SOFAR 3 … 6KTLM-G3

Installation and operating manual

Version 01 | June 2022

English

SOFAR 3KTLM, 3.6KTLM, 4KTLM, 4.6KTLM, 5KTLM, 6KTLM

Table of Content

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 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 3 ... 6KTLM-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

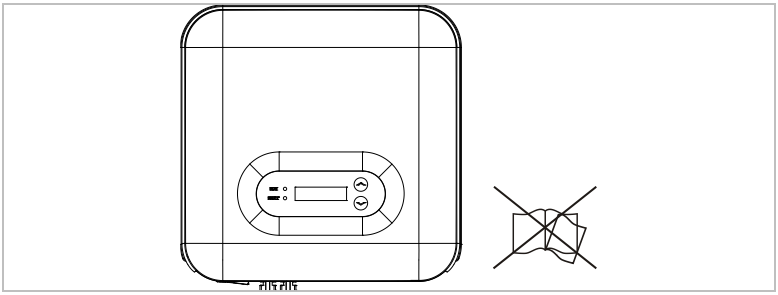
Personnel tasked with the operation and maintenance of the device must have the qualifications, competence and experience required to perform the described tasks, while also being capable of fully understanding all instructions contained within the manual. For safety reasons, this inverter may only be 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
IP	Device degree of protection according to EN 60529
	Positive and negative poles of the DC input voltage

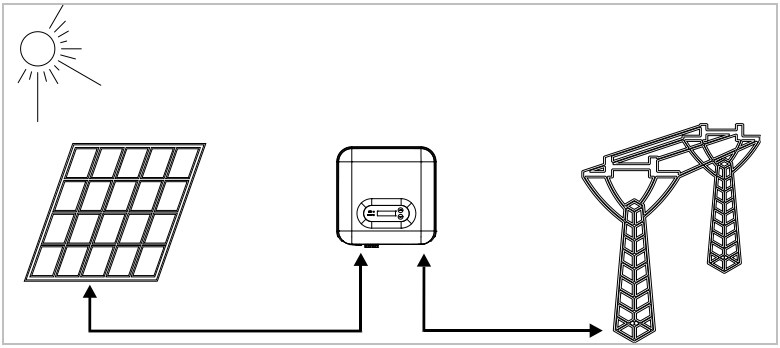
Symbol	Description
	The inverter must always be transported and stored with the arrows pointing upward
	RCM (Regulatory Compliance Mark) The product meets the requirements of the applicable Australian standards.

3 Product features

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

3.1 Product dimensions

The SOFAR 3 ... 6KTLM-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.

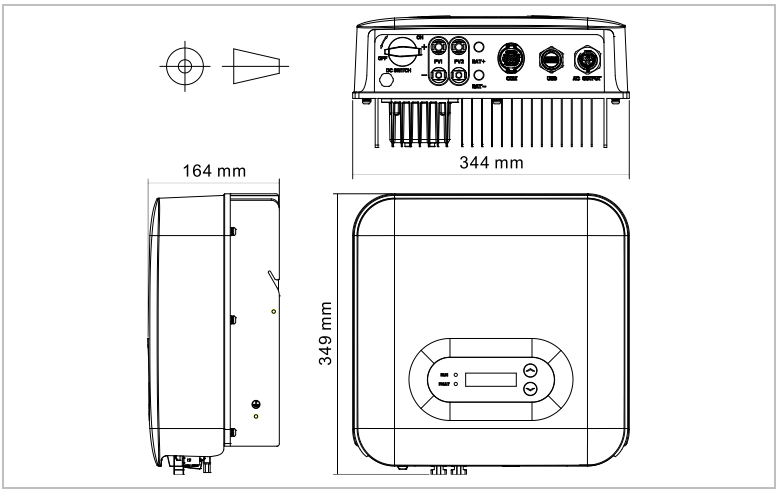


SOFAR 3 ... 6KTLM-G3 inverters may only be used with photovoltaic modules which do not require one of the poles to be earthed. In normal operation, the operating current must not exceed the limits specified within the technical data. Only photovoltaic modules may be connected at the input of the inverter (no batteries or other power sources must be connected).

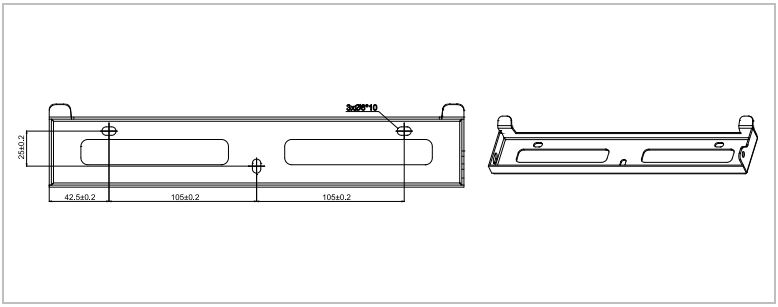
The selection of the optional inverter parts must be determined by a qualified technician who has good knowledge of the installation conditions.

Dimensions SOFAR 3 ... 6KTLM-G3:

L × W × H = 349 mm × 344 mm × 164 mm

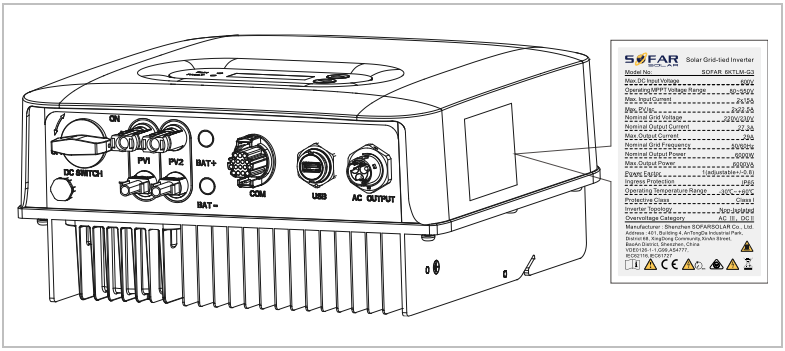


Dimensions of the mounting bracket for SOFAR 3 ... 6KTLM-G3:



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.

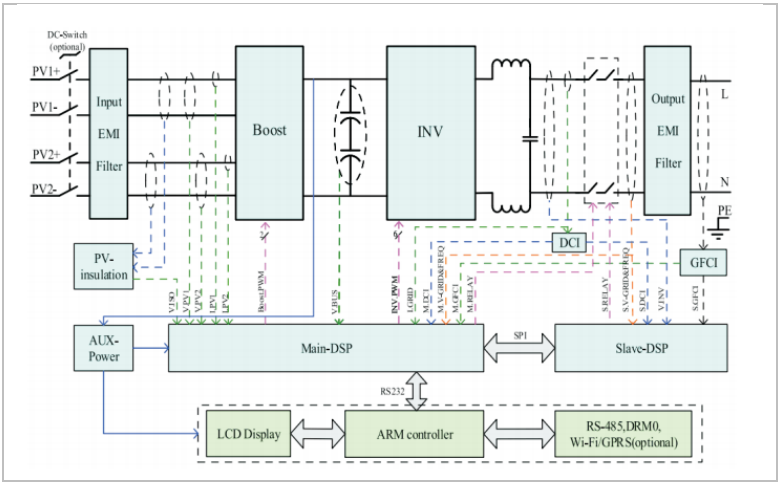
E Data transfer

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

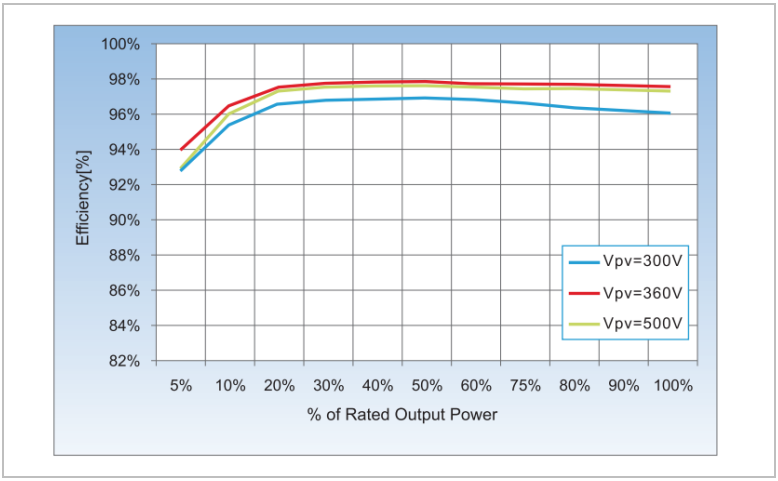
F Software update

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.

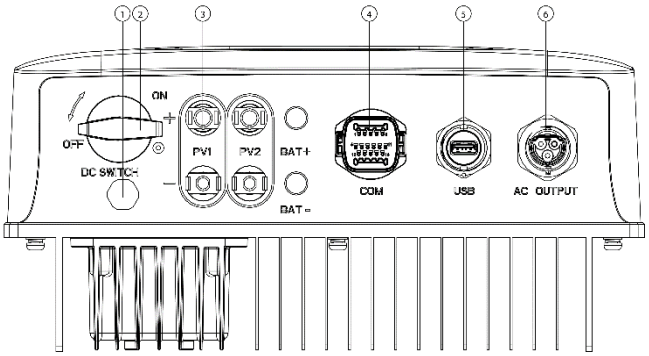
No.	Image	Description	Quantity
01		Inverter SOFAR 3 ... 6KTLM-G3	1
02		Wall bracket	1
03		PV+ input terminal	1
04		PV- input terminal	1
05		Crimp contact socket	1
06		Crimp contact pin	1
07		M6 hexagon screws	2
08		Dowel	3
09		COM 16pin communication terminal	1
10		AC output terminal	1
11		Self-tapping screw	3
12		Manual	1
13		Warranty card	1
14		Warranty registration form	1
15		WiFi stick logger	1

4.4 Connections

⚠ CAUTION

Damage during transportation

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

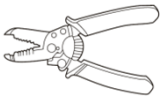
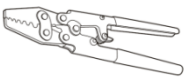
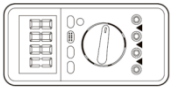


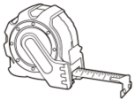
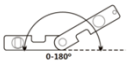
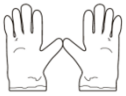
①	Venting valve	②	DC Switch
③	PV input terminals	④	COM port
⑤	USB	⑥	Grid connection port

*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

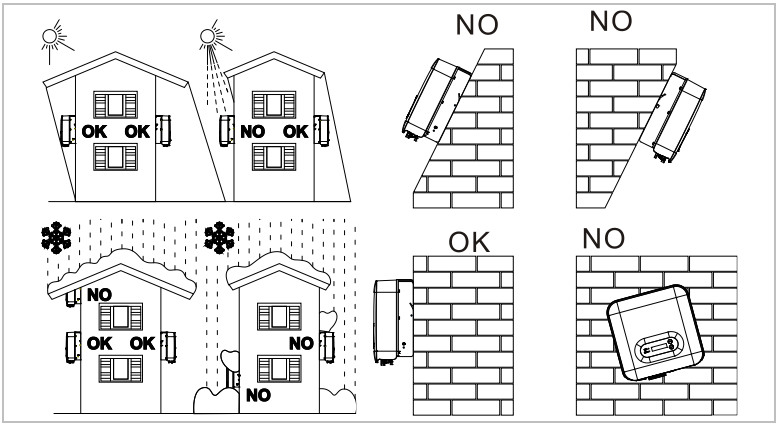
Prepare the tools required for the installation and the electrical connection.

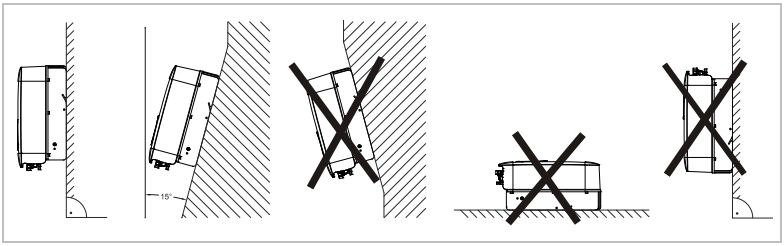
No.	Tool	Model	Function
01		Hammer drill Recommended drill diameter: 6 mm	Used to drill holes in the wall.
02		Screwdriver	Wiring
03		Cross screwdriver	Used to remove and install the screws of the AC terminal
04		Removal tool	Used to remove the PV terminal
05		Wire stripper	Used to strip the wire
06		5 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

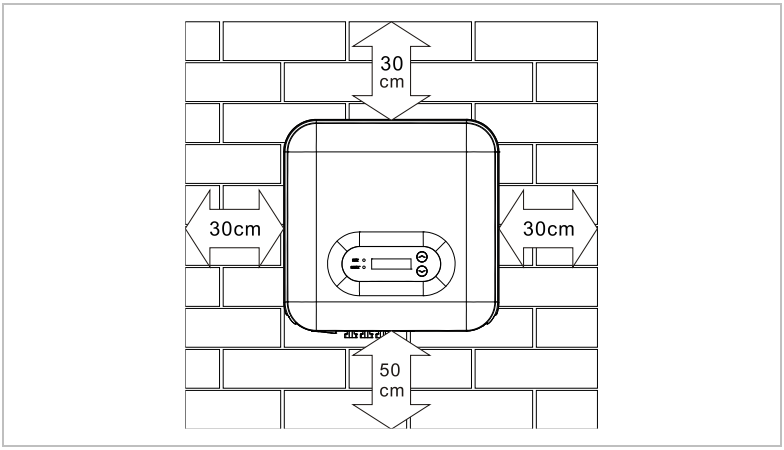
4.6 Installation location

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

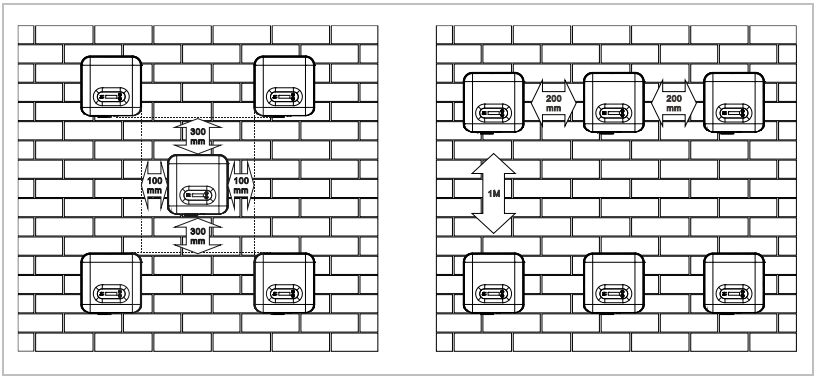




Minimum distances for individual SOFAR 3 ... 6KTLM-G3 inverters:

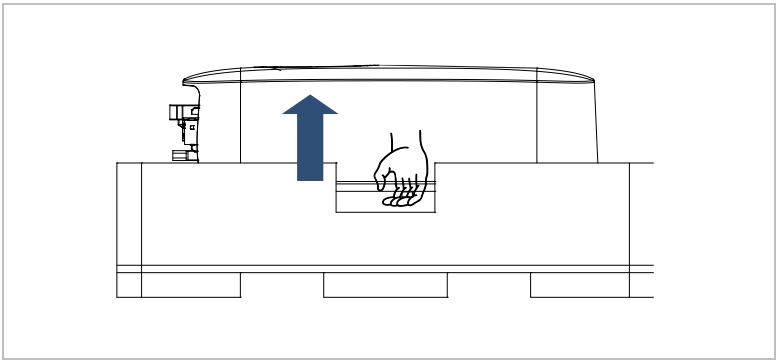


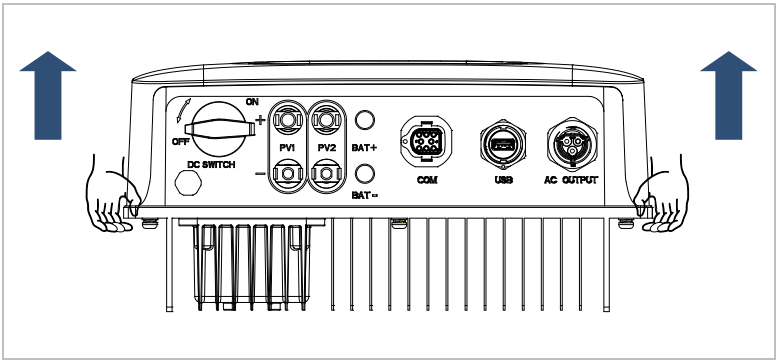
Minimum distances for several SOFAR 3 ... 6KTLM-G3 inverters:



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

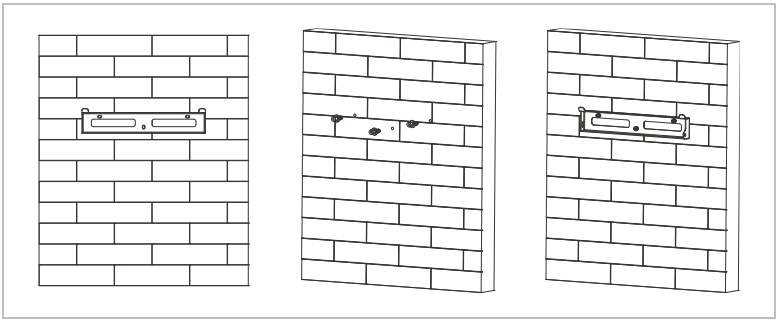
- In order to prevent injuries and damage to the device, ensure that the inverter is kept balanced while it is being moved - it is very heavy.
- Do not place the inverter on its connections, as these are not designed to bear its weight. Place the inverter horizontally on the ground.
- When you place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

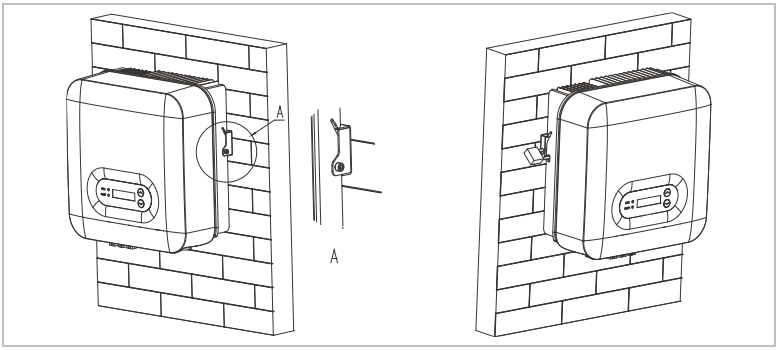
2 Insert the complete dowel into the hole vertically.

3 Fasten the rear panel to the wall using the three screws.



4 Place the inverter in the wall bracket. Secure the inverter to the wall bracket using a M6 hexagon screw.

5 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 3 ... 6KTLM-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.

Isc PV (absolute maximum)		22,5 A / 22.5 A
Maximum AC overcurrent protection	SOFAR 3KTLM-G3	15 A
	SOFAR 3.6KTLM-G3	16 A
	SOFAR 4KTLM-G3	20 A
	SOFAR 4.6KTLM-G3	23 A
	SOFAR 5KTLM-G3	25 A
	SOFAR 5KTLM-G3-A	21.7 A
	SOFAR 6KTLM-G3	29 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
COM interface	DVCA

Below are the DC switch parameters:

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

Below are the PV terminal parameters:

Rated-insulation voltage	1000 V
Rated operational current	39 A
Protection class	IP68
Maximum temperature limit	105°C

5.2 System overview

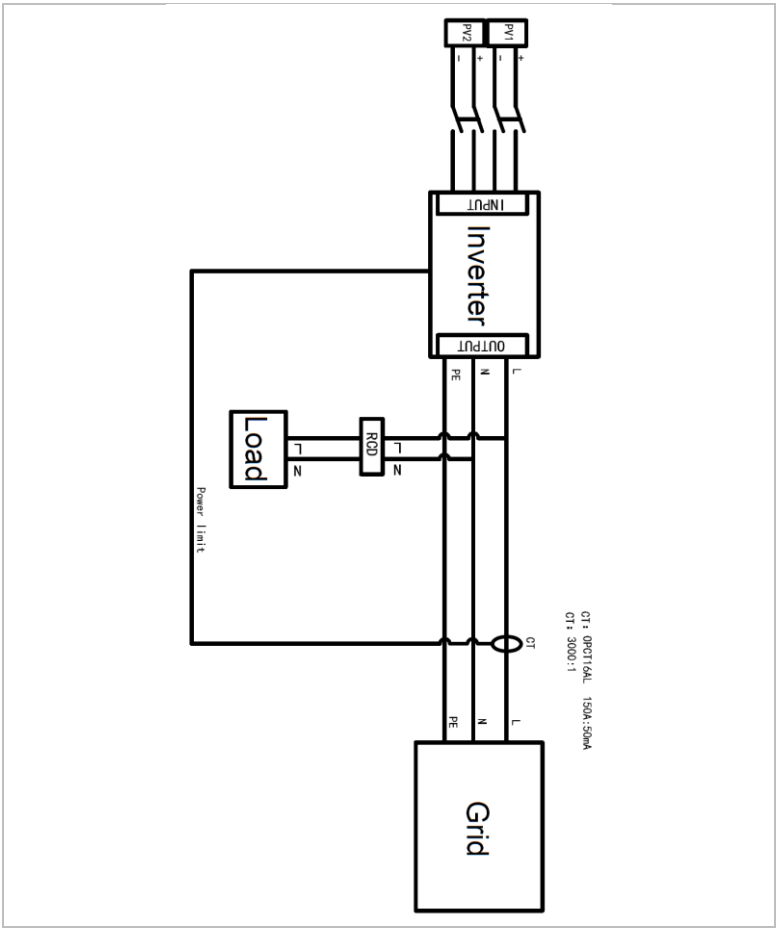
There are different system configurations possible depending on the user's requirements, existing electrical infrastructure and local regulations.

There are 2 system configurations:

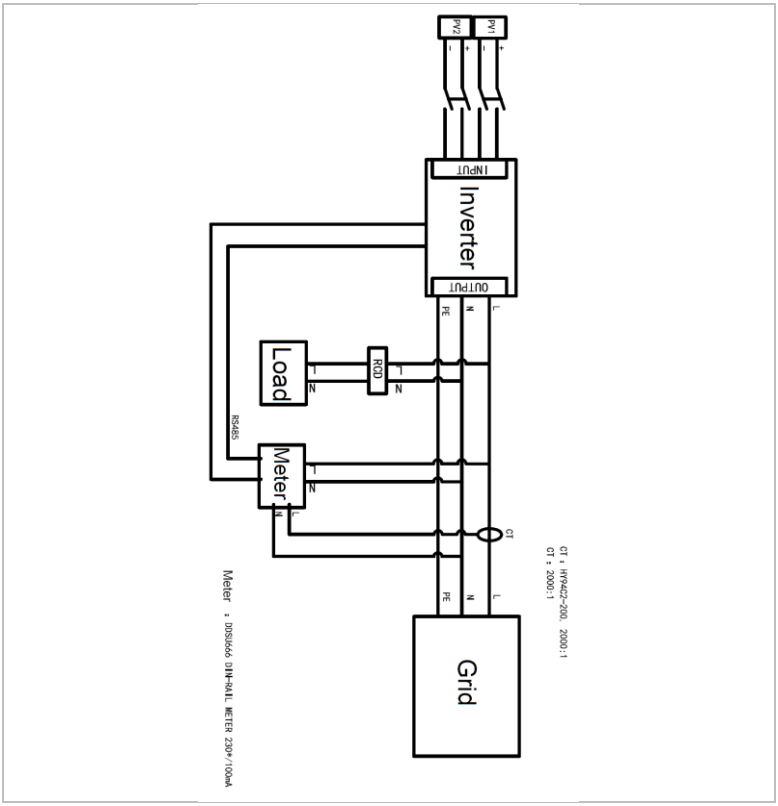
System A: direct measurement of energy with CTs

System B: measurement of energy with energy meter + CTs

5.2.1 System A (CTs)



5.2.2 System B (energy meter + CTs)



5.3 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)

5.4 Connecting the PE cables

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

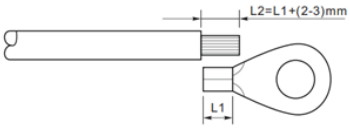
ATTENTION

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.

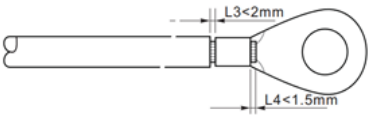
Procedure

1. Remove the insulation of the cable. For outside use, cables of ≥ 4mm² are recommended for earthing).

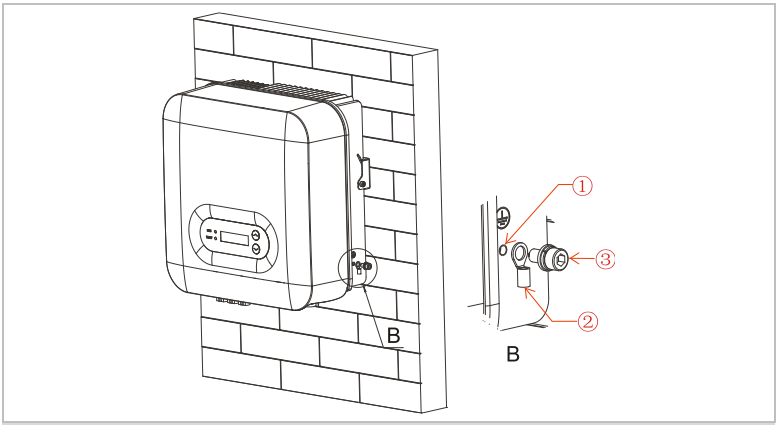


Note: L2 is 2 to 3 mm longer than L1

2. Crimp the cable to the ring terminal:



3. Install the crimped ring terminal and the washer with the M6 screw and tighten these with a torque of 6 Nm using an Allen key:



①	M6 screw	②	Ring terminal
③	Threaded hole		

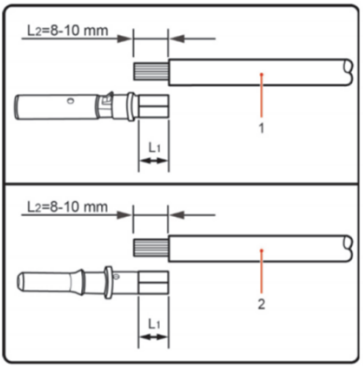
5.5 Connecting the DC cables

Please observe the recommended cable dimensions:

Cable cross-section (mm^2)		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:

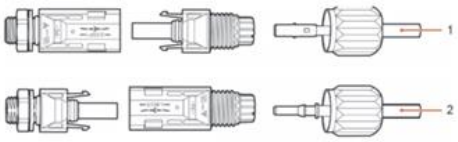


① Positive DC cable ② Negative DC cable

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

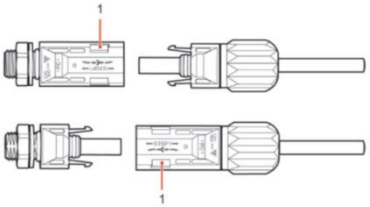
Danger of reverse polarity!

- 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.
- Please use a multimeter to ensure that the positive and negative poles of the cables are connected correctly.

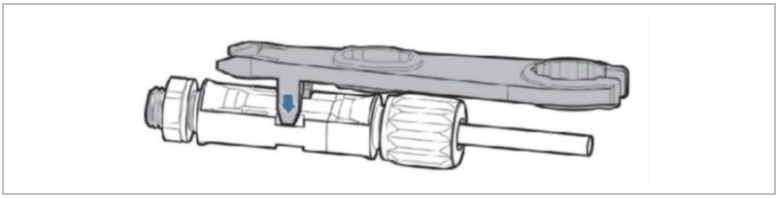
Removing the connectors

⚠ 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:



5.6 Connecting the AC power cables

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

⚠ CAUTION

AC connection

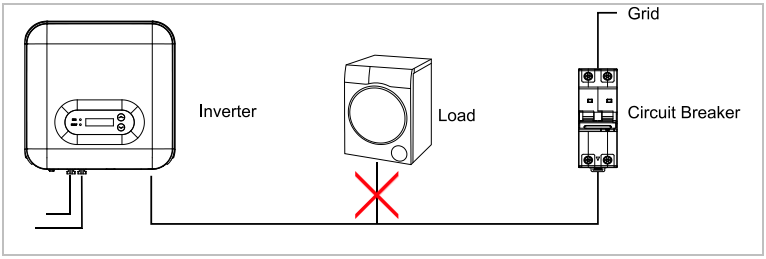
- Each inverter must have its own circuit breaker.
- Do not connect any consumers between the inverter and circuit breaker!
- The AC disconnecting device must be easily accessible.

NOTE

- The inverter SOFAR 3 ... 6KTLM-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!

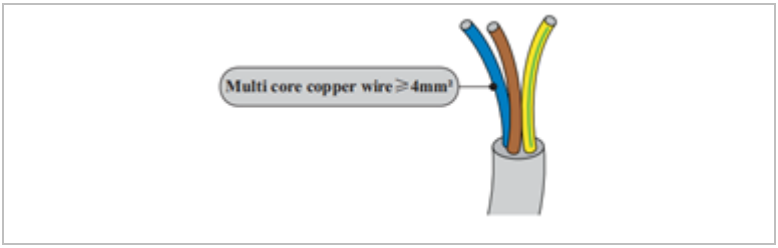
Dimensioning

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.

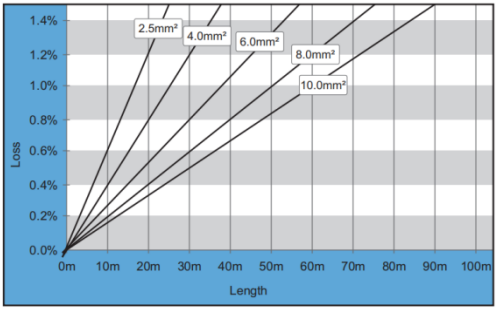


Model	3KTLM-G3	3.6KTLM-G3	4KTLM-G3	4.6KTLM-G3	5KTLM-G3	5KTLM -G3-A	6KTLM-G3
Cable (copper) (mm²)	≧6	≧6	≧6	≧10	≧10	≧10	≧10
AC disconnector (A)	20	25	25	32	32	32	32

Multi-wire copper wire

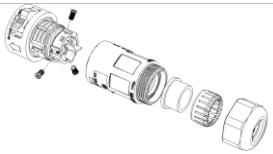


The AC cable should be correctly dimensioned in order to ensure that the loss of power in the AC cable is less than 1% of the rated output. If the AC cable resistance is too high, then the AC voltage will increase; this may cause the inverter to become disconnected from the power grid. The relationship 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 an IP66 AC connector:



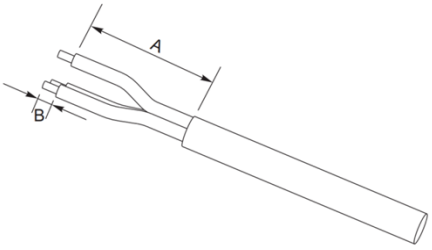
5.6.1 AC connector installation instructions

⚠ CAUTION

Electrical voltage

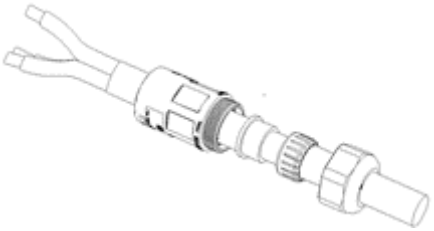
- Ensure that the grid has been switched off before removing the AC connector.

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

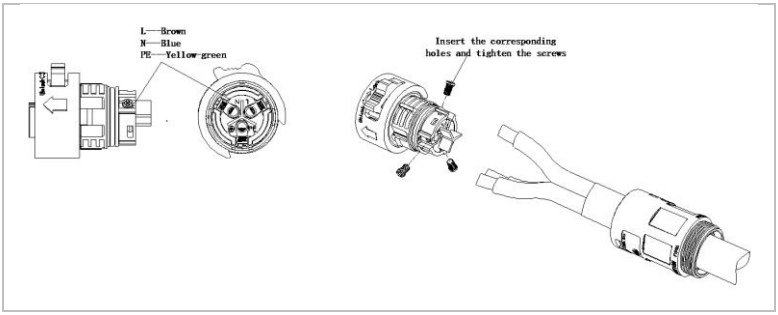


A: 15 … 25 mm B: 6 … 8 mm

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

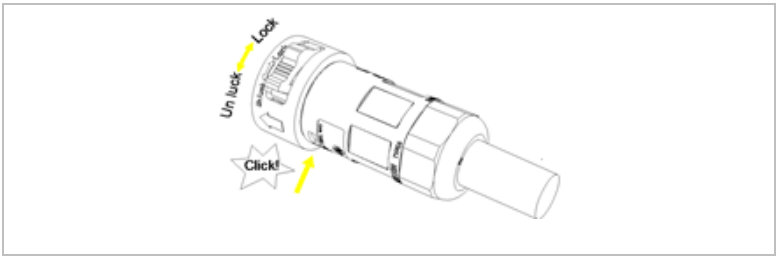


3. Connect the AC output cable in accordance with the following requirements and tighten the terminal using the Allen key (type 1) or the Phillips head screwdriver (type II).

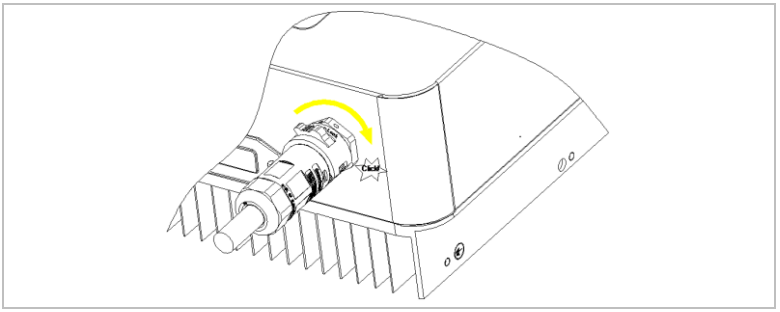


Connection	Cable
PE	Earthing cable (yellow-green)
L	Phase (brown)
N	Neutral conductor (blue)

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



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



6. Remove the AC connector by 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.

5.7 System monitoring

The SOFAR 3 ... 6KTLM-G3 inverters provide various communication methods for the system monitoring:

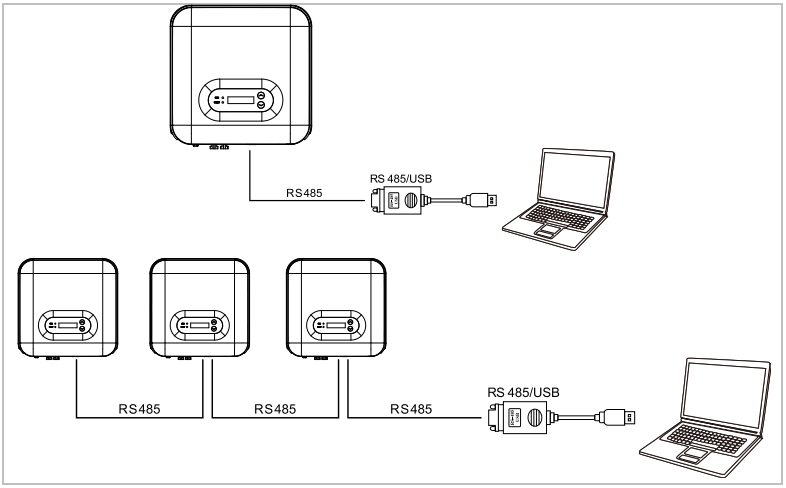
RS485 or WiFi stick (standard), GPRS or Ethernet stick (optional).

5.7.1 RS485 network

You can connect RS485-linked devices to your PC or a data logger via an RS485 USB adapter. Please refer to paragraph 5.8 for the COM pin definitions.

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

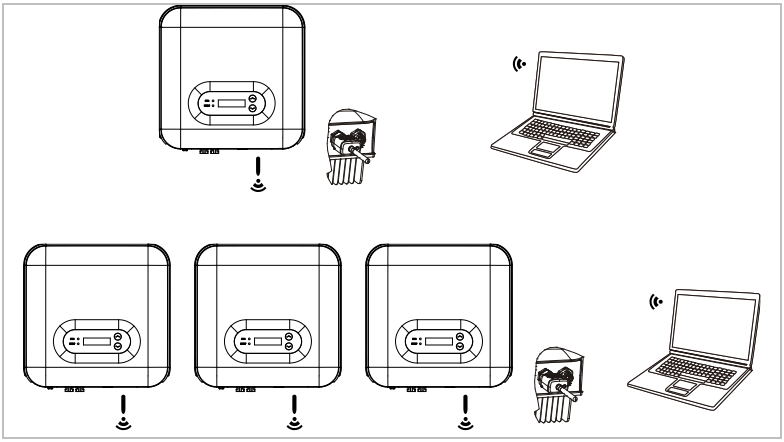


5.7.2 WiFi-, GPRS-, Ethernet stick

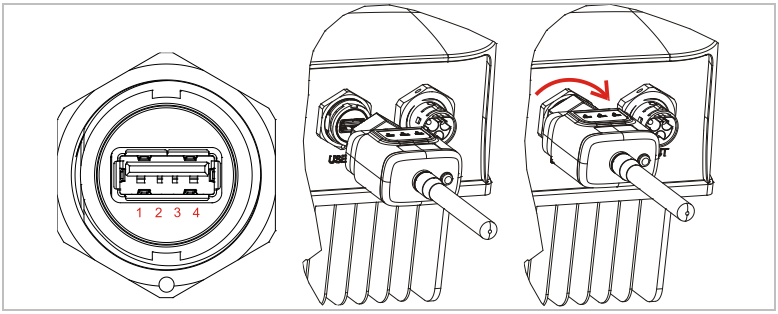
When you have installed the stick logger, the inverters can directly upload your operating, energy and alarm data in the SOLARMAN monitoring portal.

NOTE

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



5.8 Installation of the WiFi-, GPRS or Ethernet stick



5.8.1 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. For this, enter the serial number found on the stick logger.

Installers use the portal at pro.solarmanpv.com

5.8.2 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:

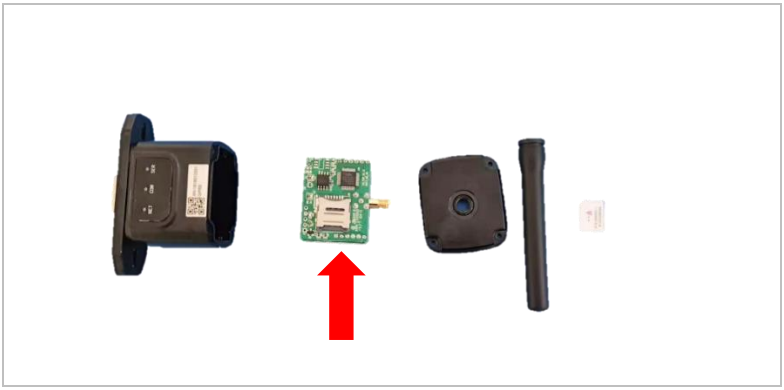
LED	Status	Description
NET:	Communication with the router	**On:** Connection to server successful
		Flashing (1 sec.): Connection to router successful
		Flashing (0.1 sec.): WPS mode active
		Off: No connection to router
COM	Communication with inverter	**Flashing** (1 sec.): Communication with inverter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

Reset button

Keystroke	Description
1 sec.	WPS mode
5 sec.	Restart
10 sec.	Restart (reset)

5.8.3 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

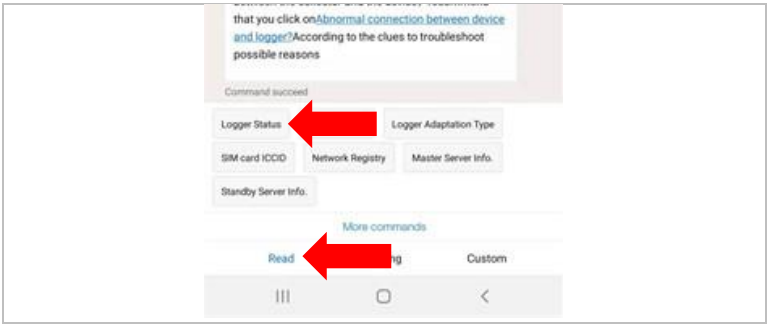
2 Identify the WiFi stick with the serial number and select it.

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:



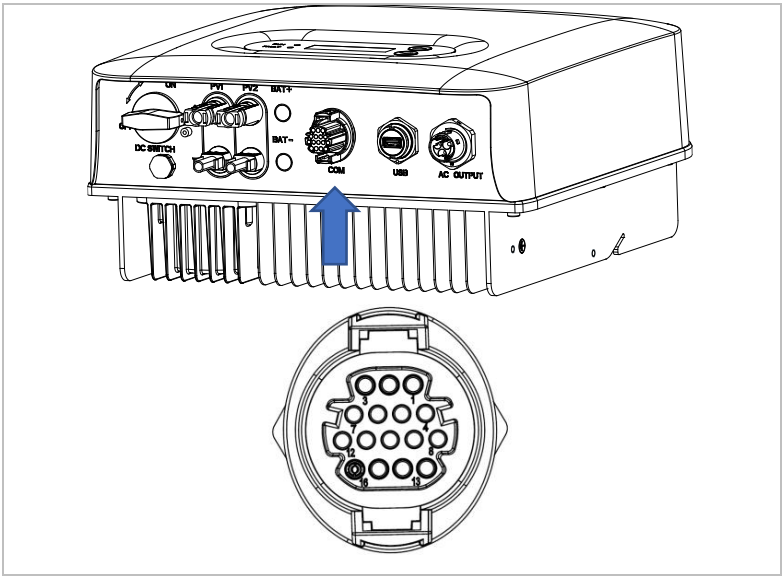
5.8.4 Setting up the Ethernet stick

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

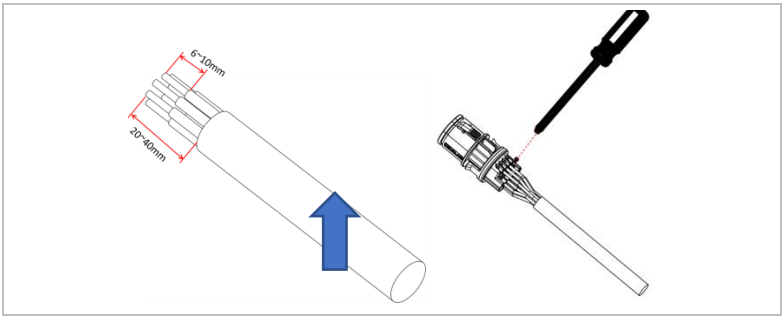
If you wish to set up a fixed IP address, connect a PC to the Ethernet stick and open the configuration page via the web address **10.10.100.254.**

5.9 RS485, CT, logic interfaces

The position of the communication interface of the SOFAR 3 ... 6KTLM-G3 is displayed below:



Please refer to below diagram for the correct connection:



Function	Pin	Definition	Note
Inverter monitoring	1	485_TX+	RS485 differential signal +
	2	485_TX+	RS485 differential signal +
	3	485_TX-	RS485 differential signal -
	4	485_TX-	RS485 differential signal -
Energy meter communication	5	RS485-A	RS485 signal +
	6	RS485-B	RS485 signal -
Logic interface pin definitions	7	GND.S	DRMS port logical IO
	8	DRM0	
	9	DRM1/5	
	10	DRM2/6	
	11	DRM3/7	
	12	DRM4/8	
	13	GND.S	Communication ground
	14	N/A	N/A
CT connection	15	CT+	CT positive connection
	16	CT-	CT negative connection

The pin definitions of the logic interface and the switching connections are shown below.

The function of the logic interface must be set on the LCD display.

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

Logic interface for AS/NZS 4777.2:2020

also known as Inverter Demand Response Modes (DRMs)

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

Pin	Function
16	DRM1/5
15	DRM2/6
14	DRM3/7
13	DRM4/8
12	GND
11	DRM0

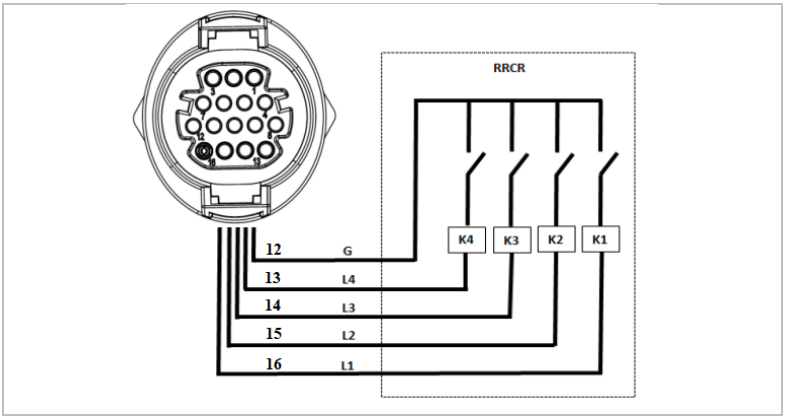
NOTE

- Supported DRM commands: DRM0, DRM5, DRM6, DRM7, DRM8.

Logic interface for VDE-AR-N 4105:2018-11

This function serves to control and/or limit the output power of the inverter.

The inverter can be connected to a radio ripple control receiver in order to dynamically limit the output power of all inverters within the system.



The inverter is preconfigured on the following power levels

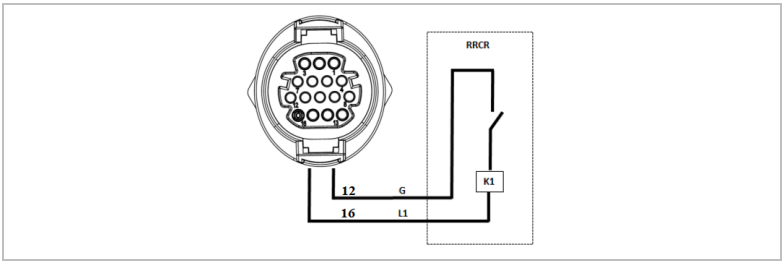
Pin	Name	Inverter	Radio ripple control receiver
16	L1	Relay 1 input	K1 - output relay 1
15	L2	Relay 2 input	K2 - output relay 2
14	L3	Relay 3 input	K3 - output relay 3
13	L4	Relay 4 input	K4 - output relay 4
12	G	Earth	Relay, common earth

Relay status: Closing is 1, opening is 0

L1	L2	L3	L4	Active power	Cos（ϕ）
1	0	0	1	0%	1
0	1	0	0	30%	1
0	0	1	0	60%	1
0	0	0	1	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
16	L1	Relay 1 input	K1 - output relay 1
12	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（ϕ）
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 3 ... 6KTLM-G3 inverter.

7.1 Control panel and display field

7.1.1 Buttons and display lights

Buttons

Button	Name	Description
↑	Up	Short press: Select previous menu item Long press: Exit menu or current interface
↓	Down	Short Press: Select next menu item Long press: "Enter" button

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
Initialization	The control software is started
Wait 10 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 “Fault” or “Permanent” state.
Normal	The inverter goes into the “Normal” state, and feeds current into the grid
Fault	The inverter goes into the “Error” state if an error or a fault occurs.

Status	Description
Permanent	The inverter has encountered an unrecoverable error, please look at the fault elimination procedures in chapter **8** or contact the SOFARSOLAR service.
DSP communicate fail	The communication between the control board and communications board has been interrupted.

7.4 Menu structure

Hold the "down" button to bring up the main menu.

Main menu

1. Enter Setting	See “Settings”
2. Event List	See “Set country codes”
3. SystemInfo	See System information menu
4. Display Time	See Display time
5. Software Update	See Firmware update

“Settings” menu

1. Set time	Sets the system time for the inverter
2. Clear energy	Deletes the total energy yield of the inverter

3. Clear events	Deletes the historical events recorded in the inverter
4. Set SafetyPara	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”
5. On-Off Control	Local control of inverter
6. Set Energy	Sets the total power generation.
7. Set Address	Enter the Modbus address (when several inverters require simultaneous monitoring), standard: 01
8. Set Input Mode	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. Default: independent mode.
9. Set Language	Sets the display language of the inverter
10. Set Reflux P	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.
11. EnDRMS	Activates or deactivates logical interfaces. Further information can be found in chapter 5.10 of this manual.
12. IV Curve Scan	Through this function, the peak point of maximum power can be tracked.
13. Autotest Fast	
14. Autotest STD	

NOTE

- The Autotest function is only applicable in Italy. Please contact SOFARSOLAR for the specific steps.

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
000	000	Germany VDE4105	018	000	EU EN50438
	001	Germany BDEW		001	EU EN50549
	002	Germany VDE0126	019	000	IEC EN61727
001	000	Italia CEI-021 Internal	020	000	Korea
	001	Italia CEI-016 Italia	021	000	Sweden
	002	Italia CEI-021 External	022	000	Europe General
	003	Italia CEI0-21 In Areti	024	000	Cyprus
002	000	Australia	025	000	India
	001	Australia AU-WA	026	000	Philippines
	002	Australia AU-SA	027	000	New Zealand
	003	Australia AU-VIC	028	000	Brazil
	004	Australia AU-QLD		001	Brazil LV
	005	Australia AU-VAR		002	Brazil 230
	006	Australia AUSGRID		003	Brazil 254
	007	Australia Horizon	029	000	Slovakia VSD
003	000	Spain RD1699		001	Slovakia SSE
004	000	Turkey		002	Slovakia ZSD
005	000	Denmark	033	000	Ukraine
	001	Denmark TR322	035	000	Mexico LV
006	000	Greece Continent	038	000	Wide-Range-60Hz
	001	Greece island	039	000	Ireland EN50438
007	000	Netherland	040	000	Thailand PEA
008	000	Belgium		001	Thailand MEA
009	000	UK G59/G99	042	000	LV-Range-50Hz
	001	UK G83/G98	044	000	South Africa
010	000	China	046	000	Dubai DEWG
	001	China Taiwan		001	Dubai DEWG MV
011	000	France	107	000	Croatia
	001	France FAR Arrete23	108	000	Lithuania
012	000	Poland			

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 List
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. Reflux Power**
4. Hardware version	**10. EnDRMs**
5. Country	**11. Power Ratio**
6. Modbus address	

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.

8.2 Error code list

Code	Name	Description	Solution
ID001	GridOVP	The voltage of the power grid is too high	If the alarm occurs occasionally, it may be due to the power grid. The inverter will automatically return to normal operation when the mains power returns to normal. If the alarm occurs frequently, check whether the mains voltage/frequency is within the permissible range. If so, check the AC circuit breaker and AC wiring of the inverter. If the alarm occurs repeatedly, contact technical support to adjust the voltage and frequency limits after obtaining approval from the local power grid operator.
ID002	GridUVP	The voltage of the mains is too low	
ID003	GridOFP	The mains frequency is too high	
ID004	GridUFP	The mains frequency is too low	

ID005	GFCI	Earth fault	If the error occurs occasionally, it may be due to external factors. The inverter will automatically return to normal operation. If the error occurs frequently and lasts for a long time, check whether the insulation resistance between the PV generator and earth (ground) is too low and check the insulation of the PV cables.
ID006	OVRT fault	OVRT function is faulty	ID006-041 are internal faults of the inverter. Turn the DC switch OFF, wait 5 minutes and then turn the DC switch ON. Check whether the error has been cleared. If not, please contact the technical support.
ID007	LVRT fault	LVRT function is faulty	
ID008	IslandFault	Island protection fault	
ID009	GridOVPInstant1	Transient overvoltage of mains voltage 1	
ID010	GridOVPInstant2	Transient overvoltage of mains voltage 2	
ID011	VGridLineFault	Fault in the mains voltage	
ID012	InvOVP	Inverter overvoltage	
ID017	HwADFaultIGrid	Mains current measurement error	

ID018	HwADFaultDCI	DC current measurement error
ID019	HwADFaultVGrid(DC)	Sampling error of the mains voltage (DC)
ID020	HwADFaultVGrid(AC)	Mains voltage sampling error (AC)
ID021	GFCIDeviceFault(DC)	Leakage current sampling error (DC)
ID022	GFCIDeviceFault(AC)	Leakage current sampling error (AC)
ID023	HwADFaultDCV	DC load voltage sampling error
ID024	HwADFaultIdc	DC input current sampling error
ID025	HwADErrDCI(DC)	¥
ID026	HwADErrIdcBranch	¥
ID029	ConsistentFault_GFCI	The GFCI sample between the master DSP and the slave DSP is not consistent
ID030	ConsistentFault_Vgrid	The line voltage sample between the master DSP and the slave DSP is not consistent.
ID033	SpiCommFault(DC)	SPI communication error (DC)

ID034	SpiCommFault(AC)	SPI communication error (AC)	
ID035	SChip_Fault	Chip error (DC)	
ID036	MChip_Fault	Master chip error (AC)	
ID037	HwAuxPowerFault	Auxiliary voltage error	
ID041	RelayFail	Relay detection failure	
ID042	IsoFault	Insulation resistance is too low	Check the insulation resistance between the PV generator and earth (ground), rectify the fault if there is a short circuit.
ID043	PEConnectFault	Earth fault	Check the PE conductor for function
ID044	PV Config Error	Incorrect input mode configuration	Check the MPPT input mode setting (parallel mode/independent mode) of the inverter and correct if necessary.
ID045	CTD isconnect	CT error	Check that the wiring of the current transformer is correct.
ID049	TempFault_Bat	Battery temperature error	Make sure that the battery does not get too hot. Check that the temperature sensor has been correctly connected to the battery.

ID050	TempFault_HeatSink1	Temperature error heat sink 1	Make sure that the inverter has been installed in a cool and well-ventilated place without direct sunlight. Make sure the inverter is installed vertically and the ambient temperature is below the inverter's temperature limit.
ID051	TempFault_HeatSink2	Temperature error heat sink 2	
ID052	TempFault_HeatSin3	Heat sink temperature error 3	
ID053	TempFault_HeatSink4	Temperature error heat sink 4	
ID054	TempFault_HeatSin5	Temperature error heat sink 5	
ID055	TempFault_HeatSin6	Temperature error heat sink 6	
ID057	TempFault_Env1	Temperature error ambient temperature 1	
ID058	TempFault_Env2	Temperature error ambient temperature 2	
ID059	TempFault_Inv1	Temperature error module 1	
ID060	TempFault_Inv2	Temperature error module 2	
ID061	TempFault_Inv3	Temperature error module 3	
ID062	TempDiffErrInv		
ID065	VbusRmsUnbalance	Asymmetrical bus voltage RMS	Internal error of the inverter. Switch off the inverter, wait 5 minutes and then switch the unit on again.
ID066	VbusInstantUnbalance	The transient value of the bus voltage is unbalanced	

ID067	BusUVP	The DC bus voltage is too low during mains connection	If the error persists, contact Technical Support.
ID068	BusZVP	The DC bus voltage is too low	
ID069	PVOVP	The PV input voltage is too high	Check whether the PV series voltage (Voc) is higher than the maximum input voltage of the inverter. If this is the case, adjust the number of PV modules in series. After the correction, the inverter automatically returns to its normal state.
ID070	BatOVP	Battery overvoltage	Check whether the voltage of the battery is higher than the maximum input voltage of the inverter. If this is the case, adjust the number of battery modules in series.
ID071	LLCBusOVP	LLC Bus overvoltage protection	Internal error of the inverter. Switch off the inverter, wait 5 minutes and then switch the unit on again. If the error persists,
ID072	SwBusRmsOVP	Inverter bus voltage RMS Software overvoltage	

ID073	SwBusInstantOVP	Inverter bus voltage instantaneous Software overvoltage	contact Technical Support.
ID081	SwBatOCP	Software overcurrent protection of the battery	
ID082	DciOCP	Dci overcurrent protection	
ID083	SwOCPInstant	Instantaneous output current protection	
ID084	SwBuckBoostOCP	BuckBoost software sequence	
ID085	SwAcRmsOCP	Output RMS current protection	
ID086	SwPvOCPInstant	PV overcurrent software protection	
ID087	IpvUnbalance	PV flows in uneven parallelism	
ID088	IacUnbalance	Unbalanced output current	
ID091	SwAcCBCFault		
ID097	HwLLCBusOVP	LLC bus hardware overvoltage	
ID098	HwBusOVP	Inverter bus hardware overvoltage	

ID099	HwBuckBoostOCP	BuckBoost hardware overflows	
ID100	HwBatOCP	Battery hardware overflow	
ID102	HwPVOCP	PV hardware overflows	
ID103	HwACOCP	Mains current is too high and has triggered hardware protection	
ID105	MeterCommFault	Communication fault with meter unit	Check communication to meter.
ID110	Overload1	Overload protection 1	Please check whether the inverter is operating under overload.
ID111	Overload2	Overload protection 2	
ID112	Overload3	Overload protection 3	
ID113	OverTempDerating	The inverter has throttled due to too high a temperature	Make sure that the inverter has been installed in a cool and well-ventilated place without direct sunlight. Make sure the inverter is installed vertically and the ambient temperature is below the temperature limit of the inverter.
ID114	FreqDerating	Mains frequency is too high	Make sure that the mains frequency and voltage are

ID115	FreqLoading	Mains frequency is too low	within the permissible range.
ID116	VoltDerating	AC voltage is too high	
ID117	VoltLoading	AC voltage is too low	
ID124	BatLowVoltageAlarm	Protection against battery undervoltage	Please check if the battery voltage of the inverter is too low.
ID125	BatLowVoltageShut	Low battery voltage shutdown	
ID129	unrecoverHwAcOCP	Mains current is too high and has caused an unrecoverable hardware fault	Internal error of the inverter. Switch off the inverter, wait 5 minutes and then switch the unit on again. If the error persists, contact Technical Support.
ID130	unrecoverBusOVP	Bus voltage is too high and has caused a non-recoverable fault	
ID131	unrecoverHwBusOVP	Permanent bus hardware failure due to overvoltage	
ID132	unrecoverIpvUnbalance	Input current is unbalanced and has caused an unrecoverable fault	
ID133	unrecoverEPSBatOCP	Permanent battery overcurrent error in EPS mode	
ID134	unrecoverAcOCPInstant	Permanent error due to transient overcurrent	

ID135	unrecoverIacUnbalance	Permanent unbalanced output current error	
ID137	unrecoverPvConfigError	Permanent input mode configuration error	Check the MPPT input mode setting (parallel mode/independent mode) of the inverter and correct it if necessary.
ID138	unrecoverPVOCPInstant	Permanent input overcurrent error	
ID139	unrecoverHwPVOCP	Permanent input hardware overcurrent error	Internal error of the inverter. Switch off the inverter, wait 5 minutes and then switch the unit back on. If the error persists, contact Technical Support.
ID140	unrecoverRelayFail	Permanent error of the mains relay	
ID141	unrecoverVbusUnbalance	The bus voltage is unbalanced and has caused an unrecoverable error	
ID142	PermSpdFail(DC)		
ID143	PermSpdFail(AC)		
ID145	USBFault	USB error	Check the USB connection of the inverter.
ID146	WifiFault	Wifi error	Check the inverter's WiFi connection.
ID147	BluetoothFault	Bluetooth error	Check the Bluetooth connection of the inverter.
ID148	RTCFault	RTC clock failure	Internal error of the inverter. Switch off the inverter, wait 5 minutes and then switch the unit back on.
ID149	CommEEPROMFault	EEPROM error of the communication card	
ID150	FlashFault	Communication card FLASH error	

ID152	SafetyVerFrault		If the error persists, contact technical support.
ID153	SciCommLose(DC)	SCI communication error (DC)	
ID154	SciCommLose(AC)	SCI communication error (AC)	
ID155	SciCommLose(Fuse)	SCI communication error (fuse)	
ID156	SoftVerError	Inconsistent software versions	Download the latest firmware from the website and launch the software update. If the error persists, contact technical support.
ID157	BMSCommunicatonFault	Lithium battery communication error	Make sure your battery is compatible with the inverter. CAN communication is recommended. Check the communication line or the connection of the battery and the inverter for errors.
ID161	ForceShutdown	Forced shutdown	The inverter has been forcibly disconnected.
ID162	RemoteShutdown	Remote shutdown	The inverter is shut down remotely.
ID163	Drms0Shutdown	DRM 0 shutdown	The inverter is running with a Drms0 shutdown.
ID165	RemoteDerating	The inverter has reduced its power due to remote control	This message is for information and is not an error

ID166	LogicInterfaceDerating	The inverter has reduced its power due to the digital inputs	
ID167	AlarmAntiRefluxing	Power reduction due to current sensor or SmartMeter configuration	
ID169	FanFault1	Fan 1 fault	Check if the corresponding fan of the inverter is running normally.
ID170	FanFault2	Fan 2 fault	
ID171	FanFault3	Fan 3 fault	
ID172	FanFault4	Fan 4 fault	
ID173	FanFault5	Fan 5 fault	
ID174	FanFault6	Fan 6 fault	
ID175	FanFault7	Fan 7 fault	
ID176	MeterCommLose	Communication fault with meter unit	Check communication to meter
ID177	BMS OVP	BMS overvoltage alarm	Internal error in the connected lithium battery. Switch off the inverter and the lithium battery, wait 5 minutes and then switch the components on again. If the error persists, contact Technical Support.
ID178	BMS UVP	BMS Undervoltage alarm	
ID179	BMS OTP	BMS High temperature warning	
ID180	BMS UTP	BMS low temperature warning	
ID181	BMS OCP	BMS overload warning during	

		charging and discharging	
ID182	BMS Short	BMS Short circuit alarm	

8.3 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.

8.3.1 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.

8.3.2 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	3KTLM-G3	3.6KTLM-G3	4KTLM-G3	4.6KTLM-G3	5KTLM-G3	5KTLM-G3-A	6KTLM-G3
Input (DC)							
Recommended max. PV input power (Wp)	4500	5400	6000	7000	7500	7500	9000
Max. DC power for single MPPT (W)	3500				3750		4500
Number of MPP trackers	2						
Number of DC inputs	1 for each MPPT						
Max. input voltage (V)	600						
Start-up voltage (V)	90						
Rated input voltage (V)	380						
MPPT operating voltage range (V)	80-550						
Full power MPPT voltage range (V)	200-500				210-500		260-500
Max. input MPPT current (A)	15 / 15						
Max. input short circuit current per MPPT (A)	22.5 / 22.5						
Output (AC)							
Rated power (W)	3000	3680	4000	4600	5000		6000
Max. AC power (VA)	3300	3680	4400	4600	5500	5000	6000
Max. output current (A)	15	16	20	23	25	21.7	29
Nominal grid voltage	L / N / PE, 230 Vac						
Grid voltage range	180 Vac-276 Vac (according to local standard)						
Nominal frequency	50 Hz / 60 Hz						
Grid frequency range	45 Hz-55 Hz / 54 Hz-66 Hz (according to local standard)						
Active power adjustable range	0...100%						
THDi	< 3%						
Power factor	1 default (adjustable +/-0.8)						
Performance							

Max. efficiency	98.2%	98.4%
European efficiency	97.3%	97.5%
Protection		
DC reverse polarity protection	Yes	
DC switch	Yes	
Safety protection	Anti-islanding, RCMU, Ground fault monitoring	
SPD	MOV: Type III standard	
Communication		
Standard Communication mode	RS485 / WiFi / Bluetooth, optional: Ethernet	
Protection		
Ambient temperature range	-30°C...+60°C	
Self-consumption at night (W)	< 1	
Topology	Transformerless	
Degree of protection	IP65	
Allowable relative humidity range	0...100%	
Max. operating altitude	4000 m	
Noise	< 25 dB	
Weight (kg)	9.2	10
Cooling	Natural	
Dimension	349*344*164 mm	
Display	LCD, App via Bluetooth	
Standard warranty	10 years, optional: up to 20 years	
Standard		
EMC	EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3, EN 61000-3-11, EN 61000-3-12	
Safety standards	IEC 62109-1 / 2, IEC62116, IEC 61727, IEC 61683, IEC 60068 (1, 2, 14, 30)	
Grid standards	VDE-AR-N 4105, VDE V 0126-1-1, V 0124-100, CEI 0-21, G98 / G99, C10 / 11, EN 50549, RD 1699	

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