Offgrid Energy Storage Inverter

Version2.0001, Release Date:6,2024

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1.Notes on this Manual

1.1 Scope of Validity

This manual is an important part of off-grid energy storage inverters and describes the assembly, installation, commissioning, maintenance and fault types of the product. Please read carefully before operation.The current off-grid series has O5KL1 models.

1.2 Target Group

This manual is for qualified electricians. The tasks described in this manual only can be performed by qualified electricians.

1.3 Symbols Used

The following types of safety instructions and general information appear in this document as described below:

Danger!

"Danger "indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Warning!

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

Caution!

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

Note!

"Note" provides tips that are valuable for the optimal operation of ours.

2. Safety

2.1 Safety Precautions

Danger!

- Danger to life due to high voltages in the inverter!
- All work must be carried out by qualified electrician.
- The appliance is not to be used by children or persons with reduced physical sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children should be supervised to ensure that they do not play with the appliance.

Caution!

- Danger of burn injuries due to hot enclosure parts!
- During operation, the upper lid of the enclosure and the enclosure body may become hot.
- During operation, only the touch screen needs to be operated.

Caution!

- Do not stay within 20cm of the inverter for a long time. Possible health problem from radiation effects!

Note!

- PV modules should have an IEC61730 class A rating.
- PV modules with IEC61730 class A can be used in systems higher than DC 50V or 240W, and these systems are potentially accessible or accessible to the public.

Warning!

- Ensure input DC voltage ≤Max. DC voltage. Over voltage may cause damage.
- Permanent damage to inverter or other losses, which will not be included in warranty!

Warning！

- Authorized service personnel must disconnect both AC and DC power from inverter before attempting any maintenance or cleaning or working on any circuits connected to inverter.

Warning!

- Do not touch anything other than the screen during operation, there is a risk of electric shock.

2.1 .1 Important Safety Instructions

- Please keep the user manual properly. When operating equipment, in addition to following the general precautions in this document, follow the specific safety instructions. We will not be liable for any consequence caused by the violation of the safety operation regulations and design, production, and usage standards.
- Accessories only together with the inverter shipment are recommended here. Other- wise may result in a risk of fire, electric shock, or injury to person.
- Make sure that existing wiring is in good condition and that wire is not undersized. Do not disassemble any parts of inverter which are not mentioned in installation guide. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the inverter yourself may result in a risk of electric shock or fire and will void your warranty.
- Keep away from flammable, explosive materials to avoid fire disaster.
- The installation place should be away from humid or corrosive substance.
- Authorized service personnel must use insulated tools when installing or working with this equipment.
- Never touch either the positive or negative pole of PV connecting device. Strictly prohibit touching both at the same time.
- The unit contains capacitors that remain charged to a potentially lethal voltage after the MAINS, battery and PV supply has been disconnected.
- Hazardous voltage will present for up to 5 minutes after disconnection from power supply.
- CAUTION-RISK of electric shock from energy stored in capacitor, never operate on the inverter couplers,the MAINS cables, Battery cables, PV cables or the PV generator when power is applied. After switching off the PV, battery, and Mains, always wait for 5minutes to let the intermediate circuit capacitors discharge before unplugging DC, battery in plug and MAINS couplers.
- When accessing the internal circuit of inverter, it is very important to wait 5 minutes before operating the power circuit or demounting the electrolyte capacitors inside the device. Do not open the device beforehand since the capacitors require time sufficiently discharge!
- They do not stop conducting electricity until the voltage at both ends falls below 30 volts.

2.1.2 PE Connection

WARNING!

- Earth connection essential before connecting supply.

Incorrect grounding can cause physical injury, death or equipment malfunction and increase electromagnetic.

2.1.3 Battery Safety Instructions

Inverter should be worked with low voltage battery, for the specific parameters such as battery type, nominal voltage and nominal capacity etc., please refer to section 3.6.

As accumulator batteries may contain potential electric shock and short-circuit current danger, to avoid accidents that might be thus resulted, the following warnings should be observed during battery replacement:

(1) Do not wear watches, rings or similar metallic items.

(2) Use insulated tools.

(3) Put on rubber shoes and gloves.

(4) Do not place metallic tools and similar metallic parts on the batteries.

(5) Switch offload connected to the batteries before dismantling battery connection terminals.

(6) Only personal with proper expertise can carry out the maintenance of accumulator batteries.

(7) Ensure that the battery is not accidentally grounded.If accidentally grounded, please remove the power supply from the ground and contact any part of the grounded battery, which may cause electric shock.(Suitable for devices without grounded power circuits and remote battery power supplies).It can reduce the possibility of such electric shocks.

2.2 Explanation of Symbol

This section gives an explanation of all the symbols shown on the inverter and on the type label.

Symbols on the Type Label.

	Refer to the operating instructions.
	Products should not be disposed as household waste.
	Components of the product can be recycled.
	Danger of hot surface!
	Danger of high voltage and electric shock!
	Caution! Failure to observe a warning indicated in this manual may result in injury.

3. Introduction

3.1 Basic Features

The off-grid Energy Storage Inverter series is a high-quality inverter that converts solar energy into AC energy and stores the energy as a battery.

The inverter can be used to optimize self-consumption, store in the battery for future use . Work mode depends on PV energy and user's preference. It can provide power for emergency use during the grid lost by using the energy from battery and inverter (generated from PV).

3.2 System Diagram

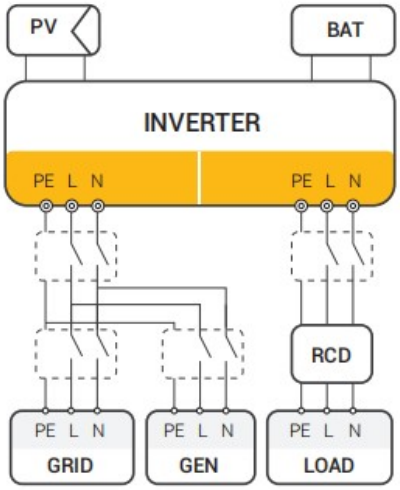


Figure3-1 O5KL1 System

All switches and RCD devices in the figure are for reference only, and the specific installation shall be subject to local regulations.

Note!

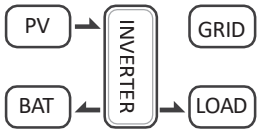
- Please control the home load and ensure that its output power is within the rated range, otherwise the inverter will shut down with an "Over load" warning.
- Please confirm with the mains grid operator whether there is any special regulations for grid connection.

3.3 Work Modes

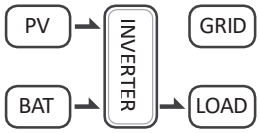
The inverter offers multiple working modes according to different requirements.

Work mode: Self Consumption

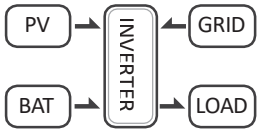
I. When PV, Grid/Gen, Battery is available:



Solar energy provides power to the loads as first priority. If the solar energy is sufficient to power all connected loads, then the surplus solar energy will charge the battery.

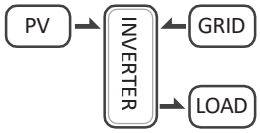


Solar energy provides power to the loads as first priority, if solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time.



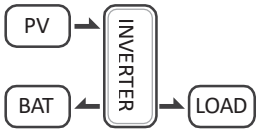
Solar energy provides power to the loads as first priority, if solar energy and battery are not sufficient to power all connected loads, utility energy (Main Grid/gen) will supply power to the loads with solar energy at the same time.

II. When PV, Grid/Gen is available(without battery):

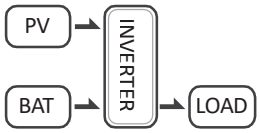


Solar energy provides power to the loads as first priority, if solar energy is sufficient to power all connected loads, Grid/gen energy will supply power to the loads at the same time.

III. When PV, Battery is available (Grid/Gen is disconnected):



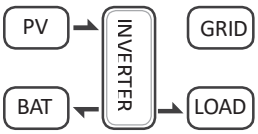
Solar energy provides power to the loads as first priority, if solar energy is sufficient to power all connected loads, solar energy will provides to charge battery.



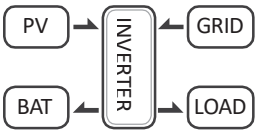
Solar energy provides power to the loads as first priority, if solar energy is not sufficient to power all connected loads, battery energy and solar energy will supply power to the loads at the same time.

Work mode: Peak Shift

I. When PV, Grid/Gen, Battery is available:

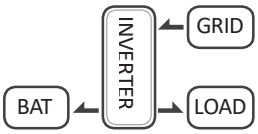


On charge time, solar energy will charge battery as first priority. The excess energy will supply power to the loads. If solar energy is sufficient to supply loads and charge battery, and if there's still some extra energy, then the excess power will be limited.



On charge time, solar energy will charge battery as first priority, then the excess solar energy will supply power to loads. If solar energy is not sufficient to charge battery and supply loads, grid/gen will supply all the connected loads with solar energy together.

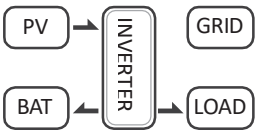
II. When Grid/Gen, Battery is available (PV is disconnected):



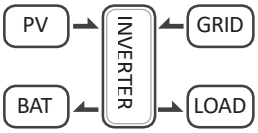
On charge time, grid/gen will charge battery and supply power to the connected loads at the same time

Work mode: Battery Priority

I. When PV, Grid/Gen, Battery is available:

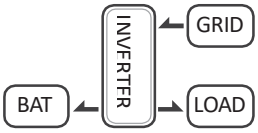


Solar energy will charge battery as first priority, if solar energy is excess, the excess power will supply load. If there's still some extra energy, then the excess power will be limited.



Solar energy will charge battery as first priority, if solar energy is excess the excess power will supply load. If solar energy is not sufficient to charge battery and supply loads, grid/gen will supply power to loads.

II. When Grid/Gen, Battery is available (PV is disconnected):



Grid/gen will supply power to load and charge battery at the same time.

Note!

- Once on the work mode of Self Consumption, Peak shift, battery priority, Off-grid energy storage inverters do not supply power to the grid.
- PV cannot provide energy to the load alone, and needs to be connected to the battery or the grid at the same time.

In addition to the above three basic modes, there is also an “Advanced Mode”. Please refer to Chapter 7 for details.

3.4 Dimension

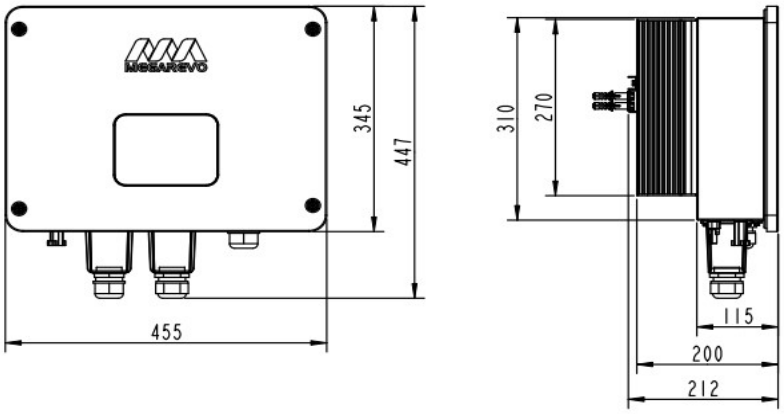
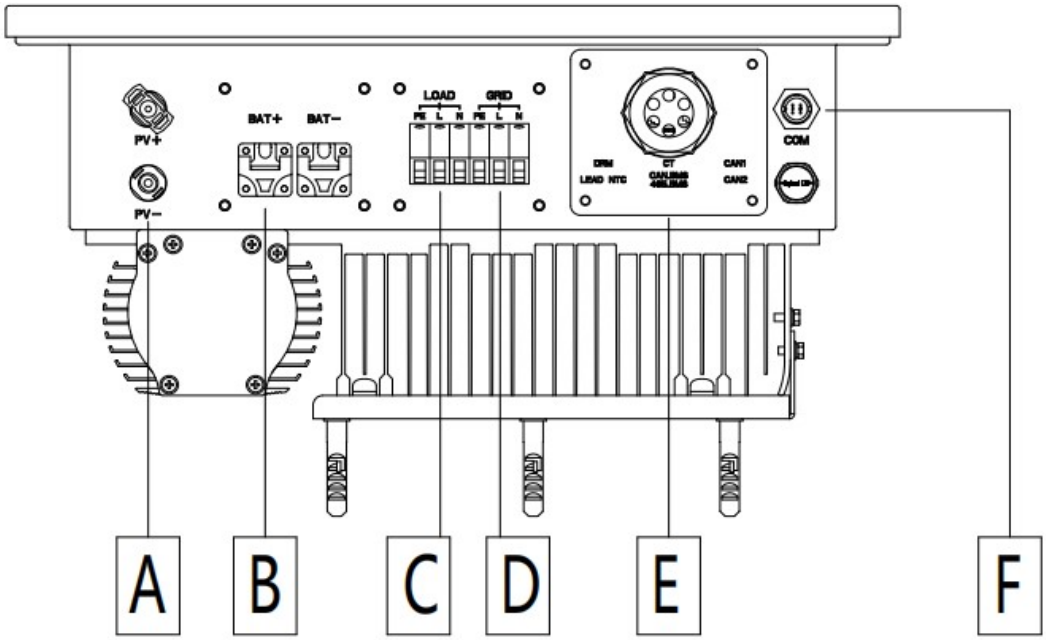


Figure3-2

3.5 Energy storage inverter terminal



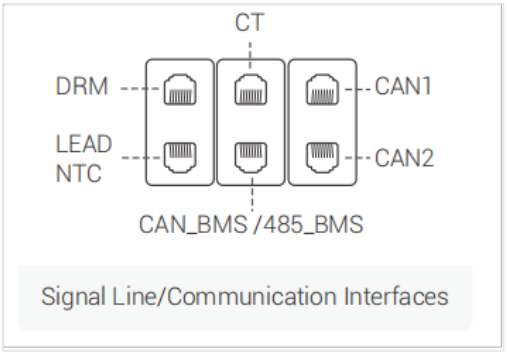
Object	Description
A	PV input

B	BAT input
C	Load
D	Grid
E	DRM/LEAD NTC/CT/CAN_BMS/485_BMS/CAN1/CAN2
F	COM

Table 3.1

WARNING !

Qualified electrician will be required for the installation.



DRM	CT	CAN1
LEAD NTC	CAN_BMS 485_BMS	CAN2

Table 3.2

***Port Function**

- CAN1/CAN2: Parallel communication.
- CAN_BMS/ 485_BMS: BMS communication for lithium batteries.
- CT: For external grid side CT to detect current size.
- DRM: Demand response modes.
- LEAD NTC: Used for communication of battery temperature.

3.6 Technical Parameters

Technical Data	O5KL1
PV Input Data	
MAX PV Input Power	7.5kW
MPPT Tracker/Strings	1/1
MAX PV Input Voltage	450V
MPPT Voltage Range	100-440V
MAX Input Current	32A
Short Circuit Current	37A
Battery Input Data	
Nominal Voltage	48V
Battery Voltage Range	40-56V
MAX Charging /Discharging Current	100A/100A
Battery Type	Lithium Or Lead Acid Battery
Charging Strategy For Li-Ion Battery	Self-adaption to BMS
AC Output Data(Off-Grid)	
Nominal Output Power	5KW
Nominal Output Voltage	230Vac
Output Frequency	50/60Hz
Maximum Apparent Output Current	21.7A
Maximum Output Overcurrent	26A
Output Power Factor	1(0.8Leading…0.8Lagging)
THDU	< 2%
Switching Time	10ms
AC Input Data(On-Grid)	
Nominal Input Voltage	230Vac
Grid Voltage Input Range	176-270Vac
Nominal Grid Voltage	50/60Hz
THDI	< 3%
Type Of Grid Connection	L+N+PE
AC Input Data(On-GEN)	
Maximum Input Power	5kw

Maximum Input Current	21.7A
Efficiency	
Max Efficiency	96%
Protection	
Island Protection	YES
Insulation Resistor Detection	YES
PV Input Reverse Protection	YES
Output Over Current Protection	YES
Output Short Protection	YES
Output Over Voltage Protection	YES
Output Under Voltage Protection	YES
AC/DC Surge Protection	YES
General Data	
Operating Temperature Range	-25 - +60℃
Relative Humidity	5-95%
Operating Altitude	0-2000m
Ingress Protection	IP65
Weight	17kg
Size (Width*Depth*Height)	455*200*447mm
Cooling	Natural Convection
Noise Emission	<35dB
Display	Color Screen
Communication With RS485/Wifi/GPRS/CAN/DRM	Possess/Optional/Optional/Possess/Possess
Standby Ioss	< 15W
Pollution Degree	II
Topology	Non-isolated

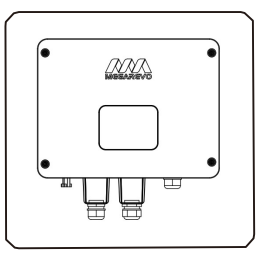
4. Installation

4.1 Check for Physical Damage

Make sure the inverter is intact during transportation. If there is any visible damage, such as cracks, please contact your dealer immediately.

4.2 Packing List

Open the package and take out the product, please check the accessories first .The packing list shown as below.



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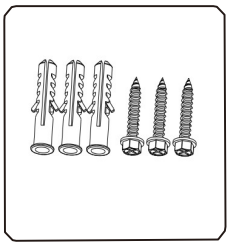

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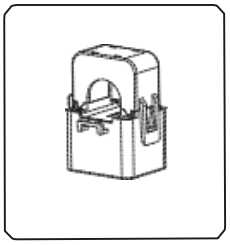

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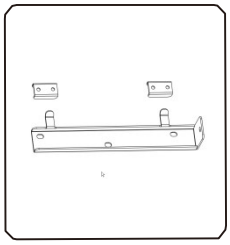

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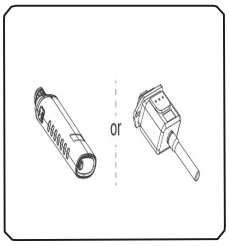

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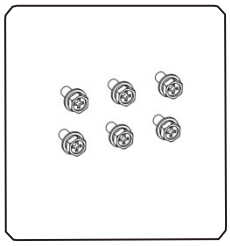

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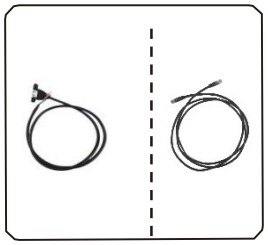


I G

Object	Description
A	Inverter
B	Expansion Pipe and Self-tapping Screw
C	CT (CTSA016-90A-90mA, inner radius 16mm)
D	Hanger
E	WiFi Module or GPRS Module(Optional)
F	PV Connectors (1*Positive, 1*Negative)
G	Hex Head Bolt
H	User Manual
I	Display Upgrade Cable
G	2M Parallel Machine Line(Optional)

4.3 Mounting

➢ **Installation Precaution**

Inverter is designed for indoor installation (IP 65).Make sure the installation site meets the following conditions:

- Not in direct sunlight.
- Not in areas where highly Flammable materials are stored.
- Not in potential explosive areas.
- Not in the cool air directly.
- Not near the television antenna or antenna cable.
- Not higher than altitude of about 2000m above sea level.
- Not in environment of precipitation or humidity (> 95%).
- Under good ventilation condition.
- The ambient temperature in the range of -25 ~ +60°C.
- The slope of the wall should be within ± 5°.
- The wall hanging the inverter should meet conditions below:
  1.solid brick/concrete, or strength equivalent mounting surface.
  2.Inverter must be supported or strengthened if the wall's strength isn't enough(such as wooden wall, the wall covered by thick layer of decoration).
  Please AVOIDE direct sunlight, rain exposure, snow laying up during installation and operation.

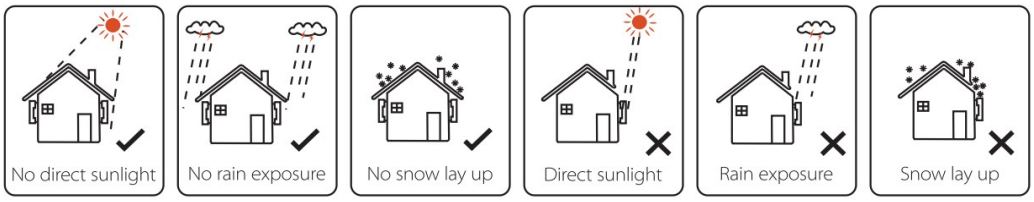
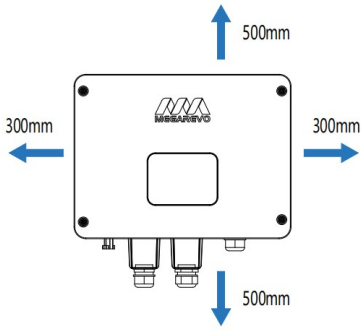


Figure4-1 Recommended Installation Locations

➢ **Space Requirement**



Position	Min. size
Left	300mm
Right	300mm
Top	500mm
Bottom	500mm
Front	1000mm

Figure4-2 Inverter Mounting Clearance

➢ **Installation**

Tools required for installation.

Installation tools : crimping pliers for binding post and RJ45, screwdriver, manual wrench etc.

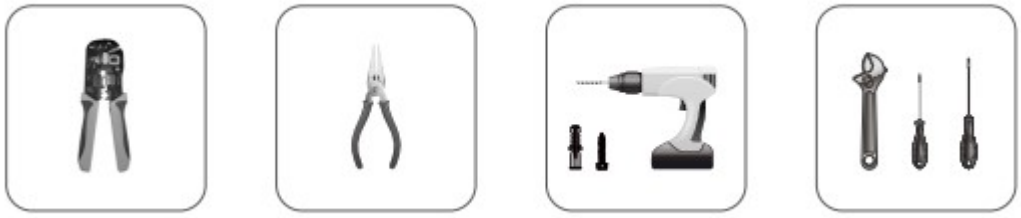


Figure4-3 Installation tools

Step 1: Mounting the hanging rack on the wall

1. Place the hanging rack on the wall, mark the location of the 3 holes and then remove it.
2. Drill holes with an drill, making sure they are deep enough (about 50~60 mm) to support the inverter.
3. Then install the expansion pipes into the hole with a proper hammer, and fix the hanging rack with self-tapping screws.

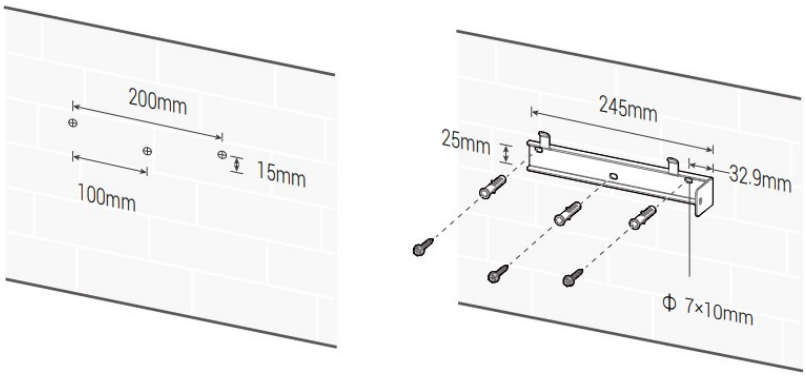


Figure4-4 Inverter wall mounting

Step 2:Lift the inverter and fix the inverter to the wall by aligning the hole of the inverter with the expansion bolt.

Step 3: Tighten the fixing screws on the right side of the inverter.

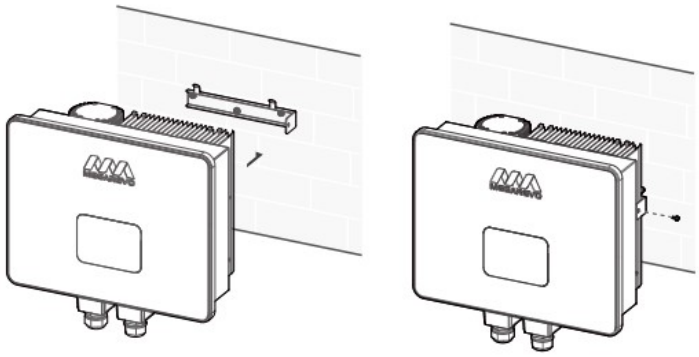


Figure4-5 Inverter Installation Instructions

Step 4:Use a screwdriver to remove the waterproof box under the lower part of the machine.

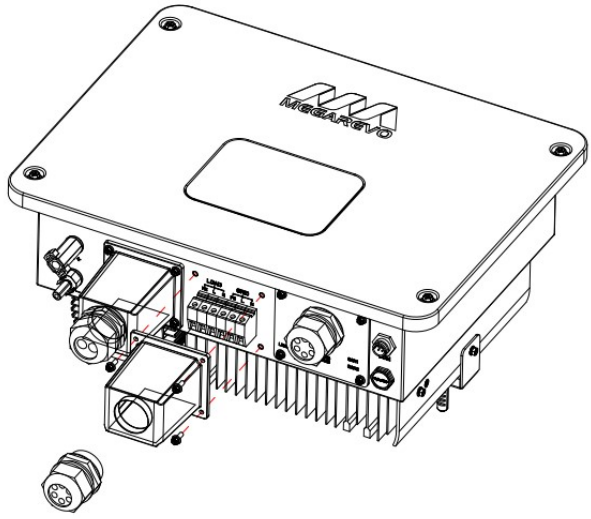


Figure4-6 Inverter Installation Instructions

Step 5: After installation, to ensure that the machine does not fall off, please double check if the machine is fixed to the rack.

Note!

Nothing should be stored on or placed against the inverter.

5. Electrical Connection

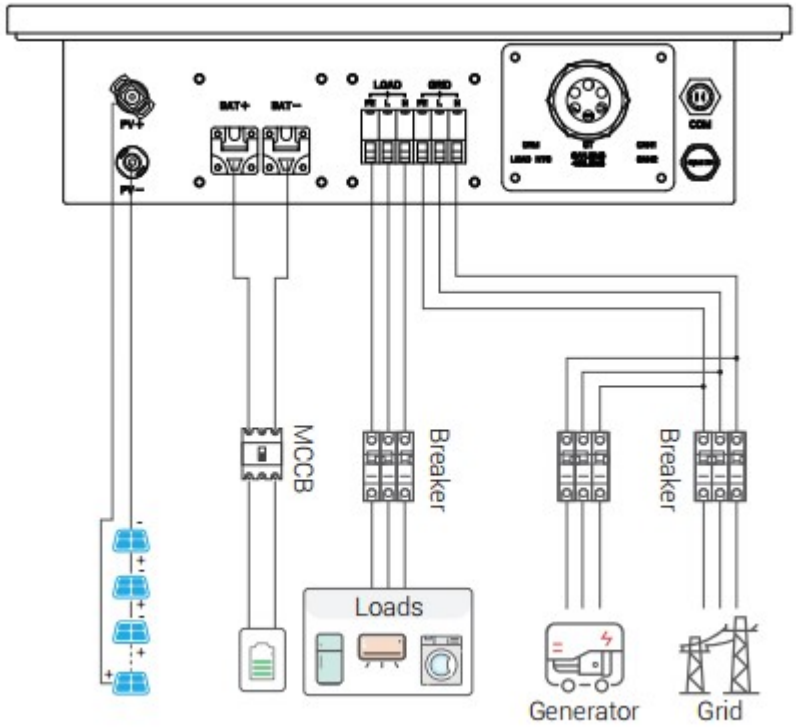
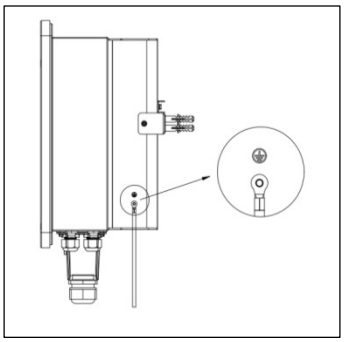


Figure5-1

5.1 PE Cable Installation

An external ground connection is provided at the right side of inverter. Prepare OT terminals: M4. Use proper tooling to crimp the lug to the terminal.Cable Size: 8AWG.

Connect the OT terminal with ground cable to the right side of inverter. The torque is 2Nm.



5.2 PV Input Cable Installation

Offgrid energy storage inverter can be connected in series with 5Kw PV modules.Select PV modules with excellent function and reliable quality. Open-circuit voltage of module arrays connected in series should be <Max. DC input voltage,operating voltage should be conformed to MPPT voltage range.

Technical Data	O5KL1
MAX DC Input Voltage	450V
MPPT Range	100V-440V

Table 5.1

Warning!

- PV module voltage is very high, which already achieve dangerous voltage range, please comply with electric safety rules when connecting.
- Please do not make PV positive or negative ground!

Note!

The following requirements of PV modules need to be applied for each input area. In order to save cable and reduce the DC loss, we suggest to install the inverter near PV modules.

Connection Steps:

Step1: Checking PV module

(1) Use multimeter to measure module array voltage.

(2) Check the PV+ and PV- from the PV string combiner box correctly.

(3) Please make sure the impedance bewteen the positive pole and negative pole of PV to earth(Warning:should be MΩ level).

Step2.: Separating the DC connector

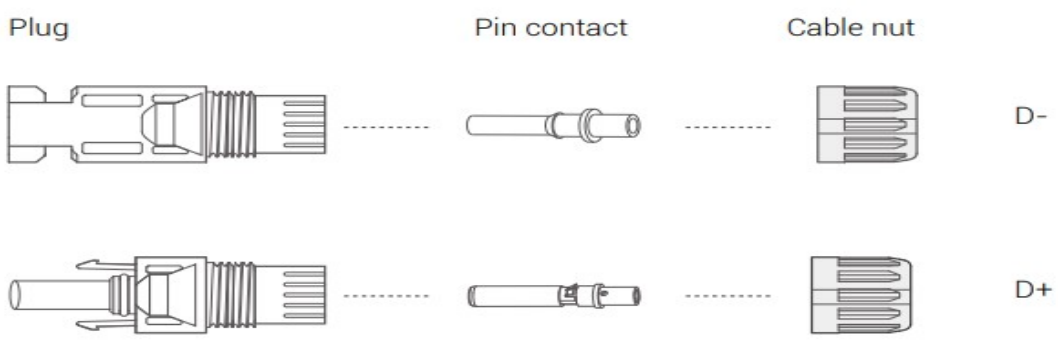


Figure5-2

Step3: Wiring

(1) Choose the 10 AWG wire to connect with the cold-pressed terminal.

(2) Remove 10mm of insulation from the end of wire.

(3) Insert the insulation into pin contact and use crimping plier to clamp it.

Figure5-3

Step4: Insert pin contact through the cable nut to assemble into back of the male or female plug. When you feel or heard a “click” sound the pin contact assembly is seated correctly.

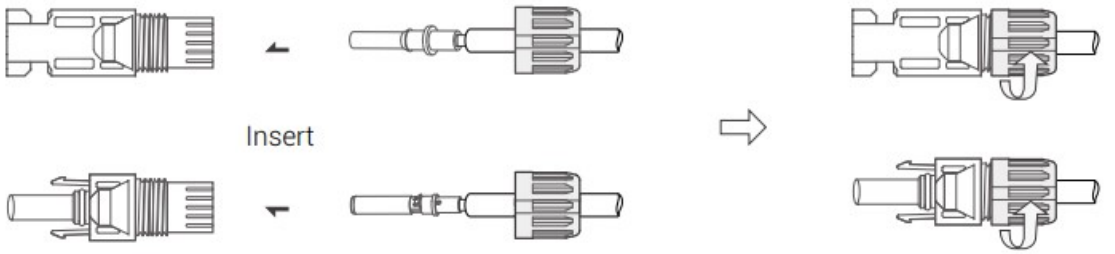


Figure5-4

Step5: Measure PV voltage of DC input with multimeter, verify DC input cable polarity.

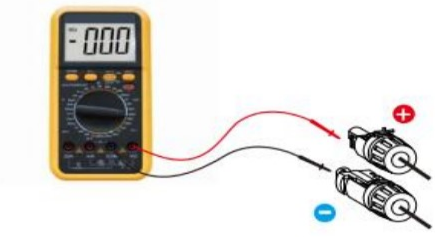


Figure5-5

Step6: Plug the PV conntector into the corresponding PV connector on inverter.

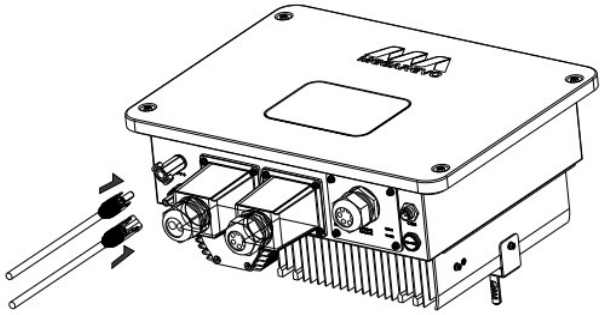


Figure5-6

Caution!

Danger of burn injuries due to hot enclosure parts! If the DC input is misconnected or reversed to cause abnormal work,The correct actions are:

*Use a clip-on ammeter to measure the DC string current.

*If it is above 0.5A, please wait for the solar irradiance reduces until the current decreases to below 0.5A.

*Only after the current is below 0.5A,You can disconnect the PV string.

* In order to completely eliminate the possibility of failure, After the power is turned off, disconnect the PV series to avoid secondary failures caused by continuous power supply of the PV the next day.Please note that any damages due to wrong operations are not covered in the device warranty.

5.3 AC Cable Installation (Grid or Gen)

Step1:Check the grid voltage

(1) Check the grid voltage and compare with the permissive voltage range (Please refer to technical data).

(2) Disconnect the circuit board from all the phases and secure against re-connection.

Step2:Select the appropriate cable and cable lug.A 10AWG and larger cables are recommended for the O5KL1.

Step3: Disassemble the waterproof connector and waterproof cover, and thread the cable through the waterproof connector.

Step4: Wiring

1. Connect the wire to the cold crimp terminal.
2. Remove 18mm of insulation from the end of the wire.
3. Insert the stripped end into the cable lug and clamp it with crimping pliers.

Step5: Insert the terminals into grid ports,loosen or tighten the crimp terminal screws with a one-way screwdriver(The wiring method of the generator is the same as that of the power grid).

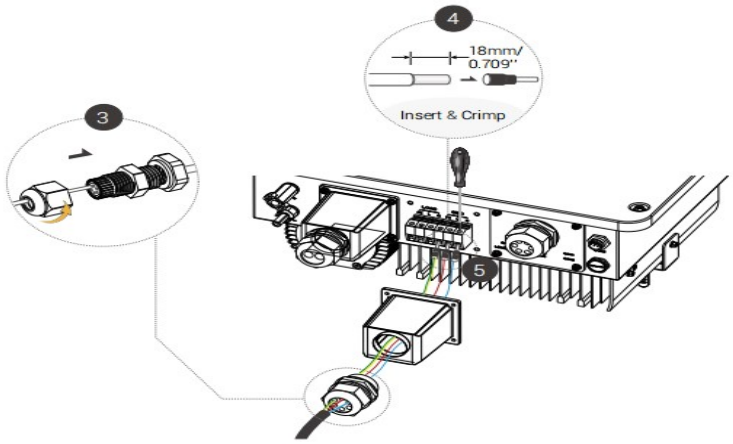


Figure5-7

5.4 AC Cable Installation (LOAD)

- The inverter has grid-connected and off-grid functions, and outputs power through the load port.When the inverter is off the grid,users need to open "Offgrid enable"function， the battery supplies power to the load.
- In a standard PV installation for an inverter, it typically involves connecting the inverter to both solar panels and batteries. The”Offgrid enable”function is not recommended for use in systems that are not connected to batteries. Failure to follow this instruction will void the standard warranty, and the user will be held liable for any related consequences.
- Offgrid inverters can provide overload output, Refer to the technical parameters of the inverter for details. The inverter is equipped with self-protection against high ambient temperatures.
- For complex applications or special loads, please contact our aftersales support.

Note!

In case of discrepancies between wiring mode of local policy and the operation guide above， especially for the wiring of neutral line, grounding and RCD, please contact us before any operation.

Load Connection:

Install an AC circuit breaker on the load output cable for safety,Circuit breakers 32.6A and larger are recommended for the O5KL1.

Note:

The absence of an AC circuit breaker in the event of an electrical short circuit in the load measurement will cause damage to the inverter.

Step1： Select the appropriate cable and wire connector,A 10AWG and larger cables are recommended for the O5KL1.

Step2： Disassemble the waterproof connector and waterproof cover, and thread the cable through the waterproof connector.

Step3: Wiring

1. Connect the wire to the cold crimp terminal.
2. Remove 18mm of insulation from the end of the wire.
3. Insert the stripped end into the cable lug and clamp it with crimping pliers.

Step 4 : Insert the terminals into load ports (loosen or tighten the crimp terminal screws with a one-way screwdriver).

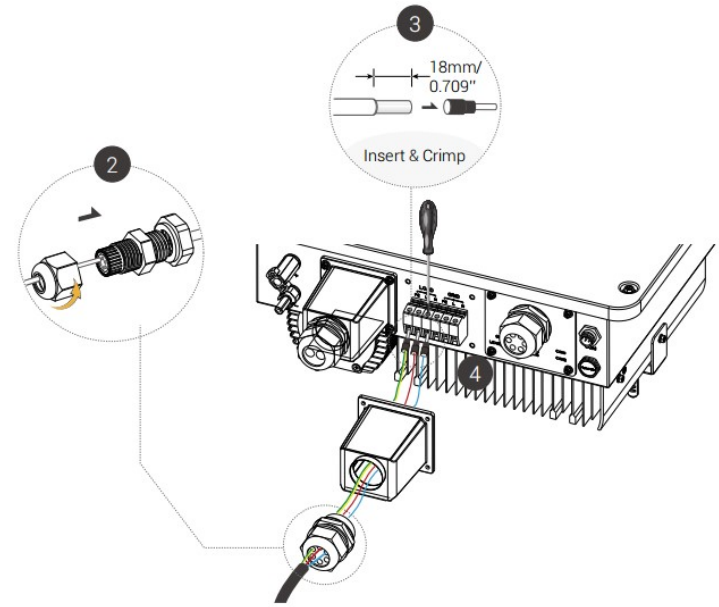


Figure5-8

Warning!

Ensure that the load output power is within its rated power,otherwise the inverter will shut down with an“over load” warning.

When "overload" occurs, adjust the load power to ensure that it is within the load output power range before turning on the inverter.

For nonlinear loads, make sure the surge power is within the load output power range.

5.5 Battery Cable Installation

The charging & discharging system of inverter is designed for 48V lithium battery.Before choosing battery, please note the maximum voltage of battery can not exceed 56V and the battery communication should be compatible with inverter.

Battery breaker：

Before connecting to battery, please install a no-polarized DC breaker to make sure inverter can be securely disconnected during maintenance,A 100A DC circuit breaker is recommended for the O5KL1.

Battery connection diagram：

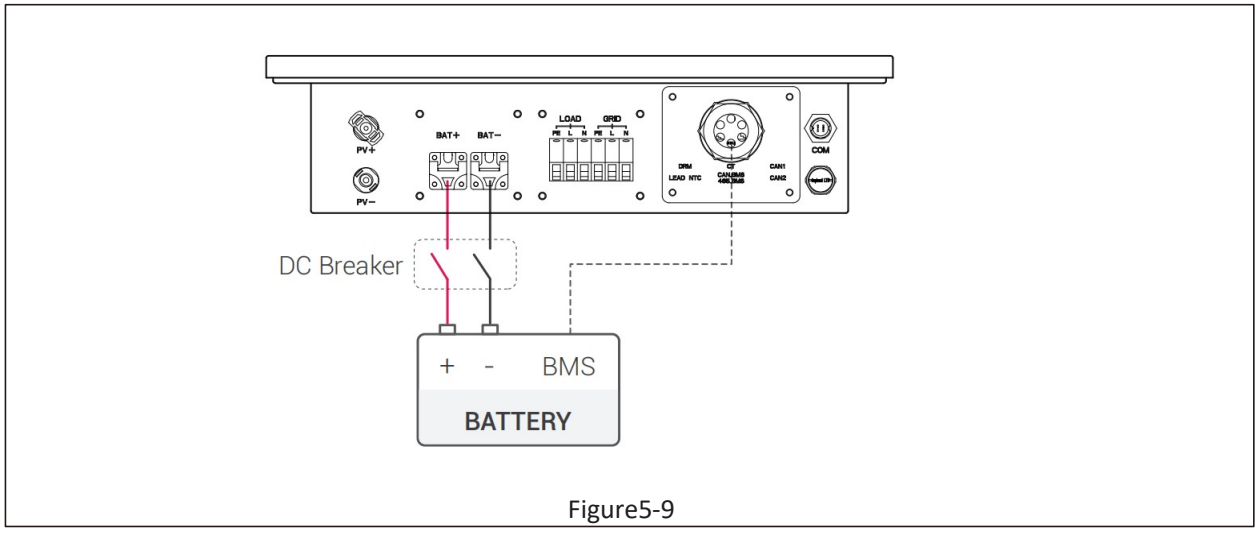
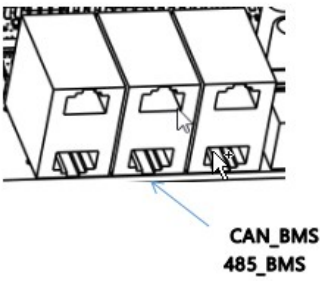


Figure5-9

BMS PIN Definition：

The communication interface between inverter and battery is RS485 or CAN with a RJ45 connector.



CN10

	1	2	3	4	5	6	7	8
CAN	X	X	GND	CAN_BMS_H	CAN_BMS_L	X	X	X
RS485	X	X	X	X	X	GND	RS485_BMSA	RS485_BMSB

Table 5.2

Note!

The battery communication can only work when the battery BMS is compatible with the inverter.

Battery connection steps:

Step1: Select the appropriate cable and O-terminal with an M6 bore,3AWG and larger cables are recommended for the O5KL1.

Step2: Disassemble the waterproof connector and waterproof cover, and thread the cable through the waterproof connector.

Step3: Wiring

1. Connect the wire to the cold crimp terminal.
2. Remove 18mm of insulation from the end of the wire.
3. Insert the stripped end into the O-terminal with an M6 bore and clamp it with crimping pliers.

Step 4 : Insert the terminals into battery ports(loosen or tighten the crimp terminal screws with a one-way screwdriver).

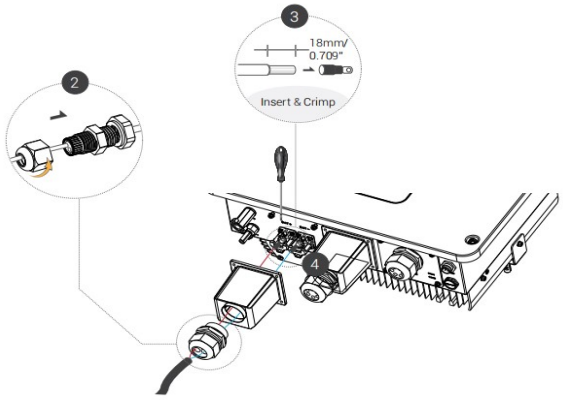


Figure5-10

Note!

Positive and negative lines are not allowed to reverse.

BMS connection steps:

Step 1: Disassembly of waterproof connector and waterproof cover.

Step 2: Prepare a communication cable (without sheath) and pass the cable through the waterproof connector.

Step 3: Insert the RJ45 connector into the BMS port of the inverter.

Step 4: Assemble waterproof connectors and waterproof cover.

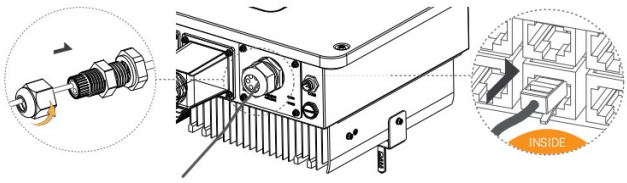


Figure5-11

Note!

The seal is for waterproofing. Please make sure it is put back in.

5.6 CT Installation instructions

CT is short for“current transform”,is used to detect Grid current .

Note!

- If CT is not installed or installed reversely, the functions of "Anti-reflux", "Self-Consumption", "Peak-shift "… will not be realized.
- The direction of the arrow on the CT points from this inverter to the GRID!
- When connected to single-phase power grid , and the CT is connected to L phase.

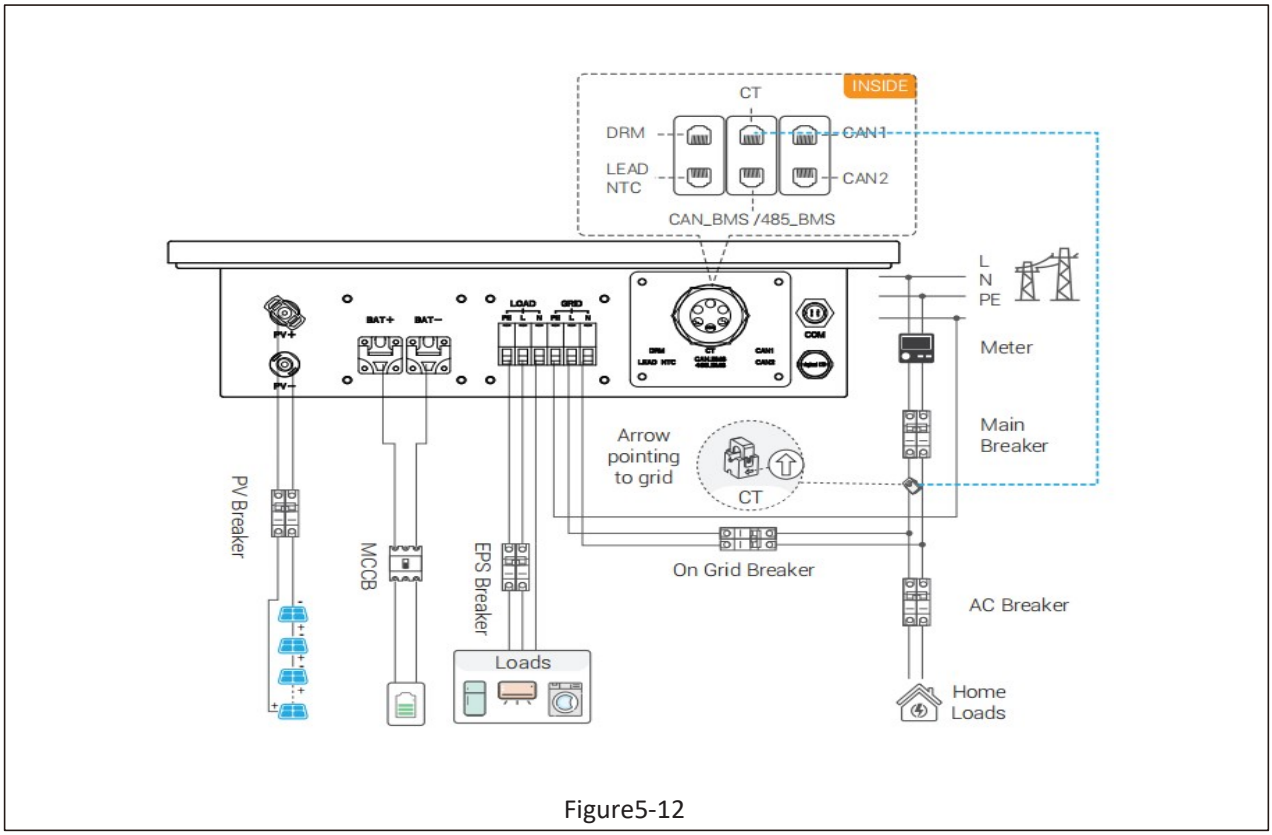


Figure5-12

CT connection steps:

Step 1: Disassembly of waterproof connector and waterproof cover.

Step 2: Prepare a communication cable (without sheath) and pass the cable through the waterproof connector.

Step 3: Insert the RJ45 connector into the CT port of the inverter.

Step 4: Assemble waterproof connectors and waterproof cover.

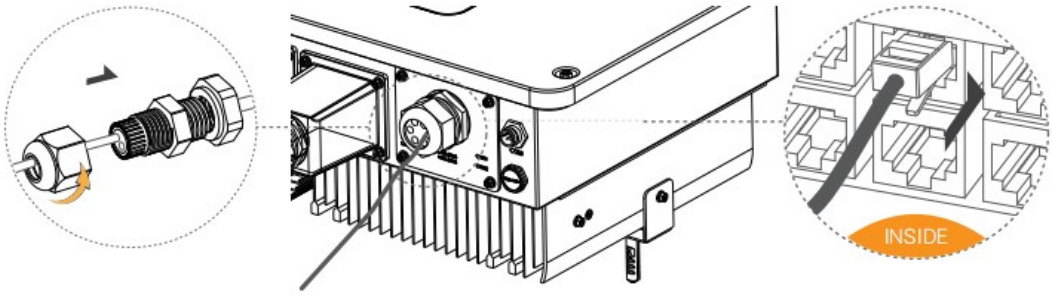


Figure5-13

Note!

The seal is for waterproofing. Please make sure it is put back in.

5.7 WiFi Connection (optional)

The inverter provides a WiFi port which can collect data from inverter and transmit it to monitoring-website by WiFi.

Purchase the product from supplier if needed.

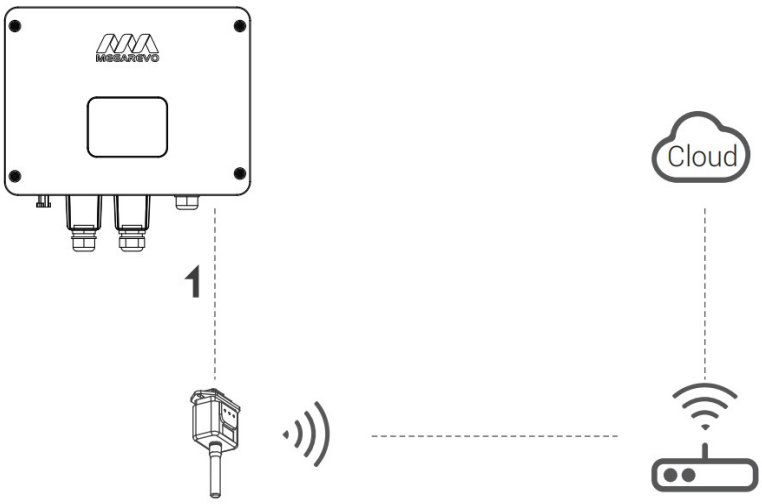


Figure5-14

WIFI connection steps:

Step1： Assemble WIFI adaptor to COM port at the bottom of the inverter.

Step2： Establish the connection between the inverter and the router.

Step3： Create a user account online(Please check the " WIFI adaptor user manual" for more details).

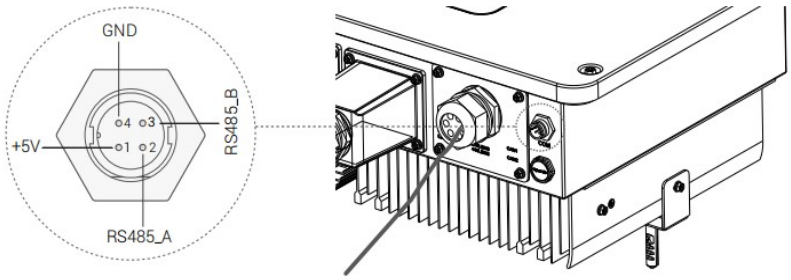


Figure5-15

5.8 Inverter Parallel Guide

5.8.1Parallel System Diagram

Multiple inverters can be installed together in parallel to provide more power.When AC loads are present, all units effectively share the load. The system diagram is as follows.

NOTE:

If using Common CT connection Method, Please contact your dealer to purchase a larger capacity CT to ensure sampling accuracy.

1.The BMS port: BMS communication for lithium batteries.

2.The CT port: For external grid side CT to detect current size.

3.CAN port: parallel port.

For parallel communication, CAT 6 cables are needed. The units should be connected hand by hand. When using common batteries, BMS cable needs to be connected to the master unit. THE inverter shares the BMS information by inter -unit parallel communication cable.

For details about how to configure parallel devices, see 7.1.3 Setting Option (2) Parallel Settings.

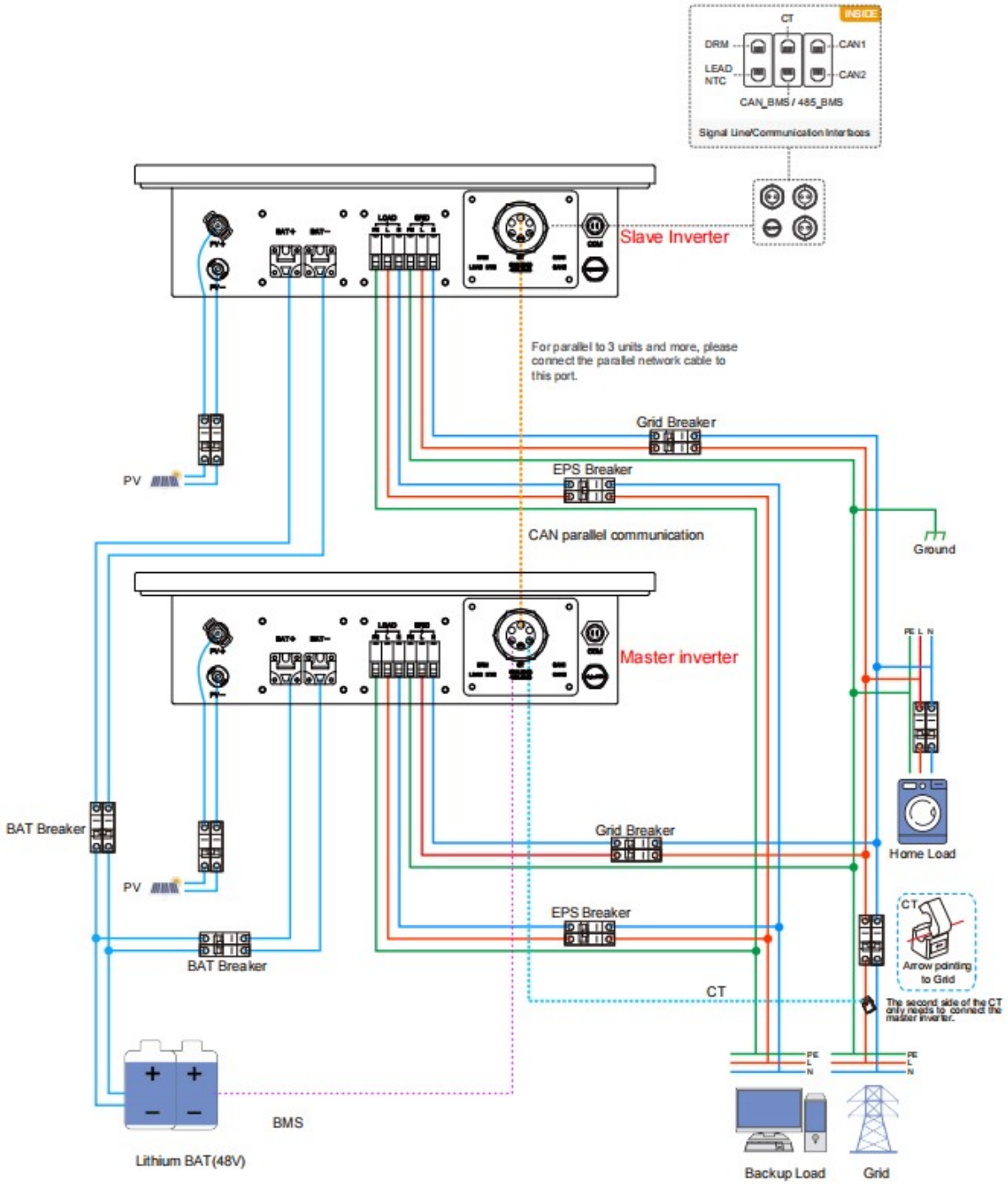

CT
INSIDE
DRM
LEAD
NTC
CAN1
CAN2
CAN_BMS / 485_BMS
Signal Line/Communication Interfaces
Slave Inverter
For parallel to 3 units and more, please connect the parallel network cable to this port.
Grid Breaker
EPS Breaker
PV
CAN parallel communication
Ground
Master inverter
PE L N
Home Load
BAT Breaker
Grid Breaker
PV
EPS Breaker
CT
Arrow pointing to Grid
The second side of the CT only needs to connect the master inverter.
BAT Breaker
CT
BMS
Lithium BAT(48V)
Backup Load
Grid

Figure5-16

5.8.2 Parallel use matters

1.Make sure all the units in parallel are with the same software version.

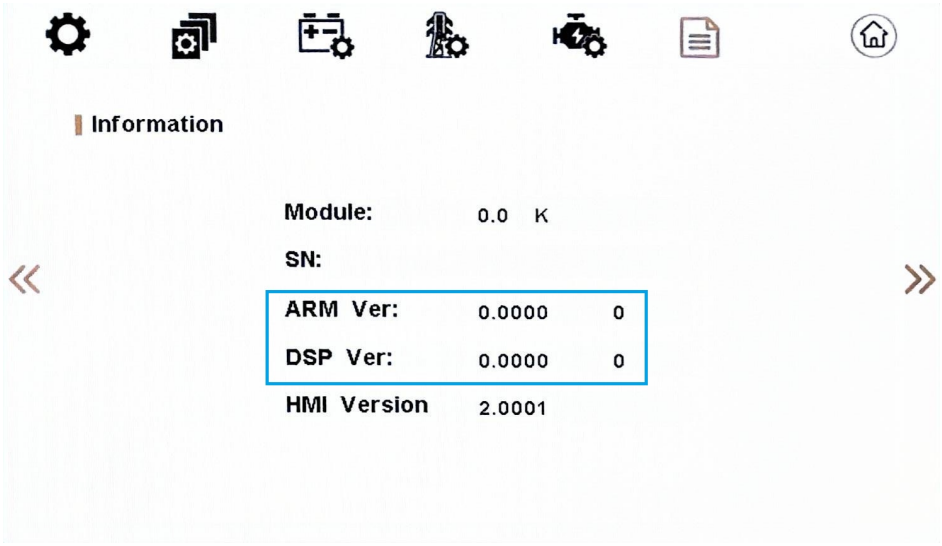


Figure5-17

2.Connect the loads of the two inverters together first. It should be noted that the grid power line and the load line of the two inverters should be roughly the same length.If user wants to add grid /load ac breaker, please make sure the lines are paralleled/jointed before connected to breaker.

3.Make sure the CT Limiter sensor is installed properly.

4.Please note that the slaver unit will be in the same work mode automatically as the master unit.

5.Only the parallel connection of shared batteries is supported. The BMS communication must be connected to the host.

6.The photovoltaic input source is independent, and the grid is shared.

7.Set the master and slave servers, number of parallel servers, and address of parallel servers.

6.Inverter Configuration

Start inverter after checking all the following:

· Ensure all the devices are accessible for operation, maintenance and service.

· Check and confirm that the inverter is firmly installed.

· Space for ventilation is sufficient for one inverter or multiple inverters.

· Nothing is left on the top of the inverter or battery module.

· Inverter and accessories are correctly connected.

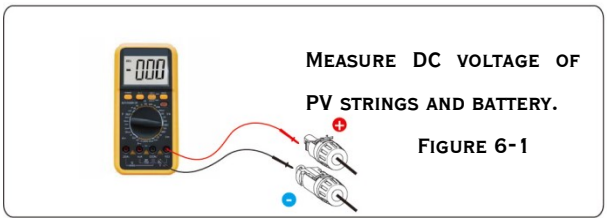
· Cables are routed in safe place or protected against mechanical damage.

· Warning signs and labels are suitably affixed and durable.

· Switch on the external AC breaker to power on the inverter control board.

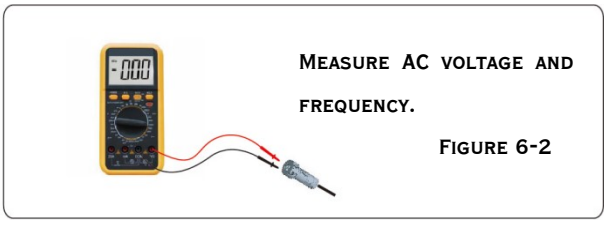
· Measure DC voltage of PV strings and battery and ensure the polarity is correct.

· Measure AC voltage and frequency and ensure they are within local standard.



MEASURE DC VOLTAGE OF PV STRINGS AND BATTERY.

FIGURE 6-1



MEASURE AC VOLTAGE AND FREQUENCY.

FIGURE 6-2

Starting inverter:

· Inverter will start automatically when the PV panel generate enough energy or the battery is charged.

· Check the status of LCD screen, the LCD screen should display the main interface.

· If the LCD screen reports a fault or alarm, please check the below:

-All the connections are right.

-All the external disconnect switches are closed.

· Enter the setting interface.

· Setting grid standards, Set the PV connection mode, set the working mode, sSet the battery type.

Shut down inverter:

· Disconnect the external AC circuit breaker and secure it against reconnection.

· Wait about 5 minutes until the capacitors inside the inverter completely discharge.

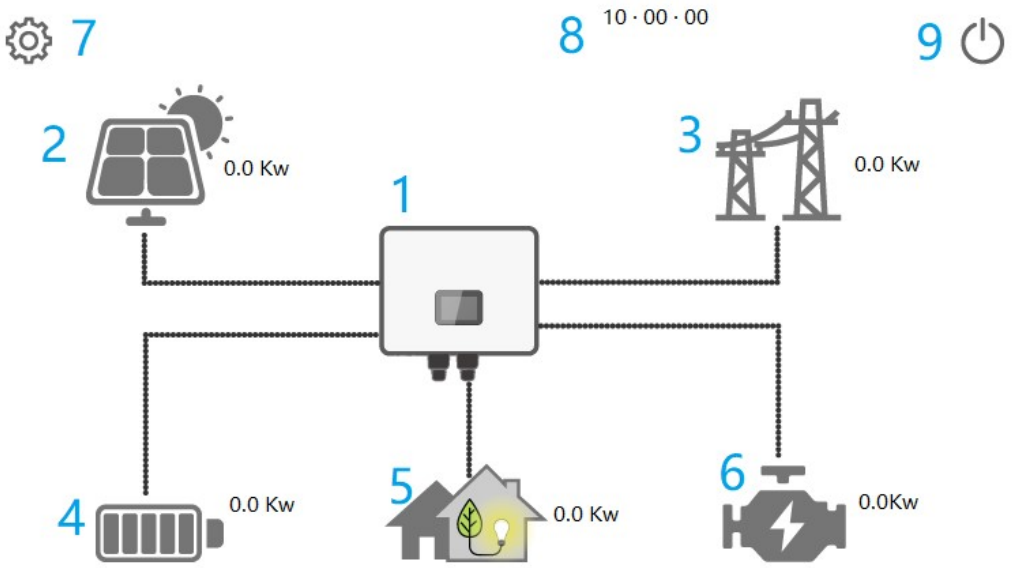
· Ensure that the DC cable is current-free via a current clamp (Figure 6-3).

Figure 6-3

7. Operation

7.1 LCD Operation

7.1.1 Home Page

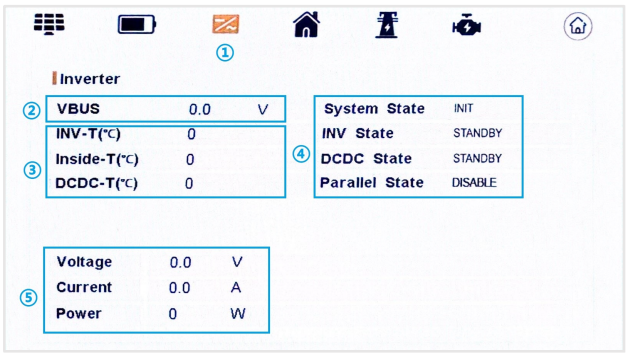


Code	Name	Explanation
①	Energy Storage Inverter	Click Energy Storage Inverter to enter the working status interface of the energy storage inverter,see section 7.1.2(1) for details.
②	PV	Display the real-time PV power. Click PV to enter the working status interface of PV,see section 7.1.2(2) for details.
③	Grid	Display the real-time grid power. Click Grid to enter the working status interface of grid, see section for 7.1.2(3) details.
④	Battery	Display the real-time battery power and percentage of battery surplus capacity from the BMS. Click Battery to enter the working status interface of battery, see section for 7.1.2(4)details.
⑤	Load	Display the real-time load power. Click Load to enter the working status interface of load,see section for 7.1.2(5) details.
⑥	Generator	Display the real-time generator power. Click generator to enter the working status interface of generator,see section for 7.1.2(6) details.

⑦	Setting	Users can click Setting to enter the settings interface,see section 7.1.3 for details.
⑧	Time	Display time.
⑨	Switch	Click the switch to set the switch of the energy storage inverter， see section for 7.1.2(7) details.

7.1.2 Working Status

(1) Energy Storage Inverter



①Users can click on the icon above to switch device status data (PV,Battery,Energy Storage Inverter, Load, Grid,Generator) and return to the Home Page. (not to be repeated later)

② **VBUS**:Real-time voltage of bus capacitor of the machine.

③Temperature

INV-T(℃): INV Temperature.

Inside-T(℃):Internal ambient temperature of the machine.

DCDC-T(℃):DCDC Temperature.

④Display status information, including System status, Inverter status, DCDC status and Parallel State.

System Status: Display complete machine status information, including: INIT, STANDBY, PV GRID, BAT GRID, BYP,AC BAT CHG, HYBRID POW etc.

INV: Displays the inverter status information,including: STANDBY,OFF GRID, GRID, OFF GRID PL, INV TO PFC.

GRID: Grid connected state.

OFF GRID PL: The PFC rectification process of the inverter from off to on.

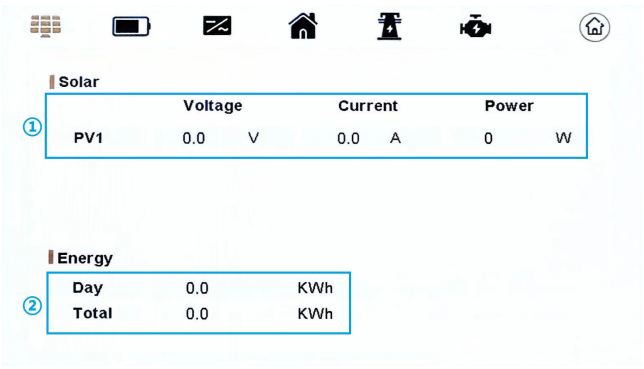
INV TO PFC: Status of power by public grid turn into on grid working mode.

DCDC Status : Displays charging and discharging status information,including: STANDBY, CHARGE, DISCHARGE.

Parallel State： Display the parallel status of the inverter,including: DISABLE,MASTER,SLAVE.

⑤The voltage, current, and power of the inverter side are displayed in real time.

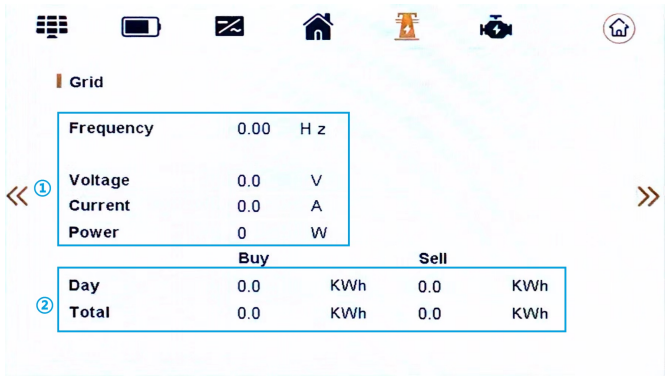
(2) PV



①Real-time display of PV voltage, current, power.

②Display the cumulative charging capacity of the PV, including daily and total accumulated energy.

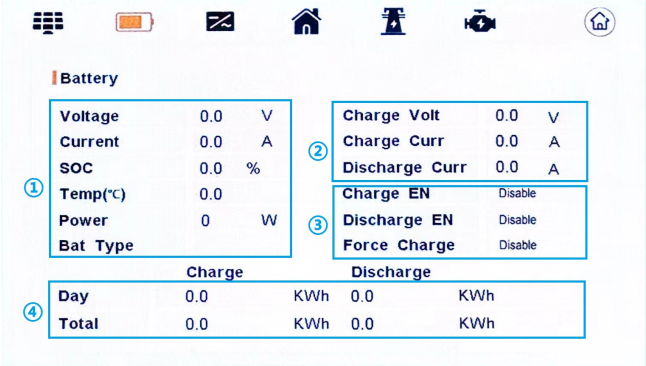
(3) Grid



①Display the working parameters on the grid, including Frequency, voltage, current, and power.

②The accumulated energy purchased by the device from the power grid, including the daily accumulated energy and the total accumulated energy.

(4) Battery



①Display the working parameters of the battery, including real-time voltage, real-time current, battery surplus capacity, battery temperature, battery power, and battery type.

②Display the maximum charge voltage, maximum charge current, and maximum discharge current transmitted by the battery BMS.

③Three working states of batteries （from BMS）, including charging, discharging, and forced charging.

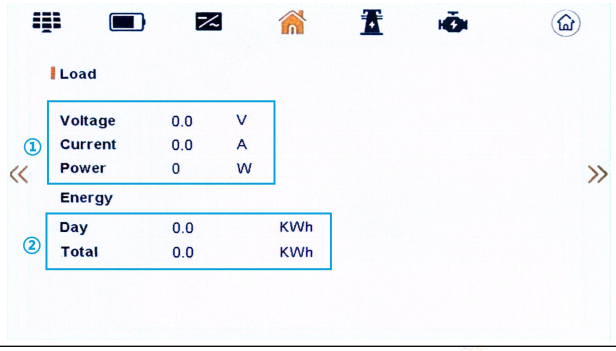
Charge EN：Charge Enable Discharge EN：Discharge Enable

④Accumulated discharge and charging capacity of the battery,including daily and total accumulated energy.

(5) Load

Load/Page One

Load

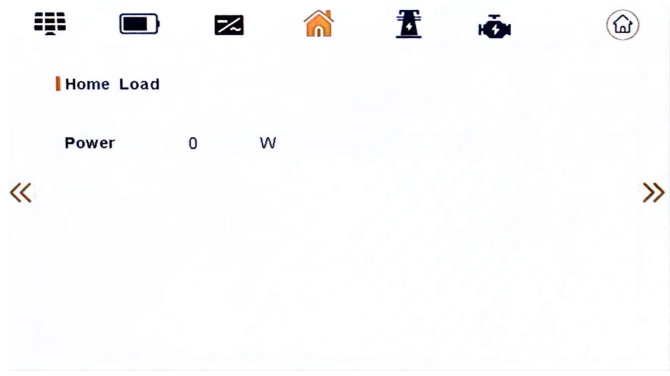


User can click « to return to the previous page, and click » to enter the next page .(not to be repeated later)

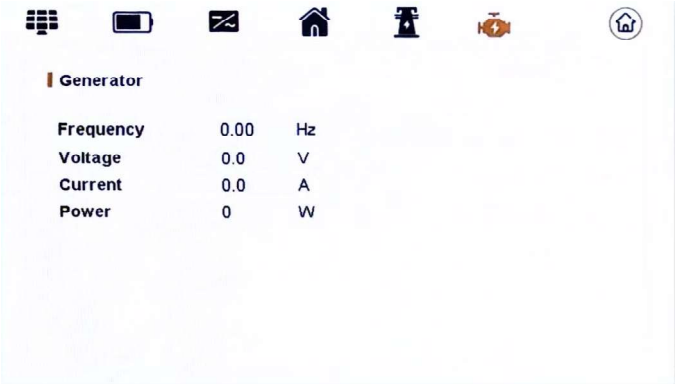
①Display the working parameters of the load, including real-time voltage, current, and power.

②Accumulated usage of load,including daily and total accumulated energy.

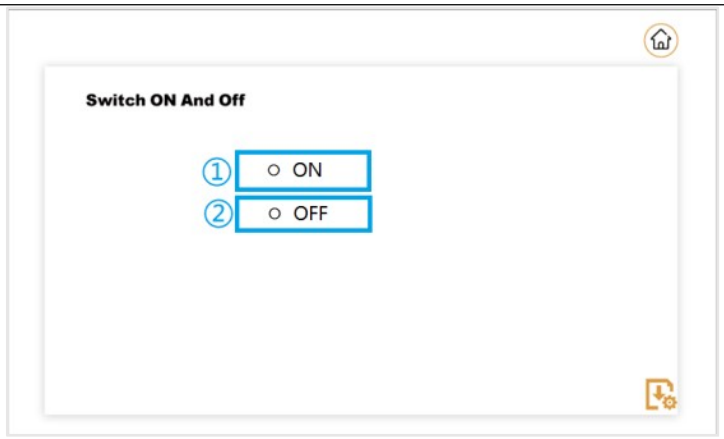
Load/Page Two

Load

When set Home load EN to "ENABLE", if you have a load connected to the mains port, you can see its Home load power.

(6) Generator


Displays the operating parameters of the generator, including real-time frequency, voltage, current, and power.

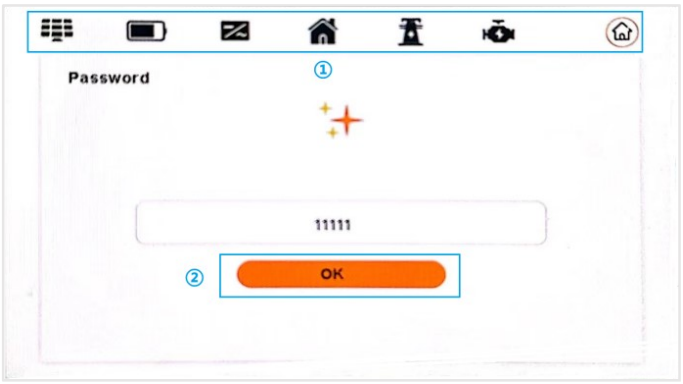
(7) Switch


①Power on,The energy storage inverter works. ②Power off， The energy storage inverter stops working.

7.1.3 Setting

Enter Setting

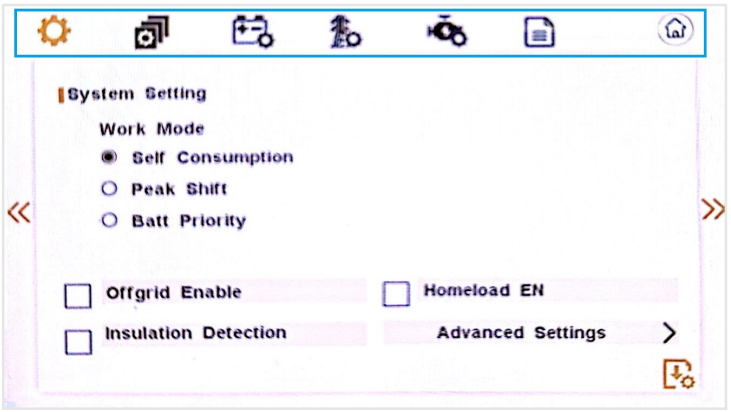
(1) Input password



①Users can click on the icon above to enter device status data (**PV**,**Battery**,**Energy Storage Inverter**, **Load**, **Grid**, **Generator**) and return to the Home Page.

②To enter the settings, a password is required. The default password is “11111”. Click OK to enter the settings interface.

(2) Enter the settings interface



Users can click on the icon above to switch between setting options, machine related information, and return to the Home Page.

: System Setting : Parallel Setting : Battery Setting

: Grid Setting : Generator Setting

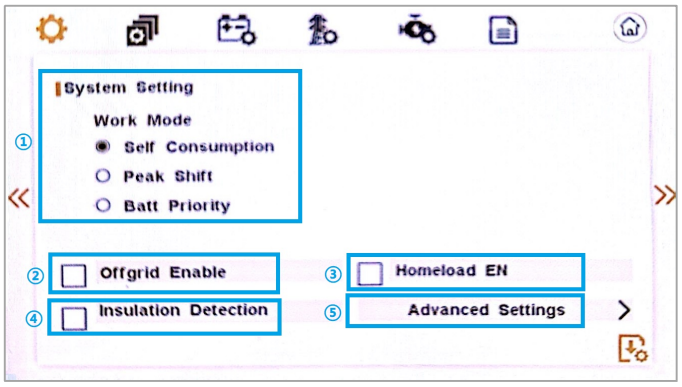
: Machine Information : Return Home Page

: After modifying the parameters, the user needs to click on this icon to confirm the modification.

Setting Option

(1) System Setting

System Setting/ Page One:



①Users have three working modes to choose from, Self Consumption, Peak Shift, and Battery Priority.

②**Offgrid Enable**：When the Grid and PV are powered off, Enable the battery to supply power to the load, default option is enable.

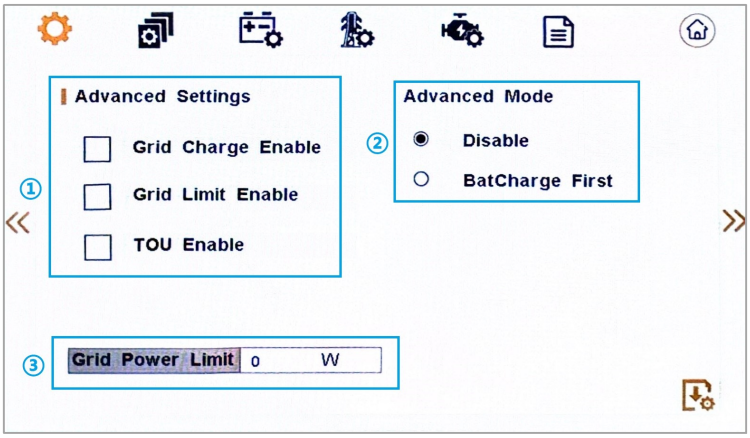
③**Homeload EN**： Enable home load statistics.

④**Insulation Detection**： Insulation detect (The default option is enabled). When the insulation detection function is enabled in the grid connected state, the insulation detection is performed once a day when the photovoltaic energy comes in, and the inverter switches to the By-pass band load. If the inverter is off-grid, the output will be disconnected during insulation detect and the load will stop working.

⑤Advanced Settings

Users can click to  enter the advanced settings interface.

Advanced Settings/ **Page One**：



①Users have three advanced settings to choose from, namely Grid Charge Enable,Grid Limit Enable and TOU Enable.

Grid Charge Enable: In advanced mode, the grid will charge the battery only if this option is checked.

Grid Limit Enable: The Grid Power Limit function takes effect only when you check it.

TOU Enable: Users need to check TOU Enable to enter the work mode of Time-of-use Enable.

②Advanced Mode：

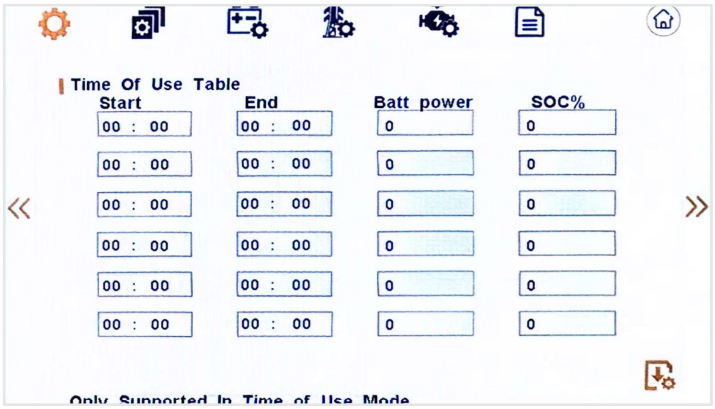
There are two options here: Disable Mode and BatCharge First Mode. The advanced mode takes effect only in automatic self Consumption mode.

Disable: When the user selects "Disable",BatCharge First is invalid.

BatCharge First： In this mode, the PV will provide energy to the battery first, and the excess energy will be provided to the load output.

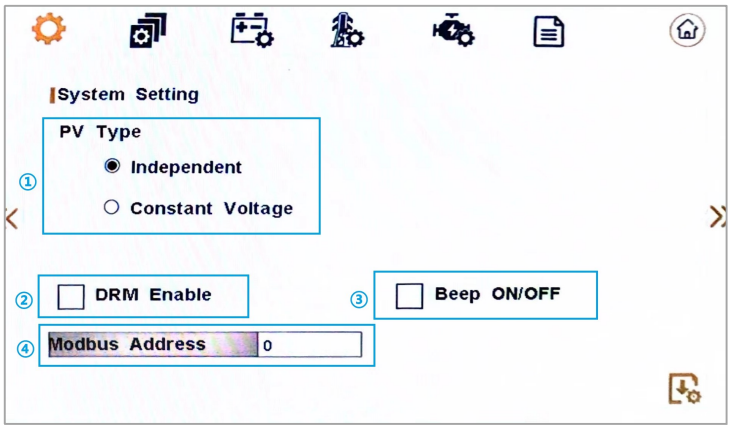
③**Grid Power Limit:** When insufficient PV energy has been provided to the load, the priority is to provide energy from the grid, and the remaining energy is provided from the battery.

Advanced Settings/**Page Two：**



Time of Use Table : There are 6 charging periods to set. If grid charge is enabled, the PV and grid together provide specific battery power values to charge the battery to the target SOC.

System Setting/Page Two:



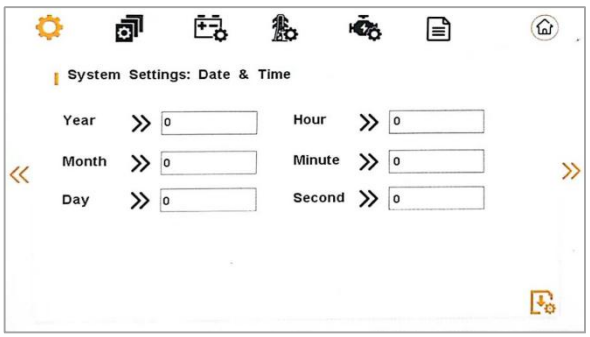
①Users can set PV types, including **Independent** and **Constant Voltage.**

②**DRM Enable:** Enable or Disable Demand Response Modes.

③**Beep ON/OFF:**Users can enable or disable the beep function, which takes effect when the inverter alarms.

④**Modbus Address:**The default modbus address is 1. User can change the address as required.

System Setting/Page Three:

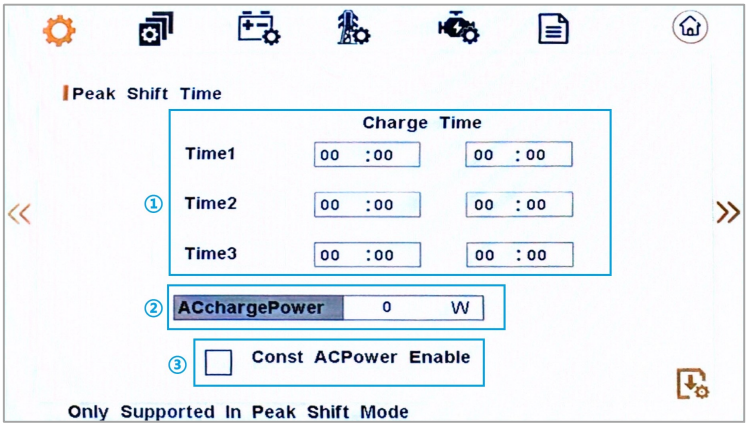


Date and Time settings

Users can manually modify the year, month, day, hour, minute and second.

The year input range should be between 2000 and 2099.

System Setting/Page Four:

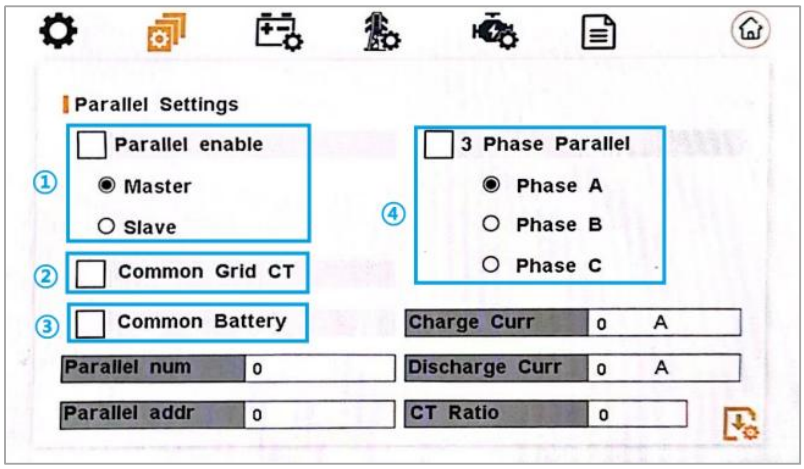


①**Peak Shift Tiom:**When the working mode is Peak Shift,Users can set 3 charging periods, and the maximum allowed setting time is 24 hours (one day).

②**ACchargePower:**This feature only works in Peak shift mode,during the charging period, when the PV is not enough to provide energy to the battery, It will obtain the corresponding energy from the grid according to the power setting value.

③**Const ACPower Enable：** The ACchargePower functions take effect only when this option is selected.

(2) Parallel Setting



①**Parallel enable:** Start or disable the parallel function.

Master/Slave: This interface is used for parallel, and the inverter is selected as the master or

slave.

②**Common Grid CT:** Enable or disable CT sharing.

③**Common Battery:** Enable or disable Battery sharing.

④**3 Phase Parallel:** Enable or disable group 3 phase enable.

PHASE A/B/C: This interface is used to select the output phase of the device when three phases are used.

Parallel num: This operation is used to select the number of parallel machines.

Parallel addr: This interface is used to select the parallel address, the host address is set to 1 by default, there is a slave, and the slave is set to 2; If there are two slaves, the slaves are set to 2 and 3 respectively; the address settings of each inverter cannot be the same.

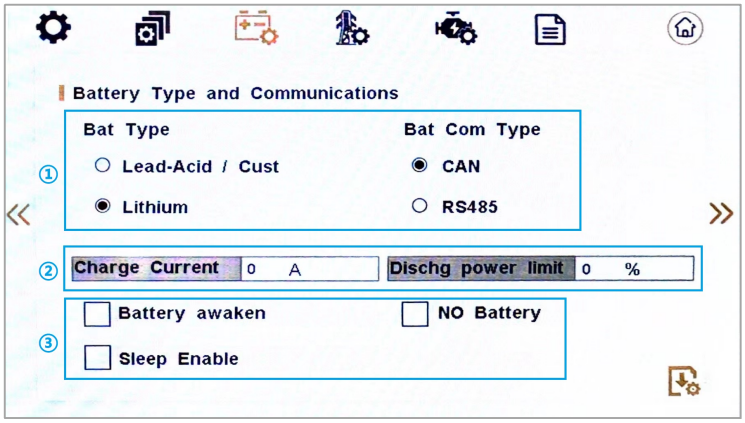
CT Ratio: Set the detection ratio of CT.Set the CT ratio to 1000:1 by default.

Charge Curr: Set the battery charging current for the parallel machine.

Discharge Cur: Set the battery discharge current for the parallel machine.

(3) Battery Settings

Battery Settings/Page One



①Set Battery Type and Battery Communication method

Users can choose the **battery type** is lead-acid battery/lithium battery, and the **battery communication** method is CAN/485.The default option is CAN.

②Users can manually input the value of charging current and discharge power limit.

③**Battery wakeup** :

When the battery is low and the battery relay has been disconnected, the inverter will send instructions to the battery forcibly sucking relay by BMS, and the inverter will charge.

The default option is disabled. (Partial battery support)

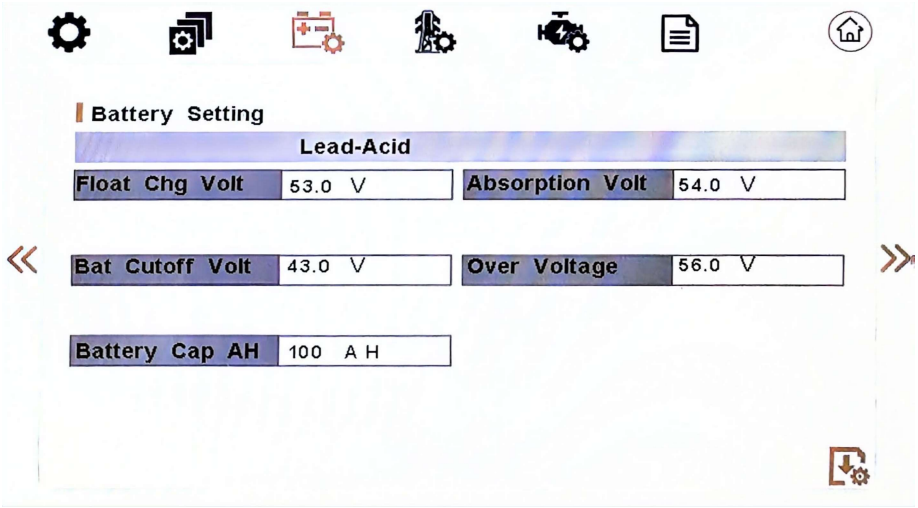
If you want to use this feature, please consult the battery brand supported by the dealer. Use it only when the battery is too low.

After the battery wakes up successfully, please turn off the function, otherwise it will affect the normal operation of the machine.

NO Battery： If you select this option when the battery is not connected, no battery alarm will be generated.

Sleep Enable: If this function is enabled during grid connection, the DC-DC does not work and the battery does not provide energy for the load.

Battery Settings/Page Two



Settings required when using lead-acid batteries

Float Chg Volt: Charge the battery with constant voltage and small current (This interface is used to set the lead acid battery charging voltage. (The input value ranges from 40 to 56)Set the floating charge voltage to be less than the constant charge voltage).

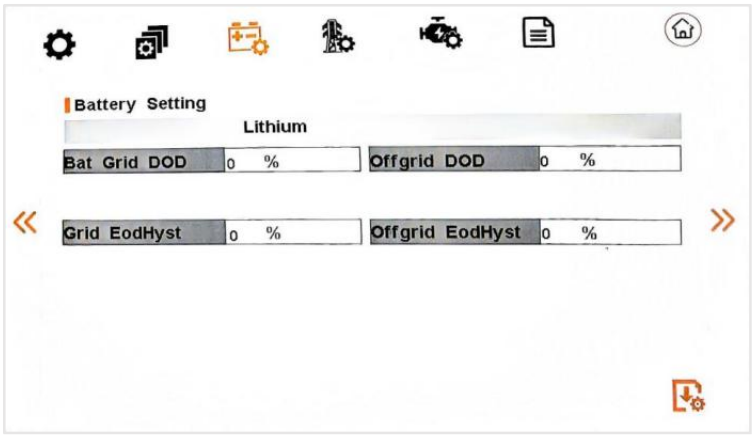
Bat Cutoff Volt: Discharge protection voltage (This interface is used to set the lead acid battery discharging voltage(The input value ranges from 40 to 51) Discharge cut-off voltage, as recommended by the battery manufacturer).

Battery Cap AH: Battery capacity (This interface is used to set the lead acid Battery capacity. It is related to the input power. (The input value ranges from 50 to 1000) The battery capacity setting will affect the maximum charging current, for example, set 100Ah, the maximum charging current is 100A*0.2=20A).

Absorption Volt: Charge the battery with constant current.

Over Voltage: Charging protection voltage (This interface is used to set the lead acid battery Charge protection voltage. (The input value ranges from 50 to 56) Charge protection voltage, as recommended by the battery manufacturer).

Battery Settings/Page Three



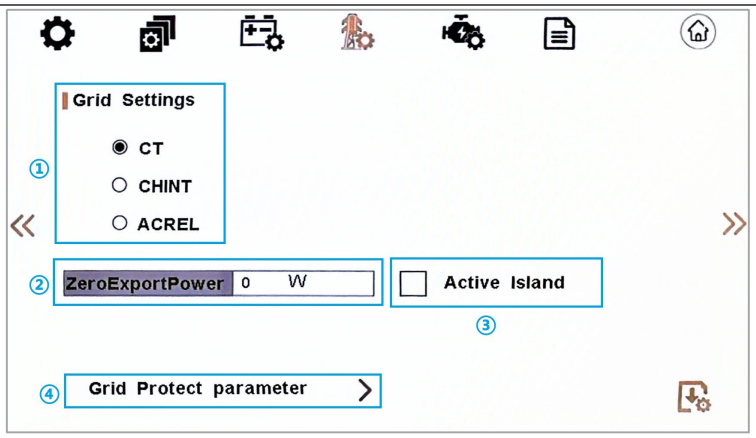
Settings required when using lithium

Bat Grid DOD/ Off-grid DOD: When the battery discharge is higher than the threshold, the inverter generates a battery low voltage alarm and stops discharging. When the device is off-grid, the PV supplies energy to the battery but not to the load until the alarm is cleared. When the device is on-grid, the inverter stops working until the alarm is cleared.

Grid Eod Hyst:/Off-grid Eod Hyst: When the low voltage alarm is generated, you need to provide energy to the battery. When the battery level is higher than the set value, the alarm is cleared and the battery can continue to discharge.

(4) Grid Setting

Grid Setting/Page one



①Users can choose to use **CT** or electricity meter to detect the grid current, currently supported by the grid manufacturers **CHINT** and **ACREL**.

②**ZeroExpower:**If the sampling error occurs when there is no power in the grid, the user can set the corresponding value to correct it.

③**Anti-Island**: Anti-Islanding(The default option is enable)

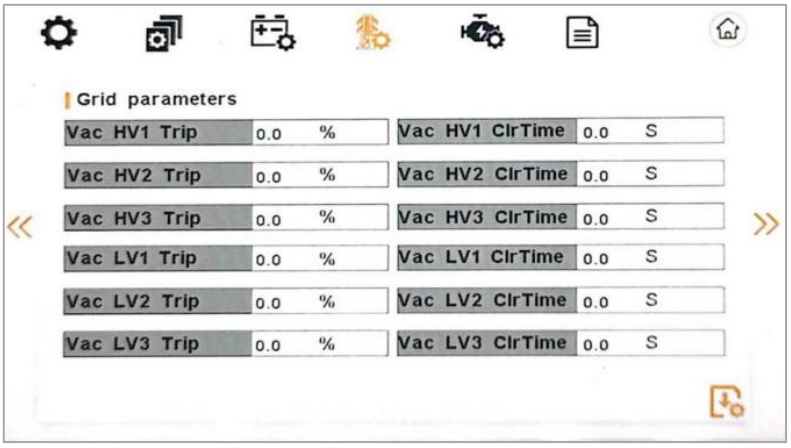
When the grid goes down, inverter will detect the loss of power and disconnect from the grid within milliseconds. It prevents your solar panels from feeding electricity into a downed power line.

④**Grid Protect parameter**

Users can click to Grid Protect parameter > enter the advanced settings interface.

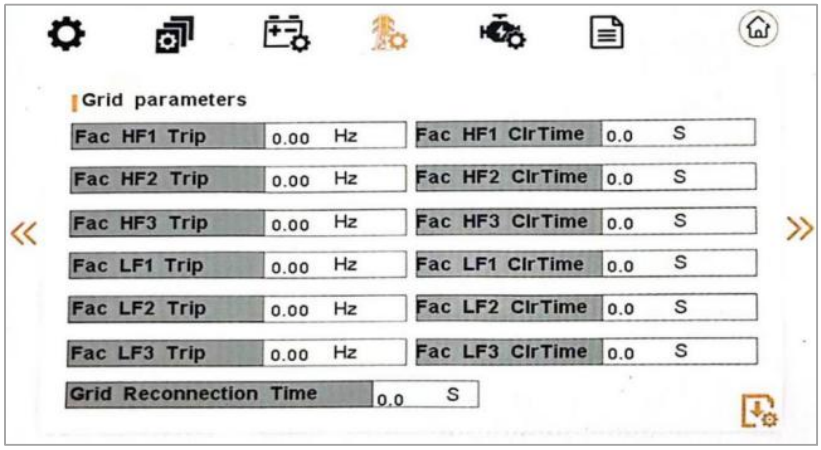
Grid parameters/page one:

On this page, users can set overvoltage protection, overvoltage protection time, undervoltage protection, and undervoltage protection time.When grid standards are set, these values are automatically updated according to local safety regulations.

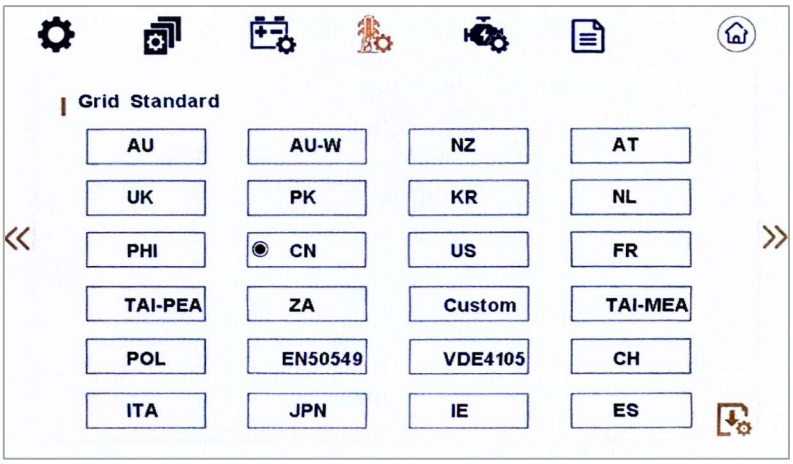


Grid parameters/page two:

On this page, users can set overfrequency protection, overfrequency protection time, underfrequency protection, underfrequency protection time, and grid reconnection time.When grid standards are set, these values are automatically updated according to local safety regulations.



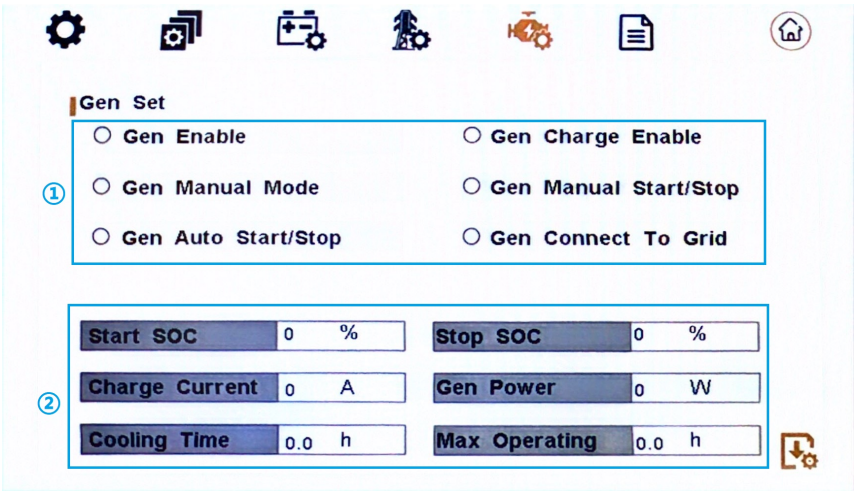
Grid Setting/Page Two



This interface is used to select Grid standard. User can set and switch grid standards according to their needs.

AU: Australia	AU-W: Western Australia	NZ: New Zealand	AT：Austria
UK: United Kingdom	PK: PAKISTAN	KR: Korea	NL：Netherlands
PHI: Philippines	CN: China	US: America	FR：France
TSAIL: THAILAND	ZA: South Africa	Custom: User defined	TAI-MEA:Thailand
POL: Poland	EN50549	VDE4105	CH：Switzerland
ITA: Italy	JPN: Japan	IE: Ireland	ES：Spain

(5) Generator Setting



①Diesel generator enable settings:

Gen Enable: Enable control of the Generator function.

Gen Chare Enable: Generator Charge Enable control.

Gen Manual Mode: If the user wants the Generator to be controlled manually, enable it (Manual control enable and automatic control enable are mutually exclusive when set).

Gen Manual Start/Stop:The on/off command in manual control mode.

Gen Auto Start/Stop: If the user wants the Generator to be automatically controlled to start and stop through the dry contact, please enable it.

Gen Connect to Grid: Connect the diesel generator to the power grid input port to enable the generator parameters to take effect. If the generator is not enabled, the power grid is enabled by default.

②Diesel generator parameter setting:

Start SOC: When the SOC of battery is lower than the setpoint， the Generator dry contact is enabled and Generator Manual operation is disabled, the connected Generator will be started.

Stop SOC: When the SOC of battery is higher than the set point, the Generator dry contact is enabled and Generator Manual operation is disabled, the connected Generator will be stopped (START SOC < STOP SOC).

Charge Current: It indicates the maximum current that the inverter charges the battery from Generator.

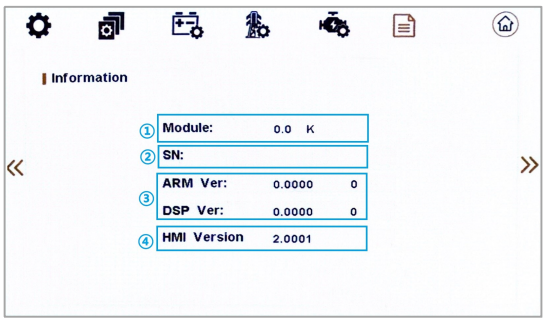
Gen Power: Rated power of Generator.

Cooling Time: It indicates the waiting time of the Generator to restart after it has reached the running time. The unit is 0.1 hour.

Max Operating: It indicates the longest time Generator can run in one day, when time is up, the Generator will be turned off. The value 240 means 24hours in which state the Generator will not be shut down all the time. The unit is 0.1 hour.

(6) Machine Information

Machine Information/Page One



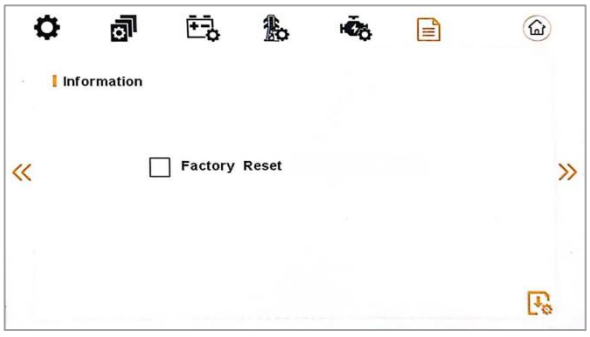
①Show inverter model.

②Energy storage inverter serial number.

③Show Software version.

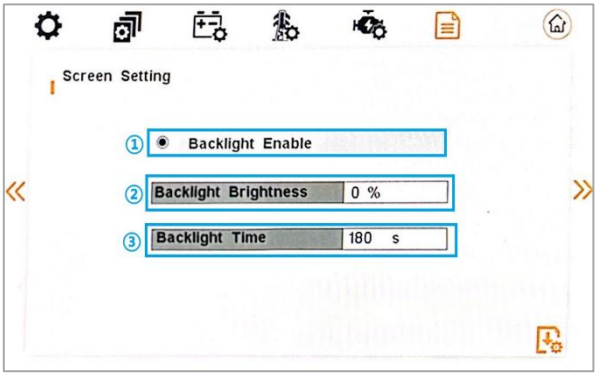
④Display HMI version

Machine Information/Page Two

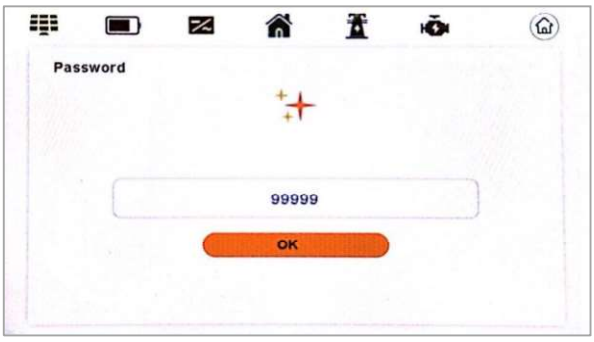
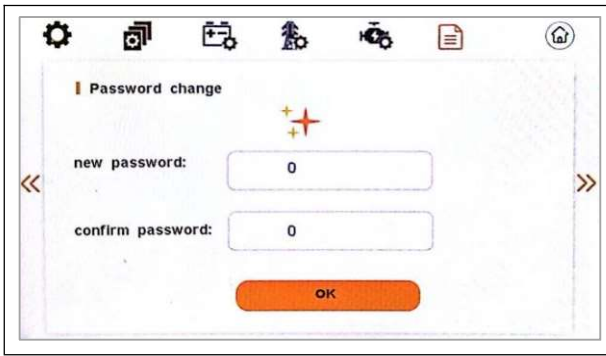


This interface is used to reset the inverter.

Machine Information/Page Three

	①LCD backlight is enabled. It is enabled by default. ②Backlight brightness adjustment. The default value is 0, and the value ranges from 0 to 100%. ③Backlight time setting. The default value is 180s.and the value ranges from 5 to 250s.

(7) Administrator account

	Users can set “99999 to enter the administrator account ,change the initial password.
	Click on Machine Information Page four , Change the default password. This page is displayed only when you enter the administrator account.

8.APP Operation

8.1 Home Page

The home page includes Wi-Fi configuration , Logger Diagnostics, Local Mode, Re factory, Language toggle (click it on the top right corner to switch languages), and Change API.

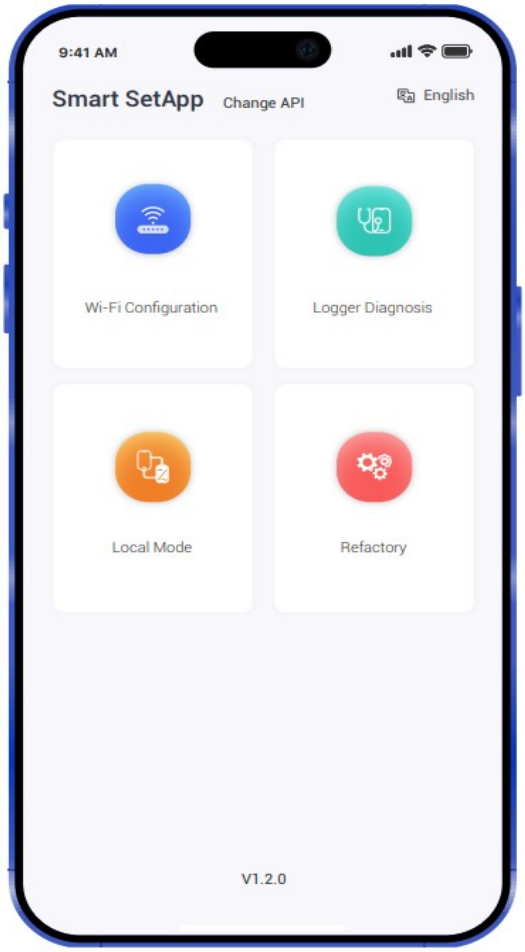


Figure 8-1

When using the Smart Set app, the goal is to be able to view the relevant status of the device in real time and control it wirelessly.
The APP provides the user with two types of connectivity, IoT remote mode (configured by the user according to the SOLARMAN Smart APP's user manual) and local mode.

8.2 Local Mode

8.2.1 Add a Logger

Click on Local Mode, it will immediately jump to the scanningnterface. Scan to enter logger SN (You can find logger SN in the external packaging or on the logger body) or click Enter SN to manually enter the SN.

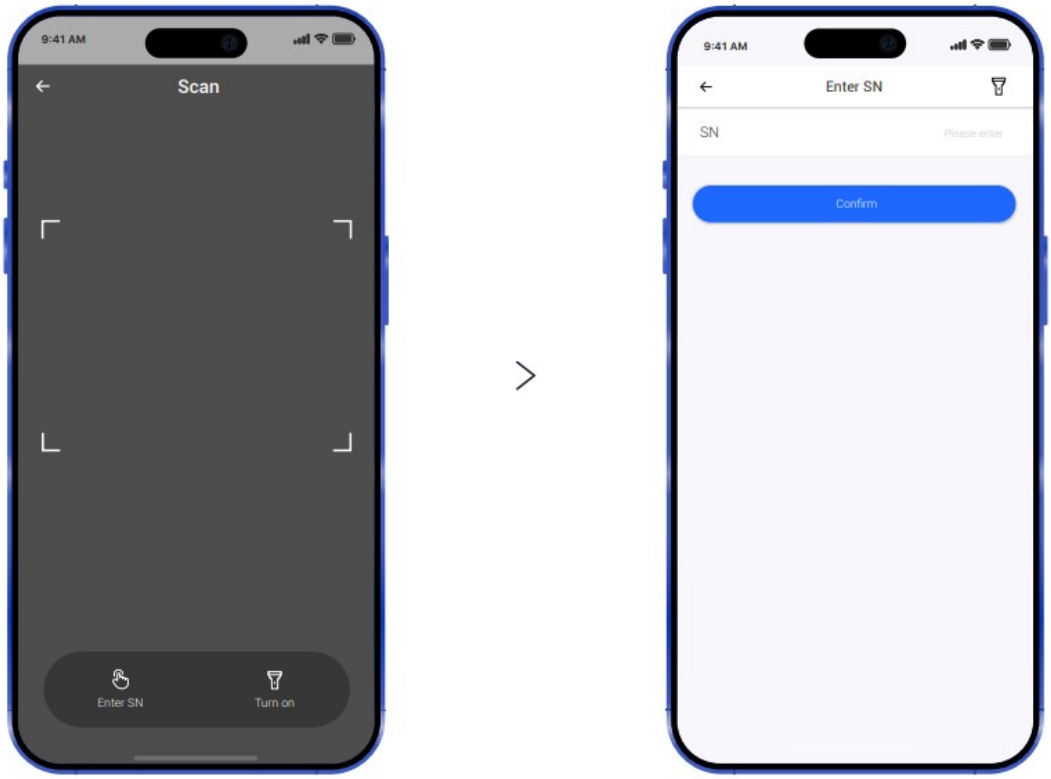


Figure 8-2

8.2.2 Bluetooth ON

Local mode supports Bluetooth connection. You can turn on Bluetooth in advance or add a logger first, then turn on Bluetooth according to the page prompt. If the connection fails, users need to reconnect.

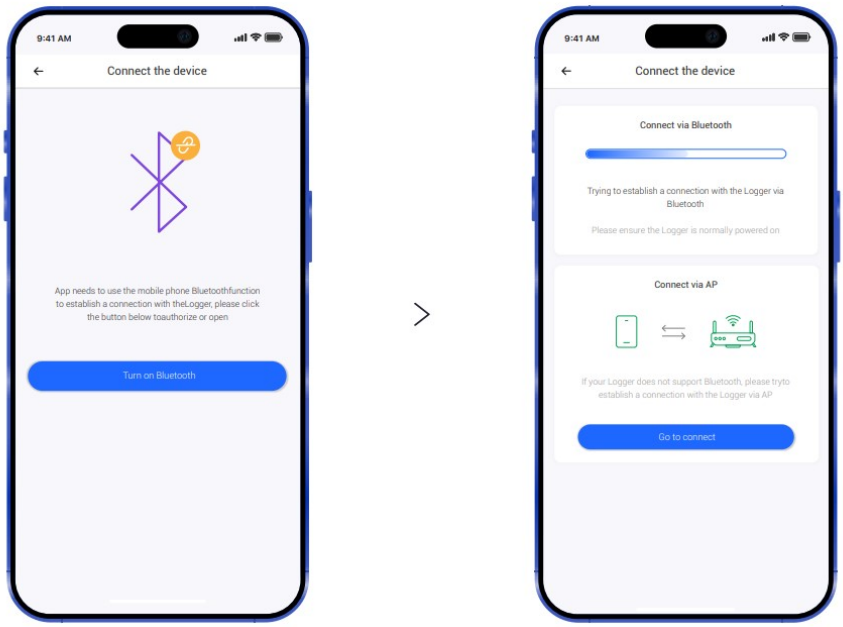


Figure 8-3

Or:

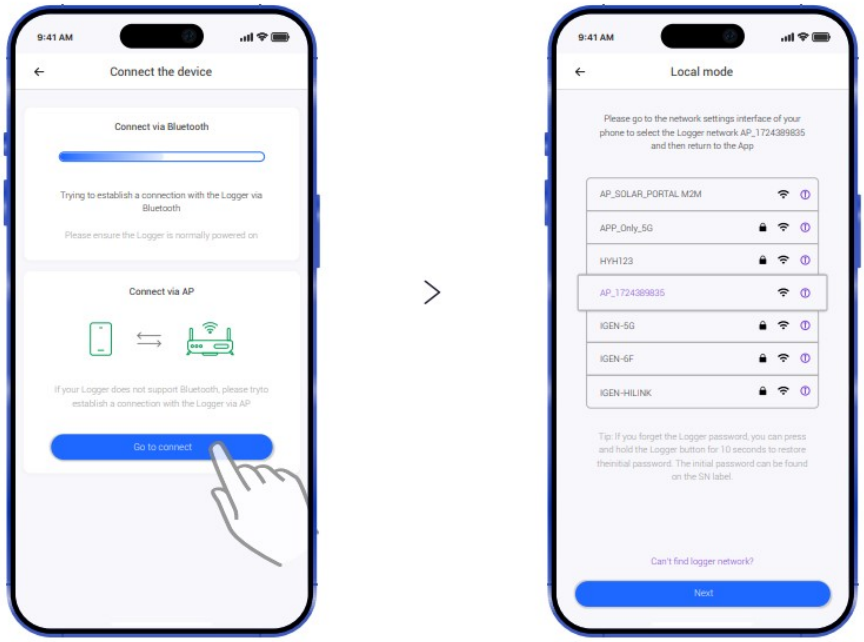


Figure 8-4

8.2.3 Enter the local mode interface

Once the connection is complete, you can view the operating status of the device and the parameters set. Click on the grouping to go to the detailed parameter page.

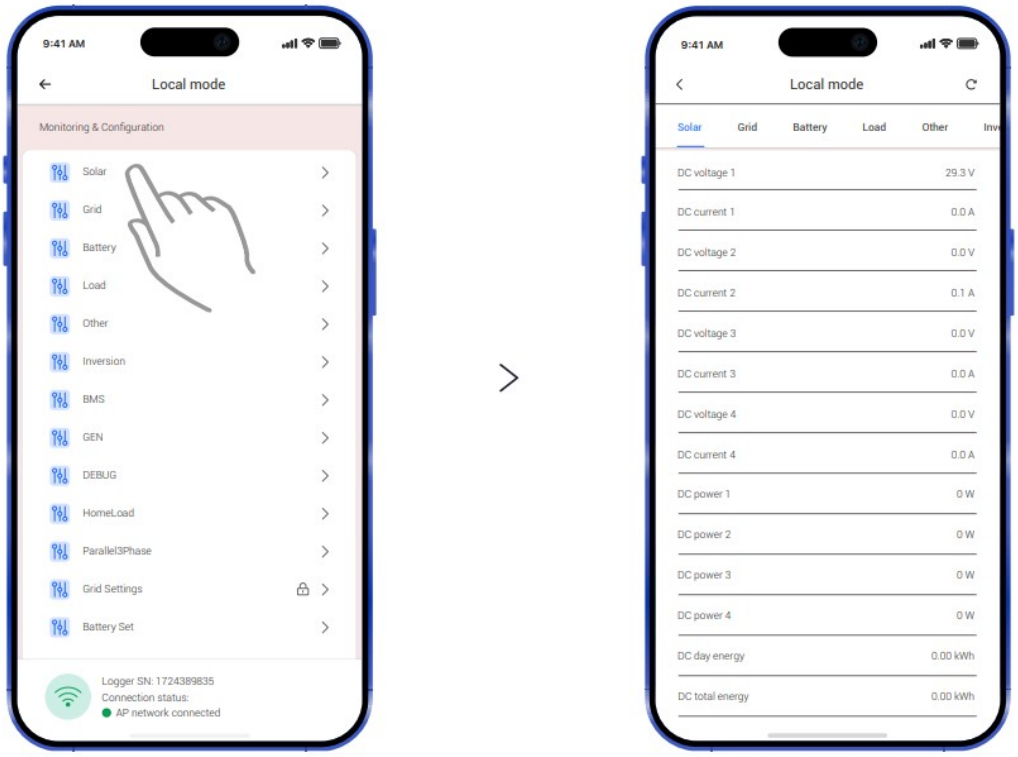


Figure 8-5

8.2.4 Working status

Click on the top groups to switch.

The Monitoring & Configuration page contains the following subgroups: Solar, Grid, Battery, Load, Other(Display software version SN code, fault information, working mode, device temperature, inverter temperature, etc.), Inversion, BMS, GEN, DEBUG, Home Load, Parallel 3Phase.

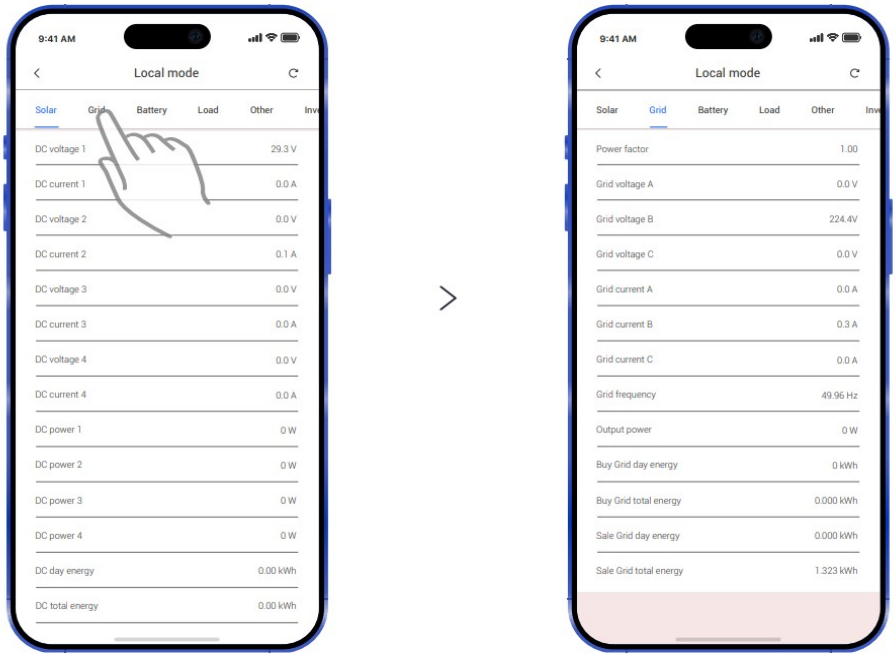


Figure 8-6

8.2.5 Set Parameters

You can set the operating parameters of the device according to their needs. The parameters set by the user need to be within the specified range.

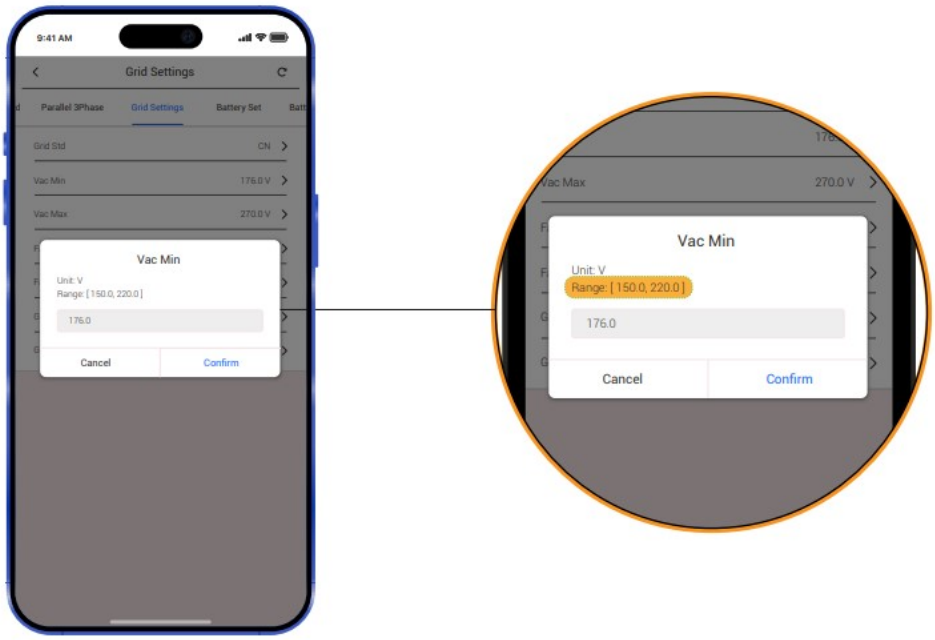


Figure 8-7

(1)Grid Settings and Grid Protect Set

A password is required to access the grid settings. The default password is "00000".

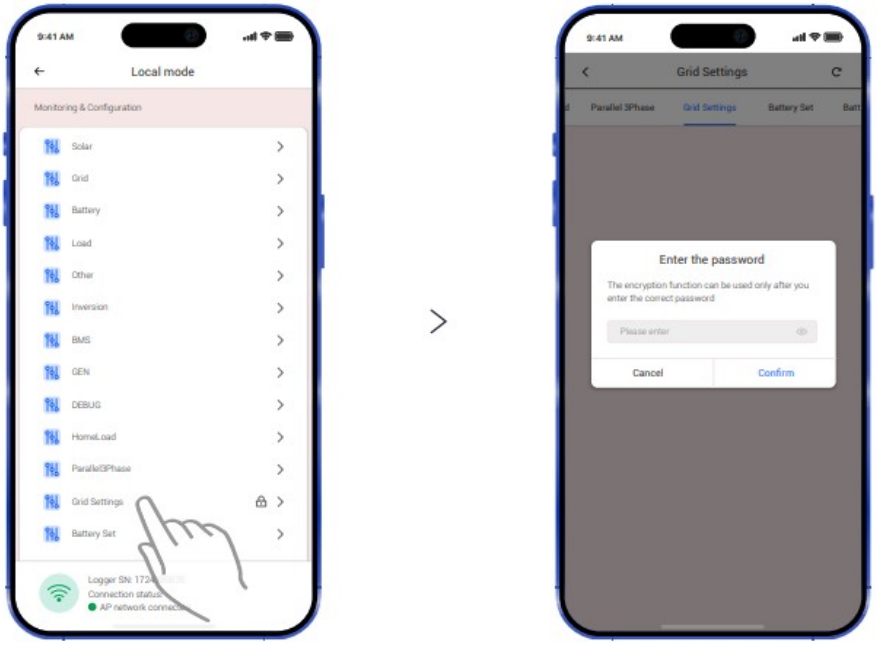


Figure 8-8

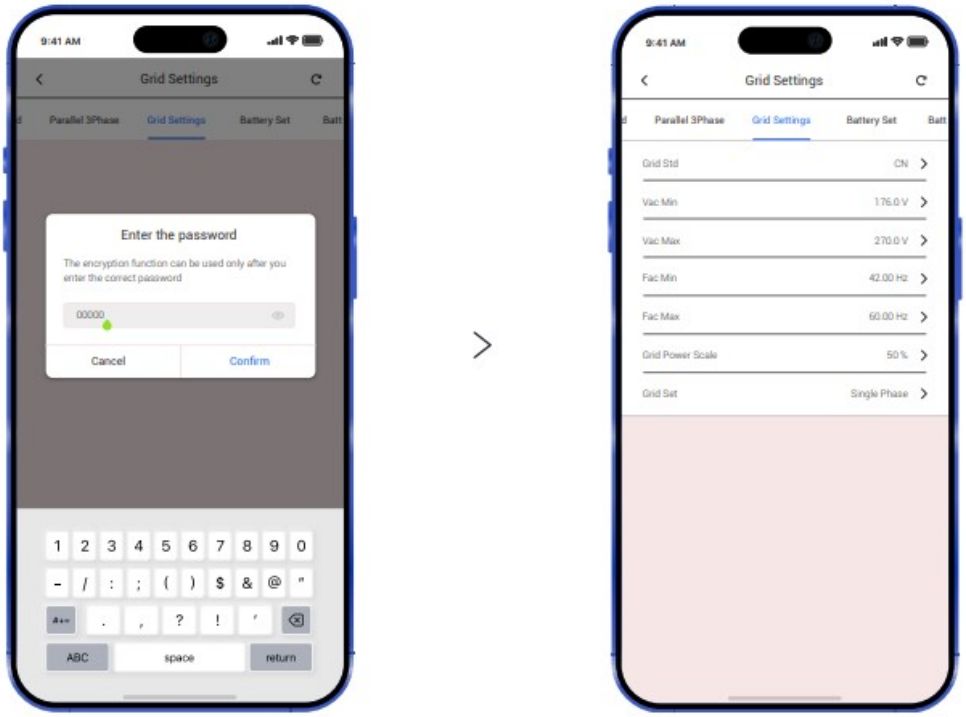


Figure 8-9

(2) Battery Set , Battery Management-Custom model available and Battery 485 communication parameter

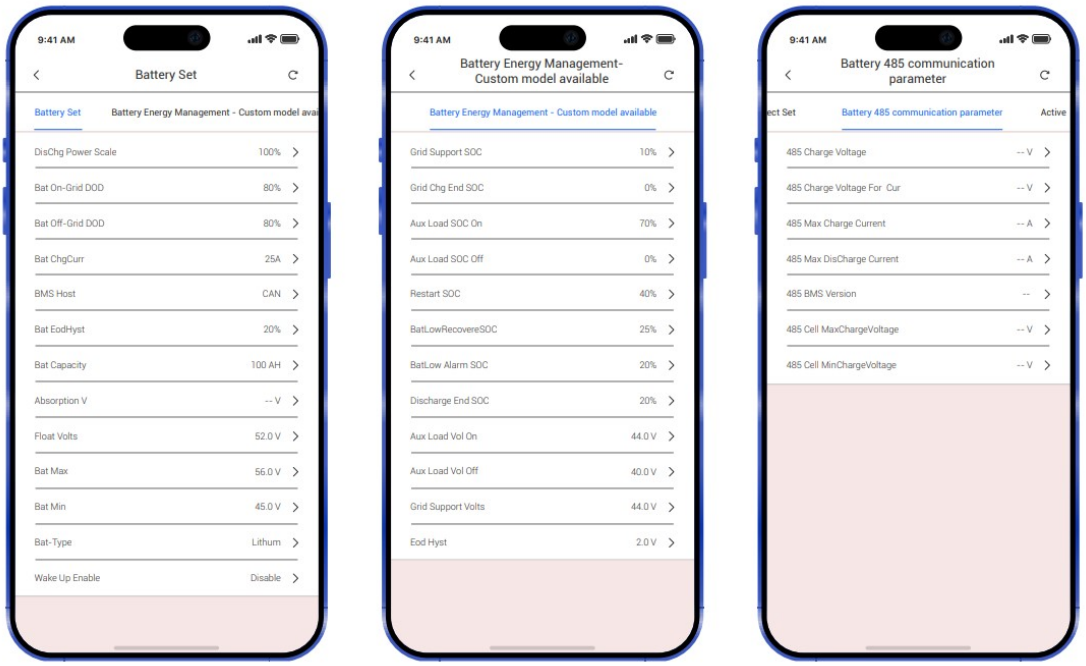


Figure 8-10

(3) Active Control

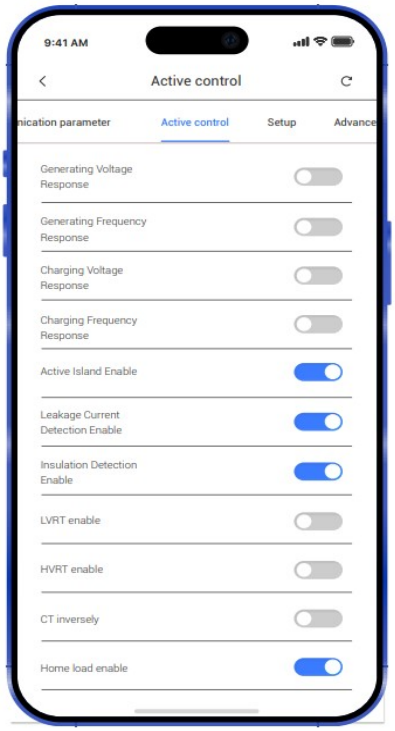


Figure 8-11

(4) Setup and Advance

Set work mode and PV input type, language, date/time, etc.

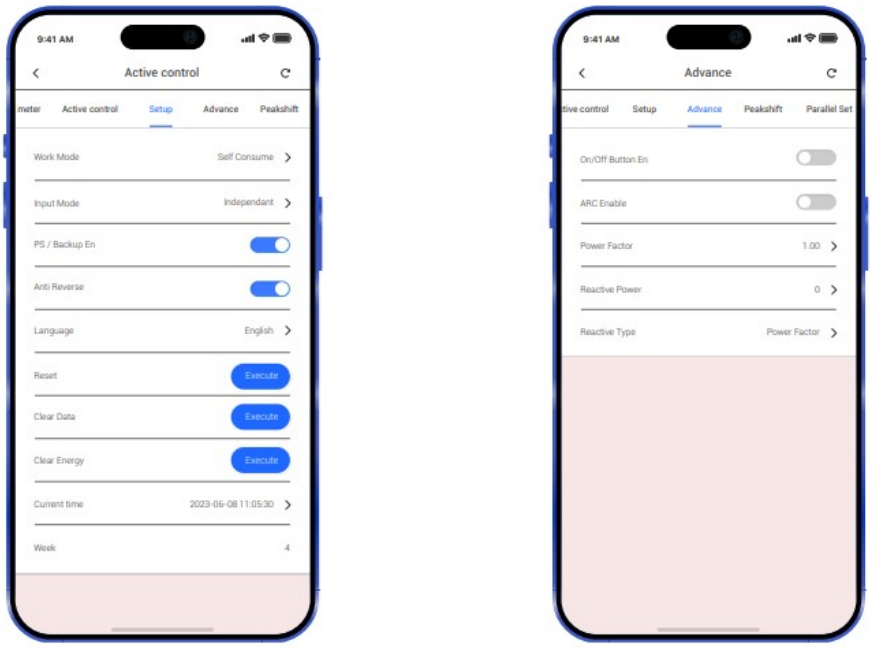


Figure 8-12

(5) Peak shift

Set peak-shift charging and discharging time. When the operating mode is peak-shift, you need to enter this screen to set the charging and discharging time and manually enter the start charging/ discharging time and the end charging/discharging time.

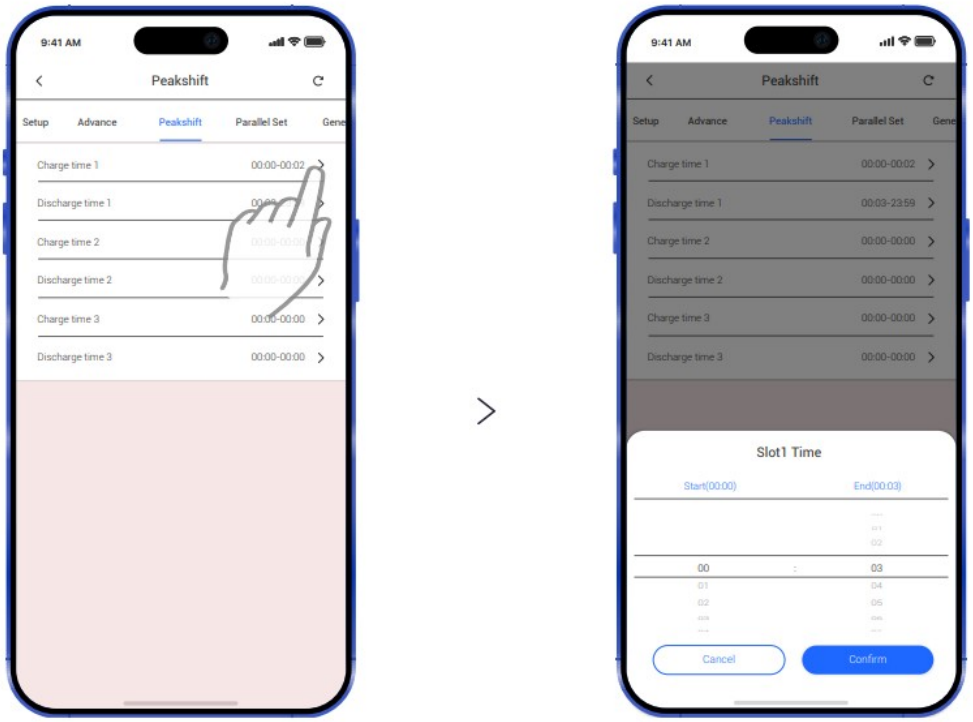


Figure 8-13

(6)Parallel Set ,Generator Set,Advance Work Mode Set,Custom Function and AC Couple

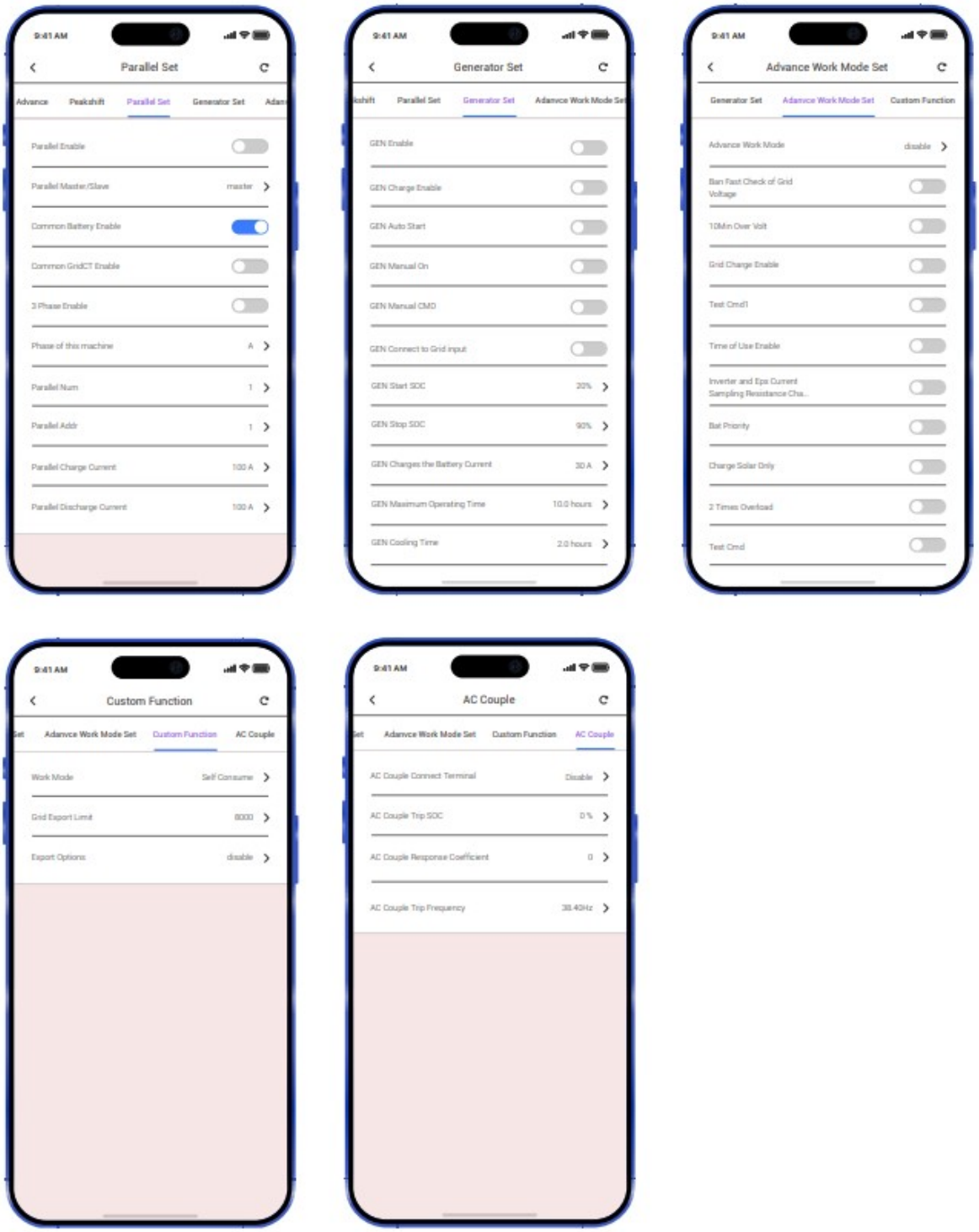


Figure 8-14

9. Fault diagnosis and solutions

The inverter is easy to maintain. When you encounter the following problems, please refer to the Solutions below, and contact the local distributor if the problem remains unsolved. The following table lists some of the basic problems that may occur during the actual operation as well as their corresponding basic solutions.

Fault diagnosis table

Content	Codes	Explaination	Solutions
Discharge Over Current	00	Battery discharge over current. When the battery is loaded, the load is too large.	(1) Nothing need to do, Wait one minute for the inverter to restart. (2) Check whether the load is in compliance with the specification. (3) Cut off all the power and shut down all the machines; disconnect the load and plug in to restart machines, then check
Over Load	01	The load power is greater than other power(PV,BAT).	(1) Check whether the load is in compliance with the maximum power of the machine. (2) Cut off all the power and shut down all the machines; disconnect the load and plug in to restart machines, then check whether the load is short circuited if the fault has been eliminated. (3) Contact customer service if error warning continues.
Bat Disconnected	02	Battery Disconnect. (Battery voltage not identified)	(1) Check whether the battery is connected. (2) Check if battery wiring port is open circuited. (3) Contact customer service if error warning continues.
Bat Under Volt	03	Battery voltage low that normal range.	(1) Checking System Settings, If so, power off and restart. (2) Check if the grid power down. If so, waitting for the grid power up, the inverter will automatically charge. (3) Contact customer service if error warning continues.
Bat Low Capacity	04	Bat Low capacity	(1) Battery Low that setting capacity.(SOC<100%-DOD)
Bat Over Volt	05	The battery voltage is greater than the Inverter maximum voltage.	(2) Checking System Settings, If so, power off and restart. (3) Contact customer service if error warning continues.

Gird Low Volt	06	Grid voltage is abnormal	(1) Check if the grid is abnormal. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
Grid Over Volt	07		
Grid Low Freq	08	Grid Frequency is abnormal.	(1) Check if the grid is abnormal. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
Grid Over Freq	09		
Gfci Over	10	Inverter GFCI exceeds standard.	(1) Check PV string for direct or indirect grounding phenomenon. (2) Check peripherals of machine for current leakage. (3) Contact the local inverter customer service if fault remains unremoved.
Parallel CAN bus failure	11	The parallel communication is abnorma.	(1) Checkthe cable , crystal,Line sequence. (2) Check if the wiring is correct.
Bus Under Volt	13	BUS voltage is lower than normal.	(1) Check the input mode setting is correct. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
Bus Over Volt	14	BUS voltage is over maximum value..	(1) Check the input mode setting is correct. (2) Restart the inverter and wait until it functions normally.
INV Over Current	15	The inverter current exceeds the normal value.	(1) Restart the inverter and wait until it functions normally.
Charge Over Current	16	Battery charge current over than the Inverter maximum voltage.	(1) Restart the inverter and wait until it functions normally.
Meter Comm Fail	17	The meter communication is abnormal.	(1) Checkthe cable , crystal,Line sequence. (2) Check if the wiring is correct.
INVUnder Volt	18	INV voltage is abnormal	(1) Check if the INV voltage is abnormal. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
INV Over Volt	19		
INV Freq Abnor	20	INV frequency is abnormal	(1) Check if the INV frequency is abnormal. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning

			continues.
IGBT Temp High	21	The inverter temperature is higher than the allowed value	(1) Cut off all the power of the machine and wait one hour, then turn on the power of the machine.
Bat Over Temp	23	Battery temperature is higher than the allowed value.	(1) Disconnect the battery and reconnect it after an hour.
Bat Under Temp	24	Battery temperature is low than the allowed value.	(1) Check the ambient temperature near the battery to see if it meets the specifications.
BMS Comm Fail	27	Communication between lithium battery and inverter is abnormal.	(1) Check the cable, crystal, Line sequence. (2) Checking the Battery switch.
Fan Fault	28	Fan Fault	(1) Check whether the Inverter temperature is abnormal. (2) Check whether the fan runs properly.(If you can see it)
Grid Phase ERR	30	The grid fault phase.	(1) Check power grid wiring
Arc Fault	31	PV Arc Fault	(1) Check Photovoltaic panels, PV wire. (2) Contact customer service if error warning continues.
Bus Soft Fail	32	The inverter may be damaged	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
INV Soft Fail	33		
Bus Short	34		
INV Short	35		
PV Iso Low	37	PVIso Low	(1) Check if the PE line is connected to the inverter and is connected to the ground. (2) Contact customer service if error warning continues.
Bus Relay Fault	38	The inverter may be damaged	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
Grid Relay Fault	39		
EPS rly Fault	40		
Gfci Fault	41		
CT Fault	43		
Selftest Fail	44		
System Fault	45		

Note!

If an error occurs that is not listed in the table, Please Contact customer service.

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