SUNWODA ENERGY



SunESS Power

Model: SW5KH3UT/SW6KH3UT/
SW8KH3UT/SW10KH3UT/
SW12KH3UT/SW15KH3UT

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About This Manual

This manual provides the product information, installation, operation, and routine maintenance of the three-phase energy storage system and battery. It does not contain all the information about the three-phase energy storage system.

Manual Using Instruction

In order to ensure the correct installation and operation of photovoltaic energy storage inverter. Please read the user manual carefully before installation, operation and maintenance, and follow the instruction during installation and operation.

Please keep this manual all time available in case of emergency.

Due to the product update caused by the actual deviation from the data, please refer to the actual.

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1 Introduction

1.1 Target Audience

This manual applies to trained and knowledgeable technical personnel who need to install, operate and maintain the inverter. The public can check the specifications through this manual.

The operator applicable to this product must meet the conditions:
● Receive professional training and familiar with this product related knowledge professional. ● Familiar with regulatory standards and electrical systems, as well as various safety precautions. ● Ability to wear personal protective equipment correctly. ● Only qualified professionals are allowed to perform installation, operation, and maintenance.

1.2 Safety Instructions

Please always obedience to the safety precautions in this product manual during the operation.

This manual is subject to update due to product upgrades or other reasons. Unless additional instructions, the manual cannot

replace the safety precautions on the product label. All descriptions here are for guidance only.

- Please read the manual carefully before using the product.
- Please always obedience to the safety precautions in this product manual during the operation.
- Please read the instructions and warning labels carefully before using the inverter and battery.
- Do not disassemble the inverter and battery. Please contact the after-sales service center if need maintenance.
- Please power off to prevent electric shock during installation.
- Only professionals are qualified to power the equipment.
- Please follow the steps in "Remove Inverter" to proceed effectively when disconnecting all AC or DC terminals.

1.3 Operating Precaution

	DANGER High voltage! Do not open the shall of the working or power on inverter, the company does not assume the relevant responsibility.		Warning! If not avoided, mild or moderate injury may result.
	DANGER High temperature! Do not touch the surface when the inverter is running. High temperature may cause burns.		Please read the instructions carefully before installation.
	DANGER High voltage needs to wait! After powering off, the operator should wait 5 minutes to ensure the battery had fully discharged.		Do not be discarded into the garbage basket directly after scrapping.
	Please recycle		Protective Earth (connector)
	No stepping on		No flame
	Do not short circuit (cut off power)		Keep away from children

	Fragile		Do not get wet

1.3.1 Inverter Safety Guidelines

- Ensure that the voltage and frequency of the grid access points conform to the inverter specifications.
- Additional protective devices like circuit breakers or fuses are recommended on the AC side.
- Please ground the PV system according to the local requirements and regulations to achieve the protection for the system and personnel.
- Operation of the inverter, it is forbidden to touch hot parts (such as radiator, etc.). The burns maybe occur even the inverter is shut down. Until the equipment cools, operate the inverter with protective gloves.
- Do not disassemble the inverter casually.
- Do not connect any cable halfway when the inverter is power on.

1.3.2 Battery Safety Guidelines

- Ground the device to prevent electric shock.
- Wear insulation gloves when handling battery.
- Do not power on the device during installation.
- Please check the polarity carefully before switching on the system.
- Do not charge or discharge a defective or damaged battery.
- Do not charge the frozen battery.
- Do not remove the battery casually.
- Do not connect to other devices when the battery is running.
- Be careful when using metal tools around batteries.

2 Product Introduction

2.1 PV grid-tied/off Energy Storage System

The PV grid-tied/off energy storage system is mainly composed of PV module, PV energy storage integrated machine, grid-off load, grid-tied load and utility grid. The system diagram shown below:

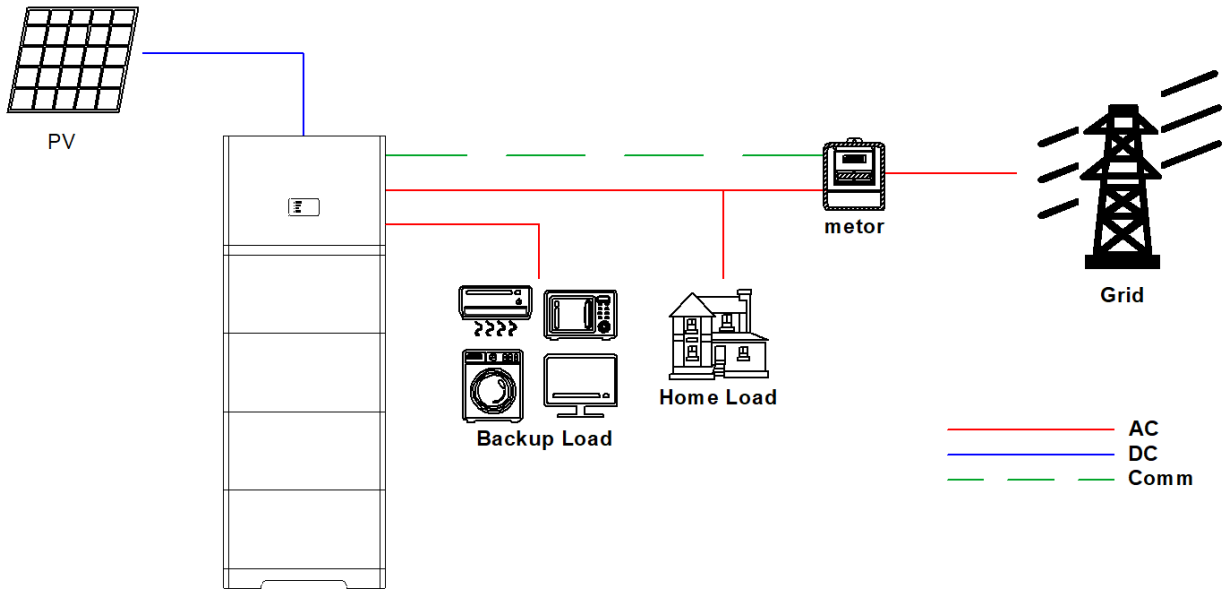


Figure 2.1-1 PV grid-tied/off energy storage system

PV module:

- When exposed to sunlight, it can convert the solar energy into electricity and supply power to the home load or charges the battery through the PV hybrid inverter;
- The battery supplies power to the load through the PV hybrid inverter when lack of sunlight.

Utility Grid:

- The system switches to the grid-off state and supply power to important loads in backup mode in the event of a power outage;
- The system switches back grid-tied state when the grid restored.

Battery:

- It can store the electricity converted by PV, increasing the proportion of self-use and reducing electricity bills by charging the battery at off-peak time and using peak time;
- It can switch to grid-off operation as backup power when grid power outages.

Application:

PV grid-tied/off energy storage system is suitable for a variety of conditions, such as:

a) Vital equipment load but without the stable grid; b) PV self-use and not feed into the grid; c) Purchase tariff is much more expensive than feed-in tariff price; d) A large gap between the peak price and the valley price.

2.2 Description of System Capacity

The energy storage system supports multiple capacity options. With one inverter, the system is compatible with up to 8 battery packs.

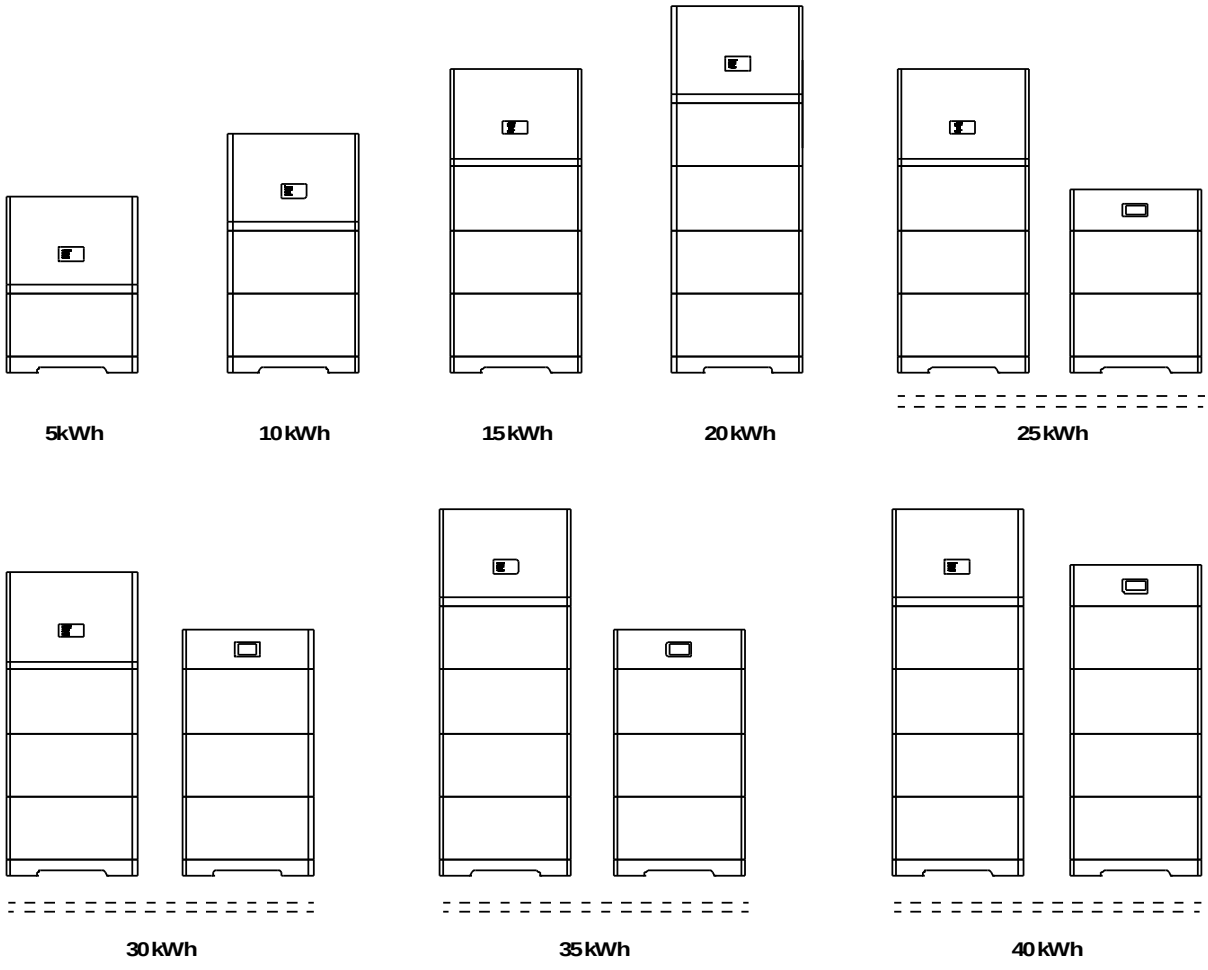


Figure 2.2-1 Description of the system capacity

Table 1 Battery parameter

Battery Pack Number	1	2	3	4	5	6	7	8

Battery Type	LiFePO4							
Battery Capacity	5 kWh	10 kWh	15 kWh	20 kWh	25 kWh	30 kWh	35 kWh	40kWh
Available Capacity (90%DOD)	4.5 kWh	9 kWh	13.5 kWh	18 kWh	22.5 kWh	27 kWh	31.5 kWh	36 kWh
Battery Voltage Range	350~450V							
Max. Power of Charge/Discharge	2.5kW	5kW	7.5 kW	10 kW	12.5kW	15kW	17.5kW	20kW

2.3 Appearance Description

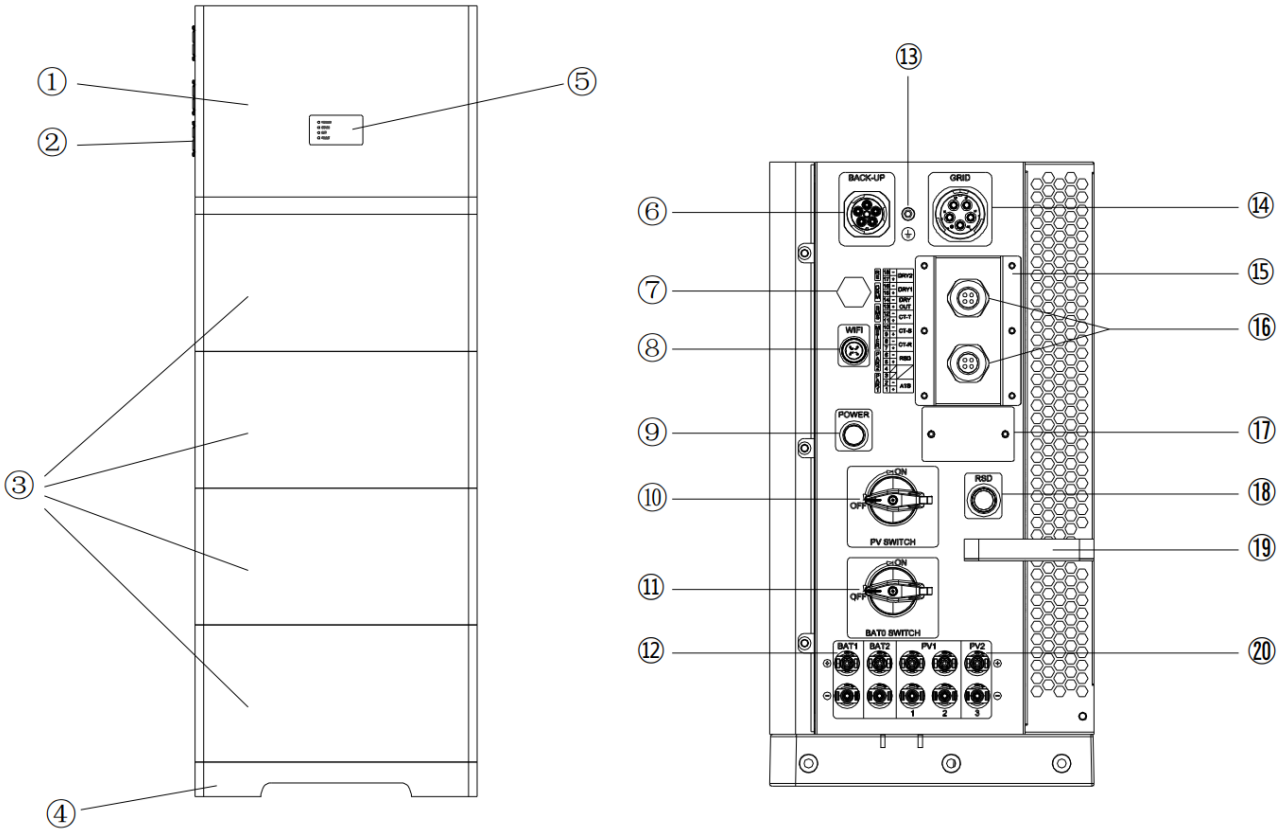


Figure 2.3-1 Appearance description

① Inverter	⑨ POWER switch
② External fan	⑩ PV DC switch
③ Battery pack	⑪ BAT DC switch
④ Base	⑫ BAT1、BAT2 connector
⑤ Indicator light	⑬ Protection earth (PE)
⑥ BACK-UP connector	⑭ GRID connector
⑦ Waterproof vent valve	⑮ Communication-port waterproof cover
⑧ WIFI connector	⑯ Waterproof lock

⑰ Maintenance port baffle	⑲ Handrail
⑱ RSD switch	⑳ PV1、PV2 connector

2.4 Dimensions and Weight

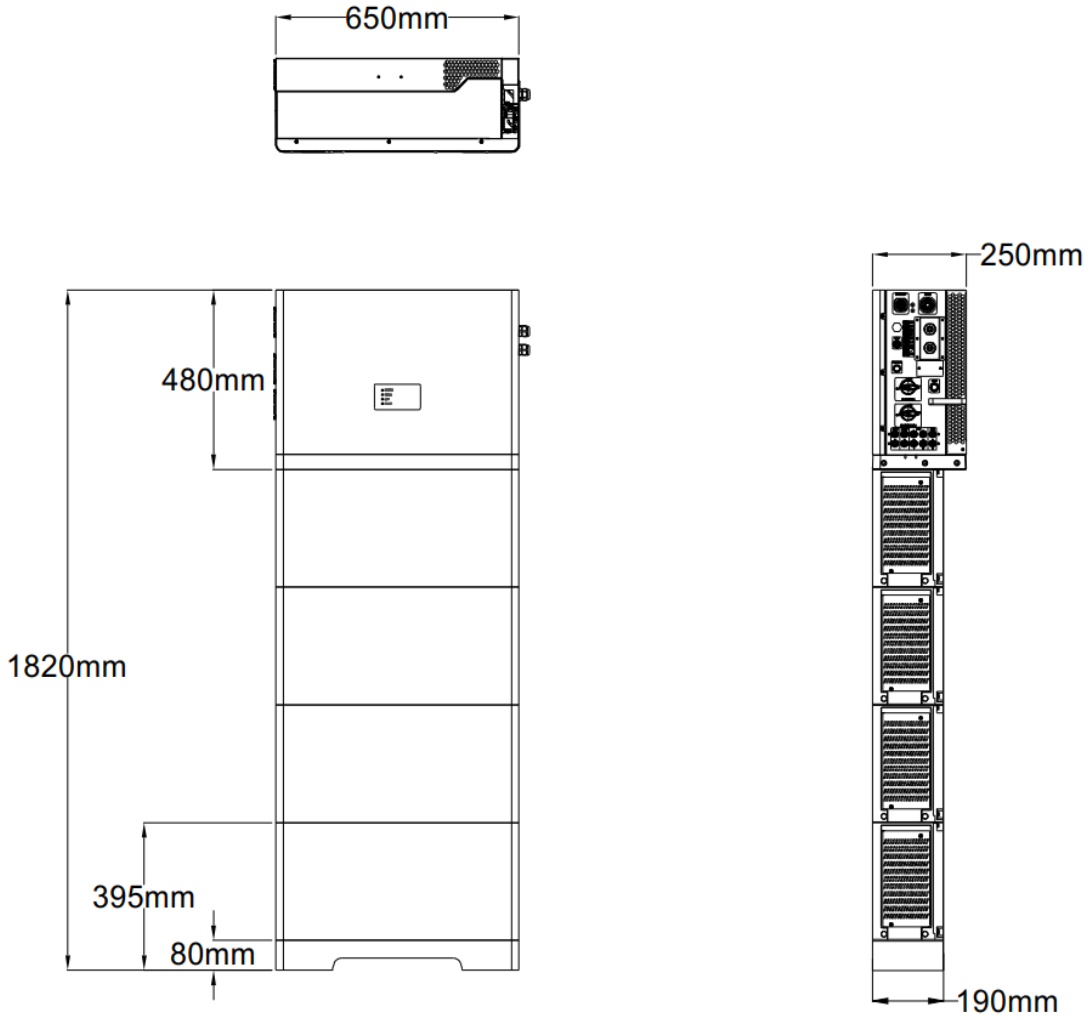


Figure 2.4-1 Dimensions

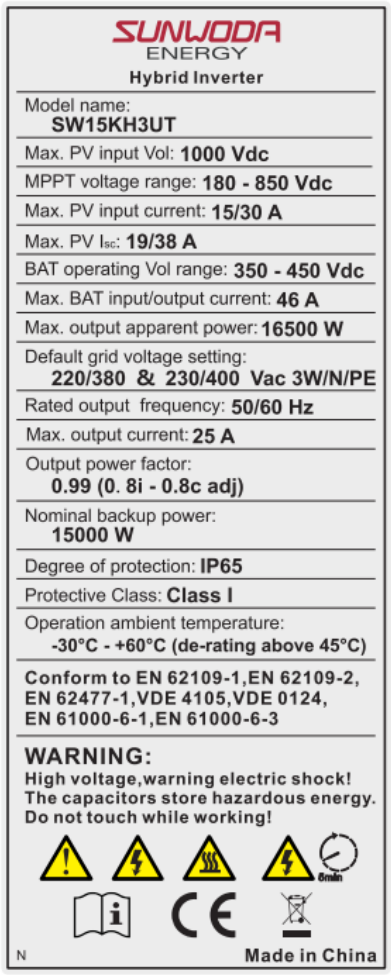
Table 2 Size and weight of models

Model	Battery pack number	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
SW5KW3UT	1	875	650	250	95.0
SW5KH3UT	2	1190	650	250	146.7
SW6KH3UT	3	1505	650	250	198.4

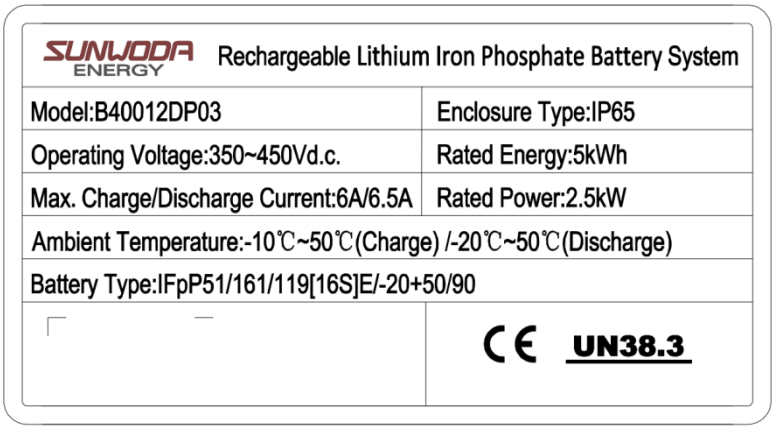
SW8KH3UT	4	1820	650	250	250.1
SW10KH3UT	4	1820	650	250	250.1
SW12KH3UT	3+2	1505+910	650	250	198.4 +116.7
SW15KH3UT	3+3	1820+1225	650	250	198.4 +168.4

2.5 Nameplate

2.5.1 Inverter Nameplate（15kW for example）



2.5.2 Battery Nameplate



3 Installation Guidelines

3.1 Equipment Inspection

The equipment has undergone completed test and strict inspection before leaving factory. The inverter and battery leave factory with normal electrical and mechanical connection property. However, damage may still occur during transportation. Please check the product carefully before signing for it

- Check the packing case for any damage.
- Check that the inverter and battery models match your requirements.
- Check the completeness of the goods according to the packing list.
- Unpack and check all internal equipment is intact and undamaged.

Please contact the dealer as soon and provide photo evidences for service provision if any equipment damaged or uncompleted. Do not discard the original equipment packaging. It is best to store the equipment in the original packaging box after it shut down and remove.

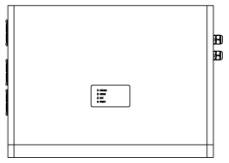
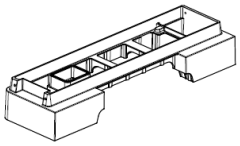
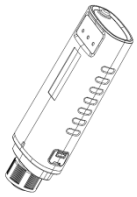
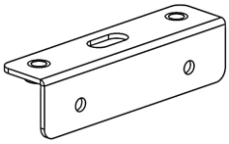
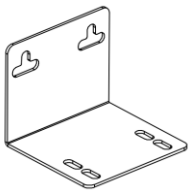
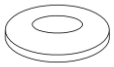
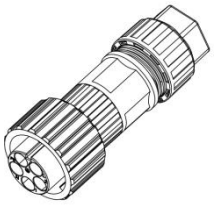
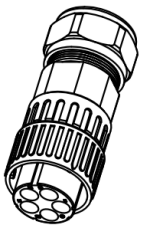
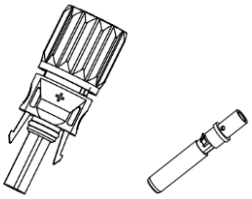
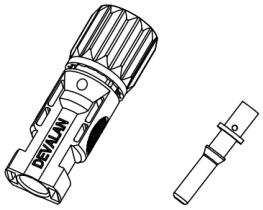
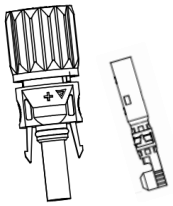
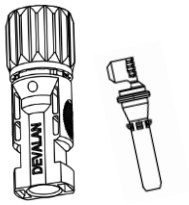
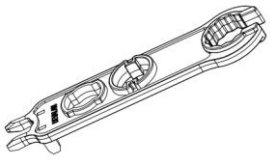
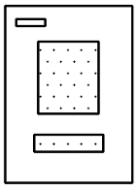
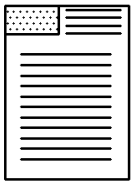
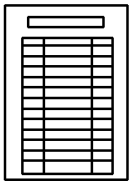
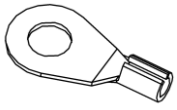
3.2 Accessories List

Please check the appearance of inverter and battery for any damage or accessories lack after opening the packaging.

Please contact the dealer for any damage or accessories lack.

- The list of inverter packaging components shown in Table 3.
- The list of optional accessories for inverters shown in Table 4.
- The list of battery packaging components shown in Table 5.

Table 3 List of inverter packaging components

 Inverter *1PCS	 Battery Base *1PCS	 Screw Cover *4PCS	 WIFI Collector *1PCS
 L-shaped bracket *4PCS	 Battery Angle Bracket *4PCS	 PCS Anti Tipping Plate *1PCS	 M6 Large Flat Gasket *10PCS
 Small Five Core Plug *1PCS	 Five Core Plug *1PCS	 BAT Connection Terminal (Blue Female) *2PCS	 BAT Connection Terminal (Blue Male) *2PCS
 Connection Terminal (Black Female) *3PCS	 Connection Terminal (Black Male) *3PCS	 Remover *1PCS	 User Manual *1PCS
 Qualified certificate This product is permitted to leave the factory after Inspection. Inspector Date Certificate of Conformity *1PCS	 Quality Assurance Card *1PCS	 Delivery Inspection Report *1PCS	 OT Terminal *1PCS

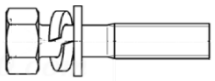
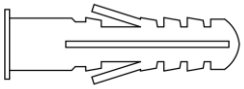
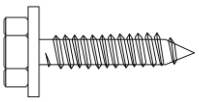
 Cross Hexagonal Combination Screw M5*12 *12PCS	 Cross Hexagonal Combination Screw M6*14 *8PCS	 Expansion Tube φ6X40 *10PCS	 Self-Tapping Screw ST6.3X40 *10PCS

Table 4 List of optional accessories

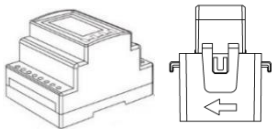
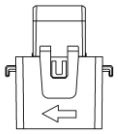
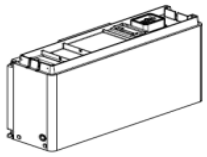
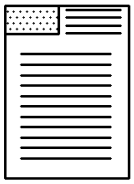
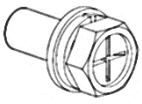
 Meter + CT *1PCS+3PCS	 CT *3PCS		

Table 5 List of battery packaging Components

 Battery Module *1PCS	 Product Packing List *1PCS	 Product Qualification Certificate *1PCS	 Screw Cover *4PCS
 Fix Screw (M5*12) *4PCS			

3.3 Installation Environment

- The installation location must meet the installation requirements of the all-in-one machine.
- Ambient humidity: 10%～95%RH.
- Ambient temperature: -25℃~+50℃.
- Altitude <4000m.

- Install the all-in-one machine in shaded, rainproof, or other sheltered and protected location.
- The installing wall should withstand the long-term machine load with sturdy construction.
- Avoid installing the equipment in flammable, explosive, or corrosive environments.
- Avoid directly sunlight to prevent overheating and power reduction.
- Avoid installing the inverter on buildings made of flammable or heat-resistant materials.
- Avoid children playing near the all-in-one machine to avoid unnecessary injury.

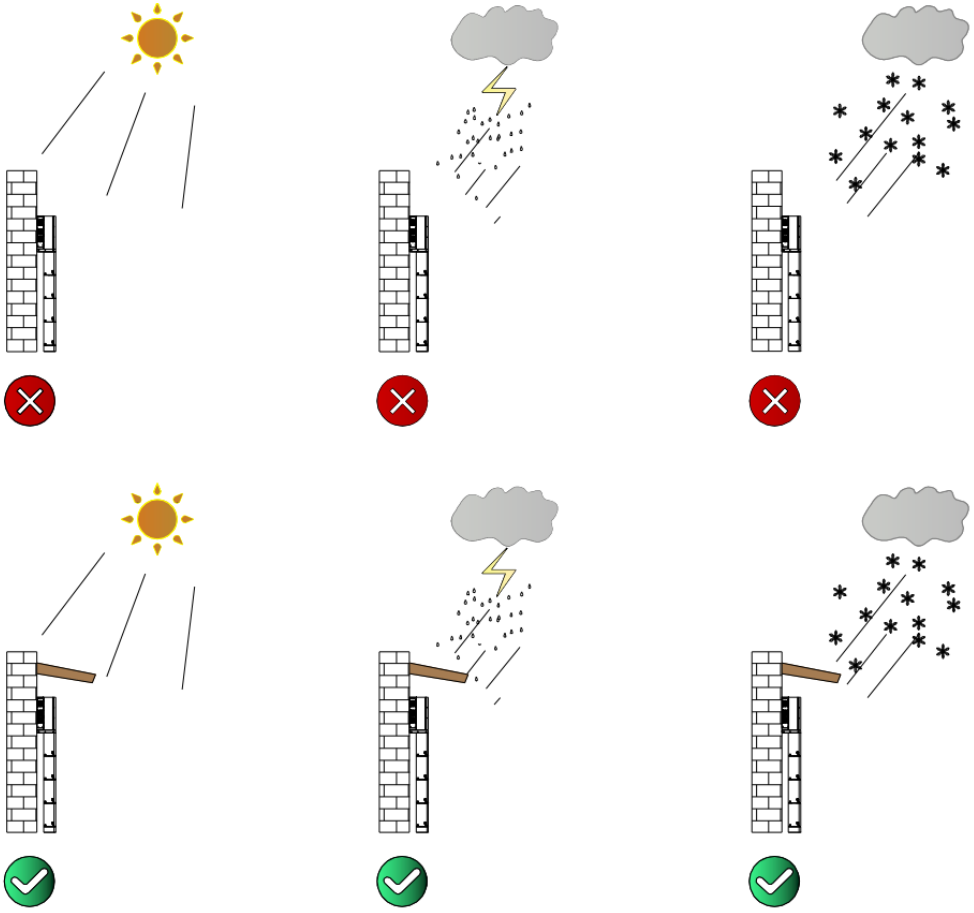


Figure 3.3-1 Installation Environment Diagram

- Recommend installing equipment vertically.
- Do not install the inverter forward (≤ 3 °), backward (≤ 3 °), upside down, horizontally, or laterally.

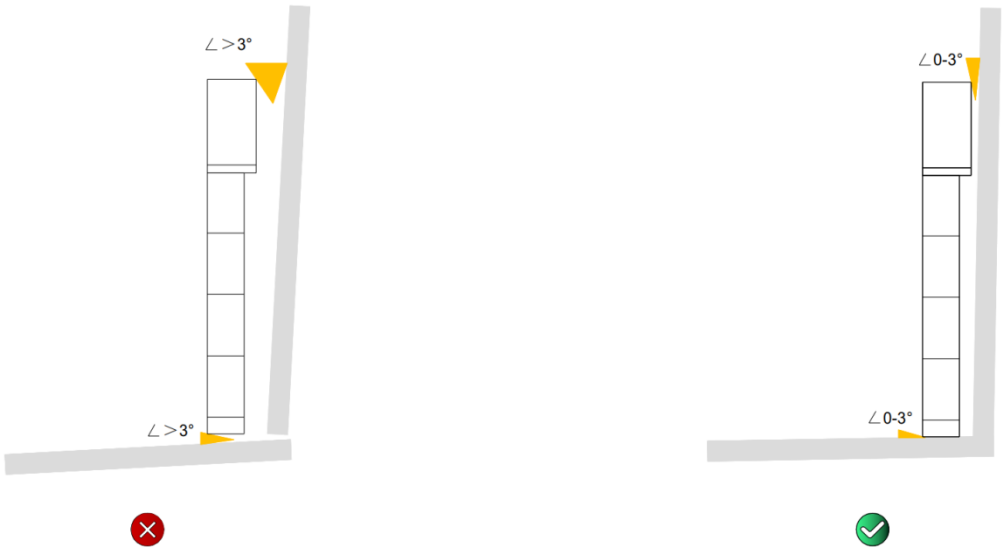


Figure 3.3-2 Installation precautions

- Reserve adequate clearance for the equipment: ensure the normal ventilation of the equipment and the convenient operation of technical personnel. The install clearance reservation diagram and table are as follows:

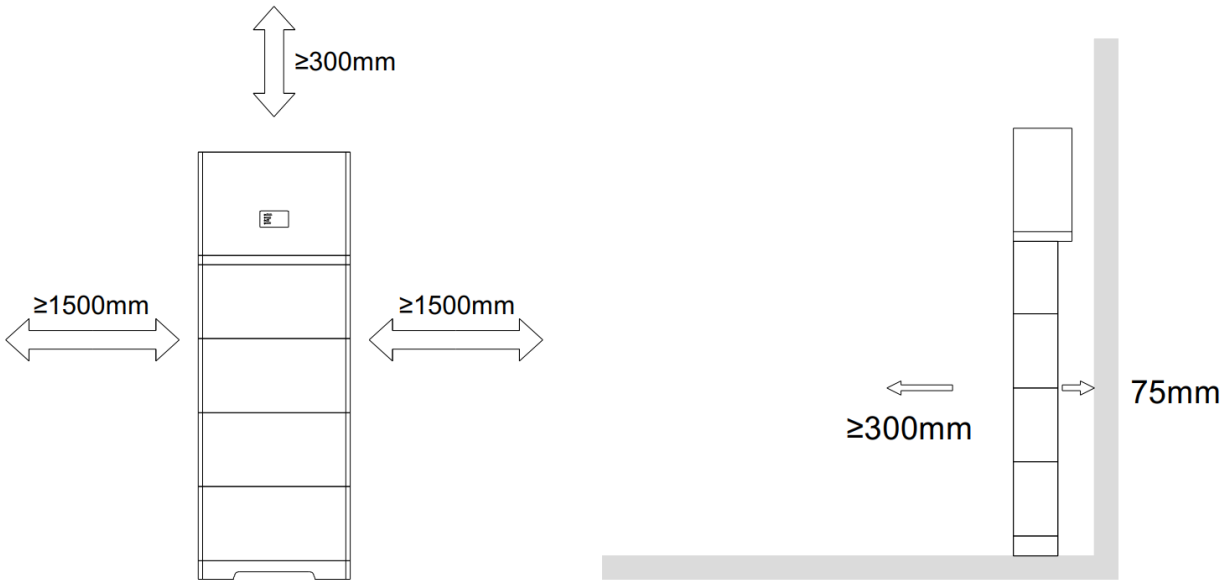


Figure 3.3-3 Install clearance reservation diagram

Table 6 Clearance reservation

Direction	Minimum Clearance（mm）
Upper side	300
Both sides	1500
Front side	300
Rear side	75

- Reserve 1.5 meters between each battery cluster when install multiple parallel machine.

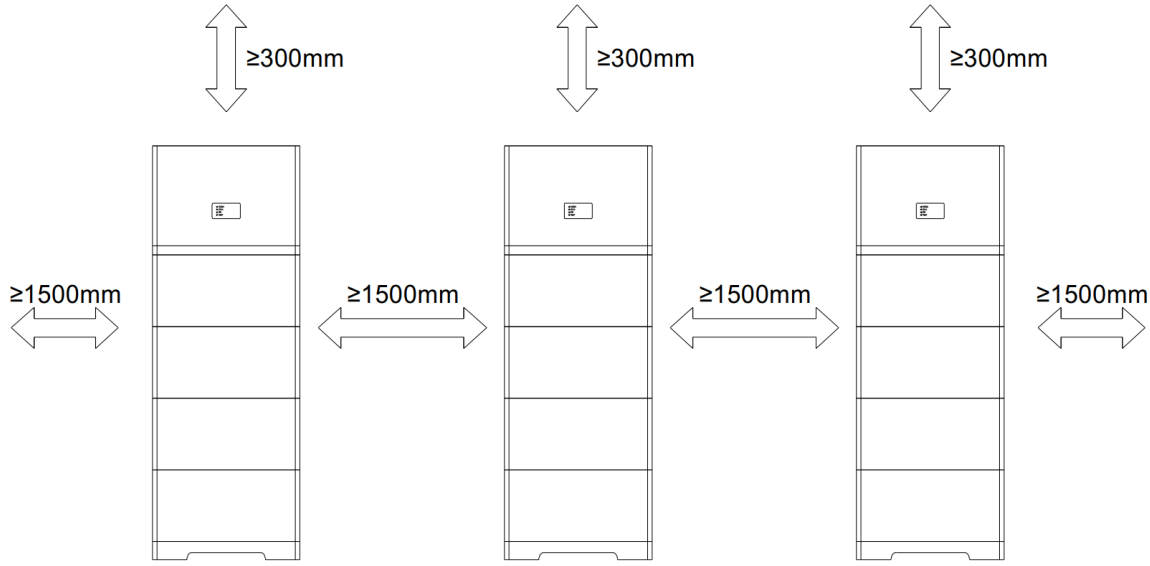


Figure 3.3-4 Multiple parallel machine installation

3.4 Preparation before installation

3.4.1 Installation precautions

Installation location should be professional. It is very critical to ensure the machine safe operation, life cycle and performance, etc.

⚠	• Ensure that the inverter has no electrical connection before installing the inverter and batteries. • Ensure to avoid the water and electricity lines in the wall before drilling.
📖	• Please read the instructions carefully before operating the equipment.

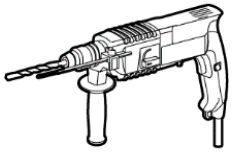
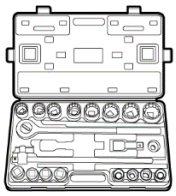
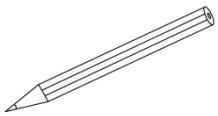
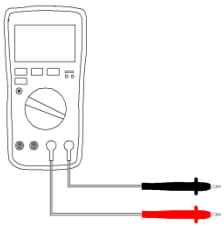
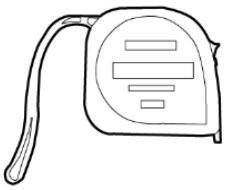
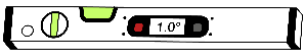
- Protection class of inverter and battery: IP65. (Suitable for indoor or outdoor installation)
- The installation position should be convenient for electrical connection, operation, and maintenance.
- Two installation personnel at least. When multiple people carry heavy objects, they should consider individual physical conditions and do a reasonable division of labor to ensure balanced weight distribution.
- Wear protective tools such as protective gloves and shoes to avoid injury when handling devices manually.

3.4.2 Installation Tools

Table 7 List of power cables

 12 AWG power cable (red/black/blue/ green-yellow)	 10AWG power cable (red/black/blue/ green-yellow)	 8AWG power cable (green-yellow)	

Table 8 List of Installation tools

 Impact drill (3/8 & 13/64 drill)	 Torque wrench (7/16 & 9/16 hexagonal socket)	 Marker pen	 Electric batch
 Hammer	 Detector	 Steel tape	 Level ruler

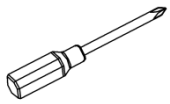
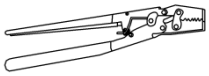
			
Cross screwdriver	Crimping pliers	Wire stripper	

Table 9 Personal protective equipment

			
Safety gloves	Safety goggles	Dust mask	Safety shoes

3.5 Installation steps

Step 1: Place the base.

(1) Take the inverter module and base module out of the carton and put them side by side

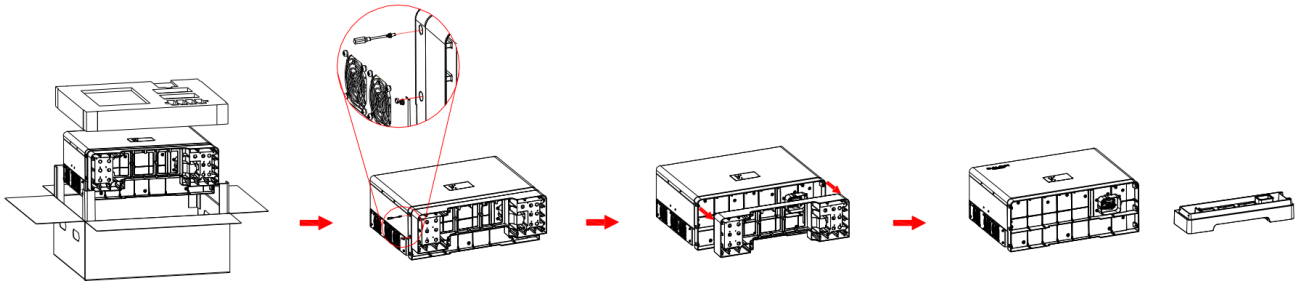


Figure3.5-1 Take out the inverter and base

(2) The base module should be placed on a level ground, parallel to the wall. The clearance to the wall should be 75mm.

* (base module Cannot be installed in a water-wading area)

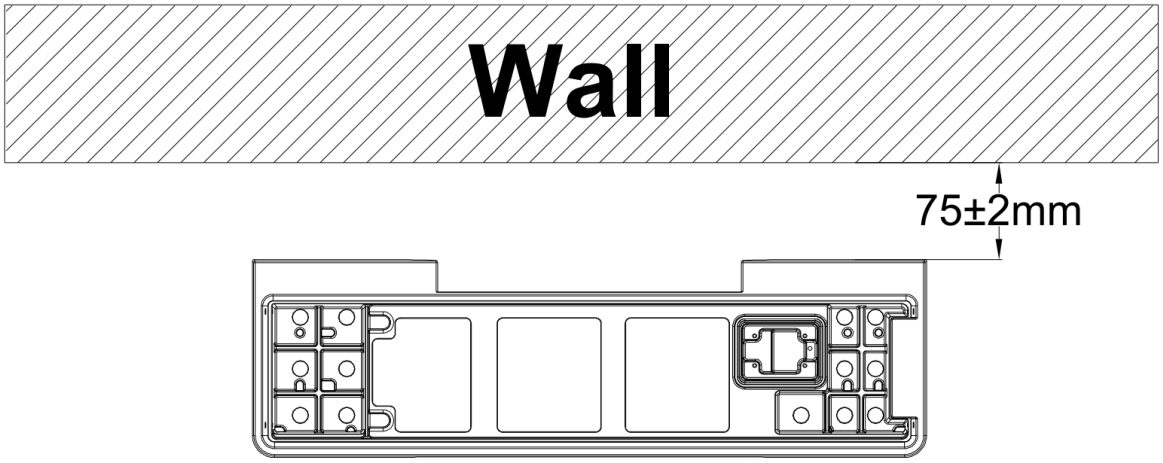
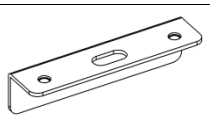


Figure3.5-2 Top view of base mounting

Step 2: Install battery fixing bracket

Battery Angle bracket	-	2PCS	
Fixing screw M5*12	M5*12	4PCS	

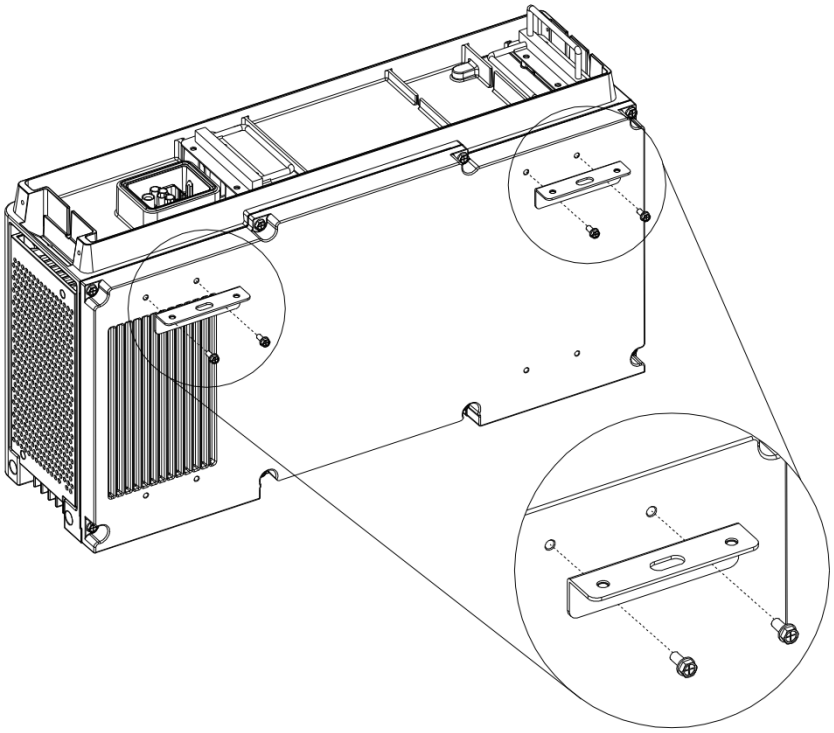
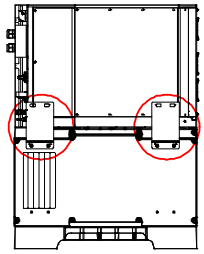
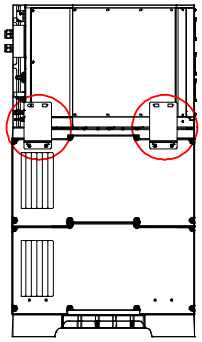
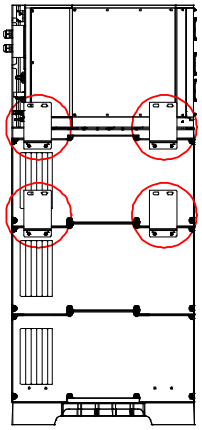
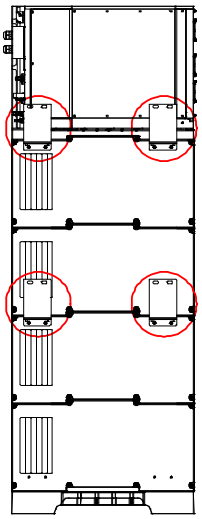


Figure3.5-3 Install fixing screws

Refer to the following for the recommended the wall mounting assembly (angle bracket + L-bracket) installation:

			
1 pcs mounting assembly on **Batt. No.1**	1 pcs mounting assembly on **Batt. No.2**	2 pcs mounting assembly on **Batt. No.2** **Batt. No.3**	2 pcs mounting assembly on **Batt. No.2** **Batt. No.4**

Step 3: Install battery module

(1) Stack battery packs on the base

Align the connector side first, and then stack gently to avoid damaging the connector! As shown in the figure

CAUTION: Battery module unit weights 50kg (110.2lbs). Two or more people are necessary to lift.

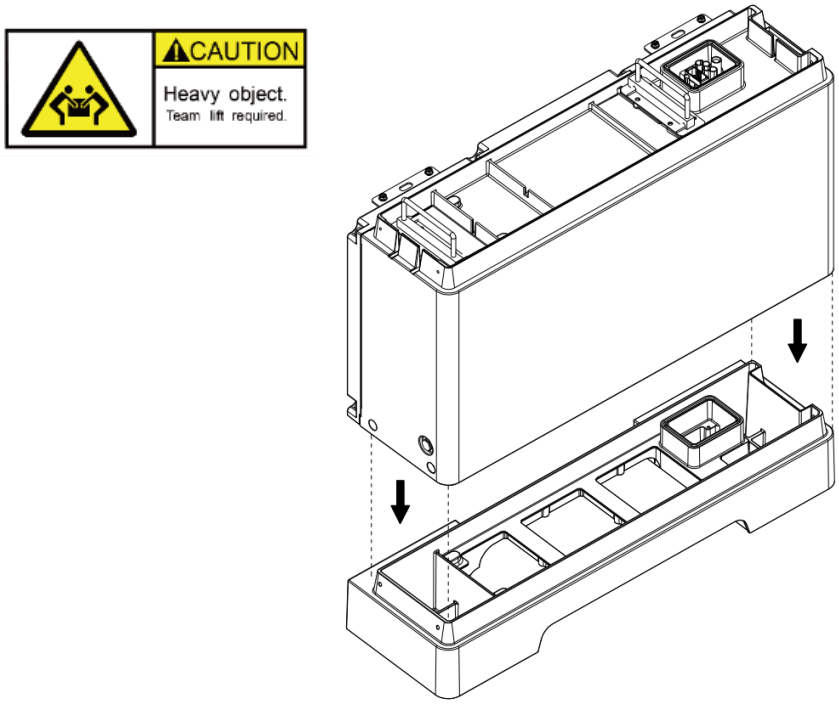


Figure3.5-4 Stack battery packs

(2) Fasten the installed battery module

Fixing screw M5*12	M5*12	4PCS	
Screw cover	-	4PCS	

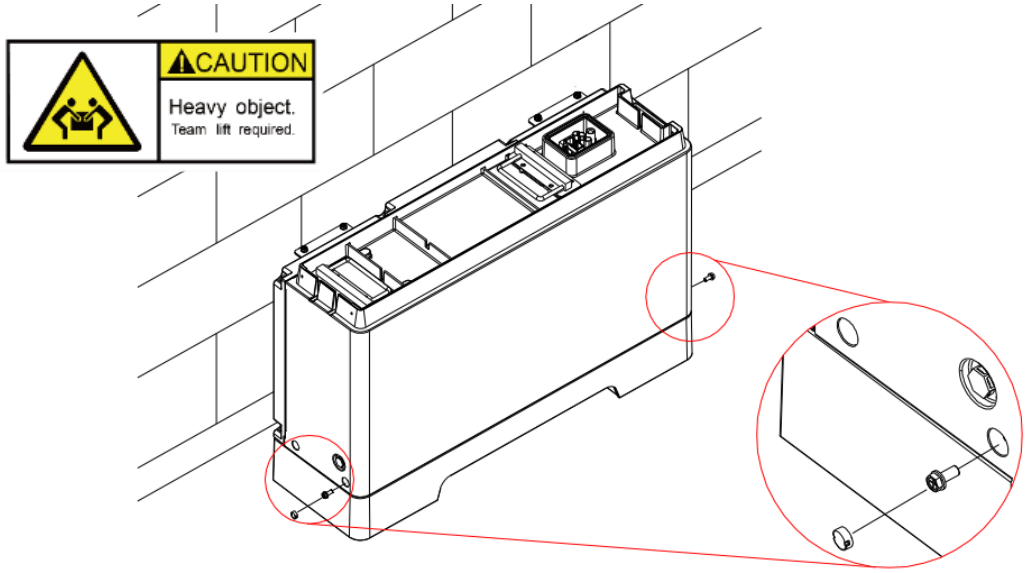


Figure3.5-5 Fasten the installed battery module

(3) Adding additional battery module

Fixing screw M5*12	M5*12	4PCS	
Screw cover	-	4PCS	

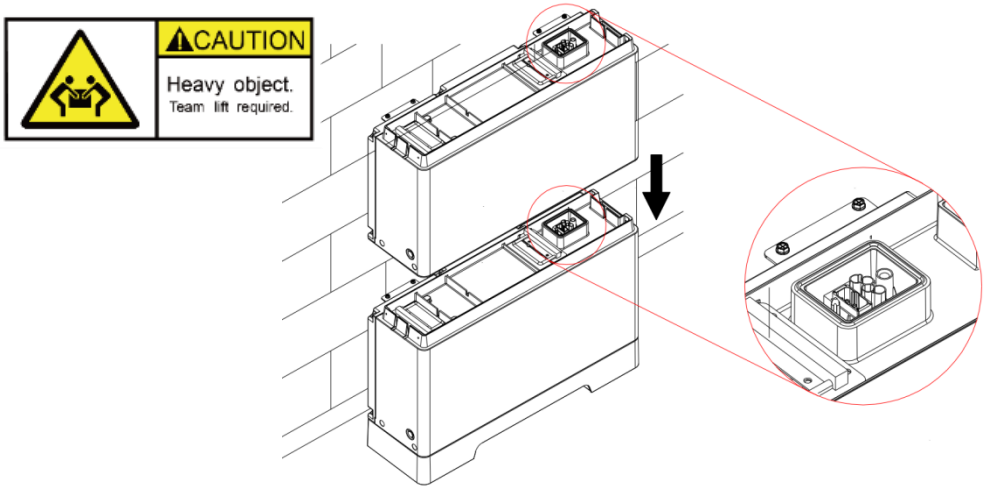


Figure3.5-6 Adding additional battery module

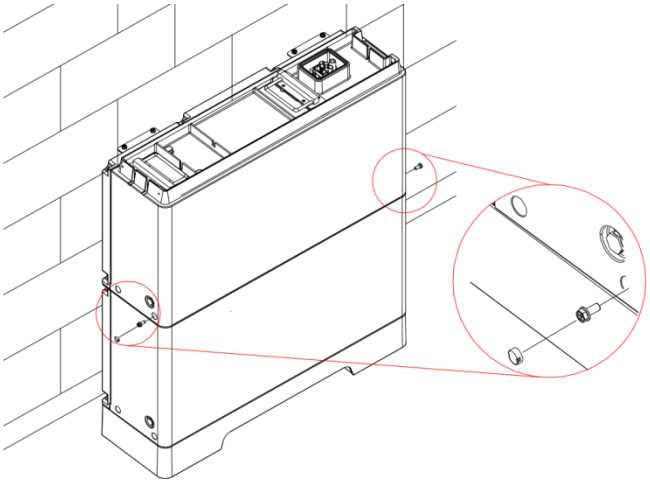
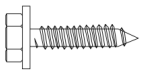
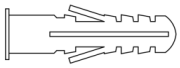
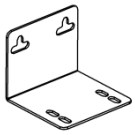
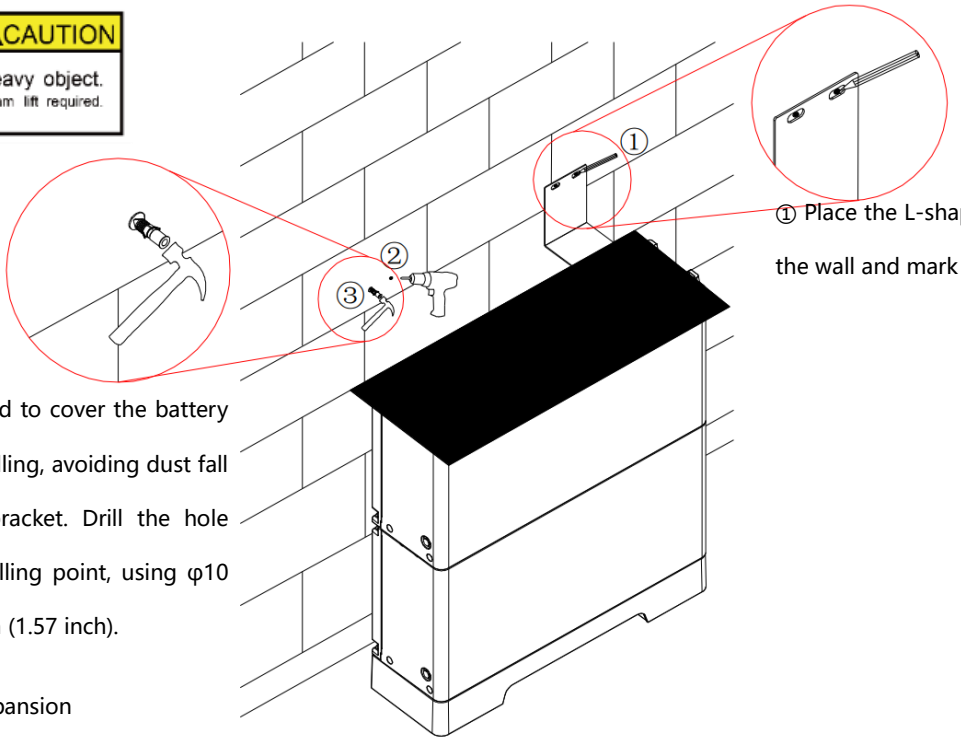


Figure3.5-7 Fasten the installed battery module

(4) Install L-bracket

Self-tapping screws	ST6.3x40	8PCS	
Fixing screw M6*14	M6*14	8PCS	
Screw cover	-	4PCS	
Expansion tube	φ6x40	8PCS	
Large Flat Gasket	-	8PCS	
L-shaped bracket	-	4PCS	



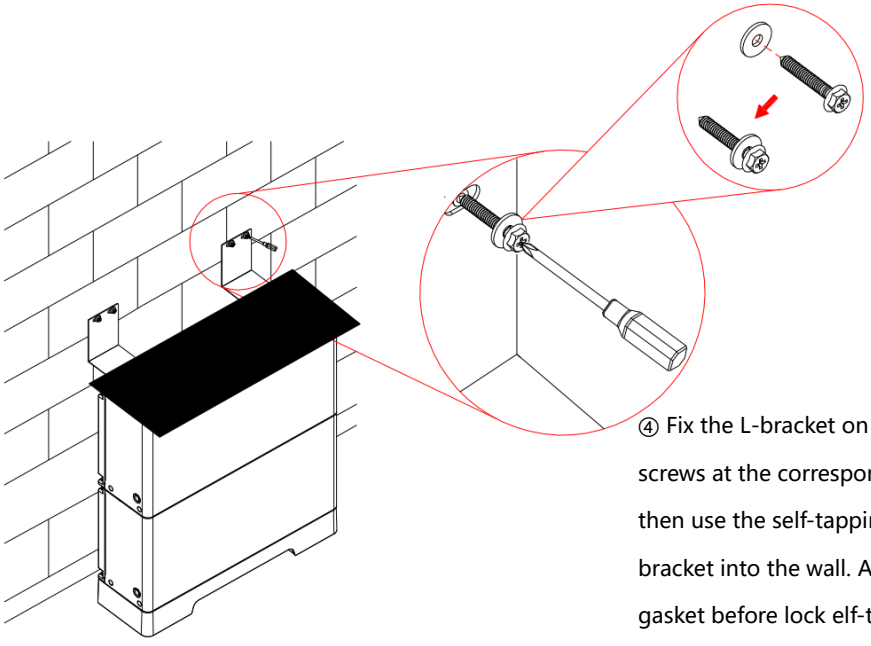


① Place the L-shaped bracket against the wall and mark the drilling point.

② Please use a shield to cover the battery connector before drilling, avoiding dust fall into. Remove the bracket. Drill the hole according to the drilling point, using φ10 drill bit, depth 40mm (1.57 inch).

③ Knock into the expansion

Figure3.5-8 Install L-shaped bracket 1



④ Fix the L-bracket on the battery with screws at the corresponding position, then use the self-tapping screw to fix the bracket into the wall. Adding large flat gasket before lock elf-tapping screw.

Figure3.5-9 Install L-shaped bracket 2

(5) Repeat the above steps to stack all battery modules, as shown.

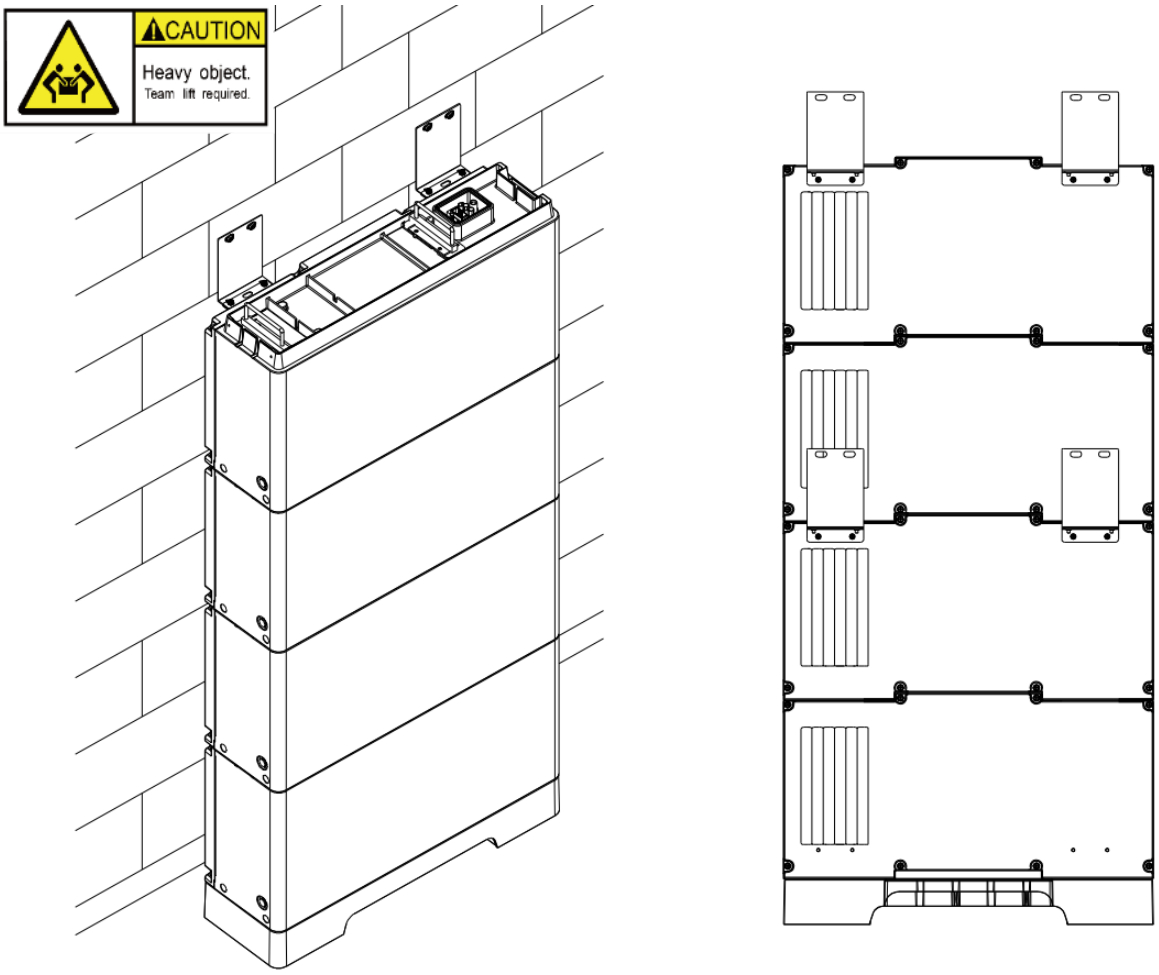
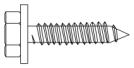
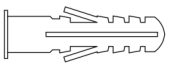


Figure3.5-10 Stack all battery modules

Step 4: Install inverter

PCS Anti tipping plate	-	1PCS	
self-tapping	ST6.3x40	2PCS	
Expansion tube	φ6x40	2PCS	
Large flat gasket	-	2PCS	
Fixing screw M5*12	M5*12	12PCS	
Screw cover	-	4PCS	

(1) The inverter is stacked on the battery as shown. Place vertically on the top of the battery module, and fix the anti-dumping bracket with screws.

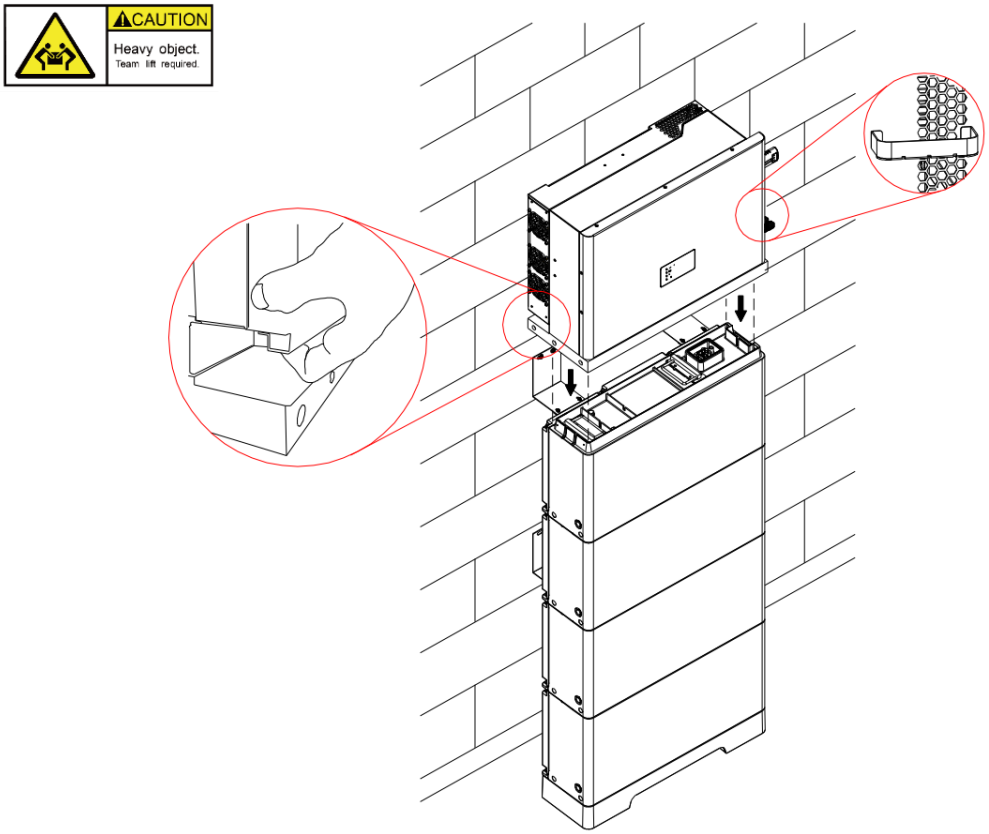
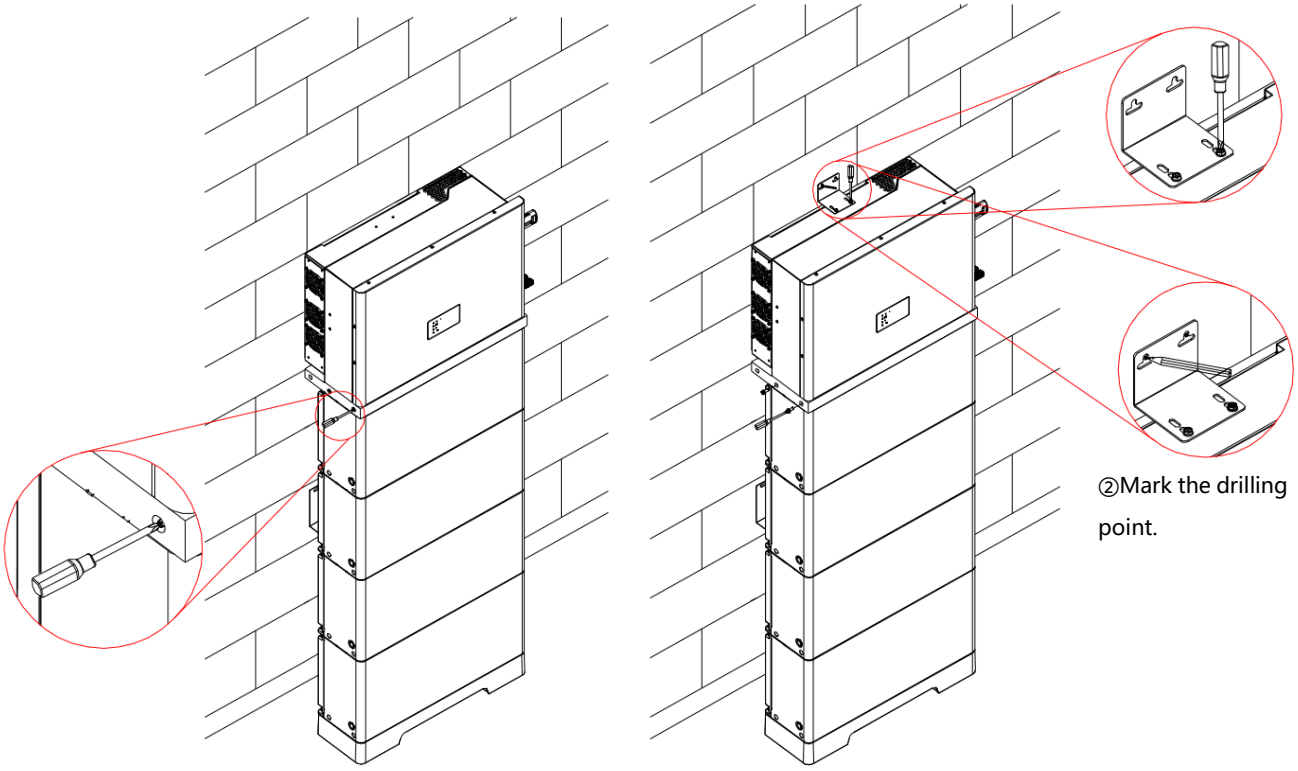


Figure3.5-11 Install inverter 1

①Lock the anti-tipping bracket.



②Mark the drilling point.

Figure3.5-12 Install inverter 2

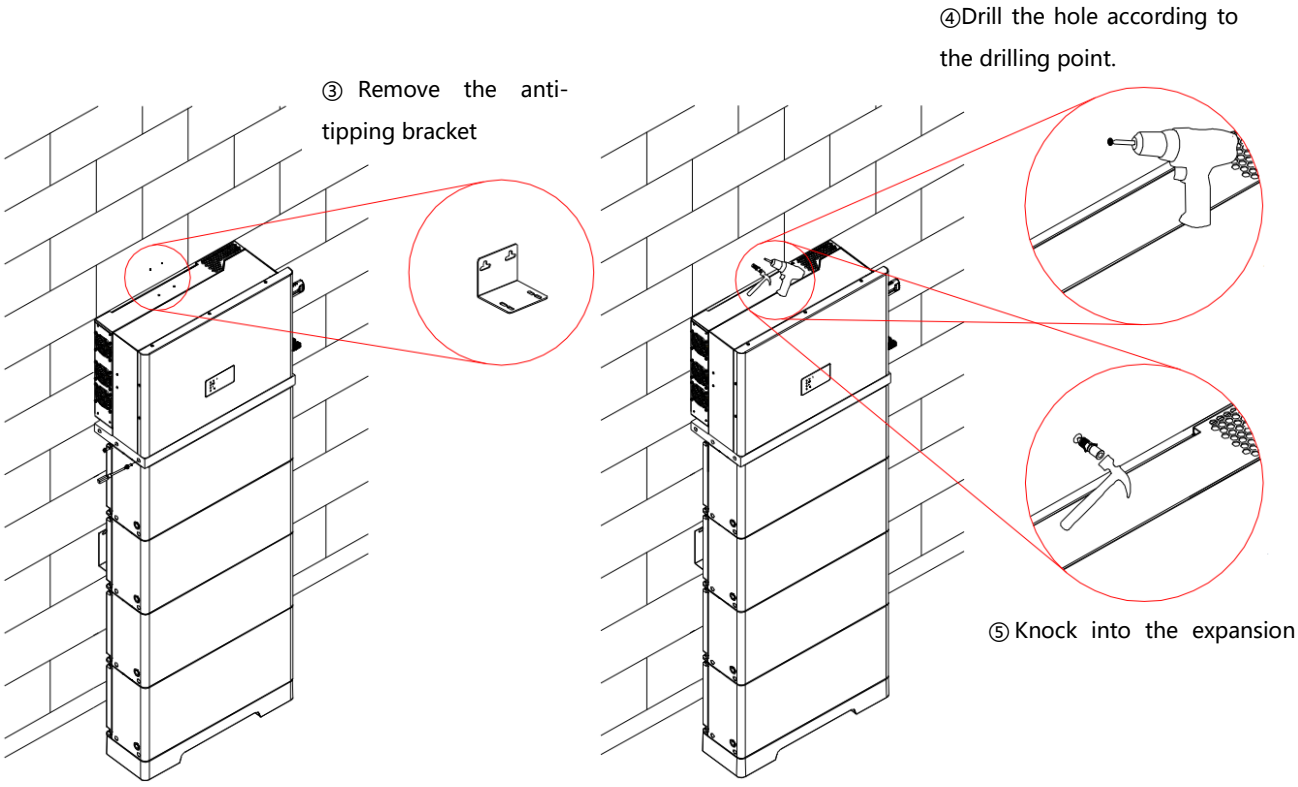
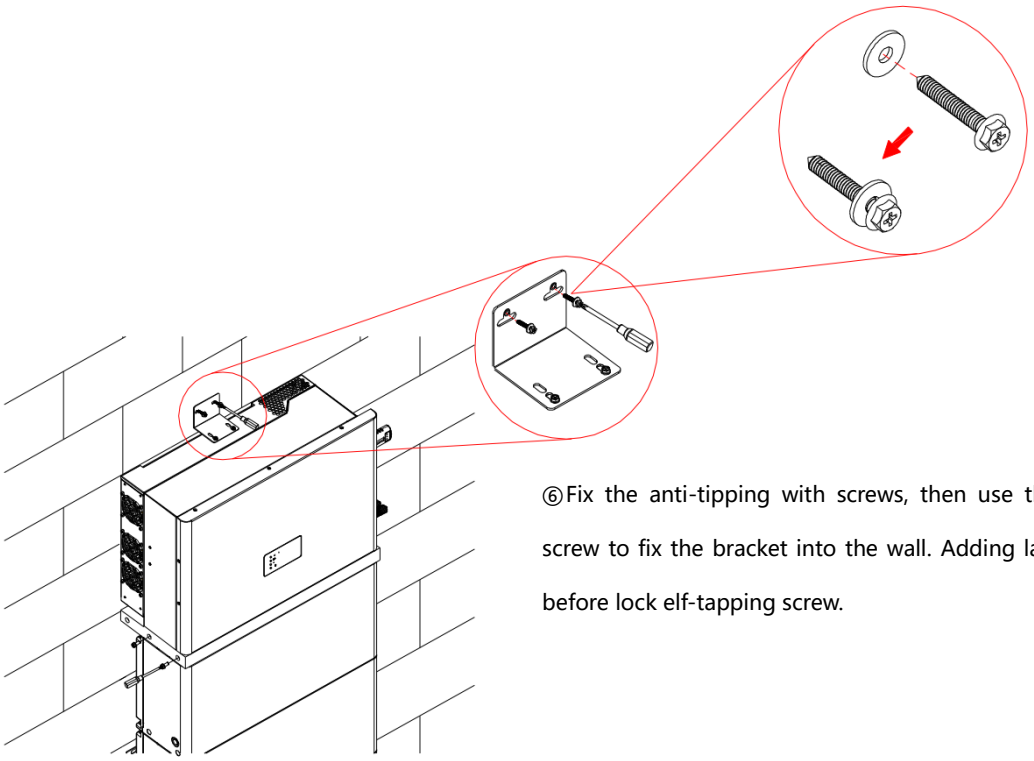


Figure3.5-13 Install inverter 3



⑥Fix the anti-tipping with screws, then use the self-tapping screw to fix the bracket into the wall. Adding large flat gasket before lock elf-tapping screw.

Figure3.5-14 Install inverter 4

(2) Installation is complete as shown.

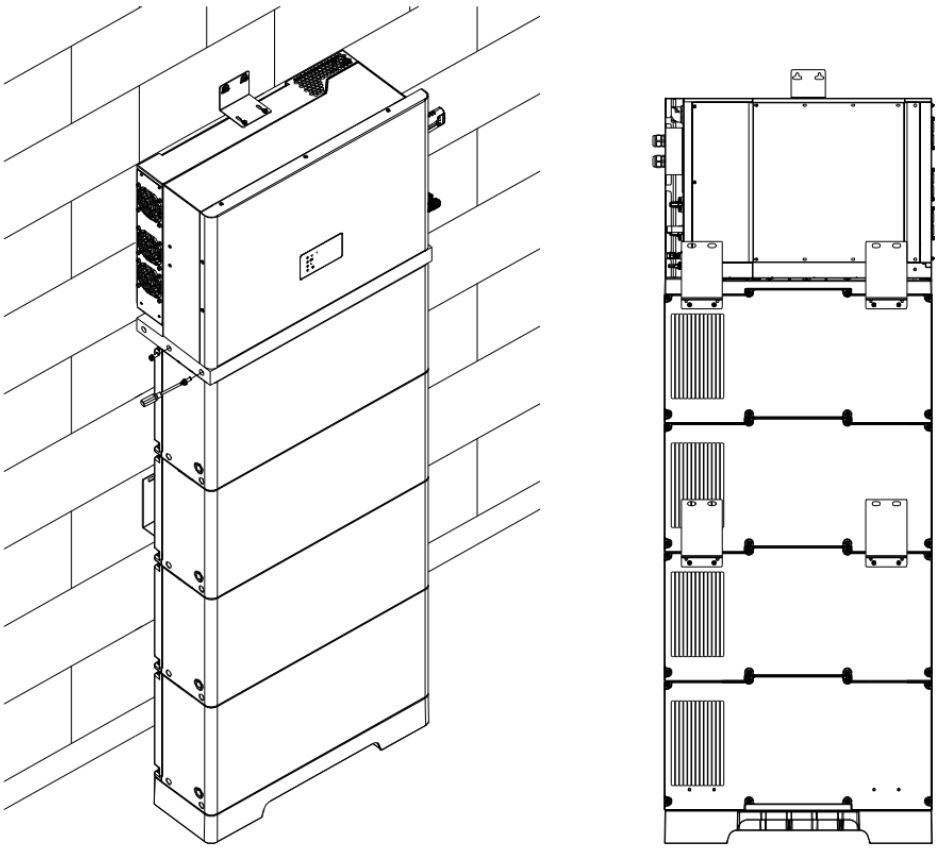


Figure3.5-15 Installation completed

4 Electrical connections

4.1 Notice

	● Do not power on the system during electrical connection. High voltage in the conducting part of inverter or battery may cause electric shock accidents. ● Ensure that the waterproof lock of the cable is tightened. Improperly installed cable connectors may damage the inverter due to moisture and dust infiltration. All warranty claim clause will be invalid for this reason. ● Using the insulation tools during the process of replacing or installing the inverter. ● Do not connect the same PV series to multiple inverters. Otherwise, the inverters may be damaged. ● Do not connect the same battery pack to multiple inverters. Otherwise, the inverters may be damaged.
	● Before the electrical connection, ensure that the inverter DC switch is "OFF" and the AC side air switch is disconnected. Otherwise, the high voltage of the inverter may cause life danger.

	• Please read the instructions carefully before operating the equipment

4.2 Preparation before Connection

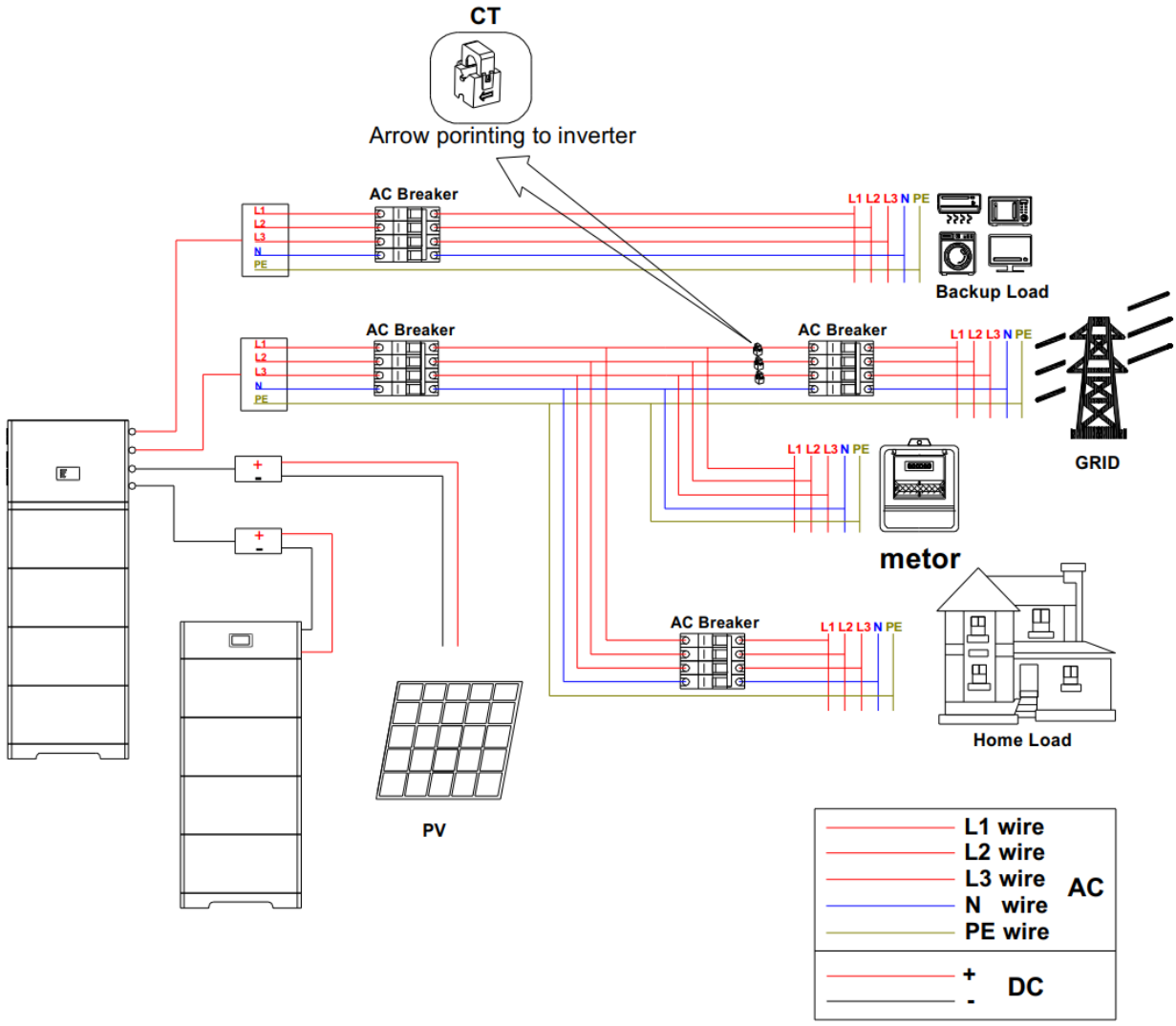


Figure 4.2-1 System circuit diagram

The recommended cables are prepared as shown in the table below:

Table10 Recommended cable specification

NO.	Cable	specification
1	PV connect cable	12AWG
2	GRID connect cable	8AWG
3	BACK-UP connect cable	10AWG
4	DC connect cable	8AWG

4.2.1 WIFI collector access

The WIFI collector access method shown in below.

Note：Only turn the WIFI collector head end.

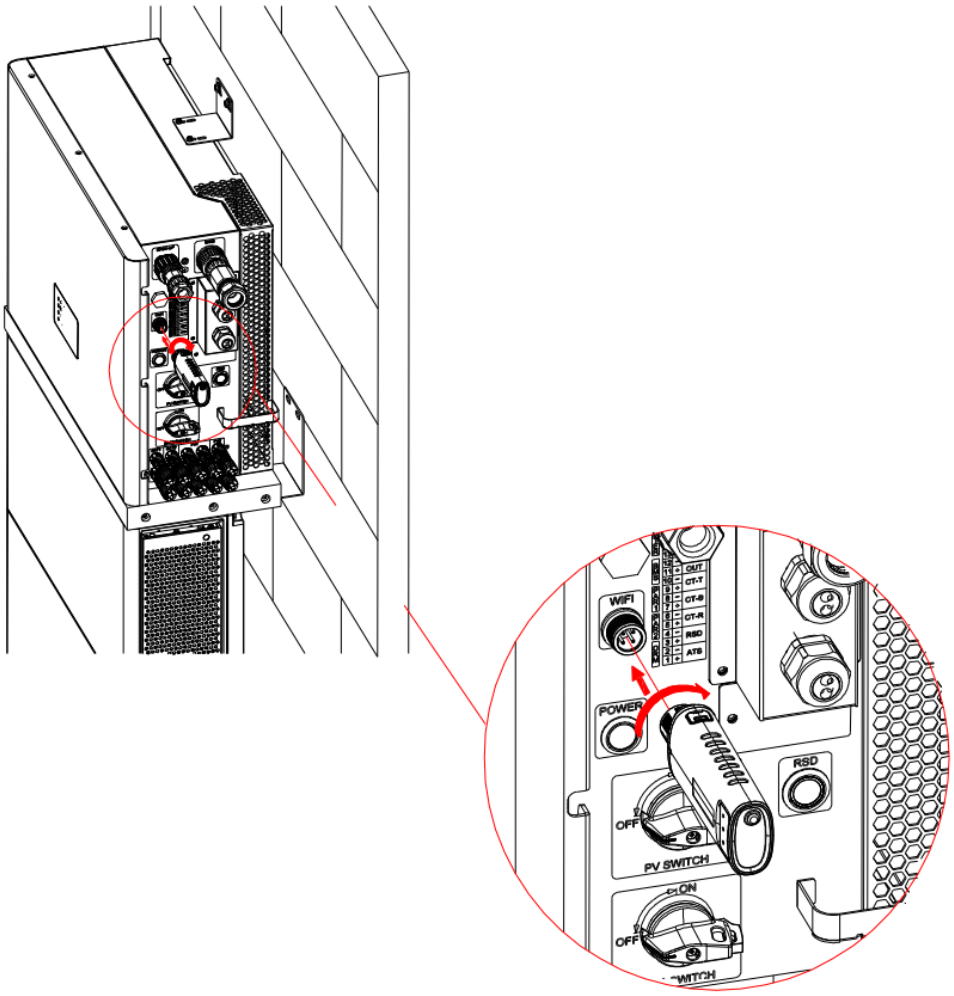


Figure 4.2-2 WIFI collector access method

Indicator light status after successful WIFI access：

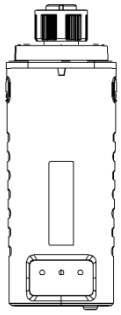


Figure 4.2-3 WIFI collector diagram

Table 11 Indicator Light meaning

Indicator light sign	Normal operation state	Indicator Light meaning
NET	constant-bright	Server connection successful
COM	constant-bright	Collector work normally
PEADY	flashing	Collector connected to inverter successfully

4.2.2 Dial switch

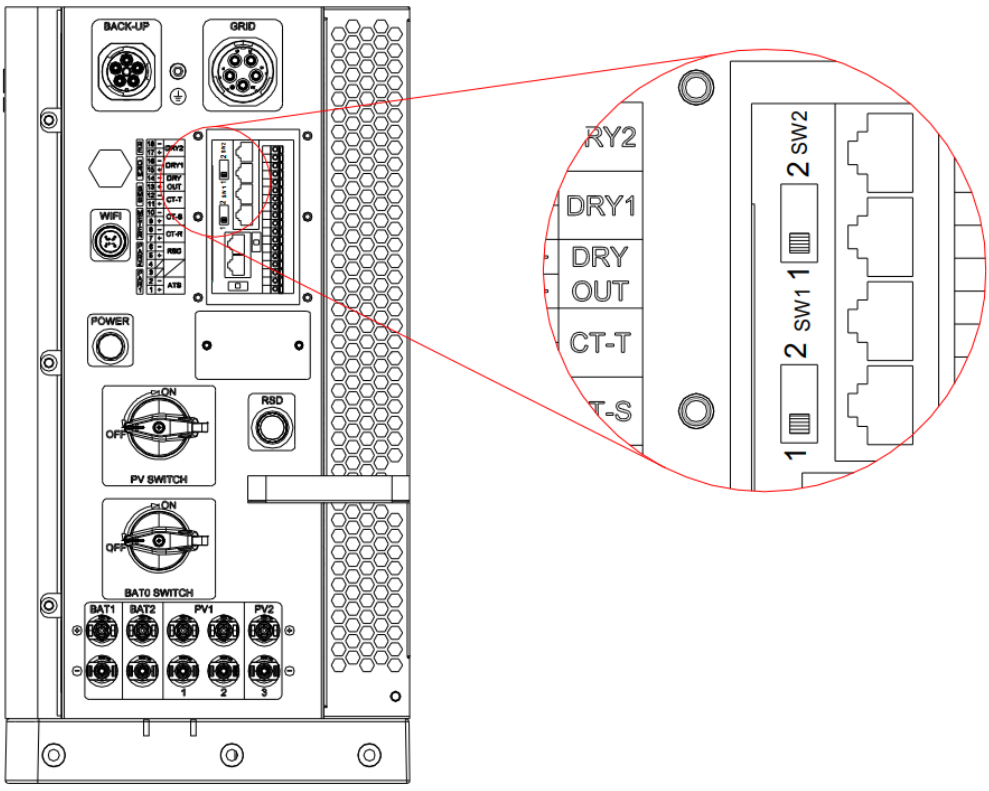


Figure 4.2-3 Dial switch diagram

Table 12 Dial switch meaning

Dial switch	Default state	Dial switch meaning
SW1	1	Dial 2 when the PCS in parallel
SW2	1	Dial 2 when the battery cluster in parallel

4.3 Electrical Connector

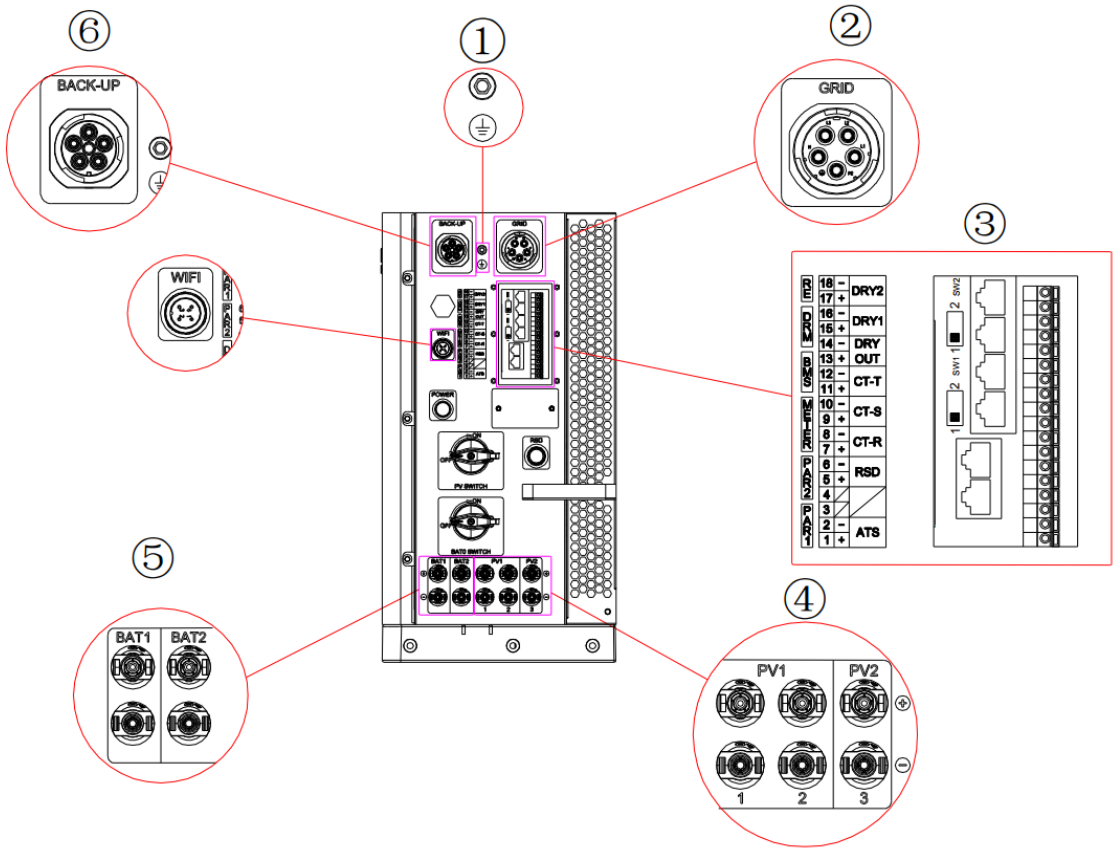


Figure 4.3-1 Inverter connector diagram

Table13 Port description

NO.	Connector	Port	Port description
①	Ground	PE	Ground protection
②	Utility grid	GRID	Grid cable interface
③	External function	PAR1、PAR2、METER、BMS、DRM、RE	Parallel mainframe, Parallel slave machine、Meter, Battery, Dry contact, Reservation

		1.ATS+; 2.ATS-; 3. / 4. / 5. RSD+、6. RSD- 7. CT-R+、8. CT-R- 9. CT-S+、10. CT-S- 11. CT-T+、12. CT-T- 13. DRYOUT+、14. DRYOUT- 15. DRY1+、16. DRY1- 17. DRY2- 18. DRY2-	1-2.ATS、5-6.RSD power、7-12.CT connector、13-14.Output dry contact、15-18.Input dry contact
④	PV	PV1-1+、PV1-1-、PV1-2+、PV1-2-、PV2+、PV2-	PV series connection port
⑤	BAT	BAT1+、BAT1-、BAT2+、BAT2-	External battery input interface
⑥	grid-off	BACK-UP	Load cable interface

4.4 Ground Protection Connection

This section describes the connect steps of connector ①.

- OT terminal and ground screw in accessories package
- Recommended cable specification:12AWG

Crimp the OT terminal of cable as follows:

Step 1: Strip the cable. Be careful not to scratch the cable core.

Crimp the OT terminal onto the cable to cover the conductor core wires completely. Then cover the junction between OT terminal and cable with heat shrink tubing or insulation tape.

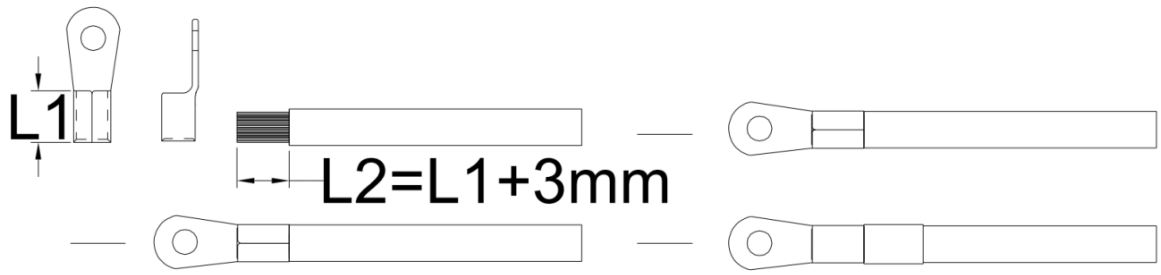
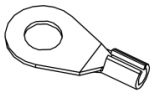


Figure 4.4-1 Strip the cable

Step 2: Place the cable on cable port and tighten with screw.

Ground screw	M5X12	1PCS	
OT terminal	RNB8-5S	1PCS	

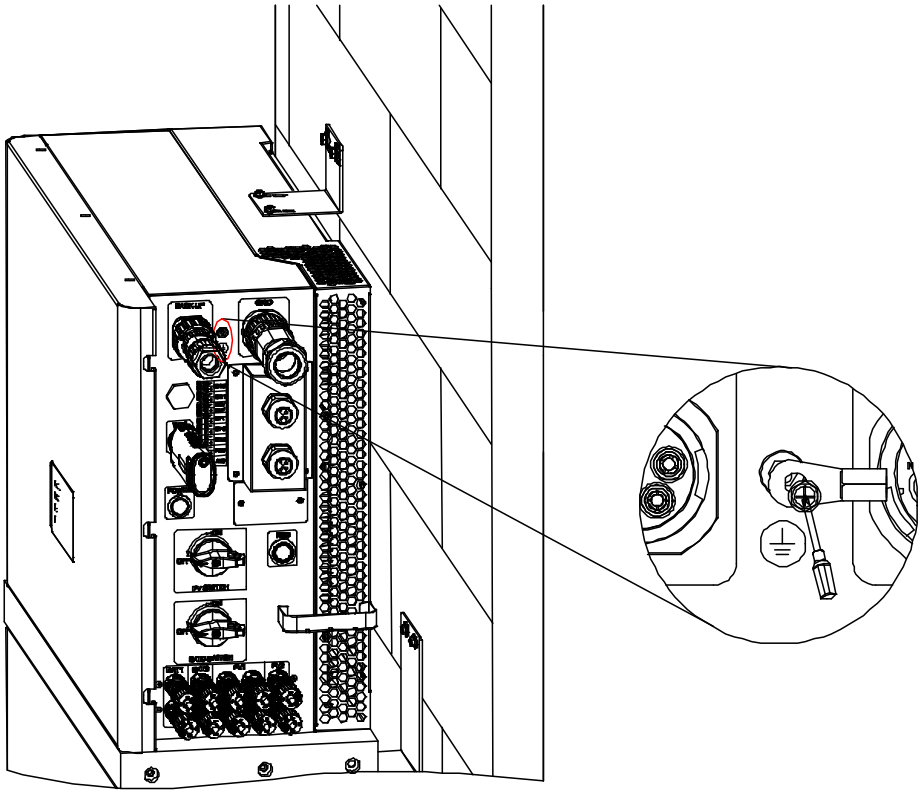


Figure 4.4-2 Inverter ground protection

4.5 PV and BAT Connection

This section describes the connect steps of BAT and PV connector.

1) Connect BAT

- Power off before operating the all-in-one.
- Battery short circuit may cause injury to person or property. The instantaneous high current caused by the short circuit can release a lot energy and cause fire
- Before connecting the battery cable, ensure that the inverter and battery are power off, and the front and rear switches of the inverter are off.
- Do not connect or disconnect battery cables during the inverter running. Improper operation can lead to electric shock hazard
- Using insulation tools to prevent accidental electric shock or battery short circuit during connecting battery cables.
- Recommended cable specification: 8AWG

Steps of connection as follows:

Step 1: BAT Positive and negative cables connect to the terminal core.

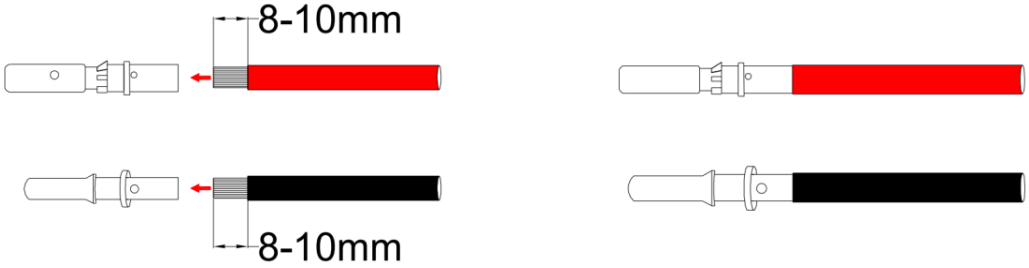


Figure 4.5-1 Prepare BAT-inverter cables

Step 2: After finished the cable with terminals, insert the BAT cables into the connector plastic shell until you hear the "click, as shown in the figure. If it need to tighten, please use the disassembly tool to operate as shown below:

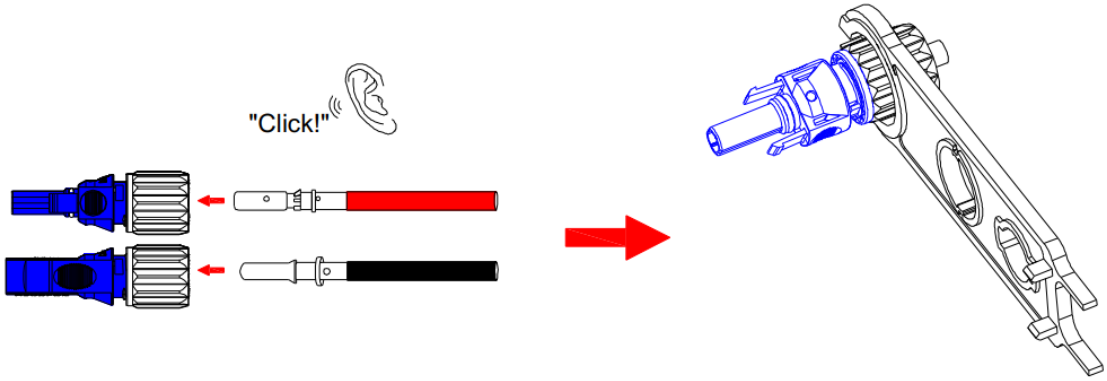


Figure 4.5-2 Connect the positive and negative connectors

Step 3: Connect the prepared BAT cables to the inverter. Please determine the polarity before inserting, and connect until you hear the "click", the connection is complete.

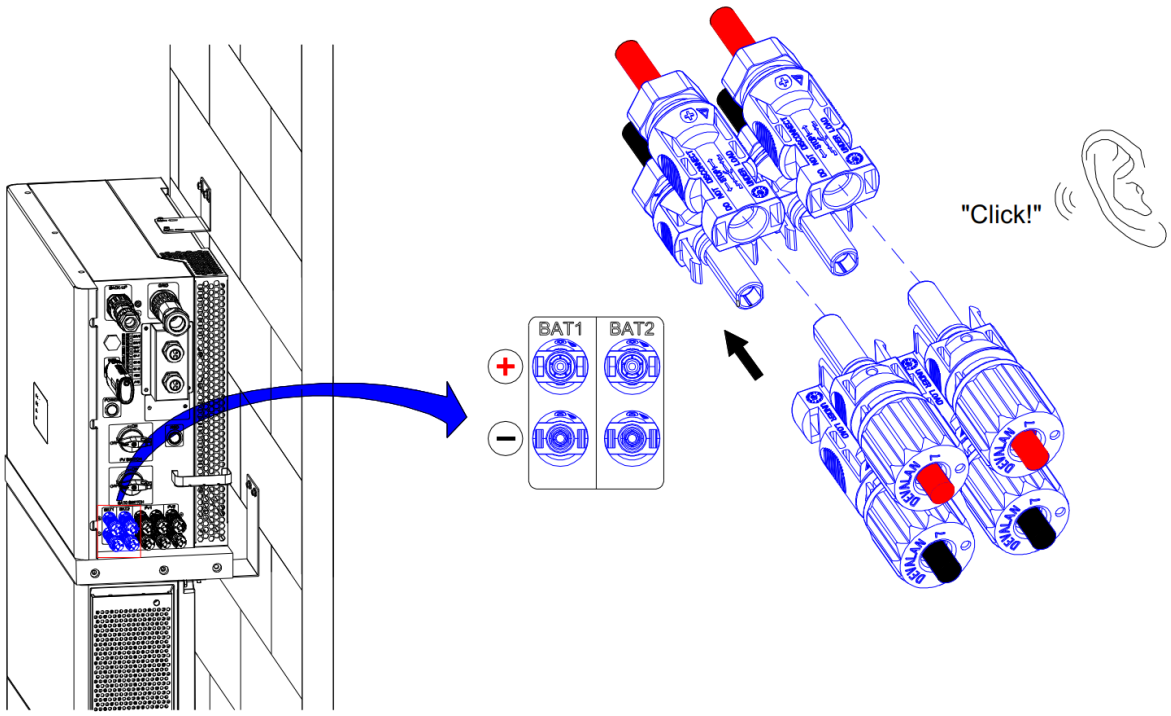


Figure 4.5-3 Connect with inverter

Step 4: Connect the other end of prepared BAT cables to DC+ and DC- of battery. Please determine the polarity before connecting.

2) Connect PV

- Please operate with the inverter and battery power down.
- Ensure that the positive and negative terminals are correctly connected before connecting the PV cable
- Recommended cable specification: 12AWG

Steps of connection as follows:

Step 1: PV Positive and negative cables connect to the terminal core

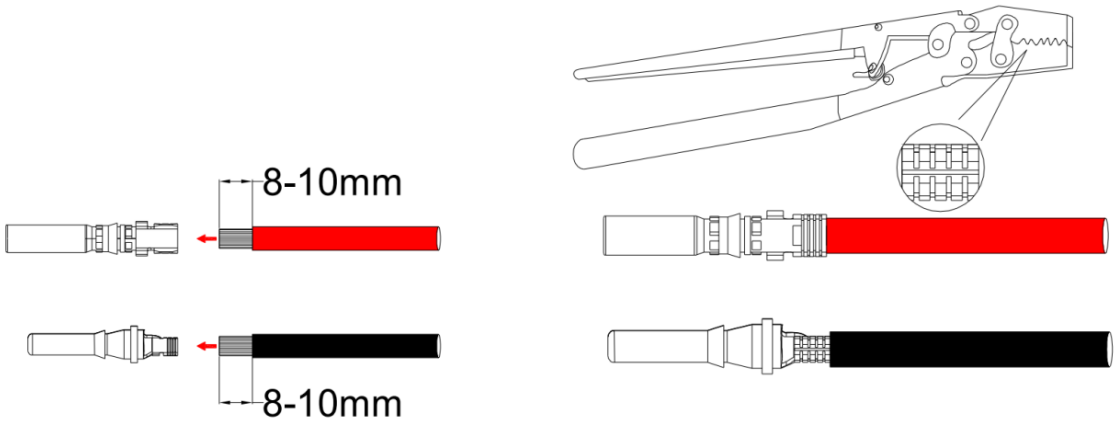


Figure 4.5-4 Prepare PV cables

Notice: Do not press the point of cable. Otherwise, the terminal cannot properly installed.

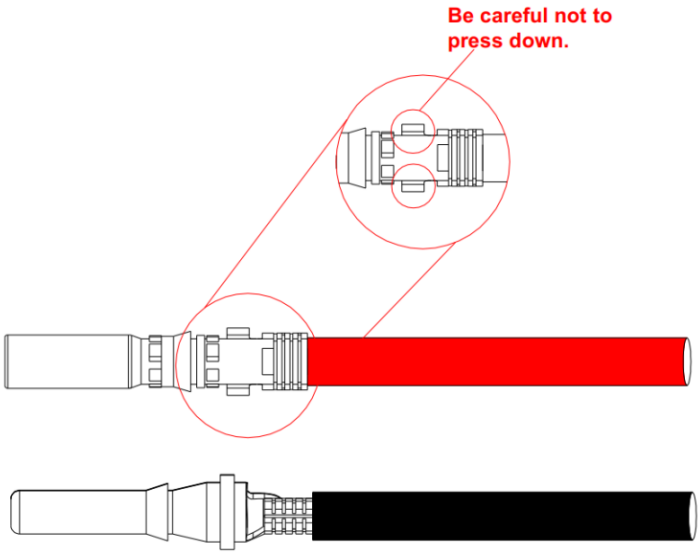


Figure 4.5-5 Precautions for preparation

Step 2: After finished the cable with terminals, insert the PV cables into the connector plastic shell until you hear the "click, as shown in the figure. If it need to tighten, please use the disassembly tool to operate as shown below:



Figure 4.5-6 Connect the positive and negative connectors

Step 3: Ensure the correct polarity of the pV cable. Measure the DC voltage by multimeter to ensure that each PV string ranges is 200-1000V.

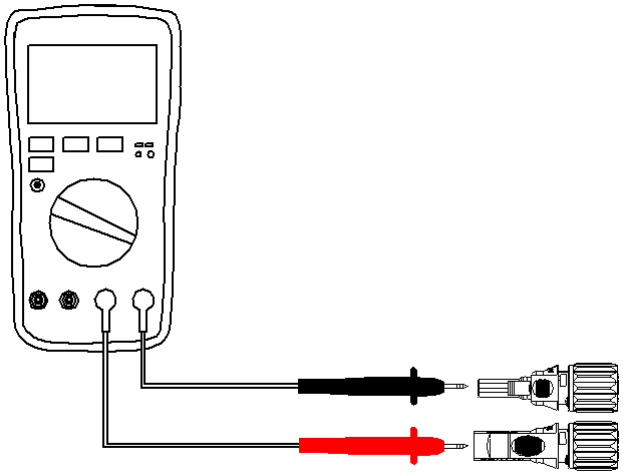


Figure 4.5-7 Measure the DC voltage of PV string

Step 4: Connect the prepared PV cables to the inverter. Please determine the polarity before inserting, and connect until you hear the "click", the connection is complete.

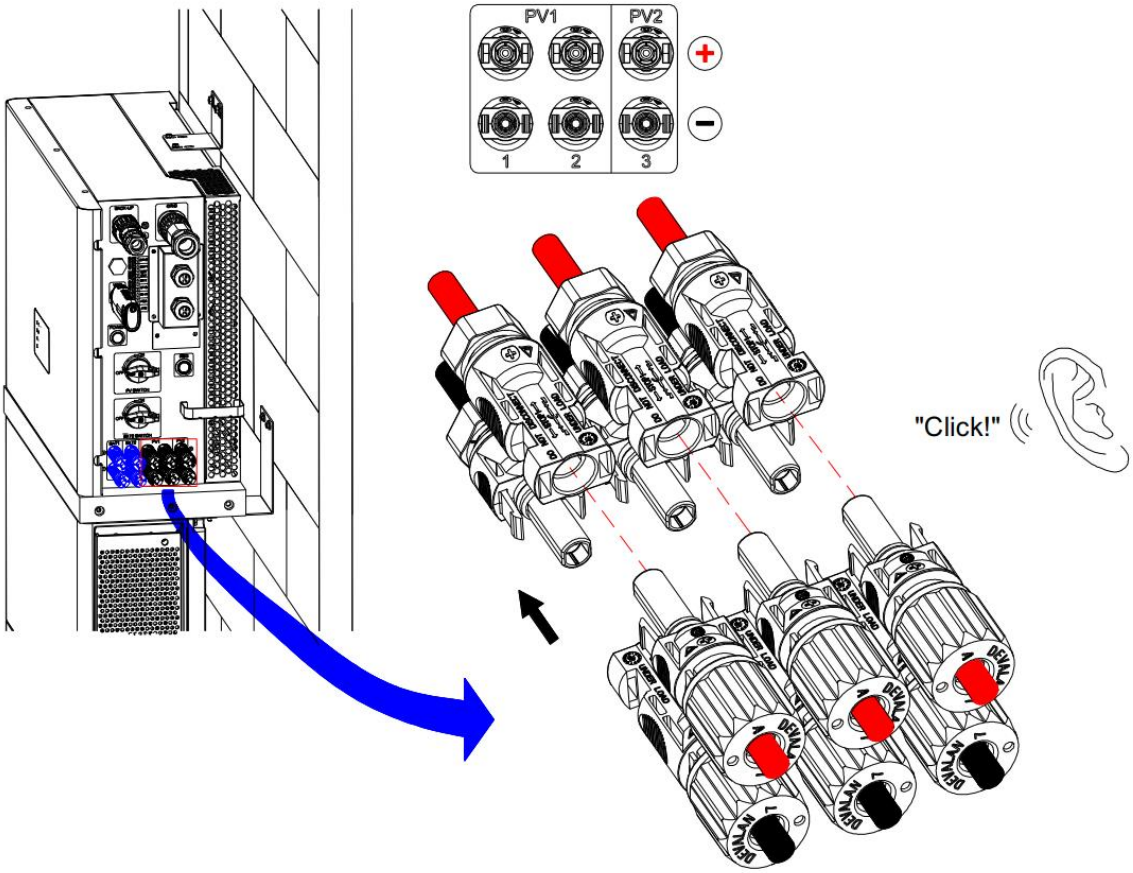


Figure 4.5-8 Connect with inverter

3) Remove terminal

Remove the terminal according to the following.

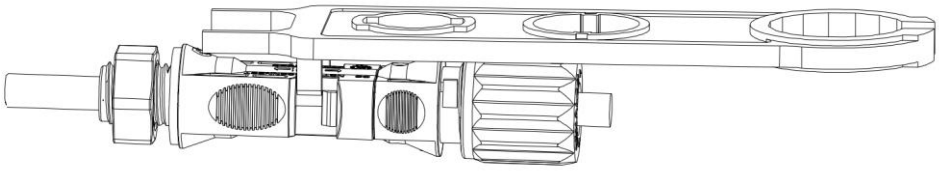


Figure 4.5-9 Remove terminal

4.6 GIRD and BACK-UP Connection

This section describes the connect steps for GRID port and BACK-UP port.

1) Connect the GIRD port

- Ensure the socket and plug wire matched properly before connecting the GRID cable.
- The GRID plug is black, matched with the black connector.
- Use single-stranded multi-core wire or cable.
- Recommended cable specification: 8AWG

Steps of connection as follows:

Step 1: Disassemble the five-pin plug and lock wires into the plug follow the silk screen instructions.

a. Loosen the nut, sleeve and plug along the thread into three parts

b. Thread the wire harness through the locking nut and sleeve

c. Insert the wires into the corresponding plug port and lock it with a hex wrench

d. Lock the plug and sleeve, sleeve and nut in turn

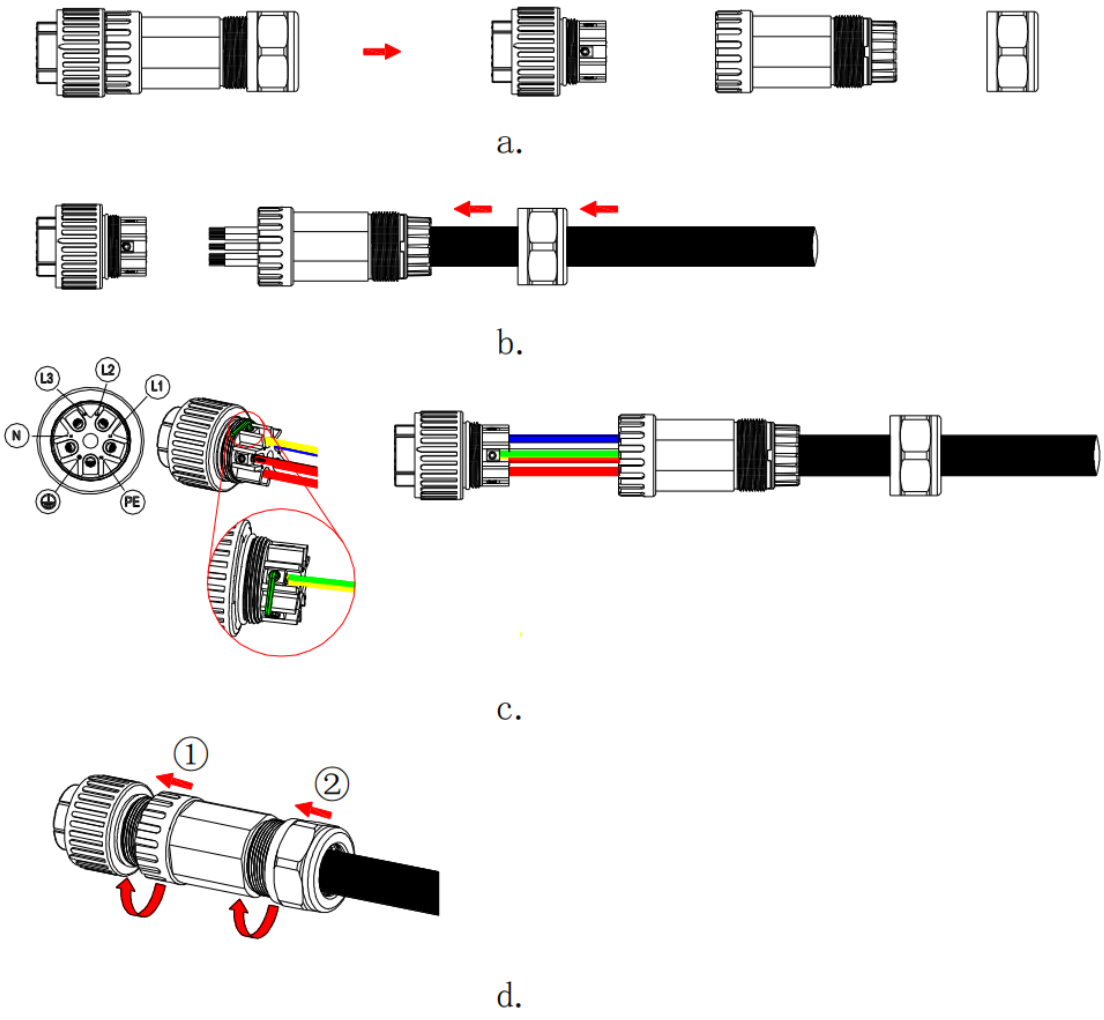


Figure 4.6-1 Prepare GIRD cable

Step 2: Connect the prepared GRID cable to the inverter follow below ① ②.

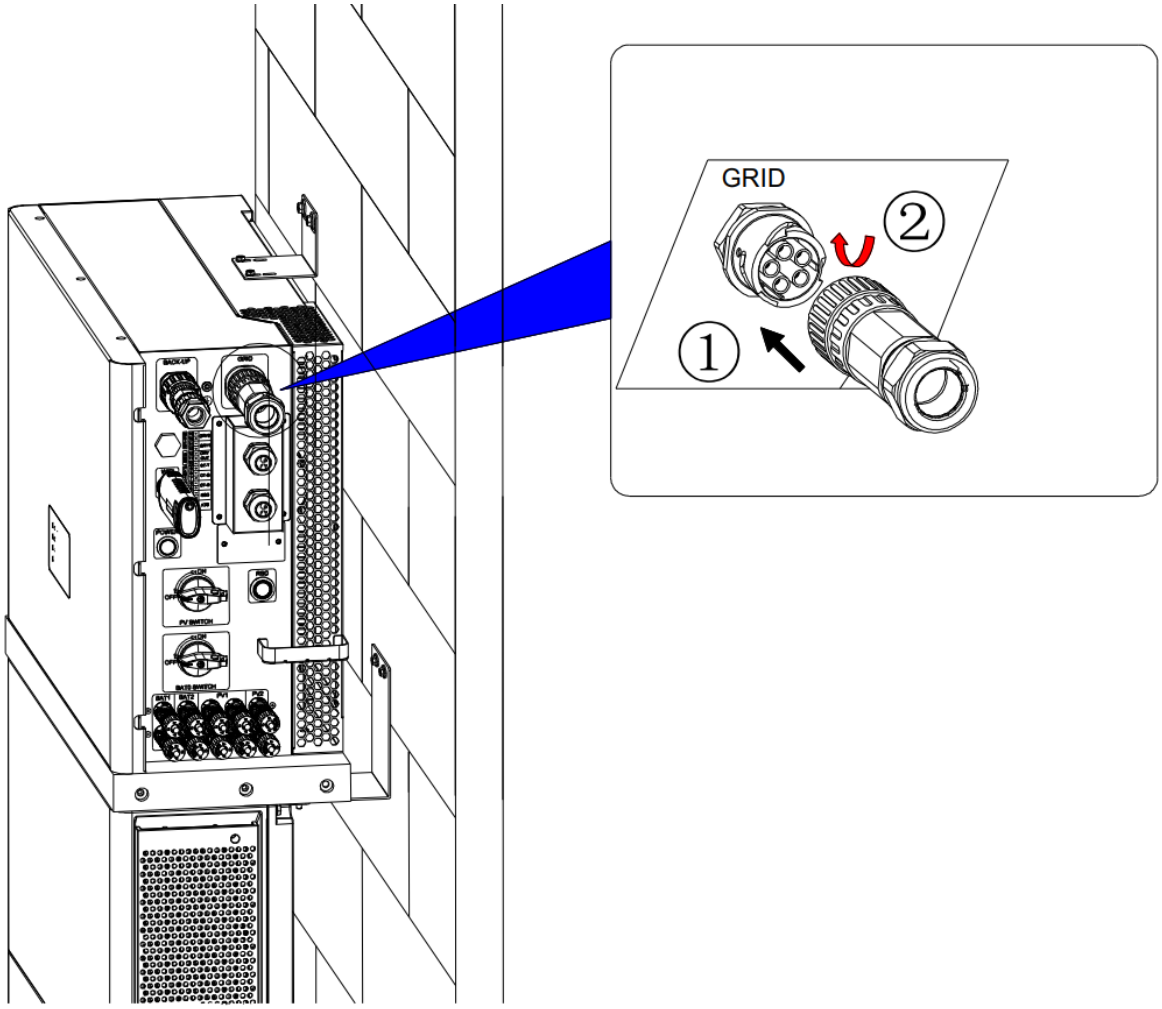


Figure 4.6-2 Connect the inverter

2) Connect the BACK-UP port

- Ensure the socket and plug wire matched properly before connecting the BACK-UP cable.
- The BACK-UP plug is blue, matched with the blue connector.
- Use single-stranded multi-core wire or cable
- Support maximum 1.1 times overload
- Recommended cable specification: 10AWG

Steps of connection as follows:

Step 1: Disassemble the five-pin plug and lock wires into the plug follow the silk screen instructions.

a. Loosen the nut, sleeve and plug along the thread into three parts

b. Thread the wire harness through the locking nut and sleeve

c. Insert the wires into the corresponding plug port and lock it with a hex wrench

d. Lock the plug and sleeve, sleeve and nut in turn

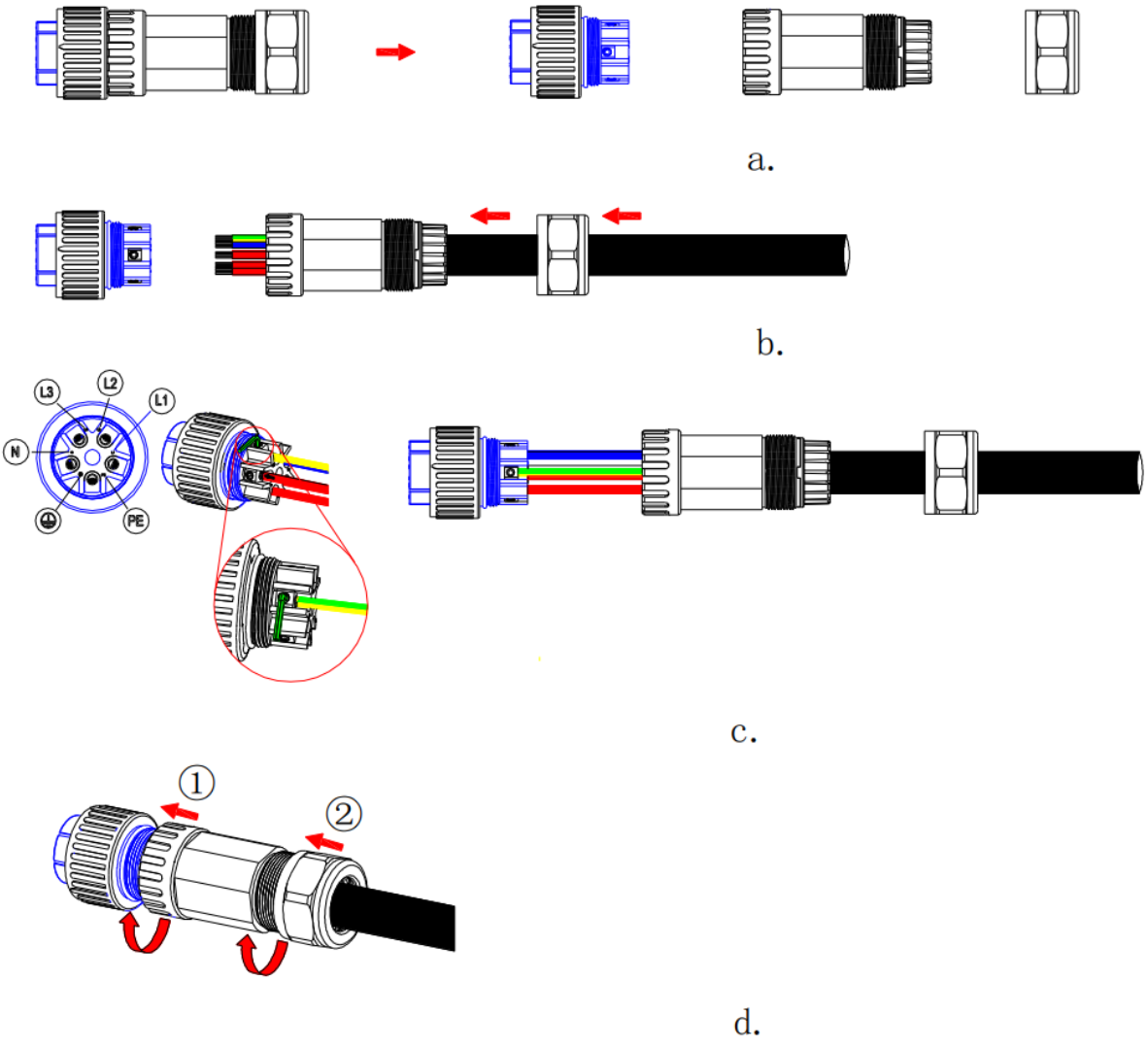


Figure 4.6-3 Prepare BACK-UP cable

Step 2: Connect the prepared BACK-UP cable to the inverter follow below ① ②.

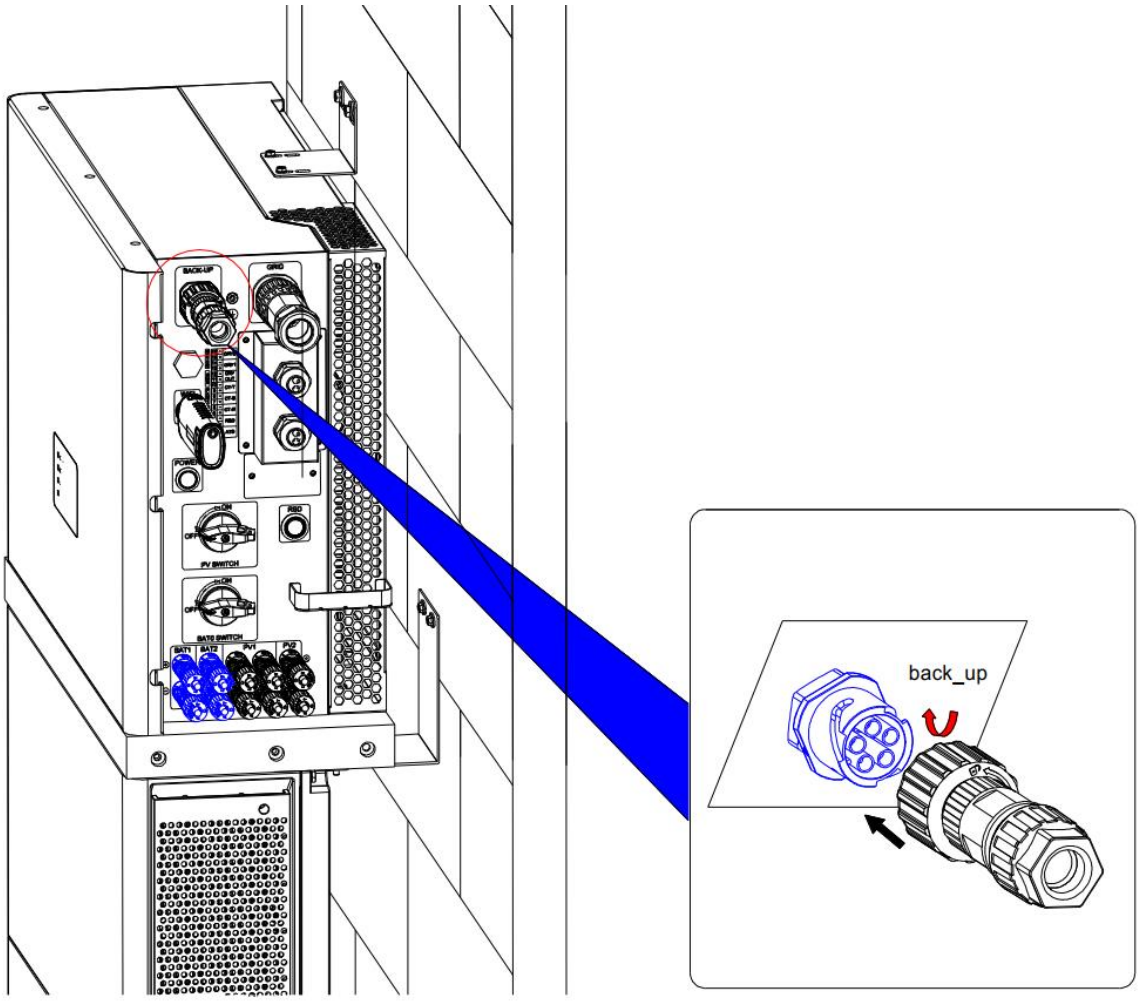


Figure 4.6-4 Connect the inverter

4.7 Communication Connection

This section describes the connect steps for external function port.

1）RJ45、LAN Connect port

Ensure that the communication port definition matches the device before connecting. Communication cables should keep away from interference sources or power lines to avoid signal interference,

The meanings of DRM、PAR2、PAR1、BMS、METER is as follows:

Note: By default, the dial switch dials to the number 1.

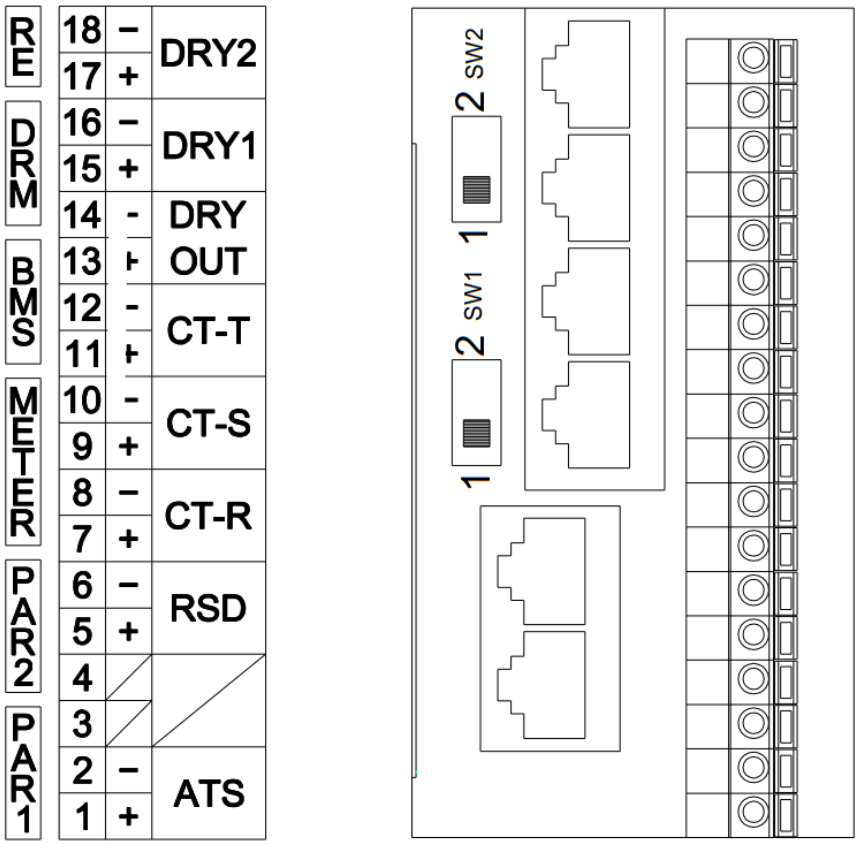


Figure 4.7-1 Communication port diagram

Table 14 Interface definition

Interface	Definition
PAR1	Parallel mainframe
PAR2	Parallel slave machine
METER	Meter
BMS	Battery CAN, 485, Wake-up function
DRM	Dry contact
RE	Reservation

Connect the communication cable to a suitable terminal to complete the cable connection

The communication cable adopts the standard T568B, and the color classification of the pins in follow table.

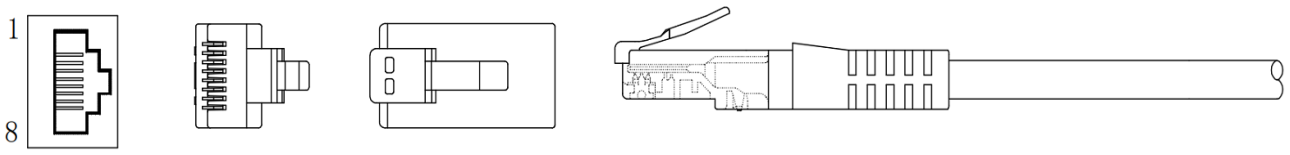


Table 15 Communication cable pin color

Pin	Color
1	Orange white
2	Orange
3	Green white
4	Blue
5	Blue white
6	Green
7	Brown white
8	Brown

4.8 Meter and CT Connection

If the selected accessories include 1 meter and CT, the system electrical connection diagram of Australia and New Zealand is as follows:

NOTE：For Australian safety country, the neutral cable of On-GRID side and BACK-UP side must be connected together, otherwise BACK-UP function will not work.

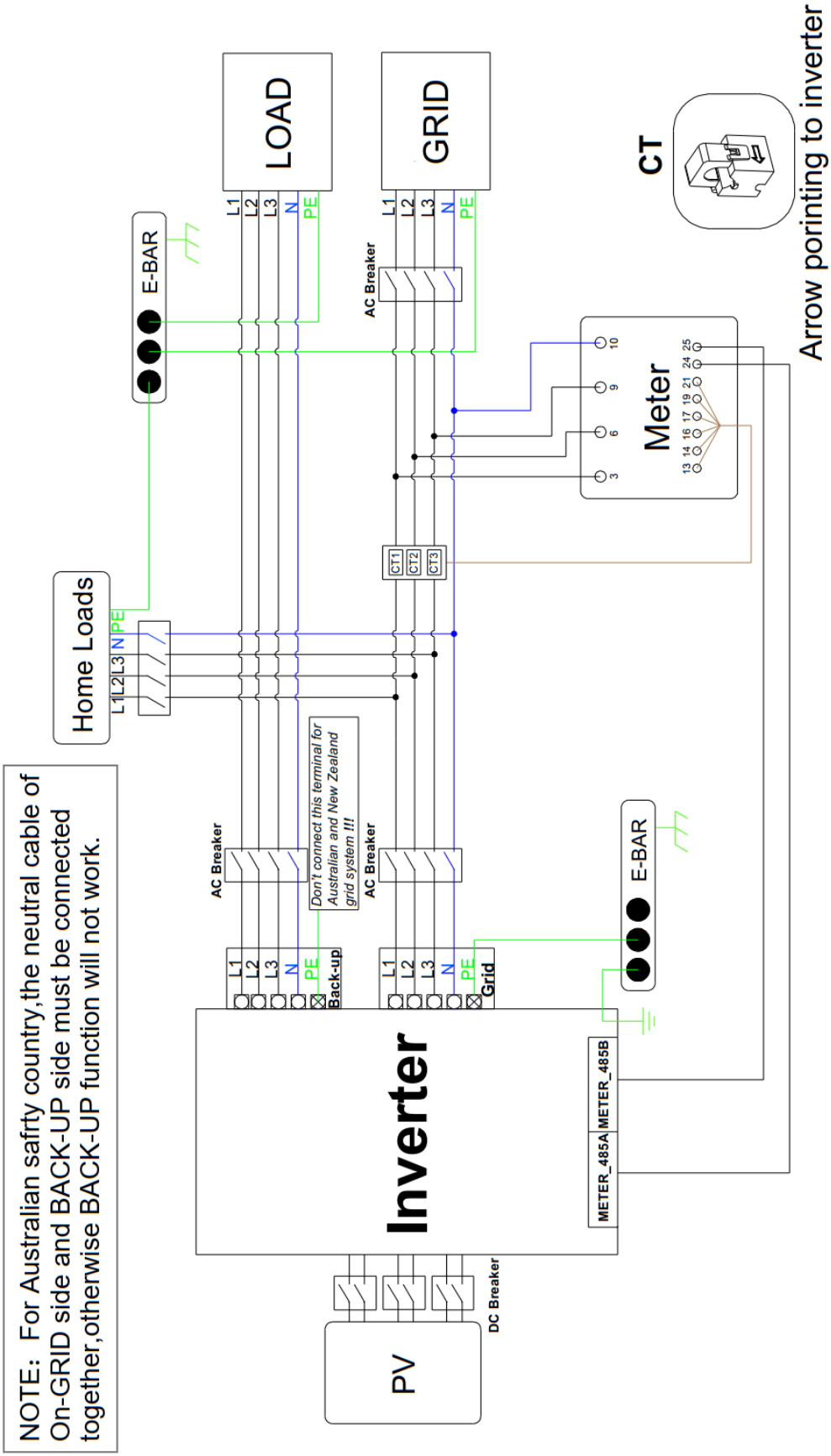


Figure 4.8-1 System electrical connection diagram of Australia and New Zealand

The system electrical connection diagram for generally applicable is as follows:

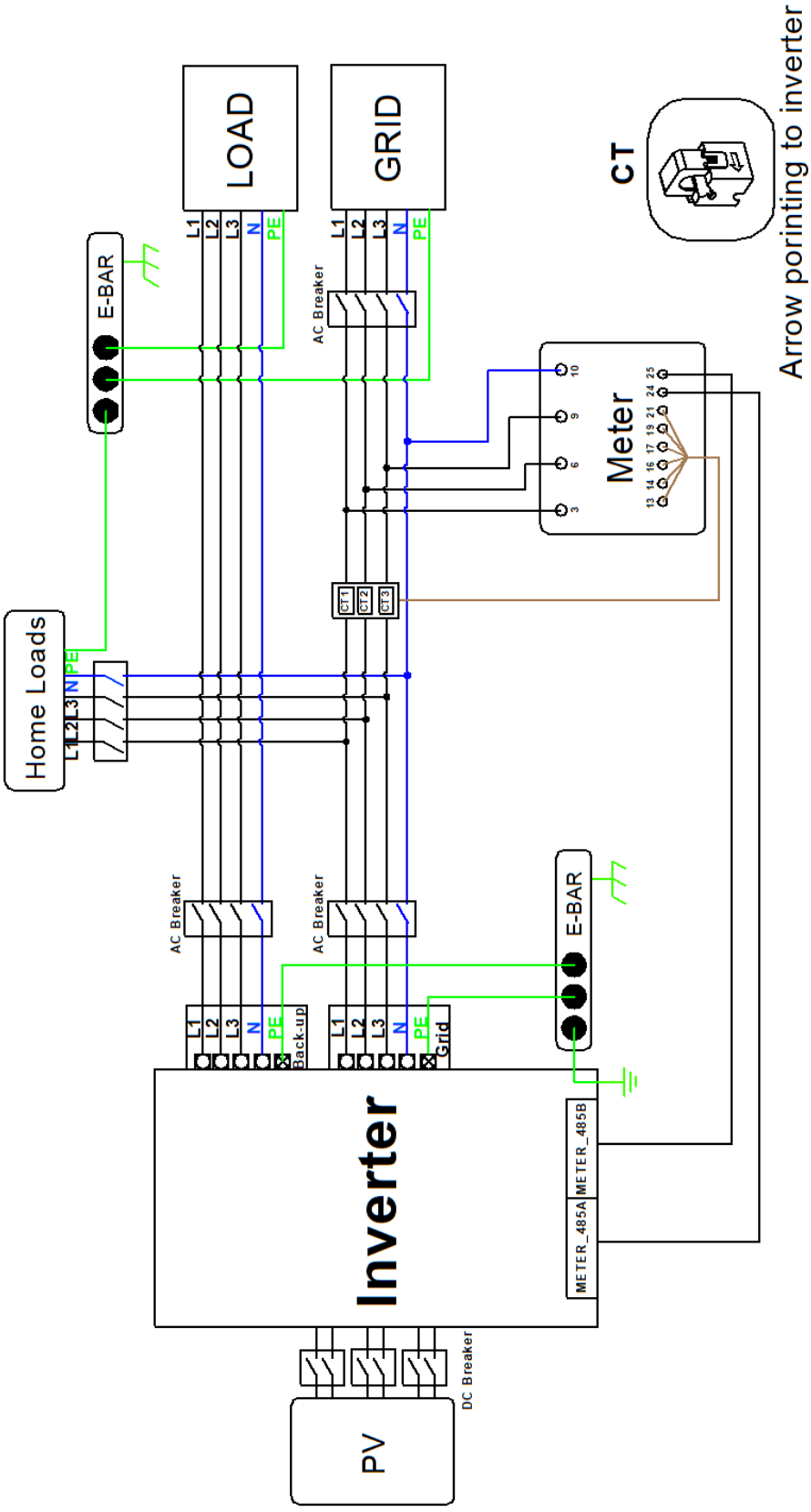


Figure 4.8-1 System electrical connection diagram

5 Equipment Commissioning

5.1 Check Before Power on

	• Please read the instructions carefully before operating the equipment。

Before turning on the inverter for the first time, the following inspection work needs to do.

- Check and confirm that all equipment have been installed securely.
- Check the PV DC switch is "OFF".
- Check the BAT DC switch is "OFF".
- Check the RSD switch is unpressed.
- Check the POWER switch is unpressed.
- Check the ground protection/ AC cable/ DC cable/ communication cable is correct polarity and firmly connected.
- Check the empty terminals are sealed.
- Check the CT cable is correct polarity, and the arrow on CT points towards the inverter.
- Check the meter wiring is correct.
- All safety labels and warning labels attached firmly and visible clearly.

5.2 Power on

Please power on the equipment according to the following steps:

1. Press the RSD switch to make the RSD module work normally after power-on, as Figure a.

2. Turn the BAT0 switch of inverter to "ON", as Figure b.

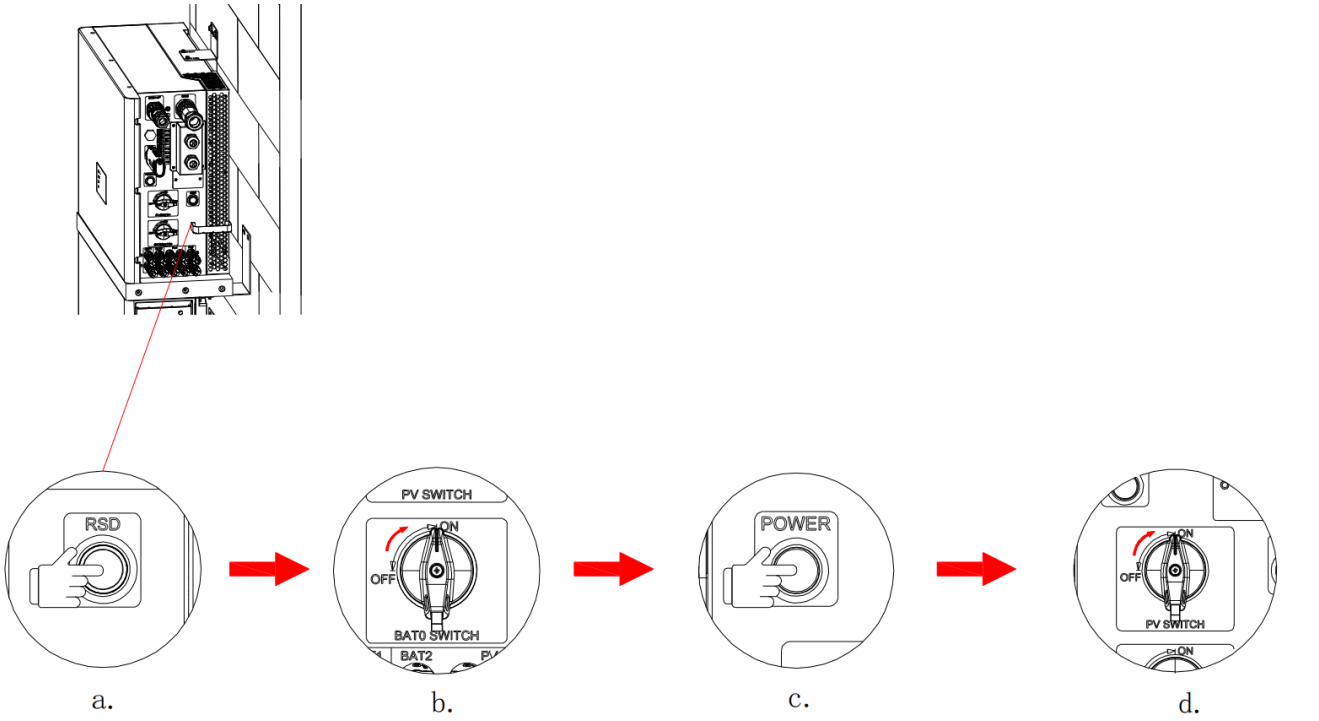
3. Press and hold the POWER button for 3s. Release the button and then the green light hold on. It means the battery work normally, as Figure c.

4. Turn the PV switch of inverter to "ON", as Figure d.

5. Close the AC switch between inverter and utility grid, then the grid power-on.

6. If a DC switch exists between inverter and PV string, close the switch.

7. After the machine is running, close the switch between BACK-UP and load.



Press the RSD switch

Turn BAT0 switch to "ON"

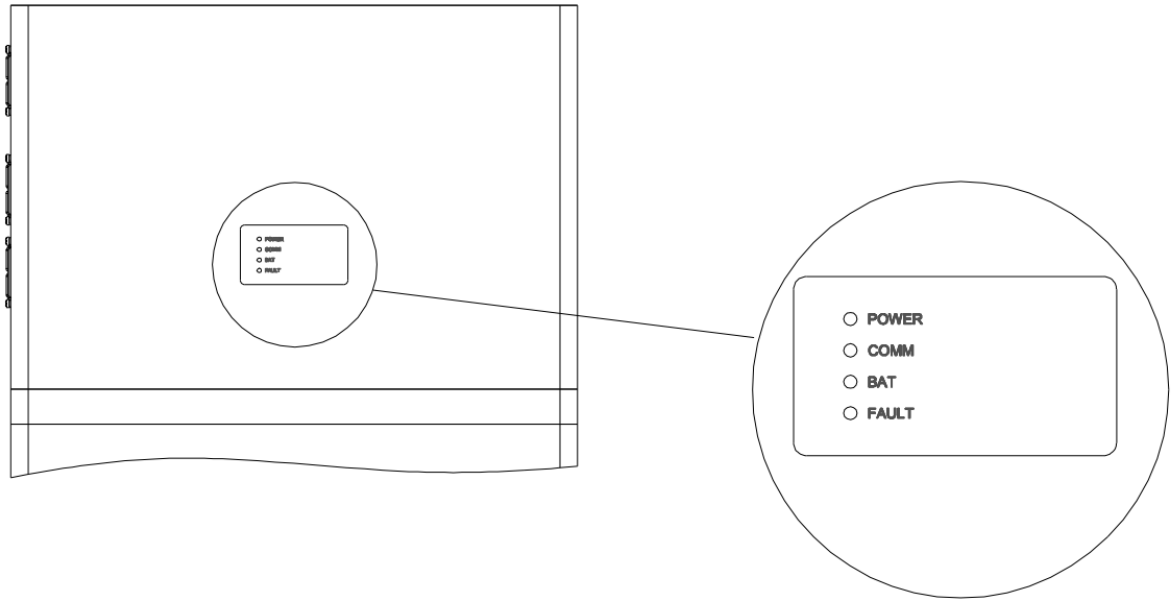
Press and hold the POWER button for 3s, then release it

Turn the PV switch to "ON"

Figure 5.2-1 Steps to power on the equipment

5.3 Indicator Description

The LED indicator on the panel of the PV-energy storage inverter can indicate the current working state of the inverter. The indicator status descriptions as follows:



Indicator	Color	Statue	Frequency	Description
①POWER	Green	on	constant on	work normally
	Green	slow flashing	light on 2s light off 2s	standby
	Green	fast flashing	light on 0.5s light off 0.5s	warning
②COMM	Green	light off	light off	no WIFI collector
	Green	on	constant on	WIFI collector successful connected
	Green	slow flashing	light on 2s light off 2s	WIFI collector failed connected
③BAT	Green	off	light off	no battery
	Green	slow flashing	light on 2s light off 2s	low battery power
	Green	fast flashing	light on 0.5s light off 0.5s	battery fault state
	Green	on	constant on	normal state
④FAULT	Red	on	constant on	level 1fault
	Red	off	light off	no fault

Description	Statue
File delivery	The four lights flickered from top to bottom in turn at 1S intervals
Upgrade（PCS）	All four indicators are on 1s and off 1s
Transfer the battery upgrade file	Four lights on

6 Software Application

Detailed steps in the attached **Software Application Manual**.

7 Fault description

This section describes the fault alarms and codes used to find inverter faults quickly. Please contact after-sales service center if you meet the following problems.

fault code	Fault Information	Explanation	Fault Analysis
W101	AmmeterOffLine	Meter off-line	The meter disconnect or abnormal communicate.
W102	BMSOffLine	BMS off-line	The battery disconnect or abnormal communicate.
W103	WIFIOffLine	WIFI off-line	The collector disconnect or abnormal communicate.
W200	InterFanWarn	Internal fan warning	The internal fan disconnect or abnormal speed.
W201	ExterFan1Warn	External fan 1 warning	The external fan 1 disconnect or abnormal speed.
W202	ExterFan2Warn	External fan 2 warning	The external fan 2 disconnect or abnormal speed.
W203	ExterFan3Warn	External fan 3 warning	The external fan 3 disconnect or abnormal speed.
F180	AFCIFault	AFCI fault	The protection threshold of the AFCI module is exceeded.
F181	OverTempFault	Over temperature fault	The temperature of the radiator exceeds the overtemperature protection threshold
F193	OverLoadFault	Overload fault	The BACK-UP load exceeded the threshold.
F196	PassByOverCurrFault	Bypass overcurrent fault	The BACK-UP load current exceeded the threshold.
F197	PassByOverLoadFault	Bypass overload fault	The BACK-UP load power exceeded the threshold.
F198	GridVoltOverFault	Grid voltage overvoltage fault	The mains voltage exceeds the local regulatory voltage limit.
F199	GridVoltLowFault	Grid voltage undervoltage fault	The mains voltage input is below the local regulatory voltage limit.
F200	GridFreqOverFault	Grid frequency overfrequency fault	The mains frequency exceeds local regulatory frequency limit.
F201	GridFreqLowFault	Grid frequency underfrequency fault	The mains frequency is below the local regulatory frequency limit.

F262	PV1OverVolt	PV1 overvoltage	The PV1 voltage exceed the PV overvoltage protection threshold.
F263	PV2OverVolt	PV2 overvoltage	The PV2 voltage exceed the PV overvoltage protection threshold.
F264	PV1OverCurr	PV1 overcurrent	The PV1 current exceed the PV overcurrent protection threshold.
F265	PV2OverCurr	PV2 overcurrent	The PV2 current exceed the PV overcurrent protection threshold.
F266	PV1ReverseConnectFail	PV1 reverse connection fault	PV1 input positive and negative reverse connection
F267	PV2ReverseConnectFail	PV2 reverse connection fault	PV2 input positive and negative reverse connection
F274	OverTempFault	Radiator overtemperature fault	PV INV radiator overtemperature
F277	PVIsoFail	Insulation detection fault	The PV ground resistance value is lower than the insulation impedance protection threshold
F380	PackOverVolt	Pack overvoltage	The output voltage of the LLC module exceeds the battery protection threshold.
F381	PackUnderVolt	Pack undervoltage	The output voltage of the LLC module lower than the battery protection threshold.
F382	BATOverVolt	Battery pack overvoltage	The battery output voltage is higher than the battery protection threshold
F383	BATUnderVolt	Battery pack undervoltage	The battery output voltage is lower than the battery protection threshold
F384	OutputOverCur	Pack output overcurrent	Battery BM-D output overcurrent.
F385	DCDCOvertemp	DC-DC overtemperature	The radiator of the BDC module is overheated
F386	OverloadTimeout	Continuous overload timeout	Battery BM-D output overload times out
F387	ComFail	Abnormal communication	The CAN communication abnormal

F440	Monomer undervoltage protection	Monomer undervoltage protection	The battery voltage is lower than the protection threshold
F441	Monomer overvoltage protection	Monomer overvoltage protection	The battery voltage is higher than the protection threshold
F443	Discharge low temperature protection	Discharge low temperature protection	The battery module will protect itself under discharging at a low temperature.
F444	Charging low temperature protection	Charging low temperature protection	The battery module will protect itself under charging at a low temperature.
F445	Discharge high temperature protection	Discharge high temperature protection	The battery module will protect itself under discharging at a high temperature.
F446	Charging high temperature protection	Charge high temperature protection	The battery module will protect itself under charging at a high temperature.

8 System Maintenance

Managed by PV energy storage connected - off grid system, the inverter can automatically complete grid-connected and power generation, start or stop operations with the change of day and night and the change of seasons

In order to ensure and extend the service life of the inverter, in addition to using the inverter in strict accordance with the contents of this manual, it is necessary to carry out necessary daily maintenance and overhaul of the inverter.

8.1 Machine Cleaning

Recommended to clean the battery and inverter regularly. If the shell is dirty, use a soft dry brush or dust removal device to remove the dust. Cleaning fluid materials include solvents, abrasives, etc. Avoid using corrosive liquids.

8.2 Fan replacement

Please replace it if the fan makes any abnormal noise or not fan operation.

Only professional personnel should perform this operation.

	• Power off the inverter and battery before the replacement, • Only professional electricians can perform fan maintenance and replacement
	• Wait 5 minutes or more until the capacitor is discharged.

The fan replacement steps are as follows:

Step 1: Ensure that the all in one is shut down and powered off.

Step 2: If the product is connected, please power off and wait at least 5 minutes before the following operations.

Step 3: Not need to remove the inverter and battery when replacing the fan.

Step 4: Pay attention to replace the fan according to the line mark.

Step 5: Remove the damaged fan and install the new to the original position as shown below.

Step 6: Unscrew the 4 fixing screws and remove the fan box, as shown in Figure

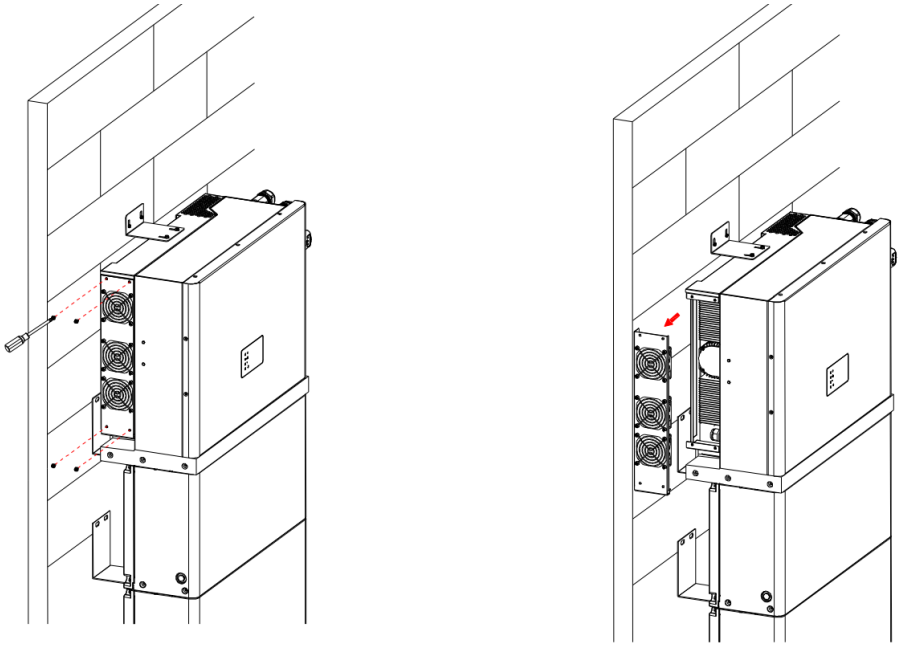


Figure 8.2-1 Remove the fan assembly

Step 7: Remove the fan assembly by separating the cable connecting the fan to the inverter with a screwdriver as shown in Figure.

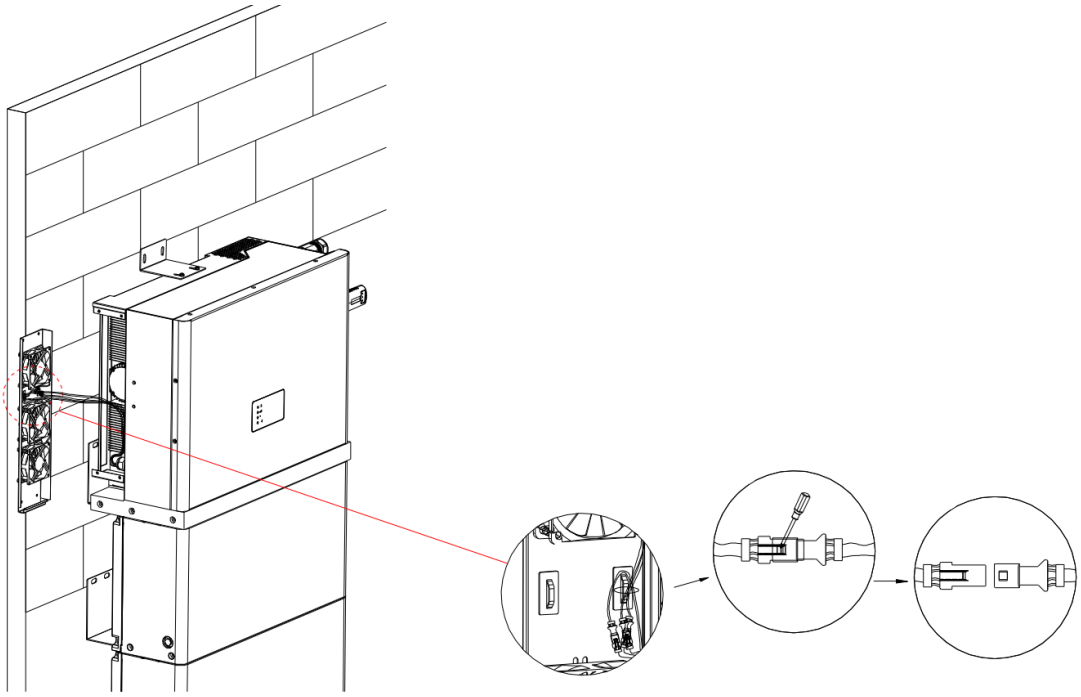


Figure 8.2-2 Remove fan cables

Step 8: Unscrew the damaged fan and replace them, as shown in Figure

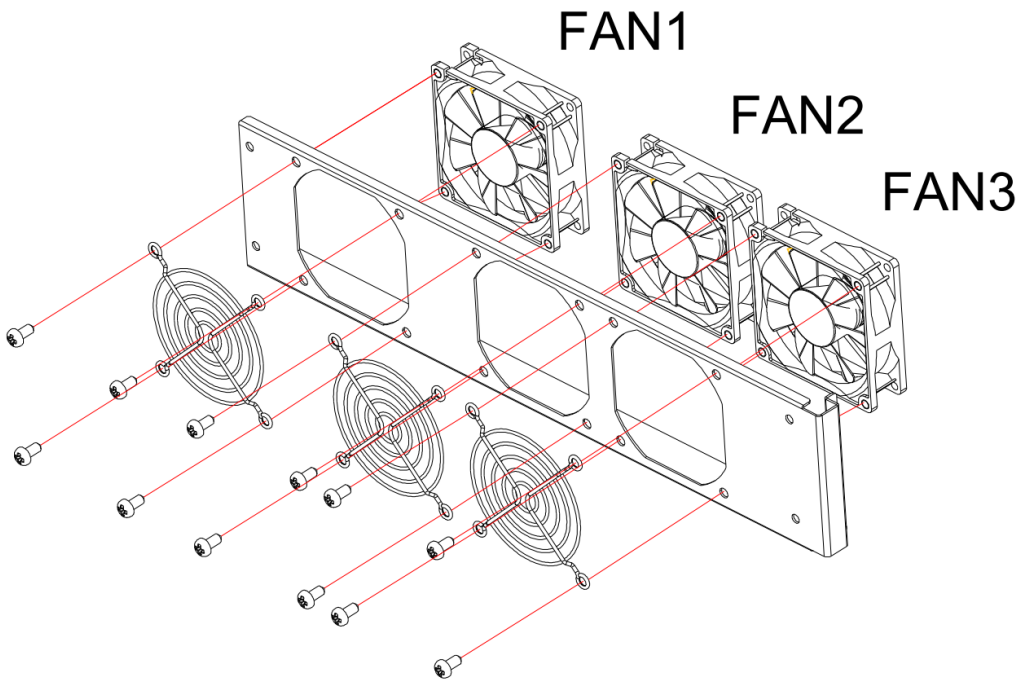


Figure 8.2-3 Remove the damaged fan

Step 9: Reconnect the cables between the fan and inverter, and install the screws and cover of the fan box to their original positions. Finally, install the inverter to the original position and restart

8.3 Inverter Removal

The inverter removal steps are as follows:

Step 1：Release the RSD switch and shut down the inverter.

Step 2: Press the POWER button for more than 5 seconds, and then wait 1s. The POWER indicator is off, and the battery is off.

Step 3：Turn off LOAD circuit breaker，GRID circuit breaker， battery DC circuit breaker、PV DC isolator .

Step 4：Wait 5-10 minutes to ensure the discharge is complete and check to ensure that the inverter turned off. Disconnect all electrical connections of the inverter, including the PV cables, battery cables, and communication cables.

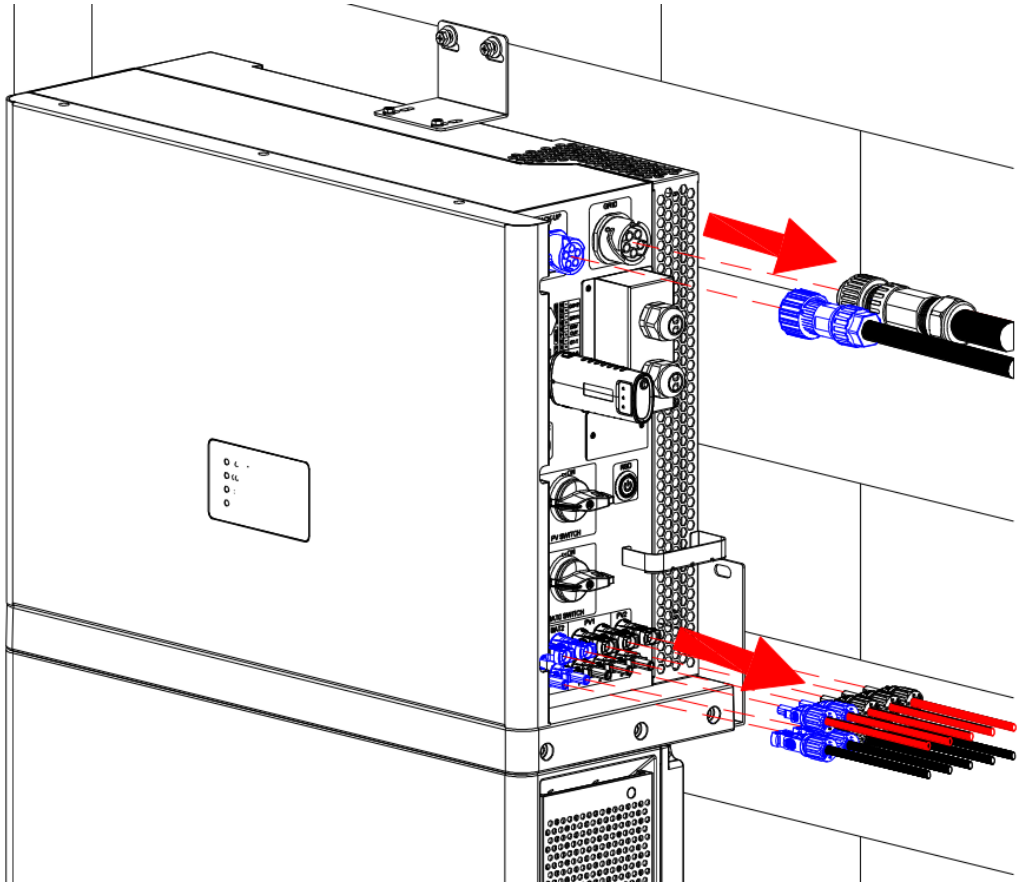


Figure 8.3-1 Remove all inverter electrical connections

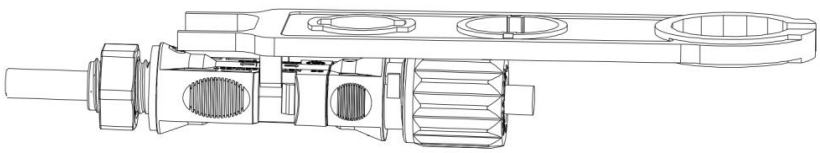


Figure 8.3-2 Remove PV、BAT terminal

Step 5: Remove the self-tapping screws and remove the inverter.

Note: The inverter is heavy, and at least two people to remove it.

Note: Waste inverters should be treated in accordance with local regulations on the disposal of e-waste and used batteries.

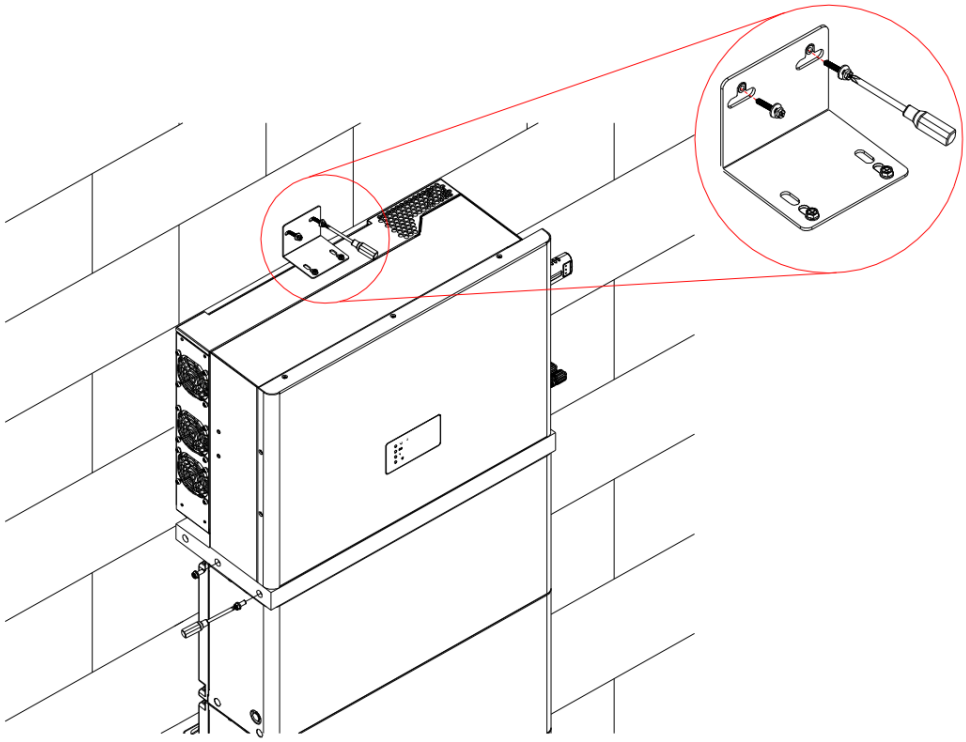


Figure 8.3-3 Remove the self-tapping screw of inverter

8.4 Battery Removal

The battery removal steps are as follows:

Step 1: Remove the inverter by referring to 8.3 Removing an Inverter

Step 2: Remove the self-tapping screws on the battery wall bracket, as shown in the picture

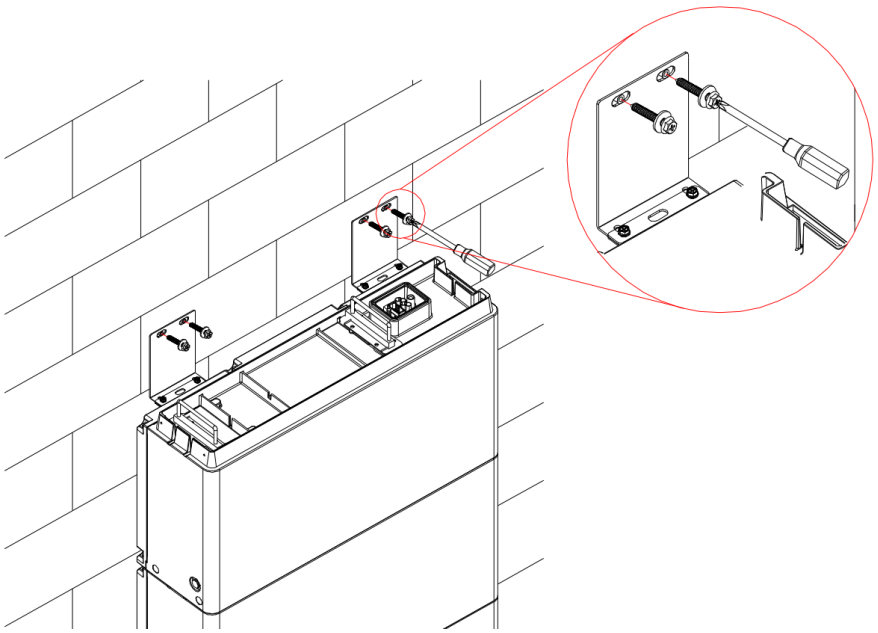


Figure 8.4-1 Remove the battery self-tapping screw

Step 3: Remove the battery pack as shown in the picture。

Note: Waste batteries should be treated in accordance with local regulations on the disposal of e-waste and used batteries.

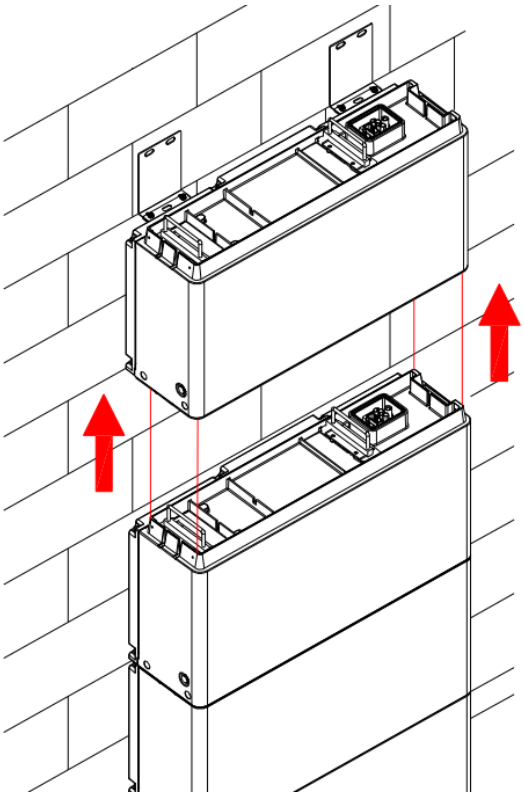


Figure 8.4-2 Remove battery pack

9 Warehouse storage guidelines

9.1 Packaging guidelines

Lithium-ion batteries is recognized as dangerous goods. The packaging requirements for battery products are as follows:

a. The packaging manufacturer with the packaging qualification for dangerous goods is responsible for providing product packaging, and the packaging manufacturer has a record in the local Commodity Inspection Bureau;

b. After the packaging manufacturer completes the packaging, the supplier needs to apply to the Commodity Inspection Bureau, and the Commodity Inspection Bureau will provide the 'Dangerous Package Product Use Inspection Sheet' and 'Dangerous package product performance inspection sheet' , and complete the dangerous package commodity inspection;

c. All battery packs should be packaged with product instruction manuals. The packaged product should be placed in a dry, dust-proof and moisture-proof packing box;

d. The product name, model, quantity, gross weight, manufacturer, and ex-factory date should be marked on the outside of the packing box.

e. The necessary signs such as "upward" and "fear of fire" shall meet the requirements of GB/T 191;

f. The packing method is: packing in a carton with molded foam buffer material in the carton;

g. Accessories packaging: single accessories are first fastened with cardboard or plastic film or braided straps, neatly placed in the carton, and filled with regular fillers (foam pads, cardboard, etc.) to prevent the accessories from shifting in the box. The following documents should be included with the product when leaving the factory:

    1) Product certificate (both in Chinese and English);
    2) Product use (installation) manual (both in Chinese and English);
    3) Product packing list (both in Chinese and English);
    4) Factory inspection report (both in Chinese and English).

h. Clean battery

Regular cleaning of the battery system is recommended. If the case is dirty, use a soft dry brush or dust collector to remove the dust. Cleaning liquid materials include solvents, abrasives, etc. Corrosive liquids should not be used to clean the housing.

9.2 Battery Storage

The battery pack is stored in a clean, dry and ventilated room with an ambient temperature of 25°C±5°C and a relative humidity of not more than 75%. The battery pack has a state of charge of 45% to 55%. Avoid contact with corrosive substances and keep away from fire and heat sources.

10 Dispose of used batteries

- Comply with applicable local regulations for the disposal of electronic waste and used batteries.
- Do not mix with your household waste.
- Do expose the battery to high temperatures or direct sunlight.
- Do not expose batteries to high humidity or corrosive environments.
- Do not expose batteries to high humidity or corrosive environments.

11Detailed specifications

Model	SW5KH3UT	SW6KH3UT	SW8KH3UT	SW10KH3UT	SW12KH3UT	SW15KH3UT
PV input parameter						
Max. input power (W)	8000	9000	12000	15000	22500	22500
Max. DC input voltage (V)	1000					
MPPT voltage range(V)	180~850					
Starting voltage (V)	180V					
Max. input current per MPPT (A)	A：15		A：15 / B：30			
Max. short-circuit current per MPPT (A)	A：19		A：19 / B：38			
No. of MPPT Tracker	1		2			
N0. of MPPT input strings per channel	A：1	A：1	A：1 / B：2	A：1 / B：2	A：1 / B：2	A：1 / B：2
Batery input parameter						
Battery capacity （kWh）	5~40					
Rated Voltage (V)	400					
voltage range (V)	350~450					
Max. continuous charging current (A)	23			46		
Max. continuous discharge current (A)	23			46		

Max. discharge power (W)	5000	6000	8000	10000	12000	15000
Max. charge power (W)	5000	6000	8000	10000	12000	15000
Grid-tied parameters						
Rated grid-tied output power (W)	5000	6000	8000	10000	12000	15000
Max. grid-tied output apparent power (VA)	5500	6600	8800	11000	13200	16500
Max. grid-tied input apparent power (VA)	8000	9000	12000	15000	18000	22500
Rated output voltage (V)	220/380 & 230/400 3W/N/PE					
Output voltage frequency (Hz)	50					
Max. grid-tied output current (A)	8.4	10	13.4	16.7	20	25
Max. input current (A)	12.2	13.7	18.2	22.8	27.4	34.2
Power factor	0.8 leading to 0.8 lagging					
Total current waveform distortion rate	<3%					
Grid-off parameters						
Grid-off rated apparent power (VA)	5000	6000	8000	10000	12000	15000
Max. output apparent power (VA)	5500	6600	8800	11000	13200	16500
Max. output current (A)	7.6	10	13.4	16.7	20	25
Rated output voltage (V)	230/400 3W/N/PE					
Rated output voltage frequency (Hz)	50					
Total voltage waveform distortion (@ linear load)	<3%					
Efficiency						
Max. efficiency	97.4%	97.4%	97.8%	97.8%	97.8%	97.8%
Eur efficiency	96.5%	96.5%	96.8%	96.8%	97%	97%
Protection						
Input DC switch	Integrated					
Insulation impedance detection	Integrated					
Residual current monitoring	Integrated					
Input reverse protection	Yes					
Anti-island protection	Yes					

Ac overcurrent protection	Yes					
Ac short circuit protection	Yes					
Ac overvoltage protection	Yes					
AFCI Dc arc protection	Optional					
Dry contact remote scheduling	Yes					
DC surge protection	Type II					
AC surge protection	Type II					
PCS general parameters						
Ambient temperature (℃)	-30～+60（>45℃ derating）					
Ambient humidity	0～95%					
Working altitude (m)	<4000（>3000m derating）					
Cooling	Air Cooling（≤47dB）					
Display	LED&APP					
BMS Communication	CAN					
Meter Communication	RS485					
Monitoring mode	4G/Wifi					
Weight (Kg)	39					
Dimensions (W*H*D, mm)	650x480x250					
Topological structure	Transformerless					
Enclosure Type	IP65					
Type classification	One machine/All in One Unit					
Installation	Stacked/Stacked in one piece					
Battery parameter						
Type	LiFePO4					
Recommended capacity	10kWh	15kWh	20kWh	20kWh	25kWh	30kWh
Available capacity （90%DOD）	9kWh	13.5kWh	18kWh	18kWh	22.5kWh	27kWh
Battery module voltage	350~450V					
Max. charge and discharge power	5kW	7.5 kW	8 kW	10 kW	12 kW	15kW
All-in-one machine general parameters						
Dimensions (W*H*D, mm)	650x1190x250	650x1505x250	650x1820x250	650x1820x250	650x910x250 650x1225x250	650x1225x250 650x1225x250
Total weight(Kg)	146.7KG	198.4KG	250.1KG	250.1KG	198.4KG+116.7KG	198.4KG+168.4KG
Storage temperature	-30～+60℃					
Ambient temperature	-10～+50℃					
Ambient humidity	10%～95%					

Working altitude(m)	<4000（<3000m derating）
Cooling	Air cooling
Enclosure Type	IP65
Noise	<47dB
Installation	wall-mounted

12 Statement without Responsibility

The company shall not be liable for the following situations occur.

- Failure or damage caused by accident or abnormal natural environment (force majeure, such as typhoon, earthquake, fire, etc.).
- The environment of installation and operation beyond the international or local national standards.
- Operating equipment is not according to the operation instructions and safety warnings in the product manual, resulting in equipment damage due to incorrect installation, operation and other human factors.
- The product code has been altered or lost.
- Disassemble, change product structure or modify software code without authorization.
- Damage caused by water or other substances infiltrating into the machine due to human reasons.
- Damage caused by storage conditions that do not meet product specifications.
- Transportation damage caused by the customer's own transportation.
- Damage outside the warranty period.



Contact

If you have any technical questions about our products, please contact **Sunwoda Energy Technology Co., LTD.**

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Version: V1.0

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