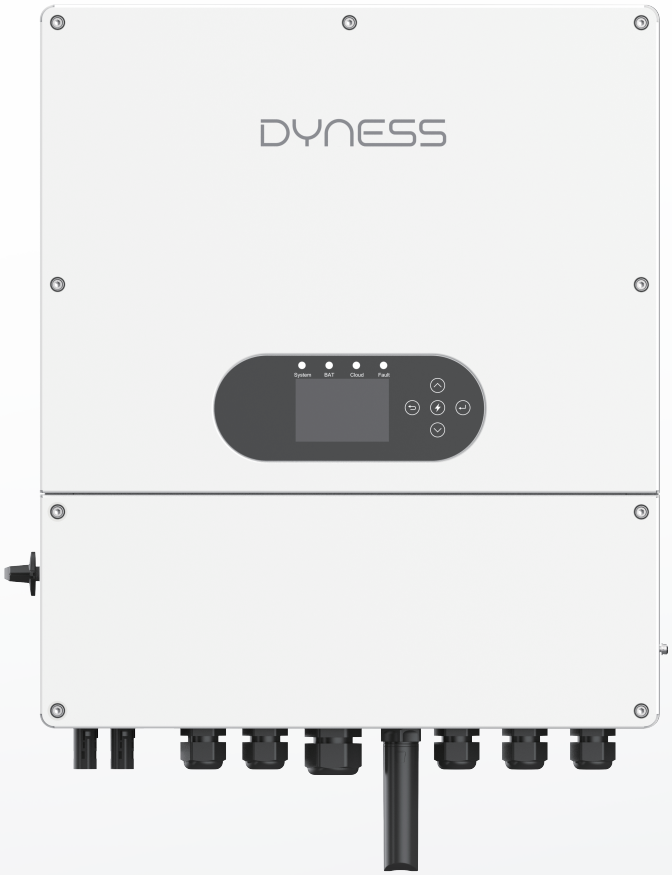


Hybrid Inverter

USER MANUAL

D3.0K-LS
D3.6K-LS
D5.0K-LS
D6.0k-LS
D8.0K-LS

File version-20240710-V1-EN Information might be subject to change without notice during product improving.

Contents

1. About the Manual

1.1 Manual Description

This manual is an integral part of the inverter and describes the assembly, installation, commissioning, maintenance and faults of the product. Please read it carefully before operation.

1.2 Applicable Models

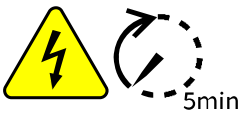
This manual applies to single-phase energy storage inverter models: D3.0K-LS、D3.6K-LS D5.0K-LS、D6.0K-LS、D8.0K-LS.

1.3 Target Groups

Only for professionals who are familiar with local regulations, standards and electrical systems, and who have been professionally trained and are knowledgeable about this product.

1.4 Safety Markings

Please carefully read and understand the meaning of the following warning signs to facilitate better use of this manual.

Label	Description
	The symbol indicates the danger of electric shock. If not avoided, could result in serious injury or even death to personnel.
	The symbol indicates some precautions. If not avoided, could result minor injuries to personnel or damage to the inverter.
	The symbol indicates that the surface temperature is high. Please do not touch it.
	Delayed discharge, and the maintenance personnel must wait for 5 minutes before they are completely powered off.
	Please read through the user manual before any operations.

	Please do not dispose of the inverter as household waste. Discard the product in compliance with local laws and regulations, or send it back to the manufacturer.
CE	CE mark of conformity.
	Grounding mark.

2. Safety Precaution

2.1 Operator Safety

Personnel installing or servicing the equipment must be highly trained and should be aware of safety precautions and proper operation.

2.2 Installation Safety

	1. Ensure that the equipment is not connected to any electrical connections before installation. 2. When drilling holes in the installation wall ensure to avoid the water and electricity lines in the wall.

	1. During transportation, pay attention to the weight of the product and keep it balanced to avoid falling and hurting the human body. 2. The tools used must be checked prior to installation for compliance with professional requirements.

2.3 Electrical Connection Safety

2.3.1 PV-side Connection Safety

	1. Use the PV input terminals included in the accessory package to connect the DC cables on the PV side. 2. Use a multimeter to check the polarity of the DC cables to ensure that the polarity is correctly connected, otherwise it may lead to equipment damage or personal injury or death. 3. A PV string cannot be connected to more than one inverter. Otherwise, it may lead to equipment damage or personal injury. 4. PV±poles to earth cannot be short-circuited, the impedance to ground should be > Vpv/30mA.

2.3.2 AC-side Connection Safety

	1. Use the cable connection AC terminals included in the accessory package. 2. It is recommended to use copper wire for the AC output cable. 3. It is recommended to install protective devices such as earth leakage protector and breaker on the AC side. The size of the protection device should be at least 1.25 times the rated AC output current.

2.3.3 Battery-side Connection Safety

	1. Use the cable connection BAT±terminals included in the accessory package. 2. It is recommended to use copper wire for the battery cable. 3. The batteries used with the inverter should be permitted by the inverter manufacturer. 4. Do not connect a battery to more than one inverter at the same time, otherwise it may lead to equipment damage. 5. Use a multimeter to check the polarity of the DC cables to ensure that the polarity is connected correctly, otherwise it may lead to equipment damage or personal injury or death.

2.4 Operation Safety

Any operation on the inverter must be carried out by specialized personnel. While the device is in operation:

	1. Do not touch the inverter case during operation. 2. Do not unplug any connector of the inverter. 3. It is strictly prohibited to touch any terminals of the inverter. 4. It is strictly prohibited to disassemble any parts of the inverter. 5. It is strictly prohibited to operate the peripheral equipment equipped with the inverter, such as DC switch, etc.

2.5 Storage Safety

If the inverter is not installed immediately, it needs to be stored according to the following requirements:

	1. Keep the inverter in the original packing box and store it in a relatively dry place 2. The box should be kept upright and stacked according to the direction of the box tips 3. Do not store the inverter in harsh environments such as direct light and rain. 4. Do not store the inverter in a place where it may be damaged.

	5. Please check the inverter and its packaging regularly.

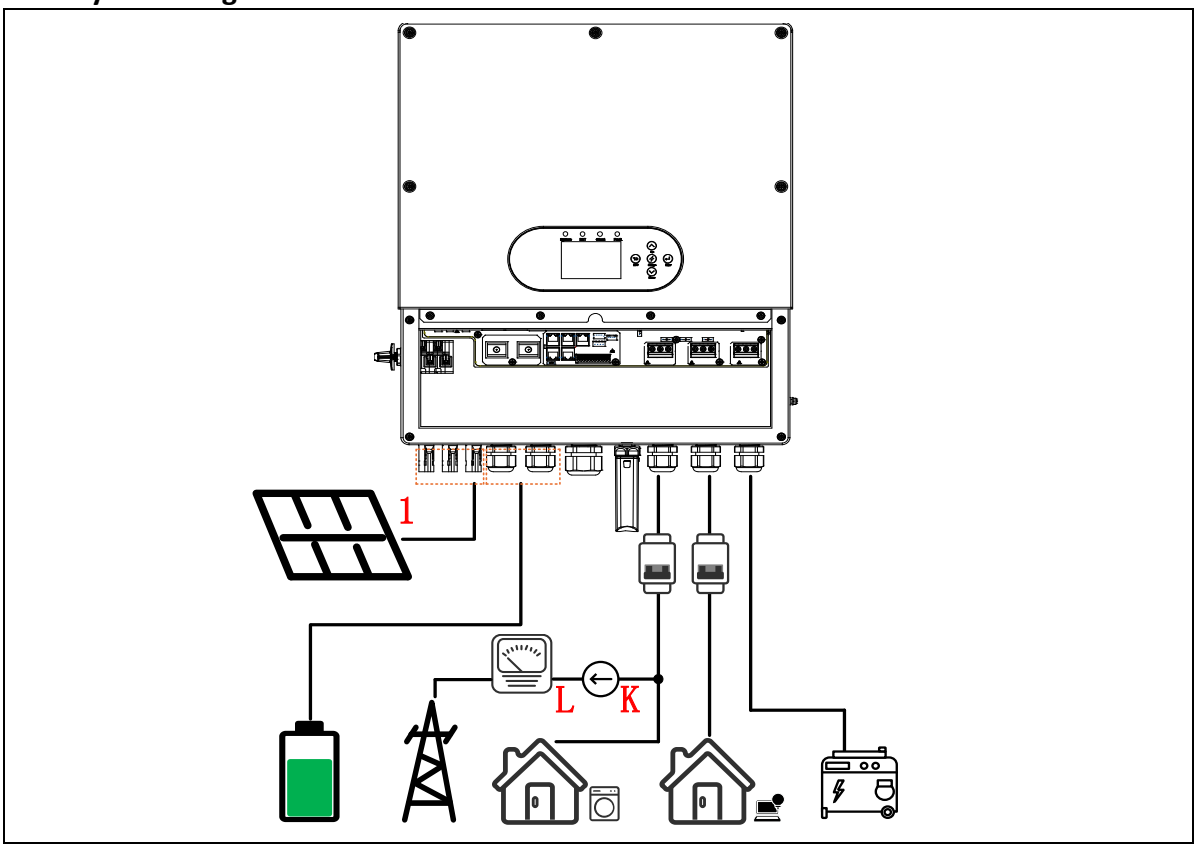
3. Product Instruction

3.1 Product Overview

This product is a hybrid inverter that converts solar energy into AC power for load consumption, stores the energy in batteries for future use or feeds it into the utility grid. The working mode of the inverter depends on the user's settings, the inverter can be used to provide emergency power in the event of grid outage.

3.2 Application diagram

- **System Diagram**



- **System Instruction**

1	PV panel	A PV string consists of PV panels connected in series.
2	Battery system	Inverter-supported batteries can be selected for matching.
3	Generator	The inverter supports connection to the generator and can control the start and stop of the generator.
4	AC circuit breaker	Self-provided BACK-UP side AC circuit breaker, rated current depends on the load and the maximum current of the inverter, recommended > 1.25 times the maximum current; rated

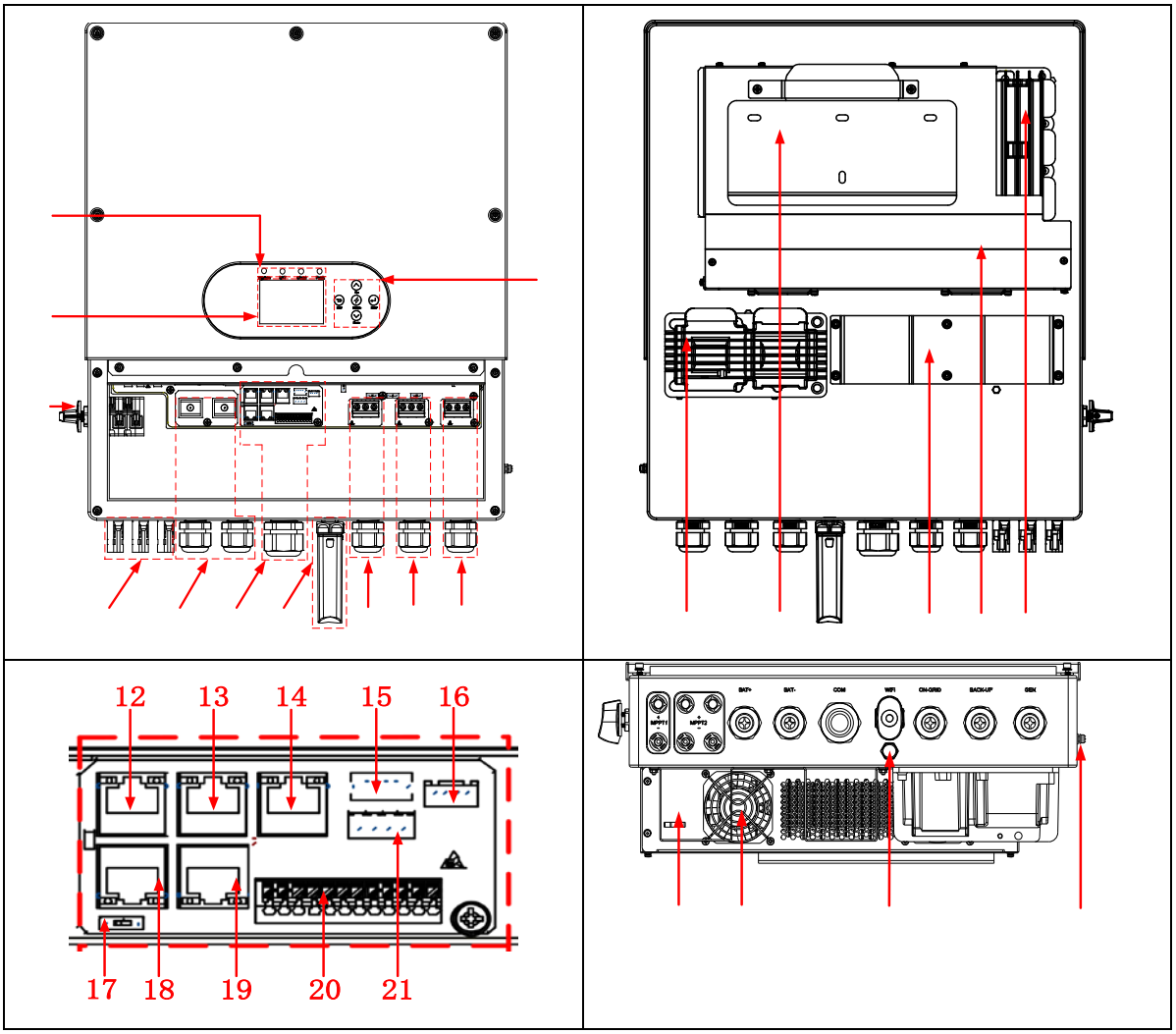
		voltage ≥ 230Vac.
5	AC circuit breaker	Self-provided ON-GRID side AC circuit breaker, rated current depends on the load and the maximum current of the inverter, recommended > 1.25 times the maximum current; rated voltage ≥ 230Vac.
6	CT	The accessory package will come with the CT, which must be connected to the grid in the direction of the CT K→L(from house to grid).
7	BACK-UP	Essential loads can be connected here, and if equipped with batteries, the loads will not be disconnected in case of grid failure.
8	Meter	Selection of meter according to local requirements.
9	Utility grid	Supported Grid Types L/N/PE,220/230/240
10	On-grid	Non-sensitive loads can be connected here, the loads will disconnected in case of grid failure.
11	Inverter	LS 3~8K

NOTE: When the inverter is off-grid, the precautions are as follows

1. If the system is not equipped with batteries, it is not recommended to use the BACK-UP function, otherwise it may cause the system power failure.
2. The load connected to the BACK-UP needs to consider the inductive and capacitive load startup and switching inrush power/current. If the inrush current is too high, it may cause the inverter to trigger overload protection.
3. BACK-UP is not allowed to connect isolation transformer, and not allowed the load to be connected behind the autotransformer.
4. BACK-UP is not allowed to connect the equipment that needs to rely on a stable power supply, such as equipment used for life-sustaining medical equipment or bank data servers and other equipment, to avoid personal injury or property damage caused by abnormal power outages.

3.3 Appearance

- **Product Appearance**



- **Functional Description**

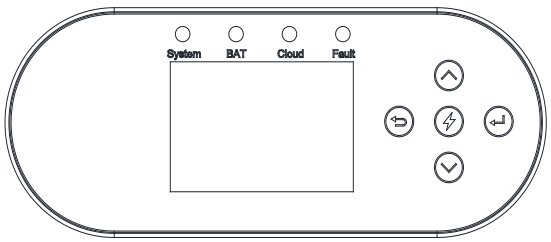
1： Inverter Indicator Light	2： Touch LCD display
3： Function buttons	4： PV Switch
5： PV input（2/3 channel input）	6： Battery connection
7： Communication connection	8： WiFi module
9： ON-GRID connection	10： BACK-UP connection
11： GEN connection(Generator)	12： Parallel-2 connection
13： Battery BMS connection	14： EMS connection
15： USB flash drive interface	16： WiFi module connection
17： Dip switch	18： Parallel-1 connection
19： CT/Meter connection	20： DI/DO connector
21： BAT temperature sampling and RS485	22： Power inductor
23： Back plate	24： Support frame
25： Air duct plate	26： Power transformer
27： Fan shroud	28： Fan cover net

29：Breather valve	30：Ground connection

- **Indicator Description**

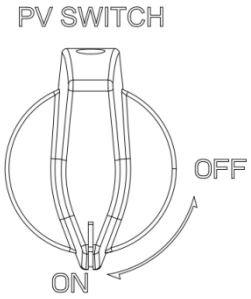
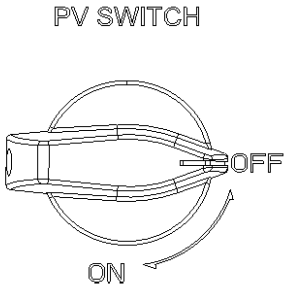
No.	Define	Colour	OFF	Single flash	Double flash	ON
1	System	Green	Standby/Fault/ Upgrade	Off-grid	Self-check	On-grid
2	BAT	Green	Battery not connected	BMS NG	/	Normal
3	Cloud	Green	WiFi Module not recognized	Not connected to router	Not connected to cloud	Normal
4	Fault	Red	Normal	BACK-UP overload	/	Fault

- **Button Description**

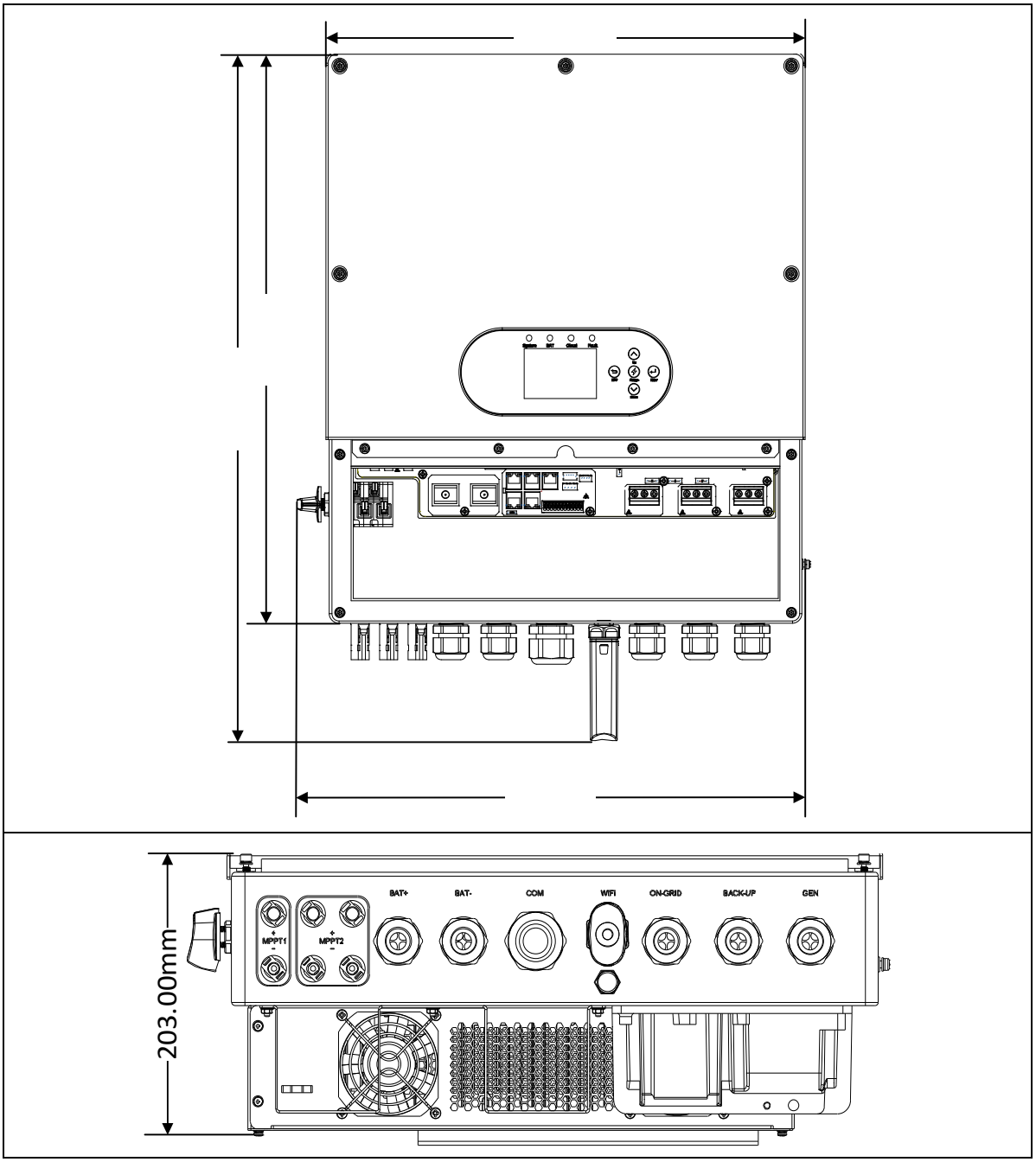


⮌	ESC
↵	Reserved
^	Page up
ϟ	Reserved
v	Page down

- **PV Switch**

ON	OFF
	

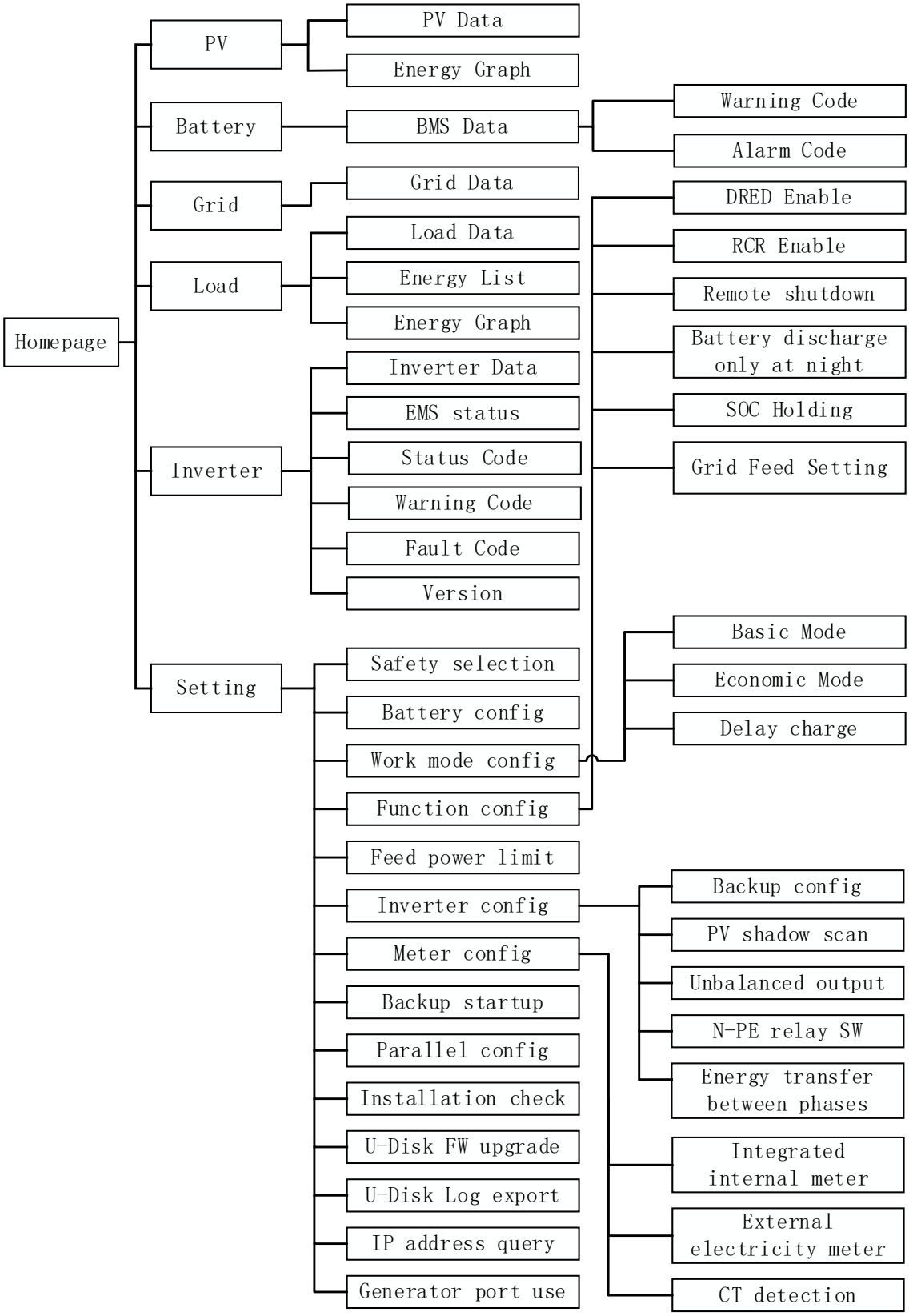
3.4 Dimensions



3.5 LCD Operation

3.5.1 LCD Function Tree Diagrams

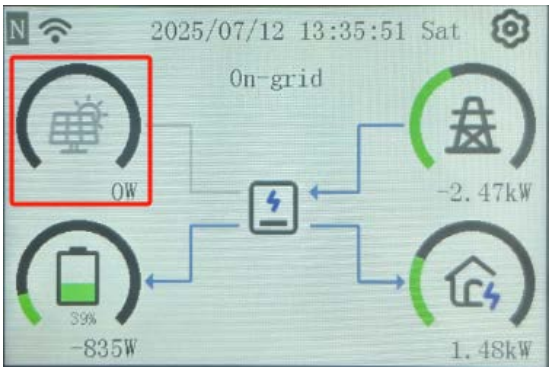
- The LCD function tree diagram is as follows, users can operate the LCD screen according to this tree diagram.

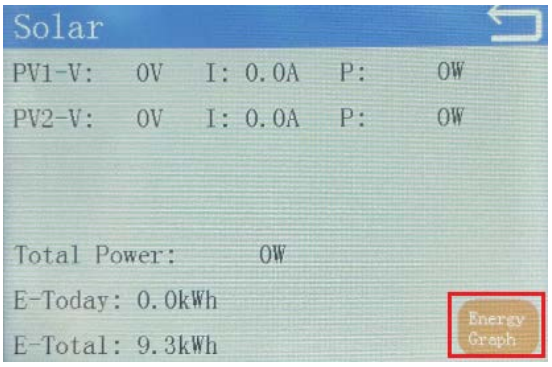

Homepage
PV
PV Data
Energy Graph
Battery
BMS Data
Warning Code
Alarm Code
Grid
Grid Data
Load
Load Data
Energy List
Energy Graph
Inverter
Inverter Data
EMS status
Status Code
Warning Code
Fault Code
Version
Setting
Safety selection
Battery config
Work mode config
Function config
Feed power limit
Inverter config
Meter config
Backup startup
Parallel config
Installation check
U-Disk FW upgrade
U-Disk Log export
IP address query
Generator port use
DRED Enable
RCR Enable
Remote shutdown
Battery discharge only at night
SOC Holding
Grid Feed Setting
Basic Mode
Economic Mode
Delay charge
Backup config
PV shadow scan
Unbalanced output
N-PE relay SW
Energy transfer between phases
Integrated internal meter
External electricity meter
CT detection

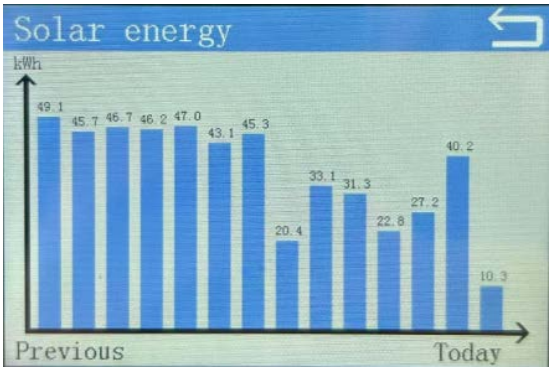
3.5.2 LCD home page introduction

The picture of the LCD homepage is as follows. Users can click on the icon to enter the relevant interface and obtain information about the inverter.

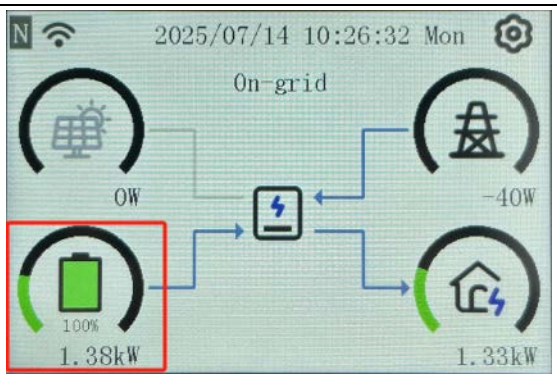
1. Solar data

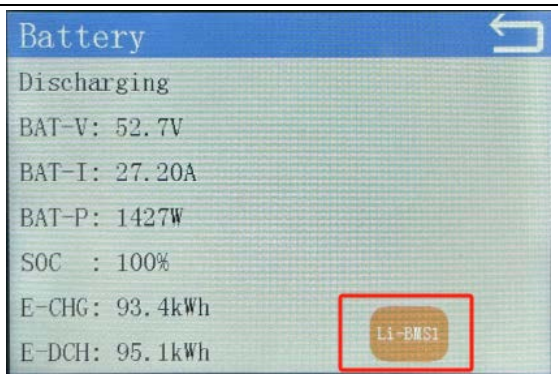


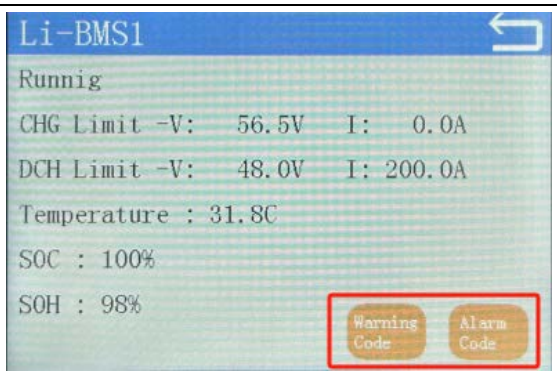


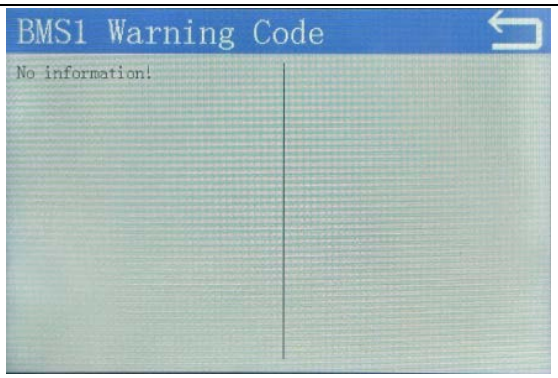


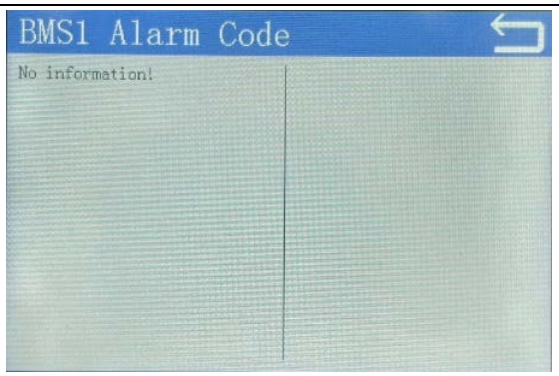
2. Battery data



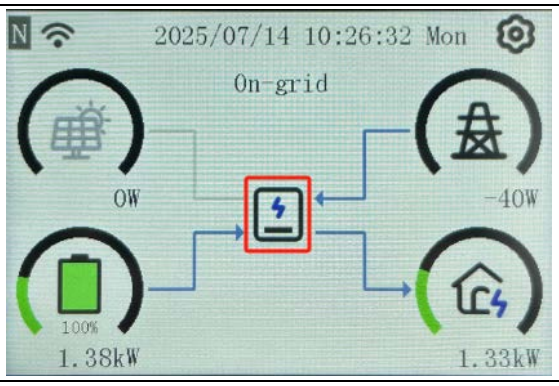


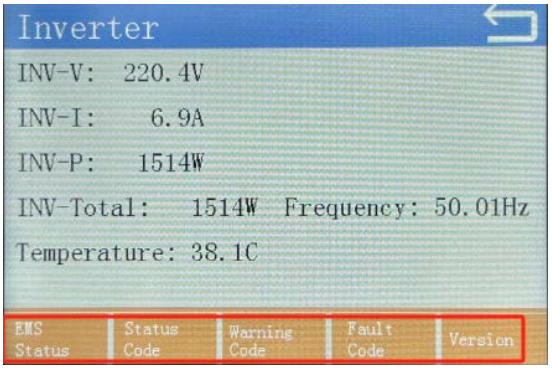


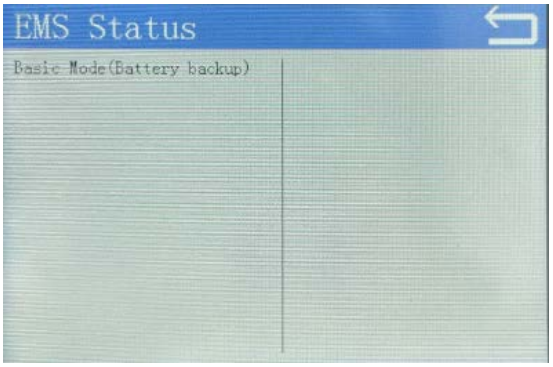


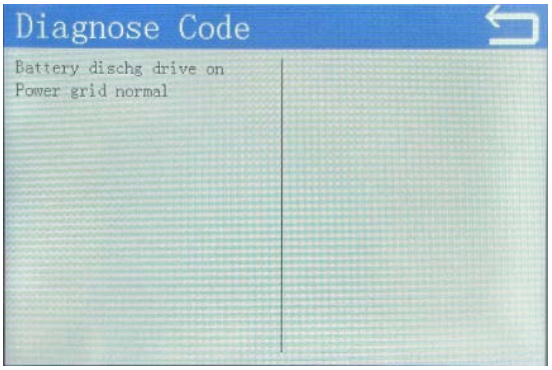


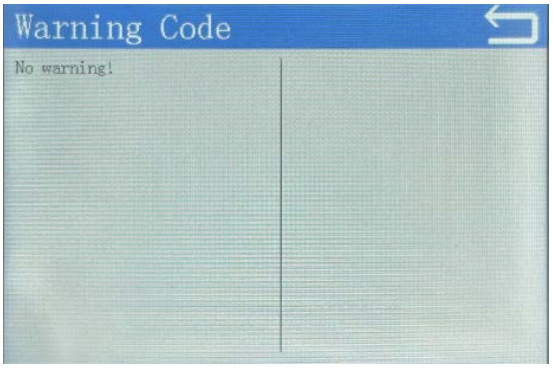
3. Inverter data

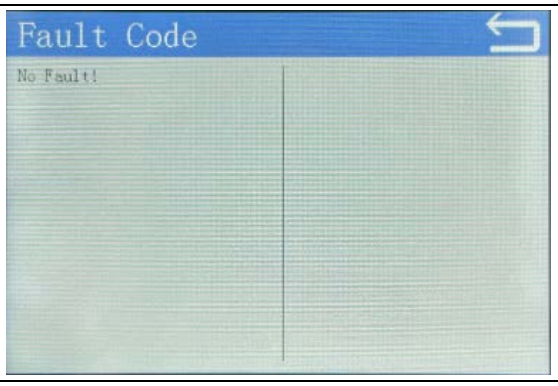


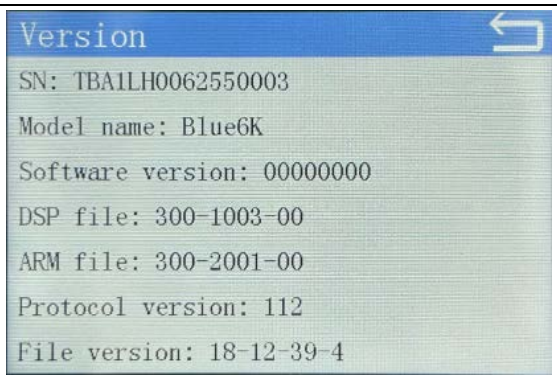




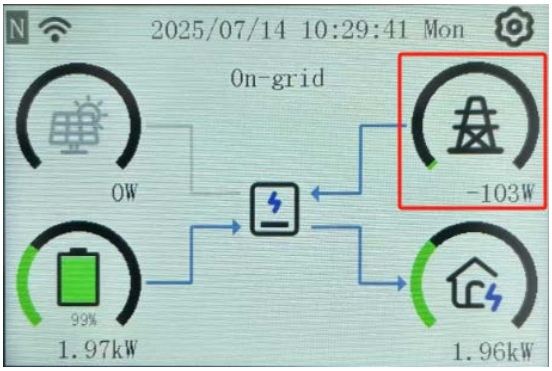


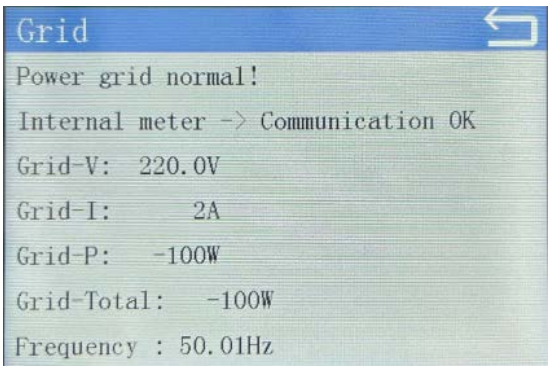




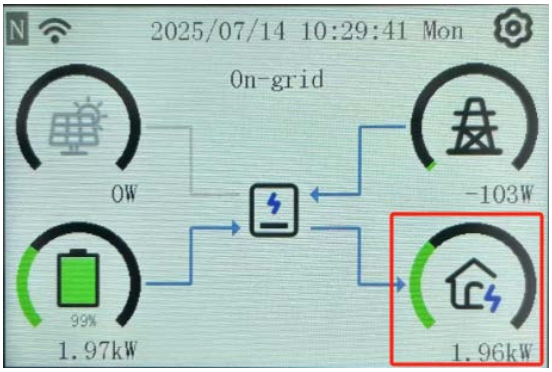


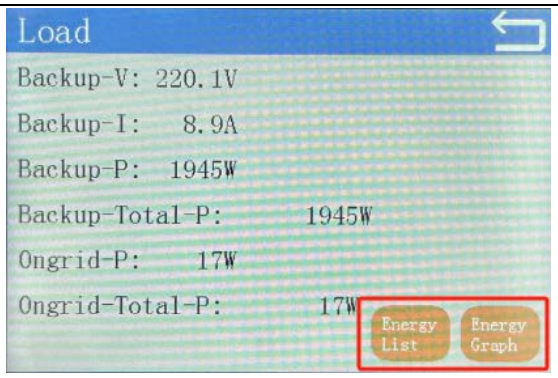
4. Grid data

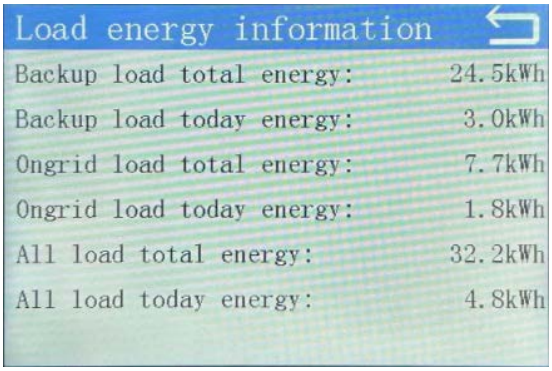


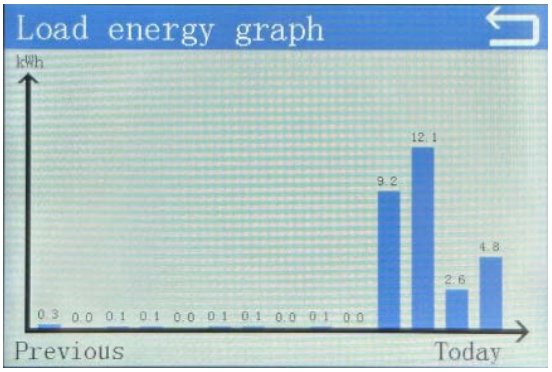


5. Load data







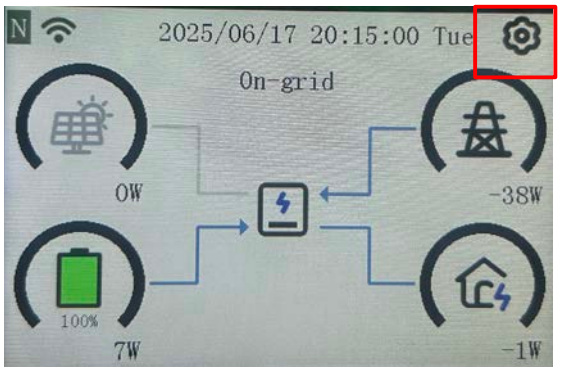


3.5.3 Description of the main functions

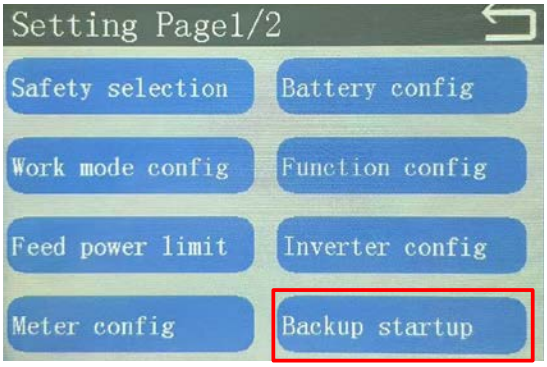
- **Manual start BACK-UP**

To manual start BACK-UP function, follow the steps below.

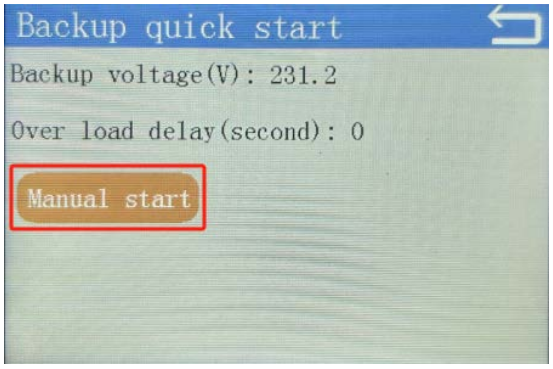
Step1



Step2



Step3

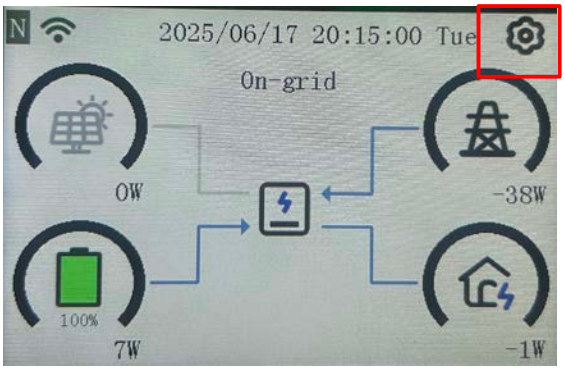


- **Battery SOC holding function**

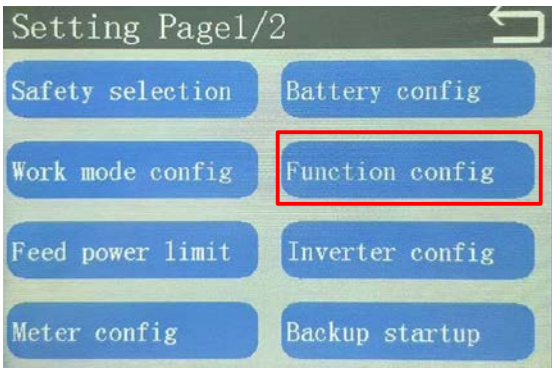
The battery SOC holding function only works in On-grid mode. After the battery is discharged to the SOC protection value, if the battery SOC is lower than the protection value due to standby power consumption, the inverter will automatically buy power from the grid to replenish the battery, so that the battery SOC is always kept at the protection value.

Refer to the following steps:

Step1

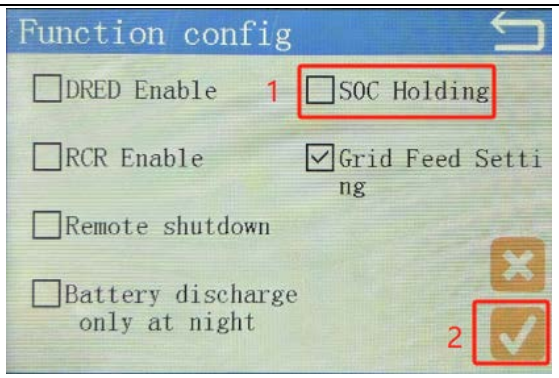


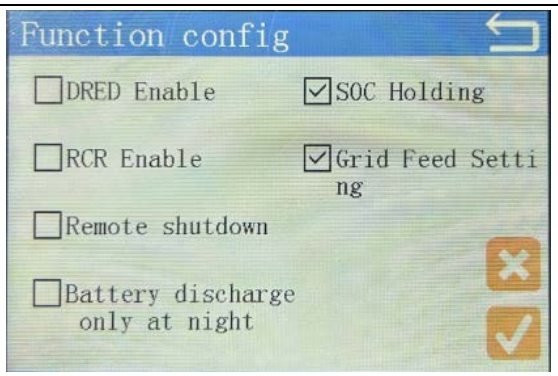
Step2



Step3

Step4





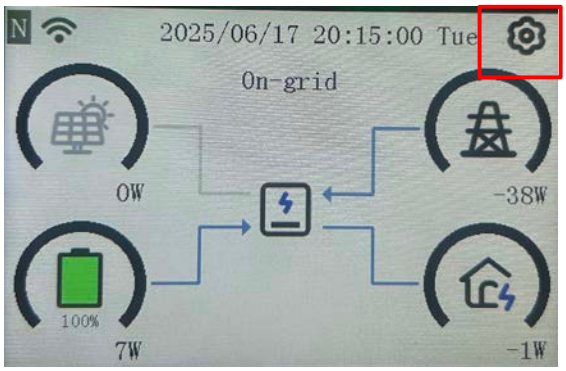
1. Click “SOC Holding”
2. Click “ √ ”

- **Grid Feed Setting Function**

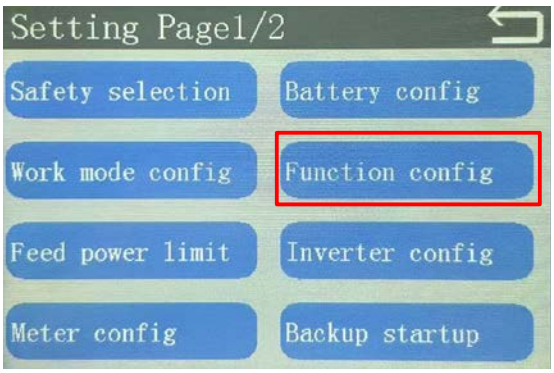
In self-use mode, the regular state will eventually control the power of the meter at 0 W. Some users prefer the demand control target to buy power from the grid or sell power to the grid, which is supported by the inverter, and the target value can be set.

Refer to the following steps:

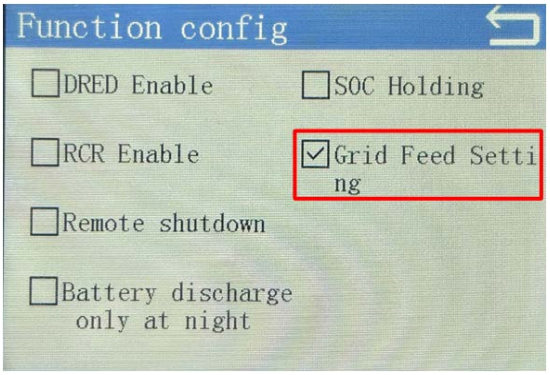
Step1



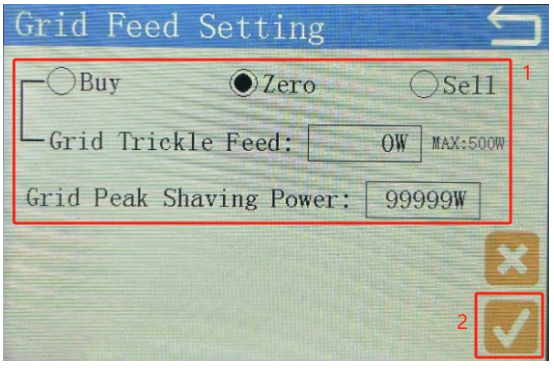
Step2



Step3



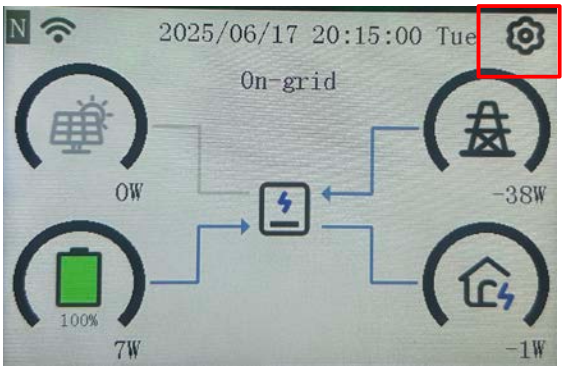
Step4

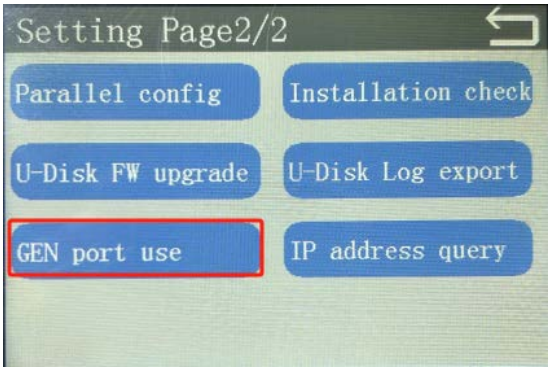


- **GEN port use explanation**

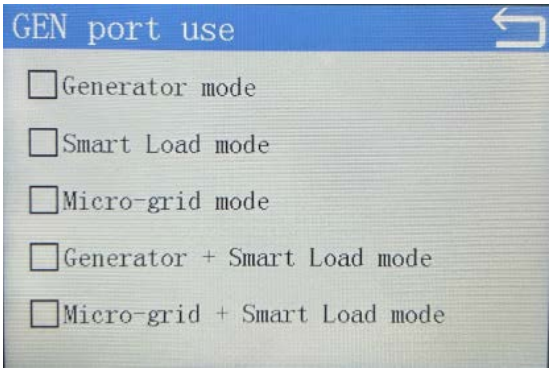
The GEN port has 5 usage modes, which are introduced one by one as follows.

Step1	Step2

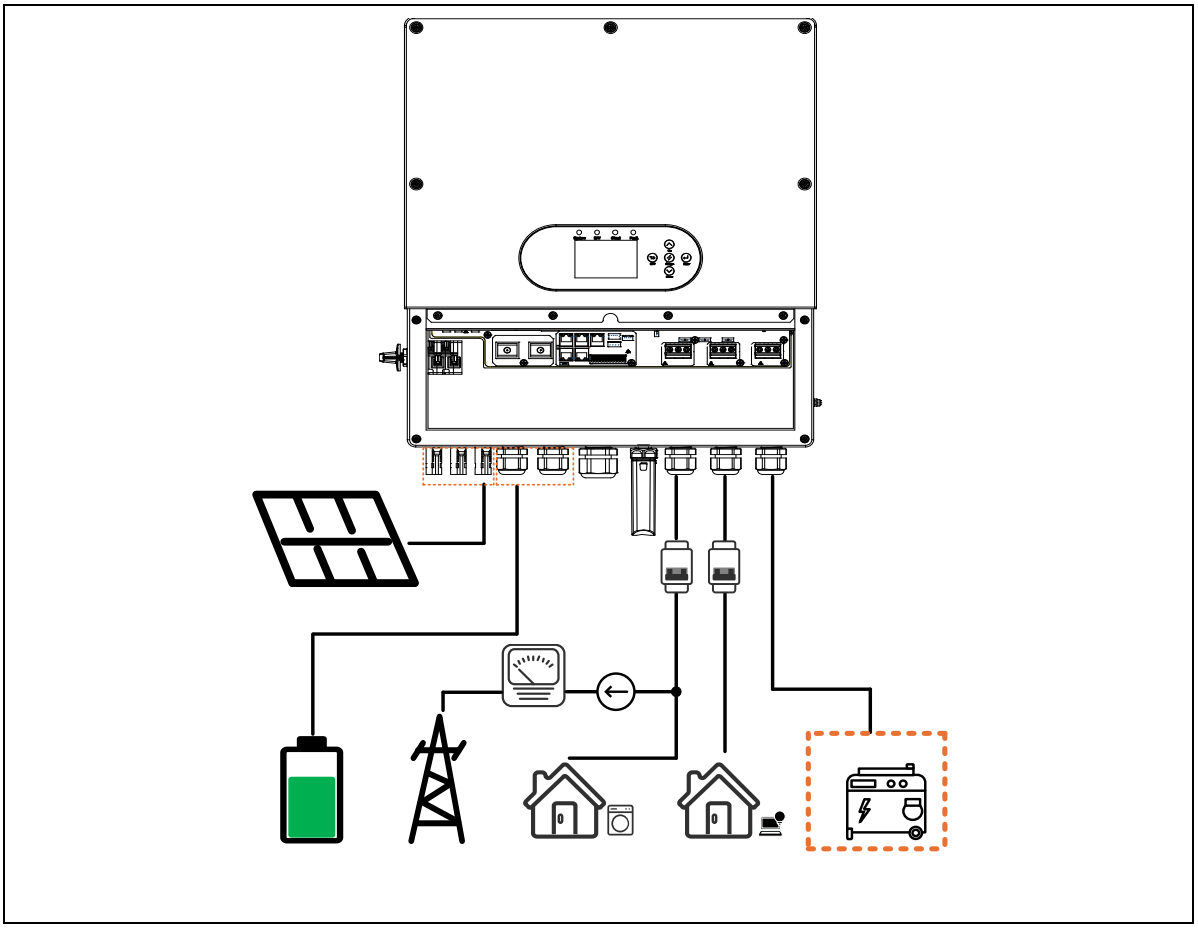




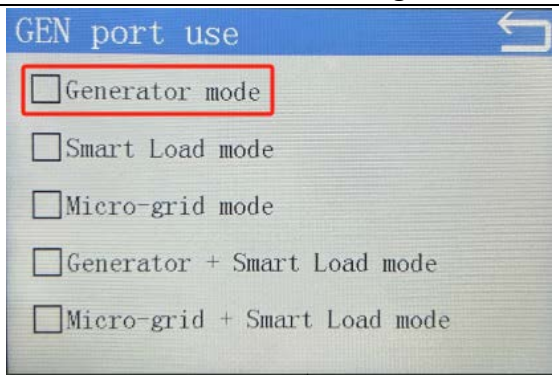
Step3

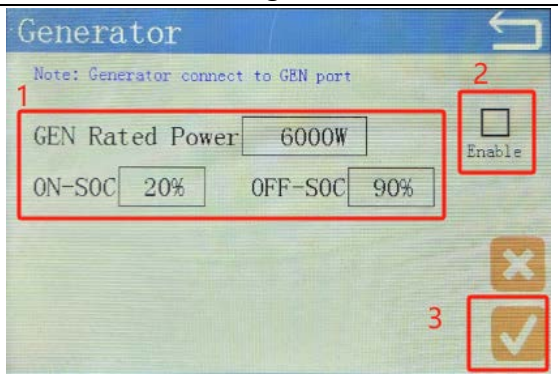


1. Generator mode



GEN-Rated Power： Setting of the rated input power parameters for the generator
ON-SOC： When the SOC is lower than this value, start the generator.
OFF-SOC： When the SOC is higher than this value, shut down the generator.

<table>
<tr>
<td> 

Click “Generator mode”</td>
<td> 

1. Set parameters
2. Click “enable”
3. Click “ √ ”</td>
</tr>
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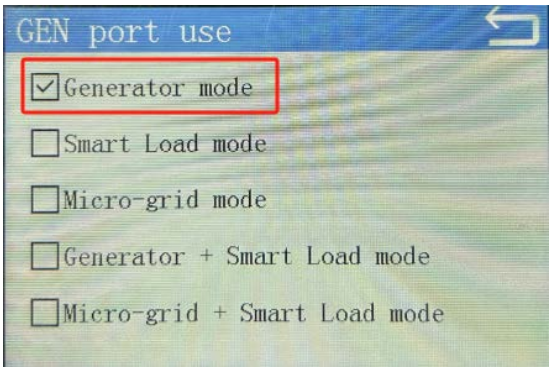
<td> 
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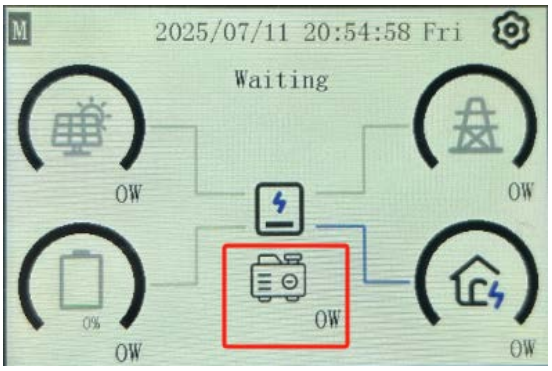
<td> 

This icon represents the device connected to the GEN port.</td>
</tr>
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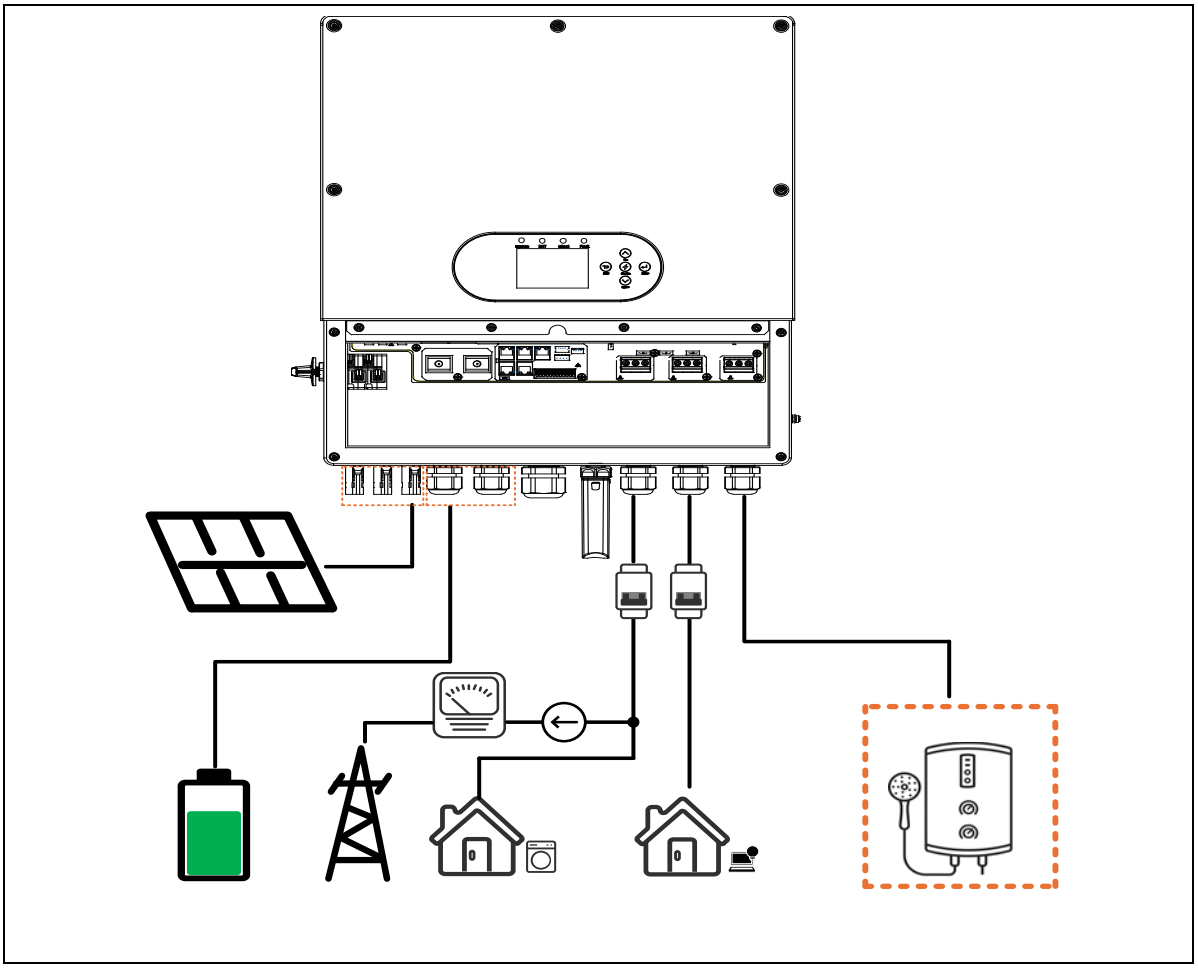
2. Smart load mode



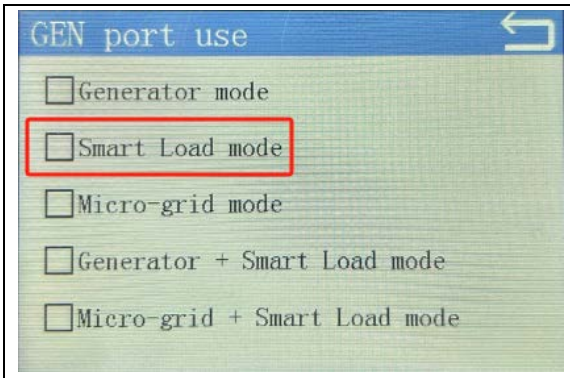
Solar power：Condition 1 for enabling the “Smart load”：Solar power is greater than the set value.

ON-SOC：Condition2 for enabling the “Smart load”：SOC is greater than the set value.

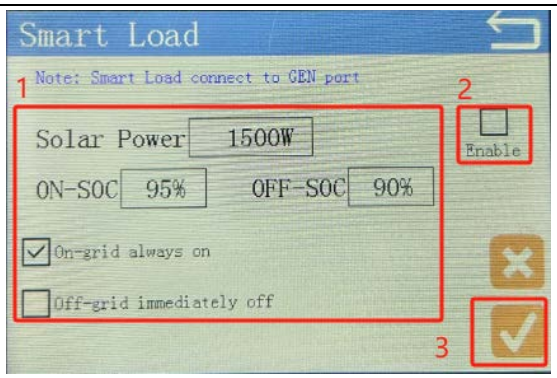
OFF-SOC：When the SOC is lower than the set value, shut down “Smart load”.

On-grid always on：Clicking the option means that “Smart load” will remain active in the on-grid mode.

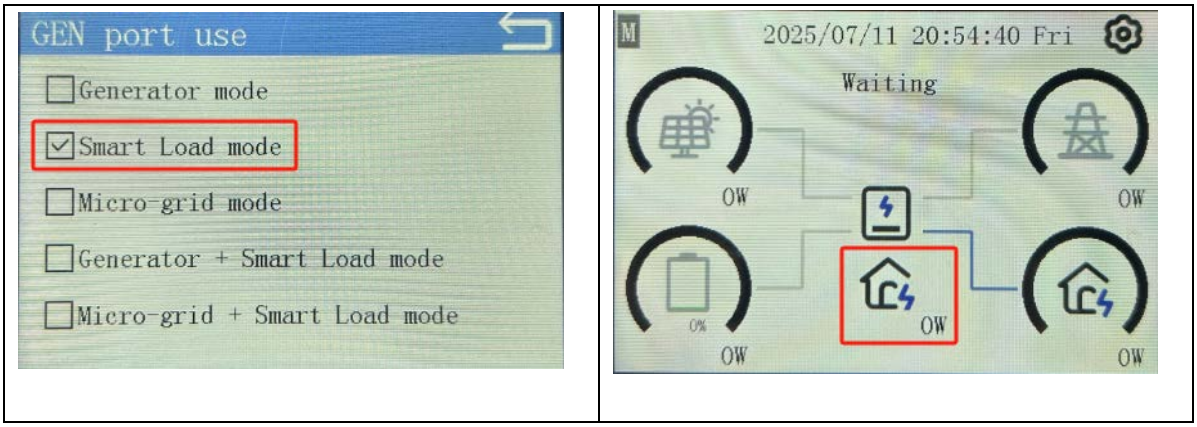
Off-grid immediately off: Clicking the option means that “Smart load” will immediately shut down in the off-grid mode.



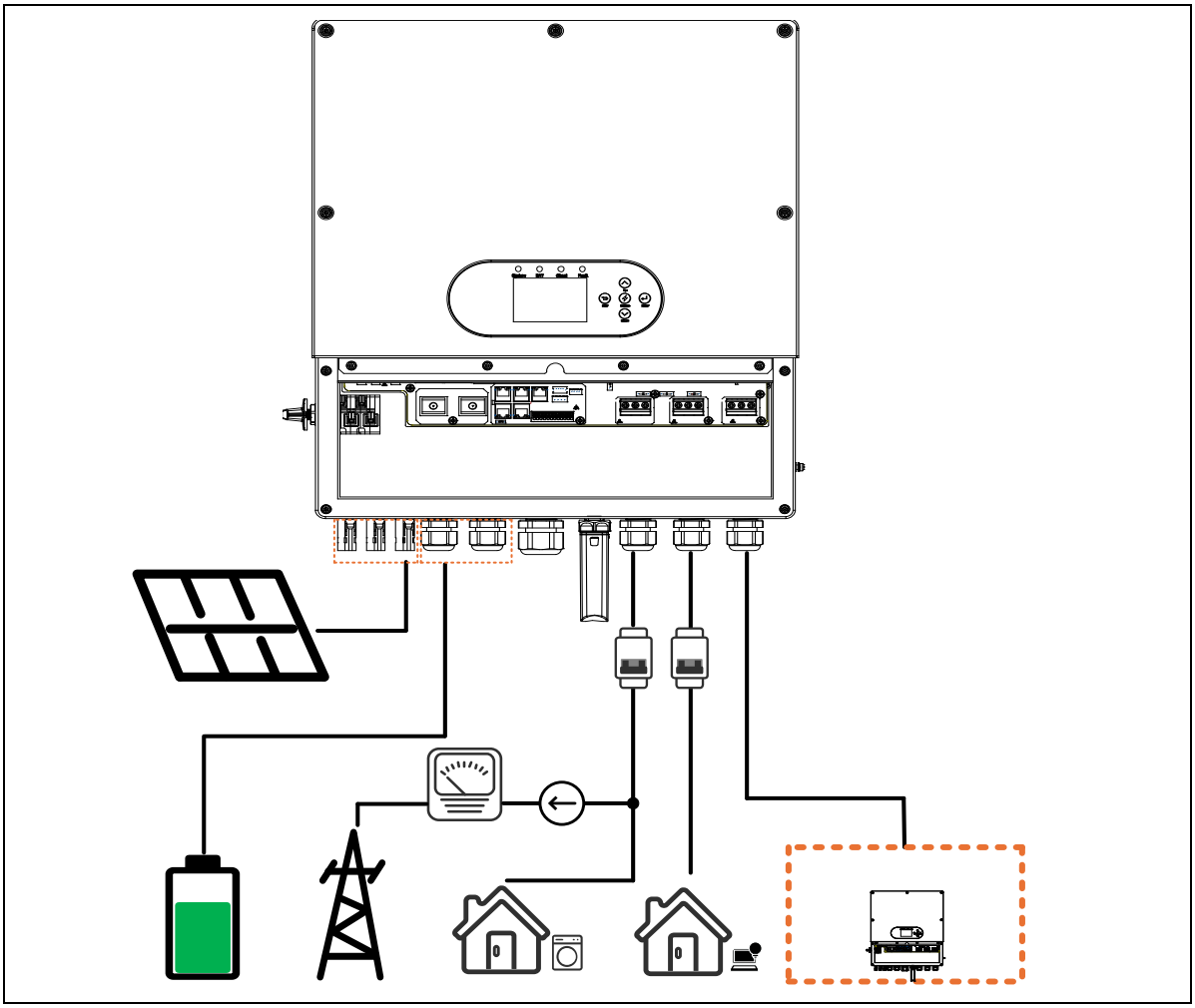
Click “Smart load mode”



1. Set parameters
2. Click “enable”
3. Click “ √ ”

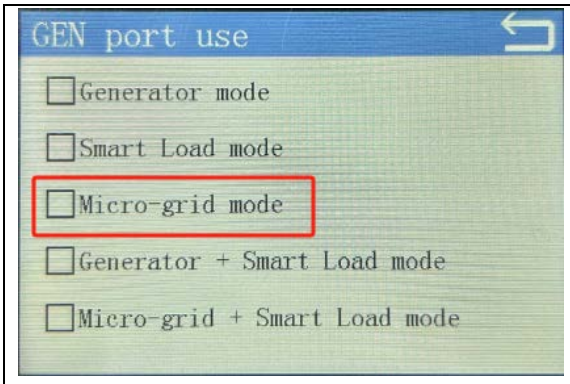


3. Micro-grid mode

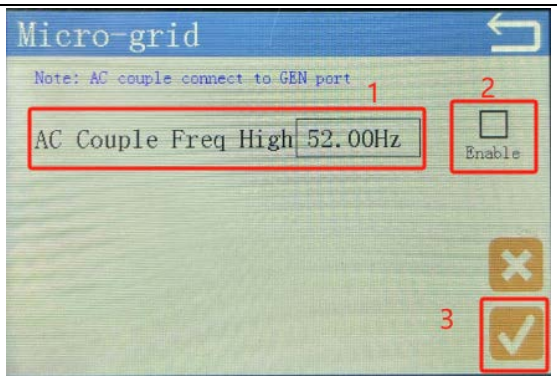


AC Couple Freq High:

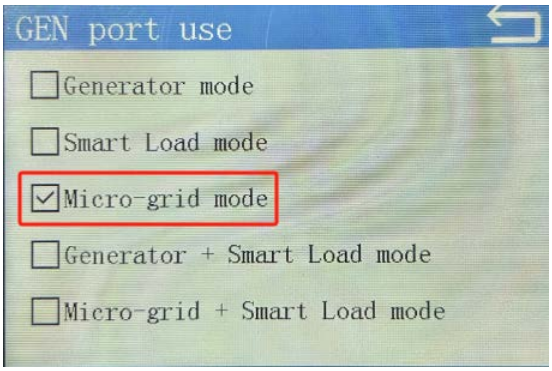
1. Set the over-frequency disconnection threshold for the on-grid inverter. When the battery is unable to continue charging, the output frequency of the hybrid inverter will be adjusted to this set value, forcing the on-grid inverter to disconnect.
2. It is generally recommended to enable the over-frequency and over-voltage load reduction functions of the on-grid inverter, which can better achieve full charging of the battery.

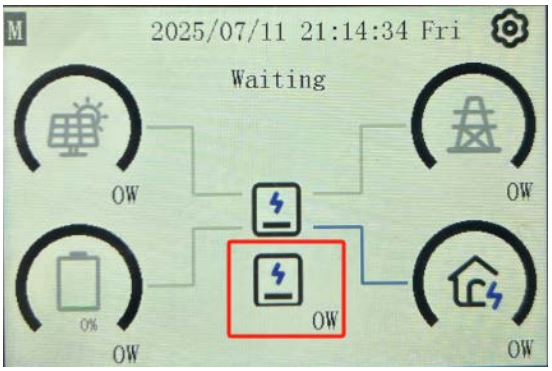


Click “Micro-grid mode”

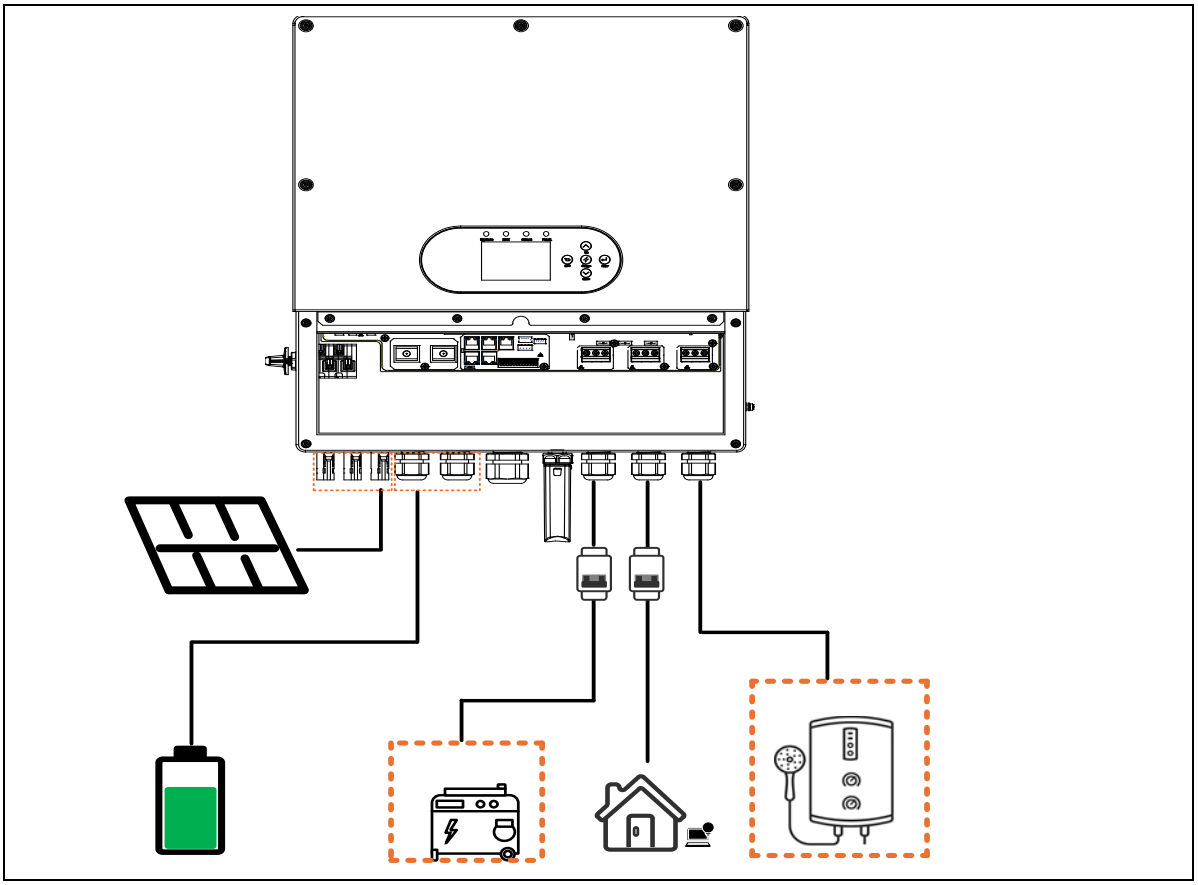


1. Set parameters
2. Click “enable”
3. Click “ √ ”

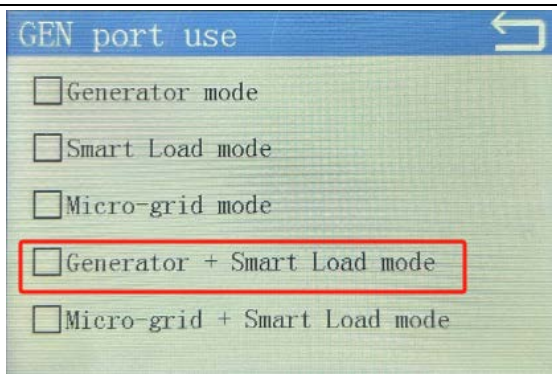




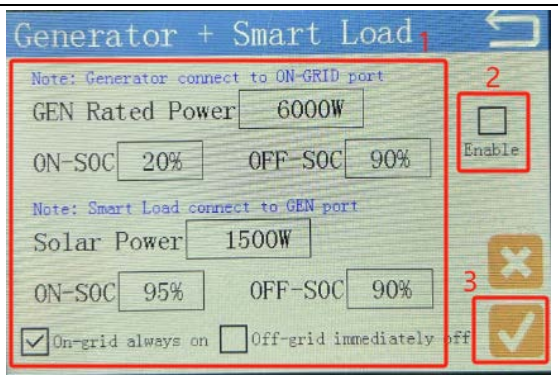
4. Generator + Smart load mode



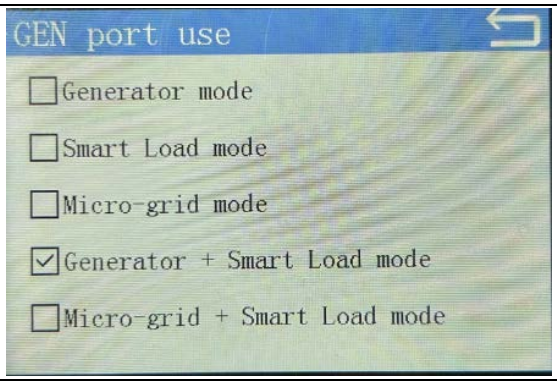
The parameters have been explained in the generator mode and the smart load mode.

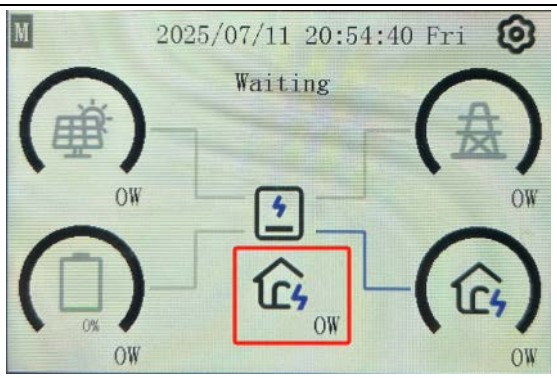


Click “Generator + Smart load mode”

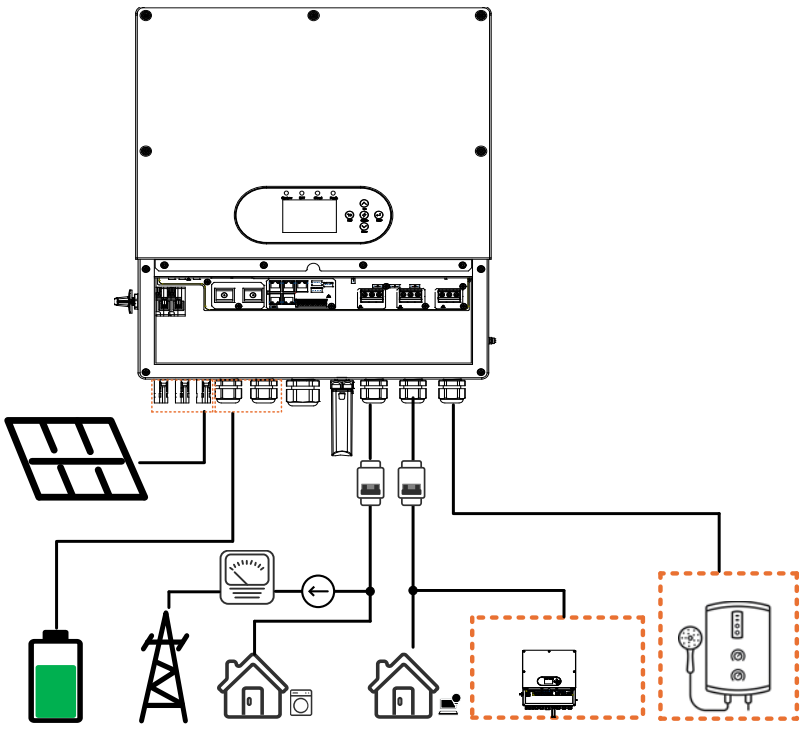


1. Set parameters
2. Click “enable”
3. Click “ √ ”

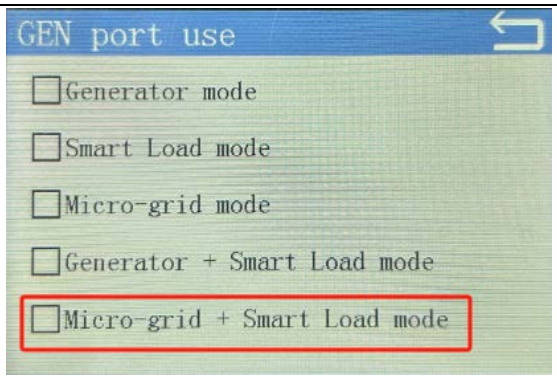




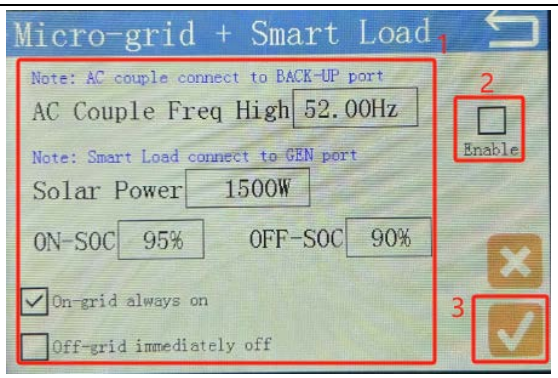
5. Micro-grid + Smart load mode



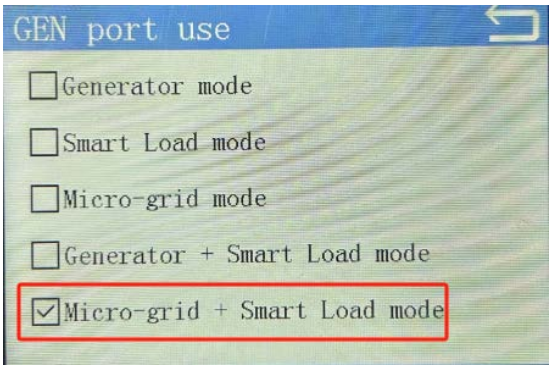
The parameters have been explained in the generator mode and the smart load mode.

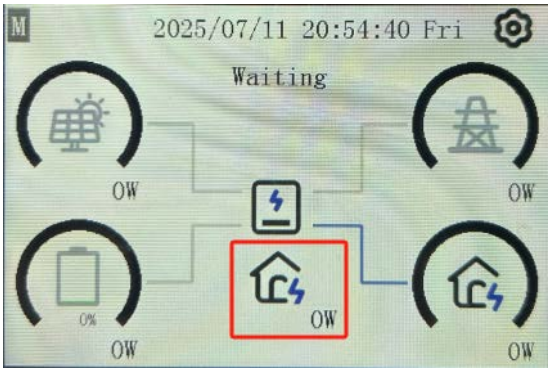


Click “Micro-grid + Smart load mode”



1. Set parameters
2. Click “enable”
3. Click “ √ ”

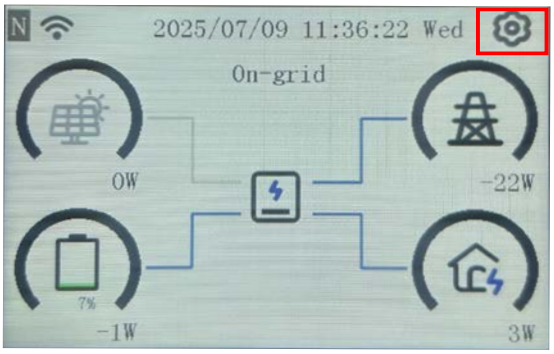




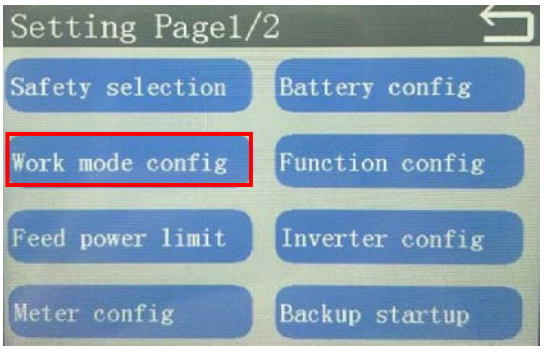
3.6 Operating Modes

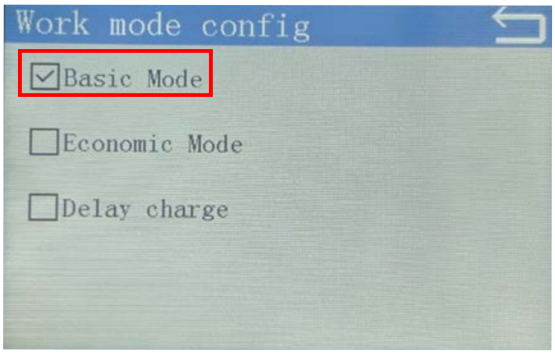
The inverter has **3 working modes:** Basic mode, Economic mode, Delay charge mode. The factory default setting is in the Basic mode.

Step1



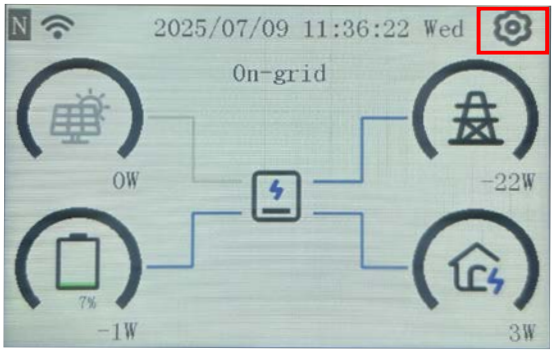
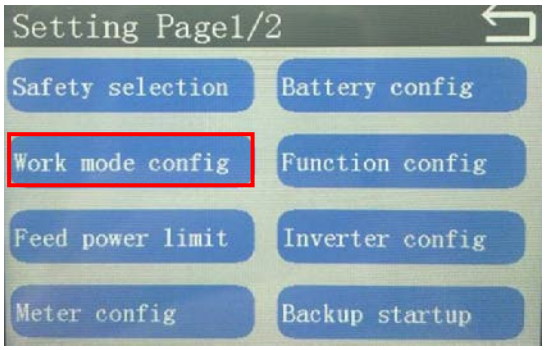
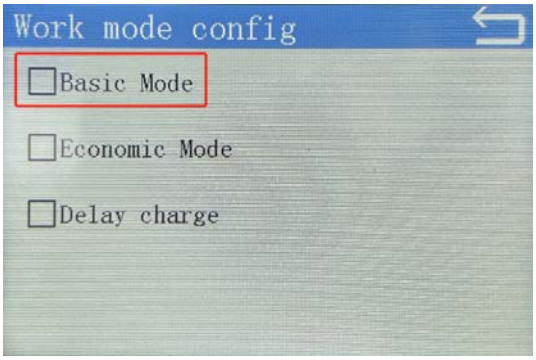
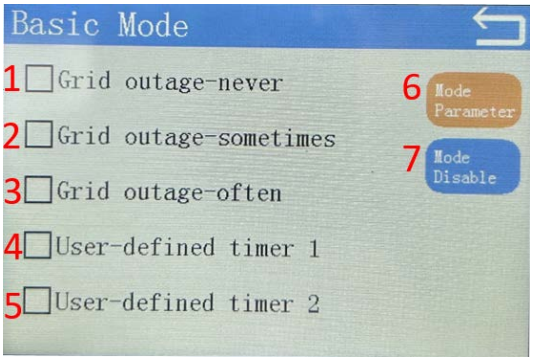
Step2



Step3	
	

3.6.1 Basic Mode

- The Basic mode interface has 5 sub-options, as shown in the following picture. Which can be set by the user according to their actual needs. The following is a detailed explanation.

Step1	Step2
	
Step3	**Step4**
	

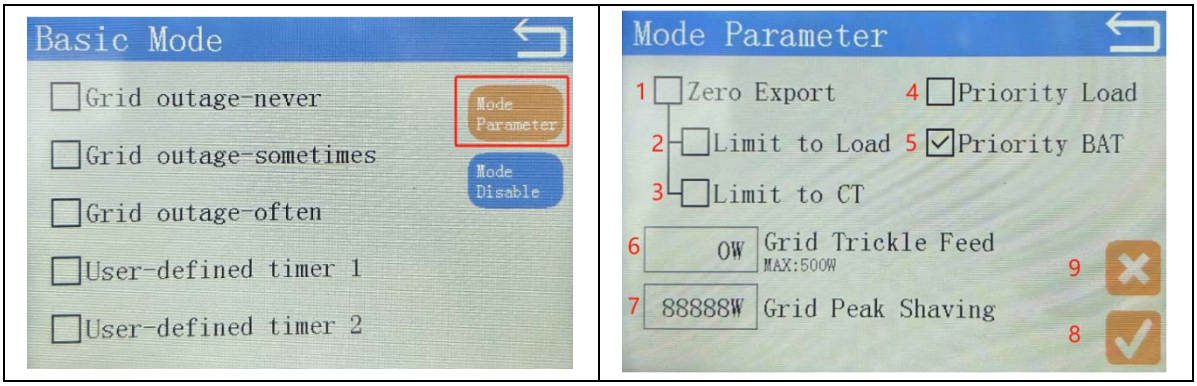
- Detailed explanation

No.	Option Name	Explanation
1	Grid outage-never	**Applicable to areas with stable grid and almost no power outage.** PV energy prioritizes powering the load; excess energy is used to charge the battery. When PV energy is insufficient, the battery discharges to replenish the energy supply.

2	Grid outage-sometimes	**Applicable to areas where grid sometimes outages.** By default, 50% of the Battery SOC is reserved for BACK-UP during grid outages. Users can also adjust this ratio and the maximum charging power of the grid. When ON-GRID, the energy from PV and grid are prioritized to ensure that the Battery SOC is not lower than 50%. On this basis, PV supplies power to the load first, and the remaining power is used to charge the battery. The battery can also discharge to replenish power. **Note:** If the maximum charging power of the grid is set to 0, it is equivalent to only using PV to charge the battery.
3	Grid outage-often	**Applicable to areas where grid often outages.** By default, 100% of the Battery SOC is reserved for BACK-UP during grid outages. Users can also adjust this ratio and the maximum charging power of the grid. When ON-GRID, the energy from PV and grid are prioritized to ensure that the Battery SOC reaches 100%. The battery only discharges when the Grid outages. **Note:** If the maximum charging power of the grid is set to 0, it is equivalent to only using PV to charge the battery.
4	User-defined timer1	User-defined timer 1 allows for the configuration of 6 different time periods to set the Battery SOC retention status during specific period of time. The parameters on the settings are explained below.
5	User-defined timer2	User-defined timer 2 allows for the configuration of 6 different time periods to set the Battery SOC retention status during specific period of time. The parameters on the settings are explained below.
6	Mode Parameter	Configure some parameters in this mode, including energy priority settings, grid feed-in settings, grid purchase electricity limit, etc. The parameters on the setting page are explained below.
7	Mode Disable	Disable this mode.

3.6.1.1 “Mode Parameter” specification

- "The Mode Parameter" interface is as shown in the following figure.



- Explanation of “Mode Parameter”

1. **Zero Export：** The feeding power to grid will be controlled to zero.
2. **Limit to Load：** The system will prioritize supplying BACK-UP loads. When the PV energy is greater than the charging battery and BACK-UP loads, the system can supply power to ON-GRID loads, but it will not sell electricity to the grid.
3. **Limit to CT：** The system will prioritize supplying BACK-UP loads and ON-GRID loads.
4. **Priority Load：** The PV energy is prioritized for supplying power to the load, and the remaining energy is used to charge the battery.
5. **Priority BAT：** PV energy is prioritized to charge the battery (default setting). When the battery is fully charged or there is excess PV energy, PV energy will supply power to the load.
6. **Grid Trickle Feed：** The power flowing from the grid to the inverter. Set this value to “20-100W” to instruct the inverter to always take the prescribed amount of power from the grid to minimise the tripping of sensitive pre-paid electricity meters if “Reverse Power Detection” occurs.
7. **Grid Peak Shaving：** Set a peak power limit for household electricity usage. This is used to prevent "inverter charging" and "total household load power" exceed "the maximum carrying capacity of the breaker in the household distribution box". This may result in "breaker tripping" or "line overheating damage". Generally, a 63A breaker can be set to 13kW; **when the electricity usage exceeds the set value, the inverter will actively reduce the charging power until it reaches 0**. (Active discharge is not currently supported.
8. **"√"：** Button for confirming parameter changes. After modifying the setting values, you must click the "√" button for the changes to take effect.
9. **"×"：** Button for canceling parameter changes. After clicking the "×" button, the current parameter modification can be cleared.

3.6.1.2 “Grid outage-never” specification

- When “Grid outage-never” is selected, the inverter operates in the default mode. The description of this mode is as follows: (We also call it Self-use mode). The Self-use mode suitable for areas with high electricity prices and low subsidies for solar power. PV energy destination priority: **load > battery > grid**

1. **Day:**

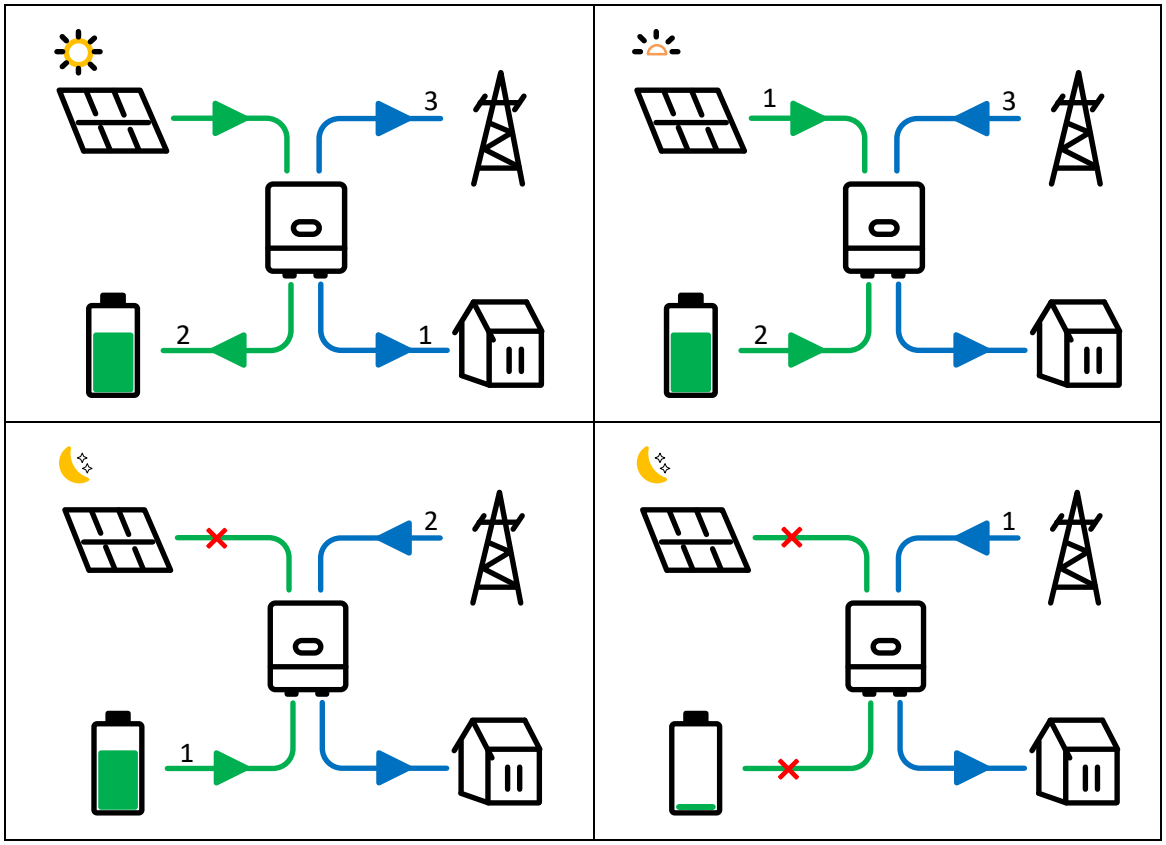
When the PV system produces enough energy, it will be provided to the load first. Excess energy is first charged to the batteries and then sold to the grid (or select “Zero Export” to prevent excess energy to the grid).

When the PV system does not produce enough energy, the battery will provide energy to the load first. If the batteries are also insufficient, the grid replenish the power for it.

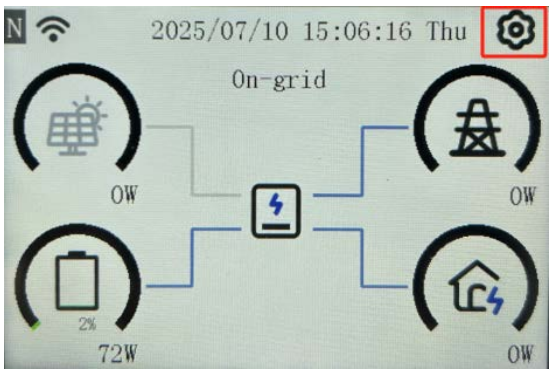
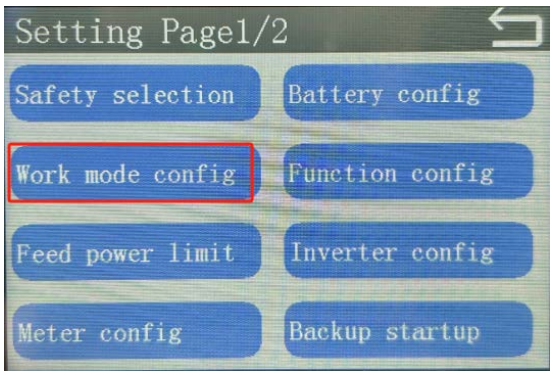
2. Night:

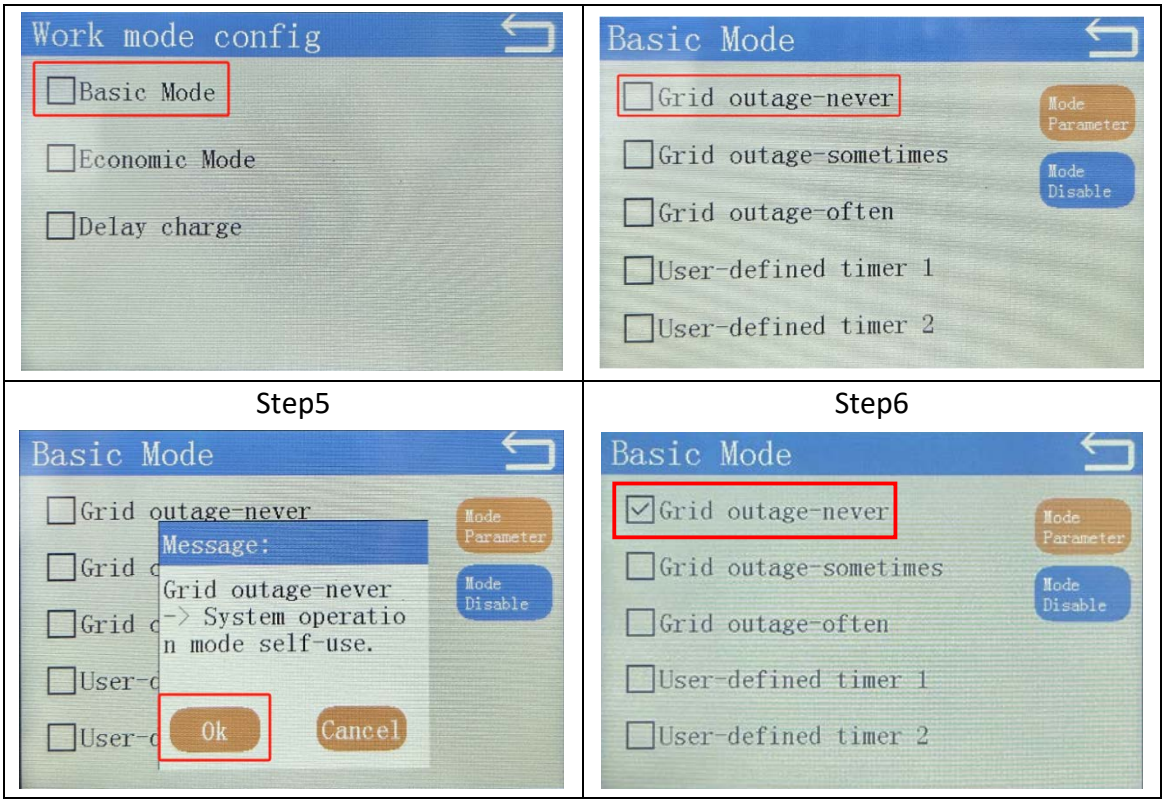
If the battery has sufficient energy, the load is supplied by the battery. If the battery is not sufficient, the load is provided by the grid

Note: The numbers 1, 2, and 3 in the chart below represent the energy supply or destination priority.



- The process for setting the "Grid outage-never" option is as follows:

Step1	Step2
	
Step3	Step4



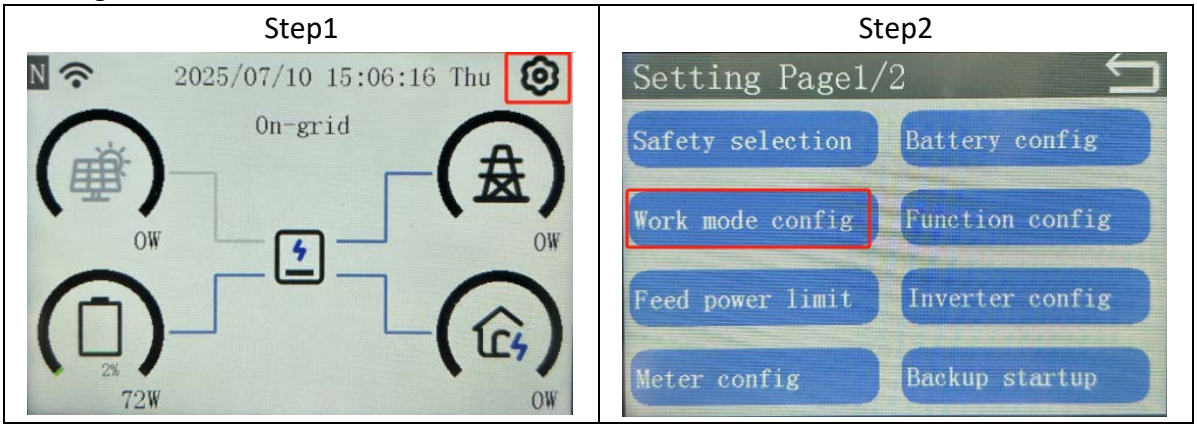
3.6.1.3 “Grid outage-sometimes” specification

- At present, the “Grid outage-sometimes” is the default working mode of the inverter when it is manufactured.

1. **AC charge power：** Set the maximum power for charging from the grid. If set to 0, only the PV energy will be used to charge the battery.
2. **BACK-UP SOC：** Set the minimum SOC state of the battery in this mode. When the battery's SOC is lower than the set value, it will continue to charge; if the battery's SOC is higher than the set value, it will allow supply power to the load during on grid period.

- The process for setting the “Grid outage-sometimes” is as follows:

Note: “Grid outage-often” and "Grid outage-sometimes" have the same operation settings.



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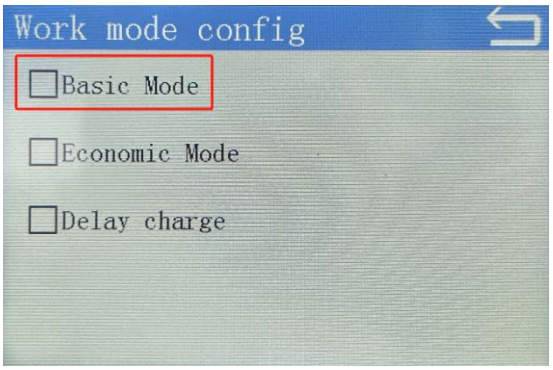
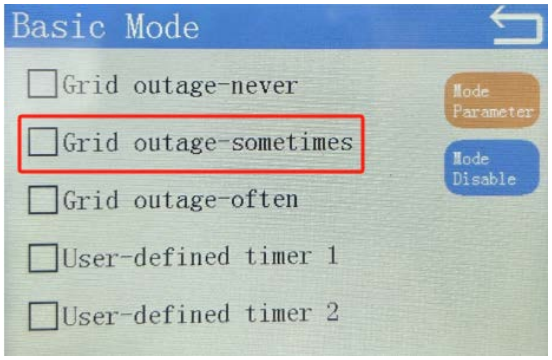
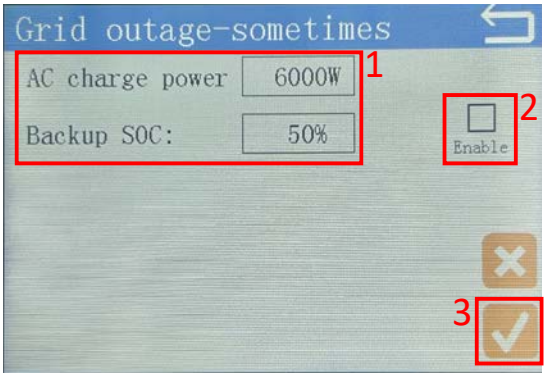
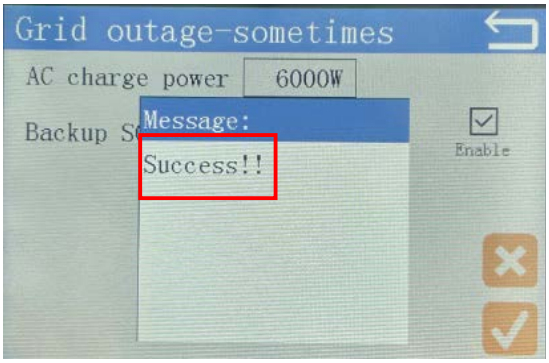
 
</td><td>Step4
 
</td></tr>
<tr><td>Step5
 

1. Set parameters; 2. Click “Enable”; 3. Click “ √ ”</td><td>Step6
 
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 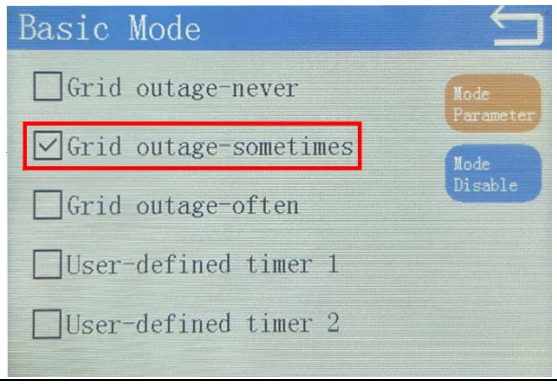
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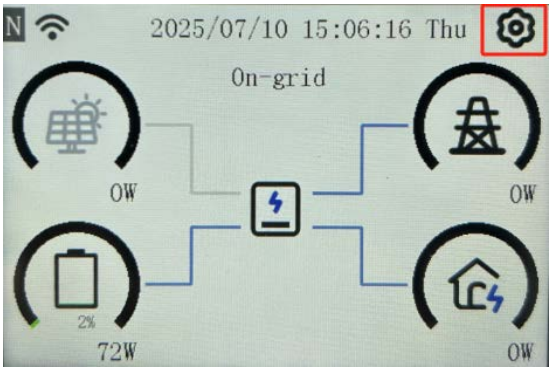
3.6.1.4 “User-defined timer” specification

- The process for setting the “User-defined timer” is as follows:

Step1	Step2

<table>
<tr>
<td> 
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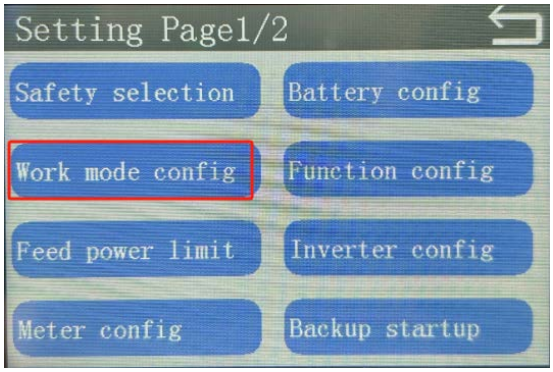
<td> 
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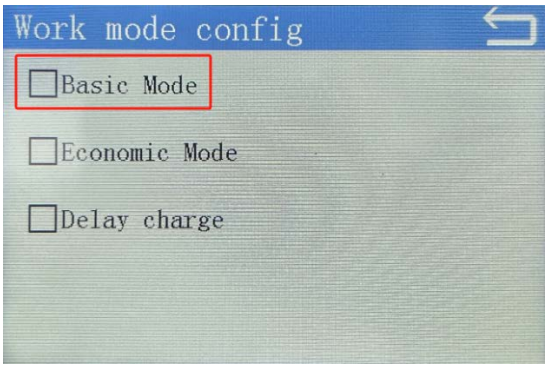
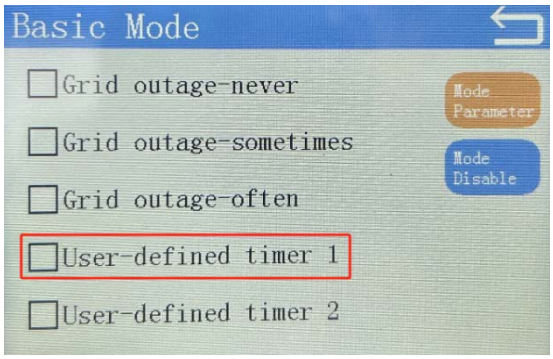
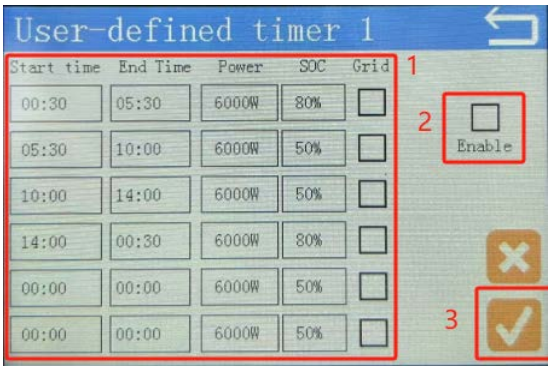
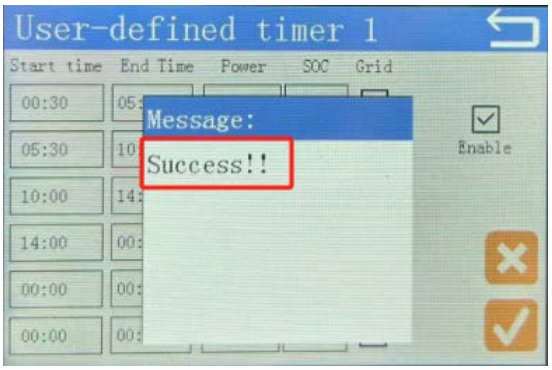
 
</td>
<td>Step4
 
</td>
</tr>
<tr>
<td>Step5
 

1.Set parameters; 2.Check "Enable"; 3.Click “OK”</td>
<td>Step6
 
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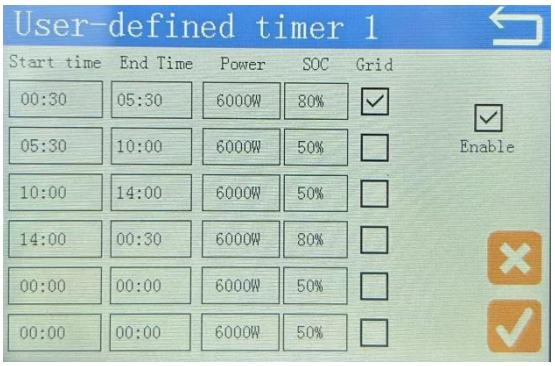
<td> 

According to the demands of different time periods, the setting interface is shown in the figure.</td>
<td>Take the setting in the left picture as an example, the explanation is as follows：
1. During 00:30-05:30, when battery SOC is lower than 80%, the battery will be charged by the grid and PV together until the battery SOC reached 80%, the max charging power of grid is 6kW. When battery SOC is higher than 80%, the battery can discharge.
2. During 05:30-10:00 and 10:00-14:00, when battery SOC is higher than 50%, the battery will discharge until the SOC reaches 50%, the max discharging power</td>
</tr>
</table>

	is 6kW. When battery SOC is lower than 50%, the battery will be charged by the PV until the battery SOC reached 50% (Because the “Grid” was not selected, the grid does not participate in the charging process.) During **14:00-00:30**, when battery SOC is higher than 80%, the battery will discharge until the SOC reaches 80%, the max discharging power is 6kW. When battery SOC is lower than 80%, the battery will be charged by the PV until the battery SOC reached 80% (Because the “Grid” was not selected, the grid does not participate in the charging process.)

- Explanation of Parameter

1. Grid： Enable switch for charging the battery from the grid.

2. Enable： The user-defined timer function enable switch. The parameter settings of this mode will only take effect after clicking "Enable" and the " √ " button.

3. " √ "： Button for confirming parameter changes. After modifying the setting values, you must click the " √ " button for the changes to take effect.

4. "×"： Button for canceling parameter changes. After clicking the "×" button, the current parameter modification can be cleared.

5. Start/End time： The beginning and end of the time period. Support for zero-crossing setting (such as 23:00-01:00). If the start time is the same as the end time, it is considered an invalid setting and the system will not execute the action for this time period.

In addition, if the 6 time periods do not cover the entire 24 hours of the day, then the battery will not allow discharging when it is not within the set time period. If “Priority BAT” is selected (the default setting), the PV energy will be first used to charge the battery, and the excess will supply to the load; if “Priority Load” is selected, the PV energy will be first used to supply the load, and the remaining will be used to charge the battery.

6. Power(W)： Set the power for this time period. If the Power setting is 0, only the PV energy will be used for charging.

If the "Grid" option is selected (which means "grid charging"), then this value is the "maximum power for charging from the grid". If the "Grid" option is not selected, then this value is the “maximum discharge power of the battery during this period".

7. SOC： Set the minimum SOC of the battery for this period of time.

(1) If the "Grid" option is selected (which means "grid charging"), When the battery SOC is lower than the set value, the battery will be charged by the grid and PV. The PV energy will still be prioritized for charging the battery .

(2) If "Grid" is not selected, the battery's SOC will stop discharging once it reaches the set value. When the PV energy is in excess, the remaining PV energy will be used to charge the battery.

(3) When the battery's SOC is below the set value:

Case1: if “Priority BAT” (the default setting) is selected, the PV energy will be prioritized for charging the battery and the remaining power will supply to the load;

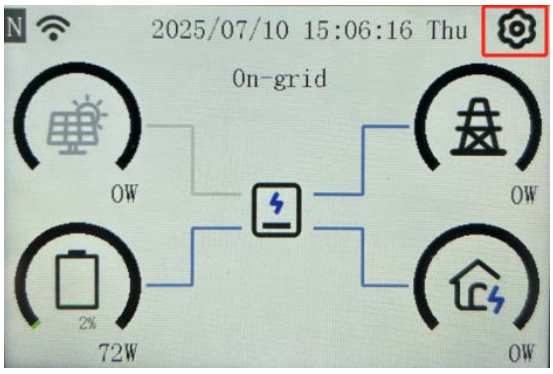
Case2: if “Priority Load” selected, the PV energy will be prioritized for supplying the load, and the remaining power will be used to charge the battery.

3.6.2 Economic mode

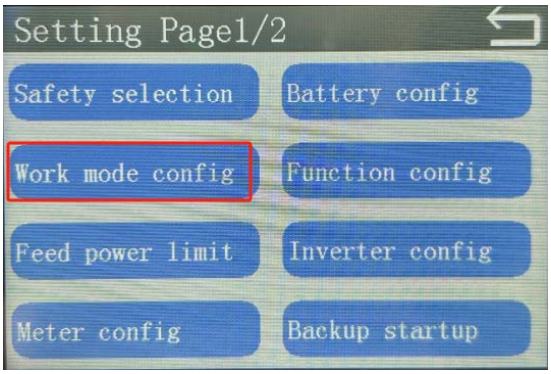
- Users can customize multiple “ECO timer”. Taking the “ECO timer 1” as an example, users can set the working status of the inverter during a period of time on the one day, and can cycle by weeks. The operation is as follows:

1. **Power(Pn)：** The power purchased from the grid (as a percentage of the rated power)
2. **Target SOC：** Battery target SOC value
3. **Sun、Mon ... ALL：** ”ALL” represents all seven days of a week. Clicking on it means selecting all days for the week. If you want to remove a certain day, you need to click on it to make it turn gray.

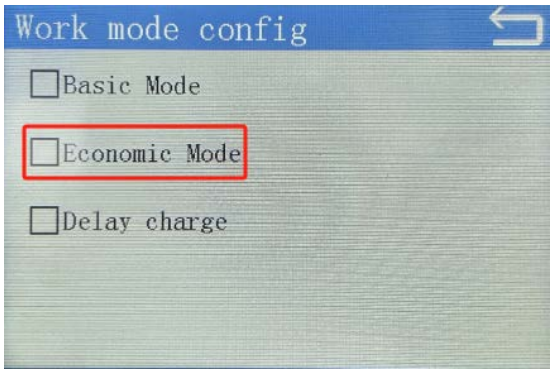
Step1



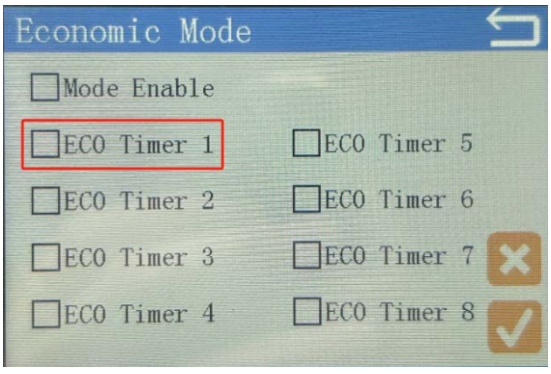
Step2



Step3

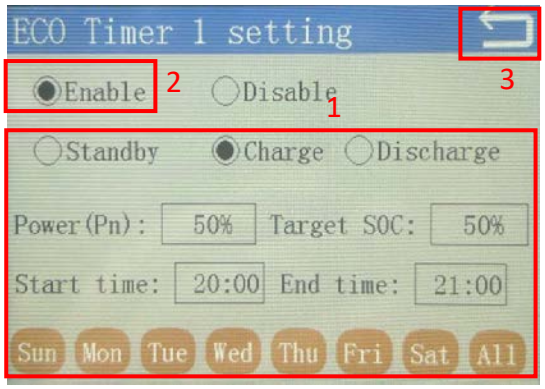


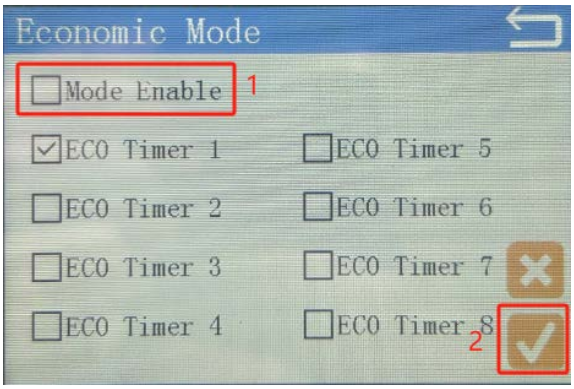
Step4

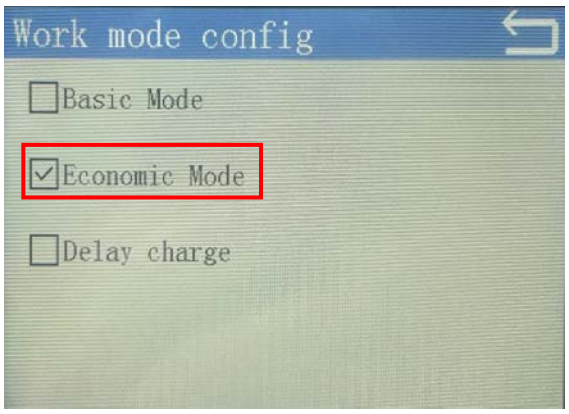


Step5

Step6

<table>
<tr>
<td> 

1. Set parameters
2. Click “Enable”
3. Return
The overall setting means: From 20:00 to 21:00 every week, 50% of the rated power is purchased from the grid to charge the battery, and the target SOC is 50%.</td>
<td> 

1. Click “Mode Enable”
2. Click “ √ ”
3. Prompt: Success! Click “Return”</td>
</tr>
<tr>
<td>Step7
 

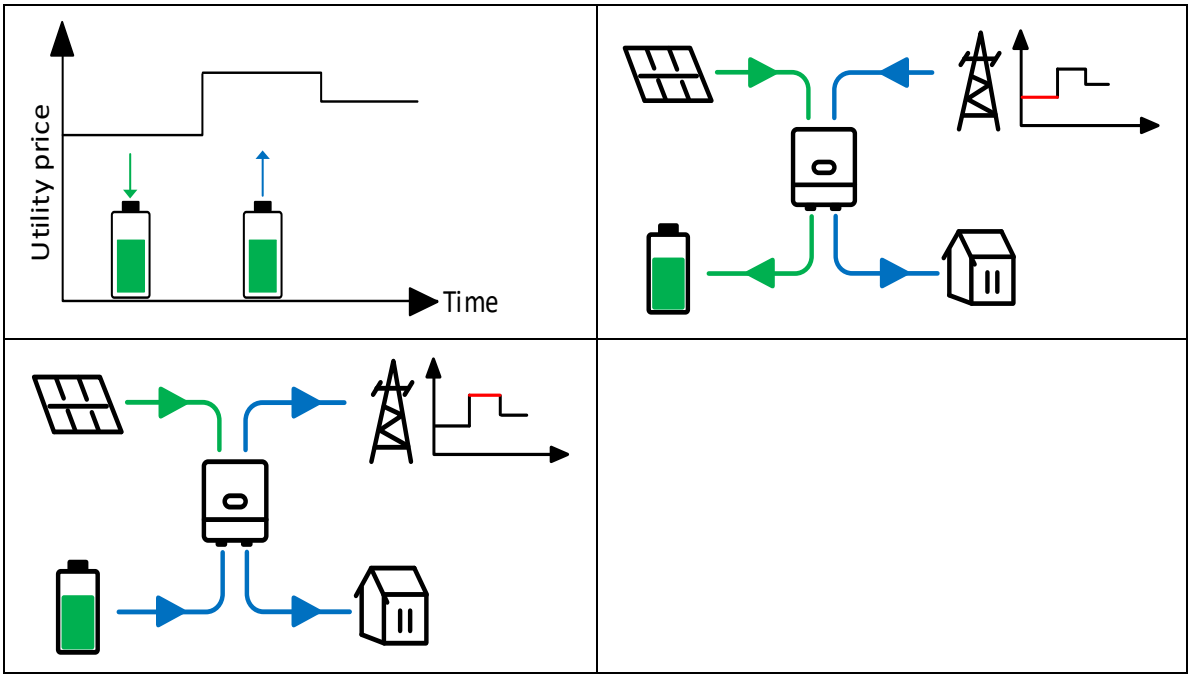
It can be seen that “Economic Mode” has been successfully set.</td>
<td></td>
</tr>
</table>

- Application Scenarios

Suitable for use in scenarios where there is a large difference between **peak and valley electricity prices**.

1. When the price of electricity is at its **peak**, the battery can be set to discharge (both the power and time of discharge can be set), and in addition to supplying the load, the excess energy will be fed into the grid.
2. Battery charging can be set when the electricity price is in the **valley** (charging power and time can be set)

Note: The system operates in the self-use mode for unscheduled periods of time.

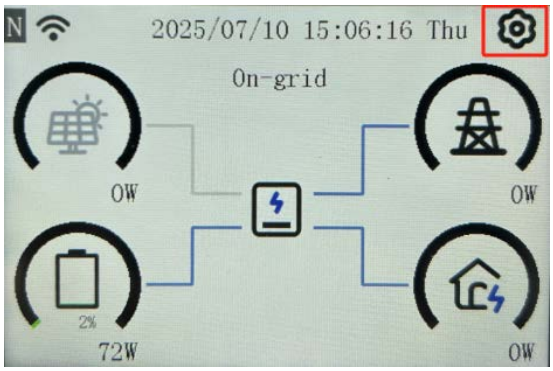


3.6.3 Delay charge mode

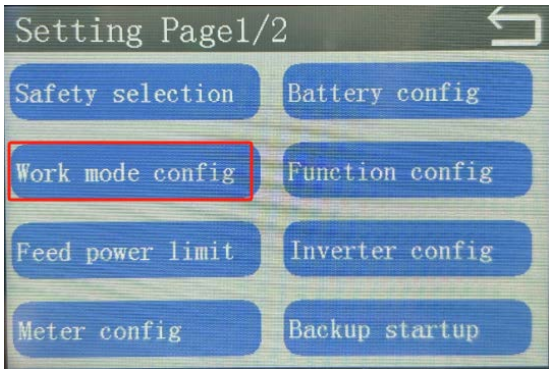
- The operation for setting the "Delay charge mode" is as follows：

1. **Output Peak Power(Pn)：** The power sold to the grid (as a percentage of the rated power)
2. **Sell start/end time：** The start and end time of this mode's period of operation

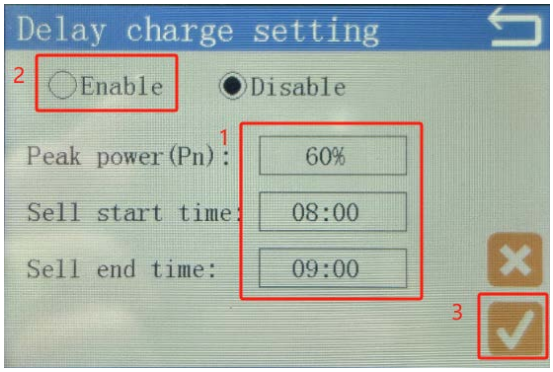
Step1



Step2

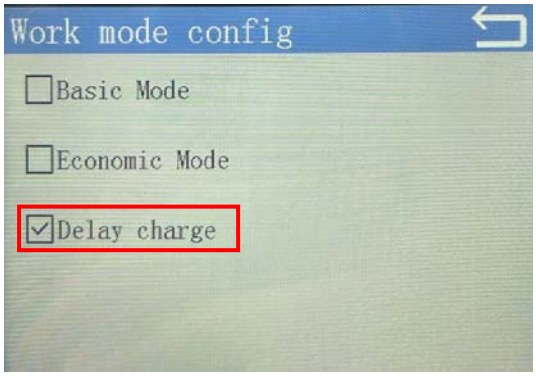


Step3



1. Set parameters

Step4



It can be seen that “Delay charge” has

2. Click “Enable” 3. Click ” √ ” The overall setting means: During the period from 8:00 to 9:00, the peak power output of the inverter is set at 60%. When the PV power is less than 60%, the PV power is used for the load and sold to the grid. When the PV power is greater than 60%, the excess part can be used to charge the battery.	been successfully set.

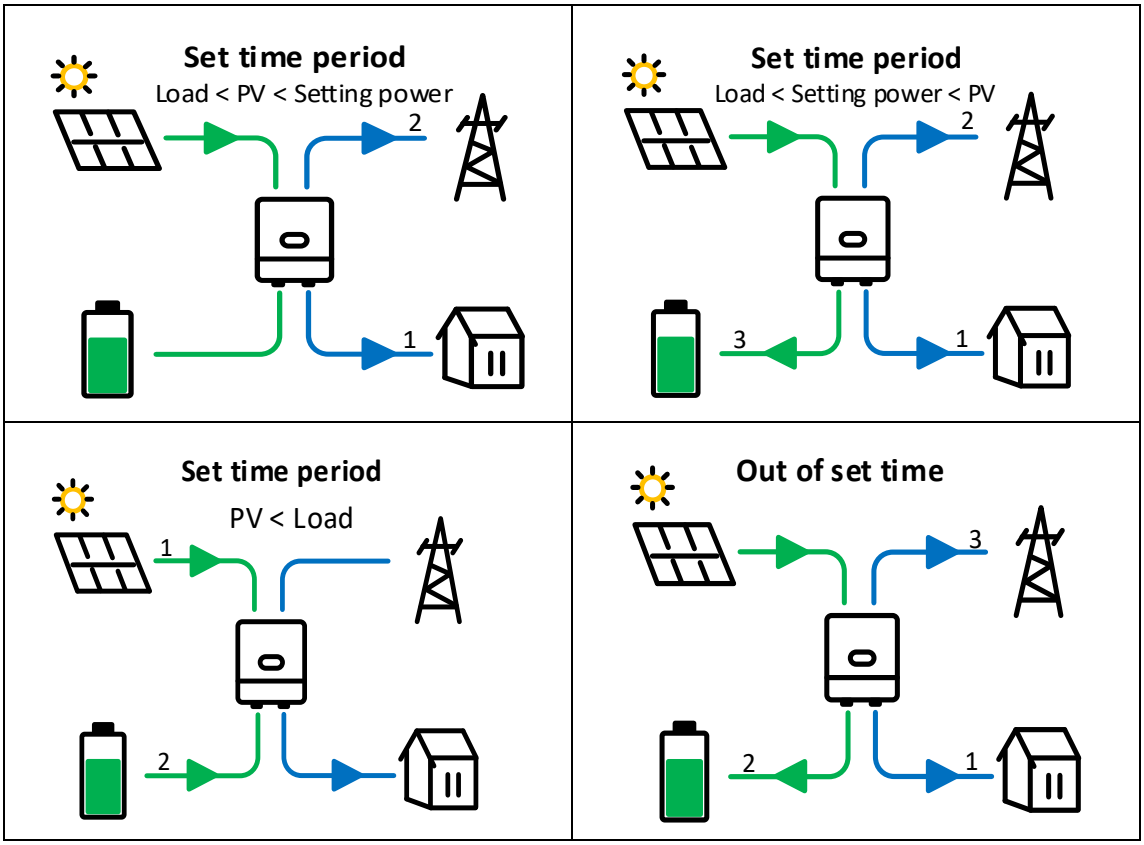
- **Application Scenarios：**

Applicable to the scenario of **PV over-allocation.**

In the morning when the PV power is lower than the setting power the selling of electricity is prioritized, the battery is not charged first to leave space for later charging, and when the PV power exceeds the setting power or is not in the set time period, the normal self-use mode is resumed. The advantage of this model is that **it can avoid the waste of PV energy in PV over-allocation application scenarios**.

Note:

1. The numbers 1, 2, and 3 in the chart below represent the priority of energy provision or destination.
2. The system operates in the self-use mode for unscheduled periods of time.



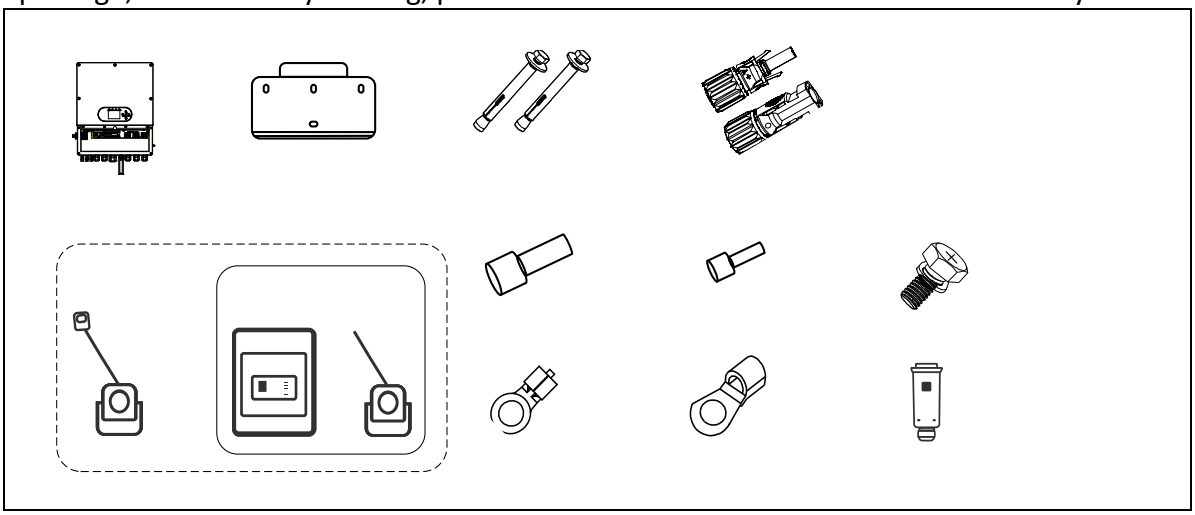
4. Inverter Installation

4.1 Pre-receipt inspection

	Before installation, please check the packaging for any abnormalities such as damage or deformation to ensure that the product are in good condition. If there is any obvious damage, please do not install and contact the supplier promptly.

4.2 Packing List

Open the package and check whether the following items are included in the accessory package, if there is any missing, please contact the after-sales service immediately.



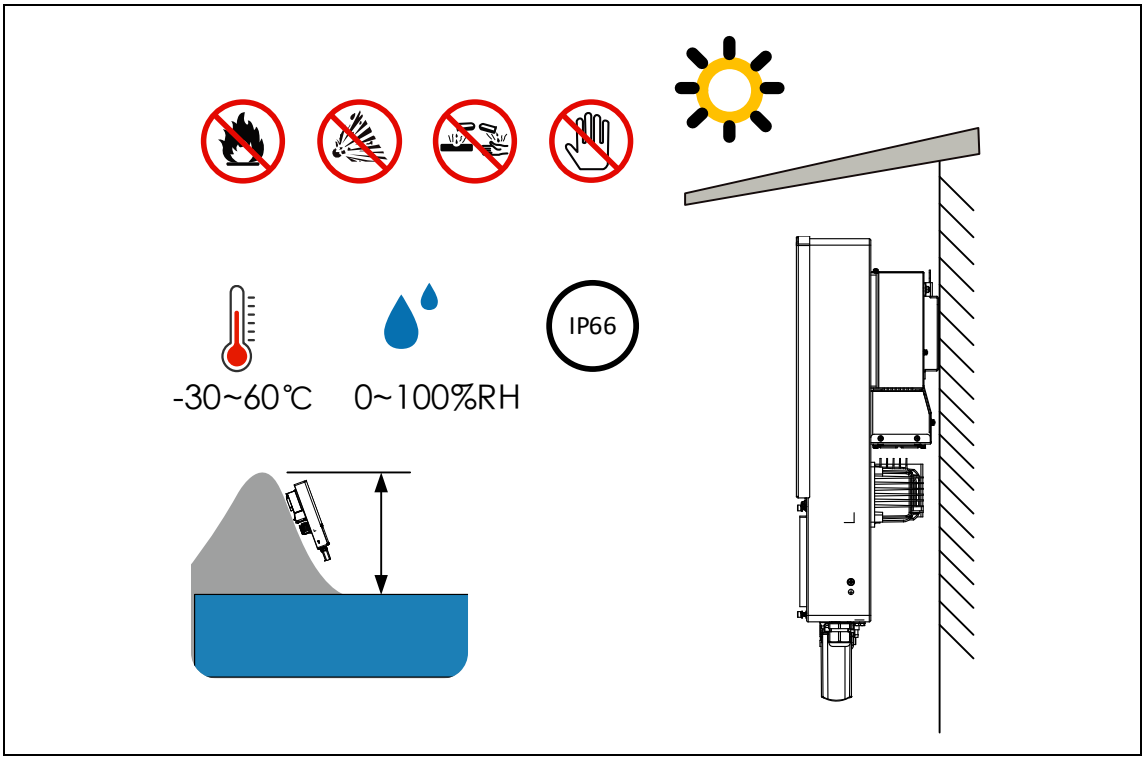
4.3 Installation Tools

Please prepare the following professional tools for installing the inverter.

4.4 Installation Requirements

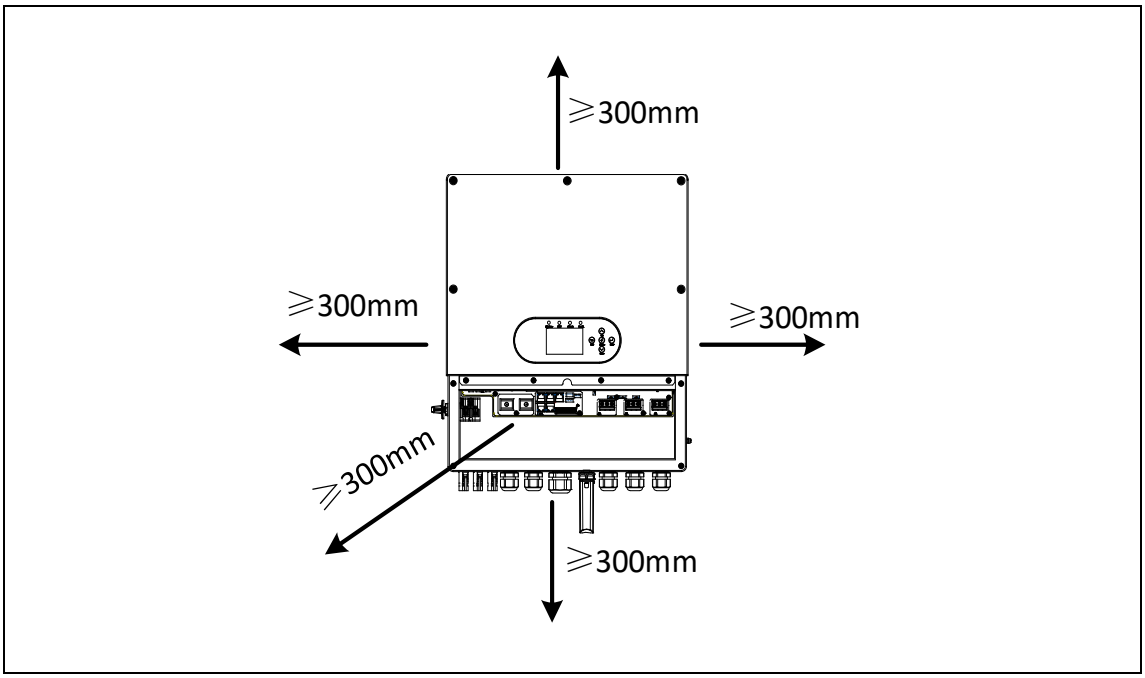
- **Environmental requirements**

⚠	1. Don't install the equipment in an environment with flammable, explosive, corrosive materials. 2. Don't install the equipment in the place where it can be easily touched, especially for children. 3. Drill holes to avoid water pipes and electrical cables in the wall. 4. The inverter should be installed to avoid direct sunlight, rain, and snow. 5. The space where the equipment is installed should be well ventilated for heat dissipation and operation. 6. The altitude at which the inverter is installed should be less than the maximum working altitude of 3000m above sea level.



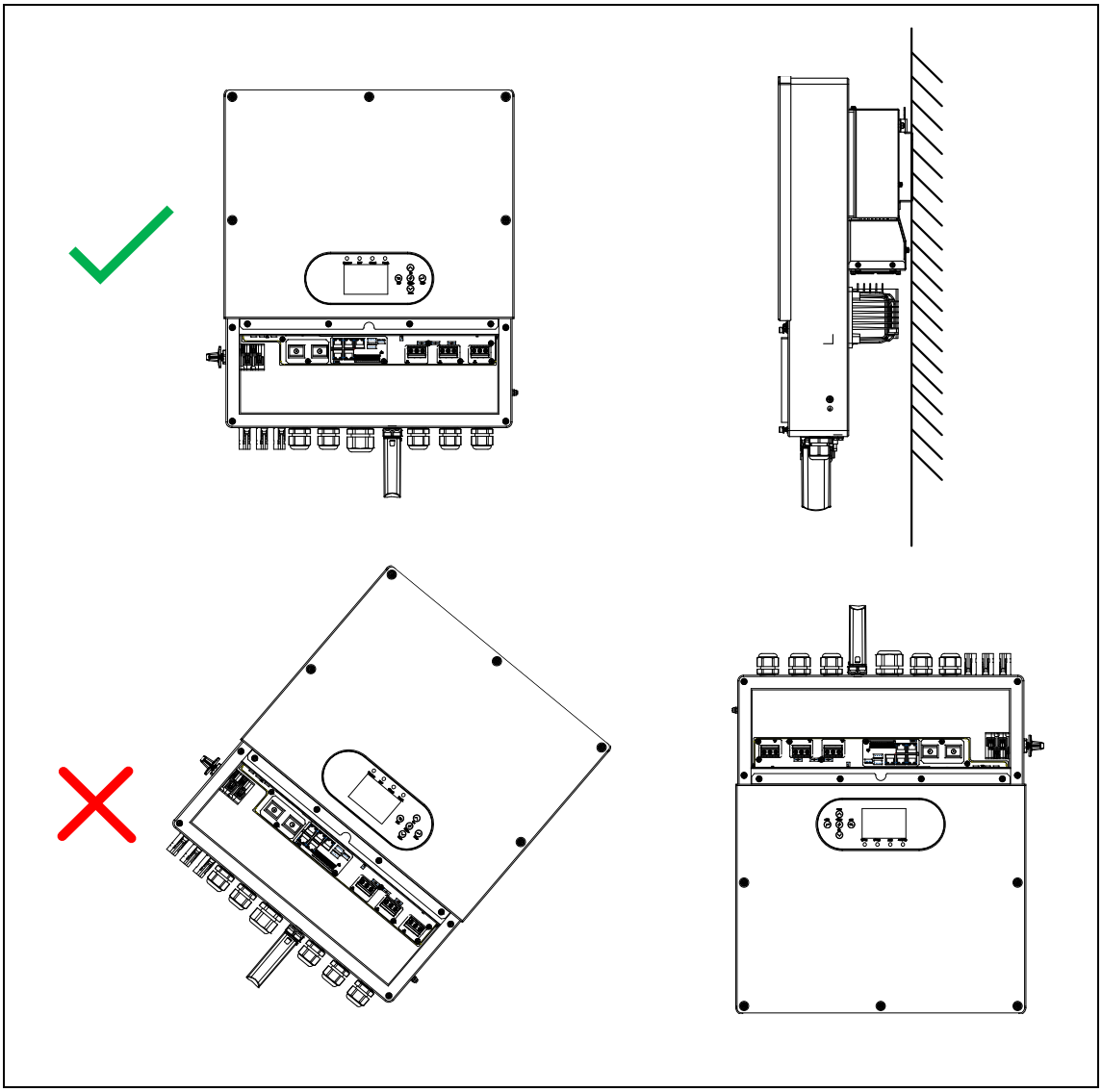
- **Space requirements**

Installation of the inverter, need to reserve enough space for heat dissipation, not less than 300mm



- **Angle and Load Carrier Requirements**

1. Mount the inverter on a solid surface to bear the weight.
2. Do not install the inverter on a poorly soundproofed carrier to avoid noise.
3. Mount the inverter at an angle of up to 5 degrees backward, not forward, inverted, sideways or excessively tilted.



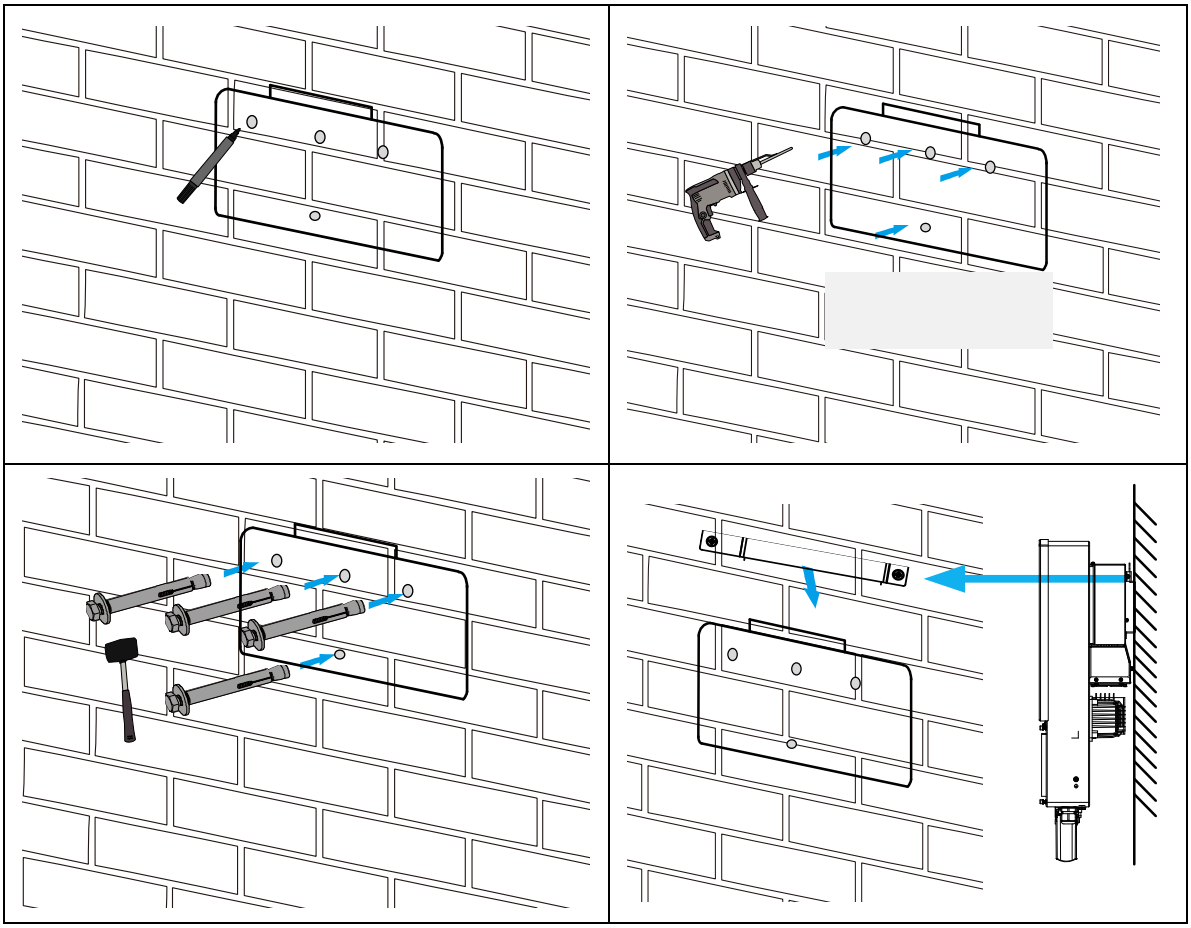
4.5 Installation steps

Step 1: Place the backing plate supplied with the box on the wall and mark the drilling position.

Step 2: Drill the holes with a hammer drill with an 8mm diameter drill bit to a depth of 80mm.

Step 3: Fix the drilled holes on the wall with the expansion bolts supplied with the accessory package.

Step 4: Hang the inverter vertically on the back plate and make sure it is securely mounted.



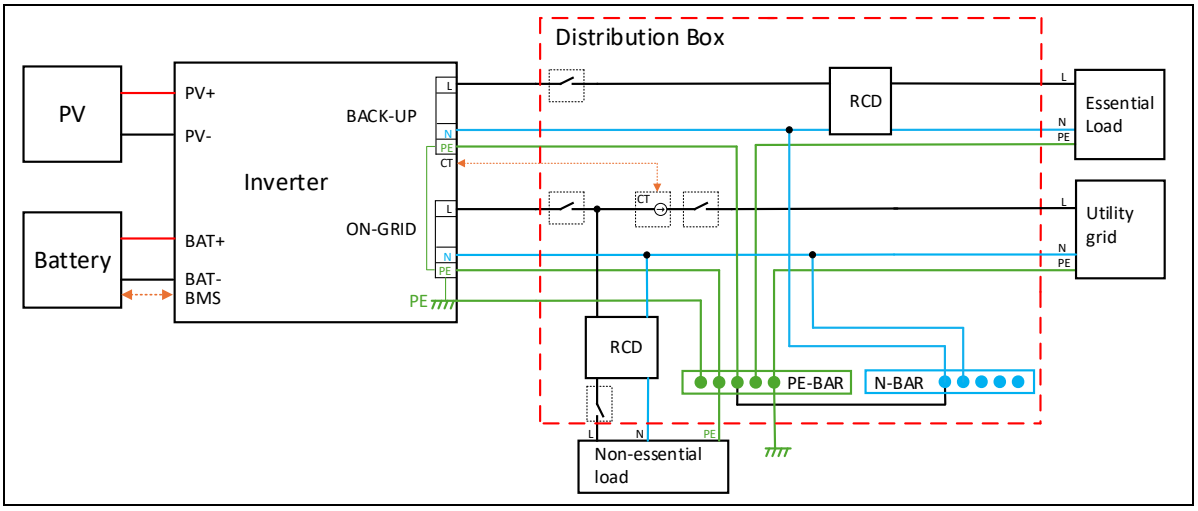
5. Electrical Connection

5.1 Wiring Diagram

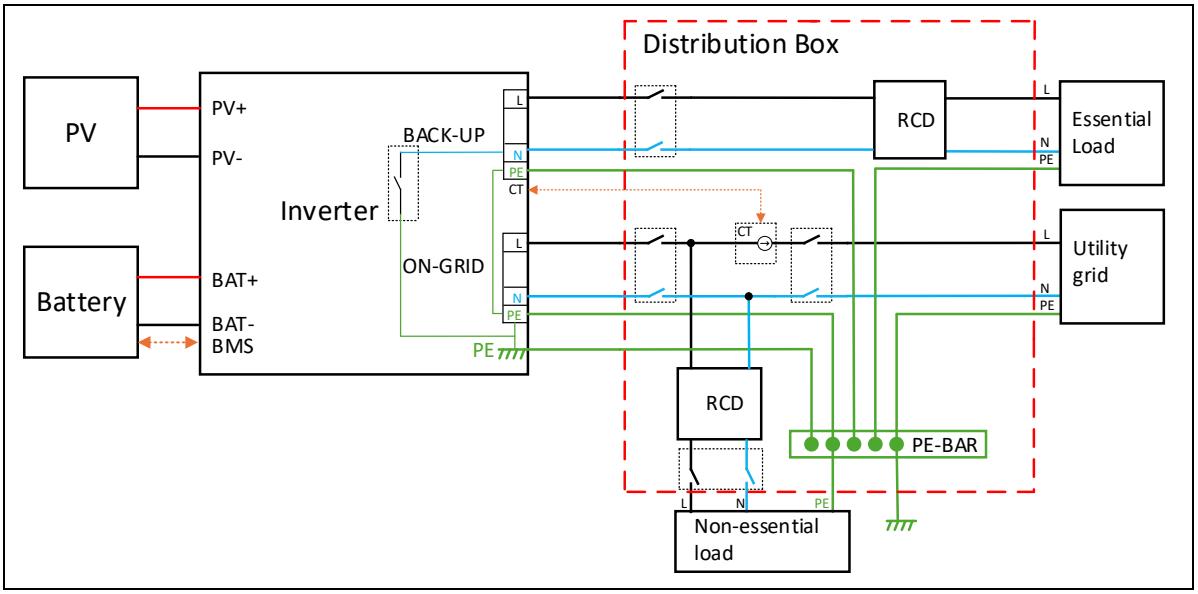
Two wiring diagrams are as follows:

⚠	1. According to the regulations and requirements of different regions, N and PE are connected in different ways. Please choose the wiring method reasonably. 2. When the inverter is powered on, the BACK-UP port is energized. Power off the inverter first if maintenance is required on the BACK-UP loads. Otherwise, it may cause electric shock. 3. The wiring diagram takes the built-in meter as an example. The inverter has a built-in meter. If the length of the CT connection to the inverter is more than 30m, you can choose to use an external meter (see section 5.5.3).

- N and PE of BACK-UP terminals are wired together in the distribution box for regions such as **Australia and New Zealand**.



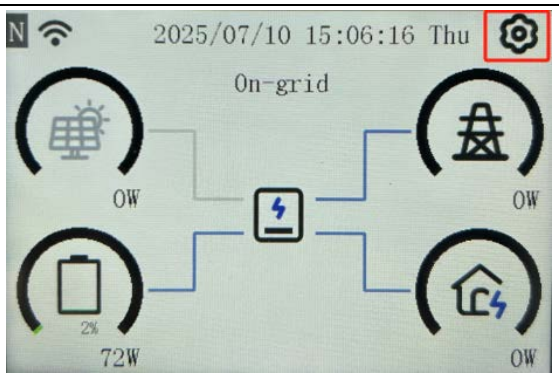
- N and PE of BACK-UP terminal are wired independently in the distribution box, suitable for **most areas**.

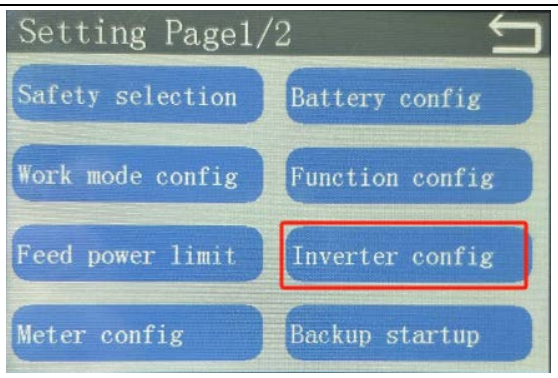


- Some regions require that “N and PE” can not be directly connected inside the inverter. Users can control the disconnection or closure of “N and PE” according to the actual needs of the site, the operation steps are as follows:

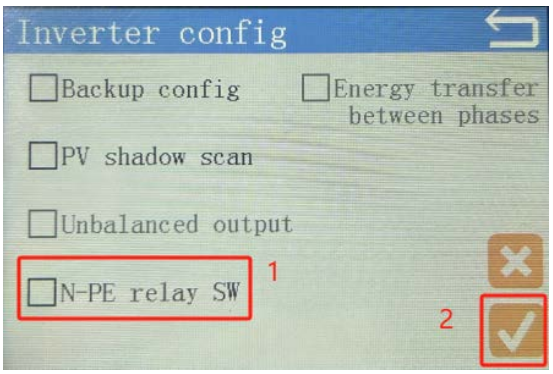
1. Click on the "N-PE relay SW" option, which indicates that “N and PE” are connected within the inverter.
2. Do not click on the "N-PE relay SW" option, which indicates that “N and PE” are not connected within the inverter.

Step1	Step2





Step3



1. Click “N-PE relay SW”
2. Click “ √ ”

5.2 PV connection

- **The inverter has 2/3 sets of PV inputs, to connect the PV cables make sure that**

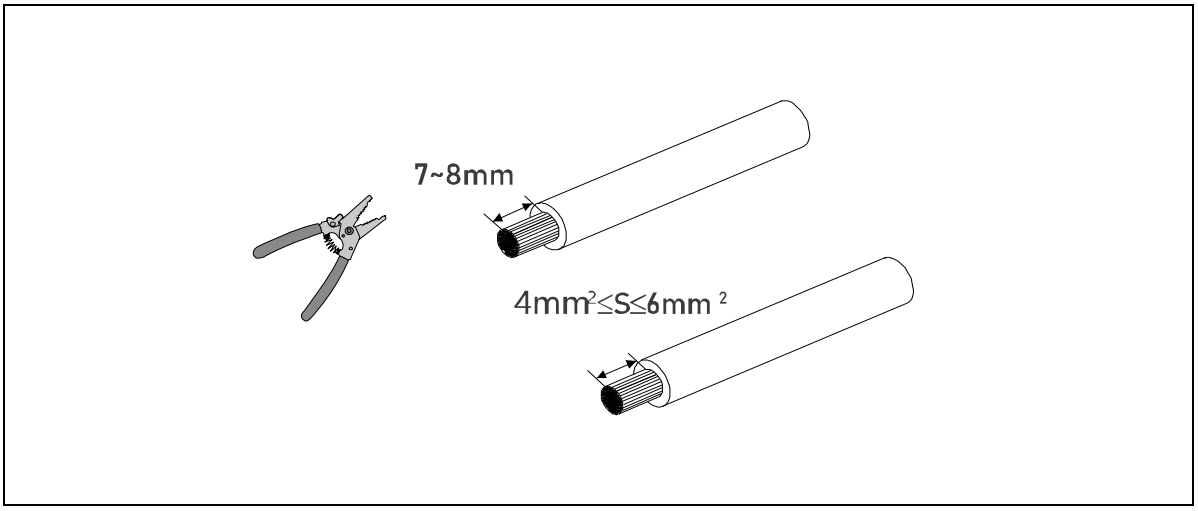
1. The open-circuit voltage of the panel is within the input voltage range specified by the inverter, and the operating voltage is within the MPPT range.
2. The panel cannot be grounded to ensure that the minimum insulation resistance to ground meets the minimum insulation impedance requirement.
3. The short-circuit current of the panel is within the range specified by the inverter.
4. Positive and negative poles are connected correctly
5. Use the connectors supplied with the accessory package, and prohibit different brands from plugging into each other.
6. It is not recommended to connect MPPT series in parallel, otherwise it will affect the tracking efficiency of MPPT. MPPT series parallel access must meet local laws and regulations.

- **PV Cable Specification Recommendations**

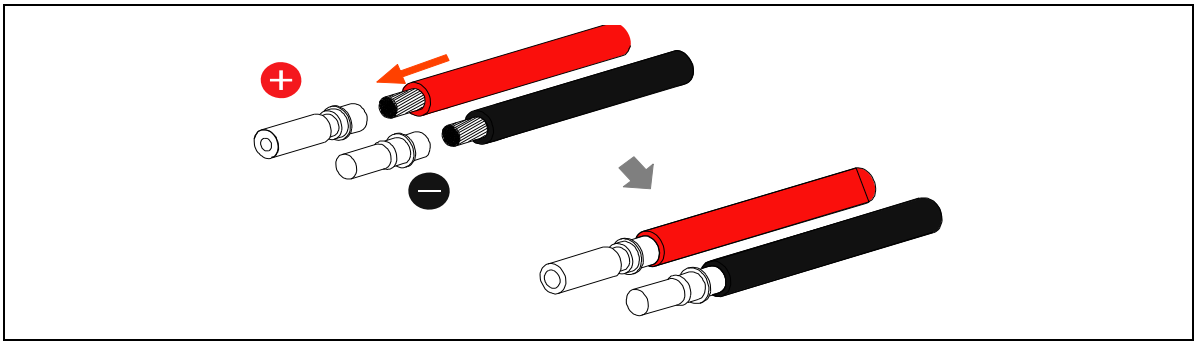
Model	Type	Cable Specifications
LS 3-8K	Copper wire cable	4-6mm^2

- **PV Cable Wiring Procedure**

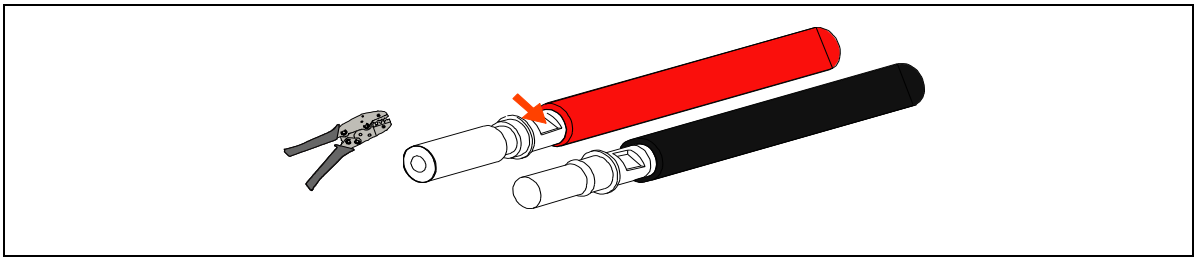
1. Cable stripped 7-8mm at one end, cross sectional area 4-6mm^2



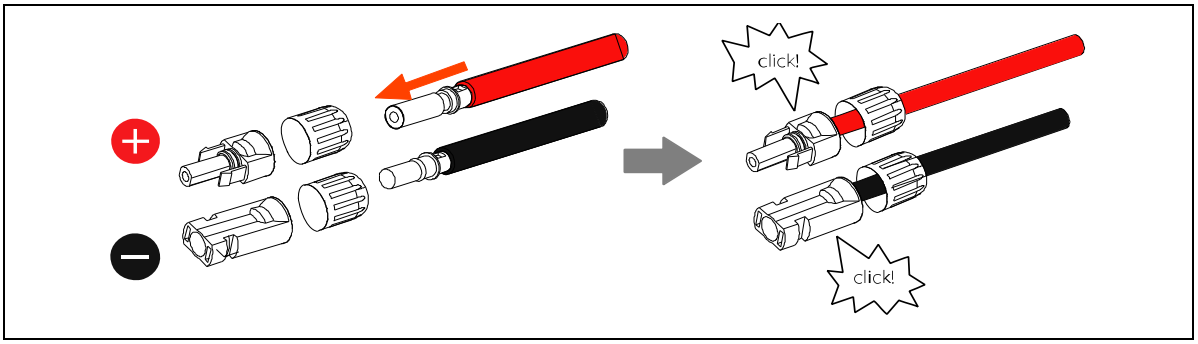
2. Take out the metal terminal and thread the dialed cable



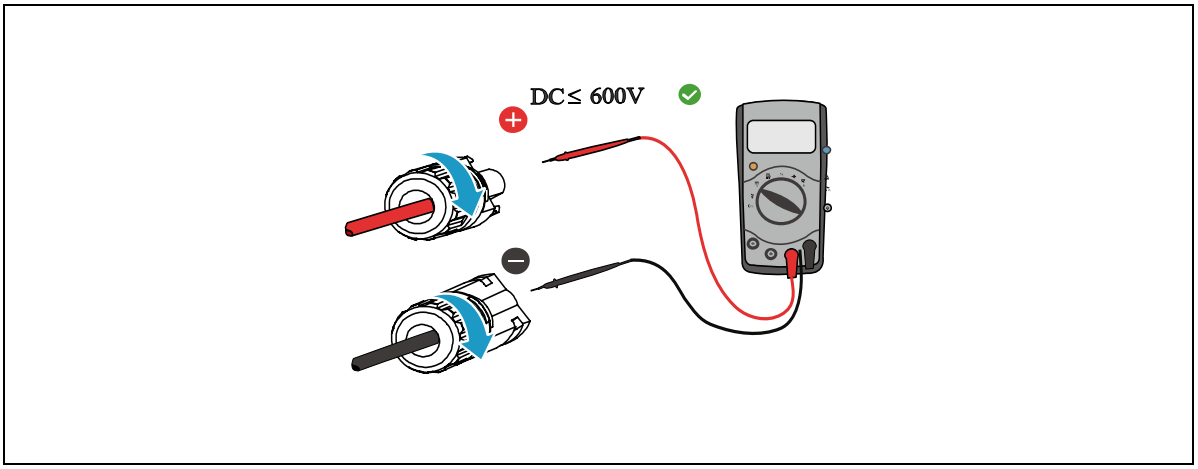
3. Use crimping pliers to crimp the unwound cable to the connector



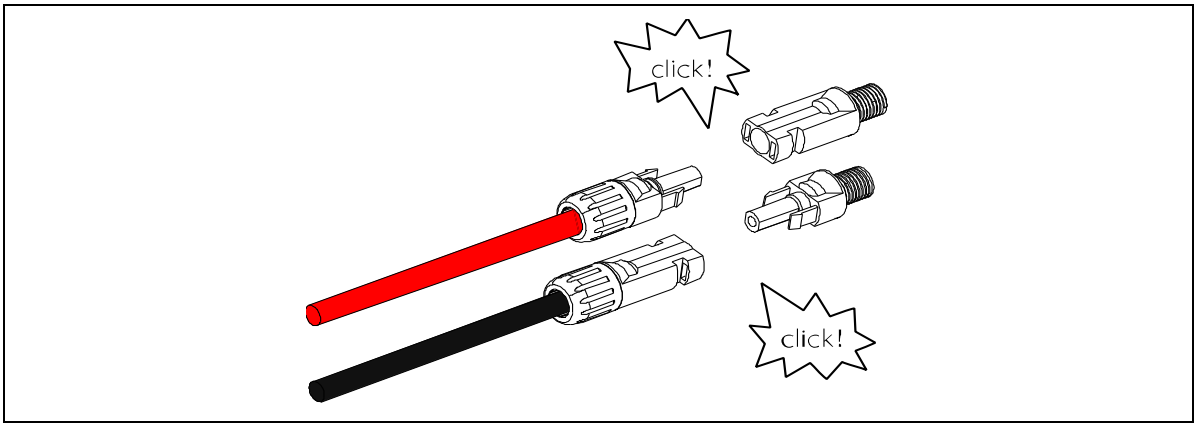
4. Thread the metal terminal through the nut and into the connector until you hear a “click”.



5. Use the multimeter to measure the positive and negative terminals and DC voltage <600V, then lock the nut.



6. Insert the connector into the inverter and “click” to tighten it.



5.3 BAT Connection

- **The inverter needs to be connected to its matching battery, to connect the battery cable make sure that**

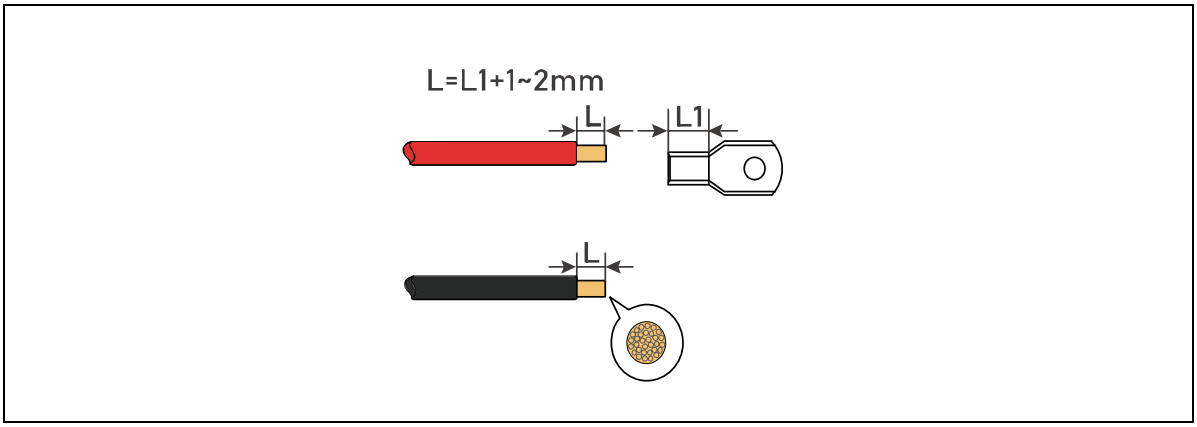
1. It is prohibited to connect the same battery pack to multiple inverters simultaneously.
2. It is prohibited to connect a load between the inverter and the battery.
3. When connecting battery cables, use insulated tools to prevent accidental electric shock or short circuit to the batteries.
4. Battery voltage is within the permissible range of the inverter.
5. The positive and negative terminals of the batteries are correctly connected.

- **Battery Cable and Circuit Breaker Specification Recommendations**

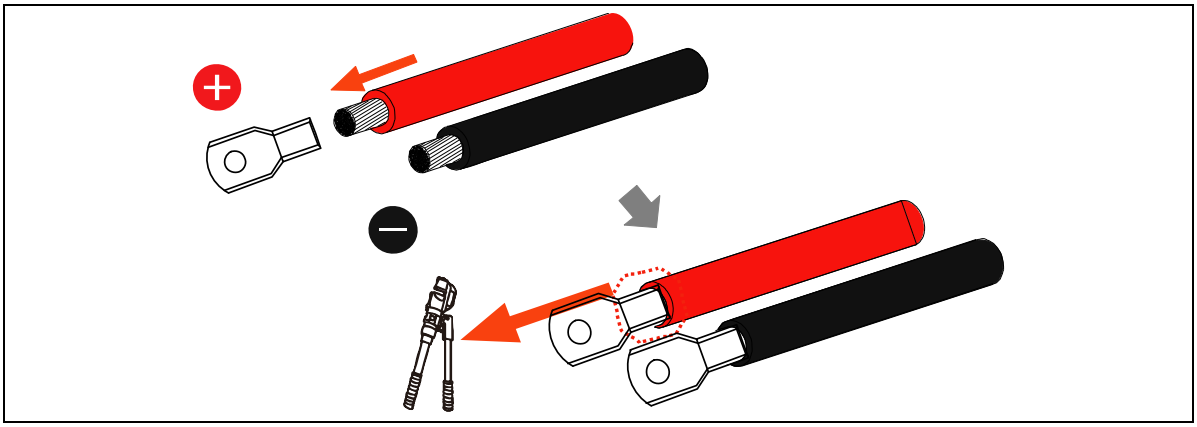
Model	Type	Cable Specifications
LS 3K-3.6K	Copper wire cable	25mm^2
LS 5K-8K	Copper wire cable	35mm^2

- **Battery Cable Wiring Procedure**

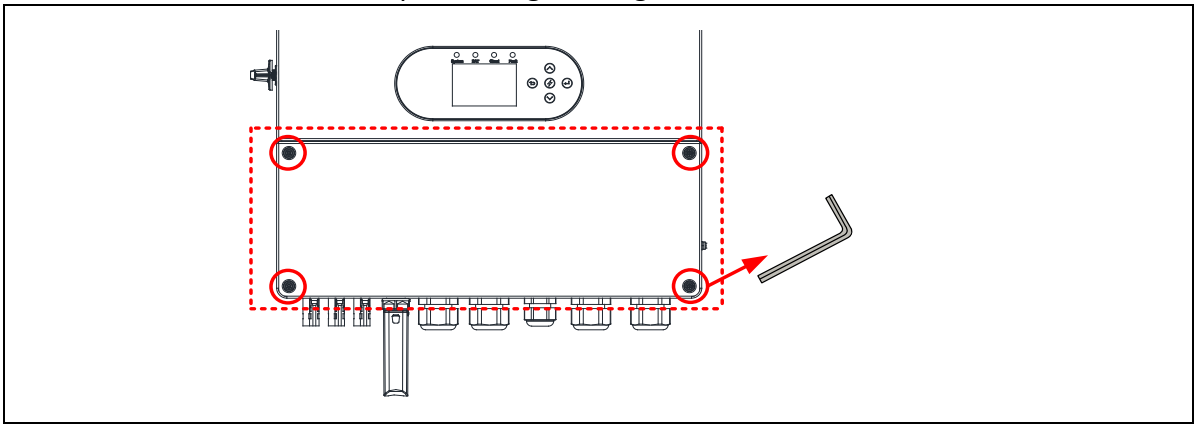
1. Stripping the wire.



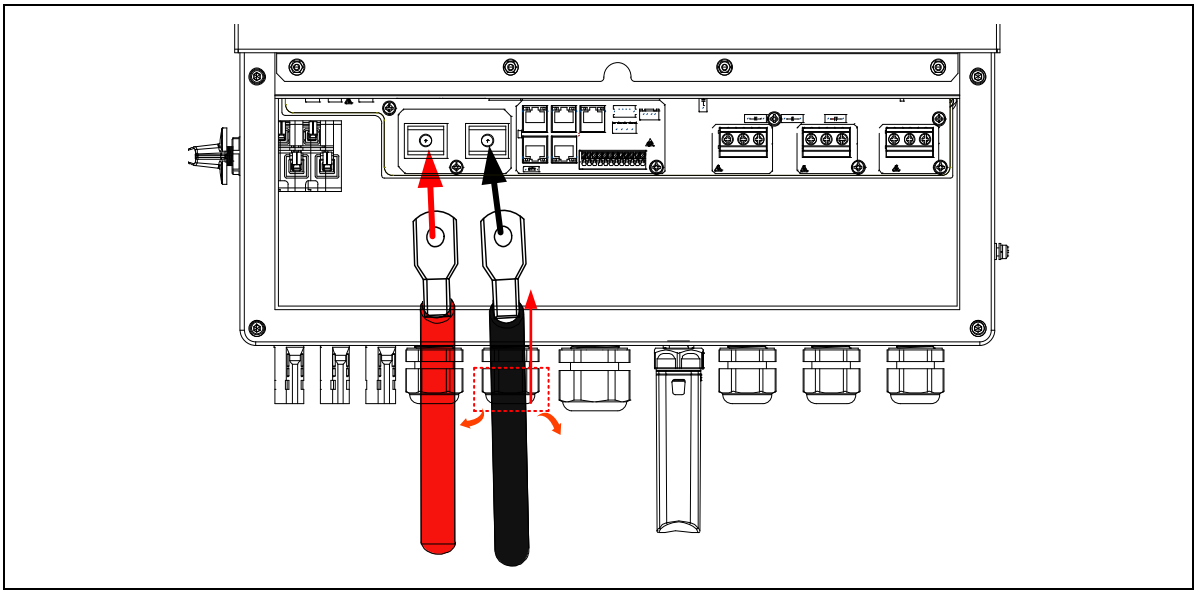
2. Use the OT terminals provided in the accessory package to insert the wired cables and then use the hydraulic pliers to press them together.



3. Remove the lower cover plate using a hexagonal screwdriver



4. The procedure for connecting the cables is as follows:
   1) Loosen the gland nut by turning it to the left.
   2) Thread the cable into the glands. Pay attention to the correct polarity.
   3) Using M8 cross screwdriver or sleeve to lock.
   4) Rightward tighten the gland nut.



5.4 AC Connection

- **The inverter has three sets of AC interfaces, BACK-UP、ON-GRID and GEN, to connect the AC cables make sure that**

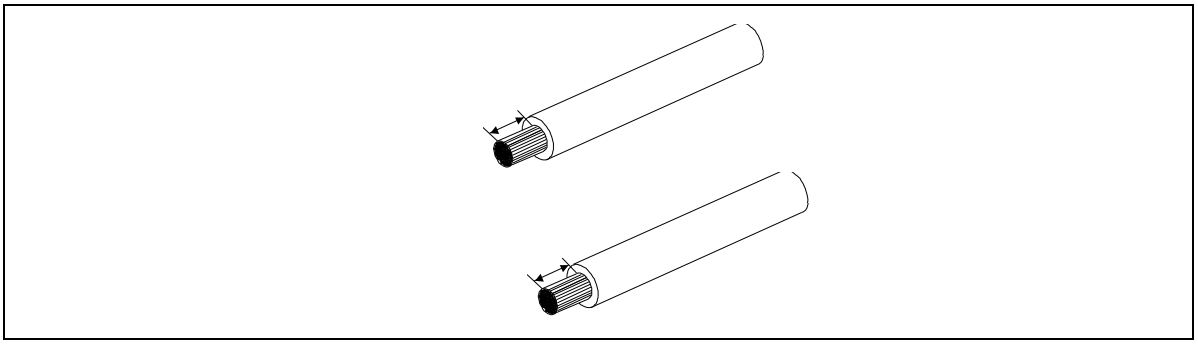
1. AC circuit breakers should be installed separately on the AC side of each inverter to ensure that the inverter can be safely disconnected from the grid in the event of an abnormality.
2. When the inverter is powered on, the BACK-UP port is powered on. If you need to maintain the loads in the BACK-UP port, please disconnect the inverter first.

- **Suggested Specifications for AC Cables and Breakers**

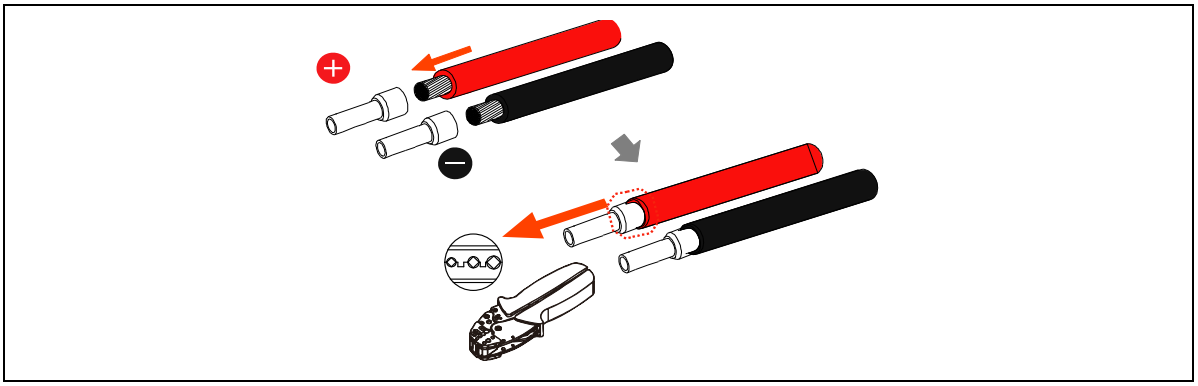
Port	Type	Model	Specifications
BACK-UP ON-GRID GEN	Copper wire cable	LS 3K-3.6K	Copper core cross-sectional area 4-6mm^2
		LS 5K-8K	Copper core cross-sectional area 6-10mm^2
	AC Circuit Breaker	LS 3K-3.6K	Nominal current ≥ 40A，Nominal voltage ≥ 230Vac
		LS 5K-8K	Nominal current ≥ 63A，Nominal voltage ≥ 230Vac

- **AC Cable Wiring Procedure**

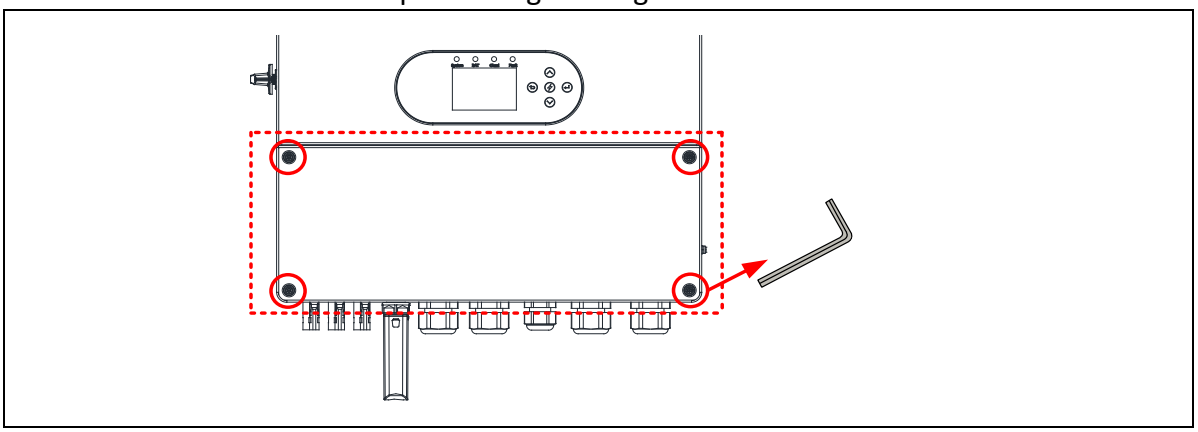
1. Cable stripped 7-8mm at one end.



2. Using the tubular terminals included in the accessory package, thread the unraveled cables and crimp them together using tubular crimping pliers.



3. Remove the lower cover plate using a hexagonal screwdriver



4. The AC is connected in the same way as the battery, and the procedure for connecting the cables is as follows:

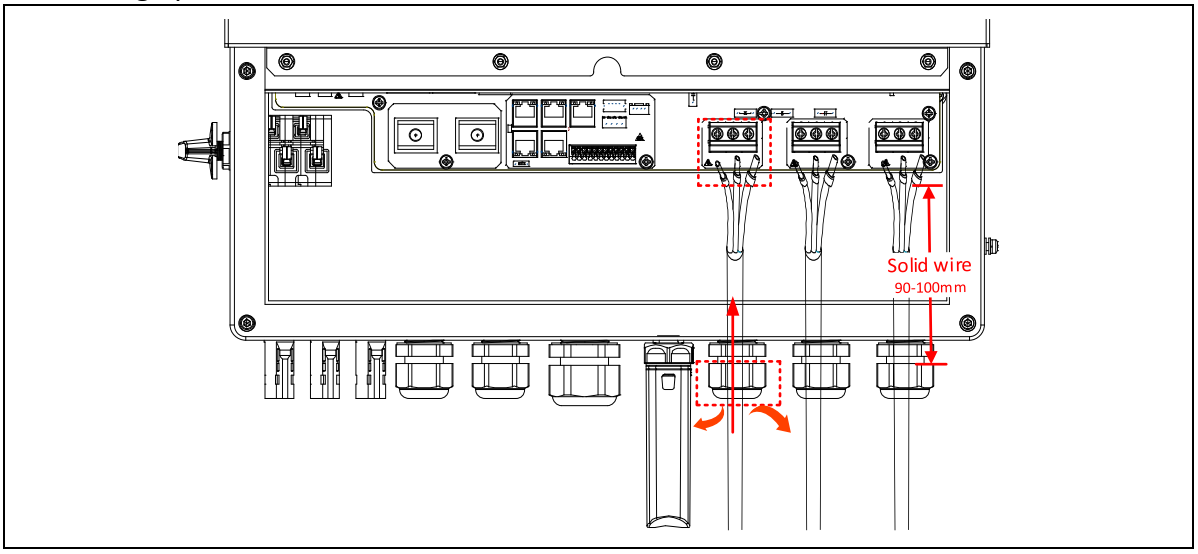
1) Loosen the gland nut by turning it to the left.

2) Thread the cable into the glands. Insert the cable into the inner core of the terminal according to the polarity and silkscreen.

3) Using M4 cross screwdriver to lock.

4) Rightward tighten the gland nut.

Note: If it is a solid wire, please set aside the outer wire skin by 90~100mm to facilitate the wiring operation.



5.5 Grounding

- **The inverter has a dedicated grounding point, to connect the ground wire please make sure that**

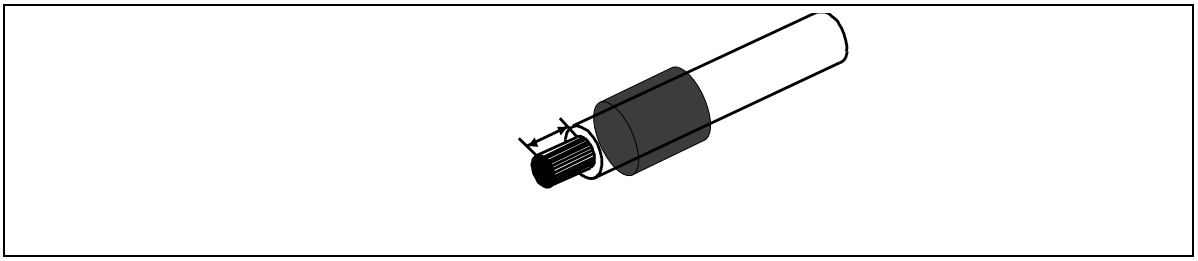
1. The ground wire connected to the inverter frame cannot replace the ground cable connected to the AC output, make sure both are grounded.
2. When using more than one inverter, please make sure that the grounding points of all inverter frame housings are connected at equal potential.
3. To improve the corrosion resistance of the metal terminal, please apply silicone or paint after installing the ground cable.

- **Grounding cable specification recommendations**

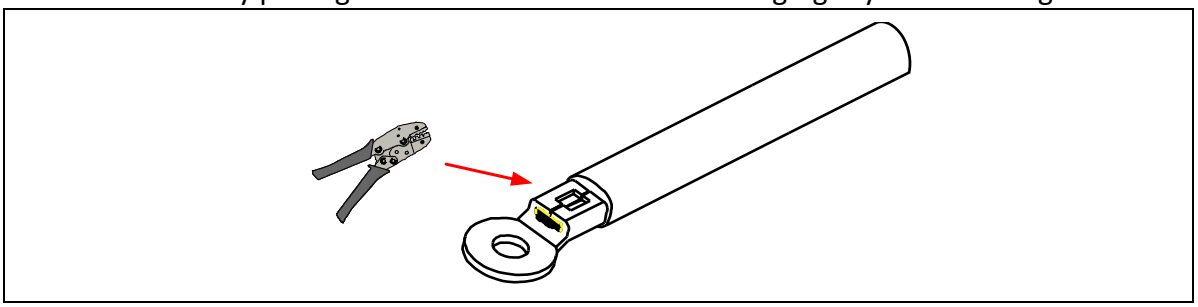
Model	Type	Cable Specifications
LS 3K-3.6K	Copper wire cable	4-6mm^2
LS 5K-8K	Copper wire cable	6-10mm^2

- **Ground cable wiring procedure**

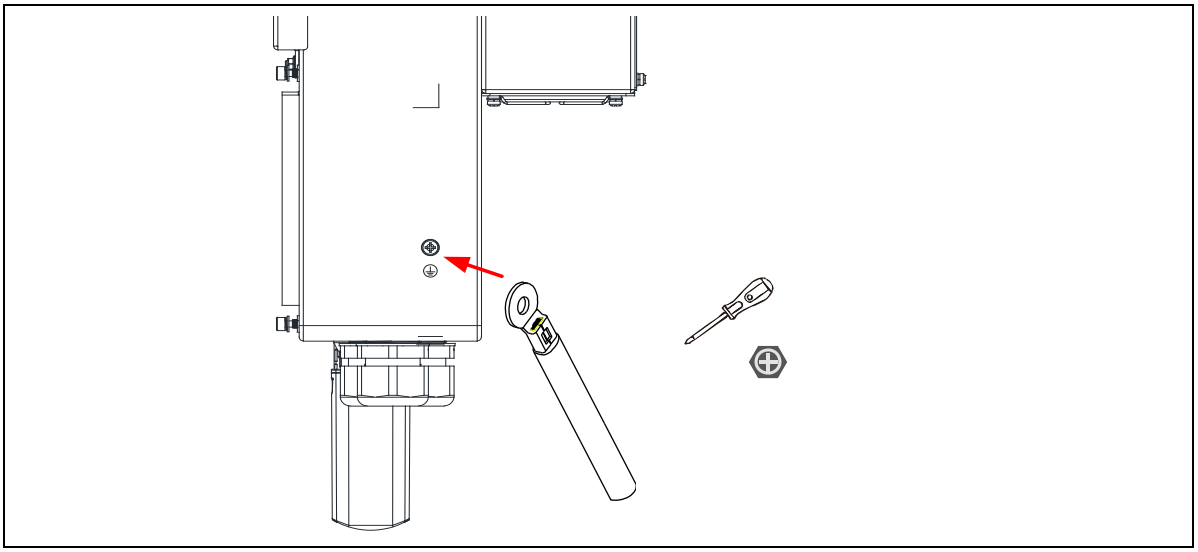
1. Cable stripped 7-8mm at one end and thread it into the heat shrink tubing.



2. Using crimping pliers, crimp the ground wire to the ground terminal supplied with the accessory package and blow the heat shrink tubing tightly with a heat gun.

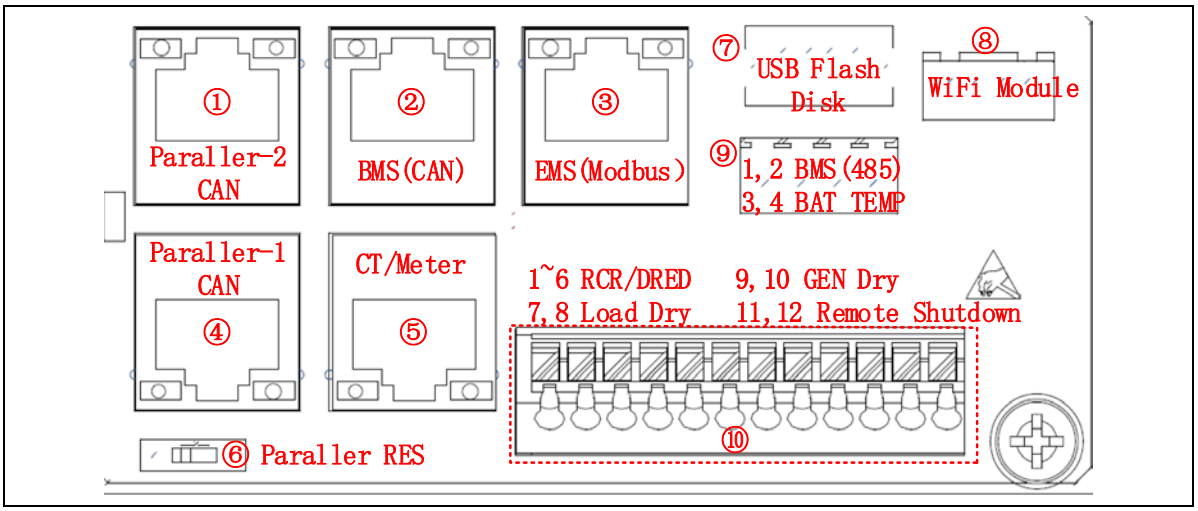


3. Connect the ground wire to the ground terminal of the box and lock it using the M5 ground screw and Phillips screwdriver included in the accessory kit.



5.6 Communications Connection

- **Communication interface board external schematic**



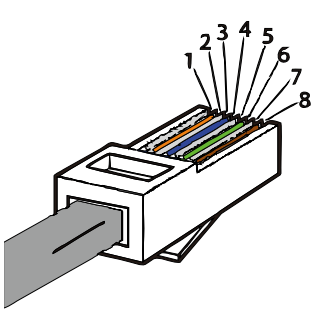
- **External interface definition**

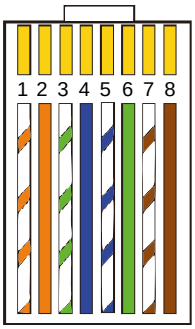
No.	Label	Function	Connection method
1	Parallel-2	Parallel communication interface 2 (CAN communication)	Standard network cable
2	BMS	Battery communication interface (CAN communication)	Standard network cable
3	EMS	485 communication interface (Modbus) to connect to a host computer or third-party device	Standard network cable
4	Parallel-1	Parallel communication interface 1 (CAN communication)	Standard network cable
5	CT/Meter	Built-in metering meter CT interface / communication interface for external metering	Standard network cable

		meter (RS-485)	
6	Parallel RES	Parallel CAN termination resistor 120 Ω	Dip switch
7	U Disk	Updating the inverter program using a USB flash drive; local data exports	USB flash drive
8	WIFI Module	WIFI Module connection	WIFI Module
9	BMS/BAT Temp	Battery communication interface (485 communication) / Battery Temperature sensor for lead-acid battery	Outdoor Copper Cable
10	RCR/DRED: 1-6	The interface of the inverter to the grid output power control, DRED and RCR function multiplexing. European safety standard is RCR; Australian safety standard is DRED.	Outdoor Copper Cable
	Load Dry: 7,8	Load Control Dry, connect dry contact signals for load control. Max24Vdc 1A	
	GEN Dry: 9,10	GEN_Start_Dry, Connect the generator and control start/stop. Max24Vdc 1A	
	RSD: 11,12	Remote Shutdown, One-touch shutdown of control devices.	

5.6.1 BMS communication

- **BMS communication line pin definition**





1	2	3	4	5	6	7	8
none	none	none	BMS_CANH	BMS_CANL	none	none	none

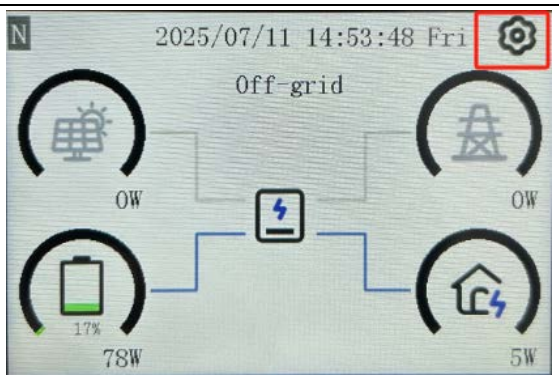
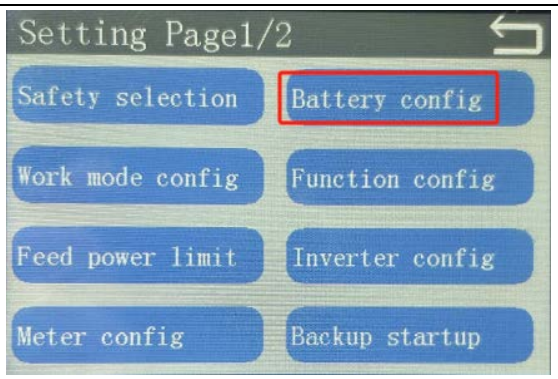
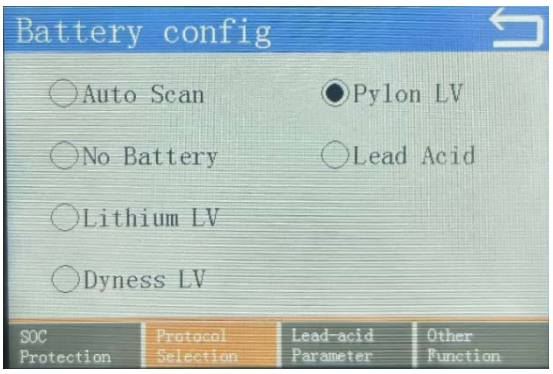
- **Battery protocol selection**

The inverter supports **automatic recognition of battery communication protocols**.

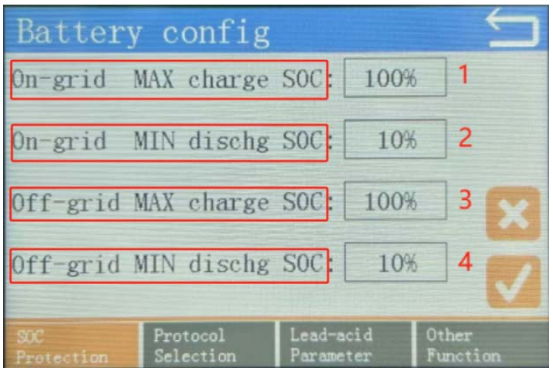
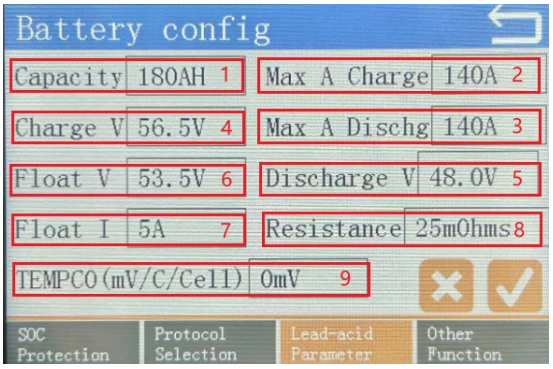
1. If the battery used is on the inverter's support list, the communication protocol will be recognized and connected automatically after the communication cable is plugged in for the first time.
2. If the first connection is unsuccessful, or if you need to replace the battery after the first connection, you can manually select the communication protocol, or you can click Auto Scan again to automatically scan the battery.

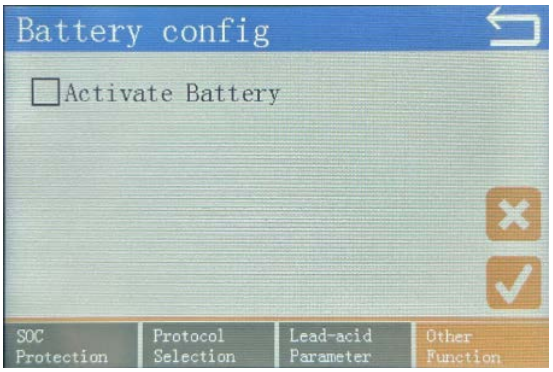
The operation steps are as follows:

Step1	Step2

<table>
<tr>
<td> 
</td>
<td> 
</td>
</tr>
<tr>
<td>Step3
 
</td>
<td></td>
</tr>
</table>

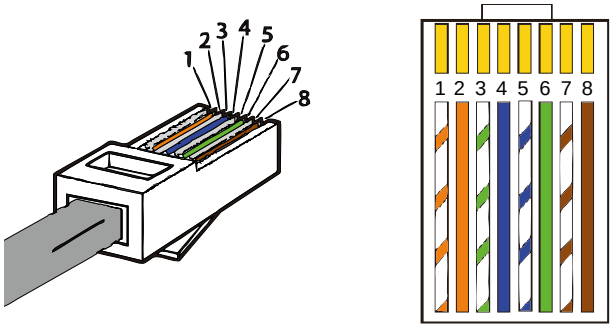
- **Explanation of functions in the "Battery config" interface**

<table>
<tr>
<td>“SOC Protection” interface
 
</td>
<td>1,3:
The max SOC at which battery charging is permitted in the “On-grid/Off-grid” mode.
2,4:
The min SOC at which the battery is allowed to discharge in the “On-grid/Off-grid” mode. If the SOC is lower than this value, discharging is not permitted.</td>
</tr>
<tr>
<td>“Lead-acid Parameter” interface
 
</td>
<td>If you choose “Lead Acid”, you need to set the parameters of this interface based on the parameters of the “Lead-acid” battery.
1: The capacity of lead-acid batteries.
2,3:The maximum charging and discharging current.
4: Maximum charging voltage.
5: Minimum discharge voltage.
6: Floating charge voltage.
7: Floating charge current.
8: The Internal resistance of “Lead-acid” batteries.
9: Temperature and voltage compensation</td>
</tr>
</table>

	coefficient of “Lead-acid” batteries.
“Other Function” interface 	**Activate Battery:** Battery activation function. When the battery is completely drained, and when there is PV energy, this function can be used to activate the battery.

5.6.2 EMS communication

- **EMS communication cable pin definition**



1	2	3	4	5	6	7	8
EMS_485_A	EMS_485_B	none	none	none	none	none	none

- **EMS Communication Function Description**

1. When used as a stand-alone device, external monitoring can be achieved through this interface.
2. When used in a parallel, this interface can jointly achieve the monitoring of both the master device and the slave device.

Note: EMS port adopts Modbus protocol format, if you need to control the inverter in depth, please contact the after-sales staff to get the Modbus protocol document.

5.6.3 CT/Meter Communication

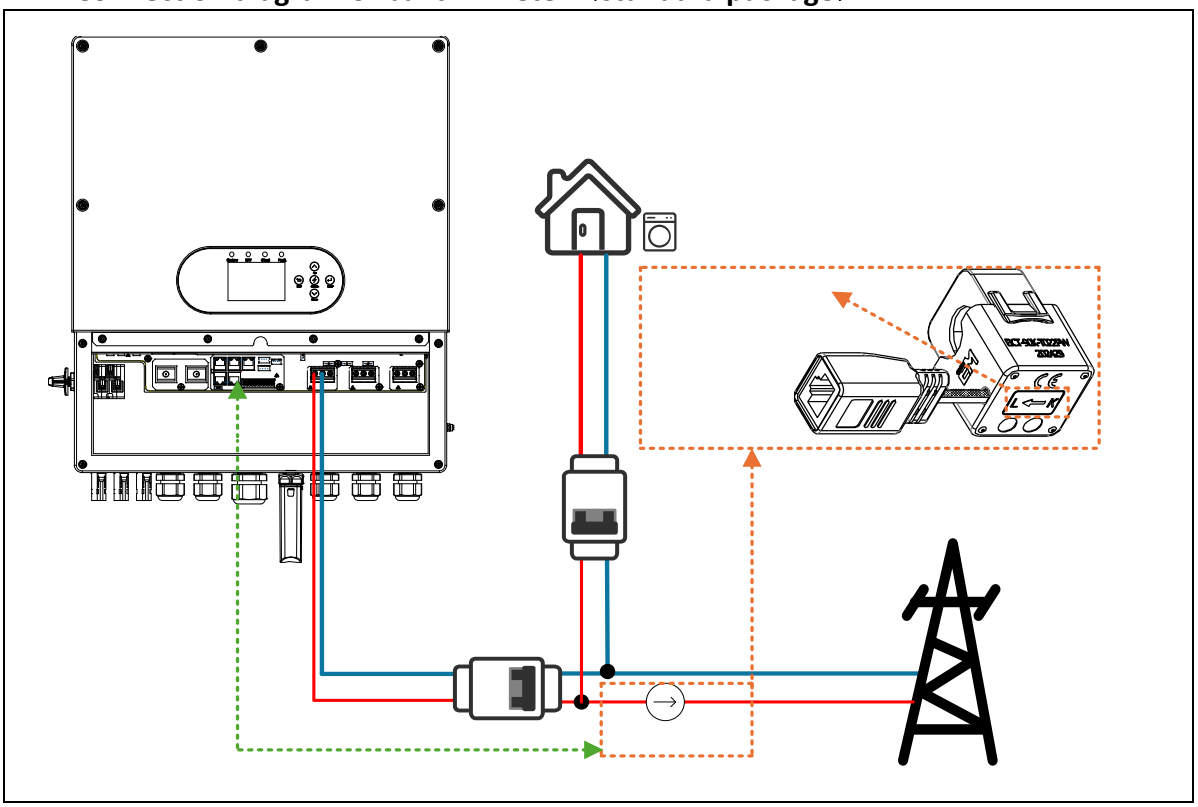
- **CT/Meter communication cable pin definition**

1	2	3	4	5	6	7	8
IL1-	IL1+	/	/	/	/	METER_485_B	METER_485_A

Note: CT/Meter communication cable requires standard network cable of category 6 and above (category 7 cable is recommended). If the length of the connecting cable between the inverter and CT is more than 30m, an optional external metering meter is available. If you want to continue to use CT, you can contact the after-sales service to confirm.

5.6.3.1 Built-in meter

- **Connection diagram of built-in meter（standard package）**



- **CT_AI self-test function**

When CT wiring is completed, please use the CT_AI self-test function. For the complex wiring environment, this function can help users to determine whether the wiring is correct or not, as well as error alerts.

Note: AI self-test function only supports built-in metering meters, not external meter.

- **CT_AI self-correcting function**

When the CT self-test is completed, if there is an error, this function can help the user to avoid manual adjustment, directly **AI self-correction**

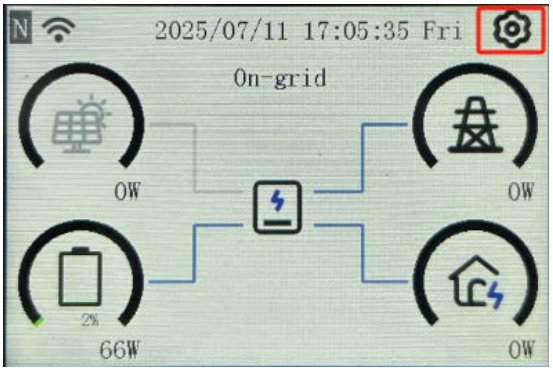
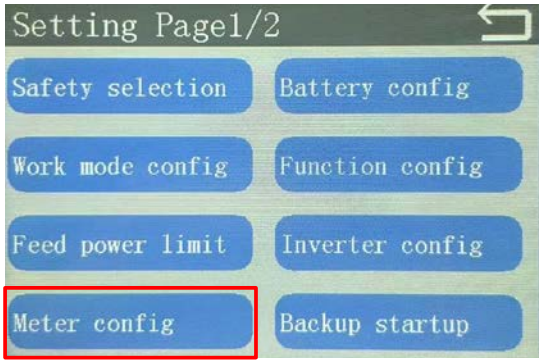
Note:

1. AI self-correction function only supports built-in meter, does not support the external meter.
2. The prerequisite for AI self-correction is that the CT should be stuck on the L wire (allowing CT to be in the wrong direction and in the wrong wire sequence).
3. After AI self-correction, the installer does not need to adjust the CT position system can work normally, but the correction result will have AI prompts.

- **The procedure for CT_AI self-test and CT_AI self-correction is as follows:**

1. After the detection is completed, it will show whether the direction and connection of CT are correct or not and prompt an error message.
2. Refer to the steps shown in the following picture. In step 5, it can be seen that the installation direction of the CT is incorrect. However, at this point, the installer does

not need to re-adjust the direction of the CT. Instead, by using the **“AI correct”** function, the software can complete the adjustment, allowing the system to function normally.

<table>
<tr><td>Step1
 
</td><td>Step2
 
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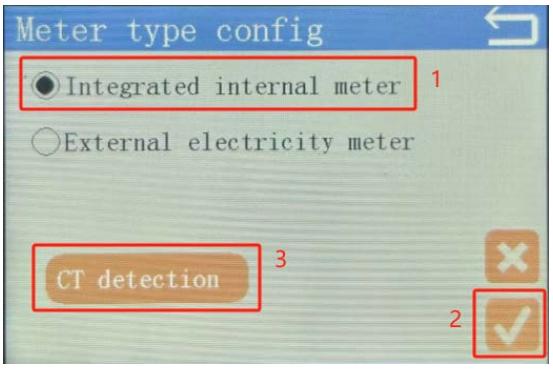
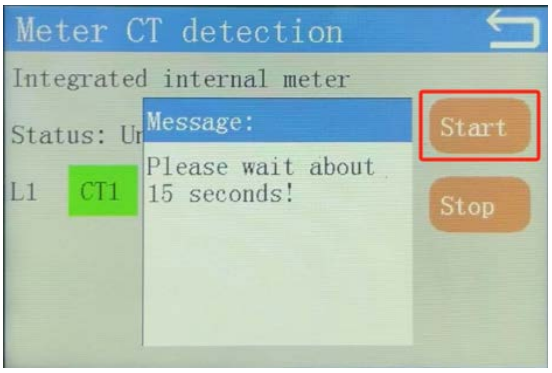
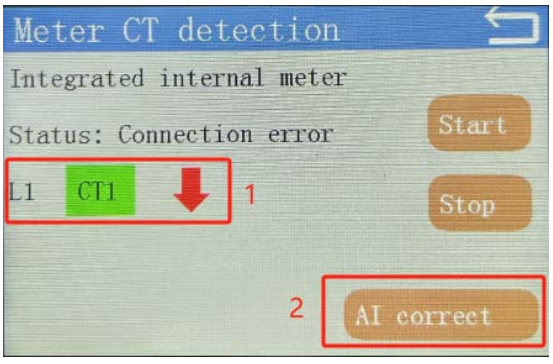
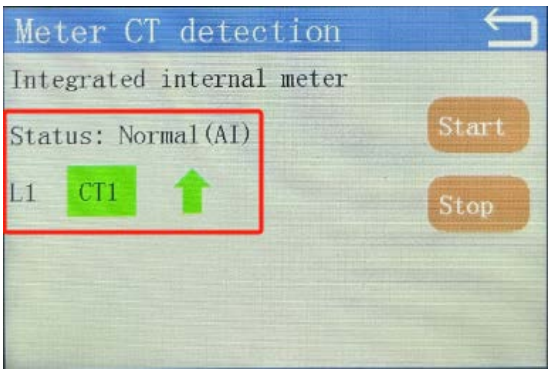
<tr><td>Step3
 

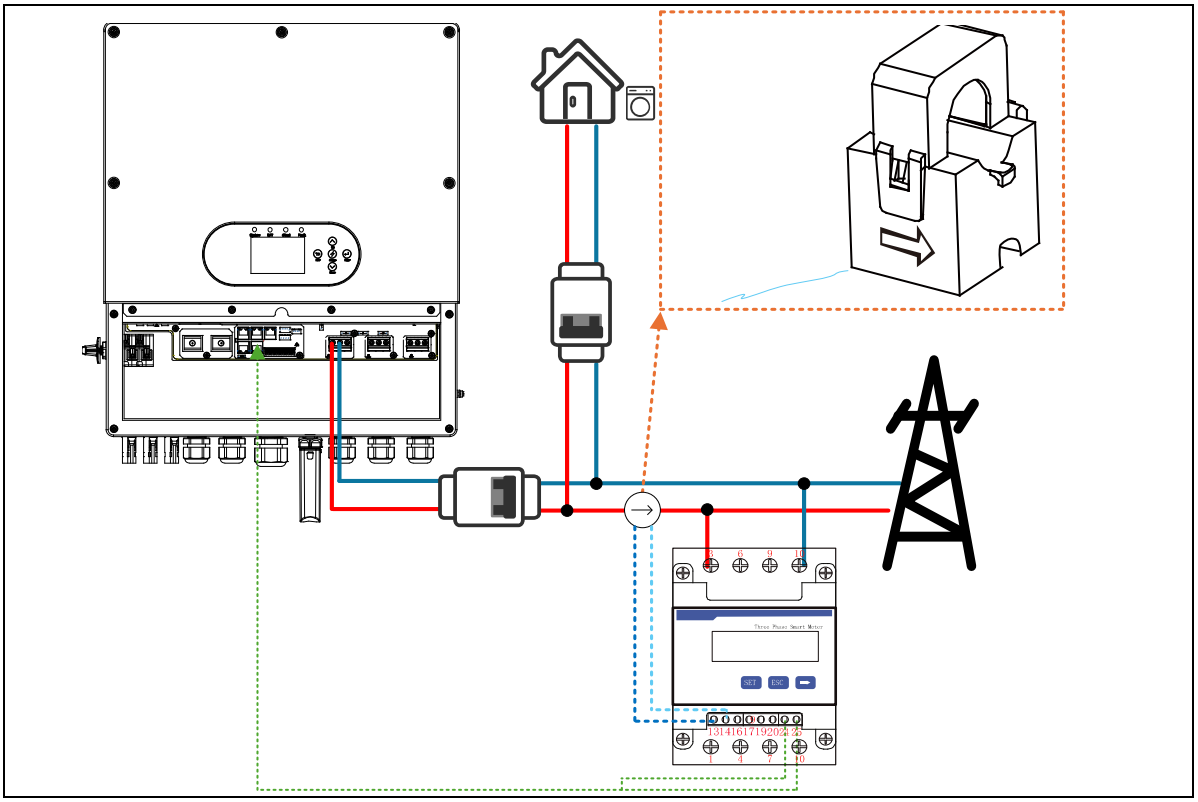
1. Select meter type
2. Click “ √ ”
3. Click “CT detection”</td><td>Step4
 
</td></tr>
<tr><td>Step5
 

1. See error message
2. Click “AI correct”</td><td>Step6
 

You can see the results after "AI correct"</td></tr>
</table>

5.6.3.2 External meters

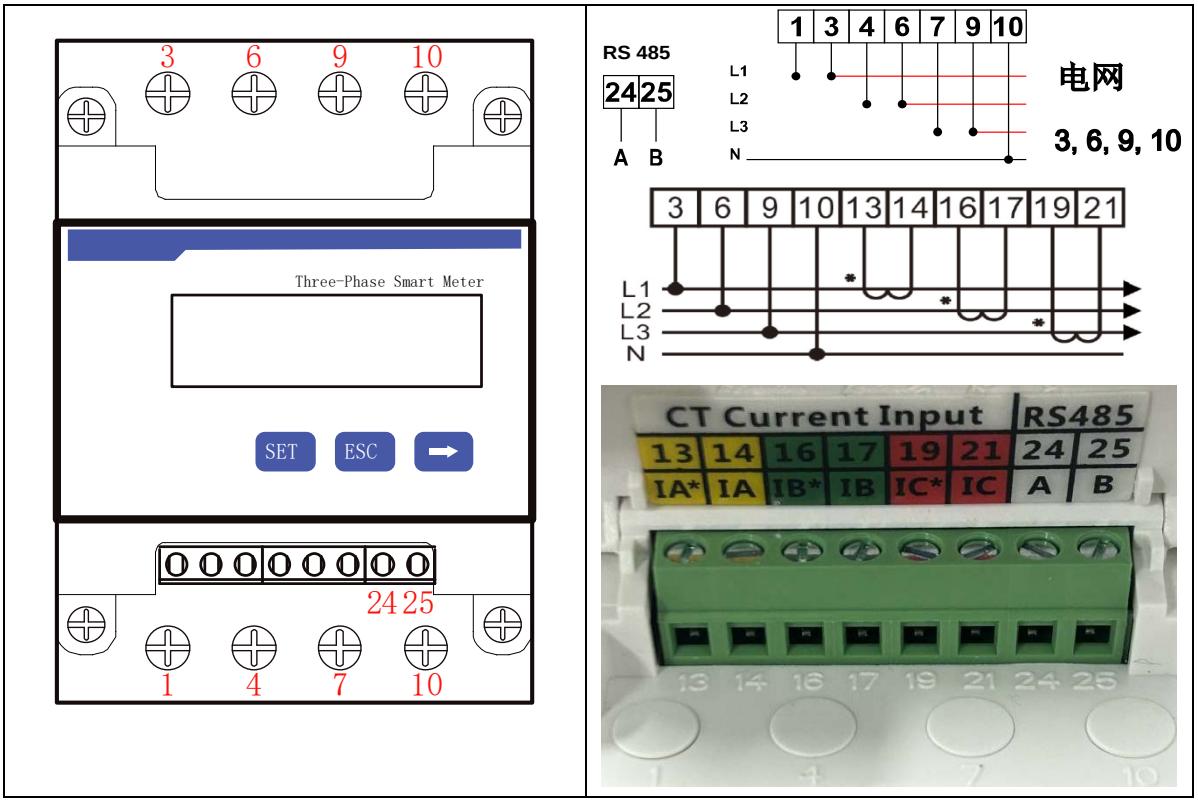
- **External meter connection schematic（optional）**



- **External Meter Communication Procedures**

1. Use the CT included in the box of the external meter to connect correctly to the IA of the meter according to the wire markings respectively.
2. According to the above diagram, connect the breaker outlet end with 3, 10 of the external meter.
3. Dial one end of the standard network cable to use pin7, 8 corresponding cable (white brown, brown) to access the meter's 485B, 485A, the other end of the crystal head to connect to the communication interface terminal.

Note: Follow the above instructions, if there is still a problem, you can refer to the instructions in the box of the external meter.

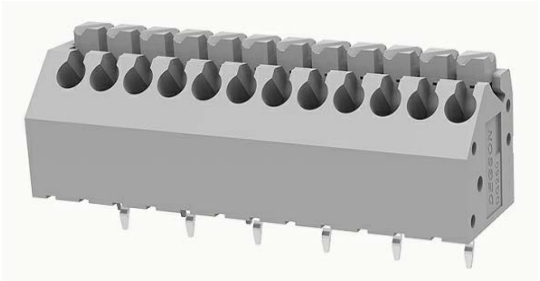


5.6.4 DI/DO Communication

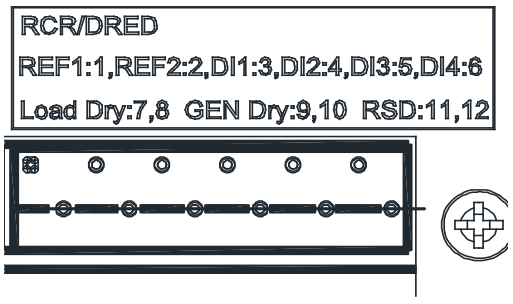
- **DRED/RCR**

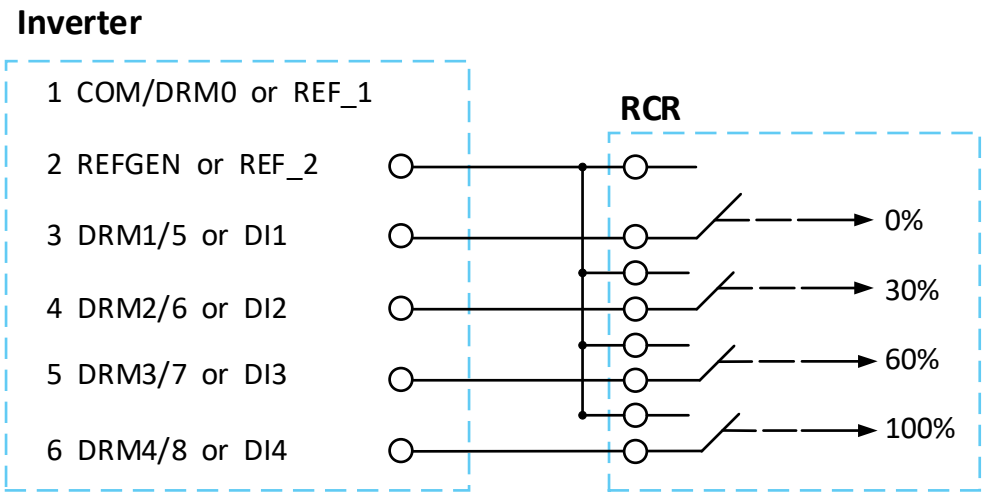
The inverters are compliant with Australian DRED standards and provide a separate DRED signal control port. In Germany and some European regions, grid companies use RCR to convert grid dispatch signals to dry contact transmission, and power plants receive grid dispatch signals via dry contact.

- **DI/DO Communication Interface Definition**



From left to right: Pin1、Pin2.....Pin12



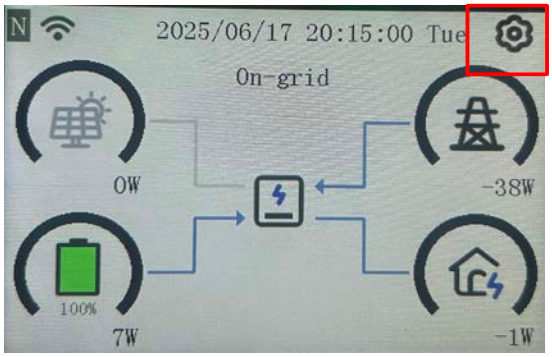
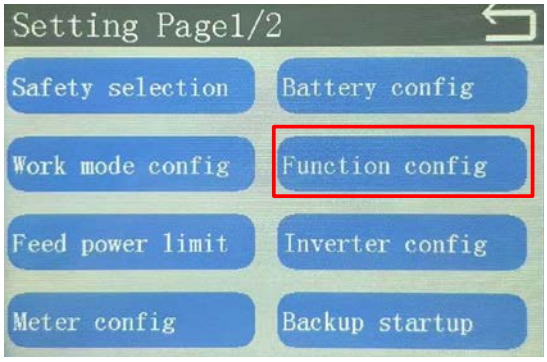


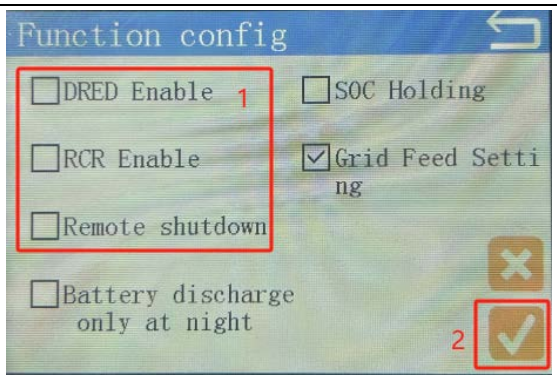
1	COM/DRM0 or REF_1
2	REFGEN or REF_2
3	DRM1/5 or DI1
4	DRM2/6 or DI2
5	DRM3/7 or DI3
6	DRM4/8 or DI4
7	DRY_RLY3_OUT+
8	DRY_RLY3_OUT-
9	DRY_RLY2_OUT+
10	DRY_RLY2_OUT-
11	IO_IN1_O
12	GND-S

- **DI/DO function operation steps**

1. The cables are accurately connected according to the silk-screening marks.
2. "DRED, RCR, Remote shutdown" are within the scope of DI/DO functions.

The operation steps are as follows：

Step1	Step2
	
Step3	

 1. Click on any one of the three functions. 2. Click " √ "	

5.6.5 Module Communication

- **Functional Description**

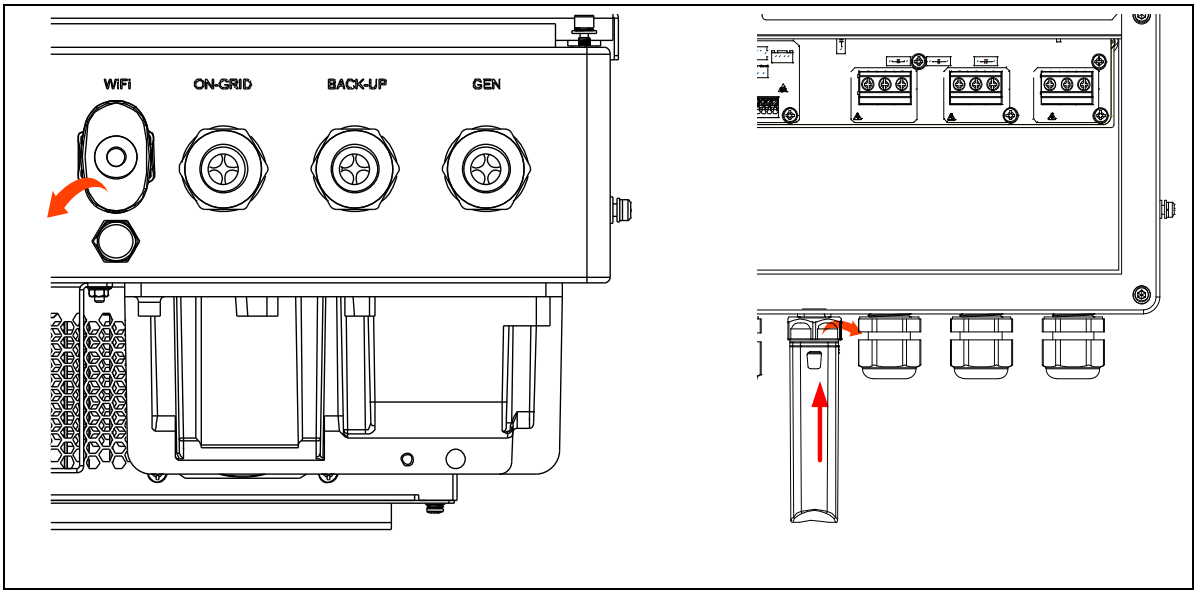
The inverter is equipped with a dedicated communication module. Connecting to cell phone or WEB enumeration, which is used to set up the inverter related parameters, view the operation information, error information, and understand the system status in time. For specific operation, please refer to the attached communication module user manual.

Two modules are provided for customers to choose from. The differences are as follows:

Module	Main Difference
	Support **WiFi, Bluetooth, LAN** communication; IP65
	Support **WiFi, Bluetooth** communication; IP20

- **Monitoring Module Installation Procedure**

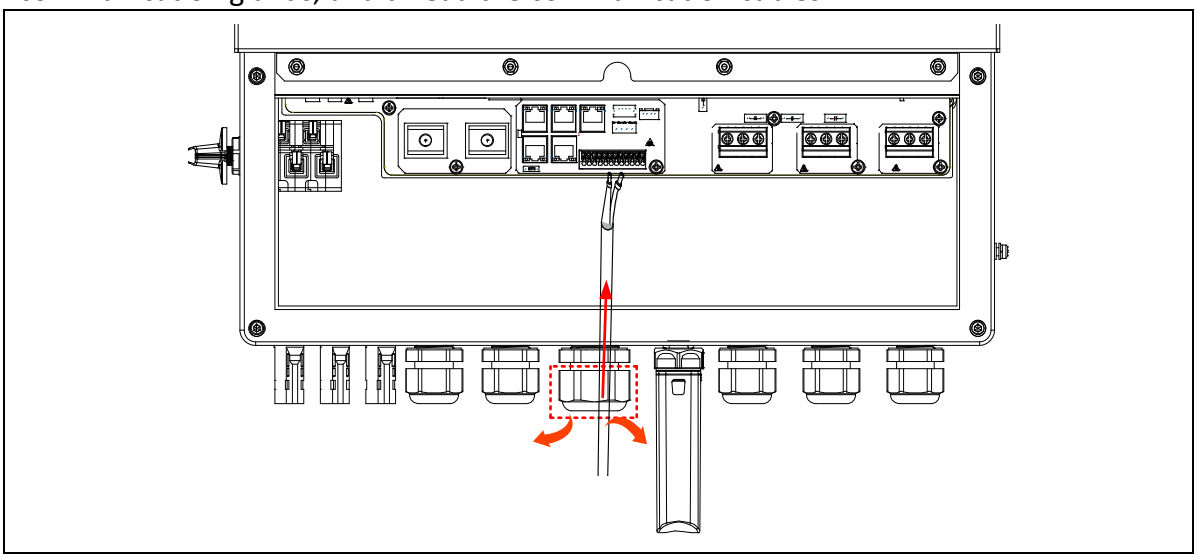
1. Remove the dust cover of the communication module interface.
2. Insert the communication module.
3. Right turn the communication module buckle, make sure it is not loosened.



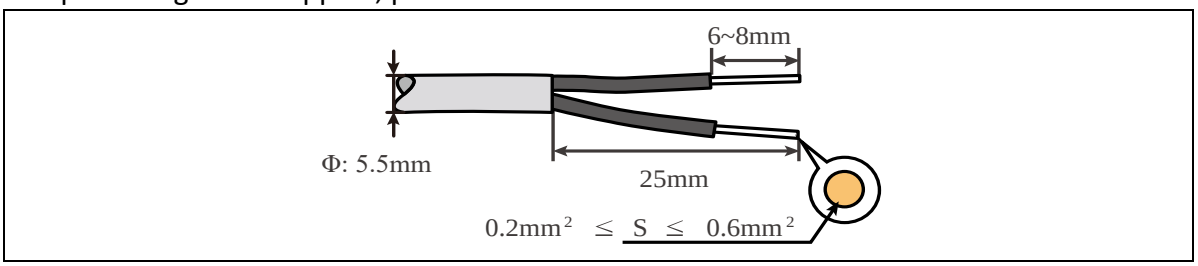
5.6.6 Communication cable wiring procedure

- To crimp the **tubular signal terminals**, proceed as follows:

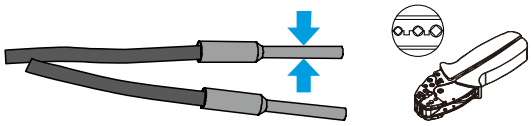
Step 1: Using an hexagon socket tool, remove the lower case cover, unscrew the communication glands, and thread the communication cables.



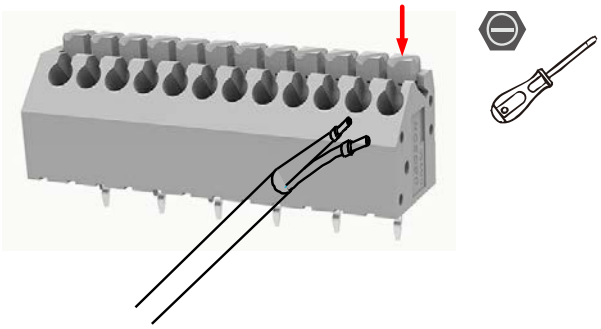
Step 2: Using wire strippers, pivot the wire 6-8mm.



Step 3: Thread the cable into the signal tubular terminal of the accessory package and crimp using tubular terminal crimping pliers.



Step 4: Use your finger or a small screwdriver to press down on the position shown in the illustration, then insert the terminal and release the screwdriver to snap it into place, tugging it outward to ensure that it snaps into place.

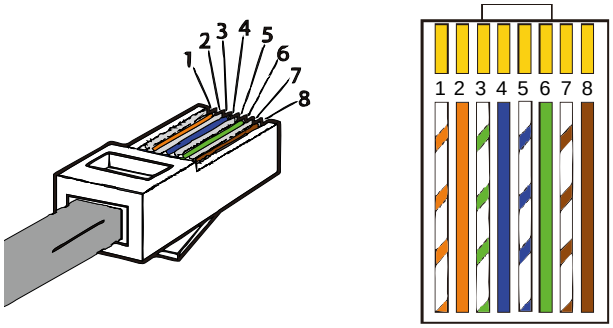


Step 5: Tighten the communication glands as illustrated in step 1

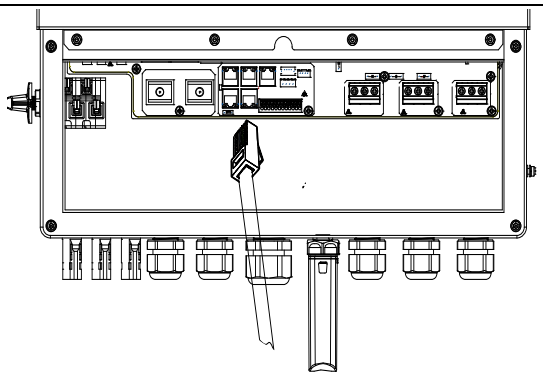
- **The standard network cable** crimping procedure is as follows:

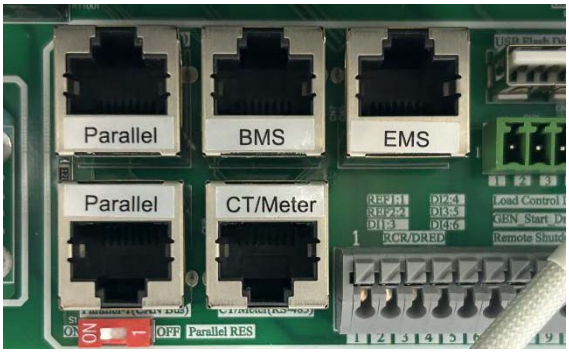
Step 1: Same as **Tubular Signal Terminal** Crimp Step 1.

Step 2: Set aside 15mm of the outer insulation of the standard network cable, set aside 6-8mm at one end of the cable, insert the crystal head and use the standard crimping pliers to crimp the cable.



Step 3: Plug in the corresponding communication interface.

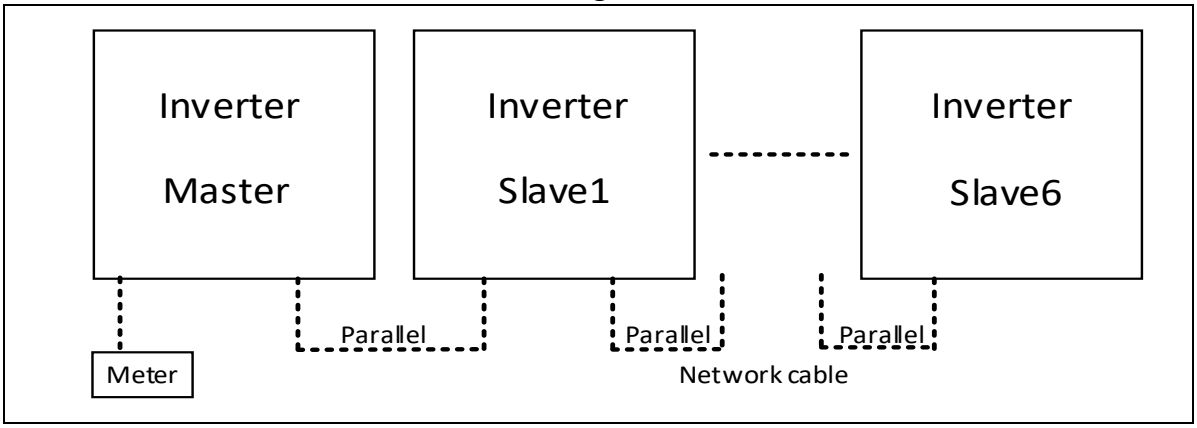




Step 4: Same as **Tubular Signal Terminal** Crimp Step 5

5.7 Parallel Connection

- **Parallel communication connection diagram**

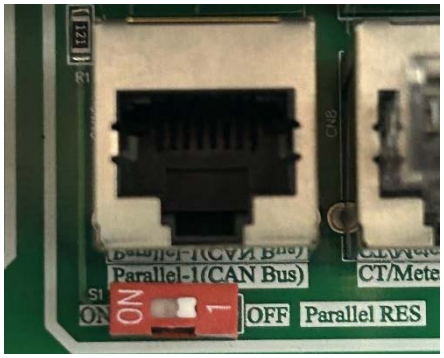
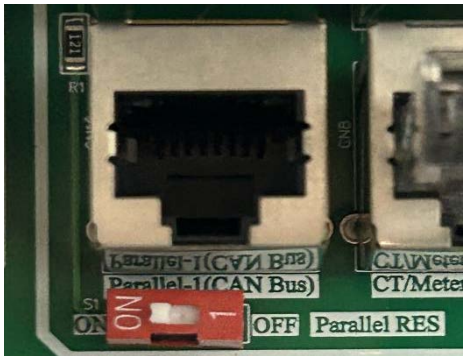


- **Parallel port wiring sequence definition**

1	2	3	4	5	6	7	8
/	/	SYN_BUS_1	PARALLEL-CANH1	PARALLEL-CANL1	GND-S	SYN_BUS_2	GND-S

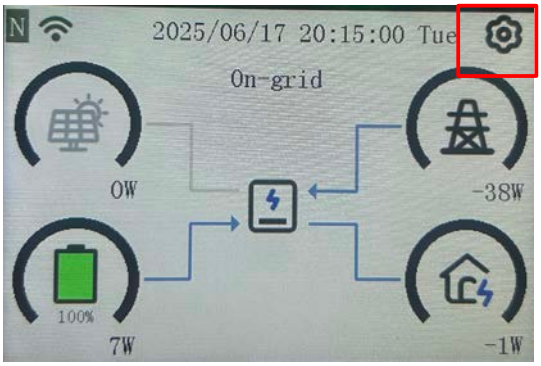
- **Parallel communication operation**

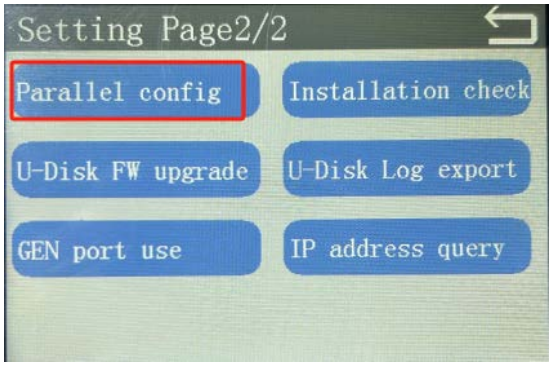
1. Connect one end of the standard network cable to the "Inverter 1" Parallel (CAN Bus), and the other end to the "Inverter 2" Parallel (CAN Bus). Repeat this connection method for all the other inverters.
2. Set the "Parallel RES" toggle switch of the first and last inverters to ON (the factory default is OFF).

OFF state	ON state
	

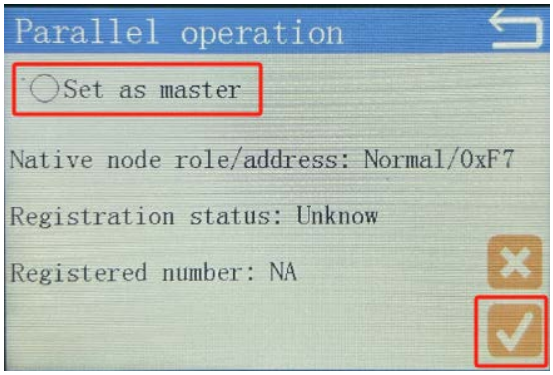
3. LCD Setting→Parallel config→Set a master. After the setting is completed, this interface on each inverter will display: Master/slave status, registration status, local operation address, registration number. Users can control the operation of the Slave by using the local operation address.

Step1	Step2



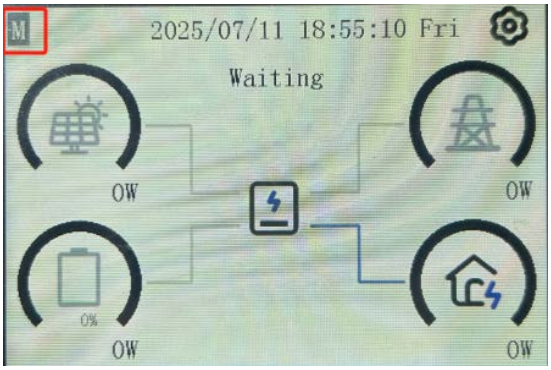


Step3



1. Set Master
2. Click " √ "

Step4



N： Indicate Single
M： Indicate Master
S： Indicate Slave

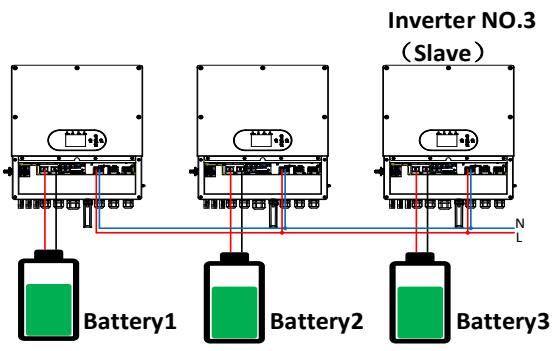
- **Parallel System wiring diagram**

1. The communication interface is described in Section 5.6.
2. Please select the specifications according to the model：

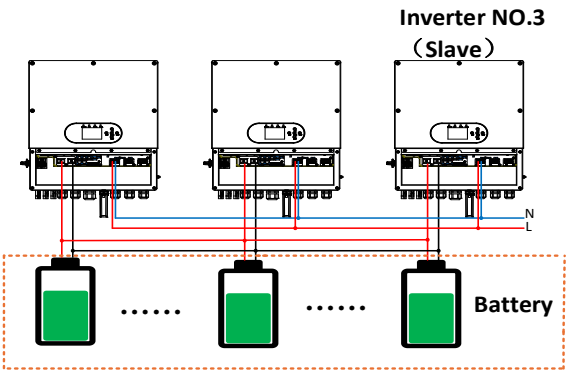
①②③： DC Breaker for battery
④⑤⑥： AC Breaker for BACK-UP
⑦⑧⑨： AC Breaker for ON-GRID
⑩： Home load breaker， the size choose depend on the load

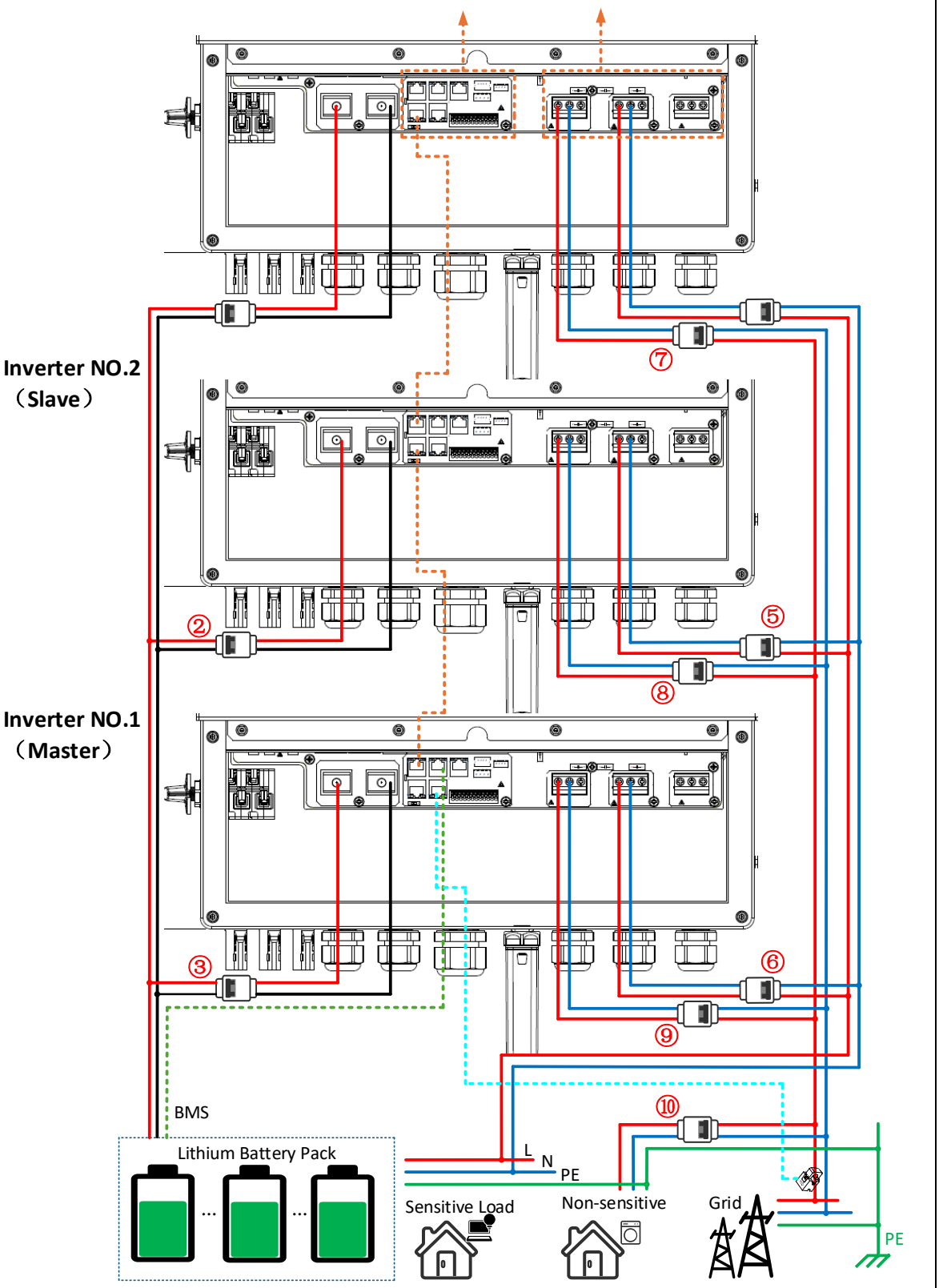
3. In the parallel system, each inverter is connected to its own battery, or the batteries can be connected in parallel. The schematic diagram is as follows:

Independent Battery



Parallel Batteries





Note:

1. The battery BMS is only connected to the Master, not the Slave.

2. The CT or Meter is only connected to the Master, not the Slave.

3. Each WiFi device needs to be configured separately to connect to the network.

6. Commissioning

6.1 Commissioning Steps

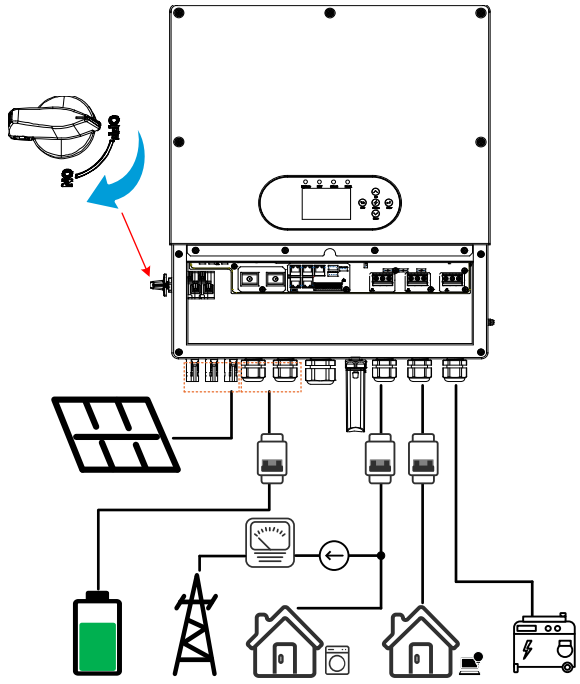
- **Pre-check before turning on**

⚠	1. Ensure that the grounding cable is reliably grounded. 2. Ensure that the inverter is installed reliably and firmly. 3. Make sure all circuit breakers are in OFF state. 4. Ensure that the PV, battery, AC and communication cables are connected reliably and securely with correct polarity.

- **If the check is complete, follow the steps below to start the inverter for the first time**

1. Close the ON-GRID side circuit breaker.
2. Close the BACK-UP side circuit breaker.
3. Close the Battery side circuit breaker.
4. Turn PV Switch to ON

Note: See section 3.3 for **indicator status** after startup

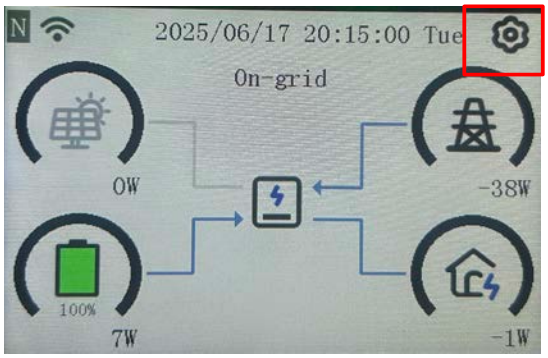


- **The inverter supports installation self-test, which is convenient for installers**

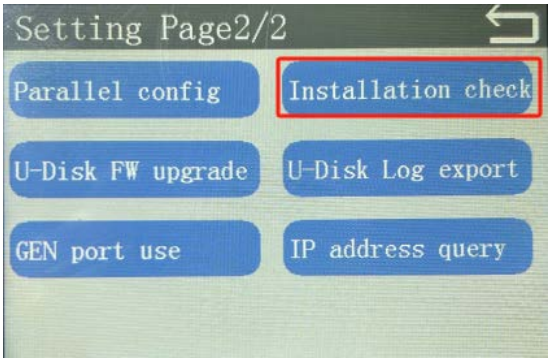
1. LCD setting interface→Setting Page2→Installation check→Start→Display self-test results(Total 4 pages)

2. Before starting the installation self-test, the LCD will display a message prompting the installer to confirm the installation and connection of PV, battery, AC, communication, CT, and WiFi modules.
3. After the self-test is completed, the LCD will display the **test results, abnormal events, and events that need to be confirmed**, and display them one by one to the installer on the subsequent page.

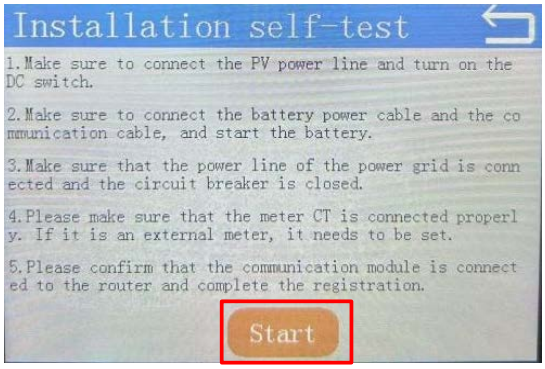
Step1



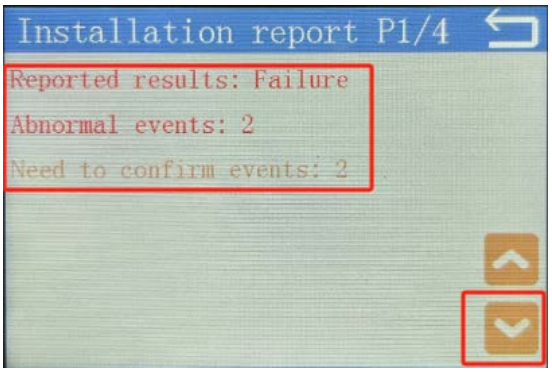
Step2



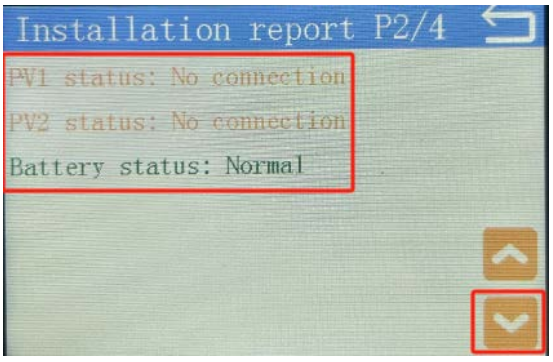
Step3



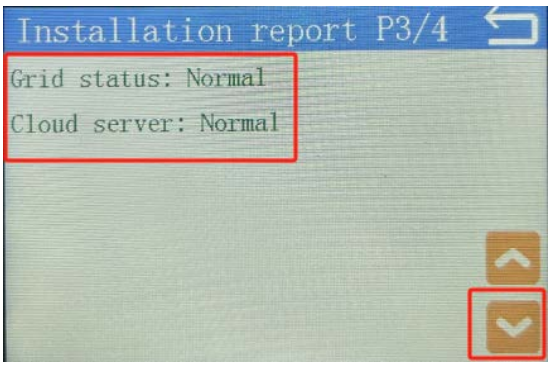
Step4



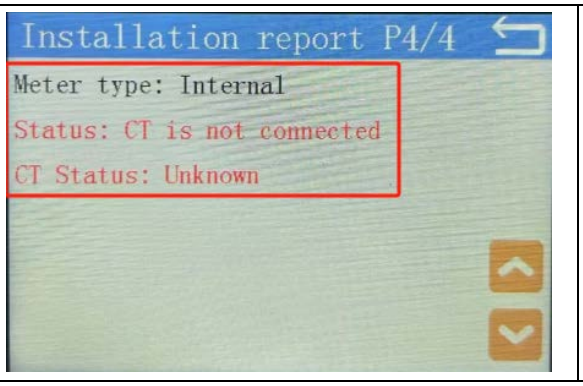
Step5



Step6

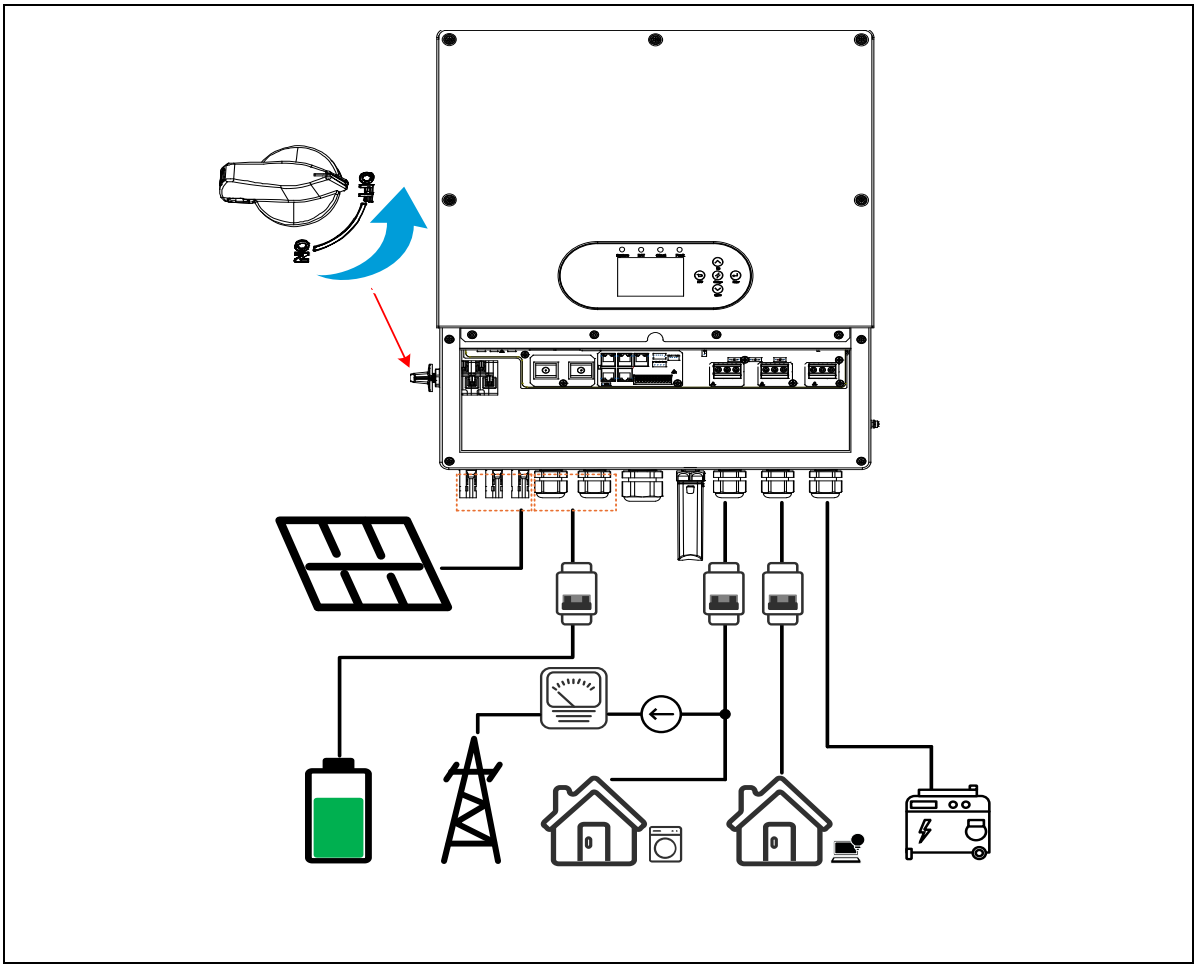


Step7



- **If the inverter needs to be powered down, follow these steps：**

1. Disconnect the ON-GRID side circuit breaker.
2. Disconnect the BACK-UP side circuit breaker.
3. Disconnect the battery side circuit breaker
4. Turn PV Switch to OFF



6.2 Firmware upgrade and data export

- **Local USB flash drive upgrade steps**

1. Contact the after-sales service to get the software upgrade package.
2. A USB drive needs to be prepared and it should meet the following requirements:

(1) The file system of the USB drive should be formatted as FAT32, and the recommended sector size is 4K bytes;
(2) Create a folder named "DYNLSBin" in the root directory of the USB drive;
(3) Copy the target firmware to the "DYNLSBin" folder. Multiple firmware files can be placed in this folder simultaneously, and they can be selected on the LCD screen;
3. Adjust the inverter status to standby waiting mode (grid only or battery only or PV only).
4. Insert the USB flash disk into the interface.
5. LCD main interface displays the icon of USB flash disk, which means it is recognized successfully, and vice versa means it is not recognized.
Note: If you are not sure how to do it, you can contact the after-sales service to get the SOP for USB flash disk upgrade.

- **Support the function of exporting running logs from U disk, and you can choose to export different time periods.**

Operation is as follows：
1. LCD setting interface→Setting Page2→U-Disk Log export→Select the time period to be exported→Export
2. LCD setting interface→Setting Page2→U-Disk FW upgrade→Select the software from U-Disk→upgrade

<table>
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 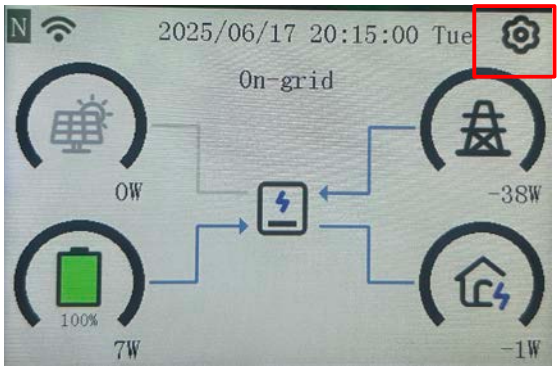
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 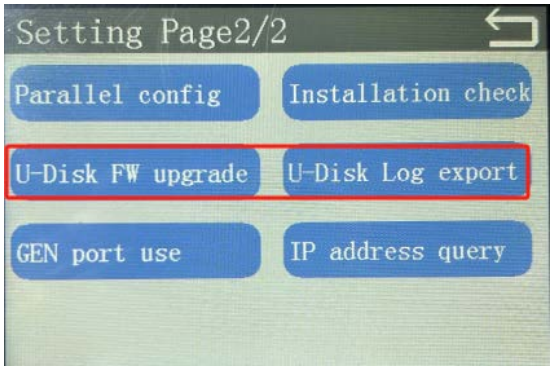
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 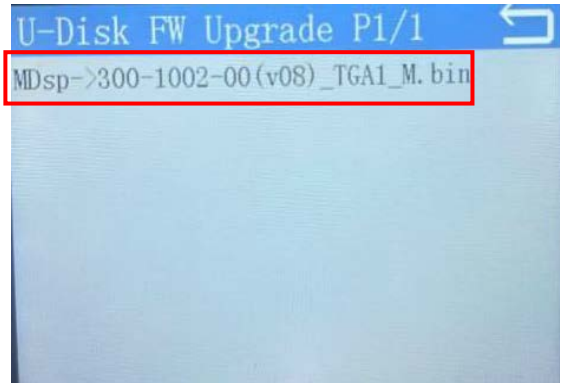
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 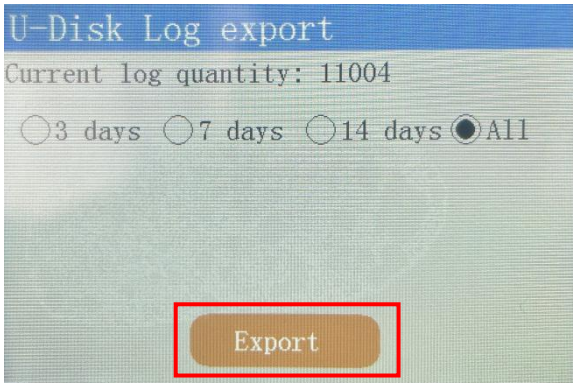
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7. Equipment Maintenance and Handling

7.1 Maintenance Precautions

- **Equipment operation and maintenance can only be operated by the professional personnel, and take good safety precautions.**

	1. Make sure the inverter is powered off before operation and maintenance. Otherwise, the inverter may be damaged or electrocution may occur. 2. After power-off, due to the characteristics of the equipment itself, it is necessary to wait for a period of time for the components to be fully discharged before operation.

- **See section 6.1 for power down procedure**

1. Disconnect the AC switch between the inverter and the utility grid.
2. Disconnect the AC switch between the inverter and the loads.
3. Disconnect the DC switch between the inverter and the batteries.
4. Disconnect the DC switch between the inverter and the PV string.

7.2 Daily Maintenance

- **Please refer to the following table for regular maintenance of the equipment**

Maintenance area	Maintenance methods	Maintenance cycles
Connection cable	Check for loose electrical connections, broken cables, etc.	1 time/half year
Air inlet and outlet	Check the air inlet and outlet and clean foreign objects and dust.	1 time/half year
External Fan	Check to see if the fan is spinning properly and if the noise is getting significantly louder or quieter. If removal for cleaning or replacement is required, please refer to the following steps.	1 time/half year
Sealability	Check whether the sealing of the inverter inlet hole meets the requirements, if there is too large a gap or not sealed, need to be resealed.	1 time/half year

- **External Fan Replacement Procedure**

1. Completely power-off the inverter, disconnect the PV, battery, and AC cables, and wait 5 minutes.
2. Take the inverter off the mounting wall and remove the duct backplate with a screwdriver.

3. Unplug the fan connector, remove the external fan pair terminals and clean or replace them.
4. After cleaning or replacing, plug in the fan connector and install the air duct back plate.

7.3 Fault Location and Handling

- Please locate and handle faults based on the following methods. If the issue cannot be resolved, contact after-sales service. Before contacting support, collect the following information:

1. Inverter information (e.g., serial number, firmware version, installation date, fault occurrence time, fault details).
2. Installation environment (e.g., weather conditions, shading of PV modules). Provide photos/videos for analysis if possible.
3. Grid status, PV module status, and Battery status.

- **Fault Information and Solutions:**

No.	Fault Name	LCD Display	Fault Cause and Solutions
1	Grid Loss	Power grid loss	**Cause**: Grid connection is lost. **Solutions**: 1.The alarm is automatically cleared after the grid power supply is restored. 2.Check whether the AC cable is connected and the AC breaker is on.
2	Grid voltage fault	Grid voltage fault	**Cause**: Grid voltage exceeds allowable range (undervoltage/overvoltage/VRT). The inverter automatically returns to normal operation after detecting that the power grid is normal. **Solutions**: 1.If the problem occurs frequently, check whether the grid voltage is within the permissible range. 2.Check grid voltage compliance. If unstable, configure BACK-UP as EPS mode. 3.Enable high-impedance mode if voltage fluctuates severely at remote installations.
3	Grid frequency fault	Grid frequency fault	**Cause**: Grid frequency exceeds allowable range (under/over frequency). The inverter automatically returns to normal operation after detecting that the power grid is normal. **Solutions**: Verify grid frequency compliance. Contact the utility company to adjust protection thresholds if

			necessary.
4	Grid phase angle fault	Grid phase angle fault	**Cause**: Grid voltage phase angle deviation. Rare occurrence. The inverter automatically returns to normal operation after detecting that the power grid is normal. **Solutions**: Contact service provider if persistent.
5	Grid phase sequence fault	Grid phase sequence fault	**Cause**: Incorrect phase sequence (non-positive sequence). **Solutions**: 1. Enable phase sequence auto-adaptation (default: enabled). 2. Verify grid terminal wiring sequence.
6	AC current has a high DC component	On-grid high DC component	**Cause:** The problem is caused by an external fault like a utility grid exception or frequency exception, the inverter will recover automatically after solving the problem. **Solutions**: 1.If the problem occurs frequently contact the dealer or the after-sales service. 2.If it persists and cannot be recovered, it may be a sensor malfunction, please contact the service provider for confirmation.
7	Off-grid AC voltage has a high DC component	Off-grid high dc component	**Cause**: Generally caused by half-wave load, it can automatically restore normal operation. **Solutions**: 1. Check load types (avoid half-wave load). 2. If it persists and cannot be recovered, it may be a sensor malfunction, please contact the service provider for confirmation
8	N-PE relay fault	N-PE relay fault	**Cause**: Generally caused by poor grounding, stop after two consecutive tests, you need to manually clear. **Solutions**: 1. Ensure proper grounding. 2. Disable N-PE relay via Inverter config if externally shorted. 3. If the fault persists, the relay may be faulty. Contact the service provider for confirmation.
9	BACK-UP output fault (overload, overcurrent, undervoltage)	BACK-UP output fault	**Cause**: Overloaded BACK-UP port or insufficient battery discharge capability. **Solutions**: 1. Optimize BACK-UP load configuration. 2. Verify battery and load compatibility.

10	The inverter temperature is too high	Device over temperature	**Cause**: High operating temperature **Solutions**: 1. Ensure adequate airflow and avoid direct sunlight. 2. If it persists and cannot be recovered, it may be a sensor malfunction, please contact the service provider for confirmation
11	The battery or PV input voltage is too high	DC input over voltage	**Cause**: PV string or battery voltage exceeds specifications. **Solutions**: 1. Please check the number of PV strings to ensure that the maximum open circuit voltage does not exceed the inverter operating voltage range. 2. Check the battery specifications to ensure that the maximum battery voltage does not exceed the inverter operating voltage range.
12	BUS voltage is too high	Bus over voltage	**Cause**: The DC bus voltage of the inverter is out of the working range, usually because the input voltage of PV strings is too high or the external environment changes dramatically leading to the control failure, the inverter will automatically recover when it detects that the bus voltage is restored to the working range. **Solutions**: 1. If it happens frequently, please check the number of PV strings to make sure the maximum open circuit voltage does not exceed the inverter working voltage range. 2. If it is always there and cannot be recovered, please contact the service provider for confirmation.
13	Internal memory operation failure	Flash operation failure	**Cause**: Flash memory failure. **Solutions**: Replace flash memory if reboot fails, please contact the service provider for confirmation.
14	CPLD communication loss	CPLD communication loss	**Cause**: Internal logic chip failure. **Solutions**: Replace CPLD if reboot fails, please contact the service provider for confirmation.
15	Slave DSP communication loss	Slave DSP communication loss	**Cause**: Firmware upgrade failure or chip damage. **Solutions**: 1. Retry firmware upgrade. 2. Replace DSP chip if unresolved, please contact

			the service provider for confirmation.
16	ARM communication loss	ARM communication loss	**Cause**: Communication failure between ARM and DSP. **Solutions**: 1. Retry firmware upgrade. 2. Contact service provider.
17	Abnormal battery access	Battery connect abnormal	**Cause**: Battery ready function not purchased or hardware mismatch. **Solutions**: 1. Remove battery if function is disabled. 2. Contact service provider for standard models.
18	The insulation resistance is low	Insulation fault	**Cause**: System insulation below safety threshold. **Solutions**: 1. Check PV/battery insulation for damage. For example, the wiring harness is damaged or the component shell is damaged. 2. Isolate components to diagnose. 3. Contact service provider.
19	GFCI protection	GFCI protection	**Cause**: System leakage current exceeds limit. After the fault disappears, the inverter automatically returns to normal operation. **Solutions**: 1. Inspect system components and grounding. 2.If the fault persists, the sensor may be faulty. Contact the service provider for confirmation.
20	Reference voltage fault	Reference voltage fault	**Cause**: Control board reference voltage failure. **Solutions**: Replace hardware if reboot fails, please contact the service provider for confirmation.
21	AC relay fault	AC relay fault	**Cause**: Inverter AC terminal relay self-test fails, two consecutive self-test failures stop operation, need to manually recover. **Solutions**: 1. If it happens frequently, please check whether there is poor contact or empty connection in the inverter grid port wiring. 2. If the fault described in 1 is rectified and the relay cannot be recovered after restart, contact the service provider for confirmation.
22	Relay self-test fault	Relay once self-test fault	**Cause**: The inverter AC terminal relay fails the single self-test, the inverter will automatically re-test and resume operation after it passes. **Solutions**: If it happens frequently, please check whether the

			wiring of inverter grid port has poor contact or empty connection.
23	Current sensor fault	HCT fault	**Cause**: Inverter current sensor failure, stop running, need to restart manually to recover. **Solutions**: If it can not be restored after reboot, it may be the inverter sensor failure, please contact the service provider for confirmation.
24	Current sensor self-test fault	HCT self-test fault	**Cause**: Inverter current sensor self-test failure, the inverter will automatically re-test and resume operation after it passes. **Solutions**: If it happens frequently, please contact the service provider for confirmation.
25	The GFCI device fault	GFCI self-test fault	**Cause**: Inverter GFCI device failure, stop running, need to restart manually to recover. **Solutions**: If it can not be restored after reboot, it may be the inverter sensor failure, please contact the service provider for confirmation.
26	GFCI self-test fault	GFCI once self-test fault	**Cause**: Inverter GFCI self-test failure, the inverter will automatically re-test and resume operation after it passes. **Solutions**: If it happens frequently, please contact the service provider for confirmation.
27	PV reverse connection	PV Connect reverse fault	**Cause**: PV string polarity reversed. **Solutions**: Correct PV polarity.
28	Battery reverse connection	Bat Connect reverse fault	**Cause**: Battery polarity reversed. **Solutions**: Correct battery polarity.

- **Warning Information and Solutions (Auto-recoverable):**

No.	Warning Name	LCD Display	Warning Cause and Solutions
1	PV/Battery voltage low	PV/Battery voltage low	**Cause**: Insufficient PV/battery voltage for grid-tie. **Solutions**: Automatic recovery once voltage normalizes.
2	BUS voltage low	Bus voltage low	**Cause**: Insufficient PV/battery power during startup or BACK-UP operation. **Solutions**: 1.Insufficient PV energy in the morning leads to grid-connected startup failure, which can be

			recovered automatically without treatment. 2.Optimize BACK-UP load during off-grid operation.
3	CPLD warning. Please check register 10605	CPLD warning	**Cause**: Internal logic chip anomaly (check register 10605).The operation can be automatically resumed after the problem disappears. **Solutions**: Contact service provider if persistent.
4	The phase-locked loop fault	PLL warning	**Cause**: Grid waveform phase anomaly. **Solutions**: Contact service provider if persistent.
5	Inverter control fault	Inverter control fault	**Cause**: Inverter control system failure. **Solutions**: 1. Automatic recovery after brief shutdown. 2. Contact service provider if unresolved.
6	Inverter software overcurrent	Inverter software overcurrent	**Cause**: AC current exceeds limits due to grid/load transients. **Solutions**: 1. Verify load types (e.g., motors, water pumps, air conditioners). 2. Contact service provider if unresolved.
7	Inverter hardware overcurrent	Inverter hardware overcurrent	**Cause**: AC overcurrent protection triggered. **Solutions**: Same as above.
8	Inverter PWM fault	Inverter PWM fault	**Cause**: PWM generator failure. **Solutions**: 1. Automatic recovery after brief shutdown. 2. Contact service provider if unresolved.
9	Battery software overcurrent	Battery software overcurrent	**Cause**: Battery current exceeds limits. **Solutions**: 1. Optimize load usage. 2. Contact service provider if unresolved.
10	PV software overcurrent	PV software overcurrent	**Cause**: PV current exceeds limits. **Solutions**: 1. Check PV cable connections and length (≤300m). 2. Contact service provider.
11	Off-grid to On-grid phase sequence fault	Off-grid phase sequence error	**Cause**: Phase sequence mismatch during grid restoration. **Solutions**: 1. Disable phase sequence auto-adaptation if three-phase motors are connected. 2. No need to deal with it in general application.
12	System	System	**Cause**:

	software shutdown	software shutdown	System active shutdown and reboot, prompted warning, no need to deal with it.
13	Off-grid AC output overvoltage	off-grid output over voltage	**Cause**: When running off-grid, the BACK-UP port output voltage is too high for protection, the protection mechanism, after a short shutdown, the inverter will automatically resume operation. **Solutions**: If it occurs frequently, please contact the service provider for confirmation.
14	Off-grid AC output undervoltage	Off-grid output under voltage	**Cause**: Off-grid operation, BACK-UP port output voltage is too low for protection, the protection mechanism, generally caused by excessive loads **Solutions**: 1. If the photovoltaic presence at this time during the day, the system is transferred to the battery charging, to be battery SOC increased by 20% or more than 90% to restore the BACK-UP port AC voltage output. 2. If only the battery exists, it will be transferred to standby, after a delay to restore the BACK-UP port AC voltage output, the delay time increases with the number of occurrences of the event, the minimum 30 seconds, the maximum 2 hours.
15	Battery PWM fault	Battery PWM fault	**Cause**: Battery PWM generator failure. **Solutions**: Contact service provider if unresolved.
16	Bus soft-start fault	Bus soft-start fault	**Cause**: Bus soft-start failure. **Solutions**: Contact service provider if reboot fails.
17	Bus Voltage Imbalance	Bus voltage Unbalance	**Cause**: The positive and negative bus voltage imbalance is out of the operating range, and the inverter resumes normal operation when the voltage returns to the normal range. **Solutions**: 1. This warning may appear when using half-wave loads when off-grid. 2. If the warning persists and cannot be restored, please contact the service provider for confirmation.

7.4 Equipment handling

- **Disassembly of the inverter**

1. Ensure that the inverter system is completely powered off

2. Disconnect all cables, including DC cables, AC cables, communication cables, WiFi modules and PE cables.
3. Remove the inverter from the mounting wall and detach the mounting back plate.
4. Properly store the inverter in its packing box and ensure that the storage conditions meet the requirements for future use.

- **End-of-life inverter**

The inverter system equipment cannot be disposed of with household waste. If the inverter can no longer be used, dispose of it in accordance with local regulations.

8. Technical Parameters

Model Name	D3.0K-LS	D3.6K-LS	D5.0K-LS	D6.0K-LS	D8.0K-LS
Battery Input Data					
Battery Type	Lead-acid/Li-Ion				
Battery Voltage Range (V)	40-60				
Nominal Battery Voltage (V)	48	48	48	48	48
Max. Charge/Discharge Current (A)	70	90	120	140	160
Max. Charge/Discharge Power (W)	3000/3300	3600/3960	5000/5500	6000/6600	8000/8800
PV String Input Data					
Max. PV Input Power (W)	6000	7200	10000	12000	16000
Max. PV Input Voltage (V)	600				
Working Voltage Range (V)	50~550				
First Feed-in Voltage (V)	60				
MPPT Range For Nominal Power (V)	100~500	120~500	150~500	180~500	180~500
Nominal PV Input Voltage (V)	380				
Max. Input Current (A)	20/20	20/20	20/20	20/20	20/40
Max. Short Current (A)	27/27	27/27	27/27	27/27	27/54
No. of MPP Trackers	2	2	2	2	2
Strings per MPP Tracker	1	1	1	1	1+2
AC Output Data (On-grid Port)					
Nominal Power Output To Grid (VA)	3000	3600	5000	6000	8000

Max.Power Output To Grid (VA) *	3300	3960	5500	6600	8800
Max.Power From Grid (VA)	8400	8400	10000	12000	12000
Nominal Output Voltage (V)	220/230/240,L/N/PE				
Nominal Output Frequency (Hz)	50/60				
Nominal AC Current To Grid (A)	13.7/13.1 /12.5	16.4/15.7 /15	22.8/21.8 /20.9	27.3/26.1 /25	36.4/34.8 /33.4
Max.AC Current To Grid (A)	15	18	25	30	40
Max.AC Current From Grid (A)	35	35	40	50	50
Output Power Factor	Adjustable from 0.8 leading to 0.8 lagging				
Output THDi (Nominal Power)	<3%				
AC Output Data (Back-up Port)					
Max.Continuous Output Power(VA)	3300	3960	5500	6600	8800
Peak Output Power(VA)**	6000 @10s	7200 @10s	10000 @10s	12000 @10s	16000 @10s
Max.Output Current (A)	15	18	25	30	40
Nominal Output Voltage (Vac)	220/230/240,L/N/PE				
Nominal Output Frequency (Hz)	50/60				
Output THDv (@Linear Load)	<3%				
Switch time	<4ms				
AC Input Data (Generator Port/Load Control Port)					
Nominal Input Apparent Power(VA)	3000	3600	5000	6000	8000
Max. Input Apparent Power(VA)	8400	8400	10000	12000	12000
Max. AC Input Current(A)	35	35	40	50	50
Nominal Input Voltage(V)	220/230/240,L/N/PE				
Nominal AC Generator Frequency(Hz)	50/60				
Efficiency					
Max.efficiency	97.6%				

Euro.efficiency	96.5%	
Protection		
Anti-island Protection	Integrated	
PV Insulation Resistance Detection	Integrated	
PV Reverse Protection	Integrated	
Residual Current Monitoring Unit	Integrated	
AC Over Current/Voltage Protection	Integrated	
DC Switch(PV)	Integrated	
Surge Protection	DC TypeⅢ/AC TypeⅢ	
Communication Interface		
Battery BMS	CAN	
EMS（Modbus）	RS485	
Meter(Outside)	RS485	
RCR/DRED	YES(DI)	
Remote Shut Down	YES(DI)	
Dry-Point	YES(DO)	
Cloud	Wi-Fi,LAN	
Display/User Interface	LED/LCD/APP	
General Data		
Operating Temperature Range(℃)	-30-60	
Relative Humidity(%)	0-100%	
Operating Altitude(m)	≤3000	
Cooling	Natural Convection	Intelligent Air Cooling
Noise(dB)	<30	40
Weight(kg)	17	
Size(W/H/D)(mm)	501*586*193	
Installation	Wall-Mounted	
Protection Degree	IP66	
Certifications&Standards		
Grid Regulation	IEC61727,IEC62116 ,EN50549-1, NRS097, G98, G99	
Safety Regulation	IEC/EN62109-1&2	
EMC	IEC/EN61000-6-1/2/3/4	

＊According to the local grid regulation

** Can be reached only
if PV and battery power
is enough

DISCOVER YOUR NATURE

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