

User Manual

M Hybrid Inverter 5kW&6kW



MANGO POWER

Catalogue

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1. Overview

This document describes the product information, installation, electrical connection, configuration and commissioning, troubleshooting and maintenance, and technical specifications of the M Hybrid Inverter 5kW&6kW. Before installing and using the product, read this manual carefully to familiarize yourself with the safety information and functions and features of the product. Manuals may be updated from time to time, please obtain the latest version from the official website for more product information.

1.1 Scope of Application

This manual is applicable to the following inverters:

Model	Rated output power	Rated output Voltage
M Hybrid Inverter 6kW	6000W	220V/230V/240V, L/N/PE
M Hybrid Inverter 5kW	5000W	220V/230V/240V, L/N/PE

Note: Since the product will be overload protected at an ambient temperature above 40 °C, the high temperature mode test in the Italian Grid Specification certification will be carried out at an ambient temperature of 40 °C.

1.2 Applicable Personnel

This document is intended for only professional and technical personnel who are familiar with local regulations, standards, and electrical systems, and have professional training and knowledge about this product.

1.3 Symbol Definition

In order to ensure the personal and property safety of users when using M Hybrid Inverter 5kW&6kW, as well as the efficient use of this product, the manual provides relevant safe operation information and uses corresponding symbols to highlight. To avoid personal injury and property damage, please fully understand and absolutely comply with these stressed information. The symbols used in this manual are listed below.

 Danger
Indicates a highly hazardous situation which, if not avoided, will result in death or serious injury.
 Warning
Indicates a hazard with a medium level of risk that could result in death or serious injury if not avoided.
 Caution
Indicates a hazard with a low level of potential that, if not avoided, could result in moderate or minor injury.
 Attention

Indicates a potentially hazardous situation that, if not avoided, may cause equipment failure or property damage.

2. Safety Precautions

The safety precautions contained in this document must be followed when operating the device.



- The inverter has been designed in strict accordance with safety regulations and has passed the tests. However, as an electrical device, you must comply with relevant safety instructions before performing any operation on the device. Improper operation may result in serious injury or property damage.

2.1 Operation Safety



- Read this manual carefully before installing the device to understand the products and precautions.
- All operations on the equipment must be carried out by professional electrical technicians who are familiar with the local standards and safety regulations.
- When operating inverters, use insulation tools and wear personal protective equipment. Wear ESD gloves, an ESD wrist strap, and an ESD suit when touching electronic components to prevent damage caused by static electricity.
- The manufacturer shall not be liable for inverter damage or personal injury caused by failure to install, use, or configure the equipment in accordance with the requirements of this manual.

2.2 PV String Safety



- Use the DC wiring terminal delivered with the chassis to connect the DC cables of the inverter. Use of other types of DC terminals may cause serious consequences. Therefore, the manufacturer is not responsible for the damage to the device.



- Ensure that the assembly frame is properly grounded to the support system.
- After connecting DC cables, ensure that the cables are securely connected.
- Use a multimeter to check whether the positive and negative DC wiring terminals of the battery are connected correctly and the voltage is within the allowable range.
- Do not connect the same PV series to multiple inverters; otherwise, the inverters will be damaged.

2.3 Battery Safety



Warning

- Read the battery safety contents in the user manual carefully before installing the device, and strictly follow the instructions in the user manual.
- The battery current may be affected by external environment, such as temperature and humidity, which may cause battery current limiting and affect battery on-load performance.
- If the battery does not start, contact the after-sales service center as soon as possible. Otherwise, the battery may be permanently damaged.
- Use a multimeter to check whether the positive and negative DC wiring terminals of the battery are connected properly and the voltage is within the allowable range.
- Do not connect the same battery string to multiple inverters. Otherwise, the inverters may be damaged.

2.4 Inverter Safety



Warning

- Ensure that the voltage and frequency of the grid-connected access point comply with the inverter grid-connected specifications.
- A protection device, such as a circuit breaker or fuse, is recommended for the AC side of the inverter. Ensure that the protection device is greater than 1.25 times the maximum AC output current of the inverter.
- The GND cable for the inverters must be securely connected. When multiple inverters are combined, ensure that the protection ground points on all inverters' chassis shells are equipotential connected.
- If the battery is not configured in the photovoltaic system, it is not recommended to use the off-grid function, and the resulting system electricity risk will not be covered by the equipment manufacturer's warranty.

2.5 Personnel Requirements

 Attention	
➤	When the inverter is running, some components may be charged or hot. Improper use, incorrect installation, or operation may result in serious injury to person or property. Transportation, loading, unloading, installation, starting and maintenance operations must be performed by qualified electrical engineers.

2.6 Description of Symbols

There are some safety-related labels on the single -phase hybrid inverter. Please read and fully understand these labels before installing the product.

Symbol	Symbol name	Symbol meaning
	It indicates the danger of residual voltage in the inverter.	Please wait for 5 minutes until the capacitor is completely discharged after the DC side of the inverter has been disconnected with power for a period of time.
	It indicates the danger of high voltage.	High voltage exists during inverter operation. If you need to operate the inverter, please make sure the inverter is disconnected.
	It indicates to be careful of high temperature surface.	The temperature of inverter housing is high during operation, so do not touch it, otherwise it may cause burns.
	It indicates grounding terminal.	Connect the inverter to ground for grounding protection purpose.
	It indicates reading the manual.	Please read and understand this manual carefully before installing the inverter.

3. Equipment Inspection and Storage

3.1 Pre-signing Inspection

Before signing for the product, please check the following:

- Check the outer packing for holes, distortions, cracks, or other signs that may cause damage to the equipment in the packing case. If so, do not open the packing and contact your distributor.
- Check whether the inverter type is correct. If not, do not open the package and contact your dealer.
- Check whether the type and quantity of the delivered package are correct and whether the appearance is damaged. If damaged, please contact your dealer.

3.2 Packing List

After the inverter is unpacked, check whether the delivered package are complete. If any components are found missing or incomplete, contact the dealer in time.

3.3 Equipment Storage

If the inverter is not put into use immediately, store it according to the following requirements:

- Ensure that the outer packing case is not removed and the desiccant is not lost.
- Ensure that the storage environment is clean and within appropriate temperature and humidity ranges.
- Ensure that inverters are placed in the height and direction according to the labels on the packing cases.
- Ensure that there is no tilt and fall risk after inverters are stacked.
- After the inverter is stored for a long time, check and confirm the inverter before it can be used.

4. Product Description

4.1 Product Overview

single-phase hybrid inverter is a photovoltaic grid-connected inverter and battery energy storage as one, with a variety of built-in working modes to suit the diversified needs of users. In the period of rising energy costs such as oil and coal, the continuous decline of energy subsidies for photovoltaic grid-connected systems, mountain areas or base stations without grid, uninterrupted power supply and emergency power supply needs, M Hybrid Inverter 5kW&6kW can provide a complete solution.

4.2 Application Scenario



Warning

- The photovoltaic system is not suitable for devices that rely on stable power supply, such as life-sustaining medical devices. Ensure that no personal injury is caused when the system is powered off.
- Do not use a load with a high starting current in the photovoltaic system. Otherwise, the off-grid output may fail due to excessive instantaneous power.
- When the inverter overload protection occurs for a single time, the inverter can automatically restart; If it happens several times, the inverter will stop, and after the fault is rectified, the inverter can be restarted immediately through the App.
- If the load capacity exceeds the rated power of the inverter during power failure, the off-grid function of the inverter automatically shuts down. To start, turn off the large load and ensure that the load power is smaller than the rated power of the inverter.
- When the inverter is in off-grid mode, it can be used normally for ordinary household load.
- Inductive load: 1.5P non-variable frequency air conditioners are supported. The standby mode may be unstable if two or more non-variable frequency air conditioners are connected.
- Capacitive load: total power $\leq 0.7 \times$ rated output power of inverter.

4.3 Appearance Description

4.3.1 Appearance Description

Please carefully inspect the packaging and accessories of the product before installation.

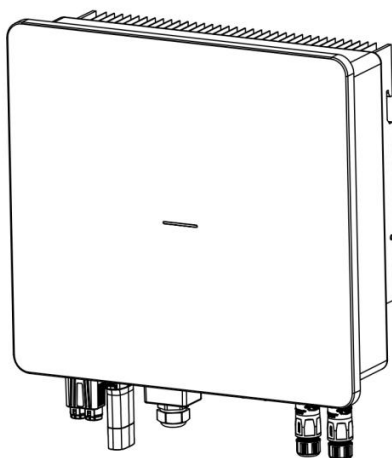


Figure 4.1 Appearance of the inverter

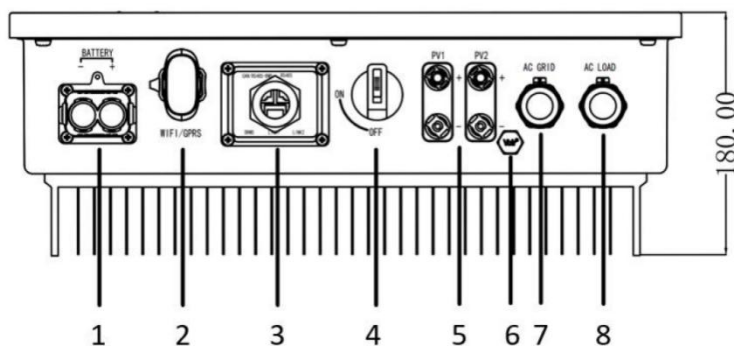


Table 4-1 Appearance of the inverter

1	Battery DC input port (BAT+/-)	5	PV DC input port (PV+/-)
2	WIFI/4G/Bluetooth	6	Explosion proof relief valve
3	Communication module interface	7	Grid-connected AC wiring port

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4	PV DC input switch	8	Off-grid AC wiring port
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4.3.2 Size Description

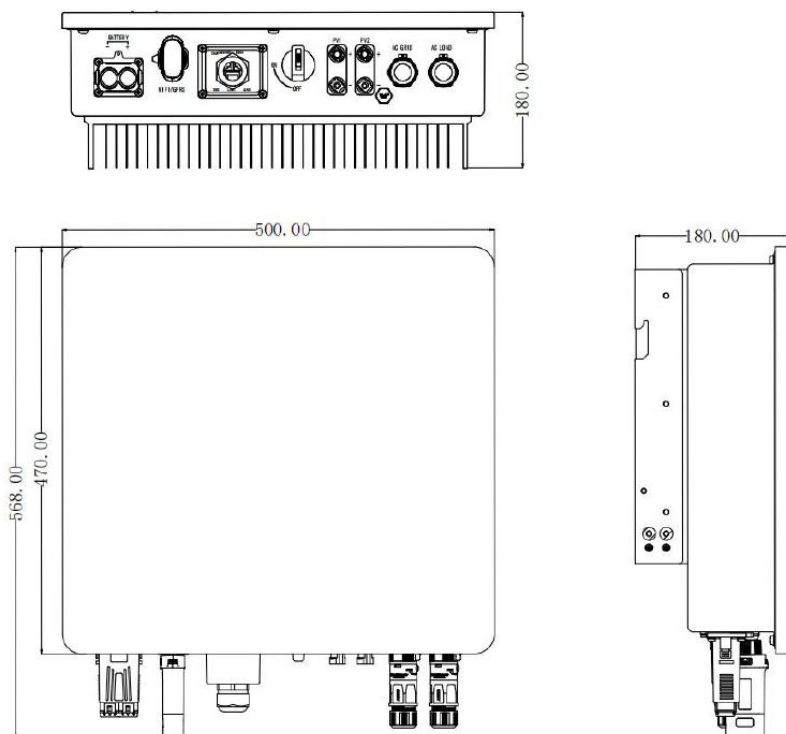


Figure 4.2 Overall size of inverter

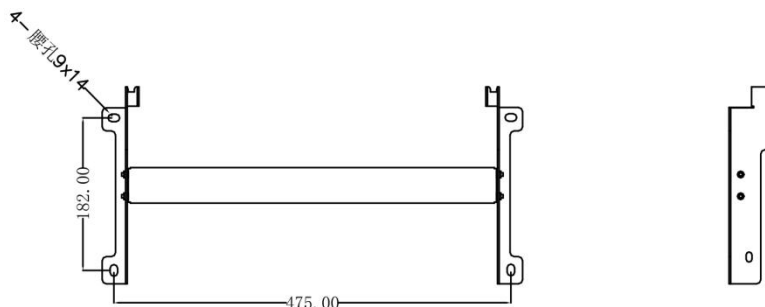


Figure 4.3 Dimensions of wall mount

5 Installation

5.1 Installation Requirements

5.1.1 Installation Environment Requirements

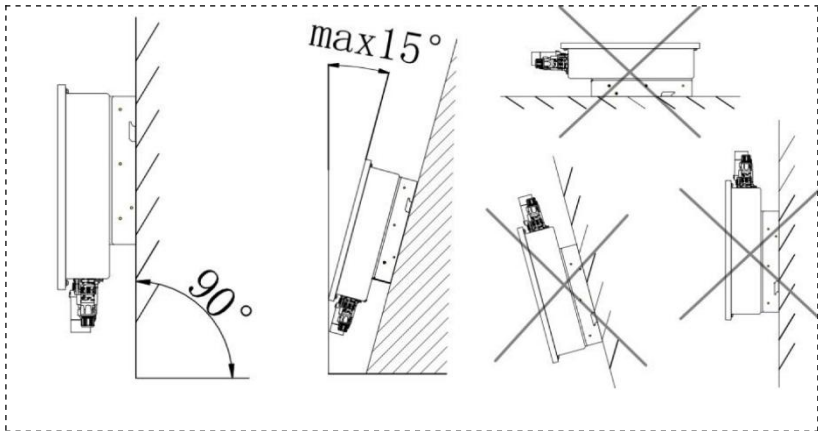
- 1) The equipment must not be installed in flammable, explosive, corrosive and other environments.
- 2) The installation position should be away from water pipes and cables in the wall to avoid danger during drilling.
- 3) The installation position should be out of the reach of children, and avoid installation in a position that is easy to touch. There may be high temperature on the surface of the equipment during operation to prevent burns.
- 4) The inverter should avoid the installation environment such as sun, rain, snow, etc. It is recommended to install it in a sheltered installation position. If necessary, an awning can be built.
- 5) The installation space must meet the requirements of ventilation, heat dissipation and operation space.
- 6) The protection level of the equipment complies with the requirements for outdoor installation, and the installation environment temperature and humidity must be within the appropriate range.
- 7) Make sure that the inverter indicator light and all labels are easy to view and that the terminal is easy to operate.
- 8) The inverter installation altitude should lower than the maximum working altitude 4000m.
- 9) Stay away from strong magnetic field environment to avoid electromagnetic interference. If a radio station or a wireless communication device below 30MHz is located near the installation location, install the device according to the following requirements:
 - Add a ferrite core with multi-turn winding at the inverter DC input line or AC output line, or add a low-pass EMI filter.
 - The distance between the inverter and the wireless electromagnetic interference device exceeds 30m.

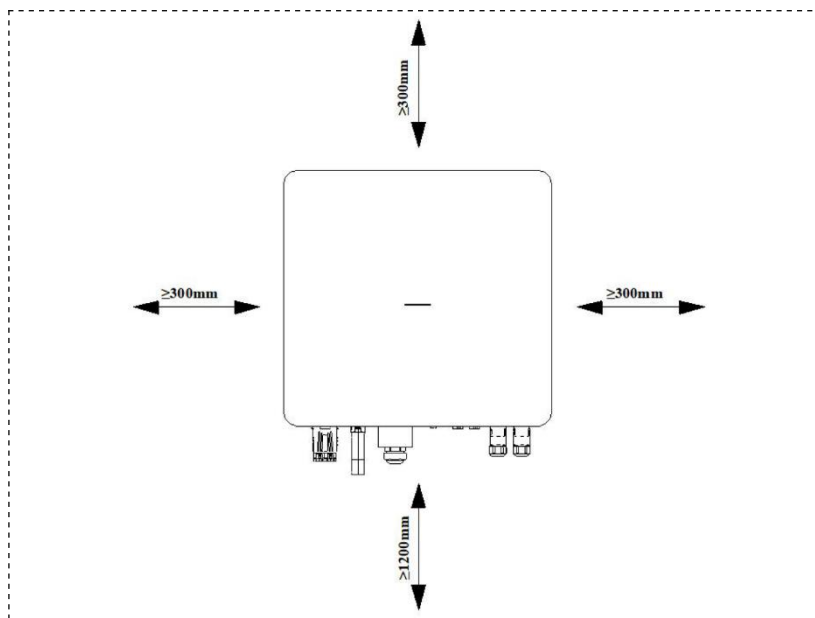
5.1.2 Mounting Carrier Requirements

- 1) The installation carrier must not be flammable material and must have fire resistance.
- 2) Please ensure that the installation carrier is solid and reliable, and can carry the weight of the inverter.
- 3) When the equipment is running, it will make noise. Do not install it on the carrier with poor sound insulation, so as to avoid the noise emitted by the equipment when it is working, which will cause trouble to residents in the living area.

5.1.3 Mounting Angle Requirements

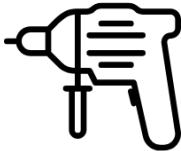
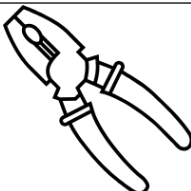
- 1) Recommended inverter installation Angle: vertical or backward $\leq 15^\circ$.
- 2) Do not invert, tilt forward, tilt back beyond the Angle, horizontal installation.
- 3) At least 1.2m from the ground below the inverter, about at least 300mm.



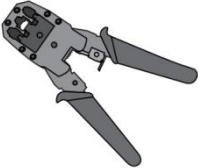
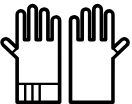


5.2 Mounting Tools

Table 5-1 List of installation tools

Series No.	Tools	Description	Function
1		Percussion drill Recommended 10mm drill	Wall drilling
2		6mm cross-head screwdriver	Removing, installing screws and wiring
3		4mm cross-head screwdriver	Removing and installing load terminal screws
4		Removal tool	Removal of PV, BAT line end terminals
5		Wire strippers	Stripping wire
6		Crimping pliers	Crimping PV and BAT cables

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7		Crimping pliers	Pressure welding grid, load end cable
8		6mm hex wrench	Fasten the grid terminal to the cable
9		Multimeter	Check whether the cable wiring is correct, the positive and negative battery terminals are correct and voltage, and grounding is reliable
10		Marking pen	Drilling mark
11		Tape	Measurement distance
12		Protective gloves	Wear when setting up the inverter
13		Goggles	Wear when drilling holes
14		Dust mask	Wear when drilling holes

5.3 Inverter Transportation

Remove the inverter from the outer packaging and carry it horizontally to the designated mounting position. Open the outer

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packaging box and the two operators need carry the inverter out of the outer packaging box and carry it to the designated mounting position.



- When carrying out the transportation, turnover, and installation, you must comply with the laws, regulations and related standards of the country or region where you are located.
- The inverter is heavy. Please keep it balanced during handling to prevent the inverter from falling and injuring the operator.
- The power cable and signal cable ports at the bottom of the inverter cannot bear any weight. Do not touch wiring terminals directly. Place the inverter horizontally.
- When the inverter is placed on the ground, put foam or paper under it to avoid damage to the shell.

5.4 Wall Mounted



- When drilling holes, ensure that the holes are drilled away from water pipes and cables in the wall to avoid dangers.
- When drilling holes, wear goggles and a dust mask to prevent dust from inhaling into the respiratory tract or falling into the eyes.

Step 1: Please choose a wall with sufficient load-bearing capacity, according to the wall bracket on the level will be wall bracket level to the installation wall, with a marker pen on the wall to mark the fixed wall bracket to be drilled position, and then use the impact drill to drill holes in the wall, drilling to keep the impact drill perpendicular to the wall, do not shake, so as to avoid damage to the wall, if the holes drilling error is large need to be re-positioned;

Step 2: Insert the M8*80 expansion screws vertically into the holes, pay attention to the depth of the expansion bolts should not be too shallow;

Step 3: Place the wall bracket against the hole, and fix the wall bracket on the wall with the nut;

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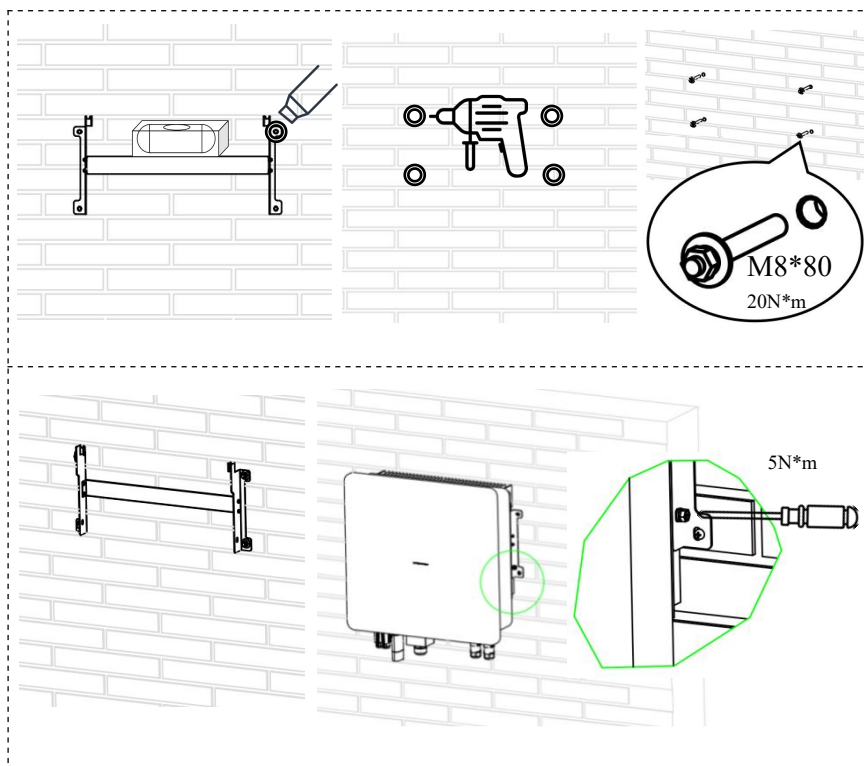


Figure 5.1 Illustrative diagram for installation of wall hangings

6. Electrical Connection

Before installation and maintenance, ensure that the AC/DC side is not powered on. The capacitors are still powered on for a period of time after the inverter is powered off. Therefore, wait at least five minutes to ensure that the capacitors are fully discharged. M Hybrid Inverter 5kW&6kW are used in battery energy storage photovoltaic systems. Equipment can be damaged if not used as intended.

6.1 Electrical System Connection Diagram

 Attention	
➤	Connect the N and PE cables to the AC GRID and AC LOAD ports of the inverters in different regions according to local regulations. For details, see local regulations.
➤	If the AC LOAD AC port is powered on after the inverter is started, power off the inverter to maintain the backup load. Otherwise, electric shocks may occur.
➤	Inverter AC GRID and AC LOAD AC ports have built-in relays. When the inverter is in off-grid state, the built-in AC GRID relay is in disconnected state; When the inverter is in the AC GRID state, the built-in AC GRID relay is in the closed state.

M Hybrid Inverter 5kW&6kW wiring system as following page: (structure schematic, non-electrical wiring standard).

Recommended circuit breaker specifications:

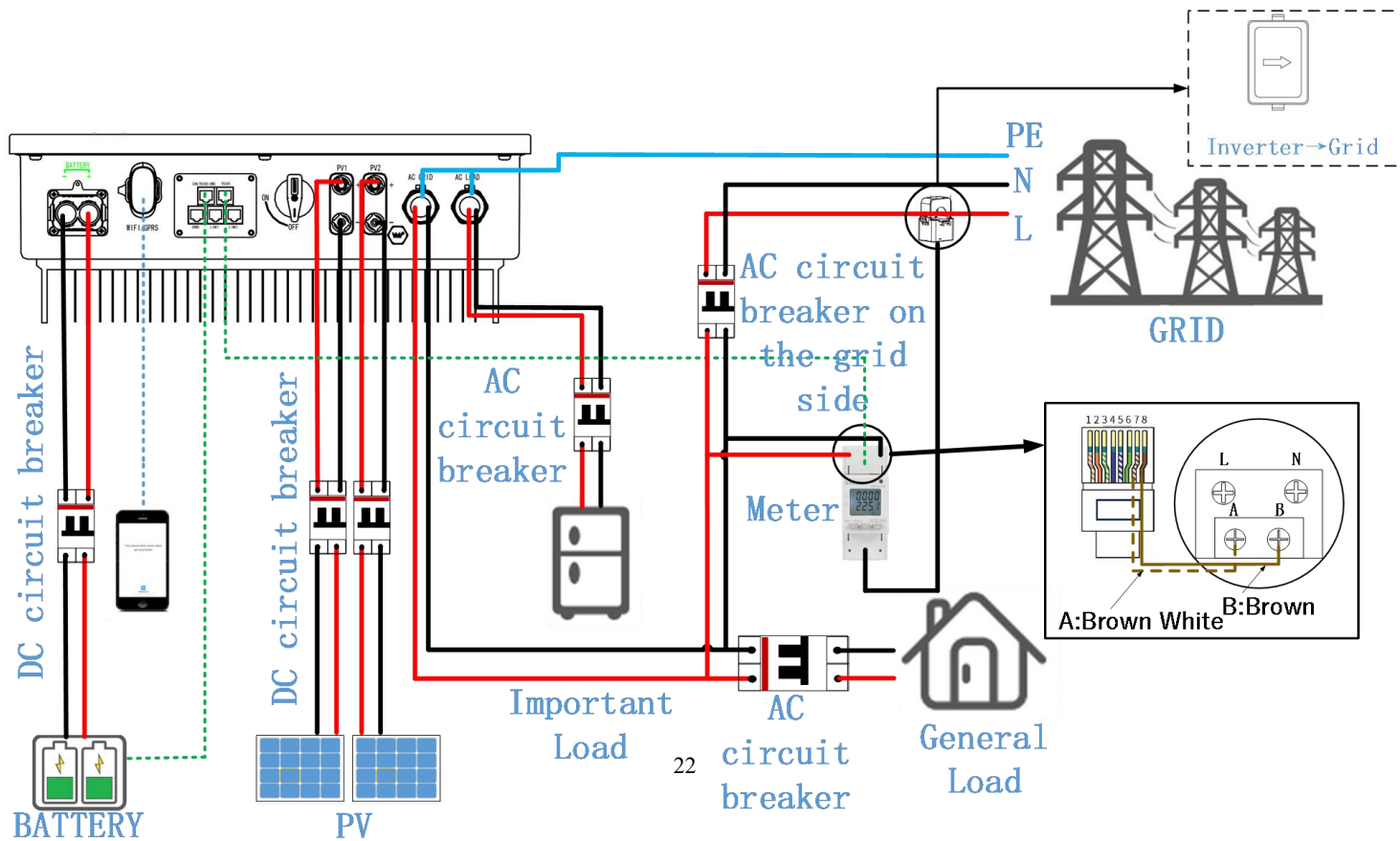
DC circuit breaker(Battery side): rated voltage $\geq 100\text{V}$, rated current $\geq 120\text{A}$;

AC circuit breaker(Grid side): rated voltage $\geq 500\text{V}$, rated current $\geq 40\text{A}$

RCD(Back up side): rated voltage $\geq 500\text{V}$, rated current $\geq 40\text{A}$; leak current $\geq 30\text{mA}$, Earth-leakage Protection Class: Type A

Note: During final installation, circuit breakers for external connections to the inverter shall comply with IEC 60947-1 and IEC 60947-2 certification requirements.

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The maintenance bypass electrical connection diagram is shown below.

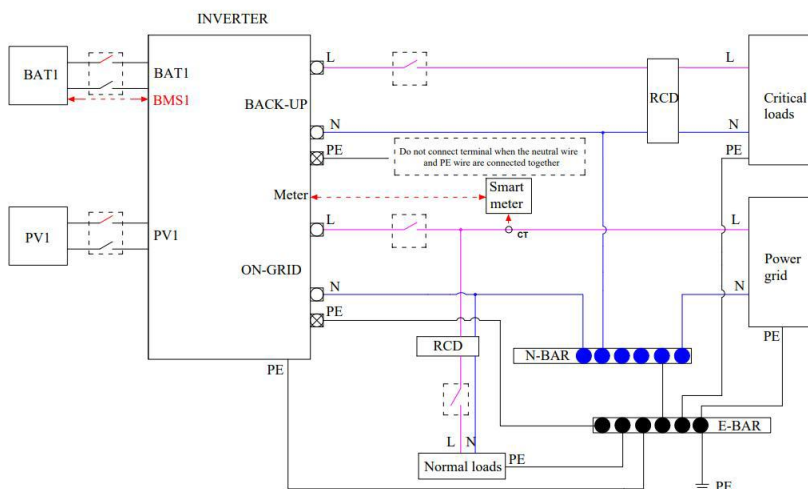


Figure 6.1 Electrical connection diagram

Note:

Earth-leakage Sensitivity: $\geq 30\text{mA}$

Earth-leakage Protection Class: Type A

Short circuit current(Battery side):1000A

Short circuit current(Grid side):99A

Short circuit current(Back up side):50A

Backfeed short-circuit currents(Battery side):292A

Backfeed short-circuit currents (Grid side, Back up side):59A

Do not connect PE terminal (Back up side) when the neutral wire and PE wire are connected together

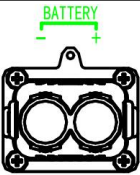
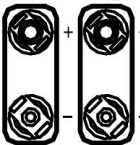
The AC Load cannot be connected to the grid and the inverter at the same time.

6.2 External Port Wiring Instructions

Select the cable size applicable to the parameters of the inverter according to its model.

Table 6-1 Cable Model and Specification Descriptions

M Hybrid Inverter 5kW&6kW

Port	Definition		Cable type	Cable specification
		+: Connect to battery positive pole	Outdoor Multi-Core Copper Cable	Wire cross sectional area: 16mm ² ~25mm ²
		-: Connect to battery negative pole		
		+: Connect to PV positive pole	Outdoor Multi-Core Copper Cable	Wire cross sectional area: 4mm ² ~6mm ²
		-: Connect to PV negative pole		
	AC load port	L3	Outdoor Multi-Core Copper Cable	Wire cross sectional area: 6mm ² ~10mm ²
		N		
		PE		
	AC grid port	L3	Outdoor Multi-Core Copper Cable	Wire cross sectional area: 6mm ² ~10mm ²
		N		
		PE		

6.3 Connecting the Ground Cable (PE)

Attention

- Since the inverter is a transformer-free type, it is required that the positive and negative electrodes of the photovoltaic array cannot be grounded, otherwise the inverter will fail. In the photovoltaic power generation system, all non-current-carrying metal components (such as brackets, distribution cabinet enclosures, inverter enclosures, etc.) should be connected to the ground.

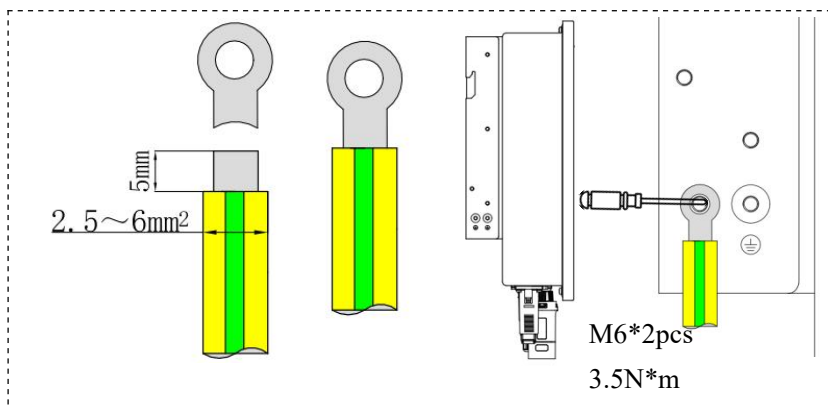


Figure 6.2 Schematic diagram of protection grounding

6.4 Connecting the PV Cable and the Battery Cable



Danger

PV series connection:

- Do not connect the same PV series to multiple inverters. Otherwise, the inverters may be damaged.
- Before connecting the PV series to the inverter, confirm the following information. Otherwise, the inverter may be permanently damaged or fire may occur, which may cause personal and property loss.
- Ensure that the maximum short circuit current and maximum input voltage of each PV are within the allowable range of the inverter.
- Ensure that the positive terminal of the PV string is connected to the PV+ of the inverter, and the negative terminal of the PV string is connected to the PV- of the inverter.

Battery cable connection:

- A battery short circuit may cause personal injury. However, a short circuit may release a large amount of energy, which may cause fire.
- Before connecting the battery cable, ensure that the inverter and battery are powered off, and the front and rear switches of the device are off.
- Do not connect or disconnect battery cables when the inverter is running. Improper operations may result in electric shock.
- Do not connect the same battery string to multiple inverters. Otherwise, the inverters may be damaged.

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- Do not connect loads between the inverter and the battery.
- When connecting battery cables, use insulation tools to prevent accidental electric shock or battery short circuit.
- Ensure that the open circuit battery voltage is within the allowable range of the inverter.



Warning

PV series connection:

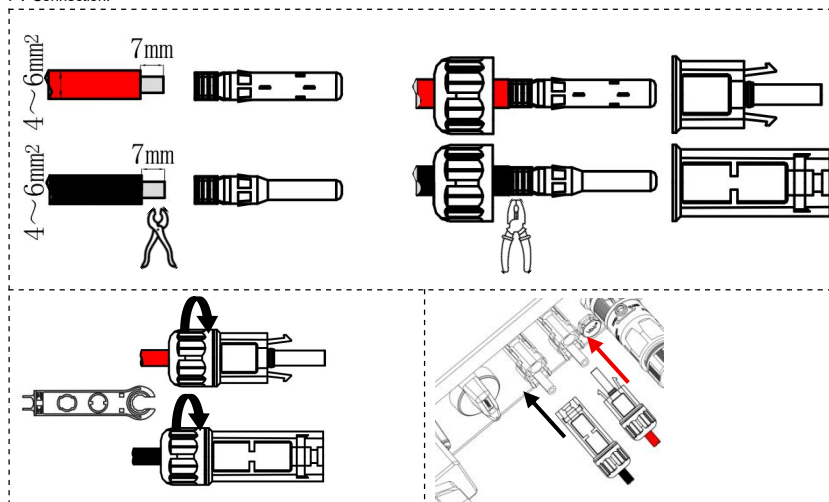
- The PV string output does not support grounding. Before connecting the PV string to the inverter, ensure that the minimum insulation resistance to the ground of the PV string meets the minimum insulation impedance requirement.

Battery cable connection:

- When connecting cables, the battery cable matches BAT+ and BAT- on the battery terminal.
- Ensure that the cable core is fully connected into the wiring hole of the terminal.
- Ensure that the cables are securely connected. Otherwise, the terminal may overheat and damage the device.

Note: Before crimping the PV and BAT cables, check and make sure that the PV knob switch is set to the 'OFF' position and that the battery is disconnected.

PV Connection:



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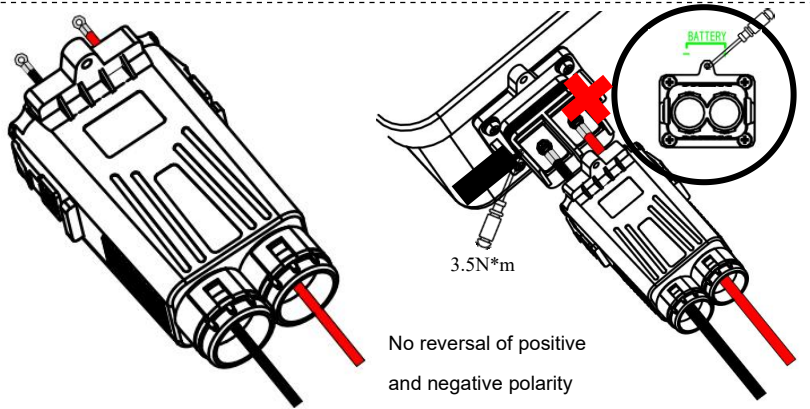
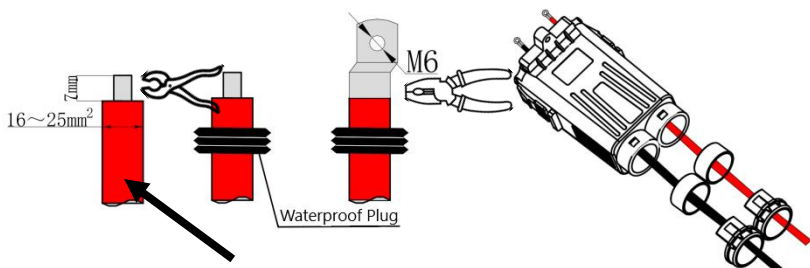
Remove the PV terminal:



Unplug the PV terminal after jamming

The PV modules used to connect to this inverter shall comply with the requirements of the IEC 61730 certified Class A standard, and the maximum permissible current through the external circuit breaker for each PV string and battery input over shall be greater than or equal to 30A.

Battery connection:



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Note: Before crimping the PV and BAT cables, please check and make sure that the PV knob switch is set to the 'OFF' position and that the battery is disconnected!

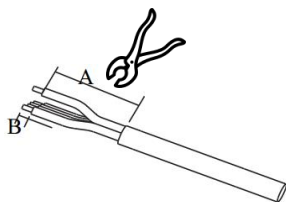
6.5 Connecting the AC Grid-Connected Cable



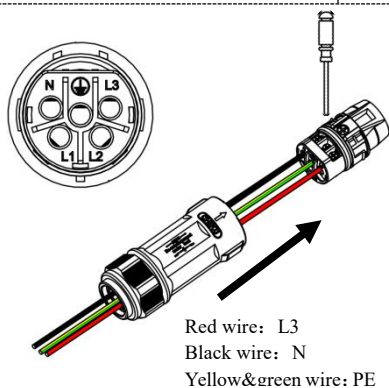
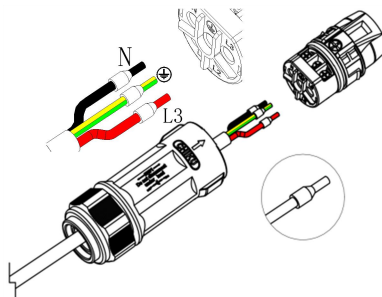
Warning

- Ensure that the AC cable matches the L3, N, and ground ports of the AC terminal properly. Incorrect connection may cause device damage.
- Ensure that the cable core is fully connected into the wiring hole of the terminal.
- Ensure that the insulation board at the AC terminal is tightly fastened.

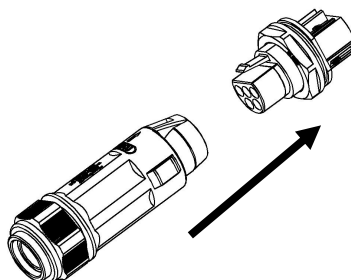
Ensure that the cables are securely connected. Otherwise, the terminal may overheat and damage the device.



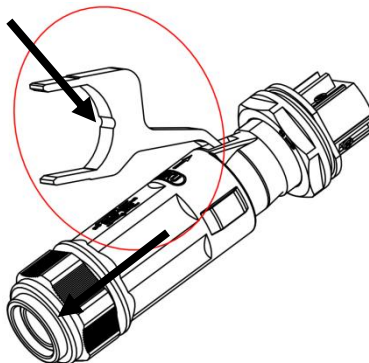
A: 15~25mm
B: 6~8mm



Connect AC Load Cable:



remove AC Load Cable:



The maximum current allowed through the circuit breaker for off-grid load to the external connection should be greater than or equal to 30A.

6.6 Installation of Communication Dongle

The communication collector is an external component that you need to select by yourself.

The collector is connected. The default WIFI/ Bluetooth module is used for remote monitoring and control of the inverter.

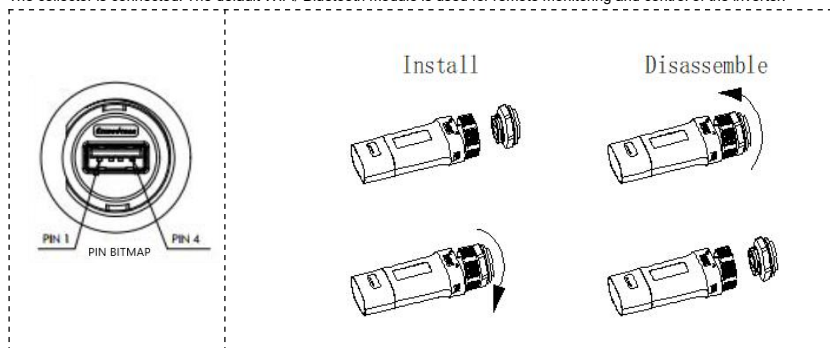


Figure 6.2 Communication interface and installation and disassembly diagram

Table 6-2 Indicators on the AGN8 WIFI Dongle

LED	state	Specific meanings
RUN&COM&NET	Alternating flashing (cycle 1500ms, each light flashes for 500ms in sequence)	Self test mode
	Flashing together (cycle 1 second, off 900ms,	Dongle is currently upgrading (including

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	on 100ms)	Bluetooth App upgrade)
	Illuminate together for 5 seconds	Dongle upgrade failed
RUN	Slow flashing (on for 1 second and off for 1 second)	Dongle is running normally
	Light off	Dongle running abnormally
	Twice flashing (on (off) 100ms, off (on) 100ms, twice)	Dongle sends Bluetooth data to the app
COM	Flash (on for 200ms, off for 200ms)	Dongle time not synchronized (scanning will not start)
	Light off	Abnormal southbound communication
	Flashing once (on (off) 100ms, off (on) 100ms, once)	Normal southbound communication
NET	Flash	Connecting to WiFi
	Light off	Connecting to MQTT
	Slow flashing	Connecting to platform
	Always on	Successfully connected to the platform
	Twice flashing	Dongle sends platform data

Table 6-3 Meaning of AGN9 4G Dongle indicator light

LED	state	Specific meanings
RUN&COM&NET	/	/
RUN	Always on	The process from power on to initialization
	Flash (with an interval of 100ms)	Gateway initialization completed, flashing for 5 seconds
	Twice flashing (on (off) 100ms, off (on) 100ms, twice)	Slow flashing (with an interval of 1 second)
COM	/	/
NET	Always on	Looking for the internet or on a call
	Flash (interval 200ms)	Data connection established or

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		network registered
	Slow flashing (with an interval of 800ms)	2G/3G network registered
	Light off	Shutdown or module sleep

6.7 Connecting the Communication Port

Multifunctional communication port, including meter communication, BMS communication, DRMS, parallel communication and external dry contact signal.

Step 1: Thread the cable through the waterproof housing of the signal interface and its respective waterproof plug, and crimp the RJ45 terminals in the order of the pins.

Step 2: Insert the cable into the communication port on the device side.

Step 3: Fasten the waterproof cover with screws.

Step 4: Tighten the waterproof nut.

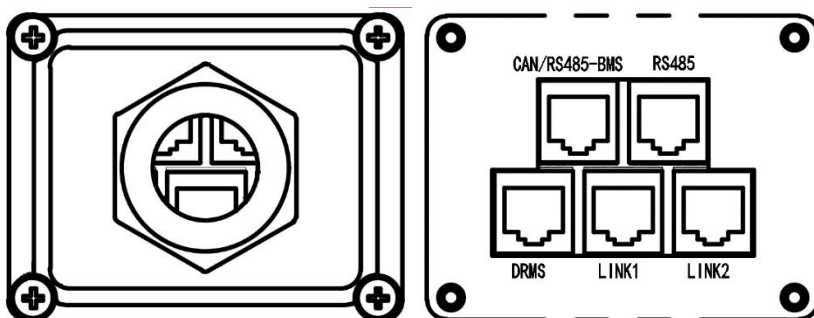


Figure 6.3 Interface diagram

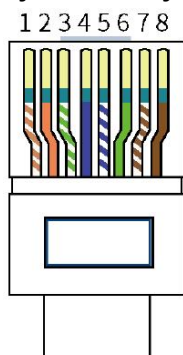


Figure 6.4 RJ45Sequence of RJ45 crystal terminals

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

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Orange& White	Orange	Green& White	Blue	Blue& White	Green	Brown& White	Brown
------------------	--------	-----------------	------	----------------	-------	-----------------	-------

6.7.1 meter and dry contact connection

Acrel ADL200N-CT

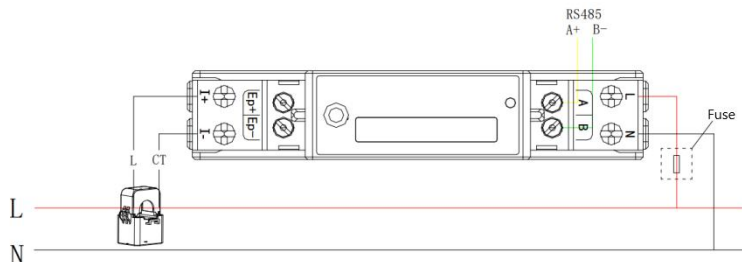


Figure 6.5 Smart Meter Terminal Wiring Description Diagram

Direction of the current wire is shown in Figure 6.6, with the arrow pointing towards the grid,

P1 (House) $\Rightarrow$ P2 (Grid)

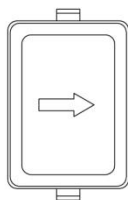


Figure 6.6 CT direction

Table 6-4 Description of dry contact ports

PIN	Definition	Fuction	Note
1	OP-	DO1	External dry contact port
2	OP+		
3	OP1-	DO2	
4	OP1+		
5	GND_SELV	Grounding	Meter communication
6	GND SELV		

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7	RS485_A_EEM	RS485A	
8	RS485_B_EEM	RS485B	

6.7.2 BMS Communication Connection

Table 6-5 Description of BMS ports

PIN	PIN	Definition	Fuction
1	GND_SELV	Grounding	Communication with Li-ion battery BMS, CAN and RS485 communication for Li-ion battery can be adapted.
2	GND_SELV	Grounding	
3	/	NC	
4	CAN_A_H	CANH data	
5	CAN_A_L	CANL data	
6	/	NC	
7	RS485_A_BMS	RS485A	
8	RS485_B_BMS	RS485B	

Note: Communication with lithium batteries requires attention to the battery's communication port sequence and pin definition.

6.7.3 DRMS/DI connection

Table 6-6 Description of DRM ports

PIN	Definition	Function	Color	Note
1	DRM1/5	① The DRMS interface is applicable to the Australian AS-NZS-4777.2 (some European requirements) safety standard ② diesel generator function DI input	Orange&White	DRMs/diesel generator sampling function multiplexed port
2	DRM2/6		Orange	
3	DRM3/7		Green&White	
4	DRM4/8		Blue	
5	REF GEN		Blue&White	
6	COM LOAD		Green	
7	/	NC	Brown&	NC

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			White	
8	/	NC	Brown	

6.7.4 Paralleling

If multiple inverters are used, connect the terminal of the network cable to Pa1 of the first inverter, connect the other end to Pa2 of the second inverter, and so on. Table 6-7 describes the signal of the network cable, Figure 6.7 shows the sequence of the network cable connection.

Table 6-7 Description of parallel ports

PIN	LINK1	LINK2	Note
1	CON2_AO	CON1_AO	Parallel signal
2	CON2_BO	CON1_BO	
3	CON2_AI	CON1_AI	
4	CON2_BI	CON1_BI	
5-6	/	/	
7	CON_SyncH	CON_SyncH	
8	CON_SyncL	CON_SyncL	

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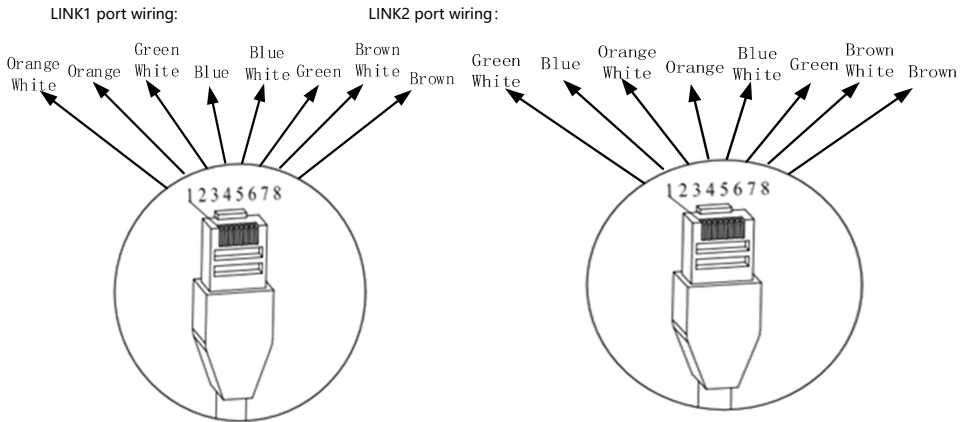


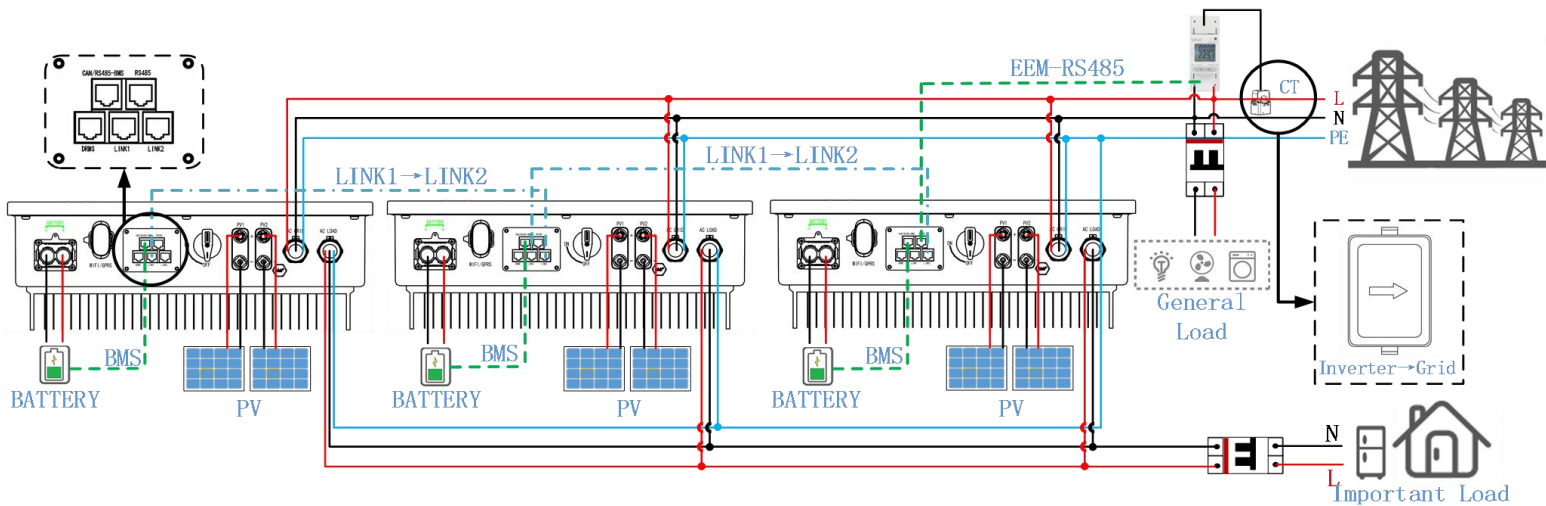
Figure 6.7 Parallel communication wiring diagram

Application note:

- Supports a maximum of 6 off-grid inverters in parallel;
- Ensure that the inverters are connected to parallel lines;
- Ensure that the load power is less than the maximum parallel power.

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Parallel standard wiring as shown below (structure schematic, non-electrical wiring standard, need to connect the circuit breaker correctly according to the electrical wiring diagram)



7. Inverter Operation

7.1 Pre-power-on Inspection

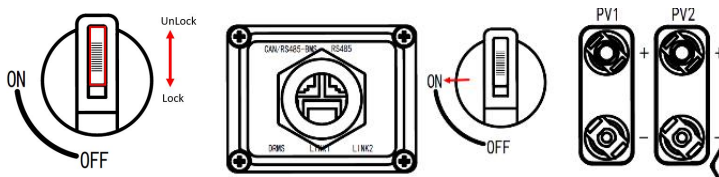
Serial	Check the entry
1	The inverter is firmly fixed to the mounting bracket on the wall.
2	Cables are bundled according to cable routing requirements, properly distributed, and without damage.
3	PV+/PV-, BAT+/BAT- cables are firmly connected, the polarity is correct, and the voltage is within the accessible range.
4	The DC switch is properly connected between the battery and the inverter, and the DC switch is off.
5	The AC circuit breaker is correctly connected between the inverter port and the power grid, and the circuit breaker is disconnected.
6	The AC circuit breaker is correctly connected between the inverter load port and the power grid, and the circuit breaker is disconnected.
7	For lithium batteries, ensure that the communication cables are properly connected.

7.2 Initial Power-on & System shutdown

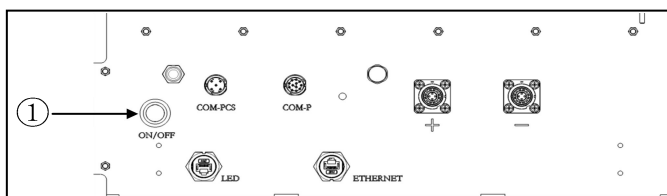
7.2.1 Follow these steps to turn on the inverter

- 1) Ensure that the inverter is not working;
- 2) Switch ON the AC circuit breaker between the inverter On Grid port and the Grid;
- 3) Push the top slider to the Unlock position, then turn on the PV DC switch on the inverter (when connected to PV);

Rotate the switch clockwise to the ON position to turn on the PV input (as shown in the figure).



- 4) Turn on the battery and Switch ON the DC switch between the battery and the inverter

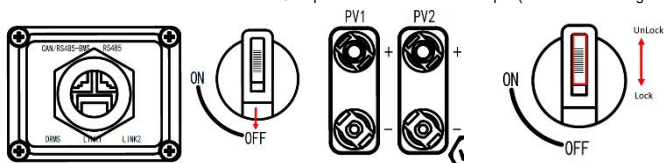


- 5) The inverter starts to run after the self-test is successful;
- 6) Switch ON the AC circuit breaker between the inverter Back up port and the load.

7.2.2 Follow these steps to turn off the inverter

- 1) Make sure all inverter loads are turned off;
- 2) Switch OFF the AC circuit breaker between the inverter Back up port and the load.
- 3) Switch OFF the AC circuit breaker between the inverter On Grid port and the Grid;
- 4) Turn off the PV DC switch on the inverter (when connected to PV); Then push the top slider to the Lock position

Rotate the switch counter-clockwise to the OFF position to turn off the PV input (as shown in the figure)



- 5) Turn off the battery and Switch OFF the DC switch between the battery and the inverter.

7.3 Working Mode

7.3.1 Self-use Mode (default mode)

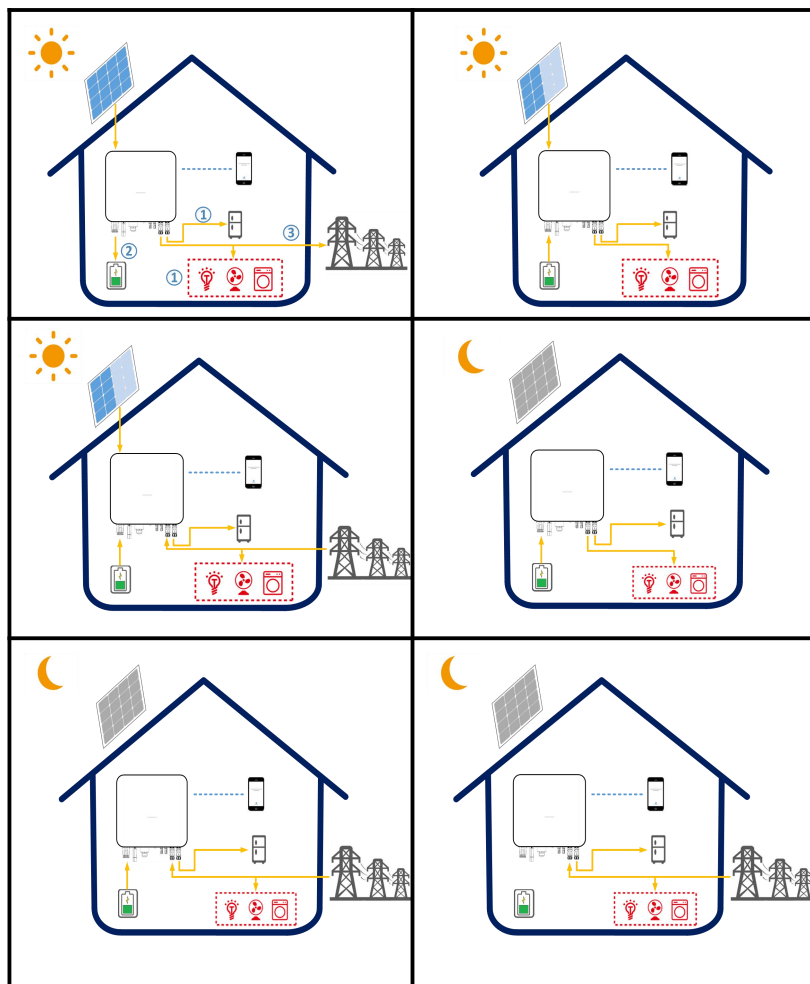
Function:

Give priority to the use of photovoltaic and battery energy, as far as possible not to use the energy of the grid.

Specific working mode:

- When the PV is sufficient, the PV priority for supplies power to the load, and excess power charges the battery.
- When the PV is insufficient, the PV and battery supply power to the load.
- When the PV and battery are insufficient, the PV, battery, and power grid work together to supply power to the load.
- When the PV is not working and the battery is sufficient, the battery supplies power to the load.
- When the PV is not working and the battery is insufficient, the battery and the grid work together to supply power to the load.
- When the PV and battery are not working, the power grid supplies power to the load, forming a bypass output.
- When the power grid is unable to supply power, the photovoltaic and battery jointly power the load.

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7.3.2 Timed Charge Mode

Function:

Set the charging period according to the user's own requirements. For example, when the electricity price is high during the day, the battery and photovoltaic power are used to power the load, and when the electricity price is low at night, the battery is charged with the electricity of the grid, so as to achieve the role of peak cutting and valley filling. Non-charge and non-discharge

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inverters operate in self-actuating mode.

Specific working mode:

Charging period:

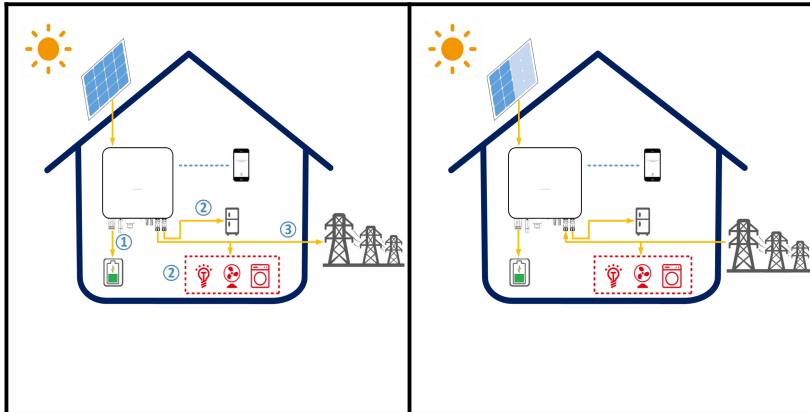
- When there is enough PV, the PV charges the battery, and the remaining power supplies the load.
- When PV is insufficient, the PV and the grid work together to charge the battery and power the load.
- When PV is not working, the grid charges the battery and powers the load.

Discharging period:

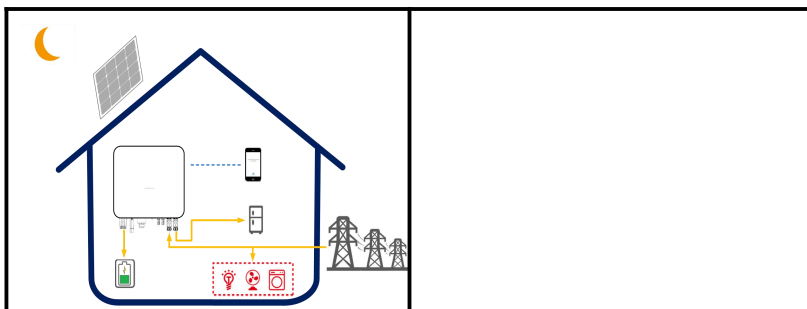
- When PV is enough, PV supplies power to load.
- When PV is insufficient, PV and battery supplies power to load together.
- When PV is not working, and the battery is sufficient, the battery supplies power to the load.
- When PV is not working, and the battery is insufficient, battery and grid supplies power to the load.
- When PV and battery is not working, the grid supplies power to the load.

Note: The charging power is defined as the power of the inverter to charge the battery, and the discharge power is defined as the power of the inverter output.

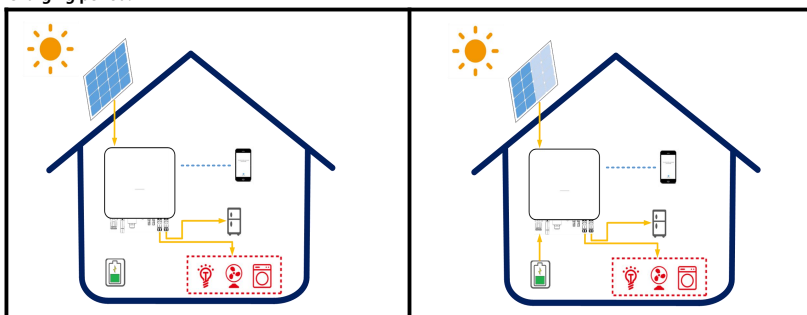
Charging period:

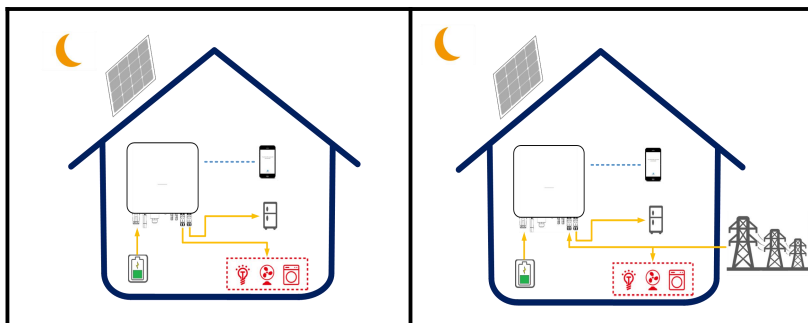


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Discharging period:





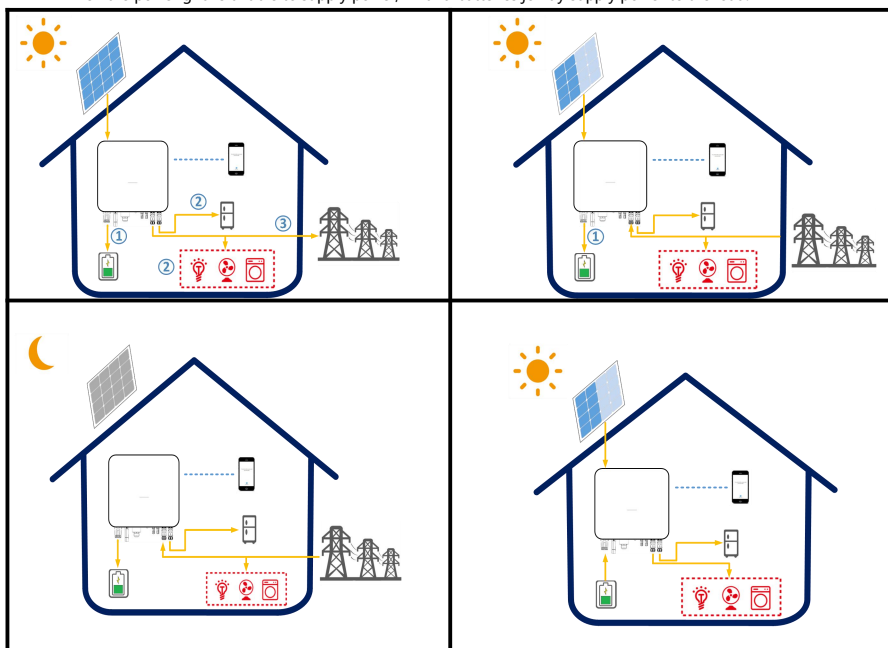
7.3.3 Backup mode/disaster recovery mode

Function:

Always keep the battery fully charged to cope with sudden power outages or other emergency situations, ensuring that users can use the battery's power reserve to supply power to the load in case of emergencies.

Specific working mode:

- When the PV is sufficient, the PV first charges the battery and then supplies power to the load, and the remaining power can be fed back to the grid.
- When PV is insufficient, PV and the power grid give priority to charging the battery, while the power grid supplies power to the load.
- When the PV is not working, the power grid charges the battery and supplies power to the load.
- When the power grid is unable to supply power, PV and batteries jointly supply power to the load.



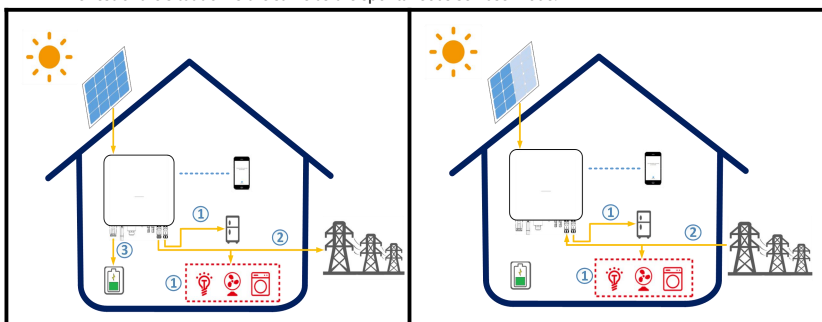
7.3.4 Priority mode for selling electricity

Function:

After meeting the demand for electricity, excess PV power generation is prioritized for sale to the grid.

Specific working mode:

- When the PV is sufficient, it prioritizes supplying power to the load before feeding the grid, and the remaining power can be used to charge the battery.
- When the PV is insufficient and the battery is insufficient, the PV and the grid supply power to the load together.
- The rest of the situation is the same as the spontaneous self use mode.



7.4 Operating mode

7.4.1 Operation mode description

Table 7-1 Explanation of Inverter Operation Modes

NO.	Operating mode	Description
1	Waiting	➤ Waiting phase after the machine is powered on. ➤ When the conditions are met, enter the self check state. ➤ If there is a malfunction, the inverter enters a fault state.
2	Self Test	➤ Before starting the inverter, perform continuous self checks, initialization, etc. ➤ If the conditions are met, the inverter enters the grid connected state and starts grid connected operation. ➤ If the power grid is not detected, it will enter an off grid state and the inverter

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		will operate off grid. ➤ If the self-test fails, it will enter a fault state.
3	AC GRID	➤ The inverter is running normally on the grid.If it is detected that the power grid does not exist or the conditions do not meet the grid connection requirements, it will enter the off grid working state. ➤ If a fault is detected, it will enter a fault state. ➤ If it is detected that the grid conditions do not meet the grid connection requirements and the off grid output function is not enabled, it will enter a waiting state. ➤ If the grid conditions meet the grid connection requirements and the grid connection function is enabled after switching off the grid, the system will enter the grid connection state.
4	Off-grid	➤ When the power grid is cut off or the grid conditions do not meet the grid connection requirements, the inverter switches to an off grid state and continues to supply power to the load. ➤ If it is detected that the grid conditions meet the grid connection requirements, it will enter the grid connection state. ➤ When the working mode is set to off grid mode before operation, the inverter works off grid. ➤ If a fault is detected, it will enter a fault state.
5	Fault	➤ If a fault is detected, the inverter enters a fault state and waits for the fault to be cleared to restore its previous operating state.

7.4.2 Indicator light description

The strip indicator light is located in the middle of the equipment panel and represents the inverter status through three colors: red, green, and blue.

Table 7-2 Description of Indicator Light Status

Display color	Indicator light	Corresponding	Remark
---------------	-----------------	---------------	--------

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	status	status description	
Green 	Light	AC GRID	Means the machine is currently operating in a grid connected state, capable of exchanging energy with the power grid, and the load can be powered on for operation.
	Flashing for 1 second/time	be ready	Means the machine is in the power on state and needs to wait until the power on is complete before the load can be powered on and run.
Blue 	Light	off-grid	The machine is currently operating in an off grid state and cannot exchange energy with the grid. The load can be powered on for operation.
Red 	Light	system failure	Means the machine is currently in a shutdown state, with a serious alarm and the load unable to power on for operation.

8. APP Operation Instructions

ESS LINK is a mobile application that can communicate with the inverter via WiFi. The following are the commonly used functions:

- Monitor the system data, alarm information, and software version of the inverter.
- Setting the parameters of the inverter
- Maintenance equipment.

The initial flowchart of the App operation is shown below:

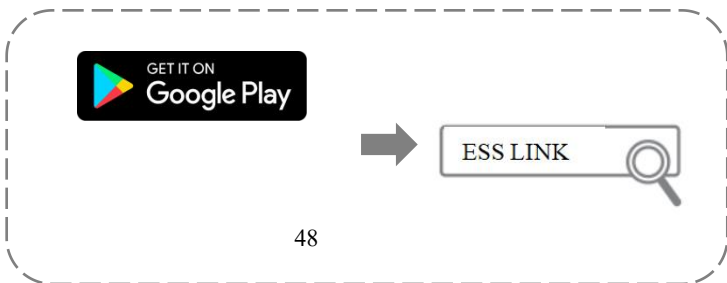


8.1 APP Download

Method 1: Users can scan the QR code below to download and install according to their phone model.



Method 2: Search ESS LINK in Google Play (Android) or App Store (IOS) to download and install.



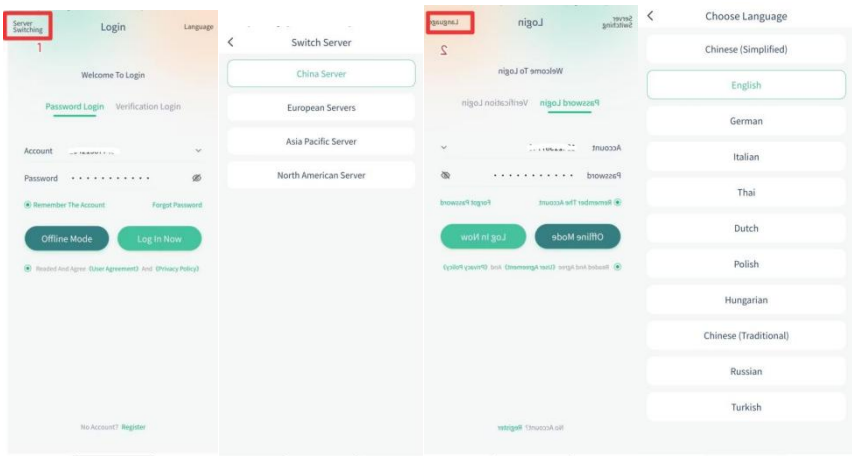


Note: After the installation of ESS LINK is completed, if there is a subsequent version update, a prompt for the new version update will appear when you enter the home page of the app (IOS users can only download the update through the APP Store).

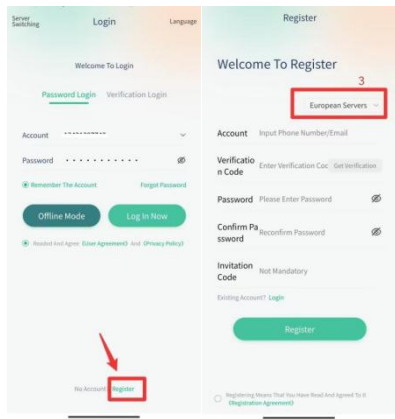
8.2 Account Registration and Device Binding

8.2.1 Account Registration

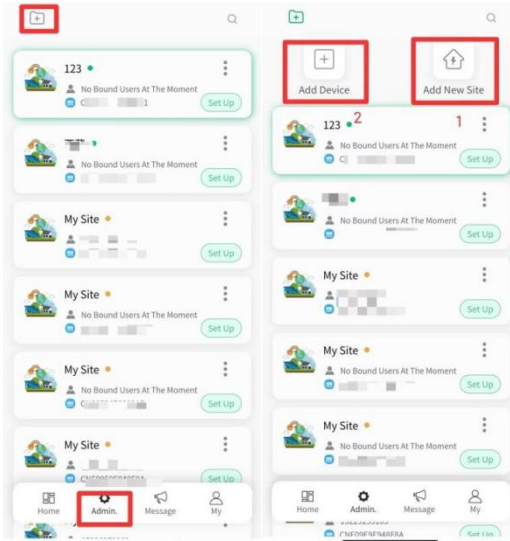
Step 1: Tap the App icon > Server Switch . The login page is displayed. In the upper left corner, you can select the server switch, and select the server near the installation location. In the upper right corner of the switch language, you can select the language type.



Step 2: Register > Select server type > Enter phone number/email > Obtain verification code > Set Password > Register, as shown below:



Step 3: Log in to the Admin page. You can add an existing Site or create a new Site as required. After the power station is created, the device is added. Select the name of the existing Site first, and then add the communication code. The device can be bound by scanning the two-dimensional code on the Wi-Fi rod (scanning the two-dimensional code on the body of the single-phase off-grid machine) or manually entering the S/N code on the Wi-Fi dongle



Add Site: If there is an existing Site, you can choose to add an existing Site, enter the power station code, or enter or scan the bound device communication code (Figure 1.7). If a power station is created for the first time, select Create a new power station and complete the required information. Fields marked with an asterisk (*) are mandatory.

If a trusted party is allowed to remotely operate and maintain its own device, including data access and parameter setting, select Allow Trusted Party remote operation and maintenance. Otherwise, disable this option.

If you need to batch set all devices in the power station, that is, select any device to deliver a parameter, and change this parameter for all devices in the power station at the same time, select Batch Set

< Add New Site

Add Existing Site
If You Have Already Created A Site And Obtained The Site No., Please Fill In To Complete The Binding

Create A New Site

< Add Existing Site

Site No.

Or

Comm. No.

Batch Import

Import Template Download

< Create New Site

Information Personalization

*Site Name

Site Pictures

*Country/Region

*Address

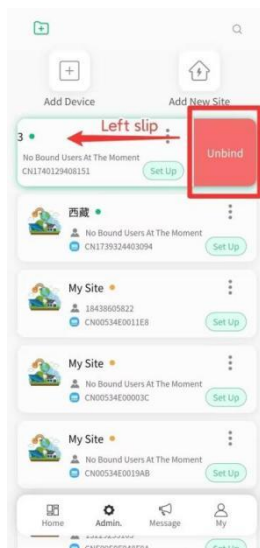
*Time Zone

*Site Total PV Power
 kW

Batch Setting Or Not ☐



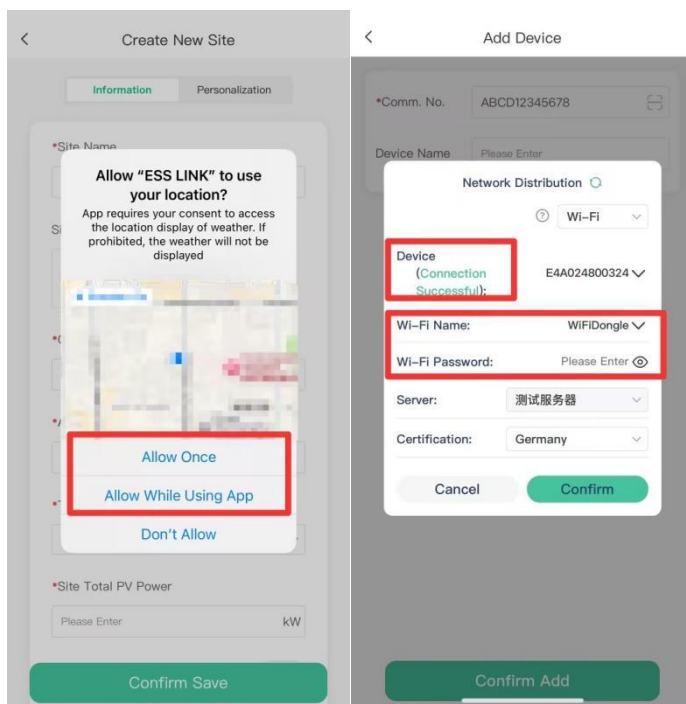
After the Site is added, the Site name is displayed on the Admin page, indicating that the Site is added successfully. To unbind the Site, locate the box where the name of the corresponding Site is located, drag the icon to the left, and click Unbind.



Add a new device: Enter the name of the Site that has been added, and then enter or scan the communication code of the device to complete the addition.

After the device is added, the distribution network interface will be directly displayed. After connecting the device, enter the wifi name and password. If there is no wifi on site, you can also connect your mobile phone to a mobile hotspot.

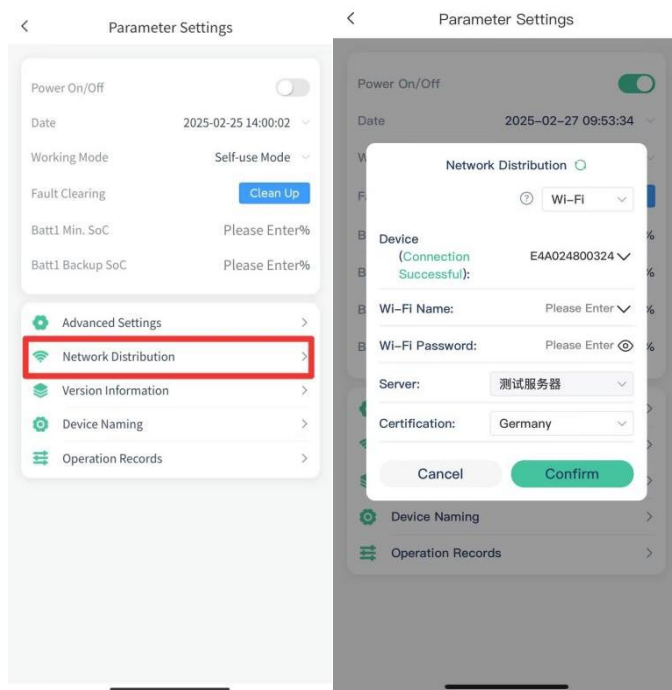
Note: Only 2.4Ghz wifi or mobile hotspots are supported



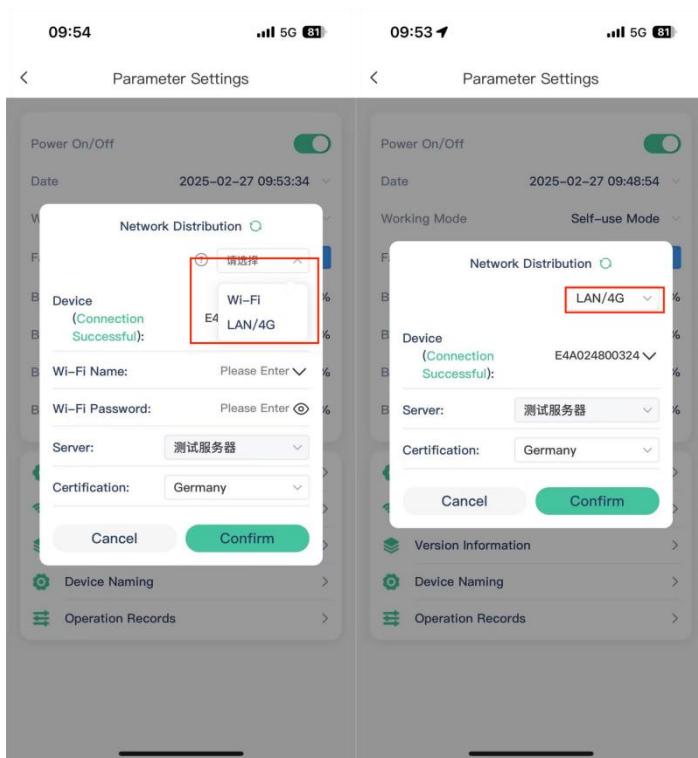
8.2.2 Online network distribution

If the network is not configured when the device is added for the first time, you can configure the network in the subsequent configuration. Click Admin > Set Up > Device Information > Network Distribution, enter the configuration page. If the Bluetooth connection between the mobile phone and the communication device is successful, the device (connection success) message will appear, and you can continue to perform network distribution operations. If the device (retry) prompt appears, it indicates that the Bluetooth connection between the phone and the communication device fails. You can click retry to retry the search and connection.

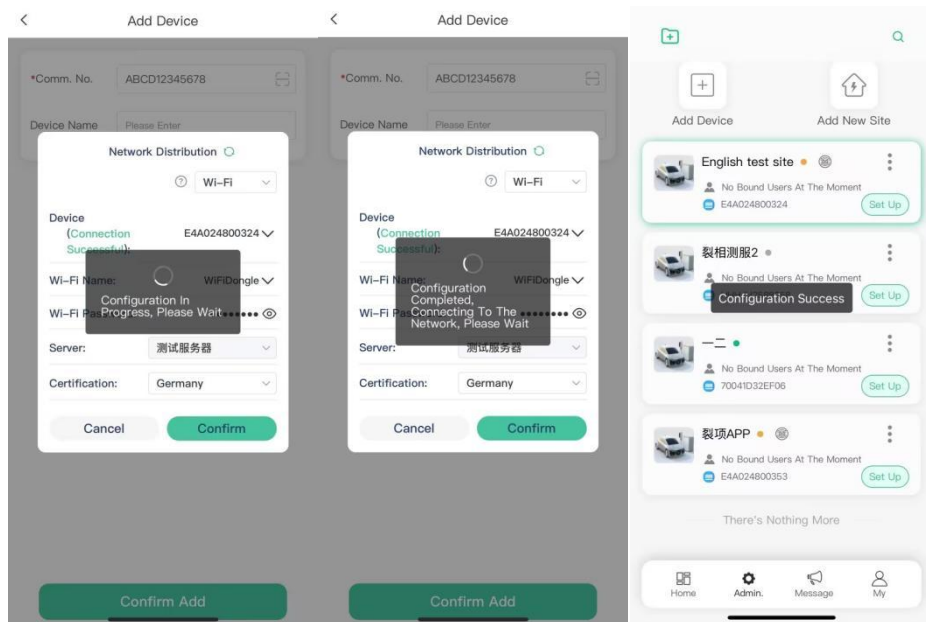
Note: One communication device supports only one mobile phone Bluetooth connection



For 4G/ Ethernet communication, select 4G or other in the upper right corner of the pop-up window, and configure only the server and country.



After the Bluetooth connection between the mobile device and the communication device (Wi-Fi stick) is successful, enter the correct Wi-Fi name and password on the APP, click Confirm, and a prompt window will pop up after the setting is successful.



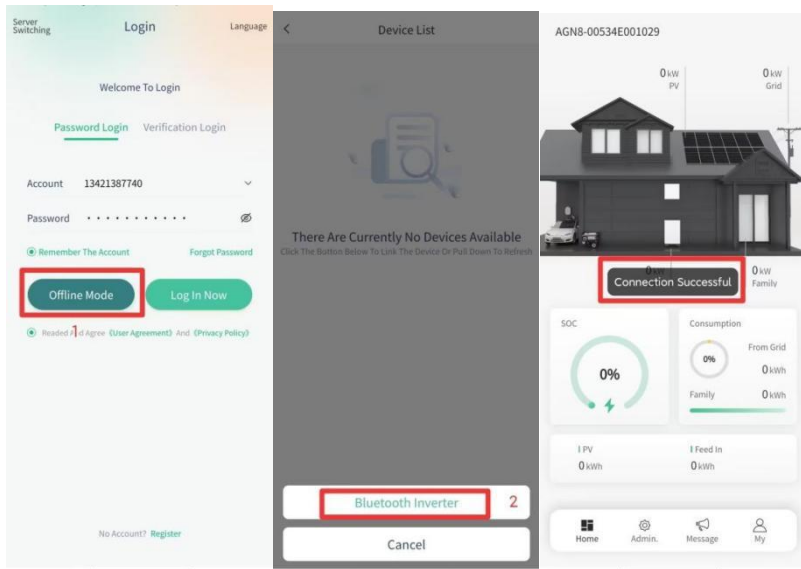
Note: Because there is a certain delay in Internet communication, if the operation is correct, it can be displayed normally within 3s. If the device offline message is displayed on the APP home page for two or three times and no offline message is displayed, the configuration is successful. If the system of the mobile phone is not suitable and the distribution network connection is not successful, please refer to 1.2.3 Using Bluetooth Inverter for network distribution.

8.2.3 Configuring a Bluetooth Inverter in Offline mode

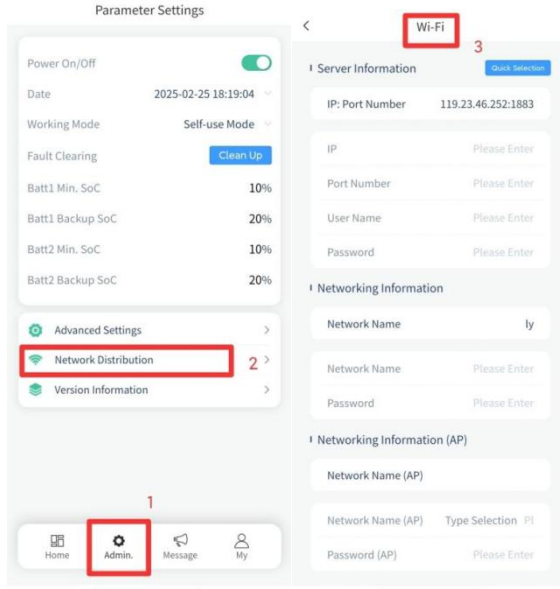
(If the network is successfully configured according to 1.2.2, skip this step.)

Step 1: Tap the App icon > Server Switch. The login page is displayed. In the upper left corner, you can select the server near the installation location. In the upper right corner, you can select the language type.

Step 2: Enter the App login interface, tap Offline Mode > Connect Device > Bluetooth Inverter (turn on Bluetooth) > tap the number on the corresponding WIFI stick to enter.



Step 3: On the home page, choose Admin > Network Distribution . The Wi-Fi configuration page is displayed.



Step 4: After entering the Wi-Fi configuration screen, click Quick Selection (select a server), enter the network name and password in the networking information (if it is 4G communication stick, you do not need to enter), slide down to the bottom and click to save the Settings.

Note: (Wi-Fi name: letters + numbers; Password length should not exceed 64 characters).

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Wi-Fi

Server Information

Quick Selection

IP: Port Number

119.23.46.252:1883

IP

Please Enter

Port Number

Please Enter

User Name

Please Enter

Password

Please Enter

Networking Information

Network Name

ly

Network Name

Please Enter

Password

Please Enter

Networking Information (AP)

Network Name (AP)

Network Name (AP)

Type Selection

PI

Password (AP)

Please Enter

Cancel

Confirm

2

China Server

European Servers

Asia Pacific Server

3

Server Information

Quick Selection

IP: Port Number

119.23.46.252:1883

IP

Please Enter

Port Number

Please Enter

User Name

Please Enter

Password

Please Enter

Networking Information

Network Name

ly

Network Name

Please Enter

Password

Please Enter

Networking Information (AP)

Network Name (AP)

Network Name (AP)

Type Selection

PI

Password (AP)

Please Enter

4

Save

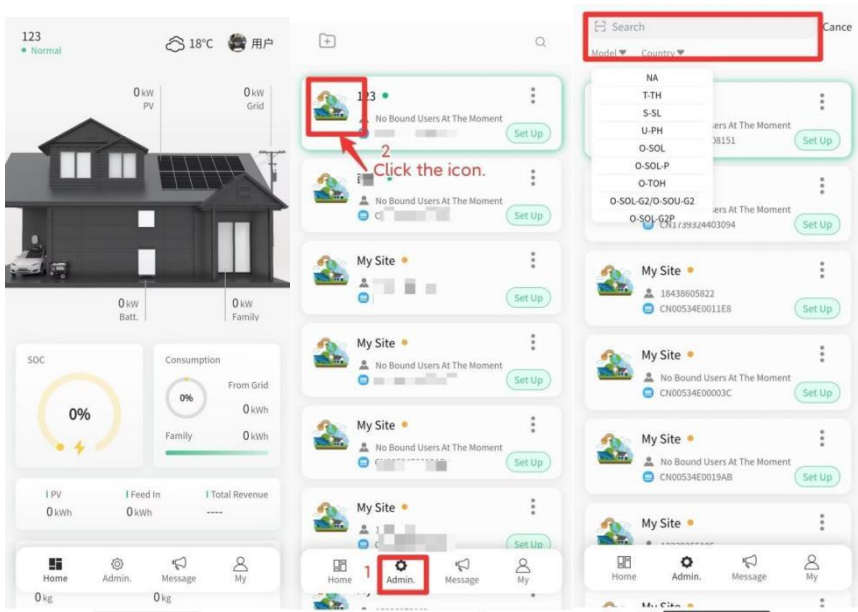
60

8.3 Home Page

8.3.1 Power station equipment

The home page of the online mode App can monitor the name of the power station, the status of the power station, the local weather, the total operating power of each unit of all equipment under the power station, the battery SOC, the load power consumption, the photovoltaic power generation, the feed amount, the total revenue, and the carbon emission reduction in the past week. The home page only displays the information of the default power station (located in the first line of all power stations).

If you have bound multiple power stations and want to display information about other power stations, go to the Admin page and click the icon of the power station to replace the default power station. If there are too many power stations, you can use the upper right magnifying glass for fuzzy search.

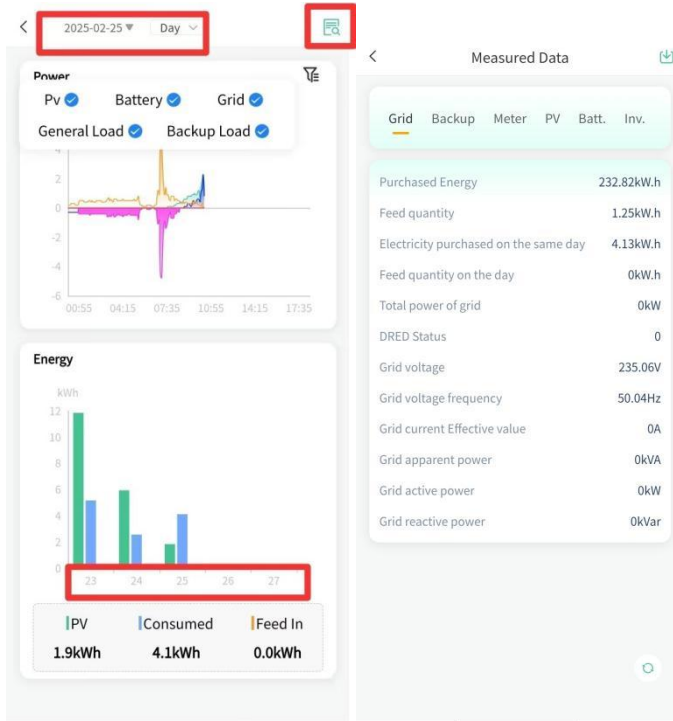


M Hybrid Inverter 5kW&6kW

Click the house icon on the home page, and you can see all the equipment information of the power station, the current status of the equipment (offline: gray, running: green, standby: orange), including the SN code, communication code, model, and rated power of the equipment.

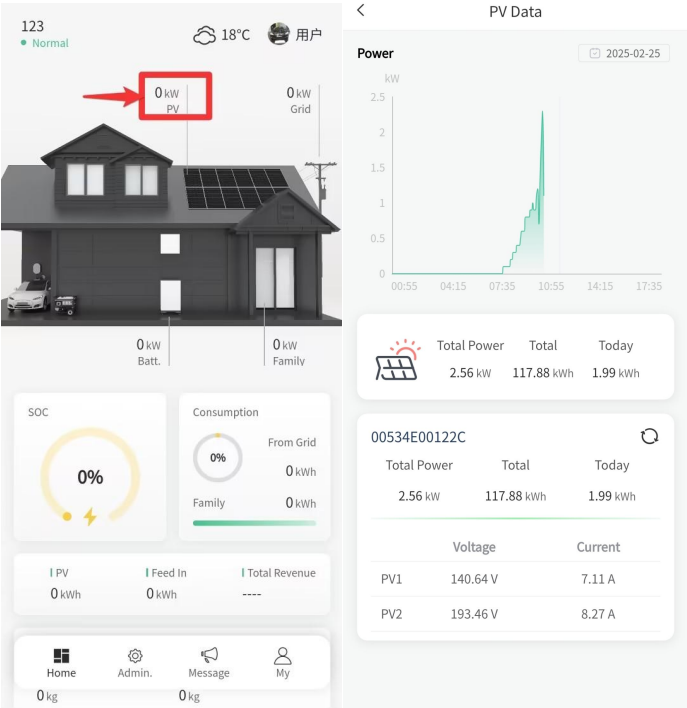
Click the corresponding device box under the power station to jump to the chart page of power statistics, SOC statistics, and electricity statistics of each unit of the equipment on that day. By selecting a date, you can view a statistical graph of important information for a given date.

Click the "Details" icon in the upper right corner of the power statistics chart to see the detailed information under each unit branch.



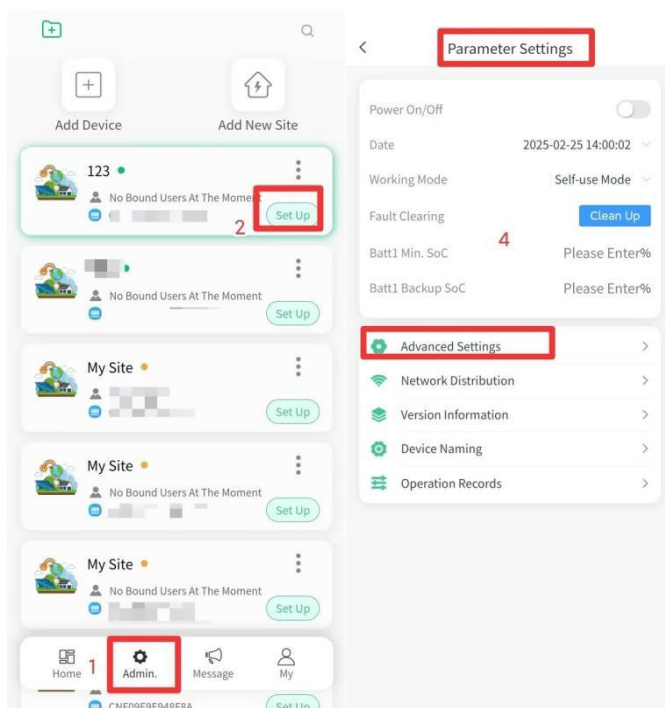
8.3.2 Home Page jump

The data displayed on the home page is the sum of information of all the equipment in the power station. Click the name of each unit to jump to the chart statistics page of each unit in the power station respectively, which includes the key information of all the equipment in the power station.



8.4 Set parameters in online mode

Through Admin > Set Up > Device Info > Parameter Settings, the device Settings page appears, including basic inverter Settings, advanced Settings, Bluetooth network distribution, version information, device naming and operation records, as shown in the following picture:

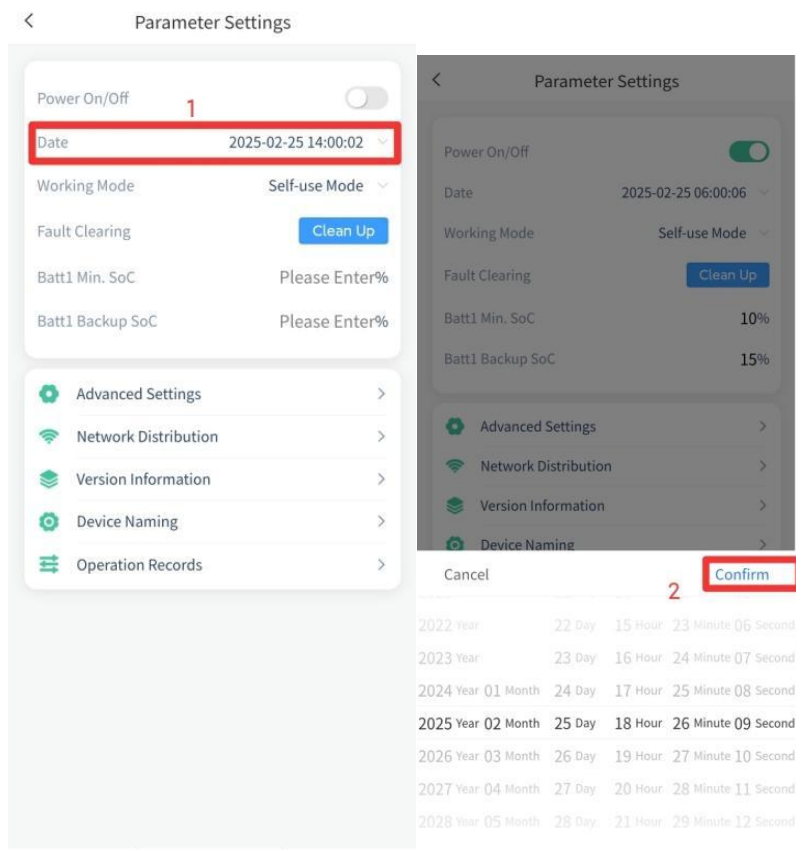


The page for setting parameters is displayed, including on/Off setting, date setting, working mode setting, time and power setting, fault clearing, and minimum battery SOC and minimum backup SOC setting in scheduled charge/discharge mode.

Advanced Settings are available only to O&M vendors. Contact the after-sales service for support.

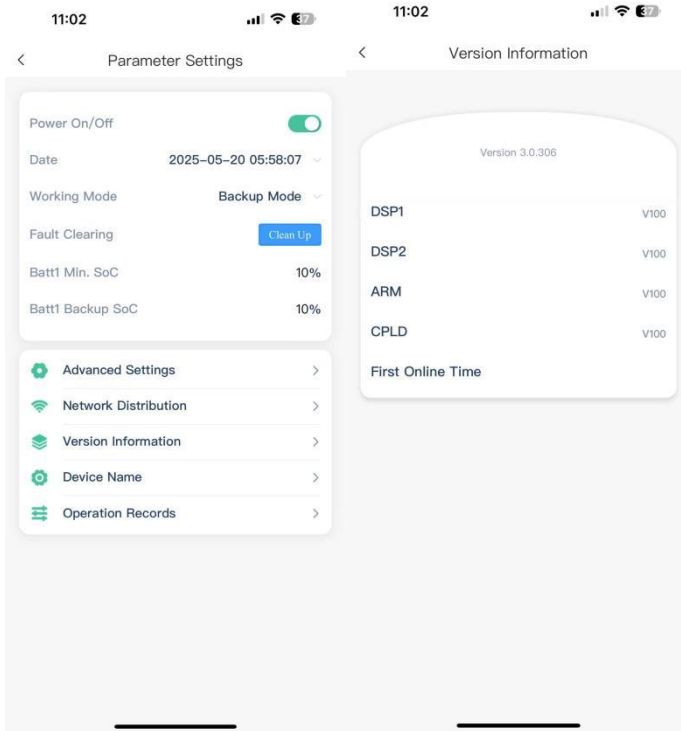
8.5 Setting the Date

- Click on the date and the Settings box will appear
- APP will automatically recognize the current date, click Confirm.



8.6 Inverter firmware version

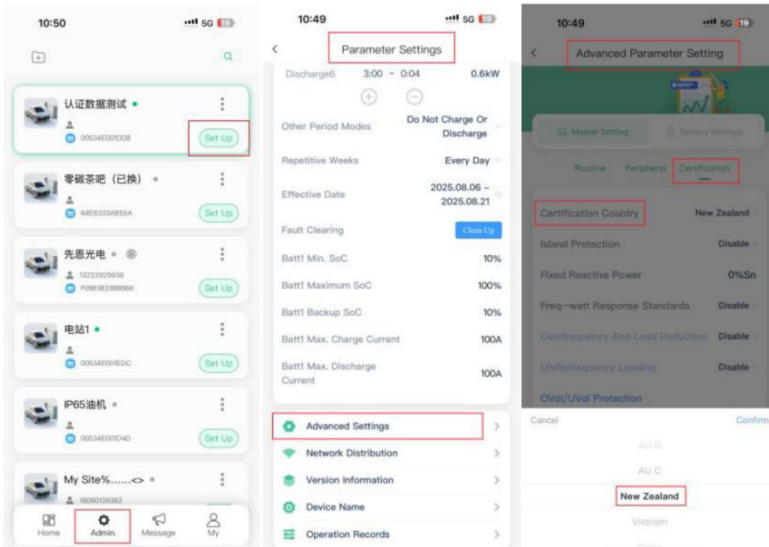
Click on the "version information" to view inverter firmware version



8.7 Grid protection settings

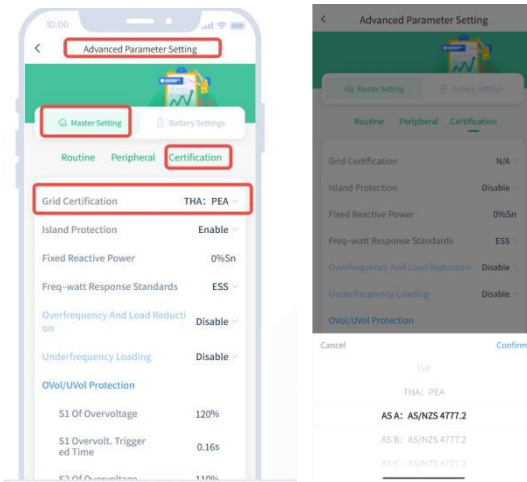
Through Admin→Set Up→Parameter Settings→Advanced Settings→Master Setting→Certification

Note: This parameter can only be viewed through advanced accounts



(1) Grid Certification

Grid Code setting interface as follows: Select AS A/B/C: AS/NZS 4777.2, or New Zealand, and confirm



(2) OVol /UVol Protection

M Hybrid Inverter 5kW&6kW

3:49

Advanced Parameter Setting

Master SettingBattery Settings

RoutinePeripheralCertification

Grid CertificationAS A: AS/NZS 4777.2

Island ProtectionDisable

Fixed Reactive Power0%Sn

Freq-watt Response StandardsDisable

Overfrequency And Load ReductionDisable

Underfrequency LoadingDisable

OVOL/UVOL Protection

S1 Of Overvoltage119.5%

S1 Overvolt. Triggered Time0.1s

S2 Of Overvoltage115%

S2 Overvolt. Triggered Time1s

S3 Of Overvoltage115%

S3 Overvolt. Triggered Time1s

10 Minute Overvolt. Protection Value112.2%

S1 Of Undervoltage30.5%

S1 Undervolt. Triggered Time1s

S2 Of Undervoltage78.3%

S2 Undervolt. Triggered Time10s

S3 Of Undervoltage78.3%

S3 Undervolt. Triggered Time10s

S1 Of Overfrequency104%

S1 Overfreq. Triggered Time0.1s

S2 Of Overfrequency104%

S2 Overfreq. Triggered Time0.1s

S1 Of Underfrequency94%

S1 Underfreq. Triggered Time1s

S2 Of Underfrequency94%

S2 Underfreq. Triggered Time1s

Upper Limit Of Connection Voltage110%

Lower Limit Of Connection Voltage89.1%

Upper Limit Of Connection Frequency100.3%

Lower Limit Of Connection Frequency95.4%

Connection Waiting Time60s

Cosφ(P) CurveDisable

PU CurveEnable

QU CurveDisable

3:49

Advanced Paramcter Setting

Master SettingBattery Settings

RoutinePeripheralCertification

Grid CertificationAS B: AS/NZS 4777.2

Island ProtectionDisable

Fixed Reactive Power0%Sn

Freq-watt Response StandardsDisable

Overfrequency And Load ReductionDisable

Underfrequency LoadingDisable

OVOL/UVOL Protection

S1 Of Overvoltage119.5%

S1 Overvolt. Triggered Time0.1s

S2 Of Overvoltage115%

S2 Overvolt. Triggered Time1s

S3 Of Overvoltage115%

S3 Overvolt. Triggered Time1s

10 Minute Overvolt. Protection Value112.2%

S1 Of Undervoltage30.5%

S1 Undervolt. Triggered Time1s

S2 Of Undervoltage78.3%

S2 Undervolt. Triggered Time10s

S3 Of Undervoltage78.3%

S3 Undervolt. Triggered Time10s

S1 Of Overfrequency104%

S1 Overfreq. Triggered Time0.1s

S2 Of Overfrequency104%

S2 Overfreq. Triggered Time0.1s

S1 Of Underfrequency94%

S1 Underfreq. Triggered Time1s

S2 Of Underfrequency94%

S2 Underfreq. Triggered Time1s

Upper Limit Of Connction Voltage110%

Lower Limit Of Connction Voltage89.1%

Upper Limit Of Connction Frequency100.3%

Lower Limit Of Connction Frequency95.4%

Connection Waiting Time60s

Cosφ(P) CurveDisable

PU CurveEnable

QU CurveDisable

3:52

Advanced Parameter Setting

Master SettingBattery Settings

RoutinePeripheralCertification

Grid CertificationAS C: AS/NZS 4777.2

Island ProtectionDisable

Fixed Reactive Power0%Sn

Freq-watt Response StandardsDisable

Overfrequency And Load ReductionDisable

Underfrequency LoadingDisable

OVOL/UVOL Protection

S1 Of Overvoltage119.5%

S1 Overvolt. Triggered Time0.1s

S2 Of Overvoltage115%

S2 Overvolt. Triggered Time1s

S3 Of Overvoltage115%

S3 Overvolt. Triggered Time1s

10 Minute Overvolt. Protection Value112.2%

S1 Of Undervoltage30.5%

S1 Undervolt. Triggered Time1s

S2 Of Undervoltage78.3%

S2 Undervolt. Triggered Time10s

S3 Of Undervoltage78.3%

S3 Undervolt. Triggered Time10s

S1 Of Overfrequency110%

S1 Overfreq. Triggered Time0.1s

S2 Of Overfrequency110%

S2 Overfreq. Triggered Time0.1s

S1 Of Underfrequency90%

S1 Underfreq. Triggered Time5s

S2 Of Underfrequency90%

S2 Underfreq. Triggered Time5s

Upper Limit Of Connction Voltage110%

Lower Limit Of Connction Voltage89.1%

Upper Limit Of Connction Frequency101%

Lower Limit Of Connction Frequency95.4%

Connection Waiting Time60s

Cosφ(P) CurveDisable

PU CurveEnable

QU CurveDisable

3:54

Advanced Parameter Setting

Master SettingBattery Settings

RoutinePeripheralCertification

Grid CertificationNZS: AS/NZS 4777.2

Island ProtectionDisable

Fixed Reactive Power0%Sn

Freq-watt Response StandardsDisable

Overfrequency And Load ReductionDisable

Underfrequency LoadingDisable

OVOL/UVOL Protection

S1 Of Overvoltage119.5%

S1 Overvolt. Triggered Time0.1s

S2 Of Overvoltage115%

S2 Overvolt. Triggered Time1s

S3 Of Overvoltage115%

S3 Overvolt. Triggered Time1s

10 Minute Overvolt. Protection Value108.3%

S1 Of Undervoltage30.5%

S1 Undervolt. Triggered Time1s

S2 Of Undervoltage78.3%

S2 Undervolt. Triggered Time10s

S3 Of Undervoltage78.3%

S3 Undervolt. Triggered Time10s

S1 Of Overfrequency110%

S1 Overfreq. Triggered Time0.1s

S2 Of Overfrequency110%

S2 Overfreq. Triggered Time0.1s

S1 Of Underfrequency90%

S1 Underfreq. Triggered Time1s

S2 Of Underfrequency90%

S2 Underfreq. Triggered Time1s

Upper Limit Of Connction Voltage110%

Lower Limit Of Connction Voltage89.1%

Upper Limit Of Connction Frequency100.3%

Lower Limit Of Connction Frequency95.4%

Connection Waiting Time60s

Cosφ(P) CurveDisable

PU CurveEnable

QU CurveDisable

Click To Load More

Click To Load More

Click To Load More

Click To Load More

(3) Power quality response

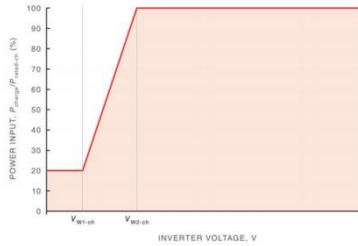
PU Curve

Volt-watt response standard

Region	Default value	V _{W1-ch}	V _{W2-ch}
Australia A	Voltage	207 V	215 V
	$P_{charge}/P_{rated-ch}$	20 %	100 %
Australia B	Voltage	195 V	215 V
	$P_{charge}/P_{rated-ch}$	0 %	100 %
Australia C	Voltage	207 V	215 V
	$P_{charge}/P_{rated-ch}$	20 %	100 %
New Zealand	Voltage	216 V	224 V
	$P_{charge}/P_{rated-ch}$	20 %	100 %
Allowed Range	Voltage	180 to 230 V	180 to 230 V
	$P_{charge}/P_{rated-ch}$	0 to 20 %	100 %

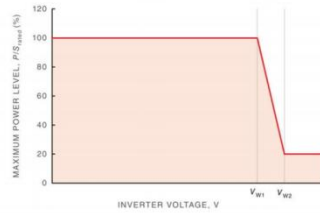
NOTE 1 P_{charge} refers to power input level through the grid-interactive port.

NOTE 2 $P_{rated-ch}$ refers to the rated active power input through the grid-interactive port used for charging the energy storage.

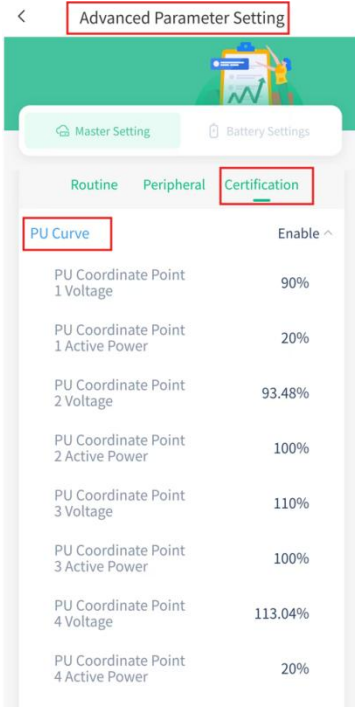


Region	Default value	V _{W1}	V _{W2}
Australia A	Voltage	253 V	260 V
	Inverter maximum active power output level (P) % of S_{rated}	100 %	20 %
Australia B	Voltage	250 V	260 V
	Inverter maximum active power output level (P) % of S_{rated}	100 %	20 %
Australia C	Voltage	253 V	260 V
	Inverter maximum active power output level (P) % of S_{rated}	100 %	20 %
New Zealand	Voltage	242 V	250 V
	Inverter maximum active power output level (P) % of S_{rated}	100 %	20 %
Allowed range	Voltage	235 to 255 V	240 to 265 V
	Inverter maximum active power output level (P) % of S_{rated}	100 %	0 % to 20 %

NOTE Australia C parameter set is intended for application in isolated or remote power systems.



View and setting:

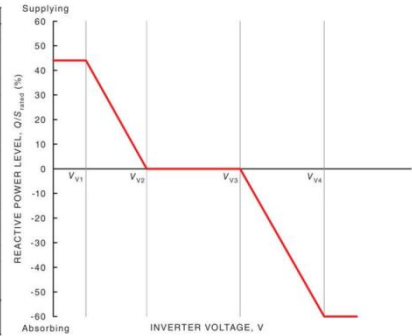


QU Curve

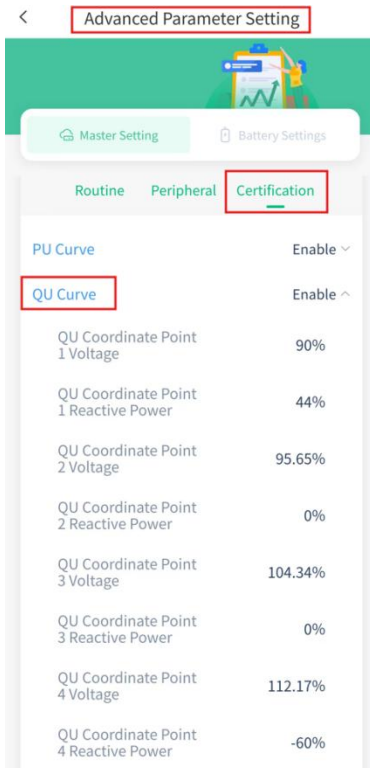
Volt-Var response standard

Region	Default value	V _{V1}	V _{V2}	V _{V3}	V _{V4}
Australia A	Voltage	207 V	220 V	240 V	258 V
	Inverter reactive power level (Q) % of S _{rated}	44 % supplying	0 %	0 %	60 % absorbing
Australia B	Voltage	205 V	220 V	235 V	255 V
	Inverter reactive power level (Q) % of S _{rated}	30 % supplying	0 %	0 %	40 % absorbing
Australia C	Voltage	215 V	230 V	240 V	255 V
	Inverter reactive power level (Q) % of S _{rated}	44 % supplying	0 %	0 %	60 % absorbing
New Zealand	Voltage	207 V	220 V	235 V	244 V
	Inverter reactive power level (Q) % of S _{rated}	60 % supplying	0 %	0 %	60 % absorbing
Allowed Range	Voltage	180 to 230 V	180 to 230 V	230 to 265 V	230 to 265 V
	Inverter reactive power level (Q) % of S _{rated}	30 to 60 % supplying	0 %	0 %	30 to 60 % absorbing

NOTE 1 Inverters may operate at a reactive power level with a range up to 100 % supplying or absorbing.
 NOTE 2 Australia C Parameter set is intended for application in isolated or remote power systems.



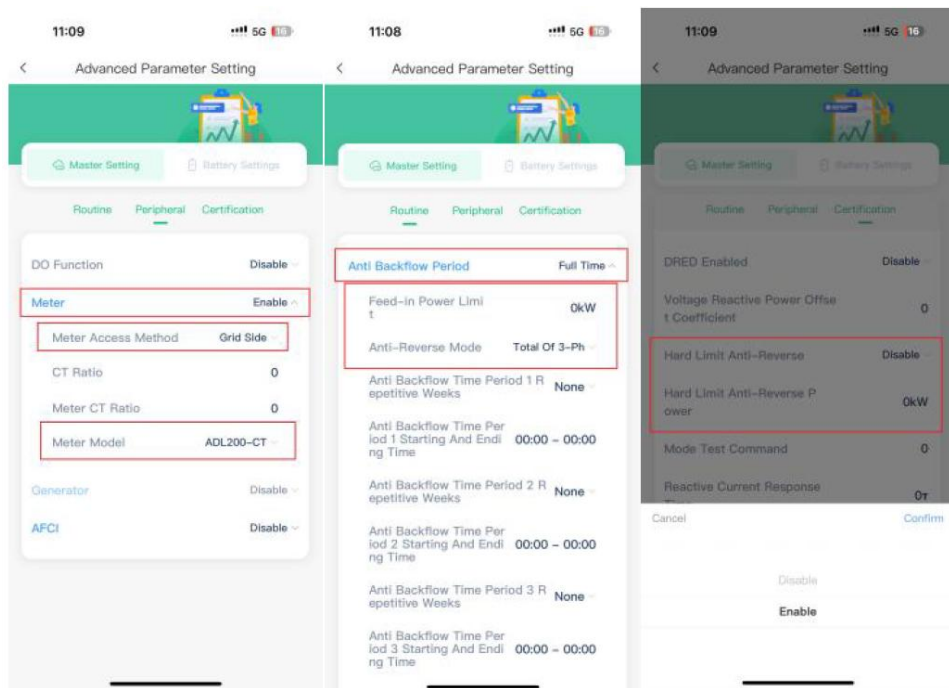
View and setting:



8.8 Generation Limit and Export Limit Control settings

Meter settings/Soft limits/hard limits

Admin→Set Up→Parameter Settings→Advanced Settings→Peripheral/Routine



Meter

Soft limits

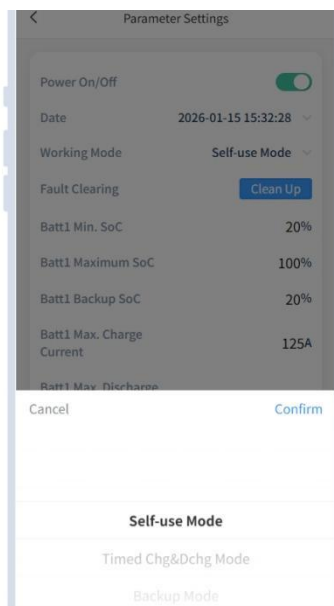
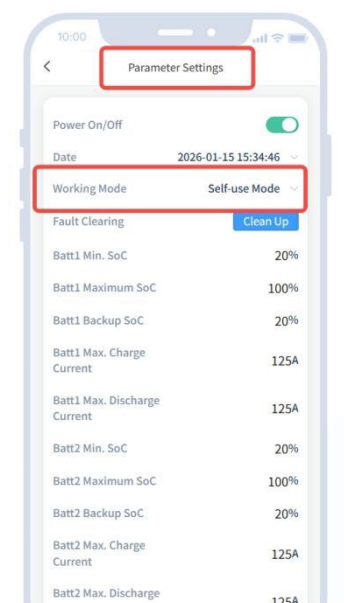
hard limits

Note: Feed-in power Limit range is -2~ 50kW; Hard Limit Anti-Reverse Power range is 0 ~ 50kW

8.9 Setting the Working Mode

When the inverter is powered on for the first time, the default working mode of the inverter is self-use. At present, the inverter has the following five working modes. Users can select the required working mode according to the actual situation. For details about the operation logic, see the user manual of each model.

Through Admin→Set Up→Parameter Settings→Working Mode→Self-use mode, or Backup mode, or Timed chg&Dchag mode



(1) Spontaneous self-use mode

1. the working mode is set to: spontaneous self-use mode;
2. Click Advanced Settings to enter the Advanced parameter Settings page and click Battery Settings.
3. according to the user's own needs, select the battery access mode, confirm whether the battery is enabled, set the battery type, battery access mode, battery protocol, battery voltage, battery maximum charge and discharge current;
4. Issue the boot command (the switch button is green).

(2) timed charge and discharge mode

1. the working mode is set to: timed charge and discharge mode;
2. according to the requirements to set the periodic charging and discharging time period (charging and discharging time periods are not allowed to cross and overlap, otherwise the machine will not execute the command), set the charging and discharging power, press the +/- sign to add/delete the charging and discharging time period; Other time modes can be selected for self-use or do not charge.
3. you can set a repeat date, effective date and deadline within a week.
4. the user can set the off-grid switching mode.
5. Issue startup instructions.

(3) Backup power mode

1. Set the working mode to backup power mode.
2. Issue startup instructions.

(4) photovoltaic priority charging

1. the working mode is set to photovoltaic priority charging;
2. Issue startup instructions.

(5) Selling point priority mode

1. the working mode is set to sell electricity priority mode;
2. Issue startup instructions.

8.10 Viewing Data

In online mode, the refresh time of energy flow diagram is 3 seconds, and the refresh time of other data is 20 seconds, with different delays depending on the network condition.

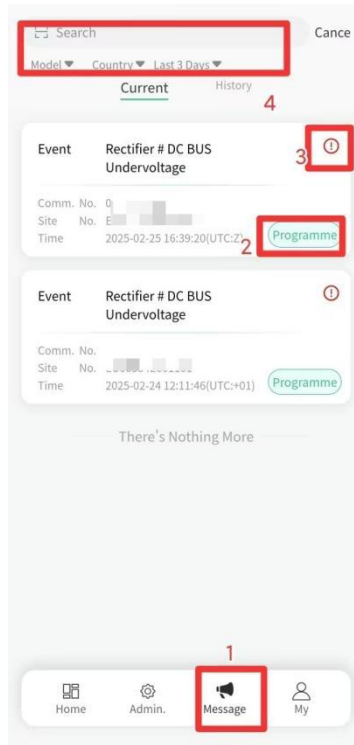
8.10.1 Alarm Information

You can choose Notification > Current/History to view current alarms, historical alarms, and all alarms.

Each alarm indicates the communication code, power station, occurrence time, and severity of the alarm (red: fault, yellow: alarm, and green: warning). For the fault type, the corresponding solution is available.

You can double-click the alarm severity icon in the upper right corner of the alarm to switch to the home page of the power station where the alarm is generated, facilitating troubleshooting.

1. Click message. All alarms are displayed
2. Click Programme, you can see the solution of the fault
3. Click the icon to return to the home page. The home page displays information about the power station where the alarm device resides
4. Click Search to search the alarm device according to the model, country, communication code, device SN and other keywords

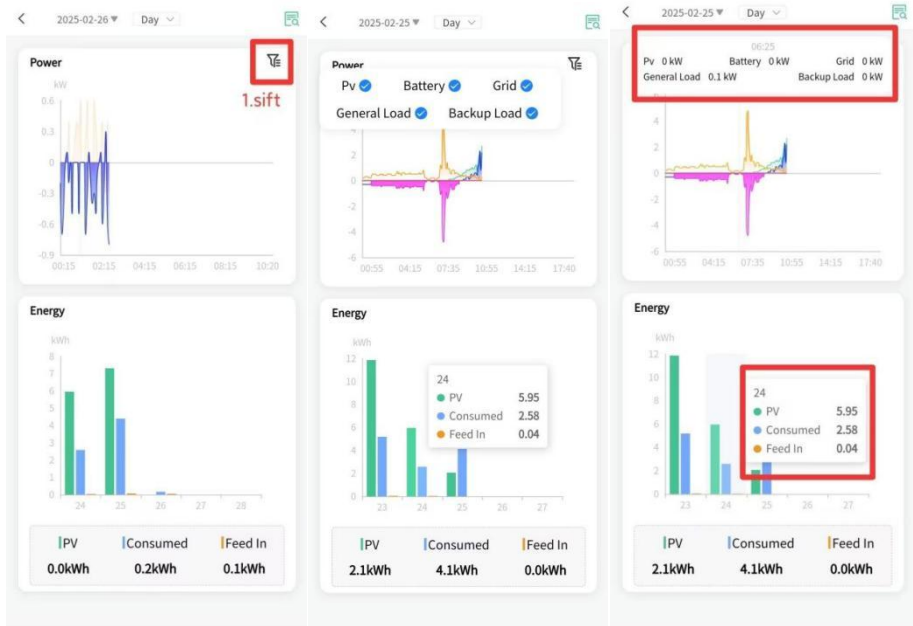


8.10.2 Power & Electricity Statistics

Through the home page (click the icon of the house) > Device List > Device Information, the interface can monitor the power and SOC of each unit of the current power station throughout the day, as well as the daily self-generated electricity, purchased electricity, feed amount, battery charging amount, battery discharge amount and other related information.

Use a graph to show the power values of PV, battery, grid, critical load, general load, and battery SOC for the day, month, year, or all day on a specified date. Click the filter button to filter whether certain power curves are displayed. Press and hold the power graph to display the specific value at the current time.

Use a bar chart to show the daily self-generated electricity, purchased electricity, feed amount, battery charging amount, and battery discharge amount. Long press the power bar chart to display the specific value of each power on the current date.



8.10.3 System Measurement Data

From the home page (click the house icon), click the upper right corner to enter the measurement data interface, which can monitor the power grid, emergency load, electricity meter, photovoltaic, battery, inverter, generator, debugging and other related information. Click the "Download" icon in the upper right corner to download the entire report to the local, click the "Refresh" button in the lower right corner to get the latest data.

Measured Data

Grid

Backup

Meter

PV

Batt.

Inv.

Purchased Energy

232.82kWh

Feed quantity

1.25kWh

Electricity purchased on the same day

4.13kWh

Feed quantity on the day

0kWh

Total power of grid

0kW

DRED Status

0

Grid voltage

236.14V

Grid voltage frequency

50.06Hz

Grid current Effective value

0A

Grid apparent power

0kVA

Grid active power

0kW

Grid reactive power

0kVar

Measured Data

Grid

Backup

Meter

PV

Batt.

Inv.

Total load power

0.69kW

Total backup load power

0kW

Total normal load power

0.13kW

Load voltage

236.49V

Load Voltage Frequency

50.06Hz

Load current effective value

0.56A

Load apparent power

0.13kVA

Load active power

0kW

Load reactive power

-0.13kVar

Measured Data

Grid

Backup

Meter

PV

Batt.

Inv.

Meter Operating Status

Online

Meter Voltage

238.2V

Meter current

3.17A

Meter apparent power

0.51kVA

Meter Active power

0.15kW

Reactive power of electric meter

0.49kVar

Power factor of electric meter

0.29

Three-phase active total power

335.33kWh

Positive active energy

334.48kWh

Reverse active energy

0.85kWh

Forward Reactive Energy

0.89kVar

Reverse Reactive Energy

154.07kVar

Meter Model

ADL200

Meter Firmware Version

0

Measured Data

Backup

Meter

PV

Batt.

Inv.

Debu

Photovoltaic 1 voltage

140.09V

Photovoltaic 1 current

6.77A

PV 1 Power

0.95kW

Photovoltaic 2 voltage

180.82V

Photovoltaic 2 current

11.03A

Photovoltaic 2 power

2kW

Total PV power

2.9kW

DCDC status

Power on

PV1 Operating Status

Working

PV2 Operating Status

Working

Measured Data

kup

Meter

PV

Batt.

Inv.

Debugging

Total battery power

2.44kW

Batt1 Operating Status

Charge

Battery 1 voltage

54.22V

Battery 1 current

46.8A

Battery 1 Power

2.44kW

Battery 1 SoC

35%

BattCab 1 BMS Operating Status

Online

BattCab 1 Basic Status

Charging

BattCab 1 Cycle

0

BattCab 1 Total Charged Energy

0kWh

BattCab 1 Total Discharged Energy

0kWh

BattCab 1 Total Voltage

53.95V

BattCab 1 Total Current

40.6A

BattCab 1 Temperature

13.9°C

BattCab 1 SoC

33%

BattCab 1 SoH

100%

BattCab 1 Max. Voltage of Cell

3.2V

Min. Voltage of Cell in BattCab 1

3.369V

Measured Data

kup

Meter

PV

Batt.

Inv.

Debugging

Operating state of inverter

On-Grid

DCAC status

Power on

Inv. voltage

239.26V

Inverter voltage frequency

50.05Hz

Inv. current Effective value

1.32A

Inv. active power

0.12kW

Inv. reactive power

0.29kVar

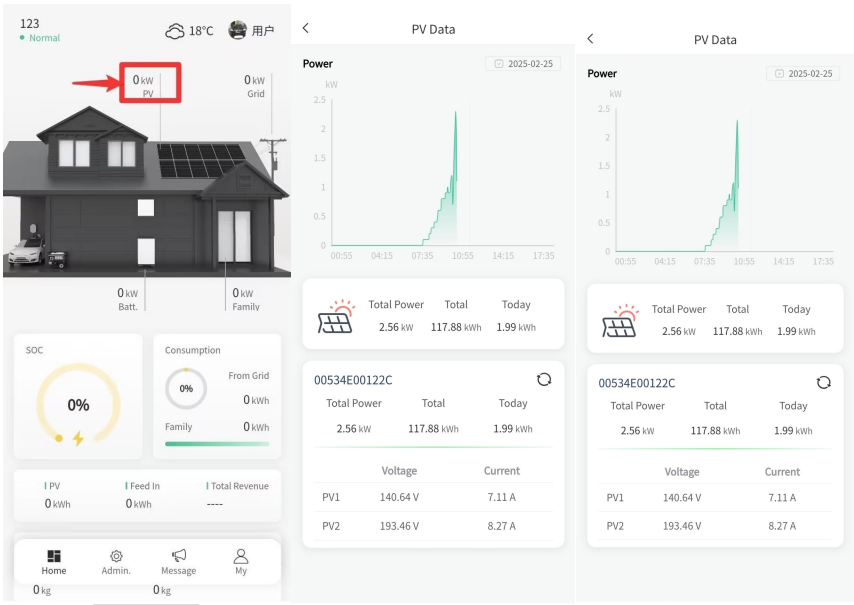
Inv. apparent power

0.32kVA

8.10.4 System Unit Data

(I) PV data

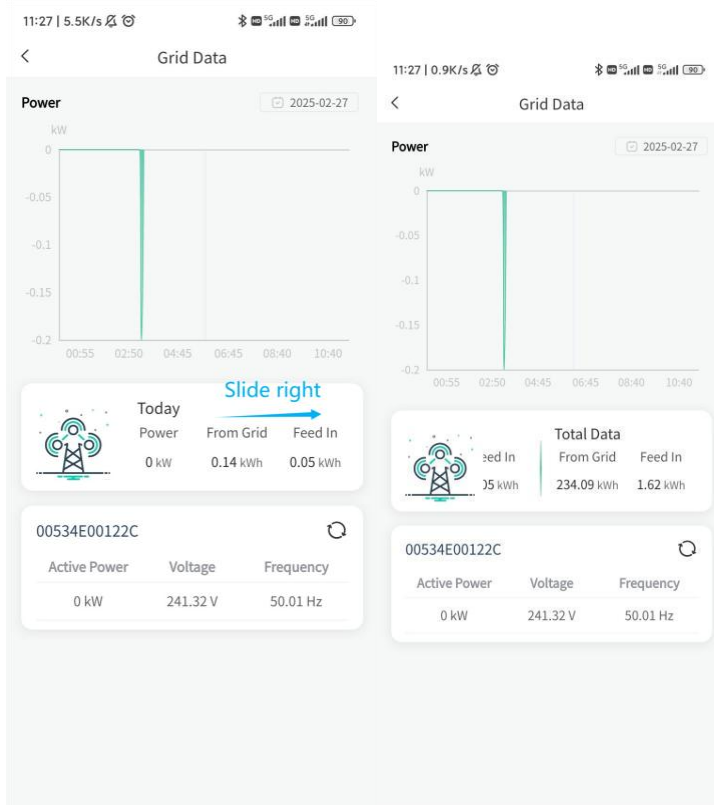
On the home page > PV > PV Data, you can view the power change, total PV power, current power generation, and total power generation of all photovoltaics in the power station. And the photovoltaic power and electricity summary value of each equipment under the current power station, as well as the voltage and current value corresponding to each PV. Click the refresh button in the upper right corner of the corresponding device communication number box to update this parameter to the latest value immediately.



(2) Power grid data

On the home page > Power Grid > Power Grid Data, you can view the waveform diagram of the total power grid power of all devices under the power station and the total power grid power change during the whole day of the day. Long press the waveform to display the actual value of the moment, and the purchased power and feed quantity of the day.

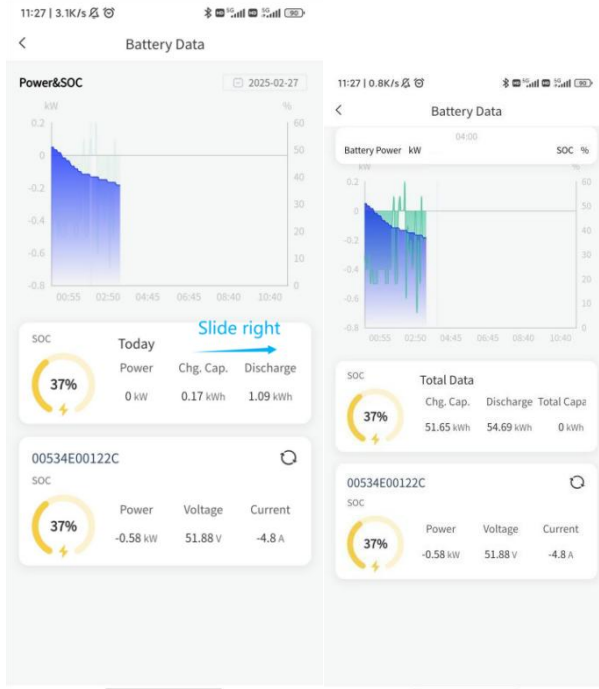
And the current operating status of each inverter device (grid icon: blue > off-grid, green > grid-connected, yellow: standby, gray: offline), active power, grid voltage, frequency, etc. Click the refresh button in the upper right corner of the corresponding device communication number box to update this parameter to the latest value immediately.



(3) Battery data

Choose Home > Battery > Battery Data to view the waveforms of the total battery power of all devices in the power station, the total battery power of the whole day, and the SOC average value. Hold down the waveform to display the actual value at this time. And how much the battery is charged and discharged today.

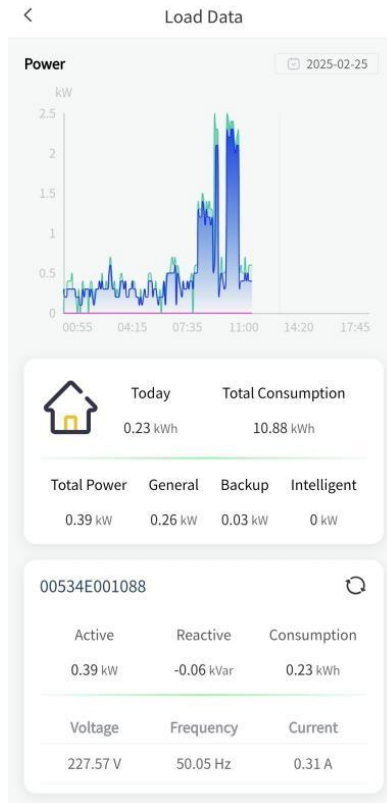
The current battery power, voltage, and current of all battery devices in the power station include the battery enabled status or BMS online status (gray: the battery is disabled or offline, yellow: the battery SOC is lower than 50%, and green: the battery SOC is greater than 50%). Click the refresh button in the upper right corner of the corresponding device communication number box to update this parameter to the latest value immediately.



(4) Load data

On the home page > Load > Load Data, you can view the waveform of the total load power of all devices in the power station and the change waveform of the total load power of the whole day on the same day. You can press and hold the waveform to display the actual value at this time. And the current power consumption and total power consumption of the load, the current total power of the load, the general load power, the important load power and the intelligent load power.

And the total active power, reactive power, electricity consumption, voltage, frequency and current of all the equipment under the power station. Click the refresh button in the upper right corner of the corresponding device communication number box to update this parameter to the latest value immediately.

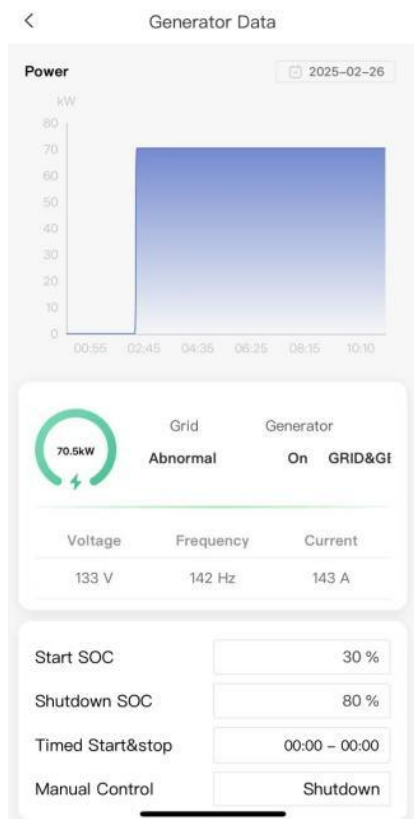


(5) Generator data

By going to Home > Generator > Generator Data, you can view the total power of the motor delivered by the power station, power grid status, generator status, generator operating mode, voltage, frequency and current.

Note: A power station is only allowed to have one generator. The generator on the home page is only displayed when the Advanced Settings - Host Settings - Peripheral, DO function is the generator.

And a convenient setting area to support the generator operation mode, including the generator control mode manual or automatic, as well as SOC start-stop or time-stop. For specific generator operation, see the product manual of each model.



9.Troubleshooting and Maintenance

This section will help users identify the possible causes of malfunction issues. When the system fails, the App will send a push notification with an interval of 45 minutes, and troubleshoot according to the **"Solution"** content in the table below

9.1 Alarm and solution

Table 9-1 Alarm Information List and Solutions

NO.	Error	Solution
1	Abnormal voltage in the power grid	- If there is occasional alarm, it may be a short-term abnormality in the power grid. After the power grid returns to normal, the inverter will automatically resume normal operation. If the alarm is frequent, check if the grid voltage/frequency is within an acceptable range. If so, please check the AC circuit breaker and AC wiring of the inverter. - If the voltage/frequency of the power grid is not within an acceptable range and the AC wiring is correct, but there are multiple alarms, please contact technical support to change the overvoltage and undervoltage and underfrequency protection values of the power grid.
2	Abnormal power grid frequency	
3	The ambient temperature is too high	- Please ensure that the inverter is installed in a place without direct sunlight. - Please ensure that the inverter is installed in a cool/well ventilated area. - Please ensure that the inverter is installed vertically and the ambient temperature is below the upper temperature limit of the inverter. - If the fault persists, please contact your dealer or after-sales service center.
4	The temperature of the radiator is too high	
5	Insulation fault	- Check the impedance of the photovoltaic string to the protective ground. If the resistance value is greater than 20k Ω, it is normal. If the resistance value is less than 20k Ω, please investigate the short-circuit point and rectify it; Check if the protective grounding wire of the inverter is connected correctly. If there are no abnormal alarms during the power on test, it will automatically clear or send a fault clearing command. - If it is confirmed that the impedance is indeed lower than the default value in cloudy and rainy weather, please reset the "insulation impedance protection point".
6	Leakage protection fault	Check if there are any problems with the machine or wiring, and

		send a fault clearing command to retest if there are no issues.
7	Island protection	- Confirm if the power grid is lost. - Contact your dealer or after-sales service center.
8	Battery 1 is not connected	- Check if the battery overvoltage setting is inconsistent with the battery specifications. - Please check if Battery 1 is connected correctly or if the voltage is abnormal. Once confirmed, the warning will automatically clear or a fault clearing command will be sent.
9	Battery 1 overvoltage	
10	Battery 1 undervoltage	
11	Battery 1 discharge terminated	
12	PV 1 not connected	Please check if PV 1 is connected correctly or if the voltage is abnormal. Once confirmed, the alarm will automatically clear or a fault clearing command will be sent.
13	PV 1 overvoltage	Check if the PV series voltage is higher than the maximum input voltage of the inverter. If so, adjust the number of PV modules in series and reduce the PV string voltage to adapt to the input voltage range of the inverter. After calibration, the inverter will automatically return to its normal state.
14	Pv1 current uniformity abnormality	
15	PV 2 not connected	Please check if PV 2 is connected correctly or if the voltage is abnormal. Once confirmed, the alarm will automatically clear or a fault clearing command will be sent.
16	PV 2 overvoltage	Check if the PV series voltage is higher than the maximum input voltage of the inverter. If so, adjust the number of PV modules in series and reduce the PV string voltage to adapt to the input voltage range of the inverter. After calibration, the inverter will automatically return to its normal state.
17	PV 2 current sharing abnormality	
18	DC bus overvoltage	Disconnect the AC output side switch and DC input side switch, and after 5 minutes, close the AC output side switch and DC input side switch. If the fault persists, please contact your dealer or after-sales service center.
19	DC bus undervoltage	
20	DC bus voltage imbalance	The voltage fluctuation remains within the allowable range for 2 seconds before automatically clearing.
21	Inverter overload	Please check if the inverter is working in overload state. After confirming normal operation, the alarm will automatically clear or send a fault clearing command within 10 minutes.
22	Inverter overload timeout	
23	Battery 1 overload timeout	

24	PV 1 overload timeout	
25	PV 2 overload timeout	
26	Inverter soft start failure	Internal fault in the inverter, turn off the inverter, wait for 5 minutes, then turn on the inverter and send a fault clearing command to restart the soft start.
27	Battery 1 soft start failed	
28	DSP1 Parameter setting malfunction	The alarm will be automatically cleared if the parameter settings are correct.
29	DSP2 Parameter setting malfunction	
30	DSP Communication Failure	SPI after communication is normal, the alarm will be automatically cleared.
31	Relay self-test failed	Send a fault clearing command to retest.
32	Inverter abnormality	After clearing other faults, the alarm will be automatically cleared.
33	PV 1 soft start failure	Inverter internal fault, turn off the inverter, wait for 5 minutes to turn on the inverter, send a fault clearing command to restart the soft start
34	PV 2 soft start failure	

9.2Regular maintenance



Warning

- Make sure that the inverter is disconnected from power.
- Wear personal protective equipment when operating the inverter.

Table 9-2 Maintenance Instructions

Maintain content	Maintenance methods	Maintenance Cycle
System cleaning	Check for foreign objects and dust on the heat sink and air inlet/outlet.	Once/Half a year~Once/Year
DC switch	Continuously turn on and off the DC switch 10 times to ensure that the DC switch functions properly.	Once/Year
Electrical connection	Check whether the cable connection is loose or detached, whether the appearance of the cable is damaged, and whether there is copper leakage.	Once/Half a year~Once/Year

10. Technical Parameter

Model	M Hybrid Inverter 6kW	M Hybrid Inverter 5kW
Battery parameters		
Battery input number	1	
Battery type	Lithium	
Rated battery voltage	51.2V	
Battery voltage range	42V-58V	
Max voltage	60V	
Rated charging and discharging power	5kW	
Max charging and discharging current	100A	
Interface	RS485/CAN	
PV input		
PV input number	2	
Max input power ^①	9000Wp	8000Wp
Max input voltage	600V	
Starting voltage	95V	
MPPT Voltage range	80~550V	
MPPT Full load voltage range	350~500V	
Rated voltage	360V	
MPPT number	2	
MPPT string	1	
MPPT Max input current	18A/18A	
MPPT max short circuit current	22A/22A	
Backfeed Current	0A	

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Remark①: Recommend two MPPT input independently , per MPPT max power no more than 4500W

Grid parameters		
Rated output power	6000W	5000W
Max input power of grid	6000VA	6000VA
Max output current	27.2A	22.7A
Max input current of grid	27.2A	27.2A
Rated grid connected voltage	220V/230V/240V	
Voltage range of grid	184-276V	
Rated grid frequency	50Hz	
Grid frequency range	45Hz~65Hz	
Power factor	~1(0.8speed-up-0.8lag)	
THDi(@rated power)	<3%	
Off grid parameters		
Rated output power	6kVA	5kVA
Max output power	6kVA	5kVA
Max output current	27.2A	22.7A
Rated output voltage	230V	
Rated output frequency	50Hz	
THDu (@Linear Load)	<2%	
On/off grid s witching time	<20ms	
Efficiency		
Efficiency in Europe	97.5%	97.5%
Maximum efficiency	98%	98%
Maximum battery charging and discharging efficiency	95.2%	
Protection		
Insulation impedance testing	Integration	

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Residual current monitoring	Integration
Input reverse protection	Integration
Anti islanding protection	Reactive power disturbance
Overvoltage and overload protection	Integration
AC short circuit protection	Integration
AC overvoltage level	III
Battery and PV overvoltage level	II
Surge protection	Integration
Lightning Protection	Integration
General Parameters	
Installation method	Wall mounted
Size	500mm*470mm*180mm
Weight	21kg
Standby power loss	≤10W
Temperature range	-25°C~+60°C (>40°C, Power reduced operation)
Humidity range	0~100%
Noise	<25dB (A)
Allowable altitude	<4000m (≤3000m full load, Reduce power by 5% for every 100m increase)
Cooling method	Natural cooling
IP Grade	IP65
Monitoring	LED/APP/WIFI/4G/Bluetooth (Optional)
Communication port	RS485/CAN/DRED/Dry contact/Parallel
Performance and Certification	
Parallel	Max 6 units in parallel
Multiple Phase	NO

M Hybrid Inverter 5kW&6kW

Warranty	10 years	10 years
CE-LVD	IEC 62109-1, IEC 62109-2, EN 62109-1, EN 62109-2, IEC62477-1	
CE-EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN 62920	
Grid	AS4777.2	

Note:

(1) The inverter only supports manual battery wake-up and does not have automatic wake-up function.

Therefore, if the battery is discharged to undervoltage sleep due to insufficient photovoltaic power or off-grid mains, it must be manually awakened and replenished in time, otherwise there is a risk of battery over-discharge;

(2) The output power of the inverter in off-grid mode is 5kw, and it will stop due to overload if it exceeds 5kw.

(3) The inverter has not been tested for multiple inverter combinations according to the AS/NZS 4777.2:2020 standard, so it is not recommended to use combination connections.