User manual

# PV Grid-Connected Inverter

Product Model:SOFAR 10K-15KTL-G2 (2019.07.31)


Product Name: PV Grid-Connected Inverter
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**Shenzhen SOFARSOLAR Co.,Ltd.**

## Notice

This manual contains important safety instructions that must be followed during installation and maintenance of the equipment. The product you purchase is restricted by SOFAR SOLAR's commercial invoice. Your product may do not cover the full characteristics or functions described in this document. SOFAR SOLAR does not state/assure the content of this document unless there is special contract agreement.

## Save these instructions!

This manual must be considered as an integral part of the equipment, and must be available at all times to everyone who interacts with the equipment. The manual must always accompany the equipment, even when it is transferred to another user or field.

## Copyright Declaration



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# Preface

## Outline

Please read the product manual carefully before installation, operation or maintenance. This manual contains important safety instructions and installation instructions that must be followed during installation and maintenance of the equipment.

- Scope

  This product manual describes the assembly, installation, commissioning, and maintenance of the following inverters.

  **SOFAR 10000TL-G2 ; SOFAR 12000TL-G2 ; SOFAR 15000TL-G2**

  Keep this manual where it will be accessible at all times.

- Target Group

  This manual is for qualified person (support person, service person are qualified mentioned in this manual).

- Symbols Used

This manual provides safety operation information and uses the symbol in order to ensure personal and property security and use the inverter efficiently when operating the inverter. You must understand these emphasize information to avoid the personal injury and property loss. Please read the following symbols which used in this manual carefully.

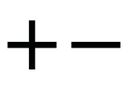
| | |
|---|---|
|  Danger | **Danger indicates a hazardous situation which, if not avoided, willresult in death or serious injury.** |
|  Warning | **Warning indicates a hazardous situation which, if not avoided, could result in death or serious injury.** |
|  Caution | **Caution indicates a hazardous situation, 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 run normally or property damage.** |
|  Note | **It also can be some tips to use this product, it can help you to solve some problems and save you time.** |

# Table of contents

# 1 Basic safety information

## 1.1 Symbols

10K~15KTL-G2 inveter has some safety related symbol, please make sure you have read and understand these symbol content before you install this equipotent.

| Symbol | Symbol name | Meaning |
|---|---|---|
|   | there is residual voltage danger in inverter. | After turning off inverter DC switch , there is voltage in the inverter capacitor within some time, we suggest you start to open the inverter for maintenance 5 minutes later after you turning off DC switch. |
|  | High voltage , electric shock hazard. | There is high voltage during inverter running , all the operations should be done by quantified professional electrical person. |
|  | High temperate on inverter enclosure Burn Hazard. | High temperature in inverter enclosure when it is running,do not touch. |
|  | CE certificate: this inverter is compilable with CE certificate standard. | This inverter is compilable with CE certificate standard. |
|  | PE connection symbol. | Connect inverter with earth terminal for protection. |
|  | Temperature sysbol. | Inverter working temperature range. |
|   | Ingress protection symbol. | This product has IP65. |
|  | Electrical positive and negative. | Be care of electrical polarity. |






## 1.2 Safety instructions and warnings

Operator must follow bellowing safety instructions when he installs 10K~15KTL-G2 series inverter ,incorrect operation may cause property loss, equipments damage or personal injury.

**1.** Inverter can be installed only by professional electrician or electrical engineer according to local standard and regulations. Only after getting permission from local power department, inverter can be connected on grid.

**2.** DC and AC switch must be turned off when installing and maintaining inverter. Can not touch inverter metal part with 5 minutes after inverter turning off.

**3.** Some part of inverter may be higher than 60 degree when it is running, please do not touch its metal part to avoid burn injury.

**4.** It is forbidden to plug off DC or AC connector when inverter is in generation.

**5.** Please do not open the inverter upper case, touch or remove inside components ,it may cause inverter damage or personal injury.

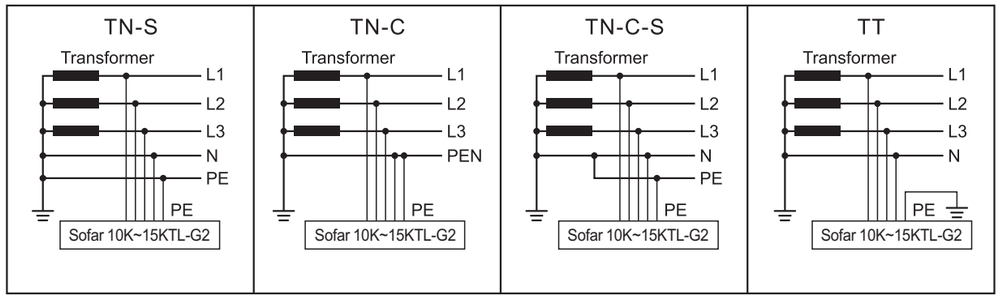
**6.** 10-15KW-G2 series inverter are transformer-less no-isolated inverter , the PV modules connected with Sofar inverter should be compatible with IEC 61730 Class A.

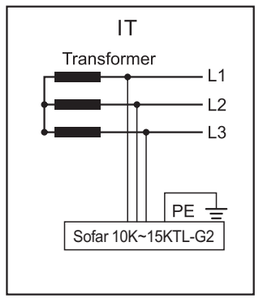
# 2 Product characteristics

## 2.1 Intended grid types

Sofar 10K~15KTL-G2 inverters are compatible with TN-S、TN-C、TN-C-S、TT、IT grid configurations。For the TT type of electricity grid, the voltage between neutral and earth should be less than 30V.

Figure2-2 Overview of the grid configurations



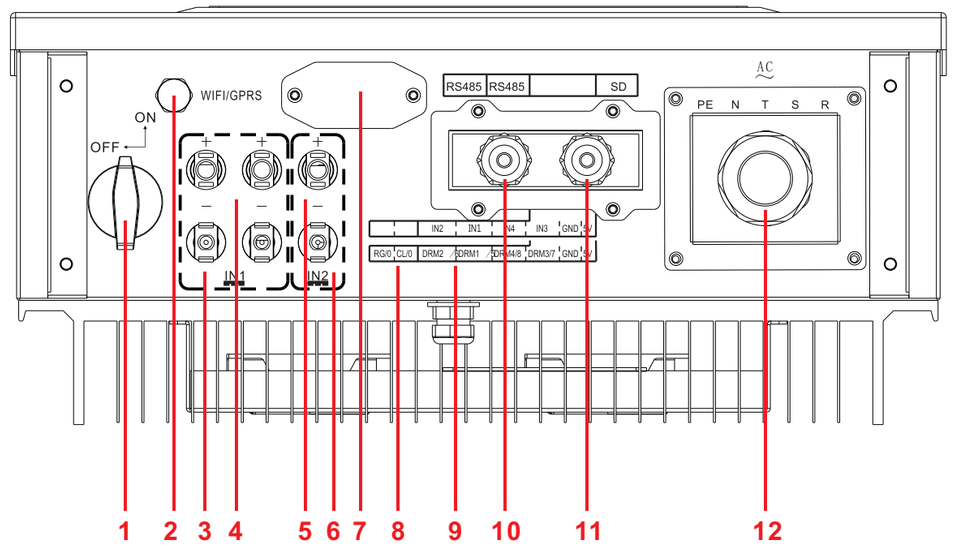









## 2.2 Interface and Dimensions




**1,** DC Switch

**2,** Vent valve

**3-6,** DC connector (DCV C)

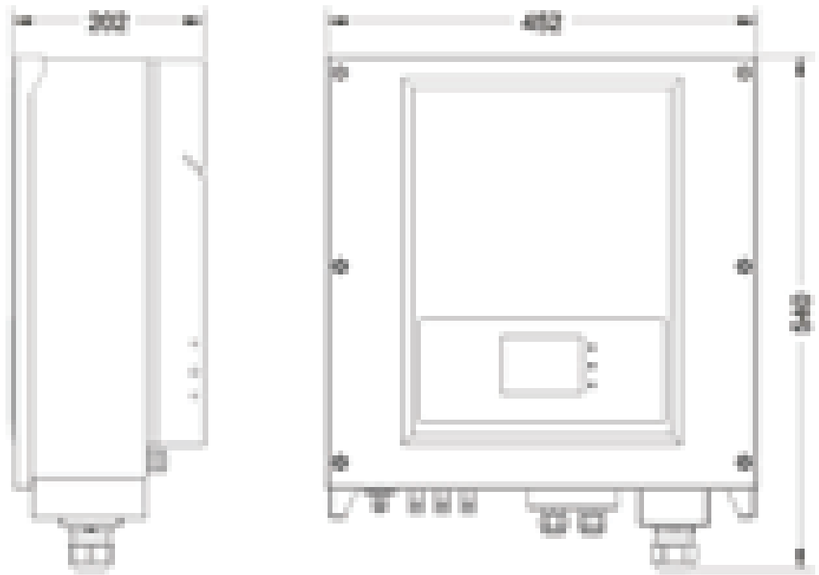
**7,** WIFI/GPRS (DCV A)

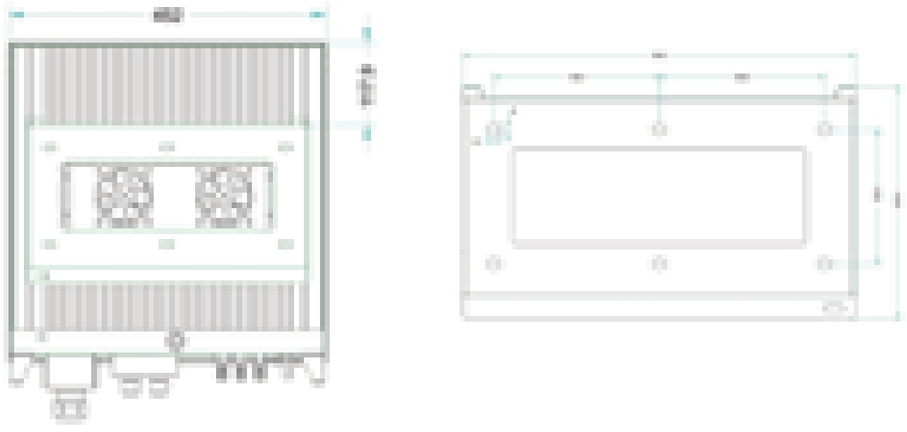
**8,** DRM0 (DCV A)

**9,** DRM5~8 & External digital inputs (DCV A)

**10-11,** RS485 (DCV A)

**12,** AC output connector (DCV C)





**1,** Inverter front **2,** Inverer side **3,** Inverter back **4,** Installation rack






## 2.3 Protection units

**A. RCMU**

When inverter'e leakage current exceeds safety requirement, inverter will stop generation

**B. Grid abnormal protection**

When inverter detects the grid or voltage is out of range , inverter will stop generation. Inverter will restart to generation automatically when the grid is normal again

**C. Ground fault detecting**

When ground fault happen , inverter will stop generation automatically and the GFI red LED will be on to inform customer.

**D. Over temperature de-rating**

When temperature is higher than internal setting ,inverter will derate the power automatically

**E. Over voltage de-rating**

WHen MPPT point is higher then 850V , inverter will derate the power automatically

**F. Over current protection**

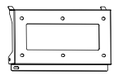
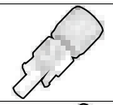
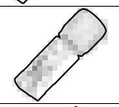
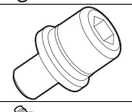
When inverter is abnormal, overter current protection can protect inverter from damange

**G. Reverse connection protection**

# 3 Installation

## 3.1 Packing Materials

Table3-1 shows the components and mechanical parts that should be delivered

| No. | Pictures | Quantity | Description |
|---|---|---|---|
| 1 |  | 1PCS | Sofar 10K~15KTL-G2 |
| 2 |  | 1PCS | Rear panel |
| 3 |  | 3PCS | DC+ input terminal |
| 4 |  | 3PCS | DC- input terminal |
| 5 |  | 3PCS | Metal terminals secured to DC+ input power cables |
| 6 |  | 3PCS | Metal terminals secured to DC- input power cables |
| 7 |  | 3PCS | M6 Hexagon screws |
| 8 |  | 6PCS | M8*80 Expansion bolts used to secure the rear panel to the wall |
| 9 |  | 1PCS | Manual |
| 10 |  | 1PCS | The warranty card |
| 11 |  | 1PCS | Certificate |

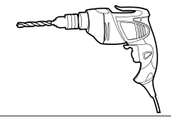
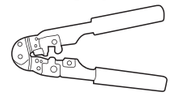
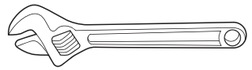
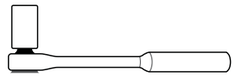
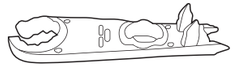
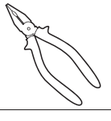
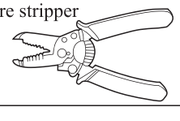


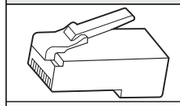
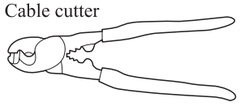
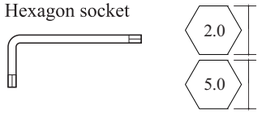
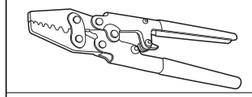
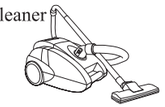
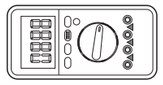
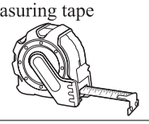
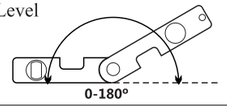
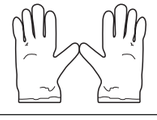



## 3.2 Tools

**Prepare tools required for installation and electrical connections.**

Table3-2 Shows the components and mechanical parts that should be delivered

| Tool | Model | Function |
|---|---|---|
| Hammer drill  | With a drill bit of Φ8.0 | Used to drill holes on the wall |
| RJ45 crimping tool  | N/A | Used to prepare RJ45 connectors for Communications cables |
| Adjustable wrench  | With an open end of larger than or greater than 32 mm | Used to tighten expansion bolts |
| Flat-head screwdriver  | M4 | • Used to tighten or loosen screws when installing AC power cables.<br>• Used to remove AC connectors from the Sofar 10K~15KTL-G2.<br>Note: The torque screwdriver and flat-head screwdriver are alternative. |
| Socket wrench  | M5 | Used to tighten ground bolts |
| Rubber mallet  | N/A | Used to hammer expansion bolts into holes |
| Removal tool  | N/A | Used to remove DC connectors from the Sofar 10K~15KTL-G2 |
| Diagonal pliers  | N/A | Used to cut and tighten cable ties |
| Wire stripper  | N/A | Used to peel cable jackets |

| Tool | Model | Function |
|---|---|---|
|  | RJ45 | 2PCS |
| Cable cutter  | N/A | Used to cut power cables |
| Hexagon socket   | Diameter 2.0mm<br>Diameter 5.0mm | Hexagon socket use to uninstall and install the front top cover and down cover. |
| Crimping tools  | N/A | Used to crimp power cables |
| Vacuum cleaner  | N/A | Used to clean up dusts after drilling holes |
| Multimeter  | N/A | Used to check grounding |
| Marker  | N/A | Used to mark signs |
| Measuring tape  | N/A | Used to measure distances |
| Level   | N/A | Used to ensure that the rear panel is properly installed |
| ESD gloves  | N/A | Operators wear ESD gloves when installing equipment. |
| Safety goggles  | N/A | Punch operator wearing |
| Anti-dust respirator  | N/A | Punch operator wearing |

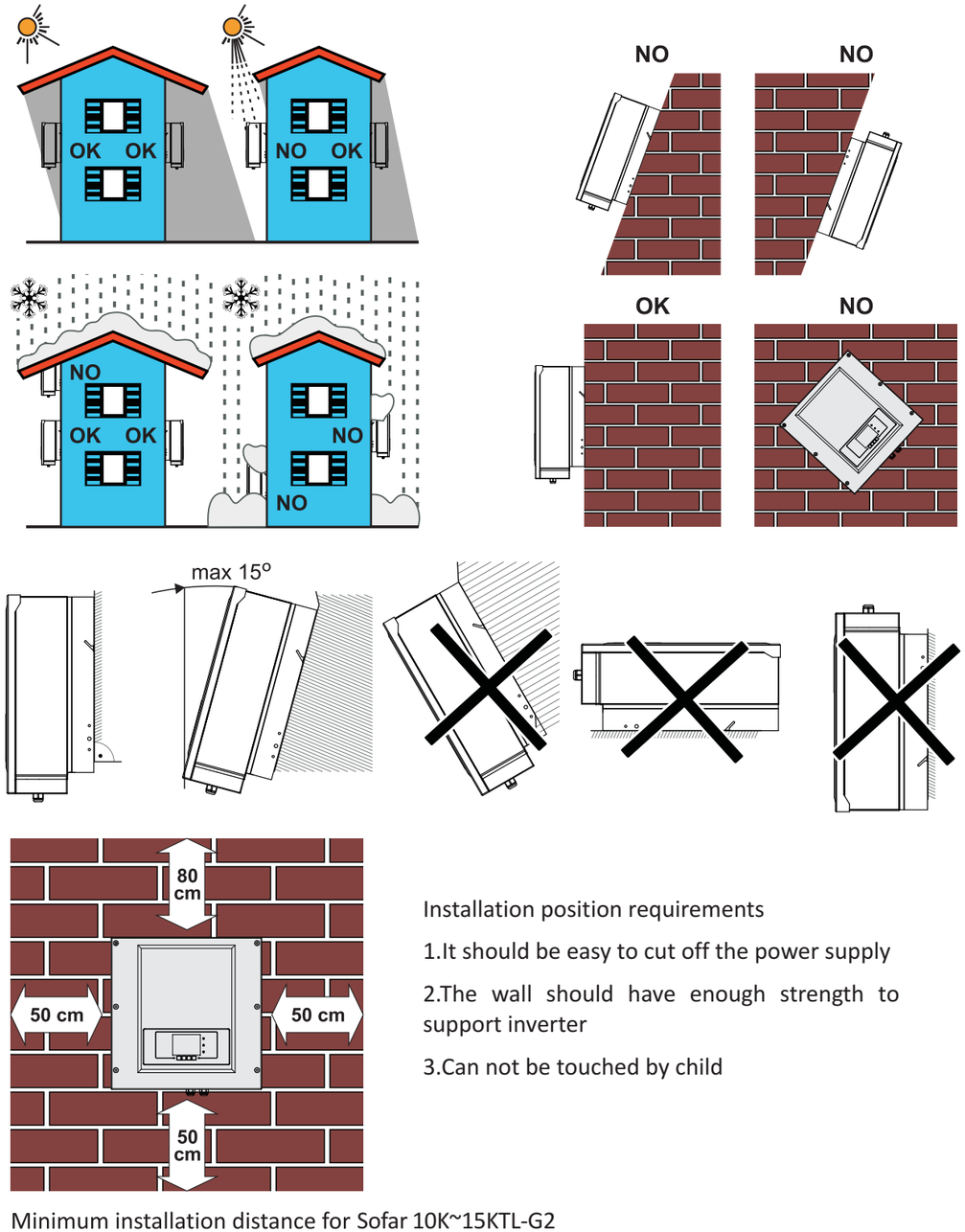





## 3.3 Determining the Installation Position

Determine an appropriate position for installing the Sofar 10K~15KTL-G2.
Comply with the following requirements when determining the installation position:

Figure 3-2 Installation position requirements




Installation position requirements

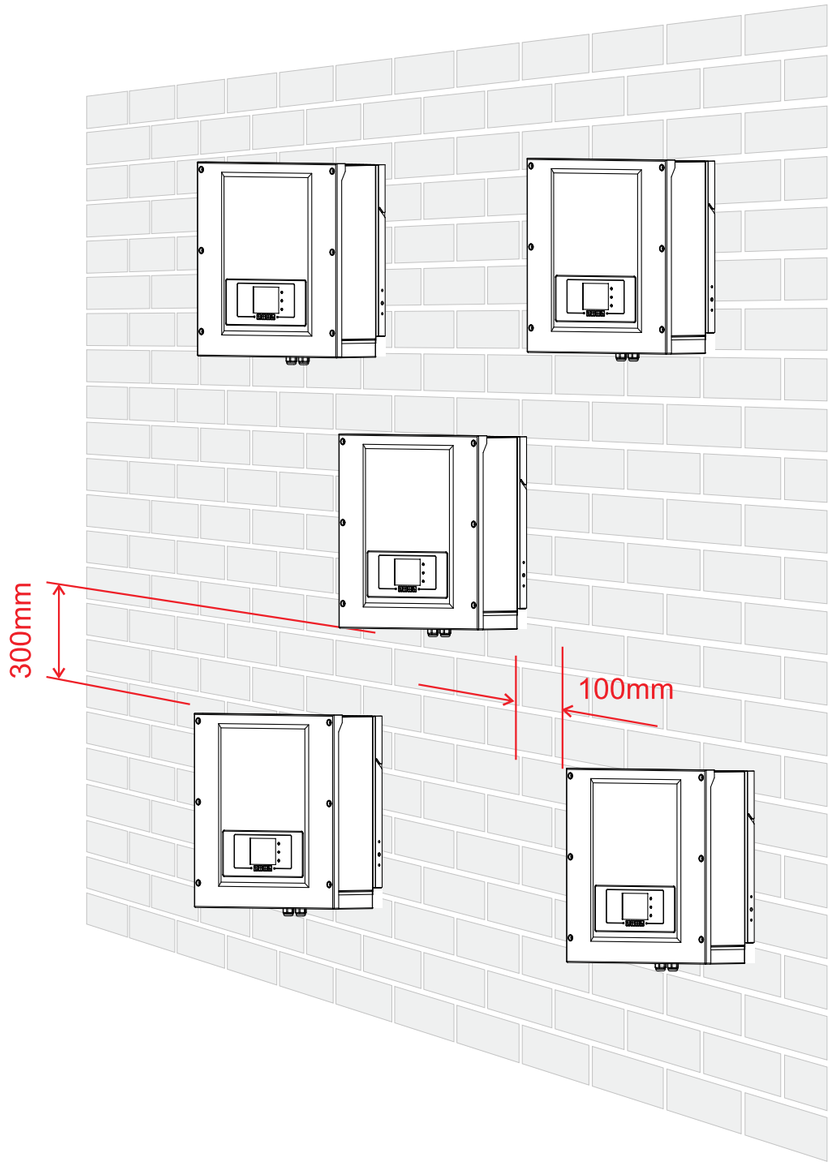
1.It should be easy to cut off the power supply

2.The wall should have enough strength to support inverter

3.Can not be touched by child

Minimum installation distance for Sofar 10K~15KTL-G2

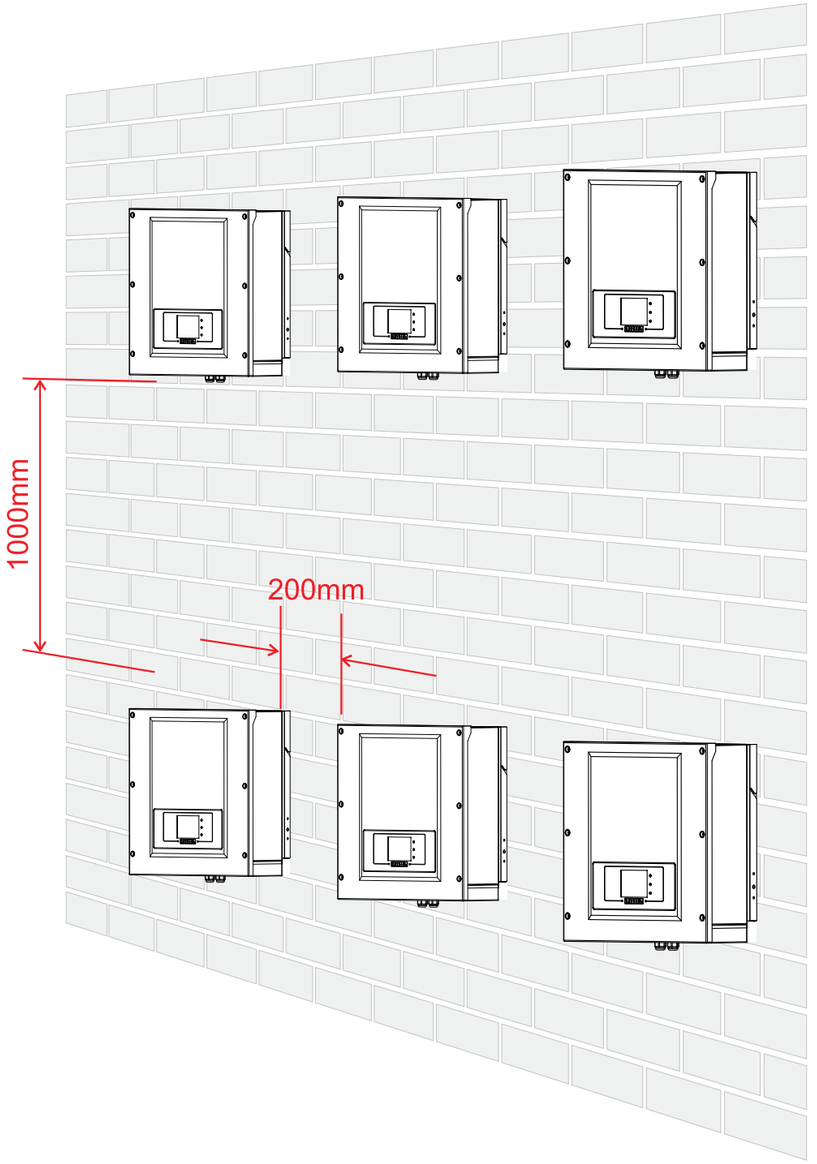
Figure 3-3 Many Sofar 10K~15KTL-G2 installation





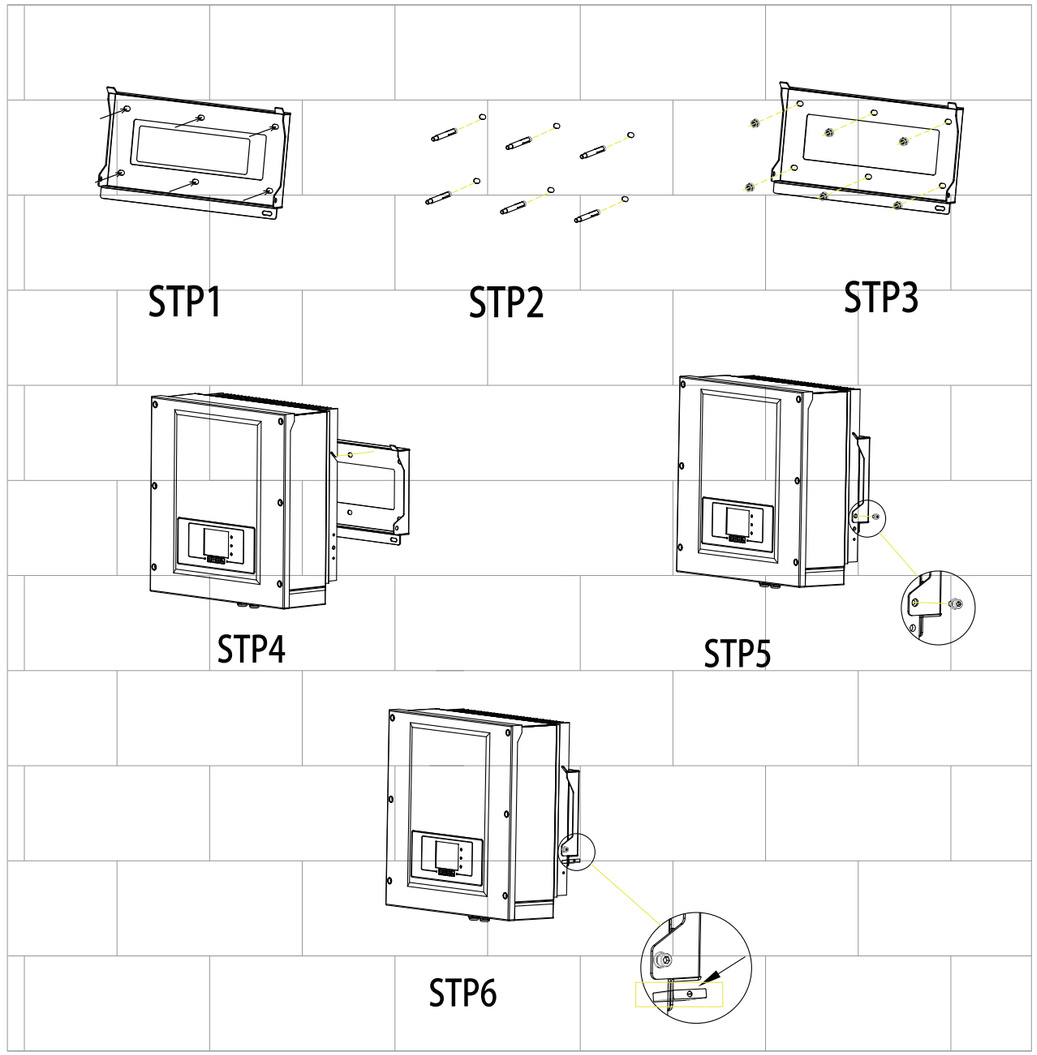






## 3.4 Installing the Sofar 10K~15KTL-G2

Figure 3-4




**1,** Mart and drilling hole **2,** Insert expansion blots **3,** install rack **4,** put on inverter
**5,** Install fix screw **6,** Lock the inverter(if nessary)





# 4 Electrical Connections

## 4.1 Connecting PGND Cables

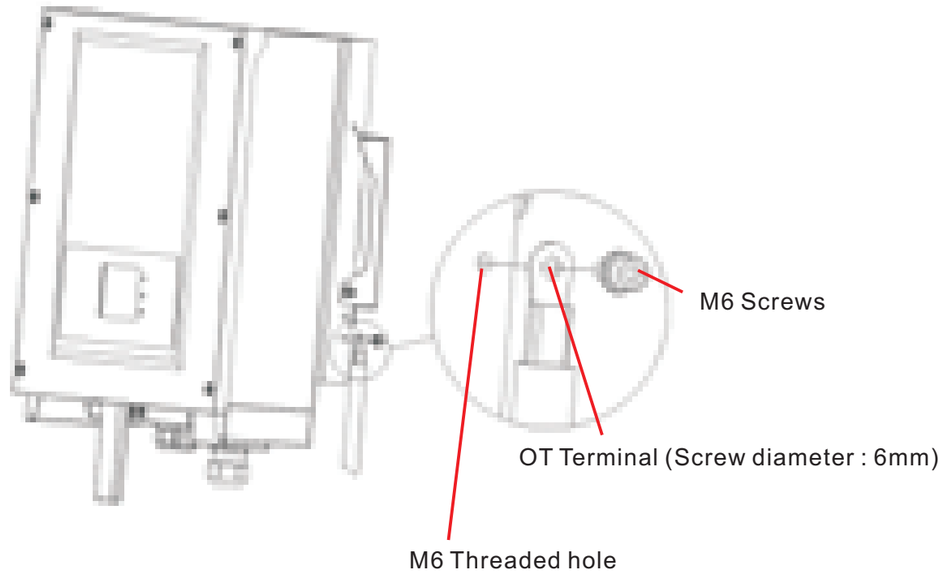
1. Make sure the inverter DC switch is in OFF status

2.Check if the grid voltage and frequency are in correct range

3.If the PV panel is thin-film panel , a transformer(1.25 times as inverter capacity) should be added at AC side

4.PE cable should be thicker than 4mm and reliable,

Figure4-2 Ground terminal composition



# 4.2 Connecting AC Output Power Cables

Cable and breaker selection

| Model | SOFAR 10000TL-G2 | SOFAR 12000TL-G2 | SOFAR 15000TL-G2 |
|---|---|---|---|
| Cable(Copper) | 4-6mm² | 4-6mm² | 4-6mm² |
| Breaker | 32A | 32A | 32A |

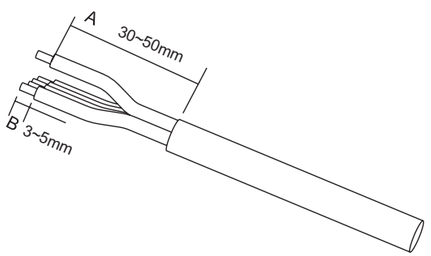
**Note**

**For safety requirement, please use the quantified cable , or it may cause cavle over heat even fire**
**The leakage current of breaker should be higher than 100mA and lower than 300mA**

| Cross area (mm²) | Maximum cable length (m) | | |
|---|---|---|---|
| | SOFAR 10000TL-G2 | SOFAR 12000TL-G2 | SOFAR 15000TL-G2 |
| 4 | 32 | 25 | 20 |
| 6 | 48 | 43 | 34 |

## AC cable installation steps

10K~15KTL-G2 is three phase output inverter, it complies with related on-grid standard and safety requirements.



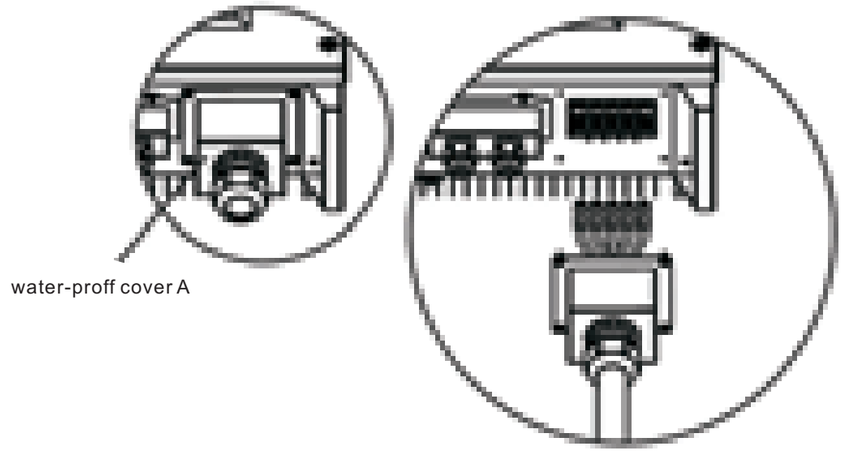

A. part cable length 30-50mm
B. part cable length 3-5mm



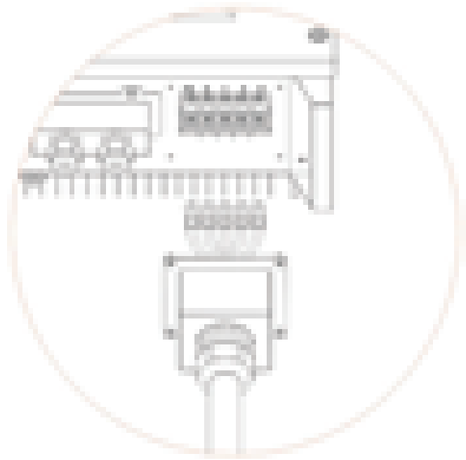
Isolation cover and terminals
can not be exposed






Crimp each core cable to OT terminal(KST, RNBL5-4 is recommended), after fixing , use isolation tape to cover exposed part of OT(except O part).



Connect OT terminal to AC connector according to the painting then fix the water-proof cover.

# 4.3 Connecting Communications Cables

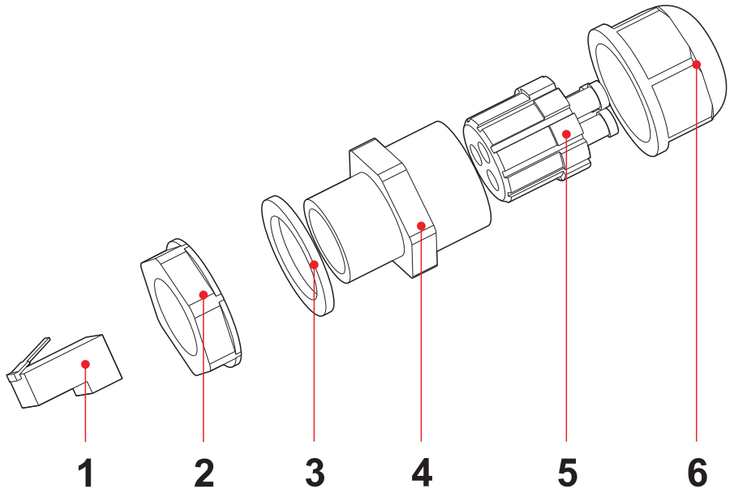
## Connecting RS485 Communications Cables

**By the RS485 communication line, connecting Sofar 10K~15KTL-G2 to communication equipment (such as data acquisition, PC terminal).**

You are recommended to use 24 AWG outdoor shielded network cables with the internal resistance less than or equal to 1.5 ohms/10 m and external diameter of 4.5 mm to 7.5 mm as RS485 communications cables.

A waterproof RJ45 connector has six parts: plug, screw nut, seals, housing, sealing plug and cable screw nut , as shown as follow.

Figure 4-6 Waterproof RJ45 connector composition




**1.** Plug **2.** Screw nut **3.** Seals **4.** Housing **5.** Sealing Plug **6.** Cable Screw nut

When routing communications cables, ensure that communications cables are separated from power cables and away from interference sources to prevent communication interruptions.





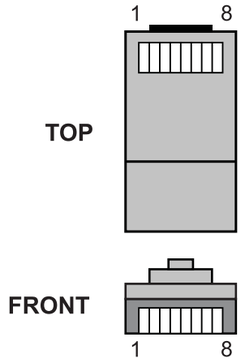
## Procedure

**Step 1** Remove the insulation layer of an appropriate length from the shielded network cable using a wire stripper.

**Step 2** Open Sofar 10K~15KTL-G2 lower cover and insert the shielded network cable into the cable screw nut, seals, screw nut.

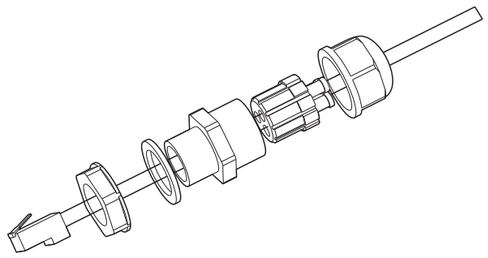
**Step 3** Connect the stripped network cable to corresponding pins on the plug, as shown as follow.

Figure 4-7 RS485 Connecting Communications Cables(1)




| No. | Color | Function |
|---|---|---|
| 1 | White and orange | RS485 B-,RS485differentialsignal- |
| 2 | Orange | RS485 A-,RS485differentialsignal+ |
| 3 | White and green | RS485 A-,RS485differentialsignal+ |
| 4 | Blue | RS485 A-,RS485differentialsignal+ |
| 5 | White and blue | RS485 B-,RS485differentialsignal- |
| 6 | Green | RS485 B-,RS485differentialsignal- |
| 7 | White and brown | NC |
| 8 | Brown | NC |

Figure 4-8 RS485 Connecting Communications Cables(2)

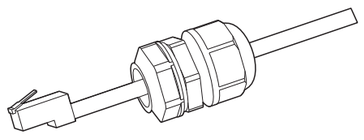


**Step 4** Crystal plug with RJ45 crimping tool.

**Step 5** Insert the plug into the RS485 port on the Sofar 10K~15KTL-G2.

**Step 6** Insert sealing plug into housing.

Figure 4-9 RS485 Connecting Communications Cables(3)



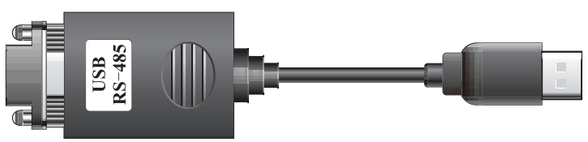
# Communications Port Description

This topic describes the functions of the RS485 and WIFI ports.

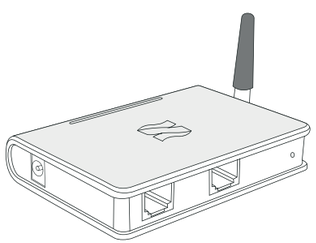
## RS485

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

**1. USB-RS485**

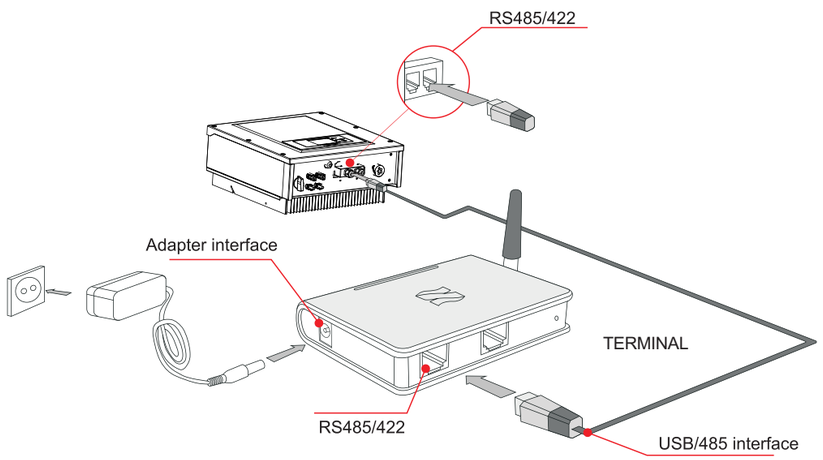



**2. TERMINAL**



If only one Sofar 10K~15KTL-G2 is used, use a communication cable with waterproof RJ45 connectors, and choose either of the two RS485 ports.

Figure 4-10 A single Sofar 10K~15KTL-G2 connecting Communications

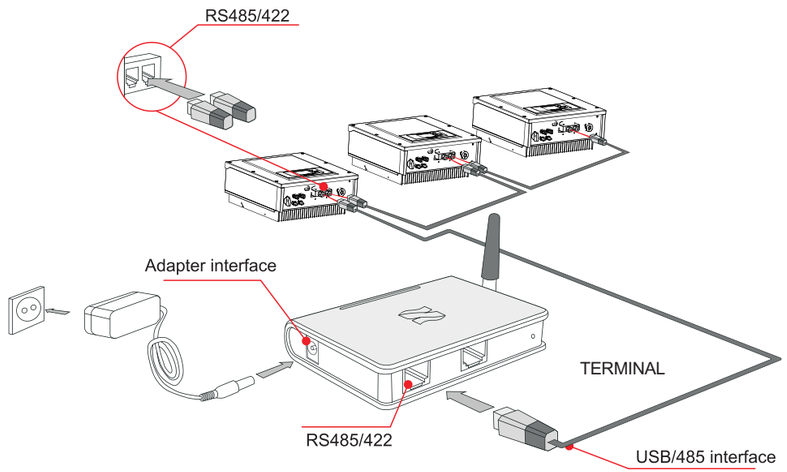



If multiple Sofar 10K~15KTL-G2 are used, connect all Sofar 10K~15KTL-G2 in daisy chain mode over the RS485 communication cable.






Figure 4-11 Multi Sofar 10K~15KTL-G2 connecting Communications



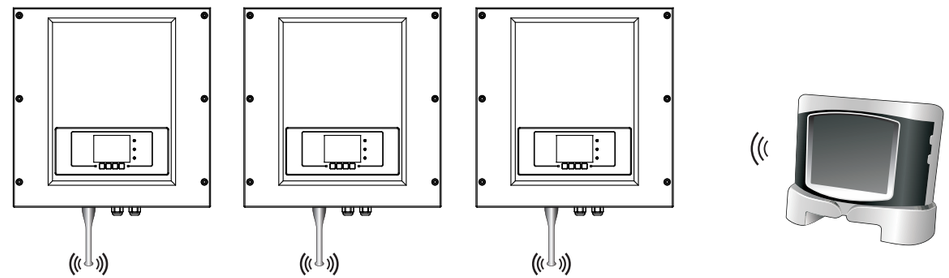

According to the manufacturers to provide SN number can register remote monitoring of

## WiFi/GPRS

By the WIFI interface, transfer the inverter power output information, alarm information, operation state to the PC terminal or local data acquisition device , then uploaded to the server (such as TERMINAL).

According to the manufacturers to provide SN number can register remote monitoring of Sofar 10K~15KTL-G2 through http://www.solarmanpv.com.

Figure 4-12 Connect multiple Wifi to wireless router



**Note**

- The length of the RS485 communication cable should be less than 1000 m.
- The distance between WIFI and Ethernet router should be less than 100m.
- If multiple Sofar 10K~15KTL-G2 are connected to the monitoring device over an RS485/RS232 converter, a maximum of 31 inverter can be connected in a daisy chain.

# 4.4 Connecting DC Input Power Cables

The positive and negative poles of the panel to inverter need to connect fuse separately. The electric wire should choose PV cable,from the junction box to the inverter, line voltage drop is about 1~2%, The inverter is installed in the PV bracket, which saves the cable and reduce the DC loss.

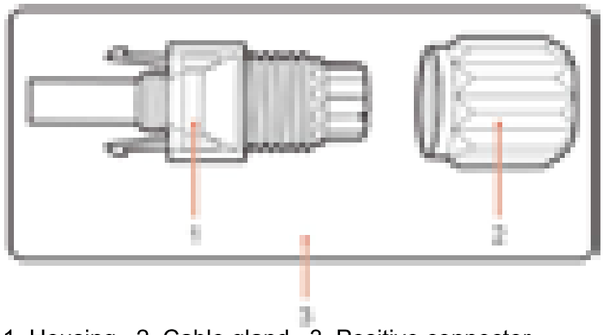
**Context**

Table 4-3 Recommended DC input cable specifications

| Cross-Sectional Area (mm) | | External Cable Diameter(mm) |
|---|---|---|
| Range | Recommended Value | |
| 4. 0~6. 0 | 4. 0 | 4. 5~7. 8 |

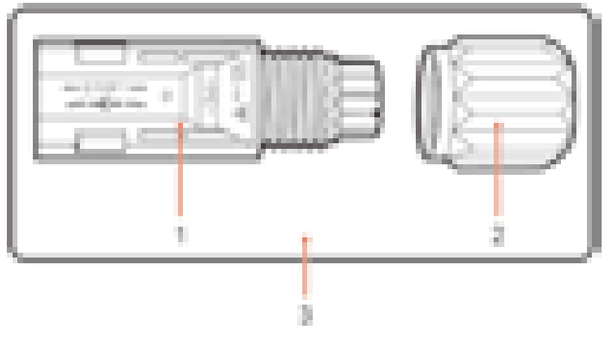
DC input connectors are classified into positive and negative connectors, as shown in Figure 4-13 and Figure 4-15.

Figure 4-13 Positive connector composition



1. Housing 2. Cable gland 3. Positive connector

Figure 4-14 Negative connector composition



1. Housing 2. Cable gland 3. Negative connector

**Note**

Positive and negative metal terminals are packed with positive and negative connectors respectively. Separate the positive from negative metal terminals after unpacking the Sofar 10K~15KTL-G2 to avoid confusing the polarities.



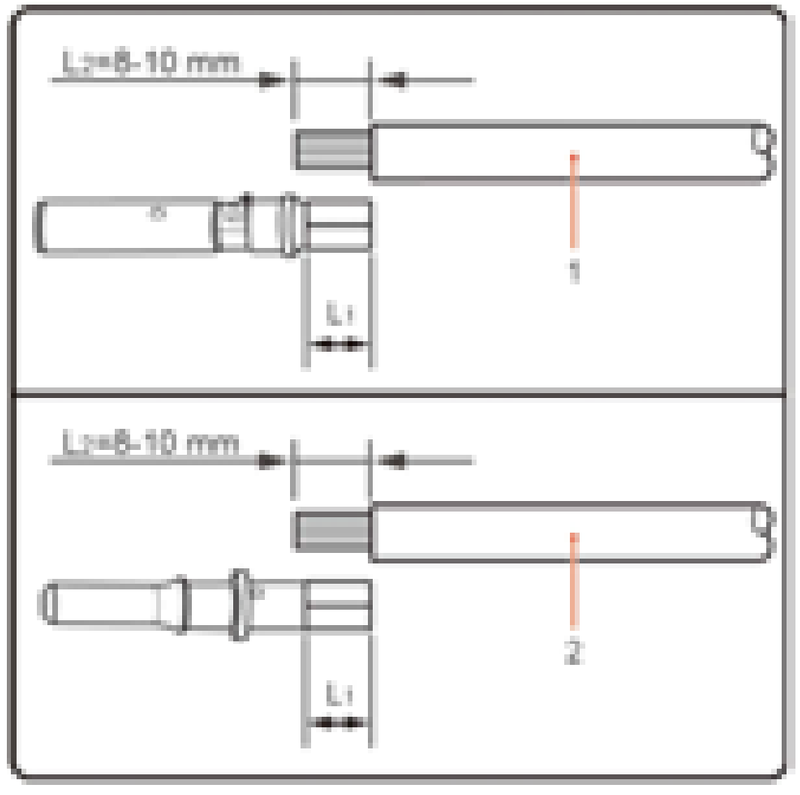


**Procedure**

**Step 1** Remove cable glands from the positive and negative connectors.

**Step 2** Remove the insulation layer with an appropriate length from the positive and negative power cables by using a wire stripper as show in Figure 4-16.

Figure 4-15 Connecting DC input power cables




1. Positive power cable 2. Negative power cable

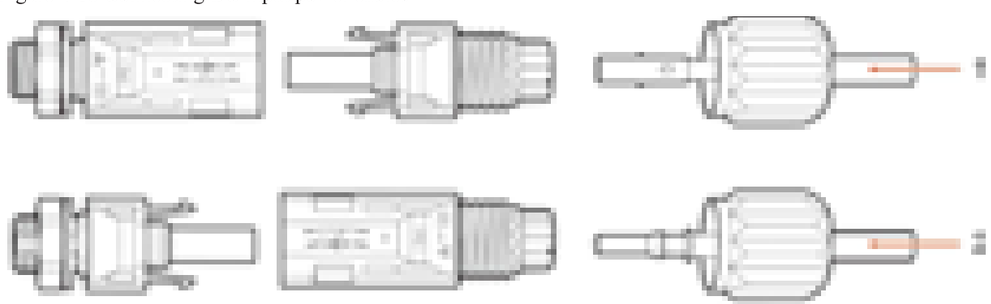
**Note**

L2 is 2 to 3 mm longer than L1.

**Step 3** Insert the positive and negative power cables into corresponding cable glands.

**Step 4** Insert the stripped positive and negative power cables into the positive and negative metal terminals respectively and crimp them using a clamping tool. Ensure that the cables arecrimped until they cannot be pulled out by force less than 400 N, as shown in Figure 4-17.

Figure 4-16 Connecting DC input power cables



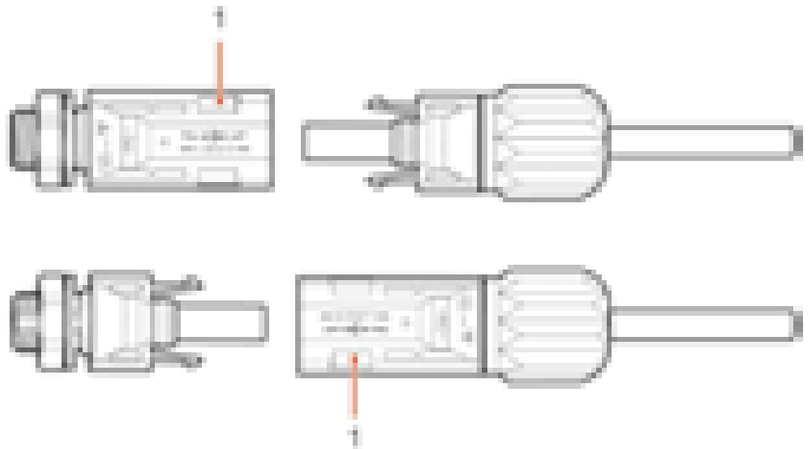
1. Positive power cable 2. Negative power cable

**Step 5** Insert crimped power cables into corresponding housings until you hear a "click" sound. The power cables snap into place.

**Step 6** Reinstall cable glands on positive and negative connectors and rotate them against the insulation covers.

**Step 7** Insert the positive and negative connectors into corresponding DC input terminals of the Sofar 10K~15KTL-G2 until you hear a "click" sound, as shown in Figure 4-17.

Figure 4-17 Connecting DC input power cables





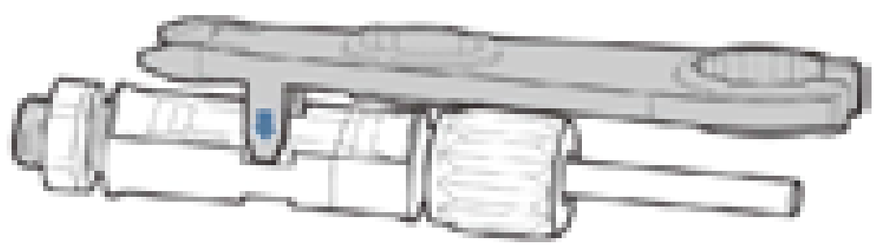



**Follow-up Procedure**

To remove the positive and negative connectors from the Sofar 10K~15KTL-G2, insert a removal wrench into the bayonet and press the wrench with an appropriate strength, as shown in Figure 4-18.

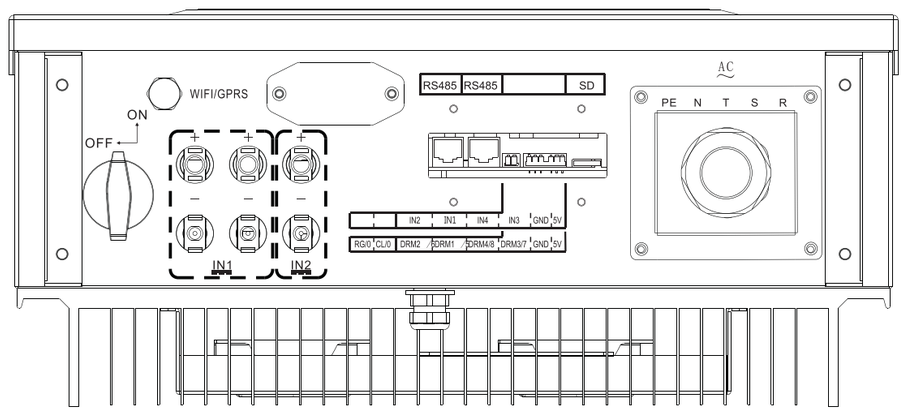
| | |
|---|---|
| Caution | **Before removing the positive and negative connectors, ensure that the DC SWITCH is OFF.** |

Figure 4-18 Removing a DC input connector



## 4.5 DRMs Functions

4.5.1 10-15KW-G2 have five TTL input and one 5V Power output witch provided the DRMs function. The Ports are RG/0,CL/0, DRM1/5, DRM2/6, DRM3/7, DRM4/8, and GND ,5V,as shown below :



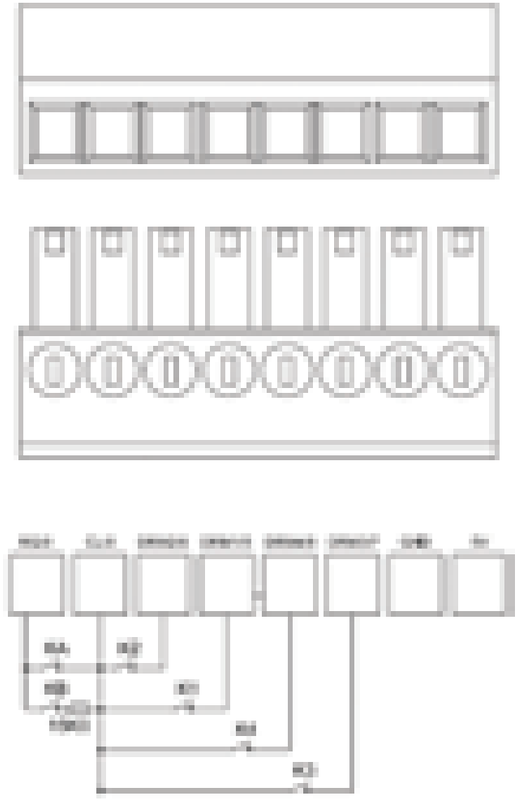
4.5.2 PINs Physical Function Discription:

The DRMs function allocation is shown in below Table:

| No. | PIN Name | Description | Connected To |
|---|---|---|---|
| 1 | [illegible] | [illegible] | [illegible] |
| 2 | [illegible] | [illegible] | [illegible] |
| 3 | [illegible] | [illegible] | [illegible] |
| 4 | [illegible] | [illegible] | [illegible] |
| 5 | [illegible] | [illegible] | [illegible] |
| 6 | [illegible] | [illegible] | [illegible] |
| 7 | [illegible] | [illegible] | [illegible] |
| 8 | [illegible] | [illegible] | [illegible] |

4.5.3 Enable the DRMs function.

1. Connected the cables as shown below ;







2. Provided the DC Power through the PV Pannel until the LCD is working;

3. Set inverter country code as 02(Australia) in Enter Setting>Set Country Code(password 0001);

4. Enable DRMs function in Enter Setting>DRMs Control(password 0001);

5. Only DRM0, DRM5, DRM6, DRM7, DRM8 has been defined. Inverter will works as DRM0, DRM5, DRM6, DRM7, DRM8 when Corresponding switch closure. Their priority is DRM0>DRM5>DRM6>DRM7>DRM8.

## 4.6 Safety check

1. Check the string polarity

2. Make sure the DC switch is OFF,connect the sting to inverter DC side accordingly

3.The string voltage can not be higher than 1000V

4. Check if the connector is fixed well and correctly

5. Check if the PE connection cable and screw is fixed well , check if the communication is connected well(if needed)

6. Check string connection type , if one string is connected to inverter two MPPT, set inverter mode as parallel mode(default is independent mode)

7. Switch on DC switch first ,check if the LCD turned on normally , then turn ON AC switch , inverter should generate power normally, if any abnormal sound, turn off the AC and DC switch. If there is alarm on the inverter , check the manual for trouble shooting.

# 5 Commissioning of inverter

## 5.1 Safety inspection before commissioning

| | |
|---|---|
| Attention | **Ensure that DC and AC voltages are within the range permitted by the inverter.** |

## 5.2 Start inverter

**Step 1** Turn on DC switch.

**Step 2** Turn on AC switch.

When the solar arrays generate adequate power, the inverter will startup automatically. Display showing “normal” indicates correct operation.

**Step 3:** Choose the correct country code. (refer to section 6.3 of this manual)

Notice: 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 other fault, please refer to part 7——error messages for help.

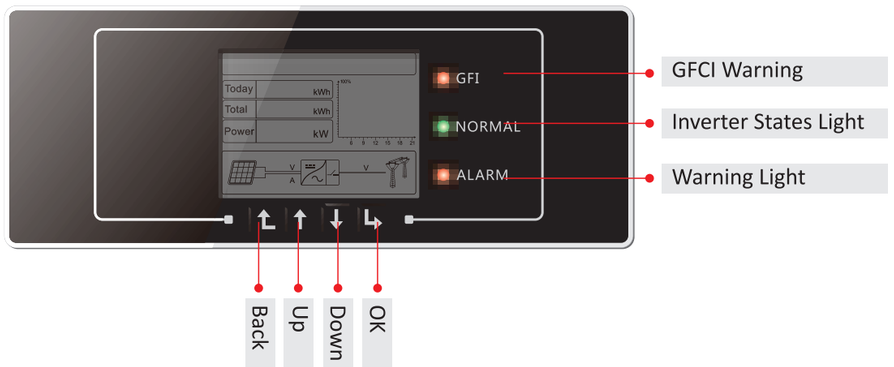





# 6 Operation interface

## 6.1 Operation and Display Panel

- Buttons and Indicator lights




**Key-button:**

- Back : to back up or enter into main interface at standard interface states
- Up : to move up or increase value
- Down : to move down or decrease value
- Enter: to confirm selection

**Indicator Lights:**

- States Light(GREEN)

  Flashing: Waiting or checking state
  ON: Normal operation
  OFF: Fault or permanent state

- Warning Light (RED)

  Flashing: Fans fault
  ON: The inverter is faulty
  OFF: Normal operation

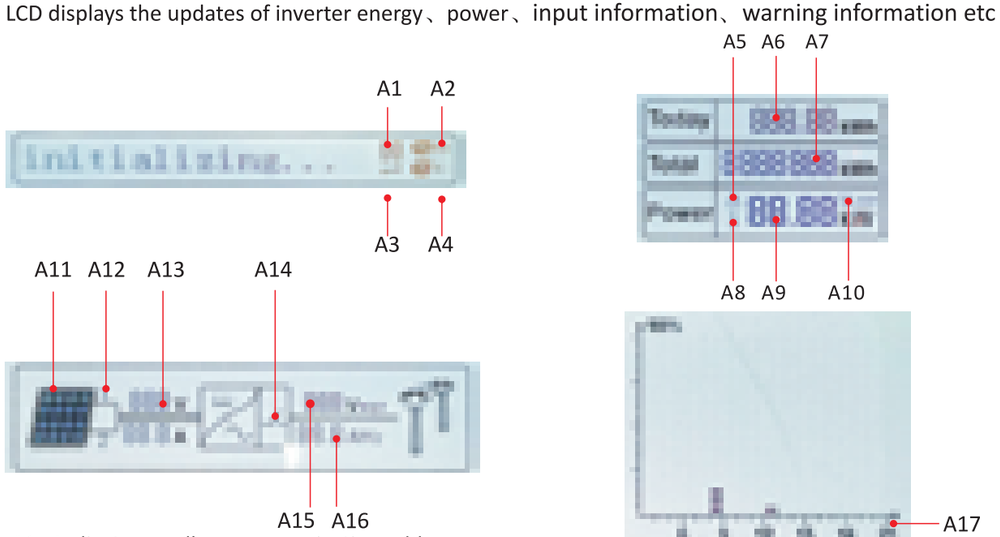
- GFCI Warning Light (RED)

  ON: GFCI fault
  OFF: GFCI normal

## 6.2 Standard Interface

LCD standard interface is used to display inverter states、information and parameter setting etc.

LCD displays the updates of inverter energy、power、input information、warning information etc




A1 - Indicates modbus communication address.
A2 - RS485 communicating
A3 - Light ON for RS485 communicating
A4 - WIFI communicating
A5 - Light flashes to warn over frequency and power derating. Light ON to warn remote off
A6 - Indicates today's energy
A7 - Indicates the total energy
A8 - Light ON warning for inverter high temperature
A9 - Indicates real time output power
A10 - MPPT SCAN function is activated (not available)
A11 - Light ON when input voltage over160V
A12 - Indicates real time input voltage and current channel
A13 - Indicates the input voltage and current of phase 1&2 and displays in turns in every three seconds
A14 - Light ON when the state is normal
A15 - Indicates R/T/S phase voltage and displays in turns in every three seconds
A16 - Indicates R/T/S phase current or frequency and displays in turns in every three seconds
A17 - Indicates the energy from 3:00am-21:00pm in the day






When power-on, LCD interface displays INITIALIZING, refer below picture.

| Initializing… |
|---|

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 10s** | Waiting States, Countdown 10S |
| **Check** | Checking |
| **Normal** | Normal Power Generation |
| **Fault** | Regular error state |
| **Permanent** | Unrecoverable error state |

**Inverter states includes: wait、check、normal、fault and permanent**

**Wait** : Inverter is waiting to Check State at the end of reconnection time. In this state, the PV voltage is more than 180V, 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 functional. Inverter will go to Fault State or Permanent State if any error or fault occurs.

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

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

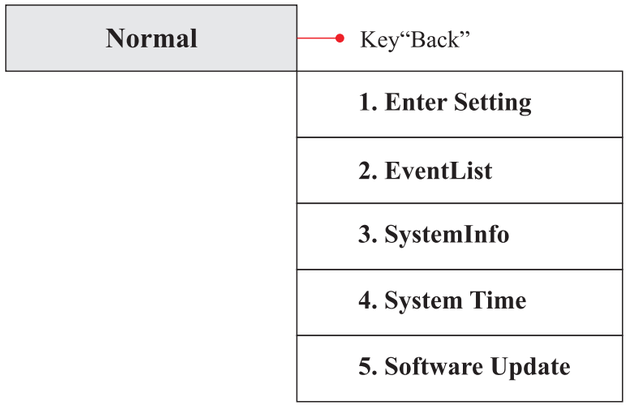
**Permanent** : Inverter has encountered unrecoverable error, we need maintainer debug this kind of error according to error code.

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

| DSP communicate fail |
|---|

## 6.3 Main Interface

Press “Back” button under standard interface to enter into main interface, including:








### (A) “Enter Setting” Interface as below:


- **Set Time**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface. Enter “1. Set Time” by pressing“Up” button or “Down” button, then press”OK“button and start to set up time.

Time set from year, month, day, minutes, and seconds in turns, “Up” button or “Down”button to choose different value to set each date. Set each value is need to press “OK” button to confirm setting. “success” is displayed if the setting time is correct, “fail” means failure settings.

◆ **Clear Energy**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface. Then Enter “2.Clear Energy ” by pressing “Up” button or “Down” button, press “OK” button and start to clear produce. “success” is displayed after settings.

◆ **Clear Events**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface.Enter “3. Clear Events” by pressing ”Up” button or “Down” button. Press “OK ”button and start to clear events. “success” is displayed after settings.

◆ **Set Country Code**

Users press “Back” button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “4.Set Country Code” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface(default:0001).If it's shown"set disable" on the screen, then you can NOT choose the operating country, you should enable country setting through " 6. Enset Country " interface. If it's shown "set Country code?" on the screen, then press Confirm button to start country setting. "Success" will be shown on the screen after a successful country setting.

User can check current country code in SystemInfo>>5. Country.

Note: Country code changing will take effect after inverter reboot.

Table 6-1 country code setting

| code | country | code | country | code | country |
|---|---|---|---|---|---|
| 00 | Germany VDE AR-N4105 | 12 | Poland | 24 | Cyprus |
| 01 | CEI0-21 Internal | 13 | Germany BDEW | 25 | India |
| 02 | Australia | 14 | Germany VDE 0126 | 26 | Philippines |
| 03 | Spain RD1699 | 15 | Italy CEI0-16 | 27 | NewZealand |
| 04 | Turkey | 16 | UK-G83 | 28 | Brazil |
| 05 | Denmark | 17 | Greece island | 29 | Slovakia VSD |
| 06 | Greece Continent | 18 | EU EN50438 | 30 | Slovakia SSE |
| 07 | Netherland | 19 | IEC EN61727 | 31 | Slovakia ZSD |
| 08 | Belgium | 20 | Korea | 32 | CEI0-21 In Areti |
| 09 | UK-G59 | 21 | Sweden | 33 | Ukraine |
| 10 | China | 22 | Europe General | 34-49 | Reserved |
| 11 | France | 23 | CEI0-21 External | | |






◆ **On-Off Control**

Users press ''Back'' button to enter ''1.Enter Setting'' interface,Press ''OK'' button to enter main setting interface.Enter ''5.On-Off Control'' by pressing ''UP'' button or ''Down'' button. Press ''OK'' button and enter On-Off Control interface,press ''OK'' button and enter ''Input Password'' Setting interface.Press ''OK'' button to set passwords (default:0001),increase or decrease value though pressing ''Up'' button or ''Dwon'' button,press ''OK'' button to next value setting.''Error! Try again'' will be displayed for wrong passwords.Press ''back'' button and rekey in the correct passwords.It will enter into ''Power on&Power off'' interface if the passwords is correct,then you can select ''Power on'' or ''Power off'' by pressing ''Up'' button or ''Down'' button and press ''OK'' button to finish the setting successfully.If you select ''Power off'',need to set how many days you want the inverter to power off,increase or decrease value though pressing ''Up'' button or ''Down'' button.After you set ''Power off'' successfully,you need to contact manufacturer to supply passwords to re-power on this inverter.

◆ **Enset Country**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface.Enter “ 6. Enset Country ” by pressing “Up” button or“Down”button, press “OK” button and enter “Input Password” Setting interface.

Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error! Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “success” will be displayed if setting successfully,

Attention: when inverter working for power generation over 24h, country setting is forbidden, it can only be set after LCD setting. Key in passwords for country setting through LCD (default: 0001), country setting can be set in 24h after keying in the correct passwords, over 24h, set through LCD again.

◆ **Set Energy**

Users press “Back” button to enter “1.Enter Setting” interface, Press “OK” button to enter main setting interface.Enter “ 7 . Set Energy ” by pressing “ Up ” button or“Down”button, press “OK” button and enter “Input Password” Setting interface.

Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error! Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “success” will be displayed if setting successfully,

◆ **Set Address**

Users press “Back” button to enter “1.Enter setting” interface, Press ”OK“ button to enter main setting interface. Enter “8. Set Address” by pressing “Up” button or ”Down“ button. Press “OK” button and enter setting interface “Success” or “fail” is displayed after setting.

◆ **Set Inputmode**

Input mode selection：Sofar 10K~15KTL-G2 has 2 MPPT, The two MPPT can run independently, and also can be operated in parallel, According to the system design, the user can choose the mode of MPPT operation.The input mode can be setting by the LCD .

Users press “Back” button to enter “1.Enter setting” interface, Press ”OK“ button to enter main setting interface. Enter “ 9 . Set inputmode” by pressing “Up” button or ”Down“ button. Press “OK” button and enter setting interface. Choose corresponded setting items by pressing “Up” button or “Down” button, then press “OK” button. “Success” or “fail” is displayed after setting.

- **Set Language**

Users press “Back” button to enter “1.Enter setting” interface, Press ”OK“ button to enter main setting interface. Enter “10. Set Language” by pressing “Up” button or ”Down“ button. Press “OK” button and enter setting interface. Choose corresponded setting items by pressing “Up” button or “Down” button, then press “OK” button. “Success” or “fail” is displayed after setting.

- **Set StartPara**

User can change the start parameter by the LCD. First the User need to copy the. TXT file which is used to change the start parameter to the SD card .

Users press Back button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “11. Set StartPara” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface. Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “Success” will be displayed if setting successfully.

- **Set SafetyVolt**

User can change the Voltage protection point by the LCD. First the User need to copy the. TXT file which is used to change the Voltage protection point to the SD card .

Users press Back button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “12. Set SafetyVolt” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface. Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “Success” will be displayed if setting successfully.

- **Set SafetyFreq**

User can change the Frequency protection point by the LCD. First the User need to copy the. TXT file which is used to change the Frequency protection point to the SD card .

Users press Back button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “13. Set SafetyFreq” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface. Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “Success” will be displayed if setting successfully.

- **Set Insulation**

User can change the Insulation protection point by the LCD. First the User need to copy the. TXT file which is used to change the Insulation protection point to the SD card .

Users press Back button to enter “1.Enter setting” interface, Press OK button to enter main setting interface. Enter “14. Set Insulation” by pressing “Up” button Or “Down” button, press “OK” button and enter “Input Password” Setting interface. Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords. “Success” will be displayed if setting successfully.





- **Set RefluxP**

Users press ''Back'' button to enter ''1.Enter Setting'' interface,Press ''OK'' button to enter main setting interface.Enter ''18.Set RefluxP'' by pressing ''Up'' button or ''Down'' button, press ''OK'' button and enter ''Input Password'' Setting interface.Press ''OK'' button to set passwords (default:0001),increase or decrease value though pressing ''Up'' button or ''Dwon'' button,press ''OK'' button to next value setting.''Error! Try again'' will be displayed for wrong passwords.Press ''back'' button and rekey in the correct passwords.Then select ''Reflux Enable'' or ''Reflux Disable'' by pressing ''Up'' and ''Down'' button.''success'' will be displayed if setting successfully.

- **DRMS0 Control(only Australia)**

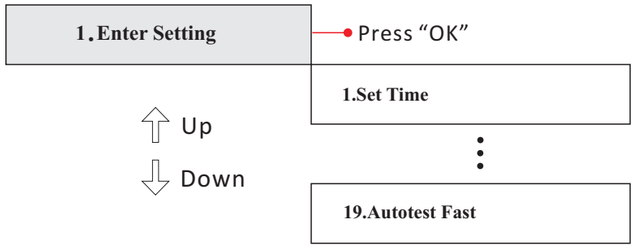
Enable the function to refer "4.4 Connecting communication cables"connection DRED, Users press Back button to enter "1.Enter setting"interface,Press OK button to enter main setting interface.Enter"18.DRMS0 Control"by pressing "Down"button,press"OK" button and enter “ Input Password ” Setting interface . Press “Back” button to set passwords (default: 0001), increase or decrease value though pressing “Up” button or “Down” button, press “OK” button to next value setting. “Error!” Try again” will be displayed for wrong passwords. Press “Back” button and rekey in the correct passwords.
If the password is correct, enter the settings "1.enable DRMS0 or press down to enter "2.disable DRMS0", and finally press the OK button to set it successfully.

- **Autotest Fast**

Step 1: During the normal operation of our SOLAR inverters, press “back” button (the leftmost button) to enter the main menu interface.

Step 2:Press “Confirm” button (the rightmost button) to enter the “Enter Setting” menu interface.

Step 3:Press “Down” button several times until “Autotest Fast” is shown on the screen.




Step 4:Press “Confirm” button to start Auto Test:


Step 5:Then the Auto Test will start automatically, Press “down” to see the test results

Test 59.S1 OK!

↓ Press “Down” button to see the test results

59.S1:230V 183ms

↓ Wait for another test

Testing 59.S2...

↓ Wait

Test 59.S2 OK!

↓ Press “Down button” to see the test results

59.S2:230V 100ms

↓ Wait for another test

Testing 27.S1...

↓ Wait

Test 27.S1 OK!

↓ Press “Down” button to see the test results

27.S1:230V 384ms

↓ Wait for another test

Testing 27.S2...

↓ Wait

Test 27.S2 OK!

↓ Press “Down” button to see the test results

27.S2:230V 188ms

↓ Wait for another test

Testing 81>S1...

↓ Wait

Test 81>S1 OK!

↓ Press “Down” button to see the test results

81>S1:49.9Hz 83ms

↓ Wait for another test

Testing 81>S2...

↓ Wait

Test 81>S2 OK!






↓ Press “Down” button to see the test results

81>S2:49.9Hz 89ms

↓ Wait for another test

Testing 81<S1...

↓ Wait

Test 81<S1 OK!

↓ Press “Down” button to see the test results

81<S1:50.0Hz85ms

↓ Wait for another test

Testing 81<S2...

↓ Wait

Test 81<S2 OK!

↓ Press “Down” button to see the test results

81<S2:50.0Hz82ms

↓

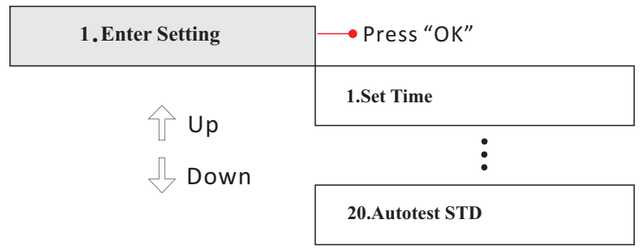
Auto Test OK!

◆ **Autotest STD**

Step 1: during the normal operation of our SOLAR inverters,press “back”button (the leftmost button) to enter the main menu interface

Step 2: Press ″Confirm″button （the rightmost button）to enter the ″setting″menu interface.

Step 3: Press ″Down″button several times until ″Autotest slow″is shown on the screen




Step 4:Press “Confirm” button to start Auto Test:

20. Autotest STD

Step 5:Then the Auto Test will start automatically, Press “down” to see the test results

Testing 59.S1...

↓ Wait

Test 59.S1 OK!

↓ Press “Down” button to see the test results

59.S1:230V 183ms

↓ Wait for another test

Testing 59.S2...

↓ Wait

Test 59.S2 OK!

↓ Press “Down button” to see the test results

59.S2:230V 100ms

↓ Wait for another test

Testing 27.S1...

↓ Wait

Test 27.S1 OK!

↓ Press “Down” button to see the test results

27.S1:230V 384ms

↓ Wait for another test

Testing 27.S2...

↓ Wait

Test 27.S2 OK!

↓ Press “Down” button to see the test results

27.S2:230V 188ms

↓ Wait for another test

Testing 81>S1...

↓ Wait

Test 81>S1 OK!

↓ Press “Down” button to see the test results

81>S1:49.9Hz 83ms

↓ Wait for another test

Testing 81>S2...

↓ Wait

Test 81>S2 OK!

↓ Press “Down” button to see the test results





81>S2:49.9Hz 89ms

↓ Wait for another test

Testing 81<S1...

↓ Wait

Test 81<S1 OK!

↓ Press “Down” button to see the test results

81<S1:50.0Hz85ms

↓ Wait for another test

Testing 81<S2...

↓ Wait

Test 81<S2 OK!

↓ Press “Down” button to see the test results

81<S2:50.0Hz82ms

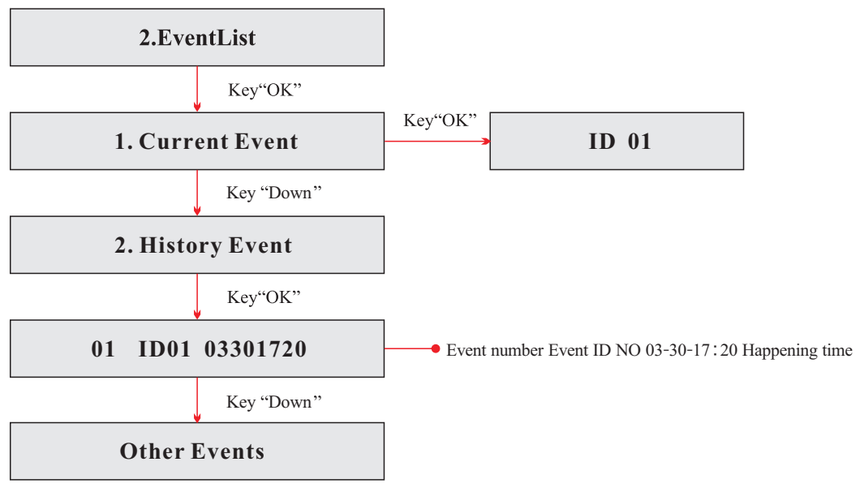
↓

Auto Test OK!

## (B) “Event List” Interface as below:

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:

Users press “Back” button and “Down” button in standard interface, then enter into 2.Event List” interface.



## (C) “SystemInfo” Interface as below:

| 3.SystemInfo |
|---|
| 1.Inverter Type |
| 2.Serial Number |
| 3.SoftVersion |
| 4.HardVersion |
| 5.Country |
| 6.Input Mode |
| 7.Safety Paras |
| 8.Power factor |
| 9.MPPT Scan |

- **Inverter Type**

Users press “Back” button and “Up” button or “Down” button enter “3. SystemInfo” interface, Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “1. Inverter Type”,then press “OK” button , the Inverter Type will be displayed.

- **Serial Number**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, Press ”OK“ button to enter enter into system information checking interface,then press“Up” button or “Down” button enter into “2. Serial Number”,then press “OK” button ,the serial number will be displayed.

- **SoftVersion**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “3. SoftVersion”,then press “OK” button , the SoftVersion will be displayed.

- **HardVersion**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “4. HardVersion”,then press “OK” button , the HardVersion will be displayed.

- **Country**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “5. Country”,then press “OK” button , the Country will be displayed.






- **Input Mode**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “6. Input Mode”,then press “OK” button , the Input Mode will be displayed.

- **Power factor**

Users press “Back” button and “Up” button or “Down” button to enter “3. SystemInfo” interface, then Press “OK” button to enter enter into system information checking interface,then press “Up” button or “Down” button enter into “ 7. Power factor ”,then press “OK” button , the Power factor will be displayed.

## (D) System Time

Press the “Back” button and “Up” button or “Down” key in the standard user interface to enter into “4.System Time”,then press “OK ” button to display the current system time.

## (E) Software Update

Press the “Back” button and “Up” button or “Down” button in the standard user interface to enter into “5. Software Update”,then press “OK” button to enter into the”input password” interface,now press the “OK” button to input the password(initial passwords is 0715),Press the“Up” and “Down” button to change the value,then press “OK” button to confirm the current value of input and enter the next set of value .when set over, if the password is wrong, the LCD will display “Error! Try again”,at this time ,you should re-enter your password.If the password is correct, then begin the update process.

User can check the current software version in SystemInfo>>3. SoftVersion.

**online update program steps are as follows:**

**Step 1** First, open SOFAR 10K~15KTL-G2 waterproof cover.

**Step 2** After open waterproof cover, Press SD card (the SD card as shown in Figure 4-5), Then the SD card will automatically pop up.

**Step 3** The SD card reader must be ready by the users, so that SD card so easy to establish the connection with the computer.

**Step 4** SOFAR SOLAR will send the Software code to the user who needs to update. After user receive the file, please decompressing file and cover the original file in SD card.

**Step 5** Insert the SD card into the SD card slot, there will be a faint clicking sound typically, indicating that has stuck.

**Step 6** then enter into the online upgrade to the main menu “5. Software Update” in the LCD display program. The method to enter the menu can refer to operation interface of LCD.

**Step 7** Input the password, if password is correct, and then begin the update process, the original password is 0715.

**Step 8** System update main DSP、slave DSP、and ARM in turns. If main DSP update success ,the LCD will display “Update DSP1 OK”, otherwise display “Update DSP1 Fail”; If slave DSP update success ,the LCD will display “Update DSP2 OK”, otherwise display “Update DSP2 Fail”.

**Step 9** If Fail , please turn off the DC breaker, wait for the LCD screen extinguish, then turn on the DC breaker again,then Continue to update from step 6.

**Step 10** After the update is completed, turn off the DC breaker, wait for the LCD screen extinguish, then install waterproof cover, and 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.

# 7 Trouble shooting and maintenance

## 7.1 Trouble shooting

This section contains information and procedures for solving possible problems with the sofar 10K~15KTL-G2 inverter.

**◉ In case of problem with inverter, check the following tips.**

- Check the warning fault messages or Fault codes on the inverter information panel. Record it before doing anything further.
- If inverter does not display any Fault, please check the following lists.
  - Is the inverter located in a clean, dry, adequately ventilated place?
  - Is the DC switch turned ON?
  - Are the cables adequately sized and short enough?
  - Are the input and output connections and wiring in good condition?
  - Are the configuration settings correct for the particular installation?
  - Are the display panel and the communications cable properly connected and undamaged?

Follow the steps below to view recorded problems:

Press “ESC” to enter the main menu in the normal interface. In the interface screen select “Event List”, then press “OK” to enter events.

**◉ EventList information**

Table 7-1 Eventlist

| EventList NO. | EventList Name | EventList description | solution |
|---|---|---|---|
| **ID01** | GridOVP | The power grid voltage is too high | • If the alarm occurs occasionally, the possible cause is that the electric grid is abnormal occasionally. SOFAR inverter automatically returns to normal operating status when the electric grid’s back to normal.<br>• If the alarm occurs frequently, check whether the grid voltage/frequency is within the acceptable range. If no, contact SOFAR technical support. If yes, check the AC circuit breaker and AC wiring of the SOFAR inverter.<br>• If the grid voltage/frequency is within the acceptable range and AC wiring is correct, while the alarm occurs repeatedly, contact SOFAR 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. |
| **ID02** | GridUVP | The power grid voltage is too low | |
| **ID03** | GridOFP | The power grid frequency is too high | |
| **ID04** | GridUFP | The power grid frequency is too low | |






| | | | |
|---|---|---|---|
| **ID05** | PVUVP | The input voltage is too low | Check whether too few PV modules are series connected in a PV string, thus the voltage(Vmp) of the PV string is lower than the minimum operating voltage of SOFAR inverter. If yes, adjust the number of series connected PV modules to increase the voltage of the PV string to fit the input voltage range of SOFAR inverter. SOFAR inverter automatically returns to normal operating status after correct adjustments. |
| **ID09** | PvOVP | The input voltage is too high | Check whether too many PV modules are series connected in a PV string, thus the voltage(Voc) of the PV string is higher than the maximum input voltage of SOFAR inverter. If yes, adjust the number of series connected PV modules to decrease the voltage of the PV string to fit the input voltage range of SOFAR inverter. SOFAR inverter automatically returns to normal operating status after correct adjustments. |
| **ID10** | IpvUnbalance | Input current is not balanced | Check the input mode(parallel mode/ independent mode) setting of SOFAR inverter according to Section 4.5 of this user manual. |
| **ID11** | PvConfigSetWrong | Incorrect input mode | |
| **ID12** | GFCIFault | GFCI Fault | • If the fault occurs occasionally, the possible cause is that the external circuits are abnormal occasionally. SOFAR inverter automatically returns to normal operating status after the fault is rectified.<br>• If the fault occurs frequently and lasts a long time, check whether the insulation resistance between the PV array and earth(ground) is too low, then check the insulation conditions of PV cables. |
| **ID14** | HwBoostOCP | Ihe input current is too high,and has happen hardware protection | Check whether the input current is higher than the maximum input current of SOFAR inverters, then check the input wiring, if both are correct, please contact SOFAR technical support. |
| **ID15** | HwAcOCP | The grid current is too high,and has happen hardware protection | ID15-ID24 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| **ID16** | AcRmsOCP | The grid current is too high | |
| **ID17** | HwADFaultIGrid | The grid current sampling error | |
| **ID18** | HwADFaultDCI | The DCI sampling error | |
| **ID19** | HwADFaultVGrid | The grid voltage sampling error | |
| **ID20** | GFCIDeviceFault | The GFCI sampling error | |
| **ID21** | MChip_Fault | The master chip fault | |
| **ID22** | HwAuxPowerFault | The auxiliary voltage error | |
| **ID23** | BusVoltZeroFault | The bus voltage sampling error | |
| **ID24** | IacRmsUnbalance | The Output current is not balanced | |

| | | | |
|---|---|---|---|
| **ID25** | BusUVP | The bus voltage Is too low | If the PV array configuration is correct (no ID5 fault), the possible cause is that the solar irradiance is too low. SOFAR inverter automatically returns to normal operating status after the solar irradiance returns to normal level. |
| **ID26** | BusOVP | The bus voltage Is too high | ID26-ID27 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| **ID27** | VbusUnbalance | The bus voltage is not balanced | |
| **ID28** | DciOCP | The Dci is too high | • Check the input mode(parallel mode/ independent mode) setting of SOFAR inverter according to Section 4.5 of this user manual.<br>• If the input mode is correct, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| **ID29** | SwOCPInstant | The grid current is too high | Internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| **ID30** | SwBOCPInstant | Ihe input current is too high | Check whether the input current is higher than the maximum input current of SOFAR inverters, then check the input wiring, if both are correct, please contact SOFAR technical support. |
| **ID49** | ConsistentFault_VGrid | The grid voltage sampling value between the master DSP and slave DSP is not consistent | ID49-ID55 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| **ID50** | ConsistentFault_FGrid | The grid frequency sampling value between the master DSP and slave DSP is not consistent | |
| **ID51** | ConsistentFault_DCI | The DCI sampling value between the master DSP and slave DSP is not consistent | |
| **ID52** | ConsistentFault_GFCI | The GFCI sampling value between the master DSP and slave DSP is not consistent | |
| **ID53** | SpiCommLose | The spi communication between the master DSP and slave DSP is fault | |
| **ID54** | SciCommLose | The Sci communication between the control board communication board is fault | |
| **ID55** | RelayTestFail | The relays fault | |
| **ID56** | PvIsoFault | The insulation resistance is too low | Check the insulation resistance between the PV array and earth(ground), if a short circuit occurs, rectify the fault. |
| **ID58** | OverTempFault | The inverter temp is too high | • Ensure the installation position and installation method meet the requirements of Section 3.4 of this user manual.<br>• Check whether the ambient temperature of the installation position exceeds the upper limit. If yes, improve ventilation to decrease the temperature.<br>• Check whether the ID90~ID92 fault (fan fault) exist, if yes, please replace the corresponding fan. |
| **ID59** | OverTempFault_Env | The environment temp is too high | |
| **ID60** | Grounding abnormal | Grounding abnormal | Check whether the ground is solid |





| | | | |
|---|---|---|---|
| **ID65** | UnrecoverHwAcOCP | The grid current is too high,and has cause unrecoverable hardware fault | ID65-ID70 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| **ID66** | UnrecoverBusOVP | The bus voltage is too high,and has cause unrecoverable fault | |
| **ID67** | UnrecoverIacRmsUnbalance | The grid current is unbalance,and has cause unrecoverable fault | |
| **ID68** | UnrecoverIpvUnbalance | The input current is unbalance,and has cause unrecoverable fault | |
| **ID69** | UnrecoverVbusUnbalance | The bus voltage Is unbalance,and has cause unrecoverable fault | |
| **ID70** | UnrecoverOCPInstant | The grid current is too high,and has cause unrecoverable fault | |
| **ID71** | UnrecoverPvConfigSetWrong | Incorrect input mode | Check the input mode(parallel mode/ independent mode) setting of SOFAR inverter according to Section 4.5 of this user manual. |
| **ID74** | UnrecoverIPVInstant | The input current is too high,and has happen unrecoverable fault | ID74-ID77 are internal faults of SOFAR inverter, turn OFF the “DC switch”, wait for 5 minutes, then turn ON the “DC switch”. Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| **ID75** | UnrecoverWRITEEEPROM | The EEPROM is unrecoverable | |
| **ID76** | UnrecoverREADEEPROM | The EEPROM is unrecoverable | |
| **ID77** | UnrecoverRelayFail | Relay has happen permanent fault | |
| **ID81** | OverTempDerating | the inverter has derated because of the temperature is too high | • Ensure the installation position and installation method meet the requirements of Section 3.4 of this user manual.<br>• Check whether the ambient temperature of the installation position exceeds the upper limit. If yes, improve ventilation to decrease the temperature.<br>• Check whether the ID90~ID92 fault (fan fault) exist, if yes, please replace the corresponding fan. |
| **ID82** | OverFreqDerating | the inverter has derated because of the grid frequency too hig | SOFAR inverter automatically reduce the output power when the frequency of electrical grid is too high. |
| **ID83** | RemoteDerating | The inverter has derated by the Remote control | SOFAR inverter records ID83 in case of remote power derating operation. Check the wiring of remote input and output control signal port on the communication board according to Section 4.4 of this user manual. |
| **ID84** | RemoteOff | The inverter has shut down because by the Remote control | SOFAR inverter records ID84 in case of remote shutdown operation. Check the wiring of remote input and output control signal port on the communication board according to Section 4.4 of this user manual. |

| | | | |
|---|---|---|---|
| **ID91** | Fan1 alarm | Fan 1 fault | Check the external fan with blue cable, if it is fault , contact Sofar to replace it. |
| **Id92** | Fan2 alarm | Fan 2 fault | Check the external fan with red cable, if it is fault , contact Sofar to replace it. |
| **ID94** | Software version is not consistent | The Software between the control board and the communication board is not consistent | Contact SOFAR technical support to upgrade software. |
| **ID95** | Communication board EEPROM fault | The Communication board EEPROM is fault | ID95~ID96 are internal faults of SOFAR inverter, turn OFF the "DC switch", wait for 5 minutes, then turn ON the "DC switch". Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| **ID96** | RTC clock chip anomaly | RTC clock chip is fault | |
| **ID97** | Invalid Country | The Country is InValid | Check the country setting according to Section 4.4 of this user manual. |
| **ID98** | SD fault | The SD card is fault | Please replace the SD card. |
| **ID99- ID100** | Reserved | | Reserved |

## 7.2 Maintenance

Inverters generally do not need any daily or routine maintenance.

### ⊙ Inverter cleaning

Please use hand blower, soft dry cloth or brush to clean inverters. Water, corrosive chemical substances or intense cleaning agent should not be used for cleaning the cooling fan or inverter. Switch off AC and DC power supply to inverter before undertaking any cleaning activity.






# 8 Decommissioning

## 8.1 Decommissioning steps

- Switch off the AC grid
- Switch Off the DC switch
- Wait for 5 minutes
- Release the DC connectors
- Release the AC terminals using screw drivers.

## 8.2 Package

If possible, please pack the inverter in the original packaging.

## 8.3 Storage

Store the inverter in a dry place where ambient temperature is between -25 and - +70 °C.

## 8.4 Disposal

At the end of its life, dispose inverters and packing materials at locations that can handle and or recycle electric equipment safely.

# 9 Technical data

## 9.1 Input parameters (DC)

| Technical Data | SOFAR 10000TL-G2 | SOFAR 12000TL-G2 | SOFAR 15000TL-G2 |
|---|---|---|---|
| Max. DC Input power | 18000W | 18000W | 18000W |
| Max. Input voltage | 1000V | | |
| Start-up voltage | 180V | | |
| MPPT voltage range | 160V-960V | | |
| Rated voltage | 600V | | |
| Full load voltage range | 350V-850V | 500V-850V | 500V-850V |
| Max input current | 21A/11A | | |
| Max. PV Short current Isc | 30A/15A | | |
| MPPT No. /String No. | 2/2+1 | | |






## 9.2 Output parameters (DC)

| Technical Data | SOFAR 10000TL-G2 | SOFAR 12000TL-G2 | SOFAR 15000TL-G2 |
|---|---|---|---|
| Rated output power | 10000W | 12000W | 15000W |
| Max apparent power | 11000VA | 13200VA | 16500VA |
| Max output current | 3*16.5A | 3*20A | 3*24A |
| Output voltage range | 230/400V; 184-275V | | |
| AC Grid frequency | 50/60HZ | | |
| Power factor range | 0.8leading- 0.8laging | | |
| THDi@100% load | <3% | | |
| Grid | 3/N/PE | | |

## 9.3 Effiecny

| Technical Data | SOFAR 10000TL-G2 | SOFAR 12000TL-G2 | SOFAR 15000TL-G2 |
|---|---|---|---|
| Max efficiency | 98.3% | 98.3% | 98.3% |
| European efficiency | 98% | 98% | 98% |
| MPPT efficiency | 99.9% | 99.9% | 99.9% |

## 9.4 Protection and Characteristic

| Technical Data | SOFAR 10000TL-G2 | SOFAR 12000TL-G2 | SOFAR 15000TL-G2 |
|---|---|---|---|
| Input reverse polarity | yes | | |
| Output over current | yes | | |
| Output over voltage | yes | | |
| Anti-islanding | yes | | |
| RCMU | yes | | |
| PV Insulation | yes | | |
| Surge protection level | III | | |
| **Common parameters** | | | |
| Dimension(W*H*D)[mm] | 540*452*202 | | |
| Weight [kg] | 23.5Kg | 23.5Kg | 25Kg |
| Operation temperature range | -25~60℃ | | |
| Noise | ≤45dB(A) | | |
| Altitude | 2000m | | |
| Night consume | <0.5W | | |
| Topology | Transformer-less | | |
| Cooling | Fan | | |
| Ingress protection | IP65 | | |
| Humidity | 0…100% | | |
| DC Connector | Mc4 | | |
| AC Connector | Screw | | |
| Display | 4.7 inch LCD | | |
| Communication | RS485(Default)WIFI/GPRS/Ethernet(optional) | | |
| Certificate | IEC62109-1,IEC62109-2,NB-T 32004 | | |
| Maximum Inverter backfeed current to array(dc μA ) | <800uA | | |
| Inrush current output inrush current and duration | 0.8A/2us | | |
| Maximum output fault current | 200A Peak | | |
| Maximum output over current protection | 65A | | |
| Protective class | Class I | | |
| Over voltage category | PV: OVC II, AC mains: OVC III | | |
| Environment pollution degree | Outside housing: Degree 3<br>Inside housing: Degree 2 | | |
| Warranty | 3/5/7/10 years | | |






# 10 Quality Assurance

## 10.1. Standard warranty period

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

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

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

3. Other pv components GPRS, WIFI, warranty period of 5 years;Lightning protection is guaranteed for 3 years. Damage caused by lightning is not covered by the warranty.

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

## 10.2. Extended warranty period

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

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

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

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

## 10.3. Invalid warranty clause

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

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

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

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

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

5) Incorrect installation, debugging and use methods;

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

7) Damage caused by improper storage by dealers or end users;

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

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

10) Improper use or misuse of the device;

11) Poor ventilation of the device;

12) The product maintenance process does not follow relevant standards;

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