SOFAR

USER MANUAL

BT5000A



Shenzhen SOFARSOLAR Co., Ltd.

Content

Preface			**1**
1	**Important Notes**		**2**
	1.1	Scope	2
	1.2	Target group	2
	1.3	Manual structure	2
	1.4	Symbols used	2
2	**Basic Safety Information**		**4**
	2.1	Safety instructions	4
	2.2	Installation and maintenance requirements	4
	2.3	Equipment labelling protection	5
	2.4	Installation requirements	5
	2.5	Caveat	5
	2.6	Signs on the AC Battery	7
3	**Product Feature**		**9**
	3.1	Description	9
	3.2	Product size	10
	3.3	Interface	10
	3.4	Human machine interface	12
	3.5	Label	14
	3.6	Features	15
4	**Product Installation**		**16**
	4.1	Installation information	16
	4.2	Installation process	16
	4.3	Pre-installation inspection	17
	4.4	Installation tools	19
	4.5	Installation environment requirements	20
	4.6	Installation spacing requirements	22
	4.7	Unpack the AC battery	23
	4.8	AC battery installation	25
5	**Electrical connections**		**31**
	5.1	Safety instructions	31

5.2 Overview 31
5.3 Connect the PE cable 32
5.4 Connect the AC cable 34
5.5 Connect the signal cable 43
5.6 Connect to SOFAR Cloud/APP 57
6 System Commissioning 60
6.1 Safety inspection before commissioning 60
6.2 Check carefully 60
6.3 Power on and shutdown 60
6.4 Operations of keys and LCD 61
7 Trouble shooting and maintenance 84
7.1 Troubleshooting 84
7.2 Routine maintenance 90
7.3 Battery module storage requirements 91
8 Specifications 92
Appendix 94
Typical application scenario 94

Preface

Take note of

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Take care of the manual

This manual is an important part of the equipment. You can print the electronic user manual on paper as needed and keep the paper and electronic documents properly for subsequent reference. Anyone operating this equipment must do so in accordance with this manual at any time.

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1 Important Notes

1.1 Scope

The rechargeable lithium-ion battery system, product model: BT5000A, is a power conversion system (PCS) integrated, AC-coupled lithium-ion battery system, and the manual will subsequently simplify to refer to the system as either 'the AC battery' or 'the battery'.

This product manual describes the installation, electrical connections, commissioning, maintenance and troubleshooting procedures of the AC battery.

1.2 Target group

This manual is intended for professional electrical engineers who install, operate, and maintain the AC battery.

1.3 Manual structure

This manual contains important safety and installation instructions that must be followed during installation and maintenance of the equipment.

1.4 Symbols used

To ensure your personal and property safety when using the AC battery, the manual provides relevant safety information and uses corresponding symbols to highlight it. Please fully understand and absolutely abide by these emphasized messages to avoid personal injury and property damage. The symbols used in this manual are listed below.

⚠ DANGER

- Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

- Warning indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

- Caution indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

ATTENTION

- Attention indicates potential risks which, if not avoided, may lead to equipment fault or property damage.

NOTE

- Note provides tips that are valuable for the optimal operation of the product.

2 Basic Safety Information

Please read the safety precautions in this manual carefully. If ignored, it may result in serious injury or death.

NOTE

- If you have problems reading the following information, please contact SOFAR.

2.1 Safety instructions

The installation of AC battery must fully comply with national and local grid standards and regulations.

Read and understand all instructions in this manual and familiarise yourself with the relevant safety symbols before starting to install and commission the AC battery.

In accordance with relevant national and state/provincial regulations, the power grid can only relate to permission from the local power department, and this operation can only be performed by qualified electricians.

If maintenance or repair are needed, please contact the nearest authorized service center. To find the nearest authorized service center, please contact your dealer. Do not attempt to repair the AC battery yourself as it may result in personal injury or property damage.

2.2 Installation and maintenance requirements

Personnel responsible for operating and maintaining the AC battery must have the necessary qualifications and experience to perform the tasks described as well as comprehend all instructions contained in the manual.

For safety reasons, the AC battery can only be installed by a qualified electrician, including:

Received training in occupational safety, as well as installation and commissioning of electrical systems.

Be familiar with local grid operator laws, standards, and regulations.

SOFAR assumes no responsibility for property damage or personal injury caused by improper use.

2.3 Equipment labelling protection

There is a nameplate on the AC battery, which contains important parameter information related to the product. Artificial damage is strictly prohibited.

The warning mark on the AC battery contains important information for safety operation. Artificial damage is strictly prohibited.

2.4 Installation requirements

Secure the AC battery on a suitable object with sufficient load bearing capacity, and ensure that the battery is placed vertically. Choose a suitable position for installing electrical equipment. Ensure there is enough space for fire exits and equipment maintenance. And maintain proper ventilation to cool the battery.

2.5 Caveat

2.5.1 Shipping requirements

Factory packaging is specifically designed to protect against shipping damage, such as severe shock, moisture, and vibration. If the equipment is visibly damaged, do not install it. Instead, notify the responsible transport company immediately.

2.5.2 Electrical connection

When using the AC battery, please observe all relevant electrical codes.

⚠ DANGER

- Dangerous AC voltage
- Before making electrical connections, make sure the AC battery is powered off or in shutdown mode.

⚠ DANGER

- Dangerous AC voltage
- All installation and electrical connections should only be performed by trained electricians.

ATTENTION

Feed-in authorization for grid.

- Obtain authorization from the local power grid department before connecting the AC battery to the power grid.

NOTE

- Voiding of guarantee
- Do not open the AC battery or remove any of the labels. Otherwise, SOFAR shall assume no guarantee.

2.5.3 Operation

DANGER

- Do not connect or disconnect power cables with power-on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.
- Follow all instructions and observe all safety documents that refer to the grid connection.

CAUTION

- While the inverter is operating, several internal components will become very hot.
- Please wear protective gloves!
- Keep children away from the device.

2.5.4 Maintenance and repair

DANGER

- High voltage generated by the equipment during operation may cause an electric shock, which could result in death, serious injury, or serious property damage.
- Prior to maintenance, switch off the breaker between the AC battery and grid, and turn off the AC battery.
- After turning off the AC battery, wait a minimum of 15 minutes before any maintenance or repair work.

ATTENTION

Unauthorized repairs!

- Following the elimination of any faults, the AC battery should be fully functional once more. Should any repairs be required, please contact a local authorized service center.
- The internal components of the AC battery must NOT be opened without the relevant authorization. SOFAR assumes no responsibility for any resulting losses or defects.

2.6 Signs on the AC Battery

The AC battery comes with some safety-related labels. Please make sure to read and fully understand these labels before installing the device.

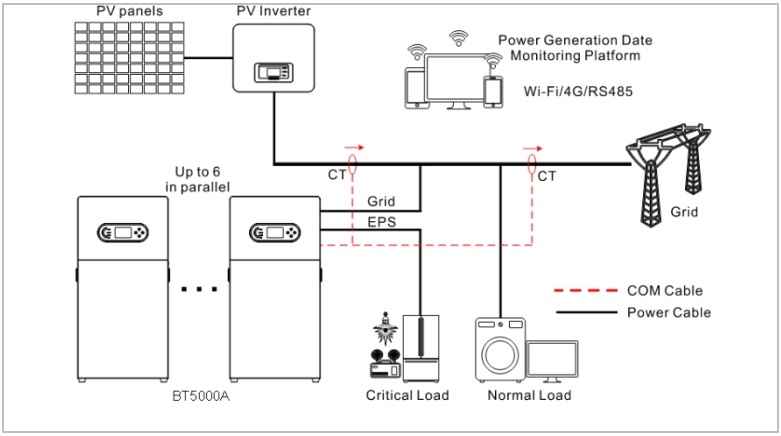
Symbol	Symbol name	Description
	Indicate there is a danger of residual voltage in the battery	There is residual voltage in the battery. Before opening the AC battery, wait 15 minutes to ensure that the capacitor is fully discharged.
	Be careful of high voltage and electric shock	The AC battery has a high voltage during operation, so be careful of electric shock.
	Beware of high surface temperatures	The shell temperature of the AC battery is relatively high when it is working. It is strictly forbidden to touch it.

Symbol	Symbol name	Description
	Comply with European standards (CE) certification	This product complies with CE certification standards
	Grounding point	This point is grounded
	Read the instructions	Please read this manual before installing the AC battery.
IP	Equipment protection level	The equipment protection level complies with EN 60529.
	Arrow pointing up	When transporting and storing the AC battery, the arrow must be facing upwards

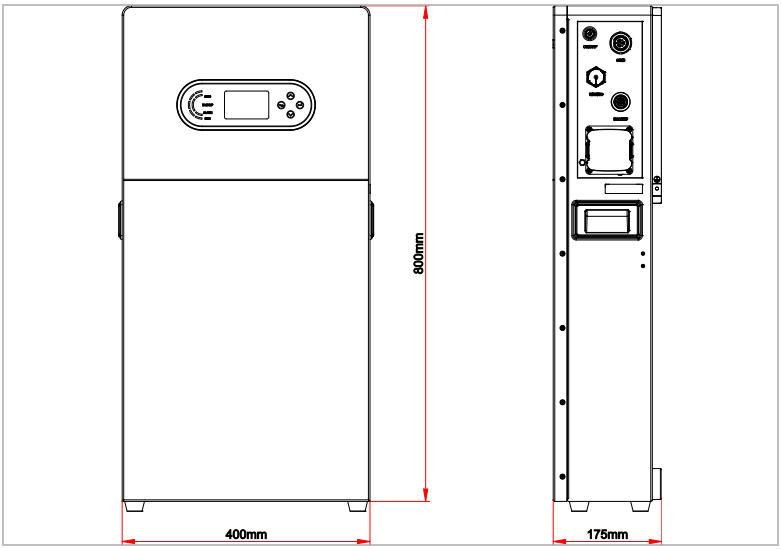
3 Product Feature

3.1 Description

The AC battery is an AC-coupled integrated energy storage battery system, with a built-in lithium iron phosphate battery module, a battery management system (BMS) and a power conversion system (PCS). It is used in various photovoltaic grid-connected power generation systems to provide energy storage or grid auxiliary service scenarios. It contains various operation modes and functions, such as self-use mode, timing mode, peak shaving mode, and other modes, and it also supports local and remote control, on-grid and off-grid mode switching and virtual power station functions.



3.2 Product size



3.3 Interface

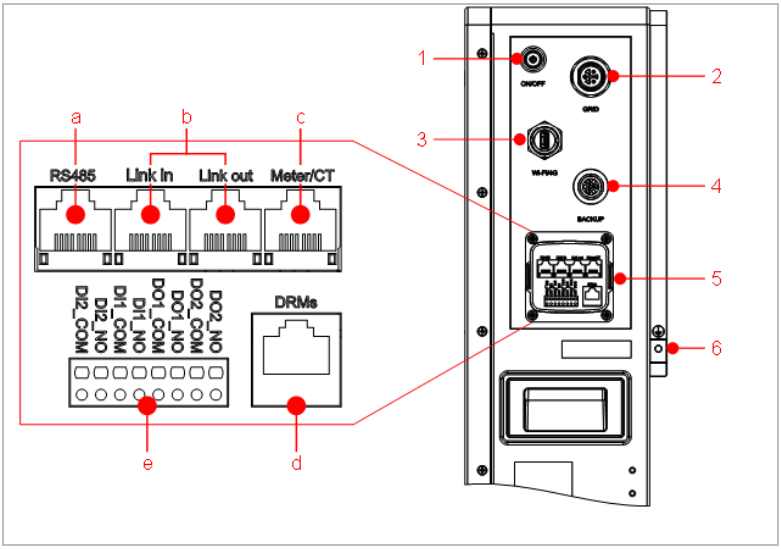


Table 3-1 Definition

1	Locking	2	On-Grid Interface (Silkscreen: GRID)
3	Data Logger Interface (Silkscreen: Wi-Fi/4G)	4	Emergency Power Supply (EPS) Interface
5	Communication Interface	6	Grounding point

Table 3-2 Communication Interface Definition

a	RS-485 Interface	b	Link Ports (For multiple batteries in parallel application)
c	Data Logger Interface (Silkscreen: Wi-Fi/4G)	d	Emergency Power Supply (EPS) Interface
e	Communication Interface		

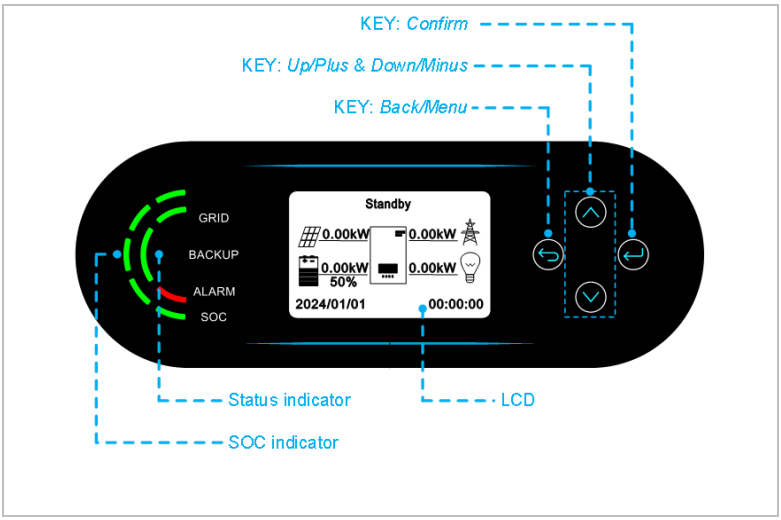
⚠ CAUTION

- Please ensure that the cables are correctly connected to their respective sockets. Incorrect connections may result in the AC battery not functioning properly or even causing irreversible damage.

⚠ CAUTION

- Damaged during transportation.
- Please check product packaging and interfaces carefully before installation;

3.4 Human machine interface



3.4.1 LCD and keys

The LCD shows the energy flow of the photovoltaic energy storage system and can also be used with keys to enter the menu page for a series of settings.

Press “Back/Menu” to the previous screen or enter the setting menu.

Press “Up/Plus” to the upper menu option or value plus 1.

Press “Down/Minus” to the lower menu option or value minus 1.

Press “Confirm” to select the current menu option or switch to the next digit.

3.4.2 LED indicators

There are two types of indicator LEDs on this product: system status LEDs and battery State of Charge (SOC) indicator LEDs.

The relevant indicator LED display instructions are shown in the table below.

Table 3-3 Table System status indicator display description

LED / STATUS	Grid	Backup	Alarm
Standby detection	Flashing	Off	Off
On-Grid operation	On	Off	Off
Off-Grid operation	Off	On	Off
fault status	Off	Off	On
software upgrade	On	On	On

Table 3-4 Table System status indicator display description

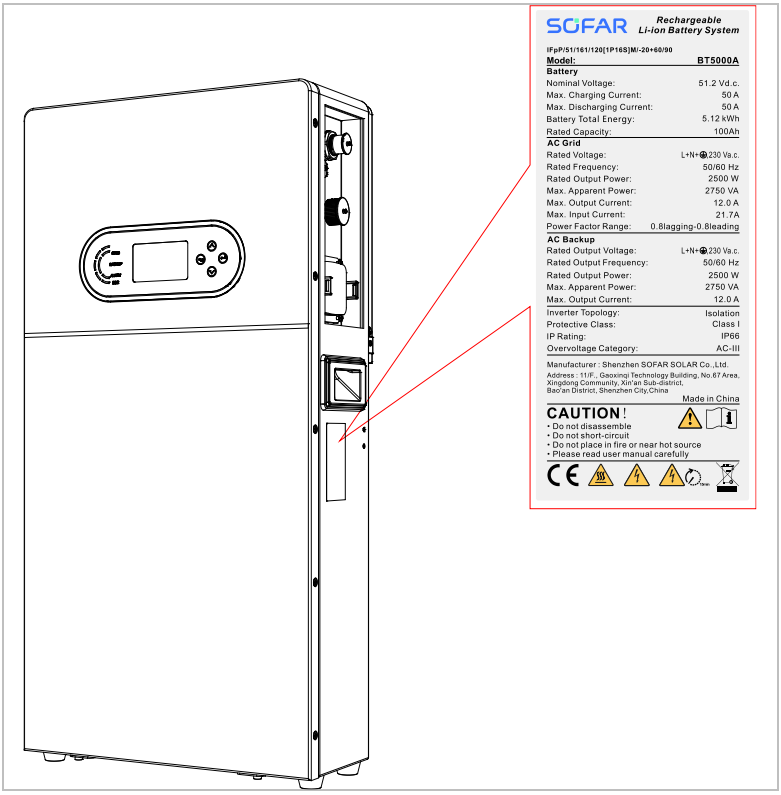
Discharge status battery indicator					
LED / Definition	L1	L2	L3	L4	L5
SOC<5%	OFF	OFF	OFF	OFF	OFF
5% ⩽ SOC<20%	ON	OFF	OFF	OFF	OFF
20% ⩽ SOC<40%	ON	ON	OFF	OFF	OFF
40% ⩽ SOC<60%	ON	ON	ON	OFF	OFF
60% ⩽ SOC<80%	ON	ON	ON	ON	OFF
80% ⩽ SOC	ON	ON	ON	ON	ON

Charge status battery indicator light					
LED / Definition	L1	L2	L3	L4	L5
SOC<20%	0.5s Flashing	OFF	OFF	OFF	OFF
20% ⩽ SOC<40%	ON	0.5s Flashing	OFF	OFF	OFF
40% ⩽ SOC<60%	ON	ON	0.5s Flashing	OFF	OFF
60% ⩽ SOC<80%	ON	ON	ON	0.5s Flashing	OFF

80% ⩽ SOC	ON	ON	ON	ON	0.5s Flashing

3.5 Label

Labels must not be covered or removed.



NOTE

- Voiding of guarantee
- Do not open the AC battery or remove any of the labels. Otherwise, SOFAR shall assume no guarantee.

3.6 Features

Integrated design of battery module, BMS, and PCS with prefabricated wiring, featuring small size, light weight, and easy installation.

Cell-level passive balancing + Pack-level active balancing, intelligent operation and maintenance, and flexible expansion.

Supports up to 200% discharge overload.

Supports the maximum operating ambient temperature of 50℃, IP66 protection level.

Supports current transformer (CT) or electricity meter connection and has anti-backflow function.

Supports on-grid and off-grid switching.

Supports intelligent load management. When the battery is full, excess photovoltaic energy is supplied to the heater or other intelligent loads.

Supports the diesel generator to be connected to the residential energy management system, automatically starts the diesel generator to charge the battery when the battery power is low.

4 Product Installation

4.1 Installation information

DANGER

- Fire hazard
- Do NOT install the AC battery on flammable materials.
- Do NOT install the AC battery in areas where flammable or explosive materials are stored.

CAUTION

Burning hazard

- Do NOT install the AC battery in places where it can be accidentally touched. The housing and heat sink may become very hot while the AC battery is operating.

ATTENTION

Weight of the device.

- Consider the weight of the AC battery when transporting and moving it.
- Choose a suitable position and surface for installation.
- Commission a minimum of two persons for the installation of the AC battery.
- Do not set down the AC battery overhead.

4.2 Installation process

The installation procedures are as follows:

Check the AC battery before installation (see section 4.3 for details).

Prepare installation tools (see section 4.4 for details).

Select the installation position (see section 4.5 and 4.6 for details).

Install the AC battery (see section 4.7 and 4.8 for details).

4.3 Pre-installation inspection

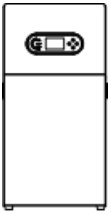
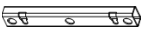
4.3.1 Outer packaging inspection

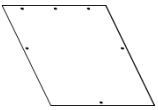
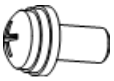
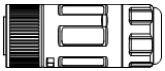
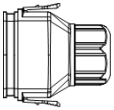
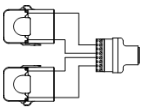
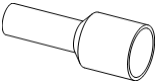
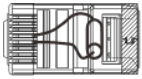
Before unpacking the AC battery, please check the outer packaging for any damage that may have occurred during transport, such as holes, cracks, or other signs of possible internal damage. If you find any packaging abnormality, please do not open it and contact your dealer immediately.

If the installation is not carried out immediately after the inspection, the packaging must be restored to its original state before storage, and only remove it within 24 hours prior to installation.

4.3.2 Component list inspection

After unpacking the AC battery, please check whether the delivery is complete and whether there is any damage. If any component is missing or damaged, please contact your dealer.

Product and accompanying documents			
 Battery module×1	 Quality certificate ×1	 Quick Installation guide ×1	 Warranty card ×1
Installation and fixing			
 Anti-tip bracket A ×2	 Anti-tip bracket B ×2	 Wall bracket ×1	 Support bracket ×1

 Positioning plate ×1	 M8*80 Expansion bolt ×4	 M4*10 SEMS screw ×4	 M6*14 Hexagonal screw ×3
 M10 Step Bolt ×2	 M5*12 Hexagonal screw ×3		
Electrical connection			
 Grid connector ×1 (With Hex key:2mm)	 EPS/Backup connector ×1 (With Hex key:2mm)	 Waterproof cover ×1	 CT kit×1
 Power cable terminal ×6	 CT kit communication cable (10m) ×1	RS-485 communication cable (10m) ×1	 Parallel operating communication cable (2.8m) ×1
 Terminal resistance for parallel operating ×1	Wire tie ×10	 Data logger	

4.3.3 Appearance and interface inspection

Before installing the AC battery, please carefully check the appearance and the interfaces of the AC battery. If you find any abnormality in the appearance or the interfaces, do not install it and contact your dealer immediately.

⚠ CAUTION

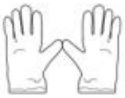
Damage during transport.

- Please check the product packaging and connections carefully prior to installation.

4.4 Installation tools

To install the AC battery, the installation tools that customers need to prepare are shown in the table below:

No.	Tool	Model	Function
01		Hammer drill Recommended drill diameter: 8mm	Used to drill holes in walls.
02		Slotted screwdriver Recommended size: 3mm	For Wiring
03		Phillips screwdriver	For mounting brackets and wiring
04		Rubber hammer	For installation of expansion bolt.
05		Wire stripper	For stripping wires
06		Sleeve	For mounting bracket
07		Crimping tool	For crimping OT connectors
08		Crimping tool	For crimping AC cable terminal

No.	Tool	Model	Function
09		Heat gun	For coating
10		Multimeter	For checking wiring and grounding
11		Marker	For marking
12		Tape measure	For measuring distance
13		Spirit level	For aligning wall brackets
14		Anti-static gloves	For installation
15		Protection goggle	For installation
16		Dust respirator mask	For installation

4.5 Installation environment requirements

Ambient temperature range: -10℃~+50℃.

Relative humidity: 5%~95% (non-condensing).

Maximum height: 4000m (IEC).

Pollution level: 3.

The AC battery should be installed in a dry and well-ventilated area to ensure good heat dissipation.

The installation position must be far away from water sources such as taps, sewer pipes, and sprinklers.

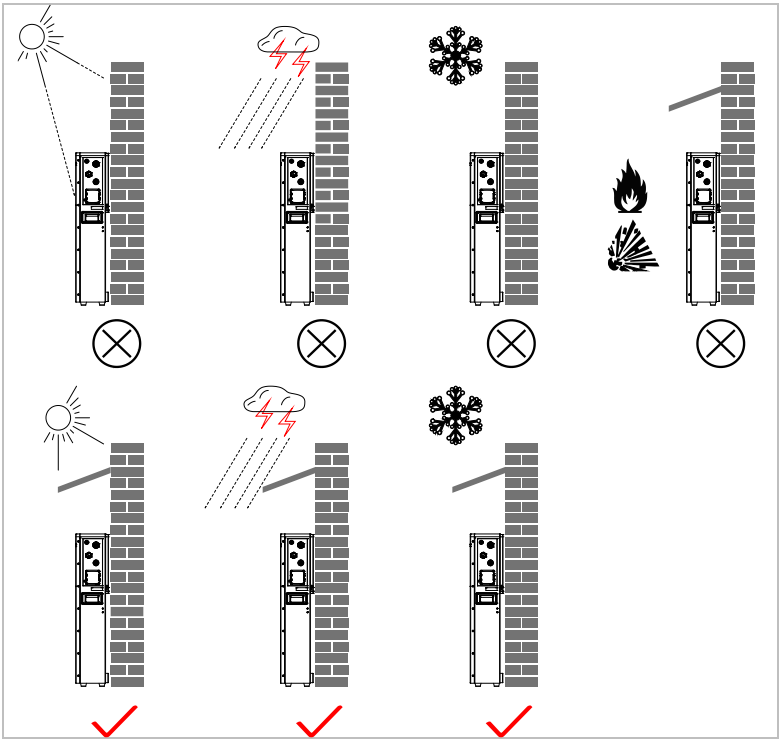
Install the AC battery in a clean environment that is free from sources of strong infrared radiation, organic solvents, and corrosive gases. Avoid exposing the AC battery to direct sunlight or water.

The installation position must be far away from fire sources.

Do not install the AC battery near flammable and explosive materials.

Install the AC battery in a sheltered place or install an awning over it.

The AC battery must be installed on a solid and flat supporting surface.



⚠ WARNING

- To prevent fire due to high temperature, ensure that the ventilation vents or heat dissipation system are not blocked when the battery is running.
- Do not expose the battery to flammable or explosive gas or smoke. Do not perform any operation on the battery in such environments.

⚠ CAUTION

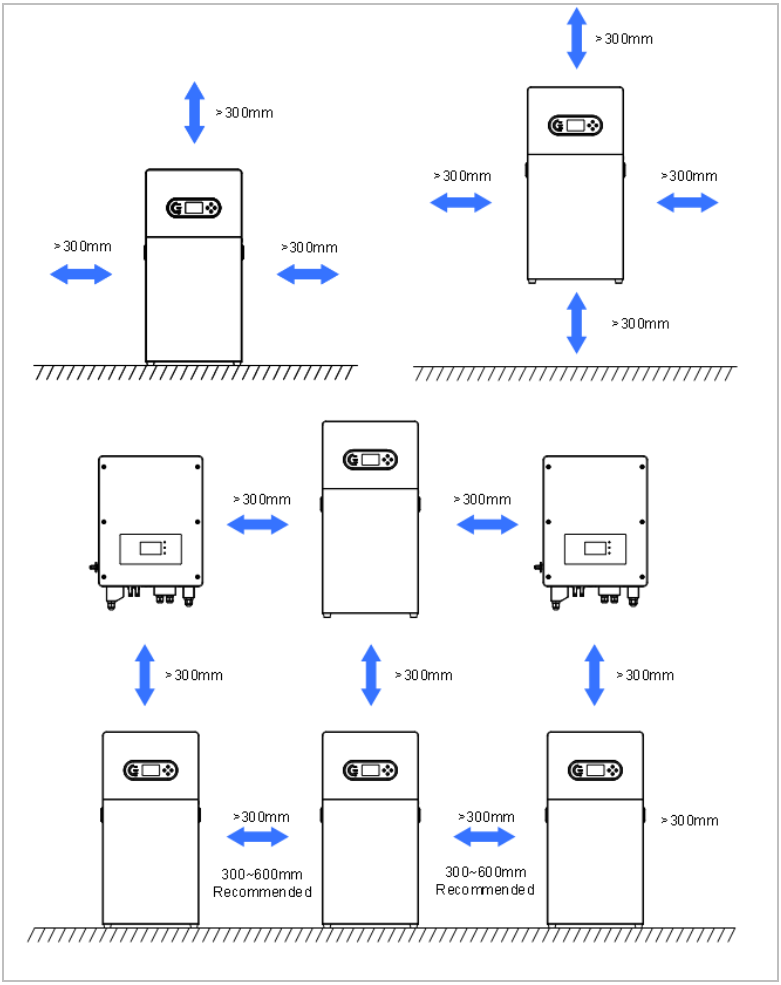
- The battery system site must be equipped with qualified fire extinguishing facilities, such as fire extinguishing sands and powder fire extinguishers.

4.6 Installation spacing requirements

⚠ CAUTION

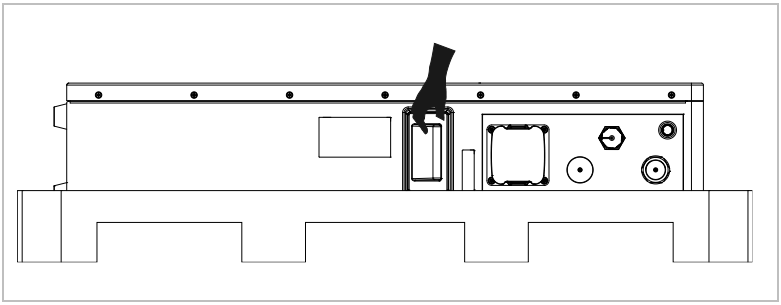
Installation distance

- Please strictly follow the installation spacing requirements.

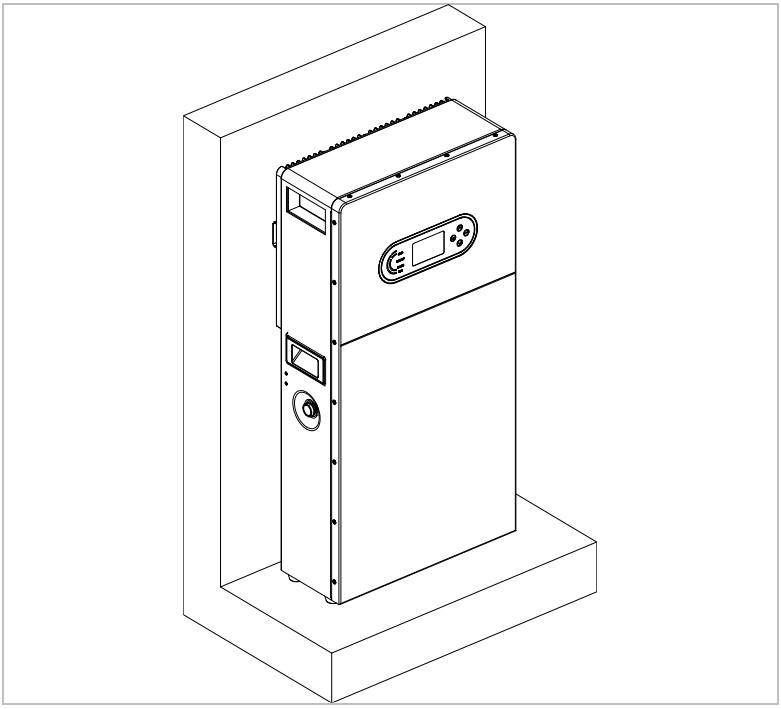


4.7 Unpack the AC battery

Step 1: Open the package and grasp the handles on both sides of the AC battery.



Step 2: Take the AC battery out of the package and move it to the installation position.



ATTENTION

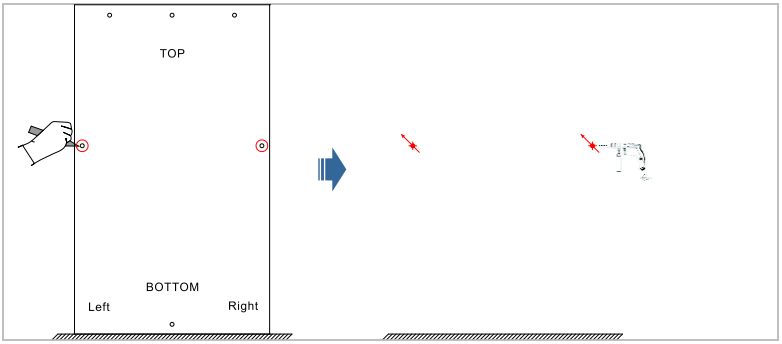
Mechanical damage

- To prevent injury and damage to the device, ensure that the AC battery is kept balanced while it is being moved - it is very heavy.

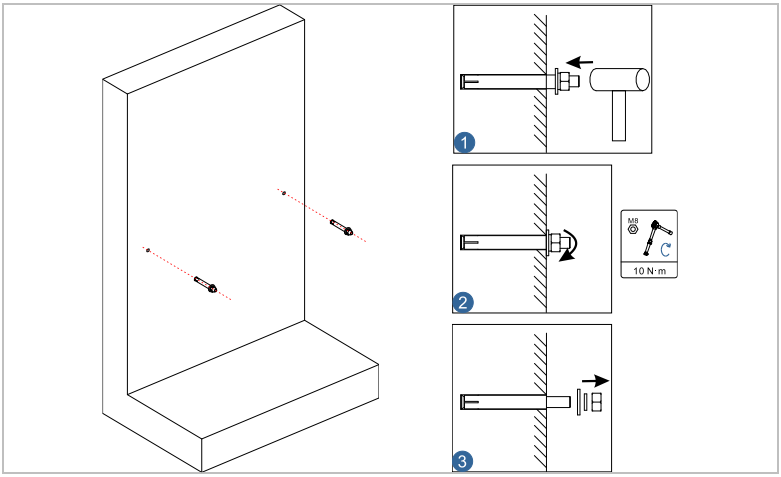
4.8 AC battery installation

4.8.1 Floor installation

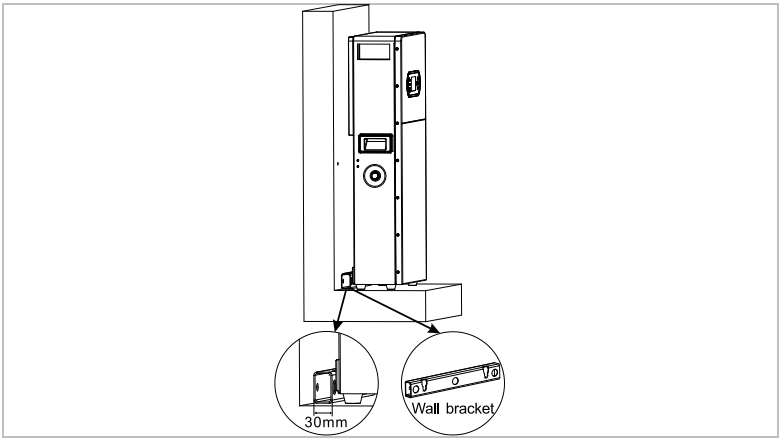
Step 1: Determine the drilling position (size: ø10, depth: 80-85mm) by the positioning plate, then mark the hole position with a marker, and drill the hole in the wall with a hammer drill. When drilling, the drill bit should be perpendicular to the wall and should not shake it to avoid damaging the wall. If the marking point is wrong, it needs to be repositioned.



Step 2: Knock in the expansion bolts, as shown in the diagram below.

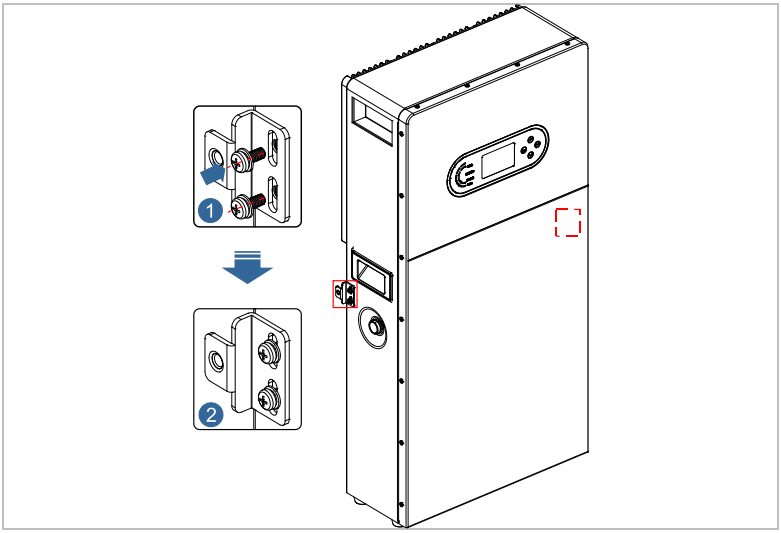


Step 3: Place the AC battery at the designated installation position and keep the back of the AC battery 25-35mm away from the wall..

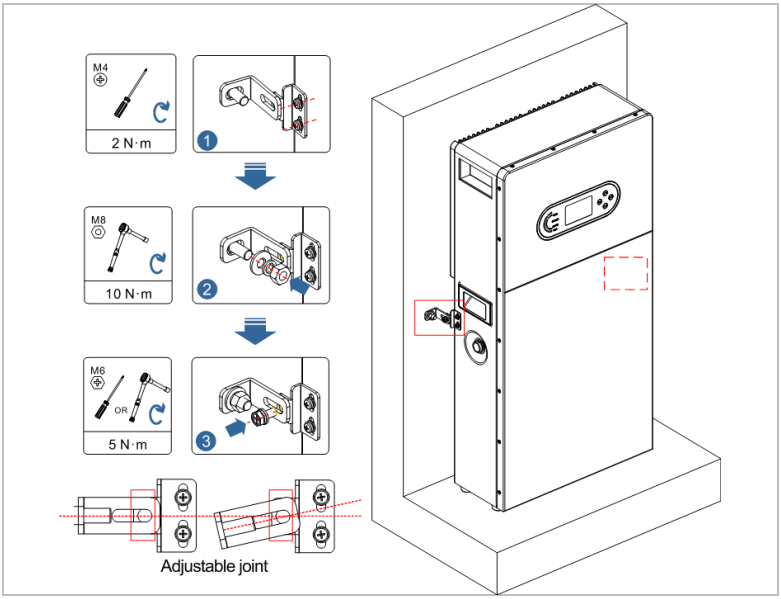


Step 4: Install the anti-tip bracket.

1. Install anti-tip bracket A to the AC battery (Screw the M4 screws to the screw holes but do NOT lock them).



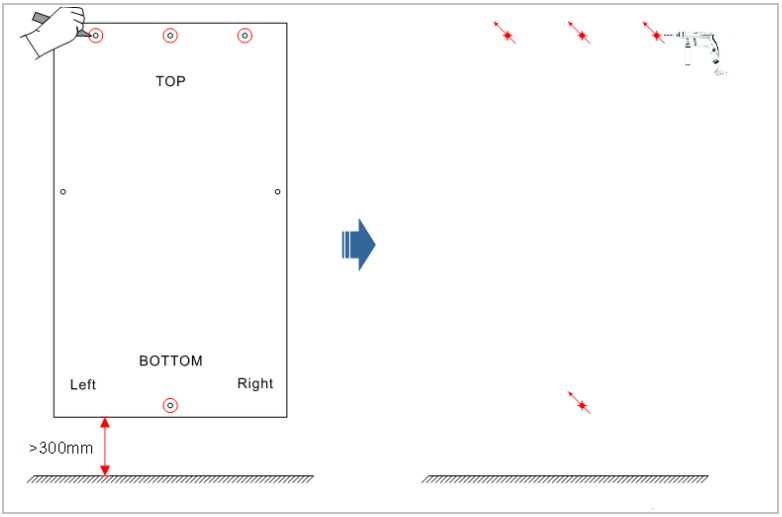
2. Adjust the height of bracket A to ensure that bracket A and bracket B are at the same height when the bolts are perpendicular to the wall. Tighten the M4 screw on bracket A, and then tighten the nut on the bolt, finally tighten the M6 screw at the joint between bracket A and bracket B.



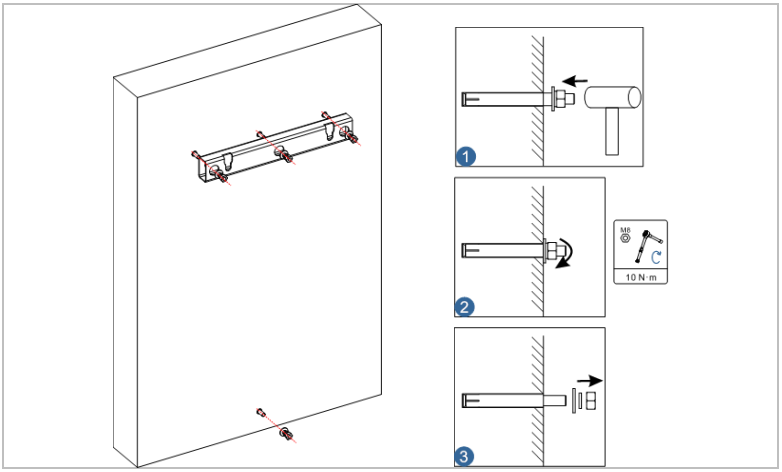
When the bolt is not strictly perpendicular to the wall surface, the back surface of the AC battery can still be parallel to the wall surface by adjusting the adjustable joint of the bracket A and the bracket B.

4.8.2 Wall mounting

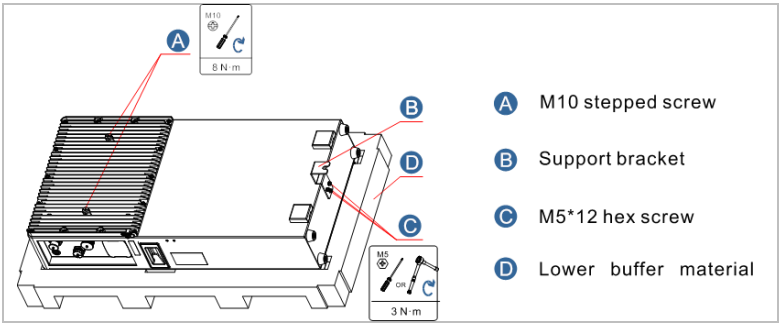
Step 1: Determine the drilling position (size: ø10, depth: 80-85mm) by the positioning plate, then mark the hole position with a marker, and drill the hole in the wall with a hammer drill. When drilling, the drill bit should be perpendicular to the wall and should not shake to avoid damaging the wall. If the marking point is wrong, it needs to be repositioned.



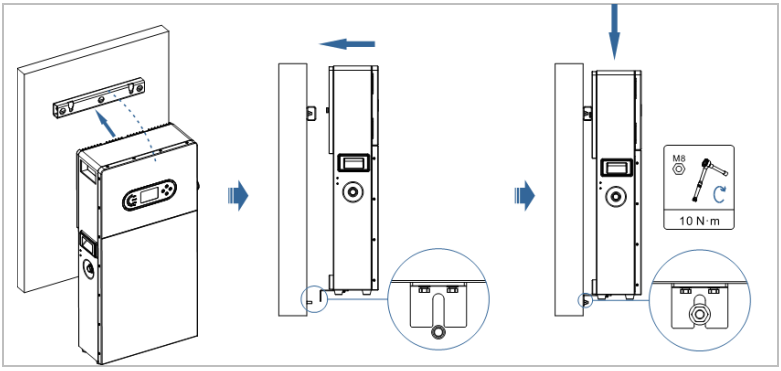
Step 2: Secure the wall bracket with expansion bolts.



Step 3: Install the step screws on the radiator and secure the support bracket with external hexagonal screws.



Step 4: Place the step screws of the AC battery on the wall mount and tighten the fixing screws to ensure safety.



5 Electrical connections

5.1 Safety instructions

DANGER

- Dangerous AC voltage
- Before making electrical connections, make sure the AC battery is powered off or in shutdown mode.

ATTENTION

Qualification

- The installation and maintenance of the AC battery must be performed by trained electrician.

NOTE

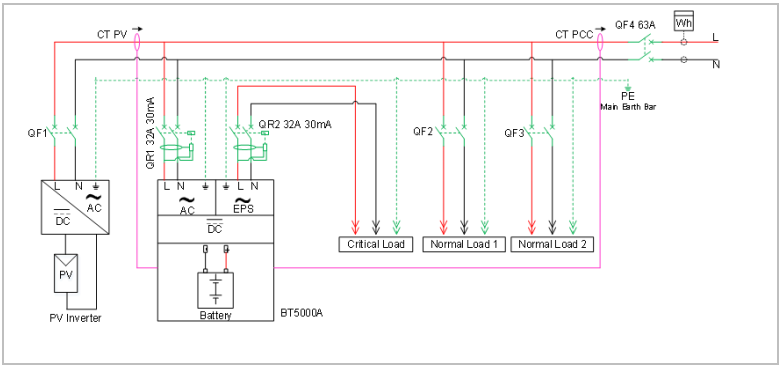
- Voiding of guarantee
- Product damage caused by operator wiring errors is not covered by the product guarantee.

5.2 Overview

The electrical connections are made as follows:

1. Connect the PE cable (see section 5.3 for details);
2. Connect the AC cable (see section 5.4 for details);
3. Connect the signal cable (see section 5.5 for details).
4. Connect to SOFAR Cloud/APP (see section 5.6 for details).

The distribution wiring diagram with EPS mode enabled is shown as follows. The output port of the AC battery needs to be connected to a residual current protection device (RCD) with an operating current of at least 30mA.



CAUTION

- The On-Grid port and Backup/EPS port of the AC battery must be connected to at least a breaker and a residual current device (RCD) with an operating current of at least 30mA before it can be connected to the power grid.

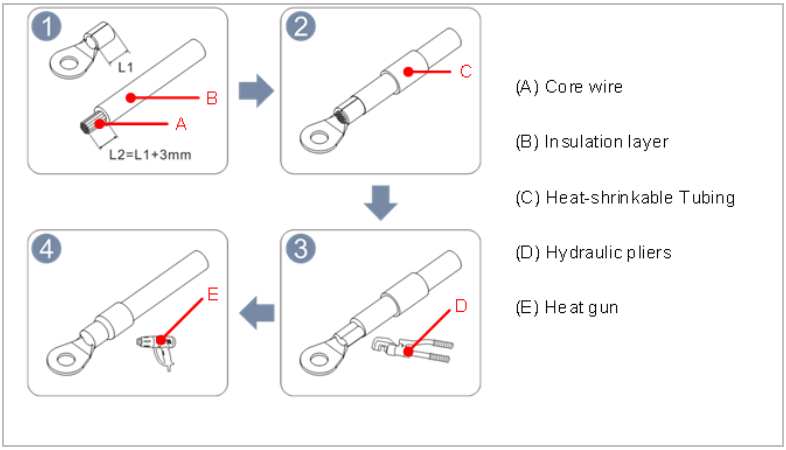
5.3 Connect the PE cable

DANGER

- Dangerous AC voltage
- Ensure that the PE cable is securely connected. Otherwise, electric shocks may occur.

Please follow the steps and diagram below:

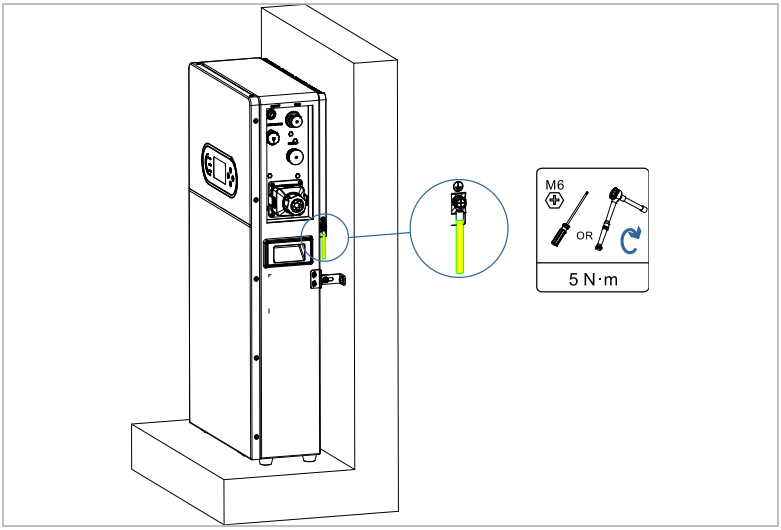
Step 1: Crimp the OT terminal as shown below.



ATTENTION

- Avoid scratching the cable core when stripping.
- The grounding wire length requirement is 4mm2 ~ 6mm2 to meet the requirements for outdoor use.
- The cavity created by crimping the terminal should be completely covered by the wire core, and the wire core should be tightly bonded to the terminal without any looseness.
- The tensile force after crimping should comply with the requirements of UL486A and UL310.

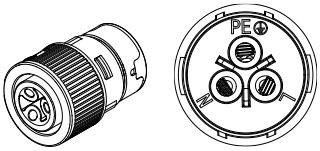
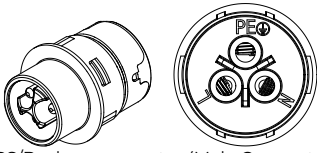
Step 2: Connect the grounding wire from the left side of the AC battery to the system ground, as shown in the diagram below.



5.4 Connect the AC cable

The AC cable is used to connect the AC battery to the load (through the EPS interface) or the grid. Please follow the instructions in the following sections for the assembly and connection of the AC cable.

5.4.1 AC connectors overview

Components	Cable types
 On-Grid connector (Female Connector)	Outdoor multi-core copper cable. Recommended: 4mm2 (12AWG) Min-Max: 2.5-6mm2 (14-10AWG)
 EPS/Backup connector (Male Connector)	Outdoor multi-core copper cable. Recommended: 4mm2 (12AWG) Min-Max: 2.5-6mm2 (14-10AWG

DANGER

- When connecting the cable, be sure to connect the live wire, neutral wire, and earth wire to L, N, and PE respectively.

CAUTION

AC connection

- Each AC battery must have its own breaker.
- AC disconnect devices must be easily accessible.

NOTE

- Please install external breakers in accordance with relevant national regulations!

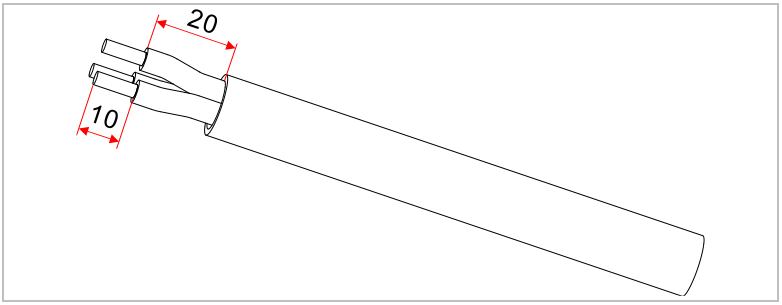
NOTE

- The cross-sectional area of a 4mm2 cable is sufficient for general applications. But if the cable is too long (>80 meter), it is recommended to use a thicker one to reduce voltage drops and power losses.

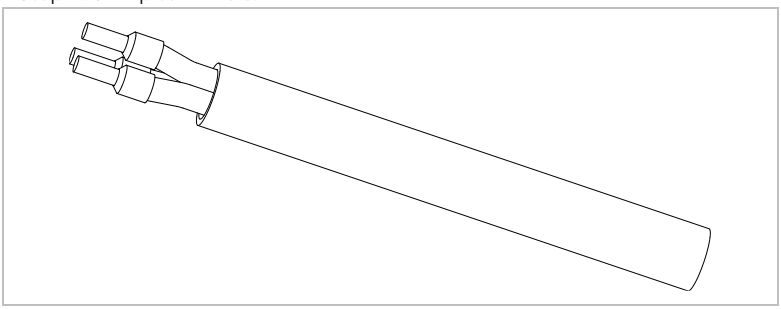
5.4.2 Assemble the AC connector

Please follow the steps and diagrams below:

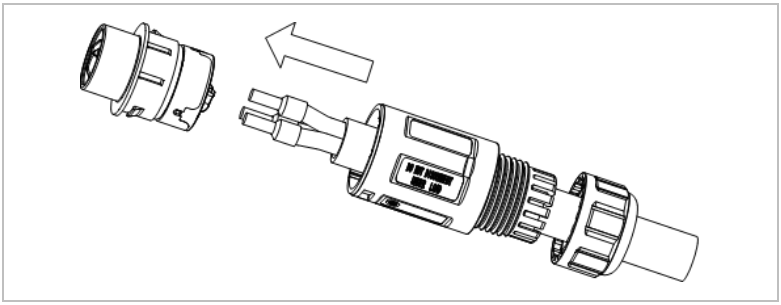
Step 1: Choose the appropriate cable based on the diagram above. Use wire strippers to remove the insulation layer of the AC output cable as shown below:



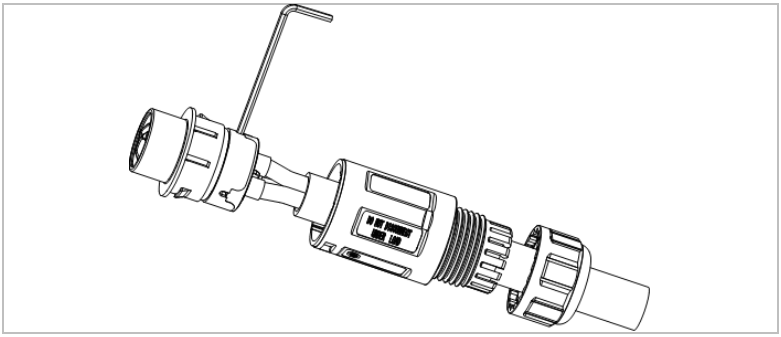
Step 2: Crimp terminals.



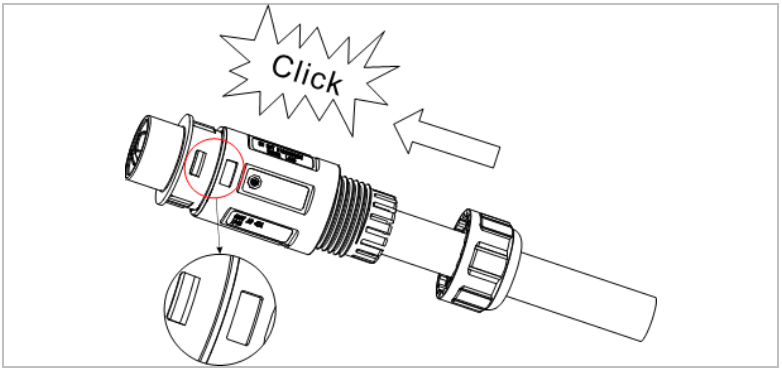
Step 3: Plug the cable into the corresponding terminal.



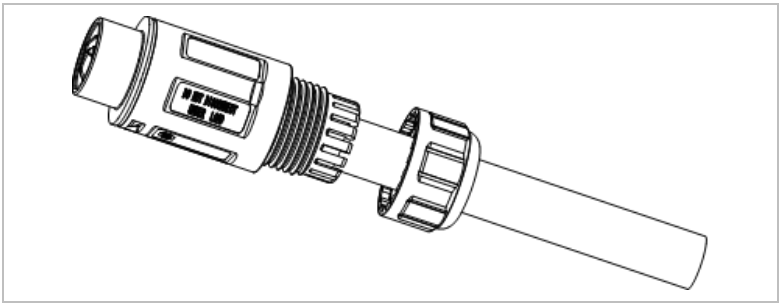
Step 4: Use a hex key to crimp the cable and tighten the screw (1.1-1.3N • m).



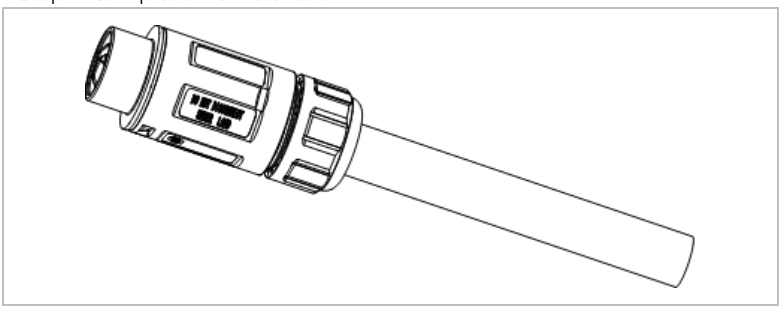
Step 5: Insert the main body into the corresponding clip and hear a "click" sound.



Step 6: Screw the locking nut into the main body (2-3N • m).



Step 7: Complete the installation.

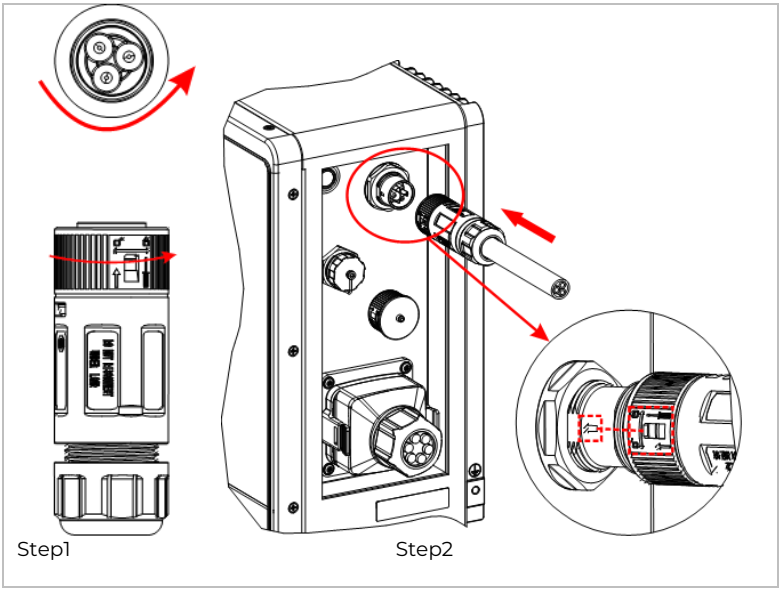


5.4.3 AC grid connection

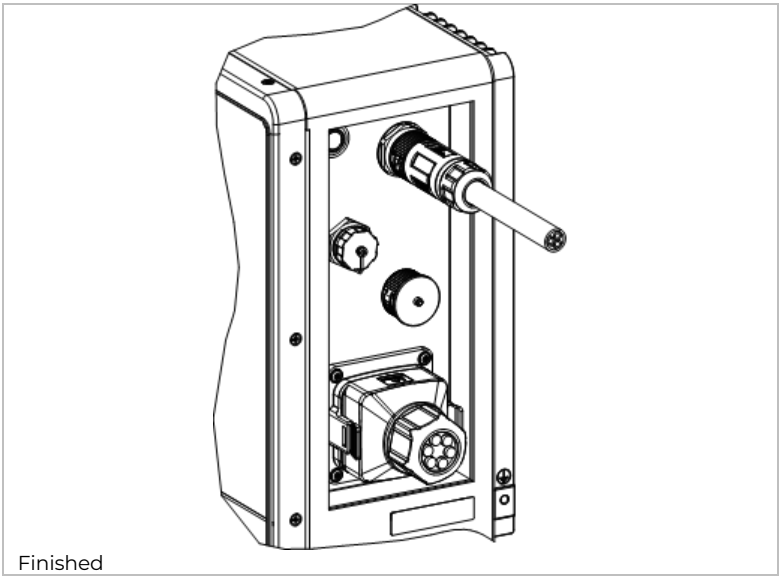
CAUTION

- The On-Grid port and Backup/EPS port of the AC battery must be connected to at least a breaker and a residual current device (RCD) with an operating current of at least 30mA before it can be connected to the power grid.

Step 1: Turn the latch of AC connector made in section 5.4.2 counterclockwise to locking state.



Step 2: Insert the AC connector made in section 5.4.2 into the On-Grid interface of the AC battery (make sure that the arrows shown in the two red boxes in STEP2 in the following figure are aligned).



Finished

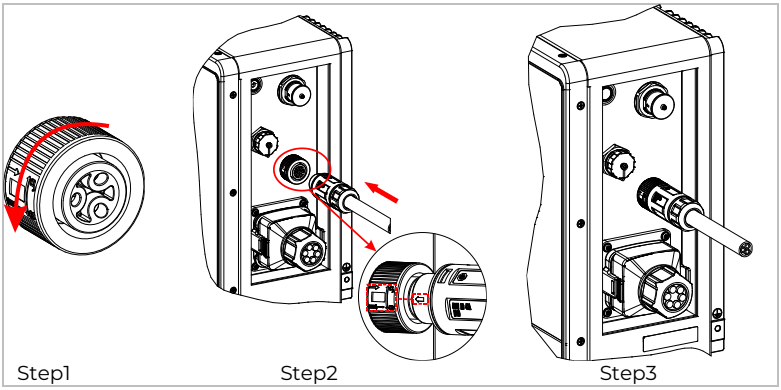
5.4.4 EPS connection

CAUTION

- The On-Grid port and Backup/EPS port of the AC battery must be connected to at least a breaker and a residual current device (RCD) with an operating current of at least 30mA before it can be connected to the power grid.

Step 1: Turn the latch of EPS interface counterclockwise to locking state.

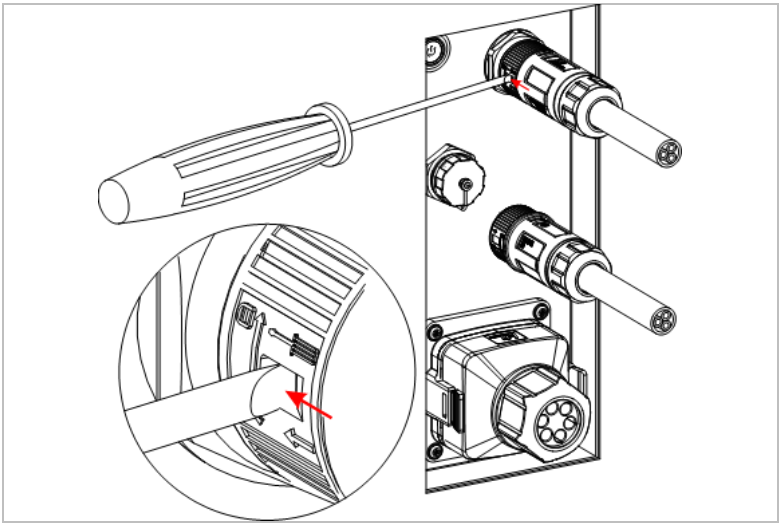
Step 2: Insert the AC connector made in section 5.4.2 into the EPS interface of the AC battery (make sure that the arrows shown in the two red boxes in Step2 in the following figure are aligned).



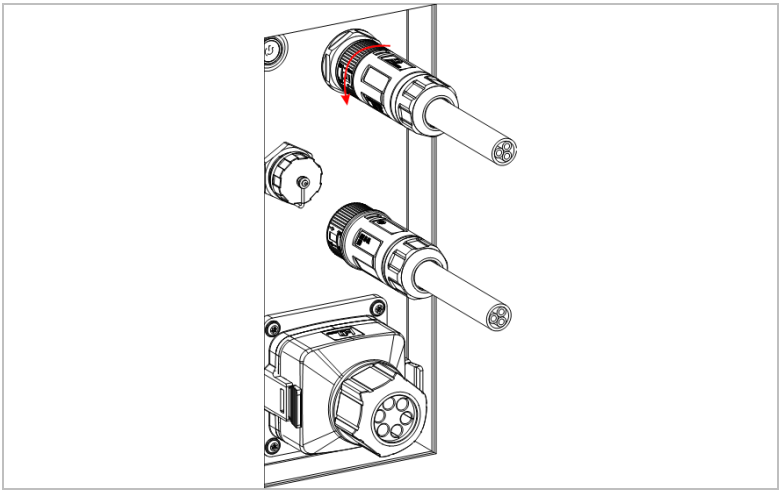
5.4.5 Unlock instruction

- **On-grid interface**

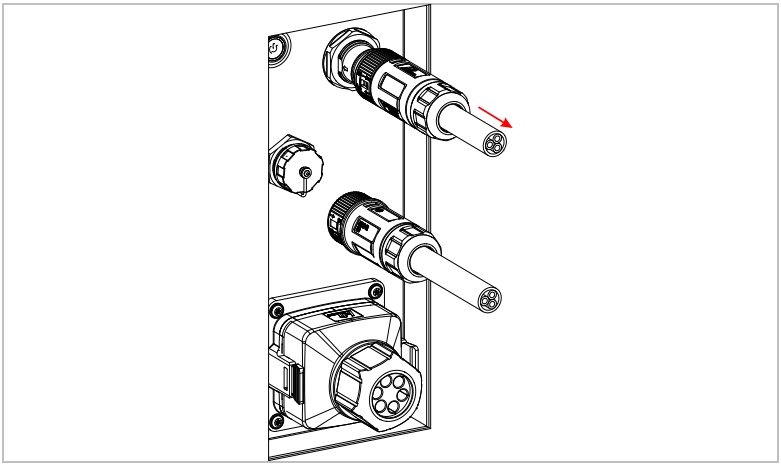
  Step 1: Use the flat head screwdriver to turn the locking mechanism in the direction indicated in the diagram.



Step 2: Rotate the latch counterclockwise to unlock state.

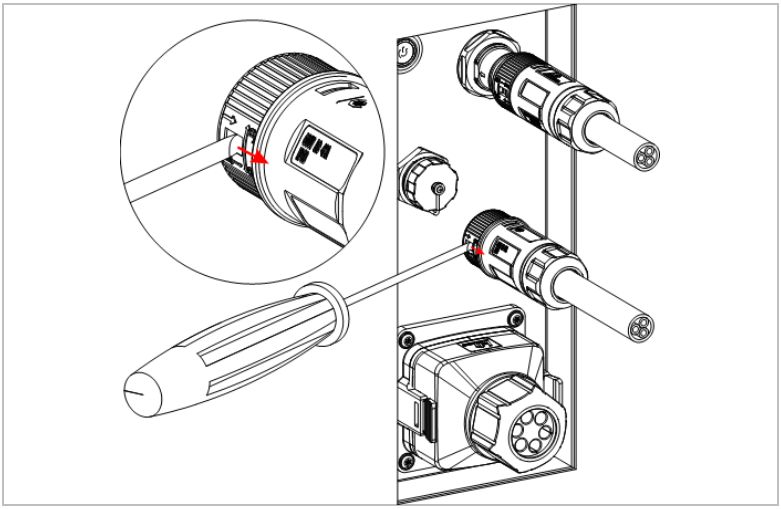


Step 3: Unplug the on-grid cable.

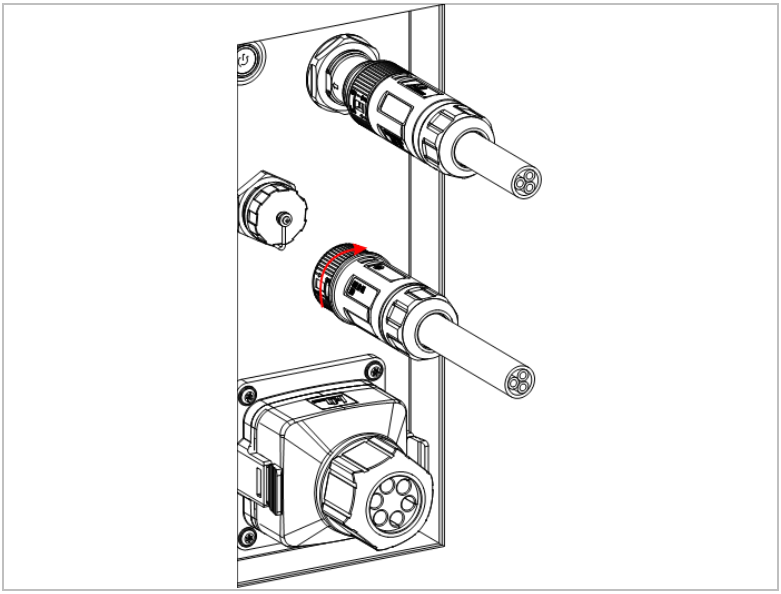


- **EPS interface**

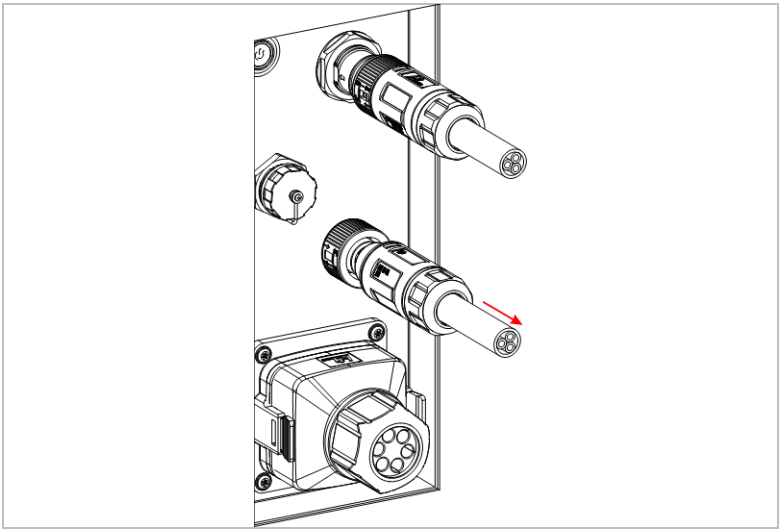
  Step 1: Use the flat head screwdriver to turn the locking mechanism in the direction indicated in the diagram.



Step 2: Rotate the latch clockwise to unlock state.



Step 3: Unplug the EPS cable.



5.5 Connect the signal cable

⚠ CAUTION

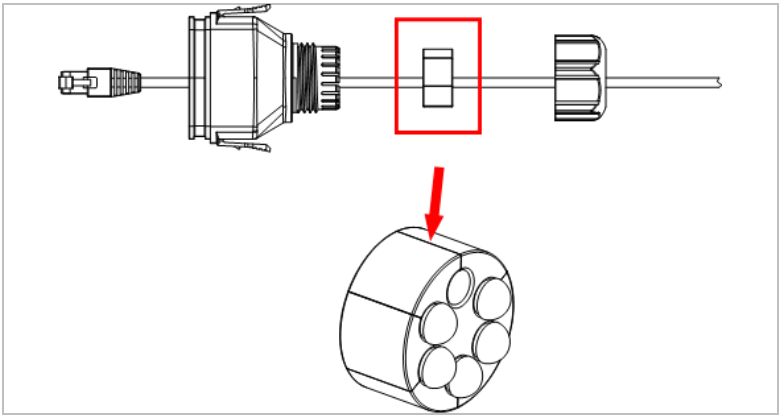
- Please ensure that the cables are correctly connected to their respective sockets. Incorrect connections may result in the AC battery not functioning properly or even causing irreversible damage.

5.5.1 Installation guide on battery side

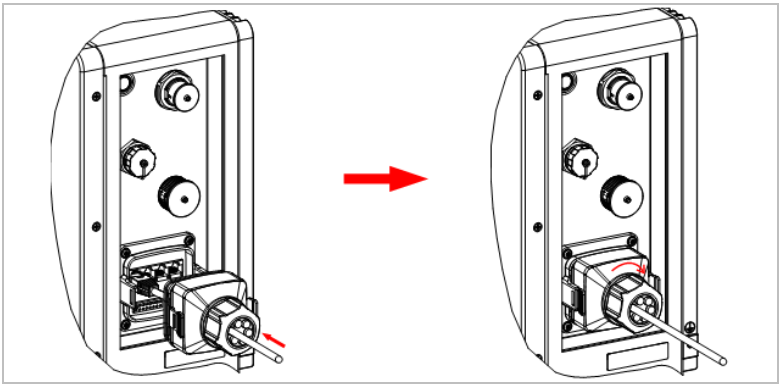
Step 1: Disassemble the waterproof cover as shown below. Pass the cable through the waterproof cover.

Each hole in the waterproof plug is preset with a plug. When installing, the plug needs to be taken out first and then the cable is inserted into the waterproof plug from the position indicated by the red arrow as shown in the figure below.

Please tighten the waterproof cover after the cable is successfully plugged in, otherwise tightening the waterproof cover first will cause difficulties in plugging.



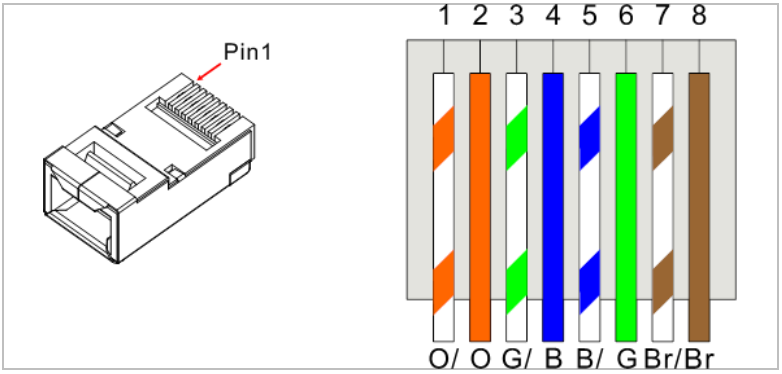
Step 2: Insert the RJ45 plug or the DI/DO terminal into the corresponding socket and turn the locking connector of the waterproof cover clockwise.



5.5.2 RS-485

- **Description**

  Users can remotely monitor the battery via RS-485 communication. It is recommended to connect a 120-ohm terminal resistor at the host side of the communication bus to improve communication quality and resistance to interference. The pin definitions of the connector are shown in the diagram and table below.

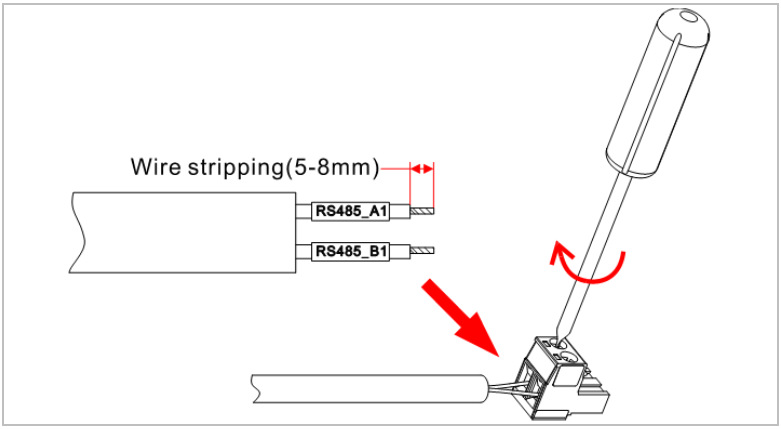


Pin	Wire color	definition
1	Orange and White	RS485_A1
2	Orange	RS485_B1
3	Green and White	\
4	Blue	Reserved
5	Blue and White	Reserved
6	Green	\
7	Brown and White	\
8	Brown	\

- **Installation guide**

  Step 1: Connect the RS-485 communication cable of the battery side by referring section 5.5.1.

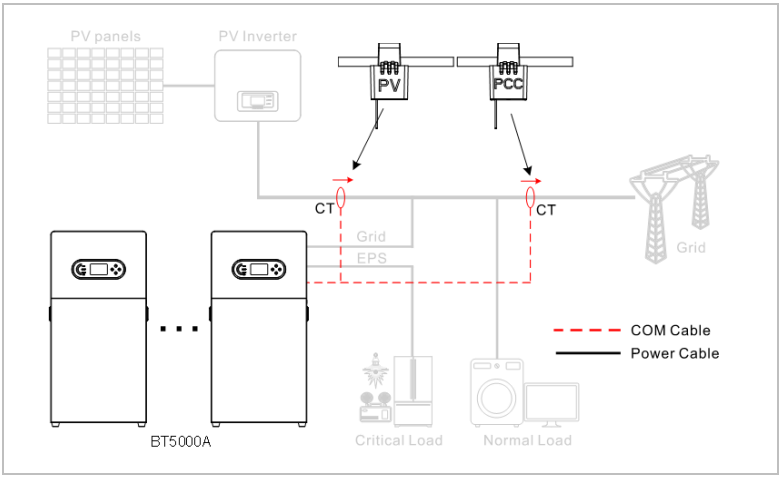
  Step 2: Connect the other end of the RS-485 communication cable to the port of the host device.



5.5.3 Meter /CT

- **Description**

It is essential to configure current detection at the output of the photovoltaic inverter and at the grid access point to achieve the full functionality of the AC battery. And if you don't have any photovoltaic inverter installed, you only need one current detection for the connection to the grid access point.



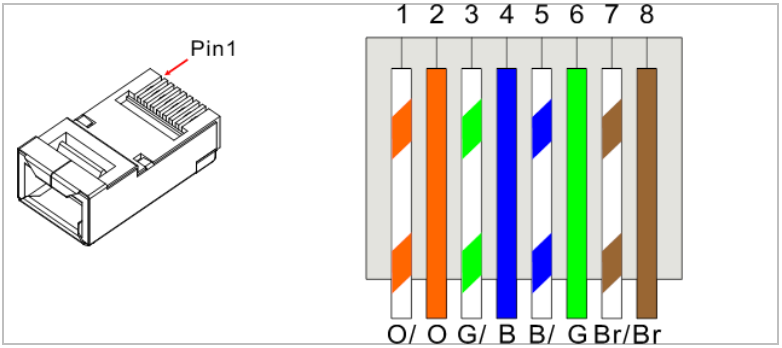
CAUTION

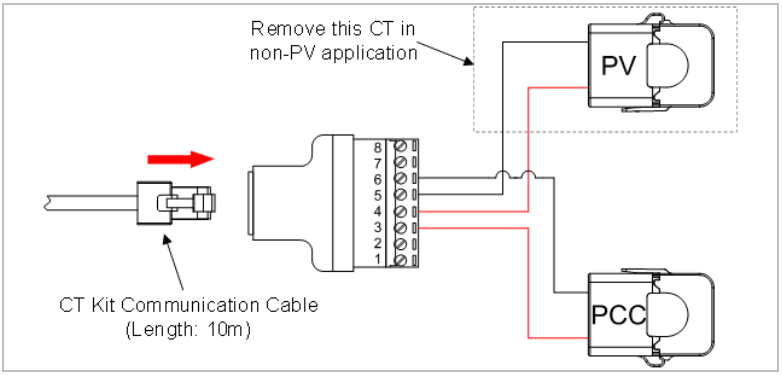
- Users can choose different CTs based on the installation, but the secondary current shall not exceed 40mA.

ATTENTION

- The CTs must be installed in specified positions, otherwise, the AC battery will either fail to operate or operate abnormally.

Please see the table below for specific pin connections.



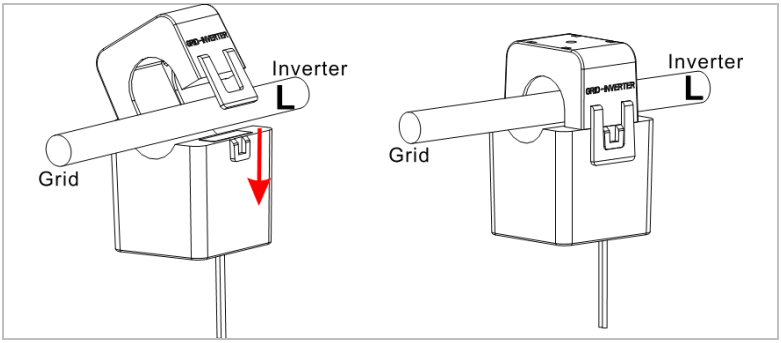


Pin	Wire color	Definition
1	Orange and White	METER_RS485_A
2	Orange	METER_RS485_B
3	Green and White	CT_PCC+
4	Blue	CT_PV+
5	Blue and White	CT_PV-
6	Green	CT_PCC-
7	Brown and White	\
8	Brown	\

If you use electricity meters, you need to purchase them separately. The AC battery communicates with the electricity meters via RS-485 to obtain data, and you need to connect the RS-485 communication interface of the electricity meter to pins #1 and #2 of the AC battery's RS-485 interface.

- **Installation guide**

Step 1: Open the CT clamp, place the live or phase wire into it, and then close the clamp again. However, it is important to pay attention to the direction of the CT and ensure that it aligns with the direction indicated on the label:
For the CT at PCC, the side with "INVERTER" printed on it should face towards the indoor distribution, while the side with "GRID" printed on it should face towards the external grid, with the arrow pointing from indoor equipment towards the external grid.
For the CT at the PV, the side with " INVERTER" printed on it should face towards the photovoltaic inverter, while the side with " GRID" printed on it should face towards the indoor distribution, with the arrow pointing towards the output direction of the photovoltaic inverter.



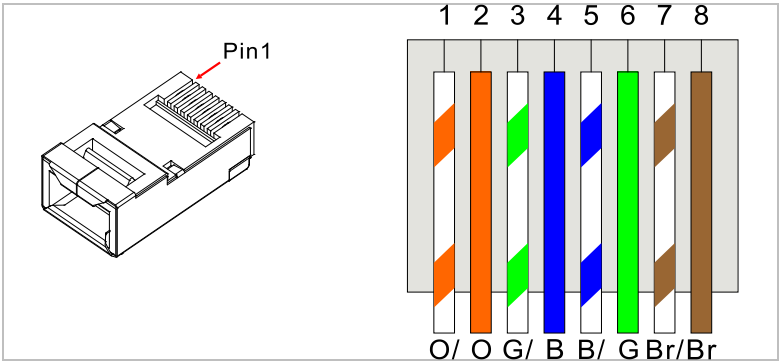
Step 2: Connect the CT kit communication cable of the battery side by referring section 5.5.1.

5.5.4 Link port

- **Description**

  In a system with multiple AC batteries in parallel, you should configure the AC batteries in master or slave mode. Only one battery can be configured as the master in one system, and the CTs or the meters must be connected to master battery for system control.

  The parallel AC batteries communicate with each other for data and commands via RS-485 and CAN, and the link cable provided with the AC battery is used specifically for this application. Connect the LP-OUT port of the master battery to the LP-IN port of the first slave battery using the link cable. Then, connect the LP-OUT port of the first slave battery to the LP-IN port of the second slave battery, and so on. Only up to six batteries are allowed to be connected in parallel.



LP-IN

Pin	Wire color	definition
1	Orange and White	RS485_A1
2	Orange	RS485_B1
3	Green and White	Reserved
4	Blue	CAN_H
5	Blue and White	CAN_L
6	Green	Reserved
7	Brown and White	Reserved
8	Brown	Reserved

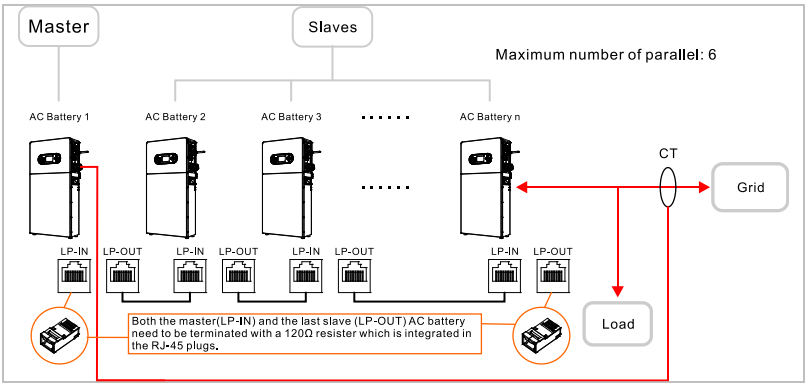
LP-OUT

Pin	Wire color	definition
1	Orange and White	RS485_A1
2	Orange	RS485_B1
3	Green and White	Reserved
4	Blue	CAN_H
5	Blue and White	CAN_L
6	Green	Reserved
7	Brown and White	Reserved
8	Brown	Reserved

To make the system more stable, it is necessary to terminate the communication. Both the master and the last slave AC battery need to be terminated with a 120Ω resister which is integrated in the RJ-45 plugs.

NOTE

- Both the master and the last slave AC battery need to be terminated with a 120Ω resister which is integrated in the RJ-45 plugs.
- Multiple AC batteries connected in parallel should use the same power model.



- **Installation guide**

For specific installation steps, refer to the installation steps in section 5.5.1.

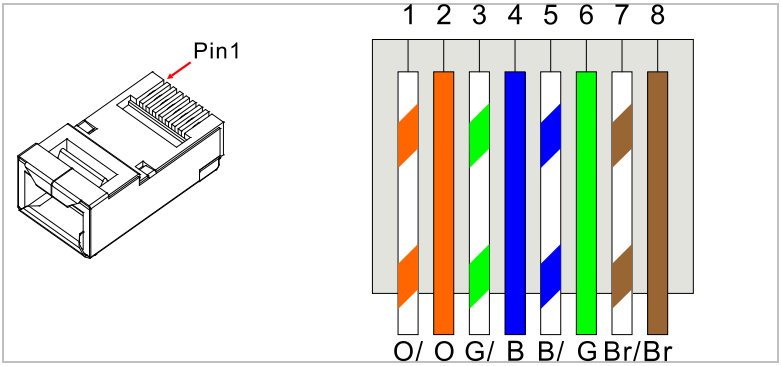
5.5.5 Installation guide

Inverter logic interfaces are used to control the AC battery via external signals, typically provided by grid operators via ripple control receivers or other means. Logic interface pins are defined according to different standard requirements.

- **AS/NZS 4777.2**

Logic interface for AS/NZS 4777.2, also known as inverter demand response modes (DRMs). The inverter will detect and initiate a response to all supported demand response commands within 2 s. The inverter will continue to respond while the mode remains asserted.

The specific pin's definition is shown below.



Pin	Wire color	definition
1	Orange and White	DRM1/5
2	Orange	DRM2/6
3	Green and White	DRM3/7
4	Blue	DRM4/8
5	Blue and White	RefGen
6	Green	DRM0
7	Brown and White	\
8	Brown	\

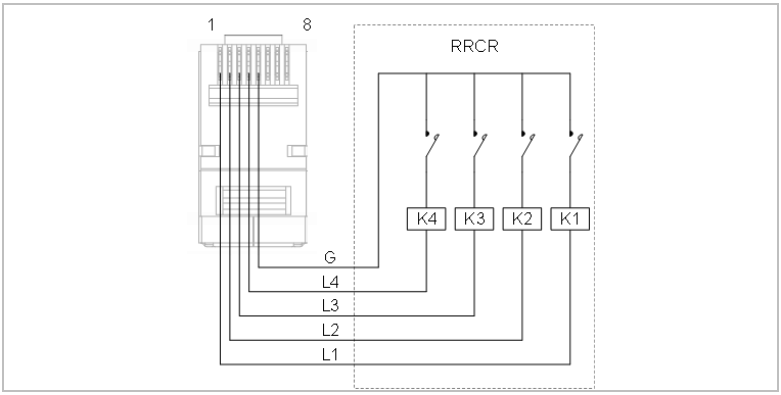
- **VDE-AR-N 4105**

Logic interface for VDE-AR-N 4105, is to control and/or limit the inverter's output power.

The inverter can be connected to a RRCR (Radio Ripple Control Receiver) to dynamically limit the output power of all the inverters in the installation.

The specific pin's description is shown below.

Pin	Name	Description	Connected to (RRCR)
1	L1	Relay contact 1 input	K1 - Relay 1 output
2	L2	Relay contact 2 input	K2 - Relay 2 output
3	L3	Relay contact 3 input	K3 - Relay 3 output
4	L4	Relay contact 4 input	K4 - Relay 4 output
5	G	GND	Relays common node
6	NC	Not Connected	Not Connected
7	NC	Not Connected	Not Connected
8	NC	Not Connected	Not Connected

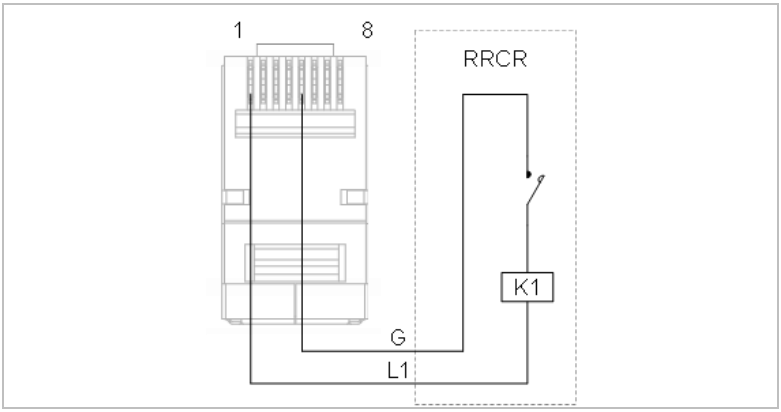


The inverter is pre-configured to the following RRCR power levels, where the relay status is closed as 1, and open as 0.

L1	L2	L3	L4	Active Power	Cos(φ)
1	0	0	0	0%	1
0	1	0	0	30%	1
0	0	1	0	60%	1
0	0	0	1	100%	1

- **EN50549-1**

Logic interface for EN50549-1, is to cease active power output within five seconds following an instruction being received at the input interface.



The specific pin's description is shown below.

Pin	Name	Description	Connected to (RRCR)
1	L1	Relay contact 1 input	K1 - Relay 1 output
2	NC	Not Connected	Not Connected
3	NC	Not Connected	Not Connected
4	NC	Not Connected	Not Connected
5	G	GND	Relays common node
6	NC	Not Connected	Not Connected
7	NC	Not Connected	Not Connected
8	NC	Not Connected	Not Connected

The inverter is pre-configured to the following RRCR power levels, where the relay status is closed as 1, and open as 0.

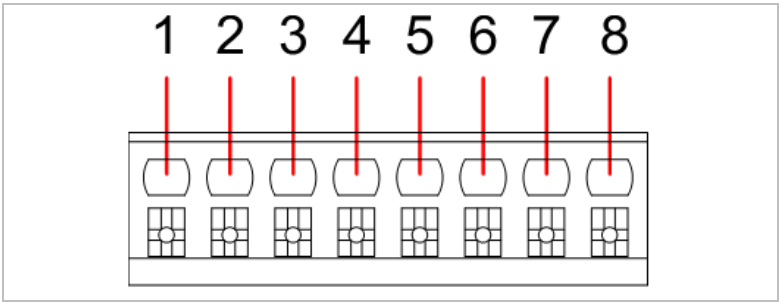
L1	Active Power	Power drop rate	Cos(φ)
1	0%	< 5 seconds	1
0	100%	/	1

- **Installation guide**

For specific installation steps, refer to the installation steps in section 5.5.1.

5.5.6 Dry contact

There are 2 output dry contacts and 2 input dry contacts available, respectively, for the control and detection of external devices, the specific function is shown in the table below.



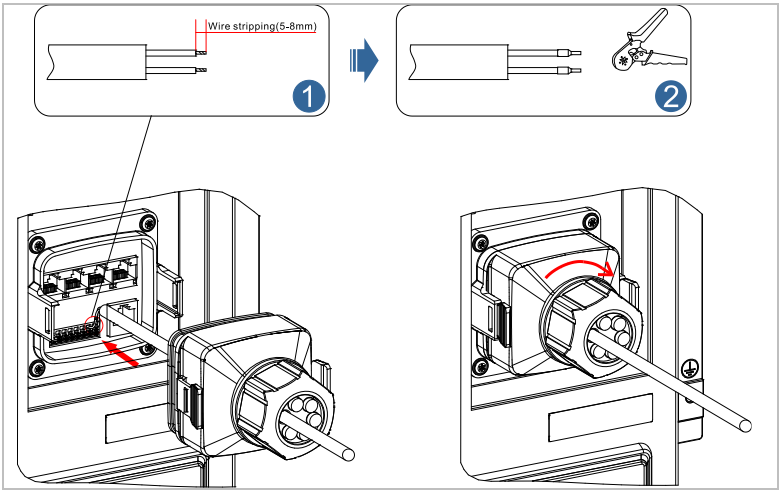
Dry contact channel	Pin	Function definition
Input dry contact 1	1-2	Automatic transfer switching (ATS) status signal input
Input dry contact 2	3-4	Emergency stop control signal input
Output dry contact 1	5-6	generator ON/OFF control signal output
Output dry contact 2	7-8	Smart Load ON/OFF control signal output

- **Installation guide**

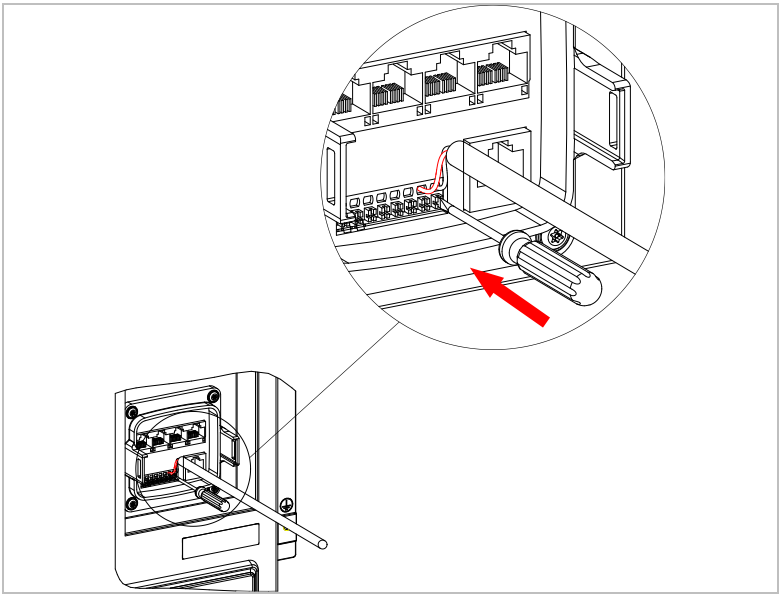
Step 1: Use wire strippers to remove the insulation layer of the dry contact communication cable.

Step 2: Crimp terminals.

Step 3: Plug the terminal into the corresponding socket and turn the locking connector of the waterproof cover clockwise. More detail can be referred to section 5.5.1.



- **Uninstallation guide**



Step 1: Turn the locking connector of the waterproof cover counterclockwise to unlock the waterproof.

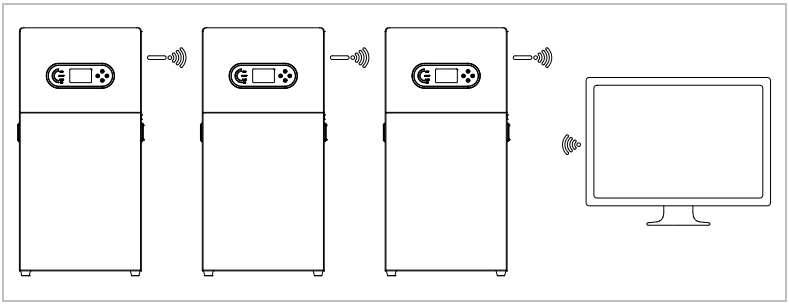
Step 2: Use a flat head screwdriver to press the button on the corresponding socket to release the cable and then pull out the cable.

5.6 Connect to SOFAR Cloud/APP

5.6.1 Data logger

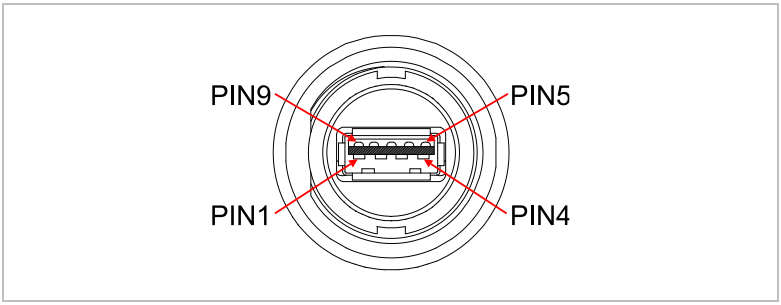
To connect to SOFAR Cloud/APP, a data logger is needed. When you install the data logger, the AC battery can upload your operation, energy, and alarm data directly in the Sofar Monitor.

There are two types of data logger, one is the standard version that uses Wi-Fi for communication, and the other is the optional version that uses 4G for communication.



5.6.2 Data logger link port

Through the USB interface, you can power on and connect the data logger.



Pin	definition
1	V+
2	D-
3	D+
4	GND
5	Reserved
6	Reserved
7	NC
8	NC
9	NC

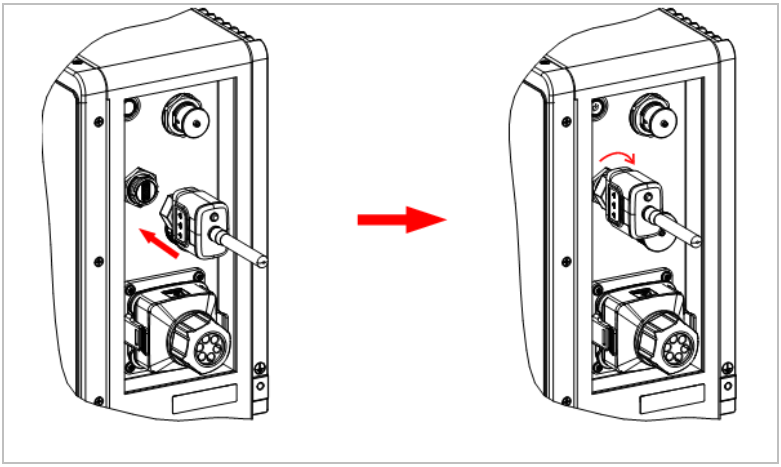
5.6.3 Install data logger

Please follow the steps and diagram below:

Step 1: Remove the protective cap on the USB interface.

Step 2: Insert the Wi-Fi/4G data logger into the USB interface.

Step 3: Tighten the connecting nut.



5.6.4 Install the APP or access SOFAR cloud through PC

Mobile operating system requirements, minimum version Android 6.0; iOS 12.4.

Android mobile phone users: Search "SOFAR Cloud" in the Android application market, download and install it.

iPhone users: Search " SOFAR Cloud " in the APP Store, download and install it.

You can also download “SOFAR Cloud” by directly scanning the QR code below.

Access via browser: https://global.sofarcloud.com to enter the SOFAR Cloud Monitoring page.

5.6.5 APP usage instructions

Access via browser: https://global.sofarcloud.com/ and find "Help Center-Operation Manual" to get usage instructions.

Obtain the APP user manual on the " Tools-Help Center-Operation Manual " page of the SOFAR Cloud.

6 System Commissioning

6.1 Safety inspection before commissioning

ATTENTION

Check voltage range

- The AC voltage should be within the allowed voltage range of the AC battery.

6.2 Check carefully

Please ensure that the AC battery and all wiring are installed correctly, safely, securely, and meet all environmental requirements.

Please check the following items carefully before running:

- The AC battery module must be secured to the wall.
- The grid voltage is within specifications.
- All LED indicators and LCD of the AC battery are off.
- The terminal resistor of communication should be connected correctly.
- Unused interfaces should be covered with sealing plugs.
- The cable is reasonably arranged, neat and not damaged.

6.3 Power on and shutdown

6.3.1 Button activation

Press and hold the On/Off button for more than 5 seconds or release the button after hearing the power-on beep (two short beeps).

Check the operating status of the AC battery by observing the LCD and the LED indicators on the front panel.

6.3.2 Grid activation

Close the switch/breaker connecting the AC battery to the grid, and then you can hear the power-on beep (two short beeps).

Check the operating status of the AC battery by observing the LCD and the LED indicators on the front panel.

6.3.3 Battery shutdown

Open the switch/breaker connecting the AC battery to the grid.

Press and hold the On/Off button for more than 3 seconds or release the button after hearing the power-off prompt (three long beeps).

6.4 Operations of keys and LCD

6.4.1 First time setup (IMPORTANT!)

IMPORTANT

PLEASE FOLLOW THE FOLLOWING PROCEDURE TO TURN ON THE AC BATTERY.

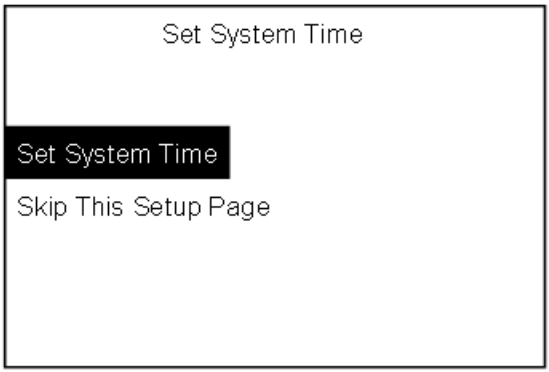
- Close the AC circuit breaker between the AC battery ON-GRID port and the grid.
- The AC battery should start to operate now (see section 6.3.2 Grid activation).

You need to set the following parameters before the battery start to operate.

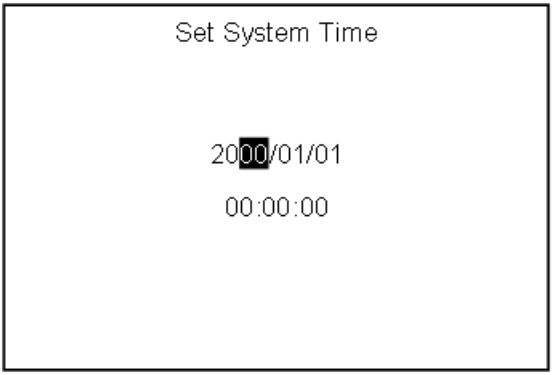
1. Select Language: Select the Language for the AC battery.



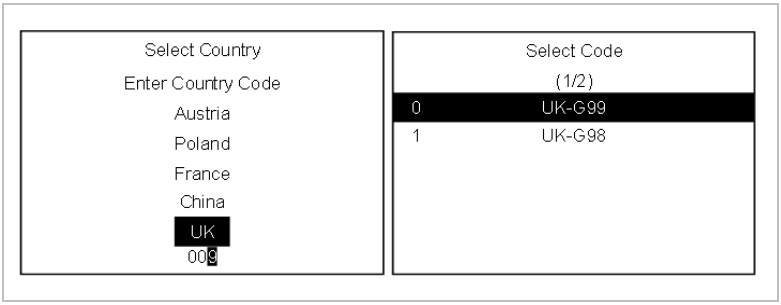
2. Set system time: Set the system time for the AC battery.



If you select “Skip This Setup Page”, you will direct enter the language setting interface. And if you select “Set System Time”, you will enter the system time setting interface.



3. Set country: Set up the safety regulation country that meets the current use conditions and requirements.



Code	Country	Code	Country	Code	Country
000	Germany	019	EN61727	039	Ireland
001	Italia	020	Korea	040	Thailand
002	Australia	021	Sweden	044	South Africa
003	Spain	022	Europe General	046	Dubai
004	Turkey	024	Cyprus	107	Croatia
005	Denmark	025	India	108	Lithuania
006	Greece	026	Philippines	109	Estonia
007	Netherland	027	New Zealand	111	Columbia
008	Belgium	028	Brazil	112	Chile
009	UK	029	Slovakia	121	Saudi Arabia
010	China	030	Czech	122	Latvia
011	France	031	Slovenia	123	Romania
012	Poland	033	Ukraine	124	Tunisia
013	Austria	034	Norway	125	Finland
015	Switzerland	035	Mexico	126	Hungary
018	EU	038	60Hz Wide Range		

NOTE

- Different distribution network operators in different countries have different requirements regarding grid connections of the AC battery. Therefore, it's very important to make sure that you have selected the correct country code according to requirements of local authority.
- Please consult qualified electrical engineer or personnel from electrical safety authorities about this. SOFAR assumes no responsibility for any consequences arising out of incorrect country code selection.

6.4.2 Main menu

In the main screen, press “back/ menu” button to enter the main menu. The main menu has the following 6 items, which will be introduced in the following sections.

Main Screen	------Press “Back”
	1.System Settings
	2.Advanced Settings
	3.Energy Statistic
	4.System Information
	5.Event List
	6.Software Upgrade

6.4.3 System settings

Select “1. System Settings”, press “Confirm” to enter system setting interface.

1.System Settings	------Press “Confirm”
2.Advanced Settings	1.Language Settings
3.Energy Statistic	2.Time
4.System Information	3.Safety Param.
5.Event List	4.Energy Storage Mode
6.Software Upgrade	5.EPS Mode
	6.Communication Addr.
	7.Generators Control

- **1. Language settings**

Select “1. Language Settings”, press “Confirm” to enter language setting interface.

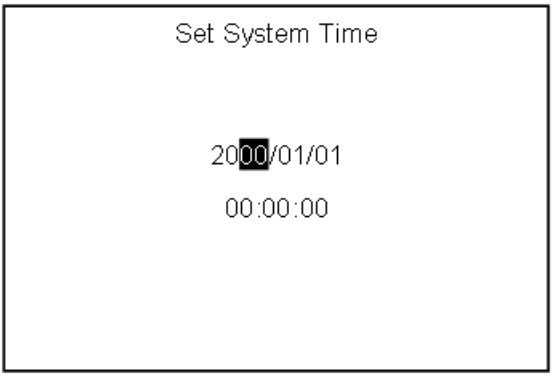


Set the AC battery display language.

Easier Way: press “Back” and “Confirm” at the same time to change system language.

- **2. Time**

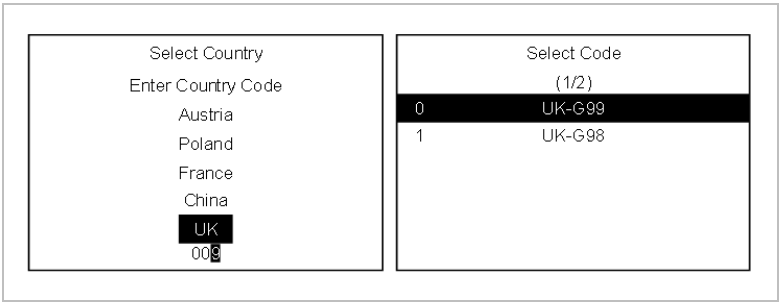
Select “2. Time”, press “Confirm” to enter system time setting interface.



Set the system time for the AC battery.

- **3. Safety parameters**

Select “3. Safety Param.”, press “Confirm”, select “1. Select Country”, press “Confirm” to enter the safety regulation country setting interface.



Set up the safety regulation country that meets the current use conditions and requirements.

- **4. Energy storage mode**

Select "4. Energy Storage Mode", press "Confirm" to enter energy storage mode setting interface.

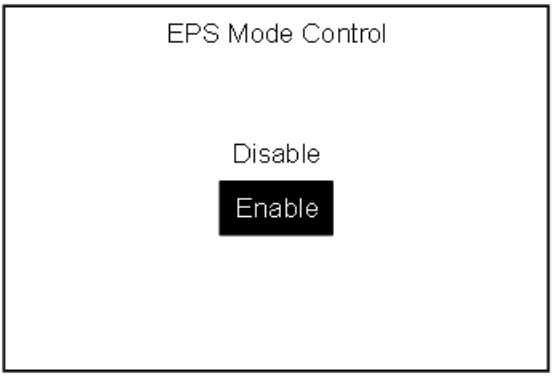
1.Language Setting	
2.Time	
3.Safety Param.	
4.Energy Storage Mode	------Press "Confirm"
5.EPS Mode	1.Self-use Mode
6.Communication Addr.	2.Time-of-use Mode
7.Generators Control	3.Timing Mode
	4.Passive Mode

Please refer to section 6.4.9 for more details.

- **5. EPS mode**

Select "5.EPS Mode", press "Confirm", select "1.EPS Mode Control", press "Confirm" to enter EPS mode control interface. And then enable or disable EPS mode control.

1.Language Setting	
2.Time	
3.Safety Param.	
4.Energy Storage Mode	
5.EPS Mode	------Press “Confirm”
6.Communication Addr.	1.EPS Mode Control
7.Generators Control	



- **6. Communication address**

Select “6. Communication Addr.”, press “Confirm” to enter communication address setting interface.

1.Language Setting	
2.Time	
3.Safety Param.	
4.Energy Storage Mode	
5.EPS Mode	
6.Communication Addr.	------Press “Confirm”
7.Generators Control	1.Communication Addr.
	2.Baud Rate

Communication Address.

Select “1. Communication Addr.”, press “Confirm” to enter communication address setting interface.

Set the communication address (when you need to monitor multiple AC batteries simultaneously)，default 001.

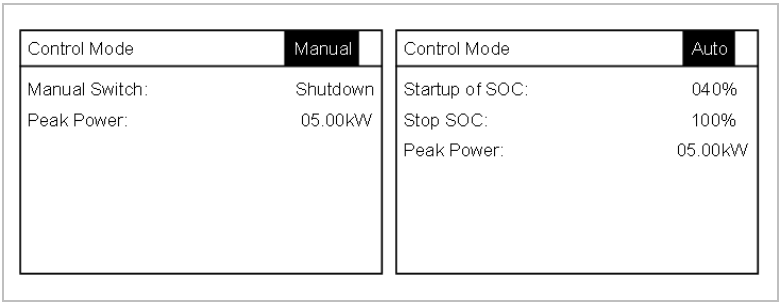
Baud rate

Select “2. Baud Rate”, press “Confirm” to enter Baud Rate setting interface.

Set the baud rate, default 9600.

- **7. Generators control**

Select “7. Generators Control”, press “Confirm” to enter generators control setting interface.



If you select “Manual” mode, you can control the turning on or off the generator and its power by yourself. And if you select “Auto” mode, the generator will charge the AC battery at Peak Power which from Startup of SOC to Stop SOC.

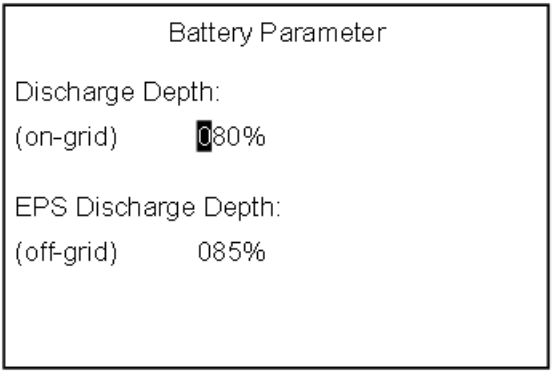
6.4.4 Advanced settings

Select "2. Advanced Settings", press "Confirm" to enter advanced setting interface.

1.System Settings	
2.Advanced Settings	------Password "0001" or "0715"
3.Energy Statistic	1.Battery Parameter
4.System Information	2.Set Feed-in Limit
5.Event List	3.Logic Interface
6.Software Upgrade	4.Factory Reset
	5.Parallel Settings
	6.CT Calibration
	7.Set Electricity Meter
	8.Battery Heater

- **1. Battery parameter**

Select "1. Battery Parameter", press "Confirm" to enter battery parameter setting interface.



Input the value of Discharge Depth & EPS Discharge Depth per battery specification.

For example: if Discharge Depth = 80% & EPS Discharge Depth = 85%. While electric grid is connected: The AC battery won't discharge the battery when its SOC is less than 20%.

In case of blackout: The AC battery will work in EPS mode (if EPS mode is enabled) & keep discharging the battery till battery SOC is less than 15%.

NOTE

- EPS Discharge Depth should be greater than Discharge Depth.

- **2. Set feed-in limit**

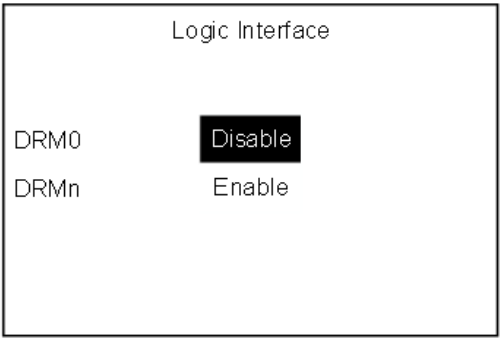
Select "2. Set Feed-in Limit", press "Confirm" to enter feed-in limit setting interface.

1.Battery Parameter	
2.Set Feed-in Limit	------Press "Confirm"
3.Logic Interface	1.Feed-in Limitation
4.Factory Reset	2.Power Limit
5.Parallel Settings	
6.CT Calibration	
7.Set Electricity Meter	
8.Battery Heater	

Enable or disable feed-in limit and set its power limit.

- **3. Logic interface**

Select "3. Logic Interface", press "Confirm" to enter logic interface setting interface.



Enable or disable logical interfaces, where DRM0 and DRMn (DRM1-8) can be independently enabled or disabled. If DRM0 is enabled, the AC battery can respond to the DRM0 command to shut down and disconnect from the grid.

And if DRMn is enabled, the AC battery will output the corresponding power based on the selected hardware interface (DRM1-8).

- **4. Factory reset**

Select "4. Factory Reset", press "Confirm" to enter factory reset setting interface.

1.Battery Parameter	
2.Set Feed-in Limit	
3.Logic Interface	
4.Factory Reset	------Press "Confirm"
5.Parallel Settings	1.Clear Energy Data
6.CT Calibration	2.Clear Events
7.Set Electricity Meter	3.Factory Reset
8.Battery Heater	

Clear the AC battery of the total power generation and events.

"1. Clear Energy Data" will clear all energy data in "Energy Statistic".

"2. Clear Events" will clear all events in "Event list".

"3. Factory Reset" will reset all user settings to the default state.

- **5. Parallel settings**

Select "5. Parallel Settings", press "Confirm" to enter parallel mode setting interface.

1.Battery Parameter	
2.Set Feed-in Limit	
3.Logic Interface	
4.Factory Reset	
5.Parallel Settings	------Press "Confirm"
6.CT Calibration	1.Parallel Control
7.Set Electricity Meter	2.Set Master/Slave
8.Battery Heater	3.Save

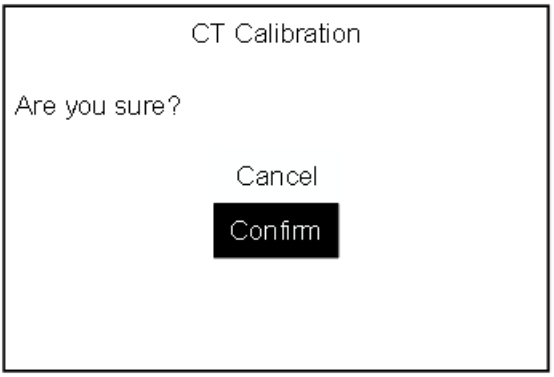
Enable or disable parallel mode and set the AC battery is master or slave.

NOTE

- The slave needs to set an additional communication address, which must be unique. Please refer to section 6.4.3 for the setting method.

- **6. CT calibration**

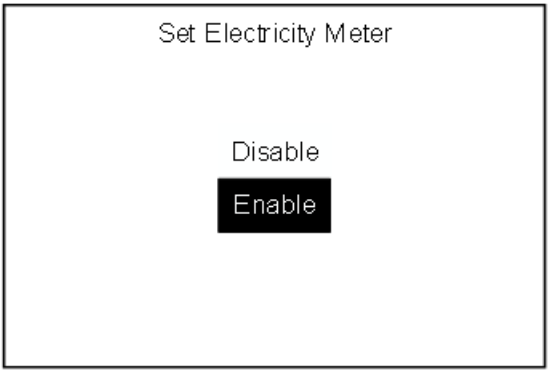
Select "6. CT Calibration", press "Confirm" to enter CT calibration setting interface.



Its function is to calibrate grid-connected power.

- **7. Set electricity meter**

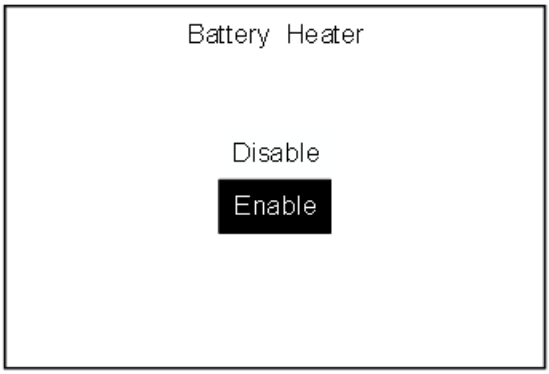
Select "7. Set Electricity Meter", press "Confirm" to enter electricity meter setting interface.



Enable or disable electricity meter interface. If you need to use a meter instead of the CT, please enable it.

- **8. Battery heater**

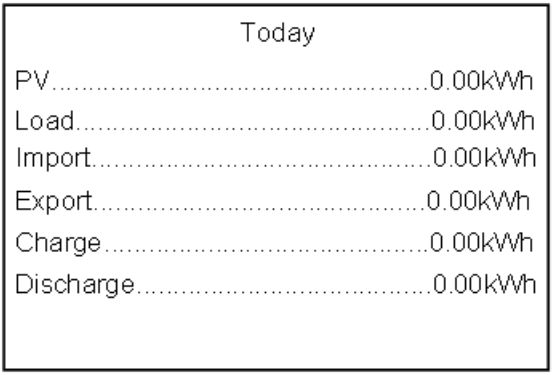
Select "8. Battery Heater", press "Confirm" to enter battery heater setting interface.



Enable or disable battery low-temperature heating interface.

6.4.5 Energy statistic

Select "3. Energy Statistic", press "Confirm" to enter energy statistic interface.



It shows the energy generation and consumption within a certain range of time. Press "Up" or "Down" to check the daily / monthly / yearly / lifetime energy statistics.

6.4.6 System information

Select “4. System Information”, press “Confirm” to enter system information interface.

1.System Settings		
2.Advanced Settings		
3.Energy Statistic		
4.System Information	------Press “Confirm”	
5.Event List	Inverter Info(1)	Product SN
6.Software Upgrade		Power Level
		Safety Firmware Version
	Inverter Info(2)	Firmware Version
		Country
		Safety Lib Version
	Inverter Info(3)	Energy Storage Mode
		RS485 Address
		EPS Mode
	Inverter Info(4)	Logic Interface
	Inverter Info(5)	Power Factor
		Feed-in Limitation
		Insulation Resistance
	Battery Info (1)	Battery Type
		Battery Cell Type
		Battery Capacity
		Discharge Depth
	Battery Info (2)	Max Charge (A)
		Max Charge (V)
		Max Discharge (A)
		Min Discharge (V)
	Safety Param.(1)	OVP1
		OVP2

	UVP1
	UVP2
Safety Param.(2)	OFP1
	OFP2
	UFP1
	UFP2
Safety Param.(3)	OVP 10mins
BMS Info	Certificated SW Version
	Certificated HW Version

In addition, “Firmware Version” includes ARM, DSPM, and DSPS version information. You can follow the prompts to press "Confirm" and input the password “0715” to access it.

6.4.7 Event list

Select “5. Event List”, press “Confirm” to enter event list interface.

1.System Settings		
2.Advanced Settings		
3.Energy Statistic		
4.System Information		
5.Event List	------Press “Confirm”	
6.Software Upgrade	1.Current Event List	
	2.History Event List	

Event list of the AC battery, including current event list and history event list.

Current Event List

Select “1. Current Event List”, press “Confirm” to check the current events.

History Event List

Select “2. History Event List”, press “Confirm” to check the history events. And continue press “Confirm”, it will switch to the time or detailed name of the events that occurred. Press “up” or “down” to check all history events if there’re more than 1 page of events.

6.4.8 Software upgrade

Select “6. Software Upgrade”, press “Confirm”, and a password input interface will appear, enter the password “0715” to enter the next level menu. Then select and confirm “1. One-click Upgrade”, the AC battery will start to upgrade the software automatically.

1.System Settings	
2.Advanced Settings	
3.Energy Statistic	
4.System Information	
5.Event List	
6.Software Upgrade	------Password “0715”
	1. One-click Upgrade

Detailed Firmware Upgrade Procedure:

Step 1: Format the USB drive. Copy the “firmware” folder to the USB drive. In addition, a configuration file for the “.bin” format upgrade package is also required.

Step 2: Insert the USB drive back to the USB drive interface.

Step 3: select and confirm “6. Software Upgrade”- “1. One-click Upgrade” to start software upgrade.

Step 4: After finishing software upgrade, the AC battery will start to operate automatically.

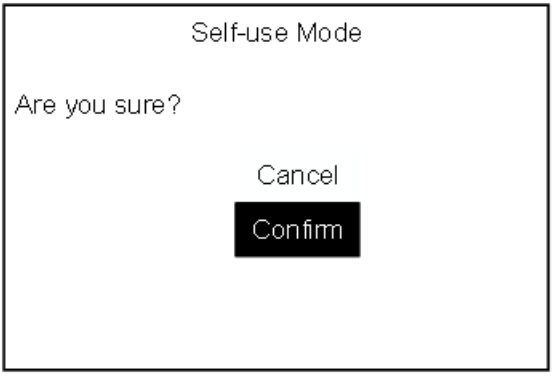
NOTE

- If the program version does not match the upgraded version when checked from the system information (see section 6.4.6), which means the software upgrade is unsuccessful, please open the AC circuit breaker (grid) and turn off the AC battery, wait 5 minutes, then close the AC circuit breaker and turn on the AC battery. And then start again from “Step 3”.

6.4.9 Energy storage mode

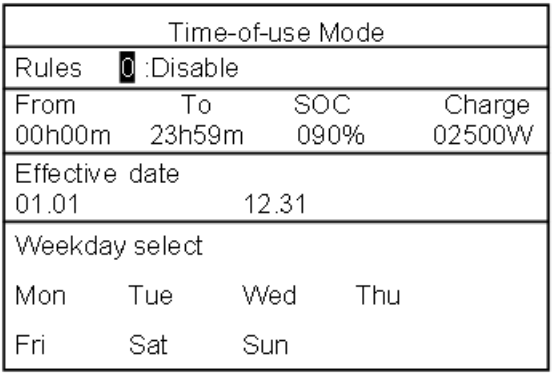
- **1.Self-use Mode**

  Select “1. Self-use Mode”, press “Confirm” to enter the Self-use mode setting interface.



- **2. Time-of-use Mode**

  Select “2. Time-of-use Mode”, and then press “Confirm” to enter Time-of-use mode setting interface.



If electricity is more expensive in high demand time (peak rate) & electricity is much cheaper in low demand time (off-peak rate).

You can select an off-peak period to charge your battery. Outside the off-peak charge period, the AC battery is working in Self-use Mode.

If your family normally go to work/school on weekdays & stay at home on weekends, which means the home electricity consumption is much higher on weekends. Thus, you need to store some cheap electricity on weekdays only. This is possible using our Time-of-use mode.

In summer, if your PV system can produce more electricity than your home electricity consumption. Then you don't need to set an off-peak charge period to charge your battery in summer at all. You can select an effective date (normally winter) for Time-of-use mode in this case. Outside the effective date, the AC battery is working in Self-use Mode.

You can set multiple Time-of-use rules to meet your more complex requirement. Right now we support 4 rules maximum (rule 0/1/2/3).

- **3. Timing Mode**

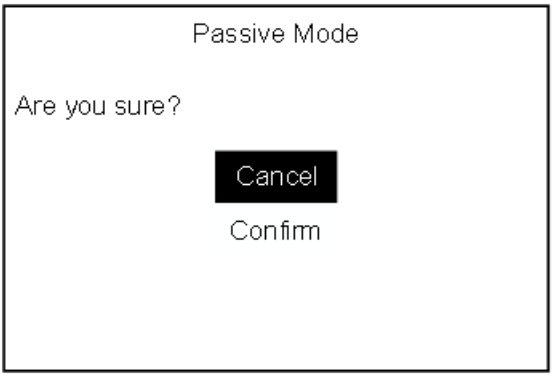
Select "3. Timing Mode", and then press "Confirm" to enter Timing mode setting interface.

The interface of Timing Mode is shown as below. You can select a charge time/power & discharge time/power in this mode.

Timing Mode	
Rules 0: Disable	
Charge Start	00h 00m
Charge End	23h 59m
Charge Power	01000W
DisCharge Start	00h 00m
DisCharge End	23h 59m
DisCharge Power	01000W

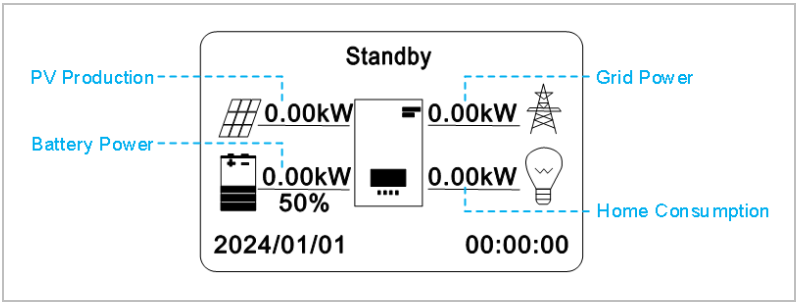
- **4. Passive Mode**

Select "4. Passive Mode", and then press "Confirm" to enter Passive mode setting interface.



For more detailed information, please ask representative of SOFAR to get a copy of passive mode communication protocol.

6.4.10 Common operations



If you didn't change the work mode of the AC battery, which means it is working in "Self-use Mode":

While "PV Production" > "Home Consumption"

If the battery is not full. The AC battery will charge the battery.

While "PV Production" < "Home Consumption"

If the battery is not flat. The AC battery will discharge the battery.

Below are some commonly used settings:

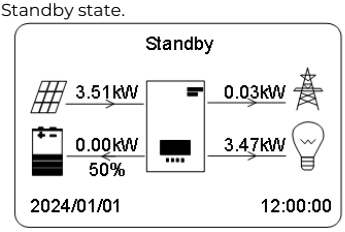
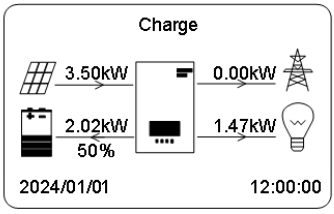
- **1.Set Self-use Mode**

  In the main interface, press "back" button to enter main menu. Select "1. System Settings", press "Confirm", then select "4. Energy Storage Mode",

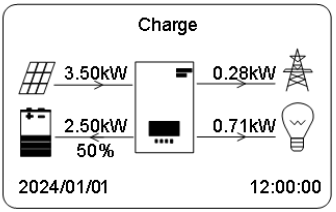
press “Confirm”, final select “1. Self-use Mode”, press “Confirm” to enter self-use mode setting interface.

Main Screen	------Press “Back”		
	1.System Settings	------Press “Confirm”	
	2.Advanced Settings	1.Language Settings	
	3.Energy Statistic	2.Time	
	4.System Information	3.Safety Param.	
	5.Event List	4.Energy Storage Mode	------Press “Confirm”
	6.Software Upgrade	5.EPS Mode	1.Self-use Mode
		6.Communication Addr.	2.Time-of-use Mode
		7.Generators Control	3.Timing Mode
			4.Passive Mode

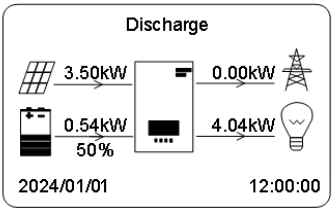
In Self-use Mode, the AC battery will automatically charge & discharge the battery.

PV generation ~= LOAD consumption (Δ P < 100W), the AC battery will stay in Standby state.	PV generation > LOAD consumption, the surplus power will be stored in the AC battery.
	

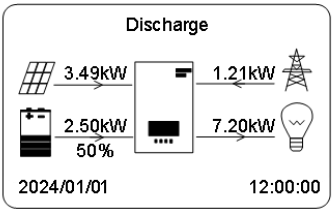
When the battery is full (or at max charge power), excess power will be exported to the grid.



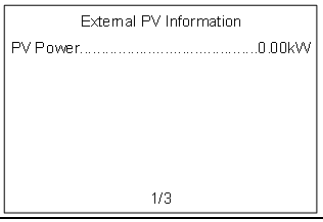
PV generation < LOAD consumption, the AC battery will discharge to supply power to load.



If PV generation + Battery < LOAD consumption, the AC battery will import power from the grid.



Press "DOWN" key to check current detailed information (3 pages in total), and press "UP" to get back to main screen.



- **2. Set Timing Mode**

In the main screen, press "back" button to enter main menu. Select "1. System Settings", press "Confirm", then select "4. Energy Storage Mode", press "Confirm", final select "3. Timing Mode", press "Confirm" to enter self-use mode setting interface.

Main Screen	------Press "Back"		
	1.System Settings	------Press "Confirm"	
	2.Advanced Settings	1.Language Settings	
	3.Energy Statistic	2.Time	
	4.System Information	3.Safety Param.	
	5.Event List	4.Energy Storage Mode	------Press "Confirm"
	6.Software Upgrade	5.EPS Mode	1.Self-use Mode
		6.Communication Addr.	2.Time-of-use Mode

7.Generators Control	3.Timing Mode
	4.Passive Mode

The interface of Timing Mode is shown as below. You can select a charge time/power & discharge time/power in this mode.

Timing Mode	
Rules [0] :Enabled	
Charge Start	01h 00m
Charge End	01h 59m
Charge Power	01500W
DisCharge Start	05h 00m
DisCharge End	06h 59m
DisCharge Power	01000W

You can set multiple Timing rules to meet your more complex requirement by enable corresponding rules. Right now, we support 4 rules maximum (rule 0/1/2/3).

As shown in the above figure, it means enable rule 0, and the AC battery will charge at 1500W power from 1:00 to 1:59am, discharge at 1000W power from 5:00 to 6:59am.

NOTE

- The time between any charging and discharging operations cannot overlap.

- **3. Parallel settings**

In the main interface, press “back” button to enter main menu. Select “2. Advanced Settings”, press “Confirm”, then input the password “0001” or “0715”, final select “5. Parallel Settings”, press “Confirm” to enter parallel mode setting interface.

Main Screen	------Press “Back”		
	1.System Settings	------Password “0001” or “0715”	
	2.Advanced Settings	1.Battery Parameter	
	3.Energy Statistic	2.Set Feed-in Limit	
	4.System Information	3.Logic Interface	
	5.Event List	4.Factory Reset	
	6.Software Upgrade	5.Parallel Settings	------Press “Confirm”
		6.CT Calibration	1.Parallel Control
		7.Set Electricity Meter	2.Set Master/Slave
		8.Battery Heater	3.Save

You can select “1. Parallel Control”, press “Confirm” to set enable parallel, then select “2. Set Master/Slave”, press “Confirm” to set master or slave, final select “3. Save”, press “Confirm” to save your setting.

NOTE

- 1) The master can only have one, while the slave can have multiple.
- 2) Before enable the parallel operation, all AC batteries need to set communication addresses, and ensure that their communication addresses are different from each other.

7 Trouble shooting and maintenance

7.1 Troubleshooting

Describes errors that may occur with this product. When troubleshooting, please read the following tips carefully:

For detailed information about the warning or error messages displayed by the AC battery status indicator, see the "Event List Information" table for details.

When the AC battery occurs alarm or error messages, the alarm reports are uploaded to the cloud. By checking the APP or monitoring platform, you can determine the cause of the AC battery alarm or failure.

Follow the steps below to check whether the current installation status meets the AC battery operation requirements:

- Is the AC battery installed in a clean, dry, well-ventilated position?
- Do the cable cross-section and length meet the requirements?
- Are the input and output connections and cabling good connection?
- Are the communication cables connected correctly and not damaged?
- Are the configuration settings correct for the user's specific installation?

Table 7-1 Event List Information

Code	Name	Description	Solution
ID001	GridOVP	The power grid voltage is too high	If the alarm occurs occasionally, the possible cause is that the electric grid is abnormal occasionally. The AC battery automatically returns to normal operating status when the electric grid's back to normal. If the alarm occurs frequently, check whether the grid voltage/frequency is within the acceptable
ID002	GridUVP	The power grid voltage is too low	
ID003	GridOFP	The power grid frequency is too high	
ID004	GridUFP	The power grid frequency is too low	
ID006	OVRT	The time of over voltage ride-through (OVRT) is out of standard	
ID007	LVRT	The time of low	

Code	Name	Description	Solution
		voltage ride-through (LVRT) is out of standard	range. If no, contact SOFAR technical support. If yes, check the AC circuit breaker and AC wiring of the AC battery. If the grid voltage/frequency is within the acceptable range and AC wiring is correct, while the alarm occurs repeatedly, contact SOFAR technical support to change the grid over-voltage, under-voltage, over-frequency, under-frequency protection points after obtaining approval from the local electrical grid operator.
ID008	IslandFault	Island protection fault	
ID009	GridOVPInstant1	Transient overvoltage 1 of Grid voltage	
ID010	GridOVPInstant2	Transient overvoltage 2 of Grid voltage	
ID012	InvVoltFault	Inverter overvoltage or undervoltage	Internal faults of the AC battery, open the AC circuit breaker and turn off the AC battery, wait for 5 minutes, then close the AC circuit breaker and turn on the AC battery. Check whether the problem is solved. If no, please contact SOFAR technical support.
ID013	RefluxFault	PCC reverse power and time exceeds safety requirements	
ID017	HwADErrIGrid	The grid current sampling error	
ID018	HwADErrDCI(AC)	The DCI sampling error	
ID020	HwADErrVGrid (AC)	The grid voltage sampling error	
ID023	HwADErrDCV	The DCV sampling error	
ID032	N-PE fault	N-PE relay detected as open circuit	
ID033	SpiCommFault (DC)	SPI communication is fault (DC)	
ID034	SpiCommFault (AC)	SPI communication is fault (AC)	

Code	Name	Description	Solution
ID037	HwAuxPowerFault	Auxiliary power error	
ID038	InvSoftStartFail	Inverter failed to output	
ID041	RelayFail	Relay detection sticky	
ID047	ParallelFault	Master does not exist or is duplicate	Check the parallel mode settings for the inverter. Check whether the wiring is correct.
ID056	NTCFault	Env NTC Fault	Internal faults of the AC battery, open the AC circuit breaker and turn off the AC battery, wait for 5 minutes, then close the AC circuit breaker and turn on the AC battery. Check whether the problem is solved. If no, please contact SOFAR technical support.
ID057	TempErrEnv1	The environment temperature is too high	Please make sure the AC battery is installed in a place without direct sunlight/other heat source. Please make sure the AC battery is installed in a well-ventilated place. Please make sure the inverter is vertically installed & the ambient temperature is less than the temperature upper limit of the AC battery.
ID059	TempErrInv1	The internal componentA temperature is too high	
ID060	TempErrInv2	The internal componentB temperature is too high	
ID067	BusUVP	Internal DC bus voltage is too low	Internal faults of the AC battery, open the AC circuit breaker and turn off the AC
ID071	LLCBusOVP	Internal DC bus voltage is too high	

Code	Name	Description	Solution
ID072	SwBusRmsOVP	The rms value of bus voltage is too high and has triggered software protection	battery, wait for 5 minutes, then close the AC circuit breaker and turn on the AC battery. Check whether the problem is solved. If no, please contact SOFAR technical support.
ID073	SwBusIOVP	The instantaneous value of bus voltage is too high and has triggered software protection	
ID082	DciOCP	The DC component of grid current is too high	
ID083	SwIOCP	Instantaneous output overcurrent protection	
ID092	SwAcCBCFault	Long-time output overcurrent protection	
ID094	PriDCChgDischgOCP	Primary charge/discharge current is too high and has triggered hardware protection	
ID095	SwBUSOCP	BUS current is too high and has triggered software protection	
ID100	HwBatOCP	Battery current is too high and has triggered hardware protection	
ID101	HwPriDCGaNFault	Primary GaN tube is faulty	
ID103	HwACOCP	Mains current is too high and has triggered hardware protection	
ID105	MeterCommFault	Communication fault with meter unit	Check whether the meter is connected correctly.
ID106	SNMachineFau	The serial number is	Internal faults of the

Code	Name	Description	Solution
	It	error	AC battery, open the AC circuit breaker and turn off the AC battery, wait for 5 minutes, then close the AC circuit breaker and turn on the AC battery. Check whether the problem is solved. If no, please contact SOFAR technical support.
ID107	HwVerError	The hardware version does not match	
ID108	GeneratorStartupFail	The ac voltage is not reached after starting the generator	Check whether the output voltage of the generator is correct. Check whether the wiring is correct.
ID109	GeneratorOverload	The generator is overload	Check whether the generator works in overload state.
ID110	Overload1	Mild overload	Check whether the inverter works in overload state.
ID111	Overload2	Moderate overload	
ID112	Overload3	Severe overload	
ID140	PermRelayFail	Permanent error of the mains relay	Internal faults of the AC battery, open the AC circuit breaker and turn off the AC battery, wait for 5 minutes, then close the AC circuit breaker and turn on the AC battery. Check whether the problem is solved. If no, please contact SOFAR technical support.
ID149	CommEEPROMFault	The EEPROM of the communication board is faulty	
ID150	FlashFault	The Flash of the communication board is faulty	
ID152	SafetyVerFault	The version of the safety regulation is error	
ID153	SCILose(DC)	SCI communication is fault(DC)	
ID154	SCILose(AC)	SCI communication is fault(AC)	
ID176	HwBatHeatingFault	Control switch of battery heater is	

Code	Name	Description	Solution
		failed	
ID177	BMS OVP	The battery voltage is too high	
ID178	BMS UVP	The battery voltage is too low	
ID181	BMS OCP	Battery over-current protection	Try to increase the ambient temperature of the battery.
ID182	BMS Short	BMS Short circuit protection	
ID186	BatDischargeHTP	The battery temperature is too high during discharge	Make sure battery is in a well-ventilated place. Try to decrease the discharging power to see if the problem is solved.
ID187	BatDischargeLTP	The battery temperature is too low during discharge	Try to increase the ambient temperature of the battery.
ID188	BatChargeHTP	The battery temperature is too high during charge	Make sure battery is in a well-ventilated place. Try to decrease the charging power to see if the problem is solved.
ID190	BatChargeLTP	The battery temperature is too low during charge	Try to increase the ambient temperature of the battery.
ID274	ARMDSPProVerFault	The version of communication protocol between ARM and DSP is not consistent	Internal faults of the AC battery, open the AC circuit breaker and turn off the AC battery, wait for 5 minutes, then close the AC circuit breaker and turn on the AC battery. Check whether the problem is solved. If no, please contact SOFAR technical support.
ID455	HwADFaultVInv	The inverter voltage sampling error	
ID456	HwADInvalidVInvEPS	The inverter voltage and the EPS voltage sampling invalid	
ID457	ConsistentFaul	The internal bus	

Code	Name	Description	Solution
	tVbus	voltage sampling error.	
ID458	HwADErrIBus	The internal bus current sampling error	
ID460	HwPriDCOCP	Primary current is too high and has triggered hardware protection	
ID473	DischgMosFault	There is an issue with the power control for battery discharging.	
ID474	ChgMosFault	There is an issue with the power control for battery charging.	
ID475	NTC Fault	Battery cell temperature sampling error	
ID476	Cell Fault	Excessive voltage difference between cells	
ID477	Cell Voltage Sample Fault	Excessive voltage difference between the total voltage and the sum of the cell voltages	

7.2 Routine maintenance

DANGER

- After turn off the AC battery, wait a minimum of 15 minutes before starting any maintenance or repair work.

The AC battery generally does not require maintenance or calibration, but you should ensure that their heat sinks are not covered with dust, dirt, or other debris.

To clean the AC battery:

Please use a blow dryer, dry soft cloth, or soft brush to clean the AC battery. Do not use water, corrosive chemicals, cleaning agents, or strong detergents to clean the AC battery.

7.3 Battery module storage requirements

Ambient temperature: -10℃-+50℃,

Storage relative humidity range: 5%~95%

Store in a dry, clean, ventilated environment, away from direct sunlight.

When storing the battery module, place it in the correct orientation. Do not store the battery module upside down or on its side. If the AC battery is not used for a long time, please recharge it regularly.

The optimal storage temperature is -10℃-+35℃, and the recommended storage time is no more than 6 months. Exceeding this temperature and time range may cause product damage.

8 Specifications

Model	BT5000A
AC Grid	
Rated Power	2500W
Rated Apparent Power	2750VA
Rated Output Current	11.4/10.9/10.4A
Max. Output Current	12.5/12/11.5A
Max. Input Current	22.7/21.7/20.8A
Rated AC Voltage	220/230/240V
Grid Voltage Range	176-276V
Rated Grid Frequency	50/60Hz
Grid Frequency Range	45-66Hz
THDI	<3%
PF	0.8 leading-0.8 lagging
AC Output (Off Grid)	
Rated _ Power _	2500W
Peak output Power _	3500W,10s
Rated Current	11.4/10.9/10.4A
Rated Voltage	220/230/240V
Rated Frequency	50/60Hz
THDV	< 3%
Battery Side	
Battery Type [1]	LFP
Rated Voltage	51.2V
Battery total Energy [2]	5.12kWh
Usable capacity [3]	4.6kWh
General Parameters	
Operating temperature range [4]	-10℃~+50℃
Relative humidity range	5%~95%(non-condensing)

Max. operating altitude [5]	<4000m
Degree of protection	IP66
Display	LCD & APP
Cooling	Natural Cooling
Communication	RS485, optional: Wi-Fi, 4G
Surge Protection	AC: Type Ⅱ
Dimensions(W*H*D)	400*800*175mm
Weights(kg)	50kg
Installation method	Wall Mounted OR Floor Mounted
Standard	IEC 61000, IEC62109, IEC62477, IEC62619, UN38.3, EN50549-1

[1] Rechargeable li-ion battery system.
[2] Test conditions:0.2C charging/discharging at 25℃, 100%DOD.
[3] Usable energy is based on battery cell only.
[4] Maximum operating temperature range, derating operation may occur. Refer to the temperature derating curve for details.
[5] If the altitude is more than 2000 m, derating operation is required. Refer to the derating curve for details.

Feature:

Wi-Fi/4G available by installing data logger.

Integrated battery and PCS, compact installation.

Flexible expansion, up to 6 units in parallel.

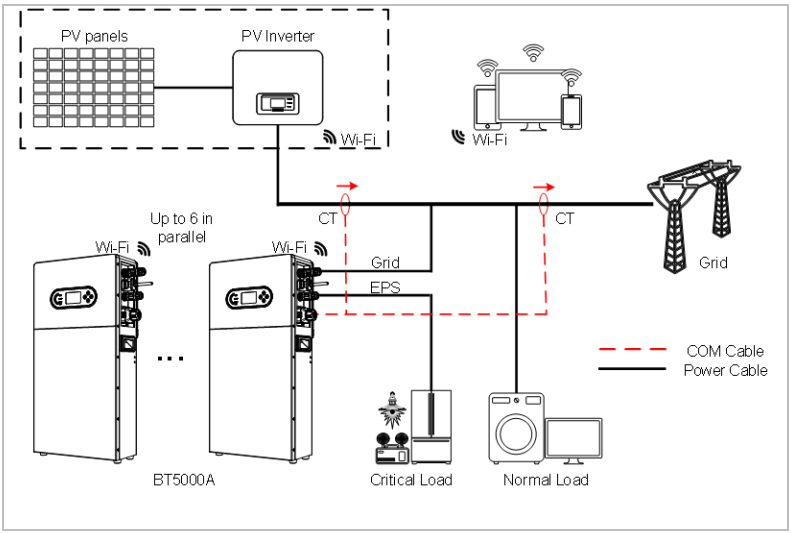
Wall or floor mounted installation, saving time and cost.

Various function settings via LCD or APP.*All specifications are subject to change without further notice.

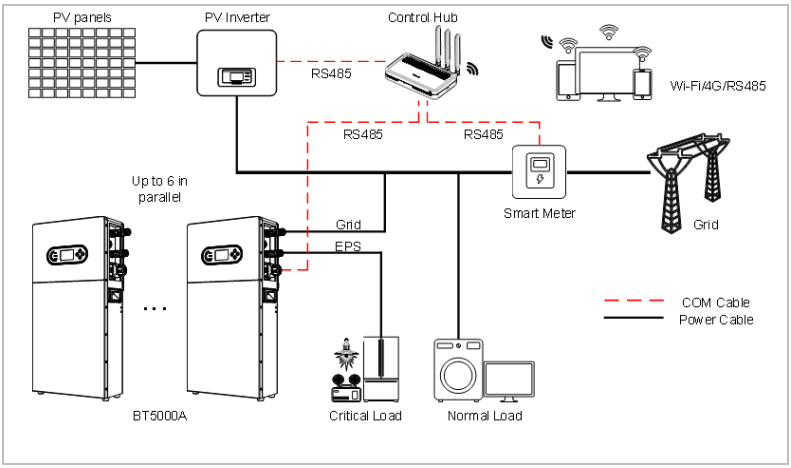
Appendix

Typical application scenario

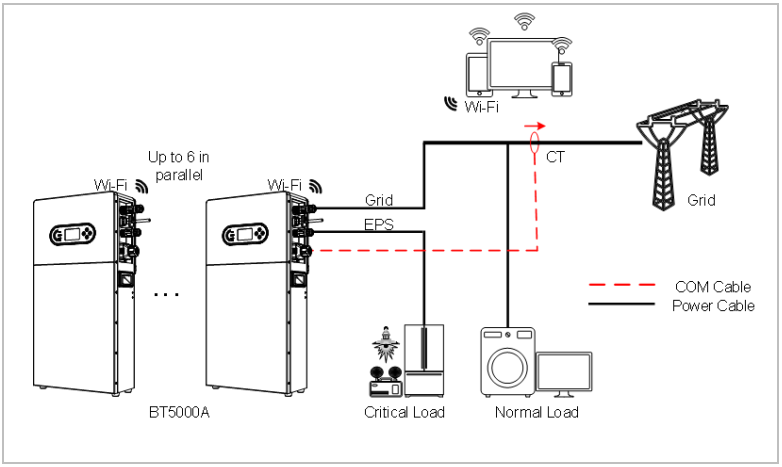
- **Single-phase application with data logger**



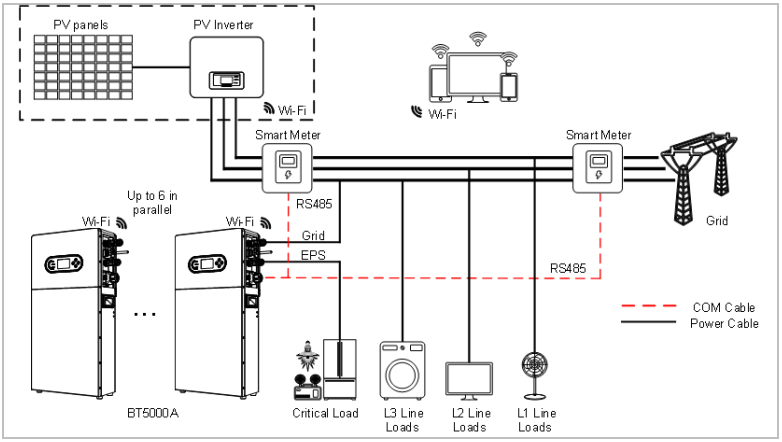
- **Single-phase application with a control hub**



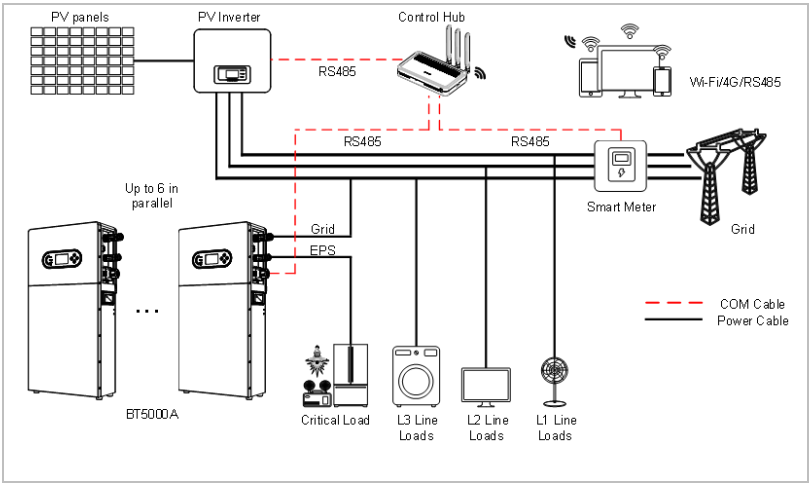
- **Single-phase application without PV inverter**



- **Three-phase application with data logger**



- **Three-phase application with a control hub**



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