User manual

Solar Grid-tied Inverter

Product Model: SOFAR 250-255KTL-HV

Shenzhen SOFARSOLAR Co., Ltd.

Contents

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.

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Document Updates

V1.2 2023-03-09

●Initial version

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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**

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

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

1.Basic Safety Information

Outlines of this Chapter

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

 Note	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.

Qualified Person

When inverter is working, it contains lethal voltages and went hot in some area. Improper installation or misoperation could cause serial 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.

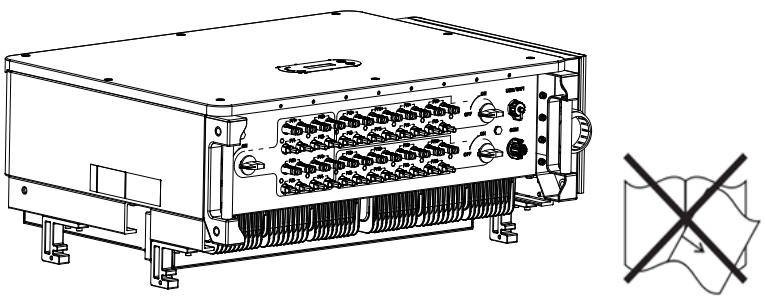
Label and Symbols

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 warming symbol attache the product which contact information of safety operation. The warming 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.

 Danger	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
 Warming	All operation must accomplish by certified electrical engineer ● Must be trained; ● Completely read the manual operation and understand all information
 Attention	Must get permission by local utility company before connecting to grid and the connection must be done by certified electrical engineers

Operation

 Danger	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. Attention to any electrical relevant instruction and document.
 Attention	Enclosure or internal components may get hot during operation. Do not touch hot surface or wear insulated gloves. Keep it away from kids !

Maintenance and repair

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

 Attention	Inverter should not work again until removing all faults. If any repair work is required, please contact local authorized service centre. Should not open the inverter cover without authorized permit, SOFARSOALR does not take any responsibility for that.

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

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

1.2. Symbols and signs

 Danger	High voltage of inverter may be harmful to health! Only certified engineer can operate the product; Juveniles, Disable, should not use this product;
 Caution	Caution of burn injuries due to hot enclosure! Only touch the screen and pressing key of the inverter while it is working.
 Attention	PV array should be grounded in accordance to the requirements of the local electrical grid company.
 Warning	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.

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
	This is a residual voltage in the inverter!	After disconnect with the DC side, there is a residual voltage in the inverter, operator should wait for 10 minutes to ensure the capacitor is completely discharged.
	Caution of high voltage and electric shock	The products operates at high voltages. Prior to performing any work on the product, disconnect the product from 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

Product Dimensions

Introduce the filed of use and the dimensions of the product.

Function Description

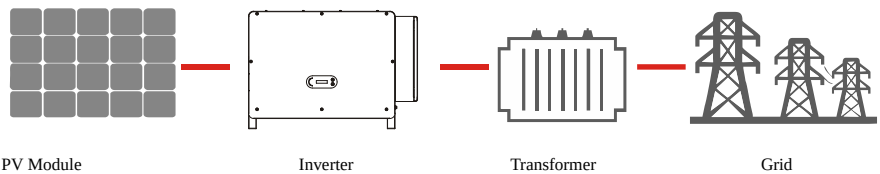
Introduce working principle and internal components.

Efficiency Curves

Introduce the efficiency curves of the product.

2.1. Intended Use

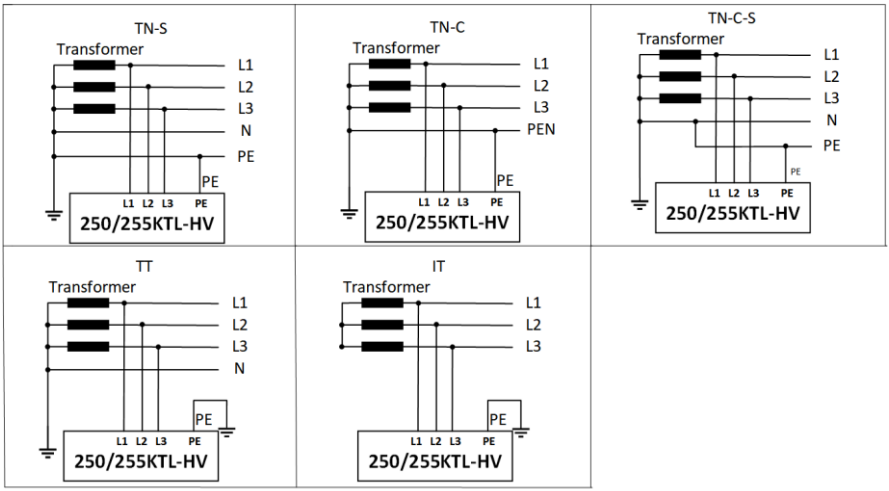
SOFAR 250/255KTL-HV is a transformerless on grid PV inverter, that converters the direct current of the PV array to the grid-compliant, three-phase current and feeds into the utility grid.



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



250/255KTL-HV Supported power grid type

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

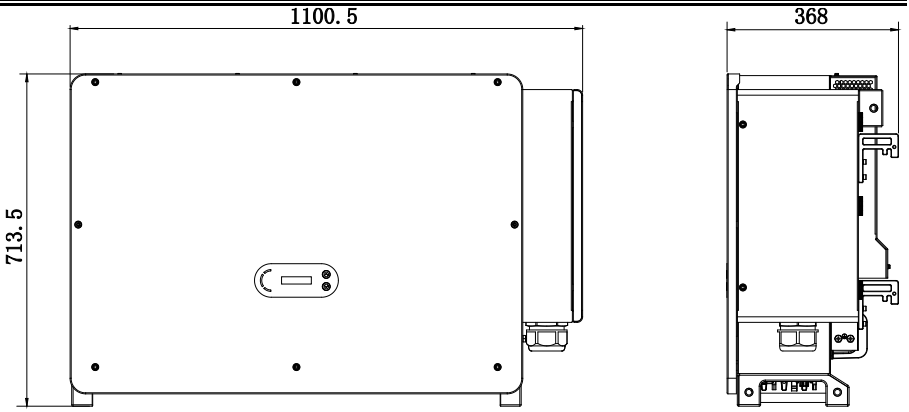
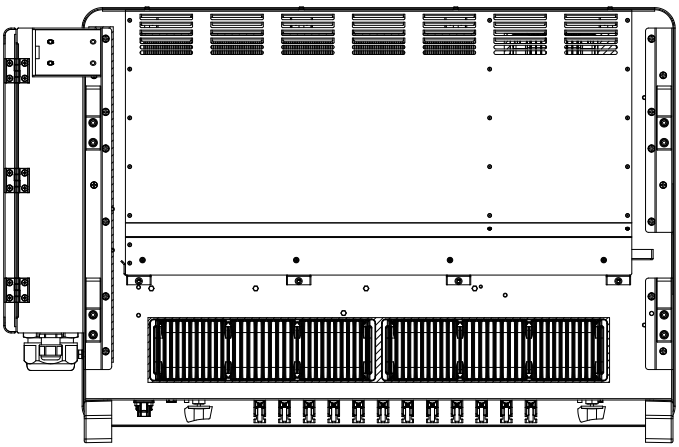


Figure 2-2 Product front view and left view dimensions



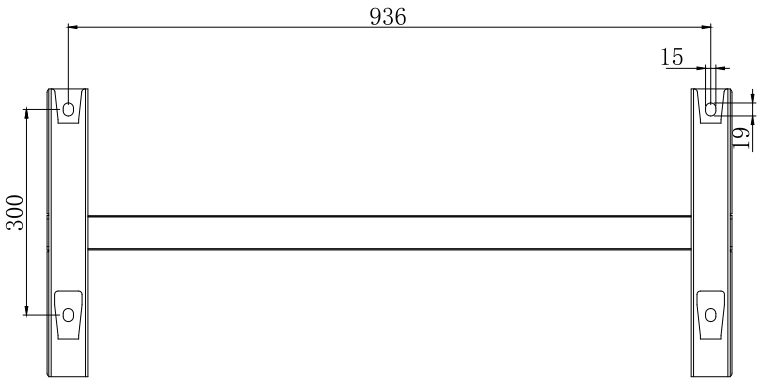


Figure 2-3 Product back view and bracket dimensions

◆ **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.

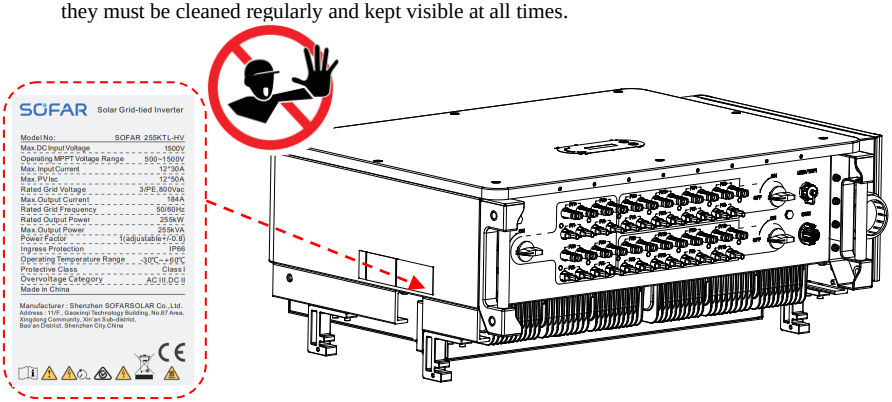


Figure 2-4 Product label

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.

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-Fior PLC.`

F. Software update

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

G. PID （optional function）

The PID effect can be recovered at night to protect the PV modules.

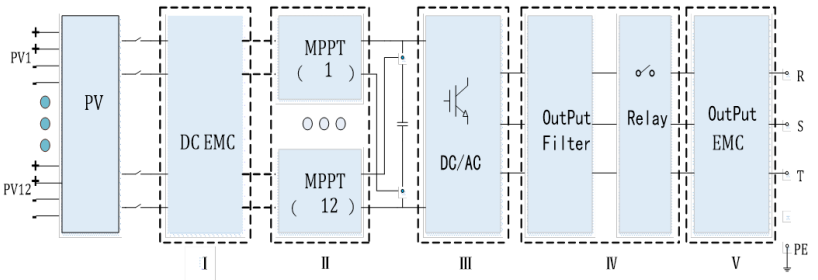
H. H. AFCI (optional function)

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

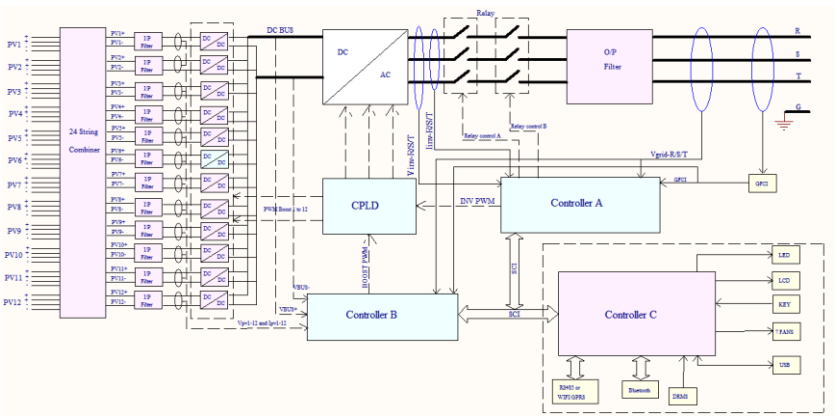
system.

2.3. Electrical block diagram

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



Schematic diaram



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℃～70℃, Relative humidity 0～95%, no condensation.

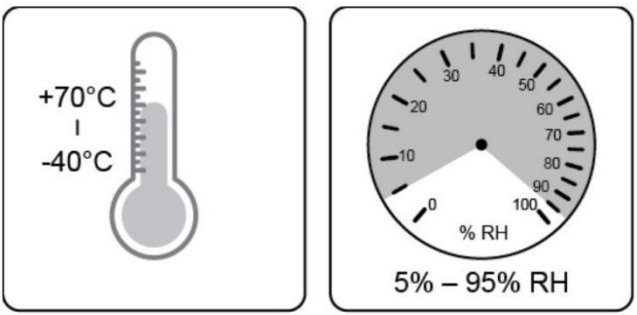


Figure 3-1Storage temperature and humidity

- 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.

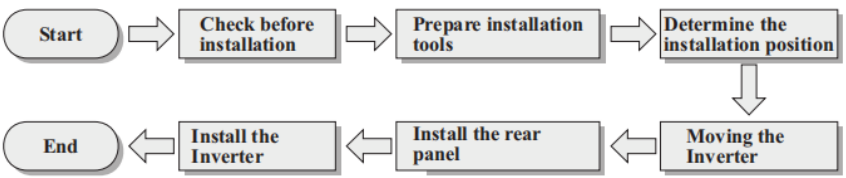
4. Installation

Outlines of this Chapter

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

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

4.1. Installation Process



4.2. Checking Before Installation

Checking Outer Packing Materials

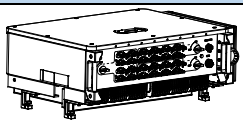
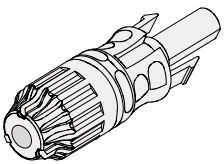
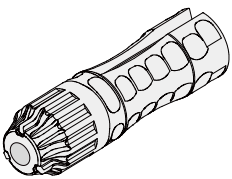
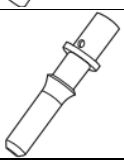
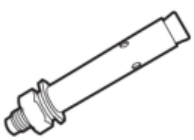
Before unpacking, please check the condition of the outer package materials if any damaged found, such as holes, cracks, please not unpack the product, contact your distributor immediately. Recommend installing the product within 24 hours after unpacking the package.

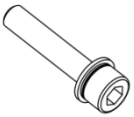
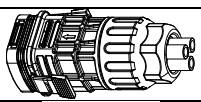
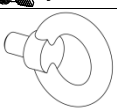
Checking Deliverable

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 4-1Components and mechanical parts that inside the package

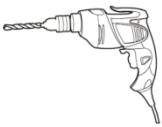
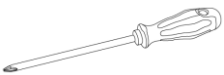
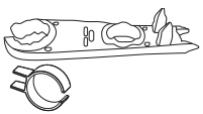
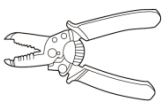
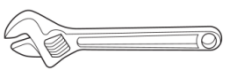
No	Pictures	Description	Quantity
1		SOFAR 250/255KTL-HV	1 pcs
2		Rear Panel	1 pcs
3		PV+ input connector	24 pcs
4		PV- input connector	24 pcs
5		PV+ metal pin	24 pcs
6		PV- metal pin	24 pcs
7		M10*90Hexagon screws	4 pcs

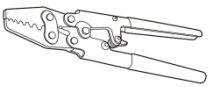
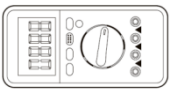
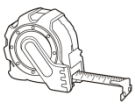
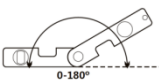
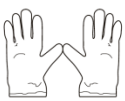
8		M6*30 Hexagon screws	2 pcs
9		Manual	1 pcs
10		Warranty Card	1 pcs
11		Outgoing inspection report	1 pcs
12		Quality Certificate	1 pcs
13		COM 16pin connector	1 pcs
14		M12 lifting bolt	2 pcs

4.3. Tools

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 @ 10mm	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

Select a appropriate location to install the product to make sure the inverter can

work in a high efficiency condition. When selecting a location for the inverter, consider the following:

Note: Install vertical or backward tilt within 0-75°,Do not install forward or upside down!

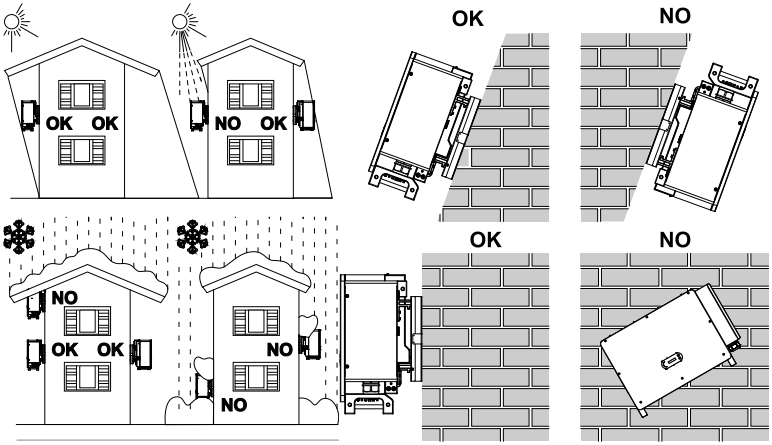
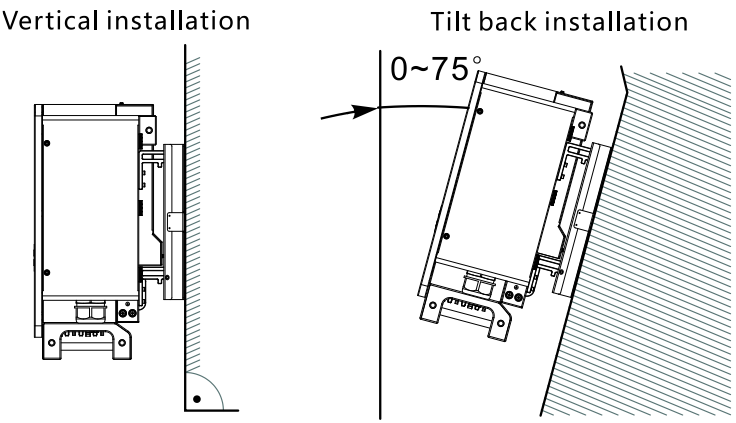


Figure 4-1Installation Position Selection



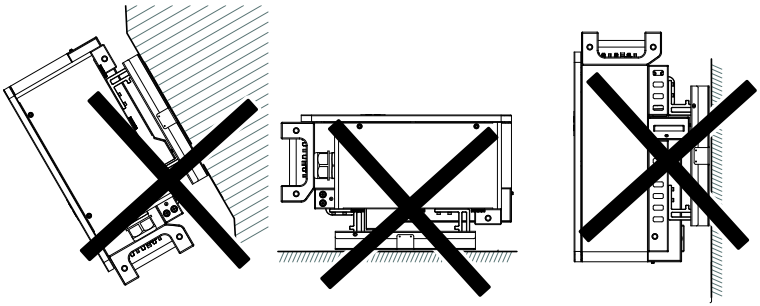
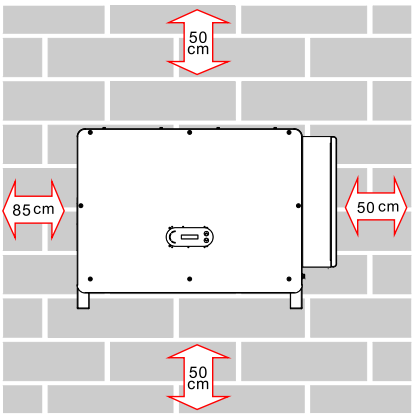


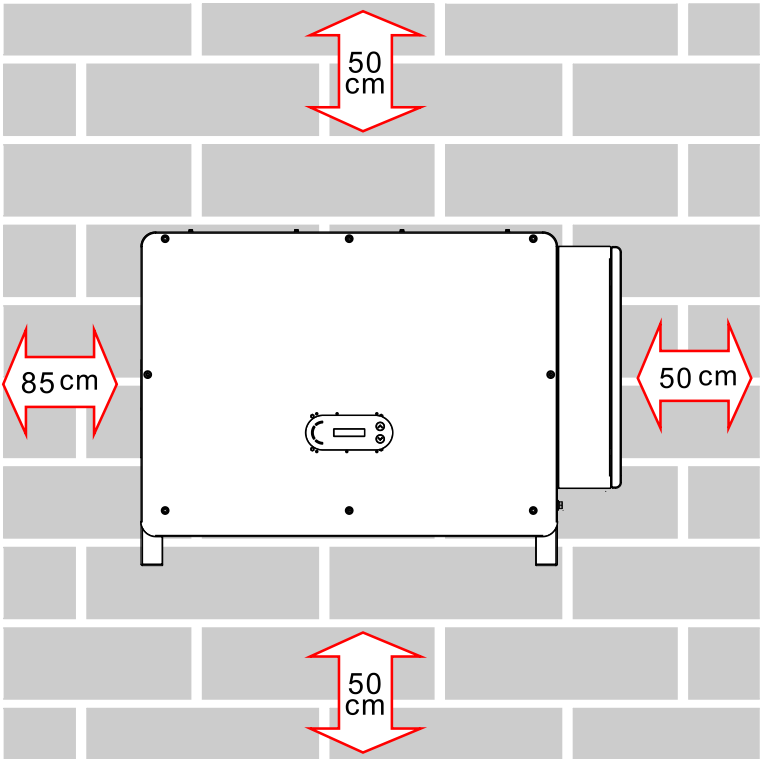
Figure 4-2Clearance for single inverter



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.



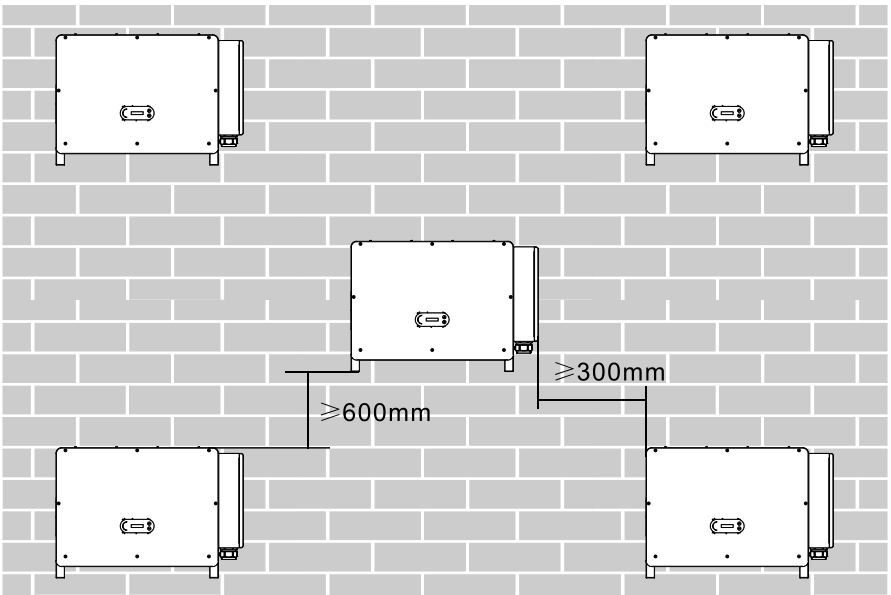


Figure 4-3 Clearance for multiple inverters

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.

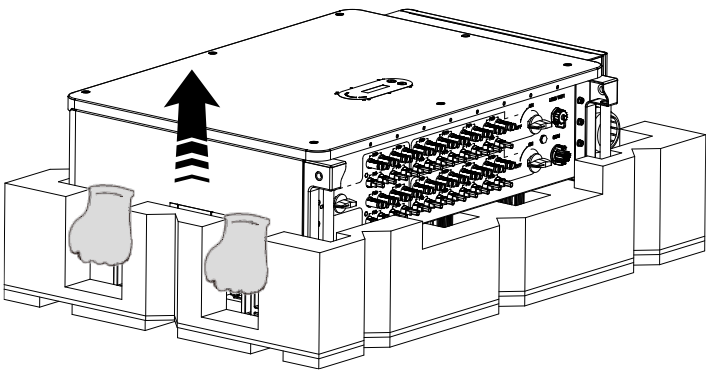


Figure 4-4 Move inverter from package

Attention	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.

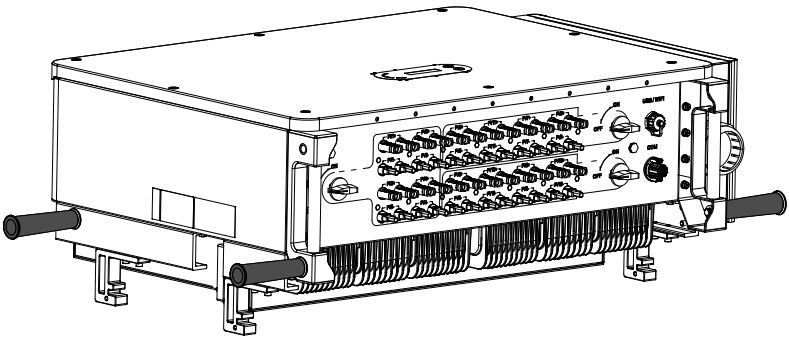


Figure 4-5 auxiliary handle position

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).

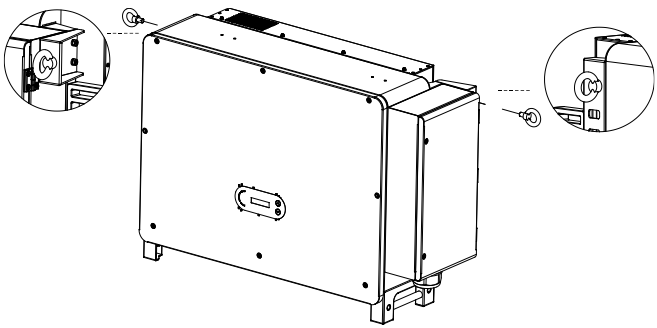
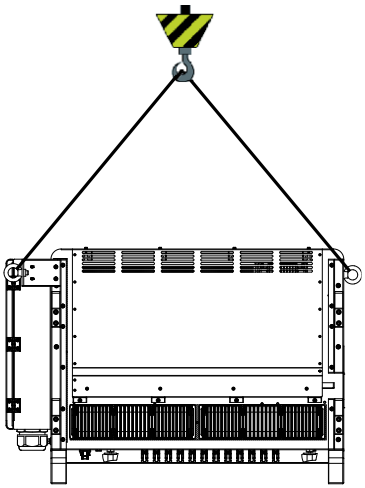


Figure 4-6 Installation of Rings

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.

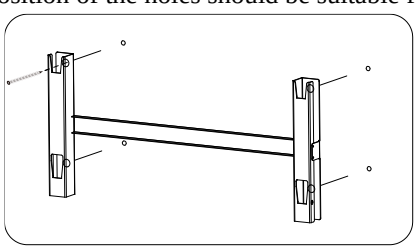


Attention	Keep balance when lifting the inverter, avoid to crash on wall or other objective. Stop working in bad weather condition such as raining, heavy fog, winding.

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.



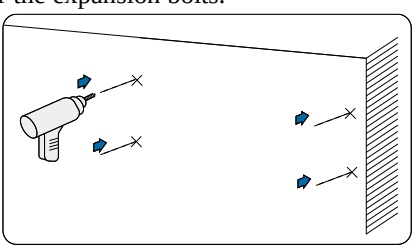


Figure 4-8 Drilling holes on the mounting wall

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

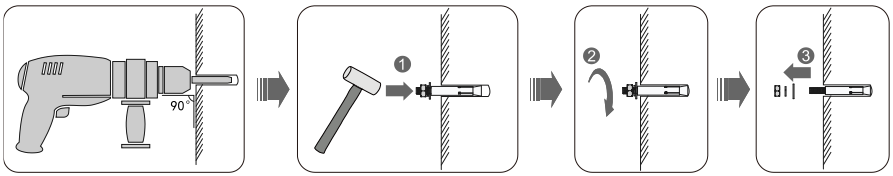


Figure 4-9 Screws into the holes

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.

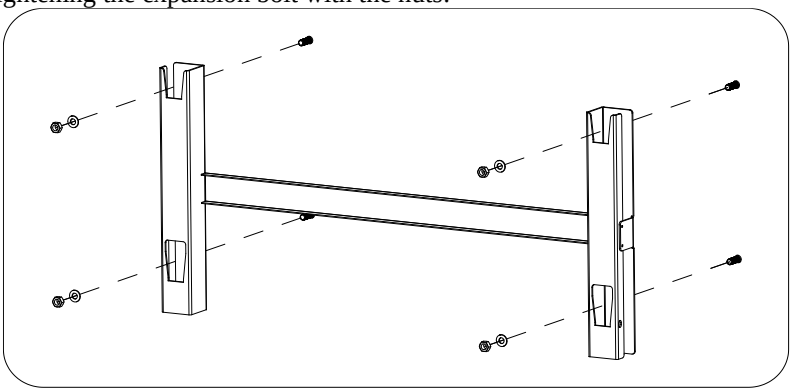
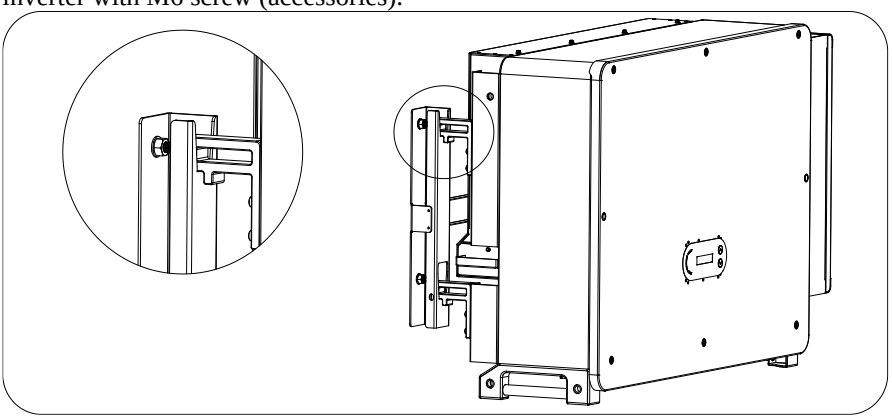


Figure 4-10 Install rear panel

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



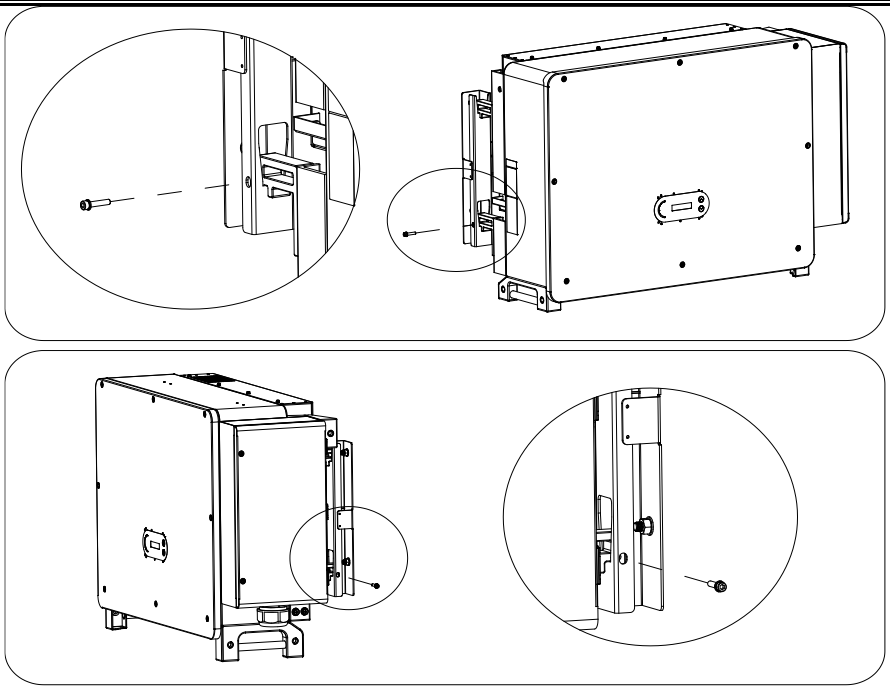


Figure 4-11 Fix inverter

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.

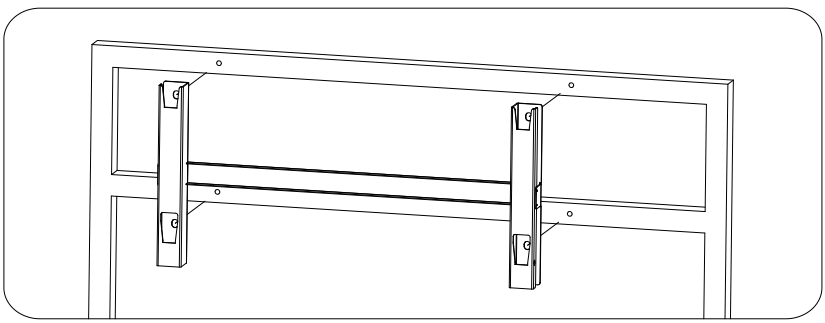


Figure 4-12 Ensure hole position

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

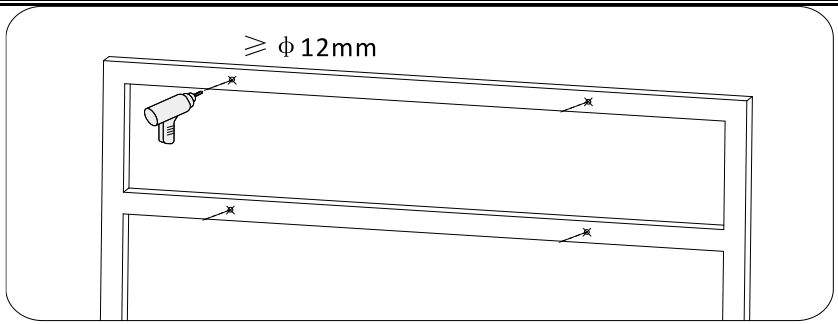


Figure 4-13 Drilling holes

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）.

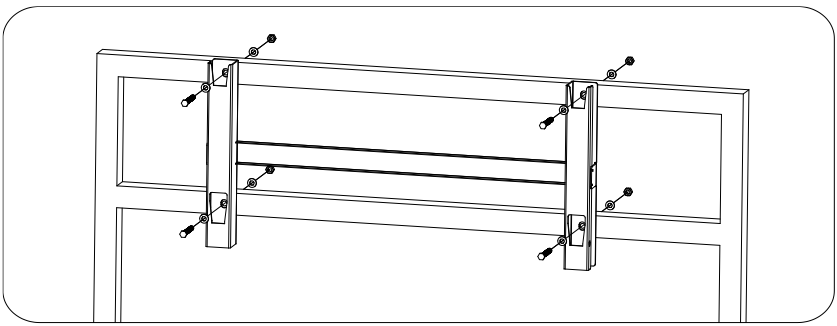
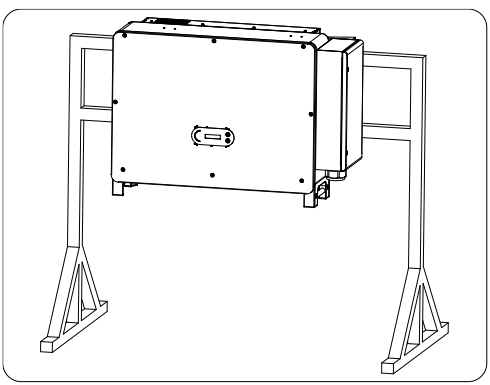


Figure 4-14 Fix wall bracket

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 1.3m, use auxiliary handle for installation. Otherwise, use lifting equipment.

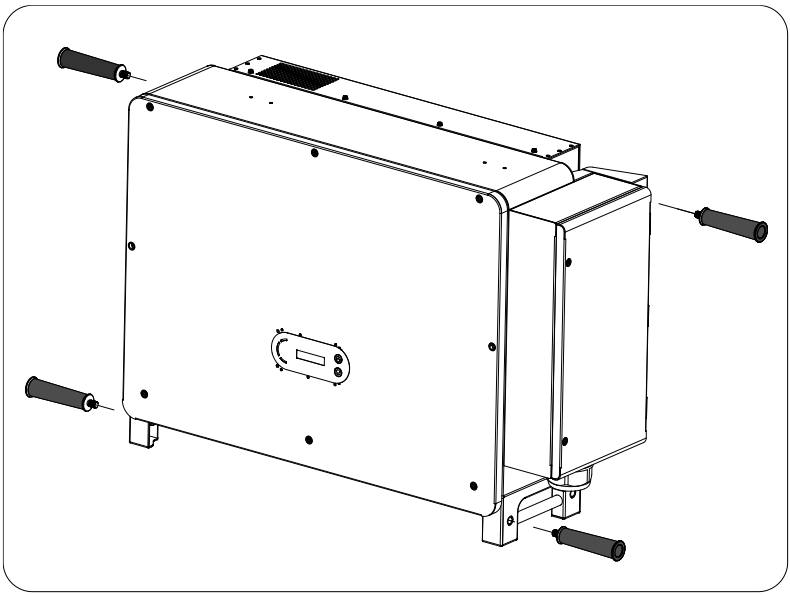


Figure 4-15 Installation position of auxiliary handle

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.

 Attention	Installation and maintenance should be done by certified electrical engineer.
 Danger	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.
 Note	For this product, the open circuit voltage of PV strings should not greater 1500V.

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 DC input connection

Connect PV array with inverter by DC cable.

5.6 Communication Connection

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

5.7 Safety check

Before operate inverter, check the PV array, inverter DC side safety connection and AC side safety connection.

5.1. Electrical Connection

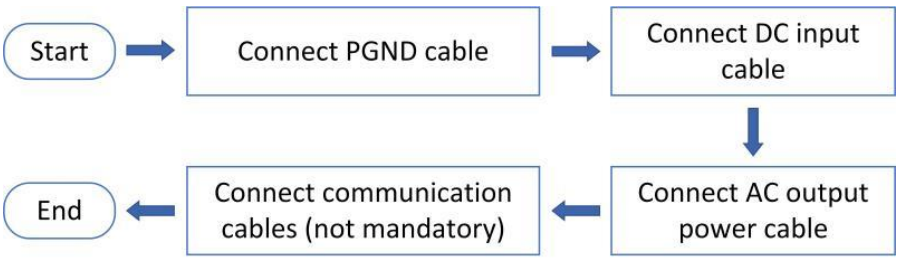
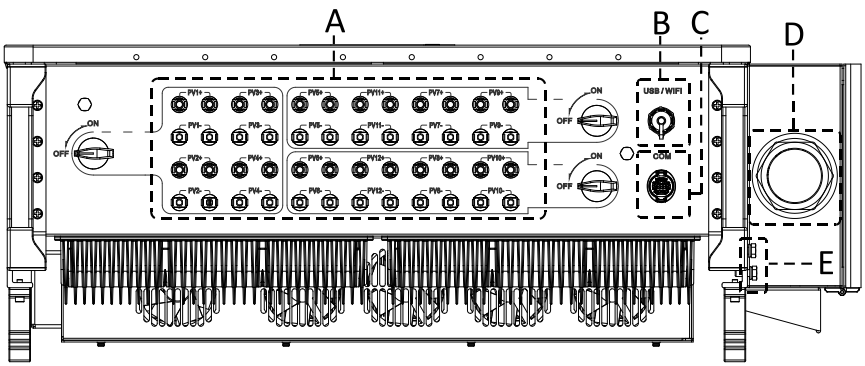


Figure 5-1 Flowchart for connecting cables to the inverter

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,GPRS Communication

C	RS485 Modbus/DRMs	RS485/DRMs	RS485 Communication port/ DRMs port
D	AC output terminals		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 usingground cable

Note	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.

Preparation: prepare the grounding cable (recommend 16mm²yellow-green outdoor cable and M8 OT Terminal)

Procedure:

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

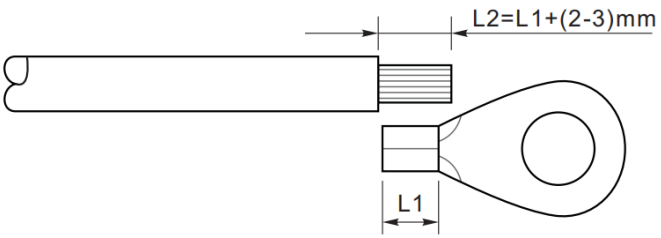


Figure 5-2 Grounding connection instruction（1）

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

Step 2: Insert the exposed core wires into the OT terminal and crimp them by using a crimping tool, as shown as figure 5.3. Recommend using OT terminal:

OTM8, Cable: ≥16mm^2.

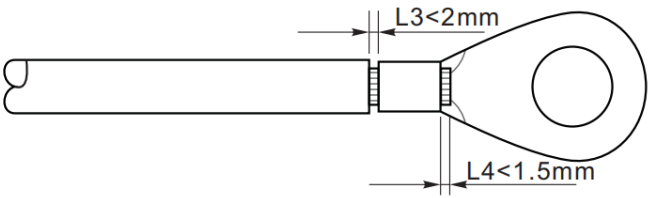
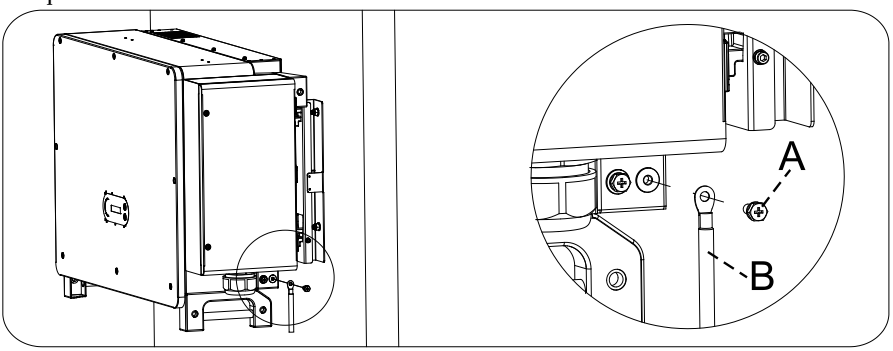


Figure 5-3 Grounding connection instruction（2）

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.

Step1: Use M6 driver to unscrew the two screws on the wiring box.

Step 2: Open wiring box cover.

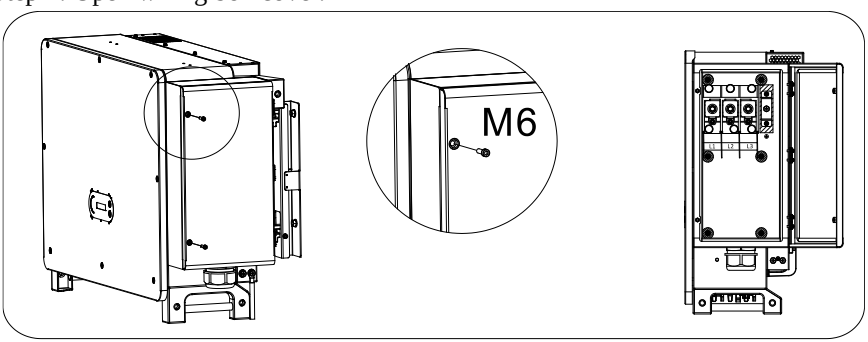


Figure 5-5 Open wiring box

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.
- When use copper core cable, please use copper terminal connector.
- When use copper clad aluminum cable, please use copper terminal connector.
- When use aluminum core cable, please use Copper and aluminum transition terminal connector or aluminum terminal connector.

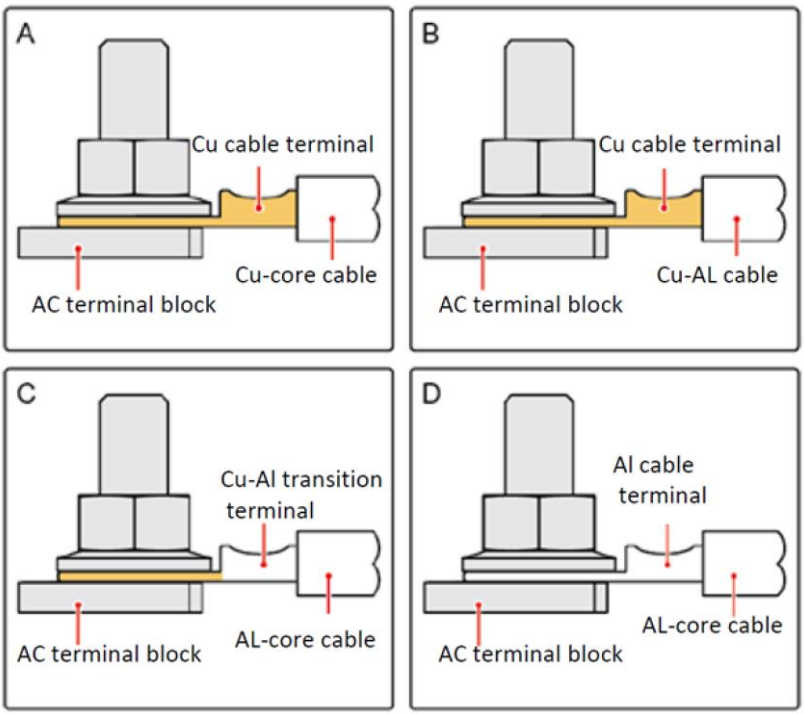


Figure 5-6 OT/DT Requirement for terminal connection

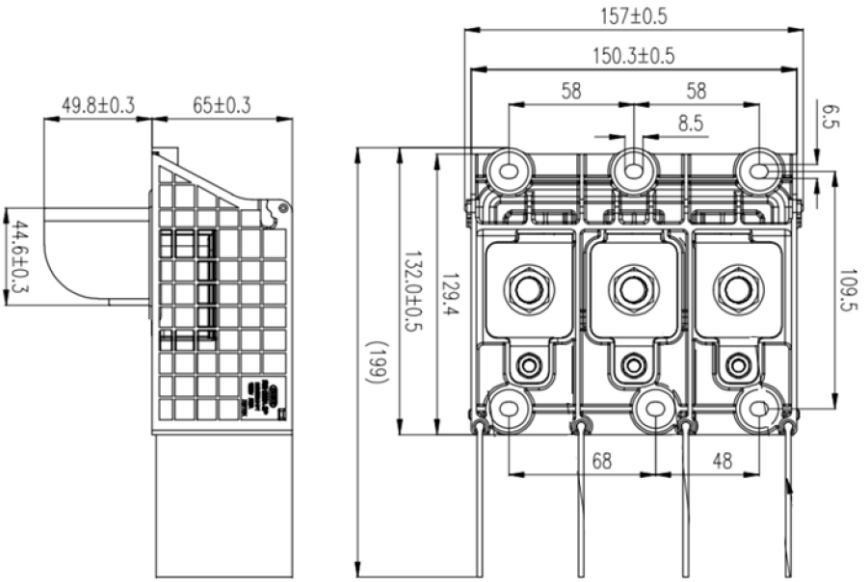


Figure 5-7 AC Terminal size

5.4.4 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

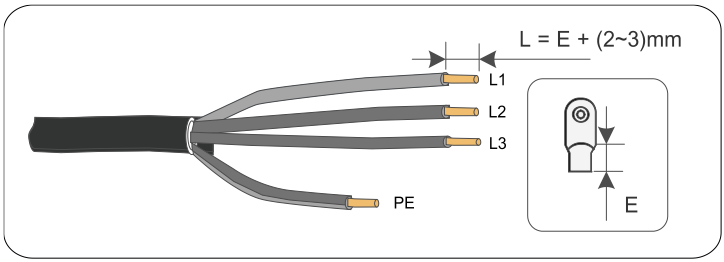
Name	Type	Area(mm²)
AC Cables	Recommended：Outdoor four-core/five-core copper or aluminum wire	Copper Wire: 95~185; Aluminum Wire: 120~240; PE Wire: reference 5.3

Step1: Open the cover, refers to section 5.3.1.

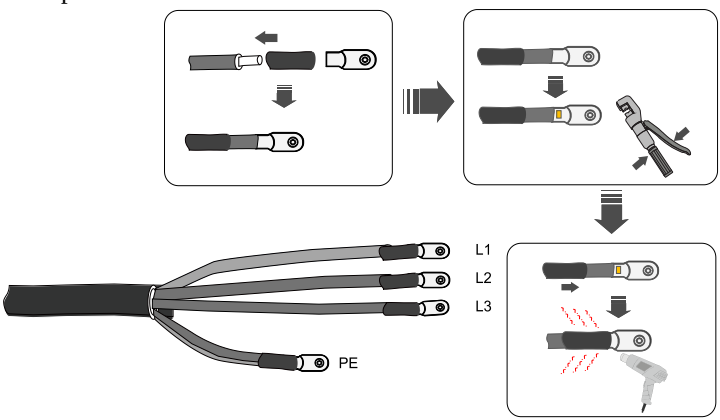
Step 2: Turn OFF the AC circuit breaker and secure against reconnection.

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.

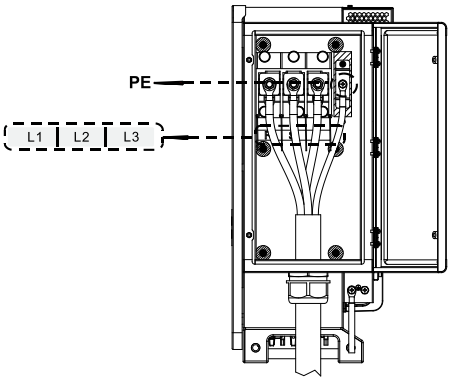
Step 4: Remove the insulation layer of an appropriate length according to figure below.



Step 5: Crimp the terminal.



Step 5: Depending on the grid configuration, connect L1, L2, L3 and N to the terminals according to the label and tighten the screw on the terminal using a screwdriver.



Note:

- Phase lines use M12 terminal connector, PE line use M8 terminal connector.

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

be careful:

- Between the inverter and the tracking control box, it is necessary to connect the protection disconnector fuse group or fuse disconnector. Specification: voltage ⩾ 800V, current 16a, protection type GM.
- The cable length between the power line terminal and the disconnector fuse group or fuse disconnector shall be ⩽ 2.5m.
- 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:

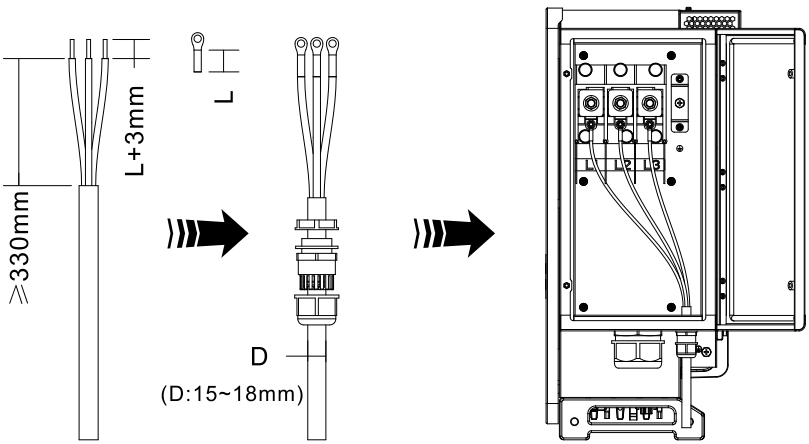
Area(mm²)	Cable outer diameter(mm)
4.0~6.0	15~18

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.
- Ensure the maximum short circuit current of PV strings should less than the maximum inverter DC current input.And three “DC switch” is in OFF position. Otherwise, it may cause high voltage and electric shock.

- Ensure PV array have good insulation condition in any time.
- Ensure same PV string should have the same structure, including: same model, same number of panels, same direction, same azimuth.
- Ensure PV positive connector connect to inverter positive pole, negative conenctor connect to inverter negative pole.
- Please use the connectors in the accessories bag. The damage cause byincorrect is not including in the warranty.

Table 5-2 Recommend DC cable size

Copper cable cross section area（mm^2）		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).

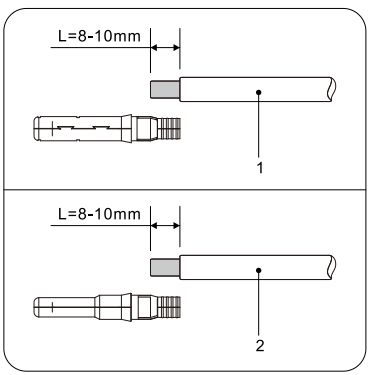
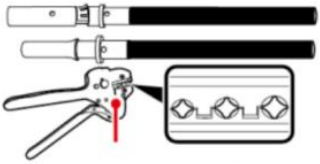


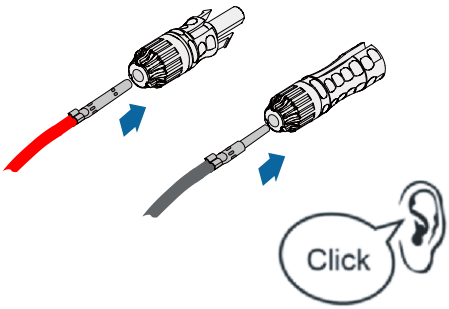
Figure 5-8 DC cable connection（1）

Step2: Crimp the PV metal contact pin to the striped cable using a proper crimping pliers.



crimping tool

Step3: Insert wire into the connector cap nut and assemble into the back of male or female plug, When you heard a “click”, the pin tact assembly is seated correctly. (3. Positive Connector, 4. negative connector).



Step 4: Measure PV voltage of DC input with multimeter, verify DC input cable polar and connect DC connector with inverter until hearing a slight sound indicated connection succeed.

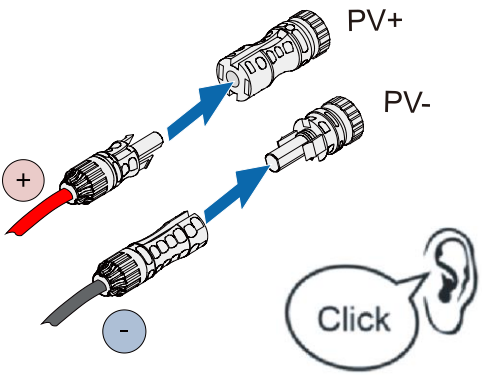
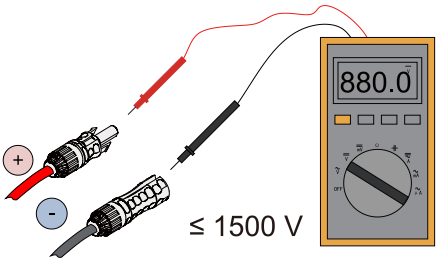


Figure 5-9DC cable connection



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

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

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

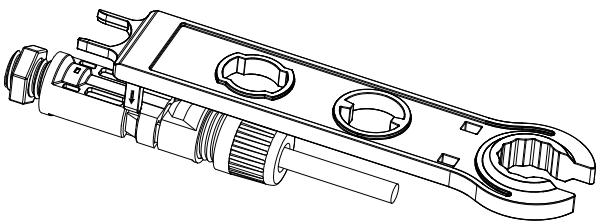


Figure 5-10 Removal DC connector

5.7. Communication Connection

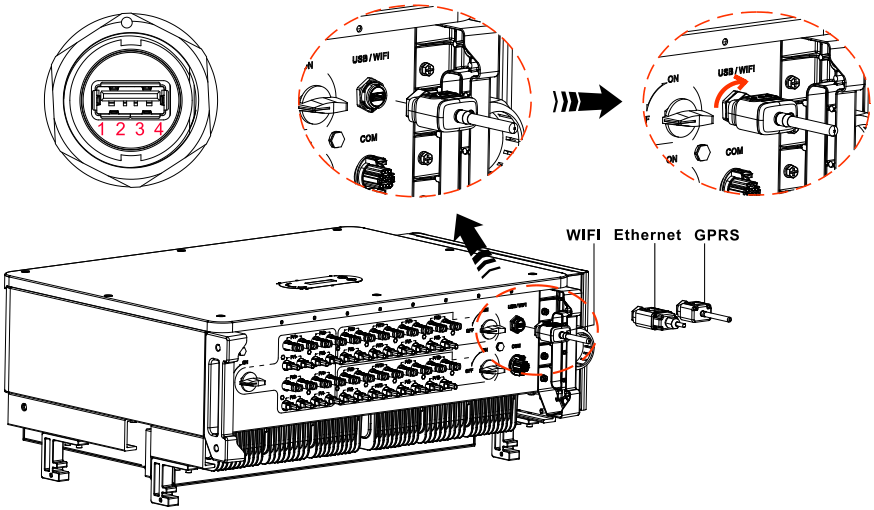
Note： When layout the wiring diagram, please separate the communication wiring and power wiring in case the signal be affected.

5.6.1 USB/WIFI Port

Port Description：

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

Procedure：



WIFI/GPRS/Ethernet

By the USB acquisition stick (WIFI/GPRS/Ethernet), 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 deviceSN.

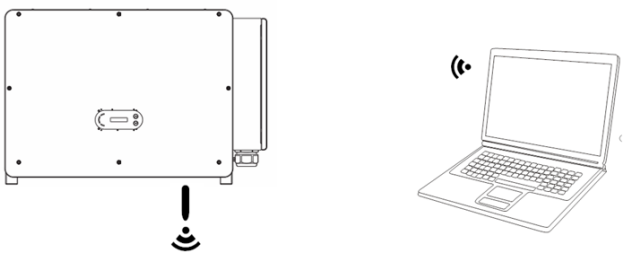


Figure 5-11 Connect one USB acquisition stick (WIFI version) to wireless router

5.6.2 COM—Multi function communication port

Table 5-3 Recommend com cable size

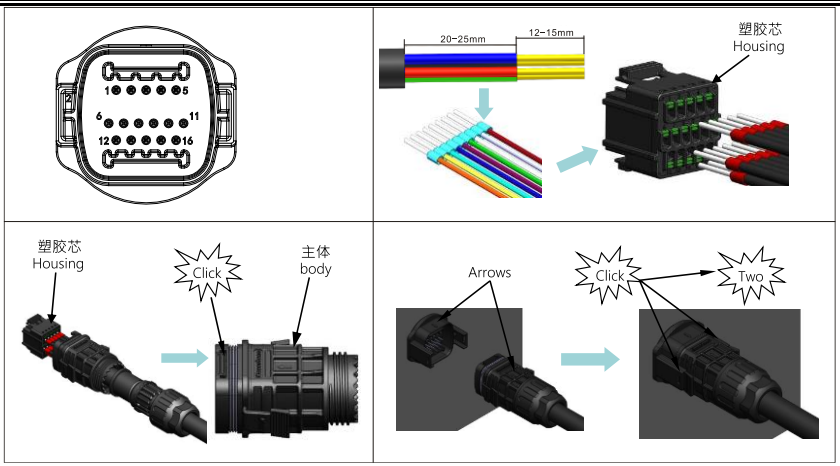
Name	Type	Outer	Area

		diameter(mm)	(mm^2)
RS485 Communication Wire	Outdoor shielded twisted pair meets local standards	3core：4~8	0.25~1

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 RS485B	Electric meter RS485 signal-	
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

Procedure：



Communications Port Description

Logic interface

(a) Logic interface for AS/NZS 4777.2:2020, also known as inverter demand response modes (DRMs).

The inverter will detect and initiate a response to all supported demand response commands within 2 s. The inverter will continue to respond while the mode remains asserted.

Table 4-3 Function description of the DRMs terminal

Pin NO.	Function
9	DRM1/5
10	DRM2/6
11	DRM3/7
12	DRM4/8
13	GND
8	DRM0

NOTE: Supported DRM command: DRM0, DRM5, DRM6, DRM7, DRM8.

(b) Logic interface forEN50549-1:2019 and VDE-AR-N 4105:2018-11, is in order to cease active power output within five seconds following an instruction being received at the input interface.

Figure 4-15 Inverter – RRCR Connection

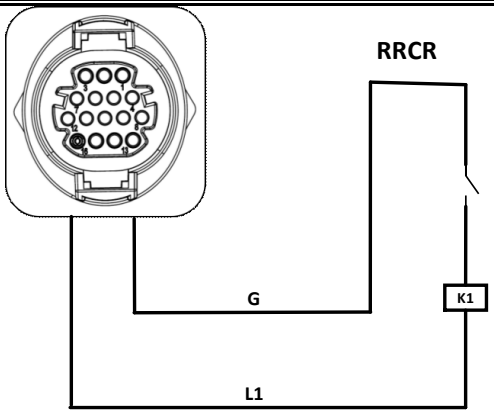


Table 5-13 Function description of the terminal

Pin NO.	Pin name	Description	Connected to (RRCR)
9	L1	Relay contact 1 input	K1 - Relay 1 output
13	G	GND	K1 - Relay 1 output

Table 4-7 The inverter is preconfigured to the following RRCR power levels.

Relay status: close is 1, open is 0

L1	Active Power	Power drop rate	Cos(ϕ)
1	0%	＜5 seconds	1
0	100%	/	1

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.

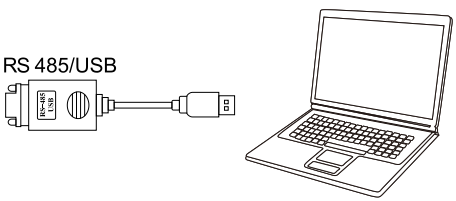


Figure 5-14 Picture of the RS485/USB converter and PC terminal

If only one SOFAR 250/255KTL-HV is used, use a communication cable, refer to **section 5.6.2** for COM pin definition, and choose either of the two RS485 ports.

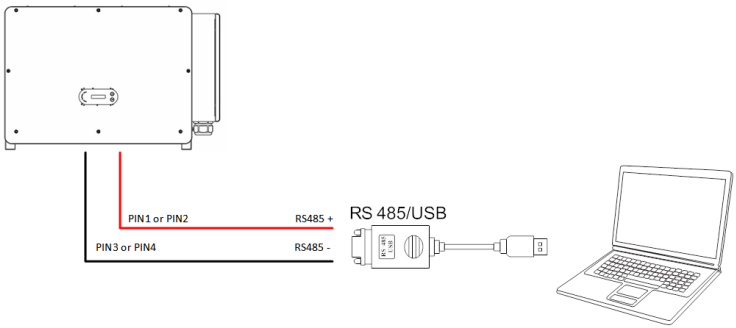


Figure 5-15 A single SOFAR 250/255KTL-HV connecting communications

Note	● The length of the RS485 communication cable should be less than 1000 m. ● The length of the WIFI communication cable should be less than 100 m.

5.6.3PLC（Multi inverter monitoring system）

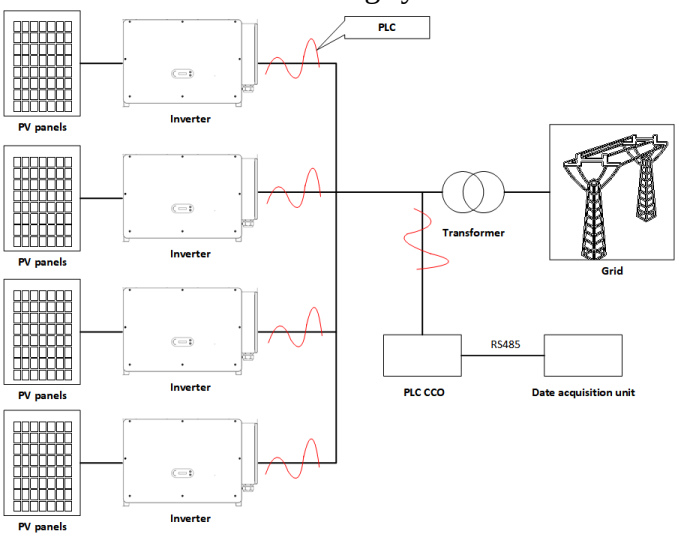


Figure 5-16Multi inverter monitoring system

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.

AC grid connection

Use multimeter to confirm that three lines and PE line are connect correctly.

DC pv connection

Use multimeter to confirm that positive pole and negative pole of PV strings, and the Voc of each string is lower than the inverter max DC input.

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-HVinverter will start automatically. Screen showing “normal” indicates correct operation.

NOTE 1: Choose the correct country code. (refer to section 7.3 of this manual).

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 8.1 of this manual —— trouble shooting for help.

7.Operation interface

Outlines of this chapter

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

7.1. 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

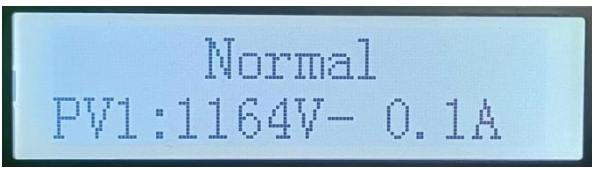
"Normal" Green light ON = Normal

"Alarm" Red light ON= recoverable or unrecoverable faulty

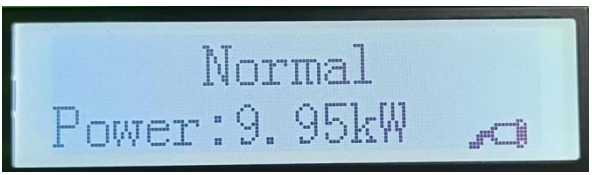
7.2. Standard Interface

LCD interface indicated inverter status, alarm information, communication connection, PV input current and voltage, grid voltage,current and frequency, today generation, total generation.

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

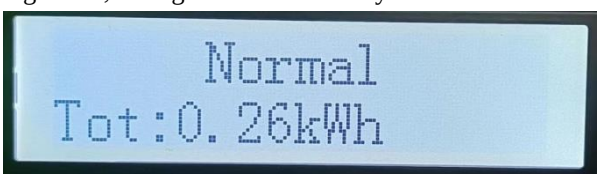


Inverter working status, PV generated power

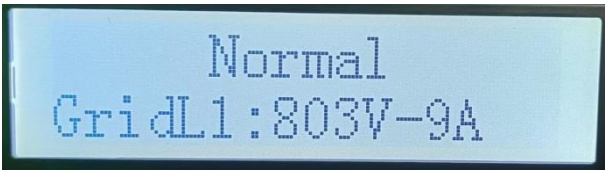


Inverter working status, today generated electricity 0

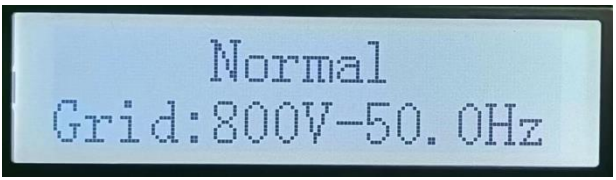
Inverter working status, total generated electricity



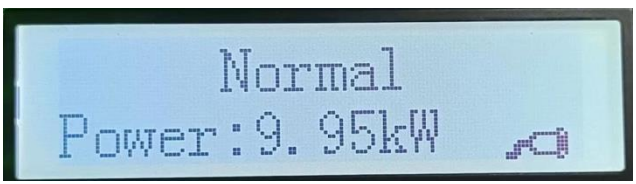
Inverter working status, grid voltage and current



Inverter working status, grid voltage and frequency



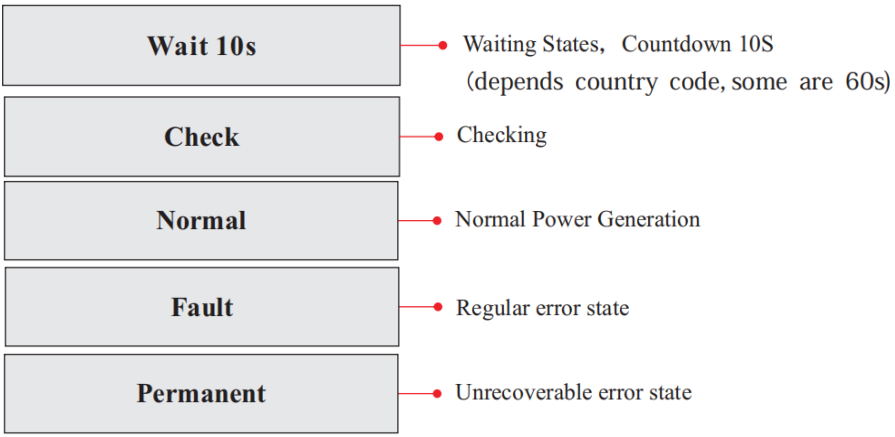
Inverter working status, Wi-Fi/ RS485 status



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.

7.3. 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	**8.Set Input mode**
	2.Clear Energy	**9.Set Language**
	3.Clear Events	**10.Set RefluxP**
	4.Country Country	**11.Logic Interface**
	5.On-Off Control	**12.IV Curve Scan**
	6.Set Energy	**13.PID**
	7.Set Address	

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	**7.Input Mode**
	2.Serial Number	**8.Remote State**
	3.Soft Version	**9.Reflux Power**
	4.Hard Version	**10.DRMs0**
	5.Country	**11.DRMn**
	6.Modbus Address	**12.MPPT Scan**

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.

7.4. Updating Inverter Software

SOFAR 250/255KTL-HV inverter offer software upgrade via USB flash drive to maximizeinverter 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.

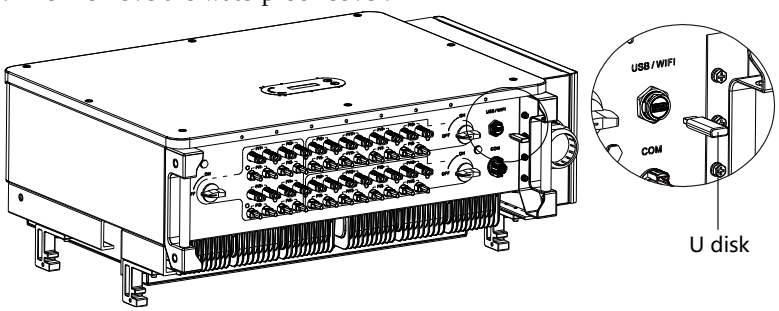


Figure 7-1Remove communication broad cover

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[6.3(E)].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 "UpdateDSP2 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 Systemlnfo>>3.SoftVersion.

8. Trouble shooting and maintenance

8.1. Troubleshooting

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

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

2) 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 7.3 (B).

Table 8-1 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. 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
ID002	GridUVP	The grid voltage is too low	
ID003	GridOFP	The grid frequency is too high	
ID004	GridUFP	The grid frequency is too low	

			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. 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.
ID007	LVRT fault	LVRT function is faulty	
ID008	IslandFault	Island protection error	
ID009	GridOVPInstant1	Transient overvoltage of grid voltage 1	
ID010	GridOVPInstant2	Transient overvoltage of grid voltage 2	
ID011	VGridLineFault	Power grid line voltage error	
ID013	RefluxFault	Anti-Reflux function is faulty	
ID017	HwADFaultIGrid	Power grid current sampling error	
ID018	HwADFaultDCI	Wrong sampling of dc component of grid current	
ID019	HwADFaultVGrid(DC)	Power grid voltage sampling error (DC)	
ID020	HwADFaultVGrid(AC)	Power grid voltage sampling error (AC)	
ID021	GFCIDeviceFault(DC)	Leakage current sampling error(DC)	
ID022	GFCIDeviceFault(AC)	Leakage current sampling error(AC)	
ID024	HwADFaultIdc	Dc input current sampling error	
ID026	HwADErrIdcBranch	\	
ID029	ConsistentFault_GFCI	Leakage current consistency error	
ID030	ConsistentFault_Vgrid	Grid voltage consistency error	
ID031	ConsistentDCI	DCI consistency error	

ID033	SpiCommFault (DC)	SPI communication error (DC)	
ID034	SpiCommFault (AC)	SPI communication error (AC)	
ID035	SChip_Fault	Chip error (DC)	
ID036	MChip_Fault	Chip error (AC)	
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.
ID050	TempFault_HeatSink1	Radiator 1 temperature protection	
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	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.
ID066	VbusInstantUnbalance	The transient value of bus voltage is unbalanced	
ID067	BusUVP	Busbar undervoltage during grid-connection	
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	SwBusRmsOVP	Inverter bus voltage RMS software overvoltage	
ID073	SwBusInstantOVP	Inverter bus voltage instantaneous value software overvoltage	
ID074	FlyingCapOVP		
ID075	FlyingCapUVP		
ID082	DciOCP	Dci overcurrent protection	
ID083	SwOCPInstant	Output instantaneous current protection	
ID085	SwAcRmsOCP	Output effective value current protection	
ID086	SwPvOCPInstant	PV overcurrent software protection	
ID098	HwBusOVP	Inverter bus hardware overvoltage	
ID102	HwPVOCP	PV hardware overflows	
ID103	HwACOCP	Ac output hardware overflows	
ID105	MeterCommFault	Meters communication fault	Check whether the meters wiring is correct.
ID110	Overload1	Overload protection 1	Please check whether the inverter is operating under overload.
ID113	OverTempDerating	Internal temperature is too high.	Make sure the inverter is installed where there is no direct sunlight.

			Please ensure that the inverter is installed in a cool/well ventilated place. Ensure the inverter is installed vertically and the ambient temperature is below the inverter temperature limit.
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	unrecoverAcOCPInstant	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	Check the USB port of the inverter
ID146	WifiFault	Wifi fault	Check the Wifi port of the inverter
ID147	BluetoothFault	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	CommEEPROMFault	Communication board EEPROM error	
ID150	FlashFault	Communication board FLASH error	

ID152	SafetyVerFault	The software version is inconsistent with the safety version	
ID153	SciCommLose(DC)	SCI communication error (DC)	
ID154	SciCommLose(AC)	SCI communication error (AC)	
ID155	SciCommLose(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.
ID165	RemoteDerating	Remote derating	The inverter is performed for remote load reduction.
ID166	LogicInterface Derating	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	MeterCommLose	Meters communication fault	Check whether the meters wiring is correct.
ID189	AFCICommLose	AFCI module communication is lost	
ID190	DCArcingAlarm	Dc arc fault	
ID191	PID_Output_F	PID function is failed	

	ail		
ID192	PLC_Com_Fail	PLC communication is lost	

8.2. 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**

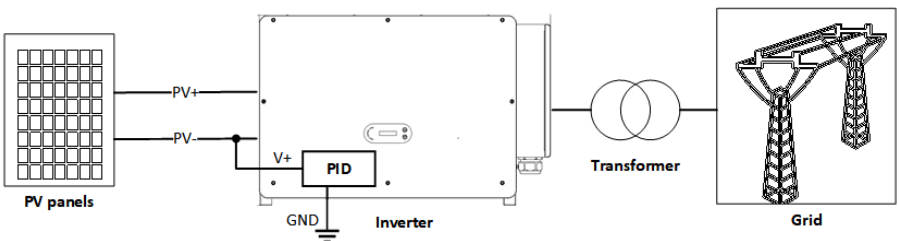
Please clean the inverter with an air blower, a dry & soft cloth or a soft bristle brush. Do NOT clean the inverter with water, corrosive chemicals, detergent, etc.

✧ **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.

8.3. PID Recovery

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.

8.4. SVG

After the SVG is enabled, the inverter can continue to be connected to the grid at night, and can respond to the reactive power scheduling instructions, saving the investment cost of the reactive static compensator.

1. It is necessary to turn on the SVG enable bit when PV is powered. If SVG is enabled at night, the inverter cannot start the grid connection at night. If you have any questions, please contact the photovoltaic module manufacturer or read its corresponding user manual.

2. When the inverter operates in SVG state, the display panel will prompt "SVG state".

3. In SVG state, the maximum reactive power of the inverter is 30% of the maximum apparent power.

4. SVG only works at night. If PV is powered, the inverter will automatically switch to the "grid connected state".

9.Technical Data

9.1. 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 MPP trackers	12
Number for DC inputs	24
Max. inputcurrent per MPPT	30A
Max. input short circuit current per MPPT	50A

9.2. Output Parameter (AC)

Parameter	SOFAR 250KTL-HV	SOFAR 255KTL-HV
Rated outputpower	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)	

9.3. 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(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	
Protection class	Class I	
Overvoltage category	AC:III, PV:II	
Input/ output SPD	PV: type II standard AC: type II Standard	

9.4. 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	

10. 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

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

1) The "warranty card" has not been sent to the distributor or our company;
2) Without the consent of our company to change equipment or replace parts;
3) Use unqualified materials to support our company 's products, resulting in product failure;
4) Technicians of non-company modify or attempt to repair and erase the product serial number or silk screen;
5) Incorrect installation, debugging and use methods;
6) Failure to comply with safety regulations (certification standards, etc.);
7) Damage caused by improper storage by dealers or end users;
8) 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;
9) Failure to follow the product user manual, installation manual and maintenance guidelines;
10) Improper use or misuse of the device;
11) Poor ventilation of the device;
12) The product maintenance process does not follow relevant standards;
13) Failure or damage caused by natural disasters or other force (such as earthquake, lightning strike, fire, etc.)

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