SUNGROW

User Manual

SG5KTL-MT
SG6KTL-MT
SG8KTL-M
SG10KTL-M
SG12KTL-M
PV Grid-connected Inverter

SG5_6KTL-MT&SG8_10_12KTL-M-UEN-Ver12 Version: 1.2

About This Manual

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

- SG5KTL-MT
- SG6KTL-MT
- SG8KTL-M
- SG10KTL-M
- SG12KTL-M

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 technical personnel who need to install, operate and maintain the inverter, and the end users who perform daily operations via the App, SunAccess.

How to Use This Manual

The documents must be kept in a convenient place and must be accessible at all times.

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

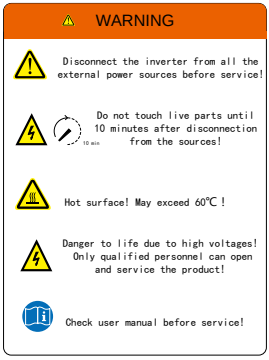
CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

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

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 belonging 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.

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 connections.**

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 Usage

SG5KTL-MT/SG6KTL-MT/SG8KTL-M/SG10KTL-M/SG12KTL-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.

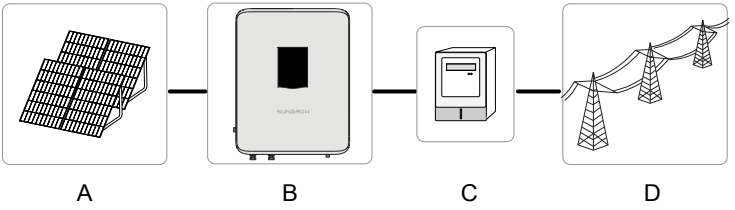
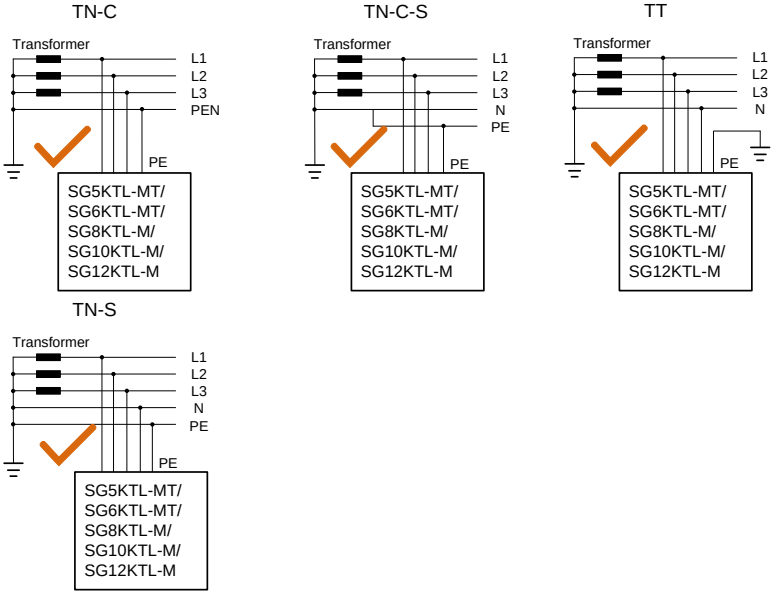


Fig. 2-1 Inverter application in PV power system

Item	Description	Note
A	PV strings	Monocrystalline silicon; polycrystalline silicon and thin-film without grounding
B	Inverter	SG5KTL-MT/SG6KTL-MT/SG8KTL-M/SG10KTL-M/SG12KTL-M
C	Metering device	meter cupboard with power distribution system
D	Utility grid	TN-C，TN-C-S，TT，TN-S

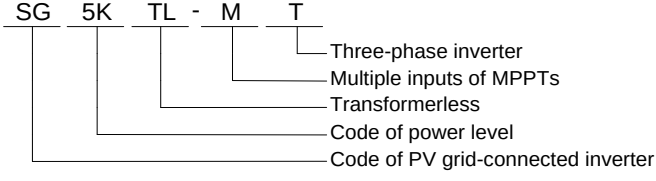
The following figure shows the common grid configurations.



2.2 Product Introduction

2.2.1 Model Description

The model description is as follows (Take SG5KTL-MT as an example):



Tab. 2-1 Power description

Model	Nominal output power	Nominal grid voltage
SG5KTL-MT	5000W	3 / N / PE, 230 / 400 V
SG6KTL-MT	6000W	
SG8KTL-M	8000W	
SG10KTL-M	10000W	
SG12KTL-M	12000W	

2.2.2 Appearance

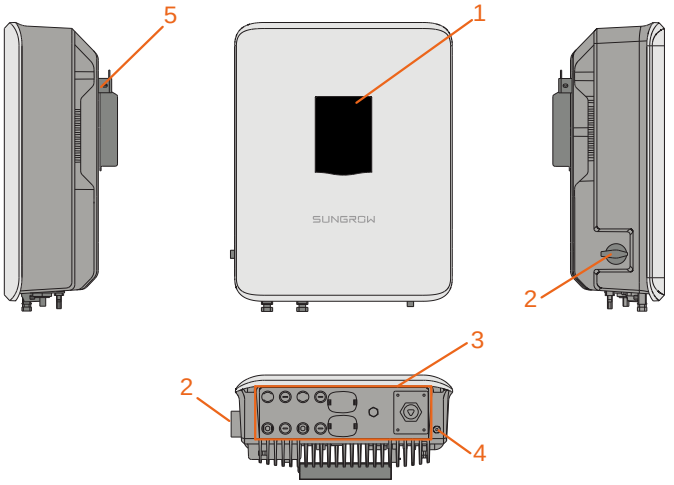


Fig. 2-2 Appearance

*Pictures are indicative only, and the actual product 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 backplate.

2.2.3 Dimensions

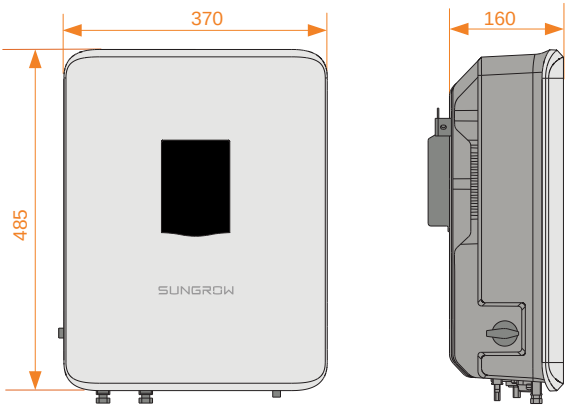


Fig. 2-3 Dimensions of the inverter (in mm)

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.

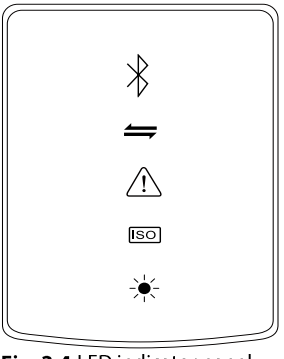


Fig. 2-4 LED indicator panel

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

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

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 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 SunAccess APP.

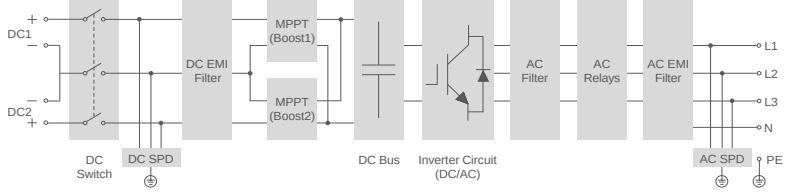


Fig. 2-5 Circuit diagram

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 stores the running information, fault records, etc.

- Parameter Setting

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

- Communication Interface

  Standard RS485 port

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

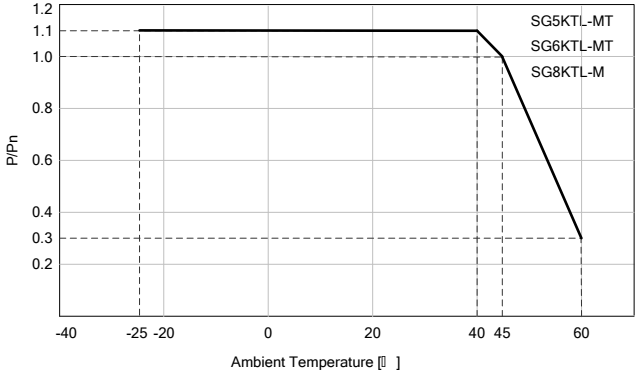
Power Limit Setting

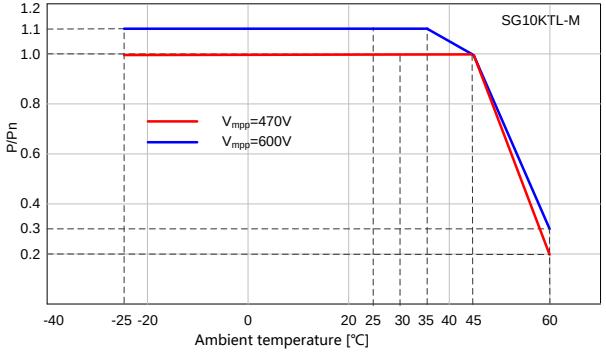
Inverter output power can be adjusted via the APP interface or remote grid dispatch from the grid company.

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.





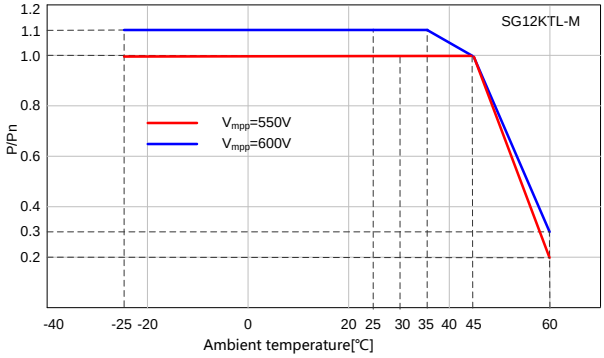


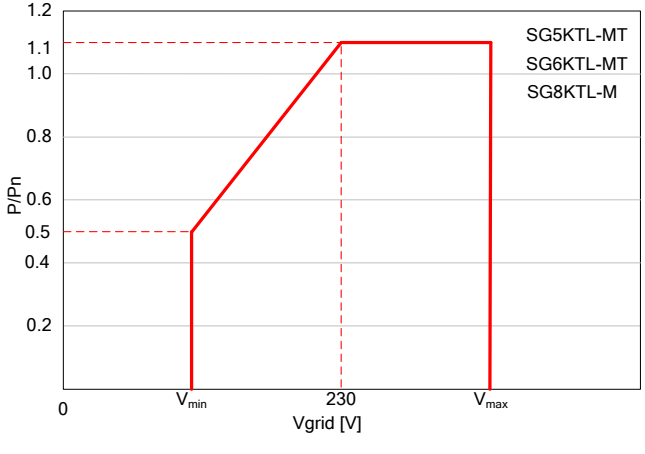
Fig. 2-6 Over-temperature Derating(Pf=1)

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



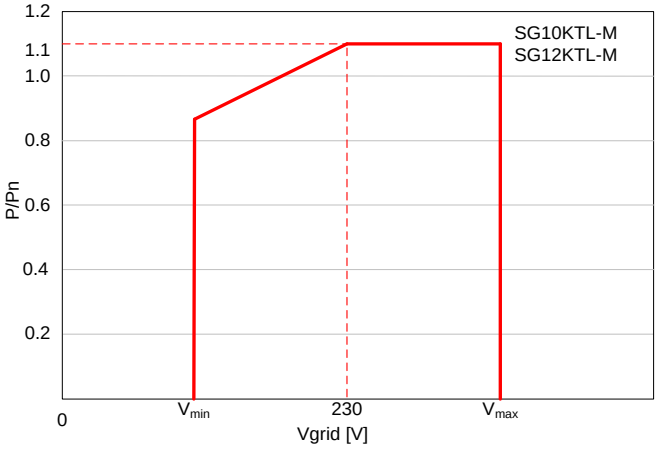
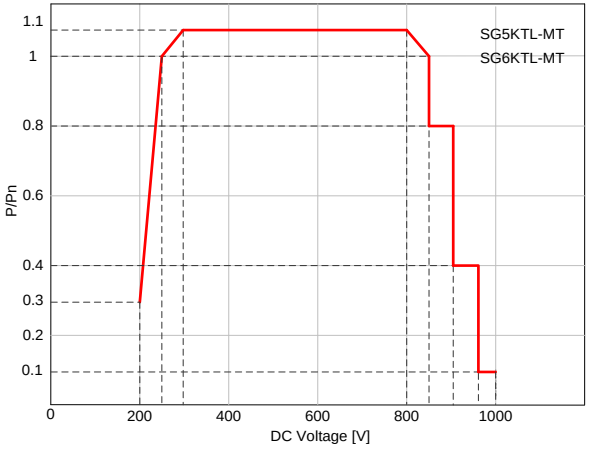


Fig. 2-7 Grid under-voltage derating(Pf=1)

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.



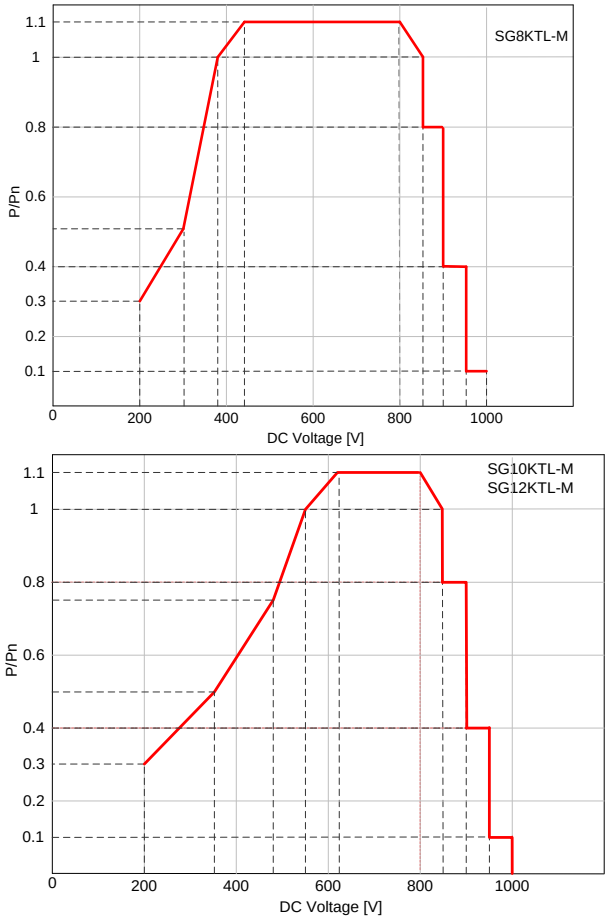


Fig. 2-8 Input voltage and the power derating(Pf=1)

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

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

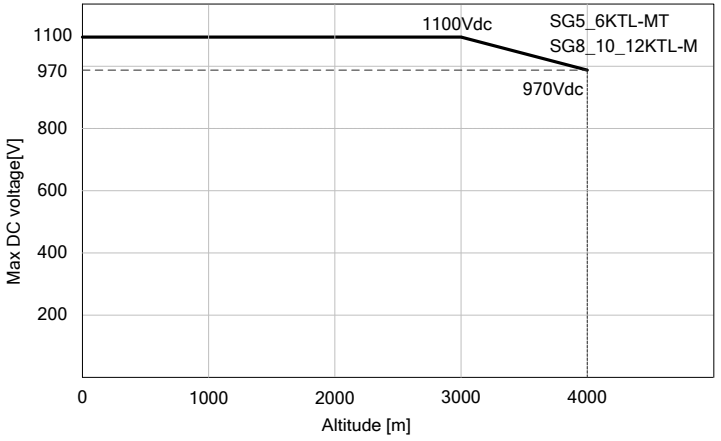
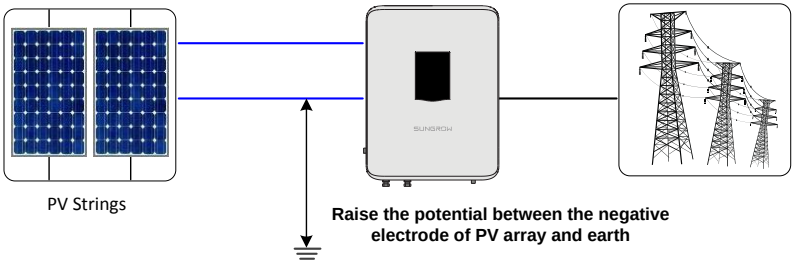


Fig. 2-9 High altitude derating

2.3.4 PID Recovery Function

This inverter provides PID recovery function, and achieves 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 22 pm and 5 am.
- If the PID 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 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.

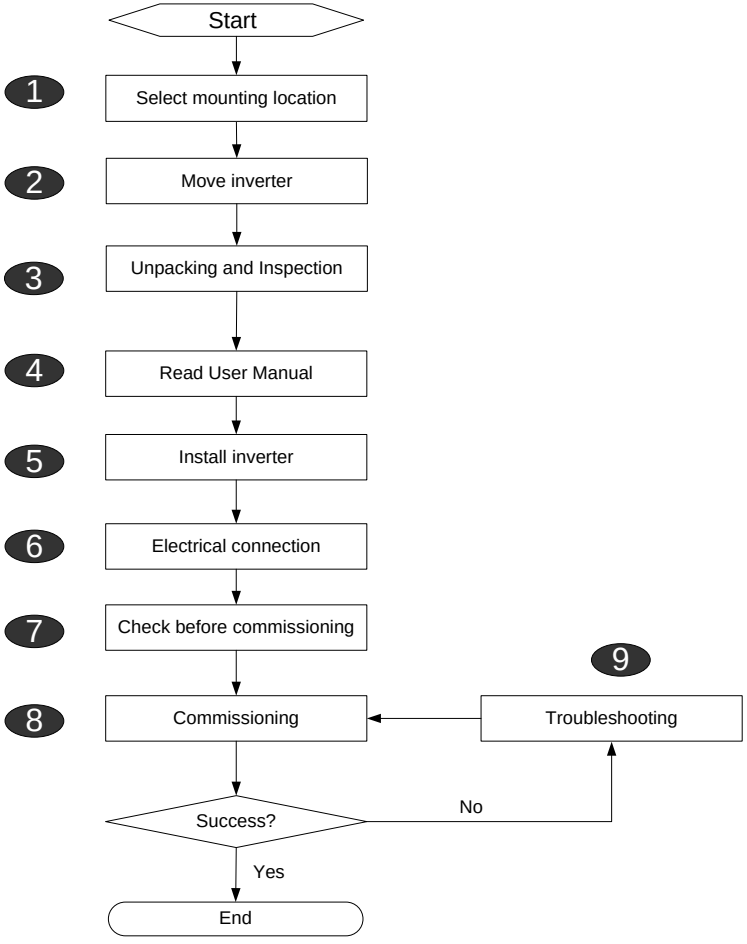


Fig. 3-1 Installation flow

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

Despite being strictly tested and checked, damage may still occur to the inverter during shipping. Therefore, thoroughly inspect the device upon receiving.

- Check the packing for any visible damage upon receiving.
- Check the scope of delivery for completeness 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 recommended to keep the inverter in its original packaging.

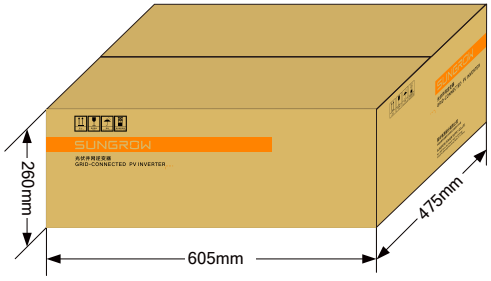
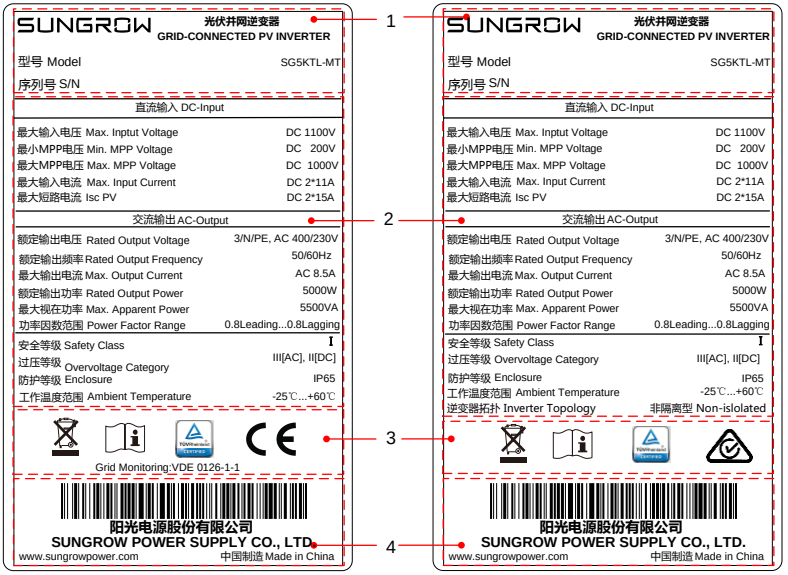


Fig. 4-1 Inverter paper packaging

4.2 Identifying 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 SG5KTL-MT 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 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.
	TÜV mark of conformity. The inverter is in compliance with directives of TÜV.
	CE mark of conformity. The inverter is in compliance with directives of CE.
	C-tick mark of conformity. The inverter is in compliance with directives of C-tick.

4.3 Scope of Delivery

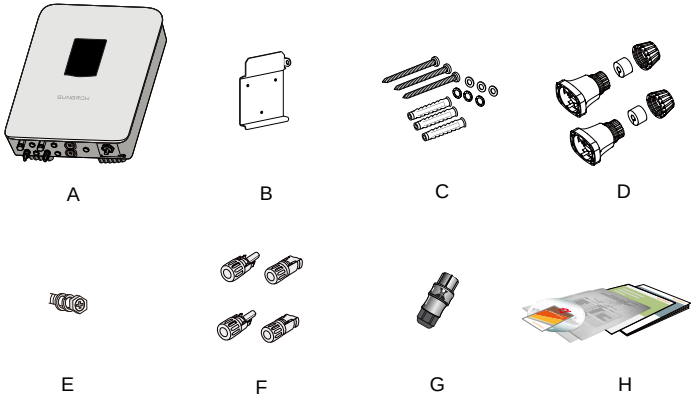


Fig. 4-3 Scope of delivery

Item	Name	Quantity	Description
A	Inverter	1 set	---
B	Backplane	1 pcs	Used to connect the inverter to the installation site.
C	Nylon bolts	3 sets	Used to fasten backplane onto concrete wall
D	Communication connectors	2 sets	Used to connect communication terminal. (one set is optional)
E	Screw	1 pcs	Used to lock the inverter mounting ears and hanging boards.
F	PV input connectors	2 pairs	Including positive and negative connectors, used to connect PV input.
G	AC output connectors	1 pcs	Used to connect AC output.
H	Documents	1 set	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 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℃ to 70℃ (-40°F -158°F), and relative humidity: 0~95%.
- Stack the inverters for at most five layers. 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 has been stored more than half a year, the qualified persons should thoroughly check and test it before using.

5 Mechanical Installation

DANGER

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

CAUTION

System performance loss due to poor ventilation!

Ensure that the device 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!

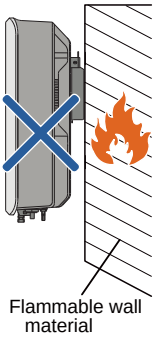
- **Always follow the instructions in the manual when moving and positioning the inverter.**
- **Injuries, serious wounds, or bruises may occur if the device is improperly handled.**

5.1 Installation Site Selection

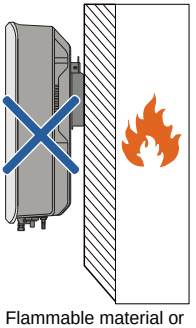
Select an optimal installation site for safe operation, long service life, and outstanding performance.

- 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 place convenient for electrical connection, operation, and maintenance.

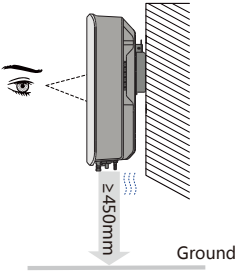
- Do not install the inverter on the wall made up of flammable materials.



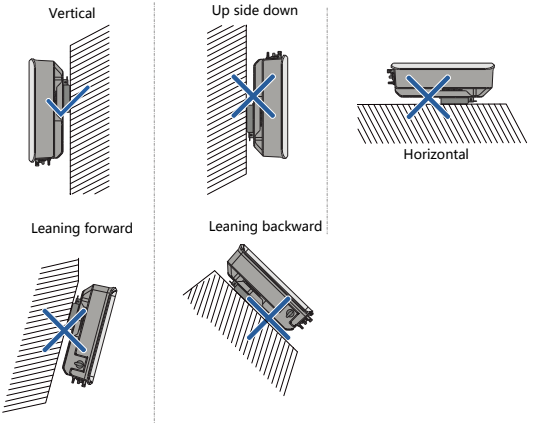
- Do not install the inverter in a place near flammable materials.



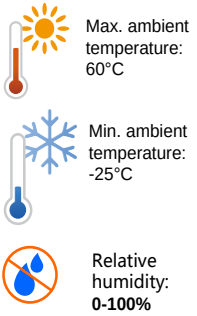
- Place the inverter at eye level for easy viewing and operation. For proper ventilation of the inverter, the lowest place of the inverter shall be no less than 450mm above the ground.



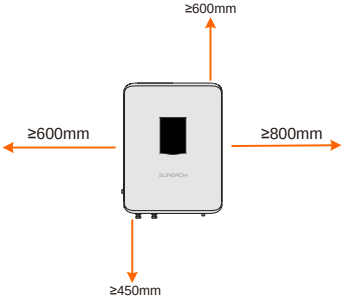
- Do not install the inverter upside down, leaning forward or horizontal installation.



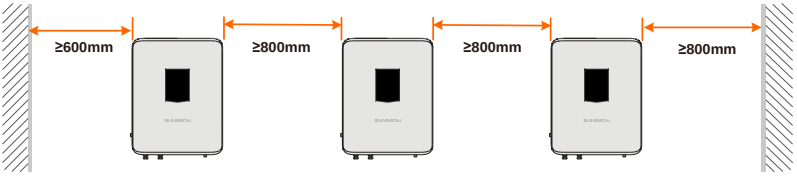
- With an IP65 protection rating, the inverter can be installed both outdoors and indoors.
- The ambient temperature should be within -25℃ to 60℃. The inverter will operate with power derating if the temperature is too high.
- The relative humidity range of the installation site is 0~100%.



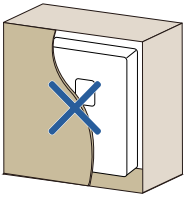
- Avoid exposing the inverter to direct sunlight, rain or snow to extend its service life despite of IP65 rating. Shaded site of the building would be better.
- Ensure there is enough space for convection



- 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 in a place 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.



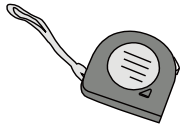
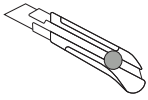
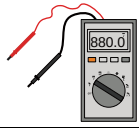
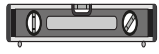
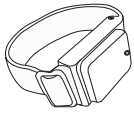
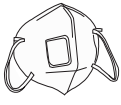
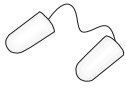
5.2 Moving Inverter to Installation Site

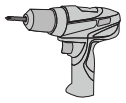
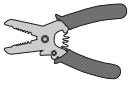
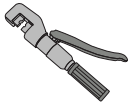
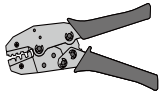
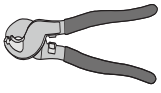
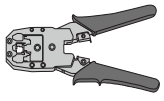
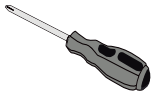
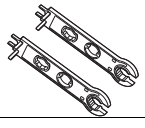
To install the inverter, remove the inverter from the packaging and move it to the installation site. Follow the instructions below as you move the inverter:

- Always be aware of the weight of the inverter.
- Lift the inverter by grasping the handles on both sides of the inverter.
- 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	Packaging tape 	Marker 	Measuring tape 
	Utility knife 	Multimeter Measurement range: ≥1100Vdc 	Level 
	Protective clothing 	Wrist strap 	Protective gloves 
	Dust mask 	Earplugs 	Goggles 
	Insulated shoes 	Vacuum cleaner 	-

Type	Tool		
Installation tools	Hammer drill Drill bit: φ10 	Rubber mallet 	Electric screwdriver Tool bit: M5 
	Wire stripper 	Hydraulic plier 	Wire crimper Crimping range: 2.5-6mm^2 
	Wire clipper 	RJ11 crimping tool 	Phillips screwdriver Specification: M4 
	Wrench for MC4 terminal 	-	-

5.4 Installing the Inverter

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

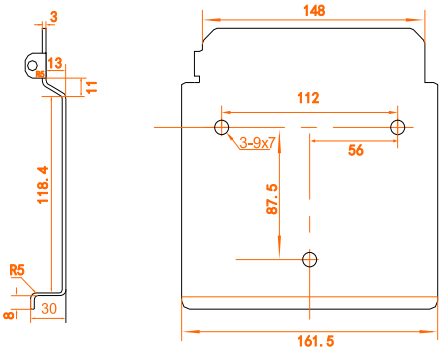


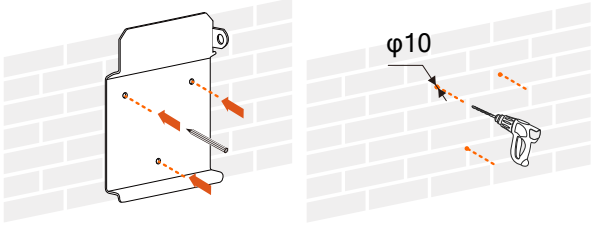
Fig. 5-1 Dimensions of the backplane (figures in mm)

Installing to Concrete Wall

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

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

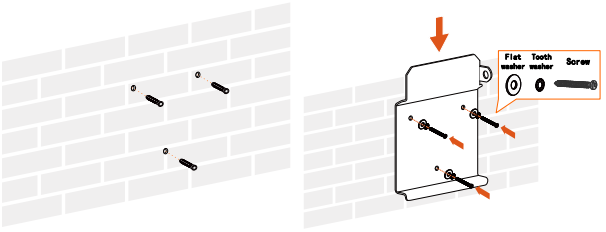
Step 3 Mark the position for holes, drilling according to the hole positions of the backplane. Drill holes according to the marks made before.



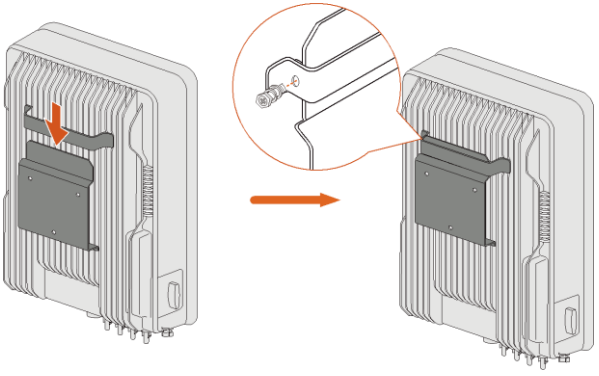
DANGER

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

Step 4 Secure the backplane to the wall firmly by the supplied expansion bolt sets.



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



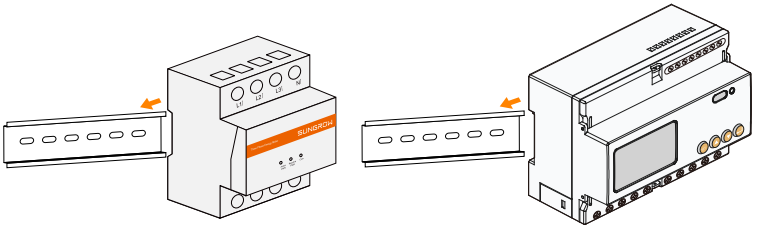
5.5 Connecting the Communication Module (Optional)

Connect the GPRS, WiFi, or E-Net communication module 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.



T65 Energy Meter DTSD1352-C Meter

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 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.

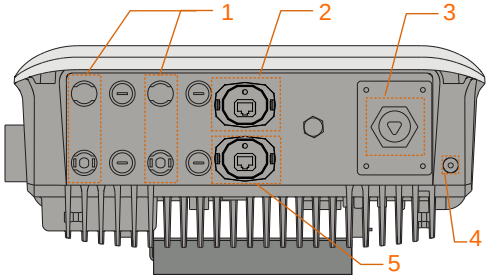


Fig. 6-1 Cable connection area

*Pictures are indicative only, and the actual product may differ.

No.	Name	Description
1	DC input plug-in terminal	MC4 terminals for PV input.
2	Communication accessory port	Can be connected to GPRS, WiFi, or E-Net communication module
3	AC cable gland	AC terminals to the power grid.
4	PE terminal	A second PE terminal
5	RS485 communication port (optional)	-

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

6.2 Grounding the Inverter

6.2.1 Grounding System Overview

In this PV system, all current-free 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.

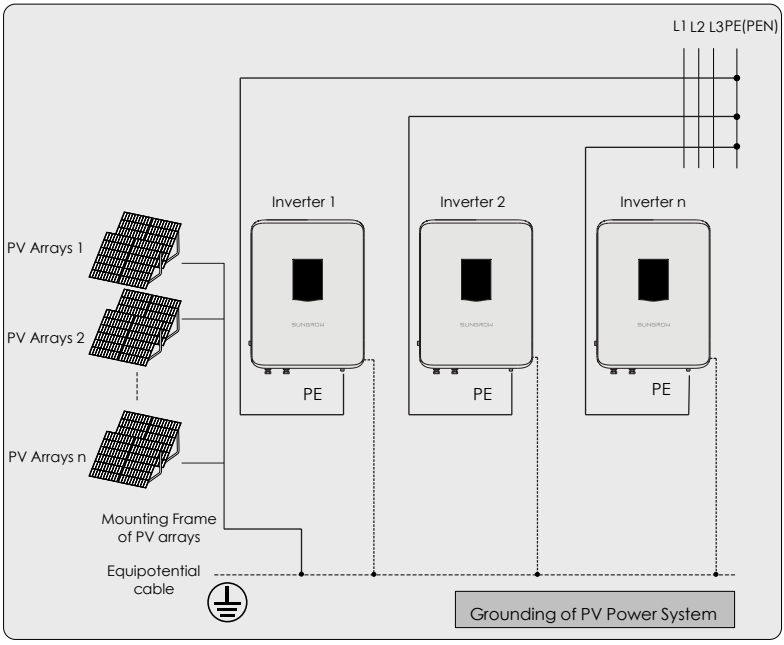


Fig. 6-2 Grounding of inverter

6.2.2 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 by torque of 1.5N•m,

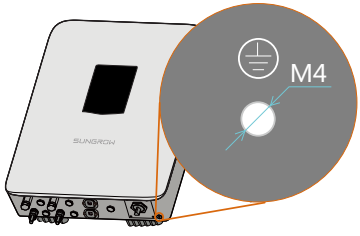


Fig. 6-3 Second PE terminal

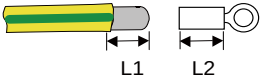
WARNING

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 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.

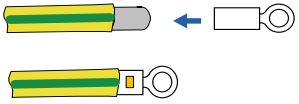
Cable Connection

Step 1 Strip a certain length off the insulation of the secondary protective grounding cable. The length depends on the specification of the OT terminal, as shown in the figure.

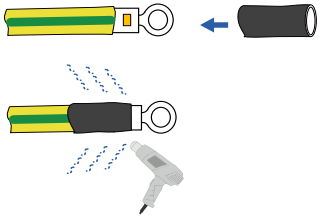


L1=L2+(2~3mm)

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 Fasten the secondary protective grounding cable with the M4 screwdriver, as shown in the figure below.

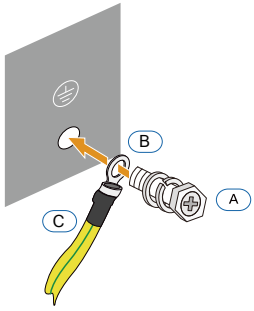


Fig. 6-4 Second PE connection

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.

6.3 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
SG5KTL-MT	16A
SG6KTL-MT	
SG8KTL-M	20A
SG10KTL-M	32A
SG12KTL-M	

NOTICE

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

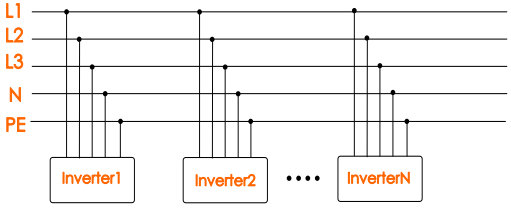
Residual Current Device

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.



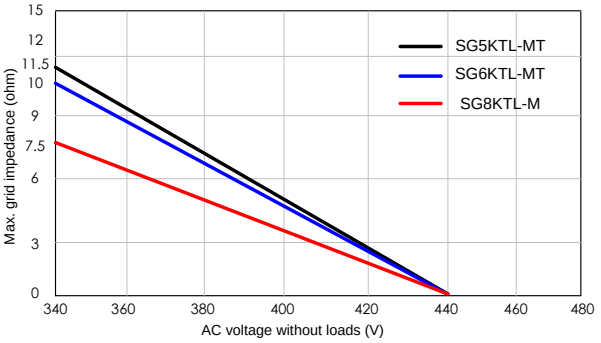
6.3.2 Grid Connection

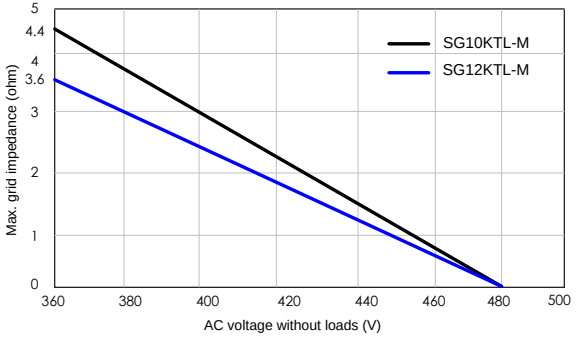
The AC terminal block is on the bottom of the inverter. AC connection is the 3-phase-4-wire grid + PE connection (L1, L2, L3, N, and PE).

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.

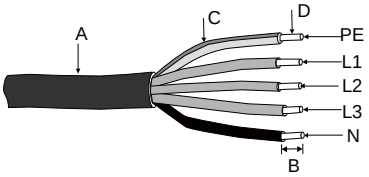
Do not connect the AC circuit breaker until all inverter electrical connections are completed.

AC cables Procedure

Step 1 Loosen all screws on the AC terminal lid and remove the lid.

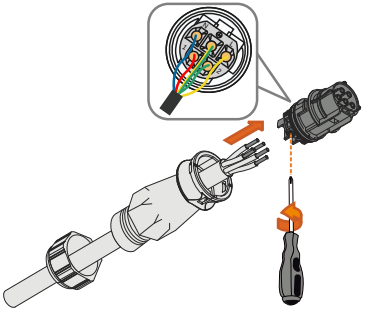
Step 2 Lead the AC cable through the Thread-Lock Sealing Nut, and the cable gland.

Step 3 Strip off insulation layer of all AC cables. The length of strip insulation is approximate 18mm.



No.	Description	Remark
A	Protective layer	Accepted cable external diameter ranges from 10mm to 14mm.
B	Length of insulation to be stripped off	18mm
C	Insulation layer	-
D	Cross-section Area Range	Ranges: 4~6 mm^2; Recommended: 6mm^2

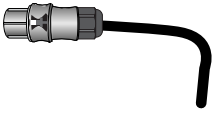
Step 4 Fix all cables to the corresponding terminals by torque of 2.0-2.5N·m, according to markings on the connector with a screwdriver, especially the "PE" cable.



Step 5 Pull cables outward to check whether they are firmly installed.

Step 6 Connect the front and the back parts until there is an audible crack.

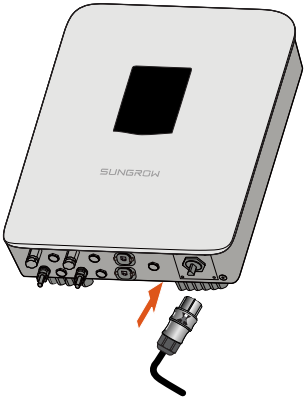
Step 7 Screw the water-proof terminal to the opposite direction.



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.

6.4 Connecting the 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.

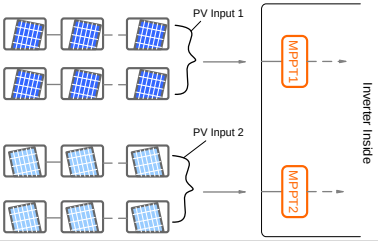
NOTICE

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
SG5KTL-MT	1100 V	15A
SG6KTL-MT		
SG8KTL-M		
SG10KTL-M		
SG12KTL-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	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℃)]=1079.2V<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 to 9mm	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

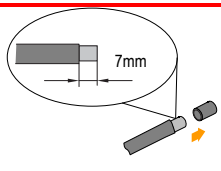
DANGER

High voltage inside the inverter!

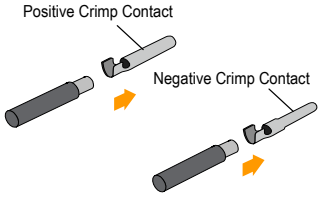
Make sure all DC and AC cables connected to the inverter are voltage-free before electrical connection.

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

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



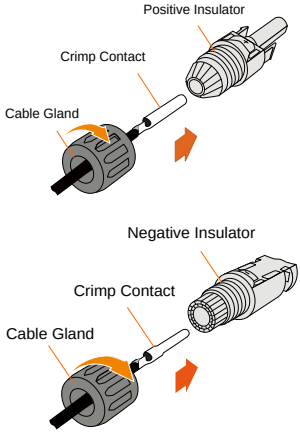
Step 2 Assemble cable ends with crimp contacts by crimping pliers.



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.



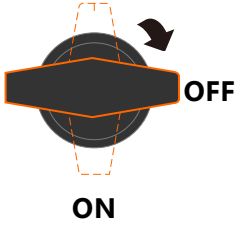
For further assembly and connection instruction, please visit the webpage of the device manufacturer.

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

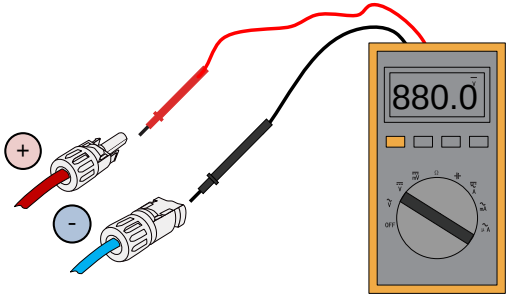
NOTICE

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

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



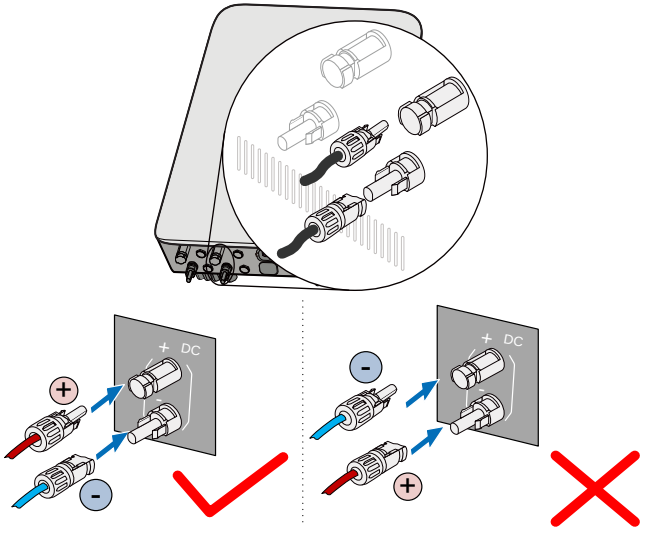
Step 8 Check the connection cable of PV string for the correct polarity and that the open-circuit voltage does not exceed the inverter input limit 1100V, even under the lowest operating temperature.



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.

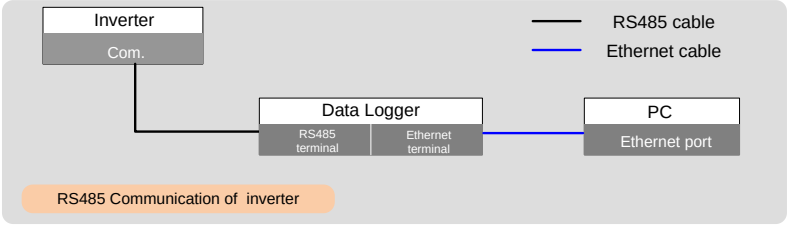


Step 10 Connect other PV strings following the above-mentioned procedures.

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.

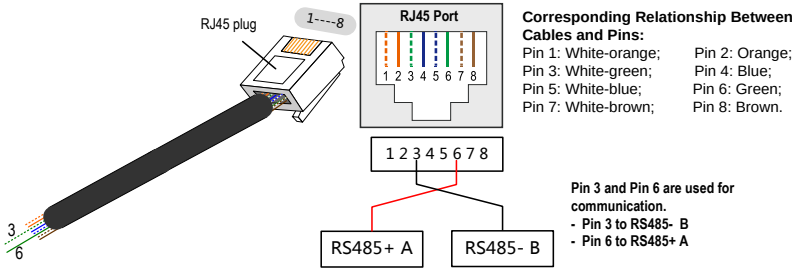
The RS485 communication port is configured to connect energy meters, for which refer to the section "6.8 Meter Connection (optional)". In addition, the port can be used for communications between inverters connected in the daisy chain manner.

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.

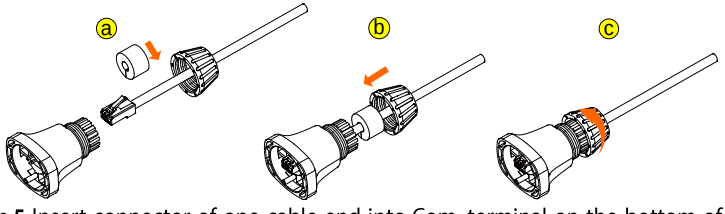
Step 2 Pin 3 white and green cable is used as RS485- B; and pin 6 green cable is used as RS485+ A.



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

Step 4 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 5 Insert connector of one cable end into Com. terminal on the bottom of the inverter. Make connector and Com. terminal engage and rotate clockwise.

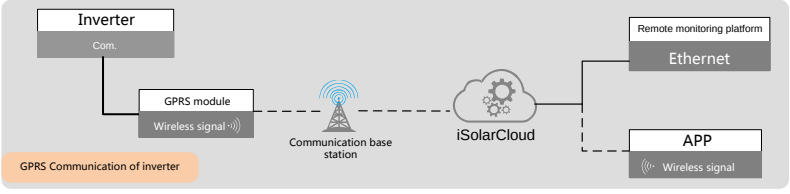
Step 6 Pull cables outwards to confirm whether they are fastened firmly.

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

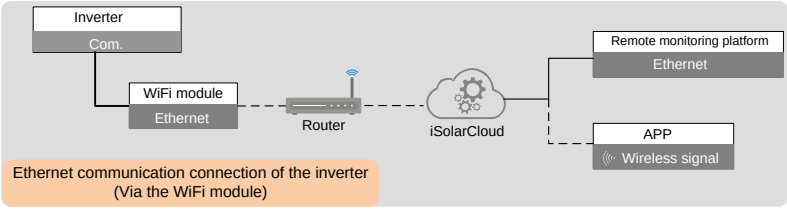
The GPRS communication and the RS485 communication are not available at the same time. Otherwise, communication failure or other problems can be caused.

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

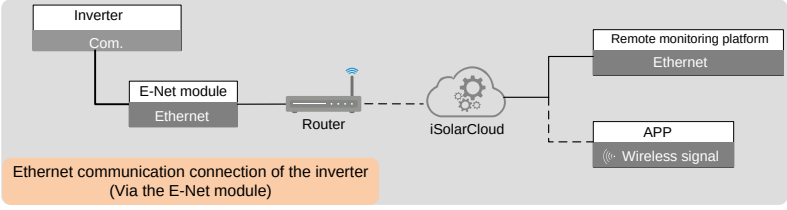
6.7 Ethernet Communication System (optional)

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.

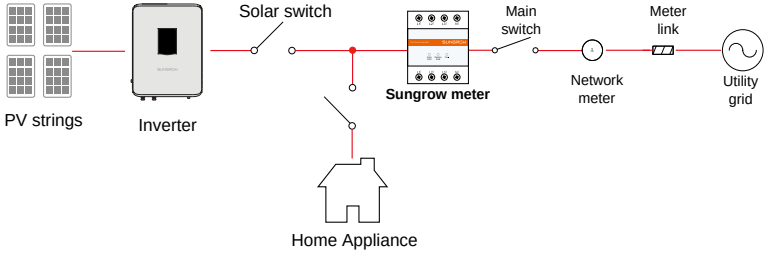
6.8 Meter Connection (optional)

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 "10.7.6 Feed-in Limitation".

The inverter can connect to two types of energy meters: T65 and DTSD1352-C. In case the phase current at the grid-connected point is ≤ 65A (for example, home load), T65 energy meter is recommended; and if the phase current is > 65A (for example, industrial and commercial load), DTSD1352-C energy meter is recommended.

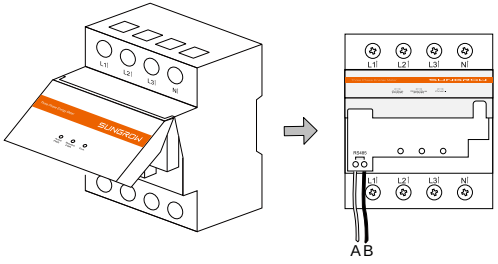
6.8.1 On the Meter Side

Connecting T65 energy meter

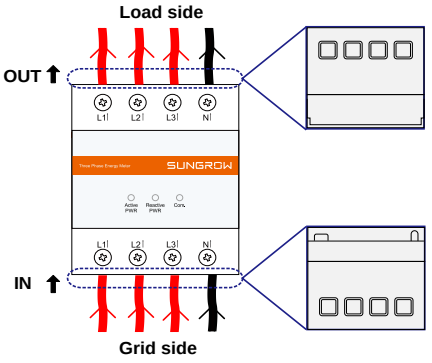


Step 1 Take out the RS485 cable from the meter's packaging.

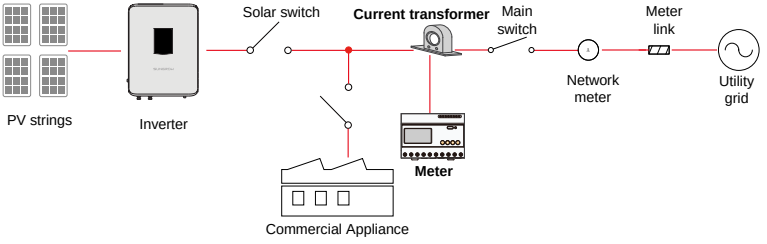
Step 2 Connect the plugs A and B to terminals A and B on the Energy Meter.



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



Prepare the communication cable and three appropriate current transformers before connecting the energy meter.

The measurement range (primary current) of the current transformer is selected according to actual current at the grid-connected point, and the measurement range (secondary current) of the current transformer is 5A.

NOTICE

RS485 communication cables should be:

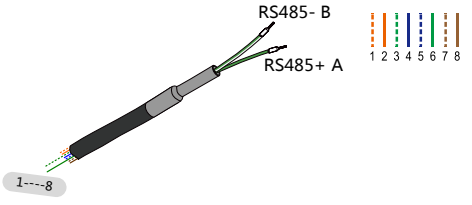
- **Shielded cables or Shielded Ethernet cables.**
- **Applicable to outdoor installation.**

Step 1 Disconnect the connection point from voltage sources and secure it against reconnection.

Step 2 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 3 and signal cable 6, and crimp them with a crimper. Cut off the redundant signal cable and warp it with a heat-shrink tubing.

Step 3 Signal cable 3 white and green cable is used as RS485- B; and signal cable 6 green cable is used as RS485+ A.

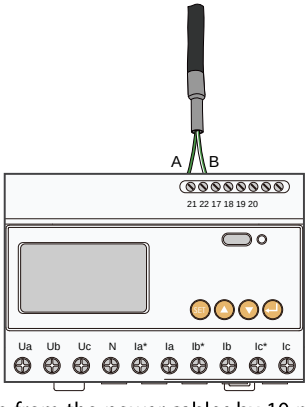


Corresponding Relationship Between Cables and Color:

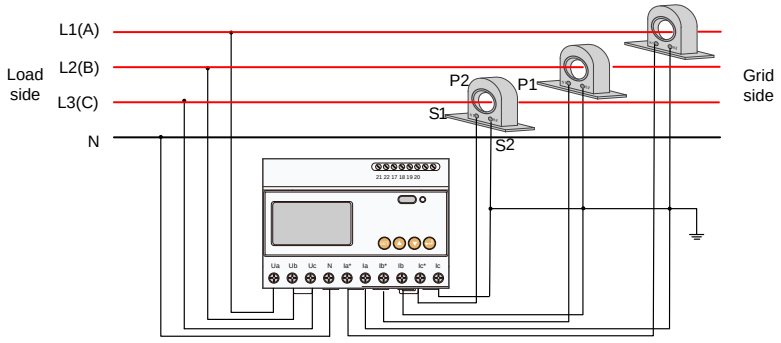
Cable 1: White-orange;	Cable 2: Orange;
Cable 3: White-green;	Cable 4: Blue;
Cable 5: White-blue;	Cable 6: Green;
Cable 7: White-brown;	Cable 8: Brown.

Cable 3 and Cable 6 are used for communication.
- Cable 3 to RS485- B
- Cable 6 to RS485+ A

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



Step 5 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)



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.

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.

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.**

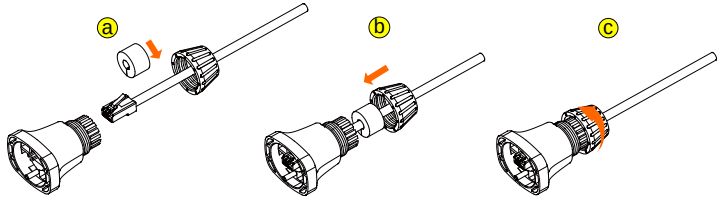
6.8.2 On the Inverter Side

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 using the T65 energy meter, for which 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 RS485 terminal on the bottom of the inverter. Make connector and RS485 terminal engage and rotate clockwise.

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

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.

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 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 Close the external AC circuit breaker.

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

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 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, and prevent it from being accidentally reconnected to the utility grid.

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.

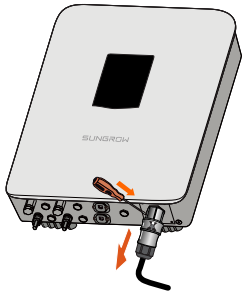
NOTICE

Please strictly 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 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 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

Once a fault occurs in the inverter, the fault information can 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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.
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 Service.

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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.
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 Service.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.
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 Service.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.

Fault code	Description	Check method
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 Service.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.
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 Service.
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 Service.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.

Fault code	Description	Check method
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 Service.
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 Service.
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 Service.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.

Fault code	Description	Check method
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 Service.
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.
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 Service.
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 Service.
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 Service.

Fault code	Description	Check method
074	Internal communication anomaly, A fault occurs in the internal communication module of the inverter.	Contact Sungrow Service.
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 Service.
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 Service.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.
088	Electric arc fault	
089	AFD disable alarm	
105	Protection self-check failure on grid side	Restart the inverter or clear the fault via the App. If the fault still exists, contact Sungrow Service.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service.
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 Service.

Fault code	Description	Check method
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service. *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 is not caused by the foregoing reasons and still exists, contact Sungrow Service. *The code 548 to code 563 are corresponding to string 1 to string 16 respectively.
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 is not caused by the foregoing reasons and still exists, contact Sungrow Service. *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 is not caused by the foregoing reasons and still exists, contact Sungrow Service. *The code 580 and 581 are corresponding to string 17 and string 18 respectively.

9.2 Maintenance

DANGER

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

Perform the following steps before starting any operations:

- **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 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 SunAccess APP

10.1 Introduction to the System

By establishing a communication connection between the SunAccess APP and the inverter through Bluetooth, the user can maintain the near end of the inverter via the APP. In addition, the user can check the running information, alarms, and events, set the parameters, download the logs, and update the firmware via the APP.

10.2 Acquire and install SunAccess APP

The SunAccess APP is available for both iOS system and Android system.

This manual takes the iOS version as an example to introduce the installation and use of SunAccess 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

- Requirements for operating system: iOS9.3 or later; or Android 5.1 or later
- Recommended iPhone models: iPhone5s and above
- Ensure that the phone has enough memory to install the app
- Sufficient battery power

10.2.2 Operation Steps

Step 1 Download the SunAccess APP installation package.

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

b) For Android: search for the SunAccess 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.

Alternatively, open the APP by tapping the its icon on the home screen

Fig. 10-1 App icon

- 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 SunAccess APP

In using the APP, make sure the phone is within 5m away from the inverter and there are no obstructions in between. The communication quality cannot be ensured otherwise.

Step 1 Open the APP, after which the Bluetooth search screen pops up automatically, and select the to-be-connected inverter according the SN on the nameplate of the inverter. The Bluetooth indicator is on once the connection is established..

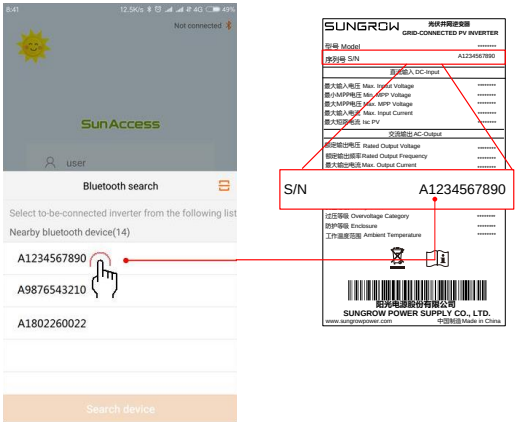


Fig. 10-2 Login

The S/N "A1234567890" is for reference only, and the actual SN may differ.

Step 2 Enter the login screen after the Bluetooth connection is established. The username is user and the password is 111111 by default. Tap the button 'Login', and enter the homepage.

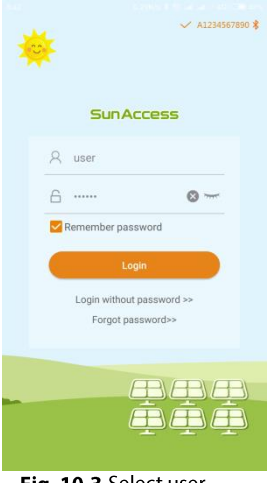


Fig. 10-3 Select user

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

Step 3 If the inverter is not initialized, you will enter the initialization protection parameter quick setting interface. After setting the quick setting interface, click "Boot" and the device will be initialized. The App will send start instructions and the device will start and operate.

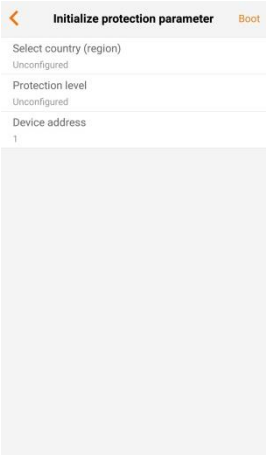


Fig. 10-4 Initialization protection parameter

System interfaces for different user types may be different. 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 indicates 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. Otherwise, faults may be caused.

If the inverter is initialized, the app automatically turns to its 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. 10-5.

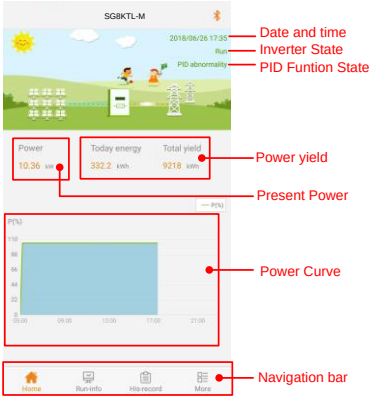


Fig. 10-5 Check the homepage info

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.

Tab. 10-1 Description of inverter state

State	Description
Run	After being energized, inverter tracks the PV arrays' maximum power point (MPP) and converts the DC power into AC power. This is the normal operation mode.
Stop	Inverter is stopped.
Initial standby	The inverter is in the initial power-on standby state
Standby	Inverter enters standby mode when DC side input is insufficient. In this mode inverter will wait within the standby duration.
Key-stop	Inverter will stop operation by manually "stop" via SunAccess app. In this way, inverter internal DSP stops. To restart the inverter, manually start via SunAccess app.
Starting	The inverter is initializing and synchronizing with the grid.
Derating running	The inverter derates actively due to environmental factors such as temperature or altitude
Fault	If a fault occurs, inverter will automatically stop operation, disconnect the AC relay. The fault information will be displayed in the SunAccess app. Once the fault is removed in recovery time, inverter will automatically resume running.
Warning	Warning information is detected.
Scheduling running	The inverter runs according to the scheduling instructions received from the monitoring background

Tab. 10-2 Description of PID function state

State	Description
PID recovery running	The inverters perform PID recovery actively.
PID protection running	The inverter is suppressing the PID effect.
PID abnormity	It is detected that the ISO impedance is abnormal or the PID function cannot work normally after the PID function enabled.
PID standby	The PID function is enabled, but regulation is not performed actually and no abnormity is detected.

10.5 Run Info

Step 1 Click the "Run-info" icon from the navigation bar.

Step 2 The run info includes the input, output, grid voltage, grid current, environment, and other info as shown in Fig. 10-6. You can swipe up and down to check the corresponding info.

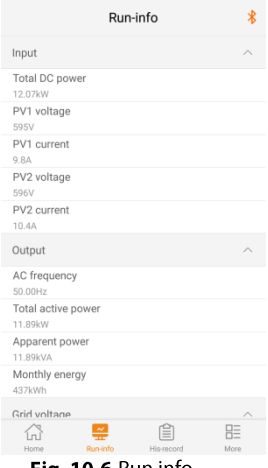


Fig. 10-6 Run info

Tab. 10-3 Description of Running Parameters

Parameter		Description
Input	Total DC power (KW)	The total PV input power
	PV1 voltage(V)	The PV1 input voltage
	PV1 current(A)	The PV1 input current
	PV2 voltage(V)	The PV2 input voltage

Parameter		Description
	PV2 current(A)	The PV2 input current
Output	AC frequency (Hz)	Gird frequency
	Total active power (kW)	-
	Apparent power(kVA)	-
	Monthly energy(kWh)	The energy generated in this month
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)	
	C phase current (A)	
Environment	Inner temperature (℃)	Internal temperature of the inverter
Others	Parallel resistance to the ground	DC bus negative voltage to ground
	Country information	Inverter selected country code
	Instruction information	Inverter selected command information

10.6 History Record

Click the "His-record" icon from the navigation bar to view the history record interface as shown in Fig. 10-7. You can check the alarm records, power yield records and event records.

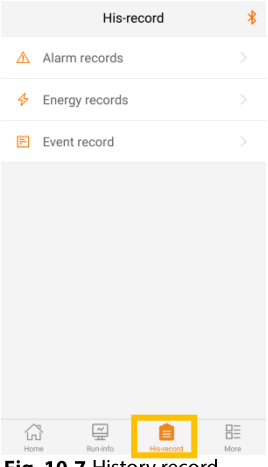


Fig. 10-7 History record

10.6.1 Alarm Records

Step 1 Click the "Alarm Records" to check the alarm records as shown in Fig. 10-8.

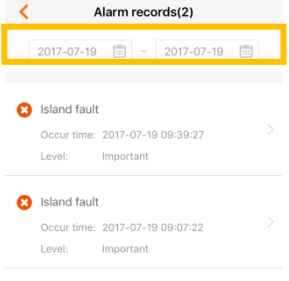


Fig. 10-8 Fault alarm records

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. 10-9.

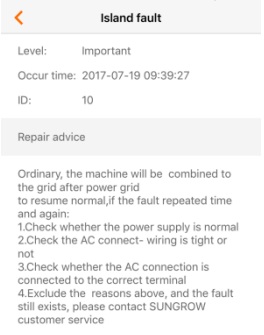


Fig. 10-9 Detailed fault alarm info

10.6.2 Energy Records

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

Tab. 10-4 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 the present power to the 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. 10-10.

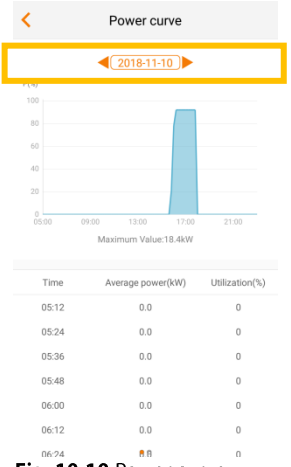


Fig. 10-10 Power curve

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. 10-11.

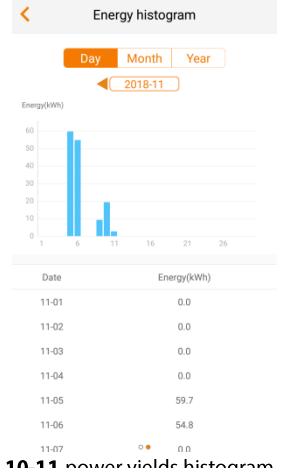


Fig. 10-11 power yields histogram

10.6.3 Event Record

Click the "Event record" to check the event record list as shown in Fig. 10-12.

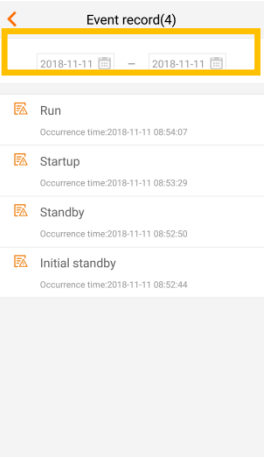


Fig. 10-12 Event record

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. 10-13. You can read and set the inverter parameters and upgrade the firmware from the "More" interface.

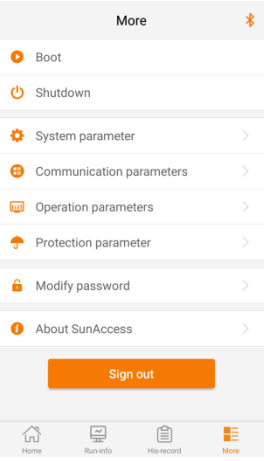


Fig. 10-13 More

10.7.1 Boot/Shutdown

Click "Boot/Shutdown" and click "Confirm" in the dialog box popped out to start or stop the inverter as shown in Fig. 10-14.

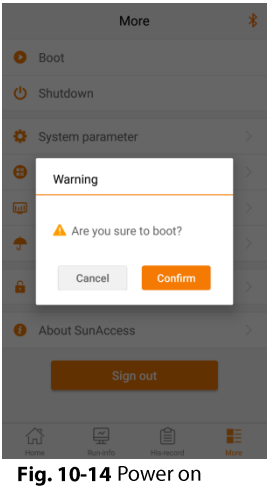


Fig. 10-14 Power on

10.7.2 System Parameter

Click the "System parameter" to check the system parameter info and set the related

parameters as shown in Fig. 10-15.

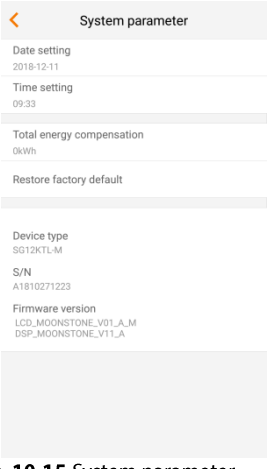


Fig. 10-15 System parameter

Tab. 10-5 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 enery 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 factory default	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 information	You can check: Device type, Serial number, and Firmware version

10.7.3 Communication Parameters

Click the "Communication parameters" to check the communication parameters and set the related parameters as shown in Fig. 10-16.

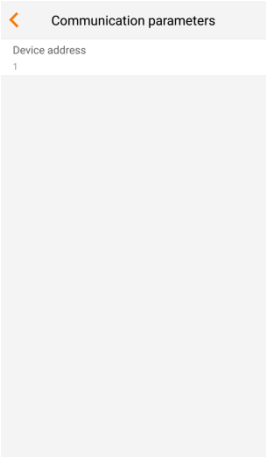


Fig. 10-16 Communication parameters

Tab. 10-6 Explanation of communication parameters

Parameter	Description
Device address	Range: 1 ~ 247

10.7.4 Operation Parameters

Click the "Operation parameters" to check the operation parameters and set the related parameters as shown in Fig. 10-17.

The operation parameters include the active & reactive power parameters.

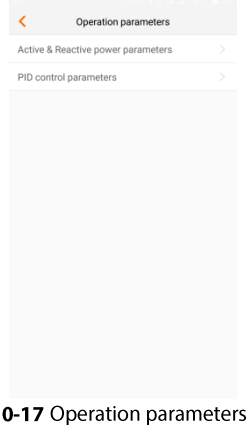


Fig. 10-17 Operation parameters

Active & reactive power parameters

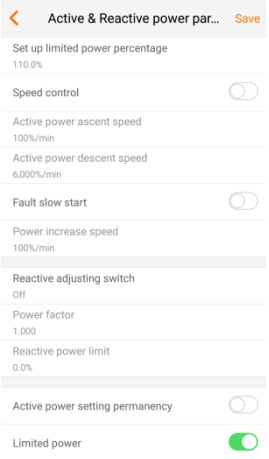


Fig. 10-18 Active & reactive power parameters

Tab. 10-7 Description of Active & reactive power parameters

Parameter	Description	Default	Range
Set up limited power percentage	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
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 option switch	-	[OFF]	[OFF]/ [Pf] [Qt] [Q(p)] [Q(u)]
Power factor	-	1.000	-1000~-800 800~1000(unit: 0.001)
Reactive power limit	Inverter reactive power limitation	0.0%	-100%~100%
Active power setting permanency	Set up whether to perpetually save the active power settings or not	[OFF]	[OFF]/ [ON]

Parameter	Description	Default	Range
Limited power	-	ON]	[OFF]/ [ON]
Reactive power setting permanency	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 option switch" parameter to activate this function and select proper regulation mode.

Tab. 10-8 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. 10-9 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%

Parameter	Description	Default	Range
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.

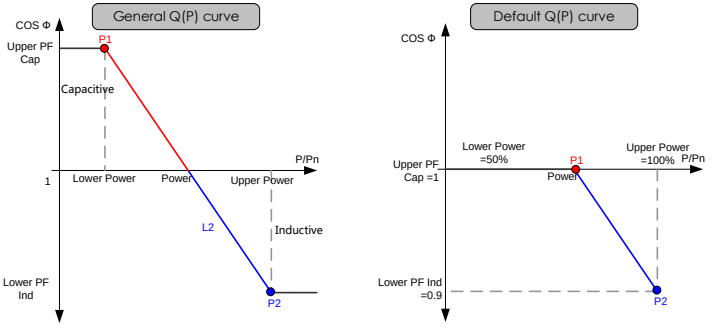


Fig. 10-19 Reactive Power Regulation Curve in Q(P) Mode

"Q(U)"Mode

The reactive power ratio changes with the grid voltage.

Tab. 10-10 "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 %	-

Parameter	Description	Default		Range	
		General region	Australia	General region	Australia
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.

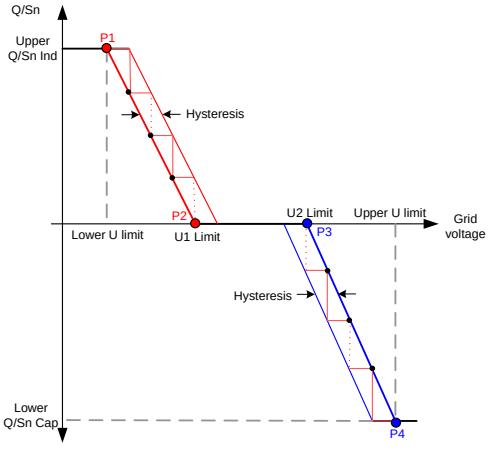


Fig. 10-20 Reactive Power Regulation Curve in Q(U) Mode

PID control parameter

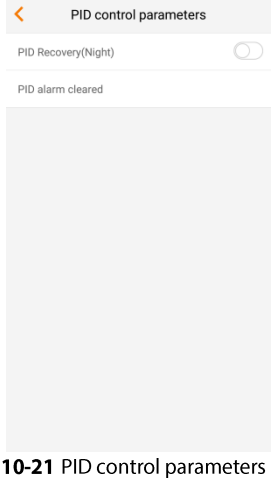


Fig. 10-21 PID control parameters

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.

Parameter	Description
PID alarm clearing	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.

10.7.5 Protection Parameter

Click the "Protection parameter" to check the protection parameter and set the related parameters as shown in 0.

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 log in with the account named "admin" and the default password is "111111".
- If the password is wrong, contact Sungrow to get the latest dynamic password.
- Unauthorized personnel are not allowed to log in with this account. Otherwise, Sungrow shall not be held liable for any damages caused.

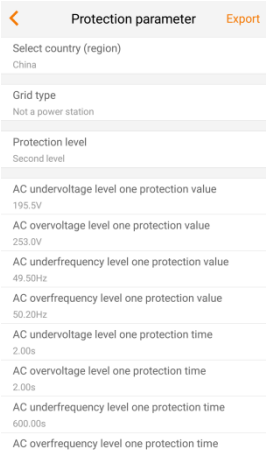


Fig. 10-22 Protection parameter

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. 10-11 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. 10-12 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
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

Parameter	Default	Range
AC under-frequency level two protection time	0.20s	0 ~ 600s
AC over-frequency level two protection time	0.20s	0 ~ 600s

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

Tab. 10-13 Description of protection recovery parameters

Parameter	Explanation
AC over-voltage recovery value	Max. protection recovery voltage
AC under-voltage recovery value	Min. protection recovery voltage
AC over-frequency recovery value	Max. protection recovery frequency
AC under-frequency recovery value	Min. protection recovery frequency

10.7.6 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.

Contact Sungrow to obtain the dynamic password before setting the feed-in limitation parameters.

Tap "Advanced Settings".

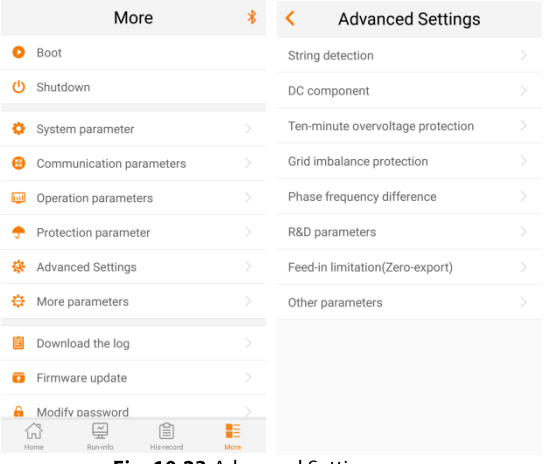


Fig. 10-23 Advanced Settings

Tap "Feed-in limitation (Zero-export)" to set the related parameters.

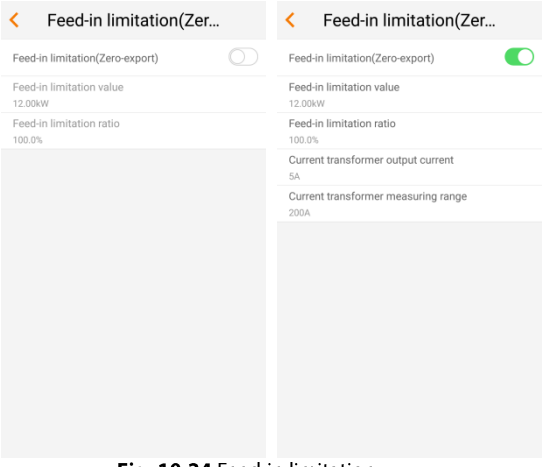


Fig. 10-24 Feed-in limitation

The feed-in limitation function is turned off by default, and the interface is shown in the left figure. Turn on the Feed-in limitation function, and the interface is shown in the right figure after refreshing.

Tab. 10-14 Description of feed-in limitation parameters (take SG12KTL-M as an example)

Parameter	Default value	Range
Feed-in limitation (Zero-export)	OFF	On/OFF
Feed-in limitation value	12.00KW	0~12.00KW
Feed-in limitation ratio	100.0%	0-100%
Current transformer output current*	5A	5A
Current transformer measuring range *	200A	1~10000A

Note: * only for DTSD1352-C energy meter.

10.7.7 Modify Password

Click the "Modify Password" to modify the password of the current account.

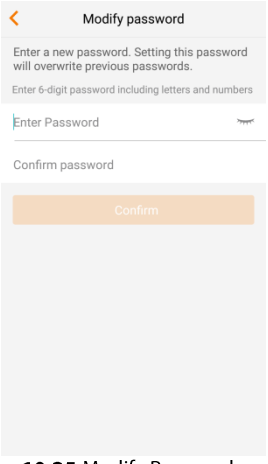


Fig. 10-25 Modify Password

10.7.8 About SunAccess

Click the "About SunAccess" to check the about interface as shown in Fig. 10-26.

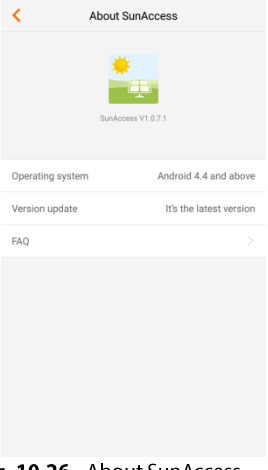


Fig. 10-26 About SunAccess

11 Appendix

11.1 Technical Data

Parameters	SG5KTL-MT	SG6KTL-MT	SG8KTL-M
Input (DC)			
Max. PV input voltage	1100V		
Min. PV input voltage / Startup input voltage	200V/250V		
Nominal input voltage	600V		
MPP voltage range	200~1000V		
MPP voltage range for nominal power	240~850V	290~850V	380~850V
No. of independent MPP inputs	2		
Max. number of PV strings per MPPT	1		
Max. PV input current	22A (11A / 11 A)		
Max. current for input connector	15A		
Max. DC short-circuit current	30A (15A / 15A)		
Max. inverter backfeed current to the array	0A		
Output (AC)			
AC output power	5500 W @ 35 ℃ / 5000 W @ 45 ℃	6600 W @ 35 ℃ / 6000 W @ 45 ℃	8800 W @ 35 ℃ / 8000 W @ 45 ℃
Max. AC output current	8.5A	10.0A	13.3A

Parameters	SG5KTL-MT	SG6KTL-MT	SG8KTL-M
Nominal AC voltage	3 / N / PE, 230 / 400 V		
AC voltage range	270 ~ 480V		
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 at nominal power	>0.99		
Adjustable power factor	0.8 leading ~ 0.8 lagging		
Feed-in phases / Connection phases	3/3		
Efficiency			
Max. efficiency	98.20%	98.40%	98.60%
Euro. efficiency	97.60%	97.70%	98.00%
Protection			
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*H*D)	370×485×160mm		
Weight	20kg		
Isolation method	Transformerless		

Parameters	SG5KTL-MT	SG6KTL-MT	SG8KTL-M
Degree of protection	IP65		
Night power consumption**	< 1 W		
Operating ambient temperature range	-25 ~ + 60 ℃ (> 45 ℃ derating)		
Allowable relative humidity range (non-condensing)	0 ~100 %		
Cooling method	Natural cooling		
Max. operating altitude	4000 m (> 3000 m derating)		
Display	LED, Bluetooth + APP		
Communication	RS485, (WiFi, E-Net optional)		
DC connection type	MC4 (Max. 6 mm²)		
AC connection type	Plug and play connector (Max. 6 mm²)		
Compliance	EN62109-1,EN62109-2,IEC61727,IEC62116,VDE0126-1-1/4105,AS4777.2,EN50438:2013,C10/11,G59/3	EN62109-1,EN62109-2,IEC61727,IEC62116,VDE0126-1-1/4105,EN50438:2013,C10/11 ,G59/3	EN62109-1,EN62109-2,IEC61727,IEC62116,VDE0126-1-1/4105,UTEC15-712-1,VFR-2014,CEI 0-21,EN50438:2013,C10/11,G59/3

* Devices for Australia are not equipped with DC switches.

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

Parameters	SG10KTL-M	SG12KTL-M
Input (DC)		
Max. PV input voltage	1100V	
Min. PV input voltage / Startup input voltage	200V/250V	
Nominal input voltage	600V	
MPP voltage range	200~1000V	
MPP voltage range for nominal power	470~850V	550~850V
No. of independent MPP inputs	2	
Max. number of PV strings per MPPT	1	

Parameters	SG10KTL-M	SG12KTL-M
Max. PV input current	22A (11A / 11 A)	
Max. current for input connector	15A	
Max. DC short-circuit current	30A (15A / 15A)	
Max. inverter backfeed current to the array	0A	
Output (AC)		
AC output power	10000VA*/11000 VA @35 ℃ / 10000 VA @ 45 ℃	13200VA @ 35 ℃ /12000 VA @ 45 ℃
Max. AC output current	16.5A	20A
Nominal AC voltage	3 / N / PE, 230 / 400 V	
AC voltage range	270 ~480V	
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 at nominal power	>0.99	
Adjustable power factor	0.8 leading ~ 0.8 lagging	
Feed-in phases / Connection phases	3/3	
Efficiency		
Max. efficiency	98.60%	
Euro. efficiency	98.10%	
Protection		
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*H*D)	370×485×160mm	
Weight	20kg	
Isolation method	Transformerless	
Degree of protection	IP65	
Night power consumption***	< 1 W	
Operating ambient	-25 ~ + 60 ℃ (> 45 ℃ derating)	

Parameters	SG10KTL-M SG12KTL-M
temperature range	
Allowable relative humidity range (non-condensing)	0 ~100 %
Cooling method	Natural cooling
Max. operating altitude	4000 m (> 3000 m derating)
Display	LED, Bluetooth + APP
Communication	RS485, (WiFi, E-Net optional)
DC connection type	MC4 (Max. 6 mm^2)
AC connection type	Plug and play connector (Max. 6 mm^2)
Compliance	EN 62109-1 , EN 62109-2 , EN 61000- 3- 11,EN 61000- 3- 12 , UTE C15- 712-1 , IEC 61727 , IEC 62116 , VDE0126- 1- 1 / 4105 , G59 / 3,AS 4777.2,IEC 60068,IEC 61683,EN 50530,CEI 0-21,UNE 206007-1

*Applicable to German.

**Devices for Australia are not equipped with DC switches.

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

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
- The fault or damage caused by using non-standard components or software or using components or software not from Sungrow

- 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 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

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