



USER MANUAL

N3H-X Series Hybrid Inverter

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1. Notes on this Manual

1.1. Scope of Validity

This manual is an integral part of Hybrid, It describes the assembly, installation, commissioning, maintenance and failure type of the product. Please read it carefully before operating.

N3H-X5-US	N3H-X8-US	N3H-X10-US
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Naming rules, For example: N3H-X8-US

"8" means "output power 8kw".

"US" means "for North America market"





Store this manual where it will be accessible at all times.

1.2. Target Group

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

1.3. Symbols Used

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

	Danger! "Danger" indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	Warning! "Warning" indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	Caution! "Caution" indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	Note! "Note" provides tips that are valuable for the optimal operation of our inverter.

2. Safety

2.1. Important Safety Instructions



Danger!

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



Caution!

- Danger of burn injuries due to hot enclosure parts!
- During operation, the upper lid of the enclosure and the enclosure body may become hot.
- Only touch the lower enclosure lid during operation



Caution!

- Possible damage to health as a result of the effects of radiation!
- Do not stay closer than 20 cm to inverter for any length of time.



Note!

- Grounding the PV generator
- Comply with the local requirements for grounding the PV modules and the PV generator. It is recommended connecting the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction and ground these in order to have optimal protection of system and persons.



Warning!

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

**Warning!**

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

**Warning!**

- Do not operate the inverter when the device is running .


**Warning!**

- Risk of electric shock!

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

before operating the power circuit or demounting the electrolyte capacitors inside the device. Do not open the device before hand since the capacitors require time sufficiently discharge!

- Surge protection devices (SPDs) for PV installation.



Warning!

- Over-voltage protection with surge arresters should be provided when the PV power system is installed.
- The grid connected inverter is not fitted with SPDs in both PV input side and MAINS side.

- Lightning will cause a 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 majority or 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.
- Specialists in lightning protection should be consulted during the end use application. Using appropriate external lightning protection, the effect of a direct lightning strike into a building can be mitigated in a controlled way, and the lightning current can be discharged into the ground.
- Installation of SPDs to protect the inverter against mechanical damage and excessive stress include a surge arrester in case of a building with external lightning protection system (LPS) when separation distance is kept.
- To protect the DC system, surge suppression device (SPD type2) should be fitted at the inverter end of the DC cabling and at the array located between the inverter and the PV generator, if the voltage protection level (VP) of the surge arresters is greater than 1100V, an additional SPD type 3 required for surge protection for electrical devices.
- To protect the AC system, surge suppression devices (SPD type2) should be fitted at the main incoming point of AC supply (at the consumers cutout), located between the inverter and the meter/distribution system;
- All DC cables should be installed to provide as short a run as possible, and positive and negative cables of the string or main DC supply should be bundled together. Avoiding the creation of loops in the system.
- Spark gap devices are not suitable to be used in DC circuits once conducting, they won't stop conducting until the voltage across their terminals is typically more than 30 volts.

➤ Anti-Islanding Effect


Islanding effect is a special phenomenon that grid-connected PV system still supply power to the nearby grid when the voltage loss is happened in the power system. It is dangerous for maintenance personnel and the public.

Hybrid series inverter provide Active Frequency Drift(AFD) to prevent islanding effect.

➤ 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 $I_{fn} \leq 240\text{mA}$ 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.

	<p>Warning!</p> <ul style="list-style-type: none">• High leakage current!• Earth connection essential before connecting supply.
--	---

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

➤ Battery Safety Instructions

Hybrid Series inverter should be worked with low voltage battery, for the specific parameters such as battery type, nominal voltage and nominal capacity etc., please refer to section 4.1.

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

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

2: Use insulated tools.

3: Put on rubber shoes and gloves.

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












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

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

2.2. Explanation of Symbol

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

Symbols on the Type Label:

	UL certified
	This symbol indicates that you should wait at least 5 mins after disconnecting the inverter from the utility grid and from the PV panel before touching any inner live parts.
	Keep dry! The package/product must be protected from excessive humidity and must be stored under cover.
	Refer to the operating instructions.
	Fragile - The package/product should be handled carefully and never be tipped over or slung.
	Products should not be disposed as household waste.
	No more than six(6) identical packages being stacked on each other
	Components of the product can be recycled.
	Danger of hot surface!
	Danger of high voltage and electric shock!
	Caution! Failure to observe a warning indicated in this manual may result in injury!

3. Introduction

3.1. Basic features

Hybrid Series is a high-quality inverter which can convert solar energy to AC energy and store energy into battery.

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

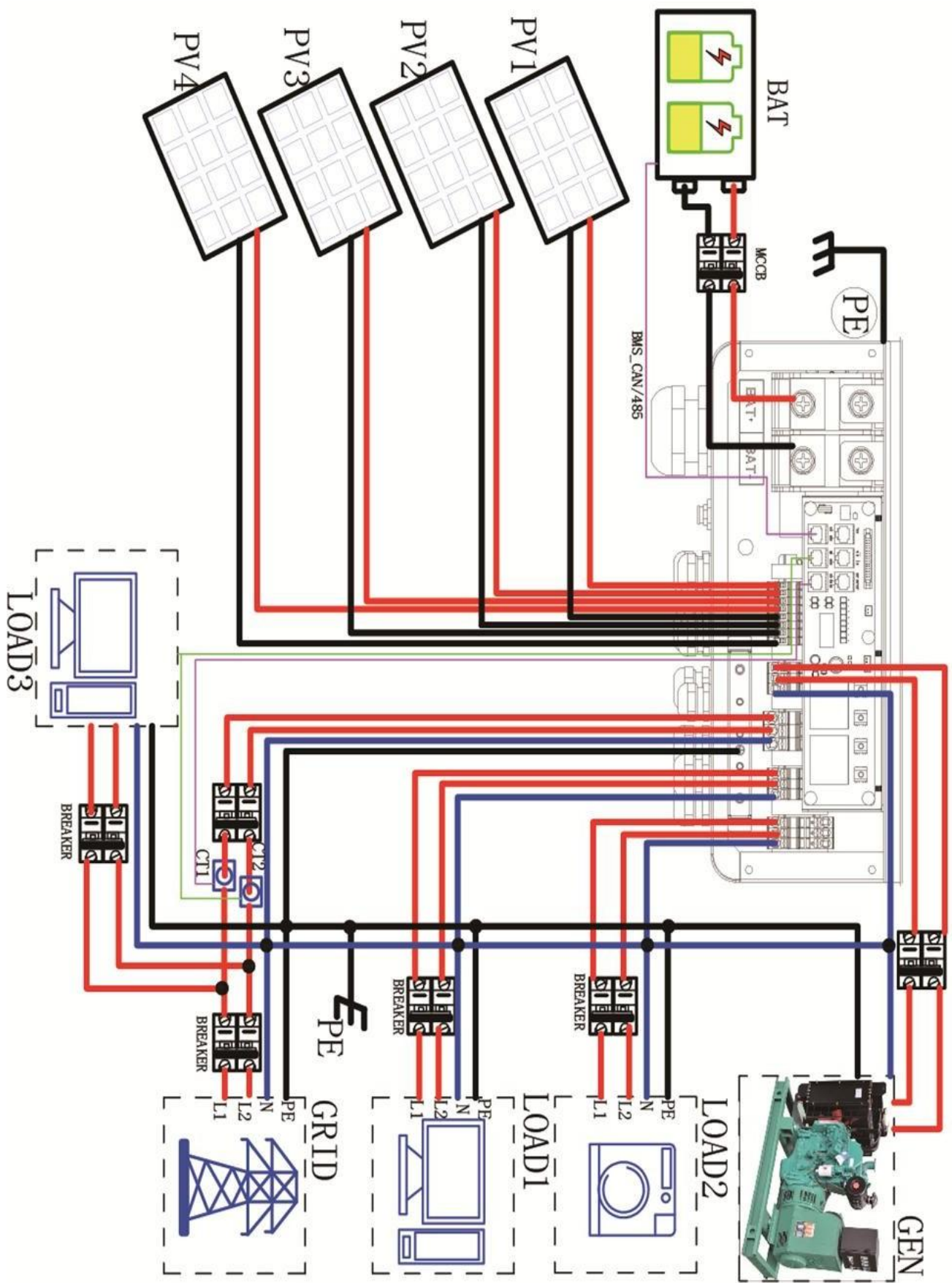
3.2. System Diagram

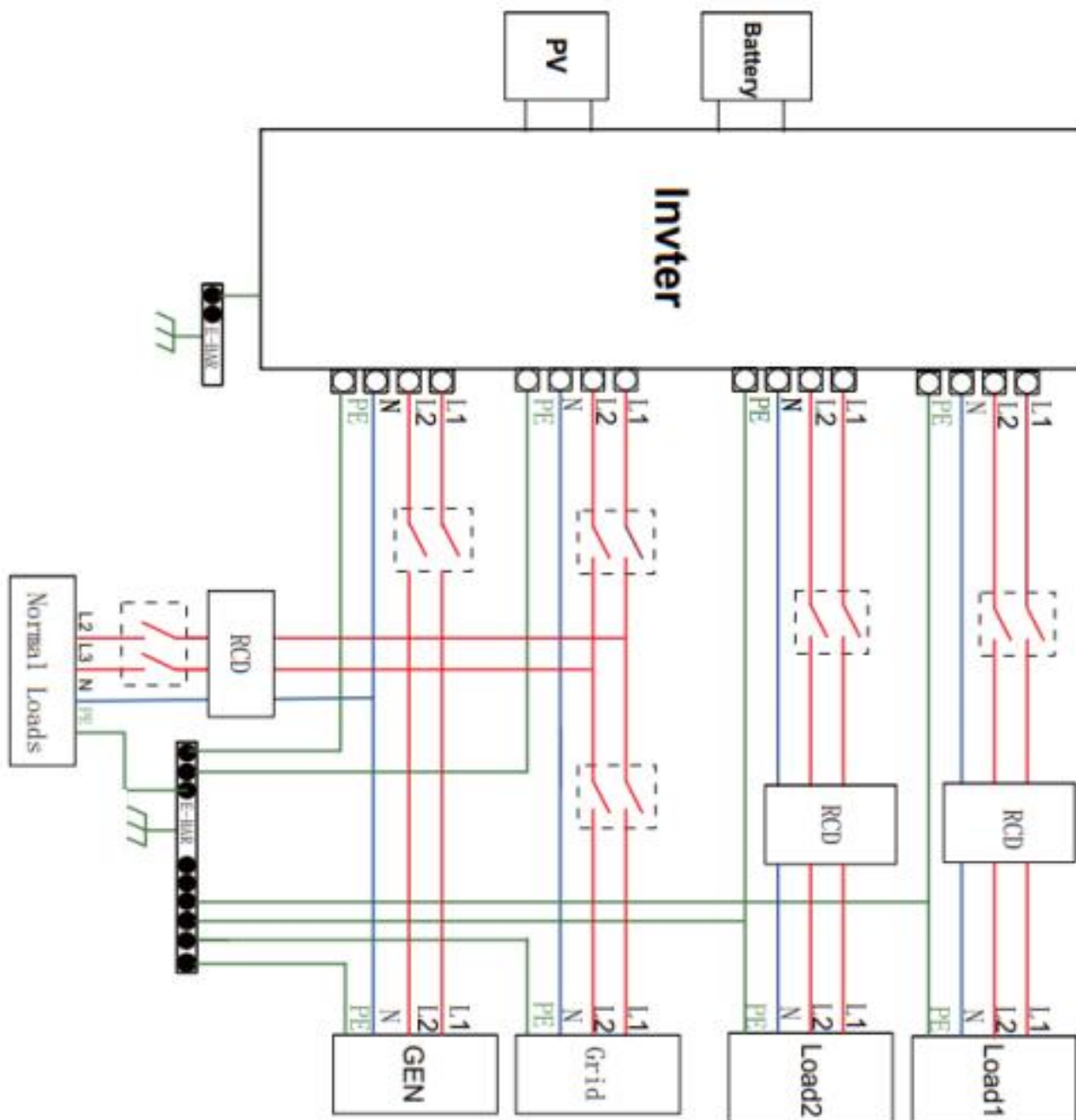
Hybrid Series is designed with two BACK-UP versions for customer to choose based on the local rules. The applies to the wiring rules that requires Neutral line of alternative supply must NOT be isolated or switched .



Note!

- Please control the home loads, and make sure it's within the "BACK-UP output rating" under BACK-UP mode, otherwise the inverter will shut down with an "overload fault" warning.
- Please confirm with the mains grid operator whether there is any special regulations for grid connection.



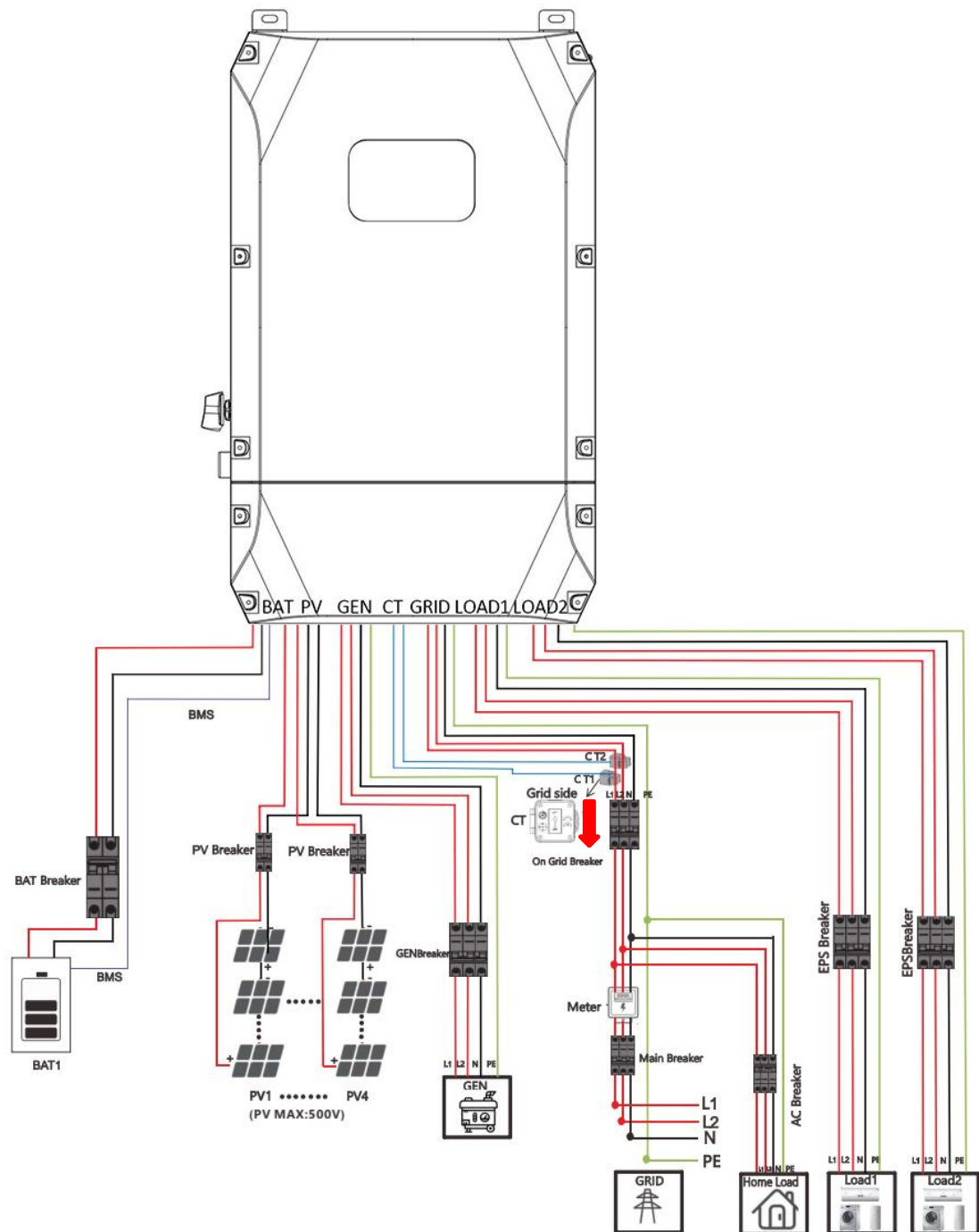


All switches and RCD devices in the figure are for reference only, and the specific installation shall be subject to local regulations.



Note!

- Please control the home loads, and make sure it's within the "BACK-UP output rating" under BACK-UP mode, otherwise the inverter will shut down with an "overload fault" warning.
- Please confirm with the mains grid operator whether there is any special regulations for grid connection.



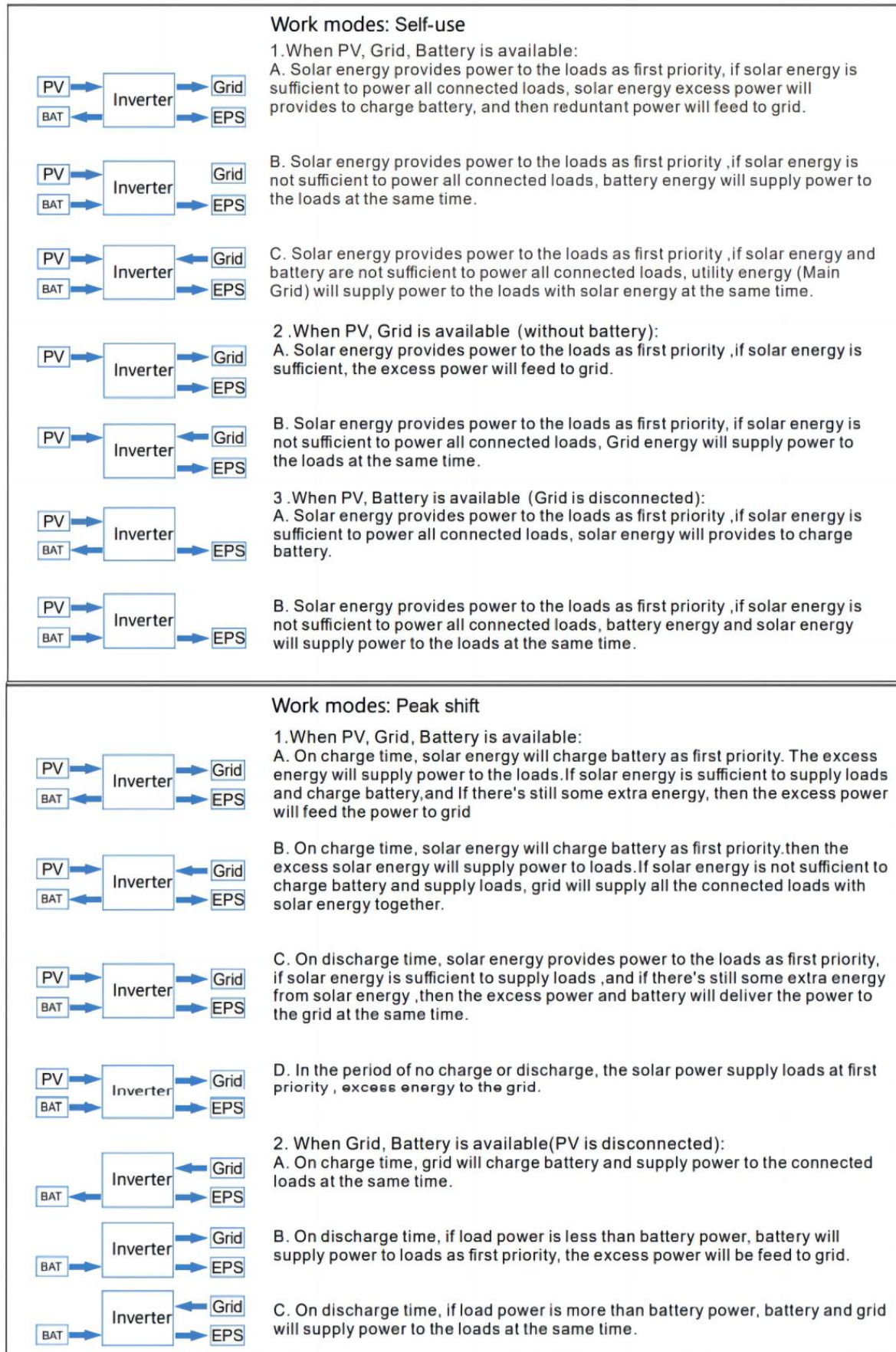
Note!



- The arrow on the CT points to the power grid, as shown.
- If the CT connector is improperly connected, the inverter cannot read the data correctly, so that the relevant working conditions cannot be realized normally.

3.3. Work Modes

Inverter provides multiple work modes based on different requirements.



Work modes: Bat priority



1. When PV, Grid, Battery is available:

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



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



2. When Grid, Battery is available (PV is disconnected):

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

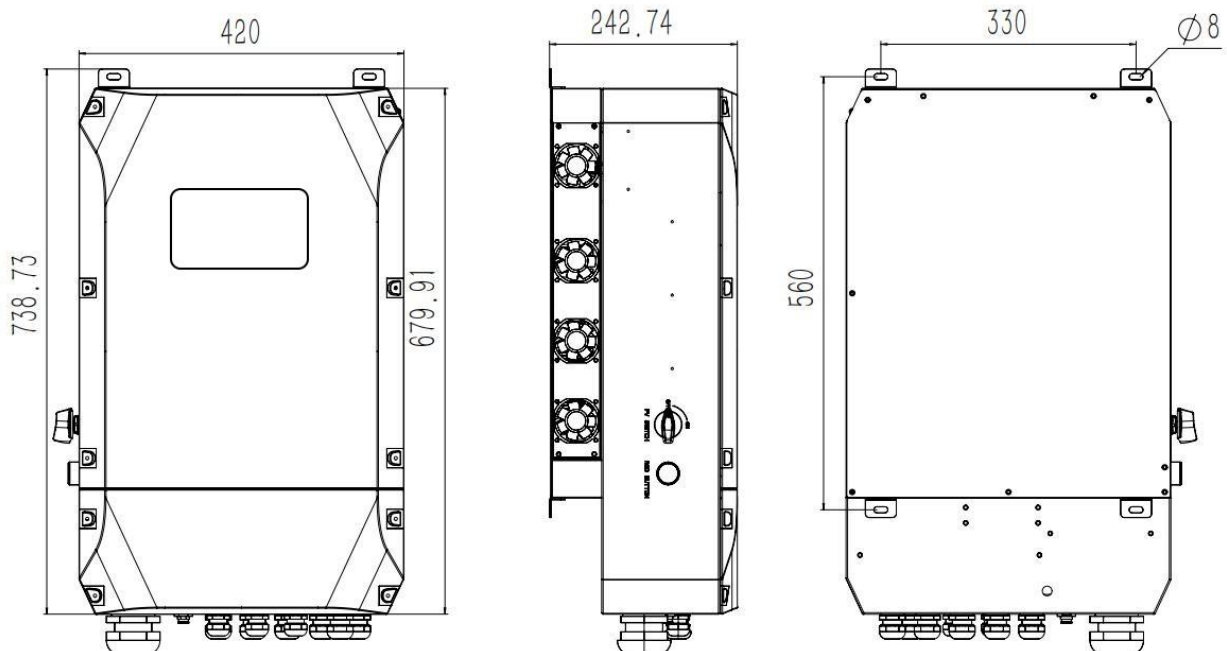
Note!



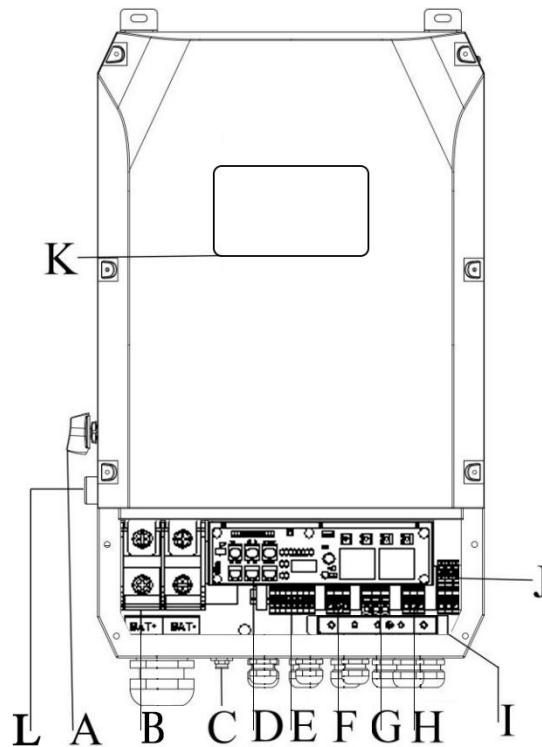
If set anti-Reverse function allowable, Once on the work mode of Self-use, Peak shift, battery priority, the system will not feed power to grid.

In addition to the above three basic modes, there is also an "Advanced Mode". Please refer to Chapter 13 for details.

3.4. Dimension



3.5. Terminals of PV inverter

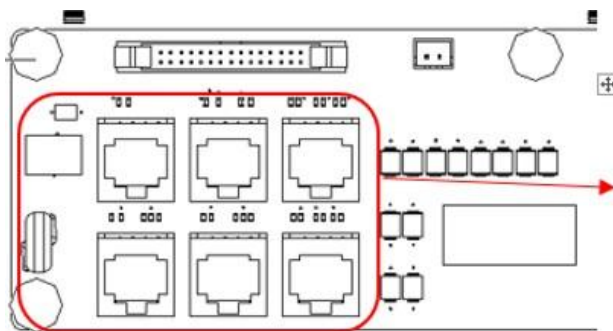


Object	Description
A	DC switch
B	BAT input
C	WiFi
D	CAN1/CAN2/RS485/BMS485, BMSCAN/CTL1/CTL2/Type-c upgrade
E	PV1~PV4 input
F	Generator
G	Grid
H	BACK-UP1 output
I	PE
J	BACK-UP2 output
K	LCD
L	RSD button



Warning!

- Qualified electrician will be required for the installation.



TYPE-C UPDATE	CAN1	CAN2	RS485
	BMS-485 BMS-CAN	CT L2	CT L1

* Port Function

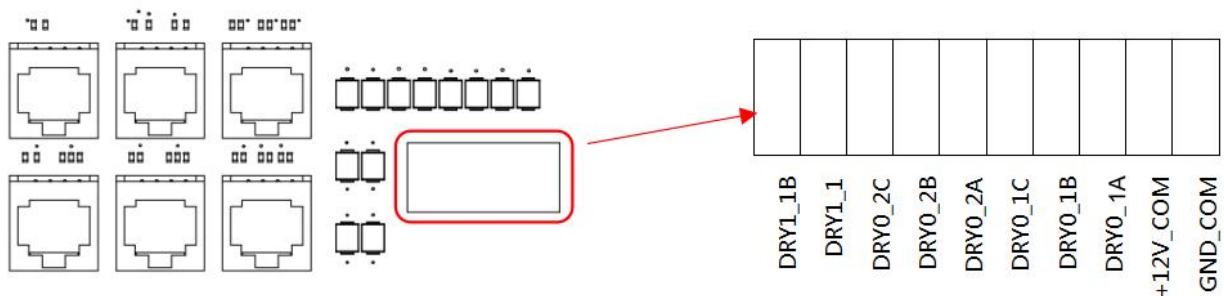
CAN1/CAN2: Communication interface for connecting inverters.

RS485: Read the internal data of inverter.

BMS-485/ BMS-CAN: BMS communication for lithium batteries.

CT L1/CT L2: For external grid side CT to detect current size.

TYPE-C UPDATE: Update machine software locally on PC via USB-A port.



DRY1_1B	DRY1_1	DRY0_2C	DRY0_2B	DRY0_2A	DRY0_1C	DRY0_1B	DRY0_1A	+12V_COM	GND_COM
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DRY1_1B/DRY1_1: Used to start the driver.

DRY0_2A and DRY0_2B (dry contact, normally closed): Reservation.

DRY0_2A and DRY0_2C (dry contact, normally open): Reservation (mutually exclusive with DRY0_2B and DRY0_2A).

DRY0_1A and DRY0_1B (dry contact, normally closed): For generators, dry contact closure, generator start, dry contact disconnection, generator shutdown.

DRY0_1A and DRY0_1C (dry contact, normally open): mutually exclusive with DRY0_1B and DRY0_1A.

+12V_com/GND_com: Used to connect RSD.

4. Technical Parameters

4.1. Inverter specification

Technical Data	N3H-X5-US	N3H-X8-US	N3H-X10-US
PV Input Data			
MAX.DC Input Power	7.5kW	12kw	15KW
NO.MPPT Tracker	4		
MPPT Range	120 - 500V		
MAX.DC Input Voltage	500V		
MAX.Input Current	14Ax4		
Battery Input Data			
Nominal voltage (Vdc)	48V	48V	48V
MAX.Charging/Discharging Current	120A/120A	190A/190A	190A/210A
Battery Voltage Range	40-60V		
Battery Type	Lithium and Lead Acid Battery		
Charging Strategy for Li-Ion Battery	Self-adaption to BMS		
AC Output Data(On-Grid)			
Nominal output power Output to Grid	5KVA	8KVA	10KVA
MAX. Apparent Power Output to Grid	5.5KVA	8.8KVA	11KVA
Output Voltage Range	110-120/220-240V split phase, 208V(2/3 phase), 230V(1 phase)		
Output Frequency	50/60Hz (45 to 54.9Hz / 55 to 65Hz)		
Nominal AC Current Output to Grid	20.8A	33.3A	41.7A
Max.AC Current Output to Grid	22.9A	36.7A	45.8A
Output Power Factor	0.8leading...0.8lagging		
OutPut THDI	< 2%		
AC Output Data(Back-Up)			
Nominal. Apparent Power Output	5KVA	8KVA	10KVA
MAX. Apparent Power Output	5.5KVA	8.8KVA	11KVA
Nominal Output Voltage L-N/L1-L2	120/240V		
Nominal Output Frequency	60Hz		
Output THDU	< 2%		
Efficiency			
Europe Efficiency	>=97.8%		
MAX. Battery to Load Efficiency	>=97.2%		
Protection			
Grounding detection	YES		
Arc Fault Protection	YES		
Island Protection	YES		

Battery reverse Polarity	YES
Insulation Resistor Detection	YES
Residual Current Monitoring Unit	YES
Output Over Current Protection	YES
Back-up Output Short Protection	YES
Terminal temperature detection	YES
Output Over Voltage Protection	YES
Output Under Voltage Protection	YES
General Data	
Output Conduit	25.4mm
PV Input Conduit	25.4mm
BAT Input Conduit	34.5mm
Operating Temperature Range	-25 ~ +60°C (> 45°C derating)
Relative Humidity	0-95%
Operating Altitude	0~4000m
Ingress Protection	IP65/NEMA 3R
Weight	41kg
Size (Width*Height*Depth)	530mm x 660mm x 200mm
Cooling	Air Cooling
Noise emission	<38dB
Display	LCD
Communication With BMS/Meter/EMS	CAN, RS485
Supported communication interface	RS485, WLAN, 4G (optional)
Self-consumption at night	< 15W (with battery enabling < 20W)
Safety	UL1741SA all options, UL1699B, CSA 22.2
EMC	FCC Part 15 Class
Grid connection standards	IEEE 1547, IEEE 2030.5, Hawaii Rule 14H, Rule 21 Phase I,II,III

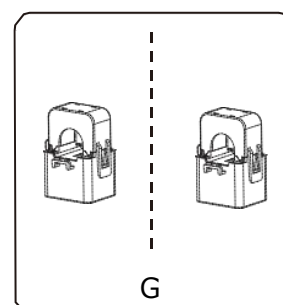
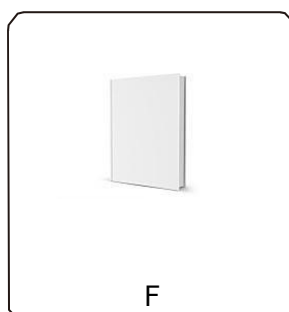
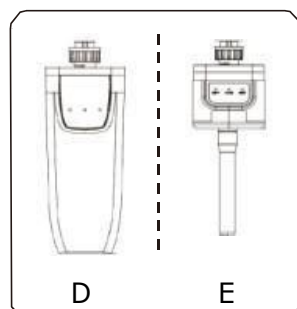
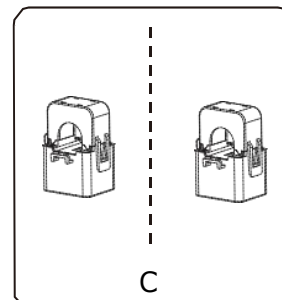
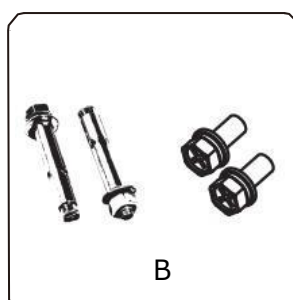
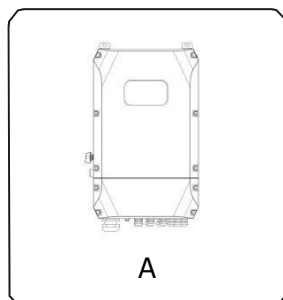
5. Installation

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 shown as below.



Object	Description
A	Inverter
B	Expansion screws and pan-head screws
C	CT (Inner radius 16mm)
D	WiFi module (optional)
E	GPRS module (optional)
F	User manual
G	CT (Inner radius 35mm / OPTIONAL)

5.3. Mounting

➤ Installation Precaution

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

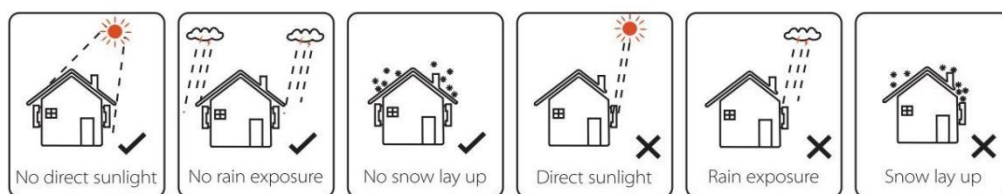
- ◆ Not in direct sunlight.
- ◆ Not in areas where highly Flammable materials are stored.

- ◆ Not in potential explosive areas.
- ◆ Not in the cool air directly.
- ◆ Not near the television antenna or antenna cable.
- ◆ Not higher than altitude of about 2000m above sea level.
- ◆ Not in environment of precipitation or humidity (> 95%).
- ◆ Under good ventilation condition.
- ◆ The ambient temperature in the range of -20℃ to +60℃.
- ◆ The slope of the wall should be within $\pm 5^\circ$.
- ◆ The wall hanging the inverter should meet conditions below:

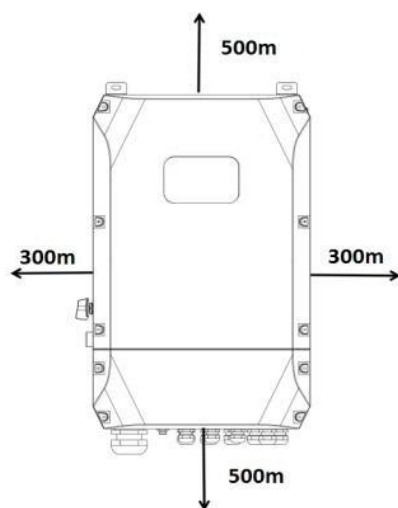
solid brick/concrete, or strength equivalent mounting surface;

Inverter must be supported or strengthened if the wall's strength isn't enough (such as wooden wall, the wall covered by thick layer of decoration).

Please AVOIDE direct sunlight, rain exposure, snow laying up during installation and operation.



➤ Space Requirement



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

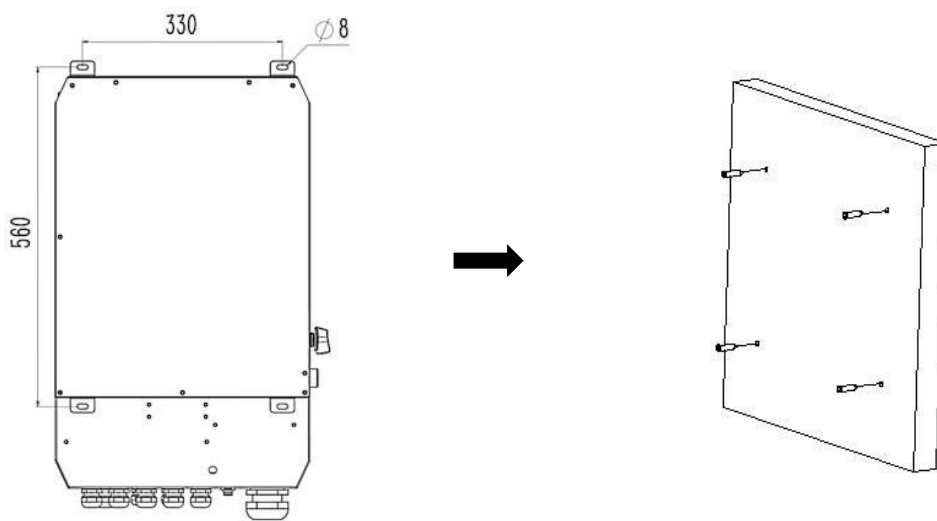
➤ Mounting

Tools required for installation.

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

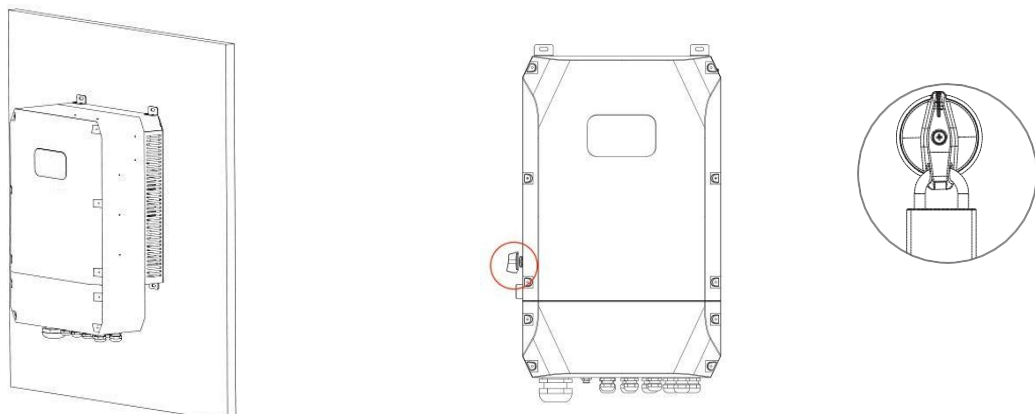


Step 1: Drill 4 holes in the wall according to the following distance dimensions, 50~60mm depth. Then use a proper hammer to fit the expansion bolt into the holes.

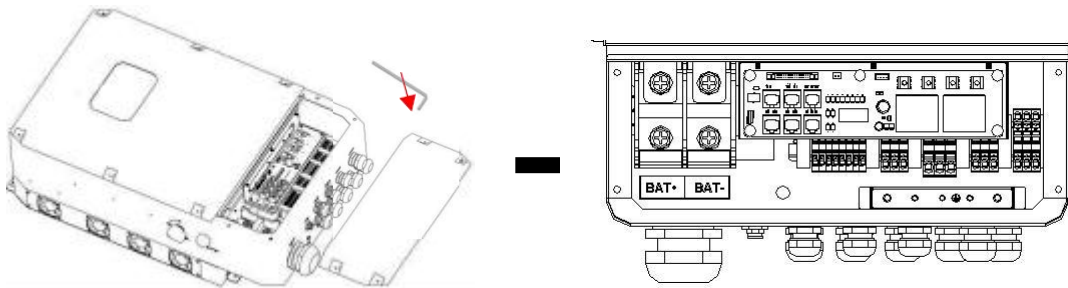


Step 2: Lift up the inverter and align the hole of the inverter with the expansion bolt, fix the inverter on the wall.

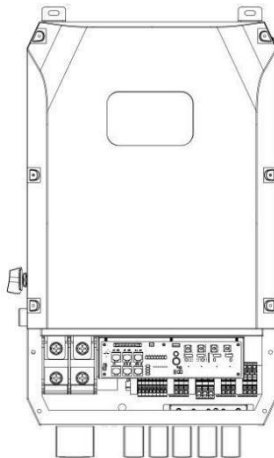
Step 3: Tighten the nut of expansion bolt, and install an anti-theft lock on DC switch of the inverter.



Step 4: Remove the cover screws by Allen Wrench and remove the cover. Remove the waterproof cover by a flat blade screwdriver. Wiring box conduit plugs, Conduit plugs are provided for 1 inch conduit fittings. If used conduit fitting is not 1 inch, an appropriate conduit adaptor should be used.



Step 5: Pass the corresponding conduit and fasten the joint.



6. Electrical Connection

6.1. PV connection

Hybrid can be connected in series with 4-strings PV modules for 5kW, 8kW and 10kW. 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.



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!

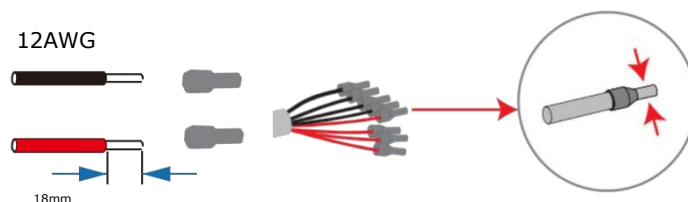


Note!

- The following requirements of PV modules need to be applied for each input area;
- Please do not make PV positive or negative ground!
- In order to save cable and reduce the DC loss, we suggest to install the inverter near PV modules.

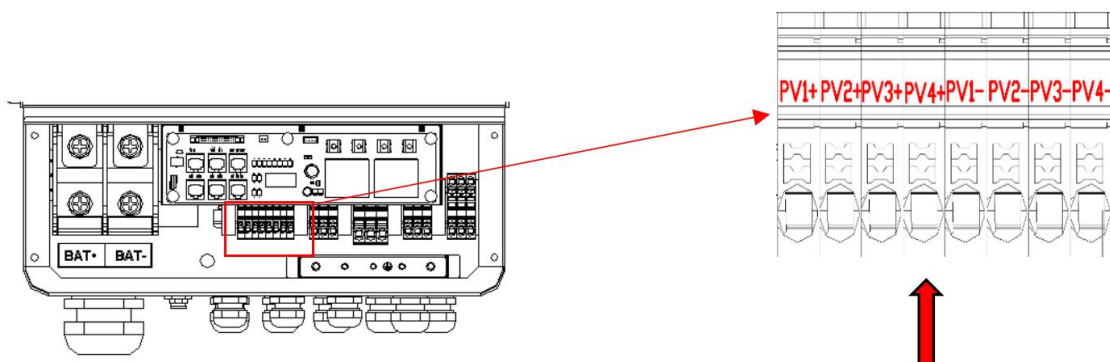
Step1. Wiring.

- 1.1 Choose the 12 AWG wire to connect with the cold-pressed terminal.
- 1.2 Remove 18mm of insulation from the end of wire.



Step2. Cross the PV cables through the PV port, Connect PV cables to PV terminals.

Connect PV cables to PV terminals.



6.2. Grid Connection (GEN connection)

Step1. Check the grid voltage.

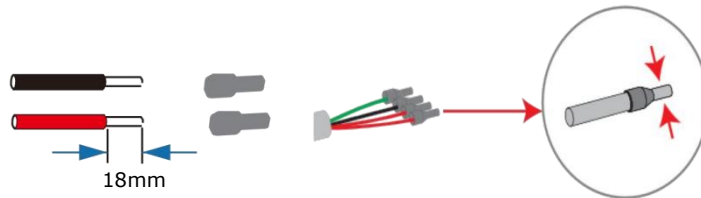
1. Check the grid voltage and compare with the permissive voltage range (Please refer to technical data).
2. Disconnect the circuit board from all the phases and secure against re-connection.

Step2. Grid cables choose

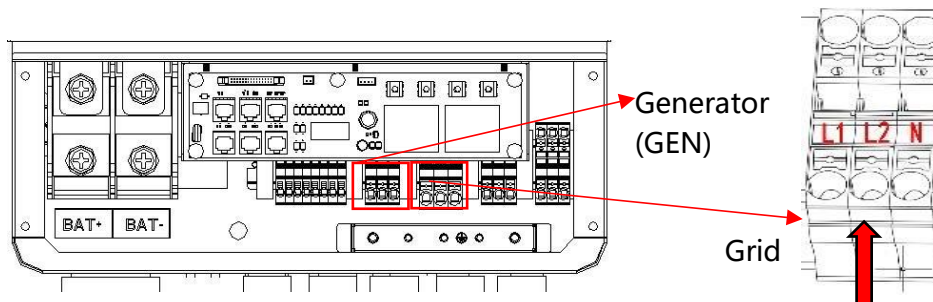
Use the right pin terminal from the accessory box. Press the connectors on cable conductor core tightly.

Model	N3H-X5-US	N3H-X8-US	N3H-X10-US
Cable	12AWG	10AWG	8AWG

Step3. Choose the wire to connect with the cold-pressed terminal. (Remove 18mm of insulation from the end of wire.)



Step4. Cross the Grid cables through the grid port, Connect Grid cables to Grid terminals.



6.3. Back-up:Load1 and Load2 Connection

Inverter has On and Off grid function, the inverter will deliver output power through AC port when the grid is on, and it will deliver output power through back-up port when the grid is off.

➤ Auto & Manual

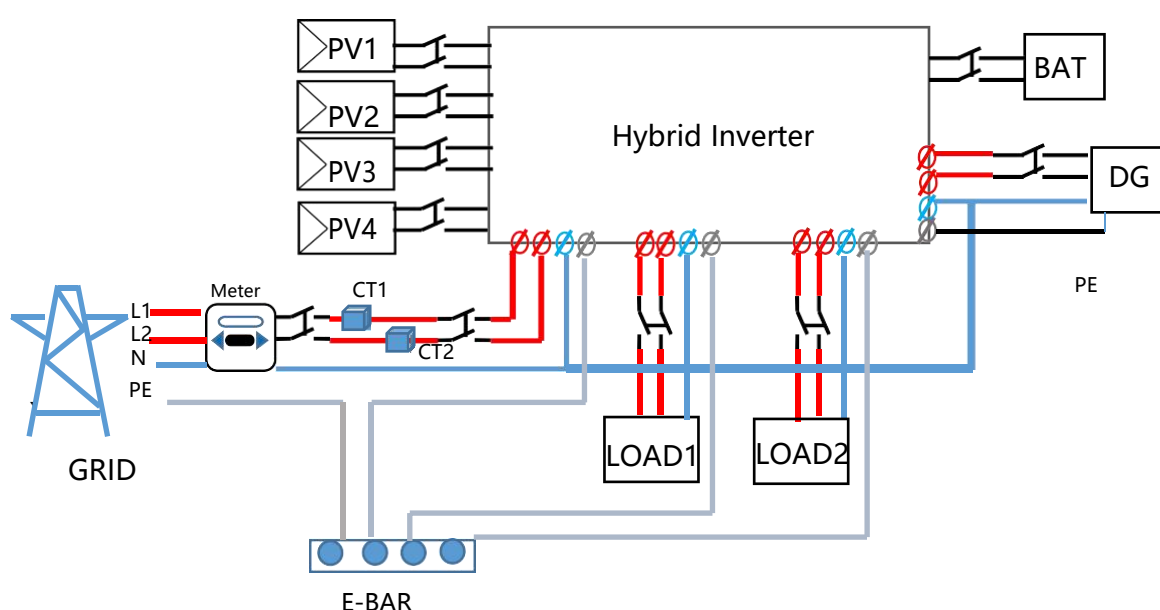
BACK-UP function can be achieved automatically or manually according to user's wishes. BACK-UP function can only be triggered automatically.

➤ Load1 port: important load.

➤ Load2 port: When the battery is not sufficient, the load on this interface will power

down

- 1) For inverter, the standard PV installation typically consists of the connection of the inverter with both panels and batteries. In case of systems not connected to the batteries, the Back-Up function is strongly not advised to use. It shall not cover the standard warranty and be liable for any consequences arising from users not following this instruction.
- 2) Hybrid inverters are able to supply over load output at its "Back-Up". For details please refer to the technical parameters of inverter. And the inverter has self-protection dreading at high ambient temperature.
- 3) For complicated application, or Special load, please contact after-sales.



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!

➤ **Back-Up:Load1 and Load2 Connection:**

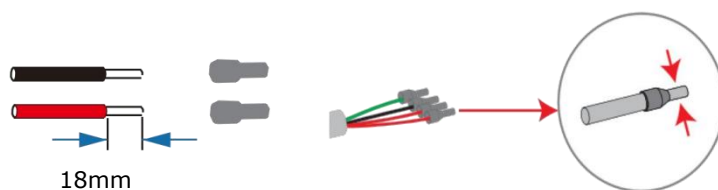
When using the off grid function, please add off grid AC breaker in off grid output cable to ensure safety.

Model	N3H-X5-US	N3H-X8-US	N3H-X10-US
Micro-breaker	32A	40A	63A

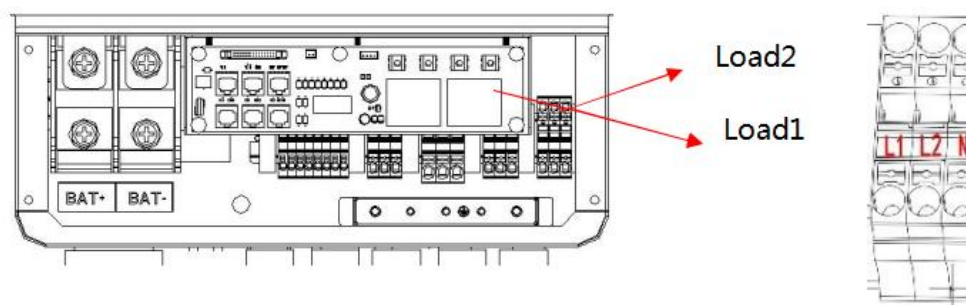
Note: The absence of AC breaker on back-up side will lead to inverter damage if an electrical short circuit happens on back-up side.

Step1.Make BACK-UP wires.

Model	N3H-X5-US	N3H-X8-US	N3H-X10-US
Cable	12AWG	10AWG	8AWG



Step2. Connect the cables to the BACK-UP:Load1 and Load2 port of the inverter.



Inside the inverter, load2 is connected to load1 through a relay, and the relay disconnect when the SOC of battery is lower than set value. At this time, the load2 is powered off and load1 is still powered on. (The total power of Load1 plus Load2 should not more than the rated BACK-UP power when GRID is off)

Requirements for BACK-UP load



Warning!

- Make sure the BACK-UP load power rating is within BACK-UP output rating, otherwise the inverter will shut down with an "over load" warning.
- When an "over load" is appeared, adjust the load power to make sure it is within the BACK-UP output power range, then turn the inverter back on.
- For the nonlinear load, please make sure the inrush power should be within the BACK-UP output power range.

6.4. Battery Connection

Charging & discharging system of Hybrid series inverter is designed for 48V lithium battery.

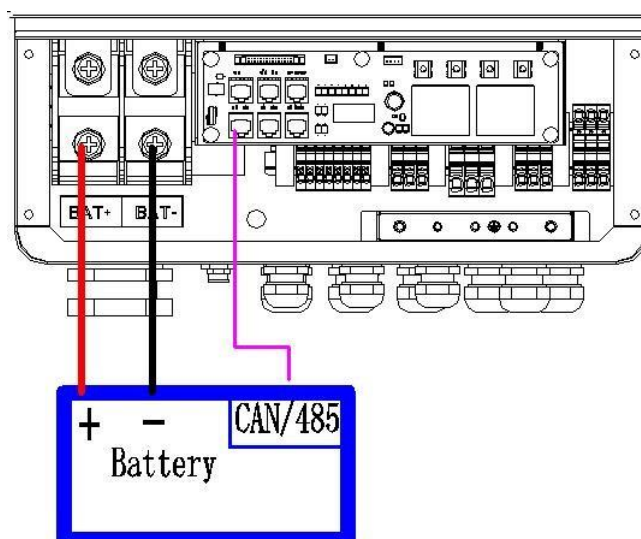
Before choosing battery, please note the maximum voltage of battery can not exceed 60V and the battery communication should be compatible with Hybrid inverter.

➤ Battery breaker

Before connecting to battery, please install a no-polarized DC breaker to make sure inverter can be securely disconnected during maintenance.

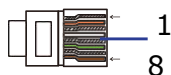
Model	N3H-X5-US	N3H-X8-US	N3H-X10-US
Current[A]	160A	250A	300A

➤ Battery connection diagram



➤ BMS PIN Definition

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



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

When using RS485 protocol, please note that PIN2 must be disconnected!



Note!

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

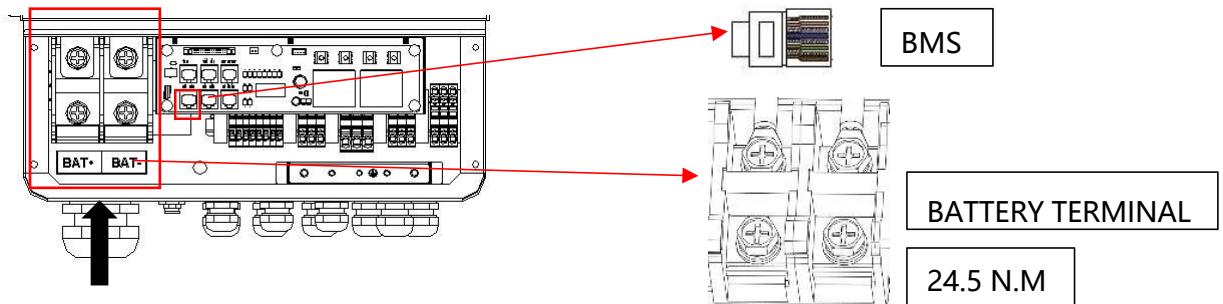
➤ Power Connection Battery:

Step1.

Choose the 1 AWG wire and strip the cable to 15mm. Select two O-terminals with an aperture of M10. Insert the stripping line into the O-terminal and clamp it with a crimping clamp.



Step2. Cross the battery cable through the battery port. Connect battery cable to battery terminal



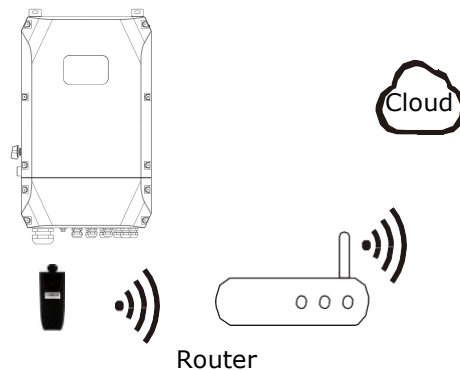
Note!

Positive and negative lines are not allowed to reverse.

6.5. WiFi Connection (optional)

Inverter provides a WiFi port which can collect data from inverter and transmit it to monitoring-website by WiFi. (Purchase the product from supplier if needed)

1) Diagram:



2) WiFi Connection:

Step1. Plug WIFI into "WiFi" port at the bottom of the inverter.

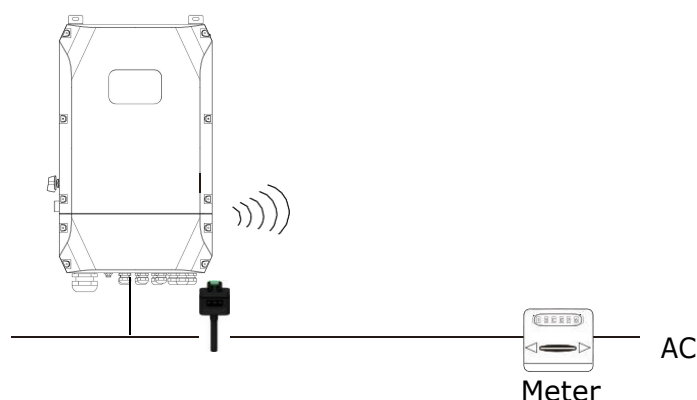
Step2. Build the connection between the inverter and router.

Step3. Create a user account online. (Please check the WiFi user manual for more details).

6.6. GPRS Connection (optional)

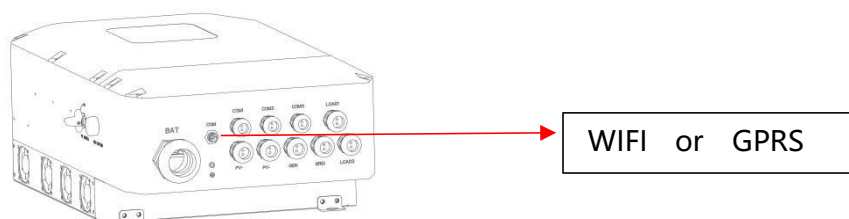
Hybrid inverter provides a GPRS (radio frequency) interface which control the switch time of a designated load via an external Smart Plug (purchase the product from supplier if needed), so that the load mostly consumes PV energy and incurs the lowest-possible energy costs during operation.

1) Diagram:



2)GPRS Connection:

Please refer to the Smart Plug user manual for detailed connection



6.7. CT Installation instruction

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

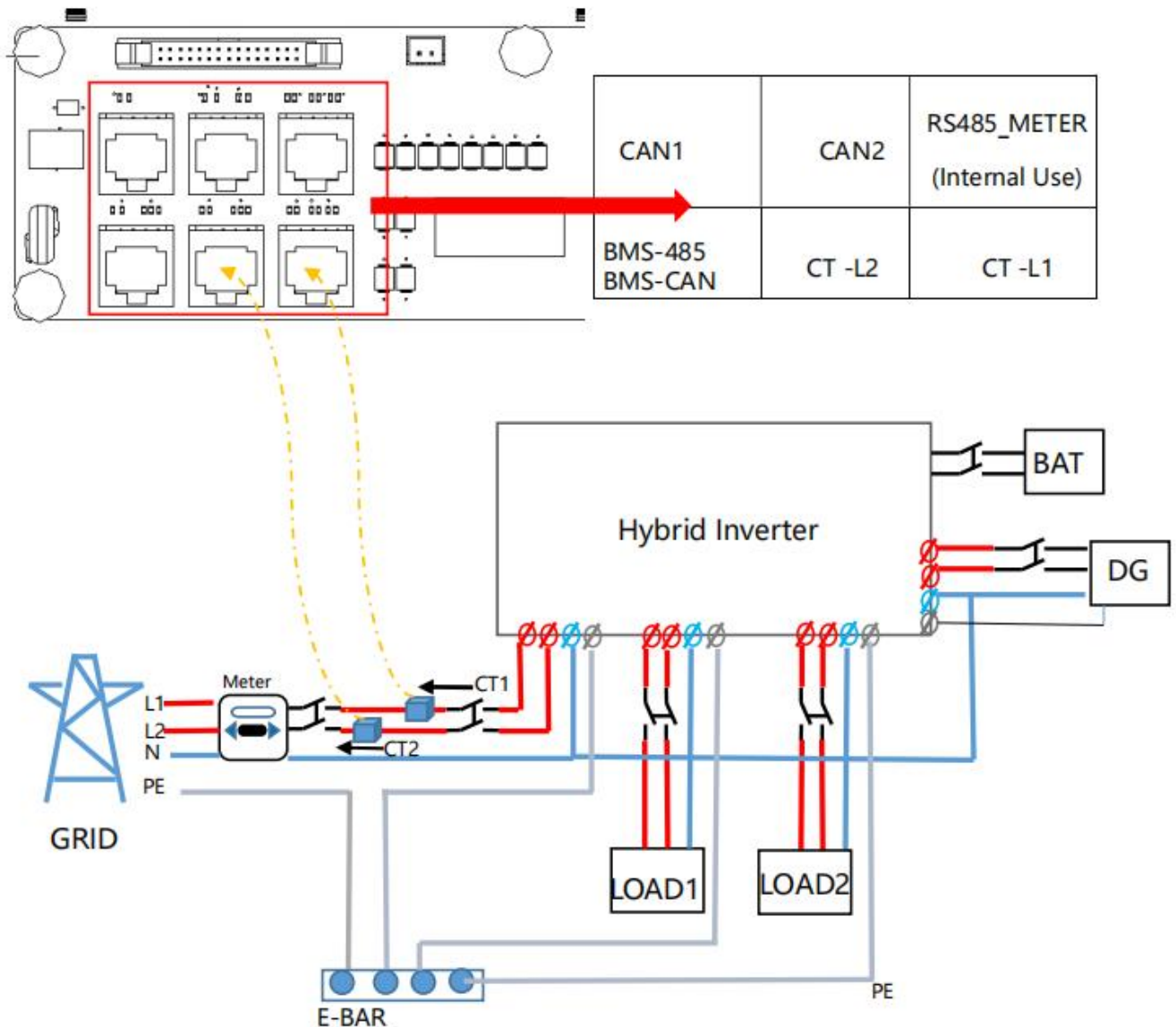


Note!

- 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). Only one CT is provided in the accessories. The RJ45 connector of CT is connected to " CT-L1", and the CT is connected to L phase.

When connected to split phase power grid (North America), the accessories provide two CTS, "CT-L1" network interface is corresponds to L1 phase, and "CT-L2" network interface is connected to L2 phase.



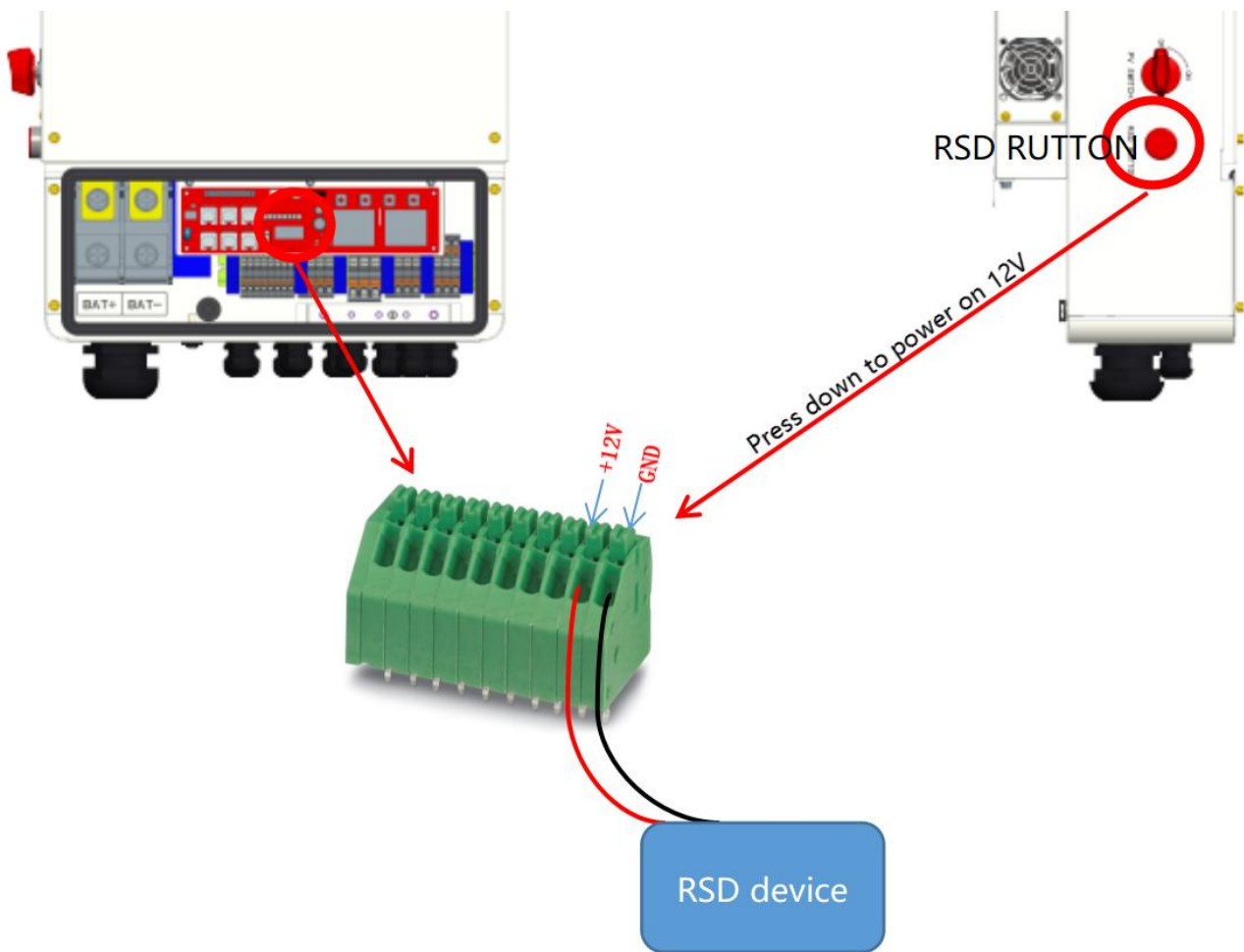
6.8. E-Stop Installation

The emergency stop (E-stop) button (D) included with this inverter is used to stop the PV modules from passing voltage on the string conductors, leaving them at a safe voltage for first responders to perform work in or on the building.

The e-stop button is a normally closed (NC) contact. When the button is pushed, the state of the e-stop is open.

Two 18-22AWG wires are used for connection between e-stop and inverter. At the inverter, these conductors are terminated at the 10 pin connector in the middle of the communication board, and the two conductors are respectively connected to DRY1_ 1B and DRY1_ 1.

At e-stop, the conductor is connected to the back of the contactor.

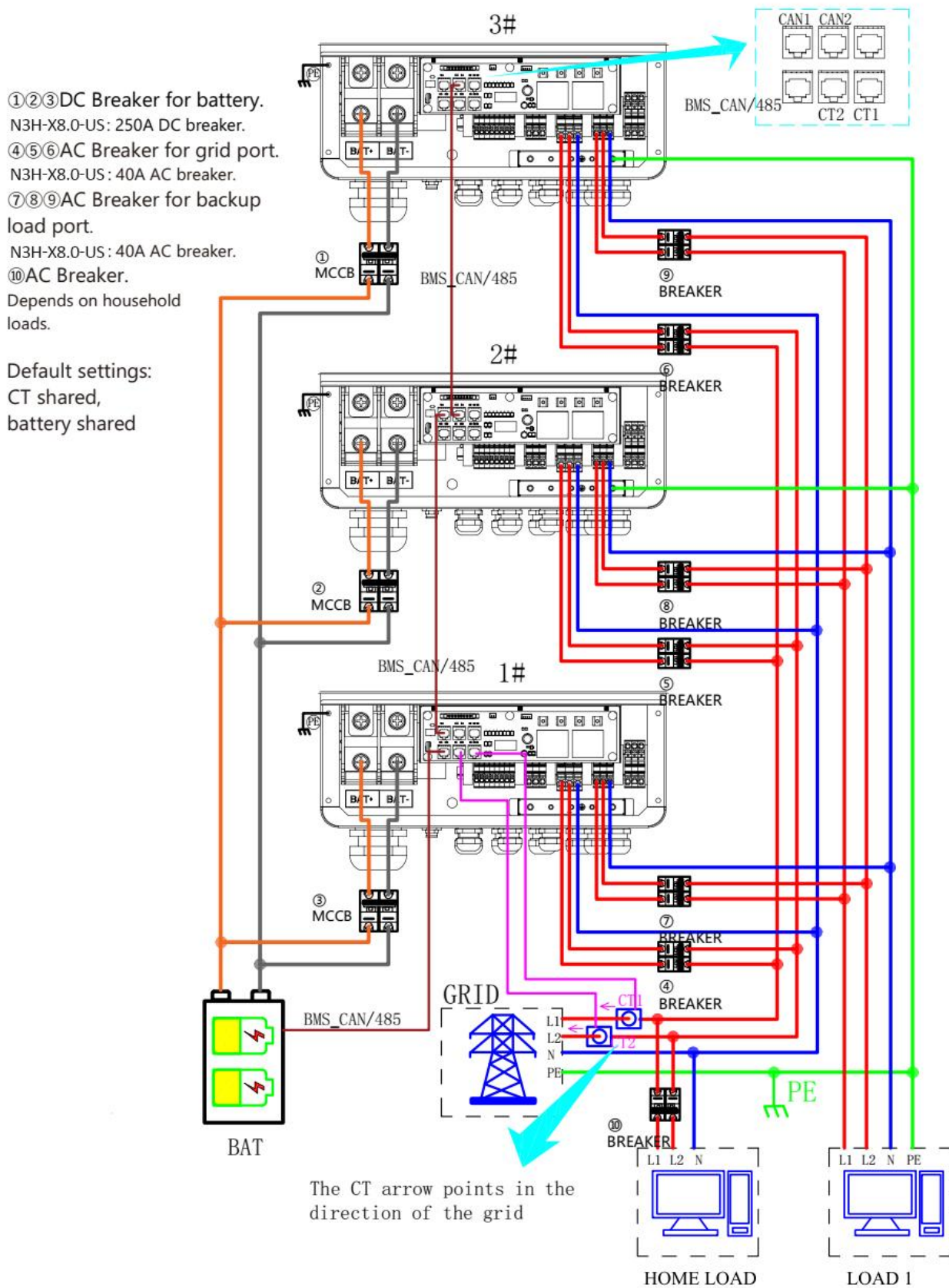


7. Inverter Parallel Guide

7.1. Parallel 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.

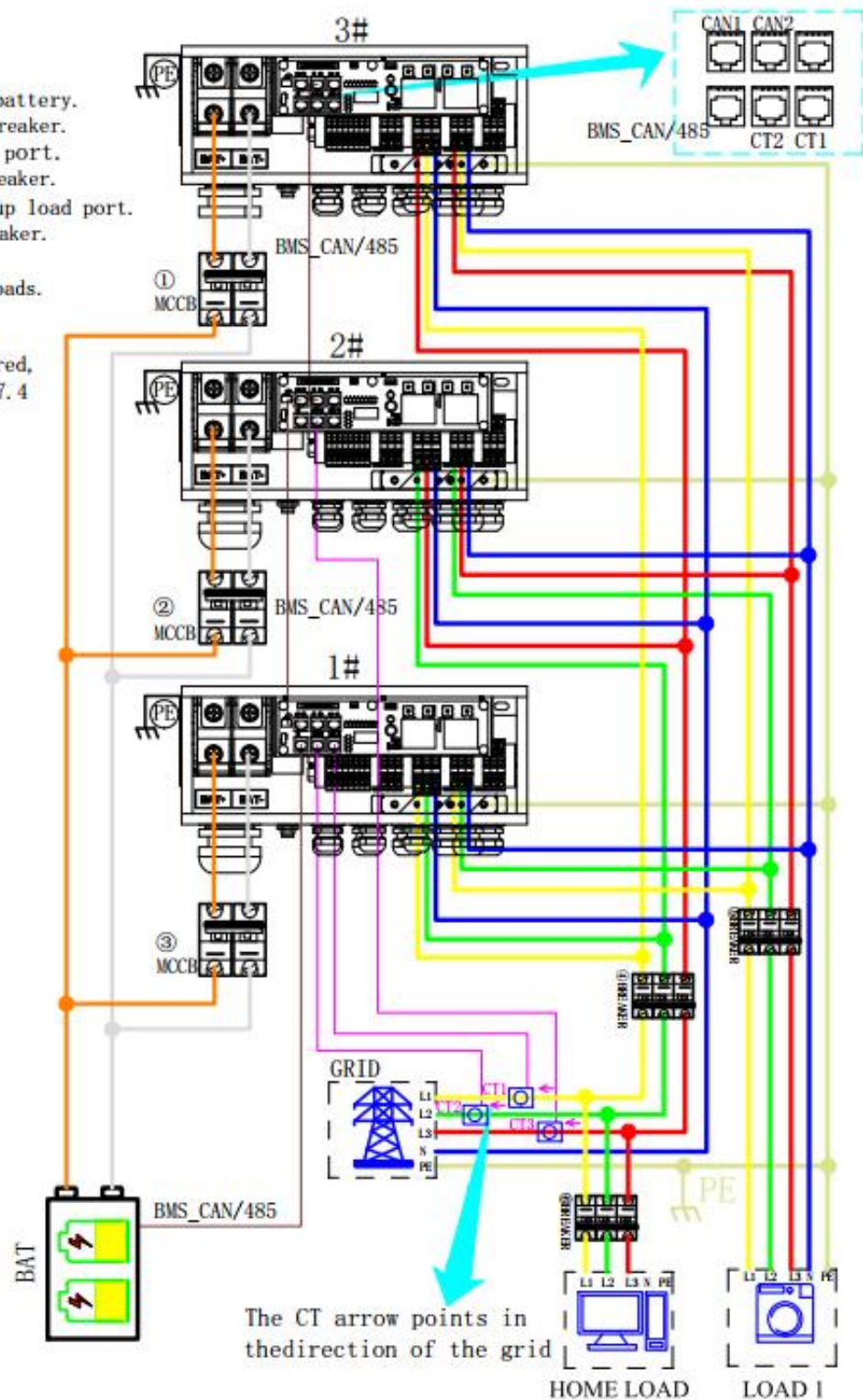
7.1.1. Split Phase (120/240Vac) Parallel Connection Diagram



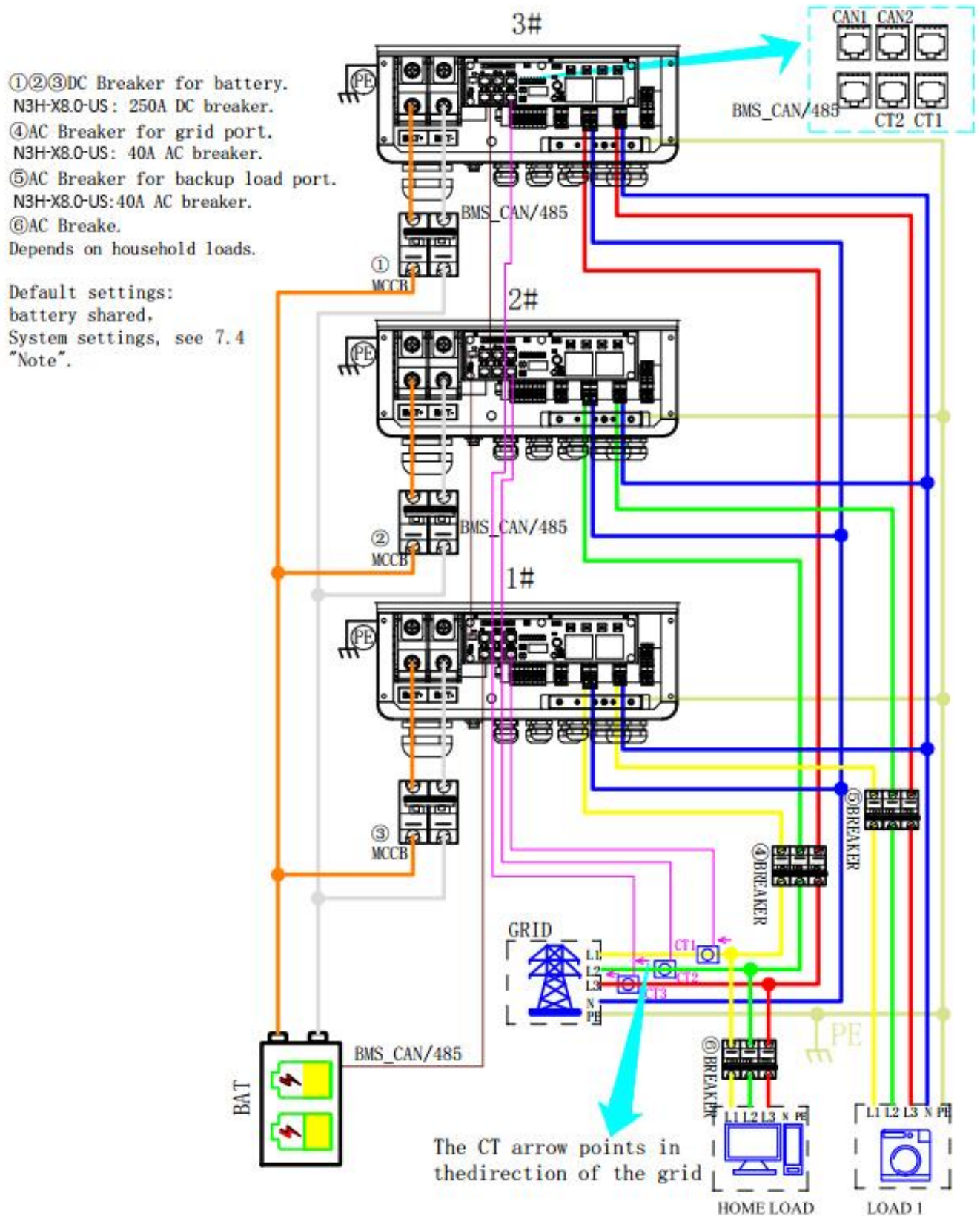
7.1.2. Parallel Connection for 120/208 Three Phase (American Standard)

- ①②③DC Breaker for battery.
N3H-X8.0-US: 160A DC breaker.
④AC Breaker for grid port.
N3H-X8.0-US: 80A AC breaker.
⑤AC Breaker for backup load port.
N3H-X8.0-US: 80A AC breaker.
⑥AC Breaker.
Depends on household loads.

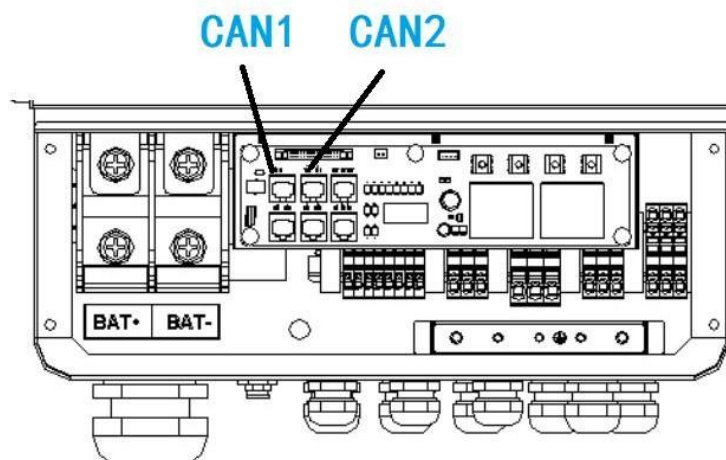
Default settings:
CT shared, battery shared,
System settings, see 7.4
"Note".



7.1.3. Parallel Connection for 230/400 Three Phase



7.2. Parallel Communication Cable Connection



For parallel communication, CAT 5 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.

7.3. Parallel Operation Notes

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

Password- >Information

Information		
ARM Ver: 0.0000 00.00		DSP
Ver: 0.0000 00.00 V1.XX.XX		
DSP: V1.XX.XX		

Please check the diagram above. The common batteries use is supported on default for maximizing the system efficiency. The BMS cable should be connected to the master inverter.

- 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.**

3) Make sure the CT Limiter sensor is installed properly. If the load is connected outside the inverter, user need to choose common ct and make sure the CT ratio is right (the default 90A ct ratio is 1:1000, no need to change). The common CT is only needed to be connected to the master inverter. Please install CT on every unit's incoming electrical service wires on L1 and L2 (see diagram) when choosing independent CT.

- 4) Please check the master and slave's setting by screen and make sure all the setting are same.

7.4. Parallel System Setting

The parallel setting page can be visited in the following steps in the screen:

Password->Parallel Settings

7.4.1. Setting

Interface	Description
<p>Parallel.</p> <p>→1.Parallel num. 2.Master/Slave 3.Parallel addr 4.Common Grid CT 5.PHASE A/B/C 6.3Phase parallel 7.Discharge Cur 8.Charge Cur 9.Parallel enable</p>	<p>This interface shows parallel setting.</p> <ol style="list-style-type: none"> 1. Total numbers of the inverters. 2. In a parallel system, the master unit broadcasts the bms and other information to the slavers. Make sure only one unit is configured as master. 3. Local unit address(1-8). 4. Common CT Enable 5. Local phase of unit for three-phase installation. (reserved function) 6. Enable or disable group 3 phase enable. 7. DISCHARGE CURR, Total battery discharge current command, only be settable in master unit in parallel mode. 8. CHARGE CURR, Total battery charge current command, only be settable in master unit in parallel mode. 9. PARALLEL EN,Enable/Disable the parallel function

7.4.2. Parallel Error information

Interface	Description
<p>ERROR NO. </p> <p>11:parallel fail</p>	<p>A parallel warning may occur because of the following reasons:</p> <ol style="list-style-type: none"> 1. Wrong setup of the parallel num. 2. Wrong inter-unit parallel communication cable. 3. Wrong setup of the unit address.

Note!

- If you need to assemble the split phase into three phases, please make the following settings:
- 1. 3PHASE EN; 2. PARALLEL EN; 3. PHASE Selection; 4. Grid Standard (United States); 5. Power Grid Settings(US 208V); 6. Master/slave selection; 7. Number of parallel machines; 8. ADDRESS.
- If you need to assemble a three-phase (230V/240) using a single phase, please make the following settings:
- 1. 3PHASE EN; 2. PHASE Selection; 3. Grid Standard(South Africa); 4. Power Grid Settings(Split Phase); 5. Master/slave selection; 6. Number of parallel machines; 7. ADDRESS. (Do not PARALLEL Enable and COMMON CT Enable)

8.3. Generator Setting

The Generator setting page can be visited in the following steps in the screen:

Password->Gen Set

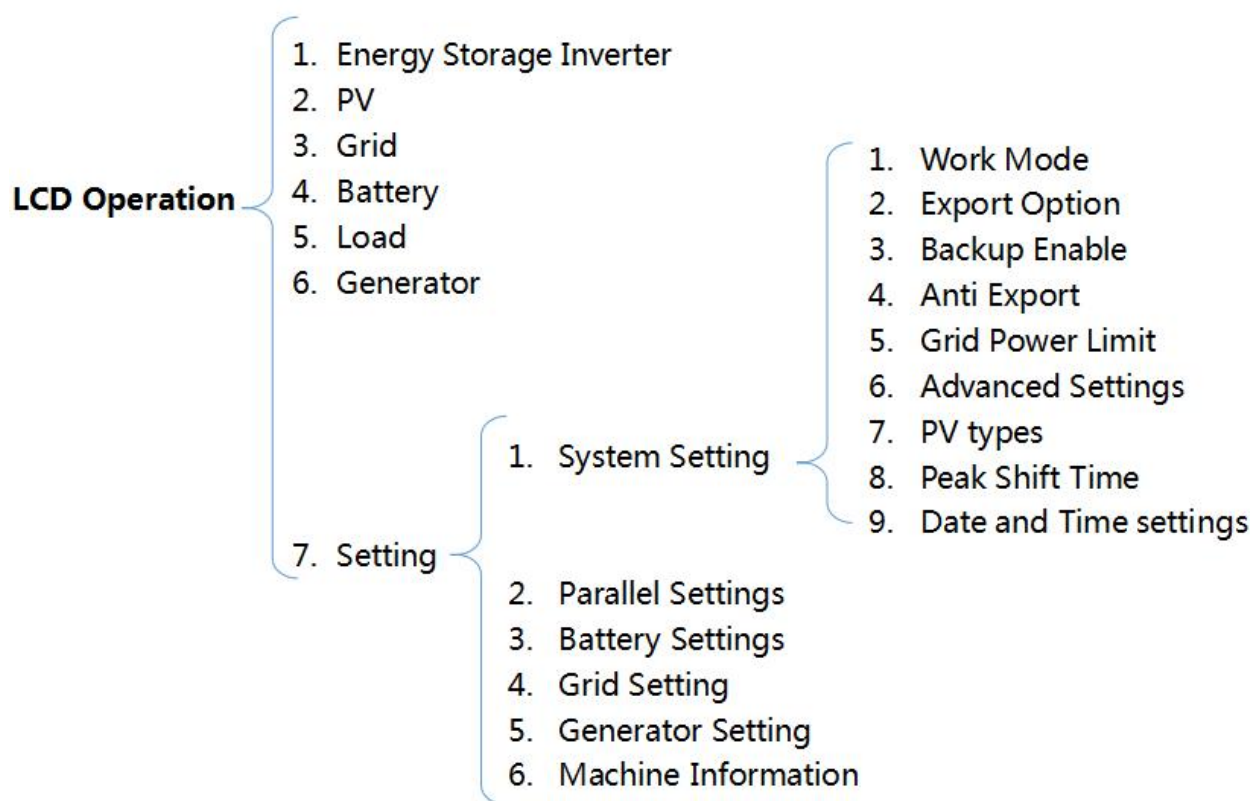
8.3.1. Setting

Interface	Description
<p>Generator.</p> <ol style="list-style-type: none"> 1. START SOC. 2. STOP SOC 3. Charge Current 4. MAX operating 5. Cooling time 6. Gen Power 	<p>This interface shows Generator setting.</p> <ol style="list-style-type: none"> 1. When the SOC of battery is lower than the setpoint, the Generator drycontact is enabled and Generator Manual operation is disabled, the connected Generator will be started. 2. When the SOC of battery is higher than the setpoint, the Generator dry contact is enabled and Generator Manual operation is disabled, the connected Generator will be stopped (START SOC < STOP SOC). 3. It indicates the maximum current that the inverter charges the battery from Generator. 4. 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. 5. It indicates the waiting time of the Generator to restart after it has reached the running time. The unit is 0.1 hour. 6. Rated power of Generator.

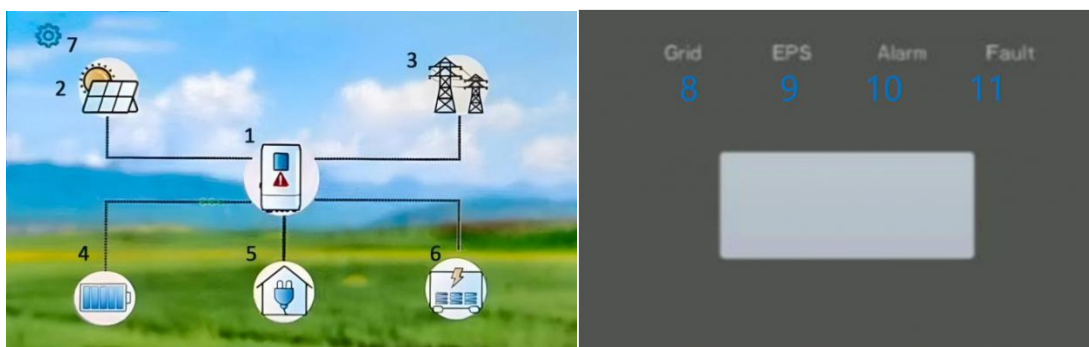
8.3.2. CONTRL

Interface	Description
<div><div>GEN CONTROL</div><div><div>1. Gen Enable</div><div>2. .Gen Charge Enable</div><div>3. Gen Manual Mode</div><div>4. Gen Auto Start/stop</div><div>5. Gen Manual Start/Stop</div><div>6. Gen Connect TO Grid</div></div></div>	<p>This interface shows Generator CONTRL.</p> <ol style="list-style-type: none">1. Enable control of the Generator function.2. Generator Charge Enable control3. If the user wants the Generator to be controlled manually, Enable it.4. If the user wants the Generator to be automatically controlled to start and stop through the dry contact, Please ban dragons. Manual En should be opposed to Gen Manual Mode.5. The on/off command in manual control mode ,6. Connect the diesel Generator to the grid input port

9. LCD Operation



9.1. Control Panel



Code	Name	Explanation
1	Energy Storage Inverter	Click Energy Storage Inverter to enter the working status interface of the energy storage inverter, see section 11.3.1 for details.
2	PV	Display the real-time PV power. Click PV to enter the working status interface of PV, see section 11.3.2 for details.
3	Grid	Display the real-time grid power. Click Grid to enter the working status interface of grid, see section for 11.3.3 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 11.3.4 details.
5	Load	Display the real-time load power. Click Load to

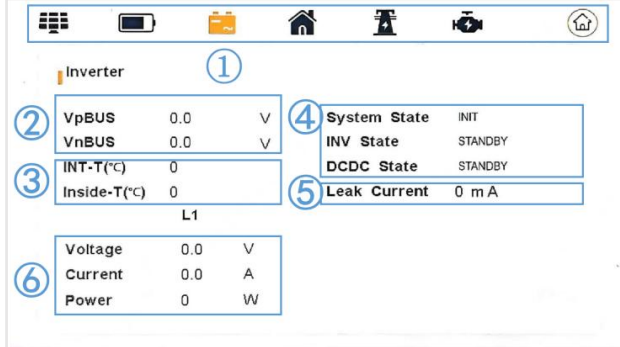
		enter the working status interface of load, see section for 11.3.5 details.
6	Generator	Display the real-time generator power. Click generator to enter the working status interface of generator, see section for 11.3.6 details.
7	Setting	Users can click Setting to enter the settings interface, see section 11.4 for details.
8	Indicator LED	lit in green: The inverter is in grid mode. Off: The inverter is in not in grid mode.
9		lit in green: The inverter is in off-grid mode. Off: The inverter is in not in off-grid mode.
10		lit in Yellow: The inverter is in Warning . Off: The inverter has no Inverter Warning
11		lit in red: The inverter is in fault status. Off: The inverter has no errors.

9.2. Instructions for LED Indicator

	Grid (Green)	EPS (Green)	Alarm (Yellow)	Fault (Red)
Initialization	off	off	off	off
Stand-by	off	off	off	off
Grid mode	on	off	off	off
Off-Grid	off	on	off	off
Bypass of mains	off	on	on	off
Fault	off	off	off	on

9.3. Working Status

9.3.1. Energy Storage Inverter



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

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

③Temperature
INV-T(°C): INV Temperature

④Display status information, including System status, Inverter status, and DCDC status.
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: Working state of off-grid conversion to grid connection.
INV TO PFC: Status of power by public grid turn into on grid working mode.
DCDC Status: Displays charging

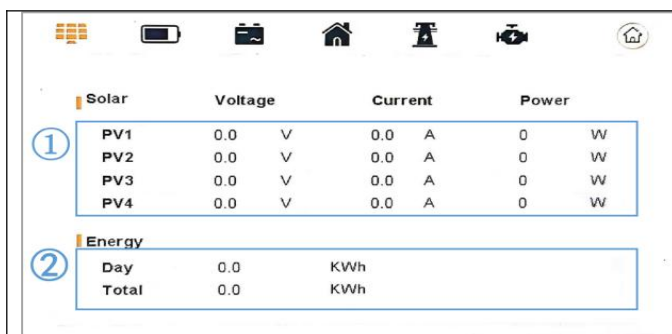
Inside-T(°C):Internal ambient temperature of the machine

and discharging status information, including: STANDBY, CHARGE, DISCHARGE.

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

⑥ Display the **real-time voltage, current, and power** of the device.

9.3.2. PV



The screenshot shows the PV monitoring interface with a top navigation bar containing icons for Home, PV, Battery, Grid, and Load. The main content area is divided into two sections: 'Solar' and 'Energy'.

Solar

	Voltage	Current	Power
PV1	0.0 V	0.0 A	0 W
PV2	0.0 V	0.0 A	0 W
PV3	0.0 V	0.0 A	0 W
PV4	0.0 V	0.0 A	0 W

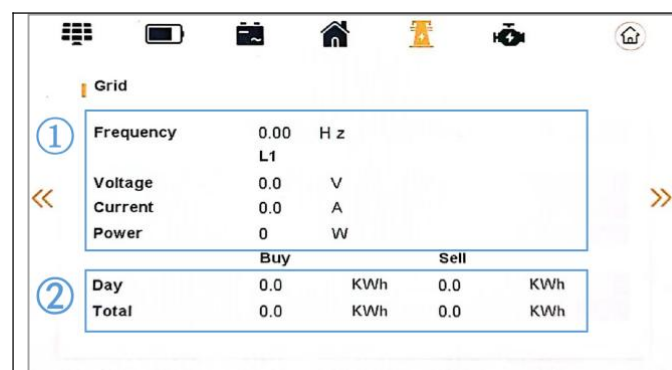
Energy

	KWh
Day	0.0
Total	0.0

① Display the working parameters of the four channels of PV (**PV1, PV2, PV3, PV4**), including **real-time voltage, current, and power**. (PV input type can be set in the settings).

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

9.3.3. Grid



The screenshot shows the Grid monitoring interface. The top navigation bar is the same as the PV interface. The main content area has a 'Grid' section.

Grid

Frequency	0.00	Hz
Voltage	0.0	V
Current	0.0	A
Power	0	W

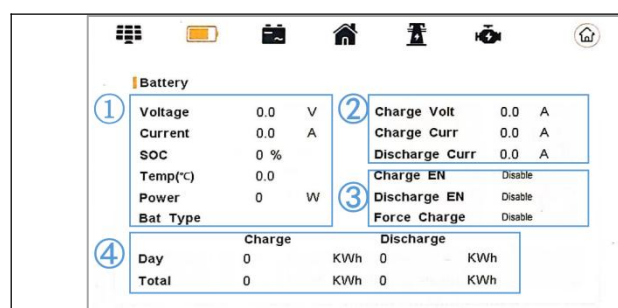
Below the grid parameters, there are two columns: 'Buy' and 'Sell'.

	Buy	Sell
Day	0.0 KWh	0.0 KWh
Total	0.0 KWh	0.0 KWh

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

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

9.3.4. Battery



The screenshot shows the Battery monitoring interface. The top navigation bar is the same as the PV interface. The main content area has a 'Battery' section.

Battery

Voltage	0.0	V
Current	0.0	A
SOC	0 %	
Temp(°C)	0.0	
Power	0	W
Bat Type		

On the right side of the battery parameters, there are two sections: 'Charge' and 'Discharge'.

	Charge	Discharge
Day	0 KWh	0 KWh
Total	0 KWh	0 KWh

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

② Display battery **charging voltage, charging current, and discharge current**.








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

Charge EN: Charge Enable
Discharge EN: Discharge Enable

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








9.3.5. Load

9.3.5.1. Load/Page One

Load										
      										
Load L1										
①	<table><tr><td>Voltage</td><td>0.0</td><td>V</td></tr><tr><td>Current</td><td>0.0</td><td>A</td></tr><tr><td>Power</td><td>0</td><td>W</td></tr></table>	Voltage	0.0	V	Current	0.0	A	Power	0	W
Voltage	0.0	V								
Current	0.0	A								
Power	0	W								
<<	>>									
Energy										
②	<table><tr><td>Day</td><td>0.0</td><td>KWh</td></tr><tr><td>Total</td><td>0.0</td><td>KWh</td></tr></table>	Day	0.0	KWh	Total	0.0	KWh			
Day	0.0	KWh								
Total	0.0	KWh								








① User can click << to return to the previous page, and click >> to enter the next page .(not to be repeated later)
② Display the working parameters of the load, including **real-time voltage, current, and power.**
③ Accumulated usage of load, including daily and total accumulated energy.

9.3.5.2. Load/Page Two

Home Load	
      	
Home Load	
Power	0.0 W
<<	>>

Display the **real-time power** of the load.

9.3.6. Generator

Generator	
      	
Generator L1	
Voltage	0.0 V
Current	0.0 A
Power	0 W

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

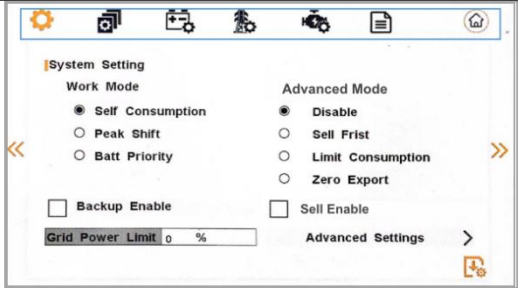








9.4. Setting

9.4.1. Enter Setting

9.4.1.1. Input password

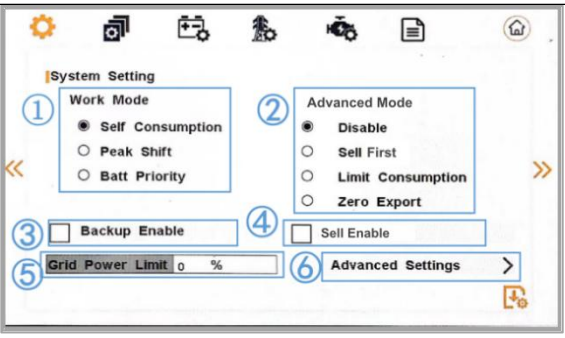
	<p>①Users can click on the icon above to enter device status data (PV, Battery, Energy Storage Inverter, Load, Grid, Generator) and return to the Home Page.</p> <p>②To enter the settings, a password is required. The default password is 11111. Click OK to enter the settings interface.</p>
---	---

9.4.1.2. Enter the setting interface

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

9.4.2. Setting Option

9.4.2.1. System setting/Page One

	<p>①Work Mode: Users have three working modes to choose from, Self Consumption, Peak Shift, and Battery Priority.</p>
<p>②Advanced Mode: There are four options here: Disable, Sell First Mode, Limited Consumption Mode and Zero Export Mode.</p> <p>Disable: Only when users selects "Disable", the three work modes (Self Consumption, Peak Shift, battery priority) take effect. When the user selects the other three options (Sell First, Limit Consumption, Zero Export), the three working modes are invalid.</p> <p>Sell First: First consider selling electricity to the grid. In this mode the anti-reflux setting is automatically disabled. The users can use this mode to sell back surplus solar power to grid. If time of use is enabled, the battery power can also be sold to grid.</p>	

Limit Consumption: In this mode, the ct limiters are used to sense the grid power flow direction. The hybrid inverter can be chosen to sell power or not sell power to grid. There is a CT Limit Power parameter available in this mode. When the battery is needed to discharge to reduced the load consumption, the grid will cover the parameter set part consumption firstly and the battery discharges energy to makes up the rest part. Other conditions are similar to SELF CONSUME working mode.

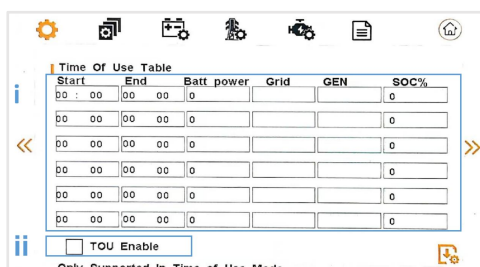
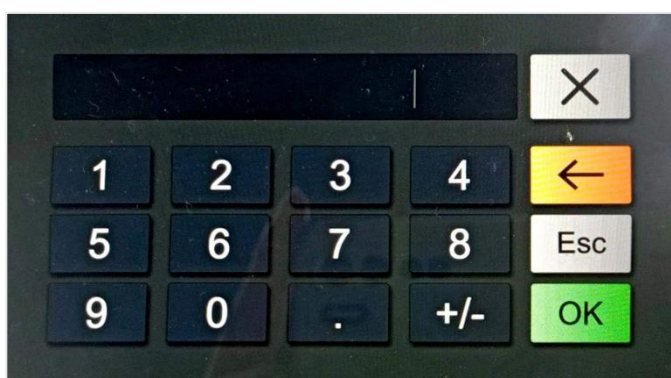
Zero Export: In this mode, the ct limiters should be installed in the input of the inverter's grid port. The hybrid inverter will not sell power to grid. The user can use Zero export power parameter to ensure the inverter won't feed back power to grid.

③**Backup Enable:** When the Grid and PV are powered off, Enable the battery to supply power to the load, default option is enable.

④**Sell Enable:** It means inverter allowed to generate electricity to the Grid.

⑤**Grid Power Limit**

Users can click to enter the numerical input interface.



⑥ Advanced Settings

Users can click **Advanced Settings** to enter the advanced settings interface.

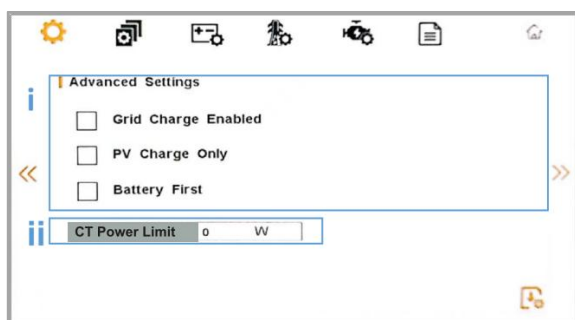
There are also some attributes of these mode: Global Grid Charge Enable, PV Charge Only, Bat Charge On Priority, Time-of-use Enable and 6 Time-of-use Slots.

Advanced Settings/First Page:

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

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

Advanced Settings/Second Page:



i. Users have three advanced settings to choose from, namely Global Grid Charge Enable, PV Charge Only and Battery First.

Global Grid Charge Enable: It is a high level control attribute of grid charge enable. If time of use function is disabled, this attribute is used to judge whether or not to charge the battery by

grid. If time of use function is enabled, the battery can be charged by grid only when the time slot grid charge attribute is enabled.

PV Charge Only: If user don't want to use grid to charge the battery in any time, please enable this attribute. The PV energy will be used first for the load, and then the excess energy will be used to charge the battery. If the PV energy is insufficient, the battery will power the load.

Battery First: If there will be a storm or other emergency, user can use this attribute to adjust the power distribution priority. If this attribute is disabled, the solar power will cover the load on priority by default.

ii. User can sets CT Power Limit

9.4.2.2. System setting/Page Two

The screenshot shows the 'System Setting' page. It has a top navigation bar with icons for settings, system, load, battery, inverter, and home. The main content area is titled 'System Setting'. There are four numbered callouts: 1 points to the 'PV Type' section with radio buttons for 'Independent' (selected), 'Parallel', and 'Constant Voltage'. 2 points to the 'ARC Enable' checkbox. 3 points to the 'Beep ON/OFF' checkbox. 4 points to the 'Aux Load SOC On' and 'Aux Load SOC Off' percentage input fields, both currently set to 0%.

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

②Enable or Disable ARC detection function.

③Users need to manually set the value of Aux Load SOC On and Aux Load SOC Off.

④**Aux Load SOC On:** The SOC value of the battery enabled by load 2 .

Aux Load SOC Off: The SOC value of the battery disabled by load 2 (SOC on> SOC off).

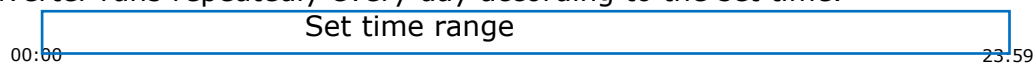
9.4.2.3. System setting/Page Three

The screenshot shows the 'Peak Shift Time' interface. It has a top navigation bar with icons for settings, system, load, battery, inverter, and home. The main content area is titled 'Peak Shift Time'. It has two sections: 'Charge Time' and 'Discharge Time'. Each section has three rows for 'Time1', 'Time2', and 'Time3'. Each row has two time input fields (start and end times). Below the input fields, it says 'Only Supported in Peak Shift Mode'.

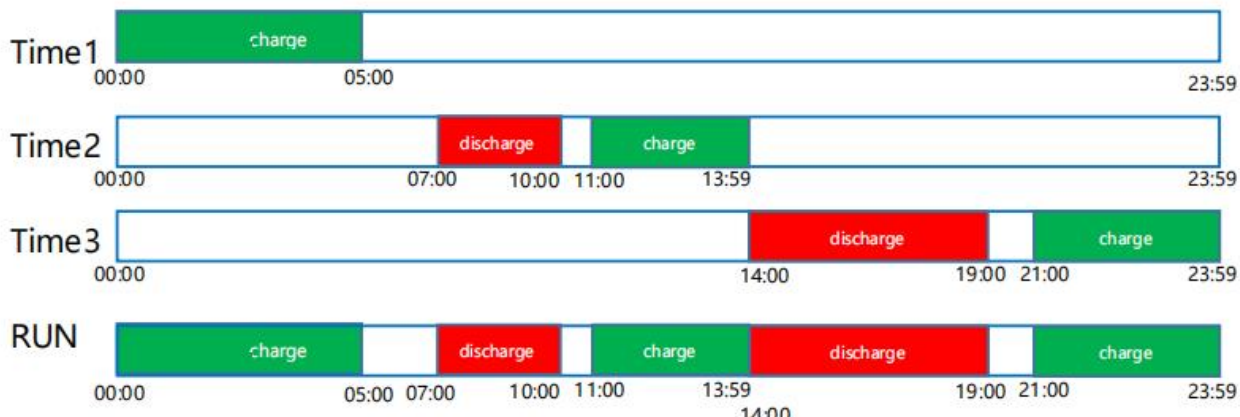
Setting of charging and discharging time for Peak Shift. When the working mode is Peak Shift, users need to enter this interface to set the charging and discharging time. And Users need to manually input the start charge/discharge time and the end charge/discharge time.

WORKTIME*

1)The maximum allowable setting time is 24h(one day), It is allowed to set six different charging and discharging states within 24h.(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 charge battery from 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.

9.4.2.4. System setting/Page Four

<p>The screenshot shows the 'System Settings: Date & Time' page. It includes input fields for Year, Month, Day, Hour, Minute, and Second, each with left and right arrow buttons for navigation. A home button is located at the bottom right.</p>	<p>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.</p>
--	---

9.4.3. Parallel Setting

<p>The screenshot shows the 'Parallel Settings' page. It includes options for 'Parallel enable' (Master/Slave), 'Common Grid CT', '3 Phase Parallel' (Phase A/B/C), and input fields for 'Parallel num', 'Parallel addr', 'CT Ratio', 'Charge Curr', and 'Discharge Cur'. Numbered callouts 1 through 4 point to specific settings.</p>	<p>① Parallel enable: Start or disable the parallel function. Master/Slave: This interface is used for paralleling, and the inverter is selected as the master or slave. ② Common Grid CT: Enable or disable CT sharing.</p>
---	---

③ **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. (Reserved function).

④ **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.

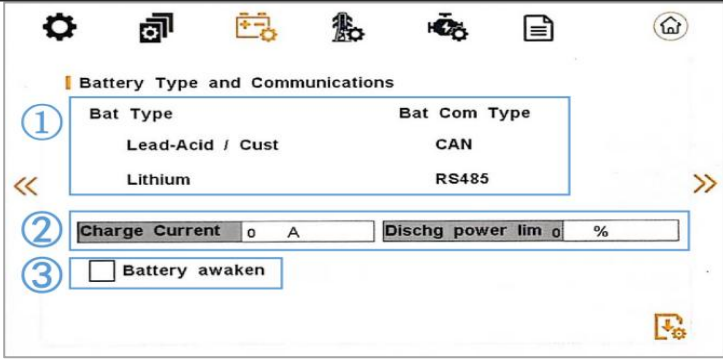
CT Ratio: Set the CT ratio to 1000:1 by default.

Charge Curr: This interface is used to select the parallel charging current.

Discharge Cur: Start or disable the parallel function.

9.4.4. Battery Setting

9.4.4.1. Battery type and communications

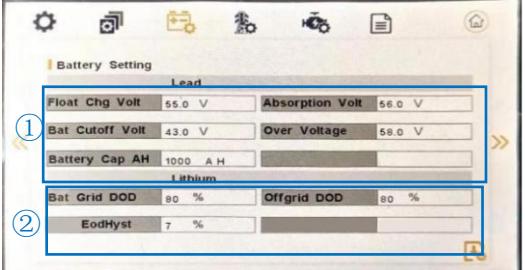


① Set Battery Type and Battery Communication method
Users can choose the **battery type** is lead-acid battery/lithium battery, and the **battery communication** method is CAN/485. The default option is CAN.

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

③ **Battery wake-up :**
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.

9.4.4.2. Battery setting



① 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 inpt 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 the input power. (The input value ranges from 50 to 1000) The battery capacity setting will affect the maximum charging current, for example, set 100Ah, the maximum charging current is $100A \times 0.2 = 20A$).

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).

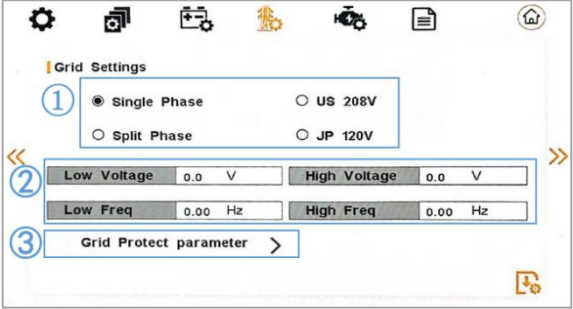
② Settings required when using lithium

Bat Grid DOD/Offgrid DOD:
When the battery discharge is higher than the set parameter, the inverter generates a battery low voltage alarm.

EodHyst: When a low-voltage alarm is generated, the alarm is cleared if the battery charge is higher than the specified amount.

9.4.5. Grid Setting

9.4.5.1. Grid setting/Page One



① Energy Storage Inverter use Single Phase, default option is Single Phase.


② **Low Voltage:** The input value of Grid low voltage. It is valid when grid mode choose custom.

High Voltage: The input value of Grid high voltage. It is valid when grid mode choose custom.

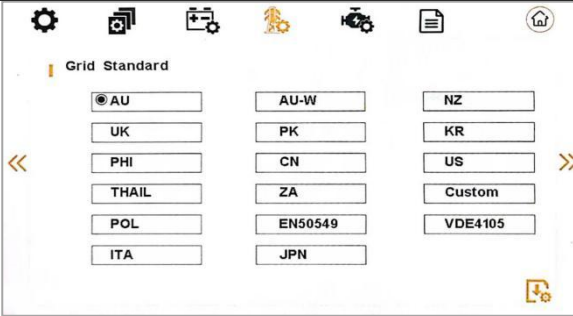
Low Freq: The input value of Grid low frequency. It is valid when grid mode choose custom.

High Freq: The input value of Grid high voltage. It is valid when grid mode choose custom.

Grid parameters/page two:



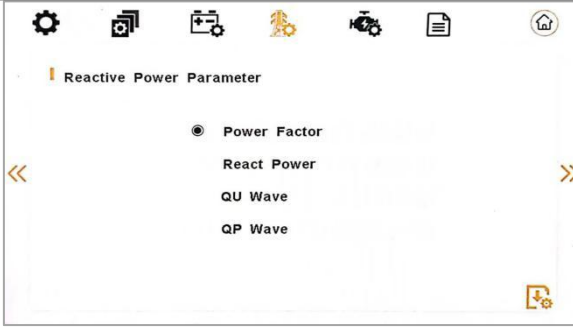
9.4.5.2. Grid setting/Page Two



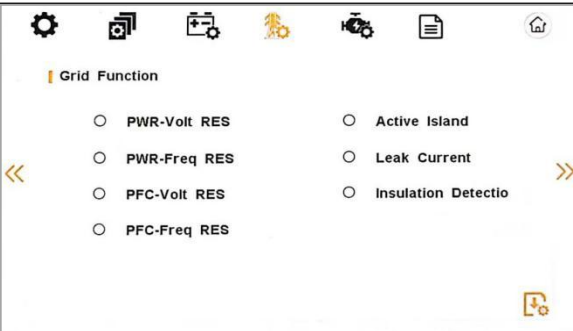
This interface is used to select Grid standard. Users can set and switch grid standards according to their needs.

AU: Australia	AU-W: Western Australia	NZ: New Zealand	UK: United Kingdom
PK: PAKISTAN	KR: Korea	PHI: Philippines	CN: China
US: America	THAIL: THAILAND	ZA: South africa	Custom: User defined
POL: Poland	EN50549	VDE4105	ITA: Italy
			JPN: Japan

9.4.5.3. Grid setting/Page Three

	<p>REACT Power Parameter: REACT Power Parameter, including: Power Factor, React Power, QU Wave, QP Wave.(For specific country if required by the local grid.)</p> <p>Power Factor:The input value should range between L0.80 and L0.99 or C0.8 and C1.00.</p> <p>React Power: Reactive power control The input value should range between - 60% and +60%, which varies with the standard.</p> <p>QU Wave: Voltage-reactive curve</p> <p>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.)</p>
---	---

9.4.5.4. Grid setting/Page Four

	<p>When the grid voltage is abnormal, the charging power will be limited, and the function will be enabled if required by the national grid standards.</p>
<p>PWR-VOLT RES: Generation voltage response. When the grid voltage is abnormal, the active power is limited, and the function is enabled when required by the national grid standard.</p> <p>PWR-FREQ RES: Generation frequency response. When the power grid frequency is abnormal, the active power will be limited, and the function will be enabled if required by the national power grid standard.</p> <p>PFC-VOLT RES: Charge voltage response When the grid voltage is abnormal, the charging power will be limited, and the function will be enabled if required by the national grid standards.</p> <p>PFC-FREQ RES: Charge frequency response. When the power grid frequency is abnormal, the charging power will be limited, and the function will be enabled if required by the national power grid standard.</p> <p>Anti-Island: Anti-Islanding(The default option is enable) When the grid goes down, inverter will detect the loss of power and disconnect from the grid within milliseconds. It prevents your solar panels from feeding electricity into a downed power line.</p> <p>Leak Current: Leak current detect (The default option is enable)</p> <p>Insulation detection: Insulation detect (The default option is enable). When the insulation detection function is enabled in the gridconnected 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.</p>	

9.4.6. Generator Setting

① Diesel generator enable settings:

Gen Enable: Enable control of the Generator function.

Gen Chare Enable: Generator Charge Enable control.

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 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 Connect To Grid: Connect the diesel Generator to the grid input port.

② Diesel generator parameter setting:

Start SOC: When the SOC of battery is lower than the setpoint, the Generator drycontact 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 setpoint, the Generator drycontact 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.

9.4.7. Machine Information

9.4.7.1. Machine information/Page One

① Show inverter model.

② Energy storage inverter serial number

③ Show Software version

9.4.7.2. Machine information/Page Two

This interface is used to reset the inverter.

10. WIFI Quick Guide

10.1. Stick Logger Quick Guide

Model: LSW-3/LSW-3-C

Notice:

Please read this manual carefully before using products and keep it in the place where O&M providers can easily find.

Due to product upgrade and other factors, the content of this manual might change from time to time. Please take actual product as standard and get latest manual from www.solarman.cn or sales. Unless otherwise agreed herein, this manual will only be used as guidance. Any statement, information or suggestion in this manual will not take any form of responsibility.

Without written permission, any content of this document (partly or entirely) cannot be extracted, copied or transmitted in any form by any company or individual.



Warning: Please remove logger after power off.

Download APP



SOLARMAN Smart
for end user



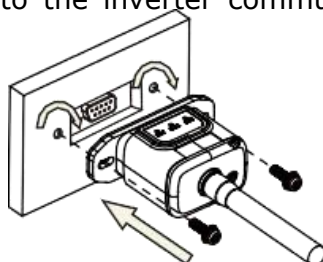
SOLARMAN Business
for business

iPhone: Search "SOLARMAN Smart" in Apple Store. Android: Search "SOLARMAN Smart" in Google Play.

10.1.1. Stick Logger Installation

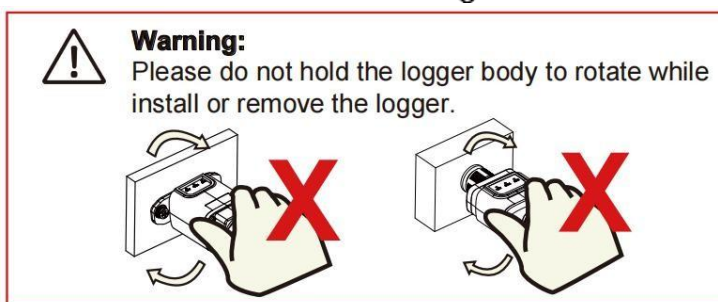
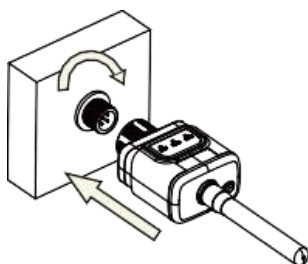
Type 1

Step1: Assemble logger to the inverter communication interface as shown in the diagram.






Type 2

Step1: Assemble logger to the inverter communication interface as shown in the diagram.



10.1.2. Logger Status Check Indicator light

Lights	Implication	Status Description(All lights are single green lights.)
	Communication with router	1.Light off: Connection to the router failed. 2.On 1s/Off 1s(Slow flash): Connection to the router succeeded. 3.Light keeps on: Connection to the server succeeded. 4.On 100ms/Off 100ms(Fast flash): Distributing network fast.
	Communication with inverter	1.Light keeps on: Logger connected to the inverter. 2.Light off: Connection to the inverter failed. 3.On 1s/Off 1s(Slow flash): Communicating with inverter.
	Logger running status	1.Light off: Running abnormally. 2.On 1s/Off 1s (Slow flash): Running normally. 3.On 100ms/Off 100ms(Fast flash): Restore factory settings.

The normal operation status of the stick logger, when router connected to the network normally:

1.Connection to the server succeeded: NET light keeps on after the logger powered on. 2.Logger running normally: READY light flashes.

3.Connection to the inverter succeeded: COM light keeps on.

10.1.3. Abnormal State Processing

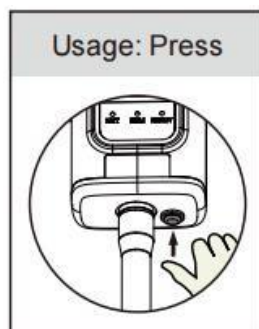
If the data on platform is abnormal when the stick logger is running, please check the table below and according to the status of indicator lights to complete a simple troubleshooting. If it still can not be resolved or indicator lights status do not show in the table below, please contact Customer Support.

(Note: Please using the following table query after power-on for 2mins at least.)

NET ● NET	COM ● COM	READY ● READY	Fault Description	Fault Cause	Solution
Any state	OFF	Slow flash	Communication with inverter abnormal	1.Connection between stick logger and inverter loosen. 2.Inverter does not match with stick logger's communication rate.	1.Check the connection between stick logger and inverter. Remove the stick logger and install again. 2.Check inverter's communication rate to see if it matches with stick logger's. 3.Long press Reset button for 5s, reboot stick logger.
OFF	ON	Slow flash	Connection between logger and router abnormal	1.Stick logger does not have a network. 2.Antenna abnormal 3.Router WiFi signal strength weak.	1.Check if the wireless network configured. 2.Check the antenna, if there is any damage or loose. 3.Enhance router WiFi signal strength. 4.Long press Resetbutton for 10s, reboot stick logger and networking again.
Slow flash	ON	Slow flash	Connection between logger and router normal, connection between logger and remote server abnormal.	1.Router networking abnormal. 2.The server point of logger is modified 3.Network limitation, server cannot be connected.	1.Check if the router has access to the network. 2.Check the router's setting, if the connection is limited. 3.Contact our customer service.
OFF	OFF	OFF	Power supply abnormal	1.Connection between stick logger and inverter loosen or abnormal. 2.Inverter power insufficient. 3.Stick Logger abnormal.	1.Check the connection, remove the stick logger and install again. 2.Check inverter output power. 3.Contact our customer service.
Fast flash	Any state	Any state	SMARTLINK networking status	Normal	1.Exit automatically after 5mins. 2.Long press Reset button for 5s, reboot stick logger. 3.Long press Reset button for 10s, restore factory settings.
Any state	Any state	Fast flash	Restore factory settings	Normal	1.Exit automatically after 1mins. 2.Long press Reset button for 5s, reboot stick logger. 3.Long press Reset button for 10s, restore factory settings.

10.1.4. Usage methods and notices for Reset button

10.1.4.1. Usage methods and key-press descriptions for Reset button



Key-press	Status Description	Light Status
Short press 1s	SMARTLINK rapid networking status.	NET light flashes fast for 100ms.
Long press 5s	Rebooting the stick logger.	All lights are extinguished immediately.
Long press 10s	Resetting the stick logger.	1.All lights are extinguished after 4s. 2.READY light flashes fast for 100ms.

10.1.4.2. Notices for Reset button

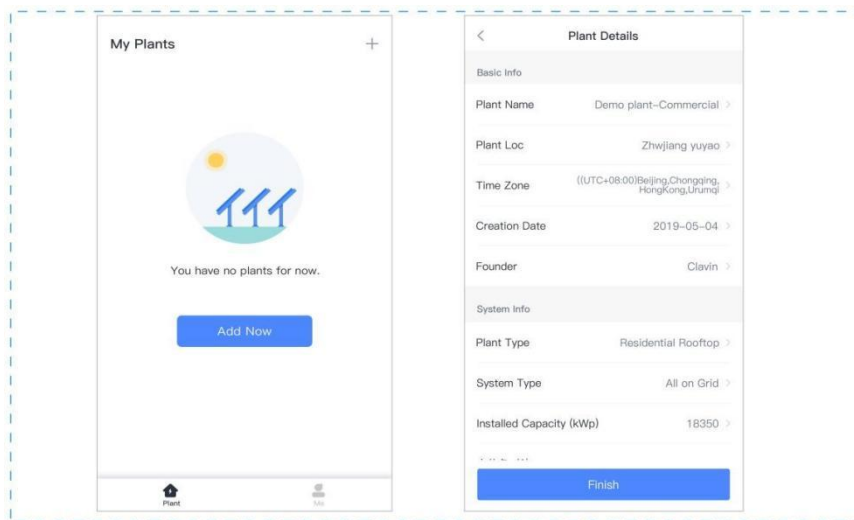


10.2. USER MANUAL for SOLARMAN Smart APP

10.2.1. Registration

Go to SOLARMAN Smart and register.

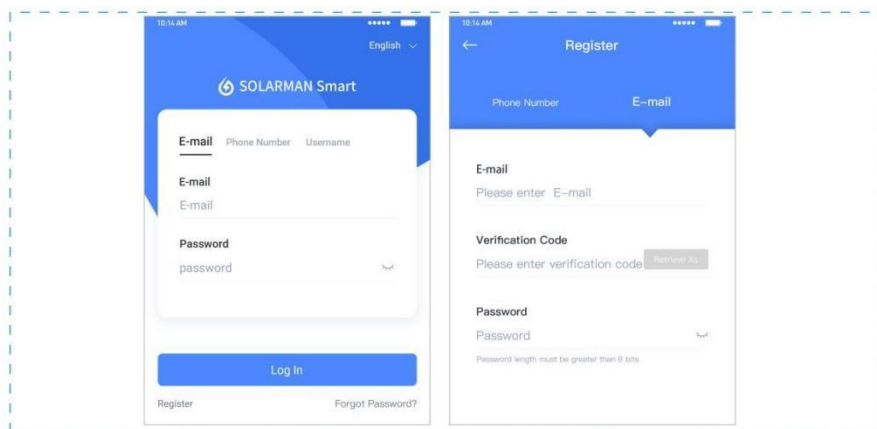
Click "Register" and create your account here.



10.2.2. Create a Plant

Click "Add Now" to create your plant.

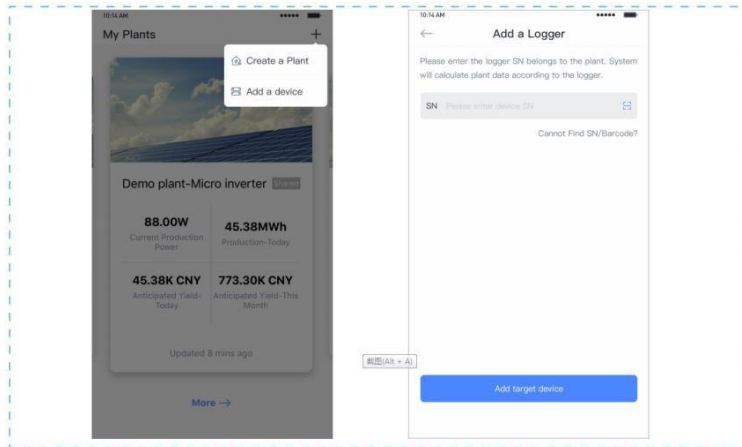
Please fill in plant basic info and other info here.



10.2.3. Add a Logger

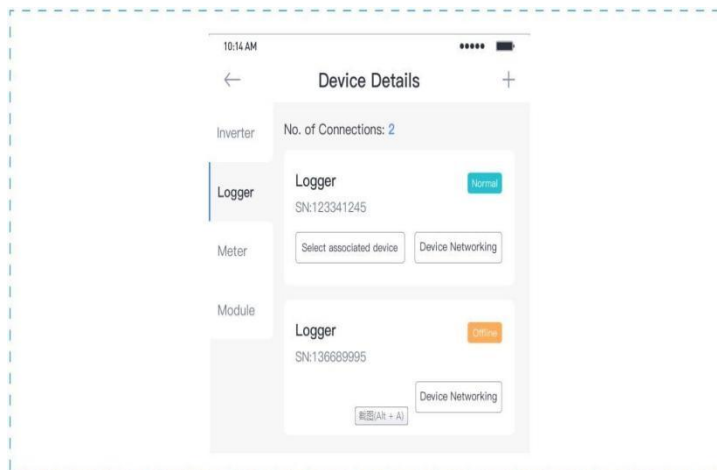
Method 1: Enter logger SN manually.

Method 2: Click the icon in the right and scan to enter logger SN, you can find logger SN in the external packaging or on the logger body.



10.2.4. Network Configuration

After the logger is added, please configure the network to ensure normal operation.



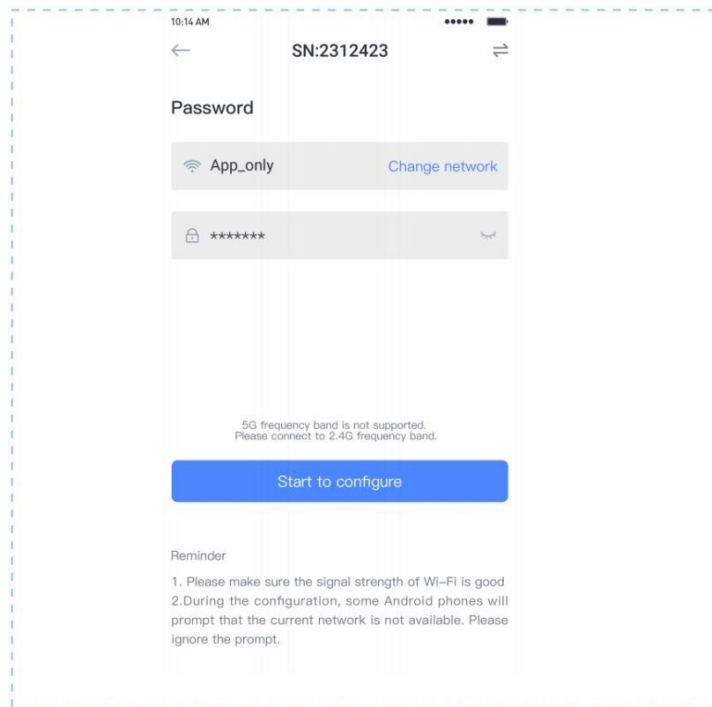
Go to "Plant Details"- "Device List", find the target SN and click "Networking".

Step 1: Confirm Wi-Fi Info

Please make sure your phone has connected to the right WiFi network. And click "Start".

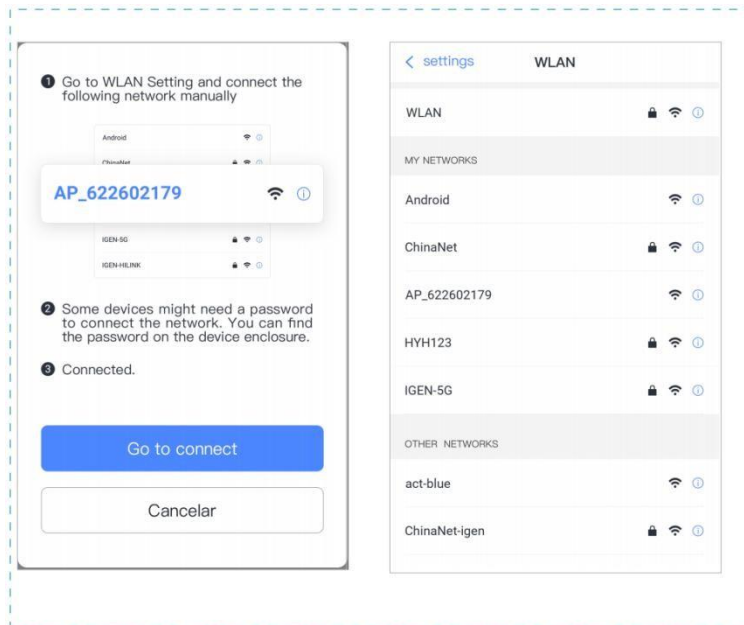


Notice: 5G WiFi is not supported.



Step 2: Connect to AP network

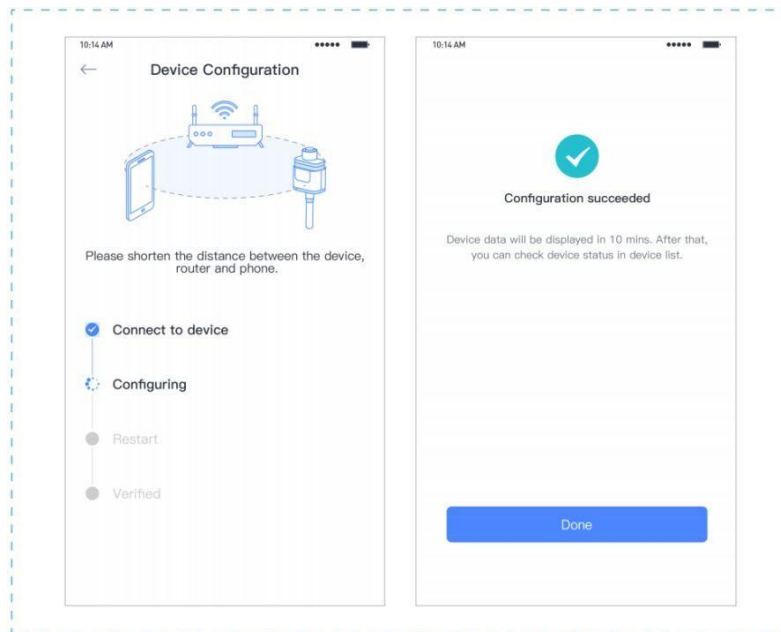
Click "Go to connect" and find the right "AP_XXXXX" network (XXXXX refers to logger SN). If the password is required, you can find the password on the logger body. Go back to SOLARMAN Smart APP, after connecting to AP network.



Step 3: Auto Configuration

Please wait for a while to complete the configuration. Then system will switch to the following page.

Click "Done" to check plant data. (Usually, the data will be updated in 10 mins)



If configuration failure occurs, please check the following reason and try it again.

- (1) Make sure WLAN is ON.
- (2) Make sure WiFi is normal.
- (3) Make sure wireless router does not implement the white-black list.
- (4) Remove the special characters in Wi-Fi network.
- (5) Shorten the distance between the phone and device.
- (6) Try to connect to other Wi-Fi.



Warning: Please make sure the stick logger is working properly before you leave the site. If there is anything abnormal, please do not leave the site and contact customer service at the first time.

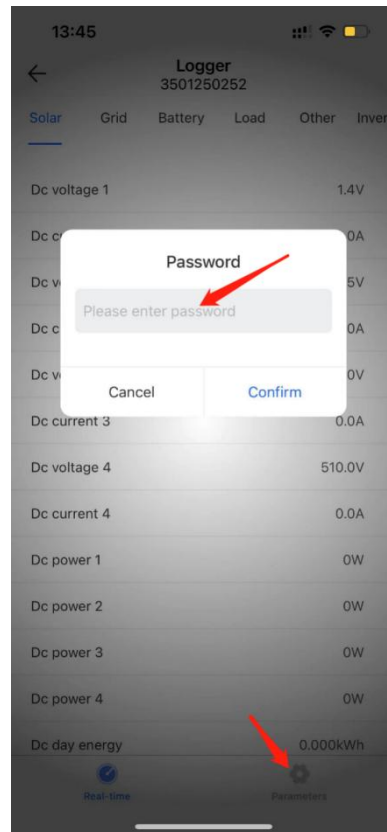
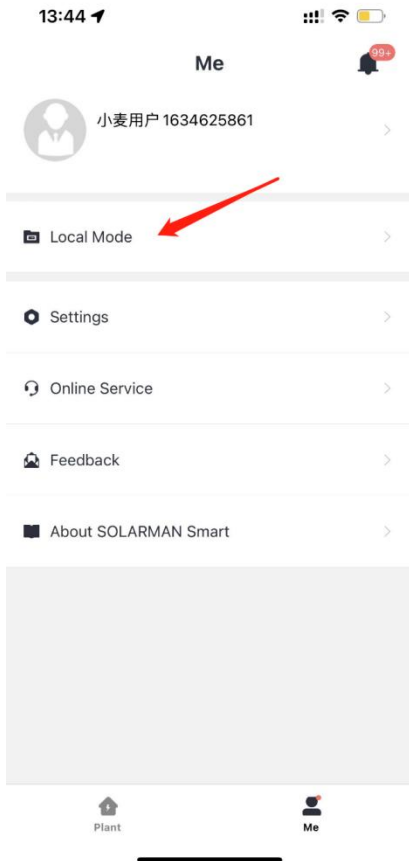
If you have any technical queries about our products, please contact us and provide the following information:

1. Product model and serial number of stick logger.
2. Product model and serial number of connected inverter. Thank you for your support and cooperation!

10.3. Grid compliance parameters setting interface of mobile APP

10.3.1. Step of entering interface parameter settings

Interface setting: Enter solarman APP using WIFI dongle > My > Local mode > Scan the QR code of the data stick > Enter the local mode interface > Parameters > Enter the password (00000) > UL parameters.



10.3.2. Display Interface

09:52	09:52	09:52
UL Set	UL Set	UL Set
Battery Set2	UL Set	Battery 485 comr
Vac HV1 Trip	Vac LV3 ClrTime	Var Var RspTime
Vac HV2 Trip	Fac HF1 Trip	Inv NorRampRate
Vac HV3 Trip	Fac HF2 Trip	Inv SoftRampRate
Vac HV1 ClrTime	Fac HF3 Trip	Vac Pwr Start
Vac HV2 ClrTime	Fac HF1 ClrTime	Vac Pwr Stop
Vac HV3 ClrTime	Fac HF2 ClrTime	Vac Pwr RspTime
Vac LV1 Trip	Fac HF3 ClrTime	Grid Reconnection Time
Vac LV2 Trip	Fac LF1 Trip	Fac Pwr HFDb
Vac LV3 Trip	Fac LF2 Trip	Fac Pwr HFK
Vac LV1 ClrTime	Fac LF3 Trip	Fac Pwr HFRspTime
Vac LV2 ClrTime	Fac LF1 ClrTime	Fac Pwr LFDdb
Vac LV3 ClrTime	Fac LF2 ClrTime	Fac Pwr LFK
Fac HF1 Trip	Fac LF3 ClrTime	Fac Pwr LFRspTime

10.4. Parameters description

10.4.1. Over/under-voltage protection point/time

Interface	Description
<p style="text-align: center;">L/HVRT</p> <p>Vac HV3 Trip <u>130%/Vn</u> Vac HV3 ClrTime <u>0.1S</u> Vac HV2 Trip <u>120%/Vn</u> Vac HV2 ClrTime <u>0.1S</u> Vac HV1 Trip <u>120%/Vn</u> Vac HV1 ClrTime <u>13.0S</u></p> <p>Vac LV1 Trip <u>80%/Vn</u> Vac LV1 ClrTime <u>20S</u> Vac LV2 Trip <u>50%/Vn</u> Vac LV2 ClrTime <u>2.0S</u> Vac LV3 Trip <u>50%/Vn</u> Vac LV3 ClrTime <u>0.1S</u></p>	<p>HV means high voltage trip protection. LV means low voltage trip protection. Vn stands for the rated voltage of the local grid. In US, Vn stands for 120V for split phase. If the user needs to use over-voltage and under-voltage protection, he can find the corresponding parameters in the above mobile APP interface according to the table on the left and set them by himself.</p>

Puerto Rico Grid Compliance Settings:

Interface	Description
<p style="text-align: center;">L/HVRT</p> <p>Vac HV3 Trip <u>120%/Vn</u> Vac HV3 ClrTime <u>0.16S</u> Vac HV2 Trip <u>120%/Vn</u> Vac HV2 ClrTime <u>0.16S</u> Vac HV1 Trip <u>110%/Vn</u> Vac HV1 ClrTime <u>1.0S</u></p> <p>Vac LV1 Trip <u>88%/Vn</u> Vac LV1 ClrTime <u>2.0S</u> Vac LV2 Trip <u>60%/Vn</u> Vac LV2 ClrTime <u>1.0S</u> Vac LV3 Trip <u>40%/Vn</u> Vac LV3 ClrTime <u>0.16S</u></p>	<p>If the user needs to use over-voltage and under-voltage protection, he can find the corresponding parameters in the above mobile APP interface according to the table on the left and set them by himself. Vn stands for the rated voltage of the local grid. In US, Vn stands for 120V for split phase.</p>

10.4.2. Over/under-frequency protection point/time

Interface	Description
<p style="text-align: center;">L/HFRT</p> <p>Fac HF3 Trip <u>67.00Hz</u> Fac HF3 ClrTime <u>4.0S</u> Fac HF2 Trip <u>62.00Hz</u> Fac HF2 ClrTime <u>0.1S</u> Fac HF1 Trip <u>61.20Hz</u> Fac HF1 ClrTime <u>4.0S</u></p> <p>Fac LF1 Trip <u>47.05Hz</u> Fac LF1 ClrTime <u>1.0S</u> Fac LF2 Trip <u>46.50Hz</u> Fac LF2 ClrTime <u>300S</u> Fac LF3 Trip <u>45.00Hz</u> Fac LF3 ClrTime <u>3.0S</u></p>	<p>HF means over-frequency trip protection. LF means under-frequency trip protection. If the user needs to use over-frequency and under-frequency protection, he can find the corresponding parameters in the above mobile phone APP interface according to the table on the left and set them by himself.</p>

10.4.3. Puerto Rico Grid Compliance Settings:

Interface	Description
<p style="text-align: center;">L/HFRT</p> <p>Fac HF3 Trip <u>61.50Hz</u> Fac HF3 ClrTime <u>10.0S</u> Fac HF2 Trip <u>61.50Hz</u> Fac HF2 ClrTime <u>10.0S</u> Fac HF1 Trip <u>60.50Hz</u> Fac HF1 ClrTime <u>300.0S</u> Fac LF1 Trip <u>59.20Hz</u> Fac LF1 ClrTime <u>300.0S</u> Fac LF2 Trip <u>57.50Hz</u> Fac LF2 ClrTime <u>10.0S</u> Fac LF3 Trip <u>57.50Hz</u> Fac LF3 ClrTime <u>10.0S</u></p>	<p>If the user needs to use over-frequency and under-frequency protection, he can find the corresponding parameters in the above mobile phone APP interface according to the table on the left and set them by himself.</p>

10.4.4. frequency-active power (freq-watt) mode parameters

Interface	Description
<p>L/HVRT</p> <p>Fac Pwr HFDb <u>0.5Hz</u></p> <p>Fac Pwr HFK <u>50%Pn/Hz</u></p> <p>Fac Pwr HFRspTime <u>0.50S</u></p> <p>Fac Pwr LFDb <u>0.036Hz</u></p> <p>Fac Pwr LFK <u>50%Pn/Hz</u></p> <p>Fac Pwr LFRspTime <u>0.50S</u></p>	<p>HFDb:Over frequency dead band.</p> <p>HFK:Over frequency PF curve.</p> <p>HFRspTime:Over frequency response time.</p> <p>LFDb:Under frequency dead band.</p> <p>LFK:Under frequency PF curve.</p> <p>LFRspTime:Under frequency response time.</p> <p>When the user needs to set the over-frequency and under-frequency dead zone, he can find the corresponding parameters in the above mobile phone APP interface according to the table on the left and set them by himself.</p> <p>Pn:Active power output in percent of nameplate.</p>

11. Advanced Mode Operation Guide

11.1. Advanced Mode Introduction

The hybrid inverter can be programmed to control how and when to use grid power. The Advanced mode allows management of flexible loads and time-of-use billing.

There are three advanced modes available: **Sell First Mode, Limited Consumption Mode and Zero Export Mode.**

Sell First Mode:

In this mode the anti-reflux setting is automatically disabled.

The users can use this mode to sell back surplus solar power to grid. If time of use is enabled, the battery power can also be sold to grid.

Limited Consumption Mode:

In this mode, the CT limiters are used to sense the grid power flow direction. The hybrid inverter can be chosen to sell power or not sell power to grid. There is a CT Limit Power parameter available in this mode. When the battery is needed to discharge to reduce the load consumption, the grid will cover the parameter set part consumption firstly and the battery discharges energy to make up the rest part. Other conditions are similar to SELF CONSUME working mode.

Zero export Mode:

In this mode, the CT limiters should be installed in the input of the inverter's grid port. The hybrid inverter will not sell power to grid. The user can use Zero export power parameter to ensure the inverter won't feed back power to grid.

There are also some attributes of these modes: **Global Grid Charge Enable, PV Charge Only, Bat Charge On Priority, Time-of-use Enable and 6 Time-of-use Slots.** The time slots parameters are shown as below:

	Grid Charge	Gen Charge	Start Time		End Time		Bat Power	Bat SOC
Time Slot1	√		1 h	0 m	8 h	0 m	8000 W	50 %
Time Slot2			8 h	0 m	9 h	0 m	8000 W	100 %
Time Slot3	√		9 h	0 m	13 h	0 m	8000 W	100 %
Time Slot4			13 h	0 m	19 h	0 m	8000 W	15 %
Time Slot5	√		19 h	0 m	20 h	0 m	8000 W	100 %
Time Slot6	√		20 h	0 m	1 h	0 m	8000 W	100 %

Global Grid Charge Enable:

It is a high level control attribute of grid charge enable. If time of use function is disabled, this attribute is used to judge whether or not to charge the battery by grid. If time of use function is enabled, the battery can be charged by grid only when the time slot grid charge attribute is enabled.

PV Charge Only:

If user don't want to use grid to charge the battery in any time, please enable this attribute.

Bat Charge On Priority:

If there will be a storm or other emergency, user can use this attribute to adjust the power distribution priority. If this attribute is disabled, the solar power will cover the load on priority by default.

6 Time-of-use Slots:

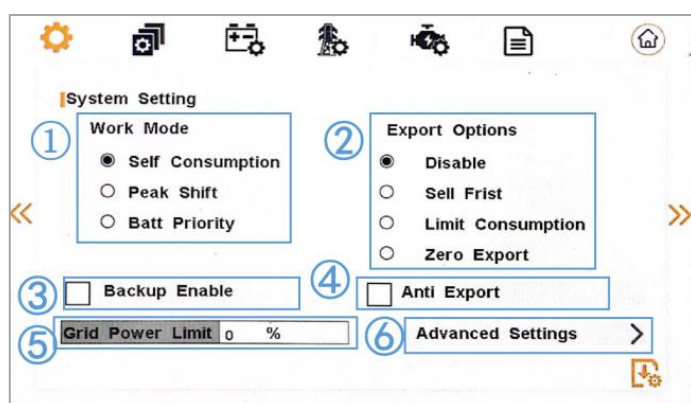
There are 6 slots which can be programmed. If grid charge/generator charge is enable, the grid is used to power the load and charge the battery to target SOC at specific bat power attribute value.

11.2. Advanced Mode Setting

The Advanced Mode Settings page can be accessed through the following steps on the screen:

Password->System Setting->Export Options->Advanced Settings->Time Of Use Table/ Advanced Settings

11.2.1. Setting



Interface	Description
--ADVAN SET-- -- >1.Export Options 2.Advanced settings 3.TOU Enable 4.Auxload Soc	This interface displays advanced mode settings. 1. ->Inverter working mode setting. 2. ->Inverter related function control. See 13.2.3 Advanced Settings for details. 3.-> Whether TIME OF USE is enabled ,Time of use setting. See 10.2.4 Time of use for details. 4.-> Used to set the SOC of the switch LOAD 2 (only if the battery is present).

11.2.2. Export Options

Interface	Description
--MODE SET-- -- > 1.Disable 2.Sell First 3.Limit Consumption 4.Zero Export	On this page, select the advanced mode you need to enable. If selected, the mode will be enabled.

11.2.3. Advan Ctrl

Interface	Description
--ADVAN CONTROL-- -- > 1. Grid Charge Enable 2. PV Charge Only 4. Battery First	1.- >Global control, whether the power grid can charge the battery. 2.- >The battery is charged only by PV, and cannot be charged by the grid. 3.- >Battery Priority Charge Enable.

11.2.4. Time of Use

Interface	Description
<div> Start: 00:00 End: 00:00 Batt Power: 00.0KW Grid: <input checked="" type="checkbox"/> GEN: SOC: 0% </div>	1.->From the start time to the end time, charge the battery with the written Power to the written SOC. If Grid is enabled(Tick✓) , allow the grid to charge. 2.->In the slot section(SOC), control the grid to charge the battery.

11.2.5. Time of Use

Interface	Description
<div> --Auxload SOC-- SOC on: 0% SOC off: 0% </div>	SOC on:The SOC value of the battery enabled by load 2 . SOC off:The SOC value of the battery disabled by load 2 . (SOC on> SOC off)

12. 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
DischgOverCur	00	Battery discharge over current. When the battery is loaded, the load is too large.	(1) Nothing need to do, Wait one minute for the inverter to restart. (2) Check whether the load is in compliance with the specification. (3) Cut off all the power and shut down all the machines; disconnect the load and plug in to restart machines, then check
Over Load	01	The load power is greater than other power(PV,BAT).	(1) Check whether the load is in compliance with the maximum power of the machine. (2) Cut off all the power and shut down all the machines; disconnect the load and plug in to restart machines, then check whether the load is short circuited if the fault has been eliminated. (3) Contact customer service if error warning continues.
BatDisconnect	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 Vol	03	Battery voltage low that normal range.	(1) Checking System Settings, If so, power off and restart. (2) Check if the grid power down. If so, waiting for the grid power up, the inverter will automatically charge. (3) Contact customer service if error warning continues.
Bat Low capacity	04	Bat Low capacity	(1) Battery Low that setting capacity.(SOC<100%-DOD)
Bat Over Vol	05	The battery voltage is greater than the Inverter maximum voltage.	(1) Checking System Settings, If so, power off and restart. (2) Contact customer service if error warning continues.
Gird low vol	06	Grid voltage is	(1) Check if the grid is abnormal.

Grid over vol	07	abnormal	(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 overFreq	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.
bus under vol	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 vol	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 cur	15	The inverter current exceeds the normal value.	(1) Restart the inverter and wait until it functions normally.
Chg over cur	16	Battery charge current over than the Inverter maximum voltage.	(1) Restart the inverter and wait until it functions normally.
Bus vol osc	17	Bus voltage instability.	(1) Check the input and output mode setting is correct. (2) Restart the inverter and wait until it functions normally.
Inv under vol	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 vol	19		
InvFreqAbnor	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 UnderTemp	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 fail	28	Fan fail	(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		
fan fault	36	Fan fault.	(1) Check whether the Inverter temperature is abnormal. (2) Check whether the fan runs properly.(If you can see it)
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		
Gfci fault	41		
Selftest fail	44		
System fault	45		
Current DCover	46		
Voltage DCover	47		

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