AF-HU

SERIES OPERATION MANUAL

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Disclaimer

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The material furnished in this manual is believed to be accurate and reliable. The information and recommendations in this manual do not constitute commitments or warranties in the form of assignments. The information in this document is subject to change without notice.

This manual mainly describes the product information, guidelines for installation, operation, maintenance and troubleshooting. And this manual applies to the AF-HU system, including the hybrid inverter. Please keep the Manual properly and operate in strict accordance with all safety and operating instructions in this manual. Please do not operate the product before reading through the manual.

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This manual introduces AF-HU system and hybrid inverter manufactured by our company. Please read this manual before you install the product and follow the instructions carefully during the installation process. Our company shall not be liable for any consequences resulting from the violation of the storage, transportation, installation, and operation regulations outlined in this document. Should you have any confusion, please contact our company for advice and clarification.

CONTENTS

1 Introduction

1.1 Content and Structure of this Manual

This manual is valid for All In One Energy Storage System.
This manual describes the product information, and guidance for installation, as well as Hybrid Inverter operation.
Observe all manual that accompanies the product, keep them in a convenient place and available at all times.
Illustrations in this manual are reduced to the essential information and may deviate from the real product.

1.2 Target Group

This manual is intended for qualified persons and end users. Only qualified persons are allowed to perform the operations marked with a warning symbol in this manual. Tasks that do not require any specific qualifications will not be marked and can be performed by the end user. Qualified persons must have:

- Knowledge of working principle of Li-ion battery.
- Knowledge of how to deal with the dangers and risks associated with installing and using electrical devices, batteries and systems.
- Knowledge of the installation and commissioning of electrical devices and systems.
- Knowledge of the applicable standards and directives.
- Understood and complied with this document, including all safety precautions.
- Understood and complied with the documents of the inverter manufacturer, all safety precautions included.

1.3 Levels of Warning Messages

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result

in death or serious injury.

WARNING

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

CAUTION

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

NOTICE

NOTICE indicates a situation which, if not avoided, can result in property damage.

1.4 Marks

	Warning electric shock.		Do not operate until 10 minutes after discharge
	Warning Fire		Read the product and operation manual before operating the battery system!
	Do not reverse connect the positive and negative		CE mark
	Do not place near open flame		Recyclable
	Do not place at the children or pet touchable area		Grounding

1.5 Definition of Abbreviations and Nouns

Abbreviation	Noun
AC	alternating current
BAT	battery
BMS	battery management system
DC	direct current

INV	inverter
PV	photovoltaic
SOC	state of charge
SOH	state of health

2 Safety Instruction

This product is designed and tested in accordance with international safety requirements IEC 62619:2022 , but as with all electrical and electronic equipment, certain precautions must be observed when installing and operating the product. To reduce the risk of personal injury and ensure the safe installation and operation of the product, more attention should be paid on following all instructions, cautions and warnings in this Manual.

2.6 Battery precautions

WARNING

It is important and necessary to read the user manual carefully before installing or using battery. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage battery, potentially rendering it inoperable.

- If the battery is stored for long time, it is required to charge it every six months, and the recommended SOC should be 50%~55%, If the battery is to be stored for more than 1 month, make sure the storage temperature falls within 0 - 35 ℃. If the battery is to be stored for not more than 1 month, make sure the storage temperature falls within -20~45℃.
- Battery needs to be recharged within 12 hours after being fully discharged.
- Do not have the product installed in any environment that falls outside the range of temperature or humidity set out in the Manual.

- All the power terminals must be disconnected for maintenance.
- Please contact the supplier within 24 hours in case of anything abnormal.
- Do not use cleaning solvents to clean battery.
- Do not expose battery to flammable or harsh chemicals or vapors.
- Do not paint any part of battery, include any internal or external components.
- Do not connect battery with PV solar wiring directly.
- Any foreign object is prohibited to insert into any part of battery.
- The warranty claims are excluded for direct or indirect damage due to above reasons.
- Before closing the circuit breaker, complete all the electrical cable connections. After closing, do not touch the connectors. If maintenance is required, the circuit breaker must be disconnected first to ensure that all operations are carried out without electricity.

2.7 Emergency situation

DANGER

This product is designed with multiple safety strategies to prevent hazards resulting from failure. However, hazards and dangers could emerge in few uncertain situations.

Fire

The battery PACK may catch fire when heated over 150°C.
Ensure an ABC or carbon dioxide extinguisher nearby the battery, and do not use water to extinguish the fire.
If a fire breaks out where the battery is installed, perform the following actions:

- Extinguish the fire before the battery catches fire.
- If the battery has caught fire, do not try to extinguish the fire. The fired battery

will produce poisonous gases, please evacuate people immediately.

Leaking

If the battery PACK leaks, avoid contact with the leaking liquid or gas.
Electrolyte is corrosive and contact may cause skin irritation and chemical burns. If one is exposed to the leaked substance, perform the following actions:
Inhalation: Evacuate the contaminated area and seek medical attention immediately.
Eyes contact: Rinse eyes with flowing water for 15 minutes and seek medical attention immediately.
Skin contact: Wash the affected area thoroughly with soap and water and seek medical attention immediately.
Ingestion: Induce vomiting as soon as possible and seek medical attention immediately.

Wet battery

If the battery is wet or submerged in water, do not try to access it. Contact customer service for technical assistance.

Damaged battery

Damaged battery may emit toxic gas or/and flammable gas, which could cause hazards to lives or property. If the battery is damaged, please keep away from the battery and contact customer service for help as soon as possible.

3 System Introduction

3.1 Parameters of energy storage system

Product name	Rechargeable Li-ion Battery System			
Inverter Module	3~15 kW			
Qty. Of Inverter Modules	1			
Battery Module	AF-HU			
Battery Type/Model	AF9000W-HU	AF13000W-HU	AF18000-HU	AF23000-HU
Number of PACK (pcs）	2	3	4	5
Total Energy (kWh)	9.21	13.82	18.43	23.04
Usable Energy (kWh)*	9.21	13.82	18.43	23.04
Voltage Range (Vd.c)	112~144	168~216	224~288	280~360
Nominal Voltage (V)	128	192	256	320
Charging Voltage Declared by Manufacturer (V)	144	216	288	360
Nominal Charging Current (A)	30			
Nominal Discharge Current (A)	30			
DOD (%)	95%			
Communication	CAN/RS485			
Dimension(L*W*H) (mm)	(600±2)* (210±2)* (895±3)	(600±2)* (210±2)* (1180±5)	(600±2)* (210±2)* (1465±7)	(600±2)* (210±2)* (1750±9)
Net Weight (kg)	100±2	141±4	182±6	223±6
Operating Condition	Indoor or outdoor			

Storage Temperature Range		＞1 month 0~35℃；≤1 month -20~55℃
Operating Temperature	Charging	0~55 ℃
	Discharging	-20~55 ℃
Humidity		15% ~ 85%RH(No Condensation)
Cooling Type		Natural
Operating Altitude (m)		< 2000(Derating above 2000 m)
IP Rating of Enclosure		IP66
Class of Protection		Class Ⅰ
Installation Method		Stacked installation
Supply Connection		Fixed power cord
Warranty		10 years (5 free warranty + 5 paid warranty)

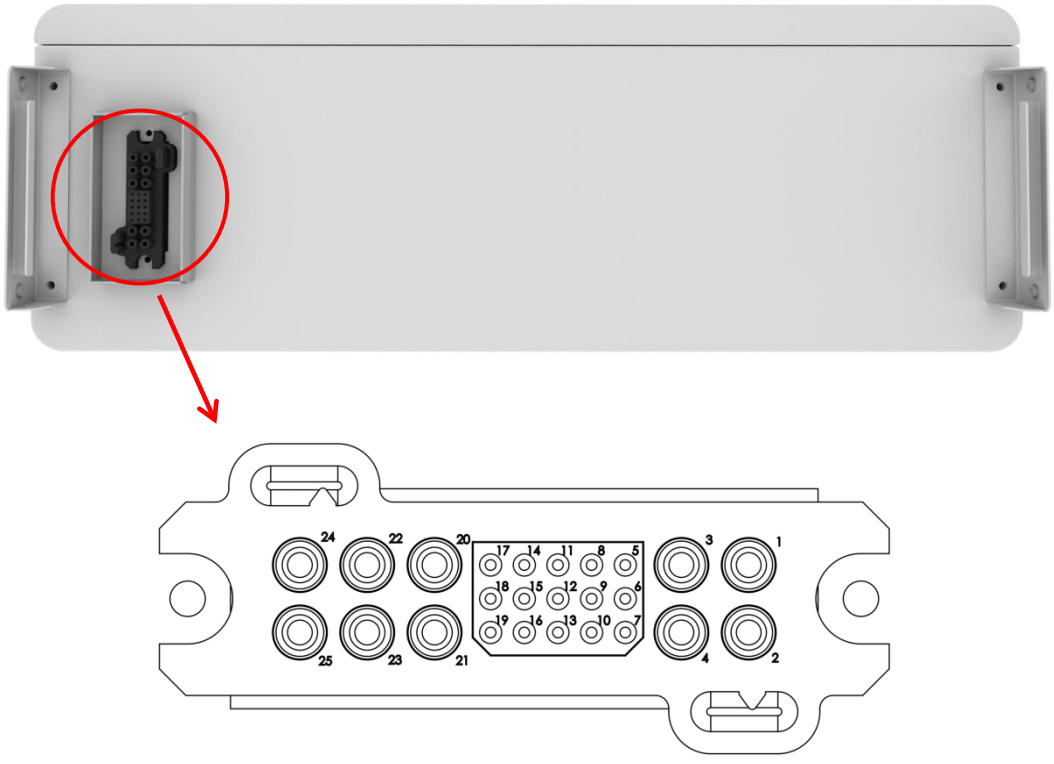
*Testing conditions based on temperature 25℃ at the beginning of life. Total Energy/Usable Energy are measured with a standard test method: 0.2C Charge and Discharge. As per the characteristics of lithium batteries, such parameters as the charge/ discharge current and efficiency listed above are subject to change. The final right of interpretation is reserved our company.

3.2 PACK

Battery Module Type	**AF4600W-HU**

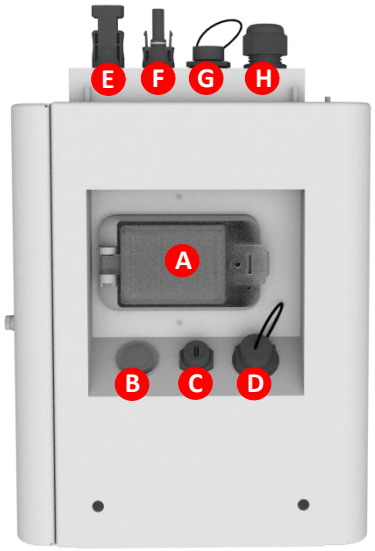
Total energy (kWh）		4.60
Usable Energy (kWh)		4.60
Voltage Range (Vd.c)		56~72
Nominal Voltage (V)		64
Max. Charge Voltage (V)		72
Max.continuous charging current (A)		30
Max.continuous discharge current (A)		30
DOD%		95%
Dimension(L*W*H) (mm)		（600±2）*（210±2）*（285±2）
Net Weight (kg)		41±2
Operating Condition		Indoor or outdoor
Operating Temperature	Charging	0~55 ℃
	Discharging	-25~55 ℃
Humidity		15%~85%RH (No Condensation)
IP rating of enclosure		IP66
Warranty		10 years (6000 cycles)

Schematic diagram and definition of the connection terminals



Pin Number	Definition	Pin Number	Definition
1,2	B+	6	CAN-L
24,25	B-	7	Coded Transmission
20,21	Protective Ground	8	BMU VCC
5	CAN-H	9	BMU GND

3.3 Battery Control Box



(A) DC Circuit Breaker

Rated Voltage	Rated Current	Release Type	Dimension(L*W*H)
DC 500 V	50 A	B	81.5*35.2*69.6 mm
Limiting Breaking Capacity（I_{cu}）	Pole	Rated Insulation Voltage(U_i)	
6 kA	2P	AC 1000 V	

(B) Button Switch

Open the circuit breaker waterproof cover A, switch the circuit breaker to ON, and then press the button switch B to light it up, the battery system successfully started. Switch the circuit breaker to OFF, the battery system is closed.

(C) Type-C Port

When the battery capacity is too low, the BMS hibernation, you can wake up the BMS by forcing a charge through the type-c port.

(D) Communication Port

Upper computer communication port, can read the battery operation information.

RJ45 PIN	definition	PIN	definition
PIN1	-	PIN5	-
PIN2	-	PIN6	-
PIN3	-	PIN7	RS485A
PIN4	-	PIN8	RS485B

(E) BAT+
Battery anode

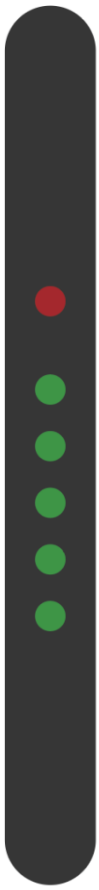
(F) BAT-
Battery cathode

(G) Inverter Port
Communication port to inverter (CAN/RS485).

RJ45 PIN	definition	PIN	definition
PIN1	-	PIN5	CAN L
PIN2	-	PIN6	-
PIN3	-	PIN7	RS485A
PIN4	CAN H	PIN8	RS485B

(H) GND
Grounding protection

LED Status Indicators：



SOC Indicators

SOC indicators		L4 ●	L3 ●	L2 ●	L1 ●
SOC (%)	0%～25%	OFF	OFF	OFF	ON
	25%～50%	OFF	OFF	ON	ON
	50%～75%	OFF	ON	ON	ON
	75%～100%	ON	ON	ON	ON

Working status indication：

State of Fault	ALM	RUN	Indicators			
			L4	L3	L2	L1
	●	●	●	●	●	●
Cell Fault	ON	OFF	OFF	OFF	OFF	OFF

NTC Fault	ON	OFF	OFF	OFF	OFF	ON
Precharge Fault	ON	OFF	OFF	OFF	ON	OFF
Short-Circuit Fault	ON	OFF	OFF	OFF	ON	ON
Charging Contactor Fault	ON	OFF	OFF	ON	OFF	OFF
Discharging Contactor Fault	ON	OFF	OFF	ON	OFF	ON
Precharge Contactor Fault	ON	OFF	OFF	ON	ON	OFF
Negative Contactor Fault	ON	OFF	OFF	ON	ON	ON
Level 3 Charging Cell Overvoltage Protection	Blink	OFF	ON	OFF	OFF	OFF
Level 3 Charging Overall Overvoltage Protection	Blink	OFF	ON	OFF	OFF	ON
Level 3 Charge Overcurrent Protection	Blink	OFF	ON	OFF	ON	OFF
Level 3 Discharge Cell Undervoltage Protection	Blink	OFF	ON	OFF	ON	ON
Level 3 Discharge Overall Undervoltage Protection	Blink	OFF	ON	ON	OFF	OFF
Level 3 Discharge Overcurrent Protection	Blink	OFF	ON	ON	OFF	ON
Level 3 Charging High Temperature, Low Temperature Protection	Blink	OFF	ON	ON	ON	OFF
Level 3 Discharging High Temperature, Low Temperature Protection	Blink	OFF	ON	ON	ON	ON

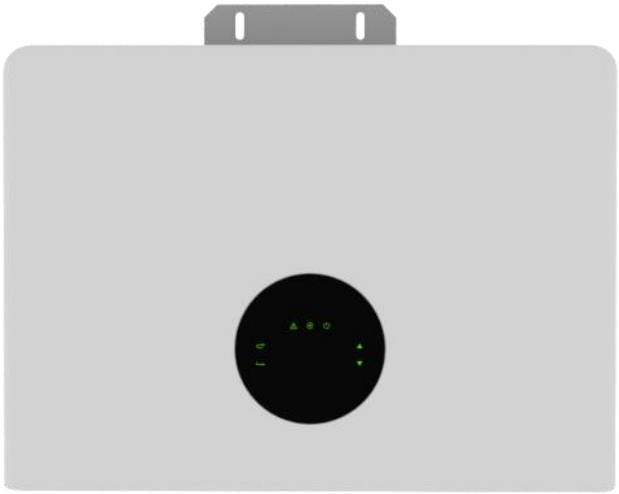
Alarm/Run LED Light	ALM 	RUN 
State of LED Light	OFF	Blink

Blinking LED Indicators:

Blink Mode	ON	OFF
Blink	0.5S	0.5S

3.4 Specifications of all in one energy storage hybrid inverter

Hybrid Inverter



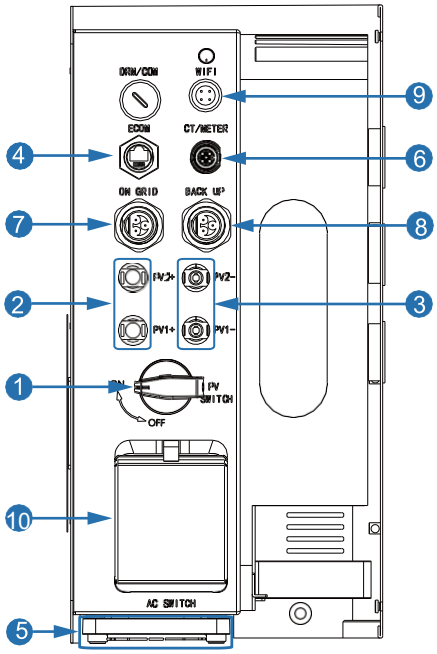
Model	3 kW	4 kW	5 kW	6 kW	8 kW	10 kW	12 kW	15 kW
Max. DC Input Power (kW)	5	6	7.5	9	12	15	18	22.5
Maximum Input Voltage (V)	1000							
Rated DC Input Voltage(V)	620							
DC Voltage Range (V)	150-1000							
MPPT Voltage Range (V)	150-850							
Full MPPT Range (V)	200- 850			250- 850	300- 850	500- 850		
Startup Voltage (V)	160							
Max. Input Current (A)	20 x 2							
Max. Short Current (A)	30 x 2							
No. of MPP Tracker / No. of PV String	2 / 2							

Battery Port								
Battery Normal Voltage (V)	150	200	200	250	300	350	450	500
Battery Voltage Range (V)	80-600							
Max. Charge/Discharge Power (kW)	3	4	5	6	8	10	12	15
Max. Charge/Discharge Current (A)	30							
Charge Curve	3 Stages							
Battery Type	Lithium batteries, lead-acid batteries, etc							
AC Grid								
Nominal AC Output Power (kW)	3	4	5	6	8	10	12	15
Max. AC Input/Output Power (kVA)	4.5/3.3	6/4.4	7.5/5.5	9/6.6	12/8.8	15/11	18/13.2	22.5/16.5
Max. AC Output Current (A)	5.3	7	8.5	10.5	13.5	17	21.5	27
Nominal AC Voltage (V)	230/400							
Nominal AC Frequency (Hz)	50/60							
Power Factor	1 (-0.8 -0.8)adjustable							
Current THD(%)	< 3%							
AC Load Output (Back-up)								
Nominal Output Power (kVA)	3	4	5	6	8	10	12	15
Nominal Output Voltage (V)	230/400							
Nominal Output Frequency (Hz)	50/60							
Nominal Output Current(A)	4.4	5.8	7.3	8.7	11.6	14.5	17.4	21.8

Peak Output Power (kVA) (60s)	3.3	4.4	5.5	6.6	8.8	11	13.2	16.5
Switching Time (ms)	< 10							
THDV (with linear load)	< 3%							
Efficiency								
Europe Efficiency (%)	97.50%							
Max. Efficiency (%)	98.00%				98.20%		98.30%	
Bat. Charge/Discharge Efficiency (%)	98.00%							
Protection								
Reverse Polarity Protection	Yes							
Over Current /Voltage Protection	Yes							
Anti-islanding Protection	Yes							
AC Short-ciruit Protection	Yes							
Leakage Current Detection	Yes							
Ground Fault Monitoring	Yes							
Grid Monitoring	Yes							
Enclosure Protect Level	IP66							
AC/DC surge protection	Type Ⅱ							
General Data								
Dimensions (W*H*D, mm)	600 x 430 x 210							
Weight (kg)	25							
Topology	Transformerless							
Cooling Concept	Natural Convection				Intelligent Fan			
Relative humidity	0 - 100 %							
Operating Temperature Range (°C)	- 25 to 60							

Operating Altitude (m)	< 4000
Noise Emission (dB)	< 40
Standby Consumption (W)	<5
Display & Communication Interfaces	LCD, LED, RS485, CAN, Wi-Fi, GPRS, 4G
Certification & Approvals	NRS097, G98/G99, EN50549-1, C10/C11, AS4777.2, VDE-AR-N4105, VDE0126, IEC62109-1, IEC62109-2
EMC	EN61000-6-2, EN61000-6-3

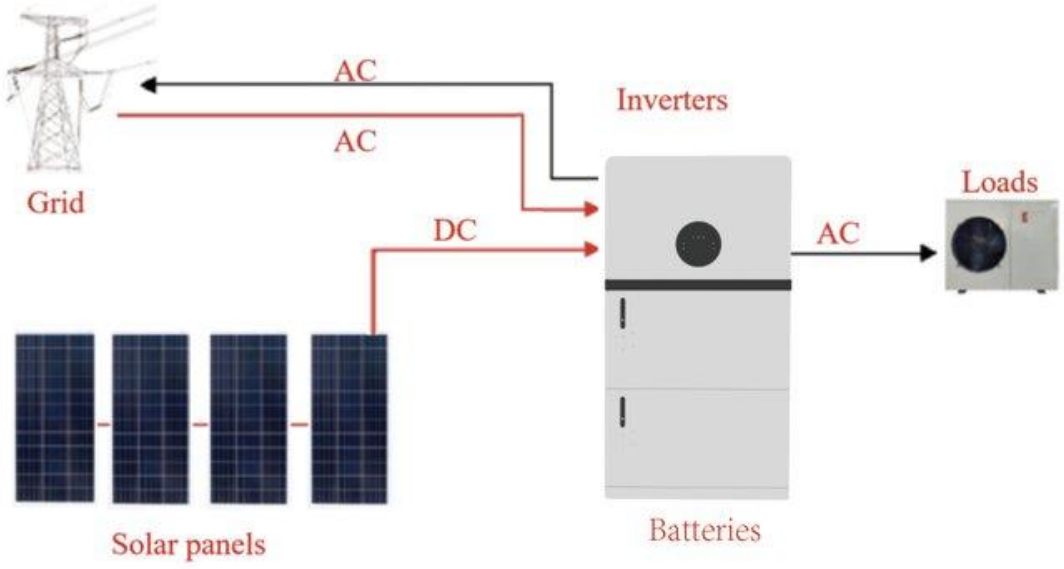
Internal of all in one energy storage hybrid inverter



No.	Items	No.	Items
1	DC Switch	6	CT/Meter Communication Port
2	DC Connectors (+) For PV Strings	7	ON GRID Port
3	DC Connectors (−) For PV Strings	8	BACK UP Port
4	Generator Communication Port	9	Monitor Module Port
5	Battery Port	10	AC Switch

3.5 Application scenario

The ALL-IN-ONE series energy storage system(includes inverter and battery AF-HU) are designed to increase energy independence for homeowners. Energy management is based on time-of-use and demand charge rate structures, significantly reduce the amount of energy purchased from the public grid and optimize self-consumption. The system can be applied in DC-coupled systems and Off-grid (with Generator) systems.



3.6 Features

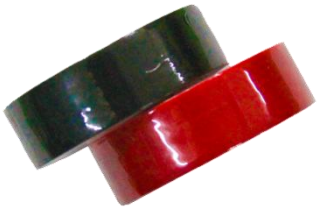
- The battery is non-toxic, pollution-free and environmental-friendly;
- Anode material is made from $LiFePO_4$ with safety performance and long cycle life;
- BMS has protection functions including over-discharge, over-charge, over-current and high/low temperature;
- Flexible configuration, multiple battery modules can be connected in series to increase storage energy;
- Battery system monitoring is achieved through inverter monitoring.

4 Installation

4.1 Tools and safety gear

The displayed tools are recommended and could be used in the installation of batteries and hybrid inverter. And the safety gear should be worn correctly during installation.

During operation, consider that the noise emitted based on the environment could possibly exceed the legal thresholds (less than 70 dB), therefore, suitable ear protection must be worn.

 Screwdriver	 Wire cutter	 Crimping modular plier
 Voltmeter	 Pocket knife	 Insulating tape
 Insulated gloves	 Safety goggles	 Safety shoes
 Socket wrench	 Percussion drill	

4.2 Package Items

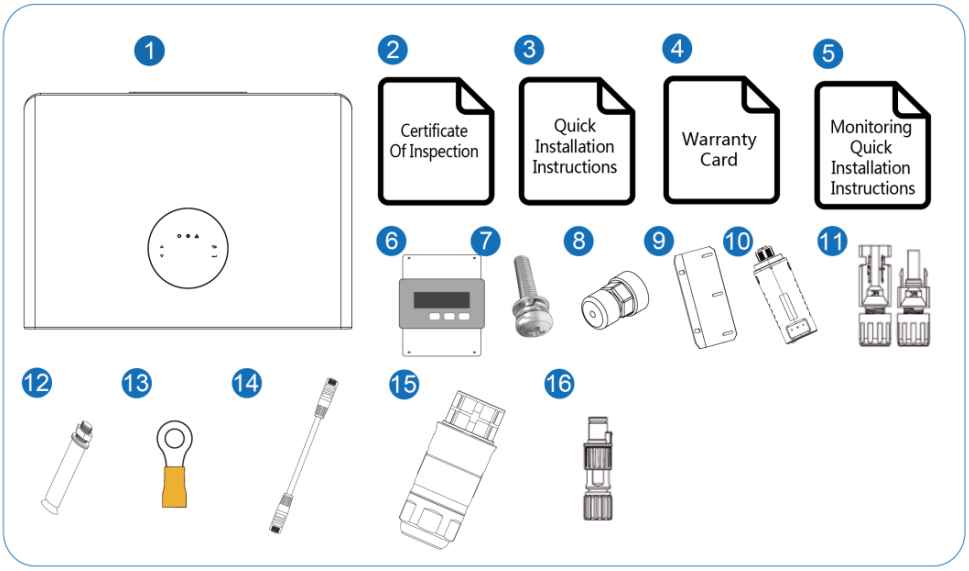
Unpacking

On receiving the products, please check to make sure the packing and all components are not missing or damaged. Please contact your dealer directly for supports if there is any damage or missing components.

Package list of inverter and battery PACK

Open the package, please check the packing list shown as below.

Inverter:



No.	Qty	Items	No.	Qty	Items
1	1	Hybrid Inverter	9	1	Wall Mounting Bracket
2	1	Certificate Of Inspection	10	1	Monitor Module
3	1	Quick Installation Instructions	11	1/2	DC Connector Set
4	1	Warranty Card	12	2	Expansion Bolt
5	1	Monitoring Quick Installation Instructions	13	2	Grounding Terminal
6	1	Smart Meter	14	1	Communication T568B
7	3	Wall Mounting Bracket	15	2	AC Waterproof Cover
8	1	Communication Connectors	16	1	Meter Connectors

Battery Control Box:

No.	Qty	Items	No.	Qty	Items

1	1	Battery Control Box	7	2	M8*20*1.2 Gasket
2	1	Battery Base	8	4	M5*8 Cross Flat Head Screw
3	1	Positioning Plate	9	4	M6*12 Hexagon Flange Face Bolt
4	2	M6*50 Expansion Bolt	10	1	User manual
5	1	Wall Mounting Bracket	11	1	Warranty Card
6	1	Box Mounting Bracket	12	1	Factory Inspection Report

PACK:

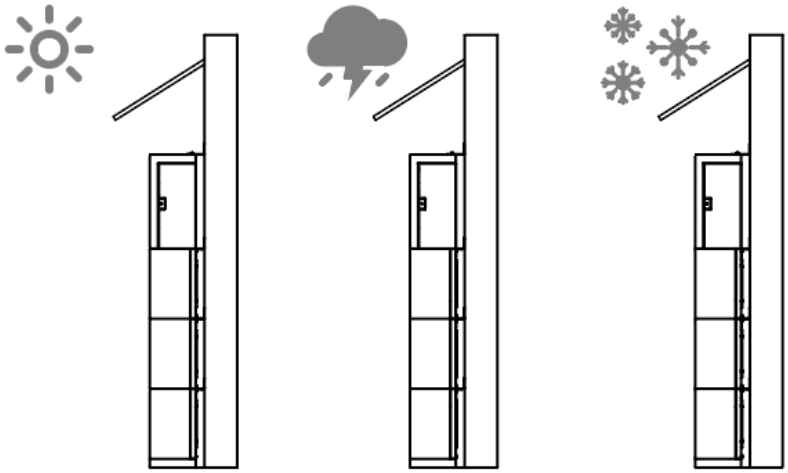
No.	Qty	Items	No.	Qty	Items
1	1	PACK	5	1	Box Mounting Bracket
2	2	M6*50 Expansion Bolt	6	2	M8*20*1.2 Gasket
3	4	M6*12 Hexagon Flange Face Bolt	7	4	M5*8 Cross Flat Head Screw
4	1	Wall Mounting Bracket			

4.3 Installation Location

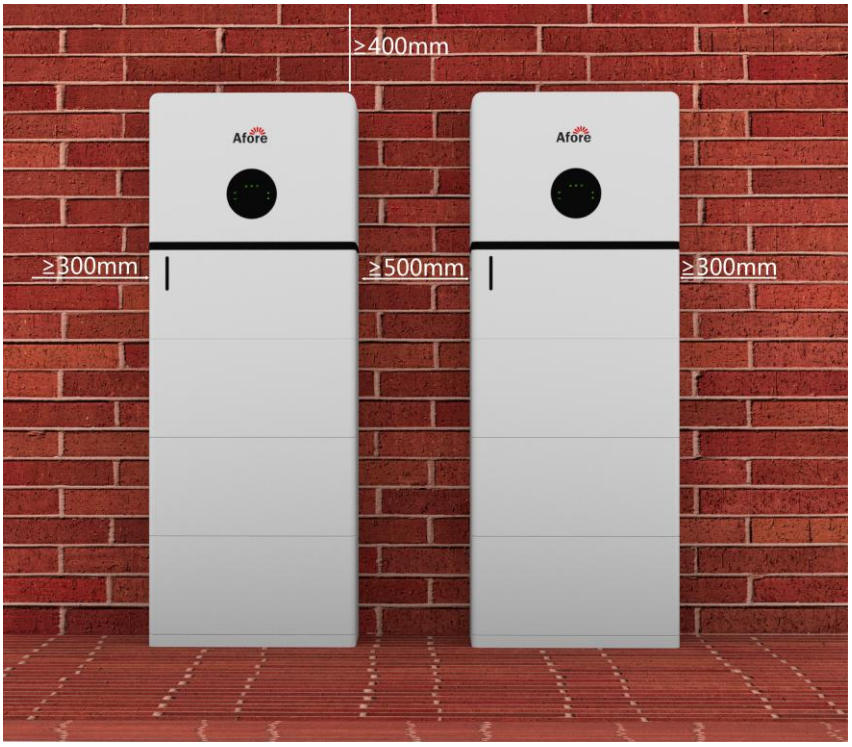
Make sure that the installation location meets the following conditions:

- Do not tilt or invert the equipment. The floor must be flat and level to ensure the equipment is installed horizontally;
- Do not install the equipment in a location easily accessible to children;
- Do not install the equipment near sources of fire or in damp locations;
- Do not install the equipment in enclosed, unventilated spaces that lack firefighting facilities and are difficult for firefighters to access;
- There are no flammable or explosive materials nearby;
- The ambient temperature is within the range from 0°C to 55°C;
- Humidity is maintained at 15% - 85% (RH) (no condensing);
- The distance from heat source is more than 2 meters;
- The distance from air outlet of inverter is more than 0.5 meters;

- The installation areas shall avoid of direct sunlight;
- This battery is installed against the wall, so it is necessary to ensure that the wall structure is stable and non-flammable;
- Allow adequate space around the battery system for installation and maintenance access;
- There are no mandatory ventilation requirements for battery module, but please avoid of installation in confined area. The aeration shall avoid of high salinity, humidity or temperature.
- Please install the battery system on a foundation about 30cm above the ground.The foundation shall bear a load of 400 kg.
- Outdoor installation requires a protective device above the battery to reduce the erosion of rain, snow and strong ultraviolet rays;



- The distance between the battery system and the surrounding area is as follows:



DANGER

The stacking connector is rated IPXXB. Contact with live parts is prohibited;

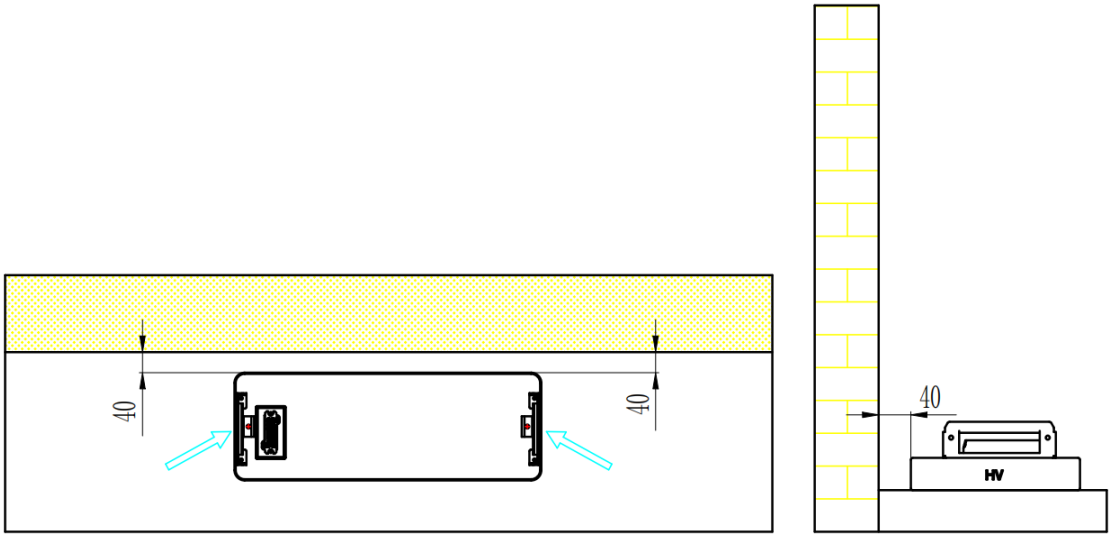
The modules are connected in series using a stacked configuration;

The modules are de-energised during stacking/unstacking.

4.4 All In One System Installation

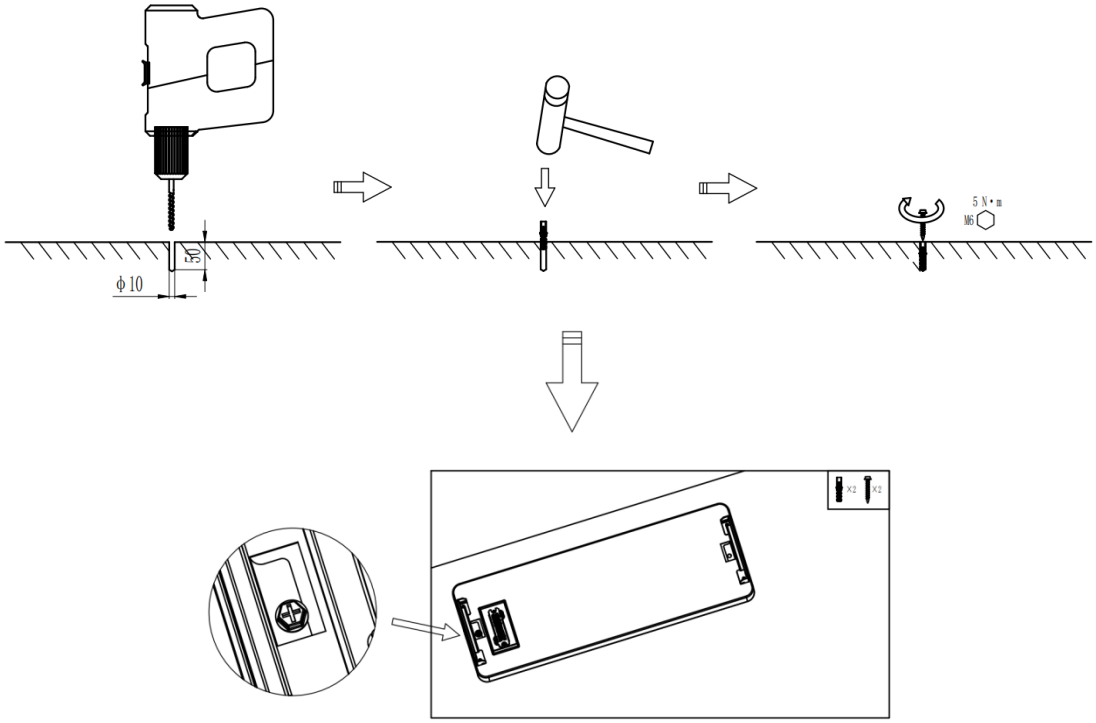
Step 1

Select a evenly level ground, place the base 40mm away from the wall, keep the base plane level, and mark the location of the base with a marker.



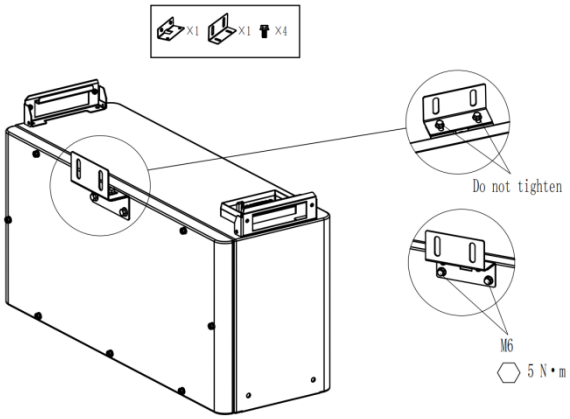
Step 2

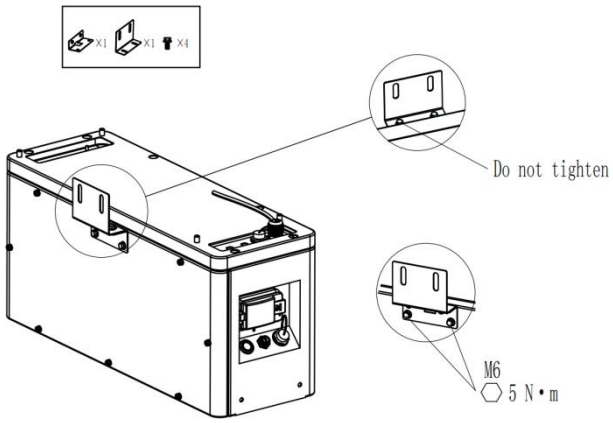
Drill holes according to the marked positions on the ground, and fix the base according to the requirements in the figure.



Step 3

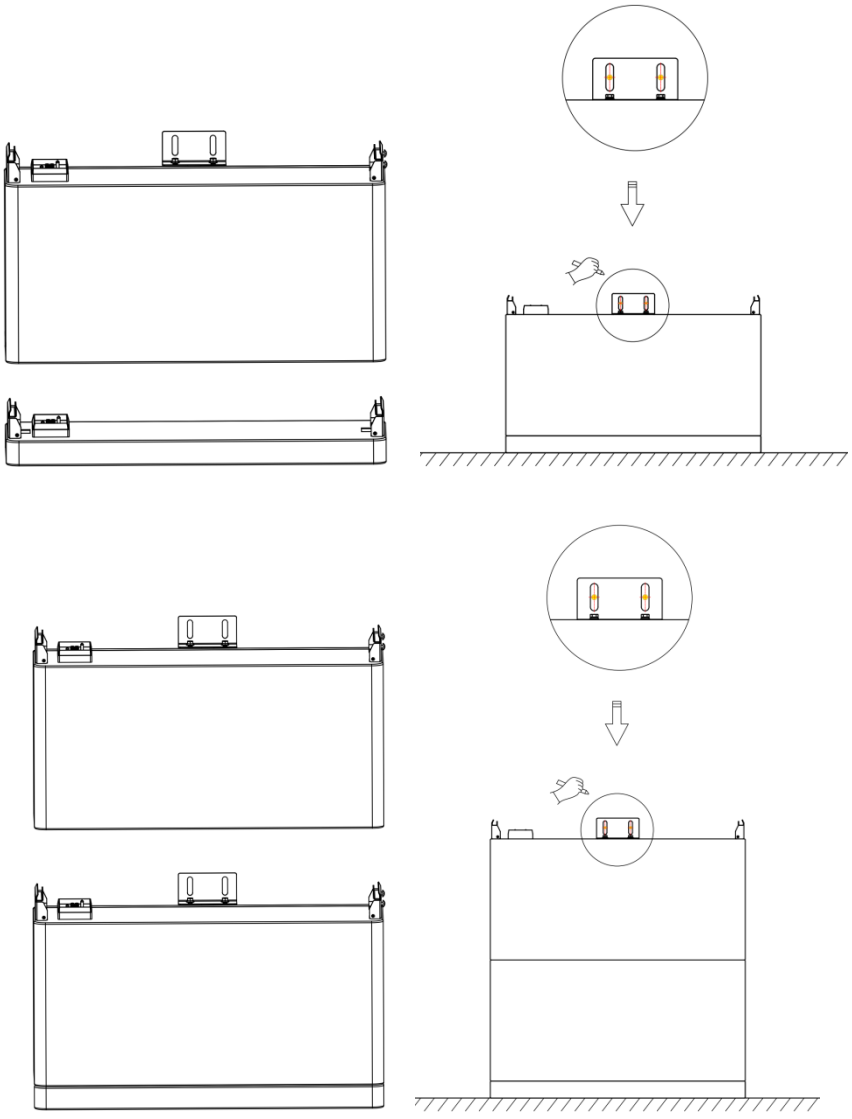
Install the wall mounting bracket and PACK mounting bracket on the PACK box and battery control box.





Step 4

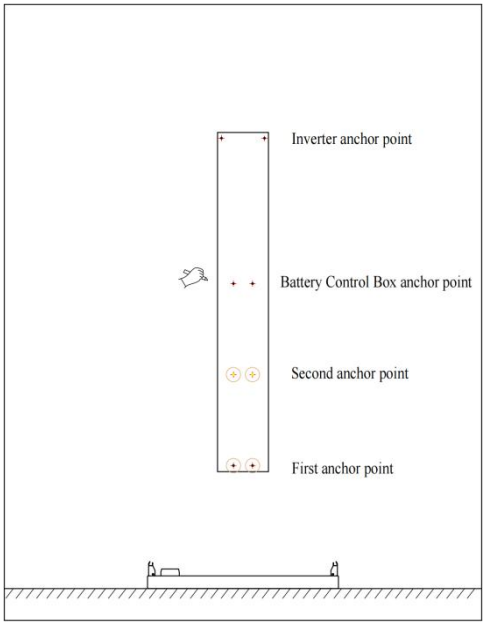
Install the first layer PACK and the second layer PACK on the base, mark the center of the Wall Mounting Bracket hole with a marker one by one, as shown in the picture.



Step 5

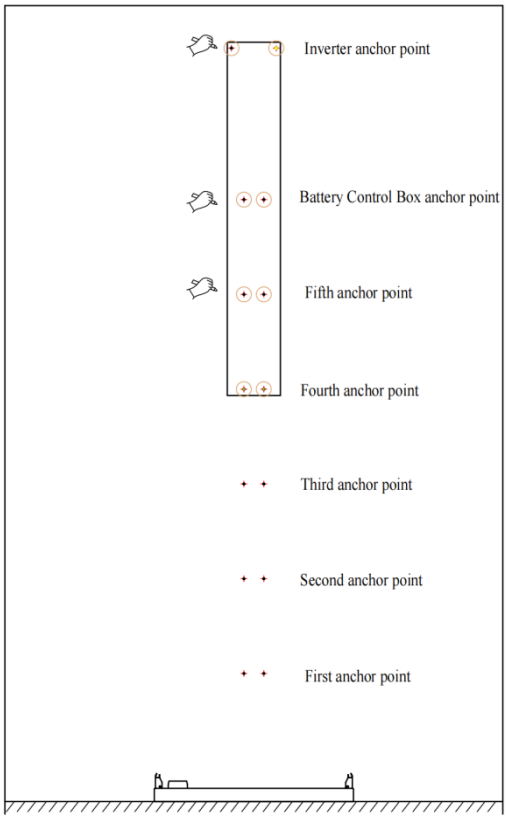
Remove the first layer of PACK and the second layer PACK to mark the other layers of the PACK with the positioning plate according to the first and second layer of PACKS positioning points. The AF-HU energy storage system contains at least two layers of PACK, each system contains a control box and inverter.

If two layer PACKS are installed, the marking method is as follows:



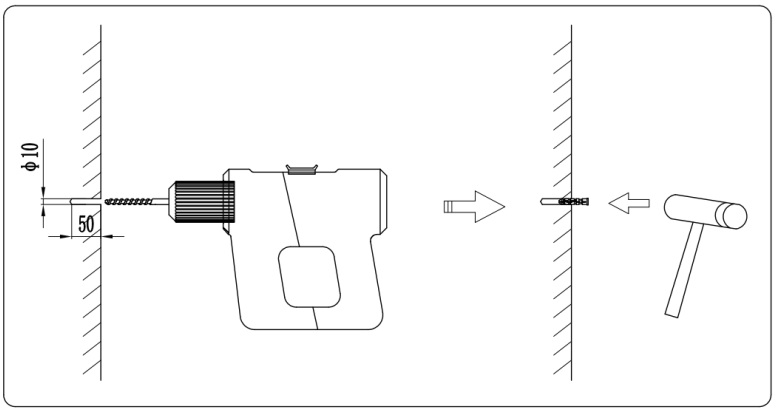
In the same way, move the positioning plate up to marked the fixed locations of the third, fourth, and fifth layer PACKS. This system contains a maximum of 5 layers of PACKS.

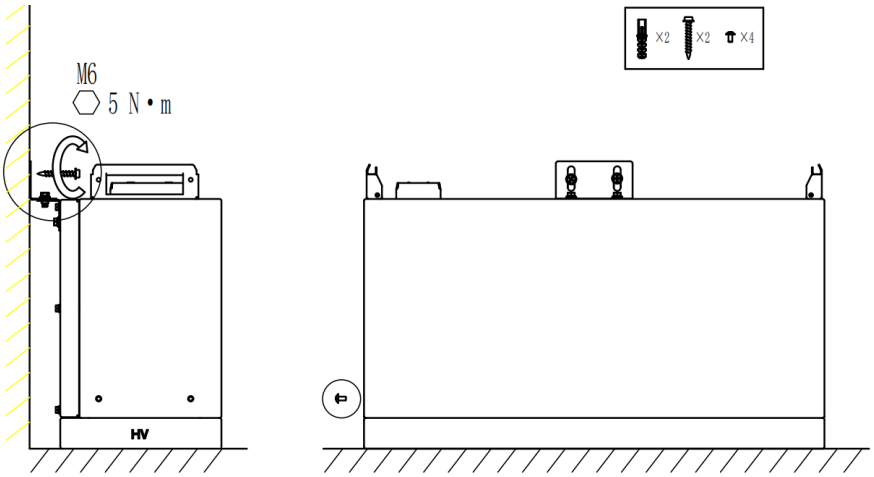
If five layer PACKS are installed, the marking method is as follows:



Step 6

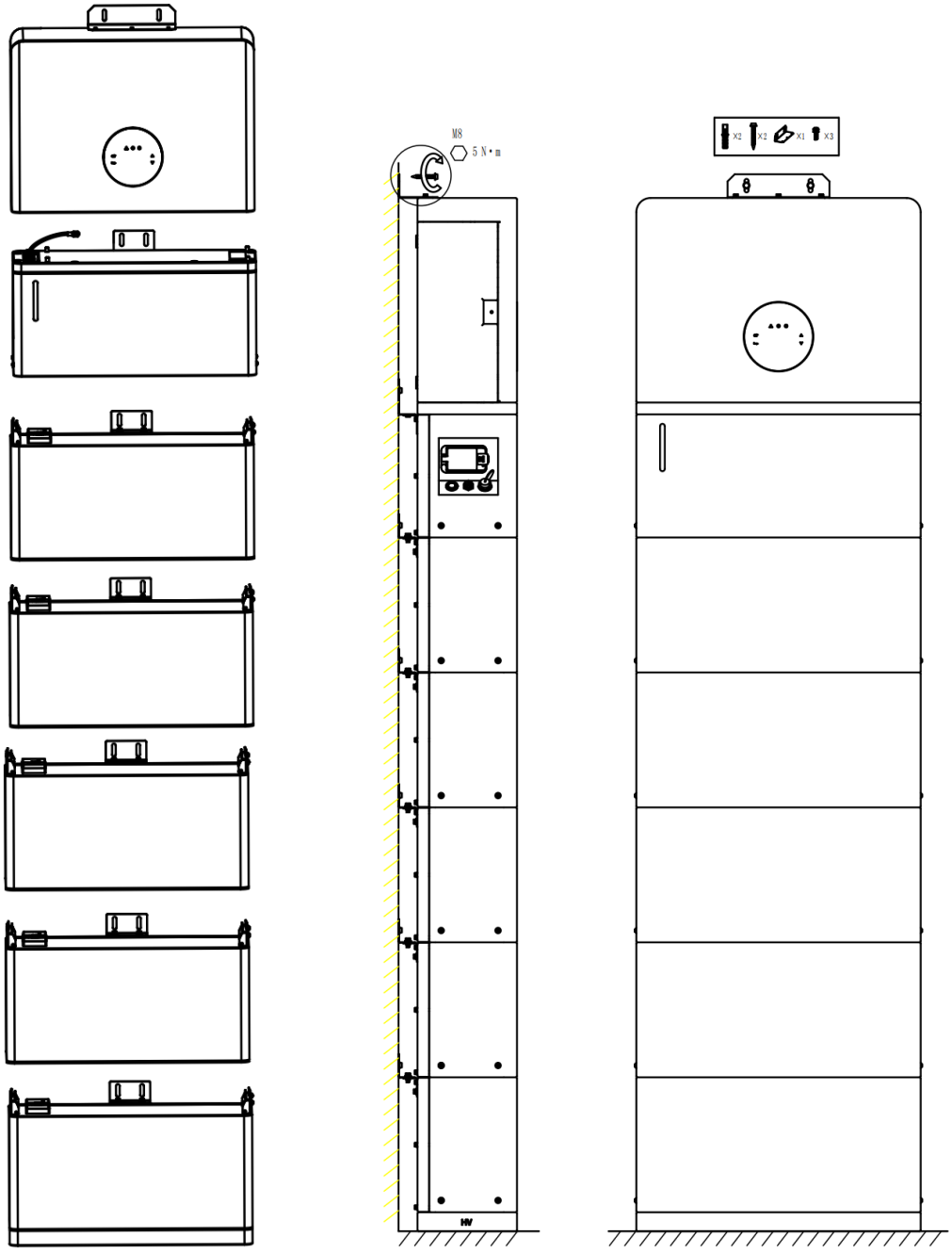
Drill the hole according to the anchor point and install the plastic expansion tube.Fix PACK to the wall with fixings, while tightening the side screws of PACK according to the figure to make the pack tightly connected.





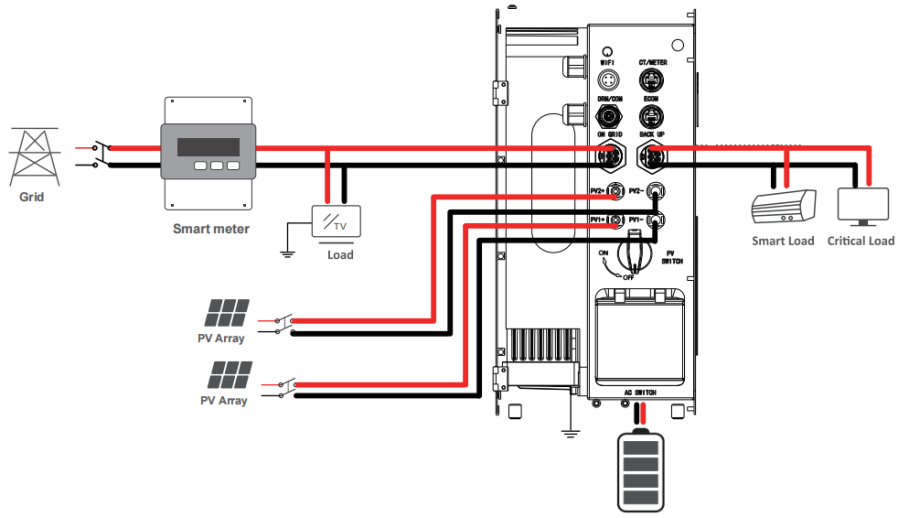
Step 7

Follow step 4 to stack the second PACK on top of the first,and secure the second layer of PACK according to Step 6. Then repeat the steps to stack and secure the third, fourth, and fifth layers of PACK.Then Stack the control box and the inverter with the uppermost PACK as shown in the figure. Keep the upper and lower connectors aligned to complete the stack, and then secure them with the screws shown in the figure.Finally,Fix the inverter with the wall with the fixed parts, and fix the screws on theow upper and ler sides.



Follow the above seven steps to complete the installation.

5 Electrical Connection



5.1 PV Connection

The hybrid inverter has one/two MPPT channels, can be connected with one/two strings of PV panels. Please make sure below requirements are followed before connecting PV panels and strings to the inverter:

(1) The open-circuit voltage and short-circuit current of PV string should not exceed the reasonable range of the inverters.

(2) The isolation resistance between PV string and ground should exceed 300 kΩ.

(3) The polarity of PV strings are correct.

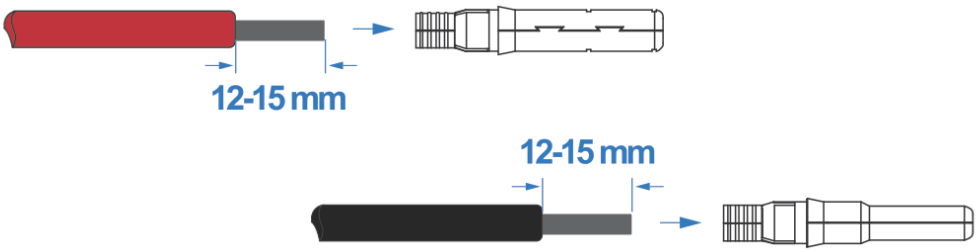
(4) Use the DC plugs in the accessory.

(5) The lightning protector should be equipped between PV string and inverter.

(6) Disconnect all of the PV (DC) switch during wiring.

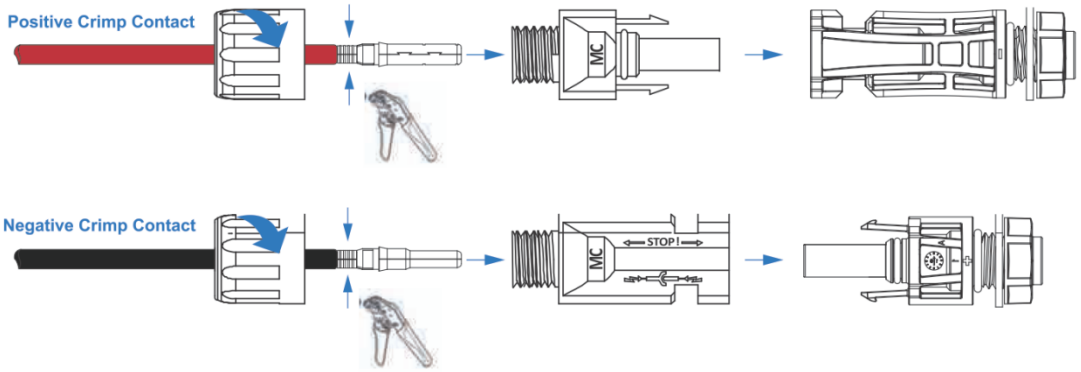
WARNING
The fatal high voltage may on the DC side, please comply with electric safety when connecting.
Please make sure the correct polarity of the cable connected with inverter, otherwise inverter could be damaged.

Step 1



Note: PV cable suggestion Cross-section 4mm².

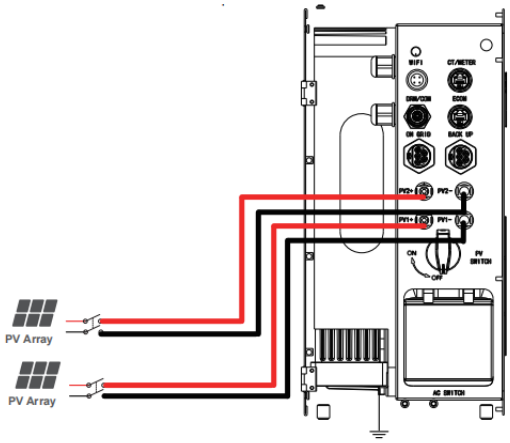
Step 2



Note: Please use PV connector crimper to pinch the point of the arrow. You'll hear click sound when the connector assembly is correct.

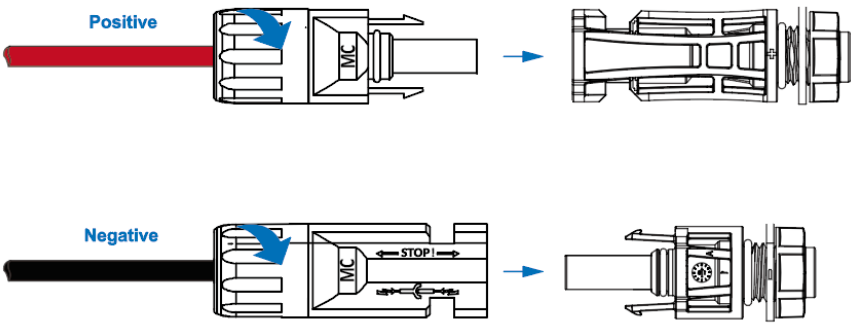
Step 3

As shown in the figure, the installation is complete.



5.2 Battery Connection

Connect the battery input interface of the inverter to the positive and negative output interfaces of the battery control box as shown in the figure.



Note: You'll hear click sound when the connector assembly is correct.

5.3 AC Connection

The AC terminal contains "GRID" and "BACK UP", GRID for load, and BACK UP for emergency load.
Before connecting, a separate AC breaker between individual inverter and AC input power is necessary. This will ensure the inverter be securely disconnected during maintenance and fully protected from current of AC input.
An extra AC breaker is needed for On-Grid connection to be isolated from grid when necessary. Below are requirements for the On-Grid AC-breaker.

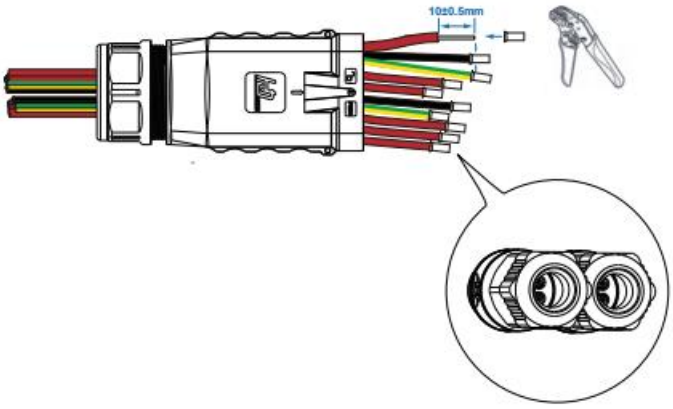
Note: There are AC circuit breakers inside the inverter for grid output/input. When using the ON Grid function, the circuit breaker needs to be closed before it can be used. In addition, qualified electrician will be required for the wiring, cable suggestion Cross-section 8-10AWG.

Please follow steps for AC connection:

(1) Connect DC protector or breaker first before connecting.

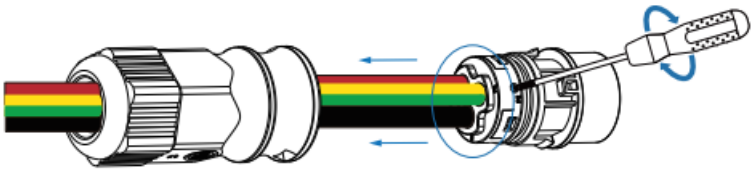
(2) Remove the 8mm (0.4 inch) long insulation sleeve, loosen the fixing screws, insert the AC input line according to the polarity indicated on the terminal block, and tighten the fixing screws.

Step 1
Use crimping pliers to press the tubular terminals.

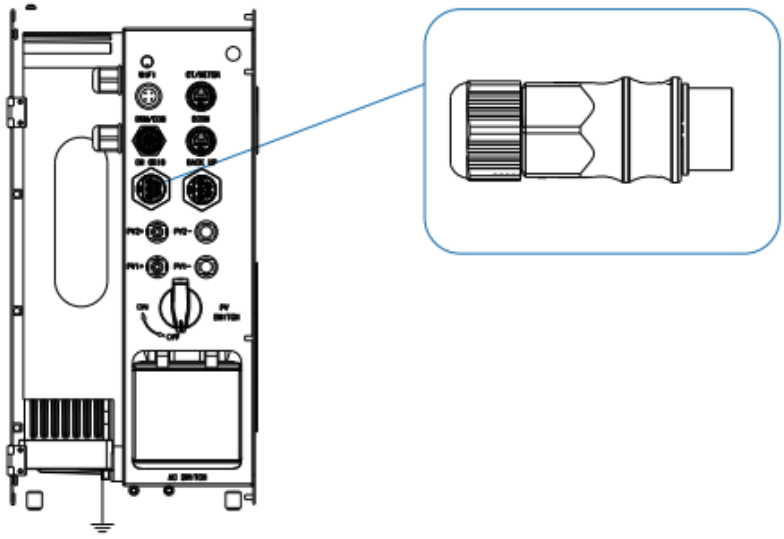


Note: The wiring terminals should be wrapped with insulation tape, otherwise it will cause a short circuit and damage the inverter.
The Max. power load connects to BACK up port should not exceed the inverter's BACK UP Max. output power range.

Step 2
Tighten the cable corresponding to the connector with a screwdriver.



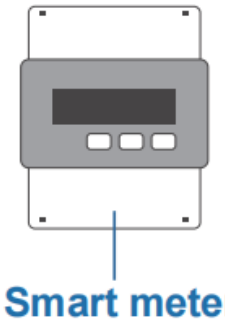
Step 3
Insert the AC Waterproof Cover into the corresponding terminal, turn the AC Waterproof Cover latch clockwise to lock .



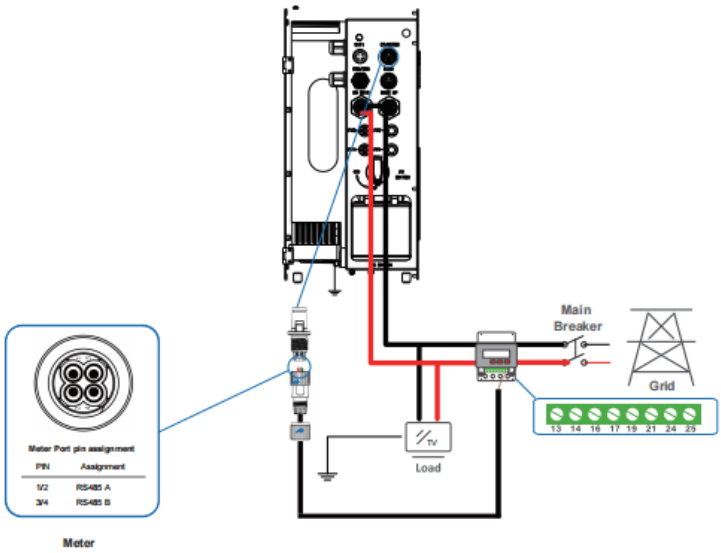
Note: After the wiring harness is locked, it should be pulled to prevent the locking from being unstable.

5.4 Meter Connection

Meter and a current sensor(CT for short below) are used to detect current power direction of the local load and the grid. The output control function of the inverters will be activated based on the detected data.



Install the Meter

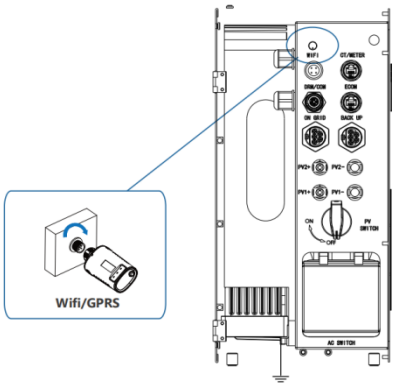


5.5 Communication Connection

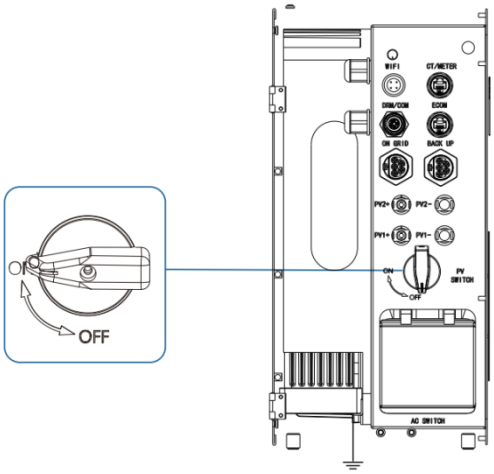
The monitoring module could transmit the data to the cloud server, and display the data on the PC, tablet and smart-phone.

Install the WIFI / Ethernet / GPRS / RS485 Communication:

Step 1



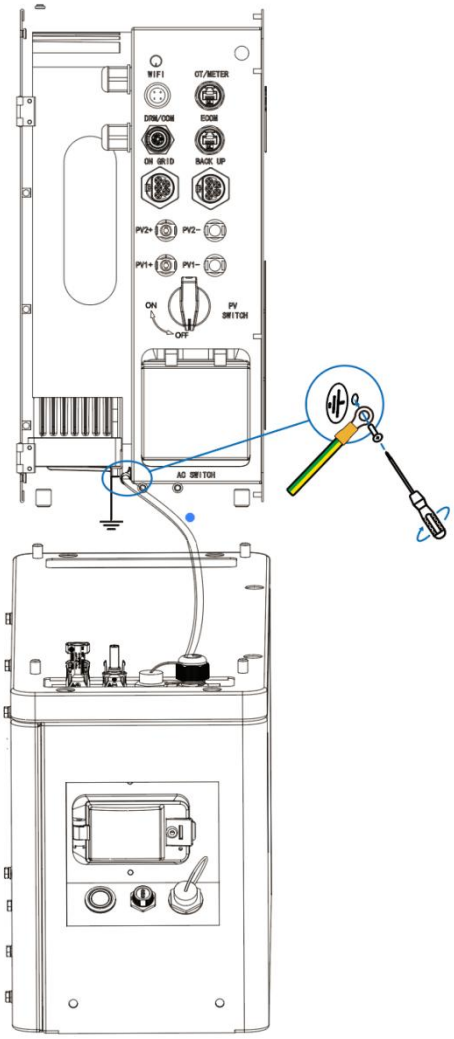
Step 2



Turn on the DC switch and AC circuit breaker, and wait until the LED indicator on the monitoring module flashes, indicating that the monitoring module is successfully connected.

5.6 Earth Connection

Note:A second protective earth (PE) terminal should be connected to the inverter. This prevents electric shock if the original protective PE wire fails.



Fix the grounding screw to the grounding connection of the machine housing.

6 Operation

6.1 Operation requirements

DANGER

The Personnel responsible for the installation and maintenance of the equipment must undergo rigorous training and obtain relevant certifications. They must be familiar with local laws, regulations, and applicable standards, understand the battery system's composition and working principles, be aware

of all safety precautions, master correct operating methods, and possess the operational qualifications required by the country where the work is performed.

- Do not perform live work (including but not limited to installation, wiring, replacement, etc.). Before any operation, ensure that all power supplies to the equipment are disconnected, including but not limited to the grid-side, inverter, and diesel generator power switches;
- Do not use sharp objects to contact the battery pack connectors;
- Do not operate the equipment in severe weather conditions (including but not limited to thunderstorms, rain, snow, typhoons, etc.);
- Do not clean or immerse the equipment with water, alcohol, oil, etc., to prevent electric leakage or electrolyte leakage from the battery pack;
- Do not strike, drag, or step on the equipment;
- Before operating the equipment, inspect it for damage. If any abnormality is found (such as physical deformation, unusual odors, etc.), do not operate the equipment;
- Before starting work, wear protective gear such as insulated gloves, insulated shoes, and a safety helmet;
- Use insulated tools during installation and wiring;
- Equipment requiring grounding must be permanently connected to the protective earth (PE). When connecting cables, the protective earth wire must be connected first; when replacing equipment, the protective earth wire must be disconnected last;

- Before contacting equipment terminals, measure the voltage at the contact points to ensure there is no risk of electric shock;
- During equipment operation, prevent any foreign objects from falling into the equipment interior.

6.2 Power on

1) Check all the power cables and communication cables between Battery Control Box and inverter. Check and make sure grounding is connected.

2) Turn on the Breaker on the Battery Control Box.After opening, the switch button will keep flashing green light.

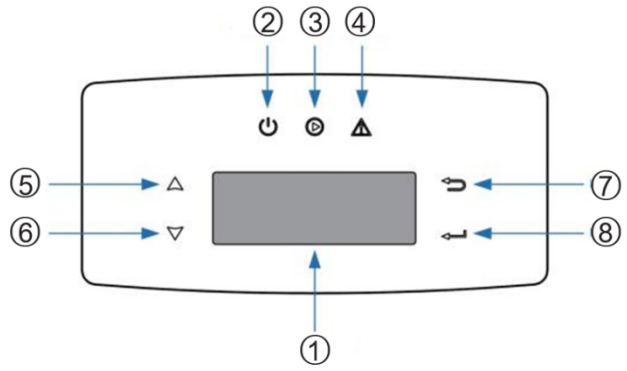
3) Press and hold the switch button for 5 seconds to activate the system and complete the startup.

4) After the battery system is powered on, the inverter will automatically start.

6.3 Power off

1) Simply turn off the circuit breaker to complete the shutdown.

6.4 Control Panel

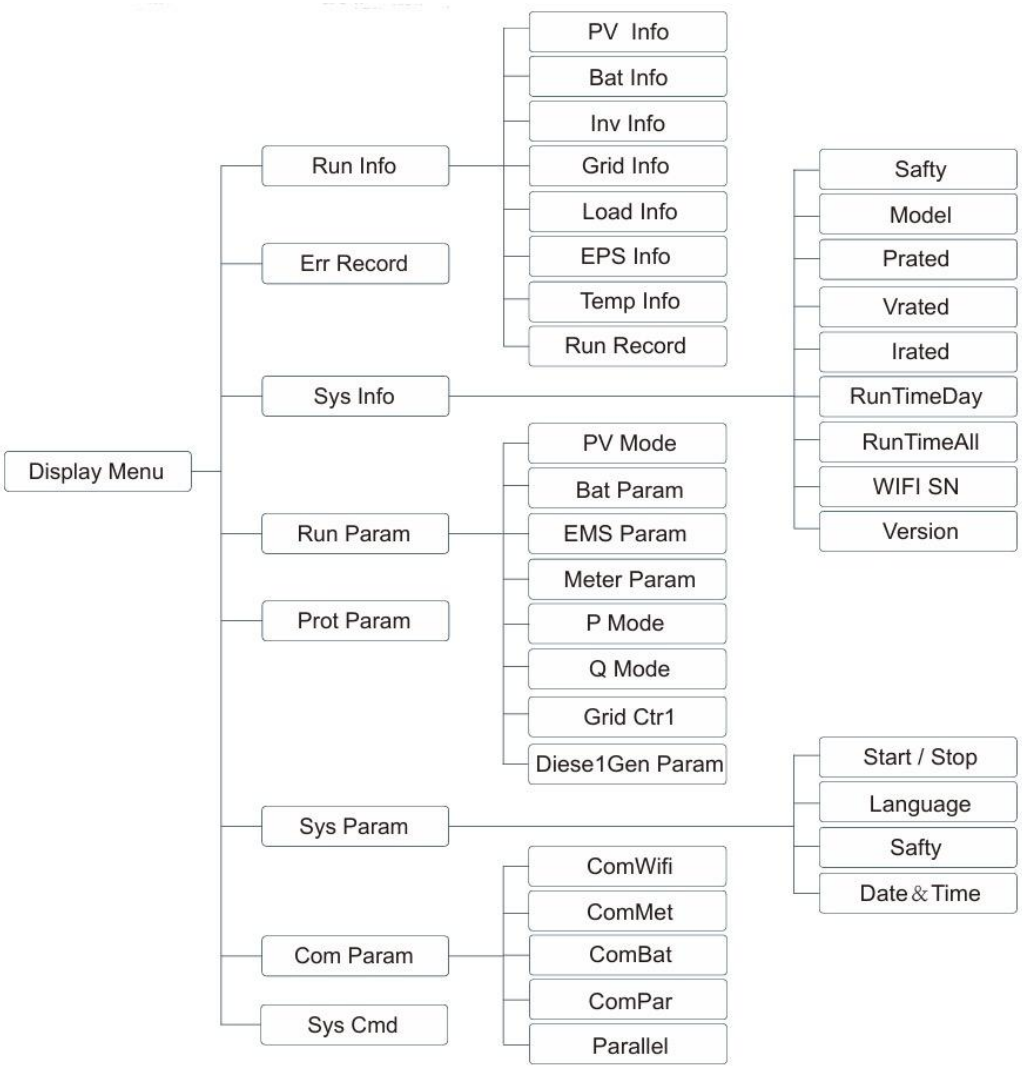


No.	Items	No.	Items
1	LCD Display	5	UP Touch Button
2	POWER LED Indicator	6	DOWN Touch Button
3	GRID LED Indicator	7	BACK Touch Button
4	FAULT LED Indicator	8	ENTER Touch Button

*Hold UP/DOWN button can be rolling quickly.

Sign	Power	Color	Explanation
POWER	ON	Green	The inverter is stand-by
	OFF		The inverter is power off
GRID	ON	Green	The inverter is feeding power
	OFF		The inverter is not feeding power
FAULT	ON	Red	Fault occurred
	OFF		No fault

Hybrid inverter has a LCD for clearly operating, and menu of the LCD can be presented as following:



The password for setting this parameter is 5432.

Finally,For detailed inverter operation instructions, please scan the QR code below:

7 Transport and Maintenance

7.1 Annual inspection

Every year after installation. The connection of power connectors, grounding points, power cables and screws are to be checked. Make sure there is no loosening, fracture or corrosion at any connection point. Check the installation environment such as dust,

water, insect etc. and make sure it is suitable for IP66 battery system.

Standard charging method by manufacturer：Charging the cell with 30A constant current until to 3.6V, then constant voltage 3.6V until charging current reduces to 5A.

7.2 Transport requirement

The product transportation process shall meet the following requirements:

- Observe the caution signs on the packaging of the device before transportation.
- Battery energy state is 20%~50%, disconnect the high voltage circuit;
- When carrying the equipment by hand, wear protective gloves to prevent injuries.
- Handle the product gently during transportation to prevent dropping,tumbling and heavy pressure;
- Prevent severe vibration, inversion, impact, extrusion, sun and rain during product transportation.

7.3 Storage

- The device must be stored indoors.
- Do not remove the original packaging material and check the outer packaging material regularly.
- The storage temperature should be between 0℃ and 45℃ . The humidity should be between 5% and 65%.
- Stack the device in accordance with the caution signs on the carton to prevent the device falling down and damage. Do not place it upside down.

7.4 Disposal instructions

- Private disassembly is prohibited; it must be performed by a professional and followed by proper recycling procedures.