

SOFAR

# USER MANUAL

SOFAR 250~255KTL-HV



Shenzhen SOFARSOLAR Co.,Ltd.

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# Preface

## Notice

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.

## Save this Instruction

This manual must be considered as an integral part of the equipment. Customer can print the electronic version to hard copy and keeping properly for future reference. Anyone who operates the device at any time must operate in accordance with the requirements of this manual.

## Copyright Declaration

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### ● Outline

This manual is an integral part of SOFAR 250/255KTL-HV. It describes the assembly, installation, commissioning ,maintenance and failure of the



product. Please read it carefully before operating.

● **Scope of Validity**






This manual contains important instructions for:  
SOFAR 250KTL-HV、SOAFR 255KTL-HV

● **Target Group**

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

● **Symbols Used**

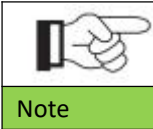
In order to ensure the safety of the user's person and property when using the PV grid-connected inverter, as well as the efficient use of this product, relevant safety operation information is provided in the manual and highlighted with the appropriate symbols. It is important that you fully understand and absolutely comply with this emphasized information to avoid personal injury and property damage. The symbols used in this manual are listed below.

 <b>Danger</b>	<p>“Danger”indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p>
 <b>Warning</b>	<p>“Warning”indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>
 <b>Caution</b>	<p>“Caution”indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.</p>
 <b>Attention</b>	<p>“Attention”indicates there are potential risks, if fail to prevent, may lead to equipment cannot normally or property damage.</p>
 <b>Note</b>	<p>“Note”provides additional information and tips that are valuable for the optimal operation of the product.</p>

# 1. Basic Safety Information

## Outlines of this Chapter

Please read the instruction carefully. Faulty operation may cause serious injury or death.



If you have any question or problem when you read the following information, please contact Shenzhen SOFARSOLAR CO., Ltd.

## Safety Instruction

Introduce the safety instruction during installation and operation of SOFAR 250/255KTL-HV.

## Symbols Instruction

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

## 1.1. Requirement for Installation and Maintenance

Installation of SOFAR 250/255KTL-HV on-grid inverter must conform with laws, regulations, codes and standards applicable in the jurisdiction.

Before installing and adjusting the produce, please read all of instructions, cautions and warnings in this manual.

Before connecting the product to the electrical utility grid, contact the local utility company for allowance. Also, this connection must be made only by qualified electrician.

If the failure persists, please contact the nearest authorized maintenance center. If you don't know which service center is closest to you, please contact your local distributor. Don't repair the product by yourself, which may lead serious injury or damage.

Prior to installing and maintaining the equipment, a DC switch should be utilized to disconnect the high voltage DC from the PV array; otherwise, the resulting high voltage may cause serious injury.

## Qualified Person

When inverter is working, it contains lethal voltages and went hot in some area. Improper installation or misoperation could cause serious damage and injury. To reduce the risk of personal injury and to ensure the safe installation and operation of the product, only a qualified electrician is allowed to execute transportation, installation, commissioning and maintenance. Shenzhen SOFARSOLAR Co, Ltd does not take any responsibility for the property destruction and personal injury because of any incorrect use.

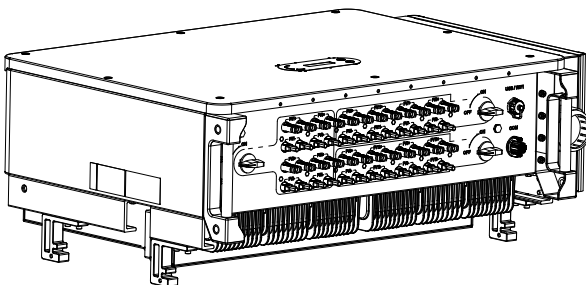
## Label and Symbols

SOFAR 250/255KTL-HV has type label attach the side of product which contact important information and technical data, the type label must permanent attached to the product.

SOFAR 250/255KTL-HV has warning symbol attache the product which contact information of safety operation. The warning symbol must permanent attached to the product.

## Installation location requirement

Please install the inverter according to the following section. Place inverter in an appropriate bearing capacity objects (such as solid brick wall, or strength equivalent mounting surface, etc.) and make sure inverter vertical placed. A proper installation location must have enough space for fire engine access in order for maintenance if faulty occur. Ensure the inverter is installed in a wall ventilated environment and have enough air cooling cycle. Air humidity should less than 90%.






**Transportation Requirement**

Inverter is in the good electrical and physical condition when it ship out from factory. During transport, inverter must be placed in its original package or other proper package. Transportation company should responsible for any damage during transport period.


If you find any packing problems that may cause the damage of inverter or any visible damage, please notice the responsible transportation company immediately. You can ask your installer or SOFARSOLAR for help if necessary.


**Electrical Connection**

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



	<p>Before the electrical connection, use opaque material to cover the PV modules or disconnect PV string DC switch. PV arrays will produce dangerous voltage if it is exposure under sun</p>
<p>Danger</p>	
	<p>All operation must accomplish by certified electrical engineer Must be trained;  Completely read the manual operation and understand all information</p>
<p>Warning</p>	
	<p>Must get permission by local utility company before connecting to grid and the connection must be done by certified electrical engineers</p>
<p>Attention</p>	

**Operation**

	<p>Touching the utility grid or the terminal conductors can lead to lethal electric shock or fire!  Do not touch non-insulated cable ends, DC conductors and any live components of the inverter.</p>
<p>Danger</p>	<p>Attention to any electrical relevant instruction and document.</p>

	<p>Enclosure or internal components may get hot during operation. Do not touch hot surface or wear insulated gloves.</p> <p>Keep it away from kids !</p>
<p>Attention</p>	

**Maintenance and repair**

	<p>Before any repair work, turn OFF the AC circuit breaker between the inverter and electrical grid first, then turn OFF the DC switch.</p> <p>After turning OFF the AC circuit breaker and DC switch wait for at least 5 minutes before carry any maintenance or repair work.</p>
<p>Danger</p>	
	<p>Inverter should not work again until removing all faults. If any repair work is required, please contact local authorized service centre.</p>
<p>Attention</p>	<p>Should not open the inverter cover without authorized permit, SOFARSOALR does not take any responsibility for that.</p>


**EMC/Noise Level**

Electromagnetic compatibility (EMC) refers to that on 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



	<p>Electromagnetic radiation from inverter may be harmful to health!</p> <p>Please do not continue to stay away from the inverter in less than 20cm when inverter is working.</p>
<p>Danger</p>	








## 1.2. Symbols and signs

	<p>High voltage of inverter may be harmful to health! Only certified engineer can operate the product; Juveniles, Disable, should not use this product;</p>
<p style="background-color: red; color: white; padding: 2px;">Danger</p>	
	<p>Caution of burn injuries due to hot enclosure! Only touch the screen and pressing key of the inverter while it is working.</p>
<p style="background-color: yellow; padding: 2px;">Caution</p>	
	<p>PV array should be grounded in accordance to the requirements of the local electrical grid company.</p>
<p style="background-color: blue; color: white; padding: 2px;">Attention</p>	
	<p>Ensure the maximum DC voltage input is less than the maximum inverter DC voltage (including in low temperature condition). Any damage cause by overvoltage, SOFARSOLAR will not take the responsibility including warranty.</p>
<p style="background-color: orange; padding: 2px;">Warning</p>	

### Signs on the Product and on the Type Label

SOFAR 250/255KTL-HV has some safety symbols on the inverter. Please read and fully understand the content of the symbols before installation.

Symbols	Name	Explanation
	<p>This is a residual voltage in the inverter!</p>	<p>After disconnect with the DC side, there is a residual voltage in the inverter, operator should wait for 5 minutes to ensure the capacitor is completely discharged.</p>
	<p>Caution of high voltage and electric shock</p>	<p>The products operates at high voltages. Prior to performing any work on the product, disconnect the product from</p>

		voltage sources. All work on the product must be carried out by qualified persons only.
	Caution of hot surface	The product can get hot during operation. Avoid contact during operation. Prior to performing any work on the product, allow the product to cool down sufficiently
	Comply with the Conformite Euroeenne (CE) Certification	The product comply with the CE Certification
	Grounding Terminal	This symbol indicates the position for the connections of an additional equipment grounding conductor
	Observe the documentation	Read all documentation supplied with the product before install
	Positive pole and negative pole	Positive pole and negative pole of the input voltage (DC)
	Temperature	Indicated the temperature allowance range
	RCM logo	RCM (Regulatory Compliance Mark) The product complies with the requirements of the applicable Australian standards.

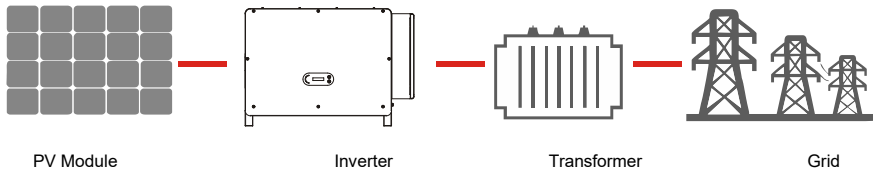
# 2.Product Characteristics

## Outlines of this Chapter

The following are the areas of use and overall dimensions of the SOFAR 250/255KTL-HV inverter; the principle of operation of the SOFAR 250/255KTL-HV inverter and its internal functional modules; and the circuit topology of the inverter.

### 2.1. Intended Use

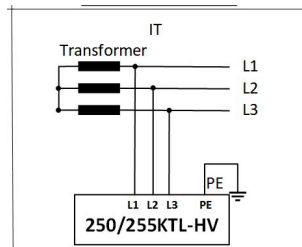
SOFAR 250/255KTL-HV is a transformerless on grid PV inverter, that converts the direct current of the PV array to the grid-compliant, three-phase current and feeds into the utility grid.



Figures 2-1 PV Grid-Tied System

SOFAR 250/255KTL-HV may only be operated with PV arrays (photovoltaic module and cabling) for on grid condition. Do not use this product for any other or additional purposes. Any damage or property loss due to any use of the product other than described in this section, SOFARSOLAR will not take the responsibility. DC input of the product must be PV module, other source such like DC sources, batteries will against the warranty condition and SOFARSOLAR will not take the responsibility.

### Supported grid types





## Product Dimensions

The choice of optional parts of inverter should be made by a qualified technician who knows the installation conditions clearly.

### Dimensions Description

- SOFAR 250/255KTL-HV  
L×W×H=1100.5\*713.5\*368mm

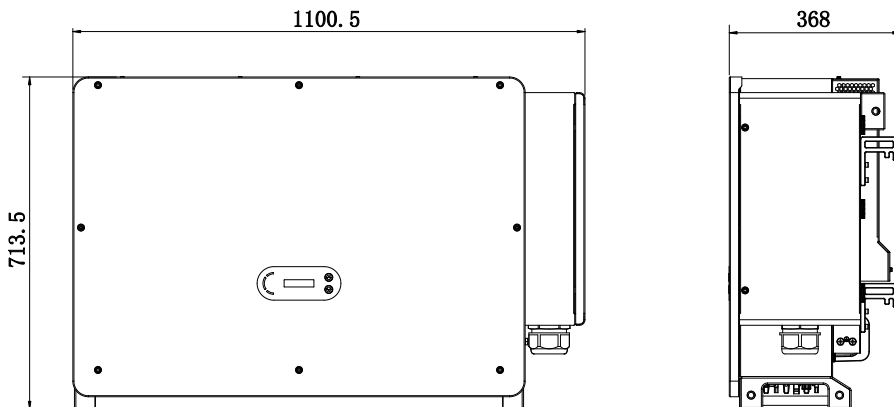
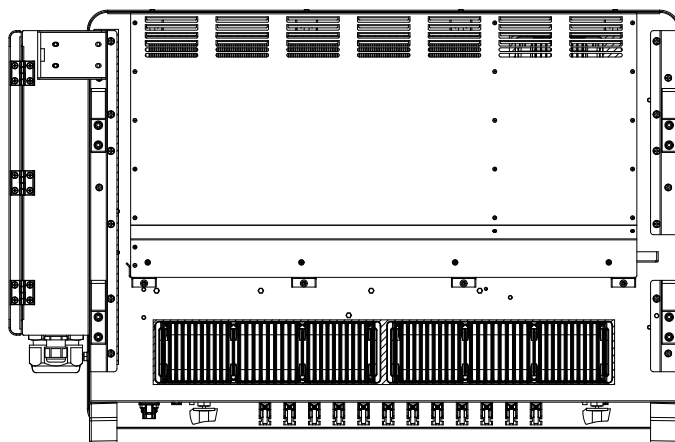


Figure 2-2 Product front view and left view dimensions



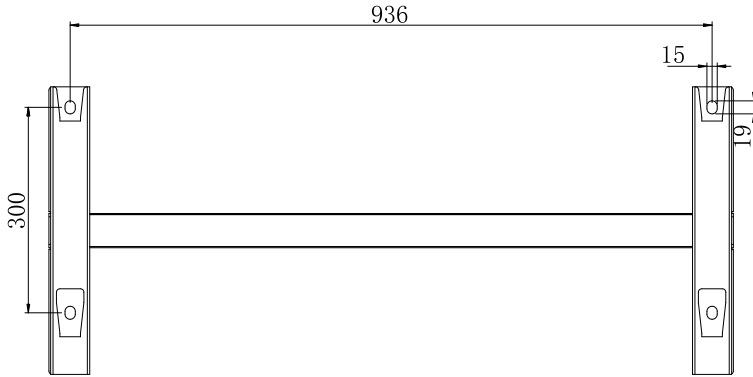


Figure 2-3 Product back view and bracket dimensions

◆ **Labels on the equipment**

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

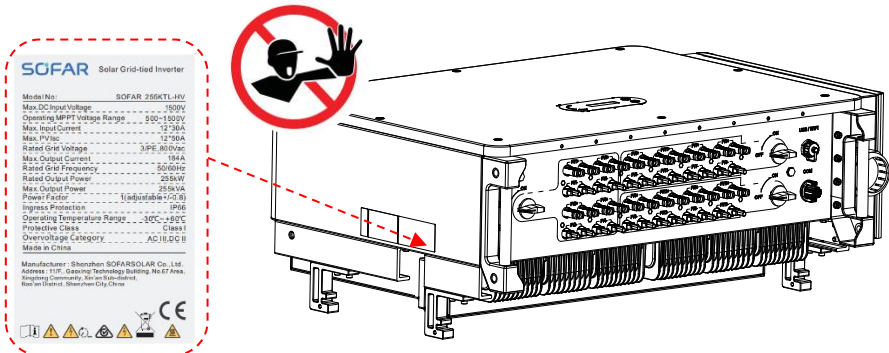


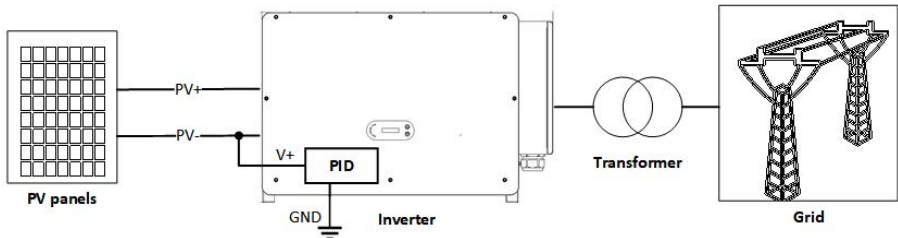
Figure 2-4 Product label

## 2.2. Function Description

DC power generated by PV arrays is filtered through Input Board then enter Power Board. Input Board also offer functions such as insulation impedance detection and input DC voltage/ current detection. DC power is converted to AC power by Power Board. AC power is filtered through Output Board then AC power is fed into the grid. Output Board also offer functions such as grid voltage/ output current detection, GFCI and output isolation relay. Control Board provides the auxiliary power, controls the operation state of inverter and shows the operation status by Display Board. Display Board displays fault code when inverter is abnormal operation conditions. At the same time, Control Board can trigger the replay to protect the internal components.

### 2.2.1 PID Function

When the inverter is running, the PID function module increases the potential between the negative pole of the photovoltaic array and the ground to a positive value to suppress the PID effect.



#### Note

1. Before enabling the PID recovery function, ensure that the polarity of the PV module's ground voltage meets requirements. If in doubt, please contact the PV module manufacturer or read their corresponding user manual.
2. If the voltage scheme of the PID protection/recovery function does not meet the requirements of the corresponding PV module, the PID function cannot work properly or may even damage the PV module.
3. Before enabling the reverse PID function, ensure that the inverter has been applied to the IT system.

4. When the inverter is not running, the PID module will apply reverse voltage to the photovoltaic module to restore the degraded module.
5. If the PID recovery function is enabled, the PID works only at night.
6. After the PID recovery function is enabled, the PV series voltage to ground is 800Vdc by default. You can change the default value through the App.

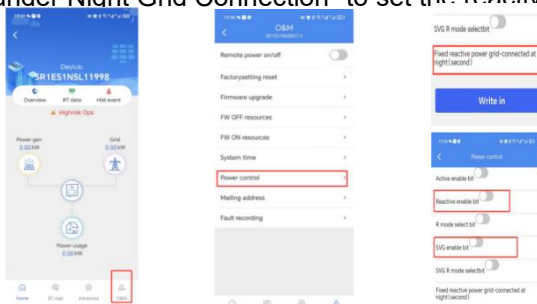
## 2.2.2 SVG function

The inverter is a four-quadrant operation, through the rectification mode, to maintain the bus voltage to ensure the machine loss, and at the same time output reactive power to maintain the reactive power loss of the grid;

The nighttime SVG function of the inverter operates in the condition of no input voltage, firstly, it needs to enable both "real-time reactive power control enable bit" and "SVG enable bit", when the DC input voltage decreases to the set threshold, the inverter starts to operate from the "grid-connected mode". When the DC input voltage drops to the set threshold, the inverter starts to switch from "Grid-connected mode" to "Night SVG mode", and the desired reactive power output can be controlled through the APP, while the inverter stays in the "Night SVG mode" mode. Currently, the SOFAR 255KTL-HV has a reactive power range of -76 kVar to +76 kVar.

### Set up the SVG

The night SVG function can be set through the Bluetooth APP of Shouhang, as shown in the following figure, click "Operation and Maintenance" -> "Power Control" -> "SVG Enable Bit" -> "Fixed Reactive Power Level under Night Grid Connection" to set the reactive power level. Click "O&M"->"Power Control"->"SVG Enable Position"->"Fixed Reactive Power Size under Night Grid Connection" to set the reactive power size.



---

When the inverter is running in "Night Q" mode, two working modes can be selected via "SVG Reactive Power Enable Bit": Fixed Reactive Power Mode (not enabled by default), i.e., set the percentage of reactive power output, and the inverter continuously outputs a fixed amount of reactive power according to the setting. The other one is the power factor mode, which, when enabled, calculates the corresponding amount of reactive power through the set power factor value.

**Attention:**

After turning on the SVG enable, the inverter can continue grid-connected operation at night and can respond to reactive power dispatch commands to save reactive static compensator investment cost.

1. It is necessary to turn on the SVG enable bit when the PV has power. If the SVG is enabled at night, the inverter cannot start grid connection at night. If in doubt, please contact the PV module manufacturer or read its corresponding user manual.
2. When the inverter is running in SVG state, the display panel will indicate "SVG state".
3. In the SVG state, the maximum reactive power of the inverter is 30% of the maximum apparent power.
4. SVG only works at night, if the PV has power, the inverter will switch to "grid-connected state" by itself.

## 2.2.3 Function Module

### **A. Energy management unit**

Remote control to start/ shunt down inverter through an external control.

### **B. Feeding reactive power into the grid**

The inverter is able to produce reactive power thus to feed it into the grid through the setting of the phase shift factor. Feed-in management can be controlled directly by the grid company through a RS485 interface.

### **C. Limited the active power fed into grid**

If enable the limited of active power function, inverter can limit the amount of active power fed into the grid to the desired value (expressed as percentage).

### **D. Self-power reduction when grid is over frequency**

If grid frequency is higher than the limited value, inverter will reduce the output power to ensure the grid stability.

### **E. Data transmission**

Inverter or a group of inverters can be monitored remotely through an advanced communication system based on RS485 interface or via Wi-Fi or PLC.

### **F. Software update**

USB interface for uploading the firmware, remotely uploading is available.

### **G. AFCI (optional function)**

When the DC connector is not assembled in place, it is easy to cause arcing or overheating of the connector. This function can detect whether there is a fault arc at the input end of the inverter. When an arc occurs, the inverter stops grid connection and gives an alarm reminder, so as to build a safe barrier for the whole system.

## 2.3. Electrical block diagram

SOFAR 250/255KTL-HV has 16-24 DC input strings. 8-12 MPPT trackers

that converts the direct current of PV array to grid-compliant, three phase current and feeds in into the utility grid. Both DC and AC side has Surge Protection Device (SPD).

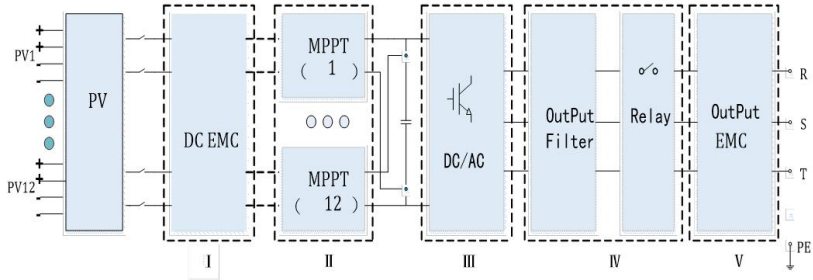


Figure 2-5 Schematic diagram

# 3. Inverter Storage

If inverter is not installing immediately, storage condition need meet below requirements:

- Place inverter into the original package and leave desiccant inside, sealed tight with taps.
- Keep the storage temperature around  $-40^{\circ}\text{C} \sim 70^{\circ}\text{C}$ , Relative humidity 5~95%, no condensation.

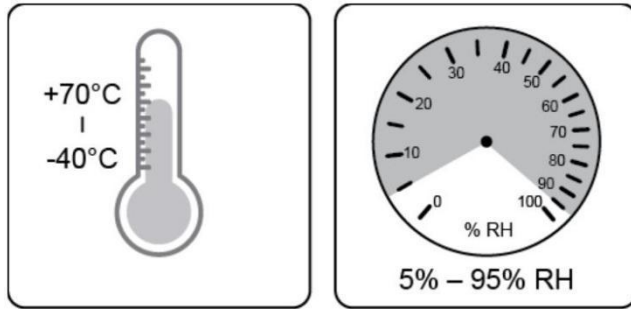


Figure 3-1 Storage temperature and humidity




- The maximum stacking layer number cannot exceed 4 layers.
- If the inverter be storage for more than half years, the inverter needs to be fully examined and tested by qualified service or technical personnel before using.



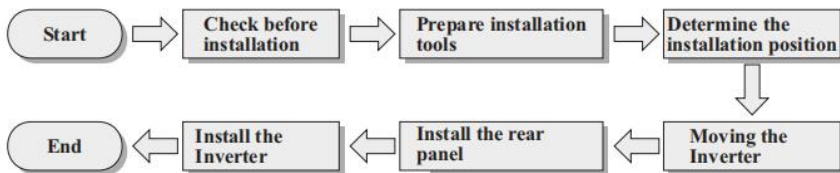
# 4. Installation

## Outlines of this Chapter

This topic describes how to install this product, please read carefully before install.

	<p>Do NOT install the product on flammable material. Do NOT store this product in potentially explosive atmospheres.</p>
<p>Dangers</p>	
	<p>The enclosure and heat sink will get hot during operation, please do not mount the product at a easy to reach location.</p>
<p>Caution</p>	
	<p>Consider the weight of this product when doing transport and moving. Choose an appropriate mounting position and surface.</p>
<p>Attention</p>	<p>At least four persons for installation.</p>

### 4.1. Installation Process



### 4.2. Checking Before Installation

#### Checking Outer Packing Materials

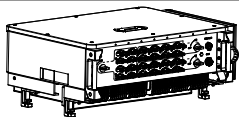

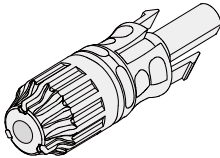
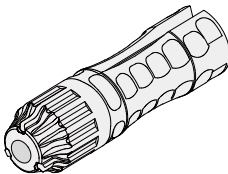


Before unpacking, please check the condition of the outer package materials if any damaged found, such as holes, cracks, please not unpack the product, contact your distributor immediately. Recommend installing the

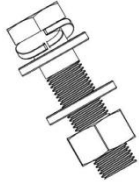




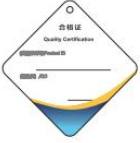


product within 24 hours after unpacking the package.

### Checking Deliverable

After unpacking, please check according to following table, to see whether all the parts were included in the packing, please contact your distributor immediately if anything missing or damage.

Table 4-1 Components and mechanical parts that inside the package


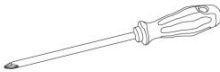
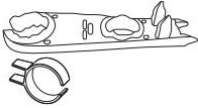
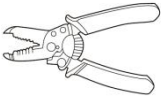
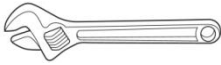
No	Pictures	Description	Quantity
1		SOFAR 250/255KTL-HV	1 pcs
2		Rear Panel	1 pcs
3		PV+ input connector	24 pcs
4		PV- input connector	24 pcs
5		PV+ metal pin	24 pcs
6		PV- metal pin	24 pcs




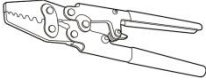
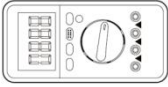


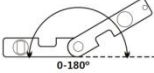
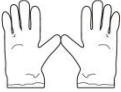
7		M12*50 combination bolt	4 pcs
8		M6*30 Hexagon screws	2 pcs
9		Manual	1 pcs
10		Warranty Card	1 pcs
11		Outgoing inspection report	1 pcs
12		Quality Certificate	1 pcs
13		COM 16pin connector	1 pcs
14		M12 lifting bolt	2 pcs



### 4.3. Tools

Installation tools include, but are not limited to, those recommended below. Other auxiliary tools may be used in the field if necessary. Prepare tools required for installation and electrical connection as following table:

Table 4-2 Installation tools

No	Tool	Description	Function
1		Hammer Drill Recommend drill @ 12mm	Used to drill holes on the wall
2		Screwdriver	Use to tighten and loosen screws when installing AC power cable Use to remove AC connectors from the product
3		Removal Tool	Remove PV Connector
4		Wire Stripper	Used to peel cable
5		With an open end of larger than or greater than 32 mm	Used to tighten expansion bolts

6		Rubber Mallet	Used to hammer expansion bolts into holes
7		M6	M6 use to uninstall and install the front top cover and down cover
8		Torque wrench	Connect AC connector
9		Crimping Tool	Use to crimp cable on grid side, load side and CT extensive cable
10		Multimeter	Check grounding cable, PV positive and negative pole
11		Marker	Mark signs
12		Measuring Tape	Measure distance
13		Level	Ensure the rear panel is properly installed
14		ESD gloves	Installer wear when installing product

15		Safety goggles	Installer wear when installing product
16		Mask	Installer wear when installing product

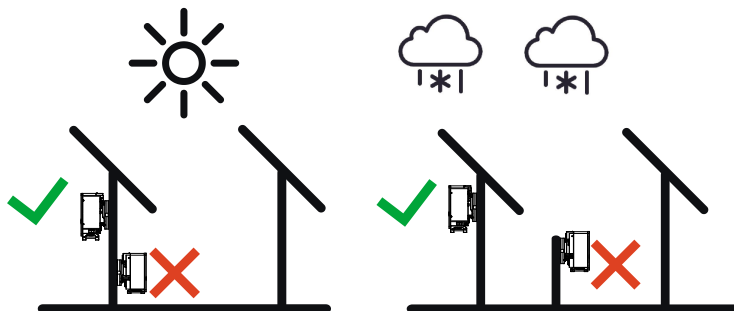
## 4.4. Determining the Installation Position

It is necessary to select a location for mounting the inverter that has sufficient load-bearing capacity to ensure that the inverter can work properly and efficiently. Please consider the following requirements when selecting a mounting location:

### Attention

- The mounting carrier has a load-bearing capacity of at least 4 times the weight of the inverter and matches the inverter size.
- The inverter has an IP66 protection rating and can be used for indoor or outdoor installation.
- Avoiding the inverter from direct sunlight, direct rain and snow will prolong the life of the inverter. It is recommended to choose a sheltered installation location or build an awning.
- Do not install outdoors in salt-infested areas, which mainly refer to coastal areas within 500m from the coast. The amount of salt spray deposition varies greatly depending on the characteristics of the seawater in the neighboring sea, sea breeze, precipitation, air humidity, topography and forest cover.
- Flammable and explosive materials must not exist within the installation environment.
- The installation location should be convenient for electrical connection, operation and maintenance.
- The inverter will generate some noise during operation and is not recommended for installation in living areas.
- Do not install in locations accessible to children.

- It is very important to ensure that the inverter is well ventilated for heat dissipation, please install the inverter in a ventilated environment.
- The inverter should be installed in a location greater than 30m from third party wireless communication facilities and living environments.



\*Note: In order to protect the service life of the product, it should be avoided from direct sunlight, rain and snow.

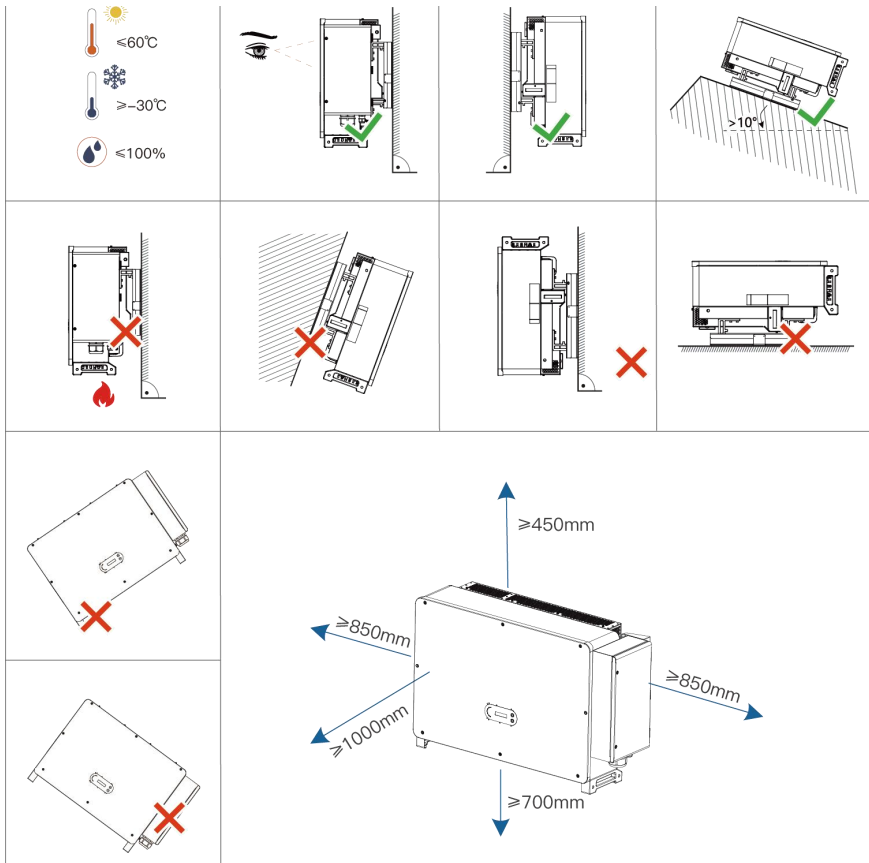


Figure 4-1 Mounting Position Selection

For multiple inverter installation scenarios, zigzag installation is recommended when there is enough space. Zigzag, back-to-back and wall mounting are not recommended. Zigzag, back-to-back and near-wall mounting require users to provide their own windshield to isolate the inverters from the incoming and outgoing air.

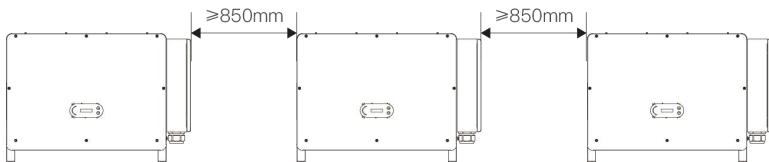


Figure 4-2 Inverter Installation Requirements



**Note:**

Other requirement for install position:

- Install position should obstruct the disconnect of power.
- Place inverter in an appropriate bearing capacity objects.
- Location should be avoid touch by children.

## 4.5. Moving of inverter

### 4.5.1 Manual handling

Unload the inverter from package, horizontally move to the install position. When open the package, at least two operator insert the hands into the slots on both side of the inverter and hold the handles.

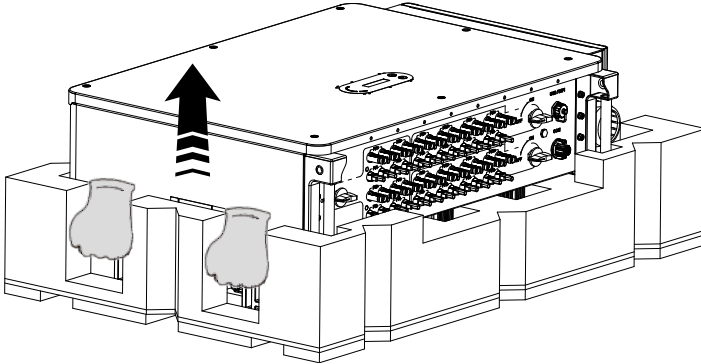


Figure 4-3 Move inverter from package



Keep the balance when lift the inverter. Required at least two operators for lifting or use forklift. Inverter is heavy, dropped while being transported may cause injuries.

Do not put the inverter with wiring terminals contacting the floor because the power ports and signal ports are not designed to support the weight of the inverter.

When place inverter on the floor, put it above foam or paper to avoid the damage of the shell of inverter.

Use auxiliary handle inside the package for moving the inverter. After use, keep it well for future usage.

Attention

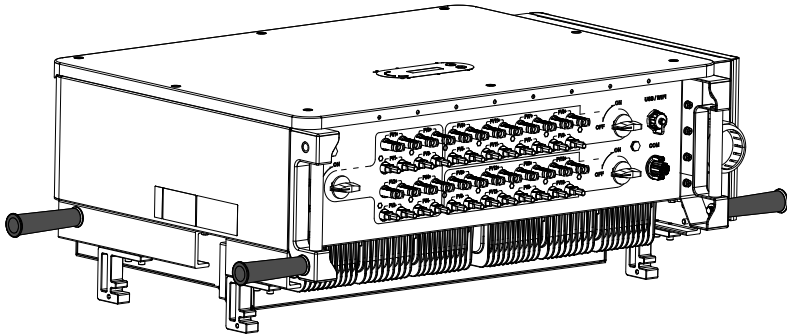


Figure 4-4 auxiliary handle position

## 4.5.2 Lifting Equipment

1. Tighten the screws of two M12 rings into the inverter sides according to the instruction diagram below (Note: M12 rings need self-preparation).

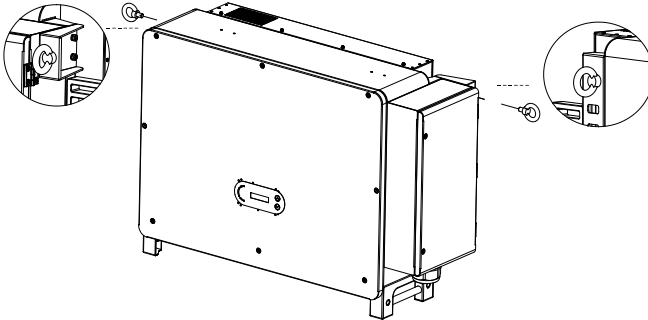


Figure 4-5 Installation of Rings

2. Fastened and tied the rope through two rings. Lifting inverter 50 mm above ground by using lifting equipment, check the tightening device of the hoisting ring and rope. After confirming that the binding connection is secure, lift the inverter to the destination.

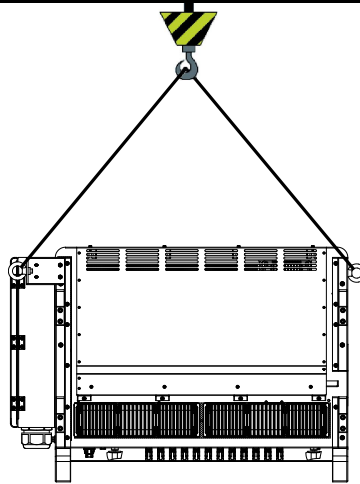


Figure 4-6 Lifting

**Attention**

Keep balance when lifting the inverter, avoid to crash on wall or other objective.  
Stop working in bad weather condition such as raining, heavy fog, winding.

## 4.6. Installation

### 4.6.1 Installed on wall:

**Step1:** Placed the rear panel on the mounting wall, determine the mounting height of the bracket and mark the mounting poles accordingly. Drilling holes by using Hammer Drill, keep the hammer drill perpendicular to the wall and make sure the position of the holes should be suitable for the expansion bolts.(Note: M10\*90 expansion screws are supplied with the goods)

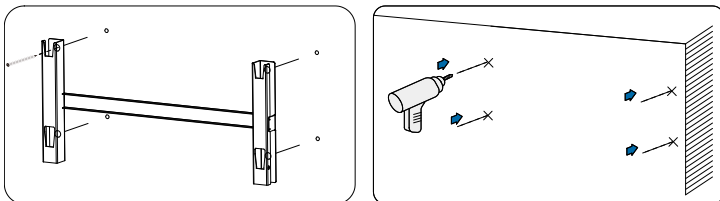


Figure 4-7 Drilling holes on the mounting wall

**Step 2:** Insert the expansion bolt vertically into the hole.

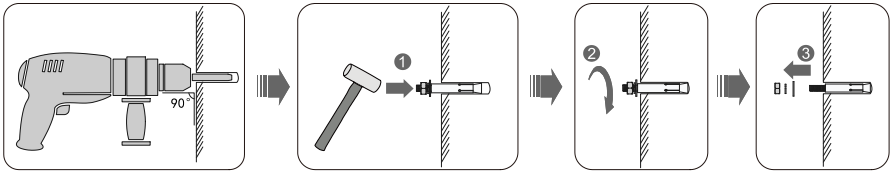


Figure 4-8 Screws into the holes

**Step 3:** Align the rear panel with the hole positions, fix the rear panels on the wall by tightening the expansion bolt with the nuts.

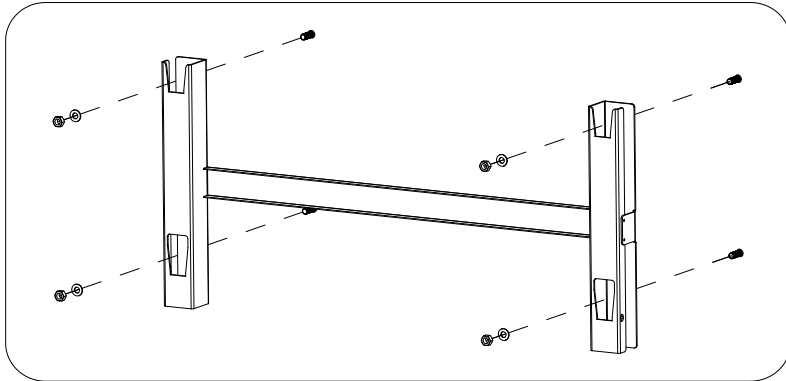


Figure 4-9 Install rear panel

**Step 4:** Lift the inverter and hang it on the rear panel, and fixing both side of inverter with M6 screw .

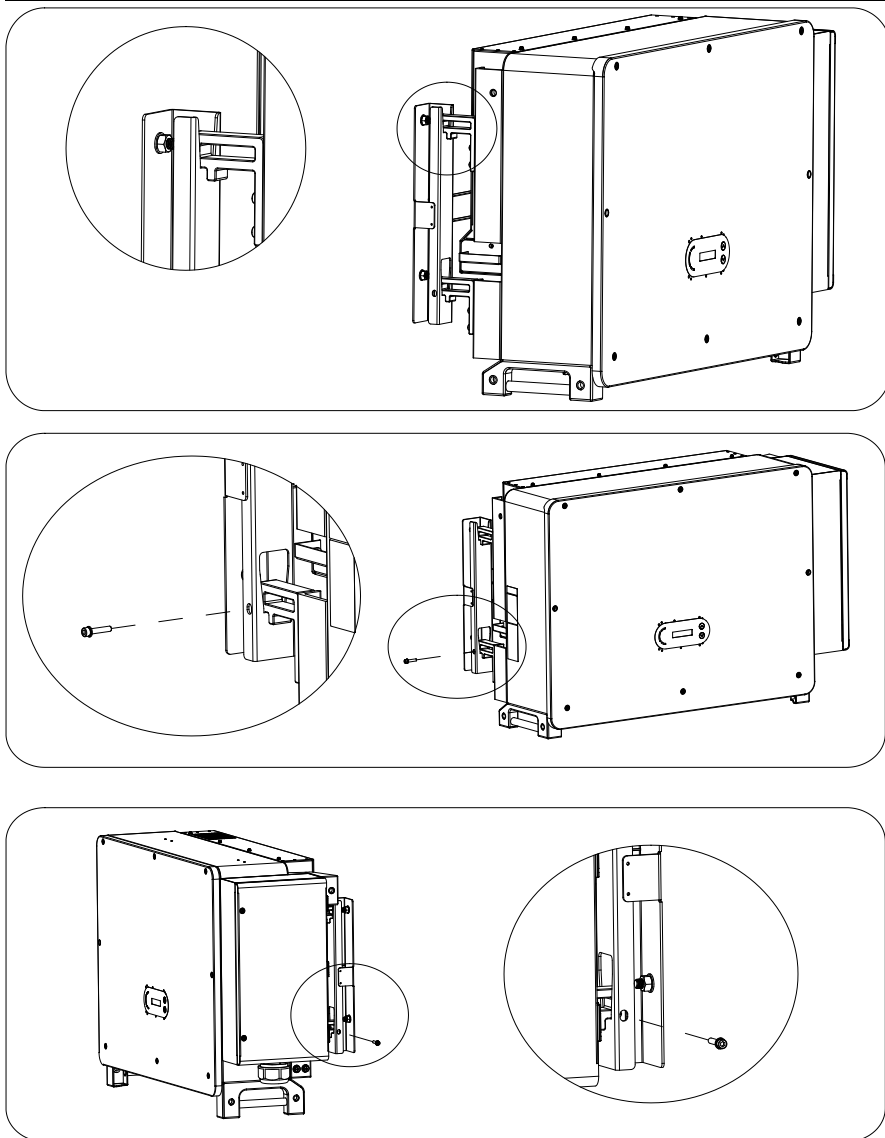


Figure 4-10 Fix inverter

### 4.6.2 Bracket Installation:

Step1: Use wall mount bracket, ensure the pole position are in same level

by using level rule and take a mark with maker.

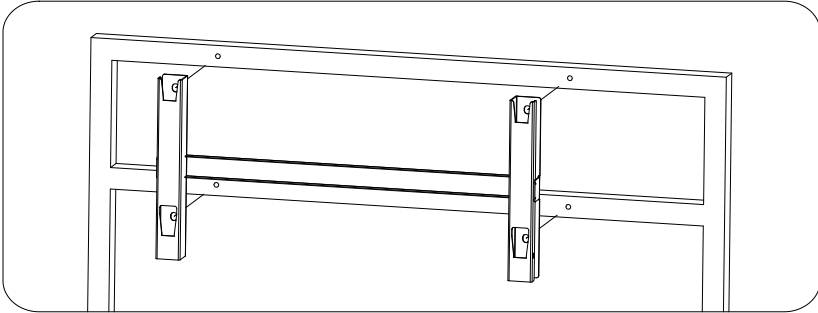


Figure 4-11 Ensure hole position

**Step 2:** Drilling hole by using Hammer Drill, recommend to do a stain proofing.

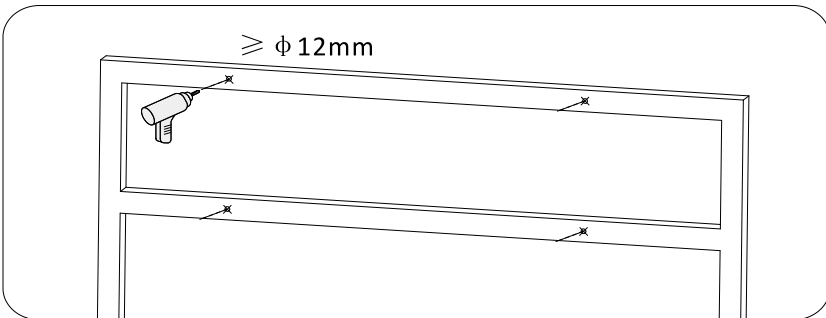


Figure 4-12 Drilling holes

**Step 3:** Use M10 screw and M10 flat washer to secure the wall bracket (Note: M10\*50 screw and M10 flat washer need self-preparation) .

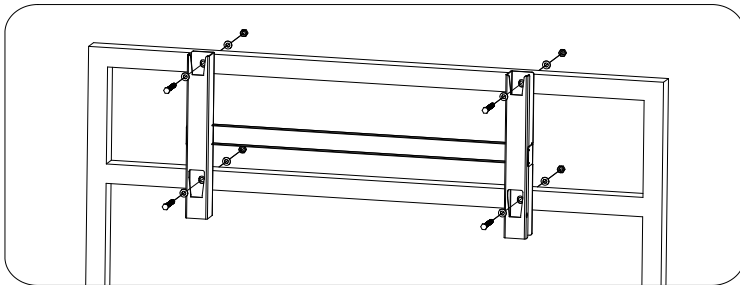
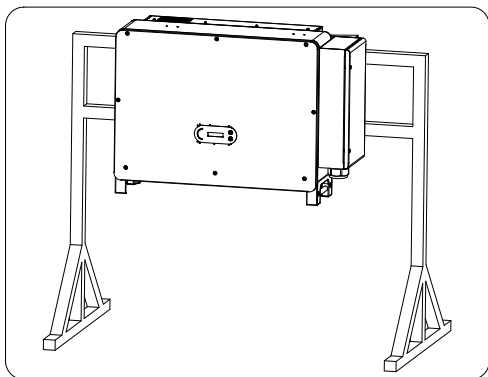


Figure 4-13 Fix wall bracket

**Step 4:** Lift the inverter and hang it on the wall bracket, and fixing both side of inverter with M6 screw (repeat 4.6.1step 4) .



**Note:** If height between ground and bracket is less than 1.5m, use auxiliary handle for installation. Otherwise, use lifting equipment.

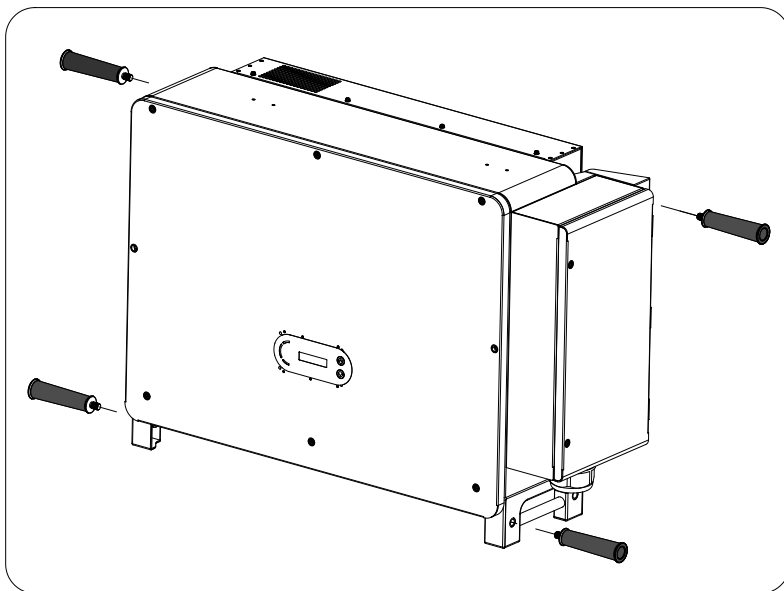


Figure 4-14 Installation position of auxiliary handle




# 5. Electrical Connection

## Outlines of this Chapter

This section introduces the electrical connection for the product. Please read the information carefully, it may helpful to understand the grounding wiring, DC input connection, AC output connection and communication connection.

### Caution:

Before performing electrical connections, ensure the DC switch is OFF and AC circuit breaker is OFF. Waiting 5 minutes for the capacitor to be electrically discharged.

	Installation and maintenance should be done by certified electrical engineer.
Attention	During electrical operations, the professional must wear protective equipment.
	Before the electrical connection, use opaque material to cover the PV modules or disconnect PV string DC switch. PV arrays will produce dangerous voltage if it is exposure under sun.
Danger	Do not close the AC/DC circuit breaker before completing the electrical connection and prevent misconnection.
	For this product, the open circuit voltage of PV strings should not greater 1500V.
Note	The cables used in the PV system must be firmly connected, undamaged, well insulated and of the appropriate size.

### 5.1 Electrical Connection

Introduce the electrical connection process.

### 5.2 Terminal Port

Introduce inverter terminal port layout.

### 5.3 Grounding Protection (PE)

Connect PE line for grounding protection.



**5.4 Connect AC output (AC-Output)**

Connect AC output for feeding generated electrical into the utility grid. Must meet the requirement of local utility grid company.

**5.5 Connect the power cord of the tracking system (optional)**

**5.6 DC input connection**

Connect PV array with inverter by DC cable.

**5.7 Communication Connection**

Introduce the propose WIFI/USB, COM and how to connect WIFI/USB port.

**5.1. Electrical Connection**

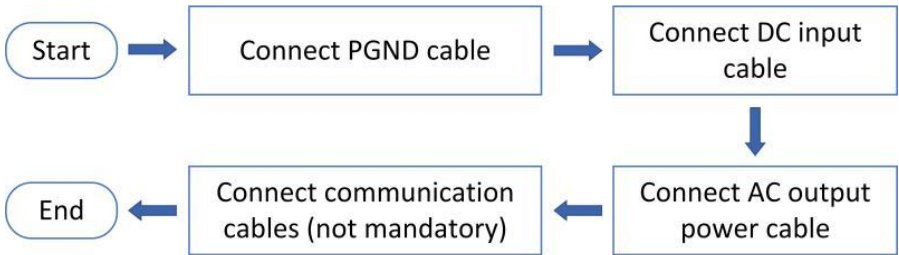
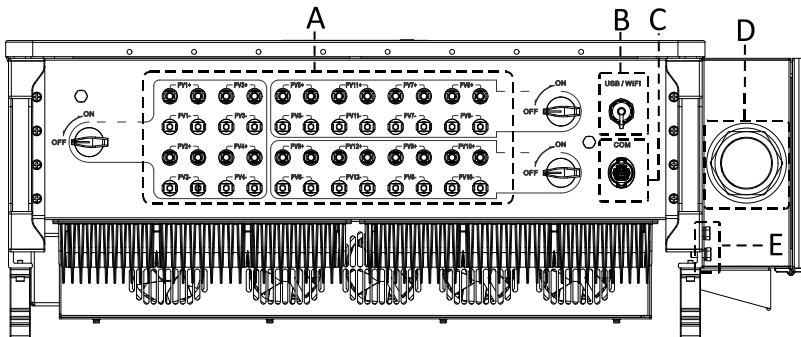



Figure 5-1 Flowchart for connecting cables to the inverter

**5.2. Terminal Connector**

Connector description as below:




\*Take picture as reference

No	Name		Description
A	DC input terminals	PVX+/PVX-	PV connector
B	USB/WIFI port	USB/WIFI	For WIFI Communication
C	RS485 Modbus/DRMs	RS485/DRMs	RS485 Communication port/ DRMs port
D	AC output terminals	AC	AC output terminal
E	Grounding		Connecting terminal of the ground , choose at least one for grounding connection
*F	DC switch lock		For Australian models

**\*Note:** Lock the screw to limit the torque of the DC switch, making it impossible to twist the DC switch from OFF to ON, or ON to OFF. Remove the screw before turning the DC switch from OFF to ON or ON to OFF.

### 5.3. Grounding Connection (PE)

Connect the inverter to the grounding electrode using ground cable

	<p>SOFAR 250/255KTL-HV is a transformerless inverter which requires the positive pole and negative pole of the PV array are NOT grounded. Otherwise, it will cause inverter failure. In the PV system, all non-current-carrying metal parts (such as mounting frame, combiner box enclosure, etc.) should be connected to earthed.</p>
<p>Note</p>	

**NOTE:** Good grounding is helpful in resisting surge voltage impulses and improving EMI performance. Before connecting AC, DC, and communication cables, connect a ground wire that protects the grounding point.

Inverter proximal grounding is recommended. It is necessary to connect the grounding points of all inverters in the same subarray to each other to ensure an equipotential connection of the ground wire.

Preparation: Prepare the grounding cable (S/2 (S is the cross section of the AC output wire) yellow-green outdoor power cable and M8OT terminal are recommended)

**Step1:** Remove the insulation layer with an appropriate length using a wire stripper shown as figure 5-2) .

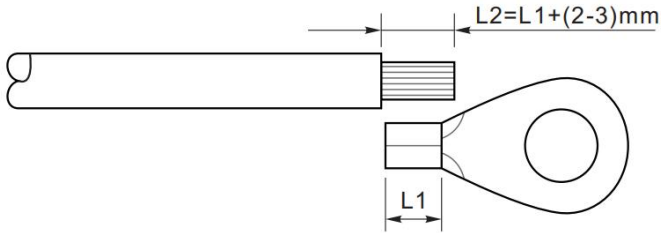


Figure 5-2 Grounding connection instruction (1)

**Note:** The length of  $L2$  should be 2~3mm higher than  $L1$ .

**Step 2:** Thread the stripped insulation core into the conductor crimp area of the OT terminal and compress with crimping pliers (Figure 5-3).

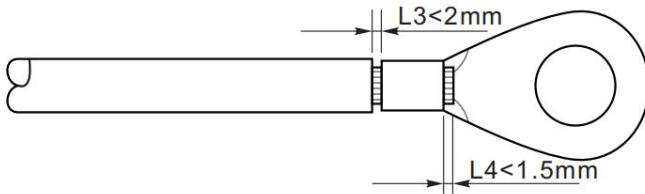
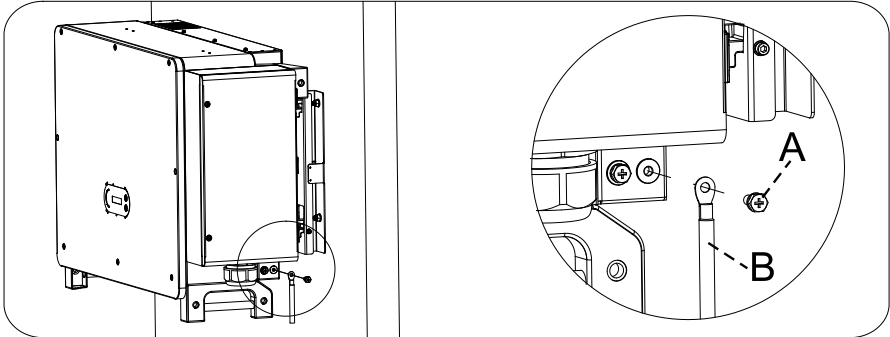


Figure 5-3 Grounding connection instruction (2)

**Note 1:**  $L3$  is the length between the insulation layer of the ground cable and crimped part.  $L4$  is the distance between the crimped part and core wires protruding from the crimped part.

**Note 2:** The cavity formed after crimping the conductor crimp strip shall wrap the core wires completely. The core wires shall contact the terminal closely.

**Step 3:** Remove the screw from the bottom side of inverter (Shown as figure 5-4), connect the grounding cable to the grounding point and tighten the grouping screw. Torque is 6-7N.m.



A.M8hexagon screw B. grounding cable

Figure 5-4 Inverter external grounding instruction diagram

**Note:** For improving anti-corrosion performance, after ground cable installed, apply silicone or paint is preferred to protect.

## 5.4. Connect grid side of inverter(AC-Output)

Inverter has a standard and integrated residual current monitoring unit (RCMU), when inverter detected leakage current excess 300mA, it will cut off with utility grid for protection. For external Residual Current Device (RCD), the rated residual current shall be 300mA or higher.

### Precondition:

Inverter AC side should connect a three phase circuit current to ensure inverter can be cut off with utility grid for abnormal condition.

The AC cable need to meet the requirement of local grid operator.

### 5.4.1 Open the wiring box

#### Note :

- Forbid to open then main board cover of inverter.
- Before open the wiring box, please ensure there is not DC and AC connection.
- If open the wiring box on snowing or raining day, please take protective measures to avoid the snow and rain enter wiring box. Otherwise, should not open the wiring box.

- Please do not unused screw in the wiring box.

Use M6 driver to unscrew the two screws on the wiring box,open wiring box cover.

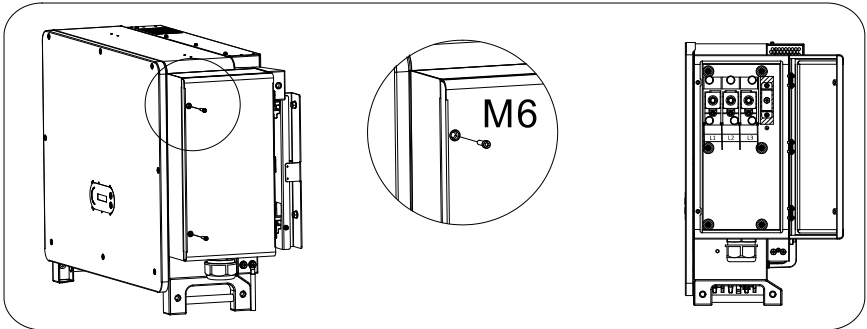


Figure 5-5 Open wiring box

## 5.4.2 Wiring Terminal and Precautions

### Note:

- Before connect to grid, please ensure the grid voltage and frequency of local grid meet the requirement of inverter , any question please seek local grid company for help.
- Inverter can only connect to grid after get the permission from local grid company.
- Should not connect any loads between inverter and AC circuit breaker.

### OT/DT Requirement:

- Use copper terminals when using copper core cables.
- When using copper-clad aluminum cables, use copper terminals.
- When using aluminum alloy cables, please use copper and aluminum transition terminals, or aluminum terminals with copper and aluminum transition spacers.

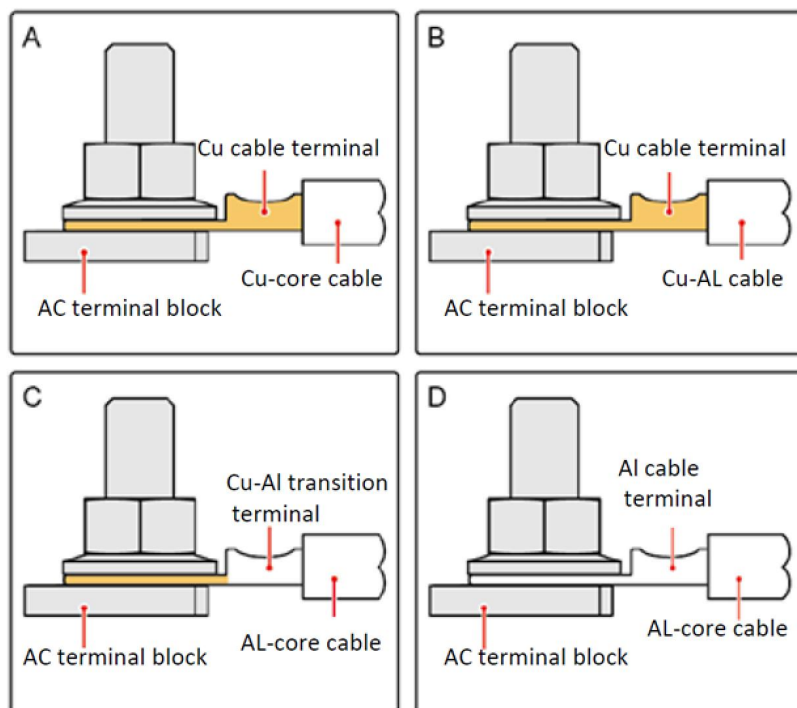


Figure 5-6 OT/DT Requirement for terminal connection

**Attention:**

- It is strictly prohibited to connect the aluminum terminal block directly to the terminal block, otherwise it will cause galvanic corrosion and affect the reliability of cable connection.
- When using copper-aluminum transition terminals, or aluminum terminals with copper-aluminum transition spacers, they need to comply with IEC61238-1 requirements.
- When using copper and aluminum transition spacer, please pay attention to the front and back, to ensure that the aluminum side of the spacer and aluminum terminal contact, copper side and terminal block contact.

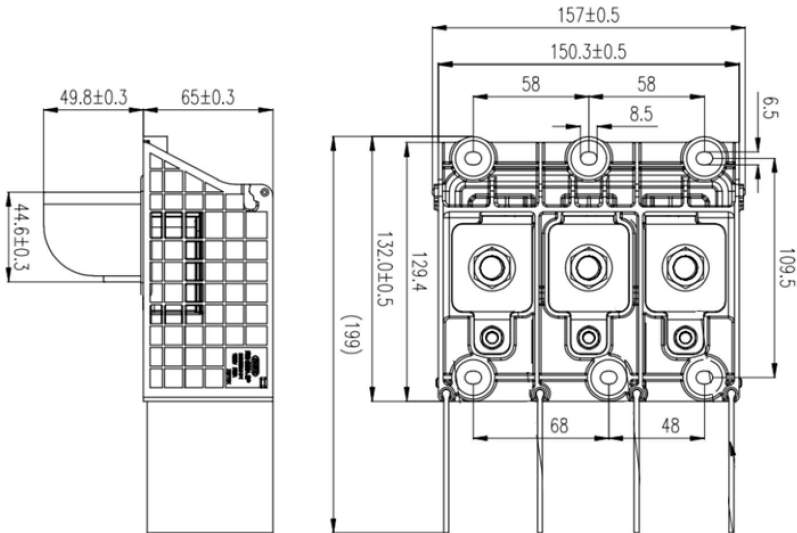


Figure 5-7 AC Terminal size

### 5.4.3 Wring Procedure

The section will use a five core wire as a sample, four core wire has same connection process.

Table 5-1 Recommend AC cable size

Name	Type	Area(mm <sup>2</sup> )
AC Output Cables	Outdoor 3-core copper、 4-core copper or aluminum wire	Copper wire: L1,L2,L3: 90~185 Aluminum wire: L1,L2,L3: 150~240 PE wire: S/2, S: AC phase line cross-sectional area
	Outdoor single core copper or aluminum wire	Copper wire: L1,L2,L3: 90~185 Aluminum wire: L1,L2,L3 wire: 150~240 PE wire: S/2, S:AC phase line cross section area

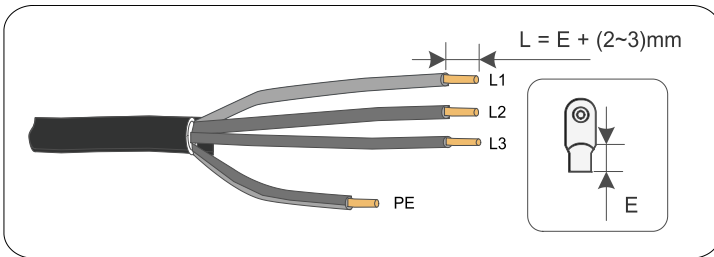
**Note:** The PE ground values in this table are valid only if the conductor material of the protective earth and the AC output line are the same. Otherwise, the protective earth conductance should be made equivalent to that specified in this table by selecting the appropriate cross-sectional area of the cable conductor. The protective earth specification is determined by this table or calculated according to IEC 60364-5-54.

**Step1:** Turn OFF the AC circuit breaker and secure against reconnection.

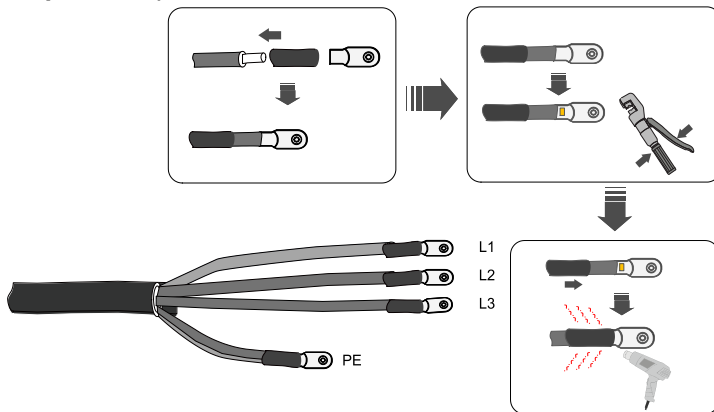
**Step 2:** Open the cover, refers to section 5.1.

**Step 3:** Unscrew the nut of the AC terminal block and select the sealing ring according to the outer diameter of the cable. Insert the nut, sealing ring into the cable in sequence.

**Step 4:** Remove the insulation layer of an appropriate length according to figure below.

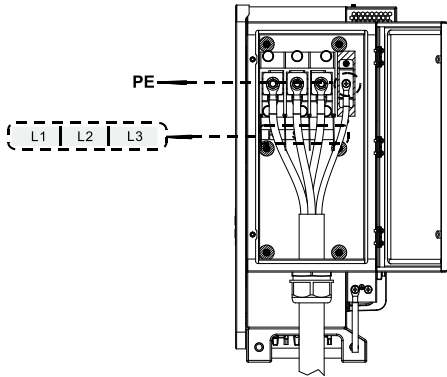


**Step 5:** Crimp the terminal.





**Step 6:** Secure the cable to the corresponding terminal.

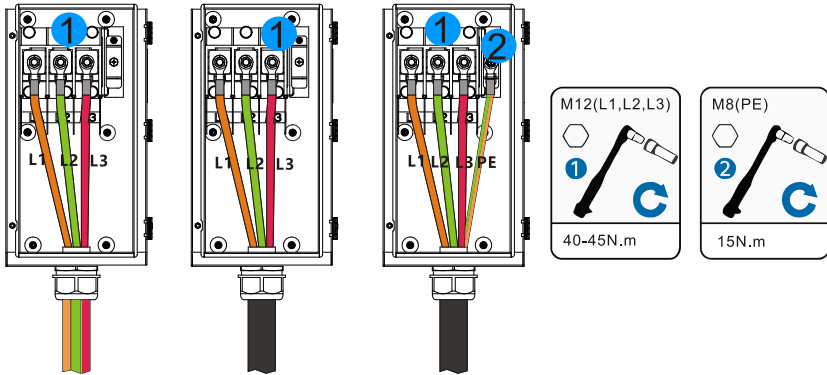


**Note:** Phase lines use M12 terminal connector, PE line use M8 terminal connector.

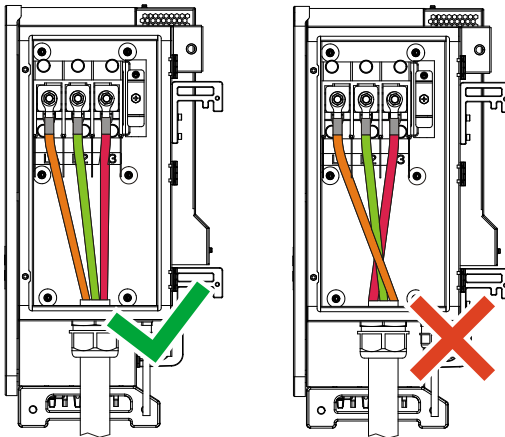
**Step 7:** Close the junction box cover and tighten the junction box screws.

**prerequisites:**

1. When using armored wire, need to pay attention to the AC cable bending radius requirements, when using three-wire or four-wire core armored, the bottom of the cable bending radius must be greater than or equal to 12 ~ 15 times the outer diameter of the cable;
2. Need to keep the AC cable vertically into the junction box;
3. Power line armored ends should be reliably grounded, grounding resistance should be no greater than 0.1 ohms, cable joints should maintain the continuity of the metal sheath;
4. The power line armored screen ground is not connected to the inverter grounding point, it is recommended that it can be connected to the nearby wall-mounted column grounding point;
5. Inverter protective grounding is recommended to give priority to the chassis shell grounding point, in the grounding terminal external silicone or paint for protection. The terminal box grounding point is mainly used to connect the multi-core AC line contains the ground wire; ground wire diameter size as table 5-1 described in the requirements.



- The length of the protective earth wire should be reserved to ensure that the protective earth wire is the last to bear the stress when the AC output wire is subjected to tensile force due to force majeure.
- After wiring is completed, the cables should not be pressed against the inter-phase baffle and should not be cross-wound.



Attention:

Inverter protective grounding is recommended to prioritize the chassis enclosure grounding point. The chassis grounding point is mainly used to connect the grounding wire contained in the multi-core AC line;

It is recommended that the inverter be grounded near the end, and the grounding is stable and reliable, and the lap resistance is less than 0.1Ω. In

order to improve the anticorrosion performance of the grounding terminal, it is recommended that after the installation of the grounding cables is completed, the outside of the grounding terminal should be coated with silica gel or brushed with paint for protection;

A three-phase AC switch is required to be configured outside the AC side of the inverter, and each inverter is required to be equipped with an AC output switch, and multiple inverters cannot be connected to an AC switch at the same time. In order to ensure that the inverter can be safely disconnected from the grid under abnormal conditions, please select the appropriate overcurrent protection device according to the local power distribution regulations;

The outside diameter of the cables can be measured according to the straightedge label on the hole of the terminal box, and make sure that the cable sheath is located inside the terminal box, and that the AC cable enters vertically into the inside of the terminal box;

Ensure that the AC output cables are tightly connected, otherwise the equipment may not operate, or the inverter terminal block may be damaged due to heat generated by the unreliable connection, etc. Damage caused by this will not be covered by the warranty of the equipment;

The cable must be protected by a wire pipe to avoid short-circuiting caused by damage to the insulation layer;

In order to quickly dispatch scenarios accordingly, please follow the same wiring sequence for connecting the AC cables between the terminal box and the box transformer L1, L2 and L3.

## **5.5. Connect the power cord of the tracking system (optional)**

Photovoltaic racking tracking system: tracking any sun's altitude angle and azimuth angle, so that the radiation receiving surface is always perpendicular to the sun's incidence direction, i.e., the sun's incidence angle within the tracking range is always zero, so as to maximize the use of solar energy resources.

Tracking system power line: power is taken from the AC three-phase grid t

o supply power to the tracking system, and the rated voltage of the power supply is the rated output voltage of the inverter.

**Attention:**

- Between the inverter and the tracking control box, it is necessary to connect the protection disconnector fuse group or fuse disconnector. Specification: voltage  $\geq 800\text{V}$ , current 16A, protection type GM.
- The cable length between the power line terminal and the disconnector fuse group or fuse disconnector shall be  $\leq 2.5\text{m}$ .
- The power line of the tracking system must be connected before the AC output line, otherwise it will cause rework.
- The tracking power cord needs to be provided by the user, and the manufacturer does not provide the power cord.

Recommended power cord specifications:

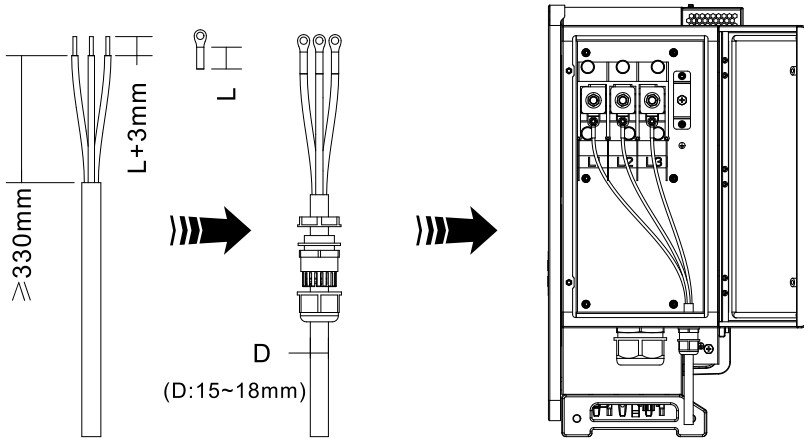
Area( $\text{mm}^2$ )	Cable outer diameter( $\text{mm}$ )
4.0~6.0	15~18

**Step 1:** use wire strippers to strip the insulation layer of the tracking power line to an appropriate length, as shown in the following figure.

**Step 2:** thread the wire core stripped of the insulation layer into the conductor crimping area of the OT terminal and press it tightly with a crimping pliers.

**Step 3:** thread the fabricated cable into the waterproof joint;

**Step 4:** connect the cable with the corresponding terminal, tighten the nut and fix the terminal.



## 5.6. Connect PV side of inverter (DC-Input)

### Note:

- Connecting PV strings into inverter must following the below procedure. Otherwise, any faulty cause by inappropriate operation will be including in the warranty case.
- Ensures that the PV string voltage per circuit does not exceed 1500V in any case.
- Make sure that the maximum short-circuit current on the DC side is within the permissible range of the inverter. Make sure that all three DC switches of the inverter are in the "OFF" position. Otherwise the resulting high voltage may cause a shock hazard.
- Ensure that the PV strings are well insulated to ground under all circumstances.
- In order to fully utilize the PV string input power, PV strings with the same input should be of the same construction, including: the same type, the same number of panels, the same tilt angle, and the same azimuth angle.
- Ensure that the polarity of the input side is correct, i.e., the positive pole of the PV string is connected to the positive pole of the DC input terminal of the inverter, and the negative pole is connected to the negative pole of the DC input terminal of the inverter.

- Prohibit the connector from being in a state where the docking snap-in is not in place, if the connector is damaged due to the docking snap-in not being in place it is not covered by the warranty.
- Please use the DC terminals included in the shipment. Damage to the unit caused by the use of incompatible terminals is not covered by the warranty.

Table 5-2 Recommend DC cable size

Copper cable cross section area (mm <sup>2</sup> )		Cable OD(mm)
Range	Recommend	
4.0~6.0	4.0	4.5~7.8

**Step1:** Find the metal contact pins in the accessories bag, connect the cable according below diagram (1.Positive cable, 2. negative cable).

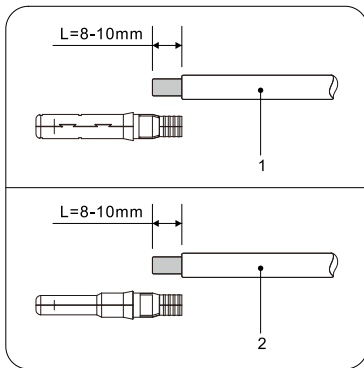
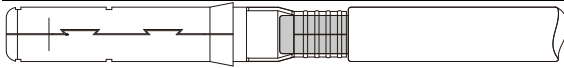
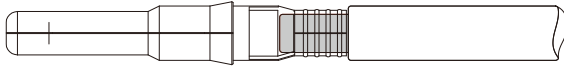


Figure 5-8 DC cable connection (1)

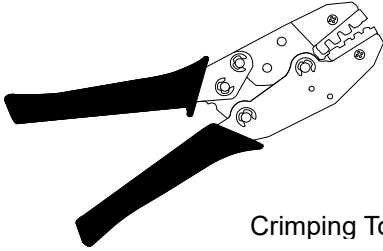
**Step2:** Use crimping pliers to crimp the cable to the metal core of the PV terminal to ensure that the cable is firmly crimped to the metal core.



PV+

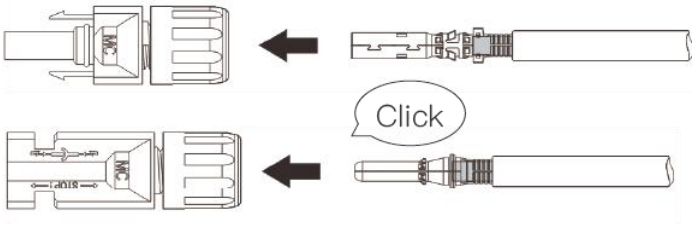


PV-

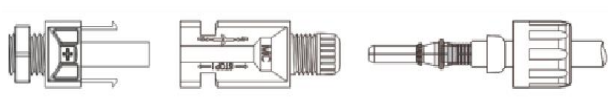


Crimping Tool

**Step3:** Pass the crimped positive and negative cable wires through the locking nut and insert them into the corresponding plastic housings until a clicking sound is heard, indicating that the metal core has clicked into place; tighten the locking nut;



**Step 4:** Use a multimeter to check the positive and negative terminals, and after confirming that there is no error, you can correspondingly insert the PV input of the inverter.

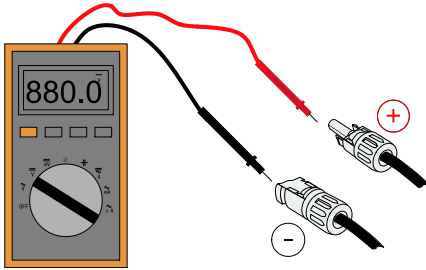


PV+



PV-

Figure 5-9DC cable connection



**Note:** Please use multimeter to make sure the PV array positive pole and negative pole!

When wiring in the field, the DC input line should be naturally sagging not less than 50mm, the axial tension on the PV connector should not exceed 80N, and it is prohibited to generate radial stress or torque on the PV connector.

**Attention:** If need to remove the PV connector from inverter side, please use the Removal Tool as below diagram, move the connector gently.

	Before, moving the positive and negative connector, please make sure "DC Switch" is on OFF position.
NOTE	

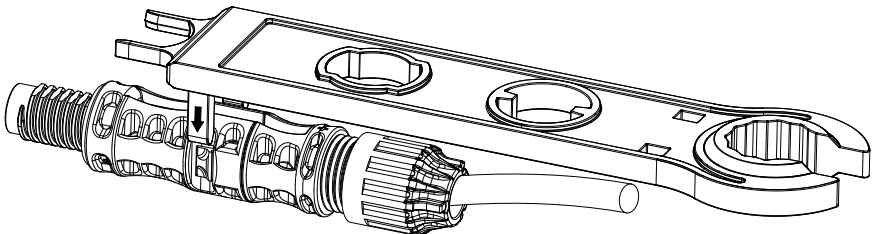


Figure 5-10 Removal DC connector



## 5.7. Communication Connection

**Note:** When layout the wiring diagram, please separate the communication wiring and power wiring in case the signal be affected.

### 5.7.1 USB/WIFI Port

Port Description:

USB/WIFI port	USB: USB Port	Use for updating the software
	WIFI: WIFI Port	Use for connect Wi-Fi for data transmission.

Procedure:

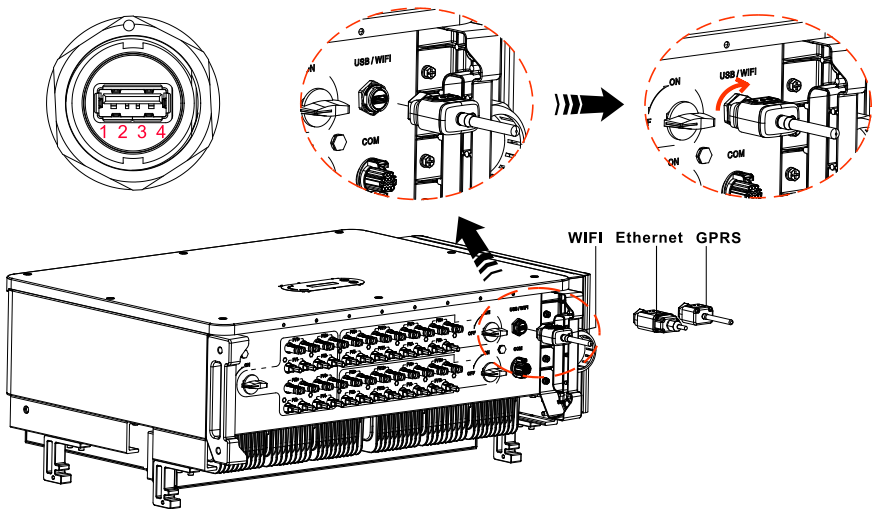


Figure 5-11 Data Collector Installation Schematic

### WIFI

By the USB acquisition stick (WIFI), transfer the inverter power output information, alarm information, operation state to the PC terminal or local data acquisition device, then uploaded to the server. Register remote monitoring of SOFAR 250/255KTL-HV at its relevant website or APP according to monitoring device SN.

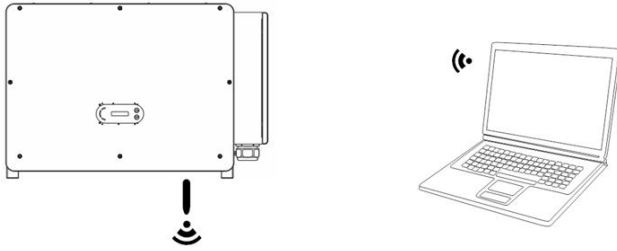
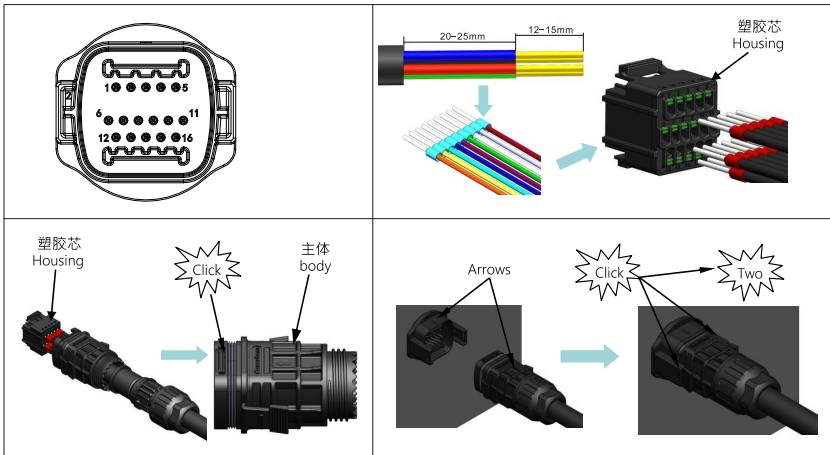


Figure 5-12 Connect one USB acquisition stick (WIFI version) to wireless router

### 5.7.2 COM—Multi function communication port

#### Access Steps:



#### Port Description:

PIN	Define	Function	Note
1	RS485A	RS485 signal+	Wire connection monitoring or multiple inverter monitoring
2	RS485A	RS485 signal+	
3	RS485B	RS485 signal-	
4	RS485B	RS485 signal-	
5	Electric meter RS485A	Electric meter RS485 signal+	Wire connection Electric meter
6	Electric meter	Electric meter RS485 signal-	

	RS485B		
7	GND.S	RS485 signal ground	
8	DRM0	Remote shunt down	DRMS port
9	DRM1/5		
10	DRM2/6		
11	DRM3/7		
12	DRM4/8		
13	GND.S	Communication Ground	
14-16	Blank PIN	N/A	N/A

Logic Interface

The logical interface is suitable for the following safety standards: Australian (AS4777), European General (50549).

RS485

By RS485 interface, transfer the inverter power output information, alarm information, operation state to the PC terminal or local data acquisition device, then uploaded to the server.

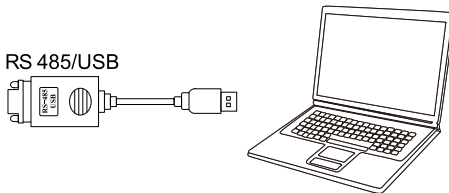


Figure 5-13 Picture of the RS485/USB converter and PC terminal

If only one SOFAR 250/255KTL-HV is used, use a communication cable, refer to for COM pin definition, and choose either of the two RS485 ports.

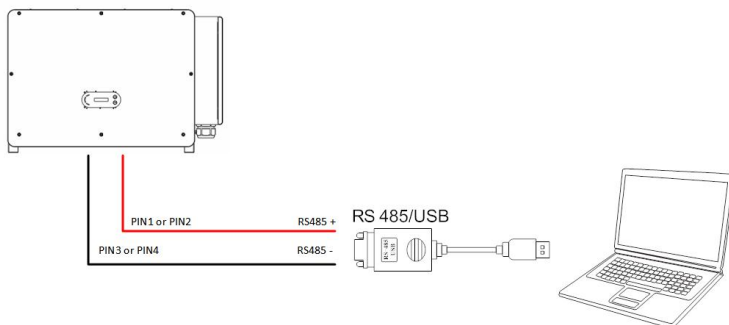



Figure 5-14 A single SOFAR 250/255KTL-HV connecting communications

	<ul style="list-style-type: none"> <li>● The length of the RS485 communication cable should be less than 1000 m.</li> <li>● The length of the WIFI communication cable should be less than 100 m.</li> </ul>
<p>Note</p>	

### 5.7.3 PLC (Multi inverter monitoring system)

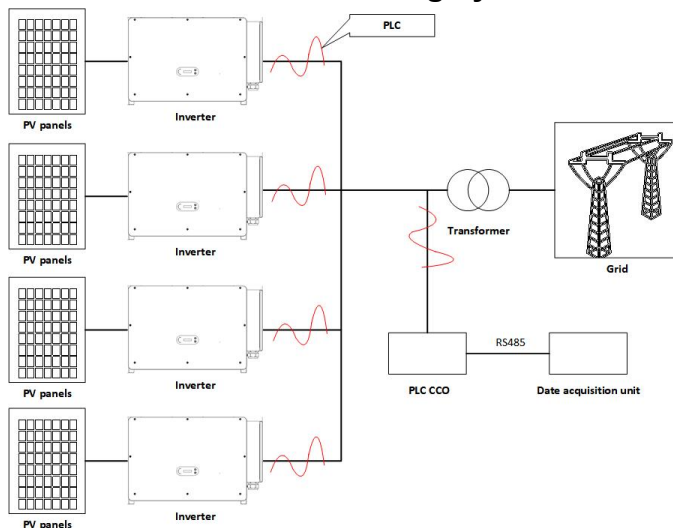


Figure 5-15 Multi inverter monitoring system

# 6. Commissioning of inverter

## Outlines this Chapter

Introduce SOFAR 250/255KTL-HV safety inspection and start processing.

### 6.1. Cable Connection Inspection



#### Attention

For first time operation, check the AC voltage and DC voltage are within the acceptable range.

When the inverter is hooked up and not in operation for half a year or more, the inverter needs to be inspected and tested by a professional before it is put into operation.

Before switching on the inverter for the first time, the following checks need to be done.

- The AC switch connecting the inverter and all DC switches on the inverter are disconnected.
- Check that the inverter is mounted in place and is firm and reliable.
- Check that the earth wire is reliably connected and that the grounding resistance is less than  $0.1\Omega$ .
- Check that the AC cables and DC cables are wired correctly and that the various wiring must be firm and reliable.
- The AC circuit breaker is selected in accordance with the requirements of this manual and local standards.
- Check that the communication cables are connected correctly and reliably.
- Check that the vacant terminals have been sealed.

## 6.2. Start Inverter

**Step 1:** Turn ON the DC switch.

**Step 2:** Turn ON the AC circuit breaker.

When the DC power generated by the solar array is enough, the SOFAR 250/255KTL-HV inverter will start automatically. Screen showing “normal” indicates correct operation.

**NOTE 1:** Choose the correct country code.

**NOTE 2:** Different distribution network operators in different countries have different requirements regarding grid connections of PV grid connected inverters.

Therefore, 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.

If the inverter indicates any fault, please refer to Section 9.3 of this manual — trouble shooting for help.

# 7.SOFAR Monitor APP(Optional)

## Overview

SOFAR Monitor is a new efficient, safe, fast and intelligent photovoltaic monitoring software, complete the near-end debugging and remote monitoring Settings. From the creation of power Plants to management, operation and maintenance, realize integrated services, easy to master your power Plant information. In the power Plant information, not only the monitored data information can be reflected through digital and dynamic flow diagrams, but also the real-time Alarm notification of faults, bringing you a simpler and more convenient experience.

## 7.1. Download

Mobile operating system requirements, minimum version Android 5.0; iOS 11.0.

- ① Android phone users: search for "SOFAR Monitor" in the Android app market (Snap Pea, Baidu, etc.), download and install.
- ② You can also download "SOFAR Monitor" by directly scanning the QR code below or taking a screenshot.



QR code

## 7.2. Account Registration and Login

### 7.2.1 Registration

If you do not have an account of SOFAR Monitor, please enter the registration page on the login interface.

#### Registration page

Please click the "Register account" button to enter the registration page.

English

Email address Sign in

Node selection  China  Europe

✉ ☎ 👤 📄

Email address

Please enter password

Forgot PW?  Keep password

Sign in

read and agree (Service Agreement) (Privacy policy)

Register account SOLARMAN account migration Experience power station

**Step1:** In the [Account Type] interface, clicking "Shop owner", and then complete the user account registration according to the interface prompts.

\*If you are a user, please contact the merchant.



The image displays three sequential screenshots of the SOFAR app registration process:

- Account type:** Shows two options: "Shop owner" (Businesses that provide services to owners) and "User" (Owner-users who own their own power stations).
- New shop registration:** A form with fields for: \*Company name, \*Country (region), \*Register mobile no., \*User name, \*Password, and Superior merchant code. It includes a "Sign in" button and a checkbox for "I read it and agreed. (Service Agreement) (Privacy policy)".
- Register new user:** A form with fields for: \*Country (region), \*Register mobile no., \*User name, \*Password, and Superior merchant code. It includes a "Sign in" button and a checkbox for "I read it and agreed. (Service Agreement) (Privacy policy)".

## Complete registration

Note: Users please select the user account type registration, if you have registered again, the password for the old password.

### Step 2: follow the prompts to complete the registration process

At present, we support cell phone number or email account for account registration; please follow the prompts, correctly enter your cell phone number or email account, set the user name, login password and verification.

After successful verification, please check the box in the agreement column to indicate that you have agreed to the "Service Agreement" and "Privacy Agreement".

**Note:** For account security considerations, the password should be a password length of 9-30 digits, should contain upper and lower case letters, numbers two or more and special characters (such as: %, &, #, etc.), do not allow spaces!

After you fill in the information correctly, click the "Register" button that prompts the completion of registration, jump to the login screen.

## 7.2.2 Login

If you already have an account of SOFAR Monitor, please log in directly on the login page.

English

Email addressSign in

Node selection  China  Europe

Email address

Please enter password

Forgot PW?  Keep password

Sign in

read and agree 《Service Agreement》 《Privacy policy》

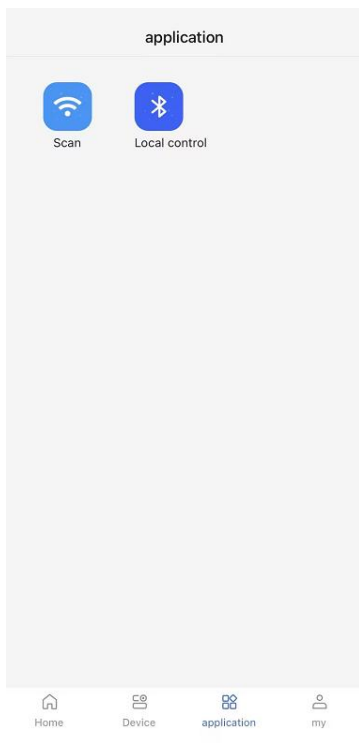
Register account SOLARMAN account migration Experience power station

## 7.3. Local Control

Note: Before using this function, please turn on the Bluetooth of your cell phone in advance, and you need to apply for permission to open before you can carry out safety regulations and firmware operations.

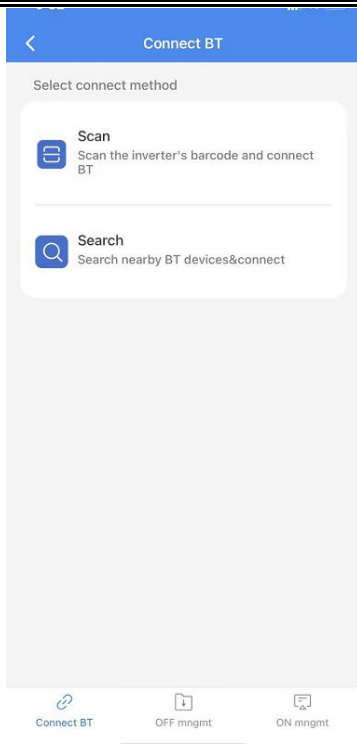
### Bluetooth Connection

The first step is to choose the connection method: enter the application interface and click [Local Control], in the page you can connect your cell phone to the inverter through Bluetooth communication to realize the functions of near-field operation and maintenance, debugging, upgrading and safety regulation.



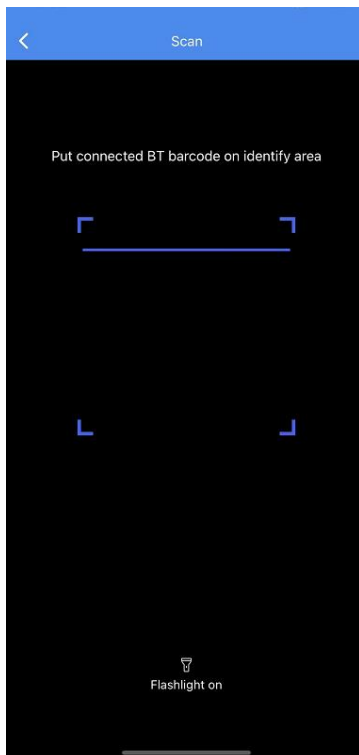
### Connection mode

The Connect Bluetooth screen is displayed. You can connect to the screen in two modes: “scan” and “search”.

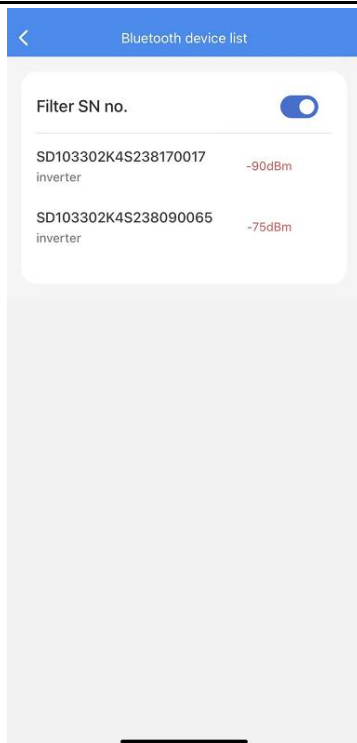


### ·Scanning:

Click [Scan] will prompt you to open the camera on the phone, scan the SN bar code on the inverter and start searching for the Bluetooth of the machine. When you find the Bluetooth, it will automatically connect and enter the home page.

**·Searching:**

Click [Search] will jump to the list of Bluetooth devices and start searching for nearby available Bluetooth devices. Select the device you want to connect according to the inverter serial number.

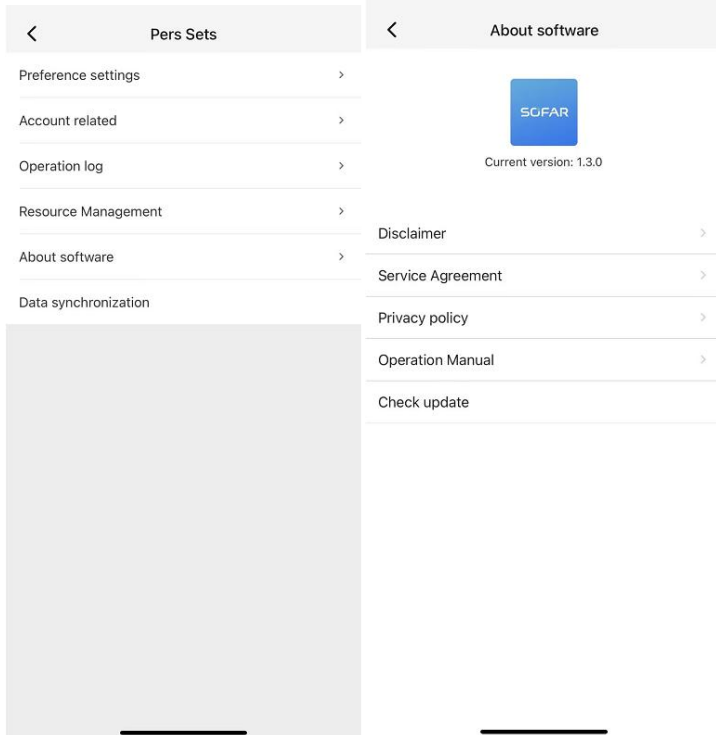


After successfully connecting the device, enter the Bluetooth home page.



## 7.4. About the Software

For the introduction of APP functions and specific operation, please click "My" page, and click [Personal Settings] to enter the sidebar, and click [Personal Settings], and you can view the operation manual in the page.





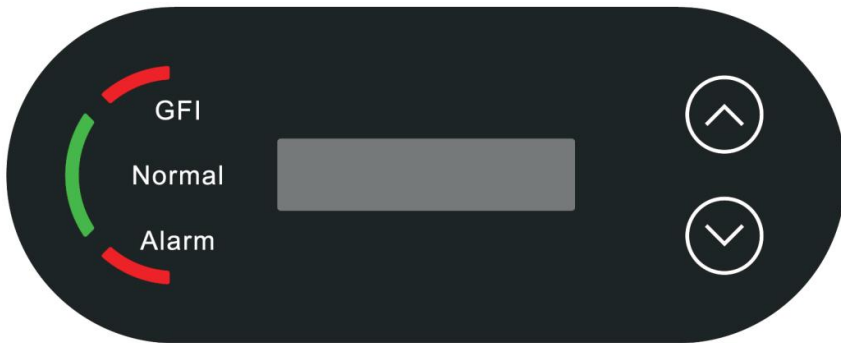
# 8. Operation interface

## Outlines of this chapter

This section introduces the display, operation, buttons and LED indicator lights of SOFAR 250/255KTL-HV Inverter.

### 8.1. Operation and Display Panel

Buttons and Indicator lights



Button:

“^” Short press UP button = go up

“^” Long press UP button = exit current interface

“v” Short press DOWN button = go down

“v” Long press DOWN button = enter current interface

Indicator Lights:

“GFI” Red light ON = GFCI faulty

“Normal” Green light flashing = counting down or checking

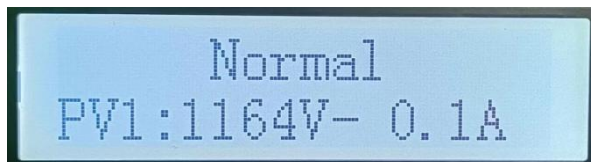
“Normal” Green light ON = Normal

“Alarm” Red light ON= recoverable or unrecoverable faulty

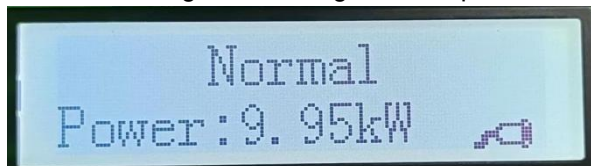
## 8.2. Standard Interface

LCD interface indicated inverter status, alarm information, communication connection, PV input current and voltage, grid voltage, current and frequency, today generation, total generation. The main screen information can be viewed by tapping the "v" button.

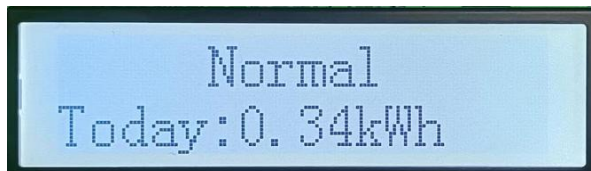
Inverter working status, PV 1 -12 PV input voltage and current



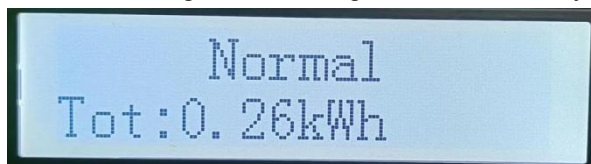
Inverter working status, PV generated power



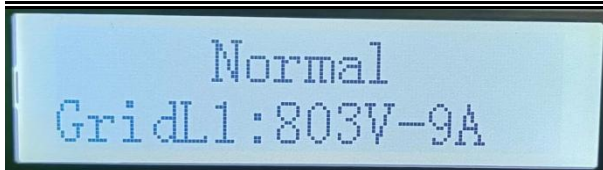
Inverter working status, today generated electricity 0



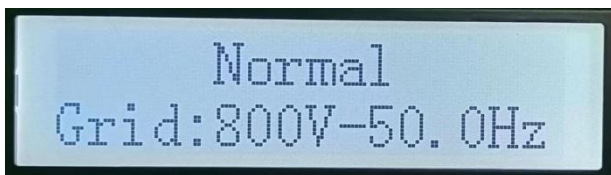
Inverter working status, total generated electricity



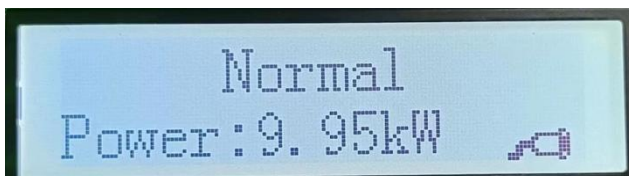
Inverter working status, grid voltage and current



Inverter working status, grid voltage and frequency



Inverter working status, Wi-Fi/ RS485/4G/Ethernet status



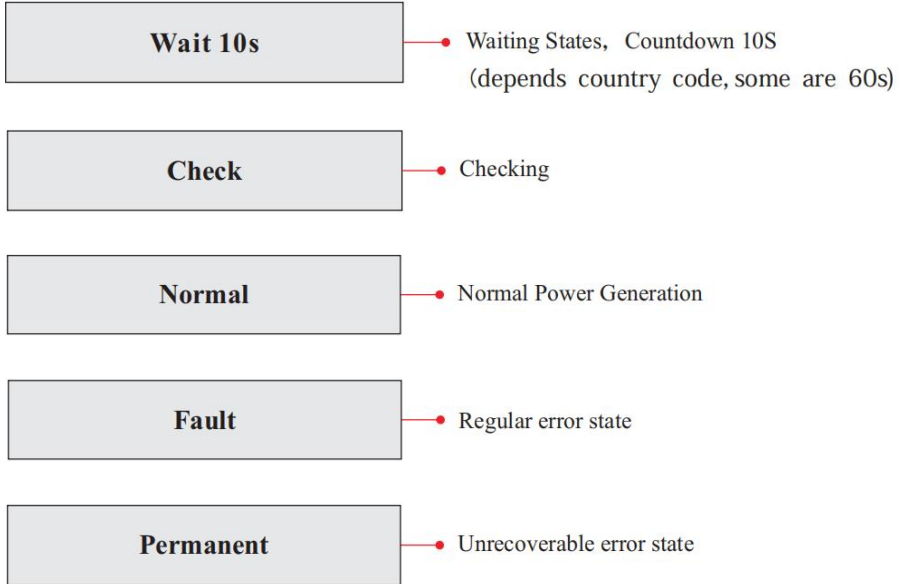
Inverter faulty alarm



When power turn on, LCD interface displays Initializing, refer below picture.



When control board successfully connected with communication board, the LCD display the current state of the inverter, display as shown in the figure below.



Inverter states includes: wait, check, normal, fault and permanent.

**Wait:** Inverter is waiting to Check State when reconnect the system. In this state, grid voltage value is between the max and min limits and so on; If not, Inverter will go to Fault State or Permanent State.

**Check:** Inverter is checking isolation resistor, relays, and other safety requirements. It also does self-test to ensure inverter software and hardware are well functional. Inverter will go to Fault State or Permanent State if any error or fault occurs.

**Normal:** Inverter enter to Normal State, it is feeding power to the grid; inverter will go to Fault State or Permanent state if any error or fault occurs.

**Fault:** Fault State: Inverter has encountered recoverable error. It should recover if the errors disappear. If Fault State continues; please check the inverter according error code.

**Permanent:** Inverter has encountered unrecoverable error, we need

maintainer debug this kind of error according to error code.

When the control board and communication board connection fails, the LCD display interface as shown in the figure below.



### 8.3. Main Interface

Long press the down button under standard interface to enter into main interface, Main interface including below information:

Normal	-----Long press DOWN button	
	1.Enter Setting	
	2.Event List	
	3.SystemInfo	
	4.Display Time	
	5.Software Update	

(A)Enter setting Interface as below:

1.Enter Setting	-----Long press DOWN button	
	1.Set time	13.Setting active load shedding
	2.Clear Energy	14.Set PCC
	3.Clear Events	15.Set power multiplier
	4.Country Country	16.PID setting
	5.On-Off Control	17.PLC setting
	6.Set Energy	18.Baud rate setting
	7.Set Address	19.Ground detection protection
	8.Set Input mode	20.Set AFCI
	9.Set Language	21.Communication interruption protection
10.Set RefluxP	22.Import safety regulations library	

	11.Logic Interface	23.Setting safety regulations library
	12.IV Curve Scan	24.Export information

Long press the button to Enter the main interface of "1.Enter Setting" and long press to enter the setting menu. You can select the content you want to set by short pressing the button.

Note1: Some settings need to enter the password (the default password is 0001), when entering the password, short press to change the number, long press to confirm the current number, and long press after entering the correct password.If "password error, try again" appears, you will need to re-enter the correct password.

### 1. Set Time

Set the system time for the inverter.

### 2. Clear Energy

Clean the inverter of the total power generation.

### 3. Clear Events

Clean up the historical events recorded in the inverter.

### 4. Country Country

Long press button, enter interface, save the specific file into USB and insert USB into inverter communication port.

### 5. On-Off Control

Inverter on-off local control.

### 6. Set Energy

Set the total power generation. You can modify the total power generation through this option.

### 7. Set address

Set the address (when you need to monitor multiple inverters simultaneously), Default 01.

### 8. Set Input mode

SOFAR 250/255KTL-HV has 8-12 MPPTs, these MPPTs can work interdependently, or divided into parallel mode. User can change the setting according to the configuration.

### 9. Set Language

Set the inverter display language.

**10. Set RefluxP**

The refluxpower value set by the anti-reflux function is the maximum power value allowed to be transmitted to the grid.

**11. Logic interface**

Enable or disable logical interfaces. It is use for below standard Australia (AS4777), Europe General (50549), German(4105).

**12. MPPT Scan**

Shadow scanning, when the component is blocked or abnormal, causing multiple power peaks, by enabling this function, the peak point of maximum power can be tracked.

**13. PID**

Enable or disable PID function. When the PID module is enabled(enter the default password: 0001),it will work between 0 a.m. and 4 a.m.

(B)Event List:

Event List is used to display the real-time event records, including the total number of events and each specific ID No. and happening time. User can enter Event List interface through main interface to check details of real-time event records, Event will be listed by the happening time, and recent events will be listed in the front. Please refer to below picture. Long press the button and short press the button to turn the page in standard interface, then enter into “2.Event List” interface.

2. Event List	
1. Current event	2. History event
Fault information	001 ID04 06150825 (Display the event sequence number, event ID number, and event occurrence time )

A. “SystemInfo” Interface as below

3.SystemInfo	-----Long press DOWN button	
	1.Inverter Type	12.Anti-reverse current p ower
	2.Serial Number	13.DRM <sub>s</sub> 0
	3.Soft Version	14.DRM <sub>n</sub>
	4.Hard Version	15.Curve Scanning
	5.Safety standard	16.Active power derating

	6.Safety software version number	17.PCC setting
	7.Safety hardware version number	18.Power multiplier
	8.Communication address	19.Ground detection protection
	9.Input Mode	20. Communication interruption protection
	10.Remote switching status	21.PLC information
	11. Anti-reverse current enable	

The user enters the main menu by long pressing the DOWN button, short press and turns the page to select menu contents, then long press the button to enter "3. SystemInfo". Turning the page down can select the system information to view.

#### B. Display Time

Long press the button and short press the button to turn the page in the standard user interface to enter into "4.Display Time", then long press the button to display the current system time.

#### C. Software Update

User can update software by USB flash drive , SOFARSOLAR will provide the new update software called firmware for user if it is necessary, The user needs to copy the upgrade file to the USB flash drive.

## 8.4. Updating Inverter Software

SOFAR 250/255KTL-HV inverter offer software upgrade via USB flash drive to maximize inverter performance and avoid inverter operation error caused by software bugs.

**Step 1** : Turn off AC circuit breaker and DC switch, remove the communication board cover as below figure. If the RS485 line has been connected, please release the waterproof nut first and make sure the communication line is no longer the force. Then remove the waterproof cover.



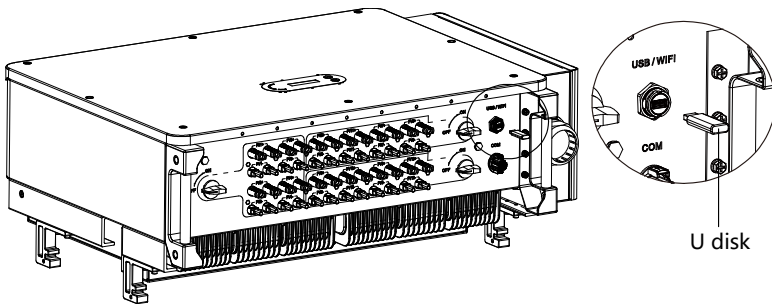


Figure 8-1 Remove communication board cover

**Step 2:** Insert USB into computer.

**Step 3:** SOFARSOLAR service team will send the software code to user, After user receive the file, please decompressing file and cover the original file in USB flash drive.

**Step 4:** Insert USB drive into the USB port of inverter.

**Step 5:** Then turn on DC switch and enter into the online upgrade to the main menu "5. Software Update" in the LCD display program. The method to enter the menu can refer to operation interface of LCD.

**Step 6:** Input the password, if password is correct, and then begin the update process, the original password is 0715.

**Step 7:** System update main DSP, slave DSP and ARM in turns. If main DSP update success, the LCD will display "Update DSP1 Success", otherwise display "Update DSP1 Fail"; If slave DSP update success, the LCD will display "Update DSP2 Success", otherwise display "Update DSP2 Fail".

**Step 8:** If Fail, please turn off the DC switch, wait for the LCD screen turn off, then turn on the DC switch again, then Continue to update from step 5.

**Step 9:** After the update is completed, turn off the DC breaker, wait for the LCD screen extinguish, then recover the communication waterproof and then turn on the DC breaker and AC breaker again, the inverter will enters the running state. User can check the current software version in SystemInfo>>3.SoftVersion.

# 9. Trouble shooting and maintenance

## 9.1. Normal outage power down operation

**Step 1:** Remote shutdown setting through the machine display, or sending shutdown command in Bluetooth APP or management system, for details, please refer to the user manual of the corresponding product or consult the after-sales personnel;

**Step 2:** After the remote shutdown is successful, make sure the output power of the inverter is 0, and then disconnect the switch between the inverter and the power grid;

**Step 3:** Disconnect the DC switch;

### Caution:

When the machine is working normally, it is strictly forbidden to disconnect the AC and DC side switches directly, so as not to damage the switches by arcing danger. It may also cause damage to the inverter in serious cases.

## 9.2. Fault power-down operation

### Operation Steps

**Step 1:** Wear personal protective equipment and avoid touching the electrically charged parts of the inverter before performing the maintenance and power down operation, otherwise it may lead to electric shock or arcing fire hazard.

**Step 2:** If the inverter is not fault shutdown, set the remote shutdown through the machine display, or send the shutdown command in the Bluetooth APP, management system side.

**Step 3:** Disconnect the AC switch.

**Step 4:** Determine whether there is DC loop current or reverse connection; use a current clamp meter to measure the DC current of each input string of the inverter first. If the current is not higher than 0.5A, please execute port DC switch operation. If the current is higher than 0.5A, you need to wait until the current is lower than 0.5A at night before performing the disconnect

---

DC switch operation.

**Step 5:** Use a multimeter to measure the AC terminal line voltage as well as the voltage of each phase of the chassis to ensure that the AC side of the inverter is disconnected.

**Step 6:** After the display indicator goes off, wait for 5min to perform fault analysis or overhaul operation on the inverter.

**Attention:**

1. When the inverter has smoke or obvious abnormality in appearance, it is strictly forbidden for maintenance personnel to open the upper cover panel of the mainframe for overhauling, please follow the operation to disconnect the inverter in time.
2. When the inverter appears non-smoking and other special abnormal faults, please contact the after-sales personnel in time for consultation to assist in troubleshooting, and avoid standing in front of the inverter during the restarting process of the inverter.

### 9.3. Confirmation of troubleshooting site information

This section describes the potential errors for this product. Please read carefully for the following tips when doing the troubleshooting:

Check the warning message or faulty codes on the inverter information panel

If not any error code display on the panel, please check the following lists:

- Is inverter be installed in a clean, dry, ventilated environment?
- Is the DC switch turn off?
- Are the cable cross section area and length meet the requirement?
- Are the input and output connection and wiring in good condition?
- Are the configuration settings correctly for the particular installation?

This section contains the potential errors, resolution steps, and provide users with troubleshooting methods and tips.

The process to check the event list can refers to Manual Chapter 8.3 (B).

**Table 9-1 Even 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	Grid UVP	The grid voltage is too low	
ID003	Grid OFP	The grid frequency is too high	
ID004	Grid UFP	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	Check for inverter and wiring.
ID006	OVRT fault	OVRT function is faulty	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.
ID007	LVRT fault	LVRT function is faulty	
ID008	Island Fault	Island protection error	
ID009	GridOVPI nstant1	Transient overvoltage of grid voltage 1	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

ID010	GridOVPI nstant2	Transient overvoltage of grid voltage 2	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.
ID011	VGrid Line Fault	Power grid line voltage error	
ID012	InvVoltFau lt	Inverter voltage error	
ID013	Reflux Fault	Anti-Reflux function is faulty	
ID014	VGridUnb alance	Grid voltage imbalance	
ID016	GridPhase Mutation	Sudden change in grid phase	
ID017	HwAD Faultl Grid	Power grid current sampling error	
ID018	HwADFaul tDCI	Wrong sampling of dc component of grid current	
ID019	HwADFaul tVGrid(DC )	Power grid voltage sampling error (DC)	
ID020	HwADFaul tVGrid(AC )	Power grid voltage sampling error (AC)	
ID021	GFCIDevi ceFault(D C)	Leakage current sampling error(DC)	
ID022	GFCIDevi ceFault(A C)	Leakage current sampling error(AC)	
ID024	HwADFaul tldc	Dc input current sampling error	

ID025	HwADerr DCI(DC)	DCI Sampling Error (DC)	
ID026	HwADerrl dcBranch	\	
ID028		PID Exception Output	
ID029	Consistent Fault_GF CI	Leakage current consistency error	
ID030	Consistent Fault_Vgri d	Grid voltage consistency error	
ID031	Consistent DCI	DCI consistency error	
ID033	SpiComm Fault(DC)	SPI communication error (DC)	
ID034	SpiComm Fault(AC)	SPI communication error (AC)	
ID035	SChip_Fa ult	Chip error (DC)	
ID036	MChip_Fa ult	Chip error (AC)	
ID038	InvSoftSta rtFail	Inverter soft start failure	
ID039	ArcShutdo wnAlarm	Arc shutdown protection	When the arc pulling occurs, first remote shutdown, then disconnect the DC, need to check the core of the PV end at night to see if there is any arc pulling or loosening.
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.
ID043	PEConnectFault	Ground fault	Check ac output PE wire for grounding.
ID044	ConfigError	Error setting input mode	Check the input mode (parallel/independent mode) Settings for the inverter. If not, change the input mode.
ID046	ReversalConnect	Input Reverse Connection Error	Reverse faults suggest that the DC switch needs to be disconnected to measure the PV light assembly and make the correct correction.
ID050	TempFault_HeatSink1	Radiator 1 temperature protection	<p>Make sure the inverter is installed in a cool/well ventilated area.</p> <p>Make sure that the inverter is mounted vertically and that the ambient temperature is below the inverter temperature limit.</p>
ID051	TempFault_HeatSink2	Radiator 2 temperature protection	
ID052	TempFault_HeatSin3	Radiator 3 temperature protection	
ID053	TempFault_HeatSink4	Radiator 4 temperature protection	
ID054	TempFault_HeatSin5	Radiator 5 temperature protection	
ID055	TempFault_HeatSin6	Radiator 6 temperature protection	
ID057	TempFault_Env1	Ambient temperature 1	

		protection	
ID058	TempFault_Env2	Ambient temperature 2 protection	
ID059	TempFault_Inv1	Module 1 temperature protection	
ID060	TempFault_Inv2	Module 2 temperature protection	
ID061	TempFault_Inv3	Module 3 temperature protection	
ID065	VbusRmsUnbalance	Unbalanced bus voltage RMS	
ID066	VbusInstantUnbalance	The transient value of bus voltage is unbalanced	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved.
ID067	BusUVP	Busbar undervoltage during grid-connection	If no, please contact technical support.
ID068	BusZVP	Bus voltage low	
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.
ID072	SwBusRm	Inverter bus	Internal inverter fault, turn off the



	sOVP	voltage RMS software overvoltage	inverter, wait 5 minutes and turn on the inverter. Check if the problem is resolved.  If not, contact technical support.
ID073	SwBusInstantOVP	Inverter bus voltage instantaneous value software overvoltage	
ID074	FlyingCapOVP		
ID075	FlyingCapUVP		
ID082	DciOCP	Dci overcurrent protection	
ID083	SwOCPIstant	Output instantaneous current protection	
ID084	SwBuckBoostOCP	BckBst Software Overcurrent	
ID085	SwAcRmsOCP	Output effective value current protection	
ID086	SwPvOCPInstant	PV overcurrent software protection	
ID087	IpvUnbalance	PV parallel uneven flow	
ID088	IacUnbalance	Output current imbalance	
ID089	SwPvOCP	PV software overcurrent protection	
ID091	ResOver	resonant	

		protection	
ID092	SwAcCBC Fault	Software wave-by-wave current limit protection	
ID093	SwPvBranchOCP	V branch software overcurrent (enabled by default)	
ID098	HwBusOVP	Inverter bus hardware overvoltage	
ID102	HwPVOC P	PV hardware overflows	
ID103	HwACOC P	Ac output hardware overflows	
ID105	MeterCommunicationFault	Meters communication fault	Check whether the meters wiring is correct.
ID107	HwVerError	Hardware version mismatch	Please check the inverter hardware version
ID110	Overload1	Overload protection 1	Please check whether the inverter is operating under overload.
ID113	OverTempDerating	Internal temperature is too high.	<p>Make sure the inverter is installed where there is no direct sunlight.</p> <p>Please ensure that the inverter is installed in a cool/well ventilated place.</p> <p>Ensure the inverter is installed vertically and the ambient temperature is below the inverter temperature limit.</p>

ID114	FreqDerating	AC frequency is too high	Please make sure the grid frequency and voltage is within the acceptable range.
ID115	FreqLoading	AC frequency is too low	
ID116	VoltDerating	AC voltage is too high	
ID117	VoltLoading	AC voltage is too low	
ID129	unrecoverHwAcOCP	Output hardware overcurrent permanent failure	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.
ID130	unrecoverBusOVP	Permanent Bus overvoltage failure	
ID131	unrecoverHwBusOVP	Permanent Bus hardware overvoltage failure	
ID134	unrecoverAcOCPIinstant	Output transient overcurrent permanent failure	
ID135	unrecoverIacUnbalance	Permanent failure of unbalanced output current	
ID140	unrecoverRelayFail	Permanent relay failure	
ID141	unrecoverVbusUnbalance	Bus voltage unbalanced permanent failure	
ID142	PermSpdFail(DC)	PV surge protection	
ID143	PermSpdFail(AC)	Grid surge protection	
ID145	USBFault	USB fault	

ID146	WifiFault	Wifi fault	Check the Wifi port of the inverter
ID147	Bluetooth Fault	Bluetooth fault	Check the bluetooth connection of the inverter
ID148	RTCFault	RTC clock failure	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.
ID149	CommEE PROMFault	Communication board EEPROM error	
ID150	FlashFault	Communication board FLASH error	
ID152	SafetyVer Fault	The software version is inconsistent with the safety version	
ID153	SciComm Lose(DC)	SCI communication error (DC)	
ID154	SciComm Lose(AC)	SCI communication error (AC)	
ID155	SciComm Lose(Fuse )	SCI communication error (Fuse)	
ID156	SoftVerError	Inconsistent software versions	Contact for technical support and software upgrades.
ID161	ForceShutdown	Force shutdown	The inverter is performed a forced shutdown
ID162	RemoteShutdown	Remote shutdown	The inverter is performed a remote shutdown.
ID163	Drms0Shutdown	Drms0 shutdown	The inverter is performed with a Drms0 shutdown.
ID164	PSComm Fault	Power station communication	Check 485 for faults

		failure shutdown	
ID165	RemoteDerating	Remote derating	The inverter is performed for remote load reduction.
ID166	LogicInterfaceDerating	Logic interface derating	The inverter is loaded by the execution logic interface.
ID167	AlarmAntiRefluxing	Anti refluxderating	The inverter is implemented to prevent countercurrent load drop.
ID169	FanFault1	Fan 1 fault	Please check whether the fan 1 of inverter is running normally.
ID170	FanFault2	Fan 2fault	Please check whether the fan 2 of inverter is running normally.
ID171	FanFault3	Fan 3 fault	Please check whether the fan 3 of inverter is running normally.
ID172	FanFault4	Fan 4 fault	Please check whether the fan 4 of inverter is running normally.
ID173	FanFault5	Fan 5 fault	Please check whether the fan 5 of inverter is running normally.
ID174	FanFault6	Fan 6 fault	Please check whether the fan 6 of inverter is running normally.
ID175	FanFault7	Fan 7 fault	Please check whether the fan 7 of inverter is running normally.
ID176	MeterCommunicationLose	Meters communication fault	Check whether the meters wiring is correct.
ID189	AFCICommunicationLose	AFCI module communication is lost	/
ID190	DCArcingAlarm	Dc arc fault	/
ID191	PID_Output_Fail	PID function is failed	/

ID192	PLC_Com _Fail	PLC communication is lost	/
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## 9.4. Maintenance

Inverters generally do not need any daily or routine maintenance. But ensure 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 & 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 & soft cloth or a soft bristle brush. Do NOT clean the heat sink with water, corrosive chemicals, detergent, etc.

In order to make the inverter operate stably and reliably for a long period of time and to provide a good working environment for the inverter, please carry out relevant maintenance and inspection work on the inverter according to the inspection table.

**Table9-2: Routine Maintenance and Overhaul Points**

Inspection content	Method of determination	maintenance cycle
Fan	Check for abnormalities in fan operation, lagging, etc.	At least half a year/1 time
Air inlet and outlet	1. Regularly check whether there is dust accumulation in the air inlet and outlet, and remove the air inlet baffle plate to clean up when necessary; 2. The surrounding area should not	At least half a year/1 time

	<p>be affected by plants and grasses that affect the heat dissipation in front of the inverter, and it is necessary to inspect and get rid of grasses in time.</p> <p>3. The inverter should not be surrounded by piles of objects that affect the air inlet and outlet of the inverter, thus affecting the heat dissipation effect of the inverter;</p>	
Electrical Connection	<p>1. Check whether the cable connection is detached or loose. 2. Check the cable for damage, emphasizing the skin of the cable in contact with metal surfaces for signs of cuts.</p> <p>3. Check whether the sealing plug of the unused DC input terminal is detached.</p> <p>4. Check that the waterproof covers of the unused COM ports and USB ports are not locked.</p> <p>5. Check whether the AC port is blackened and heated abnormally, and check whether the screws of the distribution box are all locked;</p>	At least half a year/1 time
Ground point inspection	<p>1. Check whether the grounding point is connected normally and whether the grounding impedance is <math>&lt;1\Omega</math>;</p> <p>2. Check whether the grounding point is loose, rusty, etc. If so, please replace the screws and re-lock them in time;</p>	Half a year or 1 year/1 time
Equipment operation status check	<p>1. Whether the status of each indicator light is normal when the equipment is running, and whether there is any fault alarm message in the control panel;</p> <p>2. Check whether the parameters</p>	At least half a year/1 time

	<p>of inverter operation are within the prescribed range, focusing on DC voltage, DC current, DC power, AC voltage, AC current, frequency, power generation, daily power generation, cumulative power generation and other parameters are normal;</p> <p>3. Whether the equipment is normal without abnormal noise and odor;</p>	
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Please review the contents of the attached inspection form for more details.

## 9.5. Fan Maintenance and Replacement Instructions

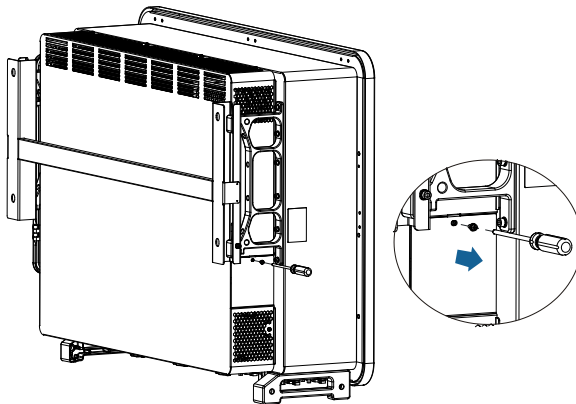
### 9.5.1 Fan Maintenance

#### Attention

Before replacing the fan, it is necessary to perform a power-down operation on the inverter.

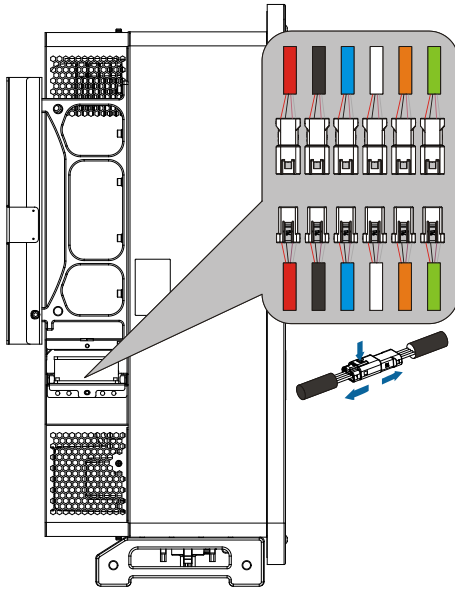
When replacing the fan, insulated tools must be used and personal protective equipment must be worn.

**Step 1:** Unscrew the screws and remove the small baffles and keep them in a safe place.

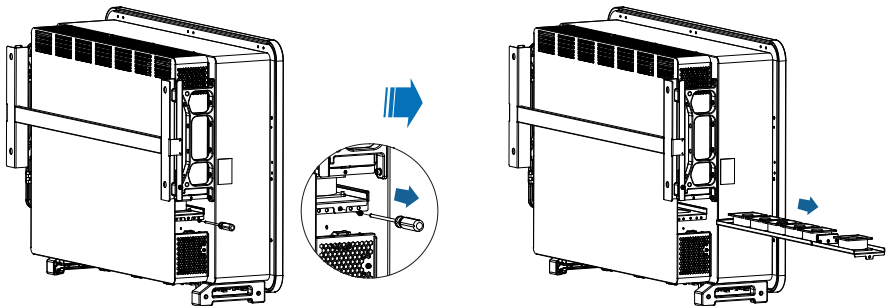


**Step 2:** Cut off the cable ties holding the fan cables and disconnect all the connecting terminals in turn.





**Step 3:** Remove the screws securing the fan bracket and pull the fan mounting bracket all the way out.



**Step 4:** Clean the fan using a soft-bristled brush or vacuum cleaner to remove any debris or mud left on the fan bracket.

**Step 5:** Push the cleaned fan bracket fully in against the mounting position and tighten the screws.

**Step 6:** connect the connectors according to the color and fan serial number.

**Step 7:** put the small baffle back on and tighten the screws.

## 9.5.2.Fan replacement

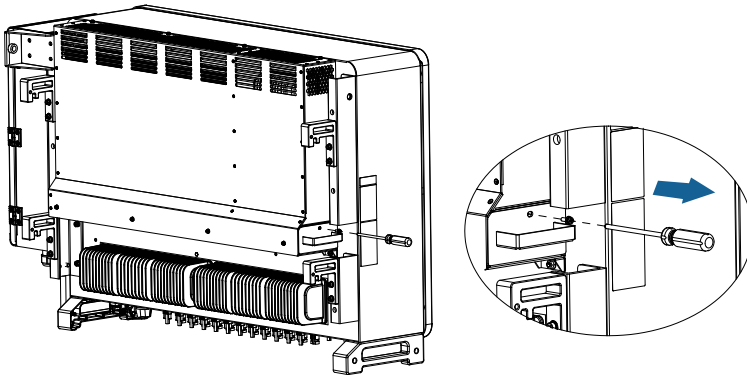
When the inverter reports a fan failure, a fan replacement is required for the inverter.

Attention:

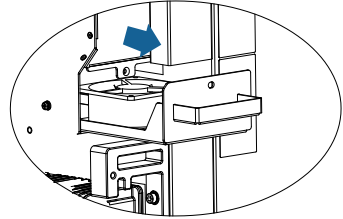
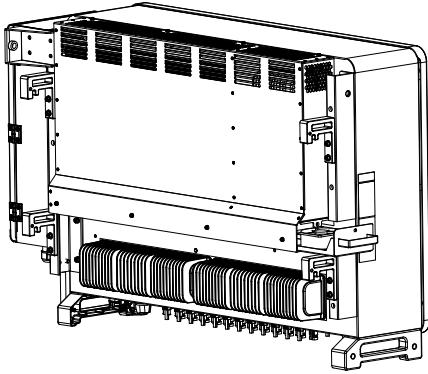
Before replacing the fan, it is necessary to perform a de-energizing operation on the inverter.

When replacing the fan, insulated tools must be used and personal protective equipment must be worn.

**Step 1:** Remove the fan bracket fixing screws and secure them.

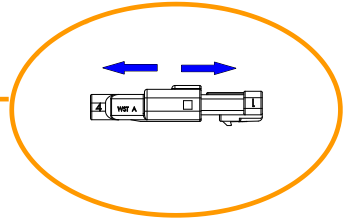
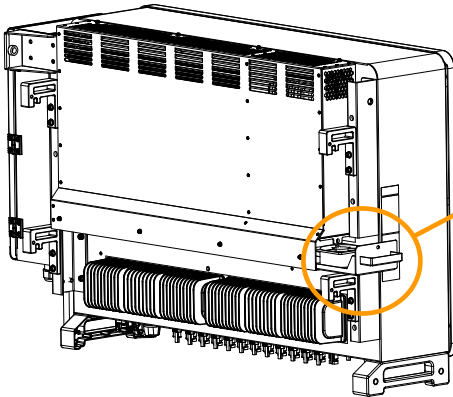


**Step 2:** pull out the fan mounting bracket about 5-10CM.

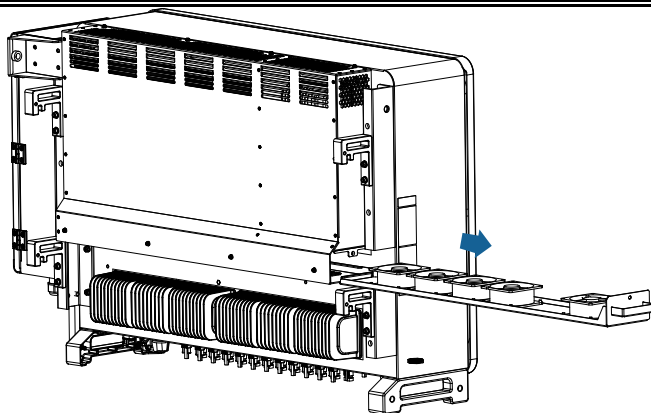


**Step 3:** Cut the fan cable retaining ties and unplug the connection terminals.

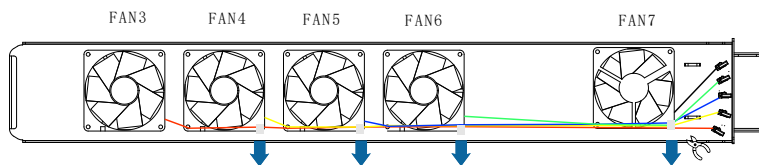
Note: You can't use brute force to pull out the terminal, you can use your fingernail (tweezers or a small screwdriver are recommended) to press down on the movable buckle, and then pull it out to the 2 ends.



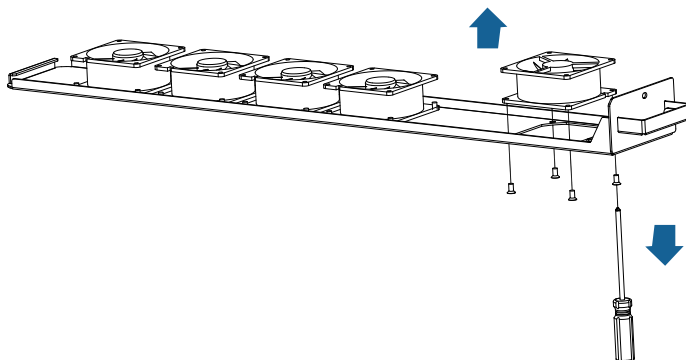
**Step 4:** Pull the fan mounting bracket all the way out.



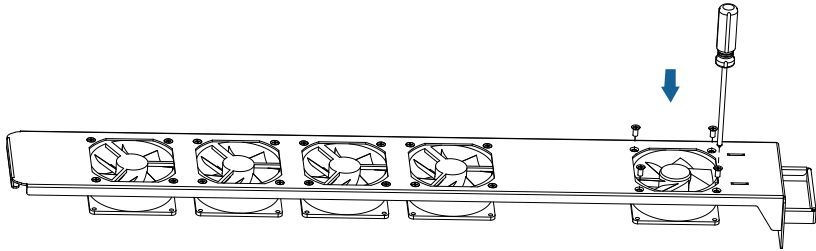
**Step 5:** Cut off the faulty fan (the outermost FAN 7 is used as an example below, all other fans work in the same way) tie.



**Step 6:** Remove the defective fan and store the removed screws properly.








**Step 7:** Install the new fan.



**Step 8:** After the new fan is installed, tie the fan wires in the same position as the original wires.

**Step 9:** push the fan bracket in, and then connect the connectors in sequence corresponding to the color and fan serial number identification.

Table 1, Comparison of Fan Failure Messages

Fan Name	FAN 3	FAN 4	FAN 5	FAN 6	FAN 7
Color	red	black	blue	white	yellow
Corresponding PCBA port	 CN03	 CN04	 CN05	 CN06	 CN07
Corresponding fault code	Fan 3 failure	Fan 4 failure	Fan 5 failure	Fan 6 failure	Fan 7 failure
	FanFault 3	FanFault 4	FanFault 5	FanFault 6	FanFault 7

Step 10: Push the fan mounting bracket all the way in and tighten the screws.

# 10. Technical Data

## About this chapter

Introduces the technical specifications for each model of the SOFAR 225/230KTL-HV solar grid-tie inverter.

## 10.1. Input parameters (DC)

Parameter	SOFAR 250/255KTL-HV
Max. input voltage	1500V
Rated input voltage	1160V
Start-up voltage	550V
MPPT operating voltage range	500V~1500V
Full power MPPT voltage range	800V~1300V
Number of MPPT trackers	12
Number for DC inputs	24
Max. inputcurrent per MPPT	30A
Max. input short circuit current per MPPT	50A

## 10.2. Output Parameter (AC)

Parameter	SOFAR 250KTL-HV	SOFAR 255KTL-HV
Rated output power	250kW	255kW
Maximum apparent power	250kVA@35°C/ 230kVA@45°C/ 220kVA@50°C	255kVA@35°C/ 230kVA@45°C/ 220kVA@50°C
Rated output current	180.5A	184A
Max. Output current	180.5A	184A
Nominal grid voltage	3W+PE, 800Vac	
Grid voltage range	640~920Vac	
Nominal frequency	50Hz / 60Hz	
Grid frequency range	45~55Hz / 55~ 65Hz	
Active power adjustable range	0~100%	
THDi	<3%	
Power factor	1 default (-0.8...+0.8 adjustable)	

### 10.3. Performance Parameter

Parameter	SOFAR 250KTL-HV	SOFAR 255KTL-HV
Max efficiency	99.02%	
European Weighted efficiency	98.7%	
MPPT efficiency	>99.9%	
EMC	EN/IEC 61000-6-2, EN/IEC 61000-6-4	
Safety standard	IEC 62109-1/2, IEC62116, IEC61727, IEC 61683, IEC60068-2-1/-2/-14/-30	
Grid standard	EN50549, EN50530, VDE 0126-1-1, VDE-AR-N 4110/4120, NB/T32004	
Protection	Leakage current/Anti-islanding /DC reverse polarity/ZVRT/AC and DC secondary lightning protection	
Ground fault monitoring	Yes	
PV-array string fault monitoring	Yes	
Zero voltage ride through	Yes	
PID recovery	Yes	
AFCI protection	Optional	
Protection class	Class I	
Oversvoltage category	AC:III, PV:II	
Input/ output SPD	PV: type II standard AC: type II Standard	



## 10.4. General Data

Parameter	SOFAR 250KTL-HV	SOFAR 255KTL-HV
Topology	Transformless	
Ambient temperature range	-30℃~+60℃	
Relative humidity	0%~100%	
DC Switch	Yes	
Cooling	Smart forced air cooling	
Max.altitude	5000m(> 4000m derating)	
Mounting	Wall mount	
Communication	RS485/PLC	
Display	LCD& Bluetooth +APP	
Self-consumption at night	<2W	
Degree of protection	IP66	
Dimension	1100.5×713.5×368mm	
Weight	99.3kg	

# 11. Quality Assurance

## Standard warranty period

The standard warranty period of inverter is 60 months (5 years). There are two calculation methods for the warranty period:

Purchase invoice provided by the customer: the first flight provides a standard warranty period of 60 months (5 years) from the invoice date;

The customer fails to provide the invoice: from the production date (according to the SN number of the machine), Our company provides a warranty period of 63 months (5.25 years).

In case of any special warranty agreement, the purchase agreement shall prevail.

## Extended warranty period

Within 12 months of the purchase of the inverter (based on the purchase invoice) or within 24 months of the production of the inverter (SN number of machine, based on the first date of arrival), Customers can apply to buy extended warranty products from the company's sales team by providing the product serial number, Our company may refuse to do not conform to the time limit extended warranty purchase application. Customers can buy an extended warranty of 5, 10, 15 years.

If the customer wants to apply for the extended warranty service, please contact the sales team of our company. to purchase the products that are beyond the purchase period of extended warranty but have not yet passed the standard quality warranty period. Customers shall bear different extended premium.

During the extended warranty period, PV components GPRS, WIFI and lightning protection devices are not included in the extended warranty period. If they fail during the extended warranty period, customers need to purchase and replace them from the our company.

Once the extended warranty service is purchased, our company will issue the extended warranty card to the customer to confirm the extended warranty period.

## Invalid warranty clause

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Equipment failure caused by the following reasons is not covered by the warranty:

The "warranty card" has not been sent to the distributor or our company;

Without the consent of our company to change equipment or replace parts;

Use unqualified materials to support our company 's products, resulting in product failure;

Technicians of non-company modify or attempt to repair and erase the product serial number or silk screen;

Incorrect installation, debugging and use methods;

Failure to comply with safety regulations (certification standards, etc.);

Damage caused by improper storage by dealers or end users;

Transportation damage (including scratches caused by internal packaging during transportation).Please claim directly from the transportation company or insurance company as soon as possible and obtain damage identification such as container/package unloading;

Failure to follow the product user manual, installation manual and maintenance guidelines;

Improper use or misuse of the device;

Poor ventilation of the device;

The product maintenance process does not follow relevant standards;

Failure or damage caused by natural disasters or other force (such as earthquake, lightning strike, fire, etc.)

Version 1.0



ENERGY TO POWER YOUR LIFE

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