SUNGROW

User Manual

SG15KTL-M
SG20KTL-M
SG10KTL-MT
PV Grid-connected Inverter

SG15_20KTL-M&SG10KTL-MT-UEN-Ver15-201910 Version: 1.5

About This Manual

This manual is applicable to the following PV string inverters researched by Sungrow Power Supply Co., Ltd:

- SG15KTL-M
- SG20KTL-M
- SG10KTL-MT

These inverters will be referred to as inverter for short unless otherwise specified.

Aim

This manual contains information about the inverter, which will provide guidelines on connecting the inverter into the PV power system and how to operate the inverter.

Related Documents

The manual cannot include all information about the PV system. You may get additional information at www.sungrowpower.com.

Target Group

This manual is intended for:

- qualified personnel who are responsible for the installation and commissioning of the inverter; and
- inverter owners who perform daily operations via the App, iSolarCloud.

How to Use This Manual

Read the manual and other related documents before performing any operation on the inverter. Documents must be stored carefully and be available at all times.

Contents may be periodically updated or revised due to product development. The

information in this manual is subject to change without notice. The latest manual can be acquired at www.sungrowpower.com.

Symbol Explanation

Safety instructions will be highlighted with the following symbols.

DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

CAUTION

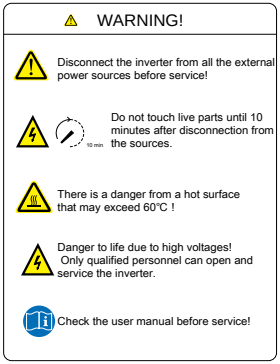
CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates a situation which, if not avoided, could result in equipment or property damage.

NOTE indicates additional information, emphasized contents or tips to help you solve problems or save time.

Symbols on the Inverter Body



Contents

1 Safety Instructions

The inverter has been designed and tested strictly according to international safety regulations. As electrical and electronic equipment, the inverter must be installed, commissioned, operated, and maintained in accordance with corresponding safety instructions. Incorrect operation or work may cause:

- injury or death to the operator or a third party; or
- damage to the inverter and other properties of the operator or a third party

Therefore, the following general safety instructions must be read and always kept in mind prior to any work. All detailed work-related safety warnings and notes will be specified at the critical points in corresponding chapters.

1.1 General Safety

PV Panels

Please follow the safety instructions related to the PV strings.

⚠ DANGER

Lethal voltage!

PV strings will produce electrical power when exposed to sunlight and can cause a lethal voltage and an electric shock.

Only qualified personnel can perform the wiring of the PV panels.

Utility Grid

Please follow the regulations related to the utility grid.

NOTICE

All electrical connections must be in accordance with local and national standards.

Only with the permission of the utility grid, the inverter can be connected to the utility grid.

1.2 Inverter

DANGER

Danger to life from electric shocks due to live voltage

- Do not open the enclosure at any time. Unauthorized opening will void guarantee and warranty claims and in most cases terminate the operating license.
- When the enclosure lid is removed, live components can be touched which can result in death or serious injury due to electric shock.

Danger to life from electric shock due to damaged inverter

- Only operate the inverter when it is technically faultless and in a safe state.
- Operating a damaged inverter can lead to hazardous situations that can result in death or serious injuries due to electric shock.

WARNING

Risk of inverter damage or personal injury

Do not pull out the PV connectors and AC connector when the inverter is running.

All the warning labels and nameplate on the inverter body must be clearly visible and must not be removed, covered or pasted.

CAUTION

Risk of burns due to hot components!

Do not touch any hot parts (such as heat sink) during operation. Only the DC switch can safely be touched at any time.

NOTICE

Only qualified personnel can perform the country setting.

Unauthorized alteration of the country setting may cause a breach of the type-certificate marking.

Risk of inverter damage due to electrostatic discharge (ESD).

By touching the electronic components, you may damage the inverter. For

inverter handling, be sure to:

- **avoid any unnecessary touching; and**
- **wear a grounding wristband before touching any connectors.**

Operate the inverter by strictly following the descriptions in this manual to avoid unnecessary injury to persons and damage to the device. Arc flash, fire or explosion may occur if done otherwise and SUNGROW will hold no liability for damages.

⚠ WARNING

The following improper operations can cause an arc flash, fire, and explosion inside the device. Keep in mind that these accidents can only be handled by qualified personnel. Improper handling of these accidents may lead to a more serious fault or accident.

- **Plugging in and unplugging the DC side HV fuse when it is alive;**
- **Touching the end of the cables that have no insulation and may still be alive;**
- **Touching the connection copper bus bar, terminal or other spare parts inside the device that may be alive;**
- **The power cable connection is loose;**
- **Spare parts, such as bolts, are left inside the inverter;**
- **Incorrect operation performed by unqualified persons that have not received training.**

⚠ WARNING

Before any operation of the device, a preliminary arc flash assessment in the operation area is necessary. If there is a possibility of an arc flash,

- **The operators must receive related safety training;**
- **Use best practices to identify the areas that may be affected by an arc flash;**
- **Before any operation in the area that may be affected by an arc flash, personal protective equipment (PPE) that meets the requirement must be worn. A PPE category 2 is recommended.**

1.3 Skills of Qualified Personnel

⚠ WARNING

All installations should be performed by technical personnel. They should have:

- **Received professional training;**
- **Read through this manual and understood all related safety instructions;**
- **Been familiar with safety instructions related to electric system.**

The technical personnel mentioned above can perform the following operations:

- Install the inverter in a proper place;
- Connect the inverter to the PV system;
- Connect other devices to the PV system;
- Commission the inverter;
- Operate and maintain the inverter.

2 Product Description

2.1 Intended Use

SG15KTL-M/SG20KTL-M/ SG10KTL-MT; a transformerless three-phase PV grid-connected inverter, is an integral component in the PV power system. The inverter is designed to convert the direct current power generated from the PV modules into grid-compatible AC current and feeds the AC current to the utility grid. The intended usage of the inverter is illustrated in Fig. 2-1.

WARNING

Inverter cannot connect the PV strings whose positive and negative terminals need to be grounded.

Do not connect any local load between the inverter and the AC circuit breaker.

Inverter is applicable only to the grid-connected PV system. Any other usage is strictly forbidden.

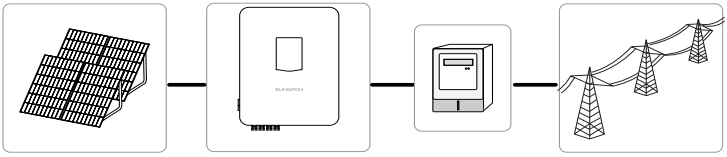
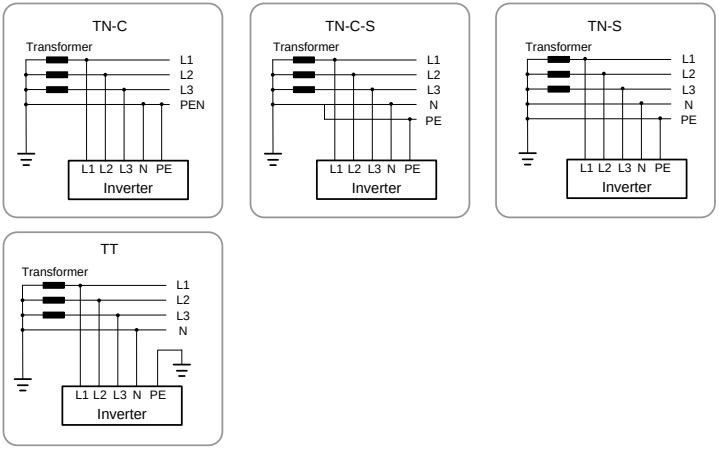


Fig. 2-1 Inverter application in PV power system

Item	Description	Note
A	PV strings	Monocrystalline silicon; polycrystalline silicon and thin-film without grounding
B	Inverter	SG15KTL-M/SG20KTL-M/SG10KTL-MT
C	Metering device	meter cupboard with power distribution system
D	Utility grid	TN-C，TN-C-S，TT，TN-S

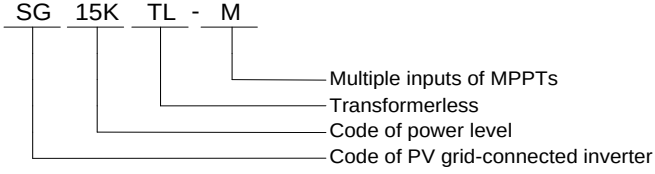
The following figure shows the common grid configurations.



2.2 Product Introduction

2.2.1 Model Description

The type description is as follows (Take SG15KTL-M as an example):



Tab. 2-1 Power level description

Type	Nominal output power	Nominal grid voltage
SG15KTL-M	15000W	3 / N / PE, 230 / 400 V
SG20KTL-M	20000W	
SG10KTL-MT	10000W	

2.2.2 Appearance

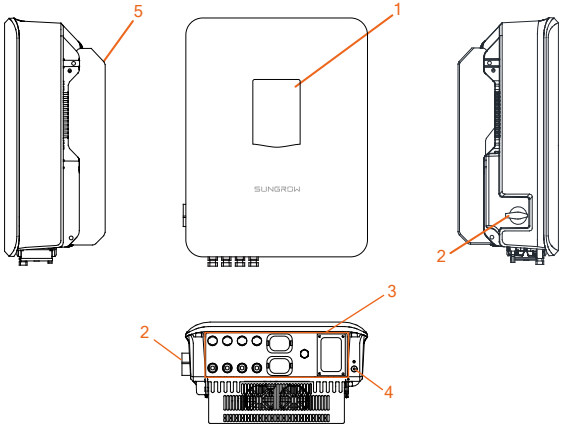


Fig. 2-2 Appearance

*The image shown here is for reference only. The actual product you receive may differ.

No.	Name	Description
1	LED indicator panel	HMI interface to indicate the present working state of the inverter.
2	DC switch*	Protective components for safely disconnecting DC side current.
3	Electrical connection area	Includes DC terminal, AC terminal and communication terminal.
4	PE second terminal	User can connect this terminal as per requirements.
5	Hanger	Hang the inverter on the wall-mounting bracket.

* Devices for Australia are not equipped with DC switches.

2.2.3 Dimensions

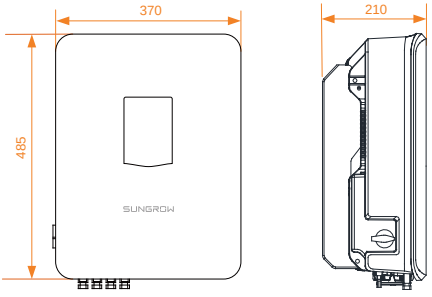


Fig. 2-3 Dimensions of the inverter (in mm)

2.2.4 LED Indicator Panel

As an HMI interface, the LED indicator panel on the front of the inverter can indicate the present working state of the inverter.

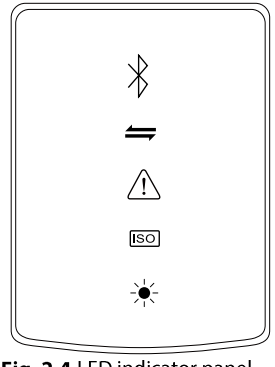


Fig. 2-4 LED indicator panel

Tab. 2-2 State description of the LED indicator panel

LED indicator	LED color	LED state	Definition
Bluetooth	Blue	ON	The Bluetooth has been connected, but there is no data exchange
		Flashing	The Bluetooth has been connected, and there is data exchange
		OFF	No device is connected to the inverter through the Bluetooth.

LED indicator	LED color	LED state	Definition
Communication 	Blue	Flashing	The communication cable or communication module has been connected, and there is data exchange in the communication channel
		OFF	Neither the communication cable nor the communication module is connected, or there is no data exchange in the communication channel
Fault/PID 	Red	ON	A fault has occurred (the device cannot feed power into the grid)
		Flashing	The fault is being restored
	Green	ON	PID function is running
		Flashing	PID function exception
	-	OFF	No alarm or fault has occurred and PID function is not enabled
Earth impedance abnormal 	Red	ON	An earthing short circuit has occurred (the device cannot feed power into the grid)
		OFF	No fault occurs
Normal operation 	Green	ON	The device is connected to the grid and operates normally
		Flashing	The DC or AC side has been powered on and the device is in standby or startup state (has not fed power into the gird)
		OFF	Both the AC and DC sides have been powered off, or a fault occurs

2.2.5 DC Switch (Optional)

The DC switch is used to disconnect the DC current safely whenever necessary.

The inverter operates automatically when input and output requirements are met. Rotate the DC switch to the "OFF" position to stop the inverter when a fault occurs or when you need to stop the inverter.

- Turn the DC switch to the ON position before restarting the inverter.
- Devices for Australia are not equipped with DC switches.

2.3 Technical Description

2.3.1 Circuit Diagram

Fig. 2-5 shows the main circuit of the inverter.

The MPPT is utilized for DC input to ensure the maximum power from the PV array at different PV input conditions.

The inversion circuit converts the DC power into AC power and feeds the AC power to the utility grid through the AC terminal. The protection circuit is equipped to ensure the safe operation of the device and personal safety.

The DC switch is used to disconnect the DC current safely. The inverter is provided with standard RS485 ports for communication. Users can check running data and set related parameters via the iSolarCloud APP.

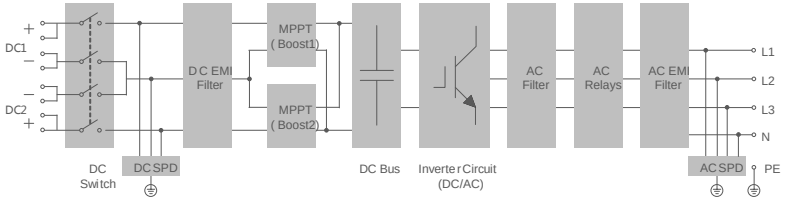


Fig. 2-5 Circuit diagram

2.3.2 Function Description

- Conversion function

  The inverter converts the DC current into grid-compatible AC current and feeds the AC current into grid.

- Data storage

  The inverter logs running information, error records, etc.

- Parameter setting

  The inverter provides various settable parameters. Users can set parameters through the APP to meet the requirements and optimize the performance.

- Communication interface

  Standard RS485 port can be connected to monitoring a device and PV system

  Communication accessory port

- Communication accessory port is provided to which communication module can be connected, thereby achieving the communication function and connecting the monitoring device to the whole PV system.
- It is recommended to use the communication module from SUNGROW for using a device from other companies may lead to communication failure or other unexpected damage.

- Protection Function
  - Short-circuit protection
  - Ground insulation resistance monitoring
  - Grid voltage monitoring
  - Grid frequency monitoring
  - Residual current protection
  - Monitoring on DC injection of AC output current
  - Anti-islanding protection
  - Ambient temperature monitoring
  - DC over-voltage protection
  - Over-current protection
  - Power module over-temperature protection
  - PID recovery function (optional)

2.3.3 Derating

Output derating is a way to protect the inverter from overload or potential faults. In the following cases, power derating is required:

- Ambient temperature is too high
- Grid voltage is too low
- Fluctuations of external power level
- Input voltage is too high
- Altitude is too high

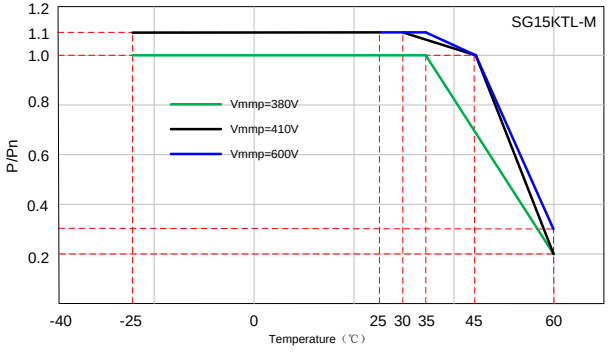
Power Limit Setting

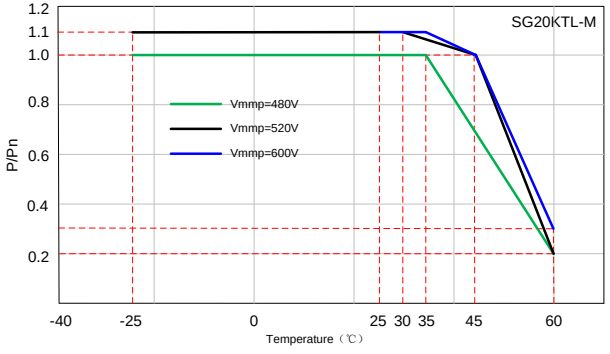
Inverter output power can be adjusted via the APP interface or remote grid dispatch from the grid company. The corresponding operating state will display on the LED Indicator Panel.

Over-temperature Derating

High ambient temperature, fan failure or poor ventilation will lead to inverter power derating.

- When the module temperature exceeds the upper limit, the inverter will derate power output until the temperature drops within the permissible range.
- When the inverter internal temperature exceeds the upper limit, the inverter will derate power output until the temperature drops within the permissible range.





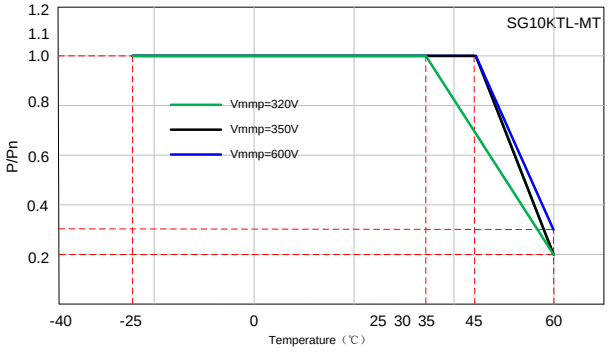


Fig. 2-6 Over-temperature Derating(Pf=1)

Note: Some devices are not equipped with the capacity of 1.1 times of overload output. Specifically, refer to the nameplate and technical data.

When both the module temperature and the internal temperature meet the derating condition, inverter limits its power according to the lower power limit value of the two.

Grid Under-voltage Derating

When the grid voltage is low, the inverter will derate the output power to make sure the output current is within the permissible range. Once the grid voltage is within Vmin to 230V, the inverter will derate the output power.

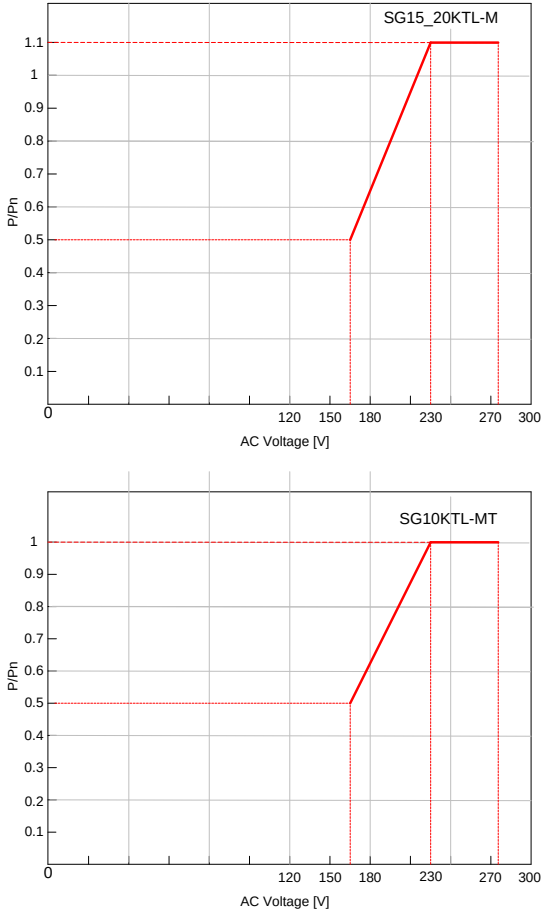
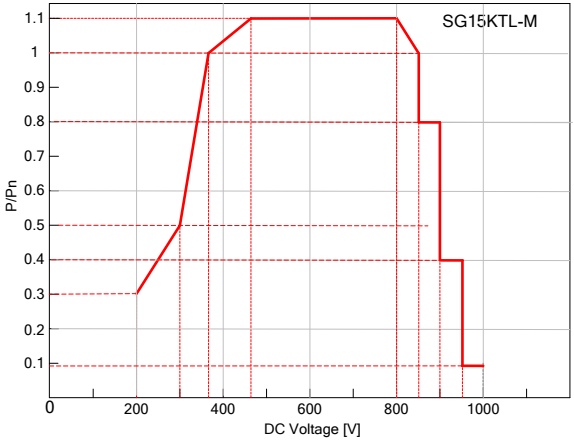


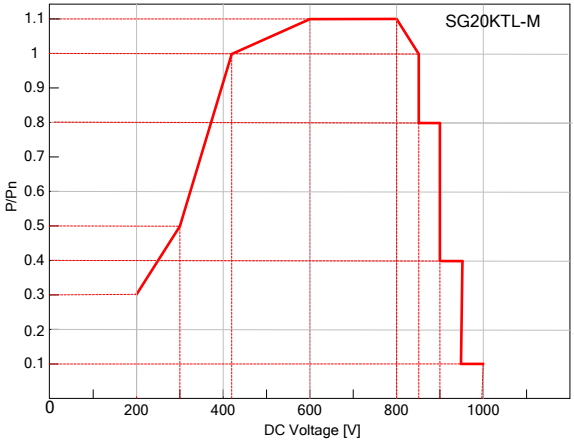
Fig. 2-7 Grid under-voltage derating(Pf=1)

Note: Some devices are not equipped with the capacity of 1.1 times of overload output. Specifically, refer to the nameplate and technical data.

High input voltage derating

If the input voltage is too high, the inverter may derate the power output. The relationship between the input voltage and the power derating is shown in the figure below.


SG15KTL-M
P/Pn
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
200
400
600
800
1000
DC Voltage [V]


SG20KTL-M
P/Pn
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
200
400
600
800
1000
DC Voltage [V]

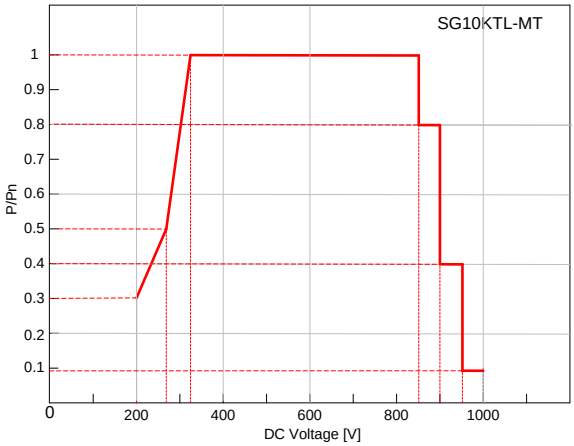


Fig. 2-8 Input voltage and the power derating(Pf=1)

Note: Some devices are not equipped with the capacity of 1.1 times of overload output. Specifically, refer to the nameplate and technical data.

High altitude derating

To ensure normal operation at high altitude, the AC&DC voltage of the inverter should meet the derating requirement as described in the figure below.

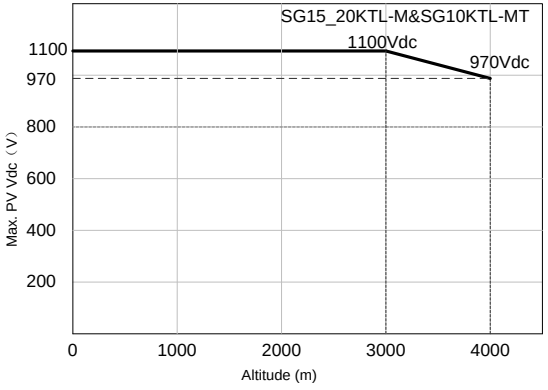
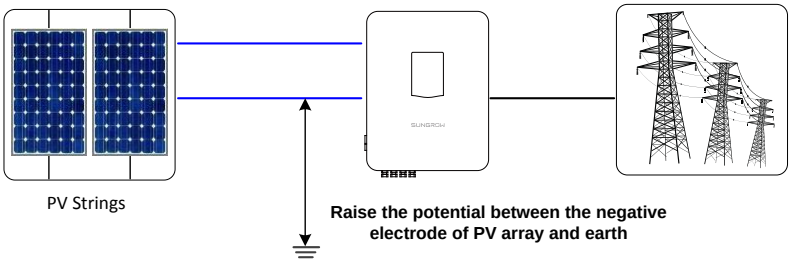


Fig. 2-9 High altitude derating

2.3.4 PID Recovery Function (Optional)

The inverter's PID recovery function is achieved by raising the potential between the

negative electrode of PV array and earth by using internal PID function module.



When the inverter is not running, the PID function module imposes a reverse potential to the PV modules so as to recover the PV modules in which PID effect has occurred.

- The PID recovery function is enabled by default between 22pm and 5am.
- If the PID recovery function is to be enabled, ensure that all PV modules in the array of power station to which inverter belongs must be P-type. Otherwise, the PID recovery function will be abnormal. If other types of PV modules need to be selected, please contact SUNGROW.

3 Installation Flow

Fig. 3-1 shows the installation flow of the inverter and Tab. 3-1 gives a detailed explanation.

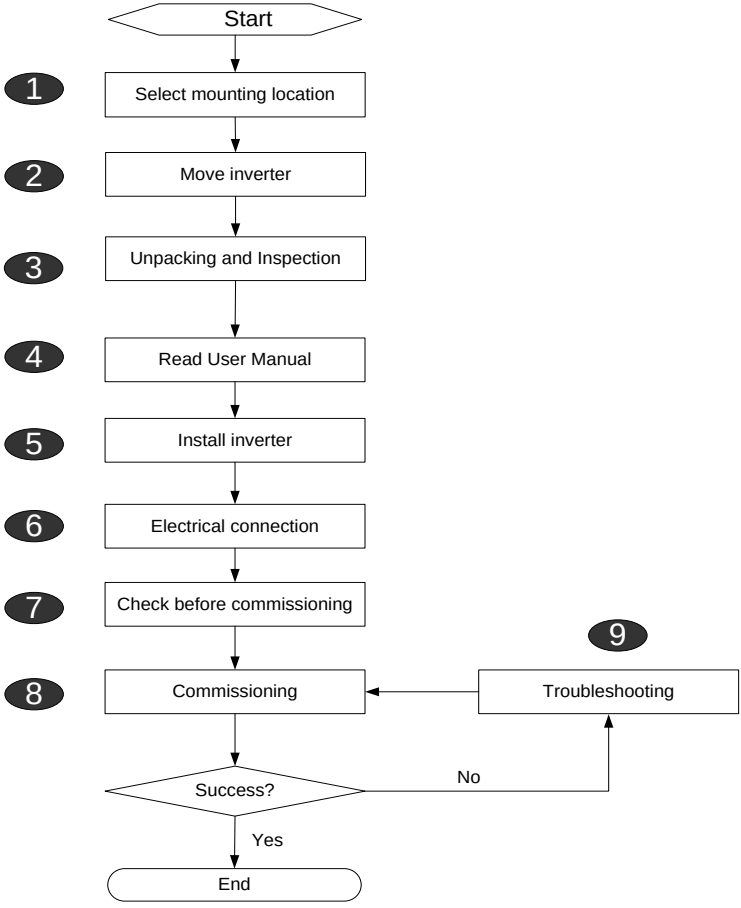


Fig. 3-1 Installation flow

Tab. 3-1 Description of installation flow

Step	Description	Reference
1	Select optimal installation site	5.1
2	Move the inverter to the installation site	5.2
3	Unpacking and inspection	4.1
4	Read the User Manual, especially the section on "Safety Instruction"	1
5	Install the inverter to the selected installation site	5.4
6	Electrical connection; DC side connection; AC side connection; Ground connection; Communication connection; Meter connection.	6.2~6.8
7	Inspection before commissioning	7.1
8	Start up the inverter and configure corresponding parameters.	7.2
9	Troubleshooting	9.1

4 Unpacking and Storage

4.1 Unpacking and Inspection

The inverter is thoroughly tested and strictly inspected before delivery. Damage may still occur during shipping. Conduct a thorough inspection after receiving the device.

- Check the packing for any visible damage.
- Check the scope of delivery for completeness according to the packing list.
- Check the inner contents for damage after unpacking.

Contact SUNGROW or the distributor in case of any damaged or missing components.

Do not dispose of the packaging. It is recommended to store the inverter in its original packaging.

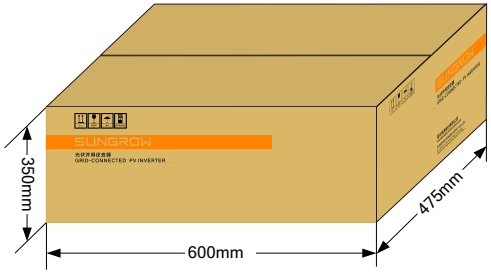
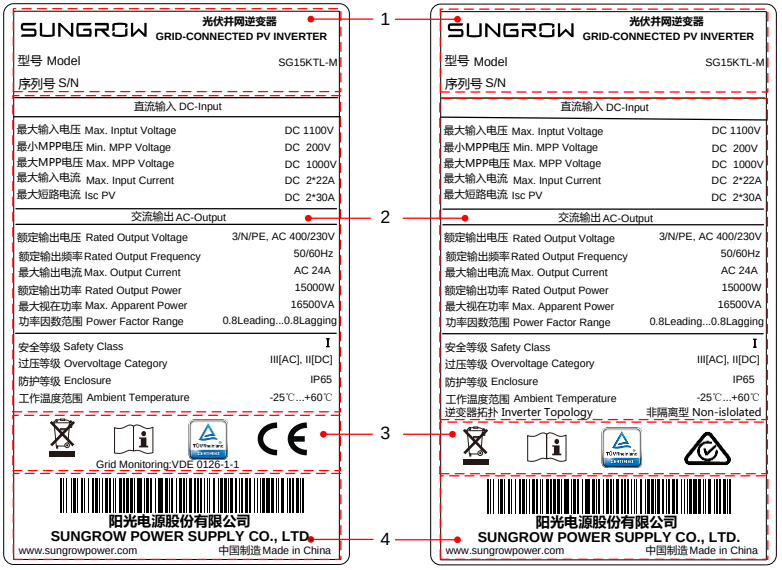


Fig. 4-1 Inverter paper packaging

4.2 Identifying the Inverter

The nameplates are attached to the inverter and the packaging carton. It provides information on type of inverter, important specifications, marks of certification institutions, and serial number which are available and identified by SUNGROW. (Take SG15KTL-M as an example)



Applicable to products in countries (regions) other than Australia

Applicable to products for Australia

Fig. 4-2 Nameplate of Inverters

*Image shown here is for reference only. Actual product you receive may differ.

Item	Description
1	SUNGROW logo and product type
2	Technical data of inverter
3	Marks of conformity
4	Website, and country of manufacture

Tab. 4-1 Description of Icons on the Nameplate

Icon	Description
	Don't dispose of the inverter with the household waste.
	Refer to the corresponding instructions.
	TÜV mark of conformity.
	CE mark of conformity.
	RCM mark of conformity.

4.3 Scope of Delivery

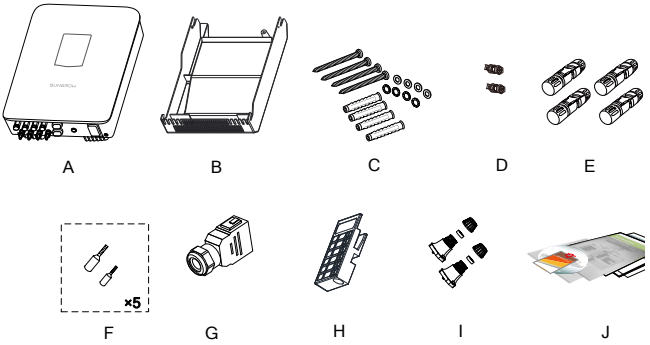


Fig. 4-3 Scope of delivery

Item	Name	Description
A	Inverter	-
B	Wall-mounting bracket	Used to connect the inverter to the installation site.
C	Nylon bolt	Four sets. Used to fasten wall-mounting bracket onto a concrete wall
D	Screwassembly	Two pcs. Used to lock the inverter mounting ears and hanging boards.
E	PV input connector	Four pairs. Including positive and negative connectors, used to connect PV input.
F	Cord end terminal	There are cord end terminals of two specifications (5 for each specification) used to connect AC cables. Select appropriate terminals according to the cable cross-section area.
G	AC output connector	Used to connect PV output, contains two layers of rubber gasket. The inner gasket needs to be removed when the outer diameter of AC cable is 19~25mm.
H	Block (Optional)	Used to avoid accidental tripping of the AC connector.
I*	Communication connector	Used to protect the RJ45 connector of Ethernet communication cable.
J	Document	Quality certificate, packing list, test report and quick user manual

*There are two communication port versions for the inverter: single port and dual ports. For details, refer to the product you receive. The inverter with single communication port is equipped with one set of communication connector, and the inverter with duel communication ports is equipped with two sets of communication connectors.

4.4 Storage of the Inverter

Proper storage is required if the inverter is not installed immediately. SUNGROW shall hold no liability for the damage of the device, in appearance or the failure of internal components, caused by improper storage of the device as specified in this manual. The inverter must be packed into its original carton with the desiccant bags inside.

- The inverter must be packed into its original carton with the desiccant bags inside.
- Seal the packing carton with adhesive tape.
- Store the inverter in a dry and clean place to protect it from dust and moisture.
- Relative storage temperature: -40℃ to 70℃ (-40°F ~ 158°F), and relative humidity: 0~95%.
- Do not stack more than 5 inverter packages on top of each other. Do not store the inverters in stack for more than half a year
- Keep the inverter away from the chemical corrosive materials to avoid possible corrosion.
- Periodically (recommended: six months) check the inverter for any visible damages during storage, and replace the packing if necessary.
- The packing should be upright.
- If the inverter is stored for half a year or longer, the local installer or service dept. of SUNGROW should perform a comprehensive test before connecting the inverter into a PV power system.

5 Mechanical Mounting

DANGER

Make sure the inverter is not electrically connected before installation.

CAUTION

System performance loss due to poor ventilation!

Ensure that the inverter is well ventilated during operation and the air inlets and outlets are unblocked.

There is a risk of injury due to improperly handling the device!

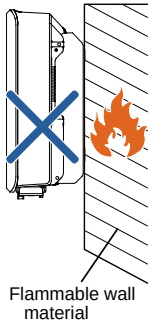
- **Always follow the instructions in the manual when moving and positioning the inverter.**
- **Injuries, serious wounds, or bruises may occur if the device is improperly handled.**

5.1 Location Requirements

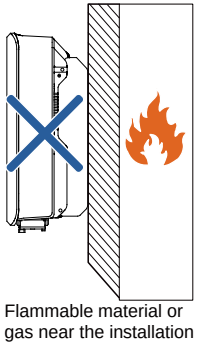
Select an optimal mounting location for safe operation, long service life, and outstanding performance.

- Take the load capacity of the wall into account. The wall (concrete wall or metal frame) should be strong enough for the weight of the inverter over a long period.
- Install the inverter in a place convenient for electrical connection, operation, and maintenance.

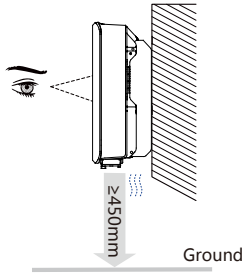
- Do not install the inverter on the wall made up of flammable materials.



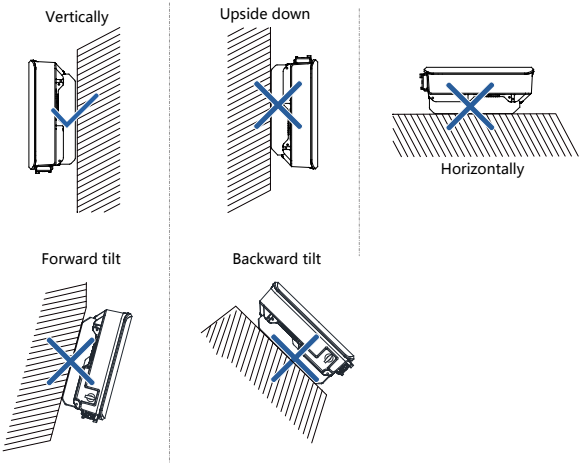
- Do not install the inverter in a place near flammable materials.



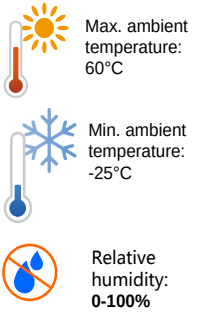
- Mount the inverter at eye level for easy inspection. For proper ventilation of the inverter, the lowest place of the inverter shall be no less than 450mm above the ground.



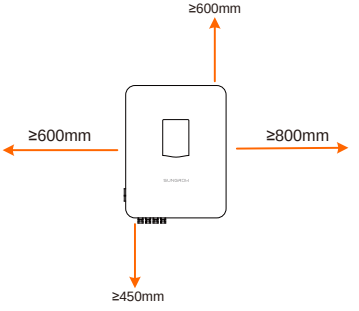
- Never install the inverter horizontally, or with a forward tilt/backward tilt, or even with upside down.



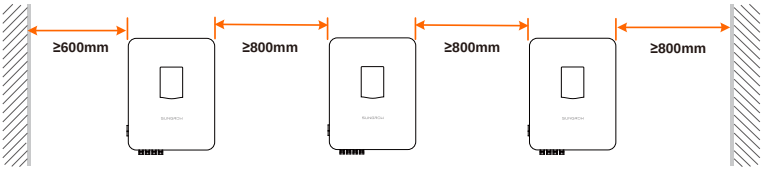
- The inverter with IP 65 can be installed both outdoors and indoors.
- The ambient temperature should be within -25℃ to 60℃. The inverter will operate with power derating if the temperature is too high.
- The relative humidity range of the installation site is 0~100%.



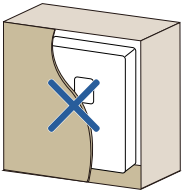
- Prevent the inverter from direct exposure to sun, rain and snow.
- Ensure there is enough space for convection



- Ensure there is enough space for convection when installing multiple inverters. It is suggested to stager the inverters.



- Do not enclose the inverter into a tight confinement. Otherwise the inverter will not work normally.
- The location should be not accessible to children.
- Do not install the inverter near residential areas. Noise can be produced during inverter operation which may affect the daily life.



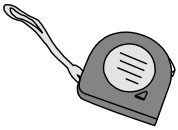
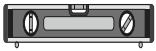
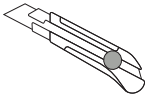
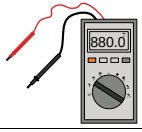
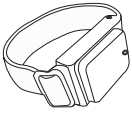
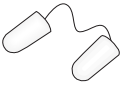
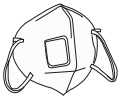
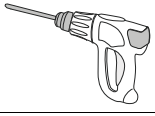
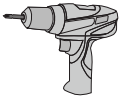
5.2 Moving Inverter to Installation Site

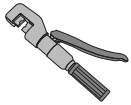
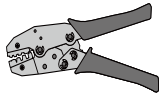
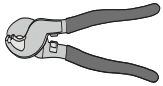
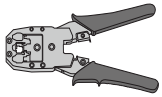
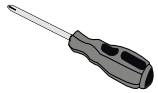
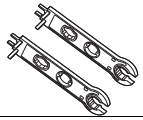
To install the inverter, remove the inverter from the packaging and move it to the installation site. Follow the instructions below as you move the inverter:

- Always be aware of the weight of the inverter.
- Lift the inverter by grasping the handles on both sides of the inverter.
- Move the inverter by at least two persons or by using proper transport tool.
- Do not release the equipment unless it has been secured firmly.

5.3 Installation Tools

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site.

Type	Tool		
General tools	Marker 	Measuring tape 	Level 
	Utility knife 	Multimeter Measurement range: ≥1100Vdc 	Wrist strap 
	Earplugs 	Goggles 	Protective gloves 
	Dust mask 	Insulated shoes 	Vacuum cleaner 
Installation tools	Hammer drill Drill bit: φ10 	Rubber mallet 	Electric screwdriver Tool bit: M5 

Type	Tool		
	Wire stripper 	Hydraulic plier 	Crimping tool Crimping range: 2.5-6mm^2 
	Wire clipper 	RJ45 crimping tool 	Phillips screwdriver Specification: M4 
	Wrench for MC4 terminal 	-	-

5.4 Installing the Inverter

Inverter is mounted onto the wall via the wall-mounting bracket enclosed in the packing. If you do not use the supplied wall-mounting bracket, you can drill holes as per specifications below:

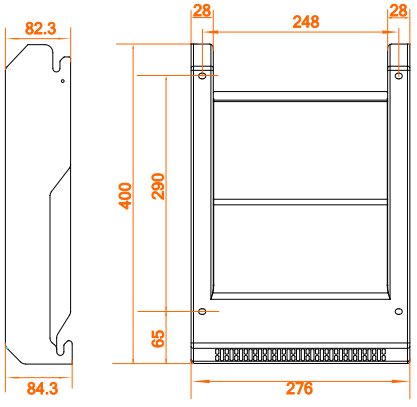
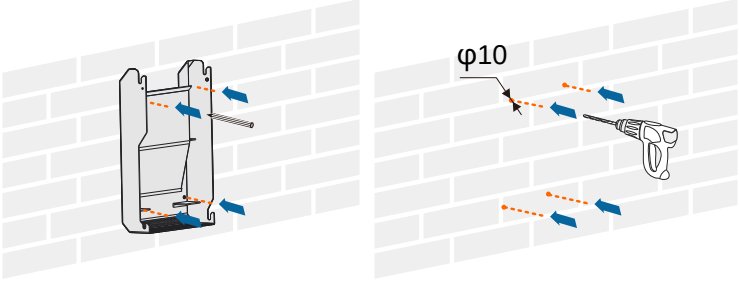


Fig. 5-1 Dimensions of the wall-mounting bracket (figures in mm)

Step 1 Take out the wall-mounting bracket and corresponding fasteners from the packaging.

Step 2 Place the wall-mounting bracket on the chosen concrete wall and adjust it to proper position and height.

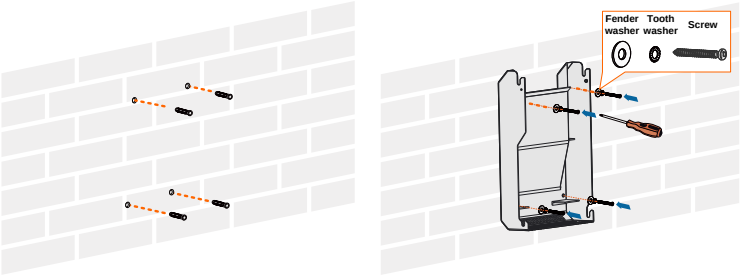
Step 3 Mark positions according to holes on the wall-mounting bracket, and drill holes according to the marks made before.



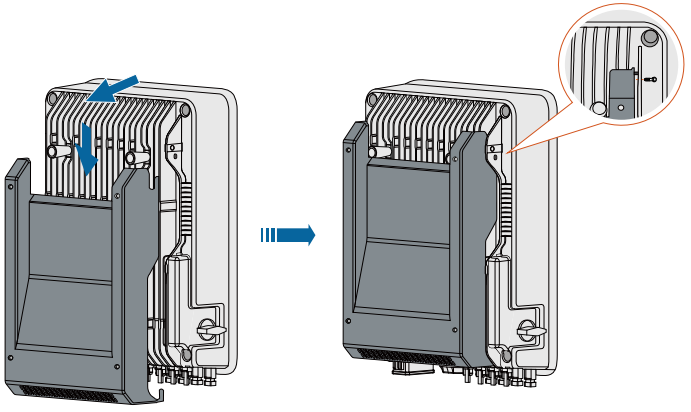
DANGER

Check to ensure that there is no other electronic or plumbing installed inside the wall before drilling holes.

Step 4 Secure the wall-mounting bracket to the wall firmly with the supplied expansion bolt sets.



Step 5 Lift the inverter and slide it down along the wall-mounting bracket to make sure they match perfectly. Use the fastener set to lock the device.



5.5 Connecting the Communication Module (Optional)

Connect the communication module GPRS, WiFi, or E-Net to the communication accessory port at the bottom of the inverter.

For detailed connection description of the communication module, refer to related user manual.

5.6 Installing the Energy Meter (Optional)

The Energy Meter should be installed between the grid and the load. It supports a 35 mm DIN-rail installation, as shown in the following figure.

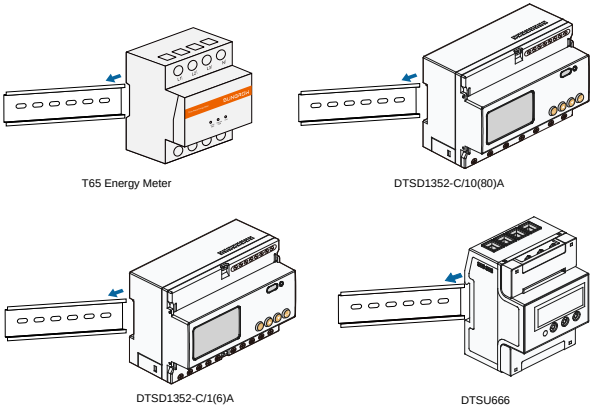


Fig. 5-2 Installing the Meter to the Rail

6 Electrical Connection

After installation, the inverter can be connected to the PV system.

All electrical connections must comply with local regulations and related electrical rules.

WARNING

All cables must be firmly attached, undamaged, properly insulated and adequately dimensioned.

WARNING

- **Improper operation during the wiring process can cause fatal injury to the operators or unrecoverable damage to the inverter..**
- **Only qualified personnel can perform the wiring work.**
- **Always keep in mind that the inverter is dual power supplied. Wear proper personal protective equipment such as helmet, insulated footwear, and glove, etc.**

6.1 Terminal Description

All electrical terminals are located at the bottom of unit.

Enough space should be kept for electrical connection at the bottom of the inverter when choosing the installation site.

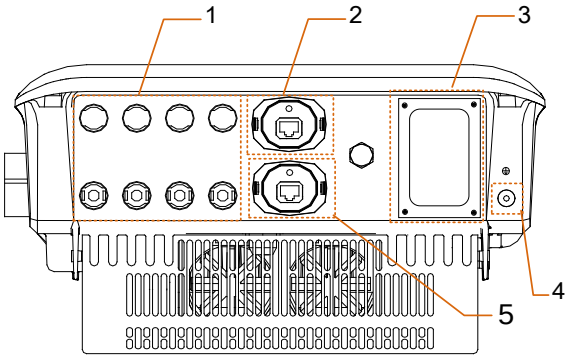


Fig. 6-1 Terminal description

*The image shown here is for reference only. The actual product you receive may differ.

No.	Name	Description
1	DC input plug-in terminal	MC4 terminals for PV input.
2	Communication accessory port	-
3	AC cable gland	AC terminals to the power grid.
4	PE terminal	A second PE terminal
5	RS485 communication port (optional)	-

6.2 Grounding the Inverter

6.2.1 Grounding System Overview

In this PV system, all current-free metal parts and device enclosure, such as the PV array frame and inverter enclosure, should be grounded.

When there is only one inverter in the PV system, ground the PE cable.

When there are multiple inverters in the PV system, they can be multi-point grounded. Connect PE cables of all inverters and the mounting metal frames of PV array to the equipotential cable (according to the on-site conditions) to implement an equipotential connection.

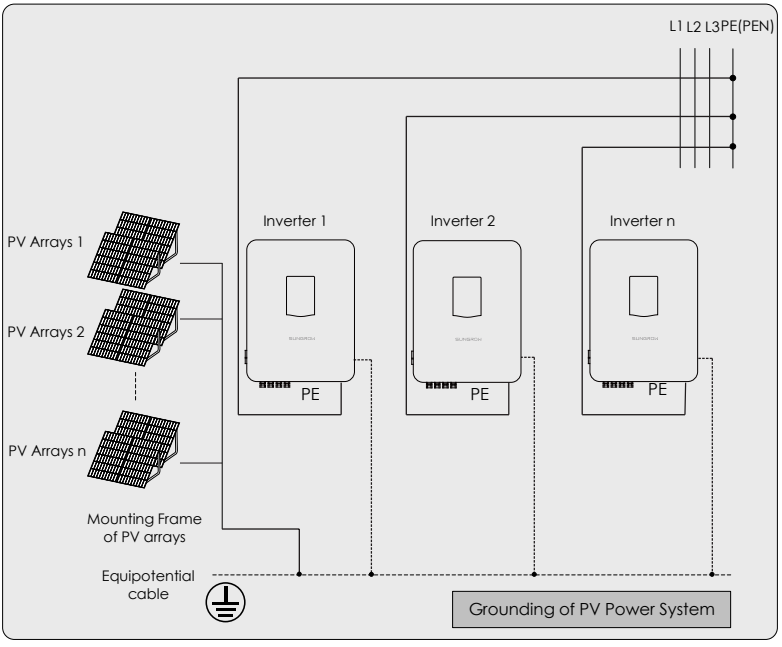


Fig. 6-2 Grounding of inverter

6.2.2 Second Protective Earth Terminal

Position of Second PE Terminals

There is a second PE terminal on one side of the inverter and it should be grounded. Fix the PE cable to the second PE terminal with the torque 1.5N·m.

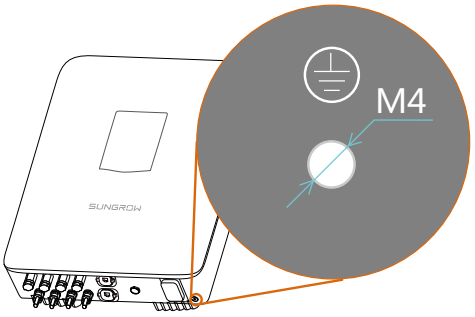


Fig. 6-3 Second PE terminal

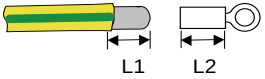
WARNING

The ground connection of this second PE terminal cannot replace the connection of the PE terminal of the AC cables. Make sure the two PE terminals are both grounded reliably.

Due to the transformer-less design of the inverter, neither the DC positive pole nor the DC negative pole of the PV string can be grounded.

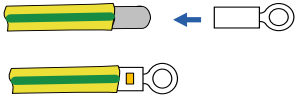
Cable Connection

Step 1 Strip the insulation from the second PE cable by a certain length which depends on the specification of the OT terminal, as shown in the figure.

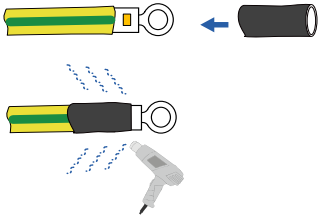


L1=L2+(2~3mm)

Step 2 Insert the cable into the OT terminal and crimp it with a crimper.



Step 3 Wrap the crimping area with heat-shrink tubing.



Step 4 Remove the screw on the grounding terminal and fasten the secondary protective grounding cable with M4 Phillips screwdriver.

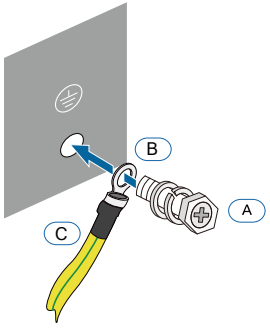


Fig. 6-4 Second PE connection

Item	Name	Description
A	Screw	Bolt type: M4×12mm Attached to the machine before delivery
B	Cable socket	-
C	Yellow-green grounding cable*	-

*The cross-sectional area of the yellow-green grounding cable shall be exactly the same as that of the PE wire in the AC cable.

6.3 AC Side Cable Connection

6.3.1 AC side requirements

Connection to the utility grid must be done only after receiving approval from the local utility company.

Before grid-connection, verify to make sure the grid voltage and frequency meet the requirements of the inverter. Contact the local utility grid company if there are any

problems. For detailed parameters, please refer to "11.1 Technical Data".

AC Circuit Breaker

An independent three or four-pole circuit breaker is installed on the output side of the inverter to ensure that the inverter can be disconnected safely.

Inverter Type	Recommended AC circuit breaker current
SG15KTL-M	40 A
SG20KTL-M	50 A
SG10KTL-MT	40 A

NOTICE

- **Multiple inverters cannot share a circuit breaker.**
- **It is not allowed to connect loads between inverter and circuit breaker.**

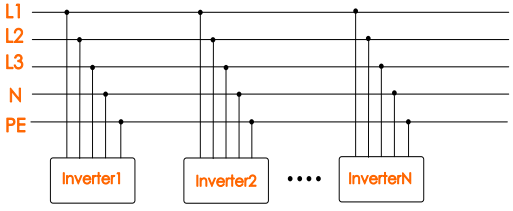
Residual Current Monitoring Device

With an integrated comprehensive residual current monitoring unit inside, the inverter is able to distinguish the fault current from normal capacitive leakage current. The inverter will disconnect from the grid once a fault current higher than the limit value is detected.

Multiple Inverters in parallel Connection

The following requirements must be observed if several inverters are connected in parallel to the grid.

Several inverters are in parallel connection to the three-phase low voltage grid
Requirements:
Support up to 10 inverters in parallel operation.



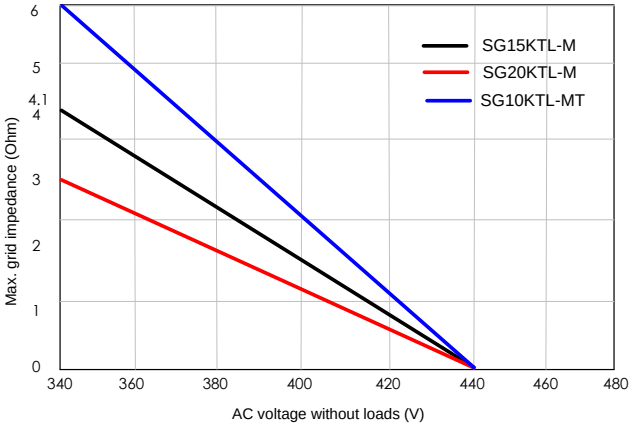
6.3.2 Grid Connection

The AC terminal block is on the bottom of the inverter. AC connection is the three-phase-four-wire grid +PE connection (L1, L2, L3, N, and PE).

AC Cable Requirements

Select AC cables according to the following factors:

- Grid impedance corresponds to the specifications below to avoid accidental short-circuit or output power derating.



- Considering the factors such as voltage drop, it is necessary to increase the cable cross section. The cable power loss must be less than 1% of the rated power.
- Withstand ambient temperature;
- Layout type (inside wall, underground, free air etc.);
- UV resistance and so on.

Connecting the Inverter to Grid

DANGER

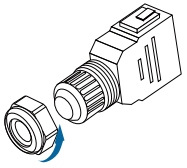
High voltage inside the inverter!

Ensure all cables are voltage-free before electrical connection.

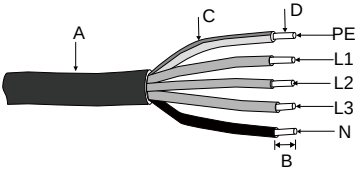
Do not connect the AC circuit breaker until all inverter electrical connections are completed.

AC cables Procedure

Step 1 Unscrew the waterproof terminal of the AC connector counter clockwise.

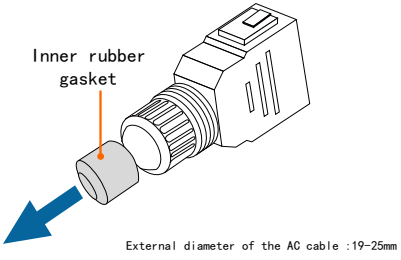


Step 2 Strip the insulation from each AC cables by about 12mm.

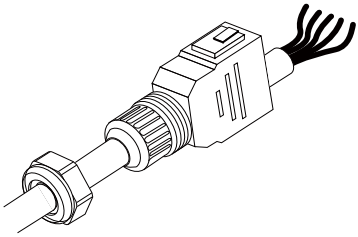


No.	Description	Remark
A	Cable jacket	Cable external diameter ranges from 14mm to 25mm.
B	Length of insulation to be stripped off	12 mm
C	Insulation layer	-
D	Cross-section Area Range	Ranges: 6~10mm^2; Recommended: 10 mm^2

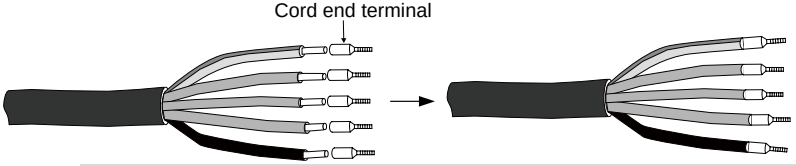
Step 3 Remove the inner rubber gasket if the external diameter of the to-be-used AC cable ranges from 19~25mm. Ignore this step when the external diameter of the AC cable ranges from 14~18mm.



Step 4 Thread the AC cable of appropriate length through the waterproof terminal.

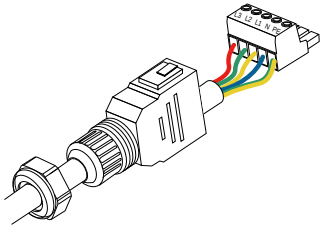


Step 5 When using a multi-core multi-strand copper wire cable, connect the AC cable head to the cord end terminal by appropriate torque.



- Select appropriate cord end terminal according to the cable cross-section area.
- In case of single-strand copper wire, skip installing any cord end terminal.

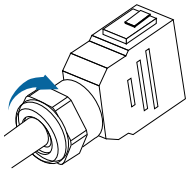
Step 6 Fix all cables to the corresponding terminals with the torque 2.0-2.5N·m, according to markings on the connector with a screwdriver, especially the "PE" cable. If the phase line is connected to the terminal of "PE" or "N" cable, the inverter will be irremediably damaged.



Step 7 Pull cables outward to check whether they are firmly installed.

Step 8 Connect the front and the back parts until there is an audible crack.

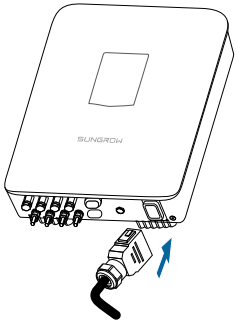
Step 9 Tighten the waterproof terminal clockwise.



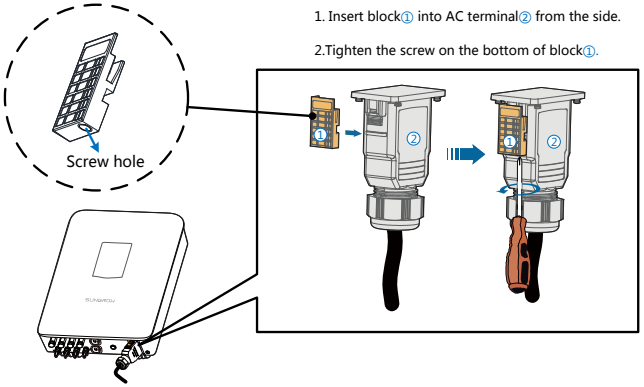
AC Wiring Procedure

Step 1 Disconnect AC circuit breaker secure it against reconnection.

Step 2 Insert the AC connector into the input terminals on the bottom of the inverter until there is an audible sound.



Step 3 **(Optional)**Insert the block, as shown in the figure below.



Step 4 Connect PE cable to ground.

Step 5 Connect phase cable and "N" cable to AC circuit breaker.

NOTICE

Pay attention to the layout of AC wiring. The phase line and neutral line cannot be inversely connected. Otherwise, the inverter cannot operate normally.

Step 6 Connect AC circuit breaker to utility grid.

Step 7 Make sure all AC cables are firmly installed.

6.4 Connecting Inverter to PV Arrays

DANGER

Lethal voltage exists!

PV arrays produce electrical energy when exposed to light and thus can create an electrical shock hazard.

DANGER

Make sure that the PV impedance to the ground is proper before connecting the PV array to the inverter.

6.4.1 PV Input Configuration

The inverter has two PV input areas PV1 input and PV2 input, each with its MPP tracker.

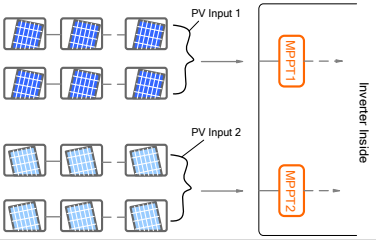
NOTICE

The following requirements must be adhered to. Failure to do so may void any or all warranty rights.

- **Make sure the voltage of each PV array is less than 1100V at all times. Permanent damage may occur otherwise.**
- **Make sure the max. short-circuit current of the DC side is within the permissible range. Permanent damage may occur otherwise.**

The two PV inputs work independently, each with its own MPPT. Therefore the two PV inputs can be different with each other, including different PV module types, different numbers of connected in PV string, different tilt angles or orientation angle of PV modules.

As shown in the following diagram, the inverter should choose independent mode due to different orientation angle between the four PV inputs.



NOTICE

To make sure maximum DC power can be utilized, PV strings connected to individual input MPPT should have a homogenous structure, including the same type, the same number, identical tilt and identical orientation.

Prior to connecting the inverter to PV inputs, the following electrical specifications must be met simultaneously:

Inverter Type	Open-circuit Voltage Limit for Each Input	Short-circuit Current Limit for Each Input
SG15KTL-M	1100 V	30A
SG20KTL-M		
SG10KTL-MT		

Considering the negative voltage temperature coefficient of PV module, more attention should be paid to the open-circuit voltage of PV strings when designing at the lowest ambient temperature.

Take JKM275PP-J4PV cells for example.

Item	Parameter
PV cell type	JKM275PP-J4
Power	275W
Open-circuit voltage (STC)	39.1V
Short-circuit current (STC)	9.15A
Open-circuit voltage temperature coefficient (β)	-0.30%/℃
No. of PV cells in a PV string	24

Under the STC condition, where ambient temperature is 25℃, the open-circuit voltage of PV cells is 39.1V×24=938.4V<1100V.

Supposed that the lowest temperature is -25℃, the open-circuit voltage of PV cells is 24×39.1V×[1+β×(min. ambient temperature- STC temperature)] = 24×39.1V×[1+(-0.30%/℃)×(-25℃-25℃)]=1079.16V<1100V (meet the operation requirement).

Therefore, PV string should be designed to meet the open-circuit voltage requirement even under the lowest ambient temperature condition.

6.4.2 PV Input Connection

DC cables from PV strings should be equipped with DC connectors.

SUNGROW provides corresponding plug connectors in the scope of delivery for quick connection of PV inputs. Pairs of MC4 DC connectors are supplied in the scope of delivery.

To maintain IP65 weatherproof function of inverter, only the supplied DC connectors or the connectors of the same protection class can be used.

DC Cable Requirements

Tab. 6-1 DC Cable Requirements

Cross-section Area Range	Outer cable diameters	Max. Withstand Voltage	Max. input current for each PV string
2.5 to 6mm^2	6 to9mm	1100V	15A

NOTICE

- **The DC cable must be multi-core cable.**
- **The input current of each input channel should be less than 15A.**

DC Cable Connection

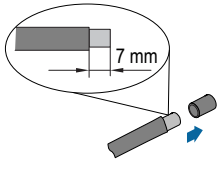
DANGER

High voltage inside the inverter!

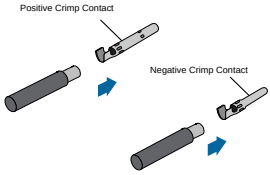
Make sure all DC and AC cables connected to the inverter are voltage-free before electrical connection.

Do not connect the AC circuit breaker before electrical connection is completed.

Step 1 Strip the insulation from each DC cable by 7mm.



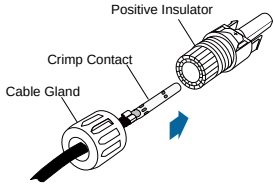
Step 2 Assemble cable ends with crimp contacts by crimping pliers.

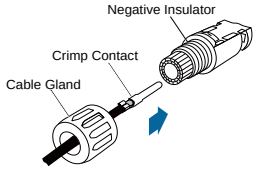


Step 3 Lead cable through cable gland.

Step 4 Insert the crimp contact into the insulator until it snaps into place. Then pull the cable outward to check if it is correctly engaged.

Step 5 Screw the cable gland to front insulator with tightening torque 2.5…3 N·m.





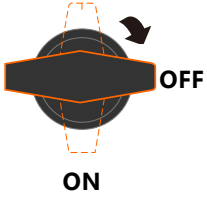
For further assembly and connection instruction, please visit the website of the device manufacturer.

Step 6 Make sure the connection cable of PV string for the correct polarity.

NOTICE

The inverter will not function properly if the DC polarities are reversed.

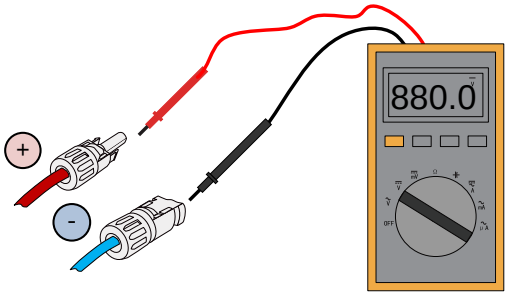
Step 7 Rotate the DC switch to the "OFF" position.



Skip performing step 7 when the actual device is not equipped with DC switch.

Step 8 Check the connection cable of PV string for the correct polarity and that the

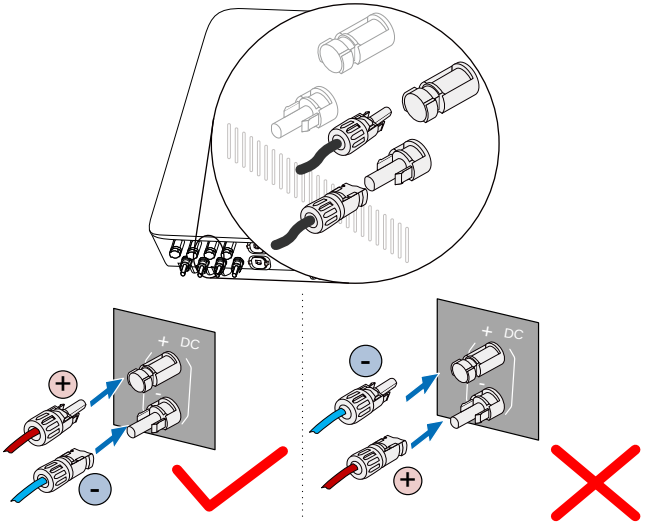
open-circuit voltage does not exceed the inverter input limit 1100V, even under the lowest operating temperature.



NOTICE

Check the positive and negative polarity of the PV cells. After confirmation, you can insert the DC connectors into the input terminals on the bottom of the inverter.

Step 9 Insert the positive and negative DC connectors into the input terminals on the bottom of the inverter until there is an audible sound.

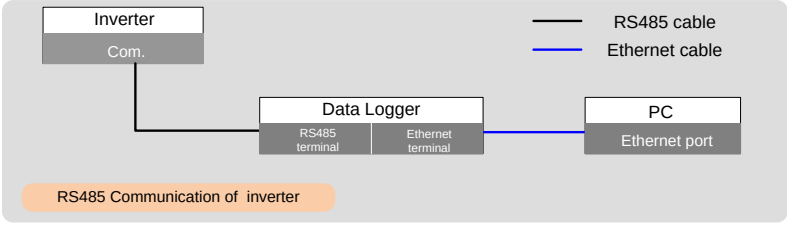


Step 10 Connect other PV strings following the above-mentioned procedures.

Step 11 Seal the unused DC terminals with the MC4 waterproof plugs.

6.5 RS485 Communication System

As for one inverter, an RS485 cable can guarantee the communication connection.



Prepare communication cable before communication connection.

NOTICE

RS485 communication cables should be:

- **Shielded cables or Shielded Ethernet cables.**
- **Applicable to outdoor installation.**

A converter such as Data Logger is needed to convert signal between inverter and PC.

The communication accessory port can directly connect to communication modules produced by SUNGROW, such as GPRS, WiFi, or E-Net, for which, refer to the section "6.6 GPRS Communication System (Optional)" and the section "6.7 Ethernet Communication System (Optional)." Alternatively, via RS485 communication cable, the communication accessory port can connect to other communication devices, such as Logger.

The RS485 communication port is configured to connect energy meters, for which refer to the section 6.8 Meter Connection (Optional). In addition, the port can be used for communications between inverters connected in the daisy chain manner.

Not inverters of all types can be connected via the RS485 cable in the daisy chain manner and communicate with each other. Contact SUNGROW to ensure that the purchased devices support communications between multiple inverters before connecting them in the daisy chain manner.

Proceed as follows to connect other external communication devices to the

communication accessory port via the RS485 communication cable.

Step 1 Strip the insulation layer of the communication cable with an Ethernet wire stripper, and lead the corresponding RS485A/B signal cables out.

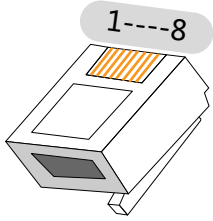


Fig. 6-5 RJ45 plug

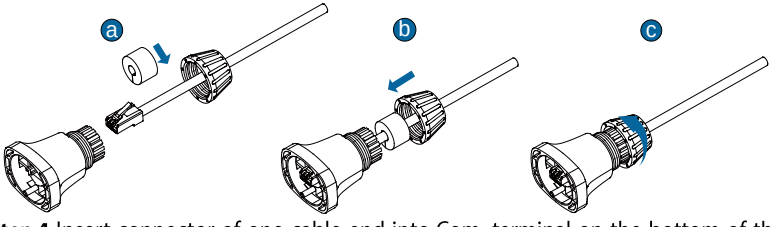
Tab. 6-2 Pin definitions of the RJ45 plug

RJ45 connector	Pin	Color	Description
TIA/EIA 568A	3	White-orange	RS485- B
	6	Orange	RS485+ A
TIA/EIA 568B	3	White-green	RS485- B
	6	Green	RS485+ A

Pin 1 and pin 2 are configure to supply power for communication modules. Never connect or use these two pins when preparing the RS485 communication cable. Otherwise, damage can be caused to inverters or other devices connected through the communication cable.

Step 2 Insert the stripped communication cable into the RJ45 plug in the correct order, and crimp it with a crimper.

Step 3 Insert the RJ45 plug into the front plug connector until it makes a clicking sound, install the plastic rings then tighten the cable gland with appropriate torque.



Step 4 Insert connector of one cable end into Com. terminal on the bottom of the inverter. Make connector and Com. terminal engage and rotate clockwise.

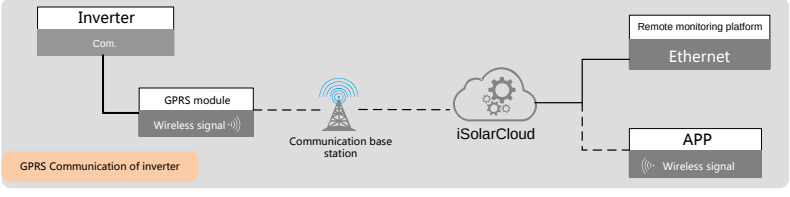
Step 5 Pull cables outward to confirm whether they are fastened firmly.

Set the communication parameters via the APP if more than one inverter is connected to PC or Logger.

6.6 GPRS Communication System (Optional)

Connect the GPRS module produced by SUNGROW to the communication accessory port. After successful connection, information such as power generation and running state of the inverter can be viewed via the APP on the phone.

The block diagram of the GPRS communication system is as follows:



NOTICE

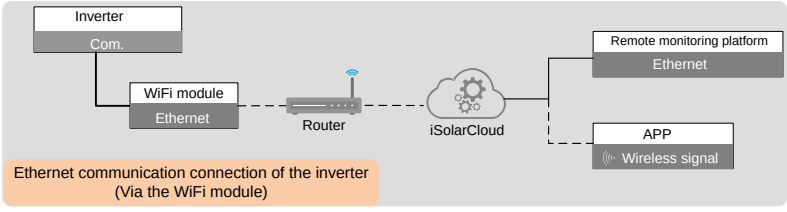
The GPRS communication and the RS485 communication are not available at the same time. Otherwise, communication failure or other problems can be caused.

For details on module installation and configuration, refer to the manual delivered together with the module.

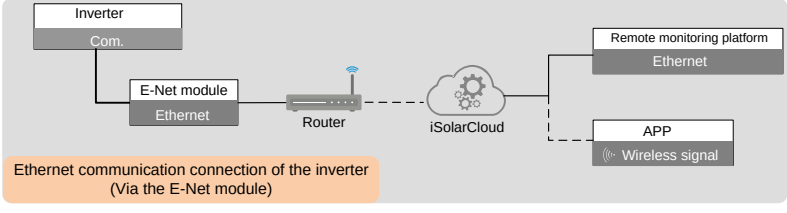
6.7 Ethernet Communication System (Optional)

Connect the WiFi or E-Net module produced by SUNGROW to the communication accessory port. After successful connection, information such as power generation and running state of the inverter can be viewed via the APP on the phone.

The block diagram of the Ethernet communication system is as follows:



Ethernet communication connection of the inverter (Via the WiFi module)



Ethernet communication connection of the inverter (Via the E-Net module)

NOTICE

The Ethernet communication and the RS485 communication are not available at the same time. Otherwise, communication failure or other problems can be caused.

For details on module installation and configuration, refer to the manual delivered together with the module.

6.8 Meter Connection (Optional)

The inverter is equipped with the feed-in power limit function, so as to meet the requirements of some national standards or grid standards for the output power at the grid connection point. For the setting of feed-in power limit, refer to the section "10.7.4 Feed-in Limitation (Optional)".

The inverter can connect to three types of energy meters: T65, DTSD1352-C/10(80)A and DTSD1352-C/1(6)A, and DTSU666.

If the phase current at the grid-connected point is ≤ 65A (for example, home load), T65 and DTSU666 energy meter is recommended.

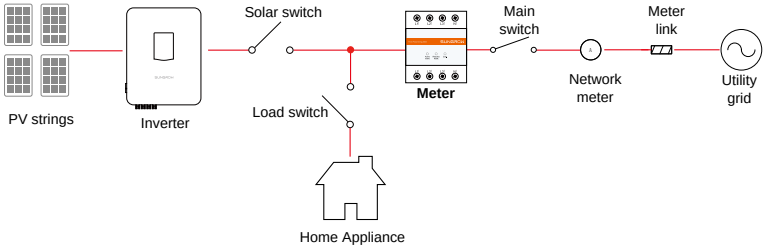
In case the phase current at the grid-connected point is ≤ 80A (for example, home load), DTSD1352-C/10(80)A energy meter is recommended; and if the phase current

is > 80A (for example, industrial and commercial load), DTSD1352-C/1(6)A energy meter is recommended.

Contact SUNGROW to ensure if the meter model is available locally.

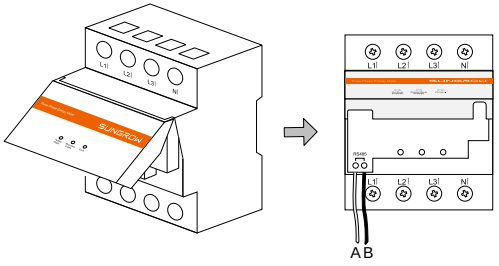
6.8.1 On the Meter Side

Connecting T65 Energy Meter

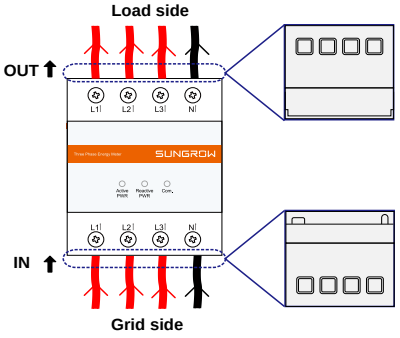


Step 1 Take out the RS485 cable from the meter's packaging.

Step 2 Connect the plugs A and B to terminals A and B on the Energy Meter.



Step 3 Strip the insulation from the power cables by 10 mm, and then connect the cables to the terminals on the Energy Meter. (Cross-section: 10 mm^2 to 25 mm^2)



Connecting DTSD1352-C Energy Meter

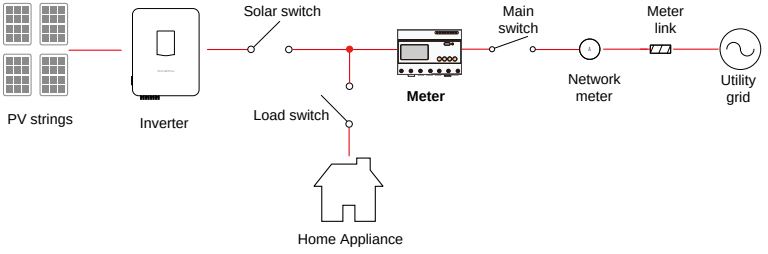


Fig. 6-6 The application of DTSD1352-C/10(80)A in the PV system

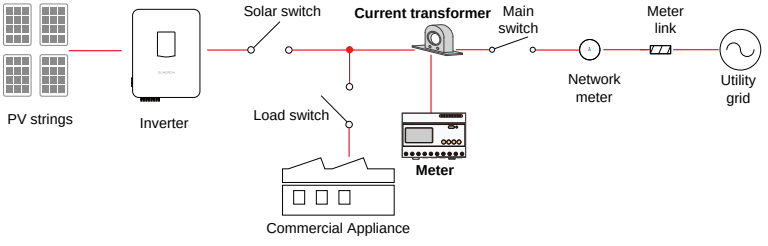


Fig. 6-7 The application of DTSD1352-C/1(6)A in the PV system

Prepare the RS485 communication cable and three appropriate current transformers before connecting the energy meter DTSD1352-C/1(6)A. Connecting the DTSD1352-C/10(80)A does not require the current transformer.

The measurement range (primary current) of the current transformer should be

selected according to actual maximum current at the grid-connected point, and the maximum secondary current (output current) of the current transformer should be 5A.

NOTICE

RS485 communication cables should be:

- **Shielded twisted cables or Shielded Ethernet cables.**
- **Applicable to outdoor installation.**

Step 1 Turn off solar switch, load switch, main switch and other power switches, and secure them against reconnection.

Step 2 Strip the insulation from the power cables by 10 mm, and then connect the cables to the terminals on the Energy Meter. (Cross-section: 10 mm^2 to 25 mm^2)

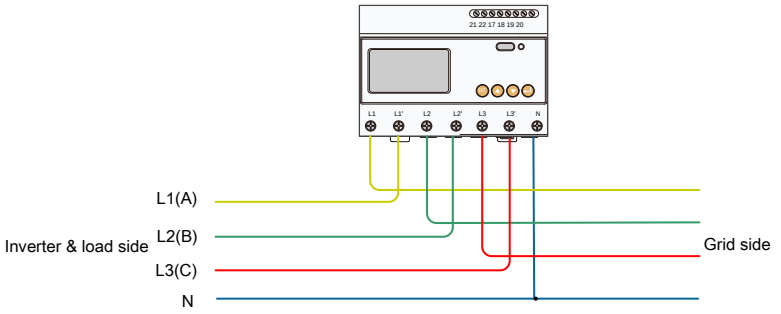


Fig. 6-8 DTSD1352-C/10(80)A direct connect

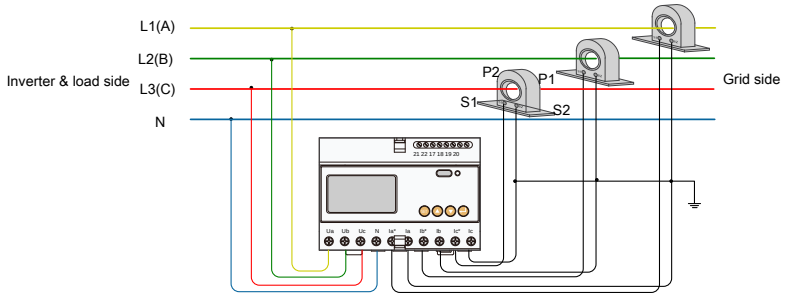


Fig. 6-9 DTSD1352-C/1(6)A connect via current transformer

During connecting to the current transformers, note that:

- P1 side is connected to the grid, and P2 side is connected to the load.

- S1 terminals of the three current transformers are connected to Ia*, Ib*, and Ic* of the energy meter respectively; and S2 terminals are connected to Ia, Ib, and Ic respectively.
- S2 terminals of the three current transformers are connected together and then single-point grounded, for example, connected to the PE cable of the switch cabinet.

During actual indirect connection to the current transformer, wrong operations such as incorrect cable connection, different phase of the current and voltage, and voltage loop disconnection may occur. Consequently, the energy meter cannot measure accurately. After installation, check that the cables are firmly and correctly in place.

NOTICE

- **Pay attention to the direction marks on the current transformer and avoid incorrect connection.**
- **The three-phase voltage sequence is consistent with the three-phase voltage sequence of the inverter. Ua, Ub, and Uc are corresponding to L1, L2, and L3 of the inverter respectively. Ensure correct cable connection.**

NOTICE

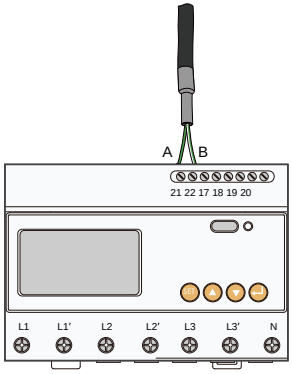
During routine maintenance, particularly pay attention to the connection terminals of the energy meter to prevent loose cable connection or open circuit. Otherwise, lethal high voltage will be generated on the secondary side of the current transformer.

Just connect the line conductor L1,L1′ and the neutral conductor, then the three-phase Energy Meter DTSD1352-C/10(80)A can be used as a single-phase meter.

Step 3 Strip the insulation layer of the communication cable with a wire stripper, and lead the corresponding RS485A/B signal cable out. Insert cord end terminals into signal cable RS485+ A and signal cable RS485- B, and crimp them with a crimper. Cut off the redundant signal cable and warp it with a heat-shrink tubing.

The definitions of the RS485A/B signal cable refer to "Tab. 6-2 Pin definitions of the RJ45 plug".

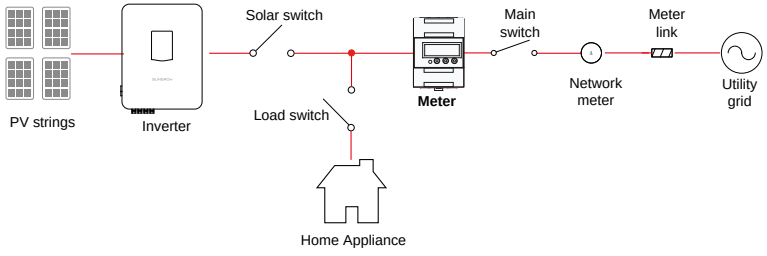
Step 4 Connect the plugs RS485+ A and RS485- B to terminals 21 and 22 on the Energy Meter.



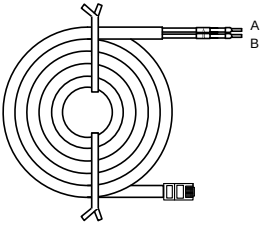
WARNING

- **Improper cable connection may lead to a fatal injury or permanent damage to the device.**
- **Cable connections shall only be done by qualified professional personnel.**
- **Incorrect cable connection shall void any warranty claims, and SUNGROW shall not be held liable for any damage caused.**

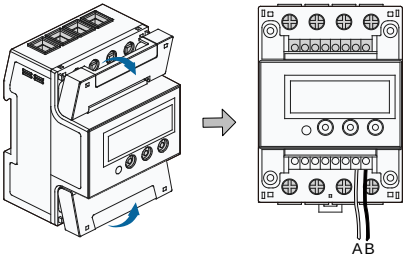
Connecting DTSU666 Energy Meter



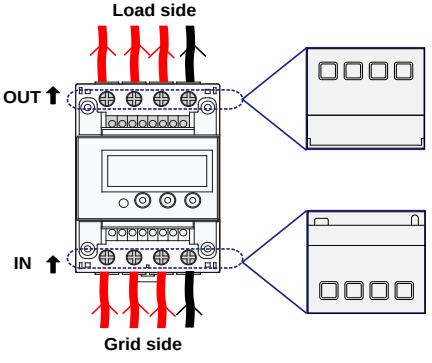
Step 1 Take out the meter and RS485 cable from the meter's packaging.



Step 2 Connect the plugs A and B to terminals 24 and 25 on the Energy Meter.



Step 3 Strip the insulation from the power wires by 10 mm. Then connect the wires to the terminals on the Smart Energy Meter, as shown below. (Cross-section: 10 mm^2 to 25 mm^2)



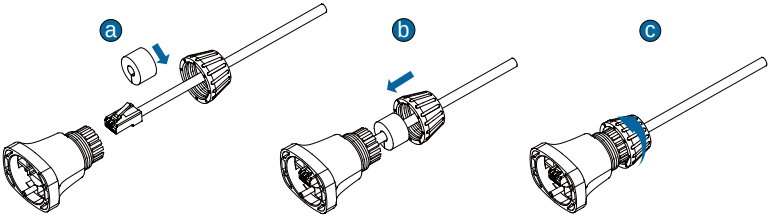
6.8.2 On the Inverter Side

Proceed as follows to connect the RS485 communication cable to the inverter:

Step 1 Prepare the RJ45 plug. Specifically, refer to the related description in section 6.5 RS485 Communication System".

Skip performing the foregoing step 1 when the RS485 communication cable has been prepared.

Step 2 Insert the RJ45 plug into the front plug connector until it makes a clicking sound, install the plastic rings then tighten the cable gland with appropriate torque.



Step 3 Insert connector of one cable end into Meter / RS485 terminal on the bottom of the inverter. Make connector and Meter / RS485 terminal engage and rotate clockwise.

Step 4 Pull cables outward to confirm whether they are fastened firmly.

7 Commissioning

Proper commissioning is essential for the system to protect it against fires, injury and electric shock.

7.1 Inspection before Commissioning

Check the following items before starting the inverter:

1. All the installation sites are convenient for operation, maintenance and service.
2. Check and confirm that the inverter is firmly installed.
3. Space for ventilation is sufficient for one inverter or multiple inverters.
4. Nothing is left on the top of the inverter
5. The inverter and accessories are correctly connected.
6. Cables are routed safely place and protected against mechanical damage.
7. The selection of the AC circuit breaker is in accordance with this manual and local standards.
8. The unused terminals at the bottom of the inverter are properly sealed.
9. Warning signs and labels are suitably affixed and durable.

7.2 Commissioning Procedure

If all of the foregoing requirements are met, proceed as follows to start up the inverter for the first time.

Step 1 Make sure all the above-mentioned items meet the requirements.

Step 2 Connect the external AC circuit breaker.

Step 3 Rotate the DC switch to the "ON" position.

Skip performing step 3 when the actual device is not equipped with DC switch.

Provided that there is sufficient sunlight

- PV arrays are initialized and supply DC power to the inverter;
- DC-link starts to charge and check the state of the utility grid;
- If the conditions meet requirements, the inverter feeds AC power to the grid and enters into the running state.

Step 4 Observe the states of the LED indicators, which are specifically described in "Tab. 2-2State description of the LED indicator panel".

8 Disconnecting, Dismantling and Disposing the Inverter

8.1 Disconnecting the Inverter

For maintenance or other service work, the inverter must be switched off.

Proceed as follows to disconnect the inverter from the AC and DC power sources. Lethal voltages or damage to the inverter will follow if otherwise.

Step 1 Disconnect the external AC circuit breaker and secure it against reconnection.

Step 2 Rotate the DC switch to the "OFF" position and then disconnect all of the PV string inputs

Skip performing step 2 when the actual device is not equipped with DC switch.

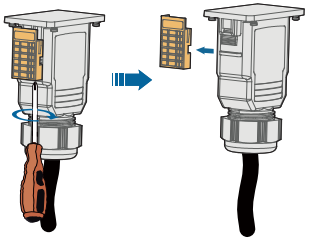
NOTICE

Please strictly follow the above sequence. The inverter may be damaged if otherwise.

Step 3 Wait about ten minutes until the capacitors inside the inverter completely discharge.

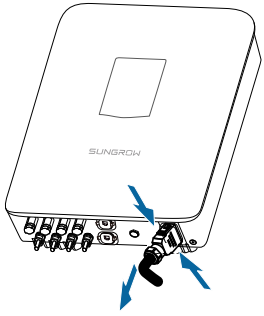
Step 4 Measure to confirm that the AC output at the AC circuit breaker is voltage free.

Step 5 **(Optional)** Remove the block with the Phillips screwdriver.



Step 6 Remove the AC cables. Press the leaf spring of the AC terminal on the bottom

of the inverter inwards from the buckle point of the side of the AC terminal head and then pull the AC terminal head out.



Step 7 Remove the DC connector, communication cable, and secondary PE cable.

8.2 Dismantling the Inverter

Refer to Chapter 5 and Chapter 6 to dismantle the inverter in reverse steps.

NOTICE

If the inverter will be reinstalled in the future, please refer to "4.4 Storage of the Inverter" or a proper storage.

8.3 Disposal of the Inverter

System owners and the O&M company are responsible for the disposal of the inverter.

NOTICE

Some parts and devices of the inverter, such as the capacitors, may cause environment pollution.

Do not dispose of the product together with household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.

9 Troubleshooting and Maintenance

9.1 Troubleshooting

Once a fault occurs in the inverter, the fault information will be displayed on the APP interface or the LCD.

Fault codes and check methods are as follows:

Fault code	Description	Check method
002	Grid overvoltage, The grid voltage is higher than the set protection value.	Generally, the inverter will be reconnected to the grid after the grid returns to normal. If the fault occurs repeatedly: 1. Measure the actual grid voltage, and contact the local electric power company for solutions if the grid voltage is higher than the set value. 2. Check whether the protection parameters are appropriately set via the APP or the LCD. 3. Check whether the cross-sectional area of the AC cable meets the requirement. 4. If the fault persists, please contact SUNGROW.
003	Transient overvoltage, The transient grid voltage is higher than the standard value.	Generally, the inverter will be reconnected to the grid after the grid returns to normal. If the fault occurs repeatedly, contact SUNGROW.

Fault code	Description	Check method
004-005	Grid undervoltage, The grid voltage is lower than the set protection value	Generally, the inverter will be reconnected to the grid after the grid returns to normal. If the fault occurs repeatedly: 1. Measure the actual grid voltage, and contact the local electric power company for solutions if the grid voltage is lower than the set value. 2. Check whether the protection parameters are appropriately set via the APP or the LCD. 3. Check whether the AC cable is firmly in place. 4. If the fault persists, please contact SUNGROW.
006-007	AC output current exceeds the upper limit of the inverter.	Generally, the inverter will be reconnected to the grid after the grid returns to normal. If the fault occurs repeatedly, contact SUNGROW.
008	Grid overfrequency, Grid frequency exceeds the upper limit of the inverter.	Generally, the inverter will be reconnected to the grid after the grid returns to normal. If the fault occurs repeatedly: 1. Measure the actual grid frequency, and contact the local electric power company for solutions if the grid frequency is beyond the set range. 2. Check whether the protection parameters are appropriately set via the APP or the LCD. 3. If the fault persists, please contact SUNGROW.
009	Grid underfrequency, Grid frequency is lower than the lower limit of the inverter.	

Fault code	Description	Check method
010	AC power failure, AC switch or circuit is disconnected.	Generally, the inverter will be reconnected to the grid after the grid returns to normal. If the fault occurs repeatedly: 1. Check whether the grid supplies power reliably. 2. Check whether the AC cable is firmly in place. 3. Check whether the AC cable is connected to the correct terminal (whether the live wire and the N wire are correctly in place). 4. Check whether the AC circuit breaker is connected. 5. If the fault persists, please contact SUNGROW.
011	DC component in the AC current exceeds the permissible range of the inverter.	1. The fault is caused by external fault of the inverter. Generally, the inverter will be reconnected to the grid after the external fault is removed. 2. If the fault occurs repeatedly, contact SUNGROW.
012	Excessive leakage current	1. The fault can be caused by poor sunlight or damp environment, and the inverter will be reconnected to the grid after the environment is improved. 2. If the environment is normal, check whether the AC and DC cables are well insulated. 3. If the fault persists, please contact SUNGROW.
013	The grid voltage or frequency is out of the permissible range, and the inverter cannot be connected to the grid normally.	Generally, the inverter will be reconnected to the grid after the grid returns to normal. If the fault occurs repeatedly: 1. Measure the actual grid frequency, and contact the local electric power company for solutions if the grid parameter exceeds the set value. 2. If the fault persists, please contact SUNGROW.
014	The grid voltage exceeds the preset AC voltage of the inverter for a long time.	Wait for the inverter to return to normal. If the fault occurs repeatedly, contact SUNGROW.

Fault code	Description	Check method
015	Grid overvoltage, The grid voltage is higher than the set protection value	Generally, the inverter will be reconnected to the grid after the grid returns to normal. If the fault occurs repeatedly: 1. Measure the actual grid voltage, and contact the local electric power company for solutions if the grid voltage is higher than the set value. 2. Check whether the protection parameters are appropriately set via the APP or the LCD. 3. Check whether the cross-sectional area of the AC cable meets the requirement. 4. If the fault persists, please contact SUNGROW.
016	Output overload, The configured module power is excessively large and out of the normal operation range of the inverter.	Wait for the inverter to return to normal. If the fault still exists, contact SUNGROW.
017	The inverter detects unbalanced three-phase grid voltage	Generally, the inverter will be reconnected to the grid after the grid returns to normal. If the fault occurs repeatedly, contact SUNGROW.
019-020	Excessively high bus voltage	Generally, the inverter will be reconnected to the grid after the bus voltage returns to normal. If the fault occurs repeatedly: 1. Check the PV voltage via the APP or the LCD. If the PV voltage exceeds the maximum permissible voltage, it indicates that the PV module configuration is too high and needs to be optimized. 2. If the fault persists, please contact SUNGROW.
021-022	The inverter detects input overcurrent of the modules	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.

Fault code	Description	Check method
024-026 030-034	Device anomaly	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.
036-037	Temperature anomaly, The temperature of the power module or the interior of the inverter is excessively high and out of the safe range.	1. Check whether the inverter is directly exposed to sunlight. If so, take some shading measures. 2. Check and clean the air ducts. 3. Check whether there is 070 (fan anomaly) alarm via the APP or the LCD. If so, replace the fans.
038	Device anomaly	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.
039	Low insulation resistance, which is generally caused by poor insulation to ground of the module/cable or by rainy and damp environment.	Wait for the inverter to return to normal. If the fault occurs repeatedly: 1. Check whether the ISO resistance protection value is excessively high via the APP or the LCD, and ensure that it complies with the local regulations. 2. Check the resistance to ground of the string and DC cable. Take correction measures in case of short circuit or damaged insulation layer. 3. If the cable is normal and the fault occurs on rainy days, check it again when the weather turns fine. 4. If the fault persists, please contact SUNGROW.
040-042	Device anomaly	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.
043	The ambient temperature is lower than the temperature at which the inverter can operate normally.	Stop and disconnect the inverter. Restart the inverter when the ambient temperature falls within the operation temperature range.

Fault code	Description	Check method
044-045	Device anomaly	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.
047	PV input mode error	Stop and disconnect the inverter. Reset the input mode of the PV array.
048-051 053-060	Device anomaly	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.
070	Fan fault	1. Check whether the fans operate normally and are blocked by sundries. If they are blocked, clear the sundries. 2. If a fan does not operate normally, stop and disconnect the inverter to replace the fan.
071	AC SPD fault	Check the SPD, and replace it if necessary.
072	DC SPD fault	
073	Device anomaly	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.
074	Internal communication anomaly, A fault occurs in the internal communication module of the inverter.	Contact SUNGROW.
075-077	Device anomaly	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.
078-081	Device anomaly	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.
087	AFD module anomaly	1. Check whether the cable connection on the DC side is normal, and take correction measures if necessary. 2. If the fault persists, please contact SUNGROW.
088	Electric arc fault	
089	AFD disable alarm	

Fault code	Description	Check method
105	Protection self-check failure on grid side	Restart the inverter or clear the fault through the App. If the fault still exists, contact SUNGROW.
106	Grounding anomaly	1. Check whether the AC cable is correctly connected. 2. Check whether the insulation between the ground cable and the live wire is normal. 3. If the fault persists, please contact SUNGROW.
116-117	Device anomaly	Wait for the inverter to return to normal. Disconnect the AC and DC switches, and reconnect the AC and DC switches 15 minutes later to restart the inverter. If the fault still exists, contact SUNGROW.
514	Abnormal communication warning of the SUNGROW Smart Energy Meter. (Inverter can be normally connected to the grid.)	1. Check whether the power cable connections of the meter are correct. 2. Check whether the RS485 connection is correct. 3. If the fault persists, please contact SUNGROW.
532-547	Reverse string polarity	1. Check whether the corresponding string is of reverse polarity. If so, disconnect the DC switch and adjust the polarity when the solar radiation is low and the string current drops below 1A. 2. If the fault persists, please contact SUNGROW. *The code 532 to code 547 are corresponding to string 1 to string 16 respectively.
548-563	String output current anomaly	1. Check whether the corresponding module is sheltered. If so, remove the shelter and ensure module cleanness. 2. Check the module for abnormal aging. 3. If the fault persists, please contact SUNGROW. *The code 548 to code 563 are corresponding to string 1 to string 16 respectively.

Fault code	Description	Check method
564-565	Reverse string polarity	1. Check whether the corresponding string is of reverse polarity. If so, disconnect the DC switch and adjust the polarity when the solar radiation is low and the string current drops below 1A. 2. If the fault persists, please contact SUNGROW. *The code 564 and code 565 are corresponding to string 17 and string 18 respectively.
580-581	String output current anomaly	1. Check whether the corresponding module is sheltered. If so, remove the shelter and ensure module cleanness. 2. Check the module for abnormal aging. 3. If the fault persists, please contact SUNGROW. *The code 580 and 581 are corresponding to string 17 and string 18 respectively.

9.2 Maintenance

⚠ DANGER

Risk of inverter damage or personal injury due to incorrect service!

Always keep in mind that the inverter is powered by dual sources: PV strings and utility grid.

Before any service work, observe the following procedure.

- **Disconnect the AC circuit breaker and then set the DC load-break switch of the inverter to OFF;**
- **Wait at least 10 minutes for inner capacitors to discharge completely;**
- **Verify that there is no voltage or current before pulling any connector.**

⚠ CAUTION

Keep non-related persons away!

A temporary warning sign or barrier must be posted to keep non-related persons away while performing electrical connection and service work.

NOTICE

- **Restart the inverter only when the fault that may impair the safety performance is removed.**
- **No components inside the inverter can be serviced by users. Please contact local authorized personnel if any service work is required.**

NOTICE

Do not replace the inverter internal components without permission. Otherwise, the inverter may be damaged, and it may void warranty claims from SUNGROW.

Item	Method	Period
System clean	Check the temperature and dust of the inverter. Clean the inverter enclosure if necessary. Check if the air inlet and outlet are normal. Clean the air inlet and outlet, if necessary.	Six months to a year (depend on the dust contents in air.)

10 iSolarCloud APP

10.1 Brief Introduction

The iSolarCloud APP can establish communication connection to the inverter via the WLAN, thereby achieving near-end maintenance on the inverter. Users can view inverter information and set parameters through the APP.

*In case of WLAN direct login, the WiFi wireless communication module researched and manufactured by SUNGROW is required. The iSolarCloud APP can also establish communication connection to the inverter via the base station or Bluetooth, thereby achieving maintenance on the inverter.

- This manual describes only how to achieve near end maintenance via WLAN direct connection.
- Screenshots in this manual are based on the Android system V2.1.6, and the actual interfaces may differ.

10.2 Download and Install

Method 1

Download and install the APP through the following application stores:

- MyApp (Android, mainland China users)
- Google Play (Android, users other than mainland China ones)
- APP store (iOS)

Method 2

Scan the following QR code to download and install the APP according to the prompt information.

The APP icon appears on the home screen after installation.

iSolarCloud

10.3 Login

10.3.1 Requirements

The following items should meet requirements:

- The AC and DC sides or the AC side of the inverter is powered-on.
- The WLAN function of the mobile phone is enabled.
- The mobile phone is within the coverage of the wireless signal of the WiFi module.

10.3.2 Login Steps

Step 1 Connect the mobile phone to the WLAN network named as "SG-WiFi Module Serial Number" (the serial number is on the side of the WiFi module). The communication indicator flashes blue once the connection is established.

Step 2 Open the APP to enter the login screen, and tap "Local Access" to enter the next screen.

Step 3 Select "WLAN", enter the password, and tap "LOGIN".

The default account is "user" and the initial password is "pw1111" which should be changed for the consideration of account security.

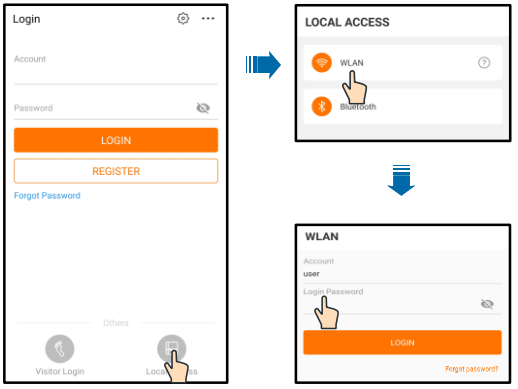


Fig. 10-1 WLAN Direct

Step 4 If the inverter is not initialized, you will enter the quick setting screen of initialize protection parameter. After finishing settings, tap "Boot" and the device will be initialized. The App will send start instructions and the device will start and operate.

Fig. 10-2 Initialization protection parameter

NOTICE

The "country (region)" must be set to the country where the inverter is installed. Otherwise, the inverter may report errors.

Step 5 After initialization settings, the home page of the APP pops up.

10.4 Function Overview

The APP provides parameter viewing and setting functions, as shown in the following Fig. 10-3.

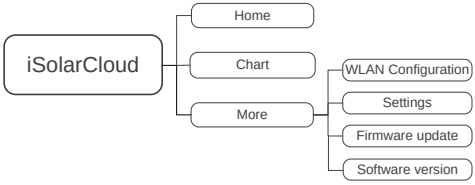


Fig. 10-3 APP function tree map

10.5 Home

Home page of the APP is shown in the following Fig. 10-4.

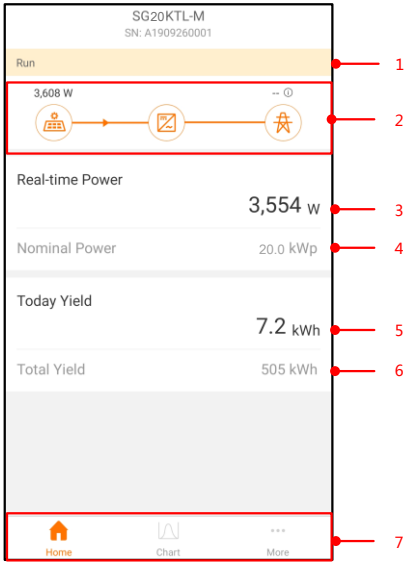


Fig. 10-4 Home

Tab. 10-1 Home page description

No.	Name	Description
1	Inverter state	Present operation state of the inverter
2	Load flow chart	Shows the PV power generation power, feed-in power, etc. The line with an arrow indicates energy flow between connected devices, and the arrow pointing indicates energy flow direction.
3	Real-time power	Shows the present output power of the inverter.

No.	Name	Description
4	Nominal power	Shows the installed power of the inverter.
5	Today yield	Shows today power generation of the inverter
6	Total yield	Shows accumulative power generation of the inverter
7	Navigation bar	Includes menus of "Home", "Chart", and "More".

If the inverter runs abnormally, the fault icon appears on the upper left corner of the screen. Users can tap the icon to view detailed fault information and corrective measures.

10.6 Chart

The APP displays power generation records in a variety of forms, including daily power generation graph, monthly power generation histogram, annual power generation histogram, and total power generation histogram.

Tab. 10-2 Description of power generation records

Item	Description
Daily power generation graph	The curve that shows change of power between 5 AM and 23 PM every day.(Each point on the curve corresponds to a power value).
Monthly power generation histogram	Shows information such as monthly power generation and month equivalent hours.
Annual power generation histogram	Shows information such as total E-annual and year equivalent hours.
Total power generation histogram	Shows information such as total power generation and total equivalent hours.

Step 1 Tap "Chart" on the navigation bar to enter the screen showing daily power generation, as shown in the following figure.

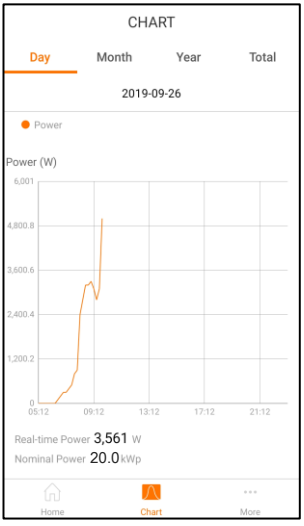


Fig. 10-5 Power curve

Step 2 Slide the screen left to view monthly power generation histogram, annual power generation histogram, and total power generation histogram.

10.7 More

Tap "More" on the navigation bar to enter the "More" screen, as shown in the following Fig. 10-6.

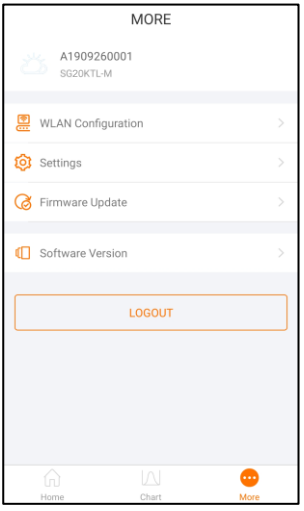
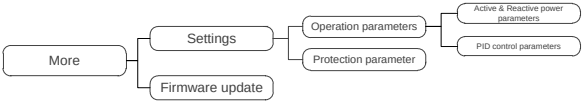


Fig. 10-6 More



The "More" screen supports the following operations:

- Set parameters including inverter operation parameters, protection parameters, and power regulation.
- Upgrade inverter firmware (ARM/DSP/PVD/CPLD).

10.7.1 Operation Parameters

Active & reactive power parameters

Tab. 10-3 Description of Active & reactive power parameters

Parameter	Description	Default	Range
Pac Limit	Inverter active power limitation	110.0%*	0~110%
Speed control	Set whether to enable speed control	[OFF]	[OFF]/ [ON]
Active power ascent speed	-	100%/min	8~6000%/min

Parameter	Description	Default	Range
Active power descent speed	-	6000%/min	8~6000%/min
Fault slow start	Set whether to enable fault slow start	[OFF]	[OFF]/ [ON]
Power increase speed	-	100%/min	8~100%/min
Reactive adjusting switch	-	[OFF]	[OFF]/ [Pf] [Qt] [Q(p)] [Q(u)]
PF	-	1.000	-1000~-800 800~1000(unit: 0.001)
Reactive power limit	Inverter reactive power limitation	0.0%	-100%~100%
Active setting keep	Set up whether to perpetually save the active power settings or not	[OFF]	[OFF]/ [ON]
Limited power	-	ON]	[OFF]/ [ON]
Reactive setting keep	Set up whether to perpetually save the reactive power settings or not	[ON]	[OFF]/ [ON]

*The default value for some devices is 100.0%.

Reactive power regulation

The inverter provides a reactive power regulation function. Use the "Reactive adjusting switch" parameter to activate this function and select proper regulation mode.

Tab. 10-4 Descriptions of reactive power regulation modes:

Mode	Descriptions
OFF	The PF is limited to +1.000, and the "Q-Var limits" is limited to 0.0%.
Pf	The reactive power can be regulated by the parameter PF (Power Factor).
Qt	The reactive power can be regulated by the parameter Q-Var limits (in %).
Q(P)	The PF changes with the output power of the inverter.
Q(U)	The reactive power changes with the grid voltage.

"OFF" Mode

Reactive power cannot be regulated. The PF is limited to +1.000, and the Q-Var limit

is limited to 0.0%.

"Pf" Mode

The reactive power can be regulated by the parameter PF on the Run-param screen.

"Qt"Mode

The reactive power can be regulated by the parameter Q-Var limits (in %) on the Run-parameter screen.

"Q(P)"Mode

PF changes with the inverter output power.

Tab. 10-5 Q(P)"Mode Parameter Descriptions:

Parameter	Description	Default	Range
Lower Power*	Output power of point P1 in the Q(P) mode curve (in %)	50%	0%~50%
Upper Power*	Output power of point P2 in the Q(P) mode curve (in %)	100%	50%~100%
Upper limit_PF(Cap)	Power factor of point P1 in the Q(P) mode curve	1.000	0.900~1
Lower limit_PF(Ind)	Power factor of point P2 in the Q(P) mode curve	0.900	0.900~1

*Lower Power <Upper Power

Note: According to the regulations and standards of different countries or regions, the default values will be different.

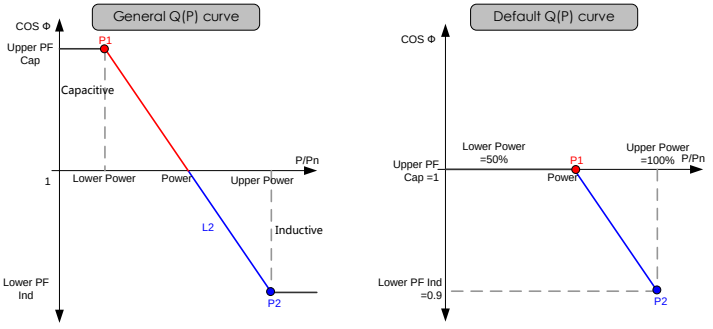


Fig. 10-7 Reactive Power Regulation Curve in Q(P) Mode

"Q(U)"Mode

The reactive power ratio changes with the grid voltage.

Tab. 10-6 "Q(U)"Mode Parameter Descriptions:

Parameter	Description	Default		Range	
		General region	Australia	General region	Australia
Lower U Limit	Grid voltage limit (in %) of point P1 in the Q(U) mode curve	80%	90%	80%~100 %	-
U1 Limit*	Grid voltage limit (in %) of point P2 in the Q(U) mode curve	95%	95.6%	90% ~ 109.9%	93.9% ~ 100%
U2 Limit*	Grid voltage limit (in %) of point P3 in the Q(U) mode curve	105%	108.7%	100% ~ 110%	102% ~ 110.9%
Upper U Limit	Grid voltage limit (in %) of point P4 in the Q(U) mode curve	115%	115%	100% ~ 120%	106% ~ 115%
Hysteresis*	Hysteresis voltage width (in %)	3%		0%~5%	
Lower Q/Sn	Inductive Q/Sn value of point P4 in the Q(U) mode curve	25%	30% lagging	0%~50%	0~ 60% lagging
Upper Q/Sn	Capacitive Q/Sn value of point P1 in the Q(U) mode curve	25%	30%	0%~50%	0~ 60%

*U1 Limit + Hysteresis < U2 Limit – Hysteresis

Note: According to the regulations and standards of different countries or regions, the default values will be different.

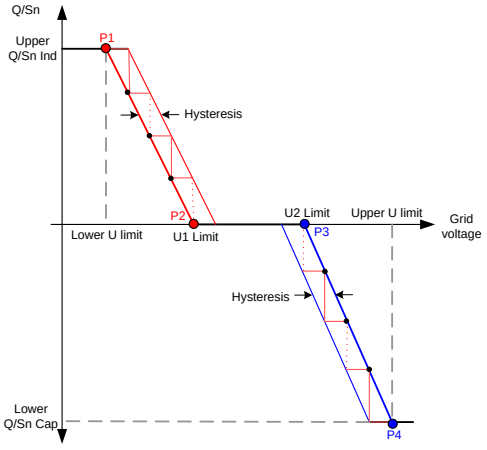


Fig. 10-8 Reactive Power Regulation Curve in Q(U) Mode

PID control parameters

Tab. 10-7 PID control parameters

Parameter	Description
PID Recovery(Night)	Set enabling/disabling of the PID night recovery function. PID night recovery functions between 22:00 pm and 5:00 am by default.
PID alarm cleared	If ISO impedance abnormality or PID function exception is detected during running of the PID function, the inverter reports a PID false alarm and reminds the user to take corresponding measures. After processing, the alarm information can be cleared via the function.

After the PID night recovery function is enabled, the fault indicator on the inverter main panel turns green.

10.7.2 Protection Parameter

- User with this account can only view protection parameters, and default values of these protection parameters have been set according to corresponding grid standards.
- To modify protection parameters, contact SUNGROW to obtain the advanced account and corresponding password.

Tab. 10-8 Protection parameter description

Parameter	Definition/Setting description
Country(region)	Depends on the location of the plant
Grid type*	Depends on the grid standards
Protection level	The level of protection of over/under-voltage and over/under-frequency
Single-level protection value	See Tab. 10-9
Multi-level protection values	See Tab. 10-10
Protection recovery value	See Tab. 10-11

*If the country code is "China", the grid type can be set to power plant/non-power plant.

⚠ CAUTION

Set the grid type to correct value according to definitions of power plant scenario and non-power plant scenario. Otherwise, the inverter will run abnormally or even be damaged, and SUNGROW shall not be held liable for any damage caused.

- **Power plant scenario: The inverter is applied to a power plant whose capacity is greater than 1 MW, or to a power plant that feeds power into the grid at the voltage greater than 35KV and connects to the public power grid at the voltage of 10KV.**
- **Non-power plant scenario: application scenarios other than the power plant scenario.**

The definitions come from the national code "NB/T 32004", "GB-T19964"

Tab. 10-9 Single-stage Protection Parameters Explanation

Parameter	Default	Range
AC under-voltage single-stage protection value	110.0V	23V ~ 230V
AC over-voltage single-stage protection value	276.0V	220V ~ 322V
AC under-frequency single-stage protection value	49.5Hz	45Hz ~ 49.89Hz
AC over-frequency single-stage protection value	50.20Hz	50.11Hz ~ 55Hz

Tab. 10-10 Multi-stage Protection Parameters Explanation

Parameter	Default	Range
AC under-voltage level one protection value	195.5V	23V ~ 230V
AC over-voltage level one protection value	253.0V	220V ~ 322V
AC under-frequency level one protection value	49.50Hz	45Hz ~ 49.89Hz
AC over-frequency level one protection value	50.20Hz	50.11Hz ~ 55Hz
AC under-voltage level one protection time	2.00s	0 ~ 600s
AC over-voltage level one protection time	2.00s	0 ~ 600s
AC under-frequency level one protection time	600s	0 ~ 600s
AC over-frequency level one protection time	120s	0 ~ 600s
AC under-voltage level two protection value	115.0V	23V ~ 230V

Parameter	Default	Range
AC over-voltage level two protection value	310.5V	220V ~ 322V
AC under-frequency level two protection value	48.00Hz	45Hz ~ 49.89Hz
AC over-frequency level two protection value	50.50Hz	50.11Hz ~ 55Hz
AC under-voltage level two protection time	0.10s	0 ~ 600s
AC over-voltage level two protection time	0.05s	0 ~ 600s
AC under-frequency level two protection time	0.20s	0 ~ 600s
AC over-frequency level two protection time	0.20s	0 ~ 600s

Tab. 10-11 Description of protection recovery parameters

Parameter	Explanation
Vmax-recover	Max. protection recovery voltage
Vmin-recover	Min. protection recovery voltage
Fmax-recover	Max. protection recovery frequency
Fmin-recover	Min. protection recovery frequency

10.7.3 Firmware Update

Preparation of firmware upgrade package

Contact the supplier or SUNGROW to get the upgrade package (.sgu file) and store the package in the specified path.

- Path (Android system): root directory /iscFiles
- Storage method (iOS system): Connect the mobile phone to the computer through a data cable, find the folder iSolarCloud application via iTunes, iMazing, or iTools, and copy the upgrade package to the folder "Document".

Upgrade

Tap "Firmware upgrade" to enter the corresponding screen, as shown in the following Fig. 10-9.

Fig. 10-9 Firmware upgrade

Select the desired upgrade package to upgrade the firmware.

10.7.4 Feed-in Limitation (Optional)

The feed-in limitation function requires the using of energy meter. Without the energy meter, the feed-in limitation function will be unavailable. The function of the feed-in limitation is to limit the power of the grid point.

Contact SUNGROW to obtain the username and password before setting the feed-in limitation parameters.

Unauthorized personnel are not allowed to log in with this account. Otherwise, SUNGROW shall not be held liable for any damages caused.

Tap "More" -> "Advanced setting" -> "Feed-in Limitation (Zero-export)" to enter the corresponding screen.

Tab. 10-12 Description of feed-in limitation parameters

Parameter	Default value		Range
	Germany	Others	
Feed-in limitation (Zero-export)	[ON]	[OFF]	[OFF]/[ON]
Feed network power limit value	Rated power×70%	Rated power	0 ~ 12.00KW
Feed network power limit ratio	70.0%	100.0%	0 ~ 100%
Current transformer *	external		Built-in/ External

Note: * only for DTSD1352-C/10(80)A, DTSD1352-C/1(6)A or DTSU666 energy meter.

In case the energy meter DTSD1352-C/10(80)A is used, set the current transformer to "Built-in".

In case the energy meter DTSD1352-C/1(6)A is used, set the current transformer to "External".

When the current transformer is set to "External", set current transformer parameters according to the following Tab. 10-13.

Tab. 10-13 Parameter description of external current transformer

Parameter	Default value	Range
Current transformer output current	5A	-
Current transformer measuring range *	200A	1 ~ 10000A

If an energy meter equipped with external current transformer is applied, the measurement range (primary current) of the current transformer should be selected according to actual maximum current at the grid-connected point, and the maximum secondary current (output current) of the current transformer should be 5A.

The current transformer's primary current should be equal to or greater than the maximum expected AC current from the grid, per phase. Important: The closer the expected AC current is to the chosen primary current value, the more precise the measurement will be.

11 Appendix

11.1 Technical Data

Parameters	SG15KTL-M	SG20KTL-M	SG10KTL-MT
Input Side Data			
Max. PV input voltage	1100 V		
Min. PV input voltage / Startup input voltage	200 V / 250 V		
Nominal input voltage	600 V		
MPP voltage range	200 ~ 1000 V		
MPP voltage range for nominal power	380~850 V	480~850 V	320~850 V
No. of MPPT(s)	2		
Max. number of PV strings per MPPT	2		
Max. PV input current	44 A (22A / 22 A)		
Max. input current for input connector	15A		
Max. Short-circuit input current of PV	60 A (30A / 30A)		
Max. inverter backfeed current to the array	0 A		
Output Side Data			
AC output power	16500 VA @ 35 ℃/ 15000 VA @ 45 ℃	22000 VA @ 35 ℃/ 20000 VA @ 45 ℃	10000 VA @ 45 ℃
Max. AC output current	24.0 A	31.9 A	16.5A
Nominal AC voltage	3 / N / PE, 230 / 400 V		

Parameters	SG15KTL-M	SG20KTL-M	SG10KTL-MT
AC voltage range	270 ~ 480V		
AC connected Inrush current(Peak/Duration)	0A		
Nominal grid frequency / Grid frequency range	50 Hz / 45 ~ 55 Hz, 60 Hz / 55 ~65 Hz		
THD	< 3% (at nominal power)		
DC current injection	<0.5% In		
Power factor	> 0.99		
Adjustable power factor	0.8 leading ~ 0.8 lagging		
Feed-in phases / Connection phases	3 / 3		
Efficiency			
Max. efficiency / Euro. efficiency	98.6 % / 98.3 %		98.6 % / 98.1 %
Protection			
LVRT	Yes		
DC reverse connection protection	Yes		
AC short circuit protection	Yes		
Leakage current protection	Yes		
Grid monitoring	Yes		
DC switch* / AC switch	Yes / No		
PV string current monitoring	Yes		
PID recovery function	Optional		
Overvoltage protection	DC Type II / AC Type II		
General Data			
Dimensions ((W x H x D)	370×485×210 mm		
Weight	24 kg		
Isolation method	Transformerless		

Parameters	SG15KTL-M	SG20KTL-M	SG10KTL-MT
Degree of Protection	IP65		
Night power consumption**	<1W		
Operating ambient temperature range	-25℃ to + 60℃ (>45℃ derating)		
Allowable relative humidity range (non-condensing)	0 ~ 100%		
Cooling method	Smart forced air cooling		
Max. operating altitude	4000m (>3000m derating)		
Display / Communication	LED, Bluetooth + APP / RS485 (Optional: WiFi / Ethernet)		
DC connection type	MC4 (Max. 6 mm^2)		
AC connection type	Plug and play connector (Max. 10 mm^2)		
Compliance	EN 62109-1, EN 62109-2, EN 61000-3-11, EN 61000-3-12, IEC 61727, IEC 62116, IEC 60068,IEC 61683, EN 50530, VDE-AR-N 4105:2018, AS/NZS 4777.2, CEI 0-21, UNE 206007-1, G59/3,VDE 0126-1-1/A1 VFR 2014, UTE C15-712-1, EN 50549-1:2019, EN 50438		EN 62109-1, EN 62109-2, IEC61000-6-2, IEC 61000-6-3, IEC 62116, AS4777.2
Grid support	Active & reactive power control and power ramp rate control		

* Devices for Australia are not equipped with DC switches.

**Devices without PID recovery function and AC power supply.

11.2 Quality Assurance

When product faults occur during the warranty period, SUNGROW will provide free service or replace the product with a new one.

Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, SUNGROW has the right to refuse to honor the quality guarantee.

Conditions

- After replacement, unqualified products shall be processed by SUNGROW.
- The customer shall give SUNGROW a reasonable period to repair the faulty device.

Exclusion of Liability

In the following circumstances, SUNGROW has the right to refuse to honor the quality guarantee:

- If the free warranty period for the whole machine/components have expired.
- If the device is damaged during transport.
- If the device was incorrectly installed, refitted, or used.
- If the device is operated in a very improper environment, as described in this manual.
- If the fault or damage was caused by installation, repairs, modification, or disassembly performed by a service provider or personnel other than this company.
- If the fault or damage was caused by the use of non-standard or non-SUNGROW components or software.
- If the installation and use range are beyond stipulations of relevant international standards.
- If the damage was caused by an abnormal natural environment.

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of SUNGROW.

Software Licenses

- It is prohibited to use data contained in firmware or software developed by SUNGROW, in part or in full, for commercial purposes by any means.
- It is prohibited to reverse engineer, crack, or perform any other operations that compromise the original program design of the software developed by SUNGROW.

11.3 Contact Information

Should you have any question about this product, please contact us.

We need the following information to provide you the best assistance:

- Type of the device
- Serial number of the device
- Fault code/name
- Brief description of the problem

China (HQ) Sungrow Power Supply Co., Ltd Hefei +86 551 65327834 service@sungrowpower.com	Australia Sungrow Australia Group Pty. Ltd. Sydney +61 2 9922 1522 service@sungrowpower.com.au
Brazil SungrowDo Brasil Sao Paulo +55 11 2366 1957 latam.service@sa.sungrowpower.com	France Sungrow France – Siege Social Paris service.france@sungrow.co
Germany Sungrow Deutschland GmbH München +49 89 324 914 761 service.germany@sungrow.co	Greece Service Partner – Survey Digital +30 2106044212 service.greece@sungrow.co
India Sungrow (India) Private Limited Gurgaon +9108041201350 service@in.sungrowpower.com	Italy Sungrow Italy Milano service.italy@sungrow.co

Japan Sungrow Japan K.K. Tokyo + 81 3 6262 9917 japanservice@jp.sungrowpower.com	Korea Sungrow Power Korea Limited Seoul +827077191889 service@kr.sungrowpower.com
Malaysia Sungrow SEA Selangor Darul Ehsan +6019897 3360 service@my.sungrowpower.com	Philippines Sungrow Power Supply Co., Ltd Mandaluyong City +639173022769 service@ph.sungrowpower.com
Thailand Sungrow Thailand Co., Ltd. Bangkok +66891246053 service@th.sungrowpower.com	Spain Sungrow Ibérica S.L.U. Navarra service.spain@sungrow.co
Romania Service Partner - Elerex +40 241762250 service.romania@sungrow.co	Turkey Sungrow Deutschland GmbH Turkey Istanbul Representative Bureau Istanbul +90 2127318883 service.turkey@sungrow.co
UK Sungrow Power UK Ltd. Milton Keynes +44 (0) 0908 414127 service.uk@sungrow.co	U.S.A, Mexico Sungrow USA Corporation PhoenixArizona +1833 7476937 techsupport@sungrow-na.com

Vietnam

Sungrow Vietnam

Hanoi

+84 918 402 140

service@vn.sungrowpower.com