Off-grid solar inverter

User manual

Power: 5.0kVA-6.0kVA

Product model: HS1045EH48L/HS1055EH48L/HS1055EH48P
HS1045EN48L/HS1055EN48L/HS1055EN48P

CATALOGUE

About this manual

Purpose

This manual describes detailed product information and installation, operation and maintenance instructions of off-grid solar inverters.

Thank you very much for using the HS series off-grid solar inverter which is developed and produced by our company. We sincerely hope that this product can meet your needs, and we look forward more valuable suggestions on the performance and functionality of the product.

This manual is intended for the users who install, operate and maintain the off-grid solar inverters. Operators should have certain electrical knowledge and be familiar with electrical principles and characteristics of electronic components.

How to use the Manual

Please read this manual carefully before using this product. Please keep this manual in a place easy for operation and maintenance personnel to find.

The contents and the pictures, signs and symbols of this manual are owned by our company.The content of this manual shall not reproduced publicly without written authorization except the company's internal personnel.

The contents of the manual will be constantly updated and corrected, but it is inevitable that there are slight inconsistency or errors with the physical objects. Users should request the latest version of the manual from the download or the sales channel.You can get the latest manual through your dealer.

Safety instructions

This manual contains all the safety, installation and operation instructions for the HS series off-grid solar inverters. Read all the instructions and precautions in the manual carefully before installation and use.

- Read this manual before operation and we shall not be liable for any failure or loss caused by improper operation.
- Don't remove the device. Bring it to a qualified service center when a service or repair is required. Incorrect restructuring may cause a risk of electric shock or fire.
- To reduce the risk of electric shock, disconnect all power supplies before trying any maintenance or cleaning. Closing the device doesn't reduce this risk.
- The surface temperature of the off-grid solar inverter may exceed 60℃ during operation, so make sure it is cooled before making contact and place the inverter out of the reach of the children.
- This product is an indoor installation product, if outdoor installation should avoid direct sunlight and rain infiltration.
- Don't install the off-grid solar inverter in a harsh environment such as wet, greasy, flammable, explosive or dust accumulation.
- After the switch of the power supply is turned off, there is still high pressure inside the off-grid solar inverter. Don't immediately open or touch the internal devices. After the capacitor discharge is completed (more than 5 minutes), the relevant operations will be conducted.
- When replacing the battery, the equipment should be fully powered on, and the relevant operation should be conducted after checking that the equipment is out of power.
- Before using the unit, read all the instructions and warning marks on the unit, battery and all appropriate sections in this manual.
- In order to achieve the optimal operation of this off-grid solar inverter, please select the appropriate cable size according to the required specifications. Proper operation of this inverter / charger is very important.
- Be very careful when using metal tools on or around the battery. The throwing tool may generate sparks or short-circuit batteries or other electrical components and may cause an explosion.
- When you want to disconnect AC or DC terminals, follow the installation procedure. Please refer to the installation section of this manual for more details.
- Ground description: This off-grid solar inverter shall be connected to a permanent ground wiring system. When installing this inverter, the local requirements and regulations must be observed. The positive and negative electrode and the PV positive and negative electrode of the off-grid inverter system battery cannot be grounded.
- Don't cause a short circuit of the AC output and the DC input. Don't connect to the mains when the DC input is short circuit.
- You must clearly know what kind of battery you need to use. If the battery is mismatched with the energy storage machine, the system will not operate.
- All the wiring, installation, commissioning and other work should be completed by the relevant professionals.
- During installation, don't touch any component in the junction box below the energy storage.

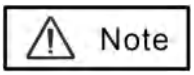
Safety Identification Symbol:

The following lists the symbols that may be used in this manual. Please read them carefully to use this manual better.

"Risk" indicates a high potential danger and a failure to avoid it would result in death or serious injury.

"Warning" indicates a moderate potential hazard and a failure to avoid conditions that could lead to death or serious injury.

"Care" indicates low potential risk and failure to avoid conditions that could lead to moderate or mild injury to a person.



"Note" indicates a potential risk to avoid situations that may cause the equipment to operate properly or cause property damage.


Instructions

"Instructions" is the additional information in the manual, emphasizing and implementing the content, it may also provide tips or tricks for optimizing the use of products, can help you solve a problem or save you time.

Chapter 1 Product description

1.1 Product overview and features

The HS series is a combination of inverters, solar chargers and battery chargers to provide a portable size of an uninterruptible power supply. Its comprehensive LCD screen provides user configurable and easily accessible button operation, with mains first, solar first, mains and solar hybrid, only solar charging four charging modes optional; Three output modes of photovoltaic priority, inverter first and mains priority are optional to meet different application needs.

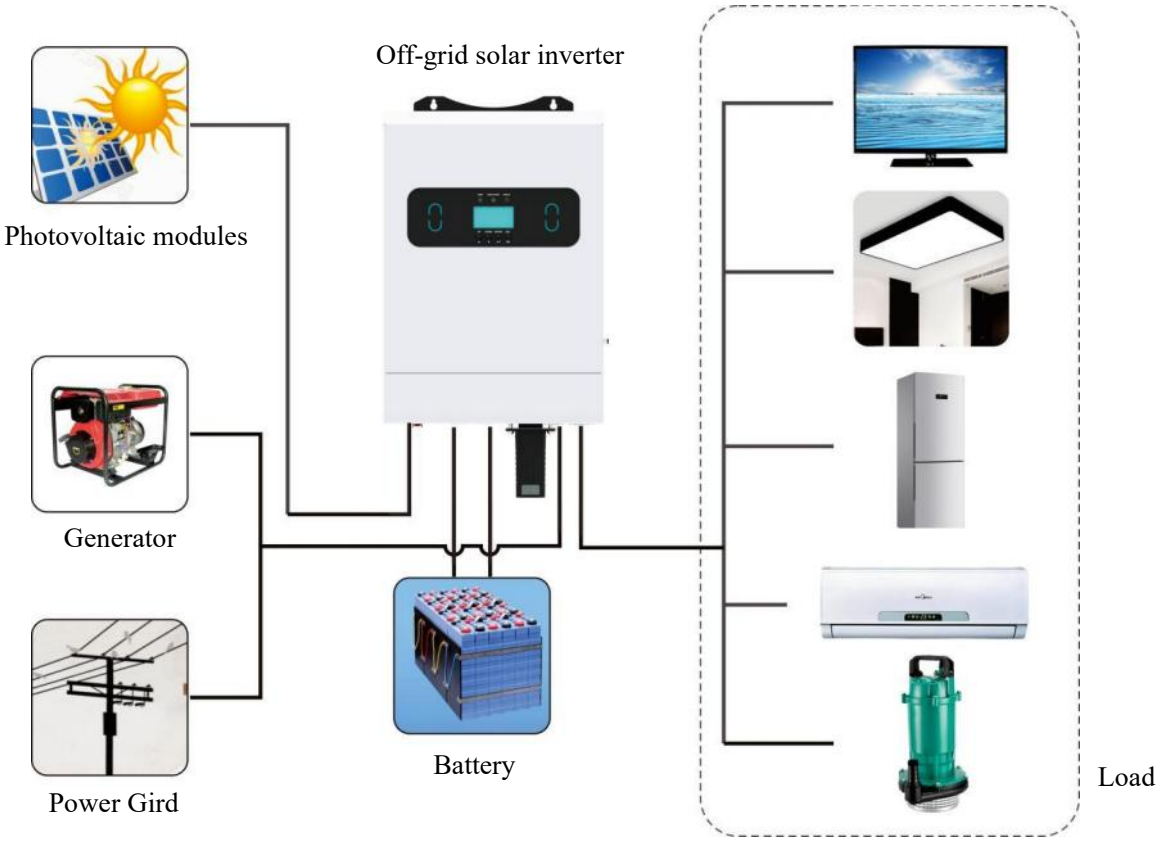
Features:

1. Pure sine wave inverter with full digital voltage and current with double closed-loop control.
2. The charging module samples the all-digital voltage and current control, which safely and efficiently realizes the charging and protection of the battery.
3. It has three output modes: photovoltaic priority, inverter priority and Utility Power bypass priority, and has uninterrupted power supply function.
4. There are four charging modes: Utility Power first, solar first, Utility Power and solar hybrid, and solar charging only.
5. Advanced MPPT PV maximum power tracking technology to maintain the maximum PV output.
6. LCD screen and LED indicator light design, dynamic display system data and running status.
7. With the energy-saving mode function, to reduce the no-load loss.
8. It is adopted the Intelligent adjustable speed fan for quiet and efficient heat dissipation, extending the system life.
9. With lithium battery, solar energy and mains power activation function, support lead-acid battery, lithium battery access.
10. Anti-backflow grid-connected function (photovoltaic mains hybrid power supply), photovoltaic grid-connected power generation mode can be set..
11. It has multiple protection functions, complete short circuit protection, over-voltage/under-voltage, overload, over-temperature, reverse irrigation, and other protections.
12. It can also bypass output without battery, to meet the uninterrupted power supply demand of special scenarios such as battery trip and battery damage.
13. Up to 9 parallel machines are supported.

Note: HS1045EN48L / HS1055EN48L / HS1055EN48P models have no PV input terminals, and all functions involving PV in the user manual are invalid.

1.2 Basic system introduction

The following figure shows the system application scenarios of this product. A complete system includes the following parts, and the specific system wiring mode is determined by the actual application scenarios.



As shown in the figure above, a complete off-grid energy storage system must consist of solar photovoltaic modules, off-grid solar inverters, batteries, and the power grid, etc.

1. Photovoltaic modules: convert light energy into direct current energy and charge the battery through an off-grid solar inverter.

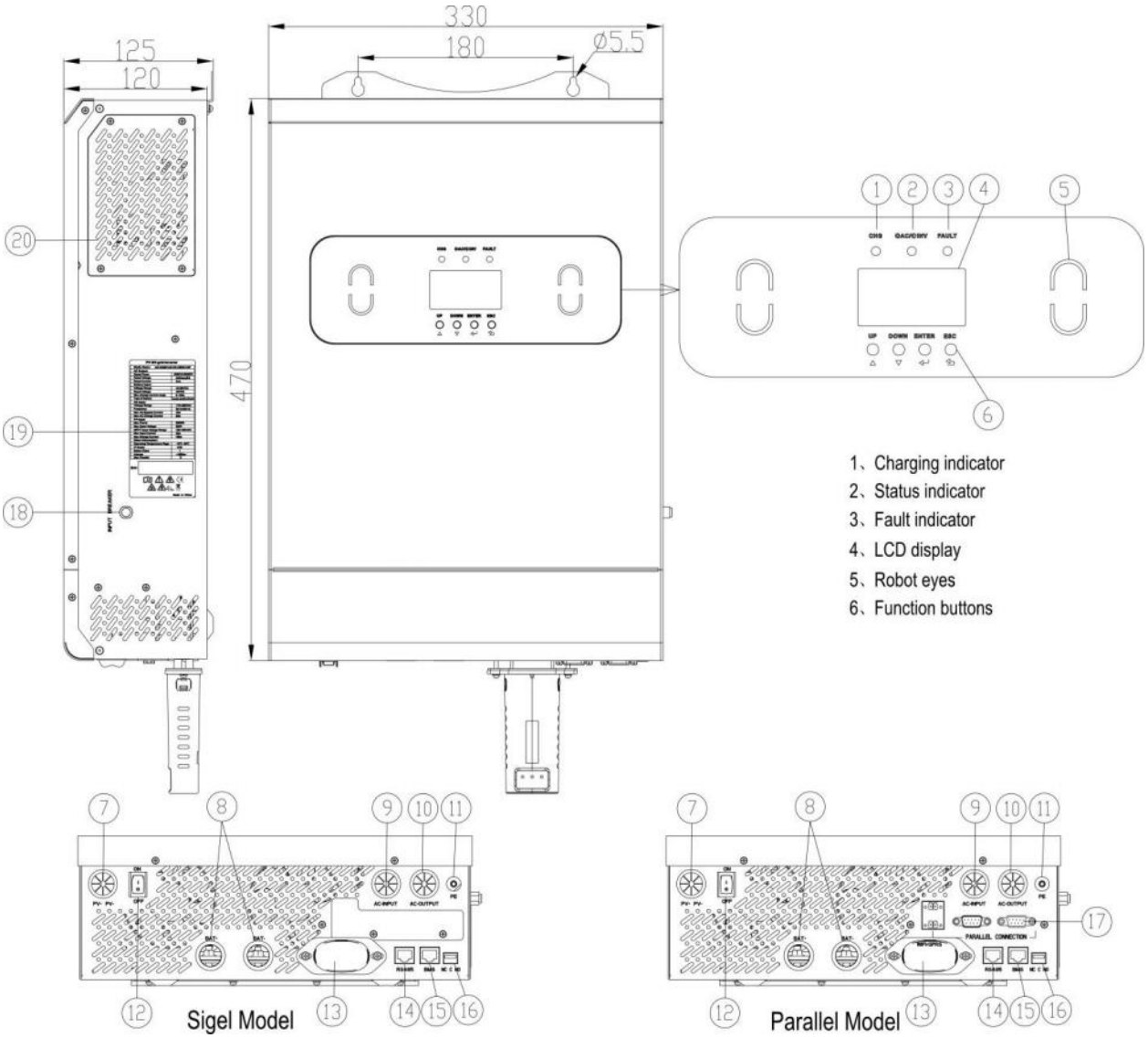
2. Battery: The function of a battery is to ensure the normal power consumption of the system load when there is no or unstable utility power.

3. Utility power or other AC input sources: accessed at the AC input terminal, which can supply power to the load and charge the battery. In the absence of an AC input source, the load is powered by batteries and photovoltaic modules.

4. Load: all kinds of electrical appliances in the home or office environment, including tubular lights, fans, refrigerators, air conditioners, aspirate pumps and other electric electrical appliances.

5. Off-grid solar inverter: a device for overall energy conversion.

1.3 Product appearance introduction



①	Charge lamp	⑪	AC output is ground
②	AC or inverter indicator lamp	⑫	ON / OFF push-button switch
③	Fault indicator lamp	⑬	Communication stick
④	LCD display screen	⑭	RS485 communication port
⑤	Robot eyes	⑮	BMS communication port
⑥	Function button	⑯	Dry contact point
⑦	PV port	⑰	Combined current connection port
⑧	Battery port	⑱	Overload protector
⑨	AC input port	⑲	Parameter labeling
⑩	AC output port	⑳	Dust guard

Chapter 2 Installation

About this chapter

This chapter introduces the relevant configuration of the machine and the main installation process. Please read this instructions carefully and be familiar with the installation steps to help the installer correctly install our HS series off-grid solar inverters.

2.1.safety instruction

	**The open-circuit DC voltage of the photovoltaic array is up to 500V, and the AC side voltage of the power grid is up to 280V. Never touch the live terminal directly. Ensure no electric AC / DC side before installation and maintenance.**

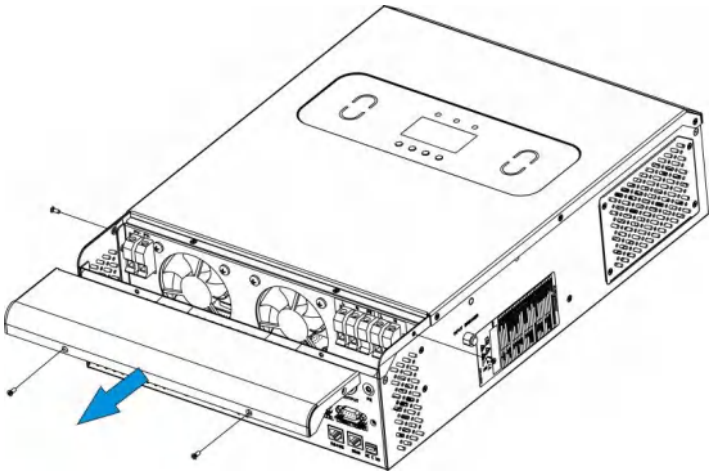
- Before using the unit, read all the instructions and warning marks on the unit, battery and all appropriate sections in this manual.
- Note: In order to reduce the risk of injury, lead-acid batteries can only be charged for deeply recycled rechargeable batteries, and other types of lead-acid batteries may burst, causing personal injury and damage.
- Do not disassemble the device. When service or repair is required, bring it to a qualified service center. Incorrect reassembly can lead to a risk of electric shock or fire.
- To reduce the risk of electric shock, disconnect all electrical wires before attempting any maintenance or cleaning. Turning off the device does not reduce this risk.
- Note: Only professional personnel can use the battery and install this equipment.
- Never charge a frozen battery.
- To achieve the optimal operation of this inverter / charger, please select the appropriate cable size according to the required specifications. Proper operation of this inverter / charger is very important.
- Be very careful when using metal tools on or around the battery. The throwing tool may generate sparks or short-circuit batteries or other electrical components and may cause an explosion.
- When you want to disconnect AC or DC terminals, follow the installation procedure. Please refer to the installation section of this manual for more details.
- Ground instructions-This inverter / charger shall be connected to the permanent ground wiring system. When installing this inverter, the local requirements and regulations must be observed. The positive and negative electrode and the PV positive and negative electrode of the off-grid inverter system battery cannot be grounded.
- Don’t cause a short circuit of the AC output and the DC input. Don’t connect to the utility power when the DC input is short circuit.
- Warning! Only qualified service personnel are able to use the equipment. If an error remains after the following troubleshooting table, send this inverter / charger back to your local dealer or service center for maintenance.

2.2.Preparation before installation

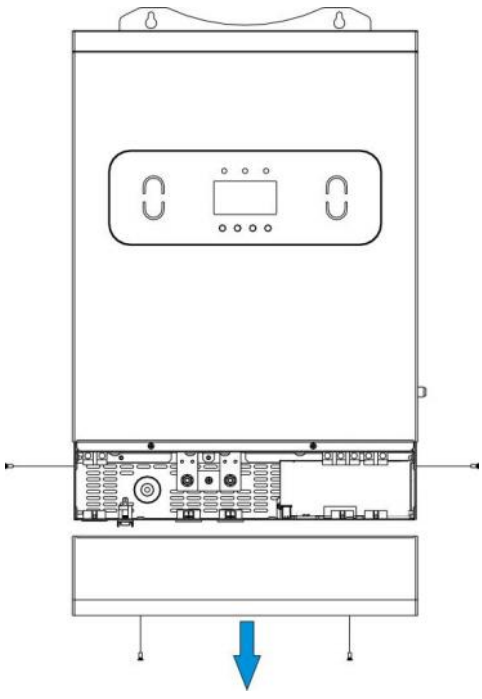
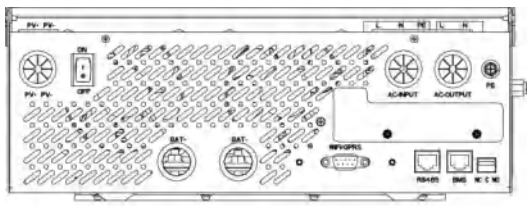
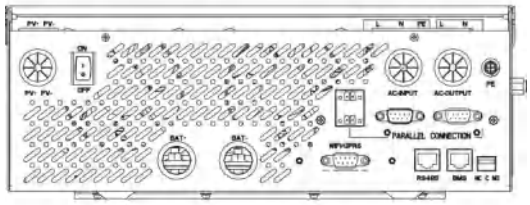
2.2.1. Check the equipment before installation. Ensure that there are no damaged items in the package. You will receive the following items in the package:

- Machine * 1
- Self-tapping screw ST48X30C*3 and its supporting expansion pipe *3
- Communication stick * 1(optional), user manual * 1, warranty form * 1, factory inspection report
- Parallel communication line (parallel model)

2.2.2. Before installing and connecting all wiring, remove the repair cover screws and remove the cover as shown in the figure.



Remove the access cover screws and remove the terminal protection cover:

Front elevation	Bottom view
	 Sigel model  Parael 1 model

2.2.3. Wiring specifications and circuit breaker selection

- For the PV input line diameter and switch selection, please refer to the following table:

Model	The PV input wiring line diameter is recommended	Maximum PV input Voltage / current	Recommended air switch or circuit breaker model
HS1045EH48	10AWG	500V /25A	2P—40A
HS1055EH48/HS055EH	10AWG	500V /25A	2P—40A
Note: The voltage shall not exceed the maximum PV input open circuit voltage in series.			

- Recommended AC input / output line diameter and switch selection please refer to the following table:

Model	The AC input / output is recommended Wiring diameter	Maximum bypass communication Input / output current	Recommended air switch or circuit breaker model
HS1045EH48	8AWG	230V/40A	2P—63A
HS1055EH48/HS1055EH48P	8AWG	230V/40A	2P—63A
The above wiring line diameter and circuit breaker are only recommended, please select the appropriate wiring line diameter and circuit breaker according to the actual situation.**It is suggested that the input and output cable length of the off-grid solar inverter is consistent with the line diameter.**			

- For the recommended battery input line diameter and switch selection, please refer to the following table:

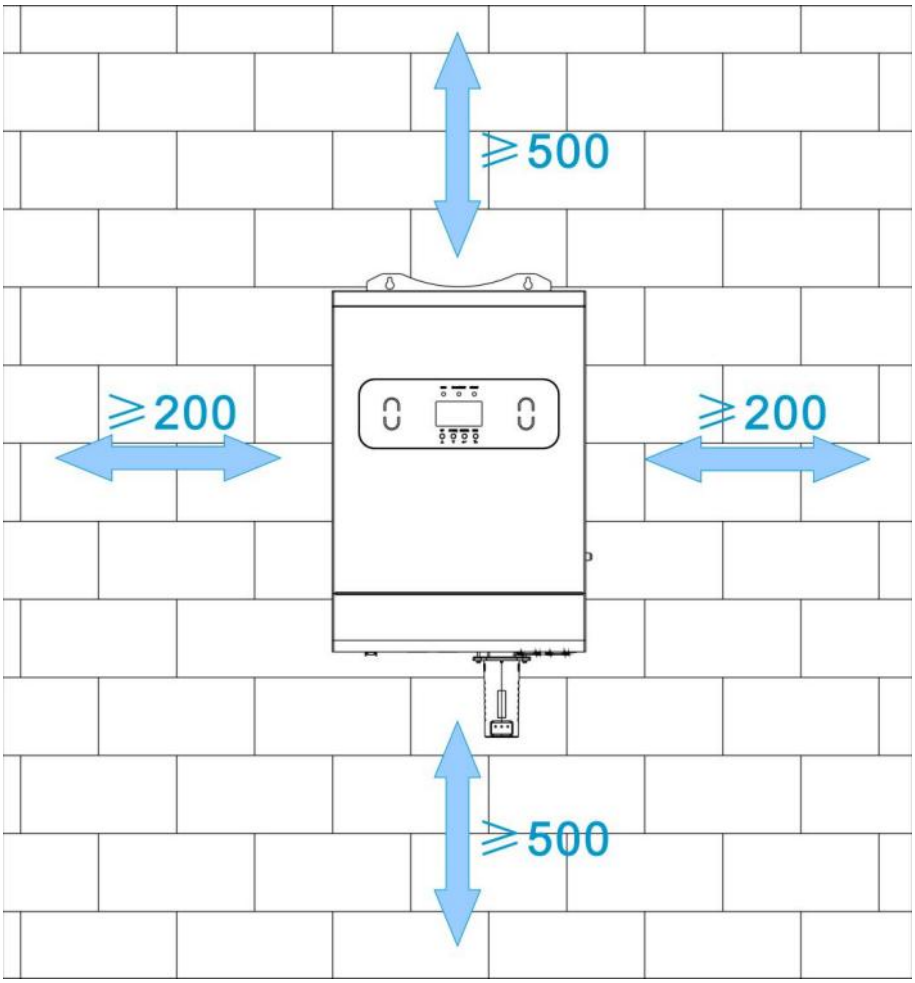
Model	Battery wiring wire diameter is recommended	Battery rated discharge current	Maximum charging current	Recommended air switch or circuit breaker model
HS1045EH48	2AWG	100A	100A	2P—160A
HS1055EH48/HS1055EH48P	2AWG	125A	100A	2P—160A
Note: The wiring line diameter is for reference only. If the distance between the off-grid solar inverter and the battery is far away, the use of a thicker line can reduce the system loss. **It is recommended that the length of the cable between the off-grid solar inverter and the battery should not exceed 3m.For the connection of all machines, the cable shall be of the same length as the wire diameter.**				

2.3.Installation and connection

2.3.1. install machinery:

（一） Mounted on a solid and non-combustible wall, install the inverter on the line of sight height and can reach the display start button to read the LCD display and start equipment at any time. In order to ensure the optimal operation condition, with additional protection during the indoor and outdoor installation, the installation ambient temperature shall be between -10℃ and 55℃.

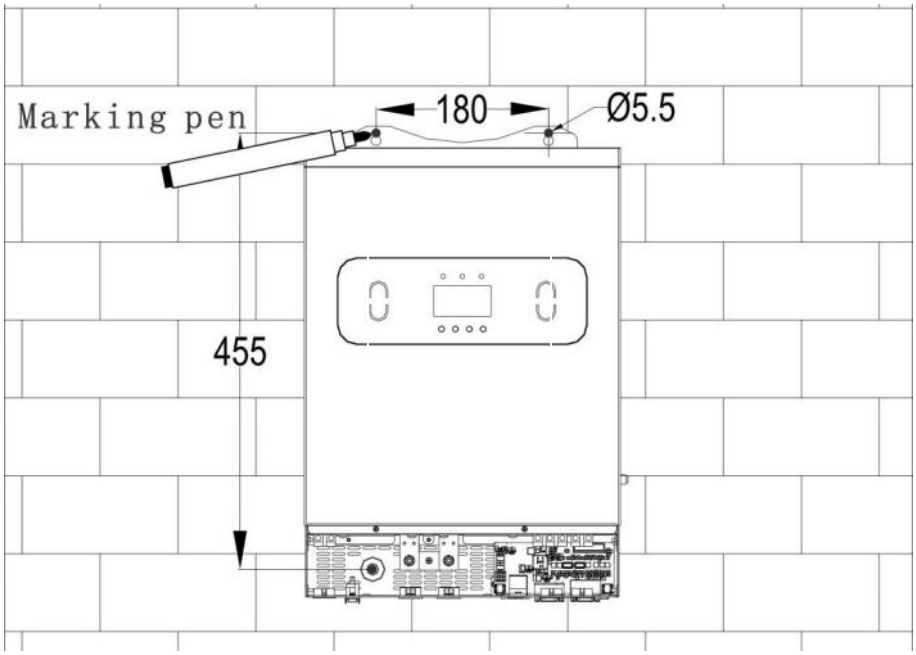
（二）When installing the off-grid solar inverter, ensure that there is enough space for installation. The off-grid solar inverter has at least 500mm space, and at least 200mm space between the left and right, to ensure natural convection and heat dissipation. Refer to the whole machine installation schematic diagram as shown below.



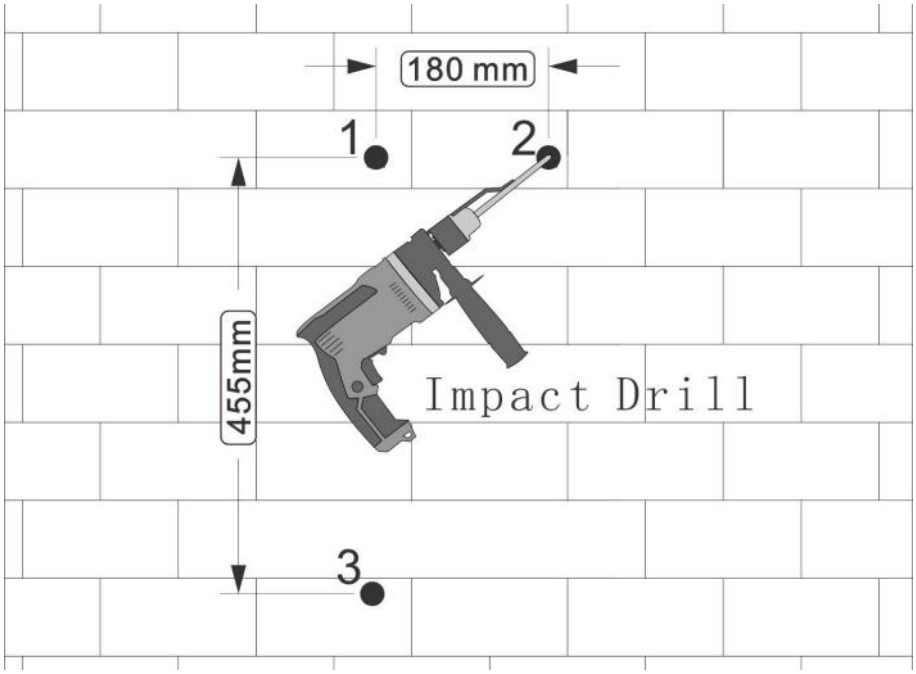
（三） The detailed fixing and installation steps are as follows:

Warning: Danger of explosion! Don’t place the off-grid solar inverter with the lead-acid liquid battery in a closed space! Don’t be installed even in closed places where battery gas may accumulate.

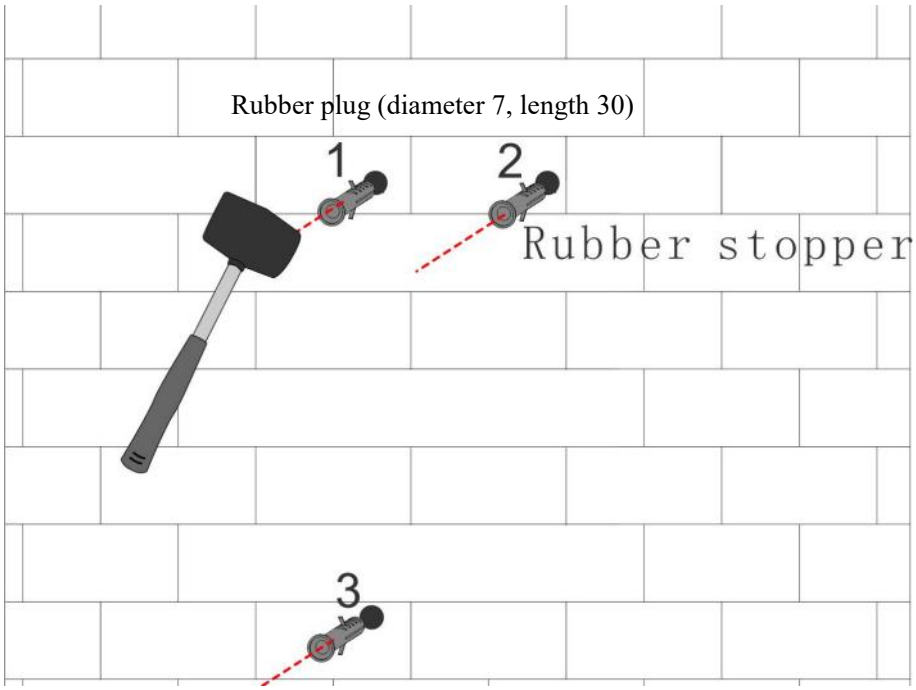
（一）Positioning hole mark: mark "◎" on the wall according to the size of the following picture or using the equipment;



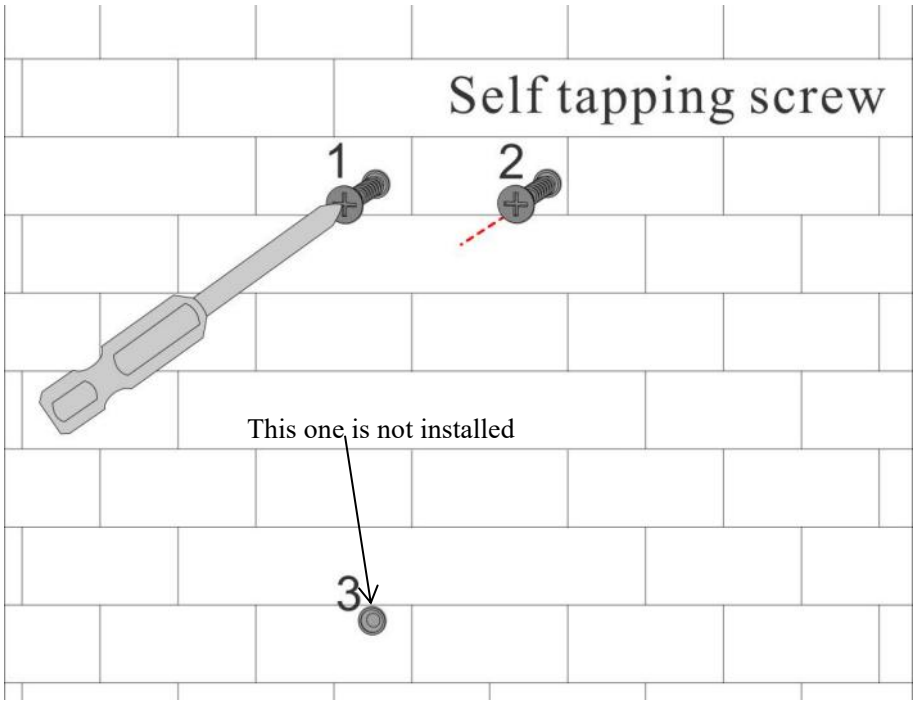
（二）Drilling: With Impact drill on the wall mark drilling (3 PCS), drill diameter 7mm drill depth 40mm;



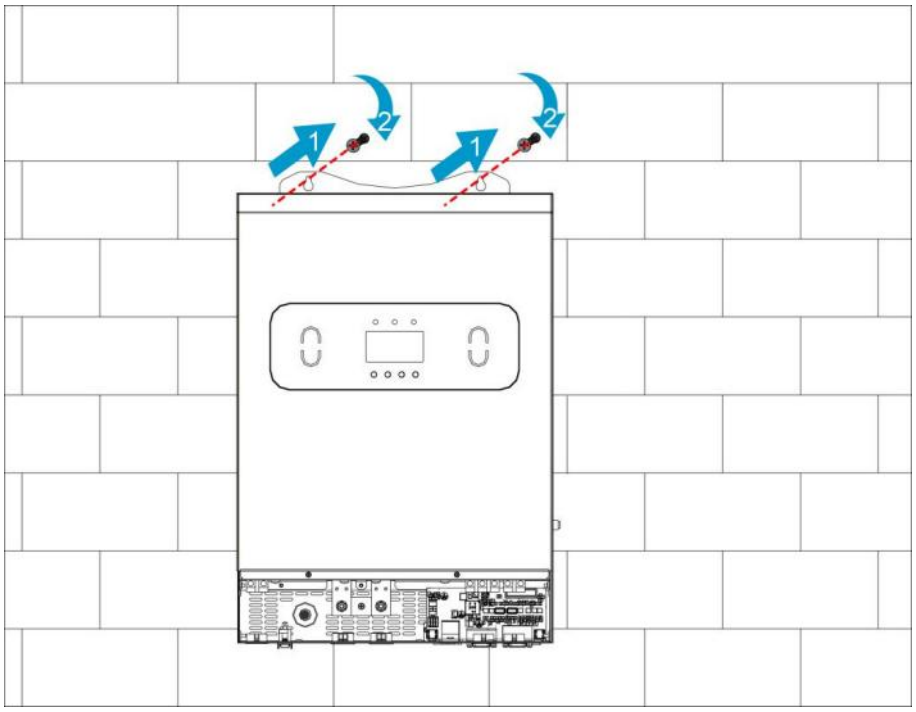
（三）Embedded expansion pipe: Embed the expansion pipe in the drilled hole with a hammer, and the end surface of the rubber plug is flush with the wall (3 places);



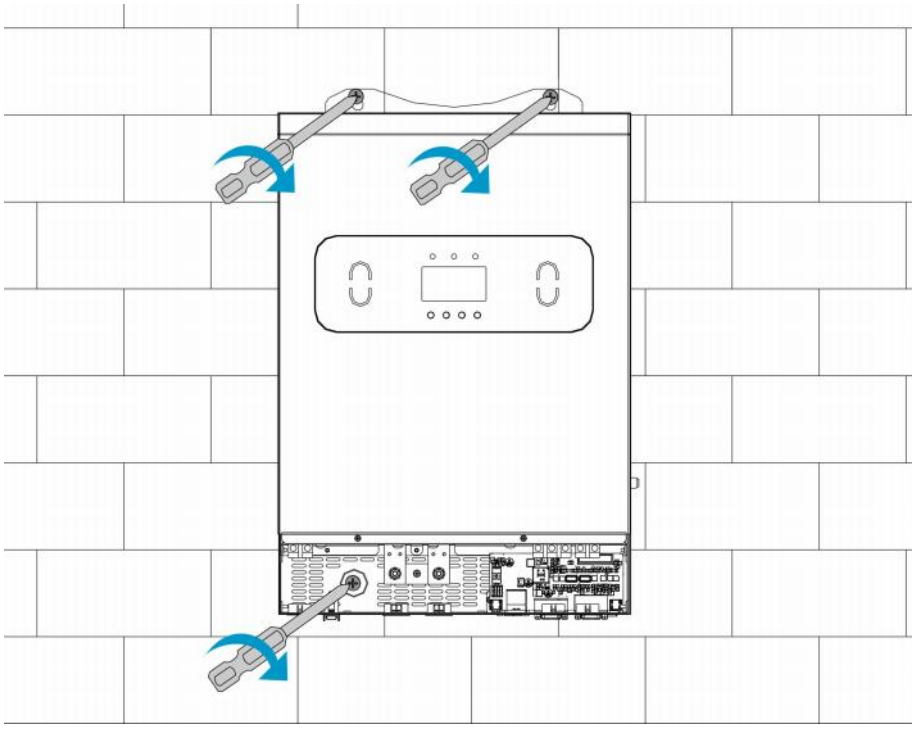
（四）Screw in the upper two screws (not all of them are screwed in so that the machine can be hooked up in the next step);



（五）Hang the device into the upper two screws.



（六）Tighten the 3- ST48X30 self-tapping screws so that the fixation is complete

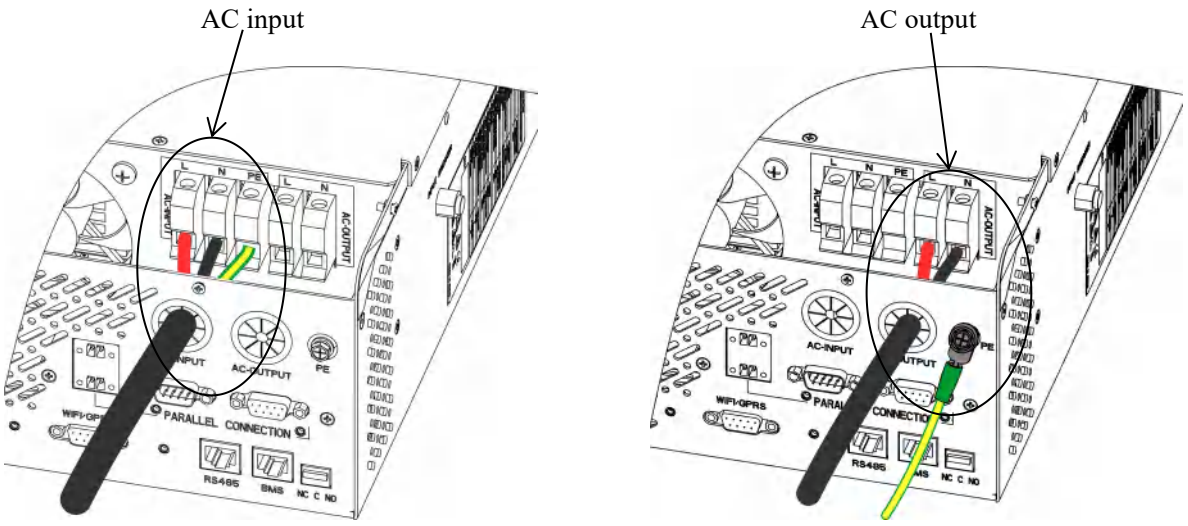


2.3.2. AC input / output wiring:

① Before AC input / output wiring, first disconnect the external circuit breaker, and confirm whether the cables used are qualified. For the selection of cables and circuit breaker, please refer to chapter "2.2.3 Wiring Specification and circuit breaker selection";

② According to the cable order and terminal position shown in the lower left figure, correctly connect the AC input line, please first ground line, and then connect the Live line and Neutral line;

③ According to the cable order and terminal position shown in the lower right figure, correctly connect to the AC output line, please first connect to the surface ground line of the casing, and then connect to the Live line and the Neutral line.



PE: Ground L: Live N: Neutral

Note: AC-INPUT represents the AC input, and AC-OUTPUT represents the AC output. Don't misconnect the input and output connection ports.

Note: Before connecting the AC input power supply, please install an AC circuit breaker between the off-grid solar inverter and the AC input power supply, and ensure that the AC circuit breaker is disconnected.

Warning: Wiring must be performed by a professional person

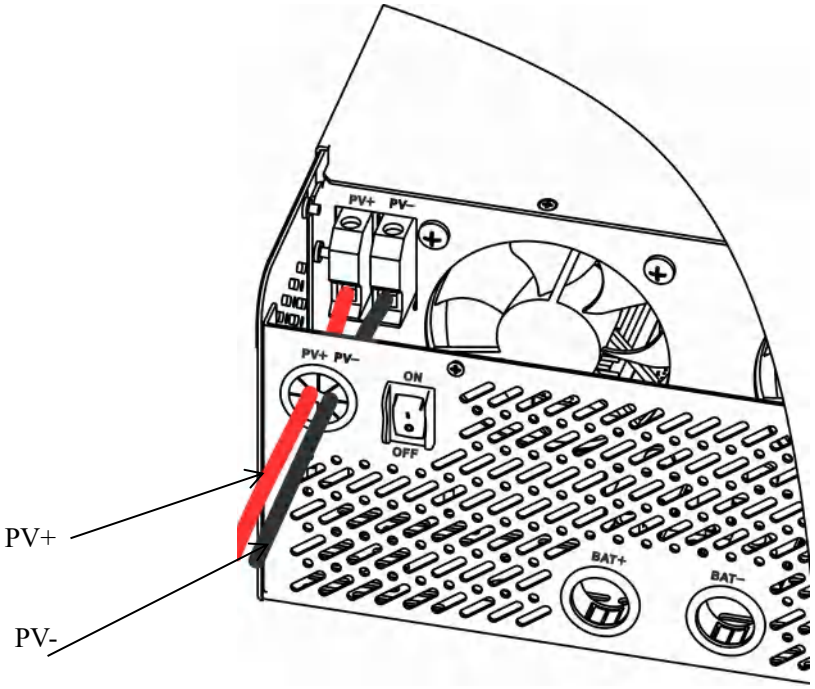
Note: Block the inlet and exit line

2.3.3. Wiring for the PV input(for HS1045EH48L/HS1055EH48L/HS1055EH48P):

① Before wiring, first disconnect the external circuit breaker, and confirm whether the cables used are qualified. For the selection of cables and circuit breakers, please refer to chapter "2.2.3Wiring Specification and circuit breaker selection";

② Correct connecting of the PV input line according to the cable order and terminal position shown in the figure below.

PV+: PV input positive electrode PV-: PV input negative electrode



Note: The positive (+) of the PV cable is connected to the positive (+) of the PV input terminal, and the negative (-) of the PV cable is connected to the negative (-) of the PV input terminal. The cable polarity must be correct.

Note: The open-circuit voltage (Voc) of the PV array connected to the inverter shall not exceed the design value of the maximum PV input voltage of the inverter;

Note: Before connecting to the PV module, install a DC circuit breaker from the inverter to the PV module

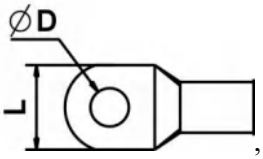
Warning: Wiring must be performed by a professional person

Note: Block the inlet and exit line

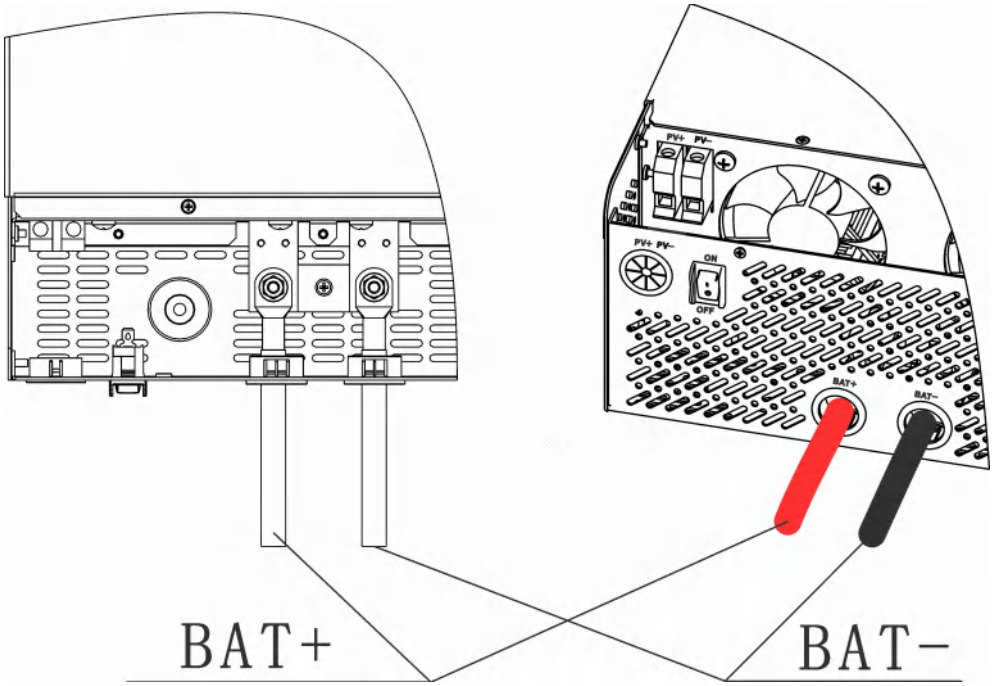
2.3.4. Battery wiring:

① Before wiring, first disconnect the external circuit breaker, and confirm whether the cables used are qualified. For the cable and circuit breaker specifications, please refer to the chapter "2.2.3 Wiring Specification and circuit breaker selection". The BAT line needs to be connected to the machine through OT terminals. See article 3 below for the size of OT terminals. T terminals must firmly press the BAT line to prevent excessive contact impedance and cause excessive heating.

② Correct connect the BAT line according to the cable sequence and terminal position shown in the figure below. BAT cable fixing nut torque 30kgf.cm.

③OT terminal specifications and models are selected according to the cable specifications and models 

, L ≤18mm,D=5.5～6mm.



Note! Before making a final DC connection or closing the DC circuit breaker / isolation circuit breaker, ensure that the cable positive (+) must be connected to the copper row positive (+) and the cable negative (-) must be connected to the copper row negative (-).

Note! Don't place anything between the flat part of the inverter terminal and the ring terminal, and don't use antioxidants on the terminals until the terminals are tightly

Warning: Wiring must be performed by a professional person

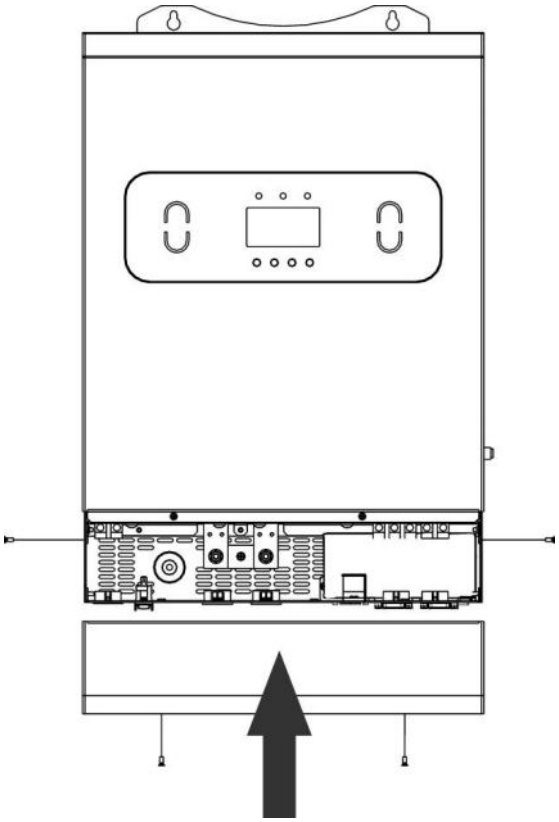
Note: Block the inlet and outlet with fireproof mud

2.3.5. Install the terminal protection cover

① Check whether the battery input is positive and negative is connected, whether the PV input is positive and negative is connected, and whether the screw is firm.

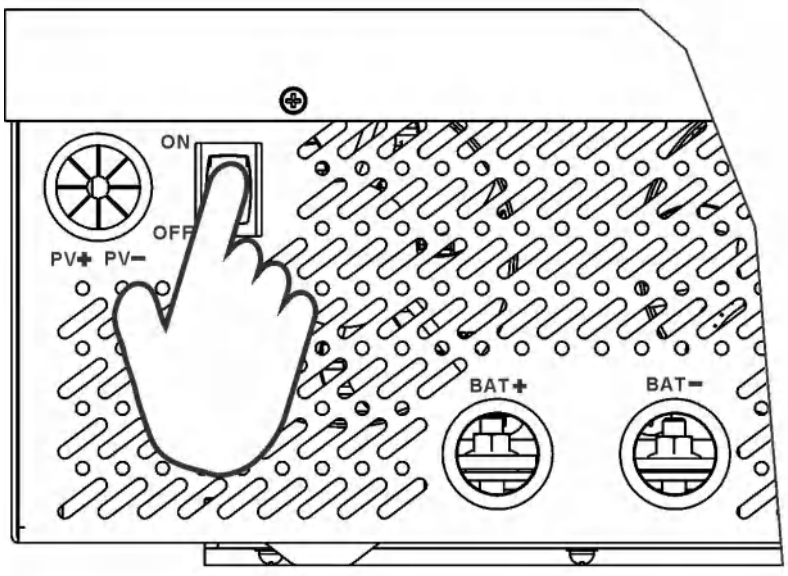
② Check that the AC input and AC output terminals are connected correctly and securely.

③ If there is no abnormality, use the tool to secure the screw protecting the cover.



2.3.6. Start the off-grid solar inverter

First close the battery end circuit breaker, then press the circular button switch on the machine panel to "ON" state, "AC / INV" indicator flashing means the inverter works normally, again close the photovoltaic array and mains circuit breaker, and finally after AC output is normal then open the AC load, lest at the same time open the load produce large instantaneous impact and protection action, off-grid solar inverter to according to the set mode of normal work.



Note: If power is supplied to different AC loads, it is recommended to open the load with large impact current first, and then open the load with small shock current after the load is stable.

Note: If the off-grid solar inverter doesn't work properly, the LCD display or indicator light is abnormal, refer to Section 6 to remove the fault.

If you need to charge the battery with the power grid, the start button must be pressed first, and the inverter is in operating mode.

Power grid on the equipment can directly bypass work

2.4.Connection and commissioning

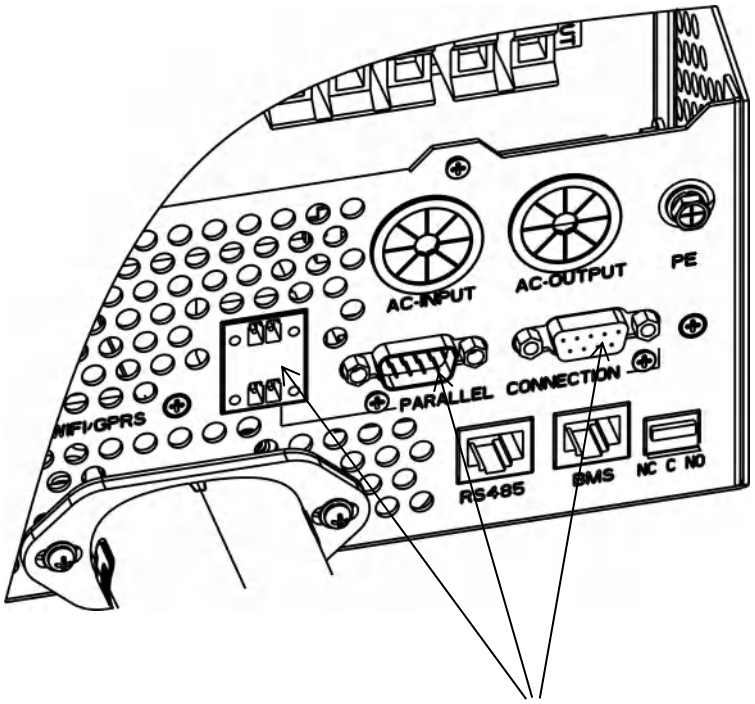
2.4.1. General introduction of the machine

(1) **Multiple installation space around the parallel machine: at least 200mm left and right, at least 500mm up and down, and on the same line, to ensure heat dissipation;**

(2) Standard machine supports single-phase and three-phase machine, American standard machine supports single-phase and phase machine;

(3) Up to 9 parallel machines can be realized;

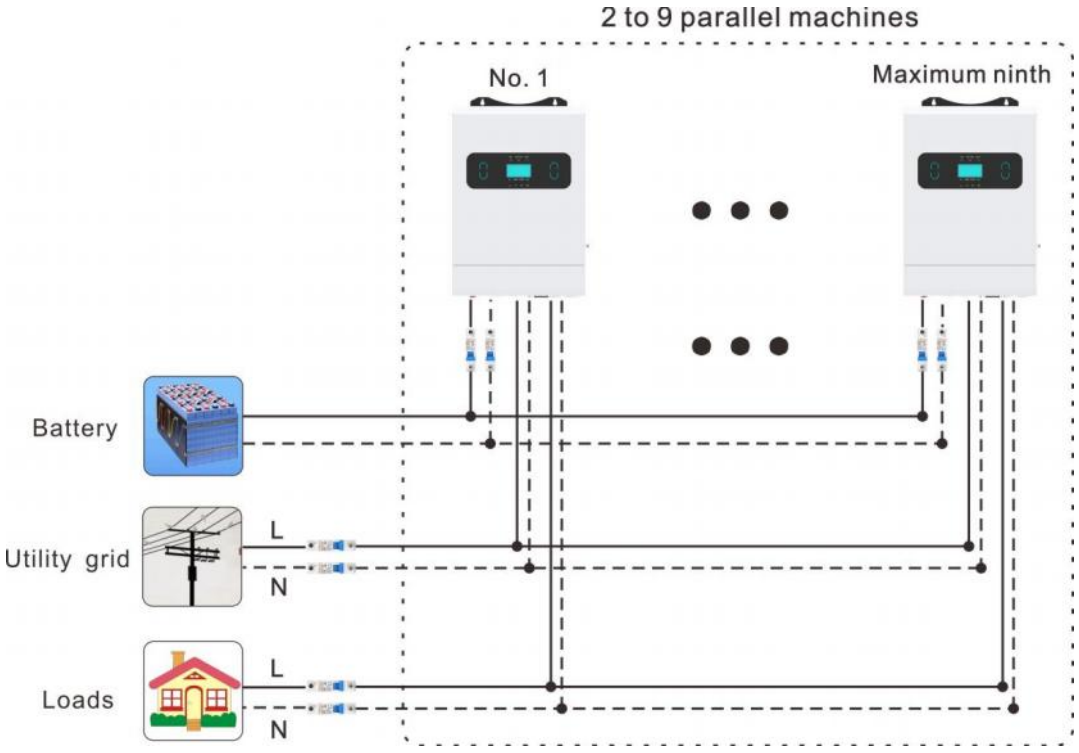
(4) The interface position of the parallel machines line is shown below;



parallel machines line interface

2.4.2. Single phase parallel connection

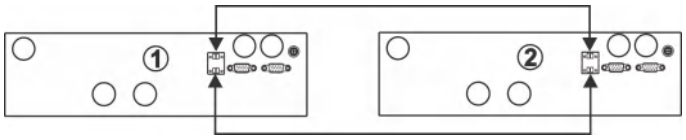
(1) Power cord connection diagram (2 to 9 units)



Note **Note: All power lines connected to the off-grid solar inverters should be of equal diameter and equal length, otherwise it may lead to uneven working flow between multiple off-grid solar inverters. All inverters must be connected to the same set of batteries.**

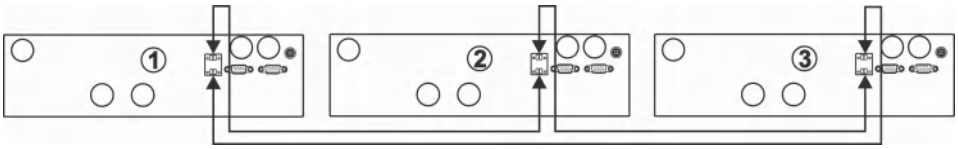
(2) Example diagram of parallel machine average flow line connection

Two parallel machines:



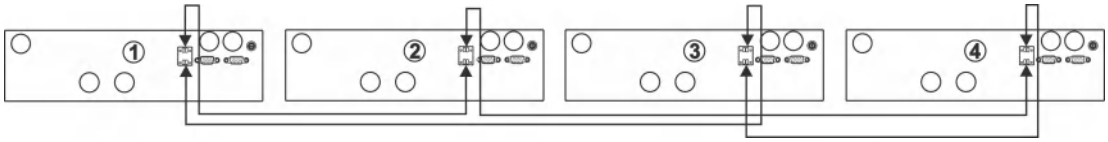
Graph (2-1)

Three parallel machines:



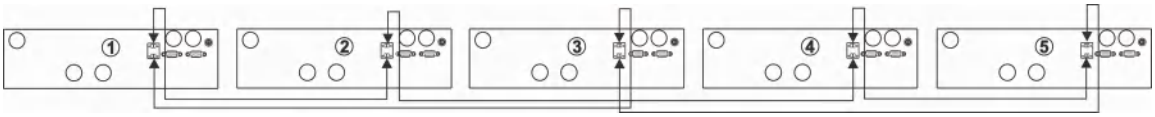
Graph (2-2)

Four parallel machines:



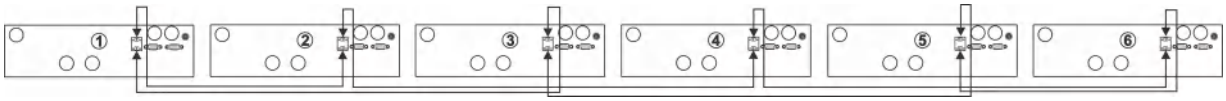
Graph (2-3)

Five parallel machines:



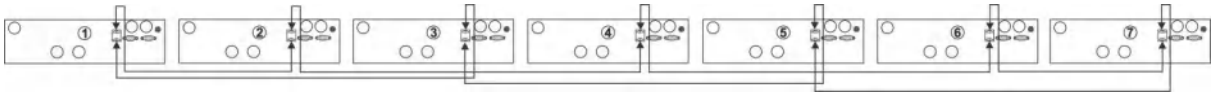
Graph (2-4)

Six parallel machines:



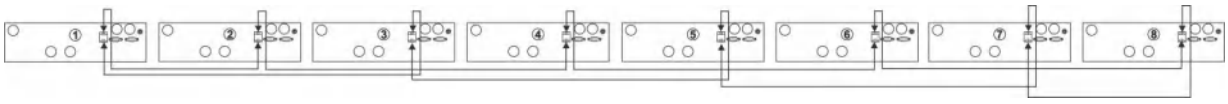
Graph (2-5)

Seven parallel machines:



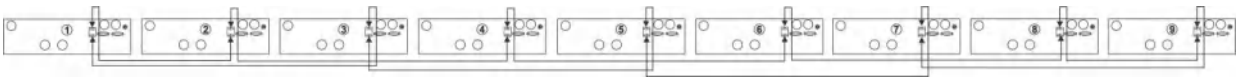
Graph (2-6)

Eight parallel machines:



Graph (2-7)

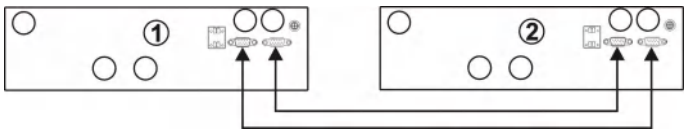
Nine parallel machines:



Graph (2-8)

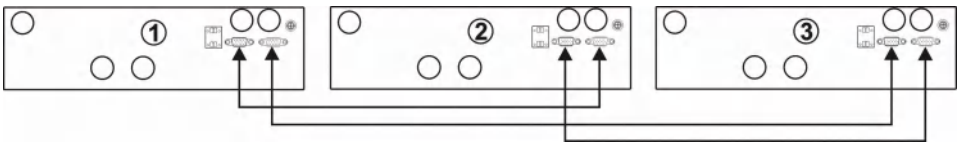
(3) Example diagram of parallel machine communication line connection

Two parallel machines:



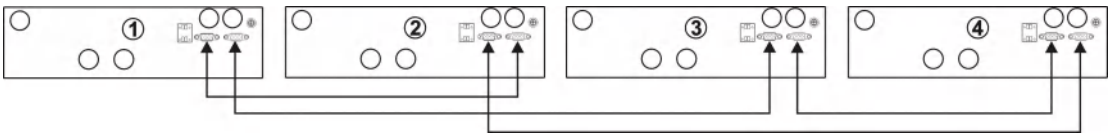
Graph (2-9)

Three parallel machines:



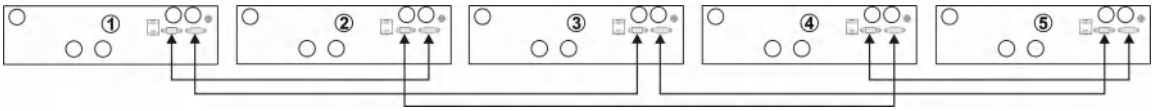
Graph (2-10)

Four parallel machines:



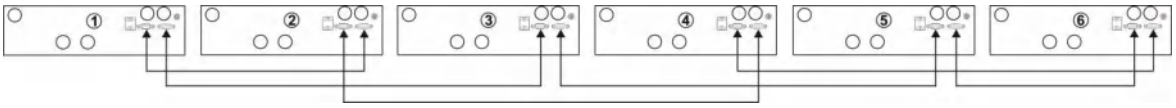
Graph (2-11)

Five parallel machines:



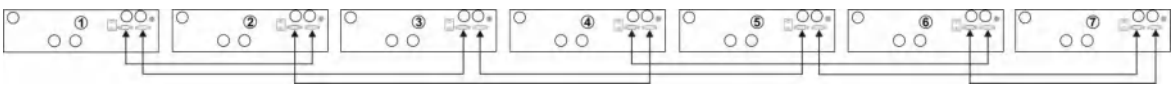
Graph (2-12)

Six parallel machines:



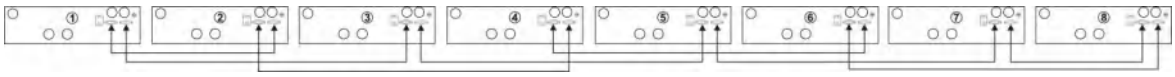
Graph (2-13)

Seven parallel machines:



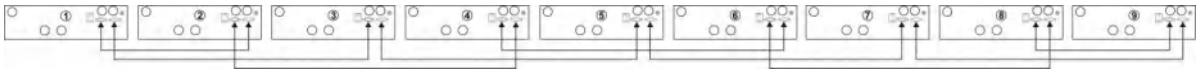
Graph (2-14)

Eight parallel machines:



Graph (2-15)

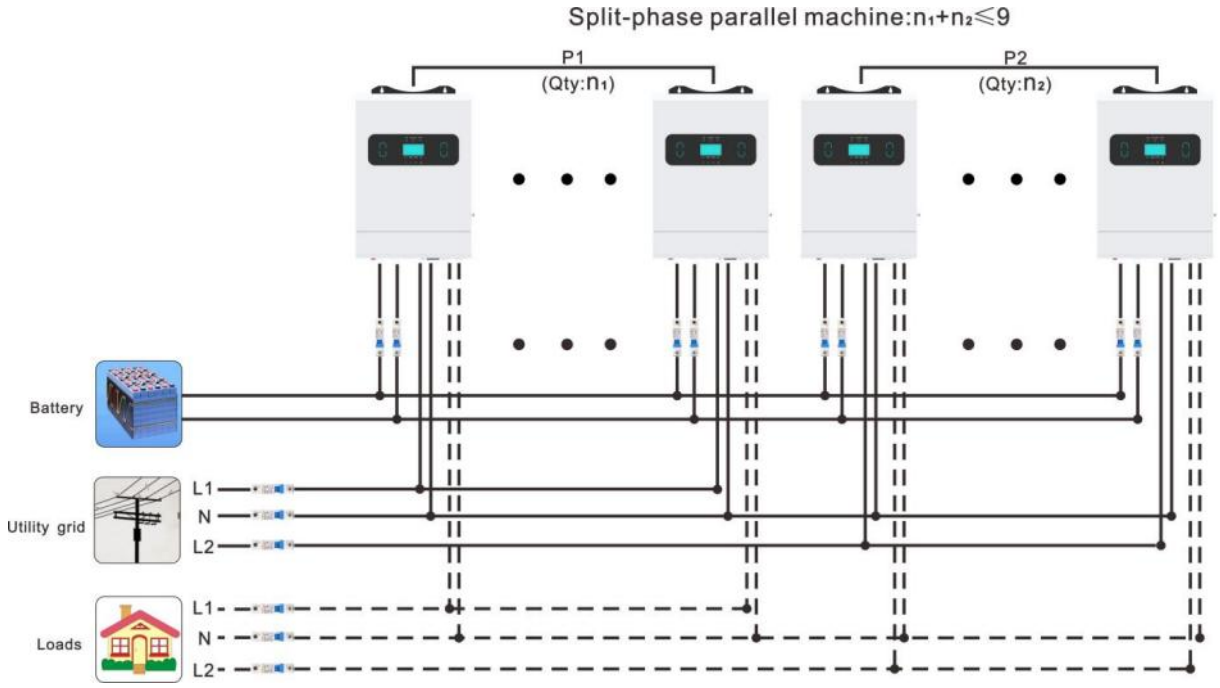
Nine parallel machines:



Graph (2-16)

2.4.3. Split-phase parallel machine connection

(1) Example diagram of the split-phase parallel machine power cord connection



Note **Note: All power lines connected to the off-grid solar inverters should be of equal diameter and equal length, otherwise it may lead to uneven working flow between multiple off-grid solar inverters. All inverters must be connected to the same set of batteries.**

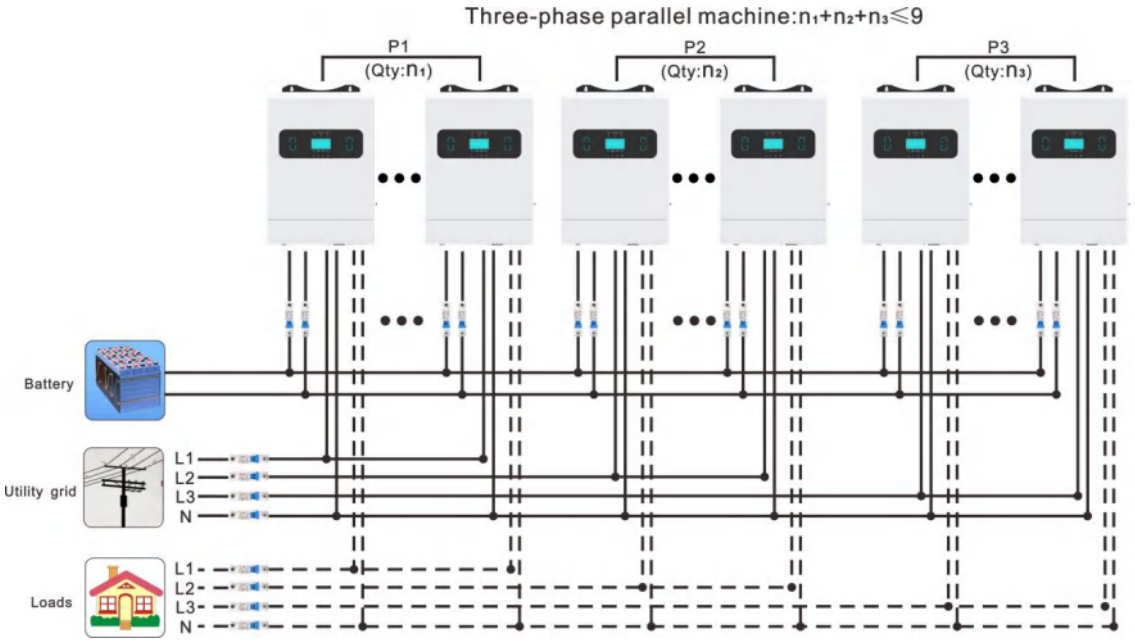
(2) The number of phases that can be paralleled in each phase, the number of n_1/n_2, and the connection diagram of the parallel current communication line, as shown in the following table, are shown in the following table

Type	Quantity of P1 **parallel**	Quantity of P2 **parallel**	Total number of machines (qty)	Example diagram of parallel machine communication line connection		Example diagram of parallel machine communication line connection
	n_1（qty）	n_2（qty）		P1	P2	
One	1	1	2	/	/	Page 22 Graph (2-9)
Two	2	1	3	Page 21 Graph (2-1)	/	Page 22 Graph (2-10)

Three	3	1	4	Page 21 Graph (2-2)	/	Page 22 Graph (2-11)
Four	2	2	4	Page 21 Graph (2-1)	Page 21 Graph (2-1)	
Five	4	1	5	Page 21 Graph (2-3)	/	Page 22 Graph (2-12)
Six	3	2	5	Page 21 Graph (2-2)	Page 21 Graph (2-1)	
Seven	5	1	6	Page 21 Graph (2-4)	/	Page 22 Graph (2-13)
Eight	4	2	6	Page 21 Graph (2-3)	Page 21 Graph (2-1)	
Nine	3	3	6	Page 21 Graph (2-2)	Page 21 Graph (2-2)	
Ten	6	1	7	Page 21 Graph (2-5)	/	Page 22 Graph (2-14)
Eleven	5	2	7	Page 21 Graph (2-4)	Page 21 Graph (2-1)	
Twelve	4	3	7	Page 21 Graph (2-3)	Page 21 Graph (2-2)	
Thirteen	7	1	8	Page 21 Graph (2-6)	/	Page 23 Graph (2-15)
Fourteen	6	2	8	Page 21 Graph (2-5)	Page 21 Graph (2-1)	
Fifteen	5	3	8	Page 21 Graph (2-4)	Page 21 Graph (2-2)	
Sixteen	4	4	8	Page 21 Graph (2-3)	Page 21 Graph (2-3)	
Seventeen	8	1	9	Page 21 Graph (2-7)	/	Page 23 Graph (2-16)
Eighteen	7	2	9	Page 21 Graph (2-6)	Page 21 Graph (2-1)	
Nineteen	6	3	9	Page 21 Graph (2-5)	Page 21 Graph (2-2)	
Twenty	5	4	9	Page 21 Graph (2-4)	Page 21 Graph (2-3)	

2.4.4. Three-phase parallel machine connection

(1) Example diagram of the three-phase parallel machine power cord connection



Note **Note: All power lines connected to the off-grid solar inverters should be of equal diameter and equal length, otherwise it may lead to uneven working flow between multiple off-grid solar inverters. All inverters must be connected to the same set of batteries.**

(2) The number of three-phase parallel machines can be paralleled, the number of $n_1/n_2/n_3$ can be taken and the connection reference diagram of the parallel current communication line, as shown in the following table

Type	Quantity of P1 **parallel** n_1 (qty)	Quantity of P2 **parallel** n_2 (qty)	Quantity of P3 **parallel** n_3 (qty)	Total number of machines (qty)	Example diagram of parallel machine communication line connection			Example diagram of parallel machine communication line connection
					P1	P2	P3	
One	1	1	1	3	/	/	/	Page 22 Graph (2-10)
Two	2	1	1	4	Page 21 Graph (2-1)	/	/	Page 22 Graph (2-11)
Three	3	1	1	5	Page 21 Graph (2-2)	/	/	Page 22 Graph (2-12)
Four	2	2	1	5	Page 21 Graph (2-1)	Page 21 Graph (2-1)	/	
Five	4	1	1	6	Page 21 Graph (2-3)	/	/	Page 22 Graph (2-13)
Six	3	2	1	6	Page 21 Graph (2-2)	Page 21 Graph (2-1)	/	
Seven	2	2	2	6	Page 21 Graph (2-1)	Page 21 Graph (2-1)	Page 21 Graph (2-1)	
Eight	5	1	1	7	Page 21 Graph (2-4)	/	/	Page 22 Graph (2-14)
Nine	4	2	1	7	Page 21 Graph (2-3)	Page 21 Graph (2-1)	/	
Ten	3	3	1	7	Page 21 Graph (2-2)	Page 21 Graph (2-2)	/	
Eleven	3	2	2	7	Page 21 Graph (2-2)	Page 21 Graph (2-1)	Page 21 Graph (2-1)	
Twelve	6	1	1	8	Page 21 Graph (2-5)	/	/	Page 23 Graph (2-15)
Thirteen	5	2	1	8	Page 21 Graph (2-4)	Page 21 Graph (2-1)	/	
Fourteen	4	3	1	8	Page 21 Graph (2-3)	Page 21 Graph (2-2)	/	
Fifteen	4	2	2	8	Page 21 Graph (2-3)	Page 21 Graph (2-1)	Page 21 Graph (2-1)	
Sixteen	3	3	2	8	Page 21 Graph (2-2)	Page 21 Graph (2-2)	Page 21 Graph (2-1)	
Seventeen	7	1	1	9	Page 21 Graph (2-6)	/	/	Page 23 Graph (2-16)
Eighteen	6	2	1	9	Page 22 Graph (2-5)	Page 21 Graph (2-1)	/	
Nineteen	5	3	1	9	Page 21 Graph (2-4)	Page 21 Graph (2-2)	/	
Twenty	5	2	2	9	Page 21 Graph (2-4)	Page 21 Graph (2-1)	Page 21 Graph (2-1)	
Twenty-one	4	4	1	9	Page 21 Graph (2-3)	Page 21 Graph (2-3)	/	
Twenty-two	4	3	2	9	Page 21 Graph (2-3)	Page 21 Graph (2-2)	Page 21 Graph (2-1)	
Twenty-three	3	3	3	9	Page 21 Graph (2-2)	Page 21 Graph (2-2)	Page 21 Graph (2-2)	

2.4.5. Parallel debugging

(1) All parallel equipment is connected to the same set of batteries, with correct polar wiring.

(2) Check the correctness of wiring phase sequence according to the wiring diagram above to avoid system problems.

(3) Check whether all connecting lines are firmly fixed to avoid cable loss or poor contact.

(4) Correct wiring according to the operating load equipment requirements, to avoid the damage to the load equipment.

(5) The [39] setting item is the only set for the host. When the machine is running, take the voltage set by the host as the standard, and adjust from the opportunity to synchronize the host. This can be set in standby mode.

(6) Modify the parallel mode of [35] settings

Press "ESC" ⟶ "UP" or "DOWN" ⟶ Turn to page 35 ⟶ "ENTER"

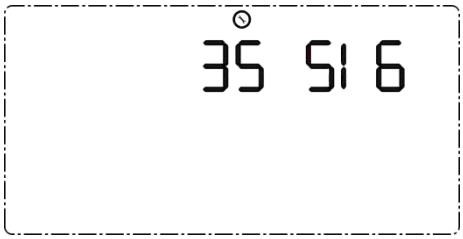
"UP" or "DOWN" ⟶ Modified to "1P1 or 2P1 or 2P2 or 2P3 or 3P1 or 3P2 or 3P3" as required ⟶ "ENTER" validation

(7) Change the parallel machine ID of [34] setting item and set ID "1~9" for each machine, each machine has a different ID number. This can be set in standby mode.

Press "ESC" ⟶ "UP" or "DOWN" ⟶ Turn to page 35 ⟶ "ENTER"

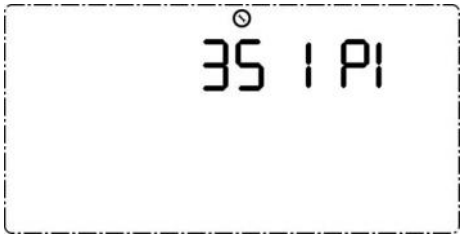
⟶ "UP" or "DOWN" ⟶ Modify to "1~9" ⟶ "ENTER" validation

(8) When used only as a single machine, the [35] setting item should be set as follows



(9) When the single-phase parallel function is used, the [35] setting item should be set as follows

All machine screens need to be set to "1P1";



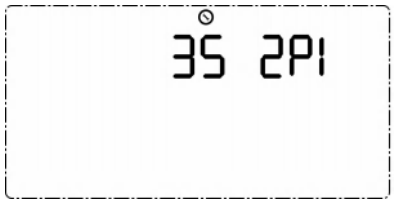
(10) When using the Split-phase parallel function, the [35] setting item should be set as follows

All machine screens connected to the P1 need to be setting to "2P1";

Suppose the output voltage set by the [39] set item is 120 Vac (only for the US standard machine)

1) When all machine screens connected to P2 are set to "2P2", the voltage phase between P1 and P2 is 180 degrees,the voltage between L1 of P1 and L2 of P2 is 120 * 2=240Vac; The voltage between L1-N and L2-N is 120Vac.

2) When all machine screens connected to P2 are set to "2P3", the voltage phase between P1 and P2 is 120 degrees,the voltage between L1 of P1 and L2 of P2 is 120 * 1.732=208Vac; The voltage between L1-N and L2-N is 120Vac.

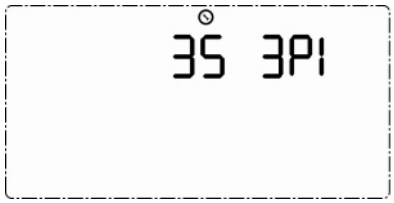
P1	P2 （the voltage phase between P1 and P2 is 180 degrees）	P2 （the voltage phase between P1 and P2 is 120 degrees）
		

(11) When the three-phase parallel function is used, the [35] setting item should be set as follows

All machine screens connected to the P1 need to be setting to "3P1";

All machine screens connected to the P2 need to be setting to "3P2";

All machine screens connected to the P3 need to be setting to "3P3";

P1	P2	P3
		

1) Suppose the output voltage set by the [39] set item is 120 Vac (only for the US standard machine):

At this time, the voltage phase difference between (P1 and P2, P1 and P3, P2 and P3) is 120 degrees, and the voltage between the live line L1 of P1 and the live line L2 of P2 is 120 * 1.732=208Vac. Similarly, the line voltage between L1 and L3 is 208Vac; The voltage between L1-N, L2-N, and L3-N is 120Vac.

2) Suppose that the output voltage set by the [39] setting item is 230 Vac (standard model):

At this time, the voltage phase difference between (P1 and P2, P1 and P3, P2 and P3) is 120 degrees, and the voltage between the live line L1 of P1 and the live line L2 of P2 is 230 * 1.732=398Vac. Similarly, the line voltage between L1 and L3 is 398Vac; The voltage between L1-N, L2-N, and L3-N is 230Vac.

(12) According to the actual number of parallel machines, set the machine ID number 1-8 through the screen setting [34] setting item.

(13) When setting [34][35][39] through the screen,This machine turns on and illuminates the screen, while the rest of the machines are turned off. After the machine is successfully set, turn off the ON/OFF key and then set another machine. After all machines are set up, power off and then power on again.

(14) After the system is running and the measured output voltage is correct, connect to the load setting.

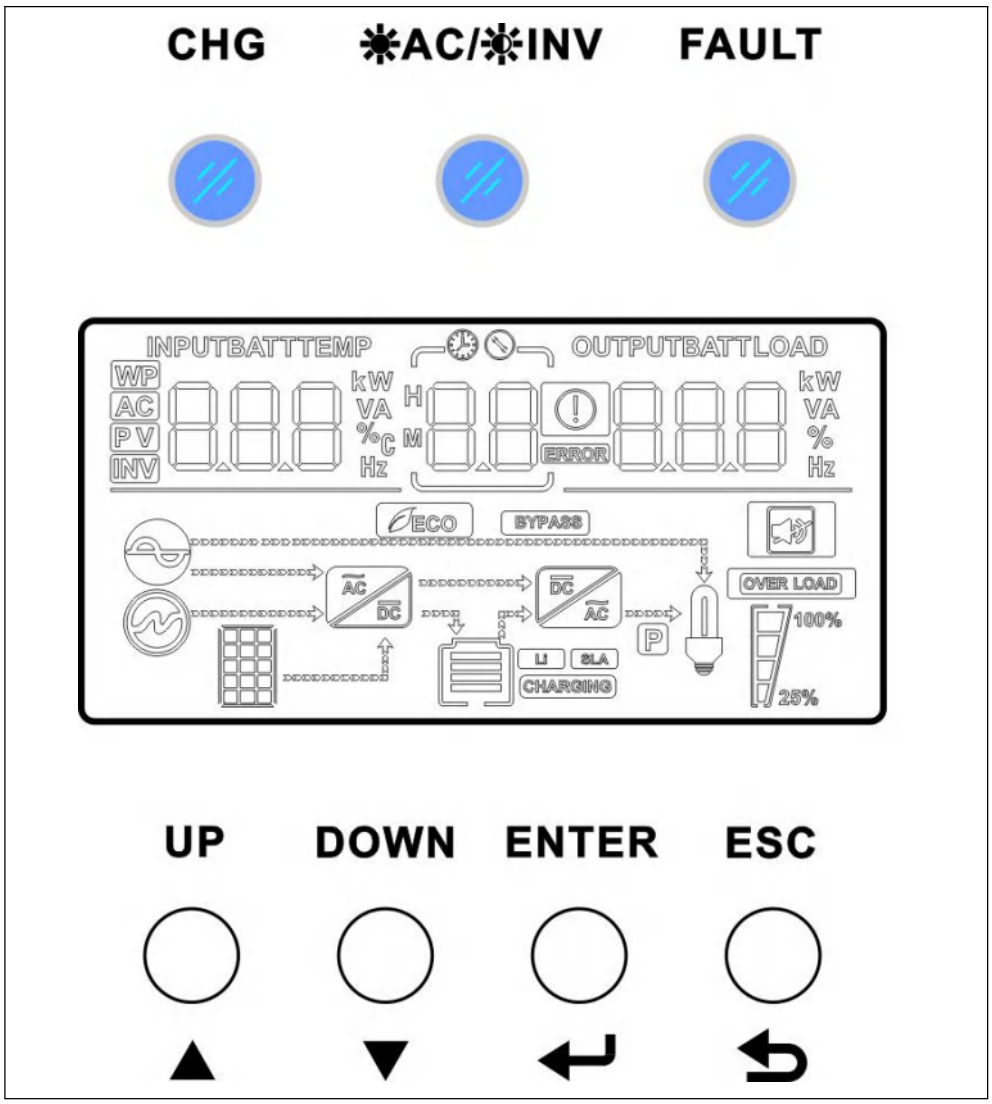
➢ **Notes for parallel machine:**

1. To avoid overload, it is best to run the overall system before opening the circuit breaker on the load side;
2. There is a transition time for this operation. Some important equipment may experience power outages;
3. The equipment of the parallel system cannot be used alone with leakage protection function;
4. The parallel cable needs to use the original matching cable, and the third-party cable is not allowed;
5. Before the parallel equipment works, the city power switch must be powered on at the same time, otherwise the "47" code fault will be reported;
6. After the parallel machine is changed to a single machine, the device needs to be completely powered down, and it is turned on after restarting;
7. After the stand-alone machine is changed to a parallel machine, the device needs to be completely powered down, and the device needs to be powered on after restarting;
8. When paralleling, the data collector and the stand-alone data collector cannot be universal;
9. When paralleling, you need to set the charging current according to the battery parameters to prevent the battery from being charged;

Chapter 3 The LCD screen operating instructions

3.1.Operation and display panels

The operation and display panel is shown below, including 1 LCD screen, 3 indicators and 4 operation keys.



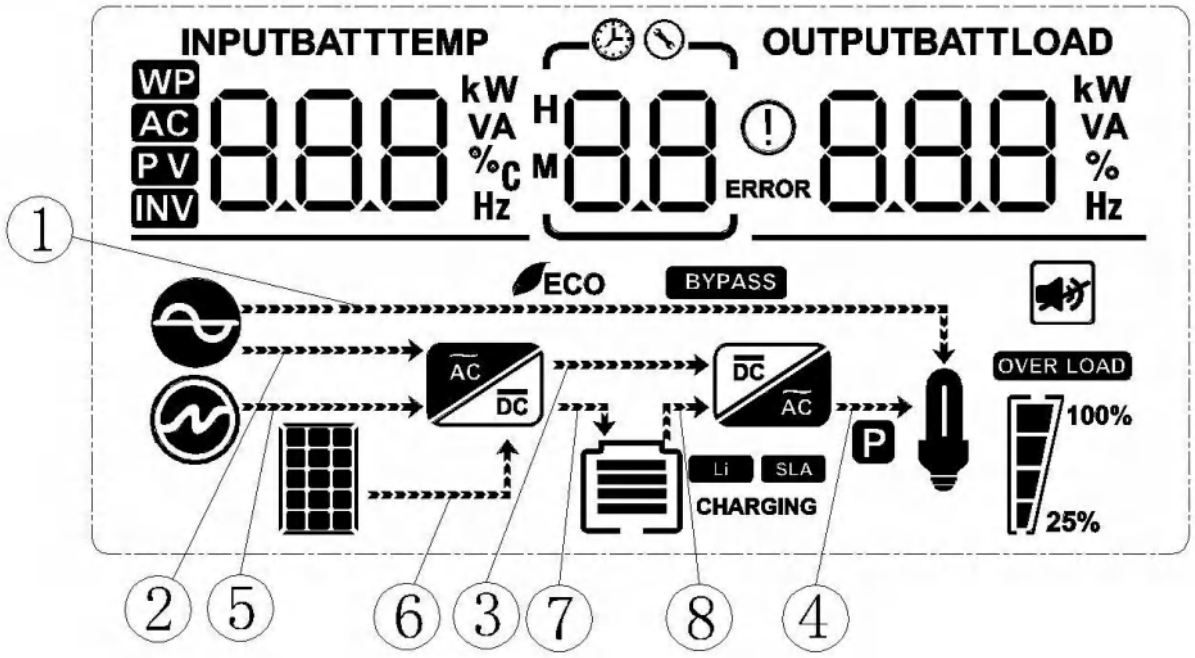
Introduction to operation keys

Function key	Description
UP	Last choice
DOWN	Next choice
ENTER	Under the Settings menu, determine / enter the options
ESC	Enter / Exit Setup Menu

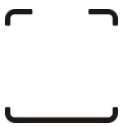
Instruction lamp introduction

Instruction lamp	Pigment	Description
CHG	Green	Flashing: The battery is charging
		Constant brightness: Charging is complete
AC/INV	Yellow	Constant brightness: utility power output
		Flashing: Inverter output
FAULT	Red	Constant brightness: Fault status

LCD Screen Introduction



Icon	Function	Icon	Function
	Indicates that the AC input side is connected to the AC input source	DC AC	Indicates that the inverter discharge circuit is working
	The icon indicates a wide voltage AC input Mode (APL mode)	BYPASS	Indicates that the machine is in the mains power bypass (Bypass) Working mode
	Indicates that the PV input is connected to the solar energy Panel	OVER LOAD	Indicates that the AC output is in an overloaded state

	Indicates that the machine is connected to the storage battery,  Represents the battery remaining power of 0% to 24%,  Represents the battery remaining power of25% to 49%,  Represents the battery remaining power of 50% to 74%  Represents the battery remaining power of 75%～100%		Indicates the percentage of the AC output load,  Represents the load percentage of 0% to 24%,  Represents the load percentage of 25% to 49%,  Represents the load percentage of 50% to 74%,  Represents the load percentage of 75%—100%
	Indicates that the current battery type is lithium pool		Indicates that the buzzer is not enabled
	Indicates that the current type of battery is lead acid cell		Indicates a machine alarm occurrence
CHARGING	Indicates that the battery is in a charging state	ERROR	Indicates that the machine is in a fault state
	Indicates that the AC / DC charging circuit is working		Indicates that the machine is in the setting mode
	Indicates an AC voltage output at the AC output end		Middle-screen parameters display: 1. In non-set mode, display the alarm or fault code; 2. In setting mode, display shows the parameter item code of the current setting
	When parallel mode is used, the host displays the icon		Display the current icon when the factory setting is restored normally
Top left parameters of the screen display: input parameters			

AC	Indicates the AC input
PV	Indicates the PV input
INV	Indicate the inverter circuit
	Display battery voltage, total battery charge current, mains charge power, AC input voltage, AC input frequency, PV Input voltage, the internal radiator temperature
Top right side parameters of the screen display: output parameters	
	Indicate the output voltage, output current, output active power, output dependent power, and battery discharge current; in setting mode, display the current set parameters under the code of parameter items

Arrow line shows			
①	Indicates the grid to supply power directly to the load	⑤	Indicates the wide voltage power generation equipment to supply power to the system
②	Indicate the grid to power the system	⑥	Indicate the PV to charge the battery
③	Blank	⑦	Indicates the battery charging circuit
④	Indicates the inverter to power the load	⑧	Indicates the battery discharge circuit

3.2. Description of setting parameters

Key operation instructions: Please press the "ESC" key to enter the Settings menu, enter the setting menu and exit and press the "ESC" key. After entering the Settings menu, press UP and DOWN to select the parameter item code to be set. Then press "ENTER" key to enter the parameter editing state, adjust the setting parameters through "UP" and "DOWN" keys, press "ENTER" key, press "ESC" key to exit the setting.

Pressing "UP" and "DOWN" keys together, and a flashing box appears on the 3S screen, the device needs to restart the factory setting. It is recommended to modify the corresponding parameters and start the machine.

Parameter number	The parameter name	Setting options	Explain
00	Enter / Exit	[00] ESC	Enter / Exit Setup Menu
01	Output-priority mode	[01] SOL	Photovoltaic priority mode, switch to the municipal power supply when the photovoltaic energy is insufficient or the battery voltage is lower than the set value of the parameter [20].
		[01] The UTI default	City power priority mode, only when the city is abnormal, switch to solar energy and battery inverter to supply the load power.

		[01] SBU	In the inverter priority mode, the solar energy and the battery have the priority to inverter to supply power to the load, and only when the battery is under voltage or lower than the set value of the parameter [20].
02	Charging priority mode	[02] CSO	PV is preferred to charge batteries, and mains is started only when pv is not available.
		[02] CUB	Mains gives priority to charging the battery, and the photovoltaic is started to charge the battery only when the mains is not available.
		[02] The SNU default	Photovoltaic and mains mixed charging, priority photovoltaic to charge batteries, photovoltaic energy is insufficient, mains charging supplement. When the photovoltaic energy is sufficient, the mains power stops charging.
			Note: Only the city power bypass output with the load time volt and the mains can be charged at the same time. When the inverter is working, the battery can only be charged by photovoltaic.
		[02] OSO	Whether the mains power is available or not, only solar power can charge the battery.
03	Battery type	[03] USE	User custom, can set all battery parameters.
		[03] GEL default	For colloidal lead-acid batteries, the average charging voltage and the floating charging voltage can be adjusted to adjust the parameter number [8] and the parameter number [11] according to the actual parameters of the battery.
		[03] SLD	For sealed lead-acid batteries, the average charging voltage and floating charging voltage can be adjusted to the parameter number [8] and parameter number [11] according to the actual parameters of the battery.
		[03] FLD	For the open lead-acid battery, the average charging voltage and the floating charging voltage can be adjusted to the parameter number [8] and the parameter number [11] according to the actual parameters of the battery.
		[03]L14/L15/L16	Lithium iron phosphate battery L14 / L15 / L 16, corresponding to lithium iron phosphate battery 14 string, 15 string and 16 string, 16 strings of default balance voltage charging voltage 56.8V, 15 string of default balance pressure charging voltage 53.2V, 14, string of default balance pressure charging voltage 49.2V.
		[03]N13/N14	Ternary lithium battery N13 / N14, corresponding to the lithium iron phosphate battery 13 series and 14 series, 13 series of default balance voltage

			charging voltage 53.2V, 14 series of default balance voltage charging voltage 57.2V.
04	BMS protocol	[04] PYL default	PYL: PYLONTECH1
		[04] PYL1	PYL1: PYLONTECH1
		[04] PYL2	PYL2: PYLONTECH2
		[04] PYL3	PYL3: PYLONTECH3
05	Maximum charging current	[05] 30A default	Set range 0~100A (photovoltaic charge + city power charge current), step 5A; In the parallel mode, the charging current is required to be changed to prevent excessive damage during the parallel charging (such as the maximum charging current of the battery is 60A, then 6 parallel charging, 10A each charging).
06	Maximum photovoltaic charging current	[06] 30A default	Photovoltaic maximum charging current setting: 0~100A, step into 5A
07	Maximum current of the mains power charge	[07] 30A default	The maximum charging current of mains charging is set, with a setting range of 0~80A, step 5A;
08	Constant voltage charging voltage	[08]56.4V default	Constant voltage charging voltage set, set range 48V～58.4V, step 0.2V.
09	Maximum time for constant charging voltage	[09] 120 default	The maximum time setting of constant voltage charging refers to the maximum charging time of the set voltage, with the setting range of 5min～900min,and step for 5 minutes
10	Constant voltage charge return voltage	[10] 52V default	After the battery is charged, the inverter stops charging. When the battery voltage is lower than this voltage value, the charging is resumed. Set the range of 44V～54V, step into 0.2V
11	Floating	[11] 54V default	Floating charge voltage, setting range 48V～58.4V, step 0.2V

	charge voltage		
12	Equalizing charge	[12] DIS default	Balanced charging is prohibited
		[12] ENA	Enables balanced charging, only (SLD / FLD / USE) lead-acid battery is effective
13	Balanced charging voltage	[13] 56.4V default	Balanced charging voltage, setting range 48V～58.4V, step 0.2V, only (SLD / FLD / USE) lead-acid battery is valid, set according to the battery type
14	Balanced charging time	[14] 120 default	Balanced charging time, set the range of 5min～900min, step for 5 minutes, only (SLD / FLD / USE) lead-acid battery is effective
15	Balanced charging delay	[15] 240 by default	Balanced charging delay, set the range of 5min～900min, step for 5 minutes, only (SLD / FLD / USE) lead-acid battery is effective
16	Equalize the charging interval cycle	[16] 30 by default	Equalized charging interval period, 0~90days, 1 step day, only (SLD / FLD / USE) lead acid battery effective
17	Balanced Charging enables	[17] DIS default	Stop the balanced charging immediately.
		[17] ENA	Start balanced charge immediately, only (SLD / FLD / USE) lead acid battery
18	Output frequency	[18] 50.0	When the first power is turned on, the output Frequency is automatically adapted according to the mains frequency, and the default 230V model is 50Hz, and the default 120V model is 60Hz.
		[18] 60.0	
19	The AC-input voltage range	[19] APL	The mains power input voltage range of 230V model is 90～280V. The mains input voltage range of 120V model is 90～140V. Set this mode for weak grid cases.
		[19] The UPS default	The mains input voltage range of 230V model is 170 to 280 V The mains input voltage range of 120V model is 90～140V
20	Battery to market electricity	[20] 44.0 by default	When the parameter [1] is SOL or SBU, when the battery voltage is lower than the set value, the output is switched from inverter to mains, with the setting range is 42V~52V, and the step is 0.2V. The battery discharge voltage needs to be changed according to the actual battery parameters.

21	Market electricity to battery	[21] 56.4V default	When the parameter [01] is SOL or SBU, the battery voltage is higher than the setting value, and the output is switched from mains to inverter, with the setting range of 48V~58V and a step of 0.2V. The battery discharge voltage needs to be changed according to the actual battery parameters.
22	Battery under-voltage alarm voltage	[22] 43V default	The battery under voltage alarm point, when the battery voltage is lower than the judgment point, report the under-voltage alarm, the output is not turned off, and the setting range is 40V～52V, step into 0.2V.
23	Battery discharge termination voltage	[23] 40V default	When the over discharge voltage and the battery voltage is lower than the minimum battery discharge voltage, stop the inverter output immediately. Set the range of 40V～52V, step into 0.2V.
24	Battery over-discharge to return voltage	[24] 52V default	When the battery under-voltage alarm, the battery voltage should be greater than this setting value to restore the battery inverter AC output, the setting range is 40V～52V, step 0.2V, and set the recovery value according to the battery type
25	Battery time-delay shutdown voltage	[25] 42V default	When the battery voltage reaches the parameter setting point, the delay shutdown time is set at [26], the setting range is 40V~52V, and the step is 0.2V.
26	Battery over-discharge delay time	[26] 5S default	When the delay time is over-put, and the battery voltage is lower than the parameter [25], close the inverter output according to the delay set time, set the range of 0S~50S, and step into 5S
27	Photovoltaic grid-connected power generation function	[27] DIS default	This feature is disabled
		[27] TOG	When the pool is filled or not connected to the pool, the energy of the photovoltaic excess local load is fed to the grid, and the parameter "01" is "UTI" mode.
		[27] TOL	When the battery is filled or not connected, the load is provided by PV and mains. PV cannot access the Internet. The parameter "01" is "UTI" mode.

28	Energy saving mode	[28] DIS default	The energy saving mode is prohibited, and the output on / off state of the inverter is not affected by the load.
		[28] ENA	If enabled, the output of the inverter is closed when the connected load is very low or not detected
29	Overload auto-restart	[29] DIS	Overload automatic restart is prohibited. If the overload inverter turns off the output, the machine will no longer resume the inverter boot.
		[29] ENA default	Overload automatically restart. If the overload inverter shutdown output occurs, the machine will restart the output after a delay of 2 minutes. After 5 times, the inverter boot is no longer resumed.
30	Over-temperature will automatically restart	[30] DIS	Overtemperature automatic restart is prohibited. If over temperature inverter closes the output, the machine will no longer open the inverter output.
		[30] ENA default	The overtemperature automatically starts. If the overtemperature inverter occurs, the inverter output will be restarted after the temperature drops.
31	Inverse overload to bypass	[31] DIS	Automatic switching to mains is prohibited during inverter overload
		[31] ENA default	Inverse overload rating 110%, ≥600S; rated value of 125%, ≥60S; rated value of 150%, automatically switched to Ms after 10S.
32	Main power supply interruption alarm	[32] DIS	Don’t give an alarm warning when the state of the main power supply changes
		[32] ENA default	To enable an alarm prompt when the state of the main power supply changes
33	The buzzer alarm	[33] DIS	No alarm
		[33] ENA default	Make the alarm
34	Model ID setting	[34] 1: Default	In parallel mode, this ID must be set, the ID range is 1-9, and the default ID of the stand-alone machine is 1
35	Parallel machine mode setting	[35] SIG by default	Single-machine use, the default SIG mode
		[35] 1P1	Single-phase parallel machine (5 parameter charging current according to battery capacity)
		[35] 2P1/2P2/2P3	Split-phase parallel machine use (only for American Standard machine)
		All machine screens connected to the P1 need to be setting to "2P1";	

		Suppose the output voltage set by the [39] set item is 120 Vac (only for the US standard machine) 1) When all machine screens connected to P2 are set to "2P2", the voltage phase between P1 and P2 is 180 degrees,the voltage between L1 of P1 and L2 of P2 is 120 * 2=240Vac; The voltage between L1-N and L2-N is 120Vac. 2) When all machine screens connected to P2 are set to "2P3", the voltage phase between P1 and P2 is 120 degrees,the voltage between L1 of P1 and L2 of P2 is 120 * 1.732=208Vac; The voltage between L1-N and L2-N is 120Vac.	
		[35] 3P1/3P2/3P3	Three-phase parallel machine use setting item
		All machine screens connected to the P1 need to be setting to "3P1"; All machine screens connected to the P2 need to be setting to "3P2"; All machine screens connected to the P3 need to be setting to "3P3"; 1) Suppose the output voltage set by the [39] set item is 120 Vac (only for the US standard machine): At this time, the voltage phase difference between (P1 and P2, P1 and P3, P2 and P3) is 120 degrees, and the voltage between the live line L1 of P1 and the live line L2 of P2 is 120 * 1.732=208Vac. Similarly, the line voltage between L1 and L3 is 208Vac; The voltage between L1-N, L2-N, and L3-N is 120Vac. 2) Suppose that the output voltage set by the [39] setting item is 230 Vac (standard model): At this time, the voltage phase difference between (P1 and P2, P1 and P3, P2 and P3) is 120 degrees, and the voltage between the live line L1 of P1 and the live line L2 of P2 is 230 * 1.732=398Vac. Similarly, the line voltage between L1 and L3 is 398Vac; The voltage between L1-N, L2-N, and L3-N is 230Vac.	
36	The RS485 operating mode	[36] SLA default	BMS communication is Forbid
		[36] BMS	BMS communication is Enabled
38	Hi-power mode	[38] DIS	This mode is prohibited
		[38] ENA default	This mode is Enabled
39	AC output voltage gear setting	[39] Standard model default 230 Vac; American standard model default 120 Vac	Standard model: 190 / 200 / 208 / 220 / 230 / 240 / 277 Vac,Default is 230 Vac. AC output power = rated power * (set voltage / 230)
			American standard model: 100 / 105 / 110 / 120 / 127 Vac can be set, the default 120 Vac. AC output power = rated power * (set voltage / 120)

3.3.Battery type parameter table

Lead-acid cell:

Battery type / Parameter	Sealed lead acid (SLD)	Colloidal lead-based acid (GEL)	Open-mouth lead acid (FLD)	Customization (USE)
Over-voltage off voltage	60V	60V	60V	40～60V
Balanced charging voltage	58.4V	-	58.4V	48～58.4V
Constant voltage charging voltage	57.6V	56.4V	58.4V	48~58.4V (Adjustable)
Floating charge voltage	55.2V	54V	55.2V	48~58.4V (Adjustable)
Over-pressure alarm voltage	43V	43V	43V	40~52V (Adjustable)
Time-lapse shutdown voltage	42V	42V	42V	40~52V (Adjustable)
Discharging final voltage	40V	40V	40V	40~52V (Adjustable)
Over time delay time	0s	0s	0s	0~50s (Adjustable)
Balanced duration	120 Minutes	-	120 Minutes	5~900 Minutes (Adjustable)
Balanced charging interval	30 Days	-	30 Days	0~90 Days (Adjustable)
Constant pressure charge duration	240 Minutes	-	240 Minutes	5~900 Minutes (Adjustable)

Lithium cell:

Battery type / Parameter	Ternary lithium (N13)	Ternary lithium (N14)	Lithium iron phosphate (L16)	Lithium iron phosphate (L15)	Lithium iron phosphate (L14)
Over-voltage off voltage	60V	60V	60V	60V	60V
Floating charge voltage	53.2V (Adjustable)	57.2V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)
Constant voltage charging voltage	53.2V (Adjustable)	57.2V (Adjustable)	56.8V (Adjustable)	53.2V (Adjustable)	49.2V (Adjustable)
Over-pressure alarm voltage	41.6V (Adjustable)	43.8V (Adjustable)	47.8V (Adjustable)	44.6V (Adjustable)	42.2V (Adjustable)
Time-lapse shutdown voltage	41V (Adjustable)	42V (Adjustable)	47V (Adjustable)	44V (Adjustable)	42V (Adjustable)
Discharging final voltage	40V	40V	44.8V	42.8V	40.8V
Over time delay time	5s (Adjustable)	5s (Adjustable)	5s (Adjustable)	5s (Adjustable)	5s (Adjustable)
Constant voltage charging duration	-	-	-	-	-
Remark	The table only recommended values, because the battery parameters of each manufacturer are inconsistent, they should be modified according to the battery management parameters.				

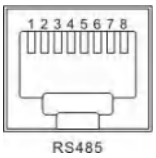
Chapter 4 Other functions

4.1 The BMS communication function

The BMS communication port function: Battery management.	

4.2 The RS485 communication function

The communication port of RS485 is the communication module interface. After connecting with the communication module selected by our company, you can check the operating parameters and status of the off-grid solar inverter through the mobile phone APP.

Pin definition, as shown: 1 pin is a 5V power supply; 2 pins are GND;RS485-A for 7 pins and 8 pins RS485-B;	

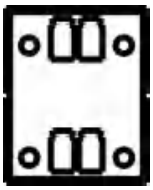
4.3 Dry contact point function

Under normal circumstances, this terminal is NC-C is normally closed and NO-C is normally open; when the battery voltage reaches the low voltage point, NC-C is disconnected and NO-C is closed. This dry contact has a withstand voltage of 230Vac and can flow 1A.	

4.4 WIFI/GPRS Communication function

Pin definition, as shown: 2 pin is RS485-B1； 3 pin is RS485-A1； 5 pin is GND；7 pin is RS485-A1； 8 pin is RS485-B1；9 pin is 5V power supply；	

4.5 Parallel machine flow cable connection port

This port is a current sharing detection port, through which the current sharing of parallel modules can be detected (only applicable to parallel power); Each machine has two current sharing detection ports, the internal parallel relationship, when connected to the rest of the models that need to be paralleled, it can be connected according to the convenience of wiring,without special mandatory wiring requirements.	

4.6 Parallel communication line connection port

This port is a parallel communication port, which can be connected to make the parallel modules communicate with each other; Each machine has two DB15 ports, one male and one female; When connecting, the male head of this machine needs to be connected to the female head of the machine to be paralleled, or the female head of this machine is connected to the male head of the machine to be paralleled; It is not allowed to connect the male head of this machine to the female head of this machine.	

Chapter 5 Protection

5.1.With the protection function

Order number	Protection classification	Defensive function
1	PV protect	PV current-limiting protection
2	AC input / output protection	Power grid over-voltage / under-voltage protection
		Exchange anti-irrigation protection
		Over-under-frequency protection
3	Battery protection	Battery over-voltage / under-voltage protection
		Battery over-current / short-circuit protection
		Charging short circuit protection
4	Output protection	Load output for short-circuit protection
		Overload protection
		Next to the flow protection
5	Temperature protection	Battery over temperature, inverter over-temperature protection

5.2.Fault code meaning

Fault code	Explain	Fault type
【01】	Battery voltage is low alarm	Report an emergency
【03】	The Battery is not connected to the alarm	Report an emergency
【04】	Battery voltage low stop discharge alarm	Report an emergency
【06】	Charge overpressure protection	Hitch
【07】	Battery capacity rate below 10% alarm (set up BMS to enable） effective)	Report an emergency
【08】	Battery capacity rate below 5% alarm (set BMS to enable effective)	Report an emergency
【09】	Battery low capacity shutdown (set BMS for efficient)	Hitch
【16】	Bus short circuit	Hitch
【17】	Solar energy input voltage overvoltage protection	Hitch
【32】	Charge too warm	Hitch
【33】	Bypass AC output for overload protection	Hitch

【34】	Inverter AC output for overload protection	Report an emergency
【35】	PV radiator for over-temperature protection	Hitch
【36】	Inter radiator over temperature protection	Hitch
【38】	Fan to block turn or failure fault	Hitch
【41】	Parallel can communication fault	Hitch
【42】	Error when the parallel machine ID is set	Hitch
【44】	Combined machine mode, parallel machine wiring failure	Hitch
【45】	And the machine flow fault	Hitch
【46】	Parallel machine mode, the battery voltage difference is large	Hitch
【47】	In the parallel mode, the mains input source is inconsistent	Hitch
【48】	Parallel machine mode, hardware synchronization signal failure	Hitch
【53】	Paral Mode Fault,The parallel machine mode is wrong	Hitch
【59】	BMS communication failure	Report an emergency

5.3.Partial troubleshooting measures

Hitch	Countermeasure
No response after boot	Check whether the power grid wiring, battery wiring and photovoltaic wiring are normal, and whether the corresponding switch is closed; In the battery-only case, press the ON / OFF key on the panel to the ON state before the display screen and the indicator light can illuminate
Battery charge over-voltage protection	Check whether the charging current, average charging voltage, and floating charging voltage set in the panel match the battery
Battery under-pressure protection	Above the battery charging to low voltage off recovery voltage.
Fan fault	Check the fan for blocking the rotation.
Bypass output overload or inverter	Reduce electrical equipment
Inverse short circuit protection	Check the output load for a short circuit
PV over-voltage	Use a multi-meter to check whether the PV input voltage is above the maximum allowable input voltage.
The battery is not connected to the alarm	Check that the battery line and the external battery circuit breaker are not connected properly.
Over-temperature protection	Check the panel showing the temperature for over-temperature
Over-output under-pressure	Measure the normal output voltage with a multi-meter

Note: If there are still errors after troubleshooting according to the above troubleshooting table, please send this equipment back to the local dealer or service center for maintenance.

Chapter 6 Off-grid solar energy system maintenance

In order to make the off-grid solar system more safe, stable and efficient in operation, customers shall conduct the following maintenance of the off-grid solar inverter, which is recommended to be no less than twice a year:

1. Check whether the inverter grounding is good;

2. Ensure that the air inlet and outlet of the off-grid solar inverter are not covered and keep well ventilated; remove the dust of the air inlet, outlet and fan regularly;

3. Check whether the AC input and output lines are tight and in good contact; whether the AC input and output lines are aging; if any, it shall be handled in time;

4. Test whether the photovoltaic modules are damaged, hot spots, pollution, and keep the surface of the photovoltaic modules clean and complete.

5. Check whether the joints and cables are aging and broken; if any, they shall be repaired in time;

6. Check whether the battery terminal is pressed and well contact; whether the battery wire is aging; if any, it should be handled in time;

Note: When checking the system, please ensure that the power supply is disconnected, pay attention to safety and discharge the capacitor completely, and then conduct the corresponding inspection or operation, otherwise there is a danger of electric shock.

The Company shall not be liable for any damage caused by:

- Incorrect installation, modification, or use
- Operating beyond the very harsh environment described in this manual
- Machine failure or damage caused by unauthorized installation, repair, change or disassembly
- Any installation and use beyond specified in the relevant international standards
- Improper use or misuse of equipment, insufficient ventilation.
- Effect of foreign matter and force manure factors (lightning strike, power grid over-pressure,inclement weather, fire, etc.).

Chapter 7 Technical parameter

Model	HS1045EN48L	HS1055EN48L	HS1055EN48P	HS1045EH48L	HS1055EH48L	HS1055EH48P
AC output (inverter)						
Rated output voltage (V)	230 (Deviation ± 4%)					
Rated output power (VA)	5000	6000	6000	5000	6000	6000
Peak power (VA)	9000	11000	11000	9000	11000	11000
Frequency (Hz)	50 / 60 (Deviation ± 0.3) automatic detection					
Discharge waveform	Pure sine wave					
Overload capacity	Rated 110%,≥ 600S; rated 125%, ≥60S; rated 150%, ≥10S (inverter overload to bypass)					
AC output and inverter power supply	Inverter power supply: when the power supply is abnormal, or power failure, switch to the inverter power supply. The off-grid solar inverter is equivalent to a backup UPS.					
AC output bypass power supply	AC bypass power supply: when the battery is under-voltage, or the inverter power supply is protected, switch to the AC bypass power supply.					
Power supply mode switching time	⩽10ms (Typical value)					
Parallel machine function	N/A	N/A	Yes, up to 9 sets	N/A	N/A	Yes, up to 9 sets
Battery (lead-acid or lithium battery)						
Rated voltage / voltage range (V)	40~60 (As available)					
Rated voltage (V)	48					
Maximum battery charging current (A)	80	80	80	100	100	100
PV maximum current (A)	N/A	N/A	N/A	100	100	100

AC max. charging current (A)	80					
Lithium-ion battery charging strategy	Follow the BMS instruction					
Lead-acid battery charging strategy	Three stops					
Battery over-voltage protection	Yes					
Battery over-current protection (No Settings)	Circuit protection with fuses					
Photovoltaic input						
Maximum PV input open circuit voltage (V)	N/A	N/A	N/A	500	500	500
MPPT, voltage range (V)	N/A	N/A	N/A	90~450	90~450	90~450
Maximum PV input (W)	N/A	N/A	N/A	4500	5500	5500
Maximum PV input current (A)	N/A	N/A	N/A	20	20	20
Maximum inverter conversion efficiency	N/A			93.8%		
AC input (mains or generator)						
Rated voltage (V)	220/230 V					
Frequency (Hz)	50 / 60 (Automatic detection)					
Over-voltage protection (V)	(170~280) ± 4% (Out of range transfer inverter output)					
Over-frequency protection (Hz)	(47-55) ± 0.3 / (57-65) ± 0.3 is not to set, adaptive (Out of range transfer inverter output)					
Over-current protection (A)	40 (Circuit protection and circuit breaker)					
Exchange anti-irrigation	Have					

protection						
Conventional parameters						
Product size (mm)	Length 470 * Wide 330 * Deep 125					
Net weight (kg)	11.5	11.5	11.5	12	12	12
Protection level / noise	IP20 (Forced air cooling, adjustable wind speed) / <60 db					
Working altitude (m)	<2000					
Operating temperature / humidity	-10℃~55℃ (-20℃ ~60℃ Storage temperature) / 5% -95% (No condensation)					
Display mode:	LCD+LED					
Communication interface	RS485 / Dry contact control, optional WIFI / GPRS / 4G					
Standard	IEC/EN62109-1/2；IEC/EN61000-6-1/3					
Certificate	CE-LVD；CE-EMC					