USER MANUAL

SOFAR 60...80KTLX-G3

CONTENTS

Preface

Notice

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

Save this Instruction

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

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Revised version

Outline

This manual is an integral part of SOFAR 60KTLX to 80KTLX-G3. It describes the assembly, installation, commissioning ,maintenance and failure of the product. Please read it carefully before operating.

Scope of Validity

This manual contains important instructions for: SOFAR 60KTLX-G3、 SOFAR 75KTLX-G3、

SOFAR 80KTLX-G3

Target Group

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

Symbols Used

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

⚠ DANGER

"Danger"indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

"Warning"indicates a hazardous situation which, if not avoided,could result in death or serious injury

⚠ CAUTION

"Caution"indicates a hazardous situation which, if not avoided, could result in minor or moderate injury

ATTENTION

"Attention"indicates there are potential risks, if fail to prevent, may lead to equipment cannot normally or property damage

NOTE

"Note"provides additional information and tips that are valuable for the optimal operation of the product

1. Basic Safety Information

Outlines of this Chapter

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

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

Safety Instruction

Introduce the safety instruction during installation and operation of SOFAR 60...80KTLX-G3.

Symbols Instruction

This section gives an explanation of all the symbols shown on the SOFAR 60...80KTLX-G3 on-grid inverter and on the type label.

1.1 Requirement for Installation and Maintenance

- Installation of SOFAR 60...80KTLX-G3 on-grid inverter must conform with laws, regulations, codes and standards applicable in the jurisdiction.

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

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

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

Qualified Person

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

Label and Symbols

SOFAR 60...80KTLX-G3 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 60...80KTLX-G3 has warming symbol attache the product which contact information of safety operation. The warming symbol must permanent attached to the product.

Installation location requirement

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

Transportation Requirement

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

If you find any packing problems that may cause the damage of inverter or any visible damage, please notice the responsible transportation company immediately. You can ask your installer or SOFARSOLAR for help is 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 5 minutes before carry any maintenance or repair work.

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

EMC/Noise Level

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

- The inherent noise-immune character: immunity to internal electrical noise
- External noise immunity: immunity to electromagnetic noise of external system
- Noise emission level: influence of electromagnetic emission upon environment

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

1.2 Symbols and signs

⚠ DANGER

High voltage of inverter may be harmful to health!
Only certified engineer can operate the product;
Juveniles, Disable, should not use this product;
Keep this product out of the reach of children;

⚠ CAUTION

Caution of burn injuries due to hot enclosure!
Only touch the screen and pressing key of the inverter while it is working

---

ATTENTION

PV array should be grounded in accordance to the requirements of the local electrical grid company

---

⚠ CAUTION

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 60...80KTLX-G3 has some safety symbols on the inverter. Please read and fully understand the content of the symbols before installation.

Symbols	Name	Explanation
⚠ ↻ 5min	This is a residual voltage in the inverter	After disconnect with the DC side, there is a residual voltage in the inverter, operator should wait for 5 minutes to ensure the capacitor is completely discharged.
⚠	Caution of high voltage and electric shock	The products operates at high voltages. Prior to performing any work on the product, disconnect the product from voltage sources. All work on the product must be carried out by qualified persons only.

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

2. Product Characteristics

Outlines of this Chapter

Product Dimensions
Introduce the field of use and the dimensions of the SOFAR 60...80KTLX-G3 on-grid inverter.

Function Description
Introduce working principle and internal components of the SOFAR 60...80KTLX-G3 on-grid inverter.

Electrical block diagram
Introduce the electrical block diagram of the product

2.1 Intended Use

The SOFAR 60...80KTLX-G3 on-grid inverter can transform a direct electric current (DC) coming from a photovoltaic generator (PV) into an alternating electric current (AC) Suitable for being fed into the utility grid.
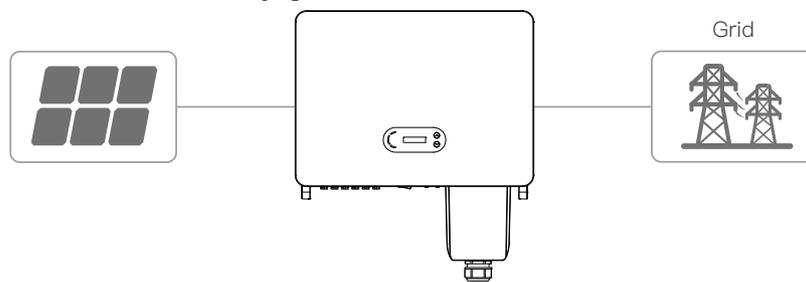
Figure 2-1 PV Grid-Tied System

The SOFAR 60...80KTLX-G3 on-grid inverter 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

According to the SOFAR 60...80KTLX-G3 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.
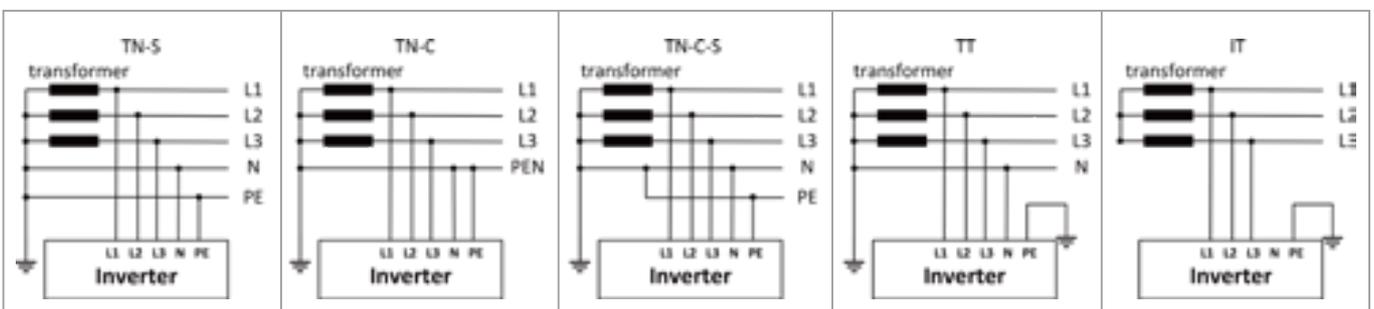
Figure2-2 Overview of the grid types

Product Dimensions

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

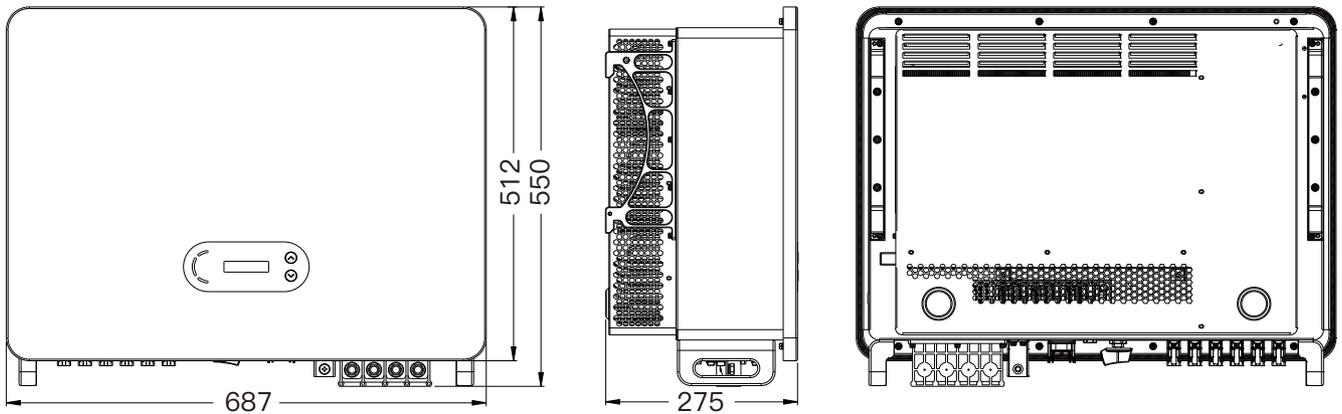## Dimensions Description

- SOFAR 60...80KTLX-G3
  L×W×H=687*561*275mm
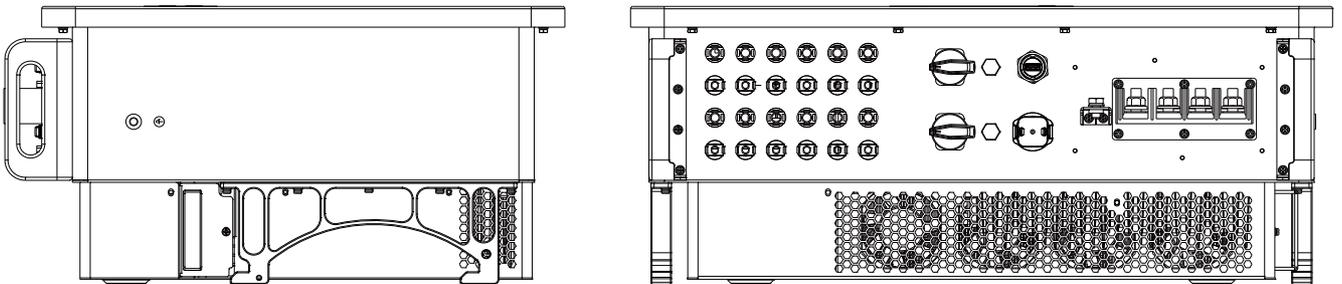

Figure 2-3 Front, side and back of the machine (80KW)

Figure 2-4 Bottom view of the machine (80KW)
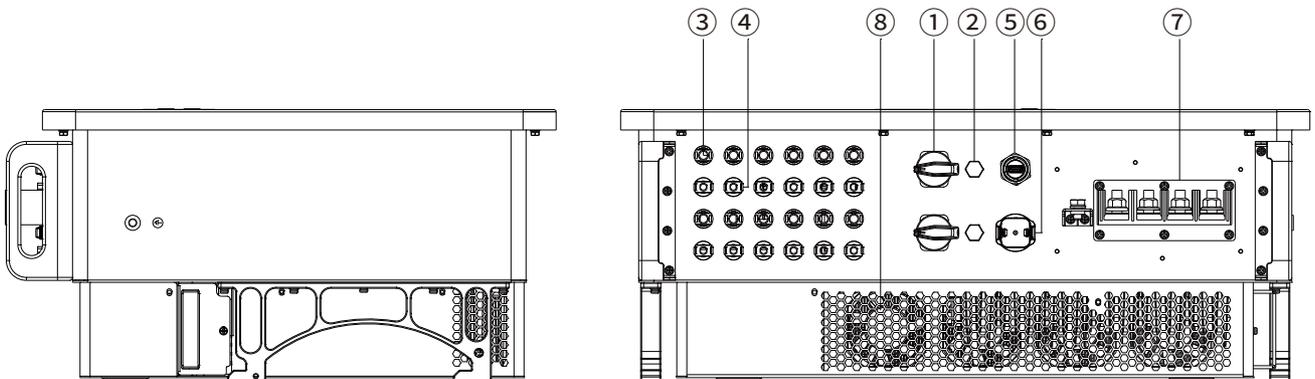
Function description of inverter box bottom

Figure 2-5 Bottom view of SOFAR 60...80KTLX-G3

① DC Switch

② Breather valve

③ DC positive poles connectors

④ DC negative poles connectors

⑤ USB Port (for WIFI communication)

⑥ COM Port (for RS485 communication)

⑦ AC output

⑧ Fans

Labels on the equipment

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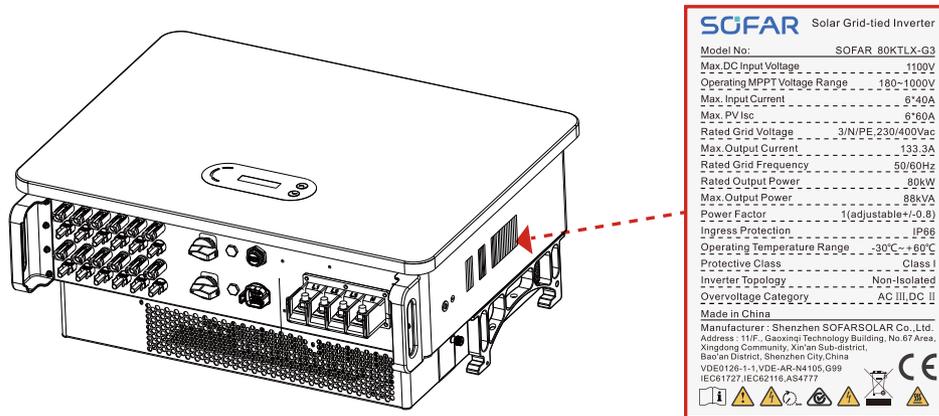

SOFAR	Solar Grid-tied Inverter
Model No:	SOFAR 80KTLX-G3
Max.DC Input Voltage	1100V
Operating MPPT Voltage Range	180~1000V
Max. Input Current	6*40A
Max. PV Isc	6*60A
Rated Grid Voltage	3/N/PE,230/400Vac
Max.Output Current	133.3A
Rated Grid Frequency	50/60Hz
Rated Output Power	80kW
Max.Output Power	88kVA
Power Factor	1(adjustable+/-0.8)
Ingress Protection	IP66
Operating Temperature Range	-30℃~+60℃
Protective Class	Class I
Inverter Topology	Non-Isolated
Overvoltage Category	AC III,DC II
Made in China	

Manufacturer : Shenzhen SOFARSOLAR Co.,Ltd.
Address : 11/F., Gaoxinqi Technology Building, No.67 Area, Xingdong Community, Xin'an Sub-district, Bao'an District, Shenzhen City,China
VDE0126-1-1,VDE-AR-N4105,G99
IEC61727,IEC62116,AS4777

Figure 2-6 Product label

2.2 Function Description

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

Function Module

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

B. Feeding reactive power into the grid
The inverter is able to produce reactive power, thus to feed it into the grid through the setting of the phase shift factor. Feed-in management can be controlled directly by the APP, or through a RS485 interface.(Optional)

C. Limited the active power fed into grid

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

D. Self-power reduction when grid is over frequency

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

E. Data transmission

Inverter can be monitored remotely through an USB stick logger(WIFI) or software Storage Monitor(optional) which is based on RS485 interface.

F. Software update

USB interface for uploading the firmware, remotely uploading is available through an USB stick logger(WIFI)

2.3 Electrical block diagram

SOFAR 60...80KTLX-G3 has 12 DC input strings, 6 MPPT trackers to tracking the maximum power point, then converters the direct current of PV array to grid-compliant, three phase current and feeds in into the utility grid. Both DC and AC side has Surge Protection Device (SPD).
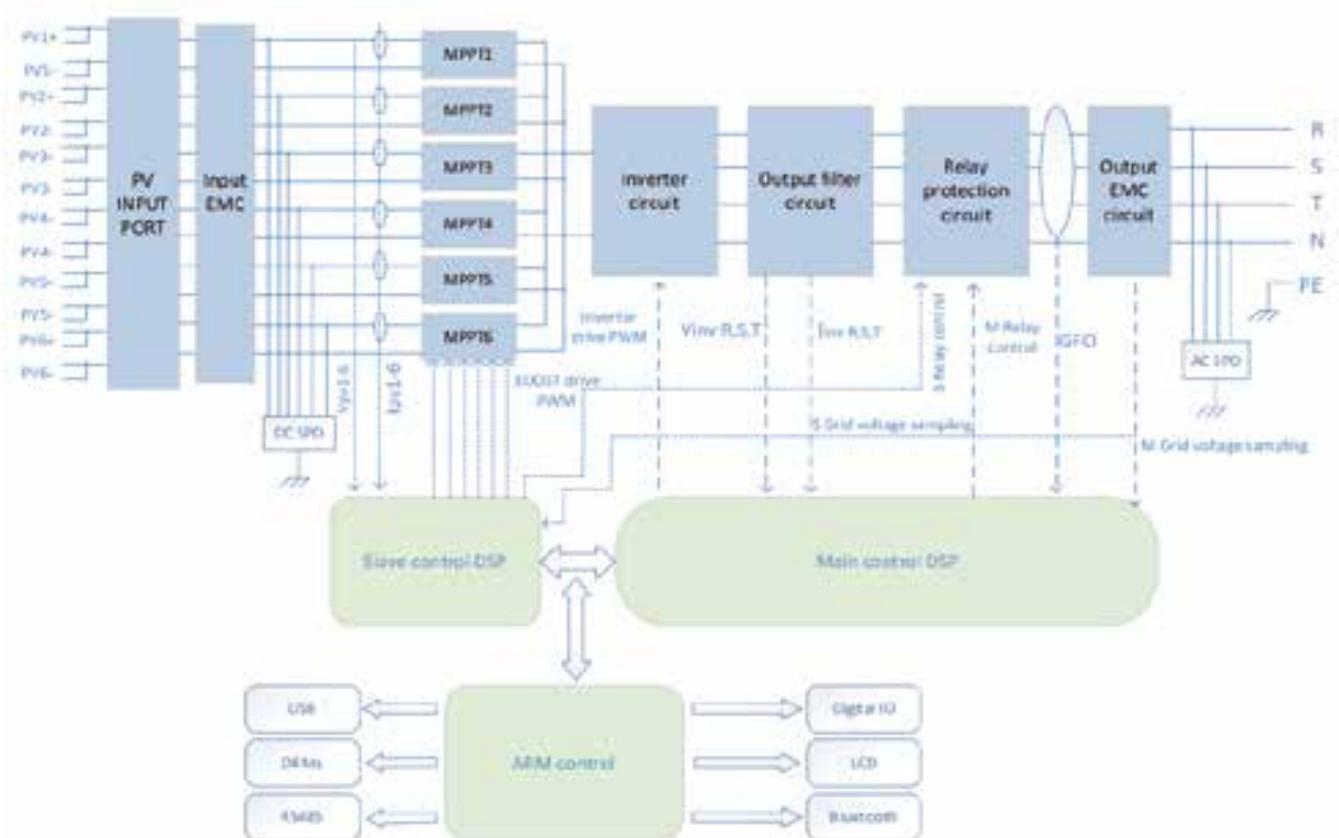
Figure 2-7 Main circuit structure
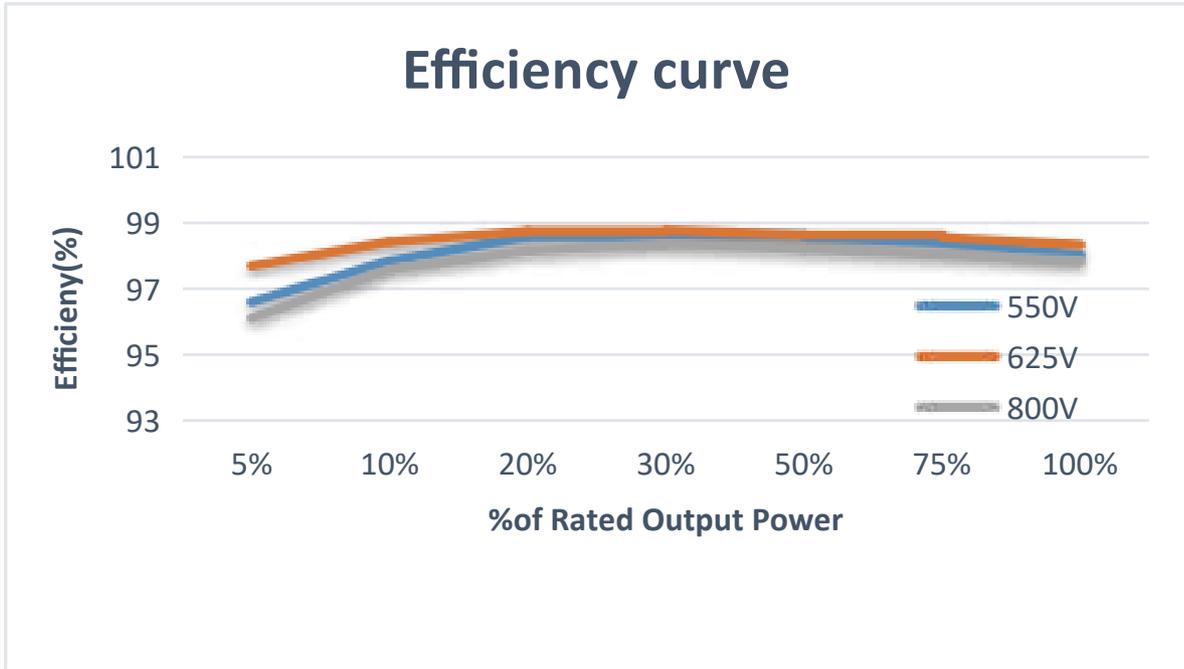
2.4 Efficiency curve

Figure 2-8 Power efficiency curve(take 80KW for example)

3. Inverter Storage

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

- Place inverter into the original package and leave desiccant inside, sealed tight with taps.
- Keep the storage temperature around -40℃～70℃, Relative humidity 5～95%, no condensation
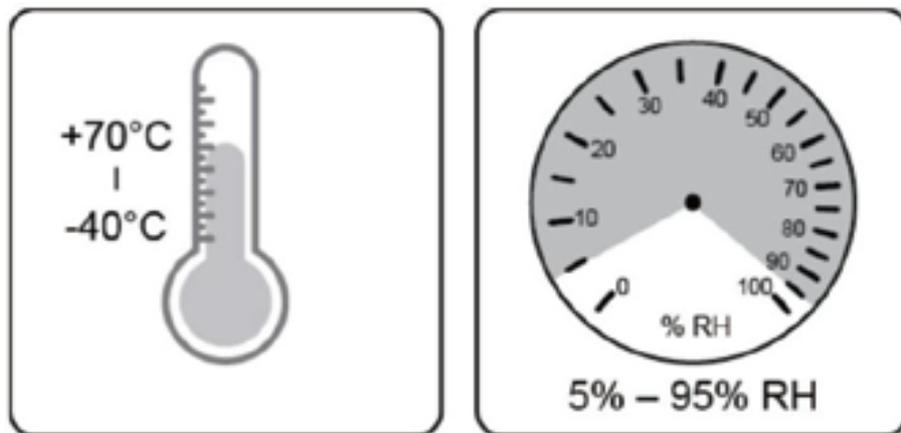
Figure 3-1 Storage temperature and humidity

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

4. Installation

Outlines of this Chapter

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

> **⚠ DANGER**
>
> Do not install the product on flammable material.
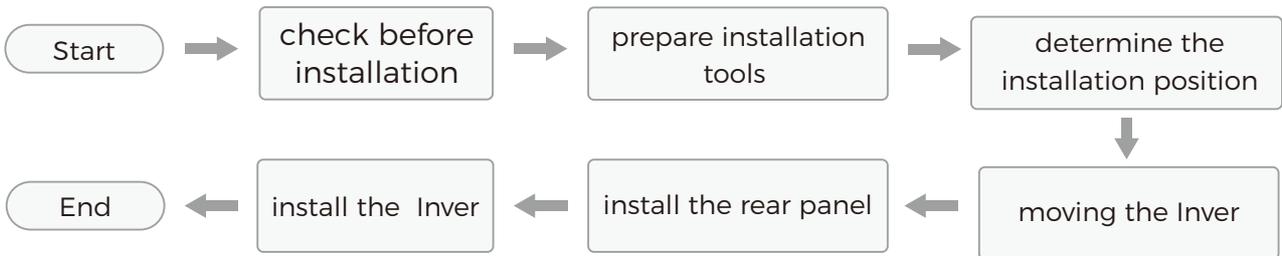> Do not store this product in potentially explosive atmospheres.

> **⚠ 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 two persons for installation.

4.1 Installation Process
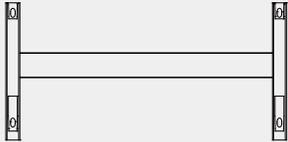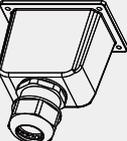
Start → check before installation → prepare installation tools → determine the installation position ↓

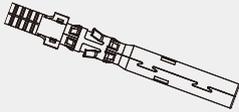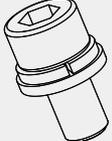End ← install the Inver ← install the rear panel ← moving the Inver
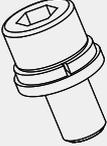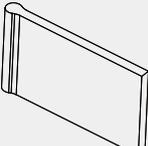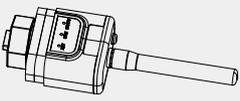
4.2 Checking Before Installation

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.
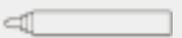
Checking Deliverable

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.

Figure 4-1Components and mechanical parts that inside the package
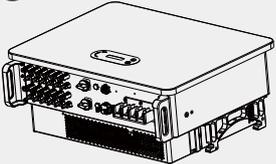
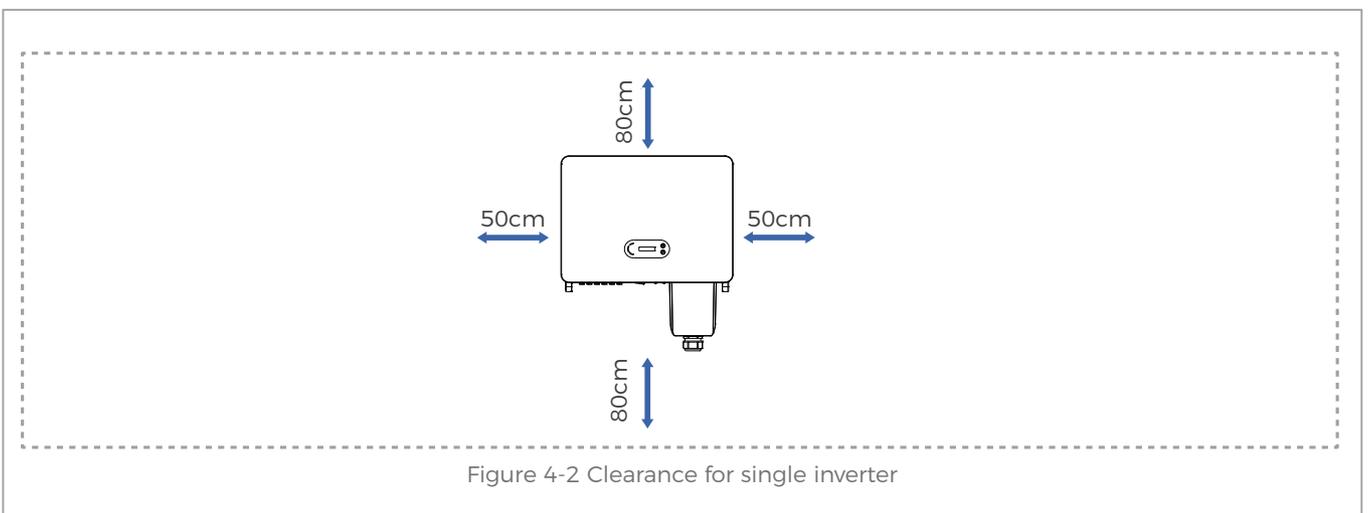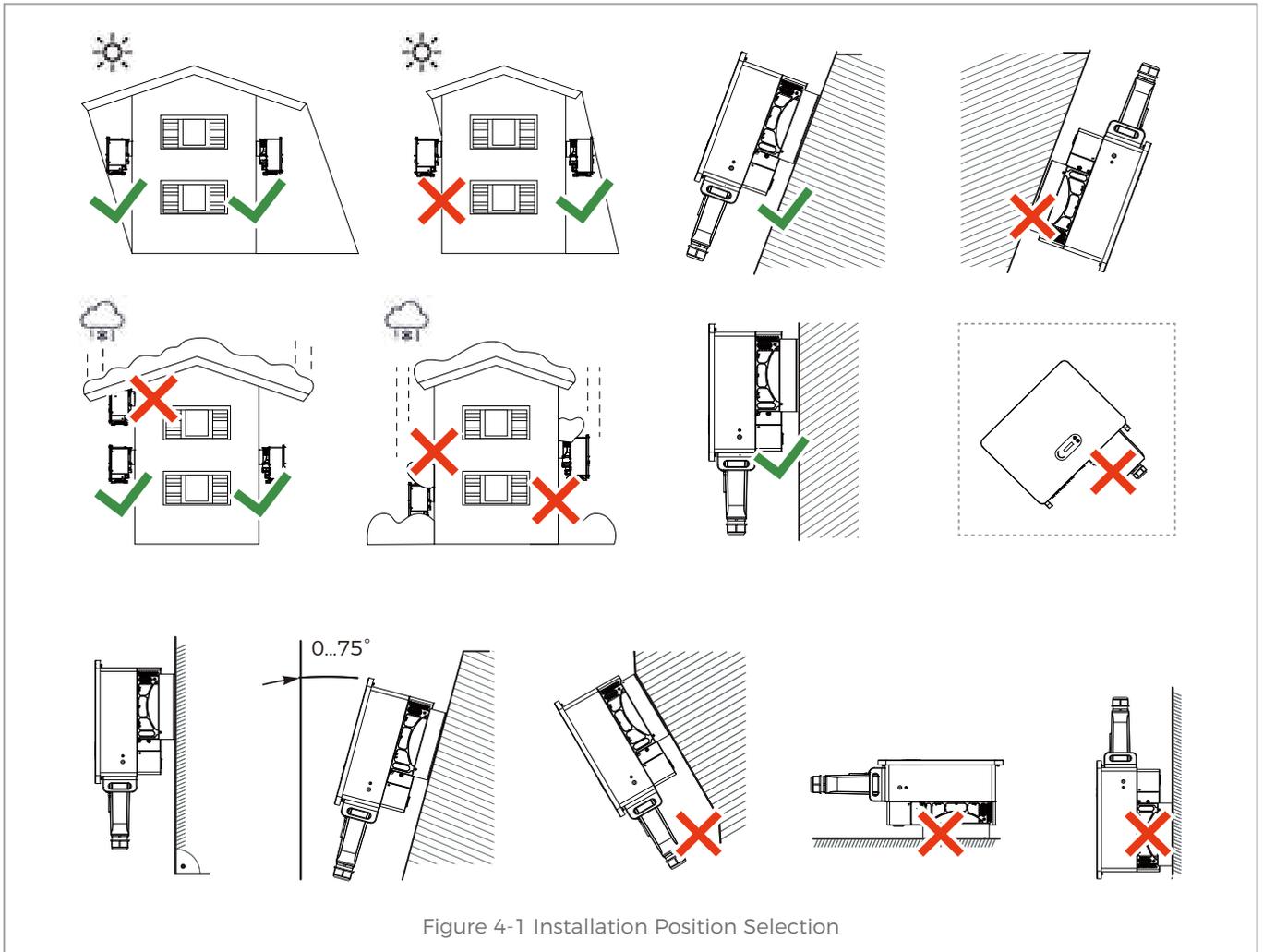| ①	SOFAR 60...80KTLX-G3 ×1	②	Rear Panel ×1
③	AC waterproof cover ×1	④	M8*80 expansion bolt ×4
⑤	PV+ metal pin ×12	⑥	PV- metal pin ×12
⑦	PV+ input connector ×12	⑧	PV- input connector ×12
⑨	M4 cross screw (For locking the waterproof cover) ×6	⑩	M6*30 Hexagon screws (For locking the Rear Panel) ×2
⑪	M6*12 Hexagon screws (For Grounding) ×1	⑫	Documents ×3
⑬	Quality Certificate ×1	⑭	AC terminal insulation partition ×5
⑬	COM connector ×1	⑭	USB WiFi Stick Logger ×1

4.3 Tools

Prepare tools required for installation and electrical connection as following table:
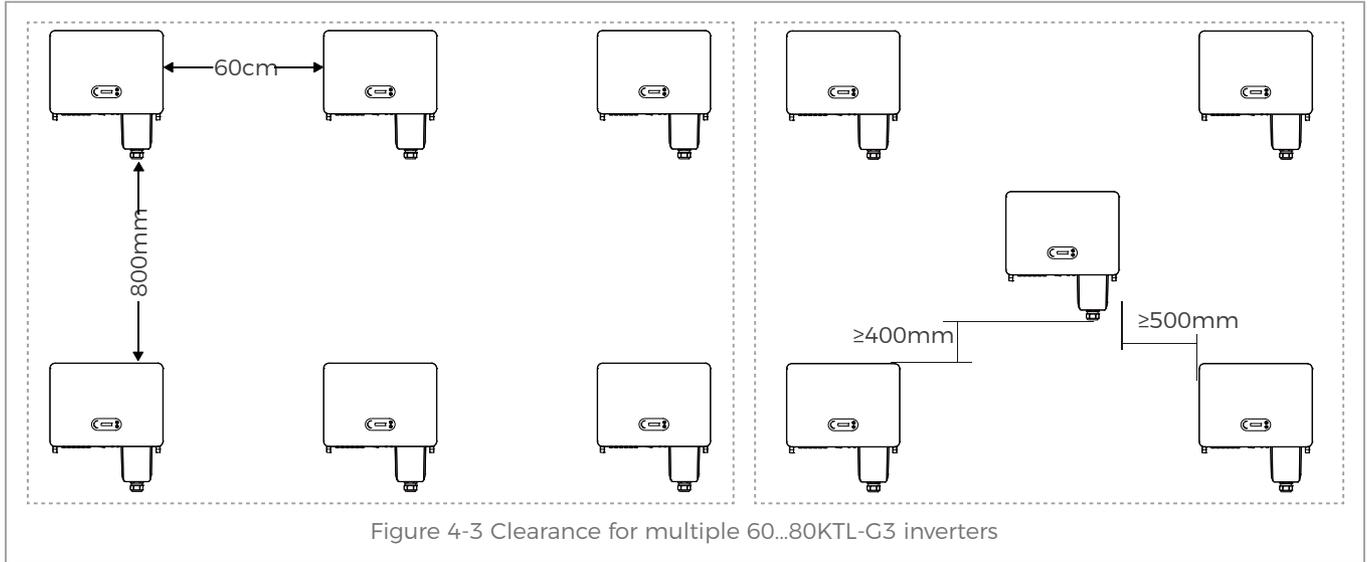Table 4-2 Installation tools

①	**Description:** Hammer Drill Recommend drill @ 10mm **Function:** Used to drill holes on the wall	②	**Description:** Screwdriver **Function:** Use to tighten and loosen screws when installing AC power cable Use to remove AC connectors from the product
③	**Description:** Removal Tool **Function:** Remove PV Connector	④	**Description:** Wire Stripper **Function:** Used to peel cable
⑤	**Description:** With an open end of larger than or greater than 32 mm **Function:** Used to tighten expansion bolts	⑥	**Description:** Rubber Mallet **Function:** Used to hammer expansion bolts into holes
⑦	**Description:** M6 **Function:** M6 use to uninstall and install the front top cover and down cover	⑧	**Description:** Torque wrench **Function:** Connect AC connector
⑨	**Description:** Crimping Tool **Function:** Use to crimp cable on grid side, load side and CT extensive cable	⑩	**Description:** Multimeter **Function:** Check grounding cable, PV positive and negative pole
⑪	**Description:** Marker **Function:** Mark signs	⑫	**Description:** Measuring Tape **Function:** Measure distance
⑬	**Description:** Level **Function:** Ensure the rear panel is properly installed	⑭	**Description:** ESD gloves **Function:** Installer wear when installing product
⑮	**Description:** Safety goggles **Function:** Installer wear when installing product	⑯	**Description:** Mask **Function:** Installer wear when installing product

4.4 Determining the Installation Position

Select a appropriate location to install the product to make sure the inverter can work in a high efficiency condition. When selecting a location for the inverter, consider the following:

Note: Install vertical or backward tilt within 0–15°, Do not install forward or upside down!

Figure 4-1 Installation Position Selection

Figure 4-2 Clearance for single inverter

Figure 4-3 Clearance for multiple 60...80KTL-G3 inverters

4.5 Moving of inverter

Manual handling

Unload the inverter from package, horizontally move to the install position. When open the package, at least two operator insert the hands into the slots on both side of the inverter and hold the handles.
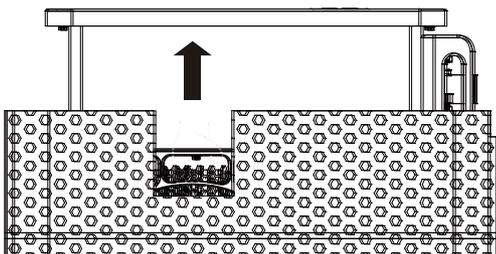
Figure 4-4 Move inverter from package
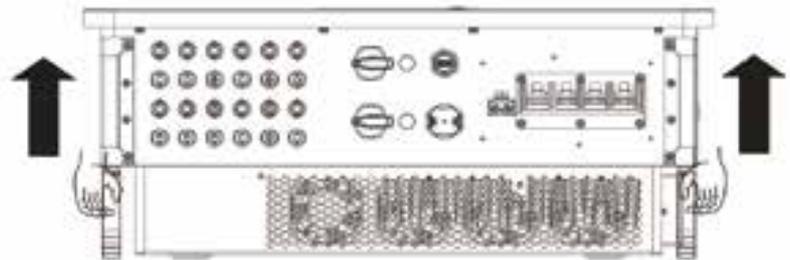
Figure 4-5 Move inverter from package(2)

ATTENTION

Inverter is heavy, attention to keep the balance when lift the inverter.

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.

4.6 Installation

Installed on wall

Step 1：Placed the rear panel on the mounting wall, determine the mounting height of the bracket and mark the mounting poles accordingly. Drilling holes by using Hammer Drill, keep the hammer drill perpendicular to the wall and make sure the position of the holes should be suitable for the expansion bolts.
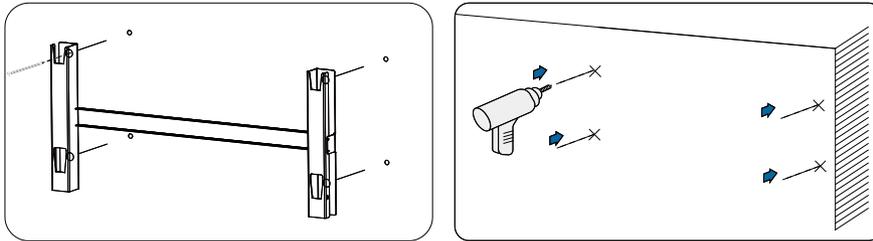
Figure 4-6 Drilling holes on the mounting wall

Step 2：Insert the expansion bolt vertically into the hole.
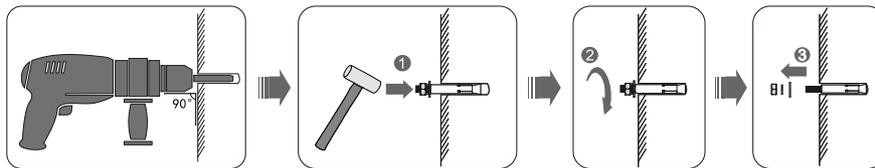
Figure 4-7 Screws into the holes

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

Figure 4-8 Install rear panel

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

Figure 4-9 Fix inverter

5. Electrical Connection

Outlines of this Chapter

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

Caution:

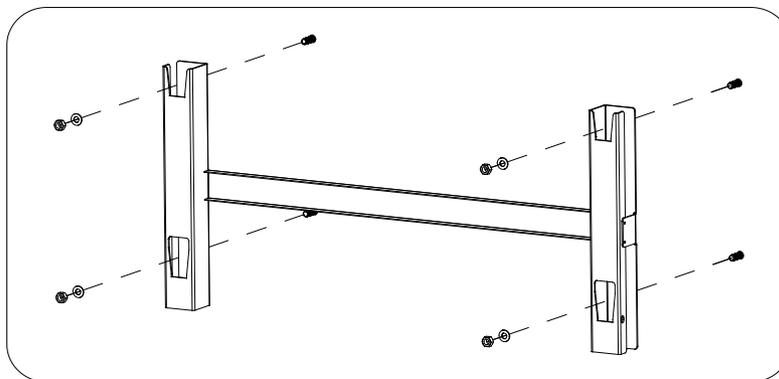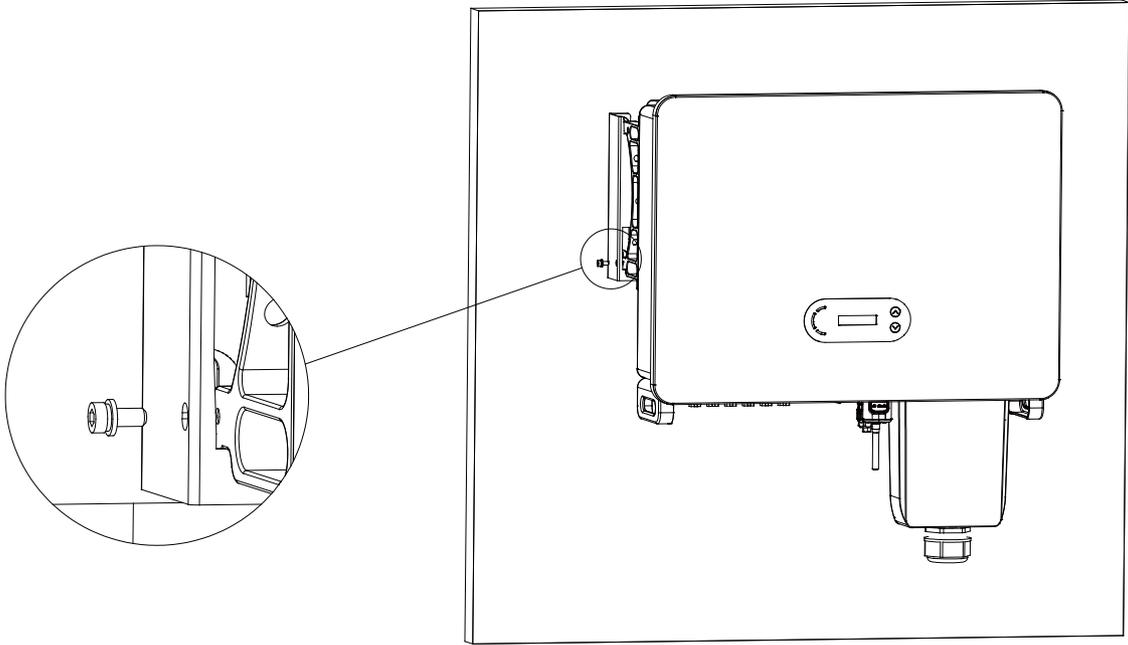Before performing electrical connections, ensure the DC switch is OFF and AC circuit breaker is OFF. Waiting 5 minutes for the capacitor to be electrically discharged.

ATTENTION

Installation and maintenance should be done by certified electrical engineer

⚠ DANGER

Before the electrical connection, use opaque material to cover the PV modules or disconnect PV string DC switch. PV arrays will produce dangerous voltage if it is exposure under sun

NOTE

For this product, the open circuit voltage of PV strings should not greater 1100V

The connected panel must meet the standard IEC61730A.

Model \ Item	IscPV(Maximum)	Maximum output current
SOFAR 60KTLX-G3	6*50A	6*32A
SOFAR 75KTLX-G3	6*60A	6*40A
SOFAR 80KTLX-G3	6*60A	6*40A

5.1 Electrical Connection

Start → Connect PGND cable → Connect AC output power cable → Connect DC input cable → Connect communication cables (not mandatory) → End
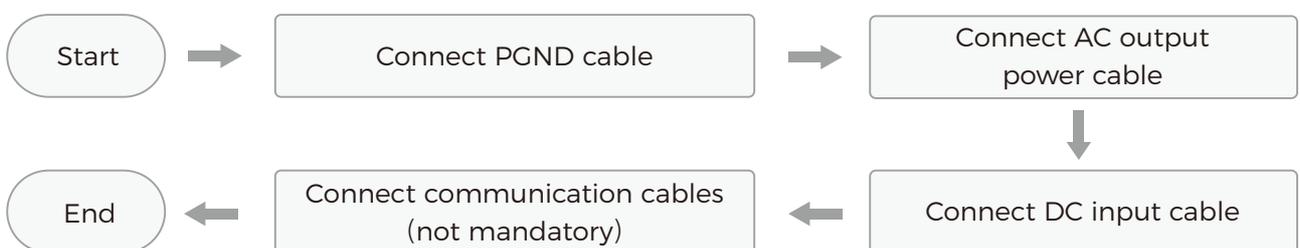
Figure 5-1 Flowchart for connecting cables to the inverter

5.2 Grounding Connection (PE)

Connect the inverter to the grounding electrode using ground cable.

> **NOTE**
>
> SOFAR 60...80KTLX-G3 is a transformerless inverter which requires the positive pole and negative pole of the PV array are NOT grounded. Otherwise, it will cause inverter failure. In the PV system, all non-current-carrying metal parts (such as mounting frame, combiner box enclosure, etc.) should be connected to earthed.

Preparation: prepare the grounding cable (recommend 16mm² yellow-green outdoor cable and M8 OT Terminal)

Procedure:

Step 1: Remove the insulation layer with an appropriate length using a wire stripper shown as figure 5-2

L2=L1+(2-3)mm

L1
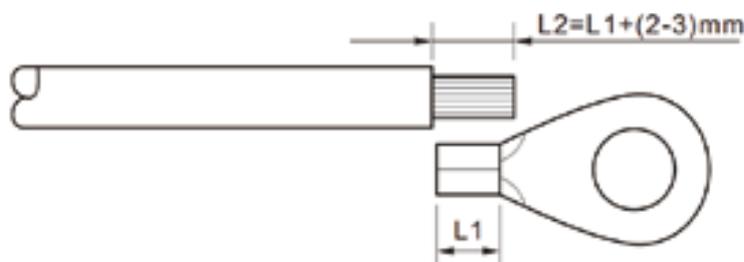
Figure 5-2 Grounding connection instruction（1）

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

Step 2: Insert the exposed core wires into the OT terminal and crimp them by using a crimping tool, as shown as figure 5.3. Recommend using OT terminal: OT M6, Cable: ≥ 16mm².

L3<2mm

L4<1.5mm
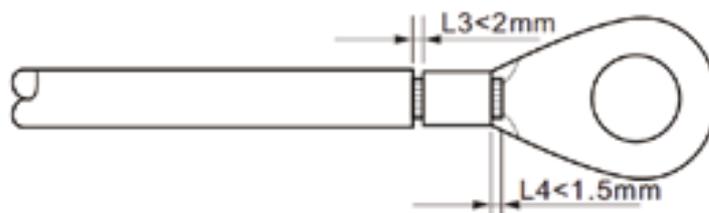
Figure 5-3 Grounding connection instruction（2）

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

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

Step 3: Tighten the OT terminal by using M6 screw. Recommend torque is 5-7N.m.
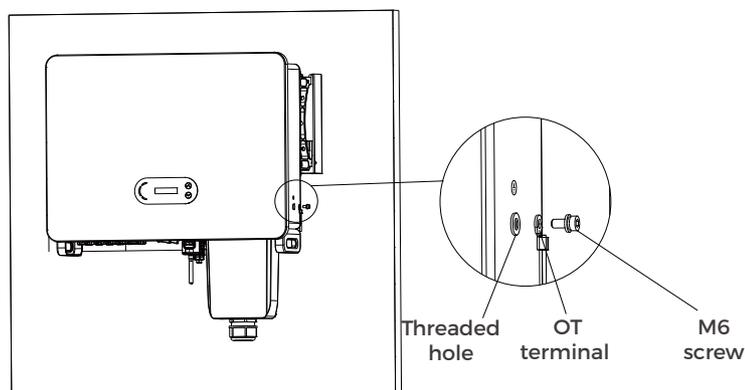
Figure 5-4 Inverter external grounding instruction diagram

5.3 Connect grid side of inverter(AC-Output)

SOFAR 60...80KTLX-G3 connect to utility grid by using AC power cable. The AC connection must meet the requirement of local grid operator.

⚠ **Caution**

Ban multiple Inverters use one circuit breaker
Ban connect loads between inverter and circuit breaker

Must use five core outdoor cable, the recommend AC cable and Residual current breaker (RCB) as below table 5-1:

Item Model	L/N Cross section area of Cu or Al cable (mm²)	PE Cross section area of Cu or Al cable (mm²)	Muti-core outdoor cable diameter (mm)	AC Circuit Breaker specification
SOFAR 60KTLX-G3	50...70	16...25	＜63	120A/380V/3P I△N=0.3A
SOFAR 75KTLX-G3	70...95	16...25	＜63	150A/380V/3P I△N=0.3A
SOFAR 80KTLX-G3	70...95	16...25	＜63	150A/380V/3P I△N=0.3A
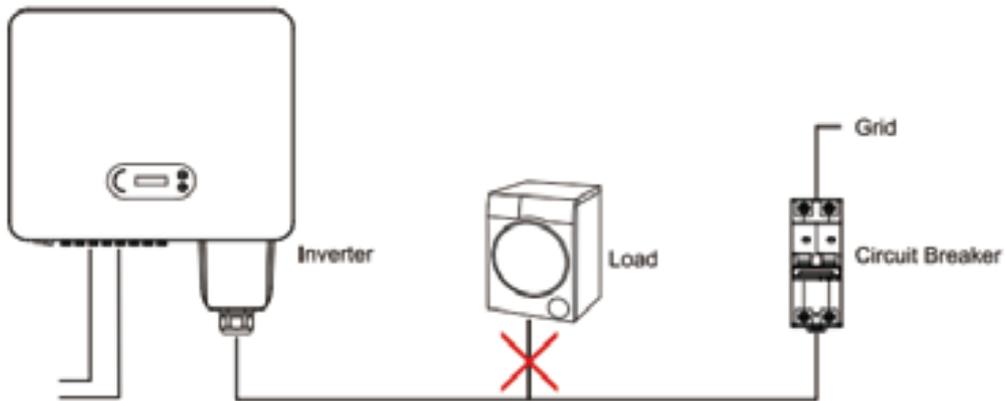
Figure 5-5 Incorrect connection between load and inverter

The resistance at connection point must less than 2Ω. In case to have a properly anti-is-landing function, please choose the high-quality PV cable and ensure the power loss is less than 1%. Meanwhile, the inverter AC side to grid connection point must less than 100m. the relation between cable length, cross section area and power loss as below:
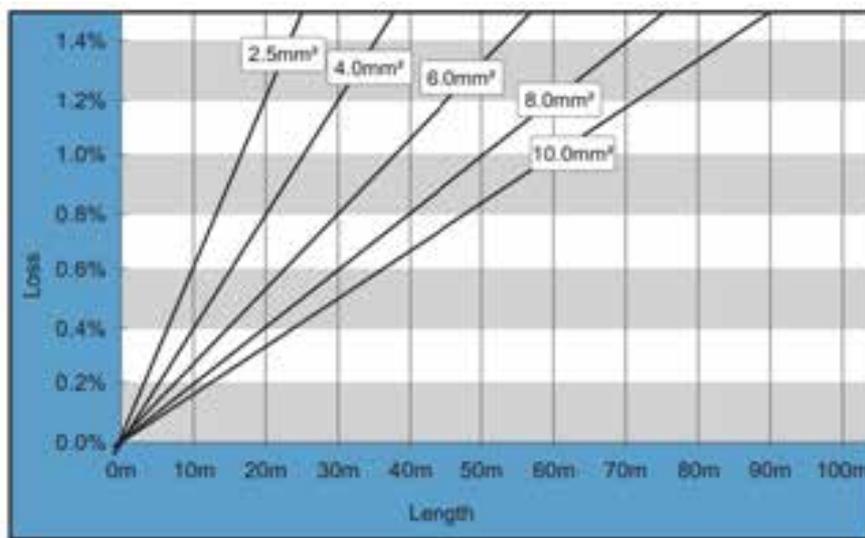
Figure 5-6 relation between cable length, cross section area and power loss

The AC output terminal of this product is equipped with high current 5-core terminal block and customized AC output waterproof cover, which can meet the IP65 level require-ments after installation. AC cable need customer self connect:
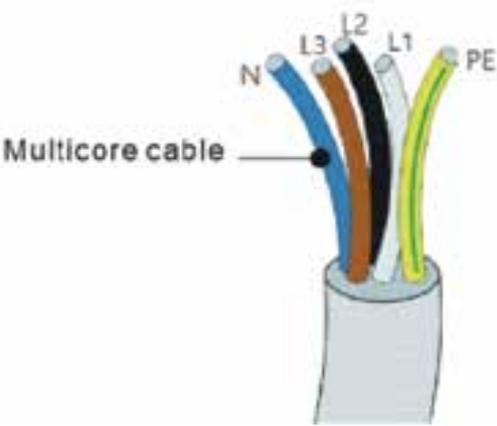
Figure 5-7 The equipment Multi-core Cable

Wiring Procedure as following:

Step 1: Remove the AC waterproof cover screw with a screwdriver, and take out the stopper in the PG waterproof joint.

Step 2: Select the appropriate cable diameter according to table 5-1, process the cable according to the following picture size requirements, and then pass through PG waterproof joint; The PE wire is connected to the grounding position of the container. External PE refer to Figure 5-4 Inverter external grounding instruction diagram.
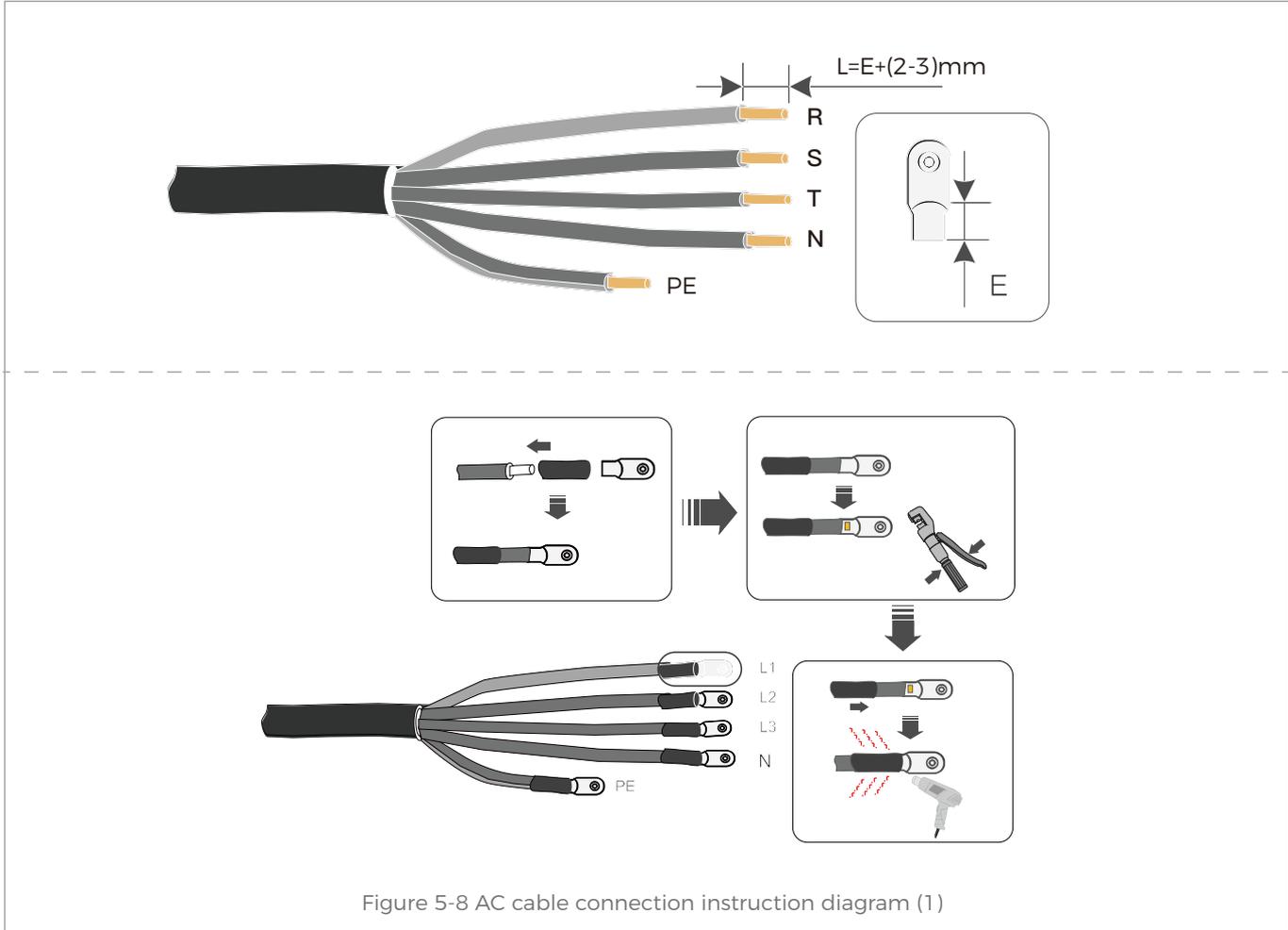
Figure 5-8 AC cable connection instruction diagram (1)

Step 3: After assembling the PG waterproof connector, connect the cable to the AC terminal block L1, L2, L3, N, PE contacts, and fasten them (8...12 N · m). Take out the AC terminal insulation partition, clamp the AC output wiring cover and screw on the AC wiring terminal (2...3 N · m).
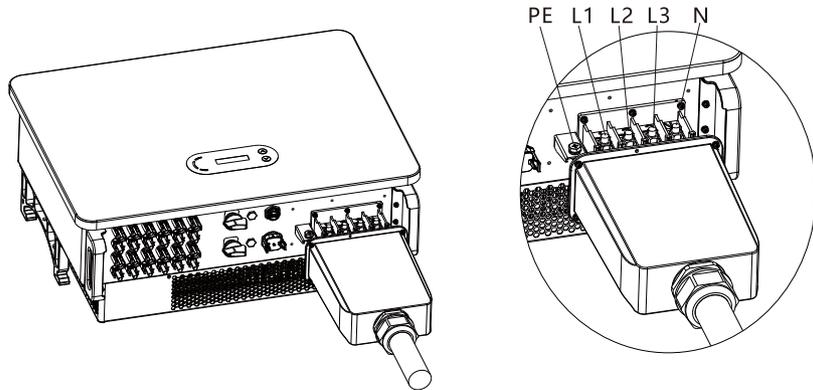
Figure 5-9 AC cable connection instruction diagram (2)

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.

Note:

It is strictly forbidden to connect the aluminum terminal block directly to the terminal block, otherwise it will cause electrochemical corrosion and affect the reliability of the cable connection.

When using copper-aluminum transition terminals, or aluminum terminal blocks with copper-aluminum transition gaskets, IEC61238-1 requirements are required.

When using copper-aluminum transition gaskets, pay attention to the front and back sides, ensure that the aluminum side of the gasket is in contact with the aluminum terminal block, and the copper side is in contact with the terminal block.

OT/DT Requirement for terminal connection
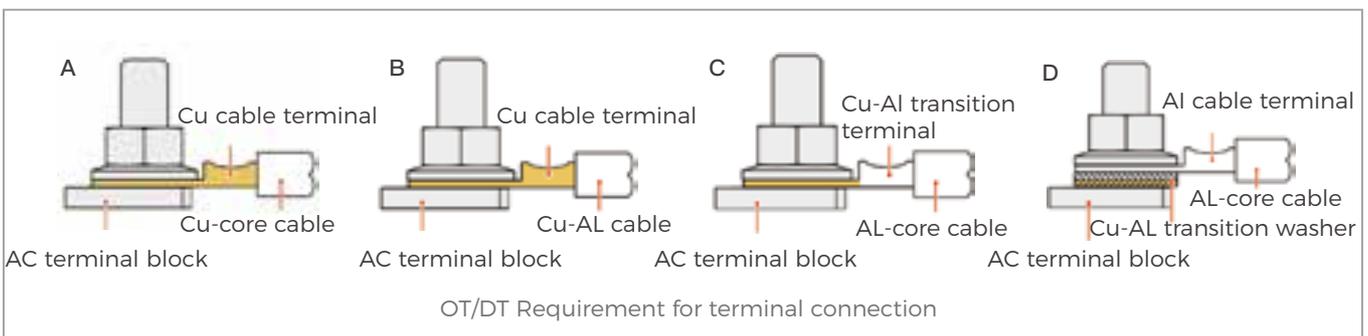
5.4 Connect PV side of inverter (DC-Input)

Note:

- Connecting PV strings into inverter must following the below procedure. Otherwise, any faulty cause by inappropriate operation will be including in the warranty case.

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

- Ensure PV array have good insulation condition in any time.

- Ensure same PV string should have the same structure, including: same model, same number of panels, same direction, same azimuth.

- Ensure PV positive connector connect to inverter positive pole, negative conenctor connect to inverter negative pole

- Please use the connectors in the accessories bag. The damage cause by incorrect is not including in the warranty.

Figure 5-2 Recommend DC cable size (maximum tolerance voltage >= 1100V PV cable)

Copper cable cross section area (mm^2)	Cable OD (mm)
2.5...6.0	6.0...9.0

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

L=8-10mm

L=8-10mm

1

2
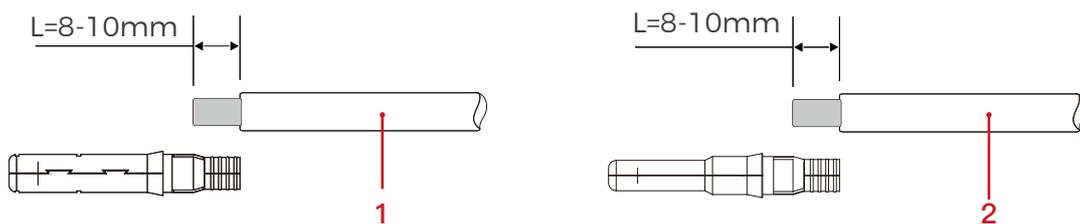
Figure 5-10 DC cable connection（1）

Step 2: Crimp the PV metal contact pin to the striped cable using a proper crimping pliers;

positive pole

negative pole

Crimping pliers
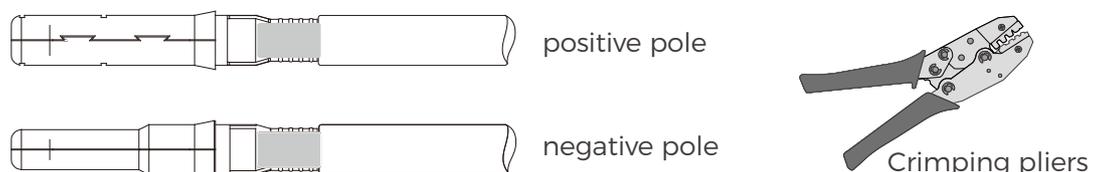
Figure 5-11 DC cable connection(2)

Step 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);
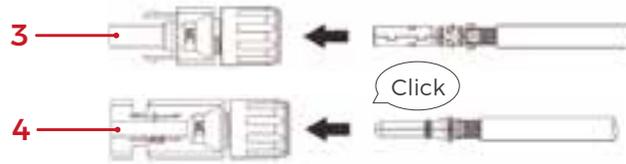
Figure 5-12 DC cable connection(3)

Step 4: Measure PV voltage of DC input with multimeter, verify DC input cable polar and connect DC connector with inverter until hearing a slight sound indicated connection succeed(5. Positive cable, 6. Negative cable).
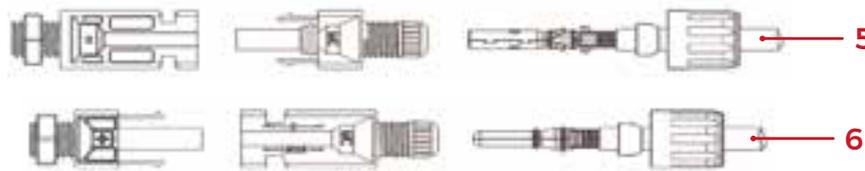
Figure 5-13 DC cable connection(4)
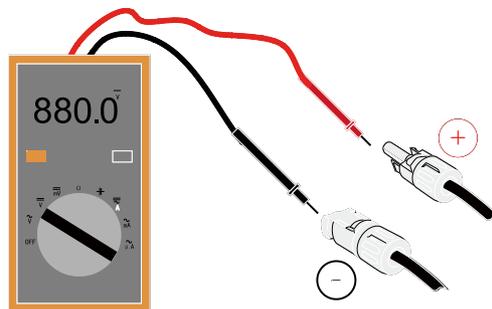
Figure 5-14 Use a multimeter to check the positive and negative electrodes

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

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

⚠️ Note	Before, moving the positive and negative connector, please make sure "DC Switch" is on OFF position.
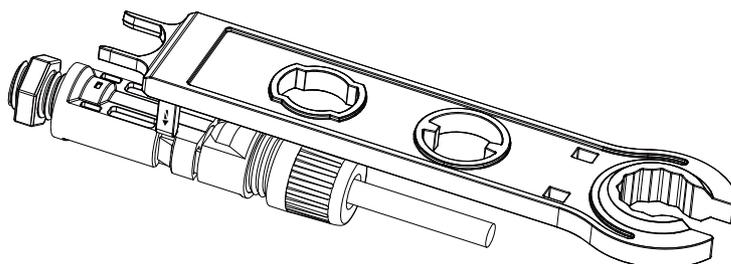
Figure 5-15 Removal DC connector

5.5 Wiring method recommended

The inverter has a total of 20 DC input terminals, of which the branch route of MPPT1...MPPT4 is controlled by DC SWITCH 1, the branch route of MPPT5...MPPT7 is controlled by DC SWITCH 2 and the branch route of MPPT8...MPPT10 is controlled by DC SWITCH 3.

It is recommended that all PV input terminals be evenly distributed on MPPT1...MPPT10 branches, and the maximum current of each MPPT is controlled at 40 A, and the maximum current of each MPPT branch is 20 A.

When the maximum current of each MPPT branch is 20 A, in order to give full play to the power generation capacity of the photovoltaic string and extend the service life of the inverter, when the number of input strings is 12...20 strings, the recommended connection method of DC input terminals is as follows:

Enter the number of strings	Terminal selection
Six	MPPT1/MPPT2/MPPT3/MPPT4/MPPT5/MPPT6 are each connected to a string
Seven	MPPT1 is connected to two strings MPPT2/MPPT3/MPPT4/MPPT5/MPPT6 are each connected to a string
Eight	MPPT1/MPPT2 are connected to two strings MPPT3/MPPT4/MPPT5/MPPT6 are each connected to a string
Nine	MPPT1/MPPT2/MPPT3 are connected to two strings MPPT4/MPPT5/MPPT6 are each connected to a string
Ten	MPPT1/MPPT2/MPPT3/MPPT4 are connected to two strings MPPT5/MPPT6 are each connected to a string
Eleven	MPPT1/MPPT2/MPPT3/MPPT4/MPPT5 are connected to two strings MPPT6 is connected to a string
Twelve	MPPT1/MPPT2/MPPT3/MPPT4/MPPT5/MPPT6 are connected to two strings

Notes: PV1/PV2 two string voltages should be as consistent as possible, PV3/PV4、PV5/PV6、PV7/PV8、PV9/PV10、PV11/PV2、PV13/PV14、PV15/PV16、PV17/PV18、PV19/PV20 is the same.

5.6 Communication Connection

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

When layout the wiring diagram, please separate the communication wiring and power wiring in case the signal be affected.
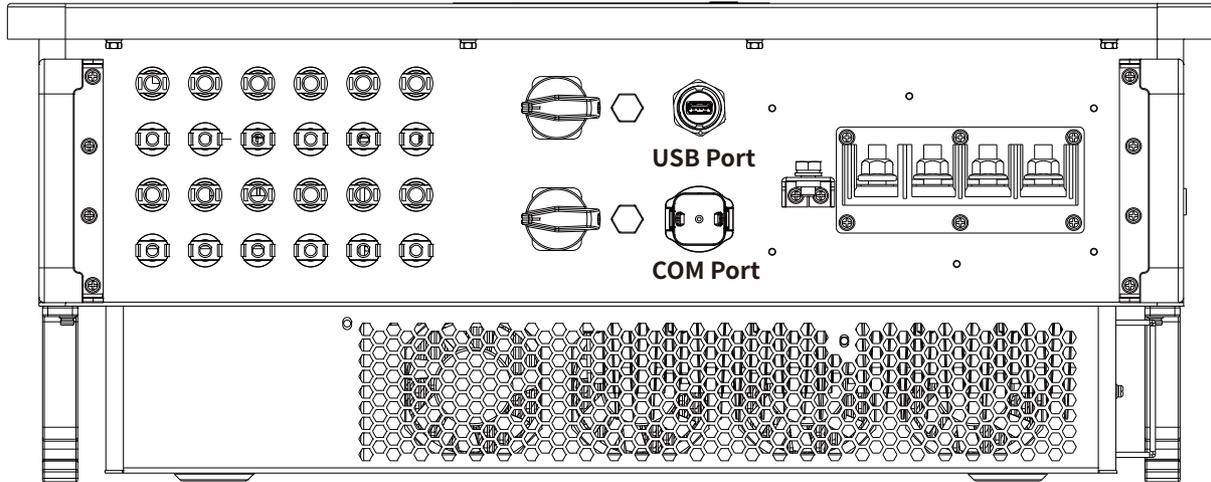
Figure 5-16 Communication connection Port

5.7.1 USB/WIFI Port

Port Description:

USB port	USB flash disk access	Use for updating the software and fault recording
	USB stick logger access	Use for remote data acquisition and upgrading of inverter

Procedure：
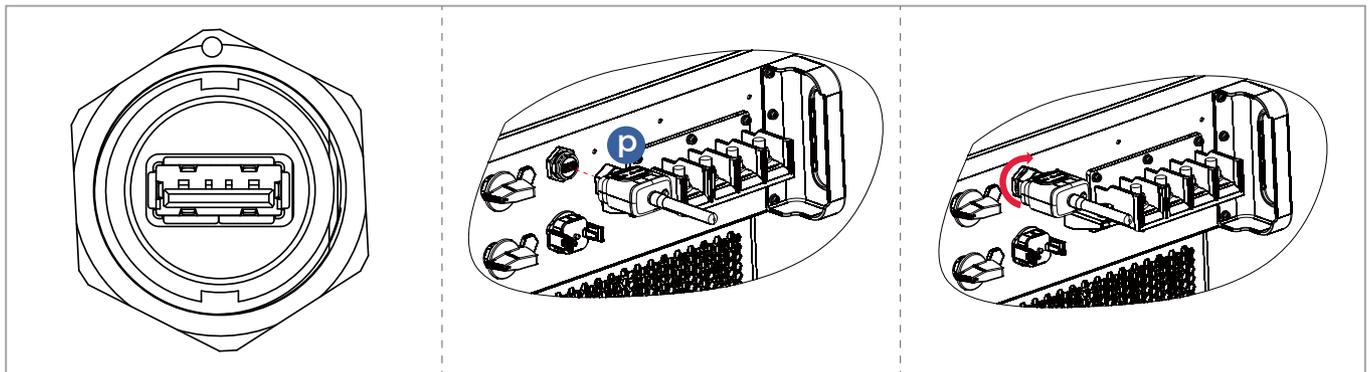
For details, please refer to the user manual of USB stick logger.

5.6.2 COM—Multi function communication port

Port Description：

PIN	Define	Function	Note
1	RS485A	RS485 signal+	Wire connection monitoring or multiple inverter monitoring
2	RS485A	RS485 signal+	
3	RS485B	RS485 signal-	
4	RS485B	RS485 signal-	
5	Electric meter RS485A	Electric meter RS485 signal+	
6	Electric meter RS485B	Electric meter RS485 signal-	
7	GND.S	Communication	
8	DRM0	ground	DRMS port
9	DRM1/5	Remote shunt down	
10	DRM2/6		
11	DRM3/7		
12	DRM4/8		
13-16	Blank PIN	N/A	DRMS port

Procedure：
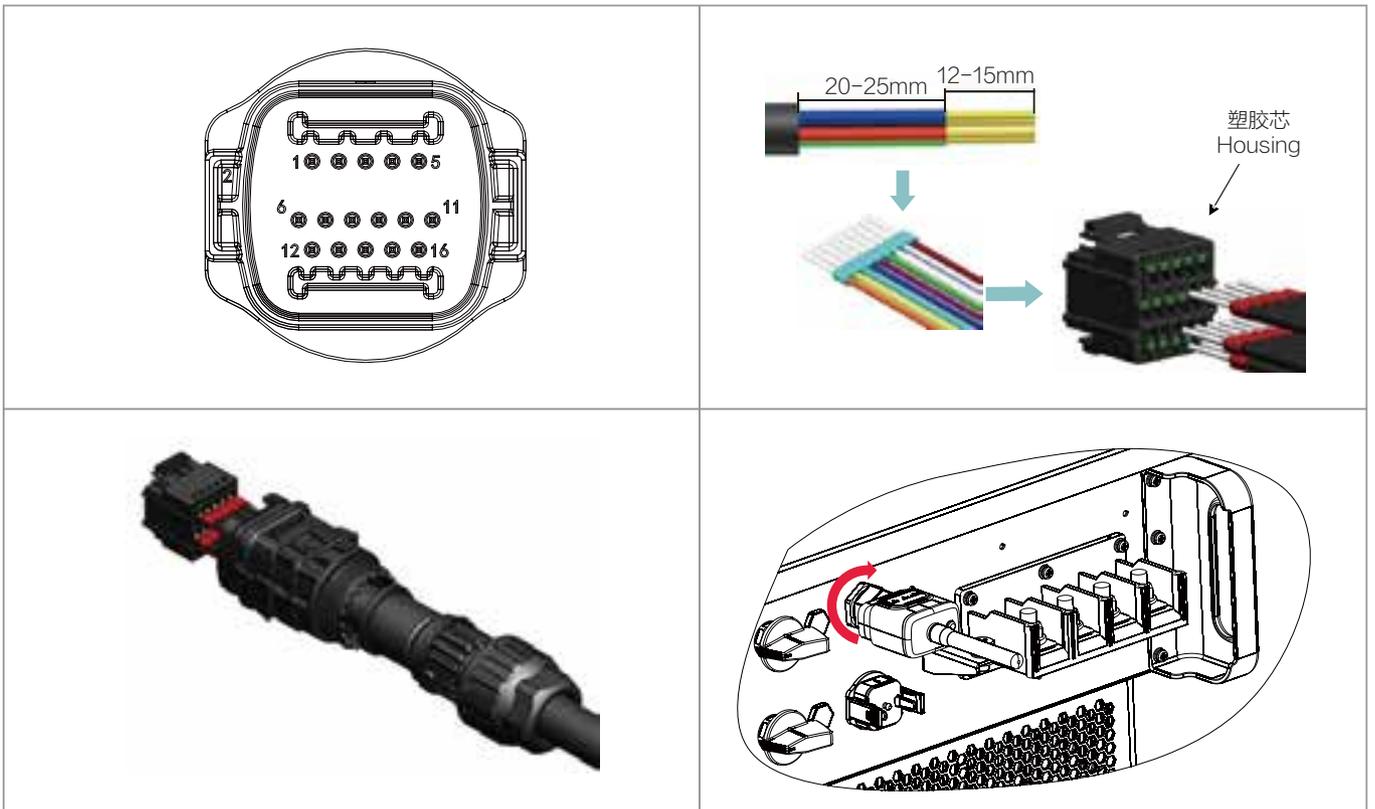
5.7 Feed-in limitation connecting line

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.
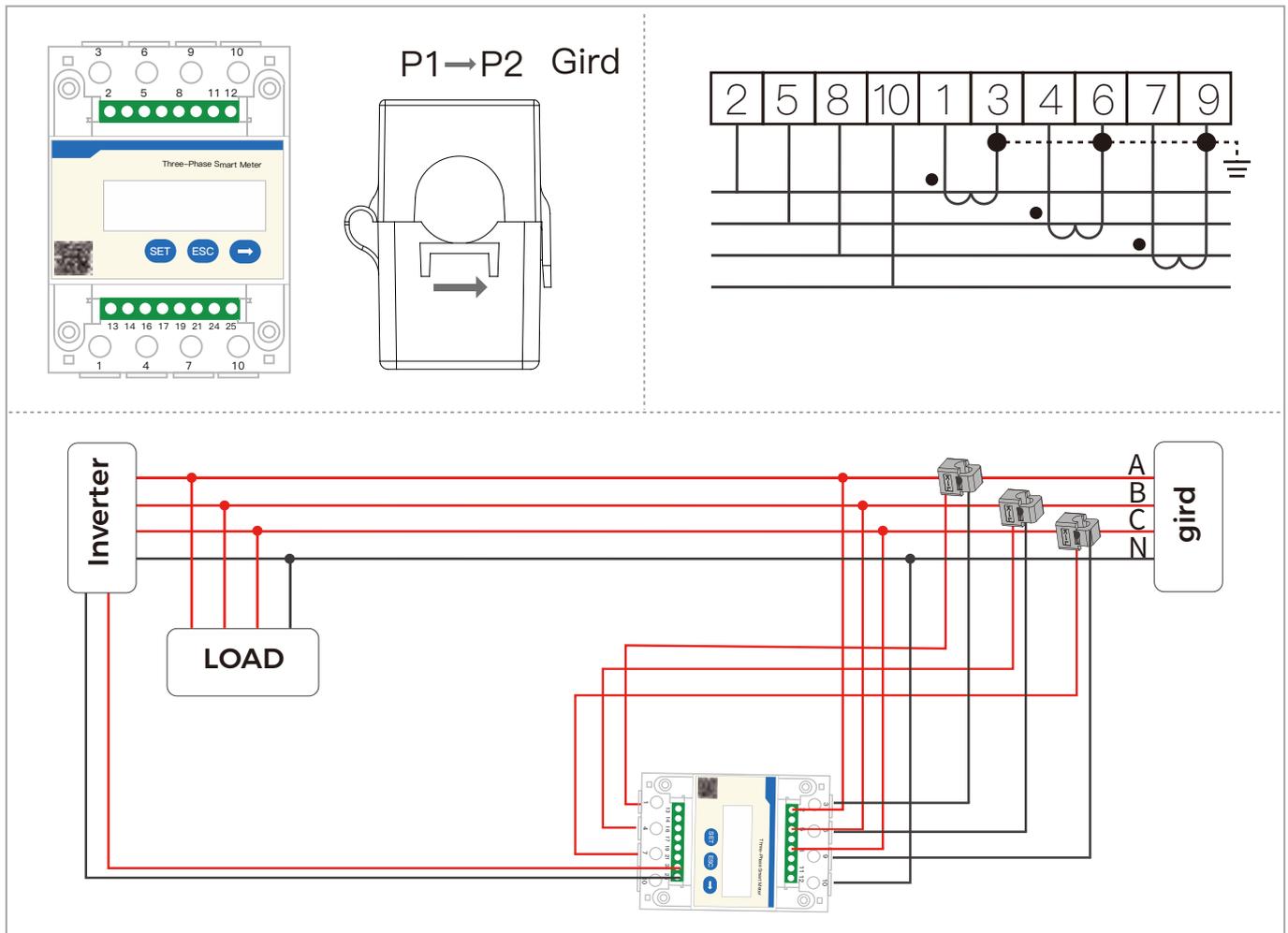
6. Commissioning of inverter

Outlines this Chapter

Introduce SOFAR 60...80KTLX-G3 safety inspection and start processing

6.1 Cable Connection Inspection

ATTENTION

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

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

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

6.2 Start Inverter

Step 1: Turn ON the DC switch.

Step 2: Turn ON the AC circuit breaker.

Step 3: Set the PV input mode. Parallel mode needs to be set via the LCD when there is a parallel connection of MPPTs or when a PV busbar is used.

When the DC power generated by the solar array is enough, the SOFAR 60...80KTLX-G3 inverter will start automatically. Screen showing"normal"indicates correct operation.

NOTE 1: Choose the correct country safety code.

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

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

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

If the inverter indicates any fault, please refer to Section 9.1 of this manual —— trouble shooting for help.

7.SOFAR monitor APP

Overview

SOFAR Monitor is a new efficient, safe and fast intelligent photovoltaic monitoring software that completes near-end debugging and remote monitoring settings. From the creation of the power station to the operation and maintenance and management to achieve integrated services, it is easy to grasp the power station information. In the power station information, not only can the monitored data information be displayed through digital and dynamic flow diagrams, but also real-time alarm notification of faults, bringing a simpler and more convenient management experience.

7.1 Software Downloads

①Download and install through the App Market.

Android mobile phone users: Search for "SOFAR Monitor" in the Android application market (Pea Pod, Baidu, etc.).

iPhone users search for "SOFAR Monitor" in the APP Store to download and install.

②You can also download "SOFAR Monitor" by scanning the QR code below.

SOFAR Monitor download

7.2 Account registration and login

7.2.1 Registered

If you do not have an account with SOFAR Monitor, please click {Register Account} at the bottom of the login screen to register.
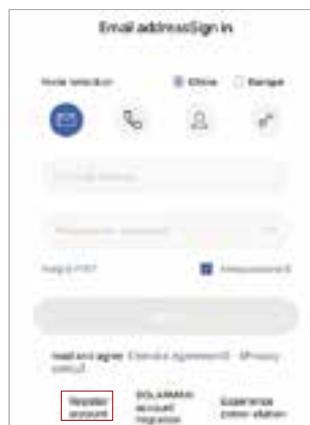
On the "Account Type" screen, click "I am a merchant", and then follow the prompts to complete the user account registration.
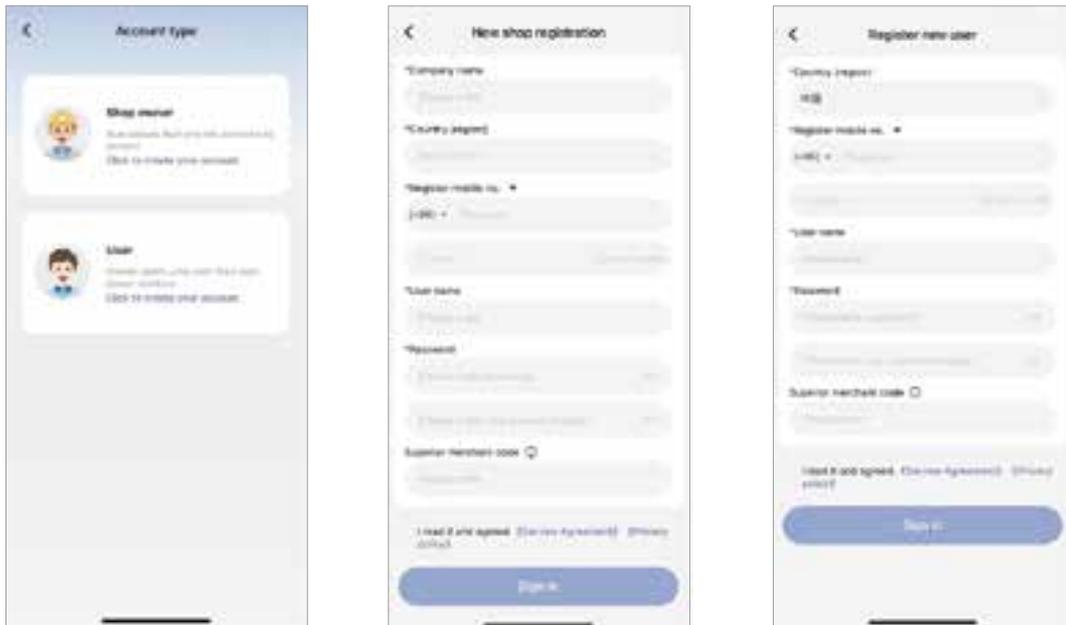
At present, mobile phone number or email account is supported for account registration; Please follow the prompts to correctly enter your mobile phone number or email account, set a login password and verify it;

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

Note!For account security reasons, passwords should be 8-25 digits plus letters, no spaces, and no username. After you fill in the information correctly, click the "Register Now" button to automatically log in to the account.

7.2.2 login

If you already have a SOFAR Monitor account, log in directly on the login page. You can log in by mobile phone number, email address, and username. After logging in success-fully, go to the homepage of Shouhang Monitor.
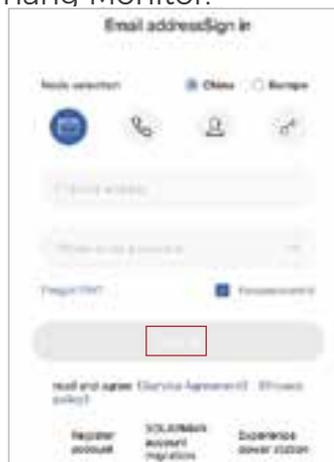
7.3 Local Monitoring

Please turn on your phone's Bluetooth in advance before using this function.

7.3.1 Bluetooth connection

Selection of connection method

1: Entering the application interface, enter the sidebar, and click [Local Control], in the page, you can connect the mobile phone and the inverter through Bluetooth communication to realize near–field operation and maintenance, debugging, upgrade and safety import and other functions.

2: Enter the "Connect Bluetooth" interface, there are two ways to connect, namely scan and search.

①**Sweep:**

Click [Scan] will prompt you to turn on the camera on the phone, scan the SN number barcode on the inverter to start searching for the Bluetooth of the machine, and automatically connect and enter the home page after searching for the Bluetooth.

②**Search:**

After clicking [Search], it will jump to the list of Bluetooth devices and start searching for nearby available Bluetooth devices, and select the device that needs to be connected according to the serial number of the inverter.

After successfully connecting the device, enter the Bluetooth homepage.

7.4 APP operation manual

For APP function introduction and specific operation, please click [≡] in the upper left corner of the page, enter the sidebar, and click [Personal Settings]>> [About Software] >> [Operation Manual] to view detailed operation information.
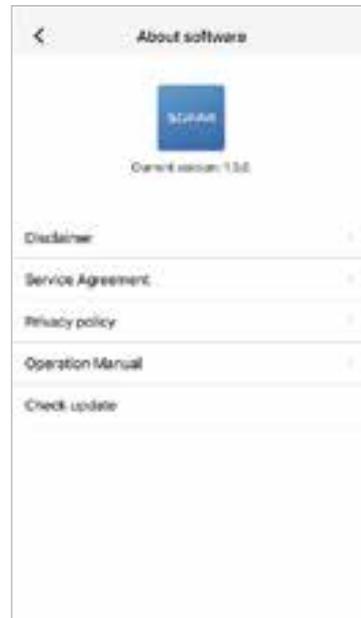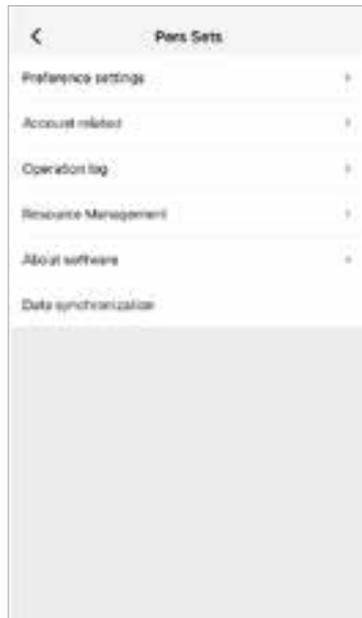
8. Operation interface

Outlines of this chapter

This section introduces the display, operation, buttons and LED indicator lights of SOFAR 60...80KTLX-G3 Inverter.

8.1 Operation and Display Panel

Buttons and Indicator lights
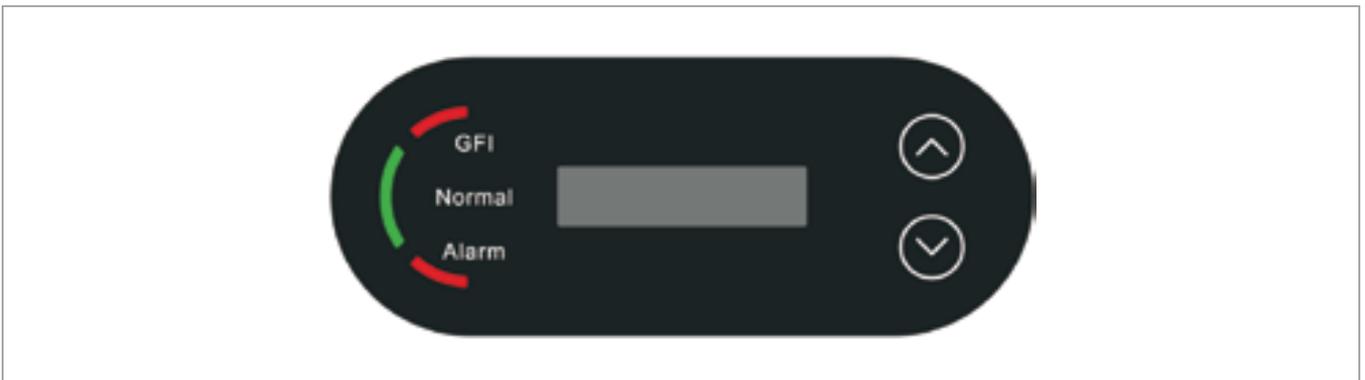
Button:

"^" Short press UP button = go up；"^" Long press UP button = exit current interface；
"v" Short press DOWN button = go down；"v"Long press DOWN button = enter current interface

Indicator Lights:

"GFI" Red light ON = GFCI faulty；"Normal" Green light flashing = counting down or checking
"Normal" Green light ON = Normal；"Alarm" Red light ON= recoverable or unrecoverable faulty

8.2 Standard Interface

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

1.Inverter working status, PV 1 input voltage and current	2.Inverter working status, PV 2 input voltage and current
Normal PV1:680V- 6.7A	Normal PV2:683V- 6.8A

3. Inverter working status, PV 3 input voltage and current

```
        Normal
PV3:675V- 7.4A
```
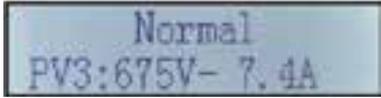
4.Inverter working status, PV 4 input voltage and current

```
        Normal
PV4:675V- 7.3A
```
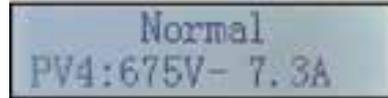
5.Inverter working status, PV generated power

```
        Normal
Power:9.07kW
```
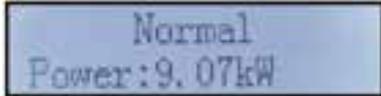
6.Inverter working status, today generated electricity

```
        Normal
Today:25.594kWh
```
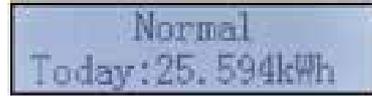
7.Inverter working status, total generated electricity

```
        Normal
Total:25.4kWh
```
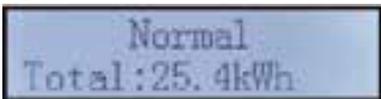
8.Inverter working status, grid voltage and current

```
        Normal

        Normal

        Normal
```
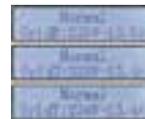
9.Inverter working status, grid voltage and frequency

```
        Normal
Grid:226V-50.0Hz
```
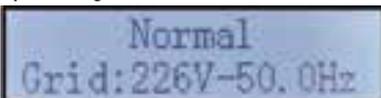
10.Inverter working status, USB status

```
        Normal
Power:9.07kW
```
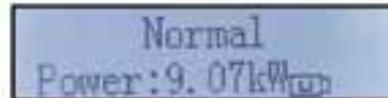
11.Inverter faulty alarm

```
        GridUVP
Power:0.00kW
```
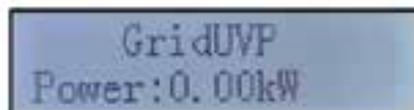
12.When control board successfully connected with communication board, the LCD display the current state of the inverter, display as shown in the figure below.

```
Wait 3  s
Power:0.00kW
```

```
Check
Power:0.00kW
```

```
Normal
Today:25.594kWh
```

```
Fault
Power:0.00kW
```

Inverter states includes: wait, check, normal and fault

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

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

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

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

Permanent: Inverter has encountered unrecoverable error, we need maintainer debug this kind of error according to error code.

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

<div align="center">

DSP communicate fail

</div>

8.3 Main Interface

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

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

A.Enter setting Interface as below:

	Long press DOWN button		
Enter Setting	1.Set time	8.Set Inputmode	17.SetSafety
	2.Clear Energy	9.Set Language	
	3.Clear Events	12.IV Curve Scan	
	4.Set Safety Para	13.Set Power Derate	
	5.On-Off Control	14.PCC Select	
	6.Set Energy	15.Reflux Mode	
	7.Set Address	16.InputSafety	

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

Note1: Some settings need to enter the password (the default password is 0001), when

entering the password, short press to change the number, long press to confirm the current number, and long press after entering the correct password.If "password error, try again" appears, you will need to re-enter the correct password.

1.Set Time
Set the system time for the inverter.

2.Clear Energy
Clean the inverter of the total power generation.

3.Clear Events
Clean up the historical events recorded in the inverter.

4.Set Safety Para
The SafeCode refers to clause 17 and can skip this step directly. Long press button, enter interface, save the specific file into USB and insert USB into inverter communication port.

5.5.On-Off Control
Inverter on-off local control.

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

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

8.Set Input mode
SOFAR 60~80KTLX-G3 has 6 MPPTs, these MPPTs can work interdependently, or divided into parallel mode. User can change the setting according to the configuration.

9.Set Language
Set the inverter display language.

10.Set Anti Reflux
Enable or disable Reflux. If disabled, the output will be the rated power. If enable, continue to set the Reflux power, the maximum power is the rated power. And continue to select PCC sampling points.
The reflux power value set by the anti-reflux function is the maximum power value allowed to be transmitted to the grid.

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

12.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.Set Power Derate

Enable or disable the power derate function of the inverter, and set the derate ratio.

14.PCC Select

Select the parallel network sampling method.

15.Reflux Mode

Select reflux mode.

16.InputSafety

To upgrade the InputSafety, perform this step, if you do not upgrade, skip this step. Put the safety library upgrade file "60-80KW-G3_SAFETY.bin" in the root directory/ firmware folder of the USB flash drive and insert the USB flash drive into the inverter. The upgrade will take place automatically after the inverter is enabled.

17.SetSafety

Press the up and down keys to select the safety standard region, press and hold the down key to enter the standard selection under the region, and then turn the page to select the safety standard.

（B）Event List：

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

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

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

(C)"SystemInfo" Interface as below

	Long press DOWN button		
	1.Inverter Type	8.Modbus Address	15.MPPT Scan
	2.Serial Number	9.Input Mode	16.Force Control
	3.General Soft Version	10.Remote State	17.Power Derate
SystemInfo	4.General Hard Version	11.Reflux Enable	18.PCC Select
	5.Country Code	12.Reflux Power	19.Reflux Mode
	6.Safety Software Version	13.DRM0	
	7.Safety Hardware Version	14.DRMn	

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

D.Display Time

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

E.Software Update

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

8.4 Updating Inverter Software

SOFAR 60...80KTLX-G3 inverter offer software upgrade via USB flash drive to maximize inverter performance and avoid inverter operation error caused by software bugs.

Step 1: Turn off AC circuit breaker and DC switch, remove the communication board cover as below figure. If the RS485 line has been connected, please release the waterproof nut first and make sure the communication line is no longer the force. Then remove the waterproof cover.
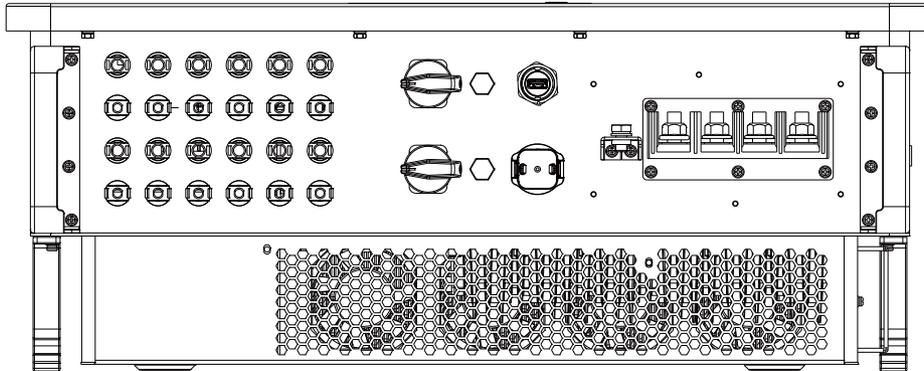
Figure 8-1 Remove communication broad cover

Step 2: Insert USB into computer；

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

Step 4: Insert USB drive into the USB port of inverter；

Step 5: Then turn on DC switch and enter into the online upgrade to the main menu"5.-Software Update"in the LCD display program[6.3(E)].The method to enter the menu can refer to operation interface of LCD.

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

Step 7: System update main DSP, slave DSP and ARM in turns.If main DSP update success,the LCD will display"Update DSP1 Success", otherwise display "Update DSP1 Fail"; If slave DSP update success,the LCD will display"Update DSP2 Success",otherwise display"UpdateDSP2 Fail".

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

Step 9: After the update is completed,turn off the DC breaker, wait for the LCD screen extinguish,then recover the communication waterproof and then turn on the

DC breaker and AC breaker again,the inverter will enters the running state. User can check the current software version in SystemInfo>>3.SoftVersion.

9. Trouble shooting and maintenance

9.1 Troubleshooting

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

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

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

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

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

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

Table 9-1 Even list

Code	Name	Description	Solution
ID001	GridOVP	The grid voltage is too high	If the alarm occurs occasionally, the possible cause is that the electric grid is abnormal occasionally. Inverter will automatically return to normal operating status when the electric grid's back to normal.
ID002	GridUVP	The grid voltage is too low	If the alarm occurs frequently, check whether the grid voltage/frequency is within the acceptable range. If yes, please check the AC circuit breaker and AC wiring of the inverter.
ID003	GridOFP	The grid frequency is too high	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.
ID004	GridUFP	The grid frequency is too low	
ID005	GFCI	Charge Leakage Fault	Check for inverter and wiring.
ID006	OVRT	OVRT function is faulty	If the alarm occurs occasionally, the possible cause is that the electric grid is abnormal occasionally. Inverter will automatically return to normal operating status when the electric grid's back to normal. If the alarm occurs frequently, check whether the grid voltage/frequency is within the acceptable range. If yes, please check the AC circuit breaker and AC wiring of the inverter. If the grid voltage/frequency is NOT within the acceptable range and AC wiring is correct, but the alarm occurs repeatedly, contact technical support to change the grid over-voltage, under-voltage, over-frequency,
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	

Code	Name	Description	Solution
ID011	VGridLineFault	Power grid line voltage error	under-frequency protection points after obtaining approval from the local electrical grid operator.
ID012	InvVoltFault	Inverter voltage error	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If no, please contact technical support.
ID017	HwADErrIGrid	Power grid current sampling error	
ID018	HwADErrDCI(AC)	Wrong sampling of dc component of grid current	
ID019	HwADErrVGrid(DC)	Power grid voltage sampling error (DC)	
ID020	HwADErrVGrid(AC)	Power grid voltage sampling error (AC)	
ID021	HwGFCIFault(DC)	Leakage current sampling error(DC)	
ID022	HwGFCIFault(AC)	Leakage current sampling error(AC)	
ID024	HwADErrIdc	Dc input current sampling error	
ID029	ConsistentGFCI	Leakage current consistency error	
ID030	ConsistentVgrid	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)	
ID037	HwAuxPowerFault	Auxiliary power error	
ID041	RelayFail	Relay detection 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.
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. If not solved, please contact SOFARSOLAR technical support.

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Code	Name	Description	Solution
ID043	PEConnectFault	Ground fault	Check ac output PE wire for grounding. If not solved, please contact SOFARSOLAR technical support.
ID044	PvConfigError	Error setting input mode	Check the input mode (parallel/independent mode) Settings for the inverter. If not solved, please contact SOFARSOLAR technical support.
ID045	CDTisconnect	CT Fault	Please check the wiring of input, output and communication according to the user's manual. If the use method is not ruled out, please contact SOFARSOLAR technical support..
ID046	ReversalCon nection	Input reverse connection error	
ID047	ParallelFault	Paralle lFault	
ID048	SNTypeFault	SN doesn't match Type	It is internal fault of inverter.
ID049	Reserved	Reserved	
ID050	TempErrHeatSink1	Radiator 1temperature protection	Ensure the installation position and installation method meet the requirements of this user manual. Check whether the ambient temperature of the installation position exceeds the upper limit. If yes, improve ventilation to decrease the temperature. Check whether the inverter has dust and dust, whether there are foreign matters blocking the fan at the air inlet. If so, please improve the ventilation and heat dissipation of the environment. It is recommended that the inverter should be cleaned once every half year or one year.
ID051	Reserved	Reserved	
ID052	Reserved	Reserved	
ID053	Reserved	Reserved	
ID054	Reserved	Reserved	
ID055	Reserved	Reserved	
ID057	TempErrEnv1	Ambient temperature 1 protection	
ID058	Reserved	Reserved	
ID059	TempErrInv1	Module 1temperature protection	
ID060	Reserved	Reserved	
ID061	Reserved	Reserved	

Code	Name	Description	Solution
ID065	BusRmsUnbalance	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 not, please contact SOFARSOLAR technical support.
ID066	BusInstUnbalance	The transient value of bus voltage is unbalanced	
ID067	BusUVP	Bus undervoltage during grid connection	If the configuration of the PV array is correct,could be the sun irradiation is too low. Once sun irradiation back to normal, inverter will work back normal
ID068	BusZVP	Bus voltage low	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.
ID069	PVOVP	PV over-voltage	
ID070	Reserved	Reserved	
ID071	LLCBusOVP	LLC BUS overvoltage protection	
ID072	SwBusRmsOVP	Inverter bus voltage RMS software overvoltage	
ID073	SwBusInstantOVP	Inverter bus voltage instantaneous value software overvoltage	
ID081	Reserved	Reserved	
ID082	DciOCP	Dci overcurrent protection	
ID083	SwOCPInstant	Output instantaneous current protection	
ID084	SwBuckBoostOCP	BuckBoost software flow	
ID085	SwAcRmsOCP	Output effective value current protection	
ID086	SwPvOCPInstant	PV overcurrent software protection	
ID087	IpvUnbalance	PV flows in uneven parallel	
ID088	IacUnbalance	Unbalanced output current	
ID097	HwLLCBusOVP	LLC hardware overvoltage	

Code	Name	Description	Solution
ID098	HwBusOVP	Inverter bus hardware overvoltage	
ID099	HwBuckBoostOCP	BuckBoosthardware overflows	
ID100	Reserved	Reserved	
ID102	HwPVOCP	PV hardware overflows	
ID103	HwACOCP	Ac output hardware overflows	
ID105	MeterCommFault	Meters communication fault	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If not, please contact SOFARSOLAR technical support.
ID106	SNMachineFault	Serial number model error	
ID110	Overload1	Reserved	
ID111	Overload2	Reserved	
ID112	Overload3	Reserved	
ID113	OverTempDerating	Overtemperature derating	Ensure the installation position and installation method meet the requirements of this user manual. Check whether the ambient temperature of the installation position exceeds the upper limit. If yes, improve ventilation to decrease the temperature. Check whether the inverter has dust and dust, whether there are foreign matters blocking the fan at the air inlet. If so, please improve the ventilation and heat dissipation of the environment. It is recommended that the inverter should be cleaned once every half year or one year.
ID114	FreqDerating	Frequency derating	
ID115	FreqLoading	Frequency loading	
ID116	VoltDerating	Voltage derating	
ID117	VoltLoading	Volatge loading	

Code	Name	Description	Solution
ID121	SpdFail(DC)	Lightning protection fault(DC)	
ID122	SpdFail(AC)	Lightning protection fault(AC)	
ID124	Reserved	Reserved	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If not, please contact SOFARSOLAR technical support.
ID125	Reserved	Reserved	
ID129	unrecoverHwAcOCP	Output hardware overcurrent permanent failure	
ID130	unrecoverBusOVP	Permanent Bus overvoltage failure	
ID131	unrecoverHwBusOVP	Busovervoltage hardware permanent fault	
ID132	unrecoverIpv Unbalance	PV unbalance current permanent fault	
ID134	unrecoverAc OCPInstant	Output transient overcurrent permanent failure	
ID135	unrecoverIac Unbalance	Output current imbalance permanent fault	
ID137	unrecoverPv ConfigError	Input mode setting error permanent failure	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If not, please contact SOFARSOLAR technical support.
ID138	unrecoverPV OCPInstant	Input overcurrent permanent fault	
ID139	unrecoverHwPVOCP	Input hardware overcurrent permanent failure	
ID140	unrecoverRelayFail	Relay permanent fault	
ID141	unrecoverVbus Unbalance	Bus Unbalanced permanent fault	
ID142	LightningProtection FaultDC	DC SPD failure	
ID143	LightningProtection FaultAC	AC SPD failure	
ID145	USBFault	USB fault	

Code	Name	Description	Solution
ID146	WifiFault	Wifi fault	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If not, please contact SOFARSOLAR technical support.
ID147	BluetoothFault	Bluetooth fault	
ID148	RTCFault	RTC clock failure	
ID149	CommEEPROMFault	Communication board EEPROM error	
ID150	FlashFault	Communication board FLASH error	
ID152	SafetyVerFault	The software version is inconsistent with the safety version	
ID153	SciCommLose(DC)	SCI communication error (DC)	
ID154	SciCommLose(AC)	SCI communication error (AC)	
ID155	SciCommLose(Fuse)	SCI communication error (Fuse)	
ID156	SoftVerError	Inconsistent software versions	
ID161	ForceShutdown	Force shutdown	
ID162	RemoteShutdown	Remote shutdown	
ID163	Drms0Shutdown	Drms0 shutdown	
ID165	RemoteDerating	Remote derating	
ID166	LogicInterfaceDerating	Logic interface derating	
ID167	AlarmAntiReflux	Anti refluxderating	

Code	Name	Description	Solution
ID169	FanFault1	Fan 1 fault	Check whether the inverter has dust and dust, whether there are foreign matters blocking the fan at the air inlet. If so, please improve the ventilation and heat dissipation of the environment. It is recommended that the inverter should be cleaned once every half year or one year.
ID170	FanFault2	Fan 2fault	
ID171	FanFault3	Fan 3 fault	
ID172	FanFault4	Fan 4 fault	
ID173	FanFault5	Fan 5 fault	
ID174	FanFault6	Fan 6 fault	
ID193-ID224	StringFuse_Fault0-31	String fuse open ircuit alarm	Internal faults of inverter, switch OFF inverter, wait for 5 minutes, then switch ON inverter. Check whether the problem is solved. If not, please contact SOFARSOLAR technical support.
ID225-ID240	Reserved	Reserved	/

10. Fan maintenance and replacing

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

Inverter cleaning

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 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. 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

Fans must be cleaned and maintained regularly for both performance and safety concerns.

> **NOTE**
>
> Defective or dirty fans can reduce the performance of the inverter Broken or faulty fans may cause cooling issues, which may lead to limited Broken or faulty fans may cause cooling issues, which may lead to limited.
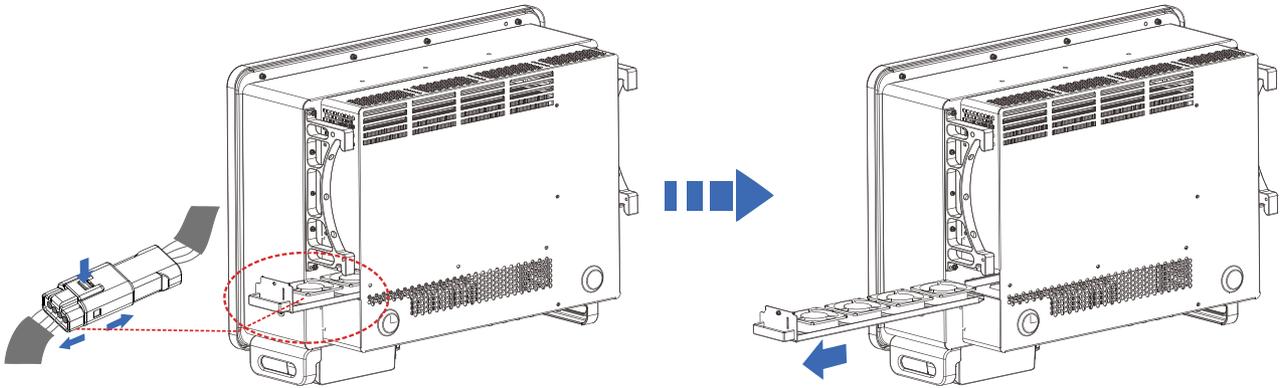> lead to limited➤   Clean fans regulary.

10.1 Fan maintenance

Follow below steps for maintenance:

1. Before replacing a fan, power f the inverter.

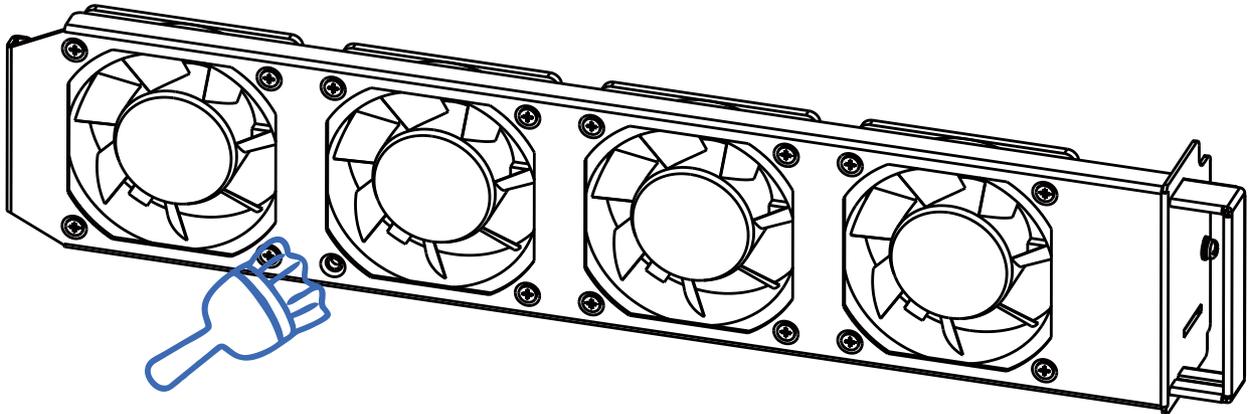2. When replacing a fan, use insulation tools and wear personal protective devices.

Step 1: Remove the screw on the fan tray and save it, Extract the fan bracket about 5-10cm.
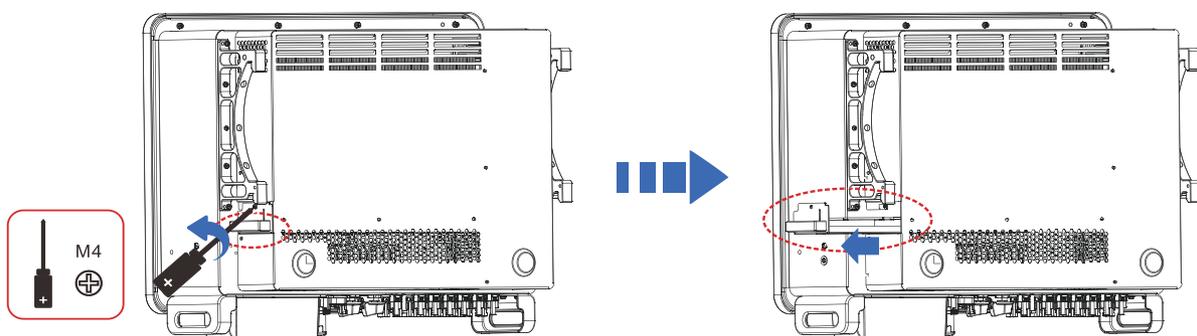
Step 2: Cut the ties holding the fan cable, unplug the connection terminals, and pull out the fan bracket.

Step 3: Use a soft-bristled brush or vacuum cleaner to clean dust and debris from the surface of the fan.
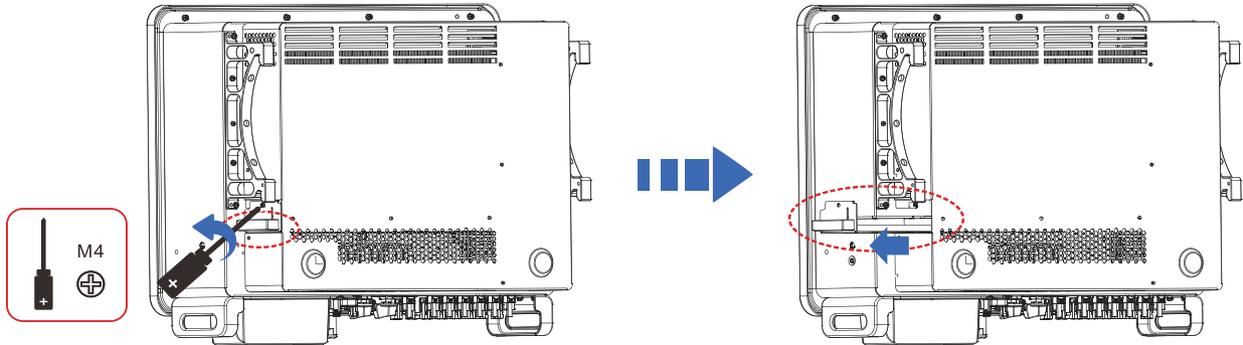

Step 4: Follow step 2 to align the fan bracket with the mounting position, push in the fan bracket and connect the connection terminals.

10.2 Replacing a Fan

Follow below steps for maintenance:

1. Before replacing a fan, power f the inverter.

2. When replacing a fan, use insulation tools and wear personal protective devices.

Step 1: Remove the screw on the fan tray and save it, Extract the fan bracket about 5-10cm.


Step 2: Cut the ties holding the fan cable, unplug the connection terminals, and pull out the fan bracket.
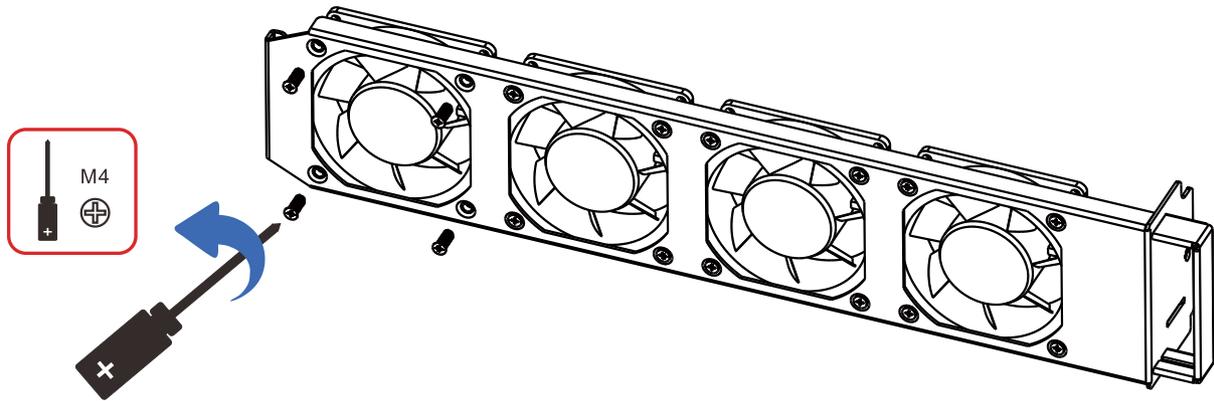
Note: You can't use brute force to pull out the terminal, you can use your fingernail (tweezersor a small screwdriver is recommended) to press down on the movable buckle, and then do the pulling and inserting.
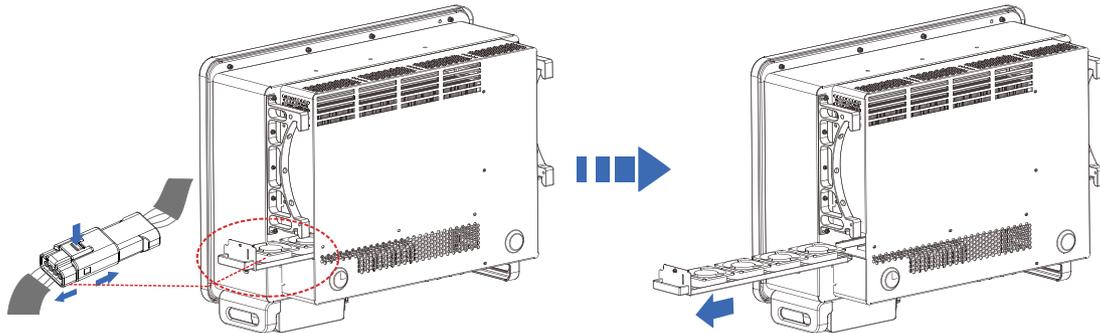
Step 3: Cut the cable ties of the faulty fan (fan 3 is used as an example below, other fans work in the same way).

FAN3   FAN4   FAN5   FAN6
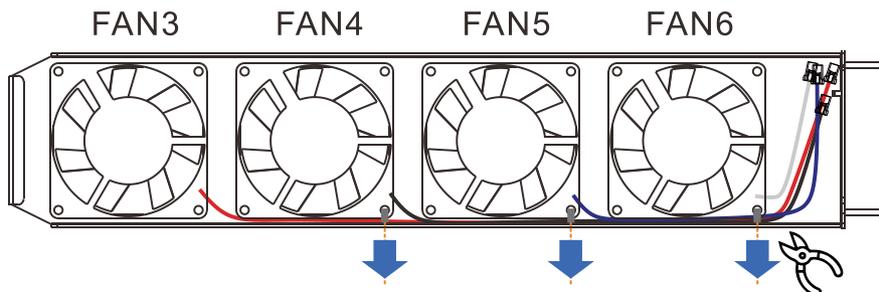
Step 4: Remove the faulty fan.

Step 5: Install the new fan, following the order of steps 4,3.

Step 6: Follow step 2 to align the fan bracket with the mounting position, push in the fan bracket and connect the connection terminals.

Table 10-1 Comparison table of fan failure messages

Name of the fan	FAN 3	FAN 4	FAN 5	FAN 6
Color	■ Red	■ black	■ Blue	■ White
Corresponding PCBA port	CN7	CN9	CN16	CN4
Code	FanFault3	FanFault4	FanFault5	FanFault6

11. Technical Data

Outlines of this Chapter

This topic lists the technical specifications for SOFAR 60...80KTLX-G3 inverter.

11.1 Parameter Table:

Datasheet	SOFAR 60KTLX-G3	SOFAR 75KTLX-G3	SOFAR 80KTLX-G3
Input (DC)			
Max. input voltage	1100V		
Rated input voltage	620V		
Start-up voltage	200V		
MPPT operating voltage range	180V...1000V		
Number of MPP trackers	6		
Number for DC inputs	2 for each MPPT		
Max. input MPPT current	6×32A	6×40A	6×40A
Max. input short circuit current	6×50A	6×60A	6×60A
Output(AC)			
Rated output power	60000W	75000W	80000W
Max. apparent power	66000VA	75000VA	88000VA
Max. Output current	100A	113A	133.3A
Rated output voltage	3/N/PE or 3/PE,230/400Vac		
Output voltage range	310Vac-480Vac (According to local standard)		
Rated output frequency	50/60Hz		
Output frequency range	45Hz-55Hz/55Hz-65Hz (According to local standard)		
Active power adjustable range	0...100%		
THDi	<3%		
Power factor	1 (adjustable+/-0.8)		
Efficiency			
Max efficiency	98.7%		
European efficiency	98.2%		

Protection	
DC reverse polarity protection	Yes
Anti-islanding protection	Yes
Leakage current protection	Yes
Ground fault monitoring	Yes
PV-array string fault monitoring	Yes
Zero export function	Yes
DC switch	Optional
SPD	PV:Type II standard,Type I optional; AC:Type III standard,Type I optional
General Data	
Ambient temperature range	-30℃...+60℃
Self-consumption at night	<2W
Topology	Transformerless
Degree of protection	IP66
Allowable relative humidity range	0...100%
Max. operating altitude	4000m
Cooling	Fan
Dimension(W×H×D)	687×561×275mm
Weight	50kg
Display	LCD, App via Bluetooth
Communication	RS485/Bluetooth, Optional:WiFi/Ethernet

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

Version 2.3

ENERGY TO POWER YOUR LIFE

SOFARSOLAR

102040200100-0