SUNGROW

User Manual

SG15KTL-M
SG17KTL-M
SG20KTL-M
PV Grid-connected Inverter

SG15_17_20KTL-M-UEN-Ver10-201803 Version: 1.0

About This Manual

This manual is for the SG15KTL-M/SG17KTL-M/SG20KTL-M, a 3-phase PV grid-connected inverter without a transformer, (hereinafter referred to as inverter unless otherwise specified). The inverter is grid-connected, transformer-less, robust and of high conversion efficiency.

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 for technical personnel who are responsible for inverter installation, operation and maintenance, and the inverter owner who will perform daily APP operation.

How to Use This Manual

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

All rights reserved including the pictures, markings, and symbols used. Any reproduction or disclosure, even partially, of the contents of this manual is strictly forbidden without prior written authorization of Sungrow.

The contents of the manual will be periodically updated or revised due to product development. There may be changes in the manual due to subsequent inverter editions. The latest manual can be acquired via visiting the website at www.sungrowpower.com.

Symbols Explanation

Important instructions contained in this manual should be followed during installation, operation, and maintenance of the inverter. And they will be

highlighted by 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

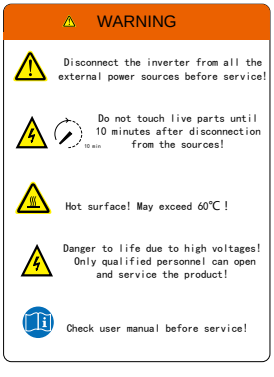
CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

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

About This Manual I

1 Safety Instructions 1

2 Product Description 6

2.1 Intended Usage 6

2.2 Product Introduction 7

2.2.1 Appearance 7

2.2.2 Dimensions 8

2.2.3 LED Indicator Panel 8

2.2.4 DC Switch 10

2.3 Technical Description 10

2.3.1 Circuit Diagram 10

2.3.2 Function Description 11

2.3.3 Derating 12

3 Installation Flow 17

4 Unpacking and Storage 19

4.1 Unpacking and Inspection 19

4.2 Identifying Inverter 19

4.3 Scope of Delivery 21

4.4 Inverter Storage 21

5 Mechanical Installation 23

5.1 Installation Site Selection 23

5.2 Moving Inverter to Installation Site 26

5.3 Installation Tools 26

5.4 Installing the Inverter 26

5.4.1 Installing to Concrete Wall 27

6 Electrical Connection 29

6.1 Terminal Description 29

6.2 AC Side Cable Connection 30
6.2.1 AC side requirements 30
6.2.2 Grid Connection 31
6.3 Connecting Inverter to PV Arrays 35
6.3.1 PV Input Configuration 35
6.3.2 PV Input Connection 37
6.4 Grounding the Inverter 40
6.4.1 Grounding System Overview 40
6.4.2 Second Protective Earth Terminal 41
6.5 Communication Connection 42
6.5.1 Communication Overview 42
6.5.2 RS485 Communication System 42
6.5.3 RS485 communication connection of the COM port 43
6.5.4 GPRS communication connection of the COM port 44
7 Commissioning 45
7.1 Inspection before Commissioning 45
7.2 Commissioning Procedure 46
8 Disconnecting, Dismantling and Disposing the Inverter 48
8.1 Disconnecting the Inverter 48
8.2 Dismantling the Inverter 49
8.3 Disposal of the Inverter 49
9 Troubleshooting and Maintenance 50
9.1 Troubleshooting 50
9.2 Maintenance 53
9.3 Contact Sungrow Service 53
10 Sun Access APP 55
10.1 Introduction to the System 55
10.2 Acquire and install Sun Access APP 55
10.2.1 Installation Condition 55
10.2.2 Operation Steps 55
10.3 Logging Sun Access APP 56

10.4 Homepage 59
10.5 Run Info 60
10.6 History Record 62
10.6.1 Fault Alarm Records 62
10.6.2 Power Yields Records 64
10.6.3 Event Records 65
10.7 More 66
10.7.1 Power On/Power Off 66
10.7.2 System Parameters 67
10.7.3 Operation Parameters 68
10.7.4 Protection Parameters 69
10.7.5 Communication Parameters 71
10.7.6 Download the Log 72
10.7.7 About Sun Access 73
11 Appendix 74
11.1 Technical Data 74
11.2 Exclusion of Liability 75
11.3 About Us 76
11.4 Contact Information 76

1 Safety Instructions

The inverter has been designed and tested according to strict international safety regulations. As electrical and electronic equipment, safety instructions related to them must be complied with during installation, commissioning, operation, and maintenance. Incorrect operation or work may result in damage to:

- The life and well-being of the operator or a third party
- The inverter and other properties that belong to 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.

⚠ 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 electric system related safety instructions.**

Technical personnel mentioned above may perform the following work:

- 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.

Before Installation

NOTICE

The unit is thoroughly tested and strictly inspected before delivery. Damage may still occur during shipping.

If there is visible damage to the packaging or the inner contents, or if there is something missing, contact Sungrow or the forwarding company.

CAUTION

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.**

During Mechanical Installation

DANGER

Make sure inverter is not electrically connected before installing the inverter.

CAUTION

System performance loss due to bad ventilation!

Proper-ventilation should be maintained during device operation. the fan's air inlet and outlet should not be covered to ensure the device interior can sufficiently cool down.

During Electrical Connection

NOTICE

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

The connection to the grid can be done only after receiving approval from the local utility grid company.

DANGER

Lethal voltage exists!

PV arrays will produce electrical energy when exposed to sunlight and thus can create potential electrical shock hazards.

WARNING

All cables must be firmly attached, undamaged, properly insulated and

adequately dimensioned.

During Inverter Operation

WARNING

Do not open inverter enclosure when inverter is under load or operating.

Only an intact and locked inverter cabinet can ensure personal and property safety.

CAUTION

There is a risk of burn!

Do not touch hot components of the inverter (for example, the heatsink) during operation. Only the DC switch can be touched during operation.

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 falling inside the inverter;**
- **Incorrect operation 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 assess 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.**

Maintenance and Service

DANGER

There is a risk of inverter damage or personal injury due to incorrect service work!

Before any operation, you should perform the following steps:

- **First, disconnect the grid side switch and then disconnect the DC switch;**
- **Wait at least 10 minutes until the inner capacitors are discharged completely;**
- **Verify, using proper testing device to make sure there is no voltage or current.**

CAUTION

Keep unqualified persons away!

A temporary warning sign and barrier must be posted to keep unqualified persons away during electrical connection and maintenance.

NOTICE

- **Restart the inverter only when the fault that may impair the inverter safety functions is removed.**
- **Inverter contains no owner serviceable parts inside. Please contact local authorized personnel if any service work is required.**

NOTICE

Do not replace the inverter internal components without permission. Damage to the inverter may occur and it may void any or all warranty rights from Sungrow.

NOTICE

There is a risk of inverter damage due to electrostatic discharge!

The printed circuit boards contain components sensitive to electrostatic discharge.

- **Wear a wrist strap when handling the boards.**
- **Avoid unnecessary touching of the boards.**

Others

NOTICE

Certain parameter settings (country selection, etc.) by the Sun Access APP must only be done by qualified persons.

Incorrect country setting may affect the inverter normal operation and cause a breach of the type-certificate marking.

⚠ WARNING

All safety instructions, warning labels, and nameplate on the inverter:

- **Must be clearly visible;**
- **Should not be removed or covered.**

⚠ WARNING

Respect the following regulations:

- **Grid-connection regulations;**
- **Safety instructions related to PV arrays;**
- **Safety instructions related to other electrical devices.**

2 Product Description

2.1 Intended Usage

SG15KTL-M/SG17KTL-M/SG20KTL-M; a transformerless 3-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.

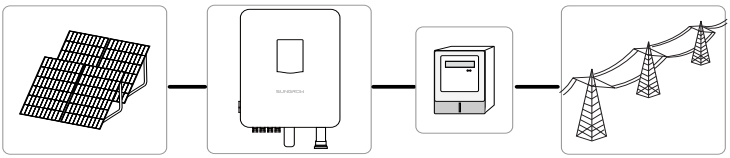
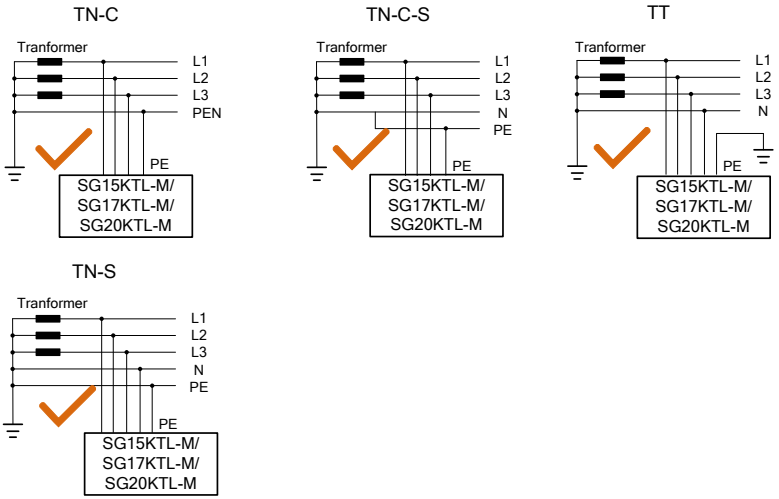


Fig. 2-1 Inverter application in PV power system

Item	Description	Note
A	PV strings	Monocrystalline silicon; polycrystalline silicon and thin-film without grounding
B	Inverter	SG15KTL-M/SG17KTL-M/SG20KTL-M
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 Appearance

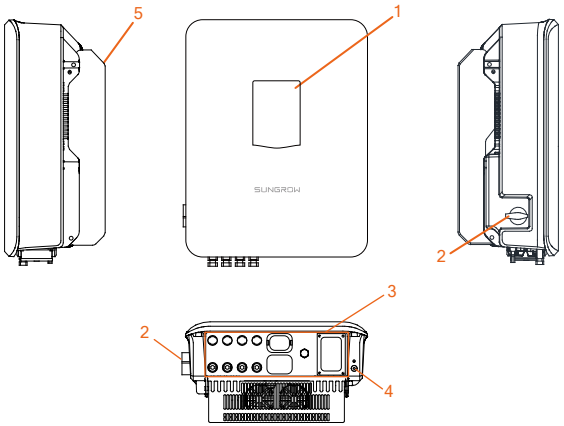


Fig. 2-2 Appearance

* Pictures are indicative only. Product in kind prevail.

No.	Name	Description
1	LED indicator panel	HMI interface to indicate the present working state of the inverter.
2	DC switch	Protective components to safely disconnect 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 backplate.

2.2.2 Dimensions

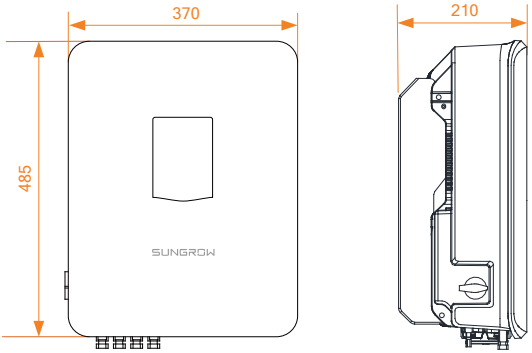


Fig. 2-3 Dimensions of the inverter (in mm)

2.2.3 LED Indicator Panel

As HMI, the LED indicator panel on the inverter front panel indicates the present working state of the inverter.

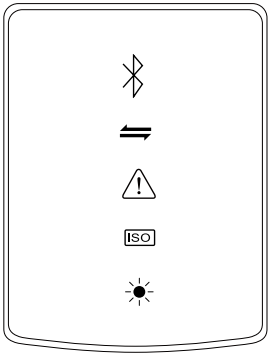


Fig. 2-4 LED indicator panel

Tab. 2-1 State description of the LED indicator panel

LED indicator	LED color	LED state	Definition
Bluetooth	Blue	ON	The Bluetooth communication is connected and there is no data communication
		OFF	No device connected to the inverter through the Bluetooth.
		Periodical flash	The Bluetooth communication is connected and there is data communication
Communication	Blue	OFF	The RS485 or GPRS communication is not connected or the communication channel has no data interaction
		Periodical flash	The RS485 or GPRS communication is connected and the communication channel has data interaction
Fault/PID recovery	Red	Off	No fault has occurred
		ON	A fault occurs, not including the communication fault.
	Green	Off	PID recovery is deactivated

LED indicator	LED color	LED state	Definition
		ON	PID recovery is activated
Earth impedance abnormal	Red	OFF	No fault occurred
		ON	An earth impedance short-circuit fault occurred (the device cannot connect to the grid)
Normal operation	Green	OFF	Both the AC and DC is powered down
		Periodical flash	The DC or AC is powered on and the device is in standby or startup state (not connect to the grid)
		ON	The device is connected to the grid and operating normally

2.2.4 DC Switch

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.

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 provides standard RS485 ports for communication. Users can check running data and set related parameters through the Sun Access APP.

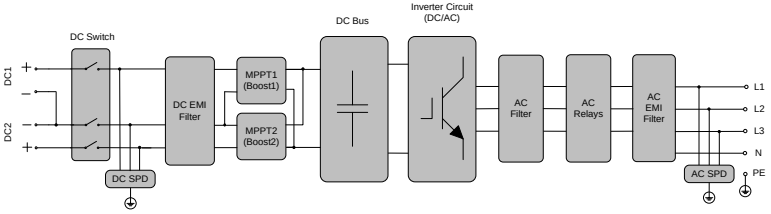


Fig. 2-5 Circuit diagram

2.3.2 Function Description

- Inversion function

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

- Data storage

  The inverter achieves the running information, fault records and etc.

- Parameter Configuration

  The inverter provides various parameter settings. You can set the parameters through the phone's APP to change the requirements of the device or optimize the performance of the device.

- Communication Interface

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

- Protection Function
  - Short-circuit protection
  - Ground insulation resistance monitoring
  - Grid voltage monitoring
  - Grid frequency monitoring
  - Residual current protection
  - DC injection of AC output current monitoring
  - Anti-islanding protection
  - Ambient temperature monitoring
  - DC over-voltage protection
  - Over-current protection
  - Power module over-temperature protection

2.3.3 Derating

Output derating is a way to protect the inverter from overload or potential faults. Situations requiring inverter power derating are:

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

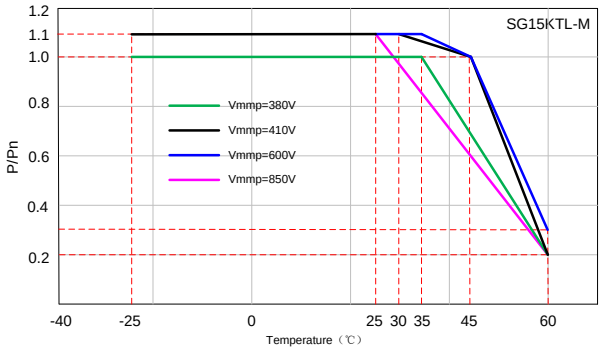
Power Limit Setting

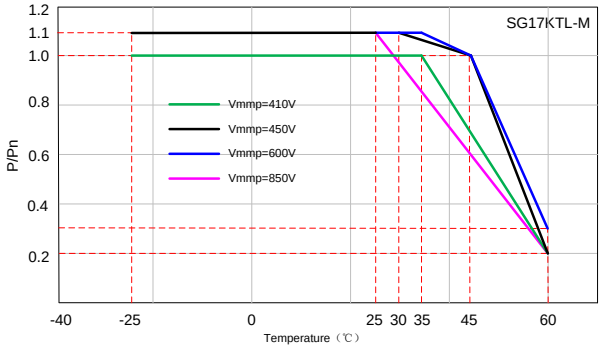
Inverter output power can be adjusted via the APP interface or remote grid dispatch from the grid company. The corresponding operating state will display on the LED Indicator Panel.

Over-temperature Derating

High ambient temperature, a broken fan 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.





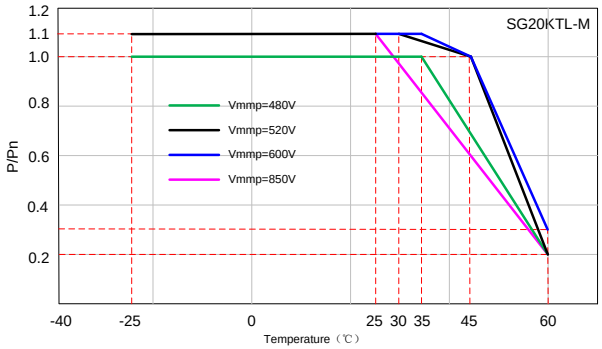


Fig. 2-6 Over-temperature Derating(Pf=1)

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…230V, the inverter will derate the output power.

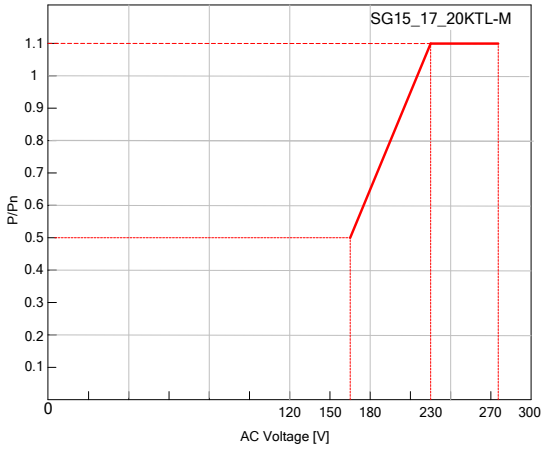
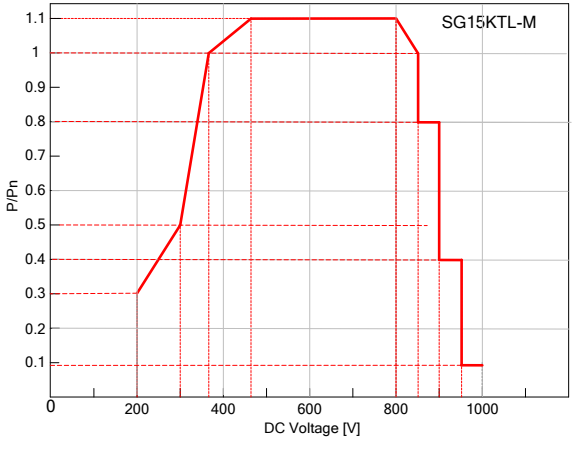


Fig. 2-7 Grid under-voltage derating(Pf=1)

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.



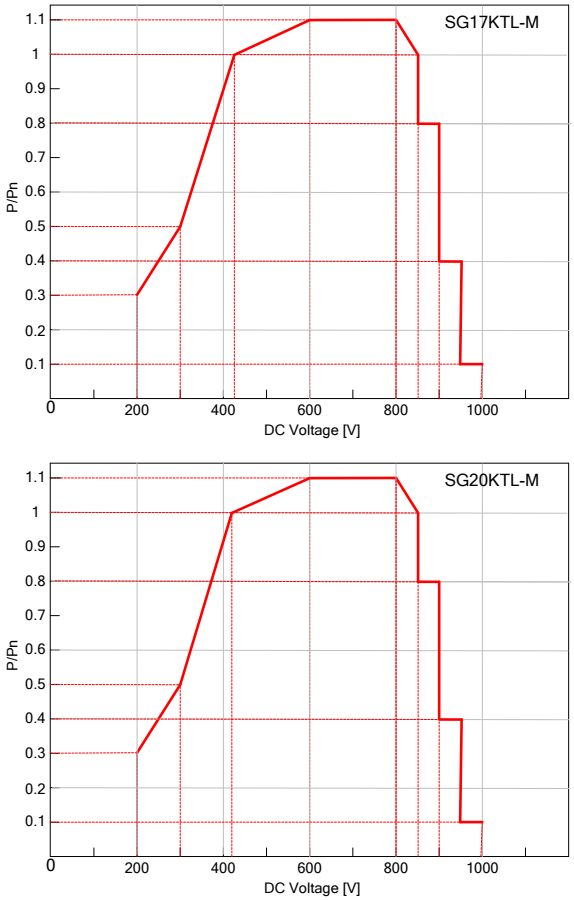


Fig. 2-8 Input voltage and the power derating(Pf=1)

High altitude derating

Every increase in altitude of 100 meters, DC voltage should be reduced by 13V.

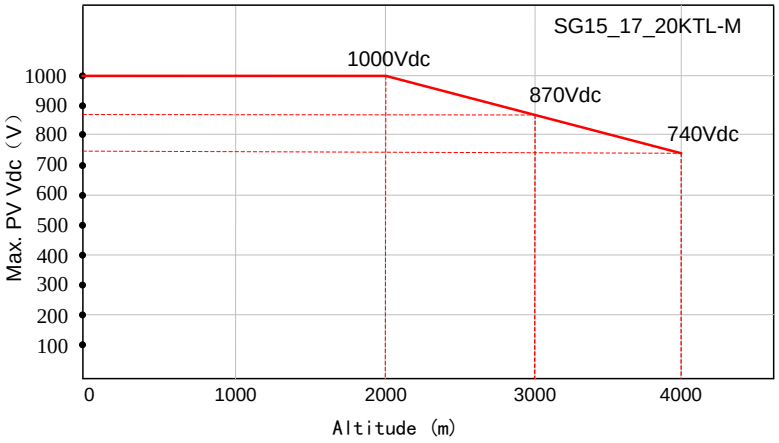


Fig. 2-9 High altitude derating

3 Installation Flow

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

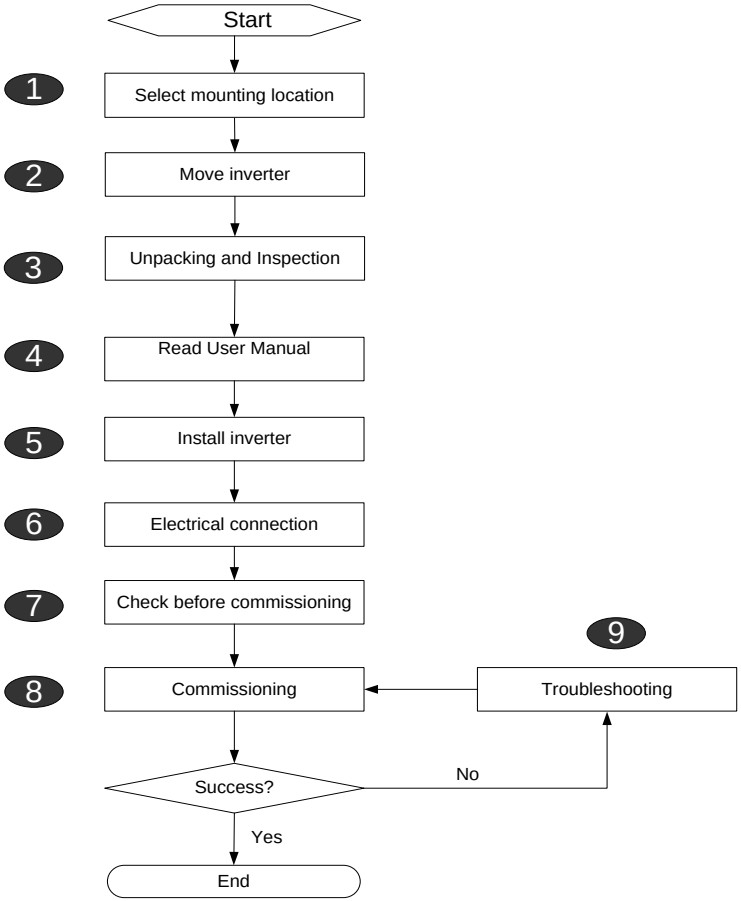


Fig. 3-1 Installation flow

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	5.3
6	Electrical connection; DC side connection; AC side connection; Ground connection; Communication connection.	6.2~6.7
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

Despite being strictly tested and checked, damage may still occur to the inverter during shipping. Therefore, the first thing you should do after receiving the device is to conduct a thorough inspection.

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

If any damage is found, please contact Sungrow or the forwarding company.

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

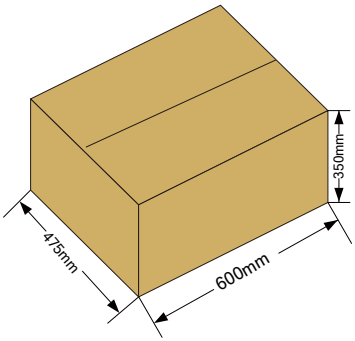


Fig. 4-1 Inverter paper packaging

4.2 Identifying Inverter

The nameplate is attached to one side of the inverter and the packaging carton respectively. It provides information on type of inverter, important specifications, marks of certification institutions, and serial number which are available and identified by Sungrow.

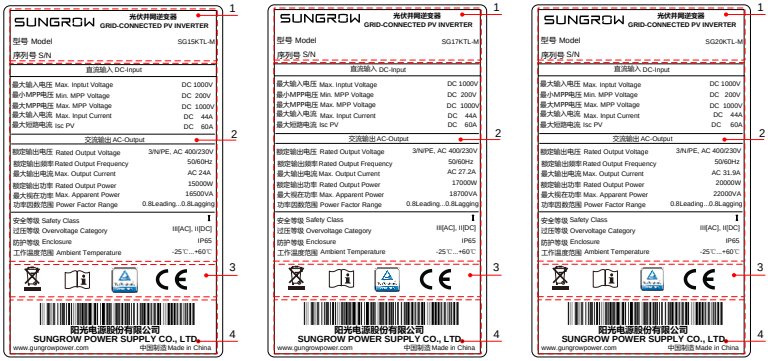


Fig. 4-2 Nameplate of Inverters

*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 certification institutions of inverter
4	Company name, website, and origin

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.
	TUV mark of conformity. The inverter is in compliance with directives of TUV.
	CE mark of conformity. The inverter is in compliance with directives of CE.

4.3 Scope of Delivery

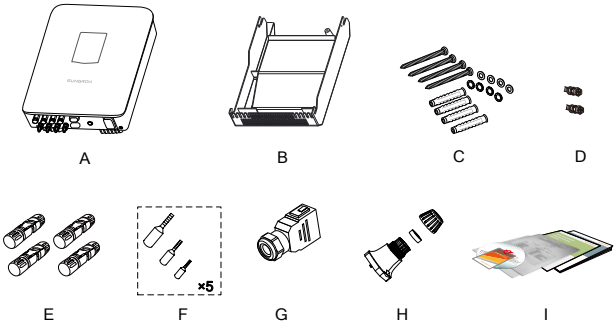


Fig. 4-3 Scope of delivery

Item	Name	Description
A	Inverter	---
B	Backplane	Used to connect the inverter to the installation site.
C	Nylon bolts	Four sets. Used to fasten backplate onto a concrete wall
D	Anti-theft screw	Two pcs. Used to lock the inverter mounting ears and hanging boards.
E	PV input connectors	Four pairs. Including positive and negative connectors, used to connect PV input.
F	European cold-pressed terminal.	There are cold-pressed terminals of large, middle, and small sizes, five for each. These terminals are used to connect AC cables. When the cross-sectional area of the AC cable is 6 mm^2, use the small-sized cold-pressed terminal; when the cross-sectional area of the AC cable is 10 mm^2, use the middle-sized cold-pressed terminal; and when the cross-sectional area of the AC cable is 16 mm^2, use the large-sized cold-pressed terminal.
G	AC output connectors	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	Communication connectors	Used to protect the RJ45 connector of Ethernet communication cable.
I	Documents	Quality certificate, packing list, Test Report, CD and quick user manual

4.4 Inverter Storage

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℃…70℃; Relative humidity: 0-95%.
- Stack the inverters in at most five layers. Do not store the inverters in stack for more than half a year if the stack layer is more than two.
- Keep the inverter away from the chemical corrosive materials to avoid possible corrosion.
- Periodically（recommended: six months) check for any visible damages during the storage period. Replace the packing material during the storage period as 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.

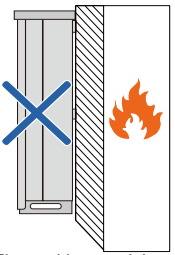
5 Mechanical Installation

5.1 Installation Site Selection

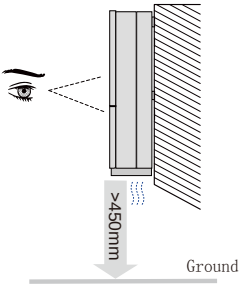
Select an optimal installation site for safe operation, long service life, and outstanding performance.

- 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 convenient location for electrical connection, operation, and maintenance.
- Do not install the inverter on the wall made up of flammable materials.

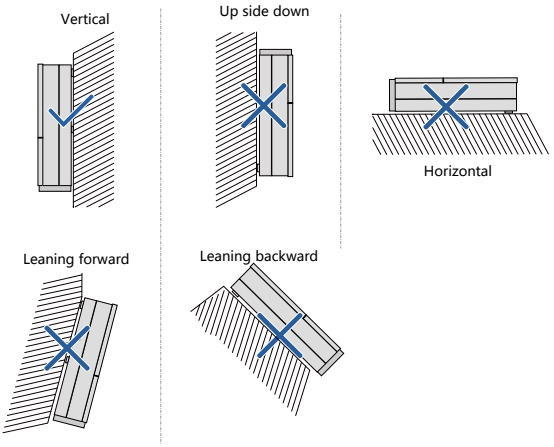
- Do not install the inverter near flammable materials or gas.



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



- Do not install the inverter upside down, leaning forward or horizontal installation.



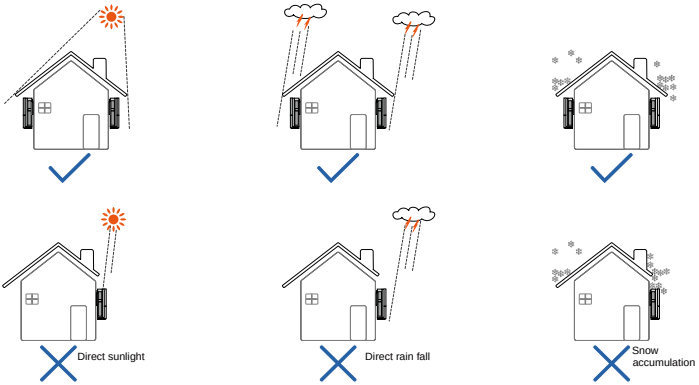
- With an IP65 protection rating, the inverter can be installed both outdoors and indoors.
- The ambient temperature should be within -25°C to 60°C. The inverter will operate with power derating if the temperature is too high.
- The relative humidity range of the installation site is 0-100%.

Max. ambient temperature: 60°C

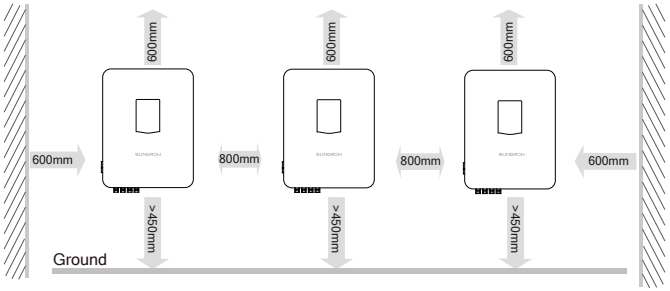
Min. ambient temperature: -25°C

Relative humidity: **0-100%**

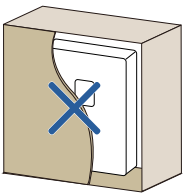
- Avoid exposing the inverter to direct sunlight, rain or snow to extend its service life despite of IP65 rating. Shaded site of the building would be better.



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



- Do not install the inverter in a confined space. The inverter will not work normally if otherwise.
- Install the inverter where children cannot reach.
- 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.
- A minimum of two people or proper moving devices should be used to move the inverter.
- Do not release the equipment unless it has been secured firmly.

5.3 Installation Tools

Gather the following tools before installation:

- Torque wrench
- Screwdriver
- Wire stripper
- Terminal crimping device
- Alcohol blast burner (or hot air blower)
- Allen wrench
- Meg-ohmmeter or multimeter
- Other auxiliary tools or spare parts

5.4 Installing the Inverter

Inverter is installed to the wall by the backplate enclosed in the packing. If you do not use the supplied backplate, you can drill holes as per specifications below:

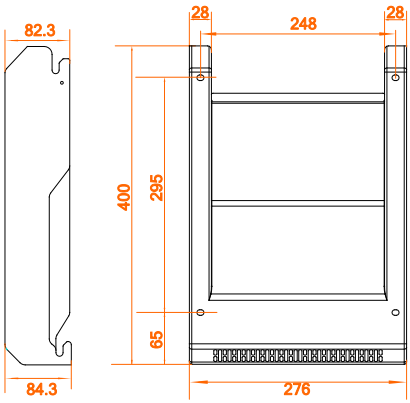
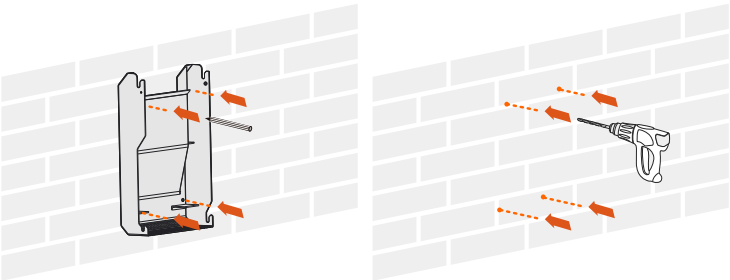


Fig. 5-1 Dimensions of the backplate (figures in mm)

5.4.1 Installing to Concrete Wall

Step 1 Remove the backplate and corresponding fasteners from the packaging.

Step 2 Place the backplate on the chosen concrete wall and adjust it to proper position and height. Mark the position for holes, drilling according to the hole positions of the backplate.

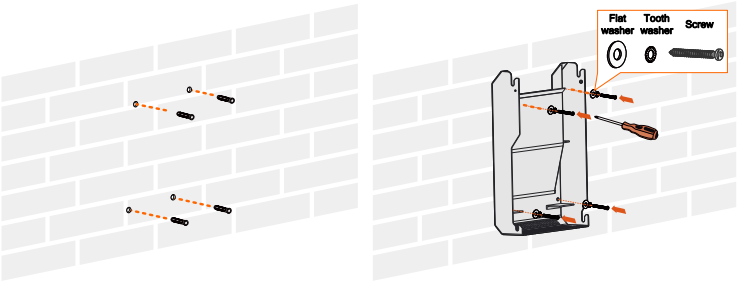


Step 3 Drill holes according to the marks made before.

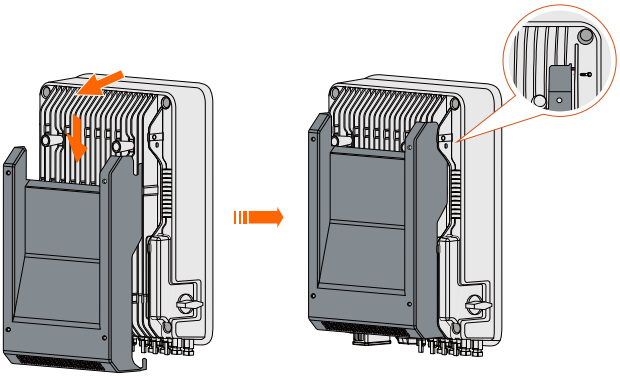
DANGER

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

Step 4 Secure the backplate to the wall firmly by the supplied expansion bolt sets. Torque of the fasten nut is 10 N·m.



Step 5 Lift the inverter above the backplate and then slide down to make sure they match perfectly. You can use the fastener set to lock the device.



6 Electrical Connection

Once the inverter is secured to the installation site, it can be connected to the PV system.

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

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.**
- **Always keep in mind that the inverter is dual power supplied. Electrical operators must wear proper personal protective equipment: helmet, insulated footwear, and glove, etc.**

6.1 Terminal Description

All electrical terminals are located at the bottom of unit. Fig. 6-1 shows the connection area.

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

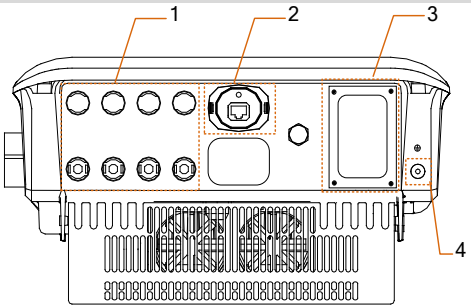


Fig. 6-1 Cable connection area

*Pictures are indicative only. Please in kind prevail.

No.	Name	Description
1	DC input plug-in terminal	MC4 terminals for PV input.
2	Communication waterproof terminal	-
3	AC cable gland	AC terminals to the power grid.
4	PE terminal	A second PE terminal

6.2 AC Side Cable Connection

6.2.1 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 with any connectivity issues. 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	63A
SG17KTL-M	
SG20KTL-M	

NOTICE

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

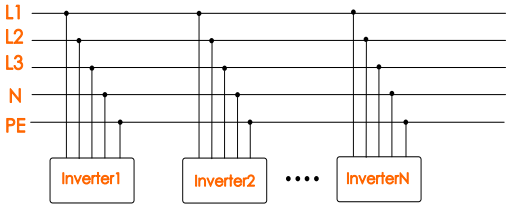
Residual Current Device

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 as soon as a fault current of more than 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 3-phase low voltage grid
Requirements:
Support up to 10 inverters in parallel operation.



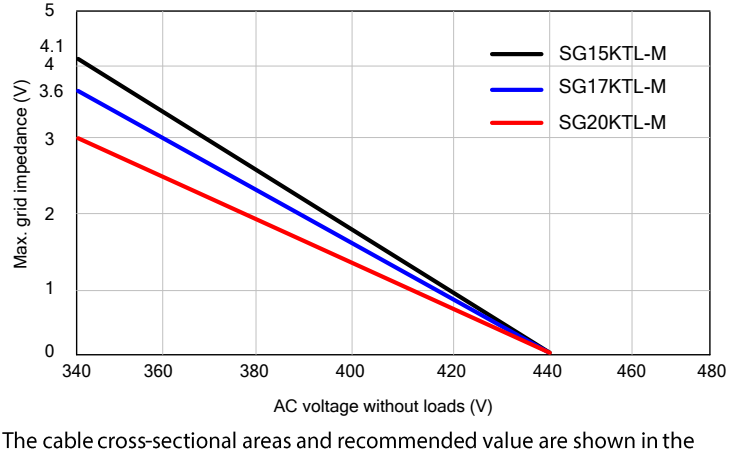
6.2.2 Grid Connection

The AC terminal block is on the bottom of the inverter. AC connection is the 3-phase-4-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.



- The cable cross-sectional areas and recommended value are shown in the following table, avoiding power loss in the cables of more than 1% of the nominal power.
- Withstand ambient temperature;
- Layout type (inside wall, underground, free air etc.);
- UV resistance and so on.

Connecting The Inverter to Grid

DANGER

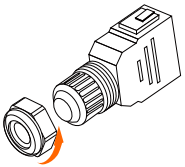
High voltage inside the inverter!

Ensure all cables are voltage-free before electrical connection.

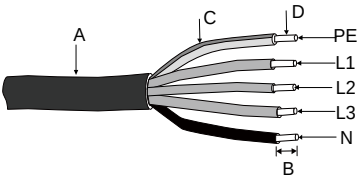
Do not connect the AC circuit breaker until all inverter electrical connections are completed.

AC cables Procedure

Step 1 Unscrew the waterproof terminal of the AC connector counterclockwise.

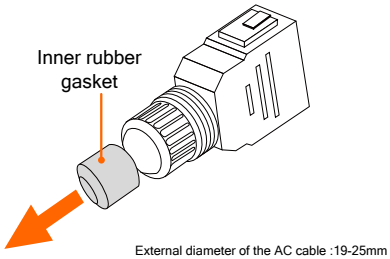


Step 2 Strip off insulation layer of all AC cables. The length of stripped insulation is approximate 12mm.

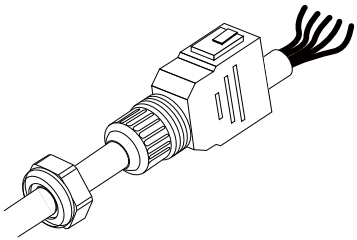


No.	Description	Remark
A	Protective layer	Accepted cable external diameter ranges from 14mm to 25mm.
B	Length of insulation to be stripped off	12 mm
C	Insulation layer	-
D	Cross-section Area Range	Ranges: 6~16 mm^2; Recommended: 10 mm^2

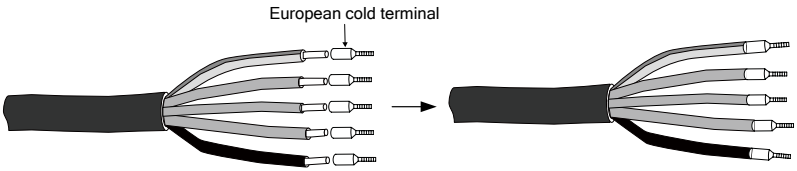
Step 3 Remove the inner rubber gasket if the external diameter of the to-be-used AC cable ranges from 19~25mm. Ignore this step when the external diameter of the AC cable ranges from 14~18mm.



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

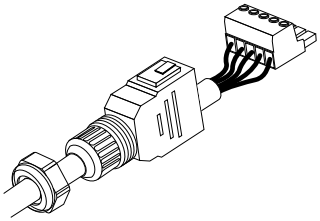


Step 5 Connect the AC cable head to the European cold terminal by appropriate torque.



There are cold-pressed terminals of large, middle, and small sizes. When the cross-sectional area of the AC cable is 6 mm^2, use the small-sized cold-pressed terminal; when the cross-sectional area of the AC cable is 10 mm^2, use the middle-sized cold-pressed terminal; and when the cross-sectional area of the AC cable is 16 mm^2, use the large-sized cold-pressed terminal.

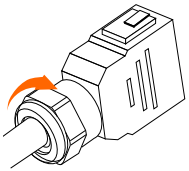
Step 6 Fix all cables to the corresponding terminals with torque of 2.0-2.5N•m, according to markings on the connector with a screwdriver, especially the "PE" cable. If the phase line is connected to the terminal of "PE" or "N" cable, the inverter will be irremediably damaged.



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.

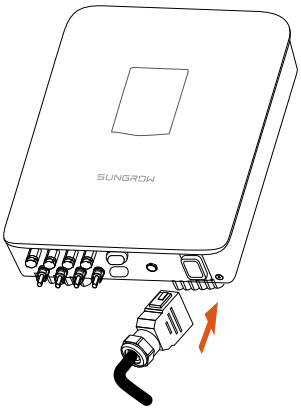
Step 9 Tighten the waterproof terminal clockwise.



AC Wiring Procedure

Step 1 Disconnect AC circuit breaker to prevent it from inadvertently reconnecting.

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



Step 3 Connect PE cable to ground.

Step 4 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 5 Connect AC circuit breaker to utility grid.

Step 6 Make sure all AC cables are firmly installed

6.3 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.

6.3.1 PV Input Configuration

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

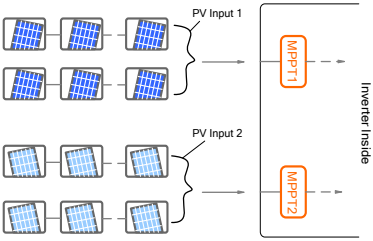
NOTICE

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 1000V 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	1000 V	30A
SG17KTL-M		
SG20KTL-M		

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	22

Under the STC condition, where ambient temperature is 25℃, the open-circuit voltage of PV cells is 39.1V×22=860.2V<1000V.

Supposed that the lowest temperature is -25℃, the open-circuit voltage of PV cells is 22×39.1V×[1+β×(min. ambient temperature- STC temperature)] = 22×39.1V×[1+(-0.30%/℃)×(-25℃-25℃)]= 989.2V<1000V (meet the operation requirement).

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

6.3.2 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...6mm^2	6…9mm	1000V	15A

NOTICE

The input current of each input channel should be less than 15A.

DC Cable Connection

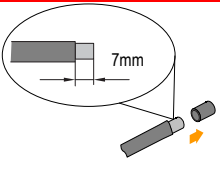
DANGER

High voltage inside the inverter!

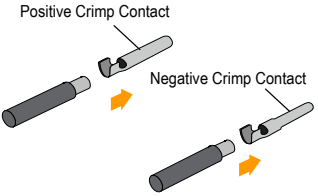
Make sure all DC and AC cables connected to the inverter are voltage-free before electrical connection.

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

Step 1 Strip off 7mm insulation layer from all DC cables.



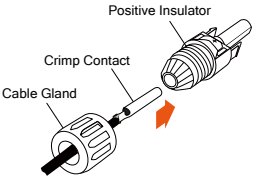
Step 2 Assemble cable ends with crimp contacts by crimping pliers.

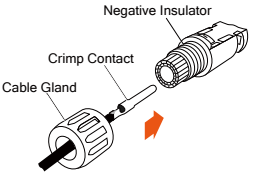


Step 3 Lead cable through cable gland.

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

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





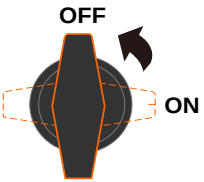
For further assembly and connection instruction, please visit the webpage of the device manufacturer.

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

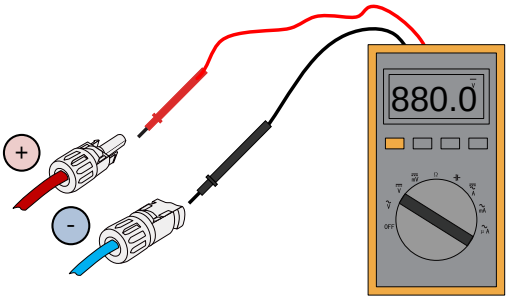
NOTICE

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

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



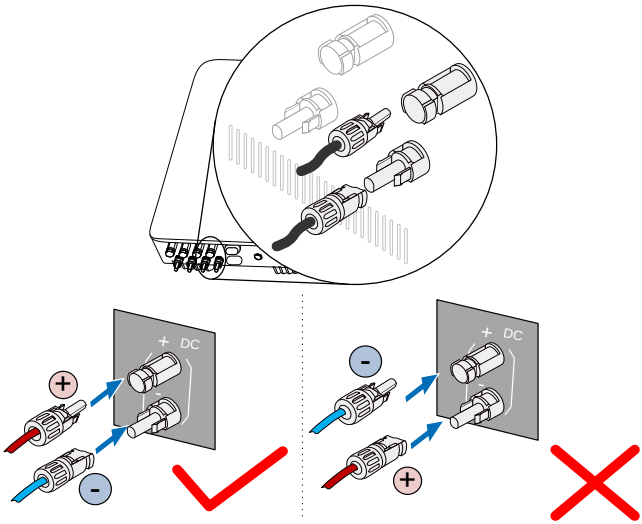
Step 8 Check the connection cable of PV string for the correct polarity and that the open-circuit voltage does not exceed the inverter input limit 1000V, even under the lowest operating temperature.



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 waterproof plugs.

6.4 Grounding the Inverter

6.4.1 Grounding System Overview

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

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.

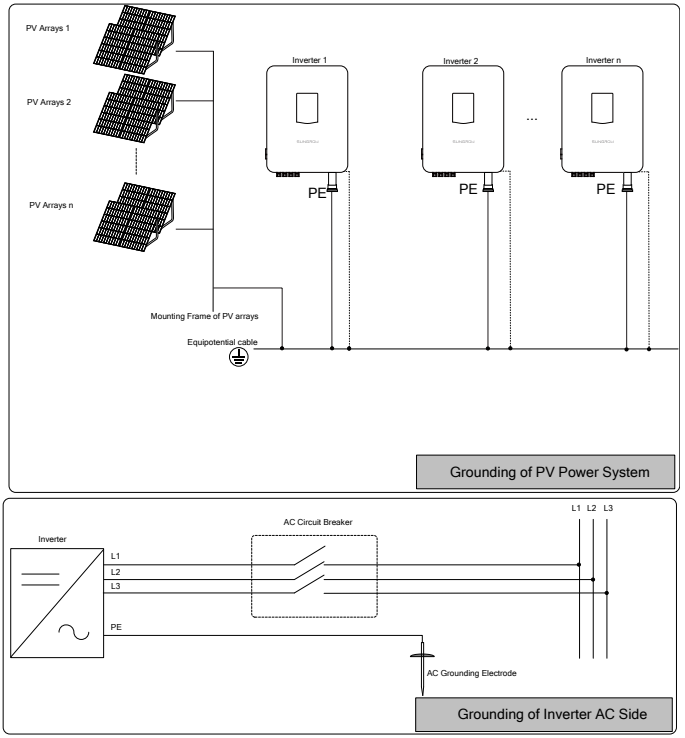


Fig. 6-2 Grounding of inverter

6.4.2 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 by torque of 1.5N•m,

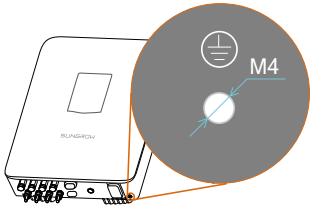


Fig. 6-3 Second PE terminal

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 all grounded reliably. Sungrow shall hold no liability for any possible consequences caused by ignorance of this warning.

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

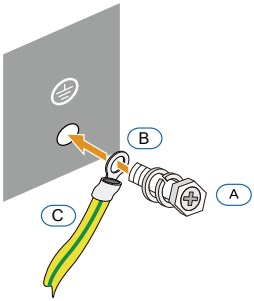


Fig. 6-4 Second PE connection

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

*the cross-sectional area of the yellow-green grounding cable shall be exactly the same with that of the PE cable of the AC cable.

6.5 Communication Connection

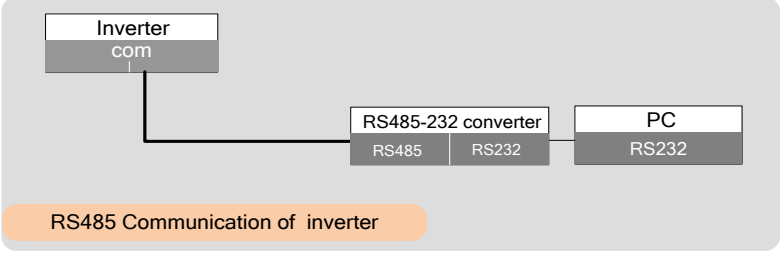
6.5.1 Communication Overview

There are communication waterproof connection terminals on the bottom of the inverter. RS485 Ethernet interface is provided. The inverter operation information can be transferred to the PC of the installed monitoring software or to a local data logging device (e.g. Logger 3000) through RS485 communication connection. The GPRS communication module can be also used for the communication. The running information of the inverter is delivered to the mobile phone via the base station, and the user can view the real-time information through the APP.

When the end of the communication cable is not connected to the RS485 communication cable or GPRS module, please do not remove the factory water-proof gland.

6.5.2 RS485 Communication System

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



Prepare communication cable before communication connection.

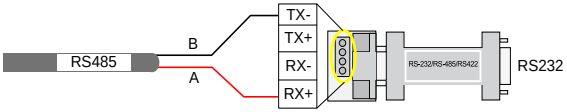
NOTICE

RS485 communication cables should be:

- **Shielded cables or Shielded Ethernet cable.**
- **The communication cables are applicable to outdoor installation.**

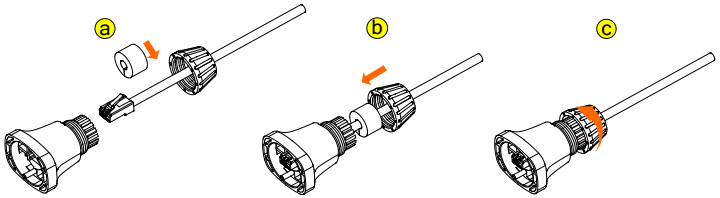
A converter such as RS485-232 converter or Data Logger is needed to convert signal between inverter and PC.

Data logger and RS485-232 converter are optional parts and can be ordered from Sungrow.



6.5.3 RS485 communication connection of the COM port

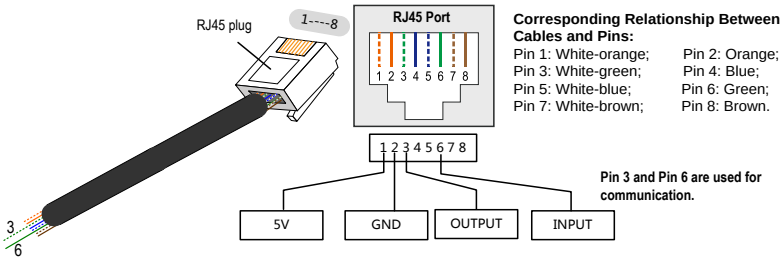
Step 1 Insert the RJ45 plug into the front plug connector until it makes a clicking sound, install the plastic rings then tighten the cable gland with appropriate torque.



Step 2 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 3 Pull cables outwards to confirm whether they are fastened firmly.

Step 4 Connect the COM cables (1, 2, 3 and 6) to terminating resistor.



Step 5 Verify the communication connection and configure the communication parameters.

6.5.4 GPRS communication connection of the COM port

Connect the GPRS wireless data collector produced by Sungrow to the COM port. After successful connection, information such as power generation and running state of the inverter can be viewed via the APP on the phone.

NOTICE

When the GPRS communication module is used, the Baud rate needs to be set to 9600 and cannot be modified. For detailed setting method, refer to the user manual 10.7.5 Communication Parameter Setting.

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

7 Commissioning

Commissioning is a critical procedure for a PV system, which can protect the system from fires, and personnel from injury and electrical shock.

7.1 Inspection before Commissioning

Before starting the inverter, you should check the following items.

Ambient Environment

1. The inverter should be accessible for operation, maintenance, and service.
2. Check again to confirm that the inverter is firmly installed.
3. Proper ventilation.
4. The inverter is clean and free of debris.
5. The inverter and accessories are correctly connected.
6. Cables are routed safely place and protected against mechanical damage.
7. The specification of the AC circuit breaker is appropriate for its intended use.
8. The terminals not used underneath the inverter should be sealed.
9. Warning signs & labels are suitably affixed and durable.

7.2 Commissioning Procedure

If all of the items mentioned above meet the requirements, 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 Close the external AC circuit breaker.

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

Provided there is sufficient sunlight:

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

Step 4 Observe the status of LED indicator panel.

LED indicator	LED color	LED state	Definition
Bluetooth	Blue	ON	The Bluetooth communication is connected and there is no data communication
		OFF	No device connected to the inverter through the Bluetooth.
		Periodical flash	The Bluetooth communication is connected and there is data communication
Communication	Blue	OFF	The RS485 or GPRS communication is not connected or the communication channel has no data interaction
		Periodical flash	The RS485 or GPRS communication is connected and the communication channel has data interaction
Fault/PID recovery	Red	Off	No fault has occurred
		ON	A fault occurs, not including the communication fault.

LED indicator	LED color	LED state	Definition
	Green	Off	PID recovery is deactivated
		ON	PID recovery is activated
Earth impedance abnormal	Red	OFF	No fault occurred
		ON	An earth impedance short-circuit fault occurred (the device cannot connect to the grid)
Normal operation	Green	OFF	Both the AC and DC is powered down
		Periodical flash	The DC or AC is powered on and the device is in standby or startup state (not connect to the grid)
		ON	The device is connected to the grid and operating normally

Step 5 Use the Sun Access App to establish the communication connection with the inverter through Bluetooth to set the initial parameters. When the device is initialized, the App will send start instructions and the device will start and operate. For details, please refer to "10.3 Logging Sun Access APP".

After setting the Country parameter, please proceed to set other parameters of the inverter in accordance with the specific requirements of the local grid. Before commissioning, please check thoroughly if the set parameters meet the local grid requirement.

8 Disconnecting, Dismantling and Disposing the Inverter

8.1 Disconnecting the Inverter

For maintenance work or any service work, the inverter must be switched off. During normal operation, the inverter should remain switched on.

Proceed as follows to disconnect the inverter from DC and AC power sources

Step 1 Disconnect the external AC circuit breaker or disconnect to prevent it from accidentally reconnecting to the utility grid.

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

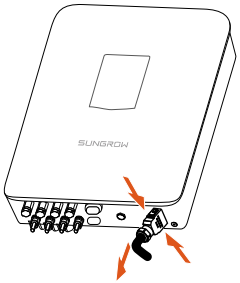
NOTICE

Please strictly adhere to the above sequence. The inverter may be damaged otherwise.

Step 3 Wait about ten minutes until the capacitors inside the inverter have been discharged.

Step 4 Measure the AC voltage to ground at the AC terminal to confirm AC output voltage of inverter at the AC circuit breaker is zero.

Step 5 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 by a slotted screwdriver and then pull the AC terminal head out.



Step 6 Remove the DC cables.

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 Inverter Storage" for 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 in the inverter, such as the LED indicator panel, batteries, modules and other components, may cause environmental pollution. Disposal of the inverter must comply with the related local regulations to avoid pollution.

9 Troubleshooting and Maintenance

9.1 Troubleshooting

When faults occur, a "Fault" state will be shown in the APP interface.

Fault Code	Description	Troubleshooting
002	The grid voltage exceeds inverter allowable range. Protection time and protection threshold vary per various country requirements.	Check the grid voltage; If the grid voltage exceeds the inverter permissible range, ask utility grid company for solution. If the grid voltage is within the permissible range, contact Sungrow.
003	Grid transient voltage exceeds the permissible range	This is a short-term fault due to grid conditions. Wait a moment for inverter recovery. If the fault still exists, please contact Sungrow.
004	The grid voltage is below the inverter's allowable lower limit. Protection time and protection threshold vary per various country requirements.	Check the grid voltage. If the grid voltage exceeds the inverter permissible range, ask utility grid company for solution. If the grid voltage is within the permissible range, contact Sungrow.
005	The grid voltage is too low.	This is a short-term fault due to grid conditions. Wait a moment for inverter recovery. If the fault still exists, please contact Sungrow.
006	The AC output current exceeds the inverter protection limit.	The inverter will resume if the output current falls below the protection value. If the fault still exists, please contact Sungrow.
007	Transient AC overcurrent	The inverter will self-recover after several seconds.
008	The grid frequency exceeds inverter allowable upper limit.	Check the grid frequency. If the grid voltage exceeds the inverter permissible range, ask utility grid company

Fault Code	Description	Troubleshooting
009	The grid frequency is below the inverter allowable lower limit.	for solution. If the grid voltage is within the permissible range, contact Sungrow.
010	Islanding	Check whether the AC circuit breaker is connected. Check whether the AC cables are all firmly connected. Check whether the grid is in service. If all conditions are OK and this fault still occurs, contact Sungrow.
011	The DC component of AC current exceeds inverter limit.	Wait for inverter recovery. If the fault still occurs, contact Sungrow.
012	Fault current leakage is detected	Check the PV strings for ground fault. If the fault occurs repeatedly, contact Sungrow.
013	Grid abnormalities are detected	Wait for inverter recovery. If the grid voltage exceeds the inverter permissible range, ask utility grid company for solution. If the grid voltage is within the permissible range, contact Sungrow.
014	The average grid voltage exceeds the permissible range for over 10 minutes.	Wait for inverter recovery. If the fault occurs repeatedly, contact Sungrow.
015	Grid impedance exceeds the inverter's limit	Check the type and size of the AC cables. Wait for inverter recovery. If the fault occurs repeatedly, contact Sungrow.
016	AC output overloads	Wait for inverter recovery. If the fault occurs repeatedly, contact Sungrow.
017	Grid voltage imbalance	Wait for inverter recovery. If the fault occurs repeatedly, contact Sungrow.
019	The transient bus voltage is high.	Wait for inverter recovery. If the fault occurs repeatedly, contact Sungrow.
020	The bus voltage is high.	Wait for inverter recovery. If the fault occurs repeatedly, contact Sungrow.
021	PV input overcurrent	Check the PV configuration and connection.
023	PV configuration mode has changed during inverter running.	Check the PV configuration; Restart the inverter.

Fault Code	Description	Troubleshooting
024	Neutral point deviation is detected.	Inverter resumes normal operation when deviation is within the permissible range; If the fault occurs repeatedly, contact Sungrow.
025	Transient imbalance of voltage neutral point	Inverter resumes normal operation when deviation is within the permissible range; If the fault occurs repeatedly, contact Sungrow.
026	Bus voltage fluctuation	This is a short-term fault. Wait for inverter recovery If the fault still occurs, contact Sungrow.
036	Module temperature is too high	Check if the AC output exceeds the rating value.
037	Ambient temperature is too high.	Check the functionality of the fans. Replace broken fans if necessary. Clean the air outlet grills. If the fault still occurs, contact Sungrow.
038	Relay fault	Check if the AC output grid live line insulation to the ground is abnormal. Wait for inverter recovery. If the fault still occurs, contact Sungrow.
039	Inverter insulation resistance fault (ISO-flt)	Wait for inverter recovery. If the fault still occurs, contact Sungrow.
040	AC or DC overcurrent fault, or DC overvoltage fault	Wait for inverter recovery. If the fault occurs repeatedly, contact Sungrow.
041	Current leakage sampling channel failure	Wait for inverter recovery. If the fault still occurs, contact Sungrow.
042	Current imbalance.	If the fault occurs repeatedly, contact Sungrow.
043	ambient temperature falls below -25°C	Disconnect and stop the inverter. Wait for the ambient temperature to rise within the permissible range and then restart inverter.
048	Phase-R current sampling channel fault.	Wait for inverter recovery. If the fault occurs repeatedly, contact Sungrow.
049	Phase-S current sampling channel fault.	
050	Phase-T current sampling channel fault.	
075	Solar irradiation is not sufficient for inverter operation.	Wait for sufficient irradiation. If this fault recurs when irradiation is sufficient, check the PV system design and adjust the connection of PV inputs.
076	PV overload	Check the PV system design and adjust the connection of PV1 inputs.

Fault Code	Description	Troubleshooting
078	PV power abnormal warning	Check the PV input for disconnection or looseness. If the warning fault still exists, please contact Sungrow
532-547	Reverse polarity warning of PVS connection.	1. Check the polarity of the PV inputs, if the polarity is reversed, please reconnect PV strings. 2. If the fault still exists, please contact with Sungrow.
548-563	The output current of the PVS is obviously abnormal.	1. Check whether the PV array is shielded. If the PV array is clear and is not shielded, check whether the PV modules are faulty. 2. Check the DC input cable for disconnection. If so, reconnect the cable and reset the PVS function. 3. If the fault still exists, please contact with Sungrow.

9.2 Maintenance

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.)

9.3 Contact Sungrow Service

Should you have any problems in operating on the inverter, please contact us:

Service hotline: +86 551 6532 7834, +86 551 6532 7845

Email: service@sungrow.cn (after-sales)

support@sungrowpower.com (technical support)

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

- Type of the inverter
- Serial number of the inverter
- Fault code/name

- Brief description of the problem

10 Sun Access APP

10.1 Introduction to the System

By establishing a communication connection with the inverter through Bluetooth, the Sun Access APP can access near-end maintenance to the inverter. You can check the running info, alarms and events, set the parameters and download the logs from the APP.

10.2 Acquire and install Sun Access APP

> The Sun Access APP is available in iOS and Android versions. You can download corresponding versions according to the operating system of your phone.
>
> This manual will utilize the iOS version to introduce the installation and use of Sun Access APP. These steps are the same for the Android version. The pictures in this document are indicative only since the app version may be upgraded later. Please refer to the actual interface of the app.

10.2.1 Installation Condition

- Required phone operating system: iOS8.0 and above for iPhones; Android 4.4 and above for Android phones
- Recommended iPhone models: iPhone5s and above
- Ensure that the phone has enough memory to install the app
- Ensure the phone is fully charged

10.2.2 Operation Steps

Step 1 Download the Sun Access APP installation package.

a) For iOS version: search for the Sun Access in the App Store; download and install the app according to the tips of the interface.

b) For Android: search for the Sun Access in Myapp or Google Play;

download and install the app according to the instructions.

Step 2 Click "Open" after the app is installed to open the app as shown in Fig. 10-1. You can also open the app by clicking the icon of the app on your phone desktop.

Fig. 10-1 Login interface

> You can also scan the QR code on the right side of the inverter cabinet to download and install according to the instructions.

10.3 Logging Sun Access APP

> During the use of the Sun Access APP, make sure your phone is within 5m from the inverter and there are no barriers between your phone and the inverter. The communication quality cannot be ensured otherwise.

Step 1 Click the icon of the app on your phone desktop to enter the login interface as shown in Fig. 10-1.

Step 2 Default username: user. Input the password 111111 and click Login. The Bluetooth devices nearby will be listed as shown in Fig. 10-3 after logging in successfully.

Fig. 10-2 Login

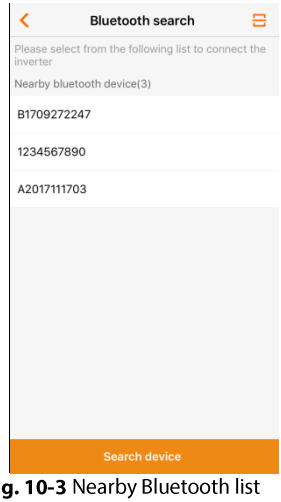


Fig. 10-3 Nearby Bluetooth list

If you have no password, please click "login without password" to log in and check certain info.

Step 3 Select the Bluetooth device to be connected according to the serial number on the nameplate to establish a connection, as shown in Figure 10-4.

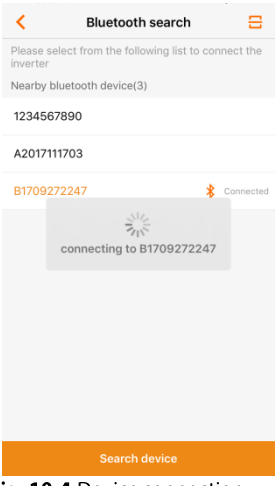


Fig. 10-4 Device connection

Step 4 If the inverter is not initialized, you will enter the initialization protection parameter quick setting interface as shown in Fig. 10-5 after the Bluetooth is connected. After setting the quick setting interface, click "Save" and the device will be initialized. The App will send start instructions and the device will start and operate

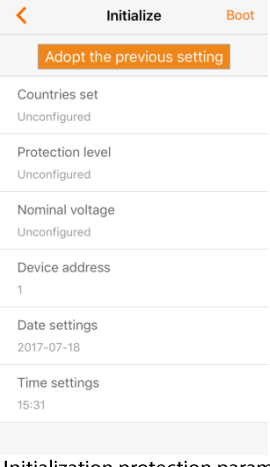


Fig. 10-5 Initialization protection parameter

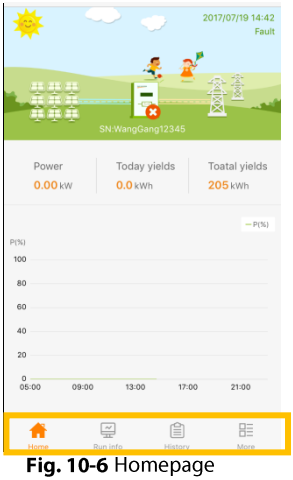
The system interface may be different for different types of users. If you login by "login without password", the app will not show the initialization protection parameter setting interface.

The regular user can only set the country, instructions (valid for certain countries) and protection stage. The country code stands for the protection parameter of corresponding location and has been set before delivery.

CAUTION

If the country code is not set correctly during commissioning, reset the protection parameters. There may be faults unless this is done.

If the inverter is initialized, the app automatically turns to its homepage as shown in Fig. 10-6 when the Bluetooth is connected.



Navigation bar

Fig. 10-6 Homepage

10.4 Homepage

Step 1 Click the "Home" icon from the navigation bar;

Step 2 The homepage with the power, power yields, and real-time alarm info will appear as shown in Fig. 10-7.

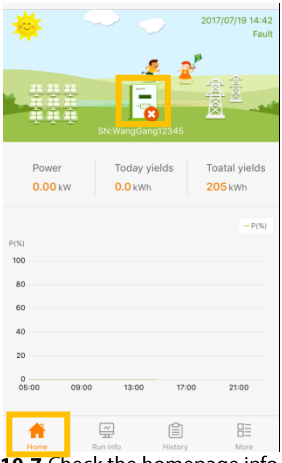


Fig. 10-7 Check the homepage info

> If a real-time alarm occurs in the inverter, there will be an alarm or fault icon appearing in the lower right corner of the inverter (circled by a box in the top of the interface). You can click this icon to get the detailed alarm or fault info.

10.5 Run Info

Step 1 Click the "Run Info" icon from the navigation bar.

Step 2 The run info includes the input, output, string, grid voltage, grid current, environment, and other info as shown in Fig. 10-8. You can swipe up and down to check the corresponding info.

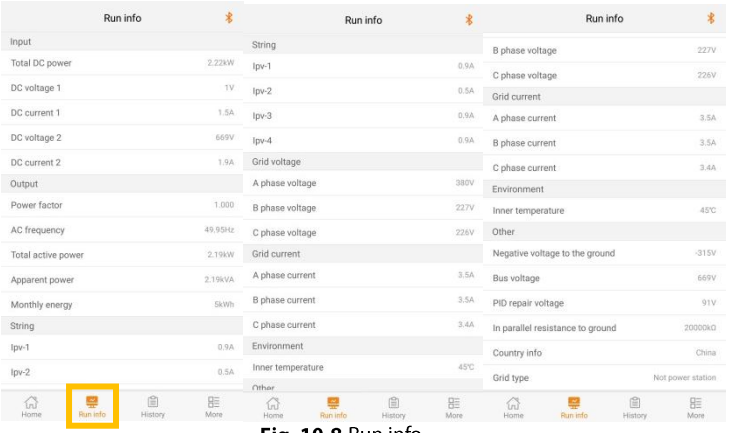


Fig. 10-8 Run info

Tab. 10-1 Description of Running Parameters

Parameter		Description
Input	Total DC power（KW）	the total PV input power
	PV voltage1(V)	the PV1 input voltage
	PV current1(A)	the PV1 input current
	PV voltage2(V)	the PV2 input voltage
	PV current2(A)	the PV2 input current
Output	Power factor	Inverter output power factor
	AC frequency（Hz）	Gird frequency
	Total active power（kW）	-
	Apparent power(kVA)	-
	Monthly generating capacity(kWh)	The energy generated in this month
String	Ipv-1	Current value of single string
	Ipv-2	
	Ipv-3	
	Ipv-4	
Grid voltage	A phase voltage（V）	Phase voltage
	B phase voltage（V）	
	C phase voltage（V）	
Grid current	A phase current（A）	Phase current
	B phase current（A）	

Parameter		Description
	C phase current (A)	
Environment	Inner temperature (℃)	Internal temperature of the inverter
Other	Negative voltage to the ground	DC bus negative voltage to ground
	Bus voltage	DC bus voltage
	In parallel resistance to ground (kΩ)	-
	Countries info	Inverter selected country code
	Command info	Inverter selected command information

10.6 History Record

Click the "History" icon from the navigation bar to view the history record interface as shown in Fig. 10-9. You can check the alarm records, power yield records and event records.

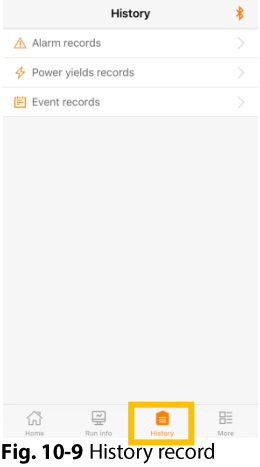


Fig. 10-9 History record

10.6.1 Fault Alarm Records

Step 1 Click the "Alarm Records" to check the alarm records as shown in Fig. 10-10.

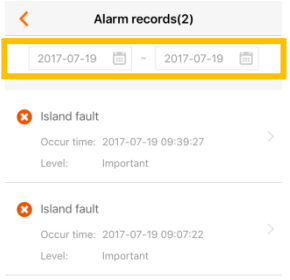


Fig. 10-10 Fault alarm records

> If you need to check the alarm records within a certain period of time, please click the time selection bar on the top of the interface to select a certain period of time. The inverter can at most, record the latest 100 fault alarm instances.

Step 2 Select one of the records in the list and click the record, to view the detailed fault info as shown in Fig.10-11.

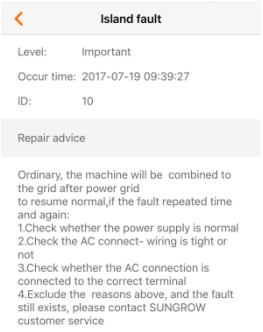


Fig. 10-11 Detailed fault alarm info

10.6.2 Power Yields Records

User can view various energy records: power curve, daily energy histogram, daily energy histogram, monthly energy histogram, and annual energy histogram.

Tab. 10-2 Explanation of power yields records

Parameter	Description
Power curve	Show the power output from 5 am to 11 pm in a single day. Each point in the curve is the percentage of present power and nominal power.
Daily energy histogram	Shows the power output every day in the present month.
Monthly energy histogram	Shows the power output every month in a year.
Annual energy histogram	Shows the power output every year.

Step 1 Click the "Power Yields Records" to view the power curve page as shown in Fig. 10-12.

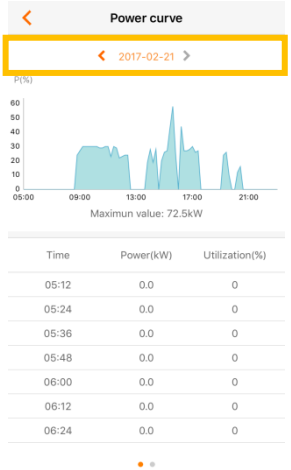


Fig. 10-12 Power curve

Step 2 Click the time selection bar on the top of the interface to check the power curve of a certain time.

Step 3 Swipe left to check the power yields histogram as shown in Fig. 10-13.

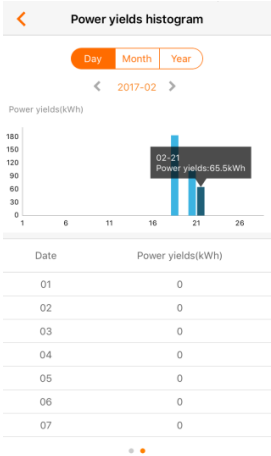


Fig. 10-13 power yields histogram

10.6.3 Event Records

Click the "Event records" to check the event record list as shown in Fig. 10-14.

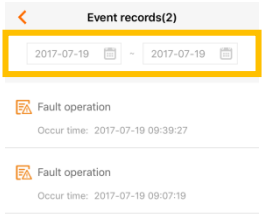


Fig. 10-14 Event records

If you need to check the event records within a certain period of time, please click the time selection bar on the top of the interface to select a certain period of time. The inverter can at most record the latest 100 events.

10.7 More

Click the "More" icon from the navigation bar to check more info as shown in Fig. 10-15. You can read and set the inverter parameters, download the logs and upgrade the firmware from the "More" interface.

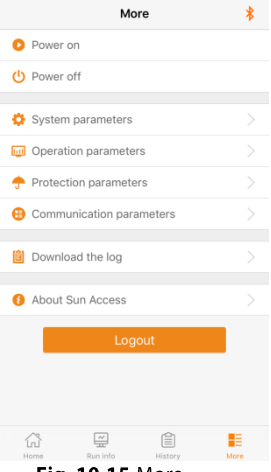


Fig. 10-15 More

10.7.1 Power On/Power Off

Click "Power on"/"Power off" and click "Confirm" in the dialog box popped out to start or stop the inverter as shown in Fig. 10-16.

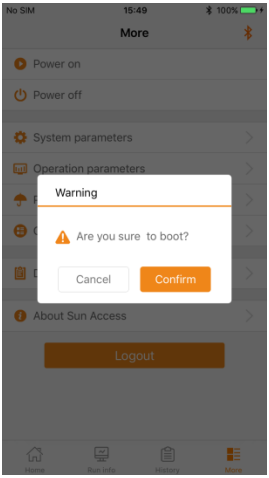


Fig. 10-16 Power on

10.7.2 System Parameters

Click the "System parameters" to check the system parameter info and set the related parameters as shown in Fig. 10-17.

Fig. 10-17 System parameter

Tab. 10-3 Explanation of system parameters

Parameter	Description
Date Setting	Time deviation between the time on the inverter and the local time of the installation site may cause data logging failure. Please adjust inverter time according to the local time.
Time Setting	
Total power yields compensation	If the accumulative value "E-total" in the inverter is different from the value in the external metering device, you should adjust energy by "Total power yields compensation" setting.
Reset to Factory Defaults	All history information will be unrecoverable cleared and all parameters will return to the default value except the protective parameters and time once the "Reset to Factory Defaults" operation is performed.
Device restart	Restart the device.
Device information	You can check: Device type, Serial number, and Firmware version

10.7.3 Operation Parameters

Click the "Operation parameters" to check the operation parameters and set the related parameters as shown in Fig. 10-18.

The operation parameters include the active & reactive power parameters.

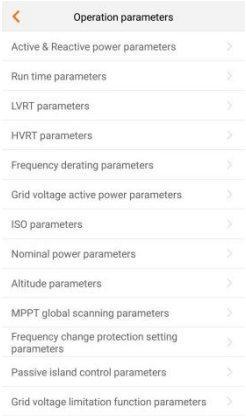


Fig. 10-18 Operation parameters

- Active & reactive power parameters

Fig. 10-19 Active & reactive power parameters

Tab. 10-4 Description of Active & reactive power parameters

Parameter	Description	Default	Range
Active power limit	Inverter active power limitation	110.0%	0-110.0%
Reactive power limit	Inverter reactive power limitation	0.0%	-
Active set up permanent	Set whether to permanently save active settings.	[OFF]	[ON]/ [OFF]
Reactive set up permanent	Set whether to permanently save reactive settings.	[ON]	[ON]/ [OFF]

10.7.4 Protection Parameters

Click the "Protection parameter" to check the protection parameter and set the related parameters as shown in Fig. 10-20.

User can only check the parameter in this interface. The default values of the protection parameters have been preset as per grid code of corresponding countries.
To set the protection parameter, please contact Sungrow to acquire advanced password.

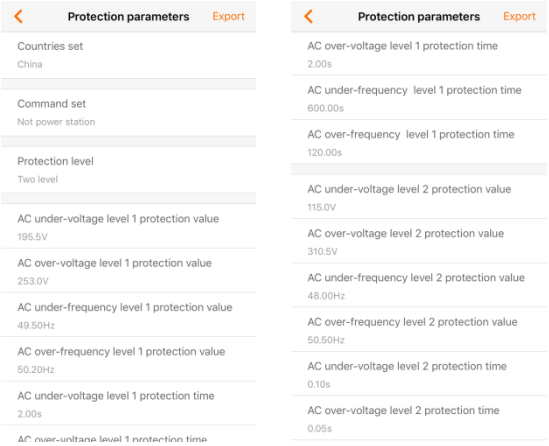


Fig. 10-20 Protection parameter

For convenient protection parameter setting, the protection parameters are preset for certain countries. After country setting, select the protection stage as single or multiple and then set the corresponding protection parameter.

Tab. 10-5 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. 10-6 Multi-stage Protection Parameters Explanation

Parameter	Default	Range
AC under-voltage level 1 protection value	195.5V	23V-230V
AC over-voltage level 1 protection value	253.0V	220V-322V
AC under-frequency level 1 protection value	49.50Hz	45Hz-49.89Hz
AC over-frequency level 1 protection value	50.20Hz	50.11Hz-55Hz
AC under-voltage level 1 protection time	2.00s	0-600s
AC over-voltage level 1 protection time	2.00s	0-600s

Parameter	Default	Range
AC under-frequency level 1 protection time	600s	0-600s
AC over-frequency level 1 protection time	120s	0-600s
AC under-voltage level 2 protection value	115.0V	23V-230V
AC over-voltage level 2 protection value	310.5V	220V-322V
AC under-frequency level 2 protection value	48.00Hz	45Hz -49.89Hz
AC over-frequency level 2 protection value	50.50Hz	50.11Hz -55Hz
AC under-voltage level 2 protection time	0.10s	0-600s
AC over-voltage level 2 protection time	0.05s	0-600s
AC under-frequency level 2 protection time	0.20s	0-600s
AC over-frequency level 2 protection time	0.20s	0-600s

Proceed to set the protection recovery value after setting the single-stage/multi-stage protection stage.

Tab. 10-7 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

10.7.5 Communication Parameters

Click the “Communication parameters” to check the communication parameters and set the related parameters as shown in Fig. 10-21.

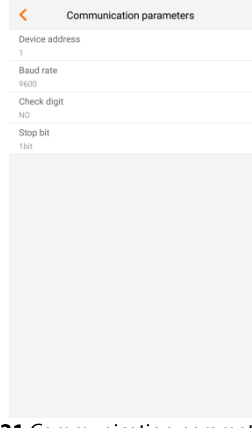


Fig. 10-21 Communication parameters

Tab. 10-8 Explanation of communication parameters

Parameter	Description
Device address	Range: 1-247

10.7.6 Download the Log

Click the "Download the log" to check the log download interface and download the logs as shown in Fig. 10-22.

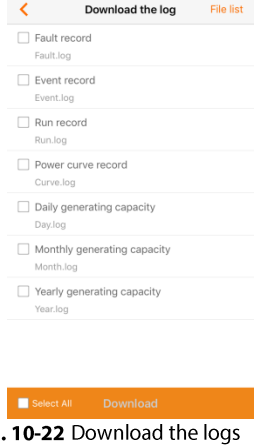


Fig. 10-22 Download the logs

10.7.7 About Sun Access

Click the "About Sun Access" to check the about interface as shown in Fig. 10-23.

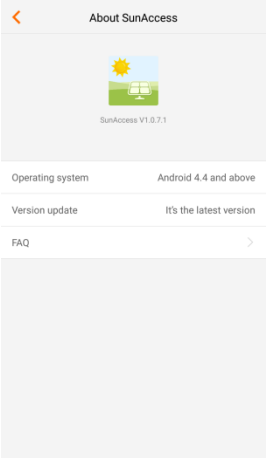


Fig. 10-23 About Sun Access

11 Appendix

11.1 Technical Data

Parameters	SG15KTL-M	SG17KTL-M	SG20KTL-M
Input Side Data			
Max. PV input voltage	1000V		
MPP voltage range	200~1000V		
MPP voltage range for nominal power	380~850 V	410~850 V	480~850 V
No. of MPPT(s)	2		
Max. PV input current	44A(22A / 22 A)		
Max. input current for input connector	15A		
Max. Short-circuit input current of PV	60A(30A / 30A)		
Max. inverter backfeed current to the array	0A		
Output Side Data			
Nominal AC output power	15000 W	17000 W	20000 W
Max. AC output apparent power	16500 VA	18700 VA	22000 VA
Max. AC output current	24.0 A	27.2 A	31.9 A
Nominal AC voltage	3 / N / PE, 230 / 400 V		
AC voltage range	270 - 480Vac		
AC connected Inrush current(Peak/Duration)	0A		
Nominal grid frequency	50Hz/60Hz		
Grid frequency range	45 - 55Hz/ 55 - 65Hz		
THD	< 3% (at nominal power)		
DC current injection	<0.5%In		
Power factor	>0.99 default value at nominal power (adj. 0.8 overexcited...0.8 underexcited)		
Protection			
DC reverse connection protection	Yes		
AC short circuit protection	Yes		
Leakage current protection	Yes		

Parameters	SG15KTL-M SG17KTL-M SG20KTL-M
Grid monitoring	Yes
PV string current monitoring	Yes
DC switch	Yes
DC fuse	No
Overvoltage protection	DC surge protection (typeⅡ), AC surge protection (type Ⅱ)
System data	
Max. efficiency	98.60%
Euro. efficiency	98.30%
Isolation method	Transformerless
Degree of Protection	IP65
Protective Class	Ⅰ
Night power consumption	<1W
Operating ambient temperature range	-25℃ to + 60℃ (>45℃ derating)
Allowable relative humidity range	0 - 100%(No condensation)
Cooling concept	Smart forced air cooling
Max. operating altitude	4000m (>2000m derating)
Display	LED indicator panel，Bluetooth+APP
Communication	RS485,GPRS(optional),WiFi(optional),E-net(optional)
DC terminal	MC4 (Max. 6 mm^2)
AC terminal	Plug and play connector (Max. 16 mm^2)
Certification	EN62109-1，EN62109-2，IEC 61727，IEC 62116，VDE0126-1-1/4105，NB/T32004-2013
Mechanical Data	
Dimensions (W×H×D)	370×485×210mm
Mounting method	Wall bracket
Weight	24kg

11.2 Exclusion of Liability

The content of these documents is periodically checked and revised where necessary. Please call us or check our website www.sungrowpower.com for the latest information. No guarantee is made for the completeness of these documents. Please contact our company or distributors for the latest version.

Guarantee or liability claims for damages of any kind are excluded if they are caused

- Improper or inappropriate use or install of the product

- Install or operate the product in unintended environment
- Install or operate the product without observing relevant safety regulations in the deployment location
- Ignore the safety warnings or instructions contained in all documents relevant to the product
- Install or operate the product under incorrect safety or protection conditions
- Alter the product or supplied software without authority
- Product malfunctions due to operation attached or neighboring devices running out of the allowed limit values
- Unforeseen calamity or force majeure
- The use of supplied software produced by Sungrow Power Supply Co., Ltd.. is subject to the following conditions:
- Decompiling, decoding or destroying the original program is prohibited.

11.3 About Us

Sungrow power supply is a Chinese leading manufacturer of various power electronics products for renewable energy generation systems. Our products include converters, inverters, battery chargers and other power supplies for distributable generation systems in both grid-connected and stand-alone applications. The power rating of SUNGROW products covers a range from several hundred watts to large mega-watt systems.

The pursuit of SUNGROW is to help our customers acquire stable and clean power with minimum cost, maximum reliability and enhanced safety.

11.4 Contact Information

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

Company:	Sungrow Power Supply Co., Ltd.
Website:	www.sungrowpower.com
Email:	info@sungrow.cn, service@sungrow.cn
Address:	No.1699 Xiyou Rd., New & High Technology Industrial Development Zone, Hefei, P. R. China.
Zip:	230088
Telephone:	+86 551 6532 7834, +86 551 6532 7845

SUNGROW

Clean power for all

Sungrow Power Supply Co., Ltd.

Add: No.1699 Xiyou Rd.,New & High Technology Industrial Development Zone, 230088,Hefei, P. R. China.
Post Zip: 230088
Web: www.sungrowpower.com
E-mail: info@sungrow.cn

Tel: +86 551 6532 7834/6532 7845
Fax: +86 551 6532 7856

Specifications are subject to changes without advance notice.