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HIGH VOLTAGE ENERGY STORAGE SYSTEM BATTERY WITH INVERTER

User Instruction

This manual introduces high-voltage lithium batteries. Before installing the battery, please read this manual and carefully follow the instructions during the installation process. If you have any questions, please contact our company immediately for consultation and clarification.

Contents

Catalogue

（Revision History）

Ver.No.	Date	Revised Content	Reasons for Change	Reviser	Approver
A0	2024.04.18	First Edition	First Draft	Haote.Feng	

1. Symbol Description

	Do not place near open fire or flammable materials.
	A potential hazard exists when the equipment is working. Wear personal protective equipment during operation.
	Warning electric shock. Power off the equipment before any operation.
	Grounding: indicate PE cable connection position.
	Do not place in areas accessible to children.
	Keep the battery away from open fire or ignition sources.
	Read the product and operation manual before operating the battery system.
	Label for Waste Electrical and Electronic Equipment (WEEE) Directive (2012/19/EU).
	The certificate label for CE.
	Recycle label.

2. Safety Precautions

 **Alert**

1) It is important and necessary to read the user manual carefully (and attachment) before installing or using battery. Failure to do so or to follow any instruction or warning in this document can result in electrical shock, serious injury, and death, or damage battery, potentially rendering it unusable.
2) When battery is stored for a long time, it is required to charge once every 6 months, and the SOC should be no less than 50%.
3) After battery module cannot be discharged, it needs to be recharged within 12h.
4) Do not connect power terminal reversely.
5) All power supplies must be disconnected during maintenance.
6) Please contact the supplier within 24 hours if there is something abnormal.
7) Do not use any liquid to clean the battery.
8) Do not expose battery to flammable or irritating chemicals or vapor.
9) Do not paint any part of battery, including any internal or external components.
10) Do not connect battery with PV solar wiring directly.
11) Do not install or use this product beyond provisions of the manual.
12) Direct or indirect damages caused by the above reasons are not covered by warranty claim.

 **Warning**

2.1 Before Connecting

1) Please check the external packaging condition before unpacking. If it is damaged, contact corresponding local retailer.
2) After unpacking, please check the products and spare parts according to spare parts list. If the product is damaged or missing, please contact your local retailer.
3) Connect to specified matching inverter.
4) Before installation, be sure to cut off the grid power and make sure battery switch is on OFF mode.
5) It is prohibited to connect the battery and AC power directly.
6) Embedded BMS in the battery is designed for 24VDC.
7) All electrical wiring must be connected in accordance with local regulations.
8) Please ensure that electrical performance of battery system is compatible with the equipment.
9) The installation onsite shall be equipped with fire-fighting facilities that meet relevant requirements, such as fire sand, dry powder fire extinguisher, etc.

2.2 In Using

1) If battery system needs to be moved or repaired, power must be cut off and battery is completely shut down.
2) It is prohibited to connect battery with different types of battery.

3) Do not connect battery to faulty inverter.

4) In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited.

5) Except for personnel from The Company Company or other authorized personnel, batteries shall not be opened, repaired or disassembled.The company shall not bear any liability or responsibility caused by violation of any safety operation or design standard, production standard, equipment safety standards or any other standards or requirements.

3.Introduction

And off-grid all-in-one machine Power energy storage system battery is a new energy storage product developed and produced by The Company, which can provide reliable power supply for all kinds of equipment or systems.

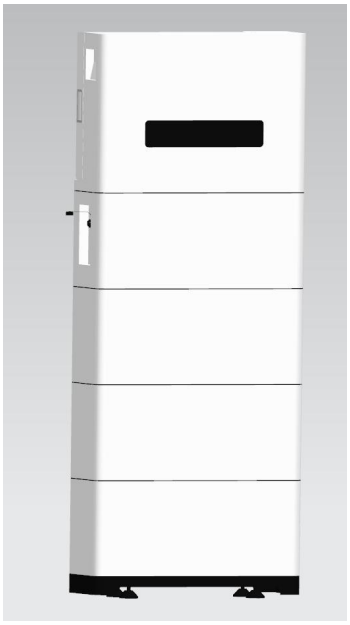


Figure 3-1

3.1 Features

1) Built-in soft-start function to reduce current impact.

2) When multiple modules are series connected, module addresses are set automatically.

3) Support for upgrading the battery module from the upper controller through CAN communication.

4) The module is non-toxic, non-polluting and environmentally friendly.

5) Cathode material is made from LiFePO4 with safety performance and long cycle life.

6) Battery management system (BMS) has protection functions including over- discharge, over-charge, over-current and high/low temperature.

7) The system can automatically manage charge and discharge state and balance voltage of each cell.

8) Flexible configuration, multiple battery modules can be connected to expand capacity and power.

9) Adopted self-cooling mode rapidly reduced system entire noise.

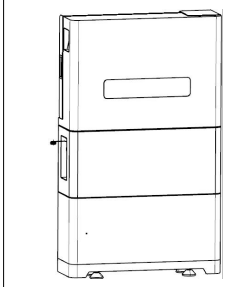
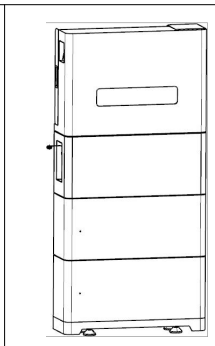
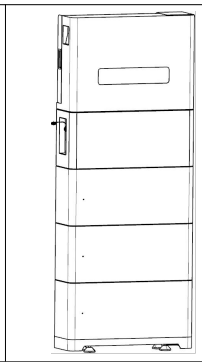
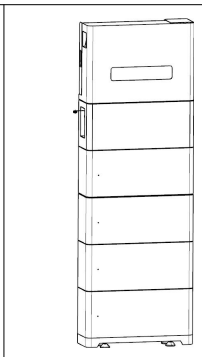
10) The module has less self-discharge, up to 6 months without charging it on shelf, no memory effect, excellent performance of shallow charge and discharge.

Functions

Protection and Alarm	Management and monitor
Charge/Discharge End	Cell Balance
Over voltage Charging Protection	Intelligent Charge Model
Under Voltage Discharging Protection	Charge/Discharge Current Limit
Charge/Discharge Over current Protection	Capacity Retention Calculate
High/Low Temperature Protection	Soft start
Short Circuit Protection	History Record

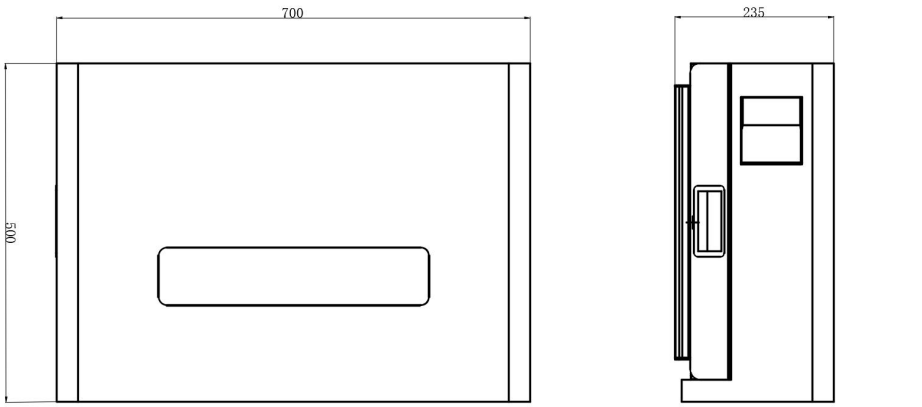
3.2 Specification

Parameters

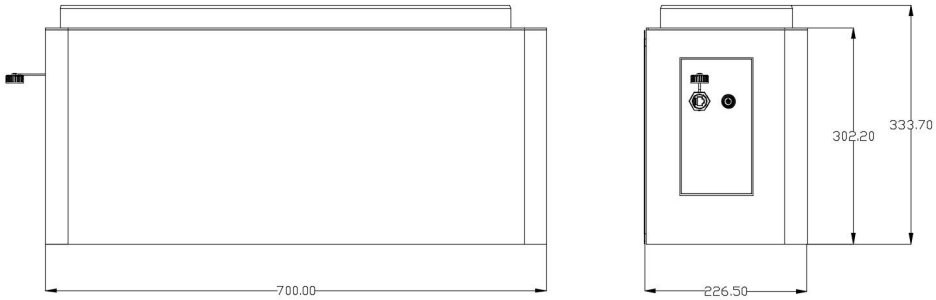
Appearance				
General Parameters				
Basic parameters	Inverter layer ×1 Battery layer×1 high pressure layex1r	Inverter layer ×1 Battery layer×2 high pressure layex1r	Inverter layer ×1 Battery layer×3 high pressure layex1r	Inverter layer ×1 Battery layer×4 high pressure layex1r
Product size (mm)	700mm*235mm*1168 mm	700mm*235mm*1470 mm	700mm*235mm*1772 mm	700mm*235mm*2075 mm
Product weight (kg)	87	132	177	222
Nominal voltage (V)	102.4	204.8	307.2	409.6
Nominal capacity (kWh)	5.12	10.24	15.36	20.48
working voltage（V）	86.4-115.2	172.8-230.4	259.2-345.5	345.6-460.8
Operating temperature range	-25 ~+60			
Degree of protection	IP65			
Cooling concept	Natural convection			
Humidity	0~95%,No condensation			

BMS communication	CAN
Design Life	10 Years（25℃）
Input(PV)	
Max PV Power	7500W
Max PV Voltage	1000Vd.c
MPPT voltage range	200~850Vd.c
Max input current/per string	13A/13A
Battery Input	
Battery voltage range	130~700V
Max charge/discharge current	25A/25A
AC Output (On-Grid)	
AC nominal power	5000VA
Max AC apparent power	5500VA
Max output current	10
Nominal AC output	50/60Hz;400/350
AC output range	45/55Hz;280~490Vac(Adj)
AC Output Back-up	
Max AC apparent power	5000VA
Norminal Output Voltage	400/380
Norminal Output Frequency	50/60Hz

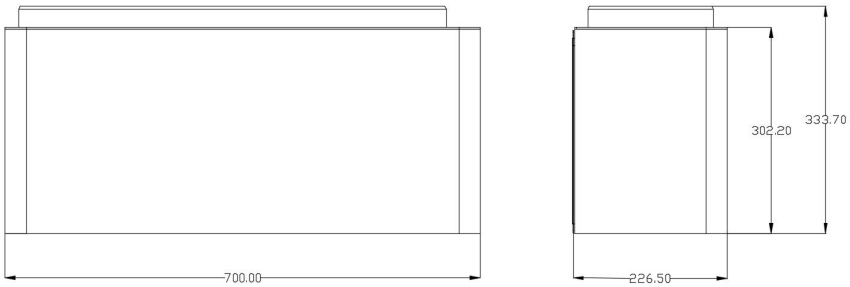
Dimensions



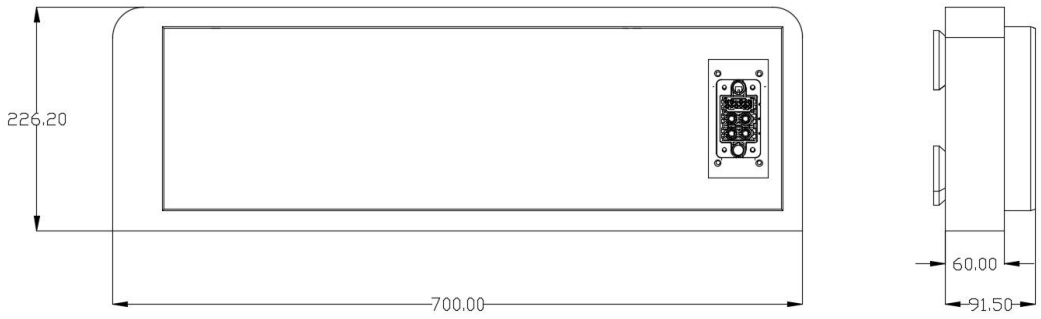
Inverse layer



Power box



Battery module



Pedestal

Figure 3-2

3.3 System Diagram

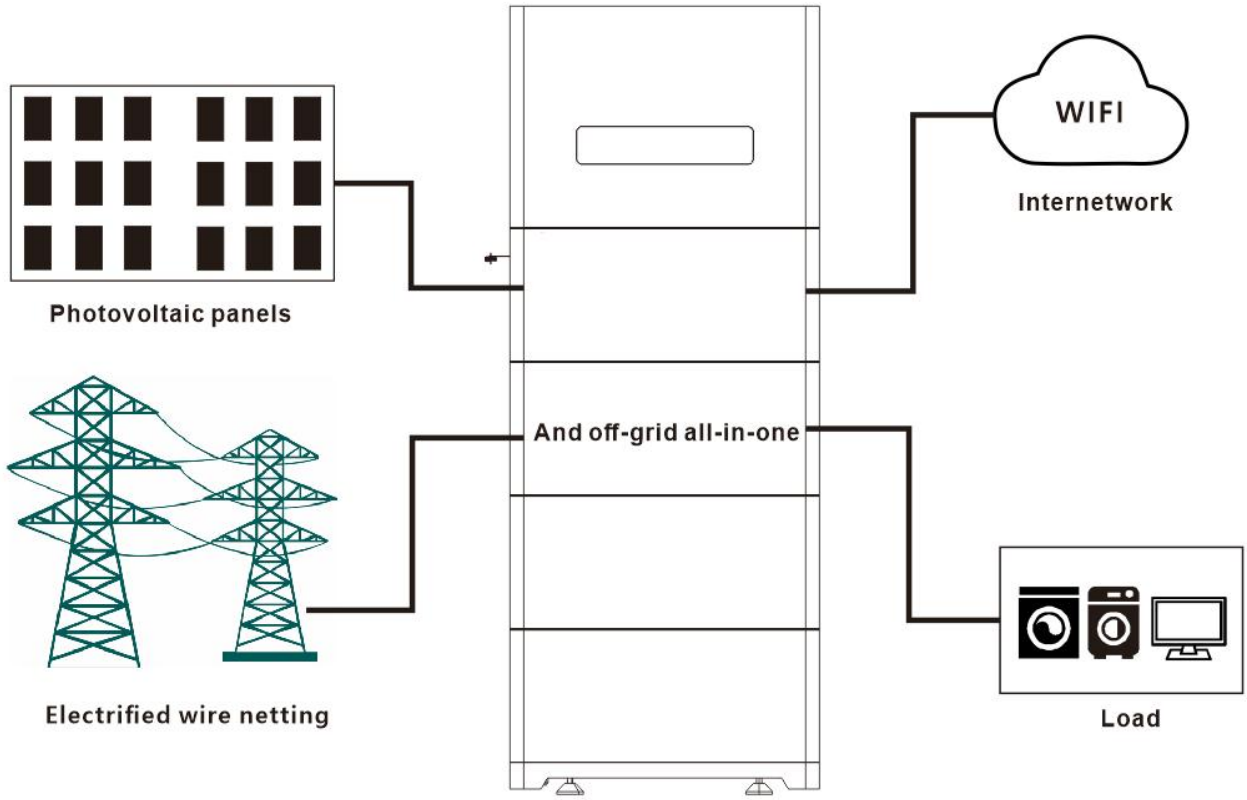


Figure 3-3

3.4 Operation Modes introduction

EPH system normally has the following operation modes based on your configuration and layout conditions.

3.4.1 Operation Modes introduction

The default is General mode, and there are mainly two common application scenarios as shown below:

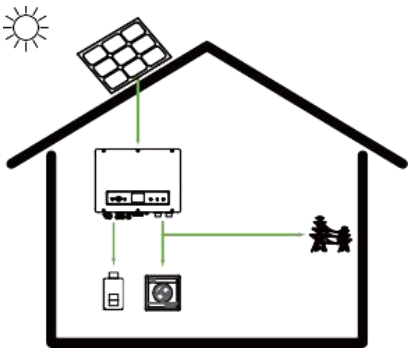


Fig:3.4.1(A)

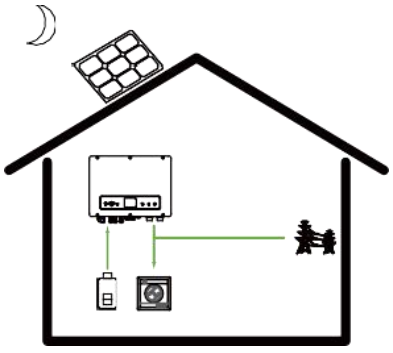


Fig:3.4.1(B)

A)When there is sufficient sunlight, it will give priority to supply power to the loads, charge the battery with excess, and then merge the excess into the grid.

B)When there is no sunlight, the battery supplies power to the loads.

3.4.2 Battery backup mode

In this, mode, it is necessary to ensure that the battery is charged regardless ot whether.

there is photovoltaic or not.

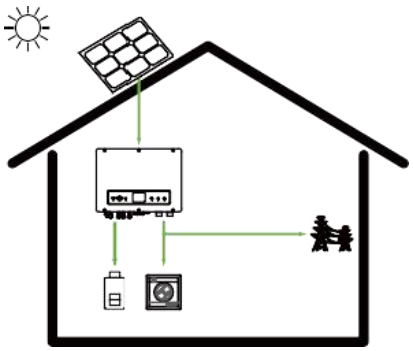


Fig:3.4.2(A)

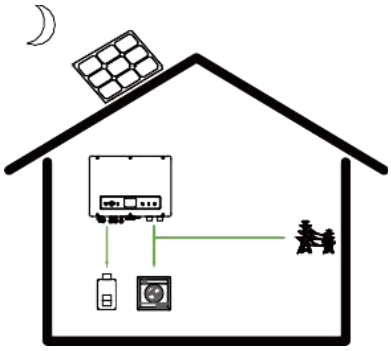


Fig:3.4.2(B)

.A) When there is sufficient sunlight, it will give priority to supply power to the loads, charge the battery with excess.

B) When there is no sunlight, the battery supplies power to the loads.

3.4.3 Peak shaving and valley filling mode

According to the difference of electricity price, a day can be divided into three periods:

peak, flat and valley.

3.4.3.1)In the valley level, the grid and PV charge the batteries.(Fig:3.4.3.1)

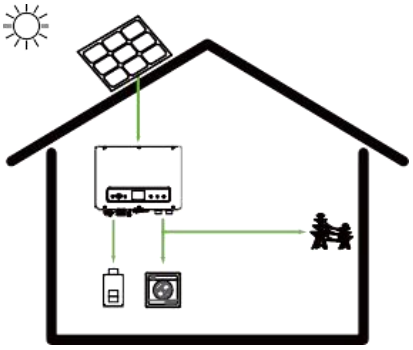


Fig:3.4.3.1)

3.4.3.2) In·the·flat*stage,if the·PV

is·sufficient,the

battery·can·be.charged(Fig:3.4.3.1A);-if the·PV·is·insufficient,.Priority is·for loads(Fig:3.4.3.1B)..

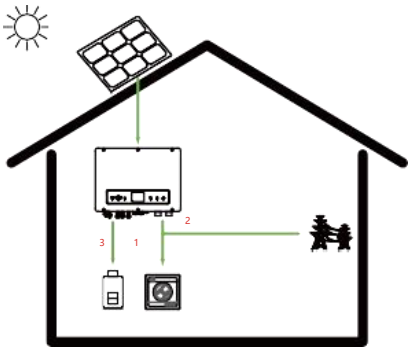


Fig:3.4.3.2A

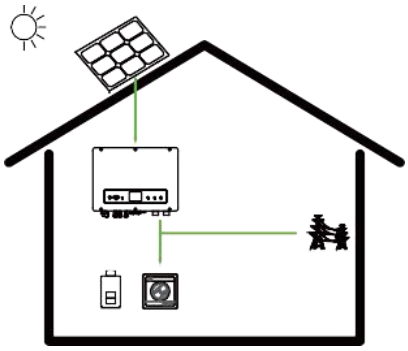


Fig:3.4.3.2B

3.4.3.3) In the peak level.

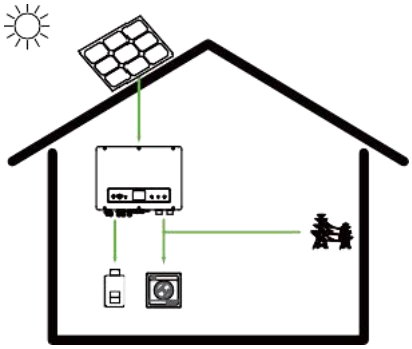


Fig:3.4.3.3（A）(PV is sufficient)

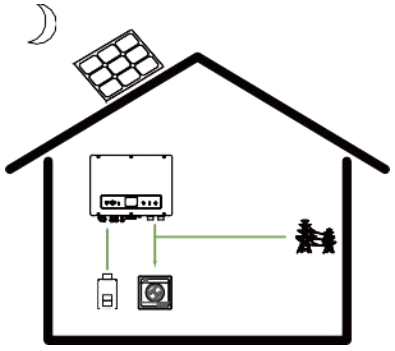


Fig:3.4.3.3（B）(PV is insufficient)

4.Safe Handling of Lithium-iron ESS Batteries Guide

4.1 Danger Label

Figure 3-4

4.2 Tool

Wire Cutter

Modular Crimping Plier

Screwdriver

Electric drill

Note

Properly use insulated tools to prevent accidental electric shock or short circuits. If tools are not insulated, cover the entire exposed metal surfaces of available tools with electrical tape except their tips.

4.3 Safety Gear

It is recommended to wear the following safety gear when dealing with battery pack.

Insulated Gloves

Safety Goggles

Safety Shoes

4.4Parts List

Item	Part Name	Description	Unit	Quantity
1	Battery layer	Optional up to 4floors	PCS	1-4
2	high pressure layer		PCS	1
3	Inverter layer ×1		PCS	1
4	Expansion screws	M6×40	PCS	Same as the number of batteries
5	Expansion screws	M4×30	PCS	Than the number of batteries plus 1

Figure 4-1

4.5 Installation Location

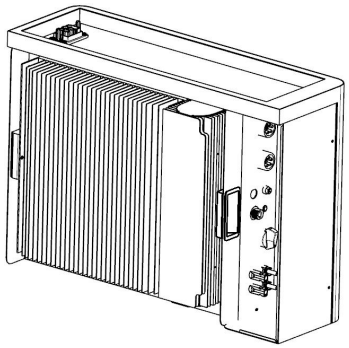
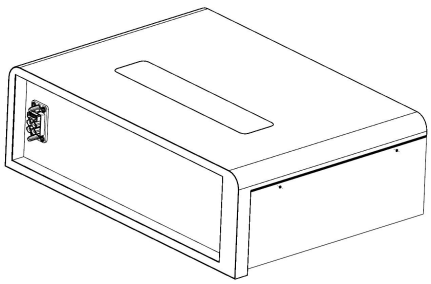
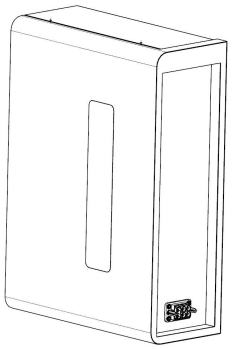
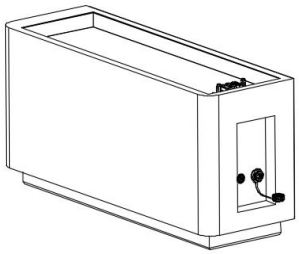
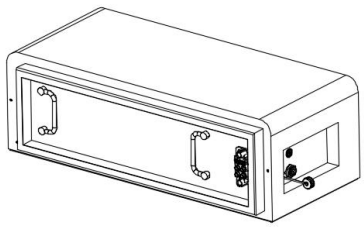
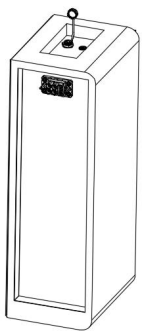
Make sure that installation location should meet the following condition:

1) The area should be completely water-proof.
2) The floor should be flat and level.
3) No flammable or explosive materials.
4) The ambient temperature is within the range from 0℃ to 45℃.
5) The temperature and humidity are maintained at a constant level.
6) There is just a little dust and dirt in the area.
7) The distance from heat source should be more than 2 meters.
8) The distance from air outlet of inverter is more than 0.5 meters.
9) Installation areas should avoid direct sunlight.
10) No forced ventilation requirement for battery module, but please avoid installing in a closed area.

Ventilation shall avoid high salinity ≤ 30%, humidity ≤ 85% and ambient temperature of 0 ~ 45 ℃.

4.6 Installation Direction

Warning

Upside down	Sidelong	Sidelong
		
		

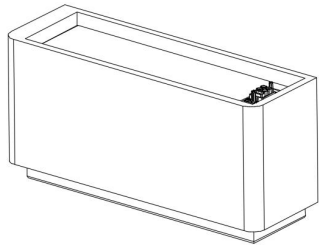
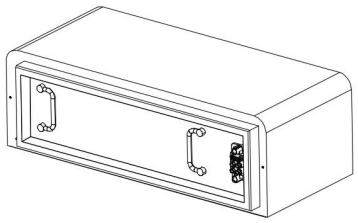
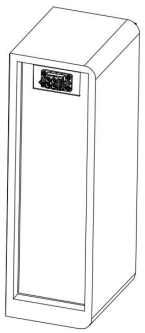
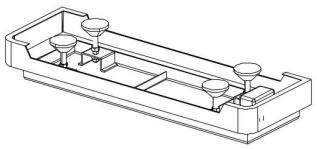
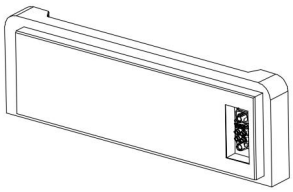
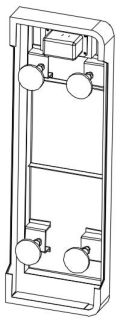
		
		
NOT allowed	NOT allowed	NOT allowed

Figure 4-2

4.7 Installation Steps

Warning

1) Follow local electric safety and installation policy.
2) All installation and operation must follow local electric standard and requirements.
3) When battery modules are paralleled, the system should be powered off before installation operating.

1. Place the base evenly on the ground and stack the battery box vertically downwards.

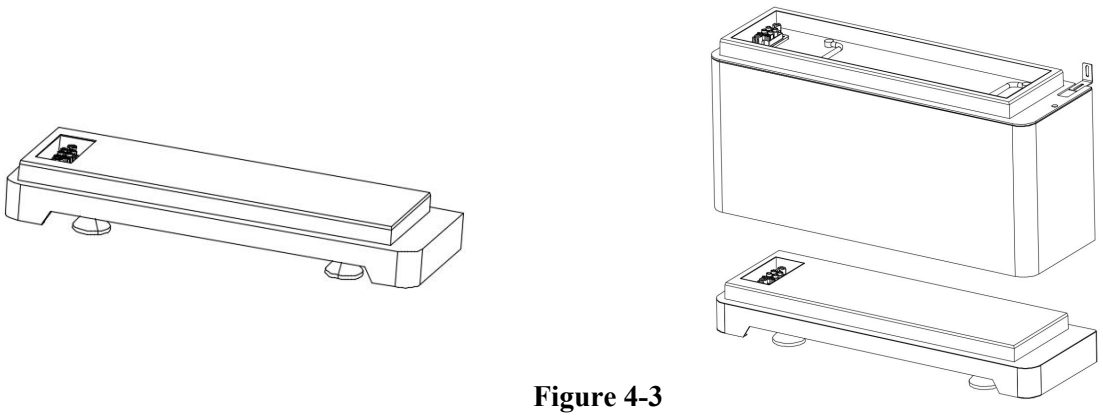


Figure 4-3

2.Use one M4 * 10 screw with a locking torque of 2.5Nm to install the fixing bracket onto the battery box.

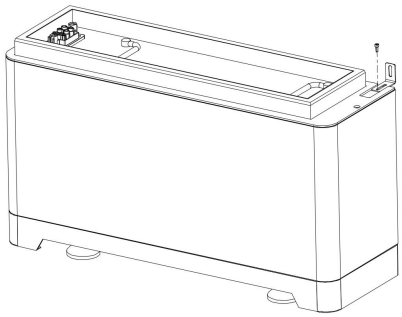


Figure 4-4

3.Place the base against the wall and mark the position of mounting holes on the wall. Remove the base and drill holes using an electric drill. The electric drill must with a dust cover to prevent dust from falling off.

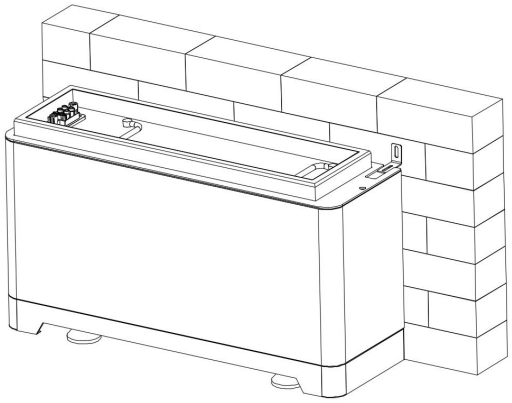


Figure 4-5

Figure 4-6

4.Place the base against the wall and secure the fixing bracket to the wall with one M6 expansion screw, locking the torque at 8Nm..

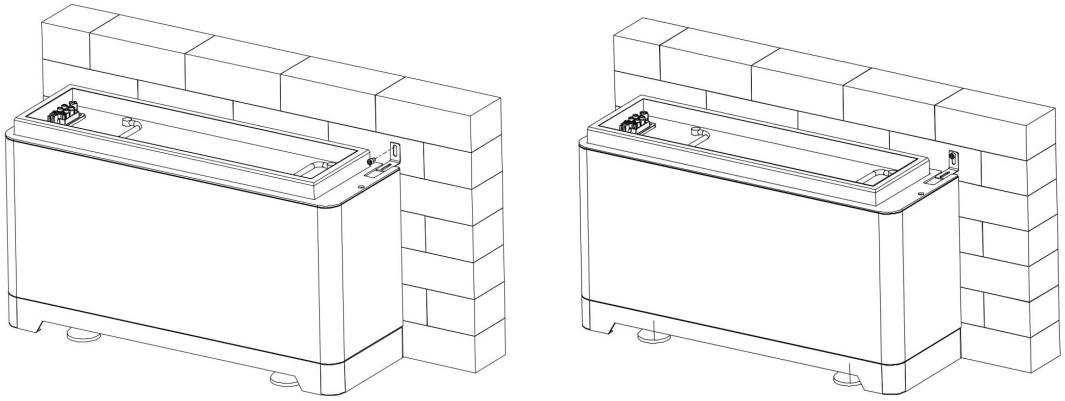


Figure 4-7

5. Then place the battery modules one by one on the base and repeat the previous steps

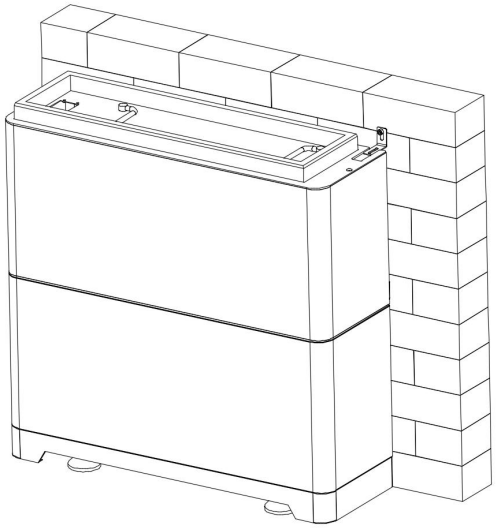


Figure 4-8

6. Then place the high-voltage one by one on the base and repeat the previous steps

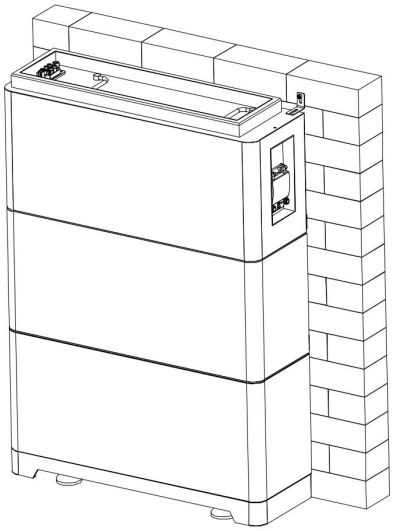


Figure 4-9

7. Then place the Inverse layer one by one on the base and repeat the previous steps

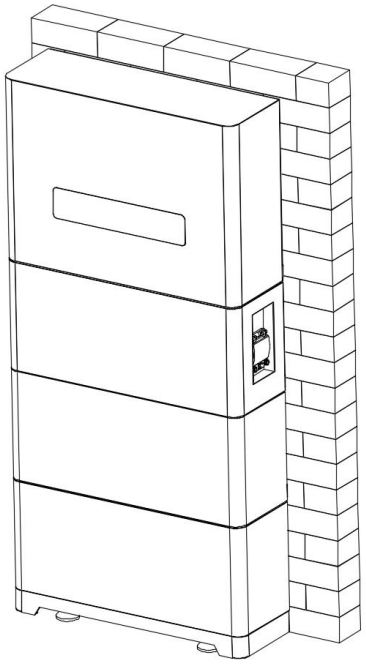


Figure 4-10

4.8 System turns on

Warning: Double check all the power cables and communication cables. Make sure the voltage of the inverter/PCS is same level with the battery system before connection. Check all the power switches are OFF.
System turns on step:

1) Check all cables are connected correctly. Check grounding is connected.
2) If necessary, turn on the switch at inverter`s battery side or between inverter and battery. If possible, turn on AC or PV power source to wake up inverter.
3) Open protect cover of Power switch. And turn on power switch.
4) Switch all the battery racks' Isolating Switch to on position.
5) Open the start button and the circuit breaker for the high-voltage layer. (1 master battery rack and 4slave battery racks at most can be configured).
6) If no alarm ,the battery system will be ready for charging and discharge with PCS.

4.9 System turns off

When failure or before service, must turn the battery storage system off:

1) Turn off inverter or power supply on DC side.
2) Turn off the switch between PCS and battery system.
3) Switch Isolating Switch to off position. (Switch off the slave battery firstly, finally switch off the master battery).

Note

1) One battery system shall just have one master, all the others are slaves. (The one on the extreme side connected to inverter is the master battery.)
2) It is forbidden to switch off the Isolating Switch during charging and discharging.

5.Electrical Connection

5.1Parts List

Item	Part Name	Description	Unit	Quantity

1	PV line end (male header)	PV line end (male header)	PCS	2
2	PV line end (female header)	PV line end (female header)	PCS	2
3	Battery line end (male)	Battery line end (male)	PCS	2
4	Battery line end (bus header)	Battery line end (bus header)	PCS	2
5	Line end AC terminal	Line end AC terminal	PCS	2
6	RJ 45 Waterproof cap	RJ 45 Waterproof cap	PCS	2

Figure 5-1

5.2 Overview of The Electrical Connecting Part

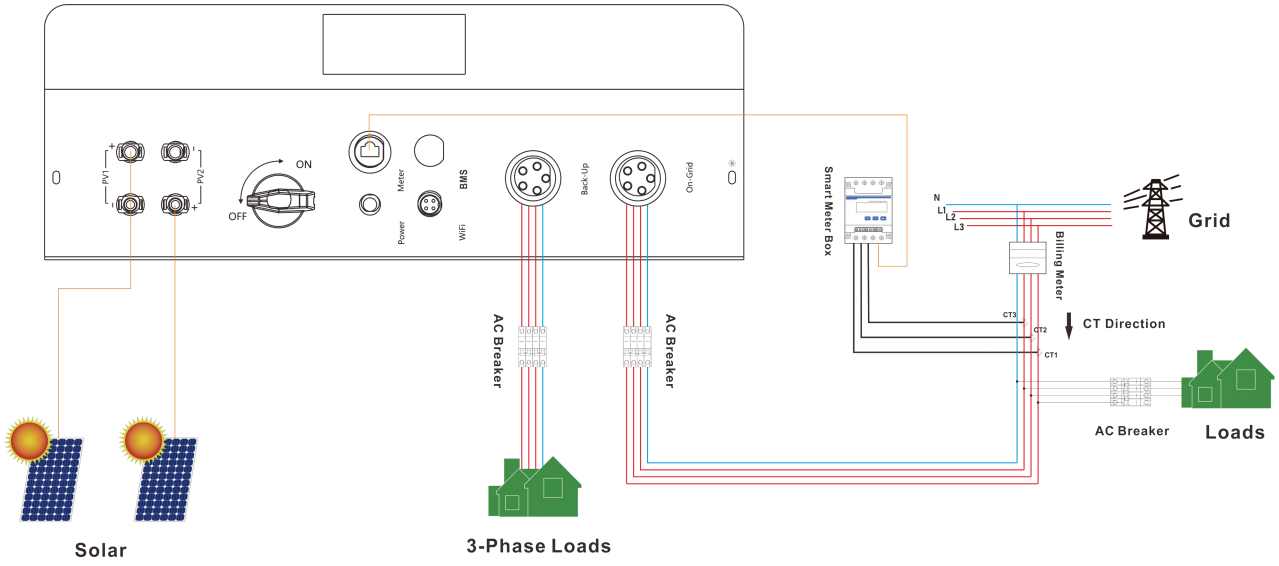


Figure 5-2

5.3 Overview of The Electrical Connecting Part

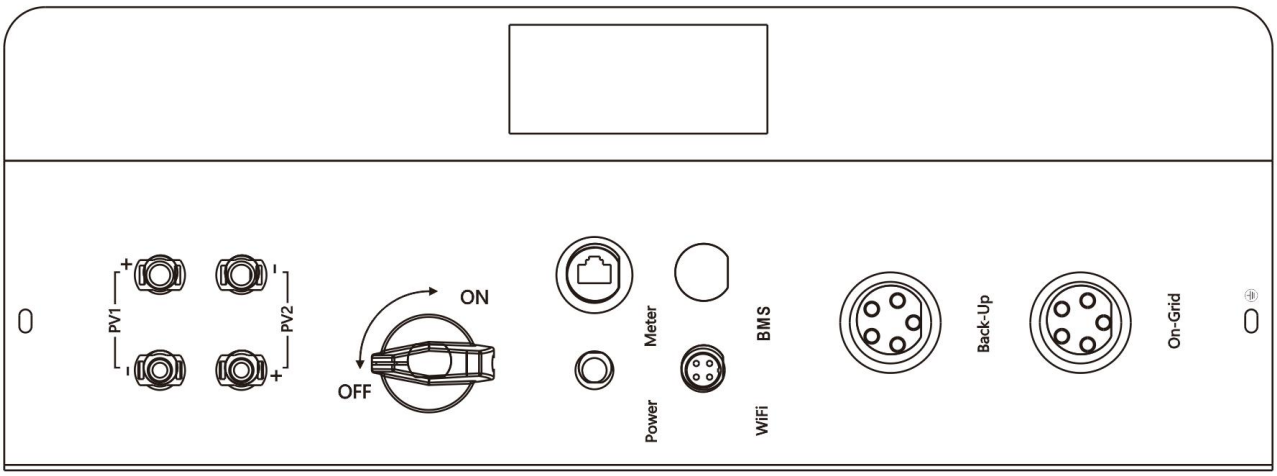


Figure 5-3

5.4 PV Connection

Before connecting PV panels/strings to inverter, please make sure:

1)Use the right PV connectors in the accessory box.

2) The voltage, current and power ratings of the PV strings are within the allowable range of the inverter. Please refer to the Technical Data Sheet for voltage and current limits.

3)Make sure the PV switch of the inverter is in the “OFF" position during wiring.

4)PV strings could not connect to EARTH conductor.

STEP1:
Assemble the PV connectors from the accessory box.(PV cable must be firmly crimped into connectors)

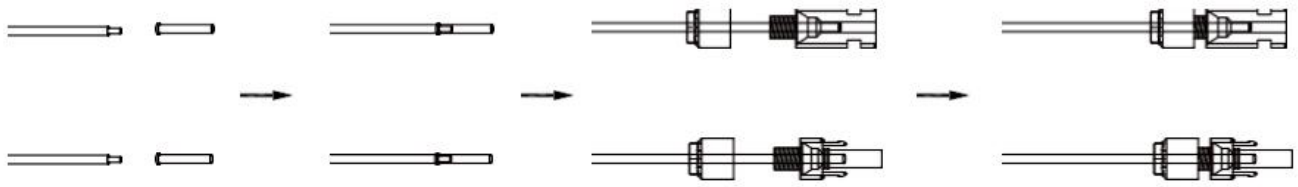


Figure 5-2

STEP2:
Connect the PV connectors to the inverter. There will be a click sound if connectors are inserted correctly into PV plugs.

5.5 Grid & EPS Connection

Use the AC connectors from accessory box for grid and EPS connection. An external AC breaker(32A) is needed for on-grid connection to isolate from grid when necessary .

STEP1:
Assemble the grid connector. Follow the markings on the connectors.
make sure 3L/N/PE lines are connected correctly.

Note: Pin 1 connect to grid phase A, pin 2 connect to phase B and pin l to phase C.

The similar way to assemble the EPS connector, pin 1, pin2 and pin L are live lines, pin N is neutral.

Figure 5-4

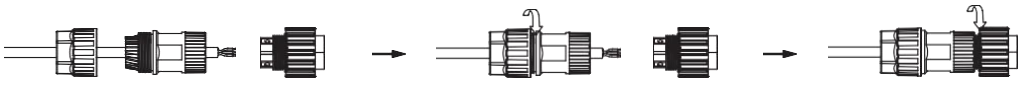


Figure 5-5

STEP2:
Connect the grid connector and the EPS connector to the inverter. Just follow the markings on the inverter to connect them correctly.

5.6 Power key and Declaration for EPS Loads

The power button on the rear panel is only used for EPS function.

- When mains power does not exist and EPS function is enabled, press and hold for 3seconds,the inverter will enter backup mode.
- When inverter operates in backup mode, press and hold for 3 seconds, inverter will exit backup mode,
- When inverter gives an alarm and shutdown in backup mode, press and hold for 3seconds.

inverter will clear alarm.

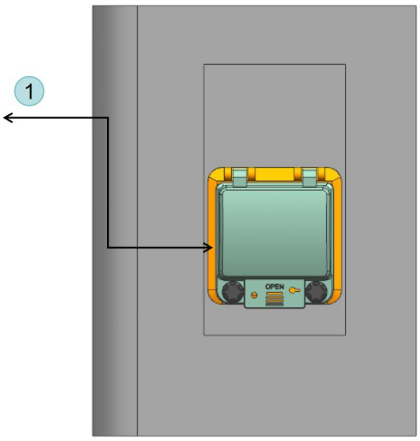
Accepted loads as blow ;

- Inductive load: a non-frequency conversion air conditioner within 1.5P can be connected to EPS side. Two or more may cause EPS output unstable.Do not connect 3-phase inductive load(like motor) without Neutral line to EPS side.
- Capacitive load: Total power <=0.6*nominal power of model.

5.5 Power key and Declaration for EPS Loads

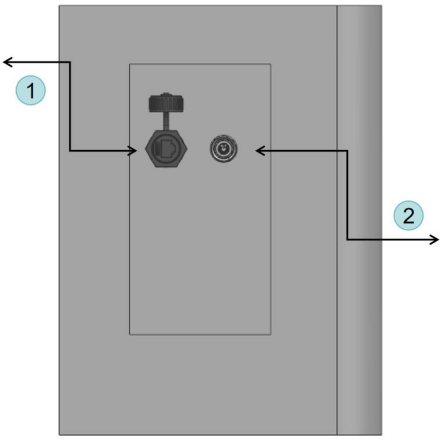
Please Refer to the connection instructions in the meter box for connection

5.6 Equipment interface instruction



① **Breaker: control circuit output, turn the switch to ON when use**

Figure 5-6



① **PCS: battery communication with PCS by RJ45 8P8C**

② **Start button: System start switch, Press the button BMS will works**

Figure 5-7

➢ Start

Start button: When battery is dormant, press the START button to start the battery module.

Forced Start button: Press and hold the button for 6s to turn on the battery for black start.

➢ Operating mode indication

The start button led lighting to show the battery system is running or having alarm.

Status	Mode	Run/Alarm	Remark
Power off	Power off		Light is off
Run	Standby/Charge/Discharge		Light is on
Alarm	Level I Alarm		System can run, but there will be alarm tips
	Level II Alarm		System will stop, and check the problem

Note

Description of indicator light

 The indicator light is off.

 The indicator light is on

 The indicator light is flashing. Duration of indicator on is 0.25s, Duration of indicator off is 3.75s.

 The indicator light is flashing. Duration of indicator on is 0.5s, Duration of indicator off is 1s.

➢ Breaker

When the circuit breaker is pushed to the ON position, the Positive Power Terminal will connect with the HV+ battery contacts, and the Negative Power Terminal will connect with the battery's negative terminal. On the other hand, when the circuit breaker is in the OFF position, both connections will be disconnected. The outside of the circuit breaker is protected by a protective cover, which is waterproof and dust proof, and can prevent accidental touch.

Attention:

It is strictly prohibited to turn off the circuit breaker switch first when the inverter is charging and discharging the battery

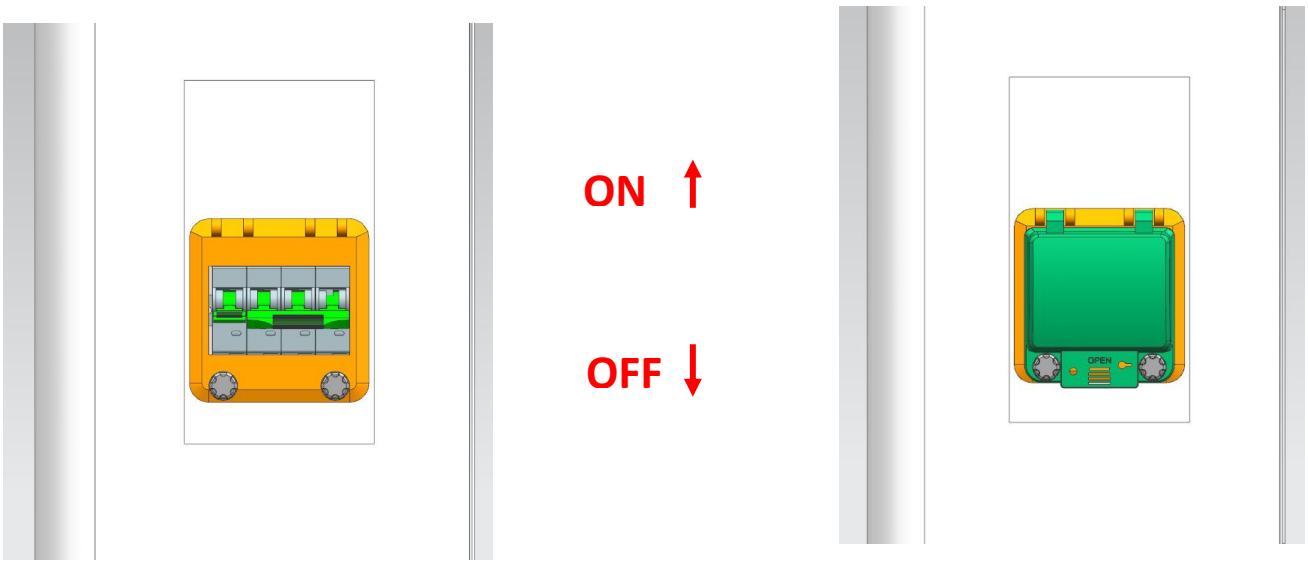


Figure 5-8

➢ PCS port

Maintenance and communication port for equipment failure.

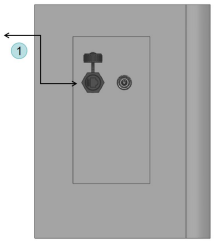
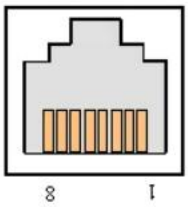


Figure 5-9

RJ45 Socket



Pin	Definition
1	RS485-1A
2	RS485-1B
3	Undefined
4	CAN3-H
5	CAN3-L
6	RS485-2A
7	RS485-2B
8	DI1_L

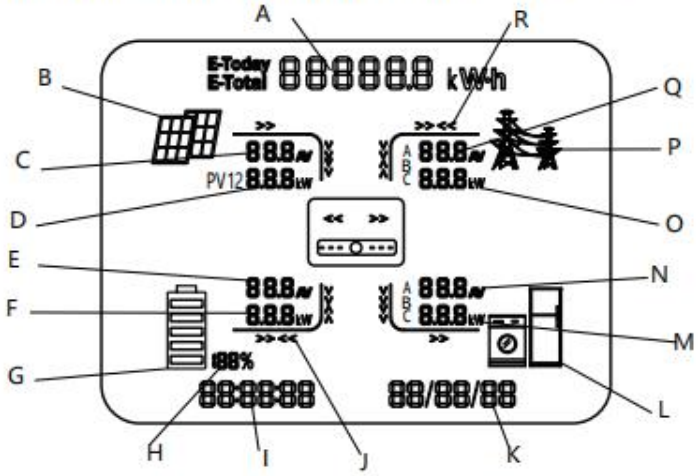
6.Operating of the Inverter

6.1 LED and LCD Display

The LED indicators are shown as blow:

LED	Status	Explanation
SYSTEM	ON	System is powered up
	OFF	System is not powered up
GRID	ON	Grid is normal
	OFF	Grid loss
	FLASH	Grid is abnormal
EPS	ON	Inverter in offline mode, EPS is active
	OFF	Inverter is not in offline mode
COM	ON	WIFI module connected
	OFF	WIFI module not connected
METER	ON	Smart meter communication OK
	OFF	Smart meter communication fail
FAULT	ON	Alarm occurred and inverter stop work
	OFF	No Alarm
	FLASH	Alarm occurred but inverter still work

The LCD display shows the detailed information of the inverter



Position	Description
A	It indicates the power output amount of total and today alternately. Unit: kWh or MWh
B	PV panels indicator
C	PV1,PV2 panels parameters. Voltage and current are displayed alternately.
D	Total PV power
E	Battery parameters. Voltage and current are displayed alternately.
F	Battery power
G	Battery indicator
H	SOC of battery
I	Current time
J	Power flow array of battery. When it towards battery, it means charging; when it towards inverter,it means discharging.
K	Default as current date. When an error occurs, fault code will be displayed alternately.
L	Loads indicator
M	Loads power consumption of each phase
N	Load parameters. Voltage and current of each phase are displayed alternately.
O	Power export or import of each phase
P	Grid indicator
Q	Grid parameters. Voltage and current of each phase are displayed alternately.
R	Power flow array of load

This part introduces the common fault and solving steps, provides troubleshooting methods and skills to the user, and helps the user identify and solve some common faults of the inverter.

Protection code	Description	Recommended solution
P001	PV over voltage protection	Check the configuration of the PV panels
P002	Battery over voltage protection	Check if battery volt larger than 600V
P003	Insulation resistance low	Check the insulation of PV panels
P004	Leakage current high	This error will reset itself.
P005	Over temperature protection	The inverter will recover automatically when the temperature gets lower.
P006	Bus voltage unbalance	The inverter will recover automatically.
P007	Bus voltage high	
P008	Bus voltage low	
P009	Grid and EPS are reversed	Check the connection of AC side. Make sure the grid and EPS load are connected to the ports on the inverter correctly.
P010	Grid relay open-circuit	Shut down and restart .If it still can't be auto-recover, please contact the service.
P011	Grid relay stick	
P012	On-grid mode bus soft start fault	
P013	MCU communication fault	
P019	Battery SOC low in on-grid mode	Battery discharged to low level, it will recover after charged automatically
P020	Battery SOC low in EPS mode	
P021	Battery voltage low	

P022	Battery open-circuit	Check the connection of battery and set right battery SOC in each mode.Check the battery for parameter settings.
P023	Battery SOC deadly low	
P024	BMS communication fault	Check the BMS communication cable and BMS protocol setting
P025	No time interval setting for Peak shaving and valley filling mode	Check inverter work mode setting
P026	Remote off	Inverter turn off through monitoring
P027	Smart meter communication fault	Check the communication cable for smart meter and meter protocol
P033	Grid voltage high	Check if grid fails or not connected well
P034	Grid voltage low	
P035	Grid frequency high	
P036	Grid frequency low	
P037	Islanding protection	
P038	Grid wave loss	
P039	DC injection high	The inverter will recover automatically.
P040	Utility not three phase	Check if grid cable well connected
P041	Phase sequence fault	Reverse connection order of L2 and L3 cable
P042	PLL error	The inverter will recover automatically.
P048	EPS overload	Decrease EPS loads to make sure the total loads power is lower than EPS nominal output power, press power key more than 3 seconds to clear alarm
P049	EPS output voltage high	Check if EPS over load, press power key more than 3 seconds to clear alarm
P050	EPS output voltage low	
P051	EPS mode bus soft start fault	
P052	Inv soft start fault	
P053	EPS load short circuit	

P059	Battery current limited	The inverter will recover automatically.
P060	Inv trip	
P061	Transient trip	
P062	Bus trip	

If you meet any problem that you cannot solve by yourself, please contact with your local distributor or our company.

6.2Monitoring System

Power View monitoring platform support both APP and web monitoring, user can monitor detailed running information like generating capacity, system data, and send command, set parameters at same time.

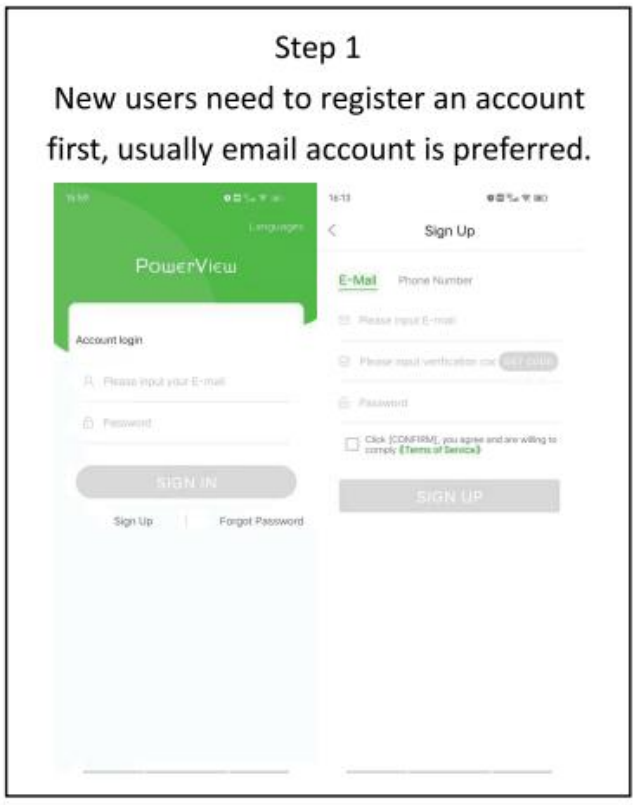
6.2.1 Software acquisition

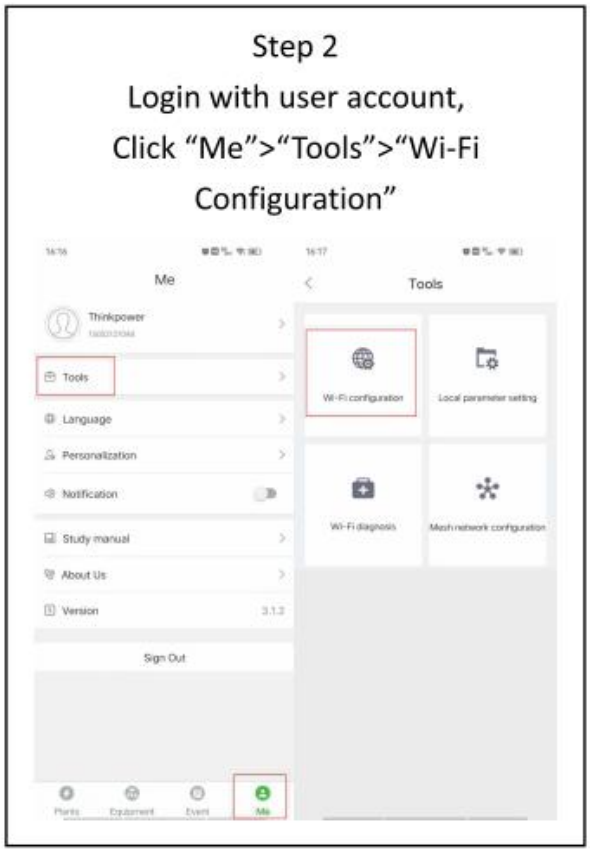
APP: Download APP by searching 'PV Pro ' in Google Play or Apple App Store.

Web: https://pv.inteless.com

6.2.2 Software acquisition

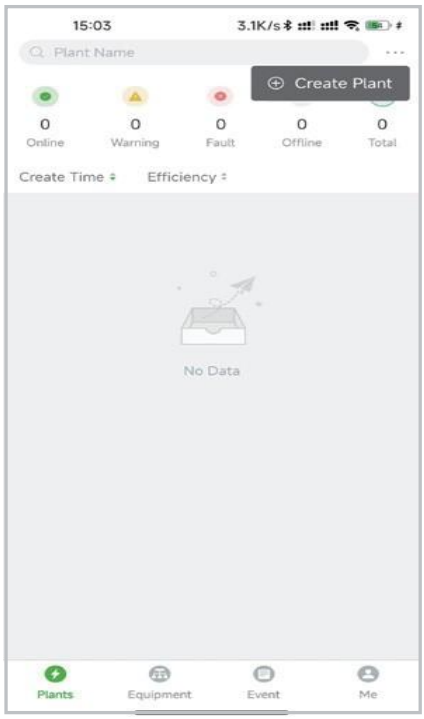
Plug in the WiFi module, power up inverter with PV or Battery, the WiFi module red LED will turn on, configure WiFi follow steps below.





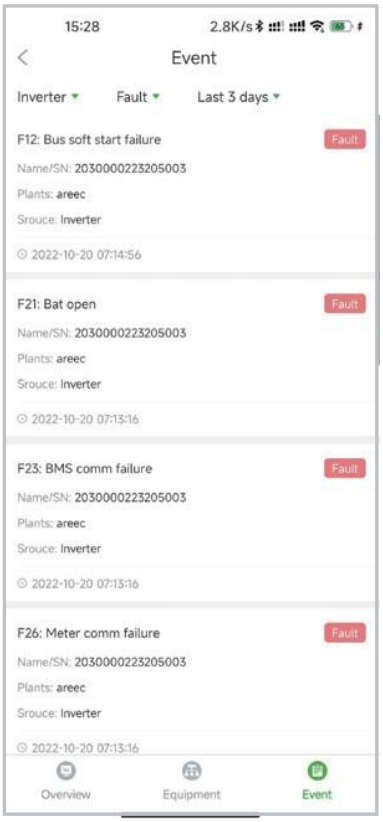
6.2.3 Create·Plant.

Step1: On the APP "Plants" page, click the upper right corner “...”Create Plant, Scan the QR code on the module.



Step2: Click"CREATE" after filling in the information, and click "Done"in the upper right corner.

Click the created power station to view the current status and power generation information of the power station: You can also query the machine error information.

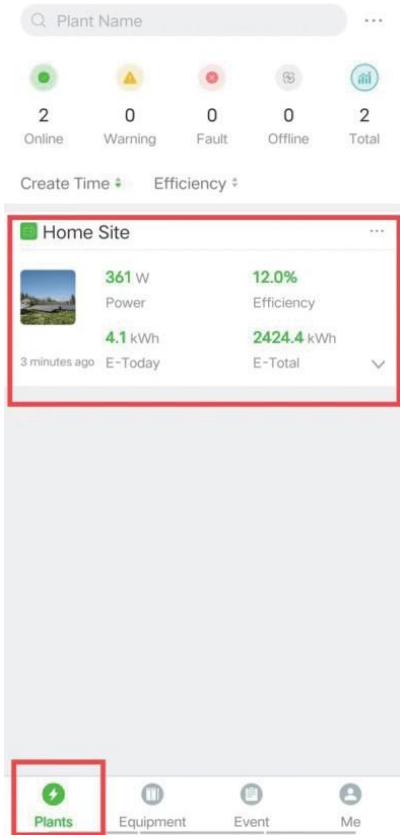


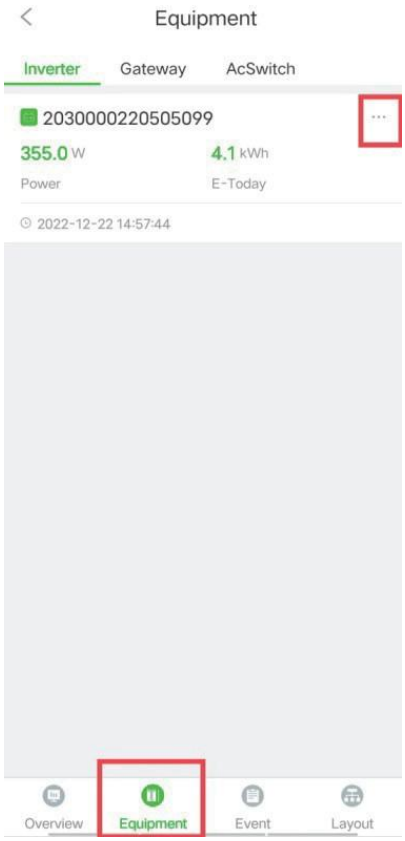
6.3 Parameter setting

We support both local(4.3.1) and remote(4.3.2)parameter settings. The default setting is most common, and users usually do not need additional settings except battery protocol choice.

6.3.1 Enter parameter setting list(Remote setting)

Remote parameter setting is suitable for power plants with network Click "Plants" to enter the power station list, click your power station,click"Equipment", then click "..." in the upper right corner, and select "Setting Params" to enter the parameter setting list.

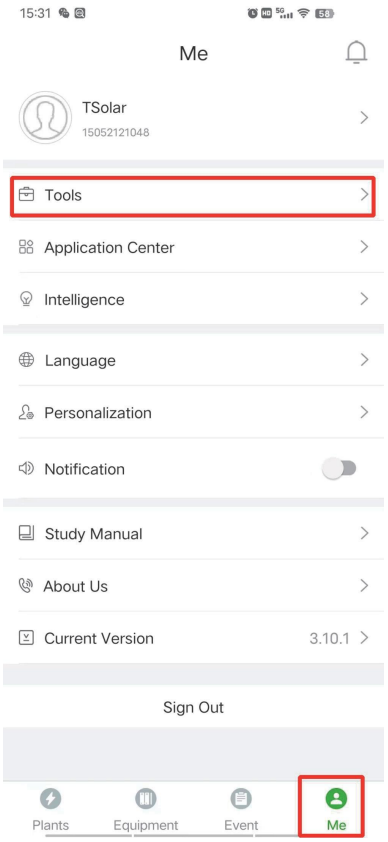


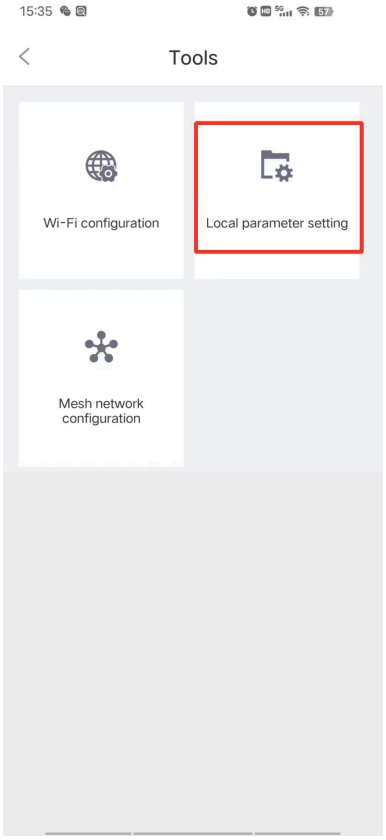


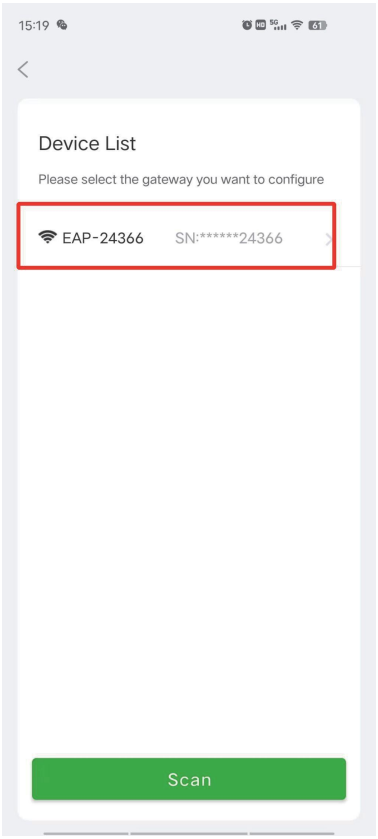
6.3.2 Enter parameter setting list(Local setting)

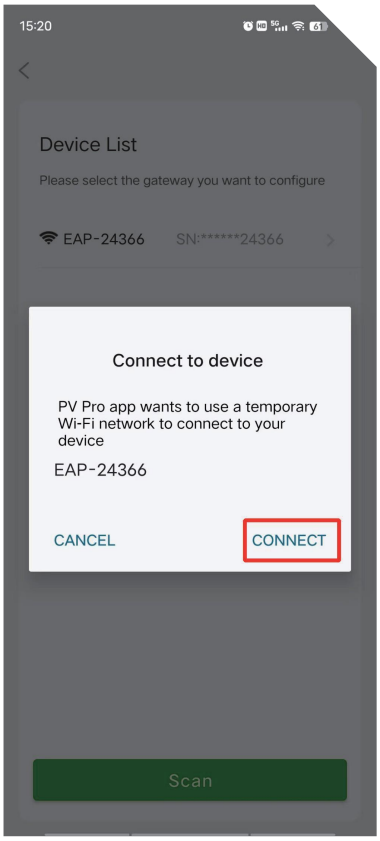
Local parameter setting is suitable for power plants without network Standing in front of the inverter, Click"Me">“Tools">“Local parameter setting”select corresponding WiFi module signal, choose “CONNECT” to enter parameter setting list.

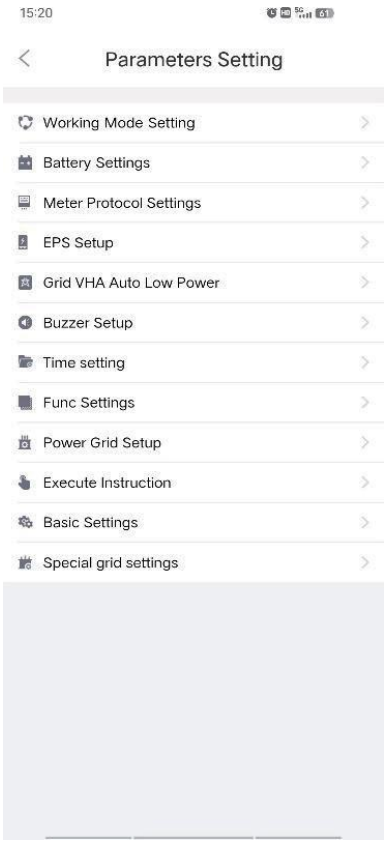
Note: During setting, smartphone may remind you whether to switch networks please choose no


15:31
Me
TSolar
15052121048
Tools
Application Center
Intelligence
Language
Personalization
Notification
Study Manual
About Us
Current Version
3.10.1
Sign Out
Plants
Equipment
Event
Me


15:35
Tools
Wi-Fi configuration
Local parameter setting
Mesh network configuration


15:19
Device List
Please select the gateway you want to configure
EAP-24366
SN:******24366
Scan


15:20
Device List
Please select the gateway you want to configure
EAP-24366
SN:******24366
Connect to device
PV Pro app wants to use a temporary Wi-Fi network to connect to your device
EAP-24366
CANCEL
CONNECT
Scan


15:20
Parameters Setting
Working Mode Setting
Battery Settings
Meter Protocol Settings
EPS Setup
Grid VHA Auto Low Power
Buzzer Setup
Time setting
Func Settings
Power Grid Setup
Execute Instruction
Basic Settings
Special grid settings

6.4 On the parameter setting page

you can enter the corresponding parameter items to set according to your circumstances

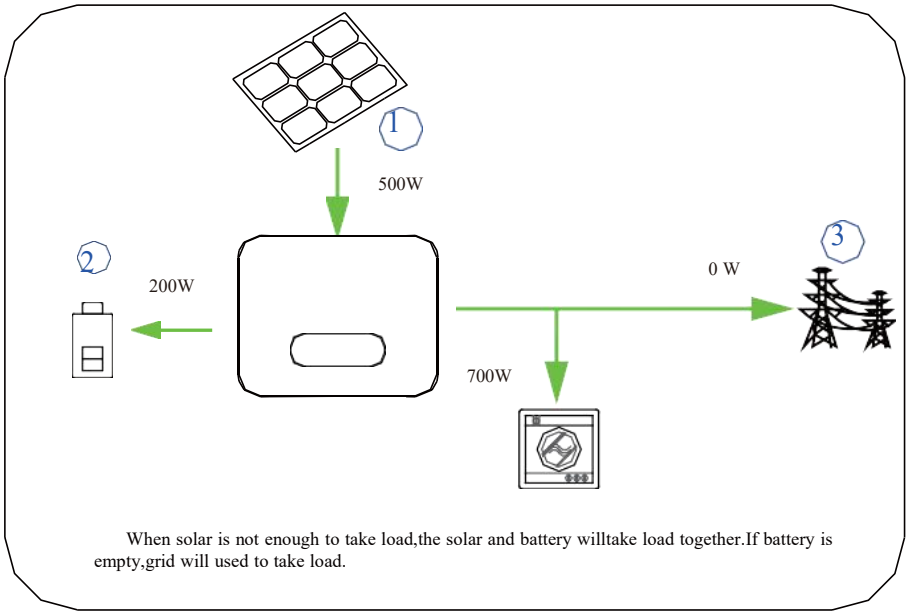
6.4.1 Enter parameter setting list(Remote setting)

- Working lode

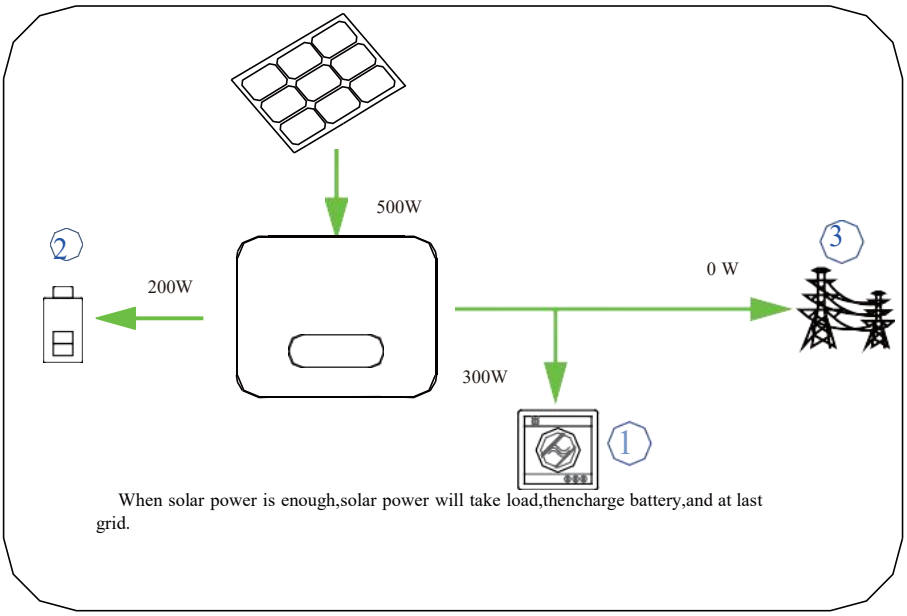
The energy storage inverter provides four working modes to meet theneeds of users in different applications namely,General Mode Peak shaving and valley filling Mode, Battery backup Mode and Micro grid Mode.

1.General mode (Load first mode)

General mode can maximize the self use rate of solar power, and reduceenergy bill significantly.



The priority order of solar power usage is Load>Battery>Grid.



2.Peak shaving And Valley Filling Mode

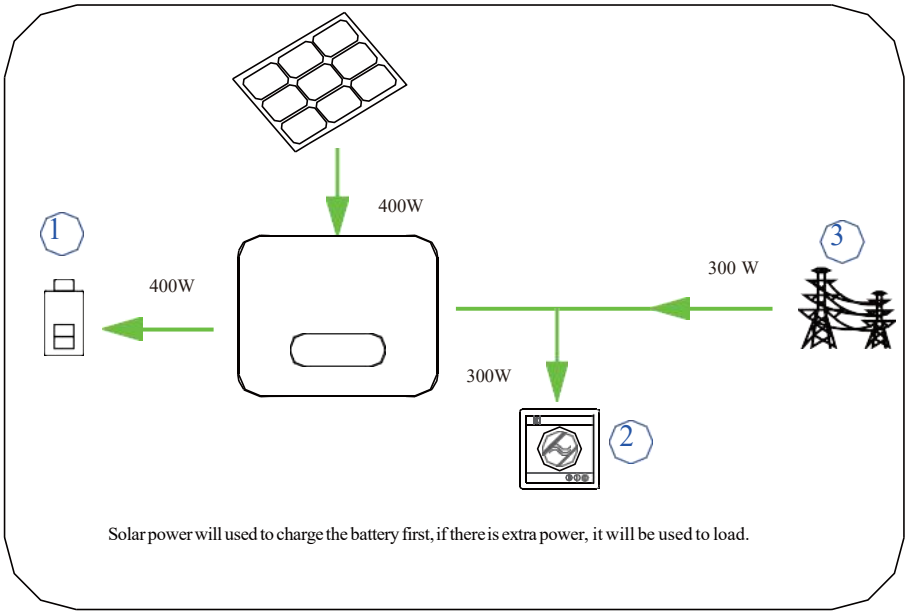
This mode can be chosen for areas with large differences in peak and valleyelectricity prices.

It should be noted that user must correctly set the peak valley period at thebottom of the page.

During the peak period, The priority order of solar power usage is same asgeneral mode, Load>Battery>Grid;

During the valley period, The priority order of solar power usage is Battery>Load>Grid. User can set whether to charge the battery from the gridduring this period.

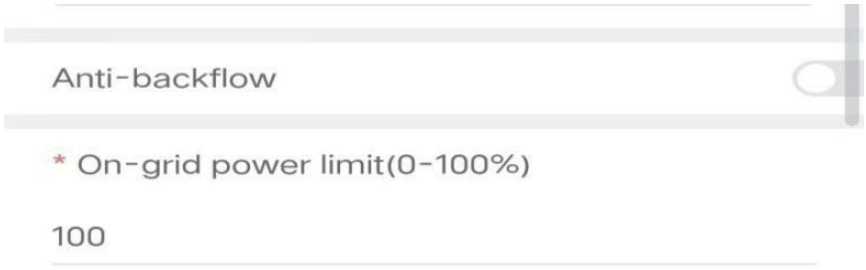
3.Battery Back-up Mode(Charge first mode)



4.Micro grid Mode

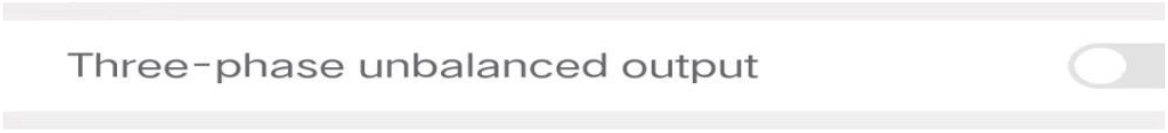
Applicable in areas without power grid.

- power limit setting



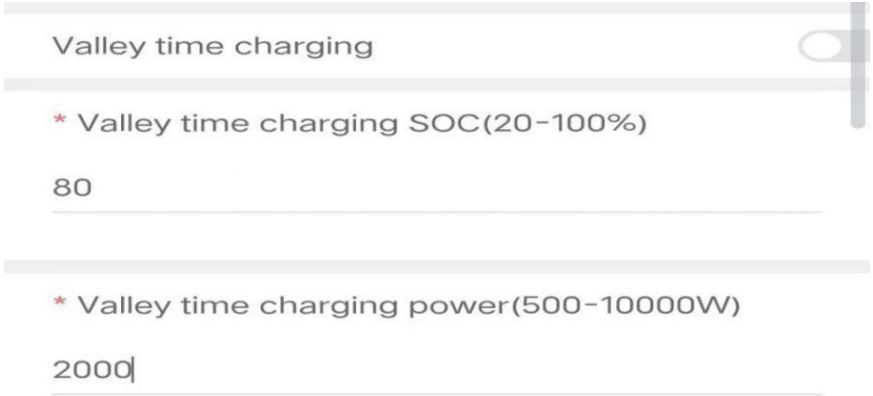
Users can choose whether to turn on the on-grid power limit function after the battery is fully charged according to whether the local power grid company allows the photovoltaic power being exported to the power grid. This function is turned off by default. When the photovoltaic power is great- er than the load power, the system will charge the battery. If the battery is full at this time, if the on-grid power limit function is turned off, the excess photovoltaic power will be sent to the power grid; If the on-grid power limit function is enabled, the system will adjust the amount of power sent to the grid according to the power limit percentage set by the user.
For example, if the system is 10kW and the on-grid power limit is 0%, the power export is completely prohibited; If it is 50%, after the system is fully charged, the excess photovoltaic energy is allowed to send 5kW to the grid at most.

- three phase unbalance setting



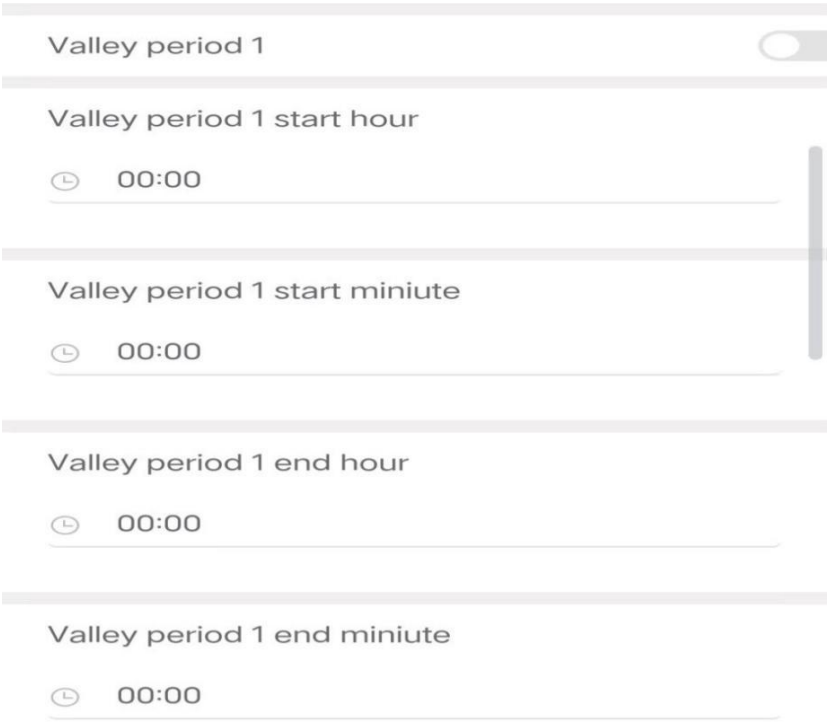
In some countries or regions, such as the Czech Republic, three-phase billing meters charge independently on each phase. Users can choose whether to turn on the three-phase unbalanced output function. It should be noted that in most countries, three-phase billing meters are charged uniformly after three-phase summary, so it is not necessary to turn on this function, because the conversion efficiency of the inverter will be slightly reduced after turning on this function.

- Valley time charging



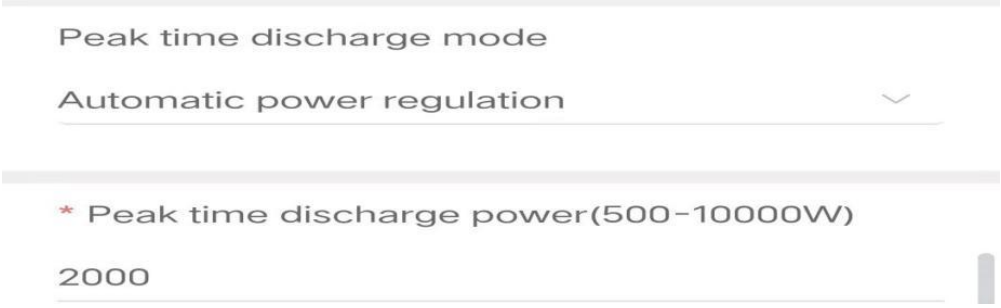
This function is only effective when the user selects the peak shaving and valley filling mode, and it is generally not recommended to start it.

- valley period &peak period



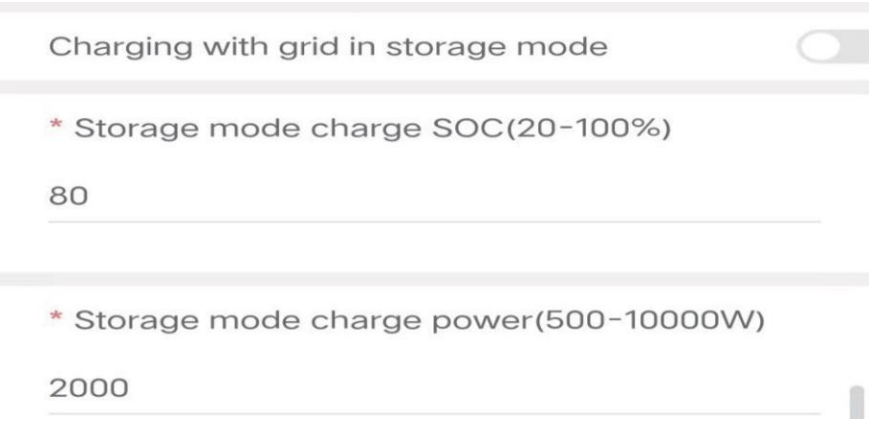
Peak and valley periods are only effective when the user selects the peak cutting and valley filling mode. The system can set three Valley periods and three peak periods, and the periods cannot overlap.

- peak time discharge



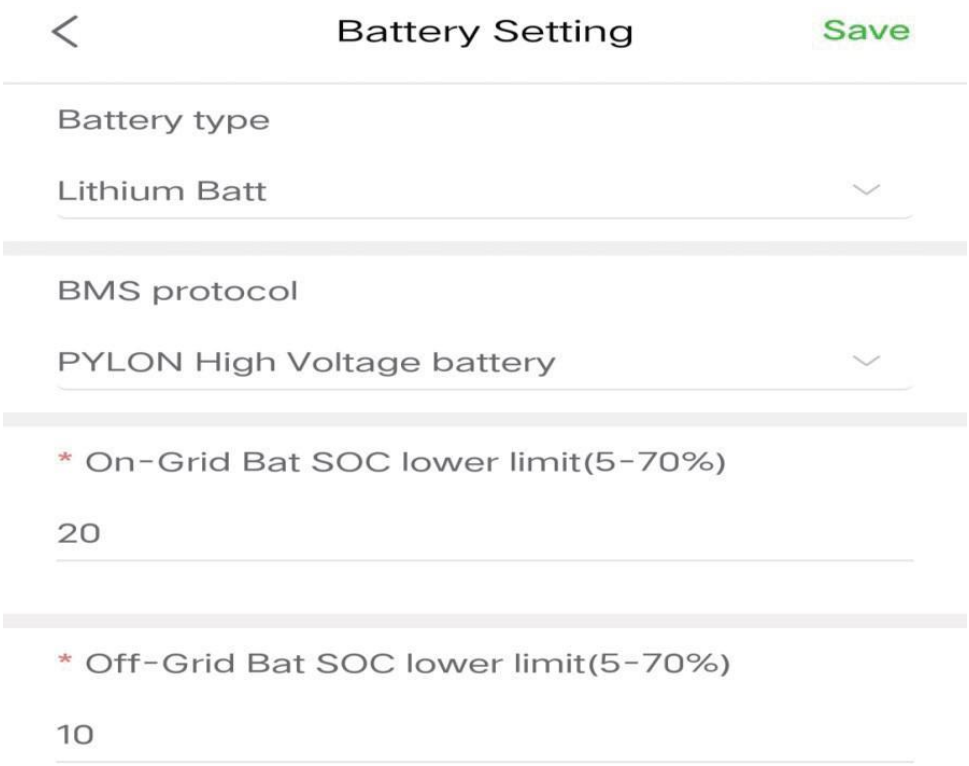
The peak time discharge setting is only effective when the user selects the peak shaving and valley filling mode. During the peak time, the default setting is that the system automatically adjusts the discharge power according to the household power detected by the smart meter; If the smart meter is not installed, the user can select a fixed discharge power according to the approximate power consumption.

- battery backup mode charging setting



The battery backup mode charging setting is only effective when the user selects the battery backup working mode. You can set whether to turn on the mains power to charge the battery, and the charging power and battery charging cut-off SOC.

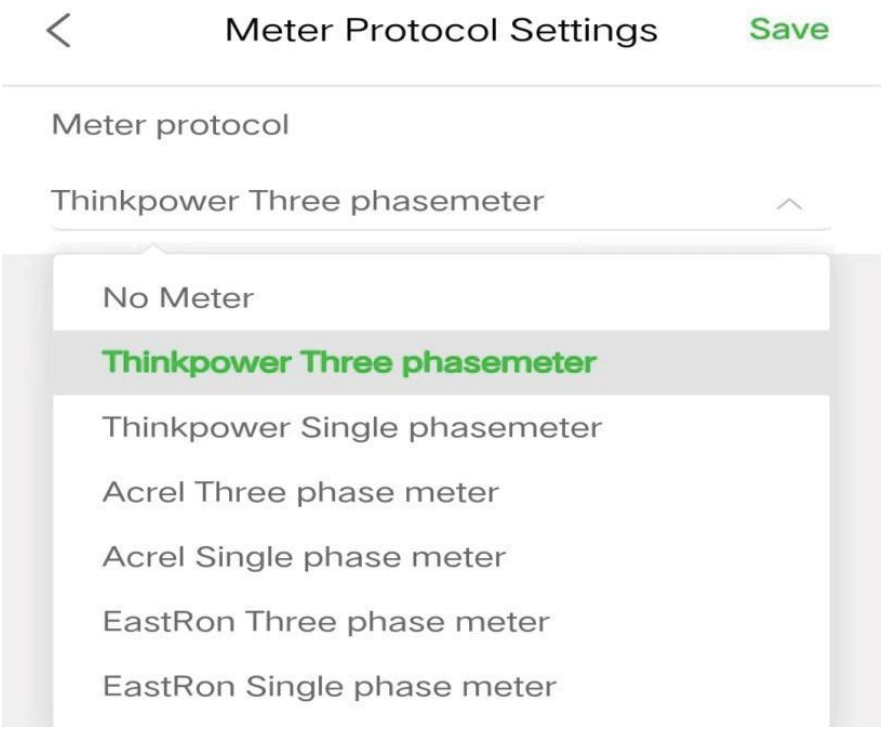
6.4.2 Battery setting



EPH series hybrid inverter only supports Lithium battery. If your system is not equipped with battery, you can select Lead acid battery, and select "No BMS Protocol", the inverter will not generate battery related alarms. Default BMS protocol is "Think Power High Voltage battery". You can select the corresponding protocol according to your battery.
On Grid Bat SOC lower limit refers to that when the power grid is normal, the inverter discharges the battery to provide load consumption and avoid generating electricity charges. By default, the lower limit of battery discharge SOC when grid normal is 20%, that is, the discharge depth is 80%. If your local power grid is unstable or photovoltaic power generation is small in winter, you can reduce the maximum discharge depth; Off Grid Bat SOC lower limit means that when the power grid is lost, if you enable the EPS function, the

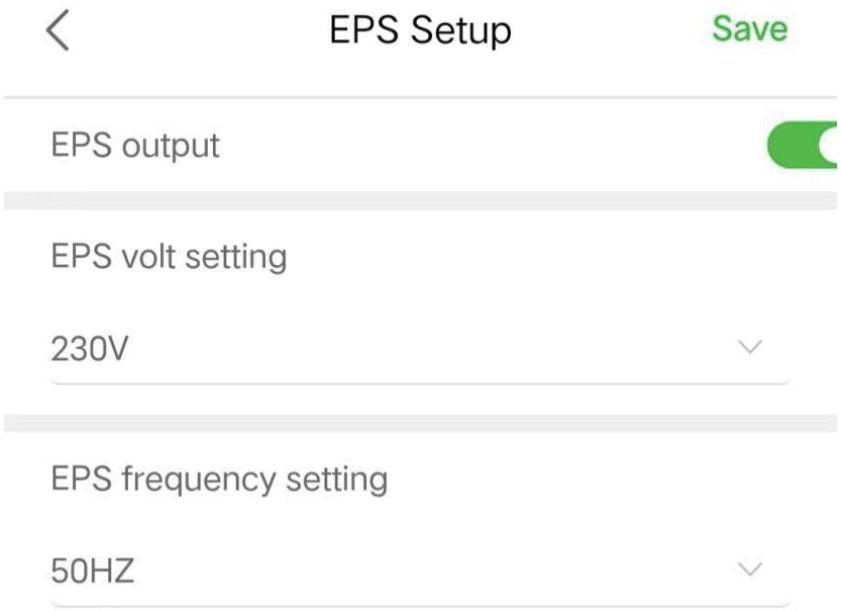
inverter will enter the off grid mode to provide power for the key loads connected to the backup port. By default, the lower limit of battery discharge SOC in the off grid state is 10%, that is, the discharge depth is 90%. You can make corresponding modifications according to your the circumstances.

6.4.3.Meter.Protocol.setting



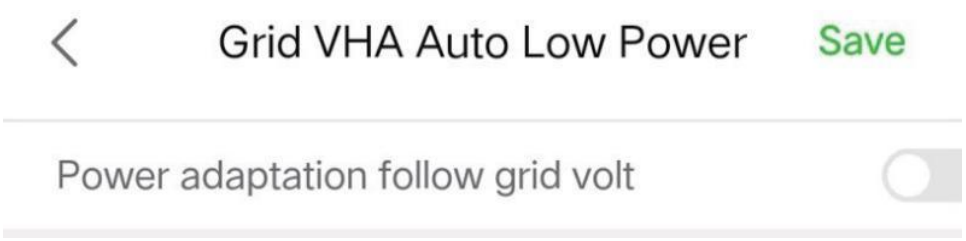
If you use Chint meter, please select “Think Power Three phase meter”; If it is an Acrel meter, please select “Acrel Three phase meter”; For East Ron meter, please select “East Ron Three phase meter”.

6.4.4.EPs·Setup



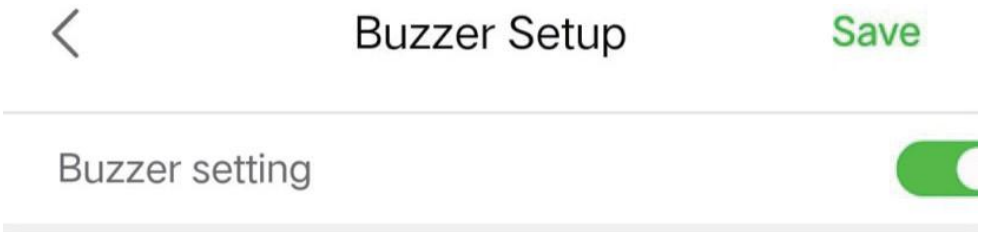
You can choose whether to enable the EPS function according to your demands. EPS is generally used in an emergency, and its endurance depends on the battery capacity and pv power. It is not recommended to connect heavy loads at the backup port.

6.4.5.Grid·VHA·Auto·Low·Power



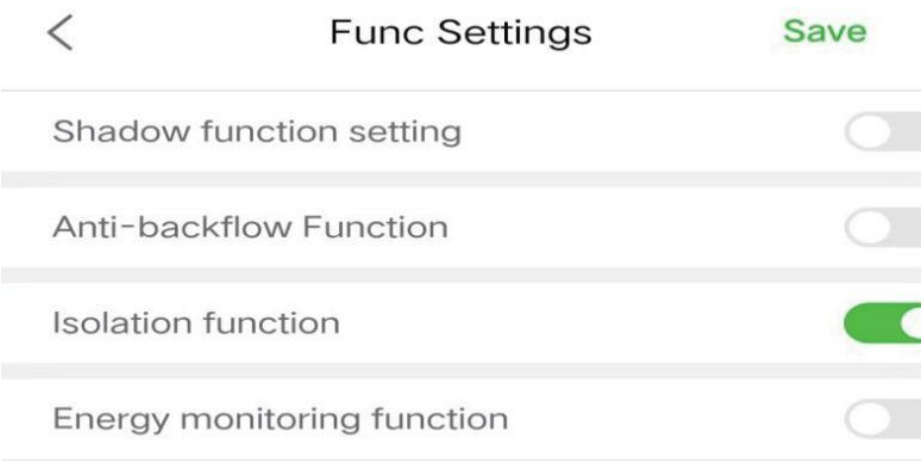
The solar system will sell electricity to the power grid when the battery is full. If it is a weak power grid(local transformer capacity is small), it may cause the grid voltage to rise and reach the high-voltage protection limit, inverter will disconnect from grid; If this function is enabled, the inverter will automatically reduce the generating power when the grid voltage is close to the high-voltage protection limit to avoid inverter disconnection.

6.4.6.Buzzer.setup



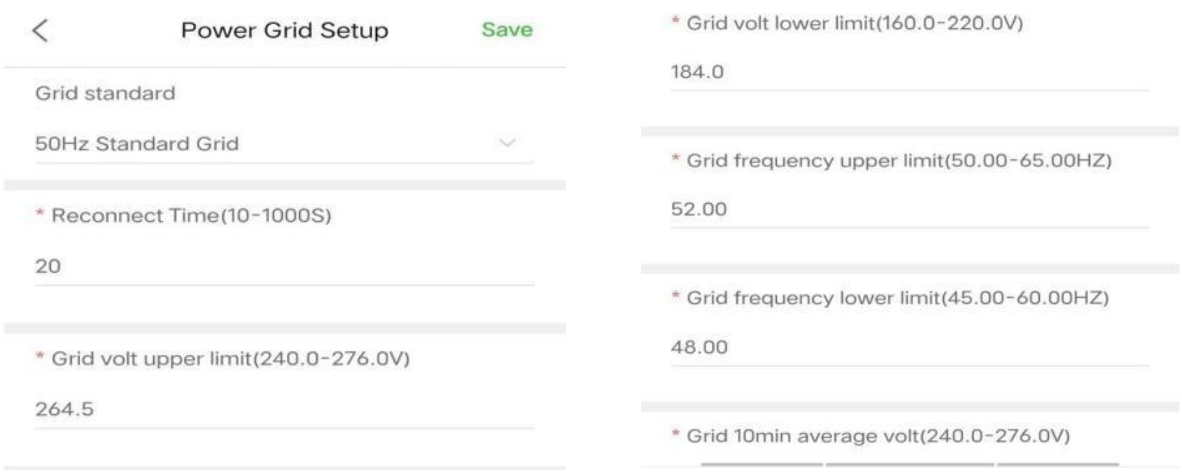
When the inverter is in the off grid mode or there is a fault in the off grid mode, the buzzer will generate a sound alarm, and you can choose to turn the buzzer on or off.

6.4.7.Function.settings



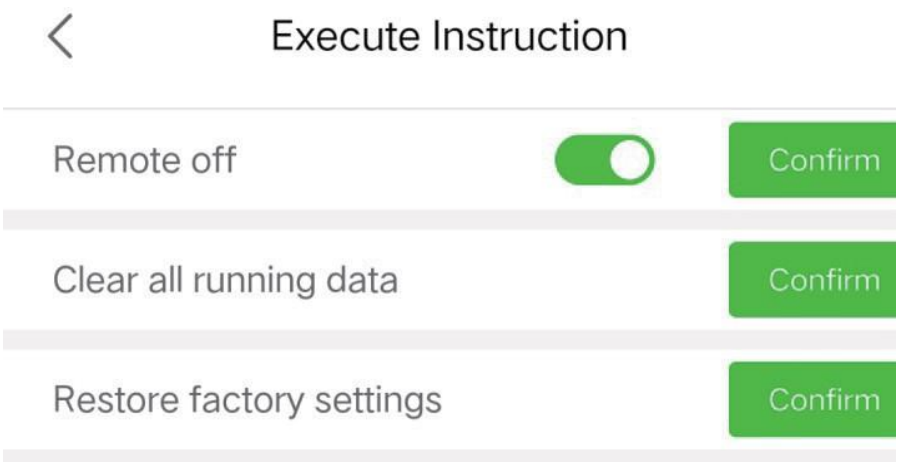
Shadow function setting: If your solar system is shaded between 9:00 a.m. and 3:00 p.m., you can enable this function, generally, it is not recommend- ed to enable it.
Anti-Back up flow Function: Ignore this option. This function is the same as the Anti back flow function in Working Mode Setting.
Isolation function: The isolation function of solar string will generate alarm when the impedance of solar string to ground is lower than limit value. If the inverter continues to alarm, you can disable this function after confirming that the solar sting has no problem with the insulation to the ground. Make sure that the solar string is well insulated from the ground. If the solar string is short to the ground and the isolation function disabled, it will cause invert- er irrecoverable damage.
Energy monitoring function： Ignore this option, it is only used for common on-grid inverter.

6.4.8.Power.Grid·setup



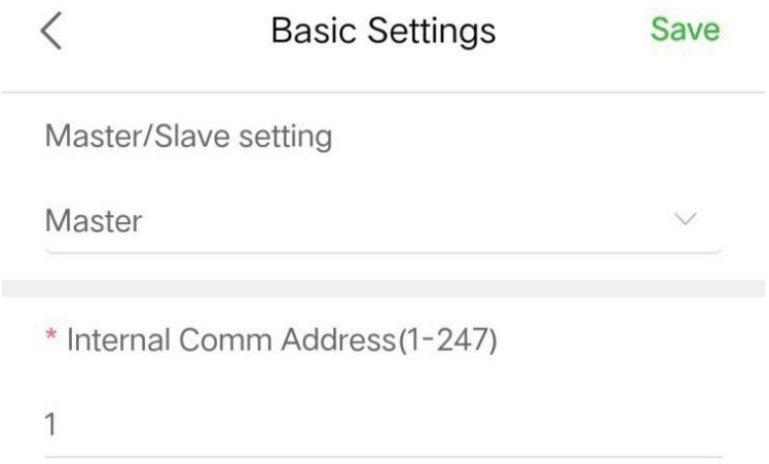
It is recommended to keep the default parameter settings.

6.4.9.Excute·Instruction



Remote off: The inverter can be turned off or on remotely by clicking this option
Clear all running data: The operation data of inverter can be cleared by clicking this option
Restore factory settings: You can restore the default settings of the invert- er by clicking this option.

6.4.10.Basic·settings



If your system is equipped with two or more inverters, please set one master with address 1, and the others are slave. The slave addresses are arranged in order from 2.

6.4.11.special.grid·settings.

Some countries require to display more grid parameter settings, and it is generally recommended to retain the default settings.

6.4.12.Active·power and·Reactive·power control.

Some countries require this setting, it is generally recommended to retain the default settings.

7 Emergency Situations

7.1 Battery Leakage

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below.

1) Inhalation: Evacuate contaminated area and seek medical aid.
2) Contact with eyes: Rinse eyes with flowing water for 15 minutes and seek medical aid.
3) Contact with skin: Wash affected area thoroughly with soap water and seek medical aid.

   Ingestion: Induce vomiting and seek medical aid.

7.2 On Fire

NO WATER!

Only dry powder fire or carbon dioxide extinguisher can be used; if possible, move the battery module to a safe area before it catches fire.

7.3 Wet Batteries

If the module is wet or submerged in water, do not let people access it, then contact us or an authorized dealer for technical support. Cut off all power switch on inverter side.

7.4Damaged Batteries

Damaged batteries are dangerous and must be handled with utmost care. They are not fit for use and may pose a danger to people or property. If the module seems to be damaged, pack it in its original container, then return it to authorized dealer.

 **Warning**

Damaged batteries may leak electrolyte or produce flammable gas.

8 Remarks

8.1 Recycle and Disposal

In case a battery (normal condition or damaged) needs disposal or needs recycling, it shall follow the local recycling regulation (i.e. Regulation (EC) Nº 1013/2006 among European Union) to process, and using the best available techniques to achieve a relevant recycling efficiency.

8.2 Maintenance

1) It is required to charge the battery at least once every 6 months, for this charge maintenance make sure the SOC is charged to higher than 85%.
2) Check installation environment such as dust, water, insect etc. Make sure it is suitable for IP20 battery system. Connection of power connector, grounding point, power cable and screw are suggested to be checked every year.

Maintenance Record

Dear user.thank you for selecting our product,Please fill in and keep the warranty card for better services.

Attn:_____Product No.:_____

Tel:_____E-mail:_____

Purchase Date:_____

Address:_____

Maintenance Record			
Date of repair	Content	Maintenance Personnel	Note