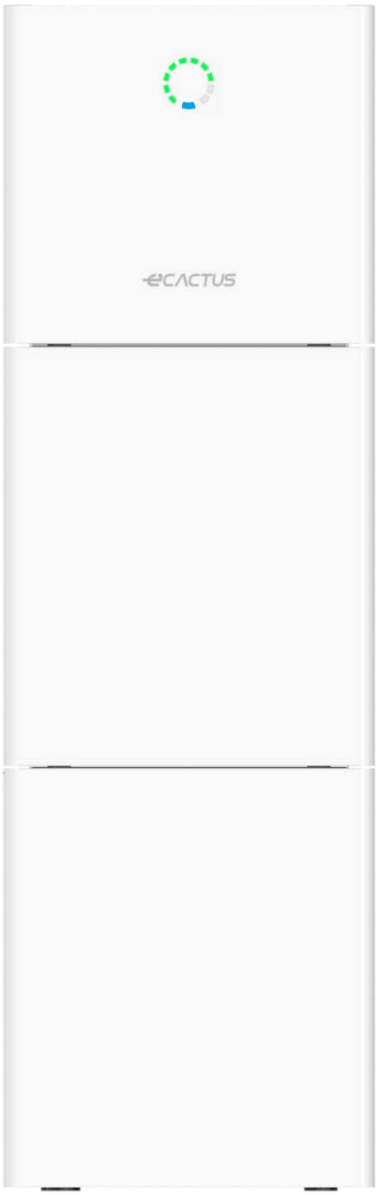


WH-SPHA3.6H-5.12kWh WH-SPHA3.6H-10.24kWh

WH-SPHA4.6H-5.12kWh WH-SPHA4.6H-10.24kWh

WH-SPHA5.0H-5.12kWh WH-SPHA5.0H-10.24kWh

WH-SPHA6.0H-5.12kWh WH-SPHA6.0H-10.24kWh

USER MANUAL

CONTENTS

Copyright Statement

Version Information

Version	Date	Content
V1.0	2021-8-12	
V2.0	2022-5-26	
V3.0	2022-8-30	

1. GENERAL INTRODUCTION

1.1 System Introduction

WH-SPHA series hybrid all-in-one battery energy storage system (BESS) is designed for both indoor and outdoor use. BESS can store the DC power generated by the PV array into the battery, or convert it into AC power to loads. This user manual applies to the following products: WH-SPHA3.6H-5.12kWh/WH-SPHA3.6H-10.24kWh/WH-SPHA4.6H-5.12kWh/WH-SPHA4.6H-10.24kWh/WH-SPHA5.0H-5.12kWh/WH-SPHA5.0H-10.24kWh/WH-SPHA6.0H-5.12kWh/WH-SPHA6.0H-10.24kWh.

1.2 Safety Introduction

1.2.1 Protection of Warning Sign

● **SYMBOLS EXPLANATION**

	Caution ！ Failing to observe a warning indicated in this manual may result in injury.
	Danger of high voltage and electric shock ！
	Danger of hot surface!
	Components of the product can be recycled.
	This side up! The package must always be transported, handled and stored in such a way that the arrows always point upwards.
	No more than six (6) identical packages being stacked on each other.
	Product should not be disposed as household waste.
	The package/product should be handled carefully and never be tipped over or slung.
	Refer to the operating instructions.
	Keep dry! The package/product must be protected from excessive humidity and must be stored under cover.
	Inverter will be touchable or operable after minimum 5 minutes of being turned off or totally disconnected, in case of any electrical shock or injury.
CE	CE Mark

● SAFETY WARNING

Any installation and operation on BESS must be performed by qualified electricians, in compliance with standards, wiring rules or requirements of local grid authorities or companies (like AS 4777 and AS/ NZS 3000 in Australia).

Before any wiring connection or electrical operation on BESS, all battery and AC power must be disconnected from BESS for at least 5 minutes to make sure BESS is totally isolated to avoid electric shock.

The temperature of BESS surface might exceed 60℃ during working, so please make sure it is cooled down before touching it, and make sure the BESS is untouchable for children.

Usage and operation of the BESS must follow instructions in this user manual, otherwise the protection design might be useless and warranty for the BESS will be invalid.

Do not open BESS cover or change any component without WIFO PRO's authorization, otherwise the warranty commitment for the BESS will be invalid.

Appropriate methods must be adopted to protect BESS from static damage. Any damage caused by static is not warranted by WIFO PRO.

The neutral continuity is NOT maintained internally, it must be achieved by external connection arrangements like in the system connection diagram for Australia on page 31 section 2.3.3.

This BESS includes an integrated residual current device (RCD).
If an external residual current device (RCD) is used, a device of type A should be used, with a tripping current of 30 mA or higher.

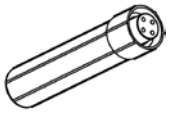
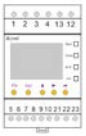
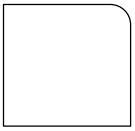
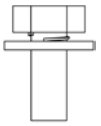
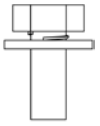
This BESS uses active anti-islanding protection, the method is shifting the frequency of the inverter away from nominal conditions in the absence of a reference frequency (frequency shift).

This BESS is a multiple mode inverter, it is used for outdoor unconditioned without solar effects. The maximum operating ambient temperature is 55 ℃.

Product should not be used in multiple phase combinations.

In the event of an earth fault, an error message will be sent to eCactus App and the status lamp on our product will turn into red.

1.3 Packing List

<table>
<tr><th colspan="5">WH-SPHA-3.6H/4.6H/5.0H/6.0H-5.12kWh</th></tr>
<tr><td>  </td><td>  </td><td>  </td><td colspan="2">  </td></tr>
<tr><td>1xWifi module</td><td>Terminal accessory</td><td>Document accessory</td><td colspan="2">2 x upper and lower connection plate</td></tr>
<tr><td>  </td><td>  </td><td>  </td><td>  </td><td>  </td></tr>
<tr><td>1x Meter (Three Phase Meter/ Single Phase Meter)</td><td>1xQuick Installation Manual</td><td>Label accessory</td><td>8xM4* 10</td><td>1xM4*10 (PE)</td></tr>
<tr><td>  </td><td>  </td><td>  </td><td>  </td><td>  </td></tr>
<tr><td>1x Back plate</td><td>4xCushions</td><td>10xCable ties</td><td>2xφ10* 60</td><td>Disassemble tool</td></tr>
<tr><td colspan="2">  </td><td colspan="3">  </td></tr>
<tr><td colspan="2">1 x Left side plate</td><td colspan="3">1 x Right side plate</td></tr>
</table>

<table>
<tr><th colspan="2">Battery box side plate*1</th></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>1 x Left side plate</td><td>1 x Right side plate</td></tr>
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<table>
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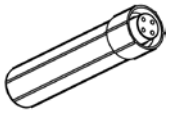
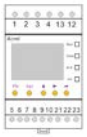
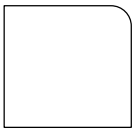
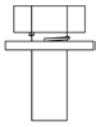
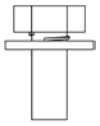
<tr><td>  </td><td>  </td><td>  </td><td>  </td><td>  </td></tr>
<tr><td>1xWifi module</td><td>2xcables</td><td>Terminal accessory</td><td>Document accessory</td><td>4x upper and lower connection board</td></tr>
<tr><td>  </td><td>  </td><td>  </td><td>  </td><td>  </td></tr>
<tr><td>1x Meter (Three Phase Meter/ Single Phase Meter)</td><td>1xQuick Installation</td><td>Label accessory</td><td>16xM4*10</td><td>1xM4*10(PE)</td></tr>
<tr><td>  </td><td>  </td><td>  </td><td>  </td><td>  </td></tr>
<tr><td>2x Back plate</td><td>4xCushions</td><td>15xCable ties</td><td>4xφ10*60</td><td>Disassemble tool</td></tr>
<tr><td colspan="2">  </td><td colspan="3">  </td></tr>
<tr><td colspan="2">1 x Left side plate</td><td colspan="3">1 x Right side plate</td></tr>
<tr><th colspan="5">Battery box side plate*2</th></tr>
<tr><td colspan="2">  </td><td colspan="3">  </td></tr>
<tr><td colspan="2">1x Left side plate</td><td colspan="3">1 x Right side plate</td></tr>
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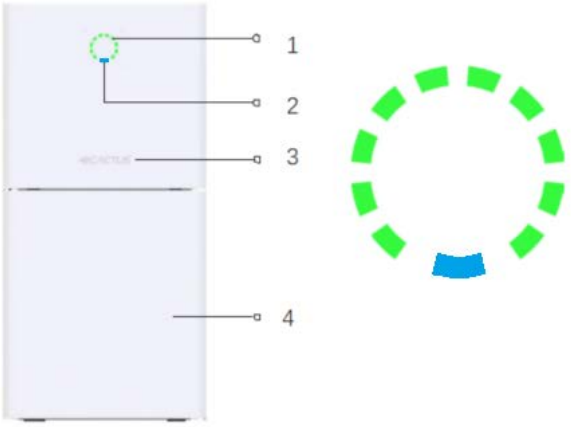
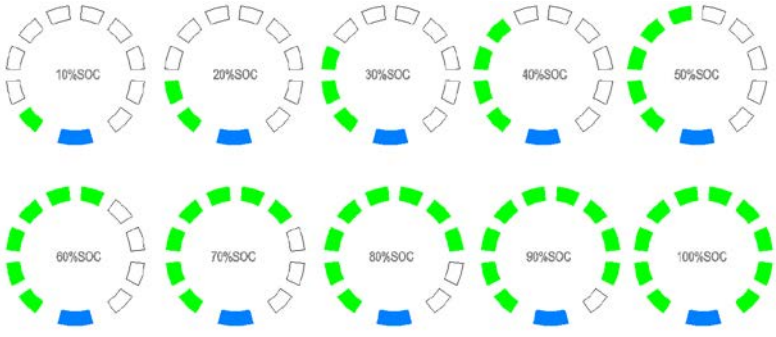
1.4 System Appearance



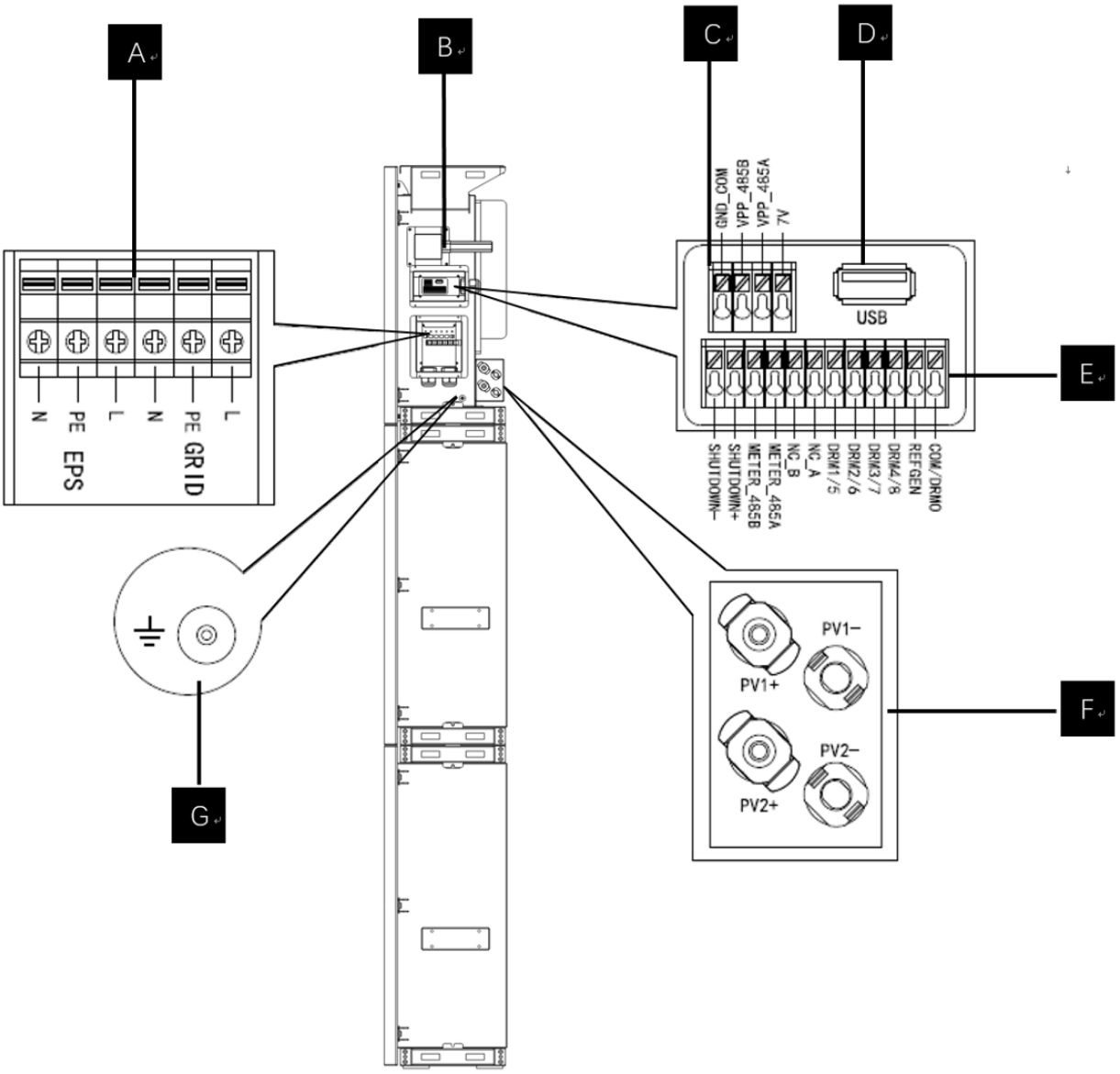
Object	Description
1	Energy indicator lamp
2	Status indicator lamp
3	logo
4	battery box *1

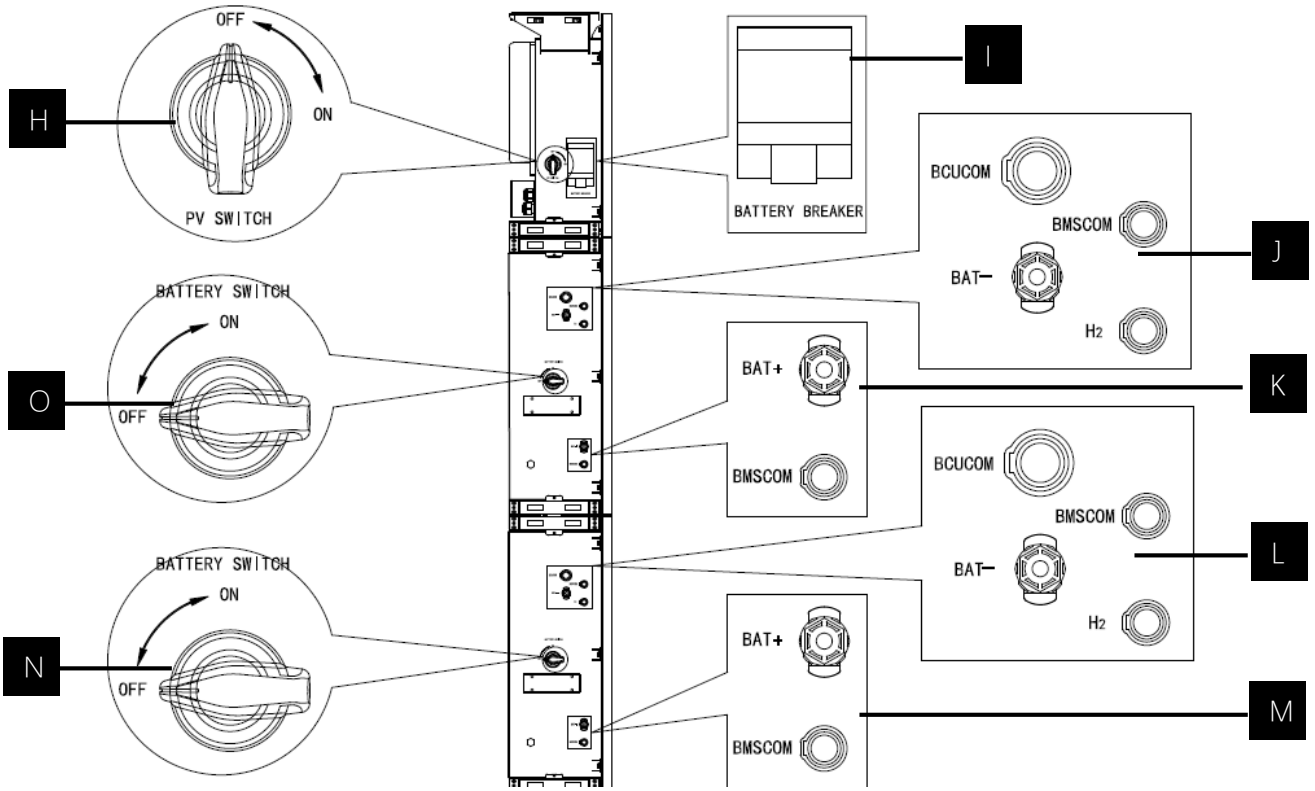
Note: *1 Two battery boxs can be placed.

LED INDICATORS:

STATUS	LED INDICATORS	
Waiting		Blue LED blinking, with an interval of 1sec
Checking		Blue LED blinking, with an interval of 0.5sec
Normal		Blue LED on
DSP fault		Red LED on
Battery com. fault		Red LED blinking, with an interval of 1sec
Meter com. fault		Red LED blinking, with an interval of 0.5sec
Energy indicators		

Terminals of BESS:





Object	Description	Tool requirements and torque
A	Grid output & EPS output	Cross screwdriver 2.5 N·m
B	Wifi port	Plug and play terminals no tool required
C	VPP communication port	Flat head screwdriver
D	USB port for upgrading	Plug and play terminals no tool required
E	Meter communication port & DRM port	Flat head screwdriver
F	PV connection area	Plug and play terminals no tool required
G	Earthing screw	Cross screwdriver 2.5 N·m
H	PV switch(optional) For Australia and New Zealand the PV switch is not integrated	---
I	Battery breaker	Rated voltage [d.c.V] 500 Rated current [d.c.A] 40 Rated insulation voltage [d.c.V] 1000 Rated impulse voltage [d.c.V] 6000 Icu [kA] 6 Ics [kA] 6 Operating temperature -30℃...70℃
J\K\L\M	Battery internal communication & power connected area	Plug and play terminals no tool required

N\O	Battery switch	The battery switch isolates the internal battery modules which are connected in series, the battery switch should not be used to disconnect the batteries under load. Isolation of battery under load is achieved via battery breaker.

1.5 Liability Limitation

WIFO PRO does not assume any direct or indirect liability for any product damage or property loss caused by the following conditions.

- Product modified, design changed or parts replaced without Wifo Pro's authorization;
- Changes, or attempted repairs and erasing of series number or seals by non Wifo Pro technician;
- System design and installation are not in compliance with standards or regulations;
- Failure to comply with the local safety regulations (VDE for DE, SAA for AU, MEA PEA for Thailand);
- Transport damage (including painting scratch caused by rubbing inside packaging during shipping). A claim should be made directly to shipping or insurance company in this case as soon as the container/ packaging is unloaded and such damage is identified;
- Failure to follow any/all of the user manual, the installation guide and the maintenance regulations;
- Improper use or misuse of the device;
- Insufficient ventilation of the device;
- The maintenance procedures related to the product that have not been followed to an acceptable standard;
- Force majeure(violent or stormy weather, lightning, fire etc.);

2. INSTALLATION

It is required to be installed on a flat ground or platform which can bear at least 300Kg. The back of the battery box requires a wall or bracket that can fix expansion bolts, bearing at least 300Kg. The installation site is required to be free from and has no flammable and explosive items and maintains air circulation.

2.1 Installation Site and Environment

2.1.1 General

BESS is outdoor version and can be installed in an outdoor or an indoor location. The BESS is naturally ventilated. The location should therefore be clean, dry and adequately ventilated. The mounting location must allow free access to the unit for installation and maintenance purposes, and the system panels must not be blocked.

The following locations are not allowed for installation:

- habitable rooms;
- ceiling cavities or wall cavities;
- on roofs that are not specifically considered suitable;
- access / exit areas or under stairs / access walkways;
- Places where the freezing point can be reached, such as garages, carports or other places as well as wet rooms;
- places where salty and humid air can penetrate;
- seismic areas - additional security measures are required;
- sites higher than 3000 meters above sea level;
- places with an explosive atmosphere;
- locations with direct sunlight or a large change in the ambient temperature;

2.1.2 Restricted Locations

The BESS shall not be installed:

(1)within 600 mm of any heat source, such as hot water unit, gas heater, air conditioning unit or any other appliance.

(2)within 600 mm of any exit;

(3)within 600 mm of any window or ventilation opening;

(4)within 900 mm of access to 220/230/240 Vac connections;

(5)within 600 mm of side of other device.

BESS installed in any corridor, hallway, lobby or the like and leading to an emergency

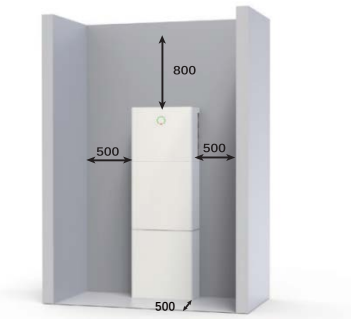
exit shall ensure sufficient clearance for safe egress of at least 1 meter.

2.1.3 Barrier to Habitable Rooms

To protect against the spread of fire in living spaces where the BESS is mounted or on surfaces of a wall or structure in living spaces with a BESS on the other side, the wall or structure shall have a suitable non- combustible barrier. If the mounting surface itself is not made of a suitable non-combustible material, a non-combustible barrier should be placed between the BESS and the surface of a wall or structure. If the BESS is mounted at a wall or at least distance of 30 mm from the wall or the structure separating it from the habitable space, the distances to other structures or objects must be increased.

The following distances must remain empty:

(1) 500 mm beside the BESS;
(2) 800 mm above the BESS;
(3) 500 mm before the BESS.

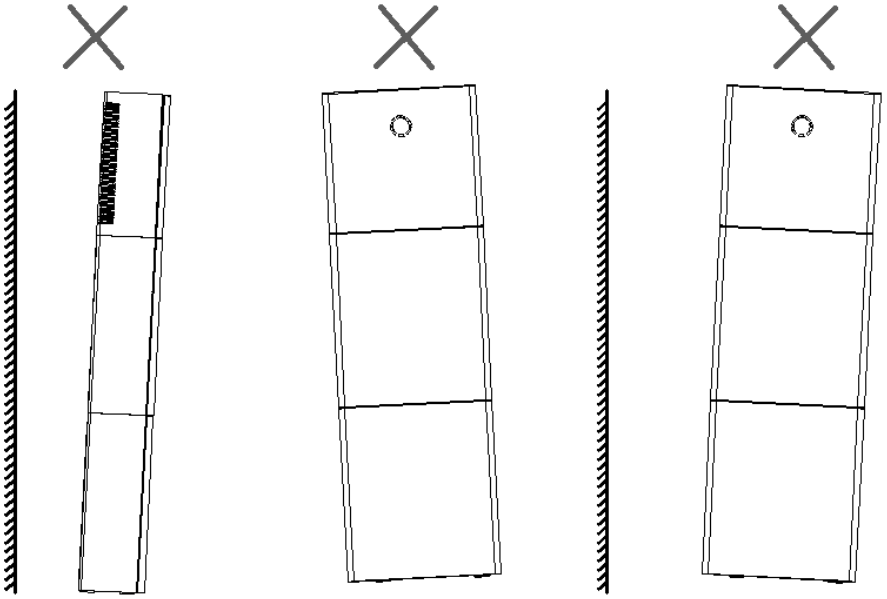


2.1.4 SELECT MOUNTING LOCATION

For The BESS's protection and convenient maintenance, mounting location for The BESS should be selected carefully based on the following rules:

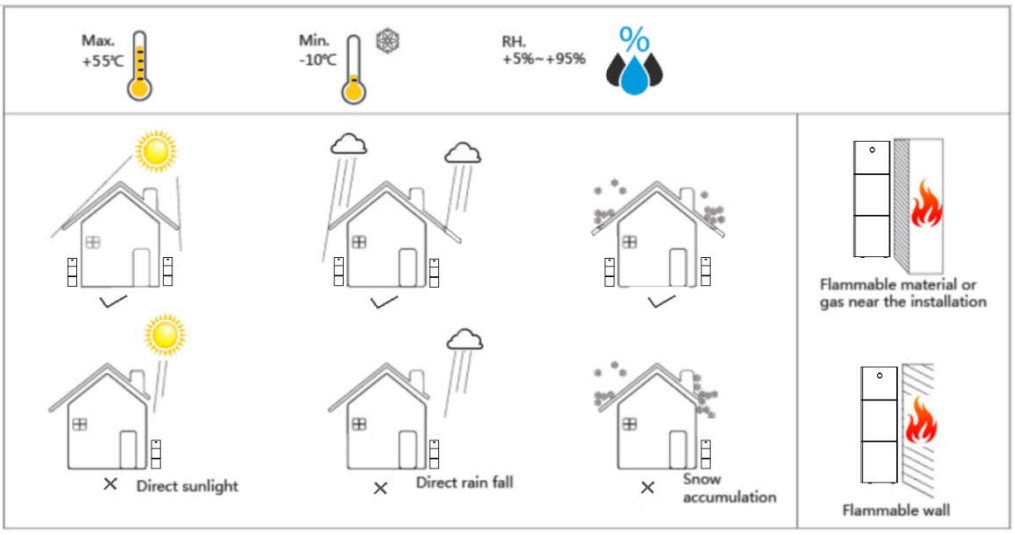
Rule 1. The BESS should be installed on a solid surface, where is suitable for inverter's dimensions and weight.

Rule 2. The BESS installation should stand vertically or lie on a slop by max 2° (Pic 1).



Rule 3. Ambient temperature should be lower than 45℃.

Rule 4. The installation of The BESS should be protected under shelter from direct sunlight or bad weather like snow, rain, lightning etc.

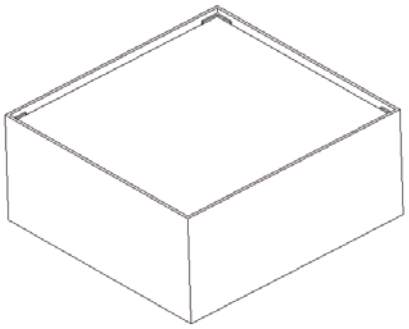
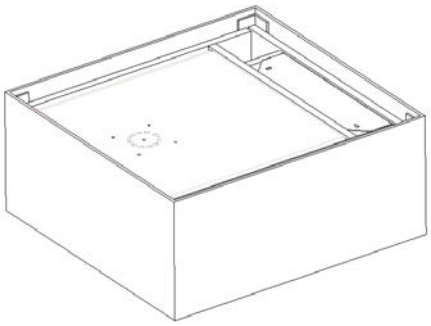


Rule 5. The BESS should be installed at eye level for convenient maintenance.

Rule 6. Product label on The BESS should be clearly visible after installation.

2.2 Installation Steps

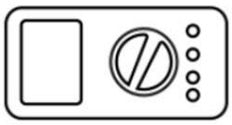
Unpacking the battery box and inverter box.

	
Unpacking the battery box	Unpacking the inverter box

2.2.1 Battery Box Installation

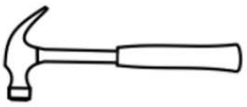
Installation Tools:

screwdriver

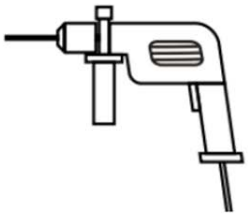


Multimeter

Wire stripper

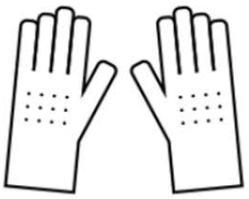


Claw hammer

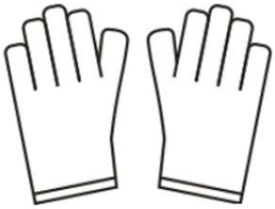


Percussion drill

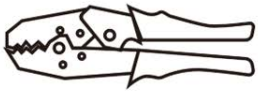
Diagonal pliers



Insulating gloves



Protective gloves

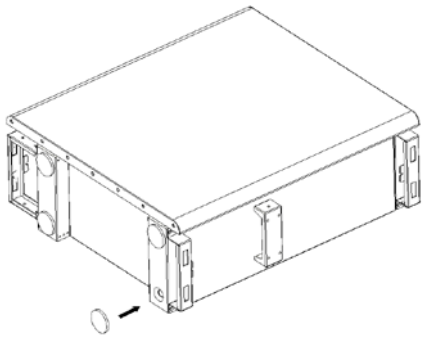


Crimping pliers

For 10kWh BESS:

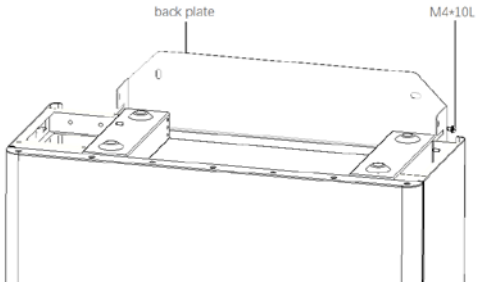
Step 1： Paste the cushions of the battery box

Find four cushions from the inverter packaging accessory and paste them at the four corners of the bottom of the battery box.



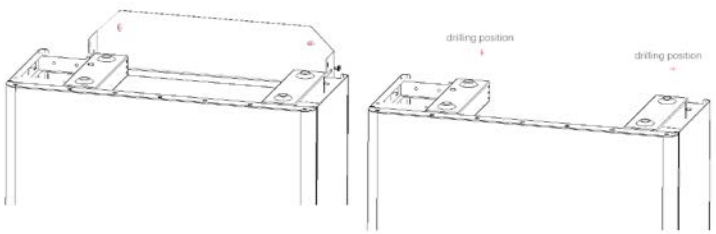
Step 2： Back plate pre-tightening

Remove the installation back plate from the inverter attachment package and pre-tighten the back plate to the top of the battery box with two M4*10 screws, as shown in the figure below:



Step 3： Drilling holes

Put the pre-installed battery box in a specified position, so that it is close to the fixture, mark it according to the hole position on the back plate, then rotate the back plate at an angle (or take the backboard away), and drill holes at the fixture with Ø10mm.

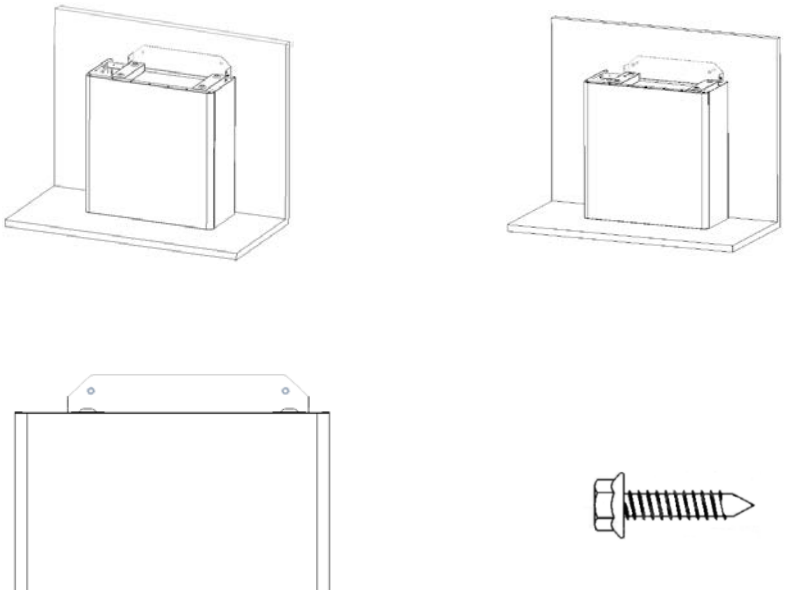


Step 4 : Fix expansion tube

Find the expansion screw from the inverter box accessory package and hammer it into the pre-drilled hole so that its surface is flush with the wall.

Step 5 : Fix battery box and back plate

Rotate the back plate in place and spin the expansion pipe into the locking back plate with self- tapping screws (note that the battery box is fixed with the back plate). Replace the battery box and align the expansion pipe with the backboard hole, and then spin the self- tapping screws into it until the screw plane is pressed on the back plate.

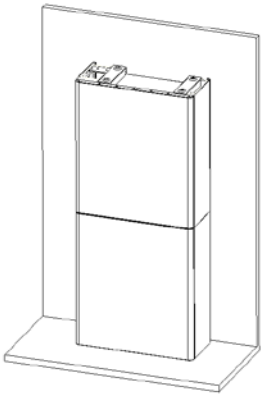


Step 6 : Back plate pre-tightening

Remove the installation back plate from the inverter attachment package and pre-tight the back plate to the top of the battery box with two M4*10 screws, as shown in the figure below.

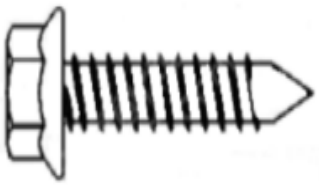
Step 7： Install the second battery box

Put the second battery box smoothly on the top of the first battery box, and be careful not to hit the Back plate.



Step 8： drilling holes

Put the pre-installed battery box in a specified position, so that it is close to the fixture, mark it according to the hole position on the back plate, then rotate the back plate at an angle (or take the backboard away), and drill holes at the fixture with Ø10mm.

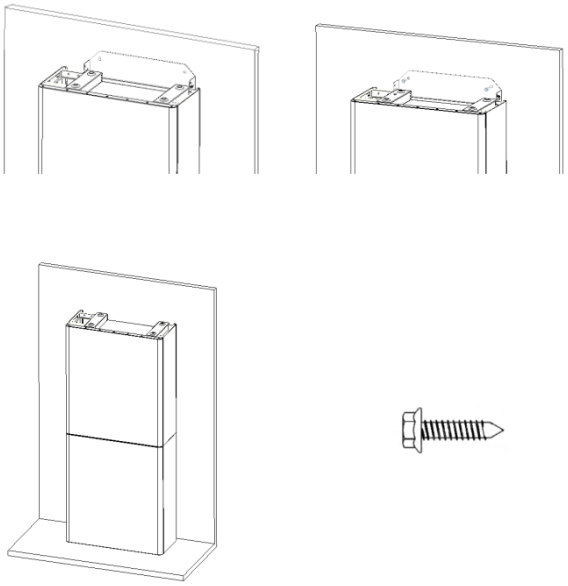


Step 9： Fix expansion tube

Find the expansion screw from the inverter box accessory package and hammer it into the pre- drilled hole so that its surface is flush with the wall.

Step 10： Fix battery box and back plate

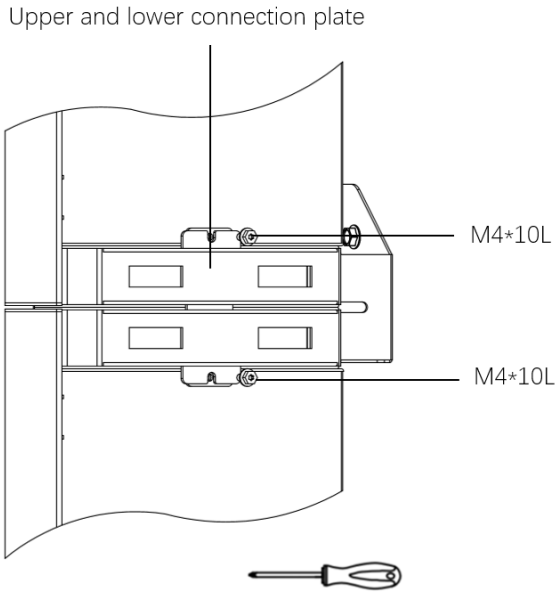
Rotate the back plate in place and spin the expansion pipe into the locking back plate with self- tapping screws (note that the battery box is fixed with the back plate). Replace the battery box and align the expansion pipe with the backboard hole, and then spin the self- tapping screws into it until the screw plane is pressed on the back plate.



How to fine-tune the battery box:

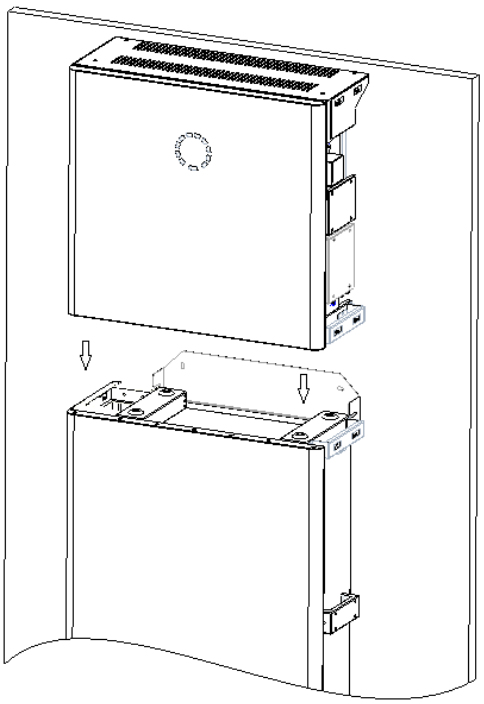
Item	Name	Torque	Note
1	Expansion screws	4 N·m	Tune up and down
2	Tune screws	3 N·m	Tune left and right
3	Fix screws	3 N·m	Tune front and back

Step 1 1： Fix the upper and lower connection plate. (Torque 2.5N.m)



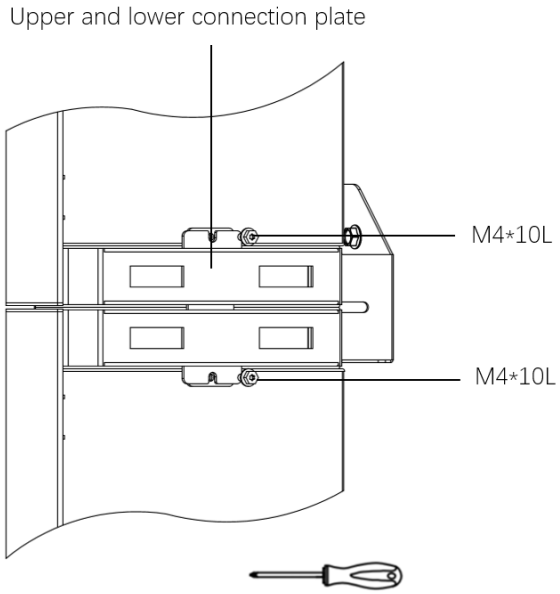
2.2.2 Inverter Box Installation

Step 1： Take the inverter out of the box and place it smoothly on the battery box. Be careful not to damage the cables of the inverter when moving it.



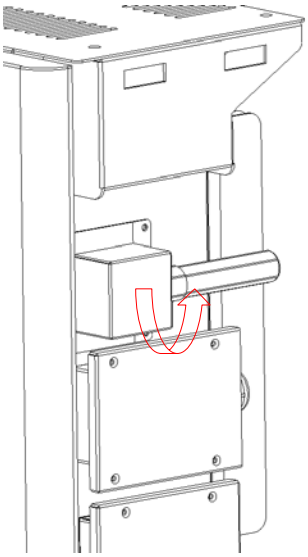
Step 2： Fix the upper and lower connection board to the inverter box

Pre-lock the back plate and inverter with M4*10L stainless steel screws, then lock the battery box and inverter with a upper and lower connection plate, and finally lock the back plate with the screws of the inverter.（Torque 2.5N.m）



Step 3： Install Wifi module

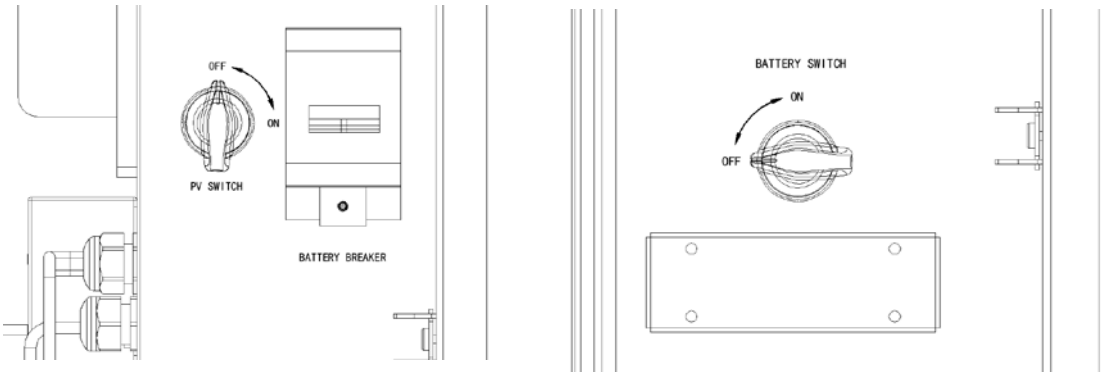
Find the Wifi module in the accessory package and insert it into the base, then tighten the Plastic nut. Torque: 2.5N.



2.3 Cable Connection

2.3.1 General

Make sure all the switches and breakers on the BESS are turned off.



Note: For Australia and New Zealand the PV SWITCH is not integrated.
Note: The external isolation devices for PV array ports shall include the requirement of an additional external break switching device that conforms to the requirements AS/NZS 4777.1

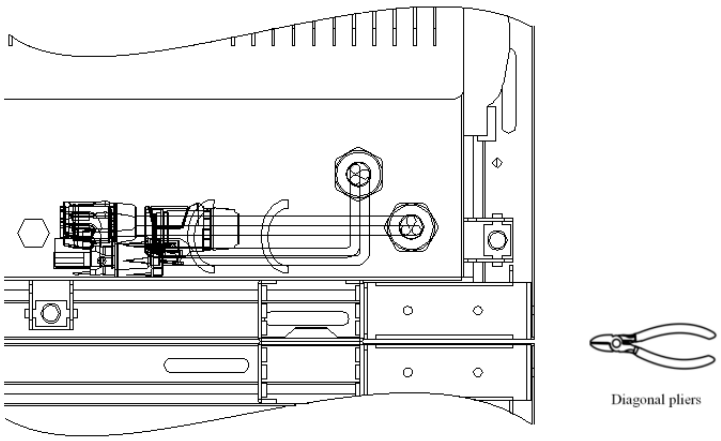
2.3.2 Connect the Inverter Box and Battery Box

Recommended cables and terminals:

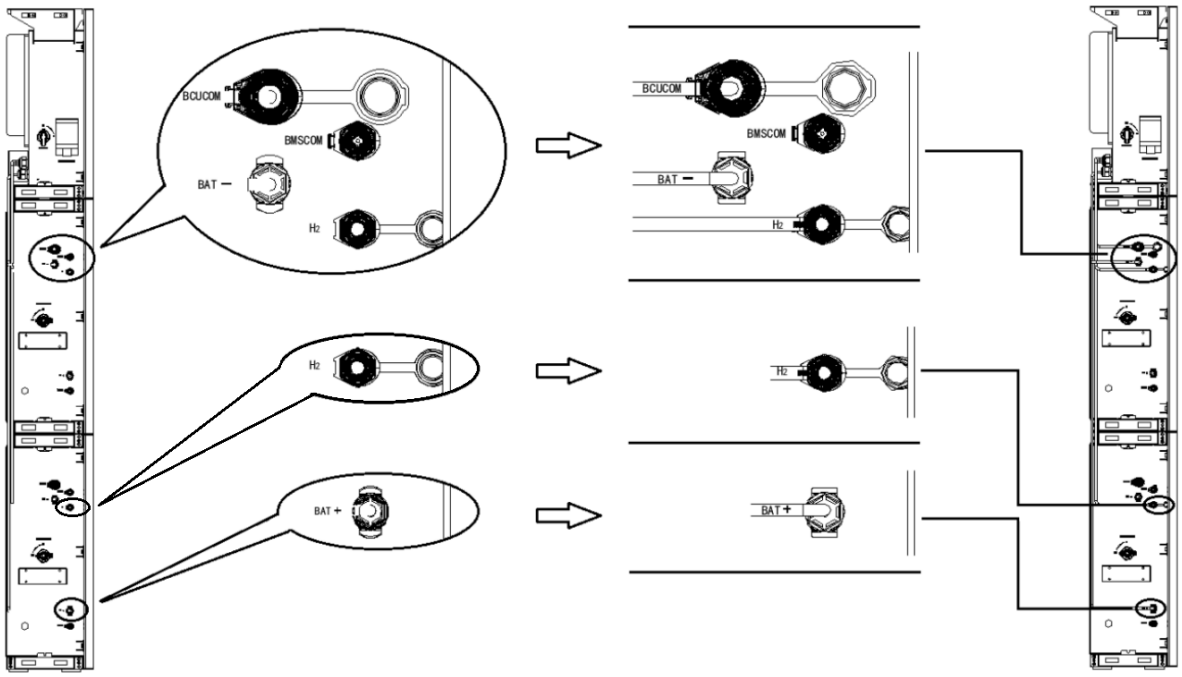
Cable Type	Cable Specification	Terminal Model
PE cable	10AWG	OT5-4 (In accessory)
PV+ cable	10AWG(RED)	Positive DC Plug (In accessory)
PV- cable	10AWG(BLACK)	Negative DC Plug (In accessory)
Grid cable	8AWG	E10-12 (In accessory)
EPS cable	10AWG	E6012 (In accessory)

For 10kWh BESS:
Make sure all the switches and breakers on the BESS are turned off.

Step 1： Untie the cable ties.

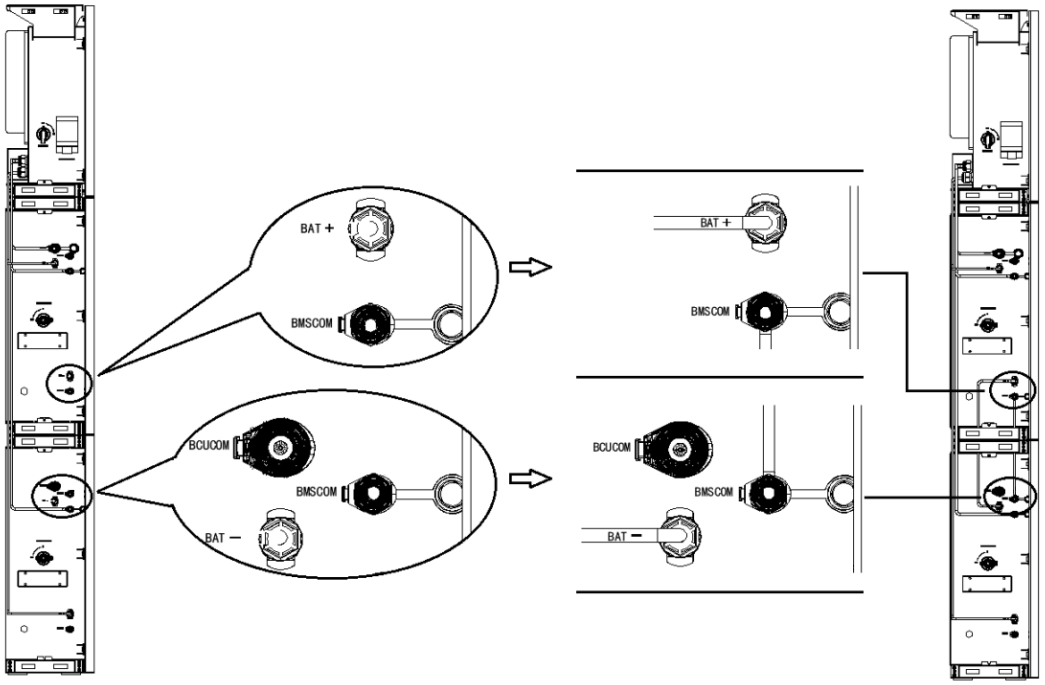


Step 2： First open the waterproof cover of the corresponding terminal, and insert the corresponding terminal in turn according to the cable label.



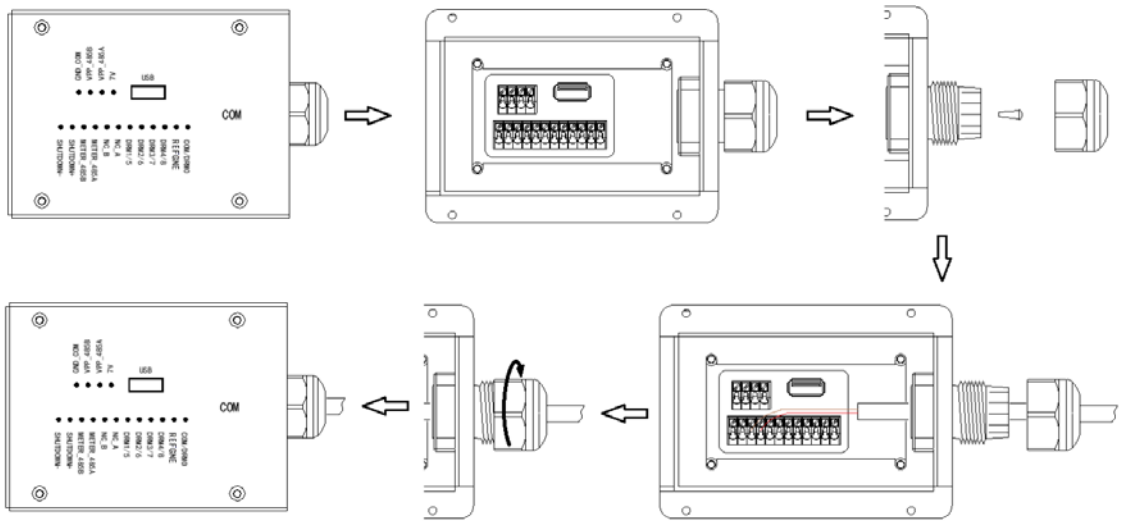
Step 3： Connect the cables between two battery boxes

Find two wires from the inverter box and insert the corresponding port according to the wire number.



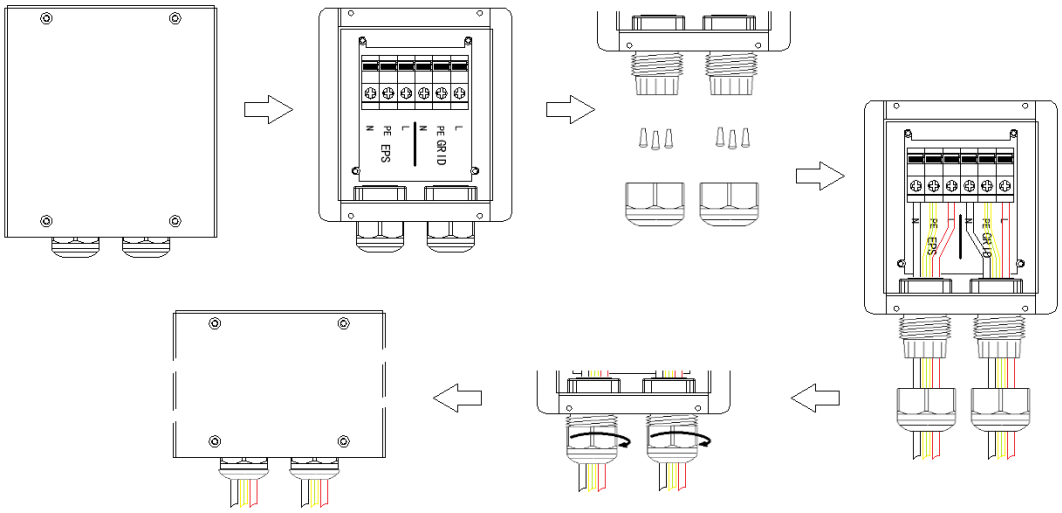
Step 4： Connect the communication cables

Open the communication cover plate and wiring according to the print instructions on the communication cover board. Open the press nut of the waterproof connector, pull out the seal race, then penetrate the conductor into the hole, connect the corresponding label in turn, then tighten the forced nut, and finally lock the waterproof cover plate.



Step 5： GRID and EPS cables

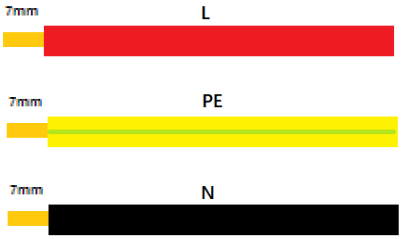
Open the waterproof cover plate and connect according to the type description on the box. Open the press nut of the waterproof joint and pull out the seal race. Then penetrate the wire into the hole.



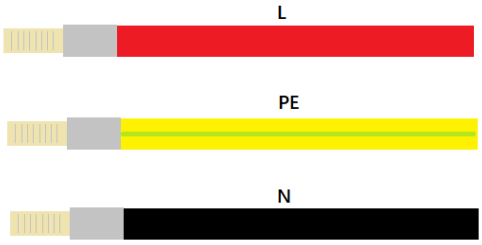
Note: The length of the cable shall be less than 30 meters.

Pressed cable :

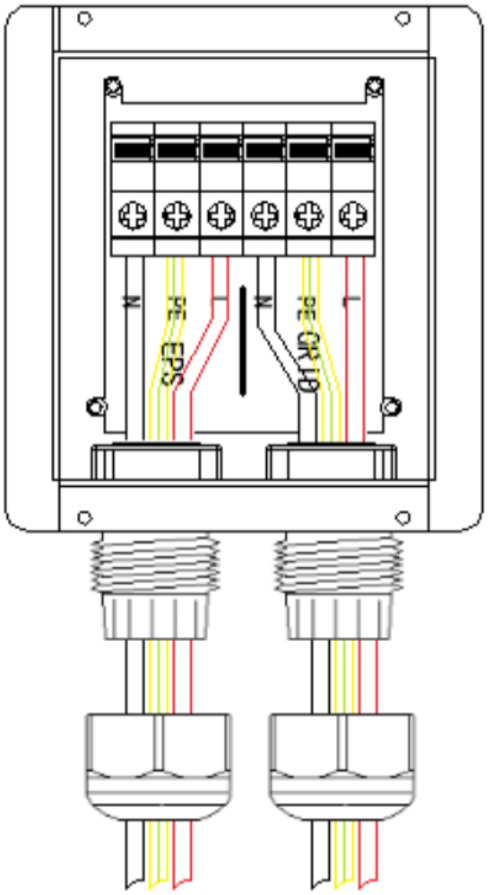
1. Peel off the L/N/PE cable end of 7mm length.



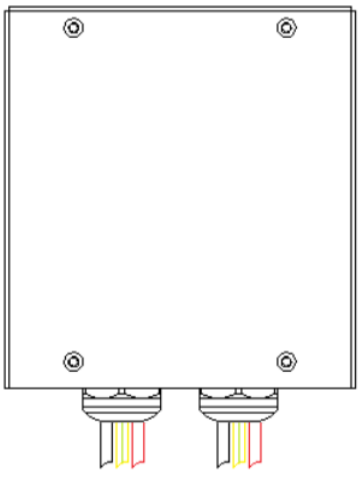
2. Put the "I" terminal into the cable and press it tightly with pressure line clamps.



3. Insert the terminal into the wiring seat, use a cross screwdriver to lock the screws (2.5N.m), and tighten the nut.



4. Fix the waterproof cover and lock it.



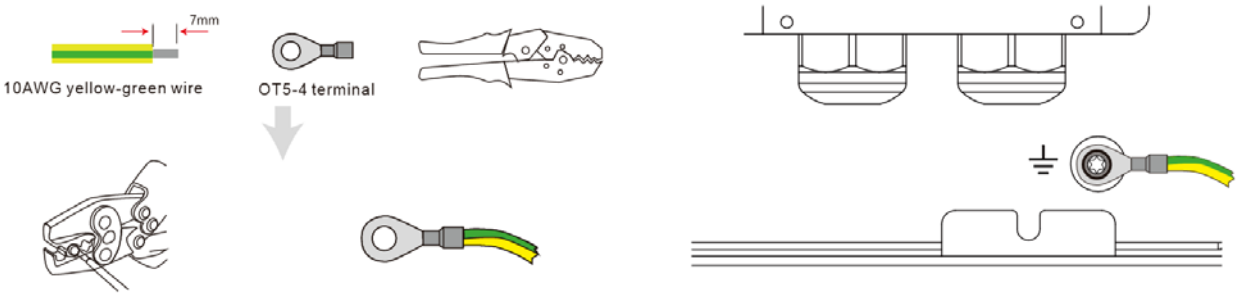
Note:

Declaration for back-up function:

- Some external factors may cause the back-up switching time more than 10 ms, so do not connect loads that depend on a stable energy supply for a reliable operation.
- Loads which may create very high start-up current surges such as fixed frequency air

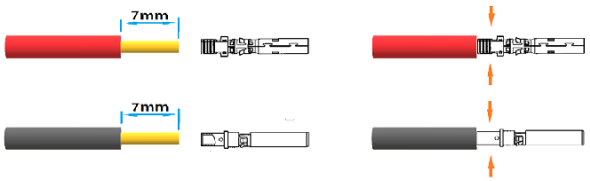
conditioner, high-power pump, these loads may cause the inverter into overload protection state.

Step 6 : Connect PE cable.

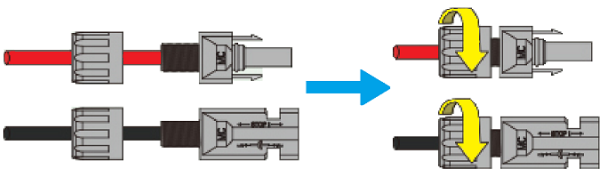


Step 7： Connect PV cables

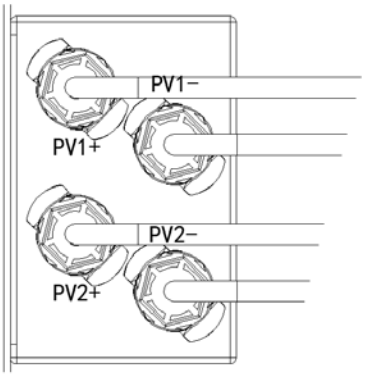
1. Press the terminal;



2. Plug through the terminal and lock the nut;



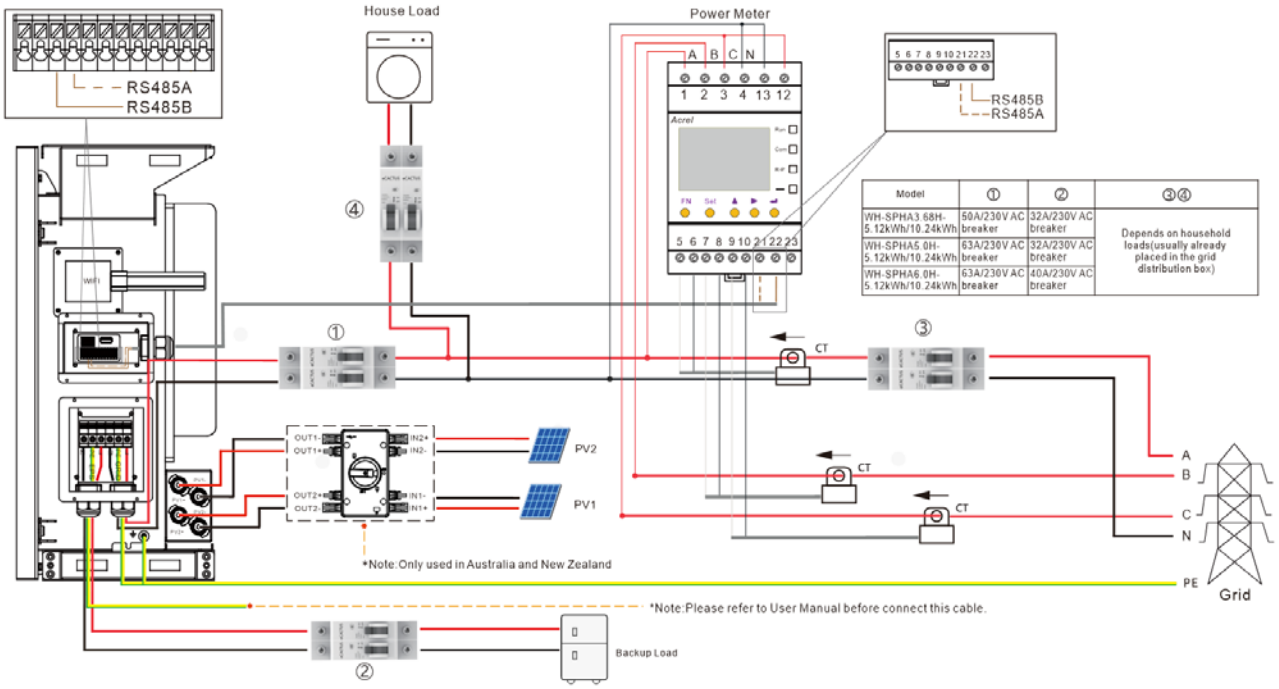
3. Finish the interpolation.


PV1−
PV1+
PV2−
PV2+

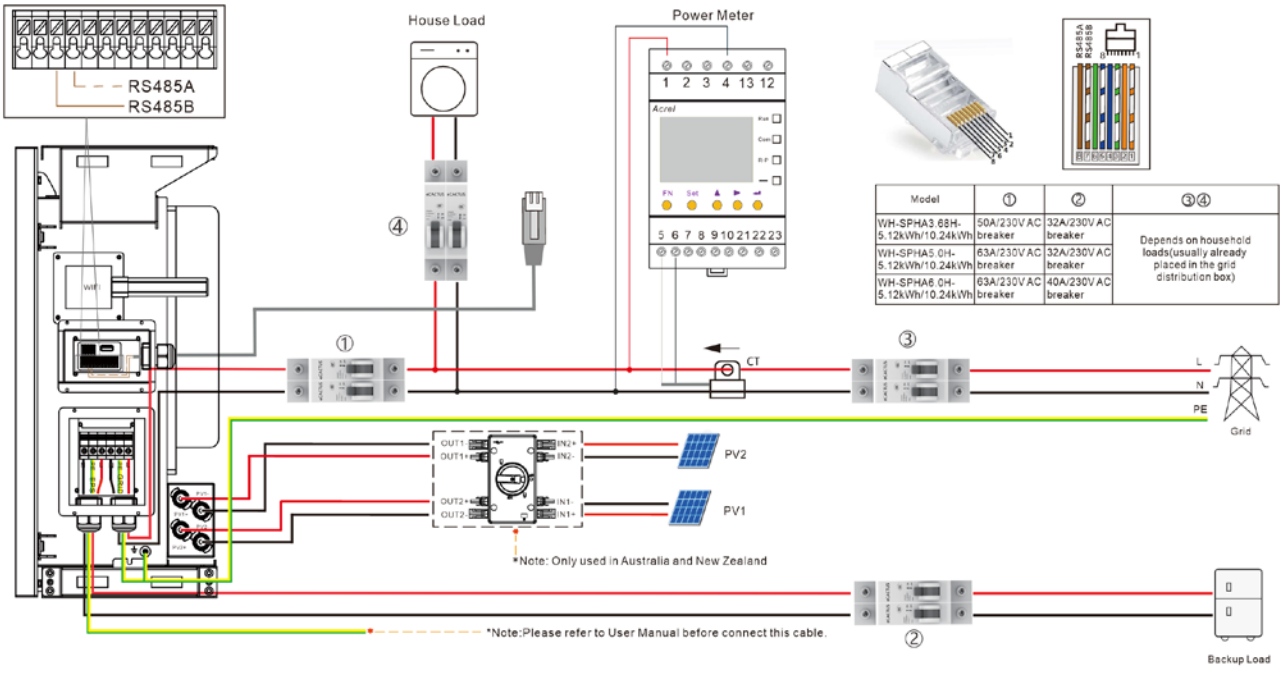
2.3.3 System Wiring

Please select breaker according to the specification below:

Three Phase Meter



Single Phase Meter

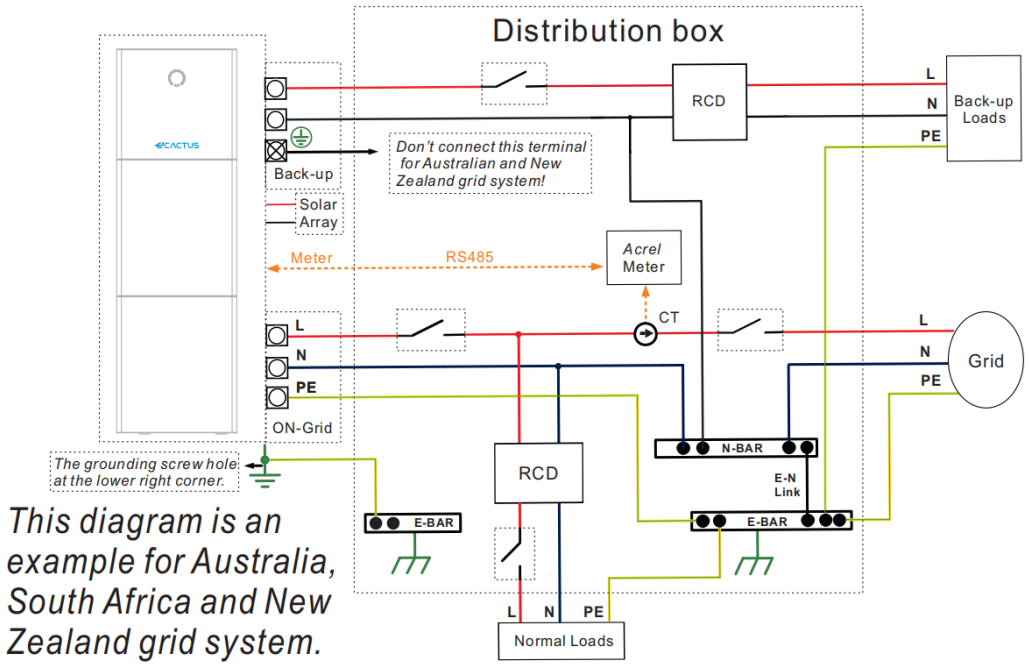


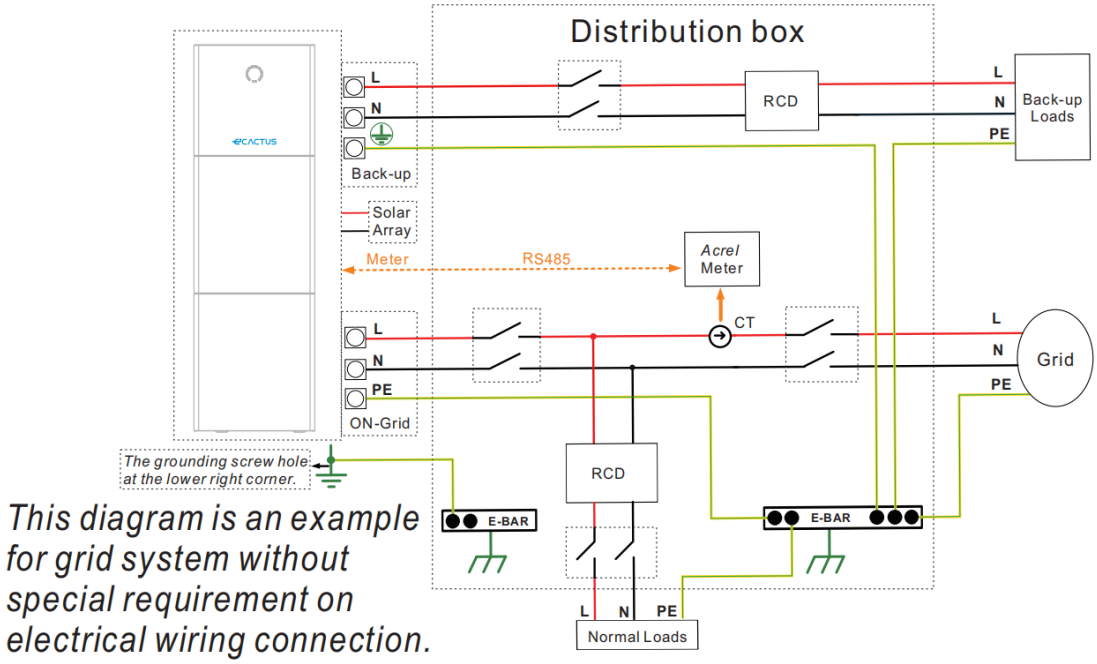
Choose the proper breaker:

Model	①	②	③④
WH-SPHA3.6H-5.12kWh/10.24 kWh	50A/230 V AC breaker	32A/230 V AC breaker	Depends on household loads (usually already placed in the grid distribution box)
WH-SPHA4.6H-5.12kWh/10.24 kWh	63A/230 V AC breaker	32A/230 V AC breaker	
WH-SPHA5.0H-5.12kWh/10.24 kWh	63A/230 V AC breaker	32A/230 V AC breaker	
WH-SPHA6.0H-5.12kWh/10.24 kWh	63A/230 V AC breaker	40A/230 V AC breaker	

● System Connection Diagrams

Note: For Australia safety country, the neutral cable of On-Grid side and Back-Up side must be connected together, otherwise Back-Up function will not work.





Note: The back-up PE line and rack earth must be grounded properly and effectively. Otherwise the back-up function may be abnormal when the grid fail.

2.3.4 Power Meter

The electricity meter should be mounted and connected at the grid transition point so that it can measure the grid reference and feed-in power.

CT meter ratio and accuracy table

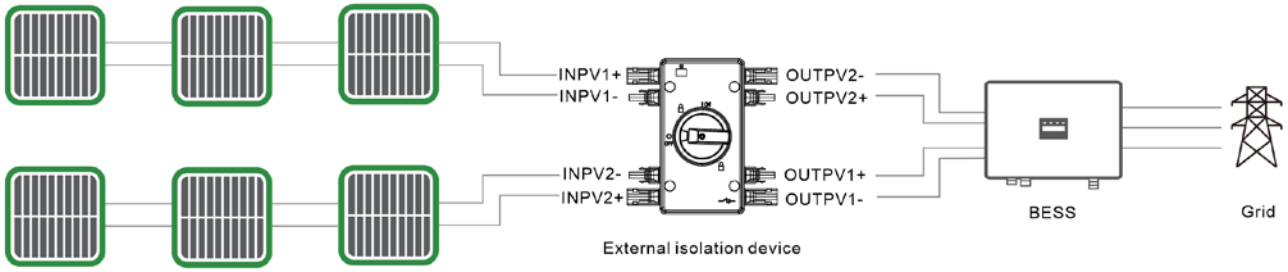
Manufacturer	Model	CT ratio	Accuracy
Acrel Co., Ltd	ACR10R-D16TE	3000	0.5 level

2.3.5 External isolation devices for PV array

For Australia and New Zealand the PV SWITCH is not integrated. An external isolation device for PV array ports is needed. The external isolation device shall conforms to the requirements AS/NZS 4777.1

External isolation device for PV array table

Manufacturer	Model
PROJOY Electric Co., Ltd	PEDS100-EL40R-4(4MC4)

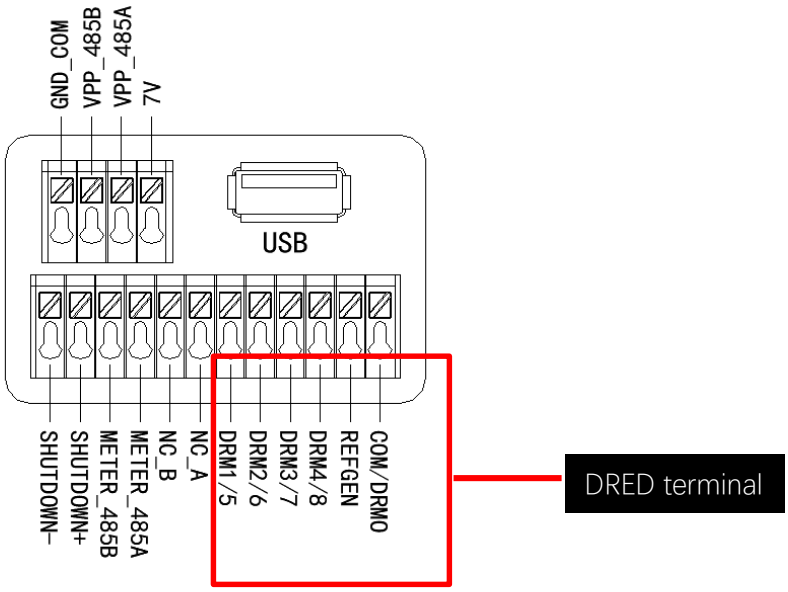


2.4 DERD Connection

DRED is used for Australia and New Zealand installation to support several demand response modes.

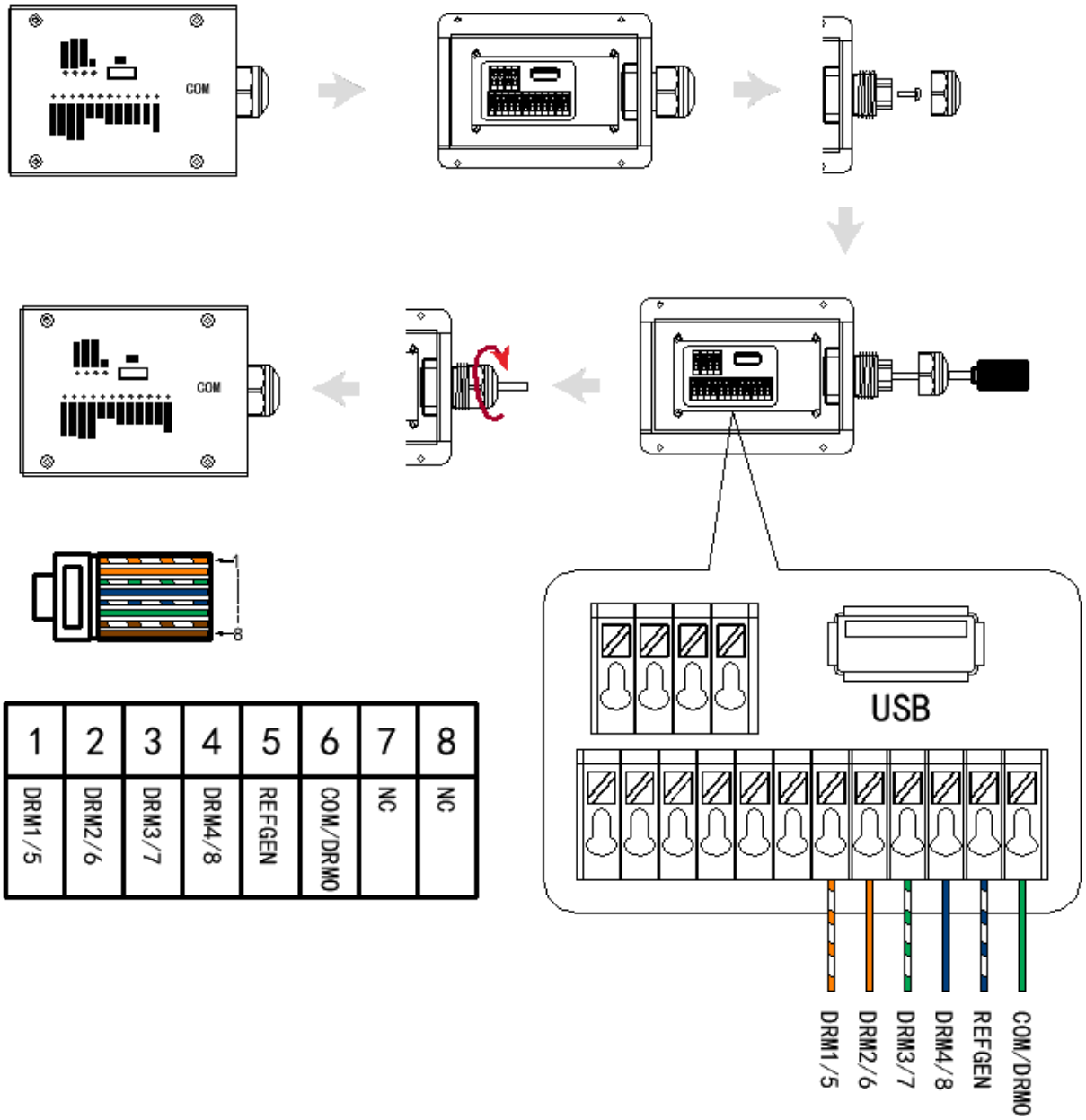
Demond response mode	Requirement
DRM0	Disconnected Import power = 0 & Generate power = 0
DRM1	Import power = 0
DRM2	Import power < 50%
DRM3	Import power < 75%
DRM4	Import power = Not limited
DRM5	Generate power = 0
DRM6	Generate power < 50%
DRM7	Generate power < 75%
DRM8	Generate power = Not limited

●DRED terminal:



●DRED Wire connection

Open the communication cover plate and wiring according to the print instructions on the communication cover board. Open the press nut of the waterproof connector, pull out the seal race, then penetrate the conductor into the hole, connect the corresponding label in turn, then tighten the forced nut, and finally lock the waterproof cover plate.



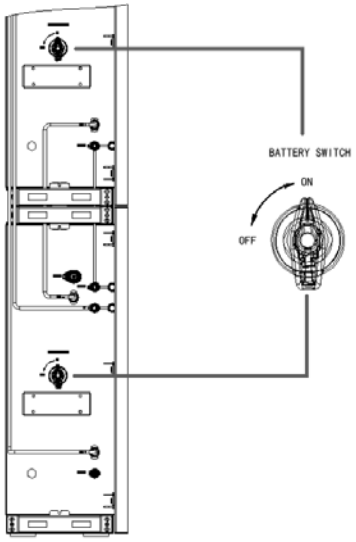
1	2	3	4	5	6	7	8
DRM1/5	DRM2/6	DRM3/7	DRM4/8	REFGEN	COM/DRMO	NC	NC

3. SYSTEM OPERATION

3.1 Switch On

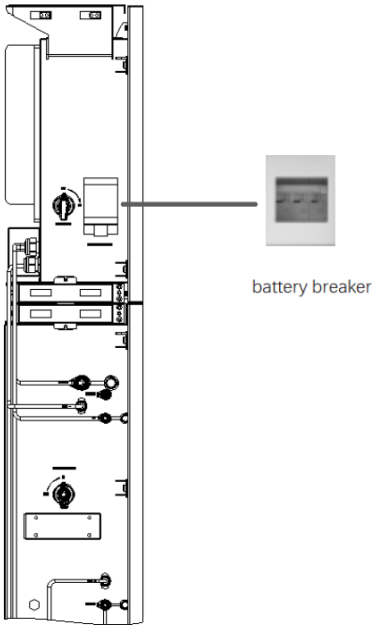
Warning: Please check the installation again before turning on the system.

Step 1: Turn on the battery switch on every battery module

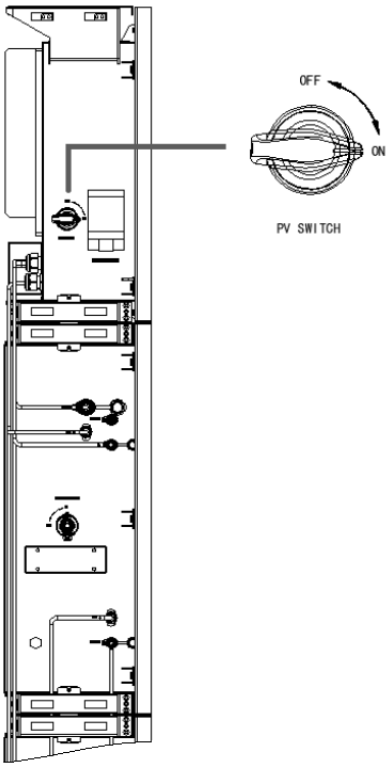


Note:
The battery switch isolates the internal battery modules which are connected in series, the battery switch should not be used to disconnect the batteries under load. Isolation of battery under load is achieved via battery breaker.

Step 2 : Open the battery breaker cover and turn on the battery breaker.



Step 3: Turn on the PV switch.



Note: For Australia and New Zealand the PV SWITCH is not integrated.
Note: The external isolation devices for PV array ports shall include the requirement of an additional external break switching device that conforms to the requirements AS/NZS 4777.1

Step 4: Turn on the grid breaker.

Step 5: If backup load is applied, switch on the backup breaker.

Step 6: Close the battery breaker cover.

Step 7: Configure the WIFI stick (Only if this is the first time turning on the system). Please follow the instructions in section 4 to section 5.

3.2 Switch Off

Step 1: If backup load is applied, turn off the backup load first, and then turn off the backup breaker.

Step 2: Turn off the grid breaker.
Step 3: Turn off the PV switch.

Step 4: Open the battery breaker cover and turn off the battery breaker.

Step 5: Turn off the battery switch on every battery module.

Step 6: Close the battery breaker cover.

3.3 Emergency Situations

3.3.1 Emergency Procedure

When the WH-SPHA battery energy storage system (BESS) appears to be running abnormally, you can turn off the main grid breaker that directly feeding the BESS, and turn off all switches within the BESS. Then please contact Wifo Pro and we will provide detailed instructions.

WARNING: Please do not open the upper cover plate of the BESS by yourself.

3.3.2 First Aid Measures

If battery module leaks electrolyte, avoid contacting with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below:
Skin contact: Remove contaminated clothes and rinse skin with plenty of water or shower for at least 15 minutes. Take a medical treatment immediately.
Eye contact: Immediately flush eyes with plenty of water continuously for at least 15 minutes, occasionally lifting the upper and lower eyelids. Take a medical treatment immediately.
Inhalation: Cover the victim in a blanket, move to the place of fresh air and keep quiet.Take a medical treatment immediately. When dyspnea (breathing difficulty) or asphyxia (breath-bald), give artificial respiration immediately.
Ingestion: Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious. Take a medical treatment immediately.

3.3.3 Firefighting Measures

Extinguishing media: Dry power, sand, carbon dioxide (CO2), water spray Fire precautions and protective measures:

Flammable properties: Lithium ion batteries contain flammable liquid electrolyte that may vent, ignite and produce sparks When subjected to high temperature (> 150 ℃) , When damaged or abused (e.g., mechanical damage or electrical overcharge). Burning cells can ignite other batteries in close proximity.

Explosion data: Extreme mechanical abuse will result in rupture of the batteries. Throw into the fire will result in burning.

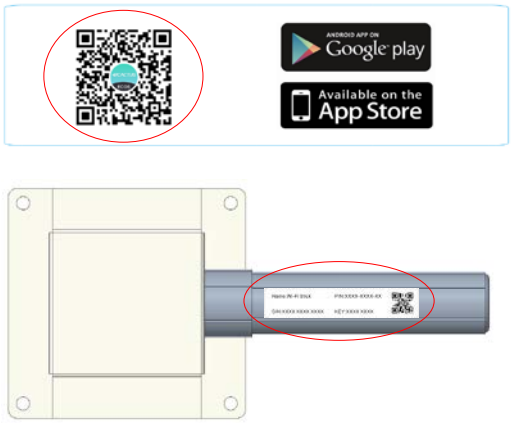
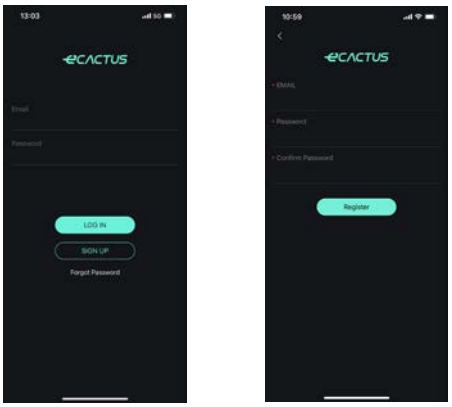
Special protective equipment for firefighters: In the event of a fire, wear full protective clothing and self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

4. ECACTUS CONFIGURATION & WIFI RELOAD

• This part shows eCactus configuration step by step.

4.1 Preparation

1. Inverter must be powered up with only PV power.
2. Need a router with available Internet access to the eCactus application center.
3. An Android or iOS smart phone

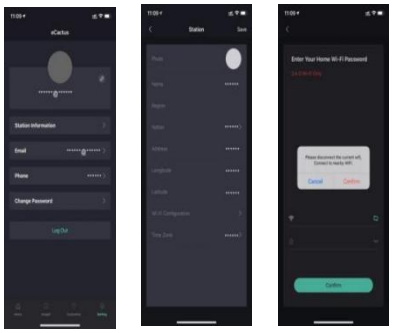
STEP1 1. Scan the QR code on the front of the device to install Android or iOS version eCactus App which depends on the operating system.	
STEP2 1. Open ECOS APP and click the sign up button to register a new user account. 2. Following all the instructions during the sign up process to successfully connect the device with ECOS. 3.The QR code for the product connection ID is on the Wi-Fi stick within the right side of the device.	

NOTE:

1. Please make sure the password is right the same with the router's.
2. Ensure that the signal strength between the Wifi module and the wireless network is stable.
3. If everything is right well, the Wi-Fi LED on inverter will change from double blink to quartic blink then to solid status, Which means Wi-Fi is connected to eCactus successfully.

4.2 Wi-Fi Reset & Reload

Wi-Fi Reset means restarting Wi-Fi module, Wi-Fi settings will be reprocessed and saved. Wi-Fi Reload means setting Wi-Fi module settings back to default factory setting.

Wi-Fi Reset: Please use your eCactus App to reset Wi-Fi configuration. Navigate to Setting and Station information and then Wi-Fi Configuration and follow the instructions to finish Wi-Fi reset procedure.	

4.3 Install Side Plate

Confirm that the left and right side plates are installed respectively after the BESS is working properly.:

5. EMS CONFIGURATIONS

Energy management system(EMS) configurations can be done via eCactus App or online website.

Three working modes can be set:

1.Self-Powered:

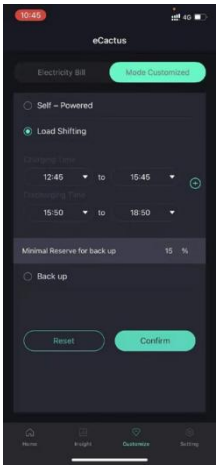
eCactus will manage your family power to reduce buying power from power grid.

2.Load Shifting

Power from battery will be charge and discharged as you configured.

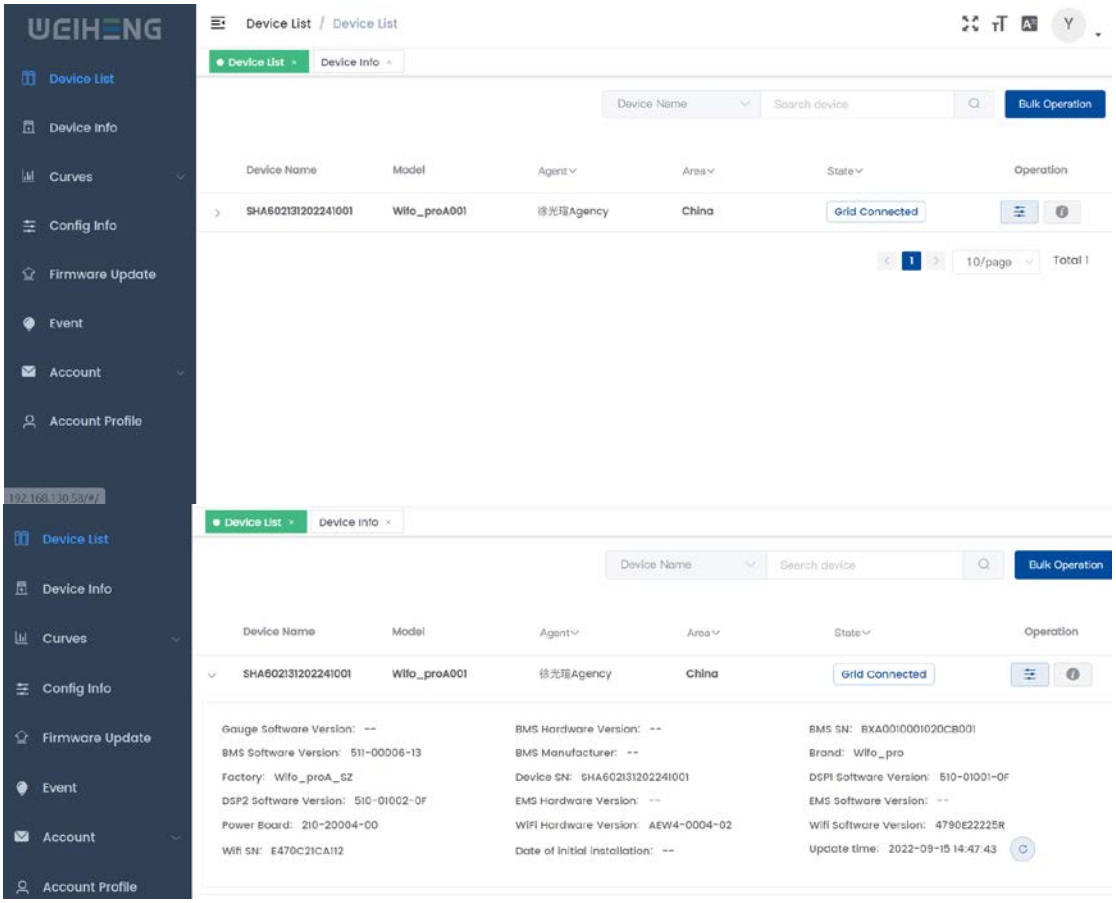
3.Backup:

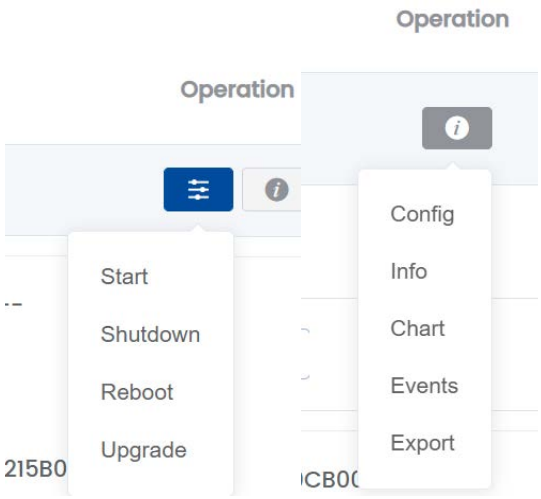
eCactus will not discharge battery unless power grid is off. At that time, eCactus can support your family power usage by discharging battery.

Working Modes: Navigate to Customize tab and you can one of three operation modes from eCactus App.	

6. ECOS Hub (PC) User Manual (For Agent)

Device list:



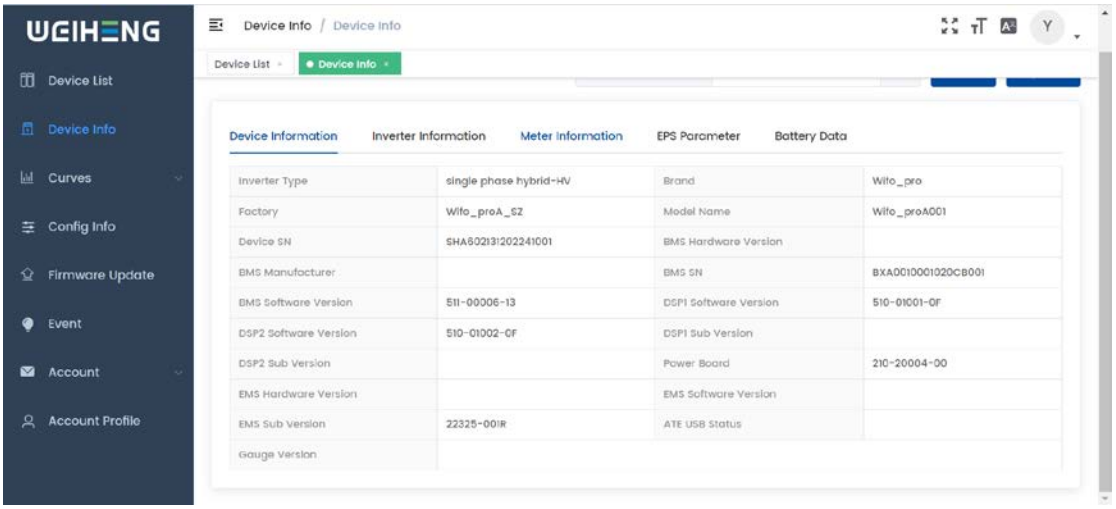


1. Device list shows the devices belongs to the current agent account.
2. Clicking the tab to see more information about the device
3. Under operation, the left bottom contains 4 commands to control the device, which are “Start”,” Shutdown”,” Reboot”, “Upgrade”. “Upgrade” function allows you to upgrade the device firmware.
4. The right bottom contains 5 main functions which are “Configuration”,” Data”,” Chart”, “Events” and “Export”.

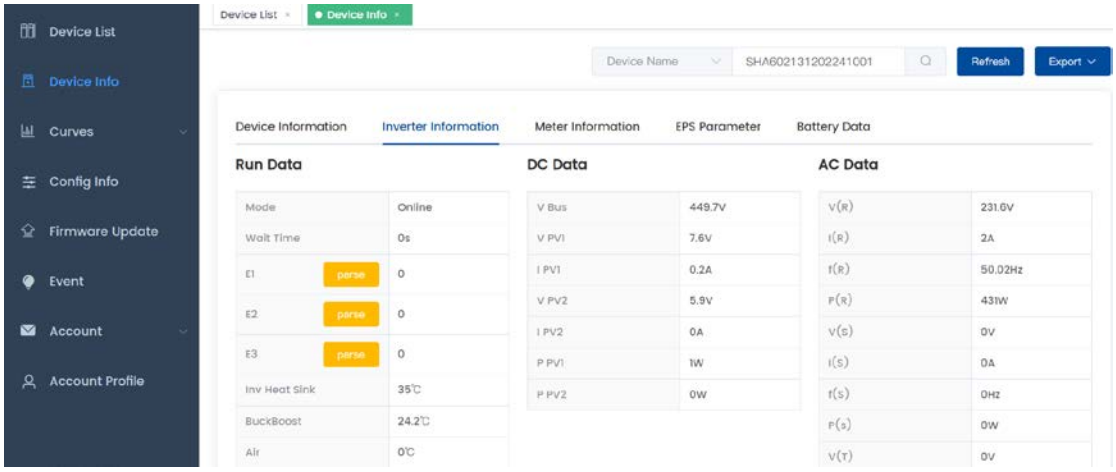
Device info:

The device info module shows the device information, inverter information, meter information, eps parameter and battery data.

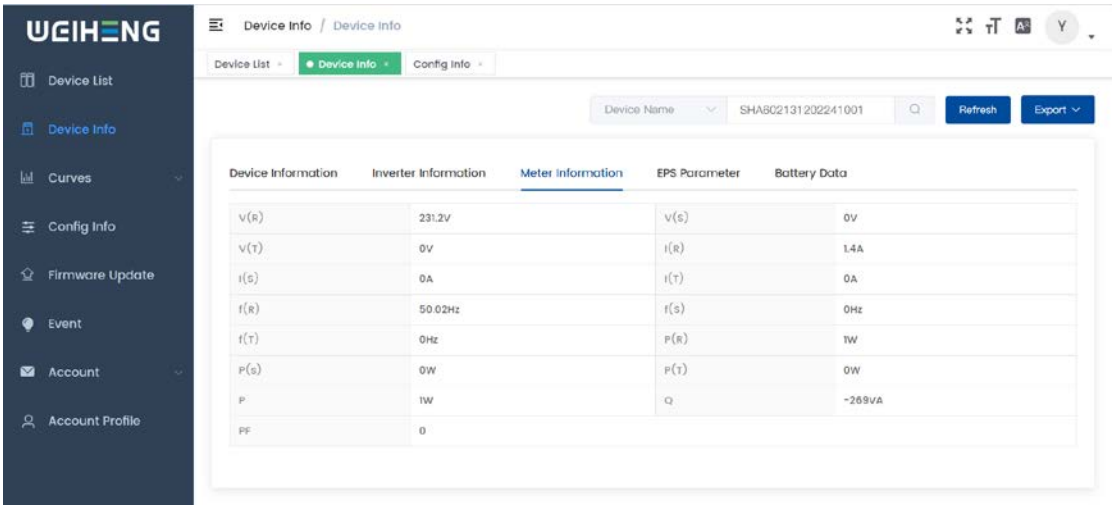
Device information:



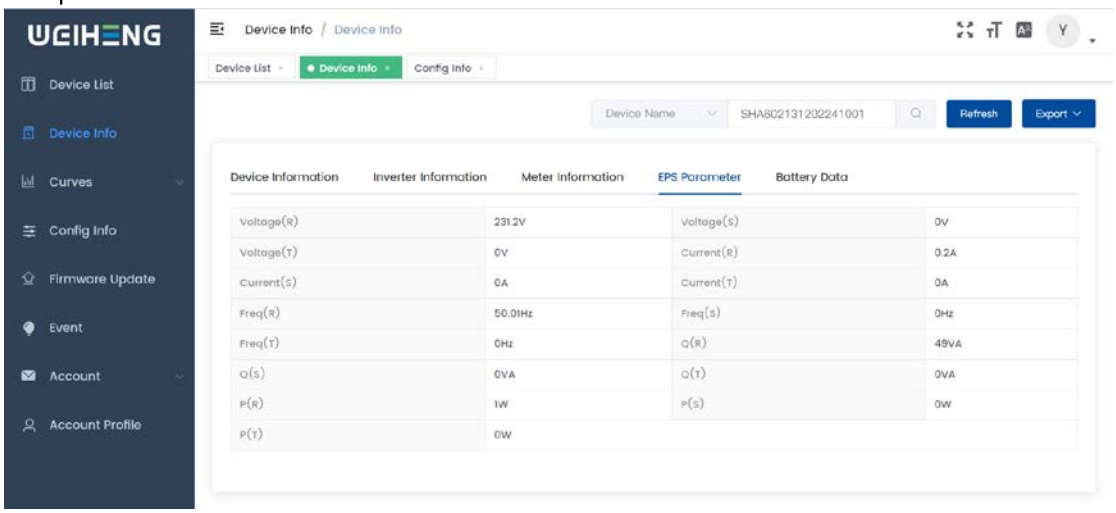
Inverter information:



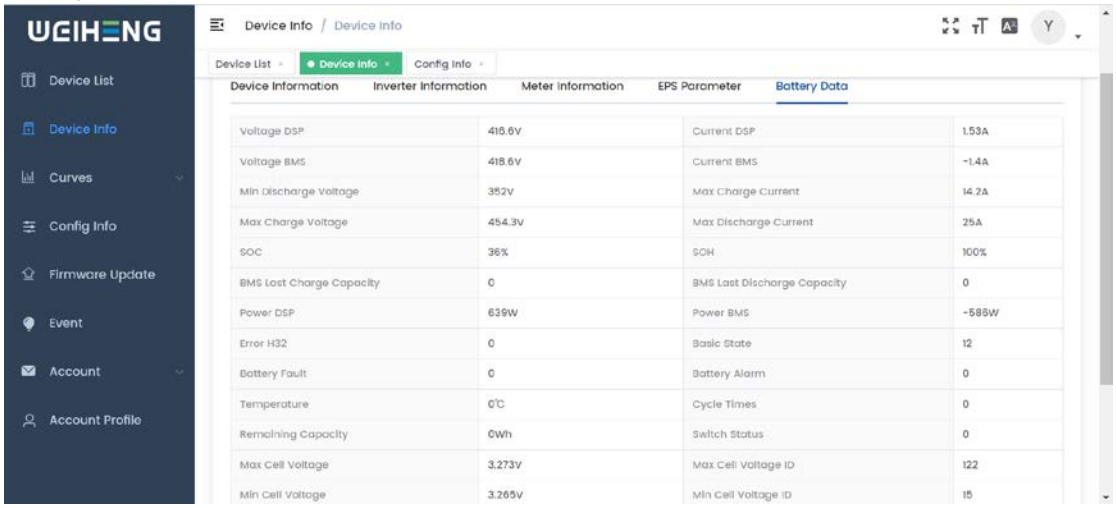
Meter information:



EPS parameter:



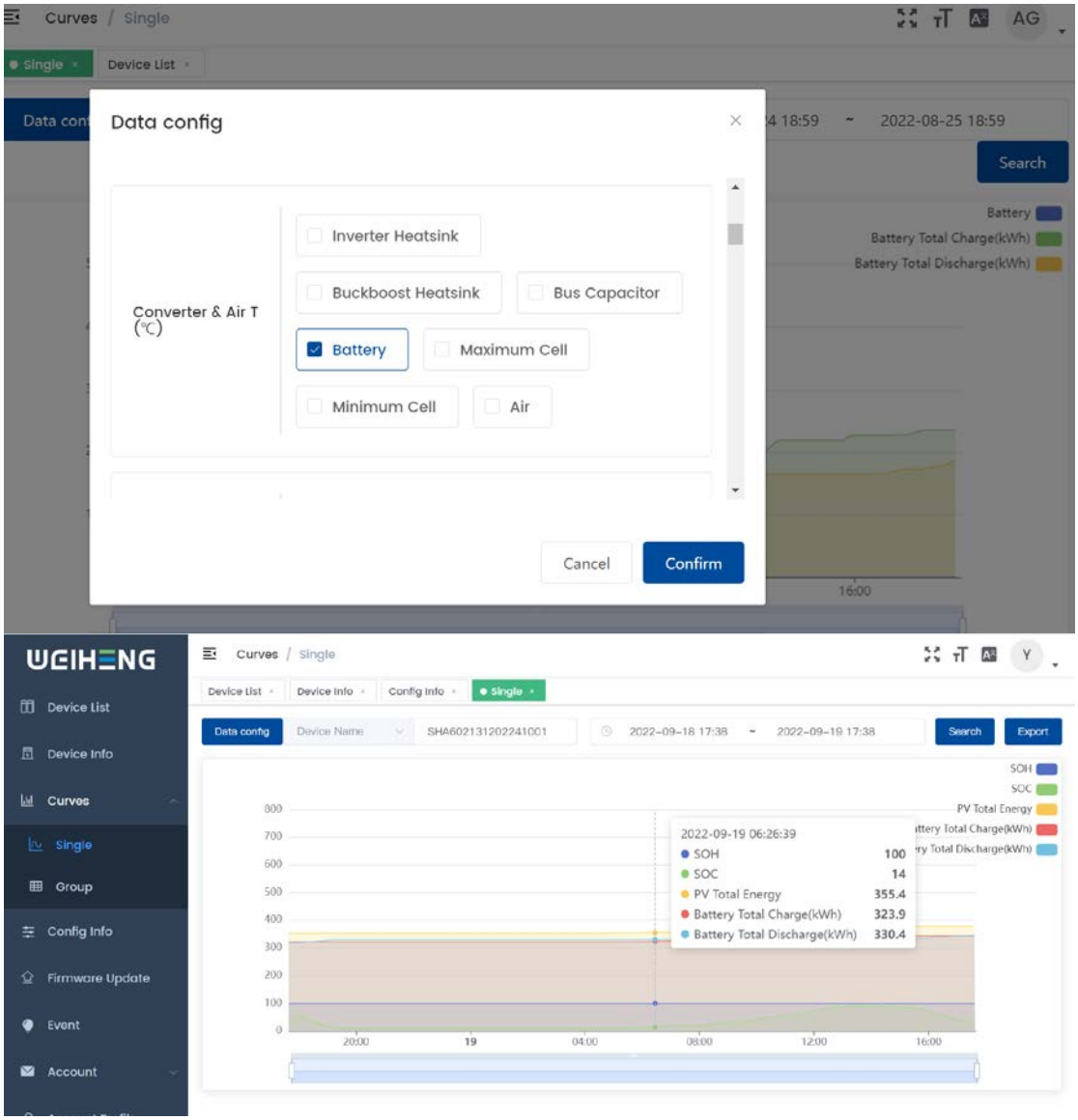
Battery data:



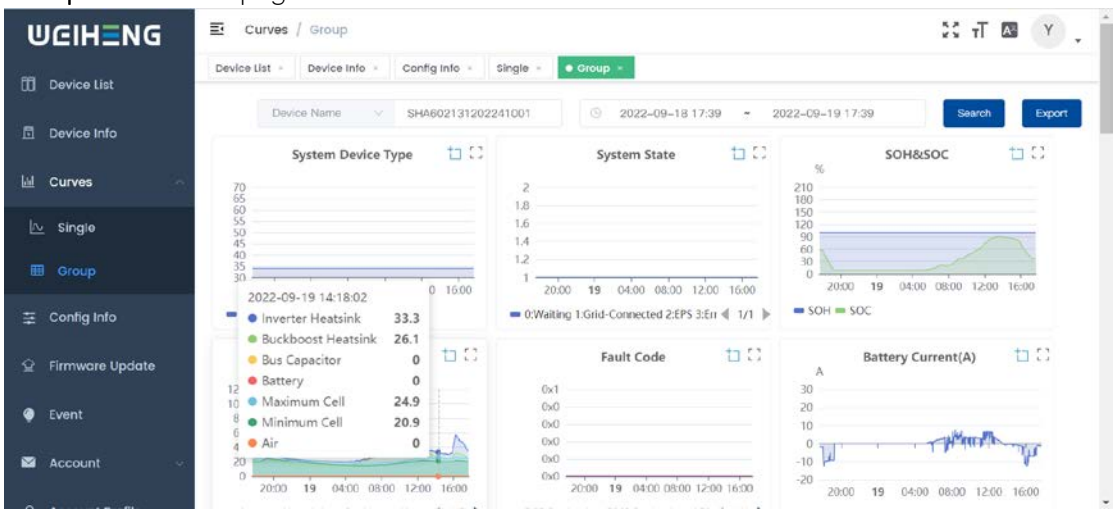
Curves

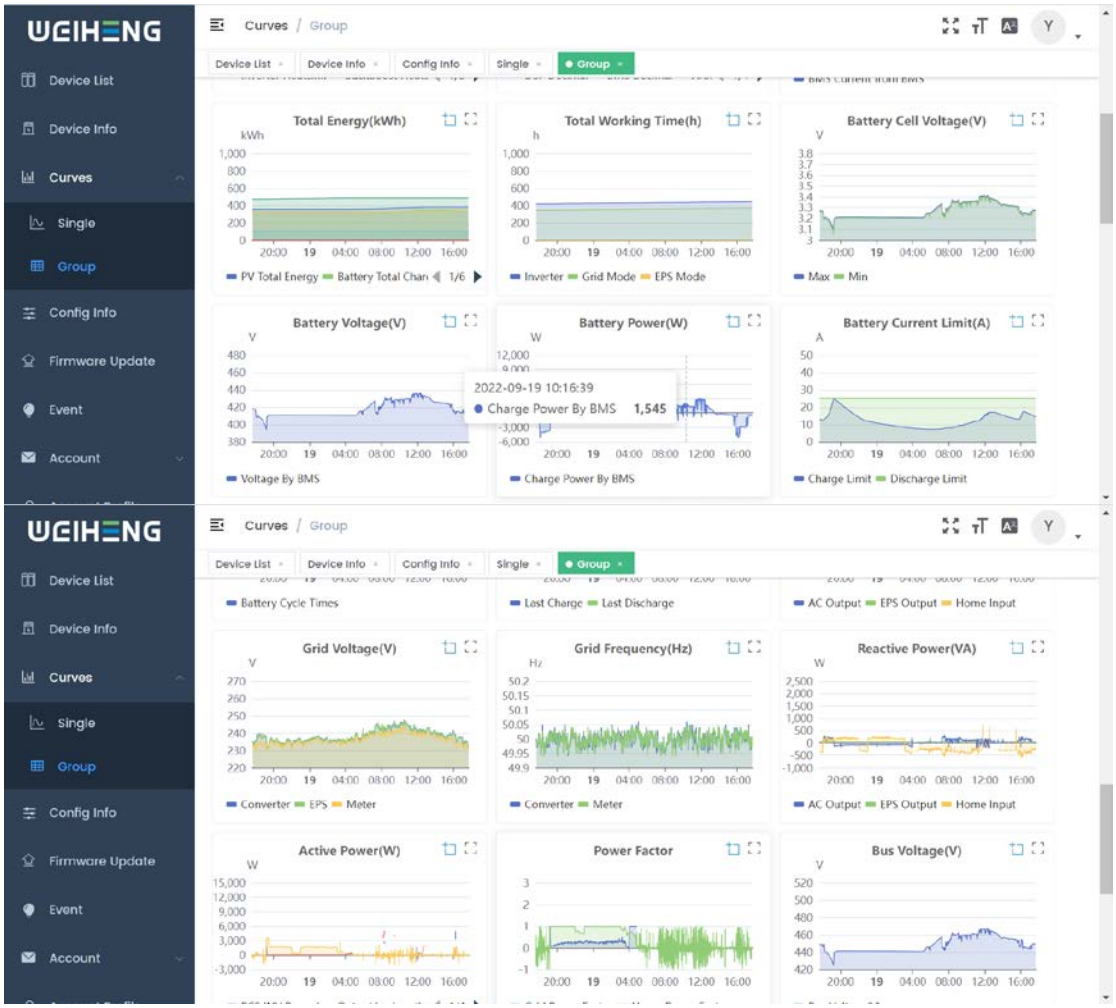
This module shows the data curves of the device and supports query by date and export functions.

Single curve: You can select no more than 6 data types to form into a single curve.



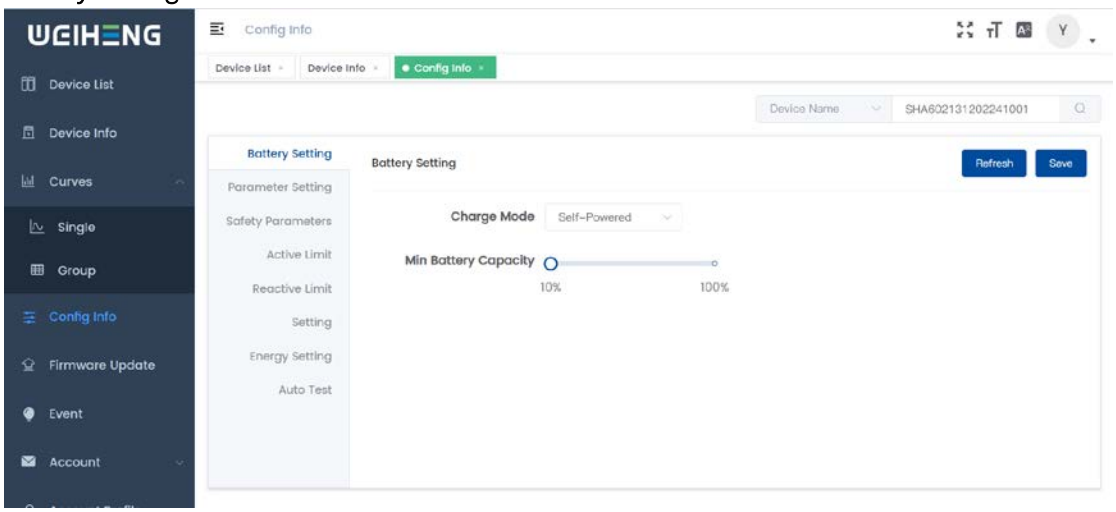
Group curves: This page shows the 28 different data curves of the device.

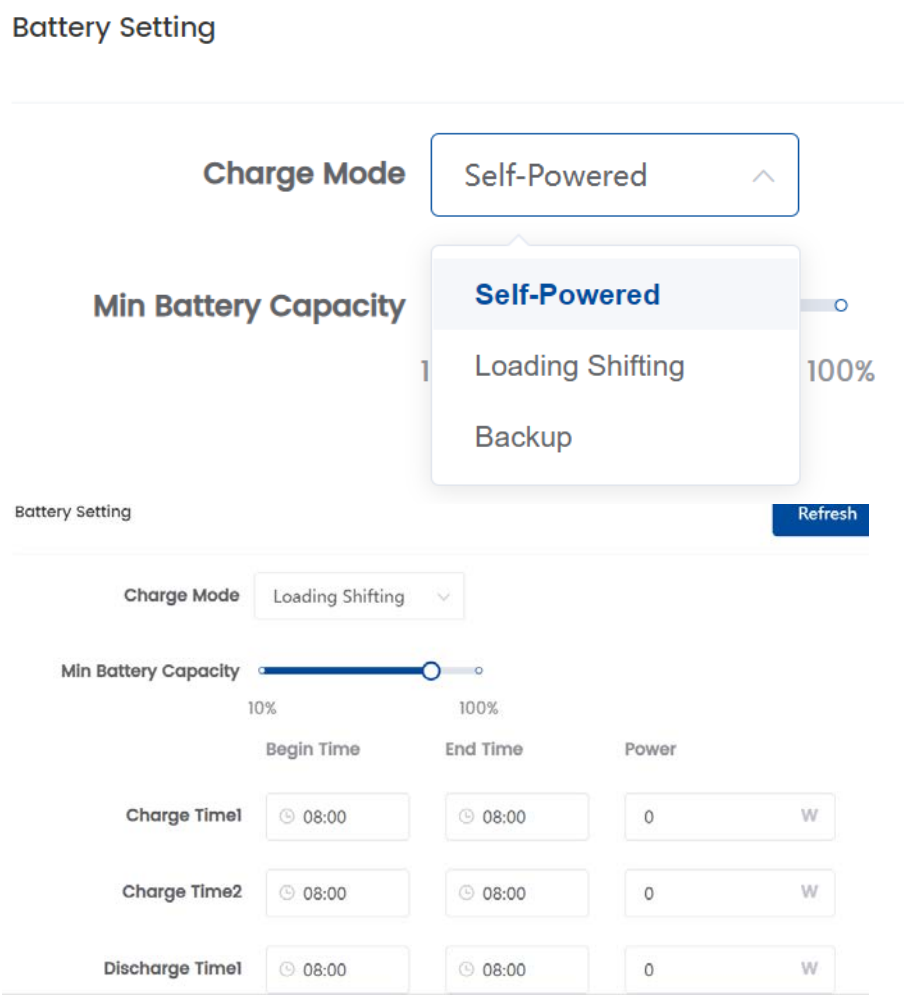


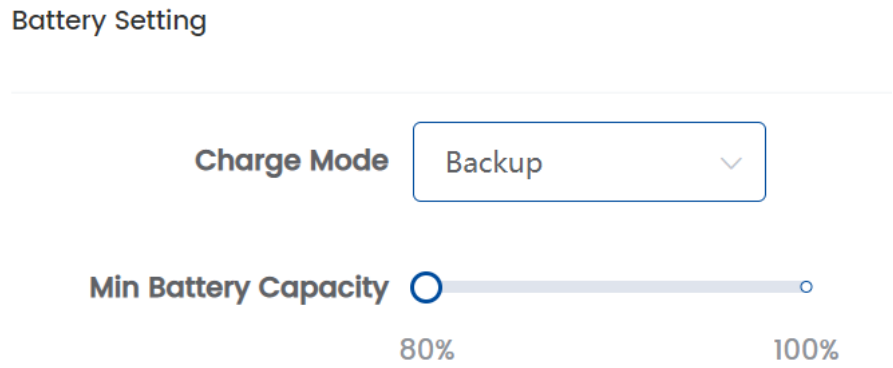


Configuration:

Battery setting:





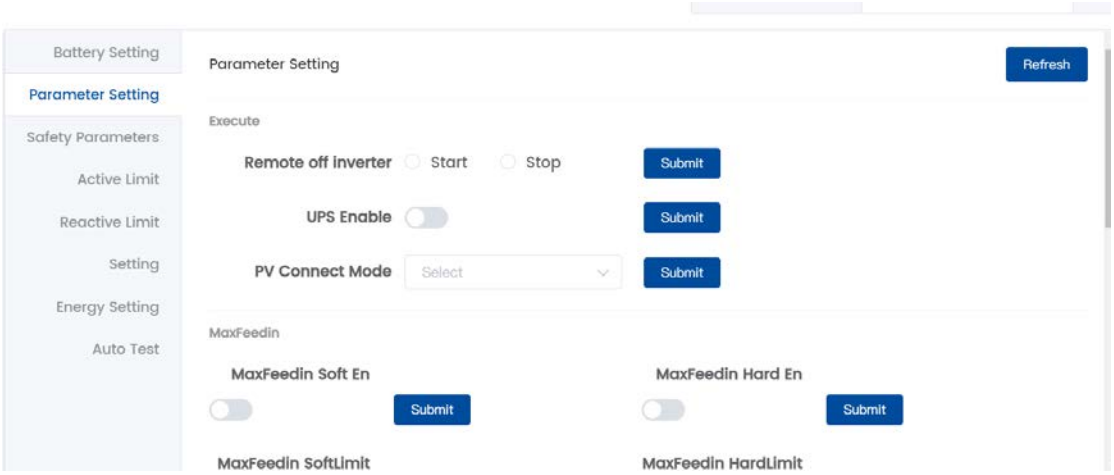


We support 3 different battery charge mode at the moment.
Under “Self-Powered” mode, the system uses solar power and battery first rather than grid power. The battery capacity will not lower than setting percentage.

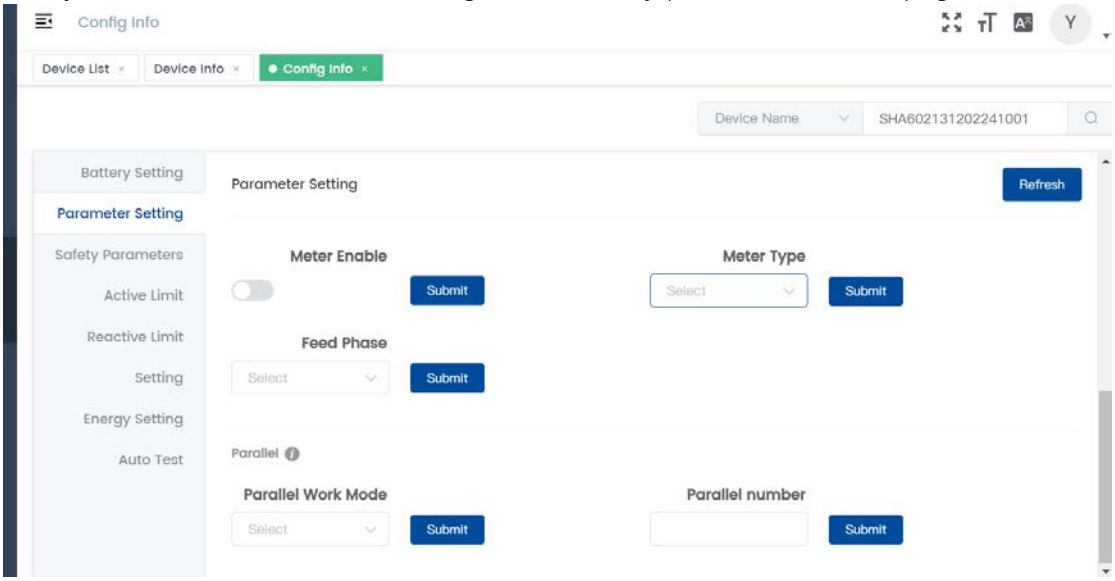
Under “Loading shifting” mode, user can customize the charging and discharging based on time.

Under “backup” mode, the battery will not lower than setting capacity (min 80%).

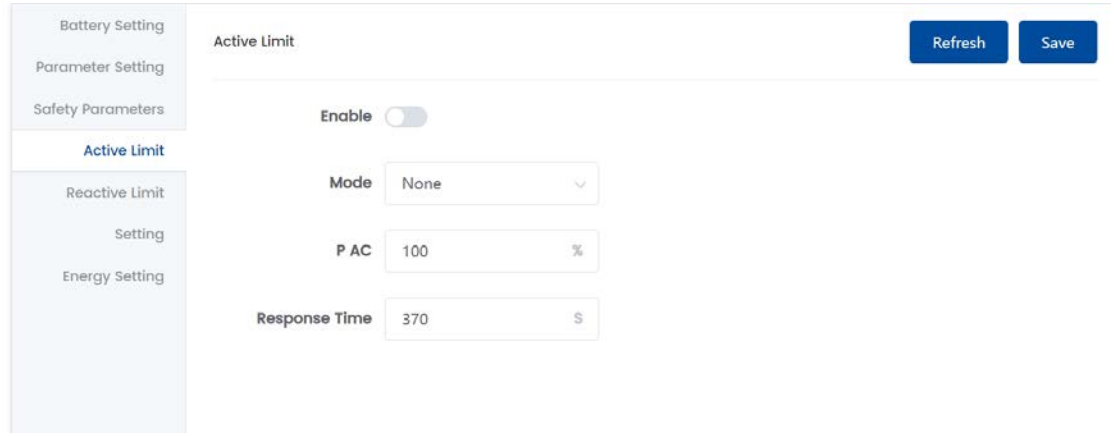
Parameter setting: The user can set the parameters on this page.

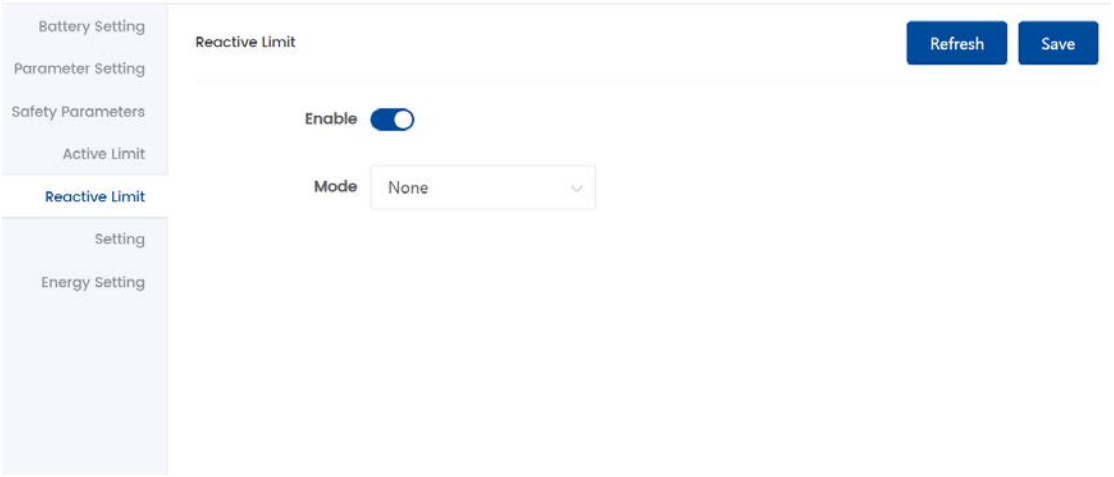


Safety Parameters: The user can change device safety parameters on this page.

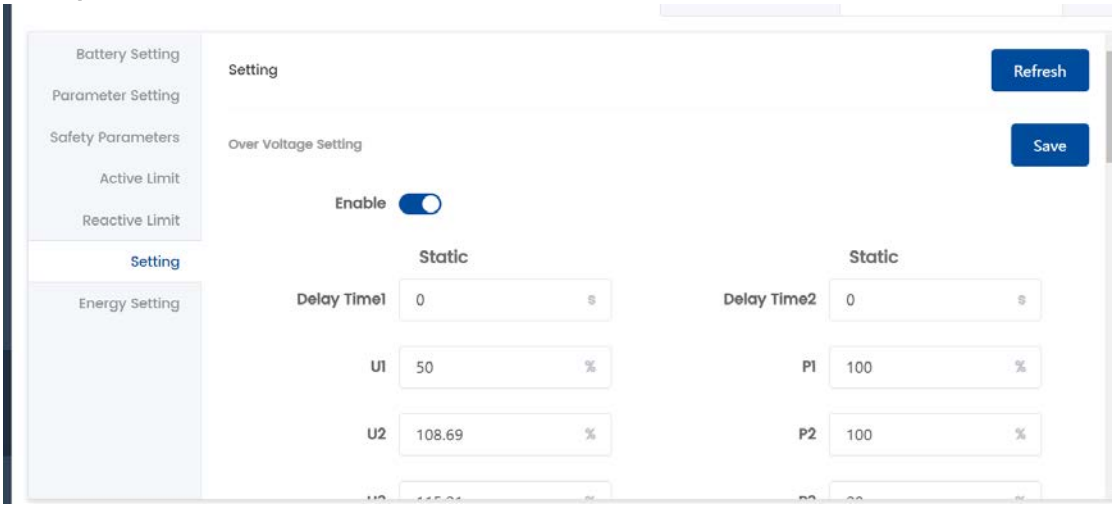


Active limit & Reactive limit: The user can change active and reactive limit settings on these pages.



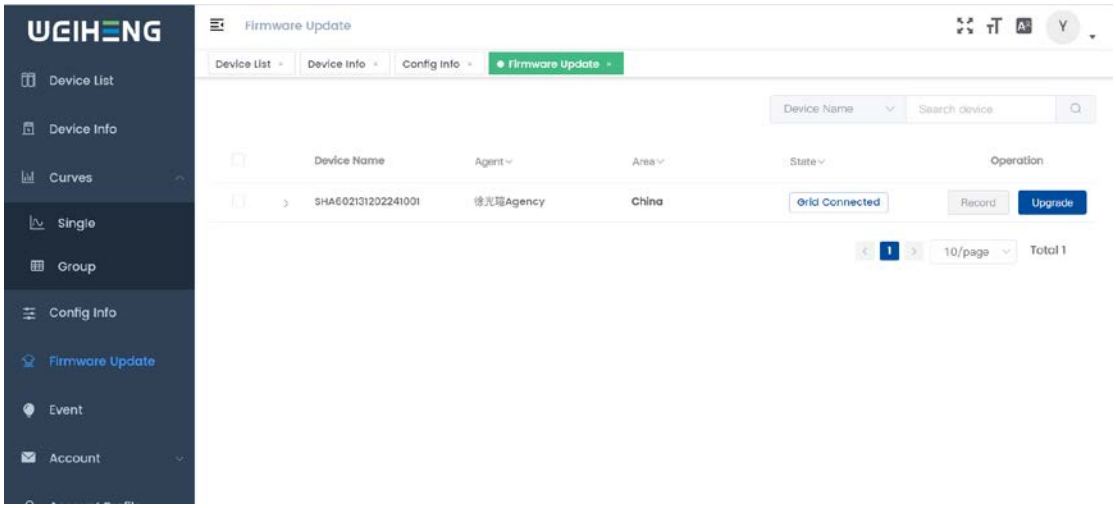


Setting: The user can change some settings on this page.

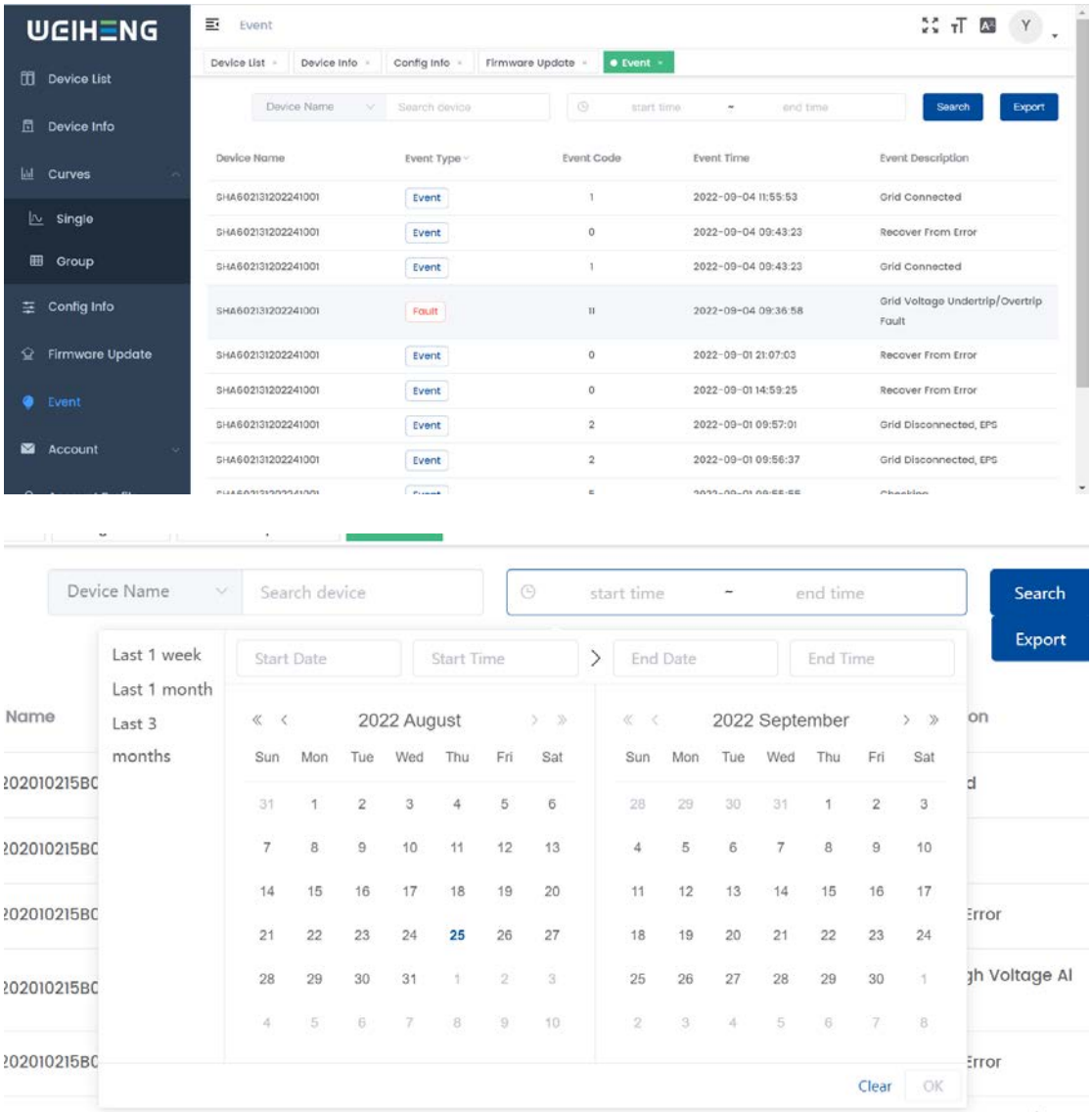


Energy setting: The agent only can check the energy settings of the device on this page.

Firmware Upgrade: Agent can help user upgrade their device firmware on this page.



Event: This page shows the events, warnings and faults for all devices under the account. It also supports querying events on any date and exporting the queried data.



7. Cleaning and Maintenance

Power off the system first.

● **Shut down procedure :**

Step 1: If backup load is applied, turn off the backup load first, and then turn off the backup breaker. Step 2: Turn off the grid breaker.

Step 3: Turn off the PV switch.

Step 4: Open the battery breaker cover and turn off the battery breaker.

Step 5: Turn off the battery switch on every battery module.

Step 6: Close the battery breaker cover.

7.1 Cleaning

When the BESS needs to be cleaned, please power off the system first. If you want to clean the battery case, use a soft dry brush or vacuum cleaner to remove the dirt. Do not use solvents, abrasives, corrosive liquids, etc. to clean the case.

7.2 Storage and Maintenance

Since the battery capacity is 30% before transportation, the module needs maintenance after long-term storage. During maintenance, fully discharge the battery with 0.1C current, and then charge the battery to 30% with 0.1C current. Please refer to the table below for details. Maintenance cycle at different temperatures:

Temperature	**Charging interval (Months)**
25℃	18
35℃	12
45℃	6

CAUTION:

- Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
- When replacing batteries, replace with the same type and number of batteries or battery packs.
- General instructions regarding removal and installation of batteries.
- Do not dispose of batteries in a fire. The batteries may explode.
- Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:

►Remove watches, rings, or other metal objects.

►Use tools with insulated handles.

►Wear rubber gloves and boots.

►Do not lay tools or metal parts on top of batteries.
►Disconnect charging source prior to connecting or disconnecting battery terminals.
►Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

8. ANNEX

8.1 Datasheet

All-In-One Spec.
Series name: Agave

Model	**WH-SPHA3.6H-5.12kWh WH-SPHA3.6H-10.24kWh**	**WH-SPHA4.6H-5.12kWh WH-SPHA4.6H-10.24kWh**	**WH-SPHA5.0H-5.12kWh WH-SPHA5.0H-10.24kWh**	**WH-SPHA6.0H-5.12kWh WH-SPHA6.0H-10.24kWh**
PV Input				
Absolute max Voltage [d.c.V]	600			
MPPT Voltage Range [d.c.V]	100...550			
Max. DC Input Power [W]	4800	6200	6650	8000
Start-up Voltage [d.c.V]	90			
Rated Operating Voltage [d.c.V]	360			
Max. Input Current [d.c.A]	12.5/12.5			
Max. inverter backfeed current to array[d.c.A]	0			
Isc PV[d.c.A]	18/18			
NO. of MPP Trackers	2			
NO. of Strings per MPP Tracker	1			

Battery Model	WH-BXB5.12 (For models: WH-SPHA3.6H-5.12kWh WH-SPHA4.6H-5.12kWh WH-SPHA5.0H-5.12kWh WH-SPHA6.0H-5.12kWh)		WH-BXB10.24 (For models: WH-SPHA3.6H-10.24kWh WH-SPHA4.6H-10.24kWh WH-SPHA5.0H-10.24kWh WH-SPHA6.0H-10.24kWh)	
Battery Capacity	LiFePO4 5.12kWh		LiFePO4 10.24kWh	
Nominal Battery Voltage [d.c.V]	204.8		409.6	
Battery Voltage Range [d.c.V]	160...227.2		320...454.4	
Max. Charge/Discharge Current [d.c.A]	25/25			
Depth of Discharge [%]	90			
AC Input/Output				
Rated output Power [W]	3600	4600	5000	6000
Rated Apparent Power to Grid [VA]	3600	4600	5000	6000
Max. Apparent Power to Grid [VA]	3600	4600	5000	6000
Max. Apparent Power from Grid [VA]	7200	9200	10000	12000
Rated Voltage [a.c.V]	220/230/240			
Rated Frequency [Hz]	50/60			
Rated AC Current to Grid[a.c.A]	15.6	20	21.7	26.1
Rated AC Current from Grid[a.c.A]	31.2	40	43.4	52.2
Inrush current[a.c.A]	16 a.c.A (peak), 11.3 us (duration)			
Max. output fault current[a.c.A]	57 (peak), 40 (rms)			
AC output Maximum output overcurrent protection[a.c.A]	40			
AC input power factor	-0.8...+0.8			
AC output power factor	1(-0.8...+0.8 adjustable)			
THDi	< 3%			

EPS Output (With Battery)				
Max. Output Power [W]	3600	4600	5000	6000
Rated Apparent Power [VA]	4320	5520	6000	7200
Max. Apparent Power [VA]	4320	5520	6000	7200
Rated Voltage [a.c.V]	230 (±2%)			
Norminal Frequency [Hz]	50/60 (±0.2%)			
Rated Output Current [a.c.A]	18.8	24	26.1	31.3
Inrush current[a.c.A]	16 a.c.A (peak), 11.3 us (duration)			
Max. output fault current[a.c.A]	57 (peak), 40 (rms)			
EPS output Maximum output overcurrent protection[a.c.A]	40			
Switch time [ms]	< 10			
THDv @ Linear Load [%]	< 2			
Power Factor	-0.8...+0.8			
Efficiency				
PV Max. Efficiency[%]	97.6			
PV Europe Efficiency[%]	97			
PV Max. MPPT Efficiency[%]	99.9			
Battery Charge by PV Max. Efficiency[%]	98			
Battery Discharge Efficiency[%]	96.7			
Protection				
Over/Under voltage protection	Yes			
DC isolation protection	Yes			
DC injection monitoring	Yes			
Residual current detection	Yes			
Anti-islanding protection	Yes			
Over load protection	Yes			
Battery Input reverse polarity protection	Yes			

PV reverse polarity protection	Yes	
Surge protection	Yes	
Over heat protection	Yes	
General Data	**WH-BXB5.12**	**WH-BXB10.24**
Dimension (W/D/H)[mm]	550*233*1125	550*233*1750
Dimension of Packing (W/D/H)[mm]	645*302*1370	655*302*2055
Net weight [kg]	68	115
Gross weight [kg]	78	130
Operation Temp [°C]	-10...+55	
Relative Humidity[%]	0...95	
Altitude [m]	<= 3000	
Ingress Protection	IP65	
Cooling	Natural	
Inverter Topology	Non-isolated	
Over voltage category	III(AC), II (DC)	
Protective class	Class I	
Active anti-islanding method	frequency shift	
Human Interface	LED/APP	
BMS Communication Interface	RS485/CAN	
Meter Communication Interface	RS485	
Noise Emission [dB]	< 25	
Standby Power Consumption [W]	< 5	
Safety and Approvals		
Safety	IEC62040.1:2019 AS/NZS 4777.2:2020 IEC 62109-1&-2 IEC62619 UN38.3 IEC60730-1	
EMC	EN IEC 61000-6-2:2019 EN IEC 61000-6-3:2021	

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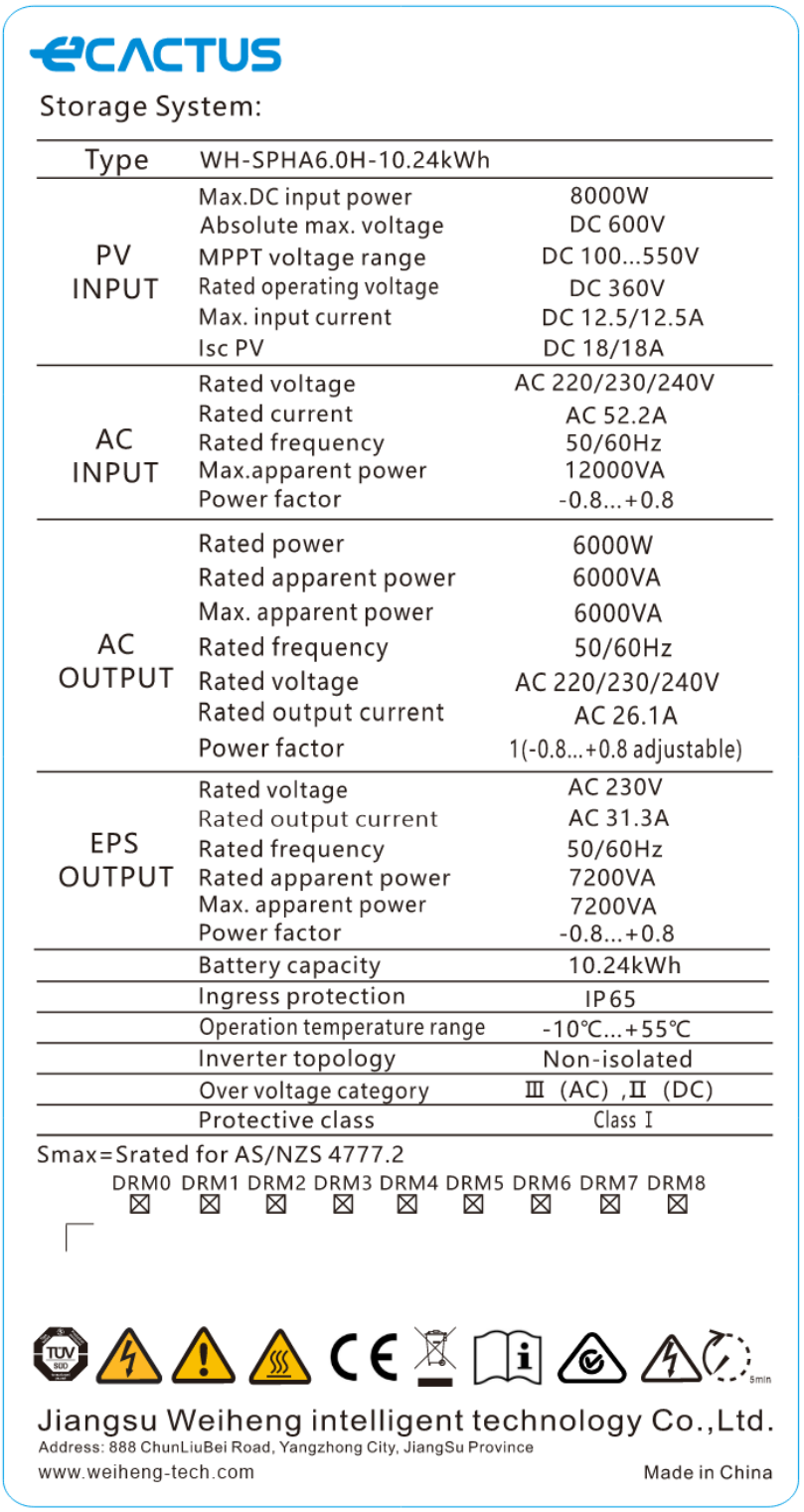
Made in China

9. LABELS

9.1 Inverter label



ECACTUS

Storage System:

Type	WH-SPHA6.0H-10.24kWh	
PV INPUT	Max.DC input power	8000W
	Absolute max. voltage	DC 600V
	MPPT voltage range	DC 100...550V
	Rated operating voltage	DC 360V
	Max. input current	DC 12.5/12.5A
	Isc PV	DC 18/18A
AC INPUT	Rated voltage	AC 220/230/240V
	Rated current	AC 52.2A
	Rated frequency	50/60Hz
	Max.apparent power	12000VA
	Power factor	-0.8...+0.8
AC OUTPUT	Rated power	6000W
	Rated apparent power	6000VA
	Max. apparent power	6000VA
	Rated frequency	50/60Hz
	Rated voltage	AC 220/230/240V
	Rated output current	AC 26.1A
	Power factor	1(-0.8...+0.8 adjustable)
EPS OUTPUT	Rated voltage	AC 230V
	Rated output current	AC 31.3A
	Rated frequency	50/60Hz
	Rated apparent power	7200VA
	Max. apparent power	7200VA
	Power factor	-0.8...+0.8
	Battery capacity	10.24kWh
	Ingress protection	IP65
	Operation temperature range	-10℃...+55℃
	Inverter topology	Non-isolated
	Over voltage category	Ⅲ (AC) ,Ⅱ (DC)
	Protective class	Class I

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DRM0 DRM1 DRM2 DRM3 DRM4 DRM5 DRM6 DRM7 DRM8

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Jiangsu Weiheng intelligent technology Co.,Ltd.

Address: 888 ChunLiuBei Road, Yangzhong City, JiangSu Province

www.weiheng-tech.com Made in China

9.2 Battery label