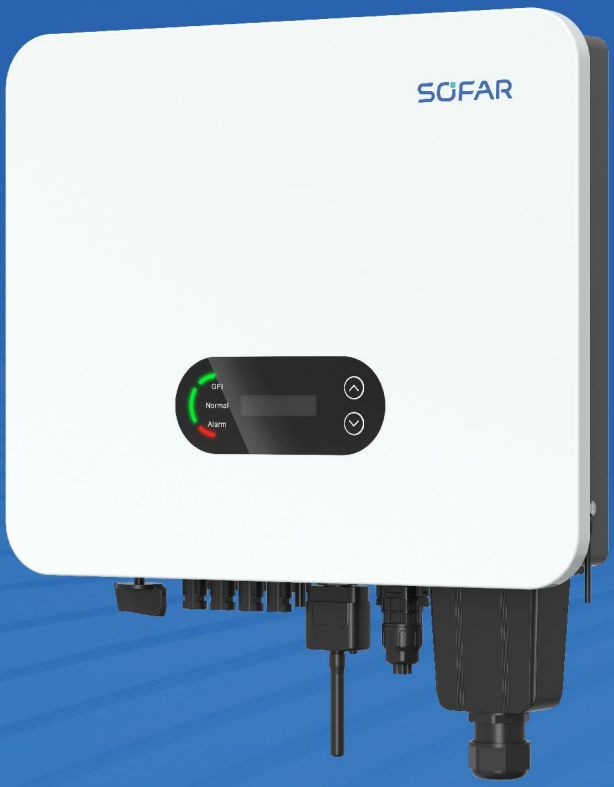
SOFAR

USER MANUAL

SOFAR 15...30KTLX-G3P



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English

Content

1 About This Manual

This Installation and user manual (hereinafter referred to as the manual) describes the installation, electrical connection, commissioning, maintenance and fault elimination procedures of the following products:
SOFAR 15KTLX-G3P, SOFAR 17KTLX-G3P, SOFAR 20KTLX2-G3P,
SOFAR 23KTLX-G3P, SOFAR 25KTLX-G3P.

- Carefully read this manual before use and retain it for future reference!
- Treat this manual as an integral component of the device.
- Please retain this manual in a readily accessible location for future reference.

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

- Read and observe all given safety information.

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

1.1 Copyright declaration

SOFARSOLAR reserves the right to final interpretation. This manual may be amended following feedback from users or customers.
Consult our website at: www.sofarsolar.com for the latest version.

1.2 Presentation of warnings

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

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

Warning symbol

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

Signal word

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

Sectional warnings

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

⚠ WARNING

Type and source of danger

Consequences for non observance

- Avoiding the danger

Embedded warnings

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

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

1.3 Presentation of action instructions

This table shows the sequence of Action steps:

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

1.4 Note

Notes are presented in a grey bar.

Provides tips essential to the optimal operation of the product.

2 Basic Safety Information

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

If you have any questions or problems after reading the following information, please contact SOFARSOLAR.

Read and understand the instructions within this manual and familiarise yourself with the relevant safety symbols in this chapter before beginning with the installation of the device and eliminating any faults.

Before connecting to the power grid, you must obtain official authorisation from the local power grid operator in accordance with the corresponding national and state requirements. Furthermore, the operation may only be carried out by qualified electricians.

Please contact the nearest authorised service centre if any maintenance or repairs are required.

- Please contact your dealer to obtain information about your nearest authorised service centre.
- Do NOT carry out repairs on the device yourself, this may lead to injury or property damage.
- Before installing the device or carrying out maintenance on it, you must turn off the DC switch in order to interrupt the DC voltage of the PV generator. You can also switch off the DC voltage by turning off the DC switch in the array junction box. Not doing this may result in serious injury.

2.1 Target group

This manual is intended for qualified electricians who are responsible for the installation and commissioning of the inverter in the PV system, as well as the PV system operators.

2.2 Qualified personnel

Personnel tasked with the operation and maintenance of the device must have the qualifications, competence and experience required to perform the described tasks, while also being capable of fully understanding all instructions contained within the manual. For safety reasons, this inverter may only be installed by a qualified electrician.

Requirements for qualified electricians:

- Personnel have received training on occupational safety, as well as the installation and commissioning of electrical systems.
- Personnel are familiar with the local laws, standards and regulations of the grid operator.

SOFARSOLAR assumes no responsibility for the destruction of property or any injuries to personnel caused by improper usage.

2.3 Installation requirements

Install the inverter according to the information contained in the following section.

- Choose a suitable place for the installation of electrical devices.
- Ensure that there is sufficient space for an emergency exit which is suitable for maintenance.
- Installation of the inverter must conform with laws, regulations, codes and standards applicable in the jurisdiction.
- Before connecting the product to the electrical utility grid, contact the local utility company for approval.

2.4 Transport requirements

The factory packaging is specifically designed to prevent transport damage, i.e. violent shocks, moisture and vibrations. However, the device must not be installed if it is visibly damaged. In this case, notify the responsible transport company immediately. If necessary, you can seek help from your photovoltaic system installer or SOFARSOLAR.

The stacking height of multiple inverters should not exceed the stacking limit indicated on the outer box.

If the inverter is stored for more than half a year, the inverter needs to be fully examined and tested by qualified service or technical personnel before use. For storage conditions see Technical Data.

2.5 Labelling on the device

The labels must NOT be concealed by items and foreign objects (rags, boxes, devices, etc.). They must be regularly cleaned and kept clearly visible at all times. See the chapter about the 3.4 Labelling on the inverter.

2.6 Electrical connection

Observe all applicable electrical regulations when working with the Solar inverter.

⚠ DANGER

Dangerous DC voltage

- Before establishing the electrical connection, cover the PV modules using opaque material or disconnect the PV generator from the inverter. Solar radiation will cause dangerous voltage to be generated by the PV generator!

⚠ DANGER

Danger through electric shock!

- All installations and electrical connections may only be carried out by trained electricians!

NOTICE

Authorisation for grid feed-in

- Obtain authorisation from the local power grid operator before connecting the inverter to the public power grid.

Do not open the inverter or remove any of the labels. Otherwise, SOFARSOLAR shall assume no guarantee.

2.7 Operation

⚠ DANGER

Electric shock

- Contact with the electrical grid or the device's terminals may result in an electric shock or fire!
- Do not touch the terminal or the conductor which is connected to the electrical grid.
- Follow all instructions and observe all safety documents that refer to the grid connection.

⚠ CAUTION

Burning due to hot housing

- While the inverter is being operated, several internal components will become very hot. Please wear protective gloves!
- Keep children away from the device!

2.8 Repair and maintenance

⚠ DANGER

Dangerous voltage!

- Before carrying out any repair work, first switch off the AC circuit breaker between the inverter and power grid, and then the DC switch.
- After switching off the AC circuit breaker and the DC switch, wait a minimum of 5 minutes before starting any maintenance or repair work.

NOTICE
Unauthorised repairs! ▶ Following the elimination of any faults, the inverter should be fully functional once more. Should any repairs be required, please contact a local authorised service centre. ▶ The internal components of the inverter must NOT be opened without the relevant authorisation. SOFARSOLAR assumes no responsibility for any resulting losses or defects.

2.9 EMC / noise level of inverter

Electromagnetic compatibility (EMC) refers to the fact that electrical equipment functions in a given electromagnetic environment without any trouble or error, and imposes no unacceptable effect upon the environment. Therefore, EMC represents the quality characteristics of electrical equipment.

- The inherent noise-immune character: immunity to internal electrical noise.

- External noise immunity: immunity to electromagnetic noise of the external system.

- Noise emission level: influence of electromagnetic emission upon the environment.

⚠ DANGER
Electromagnetic radiation from the inverter may be harmful to health! ▶ Please do not continue to stay around the inverter for less than 20 cm when the inverter is working.

2.10 Symbols and signs

⚠ DANGER
Dangerous DC voltage ▶ High voltage circuits of inverters can endanger life. ▶ All installations and electrical connections may only be carried out by trained electricians.

- Minors, individuals with disabilities, and those with mental health conditions are prohibited from using this product.
- This product should be installed out of the reach of children.

⚠ WARNING

Damage due to overvoltage

- Ensure that the input voltage does not exceed the maximum permissible voltage. Overvoltage may cause long-term damage to the inverter, as well as other damage that is not covered by the warranty.

⚠ CAUTION

Beware of burning hazards due to the hot housing!

- While the inverter is in operation, only touch the display and the buttons, as the housing can become hot.

NOTICE

Implement earthing!

- The PV generator must be earthed in accordance with the requirements of the local power grid operator!
- For reasons of personal safety, we recommend that all PV module frames and inverters of the PV system are reliably earthed.

Symbols on the inverter

Several symbols pertaining to safety can be found on the inverter. Please read and understand the content of these symbols before starting the installation.

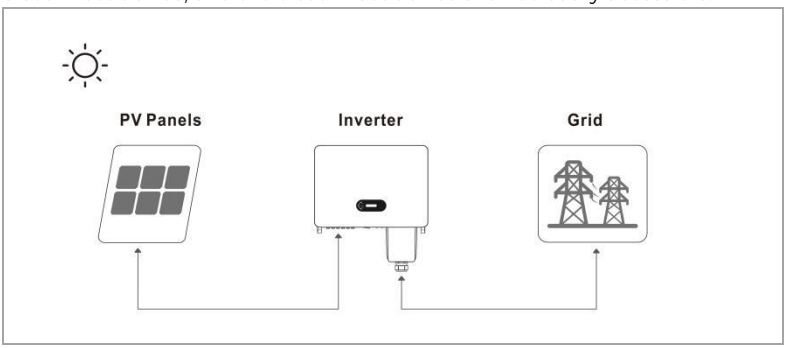
Symbol	Description
	Residual voltage is present in the inverter! Before opening the inverter, you should wait five minutes to ensure that the capacitor has been fully discharged.

Symbol	Description
	Caution! Danger through electric shock
	Caution! Hot surface
CE	The product is compliant with EU guidelines
	Earthing point
	Please read the manual before installing the inverter
IP	Device degree of protection according to EN 60529
+−	Positive and negative poles of the DC input voltage
	The inverter must always be transported and stored with the arrows pointing upward
	Allowable operating temperature range.
	RCM (Regulatory Compliance Mark) The product meets the requirements of the applicable Australian standards.
	When the equipment is scrapped, it is disposed of following local laws and regulations or sent to the manufacturer.

3 Product Features

3.1 System description

SOFAR 15-25KTLX-G3P is a two MPPT grid-tied PV inverter which converts the DC power generated by PV arrays into sine wave single-phase AC power and feeds it to the public electrical grid, AC circuit breaker and DC switch used as disconnect device, and the disconnect device shall be easily accessible.

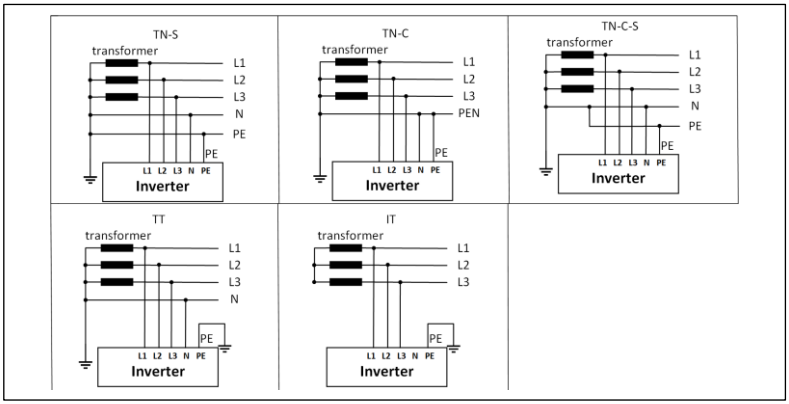


SOFAR 15-25KTLX-G3P inverters can only be used with photovoltaic modules that do not require one of the poles to be grounded. The operating current during normal operation must not exceed the limits specified in the technical specifications. Only the photovoltaic modules can be connected to the input of the inverter (do not connect batteries or other sources of power supply).

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

3.2 Intended grid types

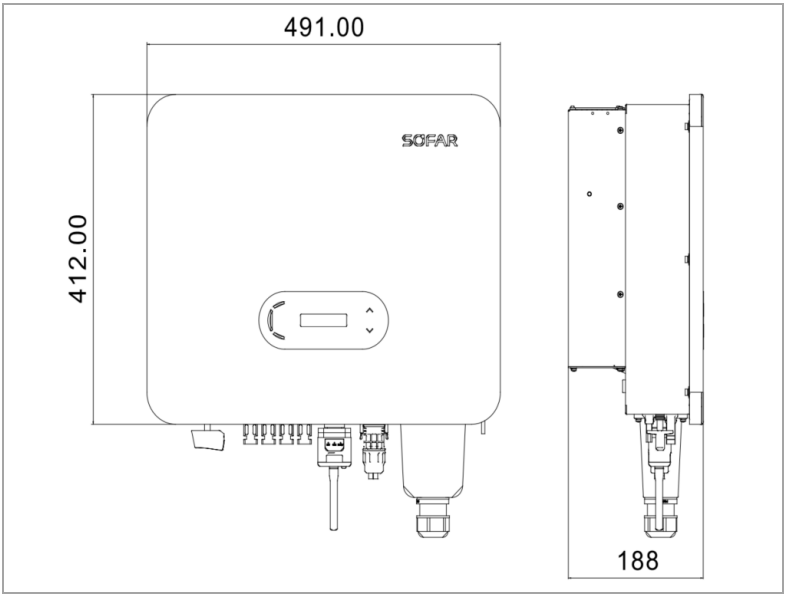
SOFAR 15-25KTLX-G3P configurations for the TT type of electricity grid, the voltage between neutral and earth should be less than 30V. Inverters are compatible with TN-S, TN-C, TN-C-S, TT, IT grid.



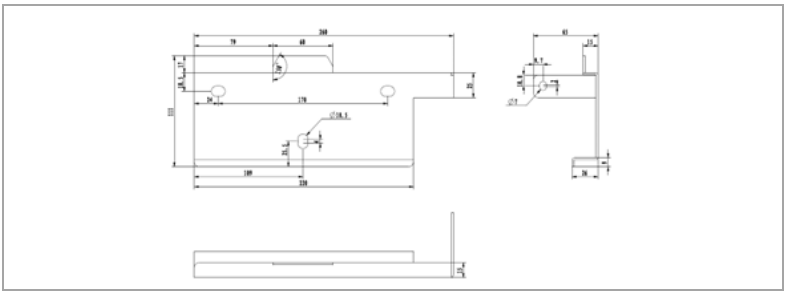
3.3 Product dimensions

All SOFAR 15-25KTLX-G3P have the following dimensions:

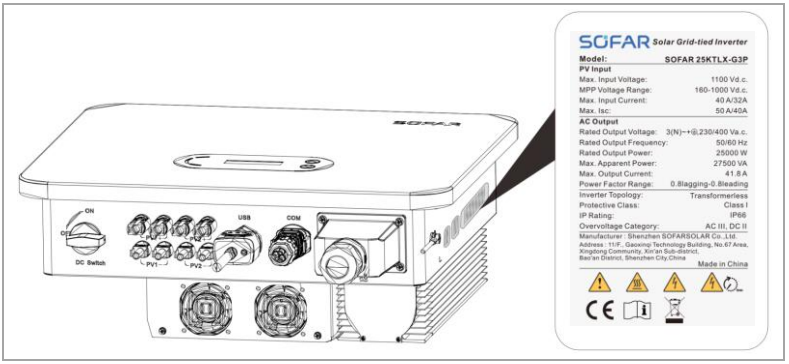
491 mm×412 mm×188 mm



Bracket dimensions of inverter:



3.4 Labelling on the inverter



The machine nameplate must not be obscured or broken by other objects (rags, cardboard boxes or other tools); the surface of the machine nameplate must be kept clean and clear to ensure that the contents are clearly visible.

3.5 Functional features

The DC output generated by the PV generator is filtered by the input board before it reaches the power board. The input board also provides functions such as the detection of insulation impedance and the measurement of the DC current and voltage. The power board converts the DC current into AC current. The AC current is filtered by the output board and fed into the power grid. The output board also provides functions such as grid voltage and current measurement, earth fault protection and a disconnecting relay. The control

board supplies the auxiliary energy, controls the operating state of the inverter and displays the operating status on the display board. An error code will appear on the display if the inverter is in an abnormal operating state. At the same time, the control board may trigger the relay to protect the internal components.

Functions

A Energy management unit

This control can be used to switch the inverter on/off through an external (remote) control.

B Feeding reactive power into the grid

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

C Limiting the active power fed into the grid

The inverter, if enabled can limit the amount of active power fed into the grid by the inverter to the desired value (Expressed as a percentage).

D Self-power reduction when the grid is over frequency

When the grid frequency is higher than the limited value, the inverter will reduce output power, which is necessary for grid stability.

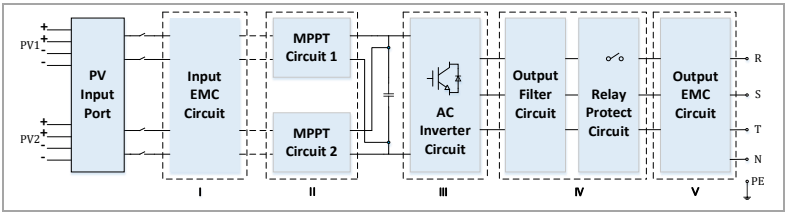
E Data transmission

The inverter or a group of inverters may be monitored remotely through an advanced communication system based on RS-485 serial interface, or remotely via the WIFI/GPRS.

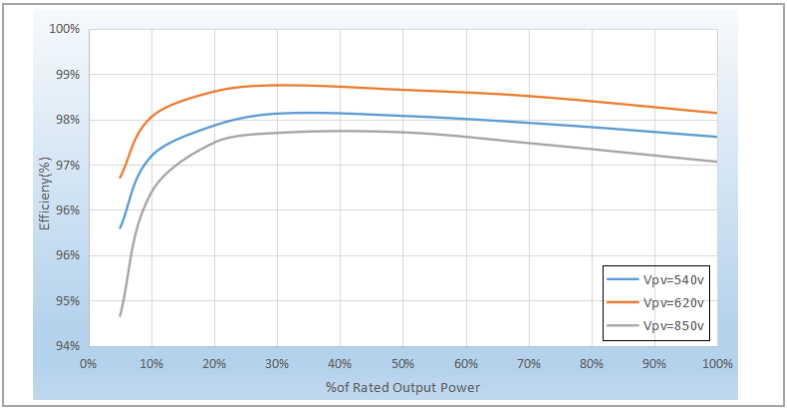
F Software update

Support USB flash drive local upgrade software and Wi-Fi/GPRS remote upgrade software.

3.6 Electrical block diagram



3.7 Efficiency curve



4 Inverter Storage

If the inverter is not installed immediately, storage conditions need to meet the following requirements:

Place the inverter in the original packing case with the desiccant inside.

Keep the storage temperature around -30℃to +70℃, Relative humidity 5 to 95%, non-condensing.

In case of stacking storage, the number of stacking layers should never exceed the limit marked on the outer side of the packing case.

The packing case should be upright.

If the inverter needs to be transported again, pack it strictly before loading and transporting it.

Do not store the inverter in places susceptible to direct sunlight, rain, and strong electric field.

The inverter needs to be stored in a clean and dry place and protected from dust and moisture.

Inverters stored for half a year and above need to be inspected and tested by a professional before being put into use.

Please store the product in accordance with the storage requirements. Damage to the product caused by storage conditions that do not meet the requirements will not be covered by the warranty.

5 Installation

⚠ DANGER

Fire hazard

- Do NOT install the inverter on flammable material.
- Do NOT install the inverter in an area in which flammable or explosive material is stored.

⚠ CAUTION

Burning hazard

- Do NOT install the inverter in places where it can be accidentally touched. The housing and heat sink may become very hot while the inverter is being operated.

NOTICE

Handling Safety

- Consider the weight of the inverter when transporting and moving it.
- Choose a suitable installation location and surface.
- Commission a minimum of two persons for the installation of the inverter.
- Do not turn the inverter upside down.

5.1 Installation procedure

Mechanical installation is performed as follows:

1. Examine the inverter before installation
2. Prepare the installation
3. Select an installation location
4. Transport the inverter
5. Mount the rear panel
6. Install the inverter

5.2 Examination before installation

Before unpacking the inverter, check the external packaging material for damage, e.g. holes and cracks. If you discover any cases of damage, do not unpack the inverter and contact the transport company and/or dealer immediately.

Do not install the inverter if the packaging is damaged.

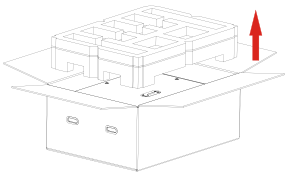
It is recommended that the packaging material be removed within 24 hours before installing the inverter.

Keep the original packaging and use it whenever the inverter needs to be shipped or transported.

5.3 Unpacking the inverter

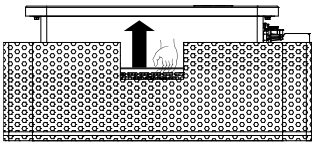
▶ Open the packaging and have at least two people grip underneath the inverter at both sides.

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



CAUTION Please handle the inverter carefully. Keep your balance when lifting the inverter.

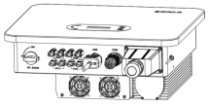
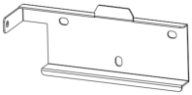
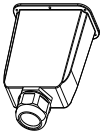
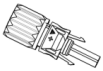
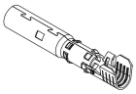
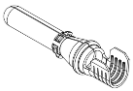
▶ Lift the inverter out of the packaging and move it to its installation position horizon tally.

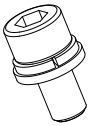
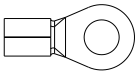
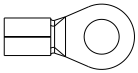
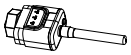


5.4 Checking the delivery scope

▶ Check that the delivery is intact and complete.

In the event of any damage or missing components, contact the wholesaler.

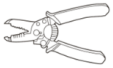
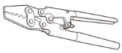
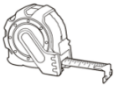
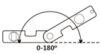
No.	Image	Description	Quantity
1		SOFAR 15-25KTLX-G3P	1
2		Wall bracket	1
3		AC waterproof cover	1
4		M8*80 Hexagon screws	3
5		PV+ input terminal	3/4
6		PV- input terminal	3/4
7		Metal terminals secured to PV+ input power cables	3/4
8		Metal terminals secured to PV- input power cables	3/4
9		M4 cross screw (For locking the waterproof cover)	4

No.	Image	Description	Quantity
10		M5 cross screw (For locking the rear panel)	1
11		M6 Hexagon screws	1
12		R-type terminal (Connect PE)	1
13		R-type terminal (Connect L1/L2/L3/N)	4
14		COM Communication Terminal	1
15		USB acquisition stick (WIFI/GPRS/Ethernet)	1
16		Documents	1

5.5 Tools

Prepare tools required for installation and electrical connections.

No.	Tool	Model	Function
1		Hammer drill Recommend drill dia. 6mm	Used to drill holes on the wall.

No.	Tool	Model	Function
2		Screwdriver	Wiring
3		Socket wrench	Fasten the cable and install the expansion bolt
4		Hammer	Install the expansion bolt
5		Removal tool	Remove PV terminal
6		Wire stripper	Strip wire
7		5mm Allen Wrench	Turn the screw to connect rear panel with inverter.
8		Crimping tool	Used to crimp power cables
9		Multi-meter	Used to check grounding
10		Marker	Used to mark signs
11		Measuring tape	Used to measure distances
12		Level	Used to ensure that the rear panel is properly installed

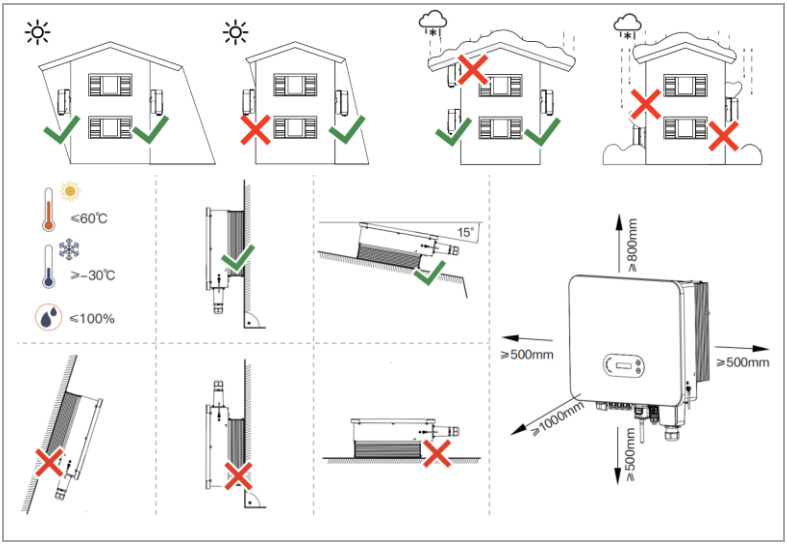
No.	Tool	Model	Function
13		ESD gloves	Operators wear
14		Safety goggles	Operators wear
15		Anti-dust respirator	Operators wear

5.6 Selecting an installation location

Requirements for install position:

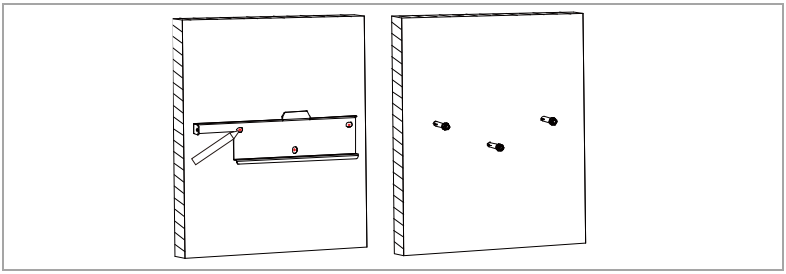
- Install position must not obstruct the disconnect of power.
- Place the inverter on an appropriate bearing capacity object.
- Location should be avoided touch by children.

Choose a suitable position for the installation of the inverter. Ensure that the following requirements have been fulfilled:

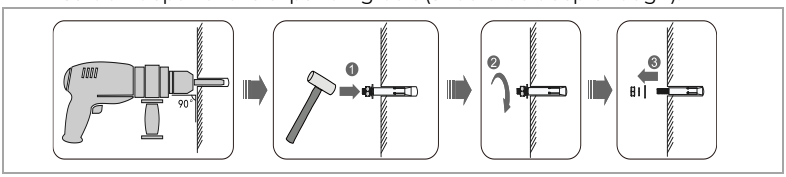


5.7 Installing the inverter

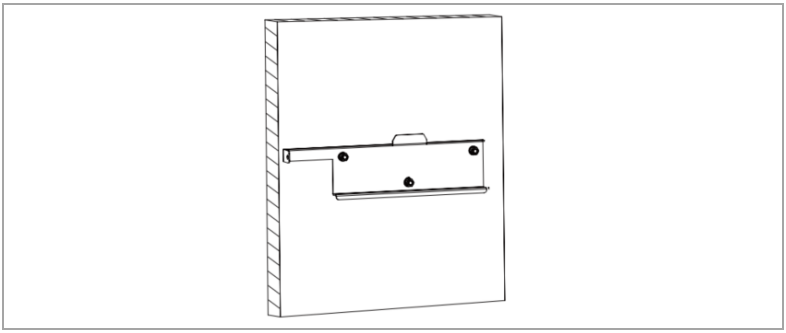
1. Determine the positions for drilling holes, ensure the hole positions are level, then mark the hole positions using a marker pen, use the hammer drill to drill holes on the wall. Keep the hammer drill perpendicular to the wall, do not shake when drilling, so as not to damage the wall. If the error of the hole positions is too big, you need to reposition.



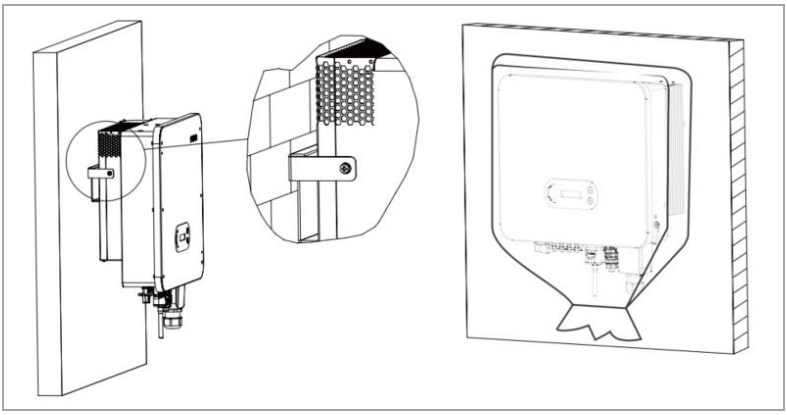
2. Insert the expansion bolt vertically into the hole, pay attention to the insertion depth of the expanding bolt (should be deep enough).



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



4. Hook the inverter to the rear panel. Using an M5 screw to secure the inverter to the rear panel to ensure safety.



6 Electrical Connections

⚠ DANGER

Dangerous DC voltage

- Before establishing the electrical connection, cover the PV modules using opaque material or disconnect the PV generator from the inverter. Solar radiation will cause dangerous voltage to be generated by the PV generator.
- Before performing electrical connections, ensure that the DC switch is OFF.
- Reason is that the electrical charge remains in the capacitor after the DC switch has been switched off. Therefore, at least 5 minutes must lapse before the capacitor has been electrically discharged.

NOTICE

- Installation and maintenance of the inverter must be performed by a professional electrical engineer.
- For SOFAR 15-25KTLX-G3P, open-circuit voltage(Voc) of module arrays connected in series must be⩽1100V.
- The connected PV modules must have an IEC 61730 Class A rating.

Model	Isc PV (absolute maximum)	Maximum output over current protection
SOFAR 15KTLX-G3P	25A/40A	25.1A
SOFAR 17KTLX-G3P	25A/40A	28.5A
SOFAR 20KTLX2-G3P	50A/40A	33.5A
SOFAR 23KTLX-G3P	50A/40A	38.5A
SOFAR 25KTLX-G3P	50A/40A	41.8A

The decisive voltage class (DVC)

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

Interface	DVC
PV input interface	DVCC
AC output interface	DVCC
USB interface	DVCA
Com interface	DVCA

DC switch parameters	
Rated-insulation voltage	1100V
Rated impulse withstand voltage	8KV
Rated operational current (Ie)	1100V/5A, 1000V/8A, 800V/12.5A, 500V/25A
PV utilization category	DC-PV2
Rated short time withstand current (Icw)	700A
Rated short-circuit making capacity (Icm)	4xIe
Rated breaking capacity	4xIe

PV terminal parameters	
Rated-insulation voltage	1000V
Rated operational current	39A
Protection class	IP68
Maximum temperature limit	105℃

6.1 Connection sequence

Electrical installation is performed as follows:

1. Connect PE cable
2. Connect DC input cable

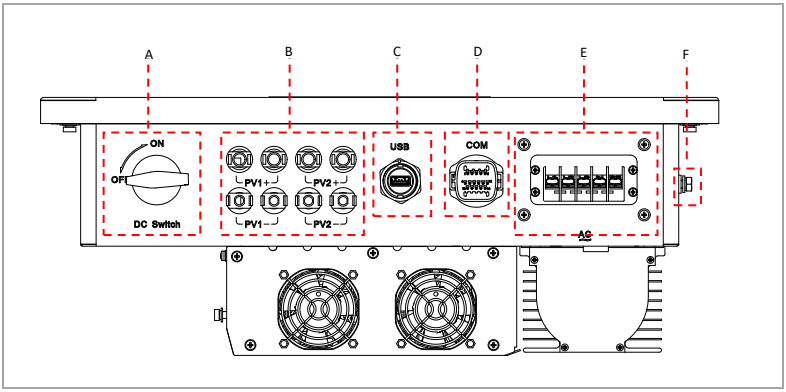
3. Connect AC output power cable
4. Connect communication cable (optional)

6.2 Terminal connector

⚠ CAUTION

Pay attention to damage during transport

▶ Please carefully check that the product packaging and each connection terminal are intact before installation.



No.	Label	Description
A	DC SWITCH	Control the access and shutdown of DC inputs
B	PV1-2(+/-)	PV inputs connection
C	USB port	USB firmware update or Stick logger connection
D	COM	RS 485 Communication / DRMs
E	AC OUTPUT	AC output connection
F	Grounding protection	Reliable grounding for inverters

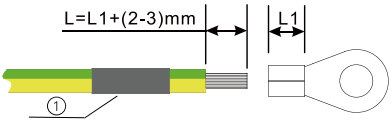
6.3 Connect grounding PE cable

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

The inverter is transformer-less, requires the positive pole and negative pole of the PV array to be NOT grounded. Otherwise, it will cause inverter failure. In the PV power system, all non-current carrying metal parts (such as PV module frame, PV rack, combiner box enclosure, and inverter enclosure) should be connected to the earth.

▶ **Prerequisites:** The PGND cables are prepared (≥10 mm²outdopower cables are recommended for grounding purposes), the colour of the cable should be yellow-green.

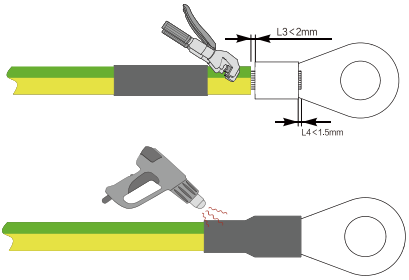
1. Remove the insulation of the cable.



①Heat shrink tubing

*Note: The length of L2 should be 2 to 3MM higher than L1.

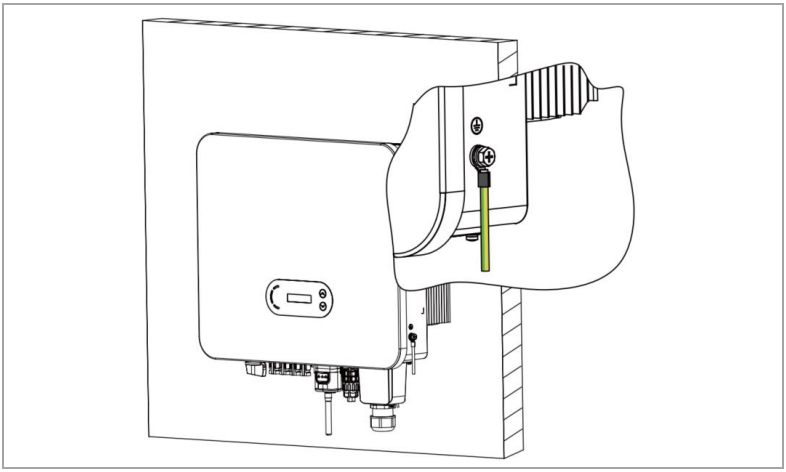
2. Crimp the cable to the ring terminal.



*Note1：L3 is the length between the insulation layer of the ground cable and the crimped part. L4 is the distance between the crimped part and core wires protruding from the crimped part.

*Note 2：L4 is the distance between the crimped part and core wires protruding from the crimped part.

3. Install the crimped OT terminal, flat washer using M6 screw, and tighten the screw to a torque of 5~7 N.m using an Allen wrench.



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

6.4 Connect grid side of inverter (AC-Output)

Connect the inverter to the AC power distribution frame or power grid using AC output power cables.

⚠ CAUTION

- Each inverter must have its own circuit breaker.
- Do not connect any consumers between the inverter and circuit breaker!
- The AC disconnecting device must be easily accessible.

NOTICE

Obtaining permission to connect to the grid

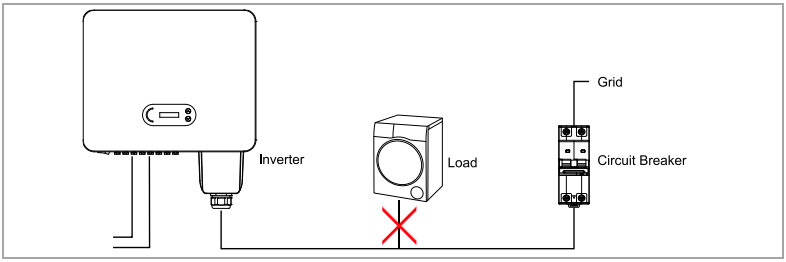
- The AC cable needs to meet the requirement of the local grid operator.

All the AC output cables used for the inverters are outdoor three-core cables.

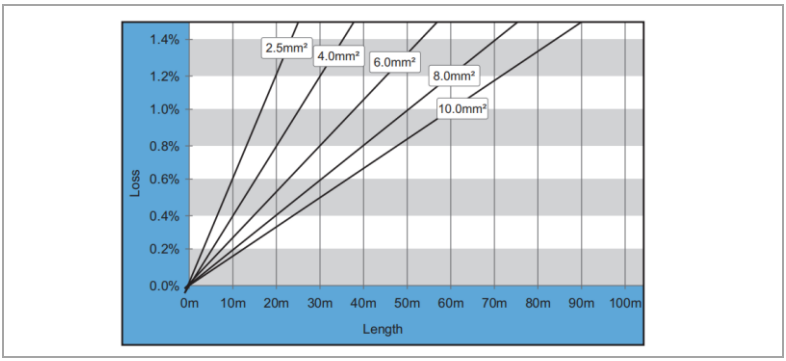
To facilitate the installation, use flexible cables.

Item / Model	Cross section area of Cu cable (mm2)	Multi-core outdoor cable (mm)	AC circuit breaker specification
SOFAR 15KTLX-G3P	8~16, recommend 10	17-24	40A/230V/3P current leakage protection 0.1A
SOFAR 17KTLX-G3P	8~16, recommend 12		
SOFAR 20KTLX2-G3P			
SOFAR 23KTLX-G3P	8~16, recommend 14		63A/230V/3P current leakage protection 0.1A
SOFAR 25KTLX-G3P			

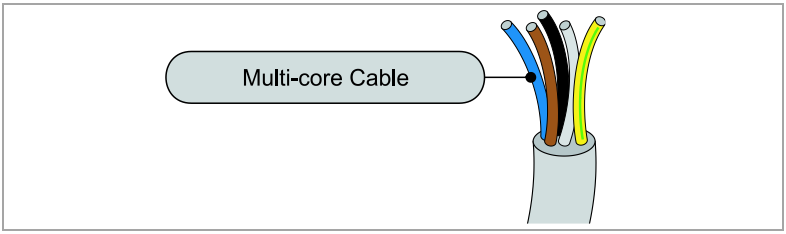
NOT allowed: connect loads between inverter and circuit breaker:



AC cable should be correctly sized to ensure the power loss in AC cable is less than 1% of the rated power. If the resistance of the AC cable is too high, it will cause a huge increase in the AC voltage, which may lead to a disconnection of the inverter from the electrical grid. The relationship between power loss in AC cable and wire length, wire cross sectional area is shown in the following figure:

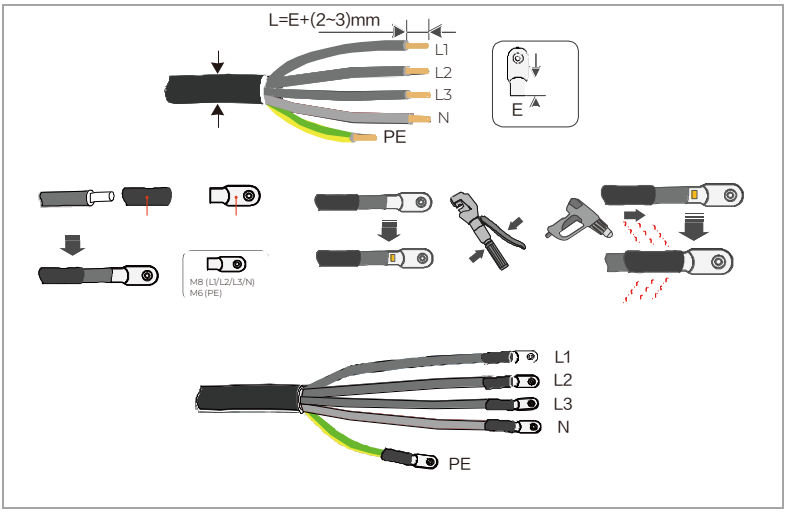


The AC output of this product is equipped with a 5-pole terminal block connector. The inverter is equipped with IP66 AC connector, and the AC output cable needs to be wired by the customer.

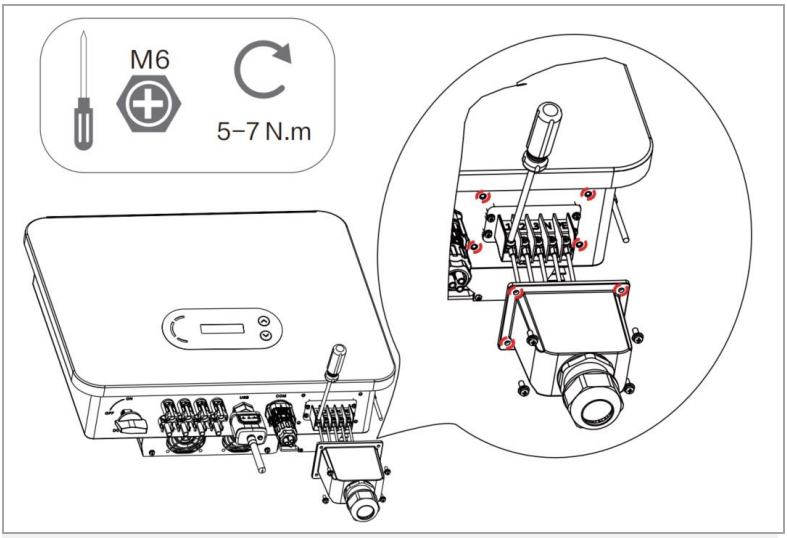


Wiring Procedure:

1. Use a screwdriver to remove the screws of the AC waterproof cover, then take out the plug rod from the PG waterproof cable gland.
2. Select the appropriate cable diameter and prepare the cable according to the requirements.



3. Pass the AC cable through the PG waterproof gland, connect it to terminals L1, L2, L3, N, and PE on the AC terminal block, then secure with M6 screws (5-7 N·m) and M8 screws (6-10 N·m) using sleeves, and finally install the AC protective cover screws (2-3 N·m)



Note: When using aluminium wire, you need to use a copper-aluminium transfer terminal. The copper terminal is included in the package.

6.5 Connect PV side of inverter (DC-Input)

Connecting PV strings into inverter must follow the below procedure. Any faulty cause by inappropriate operation will be not included in the warranty.

WARNING

- Before connecting the PV array to the inverter, make sure that the PV array is well insulated to ground.
- Make sure that the voltage and the maximum short-circuit current of each PV string are within the permissible range of the inverter, see 'Technical Data' for details.
- Ensure that the 'DC switch' is in the OFF position.
- Before connecting the DC connector to the inverter, please check the positive and negative polarity of the PV string and make sure it is correct before plugging the DC connector into the corresponding DC terminal.
- Do not connect the same PV string to more than one inverter, otherwise it may cause damage to the inverter.

NOTICE

- Ensure PV positive connector connects to the inverter positive pole, negative connector connects to the inverter negative pole. Use the connectors in the accessories bag. The damage caused by incorrect is not included in the warranty.
- Ensure same PV string must have the same structure, including: same model, same number of panels, same direction, same azimuth.

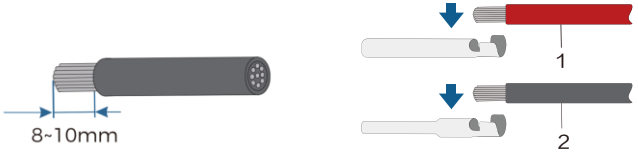
Recommended DC input cable size

Cross-Sectional Area（mm2）	External Cable Diameter(mm)
4.0~6.0	6.0~9.0

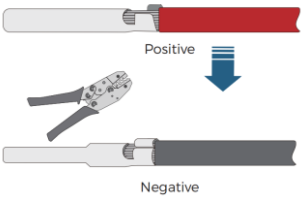
1. Use the metal contact pins from the accessories bag. Connect the cable according to the diagram (1.Positive cable, 2. Negative cable).

2. Insert the positive and negative DC cables into the corresponding contact pins.

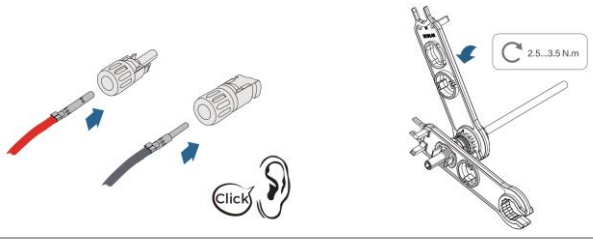
CAUTION Danger of reverse polarity, use the corresponding contact pins, ensure that the polarity is correct before plugging into the DC connections!



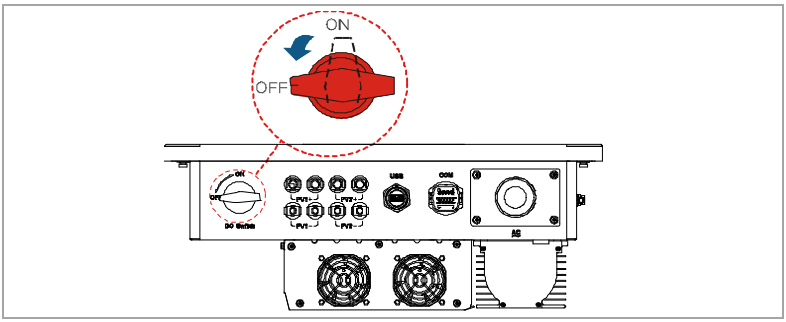
3. Crimp the PV metal contact pin to the striped cable using proper crimping pliers.



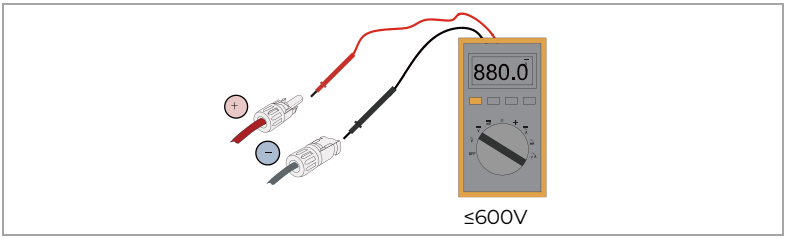
4. Insert the crimped DC cables into the corresponding connector housing until you hear a **clicking** sound.



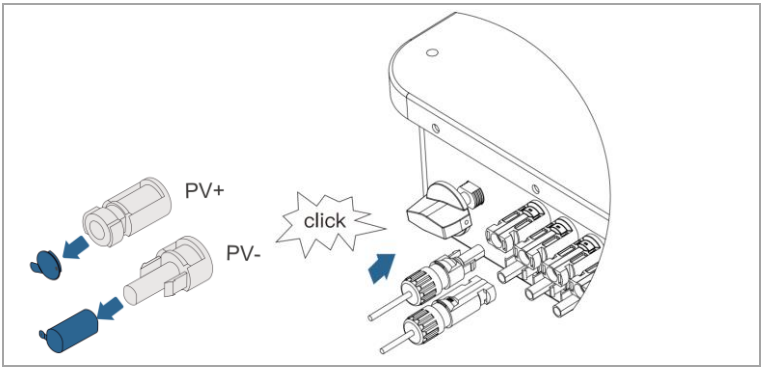
5. Ensure the DC switch is in the 'OFF' position.



6. Check the polarity of the DC input cable by measuring the PV voltage at the DC input with a multimeter. Ensure that the open circuit voltage does not exceed the inverter input limit of 600V under any circumstances.



7. Connect the DC connector to the inverter.



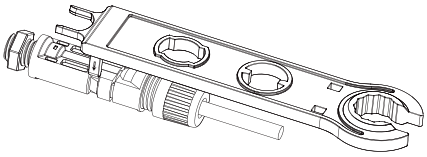
For unconnected PV ports, do not remove the connector plug to prevent water.

Removing the DC connector:

If you need to remove the PV connector from the inverter side, use the Removal Tool as shown figure below, move the connector gently.

- Insert a removal key into the locking and press on the key with adequate force.

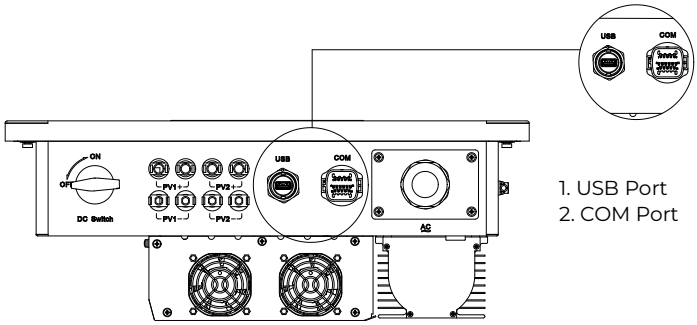
CAUTION Danger of DC arcing. Set the DC switch to OFF before removing the plus and minus connector.



6.6 Communication connection

When laying out the cable routing, separate the communication wiring and power wiring because the signal can be affected.

The SOFAR 15-25KTLX-G3P has one UBS port and one COM port, as shown in the figure below:



1. USB Port
2. COM Port

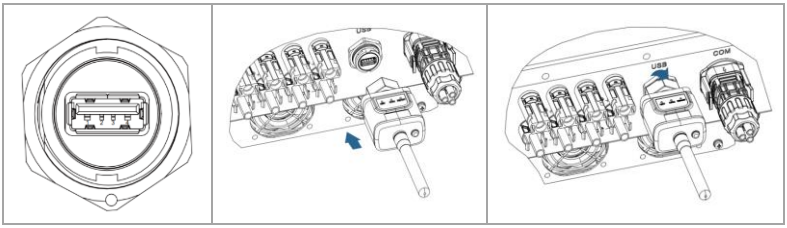
USB port

Port Description:

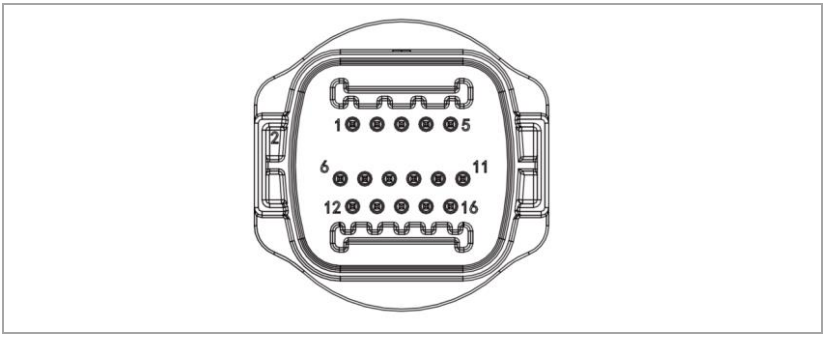
USB Port	USB flash drive connection	Use for updating the software

	4G dongle connection	Use for remote data acquisition and upgrading of inverters

Install the data acquisition stick into the USB port on the bottom of the inverter.



COM port



COM—Multi function communication port

Name	Type	Outer diameter(mm)	Area (mm^2)
RS485 Communication Wire	RS485AOutdoor shielded twisted pair meets local standards	3core: 4~8	0.25~1

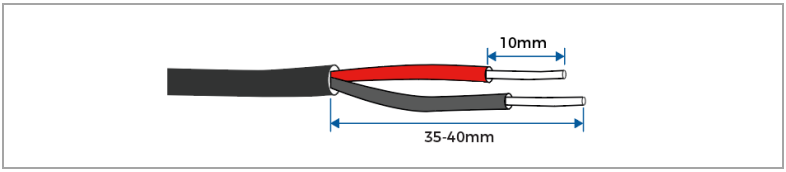
Port Description

PIN	Definition	Function	Note
1	RS485A	RS485 signal+	Wire connection monitoring or
2	RS485A	RS485 signal+	

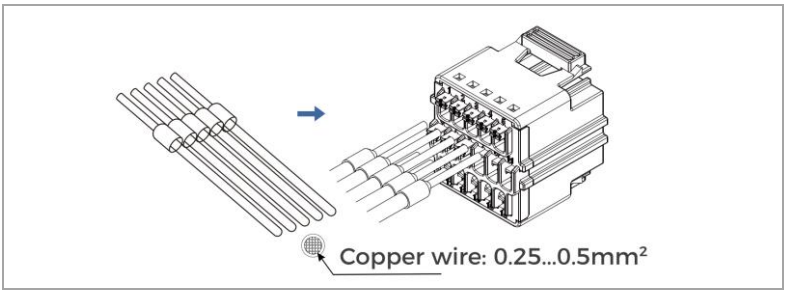
3	RS485B	RS485 signal-	multiple inverter monitoring
4	RS485B	RS485 signal-	
5	Electric meter RS485A	Electric meter RS485 signal+	Wire connection of electricity meter
6	Electric meter RS485B	Electric meter RS485 signal-	
7	GND.S	Terra de comunicação	As RS485 signal ground or DRMS port ground
8	DRM0	Redução remota	DRMS port
9	DRM1/5	DRMS porta lógica IO	
10	DRM2/6		
11	DRM3/7		
12	DRM4/8		
13-16	Blank PIN	N/A	N/A

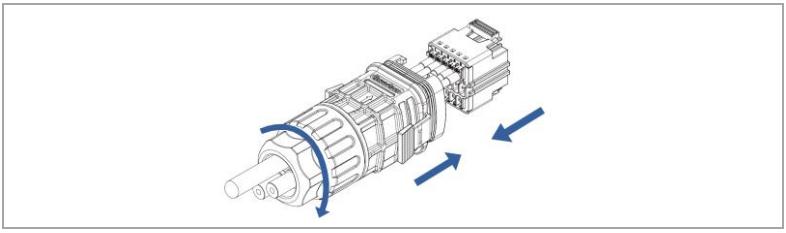
Procedure:

1. Strip the cable of the appropriate lengths of protective and insulating layers.

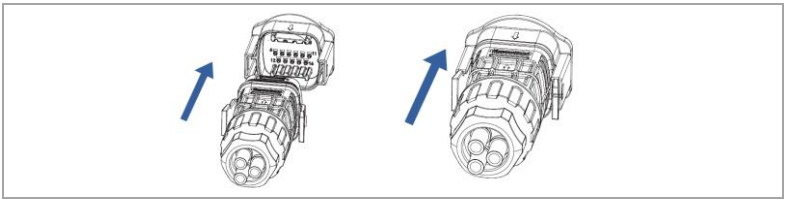


2. Secure the cable to the terminal block, gently pull back on the cable and tighten the locking nut.





3. Remove the waterproof cover of the communication terminal and install the connector to the communication terminal.



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 seconds. The inverter will continue to respond while the mode remains asserted.

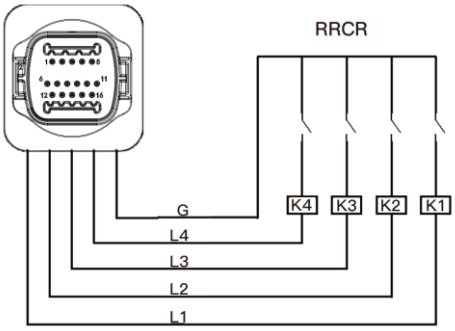
Function description of the DRMs terminal:

PIN	Functi
9	DRM1/5
10	DRM2/6
11	DRM3/7
12	DRM4/8
7	GND
8	DRM0

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

B. Logic interface for VDE-AR-N 4105:2018-11 is in order to control and/or limit the inverter's output power.

The inverter can be connected to an RRCR (Radio Ripple Control Receiver) in order to dynamically limit the output power of all the inverters in the installation.



Inverter – RRCR Connection

Function description of the terminal

PIN	Pin name	Description	Connected to (RRCR)
9	L1	Relay contact 1 input	K1 - Relay 1 output
10	L2	Relay contact 2 input	K2 - Relay 2 output

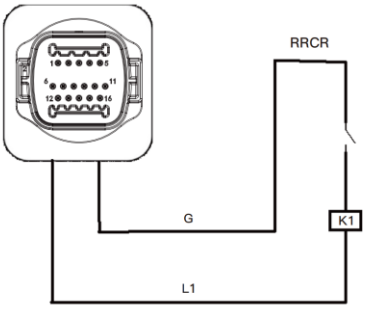
PIN	Pin name	Description	Connected to (RRCR)
11	L3	Relay contact 3 input	K3 - Relay 3 output
12	L4	Relay contact 4 input	K4 - Relay 4 output
7	G	GND	Relays common node

The inverter is preconfigured to the following RRCR power levels:

Relay status: close is 1, open is 0

L1	L2	L3	L4	Active Power	cos(φ)
1	1 or 0	1 or 0	1 or 0	0%	1
0	1	1 or 0	1 or 0	30%	1
0	0	1	1 or 0	60%	1
0	0	0	1	100%	1

C. Logic interface for EN50549-1:2019, is in order to cease active power output within five seconds following an instruction being received at the input interface



Inverter – RRCR Connection

Function description of the terminal

PIN	Pin name	Description	Connected to (RRCR)
8	L1	Relay contact 1 input	K1 - Relay 1 output
7	G	GND	K1 - Relay 1 output

The inverter is preconfigured to the following RRCR power levels:

Relay status: close is 1, open is 0

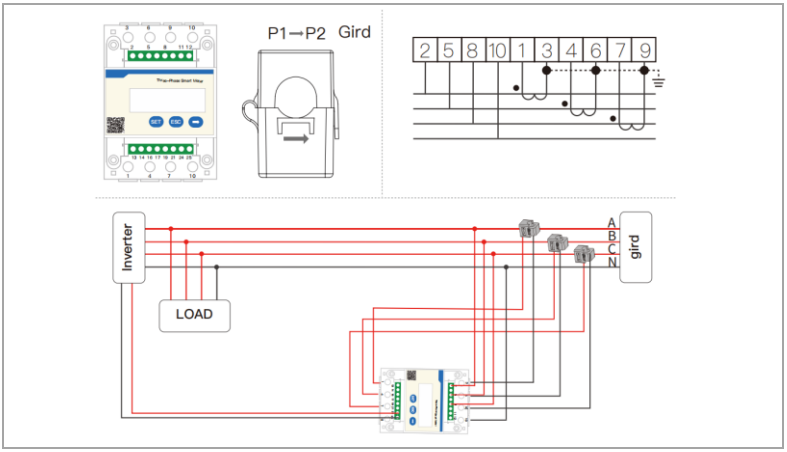
L1	Active Power	Power drop rate	cos(φ)
1	0%	< 5 seconds	1
0	100%	/	1

Feed-in limitation connecting line

With this function, one single inverter can dynamically limit its output power to keep the feed-in power at the point of common coupling (PCC) below a defined setpoint.

To use the feed-in limitation function, an external SmartMeter has to be connected to measure the power flow at the PCC:

The arrow of the CT's must point to the grid.



7 Commissioning

NOTICE
Pre-commissioning checks ▶ Before starting up the device for the first time, all operations performed on the device should be thoroughly checked. ▶ Ensure that DC and AC voltages are within the acceptable range of the inverter.

Before turning on the inverter for the first time, perform the following checks:

- Check and make sure that all equipment is installed safely and properly.
- Check that the DC breaker and the AC breaker are in the “OFF” position.
- Check that the grounding cables, AC cables, and DC cables are correctly and securely connected.
- Check that the communication cables are correctly and securely connected.
- Check that all unused terminals are properly sealed.
- Make sure no installation tools are left on the equipment or inside the connection box (if the equipment has one).
- Check that the selection of the AC breaker complies with this manual and local regulations.
- Check that all safety and warning labels are firmly attached and clearly visible.

7.1 Starting the inverter

1. Switch on the DC switch.
2. Switch on the AC circuit breaker.

   ↳When the DC output generated by the solar system is at a sufficient level, the inverter starts automatically. A correct operation is indicated by the screen displaying **Normal**.

- Different distribution network operators in different countries have different requirements regarding grid connections of PV grid connected inverters.
- Choose the correct country code. If in doubt, consult a qualified electrical engineer or an electrical safety officer.
- SOFARSOLAR is not responsible for any consequences arising out of incorrect country code selection.
- The inverter can monitor the power grid in real time. The protection can be realized when the power grid is abnormal, so that the inverter is separated from the power grid.

If the inverter displays an error message, consult chapter 10.1 Troubleshooting.

8 SofarCloud APP

SofarCloud is a platform for the full lifecycle management of renewable energy plants. It is designed for distributors/installers and end users of residential PV and storage systems as well as commercial and industrial PV and storage systems. Customers can monitor their systems both locally and remotely via the web interface or mobile app, effectively helping them to stay informed about the real-time operation of their plants, enabling refined management, efficient maintenance, transparent operation, and maximised benefits.

Web portal: https://eu.sofarcloud.com

8.1 Download and Install the App

1. Android device users can download the APP through major Android application markets such as Google Play.
2. IOS device users can search for “SofarCloud” in the App Store and download the app.
3. You can also download the “SofarCloud” by scanning the QR code below.

8.2 Register on APP

As the APP is updated periodically, the operation methods shown in this manual are for reference only. Please refer to the actual app interface for the most up-to-date instructions.
If you have any questions, please consult the SofarCloud Web and App User Manual or contact SOFARSOLAR for assistance.

Before logging into the app, please ensure the following conditions are met:

- The inverter's AC and DC sides are powered on.

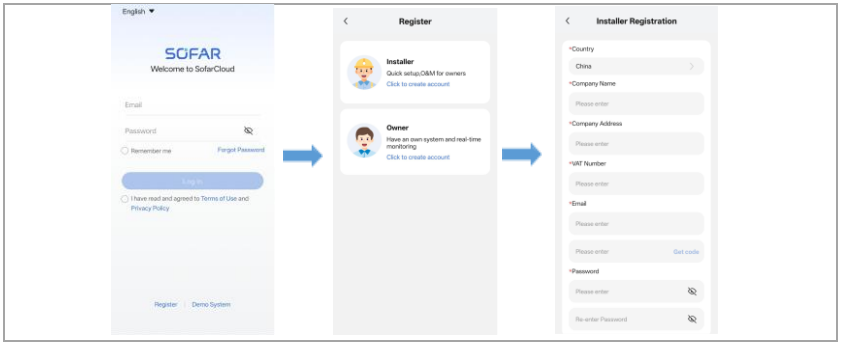
- The distance between your mobile phone and the inverter is within 5 meters with no obstacles in between.
- The Bluetooth function on your mobile phone is enabled.

Register

If you do not have a SofarCloud account, please click [Register] at the bottom of the login page.

On the registration page, select either [Installer] or [Owner], then follow the on-screen instructions to complete the account registration.

Once your account is successfully registered, you can log in to SofarCloud using your registered username and password.



Currently, account registration supports either a mobile phone number or an email address.

Please follow the on-screen instructions to correctly enter your mobile phone number or email address, set a login password, and complete the verification process.

After successful verification, please tick the checkbox to indicate that you agree to the **Terms of Use** and **Privacy Policy**.

If you already have a SofarCloud account, you can log in directly.

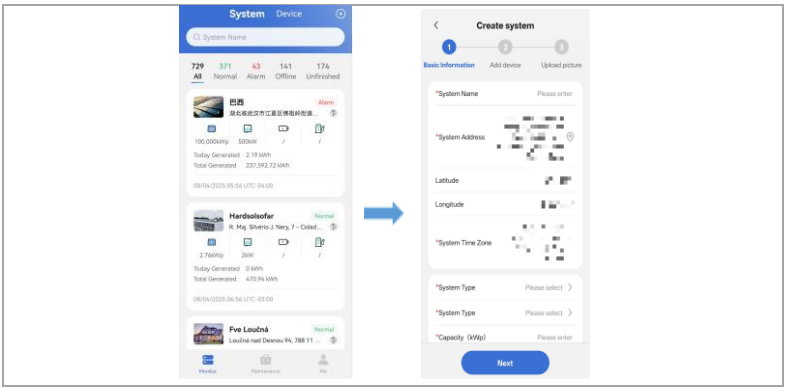
> For account security purposes, the password must be a combination of numbers and letters, 6 to 32 characters in length, and must not contain spaces.

After correctly entering all required information, click the [Register] button to automatically log in to your account.

8.3 Add a device

Method 1: Add a device via “Create system”

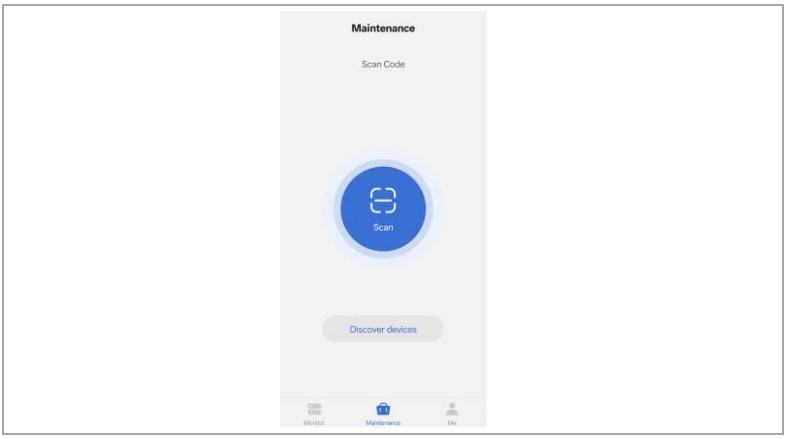
1. On the Home > Monitor tab, click the button at the top right corner to enter the "Create system" interface.
2. After completing the basic information as prompted, click the [Add] button under the "Add Device" section.



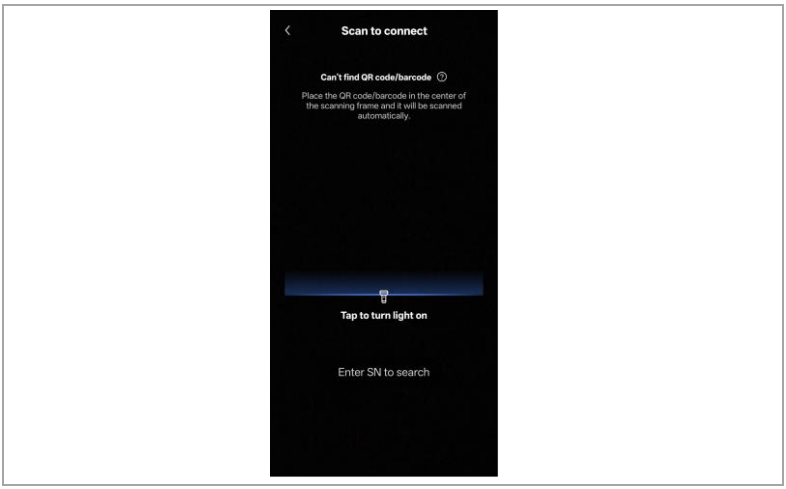
3. Scan the QR code or barcode of the device to obtain the SN number. Alternatively, you can manually enter the SN number and optionally enter a device name.
4. After clicking the [Confirm] button to complete the device addition, click [Next > Submit] to proceed.

Method 2: Add a device directly

1. After logging into the app, go to the Home > Maintenance tab.
2. Tap [Scan] to quickly recognise and connect by scanning the device's barcode, or tap [Discover Devices] to select and connect to the target device from the list of Bluetooth-discovered devices.

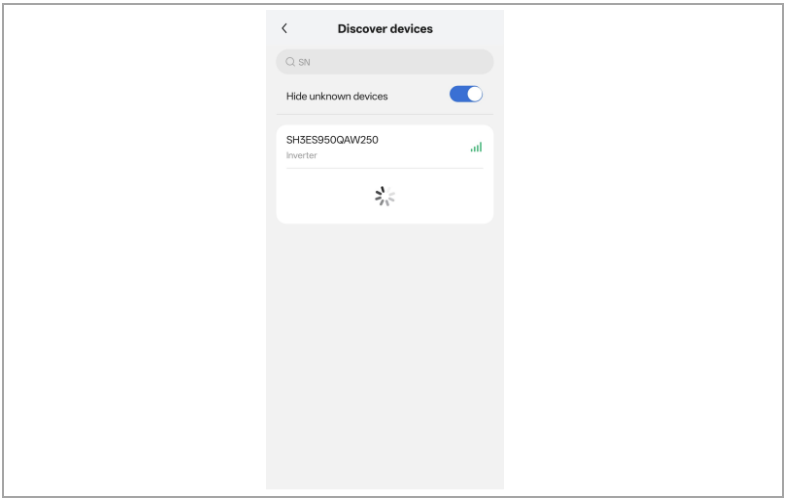


- **Scan:** Tap [Scan] to prompt the phone's camera to open. Scan the barcode of the inverter's SN number to start searching for the device's Bluetooth. Once the Bluetooth is found, it will automatically connect and return to the home page.

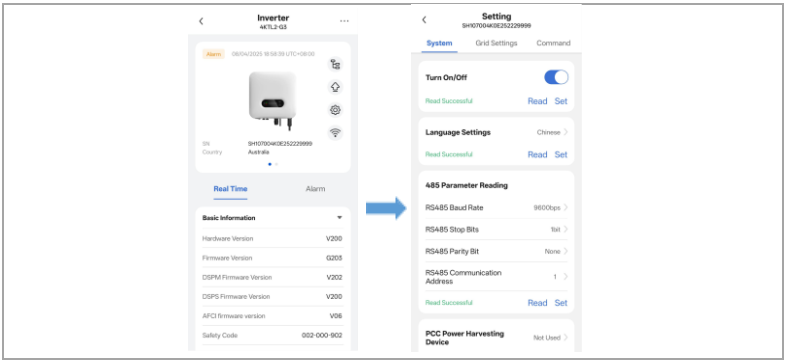


- **Discover Devices:** After tapping [Discover devices], the app will navigate to the Bluetooth device list and start searching for nearby

available Bluetooth devices. Select the device to connect to based on the inverter's serial number.



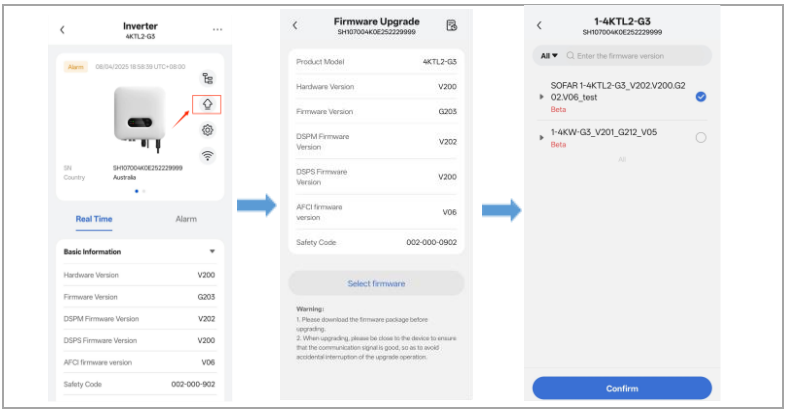
3. After successfully connecting the device, go to the device page. Through the [Quick Setup] section, you can configure the language, time, and safety code.



The available safety codes may vary depending on the device and software version. Please refer to the actual interface for details.

8.4 Device upgrade

1. Tap the [Upgrade] button, and follow the on-screen instructions to download the firmware package in advance.
2. Tap [Select Firmware], choose the target firmware, and then tap [Confirm] at the bottom



1. During the upgrade process, the system will sequentially send commands, download the firmware, verify the firmware, and upgrade the device based on the selected firmware, until the upgrade reaches 100% completion.

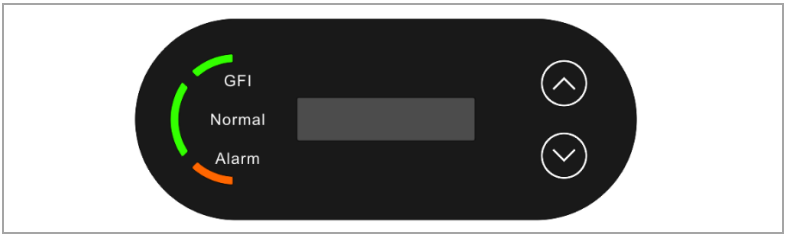
2. If the upgrade fails, the failure reason will be displayed at the point of failure. You can either tap [Cancel] in the lower-left corner to exit the upgrade, or tap [Retry] in the lower-right corner to attempt the upgrade again.

9 Operation

This chapter describes the display, operation, buttons and LED indicators related to the inverter. Some of the products are not equipped with LCD display, please refer to the actual products received.

9.1 Control panel and display

Buttons and display lights



Button

Button	Description
^	UP key **Short press:** Select previous menu item **Long press:** Exit menu or interface
v	DOWN key **Short press:** Select next menu item **Long press:** Enter function or interface

LED

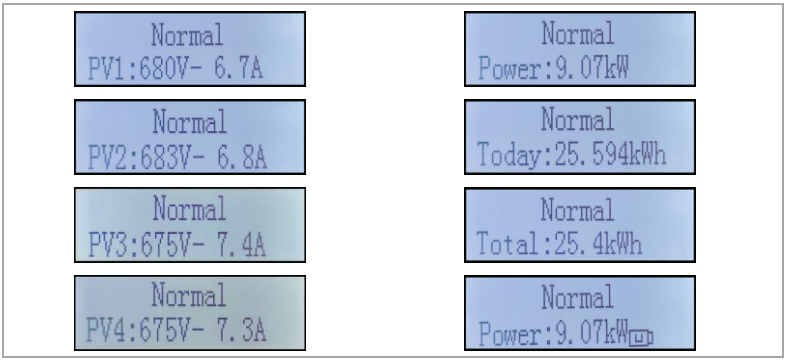
LED			Description
Normal	Green	Light up	Normal state
		Flashes	Wait or Check state
GFI	Red	Light up	GFCI ground leakage fault or low insulation resistance alarm
Alarm	Red	Light up	Recoverable fault or permanent fault state

9.2 Standard display

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

This shows a rolling status display:

1. PV 1 input voltage and current
2. PV 2 input voltage and current
3. PV 3 input voltage and current
4. PV 4 input voltage and current
5. PV generated power
6. Today generated electricity
7. Total generated electricity
8. USB status



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

9.3 Status display

The following table displays the various statuses and their meanings:

Status	Description
Wait	The inverter is waiting to Check State when reconnecting the system. In this state, the grid voltage value is between the max and min limits and so on; If not, Inverter will go to Fault State or Permanent State.
Check	The inverter is checking isolation resistors, relays, and other safety requirements. It also does self-test to ensure inverter software and hardware are well-functional. The inverter will go to Fault State or Permanent State if any error or fault occurs.
Normal	The inverter enters to Normal State, feeding power to the grid; the inverter will go to a Fault State or Permanent state if any error or fault occurs.
Fault	The inverter has encountered a recoverable error. It should recover if the errors disappear. If the Fault State continues; please check the inverter according to the error code.

9.4 Menu structure

▶ Hold ⓥ key to show the main menu.

Main

Sub menu	What can do here
1. Enter Setting	Change device settings
2. Event list	Display the current event list and the event history
3. SystemInfo	Display system information
4. System time	Display the current system time
5. Software update	Perform a software update

▶ Press ⓤ or ⓥ key to select a sub-menu and hold the key to open it.

Enter Setting

Long press the "⊙" button to Enter the main interface of "**1.Enter Setting**" and long press the "⊙" to enter the setting menu. You can switch up and down to choose what you want by short pressing the "⊙" and "⊙".

Several settings require a password to be entered (the standard password is 0001). When entering the password, press briefly to change the figure and press and hold to confirm the current figure.

Press and hold the ⊙ key during password entry to exit the password entry screen.

If 'Wrong password, please try again' appears, you need to re-enter the correct password.

Menu	Description
1. Set Time	Set the system time for the inverter.
2. Clear Energy	Clean the inverter of the total power generation.
3. Clear Events	Clean up the historical events recorded in the inverter.
4. Set SafetyCode	User can modify the Safety Param of the machine through the USB flash disk, and the user needs to copy the parameter information that needs to be modified into the USB flash disk card in advance. *Note: To enable this feature, please contact the SOFARSOLAR technical support. For the country code please refer to the table below of "**Setting of country codes**".
5. On-Off Control	Inverter on-off local control.
6. Set Energy	Set the total power generation. You can modify the total power generation through this option.
7. Set ComProtocol	Set the type of communication protocol, including RS485, USB, and Bluetooth three types, and set the baud rate and address.
8. Set Inputmode	SOFAR 15-25KTLX-G3P has three to four MPPT channels, which can run independently or in parallel. Users choose the operation mode of MPPT according to the system design. The parallel mode applies to the case where two channels are in

Menu	Description
	parallel, the independent mode is applicable to the case where two channels of MPPT run independently, and the default mode is the independent mode.
9. Set Language	Set the inverter display language.
10. Set Feed-in Limit	Enable or disable the feed-in limitation function of the inverter, and set the feed-in power. This function needs to be used with external CT.
11. Logic Interface	Enable or disable logical interfaces.
12. IV Curve Scan	Shadow scanning, when the component is blocked or abnormal, causing multiple power peaks, by enabling this function, the peak point of maximum power can be tracked.
13. PCC Select	Set the power measurement device type at the grid connection point (e.g., meter, ARPC, or collector).
14. Reflux Mode	Select the feed-in limitation mode from the following options: O Default Feed-in Limitation Mode O Three-Phase Average Power Feed-in Limitation Mode O Per-Phase Power Mode
15. OVP	Set Grid Overvoltage Protection Level 1
16. Power Limit	Set Active Power Percentage
17. ReactivePara	Set Reactive Power Percentage
18. Hard Reflux	Hardware Feed-in Limitation
19. PV-ISO	PV-ISO Detection
20. PELineControl	3-Phase Grid Grounding Detection
21. InputSafety	Import Safety Regulation Library (.bin) via USB
22. SetSafetyLibrary	Select Safety Regulation from Imported Library

Menu	Description
23. AFCI Control	Configure DC arc fault detection parameters, such as 'ArcAlarmClear' or 'ArcDetectMode'.
24. Fan Setting	1. Fan Self-Test - Used for fan fault diagnosis. 2. Noise Mode Selection - Choose between High-Noise Mode (higher fan speed) or Low-Noise Mode (reduced fan speed)
25. Comm Blackout Config	Set RS485 interrupt mode and timeout period. If a communication timeout occurs, the inverter will execute predefined protection logic.

Setting of country codes

Code		Country	Code		Country
000	000	Alemanha VDE4105	018	000	EU EN50438
	001	Alemanha BDEW		001	EU EN50549
	002	Alemanha VDE0126	019	000	IEC EN61727
001	000	Itália CEI-021 Interno	020	000	Coreia
	001	Itália CEI-016 Itália	021	000	Suécia
	002	Itália CEI-021 Externo	022	000	Europa Geral
	003	Itália CEI0-21 In Areti	024	000	Chipre
002	000	Austrália	025	000	Índia
	001	Austrália AU-WA	026	000	Filipinas
	002	Austrália AU-SA	027	000	Nova Zelândia
	003	Austrália AU-VIC	028	000	Brasil
	004	Austrália AU-QLD		001	Brasil LV
	005	Austrália AU-VAR		002	Brasil 230
	006	Austrália AUSGRID		003	Brasil 254
	007	Austrália Horizon	029	000	Eslováquia VSD
003	000	Espanha RD1699		001	Eslováquia SSE
004	000	Turquia		002	Eslováquia ZSD
005	000	Dinamarca	033	000	Ucrânia

Code		Country	Code		Country
	001	Dinamarca TR322	035	000	México LV
006	000	Grécia Continente	038	000	Faixa ampla – 60 Hz
	001	Ilha da Grécia	039	000	Irlanda EN50438
007	000	Países Baixos	040	000	Tailândia PEA
008	000	Bélgica		001	Tailândia MEA
009	000	Reino Unido G59/G99	042	000	Faixa LV-50Hz
	001	Reino Unido G83/G98	044	000	África do Sul
010	000	China	046	000	Dubai DEWG
	001	China Taiwan		001	Dubai DEWG MV
011	000	França	107	000	Croácia
	001	França FAR Arrete23	108	000	Lituânia
012	000	Polônia			

Event List

Event List is used to display the real-time event records, including the total number of events and each specific ID No. and happening time. User can enter Event List interface through main interface to check details of real-time event records, Event will be listed by the happening time, and recent events will be listed in the front.

Please refer to below picture. Long press the " ⓥ " enter into main menu interface, and short press the " ⓥ " to turn the page in standard interface, then enter into "2.Event List" interface.

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

System Information

SystemInfo	Long press the " ⊙ "	
	1. Inverter Type	14. DRMn
	2. Serial Number	15. MPPT Scan
	3. GeneralSoftVer	16. ForceControl
	4. Hard Version	17. PCC Select
	5. ProtocolVer	18. PV-ISO
	6. Safety	19. GFCI
	7. SafetySwVer	20. PV Strings
	8. SafetyHardVer	21. Reactive Power
	9. Input mode	22. Power Ratio
	10. Remote State	23. Safety Paras
	11. Reflux Enble	24. ComProtocol
	12. Reflux Power	25. Comm Blackout Config
	13. DRMs0	

System Time

Display the current system time.

Software update

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

9.5 Update Software online

Inverters offer software upgrade via USB flash drive to maximise inverter performance and avoid inverter operation errors caused by software bugs.

1. Switch the DC and AC switches off and then remove the communication cover. If an RS485 line has been connected, ensure that the nut is loosened. Ensure that the communication line is not energized. Remove the cover to prevent the connected communications connector from becoming loose.
2. Insert the USB stick into the computer.
3. SOFARSOLAR service team will send the firmware update to the user.
4. Unzip the file and copy the original file to a USB stick. Attention: The firmware update file must be in the “firmware” subfolder.
5. Insert the USB flash drive into the USB interface of the inverter.
6. Switch on the DC switch and go to menu item “5. Software update” on the LCD display.
7. Enter the password (the standard password is 0715).
8. The system will then successively update the main DSP, slave DSP and ARM processors. Pay attention to the displays. If the main DSP update is successful, the LCD will display “Update DSP1 Success", otherwise display "Update DSP1 Fail"; If the slave DSP update success, the LCD will display "Update DSP2 Success", otherwise display "UpdateDSP2 Fail"
9. If an error message appears, switch off the DC switch and wait until the LCD screen goes out. Then, switch the DC switch back on and proceed with the update from step 5.
10. After the update is complete, switch the DC switch off and wait until the LCD screen goes out.
11. Re-establish a watertight communication connection.
12. Switch the DC and AC circuit breaker back on.
13. You can check the current software version in item “Software version” of the “SystemInfo” menu.

10 Troubleshooting and Maintenance

10.1 Troubleshooting

This section contains information and procedures pertaining to the remedying of potential problems with the inverter.
As the content of this chapter involves software version updates, the differences may exist among different versions of the software. If you have any questions, please contact the SOFARSOLAR technical team.

To carry out troubleshooting, proceed as follows:

1. Check the warnings, error messages or error codes displayed on the screen of the inverter.
2. If no error information is displayed on the screen, check whether the following requirements have been fulfilled:
   - ✓ Has the inverter been set up in a clean, dry, well-ventilated area?
   - ✓ Is the DC switch set to ON?
   - ✓ Are the cables sufficiently dimensioned and short enough?
   - ✓ Are the input connections, output connections and wiring all in good condition?
   - ✓ Are the configuration settings for the relevant installation correct?

Please proceed as follows to display the recorded problems: Hold the button down to bring up the main menu of the standard interface. Select “2. Event list” and hold the button down to bring up the event list.

Earth fault alarm

This inverter is compliant with IEC 62109-2 Clause 13.9 for earth fault protection. If an earth fault alarm occurs, the error is displayed on the LCD screen, the red light illuminates and the error can be found in the error history log.

In the case of devices equipped with a stick logger, the alarm information can be viewed on the monitoring portal and retrieved via the smartphone app.

Event list

The error codes and troubleshooting methods of the inverter are detailed in the following table. The models you purchased may only contain some of the fault information listed therein. When the inverter malfunctions, you can query the fault information through the LCD display of the device or the mobile App.

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	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID006	OVRT fault	OVRT function is faulty	
ID007	LVRT fault	LVRT function is faulty	
ID008	IslandFaul t	Island protection error	
ID009	GridOVPIn stant1	Transient overvoltage of grid voltage 1	

Code	Name	Description	Solution
ID010	GridOVPInstant2	Transient overvoltage of grid voltage 2	
ID011	VGridLineFault	Power grid line voltage error	
ID013	RefluxFault	Feed-in limitation function is faulty	
ID017	HwADFaultIGrid	Power grid current sampling error	
ID018	HwADFaultDCI	Wrong sampling of dc component of grid current	
ID019	HwADFaultVGrid(DC)	Power grid voltage sampling error (DC)	
ID020	HwADFaultVGrid(AC)	Power grid voltage sampling error (AC)	
ID021	GFCIDeviceFault(DC)	Leakage current sampling error (DC)	
ID022	GFCIDeviceFault(AC)	Leakage current sampling error (AC)	
ID023	HwADFaultDCV	Error in dc component sampling of load voltage	
ID024	HwADFaultIdc	Dc input current sampling error	
ID029	ConsistentFault_GFCI	Leakage current consistency error	
ID030	ConsistentFault_Vgrid	Grid voltage consistency error	

Code	Name	Description	Solution
ID033	SpiComm Fault(DC)	SPI communication error (DC)	
ID034	SpiComm Fault(AC)	SPI communication error (AC)	
ID035	SChip_Fault	Chip error (DC)	
ID036	MChip_Fault	Chip error (AC)	
ID038	InvSoftStartFail	Inverter failed to output	
ID041	RelayFail	Relay detection failure	
ID042	IsoFault	Low insulation impedance	Check the insulation resistance between the photovoltaic array and ground (ground), if there is a short circuit, the fault should be repaired in time.
ID043	PEConnectFault	Ground fault	Check ac output PE wire for grounding.
ID044	ConfigError	Error setting input mode	Check the input mode (parallel/independent mode) Settings for the inverter. If not, change the input mode.
ID048	SNTypeFault	Serial number fault	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved.
ID050	TempFault_HeatSink1	Radiator 1 temperature protection	/
ID057	TempFault_Env1	Ambient temperature 1 protection	

Code	Name	Description	Solution
ID059	TempFault_Inv1	Module 1 temperature protection	
ID065	VbusRmsUnbalance	Unbalanced bus voltage RMS	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support
ID066	VbusInstantUnbalance	The transient value of bus voltage is unbalanced	
ID072	SwBusRmsOVP	Inverter bus voltage RMS software overvoltage	
ID073	SwBusInstantOVP	Inverter bus voltage instantaneous value software overvoltage	
ID082	DciOCP	Dci overcurrent protection	
ID083	SwOCPInstant	Output instantaneous current protection	
ID085	SwAcRmsOCP	Output effective value current protection	
ID086	SwPvOCPInstant	PV overcurrent software protection	
ID098	HwBusOVP	Inverter bus hardware overvoltage	
ID102	HwPVOCP	PV hardware overflows	
ID103	HwACOCP	Ac output hardware overflows	

Code	Name	Description	Solution
ID105	MeterCommFault	Meters communication fault	Check whether the meters wiring is correct.
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.
ID129	unrecoverHwAcOCP	Output hardware overcurrent permanent failure	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID134	unrecoverAcOCPInstant	Output transient overcurrent permanent failure	
ID135	unrecoverIacUnbalance	Permanent failure of unbalanced output current	
ID141	unrecoverVbusUnbalance	Bus voltage unbalanced permanent failure	
ID142	PermSpdFail(DC)	PV surge protection	
ID143	PermSpdFail(AC)	Grid surge protection	
ID145	USBFault	USB fault	Check the USB port of the inverter
ID146	WifiFault	Wifi fault	Check the Wifi port of the inverter

Code	Name	Description	Solution
ID147	Bluetooth Fault	Bluetooth fault	Check the bluetooth connection of the inverter
ID152	SafetyVer Fault	The software version is inconsistent with the safety version	/
ID154	SciComm Lose(AC)	SCI communicati on error (AC)	
ID156	SoftVerErr or	Inconsistent software versions	Contact for technical support and software upgrades.
ID169	FanFault1	Fan 1 fault	Please check whether the fan 1 of inverter is running normally.
ID170	FanFault2	Fan 2fault	Please check whether the fan 2 of inverter is running normally.
ID171	FanFault3	Fan 3 fault	Please check whether the fan 3 of inverter is running normally.
ID172	FanFault4	Fan 4 fault	Please check whether the fan 4 of inverter is running normally.
ID173	FanFault5	Fan 5 fault	Please check whether the fan 5 of inverter is running normally.
ID174	FanFault6	Fan 6 fault	Please check whether the fan 6 of inverter is running normally.
ID175	FanFault7	Fan 7 fault	Please check whether the fan 7 of inverter is running normally.
ID192-ID216	StrFuseAL M	StrFuseALM	Group fuse alarm, only for Korean safety regulations.

If the handling methods recommended in the "Solution" column fail to help you, please contact the dealer or SOFARSOLAR.

10.2 Maintenance

Inverters do not generally require daily or routine maintenance. Before carrying out cleaning, ensure that the DC switch and AC circuit breaker between the inverter and power grid have been switched off. Wait at least 5 minutes before carrying out cleaning.

Cleaning the inverter

Clean the inverter using an air blower and a dry, soft cloth or a soft bristle brush. Do NOT clean the inverter with water, corrosive chemicals, cleaning agents etc.

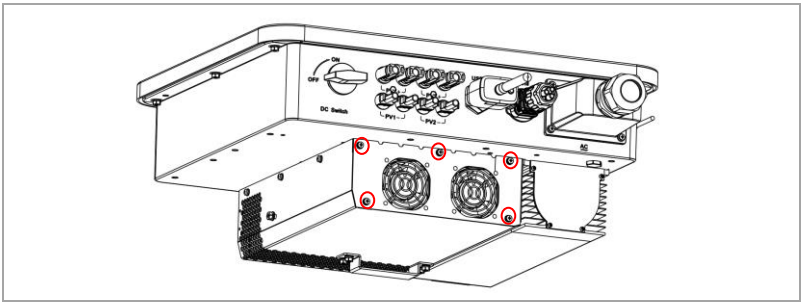
Cleaning the heat sink

In order to help guarantee the correct long-term operation of the inverter, make sure that there is sufficient space for ventilation around the heat sink. Check the heat sink for blockages (dust, snow etc.) and remove them if present. Please clean the heat sink using an air blower and a dry, soft cloth or a soft bristle brush. Do NOT clean the heat sink with water, corrosive chemicals, cleaning agents etc.

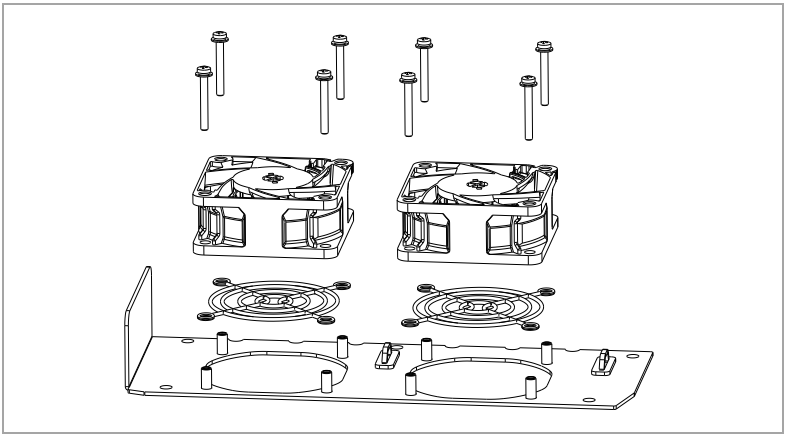
Fan maintenance

For SOFAR 15-25KTLX-G3P series inverter with fans, if the fan is broken or not working properly may cause an inverter heat dissipation issue and affect the working efficiency of the inverter. Thus, fans need to have regular cleaning and maintenance, details operating as below:

1. Closed inverter, check the wiring side to ensure all electrical connections of inverter is turned off;
2. Unscrew six screws at the corner of fans baseboard;



3. Remove the screws at the fan position, unplug the terminal at the fan and inverter interface and completely remove the fan;



4. Use a soft brush to clean the fan. If it is damaged, please replace it in time;
5. Re-install the inverter according to the above steps.

11 Technical Data

Model	SOFAR 15KTLX-G3P	SOFAR 17KTLX-G3P	SOFAR 20KTLX2-G3P	SOFAR 23KTLX-G3P	SOFAR 25KTLX-G3P
Input (DC)					
Max. input voltage	1100V				
Rated input voltage	620V				
Start-up voltage	180V				
MPPT operating voltage range	160-1000V				
Number of MPP trackers	2				
Number for DC inputs	1/2		2/2		
Max. input MPPT current	20A/32A		40A/32A		
Max. input short circuit current	25A/40A		50A/40A		
Output (AC)					
Rated output power	15000W	1700W	20000W	23000W	25000W
Max. apparent power	16500VA	18700VA	22000VA	25300VA	27500VA
Rated output current	22.8A/380Vac 21.8A/400Vac 20.9A/415Vac	25.9A/380Vac 24.7A/400Vac 23.7A/415Vac	30.4A/380Vac 29A/400Vac 27.9A/415Vac	35A/380Vac 33.4A/400Vac 32A/415Vac	38A/380Vac 36.3A/400Vac 34.8A/415Vac
Max. output current	25.1A	28.5A	33.5A	38.5A	41.8A
Rated output voltage	3/N/PE, 220 / 380 Vac				
Output voltage range	310Vca-480Vca				
Rated output frequency	50Hz/60Hz				
Output frequency range	45~55Hz/55~65Hz				
Active power adjustable range	0~100%				
THDi	<3%				
Power factor	0.8 leading – 0.8 lagging				
Efficiency					
Max. efficiency	⩾98.6%				

European efficiency	⩾98.1%	
Protection		
DC reverse polarity protection	Yes	
Anti-islanding protection	Yes	
Leakage current protection	Yes	
Ground fault monitoring	Yes	
PV-array string fault monitoring	Yes	
DC switch	Yes	
AFCI	Optional	
SPD	PV: Type III, AC: Type III	
General Data		
Ambient temperature range	-25℃ to +60℃	
Self-consumption at night	<1W	
Topology	Transformerless	
Degree of protection	IP66	
Allowable relative humidity range	0-100%	
Max. operating altitude	4000m (>2000m derating)	
Cooling	Smart air cooling	
Dimension (W × H×D)	491×412×188mm	
Weight	19kg	20.5kg
Display	LCD & Bluetooth +APP	
Communication	RS485 / Wi-Fi	
Standard	IEC/EN 62109-1/2, IEC/EN 61000-6-1/2/3/4, IEC 62116, IEC 61727, IEC 61683, IEC 60068-2-1/2/14/30, PORTARIA INMETRO N° 140, ABNT NBR 16149/16150	

Note: the product may be upgraded in the future. The above parameters are for reference only. Please refer to the real product

12 Quality Assurance

If a product fault occurs during the warranty period, SOFARSOLAR will provide free repair service or replace the product with a new one, subject to the warranty terms and conditions.

Required Proof for Service

During the warranty period, customers must provide a valid purchase invoice and proof of the purchase date. Additionally, the product's trademark must remain intact and legible. Otherwise, SOFARSOLAR reserves the right to decline warranty service.

Conditions

- If a replacement is provided, the faulty product will be handled by SOFARSOLAR.
- Customers must allow SOFARSOLAR a reasonable period to repair the faulty device.

Limitations and Exclusions

SOFARSOLAR reserves the right to refuse warranty service in the following cases:

- The product's warranty period has expired.
- Damage occurred during transportation.
- The device was improperly installed, modified, or used.
- The device was operated in conditions beyond those specified in this manual.
- The fault or damage was caused by unauthorised installation, repair, modification, or disassembly by personnel not authorised by SOFARSOLAR.

- The fault or damage resulted from the use of non-standard or non-SOFARSOLAR components or software.
- The installation and operating conditions do not comply with relevant international standards.
- The device was damaged due to unforeseen natural disasters or force majeure.

For faulty products under the above conditions, customers may request repair services, which may be subject to additional costs based on SOFARSOLAR's assessment.

Contact Us

If the purchased product encounters a fault, customers can quickly contact us through the following methods, and we will respond as soon as possible. Customers may also reach out to our authorised local service providers or distributors for assistance.

We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device
- Error code/name
- Purchase invoice and warranty card
- The device was damaged due to unforeseen natural disasters or force

For more detailed information, please email service@sofarsolar.com or visit WWW.SOFARSOLAR.COM.

Version 1.0

ENERGY TO POWER YOUR LIFE

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