User Manual

Hybrid Inverter
Brux 3-8KTL-HT
Version 1.002

Solar-In

Your Gateway to Clean Energy

Contents

1. NOTES ON THIS MANUAL 3

1.1 Scope of Validity 3
1.2 Target Group 3
1.3 Symbols Used 3

2. SAFETY 4

2.1 Safety Precautions 4
2.2 Explanation of Symbol 7
2.3 Maintenance related information 8
2.4 Battery maintenance 8
2.5 Low voltage Earthing system 9

3. INTRODUCTION 12

3.1 Basic features 12
3.2 System Diagram 12
3.3 Work Modes 13
3.4 Dimensions 15
3.5 Terminals of PV inverter 16

4. TECHNICAL PARAMETERS 18

4.1 Inverter Specification 18

5. INSTALLATION 20

5.1 Check for Physical Damage 20
5.2 Packing List 20
5.3 Mounting 21

6. ELECTRICAL CONNECTION 24

6.1 PE Cable Installation 24
6.2 PV Input Cable Installation 24
6.3 AC Cable Installation (Grid or Gen) 27
6.4 AC Cable Installation (Load) 42
6.5 Battery Cable Installation 44
6.6 CT Installation instructions 47
6.7 WiFi Connection (optional) 49
6.8 GPRS Connection (optional) 50
6.9 Bluetooth Connection (optional) 51
6.10 Inverter Parallel Guide 52
6.11 Inverter Three Phase Guide 55

7. INVERTER CONFIGURATION 58

8. OPERATION 59

8.1 LCD Operation 59

9. APP OPERATION..... 78

9.1 Home Page 78
9.2 Local Mode..... 79

10. ITALY SELF-TESTING (AUTO TEST FAST)..... 88

11. FAULT DIAGNOSIS AND SOLUTIONS 91

1.Notes on this Manual

1.1 Scope of Validity

Our comprehensive manual for the Brux3-8KTL-HT hybrid inverters is an indispensable resource. It provides detailed instructions on the assembly, installation, commissioning, maintenance, and troubleshooting of the product. It is crucial to thoroughly read this manual before running the inverters to ensure proper usage and avoid any potential issues. Brux Series Single Phase Hybrid Inverters Brux3-8KTL-HT: This series comes with varied sizes of 3, 3.6, 4, 4.6, 5, 6 and 8 Kw.

1.2 Target Group

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

1.3 Symbols Used

The following are the safety symbols used in this Manual to indicate potential safety risks and important safety instructions.

	Risk of high voltages which might lead to electric shocks
	Risk of burns due to hot surface
	Danger warning
	**WARNING!** When performing maintenance on the input and output of the inverter after disconnecting it, wait at least 5 minutes for the inverter to discharge any remaining electrical charge.
	**Safety Tips!** This symbol indicates important safety information that, if not followed, could result in serious personal injury or even death.
	**Note!** “Note” provides tips that are valuable for the optimal operation of the inverter.

2. Safety

2.1 Safety Precautions

Danger!

- Danger to life due to high voltages in the inverter
- A qualified electrician must conduct all the work.
- The appliance must not 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.

Warning!

- Danger of burn injuries due to hot parts of the enclosure
- The upper lid and body of the enclosure may become hot during operation.
- Only the touch screen can be touched during use to avoid burns.

Warning!

- Potential health risks associated with the inverter's radiation.
- Avoid prolonged exposure within 20cm of the inverter.

Important!

- PV modules should have an IEC61730 class A rating
- This rating ensures that the PV modules are suitable for systems that run at voltages higher than DC 50V or 240W and are potentially accessible or accessible to the public.

Caution!

- To avoid any potential damage, ensure that the input DC voltage does not exceed the maximum specified DC voltage.
- Operating the system with higher voltages may result in permanent damage to the inverter or other components, which will not be covered under warranty
- Before performing any maintenance, cleaning, or working on circuits connected to the inverter, it is imperative that a qualified service personnel disconnect both AC and DC power from the inverter
- Avoid touching any parts other than the screen while the inverter is operating, as there is a risk of electric shock

2.1 .1 Important Safety Instructions

- It is important to store the user manual appropriately. In addition to adhering to the general precautions outlined in this manual, it is crucial to also follow the specific safety instructions when operating the equipment. We cannot be held responsible for any consequences resulting from the violation of safety operation rules, as well as the standards set for design, production, and usage.
- It is strongly recommended that accessories are only used in conjunction with the inverter shipment. Using other accessories may pose a risk of fire, electric shock, or personal injury.
- Ensure that the existing wiring is in proper working condition and that the wire used is of an appropriate size. Refrain from dismantling any components of the inverter that are not specifically mentioned in the installation guide, as it is not designed for user servicing. Refer to the Warranty section for guidance on obtaining professional service. Attempting to service the inverter yourself may create the potential for electric shock or fire, and it will also negate your warranty.
- Avoid flammable and explosive materials to prevent fire hazards.
- Install the equipment in a location away from humid or corrosive substances.
- Only authorized service personnel should handle and install the equipment.
- Use insulated tools when working with the equipment.
- Avoid touching the positive and negative poles of the PV terminals.
- Never touch both poles simultaneously and strictly prohibit doing so.
- The unit may still have a potentially lethal voltage even after it has been disconnected from the power supply. Hazardous voltage may be present for up to 5 minutes after disconnection.
  - After switching off the PV, battery, and mains, always wait for 5 minutes to allow the intermediate circuit capacitors to discharge before unplugging DC, battery, and mains couplers.
  - It is crucial to wait for 5 minutes before operating the power circuit or removing the capacitors inside the device when accessing the internal circuit of the inverter.
  - Do not open the device prematurely as the capacitors need sufficient time to discharge.

- Never operate on the inverter couplers, mains cables, battery cables, PV cables, or PV generator when power is applied to avoid the risk of electric shock.

2.1.2 Install surge protection devices (SPDs) for PV and on Grid side

WARNING!

- Over-voltage protection with surge arresters should be provided when the PV power system is installed.
- Install surge protection devices (SPDs) to protect the inverter against damage and stress

Please install the following:

1. Install SPD type 2 at the inverter end of DC cabling and between the inverter and PV array (near to the inverter)
2. Use additional SPD type 3 if surge arrester VP is greater than 1100V
3. Install SPD type 2 at main incoming point of AC (Grid) supply and between inverter and the meter (AC SPD 275V)
4. Minimize length of DC cables and bundle positive and negative cables together to avoid creating loops in the system

Lightning will cause damage either from a direct strike or from surges due to a nearby strike. Induced surges are the most likely cause of lightning damage in many installations, especially in rural areas where electricity is usually provided by long overhead lines. Surge may be included on both the PV array conduction and the AC cables leading to the building.

- Consult specialists in lightning protection for proper implementation
- Use external lightning protection measures to mitigate direct lightning strikes
- Do not use spark gap devices in DC circuits as they continue conducting until voltage exceeds 30 volts.

2.1.3 Anti-Islanding Effect

The islanding effect is a special phenomenon where a grid-connected PV system still delivers power to the nearby grid when voltage losses occur in the power system. This can be dangerous for maintenance personnel and the public. The inverters offer Active Frequency Drift (AFD) to prevent the islanding effect.

2.1.4 PE Connection and Leakage Current

The end-use application shall monitor the protective conductor by residual current operated protective device (RCD) with rated fault current Ifn≤240mA which automatically disconnects the device in case of a fault.
The device is intended to connect to a PV generator with a capacitance limit of approx. 700nf.

WARNING!

- High leakage current!
- Earth connection is essential before connecting supply.

Improper grounding can result in bodily harm, fatalities, equipment malfunctions, and heightened electromagnetic emissions.

2.1.5 Battery Safety Instructions

The Brux-series inverter is designed to be used with a low voltage battery. Please refer to section 4.1 for specific details regarding the battery type, nominal voltage, and nominal capacity. It is important to note that accumulator batteries may pose a risk of electric shock and short-circuit currents. To prevent accidents that

could result from these dangers, it is crucial to follow the following precautions when replacing the battery:

1. Avoid wearing watches, rings, or any other metal objects while working with batteries.
2. Utilize insulated tools to reduce the risk of electric shock.
3. Wear rubber shoes and gloves for added protection.
4. Do not lay metallic tools or parts near the batteries to prevent accidental short circuits.
5. Always turn off any devices connected to the batteries before removing their connections.
6. Only individuals with the appropriate knowledge and skill should perform maintenance on battery accumulators.

2.2 Explanation of Symbols

This section explains all the symbols shown on the inverter.

	CE mark. The inverter complies with requirements of applicable CE guidelines.
	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 comply with the warning stated in this manual may lead to harm or injury.

2.3 Maintenance related information

Maintenance instructions:

- Guidelines and frequency for any necessary preventive maintenance to ensure safety. This may include blocking terminals periodically, among other steps.
- Instructions on how to access the operator's designated area, along with a warning to avoid entering other parts of the equipment.
- Part numbers and instructions on obtaining any operator replaceable parts that may be needed.
- Guidelines for safety practices and cleaning, if recommended for maintenance.
- If there are multiple power sources supplying the equipment, the manual should provide information indicating which specific disconnecting devices need to be operated to completely isolate the equipment.

2.4 Battery maintenance

The Battery maintenance need to cover the following information:

- Battery maintenance should be carried out or supervised by knowledgeable personnel.
- Do not throw the battery into the fire. The battery may explode.
- Avoid opening or causing any harm to the battery. The electrolyte it contains can be harmful to the skin and eyes and may have toxic properties.
- There may be a risk of electric shock and high short-circuit current in the battery.
- The following precautions should be observed when using batteries:
  (1) Remove watches, rings, or other metal items.
  (2) Using tools with insulated handle.
  (3) Wear rubber gloves and boots.
  (4) Do not place tools or metal parts on the battery.
  (5) Disconnect the charging power supply before connecting or disconnecting the battery terminals.
  (6) Make sure the battery is not grounded by accident. If it is grounded by accident, disconnect the power supply from the ground and avoid touching any part of the grounded battery to prevent electric shock. This is applicable for devices that do not have grounded power circuits and have remote battery power supplies. By following these instructions, the risk of electric shocks can be reduced.

2.5 Low voltage Earthing system

The grounding of the power system is directly related to the personal and property safety of users, as well as the normal operation of electrical and electronic equipment. According to the regulations of International Electrotechnical Commission (IEC), low-voltage distribution system is called TT system, TN system and IT system according to different grounding modes. The TN system is further divided into TN-C, TN-S, and TN-C-S systems.

2.5.1 TN system

TN system, known as protective neutral connection. When a fault electrifies the metal casing of electrical equipment, it forms a short circuit between the phase and zero lines, resulting in low circuit resistance and high current, which can cause the fuse to quickly fuse or the protective device to act to cut off the power supply. In the TN system, there are three types of systems: TN-C, TN-S, and TN-C-S.

(1) TN-C system

The N line and PE line are integrated throughout the entire system.

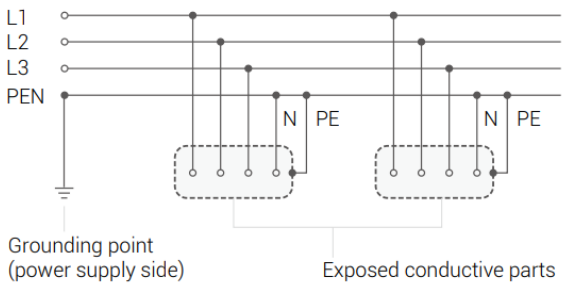


Figure2-1 TN-C system

(2) TN-S system

The N line and PE line are separated throughout the system.

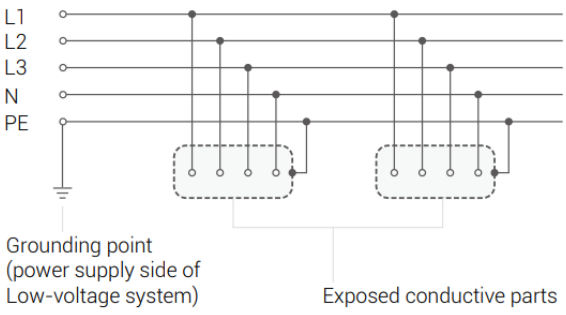


Figure2-2 TN-S system

(3) TN-C-S system

In the whole system, the N line and PE line are usually integrated only before the power incoming point of low-voltage electrical device, and they are divided into two lines after the power incoming point.

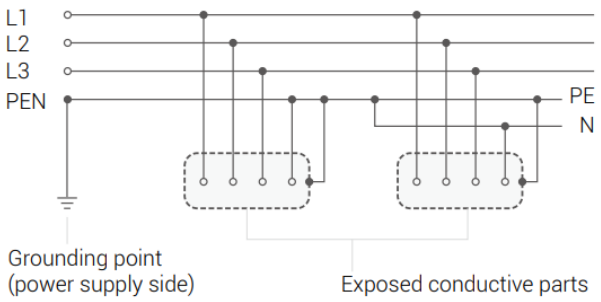


Figure2-3 TN-C-S system

2.5.2 TT system

TT system is a system where the neutral point of the power supply is directly grounded, and the exposed conductive part of the electrical equipment is also directly grounded. The grounding of the neutral point of the power supply is usually called working grounding, while the grounding of the exposed conductive part of the equipment is called protective grounding. In the TT system, these two grounds must be independent of each other. Equipment grounding can refer to each device having its own independent grounding device, or multiple devices sharing a common grounding device.

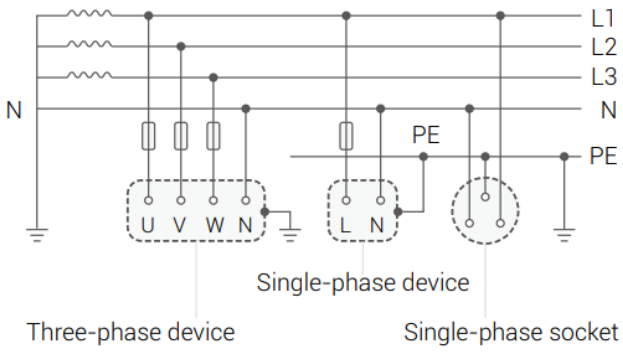


Figure2-4 TT system

2.5.3 IT system

IT system is a system where the neutral point of the power supply is not grounded, and the exposed conductive part of the electrical equipment is directly grounded.IT system can set neutral wires, but IEC does not recommend setting neutral wires. If a neutral line is set and a ground fault occurs at any point of the N line in the IT system, the system will no longer be an IT system.

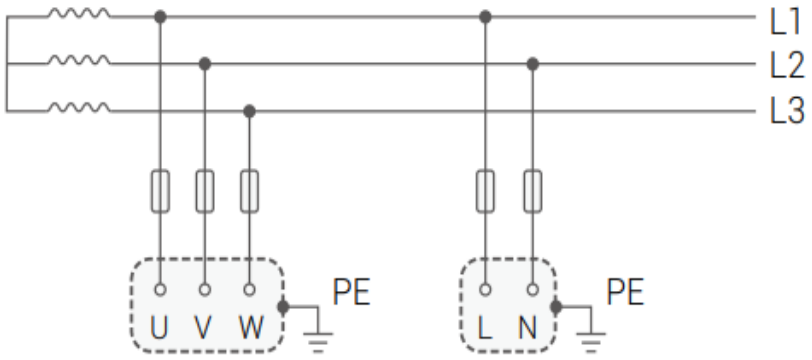


Figure2-5 IT system

3. Introduction

3.1 Basic features

The Brux series is a top-notch inverter that has the capability to convert solar energy into AC energy and conveniently store it in a battery. This versatile inverter allows for various usage options, such as maximizing self-consumption, storing excess energy in the battery for later use, or even feeding energy back into the public grid. The operational mode of the inverter is determined by the amount of PV energy available and the user's individual preference. Additionally, in times of grid outages, the inverter can supply power in emergencies by utilizing the energy stored in the battery and generated by the PV system.

3.2 System Diagram

Brux 3 to 8 Kw

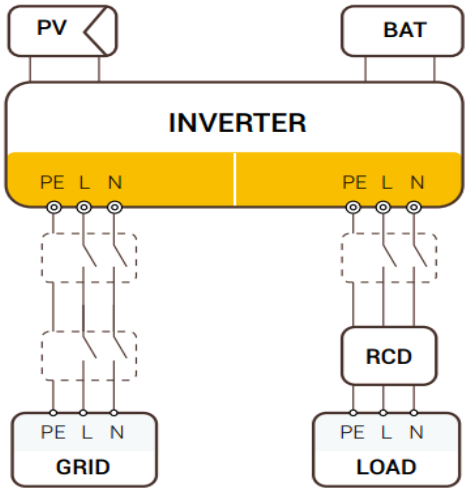


Figure3-2 Brux 3 to 8 Kw system diagram.

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

Important!

- Please control the home load and ensure that its output power is within the rated range, otherwise the inverter will shut down with an “Overload” warning.
- Please install an overcurrent protector and AC SPD on the load side and on the AC input side to protect the inverter from overload and surges.
- Please confirm with the mains grid operator whether there are any special regulations for grid connection.

3.3 Work Modes

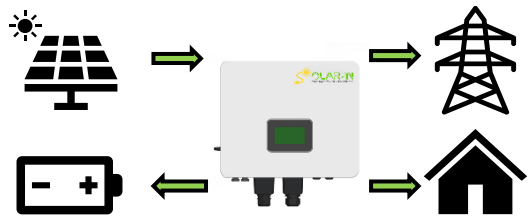
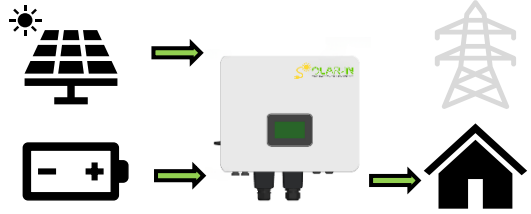
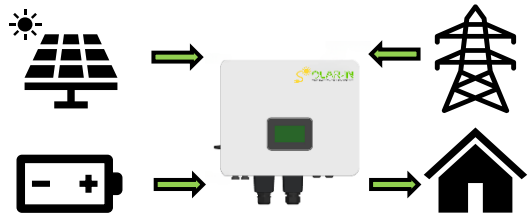
The Brux series offers multiple operating modes, including:

1. Self-Consumption
2. Peak shift
3. Battery priority
4. Advanced mode

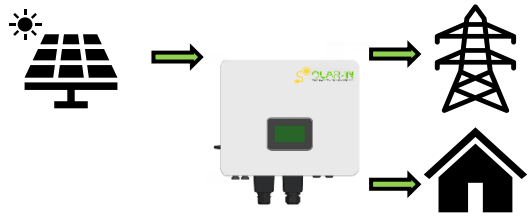
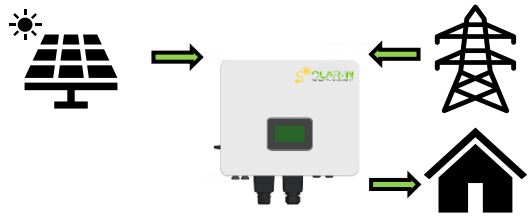
Users can choose the mode that best fits their needs.

1. Self-Consumption

When PV, Grid and Battery are all connected:

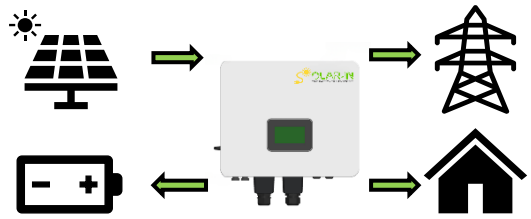
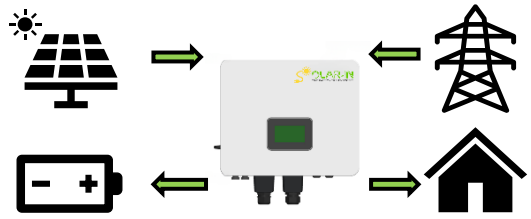
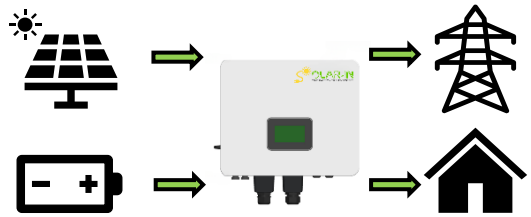
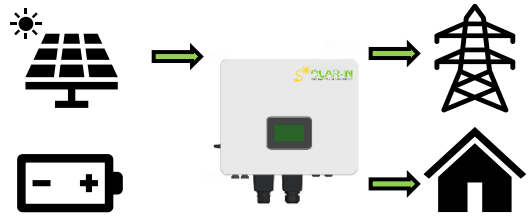
	Solar energy provides power to the load as priority. If solar energy is **sufficient** to power all connected loads, then the surplus solar energy will charge the battery. The remaining energy will be fed to the grid
	**If the Gris is unavailable:** solar energy takes priority in powering the load. If solar power is **insufficient** to support all connected loads, the battery will simultaneously provide additional power.
	solar energy takes priority in powering the load. If solar power and battery is **insufficient** to support all connected loads, the main grid (Utility) will simultaneously provide additional power to the load.

When PV and Grid are connected (without battery):

	Solar energy is prioritized to power the load. If the solar energy is enough to meet the demands of all connected loads, any excess will be fed back to the grid.
	solar energy takes priority in powering the load. If solar power is **insufficient** to support all connected loads, the main grid (Utility) will simultaneously provide additional power to the load.

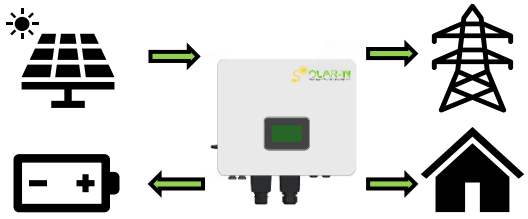
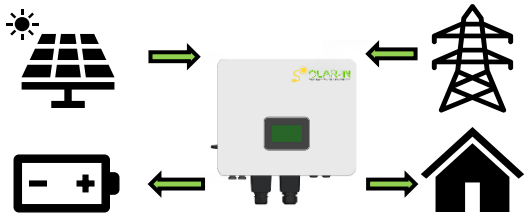
2. Peak shift

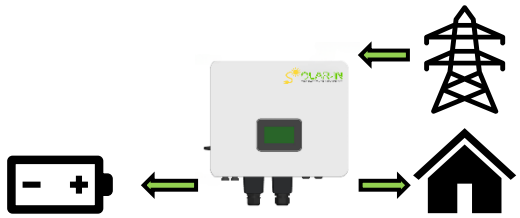
When PV, Grid and Battery are all connected:

	During the charge period, solar energy is prioritized for charging the battery. Any excess energy will be used to power the load. If solar energy is **sufficient** to both charge the battery and power the load, the remaining surplus will be fed into the grid.
	During the charge period, solar energy is prioritized for charging the battery. Any surplus energy will power the load. If solar energy is **insufficient** to charge the battery and power the load simultaneously, the grid will supply power to the connected loads along with the available solar energy.
	During the discharge period, Solar energy is prioritized to power the load. If solar energy is sufficient to meet the load's demands, any remaining surplus, along with the battery's energy, will be fed into the grid.
	In the period of no charge and no discharge, solar energy is prioritized to power the load, any remaining surplus will be fed into the grid.

3. Battery priority

When PV, Grid and Battery are all connected:

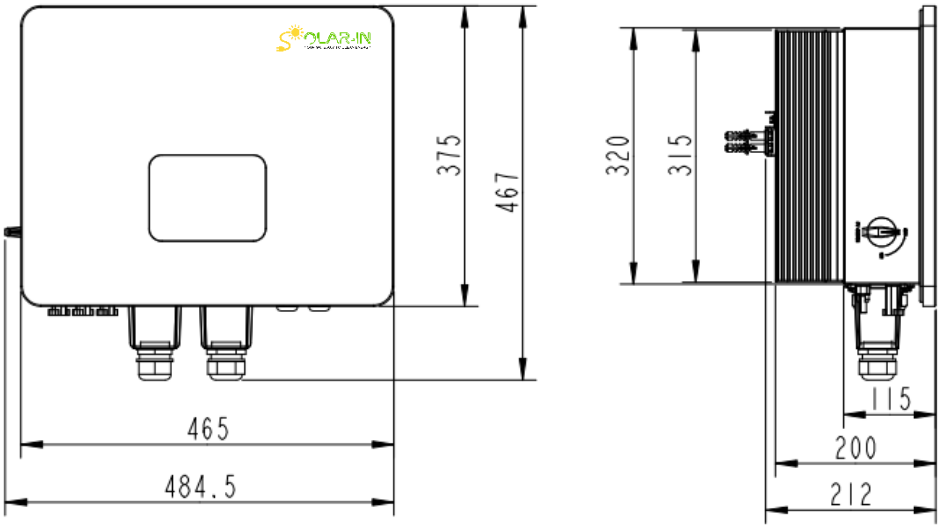
	Solar energy is prioritized for charging the battery based on the set current and charging rate. Any excess energy will be used to power the load. If additional surplus remains, it will be fed into the grid.
	Solar energy is prioritized for charging the battery based on the set current and charging rate. Any excess energy will be used to power the load. If solar energy is **insufficient** to charge the battery and power the load simultaneously, the grid will supply power to the connected loads along with the available solar energy.

	**When grid and battery are available (PV is disconnected):** Grid will supply power to the load and charge battery at the same time.

Note!
If the power selling function is not enabled, the system will not feed power to the grid while operating in Self-Consumption, Peak Shift, or Battery Priority modes.

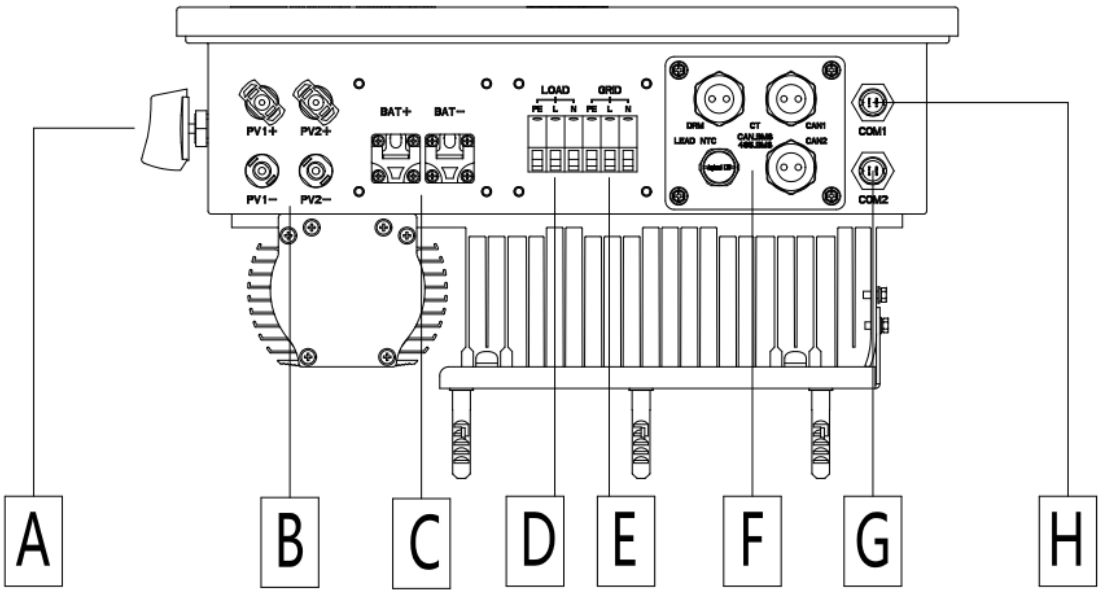
3.4 Dimensions

(1) Brux-series 8kw：



3.5 Brux-series terminal diagram

Brux Series inverter terminal diagram

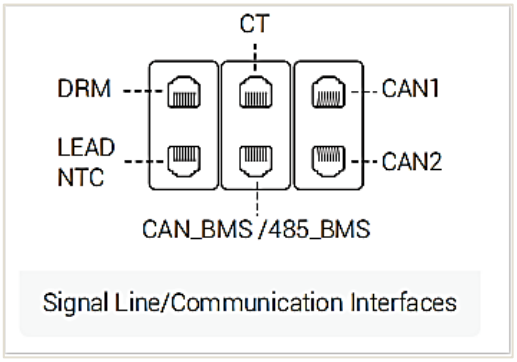


Object	Description
A	DC switch
B	PV input
C	BAT input
D	Load
E	Grid
F	CAN1/CAN2/CT/CAN_BMS/485_BMS/DRM/LEAD NTC
H	COM1
G	COM2

WARNING!

A qualified electrician will be required for the installation.

* Port Function



DRM	CT	CAN1
LEAD NTC	CAN_BMS 485_BMS	CAN2

- 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.

4. Technical Parameters

4.1 Inverter Specification

Module	Brux3K6TL-HT	Brux4KTL-HT	Brux4K6TL-HT	Brux5KTL-HT	Brux6KTL-HT	Brux8KTL-HT
Input (PV)						
Max. PV Input Power (kW)	5.4	6	6.9	7.5	9	12
Max. PV Input Voltage (V)	550					
Start-up Voltage (V)	100					
MPPT range/Nominal Voltage	80 ~ 500/360					
Number of MPPT Trackers	2					2 MPPT (MPPT No. 1 with 1 string, MPPT No.2 with 2 strings))
Max. PV Input Current (A)/MPPT	16					16/32
Max. Short-Circuit Current (A)/MPPT	18.5					18.5/37
OVC category	II					
Output (AC)						
Rated Output Power (kW)	3.68	4	4.6	5	6	8
Max. Output Power(kW)	3.68	4.4	4.6	5.5	6	8
Max. Output Current (A)	16	19.1	20	21.7	28.7	38.3
Nominal Voltage/ Range (V)	230/176~270					
Rated Frequency (Hz)	50 / 60					
THDi (@Rated Power)	＜3%					
Power Factor	1(0.8 leading~0.8 lagging)					
AC grid type	L+N+PE					
OVC category	III					
Output (EPS)						
Max. Output Power (kW)	3.68	4	4.6	5	6	8
Max. Output Current	16	19.1	20	21.7	28.7	38.3
Overload capacity	110%, 60S/ 120%, 30S/ 150%, 10S					
Rated Voltage, Frequency	230V, 50Hz					
THDv (@Rated Power)	＜2%					
Switch Time	＜10ms					
Battery						
Battery Type	Lithium					
Battery Voltage Range (V)	40~58					

Communication Interface	CAN/RS485					
Charging Strategy for Li-Ion Battery	Self-adaption to BMS					
Max. Charge / Discharge Current (A)	72/72	80/80	92/92	100/100	120/120	160/160
Efficiency						
PV Max. Efficiency	98.0%					
EU Efficiency	97.0%					
Battery Charge/Discharge Efficiency	96.0%					
MPPT Efficiency	99.9%					
Protection						
Insulation Resistance Monitoring	Yes					
Ground Fault Monitoring	Yes					
Over Current / Over Voltage Protection	Yes					
Battery Soft Start Protection	Yes					
AFCI Protection	Optional					
Surge Protection	Type II					
Communication						
Display	LCD					
Communication: RS485 / WIFI / 4G / CAN / DRM	Yes/Opt/Opt/Yes/Yes					
Standard Compliance						
Certification	IEC/EN 62109-1/2, IEC/EN 61000-6-3, Belgium C10/C11, CE, 1V, IEC/EN62109-1/-2, IEC/EN62477-1, South Africa NRS097-2-1; 2017, IEC/EN 61000-6-1					
General Data						
Dimension (W*D*H) (mm)	454.5*220*467					484*200*467
Weight (kg)	19					22
Operating Temperature Range (℃)	-25℃～+60					
Cooling Method	Natural					
Protection Degree	IP65					
Max. Operating Altitude	2000m (>2,000 Derating)					
Noise	＜35dB					
Relative Humidity	0~95% (non-condensing)					
Self-consumption	＜15W					
Topology	Non-isolated					
Warranty	Standard 6 Years/10 years optional					

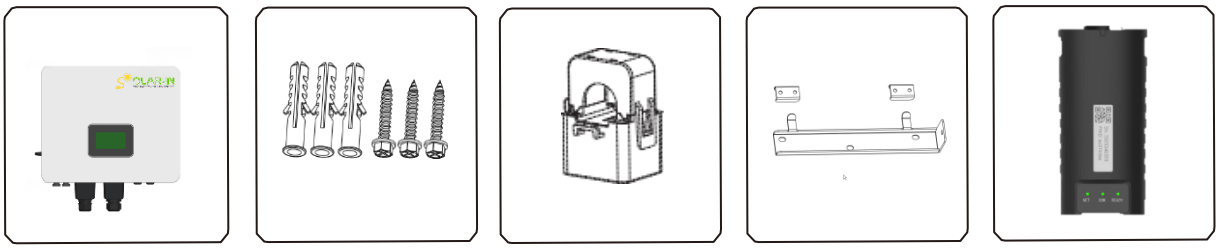
5. Installation

5.1 Check for Physical Damage

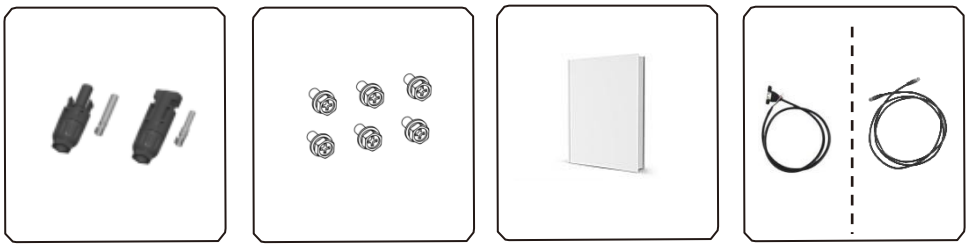
Make sure the inverter is intact during transportation. If there is any visible damage, such as cracks, please contact your dealer immediately.

5.2 Packing List

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



A B C D E



F G H I G

Object	Description
A	Inverter
B	Expansion pipe and Self-tapping screw
C	Current transformer
D	Hanger
E	Wi-Fi module (optional)
F	PV connectors (2*positive, 2*negative)
G	Hex head bolt
H	User manual (Digital, available on our website)
I	Display upgrade cable (optional)
G	2M Parallel Machine Line(optional)

5.3 Mounting

➢ **Installation Conditions**

The following points must be considered for the installation of the inverter:

- The inverter can be installed in an indoor or outdoor environment.
- During operation of the inverter, the housing and heat sinks will heat up. Do not install the inverter where it can be accessed easily.
- Do not install the inverter in an area where flammable or explosive materials are stored.
- Install the inverter in a well-ventilated environment, to facilitate heat radiation.
- It is recommended to choose an installation position with shade or build a sunshade. Not in direct sunlight.
- Ambient temperature: -30℃~60℃.
- The installation position should be far away from electronic devices generating strong electromagnetic interference such as television antenna or antenna cable.
- The installation position should be on a fixed and solid object surface, such as a wall or metal bracket. The wall 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).
  3. The slope of the wall should be within ± 5°.
- The installation position must provide reliable grounding for the inverter, and the grounding metal conductor must be made of the same material as the reserved grounding metal conductor of the inverter.
- Not in environment of precipitation or humidity (> 95%).

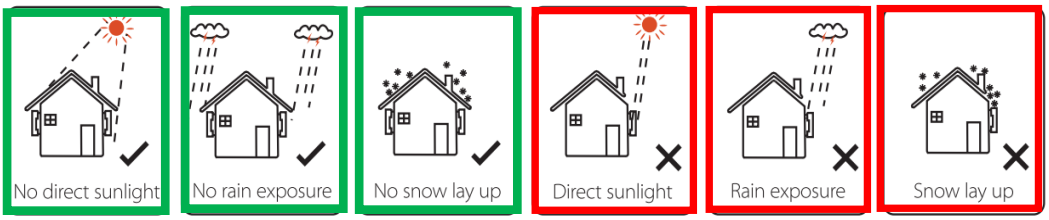
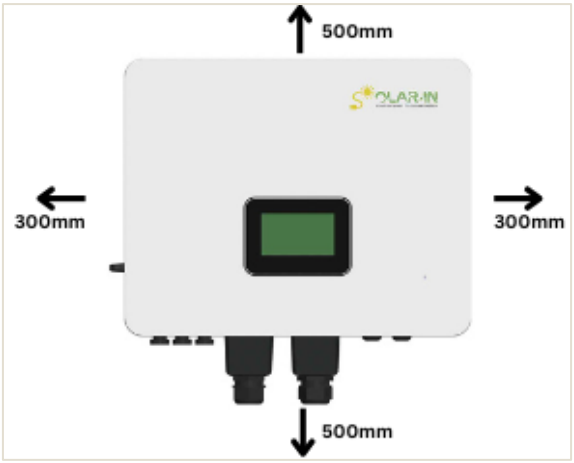


Figure5-1 Recommended Installation Locations

➢ **Space Requirement**



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

Figure5-2 Inverter Mounting Clearance

➢ **Installation**

Tools required for installation.

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

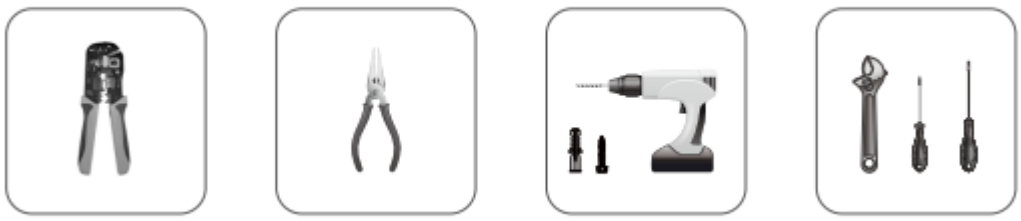


Figure5-3 Installation tools

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 a 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.

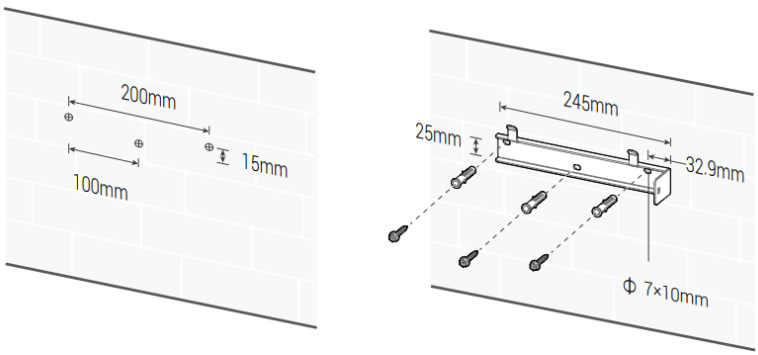


Figure5-4 Inverter wall mounting

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 fixed screws on the right side of the inverter.

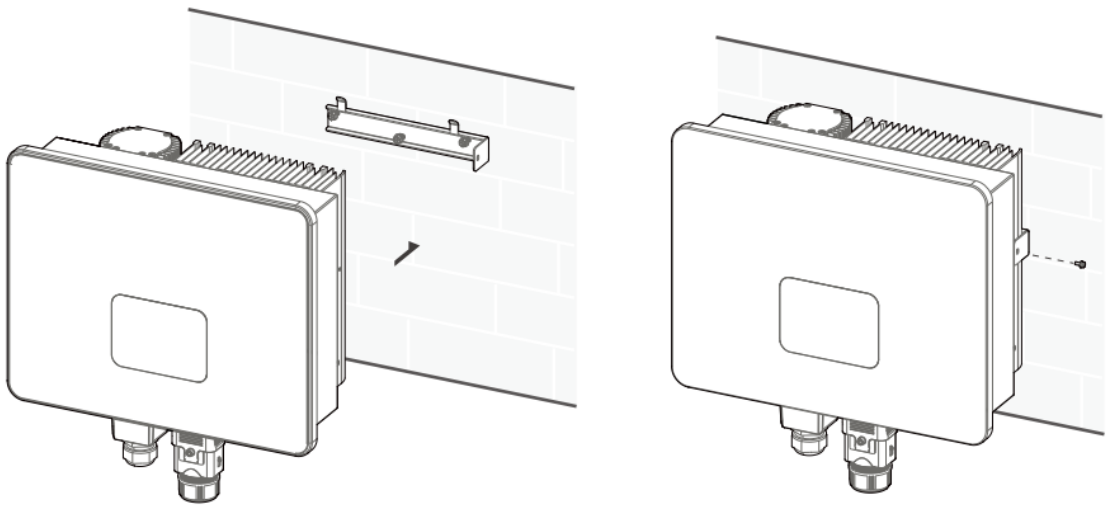


Figure5-5 Inverter Installation Instructions

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

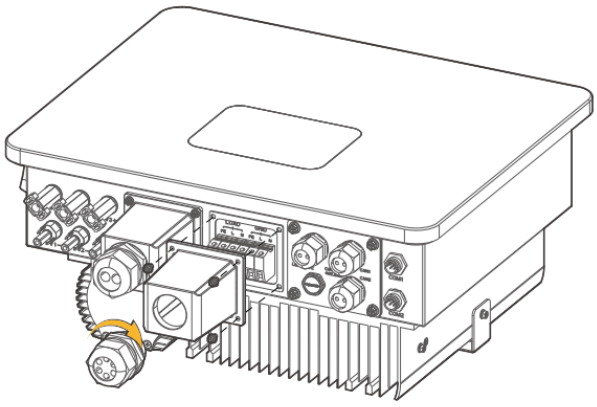


Figure5-7 Inverter Installation Instructions

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.

6. Electrical Connection

Electrical wiring diagram

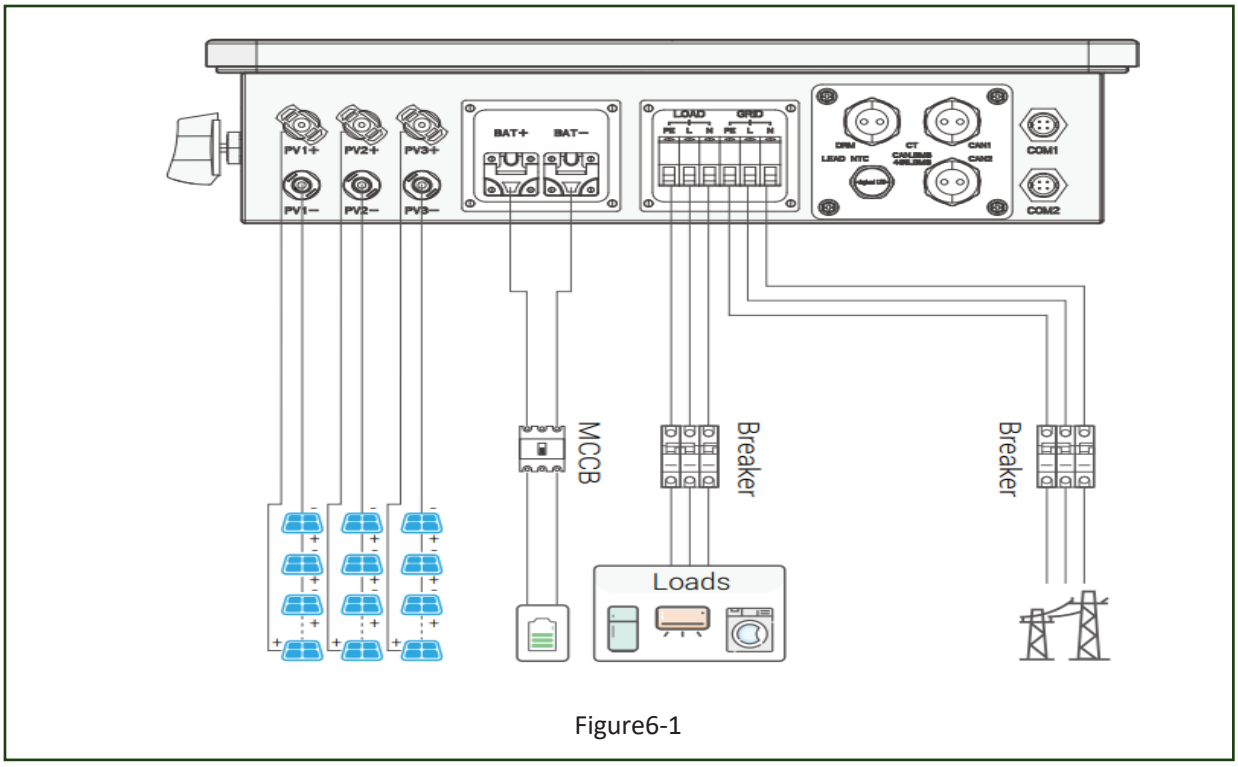
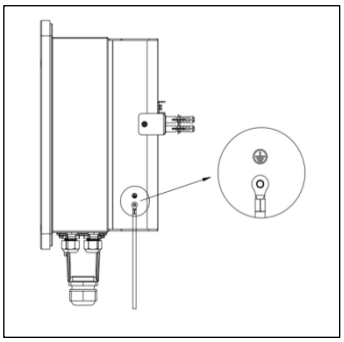


Figure6-1

6.1 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.



6.2 PV Input Cable Installation

Brux series inverters can be connected in series with 2/3-strings PV modules for 3kW, 3.6kW, 4kW, 4.6kW, 5Kw,6Kw and 8kW.

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	Brux3K6TL-HT	Brux4KTL-HT	Brux4K6TL-HT	Brux5KTL-HT	Brux6KTL-HT	Brux8KTL-HT
MAX. DC Input Voltage	550V					
MPPT Range	80V-500V/360V					

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. To save cable and reduce the DC loss, we suggest installing 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 between the positive pole and negative pole of PV to earth is correct. (Warning: should be MΩ level)

Step2.: Separating the DC connector

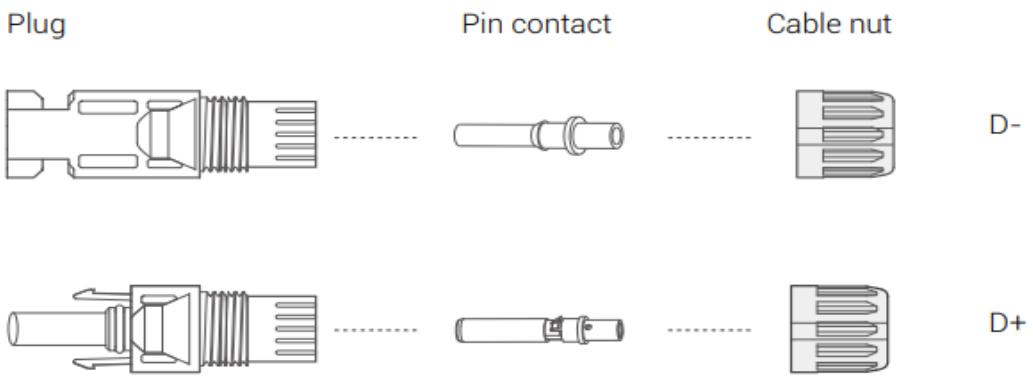


Figure6-2

Step3: Wiring

(1) Choose 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.

Figure6-3

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

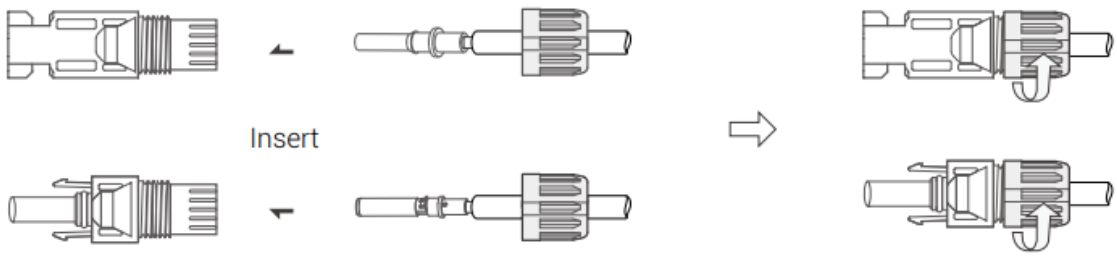


Figure6-4

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

Figure6-5

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

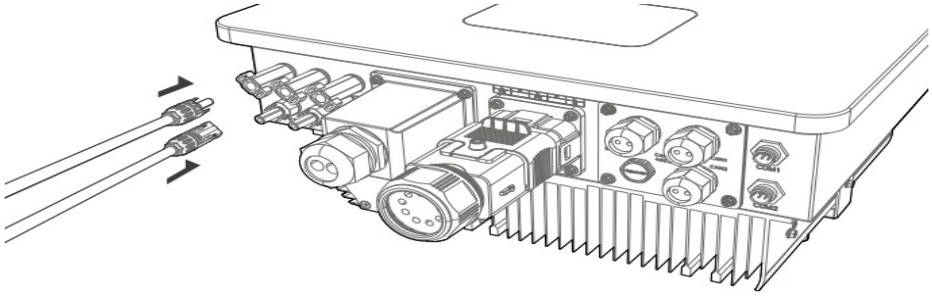


Figure6-6

Caution!

Danger of burn injuries due to hot enclosure parts! If DC inputs are accidently reversely connected or inverter is faulty or not working properly, it is NOT allowed to turn off the DC switch. Otherwise, it may cause DC arc and damage the inverter or even lead to a fire disaster. 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 to reduce until the current decreases to below 0.5A.

*Only after the current is below 0.5A, you are allowed to turn off the DC switches and disconnect the PV strings.

* To eliminate the possibility of failure, please disconnect the PV strings after turning off the DC switch to avoid secondary failures due to continuous PV energy on the next day. Please note that any damage due to wrong operations is not covered in the device warranty.

6.2 AC Cable Installation (Grid)

Step1: Check the grid voltage and select appropriate breaker size

- Check the grid voltage and compare it with the allowed voltage range (refer to the technical data).
- Disconnect the board from all phases and ensure that it is not reconnected.
- Install an AC circuit breaker on the grid side for safety.

Item	Brux3K6TL-HT	Brux4KTL-HT	Brux4K6TL-HT	Brux5KTL-HT	Brux6KTL-HT	Brux8KTL-HT
Micro-breaker	25A		32A		63A	

Step2: Select the appropriate cable and cable lug.

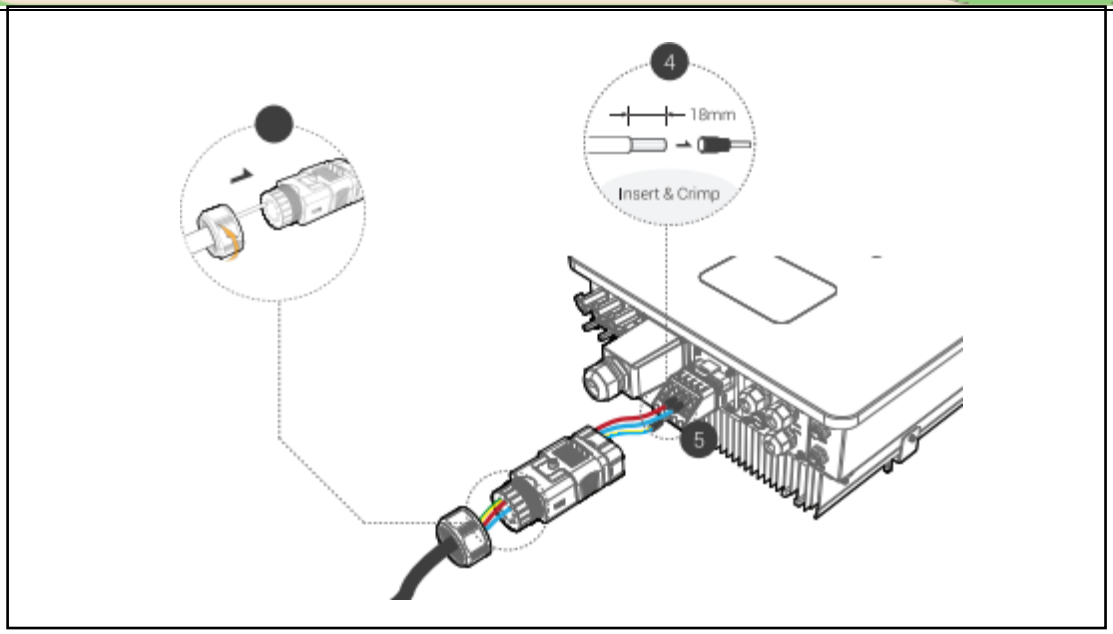
Model	Brux3K6TL-HT	Brux4KTL-HT	Brux4K6TL-HT	Brux5KTL-HT	Brux6KTL-HT	Brux8KTL-HT
Cable	6mm^2		6mm^2		8mm^2	

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.

Step 5: Insert the terminals into grid ports (loosen or tighten the crimp terminal screws with a one-way screwdriver).



6.4 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 "Off grid 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.

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 after-sales support team.

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.

Item	Brux3K6TL-HT	Brux4KTL-HT	Brux4K6TL-HT	Brux5KTL-HT	Brux6KTL-HT	Brux8KTL-HT
Micro-breaker	25A		32A		63A	

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, this will void the warranty.

Step1： Select the appropriate cable and wire connector

Model	Brux3K6TL-HT	Brux4KTL-HT	Brux4K6TL-HT	Brux5KTL-HT	Brux6KTL-HT	Brux8KTL-HT
Cable	6mm²		6mm²		8mm²	

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).

- **Wiring diagram**

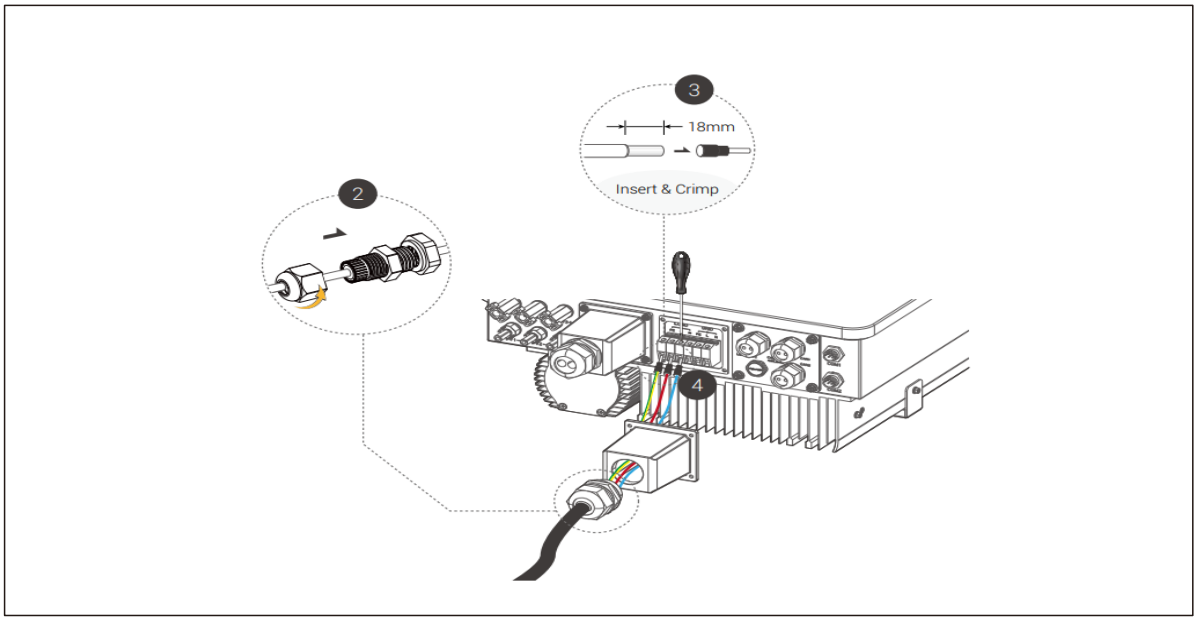


Figure6-12

Warning!

Ensure that the load output power is within its rated power, otherwise the inverter will shut down with an "overload" 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.

6.5 Battery Cable Installation

The charging & discharging system of Brux-series inverter is designed for 48V lithium battery.

Before choosing battery, please note the maximum voltage of battery cannot exceed 60V and the battery communication should be compatible with the inverter.

Battery breaker

Before connecting to battery, please install a non-polarized DC breaker (DC_MCCB) to make sure inverter can be securely disconnected during maintenance.

Model	Brux3K6TL-HT	Brux4KTL-HT	Brux4K6TL-HT	Brux5KTL-HT	Brux6KTL-HT	Brux8KTL-HT
Current [A]	100A	125A	125A	150A	150A	200A

Battery connection diagram

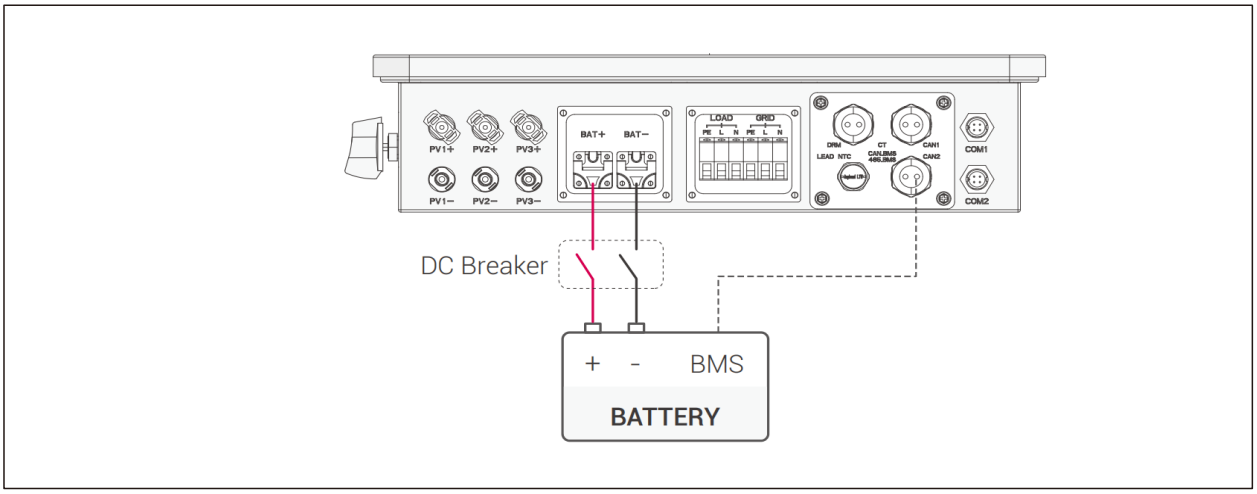
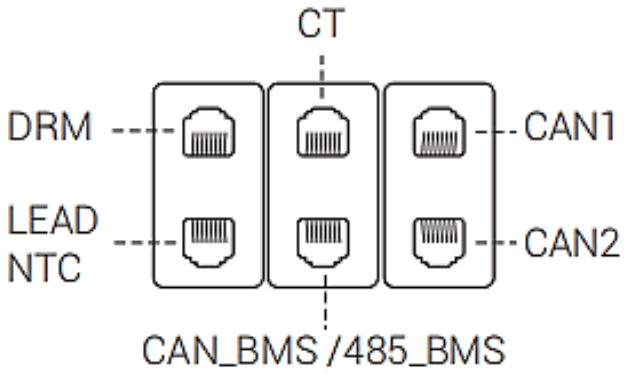


Figure6-13

BMS PIN Definition

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



Signal Line/Communication Interfaces

CN10

	1	2	3	4	5	6	7	8
CAN	X	X	X	BMS_CANH	BMS_CANL	X	X	X
RS485	X	X	X	X	X	GND	BMS_485A	BMS_485B

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.

Model	Brux3K6TL-HT	Brux4KTL-HT	Brux4K6TL-HT	Brux5KTL-HT	Brux6KTL-HT	Brux8KTL-HT
Cable	25mm²			35mm²		50mm²

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

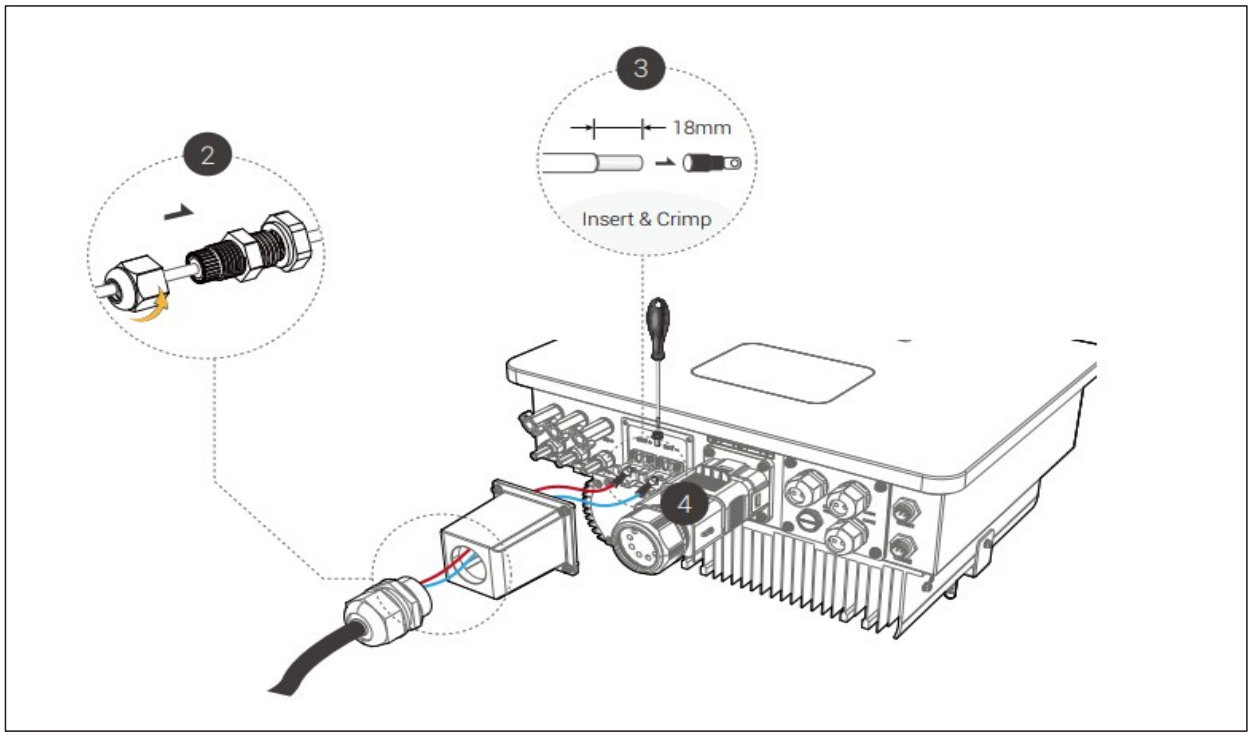


Figure6-14

Note!

The positive and negative lines must not be reversed, as doing so will void the warranty.

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 (loose or tighten the crimp terminal screws with a one-way screwdriver).

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.

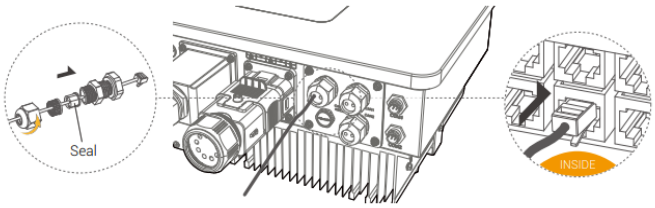


Figure6-15

Note!

The seal is used for waterproofing. Please ensure it is properly reinstalled.

6.6 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-use", "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 (Europe, Africa, Asia, Australia). A CT is provided in the accessory. The RJ45 connector of CT is connected to” CT-L1”, and the CT is connected to L phase.

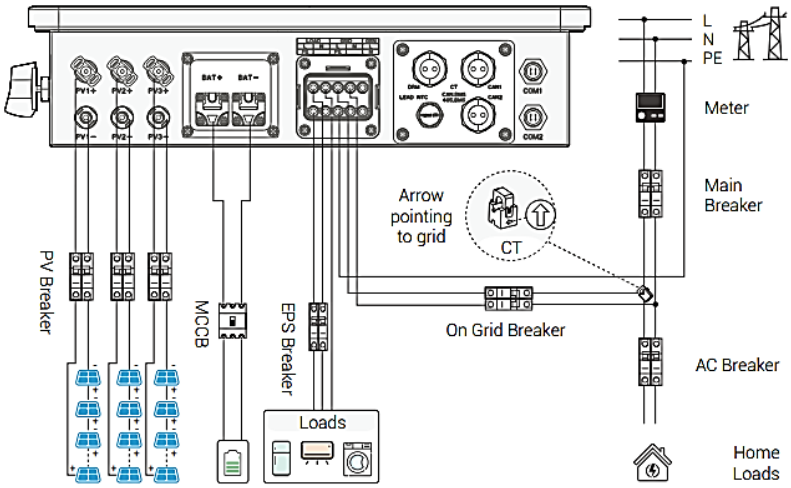


Figure6-16

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.

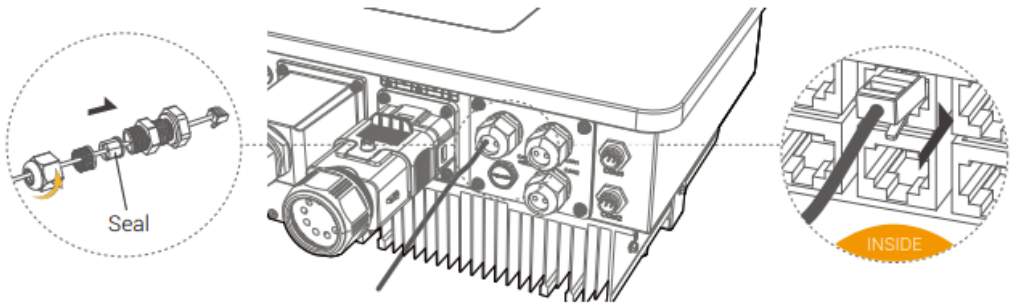


Figure6-17

Note!
The seal is used for waterproofing. Please ensure it is properly reinstalled.

6.7 WiFi/GPRS Connection (optional)

The inverter includes a Wi-Fi port that collects data from the inverter and transmits it to a monitoring website via Wi-Fi. Please purchase the product from the supplier if necessary.

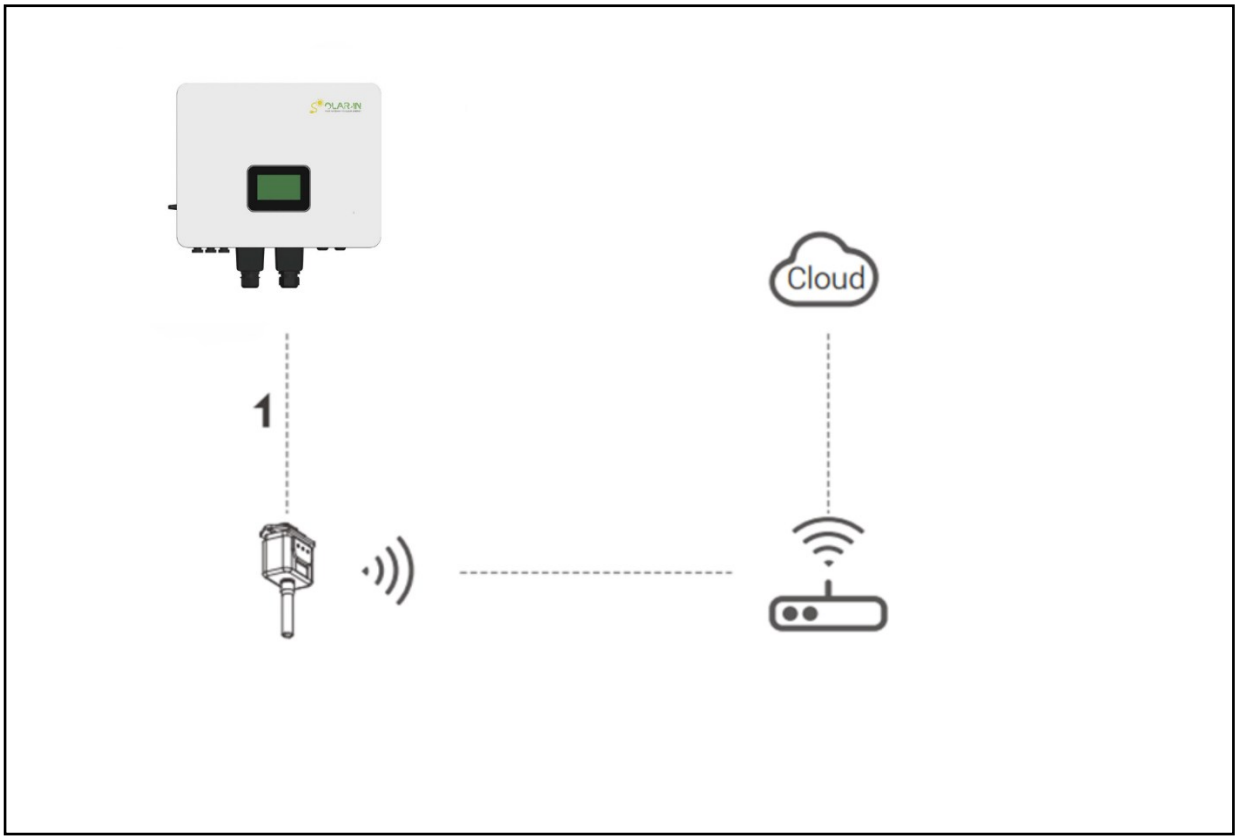


Figure6-18

WIFI connection steps:

Step1： Assemble WIFI adaptor to COM1 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).

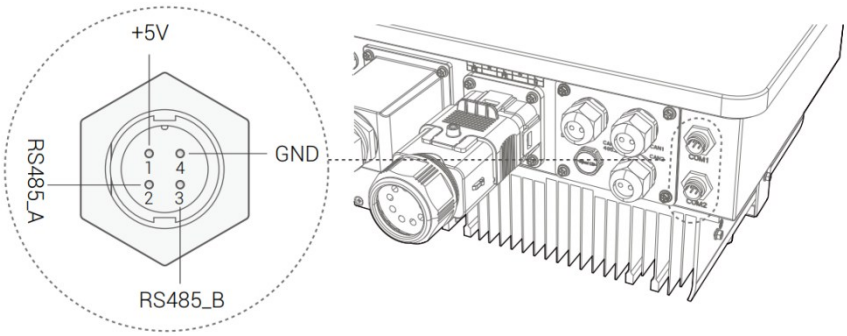


Figure6-19

6.9 Bluetooth Connection (optional)

If you need to set a mode or check the device status, you can connect locally via Bluetooth. The inverter provides a Wi-Fi (including Bluetooth) port that can collect data from the inverter and transmit it to a mobile terminal via Bluetooth.

Step 1: Plug the Wi-Fi into the COM1 port at the bottom of the inverter.

Step 2: Turn on the Bluetooth of the mobile terminal to search for a pairing connection.

Step 3: Open the solarman Smart SETapp on the mobile terminal.

Step 4: Click on the local mode, enter the SN code by scanning or manually inputting the SN code.

Figure6-22

6.10 Inverter Parallel Guide

6.10.1Parallel System Diagram

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

NOTE:

If using the 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 8.1.3 Setting Option (2) Parallel Settings.

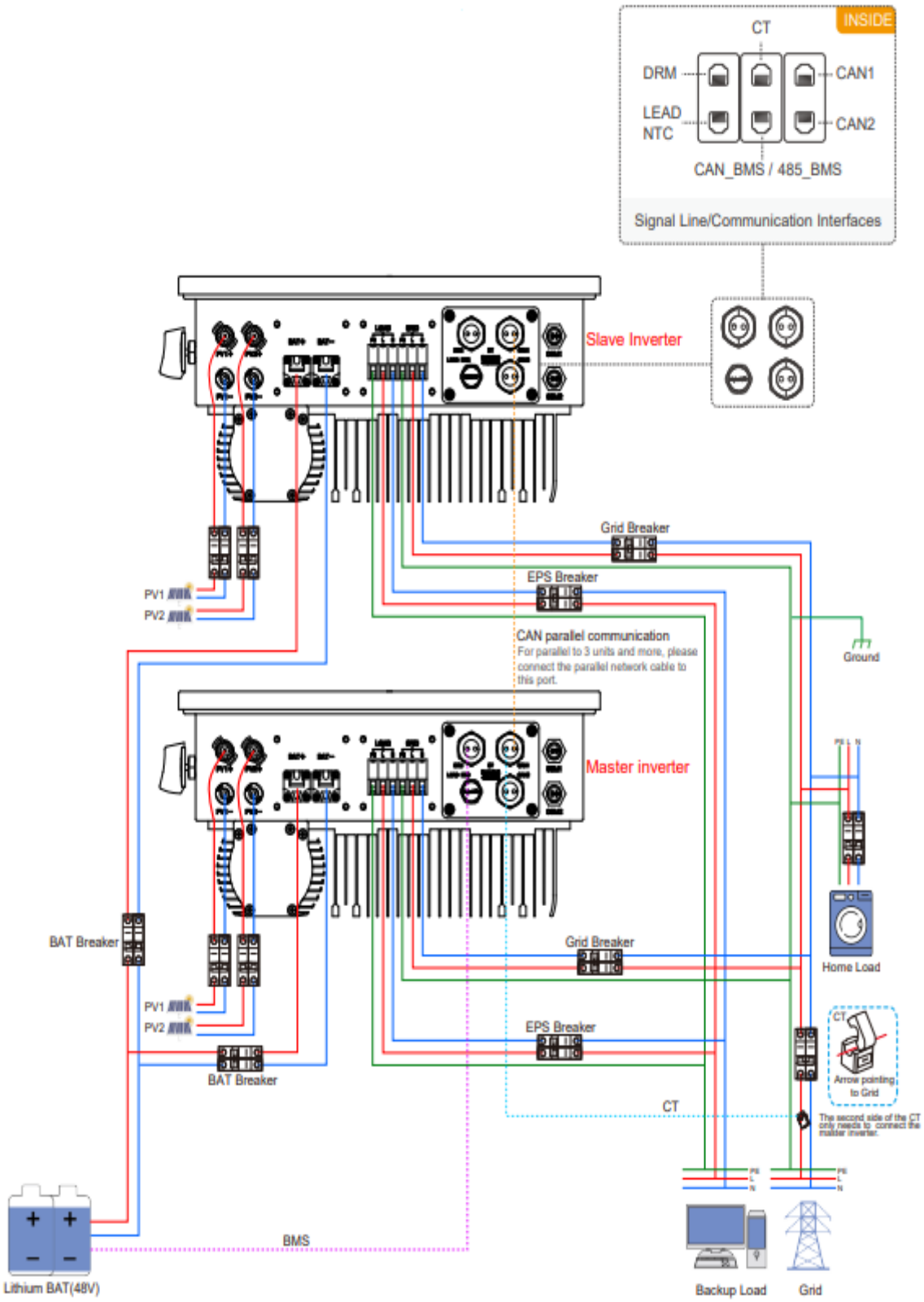

INSIDE
CT
DRM
LEAD
NTC
CAN1
CAN2
CAN_BMS / 485_BMS
Signal Line/Communication Interfaces
Slave Inverter
Grid Breaker
EPS Breaker
PV1
PV2
CAN parallel communication
For parallel to 3 units and more, please connect the parallel network cable to this port.
Ground
Master inverter
BAT Breaker
Grid Breaker
Home Load
PV1
PV2
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

Figure6-23

6.10.2 Parallel use matters

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

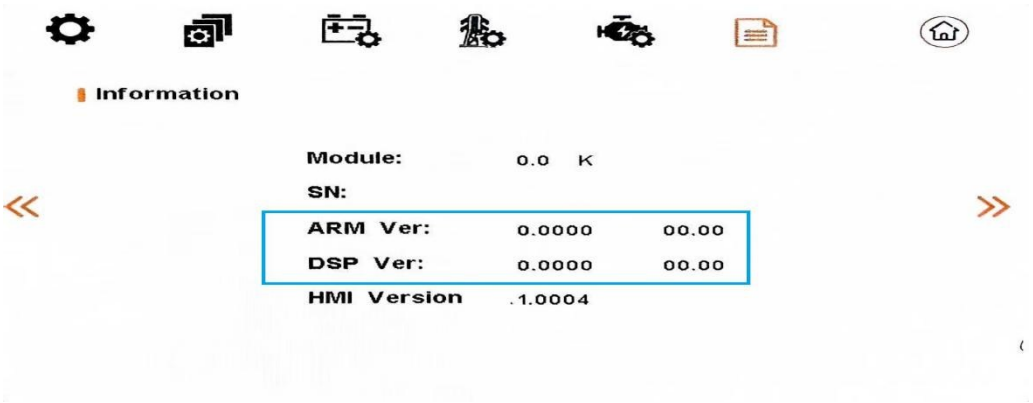


Figure6-24

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.

6.11 Inverter Three Phase Guide

6.11.1 Three phase System Diagram

Three single-phase inverters can be combined to form a three-phase inverter. The system block diagram is as follows.

NOTE:

1.Please disable the parallel function and enable the group three phase function.

2.Set the parallel address of the 1# Master to 1, the parallel address of the 2# slave and the parallel address of the 3# slave to 3.

3.Select phase A for the 1# Master inverter and phase A for the grid interface (The host must be set to phase A); Select phase B for the 2# slaver inverter and phase B for the grid interface; Select phase C for the 3# slaver inverter and phase C for the grid interface.

4. If a phase sequence error alarm is generated for the inverter, the three-phase power grid does not correspond to the three-phase phase sequence of the inverter ABC, and the phase sequence needs to be adjusted.

For 3 Phase 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 the three-phase configuration method, see 8.1.3 Setting Option (2) parallel setting.

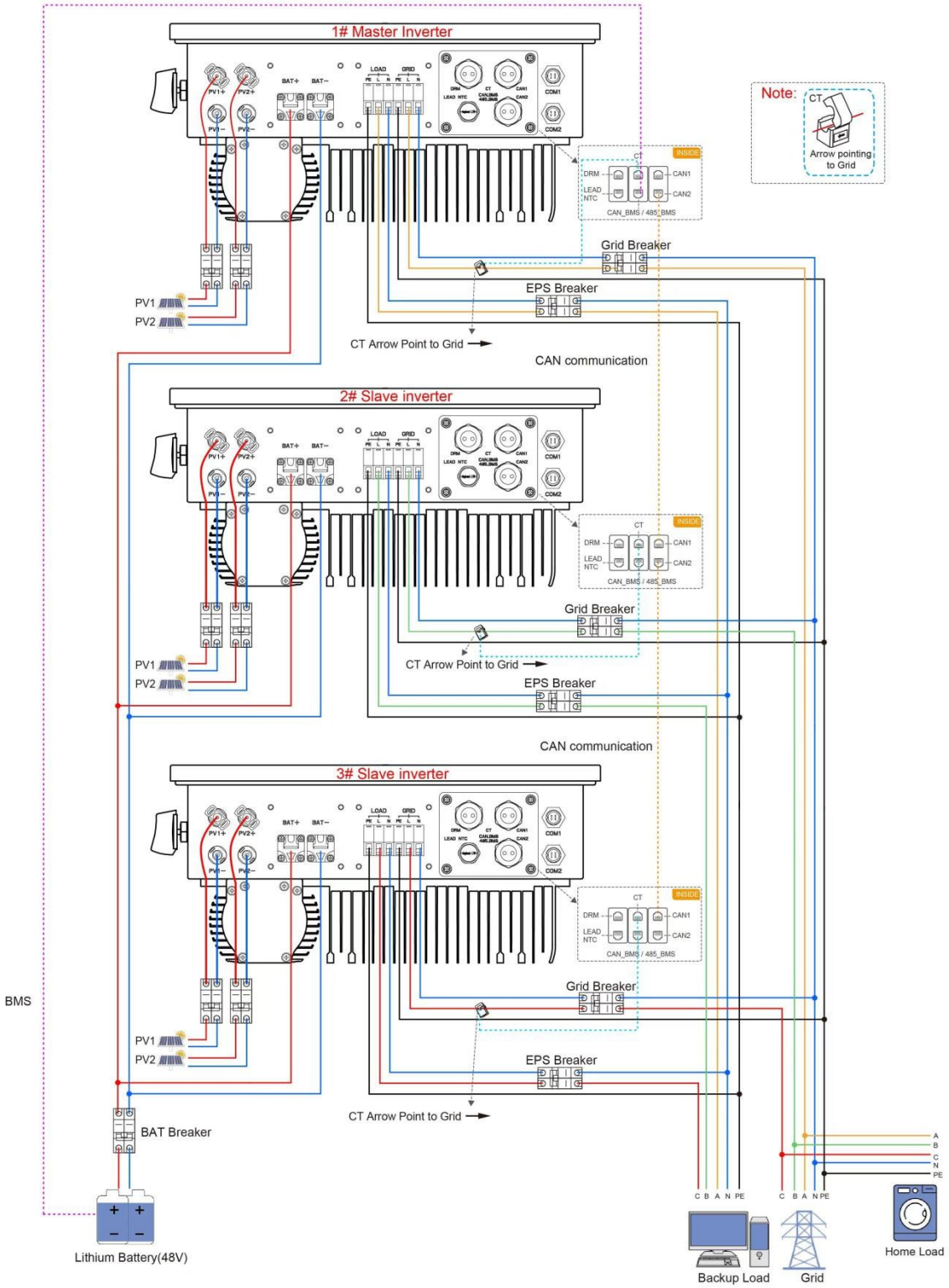

1# Master Inverter
2# Slave inverter
3# Slave inverter
Note:
CT
Arrow pointing to Grid
Grid Breaker
EPS Breaker
CT Arrow Point to Grid
CAN communication
PV1
PV2
BMS
BAT Breaker
Lithium Battery(48V)
Backup Load
Grid
Home Load

Figure6-25

6.11.2 Three-phase use matters

1. Ensure that all three-phase units use the same software version.

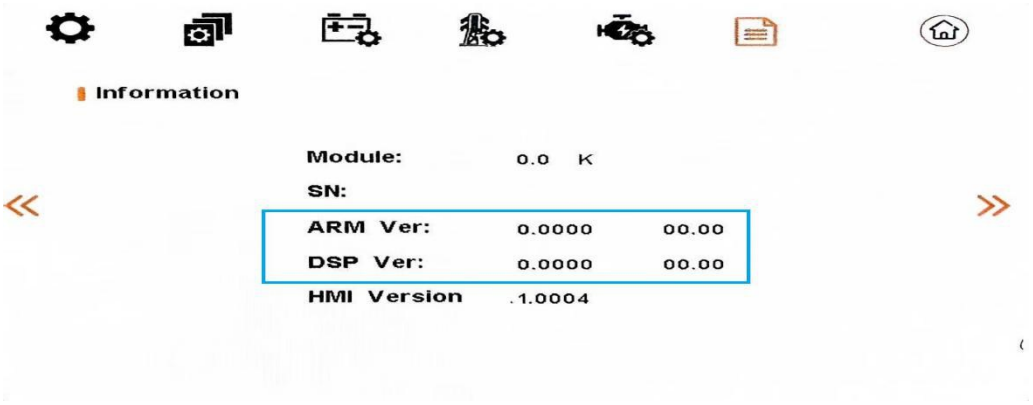


Figure6-26

2.Connect the load line and the power grid line separately, and it should be noted that the load line and the N line of the grid line needs to be connected together.

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.

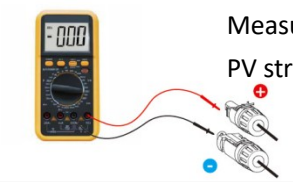
6.In the group three-phase system, the main load and the grid line must be connected as phase A, the load of 2# slave and the grid line must be connected as phase B, and the load and grid line of 3# slave must be connected as phase C.

7.When the group is three-phase, it is also necessary to set the number and address of parallel machines.

7.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 places 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 7-1

Measure AC voltage and frequency.
Figure 7-2

Starting inverter:

· Inverter will start automatically when the PV panel generates 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.
-The DC switch of the inverter is in the ‘ON ‘position.
· Enter the setting interface.
· Setting grid standards, page 73; Set the PV connection mode, see page 67; To set the working mode, see page 65; Set the battery type, see page 69; To set inverter output power, see page 71.

Shut down inverter:

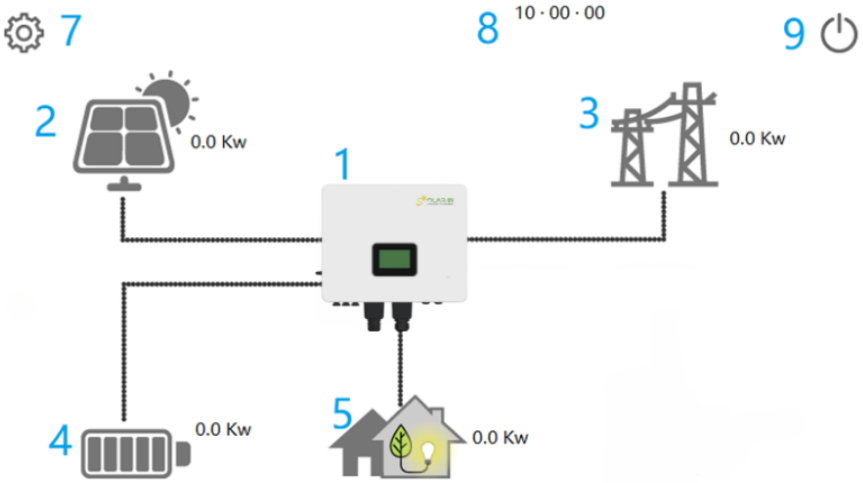
· Disconnect the external AC circuit breaker and secure it against reconnection.
· Rotate the DC switch to the "OFF" position for disconnecting all the PV string inputs.
· Wait about 10 minutes until the capacitors inside the inverter completely discharge.
· Ensure that the DC cable is current-free via a current clamp (Figure 7-3).

Figure 7-3

8. Operation

8.1 LCD Operation

8.1.1 Home Page

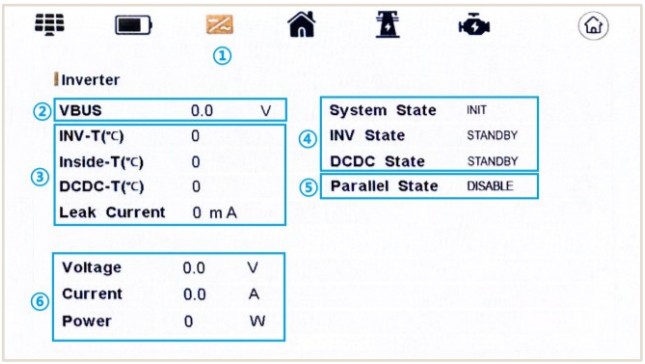


Code	Name	Explanation
①	Brux Series Single Phase Inverter	Click on the display to enter the working status interface of the inverter, see section 8.1.2(1) for details.
②	PV	Display the real-time PV power. Click PV to enter the working status interface of PV, see section 8.1.2(2) for details.
③	Grid	Display the real-time grid power. Click Grid to enter the working status interface

		of grid, see section for 8.1.2(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 8.1.2(4) details.
⑤	Load	Display the real-time load power. Click Load to enter the working status interface of load, see section for 8.1.2(5) details.
⑥	Generator	Optional (it comes with some versions of our inverters)
⑦	Setting	Users can click Setting to enter the settings interface, see section 8.1.3 for details.
⑧	Time	Display time.
⑨	Switch	Click the switch to set the switch of the inverter , see section for 8.1.2(7) details.

8.1.2 Working Status

(1) Brux series inverter



①Users can click on the icons above to switch device status data (PV, Battery, Inverter, Load, Grid or 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.

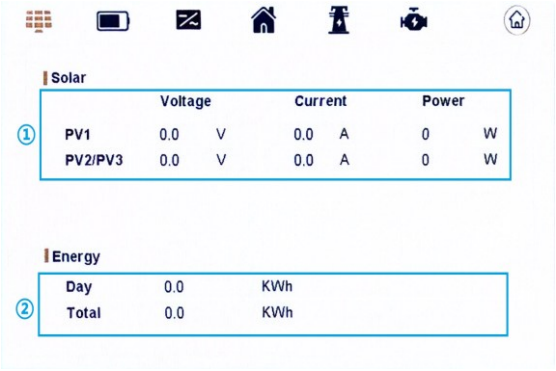
DCDC Status: Displays charging and discharging status information, including: STANDBY, CHARGE, DISCHARGE.

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

⑤**Leak current**: Real-time leak current of the machine.

⑥The **voltage**, **current**, and **power** of the inverter side are displayed in real time.

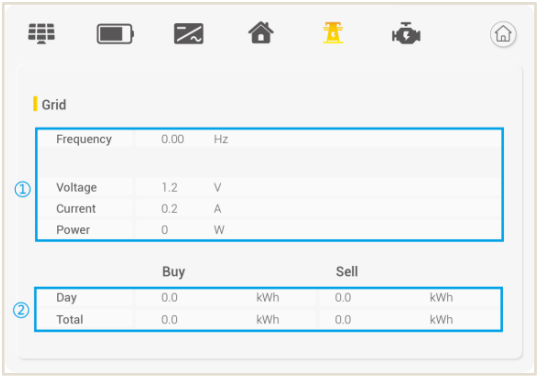
(2) PV



①Display the working parameters of the two channels of PV (**PV1, PV2/PV3**), including **real-time voltage**, **current**, and **power.** (PV input type can be set in the settings)

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

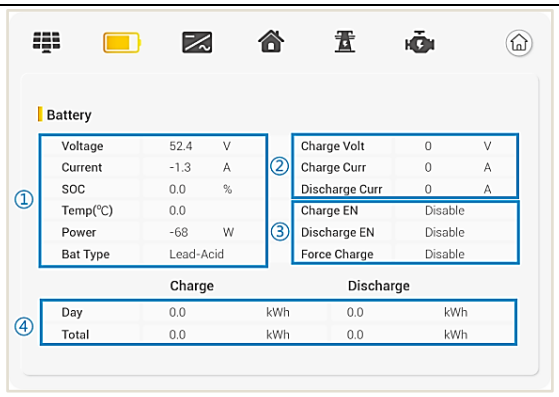
(3) Grid



①Display the working parameters on the grid, including **Frequency**, **real-time voltage**, **real-time current**, and **real-time power**.

②Accumulated energy from the power grid to the equipment (Buy) and accumulated energy from equipment to the power grid (Sell), including daily and 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**.

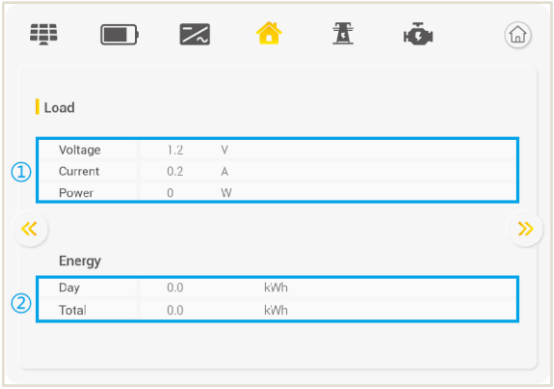
Charge EN：Charge Enable　　Discharge EN：Discharge Enable

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

(5) Load

Load/Page One

Load

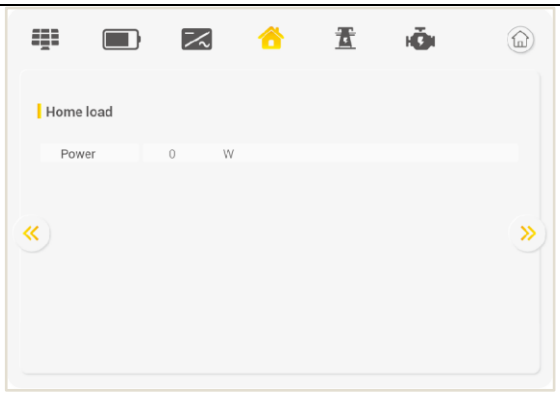


User can click « to return to the previous page and click » to enter the next page. (not to be repeated later)

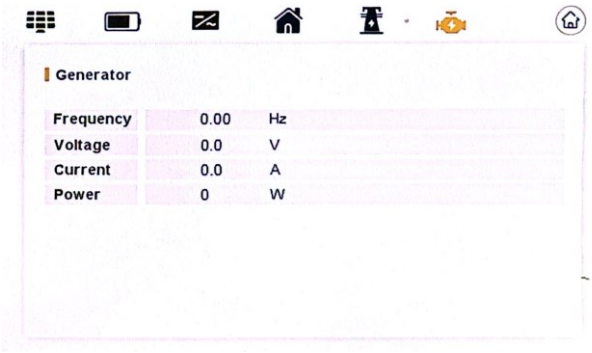
①Display the working parameters of the load, including **real-time voltage**, **current**, and **power.**

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

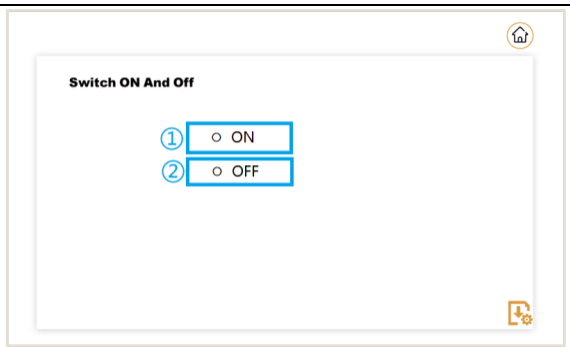
Load/Page Two

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


Display the working parameters of the generator, including **real-time Frequency, voltage**, **current**, and **power**.

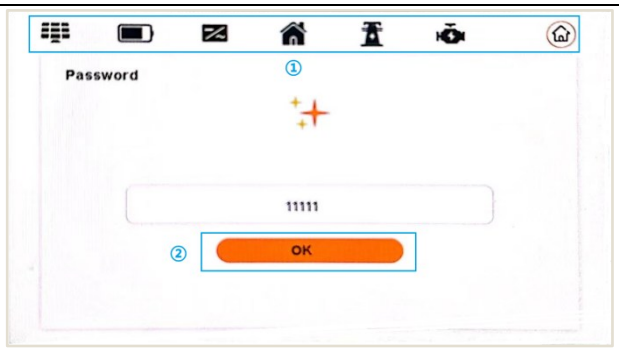
(7) Switch


①Power on, the inverter works. ②Power off，the inverter stops working.

8.1.3 Setting

Enter Setting

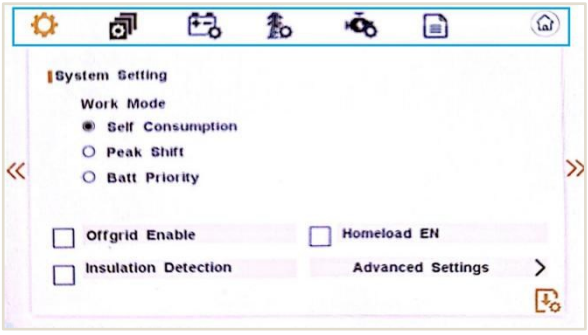
(1) Input password



①Users can click on the icon above to enter device status data (**PV**, **Battery**, **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

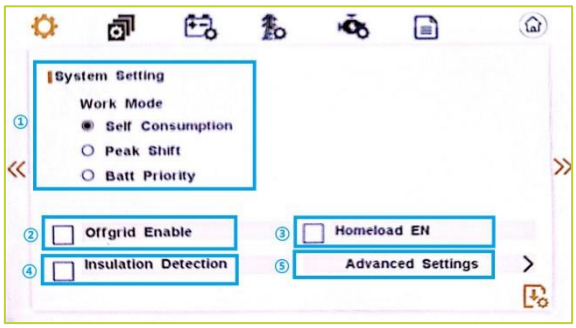
: Machine Information : Return Home Page

: 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 enabled.

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

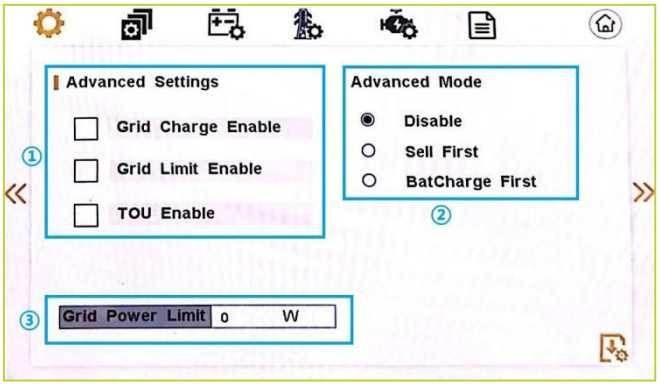
④**Insulation Detection**：Insulation detect (The default option is enabled). When the insulation detection function is enabled in the grid connected state, the insulation detection is performed once a day when the photovoltaic energy comes in, and the inverter switches to the By-pass band load. If the 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 three options here: Disable Mode, Sell First Mode and BatCharge First Mode. The advanced mode takes effect only in automatic self-Consumption mode.

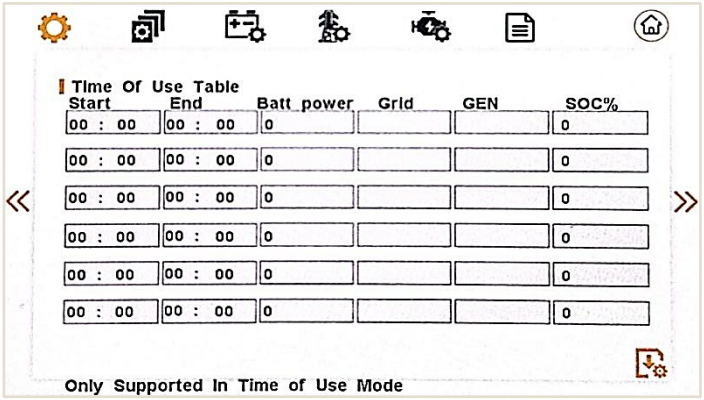
Disable: When the user selects "Disable", the two working modes， are invalid. Only if the other two options are selected, the two working modes (Sell Fiest, BatCharge First) take effect and work.

Sell First: In this mode, PV will be given priority to AC output, where the load priority is higher than the grid, and excess energy will be provided to the battery.

BatCharge First： In this mode, the PV will provide energy to the battery first, and the excess energy will be provided to the AC output, whose load is prioritized over the grid.

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：**



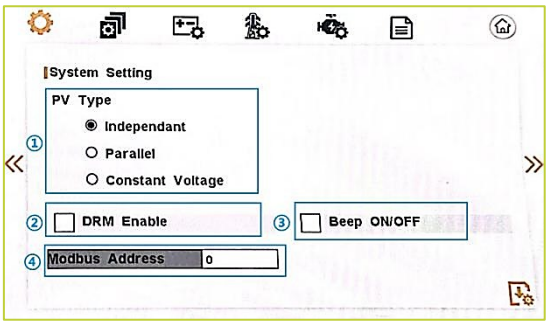
Time-of-use Enable: There are 6 slots which can be programmed. If grid charge is enabled, the grid is used to power the load and charge the battery to target SOC at specific bat power attribute value.

Grid： Grid is ticked, indicating that in the effective interval of the current interface time period, if the set SOC is greater than the actual SOC of the battery, the power grid will charge the battery (if not ticked, the power grid will not charge the battery).

GEN： GEN is ticked to indicate charging with GEN.

Batt power： The power that the grid charges and discharges to the battery.

System Setting/Page Two:



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

Independent： The Factory default is independent. When photovoltaic parallel input is set to independent mode, photovoltaic power will be unbalanced

Parallel: Parallel is commonly used for testing, two or three photovoltaic circuits are connected in parallel.

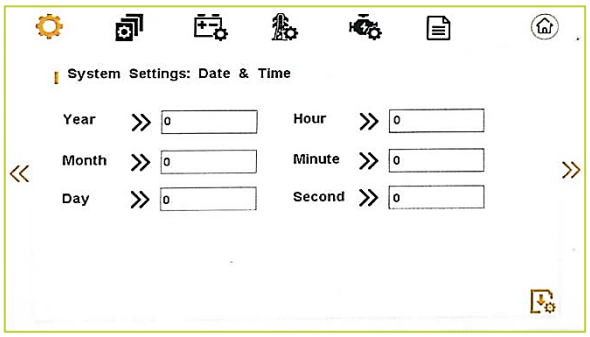
Constant Voltage: Constant voltage mode

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. Users can change the Modbus address as required.

System Setting/Page Three:

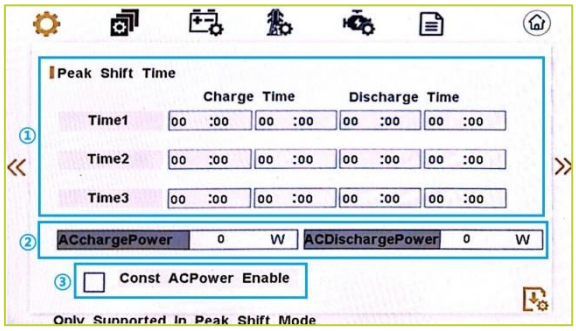


Date and Time settings

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:

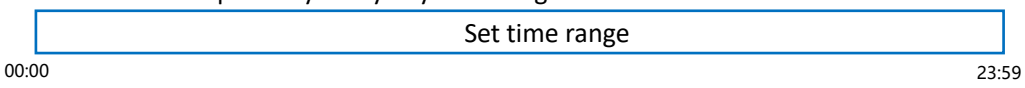


Setting of charging and discharging time for Peak Shift.

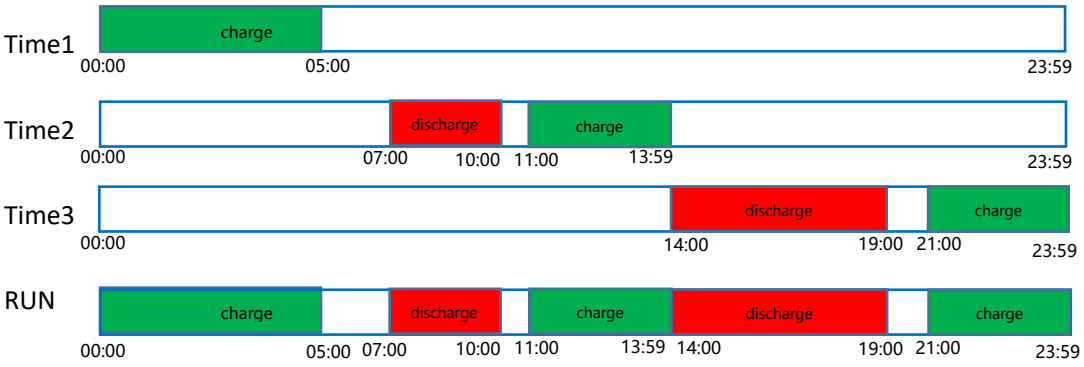
When the working mode is Peak Shift, users need to enter this interface to set the charging and discharging time. And Users need to manually input the start charge/discharge time and the end charge/discharge time.

① **WORKTIME***

1) The maximum allowable setting time is 24 hours (one day), It is allowed to set six different charging and discharging states within 24 hours (time1 twice,time2 twice,time3 twice), The inverter runs repeatedly every day according to the set time.



2) The inverter executes according to the settings of time1, time2 and time3 in the order of time. The following figure is an example。 Different time periods do not overlap.



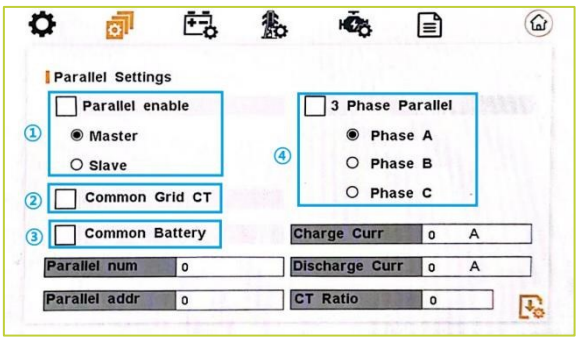
3) If you want to set a continuous charging time from the first night to the next morning. For example, you want to charge battery form first day 21:00pm to next day 5:00am, divide this time period into two time periods (21:00~23:59, 00:00~05:00), and select two charging time periods from Time1, Time2 and Time3 and set them.

② **AC charge Power:** 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 draw energy from the grid based on power Settings.

ACDischargePower: This feature only works in Peak shift mode, during the discharge period, supply energy to the grid at the set power，the actual power depends on the setting and the grid discharge power which is less.

③ **Const ACPower Enable：** The AC charge Power and AC Discharge Power functions take effect only when this option is selected.

(2) Parallel Setting



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

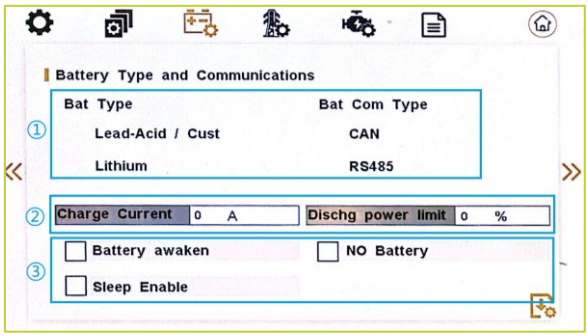
Master/Slave: This interface is used for parallel, and the inverter is selected as the master or slave.

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 charging current of parallel machine.
Discharge Cur: Set the discharge current of parallel machine.

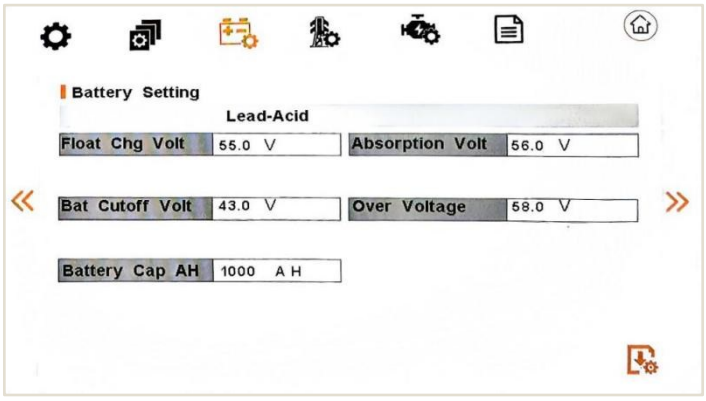
(3) Battery Settings

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 59.5) Set the floating charge voltage to be less than the constant charge voltage).

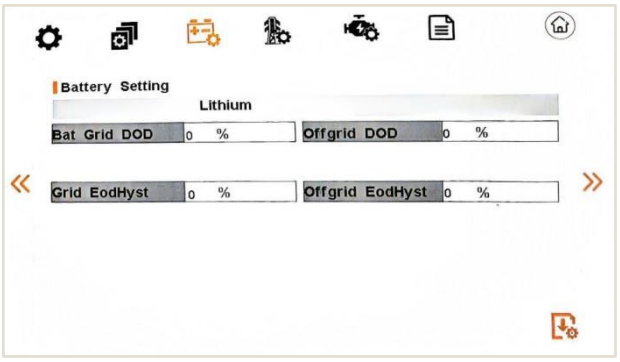
Bat Cutoff Volt: Discharge protection voltage (This interface is used to set the lead acid battery discharging voltage (The input value ranges from 40 to 51) Discharge cut-off voltage, as recommended by the battery manufacturer).

Battery Cap AH: Battery capacity (This interface is used to set the lead acid Battery capacity. It is related to 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 59.5) Charge protection voltage, as recommended by the battery manufacturer).

Battery Settings/Page Three



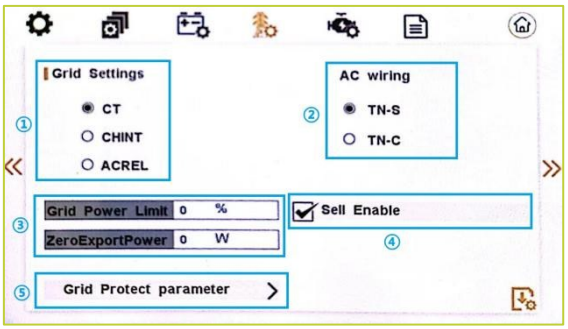
Settings required when using lithium

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**.

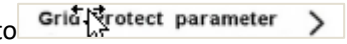
②Users can set the AC wiring system to TN-S or TN-C.

③**Grid Power Limit**： Users can click to enter the numerical input interface. This function is used to limit the inverter conversion power of the inverter. The default parameter is 100%.

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

④**Sell Enable**： Whether the inverter is allowed to sell electricity to the grid. The option is checked, which means that the inverter can generate electricity to the grid.

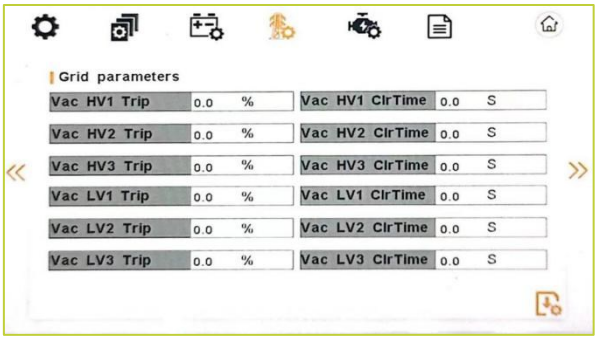
⑤**Grid Protect parameter**

Users can click to 

enter the advanced settings interface.

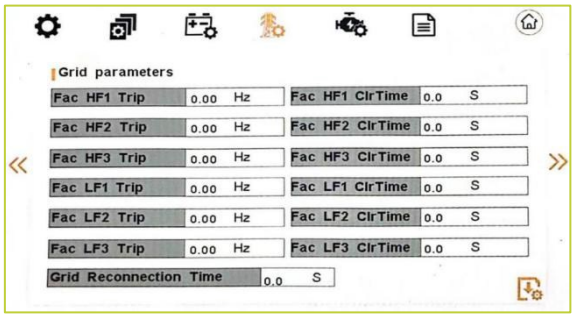
Grid parameters/page one:

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.



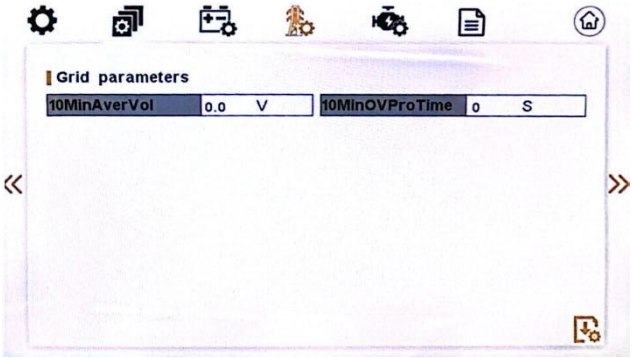
Grid parameters/page two:

On this page, users can set over frequency protection, over frequency 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.

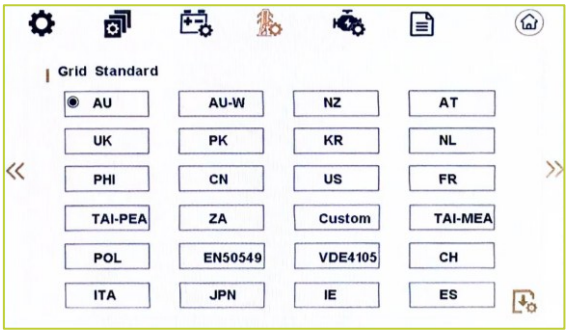


Grid parameters/page three:

Ten ten minutes Protection voltage and ten protection time, default values are 253V and 603S. The setting value of the protection voltage cannot exceed the primary overvoltage protection value of the power grid standard. The protection time can only be changed if the Italian safety regulations are set, and the value range is 600 to 610S. Every increase of 1 means that the Italian self-test level 1 overvoltage detection time is increased by 1000ms.



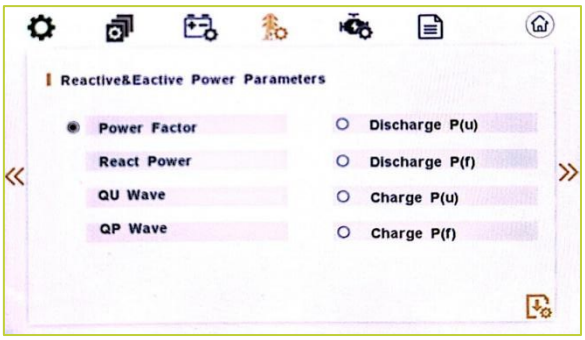
Grid Setting/Page Two



This interface is used to select Grid standard. Users 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	CH：Switzerland
POL: Poland	EN50549 (Belgium)	VDE4105 (Germany	ES：Spain
ITA: Italy	JPN: Japan	IE: Ireland	

Grid Setting/Page Three



REACT Power Parameter：REACT Power Parameter，including **Power Factor**, **React Power**, **QU Wave**, **QP Wave**. (For specific country if required by the local grid.)

Power Factor: The input value should range between L0.80 and L0.99 or C0.8 and C1.00.

React Power: Reactive power control

The input value should range between -60% and +60%, which varies with the standard.

QU Wave: Voltage-reactive curve

QP Wave: Active power-reactive power curve

(These two functions are not available on the screen, please contact the distributor if you need to use them).

Discharge P(u): Discharge voltage response.

When the power grid voltage is abnormal, limit the discharge active power and enable the function according to the requirements of the national power grid standard.

Discharge P(f): Discharge frequency response.

When the power grid frequency is abnormal, limit the discharge active power and enable the function according to the requirements of the national power grid standard.

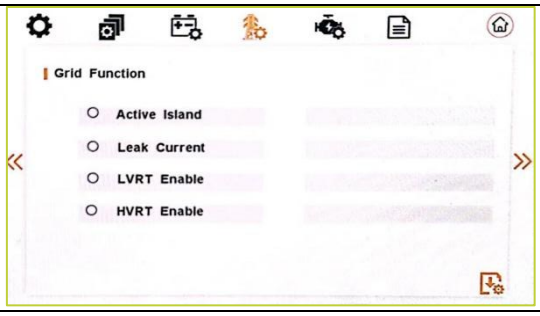
Charge P(u): Charge voltage response.

When the power grid voltage is abnormal, limit the Charge active power and enable the function according to the requirements of the national power grid standard.

Charge P(f): Charge frequency response.

When the power grid frequency is abnormal, limit the Charge active power and enable the function according to the requirements of the national power grid standard.

Grid Setting/Page Four



Active Island: Anti-Islanding (The default option is enabled)

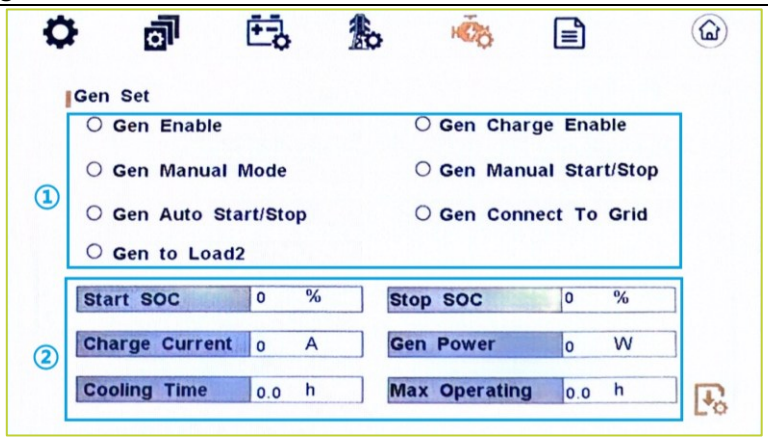
When the grid goes down, the inverter will detect the loss of power and disconnect from the grid within milliseconds. It prevents your solar panels from feeding electricity into a downed power line.

Leak current： Leak current detect (The default option is enabled).

LVRT Enable: When the inverter is connected to the grid, the grid voltage suddenly drops, and the inverter can still be connected to the grid for a short time. To use this function, turn off Offgrid Enable.

HVRT Enable: When the inverter is connected to the grid, the grid voltage suddenly rises, and the inverter can still be connected to the grid for a short time. To use this feature, turn off Offgrid Enable.

(5) Generator Setting



①Diesel generator enable settings:

Gen Enable: Enable control of the Generator function.

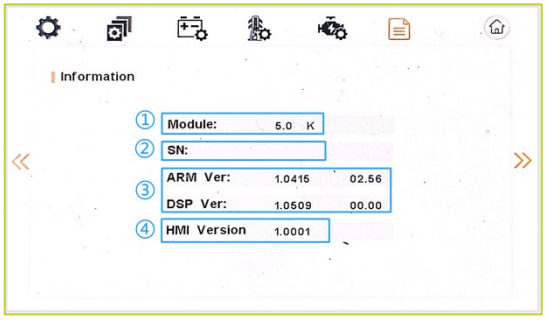
Gen Chare Enable: Generator Charge Enable control.

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**: When enabled, the generator can be connected to the grid input port. **Gen to Load2:** When enabled, the generator port can be used as a second load output port. 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

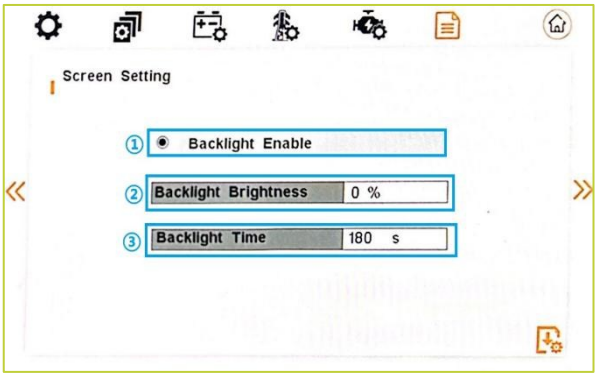
Machine Information/Page One

	①Show inverter model. ②Inverter serial number. ③Show Software version. ④Display HMI version

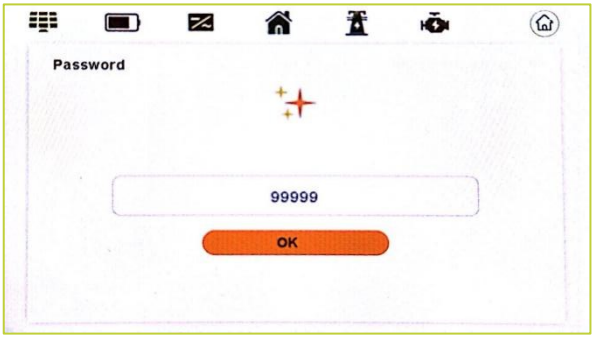
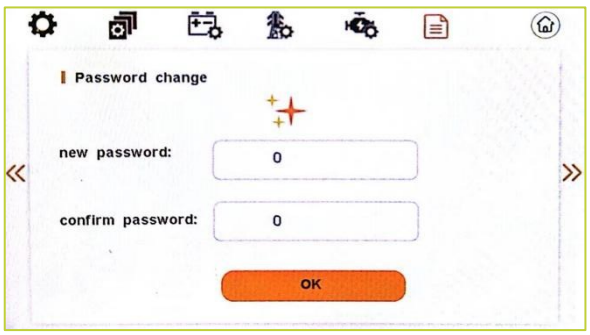
Machine Information/Page Two

	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.

9. APP Operation

9.1 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.

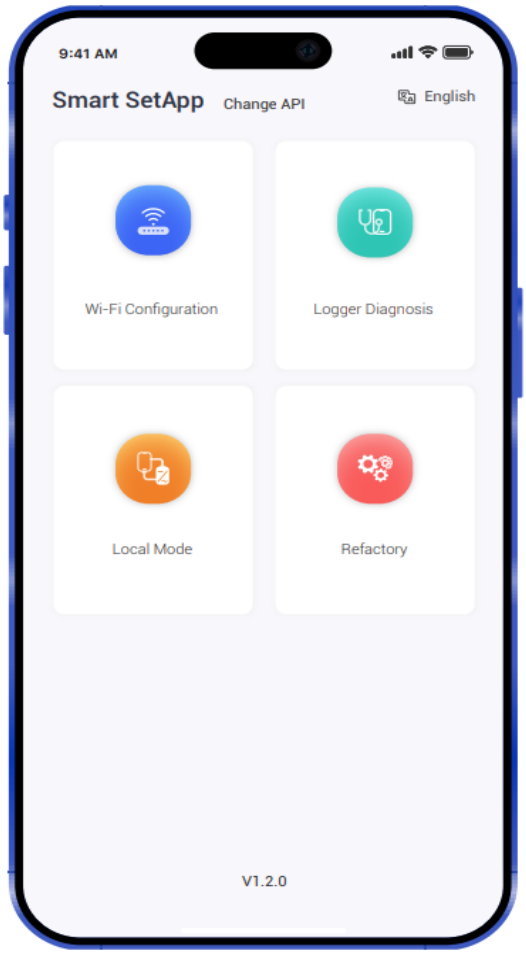


Figure 9-1

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.

9.2 Local Mode

9.2.1 Add a Logger

Click on Local Mode, it will immediately jump to the scanner interface. 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.

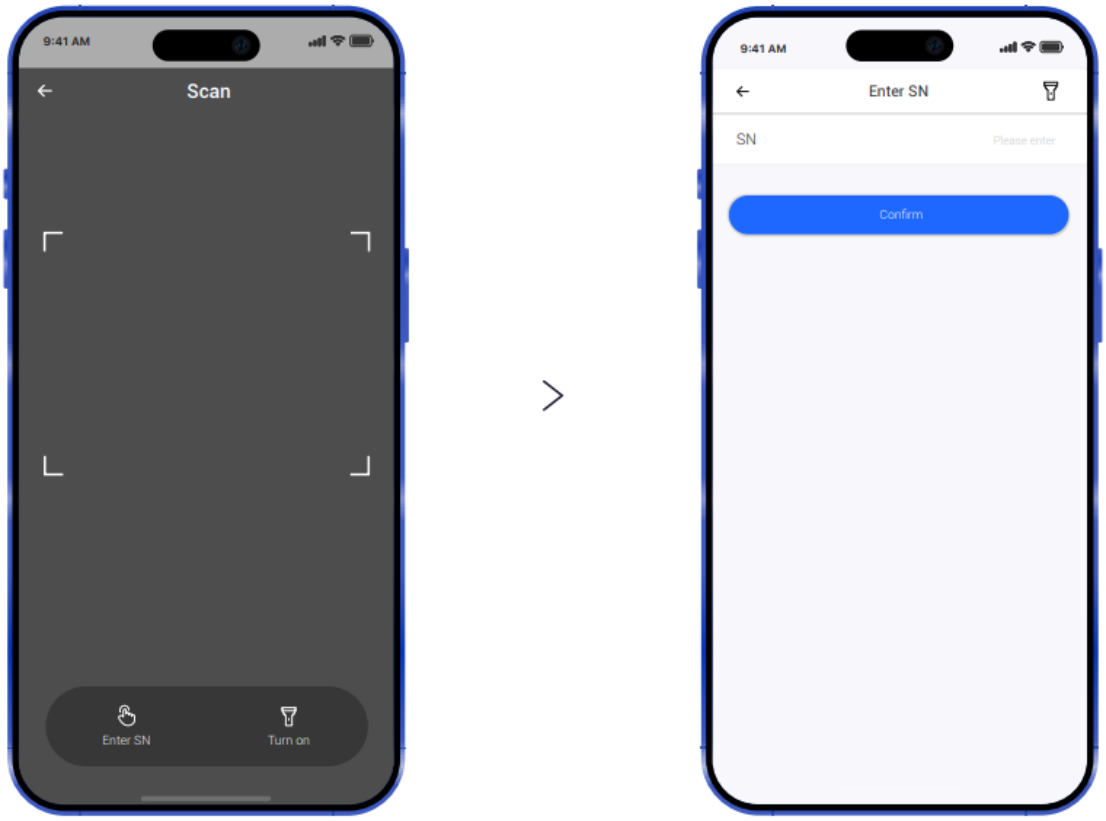


Figure 9-2

9.2.2 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.

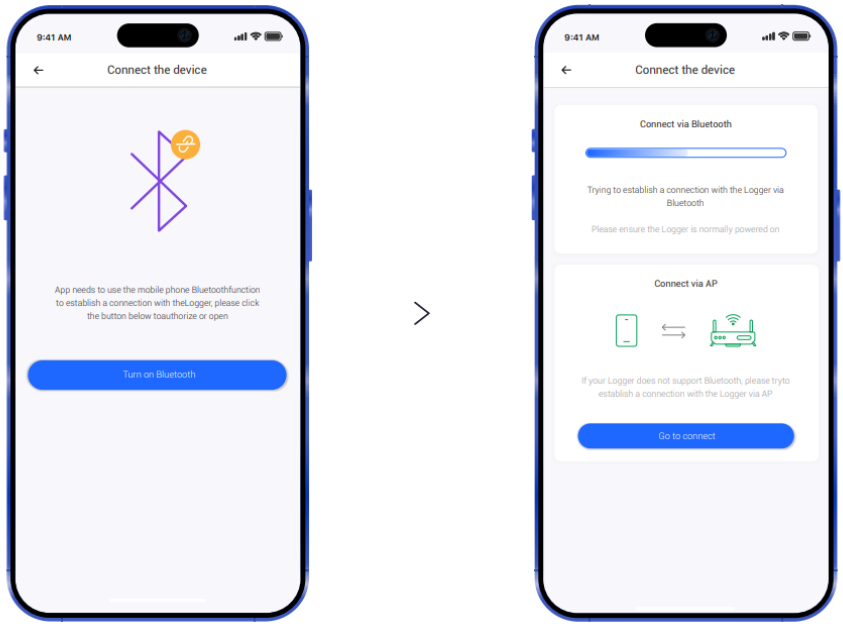


Figure 9-3

Or:

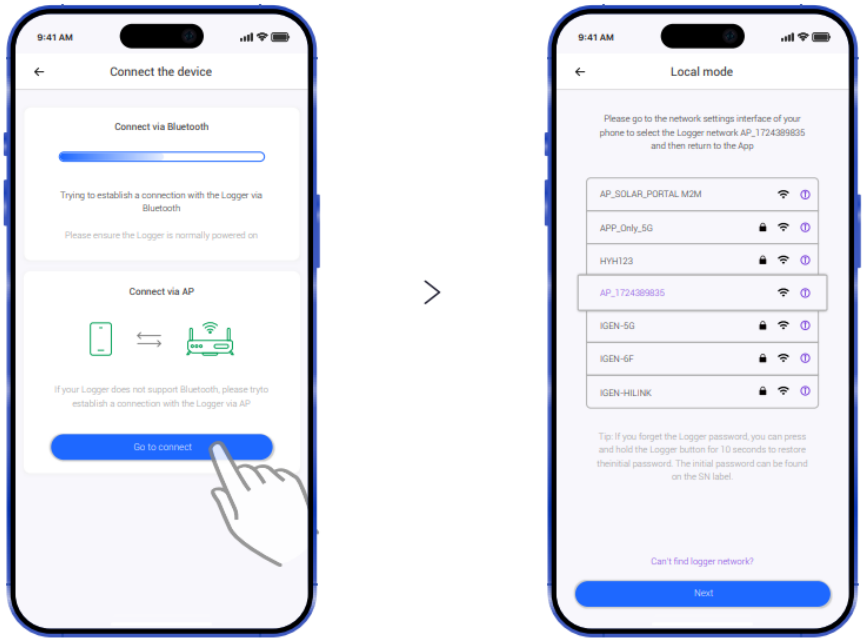


Figure 9-4

9.2.3 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.

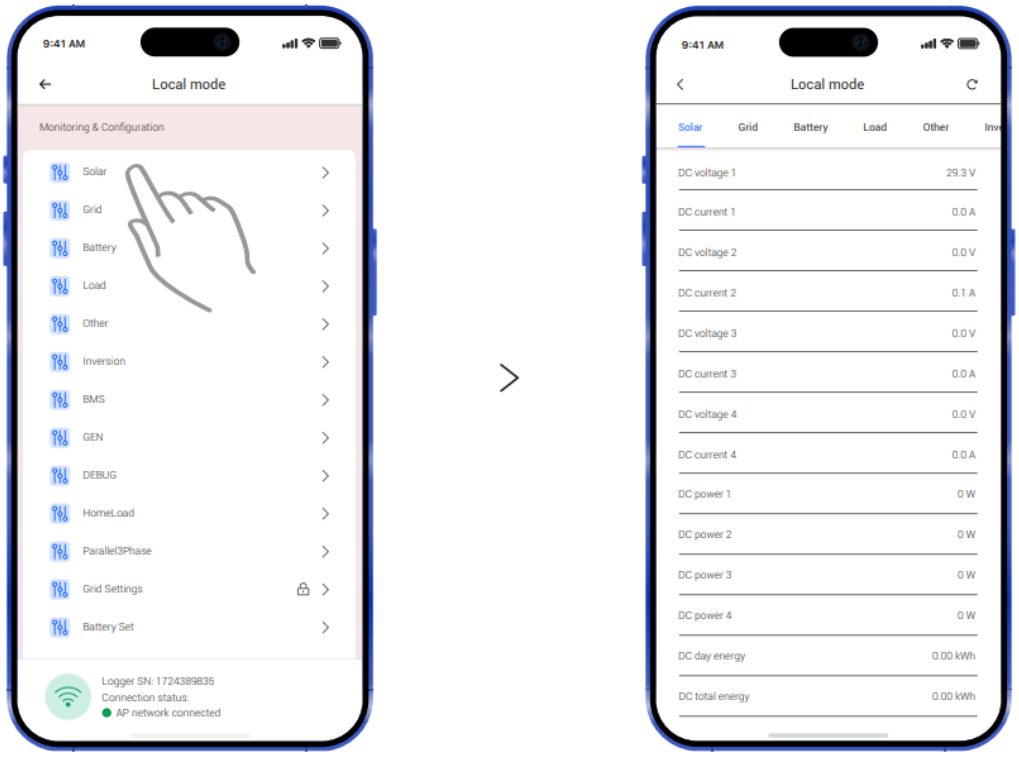


Figure 9-5

9.2.4 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.

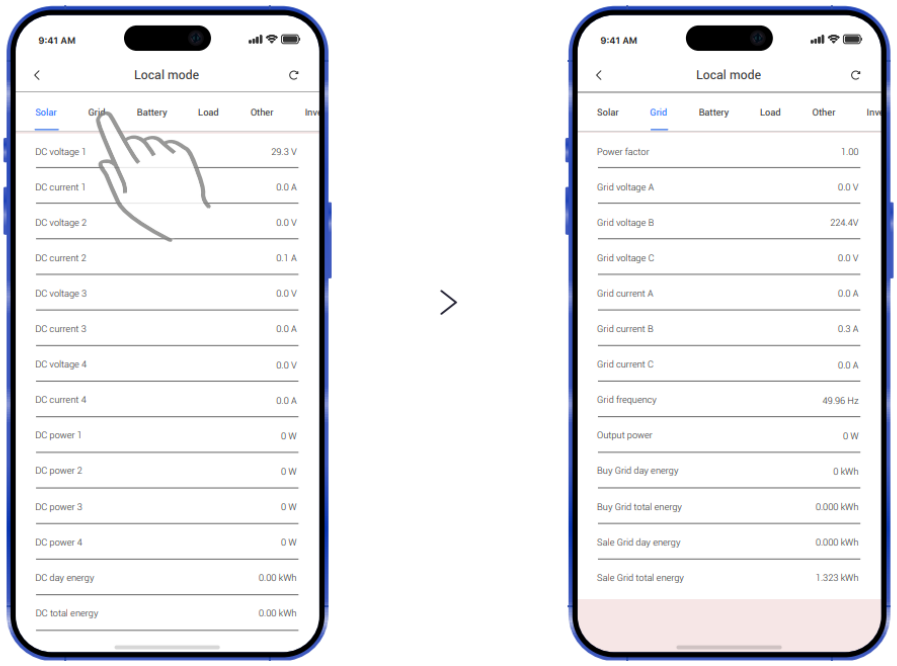


Figure 9-6

9.2.5 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.

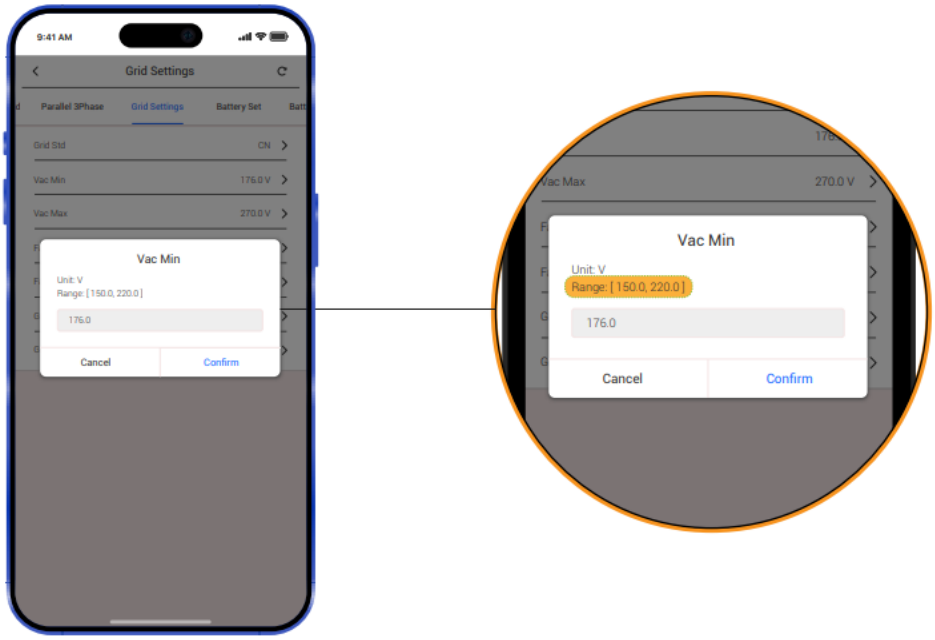


Figure 9-7

(1) Grid Settings and Grid Protect Set

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

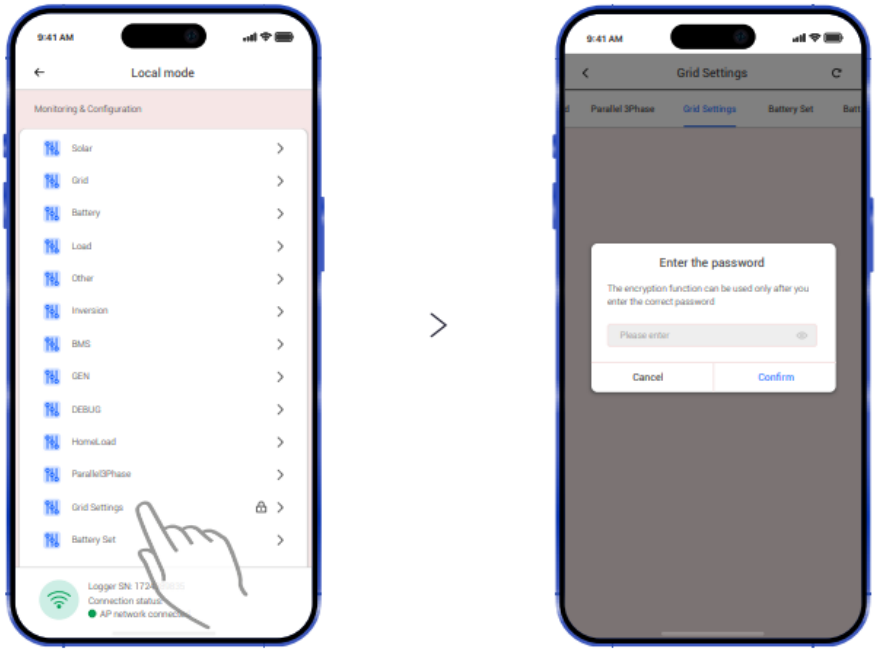


Figure 9-8

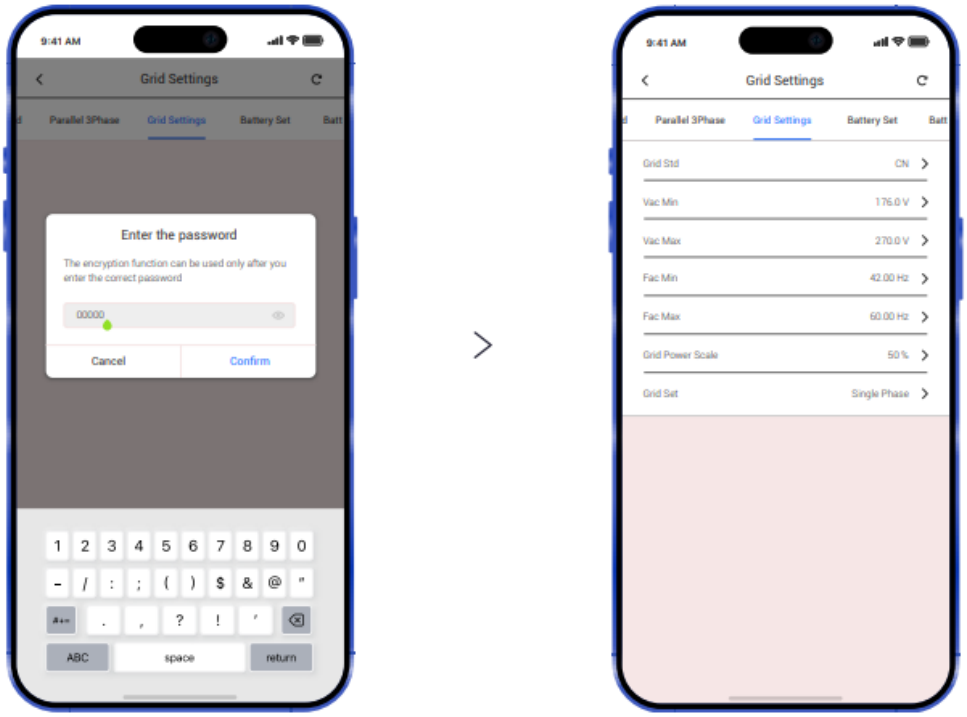


Figure 9-9

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

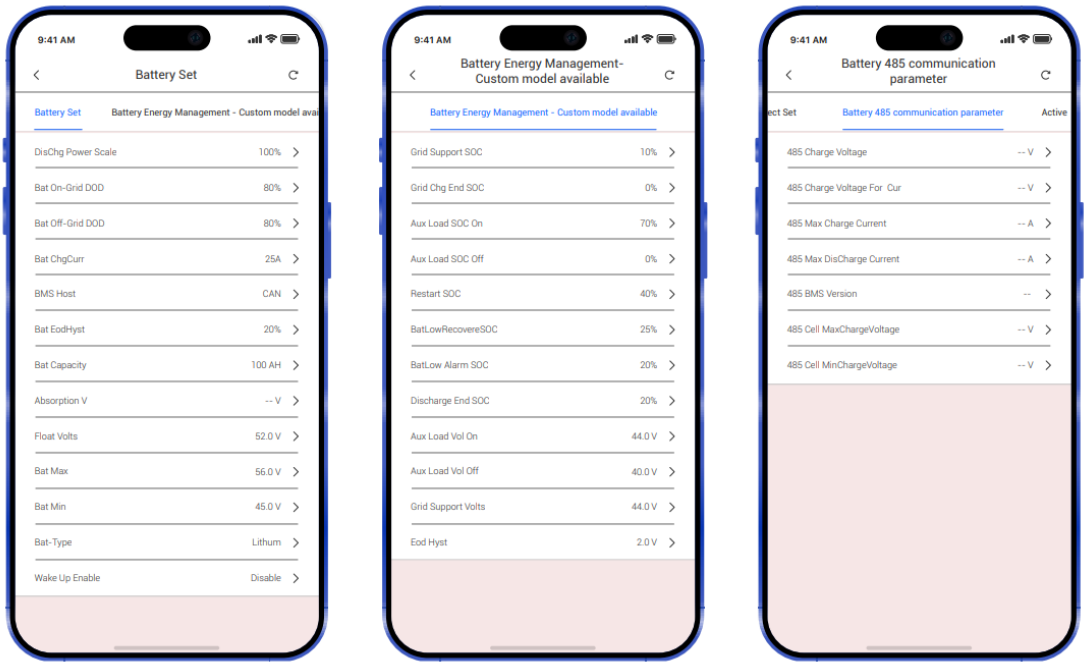


Figure 9-10

(3) Active Control

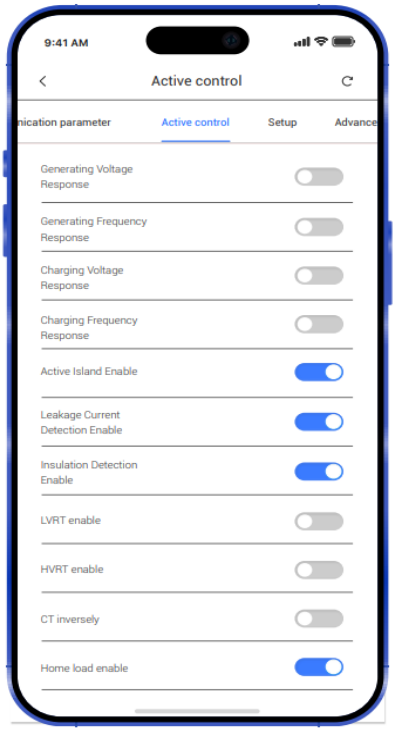


Figure 9-11

(4) Setup and Advance

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

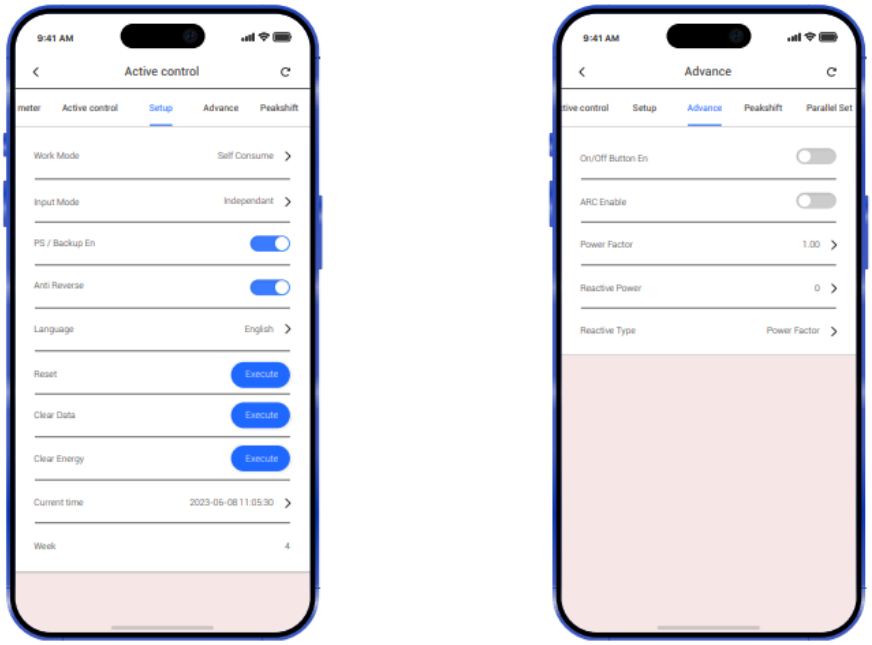


Figure 9-12

(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.

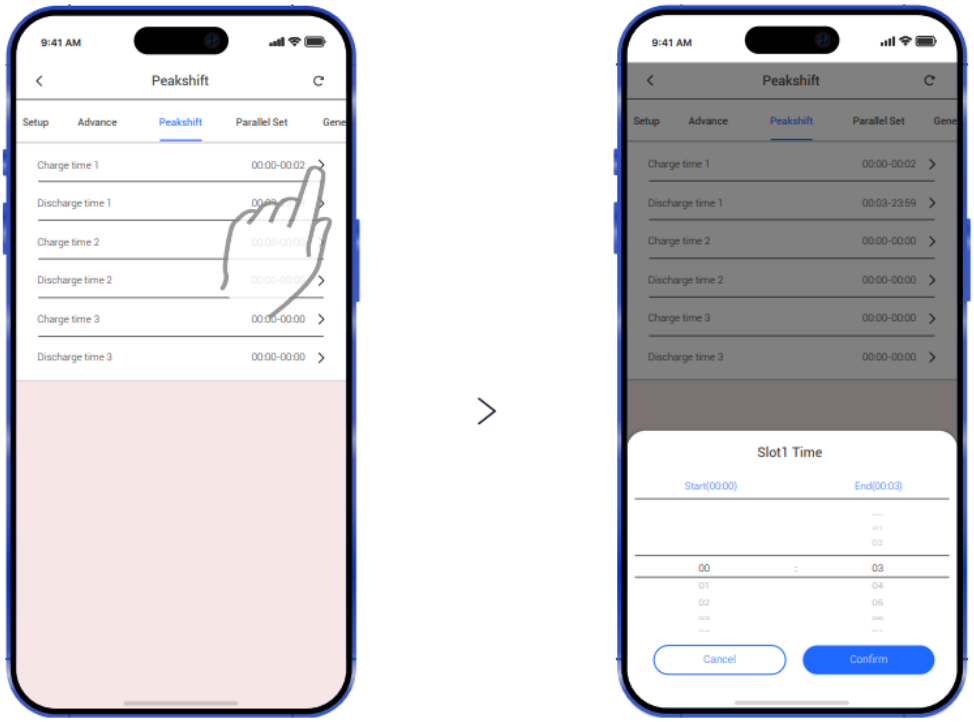


Figure 9-13

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

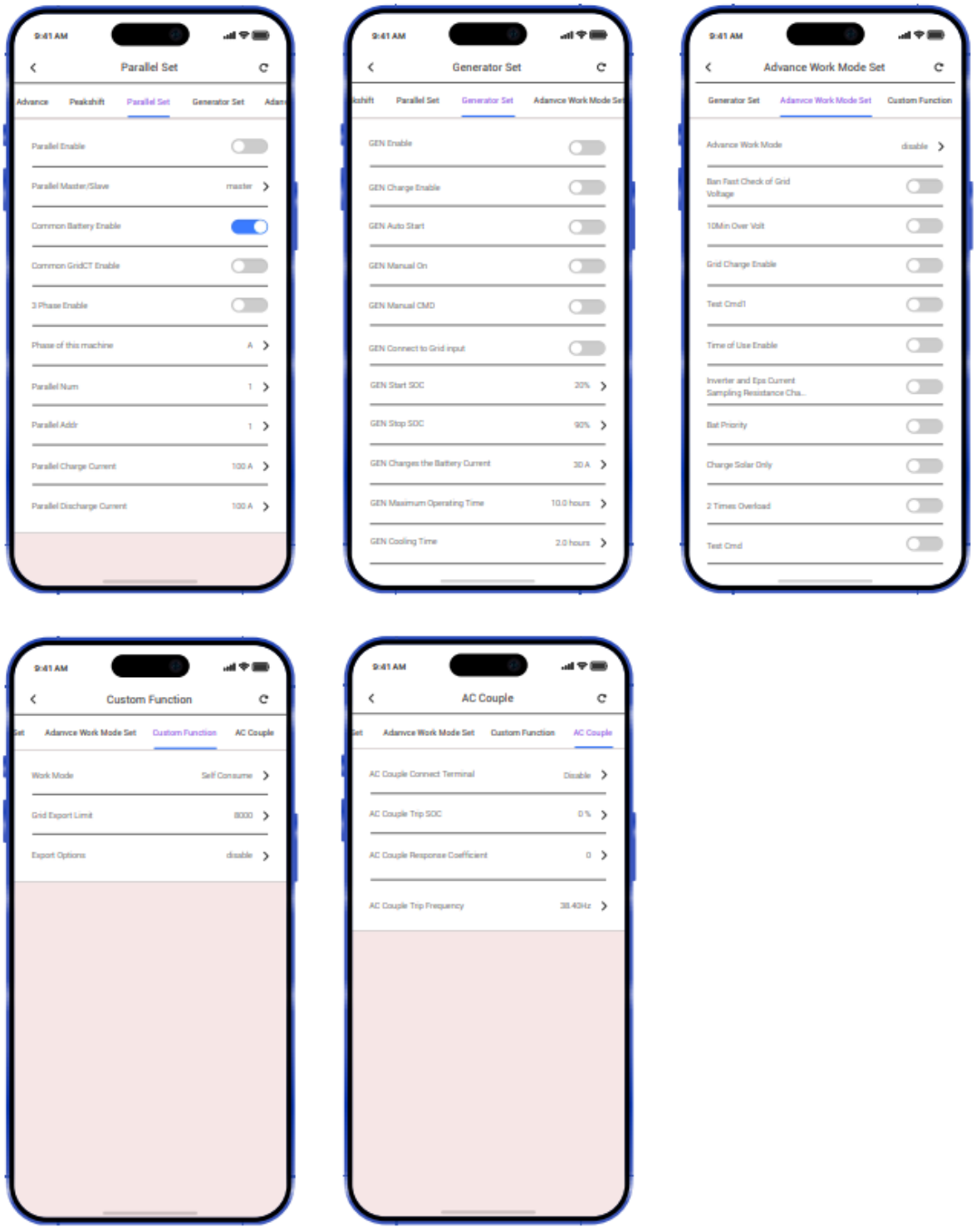


Figure 9-14

10. Italy self-testing (Auto test Fast)

1.As shown in Figure 10-1, the power grid standard is ITA. Ensure that the power grid is connected and the inverter is error-free, otherwise do not test.

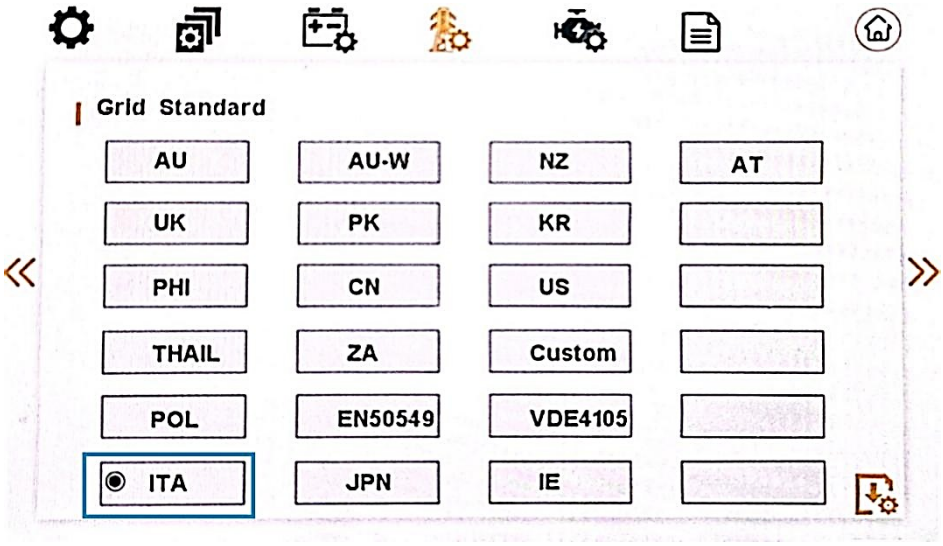


Figure 10-1

2.Click the setting icon in the upper left corner of the LCD screen to enter the password input interface, enter the password "33333", and click ok, as shown in Figure 10-2:

Figure 10-2

3.Enter the Italy self-test interface and click Start test, as shown in Figure 10-3:

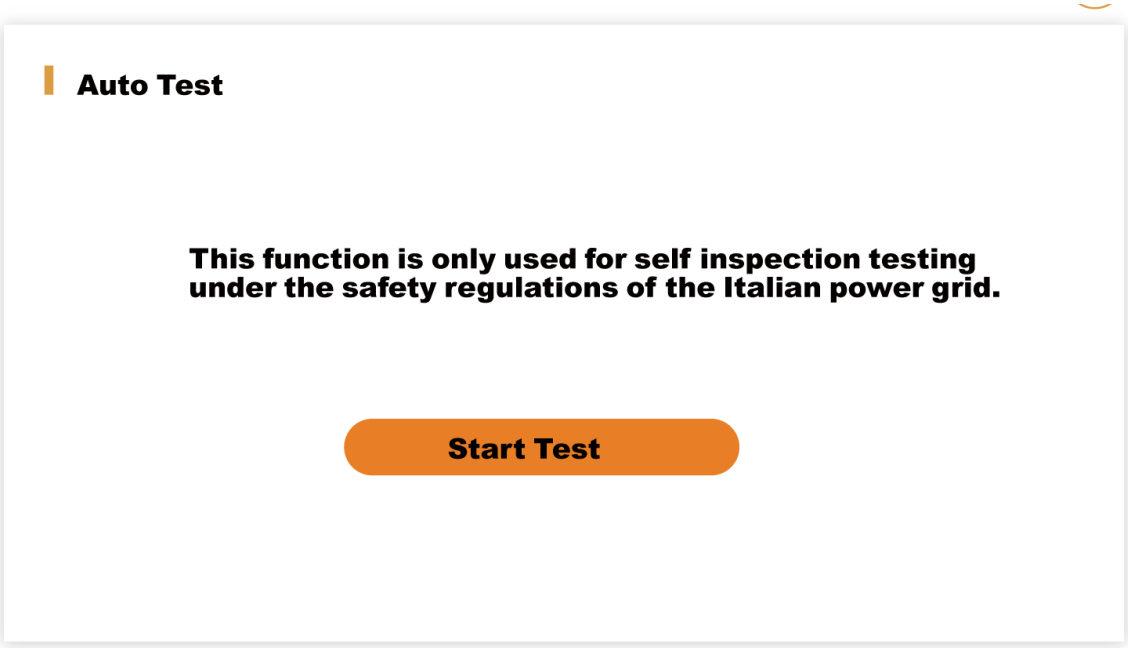


Figure 10-3

4.Wait until the test is complete, as shown in Figure 10-4, 10-5：

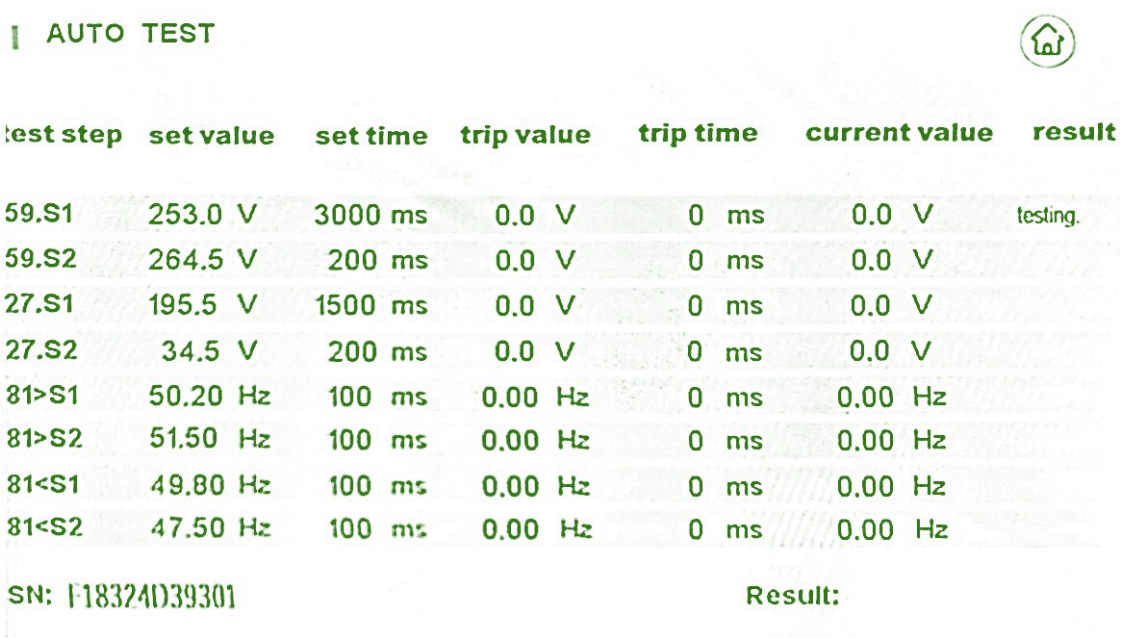


Figure 10-4

AUTO TEST

test step	set value	set time	trip value	trip time	current value	result
59.S1	253.0 V	3000 ms	231.2 V	3000 ms	231.2 V	Pass
59.S2	264.5 V	200 ms	230.9 V	200 ms	230.9 V	Pass
27.S1	195.5 V	1500 ms	230.9 V	1498 ms	230.9 V	Pass
27.S2	34.5 V	200 ms	230.9 V	198 ms	230.9 V	Pass
81>S1	50.20 Hz	100 ms	49.98 Hz	98 ms	49.98 Hz	Pass
81>S2	51.50 Hz	100 ms	50.00 Hz	99 ms	50.00 Hz	Pass
81<S1	49.80 Hz	100 ms	50.03 Hz	100 ms	50.03 Hz	Pass
81<S2	47.50 Hz	100 ms	50.04 Hz	96 ms	50.04 Hz	Pass

SN: [18324D39301 Result: Test Pass

Figure 10-5

Object	Description
27.S1	Under voltage protection
27.S2	Under voltage protection
59.S1	Over voltage protection
59.S2	Over voltage protection
81<S1	Under frequency protection
81<S2	Under frequency protection
81>S1	Over frequency protection
81>S2	Over frequency protection

NOTE:

The user can set the primary overvoltage protection voltage and protection time of the Italian self-test, see 8.1.3Setting Option (4) Grid Setting/page three.

11. 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	Explanation	Solutions
Discharge Over Current	00	Battery discharge over current. When the battery is loaded, the load is too large.	(1) Nothing needs to be done, wait one minute for the inverter to restart. (2) Check whether the load is following 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
Overload	01	The load power is greater than other power (PV, BAT).	(1) Check whether the load is in compliance with the maximum pwhat is ower 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 powers down. If so, waiting for the grid to 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.

Grid Over Volt	07		(2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
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 abnormal.	(1) Check the 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) Check the cable, crystal, Line sequence. (2) Check if the wiring is correct.
INV Under 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	PV Iso 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		
GfciFault	41		
CT Fault	43		
Self-test Fail	44		
System Fault	45		

Note!

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