

SOFAR 1100TL ... 3300TL-G3

# Installation and operating manual

**Version 01 | Dec 2021**

English



SOFAR 1100TL, 1600TL, 2200TL, 2700TL, 3000TL, 3300TL

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# 1 About this manual

This manual contains important safety information that must be observed during installation and maintenance of the device.

**Carefully read this manual before use and retain it for future reference!**

This manual must be treated as an integral component of the device. The manual must be kept in close proximity to the device, including when it is handed over to another user or moved to a different location.

## 1.1 Copyright declaration

The copyright of this manual is owned by SOFARSOLAR. It may not be copied – neither partially nor completely – by companies or individuals (including software, etc.) and must not be reproduced or distributed in any form, or with the appropriate means.

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

The current version was updated on 20.07.2022.

## 1.2 Structure of the manual

This manual contains important safety and installation instructions that must be observed during installation and maintenance of the device.

## **1.3 Scope**

This product manual describes the installation, electrical connection, commissioning, maintenance and fault elimination procedures of the **SOFAR 1100...3300TL-G3** inverters.

## **1.4 Target group**

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

## **1.5 Symbols used**

This manual contains information on safe operation and uses symbols to ensure the safety of persons and property as well as the efficient operation of the inverter. Please read through the following symbol explanations carefully in order to prevent injury or property damage.

**⚠ DANGER**

**Non-observance will result in death or serious injury.**

- Follow the warnings in order to prevent death or serious injury!

**⚠ WARNING**

**Non-observance may result in death or serious injury.**

- Follow the warnings in order to prevent serious injury!

**⚠ CAUTION**

**Non-observance may result in minor injury.**

- Follow the warnings in order to prevent injury!

**ATTENTION**

**Non-observance may result in property damage!**

- Follow the warnings in order to prevent damage to or destruction of the product.

**NOTE**

- Provides tips essential to the optimal operation of the product.

## 2 Basic safety information

### NOTE

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

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

### 2.1 Safety information

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

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

Please contact the nearest authorised service centre if any maintenance or repairs are required. Please contact your dealer to obtain information about your nearest authorised service centre. Do NOT carry out repairs on the device yourself; this may lead to injury or property damage.

Before installing the device or carrying out maintenance on it, you must open the DC switch in order to interrupt the DC voltage of the PV generator. You can also switch off the DC voltage by opening the

DC switch in the Array junction box. Not doing this may result in serious injury.

### **2.1.1 Qualified personnel**

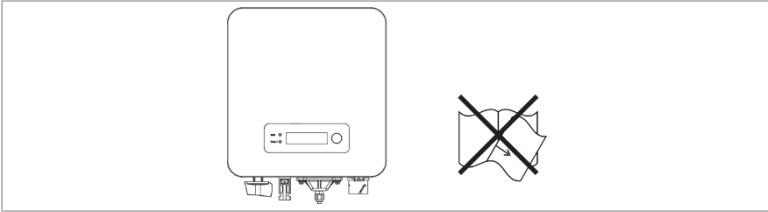
Personnel tasked with the operation and maintenance of the device must have the qualifications, competence and experience required to perform the described tasks, while also being capable of fully understanding all instructions contained within the manual. For safety reasons, this inverter may only be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

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

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

### **2.1.2 Installation requirements**

Please install the inverter according to the information contained in the following section. Mount the inverter to a suitable object with a sufficient load-bearing capacity (e.g. walls, PV frames etc.) and ensure that the inverter is upright. Choose a suitable place for the installation of electrical devices. Ensure that there is sufficient space for an emergency exit which is suitable for maintenance. Ensure sufficient ventilation in order to guarantee an air circulation for the cooling of the inverter.



### **2.1.3 Transport requirements**

The factory packaging is specifically designed to prevent transport damage, i.e. violent shocks, moisture and vibrations. However, the device must not be installed if it is visibly damaged. In this case, notify the responsible transport company immediately.

### **2.1.4 Labelling on the device**

The labels must NOT be concealed by items and foreign objects (rags, boxes, devices, etc.); they must be regularly cleaned and kept clearly visible at all times.

### **2.1.5 Electrical connection**

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

**⚠ DANGER****Dangerous DC voltage**

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

**⚠ DANGER****Danger through electric shock!**

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

**IMPORTANT****Authorisation for grid feed-in**

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

**NOTE****Voiding of guarantee**

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

## 2.1.6 Operation

### **DANGER**

#### **Electric shock**

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

### **CAUTION**

#### **Burning due to hot housing**

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

### 2.1.7 Repair and maintenance

#### **DANGER**

##### **Dangerous voltage!**

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

#### **IMPORTANT**

##### **Unauthorised repairs!**

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

## 2.2 Symbols and signs

#### **CAUTION**

**Beware of burning hazards due to the hot housing!**

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

**ATTENTION****Implement earthing!**




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



 **WARNING****Damage due to overvoltage**

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

### 2.2.1 Symbols on the inverter

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

Symbol	Description
	Residual voltage is present in the inverter! Before opening the inverter, you should wait five minutes to ensure that the capacitor has been fully discharged.
	Caution! Danger through electric shock
	Caution! Hot surface
	The product is compliant with EU guidelines
	Earthing point
	Please read the manual before installing the inverter
	Device degree of protection according to EN 60529
	Positive and negative poles of the DC input voltage

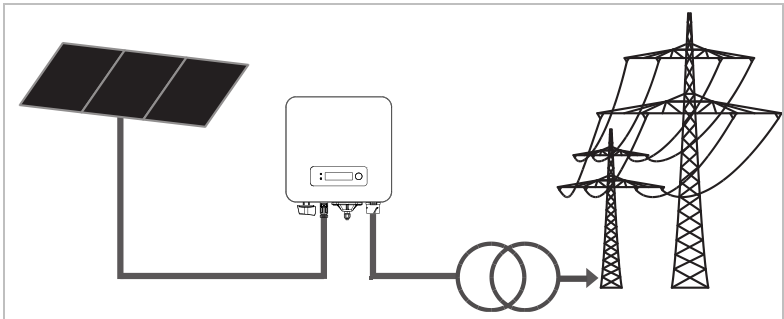
Symbol	Description
	The inverter must always be transported and stored with the arrows pointing upward
	RCM (Regulatory Compliance Mark) The product meets the requirements of the applicable Australian standards.

## 3 Product features

This chapter describes the product features, dimensions and efficiency levels.

### 3.1 Product dimensions

The SOFAR 1100TL ... 3300TL-G3 is a grid-coupled PV inverter with an MPPT which converts the direct current generated by PV systems into a single-phase alternating current and feeds it into the public power grid. The AC circuit breaker and DC switch are used as a disconnecting device and must be easily accessible.



SOFAR 1100TL ... 3300TL-G3 Inverters may only be used with photovoltaic modules which do not require one of the poles to be earthed. In normal operation, the operating current must not exceed the limits specified within the technical data. Only photovoltaic modules may be connected at the input of the inverter (no batteries or other power sources must be connected).

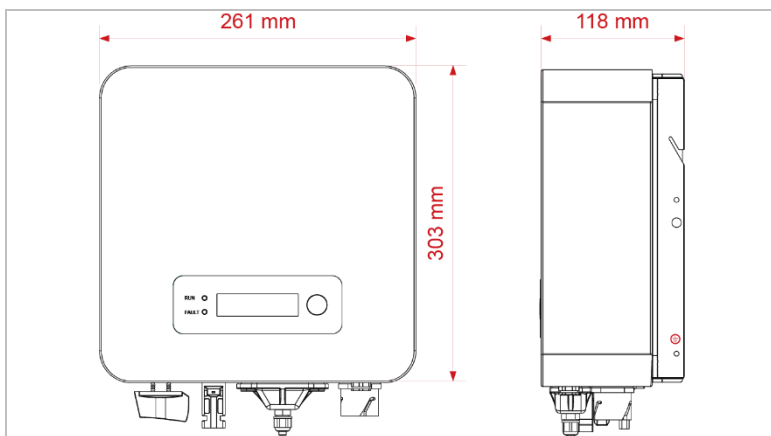
The selection of the optional inverter parts must be determined by a qualified technician who has good knowledge of the installation conditions.

SOFAR 1100TL-G3 / 1600TL-G3 / 2200TL-G3:

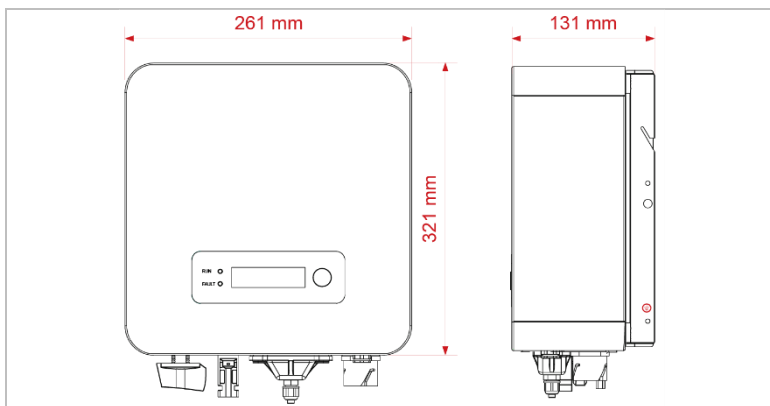
$L \times W \times H = 303 \text{ mm} \times 260.5 \text{ mm} \times 118 \text{ mm}$

SOFAR 2700TL-G3 / 3000TL-G3 / 3300TL-G3:

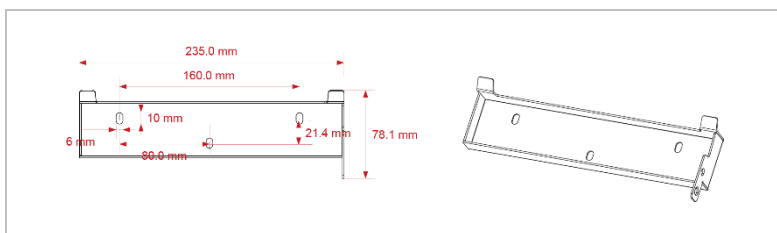
$L \times W \times H = 321 \text{ mm} \times 260.5 \text{ mm} \times 131.5 \text{ mm}$



Dimensions SOFAR 1100TL-G3 ... 2200TL-G3



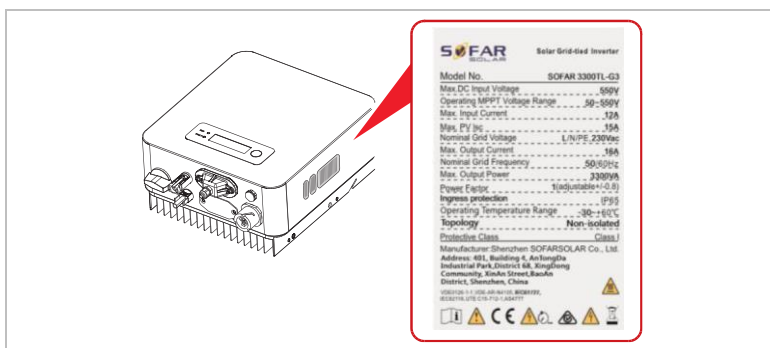
Dimensions SOFAR 2700TL-G3 ... 3300TL-G3



Dimensions of the mounting for SOFAR 1.1K ... 3.3KTL-G3

## 3.2 Labelling on the device

Labelling must not be covered or removed!



### 3.3 Functional features

The DC output generated by the PV generator is filtered by the input board before it reaches the power board. The input board also provides functions such as the detection of insulation impedance and the measurement of the DC current and voltage. The DC current is converted into AC current by the power board. The AC current is filtered by the output board and fed into the power grid. The output board also provides functions such as grid voltage and current measurement, earth fault protection and a disconnecting relay. The control board supplies the auxiliary energy, controls the operating state of the inverter and displays the operating status on the display board. An error code will appear on the display if the inverter is in an abnormal operating state. At the same time, the control board may trigger the relay in order to protect the internal components.

#### 3.3.1 Functions

##### **A Digital inputs (DRMs)**

The inverter can be switched on/off via the external control.

##### **B Feeding of reactive power into the grid**

The inverter is capable of generating reactive power and can also feed it into the grid. The setting of the power factor (Cos Phi) can be controlled via the serial RS485 interface.

##### **C Limitation of the active power fed into the grid**

The inverter can limit the active power fed into the grid to a specific value (as a percentage of the rated output).

### D Output reduction at overfrequency within the grid

If the grid frequency is higher than the limit value, the inverter will reduce the output power; this is required to ensure stability of the grid.

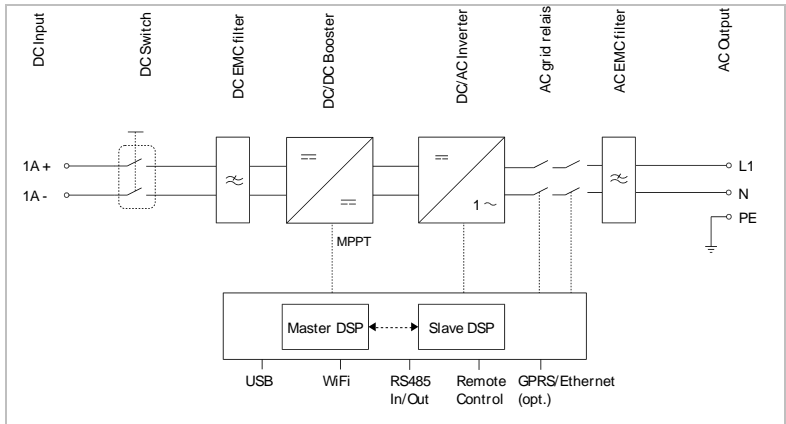
### E Data transfer

The inverter (or a group of inverters) can be monitored remotely via the RS485 communication bus or via WiFi/GPRS.

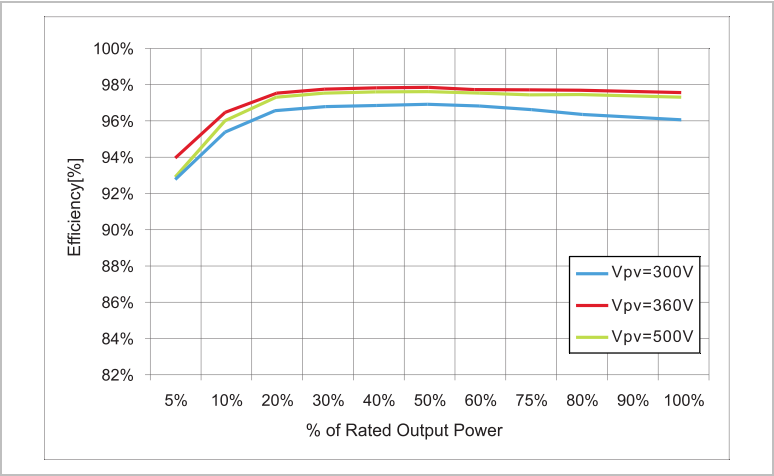
### F Software update

The device supports local updates via USB stick and remote updates via WiFi/GPRS.

## 3.3.2 Electrical block diagram



### 3.4 Efficiency curve



## 4 Installation

### 4.1 Installation information

#### **DANGER**

##### **Fire hazard**

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

#### **CAUTION**

##### **Burning hazard**

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

#### **IMPORTANT**

##### **Weight of the device**

- Take into account the weight of the inverter when transporting and moving it.
- Choose a suitable installation location and -surface.
- Commission a minimum of two persons with the installation of the inverter.
- Do not set down the inverter upside-down.

### 4.2 Installation procedure

Mechanical installation is performed as follows:

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



















## **4.3 Examination before installation**

### **4.3.1 Checking the external packaging materials**

Packaging materials and components may become damaged during transportation. Therefore, the external packaging materials must be examined before the inverter is installed. Check the external packaging material for damage, e.g. holes and cracks. If you discover any cases of damage, do not unpack the inverter and contact the transport company and/or dealer immediately. It is recommended that the packaging material should be removed within 24 hours before installing the inverter.

### **4.3.2 Checking the delivery scope**

After unpacking the inverter, check that the delivery items are both intact and complete. In the event of any damage or missing components, contact the wholesaler.

No.	Image	Description	Quantity
01		Inverter SOFAR 1100TL ... 3300TL-G3	1
02		Wall bracket	1
03		PV+ input terminal	1
04		PV- input terminal	1
05		Crimp contact socket	1
06		Crimp contact pin	1
07		M5 hexagon screws	2
08		Dowel	3
09		M5 washer	5
10		Spring washer	5
11		Self-tapping screw	3
12		Manual	1
13		Warranty card	1
14		Output control report	1
15		Warranty registration form	1
16		AC output terminal	1
17		RS485 terminal block (2-pole)	1
18		WiFi stick logger	1

19



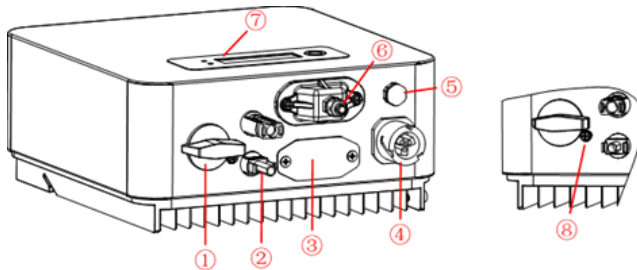
M4X14 Phillips screw, triple (only for DC switch lock) 1

## 4.4 Connections

### CAUTION

#### Damage during transportation

- Please check the product packaging and connections carefully prior to installation.





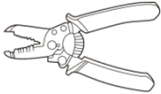

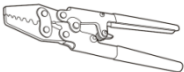
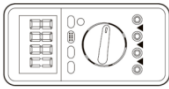



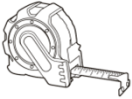
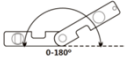
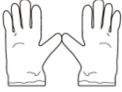


① DC switch	② PV input terminal
③ WiFi/GPRS/Ethernet	④ Grid connection port
⑤ Venting valve	⑥ USB/DRMs/RS485/CT
⑦ LCD	⑧ DC switch lock (for Australian models)*

\*Note: Insert the screw into the hole on the DC switch to lock the switch. Remove the screw prior to the switch.

## 4.5 Tools

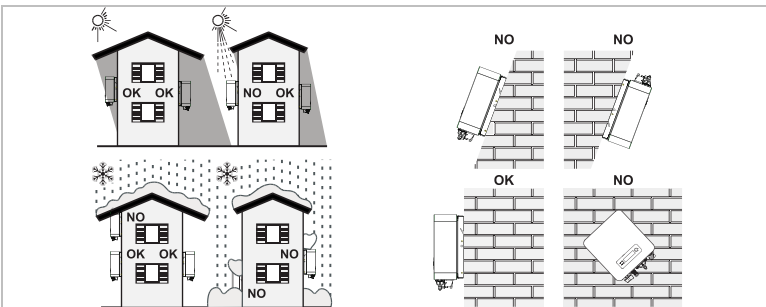
Prepare the tools required for the installation and the electrical connection.

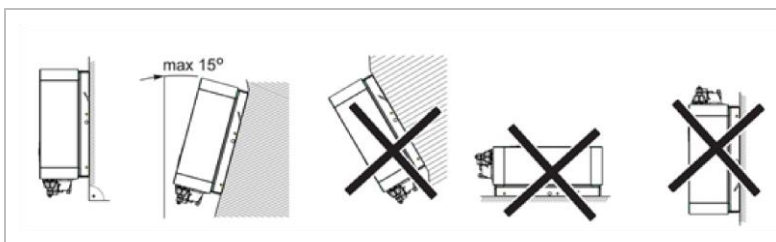
No.	Tool	Model	Function
01		Hammer drill Recommended drill diameter: 6 mm	Used to drill holes in the wall.
02		Screwdriver	Wiring
03		Phillips screwdriver	Used to remove and install the screws of the AC terminal
04		Removal tool	Used to remove the PV terminal
05		Wire stripper	Used to strip the wire
06		4 mm Allen key	Used to turn the screw to connect the rear panel to the inverter.
07		Crimping tool	Used to crimp power cables
08		Multimeter	Used to check the earthing

No.	Tool	Model	Function
09		Marker	Used for marking
10		Measuring tape	Used to measure distances
11		Spirit level	Used to align the wall bracket
12		ESD gloves	for the installer
13		Safety goggles	for the installer
14		Anti-dust respiratory mask	for the installer

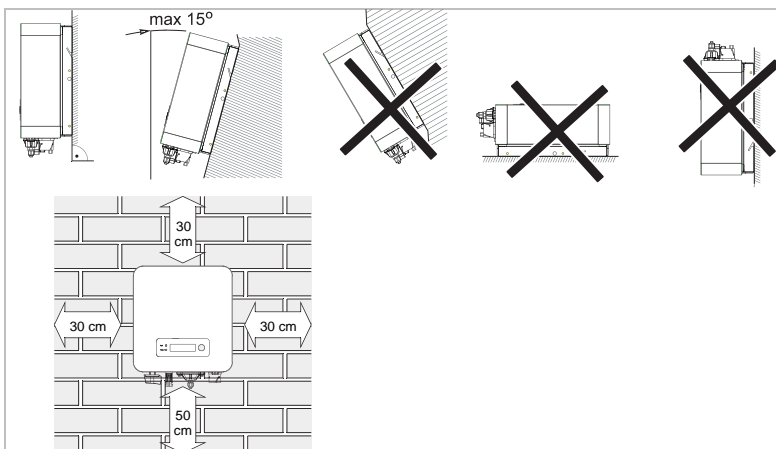
## 4.6 Installation location

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

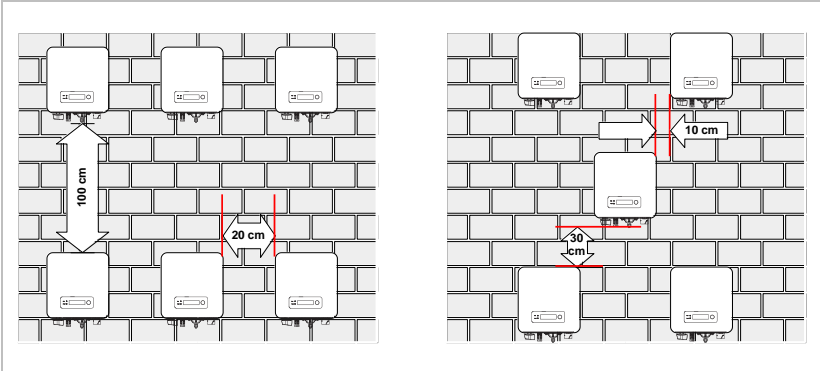




Minimum distances for individual SOFAR 1100TL ... 3300TL-G3 inverters:

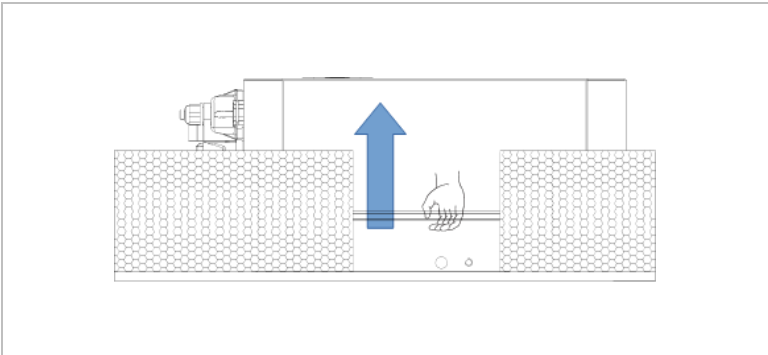


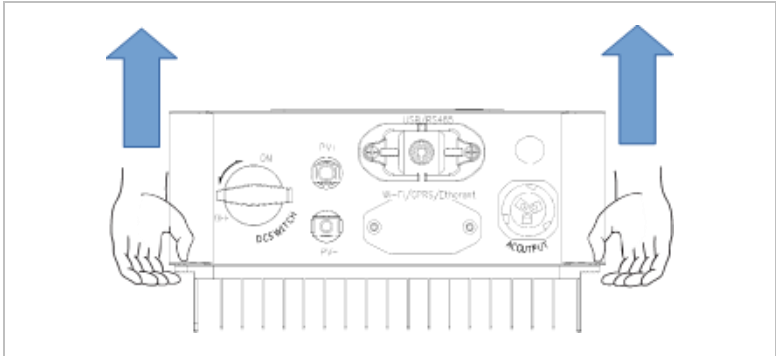
Minimum distances for several SOFAR 1100TL ... 3300TL-G3  
inverters:



## 4.7 Unpacking the inverter

1. Open the packaging and grip underneath the inverter at the sides with both hands.





2. Lift the inverter out of the packaging and move it to its installation position.

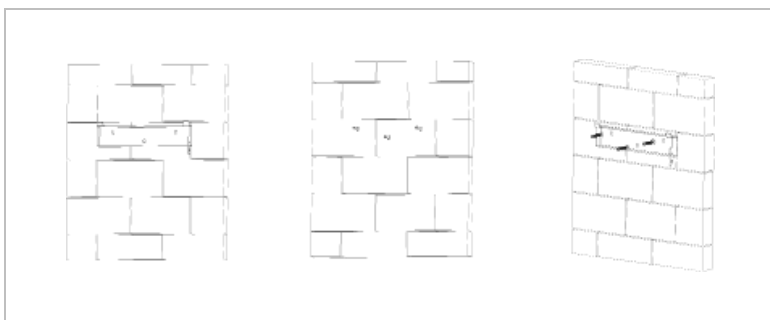
## ATTENTION

### Mechanical damage

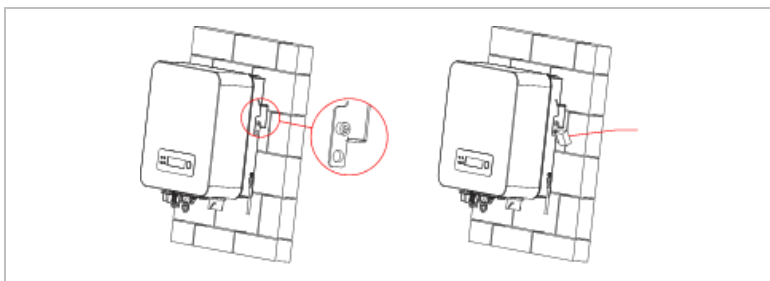
- In order to prevent injuries and damage to the device, ensure that the inverter is kept balanced while it is being moved - it is very heavy.
- Do not place the inverter on its connections, as these are not designed to bear its weight. Place the inverter horizontally on the ground.
- When you place the inverter on the ground, place foamed material or paper underneath it in order to protect its housing.

## 4.8 Installation of the inverter

- 1 Hold the wall bracket in the desired place and mark the three holes. Put the wall bracket aside and drill the holes.
- 2 Insert the complete dowel into the hole vertically.
3. Fasten the rear panel to the wall using the three screws.



- 3 Place the inverter in the wall bracket. Secure the inverter to the wall bracket using a M5 hexagon screw.
- 4 You can secure the inverter to the wall bracket using a lock.



## 5 Electrical connections

### 5.1 Safety instructions

This topic describes the electrical connections of the inverter SOFAR 1100TL ... 3300TL-G3. Read this section thoroughly and carefully before connecting the cables.

#### DANGER

##### Electrical voltage at the DC connections

- Ensure that the DC switch is OFF before establishing the electrical connection. The reason is that the electrical charge remains in the capacitor after the DC switch has been switched off. Therefore, at least 5 minutes must lapse before the capacitor has been electrically discharged.

#### DANGER

##### Electrical voltage

- PV modules generate electrical energy when exposed to sunlight, and this may present an electrical shock hazard. Therefore, cover the PV modules with an opaque sheet before connecting to the DC input power cable.

#### ATTENTION

##### Qualification

- The installation and maintenance of the inverter must be carried out by an electrician.

The connected PV modules must be compliant with IEC 61730 class A.

<b>Isc PV (absolute maximum)</b>		15.0 A
	SOFAR 1100TL-G3	5.3 A
	SOFAR 1600TL-G3	7.7 A
<b>Maximum AC overcurrent protection</b>	SOFAR 2200TL-G3	10.6 A
	SOFAR 2700TL-G3	13.0 A
	SOFAR 3000TL-G3	14.5 A
	SOFAR 3300TL-G3	16.0 A

The DVC (decisive voltage classification) is the circuit voltage which constantly occurs between two arbitrary live parts during proper use in a worst-case scenario:

Interface	DVC
DC input	DVCC
AC output	DVCC
USB interface	DVCA
RS485 interface	DVCA
CT interface	DVCA
Logic interface	DVCA
WiFi/GPRS/Ethernet interface	DVCA

## 5.2 Electrical connection

The electrical connection is established as follows:

1. Connect PE cable
2. Connect DC input cable
3. Connect AC output power cable
4. Connect communication cable (optional)

## 5.3 Connecting the PE cables

Connect the inverter to the equipotential bonding bar by using the protective earth cable (PE) for grounding.

### ATTENTION

#### Pole earthing not permissible!

- As the inverter is transformerless, the plus and minus poles of the PV generator must NOT be earthed. Otherwise, the inverter will malfunction. In the PV system, not all live metal parts (e.g. PV module frames, PV frame, generator connection box housing, inverter housing) require earthing.

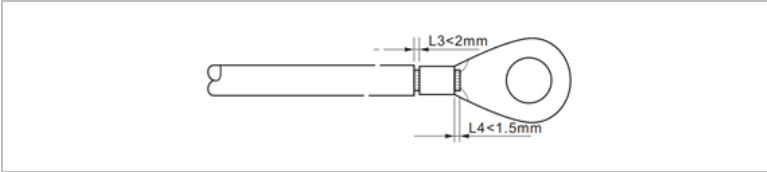
### Procedure

1. Remove the insulation of the cable. For outside use, cables of  $\geq 4\text{mm}^2$  are recommended for earthing).

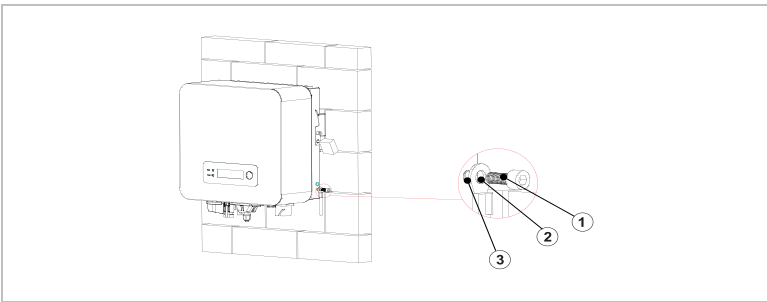


**Note:** L2 is 2 to 3 mm longer than L1

2. Crimp the cable to the ring terminal:



3. Install the crimped ring terminal and the washer with the M5 screw and tighten these with a torque of 3 Nm using an Allen key:



① M5 screw

② Ring terminal

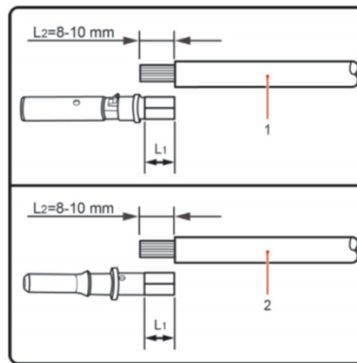
③ Threaded hole

## 5.4 Connecting the DC cables

Please observe the recommended cable dimensions:

Cable cross-section (mm <sup>2</sup> )		Outer diameter of cable (mm)
Range	Recommended value	
4.0 ... 6.0	4.0	4.5 ... 7.8

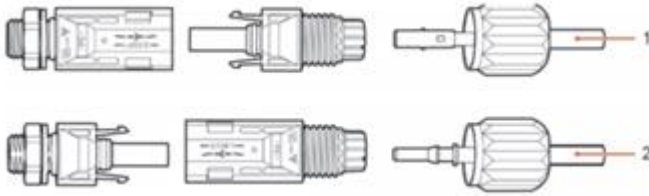
1. Remove the crimp contacts from the positive and negative connections.
2. Remove the insulation of the cables:



- ① Positive DC cable
- ② Negative DC cable

**Note:** L2 is 2 to 3 mm longer than L1

3. Insert the positive and negative DC cables into the corresponding cable glands.
4. Crimp the DC cables. The crimped cable must be able to withstand a tractive force of 400 Nm.

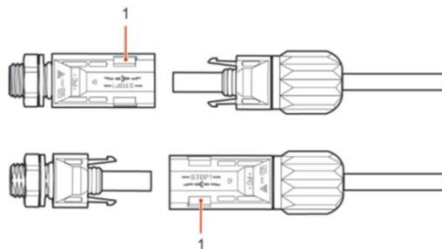


- ① Positive power cable      ② Negative power cable

### ⚠ CAUTION

#### **Danger of reverse polarity!**

- Ensure that the polarity is correct before plugging into the DC connections!
5. Insert the crimped DC cables into the corresponding connector housing until you hear a “clicking” sound.
  6. Re-screw the cable glands to the connector housing.
  7. Insert the positive and negative connectors into the corresponding DC input terminals of the inverter until you hear a “clicking” sound.



- ① Locking

**Note:** Insert the protective caps into the unused DC connections.

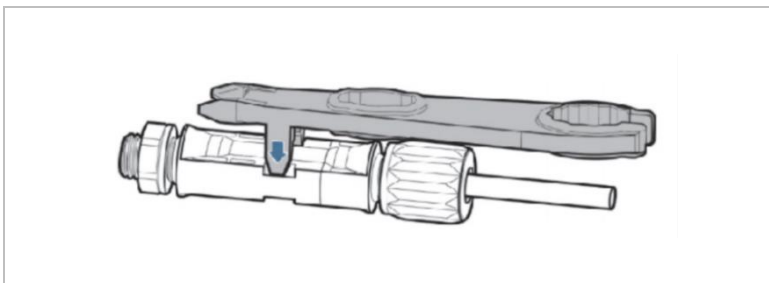
## Removing the connectors

### CAUTION

#### Danger of DC arcing

- Before removing the plus and minus connector, ensure that the DC switch has been set to OFF.

In order to remove the plus and minus connection from the inverter, insert a removal key into the locking and press on the key with the adequate force as shown in the following illustration:



## 5.5 Connecting the AC power cables

Connect the inverter to the AC power distributor or the power grid using AC power cables.

### CAUTION

#### AC connection

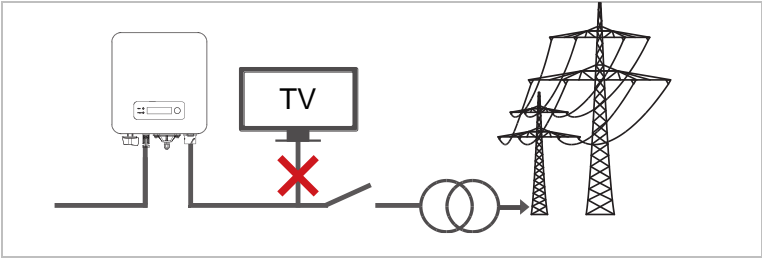
- Each inverter must have its own circuit breaker.
- Do not connect any consumers between the inverter and circuit breaker!
- The AC disconnecting device must be easily accessible.

NOTE

- The inverter SOFAR 1100...3300TL-G3 has a built-in AFI (univ. sensitive residual current protection). If an external AFI is required, we recommend an AFI type A featuring a residual current of 100 mA or higher.
- Please follow the national rules and regulations for the installation of external relais or circuit breakers!

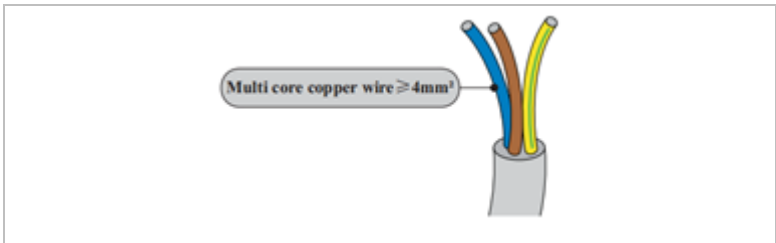
Dimensioning

The AC output cables are three-wire cables for outdoor areas. To simplify the installation process, use flexible cables. The recommended cable specifications are listed in the following table.

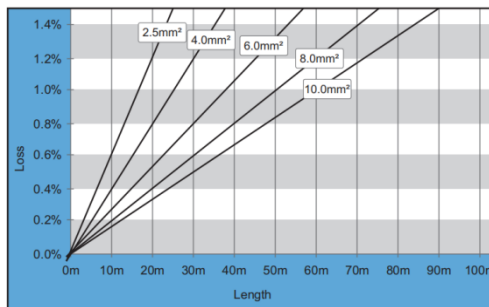


Model	1100TL-G3	1600TL-G3	2200TL-G3	2700TL-G3	3000TL-G3	3300TL-G3
Cable (copper)	$\geq 4\text{mm}^2$	$\geq 4\text{mm}^2$	$\geq 4\text{mm}^2$	$\geq 6\text{mm}^2$	$\geq 6\text{mm}^2$	$\geq 6\text{mm}^2$
AC disconnecter	16 A / 400 V	16 A / 400 V	25 A / 400 V	25 A / 400 V	25 A / 400 V	25 A / 400 V

### Multi-wire copper wire

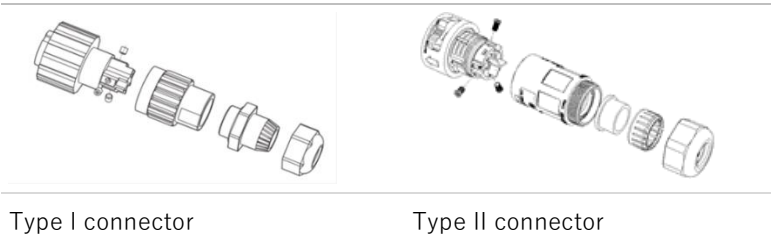


The AC cable should be correctly dimensioned in order to ensure that the loss of power in the AC cable is less than 1% of the rated output. If the AC cable resistance is too high, then the AC voltage will increase; this may cause the inverter to become disconnected from the power grid. The relationship between the leakage power in the AC cable and the cable length, the cable cross-section, is displayed in the following illustration:



### AC connector type

The inverter is equipped with two types of IP66 AC connector (type I connector or type II connector):



### 5.5.1 AC connector installation instructions

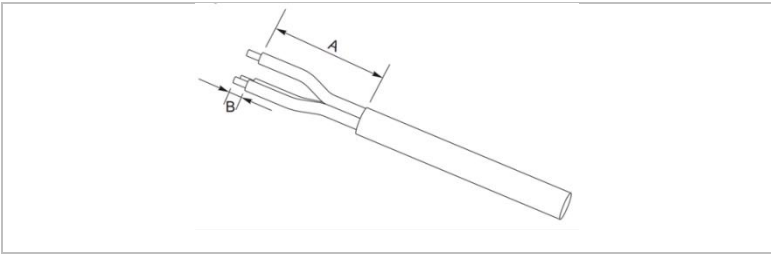
**⚠ CAUTION**

#### Electrical voltage

- Ensure that the grid has been switched off before removing the AC connector.

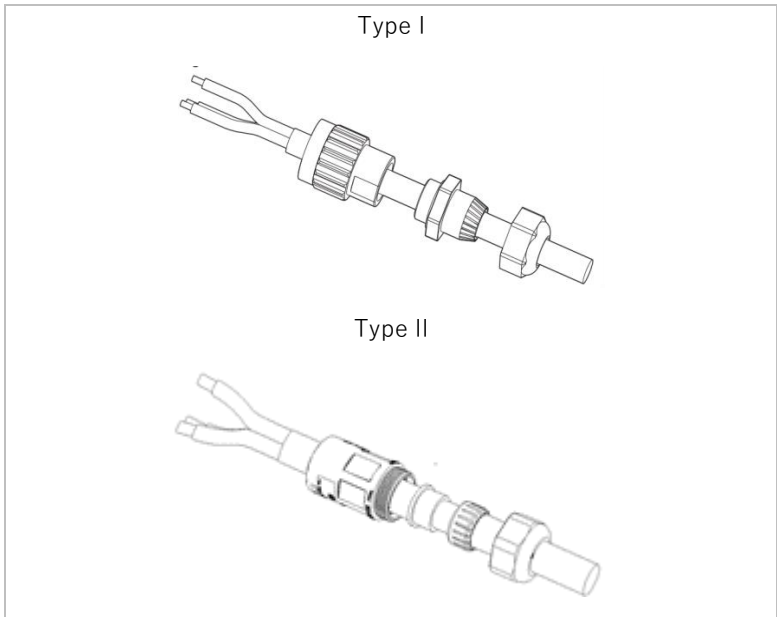
Select the suitable cable. Remove the insulating layer of the AC output cable using a wire stripper and in accordance with the following illustration:

Type I A: 30 ... 50 mm B: 6 ... 8 mm

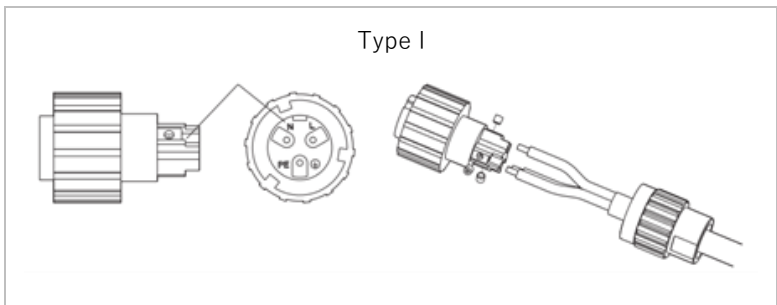


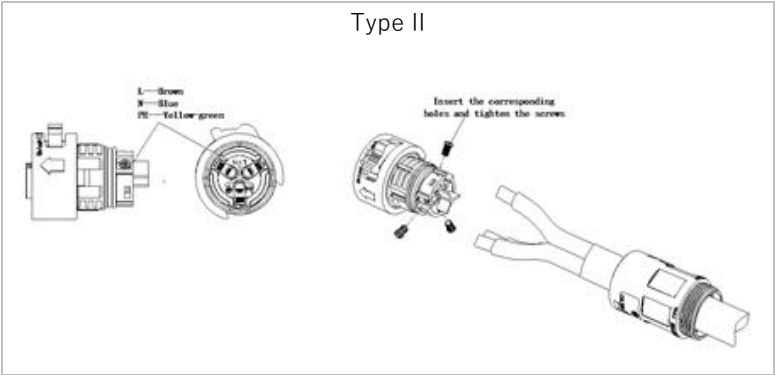
Connector type	A	B
Type I	30 ... 50 mm	6 ... 8 mm
Type II	15 ... 25 mm	6 ... 8 mm

1. Disassemble the connector in accordance with the following illustration: guide the AC output cable through the cable gland;



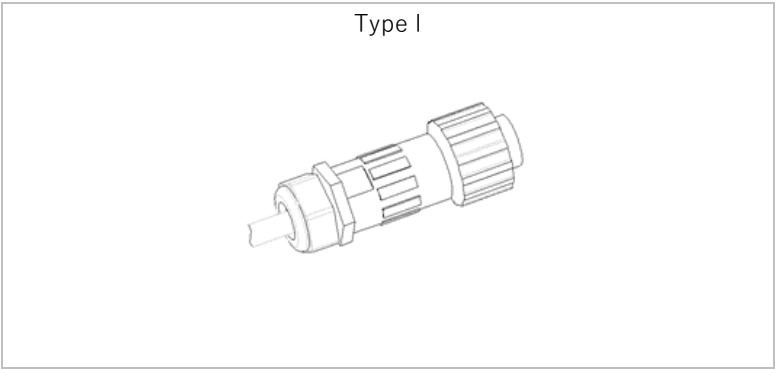
2. Connect the AC output cable in accordance with the following requirements and tighten the terminal using the Allen key (type 1) or the Phillips head screwdriver (type II).

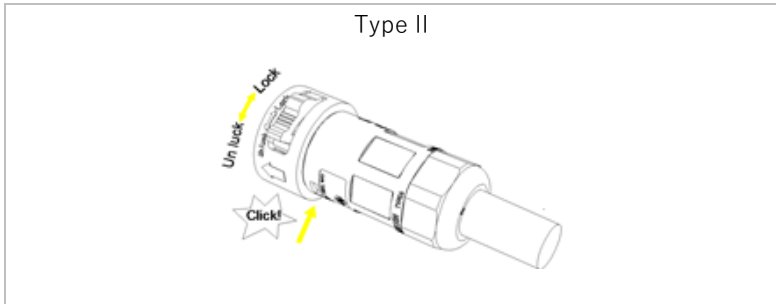




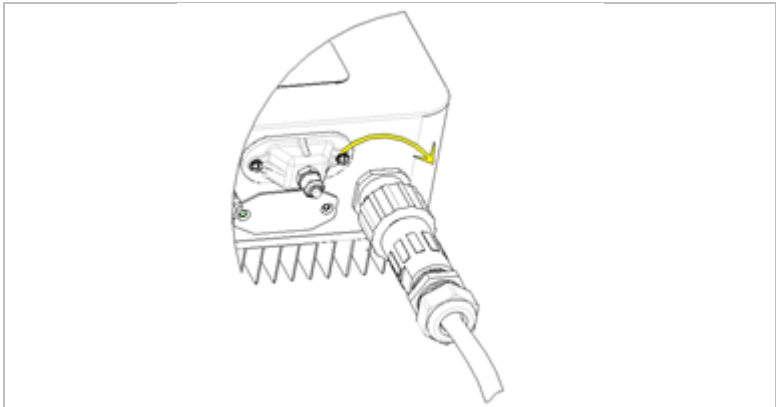
Connection	Cable
PE	Earthing cable (yellow-green)
L	Phase (brown)
N	Neutral conductor (blue)

3. Assemble the connector housing and screw the cable gland tight.





4. Connect the AC connector to the AC connection of the inverter by turning it clockwise until it locks into place.



5. Remove the AC connector by turning it anticlockwise (type I) or turning the unlocking switch to the “unlock” position (type II).

### **⚠ CAUTION**

#### **Electrical voltage**

- Ensure that the grid has been switched off before removing the AC connector.

## 5.6 System monitoring

The SOFAR 1100TL ... 3300TL-G3 inverters provide various communication methods for the system monitoring:

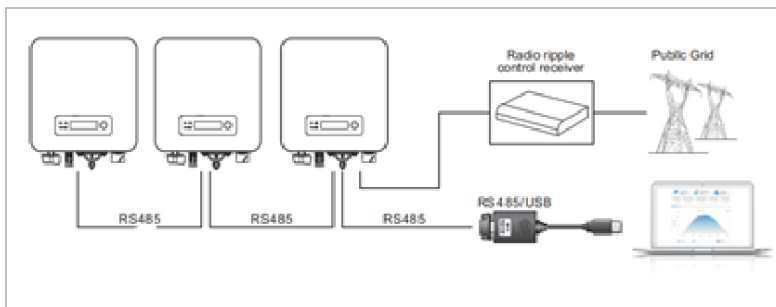
RS485 or WiFi stick (standard), GPRS or Ethernet stick (optional).

### 5.6.1 RS485 network

You can connect RS485-linked devices to your PC or a data logger via an RS485 USB adapter.

#### NOTE

- The RS485 line may not be any longer than 1000 m
- Assign each inverter its own modbus address (1 to 31) via the LCD display

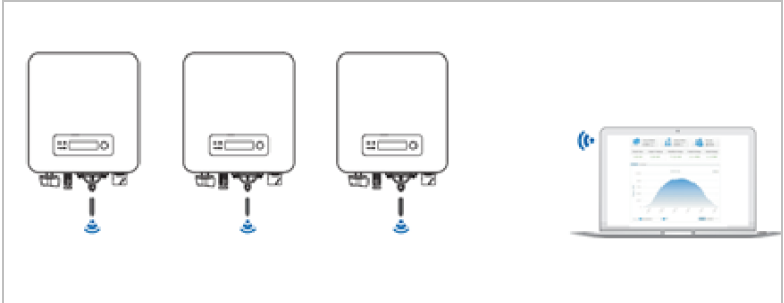


### 5.6.2 WiFi-, GPRS-, Ethernet stick

When you have installed the stick logger, the inverters can directly upload your operating, energy and alarm data in the SolarMAN monitoring portal.

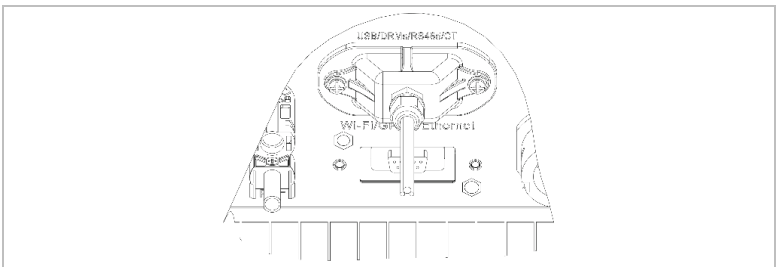
## NOTE

- In order to use the stick logger, the inverters must have the modbus address 1



## 5.7 Installation of the WiFi-, GPRS or Ethernet stick

- 1 Remove the waterproof WiFi/GPRS cover using a screwdriver.
- 2 Install the WiFi/GPRS/Ethernet stick.
- 3 Fasten the WiFi/GPRS module with screws.



### 5.7.1 Configuration of the WiFi stick via the web browser

**Preparation:** The WiFi stick is installed in accordance with the previous section and the SOFAR inverter must be in operation.

Carry out the following steps in order to configure the WiFi stick:

- 1 Connect your PC or smartphone with the WiFi network of the WiFi stick. The name of this WiFi network is “AP”, followed by the serial number of the WiFi stick (see rating plate). When you are prompted for a password, you can find it on the label of the WiFi stick (PWD).
- 2 Open an Internet browser and enter the address **10.10.100.254**. Recommended browsers: Internet Explorer 8+, Google Chrome 15+, Firefox 10+
- 3 Enter the username and password, which are both set to **“admin”** by default. The “Status” page will be opened.
- 4 Click on the “Wizard” in order to configure the WiFi stick for Internet access.

**Result**      The WiFi stick begins to send data to SolarMAN.

Register your system at the website [home.solarmanpv.com](http://home.solarmanpv.com). For this, enter the serial number found on the stick logger.

Installers use the portal at [pro.solarmanpv.com](http://pro.solarmanpv.com)

### 5.7.2 Setting up the WiFi stick with the app

To download the app, search for “SOLARMAN” in the Apple or Google Play store, or use the following QR codes:

- **SOLARMAN Smart** (for end customers):



- **SOLARMAN Business** (for installers):



### Configuration steps

- 1 After starting the app, register as a new user or enter the current SOLARMAN access data.
- 2 Create a new system and save the system data.
- 3 Scan the barcode of the stick logger to assign an inverter to the system.
- 4 Go to the newly created system in order to configure the stick logger (device/logger)
- 5 Press the button on the WiFi stick for 1 second to activate the WPS mode of the stick so that the smartphone can be connected to the WiFi stick.

- 6 Now, select your local WiFi network for Internet access and enter your WiFi password.
- 7 The WiFi stick is configured with the access data.

WiFi stick status

The LEDs on the WiFi stick provide information regarding the status:

LED	Status	Description
NET:	Communication with the router	<b>On:</b> Connection to server successful
		<b>Flashing</b> (1 sec.): Connection to router successful
		<b>Flashing</b> (0.1 sec.): WPS mode active
		<b>Off:</b> No connection to router
COM	Communication with inverter	<b>Flashing</b> (1 sec.): Communication with inverter
		<b>On:</b> Logger connected to inverter
		<b>Off:</b> No connection to inverter
READY	Logger status	<b>Flashing</b> (1 sec.): Normal status
		<b>Flashing</b> (0.1 sec.): Reset running
		<b>Off:</b> Error status

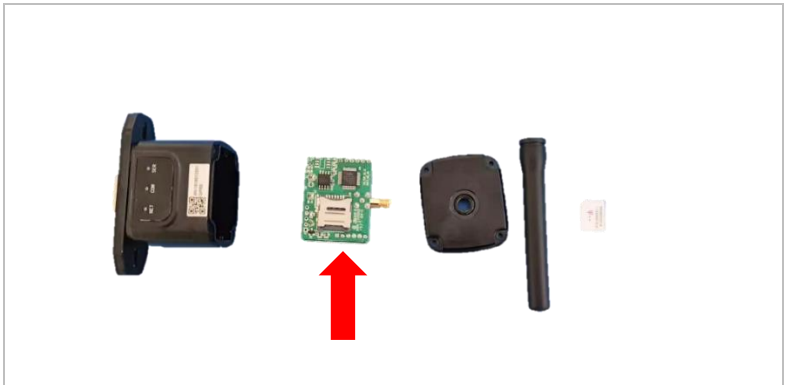
Reset button

Keystroke	Description
1 sec.	WPS mode

Keystroke	Description
5 sec.	Restart
10 sec.	Restart (reset)

### 5.7.3 Setting up the GPRS stick

The GPRS stick must be equipped with a SIM card:

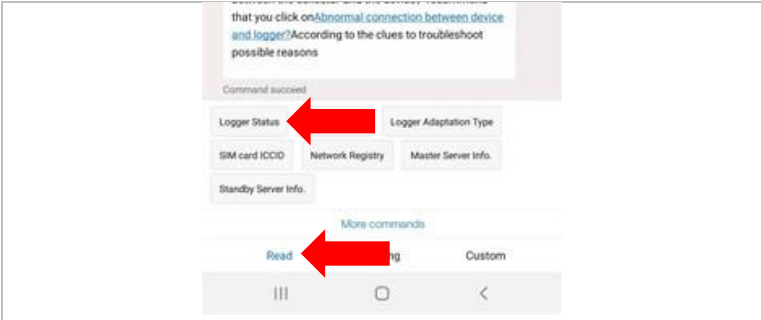


The GPRS stick must be set up via the SOLARMAN Business:

Observe the following steps:

- 1 Open the app and call up the Bluetooth Tools menu item
- 2 Identify the WiFi stick with the serial number and select it.
- 3 Call up the “Custom” item
- 4 Enter the command AP+YZAPN= “APN name of your grid operator”  
(e.g. for T-Mobile: AP+YZAPN=internet.v6.telekom)
- 5 To check the setting, call up AP+YZAPN

- 6 You can check the status via the “Logger Status” and “Read” menu item. Depending on the grid operator, wait several minutes until the connection has been established and the status is normal:



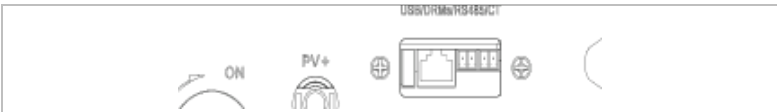
### 5.7.4 Setting up the Ethernet stick

The Ethernet stick is delivered with DHCP as standard, so it automatically gets an IP address from the router.

If you wish to set up a fixed IP address, connect a PC to the Ethernet stick and open the configuration page via the web address **10.10.100.254**.

### 5.8 RS485, CT, logic interfaces

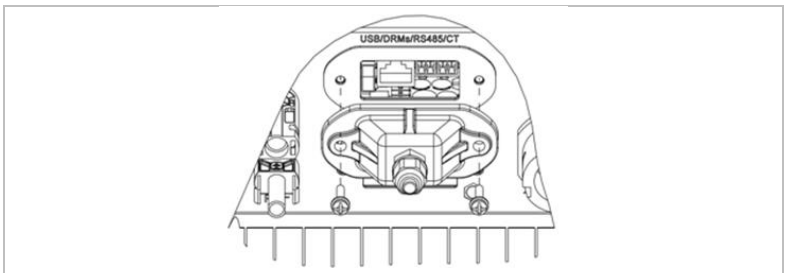
The position of the communication interface of the SOFAR 1100TL ... 3300TL-G3 is displayed below:



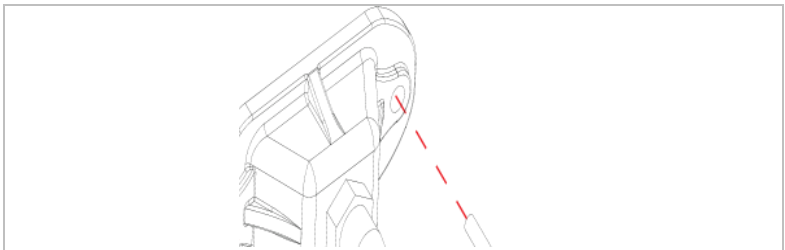
The wiring methods for RS485 and the current sensor (CT) are identical:

Communication function	RS485	CT
Cable cross-section	0.5 ... 1.5mm <sup>2</sup>	0.5 ... 1.5mm <sup>2</sup>
Outer diameter	2.5 ... 6 mm	2.5 ... 6 mm

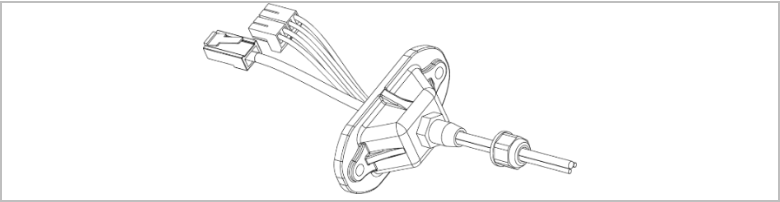
1. Remove the waterproof cover of the communication interface using a screwdriver;





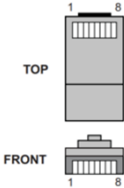
2. Release the waterproof cable gland and remove the plug of the waterproof connector;

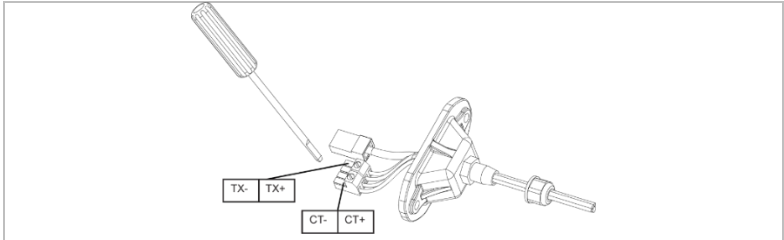


- 3. Select a suitable cable and strip it approx. 6 mm. Guide the cable through the cable gland and the waterproof cover, connect the wires and tighten the screws of the terminal using a slot head screwdriver.
- 4. Engage the terminal in accordance with the imprinted label, and then tighten the screws to fasten the waterproof cover. Turn the cable gland clockwise in order to ensure secure fastening.



**Cable assignments**

Type	RS485		CT		Logic interface
Connection					
Pin	TX-	TX+	CT-	CT+	See following table
Function	RS485-	RS485+	CT-	CT+	



The pin definitions of the logic interface and the switching connections are as follows:

The function of the logic interface must be set on the LCD display; please observe the operating steps in section 6.3.

Logic interface pins are defined in accordance with various standard specifications.

### **Logic interface for AS/NZS 4777.2:2015**

also known as Inverter Demand Response Modes (DRMs)

The inverter recognises all supported Demand Response commands and initiates the reaction within two seconds.



The inverter is preconfigured on the following power levels

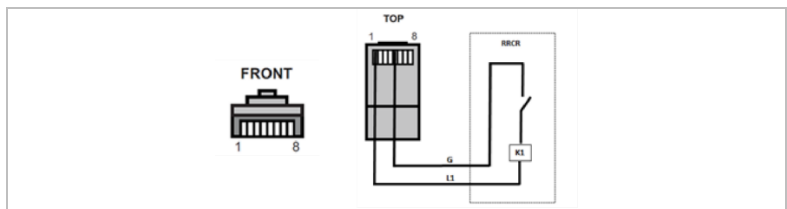
Pin	Name	Inverter	Radio ripple control receiver
1	L1	Relay 1 input	K1 - output relay 1
2	L2	Relay 2 input	K2 - output relay 2
3	L3	Relay 3 input	K3 - output relay 3
4	L4	Relay 4 input	K4 - output relay 4
5	G	Earth	Relay, common earth

Relay status: Closing is 1, opening is 0

L1	L2	L3	L4	Active power	Cos ( $\phi$ )
1	0	0	1	0%	1
0	1	0	0	30%	1
0	0	1	0	60%	1
0	0	0	0	100%	1

### Logic interface for EN50549-1:2019

The active power output can be ended within five seconds following a command to the input interface.



**Functional description of the terminal**

Pin	Name	Inverter	Radio ripple control receiver
1	L1	Relay 1 input	K1 - output relay 1
5	G	Earth	Relay, earth

The inverter is preconfigured on the following power levels.

Relay status: Closing is 1, opening is 0

L1	Active power	Power drop rate	Cos ( $\phi$ )
1	0%	< 5 seconds	1
0	100%	/	1

## 6 Commissioning the inverter

### 6.1 Safety test before commissioning

#### ATTENTION

##### Check the voltage range

- Ensure that the DC and AC voltages are within the permissible range of the inverter.

### 6.2 Starting the inverter

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

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

If the inverter displays an error message, consult chapter 8 for help.

#### NOTE

- Different distribution network operators in various countries have differing requirements for the grid connection of grid-coupled PV inverters.
- Ensure that you have selected the correct country code according to regional authority requirements, and consult a qualified electrician or employees of electrical safety authorities.
- SOFARSOLAR is not responsible for the consequences of selecting the incorrect country code.
- The selected country code influences the device grid monitoring. The inverter continuously checks the set limits and, if required, disconnects the device from the grid.

## 7 Operation of the device

This chapter describes the LCD and LED displays of the SOFAR 1100TL ... 3300TL-G3 inverter.

### 7.1 Control panel and display field

#### 7.1.1 Buttons and display lights



##### Button

Hold the button down to bring up the next menu level or to confirm the selection ("Enter" button)

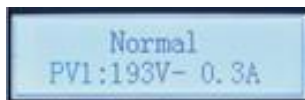
Press the button briefly to scroll through the menu entries.

##### LEDs

RUN (green)	illuminates: "Normal" state
	flashes: "Wait" or "Check" state
FAULT (red)	illuminates: "Error"

### 7.2 Standard display

This shows a rolling display of the DC voltage/current (PV1), energy yields (today/total), grid voltage and current, as well as the status.



## 7.3 Status display

The following table displays the various statuses and their meanings:

Status	Description
Initialisation	The control software is started
Wait 30 s	Connecting criteria are checked. The voltage and frequency limits must be within the defined range for a specific duration in accordance with the selected country code.
Check	The inverter checks the insulation resistance, relays and other safety requirements. It will also carry out a self-test to ensure that its software and hardware are functioning faultlessly. If an error or a fault occurs, the inverter will go into the “Error” or “Continuous” state.
Normal	The inverter goes into the “Normal” state, and feeds current into the grid
Error	The inverter goes into the “Error” state if an error or a fault occurs.
Continuous	The inverter has encountered an unrecoverable error, please look at the fault elimination procedures in chapter <b>8</b> or contact the SOFARSOLAR service.
Comm. error	The communication between the control board and communications board has been interrupted.

## 7.4 Menu structure

Hold the button down to bring up the main menu.

### Main menu

<b>1. Settings</b>	See “Settings”
<b>2. Event list</b>	See “Set country codes”
<b>3. System</b>	See System information menu
<b>4. Display time</b>	See Display time
<b>5. Software update</b>	See Firmware update

### “Settings” menu

<b>1. Set time</b>	Sets the system time for the inverter
<b>2. Delete energy</b>	Deletes the total energy yield of the inverter
<b>3. Delete events</b>	Deletes the historical events recorded in the inverter
<b>4. Country</b>	Sets the country and standard applicable to the current application conditions and requirements. Before setting this, ensure that the “Activate country setting” option has been activated. For further information, see “7. Activate country setting”
<b>5. On/off control</b>	Local control of inverter

<b>6. Activate country setting</b>	<p>Activate this option before setting the country.</p> <p>Attention: If the inverter has been supplying for more than 24 hours, then the country setting has been deactivated. It can only be carried out in accordance with the LCD setting. Enter the password for the country setting via the LCD display (standard: 0001)</p>
<b>7. Total energy</b>	Sets the total energy.
<b>8. Modbus address</b>	Enter the Modbus address (when several inverters require simultaneous monitoring), standard: 01
<b>9. Input mode</b>	For the SOFAR inverter input mode, either parallel mode or independent mode may be selected. For devices with an MPPT, the setting will have no effect.
<b>10. Set language</b>	Sets the display language of the inverter
<b>11. Set start parameters</b>	<p>The user can change the inverter via a USB stick. Firstly, the user must copy any parameter information to be changed to the USB stick. To use this function, please contact SOFARSOLAR's technical support department</p>
<b>12. Safety voltage</b>	
<b>13. Set safety frequency</b>	
<b>14. Insulation resistance</b>	

<b>15. Reactive power</b>	Activates or deactivates the reactive power functions
<b>16. Output reduction</b>	Activates or deactivates the output reduction function of the inverter and sets the reduction rate
<b>17. Feed-in power limitation</b>	Activates or deactivates the feed-in power function of the inverter and sets the maximum feed-in power. This function must be used together with an external current converter. Further information can be found in chapter 4.5 of this manual (RS485, current converter, inverter logic interface connection)
<b>18. MPPT scan</b>	Cyclical scanning of the IV curve in order to find the global point of the maximum output. Advisable in the case of shaded solar generators.
<b>19. Start time</b>	The waiting time for switching on and restarting following a mains fault can be set here.
<b>20. Electricity meter</b>	Activates or deactivates the meter functions.
<b>21. Logic interface</b>	Activates or deactivates logical interfaces. Further information can be found in chapter 4.5 of this manual (connection of the RS485-, current converter- and inverter logic interface).

## 22. Power ratio

Corrects the internal power indicator of the inverter

## Password

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

### Setting of country codes

Code	Country	Code	Country
0	Germany VDE AR-N4105	25	India
1	Italy (CEI 0-21 internal)	26	Philippines
2	Australia	27	New Zealand
3	Spain RD1699	28	Brazil
4	Turkey	29	Slovakia (VSD)
5	Denmark	30	Slovakia (SSE)
6	Greece (mainland)	31	Slovakia (ZSD)
7	Netherlands	32	Italy (CEI0-21 In Areti)
8	Belgium	33	Ukraine
9	UK (G98)	34	Brazil LV
10	China	35*	Mexico LV
11	France	36*	France (Arrete 23)
12	Poland	37*	Denmark TR3.2.2
13	Germany (BDEW)	38	Wide range - 60 Hz
14	Germany (VDE 0126)	39	Ireland EN504
15	Italy (CEI0-16)	40*	Thailand PEA
16	UK (G98)	41*	Thailand MEA
17	Greece (islands)	42*	LV range - 50 Hz
18	EU (EN50438)	43	EU (EN50549)
19	IEC (N61727)	44	South Africa

<b>20</b>	Korea	<b>45</b>	Australia (WA)
<b>21</b>	Sweden	<b>46</b>	Dubai DEWG
<b>22</b>	Europe (general)	<b>47</b>	Dubai DEWG MV
<b>23</b>	Italy (CEI 0-21 external)	<b>48*</b>	Taiwan
<b>24</b>	Cyprus	<b>49*</b>	Australia (VIC)

(\* country temporarily unable to be set)

## Event list menu

The event list is used to display the real time event recordings, including the total number of events and each specific ID no. and event time. The most recent events are listed at the top.

### 2. Event list

#### 1. Current event

#### 2. Event "History"

#### Fault information

001 ID04 06150825

(display of the event sequence number, event ID number and time that the event takes place)

## System information menu

#### 1. Inverter type

#### 7. Input mode

#### 2. Serial number

#### 8. Output factor

#### 3. Software version

#### 9. Feed-in power limitation

#### 4. Hardware version

#### 10. Safety parameters

#### 5. Country

#### 11. MPPT scan

#### 6. Modbus address

#### 12. Power ratio

### **Display time**

Displays the current system time.

### **Firmware update**

The user can update the software via the USB flash drive.

SOFARSOLAR will provide the firmware update when it is required.

## **7.5 Firmware update**

1. Switch the DC and AC switches off and then remove the communication cover. If an RS485 line has been connected, ensure that the nut is loosened. Ensure that the communication line is not energised. Remove the cover to prevent the connected communications connector from becoming loose.
2. Insert the USB stick into the computer.
3. SOFARSOLAR will send the firmware update to the user.
4. Unzip the file and copy the original file to a USB stick. Attention: The firmware update file must be in the “firmware” subfolder!
5. Insert the USB flash drive into the USB interface of the inverter.
6. Switch on the DC switch and go to menu item “5. Software update” on the LCD display.
7. Enter the password (the standard password is 0715).
8. The system will then successively update the main DSP, auxiliary DSP and ARM processors. Pay attention to the displays.
9. If an error message appears, switch off the DC switch and wait until the LCD screen goes out. Then, switch the DC switch back on and proceed with the update from step 5.

10. After the update is complete, switch the DC switch off and wait until the LCD screen goes out
11. Re-establish a watertight communication connection
12. Switch the DC and AC circuit breaker back on
13. You can check the current software version in item "3. Software version" of the SystemInfo menu.

## 8 Troubleshooting handling

### 8.1 Troubleshooting

This section contains information and procedures pertaining to the remedying of potential problems with the inverter.

To carry out troubleshooting, proceed as follows:

- Check the warnings, error messages or error codes displayed on the screen of the inverter.

If no error information is displayed on the screen, check whether the following requirements have been fulfilled:

- Has the inverter been set up in a clean, dry, well-ventilated area?
- Is the DC switch set to ON?
- Are the cables sufficiently dimensioned and short enough?
- Are the input connections, output connections and the wiring all in good condition?
- Are the configuration settings for the relevant installation correct?
- Are the display field and the communication cables correctly connected and undamaged?

Please proceed as follows to display the recorded problems: Hold the button down to bring up the main menu of the standard interface.

Select “2. Event list” and hold the button down to bring up the event list.

**Earth fault alarm**

This inverter is compliant with IEC 62109-2 Clause 13.9 for earth fault protection.

If an earth fault alarm occurs, the error is displayed on the LCD screen, the red light illuminates and the error can be found in the error history log.

**NOTE**

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

ID	Name	Description	Solution
01	GridOVP	The voltage of the power grid is too high	<p>If the alarm occurs occasionally, then the reason may be the power grid. The inverter automatically returns to its normal operating state when the power grid is back to normal.</p> <p>If the alarm is occurring frequently, check whether the grid voltage/frequency is within a permissible range. If it is, check the AC circuit breaker and the AC cables of the inverter.</p> <p>If the alarm occurs repeatedly, contact the technical support department in order to adjust the voltage and frequency limits after you have obtained the approval of the local power grid operator.</p>
02	GridUVP	The voltage of the power grid is too low	
03	GridOFP	The grid frequency is too high	
04	GridUFP	The grid frequency is too low	
05	PVUVP	The input voltage is too low	<p>Check whether too few PV modules have been switched in series and correct this if required. The inverter automatically returns to its normal operating state.</p>
06	Vlvrtlow	LVRT function disrupted	<p>Check whether the grid voltage is fluctuating strongly.</p>
07	Vovrthigh	OVRT function disrupted	
09	PVOVP	The input voltage is too high	<p>Check whether too many PV modules have been switched in series and correct this if required. The inverter automatically returns to its normal operating state</p>

ID	Name	Description	Solution
10	IpvUnbalance	Input current is not symmetrical	Check the setting of the MPPT input mode (parallel mode/independent mode) of the inverter and correct it as well if required.
11	PvConfigSet Wrong	Incorrect MPPT mode	
12	GFCIFault	Earthing error	If the error occurs occasionally, then external factors may be to blame. The inverter automatically returns to its normal operating state. If the error occurs frequently and lasts for a prolonged period, check whether the insulation resistance between the PV generator and earth (ground) is too low and examine the PV cable insulation.
14	HwBoostOCP	The input current is too high and has triggered the hardware protection	Check whether the input current is higher than the maximum permissible input current of the inverter. Check the input cables. If both are correct, please contact the technical support department.
15	HwAcOCP	The grid current is too high and has triggered the hardware protection	ID15-ID24 are internal errors of the inverter. Switch the DC switch OFF, wait 5 minutes and then switch the DC switch ON. Check whether the error has been rectified. If not, please contact the technical support department.
16	AcRmsOCP	The grid current is too high	
17	HwADFaultGrid	Grid current measurement error	

ID	Name	Description	Solution
18	HwADFaultDCI	DC current measurement error	
19	HwADFaultVGrid	Grid voltage measurement error	
20	GFCIDeviceFault	GFCI measurement error	
21	MChip_Fault	Master chip error	
22	HwAuxPowerFault	Auxiliary voltage error	
23	BusVoltZeroFault	Bus voltage measurement error	
24	IacRmsUnbalance	The output current is not balanced	
25	BusUVP	The DC bus voltage is too low	If the configuration of the PV generator is correct (no ID05 error), the possible cause may be linked to insufficient sunlight. The inverter automatically returns to its normal operating state when the level of sunlight is back to normal.
26	BusOVP	The bus voltage is too high	ID26-ID27 are internal errors of the inverter. Switch the DC switch OFF, wait 5 minutes and then switch the DC switch ON. Check whether the error has been rectified. If not, please contact the technical support department.
27	VbusUnbalance	The bus voltage is not balanced	

ID	Name	Description	Solution
28	DciOCP	The DC current is too high	Check the setting of the MPPT input mode (parallel mode/independent mode) of the inverter and correct if required.
29	SwOCPInstant	The grid current is too high	Internal inverter error, switch the DC switch OFF, wait 5 minutes and then switch the DC switch ON. Check whether the error has been rectified. If not, please contact the technical support department.
30	SwBOCPInstant	The input current is too high	Check whether the input current is higher than the maximum permissible input current of the inverter, then check the input cables. If both are correct, please contact the technical support department.
33	Overload	Reflux overload timeout	Check whether the power is outside the permissible range. If so, set the power to the correct range.
49	ConsistentFault_VGrid	The sample value of the grid voltage between the master DSP and the slave DSP is not consistent.	ID49-ID55 are internal errors of the inverter. Switch the DC switch OFF, wait 5 minutes and then switch the DC switch ON. Check whether the error has been rectified. If not, please contact the technical support department.
50	ConsistentFault_FGrid	The sample value of the grid frequency between the master DSP and the slave DSP is not consistent	

ID	Name	Description	Solution
51	ConsistentFault_DC	The sample value of the DCI between the master DSP and the slave DSP is not consistent	
52	ConsistentFault_GFCI	The sample value of the GFCI between the master DSP and the slave DSP is not consistent	
53	SpiCommLoss	The SPI communication between the master DSP and the slave DSP is faulty	
54	SciCommLoss	The SCI communication between the control board and communications board is faulty	
55	RelayTestFailure	Grid relay error	
56	PvIsoFault	The insulation resistance is too low	Check the insulation resistance between the PV generator and earth (ground), and rectify the error in the event of short-circuiting.
57	OverTempFault_Inverter	The temperature of the inverter is too high	Ensure that the mounting position and method both comply with the necessary requirements.
58	OverTempFault_Boost	The DC/DC booster temperature is too high	Check whether the ambient temperature at the installation location exceeds the upper limit value. If so, improve the ventilation in order to reduce the temperature.
59	OverTempFault_Env	The ambient temperature is too high	

ID	Name	Description	Solution
65	UnrecoverHwAcOCP	The grid current is too high and has caused an unrectifiable hardware error	ID65-ID70 are internal inverter errors, switch the DC switch OFF, wait 5 minutes and then switch the DC switch ON. Check whether the error has been rectified. If not, please contact the technical support department.
66	UnrecoverBusOVP	The bus voltage is too high and has caused an unrectifiable error	
67	UnrecoverIacRmsUnbalance	The grid current is unsymmetrical and has caused an unrectifiable error	
68	UnrecoverIpvUnbalance	The input current is unsymmetrical and has caused an unrectifiable error	
69	UnrecoverVbusUnbalance	The bus voltage is unsymmetrical and has caused an unrectifiable error	Check the setting of the MPPT input mode (parallel mode/independent mode) of the inverter and correct if required.
70	UnrecoverOCPIInstant	The grid current is too high and has caused an unrectifiable error	
71	UnrecoverPvConfigSetWrong	Incorrect input mode	

ID	Name	Description	Solution
74	UnrecoverIPV Instant	The input current is too high and has caused an unrectifiable error	ID74-ID77 are internal inverter errors, switch the DC switch OFF, wait 5 minutes and then switch the DC switch ON. Check whether the error has been rectified. If not, please contact the technical support department.
75	UnrecoverWR ITEEPROM	The EEPROM cannot be recovered	
76	UnrecoverRE ADEEPROM	The EEPROM cannot be recovered	
77	UnrecoverRel ayFail	The grid relay has a permanent error	
81	OverTempDe rating	The inverter has derated itself due to the temperature being too high	Ensure that the installation position and method both comply with the necessary requirements of this user manual. Check whether the ambient temperature at the installation location exceeds the upper limit value. If so, improve the ventilation in order to reduce the temperature.
82	OverFreqDer ating	The inverter has derated itself due to the grid frequency being too high	The inverter automatically reduces the output power when the frequency of the electrical grid is too high. Ensure that the grid frequency is within the permissible range.
83	RemoteDerat ing	The inverter has derated itself through the remote control	The inverter logs ID83 when the remote power is reduced. Check the wiring of the remote control input and output signal connection on the communication board

ID	Name	Description	Solution
84	RemoteOff	The inverter was switched off through the remote control	The inverter logs ID84 in the event of a remote switch-off. Check the wiring of the remote control input and output signal connection on the communication board
85	UnderFrequencyDerating	The inverter has derated itself due to a low grid frequency	The inverter automatically reduces the output power when the frequency of the electrical grid is too low. Ensure that the grid frequency is within the permissible range.
89	UnderFrequencyUp Power	Underfrequency	Ensure that the grid frequency is within the permissible range.
93	Lightning protection alarm	The overvoltage protection has been triggered	Check whether the device is damaged and contact the technician for assistance.
94	Softwareversion is not consistent	The the control board and communications board software is not consistent	Contact the technical support department in order to upgrade the software.
95	Communication board EEPROM fault	The EEPROM of the communications board is faulty	ID95 ... ID96 are internal errors of the inverter. Switch the DC switch OFF, wait 5 minutes and then switch the DC switch ON. Check whether the error has been rectified. If not, please contact the technical support department.
96	RTC clock chip anomaly	The RTC clock chip is faulty	
97	Invalid Country	The country is invalid	Check the country setting and correct if required.

ID	Name	Description	Solution
98	SDfault	The SD card is defective	Please replace the SD card.

## 8.2 Maintenance

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

### 8.2.1 Cleaning the inverter

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

### 8.2.2 Cleaning the heat sink

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

## 9 Technical data

Datasheet	1100TL-G3	1600TL-G3	2200TL-G3	2700TL-G3	3000TL-G3	3300TL-G3
Input (DC)						
Recommended max. PV input power (Wp)	1500	2200	3000	3700 W	4100	4500
Max. input voltage (V)	500			550		
Aux. start-up voltage (V)	60					
Start-up voltage (V)	70					
Rated input voltage (V)	360					
MPPT operating voltage range (V)	50-500			50-550		
Full power MPPT voltage range (V)	110-450	150-450	200-450	250-500	275-500	300-500
Max. input current MPPT (A)	12					
Max. DC input short circuit current per MPPT (A)	15					
Number of MPPT / string per MPPT	1 / 1					
Input terminal type	MC4 / H4					
Output (AC)						
Rated power (W)	1100	1600	2200	2700	3000	3300
Max. AC power (VA)	1100	1600	2200	2700	3000	3300
Max. output current (A)	5.3	7.7	10.6	13	14.5	16
Nominal grid voltage	L / N / PE, 230 Vac					
Grid voltage range	180-276 Vac (according to local standard)					
Nominal grid frequency	50 Hz / 60 Hz					
Grid frequency range	45...55 Hz / 54...66 Hz (according to local standard)					
THDi	< 3%					
Power factor	1 default (adjustable +/-0.8)					
Efficiency						
Max. efficiency	97.5%			97.7%		
European Weighted efficiency	96.9%			97.2%		
Protection						

Anti-islanding protection	Yes	
DC reverse polarity protection	Yes	
DC switch	Yes	
Overtemperature protection	Yes	
Leakage current protection	Yes	
Earth fault protection	Yes	
SPD	MOV: Type III standard	
Communication		
Standard Communication mode	RS485 / WiFi, optional: Ethernet	
General		
Topology	Transformerless	
Ambient temperature range	-30°C...+60°C	
Self-consumption at night (W)	< 1	
Allowable relative humidity range	0...100%	
Noise	< 25 dB	
DC switch	Optional	
Cooling	Natural	
Max. operating altitude	2000 m	
Dimension (mm)	303*260.5*118	321*260.5*131.5
Support bracket	Wall-mounted	
Weight (kg)	5.5	6.3
Display	LCD+LED	
Degree of protection	IP65	
Warranty	10 years, optional: up to 20 years	
Standard		
EMC	EN 61000-6-1, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3	
Safety standards	IEC 62116, IEC 61727, IEC 61683, IEC 60068 (1,2,14,30), IEC 62109-1 / 2	
Grid standards	VDE V 0124-100, VDE V 0126-1-1, VDE-AR-N 4105, G83 / 2, C10 / 11, RD 1699	



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