SOFAR

USER MANUAL

SOFAR 250...350KTL

Shenzhen SOFARSOLAR Co., Ltd.

Shenzhen SOFARSOLAR Co., Ltd.
11/F, Gaoxinqi Technology Building,District 67,
XingDong Community, Xin'an Street,Bao'An District, Shenzhen
Web: www.sofarsolar.com
Email:info@sofarsolar.com

EU Representative Information: SofarSolar GmbH
Add.: Kraemerstrasse 20, 72764 Reutlingen, Germany
Tel: +49 (0)7121 31767-0
Email: europe@sofarsolar.com

Document number
Issue 02 / 08.2025
English

Content

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. Read and observe all given safety information.

Copyright Declaration

Outline

This document describes the assembly, installation, commissioning, maintenance and fault clearance of the SOFAR 250KTLX0, SOFAR 330KTLX0, SOFAR 333KTLX0, SOFAR 350KTLX0, SOFAR 330KTLX1, SOFAR 333KTLX1, SOFAR 350KTLX1(also referred to as SOFAR 250~350KTL series).

Please read it carefully before operating. Ensure that you are familiar with the features, functions, and safety precautions provided in this document.

Figures provided in this document are for reference only.

Scope of Validity

This manual contains important instructions for:

SOFAR 250KTLX0 SOFAR 350KTLX0 SOFAR 350KTLX1	SOFAR 330KTLX0 SOFAR 330KTLX1	SOFAR 333KTLX0 SOFAR 333KTLX1

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.

NOTICE

– "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.

ATTENTION	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 250~350KTL series.

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 250~350KTL series 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 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 250~350KTL series 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 250~350KTL series has warming symbol attached 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 object (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 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

WARNING

– 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 25 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 2m 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(Enclosure surface temperature limit up to 100˚C)! 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 250~350KTL series has some safety symbols on the inverter. Please read and fully understand the content of the symbols before installation.

Symbol	Description
	After disconnect with the DC side, there is a residual voltage in the inverter, operator should wait for 25 minutes to ensure the capacitor is completely discharged.
	Caution! Danger through electric shock
	Caution! Hot surface
	The product is compliant with EU guidelines
	Earthing point
	Read the manual before installing the inverter
	Positive and negative poles of the DC input voltage
	The temperature range in which the inverter can operate
	RCM (Regulatory Compliance Mark) The product meets the requirements of the applicable Australian standards.
	WEEE designation

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.

Circuit Topology Diagram

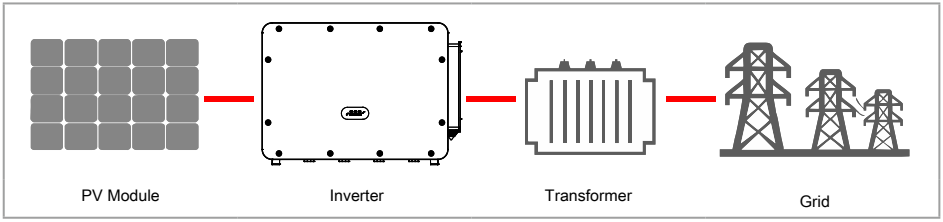
The main inverter circuit topology diagram is presented.

DC SWITCH DC Switch Description

Describes the operation of the SOFAR 320KTLX0 inverter DC switch.

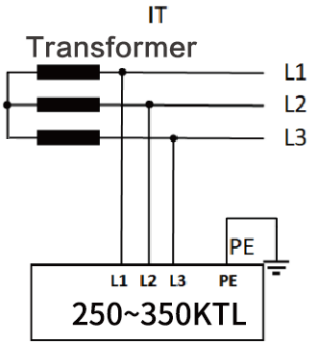
2.1 Intended Use

SOFAR 250~350KTL series 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.



SOFAR 250~350KTL series 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



This model supports IT grid form only, if you want to connect to other types of grid form, such as TT, TN-C, TN-C-S, please contact our engineers for confirmation.

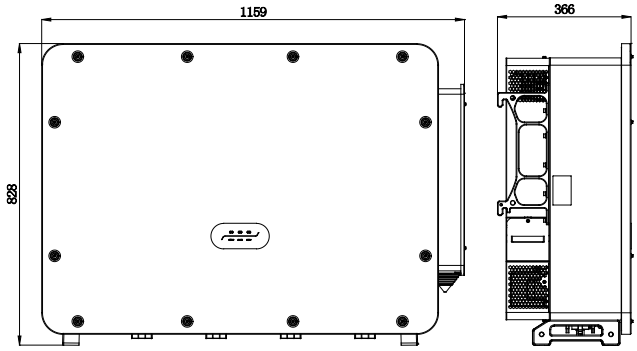
Product Dimensions

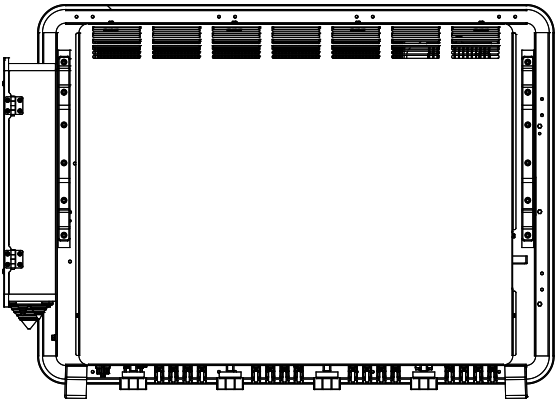
The choice of optional parts of inverter should be made by a qualified technician who knows the installation conditions clearly.

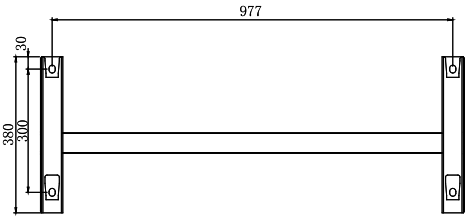
Dimensions Description

- SOFAR 250~350KTL series

W×H×D=1159×828×366mm

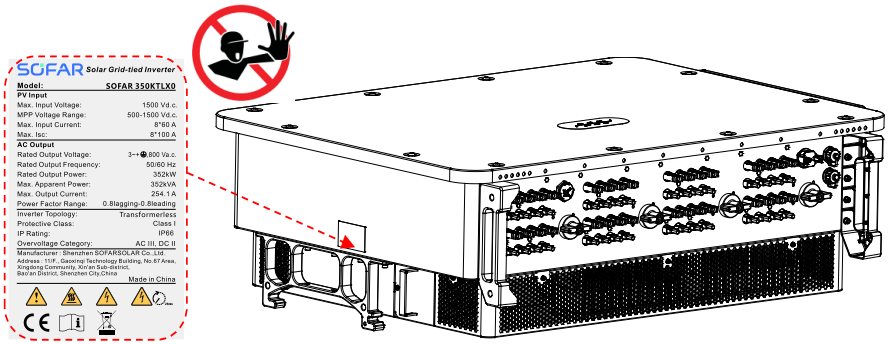






Labels on the equipment

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.

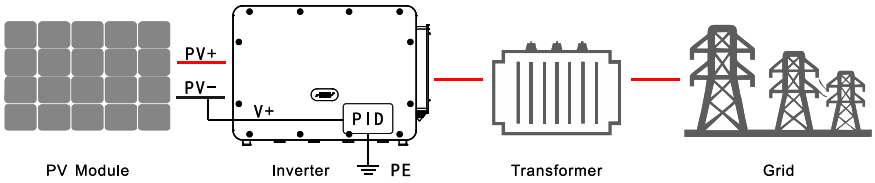


2.2 Function Description

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.

PID Function

When the inverter is not running at night, if the PID repair function is enabled, the PID function module raises the potential between the negative terminal of the PV array and ground to a positive value to suppress the PID effect.



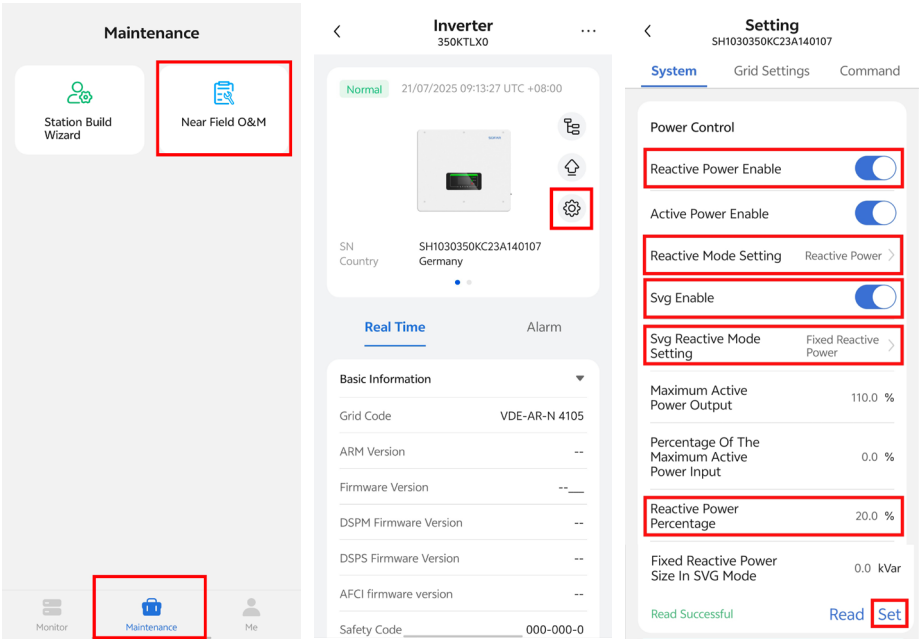
- Before using the PID repair function, make sure that the ground voltage polarity of the PV module meets the requirements. If in doubt, contact the PV module manufacturer or read its corresponding user manual.
- The voltage of the built-in PID protection/repair function needs to meet the P-type components.
- Before turning on the PID repair function, make sure that the inverter has been applied to the IT system.
- When the inverter is not running, the PID module will apply reverse voltage to the photovoltaic module to restore the degraded module.
- Before turning on the PID repair function, you need to calibrate the working time of the inverter, and the PID defaults to work from 0:00 to 4:00.
- After the PID recovery function is enabled, the PV series voltage to ground is 650Vdc by default. You can change the default value through the App.

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 350KTLX0 has a reactive power range of ±30% of rated power.

Set up the SVG:



The night SVG function can be set through the Bluetooth APP of SOFAR Cloud. The steps are as follows:

Step1: Click “Maintenance” -> Click “Near Field O&M” -> Click on “Scan” to scan the SN bar code on the inverter or click “Discover device” to connect the inverter.

Step2: Click on the settings icon on the right side of the inverter image -> Enable “Reactive Power Enable” -> Click on “Reactive Mode Setting” and select “Reactive Power”.

Step3: Enable “SVG enable” -> Click on “SVG Reactive Mode Setting” and select “Fixed Reactive Power” -> Click on the “Reactive power percentage” input box and enter the reactive power percentage, ranging from -30 to 30 -> Click on “Set”.

When the inverter is running in “SVG state” mode, two working modes can be selected via “SVG Reactive Power Enable Bit”: Fixed Reactive Power Mode (not enabled by default), 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 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 LED display green light (POWER) is always on.
3. In SVG state, the rated power of the inverter is 30% of the rated power.
4. SVG only works at night. If PV is powered, the inverter will automatically switch to the “grid connected state”

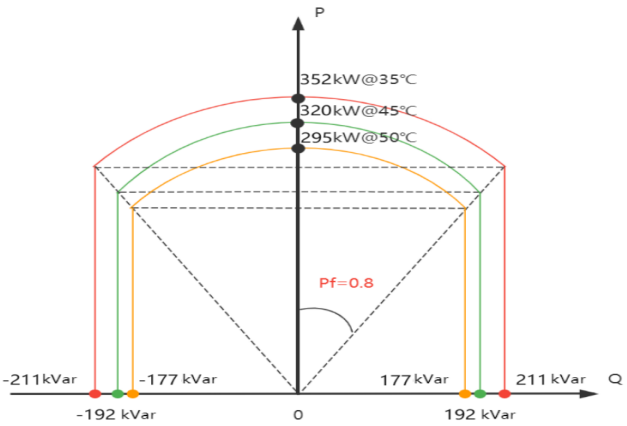
Reactive Power Regulation

The inverter is capable of generating reactive power, so the amount of reactive power input to the grid can be controlled by setting the phase shift factor (power factor). Grid connection management can be realized by a host computer via RS485 or PBUS communication control.

The inverter can support the grid by providing reactive power in different ways.

Reactive mode I: reactive power regulation through fixed power factor

The adjustable range of power factor PF is 0.8 to 1, -1 to -0.8. After the fixed power factor is set, the reactive power is calculated according to the current active power. The shaded part of the figure below shows the reactive power calculated from the fixed power factor and active power:



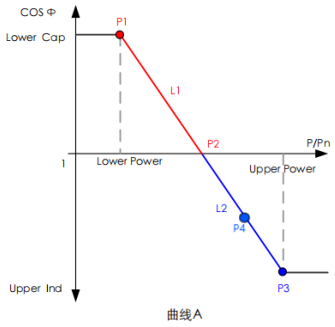
Reactive mode 2: reactive power regulation through fixed reactive power percentage

The adjustable range of reactive power percentage is -60% to 60%. In this mode, set a fixed reactive power percentage, and the system will calculate the power factor angle according to the set reactive power percentage, and then calculate the corresponding reactive power according to the current active power.

For example, the rated active power of SOFAR 350KTLX0 is 352KW. If the reactive power percentage is set to 40%, the reactive power output is 352 * 40%= 140.8kvar.

Reactive mode 3: the reactive power of inverter will follow the change of active power

By setting the four level active power load reduction point, the reactive power is calculated according to the power factor corresponding to the set active power. When the active power changes, the corresponding reactive power also changes. The corresponding relationship between active power and power factor is shown in the figure:

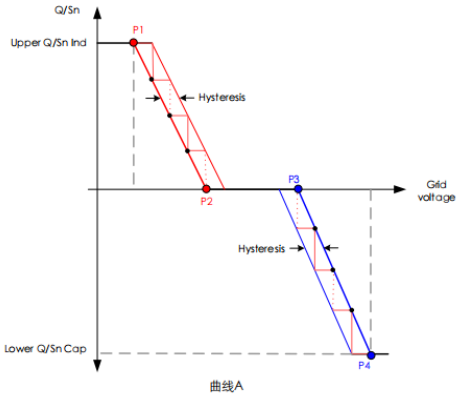


Parameter	Explain	Range
P_P1	Cos φ (P) Output active power at point p1 on the mode curve	Optional
P_P2	Cos φ (P) Output active power at point P2 on the mode curve	Optional
P_P3	Cos φ (P) Output active power at point P3 on the mode curve	Optional
P_P4	Cos φ (P) Output active power at point P4 on the mode curve	Optional
Cosφ_P1	Cos φ (P) Power factor angle at point p1 on the mode curve	0.8~1
Cosφ_P2	Cos φ (P) Power factor angle at point p2 on the mode curve	0.8~1
Cosφ_P3	Cos φ (P) Power factor angle at point p3 on the mode curve	-1~-0.8
Cosφ_P4	Cos φ (P) Power factor angle at point p4 on the mode curve	-1~-0.8
Sgn(Cosφ)_P1	Cos φ (P)Symbol of the power factor angle at point p1 on the mode curve	leading
Sgn(Cosφ)_P2	Cos φ (P)Symbol of the power factor angle at point p2 on the mode curve	leading
Sgn(Cosφ)_P3	Cos φ (P)Symbol of the power factor angle at point p3 on the mode curve	lagging
Sgn(Cosφ)_P4	Cos φ (P)Symbol of the power factor angle at point p4 on the mode curve	lagging

- This mode has a voltage entry enable bit. If it is enabled, it is necessary to set the LockinV voltage percentage and LockoutV voltage percentage. When the grid voltage percentage is greater than the LockinV voltage percentage, this mode is normally enabled; When the grid voltage percentage is less than the LockoutV voltage percentage, the reactive power is 0.

Reactive mode 4: inverter reactive power continuously changes with grid voltage

The reactive power is adjusted by setting the high-voltage starting point, high-voltage ending point, low-voltage starting point and low-voltage ending point of the grid voltage, in which the grid voltage changes continuously. The following figure shows the relationship between reactive power and grid voltage:

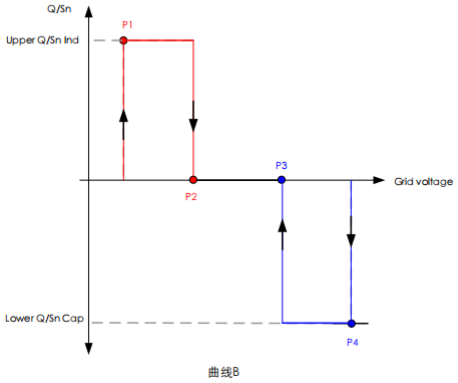


Parameter	Explain	Range
P1	P1 on the Q (U) mode curve is the starting voltage point of low voltage	Optional
P2	P2 on the Q (U) mode curve is the ending voltage point of low voltage	Optional
P3	P3 on the Q (U) mode curve is the starting voltage point of high voltage	Optional
P4	CP4 on the Q (U) mode curve is the ending voltage point of high voltage	Optional

- This mode has a voltage entry enable bit. If it is enabled, it is necessary to set the LockinV voltage percentage and LockoutV voltage percentage. When the grid voltage percentage is greater than the LockinV voltage percentage, this mode is normally enabled; When the grid voltage percentage is less than the LockoutV voltage percentage, the reactive power is 0. (response waiting time during detection can be set)
- Among them, the reactive power at point P1 is the maximum lagging reactive power, the reactive power at point P2 is the reactive power at the low voltage ending voltage point, the reactive power at point P3 is the reactive power at the high voltage starting voltage point, and the reactive power at point P4 is the maximum leading reactive power.

Reactive mode 5: inverter reactive power continuously changes with grid voltage

The reactive power is adjusted by setting the high-voltage starting point, high-voltage ending point, low-voltage starting point and low-voltage ending point of the grid voltage, in which the grid voltage changes step by step. The following figure shows the relationship between reactive power and grid voltage:



Parameter	Explain	Range
P1	P1 on the Q (U) mode curve is the starting voltage point of low voltage	Optional
P2	P2 on the Q (U) mode curve is the ending voltage point of low voltage	Optional
P3	P3 on the Q (U) mode curve is the starting voltage point of high voltage	Optional
P4	P4 on the Q (U) mode curve is the ending voltage point of high voltage	Optional

- this mode has a voltage entry enable bit. If it is enabled, it is necessary to set the LockinV voltage percentage and LockoutV voltage percentage. When the grid voltage percentage is greater than the LockinV voltage percentage, this mode is normally enabled; When the grid voltage percentage is less than the LockoutV voltage percentage, the reactive power is 0. (response waiting time during detection can be set).
- Among them, the reactive power corresponding to P1 and P4 points is the maximum reactive power point. (both can be set by self selection)

Reactive mode 6: the inverter calculates the current output reactive power through constant apparent power

That is, when the active power does not reach the rated value, the reactive power is calculated according to the rated apparent power, and the calculation formula is $Q = \sqrt{S^2 - P^2}$; When the active power reaches the rated value, the reactive power is 0.

- phase type can be set: 1 Zero reactive power: reactive power is 0; 2. lagging reactive power: reactive power is negative; 3. leading reactive power: the reactive power is positive.

Other Function Modules

A. **Energy management unit**
Remote control to start/ shunt down inverter through an external control.

B. **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).

C. **Self-power reduction when grid is over frequency**
TIf grid frequency is higher than the limited value, inverter will reduce the output power to ensure the grid stability.

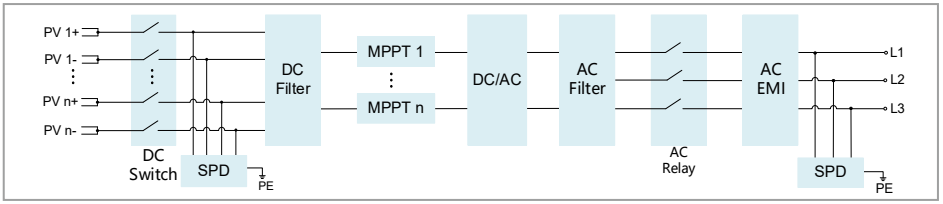
D. **Data transmission**
Inverter or a group of inverters can be monitored remotely through an advanced communication system based on RS485 interface or PBUS communication.

E. **Software update**
USB interface for uploading the firmware, remotely uploading is available.

F. **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, to build a safe barrier for the whole system.

2.3 Circuit Diagram

The following figure shows the main circuit of the inverter .



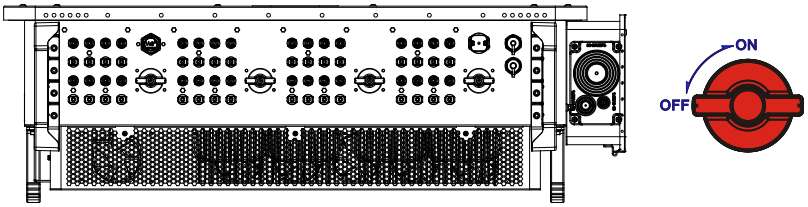
SOFAR 250~350KTL series utilizes multiple MPPT trackers to uesd to ensure a maximum power from PV arrays at different PV input conditions.

DC Switches can safely disconnect the PV input when necessary to ensure the safe operation of the inverter and the safety of personnel.

Both DC and AC side has Surge Protection Device (SPD).

2.4 DC Switch Descriptions

The inverter is equipped with four DC switches, and per DC switch controls two MPPTs which can safely disconnect it from PV strings. Each switch controls the DC terminals in the area where the switch is located.



DESCRIPTIONS:

SWITCH	DESCRIPTIONS	
DC SWITCH	“ON”	The DC switch is closed and has breaking protection.
	“OFF”	The DC switch is disconnected.

DC SWITCH automatically breaks and disconnects when a fault occurs.

Please check the type of fault through the “SOFAR SETTING” APP first, wait at least 3min after troubleshooting, and operate under the guidance of the technical support staff.

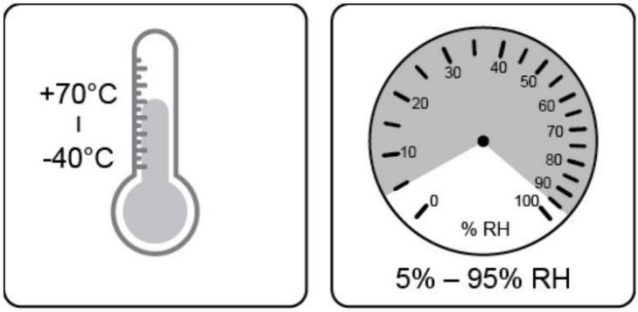
DC SWITCH BREAKING:

- DC SWITCH carries out automatic breaking and de-coupling in the event of inverter malpractices such as PV string reversal, string overcurrent, and string current backfeeding.
- DC SWITCH also automatically breaks and disconnects when the inverter has an internal fault. The FAULT indicator light is always on, and all four DC switches are automatically disconnected. Please contact the company's technical support staff after the switches are disconnected, and do not close the DC switches by yourself.

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.
- Do not tilt or invert the box.
- Store in a clean and dry place and protect from dust and moisture. Do not subject to rain or ground water erosion.
- When stacking, place the inverter carefully to avoid personal injury or equipment damage caused by tipping the equipment.
- Keep the storage temperature around -40˚C~70˚C. Relative humidity 5~95%, no condensation.



- 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.

DANGER

- Do not install the product on flammable material.
- Do not store this product in potentially explosive atmospheres.

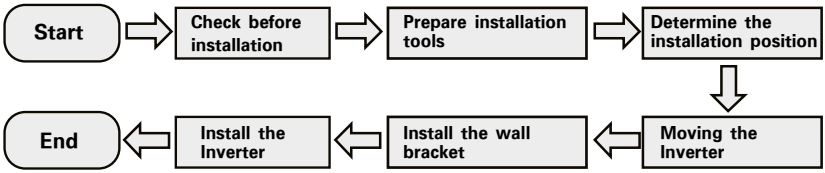
CAUTION

- 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 four 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

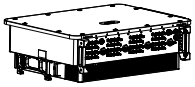
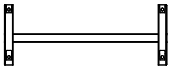
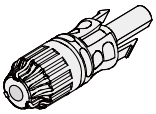
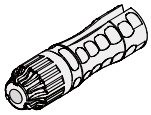
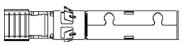
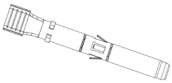
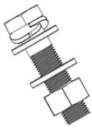
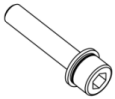
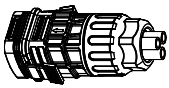
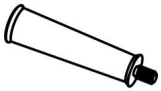
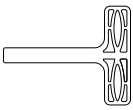
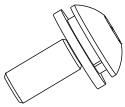
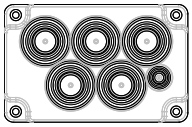
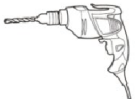
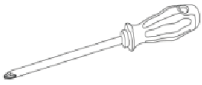
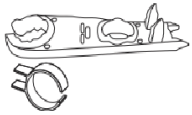
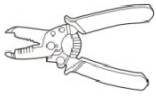
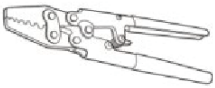
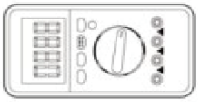
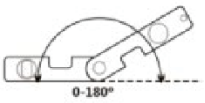
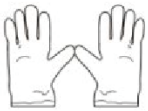
Image	Qty	Description	Image	Qty	Description
	1	SOFAR 250...350KTL series		1	Wall Bracket
	32 /24	PV+ input connector *24pcs(250KTLX0)		32 /24	PV- input connector *24pcs(250KTLX0)
	32 /24	PV+ metal pin *24pcs(250KTLX0)		32 /24	PV- metal pin *24pcs(250KTLX0)

Image	Qty	Description	Image	Qty	Description
	4	M12*50 Hexagon screws		2	M6*30 Hexagon screws
	1	Documents		1	COM 16pin connector
	2	M12 lifting bolt		4	Auxiliary Handle
	1	DC switch Handle		4	M6*16 Hexagon screws
	1	Single-core Over-wire plug			

4.3 Installation 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

	Hammer drill		Screwdriver
	Removal tool		Wire stripper

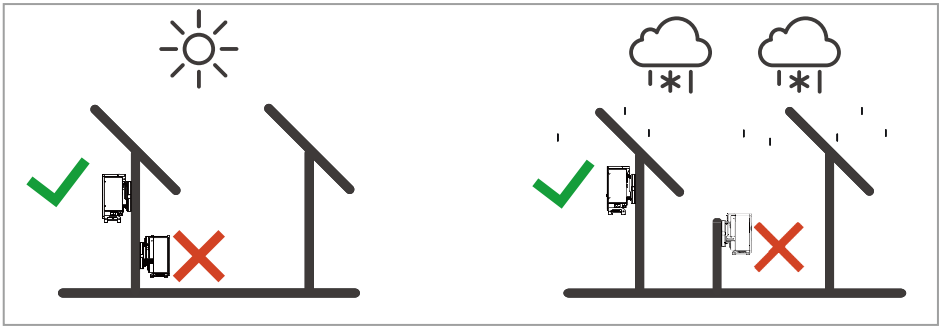
	Crescent wrench		Hammer
	M6 Allen key		Socket wrench
	Crimping tool		Multimeter
	Marker		Measuring tape
	Spirit level		ESD gloves
	Safety goggles		Anti-dust respiratory mask

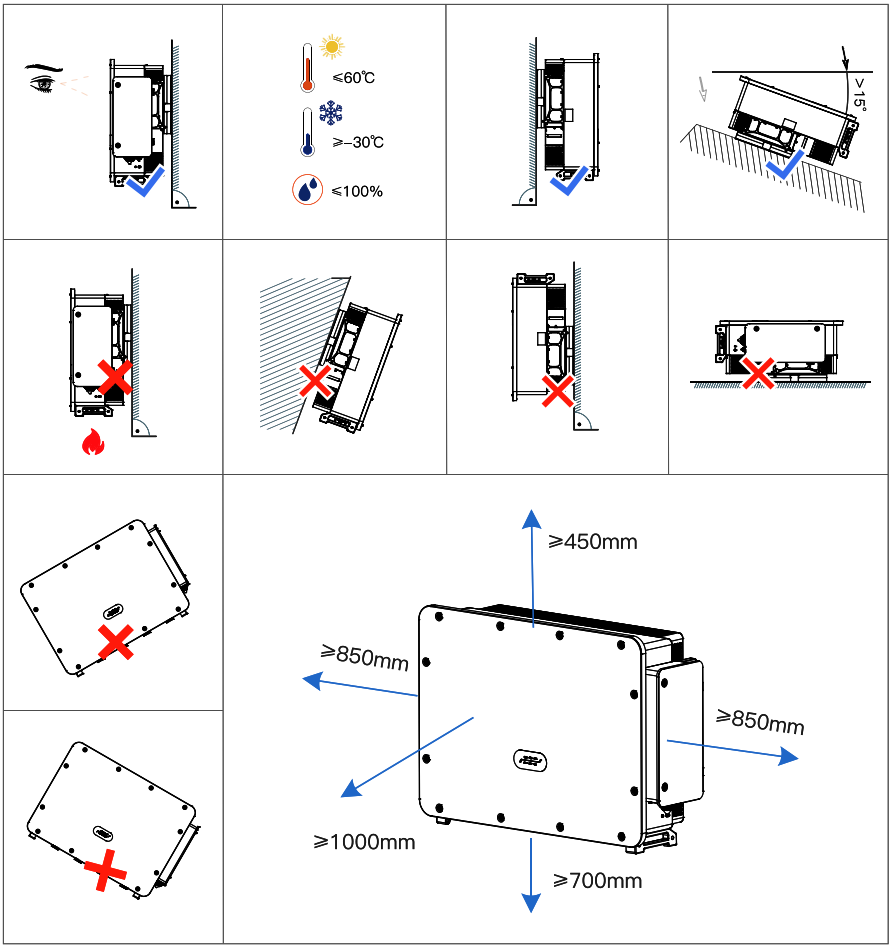
4.4 Determining the Installation Position

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:

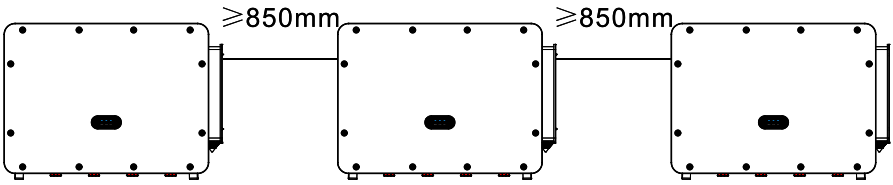
- The mounting carrier has a load-bearing capacity of at least 4 times the weight of the inverter and matches the inverter size.
- The inverter has an IP66 protection rating and can be used for indoor or outdoor installation.
- Avoiding the inverter from direct sunlight, direct rain and snow will prolong 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.

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. When selecting a mounting location, consider the following requirements:

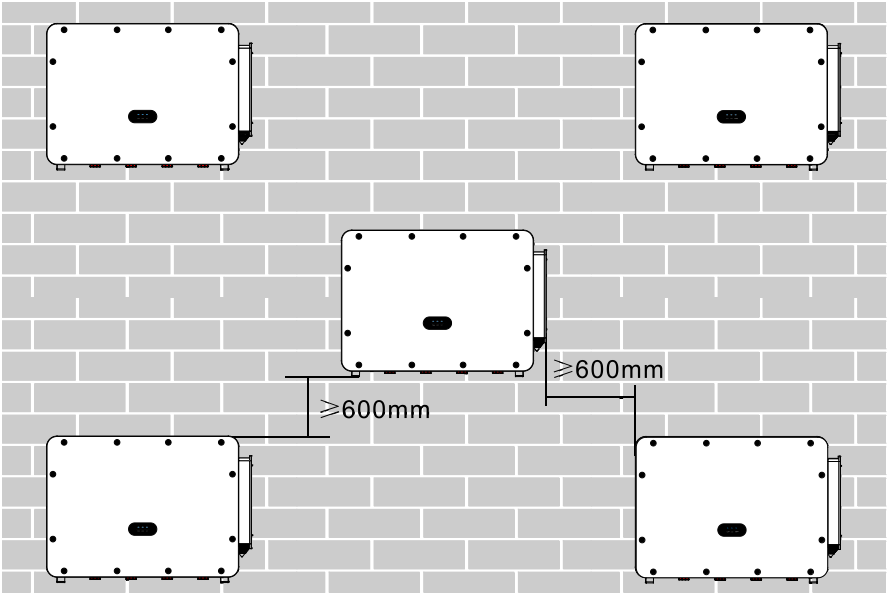




For multiple inverter installation scenarios, zigzag installation is recommended when there is enough space. Zigzag, back-to-back and wall mounting are not recommended. Zigzag, back-to-back and near-wall mounting require users to provide their own windshield to isolate the inverters from the incoming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



a) Recommended Installation



b) Unrecommended Installation Method

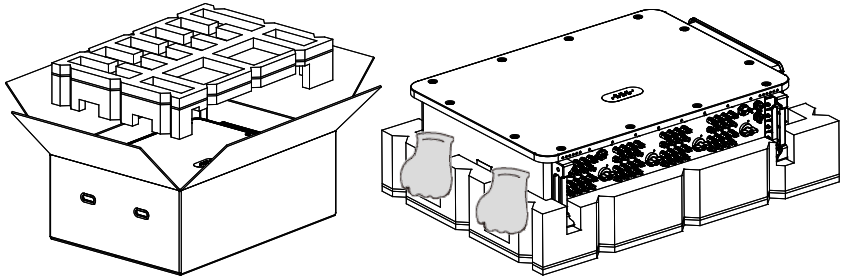
Other requirement for install position:

- 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

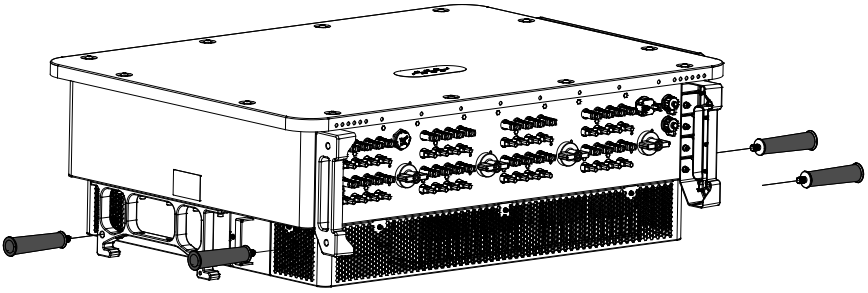
Manual handling

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



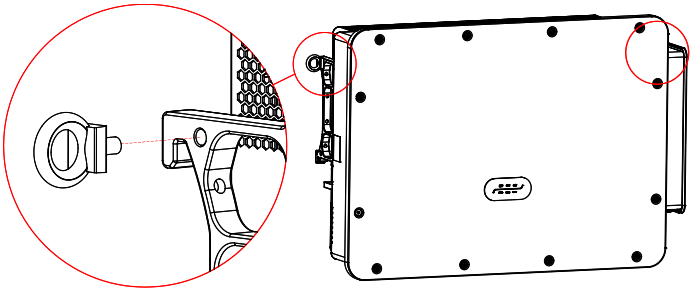
ATTENTION

- Keep the balance when lift the inverter. Required at least four 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.

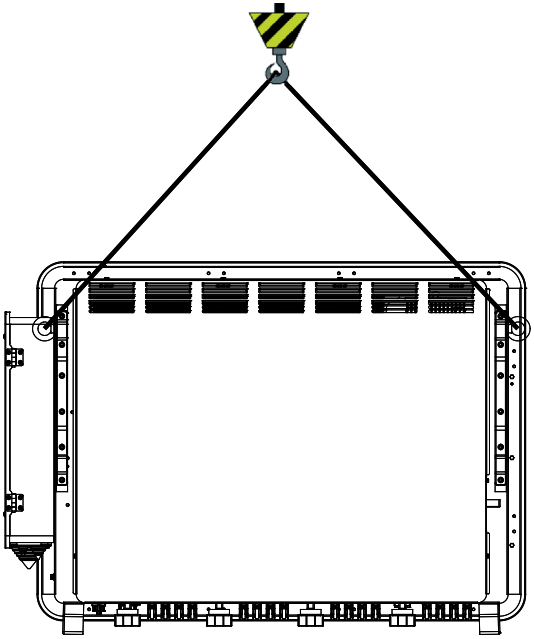


Lifting Equipment

1. Tighten the screws of two M12 rings into the inverter sides according to the instruction diagram below.



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

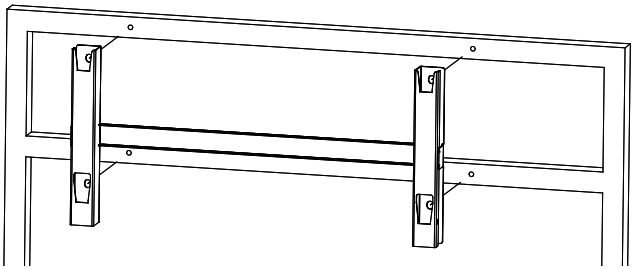
- Keep balance when lifting the inverter, avoid to crash on wall or other objective.
- Stop working in bad weather condition such as raining, heavy fog, winding.

4.6 Installation

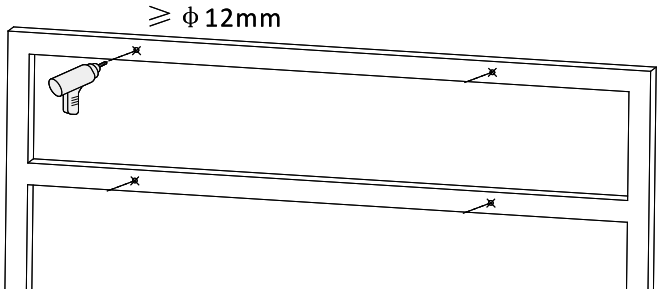
Always make sure the inverter is free of any electrical connections before installing the inverter. Before drilling, make sure that you avoid any utility alignments in the wall to avoid any hazards!

Installing the bracket on a stand :

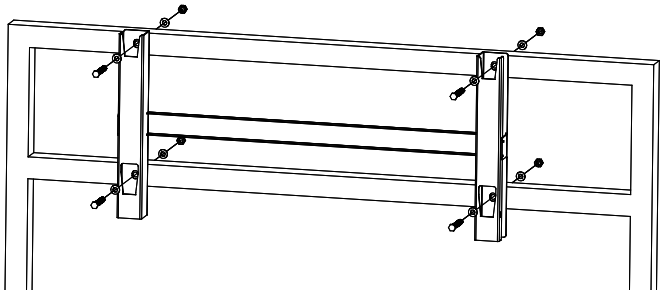
1. Use wall bracket, ensure the pole position are in same level by using level rule and mark the holes.



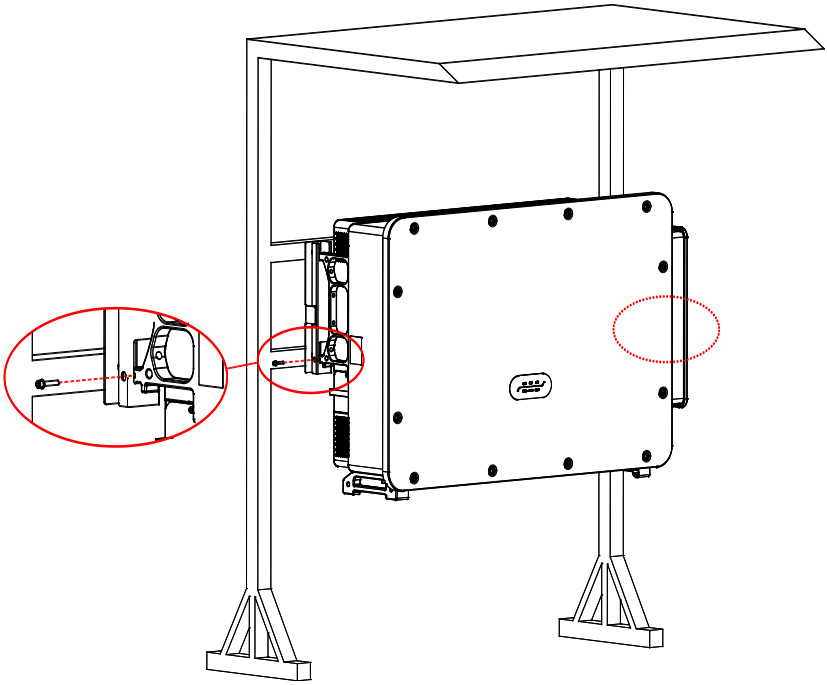
2. Drilling hole by using a Hammer Drill, recommend to do a stain proofing.



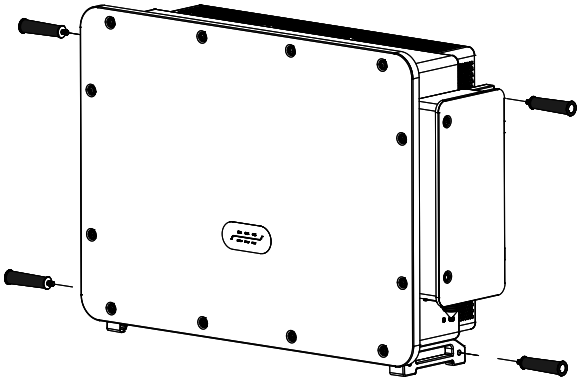
3. Use M12*50 Hexagon screws to secure the wall bracket.



4. Lift the inverter and hang it on the wall bracket, and fixing both side of inverter with M6 screw.



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



5 Electrical Connections

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 25 minutes for the capacitor to be electrically discharged.

ATTENTION

- Installation and maintenance should be done by certified electrical engineer.
- During electrical operations, the professional must wear protective equipment.

⚠ 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.
- Do not close the AC/DC circuit breaker before completing the electrical connection and prevent misconnection.

NOTE

- For this product, the open circuit voltage of PV strings should not greater 1500V.
- 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.

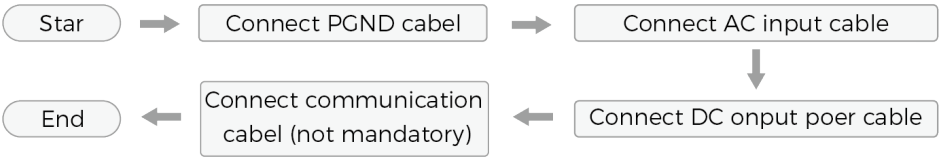
5.7 Recommended wiring methods

Introduce Recommended wiring methods.

5.8 Communication Connection

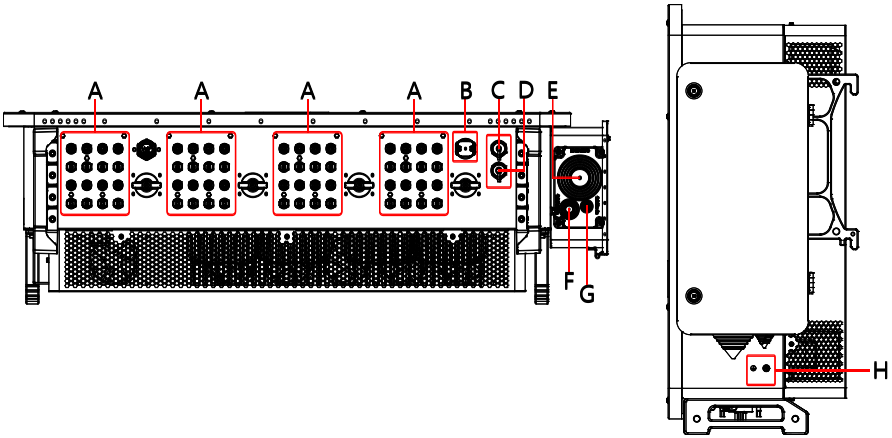
Introduce the propose USB, COM and how to connect USB port.

5.1 Electrical Connection



5.2 Terminal Connector

Connector description as below:



*Take picture as reference

No	Name	Label	Description
A	DC input terminals	PVX+/PVX-	PV connector
B	RS485	COM	RS485 Communication port/ DRMs port
C	USB port	USB/Wi-Fi	USB port
D	RJ45	Ethernet	Ethernet port
E	AC output terminals	AC	AC output terminal
F	Tracking Axis Power Terminal	Tracking Axis Power Terminal	Tracking System Power Wiring
G	Grounding		Connecting terminal of the ground , choose at least one for grounding connection
H	Grounding	Grounding	Reliable grounding for inverters

5.3 Grounding Connection (PE)

Connect the inverter to the grounding electrode usingground cable

NOTE

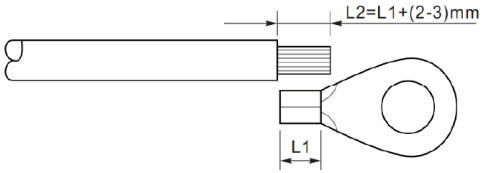
– SOFAR 250~350KTL series is a transformerless inverter which requires the positive pole and negative pole of the PV array are NOT grounded. Otherwise, it will cause inverter failure. In the PV system, all non-current-carrying metal parts (such as mounting frame, combiner box enclosure, etc.) should be connected to earthed.

- 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 (recommend S/2 mm² ('S' is the cross-sectional area of the AC output cables) yellow-green outdoor cable.

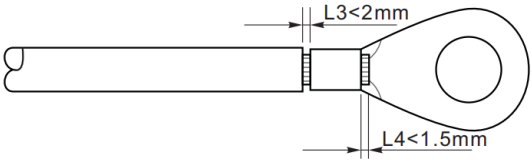
Procedure:

1. Remove the insulation layer with an appropriate length using a wire stripper as shown in the following figure.



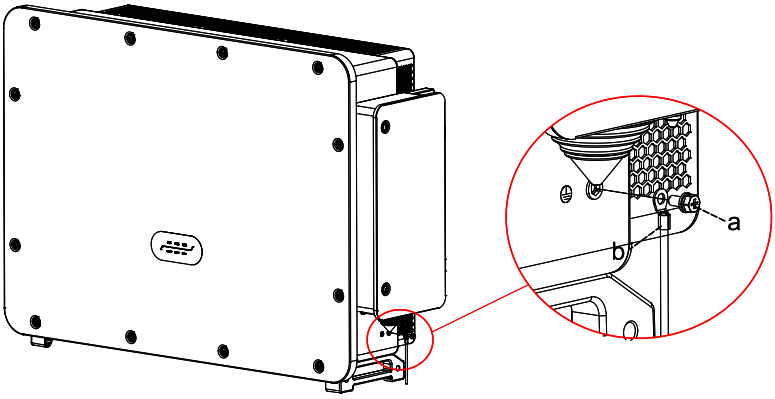
The length of L2 should 2~3mm higher than L1.

2. Insert the exposed core wires into the OT terminal and crimp them by using a crimping tool, as shown in the following figure. Recommend using OT terminal: OTM8, Cable: ≥16mm2.



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

3. Remove the screw from the bottom side of inverter (as shown in the following figure), connect the grounding cable to the grounding point and tighten the grouping screw. Torque is 6-7N.m.



a.M8hexagon screw b. grounding cable

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)

According to user's manual, an external AC relays needs to be installed on at the final plant. This external relay, must be approved by Synergrid:

For Belgium, one of the following links is required for external AC relays. download.cfm(synergrid.be)

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.

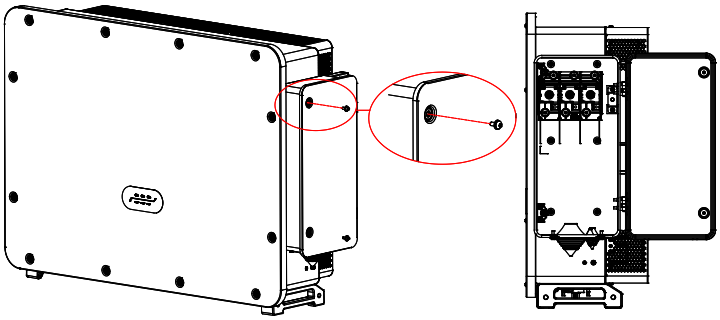
Precondition:

- 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

- 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.

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



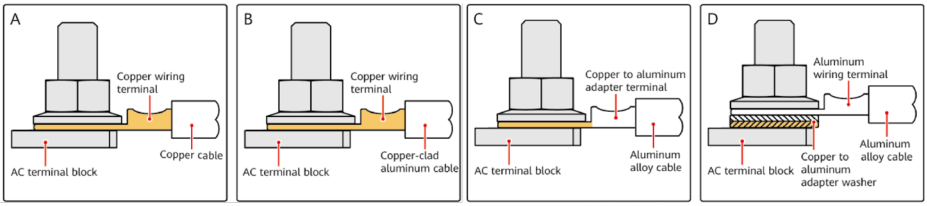
5.4.2 Wiring Terminal and Precautions

- 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:

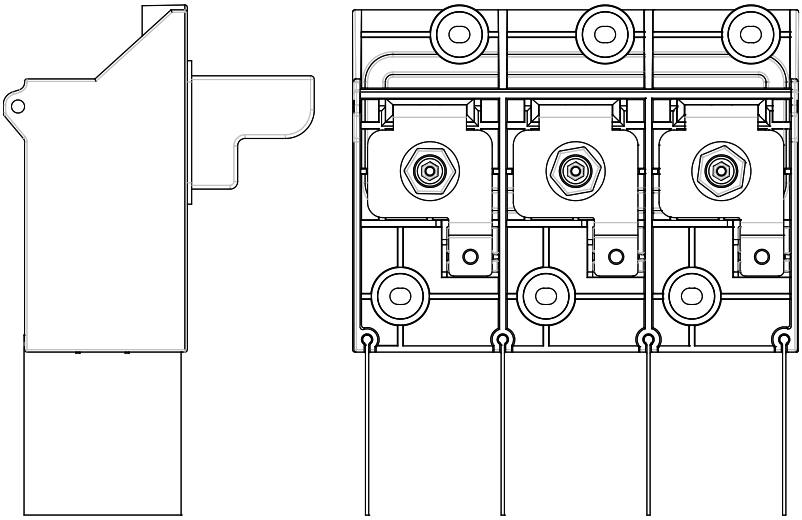
- When use copper core cable, please use copper terminal connector.
- When use copper clad aluminum cable, please use copper terminal connector.

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



CAUTION

Direct contact between copper and aluminium conductors will cause galvanic corrosion and affect the reliability of the electrical connection.
When using copper-aluminum transition terminals, or aluminum terminals with copper-aluminum transition spacers, the requirements of IEC 61238-1 must be met.
When using copper-aluminum transition spacers, please pay attention to the front and back to ensure that the aluminum side of the spacer and the aluminum terminal contact, the copper side and the terminal block contact.



5.4.3 Wring Procedure

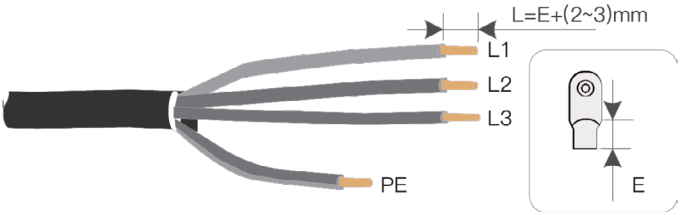
The section will use a multi-core wire as a sample, single-core wire has same connection process.

Table 5-1 Recommend AC cable size

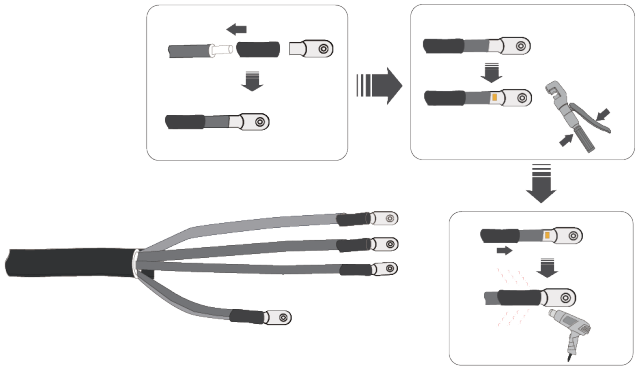
Name	Type	Area(mm²)	Outer Diameter
AC output power cables (multi-core)	• If the ground point on the enclosure is used, three-core (L1, L2, and L3) outdoor cables and M12 OT/DT terminals (L1, L2, and L3) are recommended. • If the ground point in the maintenance compartment is used, four-core (L1, L2, L3, and PE) outdoor cables, M12 OT/DT terminals (L1, L2, and L3), and M10 OT/DT terminals (PE) are recommended. You do not need to prepare a PE cable.	• Copper cable: S: 120-300 mm² Sp ≥ S/2 • Aluminum alloy cable or copper-clad aluminum cable: S: 150–400 mm² Sp ≥ S/2	24–66 mm
AC output power cables(single-core)	(Recommended) Single-core outdoor cable and M12 OT/DT terminal	• Copper cable: S: 120-300 mm² Sp ≥ S/2 • Aluminum alloy cable or copper-clad aluminum cable: S: 150–400 mm² Sp ≥ S/2	14–40 mm
The value of Sp is valid only if the conductors of the PE cable and AC power cable use the same material. If the materials are different ensure that the conductor cross-sectional area of the PE cable produces a conductance equivalent to that specified in this table. The specification of the PE cable are subject to this table or calculated according to IEC 60364-5-54			

- The maximum suitable copper terminal type suitable for AC terminal blocks is RNB300-12; The maximum copper-to-aluminum transition terminal type suitable for AC terminal blocks is DTL-400.

1. Open the cover, refers to section 5.4.1.
2. Turn OFF the AC circuit breaker and secure against reconnection.
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.
4. Remove the insulation layer of an appropriate length according to figure below.

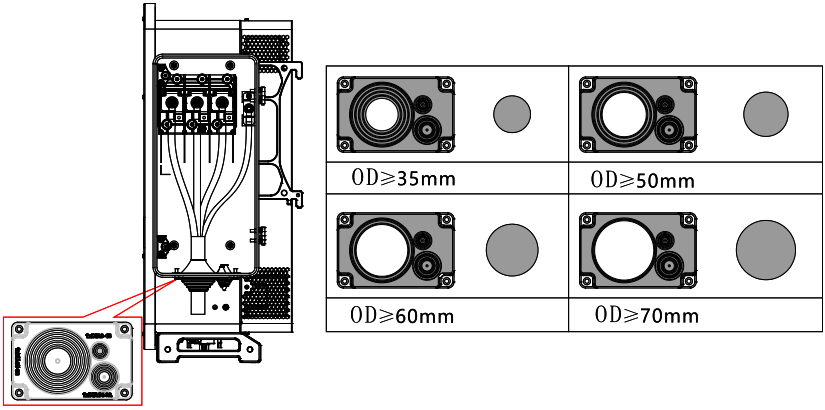


5. Crimp the terminal.



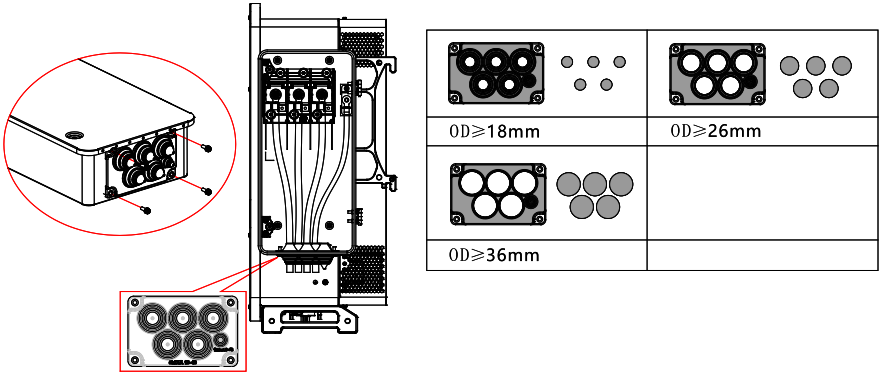
6. Depending on the grid configuration, connect L1, L2, L3 and N to the terminals according to the label and tighten the screw on the terminal using a screwdriver.

Multi-core wire wiring diagram:



Single core wire wiring diagram:

Select single-core wire, before wiring, you need to replace the already installed in the machine plug with the single-core over-wire plug supplied with the shipment.

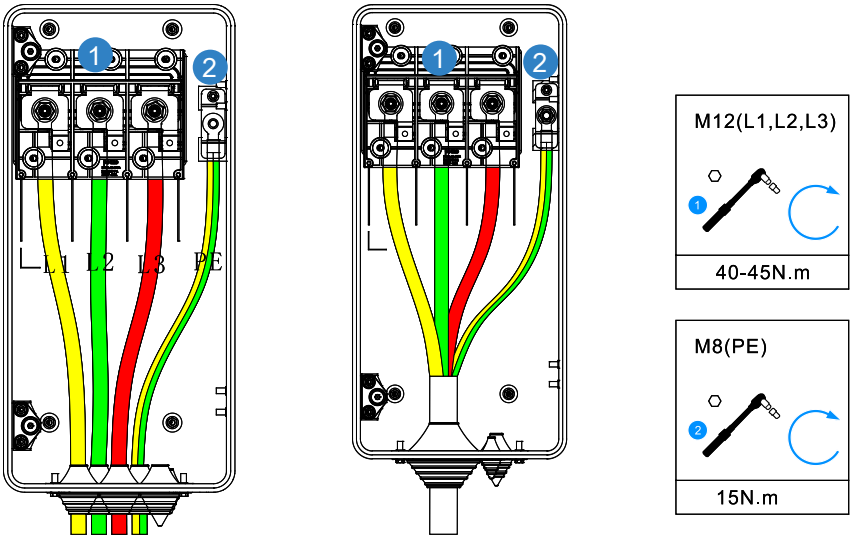


Phase lines use M12 terminal connector, PE line use M8 terminal connector.

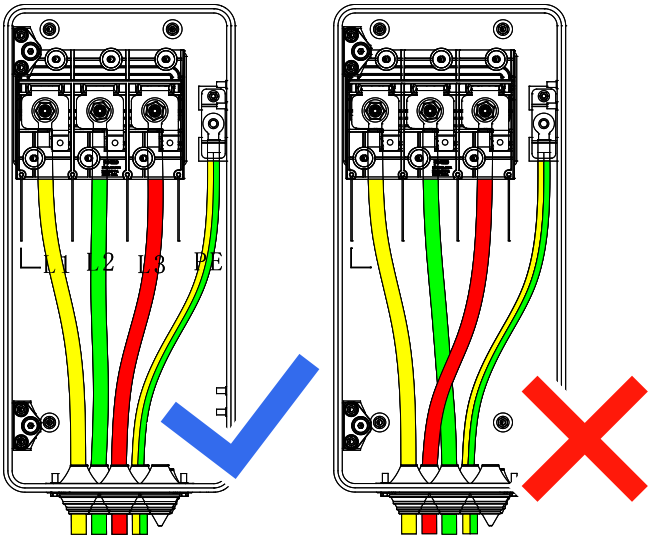
7. Close the junction box cover and tighten the junction box screws. Recommended torque 5-7N.m.

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 10 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.



6. 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.
7. 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 straight-edge 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 to supply power to the tracking system, and the rated voltage of the power supply is the rated output voltage of the inverter.

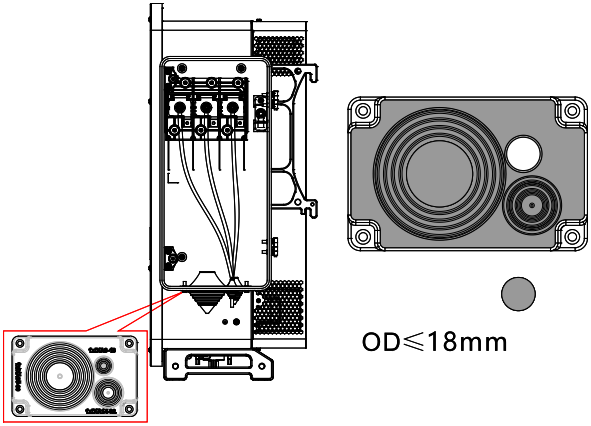
Be careful:

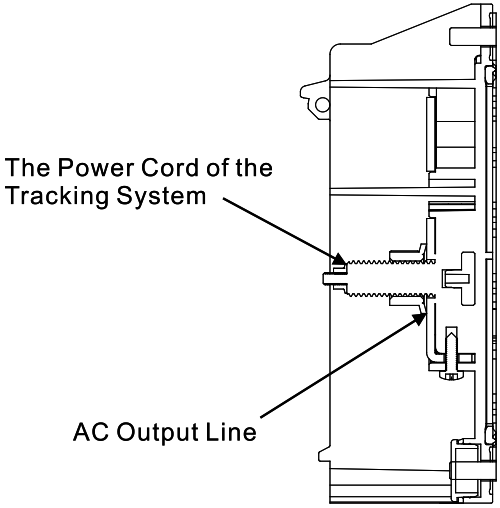
- Between the inverter and the tracking control box, it is necessary to connect the protection disconnector fuse group or fuse disconnector. Specification: voltage ≥ 800V, current 16a, protection type GM.
- The cable length between the power line terminal and the disconnector fuse group or fuse disconnector shall be ≤ 2.5m.
- The AC output line must be connected before the power line of the tracking system, 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:

Type	Cable outer diameter(mm)
Three core outdoor copper cable	15~18

1. Use wire strippers to strip the insulation layer of the tracking power line to an appropriate length.
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.
3. Thread the fabricated cable into the over-wire plug.
4. Connect the cable with the corresponding terminal, tighten the nut and fix the terminal.


OD≤18mm


The Power Cord of the Tracking System
AC Output Line

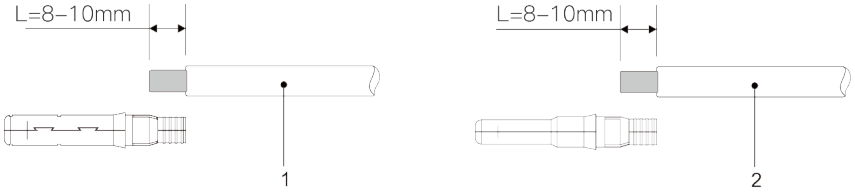
5.6 Connect PV side of inverter (DC-Input)

- 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 four “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 connector connect to inverter negative pole.
- Please use the connectors in the accessories bag. The damage cause by incorrect is not including in the warranty.

Table 5-2 Recommend DC cable size

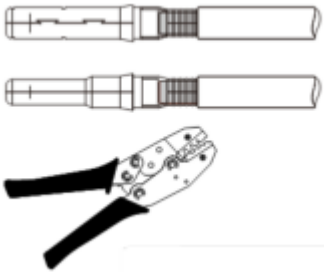
Copper cable cross section area (mm²)		Cable OD(mm)
Range	Recommend	
4.0 – 6.0	4.0	4.5 – 7.8

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

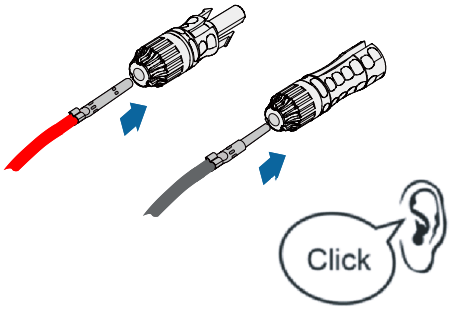


1.Positive DC cable / 2.Negative DC cable

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

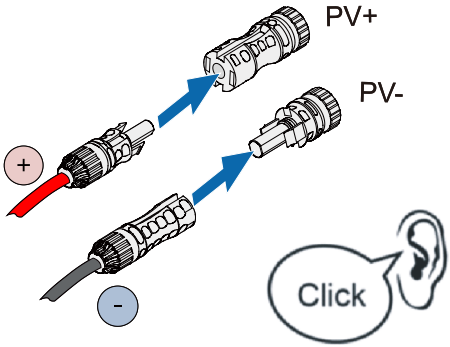


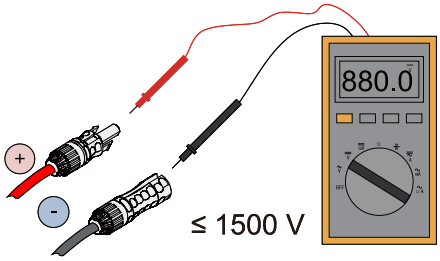
3. Insert wire into the connector cap nut and assemble into the back of male or female plug, When you heard a “click”, the pin tact assembly is seated correctly. (3. Positive Connector, 4. negative connector).



3. Positive Connector / 4. negative connector

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.





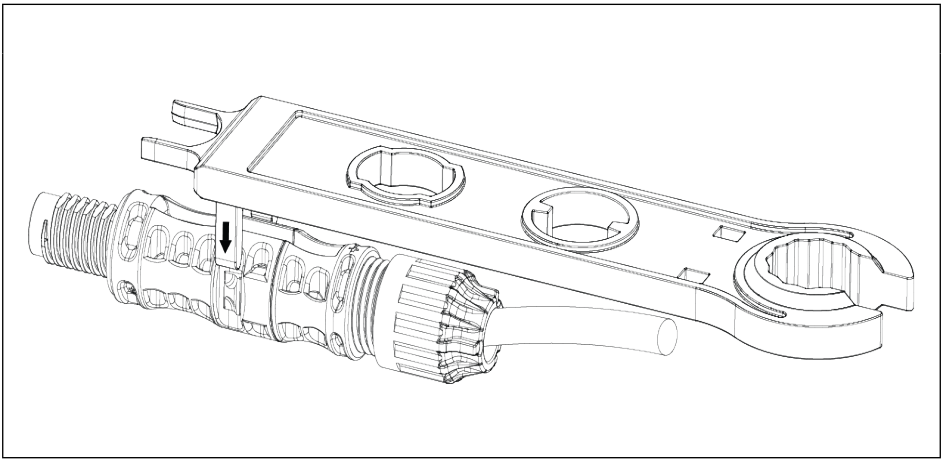
Please use multimeter to make sure the PV array positive pole and negative pole!

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.

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.



5.7 Recommended Wiring Methods

The inverter has a total of 32 DC input terminals, of which the branches of MPPT1 to MPPT2 are controlled by DC SWITCH 1, the branches of MPPT3 to MPPT4 are controlled by DC SWITCH 2, the branches of MPPT5 to MPPT6 are controlled by DC SWITCH 3, and the branches of MPPT7 to MPPT8 are controlled by DC SWITCH 4.

It is recommended that all PV input terminals be divided equally among MPPT1 to MPPT8 branches, and the maximum current of each MPPT is controlled at 60A, and the maximum current of each branch of MPPT is 20A.

For example, when the number of input strings is 20 to 31, the recommended connection of DC input terminals is as follows.

Strings number	Terminal Selection
20	MPPT1/MPPT3/MPPT5/MPPT7 are connected to 3 strings respectively, MPPT2/MPPT4/MPPT6/MPPT8 are connected to 2 strings respectively.

Strings number	Terminal Selection
21	MPPT1/MPPT3/MPPT5/MPPT7/MPPT8 are connected to 3 strings respectively, MPPT2/MPPT4/MPPT6 are connected to 2 strings respectively.
22	MPPT1/MPPT2/MPPT3/MPPT5/MPPT7/MPPT8 are connected to 3 strings respectively, MPPT4/MPPT6 are connected to 2 strings respectively.
23	MPPT1/MPPT2/MPPT3/MPPT4/MPPT5/MPPT7/MPPT8 are connected to 3 strings respectively, MPPT6 are connected to 2 strings respectively.
24	MPPT1 ~ MPPT8 are connected to 3 strings respectively,
25	MPPT8 are connected to 4 strings respectively, MPPT1 ~ MPPT7 are connected to 3 strings respectively,
26	MPPT1/MPPT8 are connected to 4 strings respectively, MPPT2/MPPT3/MPPT4/MPPT5/MPPT6/MPPT7 are connected to 3 strings respectively.
27	MPPT1/MPPT7/MPPT8 are connected to 4 strings respectively, MPPT2/MPPT3/MPPT4/MPPT5/MPPT6 are connected to 3 strings respectively.
28	MPPT1/MPPT3/MPPT5/MPPT7 are connected to 4 strings respectively, MPPT2/MPPT4/MPPT6/MPPT8 are connected to 3 strings respectively.
29	MPPT1/MPPT3/MPPT5/MPPT7/MPPT8 are connected to 4 strings respectively, MPPT2/MPPT4/MPPT6 are connected to 3 strings respectively.
30	MPPT1/MPPT2/MPPT3/MPPT5/MPPT7/MPPT8 are connected to 4 strings respectively, MPPT4/MPPT6 are connected to 3 strings respectively.
31	MPPT1/MPPT2/MPPT3/MPPT4/MPPT5/MPPT7/MPPT8 are connected to 4 strings respectively, MPPT6 are connected to 3 strings respectively.

5.8 Communication Connection

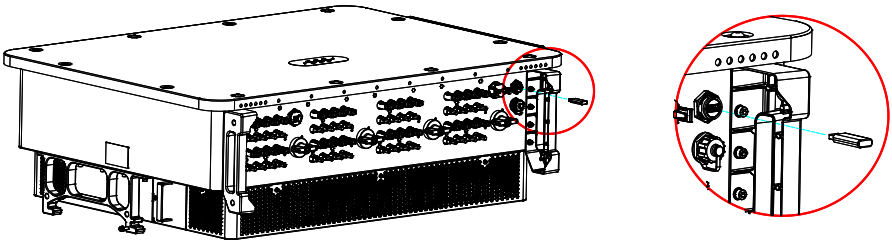
When layout the wiring diagram, please separate the communication wiring and power wiring in case the signal be affected.

USB Port

Port Description:

USB port	Use for updating the software

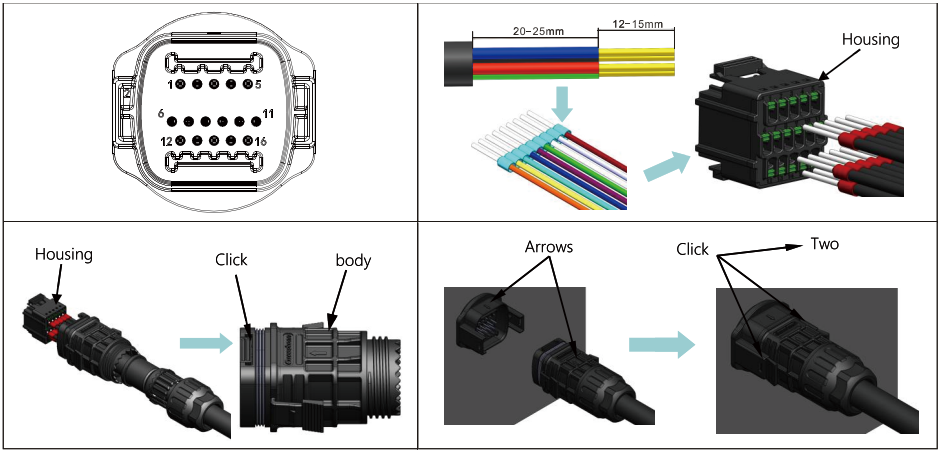
Procedure:



Wi-Fi/GPRS

By the USB acquisition stick (Wi-Fi/GPRS), 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 250~350KTL series at its relevant website or APP according to monitoring device SN.

COM—Multi function communication port



Port Description:

Pin	Name	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	Communication Ground	
8	DRM0	Remoteshutdown	DRMS port
9	DRM1/5		
10	DRM2/6		
11	DRM3/7		
12	DRM4/8		
13	GND.S	Communication Ground	N/A
14-16	Blank PIN	N/A	N/A

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 5-3 Function description of the DRMs terminal

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

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.

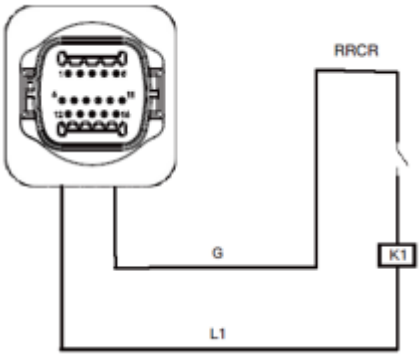


Table 5-4 Function description of the DRMs terminal

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

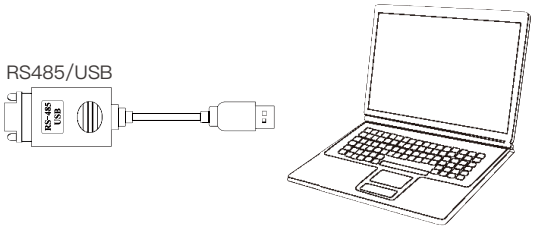
Table 5-5 The inverter is preconfigured to the following RRCR power levels.

Relay status: close is 1, open is 0

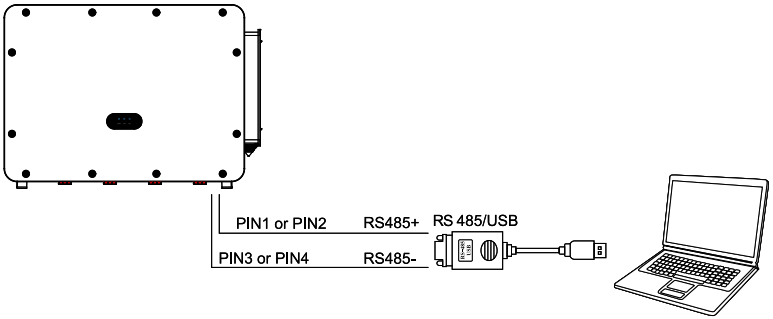
L1	Active Power	Power drop rate	Cos(Φ)
1	0%	＜5 seconds	1
0	100%	/	1

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.



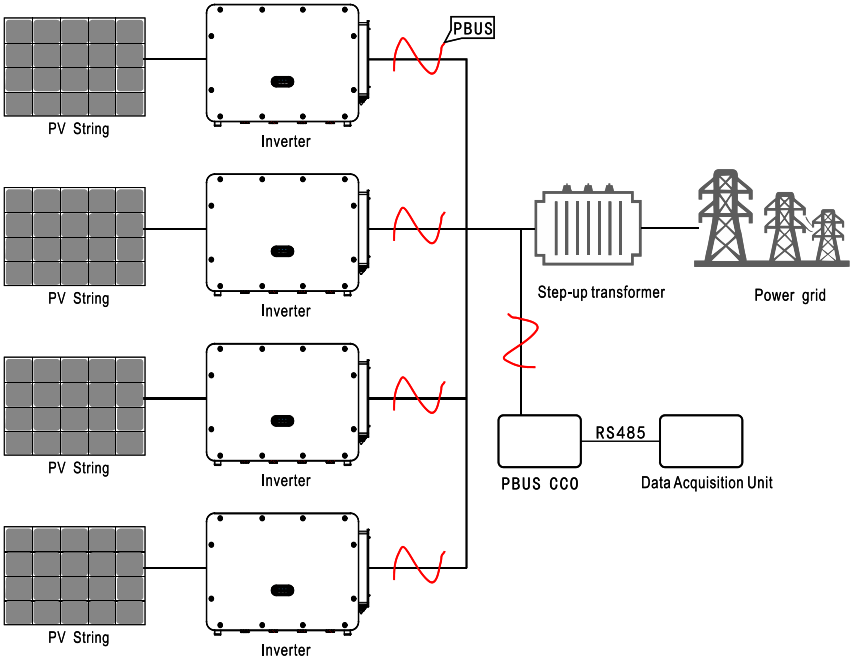
If only one SOFAR 250~350KTL series is used, use a communication cable, refer to section 5.6.2 for COM pin definition, and choose either of the two RS485 ports.



NOTE

– The length of the RS485 communication cable should be less than 1000 m.

PBUS COMMUNICATION (Multi inverter monitoring system)



PBUS Technical parameters of communication module:

Technical Index	Parameter
Maximum communication distance	1000m
PBUS Input Voltage	line voltage 320 ~ 920VAC/50/60HZ/three-phase
Communication	RS485/PBUS

PBUS installation and cable routing specifications:

1. Inverter installation location requirements: inverter installation location can not be close to the place of serious magnetic field interference, to avoid interference to the PBUS communication signals.
2. Requirements of load side: There should be no big capacitance load between the load phase and phase of the AC output side of the connected inverter, if there is capacitance, the capacitance value is suggested to be less than 600PF.
3. Cable requirements: generally use multi-core cable. If each phase of a separate cable, the PBUS communication distance should be reduced to less than 800 meters, and the three-phase cable should be wired close to each other; if the three-phase use of multi-core cable, then the PBUS communication distance can reach a maximum of 1000 meters.
4. wiring environmental requirements:
   a. Soil buried wiring: if the cable line is wired by burying under the soil, the PBUS communication distance can reach a maximum of 1000 meters.
   b. Tin roof plus trunking wiring: if the cable is laid on the tin roof of the plant, it is recommended that the PBUS communication distance is controlled below 500 meters.

6 Commissioning of Inverter

Outlines this Chapter

Introduce SOFAR 250~350KTL series safety inspection and start processing.

6.1 Check Before Power-On

ATTENTION
– Before starting up the equipment for the first time (test run), all operations performed on the equipment should be thoroughly checked. In particular, check that the DC terminal voltage and the AC terminal voltage are in accordance with the range permitted by the inverter.

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 0.1Ω.
- 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.

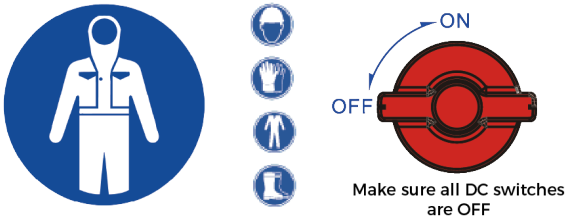
6.2 Start Inverter

ATTENTION

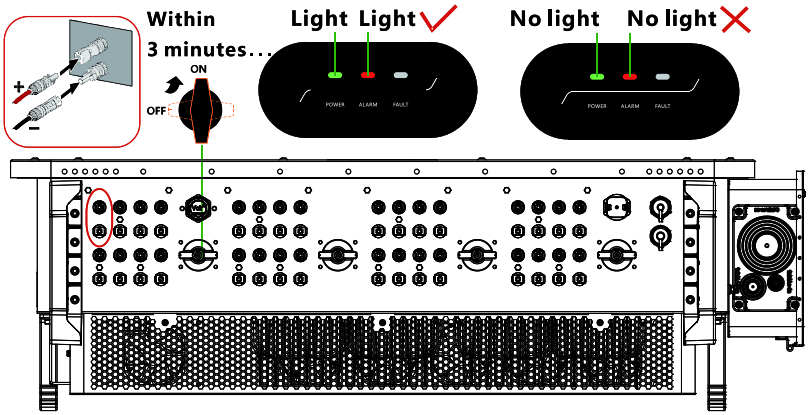
- DC switch has the function of automatic breaking, if the wiring has the phenomenon of string reverse connection, string overcurrent, etc., it will trigger the DC switch automatic breaking protection, please check the corresponding fault information in the Shouhang cloud monitoring APP, refer to the instructions in section 9.3 to check the alarm, and confirm that the alarm disappears before you close the DC switch.
- Do not allow any obstacles (e.g. cables or operators holding down the handle) within the rotational travel of the DC switch handle during system power-up or operation, otherwise the DC switch will not be able to break automatically.
- Do not close the DC switch when the grid connection indicator is green (the inverter is in grid connection), otherwise the inverter may be damaged due to lack of insulation impedance test.

If all of the above items are in order, perform the following steps to start the inverter for the first time.

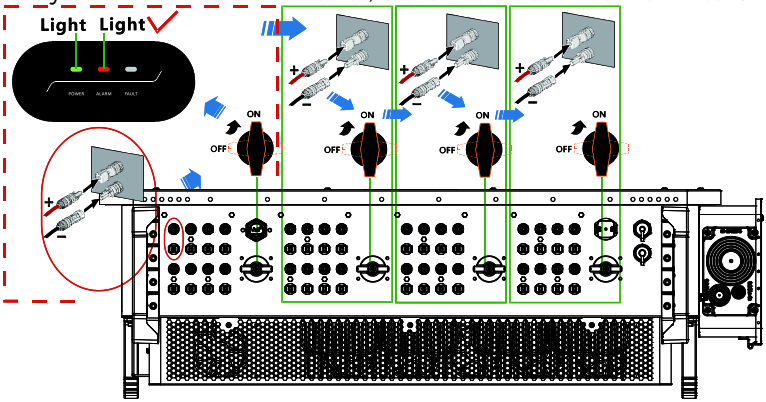
1. Wear PPE and disconnect all DC switches.



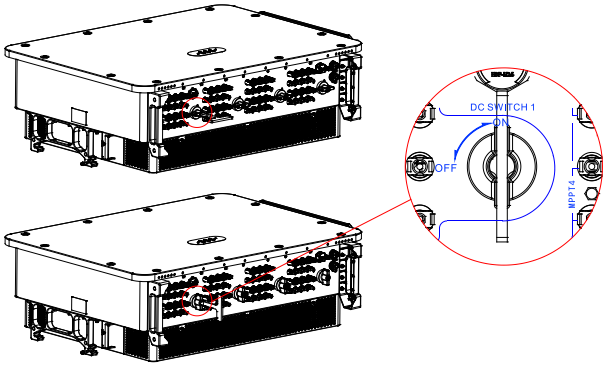
2. Measure the voltage of a group of strings with a multimeter and connect PV+ and PV- to the input of PV1 of the inverter respectively. Close the DC SWITCH1 switch, within 3 minutes, you can see the POWER lamp is always on, ALARM lamp is always on (not connected to AC), that means the first set of string PV+ and PV- access is correct. If you do not see the POWER lamp is always on/ALARM lamp is always on within 3 minutes, it means that the first set of string PV+ and PV- are connected incorrectly. Disconnect the DC SWITCH1 switch, re-exchange the PV+ and PV- access, and re-access the test according to the second step. If the POWER/ALARM light is not on for 3 minutes, please contact the technical support engineer.



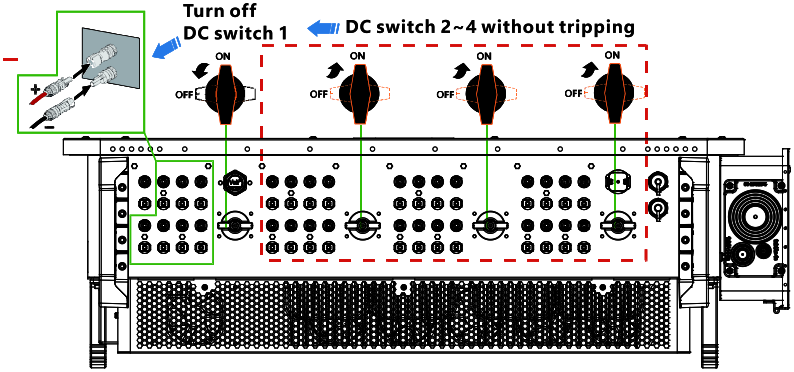
3. After the PV1 branch is correctly connected, light up the LED condition. After connecting the six-channel string of MPP3~MPPT8 to the PV input of the inverter according to PV+ and PV- correspondingly, close the three DC switches of DC SWITCH2/3/4. If there is no DC switch decoupling, it means that all the branches are connected correctly. If there is a DC switch debounce, it means that the DC switch corresponding to the PV branch has a reverse connection phenomenon, after re-checking the defective, correctly connected to the inverter, close the debounce DC switch.



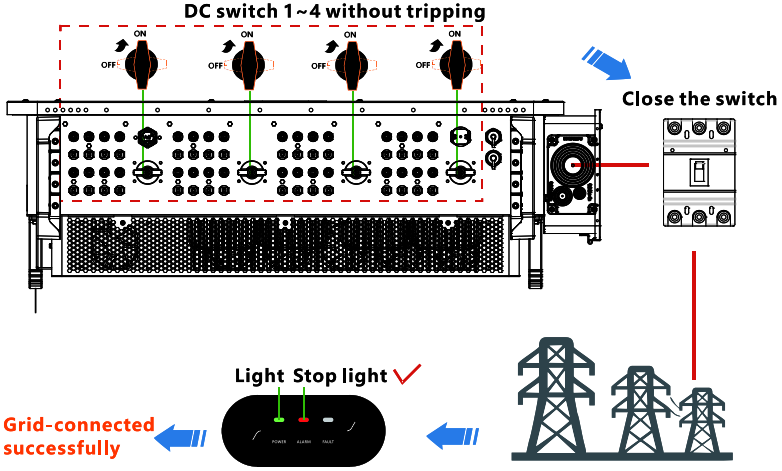
If the switch trips to “OFF” in the above steps, it means that the string has reverse connection and reverse injection problems, and the corresponding string needs to be troubleshooted. Before closing the switch, confirm that the inverter is in the shutdown state, use the reset handle of the switch, move the switch beyond the position of the silk screen „ON“ on the bottom of the inverter, and stay for about 6S to ensure that the switch is closed.



4. Disconnect the DC SWITCH1 switch, connect the remaining strings to the MPP1 and MPPT2 branches correctly, and close the DC SWITCH1 switch. If there is no DC switch release, it means that all strings are connected correctly. If there is a DC switch debounce, it means that the DC switch corresponding to the PV branch has a reverse connection phenomenon, after re-checking the defective, correctly connected to the inverter, close the debounce DC switch.



5. Close the switch between the inverter and the AC power grid. within 3 minutes the ALARM light is off and the POWER light is always on, the inverter is successfully connected to the grid. If the FAULT light is on or there are other defects, disconnect all switches and contact the technical support engineer in time.



If the inverter is faulty, please refer to section 9.3 of this manual for one by one troubleshooting.

7 SOFAR Cloud APP (Optional)

Overview

SOFAR Cloud 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 6.0; iOS 12.4.

- Android phone users: Scan the QR code below to download and install SOFAR Cloud.
- iPhone users: Search for “SOFAR Cloud” in the APP Store, download and install it.You can also download “SOFAR Cloud” by directly scanning the QR code below or taking a screenshot.

QR code

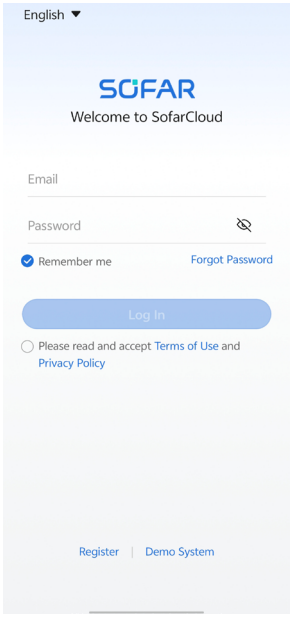
7.2 Account Registration and Login

Registration

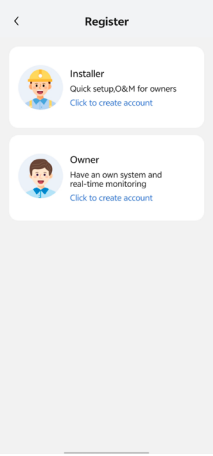
If you do not have an account of SOFAR Cloud, please enter the registration page on the login interface.

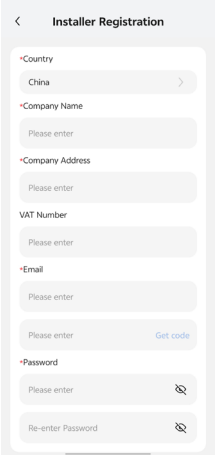
Registration page

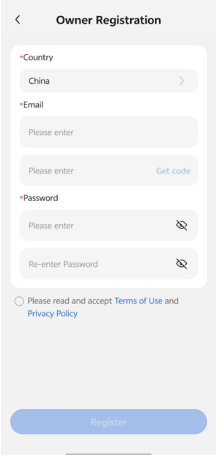
Please click the “Register account” button to enter the registration page.



1. In the [Register] interface, clicking “Installer”, and then complete the user account registration according to the interface prompts.







Complete Registration

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

2. Follow the prompts to complete the registration process

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

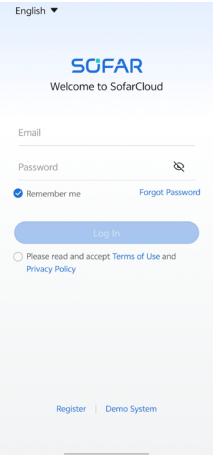
AAfter successful verification, please check the box in the agreement column to indicate that you have agreed to the “Service Agreement” and “Privacy Agreement”.

For account security considerations, the password should be a password length of 8-32 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.

Login

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



7.3 Maintenance

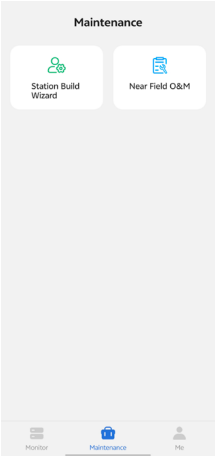
Before using this function, please turn on the Bluetooth of your cell phone in advance, and you need to apply for permission to open before you can carry out safety regulations and firmware operations.

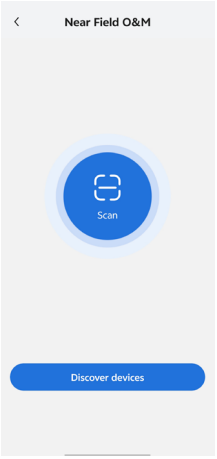
Bluetooth Connection

Enter the application interface and click [Maintenance] at the bottom, then click [Near Field O&M] on the right. On this 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

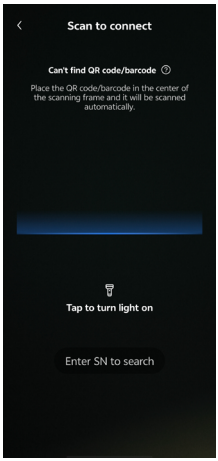
In the Maintenance screen,you can connect to the screen in two modes: “Scan Code” and “Discover devices”.





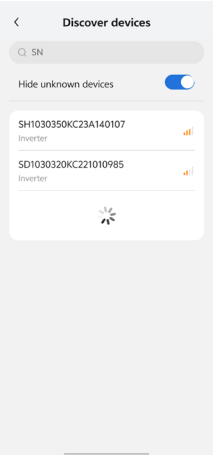
Scanning:

Click [Scan Code] 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.

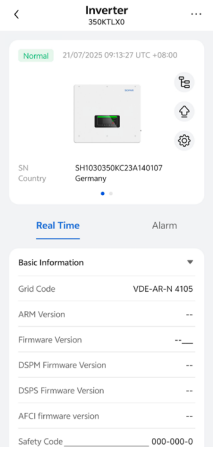


Searching:

Click [Discover devices] 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.

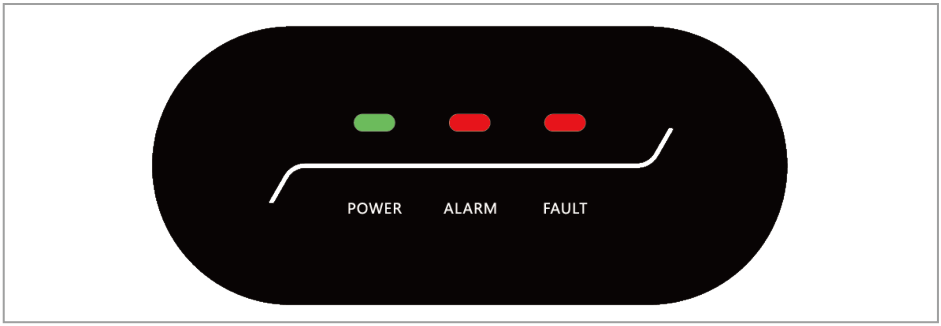


8 Operational Interface

About This Chapter

This section describes the SOFAR 320KTLX0 display, operation, and LED indicators.

8.1 Operation and Indicators



Indicator Lights:

Green light (POWER) on = Normal: Always on;

In upgrading: fast flashing (on for 200ms/off for 200ms);

In detection: slow flash (200ms on/ 1s off).

Red (ALARM) = Recoverable fault or permanent fault status.

Red (FAULT) on = GFCI leakage current fault or low insulation impedance alarm, LED on and buzzer sounding.

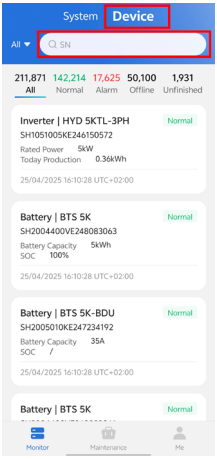
8.2 Online Software Upgrade

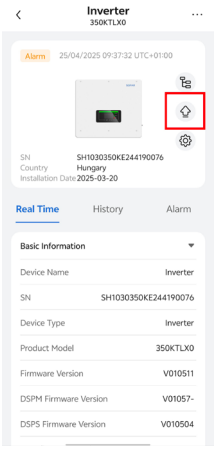
Updating the inverter software version can optimize the performance of the inverter. To facilitate customersl software upgrade, 350KTLX0 inverter provides the function of upgrading the program through SOFAR Cloud APP.

According to different requirements, select the firmware package you want to upgrade and perform a firmware upgrade on the device.

Prompt: This function is only available to admin, R & D engineer, after - sales engineer, installer. Currently, only some models are supported for upgrade. For specific models, please contact the operation and maintenance personnel of SolarVeiws APP:

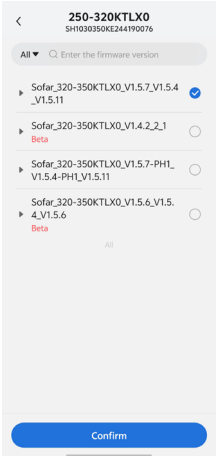
1. Find “Device” on the main page. After clicking, enter the SN number of the inverter that needs to be upgraded in the search box.Picture 1.After a successful connection, click the upgrade arrow button on the right side of the inverter icon.Picture 2.





2. Select Firmware Package

After entering the firmware upgrade page, you can select the online firmware package or select the firmware package within the local firmware library to upgrade. After selecting the files to be upgraded, click Next.



3. Upgrade

After selecting the firmware, jump to the upgrade details page, click “Confirm” to start upgrading the firmware. Please do not turn off the screen of your phone during the firmware upgrading process. When the progress of firmware download is completed, you will enter the progress of firmware upgrade, when the progress is completed, the Finish button in the box will turn blue, click “Finish”.

9 Troubleshooting and Maintenance

9.1 Normal shutdown and power down operation

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;
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;
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

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.
2. If the inverter is not fault shutdown, set the remote shut down through the machine display, or send theshutdown command in the Bluetooth APP, management system side.
3. Disconnect the AC switch.
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.
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.
6. After the display indicator goes off, wait for 25min 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, in the process of restarting the inverter, avoid standing in front of the inverter.

9.3 Troubleshooting site information confirmation

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 SOFAR Monitor APP.

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. 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.
ID002	GridUVP	The grid voltage is too low	
ID003	GridOFP	The grid frequency is too high	
ID004	GridUFP	The grid frequency is too low	
ID005	GFCI	Charge Leakage Fault	Check for inverter and wiring.

Code	Name	Description	Solution
ID006	OVRT	OVRT function is faulty	ID006-ID041 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	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	
ID014	VGridUnbalance	Grid voltage imbalance	
ID015	InvOVPInstant	Inverter instantaneous overvoltage	
ID016	GridPhaseMutation	Sudden change in grid phase	
ID017	HwADFaultIGrid	Power grid current sampling error	
ID018	HwADFaultDCI(AC)	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)	

Code	Name	Description	Solution
ID021	HwGFCIFault(DC)	Leakage current sampling error(DC)	
ID022	HwGFCIFault(AC)	Leakage current sampling error(AC)	
ID023	HwADFaultDCV	Load voltage DC component sampling error	
ID024	HwADFaultIdc	Dc input current sampling error	
ID025	HwADErrDCI(DC)	DCI Sampling Error (DC)	
ID026	HwADErrIdc-Branch	\	
ID027	PVLowImpedance	PV- Low impedance to PE	
ID028	PIDAbnormalOut	PID Abnormal Output	
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)	

Code	Name	Description	Solution
ID037	HwAuxPower-Fault	Auxiliary power error	
ID038	InvSoftStartFail	Inverter soft startup failed	
ID039	ArcShut-downAlarm	Arc shutdown	
ID040	LowLightChkFail	protection	
ID041	RelayFail	Low light 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.
ID045	CTDisconnect	CT error	
ID046	ReversalConnection	Input Reverse Error	
ID047	ParallelFault	ParallelFault	/

Code	Name	Description	Solution
ID050	TempErrHeat-Sink1	Radiator 1 temperature protection	Please ensure that the inverter is installed in a cool/well ventilated area. Make sure that the inverter is mounted vertically and that the ambient temperature is below the inverter temperature limits.
ID051	TempErrHeat-Sink2	Radiator 2 temperature protection	
ID052	TempErrHeat-Sink3	Radiator 3 temperature protection	
ID053	TempErrHeat-Sink4	Radiator 4 temperature protection	
ID054	TempErrHeat-Sink5	Radiator 5 temperature protection	
ID055	TempErrHeat-Sink6	Radiator 6 temperature protection	
ID056	NTCFault	NTC fault	
ID057	TempErrEnv1	Ambient temperature 1 protection	
ID058	TempErrEnv2	Ambient temperature 2 protection	
ID059	TempErrInv1	Module 1 temperature protection	
ID060	TempErrInv2	Module 2 temperature protection	
ID061	TempErrInv3	Module 3 temperature protection	
ID062	TempDiffErrInv	Temperature difference error of inverter module	

Code	Name	Description	Solution
ID065	BusRmsUnbalance	Unbalanced bus voltage RMS	Internal faults of inverter, switch OFF inverter, wait for 25 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID066	BusInstUnbalance	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	ID072-ID104 Internal inverter fault, turn off the inverter, wait 25 minutes and turn on the inverter. Check if the problem is resolved. If not, please contact technical support.
ID073	SwBusIOVP	Inverter bus voltage instantaneous value software overvoltage	
ID074	FlyingCapOVP		
ID075	FlyingCapUVP		
ID076	PVUVP	PV undervoltage protection	
ID082	DciOCP	Dci overcurrent protection	

Code	Name	Description	Solution
ID083	SwIOCP	Output instantaneous current protection	
ID084	SwBuckBoos-tOCP	BuckBoost software overcurrent protec-tion	
ID085	SwAcRmsOCP	Output effective value current protection	
ID086	SwPvOCPInstant	PV overcurrent soft-ware protection	
ID087	IpvUnbalance	PV flows in	
ID088	IacUnbalance	Unbalanced	
ID089	SwPvOCP	PV overcurrent soft-ware protection	
ID090	IbalanceOCP	Inverter bus balance current protection	
ID091	ResOver	Resonant protection	
ID092	SwAcCBCFault	Software current lim-ited protection	
ID093	SwPvBran-chOCP1	PV branch software overcurrent 1(enabled by default)	
ID098	HwBusOVP	Inverter bus hardware overvoltage	
ID099	HwBuckBoos-tOCP	BuckBoosthardware	
ID102	HwPVOCP	PV hardware over-flows	
ID103	HwACOCP	Ac output hardware overflows	

Code	Name	Description	Solution
ID104	HwDiffOCP	Hardware differential overcurrent	/
ID105	MeterCommFault	Meters communication fault	Check whether the meters wiring is correct.
ID106	SNMachineFault	Serial number machine error	/
ID107	HwVerError	Hardware version mismatch	/
ID110	Overload1	Overload protection 1	Please check whether the inverter is operating under overload.
ID111	Overload2	Overload protection 2	
ID112	Overload3	Overload protection 3	
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	
ID123	PermOutShortCircuitFail	Output short circuit fault	/

Code	Name	Description	Solution
ID129	PermHwAcOCP	Permanent hardware overcurrent failure	ID129-ID143 Internal faults of inverter, switch OFF inverter, wait for 25 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID130	PermBusOVP	Permanent Bus overvoltage failure	
ID131	PermHwBusOVP	Permanent Bus hardware overvoltage failure	
ID132	PermIpvUnbalance	Permanent PV unbalance failure	
ID134	PermAcOCPInstant	Output transient overcurrent permanent failure	
ID135	PermIacUnbalance	Permanent failure of unbalanced output current	
ID136	PermInvStartFail	Permanent INV start failure	
ID137	PermInCfgError	Input mode setting error permanent failure	
ID138	PermDCOCPInstant	Input overcurrent permanent fault	
ID139	PermHwDCOCP	Input hardware overcurrent permanent failure	
ID140	PermRelayFail	Permanent relay failure	
ID141	PermBusUnbalance	Bus voltage unbalanced permanent failure	
ID142	PermSpdFail(DC)	PV surge protection	
ID143	PermSpdFail(AC)	Grid surge protection	

Code	Name	Description	Solution
ID145	USBFault	USB fault	ID145-ID156 Internal inverter fault,turn off the inverter,wait 25 minutes and turn on the inverter. Check if the problem is resolved. If not,please contact technical support.
ID146	WifiFault	Wi-Fi fault	
ID147	BluetoothFault	Bluetooth fault	
ID148	RTCFault	RTC Clock fault	
ID149	CommEEPROM-Fault	Communication board EEPROM error	
ID150	FlashFault	Communication board FLASH error	
ID152	SafetyVerFault	Safety version error	
ID153	SCILose(DC)	SCI communication error (DC)	
ID154	SCILose(AC)	SCI communication error (AC)	
ID156	SoftVerError	Inconsistent software versions	
ID161	ForceShutdown	Force shutdown	The inverter is performed a forced shutdown
ID162	RemoteShut-down	Remote shutdown	The inverter is performed a remote shutdown.
ID163	Drms0Shutdown	Drms0 shutdown	The inverter is performed with a Drms0 shutdown.
ID164	PSCommFault	Power station com-munication failure	/
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.

Code	Name	Description	Solution
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.
ID386	FanFault8	Fan 8 fault	Please check whether the fan 8 of inverter is running normally.
ID191	PID_Output_Fail	PID function is failed	/
ID381	DcSwitchTrip1	DC switch 1 tripped	If the switch trips to “OFF” in the above steps, it means that the string has reverse connection and reverse injection problems, and the corresponding string needs to be troubleshooted. Before closing the switch, confirm that the inverter is in the shutdown state, use the DC switch handle of the switch, move the switch beyond the position of the silk screen “ON” on the bottom of the inverter, and stay for about 6S to ensure that the switch is closed.
ID382	DcSwitchTrip2	DC switch 2 tripped	
ID383	DcSwitchTrip3	DC switch 3 tripped	
ID384	DcSwitchTrip4	DC switch 4 tripped	

Code	Name	Description	Solution
ID442	ARMDSPProVer-Fault	ARM_DSP protocol version inconsistency	/
ID462	FireToGround-WireShot	Live wire earth wire short circuit fault	/
ID463	Unrecover_Fire_To_Ground_Wire_Short	Live wire earth wire short circuit permanent fault	/

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 25 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.

Table 9-2 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 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. 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;	At least half a year/1 time
Electrical Connection	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. 3. Check whether the sealing plug of the unused DC input terminal is detached. 4. Check that the waterproof covers of the unused COM ports and USB ports are not locked. 5. Check whether the AC port is blackened and heated abnormally, and check whether the screws of the distribution box are all locked;	At least half a year/1 time

Inspection content	Method of determination	maintenance cycle
Ground point inspection	1. Check whether the grounding point is connected normally and whether the grounding impedance is <1Ω; 2.Check whether the grounding point is loose, rusty, etc. If so, please replace the screws and re-lock them in time;	Half a year or 1 year/1 time
Equipment operation status check	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; 2. Check whether the parameters 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; 3.Whether the equipment is normal without abnormal noise and odor;	At least half a year/1 time

Please review the contents of the attached inspection form for more details.

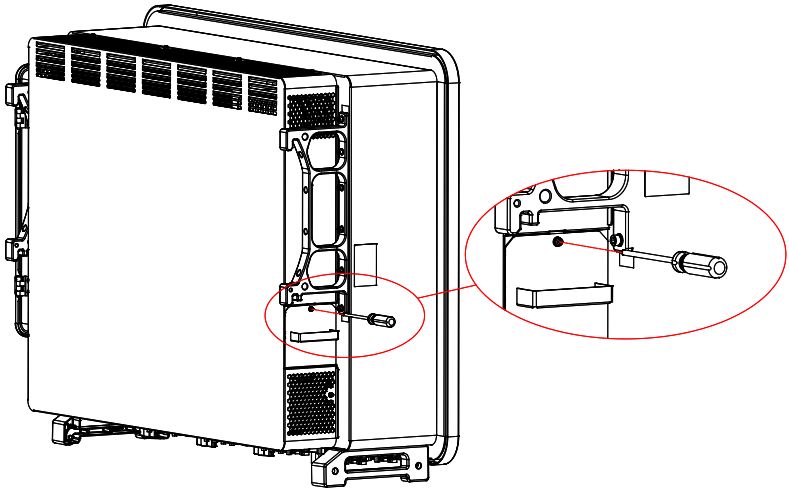
9.5 Fan Replacement and Maintenance Instructions

Fan replacement

Inverter cleaning

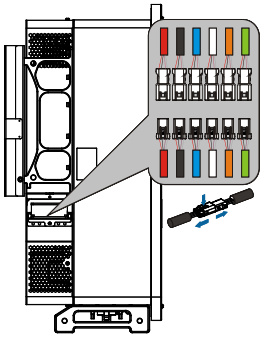
- Before replacing the fan, it is necessary to perform a de-energizing operation on the inverter.
- When replacing the fan, insulated tools must be used and personal protec

1. Remove the fan bracket fixing screws and secure them.

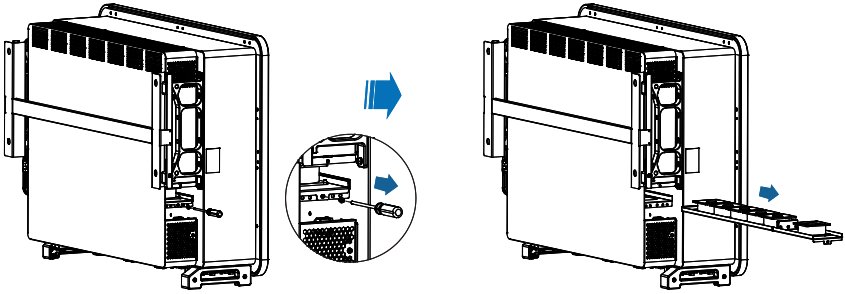


2. Cut off the cable ties holding the fan cable and then disconnect all the connecting terminals in turn.

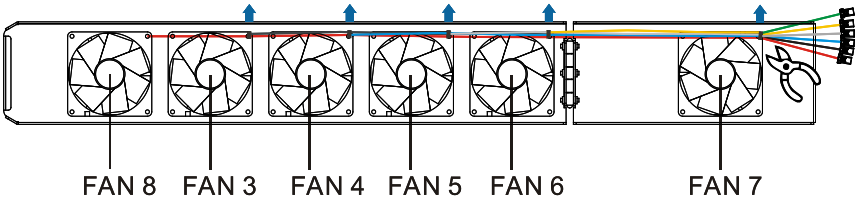
You can't use brute force to pull out the terminals, you can use your fingernail (tweezers or a small screwdriver are recommended) to press the movable buckle, and then pull out the two ends.



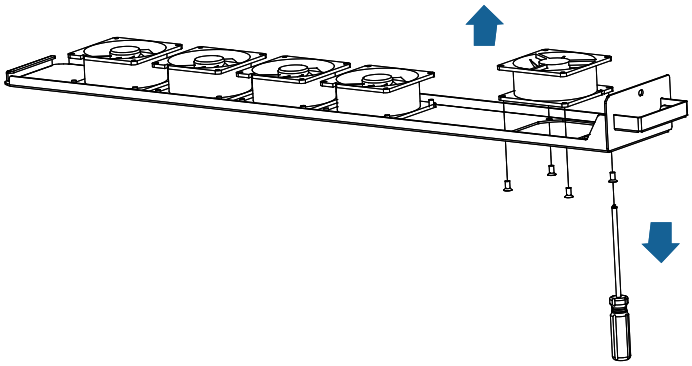
3. Remove the screws securing the fan bracket and pull the fan mounting bracket all the way out.



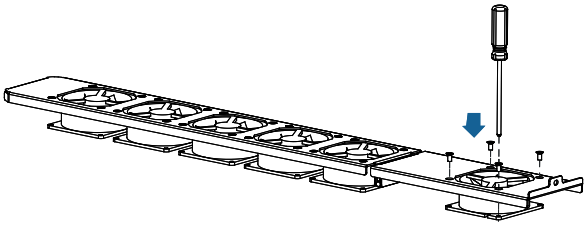
4. Cut off the tie-wraps of the defective fan (the outermost FAN 7 is used as an example below, and the other fans work in the same way).



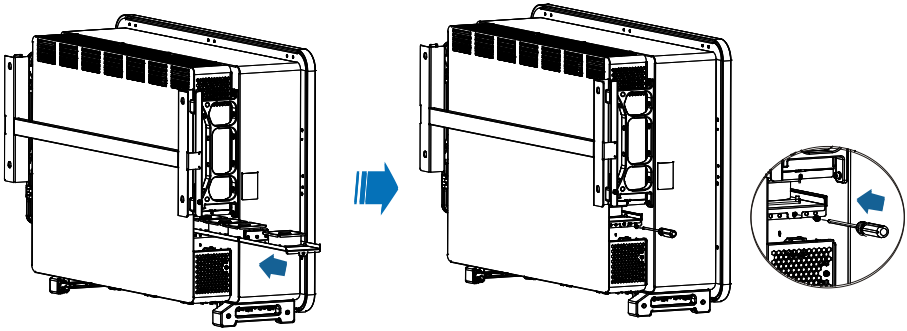
5. Remove the defective fan and keep the removed screws in a safe place.



6. Lock the new fan in place.



7. After the new fan is installed, tie the fan cable in the same position as the original cable tie.
8. Push the fan bracket completely in against the mounting position and tighten the screws.

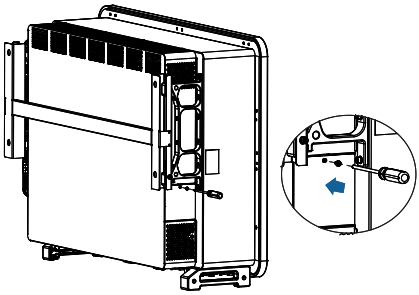


9. Connect the connectors according to the color and serial number of the fan.

Table 9-3 Comparison of Fan Failure Messages

Fan Name	FAN 3	FAN 4	FAN 5	FAN 6	FAN 7	FAN 8
Color						
Corresponding PCBA port	CN23	CN22	CN27	CN26	CN29	CN28
Corresponding fault code	Fan 3 failure	Fan 4 failure	Fan 5 failure	Fan6 failure	Fan7 failure	Fan 8 failure
	Fan-Fault3	Fan-Fault4	Fan-Fault5	Fan-Fault6	Fan-Fault7	Fan-Fault8

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

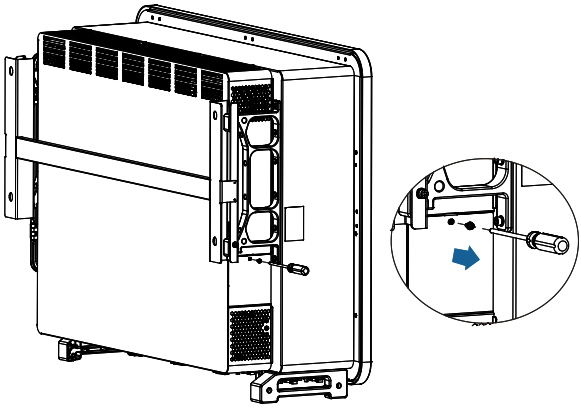


Fan Maintenance

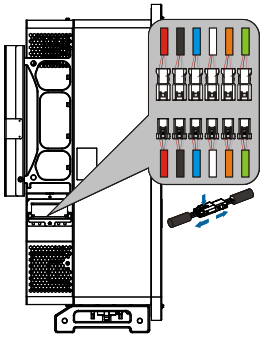
Attention:

- Before replacing the fan, it is necessary to perform a power-down operation on the inverter.
- IWhen replacing the fan, insulated tools must be used and personal protective equipment must be worn.

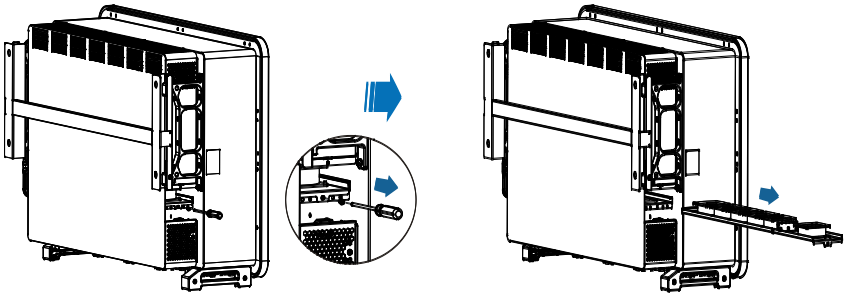
1. Unscrew the screws and remove the small baffles and keep them in a safe place.



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



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



4. Clean the fan using a soft-bristled brush or vacuum cleaner to remove any debris or mud left on the fan bracket.
5. Push the cleaned fan bracket fully in against the mounting position and tighten the screws.
6. Connect the connectors according to the color and fan serial number.
7. Put the small baffle back on and tighten the screws.

10 Technical Data

10.1 Input Parameters (DC)

Model	SOFAR 250KTLX0	SOFAR 330KTLX0	SOFAR 333KTLX0	SOFAR 350KTLX0	SOFAR 330KTLX1	SOFAR 333KTLX1	SOFAR 350KTLX1
Max. input voltage	1500V						
Rated input voltage	1160V						
Start-up voltage	550V						
MPPT operating voltage range	500~1500V						
Full power MPPT voltage range	860~1300V						
Number of MPP trackers	6	8			6		
Number for DC inputs	24	32			24		
Max. input short circuit current	6*60A	8*60A			6*80A		
Max. input short-circuit current	6*100A	8*100A			6*100A		

10.2 Output Parameter (AC)

Model	SOFAR 250KTLX0	SOFAR 330KTLX0	SOFAR 333KTLX0	SOFAR 350KTLX0	SOFAR 330KTLX1	SOFAR 333KTLX1	SOFAR 350KTLX1
Rated output power	250kW	330kW	333kW	352kW	330kW	333kW	352kW
Maximum apparent power	250kVA	330kVA	333kVA	352kVA	330kVA	333kVA	352kVA
Max. Output current	180.5A	238.2A	240.3A	254.1A	238.2A	240.3A	254.1A
Nominal grid voltage	3/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	-0.8...+0.8 adjustable						

10.3 Performance Parameter

Model	SOFAR 250KTLX0	SOFAR 330KTLX0	SOFAR 333KTLX0	SOFAR 350KTLX0	SOFAR 330KTLX1	SOFAR 333KTLX1	SOFAR 350KTLX1
Max efficiency	99.05%						
European Weighted efficiency	98.80%						
MPPT efficiency	>99.9%						
EMC	EN 61000-6-2, EN 61000-6-4						
Safety standard	IEC62109-1/2, IEC62116, IEC61727, IEC-61683, IEC60068-2-1/2/14/30						
Grid standard	VDE-AR-N 4110/4120, CEI 0-16, UNE 217002, NTS 631, EN50549, EN50530, IEC 62910						
Protection	Leakage current/Anti-islanding /DC reverse polarity/ZVRT/AC and DC secondary lightning protection						
Ground fault monitoring	Yes						
PV-array string fault monitor-ing	Yes						
Protection class	Class I						
Overvoltage category	AC: III, PV: II						
Input/ output SPD	PV: type II standard, AC: type II Standard						

10.4 General Data

Model	SOFAR 250KTLX0	SOFAR 330KTLX0	SOFAR 333KTLX0	SOFAR 350KTLX0	SOFAR 330KTLX1	SOFAR 333KTLX1	SOFAR 350KTLX1
Topology	Transformless						
Ambient temperature range	-30˚C ~ +60˚C						
Relative humidity	0% ~ 100%						
DC Switch	Yes						
Cooling	Smart forced air cooling						
Max. operating altitude	4000m						
Communica-tion	RS485 / PBUS						
Display	LED& Bluetooth +APP						
Degree of protection	IP66						
Dimension (W×H×D)	1159×828×366mm						
Weight	≤111 kg		≤113 kg			≤111 kg	

Version 1.0

ENERGY TO POWER YOUR LIFE

ADDRESS

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

EMAIL

info@sofarsolar.com

WEBSITE

www.sofarsolar.com

SOFARSOLAR