Version: EN-UM-1.0

USER MANUAL

ESS Inverter

HISTORY

VERSION	ISSUED	COMMENTS
1.0	18-Oct.-22	First release

Preface

About This Manual

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

Target Group

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

Scope

This manual is applicable to following inverters:

- CPS SCE3.6KTL-60/EU
- CPS SCE3.68KTL-60/EU
- CPS SCE4.6KTL-60/EU
- CPS SCE4.6KTL-120/EU
- CPS SCE5KTL-60/EU
- CPS SCE5KTL-120/EU
- CPS SCE6KTL-60/EU
- CPS SCE6KTL-120/EU
- CPS SCB4.6KTL/EU
- CPS SCB5KTL/EU
- CPS SCB6KTL/EU

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 ESS inverter to reduce the waste of you resource.

CONTENTS

Preface

1. Safety

2. Product Introduction

3. Installation

4. Electrical Connection

1. Safety

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

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

1.1 Symbols Used

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

1.2 Safety Precaution

- Installation,maintenance and connection of inverters must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and requirements of local power authorities and/or companies(for example: AS 4777 and AS/NZS 3000 IN Australia).

- To avoid electric shock, DC input and AC output of the inverter must be terminated at least 5 minutes before performing any installation or maintenance.

- The temperature of some parts of the inverter may exceed 60℃ during operation. Do not touch the inverter during operation to avoid being burnt and let it cool before touching it.

- Ensure children are kept away from inverters.

- Don't open the front cover of the inverter. A part from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.

- Static electricity may damage electronic components. Appropriate method must be adopted to prevent such damage to the inverter; otherwise the inverter may be damaged and the warranty annulled.

- Ensure the output voltage of the proposed PV array is lower than the maximum rated input voltage of the inverter; otherwise the inverter may be damaged and the warranty annulled.

- When exposed to sunlight, the PV array generates dangerous high DC voltage. Please operate according to our instructions, or it will result in danger to life.

- PV modules should have an IEC61730 class A rating.

- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

- Completely isolate the inverter before maintaining. Completely isolate the inverter should: Switch off the PV switch, disconnect the PV terminal, disconnect the battery terminal, and disconnect the AC terminal.

- Prohibit to insert or pull the AC and DC terminals when the inverter is running.

- In Australia, the inverter internal switching does not maintain the neutral integrity, neutral integrity must be addressed by external connection arrangements.

- In Australia, the output of backup side in switchbox should be labeled main switch UPS supply, the output of normal load side in switchbox should be labeled mains switch inverter supply.

- Don't connect ESS inverter in the following ways:
  EPS Port should not be connected to grid;
 The single PV panel string should not be connected to two or more inverters.

2. Product Introduction

2.1 Overview

Hybrid Inverter

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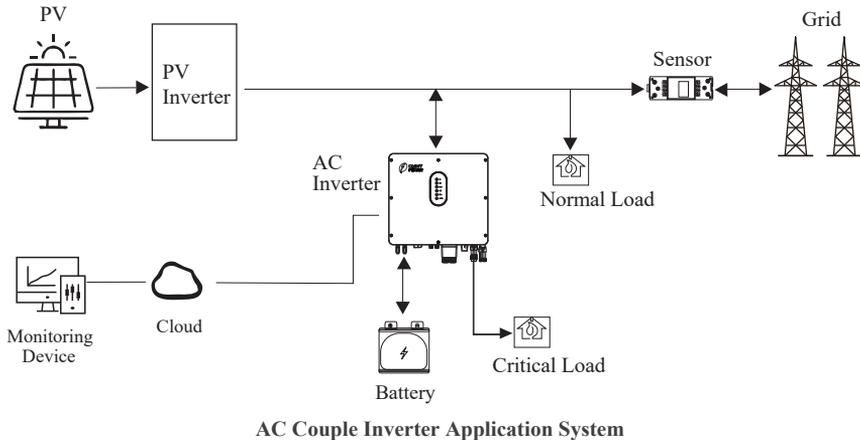
The inverter can be used to optimize self consumption, store in the battery for future use or feed into public grid. Work mode depends on PV energy and user's preference. It can provide power for emergency use during the grid lost by using the energy from battery and inverter (generated from PV).

Hybrid Inverter Application System
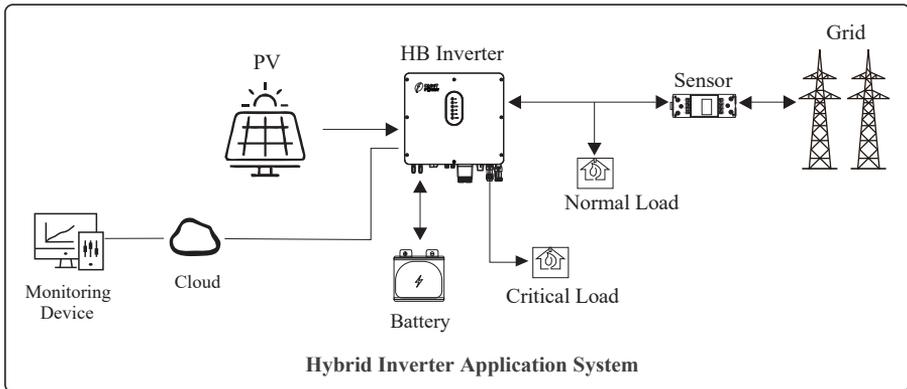
AC Couple Inverter

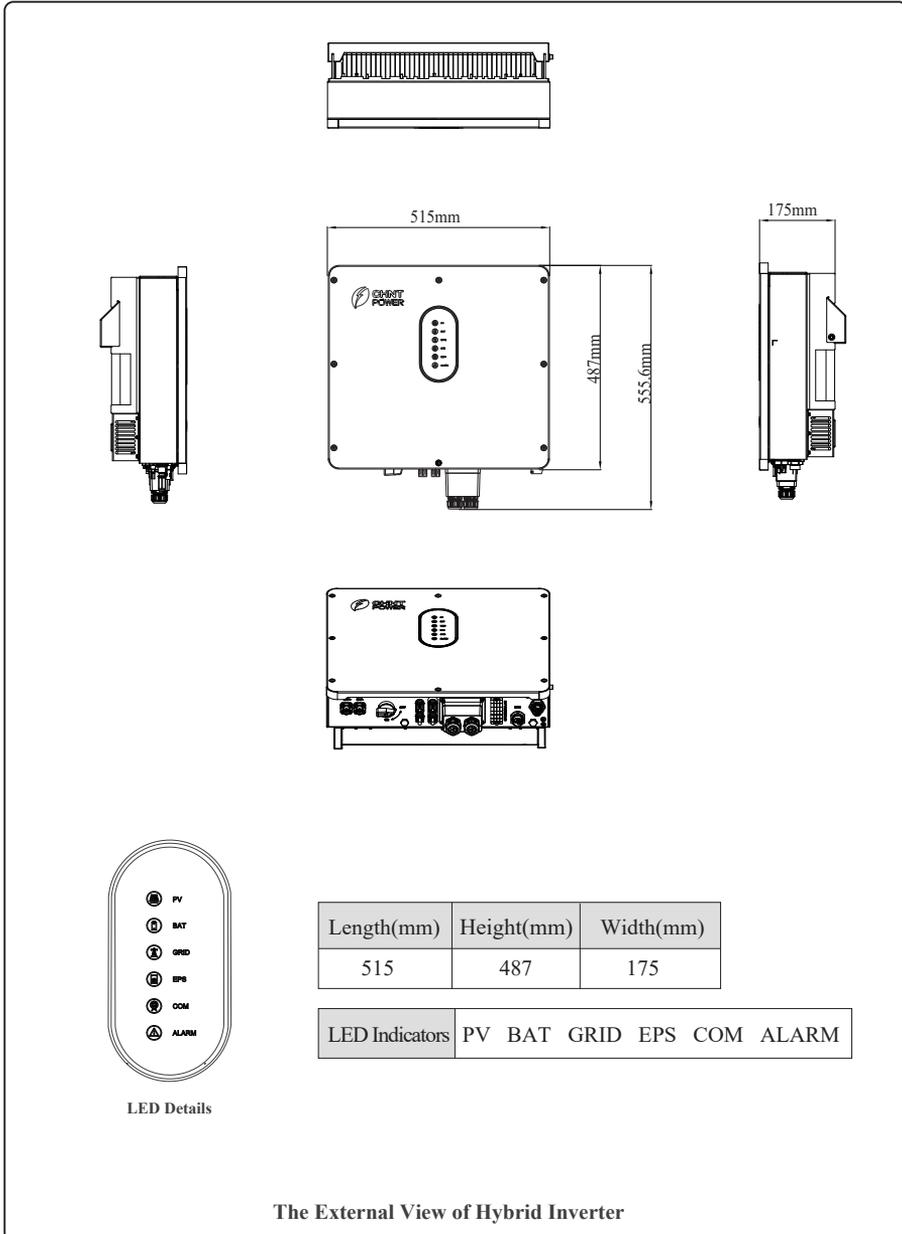The AC couple inverters are high-quality inverter which can store energy into battery.

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

AC Couple Inverter Application System

2.2 Product Appearance

2.2.1 Hybrid Inverter

Length(mm)	Height(mm)	Width(mm)
515	487	175

LED Indicators	PV	BAT	GRID	EPS	COM	ALARM

LED Details

The External View of Hybrid Inverter

1. Battery Connect Terminals
2. PV Switch
3. PV Input Terminals
4. COM1 Ports
   (USB, PARAL, RS485, DRM,
   CT/METER, BMS, NTC/RMO/DRY)
5. COM2 Port
   (GPRS/WIFI/LAN)
6. EPS Output Terminal
7. GRID Output Terminal
8. Grounding Terminal

The bottom view of hybrid inverter

2.2.2 AC Couple Inverter

515mm

175mm

487mm

555.6mm

Length(mm)	Height(mm)	Width(mm)
515	487	175

LED Indicators	BAT GRID EPS COM ALARM

BAT
GRID
EPS
COM
ALARM

LED Details

The External View of AC Couple Inverter

1. Battery Connect Terminals

2. COM1 Ports
   (USB, PARAL, RS485, DRM,
   CT/METER, BMS, NTC/RMO/DRY)

3. COM2 Port
   (GPRS/WIFI/LAN)

4. EPS Output Terminal

5. GRID Output Terminal

6. External Protection Ground
   Terminal

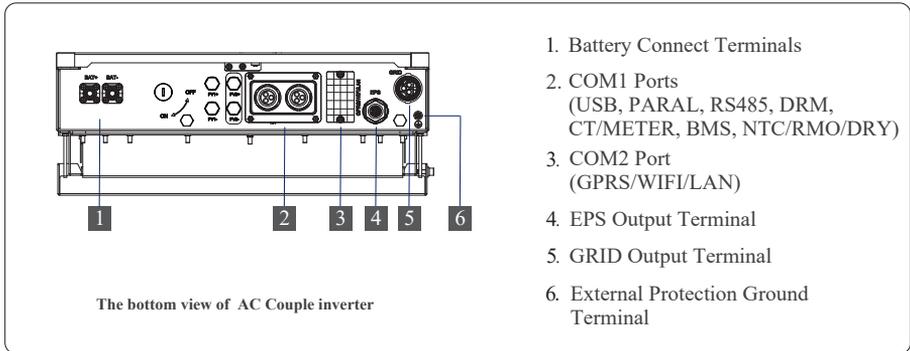**The bottom view of AC Couple inverter**

Note: The appearances of hybrid inverter and AC couple inverter are presented in detail in this section. The following chapters are only illustrated by hybrid inverter.

2.3 Model Definition

The letters in the product model have the specific informations.
(Take CPS SCE5KTL-60/EU as example.)

CPS SCE5KTL-60/EU

Charge/discharge current (60A)

Power(5000W)

Hybrid Inverter
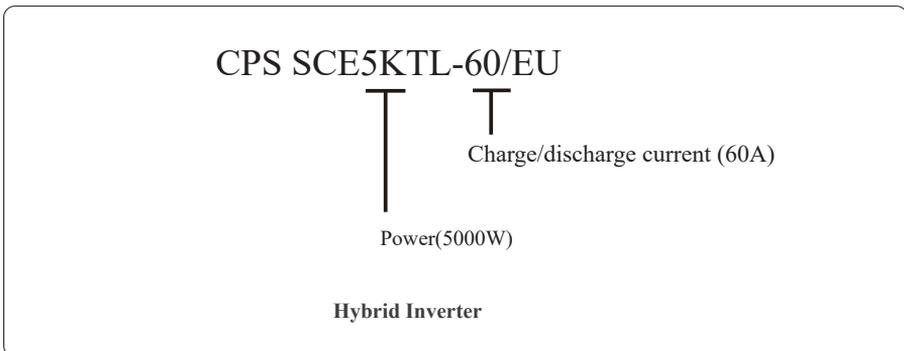
3. Installation

3.1 Packing List

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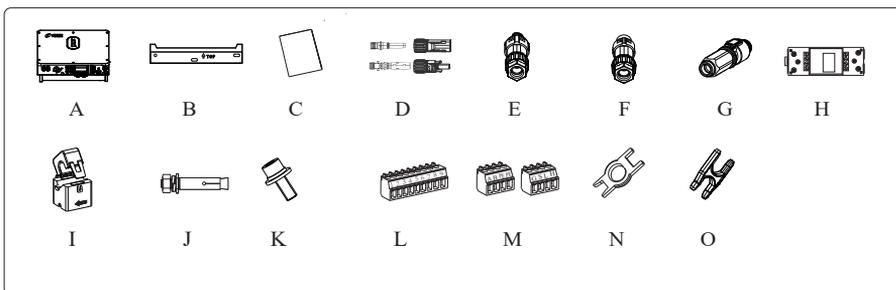

| Number	Quantity	Description
A	1	Inverter
B	1	Mounting bracket
C	1	File package
D	2/2	PV terminal connector group (PV+/PV-) ; N/A for AC Couple
E	1	EPS connector
F	1	Grid connector
G	2	Battery connector
H	1	Meter (Optional)
I	1	CT
J	3	M12 Expansion screws
K	1	M6 Security screw
M	1	9-Pins terminal
N	2	4-Pins terminal
O	1	Removal tool for PV connector
P	1	Removal tool for Grid/EPS connector

3.2 Selecting the Mounting Location

3.2.1 Installation Environment Requirements

a. The storage inverter protection class is IP65 and can be mounted indoors or outdoors.

b. The mounting location must be inaccessible to unrelated personnel since the enclosure and heat sinks are extremely hot during operation.

c. Do not install the storage inverter in areas containing highly flammable materials or gases.

d. To ensure optimum operation and long service life, the ambient temperature must be below 50℃.

e. The storage inverter must be mounted in a well ventilated environment to ensure good heat dissipation.

f. To ensure long service life, the storage inverter must not be exposed to direct solar irradiation, rain, or snow. It is recommended that the inverter be mounted in a sheltered place.

g. The carrier where the inverter is mounted must be fire-proof. Do not mount the inverter on flammable building materials.

h. Do not install the inverter in a rest area since it will cause noise during operation.

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

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

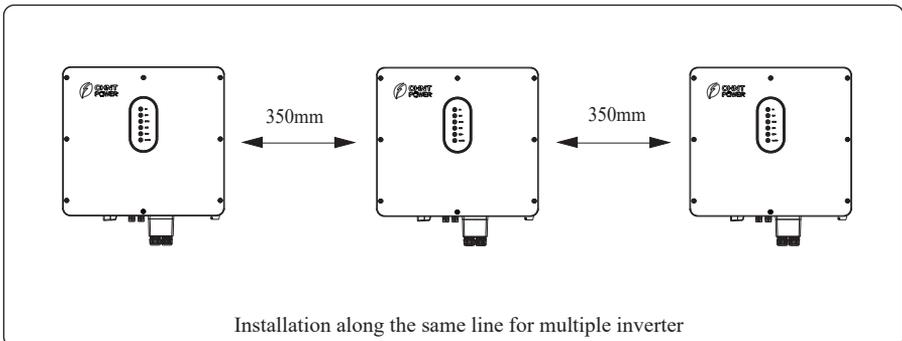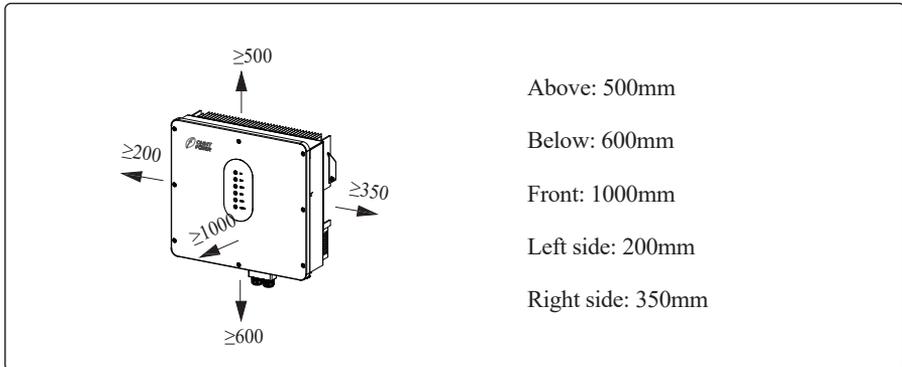k. Please avoid direct sunlight, rain exposure, show lay up install.
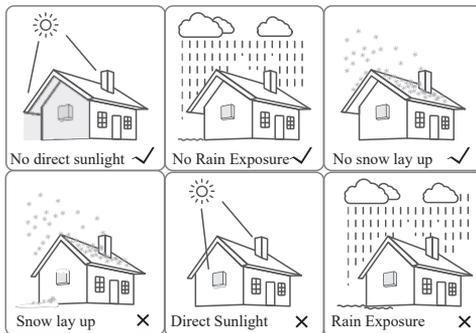
3.2.2 Mounting Requirements

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

Upright   Lean back ≤15°   Upside-down   Horizontally
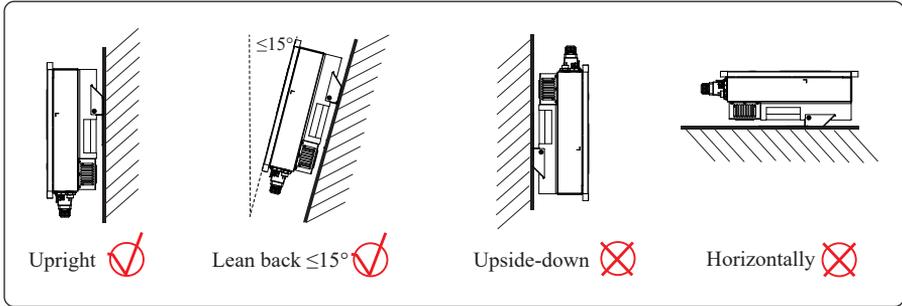
3.2.3 Installation Space Requirements

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


≥500
≥200
≥350
≥1000
≥600

Above: 500mm

Below: 600mm

Front: 1000mm

Left side: 200mm

Right side: 350mm

350mm   350mm

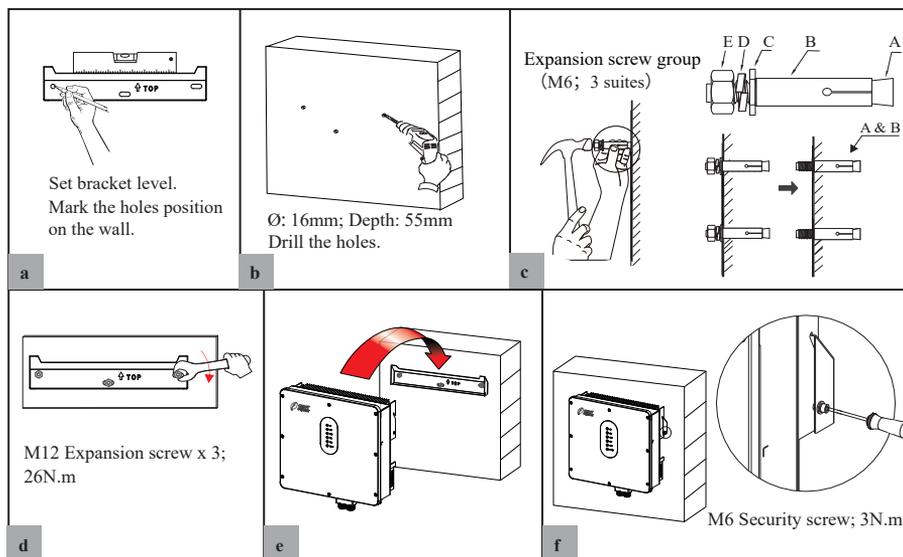Installation along the same line for multiple inverter

3.3 Mounting

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

Step 1. Install the mounting bracket

1. Use a level ruler to mark the position of the 3 holes on the wall. Refer to Figure a. And drill 3 holes, 16mm in diameter and 55mm in deep. Refer to Figure b.

2. Knock the expansion screw kit into the hole together with a hammer. Refer to Figure c.
   Note: Do not remove the nut unit in this step.

3. After tightening 2-3 buckles, the expansion bolts are tight and not loose, and then unscrew the bolts, spring washer, gasket. Refer to Figure c.

4. Install and fix the mounting bracket on the wall. Refer to Figure d.

510.6
450
29.3
25
45.3
14   34   ⇧ TOP   14
108.3
20
255.3
20

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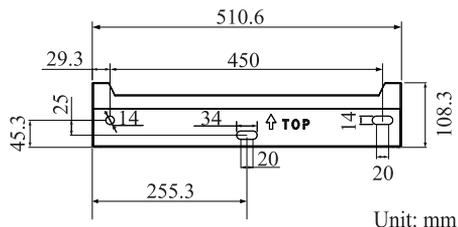
Step 2. Install the inverter on the mounting bracket. Then lock the inverter using the security screw. Refer to Figure e, Figure f.

Set bracket level. Mark the holes position on the wall. **a**	Ø: 16mm; Depth: 55mm Drill the holes. **b**	Expansion screw group (M6; 3 suites) E D C B A A & B **c**
M12 Expansion screw x 3; 26N.m **d**	**e**	M6 Security screw; 3N.m **f**

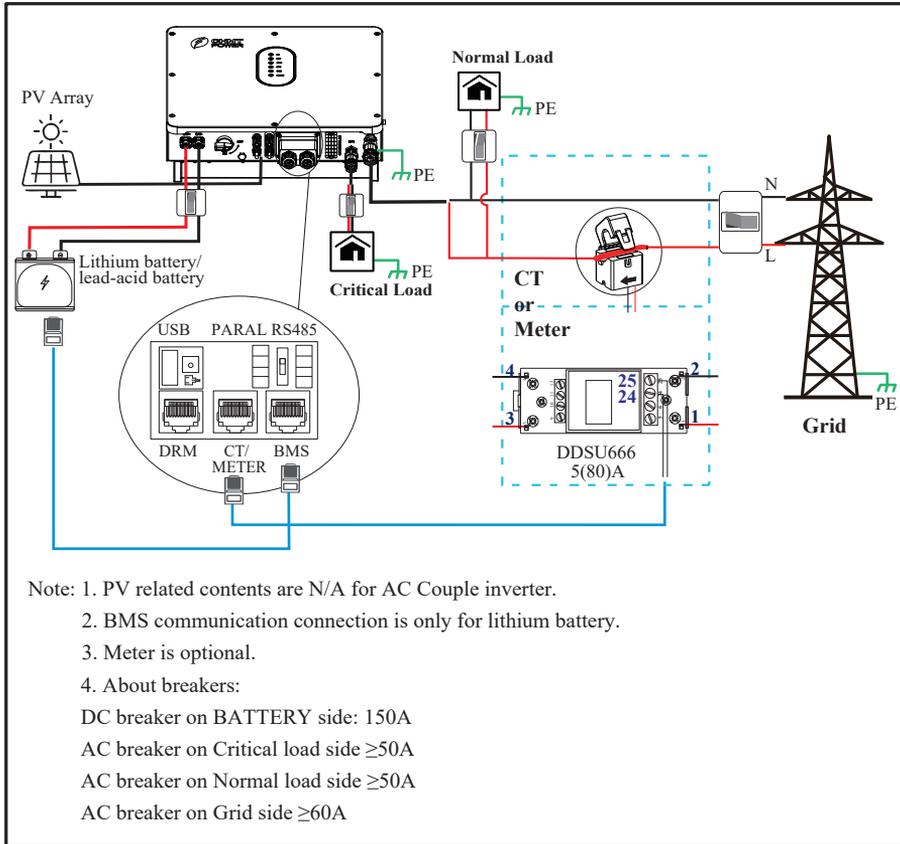| ⚠ **DANGER**	Before frilling the hole on the wall, ensure no damage on the electric wire and/or water pipe inside the wall.

⚠ **CAUTION**	To prevent potential damages and injuries from inverter falling down, please hang the inverter on the bracket, do not loosen grip unless confirm the inverter is well mounted.

4. Electrical Connection

This chapter shows the details connection of ESS inverter. And PV connection is N/A for AC couple inverters. The following illustration only uses the hybrid inverters as an example.
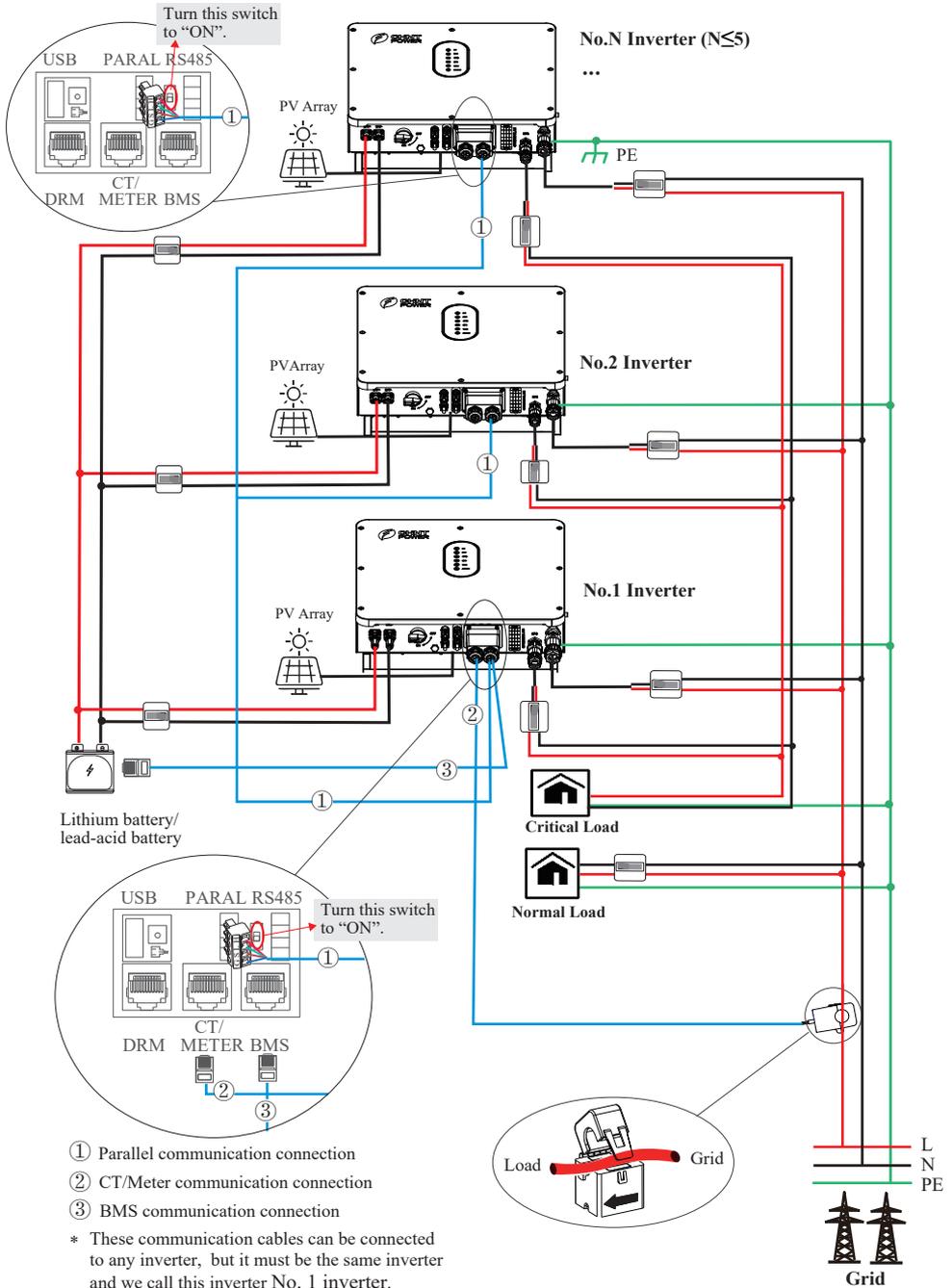
ESS inverter system connection diagram:

Non-parallel connection mode

Note: 1. PV related contents are N/A for AC Couple inverter.

2. BMS communication connection is only for lithium battery.

3. Meter is optional.

4. About breakers:

DC breaker on BATTERY side: 150A

AC breaker on Critical load side ≥50A

AC breaker on Normal load side ≥50A

AC breaker on Grid side ≥60A

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

Single phase parallel connection mode-Scheme A (N≤5)

Turn this switch to "ON".

USB   PARAL RS485

①

DRM   CT/ METER   BMS

PV Array

No.N Inverter (N≤5)

...

PE

①

No.2 Inverter

PVArray

①

No.1 Inverter

PV Array

②

③

①

Lithium battery/ lead-acid battery

Critical Load

Normal Load

USB   PARAL RS485

Turn this switch to "ON".

①

DRM   CT/ METER   BMS

②

③

Load   Grid

L
N
PE

Grid

① Parallel communication connection

② CT/Meter communication connection

③ BMS communication connection

∗ These communication cables can be connected to any inverter, but it must be the same inverter and we call this inverter No. 1 inverter.
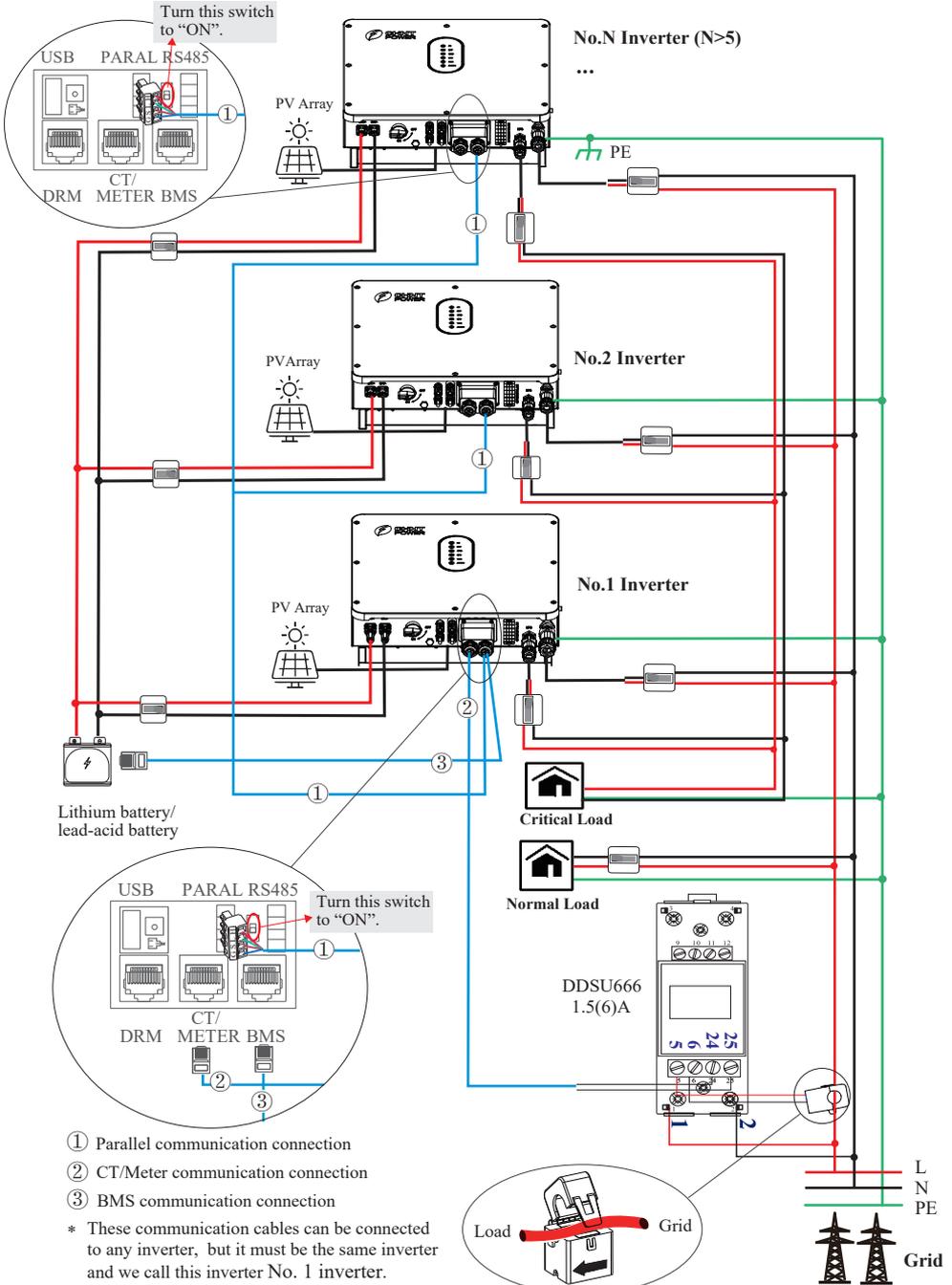
Note for Scheme A:

1. PV related contents are N/A for AC Couple inverter.

2. BMS communication connection is only for lithium battery.

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

4. With parallel connection mode, it is necessary to connect APP to one of inverters and then go to Console > Other Setting page to enable Parallel mode on APP. Please refer to page 63.

5. About breakers:

DC breaker on BATTERY side: 150A

AC breaker on Critical load side ≥50A

AC breaker on Normal load side ≥50A

AC breaker on Grid side ≥60A

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

Single phase parallel connection mode-Scheme B (N>5)

Turn this switch to "ON".

USB   PARAL RS485

①

PV Array

No.N Inverter (N>5)

...

PE

DRM   CT/METER   BMS

No.2 Inverter

PVArray

①

No.1 Inverter

PV Array

②

③

①

Lithium battery/
lead-acid battery

Critical Load

USB   PARAL RS485

Turn this switch to "ON".

①

DRM   CT/METER   BMS

②

③

Normal Load

DDSU666
1.5(6)A

① Parallel communication connection

② CT/Meter communication connection

③ BMS communication connection

∗ These communication cables can be connected
to any inverter, but it must be the same inverter
and we call this inverter No. 1 inverter.

Load   Grid

L
N
PE

Grid

Note for Scheme B:

1. PV related contents are N/A for AC Couple inverter.

2. BMS communication connection is only for lithium battery.

3. It is necessary to additionally purchase suitable CT and meter according to the specific requirements in parallel connection mode-Scheme B.

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

5. With parallel connection mode, it is necessary to connect APP to one of inverters and then go to Console > Other Setting page to enable Parallel mode on APP. Please refer to page 63.

6. About breakers:

DC breaker on BATTERY side: 150A

AC breaker on Critical load side ≥50A

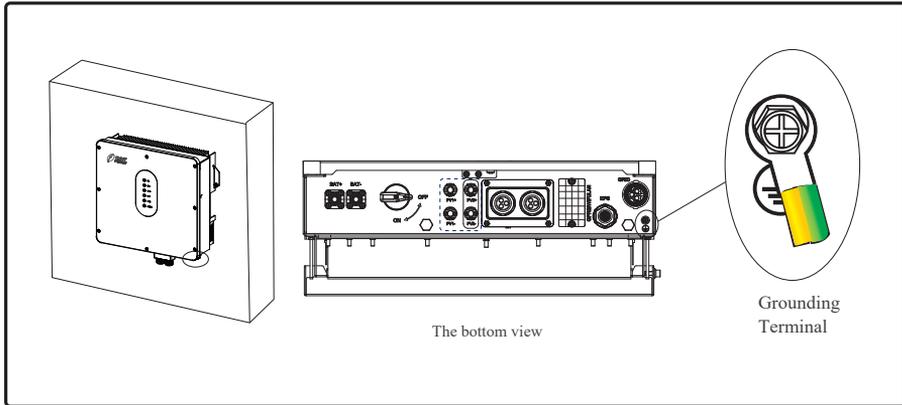AC breaker on Normal load side ≥50A

AC breaker on Grid side ≥60A

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

4.1 Grounding

A protective earth (PE) terminal is equipped at the side of the inverter. Please be sure to connect this PE terminal to the PE bar for reliable grounding. AWG 10 or 12 yellow green lines are recommended.
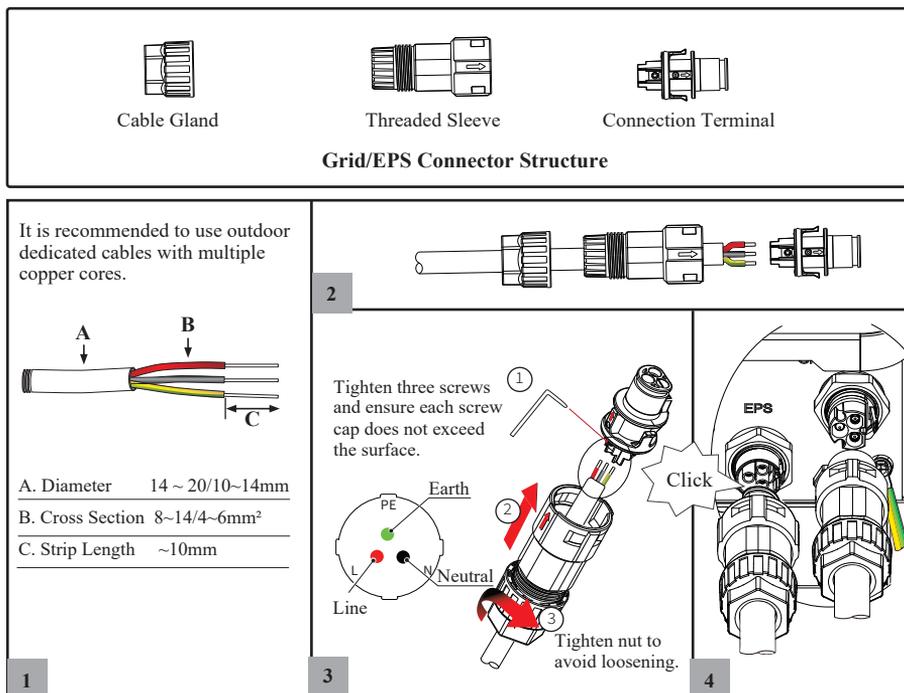

The bottom view

Grounding Terminal

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

4.2 Grid/EPS Connection

Before connecting the GRID/EPS 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.

Grid/EPS connection please refer to below.

Step 1: Assemble the AC connector.

Cable Gland   Threaded Sleeve   Connection Terminal

Grid/EPS Connector Structure

It is recommended to use outdoor dedicated cables with multiple copper cores.

A. Diameter   14 ~ 20/10~14mm

B. Cross Section   8~14/4~6mm²

C. Strip Length   ~10mm

2

Tighten three screws and ensure each screw cap does not exceed the surface.

Earth

PE

Neutral

Line

Tighten nut to avoid loosening.

Click

EPS

1

3

4

Step 2: Connect the AC connector.

An AC breaker should be installed between inverter and the grid/EPS.

a. Before connecting the AC cable from inverter to AC breaker, you should confirm the AC breaker is working normally. Turn off the AC breaker and keep it open.

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 grid/EPS grid.

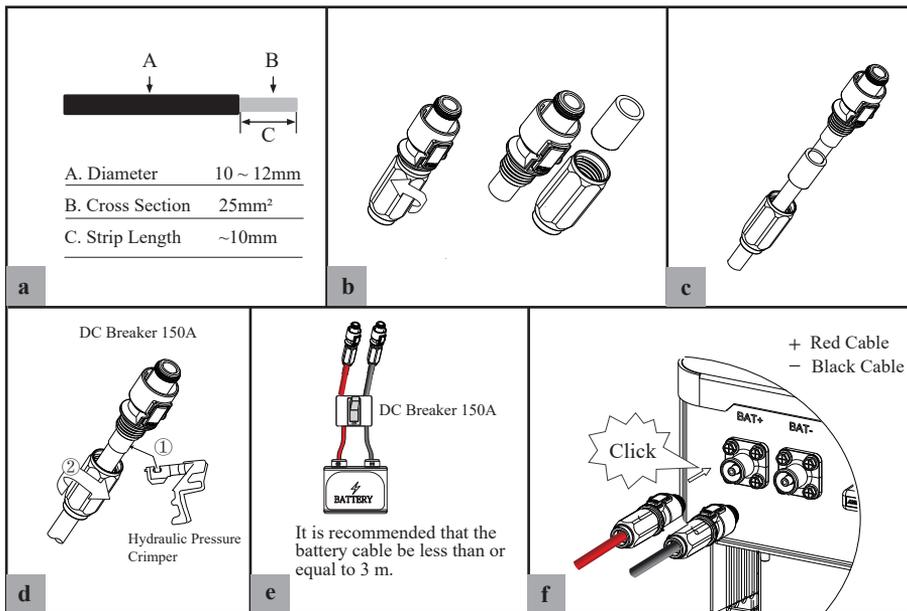| ⚠ NOTICE	• Multiple inverters are not allowed to share a circuit breaker. • Load is not allowed to connect between the inverter and the AC breaker.

To ensure that the inverter can be safely and reliably disconnected from the grid, a AC breaker（≥50A) should be installed only for inverter grid/EPS port..

4.3 Battery Connection

ESS inverter now only supports the lithium / lead-acid battery. The recommended lithium battery brands are as follows: PYLON LPF, Aoboet LPF, Dyness LPF, UZENERGY L051100-A.

This part in this manual only describe 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 you using.

Before connecting to battery, please install a separate DC breaker (150A; not equipped) between inverter and battery. This ensure the inverter can be security disconnected during maintenance.

A **B** **C** A. Diameter 10 ~ 12mm B. Cross Section 25mm² C. Strip Length ~10mm **a**	**b**	**c**
DC Breaker 150A ① ② Hydraulic Pressure Crimper **d**	DC Breaker 150A BATTERY It is recommended that the battery cable be less than or equal to 3 m. **e**	+ Red Cable − Black Cable BAT+ BAT- Click **f**

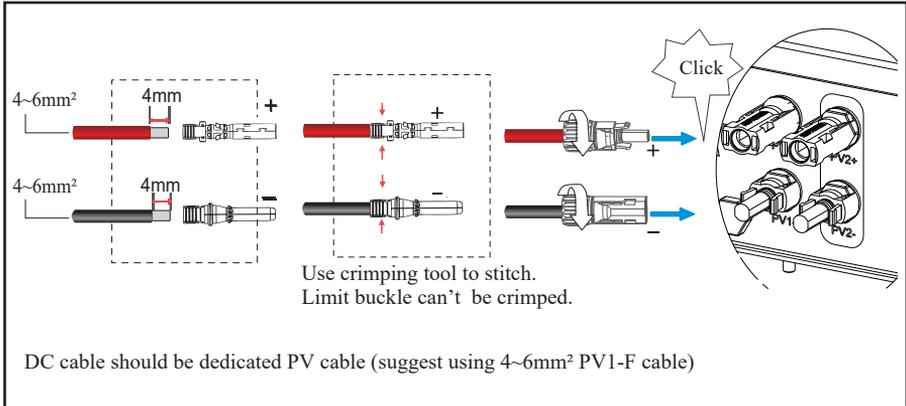|	
⚠ **WARNING**	• Polarity reverse will damage the inverter! • Be careful of electric shock and chemical hazards! • To reduce risk of injury, please use the suitable recommended cable size.

Battery Communication Connection

If the battery type is lithium battery which need communication between the inverter and battery management system (BMS), the connection must be installed.

Please refer to section 4.6.1 for details.

4.4 PV Connection (N/A for AC Couple Inverter)

PV connection please refer to below.

Use crimping tool to stitch.
Limit buckle can't be crimped.

DC cable should be dedicated PV cable (suggest using 4~6mm² PV1-F cable)

⚠ NOTICE	• Before connection the PV panels, make sure the plug connector have the correct polarity. Incorrect polarity could permanently damage the inverter. • PV array shouldn't be connected to the grounding conductor. • The minimum insulation resistance to ground of the PV panels must exceed 18.33kΩ, there is a risk of shock hazard if the requirement of minimum resistance is not met.

4.5 Meter/CT Connection

You can monitor usage with a meter or a CT.

4.5.1 Meter Connection

This section is applicable to non-parallel connection mode only.
ESS inverter supports the meter CHINT-DDSU666 meter by default. The meter is optional.

DDSU666
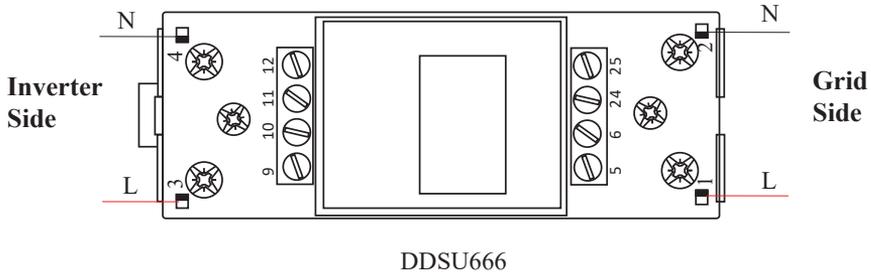
Before connecting to Grid, please install a separate AC breaker (≥60A; not equipped) between meter and Grid. This ensure the inverter can be security disconnected during maintenance.

The connection diagram of power cable of meter is as shown in the figure below:
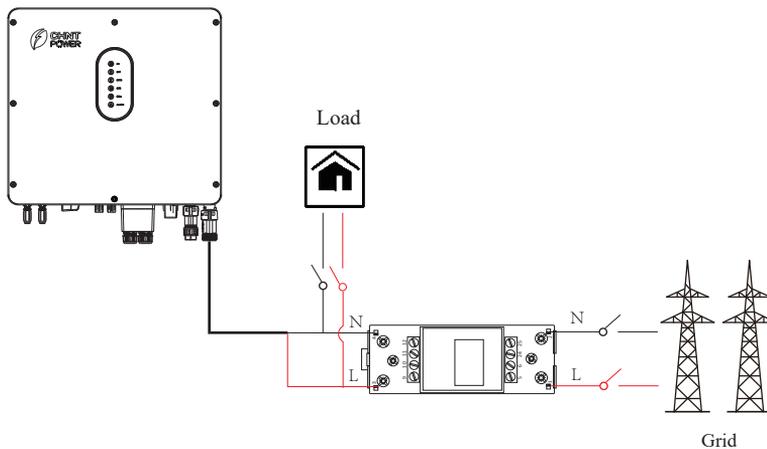
Please refer to the meter instruction manual for details.

4.5.2 CT Connection

Before connecting to Grid, please install a separate AC breaker (≥60A; not equipped) between CT and Grid. This ensure the inverter can be security disconnected during maintenance.

The connection diagram of power cable of CT is as shown in the figure below:
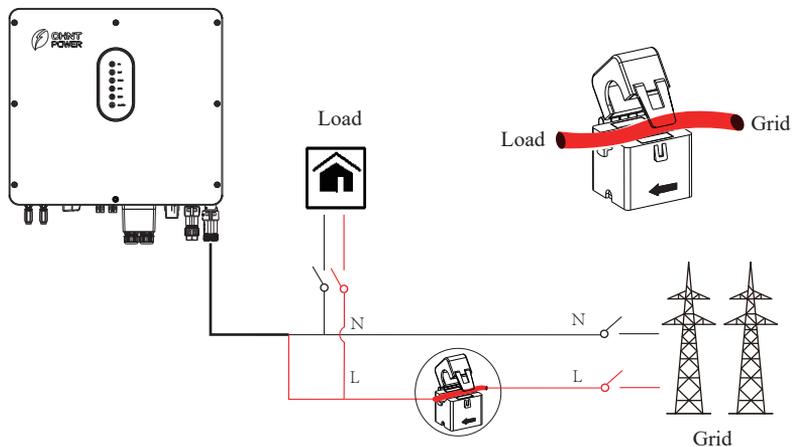
Please attention to the Current interchanger (CT) connection. The arrow on the CT indicates the current flow from grid to inverter. And lead the live line through the detection hole of CT.

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

4.6 Communication Connection

There are communication interfaces in the communication port on the bottom of the inverter as show below：
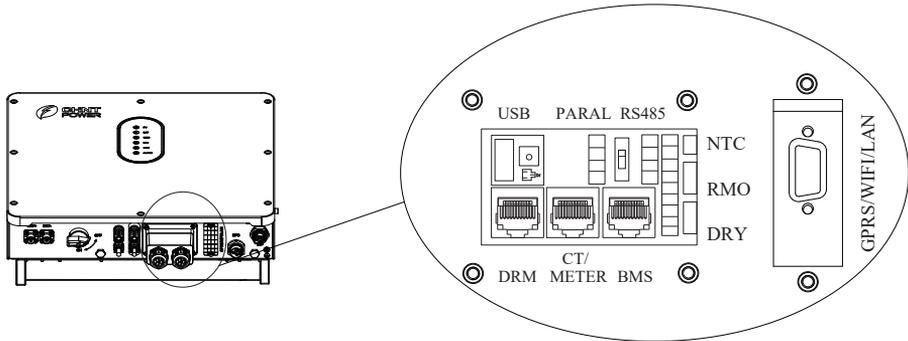
Interface		Descriptions
USB		For fast firmware upgrade.
PARAL		4-Pins interface for parallel communication
		A matched resistance switch for parallel communication
RS485		4-Pins interface for RS485 communication
DRM		Demand response mode for Australia application
CT/METER		For Meter communication or Grid current sense.
BMS		Lithium battery communication interface
9-Pins	NTC	Temperature sensor terminal of lead-acid battery
	RMO	Remote off control
	DRY	DO control
GPRS/WIFI/LAN		For GPRS/WIFI/LAN communication.

4.6.1 BMS Connection (Only for Lithium Battery)

RJ45 Terminal Configuration of Battery Communication (BMS)
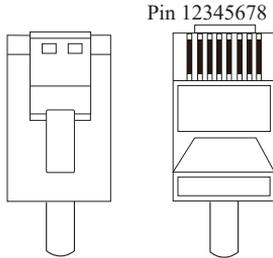
Pin 12345678

PIN	1	2	3	4
Function Description	RS485_ A	RS485_B	GND_S	GND_S

PIN	5	6	7	8
Function Description	GND_S	GND_S	CAN_L	CAN_H

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

Refer to the following steps:

a Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.

c
① Insert RJ45 terminals into corresponding ports.
② Screw the waterproof cover back to inverter firmly with 4 x M4 screws(1.2N.m).
③ Install the seal into the threaded sleeve, fasten the rubber nut.

b Make the RJ45 terminal according to above function description of each Pin definition.
Lead the BMS cable through the rubber nut, seal and waterproof cover in turn.

Don't cut off any communication cables.

Lithium Battery

BMS cable

Rubber nut

Threaded sleeve

RJ45 terminals

Inverter side

Seal   Waterproof cover

Press the BMS cable in the seal via the side incisions.

4.6.2 DRMs Connection

DRMs is a shortened form for "inverter demand response modes". It is a compulsory requirements 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. Please refer to page 63.

RJ45 Terminal Configuration of DRMs
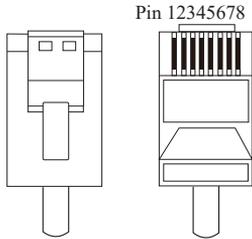
Pin 12345678

PIN	1	2	3	4
Function Description	DRM1/5	DRM2/6	DRM3/7	DRM4/8

PIN	5	6	7	8
Function Description	REF	DRM 0/COM	NC	NC

Refer to the following steps:

a	Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.
c	① Insert RJ45 terminals into corresponding ports. ② Screw the waterproof cover back to inverter firmly with 4 x M4 screws(1.2N.m). ③ Install the seal into the threaded sleeve, fasten the rubber nut.

| b	Make the RJ45 terminal according to above function description of each Pin definition. Lead the BMS cable through the rubber nut, seal and waterproof cover in turn.

Threaded sleeve

DRMs cable

RJ45 terminals

DRMs Control Module

Inverter side

Rubber nut

Don't cut off any communication cables.

Seal   Waterproof cover

Press the DRMs cable in the seal via the side incisions.

4.6.3 Meter/CT Connection
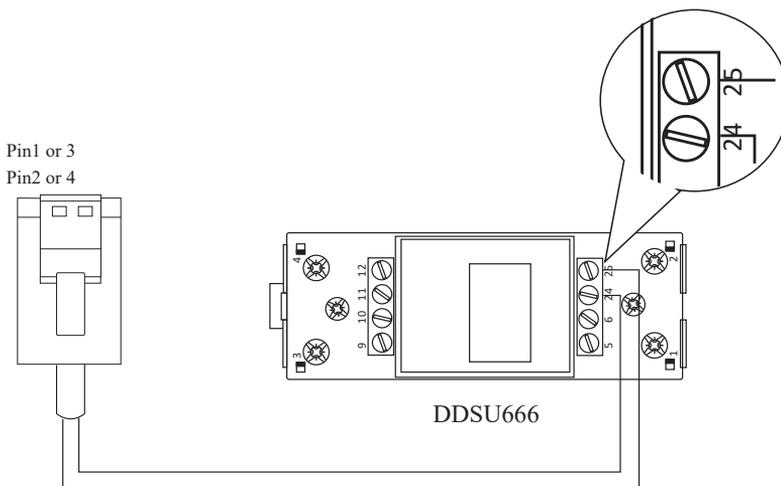
RJ45 Terminal Configuration of Meter/CT Communication

Pin 12345678
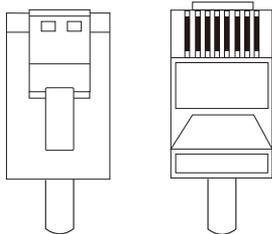
PIN	1	2	3	4	5	6	7	8
Function Description	RS485_A	RS485_B	RS485_A	RS485_B	CT-	CT+	NC	NC

4.6.3.1 Meter Connection

Meter cable connection overview

Pin1 or 3
Pin2 or 4

DDSU666

Inverter	Meter
Pin1 or Pin3(RS485_A)	Pin24
Pin2 or Pin4(RS485_B)	Pin25

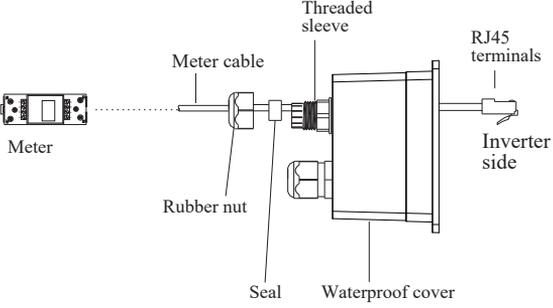**Connect meter. Refer to the following steps:**
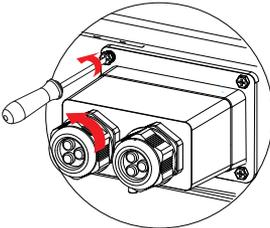
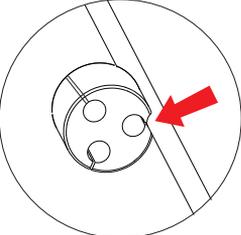|	
a Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.	**c** ① Insert RJ45 terminals into corresponding ports. ② Screw the waterproof cover back to inverter firmly with 4 x M4 screws(1.2N.m). ③ Install the seal into the threaded sleeve, fasten the rubber nut.
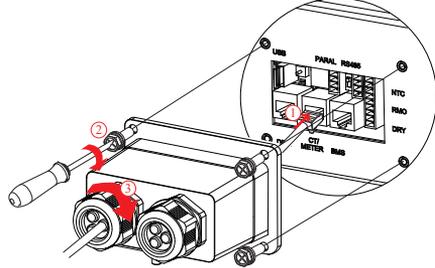
b Make the RJ45 terminal according to above function description of each Pin definition.
Lead the meter communication cable through the rubber nut, seal and waterproof cover in turn.

Meter cable

Threaded sleeve

RJ45 terminals

Meter

Inverter side

Rubber nut

Seal   Waterproof cover
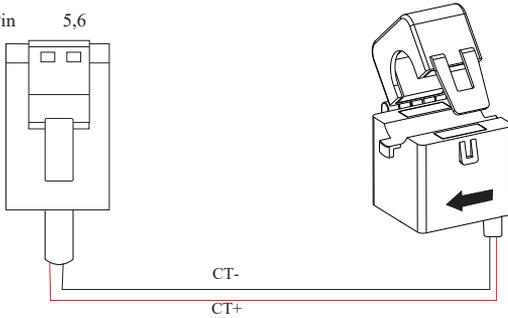
⚠ Don't cut off any communication cables.

Press the meter cable in the seal via the side incisions.

4.6.3.2 CT Connection

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

CT cable connection overview

Inverter	CT
Pin5(CT-)	Black
Pin6(CT+)	Red

Connect CT. Refer to the following steps:

a Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.	**c** ① Insert RJ45 terminals into corresponding ports. ② Screw the waterproof cover back to inverter firmly with 4 x M4 screws(1.2N.m). ③ Install the seal into the threaded sleeve, fasten the rubber nut.

b Make the RJ45 terminal according to above function description of each Pin definition.
Lead the CT cable through the rubber nut, seal and waterproof cover in turn.

Don't cut off any communication cables.

Press the CT cable in the seal via the side incisions.

4.6.4 RS485 Connection

4-Pins Terminal Configuration of RS485 Communication

PIN	A	B	PE	PE
Function Description	RS485_A	RS485_B	PE	PE

Connect RS485. Refer to the following steps:

a Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.

c
① Insert 4-Pins terminal into corresponding ports.
② Screw the waterproof cover back to inverter firmly with 4 x M4 screws(1.2N.m).
③ Install the seal into the threaded sleeve, fasten the rubber nut.

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

Lead the RS485 cable through the rubber nut, seal and waterproof cover in turn.

Threaded sleeve

4-Pins terminal

RS485 cable

RS485 Control Module

Don't cut off any communication cables.

Inverter side

Rubber nut

Seal   Waterproof cover

Press the RS485 cable in the seal via the side incisions.

4.6.5 Parallel Communication Connection

4-Pins Terminal Configuration of parallel Communication

| PIN	G	S	L	H
Function Description	GND_S	PARA_SYNC	CAN_L	CAN_H

Parallel communication cable connection overview
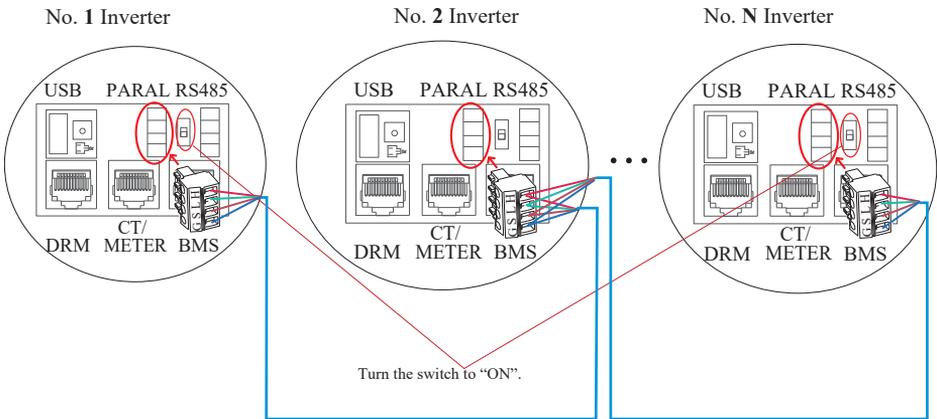
It is necessary to turn the matched resistance switch of No. **1** inverter and No. **N** inverter to "ON" in parallel connection mode.
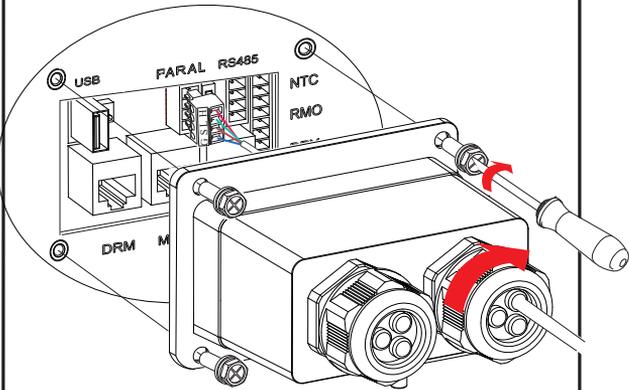
Master Inverter	No. **1** Slave Inverter	No. **N** Slave Inverter
PinH(CAN_H)	PinH(CAN_H)	PinH(CAN_H)
PinL(CAN_L)	PinL(CAN_L)	PinL(CAN_L)
PinS(PARA_SYNC)	PinS(PARA_SYNC)	PinS(PARA_SYNC)
PinG(GND_S)	PinG(GND_S)	PinG(GND_S)

Refer to the following steps:
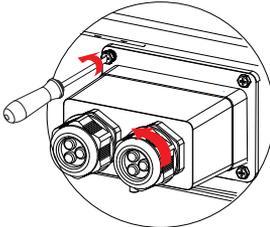
a

Unscrew the waterproof cover
and loosen the rubber nut on
waterproof cover.

c

① Insert 4-Pins terminal into corresponding ports.
② Screw the waterproof cover back to inverter firmly
   with 4 x M4 screws(1.2N.m).
③ Install the seal into the threaded sleeve, fasten the
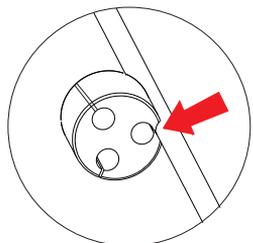   rubber nut.

b

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

Lead the RS485 cable through the rubber nut, seal and waterproof cover in turn.
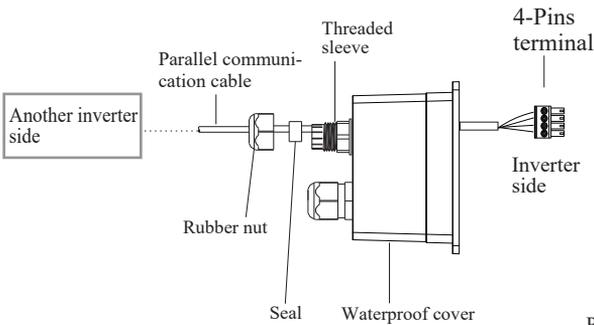
Don't cut off any
communication cables.

Press the Parallel communication
cable in the seal via the side incisions.

4.6.6 NTC/RMO/DRY Connection(s)

9-Pins Terminal Configuration of Auxiliary Communication

Pin123456789

PIN	Function Description
1	NO1 (Normal Open)
2	N1
3	NC1 (Normal Close)
4	NC2 (Normal Close)
5	N2
6	NC2 (Normal Close)
7	REMO OFF
8	GND S (NTC BAT)
9	NTC BAT+

Refer to the following steps:

a

Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.

b

Make the 9-Pins terminal according to above function description of each Pin definition for the auxiliary port you want to use.

Lead the NTC/RMO/DRY cable(s) through the rubber nut, seal and waterproof cover in turn.

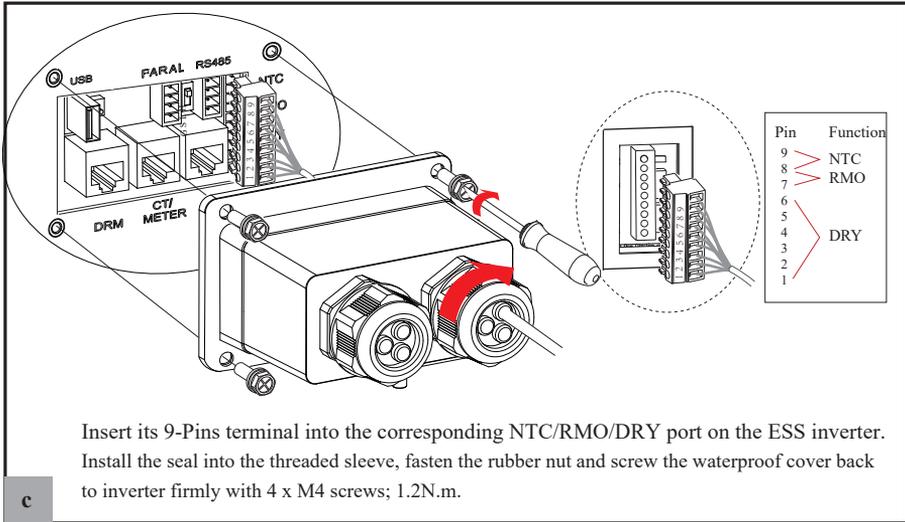NTC/RMO/DRY Control Module(s)

NTC/RMO/DRY cable(s)

Threaded sleeve

9-Pins terminal

Inverter side

Rubber nut

Seal   Waterproof cover

Don't cut off any communication cables.

Press the NTC/RMO/DRY cable(s) in the seal via the side incisions.

Pin	Function
9	NTC
8	
7	RMO
6	
5	
4	DRY
3	
2	
1	

c	Insert its 9-Pins terminal into the corresponding NTC/RMO/DRY port on the ESS inverter. Install the seal into the threaded sleeve, fasten the rubber nut and screw the waterproof cover back to inverter firmly with 4 x M4 screws; 1.2N.m.

4.6.7 GPRS/WiFi/LAN Module Connection (Optional)

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

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

a	Loosen two screws and move the cover.	b	Insert GPRS/WiFi/LAN module into GPRS/WIFI/LAN port, and ensure that it does not fall off.

2 x M4 screws; 0.8N.m

Or   **Or**

0.2~0.3N.m

c	Install the module.
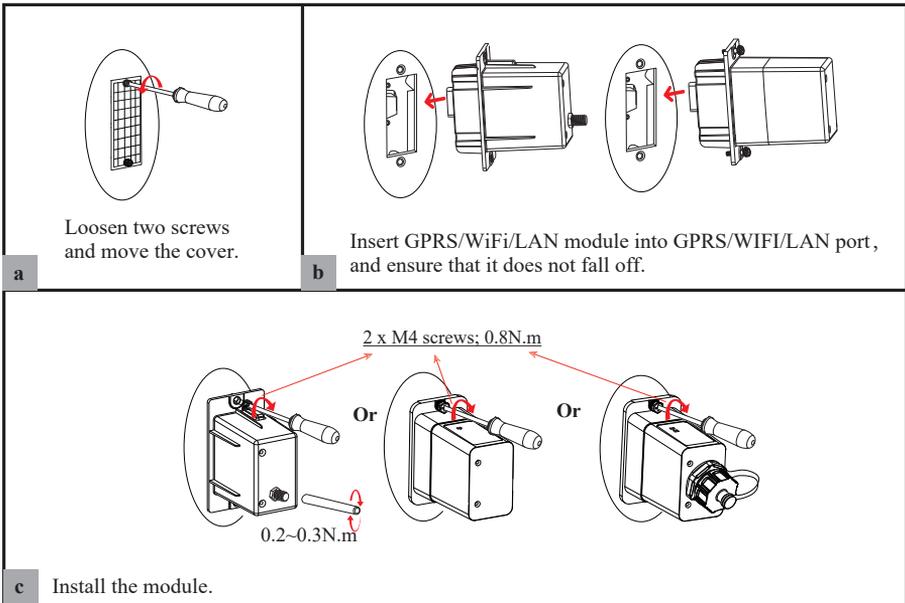
5. System Operation

5.1 Inverter Working Mode

The inverter supports several different working modes.
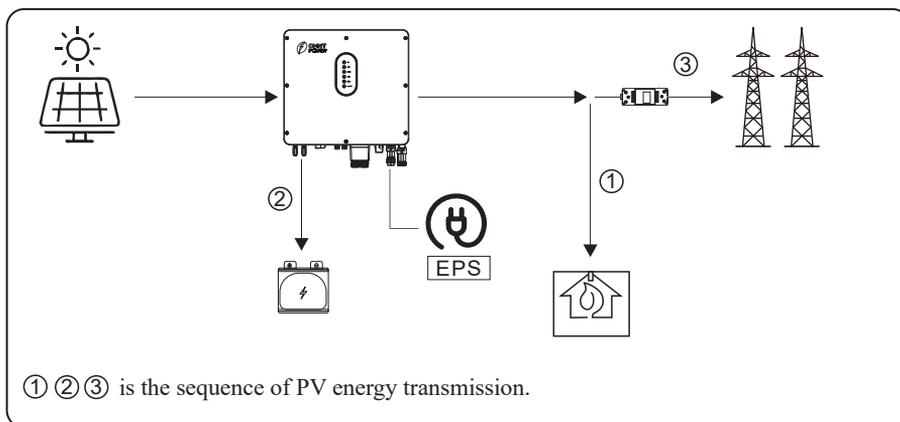
5.1.1 Self Used Mode

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

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

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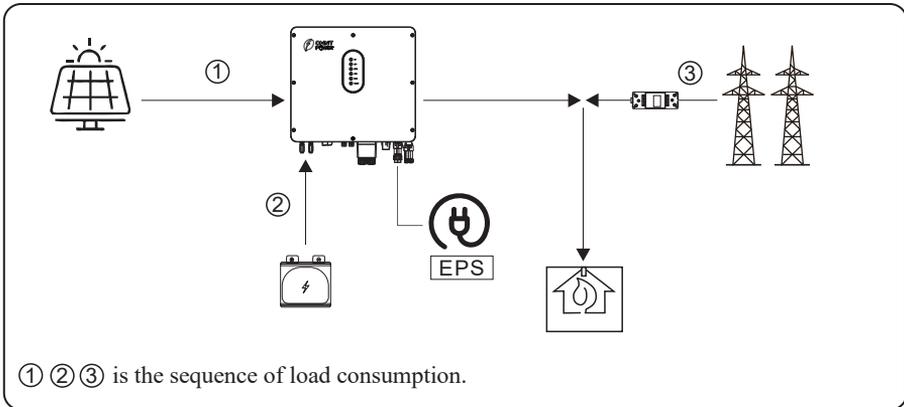
a) Wealthy PV Energy

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


① ② ③ is the sequence of PV energy transmission.

b) Limited PV power

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

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 demand is not met then will consume the grid energy.


① ② is the sequence of load consumption.
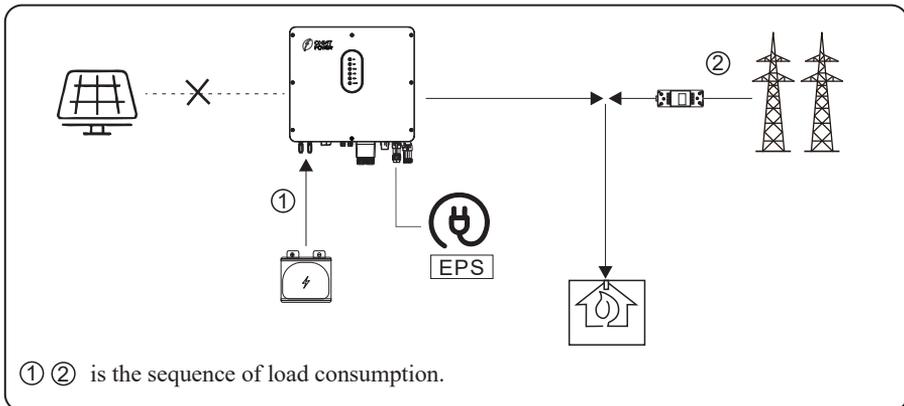
5.1.2 Feed-in Priority Mode

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

a) Wealthy PV Energy

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


① ② ③ is the sequence of PV energy transmission.
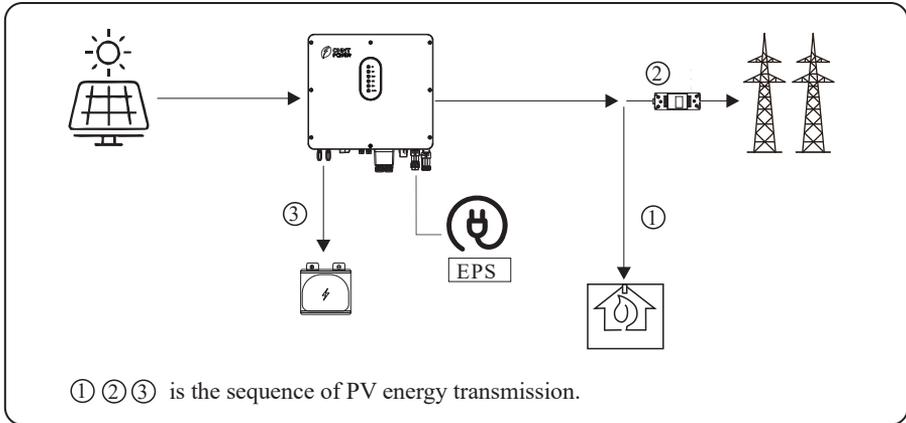
b) Limited PV Energy

When PV energy is limited and can not meet the feed-in grid power, the battery will discharge to meet it.
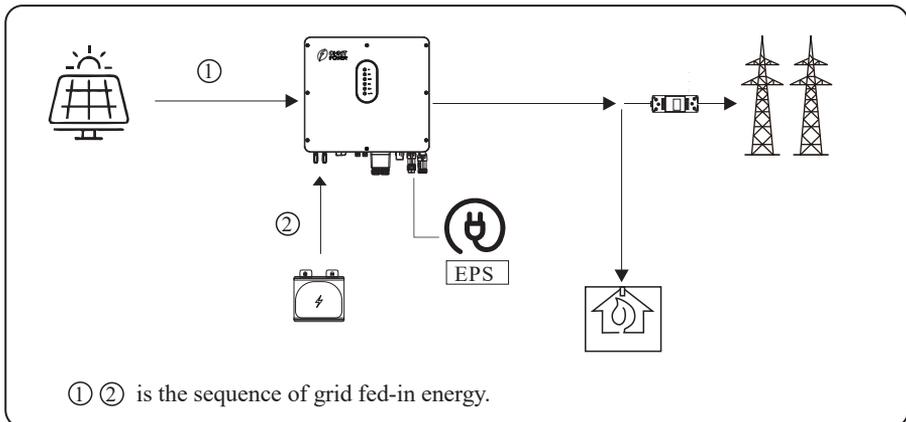
① ② is the sequence of grid fed-in energy.

c) No PV Input

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

$$P_{BAT} < P_{Load}$$

$$P_{BAT} \geq P_{Load}$$
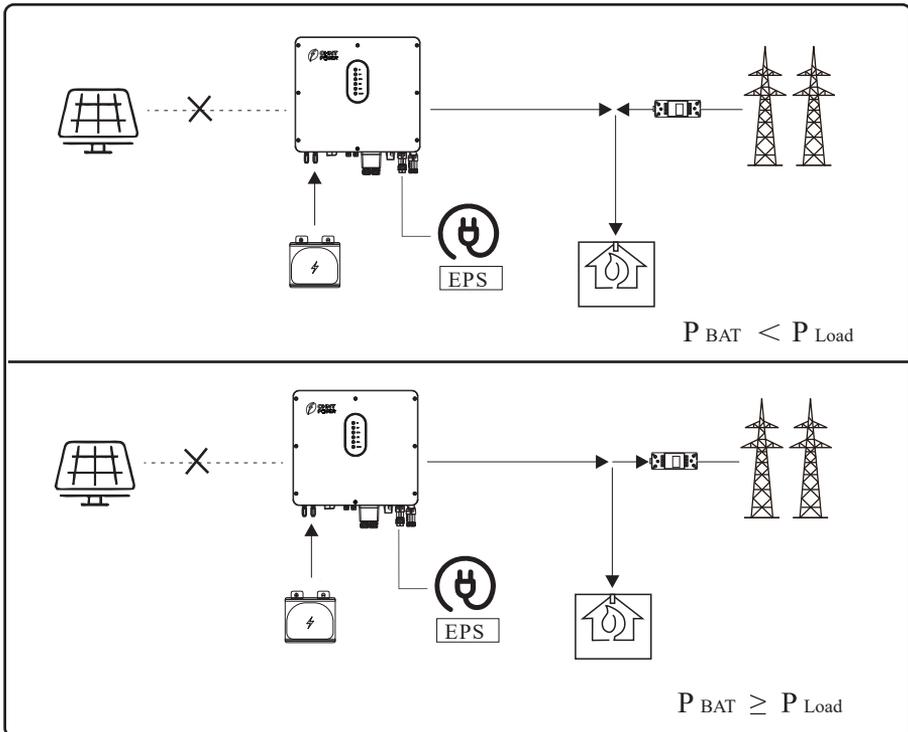
5.1.3 Time-Based Control Mode

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

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

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

5.1.4 Back-up Mode

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

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

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

Forbid AC charging

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

a) Wealthy PV power

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

① ② ③ is the sequence of PV energy transmission.
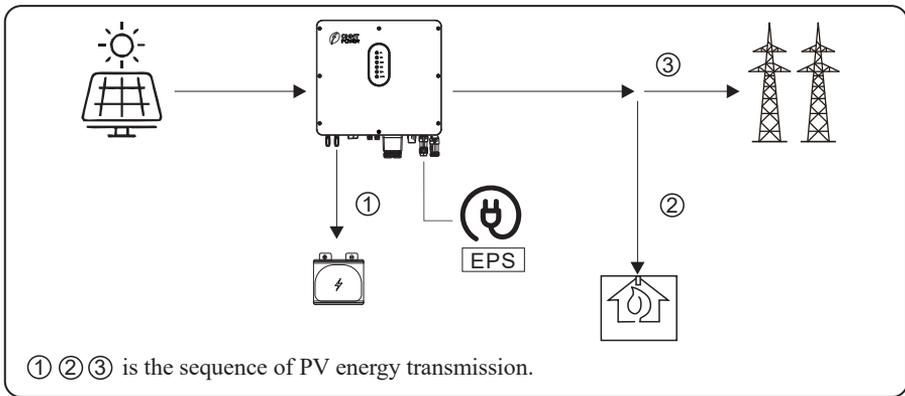
b) Limited PV power

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

Allow AC charging

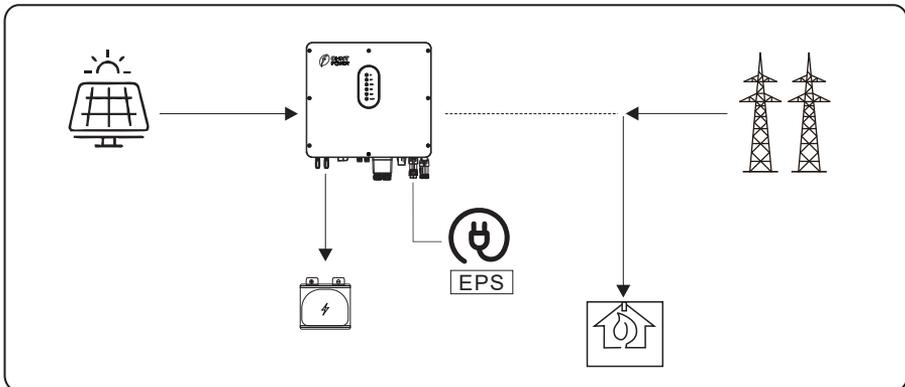In this situation, the battery can be charged both with PV and AC.

a) Wealthy PV power

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

① ② ③ is the sequence of PV energy transmission.
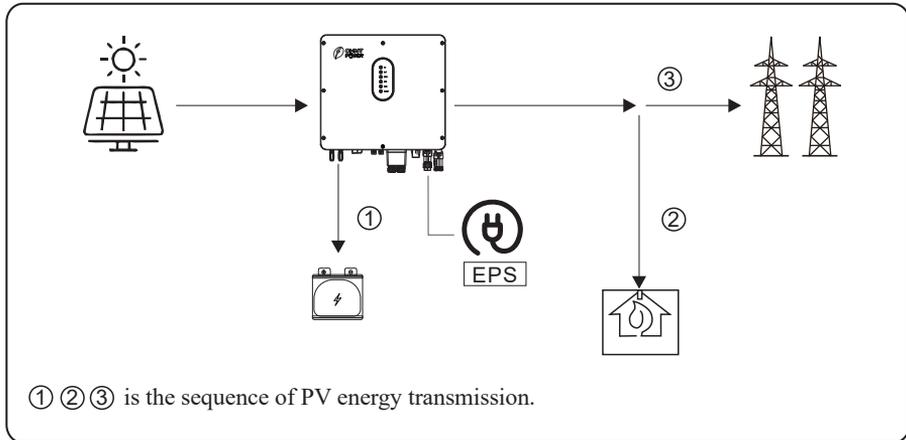
b) Limited PV power

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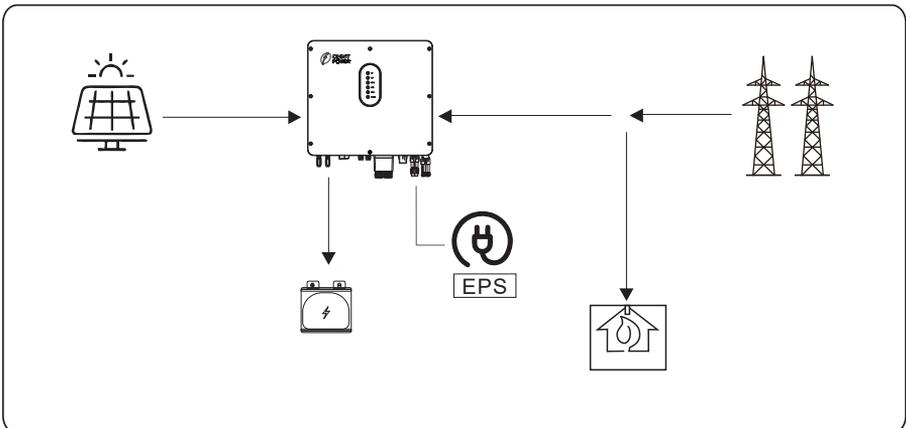
5.1.5 Off Grid Mode

When the power grid is cut off, the system automatically switches to Off Grid mode.
Under off-grid mode, only critical loads are supplied to ensure that important loads continue to work without power failure.

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

a) Wealthy PV power

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

① ② is the sequence of PV energy transmission.
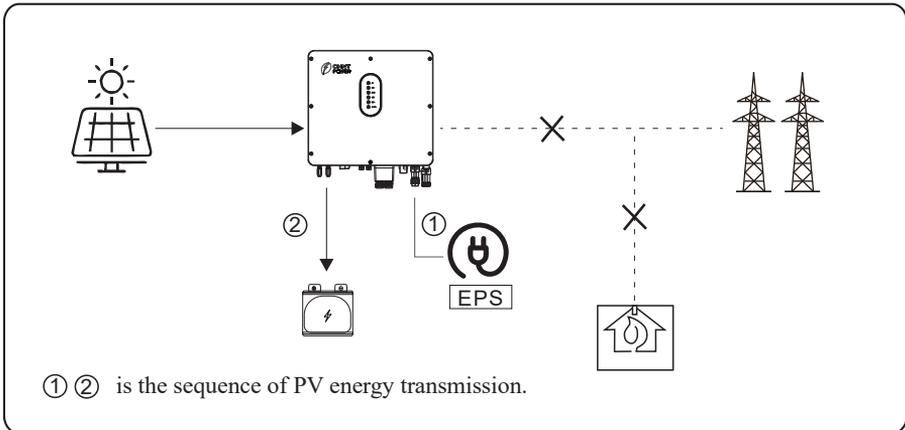
b) Limited PV power

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

① ② is the sequence of EPS load consumption.
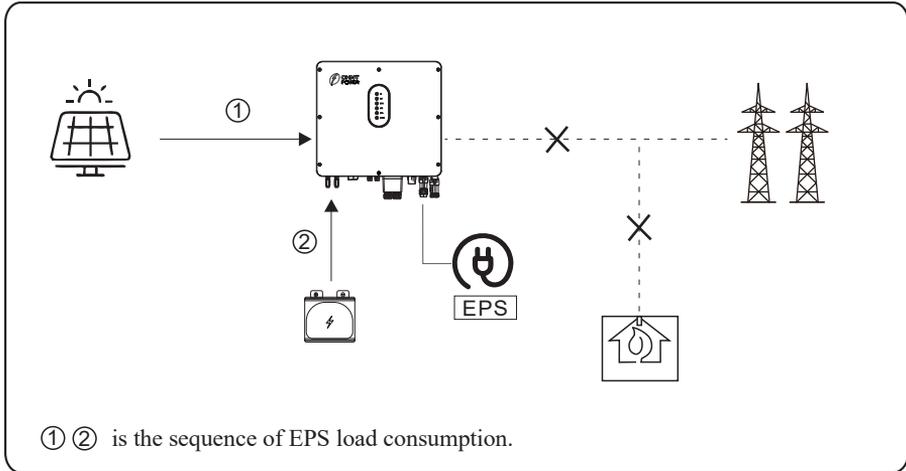
⚠ NOTICE	• Under this mode, please complete the output voltage and frequency settings. • It is better to choose the battery capacity larger than 100Ah to ensure EPS function work normally. • If EPS output loads are inductive or capacitive loads, to make sure the stability and reliability of system, it is recommended to configure the power of these loads to be within 50% EPS output power range.

5.2 Startup/Shutdown the System

5.2.1 Startup the System

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

AC Frequency 50/60Hz	PV Voltage 90~530V
Battery Voltage 42~60V	Grid AC Voltage 180~270V

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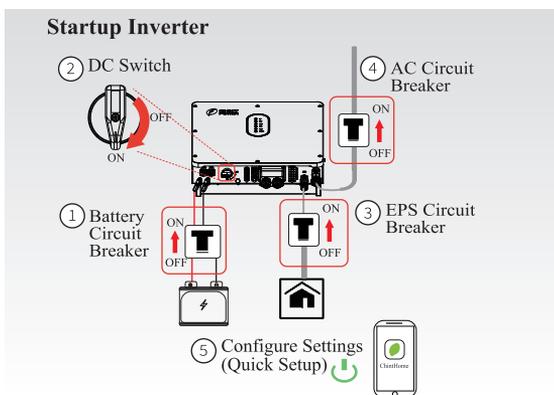
5.2.2 Shutdown the System

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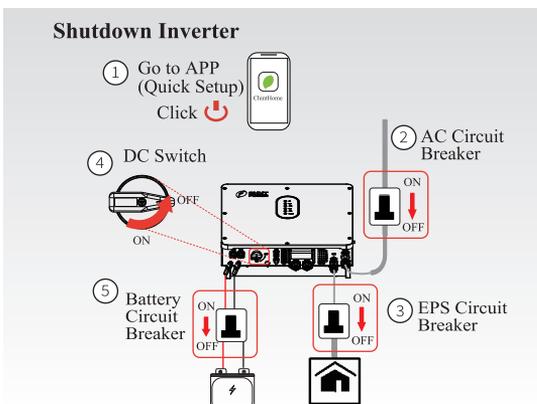
6. Commissioning

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

6.1 Inspection

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

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

6.2 Commissioning Procedure

After the inspection and make sure status is right, then start the commissioning of the system.
1) Power on the system by referring to the Startup section 5.2.1.
2) Setting the parameters on the App according to user's requirement.
3) Finish commissioning.

7. User Interface

7.1 LED

This section describes the LED panel. LED indicator includes PV, BAT, GRID, EPS, COM, ALARM indicators. PV is N/A for AC couple.
It includes the explanation of indicator states and summary of indicator states under the running state of the machine.
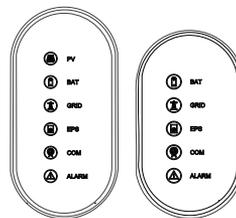
LED Indicator	Status	Description
PV	On	PV input is normal.
	Blink	PV input is abnormal.
	Off	PV is unavailable.
BAT	On	Battery is charging.
	Blink	Battery is discharging. Battery is abnormal.
	Off	Battery is unavailable.
GRID	On	GRID is available and normal.
	Blink	GRID is available and abnormal.
	Off	GRID is unavailable.
COM	On	Communication is ok.
	Off	Power supply is unavailable.
EPS	On	EPS power is available.
	Blink	EPS output is abnormal.
	Off	EPS power is unavailable.
ALARM	On	Fault has occurred and inverter shuts down.
	Blink	Alarms has occurred but inverter doesn't shut down.
	Off	No fault.

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

Details	Code	PV LED	Grid LED	BAT LED	EPS LED	COM LED	ALARM LED
RS485/DB9/BLE/USB		◎	◎	◎	◎	●	◎
Inverter over temperature	C5						
Fan abnormal	C8						
Inverter in power limit state	CL						
Data logger lost	CH	◎	◎	◎	◎	◎	★
Meter lost	CJ						
Remote off	CN						
PV insulation 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						
Software incompatibility	CC						
Internal storage error	CD						
Boost abnormal	CG						
Dc-dc abnormal	CU						

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

★ 　Blink 1s and off 1s 　　★★ 　Blink 2s and off 1s

7.2 App Setting Guide

7.2.1 Download App

• Scan the QR code on the inverter to download the APP.

• Download APP from the App Store or Google Play.

The APP should access some permissions such as device's location. You need to allow all permissions to be granted in all pop-up windows when installing the APP or in your own phone setting.

7.2.2 App Architecture

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

• Cloud login: APP read data from cloud server through API and display inverter parameter

• Local connection: APP read data from inverter through Bluetooth connection with Modbus protocol to display and configure inverter parameter.
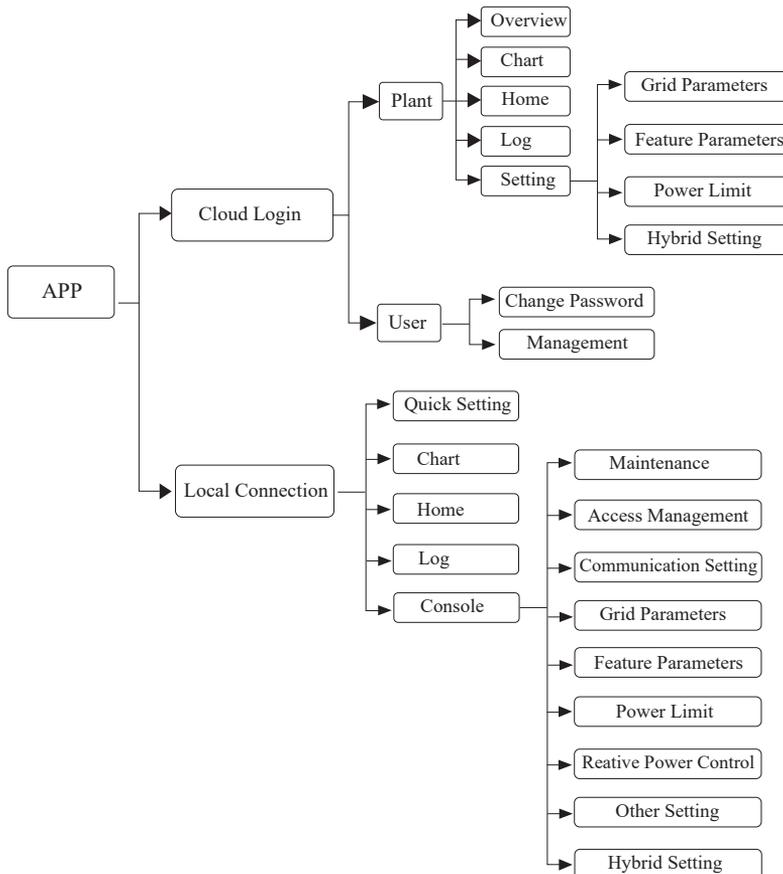
7.2.3 Local Setting

■ **Access Permission**

Before using the local setting, the APP should access all permissions. When the APP asks for permission, please click Allow.

■ **Connect Inverter**

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

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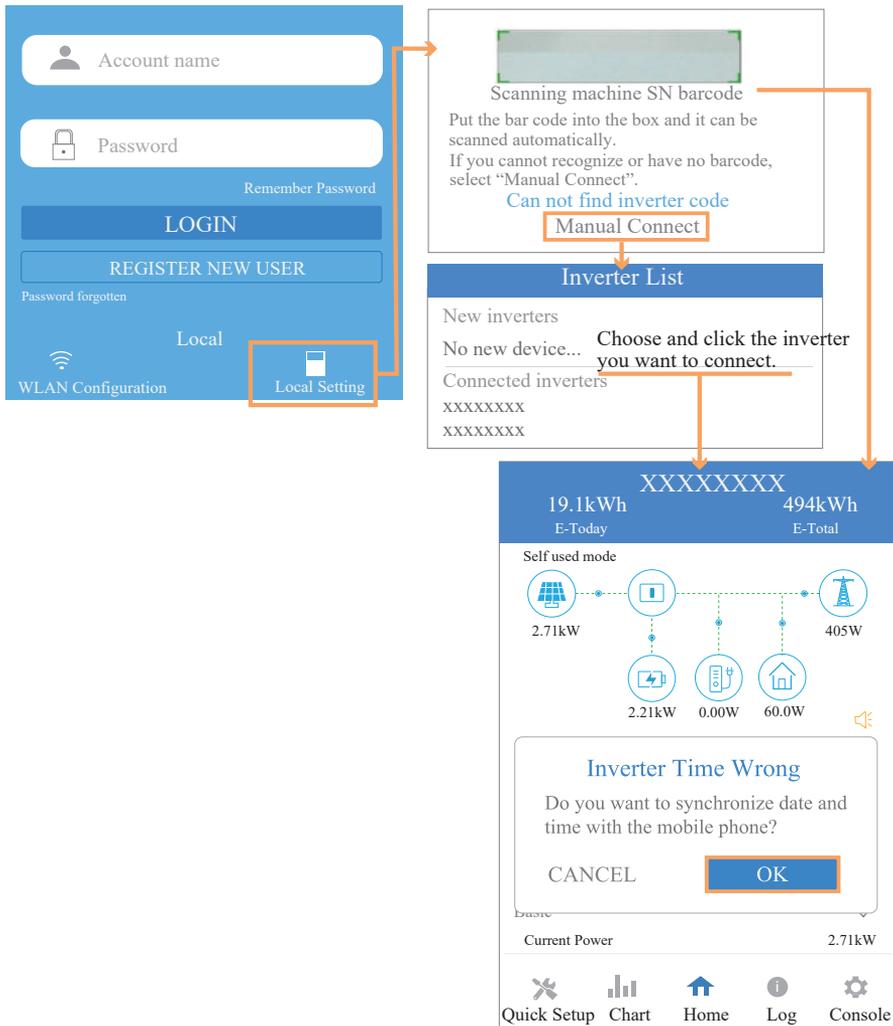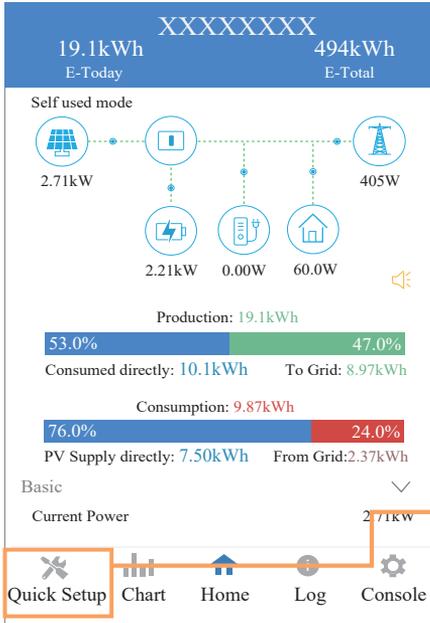
- **Quick Setting**

1. Connect to the router.

    Step 1 Go to Quick Setting page.

    Step 2 Click each item to enter the informations, then click Next.

2. Set parameters of power grid.

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

    Step 2 Click Next.

    Step 3 Click Previous back to the previous page.

3. Set parameters of power limit

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

    Step 2 Click Next.

    Step 3 Click Previous back to the previous page.

4. Set parameters of work mode

    Step 1 Click each item to enter the informations of work mode.

    Step 2 Click Next.

    Step 3 Click Previous back to the previous page.
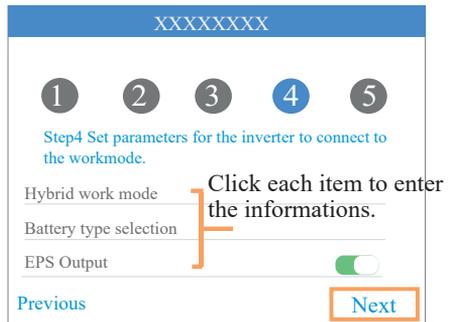
5. Start Inverter

    Step 1 Click ⏻.

    Step 2 Click Previous back to the previous page.
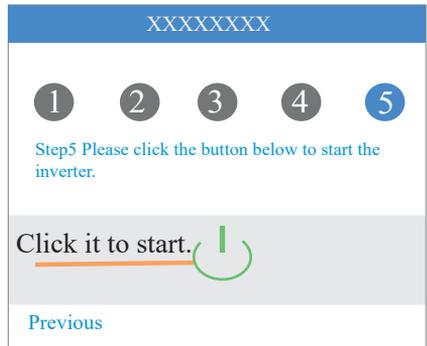
■ **Chart**

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

1. Query(Daily) Data
Go to Chart > Day page. It will show the Daily Production or Consumption Curve in this page. You can swipe the screen left and right to switch the graph.
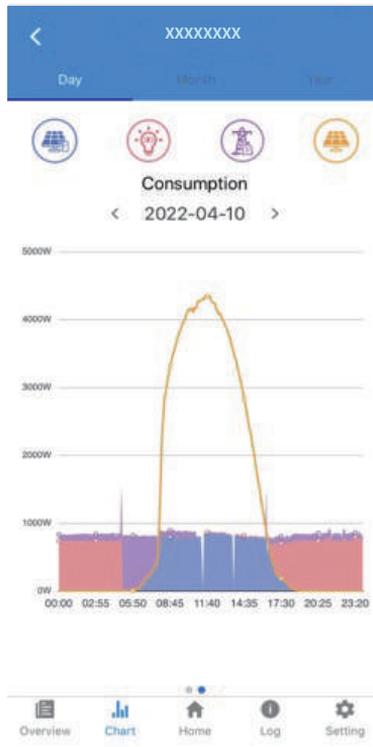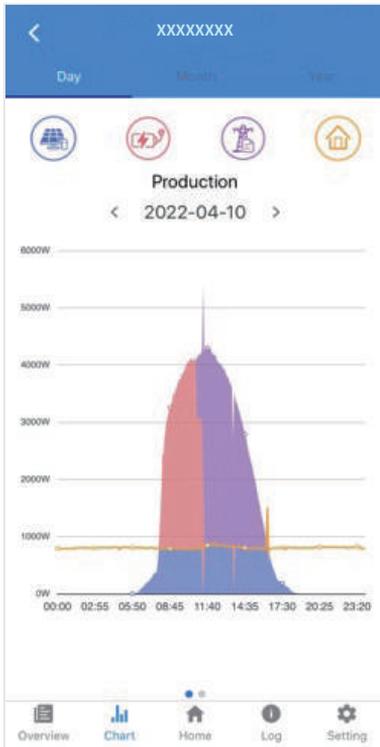
Different color curves represent energy data of different the icon.

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

Click the curves to display the specific data.

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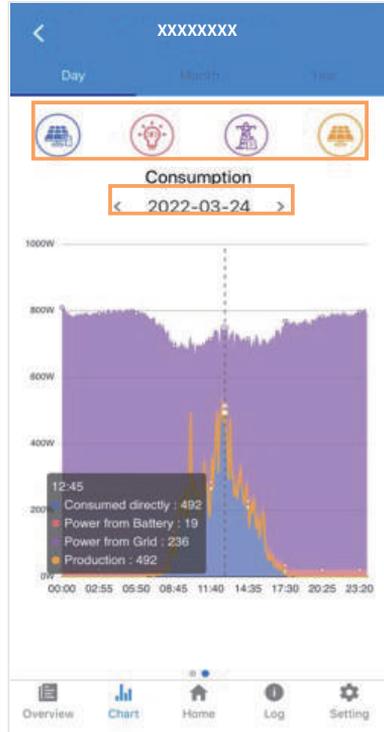
2. Query(Monthly or Yearly) Data

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

Daily data retention: 7 days
Monthly data retention: 36 months
yearly data retention: 10 years

■ **Local Setting Homepage**

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

XXXXXXXX
19.1kWh   494kWh
E-Today   E-Total

Self used mode

2.71kW   405W

2.21kW   0.00W   60.0W

Production: 19.1kWh

53.0%   47.0%
Consumed directly: 10.1kWh   To Grid: 8.97kWh

Consumption: 9.87kWh

76.0%   24.0%
PV Supply directly: 7.50kWh   From Grid:2.37kWh

Basic   Click here to expand.

Current Power   2.71kW

Quick Setup   Chart   Home   Log   Console


XXXXXXXX
19.1kWh   494kWh
E-Today   E-Total

Self used mode

2.71kW   405W

The alarm list

CC-Software incompatibility

CANCEL   INACTIVE

Consumption: 9.87kWh

76.0%   24.0%
PV Supply directly: 7.50kWh   From Grid:2.37kWh

Basic

Current Power   2.71kW

Quick Setup   Chart   Home   Log   Console

■ **History Log**

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

XXXXXXXX

No history data

Consumed directly: 10.1kWh   To Grid: 8.97kWh

Consumption: 9.87kWh

76.0%   24.0%
PV Supply directly: 7.50kWh   From Grid:2.37kWh

Basic

Current Power   2.71kW

Quick Setup   Chart   Home   Log   Console

Quick Setup   Chart   Home   Log   Console
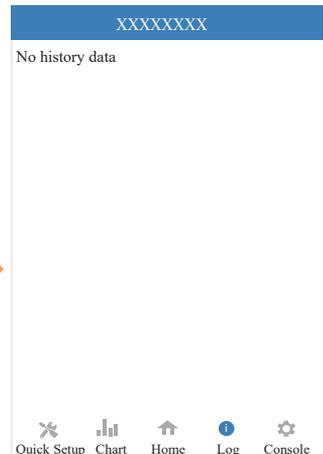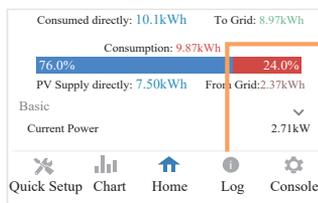
■ **Maintenance**

Go to Console page. And click Maintenance
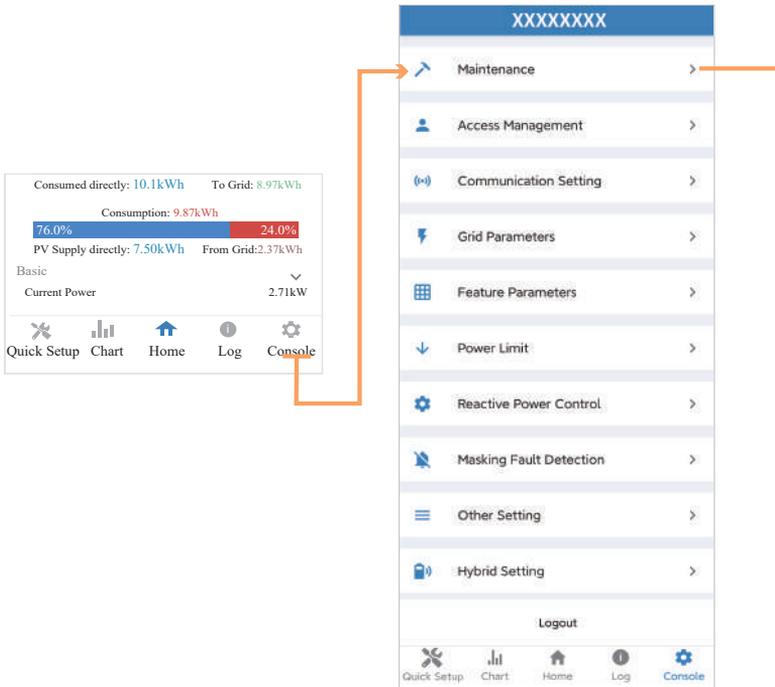
Then you need to enter password in a popup window (as shown below).
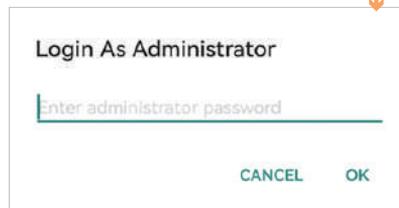
In this page, you can view the basic information like some version information, do some maintaining operations like turn off/on the inverter and manage data.
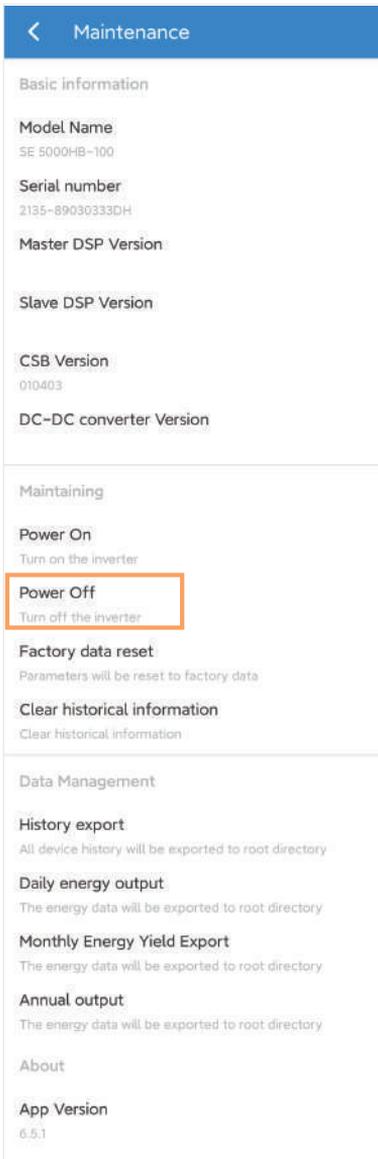
- **Console**

Access Management

Go to Console > Access Management page. In this page, you can switch the login permission.
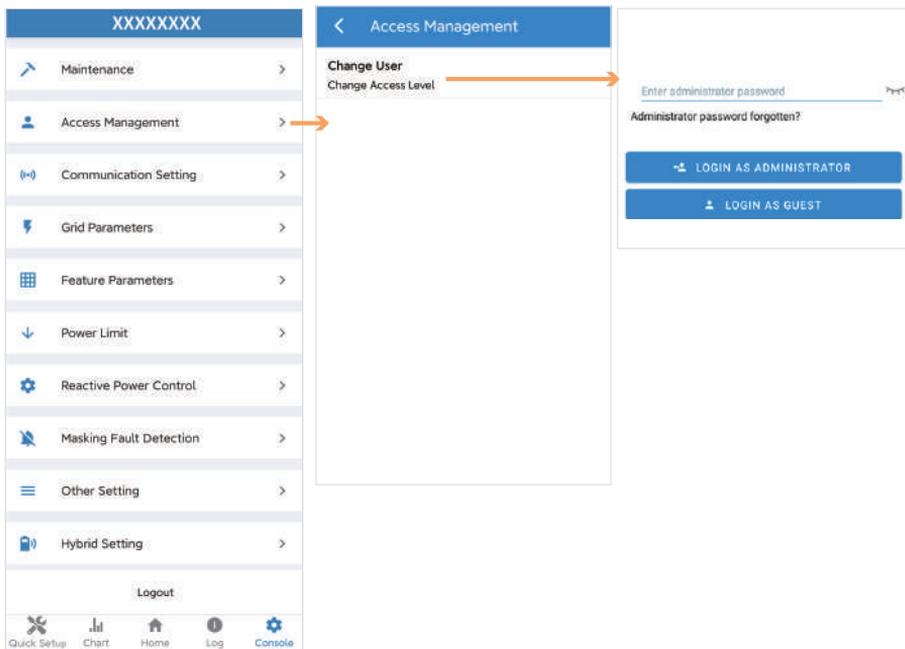
Communication Setting

Go to Console > Communication Setting page. In this page, you can set or change the parameters of communication settings: Basic Setting, RS485 Setting and Ethernet Setting.
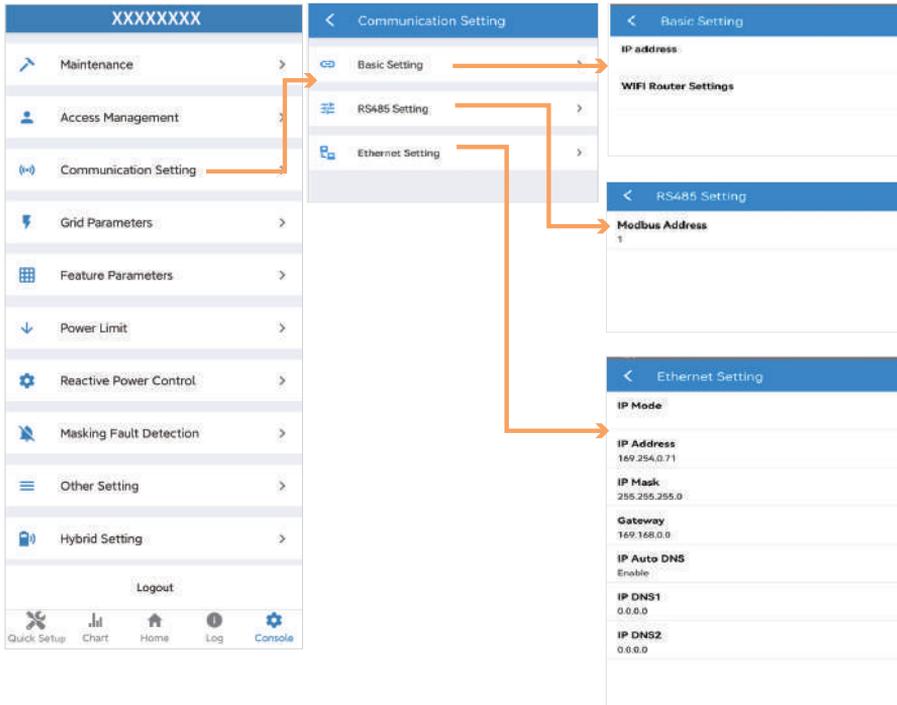
Grid Parameters

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

Feature Parameters

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

Power Limit

Go to Console > Power Limit page. In this page, you can set or change the parameters of power limit, as shown in the figure.
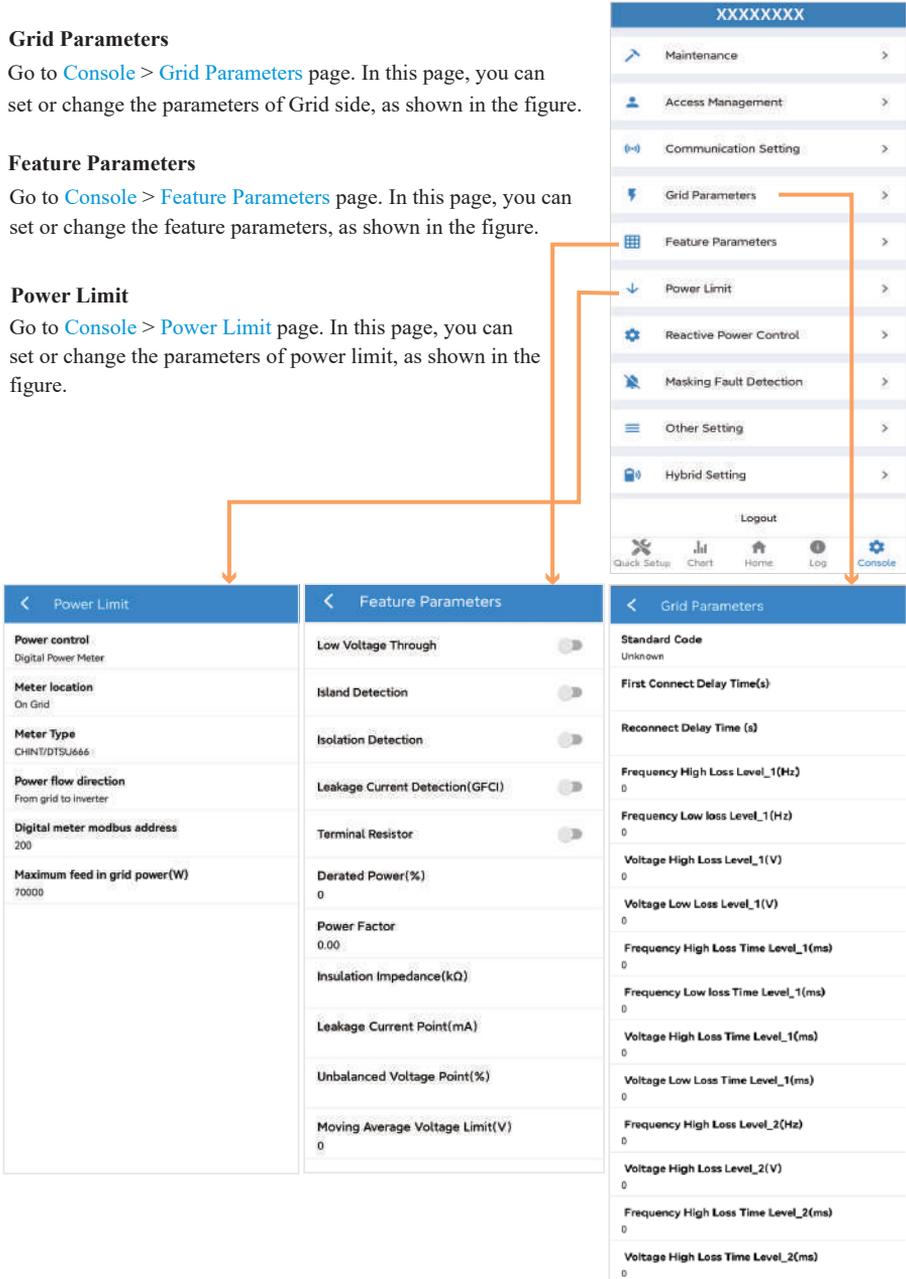
Reactive Power Control

Go to Console > Reactive Power Control page. In this page, you can set or change the Reactive Power
Control parameters.
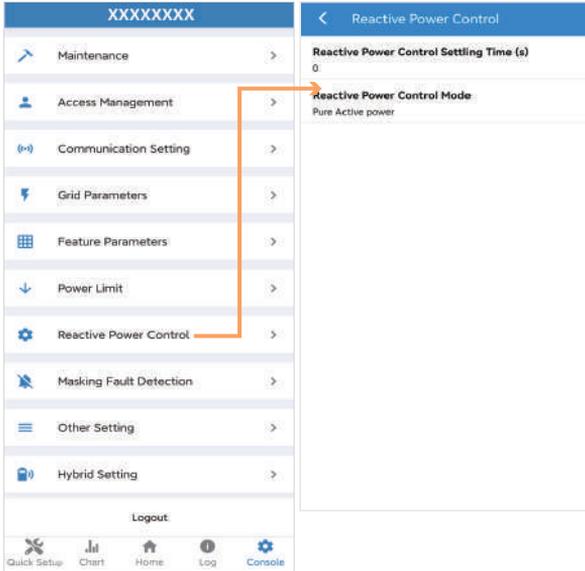
Other Setting

Go to Console > Other Setting page. In this page, you can set other setting parameters.

Enable Buzzer On to open
the Buzzer function.

Enable DRM Function to open
the Buzzer function.

Enable Parallel mode when
parallel connection.

Hybrid Setting

Go to Console > Hybrid Setting page. In this page, you can set Hybrid Setting parameters.
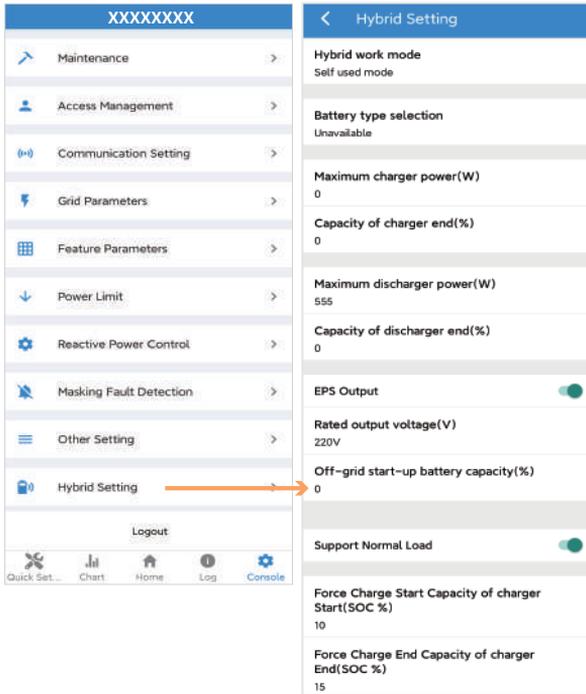
8. Maintenance

⚠ 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
PV inverter cleaning	Check periodically that the heat sink is free from dust and blockage.	Clean periodically the heat sink.	Yearly
PV inverter running status	Check that the inverter is not damaged or deformed. Check for normal sound emitted during inverter operation. Check and ensure that all inverter communications is running well.	If there is any abnormal phenomenon, replace the relevant parts.	Monthly
PV inverter electrical connections	Check that all AC, DC and communication cables are securely connected; Check that PGND cables are securely connected; Check that all cables are intact and free from aging.	If there is any abnormal phenomenon, replace the cable or re-connect it.	Semiannually

8.2 Inverter Troubleshooting

When the inverter has an exception, its basic common warning and exception 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.
A1	Grid under voltage	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.
A3	Grid over frequency	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.
A4	Grid under frequency	
A2	Grid absent	Wait till power is restored.
B0	PV over voltage	Check whether the maximum voltage of a single string of input PV modules is greater than the allowable voltage. If the maximum voltage is higher than the standard voltage, modify the number of pv module connection strings.
B1	PV insulation abnormal	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.
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, pls. contact the customer service center.

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, pls. refer to the suggestions or measures of Grid over voltage. and the inverter fails to generate power, contact the customer service center. If there is no abnormality on the grid side, the machine fault can be determined. (If you open the cover and find traces of damage to the relay, it can be concluded that the machine is faulty.) And pls. contact the customer service center.
CN	Remote off	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, pls. check the installation site for direct sunlight, good ventilation, and high ambient temperature (Such as installed on the parapet). If the ambient temperature is lower than 45 ° C and the heat dissipation is good, contact the customer service center.
C6	GFCI abnormal	1. If the alarm occurs occasionally, it could have been an occasional exception to the external wiring, the inverter can be automatically recovered, no action required. 2. If it occurs repeatedly or cannot be recovered for a long time, pls. contact customer service to report repair.
B7	PV string reverse	Check and modify the positive and negative polarity of the input of the circuit string.
C8	Fan abnormal	1. If the alarm occurs occasionally, pls. restart the inverter. 2. If it occurs repeatedly or cannot be recovered for a long time, check whether the external fan is blocked by foreign objects. Otherwise, contact customer service.
C9	Unbalance Dc-link voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required.
CA	Dc-link over voltage	2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.

CB	Internal communication error	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CC	Software incompatibility	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CD	Internal storage error	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CE	Data inconsistency	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CF	Inverter abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CG	Boost abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CJ	Meter lost	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.
P1	Parallel ID warning	It is Parallel ID Alarm. Pls. check the parallel communication cable, and check whether any inverter joins or exits online. All inverters are powered off completely, check the line, and then power on the inverters again to ensure that the alarm is cleared.
P2	Parallel SYN signal warning	Parallel synchronization signal is abnormal. Check whether the parallel communication cable is properly connected.
P3	Parallel BAT abnormal	The parallel battery is abnormal. Whether the battery of the inverter is reported low voltage or the battery is not connected.
P4	Parallel GRID abnormal	The parallel grid is abnormal. Whether the grid of the inverter is abnormal.

D2	Battery over voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. Check that the battery overvoltage protection value is improperly set. 3. The battery is abnormal. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
D3	Battery under voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. Check the communication line connection between BMS and inverter (lithium battery). 3. The battery is empty or the battery voltage is lower than the SOC cut-off voltage. 4. The battery undervoltage protection value is improperly set. 5. The battery is abnormal. 6. If exclude the above, the alarm continues to occur, please contact the customer service center.
D4	Battery discharger over current	1. Check whether the battery parameters are correctly set. 2. Battery undervoltage. 3. Check whether a separate battery is loaded and the discharge current exceeds the battery specifications. 4. The battery is abnormal. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.
D5	Battery over temperature	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.
D6	Battery under temperature	
D7	EPS output voltage abnormal	1. Check whether the EPS voltage and frequency Settings are within the specified range. 2. Check whether the EPS port is overloaded. 3. When not connected to the power grid, check whether EPS output is normal. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
D8	Communication error (Inverter-BMS)	1. Check whether the battery is disconnected. 2. Check whether the battery is well connected with the inverter. 3. Confirm that the battery is compatible with the inverter. It is recommended to use CAN communication. 4. Check whether the communication cable or port between the battery and the inverter is faulty. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.

D9	Internal communication loss(E-M)	1. Check whether the communication cables between EPS, electricity meter and inverter are well connected and whether the wiring is correct 2. Check whether the communication distance is within the specification range
DA	Internal communication loss(M-D)	3. Disconnect the external communication and restart the electricity meter and inverter. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
CU	Dcdc abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, please check: 1) Check whether the MC4 terminal on the PV side is securely connected. 2) Check whether the voltage at the PV side is open circuit, ground to ground, etc. If exclude the above, the alarm continues to occur, please contact the customer service center.
CP	EPS 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	EPS short circuit	1. Check whether the live line and null line of EPS 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, EPS switch needs to be manually turned on during normal use.)
DC	EPS over load	1. Disconnect the EPS 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 EPS switch needs to be manually turned on for normal use.)

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:

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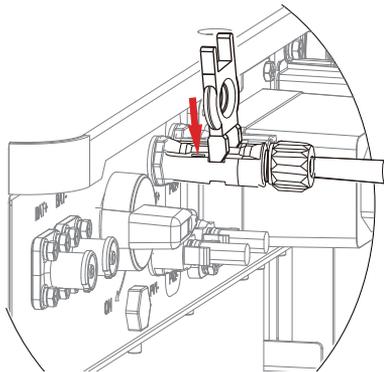
📄 **NOTE**

To remove the PV/Grid/EPS connectors, insert the removal tool into the bayonet according to the position indicated in the drawing, press inward, and then take out the connector outward.

PV Connectors Removing Detail

Grid/EPS Connectors Removing Detail

Step 2. Remove the inverter from the mounting bracket.

Step 3. Remove the mounting bracket.

9. Technical Specifications

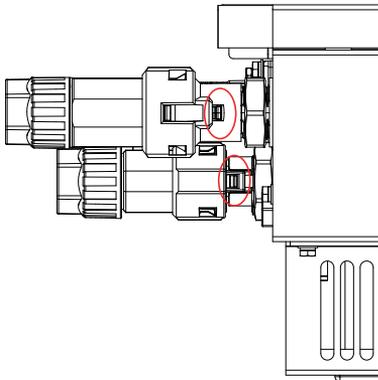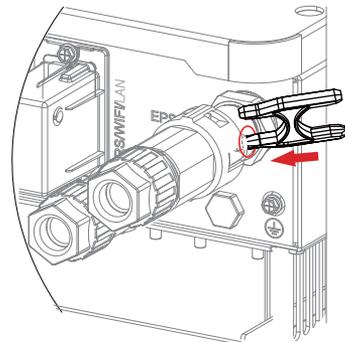| Model	CPS SCE3.6KTL-60/EU	CPS SCE3.68KTL-60/EU	CPS SCE4.6KTL-60/EU	CPS SCE4.6KTL-120/EU	CPS SCE5KTL-60/EU	CPS SCE5KTL-120/EU	CPS SCE6KTL-60/EU	CPS SCE6KTL-120/EU	CPS SCB4.6KTL/EU	CPS SCB5KTL/EU	CPS SCB6KTL/EU
Efficiency											
Max.efficiency (PV to AC)	95.5%	95.5%	95.5%	95.5%	95.5%	95.5%	95.5%	95.5%	N/A	N/A	N/A
Max.efficiency (AC to BAT)	93.5%	93.5%	93.5%	93.5%	93.5%	93.5%	93.5%	93.5%	93.5%	93.5%	93.5%
Input (PV)											
Max. PV power (W)	9000	9000	9000	9000	9000	9000	9000	9000	N/A	N/A	N/A
Max. PV voltage (V)	550	550	550	550	550	550	550	550	N/A	N/A	N/A
Max. input current (A)	15/15	15/15	15/15	15/15	15/15	15/15	15/15	15/15	N/A	N/A	N/A
Max. short current (A)	20/20	20/20	20/20	20/20	20/20	20/20	20/20	20/20	N/A	N/A	N/A
Startup voltage (V)	90	90	90	90	90	90	90	90	N/A	N/A	N/A
MPPT voltage range @full load (V)	280-480	280-480	200~480	200~480	200~480	200~480	230~480	230~480	N/A	N/A	N/A
No. of MPPT trackers	2	2	2	2	2	2	2	2	N/A	N/A	N/A
String per MPPT tracker	1	1	1	1	1	1	1	1	N/A	N/A	N/A
Input (BAT)											
Compatible battery type	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid	Lithium/Lead-acid
Norminal battery voltage (V)	48	48	48	48	48	48	48	48	48	48	48
Battery voltage range (V)	40~60	40~60	40~60	40~60	40~60	40~60	40~60	40~60	40~60	40~60	40~60
Lithium battery charge curve	Self-adaption to BMS	Self-adaption to BMS	Self-adaption to BMS	Self-adaption to BMS	Self-adaption to BMS	Self-adaption to BMS	Self-adaption to BMS	Self-adaption to BMS	Self-adaption to BMS	Self-adaption to BMS	Self-adaption to BMS
Max. charge/discharge current (A)	60/60	60/60	60/60	120/120	60/60	120/120	60/60	120/120	100/100	100/100	120/120
Max. charge/discharge power (W)	3000/3000	3000/3000	3000/3000	6000/6000	3000/3000	6000/6000	3000/3000	6000/6000	5000/5000	5000/5000	6000/6000

Model	CPS SCE3.6KTL-60/EU	CPS SCE3.68KTL-60/EU	CPS SCE4.6KTL-60/EU	CPS SCE4.6KTL-120/EU	CPS SCE5KTL-60/EU	CPS SCE5KTL-120/EU	CPS SCE6KTL-60/EU	CPS SCE6KTL-120/EU	CPS SCB4.6KTL/EU	CPS SCB5KTL/EU	CPS SCB6KTL/EU
Output (Grid)											
Nominal AC output power (W)	3600	3680	4600	4600	5000	5000	6000	6000	4600	5000	6000
Max.AC output apparent power (VA)	3960	3960	4600	4600	5500	5500	6000	6000	4600	5500	6000
Max.AC output power (PF-1) (W)	3600	3600	4600	4600	5500	5500	6000	6000	4600	5500	6000
Max.AC output current (A)	18	18	22	22	25	25	27.2	27.2	22	25	27.2
Rated AC voltage (V)	220								220		
AC voltage range (V)	150~300(adjustable)								150~300(adjustable)		
Rated AC frequency (Hz)	50/60								50/60		
AC frequency range (Hz)	45~55/55~65(adjustable)								45~55/55~65(adjustable)		
Grid connection	Single phase								Single phase		
Power factor	>0.99@rated power(adjustable 0.8LG~0.8LD)								>0.99@rated power(adjustable 0.8LG~0.8LD)		
THDI	<3%								<3%		
Output (Back up)											
Nominal output voltage (V)	230								230		
Nominal output frequency (Hz)	50/60								50/60		
Transfer time (ms)	10(type)/20(max.)								10(type)/20(max.)		
THDV	<3%@100%R load								<3%@100%R load		
Nominal output power (W)	3000	3000	4600	3000	5000	3000	5000	4600	5000	6000	
Nominal output current (A)	13	13	20	13	21.7	13	21.7	20	21.7	26	

Model	CPS SCE3.6KTL-60/EU	CPS SCE3.68KTL-60/EU	CPS SCE4.6KTL-60/EU	CPS SCE4.6KTL-120/EU	CPS SCE5KTL-60/EU	CPS SCE5KTL-120/EU	CPS SCE6KTL-60/EU	CPS SCE6KTL-120/EU	CPS SCB4.6KTL/EU	CPS SCB5KTL/EU	CPS SCB6KTL/EU
Protection											
Protection category					Class I					Class I	
AC overcurrent protection					Support					Support	
AC short circuit protection					Support					Support	
Leakage current protection					Support					Support	
AC overvoltage category					III					III	
PV overvoltage category					II					N/A	
Surge Arrester					DC Type III; AC Type III					AC Type III	
PV switch					Support					N/A	
Anti-islanding protection					Support (Frequency shift)					Support (Frequency shift)	
DC reverse connection					Support					N/A	
Insulation detection					Support					Support	
General											
Topology					Transferless					Transferless	
Max. operation altitude (m)					4000					4000	
Ingress protection degree					IP65					IP65	
Operating temperature range (℃)					-25~60					-25~60	
Noise emission (dB)	<=30		<=30	<=35	<=30	<=35	<=30	<=35		<=35	
Weight (kg)	16		20	25	20	25	20	25		20	

Model	CPS SCE3.6KTL-60/EU	CPS SCE3.68KTL-60/EU	CPS SCE4.6KTL-60/EU	CPS SCE4.6KTL-120/EU	CPS SCE5KTL-60/EU	CPS SCE5KTL-120/EU	CPS SCE6KTL-60/EU	CPS SCE6KTL-120/EU	CPS SCB4.6KTL/EU	CPS SCB5KTL/EU	CPS SCB6KTL/EU
Relative humidity (%)					0~100					0~100	
Cooling concept					Natural					Natural	
Mounting					Wall bracket					Wall bracket	
Dimensions (W*H*D)					(515*487*175)mm					(515*487*175)mm	
PV connection way					MC4/H4					N/A	
Battery connection way					Dedicated DC connector					Dedicated DC connector	
AC connection way (Grid & back up)					Dedicated AC connector					Dedicated AC connector	

Display & Communication

Display					LED+APP					LED+APP	
Communication interface					BMS (CAN/RS485)/Ethernet/WiFi/GPRS/DRMs/Meter (RS485)/USB					BMS (CAN/RS485)/Ethernet/WiFi/GPRS/DRMs/Meter (RS485)/USB	

Certification

Grid					IEC61727; VDE-AR-N4105; VDE0126-1-1; CEI0-21; EN50549; AS4777					IEC61727; VDE-AR-N4105; VDE0126-1-1; CEI0-21; EN50549; AS4777	
Safety					IEC62109-1&2; IEC62477-1; IEC62040-1					IEC62109-1&2; IEC62477-1; IEC62040-1	
EMC					IEC61000-6-1/2/3/4					IEC61000-6-1/2/3/4	

Warranty

Period (Years)					5/10 (optional)					5/10 (optional)	

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