

USER MANUAL

HYD-10-12K-LS1



Shenzhen SOFARSOLAR Co., Ltd.

11/F, Gaoxingqi Technology Building,
District 67, XingDong Community, XinAn Street,
Bao'An District, Shenzhen, China

Email: service@SOFAR.com

Web: www.sofarsolar.com

EU Representative Information: SofarSolar GmbH.

Add.: Kraemerstrasse 20, 72764 Reutlingen, Germany

Tel: [+49 \(0\)7121 31767-0](tel:+4907121317670)

Email: europe@sofarsolar.com

Document number

Issue 01 | 26.02.2026

English

CONTENT

1	About this manual	1
1.1	Copyright declaration	1
1.2	Presentation of warnings	2
1.3	Presentation of action instructions	3
1.4	Note	3
2	Basic safety information	4
2.1	Safety instructions	4
2.2	Symbols and signs	9
3	Product characteristics	11
3.1	Product information	11
3.2	Size description	13
3.3	Function characteristics	13
4	Installation	14
4.1	Checking Before Installation	14
4.2	Product Overview	15
4.3	Component List	17
4.4	Tools	18
4.5	Installation Environment	20
4.6	Determining the Installation Position	20
4.7	Unpacking the inverter	21
4.8	Installation of the inverter	22
5	Electrical Connections	23
5.1	Wire instructions	24
5.2	Connecting PGND Cables	25
5.3	Battery Connection	26
5.4	PV Connection	29
5.5	Load connection	32
5.6	Grid connection	33
5.7	GEN connection	35

5.8	System electrical topology	36
5.9	External communication interface	38
5.10	Wiring Diagram Overview	55
6	Buttons and indicator lights	57
6.1	Buttons	57
6.2	Indicator lights and status	57
7	Operation	58
7.1	Double Check	58
7.2	First Time Setup (IMPORTANT!)	58
7.3	Menu	67
7.4	Power-On Step	101
7.5	Power-off Step	102
8	Troubleshooting	103
8.1	Maintenance	112
9	Datasheet	113

1 About this manual

This Installation and user manual (hereinafter referred to as the manual) describes the installation, electrical connection, commissioning, maintenance and fault elimination procedures of following products:

HYD-10K-LS1, HYD-12K-LS1

HYD-10/12K-LS1 inverter is a single-phase photovoltaic energy storage inverter integrating grid connected photovoltaic inverter and battery energy storage, and the manual will subsequently simplify to the system as either “the HYD inverter” or “the inverter”.

- ▶ Carefully read this manual before use!
- ▶ Treat this manual as an integral component of the device.
- ▶ Keep this manual in close proximity to the device, including when it is handed over to another user or moved to a different location.

This manual contains important safety information on installation, operation and maintenance of the device.

- ▶ Read and observe all given safety information.

The products, services or features you purchased shall be subject to the company's commercial contracts and terms. All or part of the products and services described in this document may not within the scope of your purchase. Unless additional terms and conditions in your contract, the company does not make any statement or guarantee on the contents of this document.

1.1 Copyright declaration

The copyright of this manual is owned by SOFAR. It may not be copied – neither partially nor completely – by companies or individuals (including software, etc.) and must not be reproduced or distributed in any form, or with the appropriate means.

SOFAR reserves the right to final interpretation. This manual may be amended following feedback from users or customers.

Consult our website at: <https://www.SOFAR.com> for the latest version.

1.2 Presentation of warnings

This manual contains information on safe operation and uses symbols to ensure the safety of persons and property as well as the efficient operation of the inverter.

- Read through the following symbol explanations carefully in order to prevent injury or property damage.

1.2.1 Warn symbol

	The general danger symbol warns of risk of serious injury when used with the signal words CAUTION, WARNING, and DANGER.
---	--

1.2.2 Signal words

DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a danger that results in damage to or destruction of the inverter.

1.2.3 Sectional warnings

Sectional warnings refer to a complete section and are structured as follows:

 WARNING
Type and source of danger Consequences for non-observance ► Avoiding the danger

1.2.4 Embedded warnings

Embedded warnings are part of an action sequence and are placed right before the dangerous step.

WARNING Combination of type/source of danger, consequences for non-observance and avoiding the danger.

1.3 Presentation of action instructions

This table shows the sequence of Action steps:

Symbol	Function
✓	This describes an action requirement
1. 2. 3.	This is the sequence of action steps that must be followed step by step
▶	This is a single action step
↩	This describes the result of the action

1.4 Note

Notes are presented in a grey bar.

- ▶ Provides tips essential to the optimal operation of the product.

2 Basic safety information



- If you have any questions or problems after reading the following information, please contact SOFAR

This chapter details the safety information pertaining to the installation and operation of the device.

2.1 Safety instructions

Read and understand the instructions of this manual, and be familiar with relevant safety symbols in this chapter, then start to install and troubleshoot the equipment.

According to the national and state requirements, before connecting to the electrical grid, you must get permission from the local electrical grid operation can only be performed by qualified electrical engineer.

Please contact the nearest authorized service center if any maintenance or repair is needed. Contact your distributor for the information of the nearest authorized service center. Do NOT repair it by yourself, it may cause injury or property damage.

Before installing and maintaining the equipment, you should turn the DC switch OFF to cut off the high voltage DC of the PV array. You can also turn the switch in the PV combiner box off to cut off the high voltage DC. When the battery needs to be installed, please confirm the positive and negative terminals of the battery and turn off the battery. Otherwise, serious injury may be caused.

2.1.1 Qualified persons

The customer must make sure the operator has the necessary skill and training to do his/her job. Staff in charge of using and maintaining the equipment must be skilled, aware and mature for the described tasks and must have the reliability to correctly interpret what is described in the manual. For safety reason only a qualified electrician, who has received training or has demonstrated skills and knowledge in construction and in operation of this unit, can install this inverter. Shenzhen SOFARSOLAR Co., Ltd. does not take any responsibility for the property destruction and personal injury because of any incorrect use.

2.1.2 Installation requirements

Please install inverter according to the following section. Fix the inverter on an appropriate object with enough load bearing capacity (such as walls, PV racks etc.), and ensure that inverter is vertical placed. Choose a place suitable for installing electrical devices. And assure there is enough fire exit space, convenient for maintenance. Maintain proper ventilation to ensure enough air cycle to cool the inverter.

2.1.3 Transport requirements

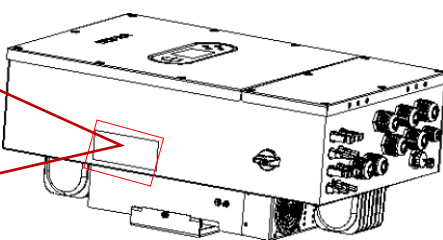
If you find packing problems that may cause the damage of the inverter, or find any visible damage, please immediately notice the responsible transportation company. You can ask solar equipment installation contractor or Shenzhen SOFARSOLAR Co., Ltd. for help if necessary.

Transport of the equipment, especially by road, must be carried out by suitable ways and means for protecting the components (in particular, the electronic components) from violent shocks, humidity, vibration, etc.

2.1.4 Labels on the equipment



The labels must NOT be hidden with objects and extraneous parts (rags, boxes, equipment, etc.); they must be cleaned regularly and kept visible at all times.



SOFAR Hybrid Inverter	
Model:	HYD-10K-L-S1
PV Input	
Max. Input Voltage:	550 Vd.c.
MPPT Voltage Range:	60-500 Vd.c.
Max. Input Current:	40/40A
Max. Isc:	50/50A
Battery	
Voltage Range:	40-60 Vd.c.
Max. Charging Current:	190A
Max. Discharging Current:	190A
Battery Type:	Lithiumion & Lead-acid
AC Backup	
Rated Output Voltage:	L+N+Q/220/230/240 Va.c.
Rated Output Frequency:	50/60 Hz
Rated Output Power:	10 kW
Max. Apparent Power:	11 kVA
Max. Output Current:	50A
AC Grid	
Rated Voltage:	L+N+Q/220/230/240 Va.c.
Rated Frequency:	50/60 Hz
Rated Output Power:	10 kW
Max. Apparent Power:	11 kVA
Max. Output Current:	50A
Max. Input Current:	50A
Power Factor Range:	0.8 lagging-0.8 leading
Inverter Topology:	Isolation (for battery)
Protective Class:	Class I
IP Rating:	IP66
Overvoltage Category:	AC III, DC II
Manufacturer: Shenzhen SOFARSOLAR Co., Ltd. Address: 11/F., Gasping Technology Building, No.87 Area, Xingdong Community, Xin'an Sub-district, Bao'an District, Shenzhen City, China	
Made in China	
	

- The picture is only for reference, please make the object as the standard.

2.1.5 Electric connection

Please comply with all the current electrical regulations about accident prevention in dealing with the SOFAR inverter.


DANGER

- Before the electrical connection, make sure to use opaque material to cover the PV modules or to disconnect PV array DC switch. Exposure to the sun, PV array will produce a dangerous voltage!

**WARNING**

- ▶ All installation accomplished only by professional electrical engineer!
- ▶ Must be trained!
- ▶ Completely read the manual operation and understand relevant matter.

NOTICE

- ▶ Get permission from the local electrical grid operator, complete all electrical connections by professional electrical engineer, then connect inverter to electrical grid.

- ▶ It's forbidden to remove the tamper evident label, or open the inverter. Otherwise SOFAR will not provide warranty or maintenance!

2.1.6 Operation**DANGER**

- ▶ Touching the electrical grid or the terminal of the equipment may lead to electrocution or fire!
- ▶ Don't touch the terminal or conductor connected to the electrical grid.
- ▶ Pay attention to any instructions or safety documents related to grid connection.

NOTICE

- ▶ Some internal components will be very hot when inverter is working. Please wear protective gloves!

2.1.7 Maintenance and repair



DANGER

- ▶ Before any repair work, turn OFF the AC circuit breaker between the inverter and electrical grid first, then turn off the DC switch.
- ▶ After turning off the AC circuit breaker and DC switch, wait for 5 minutes at least before carrying out any maintenance or repair work.

NOTICE

- ▶ Inverter should work again after removing any faults. If you need any repair work, please contact with the local authorized service center.
- ▶ Do not open the internal components of inverter without authorization, otherwise Shenzhen SOFARSOLAR Co., Ltd. does not take any responsibility for the property destruction and personal injury.

2.1.8 EMC / noise level of inverter

Electromagnetic compatibility (EMC) refers to that one electrical equipment functions in a given electromagnetic environment without any trouble or error, and impose no unacceptable effect upon the environment. Therefore, EMC represents the quality characters of an electrical equipment. The inherent noise-immune character: immunity to internal electrical noise. External noise immunity: immunity to electromagnetic noise of external system. Noise emission level: influence of electromagnetic emission upon environment.



DANGER

Electromagnetic radiation from inverter may be harmful to health!

- ▶ Please do not continue to stay around the inverter in less than 20 cm when inverter is working.

2.2 Symbols and signs



CAUTION

Caution of burn injuries due to hot enclosure!

- ▶ You can only touch the screen and pressing key of the inverter while it's working.

NOTICE

- ▶ PV array should be grounded in accordance to the requirements of the local electrical grid operator!
- ▶ We suggest that all PV module frames and inverter are reliably grounded to protect the PV system and personnel security.



WARNING

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

2.2.1 Signs on the inverter

There are some symbols which are related to security on the inverter. Please read and understand the content of the symbols, and then start the installation.

Symbol	Description
	This symbol indicates a hazardous situation which could result in injuries, if not avoided.
	There is a residual voltage in the inverter! Before opening the equipment, operator should wait for five minutes to ensure the capacitor is discharged completely.
	Caution, risk of electric shock.

Symbol	Description
	Caution hot surface.
	Comply with the European Conformity (CE marking) certification.
	Grounding point.
	Please read this manual before install the HYD inverter.
	Positive pole and negative pole of the input voltage (DC).
IP66	This indicates the degree of protection of the equipment according to IEC standard 70-1. (EN 60529)
	This side up, the HYD inverter must always be transported, handled and stored in such a way that the arrows always point upwards.

3 Product characteristics

3.1 Product information

The HYD inverter is a single-phase photovoltaic energy storage inverter integrating grid connected photovoltaic inverter and battery energy storage. The inverter has a variety of built in operating modes to suit the diverse user needs.

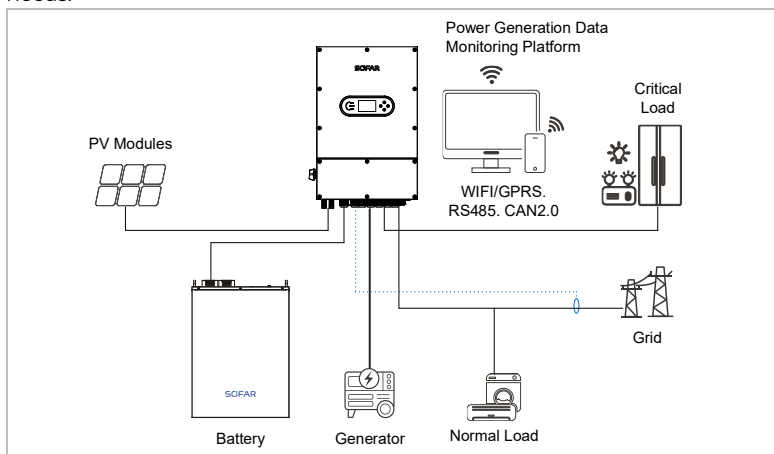


Figure 3-1(a) The inverter on-grid system diagram

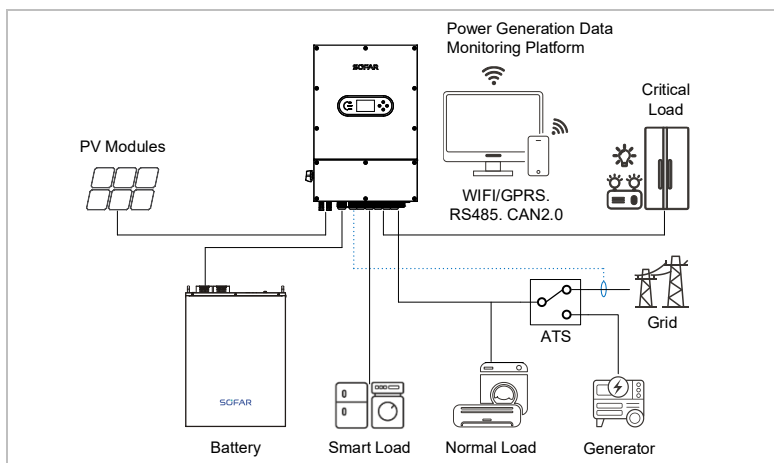


Figure 3-1(b) The inverter off-grid system diagram

(Grid port connect Generator via ATS; Generator port connects Smart Load)

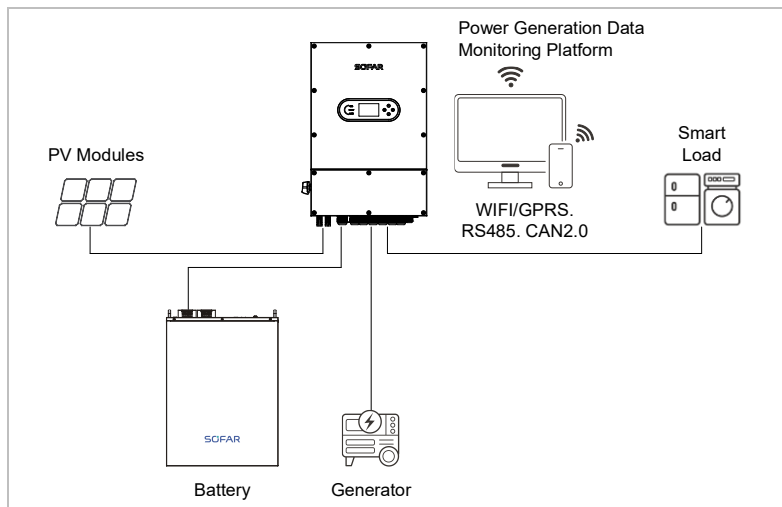


Figure 3-1(c) The inverter off-grid system diagram.
(only Generator; Backup port connects Smart Load)

The inverter can provide a complete solution in the period of rising energy costs such as oil and coal; The energy subsidy of photovoltaic grid-connected system keeps falling. In the period of continuous power supply and emergency power supply demand in mountainous areas or base stations without power grid.

The inverter can be connected to a generator, as shown in figure 3-1(a), to timely control the generator to replace the grid and continue working when the grid is disconnected.

In addition, the grid port of the inverter can also be directly connected to the generator, while the generator port is connected to the smart load, as shown in figure 3-1(b).

Finally, the backup port of the inverter can also be connected to smart load, but an additional relay needs to be connected for control, as shown in figure 3-1(c). Please refer to section 4.9.2 for the method of connecting external relays.

3.2 Size description

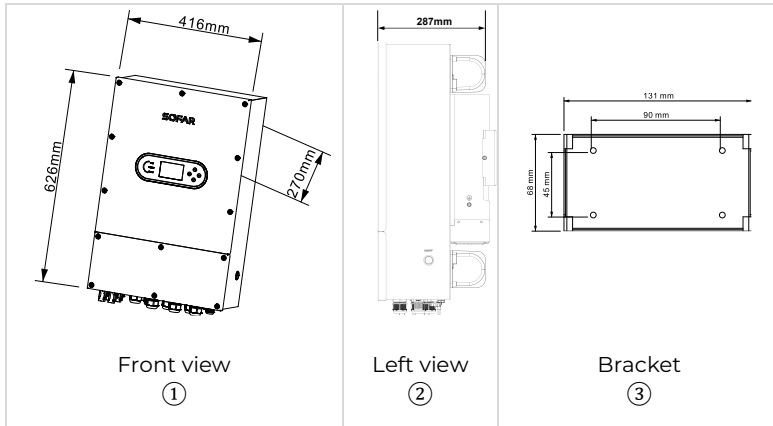


Figure 3-2 Size chart

3.3 Function characteristics

- ▶ Support 200% overload for 10 seconds.
- ▶ Supports 1.6 DC: AC ratio to connect more PV capacity
- ▶ Max.190A charge/discharge current capability.
- ▶ Wide MPPT voltage range (60-500V).
- ▶ Automatic switchover time of 4ms, provides seamless switching between grid and backup.
- ▶ The Emergency Power Supply (EPS) mode can support inductive loads. Such as, air-conditioners or refrigerators.
- ▶ Support diesel generators for energy storage and home power, during grid power outage.
- ▶ Multiple inverters in parallel to build a microgrid.
- ▶ Smart monitoring, RS485/Wi-Fi/GPRS(Optional).

4 Installation

Installation notes



DANGER

- ▶ Do not install the inverter on flammable material.
- ▶ Do not install the inverter in an area used to store flammable or explosive material.



CAUTION

- ▶ The enclosure and heat sink are very hot while the inverter is working, therefore do not install the inverter in places where you might touch them inadvertently.

NOTICE

- ▶ Consider the weight of inverter when transporting and moving the inverters.
- ▶ Choose an appropriate mounting position and surface.
- ▶ Assign at least two persons to install the inverter.

4.1 Checking Before Installation

Checking Outer Packing Materials

Packing materials and components may be damaged during transportation. Therefore, check the outer packing materials before installing the inverter. Check the outer packing materials for damage, such as holes and cracks. If any damage is found, do not unpack the inverter and contact the dealer as soon as possible. You are advised to remove the packing materials within 24 hours before installing the inverter.

Checking Deliverable

After unpacking the inverter, check whether deliverable is intact and complete. If any damage is found or any component is missing, contact the dealer.

- Please see the packing list for components and mechanical parts that should be delivered.

4.2 Product Overview

The inverter is 100% strictly inspected before package and delivery. It is forbidden to put the inverter upside down during delivery.

 CAUTION
► Please check the product package and fittings carefully before installation.

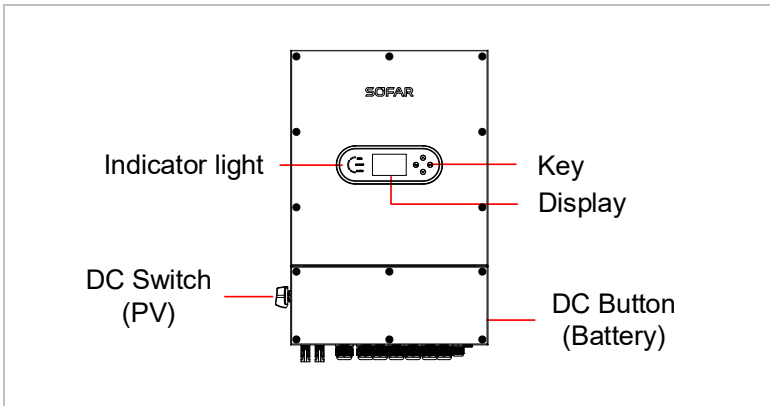


Figure 4-1 Front side view

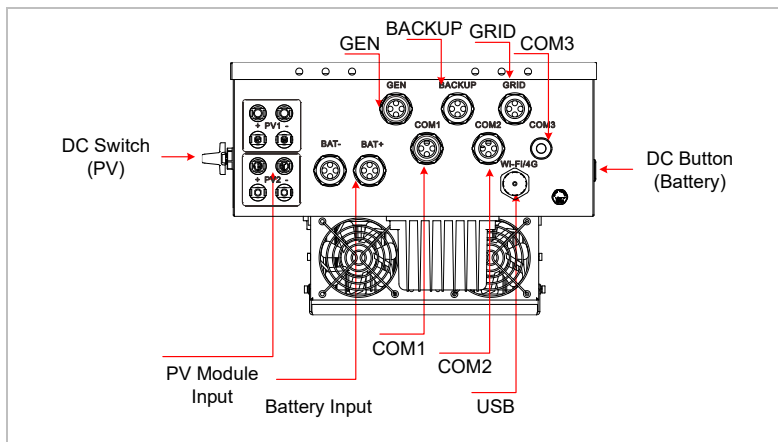


Figure 4-2 Bottom side view

Table 4-1 Product Component Description

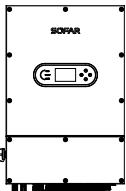
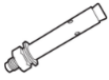
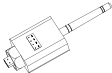
Name	Description
1. Indicator light	Display whether the inverter is abnormal and the grid connection status
2. Display	Display detailed information of the inverter
3. Key	Used for controlling inverters
4. DC Switch (PV)	This is the DC disconnect switch for the PV.
5. DC Button (Battery)	This is the DC button for the Battery, to enable battery function.
6. COM1	RS485 and CAN communication cables and parallel cables should go through these.
7. COM2	RS485 and CAN communication cables and parallel cables should go through these.
8. COM3	Conduit for CT conductors should be connected here.
9. GEN	Conduit for AC conductors to generator should be connected here.
10. BACKUP	Conduit for AC conductors to backup loads panel should be connected here.
11. GRID	Conduit for AC conductors to the main service panel should be connected here.
12. PV Module Input	Conduit for PV conductors should be connected here.

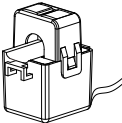
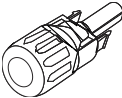
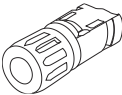
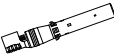
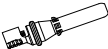
Name	Description
13. Battery Input	Conduit for Battery conductors should be connected here.
14. USB	Conduit for the datalogger and USB disk should be connected here.

4.3 Component List

Check the equipment before installation. Please make sure nothing is damaged in the package. You should have received the items in the following package:

Table 4-2 Product component list

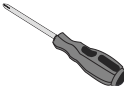
NO.	Image	Description	Quantity PCS
01		HYD inverter module	1
02		Quick installation guide	1
03		Wall bracket	1
04		M6*60 expansion bolt	4
05		M5*12 hexagon screw	4
06		Datalogger	1

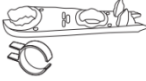
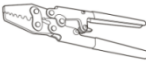
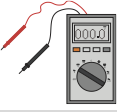
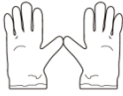
NO.	Image	Description	Quantity PCS
07		Parallel operating communication cable (1.5m)	1
08		PCC CT	1
09		Positive connector	4+1(spare)
10		Negative connector	4+1(spare)
11		Positive metal contact	4+1(spare)
12		Negative metal contact	4+1(spare)
13		Temperature sensor of lead-acid battery(Optional)	1

4.4 Tools

Prepare tools required for installation and electrical connections.

Table 4-3 Tools required for installation and electrical connections.

NO.	Tool	Model	Function
1		Hammer drill Recommend drill diameter 10mm	Used to drill holes on the wall.
2		Cross screwdriver	Remove and install AC terminal screws

NO.	Tool	Model	Function
3		Removal tool	Remove PV terminal
4		Wire stripper	Strip wire
5		Crimping tool	Used to crimp power cables
6		Multi-meter	Used to test electrical polarity and voltage
7		Adjustable wrench (Max. 3/4-inch open end)	Used to tighten expansion bolts
8		Marker	Used to mark signs
9		Measuring tape	Used to measure distances
10		Level	Used to ensure that the rear panel is properly installed
11		Gloves	Personal protective equipment
12		Safety goggles	Operators wear

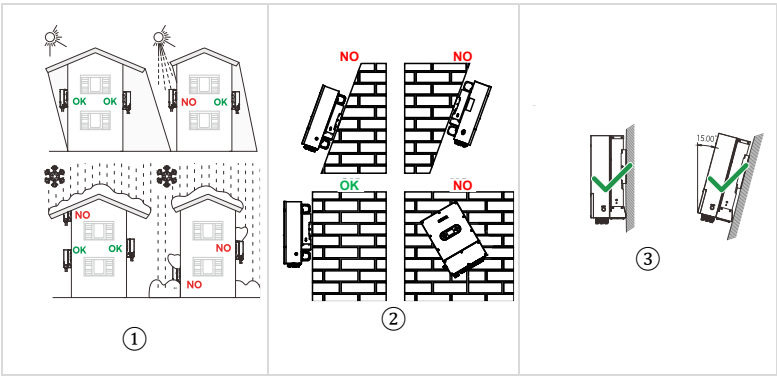
NO.	Tool	Model	Function
13		Anti-dust respirator	Operators wear

4.5 Installation Environment

- 1. Choose a dry, clean, and tidy place, convenient for installation.
- 2. Ambient temperature range: -30°C ~ 60°C.
- 3. Relative humidity: 0 ~ 100% (non-condensed).
- 4. The inverter shall be installed in a well-ventilated place.
- 5. No flammable or explosive materials close to the inverter.
- 6. The AC overvoltage category of the inverter is category III.
- 7. Maximum altitude: 4000m.

4.6 Determining the Installation Position

Determine an appropriate position for installing the inverter. Comply with the following requirements when determining the installation position.



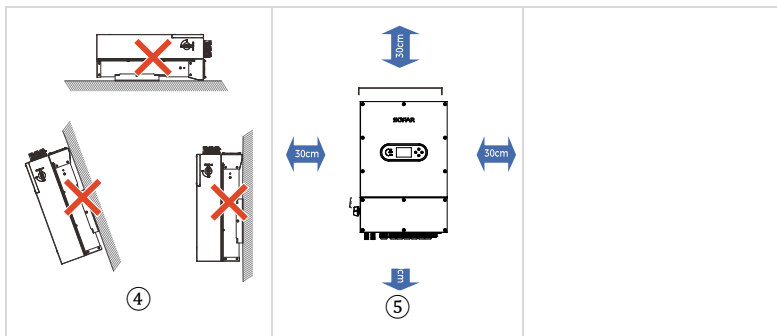


Figure 4-3 Installation Position of the inverter

4.7 Unpacking the inverter

Step 1 Open the packaging, insert hands into the slots on both sides of the inverter and hold the handles, as shown in Figure3-4.

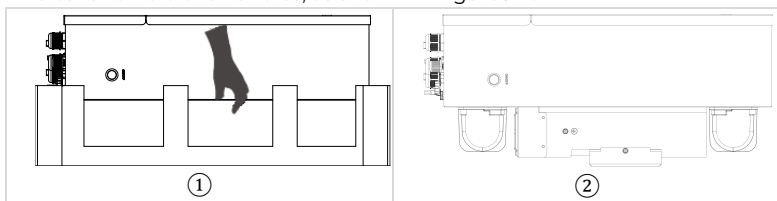


Figure 4-4 Moving the inverter

Step 2 Lift the inverter from the packing case and move it to the installation position.

NOTICE

- ▶ To prevent device damage and personal injury, keep balance when moving the inverter because the inverter is heavy.
- ▶ Do not put the inverter with its wiring terminals contacting the floor because the power ports and signal ports are not designed to support the weight of the inverter. Place the inverter horizontally.
- ▶ When placing the inverter on the floor, put foam or paper under the inverter to protect its shell.

4.8 Installation of the inverter

Step 1 Determine the positions for drilling holes, ensure the hole positions are level, then mark the hole positions using a marker pen, as shown in Figure 4-5①.

Step 2 Use the hammer drill to drill holes on the wall (diameter $\Phi 8$ mm). When drilling, keep the hammer drill perpendicular to the wall and drill slightly deeper than the length of the expansion pipe. After drilling, please check whether the hole position is suitable with the back plate. If the error is too large, please reposition the hole, as shown in Figure 4-5②.

Step 3 Slowly hammer the expansion screw into the drilled hole. Position the back plate well, place the shrapnel and flat pad, and fix the back plate with hexagon nut, as shown in Figure 4-5③.

Step 4 Hang the inverter on the back plate, as shown in Figure 4-5④.

Step 5 Lock the inverter and the back plate with M5 hex screw, you can secure the inverter to the rear panel, as shown in Figure 4-5⑤.

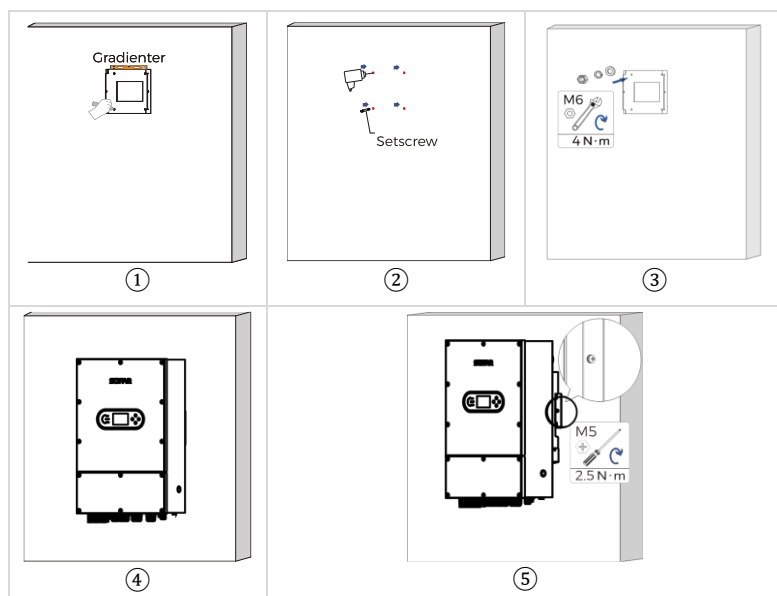


Figure 4-5 Installing the inverter

5 Electrical Connections

Before performing electrical connections, ensure that the DC switch is off. Since the stored electrical charge remains in a capacitor after the DC switch is turned off, it's necessary to wait for at least 5 minutes for the capacitor to be electrically discharged.

The inverter is intended to be used in PV system with battery storage. If not used as intended, the protection provided by the equipment may be impaired.

NOTICE

- ▶ Installation and maintenance of inverter, must be operated by professional electrical engineer.
- ▶ Wear rubber gloves and protective clothing (protective glasses and boots) when working on high voltage/high current systems such as inverter and battery systems.



DANGER

- ▶ PV modules will generate electric energy when exposed to sunlight and may cause electrical shock hazard. Therefore, before connecting DC input power cable, make sure to use opaque material to cover the PV modules.
-
- ▶ For the inverter, open-circuit voltage (Voc) of module arrays connected in series must be $\leq 550\text{V}$.

The connected PV modules must have an IEC 61730 Class A rating.

- ▶ The DVC is the voltage of a circuit which occurs continuously between any two live parts in the worst case rated operating condition when used as intended.

Table 5-1 The decisive voltage class (DVC)

Interface	DVC
PV input port	DVC-C
Grid connection port	DVC-C
Battery input port	DVC-B
Load connection port	DVC-C
Generation input port	DVC-C
USB/WiFi interface	DVC-A
COM interface	DVC-A

5.1 Wire instructions

Table 5-2 Cable description

Cables Type	Purpose	Connection Points
Ground Cables	Grounding conductors for the system	From the main ground bar to the ground point inside the inverter wire box
Battery Cables	Battery DC connection to the inverter	From the battery (+) and (-) terminals to the inverter BAT+ and BAT- terminals
PV Cables	PV DC connection to the inverter	From the PV array to the PV+ and PV- terminals in the inverter
AC Backup Cables	Inverter AC connection to the backup load	From the backup loads to the inverter AC-BACKUP port L/N terminals
AC Grid Cables	Inverter AC connection to the Grid	From the grid to the inverter AC-Grid port L/N terminals
AC GEN Cables	Inverter AC connection to the generator	From the generator to the inverter AC-Gen port L/N terminals

5.2 Connecting PGND Cables

Connect the inverter to the grounding electrode using protection ground (PGND) cables for grounding purpose.

NOTICE

- ▶ The inverter is transformer-less, requires the positive pole and negative pole of the PV array are not grounded. Otherwise, it will cause inverter failure. In the PV power system, all non-current carrying metal parts (such as: PV module frame, PV rack, combiner box enclosure, inverter enclosure) should be connected to earth.
- ▶ The protective grounding of the chassis shell cannot replace the PGND cable of the AC LOAD Port. Ensure that the two PGND cables are reliably connected to the PE-BAR inside of the inverter.
- ▶ When multiple inverters are deployed, ensure that the protective ground points of all inverters are firmly connected.

The PGND cables are prepare ($\geq 4\text{mm}^2$ outdoor power cables are recommended for grounding purposes), the color of cable should be yellow-green.

Procedure:

Step 1 Remove the insulation layer with an appropriate length by using a wire stripper, as shown in figure 5-1①.

Step 2 Insert the exposed core wires into the OT terminal and crimp them by using a crimping tool, as shown in figure 5-1②.

Step 3 Install the crimped OT terminal, flat washer and M5 screw. Tighten the screw to a torque of 2.5 Nm. by using an Allen wrench, as shown in figure 5-1③.

- ▶ L3 is the length between the insulation layer of the ground cable and the crimped part. L4 is the distance between the crimped part and core wires protruding from the crimped part.

- The cavity formed after crimping the conductor crimp strip shall wrap the core wires completely. The core wires shall contact the terminal closely.

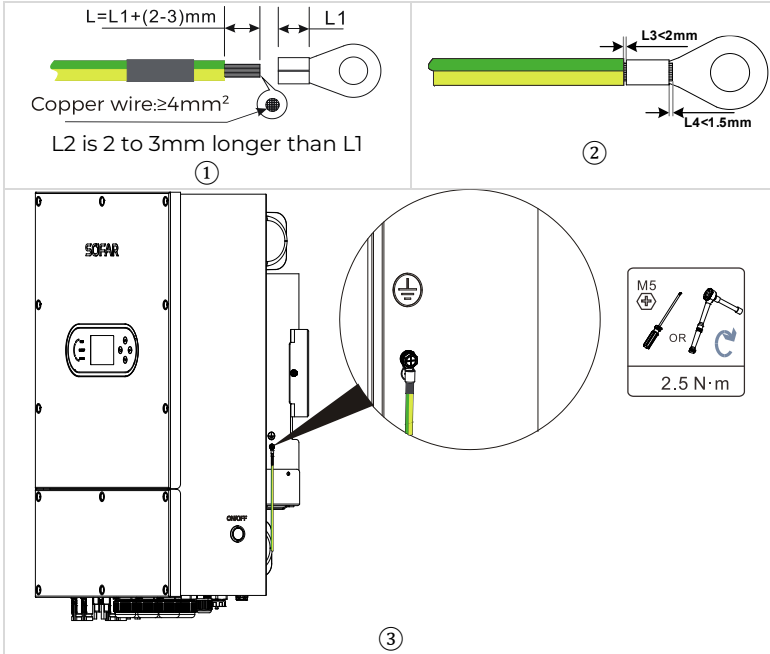


Figure 5-1 Connecting PGND cable

5.3 Battery Connection

Procedure:

Step 1 Each time the battery is disassembled or installed, the voltage at the inverter's battery terminals must be measured with a multi-meter. If the measured voltage exceeds 10V, discharge the terminals using the multi-meter's resistance (ohm) mode, as shown in Figure 5-2(a)②.

Step 2 Select proper battery cable types and specifications based on Table 5-3. Remove cable glands from the positive and negative connectors.

Table 5-3 Recommended battery cables for different models

Model	Cross-sectional area of cables
HYD-10/12K-LS1	42.41mm ² (1 AWG)

Step 3 Connect the cable through the BAT port, and pay attention to the correct polarity, as shown in Figure 5-2(a)①.

Step 4 After passing the cable through the BAT port, fix it to the BAT+ and BAT- of the inverter with M8 screws, as shown in Figure5-2(a)②).

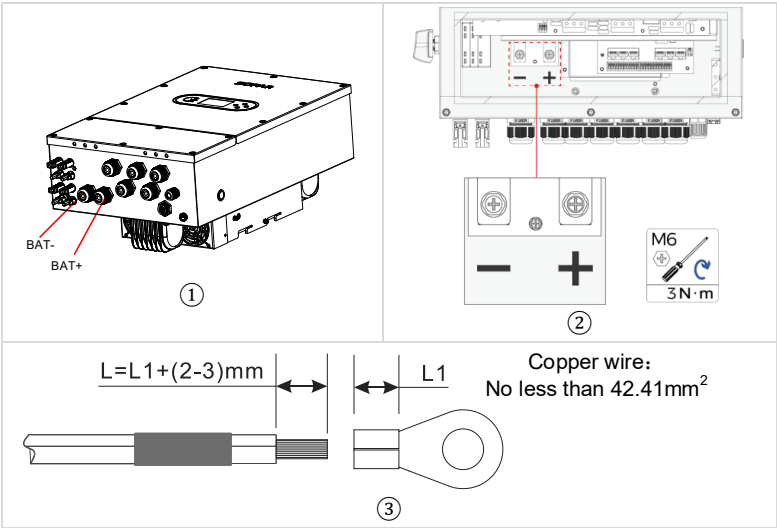


Figure 5-2 (a) Install battery connection

When the lead-acid battery is connected, its temperature sensor needs to be connected to the 1pin and 2pin of the COM3 port, so as to realize the real-time monitoring of lead-acid battery temperature. The actual wiring diagram is shown in 4.2(b). Connect one end of the temperature sensor cable plug to the COM3 interface, and the sensor is placed on the surface of the lead-acid battery housing.

⚠ DANGER

- ▶ When using lead-acid batteries, a temperature sensor must be connected to prevent danger from excessive temperatures.
- ▶ To ensure the safe operation of the inverter, it is necessary to carefully check that the positive and negative cables of the battery port cable, they cannot be reversed.
- ▶ The temperature sensor wiring has no polarity.
- ▶ It is recommended to add an external DC Switch for turning off batteries.

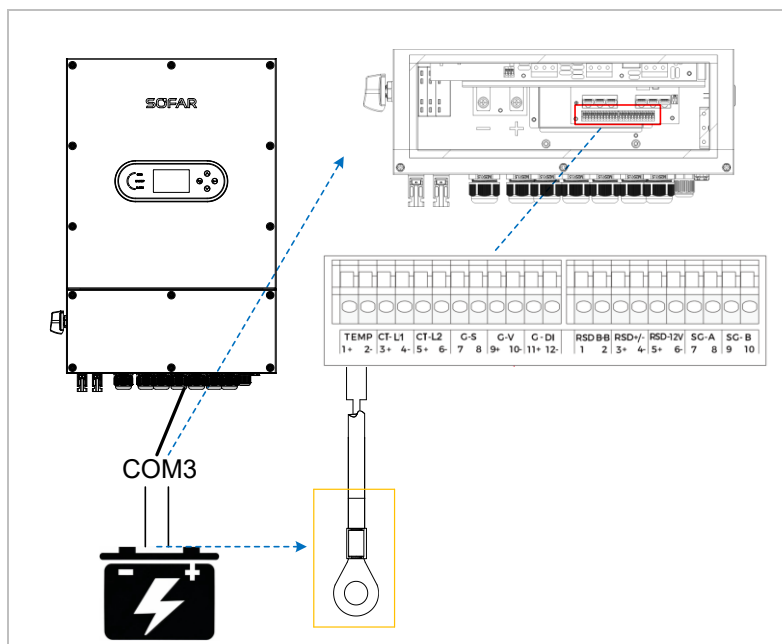


Figure 5-2(b) Temperature Sensor Connection for Lead-Acid Battery

5.4 PV Connection

Procedure:

Step 1 Select the appropriate cable type and specifications according to the Table 4-4. Remove cable glands from the positive and negative connectors. (It is recommended that the positive and negative be distinguished by different colors)

Table 5-4 Recommended PV cables for different models

Model	Cross-sectional area of cables
HYD-10/12K-LS1	4.0~6.0mm ² (12AWG~10AWG)

Step 2 Remove the insulation layer with an appropriate length from the positive and negative power cables by using a wire stripper as show in figure 5-3①.

Step 3 Insert the stripped positive and negative power cables into the positive and negative metal terminals respectively and crimp them using a crimping tool. Ensure that the cables are crimped until they cannot be pulled out by force less than 400 N, as shown in figure 5-3②.

Step 4 Insert crimped power cables into corresponding housings until you hear a "click" sound. The power cables snap into place, as shown in figure 5-3③.

Step 5 Reinstall cable glands on positive and negative connectors and rotate them against the insulation covers, as shown in figure 5-3④.

Step 6 Use the multi-meter, measure the PV port voltage Voc, and then make the connection with the inverter to prevent live operation, as shown in figure 5-3⑤

Step 7 Insert the positive and negative connectors into corresponding PV terminals of the inverter until you hear a "click" sound, as shown in figure 5-3⑥⑦.

To remove the PV connector, you need to press the grooves on both sides of the terminal to apply force outward.

- ▶ The inverter has two MPPTs, which can operate independently or in parallel. The inverter can automatically identify the MPPT operating mode.

**DANGER**

- ▶ Before removing the positive and negative connectors, ensure that the DC switch is off.

- ▶ The system has PV anti-reverse connection function, which can protect the device from being damaged when the input is reversed. Therefore, to ensure the safe operation of the inverter, the PV positive and negative poles cannot be reversed, otherwise the inverter will report the PV reverse connection failure.
- ▶ If the PV input cable is reversed by mistake and the “DC switch” is set to “ON”, do not perform any operations on the positive or negative connectors of the DC switch and PV terminals immediately. Otherwise, the device may be damaged. You need to wait until the solar irradiance decreases at night. When the photovoltaic module current is reduced to below 0.5A, set the “DC switch” to “OFF”, and remove the positive and negative connectors of the PV end to correct the polarity of the input line.

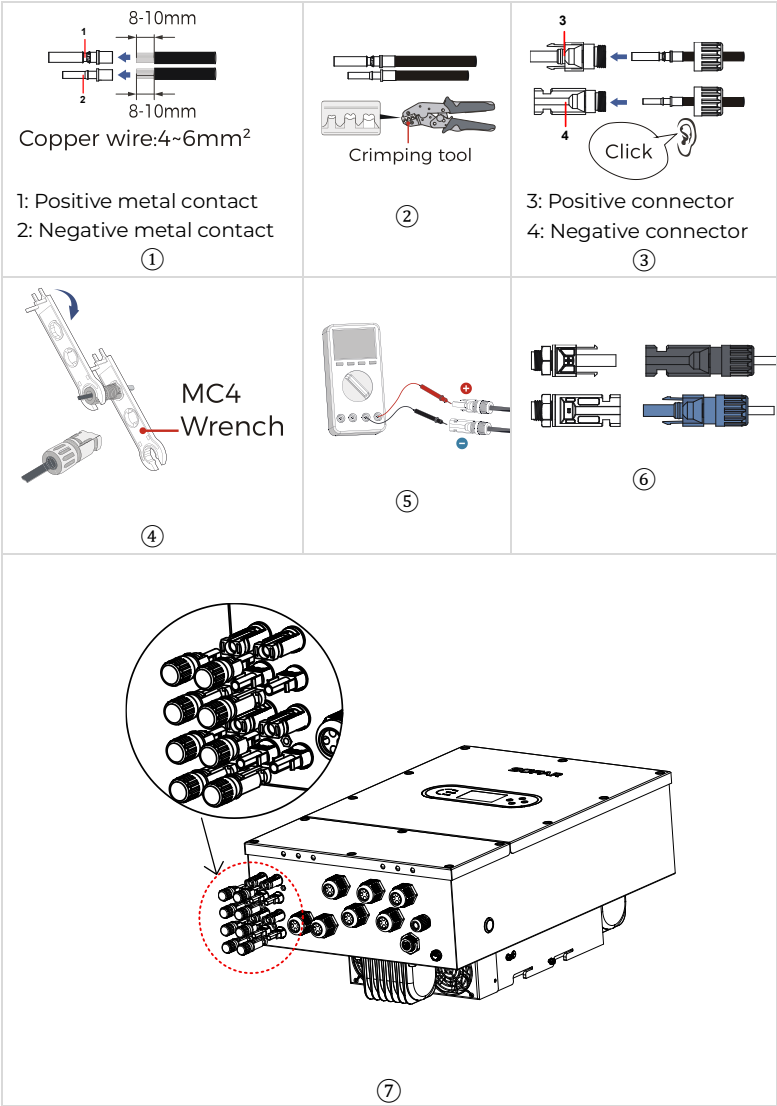


Figure 5-3 Connect PV

5.5 Load connection

Procedure:

Step 1 Prepare the wires needed for port BUCKUP, remove the insulation layer of the load output cable using a wire stripper according to the figure 5-4① shown below: A:20mm B:10mm.

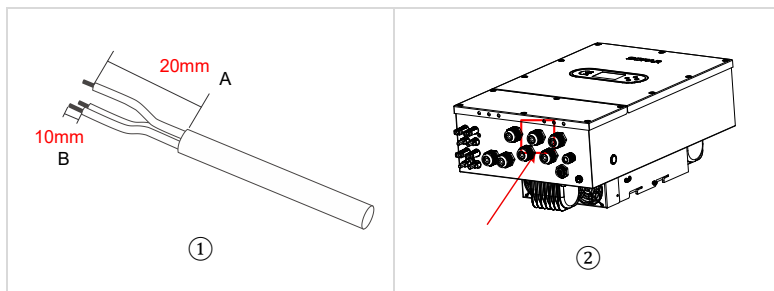
Table 5-5 Recommended AC cables for different models

Model	Cross-sectional area of cables
HYD-10/12K-LS1	8.37~13.3mm ² (8AWG~6AWG)

Step 2 The prepared cable is inserted through the BUCKUP port as shown in Figure 5-4② below.

Step 3 The cables after connection shall be connected to the ports according to L and N respectively, and the grounding wire should be firmly connected to the PE bar inside of the inverter, as shown in Figure 5-4③ and ④ below.

- Do not remove the AC Load plug from the inverter when it is working.



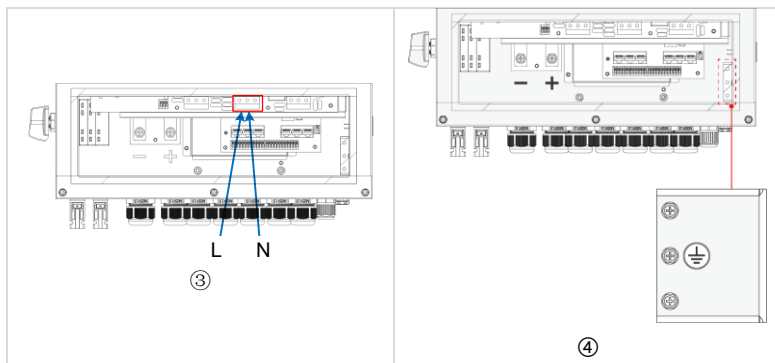


Figure 5-4 Load connection

- Do not connect any cables at the “NC” pin of the terminal.

5.6 Grid connection

The inverter is equipped with an integrated residual current monitoring unit. When the inverter detects that the residual current exceeds limitation, the connection to the power grid will be quickly disconnected. And please refer to Table 4-5 for the cable type.

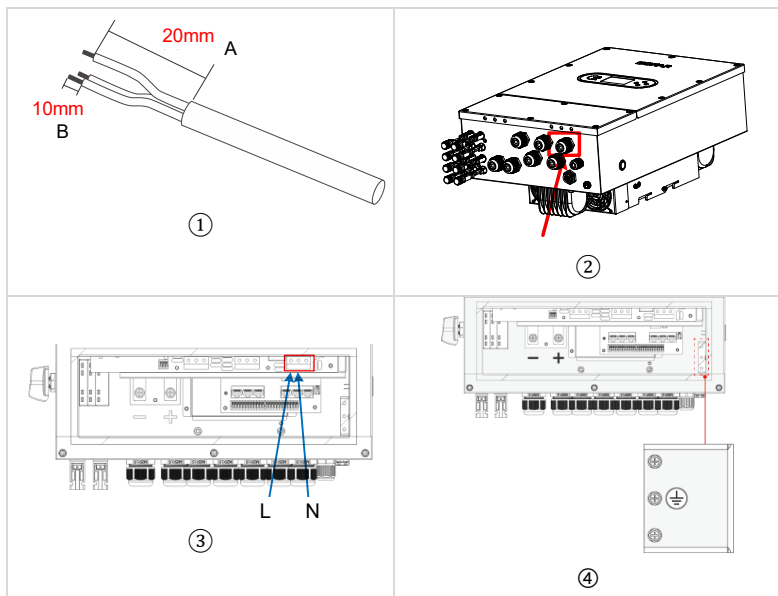
If the external ac switch has leakage protection function, its rated leakage action current is required to be $\geq 300\text{mA}$.

Procedure:

Step 1 Select the appropriate cable type and specifications according to the table 5-5.

Step 2 Pass the cable through the Grid port and tighten the port cap, as shown in figure 5-5② below.

Step 3 The cables passed are locked on the terminals according to L and N and tighten it, the grounding cable should be firmly connected to the PE bar inside of the inverter as shown in figure5-5 ③ and ④ below.



- Do not connect any cables at the “NC” pin of the terminal.

5.7 GEN connection

Step 1 Select the appropriate cable type and specifications according to the table 5-5.

Step 2 Pass the cable through the Grid port and tighten the port cap, as shown in figure 5-6② below.

Step 3 The cables passed are locked on the terminals according to L and N and tighten it, the grounding cable should be firmly connected to the PE bar inside of the inverter as shown in figure 5-6 ③ and ④ below.

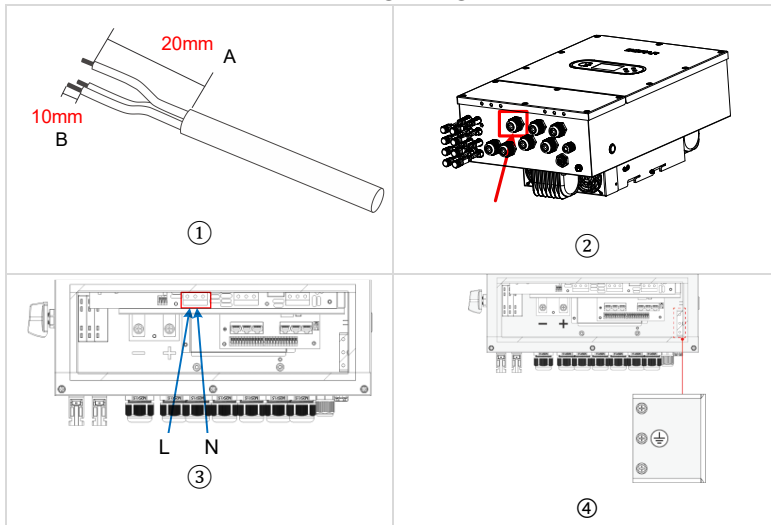


Figure 5-6 Generator connection

- Do not connect any cables at the "NC" pin of the terminal.

5.8 System electrical topology

The inverter series residential storage system is mainly composed of PV modules, battery, inverters, load, Grid, generator, and smart meters/CT.

The system electrical topology varies depending on the legal requirements of different countries and regions. For most countries and regions, please follow the electrical topology in figure 5-7(a). The back-up PE line and earthing bar must be grounded properly and effectively. Otherwise, the back-up function may be abnormal when the Grid fails.

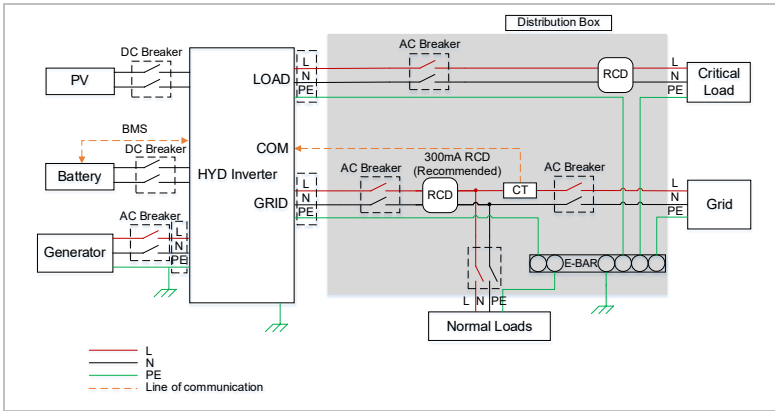


Figure 5-7(a) On-Grid system Electrical Topology

For Australia and New Zealand, please follow the electrical topology in figure 5-7(b), where N and PE are connected in the distribution box.

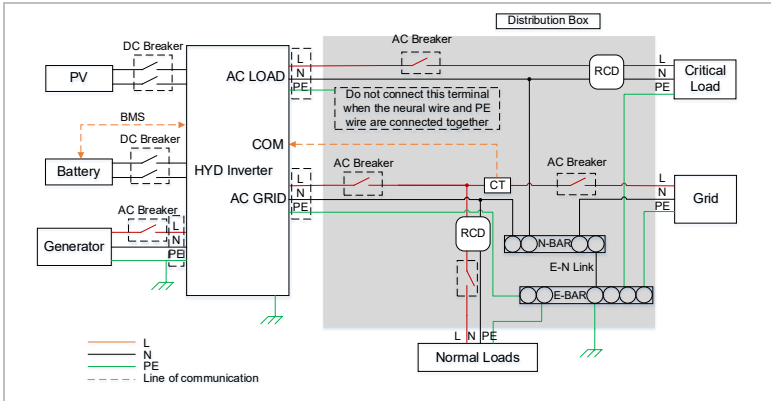


Figure 5-7(b) On-Grid system Electrical Topology
(N and PE wires are connected in the distribution box)

DANGER

- ▶ Install Residual current device (RCD) in front of the load
 - ▶ RCD is necessary for critical load, but optional for normal load.
 - ▶ In off-grid mode, the Entry master switch is unprotected, and load leakage could lead to shock danger.
 - ▶ All RCDs connected to Loads are Type B and its rated earth leakage action current $<30\text{mA}$.
-
- ▶ In the menu of the inverter, Neutral Point Grounding function is disabled in default state.

5.9 External communication interface

The external communication line is led out from the port below the inverter, as shown in figure 5-8, and its terminal type is shown in table 5-6.

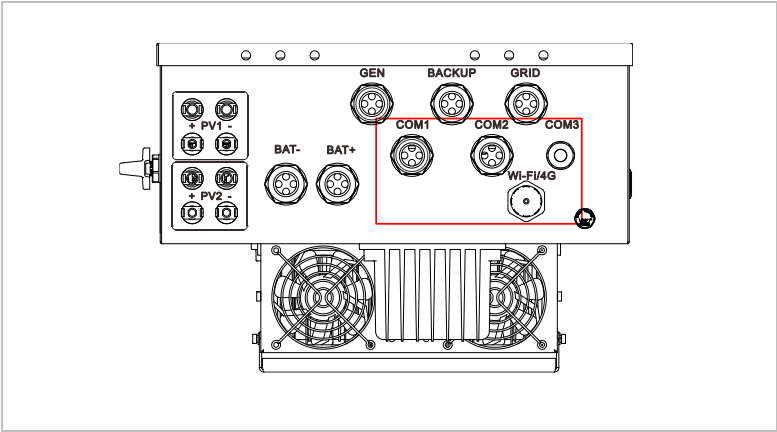


Figure 5-8 Communication port

Table 5-6 Communication line type

Port	Port Type	Description
COM1	4 holes watertight cable gland	Used for RJ45 connection inside wiring box
COM2	4 holes watertight cable gland	Used for RJ45 connection inside wiring box
COM3	6 holes watertight cable gland	Used for 12 PIN terminal block connection inside wiring box
WIFI/4G	USB	Used for Sofar data logger or USB disk connection

Wiring steps for COM1-COM3:

Step 1 Loosen the cable gland and remove the watertight caps inside the cable gland based on the number of the cables and keep the unused holes with watertight cap.

Step 2 Lead the cable into the holes in the cable gland.

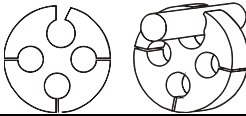
(COM1-COM2 Hole Diameter: 6mm, COM3 Hole Diameter: 2mm)

Step 3 Connect the cable to the corresponding terminals inside the wiring box.

Step 4 Reassemble the cable gland and ensure there is no bending or stretching of the cables inside the wiring box.

**CAUTION**

- ▶ The 4-hole fastening rings inside the cable gland for COM are with openings on the side.
- ▶ Please separate the gap with hand and squeeze the cables into the holes from the side openings.



5.9.1 USB/WIFI communication interface

Step 1 Remove the protective cover from the USB/Wi-Fi port of the inverter.

Step 2 Install the datalogger on the USB/Wi-Fi port.

Step 3 Tighten the connecting nut on the datalogger.

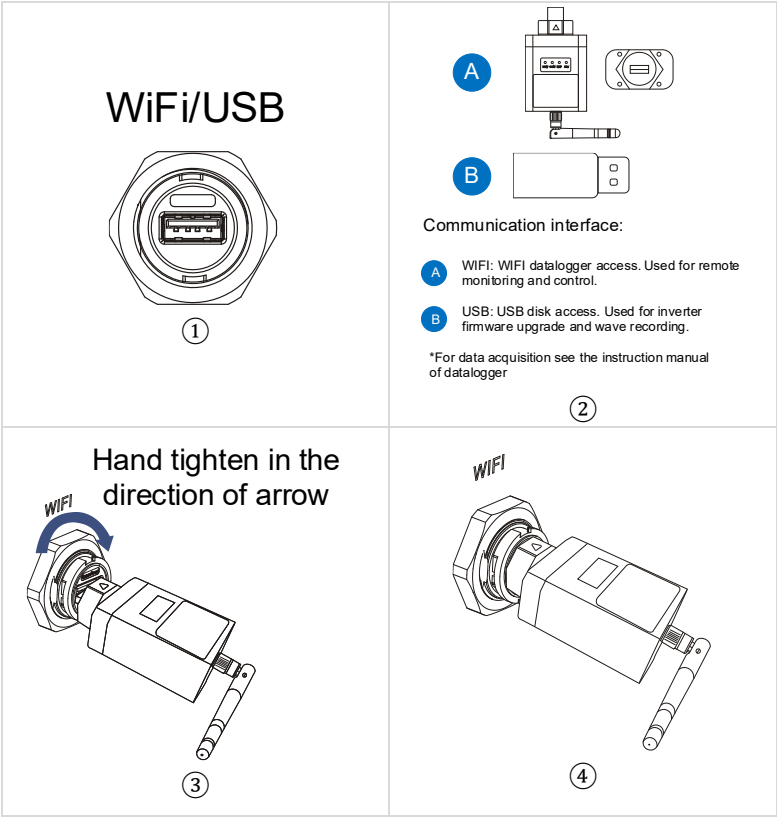


Figure 5-9 USB/Wi-Fi communication interface

Table 4-7 Interface description

PIN	Definition	Function	Note
1	GND.S	USB power -	The USB power supply is 5V/1A, it Cannot be used for external device charging
2	DP	USB data +	
3	DM	USB data -	
4	VBUS	USB power +	

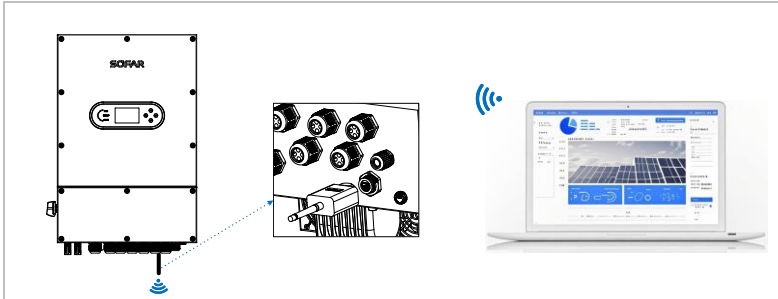


Figure 5-10(a) Collects information about single inverter

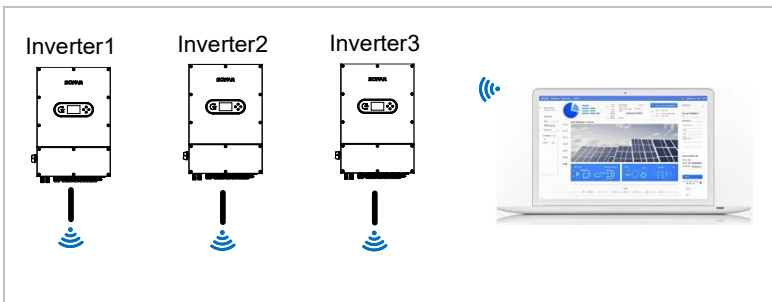


Figure 5-10(b) Collects information about multiple inverters

The operation information (generated energy, alert, operation status) of the inverter can be transferred to PC or uploaded to the server via Wi-Fi/GPRS. Users can choose to use web or APP for monitoring and viewing according to their needs. The collected information is shown in Figure4-10. You need to register an account and bind the device with the Wi-Fi/GPRS SN number. The SN number of the Wi-Fi/GPRS shall be affixed to the package box and the Wi-Fi/GPRS.

Web: <https://global.sofarcloud.com>

APP: Android: Go to Android Market and search "SOFAR Cloud".

IOS: Go to App Store and search "SOFAR Cloud".

- ▶ SOFAR Cloud:



5.9.2 Communication interface

The internal communication of the inverter is shown in figure 5-11, and its functional description is shown in table 5-8.

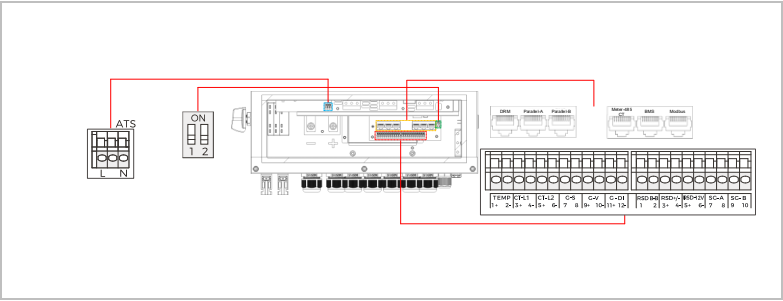


Figure 5-11 Internal communication ports overview

Table 5-8 Internal communication ports description

Terminal	Type	Description
BMS	RJ45	Used for CAN communication between inverter and Lithium battery BMS.
Meter-485 CT	RJ45	(Optional)Used for RS485 communication between inverter and the smart meter.
DRM	RJ45	(Optional) To realize demand response or logic interface function, this function may be required in UK and Australia.

Terminal	Type	Description
Modbus	RJ45	(Optional) Used for Modbus RTU communication with 3rd party external device or controller.
Parallel-A	RJ45	(Optional) Parallel operation communication port.
Parallel-B	RJ45	(Optional) Parallel operation communication port.
DIP Switch	-	When a single inverter is running, DIP switch's 2 pin shall be at the bottom position. When multiple inverters are paralleled, DIP switch's 2 pin shall be both at the top position.
TEMP	Terminal Block	Pin 1 and Pin 2 (From Left to Right) Used for Battery temperature sensor between inverter and lead-acid battery.
CT-L1	Terminal Block	Pin3 and Pin4 (From Left to Right) used for PCC-side Line CT wire connection.
CT-L2	Terminal Block	Pin5 and Pin6 (From Left to Right) used for PV-side Line CT wire connection.
G-S	Terminal Block	Pin 7 and Pin 8 (From Left to Right) Used for Generator start-stop signal.
G-V	Terminal Block	Pin9 & Pin 10 (From Left to Right) Reserved.
G-DI	Terminal Block	Pin11 & Pin 12 (From Left to Right) Used for emergency stop signal.
ATS-230V	Terminal Block	Reserved (Pin L & Pin N (From Left to Right)230Vac/1A ATS Signal).
RSD B-B RSD +/- RSD-12V	Terminal Block	Reserved (RSD)
SG-A SG-B		Reserved (Heat pump)

► **BMS Terminal Connection**

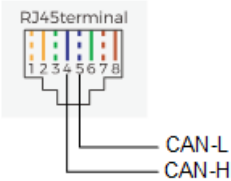
CAN communication is supported between inverter and compatible battery models.

Please lead the CAN cable through the COM1 or COM2 port of the inverter and connect to the BMS terminal with RJ45 connector.

Before connecting CAN cable with the battery, please check whether the communication pin sequence of the inverter and the battery match; If it does not match, you need to cut off the RJ45 connector at one end of the CAN cable and adjust the pin sequence according to the pin definitions of both inverter and battery.

Pin definition of the inverter BMS Port is following EIA/TIA 568B.

Table 5-9 Pin definition of BMS port

Pin	Wire color	Definition	Wiring diagram
1	Orange and White	\	
2	Orange	\	
3	Green and White	\	
4	Blue	CAN-H	
5	Blue and White	CAN-L	
6	Green	\	
7	Brown and White	\	
8	Brown	\	

► **Meter/CT Terminal Connection (Optional)**

If a smart meter is preferred to be installed other than the provided CT, please contact Sofar sales rep to order the smart meter and corresponding meter CT. Please lead the Meter RS485 cable through the COM1 or COM2 port of the inverter and connect to the Meter terminal with RJ45 connector.

Pin definition of the Meter and CT Terminal as follows:

Table 5-10 Pin definition of Meter/CT port

Pin	Wire color	Definition	Wiring diagram
1	Orange and White	Meter RS485A	
2	Orange	Meter RS485B	
3	Green and White	CT – PCC+	
4	Blue	CT – PV+	
5	Blue and White	CT – PV-	
6	Green	CT – PCC-	
7	Brown and White	\	
8	Brown	\	

NOTE:

The CT on the PCC and PV sides can also be connected to the "CT-L1" and "CT-L2" terminals which are respectively connected to Pin3&Pin6 and Pin4&Pin5.

► **Meter Connection**

The inverter supports connecting instrument transformer meter and direct-connected meter.

The Instrument Transformer Meter is shown in the figure 5-12(a)①, Pin1 and Pin2 correspond to 7,8 respectively on the Meter, as shown in figure 5-12③.

The connection mode is shown in figure 5-12②. The 1/2 and 3/4 on the electricity meter are connected to voltage signals L and N respectively. And the current needs to be connected through the current transformer, 5/6 correspond to the current transformer.

The direction of the current transformer is shown in figure 5-12④.

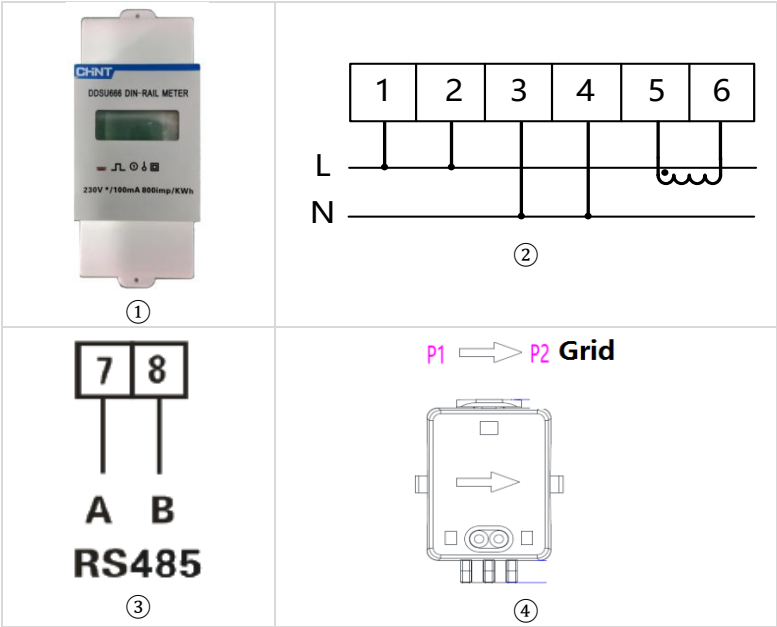


Figure 5-12(a) Meter (Instrument Transformer Meter)

The direct-connected meter is shown in the figure 5-12(b)①, Pin1 and Pin2 correspond to 24,25 respectively on the Meter, as shown in figure 5-12②. The connection mode is shown in figure 5-12②. The 1/3 and 2/4 on the electricity meter are connected to voltage signals L and N respectively.

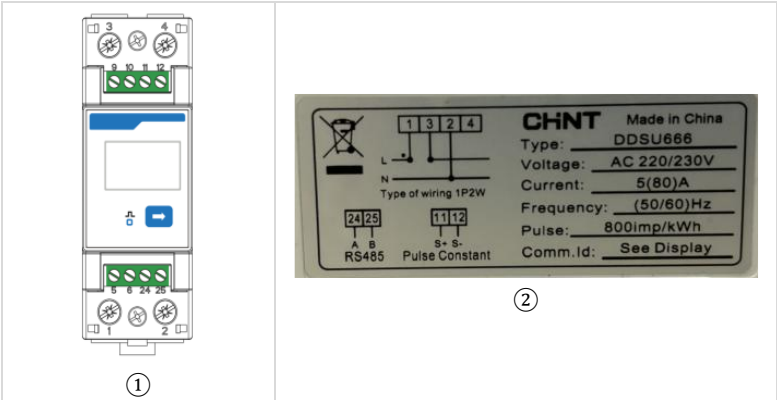


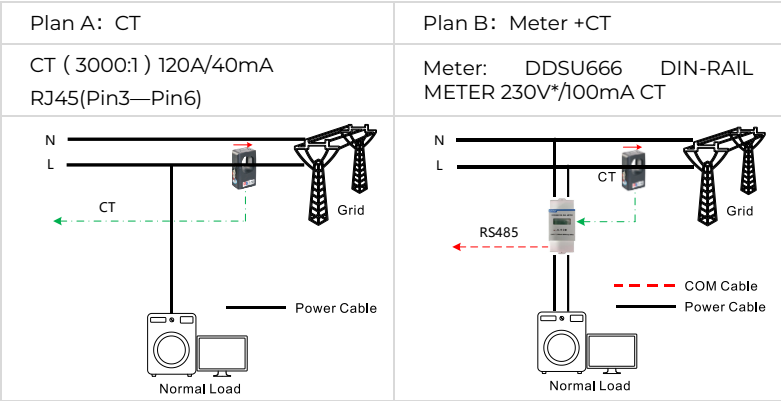
Figure 5-12(b) Meter (Direct-connected Meter)

► **CT Connection**

If you need to use the CT alone, attach the CT to Pin3 and Pin6(CT-L1) of the RJ45 Connector.

There are two ways to get grid current information:

Plan A: CT, Plan B: Meter +CT



► **RS485 Port Connection (Optional)**

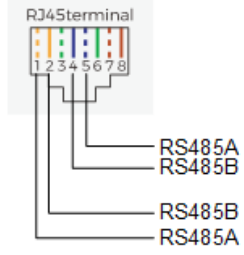
If a 3rd party external device or controller needs to communicate with the inverter, the RS485 port can be used. Modbus RTU protocol is supported by Sofar inverters.

To acquire latest protocol document, please contact Sofar local service team or Sofar sales.

Pin definition of the RS485 port is following EIA/TIA 568B.

Table 5-11 Pin definition of RS485 port

Pin	Wire color	Definition	Wiring diagram
1	Orange and White	RS485A	
2	Orange	RS485B	
3	Green and White	\	
4	Blue	RS485B	
5	Blue and White	RS485A	

Pin	Wire color	Definition	Wiring diagram
6	Green	\	
7	Brown and White	\	
8	Brown	\	

► 12-pin Communication Terminal Block

Terminal Block Connection Steps:

Step 1 Lead the wires through the hole in COM3 port. (Hole Diameter: 2 mm).

Step 2 Strip the wires for 9mm length.

Step 3 Use slot type screwdriver to press the block on the top.

Step 4 Insert the exposed copper part of the cable into the terminal.

Step 5 Remove the screwdriver and the terminal will clamp down on the exposed copper part.

Step 6 Give the cable a gentle tug to ensure that it is firmly secured.

► With Lead-acid Battery (Optional)

When using lead-acid batteries, connect the battery temperature sensor to the 12-pin terminal block of the inverter for real-time temperature monitoring. Please contact Sofar sales representative to order the battery temperature sensor.

Step 1 Take out the battery temperature sensor cable and lead through the COM3 port of the inverter and connect the positive and negative electrode lines to the Pin1 and Pin2 of the 12-pin terminal block.

Step 2 Fasten the temperature sensor ring onto the battery module. If no suitable fastening terminal can be found on the battery module, the sensor ring can be attached to the positive or negative pole of the battery module.

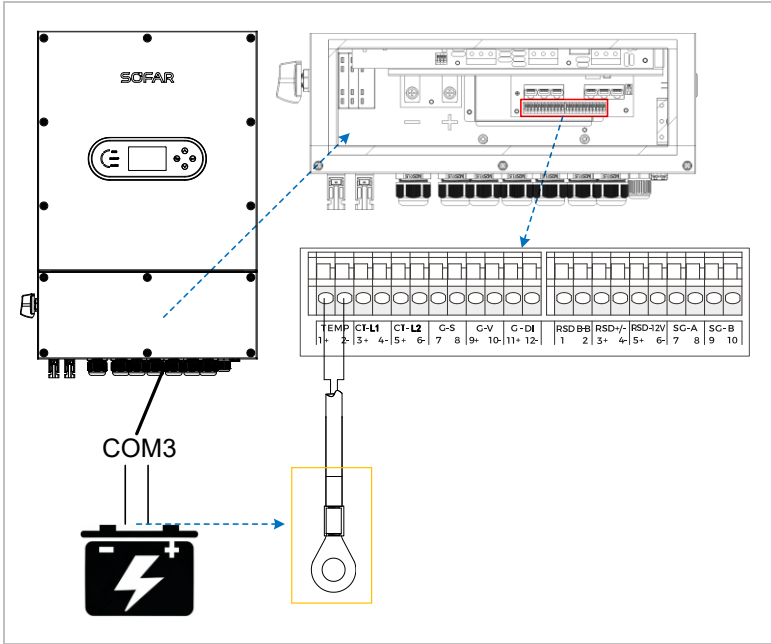


Figure 5-15 Temperature Sensor Connection for Lead-Acid Battery

NOTE: The temperature sensor wiring has no polarity.

► CT Terminal Connection

CT can not only share an RJ45 terminal with the Meter and be connected to the “Meter/CT Terminal”, but can also be directly connected to the 12-pin terminal of the inverter.

Step 1 Take out the CT cable and lead through the COM3 port of the inverter and connect the positive and negative electrode lines to the Pin3 and Pin4 of the 12-pin terminal block.

Step 2: Hang the CT near the grid side.

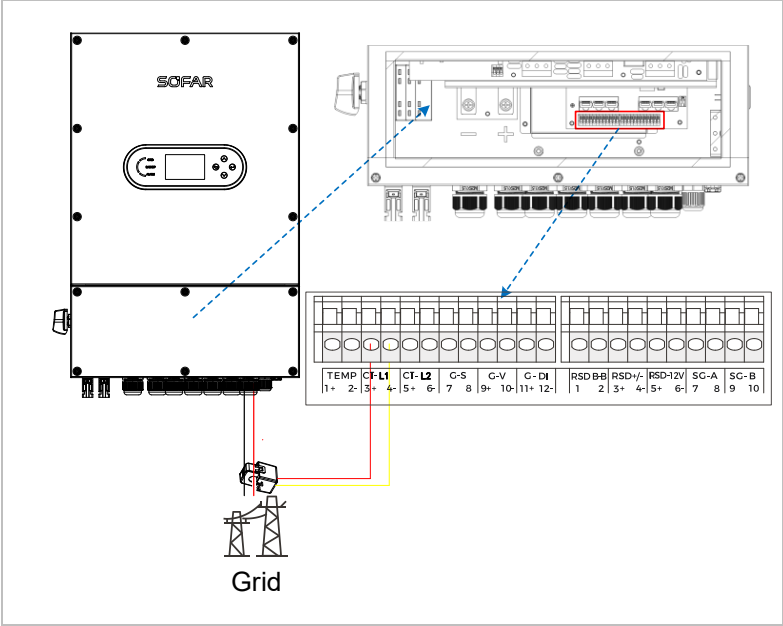


Figure 5-16 CT connected to 12-pin terminal block

► **G-S Terminal Connection**

The G-S terminal is a voltage-free dry contact signal for connecting with generator's NO relay to start up the generator when necessary.

When generator operation is not needed, Pin7 and Pin8 is in open circuit.

When generator operation is needed, Pin7 and Pin8 is in short circuit.

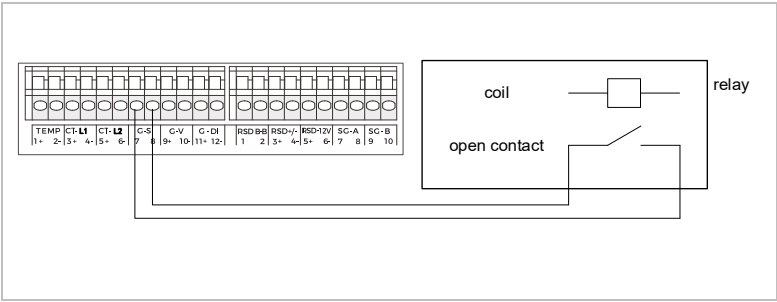


Figure 5-17 Generator start/stop signal wiring

► **G-DI Terminal Connection**

The G-DI terminal is a voltage-free dry contact signal for inverter to emergency stop when necessary.

When emergency stop is not needed, Pin11 and Pin12 is in open circuit.

When emergency stop is needed, Pin11 and Pin12 is in short circuit.

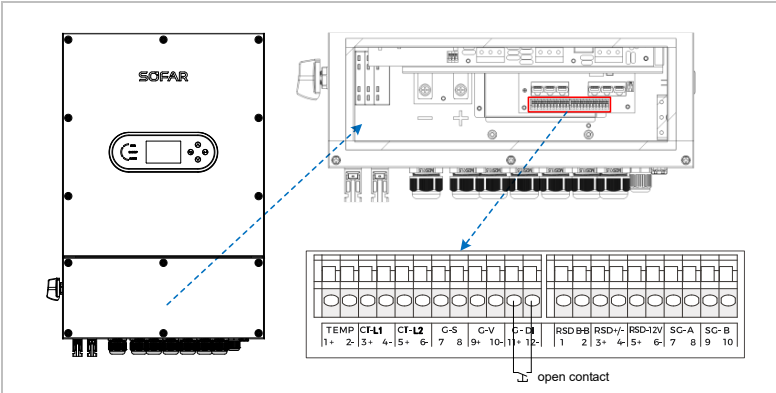


Figure 5-18 Inverter emergency stop signal wiring

► **ATS-230V Terminal Connection (Optional)**

When the “ATS Output Type” is set to “Neutral Point Grounding”, the inverter connects the grid, the ATS port voltage will be 0. the inverter disconnected from the grid, the ATS port voltage will output 230Vac/1A. With this feature and external no-type relay, it can realize N and PE disconnection or connection. Actually, the inverter could connect the N to PE internally, so this ATS-230V could be unused.

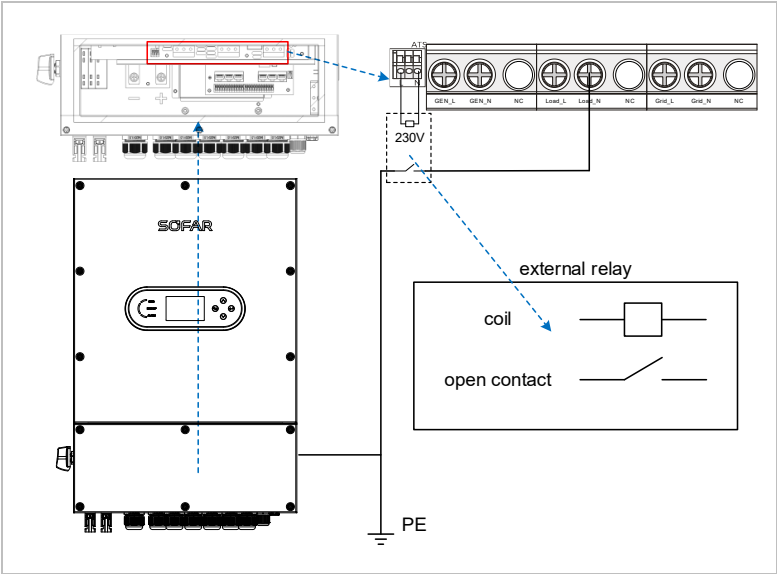


Figure 5-19(a) ATS-230 signal wiring (Neutral Point Grounding)

When the “ATS Output Type” is set to “Smart Load”, outside the time set to enable the smart load, the ATS port voltage will be 0; during the time set to enable the smart load, the ATS port voltage will output 230Vac/1A. With this feature and external no-type relay, smart load can be turned on and off at the Backup port.

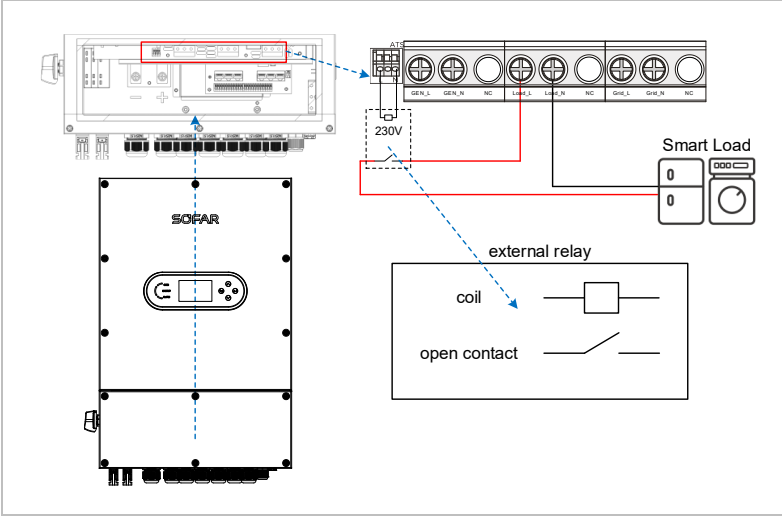


Figure 5-19(b) ATS-230 signal wiring (Smart Load)

5.9.3 Parallel-A (P-A)/Parallel-B (P-B) communication interface parallel operation

Up to 6 units of the inverter can be connected in parallel.
Please connect the paralleled inverters in daisy chain by using P-A and P-B terminals.
Standard CAT5 with shielding layers internet cable can be used.

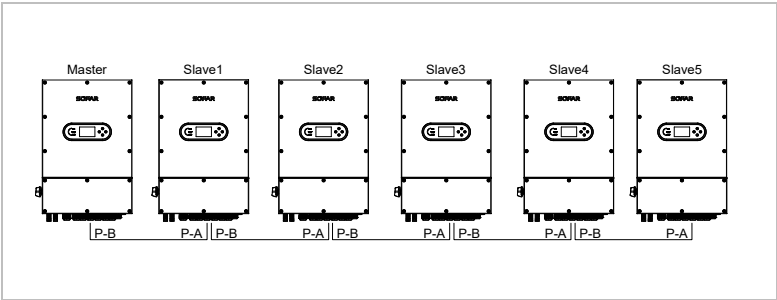


Figure 5-20 Parallel wiring diagram

NOTE: Both the P-A port of the first inverter and the P-B port of the last inverter need to set one of DIP Switch's 2(right side) to ON.

AC LOAD is also parallel for parallel machines:

Both the P-A port of the first inverter and the P-B port of the last inverter need to set one of DIP Switch's 2 to ON.

The cable length of the AC LOAD terminal connected from the LOAD terminal to each machine shall be consistent with the specification of the cable length, so as to ensure that the loop impedance is consistent and the current of the LOAD current diverted to each machine is nearly equal.

When inverters in parallel, All AC grid should be Shared a total breaker; All AC LOAD should be Shared another total breaker.

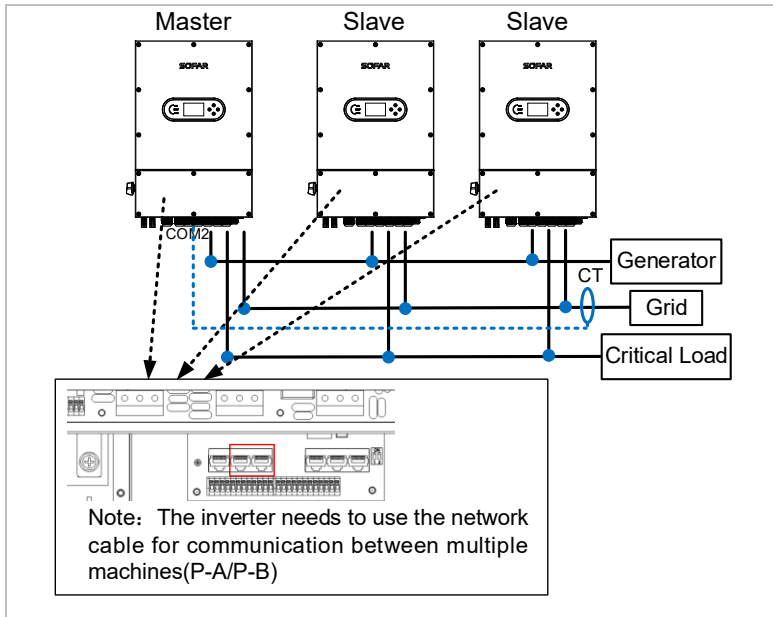


Figure 5-21(a) parallel system (On-Grid)

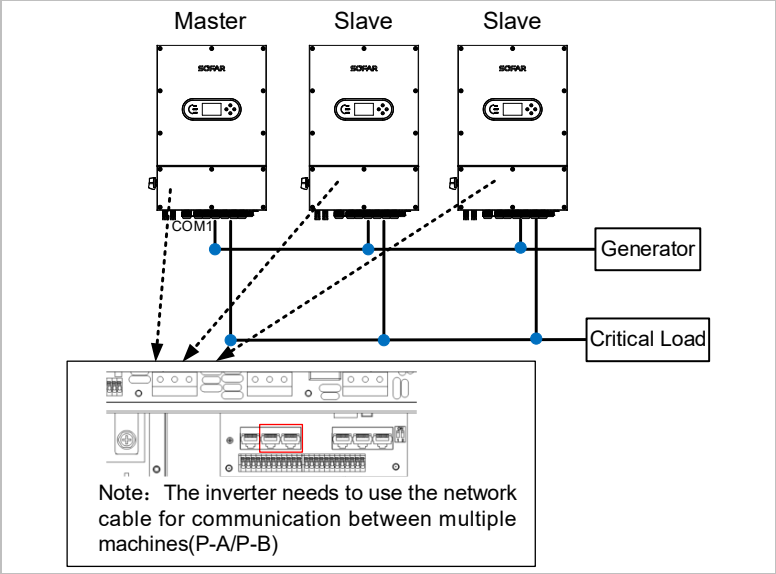


Figure 5-21(b) parallel system (Off-Grid)

5.10 Wiring Diagram Overview

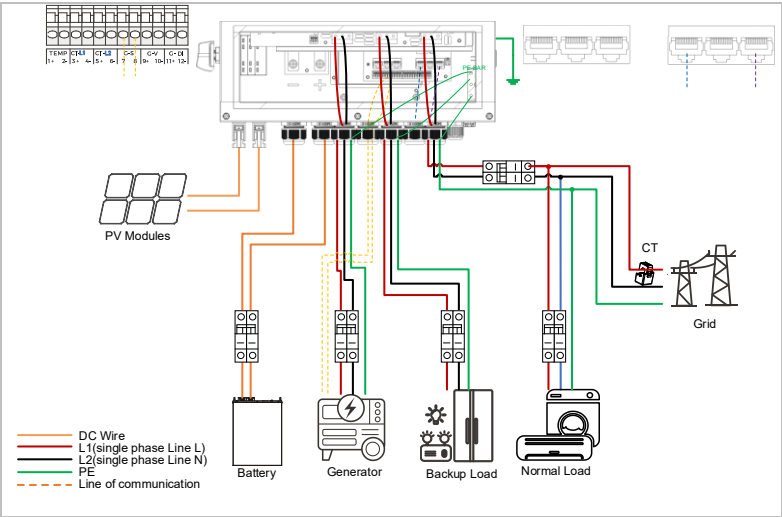


Figure 5-22 (a) Overview of Wiring for Single inverter Systems

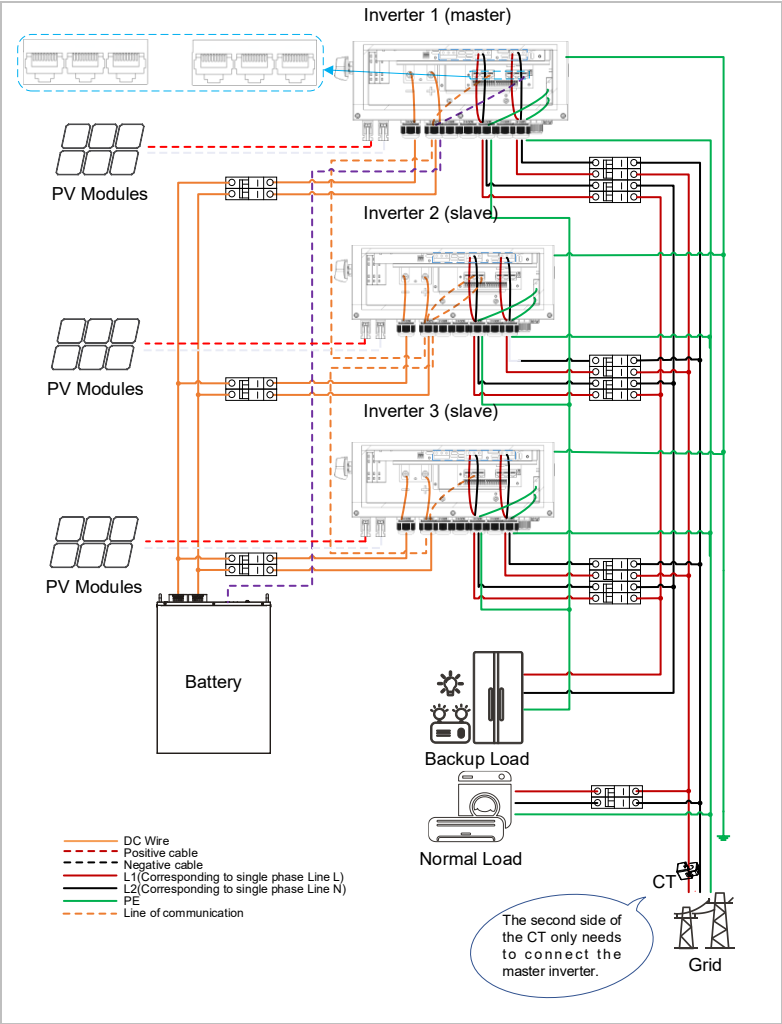


Figure 5-22(b) Overview of Wiring for Multi inverter System

6 Buttons and indicator lights

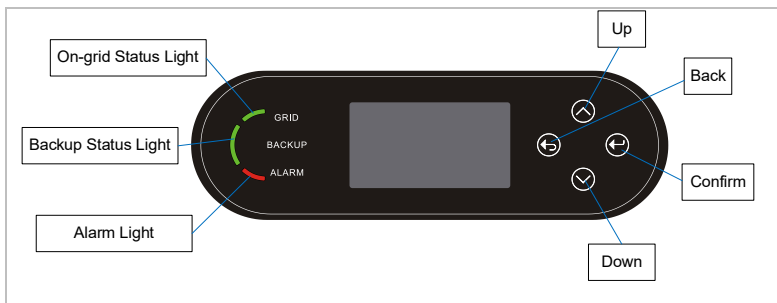


Figure 6-1 Buttons and indicator lights

6.1 Buttons

- ▶ Press “Back” to the previous screen or enter the main interface.
- ▶ Press “Up” to the upper menu option or value plus 1.
- ▶ Press “Down” to the lower menu option or value minus 1.
- ▶ Press “Confirm” to select the current menu option or switch to the next digit.

6.2 Indicator lights and status

Status	On Grid Green light	Off-Grid Green light	Alarm Red light
On-grid	ON	OFF	
Standby (On-Grid)	Flashing	OFF	
Off-Grid	OFF	ON	
Standby (Off-Grid)	OFF	Flashing	
Alarm			ON
Update	ON	ON	ON

There are three types of indicator lights: Grid, Backup and Alarm, display instructions are shown in the table above. Especially, Alarm light may turn on in any grid or standby status.

7 Operation

7.1 Double Check

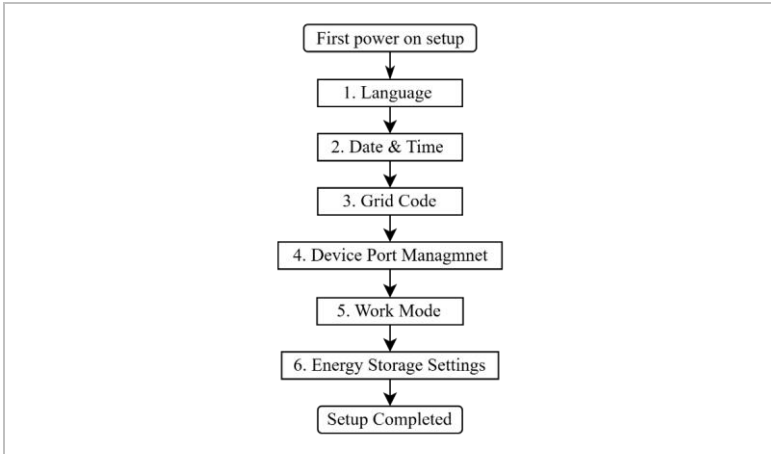
Please double check the following before operation.

- ▶ Inverter is firmly fastened to the mounting bracket on the wall.
- ▶ PV+/PV- wires are firmly connected, polarity and voltage are correct.
- ▶ BAT+/BAT- wires are firmly connected, polarity and voltage are correct.
- ▶ DC breaker is correctly connected between battery and inverter, DC breaker: OFF.
- ▶ GRID/LOAD/GEN cables are firmly / correctly connected.
- ▶ AC circuit breaker is correctly connected between inverter GRID port and power grid, circuit breaker: OFF.
- ▶ AC circuit breaker is correctly connected between inverter LOAD port and critical load, circuit breaker: OFF.
- ▶ For lithium battery, please ensure that the communication cable has been correctly connected.

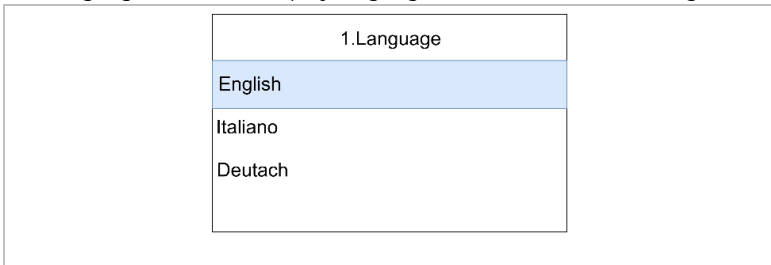
7.2 First Time Setup (IMPORTANT!)

IMPORTANT: Please follow the following procedure to switch ON inverter. When switch off the inverter, simply follow the reverse sequence of operations.

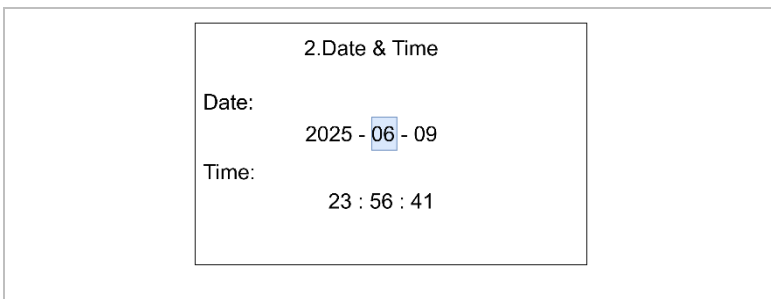
1. Make sure there's no power generation in inverter's phase.
2. Turn ON DC breaker between battery and inverter.
3. Switch ON the battery.
4. Turn ON the DC switch on the PV side of inverter.
5. Turn ON AC circuit breaker between the inverter LOAD port and critical load.
6. Turn ON AC circuit breaker between the inverter GRID port and the power grid.
7. Turn ON the DC switch on the battery side.
8. Inverter should start to operate now.
9. You need to set the following parameters before inverter starts to operate.



1. Language: Select the display language for LCD, the default is English.



2. Date & Time: If you are connected to the host computer such as data collector or mobile phone APP, the time should have been calibrated to the local time.



3. Grid Code: Refer to the grid code table 6-1 below and select country and grid code.

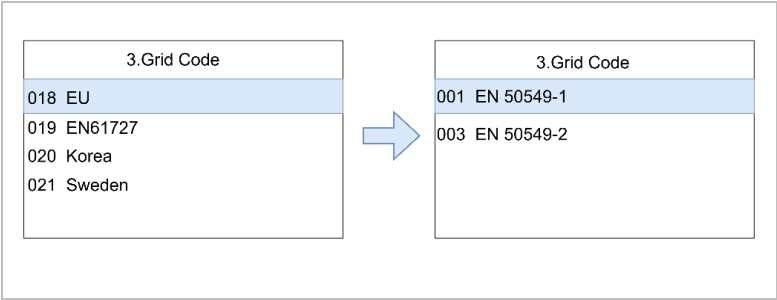


Table 7-1 List of regulated countries

code		Region	Grid Code	Description
000	000	Germany	VDE-AR-N 4105	Germany low-voltage
	005		VDE-AR-N 4110	VDE-AR-N 4110
	006		VDE-AR-N 4120	VDE-AR-N 4120
	007		VDE4105 cosPhiI	VDE4105 cosPhiI
	008		VDE4105 cosPhiP	VDE4105 cosPhiP
	009		VDE4105 Q-U	VDE4105 Q-U
001	000	Italy	CEI-021In.	Italy low-voltage ≤11kVA
	001		CEI-016	CEI-016
	002		CEI 0-21Ex.	Italy low-voltage >11kVA
	003		CEI 0-21 Areti	CEI 0-21 Areti
002	000	Australia	Australia-A	New South Wales, Victoria, Queensland, south Australia, Australian Capital Territory, Jervis Bay Territory
	008		Australia-B	Western Australia , Northern Territory
	009		Australia-C	Tasmania

code		Region	Grid Code	Description
003	000	Spain	RD 1699	RD 1699
	002		NTS 631-BCD	Spain NTS typeB/C/D
	003		UNE 217002 RD647	Spain UNE+RD
	004		Spain island	Spain island
	006		NTS 631-A	Spain NTS typeA
004	000	Turkey	EN 50549-1	Turkey
005	000	Denmark	Denmark	Denmark
	001		DK-TR 322	DK-TR 322
	002		Western Denmark	Western Denmark
	003		Eastern Denmark	Eastern Denmark
006	000	Greece	GR-Continent	GR-Continent
	001		GR-Island	GR-Island
007	000	Netherland	EN 50549-1	Netherland low-voltage
008	000	Belgium	C10/11	Belgium
	002		Belgium-LV	Belgium-LV
009	000	UK	G99	UK output current >16A
	001		G98	UK output current≤16A
	002		G99/NI	Nor Ireland output current >16A
	003		G98/NI	Nor Ireland output current≤16A
010	000	China	NB/T 32004-B	NB/T 32004-B
	009		NB/T 32004-A	NB/T 32004-A
011	000	France	France	France
	001		FRArrete23	FRArrete23
	003		France VFR 2019	France VFR 2019
	004		VDE 0126 Enedis	VDE 0126 Enedis
	006		VFR 2019 Enedis	VFR 2019 Enedis
	007		EN 50549-1	EN 50549-1
012	000	Poland	Poland-A	Poland-A:≤0.2MW
	004		Poland-ABCD	Poland-ABCD

code		Region	Grid Code	Description
013	000	Austria	TOR Erz. cosPhiI	TOR Erz. cosPhiI
	001		TOR Erzeuger Q-UFrance VFR	TOR Erzeuger Q-UFrance VFR
015	000	Switzerland	NA/EEA NE7-A	Switzerland-A
018	001	EU	EN 50549-1	EN 50549-1 230V 50Hz
	003		EN 50549-2	EN 50549-2
019	000	IEC 61727	IEC 61727	IEC61727 230V 50Hz
020	000	Korea	Korea	Korea
021	000	Sweden	Sweden	Sweden
	001		EIFS 2018:2-A	Sweden typeA
022	000	User -Def.	User def.-50Hz	User defined-50 Hz
024	000	Cyprus	Cyprus	Cyprus
	001		CY-LV-RES	CY-LV-RES
	002		CY-LN/MV-COM	CY-LN/MV-COM
	003		CY-LV/MV-UT	CY-LV/MV-UT
025	000	India	IEC 61727-India	IEC 61727-India
027	000	New Zealand	New Zealand	New Zealand
028	000	Brazil	Portaria No 140	Portaria No 140
	001		Brazil-LV	Brazil-LV
	002		Brazil-230	Brazil-230
	003		Brazil-254	Brazil-254
029	000	Slovakia	SK-VSD	SK-VSD
	001		SK-SSE	SK-SSE
	002		SK-ZSD	SK-ZSD
030	004	Czech	PPDS A1/A2 2025	PPDS A1/A2 2025
031	000	Slovenia	SIST EN 50549-1	Slovenia
033	000	Ukraine	Ukraine	Ukraine
034	001	Norway	Norway-LV	Norway-LV
039	000	Ireland	EN 50549-1 Mini	EN 50549-1 Mini
	001		EN 50549-1 Micro	single phase inverter≤6KVA; three phase inverter ≤11KVA

code		Region	Grid Code	Description
040	000	Thailand	Thai-PEA	Thai-PEA
	001		Thai-MEA	Thai-MEA
	002		Thai-PEA	Thai-PEA
044	000	South Africa	NRS 097-2-1	South Africa-A
046	000	Dubai	DEWG	DEWG
	001		DEWG-MV	DEWG-MV
111	000	Columbia	Columbia	Columbia
121	000	Saudi Arabia	Saudi Arabia	Saudi Arabia
122	000	Latvia	Latvia	Latvia
123	000	Romania	ANRE Nr.208	Romania
125	000	Finland	Finland	Finland

**CAUTION**

- It's very important to make sure that you have selected the correct country code according to requirements of local authority.
- Please consult qualified electrical engineer or personnel from electrical safety authorities about this.
- Shenzhen SOFARSOLAR Co., Ltd. is not responsible for any consequences arising out of incorrect country code selection.

4. Device Port Management: Managing PV, BAT, GRID, BACKUP and GEN external ports, LCD will display a corresponding preview interface based on port settings. The selections of each port refer to table below. When GRID port is GEN, generator icon will replace grid icon, then GEN port cannot be set as GEN.

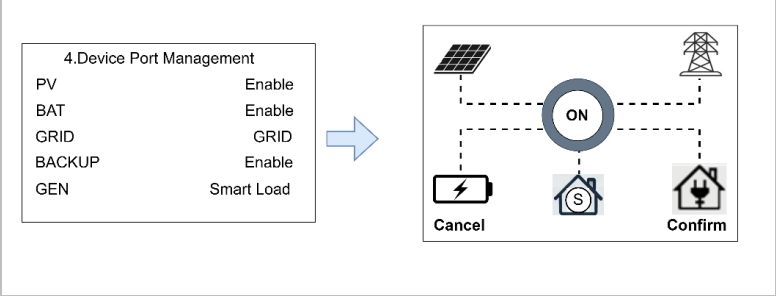


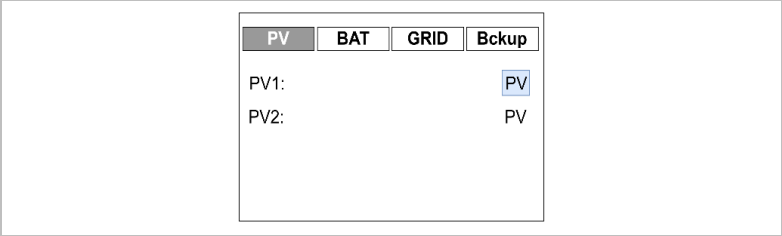
Table 7-2 Selections of each port

Port Name	Selection
PV	Enable/Disable
BAT	Enable/Disable
GRID	GRID/GEN/Disable
BACKUP	Enable
GEN	GEN/Smart Load/Disable

After confirming the ports setting, it will enter the detailed settings of each enabled port, such as PV input channel enable or disable.

Completed port icons turn black. The currently configured port icon blinks at 0.5-second intervals. Unconfigured port icons remain blank. Some ports may have multiple configuration interfaces.

Please refer to Device Port Management in **7.3.5 System Settings** for more details.



PV	BAT	GRID	Bckup
Battery Type			1/2
1.Lead Acid			
2.PYLON			
3.GENERAL			
4.GTX5000S			
5.SF-5KWH-L1			
6.SF-16KWH-L1			
7.LG			

PV	BAT	GRID	Bckup	GEN
PCC Meter/CT				
Enable				

PV	BAT	GRID	Bckup	GEN
Feed-in Limit Control				
Enable				
Feed-in Limit Power				
0001.5 kW				

PV	BAT	GRID	Bckup	GEN
Control Mode				
Manual				
Rated Power				
0005.0 kVA				

PV	BAT	GRID	Bckup
Battery Type			2/2
8.Alpha. ESS			
9.CATL			
10.WECO			
11.Fronius			
12.Dowell			
13.Dyness			

PV	BAT	GRID	Bckup	GEN
PCC Import Limit Control				
Enable				
PCC Import Limit Power				
0001.5 kW				

PV	BAT	GRID	Bckup	GEN
Backup Load				
Enable				

PV	BAT	GRID	Bckup	SmtLd
Mode				Smart Mode
Rated Power				0003.0kW
Start SOC				080 %
Stop SOC				010 %

5. Work Mode: Select the working mode for inverter. The passive mode requires external remote EMS device to control power precisely; the others can run automatically. Please refer to **7.3.8 Work Mode** for details.

5.Work Mode
1.Self-use
2.Feed-in Priority
3.Peak Shaving
4.Time-of-use
5.Passive

- 6. Energy Storage Settings: Set Charge Limit SOC, On-grid Discharge Limit SOC, Off-grid Discharge Limit SOC and Off-grid Recovery Discharge SOC.
- ▶ When inverter is in on-grid state and enable the BACKUP port, the battery will discharge until it reaches the Off-Grid Discharge Limit SOC.

Energy Storage Settings	
Charge Limit SOC	100%
On-Grid Discharge Limit SOC	020%
Off-Grid Discharge Limit SOC	010%
Off-Grid Recovery Discharge SOC	015%

- ▶ After completing first power on setup, LCD displays prompt interface **Success** for a second and enters to the homepage which shows Energy Flow Diagram.

Success

- ▶ There are some other default parameters refer to the table below.

Table 7-3 Default values for other Settings

Settings	Default Values
IV Curve Scan	Disable
Logic interface	Disable
Parallel Setting	Disable
BACKUP GFCI	Disable
ATS Output Type	Disable
E-STOP	Disable
Contact Output Type	Wet

7.3 Menu

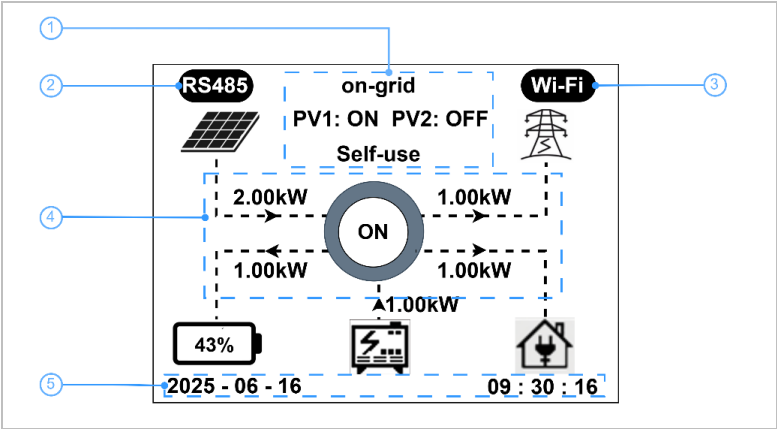


Figure 7-1 Homepage

- ▶ When the battery-side button is pressed, the circle in the center of the screen displays ON, otherwise, it shows OFF.

① Status Display: The status bar contains three rows. The first row displays the working status of the inverter, the second row displays the status of 5 external components, which automatically switch every 3 seconds, and the third row displays the working mode.

Table 7-4 Status

Operating Status	On-Grid	
	Off-Grid	
	Fault	
	Detecting	
	Standby	
Components Status	PV1	On/Off
	PV2	On/Off
	BAT	Charging/Discharging
	DRM	DRM0~DRM8
Working Mode	Self-use	
	Feed-in Priority	
	Peak Shaving	
	Time-of-use	
	Passive	

② **External EMS & Master/Slave:** When an RS485 communication cable is externally connected to the inverter, the top-left corner of the screen will display .

When the inverter is configured as Master or Slave in Parallel settings, the top-left corner of the screen will display  or . The default is Master. The external EMS and the Master/Slave automatically switch every 3 seconds.

③ **External Accessories:** When a meter is connected to the inverter, the top-right corner of the screen will display .

When a data logger or USB flash drive is connected to the inverter, the top-right corner of the screen will display  or .

The Meter icon and the data logger/ USB icon switch every 3 seconds

④ **Energy Flow Diagram:** All icons in the diagram will be displayed dynamically based on port configuration. For example, if the GRID port is configured as GEN, the generator icon will replace the grid icon in the upper-right corner. Please refer to Device Port Management in the **7.3.5 System Settings**.

Table 7-5 Icons in Energy Flow Diagram

Symbol	Description	Notes
	PV	
	Battery	arrow pointing to battery = charging power; arrow pointing away from battery = discharging power
	Grid	arrow pointing to grid = feeding into grid; arrow pointing away from grid = drawing power from grid
	Generator	
	Household load	
	Smart load	

⑤ **System Time:** system time at this moment.

In homepage, press “back” button to enter main menu. there are the following 7 options.

Main Menu 1.System Information 2.Real-time Information 3.Event List 4.Energy Statistic 5.System Settings 6.Advanced Settings 7.Firmware Update

7.3.1 System Information

1.System Information	----Press “Confirm”	
2.Real-time Information	Inverter (1)	Serial Number
3.Event List		Rated Power
4.Energy Statistics		Firmware Version
5.System Settings		Grid Code
6.Advanced Settings	Inverter (2)	BAT Channel
7.Software Upgrade		PV Channel 1
	Inverter (3)	PV Channel 2
		Work Mode
		RS485 Address
	Inverter (4)	BACKUP
		IV Curve Scan
		Logic Interface
		Power Factor
	Inverter (5)	Feed-in Limit
		Insulation Resistance
	Inverter (6) (Safety Param)	Parallel
		Automatic Battery Active
		OVP1
		OVP2
		UVP1
UVP2		
OFP1		
OFP2		

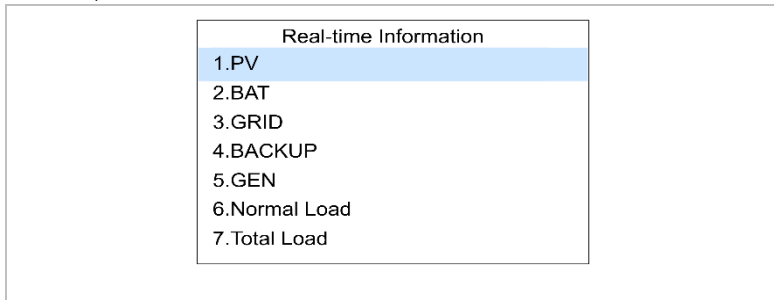
	UFP1
	UFP2
Inverter (7) (Safety Param)	OVP 10mins
Battery (1) (Acid)	Battery Capacity
	Max Charge Current
	Max Discharge Current
Battery (2) (Acid)	Max Charge Voltage
	Min Discharge Voltage
	Float Charge Voltage
	TEMPCO
Battery (3) (Acid)	Voltage Recovery Buffer
Battery (1~8) (Lithium)	Serial Number
	Firmware Version
Battery (9) (Lithium)	Max Charge Current
	Max Discharge Current
Battery (10) (Lithium)	Charge Limit SOC
	On-grid Discharge Limit SOC
	Off-grid Discharge Limit SOC
	Off-grid Recovery Discharge SOC

- ▶ There are two sub information interfaces, Inverter and Battery.
- ▶ Battery interfaces display based on the battery type, acid or lithium. Particularly, Battery shows up to 16 serial numbers and firmware versions of lithium batteries connect to inverter, 2 batteries in every page. if the number is less than 16, the excess interface will be hidden automatically.

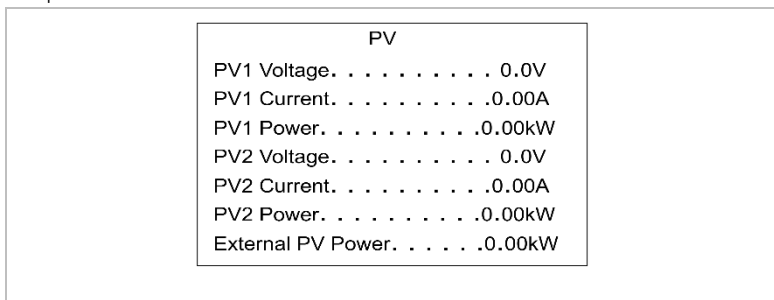
- ▶ Battery interface will show “No battery” if there is no battery connects to the inverter.

7.3.2 Real-time Information

When selecting bar is on Real-time Information, press “confirm” button, it will show 7 options in sub interface.



1. PV: It shows info of 2 PV input channels. External PV Power is the total PV power.



2. BAT: If BAT port connects no battery, it will only display BAT Port Info (the bottom-left picture). On the contrary, it will display up to 8 pages of BAT Real Info if batteries are connected.

BAT Port Info Voltage. 0.0V Current.0.00A Power. 0.00kW SOC. 100%	BAT1 Real Info Voltage. 0.0V Current.0.00A SOC.100% Max Cell Temp. 26.0°C Min Cell Temp.26.0°C
---	---

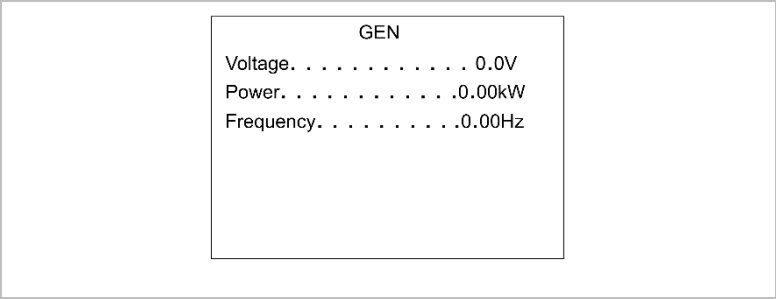
3. GRID: The GRID port displays information as the picture below.

GRID Voltage. 0.0V Power.0.00kW Frequency.50.00Hz
--

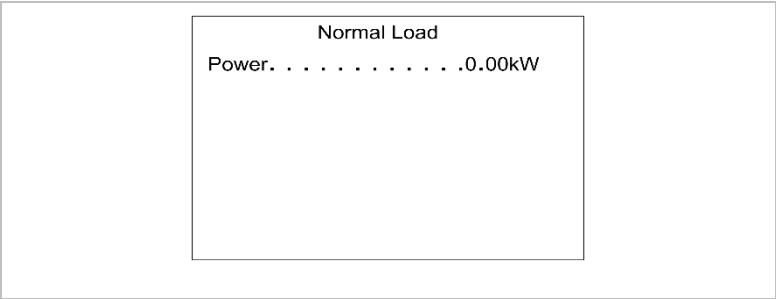
4. BACKUP: The BACKUP port displays information as the picture below.

BACKUP Voltage. 0.0V Power.0.00kW Frequency.50.00Hz
--

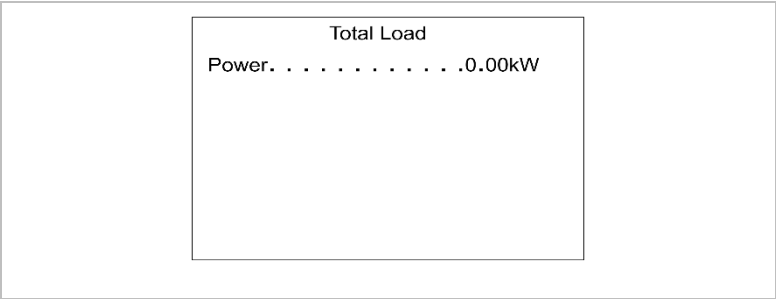
5. GEN: the GEN port displays information as the picture below.



6. Normal Load: Only power information.

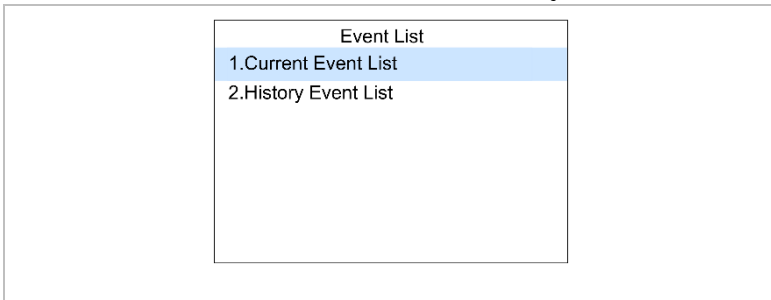


7. Total Load: Only power information.



7.3.3 Event List

There are two different kinds of lists, current and history.



1. Current Event List: It shows all the events are happening right now. After one event recovers, current list will automatically clear it.
2. History Event List: It displays the last 100 historical events. Up and down button will switch the pages of event list, which show up to 8 events in a page. Press the confirm button once will switch between event description and trigger time.

7.3.4 Energy Statistic

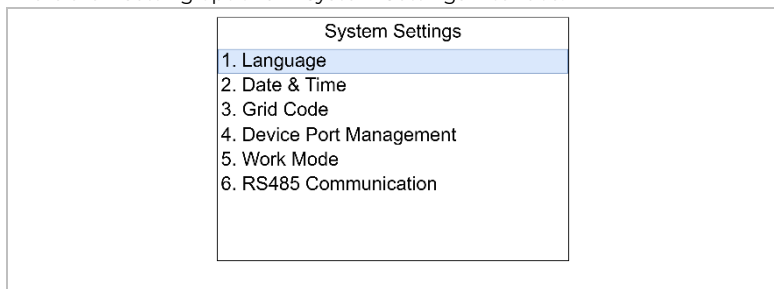
This interface displays PV power consumption, load power consumption, grid sales, grid purchases, battery charging and discharging, represented by PV, Load, Import, Export, Charge and Discharge respectively.

Today	
PV.	0.00kWh
Load.	0.00kWh
Import.	0.00kWh
Export.	0.00kWh
Charge.	0.00kWh
Discharge	0.00kWh

Press up and down button to switch between today, month, year and lifetime energy statistics interface.

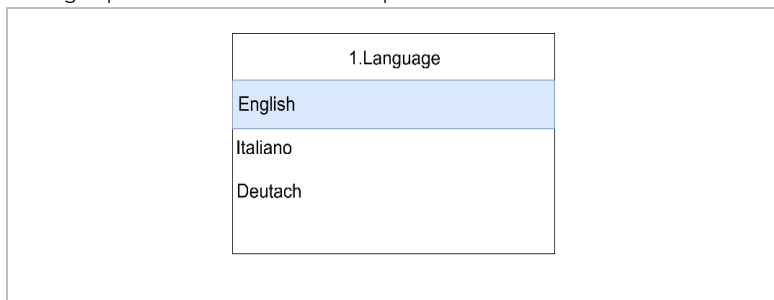
7.3.5 System Settings

There are 7 setting options in System Settings interface.



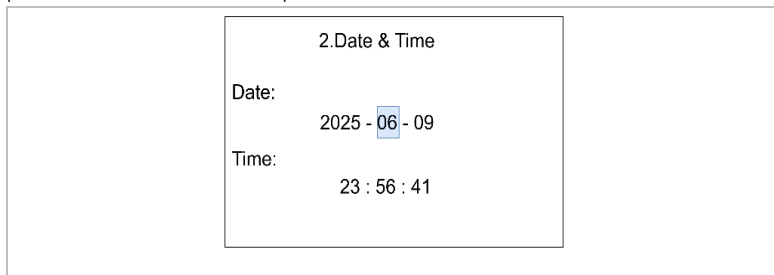
1. Language

Used to set the menu display language, the function is same as the language setting in procedure of first-time setup.



2. Date & Time

Set the system time for the inverter, the function is same as the time setting in procedure of first-time setup.



3. Grid Code

If user never input level 2 password, or entering the password and the screen turning off for 10 minutes, it is necessary to enter the password. Incorrect prompt will show up if the password doesn't match.

For the level 2 password, please consult the representative of SOFAR.

Input Password! ****	Incorrect, Try Again!
------------------------------------	------------------------------

After inputting the right level 2 password, you can select the country and switch to different grid code, it is as same function as Grid Code setting in the procedure of first-time setup.

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: center;">3.Grid Code</th> </tr> <tr> <td>018 EU</td> </tr> <tr> <td>019 EN61727</td> </tr> <tr> <td>020 Korea</td> </tr> <tr> <td>021 Sweden</td> </tr> </table>	3.Grid Code	018 EU	019 EN61727	020 Korea	021 Sweden		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: center;">3.Grid Code</th> </tr> <tr> <td>001 EN 50549-1</td> </tr> <tr> <td>003 EN 50549-2</td> </tr> </table>	3.Grid Code	001 EN 50549-1	003 EN 50549-2
3.Grid Code										
018 EU										
019 EN61727										
020 Korea										
021 Sweden										
3.Grid Code										
001 EN 50549-1										
003 EN 50549-2										



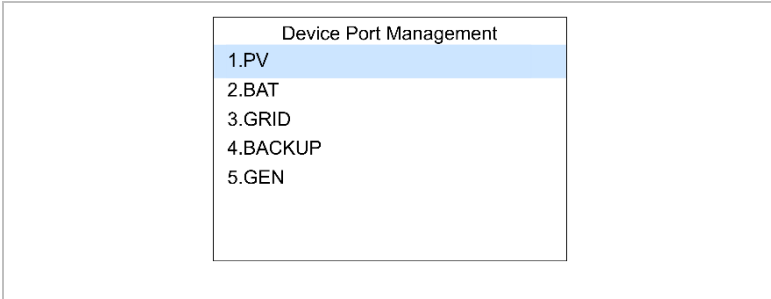
CAUTION

- ▶ It's very important to make sure that you have selected the correct country code according to requirements of local authority.
- ▶ Please consult qualified electrical engineer or the personnel from electrical safety authorities about this.

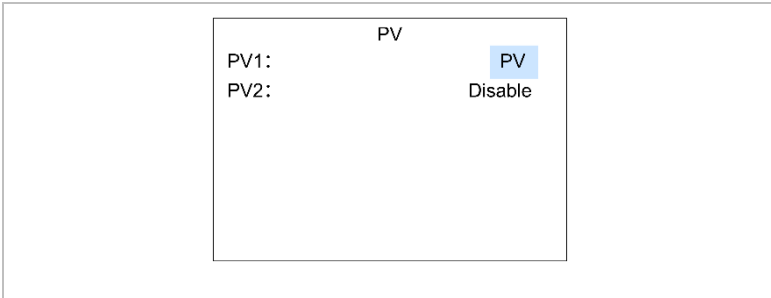
- Shenzhen SOFARSOLAR Co., Ltd. is not responsible for any consequences arising out of incorrect country code selection.

4. Device Port Management

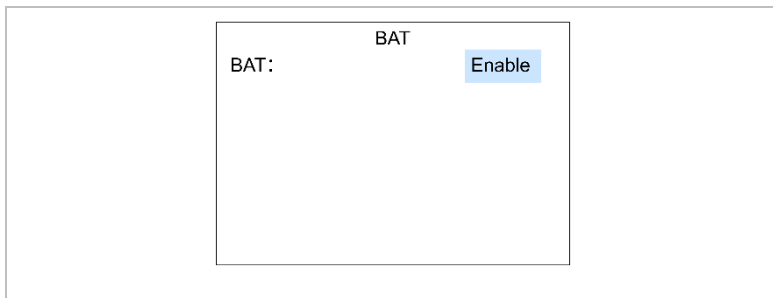
There are 5 ports to set. Each port may affect Energy Flow Diagram in the homepage.



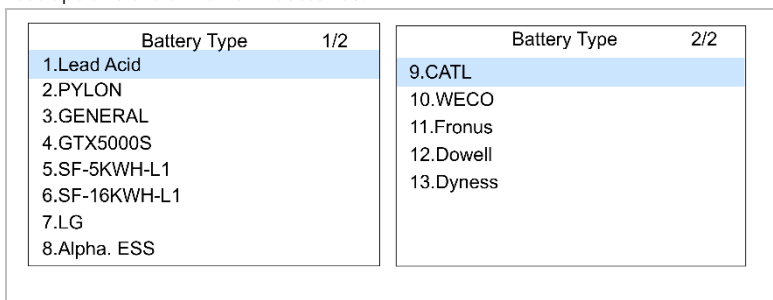
1. PV: Set the enable and disable of two PV channels, "PV" represents as enable. Even both channels are disabled, PV icon still exists in the Energy Flow Diagram.



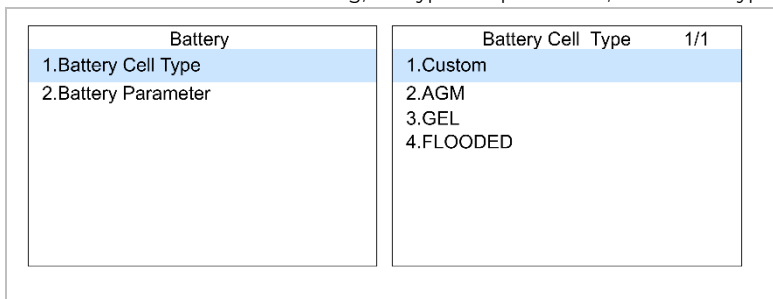
2. BAT: User can enable or disable BAT port, which affects the battery icon in the Energy Flow Diagram, enable for showing the icon, disable for hiding it.



After press confirm button to enable port, LCD will display 2 pages, totaling 12 battery types for option. Lead Acid option is the only for lead acid battery, the rest options are all lithium batteries.



Lead Acid will lead to further setting, cell type and parameter, there 4 cell types.



If user select custom cell type, Battery Parameter will show 4 pages of settings.

Battery Parameter 1/4 Battery Capacity: 0020Ah	Battery Parameter 2/4 Max Charge Voltage: 57.0V Min Discharge Voltage: 46.0V Float Charge Voltage: 55.3V
Battery Parameter 3/4 TEMPCO: -2.0mV/Cell Max Charge Current: 020A Max Discharge Current: 020A	Battery Parameter 4/4 Voltage Recovery Buffer: 2.5V

If user select non-custom cell type, such as AGM cell, Battery Parameter will show 2 pages of settings.

Battery Parameter 1/2 Battery Capacity: 0100Ah	Battery Parameter 2/2 Min Discharge Voltage: 46.0V Max Discharge Current: 100A
--	---

Lithium batteries do not need to set the further detailed parameters except PYLON, user must choose the battery type for PYLON.

Battery Type
1.US2000
2.US3000
3.US5000

- If there is no battery connects to inverter effectively, even BAT port is enabled, Energy Flow Diagram will not show BAT icon.

3. GRID: There are 3 options for this port, Disable, GRID or GEN. Generator icon will replace grid icon in the upper right corner of Energy Flow Diagram when port is set as GEN, while other selections remain gird icon.

LCD will show the generator parameter settings when port set as GEN, generator has 2 control modes, Auto or Manual. Auto mode is controlled by SOC when BAT port set the lithium battery, while it runs by battery voltage when lead acid battery connects to machine.

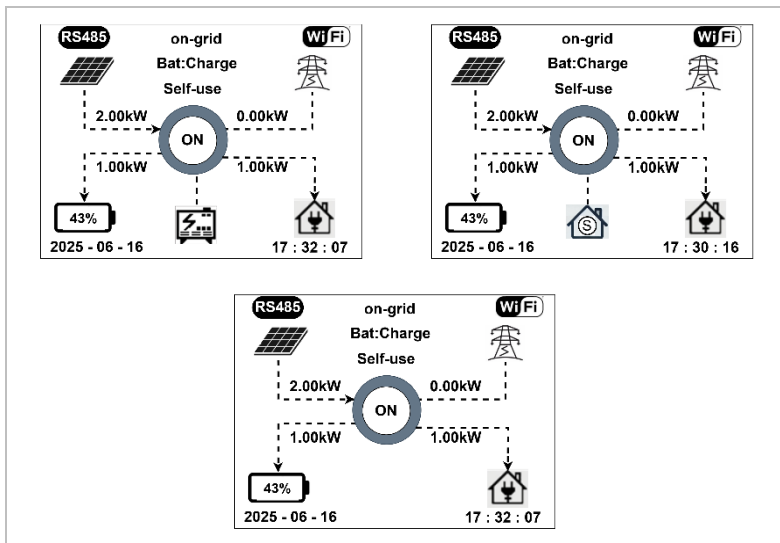
GRID	
GRID:	GEN
Genset Mode:	Manual
Rated Power:	0005.0kVA

GRID		GRID	
GRID:	GEN	GRID:	GEN
Genset Mode:	Auto	Genset Mode:	Auto
Start SOC:	40%	Startup of Voltage:	45.0V
Stop SOC:	80%	Stop of Voltage:	55.0V
Rated Power:	0005.0kVA	Rated Power:	0005.0kVA

4. BACKUP: This port can be set as Disable or Enable. This port can connect to the smart load with ATS device. Please refer to ATS Output Type in **7.3.6 Advanced Settings** for Smart Load configuration.

GRID	
GRID:	GEN
Genset Mode:	Auto
Startup of Voltage:	45.0V
Stop of Voltage:	55.0V
Rated Power:	0005.0kVA

5. GEN: There are 3 options for this port, Disable, GEN and Smart Load. Specially, if Grid port is set as GEN, the selection of GEN in this port will be hidden. Choosing GEN in GEN port is as same as it in the Grid port. If GEN is selected, the generator icon will appear in the lower center of the Energy Flow Diagram, generator icon will be replaced as smart load icon if Smart Load is selected, while nothing shows if port is set as Disable.



Smart Load has 4 control modes, including Normally on, normally off, Smart Mode and Timing Mode. Particularly, Smart Mode can be controlled by SOC or battery voltage depend on the battery type connected to the inverter, lead acid battery or lithium battery.

GEN		GEN	
GEN:	Smart Load	GEN:	Smart Load
Mode:	Normally On	Mode:	Normally Off

GEN		GEN	
GEN:	Smart Load	GEN:	Smart Load
Mode:	Smart Mode	Mode:	Timing Mode
Startup Power:	0005.0kW	Time:	00:00-23:59
Startup of Voltage:	57.6V	Date:	01.01-12.31
Stop of Voltage:	46.0V	Weekday:	Mon. Tue. Wed. Thu. Fri. Sat. Sun.

5. Work Mode

Select “5. Work Mode”, press “Confirm” to enter the work mode and the energy storage settings interface. Please refer to section **Work Mode** for more details.

5.Work Mode	Energy Storage Settings
1.Self-use Mode	Charge Limit SOC 100%
2.Feed-in Priority Mode	On-Grid Discharge Limit SOC 020%
3.Peak Shaving Mode	Off-Grid Discharge Limit SOC 010%
4.Time of Use Mode	Off-Grid Recovery Discharge SOC 015%
5.Passive Mode	

6. RS485 Communication

Select “RS485 Communication”, press “Confirm” to enter communication setting interface.

Set the communication address from 001 to 247, and the default is 001.

RS485 Communication
1.Address
2.Baud Rate

1. Address: Set the communication address from 001 to 247, and the default is 001.

Address 001

2.Baud Rate: Only 2 options, 9600 or 115200 baud rate, and the default is 9600.

Baud Rate 9600 115200
--

7.3.6 Advanced Settings

User can input level 1 or level 2 password to enter the interface of advanced settings, including 14 options.

For the level 2 password, please consult the representative of SOFAR.

1.System Information	
2.Real-time Information	
3.Event List	
4.Energy Statistics	
5.System Settings	
6.Advanced Settings	-----Level 1 Password "0001"
7.Software Update	1.Battery
	2.Feed-in Limit Control
	3.IV Curve Scan
	4. Logic Interface
	5.Restore Factory Settings
	6.Parallel Settings
	7.Once CT Calibration
	8.Switch On/Off
	9.PCC Import Limit Control
	10.Set PCC Power Offset
	11.BACKUP GFCI
	12.ATS Output Type
	13.Contact Output Type
	14.E-stop
	15.PCC Meter/CT

1. Battery

Select "1. Battery" to enter the interface of battery settings.

Battery
1. 30 Days SOC Calibration
2. Battery Active

1. 30 days SOC Calibration: Select it and press "Confirm" to enter the battery SOC auto-calibration setting interface. Default is "Disable", which means inverter will calibrate SOC automatically every 30 days.

30 Days SOC Calibration
Disable
Enable

2. Battery Active: Select it and press "Confirm" to enter the active interface. User can enable or disable to automatically activate battery, also user can manually active battery once.

Battery Active
1. Auto Active
2. Once Manual Active

2. Feed-in Limit Control

Select “2. Feed-in Limit Control” to enter the settings interface. User can enable or disable feed-in limitation mode and hard limit control, and user can also set the feed-in limit power.

Feed-in Limit Control

1.Feed-in Limitation Mode

2.Feed-in Limit Power

3.Hard Limit Control

Feed-in Limitation Mode

Disable

Enable

Feed-in Limit Power

0000.0kW

Hard Limit Control

Disable

Enable

3. IV Curve Scan

Select “3. IV Curve Scan” to enter the settings interface. User can enable or disable scan control and set the scanning period. User can also manually scan once.

IV Curve Scan

1.Scan Control

2.Scan Period

3.Once Manual Scan

Scan Control Disable Enable	Scan Period 030Min
---	---

4. Logic Interface

Select "4. Logic Interface" to enter the settings interface. User can enable or disable DRM0 and DRMn.

Logic Interface 1.DRM0 2.DRMn	
DRM0 Disable Enable	DRM1 Disable Enable

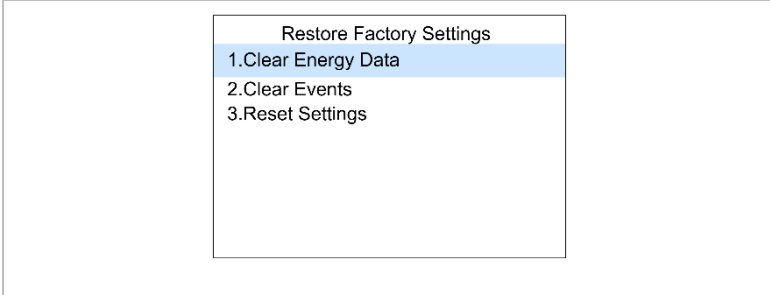
5. Restore Factory Settings

Select "5. Restore Factory Settings" to enter the reset interface.

"1. Clear Energy Data" will clear all energy data in "Energy Statistic".

"2. Clear Events" will clear all events in "Event list".

"3. Reset Settings" will reset all user settings to the default state.

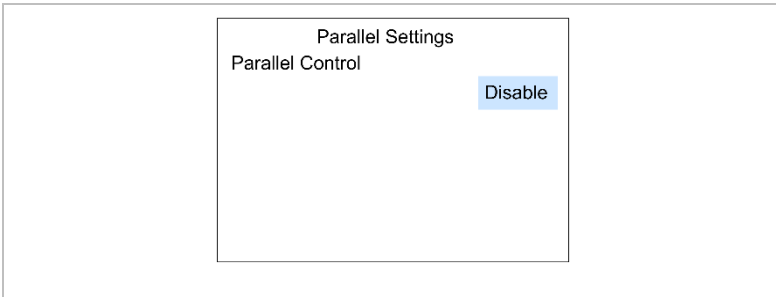


6. Parallel Settings

Select "6. Parallel Settings" to enter the setting interface.

User can enable or disable the parallel control. If Parallel Control is set as disable, the interface will hide Master-Slave setting.

If the inverter is set as Slave, user need to set the parallel address in the whole parallel system.



Parallel Settings Parallel Control Enable Master-Slave Master	Parallel Settings Parallel Control Enable Master-Slave Slave Parallel Address 02
---	---

7. Once CT Calibration

Select "7. Once CT Calibration" to calibrate the direction of CT immediately. The operate may success or fail.

Success	Illegal Operation!
---	--

8. Switch On/Off

Select "8. Switch On/Off" to enter the interface. User can switch on or switch off the machine.

Inverter will switch on automatically after completing first-time settings.

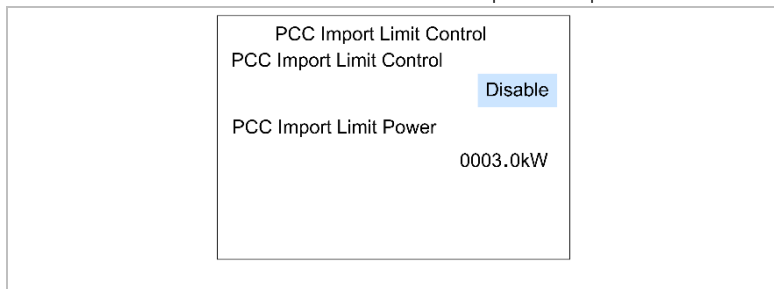
Switch On/Off

Switch Off

Switch On

9. PCC Import Limit Control

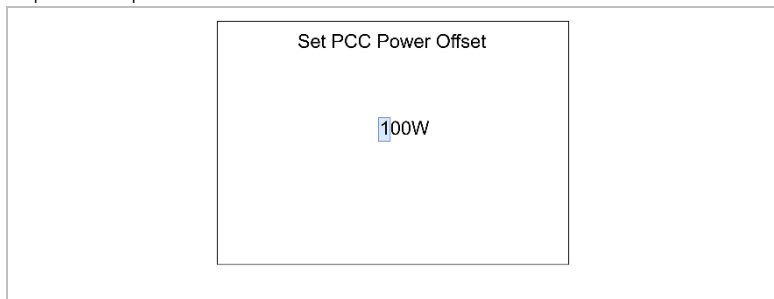
Select "9. PCC Import Limit Control" to enter the interface. User can enable or disable the PCC limit control and set the PCC import limit power.



PCC Import Limit Control
PCC Import Limit Control
Disable
PCC Import Limit Power
0003.0kW

10. Set PCC Power Offset

Select "10. Set PCC Power Offset" to enter the interface. User can set the PCC import limit power.



Set PCC Power Offset
100W

11. BACKUP GFCI

Select "11. BACKUP GFCI" to enter the interface. User can enable or disable the function.

BACKUP GFCI

Disable

Enable

12. **ATS Output Type**

Select "12. ATS Output Type" to enter the setting interface. There are 3 options, Disable, Neutral Point Grounding and Smart Load.

ATS Output Type

Type:

Disable

ATS Output Type

Type:

Neutral Point Grounding

If the type is set as Smart Load, it shows further smart load settings which is same as the Smart Load of GEN port.

ATS Output Type

Type:

Smart Load

Mode:

Timing Mode

Time:

00:00-23:59

Date:

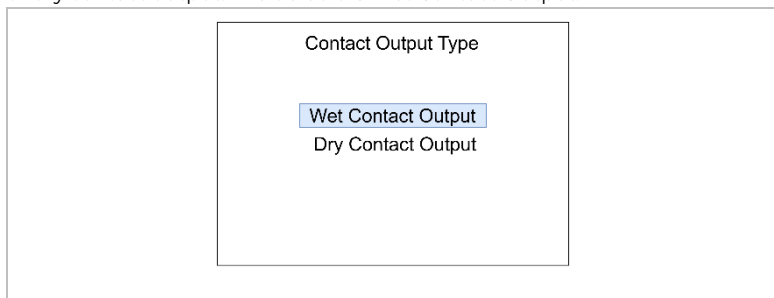
01.01-12.31

Weekday:

Mon. Tue. Wed.
Thu. Fri. Sat. Sun.

13. Contact Output Type

Select "13. Contact Output Type" to enter the setting interface. User can set wet or dry contact output. The default is Wet Contact Output.



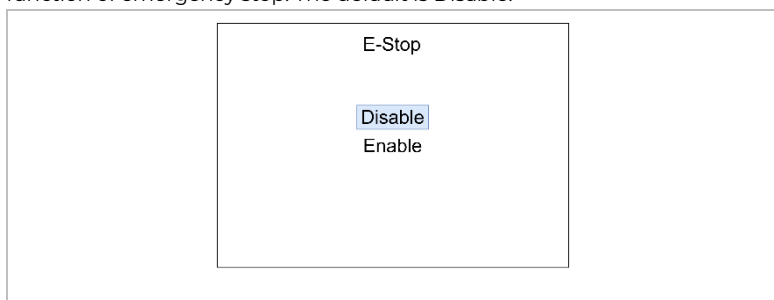
Contact Output Type

Wet Contact Output

Dry Contact Output

14. E-Stop

Select "14. E-Stop" to enter the setting interface. User can enable or disable the function of emergency stop. The default is Disable.



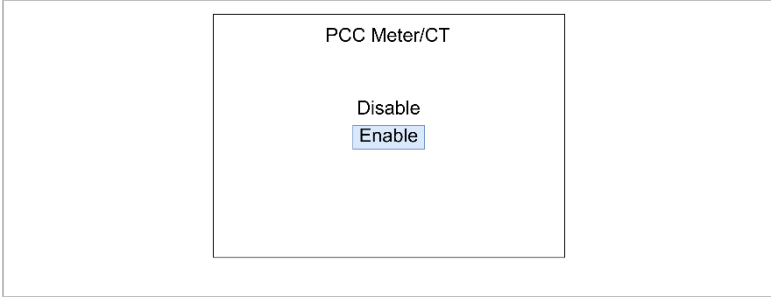
E-Stop

Disable

Enable

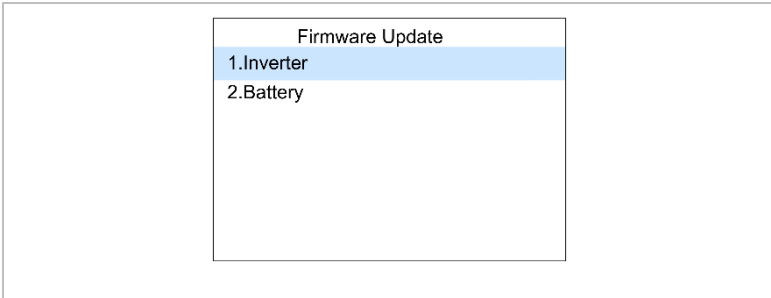
15. PCC Meter/CT

Select "15. PCC Meter/CT" to enter the setting interface. User can enable or disable meter and CT. The default is Enable.

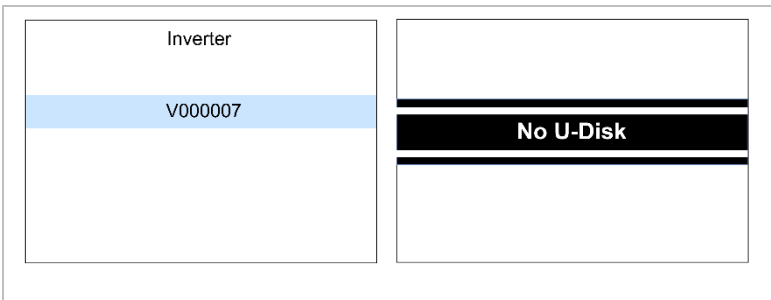


7.3.7 Firmware Update

User can input level 2 password to enter the updating interface, including two kinds of device, Inverter and Battery. For the level 2 password, please consult the representative of SOFAR.

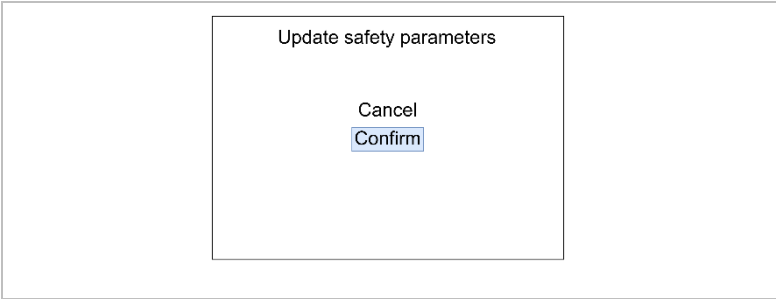


Select the device and press "Confirm" after u-disk plugged in, it will show the firmware version for updating. It will show the prompt "No U-Disk" if there is no u-disk connected.

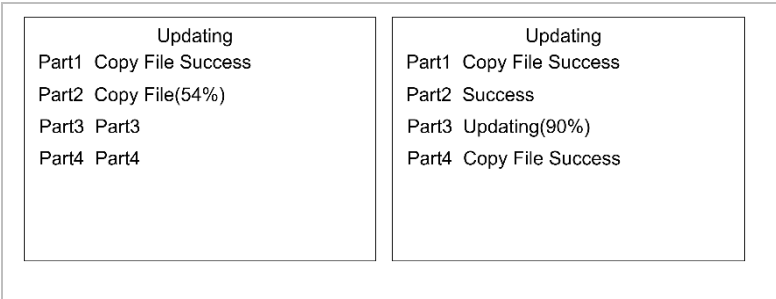


- ▶ The firmware needs to be placed in the folder named “firmware” located in the root directory of the u-disk.
- ▶ There are 4 parts firmware of Inverter with the same version numbers in the filename, while Battery has 2 parts. The interface will not display the selection of updating version if lack of any firmware part.

Select the version and press “Confirm” to update Inverter device, user can decide to update the safety parameters or not by selecting Confirm or Cancel.



After copying the firmware from u-disk completely, device starts to update, Inverter update order: part2, part3, part4 and part1. Battery update order: part1, part2. Inverter or Battery will reboot immediately once update successfully.



7.3.8 Work Mode

When the inverter is in on-grid state, there are five modes to work, including Self-use, Feed-in Priority, Peak Shaving, Time-of-use and Passive.

► Self-use

PV Energy Supply Priority depends on the Battery Priority Control setting item.

Load Energy Consumption Priority: PV > Battery > Grid.

Settings	Description
Battery First	▶ When Battery First is set as Disable, the PV Energy Supply Priority is Load > Battery > Grid. The power from PV supplies the loads first. After that, if there is excess PV power, charges the battery first and then feeds into the grid. ▶ When Battery First is set as Enable, user need to set the Battery First Cut-off SOC. ▶ The PV Energy Supply Priority is Battery > Load > Grid when battery SOC is less than the Battery First Cut-off SOC. The PV power charges the battery first. After that, if there is excess PV power, supplies the loads first and then feeds into the grid.
Battery Priority Cut-off SOC	
Charging From Grid	▶ When Charging from Grid setting is enabled and the battery soc is less than the Charge Cut-off SOC, it will force the battery to charge with the Charging Power Limit. When the battery SOC exceeds the Charge Cut-off SOC, the battery will no longer be forced to charge. ▶ The setting of Charging from Grid only works during effective time period, according to the Time, Date, Weekday settings.
T/D(Time/Date)	
Weekday	
Charging Power Limit	
Charge Cut-off SOC	

Self-use	Self-use
Battery First: Disable	Battery First: Enable
Charging From Grid: Disable	Battery First Cut-off SOC: 080%
	Charging From Grid: Disable

Self-use	
Battery First:	Enable
Battery First Cut-off SOC:	080%
Charging From Grid:	Enable
T/D:	00:00-23:59 01.01-12.31
Weekday:	Mon. Tue. Wed. Thu. Fri. Sat. Sun.
Charging Power Limit:	01000W
Charge Cut-off SOC:	100%

► **Feed-in Priority**

PV Energy Supply Priority: Load> Grid > Battery.

Load Energy Consumption Priority: PV > Battery > Grid.

Settings	Description
Feed-in Power	▶ PV Power < Load Power. The PV and battery supply power to the loads at the same time. ▶ PV Power - Load Power ≤ Feed-in Power. The power generated from PV is directly supplied to the loads first. The excess power beyond the load consumption will be fed into the grid. ▶ PV Power - Load Power > Feed-in Power. The power generated from PV is directly supplied to the loads first. Then the power fed to the grid reaches the Feed-in Power and the excess power charges the battery.

Feed-in Priority	
Feed-in Power:	0010.0kW

► **Peak Shaving**

PV Energy Supply Priority: Load > Battery > Grid.

Load Energy Consumption Priority: PV > P_import > Battery > Grid.

P_import represents Import Power Limit, which means the maximum power that can be purchased from the grid with priority before battery starts to supply the load consumption.

Settings	Description
Import Power Limit	► When the PV energy is insufficient to supply the load, import from the grid to supply the load firstly. When the power from the grid exceeds the Import Power Limit, the battery will discharge to supply the load. ► If PV Power + Import Power Limit + Battery Max Discharge Power < Load Power, the insufficient power will import from grid. ► If PV Power + Priority Import Power - Load Power > 0, and Charging from Grid is enabled, the excess power will charge the battery until the battery SOC reaches the Charge Cut-off SOC. Otherwise, the battery will stay in standby state if Charging from Grid is disabled.
Charging From Grid	
Charge Cut-off SOC	

► **Time-of-use**

In the Time-of-use, includes not only Charge and Discharge modes, but also the Peak Shaving, Feed-in Priority and Self-use previously mentioned.

There are 5 rules to set in this mode, each one can be disabled or enabled. If a rule is enabled, user must set the mode, time, date, weekday and detailed parameters based on the mode. Once two rules effect in the same time, for instance, rule 1 for Self-use and rule 3 for Discharge, the inverter will choose the lower number rule which is rule 1 to execute Self-use working mode smartly.

Charge and Discharge are simple, just force the battery to charge or discharge at the setting power during the effective time. Others have the same functionality as the previous working mode.

Time-of-use Rules 1: Enable Mode Charge Time: 01:00-05:00 Date: 01.01-12.31 Weekday: Mon. Tue. Wed. Thu. Fri. ---. Sun. Power: 02500W SOC: 100%	Time-of-use Rules 2: Enable Mode Discharge Time: 01:00-05:00 Date: 01.01-12.31 Weekday: Mon. Tue. Wed. Thu. Fri. Sat. Sun. Power: 02500W SOC: 100%
Time-of-use Rules 3: Enable Mode Peak Shaving Time: 01:00-05:00 Date: 01.01-12.31 Weekday: Mon. Tue. Wed. Thu. Fri. Sat. Sun. Charging From Grid: Disable Power-SOC: 0002.5kW-100%	Time-of-use Rules 4: Enable Mode Feed-in Priority Time: 01:00-05:00 Date: 01.01-12.31 Weekday: Mon. Tue. Wed. Thu. Fri. Sat. Sun. Power: 0002.5kW
Time-of-use Rules 5: Enable Mode Discharge Time: 01:00-05:00 Date: 01.01-12.31 Weekday: Mon. Tue. Wed. Thu. Fri. Sat. Sun. Battery First Disable Battery First Cut-off SOC: 100%	

► Passive

When passive mode is selected as the working mode, the power scheduling of the inverter is controlled by external commands.

For more detailed information, please ask representative of SOFAR to get a copy of passive mode communication protocol.

7.4 Power-On Step

IMPORTANT: Every time the battery restarts, the inverter also needs to be turned on again.

Step 1 Turn ON DC isolator between battery and inverter.

Step 2 Switch ON the battery.

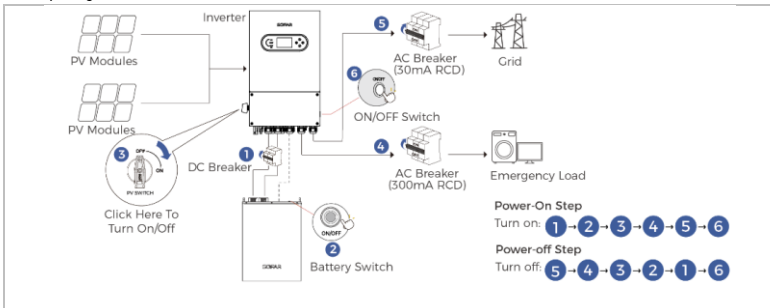
Step 3 Turn ON the DC switch on the PV side.

Step 4 Turn ON AC circuit breaker between the inverter LOAD port and critical load.

Step 5 Turn ON AC circuit breaker between the inverter GRID port and GRID.

Step 6 Turn ON the ON/OFF switch on the inverter side.

NOTE: Open it in a standard order. If this operation has not be performed normally, all problems caused will be borne by the user, nothing to do with the company.



7.5 Power-off Step

Step1 Turn Off AC circuit breaker between the inverter GRID port and GRID.

Step2 Turn Off AC circuit breaker between the inverter LOAD port and critical load.

Step3 Turn Off the DC switch on the PV side.

Step4 Switch Off the battery.

Step5 Turn Off DC isolator between battery and inverter.

Step6 Turn Off the DC switch on the inverter side.

NOTE: Close it in a standard order. If this operation have not be performed normally, all problems caused will be borne by the user, nothing to do with the company.

8 Troubleshooting

This section contains information and procedures for solving possible problems with the inverter.

This section helps users to identify the inverter fault. Please read the following procedures carefully:

Check the warning, fault messages or fault codes shown on the inverter screen, record all the fault information.

If there is no fault information shown on the screen, check whether the following requirements are met:

- ▶ - Is the inverter mounted in a clean, dry place with good ventilation?
- ▶ - Is the DC switch turned ON?
- ▶ - Are the cables adequately sized and short enough?
- ▶ - Are the input and output connections and wiring in good condition?
- ▶ - Is the configuration Settings correct for the particular installation?
- ▶ - Are the display panel and the communication cables properly connected and undamaged?

Follow the steps below to view recorded problems: Press "Back" to enter the main menu in the normal interface. In the interface screen select "Event List", then press "OK" to enter events.

▶ Earth Fault Alarm

This inverter complies with IEC 62109-2 clause 13.9 for earth fault alarm monitoring.

If an Earth Fault Alarm occurs, the fault will be displayed on the LCD screen, the red light will be on, and the fault can be found in the history of the fault. For the machine installed with Wi-Fi/GPRS, the alarm information can be seen on the corresponding monitoring website, and can also be received by the APP on the mobile phone.

► Event List information

Table 8-1 Event List

Code	Name	Description	Solution
ID001	GridOVP	The grid voltage is too high	If the alarm occurs occasionally, the possible cause is that the electric grid is abnormal occasionally. Inverter will automatically return to normal operating status when the electric grid's back to normal.
ID002	GridUVP	The grid voltage is too low	
ID003	GridOFP	The grid frequency is too high	
ID004	GridUFP	The grid frequency is too low	If the alarm occurs frequently, check whether the grid voltage/frequency is within the acceptable range. If yes, please check the AC circuit breaker and AC wiring of the inverter. If the grid voltage/frequency is NOT within the acceptable range and AC wiring is correct, but the alarm occurs repeatedly, contact technical support to change the grid over-voltage, under-voltage, over-frequency, under-frequency protection points after obtaining approval from the local electrical grid operator.
ID005	GFCI	Charge Leakage Fault	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved.
ID006	OVRT	Over Voltage Ride Through function is faulty	If no, please contact technical support.

Code	Name	Description	Solution
ID007	LVRT	Low Voltage Ride Through function is faulty	
ID008	IslandFault	Island protection error	
ID009	GridOVPIinstant1	Transient overvoltage of grid voltage 1	
ID010	GridOVPIinstant2	Transient overvoltage of grid voltage 2	
ID012	InvVoltFault	Inverter voltage error	
ID013	RefluxOverload	Feed-in limitation overload	
ID017	HwADFaultIGrid	Power grid current sampling error	
ID018	HwADFaultDCI	Wrong sampling of dc component of grid current	
ID020	HwADFaultVGrid (AC)	Power grid voltage sampling error (AC)	
ID022	GFCIDeviceFault (AC)	Leakage current sampling error (AC)	

Code	Name	Description	Solution
ID024	HwADFaultIdc	DC input current sampling error	
ID029	ConsistencyFault_GFCI	Leakage current consistency error	
ID030	ConsistencyFault_Vgrid	Grid voltage consistency error	
ID037	HwAuxPowerFault	Auxiliary power error	
ID038	InvSoftStartFail	Inverter soft start failure	
ID041	RelayFail	Relay detection failure	
ID042	IsoFault	Low insulation impedance	Check the insulation resistance between the photovoltaic array and ground (ground), if there is a short circuit, the fault should be repaired in time.
ID045	CTDisconnect	CT error	Check whether the CT wiring is correct.
ID046	ReversalConnection	PV reverse connection	Please check whether the positive negative pole of the PV on the inverter is reversed. If yes, wait until the PV end current is lower than 0.5A, set the "DC Switch" to the "OFF" position and adjust the string polarity.
ID047	ParallelFault	Parallel error	1. Please check whether the parallel cable is correctly connected;2. Please check whether the parallel setting on the LCD is correct.

Code	Name	Description	Solution
ID049	TempFault_Bat	Battery temperature protection	1. Please check whether the lead-acid battery temperature sensor is installed; 2. Please check whether the connection of the temperature sensor is loose or falls off; 3. If both conditions are normal, check whether the battery temperature is too high or too low. If the fault information still exists, please contact technical support.
ID050	TempFault_HeattSink1	Radiator 1 temperature protection	Make sure the inverter is installed where there is no direct sunlight. Please ensure that the inverter is installed in a cool/well-ventilated place. Ensure the inverter is installed vertically and the ambient temperature is below the inverter temperature limit.
ID051	TempFault_HeattSink2	Radiator 2 temperature protection	
ID052	TempFault_HeattSink3	Radiator 3 temperature protection	
ID057	TempFault_Env1	Ambient temperature 1 protection	Make sure the inverter is installed where there is no direct sunlight. Please ensure that the inverter is installed in a cool/well-ventilated place. Ensure the inverter is installed vertically and the ambient temperature is below the inverter temperature limit.
ID067	BusUVP	Busbar undervoltage during	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check

Code	Name	Description	Solution
		grid-connection	whether the problem is solved. If no, please contact technical support.
ID069	PVOVP	PV over-voltage	Check whether the PV series voltage (Voc) is higher than the maximum input voltage of the inverter. If so, adjust the number of PV modules in series and reduce the PV series voltage to fit the input voltage range of the inverter. After correction, the inverter will automatically return to its normal state.
ID070	BatOVP	Battery over-voltage	Check whether the battery overvoltage setting is inconsistent with the battery specification.
ID072	SwBusRmsOVP	Inverter bus voltage RMS software overvoltage	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID073	SwBusInstantOVP	Inverter bus voltage instantaneous value software overvoltage	
ID081	SwBatOCP	Battery overcurrent software protection	
ID086	SwPvOCPInstant	PV overcurrent software protection	

Code	Name	Description	Solution
ID091	ResOver	Battery input hardware protection	
ID096	EpsLoadShortCircuit	EPS short circuit protection	If the fault has been detected for three times, wait 30 minutes before entering the off-grid working mode again. Please check whether the AC LOAD port is connected correctly.
ID098	HwBusOVP	Inverter bus hardware overvoltage	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID100	HwBatOCP	Battery hardware overcurrent	
ID102	HwPVOC	PV hardware overcurrent	
ID103	HwACOC	Ac output hardware overcurrent	
ID105	MeterCommFault	Meter communication error	Please check whether the meter is connected and whether the meter parameters are set correctly.
ID108	GeneratorStartupFail	Generator startup failure	1.Check whether the generator is in good condition; 2. Check whether the generator and inverter are properly connected.
ID109	GeneratorOverload	Generator overload	Please check whether the generator is working under overload condition.
ID110	Overload1	Overload protection 1	Please check whether the inverter is operating under overload.
ID111	Overload2	Overload protection 2	

Code	Name	Description	Solution
ID124	BatLow	Warning of low battery level	Please check whether the battery SOC or voltage is too low.
ID145	USBFault	USB fault	Check the USB port of the inverter.
ID147	BluetoothFault	Bluetooth fault	Check the Bluetooth connection of the inverter.
ID150	FlashFault	Communication board FLASH error	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID152	SafetyVerFault	Safety version error	
ID153	SCIlose(DC)	SCI communication error (DC)	
ID154	SCIlose(AC)	SCI communication error (AC)	
ID156	SoftVerError	Inconsistent software versions	Contact for technical support and software upgrades.
ID157	BMSCommFault	Communication failure of lithium battery	Make sure your battery is compatible with the inverter. CAN communication is recommended. Check the communication line or port of the battery and inverter for faults.
ID162	RemoteShutdown	Remote shutdown	The inverter is performed a remote shutdown.
ID163	Drm0Shutdown	Drm0 shutdown	The inverter is performed a Drm0 shutdown.
ID169	FanFault1	Internal Fan fault	Check if the corresponding fan of the

Code	Name	Description	Solution
ID170	FanFault2	External Fan fault	inverter is running normally. If the problem is not solved, please contact technical support.
ID177	BMS OVP	BMS over-voltage alarm	Internal failure of lithium battery, close inverter and lithium battery, and wait 5 minutes to open inverter and lithium battery. Check that the problem is resolved. If not, please contact technical support.
ID178	BMS UVP	BMS under-voltage alarm	
ID179	BMS OTP	BMS high temperature warning	
ID180	BMS UTP	BMS low temperature alarm	
ID181	BMS OCP	Warning of overload in charge and discharge of BMS	
ID182	BMS Short	BMS short circuit alarm	
ID186	BatDischargeHTP	Battery discharge over temperature protection	Make sure the battery is operating within its normal temperature range. Power off and wait for 2 hours. If the problem is not solved, please contact technical support.
ID187	BatDischargeLTP	Battery discharge low temperature protection	
ID188	BatChargeHTP	Battery charge over temperature protection	
ID190	BatChargeLTP	Battery charge low temperature protection	

Code	Name	Description	Solution
ID274	ConsistentFault Vbus	Bus voltage consistency error	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.

8.1 Maintenance

Inverters generally do not need any daily or routine maintenance. Heat sink should not be blocked by dust, dirt or any other items. Before the cleaning, make sure that the DC switch is turned OFF and the circuit breaker between inverter and electrical grid is turned OFF. Wait at least for 5 minutes before the Cleaning.

► Inverter cleaning

Please clean the inverter with an air blower, a dry and soft cloth or a soft bristle brush. Do NOT clean the inverter with water, corrosive chemicals, detergent, etc.

► Heat sink cleaning

For the long-term proper operation of inverters, ensure there is enough space around the heat sink for ventilation, check the heat sink for blockage (dust, snow, etc.) and clean them if they exist. Please clean the heat sink with an air blower, a dry and soft cloth or a soft bristle brush. Do not clean the heat sink with water, corrosive chemicals, detergent, etc.

9 Datasheet

- The following parameters may change without notice, please refer to the user manual and Datasheet on our website.

Model	HYD-10K-LS1		HYD-12K-LS1	
Battery Parameters				
Battery type	Lead-acid or Lithium-ion			
Number of Battery Input Channels	1			
Battery voltage range	40-60 Vd.c.			
Max charging power	10000 W			
Max. Discharging Power	10000W			
Maximum charging current	210 A	250 A		
Maximum discharging current	210 A	250 A		
BMS Communication	RS-485/CAN			
PV Input				
Recommended Max. PV input power (Wp)	20kWp	24kWp		
Max. input voltage	550 Vd.c.			
Rated input voltage	360 Vd.c.			
Start-up voltage	90 Vd.c.			
MPPT full load voltage range	200-450 Vd.c.			
MPPT voltage range	60-500 Vd.c.			
Number of MPPT	2			
Max. Number of Input Strings per MPPT	2/2			
Max. Input Current	40/40 A			
Max. Isc	50/50 A			
AC Grid				
Rated Output Power	10kW	12kW		
Rated Output Current	45.5/43.5/41.7 A	54.5/52.2/50 A		
Rated Apparent Power	10kVA	12 kVA		

Model	HYD-10K-LS1	HYD-12K-LS1
Max. Apparent Power	11kVA	13.2 kVA
Max. Output Current	50.0/47.8/45.8 A	60.0/57.4/55 A
Max. Input Current	50 A	60A
Rated Output Voltage	L+N+PE,220/230/240 V.a.c.	
Rated Output Frequency	50/60 Hz	
Power Factor Range	0.8 lagging-0.8 leading	
THDi	<3%	
AC Backup		
Rated Output Power	10kW	12kW
Rated Output Current	45.5/43.5/41.7A	54.5/52.2/50 A
Rated Apparent Power	10kVA	12 kVA
Max. Apparent power	11kVA	13.2 kVA
Max. output current	50.0/47.8/45.8 A	60.0/57.4/55 A
Peak Output Apparent Power	2 times of rated power, 10s	
Rated Output Voltage	L+N+PE,220/230/240 V.a.c.	
Rated Output Frequency	50/60 Hz	
THDv (@Liner load)	<3%	
Switch time	4ms(default)	
Efficiency And Protection		
Max. MPPT Efficiency	99.90%	
European Efficiency	96.50%	
Max. Efficiency	97.50%	
Max. Efficiency of Charging/Discharging	94.00%	
DC Switch	Yes	
PV Reverse Connection Protection	Yes	
Output Short Circuit Protection	Yes	
Output Over current Protection	Yes	
Output Overvoltage Protection	Yes	

Model	HYD-10K-LS1	HYD-12K-LS1
Insulation Impedance Detection	Yes	
Residual Current Detection	Yes	
Anti-island Protection	Yes	
Surge Protect-ion	PV: Type II, AC: Type II	
General Data		
Dimensions(W*H*D)	410*620*270 mm	
Weight	30 kg	
Inverter Topology	Non-Isolation	
Protective Class	Class I	
Standby Self consumption	<15 W	
Operating Temperature Range	-30°C to +60°C (derating above +50°C)	
Relative Humidity Range	5%~95%	
Max. Operating Altitude	4000 m (derating above 2000 m)	
Cooling Mode	Intelligent Airflow	
IP Rating	IP66	
Overvoltage Category	AC III, DC II	
Installation Method	Wall Mounted	
Display	LCD and APP	
Communication	RS485, Optional: Wi-Fi/4G/LAN	

Version 1.0



ENERGY TO POWER YOUR LIFE

ADDRESS

11th Floor, Gaoxingqi Technology Building,
District 67, Xingdong Community, Xin'an Street,
Bao'an District, Shenzhen, China

EMAIL

info@sofarsolar.com

WEBSITE

www.sofarsolar.com

SOFARSOLAR | 

