User manual

PV Grid-Connected Inverter

Product Model: Sofar 30-40KTL  Document Version 1.0(2015.08.06)

Shenzhen SOFARSOLAR Co., Ltd.
Notice
This manual contains important safety instructions that must be followed during installation and maintenance of the equipment.

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.

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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 30000-Sx  Sofar 33000-Sx  Sofar 40000-Sx(x=0-2)
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.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danger</td>
<td>Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</td>
</tr>
<tr>
<td>Warning</td>
<td>Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</td>
</tr>
<tr>
<td>Caution</td>
<td>Indicates a hazardous situation, if not avoided, could result in minor or moderate injury.</td>
</tr>
<tr>
<td>Attention</td>
<td>Indicates there are potential risks. If fail to prevent, may lead to equipment cannot run normally or property damage.</td>
</tr>
<tr>
<td>Note</td>
<td>Provides tips that are valuable for the optimal operation of the product.</td>
</tr>
</tbody>
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Basic safety information

If you have any question or problem when you read the following information, please contact Shenzhen SOFARSOLAR Co., Ltd.

Outlines of this chapter

safety instruction

It mainly introduce the safety instruction when install and operate the equipment.

Symbols and signs

It mainly introduce the safety symbols on the inverter.

1.1 Safety instructions

Read and understand the instruction of this manual, and be familiar with relevant safety symbols in the paragraph, then start to install and debug the equipment. According to the national and state requirements, before connect the grid, you must get power department permission, and perform the operation only by qualified electrical engineer. Before installing and maintaining the equipment, you should cut off the high voltage application of PV array. You can also open the switch of Solar Array Combiner to cut off the high voltage. Otherwise, serious injury may be caused.

Qualified persons

The customer must make sure the operator has the necessary skill and training to do his/her job. Staff in charge of using and maintaining the equipment must be skilled, aware and mature for the described tasks and must have the reliability to correctly interpret what is described in the manual. For safety reason only a qualified electrician, who has received training and/or has demonstrated skills and knowledge in construction and in operation of this unit, can install this inverter. Shenzhen SOFARSOLAR Co., Ltd does not take any responsibility for the property destruction and personal injury because of any incorrect use.

Assembly situation requirements

Please install and start inverter according to the following sections. Put the inverter in appropriate bearing capacity objects (such as wall and components and so on), to ensure that inverter vertical placed. Choose suitable place for installing electrical equipment. And assure enough fire exit space, convenience for maintenance. Maintain proper ventilation, and ensure that have the enough air cooling cycle.

Transport requirements

If you find packing problems that may cause the damage of the inverter, or find any visible damage, please immediately notice the responsible transportation company. You can ask solar equipment installation contractor or Shenzhen SOFARSOLAR Co. Ltd for help if necessary. Transport of the equipment, especially by road, must be carried out with by suitable ways and means for protecting the components (in particular, the electronic components) from violent shocks, humidity, vibration, etc.

Electric connection

Please comply with all the current electrical regulations about accident prevention in dealing with the current inverter.

- Danger
  - Before the electrical connection, make sure to use opaque material to cover the PV modules or to disconnect PV array DC switch. Exposure to the sun, PV array will produce a dangerous voltage!

- Warning
  - All installation accomplished only by professional electrical engineer!
  - Must be trained.
  - Completely read the manual operation and understand relevant matters.

- Attention
  - Only get permission by the local power department and complete all electrical connection by professional electrical engineer then connect inverter into grid.

- Note
  - The equipment is composed of two cases. It's forbidden to remove the tamper evident label, and open the upper case. Otherwise SOFARSOLAR will not provide service and maintenance!
Operation

- Touching the power grid or the terminal of equipment may lead to die of electric shock or fire!
  - Don't touch the terminal or conductor which connect to the power circuit;
  - Pay attention to anything about grid connection and security document.

- Some internal components will be very hot when inverter is working. Please wear protective gloves!

Maintenance and repair

- Disconnected with the PV components array and electricity grid before any repair work;
- After turn off AC breaker and DC switch for 5 minutes later, the maintenance or repair of the inverter can be carried out!

EMC / noise level of inverter

Electromagnetic compatibility (EMC) refers to that one 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 electrical equipment.

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

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

1.2 Symbols and signs

Safety symbols

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

Caution of burn injuries due to hot enclosure parts!
- During working only can touch the display and key parts of inverter.

PV array should be connected to the ground in accordance with requirements of local power department!
- To protect system and the personnel security, we suggest that PV array of border and inverter should be reliable grounding.

Ensure input DC voltage < Max.DC voltage. Over voltage may cause permanent damage to inverter or other losses, which will not be included in warranty!

There is residual voltage in the inverter! Before open the equipment, operator should wait for five minutes to ensure the capacitance discharge completely.

Be careful of high voltage.

Be careful of high temperature.

Conformity with European.

Point of connection for grounding.

This indicates the allowed temperature range.

This indicates the degree of protection of the equipment according to IEC standard 70-1 (EN 60529 June 1997).

Positive pole and negative pole of the input voltage (DC).
2 Product characteristics

Outlines of this chapter

Product identification
It introduces the field of use, and how to identify different types of Sofar 30~40KTL.

Function description
It introduces how the inverter works and the function modules inside.

Protection modules
It introduces the protection modules in the inverter.

2.1 Product identification

Field of use
This equipment is a multi-string inverter designed to: transform a direct electric current (DC) coming from a photovoltaic generator (PV) into an alternating electric current (AC) suitable for being fed into the national grid.

Figure 2-1 PV Grid-tied System

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

Intended grid types:
Sofar 30~40KTL 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.

Figure 2-2 Overview of the grid configurations

Components of the inverter:
Figure 2-3 Two parts of the inverter

1 power converter part 2 wiring box
The specific models of multi-string inverter that this manual is about are divided into three groups according to the maximum output power (30 kW, 33 kW, and 40 kW).

For inverters of equal output power, the variant between the various models is the layout of the wiring box 2. The wiring box 2 has three configurations (sx = 0, 1, 2).

**Figure 2-4 Components of bottom view (1)**

1. DC switch
2. WiFi cable gland
3. Dry contact
4. RS485 input cable gland
5. RS485 output cable gland
6. DC positive poles connectors
7. AC cable gland
8. Anti-condensation valve
9. Earth terminal
10. Fan
11. DC Negative poles connectors

**Figure 2-5 Wiring Box components (1)**

1. Communication board
2. Output AC connector

**Figure 2-6 Wiring Box components (2)**

1. DC surge protector (D)

**Figure 2-7 Wiring Box components (3)**

1. DC surge protector (G)
2. AC surge protector (D)
- The choice of model of inverter must be made by a qualified technician who knows about the installation conditions, the devices that will be installed outside the inverter and possible integration with an existing system.
- Inverter type identification:
  - SOFAR - 30000 TL 8x
  - Wiring box configuration
  - Isolation transformers
  - Rated output power
  - Inverter name
- Overall dimensions: LxWxH = 764.0mm x 564.0mm x 290.5mm

Identification labels of the equipment:

The labels must NOT be hidden with objects and extraneous parts (e.g., boxes, equipment, etc.); they must be cleaned regularly and kept visible at all times.
2.2 Function description

Operating Principle
DC power generated by PV array is filtered through string detection board and input board before entering into 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 in abnormal operation conditions. At the same time, Control board can trigger the relay so as to protect the internal components.

Operating Principle
- The string detection board detects the input voltage / current, analyses the operating status of each PV string and alerts the user that a maintenance required if a problem occurs in the PV string;
- The DC switch disconnects internal circuits from the DC input to facilitate maintenance;
- DC SPD (category III, category II is added to S1 & S2) provides the discharge loop for the overvoltage power on the DC side to protect the sofar 30-40KTL internal circuits from DC overvoltage;
- The input and output electromagnetic interference (EMI) filters filter out the EMI inside the sofar 30-40KTL to ensure that the sofar 30-40KTL meets electromagnetic compatibility requirements;
- The Input Board detects the insulation impedance of the PV array and ensures the maximum output power of the PV system by measuring the voltages & currents of PV array and tracking the maximum power point (MPPT);
- The DC-AC conversion circuit converts DC power into AC power and then the AC power is fed into the electric grid. The AC output power quality meets the requirements of the electric grid;
- The output isolation relay isolates the inverter from the electric grid when the grid or the inverter is faulty.
- The LC filter filters out the high-frequency components from the AC output of sofar 30-40KTL to ensure that the AC output meets electric grid requirements;
- AC SPD (category III, category II is added to S2) provides the discharge loop for the overvoltage power on the AC side to protect the sofar 30-40KTL internal circuits from AC overvoltage;
- The Communication Board enables the inverter to communicate via RS485, WIFI(optional), user can access all the operating data via the web browser(PC) and APP(iOS & android).
2.3 Protection

A. Configurable relay
The inverter has a configurable switching relay that can be used in various operating conditions set in the dedicated menu. A typical application example is the closing of the contact when an alarm occurs.

B. Energy management unit
B.1 Remote switching on/off
This control can be used to switch the inverter on/off through an external (remote) control.

B.2 Feeding reactive power into the grid
The inverter is able to produce reactive power and can therefore feed it into the grid through the setting of the phase shift factor. Feed-in management can be controlled directly by the grid company through a dedicated RS485 serial interface.

B.3 Limiting the active power fed into the grid
The inverter can limit the amount of active power fed into the grid by the inverter to the desired value (expressed as a percentage).

B.4 Self power reduction when grid over frequency
When the grid frequency is over limited value, inverter will reduce output power which do good to the grid stability.

B.5 Power reduction due to environmental conditions, input output voltage
The power reduction value and the inverter temperature at which it occurs depend on the ambient temperature and on many operating parameters. Example: input voltage, grid voltage and power available from the photovoltaic field. The inverter can therefore reduce the power during certain periods of the day and according to the value of these parameters.

C. Data transmission
The inverter may be monitored remotely through an advanced communications system based on an RS485 serial interface, or remotely via the WIFI.

D. Software update
SD card is used for updating the firmware.

E. Monitoring string inputs
The inverter can monitor and display the voltage and current of each individual string input. It also checks the status of the strings and generates a warning in the event of a fault.

F. Monitoring surge arresters ($1,52 versions only$)
The inverter monitors the status of the surge arresters (both AC and DC) and generates a warning in the event of a fault (visible on the display).

2.4 Efficiency and derating curve

C. Grid monitoring
Continuous monitoring of the grid voltage to ensure the voltage and frequency values stay within operating limits.

D. Inverter internal device protection
The inverter has all kinds of internal protection to protect the device inside when grid or input DC side have abnormal situation.

E. Ground fault protection
This inverter must be used with panels connected with “floating” connections, that is, with positive and negative terminals without ground connections. An advanced ground fault protection circuit continuously monitors the ground connection and disconnects the inverter when a ground fault is detected. The ground fault condition is indicated by a red LED on the front panel.

2.5 Protection modules

A. Anti-islanding
In the event of a local grid outage by the electricity company, or when the equipment is switched off for maintenance operations, the inverter must be physically disconnected safely, to ensure protection of people working on the grid, all in accordance with the relevant national standards and laws. To prevent possible islanding, the inverter is equipped with an automatic protective disconnection system called “Anti-Islanding”.

B. RCMU
Sofar inverters are equipped with a redundancy on the reading of the ground leakage current sensitive to all components of both direct and alternating current. Measurement of the ground leakage current is carried out at the same time and independently by 2 different processors: it is sufficient for one of the two to detect an anomaly to trip the protection, with consequent separation from the grid and stopping of the conversion process.
Installation

Outlines of this chapter
This topic describes how to install the Sofar 30~40KTL.

Installation notes

- Do not install the Sofar 30~40KTL on flammable building materials.
- Do not store the Sofar 30~40KTL in areas with flammable or explosive materials.

**Danger**

- Do not install the Sofar 30~40KTL in places prone to body contact because the Sofar 30~40KTL itself and heat sinks become hot during the Sofar 30~40KTL operation.

**Caution**

- Take the Sofar 30~40KTL weight into consideration when transporting and moving the Sofar 30~40KTL.
- Install the Sofar 30~40KTL in an appropriate position and surface.
- Assign at least two persons to install the Sofar 30~40KTL.

**Attention**

3.1 Installation Process
This topic describes the process for installing the Sofar 30~40KTL.

3.2 Checking Before Installation
Checking Outer Packing Materials
Packaging materials and components may be damaged during transportation. Therefore, check the outer packaging materials before installing the inverter. Checking the surface of packaging materials for damage, such as holes and cracks. If any damage is found, do not unpack the inverter and contact the dealer as soon as possible. You are advised to remove the packaging materials within 24 hours before installing the inverter.

Checking Deliverables
After unpacking the inverter, check whether deliverables are intact and complete. If any damage is found or any component is missed, contact the dealer.

3.3 Tools
Prepare tools required for installation and electrical connections.

3.4 Determining the Installation Position
Determine an appropriate position for installing the Sofar 30~40KTL.

3.5 Moving the Sofar 30~40KTL
This topic describes how to move the Sofar 30~40KTL to the installation position horizontally.

3.6 Installing the Sofar 30~40KTL
Before installing the Sofar 30~40KTL, secure the shipped rear panel to the wall. Then secure the Sofar 30~40KTL to the rear panel by using hexagon screws.
### 3.3 Tools

Prepare tools required for installation and electrical connections.

Table 3-1 shows the components and mechanical parts that should be delivered.

<table>
<thead>
<tr>
<th>No.</th>
<th>Picture</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>PCS</td>
<td>Sofar 30-40KTL</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>PCS</td>
<td>Rear panel</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>PCS</td>
<td>DC input terminal</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>PCS</td>
<td>DC input terminal</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>PCS</td>
<td>Metal terminals secured to DC input power cable</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>PCS</td>
<td>Metal terminals secured to DC input power cable</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>M4 Hexagon screw</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>SFC 10 expansion bolts used to secure the rear panel to the wall</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>PCS</td>
<td>Manual</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>PCS</td>
<td>Warranty card</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>PCS</td>
<td>Certificate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tool</th>
<th>Model</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hammer drill</td>
<td></td>
<td>Used to drill holes on the wall</td>
</tr>
<tr>
<td>RJ45 crimping tool</td>
<td>N/A</td>
<td>Used to prepare RJ45 connectors for communication cables</td>
</tr>
<tr>
<td>Adjustable wrenches</td>
<td></td>
<td>Used to tighten expansion bolts</td>
</tr>
<tr>
<td>Pin-hand screwscrews</td>
<td>M4</td>
<td>Used to tighten or loosen screws when installing AC power cables. Used to remove AC connectors from the sofar 30-40KTL. Note: The ring screwdriver and star-hand screwscrews are alternative.</td>
</tr>
<tr>
<td>Socket wrench</td>
<td>M5</td>
<td>Used to tighten ground bolts</td>
</tr>
<tr>
<td>Nutdriver</td>
<td>N/A</td>
<td>Used to tighten expansion bolts</td>
</tr>
<tr>
<td>Removal tool</td>
<td>N/A</td>
<td>Used to remove DC connectors from the sofar 30-40KTL.</td>
</tr>
<tr>
<td>Diagonal pliers</td>
<td>N/A</td>
<td>Used to cut and tighten cable ties</td>
</tr>
<tr>
<td>Wire stripper</td>
<td>N/A</td>
<td>Used to peel cable jackets</td>
</tr>
<tr>
<td>Tool</td>
<td>Model</td>
<td>Function</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Cable cutter</td>
<td>N/A</td>
<td>Used to cut power cables</td>
</tr>
<tr>
<td>Hexagon socket</td>
<td>M4,M6</td>
<td>M6 use to uninstall and install the front top cover and down cover. M4 use to install the rear panel on the sofar 30~40KTL.</td>
</tr>
<tr>
<td>Crimping tools</td>
<td>N/A</td>
<td>Used to crimp power cables</td>
</tr>
<tr>
<td>Vacuum cleaner</td>
<td>N/A</td>
<td>Used to clean up dusts after drilling holes</td>
</tr>
<tr>
<td>Multimeter</td>
<td>N/A</td>
<td>Used to check grounding</td>
</tr>
<tr>
<td>Marker</td>
<td>N/A</td>
<td>Used to mark signs</td>
</tr>
<tr>
<td>Measuring tape</td>
<td>N/A</td>
<td>Used to measure distances</td>
</tr>
<tr>
<td>Level</td>
<td>N/A</td>
<td>Used to ensure that the rear panel is properly installed</td>
</tr>
<tr>
<td>ESQ gloves</td>
<td>N/A</td>
<td>Operators wear ESQ gloves when installing equipment.</td>
</tr>
<tr>
<td>Safety goggles</td>
<td>N/A</td>
<td>Punch operator wearing</td>
</tr>
<tr>
<td>Anti-dust respirator</td>
<td>N/A</td>
<td>Punch operator wearing</td>
</tr>
</tbody>
</table>

3.4 Determining the Installation Position

Determine an appropriate position for installing the Sofar 30~40KTL. Comply with the following requirements when determining the Installation position:

**Figure 3-2 Installation position requirements**

Minimum installation distance for single sofar 30~40KTL.
3.5 Moving the Sofar 30~40KTL

This topic describes how to move the Sofar 30~40KTL to the installation position horizontally.

Procedure

Step 1 Opening the packing, insert hands into the slots on both sides of the Sofar 30~40KTL and hold the handles, as shown in Figure 3-3 and Figure 3-4. Two persons are required to move the Sofar 30~40KTL.

Figure 3-3 Moving the Sofar 30~40KTL (1)

Figure 3-4 Moving the Sofar 30~40KTL (2)

Step 2 Lift the Sofar 30~40KTL from the packing case and move it to the installation position.

- To prevent device damage and personal injury, keep balance when moving the Sofar 30~40KTL, because the Sofar 30~40KTL is heavy.
- Do not put the Sofar 30~40KTL with its wiring terminals contacting the floor, because the power ports and signal ports are not designed to support the weight of the Sofar 30~40KTL. Place the Sofar 30~40KTL horizontally.
- When placing the Sofar 30~40KTL on the floor, put foam or paper under the Sofar 30~40KTL to protect its shell.

--- End

3.6 Installing the Sofar 30~40KTL

Step 1 To determine the position for drilling holes, level hole positions, and then mark the hole position by using a marker, use the hammer drill to drill hole on the wall. Keeping the hammer perpendicular to the wall, do not shake when drilling, so as not to damage the walls. If the aperture errors, need to reposition.

Step 2 The expansion screw is vertically inserted into the hole, pay attention to expanding screw insertion depth (not too shallow).

Step 3 Putting the rear panel on the wall, the rear panel is fixed by the nuts.
Outlines of this chapter

This topic describes the Sofar 30~40KTL electrical connections. Read this part carefully before connecting cables.

NOTE:

Before performing electrical connections, ensure that the DC switch is OFF. Since the stored electrical charge remains in a capacitor long after the DC switch is turned OFF. So it’s necessary to wait for at least 5 minutes for the capacitor to be electrically discharged.

### 4.1 Electrical connection

This topic describes the electrical connection process.

### 4.2 Connecting PGND Cables

Connect the Sofar 30~40KTL to the grounding electrode using protection ground (PGND) cables for grounding purposes.

### 4.3 Connecting AC Output Power Cables

Connect the Sofar 30~40KTL to the AC power distribution frame (PDF) or electrical grid using AC output power cables after obtaining approval from local electrical grid operator.

### 4.4 Connecting Communication Cables

This topic describes the functions of WIFI and RS485 ports and the method of connecting WIFI and RS485 communication cables.

### 4.5 Connecting DC Input Power Cables

Connect the Sofar 30~40KTL to PV arrays using DC input power cables.

### 4.6 Safety check

Before start the inverter, comply with the safety precautions and check AC–DC connections.
4.1 Electrical connection

Figure 4-1 Shows the flowchart for connecting cables to the Safar 30-40KTL

![Flowchart diagram]

End

Connect DC Input power Cables

Connect Communication Cables

Start

Connect PGND Cables

Connect AC Output power Cables

Prerequisites:
The PGND cables are prepared (8 AWG outdoor power cables are recommended for grounding purposes).

Procedure:

Step 1: Remove the insulation layer with an appropriate length using a wire stripper, as shown in Figure 4-3.

Figure 4-2 Ground terminal composition

Step 2: Insert the exposed core wires into the OT terminal and crimp them by using a crimping tool, as shown in Figure 4-4.

Note: L2 is 2 to 3mm longer than L1

Step 3: Install the crimped OT terminal, flat washer, and spring washer on the M6 welded stud, and tighten the nut to a torque of 5 N.m using a socket wrench.

Note: To enhance the anti-corrosion performance of the ground terminals, apply silica gel on them after connecting the ground cable.

Note: Good grounding for the Safar 30-40KTL can help resist the impact of the surge voltage and improve the EMI performance. First connect the PGND cable before connecting the AC power cable, DC power cable, and communication cable. For the system with one Safar 30-40KTL, connect the PGND cable to the ground. For the system with multiple Safar 30-40KTL, connect the PGND cables of all Safar 30-40KTL to the grounding electrode using equipotential bonding. If the installation location is near the ground, first connect the PGND cable to the ground before installing the Safar 30-40KTL on the wall.
4.3 Connecting AC Output Power Cables

Connect the Sofar 30~40KTL to the AC power distribution frame (PDF) or electrical grid using AC output power cables.

- It is not allowed for several inverters to use the same circuit breaker.
- It is not allowed to connect loads between inverter and circuit breaker.

**Caution**

**Context**

All the AC output cables used for the inverters are outdoor five-core cables. To facilitate the installation, use flexible cables. Table 4-1 lists the recommended specifications for the cables and the breakers.

**Table 4-1**

<table>
<thead>
<tr>
<th>Type</th>
<th>Sofar 30000TL-Sx</th>
<th>Sofar 33000TL-Sx</th>
<th>Sofar 40000TL-Sx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable (Copper)</td>
<td>≥ 10mm²</td>
<td>≥ 10mm²</td>
<td>≥ 10mm²</td>
</tr>
<tr>
<td>Breaker</td>
<td>63A</td>
<td>63A</td>
<td>63A</td>
</tr>
</tbody>
</table>

**Caution**

Note: For the sake of safety, please make sure to use correctly sized cables, otherwise the current makes the cable overheat or overload, even cause a fire.

**Multi core copper wire**

The cross-section of the AC line conductor must be sized in order to prevent unwanted disconnections of the inverter from the grid due to high impedance of the line that connects the inverter to the power supply point; in fact, if the impedance is too high, it causes an increase in the AC voltage that, on reaching the limit set by the country of installation, causes the inverter to switch off.

**Table 4-2**

<table>
<thead>
<tr>
<th>The cable cross-sectional area (mm²)</th>
<th>The maximum length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sofar 30000TL-Sx</td>
</tr>
<tr>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>16</td>
<td>49</td>
</tr>
</tbody>
</table>

**Procedure**

Sofar 30~40KTL is a three-phase output inverter, strictly comply with local grid-connection requirements and safety standards.

**Step 1** Open the cover.
*Figure 4-5 Open the cover schematic diagram*

**Step 2** Remove the insulation layer of an appropriate length according to figure 4-6, then insert the AC output cable through the PG waterproof cable gland.
*Figure 4-6 AC Output Cable schematic diagram*

**Step 3** Connecting the AC output power cable: The AC output cable (R,S,T,N and PE) is connected to the terminal block, as shown in figure 4-7.
*Figure 4-7 Cable connection schematic diagram*

--- End
4.4 Connecting Communications Cables

Connecting Communications Port

Sofar 30-40KTL has two communication interface, RS485 interface, WIFI interface, as shown in the following figure:

Figure 4-8 WIFI/RS485 location map

Connecting RS485 Communications Cables

By the RS485 communication line, connecting Sofar 30-40KTL 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 4-9 Waterproof RJ45 connector composition


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 30-40KTL 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 4-11 RS485 Connecting Communications Cables(1)

<table>
<thead>
<tr>
<th>No.</th>
<th>Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White and orange</td>
<td>RS485 B-, RS485 differential signal</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td>RS485 A-, RS485 differential signal</td>
</tr>
<tr>
<td>3</td>
<td>White and green</td>
<td>RS485 A-, RS485 differential signal</td>
</tr>
<tr>
<td>4</td>
<td>Blue</td>
<td>RS485 A-, RS485 differential signal</td>
</tr>
<tr>
<td>5</td>
<td>White and blue</td>
<td>RS485 B-, RS485 differential signal</td>
</tr>
<tr>
<td>6</td>
<td>Green</td>
<td>RS485 B-, RS485 differential signal</td>
</tr>
<tr>
<td>7</td>
<td>White and brown</td>
<td>NC</td>
</tr>
<tr>
<td>8</td>
<td>Brown</td>
<td>NC</td>
</tr>
</tbody>
</table>

Figure 4-12 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 30-40KTL.

Step 6 Insert sealing plug into housing, and tighten the screw nut.

Figure 4-13 RS485 Connecting Communications Cables(3)

---End

Follow-up Procedure

To remove an RJ45 connector from sofar 30-40KTL, remove the cable screw nut, press the clip on the RJ45 connector, and then pull out the shielded RJ45 connector.
Connecting WIFI Communications Cables

By the WIFI communication line, connecting Sofar 30~40KTL to communication equipment (such as data acquisition, PC terminal).

Procedure

Step 1 Buckle the antenna to the WIFI module.
Figure 4-13 WIFI Connecting Communications Cables(1)

Step 2 Open Sofar 30~40KTL lower cover and insert the WIFI module to the location as shown.
Figure 4-14 WIFI Connecting Communications Cables(2)

Step 3 Screw out the sealing nut corresponding to let the antenna expose a portion, and tighten the screw nut.
Figure 4-15 WIFI Connecting Communications Cables(3)

Note: Pull the WIFI antenna out a little bit to enhance the signal.

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 S-WE015).

1. USB-RS485
2. S-WE015

Set the match resistor by the SWT2, the corresponding list as follows (0 OFF, 1 ON).

<table>
<thead>
<tr>
<th>SWT2_1</th>
<th>SWT2_2</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Reserve</td>
<td>No connect</td>
</tr>
<tr>
<td>1</td>
<td>Reserve</td>
<td>Connect</td>
</tr>
</tbody>
</table>
If only one Sofar 30~40KTL is used, use a communication cable with waterproof RJ45 connectors, and choose either of the two RS485 ports and need to set the SWT4(RS485 address as shown in Figure 4-8) and SWT2(Match Resistance as shown in Figure 4-8).

Figure 4-16 A single Sofar 30~40KTL connecting Communications

If multiple Sofar 30~40KTL are used, connect all Sofar 30~40KTL in daisy chain mode over the RS485 communication cable. First, set the SWT4(RS485 address dial switch) and SWT2(Match Resistance).

Figure 4-18 Multi Sofar 30~40KTL connecting Communications

According to the manufacturers to provide SN number can register remote monitoring of Sofar 30~40KTL through http://www.solarmanpv.com/portal/LoginPage.aspx.

WIFI

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 S-WEO1S).

According to the manufacturers to provide SN number can register remote monitoring of Sofar 30~40KTL through http://www.solarmanpv.com/portal/LoginPage.aspx.

Figure 4-19 Connect multiple Wi-Fi to wireless router

Note:
- The length of the RS485 communication cable should be less than 1000 m.
- The length of the WiFi communication cable should be less than 100 m.
- If multiple Sofar 30~40KTL are connected to the monitoring device over an RS485/RS232 converter, a maximum of 31 inverter can be connected in a daisy chain.
- If multiple Sofar 30~40KTL are connected to a S-WEO1S, a maximum of 31 Sofar 30~40KTL can be connected in three daisy chains.

Connecting Relay Cables

The Sofar 30~40KTL has a multifunctional relay, its output can be configured. The connecting terminal in a communication board, as shown in Figure4-8. Connecting CNT10 view as shown as follow.

It can be connected to the normally open mode (i.e. connecting NO contact and COM contact), can also be configured as a normally closed mode (i.e. connecting NC contact and COM contact).

The Relay has 4 different control function, the details please see the LCD display interface settings on the set relay function description.
## Procedure

**Step 1** To prepare the appropriate cable. The front of a wire stripping to will be in accordance with the following picture size, and then through the PG waterproof joint.

![Figure 4-19 Relay Connection (1)](image1)

**Step 2** Insert sealing plug into housing, and tighten the screw nut.

![Figure 4-20 Relay Connection (2)](image2)

**Step 3** The cable stripped to the corresponding stem node hole.

![Figure 4-21 Relay Connection (3)](image3)

--- End

---

### 4.5 Connecting DC Input Power Cables

Connect the sofar 30~40KTL to PV arrays over DC input power cables.

Input mode selection: sofar 30~40KTL has 2 MPPT. The two MPPT can run independently, but also can be operated in parallel. According to the system design, the user can choose the mode of MPPT operation.

**Independent mode (default):**

If the two MPPT panels is independent, the input mode should be set as "independent mode".

The setting method is introduced at chapter 6.3.

**Parallel mode:**

If the two MPPT panels is paralleled together by combiner, the input mode should be set as "parallel mode".

The setting method is introduced at chapter 6.3.

---

**Note**

According to the inverter type, choose the inverter accessories (cables, fuse holder, fuse, breaker etc.). So far inverter with PV array should be excellent performance, reliable quality. The open circuit voltage of PV must be less than Maximum DC input voltage of So far inverter. The output voltage of the solar array must be consistent with the MPPT voltage range.

**Table 4-5 MPPT voltage range**

<table>
<thead>
<tr>
<th>Type</th>
<th>Sofar 30000TL-Sx</th>
<th>Sofar 33000TL-Sx</th>
<th>Sofar 40000TL-Sx</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPPT voltage range</td>
<td>250~960 Vdc</td>
<td>250~960 Vdc</td>
<td>250~960 Vdc</td>
</tr>
<tr>
<td>Max. input voltage</td>
<td>1000 Vdc</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DC inductance 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.

---

**Note**

- Check polarity of PV array, to ensure the correct wiring of PV array;
- Please don't put the positive or negative of the PV array connect to earth.
PV modules generate electric energy when exposed to sunlight and can create an electrical shock hazard. Therefore, when connecting DC input power cable, cover PV modules by using opaque cloth. Before performing electrical connections, ensure that voltages of the DC cables should be within the safe voltage range, that is, lower than 60 V DC, and the DC SWITCH is OFF. Otherwise, the high voltage may result in fatal danger.

Ensure that the following conditions are met. Otherwise, fire accident may occur.

- PV modules connected in series in each PV array are of the same specifications.
- The open-circuit voltage of each PV array is always lower than or equal to 1000 V DC.
- The open-circuit voltage of each PV array is always lower than or equal to 18 A DC.
- The output power of each PV array is always less than or equal to the maximum input power of the Sofar 30–40KTL.
- The positive and negative terminals of PV arrays connect to the positive and negative DC input terminals respectively.

DC input connectors are classified into positive and negative connectors, as shown in Figure 4-24 and Figure 4-25.

### Figure 4-24 Positive connector composition

1. Housing 2. Cable gland 3. Positive connector

### Figure 4-25 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 30–40KTL 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 shown in Figure 4-25.

Figure 4-25: Connecting DC input power cables

1. Positive power cable  2. Negative power cable

Note:
L2 is 2 to 3 mm larger than L1.

Step 5: 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 crimping tool. Ensure that the cables are stripped until they cannot be pulled out by force less than 450 N, as shown in Figure 4-27.

Figure 4-26: Connecting DC input power cables

1. Positive power cable  2. Negative power cable

Step 6: Insert crimped power cables into corresponding housings until you hear a "click" sound. The power cables snap into place.
Step 7: Reinstall cable glands on positive and negative connectors and rotate them against the insulation cover.

Step 7: Insert the positive and negative connectors into corresponding DC input terminals of the SFAR B0400XTL until you hear a "click" sound, as shown in Figure 4-28.

Figure 4-27: Connecting DC input power cables

--- End ---
Follow-up Procedure
To remove the positive and negative connectors from the Sofar 30K-40KTL, insert a removal wrench into the bayonet and press the wrench with an appropriate strength, as shown in Figure 4-29.

Figure 4-29 Removing a DC input connector

4.6 Safety check

- Photovoltaic array
  Before the inverter operation, need to be examined for the photovoltaic array. Check Open circuit voltage of the each PV array whether accord with the requirements.
  - Ensure Open circuit voltage of the each PV array accorded with the requirements;
  - Ensure that the positive and negative polarity is correct.

- Sofar 30K-40KTL DC connect
  Use the multimeter to check the DC side voltage and current;
  Check the DC cable. Note the positive and negative poles cannot be reversed. Consistent with the positive and negative pole of photovoltaic array, measured each Input Open circuit voltage
  Compare the voltage, if the difference is greater than 3%, PV array line may be a fault

- Sofar 30K-40KTL AC connect
  Ensure the AC breaker of the inverter is off
  Check the inverter phase with grid is connected properly. Check the voltage of each phase is within a predetermined range. If possible, Measure the THD, if the distortion is serious, the inverter may not work.
  - Installing cover and Locking screw.

Figure 4-29 NOT allowed: connect loads between inverter and circuit breaker

5) Commissioning of inverter

5.1 Safety inspection before commissioning

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.
If the inverter indicates any other fault, please refer to part 7—error messages for help.
6) Operation Interface

Outlines of this chapter
Introduce the display, operation, buttons and LED light of SoFar 30~40KTL.

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: Fault
  ON: The inverter is faulty
  OFF: Normal operation

- GFCI Warning Light (RED)
  ON: GFCI output
  OFF: GFCI normal

6.2 Standard Interface

LCD standard interface is used to display inverter states, information and parameter setting 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
A6 - Indicates today's energy
A7 - Indicates the total energy

A10 - MPPT SCAN function is activated (not available)
A9 - indicates real time output power
A8 - Light ON for inverter high temperature
A11 - Light ON when input voltage over 350V
A12 - indicates real time input voltage and current channel
A13 - Indicates the input power 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 current or frequency and displays in turns in every three seconds
A16 - Indicates R/T/S phase voltage and displays in turns in every three seconds
When power-on, LCD Interface displays INITIALIZING, refer below picture.

When control board successfully connected with communication board, the LCD display the current state of the Inverter, display as shown in the figure below.

**6.3 Main Interface**

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

- **Normal**
  - 1. Enter Setting
  - 2. EventList
  - 3. SystemInfo
  - 4. SystemTime
  - 5. Software Update

Inverter status 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 250V, 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 enters 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.
(A) “Enter Setting” Interface as below:

1. Enter Setting

1. Set time
2. Clear Produce
3. Clear Events
4. Set Country Code
5. Remote Control
6. Relay Command
7. Enable Set Country
8. Set Total Energy
9. Set Mod-bus Address
10. Set Inputmode
11. Set Language
12. Set StartPara
13. Set SafetyVolt
14. Set SafetyFreq
15. Set Insulation
16. Relay Test

- **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, to choose different settings. Users press "OK" button and start to set up time. Time set from year, month, day, minutes, and seconds in turns, to choose different settings.

- **Clear Produce**
  Users press "Back" button to enter "1. Enter Setting" interface, Press "OK" button to enter main setting interface. Then Enter "2. Clear Produce" 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. If it's shown "set disable" on the screen, then you can NOT choose the operating country, you should enable country setting through "7. Enable Set 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.

Table 6-1 country code setting

<table>
<thead>
<tr>
<th>Code</th>
<th>country</th>
<th>Code</th>
<th>country</th>
<th>Code</th>
<th>country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany VDE AR-N4105</td>
<td>China</td>
<td>UK-G59</td>
<td>EU EN50438</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy CEI0-21</td>
<td>France</td>
<td>IEC EN61727</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>Poland</td>
<td>Korea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain RD1699</td>
<td>Turkey</td>
<td>Sweden</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>Germany BDEW 0126</td>
<td>Europe General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greece Continent</td>
<td>Germany VDE 0126</td>
<td>Customer VDE 0126</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>Italy CEI0-16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>UK-GB3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Greece island</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Remote Control
Users press "Back" button to enter "1. Enter Setting" interface, Press "OK" button to enter main setting interface. Enter "5. Remote Control" by pressing "Up" button or "Down" button. Press "OK" button and enter Remote Control Switch On&Off interface. Choose "1. Enable" or "2. Disable" by pressing "Up" button or "Down" button, press "OK" button, then communication board starts to transmit control signals to control board. “success” is displayed after setting success; otherwise it will show “fail”.

Relay Command
Users press "Back" button to enter "1. Enter Setting" interface, Press "OK" button to enter main setting interface. Enter "6. Relay Command" by pressing "Up" button or "Down" button, press "OK" button and enter "Relay Command setting" interface. Choose corresponding setting items by pressing "Up" button or "Down" button, then press "OK" button. "success" or "fail" is displayed after setting.

Relay Command Definition:

<table>
<thead>
<tr>
<th>1. Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>The relay switches whenever a connection to (and therefore a disconnection from) the grid occurs.</td>
</tr>
<tr>
<td>If the relay contractor is in normally open (close) mode, the contact will stay open (or closed) until the inverter is connected to the grid; once the inverter connects to the grid and starts to export power, the relay switches state and therefore closes (or opens).</td>
</tr>
<tr>
<td>When the inverter disconnects from the grid, the relay contact returns to its position of rest, namely open (or closed).</td>
</tr>
</tbody>
</table>

| 2. Alarm |
| The relay switches whenever there is an alarm on the inverter (Error). No switching occurs when there is a Warning. |
| If the relay contractor is in normally open (close) mode, the contact will stay open (or closed) until the inverter reports an error; once the inverter reports an error, the relay switches state and therefore closes (or opens). The contact remains switched from its rest condition until normal operation is restored. |

| 3. Config Alarm |
| The relay switches whenever there is an alarm (Error) or a Warning, which have previously been selected by the user through the PC. The contact will stay open (or closed) until the inverter reports an error or a warning and all of the settings selected from the menu; once the inverter displays an error or a warning out of those selected, the relay switches state and therefore closes (or opens) the contact. The relay remains switched from its rest condition until the alarm or warning has disappeared. |

| 4. Relay Disable |
| Control function is forbidden |

Enable Set Country
Users press "Back" button to enter "1. Enter Setting" interface, Press "OK" button to enter main setting interface. Enter "7. Enable Set 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 Address
Users press "Back" button to enter "1. Enter setting" interface, Press "OK" button to enter main setting interface. Enter "9. 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 30~40KTL 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 "10. Set inputmode" by pressing "Up" button or "Down" button. Press "OK” button and enter setting interface. Choose corresponding 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 "11. Set Language" by pressing "Up" button or "Down" button. Press "OK” button and enter setting interface. Choose corresponding 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 “12. 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 “13. 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 “14. 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 “15. 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.

• Relay Test
Users press Back button to enter “1. Enter setting” interface, Press OK button to enter main setting interface. Enter “16. Relay Test” by pressing “Up” button or “Down” button, then press “OK” button and start test relay. “Success” will be displayed if setting successfully.

(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.

Press “OK” button to get the total event numbers, show as below:

```
Events TotalNum: 02
```

Press “OK” button again; user can check each ID number and happening time, see below:

```
2. EventList

Key "OK"

Events AllNum: 02

Key "OK"

ID 91

Event ID NO.

2013-10-31 16:42

Happening time
```
(C) "SystemInfo" Interface as below:

|------------------|------------------|---------------|----------------|------------|---------------|------------------|

- **Inverter Type**
  Users press "Back" button and "Up" button or "Down" button enter "3. SystemInfo" interface, Press "OK" button to 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 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, Press "OK" button to 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, Press "OK" button to 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, Press "OK" button to 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 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.

- **Relay Command**
  Users press "Back" button and "Up" button or "Down" button to enter "3. SystemInfo" interface, then Press "OK" button to enter into system information checking interface, then press "Up" button or "Down" button enter into "7. Relay Command", then press "OK" button, the Relay Command 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. SystemTime", 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 0001), 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.

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

**Step 1** First, open sofar 30-40KTL lower cover.

**Step 2** After open the lower cover, Press SD card (the SD card as shown in Figure 4-8), then the SD card will automatically pop up.

**Step 3** The SD card reader must be ready by the users, so that SD card can easily 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 0001.

**Step 8** System update main DSP, slave DSP, FUSE and ARM in turns. If main DSP update success, the LCD will display "Update DSP1 OK", otherwise display "Update DSP Fail"; If slave DSP update success, the LCD will display "Update DSP2 OK", otherwise display "Update DSP2 Fail"; If FUSE update success, the LCD will display "Update FUSE OK", otherwise display "Update FUSE 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 the lower cover, and turn on the DC breaker and AC breaker again, the inverter will enter the running state.
Trouble shooting and maintenance

Outlines of this chapter
This topic describes how to perform daily maintenance and troubleshooting to ensure long-term proper operation of the sofar 30~40KTL inverter.

7.1 Trouble shooting
This section contains information and procedures for solving possible problems with the sofar 30~40KTL 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 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>
<thead>
<tr>
<th>EventList NO.</th>
<th>EventList Name</th>
<th>EventList description</th>
<th>solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID01</td>
<td>GridOVP</td>
<td>The power grid voltage is too high</td>
<td>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.</td>
</tr>
<tr>
<td>ID02</td>
<td>GridLVP</td>
<td>The power grid voltage is too low</td>
<td>If the alarm occurs frequently, check whether the grid voltage/percentage is within the acceptable range. If no, contact SOFAR technical support.</td>
</tr>
<tr>
<td>ID03</td>
<td>GridLOPP</td>
<td>The power grid frequency is too high</td>
<td>If the grid voltage/percentage 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.</td>
</tr>
<tr>
<td>ID04</td>
<td>GridLFP</td>
<td>The power grid frequency is too low</td>
<td>If the grid voltage/percentage 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.</td>
</tr>
</tbody>
</table>

<p>| ID05          | PVVLPV       | The input voltage is too low | Check whether too few PV modules are series connected in a PV string, thus the voltage(Voc) 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. If no, contact SOFAR technical support. |
| ID06          | VtroLow      | Low voltage across | Check the AC wiring connection to the electric grid, if it’s correct, please contact SOFAR technical support. |
| ID07-ID08     | Reserved     | Reserved             | Reserved |
| ID09          | PGMVPV       | 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. If no, contact SOFAR technical support. |
| ID10          | IpUnbalance  | Input current is not balanced | Check the input module(s)/module(s) setting of SOFAR inverter according to Section 4.5 of this user manual. |
| ID11          | PwConfigWrong| Incorrect input model mode | 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. |
| ID12          | GFCIFault    | GFCI Fault            | If the fault occurs frequently and lasts a long time, check whether the insulation resistance between the PV array and the AC wiring is correct, and the grid back to normal. |
| ID13          | Reserved     | Please sequence errors | Check whether the input current is higher than the maximum input current of SOFAR inverter, then check the input wiring, if both are correct, please contact SOFAR technical support. |
| ID14          | HwBoostOCP   | The input current is too high and has happened hardware protection | 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. |
| ID15          | HwAvOCP      | The grid current is too high and has happened hardware protection | Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| ID16          | AcRmsOCP     | The grid current is too high | Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| ID17          | HwADFeasGrid | The grid current sampling error | Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| ID18          | HwADFeasDCI  | The DCI sampling error | Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| ID19          | HwADFeasVgrid| The grid voltage sampling error | Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| ID20          | GPGDeviceFault| The GFCI sampling error | Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| ID21          | MchpFault    | The master chip fault | Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| ID22          | HwAuxPowerFault| The auxiliary voltage error | Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| ID23          | BusVolZeroFault| The bus voltage sampling error | Check whether the fault is rectified. If no, please contact SOFAR technical support. |
| ID24          | IacRmsUnbalance| The output current is not balanced | Check whether the fault is rectified. If no, please contact SOFAR technical support. |</p>
<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID25</td>
<td>Bus UVP</td>
<td>The bus voltage is too low. If the PV array configuration is correct (no ID3 fault), the possible cause is that the solar irradiance is too low. SOFAR inverter automatically returns to normal operating state after the solar irradiance returns to normal level.</td>
</tr>
<tr>
<td>ID26</td>
<td>Bus OVP</td>
<td>The bus voltage is too high. ID26-ID27 are internal faults of SOFAR inverter, turn OFF the &quot;DC switch&quot;, wait for 5 minutes, then turn ON the &quot;DC switch&quot;. Check whether the fault is rectified. If no, please contact SOFAR technical support.</td>
</tr>
<tr>
<td>ID27</td>
<td>Vbus Unbalance</td>
<td>The bus voltage is not balanced. If the input mode(parallel mode/ independent mode) setting of SOFAR inverter according to Section 4.5 of this user manual.</td>
</tr>
<tr>
<td>ID28</td>
<td>DoiOCP</td>
<td>The Dci is too high. Check whether the fault is rectified. If no, please contact SOFAR technical support.</td>
</tr>
<tr>
<td>ID29</td>
<td>SwOCP Status</td>
<td>The grid current is too high. Internal faults of SOFAR inverter, turn OFF the &quot;DC switch&quot;, wait for 5 minutes, then turn ON the &quot;DC switch&quot;. Check whether the fault is rectified. If no, please contact SOFAR technical support.</td>
</tr>
<tr>
<td>ID30</td>
<td>SwOCP Status</td>
<td>The input current is too high. Check whether the input current is higher than the maximum input current of SOFAR inverter, then check the input wiring, if both are correct, please contact SOFAR technical support.</td>
</tr>
<tr>
<td>ID49</td>
<td>Consistent Fault_VGrid</td>
<td>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 &quot;DC switch&quot;, wait for 5 minutes, then turn ON the &quot;DC switch&quot;. Check whether the fault is rectified. If no, please contact SOFAR technical support.</td>
</tr>
<tr>
<td>ID50</td>
<td>Consistent Fault_PGrid</td>
<td>The grid frequency sampling value between the master DSP and slave DSP is not consistent.</td>
</tr>
<tr>
<td>ID51</td>
<td>Consistent Fault_DCI</td>
<td>The Dci sampling value between the master DSP and slave DSP is not consistent.</td>
</tr>
<tr>
<td>ID52</td>
<td>Consistent Fault_GFCl</td>
<td>The GFCI sampling value between the master DSP and slave DSP is not consistent.</td>
</tr>
<tr>
<td>ID53</td>
<td>SpiCommLoss</td>
<td>The ppi communication between the master DSP and slave DSP is fault. If the remote input of remote input and output control signal port on the communication board exceeds the upper limit, if yes, improve ventilation to decrease the temperature.</td>
</tr>
<tr>
<td>ID54</td>
<td>SpiCommLoss</td>
<td>The sei communication between the control board communication board is fault. If the remote input of remote input and output control signal port on the communication board exceeds the upper limit, if yes, please replace the corresponding fan.</td>
</tr>
<tr>
<td>ID55</td>
<td>Relay Test Fail</td>
<td>The relay fault.</td>
</tr>
<tr>
<td>ID56</td>
<td>PvtFault</td>
<td>The isolation resistance is too low. Check the isolation resistance between the PV array and earthing (ground), if a short circuit occurs, rectify the fault.</td>
</tr>
<tr>
<td>ID57</td>
<td>OverTempFault_Inv</td>
<td>The inverter temp is too high. Ensure the installation position and installation method meet the requirements of Section 3.4 of this user manual.</td>
</tr>
<tr>
<td>ID58</td>
<td>OverTempFault_Boost</td>
<td>The Boost temp is too high. Check whether the ambient temperature of the installation position exceeds the upper limit. If yes, improve ventilation to decrease the temperature.</td>
</tr>
<tr>
<td>ID59</td>
<td>OverTempFault_EnV</td>
<td>The environment temp is too high. Check whether the ID99-ID92 fault (fan) fault exist, if yes, please replace the corresponding fan.</td>
</tr>
<tr>
<td>ID60</td>
<td>ID64</td>
<td>Reserved. Reserved. Reserved.</td>
</tr>
</tbody>
</table>

ID65 | Unrecover Bus OCP                    | The bus voltage is too high, and has cause unrecoverable fault. ID65-ID71 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 | Unrecover Inverter                  | The grid current is too high, and has cause unrecoverable fault. |
| ID67 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID68 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID69 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID70 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID71 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID72 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID73 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID74 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID75 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID76 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID77 | Unrecover Inverter                   | The grid current is too high, and has cause unrecoverable fault. |
| ID78 | ID80                                 | Reserved. Reserved. Reserved. |

ID81 | OverTemp Deming                      | 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. |
| ID82 | OverTemp Deming                      | The inverter has derated because of the temperature is too high. SOFAR inverter automatically reduces the output power when the frequency of electrical grid is too high. |
| ID83 | Remote Deming                        | The inverter has derated because of the temperature is too high. |
| ID84 | Remote Deming                        | The inverter has derated because of the temperature is too high. |
| ID85 | ID89                                 | Reserved. Reserved. Reserved. |
### Outlines of this chapter

This topic describes how to remove, pack, and dispose the Sofar 30~40KTL inverter.

#### 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.

Remove inverter from the mounting carefully to avoid injury. Please note that the Sofar 30~40KTLs inverter’s weight over 45 kgs.

#### 8.2 Package

If possible, please pack the inverter in the original packaging. If original packing it is not available, use an equivalent carton suitable for loads more than 50 kg, has handle and can be closed fully.

#### 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

Outlines of this chapter

This topic lists the technical specifications for all Sofar 30~40KTL inverters.

9.1 Input parameter (DC)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sofar 30000TL</th>
<th>Sofar 33000TL</th>
<th>Sofar 40000TL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. input voltage</td>
<td>1000V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start-up input voltage</td>
<td>350V (+/-1v)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPPT</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of DC inputs</td>
<td>4 for each MPPT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input range with Full power operation with 2 MPPT parallel</td>
<td>480V-800V</td>
<td>560V-800V</td>
<td></td>
</tr>
<tr>
<td>Max DC power for single MPPT</td>
<td>5380(480V-800V)</td>
<td>17000(480V-800V)</td>
<td>20400(560V-800V)</td>
</tr>
<tr>
<td>Operating input voltage</td>
<td>250V-960V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. input MPPT current</td>
<td>32A/32A</td>
<td>35A/35A</td>
<td></td>
</tr>
<tr>
<td>Input short circuit current</td>
<td>38A</td>
<td>42A</td>
<td></td>
</tr>
<tr>
<td>Overvoltage category of</td>
<td>III(II-52 version)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9.2 Output parameter (AC)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sofar 30000TL</th>
<th>Sofar 33000TL</th>
<th>Sofar 40000TL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power</td>
<td>27000W</td>
<td>30000W</td>
<td>36000W</td>
</tr>
<tr>
<td>Max. AC power</td>
<td>30000VA</td>
<td>33000VA</td>
<td>40000VA</td>
</tr>
<tr>
<td>Rated AC voltage</td>
<td>3/N/PE,230/400Vac</td>
<td></td>
<td>3/N/PE,277/480Vac</td>
</tr>
<tr>
<td>Grid voltage range</td>
<td>310-480Vac(adjustable)</td>
<td></td>
<td>422-528Vac</td>
</tr>
<tr>
<td>Grid frequency range</td>
<td>44-55Hz/54-66Hz(adjustable, must meet local grid requirements)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THDI</td>
<td>&lt;3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power factor</td>
<td>1 ( adjustable +/-0.8)</td>
<td></td>
<td>III(II-52 version)</td>
</tr>
</tbody>
</table>

9.3 Efficiency, Safety and Protection

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sofar 30000TL</th>
<th>Sofar 33000TL</th>
<th>Sofar 40000TL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max efficiency</td>
<td>98.5%</td>
<td>98.7%</td>
<td>98.7%</td>
</tr>
<tr>
<td>Weighted eff. (EU/CEC)</td>
<td>98.2%</td>
<td>98.4%</td>
<td></td>
</tr>
<tr>
<td>Self-consumption at night</td>
<td>&lt;1W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed in start power</td>
<td>48W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPPT efficiency</td>
<td>&gt;99.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC reverse</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC switch</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input/output SPD(II)</td>
<td>Input SPD(II): (B1, B2 version)</td>
<td></td>
<td>Output SPD(II): (B2 version)</td>
</tr>
<tr>
<td>Safety protection</td>
<td>Anti islanding, RCMU, Ground fault monitoring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>CE, CGC, AS4777, AS3100, VDE 4105, C10-C11, G59 (more available on request)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>RS485, WiFi(option), Multi-function relay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power management unit</td>
<td>According to certification and request</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.4 General Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sofar 3000TL</th>
<th>Sofar 33000TL</th>
<th>Sofar 40000TL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-25°C...+60°C</td>
<td>0...95% no condensing</td>
<td></td>
</tr>
<tr>
<td>Topology</td>
<td>Transformerless</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating altitude</td>
<td>2000m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>&lt;30dB</td>
<td>&lt;45dB</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>50kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td>Nature</td>
<td>Fan</td>
<td></td>
</tr>
<tr>
<td>Dimension</td>
<td>773<em>564</em>258mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warranty</td>
<td>5 years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10 Quality Assurance

Shenzhen SOFARSOLAR Co., Ltd offers 5 years product warranty for Sofar 30~40KTL inverters from date of installation. However, the warranty period cannot exceed 66 months from the date of delivery of the inverter. During the warranty period, Shenzhen SOFARSOLAR Co., Ltd guarantees normal operation of the inverter.

If during the warranty period, the inverter develops fault, please contact your installation contractor or supplier. In case of faults falling within manufacturers' responsibility, Shenzhen SOFARSOLAR Co., Ltd will provide service and maintenance free of any charge.

Disclaimer:
- Use of Sofar 30–40KTL inverters for any other purpose than intended;
- Faulty system design or installation;
- Improper operation;
- Use wrong protection settings on the inverter;
- Carry out unauthorized modification on the inverter.
- Damage because of external factors or the majeure force (such as lightning, over-voltage, bad weather, fire, earthquake, tsunami etc);