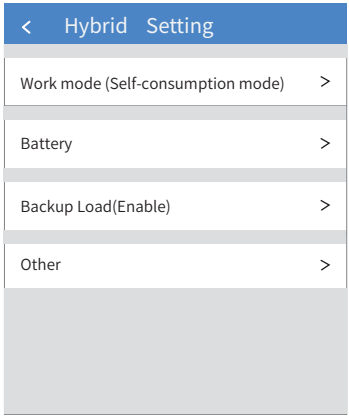
Hybrid Setting

In this page, you can set Hybrid Setting parameters.

In Console page, click Hybrid Setting.

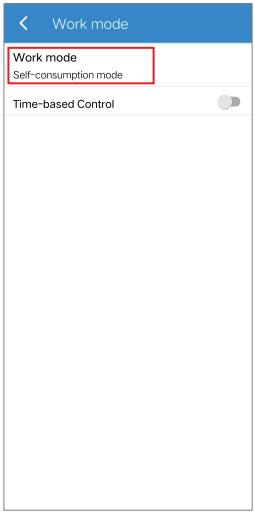
Note:

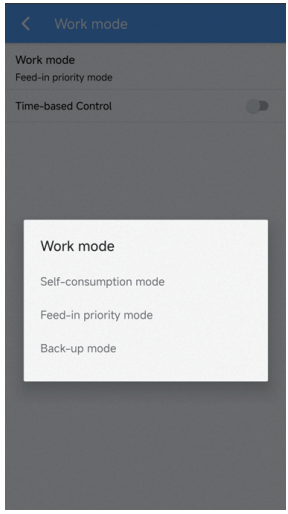
Setting/modifying these parameters requires logging into an administrator account.



- Work mode

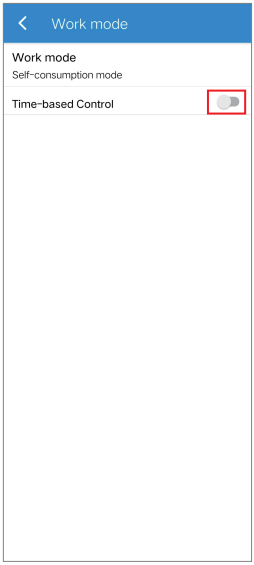
➢ The inverter supports three work modes: self-consumption mode, feed-in priority mode and Back-up mode.

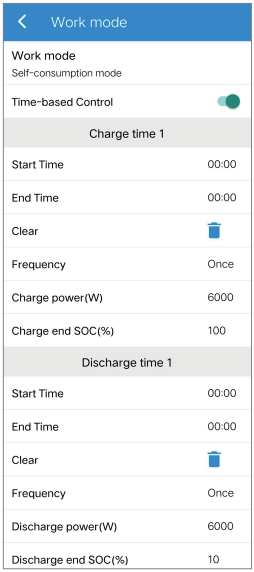




➢**Time-based Control setting**: In Work mode page, you can also find time-based control function. This function is designed to control the time setting of charging and discharging the inverter. You can set the following parameters based on your requirements:

- 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



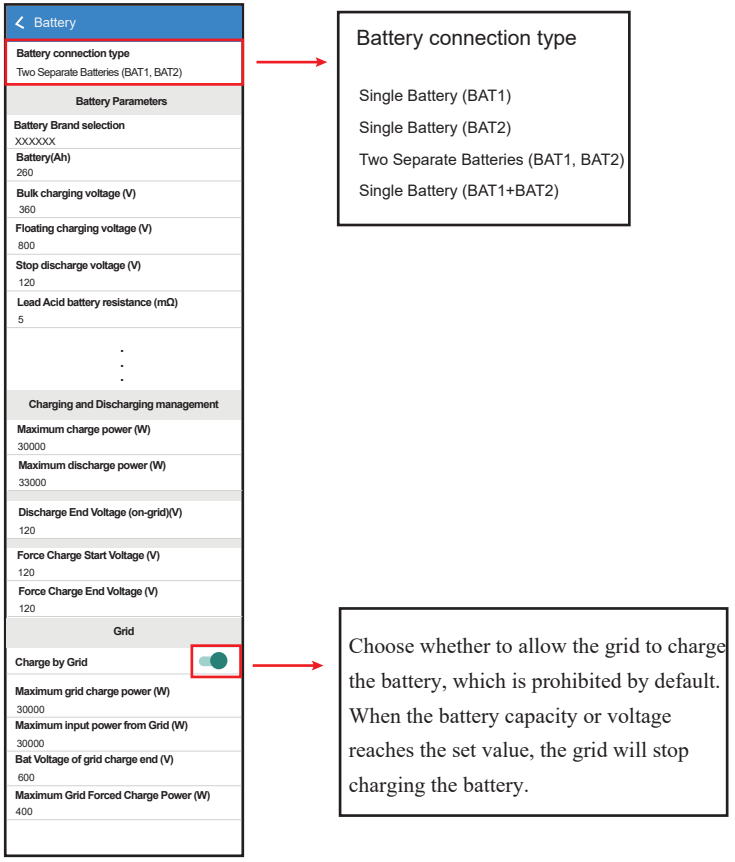


• Battery

In Battery page, information including battery parameters, charging and discharging management and grid will be listed. Enter corresponding information if necessary.

Since there are two groups of battery connect terminals, for 25K/30K, it is necessary to set battery connection type on APP and make sure that the connection methods of power port and BMS port are correct by following the table below before powering on the inverter.

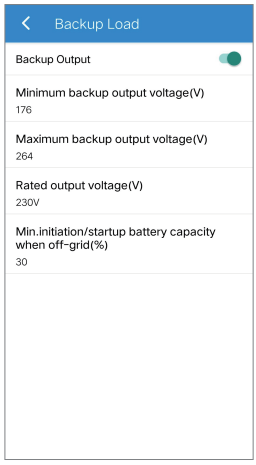
Battery connection type	Description	Power port		BMS port	
		BAT1+/-	BAT2+/-	BMS1	BMS2
Single Battery (BAT1)	Single battery system connected to BAT1 only	✓		✓	
Single Battery (BAT2)	Single battery system connected to BAT2 only		✓		✓
Two Separate Batteries (BAT1, BAT2)	Battery systems connected to BAT1 and BAT2 respectively	✓	✓	✓	✓
Single Battery (BAT1+BAT2)	Single battery system connected to both BAT1 and BAT2	✓	✓	✓	



• Backup Load

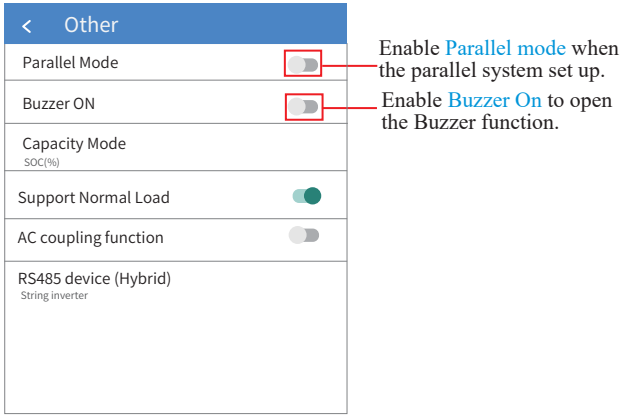
In Backup Load page, if enabling Backup Output, you can set parameters including the range of backup output voltage and Min. initiation / startup battery capacity when off-grid.

DANGER	Be aware of the danger of electric shock! When the power grid is connected and the inverter is turned on, even if the Backup Output option is not enabled, the Backup port of the inverter still has AC power.



• Other

In Other page, options including Parallel mode, Buzzer ON, Support Normal Load, and AC coupling function are listed. Enable them when necessary.



8. Maintenance

CAUTION	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.

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 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 are 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
Inverter cleaning	Check periodically that the heat sink is free from dust and blockage.	Clean periodically the heat sink.	Yearly

8.2 Inverter Troubleshooting

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

Code	Alarm Information	Suggestions
A0	Grid over voltage	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.
A7	Grid high average voltage	1. Check the actual working conditions of the power grid and the configuration of regulatory parameters. 2. Contact the customer service center.
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	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	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	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.
B7	PV string reverse	Check and modify the positive and negative polarity of the input of the circuit string.
BC	Surge Protection Devices (SPD) defective	Contact the customer service center.
C0	Internal power supply abnormal	1. If the alarm occurs occasionally, the inverter can be automatically restored, no action required. 2. If the alarm occurs repeatedly, please contact the customer service center.

Code	Alarm Information	Suggestions
C2	Inverter over dc-bias current	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	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, please 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 please contact the customer service center.
CN	Remote off	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	1. If the alarm occurs occasionally, the inverter can be automatically restored, no action required. 2. If the alarm occurs repeatedly, please 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	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, please contact customer service to report repair.
C7	System type error	Contact the customer service center.
C8	Fan abnormal	1. If the alarm occurs occasionally, please 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. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact the customer service center.
CA	Dc-link over voltage	

Code	Alarm Information	Suggestions
CB	Internal communication error	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. Please contact the customer service center.
CC	Software incompatibility	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. Please contact the customer service center.
CD	Internal storage error	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. Please contact the customer service center.
CE	Data inconsistency	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. Please contact the customer service center.
CF	Inverter abnormal	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. Please contact the customer service center.
CG	Boost abnormal	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. Please contact the customer service center.
CL	Inverter in power limit state	1. Check the actual working conditions of the power grid and the configuration of regulatory parameters. 2. Contact the customer service center.
CJ	Meter lost	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.
D1	Battery1 absent	Connect the battery.
DE	Battery2 absent	
D2	Battery1 over voltage	1.If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2.Check that the battery over-voltage 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.
DF	Battery2 over voltage	

Code	Alarm Information	Suggestions
D3	Battery1 under voltage	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.
DG	Battery2 under voltage	
D4	Battery1 discharger over current	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.
DH	Battery2 discharger over current	
D5	Battery1 over temperature	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). 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.
DJ	Battery1 over temperature	
D6	Battery1 under temperature	
DL	Battery2 under temperature	
D7	BACKUP output voltage abnormal	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 output is normal. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
D8	Communication error (Inverter-BMS1)	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.
DP	Communication error (Inverter-BMS2)	

Code	Alarm Information	Suggestions
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. 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.
DA	Internal communication loss(M-D)	
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.)
Dn	Battery1 reversed	1.Check whether the battery power line (positive and negative) is reversed with the inverter. 2.Check whether the battery power line (positive and negative) is well connected with the inverter. 3.If exclude the above, the alarm continues to occur, please contact the customer service center.
Dq	Battery2 reversed	
DU	Battery communication cable configuration error	1.Check the Battery connection type setting of APP is consistent with the current actual battery connection configuraion. 2.Check whether the battery1 and battery2 Communication interface is reversed with the inverter. 3.If exclude the above, the alarm continues to occur, please contact the customer service center.
DY	Battery power cable configuration error	1.Check the Battery connection type setting of APP is consistent with the current actual battery connection configuraion. 2.Check whether the battery1 and battery2 power line interface is reversed with the inverter. 3.If exclude the above, the alarm continues to occur, please contact the customer service center.

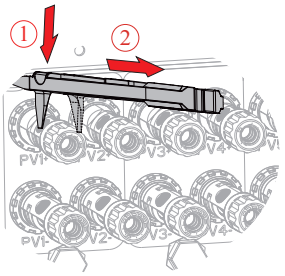
Code	Alarm Information	Suggestions
P1	Parallel ID warning	1. Check the parallel cable connections. 2. Contact the customer service center.
P2	Parallel SYN signal warning	1. Check the parallel cable connections. 2. Contact the customer service center.
P3	Parallel BAT abnormal	Connect the battery.
P4	Parallel GRID abnormal	Connect the battery.
P5	Phase sequence abnormal	1. Check the phase sequence of grid. 2. Contact the customer service center.

8.3 Removing the Inverter

WARNING	Before removing DC input connector, double check DC input switch is turned to OFF to avoid inverter damage and personal injury.

Perform the following procedures to remove the inverter:

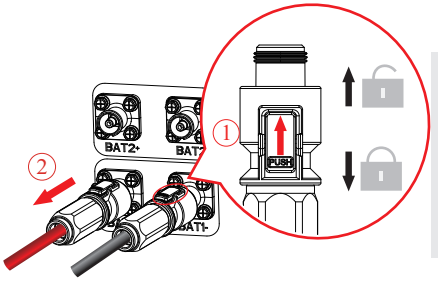
1. Disconnect all cables from the inverter, including communications cables, DC input power cables, AC output power cables, and PGND cable, as shown below.



PV Connectors Removing

NOTE

To remove the PVconnectors, insert the removal tool into the bayonet according to the position indicated in the drawing, and then take out the connector outward.



Battery Connectors Removing

NOTE

To remove the Battery connectors, push and hold the buckle, and then take out the connector outward with hand.

2. Remove the inverter from the mounting bracket.
3. Remove the mounting bracket.

9. Technical Specification

Model	12K	15K	20K	25K	30K
Input (PV)					
Max. PV Input Power	30,000W	30,000W	30,000W	45,000W	45,000W
Max. PV Voltage	1,000V				
Start-up Voltage	150V				
MPPT Operating Voltage Range	160V-950V				
MPPT Voltage Range at Rated Power	210V-800V	260V-800V	350V-800V	290V-800V	350V-800V
Max. Input Current per MPPT	32A/32A			32A/32A/32A	
Max. Short Circuit Current per MPPT	40A/40A			40A/40A/40A	
String per MPPT	4(2/2)			6(2/2/2)	
Nos. of MPPT	2			3	
Input /Output (BAT)					
Battery Type	Lithium-ion/Lead-acid				
Nominal Battery Voltage	512V				
Battery Voltage Range	120V-800V				
Battery Voltage Range at Rated Power	230V-800V	285V-800V	380V-800V	190V-800V	230V-800V
Max. Charge/Discharge Current	60A/60A			2*75A/2*75A	
Max. Charge/Discharge Power	30,000W/ 14,400W	30,000W/ 18,000W	30,000W/ 24,000W	45,000W/ 30,000W	45,000/ 36,000W
Input /Output (Grid)					
Nominal AC Output Power	12,000W	15,000W	20,000W	25,000W	30,000W
Max. AC Output Apparent Power	13,200VA	16,500VA	22,000VA	27,500VA	33,000VA
Max. AC Output Power (PF=1)	13,200W	16,500W	22,000W	27,500W	33,000W
Max. AC Output Current	3*20A	3*25A	3*33.3A	3*41.7A	3*50A
Max. Single Phase power	10,000VA	10,000VA	10,000VA	11,000VA	11,000VA
Max. Input Power	36000VA	40,000VA	40000VA	45,000VA	45,000VA
Max. Input current	3*54.5A	3*60.6A	3*60.6A	3*68.2A	3*68.2A
Nominal Grid Voltage	Three Phase 380V/400V/415V, 3W+N+PE				
Grid Voltage Range *	277V-520V (Adjustable)				
Nominal Grid Frequency	50Hz/60Hz				
Grid Frequency Range *	45Hz-55Hz/55Hz-65Hz (Adjustable)				
Power Factor	> 0.99 @rated power (Adjustable 0.8 LG - 0.8 LD)				
THDI	<3% (Rated Power)				
Output (Back up)					
Nominal Output Power	12,000W	15,000W	20,000W	25,000W	30,000W
Nominal Output Current	3*18.2A	3*22.7A	3*30.3A	3*37.9A	3*45.5A
Max. Single Phase Power	10,000VA	10,000VA	10,000VA	11,000VA	11,000VA
Peak Output Apparent Power (5min)	14,400VA	18,000VA	24,000VA	30,000VA	36,000VA
Peak Output Apparent Power (10s)	18,000VA	22,500VA	30,000VA	37,500VA	45,000VA
Nominal Output Voltage	Three Phase 380V/400V/415V, 3W+N+PE				
Nominal Output Frequency	50Hz/60Hz				
Transfer Time	10ms(typical), 20ms(max)				
THDV	<3% @100% R Load				

Model	12K	15K	20K	25K	30K
Protection					
Protection Category	Class I				
DC Switch	Yes				
Anti-islanding Protection	Yes				
AC Overcurrent Protection	Yes				
DC/AC Overvoltage Protection	DC Type II, AC Type III				
AC Short Circuit Protection	Yes				
DC Reverse Protection	Yes				
Surge Arrester	DC Type II, AC Type II				
Insulation Resistance Detection	Yes				
Leakage Current Protection	Yes				
AFCI	Optional				
RSD	Optional				
General					
Max. Operation Altitude	4000m				
Ingress Protection Degree	IP66				
Operating Temperature Range	-25℃~60℃ (>45℃ derating)				
Relative Humidity	0~100%				
Cooling Method	Natural Cooling			Smart Fan Cooling	
Noise emission	Max. 35dB			Max. 45dB	Max. 60dB
Mounting	Wall bracket				
Dimensions (W*H*D)	660mm*596mm*235mm				
Weight	45Kg			55Kg	
AC Connection	Terminal block				
PV Connection	MC4/H4				
Battery Connection	dedicated connector				
HMI & COM					
Display	Bluetooth & APP + LED , LCD (optional)				
Communication Interface	RS485/CAN (for BMS), RS485, DRM, RS485 (for Meter), 3*DO, 2*DI; Optional: Wi-Fi/LAN				
Certification					
Safety	IEC 62109-1&2				
EMC	IEC/EN 61000				
Warranty	5 Years				

Remarks:

- *The range of output voltage and frequency may vary depending upon different grid codes.
- Specifications are subject to change without advance notice.